Appendix D

Submittals

SUBMITTAL CONTROL DOCUMENT
1250 DENNY WAY PROPERTY REMEDIAL ACTION
9/15/2014

No.	Spec Section	Description	PRE-WORK	PROGRESS	CLOSEOUT	Date Submitted	Date Returned	Action Taken	Remarks
1	32 62 16	Sheet Pile Contractor Qualifications	X						
2	00 72 00	Schedule of Values	X			12/16/2013	12/16/2013		
3	00 72 00	Preliminary CPM Schedule	X			12/16/2013	12/16/2013	NET	
4	00 72 00	Update CPM Schedule (Monthly)		X		Weekly	NA	NET	No SDRL Required
5	00 72 00	Statement of Intent to Pay Prevailing Wage	X			1/15/2014	1/22/2014	NET	
6	00 72 00	Final Project Record As Built Drawings			X				
7	00 73 00	List of Subcontractors and Major Suppliers	X			x	x	x	No Submittal required. Included in Plan of Operations
8	01 30 00	Excavation and Shoring Plan				x	x	x	No Submittal required. Included in Plan of Operations
9	01 30 00	Certified Hazardous Material Reports (Disposal Records)		X					
10	01 30 00	Schedule of Required Testing (Special Inspection)	X						
11	01 31 13.26	Site Security Plan	X			x	x	x	No Submittal required. Included in Plan of Operations
12	01 31 13.26	Bulkhead Construction Plan	X			12/18/2013	1/3/2014	NET	Satisfies saftey plan submittal No. 87. Also redundant with No. 82.
13	01 31 13.26	Plan of Operations	X			1/14/2014			
14	01 33 00	Designation of Superintendent	X			x	x	x	No Submittal required. Included in Plan of Operations
15	01 35 43	Environmental Protection Plan/SPCC Plan/Designation of Transporters and Disposal Facilities	X			12/16/2013	12/16/2013	NET	All three items identified are NET
16	01 33 00	Schedule of Submittals	X			12/16/2013	12/16/2013	NET	
17	01 33 00	Contractor Health and Safety Plan/Certification Of Worker Hazardous Material Training	X			12/16/2013	12/16/2013	MCNR	Update to include Ty's comments
17R1	01 33 00	SSHP Revision 1	X			1/17/2014	1/22/2014	NET	Ty's comments addressed
18	01 33 00	Designation of Competent Persons	X			X	X	X	No Submittal required. Included in Plan of Operations. Redundant with No. 22
19	01 33 00	Dewatering and Water Treatment Plan	X						
20	01 33 00	Contractor Quality Control Plan	X			12/16/2013	X	X	Not returned. Required additional information.
20	01 33 00	CQCP	X			1/20/2014	1/22/2014	NET	Ty's comments addressed.
21	01 33 00	Land Surveyor Qualifications	X			12/20/2013	1/8/2014	NET	
22	01 33 00	Identification of Competent Persons	X			X	X	X	No Submittal required. Included in Plan of Operations. Redundant with No. 18.
23	01 33 00	Analytical Laboratory Qualifications	X			1/7/2014	1/16/2014	MCNR	Require 2014 DOE letter of Accreditation
23.1		Analytical Laboratory Qualifications		X		2/19/2014	3/7/2014	NET	
24	01 33 00	Material Testing Laboratory Qualifications	X			1/21/2014	2/4/2014	NET	
25	01 33 00	Steel Sheet Pile Installation Inspector Qualifications	X			X	X	X	No Submittal required. KJ providing special inspection.
26	01 35 43	Imported Fill Material Analytical Testing				12/23/2013	1/9/2014	A&R, MCN	Submitted sieve, proctor, and chemical analysis. Item redundant. See submittals 75 - chemical and 73 - sieve/proctor
27	01 50 00	Dust Control Plan	X			X	X	X	No Submittal required. Included in Plan of Operations.
28	01 55 00	Traffic Control Plan	X			X	X	X	No Submittal required. Included in Plan of Operations.
29	01 57 13	Stormwater Pollution Prevention Plan (SWPPP)	X			1/17/2014	1/22/2014	NET	Includes TESC Plan
30	01 70 00	Operation and Maintenance Manuals			X				

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31	01 70 00	Spare Parts List			X				
32	01 70 00	Warranties			X				
33	02 41 00	Well Decommissioning Report		X		2/5/2014	3/7/2014	MCN	Report # is good but 3 reports don't say which MW was decommisioned
34	02 43 00	Structure Moving Plan	X			12/19/2013	23-Dec	NET	Asked for movers printed brochure if available.
35	02 81 00	Excavation, Transportation and Disposal Plan	X						
36	03 21 00	Reinforcement Steel Product Data		X					
37	03 21 00	Reinforcement Steel Shop Drawings		X					
38	03 21 00	Reinforcement Steel Mill Certs		X					
39	03 30 00	Concrete Product Data		X					
40	03 30 00	Concrete Formwork Product Data		X					
41	03 30 00	Concrete Shop Drawings		X					
42	03 30 00	Concrete Contractor Qualifications		X					
43	03 30 00	Concrete batch Plant Inspecton Record		X					
44	05 50 00	Misc. Metals Product Data		X					
45	05 50 00	Welder Certifications		X		1/21/2014	2/4/2014	NET	
46	05 50 00	Misc. Metals Shop Drawings		X					
47	06 10 00	Carpentry Product Data		X					
48	09 65 16.13	Linoleum Product Data		X					
49	09 91 00	Paint Product Data		X					
50	09 91 00	Paint Contractor Qualifications		X					
51	11 00 01	Misc. Equipment/Mechanical Product Data		X					
52	11 00 01	Misc. Equipment/Mechanical Shop Drawings		X					
53	11 00 01	Misc. Equipment/Mechanical Installation/Operation Manuals			X				
54	22 11 16	Water System Product Data		X					
55	22 11 16	Water System Shop Drawings		X					
56	22 11 16	Water System Testing and Disinfection Report		X					
57	22 11 16	Water System O&M Manuals			X				
58	22 13 19.13	Sanitary Sewer Piping Data		X					
59	22 13 29.99	Septic System Product Data		X					
60	22 13 29.99	Septic System Contractor Qualification/License		X					
61	22 13 29.99	Septic System Performance Test Results			X				
62	22 13 29.99	Septic System O&M Manuals			X				
63	22 13 29.99	Septic System Manufacturer Affidavit of Construction			X				
64	23 11 00	Fuel System Product Data		X					
65	23 11 00	Fuel System Contractor Qualifications/Certification		X					
66	23 11 00	Fuel System Shop Drawings		X					
67	23 11 00	Fuel System Test Reports			X				
68	23 11 00	Fuel System O&M Manuals			X				
69	26 00 00	Electrical Systems Product Data		X					
70	26 00 00	Electrical Systems O&M Manuals			X				
71	26 00 00	Electrical Systems As-built Drawings			X				

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No.	Spec Section	Description	PRE-WORK	PROGRESS	CLOSEOUT	Date Submitted	Date Returned	Action Taken	Remarks
72	31 20 00	Import Material Physical Samples		X					
73	31 20 00	Import Material Laboratory Testing Results		X		1/22/2014	1/23/2014	NET/MCN	Subgrade accepted, can be used as import fill if contractor chooses and accepts any increased costs.
74	31 20 00	Import Material In-Place Density Reports			X	2/12/2014	3/7/2014	NET	
75	31 20 00	Import Material Chemical Analysis		X		1/22/2014	2/4/2014	NET	
76	31 23 19	Dewatering and Water Treatment Plan	X			2/5/2014	3/7/2014	NET	
77	31 23 19	Water Treatment Analytical Results		X					
78	31 32 19	MSE Wall Product Data		X					
79	31 32 19	MSE Wall Shop Drawings		X					
80	31 32 19	MSE Design Calculations		X					
81	31 32 19	MSE Manufacturer On-site Representative Qualifications		X					
82	32 62 16	Bulkhead Construction Plan	X			X	X	X	No submittal required. Redundant with No. 12.
83	32 62 16	Bulkhead Shop Drawings	X			12/16/2013	12/16/2013	NET	
84	32 62 16	Sheet Pile Mill Certs	X			1/21/2014	1/22/2014	NET	
85	32 62 16	Sheet Pile Field Inspector Qualifications	X			X	X	X	No submittal required. KJ providing inspection. Redundant with No. 25
86	32 62 16	Sheet Pile Welder Certs	X			X	X	X	No submittal required. No structural sheet pile welding occurring.
87	32 62 16	Sheet Pile Installation Safety Plan	X			X	X	X	No submittal required. Redundant with No. 12.
88	32 62 16	Sheet Pile As-built Data			X				
89	32 62 16	Water Quality Protection and Monitoring Plan		X		12/31/2013	1/16/2014	MCN	Submittal No. changed from 93 submitted to No. 89.
90	32 70 00	Wetland Plant Source	X						
91	32 70 00	Wetland Plant Receipts			X				
92	32 70 00	Topsoil Product Data	X						
93	32 70 00	Topsoil Physical Sample		X					

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 18 December 2013
SERIAL NO.: 2
SPEC. REF.: 00 72 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 2
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		Glacier	Schedule of Values

Comment(s):

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **2**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**007200**	**32**	**Schedule of Values**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

GLACIER ENVIRONMENTAL SERVICES, INC.
PO Box 1097, Mukilteo, WA, 98275
SCHEDULE OF VALUES
WA STATE - Department of Ecology
Contract No. PW C1400123
Project: Cornet Bay Marina Remediation
200 Cornet Bay Road, Oak Harbor, Island County, WA
Progress Billing #1 through 12/15/13 Invoice #

Bid Item	Description	Unit	Unit Price	Contract Amount	TOTAL TO DATE Percent & Units Complete	TOTAL TO DATE Total Completed To Date	TOTAL TO DATE 5% Retainage	PRIOR BILLINGS Percent & Units Complete	PRIOR BILLINGS Previous Billings	PRIOR BILLINGS 5% Retainage	CURRENT BILLING Percent & Units Complete	CURRENT BILLING Current Billing	CURRENT BILLING 5% Retainage
	BASE BID SCHEDULE												
01	**GENERAL CONDITIONS and GENERAL REQUIREMENTS**			**231,725.00**									
1	MOBILIZATION/DEMOBILIZATION, BONDS, INSURANCE 5% of base bid	LS	148,600.90	148,600.90	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	DUMPSTER - monthly payment	6	$600.00	3,600.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
3	HEALTH & SAFETY - monthly payment	6	$4,500.00	27,000.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
4	TRAFFIC CONTROL - monthly payment	6	$1,200.00	7,200.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
5	TRENCH EXCAVATION & SAFETY - one payment	6	$0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
6	ECOLOGY and PROPERTY OWNER'S CONTAINERS monthly payment	LS	2,500.00	2,500.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
7	TEMPORARY EROSION & SEDIMENT CONTROLS - monthly payment	6	$5,000.00	30,000.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
8	PROJECT CLOSEOUT REQUIREMENTS one payment	LS	12,824.10	12,824.10	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
02	**PRELIMINARY CONSTRUCTION REQUIREMENTS**			**52,437.00**									
1	CONSTRUCTION ENTRANCES	LS	3,500.00	3,500.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	SITE SECURITY monthly payment	6	$850.00	5,100.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
3	PROTECT CONDUIT and CABLE	LS	250.00	250.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
4	DEMOLITION	LS	4,000.00	4,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
5	TEMPORARY ELECTRICAL POWER to the DOCKS	LS	15,078.00	15,078.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
6	TEMPORARY DOCK ACCESS	LS	14,000.00	14,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
7	FUEL PUMPING and REIMBUSEMENT	LS	2,625.00	2,625.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
8	DEMOLITION of UTILITIES	LS	2,000.00	2,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
9	MOVE CONTAINER and DEMOLISH FENCING and FOUNDATION	LS	1,500.00	1,500.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
10	REMOVE and STORE FISH CLEANING TROUGH and WEIGH SCALE	LS	750.00	750.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
11	REMOVE and STORE FLOWER POTS, FIRE PITS, and OTHER ITEMS ALONG the BULKHEAD	LS	1,000.00	1,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
12	DEMOLISH WESTERLY FLOATING DOCK SUPPORTS	LS	2,634.00	2,634.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
03	**STEEL SHEET PILE BULKHEAD WALL**			**617,000.00**									
1	STEEL SHEET PILE BULKHEAD WALL	LS	617,000.00	617,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
04	**SOILS REMEDIATION: EXCAVATION AND BACKFILL**			**1,500,000.00**									
1	STOCK PILE CLEAN and CONTAMINATED MATERIAL in SEPARATE PILES	LS	3,000.00	3,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	EXCAVATE UNCONTAMINATED SOIL and STOCKPILE (7000 CY)	LS	30,290.00	30,290.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
3	BACKFILL and COMPACT UNCONTAMINATED STOCKPILED MATERIAL (7000 CY)	LS	27,020.00	27,020.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
4	EXCAVATE CONTAMINATED SOIL and STOCKPILE (19300 tons)	LS	85,885.00	85,885.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
5	LOADOUT, HAUL, and DISPOSE of DEWATERED CONTAMINATED MATERIAL at the APPROVED DISPOSAL SITE (19300 tons)	LS	1,123,700.00	1,123,700.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
6	DEMOLISH and DISPOSE of EXISTING TIMBER BULKHEAD	LS	20,000.00	20,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
7	BACKFILL and COMPACT USING CLEAN IMPORTED MATERIAL (19300 tons)	LS	190,105.00	190,105.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
8	REINFORCED SOIL WALL	LS	20,000.00	20,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
05	**DEWATERING AND WATER TREATMENT**			**134,290.00**									
1	DEWATERING SYSTEM	LS	17,805.00	17,805.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	DEWATERING WATER TREATMENT SYSTEM	LS	116,485.00	116,485.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00

GLACIER ENVIRONMENTAL SERVICES, INC.
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SCHEDULE OF VALUES
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200 Cornet Bay Road, Oak Harbor, Island County, WA
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06	**MOVE EXISTING BUILDINGS**			**132,600.00**									
1	TEMPORARY RELOCATION of EXISTING BUILDINGS	LS	56,385.00	56,385.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	PLACE BUILDINGS on NEW FOUNDATIONS	LS	66,915.00	66,915.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
3	RESTORE STATE PARKS PROPERTY	LS	9,300.00	9,300.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
07	**BUILDING FOUNDATIONS**			**85,611.00**									
1	DEMOLISH BUILDING FOUNDATION	LS	2,200.00	2,200.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	CONSTRUCT BUILDING FOUNDATIONS and OTHER CONCRETE WORK	LS	77,411.00	77,411.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
3	RECONSTRUCT OTHER SMALL CONTAINER FACILITY on the WESTERLY SIDE of the SITE (WASTE OIL STORAGE)	LS	6,000.00	6,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
08	**WASTEWATER SYSTEM IMPROVEMENTS**			**14,130.00**									
1	CONSTRUCT the NEW SEPTIC TANK EFFLUENT PUMP SYSTEM	LS	14,130.00	14,130.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
09	**SITE FUEL DISTRIBUTION SYSTEM**			**31,700.00**									
1	REPLACE the EXISTING PROPANE TANKS	LS	6,700.00	6,700.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	DOUBLE CONTAINED FUEL PIPING	LS	25,000.00	25,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
10	**SITE IMPROVEMENTS**			**150,900.00**									
1	REINSTALL the FLOWER POTS, FIRE PITS, FISH CLEANING TROUGH, WEIGH SCALE and OTHER REMOVED ITEMS	LS	5,000.00	5,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
2	GUARD RAIL SYSTEM	LS	60,000.00	60,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
3	REPLACE ELECTRICAL, TELEPHONE, CABLE TV and OTHER WIRED SERVICES	LS	36,000.00	36,000.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
4	CONSTRUCT NEW DOCK ACCESS PLATFORMS	LS	14,500.00	14,500.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
5	CONSTRUCT NEW UNDERGROUND PIPING UTILITIES	LS	2,900.00	2,900.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
6	FINAL GRADING and CSTC PLACEMENT and COMPACTION	LS	32,500.00	32,500.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
11	**WETLAND MITIGATION**			**21,625.00**									
1	WETLAND MITIGATION	LS	21,625.00	21,625.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00
	SUB-TOTAL BASE BID			**2,972,018.00**	**0.00%**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**

GLACIER ENVIRONMENTAL SERVICES, INC.
PO Box 1097, Mukilteo, WA, 98275
SCHEDULE OF VALUES
WA STATE - Department of Ecology
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200 Cornet Bay Road, Oak Harbor, Island County, WA
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Bid Item	Description	Unit	Unit Price	Contract Amount	TOTAL TO DATE Percent & Units Complete	TOTAL TO DATE Total Completed To Date	TOTAL TO DATE 5% Retainage	PRIOR BILLINGS Percent & Units Complete	PRIOR BILLINGS Previous Billings	PRIOR BILLINGS 5% Retainage	CURRENT BILLING Percent & Units Complete	CURRENT BILLING Current Billing	CURRENT BILLING 5% Retainage
	UNIT PRICE BID SCHEDULE												
UB1	Excavate Uncontaminated Soil and Stockpile	CY	5.45	5.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UB2	Backfill and Compact Uncontaminated Material from Stockpile	CY	4.86	4.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UB3	Backfill and Compact Clean Imported Material	Ton	10.85	10.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UB4	Excavate Contaminated Soil and Stockpile	Ton	5.45	5.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UB5	Load, Transport and Dispose of Contaminated Soil	Ton	61.91	61.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUB-TOTAL UNIT PRICE BID					**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**
	TOTAL BID - BASE/UNIT PRICING					**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**
	WA State Sales Tax Location #1500 8.7%					**0.00**			**0.00**			**0.00**	
	GRAND TOTAL					**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**

TOTAL DUE THIS BILLING **$0.00**

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

Attention: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

Date: 16 December 2013
Serial No.: 03
Spec. Ref.: 00 73 00
Project: Cornet Bay Marina Remediation
K/J Job No.: 1396010.00
Submittal No.: 03
Page: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
A&R = Amend and Resubmit
NR/AR = Not Reviewed/Accepted for Record
MCN = Make Corrections Noted No Resubmittal Required
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	AR		Glacier	Preliminary Schedule

Comment(s):

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Distribution		SDRL	Encl.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **3**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**007300**	**3**	**Preliminary CPM Schedule**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

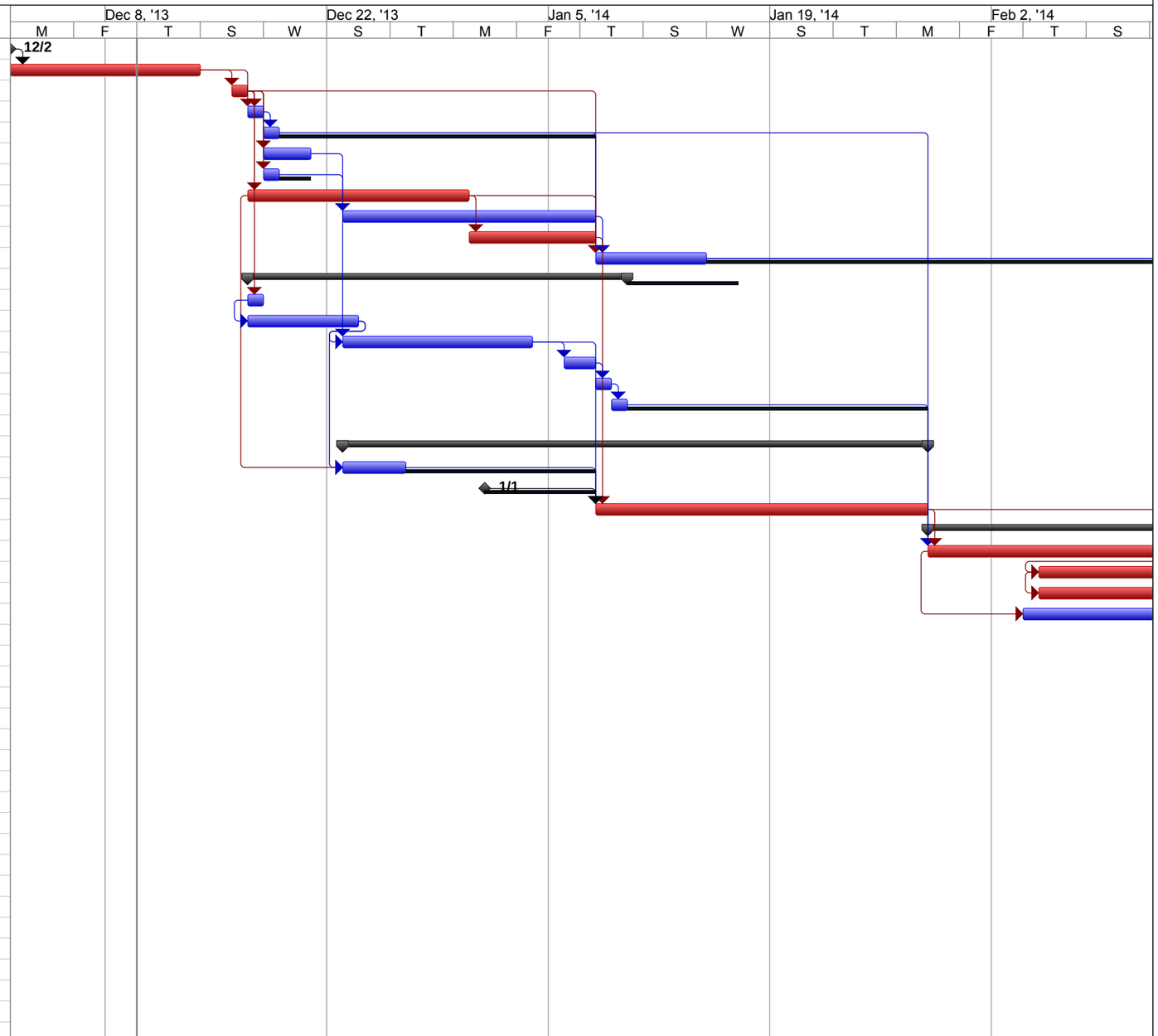
Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Department of Ecology
Cornet Bay Marina Remediation

ID	Task Name	Duration	Start	Finish	Predecessors
1	Notice to Proceed	0 days	Mon 12/2/13	Mon 12/2/13	
2	Pre-work Submittals (HASP, Operation Plan, etc.)	10 days	Mon 12/2/13	Fri 12/13/13	1
3	Mob	1 day	Mon 12/16/13	Mon 12/16/13	2
4	Pre-demo asbestos Inspection	1 day	Tue 12/17/13	Tue 12/17/13	2,3
5	Initial Survey	1 day	Wed 12/18/13	Wed 12/18/13	4
6	Office Trailer Setup	3 days	Wed 12/18/13	Fri 12/20/13	3
7	Move Fish Clean and Fire Pit Area to Storage	1 day	Wed 12/18/13	Wed 12/18/13	3
8	TESC-In Water Boom	9 days	Tue 12/17/13	Mon 12/30/13	3
9	Water Treatment System Setup	10 days	Mon 12/23/13	Tue 1/7/14	6
10	Dock Work-Floats-Gangways	5 days	Tue 12/31/13	Tue 1/7/14	8
11	Wetland Work	5 days	Wed 1/8/14	Tue 1/14/14	3,5,8,9
12	**Building Move/Demo**	**16 days**	**Tue 12/17/13**	**Thu 1/9/14**	
13	Move/Store Building Interior	1 day	Tue 12/17/13	Tue 12/17/13	3
14	Prep Building for Move	5 days	Tue 12/17/13	Mon 12/23/13	13SS
15	Move Building to Temporary Storage	8 days	Mon 12/23/13	Fri 1/3/14	14FS-1 day,7
16	Abatement	2 days	Mon 1/6/14	Tue 1/7/14	15
17	Survey Utility Stick-ups	1 day	Wed 1/8/14	Wed 1/8/14	16
18	Demo Foundation/Concrete Slabs	1 day	Thu 1/9/14	Thu 1/9/14	17
19	In Water Deadline	0 days	Fri 2/14/14	Fri 2/14/14	11,23
20	**Bulkhead Replacement**	**25 days**	**Mon 12/23/13**	**Tue 1/28/14**	
21	Sheet Pile Sub Mob	3 days	Mon 12/23/13	Thu 12/26/13	8SS,14FS-1 day
22	Steel Arrives	0 days	Wed 1/1/14	Wed 1/1/14	
23	Install Sheet Pile Wall	15 days	Wed 1/8/14	Tue 1/28/14	22,15FS-3 days,21,10
24	**Excavation/Backfill**	**35 days**	**Wed 1/29/14**	**Tue 3/18/14**	
25	Excavation and Stockpile	30 days	Wed 1/29/14	Tue 3/11/14	18,23,5
26	Import Backfill	30 days	Wed 2/5/14	Tue 3/18/14	25FS-25 days
27	Footing Drain and MSE Wall	30 days	Wed 2/5/14	Tue 3/18/14	26SS
28	Transport PCS for Treatment	30 days	Tue 2/4/14	Mon 3/17/14	25SS+4 days
29	**Building Restoration Activities**	**25 days?**	**Wed 3/19/14**	**Tue 4/22/14**	
30	Install Underslab Utilities	3 days	Wed 3/19/14	Fri 3/21/14	26
31	Form Pour New Foundation	2 days	Mon 3/24/14	Tue 3/25/14	30
32	Concrete Foundation Cure Time	5 days	Wed 3/26/14	Tue 4/1/14	31
33	Move Building Back to Original Location	4 days	Wed 4/2/14	Mon 4/7/14	32
34	Anchor/Patch/Restore Building	10 days	Tue 4/8/14	Mon 4/21/14	33
35	Move Building Contents Back	1 day?	Tue 4/22/14	Tue 4/22/14	34
36	Septic System Improvements	3 days	Tue 4/8/14	Thu 4/10/14	33
37	Restore Gas, Electric, Utilities to Building	5 days	Tue 4/8/14	Mon 4/14/14	33
38	**Site Restoration Activities**	**36 days**	**Wed 3/12/14**	**Wed 4/30/14**	
39	Restore Dock Sections	10 days	Wed 3/12/14	Tue 3/25/14	26FS-5 days
40	Fuel System Improvements	3 days	Wed 3/19/14	Fri 3/21/14	26,27
41	Bulkhead Concrete Cap	10 days	Wed 3/19/14	Tue 4/1/14	26,27
42	Concrete Slabs and Walkways	10 days	Wed 3/19/14	Tue 4/1/14	26,27
43	Stainless Railing	15 days	Wed 4/2/14	Tue 4/22/14	41,42
44	Place/Compact CSTC	5 days	Wed 4/23/14	Tue 4/29/14	26,43
45	Move Owner Outdoor features back	1 day	Wed 4/30/14	Wed 4/30/14	44,42
46	Wetland Work-Plantings	1 day	Wed 4/30/14	Wed 4/30/14	11,44
47					
48	**Closeout Milestones**	**5 days**	**Wed 4/30/14**	**Wed 5/7/14**	

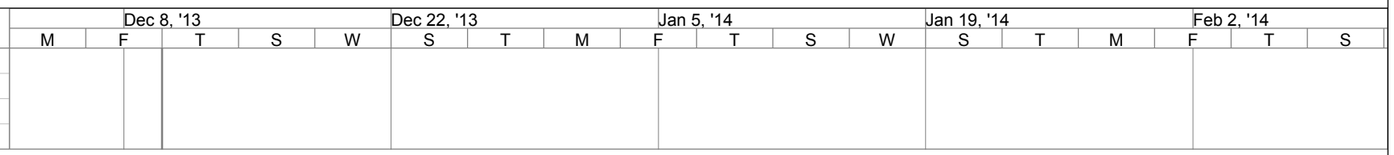


Glacier Environmental Services
Project: Preliminary Schedule
Date: Tue 12/10/13

Task	External Tasks	Manual Task	Finish-only	Slack
Split	External Milestone	Duration-only	Critical
Milestone	Inactive Task	Manual Summary Rollup	Critical Split
Summary	Inactive Milestone	Manual Summary	Progress
Project Summary	Inactive Summary	Start-only	Deadline

Department of Ecology
Cornet Bay Marina Remediation

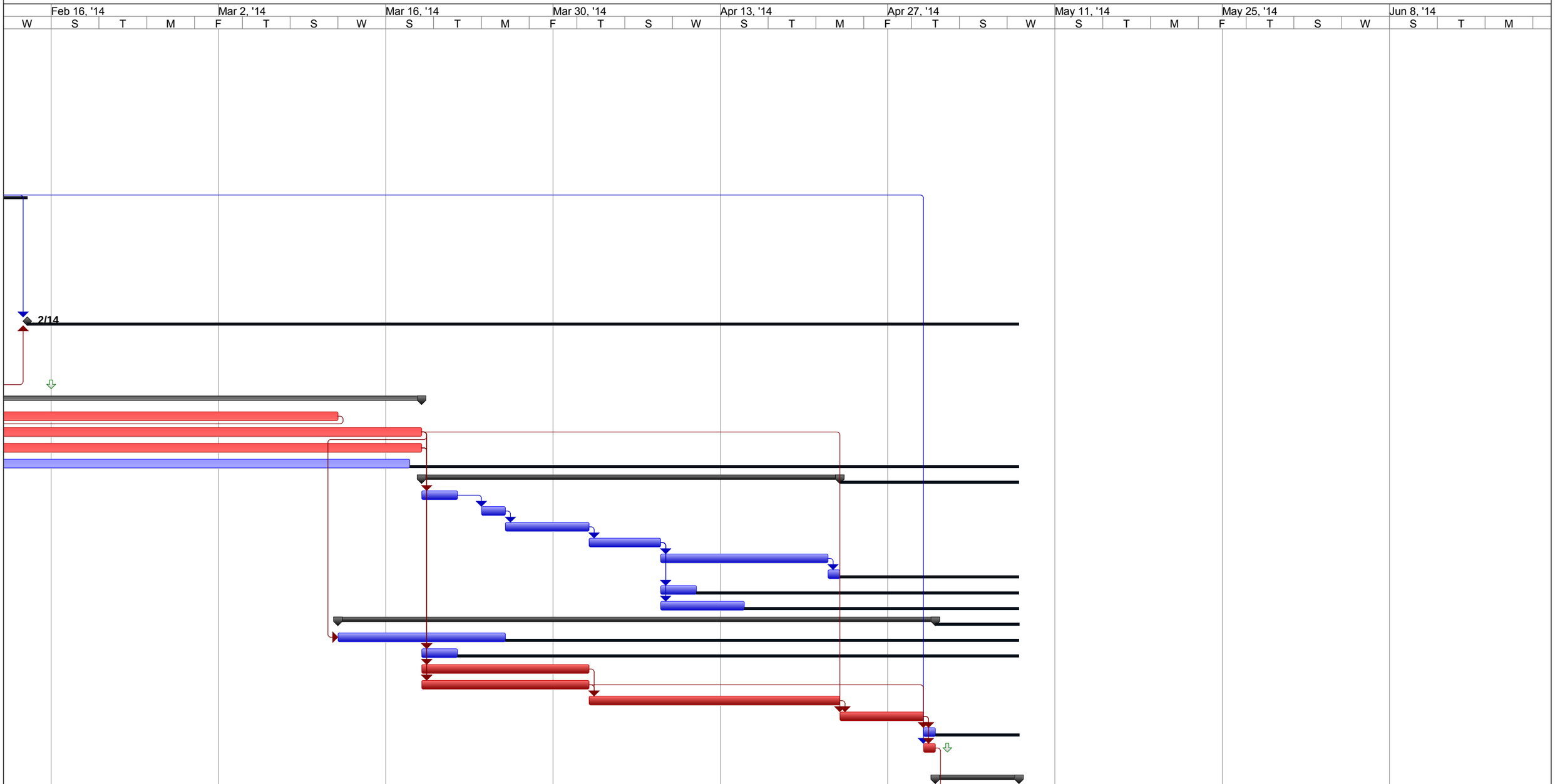
ID	Task Name	Duration	Start	Finish	Predecessors
49	Substantial Completion (150 dy)	0 days	Wed 4/30/14	Wed 4/30/14	46
50	Complete Punch List	5 days	Thu 5/1/14	Wed 5/7/14	49
51	Final Inspection	0 days	Wed 5/7/14	Wed 5/7/14	50
52	Final Completion	0 days	Wed 5/7/14	Wed 5/7/14	51



Glacier Environmental Services
Project: Preliminary Schedule
Date: Tue 12/10/13

Task	External Tasks	Manual Task	Finish-only	Slack
Split	External Milestone	Duration-only	Critical	
Milestone	Inactive Task	Manual Summary Rollup	Critical Split	
Summary	Inactive Milestone	Manual Summary	Progress	
Project Summary	Inactive Summary	Start-only	Deadline	

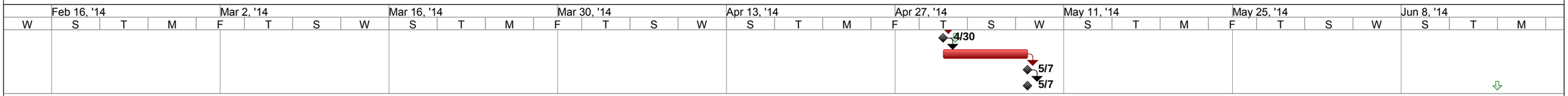
Department of Ecology
Cornet Bay Marina Remediation



Glacier Environmental Services
Project: Preliminary Schedule
Date: Tue 12/10/13

Task	External Tasks	Manual Task	Finish-only	Slack
Split	External Milestone	Duration-only	Critical
Milestone	Inactive Task	Manual Summary Rollup	Critical Split
Summary	Inactive Milestone	Manual Summary	Progress
Project Summary	Inactive Summary	Start-only	Deadline

Department of Ecology
Cornet Bay Marina Remediation



Glacier Environmental Services
Project: Preliminary Schedule
Date: Tue 12/10/13

Task	External Tasks	Manual Task	Finish-only	Slack
Split	External Milestone	Duration-only	Critical	
Milestone	Inactive Task	Manual Summary Rollup	Critical Split	
Summary	Inactive Milestone	Manual Summary	Progress	
Project Summary	Inactive Summary	Start-only	Deadline	

3 Week Look Ahead **12/16/2013**

		M	T	W	Th	Fr	Sat	Sun	M	T	W	Th	Fr	Sat	Sun	M	T	W	Th	F	Sat	Sun
Item	Task Name	12/16	12/17	12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	12/26	12/27	12/28	12/29	12/30	12/31	1/1	1/2	1/3	1/4	1/5
	Mobilization																					
	Private Utility Locate	X																				
	Septic Pump and Demo	X	X																			
	TESC and BMP setup		X	X	X																	
	Temp Fence		X																			
	Office Trailer Delivery and Setup			X	X	X																
	Building Contents Pack and Move			X																		
	Demo Out Buildings and Move Cooler and Conex				X	X																
	Demo and Brace Building for Move					X			X	X												
	Building Move									X		X	X			X	X		X	X		
	Temporary Dock Access Installation															X	X					
	Dawson Mobilization and Crane Inspection								X	X		X	X									
	Sheet Pile Delivery																X		X	X		
	Sheet Pile Installation																		X	X		

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 January 2014
SERIAL NO.: 05
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 05
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		Glacier	Statement of Intent to Pay Prevailing Wages

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **5**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/20/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**00 72 00**	**0 72 00-19**	**Statement of Intent to Pay Prevailing Wage**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Please note that subcontractors' Statement of Intent to Pay Prevailing Wage can be found at www.lni.wa.gov/

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

State of Washington
Department of Labor & Industries
Prevailing Wage Section - Telephone 360-902-5335
PO Box 44540, Olympia, WA 98504-4540

Statement of Intent to Pay Prevailing Wage

Document Received Date:	Intent ID:	Affidavit ID:	Status: Approved On
12/10/2013	607878		12/16/2013

Company Details

Company Name:	GLACIER ENVIRONMENTAL SRVC INC
Address:	~~4416 RUSSELL ROAD SUITE A~~ PO Box 1097 MUKILTEO, WA, 98275
Contractor Registration No.	GLACIES108C7
WA UBI Number	601225417
Phone Number	425-355-2826
Industrial Insurance Account ID	559,788-02
Email Address	jmerk@glacierenviro.com
Filed By	Merk, Jennifer

Prime Contractor

Company Name	GLACIER ENVIRONMENTAL SRVC INC
Contractor Registration No.	GLACIES108C7
WA UBI Number	601225417
Phone Number	425-355-2826

Project Information

Awarding Agency	ECOLOGY, WASH STATE DEPT OF PO BOX 47600 OLYMPIA, WA - 98504-4760
Awarding Agency Contact	Jing Liu
Awarding Agency Contact Phone Number	425-649-4310
Contract Number	C1400123
Project Name	Cornet Bay Marina Remediation
Contract Amount	$2,972,018.00
Bid due date	10/22/2013
Award Date	11/1/2013

Project Site Address or Directions	200 Cornet Bay Road, Oak Harbor, WA

Payment Details

Check Number:	
Transaction Id:	104165652

Intent Details

Expected project start date: (MM-DD-YYYY)	12/16/2013
In what county (or counties) will the work be performed?	Island
In what city (or nearest city) will the work be performed?	Oak Harbor
What is the estimated contract amount? **OR** is this a time and materials estimate?	$2,972,018.00
Will this project utilize American Recovery and Reinvestment Act (ARRA) funds?	No
Specifically, will this project utilize any weatherization or energy efficiency upgrade funds (ARRA or otherwise)?	No
Does your company intend to hire **ANY** subcontractors?	Yes
Does your company intend to hire subcontractors to perform **ALL** work?	No
Will your company have employees perform work on this project?	Yes
Do you intend to use any apprentices? (Apprentices are considered employees.)	No
How many owner/operators performing work on the project own 30% or more of the company?	0

Journey Level Wages

County	Trade	Occupation	Wage	Fringe	# Workers
Island	Laborers	General Laborer	$41.69	$0.00	1
Island	Laborers	General Laborer	$36.93	$4.76	3
Island	Laborers	Pipe Layer Lead	$42.99	$0.00	1
Island	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$53.49	$0.00	1
Island	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$48.73	$4.76	1
Island	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$53.00	$0.00	1
Island	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$48.24	$4.76	1
Island	Power Equipment Operators	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$52.58	$0.00	1

Island	Power Equipment Operators	Shovel , Excavator, Backhoe, Tractors Under 15 Metric Tons.	$47.82	$4.76	1
Island	Power Equipment Operators	Dozers D-9 & Under	$52.58	$0.00	1
Island	Power Equipment Operators	Dozers D-9 & Under	$47.82	$4.76	1
Island	Power Equipment Operators	Roller, Other Than Plant Mix	$50.22	$0.00	1
Island	Power Equipment Operators	Roller, Other Than Plant Mix	$45.46	$4.76	1
Island	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$53.00	$0.00	1
Island	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$48.24	$4.76	1
Island	Power Equipment Operators	Forklift: 3000 Lbs And Over With Attachments	$52.58	$0.00	1
Island	Power Equipment Operators	Forklift: 3000 Lbs And Over With Attachments	$47.82	$4.76	1
Island	Truck Drivers	Dump Truck And Trailer	$22.62	$0.00	1

Public Notes

⊟ Show/Hide Existing Notes

-- On 12/10/2013:--
Note our company mailing address is: PO Box 1097, Mukilteo, WA 98275
Our company physical address is: 3415 121st St SW, Lynnwood, WA 98087

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **12**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/18/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 31 13.26**	**5**	**Bulkhead Construction Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

Bulkhead Construction Plan

This plan has been prepared in a joint effort by Glacier and Dawson Pile Driving for the Cornet Bay Marina Remediation Project. This plan is intended to outline the specific means and methods for installation of the sheet pile wall per the project Plans and Specifications. The purpose of this plan is to identify the process for sheet pile installation for quality control, protection of property, and public safety.

Sheet Pile installation will be performed by Dawson Pile Driving, Inc., under the direct supervision of Glacier Environmental Services, Inc. Dawson Pile Driving, Inc. specializes in Marine Construction; qualifications and experience for Dawson were submitted and approved by Ecology prior to award.

Personnel

The Bulkhead will be installed by a three man crew, consisting of a crane operator, rigger, and pile buck. The following are Key Personnel for the project:

Richard Dawson (Owner/Vice President), has 53 years of experience in land and marine construction, including cranes, drop, vibratory, diesel, and air hammers, boom trucks, welding, and marine equipment operation. Licenses held: CDL, Aviation Pilot, and Certified Welder. First Aid and CPR Certified.

Jeff Carpenter (President), has 29 years of experience inland and marine construction, including pile drivers, wharf carpentry, drop, vibratory, diesel, air, and hydraulic hammers, and equipment operation. Licenses held: Certified Diver. First Aid and CPR Certified. Mr. Carpenter will be the designated company representative for Dawson while onsite.

Description of work

Equipment utilized will consist of an 80-ton crane truck, a 45-foot mobile sheet pile jig, an APE Model 150 Vibratory Driver Extractor, an APE Model 375 Power Unit, and a Delmag Model D19-42 Impact Hammer. Equipment specification sheets are attached.

The process of installation is as follows:

1) A sheet pile jig will be maneuvered into position along the shoreline for alignment during installation. The sheet pile jig (see attached drawing labeled "Jig to Line Sheet Pile") is constructed of 12-inch steel H beam affixed to a 45-foot semi trailer. It will be placed parallel to the edge of the existing bulkhead, with the outside edge placed at the proposed location of the sheet pile wall. The exact location will be determined via

surveyed offsets, located every 100 feet along the shore line. Once in place, the jig will loaded with extra weight for additional stability.

2) The APE Model 150 Vibratory Driver Extractor will be attached to the 80 ton crane, and will be used to pick up, and place the individual sheet piles into alignment along the jig. The Model 150 will clamp onto the sheets with 102 tons of force, and will safely suspend, slide together, and align the sheets using the edge of the jig as a guide. To ensure precise alignment, and to prevent any movement, each piece of sheet piling will be tack welded to the jig before being released from the crane.
3) Once aligned and attached to the jig, the sheet piles will be driven to plan elevation with the vibrator hammer. While the piling is typically driven in pairs, this is up to change depending on site conditions. If any difficulty is encountered in driving the piling to plan depth, the Delmag Model D19-42 will be used provide extra driving force. In the event that piles are driven to practical refusal, and cannot be driven to plan tip elevation, the portion remaining above plan elevation will be cut off.
4) Once the piling has been installed along the length of the jig, it will be moved forward, and the process will continue as described above. It is anticipated that 40 lineal feet of piling will be installed per day.

Glacier Environmental, Inc. is focused on completing work in a safe and professional manner, and takes every precaution possible to ensure the protection of the environment and surrounding property.

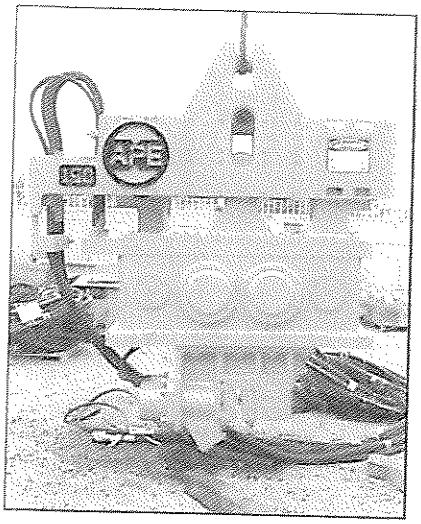
Preventative measures will be taken to ensure that there is no possibility of any damage occurring to the public property at the marina. As sheet pile installation progresses to the east, Glacier will coordinate with the marina owner/management to remove all public boats from the first lateral dock (all the way to the south, running east to west). This will provide a large enough envelope around the work area to prevent the possibility of any of the boats from being hit in the highly unlikely event that sheet piling were to tip over during transit or installation.

To ensure public safety during sheet pile installation, an alternate dock access will be provided at the west side of the marina, with temporary floating dock placed as shown on drawing S9. The method described above of using the jig to temporarily position the piles, reduces the possibility of losing grip on a pile to the time when it is being lifted and positioned. During this process, we will ensure the surrounding area and the first lateral dock is free from pedestrians.

A siltation barrier, along with a floating oil absorbent boom, will be utilized to contain any debris or oil released during the installation process. This boom will be attached to the silt fence barrier at the shore line at both sides of the work area. A boat will be in ready at all times to retrieve debris from the water.

APE Model 150 Vibratory Driver Extractor

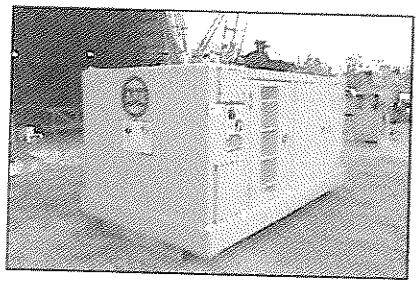
The Worlds Largest Provider of Foundation Construction Equipment



SPECIFICATIONS	DATA
Eccentric Moment	2200 in-lb (25.35 kgm)
Drive Force	102 tons (907.44 kN)
Frequency Maximum (VPM)	0 - 1800 vpm
Max Line Pull	80 tons (711.72 kN)
Suspended Weight w/o Clamp	8500 lbs (3855.54 kg)
Throat Width	14.25 in (36.2 cm)
Length	88.75 in (225.42 cm)
Height w/o Clamp	72.375 in (183.83 cm)

APE Model 375 Power Unit

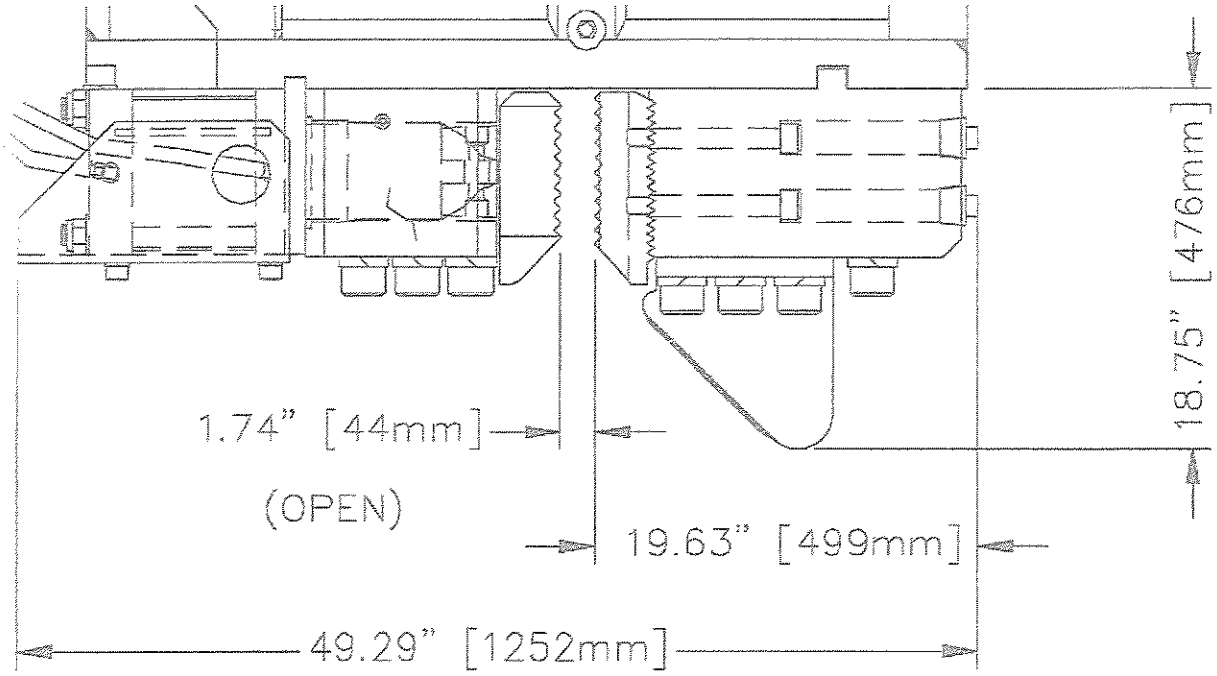
SPECIFICATIONS	DATA
Engine Type	Caterpillar C9 Tier III
Horse Power	375 HP (510.2 kW)
Drive Pressure	0 - 5000 psi (344.74 bar)
Drive Flow	120 gpm (31.7 lpm)
Clamp Pressure	Consult Factory
Clamp Flow	Consult Factory
Speed	Consult Factory
Weight	12600 lbs (5715.26 kg)
Length	126.5 in (321.31 cm)
Width	68.5 in (173.99 cm)
Height	82 in (208.28 cm)
Hydraulic Reservoir	Consult Factory
Fuel Capacity	Consult Factory

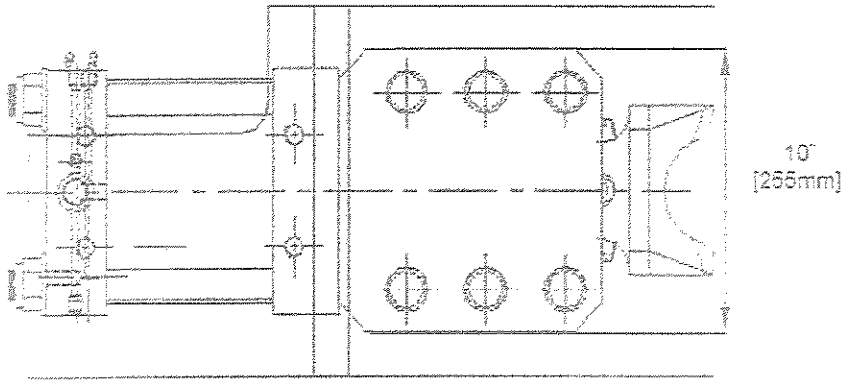


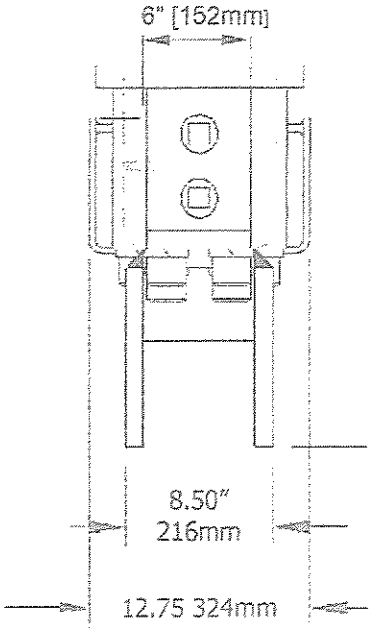
Corporate Offices
7032 South 196th
Kent, Washington 98032
Phone:(800) 248-8498 **Fax:** (253) 872-8710
Webstie: www.apevibro.com
E-mail: webmaster@apevibro.com

Model 14 Universal Clamp

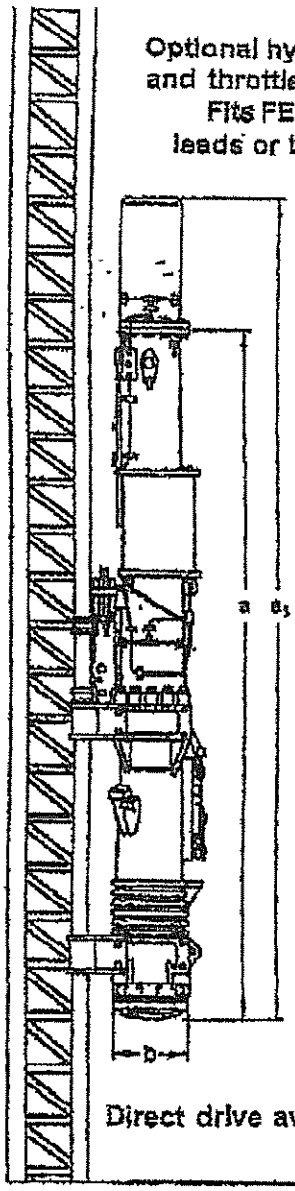
- Part No. 810216
- Used on Models 11, 14 & 14C vibrators (Called 11-23 & 14-23 prior to Jun 07)
- Used on Model 14C serial numbers V14001-V14005
- Clamping force – 85 tons at 4500 psi, 765 kN at 310 bar
- Weight – 866 lb, 393 kg
- Serial number location – Same serial number as vibrator (see vibrator serial number plate)





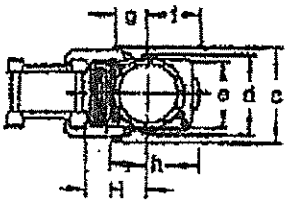


DELMAG



Optional hydraulic trip and throttle available. Fits FEC tube leads or box type.

Direct drive available



MODEL D19-42 (1.9 metric ton ram)

SPECIFICATIONS

Maximum Rated energy	42,800 ft-lbs
Minimum rated energy	16,000 ft-lbs
Stroke at rated energy	10 feet 2 inches
Maximum obtainable stroke	10 feet 3 inches
Speed (blows per minute)	37-83

WEIGHTS

Ram	4190 lbs
Anvil	754 lbs
Hammer weight (includes trip device)	7,800 lbs
Typical operating (weight with drive cap)	9,800 lbs

CAPACITIES

Fuel tank (runs on diesel or bio -diesel)	8.5 gal
Oil tank	2.4 gal

CONSUMPTION

Diesel or Bio-diesel fuel	1.5 gal/hr
Lubrication	2.4 gal/hr
Grease	twice per day

DIMENSIONS OF HAMMER

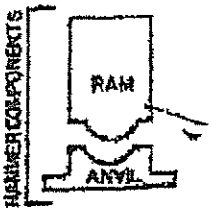
a_1	Length overall	186.2 inches
a	Length over cylinder extension	219. 3 inches
b	Impact block diameter	17.3 inches
c	Width over bolts	22 inches
d	Hammer width overall	19 inches
e	Width for guiding- face to face	12.5 inches
f	Hammer center to pump guard	13.5 inches
g	Hammer center to bolt center	13.6 inches
h	hammer depth overall	28.2 inches
H	Minimum clearance for leads	14.2 inches

® PILECO, INC.
P.O. Box 18099, Houston, TX 77222
phone: 713-691-3000 toll free: 1-800-474-6828
fax: 713-691-0089 e-mail: pileco@pileco.com

PILE AND DRIVING EQUIPMENT DATA FORM

ntract No.: _____

Contractor: _____



HAMMER

Manufacturer: DELMAG Model: D19-42 / D19-42

Type: Diesel Serial No.: BAB

Rated Energy: 42,800 @ 10.21' Length of Stroke

Explosive Force: 452 102

(For diesel hammers)

RAM

Ram Weight: 4,190# Ram Length 128.74"

(For diesel hammers)

Ram Gross Sectional Area: 12.6"

ANVIL

(With diesel hammers) Anvil Weight: 755#

Material: CONCRETE / ALUM Area 14"

CAPBLOCK

Thickness: 8" Modulus of Elasticity - E 540 KIP (P.S.I.)

Coefficient of Restitution - e 0.25

PILE CAP

Helmet
Bonnet
Anvil Block
Driveheed

= Weight: 1550#

CUSHION

Cushion Material: _____ Area: _____

Thickness: _____

Modulus of Elasticity - E _____ (P.S.I.)

Coefficient of Restitution - e _____

PILE

Type: _____

Pile Steel Length (in Leads) = _____

Diameter = _____

Wall Thickness: _____ Taper: _____

Material _____ Weight/Ft: _____

Design Pile Capacity: _____ (Tons)

Description of Splices: _____

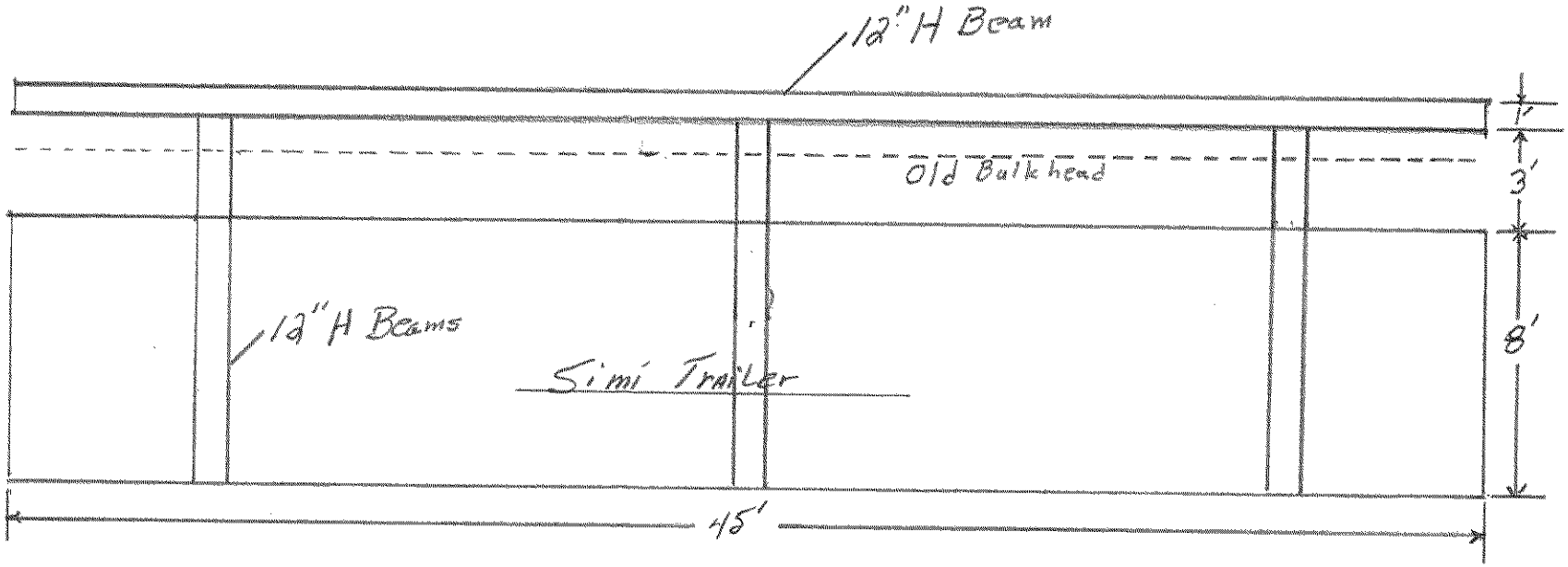
Tip Treatment Description: _____

NOTE: If sandrock is used to drive the pile, attach separate manufacturer's detail sheet(s) including weight and dimensions.

Submitted By: _____ Dated: _____

Jig to Line sheet pile
Can be ajusted to old Bulkhead
Will load extra weight on Trailer to make it stable

Dawson Pile Driving
Cornet Bay Bulkhead



SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **13**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/14/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**1 31 13.26**	**5**	**Plan of Operation**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

PLAN OF OPERATIONS

CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

Prepared by:

Glacier Environmental Services, Inc.
PO Box 1075
Mukilteo, WA 98275

Prepared for:

DEPARTMENT OF
ECOLOGY
State of Washington

November 2013

TABLE OF CONTENTS

1.0 INTRODUCTION

This document presents the work to be performed by Glacier Environmental Services, Inc. (Glacier) under Contract Agreement with Department of Ecology (DOE) for the remediation of contaminated materials at the Cornet Bay Marina Site in Oak Harbor, Washington.

The general tasks necessary to complete the work include, but are not limited to the following:

- Site preparation including installing temporary facilities and site controls, installing temporary erosion and sedimentation controls, protecting or re-routing of existing utilities;
- Construction of a new steel sheet pile bulkhead to replace the existing end-of-life wooden bulkhead;
- Lift the marina building from its foundation and move to the nearby State Park, demolish its foundation and all other concrete slabs, to allow excavation to occur.
- Excavate and stockpile clean overburden for resuse as backfill onsite
- Excavate to the depths required to reach clean soil as determined by testing of the excavation sidewalls and bottom.
- Assist the Engineer in collection of samples;
- During excavation, cutoff existing wooden bulkhead piles at the bulkhead water- side mud line. Remove and properly dispose of bulkhead construction materials offsite;
- Backfill excavations with clean imported fill material or stockpiled clean overburden material at Ecology's direction.
- Design and construct a new foundation for the Marina Building, complete other site improvements shall to return the marina to its original preconstruction condition;
- Install a new septic tank effluent pumping system connected to the existing mound on-site sewage system.

The general location of the work is shown on Sheet G1 of the project drawings.

This Operations Plan describes the methods, personnel, equipment and materials to be used by Glacier in the execution of the work. It is intended to meet the submittal requirements of Section 01 33 00 Paragraph 1.04 of the project specifications.

2.0 BACKGROUND

The Cornet Bay Marina Site is located at 200 Cornet Bay Road in Oak Harbor on Whidbey Island. It is bounded on the west by Cornet Bay; on the east by Cornet Bay Road, mixed residential homes, and light commercial land uses. Deception Pass State Park is immediately adjacent to the northeast of the Site. The marina was constructed in the 1960s and has been operated as a marina and general store since then. The Site, which covers approximately 1.1 acres of upland property, includes a store building, a gravel parking lot, and a 330-foot-long aging wooden bulkhead that separates the upland facility from the marina. Fuel is provided to boats via a vaulted underground storage tank.

Previous earthquake severed fuel lines supplying gasoline and diesel fuels to the dock fueling stations, contaminated most of the marina area with fuel product.

Soil and groundwater has been contaminated by petroleum from several fuel line releases. Contamination has been spread almost across the entire property over the years. The known contaminants in soil and groundwater include:

- Gasoline;
- Diesel fuel;
- Benzene, toluene, ethyl benzene, xylene (BTEX).

The objective of this project is to excavate, load and transport as much Gasoline, Diesel and BTEX impacted soil as is practical for legal off-site disposal. To facilitate the excavation and removal of the contaminated material to the depths required, the existing marina building will be moved from its foundation to the nearby State Park, the foundation demolished, and other site items demolished to allow excavation to occur. An approximate 350-foot steel sheet pile wall will be installed to replace the existing end-of-life wooden bulkhead. Impacted groundwater will be pumped, treated and discharged to Cornet Bay to facilitate excavation and backfill.

3.0 ORGANIZATION

Excluding DOE and its representatives, all major team members are identified below.

Glacier Environmental Services, Inc. (Glacier) will be responsible for all onsite construction activities to include, temporary facilities, temporary sediment and erosion control, protecting and or rerouting of existing utilities, new steel sheet pile bulkhead, moving and replacing marina building, demolition and reconstruction of building foundations and concrete slabs, surveying, wetland mitigation, site excavation, soil stockpiling, dewatering and water treatment, placement and compaction of clean and impacted soil, and site restoration. At the conclusion of the fieldwork, Glacier will prepare an as built drawing of the project site.

Glacier's qualifications to perform the work include over 20 years of experience in contaminated site cleanup for government, private industry, and the environmental consulting community.

All Glacier field personnel have a minimum of 40 hours Hazardous Waste Operations and Emergency Response training as defined by 29 CFR 1910.120 and three days of field experience under the supervision of a trained, experienced supervisor. In addition they have 8-hour refresher training each year.

Under Glacier's medical surveillance program, each field employee receives a baseline and annual physical examination to ensure that he or she is physically able to perform the work and that no physical condition or disease would be aggravated by exposure to the identified hazards.

Copies of training certificates and medical clearance letters for Glacier and subcontracted personnel are included in the approved Site Safety and Health Plan (SSHP).

In addition, all field employees are required to participate in Glacier's mandatory Anti-drug and Alcohol Misuse Prevention program as a condition of employment. The plans subject new employees to pre-employment testing, and existing field personnel to random testing for alcohol and controlled substances. The plans meet all requirements set forth in 49 CFR 199 and the Department of Transportation, Procedures for Transportation Drug Testing Programs as set forth in 49 CFR Part 40.

3.1 Key Personnel

Lauren Golembiewski will act as the Project Manager. Ms. Golembiewski has over 12 years of Project Management experience on government and private industry projects including underground utilities, storage tank removal and site cleanup, large waste disposal operations, spill prevention/control, storm water pollution prevention, and emergency spill response. She will continually monitor the progress of the project team; allocate all necessary resources and ensure that all communications, interactions, and liaison between Department of Ecology, Kennedy Jenks and the project team are fully developed and maintained.

Alan Hall will be the onsite Project Superintendent and Site Safety and Health Officer (SSHO). Mr. Hall has more than 20 years field and site management experience on government and private projects doing environmental, petroleum, chemical and hazardous waste, cleanup and remediation activities. He has worked closely with EPA, START, USCG, and state officials on a variety of EPA Superfund and CERCLA removal sites. As a Manager, he has experience in directing a wide range of personnel on environmental projects involving excavation, industrial cleaning, building decontamination and demolition, tank cleaning and removals, treatment cell construction, transportation and disposal of hazardous waste, mine reclamation and groundwater remediation systems. Mr. Hall's responsibilities also include project estimating, development and implementation of health and safety plans, development and implementation of Stormwater Pollution Prevention Plans (SWPPP), project cost estimates, project schedules, onsite cost tracking, procurement, subcontractor oversight, and interface with clients.

Eric Hay will act as Glacier's QA/QC officer responsible for implementing our Quality Control Plan. Eric has been part of the Glacier team for the past 8 years while continuing his education. He has experience in the field in many areas of construction. His diverse trade knowledge and organizational skills lend him

perfectly to his assigned role for this project. He will be onsite in Cornet Bay and responsible for submittals, RFI correspondence, and Quality Control Inspections.

Martin "Pat" Boggs and David Hanka are designated Excavation & Trenching Competent Persons. Pat will act as the crew foreman, responsible for direction of Glacier's field crew. David is our lead heavy equipment operator.

Equipment Operators, Laborers In addition to the personnel named above, Glacier will mobilize to the site eight to twelve other craft labor personnel including power equipment operators and laborers.

3.2 Major Subcontractors/Service Providers

Dawson Pile Driving Inc. of Lake Stevens, Washington will provide and install the approximately 340 feet of steel sheet pile. A Bulkhead Construction Plan has been submitted under separate cover.

Whatcom House Movers of Bellingham, Washington will raise existing marina building and move to park area then replace when excavation and restoration is complete. A Structure Moving Plan has been submitted under separate cover.

In addition, Glacier will subcontract the following trades: land surveying, electrical, materials testing services, carpenters, metal fabrication and trucking.

Concrete Nor'west of Oak Harbor, Washington will supply aggregate and concrete for backfill and restoration.

CEMEX of Everett, Washington will be the permitted and DOE approved soil disposal facility.

4.0 PROJECT WORKPLAN

The following Workplan outlines the proposed sequence and construction methods that will be used to complete the project. However, during construction it may be necessary to adjust or revise our schedule or construction methods to comply with unknown onsite conditions.

4.1 General

All work at the site will be conducted in accordance with applicable state and federal regulations, the project specifications, and Glacier's approved Site Safety and Health Plan (SSHP).

Following the approval of this plan and other pre-construction submittals, Glacier will mobilize the necessary manpower, equipment and materials to the site to begin work. The duration of the site work is estimated to be 150 working days and is scheduled to begin in December 2013.

Glacier will mobilize a crew of up to twelve personnel; including Project Manager, Project Superintendent, Health and Safety Manager, equipment operators, and laborers.

Prior to any construction activities Glacier will complete a one call and private utilities locate of the work site. All existing overhead and underground utilities will be clearly marked, protected or disconnected during construction.

4.2 Mobilization

It is anticipated that the following Glacier and subcontracted equipment will be mobilized to complete the soil remediation and construction on this project. Mobilization to the site is scheduled to begin on December 16, 2013:

- Two-Office Trailer (10X 42 ft)
- Storage Container (8x20 ft)
- Service Vehicles (2)
- Temporary Fencing & Barricades
- Tracked Excavator (80,000 lbs)
- Tracked Excavator (50,000 lbs)
- 650 Crawler Tractors (Dozer)
- Compactors (plate & roller)
- 3 yard wheel loader
- 80 ton Truck Crane
- Dump Trucks
- Miscellaneous Hand Tools
- Personal Protective Equipment (PPE)
- All Terrain Fork Lift
- Portable Generators
- Air Monitoring Equipment
- Spill Contingency Equipment

4.3 Preconstruction Safety Conference

A preconstruction safety meeting will be held at the site prior to beginning of site work. The meeting will be conducted by the Site Safety and Health Officer (SSHO), and attended by the Project Superintendent and all Glacier and applicable subcontractor personnel.

4.4 Site Security, Temporary Facilities and Erosion Control

Prior to commencement of work, Glacier will install a six-foot tall temporary chain link fence with three gates to control access to the site, construct a project lay down and soil staging area. Temporary dock access and a 10 foot wide walkway will be established prior to removal of existing dock accesses. Mobile offices will be provided for the Glacier crew, engineers and Ecology. Temporary erosion and sediment BMP's will be provided and installed in accordance with the Erosion Control Plan.

4.5 Spill Contingency

During all work, Glacier will maintain a ready supply of spill cleanup equipment to include 3M Type 156 absorbent pads, 3-40 pound bag of granular absorbent (kitty litter), nitrile gloves and poly spill bags.

4.6 Marina Building

Glacier or their subcontractors will disconnect all utilities, remove all items/ freezers/ refrigerators/ merchandise from inside building, remove all items/freezers from exterior of the building, brace all interior areas needed for move, and disconnect building walls from existing foundation.

Whatcom House Movers will then raise the building, place moving equipment underneath, move to holding area northeast of existing site outside the excavation area. A Structure Moving Plan has been submitted under separate cover.

4.7 Concrete and Foundation

After the building is moved Glacier will survey all existing foundations and slabs for reconstruction. Using a hydraulic breaker and an excavator Glacier will demolish, stockpile and load out all concrete from foundations and slabs to Concrete Nor'West for recycling

4.8 Bulkhead Sheet Pile Wall

Dawson Pile Driving will install the Steel Bulkhead per the Bulkhead construction Plan submitted under separate cover. The bulkhead will be installed from West to East. Pedestrian traffic will use the Eastern most dock until sheet pile installation reaches that point, at which time a temporary dock will be installed on the Western most dock for access to the Marina. The existing main distribution panel (MDP) will be temporality removed and replaced to allow the sheet pile to progress through that area, approximately 24 hours.

4.9 Water Treatment

Prior to excavation work, Glacier will design and build a water treatment facility onsite for treatment of groundwater and waters collected from excavated soil.

Excavations will be dewatered to facilitate site remediation as detailed in the Dewatering, Treatment and Discharge Plan, submitted under separate cover. Collection of water will be through 2-inch wellpoints, sumps within the excavation and sumps at stockpile locations. Wellpoints will be installed by a licensed driller on the East and West ends of the excavation; their purpose to stop/slow water infiltrating from the Bay. The sumps installed within the excavation will be temporary and constructed of PVC screen and pea gravel and are utilized for dewatering the area of excavation. Sumps will also collect water from draining stockpiled soil.

Collected water will be treated through a Chitosan Treatment System capable of handling 100 gpm before discharge to Cornet Bay. Details of the system construction and capabilities are included in the Dewatering, Treatment and Discharge Plan, submitted under separate cover.

Glacier will enter into an administrative order with Ecology for discharge of treated water.

4.10 Wetland Mitigation

To meet the fish window requirement of in-water work completion before February 15, 2014, Glacier will excavate contaminated soils in the wetland during or immediately after the sheet pile wall construction. Using an excavator at low tide crews will clear, grub, remove contaminated soil, and topsoil. Materials will be stockpiled and drained of water in preparation for disposal. To ensure sediment is not being transferred to the bay the excavation area will be backfilled and erosion controls

will be in place daily or before tides return to excavation area. Planting of the Wetland will be postponed until spring of 2014 to ensure plant survival.

4.11 Excavation Plan

Prior to excavation Glacier will survey the site, this initial survey will be the control to determine volumes during the ensuing excavations.

Glacier plans to excavate the site generally from West to East. It is anticipated that the excavation will be completed in 3-4 smaller sections. After completing the wetland mitigation, we will move East and complete an area large enough to backfill and relocate the MDP. We have proposed relocating the MDP to the west of its current location to facilitate the excavation and reduce the amount of temporary power and power outages needed for the project. After the new MDP is in place, the excavation will continue along the face of the new bulkhead for the remaining length of the excavation. This will allow trucks to use the upland portion of the site as a haul route during the majority of the project.

Clean overburden will remain in place until that section is excavated (i.e. we will not clear all overburden up front).Glacier will delineate an area using paint and/or stakes, excavation will begin by using excavators and dozer to remove the uncontaminated soil at the surface to a depth where impacted or contaminated soils are encountered. This soil will be stockpiled in an area away from contaminated soil to ensure no cross contamination. Kennedy Jenks will determine the suitability of the soil for reuse. Each area will be surveyed after the removal of clean overburden for as built records and measurement for payment.

Contaminated soil will be excavated and placed in interim stockpiles within the excavation for dewatering and characterization. It is anticipated that these stockpiles will be relocated or hauled away within 24 hours. Glacier will work closely with Kennedy Jenks during this process to help sample and determine limits of excavation. Once an excavation has reached is maximum limits and confirmation samples have been screened, the survey crew will collect as-built data.

As excavation progresses along the old creosote-treated timber bulkhead, Glacier will use a combination of chainsaws and excavators to demolish the old wall down to the mudline as specified. This material will also be removed and stored in a lay down area until the material can be hauled offsite for proper disposal.

4.12 Backfill

Backfill will be continuous and methodical as excavations, footing drain and the MES wall are completed in each section. We will maintain separation between backfill and unexcavated or active areas with trenches. These trenches will keep clean import material from contacting contaminated soil; we will also keep the trenches free of groundwater so there is no infiltration into clean backfill. Imported pit run material, meeting the specifications, will be supplied by Concrete Nor'west and compacted to 95% of maximum density. Backfill will be placed using excavators and a dozer, compaction will be achieved

using both an excavator with a vibratory plate attachment and an 11 ton vibratory roller. Native soil that was excavated and stockpiled will be placed above the water table and surveyed for volume.

4.14 Site Restoration

Final site restoration will begin once backfill in an area is to subgrade and it is determined that finishing the area will not cause any issues by the continued excavation. Restoration will consist of reestablishing the dock access points, placing a layer of crushed surface top course rock over parking, installation of new concrete bulkhead, new concrete patio slab, new concrete slab on grade foundation, new septic tank, new 2-inch fuel lines and detection system, placing marina building back onto new foundation, connection of all utilities and permanent power to docks, placing topsoil and hydroseeding planting areas and moving fire pits and planters back to original locations.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

Attention: Lauren Golembiewski (425-355-2826)
lmiles@glacierenviro.com

Date: 16 December 2013
Serial No.: 15
Spec. Ref.: 00 35 43
Project: Cornet Bay Marina Remediation
K/J Job No.: 1396010.00
Submittal No.: 3
Page: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
A&R = Amend and Resubmit
NR/AR = Not Reviewed/Accepted for Record
MCN = Make Corrections Noted – No Resubmittal Required
MCNR = Make Corrections Noted - Resubmittal Required
RR = Rejected, Resubmit

Item #	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	AR		Glacier	Environmental Protection Plan
2	AR		Glacier	SPCC Plan
3	AR		Glacier	Selected Disposal Facilities

Comment(s):

These documents have been reviewed by Kennedy/Jenks. We have no comments and have accepted them for Record Purposes.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Distribution		SDRL	Encl.
Contractor Project Manager	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJ Project Coordinator:	Richard C. Guglomo, P.E.	x	
KJ Resident Engineer:	Jarod Fisher, P.E.	x	
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **15**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**00 35 43**	**1**	**Environmental Protection Plan incl.** **SPCC Plan** **Selected Disposal Facilities**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

ENVIRONMENTAL PROTECTION PLAN

CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

Prepared by:

Glacier Environmental Services, Inc.
PO Box 1075
Mukilteo, WA 98275

Prepared for:

November 2013

ENVIRONMENTAL PROTECTION PLAN

CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

1. Purpose

As part of its dedication to environmental responsibility, Glacier Environmental Services, Inc. (Glacier) is committed to using construction methods and practices that reduce or eliminate environmental pollution. The purpose of this Environmental Protection Plan (EPP) is to present a comprehensive overview of known or potential environmental issues that will be addressed by Glacier during remediation of the Cornet Bay Marina site, at Oak Harbor, Whidbey Island, Washington.

The EPP is a working document that will be continually reviewed by management to ensure its continuing suitability, adequacy and effectiveness. This review will include an evaluation of policies and procedures, which ensure ongoing identification, evaluation, and implementation of pollution prevention opportunities.

This plan is intended to meet the submittal requirements of Section 01 35 43, Paragraph 1.02 (Environmental Protection) of the project specifications.

All operations will comply with all federal, state, and local regulations pertaining to water, air, solid waste, and noise pollution. The following rules and regulations that apply to this work include, but are not limited to:
1. Chapter 173-303 WAC Washington State Dangerous Waste Regulations
2. Chapter 173-340 WAC Model Toxics Control Act Cleanup Regulations.

2. Responsibilities

Project Manager – Lauren Golembiewski, Glacier's Project Manager will have overall responsibility for preparation, and implementation of the EPP. Working with on-site personnel, she will continually identify and submit for approval any additional requirements to be included in the EPP.

Superintendent – Alan Hall, the Glacier Site Superintendent will be responsible for ensuring day-to-day compliance to the EPP. Alan will be physically present at the site during all work and will be ultimately responsible for inspecting control measures and correcting deficiencies. He will ensure training sessions are conducted so that Glacier and subcontract employees are familiar with the provisions of the EPP, the use of specialized equipment and materials, and the pollution countermeasures contained herein.

Glacier QC Officer – Eric Hay, Glaciers Quality Control Officer will be responsible for ensuring day-to-day adherence to the EPP at Mr. Hall's discretion. Eric will also conduct training sessions for Glacier's environmental protection personal.

Craft Labor Personnel – All site personnel will be responsible for being knowledgeable of the provisions of this EPP and will report any noted deficiency, spill or event that could adversely affect human health or the environment.

3. Training

Glacier site personnel have been instructed by management in the operation and maintenance of pollution control equipment and pollution control laws and regulations. The training course outline includes:

- Understanding the regulatory and legal structure;
- understanding the responsibilities to report and respond;
- consequences on not properly reporting or responding;
- elements of a Spill Prevention, Control and Countermeasures (SPCC) Plan;
- recognition of potential spill problems;
- spill planning for construction sites;
- recognition of spill pathways; spill prevention measures and techniques;
- required actions for spill reporting.

During safety briefings, spill prevention will be discussed. Any near misses or incidents will be discussed in order to prevent them from reoccurring. Employee feedback and recommendations are encouraged in spill prevention and operation. Sign-in sheets, which included the topics of discussion at each meeting, are maintained for documentation.

4. Permits and Notifications

A Master Building Permit has been applied for through Island County Planning & Development. It covers the bulkhead installation, excavation and grading, selective demolition, structure moving, and utilities. The approved permit will be added to Appendix B when available. A permit for the septic system will also be obtained from the Public Health Department and included in this plan.

5. Protection of Existing Features

5.1 General

Field activities will be limited to the areas defined by the project specifications and drawings. Areas that are not to be disturbed will be clearly marked or delineated by fence by or other barrier.

Except as specified, Glacier will not remove, cut, deface or destroy land resources including trees, shrubs, vines, etc. These features will be clearly marked, wrapped, or otherwise protected. Monuments and markers will be protected at all times and marked with high visibility tape. Site workers will be advised as to the purpose of the markings and/or protecting particular objects.

Upon completion, Glacier will obliterate all signs of temporary construction such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by Ecology. We will level all temporary roads, parking areas and any other areas that have become compacted or shaped. Any unpaved areas where vehicles are operated will receive a suitable surface treatment or periodically wetted down to prevent construction operations from producing dust damage and nuisance to persons and property. Haul roads will be kept clear at all times of any object that

creates an unsafe condition. Any contaminants or construction material dropped from construction vehicle will be promptly cleaned up. Streets adjacent the site will be swept clean as necessary.

5.2 Preconstruction Survey

Prior to the start of on-site activities, the Glacier Superintendent and Engineer will conduct a joint survey of existing site conditions. Photographs will be taken as part of the survey. Glacier will prepare a brief report indicating on a layout plan the condition of trees, shrubs, and grassed areas immediately adjacent the work, storage area(s) and access routes.

5.3 Trees, Shrubs

Glacier will not remove, cut, deface, injure or destroy trees or shrubs outside the work area limits, or remove, deface, injure or destroy trees within the work area without permission from Ecology.

Glacier will protect trees that are located near the work which may possibly be defaced, bruised or injured or otherwise damaged by the remediation operations. No ropes, cables or guys will be fastened to or attached to any existing nearby trees or shrubs for anchorages unless specifically authorized. Where such special emergency use is permitted, Glacier will be responsible for any damage resulting from such use.

Glacier will trim and seal limbs overhanging the line of the work and in danger of being damaged by remediation operations in accordance with recognized standards for such work. Any tree alteration must be approved by Ecology

Glacier will not unnecessarily cut roots during excavation. Major roots encountered in the course of excavation will be exposed (not severed) and as a protective measure, wrapped in burlap. Roots larger than one (1) inch in diameter that are severed in the course of excavation will be trimmed and painted with an approved tree seal.

Glacier will restore or replace any trees or other landscape features scarred or damaged by equipment or construction operations. If applicable a restoration plan will be submitted. The repair and/or restoration plan shall be favorably reviewed prior to its initiation.

5.4 Fish and Wildlife Resources

All work will be performed taking such steps required to prevent any interference or disturbance to fish and wildlife. Glacier will not alter water flows or otherwise significantly disturb native habitat adjacent to the project area which are critical to fish and wildlife except as may be indicated or specified.

A siltation boom will be installed and maintained by Glacier just off-shore of work areas to minimize siltation of Cornet Bay.

Sheet pile driving activities have the potential to affect sensitive marine mammals (particularly the orca, humpback whales, and Stellar sea lines. Glacier will be prepared to halt sheet pile driving activities during dark or foggy conditions, or when marine mammals have been observed within approximately 2 miles of the project site. Ecology or Ecology's Representative will be

responsible for notifying Glacier when such conditions occur and when it is appropriate to resume sheet pile driving activities.

5.5 Cultural Resources

The project does not pass through any known archaeological sites. However, it is conceivable that unrecorded archaeological sites could be discovered during the construction. In the event that artifacts, human remains, or other cultural resources are discovered during excavations at locations of the Work, Glacier will protect the discovered items, notify Ecology, and comply with applicable law.

Glacier will immediately stop work and notify the Engineer if any artifacts, skeletal remains or other archaeological resources are unearthed during excavation or otherwise discovered on the construction site. Work stoppage will remain in effect until permission to proceed has been granted by Ecology.

6. Sedimentation and Erosion Control

Temporary Erosion and Sediment control measures will be implemented per Construction Drawing Sheet C2. Glacier's Storm Water Pollution Prevention Plan (SWPPP) is herby included in this plan by reference.

7. Air Quality

State law requires a 'survey' of materials to be disturbed during remodeling or demolition projects to determine the presence of any regulated asbestos-containing materials. Common suspect materials include vinyl floor coverings, ceiling texture, furnace ducting, etc. Preparation for moving, restoring and any asbestos abatement associated with moving of buildings will require a permit from the Northwest Clean Air Agency (NWCAA). It is anticipated that asbestos will be present in building demolition materials, however, abatement will be conducted in a contained environment, and no danger to the surrounding community is anticipated. Contractors must notify NWCAA in writing before beginning any asbestos removal projects. Abatement will be performed by Washington State Certified abatement Subcontractor. Glacier will submit asbestos related notifications, permits and reports to the Engineer upon availability.

With the exception of nuisance dust, it is not anticipated that the project will be the source of air emissions affecting human health or the environment.

Dust may be produced on site as a result of construction activities and as a result of the wind. Dust suppression techniques will be employed, including the used of water sprays, as needed. No significant concentration of acutely toxic solids, that could become airborne, is anticipated.

8. Noise Pollution

Potential sources of noise pollution include:

- Pile Driving;
- Concrete slab sawing and breaking;
- Truck Traffic;
- Slamming Truck Gates;
- Service Vehicles and Heavy Equipment (backup alarms);
- Drilling, sawing, hammering, etc.

All reasonable measures will be employed for the suppression of noise resulting from the work. Construction equipment will be fitted with exhaust silencers (mufflers) and shut off when not being used.

Maximum Noise Levels within 1,000 Feet of any Residence, Business, or Other Populated Area: Noise levels for pile drivers, trenchers, pavers, graders and trucks shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet. Work will be conducted between the hours of 7:00 AM and 7:00 PM Monday through Friday.

9. Spill Prevention, Control, and Countermeasures Plan

Properly managing hazardous and toxic substances and petroleum products at the project site will greatly reduce the potential for spills or pollution. Good housekeeping practices, along with proper use and storage of these substances form the basis of proper management. Following is a list of good housekeeping practices to be implemented during construction:

- Storage of hazardous materials, chemicals fuels and oils and fueling of construction equipment will not take place within 100 feet of any drainage, wetland, spring or other water feature.
- An effort will be made to store only enough fuel and lubricants as necessary to complete the job.
- Materials stored on-site will be stored in their appropriate containers on a level site and covered.
- Products will be stored in tightly sealed containers with the original manufacturer's label.
- Substances will not be mixed with on another unless recommended by the manufacturer.
- Whenever possible, the entire product will be used before it's container is discarded
- Manufacturer's recommendation for proper use and disposal of a product will be followed.
- If surplus product must be disposed of, the manufacturers or local and state recommended methods for proper disposal will be followed.

Because of the chemical composition of certain products, specific handling and storage procedures are required to promote the safety of handlers and prevent releases of the product to soil and receiving waters. Care will be taken to follow all directions and warnings for products used on the site. All pertinent information can be found on the material Data Safety Sheet (MSDS) for each product. The MSDS's will be kept for each product container. Several product-specific practices are listed in the following sections.

On-site vehicles and equipment will be monitored for fluid leaks and will receive regular maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. If possible, the containers will be stored in a covered truck or trailer that provides secondary containment.

Bulk storage containers having a capacity of more than 55 gallons will have secondary containment. Containment will consist of a prefabricated pan or containment mat. After each rainfall event, the contents of the secondary containment will be inspected. If no sheen is visible on the collected water, the water can be pumped or drained on the ground in a manner that

does not cause runoff or scouring. If sheen is present, it will be cleaned up before discharge of the water.

Bulk fuel or lubricating oil dispensers will have a valve that must be held open to allow flow. During fueling operations, adequate personnel and equipment will be available to detect and contain spills.

In addition to the material management practices discussed above, the following spill control and cleanup practices will be implemented

- Spills will be contained and cleaned up immediately upon discovery.
- Manufacturer's methods for spill cleanup of a material will be followed as described on the MSDS's.
- Materials and equipment needed for cleanup will be kept readily available on-site, either at an equipment storage area or on a Glacier service vehicle. Equipment to be available on-site will include but not be limited to:
    - Oil-absorbent booms: Four each, 5 feet long.
    - Oil-absorbent pads or bulk material, adequate for coverage of 200 square feet of surface area.
    - Oil-skimming system.
    - Oil dry all, gloves, and plastic bags.
- Construction personnel will be made aware of cleanup procedures, the location of spill equipment, and proper disposal procedures.
- All spills will be documented on the form included in Appendix A and provided to the Engineer.
- All wastes material will be collected and stored in a secure container and removed from the project site.

9.1. Potential Spill Identification/Volumes

The following is a list of known products, chemicals and containers that will be brought to the project by Glacier and its subcontractors.

1. *Diesel-110 gallon service vehicle mounted tank*
2. *Gasoline- 5-gallon cans*
3. *Hydraulic Oil-5 gallon cans*

Care will be taken to follow all directions and warnings for products used on-site. All pertinent information can be found on the Material Safety Data Sheet (MSDS) for each product. MSDS's will be kept for each product used at the site.

9.2. Fuels and Lubricants

- Fuels and Oils will be stored at the Glacier staging area as shown in Figure 1
- On-site vehicles and equipment will be monitored for fluid leaks and will receive regular maintenance to reduce the chance of leakage.
- During any fueling operation, Glacier will have personnel and equipment available to detect and contain spills

9.3. Waste Water

9.3.1.1. Concrete Waste

Concrete trucks will use designated Wash-Out pans. Concrete waste and slurry will be collected and drummed for legal off-site recycle/disposal.

9.3.1.2. Groundwater

Excavations will be dewatered to facilitate site remediation as detailed in the approved Dewatering, Treatment and Discharge Plan (under separate submittal and included here by reference).

Glacier will remove water from the excavation and pump it into a dewatering treatment system. Excavation water will be adequately treated onsite before being discharged to Cornet Bay. The dewatering and treatment system will be sized to adequately dewater the excavations for complete soil removal and treat water adequately to meet the discharge permit limits.

Glacier will enter into an administrative order with Ecology for discharge of treated water.

9.3.1.3. Controls of Non-storm Water Discharges

The following sources are anticipated to be an insignificant source of pollution due to the and relatively dry site conditions. It is assumed that most of the runoff from these sources will infiltrate into the soil rather than runoff.

- Water for dust control
- Air conditioning condensate from site vehicles and trailers
- Potable water sources including waterline flushing
- Uncontaminated groundwater that accumulates in the excavations

9.4. Emergency Telephone Numbers

Fire Emergency	911
Police Emergency	911
Glacier Mukilteo Office	(425) 355-2826
Glacier Project Manager, Lauren Golembiewski	(425) 268-9775
Glacier Superintendent, Alan Hall	(206) 446-5280
Client (Ecology) Representative, Jing Liu	(425) 649-4310
Kennedy Jenks Federal Way Office	(253) 835-6400
Kennedy Jenks Project Manager, Ty Schreiner	(253) 835-6400
Kennedy Jenks Site Person/SSHO TBD	(000) 000-0000
Spill Reports, Washington State Department of Ecology	(425) 649-7000
National Response Center	1-800-424-8802

9.5. Reporting

Glacier's Superintendent will be responsible for reporting any spills or hazardous substance release and will follow up with a complete and detiailed Accident and Incident Report.

10. Non-Hazardous Solid Waste Disposal

10.1. Landfill Disposal

The following non-hazardous wastes will be transported and disposed as shown below:

Material	Transporter	Disposal Facility
Petroleum Contaminated Soil	Pro USA, TBD	Cemex-Everett, Washington Thermal Desorption Facility
Asbestos Containing Materials	Thermatech NW	TBD
Creosote Treated Wood	TBD	Allied Waste-Roosevelt Landfill
Clean Debris/Fill	Concrete Nor'west	Concrete Nor'west Fill Site on Pit Road Oak Harbor, WA

Operating permits for Cemex and Allied Waste are attached as Appendix C.

10.2. Recycling/Waste Minimization

In an effort to reduce landfill waste, any items that can be reused or recycled will be segregated and handled as such. Concrete waste from demolition activities will be recycled by Concrete Nor'west in Oak Harbor.

11. Testing Imported Soil

In the absence of satisfactory existing soil quality testing documentation, Glacier will submit then results of analytical testing from the fill source, at a sampling frequency as follows:

Five (5) samples for the first 5,000 cubic yards of material and one (1) additional sample for every additional 2,000 cubic yards.

Chemical analyses will include:

- Total Petroleum Hydrocarbon in the gasoline, diesel and oil ranges (NWTPH-Gx, and NWTPH-Dx).
- RCRA Metals by EPA Method 6000/7000 series
- PCBs by EPA Method 8082B
- PAHs by EPA Method 8270C
- Dioxin Furans by EPA Method 1613B

Appendix A
Spill Report Form

Spill Report Form

Name of Facility:					
Date and time of incident:		**Date and time discovered:**		**Date and time spill stopped:**	
Location:					
Cause:					
Equipment Involved:	□ Refueling Equip. □ Leaking Fuel Tank/Vehicle		□ Hydraulic Hose □ Other _____		
Names of Person(s) responding:		**Material spilled:**			
Estimate Gallons spilled:	□ <25 □ 25 to 50 □ 50 to 100 □ 100-150 □ >150				
Did any spillage enter any water body? Y/N? (including storm drain)	If so, which one:		Estimate Gallons that reached water body:		
Describe extent of affected area:	(ex. Radius of spill? Confined to site? Confined within containment wall? Distance/direction travelled?)				
Damages caused by spill:					
Was an evacuation necessary?		**Injuries/fatalities caused by spill:**			
Action taken to stop discharge:		**Action taken to confine spill:**			
Suggested preventative measures:					
Assessment of root cause of spill:					
Other and/or additional information:					

Notifications that were made:

Name of Individual or Organization	Phone Number	Date Contacted	Comments

Date of Report:		**Name (print) :**	
Signature:			

Appendix B
Construction Permits

Appendix C
Landfill Permits

SOLID WASTE FACILITY PERMIT # SW-017

Issued by the Snohomish Health District in accordance with the provisions of Chapter 70.95 of the Revised Code of Washington (RCW), Chapter 173-350 of the Washington Administrative Code (WAC), and the Snohomish Health District Sanitary Code, Chapters 3.1 and 3.2 (adopted text of WAC 173.350).

PERMIT PERIOD: JULY 1, 2013 TO JUNE 30, 2014

PERMITTEE AND ADMINISTRATIVE INFORMATION

NAME OF FACILITY:	Cemex Incorporated Regional Treatment Facility
FACILITY LOCATION:	6300 Glenwood Avenue, Everett, Washington 98203
FACILITY OWNER:	Cemex Incorporated
FACILITY OPERATOR: PHONE	Larry Baker, Operations Manager 425-210-8429
PERMIT TYPE: ANNUAL FEE:	Petroleum Contaminated Soil Treatment $3,192.00 (2/3 fee of $2128.00 for multiple permits, same site)

The conditions of this permit are contained on the following pages. This permit is the property of the Snohomish Health District and may be suspended or revoked upon violation of any rules and regulations applicable hereto. This permit is not transferable to a different site, and must be renewed annually. This permit, or a legible copy, must be displayed or stored in a manner which allows easy access by operating personnel.

Kathy A. Pierson, RS
Solid Waste and Toxics Section
Environmental Health Division

June 21, 2013
Date of Issuance

3020 Rucker Avenue Suite 104 ■ Everett WA 98201-3900 ■ tel: 425.339.5250 ■ fax: 425.339.5254

SECTION I: STANDARD PERMIT CONDITIONS

A. This permit shall remain the property of the Snohomish Health District (Health District). The permit may be revoked, suspended, or appended upon violation of the permittee of any applicable local, state, or federal laws, or any of the conditions of this permit, by the Health Officer or any authorized agent of the Health District. If the permit is revoked, there is a procedure specified in the Snohomish Health District Sanitary Code, Chapters 3.1, *Solid Waste Handling Regulations*; and 3.2, Chapter 173-350 WAC *Solid Waste Handling Standards*, to appeal the revocation.

B. As a general condition of this permit, the permittee shall comply with the Snohomish Health District Sanitary Code, Chapters 3.1, *Solid Waste Handling Regulations*, Chapter 173-350 WAC *Solid Waste Handling Standards* or other regulations which may be subsequently adopted that affect this facility. Where any conflicts between any regulations are present, the more stringent regulations shall be in effect.

C. All conditions of this permit shall be followed for the permittee to remain in compliance. The permittee shall be responsible for all acts and omissions of all contractors and agents of the permittee. This requirement shall continue for the life of the site, including closure activity.

D. By applicant's receipt of this permit, applicant grants permission to any duly authorized officer, employee, or representative of the Health Officer of the Health District, or Washington Department of Ecology, to enter and inspect the permitted facility at any reasonable time for the purpose of determining compliance with the Snohomish Health District Sanitary Code, Chapters 3.1, *Solid Waste Handling Regulations*; Chapter 173-350 WAC *Solid Waste Handling Standards* and/or the conditions of this permit.

E. This permit, or a legible copy of the original, shall be displayed or stored in a manner which allows easy access by operating personnel.

F. This permit shall be subject to suspension or revocation if the Health District finds:

1. That the permit was obtained by misrepresenting or omitting any information that could have affected the issuance of the permit or will affect the current operation of the facility;

2. That there has been a significant change in quantity or character of the solid waste or method of solid waste handling, unless such change has been approved in advance by the Health District; or

3. That there has been a violation of any of the conditions contained in this permit.

G. This permit may be amended by the Health District. More stringent restrictions may be imposed on the facility during the period the permit is valid. Amendments shall be made in writing and become specific conditions of the permit.

H. The operating permit shall be renewed annually and, if needed, additional conditions may be placed upon the permit at the time of renewal. A permit application shall be submitted at least thirty (30) days prior to the expiration date of the existing permit.

SECTION II: PERFORMANCE STANDARDS

The owner or operator shall:

A. Design, construct, operate, and close all facilities in a manner that does not pose a threat to human health or the environment;

B. Comply with Chapter 90.48 RCW, *Water Pollution Control* and implementing regulations, including Chapter 173-200 WAC, *Water Quality Standards for Ground Waters of the State of Washington*,

C. Conform to the approved local comprehensive solid waste management plan prepared in accordance with Chapter 70.95 RCW, *Solid Waste Management – Reduction and Recycling*, and/or the local hazardous waste management plan prepared in accordance with Chapter 70.105 RCW, *Hazardous Waste Management*;

D. Not cause any violation of emission standards or ambient air quality standards at the property boundary of any facility, and comply with Chapter 70.94 RCW, *Washington Clean Air Act*; and

E. Shall comply with all other applicable local, state, and federal laws and regulations

If the performance standards of this section are not met, corrective actions (approved by the Health District) shall be designed and implemented, and enforced on a time schedule approved by the Health District.

SECTION III: SPECIFIC CONDITIONS

A. The Cemex Incorporated (Cemex Inc.) Regional Petroleum Contaminated Soil Treatment Facility shall operate in accordance with the approved plan of operation dated December 1, 1993, January 25, 1994, and April 13, 1994. The permittee shall notify the Health District in writing prior to any deviation from or change in the operating plan. These changes will require Health District approval prior to implementation.

B. Feedstock shall be limited to petroleum contaminated soil (PCS) not exceeding 3% petroleum hydrocarbon by weight. Acceptable material includes, but is not necessarily limited to, soils originating from petroleum leaking underground storage tanks (LUST), petroleum product spills, street sweepings (leaves and debris removed), and de-watered vactor waste. Unacceptable materials include garbage, wood of any type, yard waste, paper, dangerous waste, and soils contaminated with metals, pesticides, or herbicides, or any other non-petroleum contaminants or other non-inert material.

C. Incoming soil unloaded outside the storage building(s) must be immediately moved indoors for storage. Sources of contamination and contamination levels of all incoming material must be verified by an on-site laboratory. Incoming material determined to be inconsistent with the pre-profile, contaminated above Model Toxic Control Act standards with non-petroleum constituents, contaminated to the extent that they would likely be classified as dangerous waste, or otherwise found to be unsuitable for treatment shall be returned to the generator.

D. Any time "pre-tested" treated soils are to remain outside the storage building(s) for more than twenty-four hours, or during inclement weather, the soils must be covered with an impervious cover such as a waterproof tarp

E. No additional contaminated soils shall be accepted when the buildings are at full capacity. According to WAC 173-350-320 regarding Piles, piles containing nonputrescible waste and/or contaminated soils and/or dredged material can be in place for no more than three months.

F. The permittee shall keep the following records on site at all times, and make them available for Health District review upon request:

1. Self-inspection reports.

2. Source, type, and quantity of waste accepted

3. Records of any laboratory analysis performed on incoming feedstock as well as any final sampling of soil after it has been treated.

G. End-use of treated PCS must meet the criteria as indicated in the *Guidance for Remediation of Petroleum Contaminated Soils* (see attached). End-use of treated PCS must not include any residential, playground, wetland, or other sensitive area applications. Treated soils must not be used in close proximity to ground water.

SECTION IV: TESTING REQUIREMENTS

Soil characterization is required for incoming loads which include, but are not necessarily limited to, the hazardous substances described in the Model Toxics Control Act (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses, Table 740-1, and soils that contain Total Petroleum Hydrocarbons (TPH) containing Diesel Range Organics and Heavy Oils concentrations exceeding 460 mg/kg and/or TPHs containing Gasoline concentrations exceeding 100 mg/kg. In the event of heavy oil contamination, characterization must also include PCBs, volatile organics, phenols and cPAHs testing. Residential soils contaminated with number 2 heating oil or diesel fuel, are to be tested for TPHs. Additional tests may be required depending on the source of the soils.

Incoming soil loads must be tested at the following minimum frequency: at least 3 soil samples must be tested for less than 100 cubic yards of soil; at least 5 soil samples tested for 101-500 cubic yards of soil; at least 7 soil samples must be tested for 500-1000 cubic yards of soil; at least 10 soil samples must be tested for 1001-2000 cubic yards of soil; and at least 10 soil samples must be tested for greater than 2000 cubic yards, plus 1 additional sample for every 500 cubic yards over 2000

All incoming material must be verified by a state approved laboratory. Incoming material verified to be inconsistent with the pre-profile will be returned to the generator

Confirmation testing of treated soil for total petroleum hydrocarbons must be completed prior to removing the soil from the site

SECTION V. FACILITY CLOSURE CONDITIONS

The permittee must notify the Health District sixty (60) days in advance of closure. All waste shall be removed from the pile at closure, to a facility that conforms to the applicable regulations for handling the waste.

Develop, keep and abide by a closure plan approved by the Health District as part of the permitting process. As a minimum, the closure plan shall include the methods of removing waste.

SECTION VI. COMPLIANCE SCHEDULE FOR OPERATING

Not currently operating under a compliance schedule.

SECTION VII. APPROVED PERMIT AMENDMENTS

Date Approved	Request and Conditions
October 11, 1994	Include asphalt incorporation of petroleum contaminated soil. All conditions consistent with previous permit requirements
May 8, 1995	Decrease the number of outside confirmation testing of treated soil from 1 external per ten internal to 1 external per 40 internal.
Pending	Construct a new building to add 8,000 tons to the storage capacity.
August 29, 1995	Classify/verify incoming loads with onsite gas chromatograph. Out source metals testing.
September 5, 1995	Expand asphalt incorporation technique to include encapsulation by emulsion. Cold mix type asphalt product. Treated similar to RAP
July 10, 1996	Modify permit to include acceptance of street sweepings and vactor waste. Leaves shall be removed from street sweepings and vactor waste. Vactor waste shall be de-watered prior to acceptance. Testing criteria must be consistent with other incoming soils.
September 28, 2009	City of Everett approved the building permit for Cemex's Soils Storage Building, per email from David Foster, Building Inspector.
December 2, 2011	Treated Petroleum Contaminated Soil at a concentration of less than 10% is acceptable as general and compacted structural fill if placed between 20 feet below to final grade **providing** that an impervious layer covers the area

Landfill Approvals

CERCLA Landfill Approval

Municipal Solid Waste Landfill
Solid Waste Handling Facility Permit

Summary Permit List

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

JAN 16 2001

RECEIVED
JAN 19 2001
RABANCO RDC

Reply To
Attn Of: WCM-126

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Bill Borlaug, P.E.
Rabanco Roosevelt Regional Landfill
500 Roosevelt Grade Road
P.O. Box 338
Roosevelt, WA 99356

Re: **Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Off-Site Rule: Affirmative Determination of Acceptability for the Rabanco Roosevelt Regional Landfill, Roosevelt, WA**

Dear Mr. Borlaug:

This letter serves to inform you that the U.S. Environmental Protection Agency (EPA) Region 10 has made a determination of acceptability for the receipt of off-site waste generated pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) at Rabanco Roosevelt Regional Landfill. Pursuant to 40 C.F.R. Section 300.440(a), EPA has completed an initial assessment of the Rabanco Roosevelt Regional Landfill (the facility) and finds that the facility is currently acceptable for the receipt of off-site waste.

The Rabanco Roosevelt Regional Landfill is located at 500 Roosevelt Grade Road, Roosevelt, Washington. It is a Subtitle D, municipal landfill designed to receive non-hazardous waste. The facility is owned by Regional Disposal Company, an Allied Waste Industries of North American Company. The facility has a Solid Waste Handling Permit No. 2001, issued under WAC 173-351, by the Klickitat County Department of Public Health. The Solid Waste Handling Permit was issued on July 16, 1998 and expires on March 1, 2004. The Klickitat County Department of Public Health is responsible for conducting compliance evaluations at the Rabanco Roosevelt Regional Landfill at least 6 times a year. The last inspection was performed on July 27, 2000. No violation was found at the time of inspection.

Off-site wastes are defined as those wastes generated as a result of activities authorized or funded by CERCLA, 42 U.S.C. §9607, as amended. On September 22, 1993 EPA amended the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. part 300 by adding section 300.440, commonly known as the "Off-Site Rule", a copy of which is enclosed.

Printed on Recycled Paper

A review of Agency records indicates that the Rabanco Roosevelt Regional Landfill is at this time in substantial compliance with the facility's effective environmental permits and/or applicable State and Federal environmental standards. Therefore, upon receipt of this letter, the Rabanco Roosevelt Regional Landfill, Roosevelt, Washington facility is acceptable to receive non-hazardous CERCLA off-site waste. However, please be aware that EPA reserves its right to reevaluate this determination should any information which would negatively affect this determination become available. This notice does not authorize the Rabanco Roosevelt Regional Landfill, Washington facility to undertake any waste management practices at the facility which have not been previously authorized. The facility's actual receipt of CERCLA waste must be in accordance with State and Federal requirements.

Should you have any questions concerning this matter, please contact Xiang-Yu Ge, Regional Off-site Coordinator of my staff, at (206) 553-2859.

Sincerely,

Richard Albright, Director
Office of Waste and Chemicals Management

Enclosure

cc: John Thayer, Director Klickitat County Department of Public Health
Darlene Frye, Ecology Central Regional Office

Permit number 20-001

Tax parcel number
04-21-2100-0002/00
04-21-2100-0002/00
04-21-2200-0003/00
04-21-2700-0002/00
04-21-2800-0001/00
04-21-2800-0002/00
04-21-3300-0001/00
04-21-3400-0003/00

FULL PERMIT
For
MUNICIPAL SOLID WASTE LANDFILLING

Section I. Permittee Information

Facility Name: Roosevelt Regional Landfill

Facility Location: Roosevelt, Washington

The Permittee

Owner/Operator: Regional Disposal Company

Name of Contact: Matt Henry, General Manager

Address: 500 Roosevelt Grade Road. P.O. Box 338
Roosevelt, WA 99356

Telephone: 1-800-275-5641

Section II. Authorization. The permittee is hereby authorized to conduct activities associated with landfilling of municipal solid waste, in conformance with the permit application and attached general and specific conditions upon the basis of information supplied in the full permit application and in compliance with chapter 173-351 WAC and RCW 70.95.163, (including demonstrations) and all relevant federal, state and local regulations (including state air quality, water quality, and noise regulations).

"permit application"-The following documents have been submitted by RDC and constitute the complete application:

i. 2004 permit reissuance document dated December 2003
ii. Operation Plan included in the 2004 permit reissuance dated December 2003
iii. Engineering report included in the 2004 permit reissuance dated December 2003
iv. Hydrogeologic characterization dated November 1994
v. Groundwater monitoring plan dated December 2003
vi. Closure plan dated December 2003
vii. Post-closure plan dated December 2003

The permit may be suspended or revoked according to the terms set forth in section XII herein. If the permit is suspended or revoked, the permittee may appeal the action according to the terms of the permit and RCW 70.95.210.

This permit is transferable only upon prior written approval of the jurisdictional health department. The prospective transferee must demonstrate its ability to comply with laws, regulations and permit conditions. The permit shall be reviewed annually and reissued by the expiration date in conformance with Section I herein.

This permit is subject to yearly renewal in accordance with Section XII (3) of the General Conditions, until reissuance is required under Section XII (4).

Signature of Health Officer or Designee

Date of Issuance: July 15, 1998 Annual Renewal Date: April 1

Date of Modification: March 1, 2004

Date of Modification: _____

Date of Modification: _____

Date of Expiration: April 1, 2014

Section III: Demonstrations. In granting this permit, the Klickitat County Health Department acknowledges the following demonstrations for each applicable MSWLF unit made in the permit application for the time period specified:

MSWLF Unit Name/Description	Description of Demonstration	Appropriate Section of 173-351	Expiration Date of Demonstration
Completed and approved (. . .no longer a demonstration)			
1-10	Dredged material	200	December 2005

Section IV. Description of Permitted Units, Scope of the Permit, and Authorized Activities

The Permittee is authorized to conduct the following activities during the specified times at municipal solid waste landfill (MSWLF) units as described below:

a. i. MSWLF Unit Name/Description: 1-43 (entire 815 acre footprint)

ii. Rule applying to this unit: ☐ 173-304 ☒ 173-351

iii. Types of wastes authorized in this unit:
MSW, industrial, commercial, other as approved by Klickitat County Health Department.

iv. Authorized design volume: 244,600,000 yd^3

v. Earliest authorized start of activity: upon permit issuance

vi. Latest authorized completion date: December 31, 2084

Section V. Pre-construction, Pre-operational, Pre-closure Review, and Cessation of Construction or Operation Activities.

1. For each new or laterally expanded unit, the permittee shall submit final design drawings, construction specifications and construction quality assurance manual at least 60 days prior to the beginning construction date specified in Section IV. The permittee shall not begin lines construction until the jurisdictional health department approves these documents in writing.

2. The permittee is authorized to accept solid waste at any new or laterally expanded unit, only after a licensed engineer, having supervised construction, certifies that the construction is in accordance with this permit and in accordance with the construction quality assurance plans. The operator must notify the jurisdictional health department in writing of the date when solid waste will be first received at the unit. The premittee shall not accept authorized solid waste until approved in writing by the jurisdictional health department.

3. One hundred and eighty (180) days prior to beginning closure activities, specified in Section IV, the permittee shall notify the jurisdictional health department and the financial assurance trustee and/or insurer of the intent to close each unit or all units according to the approved closure plan, and submit final engineering closure plans to the jurisdictional health department for review, comments, and approval. Closure activities shall not begin until approval in writing from the jurisdictional health department for closure has been received.

4. If construction or operation activities started under a permit issued pursuant to this chapter cease for a period of twelve consecutive months, the jurisdictional health department at its discretion revoke the permit. The jurisdictional health department shall provide notice to the owner or operator in writing explaining the reasons for revocation. The jurisdictional health department shall not revoke a permit where the cessation of construction or operation is caused by factors

beyond the reasonable control of the permittee or when such cessation is in accordance with the provisions of the permit.

Section VI. Plan of Operation and Operational Requirements

All operational and maintenance activities conducted at the facility shall be in conformance with the permit application. The permittee is subject to additional operational and maintenance conditions as follows:

1. Waste Acceptance

    a. The permittee is authorized to accept for disposal, municipal solid waste and non-municipal solid waste, including industrial, inert and demolition, wood waste, other types on non-hazardous solid waste and solid wastes that have been excluded, exempted or otherwise removed from regulation under Chapter 173-303 WAC, the Dangerous Waste Regulation or otherwise excluded by state law provided that such non-municipal wastes are co-disposed with municipal solid waste stream in a unit authorized in Table 1 or this permit, and such disposal is not elsewhere prohibited by law.

    b. Klickitat County Health Department requires written notification within three (3) days of approving special wastes (as defined in WAC 173-303-040) for disposal.

2. Daily cover. The permittee shall apply daily cover according to the permit application.

3. Disease vectors. The permittee shall prevent or control disease vectors according to the permit application.

4. Explosive gas control. The permittee must control explosive gasses to ensure that concentrations of methane do not exceed standards set forth in chapter 173-351 WAC.

5. Air Criteria. The permittee must comply with all applicable Federal and Washington state air quality requirements.

    a. Section 5.1.14, disposal of asbestos, in the Operation Plan is modified as follows:
        1. Improperly contained asbestos must be reported to the Department of Ecology within twenty-four (24) hours.
        2. Improperly contained asbestos shall be isolated and remediated in accordance with 40 CFR 61.154.

    b. Location of asbestos disposal shall be reviewed prior to disturbance of solid waste in the landfill, to prevent release of asbestos fibers.

6. Access Requirements. The permittee shall control access by humans and animals according to the permit application.

7. Run-on/Run-off Control Systems. The permittee shall maintain the run-on/run-off control systems for the active and closed MSWLF units according to the permit application.

8. Surface Water Requirements. The permittee shall not allow discharges of pollutants into waters of the state that violate state law and regulations from point or nonpoint sources, in accordance with the permit application.

9. Liquids Restrictions. The permittee shall not allow liquids to be disposed of, except in accordance with the permit application.

10. Record Keeping. The permittee shall keep records required the permit application at the Roosevelt Regional Landfill. The premittee shall notify the jurisdictional health department when documents (when otherwise excluded from this requirement in the permit application) have been placed in or added to the operating record. The permittee shall furnish all information contained in the operating record for inspection at all reasonable times by the jurisdictional health department.

11. Annual Reports. The permittee shall submit an annual report for the previous calendar year to the jurisdictional health department and the Department of Ecology by April 1 each year, on forms supplied by the Department of Ecology and other information as required in this permit.

12. Additional Operating Requirements.

    a. The permitee shall operate the facility and provide all necessary resources to control road dust, collect scattered litter, prohibit scavenging, and ensure that qualified landfill personnel are on site. Minimum requirements are identified in the permit application.
    b. Dust suppressants containing calcium chloride shall not be used.
    c. Water shall not be added to the landfill, except for use as a dust and fire suppressant.

13. Operational Equipment. The permittee shall ensure that all equipment necessary to operate the landfill is available at all times. Minimum equipment requirements are identified in the permit application.

14. Permanent Posts. The permittee shall clearly mark the active boundaries

15. According to the permit application.

16. Compaction. The permittee shall thoroughly compact solid waste before succeeding layers are added according to the permit application.

17. Maintenance of Monitoring Systems. The permittee shall maintain the monitoring systems for air, ground water, and surface water according to the permit application.

18. Require Recycling. The permittee shall provide the opportunity to recycle solid wastes according to the permit application.

19. Municipal/Sewage Sludge/Biosolids. The permittee shall prohibit disposal of municipal sewage sludge or biosolids in accordance with the permit application.

Section VII. Ground Water Monitoring Program and Hydrogeologic Report

1. Groundwater Standard. The permittee shall not allow the facility to exceed the maximum contaminant levels in groundwater specified in the permit application at the approved point(s) of compliance. The permittee shall also not cause exceedances of standards contained in chapter 173-200 WAC (Drinking Water Regulations).

2. Hydrogeologic Report. The hydrogeologic report dated November 1994 which meets the performance standards of WAC 173-351-490 is approved.
3. Groundwater Monitoring Program. The Groundwater Monitoring Plan submitted in the permit application, which meets the performance standards of WAC 173-351-400 through 490 is approved.

Section VIII. Quality Assurance and Quality Control. The permittee shall perform all construction activities, including closure cap construction in general conformance with construction specifications, final design drawings, constructions quality control plans and construction quality assurance plans approved by the Klickitat County Health Department prior to construction. Construction quality assurance shall be performed by an independent third party.

Section IX. Closure and Post-Closure Plans.
1. The permittee shall perform closure and post-closure according to the permit application and subject to the submittal and approval by the Klickitat County Health Department of a post-closure groundwater monitoring plan, within thirty (30) days of permit issuance.
2. Final cover design for the landfill shall meet the design standards, as described in the closure plan. At minimum, the final cover shall meet the requirement of WAC 173-351.

Section X. Financial Assurance for Closure, Post-Closure and Corrective Action.

a. The permittee shall maintain financial instruments for closure, post-closure and known corrective actions.

b. The permittee shall comply with the financial assurance criteria requirements of WAC 173-351-600.

Section XII. General Conditions

1. Transferability

a. All permits issued pursuant to these regulations are transferable only upon prior written approval of the jurisdictional health department and a demonstration that the prospective transferee will be able to comply with applicable laws and regulations, permit conditions, and other requirements to which the prospective transferor is subject.

b. Upon transfer of ownership of all or part of a facility, a provision must be included in the property deed indicating the period of time during which the facility has been disposing of solid waste, a description of the solid waste contained within, and fact that the records for the facility have been filed with the jurisdictional health department. The deed also must reference a map, which must be filed with the county clerk, showing the limits of the active areas as defined in WAC 173-351-100.

c. Upon transfer of ownership of all or part of the facility, financial assurance shall be in place prior to completion of the transfer.

2. Appeals

Whenever the jurisdictional health department denies a permit or suspends a permit for a solid waste disposal site, it shall, upon request of the applicant or holder of the permit, grant a heading on such denial or suspension within thirty (30) days after the request therefore is made. Notice of hearing shall be given to all interested parties including the county or city having jurisdiction over the site and the department. Within thirty (3) days after the hearing the health officer shall notify the applicant or the holder of the permit in writing of his or her determination thereof. Any party aggrieved by such determination may appeal to the pollution control hearings board by filing with the hearings board a notice of appeal within thirty (30) days after receipt of notice of the determination of the health officer. The hearings board shall hold a hearing in accordance with the provisions of the Administrative Procedure Act, chapter 34.05 RCW, as now or hereafter amended.

3. Renewal

a. The owner or operator of a facility shall apply for renewal of the facility's permit annually, except for that year that a permit has been or will be reissued under WAC 173-351-720 (6).

b. Renewal procedures. The owner or operator of a facility shall apply for renewal ninety (90) days before the anniversary of the effective date of this permit, except for the year that a permit has been or will be reissued. The owner or operator is

authorized to continue all activities authorized under the currently expired permit, if the jurisdictional health department has not rendered a decision on renewal by the yearly renewal date o f the current permit. The permit renewal shall include information required under WAC 173-351-730 (3)(b).

4. Reissuance
Any owner or operator intending to continue construction, operation or post-closure beyond the permitted duration of a valid MSWLF permit must file a reissuance application at least ninety (90) days before the existing permit expires.

5. Modification
   a. The permittee intending to modify this permit must file a modification application at least thirty (30) days before the intended modification. A modification application must be made on forms authorized by the jurisdictional health department and the department.
   b. In order to allow for permit modifications to be authorized at the time of permit renewal, the permittee may combine the application required for a permit modification with the application required for a renewal permit at the time of permit renewal.

6. Suspensions and Revocations
The jurisdictional health department may revoke this permit if the facility is being operated in violation of chapter 70.95 RCW, chapter 173-351 WAC or local ordinances governing solid waste disposal facilities.

7. Inspections
Employees of the jurisdictional health department or their agents may enter upon, inspect, sample, and move freely about the premises of any MSWLF unit after presentation of credentials.

8. Alternative liner system
The Klickitat County Health Department approved an alternative liner system on March 28, 2003. The alternative liner is specified in Section 4.2.4 of the Engineering Report included in the 2004 permit reissuance document dated December 2003.

RELEVANT LANDFILL PERMITS/CERTIFICATIONS

JURISDICTION	PERMIT/CERTIFICATION TYPE and RENEWAL DATE
Klickitat County Board of Adjustment Contact: Curt Dreyer 205 S. Columbus Avenue Goldendale, WA 98620 (509) 773-4616	Roosevelt Regional Landfill Conditional Use Permit Issued April 26, 2006 Revised September 8, 2006 Renewal unnecessary Permit # CUP2006-01
Klickitat County Department of Public Health Contact: Kevin Barry Director of Environmental Health 228 W. Main Street, Suite 'B' Goldendale, WA 98620 (509) 773-4565	Solid Waste Handling Facility Permit Renewable annually March 1 Permit # 20-001
Washington State Department of Ecology Contact: Darlene Frye Central Regional Office 15 W. Yakima Avenue, Suite 200 Yakima, WA 98902 (509) 575-2490	Special Incinerator Ash Permit Issued January 30, 2004 Renewable December 31, 2008
Washington State Department of Ecology Contact: Susan Billings 15 W. Yakima Avenue, Suite 200 Yakima, WA 98902-3387 (509) 575-2490	Air Operating Permit, 03AQ-C005, 2nd Revision *(Title V Air Operating Permit)* Air Quality Permit, NOC DE 90-C153, 4th Revision *(MSW Landfill)* Air Quality Permit, NOC DE 98AQ-C131, 1st Revision *(LFG Flare)* Air Quality Permit, NOC DE 93AQ-C163, 3rd Revision *(Ash Monofill)*

Relevant landfill permits/certifications, continued

JURISDICTION	PERMIT/CERTIFICATION TYPE and RENEWAL DATE
Washington State Department of Ecology Contact: Michael Llewelyn Water Quality Program Manager Department of Ecology Olympia WA 98504-7696	National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge Baseline General Permit for Stormwater Discharges Associated with Industrial Activities
Klickitat County Board of County Commissioners 205 S. Columbus, Room 101 Goldendale, WA 98620 (509) 773-4612	Resolution adopting the 1990 Klickitat County Solid Waste Management Plan, dated December 17, 1990 -and- Resolution adopting the 1992 Addendum to the 1990 Klickitat County Solid Waste Management Plan Update, dated September 8, 1992
Washington State Department of Ecology Contact: Melissa Gildersleeve Central Regional Office 15 W. Yakima Avenue, Suite 200 Yakima, WA 98902-3387 (509) 575-2490	Approval of the Klickitat County Solid Waste Management Plan, Dated November 1990

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **93**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/31/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**32 62 16**	**32 62 16-1**	**Water Quality Protection and Monitoring Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Water Quality Protection and Monitoring Plan

This plan has been prepared by Glacier Environmental Services, Inc. for the Cornet Bay Marina Remediation Project. This plan is intended to outline the specific means and methods for the monitoring and protection of the excellent quality estuarine waters of Cornet Bay. The purpose of this plan will be to guarantee the constant monitoring and protection of the waters surrounding the mixing zone, where all in-water work will be taking place.

The State of Washington Department of Ecology Project Manual for the Cornet Bay Marina Remediation has listed the waters surrounding the Cornet Bay Marina as "Excellent Quality" estuarine waters, which fall under the protection of WAC 173-201A-210. This legislation regulates the usage of marine waters, to ensure the protection of marine animal habitat, and specifically outlines the maximum turbidity allowed in marine water. Exceptions to this turbidity restriction are allowed to occur within a *mixing zone*, which is an area described by a 150 foot radius around any necessary in-water work that has the potential to exceed the maximum Nephelometric Turbidity Units (NTUs) as established by Table 210(1)(e). Some work involved with the Cornet Bay Marina Remediation project will exceed the maximum turbidity allowed. As a result, a mixing zone will be utilized around the area of any work that has the potential to exceed maximum turbidity limitations. The size and location of mixing zones is outlined in WAC 173-201A-400, and has been used to determine the nature of the mixing zone used at Cornet Bay Marina.

A. Locations of Samples: Samples will be taken along the edge of the established mixing zone perimeter, which in this case will be 150 feet, in all directions, surrounding the area of work that is creating excessive turbidity. Testing will occur in locations along the mixing zone perimeter that are most visually indicative of containing excessive turbidity. It is the intention of this plan to actively seek out any instance of high NTU release, and monitor these areas over other areas which clearly do not have any turbidity. If excessive turbidity is not visually identifiable, one sample location will be determined randomly around the perimeter.

Every time a sample is taken, as described above, a coinciding background sample will be taken, which will be used to determine the background levels of turbidity in Cornet Bay. The background samples will be taken in the nearby vicinity of the mixing zone, but will intentionally avoid any areas that may have been influenced by work at the Cornet Bay Marina. The intention of obtaining the second sample is to provide data to contrast existing Cornet Bay water quality, against mixing zone perimeter water quality, and determine what effect, if any, has been caused by work on the Cornet Bay Marina.

B. Number of Samples: A minimum of two samples will be taken daily, when work is occurring that has the potential to cause excessive turbidity in the mixing zone. The first

sample will be along the mixing zone perimeter, and the second sample will be a coinciding background sample. In the event that no areas of excessive turbidity can be seen, only the two samples will be taken. If there is an indication of excessive turbidity, samples will be taken along the mixing zone perimeter in areas most likely to exceed maximum NTU limitations. In the instance of multiple areas being tested at the same time, only one background test will occur.

C. Parameter to be Sampled: The only parameter to be sampled will be that outlined in WAC 173-201A-210(1)(e) Aquatic Life Turbidity Criteria. As identified by the State of Washington Department of Ecology Project Manual for Cornet Bay Marina Remediation, this water is considered "Excellent Quality" estuarine water, and must meet the following criteria as is outlined in Table 210(1)(e):

"Turbidity must not exceed:

- 5 NTU over background when the background is 50 NTU or less; or
- A 10 percent increase in turbidity when the background turbidity is more than 50 NTU."

D. Equipment: Sampling for turbidity will be accomplished with a turbidometer properly calibrated to according to the owner's manual.

E. Best Management Practices (BMPs): Floating silt fence will be used to prevent the migration of silt generated from work on the Cornet Bay Marina.

F. Detection of Exceedances: If, at any time during construction, water is tested and exceeds 5 NTU over background conditions when the background turbidity is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU, we will immediately take action to stop, contain, and prevent unauthorized discharges or otherwise stop the violation and correct the problem. After such an event, we will assess the efficacy of the site BMPs and update or improve the BMPs used at the work site in an effort to reduce or prevent recurrence of the turbidity exceedance.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 16 December 2013
SERIAL NO.: 16
SPEC. REF.: 01 33 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 16
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
A&R = Amend and Resubmit
NR/AR = Not Reviewed/Accepted for Record
MCN = Make Corrections Noted No Resubmittal Required
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	AR		Glacier	Schedule of Submittals

Comment(s):

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **16**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**	**1**	**Schedule of Submittals**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

SUBMITTAL CONTROL DOCUMENT
1250 DENNY WAY PROPERTY REMEDIAL ACTION
9/15/2014

Notice to Proceed Date 12/2/2013

No.	Spec Section	Description	PRE-WORK	PROGRESS	CLOSEOUT	Number of Paper Copies									Required Submission Date	Date Submitted	DATE RETURNED		Remarks
						Administrative/ Plan	Physical Sam	Catalogue Cu	Qualifications	Shop Drawing	Mfr. Certificate	Record Keeping	As-Built Data	Other			Accepted	Not Accepted	
1	32 62 16	Sheet Pile Contractor Qualifications	X						X										
2	00 72 00	Schedule of Values	X			X									12/9/2013				
3	00 72 00	Preliminary CPM Schedule	X			X									12/16/2013				
4	00 72 00	Update CPM Schedule (Monthly)		X											1/16/2014				
5	00 72 00	Statement of Intent to Pay Prevailing Wage	X									X							
6	00 72 00	Final Project Record As Built Drawings			X								X						
7	00 73 00	List of Subcontractors and Major Suppliers	X						X						12/30/2013				
8	01 30 00	Excavation and Shoring Plan				X													
9	01 30 00	Certified Hazardous Material Reports (Disposal Records)		X								X							
10	01 30 00	Schedule of Required Testing (Special Inspection)	X																
11	01 31 13.26	Site Security Plan	X			X									12/11/2013				
12	01 31 13.26	Bulkhead Construction Plan	X			X									12/11/2013				
13	01 31 13.26	Plan of Operations	X			X									12/11/2013				
14	01 33 00	Designation of Superintendent	X						X						12/11/2013				
15	01 35 43	Environmental Protection Plan/SPCC Plan/Designation of Transporters and Disposal Facilities	X			X									12/11/2013				
16	01 33 00	Schedule of Submittals	X									X			12/11/2013				
17	01 33 00	Contractor Health and Safety Plan/Certification Of Worker Hazardous Material Training	X			X									12/11/2013				
18	01 33 00	Designation of Competent Persons	X						X						12/11/2013				
19	01 33 00	Dewatering and Water Treatment Plan	X			X													
20	01 33 00	Contractor Quality Control Plan	X			X									12/11/2013				
21	01 33 00	Land Surveyor Qualifications	X						X						12/11/2013				
22	01 33 00	Identification of Competent Persons	X						X						12/11/2013				
23	01 33 00	Analytical Laboratory Qualifications	X						X						12/11/2013				
24	01 33 00	Material Testing Laboratory Qualifications	X						X						12/11/2013				
25	01 33 00	Steel Sheet Pile Installation Inspector Qualifications	X						X						12/11/2013				
26	01 35 43	Imported Fill Material Analytical Testing																	
27	01 50 00	Dust Control Plan	X			X													
28	01 55 00	Traffic Control Plan	X			X													
29	01 57 13	Stormwater Pollution Prevention Plan (SWPPP)	X			X													
30	01 70 00	Operation and Maintenance Manuals			X									X					
31	01 70 00	Spare Parts List			X									X					
32	01 70 00	Warranties			X									X					
33	02 41 00	Well Decommissioning Report		X								X							
34	02 43 00	Structure Moving Plan	X			X													
35	02 81 00	Excavation, Transportation and Disposal Plan	X			X													
36	03 21 00	Reinforcement Steel Product Data		X				X											
37	03 21 00	Reinforcement Steel Shop Drawings		X						X									
38	03 21 00	Reinforcement Steel Mill Certs		X							X								
39	03 30 00	Concrete Product Data		X				X											
40	03 30 00	Concrete Formwork Product Data		X				X											
41	03 30 00	Concrete Shop Drawings		X						X									
42	03 30 00	Concrete Contractor Qualifications		X					X										

SUBMITTAL CONTROL DOCUMENT
1250 DENNY WAY PROPERTY REMEDIAL ACTION
9/15/2014

No.	Spec Section	Description	PRE-WORK	PROGRESS	CLOSEOUT	Number of Paper Copies									Required Submission Date	Date Submitted	DATE RETURNED		Remarks
						Administrative/ Plan	Physical Sam	Catalogue Cu	Qualification	Shop Drawin	Mfr. Certificate	Record Keeping	As-Built Data	Other			Accepted	Not Accepted	
43	03 30 00	Concrete batch Plant Inspecton Record		X					X										
44	05 50 00	Misc. Metals Product Data		X				X											
45	05 50 00	Welder Certifications		X					X										
46	05 50 00	Misc. Metals Shop Drawings		X						X									
47	06 10 00	Carpentry Product Data		X				X											
48	09 65 16.13	Linoleum Product Data		X				X											
49	09 91 00	Paint Product Data		X				X											
50	09 91 00	Paint Contractor Qualifications		X					X										
51	11 00 01	Misc. Equipment/Mechanical Product Data		X				X											
52	11 00 01	Misc. Equipment/Mechanical Shop Drawings		X						X									
53	11 00 01	Misc. Equipment/Mechanical Installation/Operation Manuals			X									X					
54	22 11 16	Water System Product Data		X				X											
55	22 11 16	Water System Shop Drawings		X						X									
56	22 11 16	Water System Testing and Disinfection Report		X										X					
57	22 11 16	Water System O&M Manuals			X								X						
58	22 13 19.13	Sanitary Sewer Piping Data		X				X											
59	22 13 29.99	Septic System Product Data		X				X											
60	22 13 29.99	Septic System Contractor Qualification/License		X					X										
61	22 13 29.99	Septic System Performance Test Results			X								X						
62	22 13 29.99	Septic System O&M Manuals			X								X						
63	22 13 29.99	Septic System Manufacturer Affidavit of Construction			X								X						
64	23 11 00	Fuel System Product Data		X				X											
65	23 11 00	Fuel System Contractor Qualifications/Certification		X					X										
66	23 11 00	Fuel System Shop Drawings		X						X									
67	23 11 00	Fuel System Test Reports			X								X						
68	23 11 00	Fuel System O&M Manuals			X								X						
69	26 00 00	Electrical Systems Product Data		X				X											
70	26 00 00	Electrical Systems O&M Manuals			X								X						
71	26 00 00	Electrical Systems As-built Drawings			X								X						
72	31 20 00	Import Material Physical Samples		X			X												
73	31 20 00	Import Material Laboratory Testing Results		X										X					
74	31 20 00	Import Material In-Place Density Reports			X								X						
75	31 20 00	Import Material Chemical Analysis		X								X							
76	31 23 19	Dewatering and Water Treatment Plan	X			X													
77	31 23 19	Water Treatment Analytical Results		X										X					
78	31 32 19	MSE Wall Product Data		X				X											
79	31 32 19	MSE Wall Shop Drawings		X						X									
80	31 32 19	MSE Design Calculations		X										X					
81	31 32 19	MSE Manufacturer On-site Representative Qualifications		X					X										
82	32 62 16	Bulkhead Construction Plan	X			X													
83	32 62 16	Bulkhead Shop Drawings	X							X									
84	32 62 16	Sheet Pile Mill Certs	X								X								
85	32 62 16	Sheet Pile Field Inspector Qualifications	X						X										
86	32 62 16	Sheet Pile Welder Certs	X						X										
87	32 62 16	Sheet Pile Installation Safety Plan	X			X													

SUBMITTAL CONTROL DOCUMENT
1250 DENNY WAY PROPERTY REMEDIAL ACTION
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88	32 62 16	Sheet Pile As-built Data			X								X						
89	32 70 00	Wetland Plant Source	X						X										
90	32 70 00	Wetland Plant Receipts			X														
91	32 70 00	Topsoil Product Data	X																
92	32 70 00	Topsoil Physical Sample		X			X												

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 January 2014
SERIAL NO.: R1
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 17R1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier	Site Safety and Health Plan R1

Comment(s):

1. Revision 1 included Ty's comments.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **17 R1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/17/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**		**SSHP**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Shop Drawing Review Letter

Kennedy/Jenks Consultants

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Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

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Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier	Site Safety and Health Plan R1

Comment(s):

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Contractor	Laurel Golembiewski	x	x
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KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **17 R1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/17/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**		**SSHP**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

SITE SAFETY AND HEALTH PLAN

CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

Prepared by:

Glacier Environmental Services, Inc.
PO Box 1075
Mukilteo, WA 98275

Prepared for:

DEPARTMENT OF
ECOLOGY
State of Washington

November 2013

SITE SAFETY AND HEALTH PLAN
CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

TABLE OF CONTENTS

SITE SAFETY AND HEALTH PLAN
CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY, WASHINGTON

I. Introduction

This site safety and health plan (SSHP) has been written for use by Glacier Environmental Services, Inc. (Glacier) employees, and to guide actions of others on the construction site during this project. Glacier assumes no responsibility for its use by others. The plan is written for the specific conditions, purpose, and personnel specified in the project documents. This plan must be amended if unanticipated conditions, representing a potential hazard to Glacier employees or subcontractors, are encountered.

II. Purpose

The purpose of this Site Safety and Health Plan (SSHP) is to address safety and health issues arising out of the potential for worker exposures to hazardous materials or conditions encountered during excavation, dewatering, backfilling, grading, and site restoration at the Cornet Bay Marina Remediation site.

The intent of this plan is to meet the requirements of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response applicable to work in potentially hazardous conditions or where there is a potential for exposure to hazardous materials or wastes. The plan is not intended to address common construction practices covered by 29 CFR 1926. The Glacier Accident Prevention Plan addresses general construction safety.

This SSHP is based on previously identified contaminants and site conditions outlined in the *Department of Ecology Invitation for Bids, IFB 1415 TCP, Cornet Bay Marina Remediation dated September 2013*. Where appropriate, the SSHP may be supplemented with material or task-specific health plans if subsequent evaluation of the site materials, or work tasks determines that a specific risk is not adequately addressed herein.

Additional safety documentation is available to Glacier employees and its subcontractors. This information includes Glacier's Accident Prevention Plan, Hazard Communication Program, Respiratory Protective Program, and Confined Space Entry Program. These plans are incorporated into this SSHP by addendum and will be available at the Site. They are intended to supplement the SSHP and to address normal safety practices on construction sites.

The SSHP will be kept on site and available to workers in accordance with CFR 1910.120(b)(4)(i).

III. Project Description

The Cornet Bay Marina Site is located at 200 Cornet Bay Road in Oak Harbor on Whidbey Island. It is bounded on the west by Cornet Bay and on the east by Cornet Bay Road and mixed residential homes and light commercial land uses. Deception Pass State Park is immediately adjacent to the north of the Site. The marina was constructed in the 1960s and has been operated as a marina and general store since then. The Site, which covers approximately 1.1 acres of upland property, includes a store building, a gravel parking lot, a 330-foot-long aging

wooden bulkhead that separates the upland facility from the marina. Fuel is provided to boats via a vaulted underground storage tank.

Previous earthquake severed fuel lines supplying gasoline and diesel fuels to the dock fueling stations, contaminated most of the marina area with fuel product.

Soil and groundwater has been contaminated by petroleum from several fuel line releases. Contamination has been spread almost across the entire property over the years. The known contaminants in soil and groundwater include:

- Gasoline;
- Diesel fuel;
- Benzene, toluene, ethyl benzene, xylene (BTEX).

The objective of this project is to excavate, load and transport as much Gasoline, Diesel and BTEX impacted soil as is practical for legal off-site disposal. To facilitate the excavation and removal of the contaminated material to the depths required, the existing marina building will be moved from its foundation to the nearby State Park, the foundation demolished, and other site items demolished to allow excavation to occur. An approximate 350 foot sheet pile wall will be installed to replace the existing end-of-life wooden bulkhead. Impacted groundwater will be pumped, treated and discharged to Cornet Bay to facilitate excavation and backfill.

IV. Preliminary Findings

This plan assumes that contaminants of concern may include Gasoline, Diesel and BTEX in both soil and groundwater. The plan also assumes that contaminant concentrations will not be present that exceed hazardous waste disposal thresholds, or to require personnel protective equipment beyond Level C. Subsequent screening with a calibrated photo ionization instrument and laboratory testing will be performed to quantify and characterize wastes. The presence of free product in excavations or if analysis determines the presence of hazardous material, this SSHP may have to be modified to describe additional hazards and require additional worker protection.

V. Scope of Work

The work to be performed will include furnishing all labor, materials and equipment necessary to complete remediation of contaminated materials at the Site.

The general tasks necessary to complete the work include, but are not limited to the following:

- Site preparation including installing temporary facilities and site controls, installing temporary erosion and sedimentation controls, protecting or re-routing of existing utilities;

- Construction of a new steel sheet pile bulkhead to replace the existing end-of-life wooden bulkhead;

- Lift the marina building from its foundation and move to the nearby State Park, demolish its foundation and all other concrete slabs, to allow excavation to occur.

- Excavate to the depths required to reach clean soil as determined by testing of the excavation sidewalls and bottom. Clean overburden, as determined by Ecology, will be excavated and stockpiled to use as backfill;

- Assist the Engineer in collection of samples;

- During excavation, existing wooden bulkhead piles will be cutoff at the bulkhead water side mud line. All bulkhead construction materials will be removed and properly disposed of offsite;

- All excavations will be backfilled as shown on the project drawings with clean imported fill material or stockpiled clean overburden material at Ecology's direction. Clean Pit Run material will be imported to backfill the remaining excavations and properly compacted to minimize future settlement.

- The marina building will be placed on a new foundation and other site improvements shall be made to return the marina to its original preconstruction condition;

- A new septic tank effluent pumping system will be installed and connected to the existing mound on-site sewage system.

VI. Task Risk Assessments

By its nature, construction work can be hazardous to personnel who are not properly trained and/or fail to apply their training, are non-observant, careless or take unnecessary risks. Proper training and observance of site rules and appropriate regulations can mitigate most of that risk. Risk assessments of tasks and operations help in the communication about risk, identification of hazards and assisting implementing or assessing hazard control strategies to reduce risk. Risk assessment is a continuous process.

For each site task to be performed, a Job Safety Hazard Analysis (JSHA) has been developed and is included in Appendix A of the SSHP. Workers should become familiar with the JSHA for each new phase of the project.

JSHA's for new phases/tasks shall be reviewed with workers in the safety meeting prior to starting that phase and periodically as that phase progresses. Workers should be encouraged to input revisions to the JSHA's to the SSHO to address unique characteristics of this site or to address risks not previously recognized. In the event that existing risk assessments are revised or new risk assessments developed, they will be incorporated into this SSHP and workers advised of changes or new assessments at safety meetings.

The JSHA's listed below have been prepared for initial site activities and are attached as Appendix A. Additional task specific JSHA's will be developed, with worker input, and included in this SSHP by addendum.

Initial JSHA's:

a. Mobilization
b. Excavation/Trenching
c. Backfilling
d. Dewatering/Water Treatment/Disposal
e. Decontamination

VII. Airborne Hazards

It is anticipated that most aspects of the project will represent minimal airborne exposure risk to workers. Exceptions may include the presence of contaminated media during excavation and grading, where there is a potential for exposure by inhalation. Nuisance dust, generated by various construction and excavation tasks, should be minimal due to the use of dust suppression techniques, such as water sprays. The following information provides more details about potential contaminants of concern (COC's) that pose a potential human health hazard:

A. Total petroleum hydrocarbons (TPH) refer to a group of substances, which have similar properties and are petroleum based. The classification includes fuels such as diesel, aviation fuels and gasoline, solvents such as mineral spirits and lubricant oils or greases.

B. Diesel (fuel oil #2) is usually a brown, slightly viscous liquid obtained from the middle distillate in petroleum distillation. It is available in various grades as required by the different uses: diesel, semi-diesel and high speed engines, all requiring a fuel with a low viscosity and moderate volatility. Diesel has a flash point of 110 to 120 degrees F., a density <1, and an auto ignition temperature of 494 degrees F. The LEL is approximately 1% and the UEL is approximately 6%. Diesel can cause irritation of the skin and inhalation of high vapor concentrations may cause headaches and stupor. There is no established PEL.

C. Gasoline is a blend of chemicals that have similar boiling and flammability characteristics. It is insoluble in water and is also lighter than water, so it will "float' on top of any standing water. Gasoline is relatively volatile so it evaporates readily when exposed to air. The vapors have a vapor density of 3 to 4 (air =1), which causes the vapors to concentrate in low-lying areas, such as the bottom of an excavation. Its primary use is as a fuel for internal combustion engines. The LEL is 1.4% or 14,000 ppm. Gasoline has a PEL and a TLV of 300 ppm. Note: if "old" gasoline is present, additives including organic lead compounds and lead scavengers such as ethylene dichloride and ethylene dibromide, may be present in small but detectable amounts. They represent minimal hazard from airborne exposure.

D. BTEX in the case of this project are the gasoline byproduct related aromatic compounds Benzene, Toluene, Ethylbenzene, and Xylene. In pure form they have characteristic "sweet" aroma. (The name "aromatic compounds" was first used to describe them because of their smell.) All are central nervous system depressants. All have been linked with some types of cancer in rats and mice when they were exposed to high (750 ppm) concentrations during a chronic (long term) study.

E. Metals of many types may be encountered during the excavation of soils, however no specific metals analysis was provided. As a general rule, metals are very poorly absorbed through intact skin. They do not represent much of an inhalation hazard unless the dust with which they are associated is in high concentration (> 10 mg/m^3). This is not likely to be encountered due to site conditions.

F. Nuisance dust may be produced on site as a result of construction activities. Dust suppression techniques will be employed, including the use of water sprays, as needed. No significant concentration of acutely toxic solids, that could become airborne, is

anticipated. The dust from the construction activity may be a nuisance to some individuals; however it is not anticipated to exceed the PEL of 10mg/m^3.

G. Respirable crystalline silica refers to one or more forms of silica, of such size as to be able to be inhaled deeply into the lung. Crystalline silica is a component of concrete and woekers may be exposed during concrete demolition. Common forms of crystalline silica, such as quartz and tripoli have exposure limits of 0.1 mg/m3. Their main health effect is the capacity to produce a lung disease, silicosis, following long periods of high exposures without proper engineering controls or use of personal protection.

   Silicosis is a chronic disease, is non-reversible and leaves the individual more susceptible to other lung diseases, such as tuberculosis. Two other forms of crystalline silica are cristobalite and tridymite, and these forms have a PEL of 0.05 rng/m3. In addition to the potential to produce silicosis, these forms may also produce cancer. Exposure to crystalline silica by ingestion or skin contact is not a significant health concern. Since the various forms of crystalline silica may be found in common sand and aggregate, the lower PEL is commonly used unless laboratory analysis confirms that neither cristobalite nor tridymite are present.

Exposure to COC's in soil is predominantly of concern through a number of possible exposure pathways, including dermal contact with soil, ingestion of soil, inhalation of soil particulates, and ingestion of contaminated groundwater.

VIII. Physical and Biological Hazards

The following is a list of potential physical and biological hazards, which may be encountered during excavation, demolition and other construction activities.

A. Noise. Power equipment and tools used in the excavation and grading activities may produce high noise levels and expose workers to noise levels in excess of 85 decibels. Noise monitoring shall be conducted as needed and in accordance with 29 CFR 1910.95, 1926.52 & 1926. Operators of portable pneumatic impact equipment and personnel in proximity, within 15 feet, to compressors and compressed air powered tools are at potential risk and will wear hearing protection when the equipment is operating. Glacier will provide disposable hearing protection.

B. Overhead Lines. Prior to commencing work, a visual inspection of the sites will be conducted to identify any power lines or conduit. Any line that interferes with, or in any way may cause a hazard to workers, will be relocated. Overhead lines that interfere or at risk due to construction will be flagged to warn workers. If lines are present outside of conduit, worker's may not bring conductive material closer than 20 feet to any energized power line.

C. Utilities. Some utilities may be encountered during the excavation. At least two days prior to the initiation of any excavation, the exact location of utilities will be confirmed by completing a "one call" utilities locate. The phone number for this service is (800) 553-4344; Glacier's unique identification code is 23514. While utilities are exposed, they shall be protected, supported or removed as necessary to safeguard workers.

D. Temperature Stress. Akthough not anticipated work may be performed during months when there may be exposure to elevated ambient temperatures. Coveralls or

disposable protective clothing could reduce evaporative cooling that could lead to stress in a non-acclimatized individual under intense work regimens. Sweating will also deplete body fluids. In hot weather or with intense work or exercise, individuals should consume about 1 to 2 gallons of water, or electrolyte replacement fluids, per day. A shaded rest area with ample supply of fluid replenishment will be available to employees. The types and symptoms of heat stress, from least severe to most severe are:

1. Heat Rash. Affected areas of the body may exhibit skin rashes. These rashes may cause itching and tingling. First Response: after work, take shower, dry skin thoroughly, change wet clothing, cool body temperature, use powder to absorb moisture.

2. Heat Cramps. Heat cramps usually occur in the muscles of the abdomen and lower extremities. Profuse sweating usually causes these, which depletes electrolyte supply. First response: move individual to cool area or shade and remove unneeded clothing to increase evaporative cooling; provide 1-2 cups of cool water to drink; gently message affected muscles; seek medical attention.

3. Heat Exhaustion. The symptoms of heat exhaustion may include profuse sweating; hot, moist skin; normal or low body temperature; weak, rapid pulse; shallow, rapid respiration rate; and pale, clammy skin. Other symptoms may include headache, extreme fatigue, weakness, dizziness, nausea and fainting. This may rapidly progress to an emergency situation. First Response: **call for ambulance**; move individual to cool area or shade; remove unnecessary clothing; place person on back with feet elevated; offer cool water to drink ONLY if conscious; transport to hospital.

4. Heat Stroke. The symptoms of heat stroke include hot, dry, and flushed skin; strong, but varying pulse; high core body temperature; seizures; and loss of consciousness. Other symptoms include headaches, dizziness, and dryness in mouth. Heat stroke may be differentiated from heat exhaustion by the high body temperature and dry, flushed skin. The onset may occur rapidly; adverse health effects may be permanent. **This is an emergency situation.** First Response- **Call for immediate ambulance transport to a medical facility.** Move individual to cool area or shade, remove clothing, sponge with cool water and fan to dissipate heat; **transport immediately to hospital.**

   If conditions such as high temperatures and high humidity are present, with heavy workloads, work/rest regimens should be implemented to prevent heat stress. Another method of monitoring the body's response to heat is to periodically measure the heart rate (HR), or pulse, for 30 seconds at the beginning of a rest period. The HR should NOT exceed 55 beats (110 beats/min). If the HR exceeds this rate, decrease work period (time between breaks) by 1/3, leaving break length the same. At next break, if HR exceeds 110 beat/minute, shorten work period by another 1/3. Continue with this procedure until HR can be maintained below 110 beats/minute. Replacement fluids should be readily available to workers at the work site, including in or near any restricted-entry or controlled zones.

E. Slip/Trip Hazards. The site surfaces may be wet as a result of rain or dust suppression. Worker's must assure good footing while in the work area.

F. Illumination. While most work will be performed during daylight hours, natural illumination will need to be supplemented with local task lighting if night work is planned. When work areas are staffed at night, access ways, active storage areas, and field maintenance areas will have a minimum of 5 foot- candles of illumination. Rest areas, toilets, and storage/repair areas will have a minimum of 10 foot-candles and offices and first-aid stations will have a minimum of 30 foot-candles.

G. Operation of Heavy Equipment. Operation of heavy equipment at the site poses hazards to operators and workers due to uneven surface and normal congestion. Only experienced, trained operators may operate heavy equipment on site. All trucks and heavy equipment will have back- up alarms. Dump trucks will have ground assistance (spotter) when backing up.

H. Open Excavations. Temporary barriers will be erected and maintained to delineate excavations. Other below-grade excavation areas that are not active will be clearly delineated by the use of high visibility barrier tape or fence. Perimeter barriers will be re-established at the end of each workday. Excavations created during site operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with of 29 CFR Part 1926 Subpart P.

1. Note: Shored excavations may create a confined space environment due to the depth and limited means of egress. As long as access/egress can be maintained by ladders, the space will be considered an excavation. However, since this space is open to the atmosphere with large cross section affording adequate normal ventilation, it will normally be non-permit required due to the lack of hazards that are immediately dangerous to life or health, such as low oxygen or hazardous atmosphere.

I. Radiological. Based on current, best-available information, there are no reported radiological hazards are on site, and therefore little or no risk to human health. Any evidence observed by site workers of possible radioactive materials present on site should be reported to the Project Manager immediately.

J. Biological. No reported biological hazards are on site. Any laceration or puncture wound should be reported to the Project Manager, thoroughly cleansed and an assessment made as to the need for medical attention.

K. Insect or snake bites. Individual susceptibility to bug bites or stings may vary. Most bug bites or stings are a nuisance that may be avoided by the use of repellents. In case of rapid inflammation (reddening/swelling) of the site of bite or sting, or ANY difficulty in breathing, immediately summon medical assistance or transport individual to emergency room. All snake bites require immediate medical attention. Report any bites or stings requiring medical attention on incident report formModifications susceptibility to bug bites or stings may vary. Most bug bites or stings are a nuisance that may be avoided by the use of repellents. In case of rapid inflammation (reddening/swelling) of the site of bite or sting, or ANY difficulty in breathing, immediately summon medical assistance or transport individual to emergency room. All snake bites require immediate medical attention. Report any bites or stings requiring medical attention on incident report form.

IX. Field Instrumentation and Monitoring

The Site Safety and Health Officer (SSHO) will monitor active work areas of the site and/or monitor personnel to determine if hazardous conditions or exposures exist. Monitoring will be conducted during operations when work is being performed below grade, within confined spaces, during excavation of soil suspected of contamination and when working in areas of obvious liquid contamination. The SSHO will assess site conditions, using observation, lab reports, and the tasks being performed, to determine the locations(s) and interval for additional monitoring. At the beginning of a new task, monitoring will be conducted continuously until stable conditions have been established and any potential hazard characterized. Additional monitoring will be performed whenever conditions, such as the nature of the substrate, change and at least every thirty minutes when workers are in the area. All measurements will be made in the breathing zone unless otherwise deemed necessary.

During site operations a combination of instruments will be used. The SSHO will check instrument operation and calibration and maintain batteries on a daily basis.

A. Combustible Gas. A Gastec™ Model GT302 or equivalent instrument, with both audible and visual alarms will be used to monitor operations where the soil surface is disturbed or when work is being performed below ground level or in a confined space. The instrument will be calibrated with 0.75% pentane prior to use. The audible alarm will be set at 20% LFL for pentane.

B. Oxygen Concentration. The Gastech GT302 or equivalent instrument will be used to measure oxygen concentration. A background reading of 20.8% oxygen by volume will be considered "normal". Both the audible and visual alarm point will be set at 19.5%.

C. "Total Organic Vapors" A MiniRAE Model 2000 or equivalent will be used to detect organic vapors. It incorporates a photoionization detector (PID) that responds to many of the common organic compounds found on industrial sites. Because the response is not linear, i.e. it does not read on a one-to-one basis for all substances, a conservative action level of 5 ppm has been established. This will allow for the additive effect of mixed gases or vapors while at the same time providing adequate protection for the most toxic. The instrument will be calibrated to 9.8-ppm toluene in air using the 10.2 eV lamp.

D. Other Chemicals. Draeger™ Colorimetric Indicator Tubes come in a wide variety of chemical and concentration combinations. Due to the difficulty of using direct reading instruments to differentiate between compounds with the same boiling temperatures or flammability range, direct reading Draeger tubes may be used. For example, if there is a significant PID reading, and aromatic hydrocarbons are suspected, Draeger tubes for benzene or xylene may be used to quantify an exposure.

The results of the air monitoring will be recorded on the form provided in Appendix B and used to determine the appropriate level of personal protective equipment (PPE) as designated in Table 1.

Table 1
Air Monitoring Action Levels

Monitoring Device	Action Level (units above background level)	Protective Measure
Photoionization Detector (10.2 eV lamp)	<5 ppm	Level D
	5-25 ppm	Level C Half Face respirator w/OV Cartridge
	>25 ppm and Oxygen/LEL in acceptable range	Stop work; contact Corporate H&S Officer; consider forced ventilation to return to acceptable level
Combustible Gas Indicator	Oxygen <19.5% or >22%	Stop work; evacuate the area; contact Corporate H&S Officer
	<5% LEL	Continue monitoring
	5-10% LEL	Use caution, continue monitoring
	>10% LEL	Stop work; contact the Corporate H&S Officer, consider forced ventilation to return to acceptable level

In the event of an alarm condition, an immediate re-test will be conducted using portable instruments, which are carried by/available to SSHO. If a secondary alarm condition is encountered, work will be suspended and workers will be removed from the area, SSHO or Project Manager notified of condition and entry restricted until safe (non-alarm) conditions are restored or verified by SSHO. All alarm events and test conditions will be recorded in a daily log. The log will be provided to the Project Manager at the end of each workday. The Project Manager will make a copy available to the Engineer.

Portable air monitoring instruments will be field calibrated regularly with a known gas concentration to assure their operability and accuracy and the results will be recorded on a log which will be on file at the Glacier field office. Instruments that fail calibration will be immediately replaced by a working unit or component while the defective unit is repaired.
All instruments used to monitor air contaminants will undergo a full “factory” calibration of sensor and electronics, as prescribed by manufacturer, at least every six months. The date of last “factory” calibration will be recorded on instrument and calibration documents for each instrument will be maintained by SSHO at the Glacier field office.

X. Medical Monitoring

All workers who will be working with hazardous materials must participate in medical monitoring, as described in 29 CFR 1910.120 (f). A medical monitoring program should consist of the following:

A. Medical and Exposure History
B. Brief "hands-on" Physical by Physician
C. Spirometry
D. Complete Blood Count, including differential

If the attending physician decides that the employee is of questionable medical status, additional tests may be run. The physician will then make a determination if the employee is capable of working on-site. If a worker becomes exposed to a chemical, or if that worker experiences suspicious symptoms, an incident physical is mandatory. This should be done as soon as possible, but in no case later than 72 hour's after the incident. The physician will be given a list of all suspected chemicals the worker may have been in contact with. The worker will not be allowed back on site until a Fitness for Duty Statement is issued by the physician. If a worker may be exposed to concentrations above the Permissible Exposure Limit (PEL) for any chemical for 30 or more days a year, a full medical exam is required.

Additionally, a specialized medical examination to determine if a person is fit to wear a respirator must be performed before anyone, required to wear a respirator, is fit tested. A non-confidential notice of fitness to wear a respirator shall be maintained on file in the Glacier field office.

Non-confidential summaries of medical determination of fitness to work (Back-to-Work Exam), following any incident, will be also be maintained on site. Other medical records for Glacier personnel are maintained by the Occupational Physician, J.R. Smith, M.D., a licensed health care practitioner at Health Force Occupational Medicine, (206) 624-3651.

Copies of the Occupational Physicians fitness for duty forms are attached in Appendix C.

XI. Selection of Personal Protective Equipment

General construction work normally does not pose a hazard due to skin contact beyond that found on most construction sites, and no special chemical protective clothing is required. Although possible contamination of soil has been reported for the site, the levels anticipated do not pose a major health hazard, unless there is prolonged skin contact. Therefore Level D protection, described below, will be worn for protection from nuisance contamination. Periodic washing of exposed skin, especially before eating, using the toilet, or leaving the site, can further minimize health hazards.

A. Head: Wearing of hard hats is required when on the site. Only hard hats meeting the current ANSI Z89.1 standard are acceptable.

B. Body: Personnel will wear standard construction clothing, unless liquids are encountered in excavations. If liquids are present in excavations, disposable coveralls made of hydrophobic woven or spun polymers or "chemically resistant" rain suits will be required to minimize contact with the liquid.

   ANSI Level II or III Orange, retro reflective orange work vests will be worn by all personnel entering the site.

C. Feet: All personnel entering the work zone will wear sturdy construction boots, meeting the current ANSI Z41 standard. While working in liquid contamination, chemically resistant boots will be worn.

D. Hand: The contamination levels in soils are not expected to pose a skin hazard to workers. Leather or cotton work gloves will suffice. However, during work in petroleum-

contaminated soil areas, the use of neoprene gloves is recommended. Personnel working in the presence of free product will wear impervious gloves.

E. Eye protection Safety glasses are required for all workers at the Site. Workers exposed to potential eye injury such as torch cutting, grinding, sandblasting, etc will wear additional protection such as goggles or face shields meeting current ANSI Z87.1 standards. The use of contact lenses will not be restricted.

F. Hearing: Single-use hearing protection devices or ear muffs will be made available to personnel working on site near heavy equipment operation.

During excavation of subsurface soils and management of stockpiled contaminated soils, and where prolonged skin contact with a hazardous concentration is expected, additional protective clothing requirements may also be required. Such requirements will be addressed in safety meetings, as needed. The additional requirements will be defined by the SSHO, based on observation and air monitoring, and may include any or all of the equipment listed above:

When there has been contact with contamination, personnel will follow decontamination procedures outlined in Section XV of SSHP prior to removal storage/disposal of personal protection.

Visitors to the site, including employees, subcontractors, representatives of BNSF, and representatives from governmental agencies shall wear personal protection deemed appropriate by Glacier or as advised by SSHO. Individuals unable or unwilling to wear the proscribed personal protection will be denied entry to the work site.

XII. Selection of Respiratory Protection

It is not anticipated that respiratory protection will be routinely required during excavation. However, some construction tasks may locally generate sufficient nuisance particulate that filtering facepiece respirators (dust masks) may be appropriate. If elevated levels of petroleum contaminants are encountered in excavations, engineering controls, such as blowers, will be used to reduce concentrations to those acceptable for use with an air-purifying respirator. Respirator selection and use, cleaning, inspection and repair/replacement and storage will be in accordance with Glacier Respiratory Protection Program.

XIII. Ventilation

Ambient air movement should be adequate to ventilate excavation areas. However, if sustained organic vapor levels in excess of 10 ppm are measured in the breathing zone, air movers will be used to ventilate the work area. If free product is noted in excavations or there are worker complaints of eye or throat irritation, mechanical ventilation may also be required.

XIV. Access Control and Work Zones

Work area control will be achieved through the use of zones (exclusion zone, contamination reduction zone, and support zone). The exclusion zone and contamination reduction zone will be designated with temporary fencing and warning signs. A site plan will be posted in the Field Office, showing the location and current boundaries of the various work zones.

Only persons directly working for Glacier, Ecology, and their sub-contractors, representatives and officials from governmental agencies will be allowed in exclusion and contamination reduction zones. The number of persons will be limited to only necessary personnel. Evidence of current training, medical surveillance and respirator fit test credentials (if respirators are required) must be provided by visitors prior to being allowed into the Contamination Reduction or Exclusion Zones.

Excavations and areas immediately surrounding excavation and stockpiling operations will be designated the exclusion zone.

The necessary equipment to accomplish decontamination will be placed in the contamination reduction zone near the entry/exit to the exclusion zone.

The Construction Yard and Staging Area will be considered the Support Zone. It will contain field offices, car park, worker support services, as well as equipment and material storage

Site entry and egress will be through a Decontamination Trailer located between the Support Zone and Contamination Reduction Zone. This single point will be monitored as needed to assure compliance with decontamination procedures. The Decontamination Trailer contains an emergency eye wash, emergency shower, first aid kit, hand cleansing facilities, and personnel protective equipment (PPE).

Personnel will be instructed on proper procedures for personal decontamination and decontamination of equipment by the SSHO. .

XV. Decontamination

A Decontamination area will be established by SSHO in the Contamination Reduction Zone near the entry/exit to the decontamination trailer. Wash and rinse buckets and brushes, bags or drums for disposing contaminated PPE articles, and drum for storing contaminated wash/rinse water will be provided in the decontamination area. All disposable clothing (PPE) will be disposed in bag or drum that is clearly labeled “PPE Waste”. Wash water from decontamination buckets will be collected in a drum marked “Waste Wash Water”.

Decontamination will be accomplished as follows:

<u>Level D decontamination</u>

- Wash rubber boots in buckets.
- If non-cotton gloves worn, wash and remove. These may be reused.
- If cotton gloves are worn, remove and place in PPE Waste drum.
- Remove any inner glove and place in PPE Waste drum.
- Remove disposable clothing and place in PPE Waste drum.
- Enter decontamination trailer and remove boots and store in locker; also inspect and store reusable gloves.
- Wash exposed skin with soap and water.
- Exit to Support Zone through “Clean side of decontamination trailer

Level C decontamination

- Wash rubber boots in bucket.
- Wash and outer gloves and remove. If single use, dispose in PPE Waste; if reusable, set aside.
- Remove respirator. Remove cartridge(s) and dispose of them in PPE Waste. Set respirator facepiece aside.
- Remove any inner glove and place in PPE Waste drum.
- Remove disposable clothing and place in PPE Waste drum.
- In decontamination trailer, remove boots and store; also inspect, clean and store respirator facepiece and reusable gloves.
- Wash exposed skin with soap and water.
- Exit to Support Zone through "Clean side of decontamination trailer

When equipment decontamination is necessary, the equipment will be cleaned on site using water from the hose of a water truck. If this does not prove sufficient, a pressure washer will be used. Wash water will be collected and stored in wastewater holding tank or drums.

XVI. Training Requirements

All personnel who will work in the Exclusion Zone or Contamination Reduction Zone must have completed a 40-hour Hazardous Waste Operations Training and a current 8-hour refresher course. Prior to beginning this project, all personnel will participate in a site-specific orientation session. New workers will attend an orientation session before starting a work assignment. Tailgate safety meetings will be conducted by the SSHO daily. If additional meetings are required, the Project Manager will notify the workers. These meetings will discuss methods to safely work around the construction site and address other specific health hazards of concern on the site. Documentation of training for Glacier and subcontract personnel is included in Appendix C.

A. Site-specific Training Content

1. Review the site Safety and Health Plan (SSHP).

2. Review of Glacier's health and safety requirements.

3. Worker responsibilities while on the job site.

4. Hazard Communication Training as defined by CFR 1910.1200.

5. Medical surveillance requirements and a review of the chemical hazards on site. This will include a list of the chemical names, permissible exposure limits, acute and chronic symptoms of exposure, first aid treatment, and any other information related to the chemicals which is deemed warranted, such as flammability.

6. Review of physical hazards on site.

7. Review of task assessments.

8. Assure that all persons required to wear respirators have medical clearance and have been fit-tested prior to respirator use.

9. Review what personal protective equipment will be used and under what circumstances, including their limitations, cleaning and inspection.

10. Review confined space entry requirements and hazards of working in confined spaces.

11. What methods of engineering controls will be used and when they are appropriate.

12. A description and demonstration of the air monitoring/gas detection equipment.

13. Review site evacuation and re-entry procedures.

14. A review of fire and explosion hazards, including the use of fire extinguishers.

15. Discussion of confined space rescue plan.

B. New Workers: Workers new to this site will also be required to have at least two days of on-site orientation under the direction of an experienced supervisor before being allowed to work unsupervised at this site.

XVII. Responsibilities

The Project Manager and the SSHO are responsible for enforcing the health and safety requirements. The Project Manager will act as Site Safety and Health Officer if the designated SSHO is not on site.

A. Project Manager will:
   1. Assure that all on-site workers have received the appropriate level of Health and Safety Training;
   2. Assure that all on-site workers meet the required qualifications for site work;
   3. Assure that all standard operating procedures are followed at all times;
   4. Address any unusual problems or conditions that may be encountered on site:
   5. If the SSHO is not on site, act in that capacity;
   6. Maintain a current list of all workers working on the site; and
   7. Report to COR if any exposure is at or above the PEL.

B. Site Safety and Health Officer (SSHO) will:
   1. Walk the work site at the beginning of each shift to assure that excavation barriers, and other signage, are in place and that zone boundaries on site plan are current;
   2. Periodically monitor the work environment for health and safety hazards. The SSHO will monitor during excavation, confined space entry, and whenever there is a worker complaint of irritation or adverse exposure or as recommended by the CIH;
   3. Record observations and instrument readings in daily log, which shall be maintained at the Glacier project office.

4. Investigate all accidents/illnesses;
5. Oversee the proper use, maintenance, and decontamination of personal protective equipment;
6. Be present at health and safety meetings and assist in topic selection and discussion;
7. Report any unsafe conditions or exposures at or above the PEL to the Project Manager.

C. Health and Safety Manager/ will:
   1. Review, sign and date the SSHP prior to submittal.
   2. Be available for consultation on any unsafe conditions that may be present on site and assist SSHO in post-incident analysis.
   3. Visit the site as necessary to audit the effectiveness of the SSHP.
   4. Coordinate any modifications to the SSHP with the Glacier Project Manager or SSHO.
   5. Review air monitoring data and recommend any changes to engineering controls, work practices and PPE.

D. Site Workers (including all Glacier employees as well as their subcontractors) will:
   1. Read and follow the Site Safety and Health Plan;
   2. Complete the required training;
   1. Not work below grade or in confined spaces while unaccompanied;
   2. Report any accidents/illnesses, unsafe conditions, or any unusual situation to Project Manager or SSHO;
   3. Check all personal safety equipment prior to entering a restricted area, to assure that the equipment is in good working order;
   4. Maintain and decontaminate personal protective equipment as required;
   5. Utilize change and wash facilities to maintain good personal hygiene; and
   6. Avoid horseplay, fighting or other actions that could injure other workers by direct contact or through distraction from potential site hazards.

XVIII. Emergency Response and Contingency Procedures

In accordance with 29 CFR 1910.120(l) and ER 385-1-92 App C C-13 (b) Glacier has developed the following emergency response and contingency procedures.

A. Incidental Responses: Glacier employees will respond to incidental situations involving chemical exposures, personal injuries, fires/explosions, environmental spills and releases that are limited in quantity and pose no emergency or threat to the safety and health of workers in the immediate vicinity.

B. Emergency Response Plan: Proper emergency planning and response are important elements of the safety and health program that help minimize employee exposure and injury. The plan includes the following elements:

   1. Personnel roles, lines of authority, and communication procedures. SSHP Section XVIII details personnel roles, lines of authority and communication procedures.

2. Pre-emergency planning. The Project Manager and SSHO will conduct pre-emergency planning and train site workers as specified in Site Safety and Health Plan Section XVII

3. Emergency recognition and prevention. All personnel who will work in the Exclusion Zone must have completed a 40-hour Hazardous Waste Operations Training and a current 8-hour refresher course, which includes emergency recognition and prevention training. In addition Glacier has initiated an Accident Prevention Plan in conjunction with this SSHP.

4. **All Emergencies call 911**

5. Emergency medical and first-aid treatment. Each situation must be evaluated on-site to determine if outside medical treatment is necessary. Symptoms or exposures involving the eyes or respiratory systems, which do not readily respond to "flushing" of "Fresh Air", should be seen by medical personnel. The Glacier Project Manager or SSHO will determine when medical attention is required. If a heart attack, stroke or heat stress is suspected, immediately notify the BNSF Project Manager and dial 911. Move individual to area where responders can have easy access. Begin CPR or other supportive care until emergency responders arrive. If 911 is unable to dispatch assistance, immediately arrange for transport by vehicle to the nearest medical facility.

6. First Aid Supplies Emergency Medical Equipment and first aid supplies, normally found on a construction site, will be maintained at the Glacier field office. A supply of water and waterless skin cleanser will be maintained to treat minor skin exposures, not requiring medical attention.

7. Fire Emergency In the event of a fire, the Project Manager will determine if it is within the site's capability to handle it. If on-site personnel, cannot control it, call 911. In any event, workers will evacuate the site, excavation or tanks, unless involved in fire fighting, until the Project Manager notifies the workers that it is safe to return. All situations will be reported.

8. Methods or procedures for alerting onsite employees. The general warning to leave the site will be three short blasts of an air horn. This warning will be repeated until all employees have left the site.

9. Evacuation routes, Safe distances and places of refuge. The Project Manager and or SSHO will designate evacuation routes and procedures, safe distances and places of refuge prior to conducting onsite activities.

In addition to the above requirements, Glacier will maintain information regarding site topography, layout, and prevailing weather conditions; and procedures for reporting incidents to local, state, and federal government agencies.

The emergency response and contingency plan requirements will be reviewed prior to onsite activities, rehearsed regularly, reviewed periodically, and amended, as necessary, to keep them current with new or changing site conditions or information.

C. Additional Emergency Information

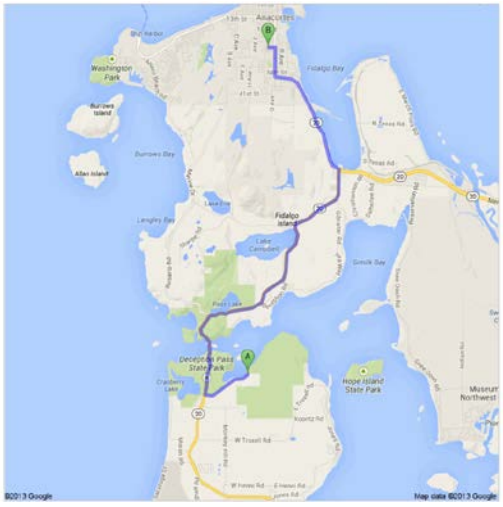
1. Emergency Jurisdiction and Notification:

   Ambulance and Fire Transportation: **Call 911**

2. Nearest Medical Facility
   Island Hospital
   1211 24th Street,
   Anacortes, WA 98221
   (360) 299-1300

   Directions:

   1) Head southwest on Cornet Bay Rd toward Canyon (About 2 minutes)
   2) Turn right onto State Route 20 E/WA-20 E (About 11 minutes)
   3) Turn left to WA-20 Spur W (About 3 minutes)
   4) At the traffic circle, take the 1st exit onto Commercial Ave (About 2 minutes)
   5) Turn left onto 24th St Hospital will be on the left (About 1 minute)



3. Site Emergency Phone Numbers-Key Personnel:

Glacier Mukilteo Office		(425) 355-2826
Glacier Corporate Health and Safety Manager	Lauren Golembiewski	(206) 268-9775
Glacier Project Manager, SSHO	Alan Hall	(206) 446-5280
Glacier Site Safety Health Officer	Alan Hall	(206) 446-5280
Client (Ecology) Representative	Jing Liu	(425) 649-4310
Kennedy Jenks Federal Way Office		(253) 835-6400
Kennedy Jenks Project Manager	Ty Schreiner	(253) 835-6400
Kennedy Jenks Site Person/SSHO	Jarod Fisher	(253) 835-6420

D. Accident/Incident Report All accidents/incidents will be reported on the standard Accident/Incident report form (See Appendix D). Originals will be maintained by the SSHO. Copies will be provided for the employees involved and their supervisors/companies.

XIX. General Work Practices

I. Fire Hazard Due to the potential for a fire hazard, no smoking or open flame will be allowed on site except in designated areas.

II. Restricted Activities No eating, drinking, gum or tobacco chewing will be allowed except in specially designated locations.

III. Eye Wash A portable eye wash meeting ANSI Z358.1 will be placed at the work site in case of accidental eye contamination.

IV. Body Contamination If body contamination should occur; "clean" water will also be available to flush contaminants from the body.

V. Fire Extinguishers At least one 100-pound (ABC) dry fire extinguisher will be available at all times in case of fire/explosion.

VI. First Aid A first aid kit will be available at the job shack for minor injuries. At least two persons holding a currently approved first aid card will be available during working hours.

VII. Telephone Communications Glacier's Project Manager will have a telephone for emergency use.

VIII. Sanitation Portable toilet(s) will be located within easy walking distance of any construction operation.

IX. General Construction Procedures All construction activities will be performed in accordance with CFR 29 1926, with a copy of the standard maintained on the job site. A copy of appropriate Glacier policies and operating procedures regarding health, safety and loss control, if any, will also be maintained on site,.

XX. Links to Other Programs

Additional programs that are part of Glacier documentation are critical to the achievement of a safe and healthful work environment. Often these programs are generic to all work situations. Since trained workers may expect to find these programs in different documents, there is little benefit to duplicating the information in the SSHP. Rather, by establishing this link, the existing programs are incorporated by reference to the SSHP.

Other Glacier Programs that are linked to the SSHP include:

1. Accident Prevention Plan,
2. Hazard Communication Program,
3. Respiratory Protective Program,
4. Confined Space Entry Program.

XXI. Plan certification

I hereby certify that I have read and understand this Site Health and Safety Plan. I agree to follow the guidelines set forth in this plan during all on-site activities.

SIGNATURE:	COMPANY/AGENCY:	DATE:

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 January 2014
SERIAL NO.: R1
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 20R1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier	Contractor Quality Control Plan Revised

Comment(s):

1. Plan revised to incorporate Ty's comments.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **20**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**	**1**	**Quality Control Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

QUALITYASSURANCE PROJECT PLAN

CORNET BAY MARINA REMEDIATION
CORNET BAY, WHIDBEY ISLAND, ISLAND COUNTY WASHINGTON

Prepared by:

Glacier Environmental Services, Inc.
PO Box 1075
Mukilteo, WA 98275

Prepared for:

DEPARTMENT OF
ECOLOGY
State of Washington

November 2013

1.0 Quality Objectives & Policies

This document establishes the Quality Plan to be instituted by Glacier Environmental Services, Inc. (Glacier) during remediation of the Cornet Bay Marina. It is intended to comply with the requirement Specification Section 01 45 00, Paragraph 1.01 C.

1.1 Quality Objectives

This plan is the Glacier project team's documentation of the organizational structure, functional responsibility, levels of authority, and lines of communication for the activities that affect quality. Quality is everyone's responsibility. All team members who perform quality functions have sufficient authority, access to work areas, and organizational freedom to:

1. Verify that all provisions have been made to provide required control testing.
2. Monitor the design, and contractor's daily work progress.
3. Check dimensional requirements.
4. Visually inspect materials received on site for proper documentation, completeness, and condition.
5. Observe all required test such as mechanical and electrical to verify that they are in compliance with the specifications.
6. Ensure the completion of all deficiencies in materials and workmanship in a timely manner.
7. Maintain a document control file.
8. Work closely with all testing agencies to verify that all required test are able to be preformed.

1.2 Quality Polices

Glacier's Quality Assurance Plan will ensure a uniform high quality level of workmanship through all phases of construction, including planning, construction, and turnover. To meet this goal the following principles will be observed:

1. Ensure the highest level of quality by maintaining supervised controls and written instructions governing Quality Control procedures and practices.
2. Establish clearly defined responsibility and authority for compliance.
3. Meet contractual requirements by conformance to Contract Document and applicable standards.
4. Complete and maintain accurate records of inspections and tests.

5. Identify and advise Glacier and Ecology of quality related non-conformance for timely corrective action. Ensure that corrective action is properly implemented and documented.

6. Maintain procedures to insure that quality requirements are communicated to all levels of the field organization, including subcontractors.

It is the intent of the plan that the function of quality control be one of cooperation. It is not the responsibly of the quality control staff to police the job, but to provide review and assistance to the operations staff (including subcontractors) to enable those involved to achieve a quality end product.

2.0 Quality Control Organizational Structure

QC Coordinator:	Eric Hay (406) 531-4760
Project Manager:	Lauren Golembiewski, Owner-Glacier Environmental
Earthwork:	David Hanka-Glacier Environmental Excavation Foreman
Mechanical:	TBD
Electrical:	Bonner Electric
Electrical Testing:	TBD (as required by specification)
Concrete Testing:	GeoTest Services, Inc.
Compaction Testing:	GeoTest Services, Inc.

3.0 Quality Control Team Responsibilities

Quality Control Coordinator

- The Quality Control Coordinator reports to the Glacier Superintendent for coordination of all quality control activities.
- Establish and maintain documented procedures to control documents and data that relate to quality assurance for the construction work.
- Administer and implement, as required, the written procedures and instruction contained in this manual.
- Coordinate with inspectors and all testing and field personnel to assure compliance with all quality control requirements of the contract documents.
- Attend coordination meeting with subcontractors and suppliers to ensure quality requirements are followed.
- Verify that quality control efforts of subcontractors and suppliers correspond with the overall quality control plan.
- Monitor the activities of the independent testing laboratories.
- Perform monthly audits of subcontractor as built drawings.

Project Manager

- The Glacier Project Manager will administer all project correspondence, prepare monthly project billings, prepare quotes for proposed change orders, resolve any conflicts within the contract documents, and conduct project meetings.

Project Superintendent

- The Project Superintendent is responsible for all field activities, and ensures that all construction is performed in accordance with the contract requirements.

- The Project Superintendent will develop schedules as required, maintain daily work records, oversee and coordinate subcontractors, field testing, inspections, and enforce project safety procedures.

4.0 Design Development Quality Control

Glacier will review the drawings during each stage of construction to ensure construct ability and functionality. These reviews will also be used to ensure that schedule and budget remain in compliance with the original contact.

5.0 Review of Construction Work

Earthwork

- Review surveys, proposed excavation limits prepared by Kennedy Jenks Consultants.

- Complete the excavation, backfill, compaction in accordance with the plans and specifications.

- Coordinate and ensure import materials comply with contract.

- Ensure appropriate level of quality assurance is provided, test are completed.

Sheet Pile Installation

- Review surveys, plan alignment, penetration drawings prepared by Kennedy Jenks Consultants

- Submit Shop Drawings indicating details and schedule of pile installation sequence. Identify pile length and shapes to suit design loads

- Submit pile driving equipment data sheets.

- Submitt Manufacturer's Mill Certificate: Certify steel sheet piles meet or exceed specified requirements.

- Submit the qualifications of the “Pile Installation Special Inspector” for review and approval.

- Submit a Safety Plan describing how boat owners will be protected during sheet setting and driving. Of special concern is potential loss of a grip on the sheet and falling on the adjacent docks and boats. Describe boat owner foot traffic control during sheet installation.

- Notify nearby residents with 10 days’ notice before proceeding with the Work.

- Verify existing conditions before starting work.

- Field Quality Control: Piles that fail tests, are placed out of position, are below cut off elevations or are damaged shall be:
    - Removed and replaced at the direction of Ecology, or repaired/modified at the direction of Ecology.
    - The decision to either remove and replace, or to repair/modify unacceptable piles shall be at the sole discretion of Ecology.
    - Provide additional piles or replace piles to conform to specified requirements

.

Structure Moving

- Conduct inspection of existing building conditions. A representative of Glacier, Ecology, and the building owner shall make mutual inspections of the building and shall document its condition before the work begins and after the work is completed.

- Inventory all building contents and provide copies of the inventory to the building owner and Ecology.

- Arrange with the affected utility companies for shut down of the affected utilities and their restoration once the building is back on its foundation.

- Store all nonperishable items in containers at a loff-site storage locker suitable to the building owner. Lock and provide access key to the building owner.

- After the building is moved back onto its new foundation, unload all stored items and replace them in their original locations back in the building

- Make all arrangements and notices to the utility providers for restoration of services.

Concrete

- Review requirements for sub-base preparation.
- Provide a complete contractor designed foundation structural plan drawing using details from the bid plan set in ACAD Civil 3D 2011 for the record
- Complete compaction testing requirements to ensure the sub-grade is acceptable.
- Review surveys to ensure the formwork for slab and foundation pours are in the proper location/elevation.
- Before concrete is placed, confirm that forms are clean of debris and other foreign material.
- Review inspection reports of concrete supplied and laboratory testing results.

Mechanical/Plumbing

- Make periodic inspections to ensure the work is in general conformity with the mechanical plans and related specifications.
- Record deficiencies found during inspection and provide Engineer with written reports.
- Review the independent inspection and testing reports called for in the mechanical plans and specifications.
- Review shop drawings and samples submitted by vendors for compliance with the mechanical plans and specifications.
- Review project plans and specifications to ensure proper installation of underground piping.
- Inspect material deliveries for damage prior to acceptance.
- Review installation requirements and bedding materials.
- Confirm existing service connection points.
- Review shop drawings, plans and specifications to ensure proper installation of piping.
- Inspect all pipe for damage prior to installation.
- Ensure space for, disassembly and removal of equipment and components for servicing.
- Review the Septic System Contractor proposed methods for the installation of se pumps and piping to ensure proper installation in accordance with the manufactures specifications.

- Review quality and standard of workmanship.

Septic System (to be amended upon subcontractor selection)

- Ensure and submit products of a manufacturer who has been regularly engaged in the design and manufacture of the product for a period of at least 5 years.
- Demonstrate to the satisfaction of Ecology that the quality is equal to the product made by those manufacturers specifically named in the specification, if an alternate product manufacturer is proposed
- Field Quality Control:
    - Verify all connections are continuously sealed with gaskets.
    - Verify all lids fit quietly in the frames and are watertight

Electrical

- Review Electrical Contractor's Quality Assurance Program.

- Obtain a list of proposed subcontractors (if any).

- Make periodic inspections to ensure the work is in general conformity with the electrical plans and related specifications.

- Record deficiencies found during inspection and provide Subcontractor and Engineer with written reports.

- Review the independent inspection and testing reports called for in the electrical plans and specifications.

- Review shop drawings and samples submitted by vendors for compliance with the electrical plans and specifications.

- Review the electrical contractors proposed method for installation of incoming services, slab on grade raceways, raceway materials, quality of workmanship and testing requirements.

6.0 Construction Inspection and Testing

Inspection of materials and work in progress will be the responsibility of the Glacier Superintendent and special inspectors to ensure that the work conforms to the contract documents.

Glacier will use the following three point inspection plan for field inspections:

- Prior to starting work a pre-work coordination meeting will be held. Attendees will include Supervisory, Quality Control and safety personnel from both Glacier and our proposed subcontractors. At a minimum the meeting will cover contract, submittal, quality control, training and safety requirements of the contract documents.

- During construction the Glacier Supervisor will monitor the work on a daily basis to assure the continuing conformance of the work.

- Once the work is complete the Glacier Quality Control Coordinator will conduct a completion inspection, and deficiencies will be noted and corrected. Following inspection an independent testing agency will perform testing on the applicable sections of the work.

7.0 Material Inspections

All materials, equipment etc. to be incorporated into the work will be subject to periodic inspection by the Quality Control Staff.

8.0 Testing Procedures

All testing will be in accordance with the project specifications. Test results will be distributed to all parties. Any deficiencies found will be immediately corrected and the Quality Control Coordinator will reinspect the work to ensure compliance.

The following matrix is prepared to show the responsibility of testing and inspection for each section of work.

Specification Section	Item	Testing Service Responsibility
03 21 00	Reinforcing Steel	Mill certificates or test reports by an Glacier subcontract testing laboratory if certificates are not available
03 30 00, Cast-In-Place Concrete	Concrete Mix Design	Glacier subcontract Testing Laboratory
Concrete	Portland Cement	Mill certificates or test reports by Glacier subcontract testing laboratory if certificates are not available.
	Concrete Aggregate	Glacier subcontract Testing Laboratory
	Concrete Batch Plant Inspection	Glacier subcontract Testing Laboratory Batch Plant Inspection or Suppliers Laboratory Certified Statement of detailed compliance with ASTM C94 and paragraph 2.2
	Slump Tests	(by Ecology)
	Compression Tests	(Cylinders cast by Glacier subcontract Laboratory) Cylinders cured at job site in a curing box provided by Glacier and meeting ASTM recommendations. Cylinders picked up at the jobsite and tested by Glaicer independent testing laboratory. One set of three cylinders required for each 150 cu. yards or fraction for each concrete class placed each day.
	Testing of Concrete in	Glacier Subcontract Testing Laboratory

	place if required	
05 50 00 Miscellaneous Metal	Welders Qualifications	Submit ANSI/AWS D1.1 qualifying tests
	Test Weld by Each Welder	Witnessed by Ecology and tested by an Glacier subcontract testing laboratory.
	Steel Material and Fasteners	Mill laboratory certificates for steel from each melt used. If mill certificates are unavailable or if steel from an unidentified melt is used, submit test report from an independent testing laboratory.
	Welding Inspection	Glacier subcontract Testing Laboratory shall continuously inspect multiple pass welds and inspect single pass welds on completion.
	Full Penetration Welds in Moment Resisting Joints	Glacier subcontract Testing Laboratory shall ultrasonically test 100% of joints.
	High Strength Bolted Connections	Glacier subcontract Testing Laboratory shall inspect all high strength bolted connections
31 20 00 Earthwork	Imported Crushed Rock for Surfacing and Structural Backfill	Glacier subcontract Testing Laboratory shall analyze for concentrations of chemicals identified in Specification Section 01 35 43.
	Imported Gravel Backfill	Glacier subcontract Testing Laboratory shall analyze for concentrations of chemicals identified in Specification Section 01 35 43.
	Imported Pit Run Backfill	Glacier subcontract Testing Laboratory shall analyze for concentrations of chemicals identified in Specification Section 01 35 43.

9.0 Environmental Monitoring

Glacier and their subcontractors will institute control measures to meet the Occupational Health and Safety requirements in relation to hazardous and non-hazardous wastes during work on Cornet Bay Remediation project

In addition to control measures, a monitoring program to prevent future environmental health concerns arising from the construction process will be put into effect.

10.0 Documentation for Non-Conformities

Quality Control inspections will be conducted during the work and deficiencies noted on a central log. A copy of the log will be placed in a binder in the Glacier's office trailer. Once the deficient item has been corrected and reinspected, the inspector will sign off the deficient item.

The intent of this pro-active approach towards quality is to identify problems at the earliest stage possible so that timely and cost effective actions can be taken. A sample format for the Inspection Report Log is attached at the end of this document.

11.0 Documentation Records

Quality Control Records will be maintained by the Glacier Quality Control Coordinator.

The quality control records will be protected from deterioration or damage throughout the period of the contract. Hard copies of all quality control records will be maintained in the contractor's field office.

During construction as built drawings will be maintained onsite, and updated as changes occur. Upon completion of the work Glacier will provide the owner with as built drawings in accordance with the project specifications.

Quality Control Report

Cornet Bay Remediation
Cornet Bay, Oak Harbor, Whidbey Island, Washington

DATE OF INSPECTION:

INSPECTED BY:

TESTING COMPANY:

SITE NAME:

JOB NUMBER:

LOCATION

TYPE OF INSPECTION: (VISUAL, PRESSURE TEST, ETC.)

WEATHER CONDITIONS:

NAME OF SYSTEM INSPECTED OR TESTED

MFG. INSTRUCTIONS/ PROCEDURES FOLLOWED ?	YES		NO	
PROPER TOOLS AND EQUIPMENT?	YES		NO	
SUFFICIENT PERSONEL (QUANTITY AND EXPERIENCE)	YES		NO	
WERE SAFETY RULES FOLLOWED	YES		NO	
DATA TO BACK UP TEST RESULTS (DATA LOGGER, TEST REPORTS)	YES		NO	

TEST METHOD AND PROTOCAL SPECIFICATION NUMBER:

	START	PSI/TEMP	STOP	PSI/TEMP	RESULTS

OUTSIDE TESTING CONTRACTOR? YES___ NO___

CLIENT OR REPRESENTATIVE WITNESS? YES___ NO___

EMPLOYEE SIGNATURE

SUPERVISOR SIGNATURE

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 23 December 2013
SERIAL NO.: 21
SPEC. REF.: 01 33 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 21
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Pacific Surveying and Engineering	Land Surveyor Qualifications

Comment(s):

1. Checking on line. Peter Brands is a licensed LS in the State of Washington.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **21**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/20/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
	01 33 00	**01 33 00-7**	**Land Surveyor Qualifications**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Pacific Surveying & Engineering

1812 Cornwall Avenue ^ Bellingham, WA 98225
Phone 360.671.7387 ^ fax 360.671.4685
E-mail pse@psesurvey.com

www.psesurvey.com

CONSTRUCTION SURVEY QUALITY CONTROL METHODOLOGY AND PROCEDURE STATEMENT

DESCRIPTION

CONSTRUCTION LAYOUT AND STAKING. The Pacific Surveying and Engineering (PSE) will conduct all survey and establish all layout required for the construction of the work and verification of quantities from the Engineer provided horizontal and vertical survey control.

CONSTRUCTION METHODS

PSE will furnish all lines, grades, and measurements necessary for the proper prosecution and control of the work contracted for under these specifications, from the control points provided.

Construction Staking and Layout includes but is not limited to:

1. Clearing and Grubbing perimeter staking.
2. Rough grade slope stakes at 50-foot stations and 50-foot grid.
3. Grade Break slope stakes and flow line at 50-foot intervals plus angle points.
4. Fence lines at 100-foot stations and angle points.
5. Walls will be staked at the face of toe, at vertical and horizontal angle points.
6. Drain lines, cut stakes on clean outs, inlets and manholes with two offsets for grade and alignment.
7. Laser or other automatic control devices shall be checked with temporary control point, temporary benchmark or grade hub.

Note: Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

ESTABLISHMENT OF SURVEY CONTROL FOR CONSTRUCTION.

1. A Land Surveyor Licensed in the State of Washington will be utilized.
2. Horizontal closure accuracy of at least 1:40,000 will be maintained.
3. Vertical loop closure of at least 0.03 foot per mile will be maintained.
4. The construction survey will use the same primary control as used for the Design Survey.
5. We will verify the internal secondary control monuments a minimum of once per month by looping back into primary control.
6. Temporary vertical benchmarks will be set on site and clearly labeled.
7. Progress and volume topographic mapping will be completed using conventional survey equipment by direct measure, all data will be collected on an electronic storage devise.

EQUIPMENT TO BE USED

1. Leica DNA03 Digital Level and standard bar code rod-standard deviation per 1km double run loop +/-1mm
2. Leica TCRP 1203+ Total Station-distance measuring-1mm +1.5ppm, angle measurement 3" of arc
3. Topcon GR3 GPS Receivers-Static Mode 3mm +.5ppm horizontal, 5mm +.5mm vertical RTK Mode 10mm +1ppm horizontal, 15mm + 1ppm vertical

PERSONNEL AND QUALIFICATIONS

The persons in charge of daily quality control checks are Peter K. Brands, PLS, CFedS in the office and field, and William Maitland, LSIT, EIT in the field. Peter has over 26 years of progressive experience, 14 years as a principal in private practice, 16 years as a Licensed Professional, managing, and supervising projects and staff. Peter excels at combining an overall approach to field work with dedication to correct procedures enhancing the production of boundary, construction, geodetic, and engineering surveys, bringing projects to completion on time and within budget. His proven record of success as a Survey Manager stems from his ability to provide leadership and coordinate complex projects. He has worked on numerous DOE cleanup sites and interim remedial projects in Washington State.

William has more than 8 years of progressive experience, With 4 years as a Land Surveyor in training, managing and supervising projects and staff. Combining precise fieldwork with sound data analysis has proven to be the backbone for the production of boundary, construction, and engineering surveys, which have satisfied both public and private customer expectations for accuracy and quality. His work style is always thorough and analytical, emphasizing the team approach and strong communication with clients and staff.

Respectfully Submitted,

Peter K. Brands, PLS, CFedS
Pacific Surveying and Engineering

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 23 December 2013
SERIAL NO.: 23
SPEC. REF.: 02 33 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 23
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

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Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCNR	1	ALS Laboratory Group	Analytical Laboratory Qualifications

Comment(s):

1. The laboratory is satisfactory but their Accreditation from the Department of Ecology expires on 12 January 2014. Please submit a new Accreditation letter from Ecology when available.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO:	Glacier Environmental Services Inc. PO Box 1097 Mukilteo, WA 98275	**DATE:**	16 January 2014
		SERIAL NO.:	23
		SPEC. REF.:	01 33 00
		PROJECT:	Cornet Bay Marina Remediation
		K/J JOB NO.:	1396010.00
ATTENTION:	Lauren Miles-Golembiewski (425-355-2826) lmiles@glacierenviro.com	**SUBMITTAL NO.:**	23
		PAGE:	1 of 1

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1	MCNR	1	Glacier	Analytical Lab Qualifications

Comment(s):

1. 2013 DOE Accreditation Letter is not current beyond 4 January 2014. Submit a new 2014 DOE Accreditation Letter.

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Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 7 March 2014
SERIAL NO.: 23
SPEC. REF.: 01 33 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 23
PAGE: 1 of 1

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Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET		Glacier/ ALS Lab	Lab Accreditation Letter

Comment(s):

1.

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KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **23**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/20/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
	01 33 00	**01 33 00-7**	**Analytical Laboratory Qualifications**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

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B. Make Corrections Noted
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   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **23.1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **2/19/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**	**01 33 00-7**	**2014 ALS Letter of Accreditation**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

ALS Environmental

Statement of Qualifications

USA

Revised May 2012

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Company Profile

ALS Group is a wholly owned subsidiary of Campbell Brothers Ltd, an Australian based public company that began operations in 1863. The company is a diversified international analytical laboratory group which first established its operations in Queensland, Australia in 1975. With more than 300 locations, operating in 50 countries throughout Australia, North America, South America, Africa, Europe, and Asia, the company is now one of the largest analytical laboratory groups in the world.

ALS provides a broad range of services to four main market segments; mining and mineral exploration, environmental monitoring, equipment maintenance through used lubricant analysis, and commodity analysis and certification.

All ALS laboratories operate under formalized quality systems, and include dedicated quality control chemists in each major laboratory, a dedicated quality control group in each region of the world, and technical managers for each service area in which the company operates. As a professional services organization, ALS is committed to the ongoing professional development of all staff members through peer interaction, as well as in-house and external training programs. ALS operates a global proactive occupational health, safety, and environmental compliance program that ensures consistent conformity with local regulatory requirements throughout the world.

Life Sciences Division

The Life Sciences Division of ALS Group includes a global network of Environmental and Food & Pharmaceutical laboratories. The Environmental segment of the Life Sciences division is the largest, most geographically diverse environmental testing network in the world. ALS Environmental has more than 60 locations throughout Asia, Australia, Europe, North America and South America to provide clients with analytical and technical support for local and international projects. ALS provides reliable analytical testing data to assist consulting and engineering firms, industry, and governments in making informed decisions about their environmental projects. A comprehensive range of environmental testing and technical support services is complemented by a commitment to quality and customer service. ALS Environmental (USA) employs over 750 professional laboratory and support personnel to ensure that work is managed properly and deadlines are met.

Benefits of Using ALS

The depth of technical and management expertise at ALS provides the basis for offices to deliver a consistently high level of service. Commitment to good science and personal service is backed by a sound quality program. Each laboratory within the ALS network maintains accreditations to satisfy target market demands. To obtain copies of Scopes of Accreditation, follow the location links on www.alsglobal.com, refer to the Web sites of accrediting bodies, or contact the local ALS laboratory location. When working with ALS, clients can expect:

- Rapid turnaround to keep projects on schedule
- Project mobilization assistance to cover the scope of services required
- Technical resources to solve problems
- Experience acquired by working with a wide range of clients and programs
- Customized EDD formats with direct database uploads
- Interaction with trained professionals and problem solvers
- Regular participation in Proficiency Test evaluations provides assurance that the accuracy of results is continuously monitored and improved

ALS' reputation as a leader in environmental chemistry is based on the commitment to keep laboratories at the cutting edge of analytical technology, while focusing on a "best value" business practice of employees to increase value of services rendered.

Laboratory Services and Capabilities

Routine Laboratory Services

The following summary highlights routine and specialty services provided by ALS Environmental (USA) that range from identifying unknown spilled contaminants to determining the cause of toxicological impacts. Experts in chemistry, microbiology, toxicity, industrial hygiene, food supplements, industrial processes, quality systems, data management, and information technology are ready to respond to all environmental challenges.

Organic Capabilities

- Air Testing (Ambient)
- CAL LUFT, CAL WET
- Chemical Agent Breakdown Products by LC/MS
- Dioxins / Furans
- Endocrine Disruptors
- Ethene, Ethane, Methane
- Explosives by LC/UV and LC/MS/MS
- Formaldehyde
- GC Semi-VOAs-PCBs
- GC Semi-VOAs-Pesticides and Herbicides
- GC Volatiles-BTEX
- GC/MS VOAs, Semi-VOAs, PAHs
- GC/MS/MS Pesticides
- GC/MS/SIM/LVI (various applications)
- GRO/DRO/ORO
- Incremental Sampling
- LC/MS and LC/MS/MS (various applications)
- NDMA
- Nitrocellulose
- Nitroglycerine, PETN,
- Nitroguanidine,
- Oxyanions and Perchlorate
- PCB Congeners
- Petroleum Biomarkers
- Pharmaceutical and Personal Care Products (PPCP)
- Polybrominated Diphenyl Ethers by GC/MS/LVI/SIM
- Sediment/Tissue Chemistry
- Speciated Hydrocarbons
- TCLP/SPLP Organics
- TPH
- Vapor Intrusion
- White Phosphorus (7580)

Inorganic Capabilities

- Chemical Separations
- Chemistry
- Clean Room Chemistry
- Clean Sampling Equipment
- Elutriations - SET, EET, DRET, etc.
- General Wet
- Hydride Techniques
- ICP/MS Metals
- Low-level Mercury
- Mercury by CV
- Metals Speciation
- Organometallics
- Physical Tests (Grain Size, Atterberg, etc.)
- Sediment/Tissue Chemistry
- Selective Sequential Extractions
- TCLP/SPLP Metals
- Ultra-trace Metals

Industrial Hygiene/ Air Capabilities

- Air Toxics Methods
- Aldehydes and Amines
- Amines
- Antineoplastic / Chemo Drugs
- Beryllium
- Diacetyl/Acetoin
- Diesel Particulates
- Fixed/Permanent Gases
- Formaldehyde/Aldehydes
- GC/MS Screens
- LEEDs Testing
- Loaner Pumps and Media
- Metals
- Methamphetamine
- Organics
- Pesticides and Herbicides
- PM-10/PM-2.5
- Silica
- Source & Stack Testing
- TO-14, 15
- TO-17
- Wet Chemistry

Asbestos/Microscopy Capabilities

- Low Level Radioactively contaminated Asbestos analysis
- Nanoparticles
- Other Fiber Identification
- Particle Sizing & Identification
- PCM
- PLM
- PLM & TEM Micrographs
- Soil (OH VAP Certified)
- TEM
- Vermiculite

Dietary Supplements

- Heavy Metals
- Minerals Analysis
- Pesticides Screens
- Vitamin Analysis

Microbiology/Mycology

- Coliforms and E. coli 0157:H7
- Endotoxins/Mycotoxins
- Microbial Identification
- Non-Viable Fungal Spore Analysis
- Viable Fungal and Bacterial Analysis

Radiochemical Capabilities

- Alpha Isotopics
- Alpha Scintillation Methods
- Carbon-14
- Gamma Scans
- Gas Flow Proportional Counting
- Gross Alpha Beta
- Iodine-129
- Iron-55
- Lead-210
- Liquid Scintillation
- Nickel-63
- Plutonium-241
- Radium226 and Radium228
- Radon-222
- Strontium-89/90
- Technetium-99
- Tritium

Field Products

Passive Diffusion Bag (PDB) Samplers for the Collection of Groundwater Samples for Volatile Organics Analysis

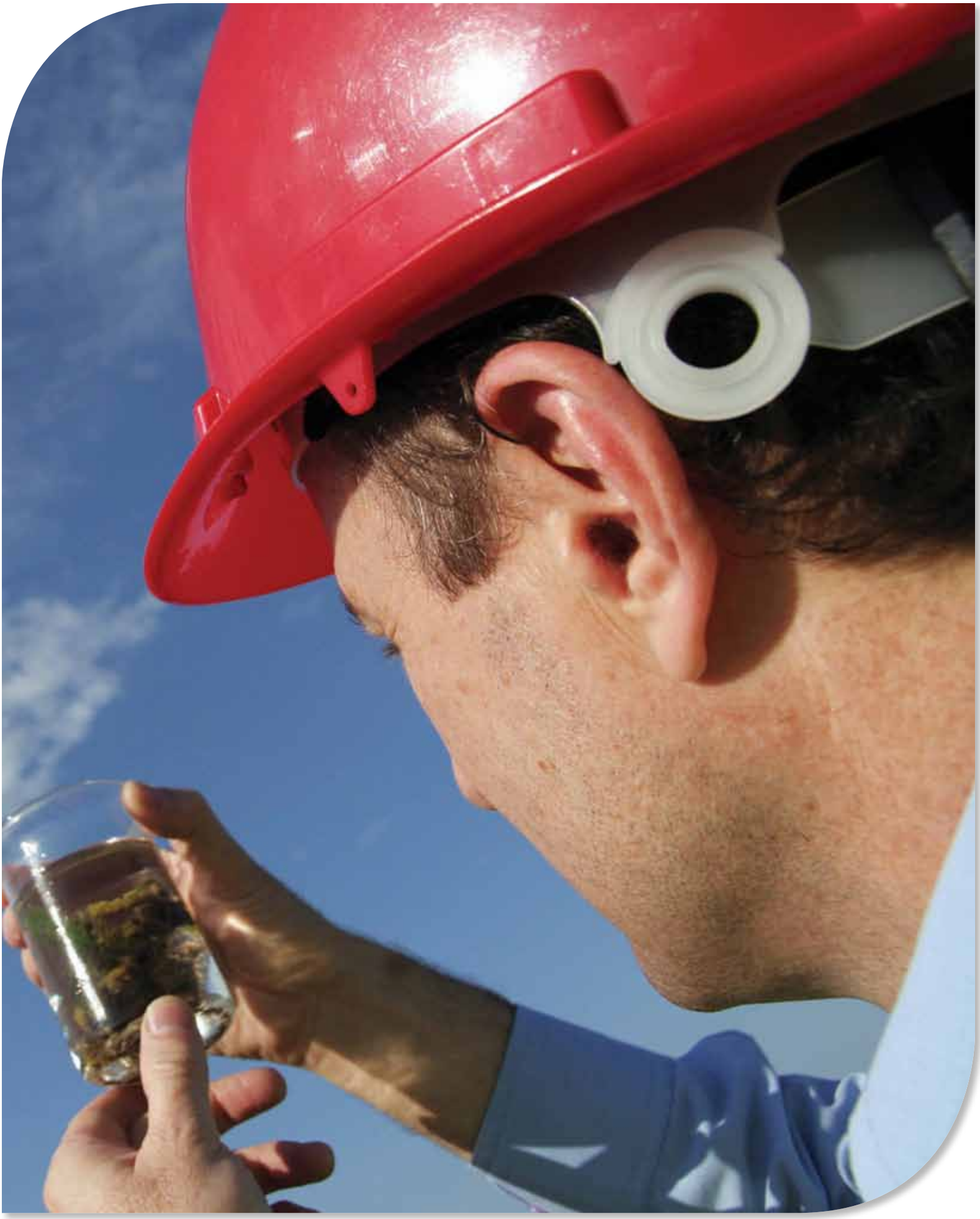
ALS has been granted a license to manufacture, use and provide the bags by the US Geological Survey (USGS) and The General Electric Company (GE), both co-patent holders on the product (US #5,804,743). The downhole passive water sampler and method of sampling was invented by Don Vroblesky (USGS) and Thomas Hyde (GE).

PDB Samplers are made of low-density polyethylene (LDPE), which acts as a semipermeable membrane. Volatile Organic Compounds (VOC's), excluding certain ketones, ethers and alcohols diffuse readily through the membrane. Equilibrium is established between the VOCs in the bag and those in the groundwater. The PDB Sampler, in the shape of a long cylindrical tube, is filled with analyte-free water. It is available in both field-ready and field-filled versions. It is simple to deploy, eliminates the collection and disposal of purged water and significantly reduces the cost of sampling. Upon retrieval, usually 14 days after deployment, bags are opened to fill vials and returned to the laboratory for analysis.

Rigid Porous Polyethylene Samplers (RPPs) for the Collection of Groundwater Samples for Water Soluble Analyte Analysis

ALS also manufactures another passive sampler based on the design and research of Don Vroblesky of the USGS. The Rigid Porous Polyethylene sampler (RPPs) is made of thin sheets of foam-like porous polyethylene with pore sizes of 6-20 microns. When completely filled with water the pores allow a water-water interface, facilitating the equilibrium of water-soluble analytes in the aquifer adjacent to the well screen with the deionized water of the RPP. Primary sampling applications for the RPPS are for all water soluble analytes, like inorganic anions and cations, metals, MEE parameters, 1,4-dioxane, MTBE, hexavalent chromium, explosives, perchlorate and dissolved gases. They are also very useful in deep wells where submersible pumps may not function

Like the PDB, the RPP is simple to deploy, eliminates the collection and disposal of purged water and significantly reduces the cost of sampling.



Value-Added Services

Seminars and Training

- Client and industry customized seminars and workshops
- Regulation updates
- Education on benefits of implementing ALS value-added services.

Personalized Service

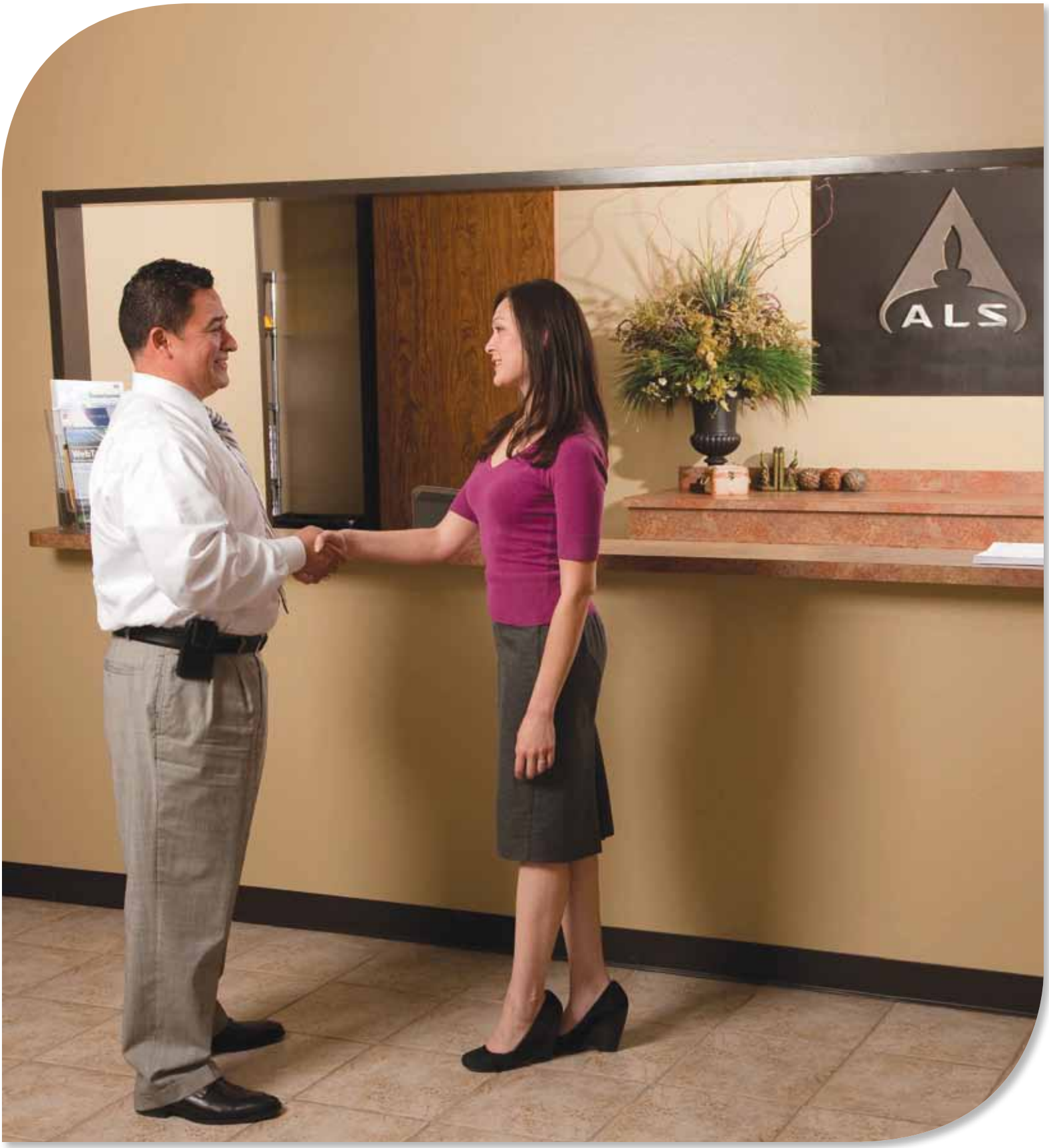
- Project Managers are highly-trained and dedicated technical professionals who have a comprehensive understanding of the analytical needs of clients

- Report formats (electronic and hard copy options) are customized to fit information technology requirements

- Prompt response to questions and project planning

- ALS offers an advanced, on-line web access service called WebTrieve™. The most unique feature is its simplicity, providing user friendly navigation to access results, compare against regulatory levels, and download data into spreadsheets for electronic data deliverable functions. WebTrieve™ is fast and convenient saving clients time and money. Simply put, WebTrieve™ delivers performance.

- ALS Environmental delivers exceptional service to your mobile device. You can check the status of your work orders, view lab results, retrieve sample handling information, and find contact information for any laboratory in North America by using the ALS Enviro iPhone Application or by accessing mobile.alsenviro.com (Blackberry and Android users).


ALS

Locations Across the USA

ALS laboratories are located strategically throughout the country. From its network of 15 laboratories and several service centers, the company is able to serve heavily populated and urbanized regions where the laboratories are located, as well as regions of the country where clients are served by both Canadian and U.S. facilities. Because of the geography and business needs of clients, ALS service includes the use of WebTrieve™, the interface to laboratory data, through which clients can access results, compare limits to agency guidelines, download reports and email directly from the website. In addition, clients can view the progress of their samples through the laboratory, from anywhere in the world, by way of an online, encrypted account.

ALS Environmental is recognized for performance excellence and client satisfaction.

Arizona
Tucson, AZ

California
Simi Valley, CA

Colorado
Fort Collins, CO

Florida
Jacksonville, FL

Hawaii
Kapolei, HI

Illinois
Chicago, IL

Maryland
Columbia, MD

Michigan
Detroit, MI
Holland, MI
Traverse City, MI

New Jersey
Edison, NJ

New York
Hopewell Junction, NY
Rochester, NY

Ohio
Cincinnati, OH
Cleveland, OH

Pennsylvania
Chambersburg, PA
Harrisburg, PA
Middletown, PA
Spring City, PA
Williamsport, PA
York, PA

Texas
Houston, TX

Utah
Salt Lake City, UT

Washington
Everett, WA
Kelso, WA

West Virginia
South Charleston, WV

Buffalo, New York/Burlington, Ontario

The Buffalo/Burlington laboratory is a specialty lab focused on High Resolution Mass Spectrometry (HRMS) in a variety of sources that include agriculture & food products and environmental samples (air, soil, sediment and water) and Air Toxics in samples derived primarily from stack and ambient air monitoring. The laboratory is accredited to ISO 17025:2005 standards by the Standards Council of Canada (SCC) and by the US National Environmental Laboratory Accreditation Conference (NELAC) to NELAC: 2003 standards.

Cincinnati, Ohio

ALS Cincinnati is an Ohio EPA Voluntary Action Program (VAP) and American Association for Laboratory Accreditation (A2LA) accredited laboratory. The Cincinnati location provides environmental analytical services to government and private clientele such as the EPA, Departments of Defense and Energy, and numerous environmental engineering firms and consultants. In supporting environmental investigation and monitoring programs, this laboratory performs a full range of organic and inorganic analyses using SW-846 and EPA methodologies on a wide range of sample matrices including groundwater, surface water, wastewater, soil, sludge, air, and hazardous waste.

The Cincinnati location is accredited by the American Industrial Hygiene Association (AIHA). ALS Cincinnati offers a comprehensive array of both NIOSH and OSHA analytical methods, as well as EPA, ASTM, AOAC, and innovative methods developed by in-house professionals. Analyses can also be adapted to situation-specific requirements in support of industrial hygiene programs, indoor air quality assessments, and other types of air testing. The laboratory is accredited by the NIST/National Voluntary Laboratory Accreditation Program (NVLAP), by AIHA, and the New York State DOH Environmental Laboratory Approval Program (ELAP) for all asbestos methods offered. ALS Cincinnati also provides asbestos analysis on soils, settled dust and radioactively contaminated samples.

Everett, Washington

ALS Everett is an environmental testing laboratory designed to analyze water, wastewater, soil, sludge, solids, waste oil, solvents, and hazardous waste samples associated with a variety of chemical and toxic contaminants. The Everett laboratory is accredited by the Washington State Department of Ecology, and routinely participates in EPA and other agency performance evaluation programs with a proven track record of stellar performance. ALS Everett provides professional analytical services for state and local governmental agencies, consulting firms, and private industry.

ALS Everett has successfully completed analyses for projects throughout the western United States. These projects involve analytical testing services in soil remediation, RI/FS, groundwater monitoring, municipal landfill monitoring, hazardous waste management, environmental assessments, UST removal projects, and process control.

Fort Collins, Colorado

ALS Fort Collins, a premier radiochemistry and environmental laboratory, serves the Department of Energy (DoE), Department of Defense (DoD), as well as numerous environmental engineering and consulting firms and private industry. The Fort Collins location earned a nationwide reputation for superior quality and legally defensible data, which aids our clients in promoting human health and preserving the environment.

This laboratory performs a full range of organic, inorganic, and radiochemical analyses and uses SW-846 and EPA methodologies on a wide range of sample matrices including groundwater, surface water, wastewater, soil, sludge, multiphasic samples, air, biota, vegetation, building debris, mixed waste, and hazardous waste. Further, ALS Fort Collins provides a full range of Alpha Spec, Gamma Spec, Liquid Scintillation, Gas Flow Proportional, and Alpha Scintillation methods.

Holland, Michigan

ALS Holland is a full service environmental laboratory offering a comprehensive range of analytical and field services while also providing our clients with access to the global network of capabilities available through the ALS Group. The laboratory has been in continuous operation since 1976 and is NELAP and state accredited in several states across the USA.

The services provided by ALS Holland are complemented by a strong commitment to our core values of quality, integrity, and service. Our value-added services include web-based 24/7 data access, custom sample bottle kits, standard 5-7 day turn-around-time, and courier and sampling services. ALS Holland also provides sampling and courier services from the Metro-Chicago and Detroit area service centers. A strong, proactive, customer feedback process helps to ensure client satisfaction on a consistent basis.

Holland, Michigan

Houston, Texas (Full-Service Laboratory)

ALS Houston is home to the North America headquarters for ALS Group's Environmental Division. The office includes the division's accounting, human resources, information technology and marketing departments, as well as the office of Raj Naran, Vice President of the Environmental Division in Europe and North America.

This flagship location operates as a full-service environmental laboratory with a dominating presence in the Gulf coast area serving the chemical, petrochemical and refining markets as well as local, state, and federal DOD programs. ALS Houston is most recognized for performance excellence resulting in client satisfaction at the highest level. The state-of-the-art, 35,000 square foot laboratory is NELAP accredited through the state of Texas and holds many other state and NELAP accreditations as well. The Houston laboratory provides testing services on soil, wastewater, ground water, sediment, air and hazardous waste meeting all quality assurance levels from standard reporting to Level IV data deliverables.

Houston, Texas (High-Resolution Laboratory)

The high-resolution laboratory in Houston, Texas is dedicated to analyses for analytes such as dioxin, furans and PCB congeners with five high-resolution gas chromatographs/high-resolution mass spectrometers (HRGC/HRMS). Houston performs these analyses on a variety of sample matrices: food products, food additives, PUF cartridges, XAD resins/filters, household dust, wipe samples, sediments, animal/marine tissues, paper, incinerator ash, soil, waste water, drinking water, and solid waste. Methodologies employed by our Houston laboratory include: EPA 8290, EPA 8280A, EPA 1668 (PCB congeners), EPA 1613B, EPA TO9 (ambient air), EPA 23 (stack testing). Technical consulting on dioxin and other recalcitrant compounds is also available. New strides are being made with the addition of method CARB 429 for very low levels of polyaromatic hydrocarbons (PAHs) and the analysis for polybrominated fire retardant chemicals like the polybrominated diphenyl ethers (PDBEs).

Houston, Texas

Jacksonville, Florida

The ALS facility in Jacksonville, Florida is a full-service analytical laboratory providing testing for many industrial, government and consulting firms in the southeastern United States. The laboratory, like others in the network, also serves international clients, having the necessary permits to accept foreign water and soils into the country for analysis.

The laboratory's technical expertise includes the analysis of routine environmental samples, landfill samples, DOD projects and waste stream characterization. They also perform industry specific testing for pulp and paper manufacturers. Our Jacksonville laboratory offers field sampling and local courier service. They provide a variety of customized reports, including electronic data deliverables and full CLP-like packages.

Kelso, Washington

ALS has a state-of-the-art, 46,000 square-foot laboratory in Kelso, Washington. The size of the laboratory, combined with its equipment and highly trained personnel, allow this facility to provide enhanced services for complex projects requiring analysis of large numbers of samples, those of difficult matrices, and those requiring low levels of detection.

The Kelso facility specializes in non-routine, complex analyses requiring a high degree of technical expertise. These special capabilities have allowed Kelso to take part in a number of method development studies for the U.S. EPA and various state and industrial agencies.

Included among the specialized procedures performed at the Kelso laboratory are techniques that allow the ultra-trace determination of various constituents in difficult sample matrices. Much of the analytical chemistry performed at the Kelso laboratory is in direct support of risk-based studies where routine environmental procedures are often insufficient to meet the project objectives.

Kelso, Washington

Middletown, Pennsylvania

ALS Middletown (formerly Analytical Laboratory Services, Inc.) has been a leader in the analytical laboratory arena for over 30 years. We provide governmental agencies and the business community with quality analytical solutions in the areas of environmental testing, industrial hygiene and field services for over 25 years. Within our modern 26,000 square-foot facility located in Middletown, Pennsylvania and multiple service centers, we possess the expertise, necessary personnel, instrumentation and certifications to perform analyses on a variety of sample matrices.

ALS employs expert analysts who understand all aspects of environmental testing and quality assurance for environmental compliance and restoration programs including RCRA, Superfund, Clean Water, Clean Air and Safe Drinking Water. Our internal data validation ensures that analytical results are technically and legally defensible and project requirements have been met. Our data has met the tough requirements of the US Environmental Protection Agency (CLP Program), US Army Corps of Engineers, US Department of Defense and most state programs.

The Middletown laboratory is supported by two satellite laboratories in Spring City, PA and York, PA.

Rochester, New York

In Rochester, New York, ALS has a full-service environmental laboratory that carries certifications in most eastern and southeastern states. It has been NELAC certified in New York since the inception of the national approval program. In addition, our Rochester laboratory participates and has approval in various industrial company audit programs.

Rochester provides routine and special analytical and field services to many large industrial and government clients. New York's Watershed Assessment Bureau has contracted with this facility for years to provide low-level nutrient and other water quality analysis on lakes and reservoirs around the state, including much of the watershed serving New York City. For this work, which also serves the data needs of the USGS and their network of water quality monitoring stations, the Rochester laboratory participates in the USGS semi-annual proficiency evaluation program.

Through the addition of specialty tests, like the low-level method for perchlorate and many industry specific methods, our Rochester laboratory keeps evolving to meet the needs of their clients.

South Charleston, West Virginia

The ALS Environmental laboratory in South Charleston is a West Virginia Department of Environmental Protection accredited laboratory offering a wide range of analytical services on ground water, surface water, wastewater, soil, sludge, solids, and hazardous waste. ALS South Charleston provides professional analytical services to state and local government agencies, engineering firms, and private industries.

Middletown,Pennsylvania

Rochester, New York

Salt Lake City, Utah

ALS Salt Lake City is a premier provider of industrial hygiene analytical services in the United States. This location consistently delivers quality data to assist our clients in promoting human health. The laboratory has been accredited by the American Industrial Hygiene Association (AIHA) since 1974, and has served as the primary contract laboratory for the National Institute for Occupational Safety and Health for more than 30 years.

The Salt Lake City facility provides environmental analytical services to government and private clientele such as the EPA, Departments of Defense and Energy, and numerous environmental engineering firms. In supporting environmental investigation and monitoring programs, ALS Salt Lake City performs a full range of organic and inorganic analyses using SW-846 and EPA methodologies on a wide range of sample matrices including groundwater, surface water, wastewater, soil, sludge, air, and hazardous waste.

Additionally, this highly technical facility offers mycological, endotoxin, and bacterial analyses, including microbial culture techniques, spectrophotometry, microscopy, and GC/MS methodology, on a variety of sample matrices.

Simi Valley, California

ALS has a premiere air testing laboratory in Simi Valley, California. The facility is a nationally recognized, 20,000 square-foot, air testing laboratory that specializes in the analysis of ambient and indoor air pollution, stationary source emissions, process gas and industrial hygiene samples. The laboratory has performed testing on projects for clients in all the U.S. States, Puerto Rico, Guam and several other countries. In addition, Simi Valley has provided analytical support to colleges and universities located throughout the United States. Simi Valley is accredited by the American Industrial Hygiene Association.

Routine air tests performed by the laboratory include: analysis of volatile organic compounds (VOCs), speciated hydrocarbons and atmospheric gases in SUMMAÒ canisters, Tedlar bags and solid adsorbent media; analysis of speciated reduced sulfur compounds; analysis of carbonyl compounds (formaldehyde and other aldehydes) sampled with DNPH tubes and impingers; analysis of pesticides, PCBs, PAHs and other semivolatile compounds, collected using high volume and low volume polyurethane foam (PUF) and PUF/XAD-2 traps; analysis of phenols and cresols by HPLC; and determination of BTU heat content. The laboratory maintains an inventory of over 4,000 passivated stainless steel canisters of various sizes, low volume flow controllers, vacuum gauges, and a wide assortment of sampling media.

Tucson, Arizona

The ALS Environmental laboratory in Tucson, Arizona has project management services, and offers fuels analyses, short holding time general chemistry parameters, and performs micro-analytical analyses (CHN, oxygen, sulfur, metals and halogens) on a wide variety of matrices for the pharmaceutical, electronic, chemical, and contract laboratory industries and for academic research. They specialize in working with difficult matrices such as those containing air-sensitive compounds or samples of very limited volume.

Salt Lake City, Utah

Simi Valley, California

Quality Management System

The ALS Quality Management System (QMS) is structured to include the needs of clients, ALS corporate policies, as well as accreditation, licensing, and certification requirements. Our exemplary QMS focuses on the generation of high-quality data, on time and responsive to client and regulatory requirements. The ALS QMS documented in the Quality Assurance Manual (QAM) is designed to meet federal, state and local regulatory guidelines and all available quality standards. Extensive training and monitoring at all facilities by quality assurance staff ensures effective implementation. It is ALS policy to:

- Generate data that are scientifically sound and legally defensible
- Comply with NELAC standards as required
- Provide high quality testing services in compliance with all federal, state and agency regulatory requirements

Following is an overview of the elements of the ALS Quality Management System.

All analytical methods used at ALS undergo validation prior to their approval for use in the laboratory. The approved methods contain criteria for quality control and performance criteria that provides information on each preparation and analytical stage of analysis. Data generated are compared to data quality objectives.

Scheduled internal audits are performed on all quality management system elements. System audits are qualitative evaluations of all components of the laboratory systems. They determine if the measurement systems are being used appropriately. Such audits typically involve a comparison of the activities given in the QA Manual with those actually scheduled or performed and are conducted by a Quality Assurance Manager at each facility. Audit findings are used by ALS to improve process performance. Accreditation, certification, and licensing bodies also perform audits to ensure conformity to the applicable standards or regulations. In addition, clients may wish to perform audits to verify compliance with their project requirements. Each ALS facility participates in the Performance Testing programs semiannually for each area of testing which it is certified. Proficiency Testing programs are used to monitor testing activities. Results are reported to accreditation bodies when applicable, and are used to measure performance and meet accreditation and license requirements.

Certifications and Accreditations

For an updated list of ALS certifications and accreditations in the USA, including the full scope of each certification, visit: http://alsglobal.com/environmental/downloads/north-america-downloads/als-usa-scopes-of-accreditation.aspx

Performance Testing Programs

ALS Environmental is committed to utilizing performance testing samples to ensure that all analyses are compliant with industry standards. The various performances programs that ALS laboratories have been routinely involved with, but not limited to, over the past several years include:

- American Water Works Association (AWWA)
- American Industrial Hygiene Association (AIHA)
- American Public Health Association (APHA)
- US Environmental Protection Agency (USEPA)
- US Army Corps of Engineers (USACE)
- US Department of Defense (DoD)
- US Department of Energy Mixed-Analyte Performance Evaluation Program (MAPEP)
- National Oceanic and Atmospheric Administration (NOAA)
- North American Proficiency Testing Program (NAPT)
- National Voluntary Laboratory Accreditation Program (NVLAP)

Quality Commitment

It is important to reiterate that ALS is committed to supporting accreditation programs by active participation in state specific environmental programs and The NELAC Institute (TNI). All feedback and non-conformance issues from clients are documented, tracked, resolved, and used as part of the company's continuous improvement plan. Monitoring of improvements provides clients with assurance that ALS has addressed their concerns and implemented corrective action procedures that meet client expectations.

The ALS management team routinely reviews all activities to ensure the continued suitability of the Quality Management System to meet expectations. The reviews are used to set measurable goals and timelines for future performance and growth. ALS management invites clients to visit the nearest laboratory for a tour and review of management systems.

Corporate Responsibility

ALS Group is committed to performing duties in efficient and ethical ways, at all times meeting and often exceeding standards that govern the operations of the company, and complying with the all applicable laws.

Compliance

ALS believes that meeting compliance obligations is a responsibility essential to its long-term success. The company is committed to adhering to all legislation that relates to the operations of ALS.

All ALS employees are responsible for complying with policies and procedures established to ensure that ALS fulfills requisite legislative requirements. Every employee, contractor, or agent of the company is held accountable to conform to the law and act ethically at all times.

Health and Safety

ALS is committed to achieving the highest levels of occupational health and safety performance in all of its laboratories through the reduction of risk of workplace injuries and illness. The company has a comprehensive health and safety program which protects staff, contractors, visitors, property, and the public. Compliance with health and safety legislation, development of safe operating procedures, employee training programs, regular site inspections, and annual audits ensure that employees at every level are responsible and accountable for the company's health and safety performance.

Environment

ALS is committed to minimizing its environmental footprint. To support this goal, each laboratory adheres to relevant legislation in their jurisdiction for waste storage and disposal. Samples and wastes are recycled or disposed in an environmentally responsible manner. Containers and packaging are recycled wherever possible.

Confidentiality

ALS employees understand the importance of confidentiality and have implemented policies that ensure the protection of client information. Employees are required to sign and follow ethics, conflict of interest, and confidentiality policies. These agreements are required to ensure that all employees are aware of:

- Laboratory policy regarding ethics, and the standards of integrity that are expected of them.
- The notion that they are free from any undue pressures that might affect the quality of their work.

Client confidentiality ensures that procedures for sending test results by mail, facsimile, email, or other electronic means meet client requirements. Requests for records made by a third party must be accompanied by written consent from the client. All employees assure clients that confidentiality is observed at all times when presenting records.

System Integrity

- Secure, virus-free system, including a firewall to protect data
- Back-up of all data
- Redundancy of major equipment and services
- Professionally managed and maintained

ALS Management and Professional Staff

ALS employs the most dedicated management and technical staff in the business. A focus on staff retention and career development has earned ALS a reputation as the "employer of choice" for laboratory professionals. This loyalty translates into a technical resource with a very high level of expertise and experience.

ALS is managed within a regional structure with the autonomy to deliver services that meet local needs. Because the majority of staff, including senior management, are chemists, testing requirements of clients are well known. The resume of key technical professionals are available upon request. Key positions include:

- **Managers** - responsible for resource management and efficient delivery of services
- **Technical Specialists** - responsible for maintaining the leadership at ALS in the analytical testing market. Technical specialists are knowledgeable about emerging technologies and are often consulted by industry and regulatory bodies to provide expert assistance on a wide range of unique projects
- **Account/Project Managers** - provide the routine interaction between the laboratory and the client as it relates to the analytical project requirements for which ALS is renowned. Each client is assigned a Project Manager that develops an understanding of service requirements
- **Chemists and Technical Staff** - are highly skilled professionals trained in modern analytical procedures
- **Support Staff** – ensure that services are available to provide clients with timely and secure data delivery

What this means to our clients . . .

The depth of technical and management expertise of ALS allows the company to deliver a consistently high level of service to clients. A commitment to having the highest level of technical expertise and knowledge provides the assurance that data are supported by a quality program using only modern instrumentation and procedures. The personal and top-notch service delivered by ALS professionals translates to peace of mind and successful partnerships.

ALS Environmental

North America Environmental Division

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Grande Prairie, AB	+1 780 539 5196
Kamloops, BC	+1 250 372 3588
London, ON	+1 519 652 6044
Mississauga, ON	+1 905 507 6910
Ottawa, ON	+1 613 225 8279
Regina, SK	+1 306 716 8741
Richmond Hill, ON	+1 905 881 9887
Saskatoon, SK	+1 306 668 8370
Thunder Bay, ON	+1 807 623 6463
Vancouver, BC	+1 604 253 4188
Waterloo, ON	+1 519 886 6910
Whitehorse, YT	+1 867 668 6689
Winnipeg, MB	+1 204 255 9720
Yellowknife, NT	+1 867 873 5593

Mexico

Monterrey, NL	+52 81 8317 9150

USA

Chambersburg, PA	+1 717 263 8800
Chicago, IL	+1 616 723 7806
Cincinnati, OH	+1 513 733 5336
Cleveland, OH	+1 216 674 4518
Columbia, MD	+1 410 290 8884
Detroit, MI	+1 313 363 8193
Edison, NJ	+1 848 229 2334
Everett, WA	+1 425 356 2600
Fort Collins, CO	+1 970 490 1511
Harrisburg, PA	+1 717 540 3424
Holland, MI	+1 616 399 6070
Hopewell Junction, NY	+1 845 894 8544
Houston, TX	+1 281 530 5656
Houston, TX (High-Res)	+1 713 266 1599
Jacksonville, FL	+1 904 739 2277
Kapolei, HI	+1 808 682 1564
Kelso, WA	+1 360 577 7222
Middletown, PA	+1 717 944 5541
Rochester, NY	+1 585 288 5380
Salt Lake City, UT	+1 801 266 7700
Simi Valley, CA	+1 805 526 7161
South Charleston, WV	+1 304 356 3168
Spring City, PA	+1 610 948 4903
Traverse City, MI	+1 231 421 3204
Tucson, AZ	+1 520 573 1061
Williamsport, PA	+1 717 648 7000
York, PA	+1 717 505 5280

RIGHT SOLUTIONS RIGHT PARTNER

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ALS Environmental

Statement
of
Qualifications

To Provide Analytical Laboratory Testing Services
2013

TABLE OF CONTENTS

ALS is an analytical testing laboratory that has been designed to analyze soil and groundwater samples associated with a variety of chemical and toxic contaminants. The laboratory is accredited by the Washington State Department of Ecology and participates in EPA and other agency performance evaluation programs. ALS provides professional analytical services for state and local governmental agencies, consulting firms and private industry.

Quality Assurance/ Quality Control Laboratory quality assurance and quality control (QA/QC) at ALS is conducted under the guidelines and objectives outlined in the ALS Quality Assurance Manual. Standard practice includes the analysis of method blanks, duplicate, matrix spike and duplicate matrix spike samples as appropriate with each batch of samples processed in the laboratory. CCI is committed to producing analytical data of the highest quality.

Service The focus of our analytical laboratory is on customer service. We fully understand the need for accurate, timely results provided in the format you desire. We recognize the importance of being responsive to our clients needs and strive to provide a cooperative professional approach to providing analytical data in a cost effective manner.

General Information

Name: ALS.

Street Address: 8620 Holly Drive, Everett, WA 98208

Telephone Number: (425) 356-2600

Fax Number: (425) 356-2626

Contacts:

Laboratory Director; Mr. Rick Bagan
e-mail: rick.bagan@alsglobal.com

Operations Manager; Mr. Carl Nott
e-mail: carl.nott@alsglobal.com

Rick Bagan, Laboratory Director, B.S. Business Administration
Mr. Bagan has 19 years experience in Environmental management including 14 years with CCI in business development and project management. As Laboratory Director, Mr. Bagan is responsible for overall laboratory performance. Other responsibilities include implementing the QA program within the laboratory, providing project management and business development service.

Carl Nott, Operations Manager, B.A. Chemistry
Mr. Nott is responsible for CCI's database administration and data review. Mr. Nott has 8 years experience in the preparation and analyses of environmental samples using GC/MS instrumentation and as such is the primary reviewer of all GC/MS data. Mr. Nott is experienced with validation of analytical data packages and data usability determination. Mr. Nott also directly repairs and maintains lab instrumentation and data systems.

Glen Perry, Organic Chemist-QA/QC Manager, B.S. Chemistry
Mr. Perry has 18 years experience in environmental organic chemistry. Mr. Perry is responsible for the evaluation of laboratory SOPs, maintenance of CCI Quality Assurance Manual, document control and internal and external auditing. Mr. Perry works with regulatory agencies to secure necessary laboratory certifications. His experience provides valuable insight as to the usability and overall quality of analytical data. Mr. Perry is also the lead Chemist for the GC/MS volatiles department.

Russ Lister, Inorganic Chemist, B.S. Chemistry
Mr. Lister has 12 years experience in the preparation and analyses of soil and liquid for metals and other inorganic compounds utilizing the following instruments: ICPMS, CVAA, and IC. Mr. Lister is responsible for the daily operation of the inorganics department which includes metals analysis and other wet chemistry methods.

Lucy Pantelleeff, Organic Chemist, B.S. Chemistry
Ms. Pantelleeff has 13 years experience in the preparation and analyses of soil and liquid, using GC/MS and ECD GC techniques. Ms. Pantelleeff is responsible for semivolatile, pesticide and PCB analyses in the laboratory.

ANALYTICAL CAPABILITIES

ALS is well equipped for analysis of volatile, semi-volatile and other organic and inorganic contaminants in a variety of matrices, including water, soil, sediment, waste, and sludge. The list below is representative of our capabilities.

ORGANICS BY GC

PARAMETER	METHOD
Aromatic Volatile Organics	EPA 602/8021
Volatile Organic Compounds	EPA 602/8021
BTEX	EPA 8021
Chlorinated Pesticides	EPA 608/8081
Chlorinated Pesticides & PCBs	EPA 608/8081/8082
Light Hydrocarbons	GC/FID
PCBs in Water	EPA 608/8082
PCBs in Soil	EPA 8082
PCBs in Oil	EPA 600/4-81-045
PCBs on Wipe	CCIAL

ORGANICS BY GCMS

PARAMETER	METHOD
Halogenated Volatiles	EPA 624/8260
Phenols	EPA 625/8270
PAHs	EPA 625/8270
PAHs by SIM	EPA 625/8270 mod
Semivolatile Organic Compounds	EPA 625/8270
Volatile Organic Compounds	EPA 624/8240/8260

WASHINGTON STATE TOXICS CLEANUP PROGRAM

PARAMETER	METHOD
Hydrocarbon Identification	NWTPH-HCID
Gasoline range organics	NWTPH-Gx
BTEX	EPA-8021
Diesel Extended	NWTPH-Dx
Total petroleum hydrocarbons	EPA-8015 Mod.
Hexane Extractable Material	EPA-1664

ANALYTICAL CAPABILITIES CONTINUED

MTCA RISK BASED METHODS

PARAMETER	METHOD
Volatile Petroleum Hydrocarbons	VPH
Volatile Petroleum Hydrocarbons and Targeted VPH Analytes by GC/PID	VPH/BTEX/MTBE/Naphthalene
Extractable Petroleum Hydrocarbons	EPH
Extractable Petroleum Hydrocarbons And Targeted PAH's By GC/MS-SIM	EPH/PAH-SIM

TRACE METALS

PARAMETER	METHOD
ICPMS Metals	EPA 200.8/ 6020
Mercury by Cold Vapor	EPA 245.2/EPA 7470/7471

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)

PARAMETER	METHOD
Zero Head space Extraction (Volatiles)	EPA 1311
Bottle Extraction (non volatile)	EPA 1311
Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	EPA 6020/7470
Chlorinated Pesticides	EPA 8080
Volatile Organics	EPA 8260
Semivolatile Organics	EPA 8270

GENERAL AND WET CHEMISTRY

PARAMETER	METHOD
Biochemical Oxygen Demand (BOD-5)	EPA 405.1
Bromide	EPA 300.0
Chloride	EPA 300.0
Cyanide	EPA 335.2 / 9010
Flash point (PMCC)	EPA 1010
Fluoride	EPA 300.0
Nitrate	EPA 300.0
Nitrite	EPA 300.0
Oil & Grease, Hexane Extractable Material	EPA 1664
Ortho Phosphate	EPA 300.0
pH	EPA 150.1
pH	EPA 9040
Solids, Total suspended (TSS)	EPA 160.1
Specific Conductance	EPA 120.1
Sulfate	EPA 300.0
Turbidity	EPA 180.1

MAJOR INSTRUMENTATION

The instruments and equipment supporting our analytical activities are listed below.

GC/MS Volatiles:

Hewlett-Packard model 6890 Series II GC with model 5973 Mass selective Detector.
Hewlett-Packard model 5890 Series II GC with model 5971 Mass selective Detector.
2-Tekmar 2000 sample concentrator.
2-Archon Autosampler (51 sample capacity).

GC/MS Semivolatiles:
2- Hewlett-Packard model 5890 Series II GC with model 5971 Mass selective Detector.
2- Hewlett-Packard Model 7673 Autosampler.

GC Volatiles:
2-Hewlett-Packard model 5890 Series II GC with one Photo Ionization Detector and one Flame Ionization Detector in series.
OI Corporation 4560 concentrator.
OI Corporation Model MPM-16 Autosampler (16 sample capacity).
OI Corporation Model 4460 concentrator.
Archon Autosampler (51 sample capacity).

GC Light Hydrocarbons:
Hewlett-Packard model 5890 GC with Flame Ionization Detector.
Hewlett-Packard model 7673 controller.

GC Semivolatiles:
2-Hewlett-Packard model 6890 GC with dual injector and dual Flame Ionization Detectors.
2-Hewlett-Packard model 7673 Autosampler.

GC Pesticides/PCBs
Hewlett-Packard model 5890 Series II GC with dual injector and dual Electron Capture Detectors.
Hewlett-Packard model 7673 Autosampler.

Inorganics:

Thermal Jarrell Ash 61E Trace Analyzer Simultaneous Inductively Coupled Plasma Emission Spectrometer with autosampler.
Cetac Quick Trace M-6100 CVAA Mercury Analysis
Dionex Series DX 100 Ion Chromatograph
Spectronic 1001 UV/VIS spectrophotometer

FACILITIES

ALS CCI has been located in Everett, WA. for 16 years. Our 6,500 square foot laboratory is divided into the following work areas.

* Sample Receiving/Sample Storage
* Extractions/ Digestions
* GC Volatiles
* GC/MS Semivolatiles
* GC/MS Volatiles
* Inorganics

The areas devoted to the environmental testing laboratory have been developed with process efficiency and data integrity as primary goals, to that end we have divided the working areas into separate operating units each of which is equipped with a separate HVAC system. This system provides an individual source of external air for each area and controls the direction of air flow within the building to prevent cross-contamination between areas.

A separate sample entry is located on the side of the building, with ample free parking and easy access for sample delivery.

Other areas include a conference room, executive and administrative offices, a reception area, and restrooms. Our space is configured to accommodate significant growth of testing volume with a minimum impact on operations.

EXAMPLE PROJECTS

Client:	Camp Dresser & McKee, Inc.
Site:	Various Industrial Sites
Type of Project:	Site Assessment/UST Removal
Test Methods:	Volatiles and Semi-Volatiles by GC/MS, Metals, TPH, Pesticides
Media Analyzed:	Soil, Water
Other:	Sample Pickup, Rush Turnaround, Custom Deliverables Package

Client: City of Everett
Site: Municipal Landfill
Type of Project: Remedial Investigation / Feasibility Study
Test Methods: Various Organic and Inorganic
Media Analyzed: Soil, Water, Air
Other: Custom Deliverables Package, Electronic Deliverables

Client: Whatcom Environmental Services
Site: Various Industrial Properties
Type of Project: Site Assessments, Remedial Investigations
Test Methods: Volatiles and Semi-Volatiles by GC/MS, Metals, TPH, Pesticides
Media Analyzed: Soil, Water
Other: Rush Turnaround

Client: Environmental Partners Inc.
Site: Various Industrial Properties
Type of Project: Remedial Investigations and UST Site Assessments
Test Methods: Volatiles and Semi-Volatiles by GC/MS, Metals, TPH, Pesticides
Media Analyzed: Soil, Water, Air
Other: Sample Pickup, Rush Turnaround

Client: Tetra Tech
Site: NW Military Base
Type of Project: Remedial Investigation
Test Methods: Volatiles by GC/MS, TPH, PCB/Pesticides, Metals
Media Analyzed: Soil, Water
Other: Rush Turnaround for over 100 Samples, Custom Deliverables Package, Electronic Deliverables

Client: Landau Associates
Site: Various Industrial Properties
Type of Project: UST Removal, Site Assessments
Test Methods: Volatiles and Semi-Volatiles by GC/MS, PCB/Pesticides, Metals, TPH
Media Analyzed: Soil, Water
Other: Sample Pickup, Rush Turnaround

EXAMPLE PROJECTS CONTINUED

Client: Shannon & Wilson
Site: Various Industrial Properties
Type of Project: Remedial Investigations, Site Assessments
Test Methods: Volatiles and Semi-Volatiles by GC/MS, PCB/Pesticides, Metals, TPH
Media Analyzed: Soil, Water
Other: Sample Pickup, Rush Turnaround

Client:	Shaw Environmental
Site:	Military Petroleum Tank Farm
Type of Project:	Remedial Investigation / Feasibility Study
Test Methods:	Volatiles and Semi-Volatiles by GC/MS, PCB/Pesticides, TPH, Metals
Media Analyzed:	Soil, Water
Other:	Sample Pickup

Client:	Severson Construction
Site:	Military Base
Type of Project:	Waste Characterization
Test Methods:	Volatiles by GC/MS, Semi-Volatiles by GC/MS, PCB/Pesticides, Metals, TPH
Media Analyzed:	Soil, Water, Waste
Other:	Army Corps of Engineers Data Deliverables Package, Sample Pickup, Rush Turnaround

Client:	TOSCO Refining Company
Site:	Large Petroleum Refinery
Type of Project:	Remedial Investigation
Test Methods:	Volatiles by GC/MS, Semi-Volatiles by GC/MS, Metals, TPH
Media Analyzed	Soil, Water
Other:	Sample Pickup, Electronic Data Deliverables

Client:	Washington State Department of Ecology-Manchester Laboratory
Site:	Various Industrial Sites
Type of Project:	Various
Test Methods:	Volatiles by GC/MS, PCB/Pesticides, Metals, TPH
Media Analyzed:	Soil, Water
Other:	Sample Pickup, Full Data Validation Deliverables

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 488 • Manchester, WA 98353-0488 • (360) 895-6144

January 3, 2013

Mr. Glen Perry
ALS Laboratory Group - Everett
8620 Holly Drive, Suite 100
Everett, WA 98208

Dear Mr. Perry:

Thank you for your application for renewal in the Environmental Laboratory Accreditation Program. Enclosed is a new Certificate of Accreditation covering the one-year period beginning January 4, 2013 and a current Scope of Accreditation.

Renewal of accreditation is based in part on review of your lab's performance over the past year as evidenced by participation in proficiency testing (PT) studies.

Note that your Scope has been updated to the current EPA approved methods per the Federal Register published May 18, 2012. Please be sure your procedures are in compliance with the current versions of the methods (including revising your SOPs and/or QA Manual).

Compounds have been added or deleted as requested, except that accreditation is not available for SW-846 methods in the Non-Potable Water matrix. Accreditation for these methods in the Solid and Chemical Materials matrix is applicable to non-NPDES water samples. (Methods approved at 40CFR136.3 must be used for NPDES compliance.)

As a reminder, continued participation in the Ecology Lab Accreditation Program requires the lab to:

- Submit a renewal application and fees annually
- Report significant changes in facility, personnel, analytical methods, equipment, the lab's quality assurance (QA) manual or QA procedures as they occur
- Participate in proficiency testing studies semi-annually, with the following exception: **For each parameter where all PT results were satisfactory, you are required to submit only one PT result over this next year, and in subsequent years, as long as the results are satisfactory.**

YOUR RIGHT TO APPEAL

You have a right to appeal Ecology's decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this decision letter. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this decision:

- File your appeal and a copy of this decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

If you have any questions concerning the accreditation of your lab, please contact me at (360) 895-6178, fax (360) 895-6180, or by e-mail at alan.rue@ecy.wa.gov.

Sincerely,

Alan D. Rue
Lab Accreditation Unit Supervisor

WASHINGTON STATE DEPARTMENT OF ECOLOGY

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

SCOPE OF ACCREDITATION

ALS Laboratory Group - Everett

Everett, WA

is accredited for the analytes listed below using the methods indicated. Full accreditation is granted unless stated otherwise in a note. Accreditation for U.S. Environmental Protection Agency (EPA) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) is for the latest version of the method. SM refers to EPA approved editions of “Standard Methods for the Examination of Water and Wastewater.” ASTM is the American Society for Testing and Materials. Other references are described in notes.

Matrix/Analyte	Method	Notes
Non-Potable Water		
Hexane Extractable Material	EPA 1664A_1_1999	
Turbidity	EPA 180.1_2_1993	
Bromide	EPA 300.0_2.1_1993	
Chloride	EPA 300.0_2.1_1993	
Fluoride	EPA 300.0_2.1_1993	
Nitrate	EPA 300.0_2.1_1993	
Nitrate-nitrite	EPA 300.0_2.1_1993	
Nitrite	EPA 300.0_2.1_1993	
Sulfate	EPA 300.0_2.1_1993	
Specific Conductance	SM 2510 B	
Residue-total	SM 2540 B	
Residue-filterable (TDS)	SM 2540 C	
Residue-nonfilterable (TSS)	SM 2540 D	
Total cyanide	SM 4500-CN E	
Biochemical oxygen demand	SM 5210 B	
Aluminum	EPA 200.8_5.4_1994	1
Antimony	EPA 200.8_5.4_1994	1
Arsenic	EPA 200.8_5.4_1994	1
Barium	EPA 200.8_5.4_1994	1
Beryllium	EPA 200.8_5.4_1994	1
Cadmium	EPA 200.8_5.4_1994	1
Calcium	EPA 200.8_5.4_1994	1

Matrix/Analyte	Method	Notes
Chromium	EPA 200.8_5.4_1994	1
Cobalt	EPA 200.8_5.4_1994	1
Copper	EPA 200.8_5.4_1994	1
Iron	EPA 200.8_5.4_1994	1
Lead	EPA 200.8_5.4_1994	1
Magnesium	EPA 200.8_5.4_1994	1
Manganese	EPA 200.8_5.4_1994	1
Molybdenum	EPA 200.8_5.4_1994	1
Nickel	EPA 200.8_5.4_1994	1
Potassium	EPA 200.8_5.4_1994	1
Selenium	EPA 200.8_5.4_1994	1
Silver	EPA 200.8_5.4_1994	1
Sodium	EPA 200.8_5.4_1994	1
Thallium	EPA 200.8_5.4_1994	1
Titanium	EPA 200.8_5.4_1994	1
Vanadium	EPA 200.8_5.4_1994	1
Zinc	EPA 200.8_5.4_1994	1
Mercury	EPA 245.1_3_1994	
Benzene	EPA 602	
Ethylbenzene	EPA 602	
m+p-xylene	EPA 602	
o-Xylene	EPA 602	
Toluene	EPA 602	
Xylenes (total)	EPA 602	
4,4'-DDD	EPA 608	
4,4'-DDE	EPA 608	
4,4'-DDT	EPA 608	
Alachlor	EPA 608	
Aldrin	EPA 608	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	
alpha-Chlordane	EPA 608	
Aroclor-1016 (PCB-1016)	EPA 608	
Aroclor-1221 (PCB-1221)	EPA 608	
Aroclor-1232 (PCB-1232)	EPA 608	
Aroclor-1242 (PCB-1242)	EPA 608	
Aroclor-1248 (PCB-1248)	EPA 608	

Matrix/Analyte	Method	Notes
Aroclor-1254 (PCB-1254)	EPA 608	
Aroclor-1260 (PCB-1260)	EPA 608	
Atrazine	EPA 608	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	
Chlordane (tech.)	EPA 608	
delta-BHC	EPA 608	
Dieldrin	EPA 608	
Endosulfan I	EPA 608	
Endosulfan II	EPA 608	
Endosulfan sulfate	EPA 608	
Endrin	EPA 608	
Endrin aldehyde	EPA 608	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	
gamma-Chlordane	EPA 608	
Heptachlor	EPA 608	
Heptachlor epoxide	EPA 608	
Hexachlorobenzene	EPA 608	
Hexachlorocyclopentadiene	EPA 608	
Methoxychlor	EPA 608	
Metribuzin	EPA 608	
Propachlor (Ramrod)	EPA 608	
Simazine	EPA 608	
Toxaphene (Chlorinated camphene)	EPA 608	
Trifluralin (Treflan)	EPA 608	
Solid and Chemical Materials		
Chromium VI	EPA 7196A_1_1992	
Total cyanide	EPA 9014	
pH (non-aqueous)	EPA 9045D	
Aluminum	EPA 6020A_(2/07)	1
Antimony	EPA 6020A_(2/07)	1
Arsenic	EPA 6020A_(2/07)	1
Barium	EPA 6020A_(2/07)	1
Beryllium	EPA 6020A_(2/07)	1
Cadmium	EPA 6020A_(2/07)	1
Calcium	EPA 6020A_(2/07)	1

Matrix/Analyte	Method	Notes
Chromium	EPA 6020A_(2/07)	1
Cobalt	EPA 6020A_(2/07)	1
Copper	EPA 6020A_(2/07)	1
Iron	EPA 6020A_(2/07)	1
Lead	EPA 6020A_(2/07)	1
Magnesium	EPA 6020A_(2/07)	1
Manganese	EPA 6020A_(2/07)	1
Molybdenum	EPA 6020A_(2/07)	1
Nickel	EPA 6020A_(2/07)	1
Potassium	EPA 6020A_(2/07)	1
Selenium	EPA 6020A_(2/07)	1
Silver	EPA 6020A_(2/07)	1
Sodium	EPA 6020A_(2/07)	1
Thallium	EPA 6020A_(2/07)	1
Titanium	EPA 6020A_(2/07)	1
Zinc	EPA 6020A_(2/07)	1
Mercury	EPA 7470A_1_1994	
Mercury	EPA 7471B_(1/98)	
Benzene	EPA 8021B_2_1996	
Ethylbenzene	EPA 8021B_2_1996	
m+p-xylene	EPA 8021B_2_1996	
o-Xylene	EPA 8021B_2_1996	
Toluene	EPA 8021B_2_1996	
Xylenes (total)	EPA 8021B_2_1996	
4,4'-DDD	EPA 8081B_(2/07)	
4,4'-DDE	EPA 8081B_(2/07)	
4,4'-DDT	EPA 8081B_(2/07)	
Alachlor	EPA 8081B_(2/07)	
Aldrin	EPA 8081B_(2/07)	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
alpha-Chlordane	EPA 8081B_(2/07)	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
Captafol	EPA 8081B_(2/07)	
Chlordane (tech.)	EPA 8081B_(2/07)	
Chlorobenzilate	EPA 8081B_(2/07)	
Chloroneb	EPA 8081B_(2/07)	

Matrix/Analyte	Method	Notes
Chloropropylate	EPA 8081B_(2/07)	
Chlorothalonil	EPA 8081B_(2/07)	
Dacthal (DCPA)	EPA 8081B_(2/07)	
delta-BHC	EPA 8081B_(2/07)	
Diallate	EPA 8081B_(2/07)	
Dichlone	EPA 8081B_(2/07)	
Dicofol	EPA 8081B_(2/07)	
Dieldrin	EPA 8081B_(2/07)	
Endosulfan I	EPA 8081B_(2/07)	
Endosulfan II	EPA 8081B_(2/07)	
Endosulfan sulfate	EPA 8081B_(2/07)	
Endrin	EPA 8081B_(2/07)	
Endrin aldehyde	EPA 8081B_(2/07)	
Endrin ketone	EPA 8081B_(2/07)	
Etridiazole	EPA 8081B_(2/07)	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
gamma-Chlordane	EPA 8081B_(2/07)	
Halowax-1000	EPA 8081B_(2/07)	
Halowax-1001	EPA 8081B_(2/07)	
Halowax-1013	EPA 8081B_(2/07)	
Halowax-1014	EPA 8081B_(2/07)	
Halowax-1051	EPA 8081B_(2/07)	
Halowax-1099	EPA 8081B_(2/07)	
Heptachlor	EPA 8081B_(2/07)	
Heptachlor epoxide	EPA 8081B_(2/07)	
Hexachlorobenzene	EPA 8081B_(2/07)	
Hexachlorocyclopentadiene	EPA 8081B_(2/07)	
Isodrin	EPA 8081B_(2/07)	
Methoxychlor	EPA 8081B_(2/07)	
Mirex	EPA 8081B_(2/07)	
Nitrofen	EPA 8081B_(2/07)	
Permethrin (total)	EPA 8081B_(2/07)	
Perthane	EPA 8081B_(2/07)	
Propachlor (Ramrod)	EPA 8081B_(2/07)	
Strobane	EPA 8081B_(2/07)	
Toxaphene (Chlorinated camphene)	EPA 8081B_(2/07)	

Matrix/Analyte	Method	Notes
trans-Nonachlor	EPA 8081B_(2/07)	
Trifluralin (Treflan)	EPA 8081B_(2/07)	
Aroclor-1016 (PCB-1016)	EPA 8082A_(2/07)	
Aroclor-1221 (PCB-1221)	EPA 8082A_(2/07)	
Aroclor-1232 (PCB-1232)	EPA 8082A_(2/07)	
Aroclor-1242 (PCB-1242)	EPA 8082A_(2/07)	
Aroclor-1248 (PCB-1248)	EPA 8082A_(2/07)	
Aroclor-1254 (PCB-1254)	EPA 8082A_(2/07)	
Aroclor-1260 (PCB-1260)	EPA 8082A_(2/07)	
Petroleum Hydrocarbons, Extractable	WA EPH	
Petroleum Hydrocarbons, Volatile	WA VPH	
Total Pet Hydrocarbons - Diesel	WDOE NWTPH-Dx	
Total Pet Hydrocarbons - Gasoline	WDOE NWTPH-Gx	
1,1,1,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,1-Trichloro-2,2,2-trifluoroethane	EPA 8260C_(8/06)	
1,1,1-Trichloro-2-propanone	EPA 8260C_(8/06)	
1,1,1-Trichloroethane	EPA 8260C_(8/06)	
1,1,2,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260C_(8/06)	
1,1,2-Trichloroethane	EPA 8260C_(8/06)	
1,1,2-Trichlorofluoroethane	EPA 8260C_(8/06)	
1,1-Dichloro-1-fluoroethane	EPA 8260C_(8/06)	
1,1-Dichloroethane	EPA 8260C_(8/06)	
1,1-Dichloroethylene	EPA 8260C_(8/06)	
1,1-Dichloropropene	EPA 8260C_(8/06)	
1,2,3,4-Diepoxybutane	EPA 8260C_(8/06)	
1,2,3-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,3-Trichloropropane	EPA 8260C_(8/06)	
1,2,3-Trimethylbenzene	EPA 8260C_(8/06)	
1,2,4-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,4-Trimethylbenzene	EPA 8260C_(8/06)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260C_(8/06)	
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260C_(8/06)	
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	EPA 8260C_(8/06)	
1,2-Dichloro-1,1,2-trifluoroethane	EPA 8260C_(8/06)	
1,2-Dichlorobenzene	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
1,2-Dichloroethane (Ethylene dichloride)	EPA 8260C_(8/06)	
1,2-Dichloropropane	EPA 8260C_(8/06)	
1,2-Dimethoxyethane	EPA 8260C_(8/06)	
1,3,5-Trimethylbenzene	EPA 8260C_(8/06)	
1,3-Butanediol	EPA 8260C_(8/06)	
1,3-Dichloro-2-propanol	EPA 8260C_(8/06)	
1,3-Dichlorobenzene	EPA 8260C_(8/06)	
1,3-Dichloropropane	EPA 8260C_(8/06)	
1,3-Dichloropropene	EPA 8260C_(8/06)	
1,4-Butanediol	EPA 8260C_(8/06)	
1,4-Dichloro-2-butene	EPA 8260C_(8/06)	
1,4-Dichlorobenzene	EPA 8260C_(8/06)	
1,4-Difluorobenzene	EPA 8260C_(8/06)	
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260C_(8/06)	
1-Butene	EPA 8260C_(8/06)	
1-Chloro-1,2,2-trifluoroethane (Freon 133)	EPA 8260C_(8/06)	
1-Chlorobutane	EPA 8260C_(8/06)	
1-Chlorohexane	EPA 8260C_(8/06)	
1-Heptene	EPA 8260C_(8/06)	
1-Hexene	EPA 8260C_(8/06)	
1-Methyl-2-n-propylbenzene	EPA 8260C_(8/06)	
1-Propene	EPA 8260C_(8/06)	
2,2,4-Trimethylpentane	EPA 8260C_(8/06)	
2,2-Dichloro-1,1,1-trifluoroethane (Freon 123)	EPA 8260C_(8/06)	
2,2-Dichloropropane	EPA 8260C_(8/06)	
2,2-Dimethylbutane	EPA 8260C_(8/06)	
2,2'-Oxybis(1-chloropropane)	EPA 8260C_(8/06)	
2,3,4-Trimethylpentane	EPA 8260C_(8/06)	
2,3-Dichloropropene	EPA 8260C_(8/06)	
2,3-Dimethylbutane	EPA 8260C_(8/06)	
2,3-Dimethylpentane	EPA 8260C_(8/06)	
2,4-Dimethylpentane	EPA 8260C_(8/06)	
2-Bromofluorobenzene	EPA 8260C_(8/06)	
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260C_(8/06)	
2-Chloro-2-methybutane (tert-Amyl chloride)	EPA 8260C_(8/06)	
2-Chloroethanol	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
2-Chloroethyl vinyl ether	EPA 8260C_(8/06)	
2-Chlorotoluene	EPA 8260C_(8/06)	
2-Ethylhexanol (2-Ethyl-1-hexanol)	EPA 8260C_(8/06)	
2-Ethyltoluene	EPA 8260C_(8/06)	
2-Hexanone	EPA 8260C_(8/06)	
2-Hexene	EPA 8260C_(8/06)	
2-Hydroxypropionitrile	EPA 8260C_(8/06)	
2-Methoxyethanol (Methyl cellosolve)	EPA 8260C_(8/06)	
2-Methyl-1,3-dioxolane	EPA 8260C_(8/06)	
2-Methyl-2-Butene	EPA 8260C_(8/06)	
2-Methylaniline (o-Toluidine)	EPA 8260C_(8/06)	
2-Methylbutadiene (Isoprene)	EPA 8260C_(8/06)	
2-Methylbutane (Isopentane)	EPA 8260C_(8/06)	
2-Methylheptane	EPA 8260C_(8/06)	
2-Methylhexane	EPA 8260C_(8/06)	
2-Methylpentane (Isohexane)	EPA 8260C_(8/06)	
2-methylpropane (Isobutane)	EPA 8260C_(8/06)	
2-Nitropropane	EPA 8260C_(8/06)	
2-Pentanone	EPA 8260C_(8/06)	
2-Picoline (2-Methylpyridine)	EPA 8260C_(8/06)	
3-Bromofluorobenzene	EPA 8260C_(8/06)	
3-Butene-1-ol	EPA 8260C_(8/06)	
3-Chloropropionitrile	EPA 8260C_(8/06)	
3-Ethyltoluene	EPA 8260C_(8/06)	
3-Methyl-1-Butene	EPA 8260C_(8/06)	
3-Methylheptane	EPA 8260C_(8/06)	
3-Methylhexane	EPA 8260C_(8/06)	
3-Methylpentane	EPA 8260C_(8/06)	
4-Bromofluorobenzene	EPA 8260C_(8/06)	
4-Chlorotoluene	EPA 8260C_(8/06)	
4-Ethyltoluene	EPA 8260C_(8/06)	
4-Isopropyltoluene (p-Cymene)	EPA 8260C_(8/06)	
4-Methyl-1-Pentene	EPA 8260C_(8/06)	
4-Methyl-2-pentanone (MIBK)	EPA 8260C_(8/06)	
4-Methylaniline (p-Toluidine)	EPA 8260C_(8/06)	
Acetamide	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
Acetone	EPA 8260C_(8/06)	
Acetonitrile	EPA 8260C_(8/06)	
Acetylene	EPA 8260C_(8/06)	
Acrolein (Propenal)	EPA 8260C_(8/06)	
Acrylamide	EPA 8260C_(8/06)	
Acrylic acid	EPA 8260C_(8/06)	
Acrylonitrile	EPA 8260C_(8/06)	
Adsorbable Organic Halides (AOX)	EPA 8260C_(8/06)	
Allyl alcohol	EPA 8260C_(8/06)	
Allyl chloride (3-Chloropropene)	EPA 8260C_(8/06)	
alpha-Methylstyrene	EPA 8260C_(8/06)	
Benzene	EPA 8260C_(8/06)	
beta-Propiolactone	EPA 8260C_(8/06)	
bis(2-Chloroethyl) sulfide	EPA 8260C_(8/06)	
bis(Chloromethyl)ether	EPA 8260C_(8/06)	
Bromoacetone	EPA 8260C_(8/06)	
Bromobenzene	EPA 8260C_(8/06)	
Bromochloromethane	EPA 8260C_(8/06)	
Bromodichloromethane	EPA 8260C_(8/06)	
Bromoethane (Ethyl Bromide)	EPA 8260C_(8/06)	
Bromoethene	EPA 8260C_(8/06)	
Bromoform	EPA 8260C_(8/06)	
Butyl acetate	EPA 8260C_(8/06)	
Carbon disulfide	EPA 8260C_(8/06)	
Carbon tetrachloride	EPA 8260C_(8/06)	
Chloral hydrate	EPA 8260C_(8/06)	
Chloroacetonitrile	EPA 8260C_(8/06)	
Chlorobenzene	EPA 8260C_(8/06)	
Chlorodibromomethane	EPA 8260C_(8/06)	
Chlorodifluoromethane (Freon-22)	EPA 8260C_(8/06)	
Chloroethane (Ethyl chloride)	EPA 8260C_(8/06)	
Chloroform	EPA 8260C_(8/06)	
Chloromethyl methyl ether	EPA 8260C_(8/06)	
Chloroprene (2-Chloro-1,3-butadiene)	EPA 8260C_(8/06)	
cis & trans-1,2-Dichloroethene	EPA 8260C_(8/06)	
cis-1,2-Dichloroethylene	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
cis-1,3-Dichloropropene	EPA 8260C_(8/06)	
cis-1,4-Dichloro-2-butene	EPA 8260C_(8/06)	
cis-2-Butene	EPA 8260C_(8/06)	
cis-2-Hexene	EPA 8260C_(8/06)	
cis-2-pentene	EPA 8260C_(8/06)	
Cycloate	EPA 8260C_(8/06)	
Cyclohexane	EPA 8260C_(8/06)	
Cyclohexanol	EPA 8260C_(8/06)	
Cyclohexanone	EPA 8260C_(8/06)	
Cyclopentane	EPA 8260C_(8/06)	
Cyclopentene	EPA 8260C_(8/06)	
Decanal	EPA 8260C_(8/06)	
Dibromochloropropane	EPA 8260C_(8/06)	
Dibromofluoromethane	EPA 8260C_(8/06)	
Dibromomethane (Methylene bromide)	EPA 8260C_(8/06)	
Dichlorodifluoromethane (Freon-12)	EPA 8260C_(8/06)	
Dichlorofluoromethane (Freon 21)	EPA 8260C_(8/06)	
Dichlorotetrafluoroethane	EPA 8260C_(8/06)	
Dicyclopentadiene	EPA 8260C_(8/06)	
Diethyl ether	EPA 8260C_(8/06)	
Diethylamine	EPA 8260C_(8/06)	
Diethylene glycol	EPA 8260C_(8/06)	
Dimethyl disulfide	EPA 8260C_(8/06)	
Dimethyl sulfoxide	EPA 8260C_(8/06)	
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	EPA 8260C_(8/06)	
Ethane	EPA 8260C_(8/06)	
Ethanol	EPA 8260C_(8/06)	
Ethene	EPA 8260C_(8/06)	
Ethyl acetate	EPA 8260C_(8/06)	
Ethyl acrylate	EPA 8260C_(8/06)	
Ethyl methacrylate	EPA 8260C_(8/06)	
Ethyl tert-Butyl alcohol	EPA 8260C_(8/06)	
Ethylbenzene	EPA 8260C_(8/06)	
Ethylene glycol	EPA 8260C_(8/06)	
Ethylene oxide	EPA 8260C_(8/06)	
Ethylene thiourea	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
Ethyleneimine	EPA 8260C_(8/06)	
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropan	EPA 8260C_(8/06)	
Fluorobenzene	EPA 8260C_(8/06)	
Fluoromethane (Freon 41)	EPA 8260C_(8/06)	
Heptanal	EPA 8260C_(8/06)	
Hexachlorobutadiene	EPA 8260C_(8/06)	
Hexachloroethane	EPA 8260C_(8/06)	
Iodomethane (Methyl iodide)	EPA 8260C_(8/06)	
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260C_(8/06)	
Isopropyl acetate	EPA 8260C_(8/06)	
Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8260C_(8/06)	
Isopropylbenzene	EPA 8260C_(8/06)	
m+p-xylene	EPA 8260C_(8/06)	
Malononitrile	EPA 8260C_(8/06)	
Methacrylonitrile	EPA 8260C_(8/06)	
Methane	EPA 8260C_(8/06)	
Methanol	EPA 8260C_(8/06)	
Methyl acetate	EPA 8260C_(8/06)	
Methyl acrylate	EPA 8260C_(8/06)	
Methyl bromide (Bromomethane)	EPA 8260C_(8/06)	
Methyl chloride (Chloromethane)	EPA 8260C_(8/06)	
Methyl formate	EPA 8260C_(8/06)	
Methyl methacrylate	EPA 8260C_(8/06)	
Methyl tert-butyl ether (MTBE)	EPA 8260C_(8/06)	
Methylcyclohexane	EPA 8260C_(8/06)	
Methylcyclopentane	EPA 8260C_(8/06)	
Methylene chloride (Dichloromethane)	EPA 8260C_(8/06)	
m-Xylene	EPA 8260C_(8/06)	
n, n-Dimethylformamide	EPA 8260C_(8/06)	
n-Amyl acetate	EPA 8260C_(8/06)	
n-Amyl alcohol	EPA 8260C_(8/06)	
Naphthalene	EPA 8260C_(8/06)	
n-Butane	EPA 8260C_(8/06)	
n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8260C_(8/06)	
n-Butylbenzene	EPA 8260C_(8/06)	
n-Butylcyclopentane	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
n-Heptane	EPA 8260C_(8/06)	
n-Hexane	EPA 8260C_(8/06)	
Nitrobenzene	EPA 8260C_(8/06)	
n-Nitroso-di-n-butylamine	EPA 8260C_(8/06)	
n-Nonane	EPA 8260C_(8/06)	
n-Octane	EPA 8260C_(8/06)	
n-Pentane	EPA 8260C_(8/06)	
n-Propane	EPA 8260C_(8/06)	
n-Propanol (1-Propanol)	EPA 8260C_(8/06)	
n-Propylamine	EPA 8260C_(8/06)	
n-Propylbenzene	EPA 8260C_(8/06)	
o-Xylene	EPA 8260C_(8/06)	
p-Diethylbenzene	EPA 8260C_(8/06)	
Pentachloroethane	EPA 8260C_(8/06)	
Pentafluorobenzene	EPA 8260C_(8/06)	
Propargyl alcohol	EPA 8260C_(8/06)	
Propionitrile (Ethyl cyanide)	EPA 8260C_(8/06)	
Propyne	EPA 8260C_(8/06)	
Purgeable Organic Halides	EPA 8260C_(8/06)	
p-Xylene	EPA 8260C_(8/06)	
Pyridine	EPA 8260C_(8/06)	
Sec-Amyl Alcohol (2-Pentanol)	EPA 8260C_(8/06)	
sec-Butylbenzene	EPA 8260C_(8/06)	
S-Methyl thioacetate (S-Methyl etanethioate)	EPA 8260C_(8/06)	
Styrene	EPA 8260C_(8/06)	
tert-Amyl alcohol (TAA)	EPA 8260C_(8/06)	
tert-Amyl ethyl ether (TAEE)	EPA 8260C_(8/06)	
tert-amylmethylether (TAME)	EPA 8260C_(8/06)	
tert-Butyl alcohol	EPA 8260C_(8/06)	
tert-Butylbenzene	EPA 8260C_(8/06)	
Tetrachloroethylene (Perchloroethylene)	EPA 8260C_(8/06)	
Tetrahydrofuran (THF)	EPA 8260C_(8/06)	
Toluene	EPA 8260C_(8/06)	
Total Trihalomethanes	EPA 8260C_(8/06)	
Total Volatile Petroleum Hydrocarbons (VPH)	EPA 8260C_(8/06)	
trans-1,2-Dichloroethylene	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
trans-1,3-Dichloropropylene	EPA 8260C_(8/06)	
trans-1,4-Dichloro-2-butene	EPA 8260C_(8/06)	
trans-2-Butene	EPA 8260C_(8/06)	
trans-2-Hexene	EPA 8260C_(8/06)	
trans-2-pentene	EPA 8260C_(8/06)	
Trichloroethene (Trichloroethylene)	EPA 8260C_(8/06)	
Trichlorofluoromethane (Fluorotrichloromethane, Fr	EPA 8260C_(8/06)	
Triethylamine	EPA 8260C_(8/06)	
Trifluoromethane (Freon 23)	EPA 8260C_(8/06)	
Vinyl acetate	EPA 8260C_(8/06)	
Vinyl bromide	EPA 8260C_(8/06)	
Vinyl chloride	EPA 8260C_(8/06)	
Xylenes (total)	EPA 8260C_(8/06)	
1,2,4,5-Tetrachlorobenzene	EPA 8270D_(2/07)	
1,2,4-Trichlorobenzene	EPA 8270D_(2/07)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8270D_(2/07)	
1,2-Dichlorobenzene	EPA 8270D_(2/07)	
1,2-Dinitrobenzene	EPA 8270D_(2/07)	
1,2-Diphenylhydrazine	EPA 8270D_(2/07)	
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270D_(2/07)	
1,3-Dichlorobenzene	EPA 8270D_(2/07)	
1,3-Dinitrobenzene (1,3-DNB)	EPA 8270D_(2/07)	
1,4-Dichlorobenzene	EPA 8270D_(2/07)	
1,4-Dinitrobenzene	EPA 8270D_(2/07)	
1,4-Naphthoquinone	EPA 8270D_(2/07)	
1,4-Phenylenediamine	EPA 8270D_(2/07)	
1-Acetyl-2-thiourea	EPA 8270D_(2/07)	
1-Chloronaphthalene	EPA 8270D_(2/07)	
1-Naphthylamine	EPA 8270D_(2/07)	
2,3,4,6-Tetrachlorophenol	EPA 8270D_(2/07)	
2,4,5-Trichlorophenol	EPA 8270D_(2/07)	
2,4,5-Trimethylaniline	EPA 8270D_(2/07)	
2,4,6-Trichlorophenol	EPA 8270D_(2/07)	
2,4-Diaminotoluene	EPA 8270D_(2/07)	
2,4-Dichlorophenol	EPA 8270D_(2/07)	
2,4-Dimethylphenol	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
2,4-Dinitrophenol	EPA 8270D_(2/07)	
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D_(2/07)	
2,6-Dichlorophenol	EPA 8270D_(2/07)	
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D_(2/07)	
2-Acetylaminofluorene	EPA 8270D_(2/07)	
2-Aminoanthraquinone	EPA 8270D_(2/07)	
2-Chloronaphthalene	EPA 8270D_(2/07)	
2-Chlorophenol	EPA 8270D_(2/07)	
2-Cyclohexyl-4,6-dinitrophenol	EPA 8270D_(2/07)	
2-Methylnaphthalene	EPA 8270D_(2/07)	
2-Methylphenol (o-Cresol)	EPA 8270D_(2/07)	
2-Naphthylamine	EPA 8270D_(2/07)	
2-Nitroaniline	EPA 8270D_(2/07)	
2-Nitrophenol	EPA 8270D_(2/07)	
2-Picoline (2-Methylpyridine)	EPA 8270D_(2/07)	
3-(Chloromethyl) pyridine hydrochloride	EPA 8270D_(2/07)	
3,3'-Dichlorobenzidine	EPA 8270D_(2/07)	
3,3'-Dimethoxybenzidine	EPA 8270D_(2/07)	
3,3'-Dimethylbenzidine	EPA 8270D_(2/07)	
3-Amino-9-ethylcarbazole	EPA 8270D_(2/07)	
3-Methylcholanthrene	EPA 8270D_(2/07)	
3-Methylphenol (m-Cresol)	EPA 8270D_(2/07)	
3-Nitroaniline	EPA 8270D_(2/07)	
4,4'-DDD	EPA 8270D_(2/07)	
4,4'-DDE	EPA 8270D_(2/07)	
4,4'-DDT	EPA 8270D_(2/07)	
4,4'-Methylenebis(2-chloroaniline)	EPA 8270D_(2/07)	
4,4'-Methylenebis(n, n-dimethylaniline)	EPA 8270D_(2/07)	
4,4'-Oxydianiline	EPA 8270D_(2/07)	
4,6-Dinitro-2-methylphenol	EPA 8270D_(2/07)	
4-Aminobiphenyl	EPA 8270D_(2/07)	
4-Bromophenyl phenyl ether	EPA 8270D_(2/07)	
4-Chloro-1,2-phenylenediamine	EPA 8270D_(2/07)	
4-Chloro-1,3-phenylenediamine	EPA 8270D_(2/07)	
4-Chloro-3-methylphenol	EPA 8270D_(2/07)	
4-Chloroaniline	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
4-Chlorophenol	EPA 8270D_(2/07)	
4-Chlorophenyl phenylether	EPA 8270D_(2/07)	
4-Dimethyl aminoazobenzene	EPA 8270D_(2/07)	
4-Methylphenol (p-Cresol)	EPA 8270D_(2/07)	
4-Nitroaniline	EPA 8270D_(2/07)	
4-Nitrobiphenyl	EPA 8270D_(2/07)	
4-Nitrophenol	EPA 8270D_(2/07)	
5,5-Diphenylhydantoin	EPA 8270D_(2/07)	
5-Chloro-2-methylaniline	EPA 8270D_(2/07)	
5-Nitroacenaphthene	EPA 8270D_(2/07)	
5-Nitro-o-anisidine	EPA 8270D_(2/07)	
5-Nitro-o-toluidine	EPA 8270D_(2/07)	
7,12-Dimethylbenz(a) anthracene	EPA 8270D_(2/07)	
a-a-Dimethylphenethylamine	EPA 8270D_(2/07)	
Acenaphthene	EPA 8270D_(2/07)	
Acenaphthylene	EPA 8270D_(2/07)	
Acetophenone	EPA 8270D_(2/07)	
Aldrin	EPA 8270D_(2/07)	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8270D_(2/07)	
alpha-Terpineol	EPA 8270D_(2/07)	
Aminoazobenzene	EPA 8270D_(2/07)	
Anilazine	EPA 8270D_(2/07)	
Aniline	EPA 8270D_(2/07)	
Anthracene	EPA 8270D_(2/07)	
Aramite	EPA 8270D_(2/07)	
Aroclor-1016 (PCB-1016)	EPA 8270D_(2/07)	
Aroclor-1221 (PCB-1221)	EPA 8270D_(2/07)	
Aroclor-1232 (PCB-1232)	EPA 8270D_(2/07)	
Aroclor-1242 (PCB-1242)	EPA 8270D_(2/07)	
Aroclor-1248 (PCB-1248)	EPA 8270D_(2/07)	
Aroclor-1254 (PCB-1254)	EPA 8270D_(2/07)	
Aroclor-1260 (PCB-1260)	EPA 8270D_(2/07)	
Atrazine	EPA 8270D_(2/07)	
Azinphos-methyl (Guthion)	EPA 8270D_(2/07)	
Barban	EPA 8270D_(2/07)	
Benzidine	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
Benzo(a)anthracene	EPA 8270D_(2/07)	
Benzo(a)pyrene	EPA 8270D_(2/07)	
Benzo(g,h,i)perylene	EPA 8270D_(2/07)	
Benzo(k)fluoranthene	EPA 8270D_(2/07)	
Benzo[b]fluoranthene	EPA 8270D_(2/07)	
Benzoic acid	EPA 8270D_(2/07)	
Benzyl alcohol	EPA 8270D_(2/07)	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8270D_(2/07)	
Biphenyl	EPA 8270D_(2/07)	
bis(2-Chloroethoxy)methane	EPA 8270D_(2/07)	
bis(2-Chloroethyl) ether	EPA 8270D_(2/07)	
bis(2-Chloroisopropyl) ether	EPA 8270D_(2/07)	
Bromoxynil octanate	EPA 8270D_(2/07)	
Butyl benzyl phthalate	EPA 8270D_(2/07)	
Captafol	EPA 8270D_(2/07)	
Captan	EPA 8270D_(2/07)	
Carbaryl (Sevin)	EPA 8270D_(2/07)	
Carbazole	EPA 8270D_(2/07)	
Carbofuran (Furaden)	EPA 8270D_(2/07)	
Carbophenothion	EPA 8270D_(2/07)	
Chlordane (tech.)	EPA 8270D_(2/07)	
Chlorfenvinphos	EPA 8270D_(2/07)	
Chlorobenzilate	EPA 8270D_(2/07)	
Chlorpyrifos	EPA 8270D_(2/07)	
Chrysene	EPA 8270D_(2/07)	
Coumaphos	EPA 8270D_(2/07)	
Crotoxyphos	EPA 8270D_(2/07)	
delta-BHC	EPA 8270D_(2/07)	
Demeton	EPA 8270D_(2/07)	
Demeton-o	EPA 8270D_(2/07)	
Demeton-s	EPA 8270D_(2/07)	
Di(2-ethylhexyl)adipate	EPA 8270D_(2/07)	
Di(2-ethylhexyl)phthalate	EPA 8270D_(2/07)	
Diallate	EPA 8270D_(2/07)	
Dibenz(a,h) acridine	EPA 8270D_(2/07)	
Dibenz(a,h) anthracene	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
Dibenz(a,j) acridine	EPA 8270D_(2/07)	
Dibenzo(a,e) pyrene	EPA 8270D_(2/07)	
Dibenzofuran	EPA 8270D_(2/07)	
Dibenzothiophene	EPA 8270D_(2/07)	
Dichlone	EPA 8270D_(2/07)	
Dichlorovos (DDVP, Dichlorvos)	EPA 8270D_(2/07)	
Dicrotophos	EPA 8270D_(2/07)	
Dieldrin	EPA 8270D_(2/07)	
Diethyl phthalate	EPA 8270D_(2/07)	
Diethyl sulfate	EPA 8270D_(2/07)	
Diethylstilbestrol	EPA 8270D_(2/07)	
Dihydrosafrole	EPA 8270D_(2/07)	
Dimethoate	EPA 8270D_(2/07)	
Dimethyl phthalate	EPA 8270D_(2/07)	
Di-n-butyl phthalate	EPA 8270D_(2/07)	
Dinocap	EPA 8270D_(2/07)	
Di-n-octyl phthalate	EPA 8270D_(2/07)	
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270D_(2/07)	
Diphenylamine	EPA 8270D_(2/07)	
Disulfoton	EPA 8270D_(2/07)	
Endosulfan I	EPA 8270D_(2/07)	
Endosulfan II	EPA 8270D_(2/07)	
Endosulfan sulfate	EPA 8270D_(2/07)	
Endrin	EPA 8270D_(2/07)	
Endrin aldehyde	EPA 8270D_(2/07)	
Endrin ketone	EPA 8270D_(2/07)	
EPN	EPA 8270D_(2/07)	
Ethion	EPA 8270D_(2/07)	
Ethyl carbamate (Urethane)	EPA 8270D_(2/07)	
Ethyl methanesulfonate	EPA 8270D_(2/07)	
Famphur	EPA 8270D_(2/07)	
Fensulfothion	EPA 8270D_(2/07)	
Fenthion	EPA 8270D_(2/07)	
Fluchloralin	EPA 8270D_(2/07)	
Fluoranthene	EPA 8270D_(2/07)	
Fluorene	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8270D_(2/07)	
Heptachlor	EPA 8270D_(2/07)	
Heptachlor epoxide	EPA 8270D_(2/07)	
Hexachlorobenzene	EPA 8270D_(2/07)	
Hexachlorobutadiene	EPA 8270D_(2/07)	
Hexachlorocyclopentadiene	EPA 8270D_(2/07)	
Hexachloroethane	EPA 8270D_(2/07)	
Hexachlorophene	EPA 8270D_(2/07)	
Hexachloropropene	EPA 8270D_(2/07)	
Hexamethylphosphoramide (HMPA)	EPA 8270D_(2/07)	
Hydroquinone	EPA 8270D_(2/07)	
Indeno(1,2,3-cd) pyrene	EPA 8270D_(2/07)	
Isodrin	EPA 8270D_(2/07)	
Isophorone	EPA 8270D_(2/07)	
Isosafrole	EPA 8270D_(2/07)	
Kepone	EPA 8270D_(2/07)	
Leptophos	EPA 8270D_(2/07)	
Malathion	EPA 8270D_(2/07)	
Maleic anhydride	EPA 8270D_(2/07)	
Mestranol	EPA 8270D_(2/07)	
Methapyrilene	EPA 8270D_(2/07)	
Methoxychlor	EPA 8270D_(2/07)	
Methyl methanesulfonate	EPA 8270D_(2/07)	
Methyl parathion (Parathion, methyl)	EPA 8270D_(2/07)	
Mevinphos	EPA 8270D_(2/07)	
Mexacarbate	EPA 8270D_(2/07)	
Mirex	EPA 8270D_(2/07)	
Monocrotophos	EPA 8270D_(2/07)	
Naled	EPA 8270D_(2/07)	
Naphthalene	EPA 8270D_(2/07)	
n-Hexadecane	EPA 8270D_(2/07)	
Nicotine	EPA 8270D_(2/07)	
Nitrobenzene	EPA 8270D_(2/07)	
Nitrofen	EPA 8270D_(2/07)	
Nitroquinoline-1-oxide	EPA 8270D_(2/07)	
n-Nitrosodiethylamine	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
n-Nitrosodimethylamine	EPA 8270D_(2/07)	
n-Nitroso-di-n-butylamine	EPA 8270D_(2/07)	
n-Nitrosodi-n-propylamine	EPA 8270D_(2/07)	
n-Nitrosodiphenylamine	EPA 8270D_(2/07)	
n-Nitrosomethylethalamine	EPA 8270D_(2/07)	
n-Nitrosomorpholine	EPA 8270D_(2/07)	
n-Nitrosopiperidine	EPA 8270D_(2/07)	
n-Nitrosopyrrolidine	EPA 8270D_(2/07)	
n-Tetradecane	EPA 8270D_(2/07)	
o,o,o-Triethyl phosphorothioate	EPA 8270D_(2/07)	
o-Anisidine	EPA 8270D_(2/07)	
Octamethyl pyrophosphoramide	EPA 8270D_(2/07)	
o-Toluidine	EPA 8270D_(2/07)	
Parathion	EPA 8270D_(2/07)	
p-Benzoquinone	EPA 8270D_(2/07)	
p-Cresidine	EPA 8270D_(2/07)	
Pentachlorobenzene	EPA 8270D_(2/07)	
Pentachloronitrobenzene	EPA 8270D_(2/07)	
Pentachlorophenol	EPA 8270D_(2/07)	
Phenacetin	EPA 8270D_(2/07)	
Phenanthrene	EPA 8270D_(2/07)	
Phenobarbital	EPA 8270D_(2/07)	
Phenol	EPA 8270D_(2/07)	
Phorate	EPA 8270D_(2/07)	
Phosalone	EPA 8270D_(2/07)	
Phosmet (Imidan)	EPA 8270D_(2/07)	
Phosphamidon	EPA 8270D_(2/07)	
Phthalic anhydride	EPA 8270D_(2/07)	
Piperonyl sulfoxide	EPA 8270D_(2/07)	
Pronamide (Kerb)	EPA 8270D_(2/07)	
Propylthiouracil	EPA 8270D_(2/07)	
Pyrene	EPA 8270D_(2/07)	
Pyridine	EPA 8270D_(2/07)	
Resorcinol	EPA 8270D_(2/07)	
Safrole	EPA 8270D_(2/07)	
Strychnine	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
Sulfallate	EPA 8270D_(2/07)	
Terbufos	EPA 8270D_(2/07)	
Tetrachlorvinphos (Stirophos, Gardona)	EPA 8270D_(2/07)	
Tetraethyl dithiopyrophosphate	EPA 8270D_(2/07)	
Tetraethyl pyrophosphate (TEPP)	EPA 8270D_(2/07)	
Thionazin (Zinophos)	EPA 8270D_(2/07)	
Thiophenol (Benzenethiol)	EPA 8270D_(2/07)	
Toluene diisocyanate	EPA 8270D_(2/07)	
Toxaphene (Chlorinated camphene)	EPA 8270D_(2/07)	
Trifluralin (Treflan)	EPA 8270D_(2/07)	
Trimethyl phosphate	EPA 8270D_(2/07)	
Tri-p-tolyl phosphate	EPA 8270D_(2/07)	
tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270D_(2/07)	
Ignitability	EPA 1010A	

Accredited Parameter Note Detail

(1) Interim accreditation pending the successful completion of an on-site audit to verify method capabilities (WAC 173-50-100).

01/19/2012

Authentication Signature
Alan D. Rue, Lab Accreditation Unit Supervisor

Date

The State of Washington Department of Ecology

ALS Laboratory Group - Everett
Everett, WA

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective January 4, 2012 and shall expire January 3, 2013.

Witnessed under my hand on January 19, 2012

Alan D. Rue
Lab Accreditation Unit Supervisor

Laboratory ID
C601

WASHINGTON STATE DEPARTMENT OF ECOLOGY

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

SCOPE OF ACCREDITATION

ALS Laboratory Group - Everett

Everett, WA

is accredited for the analytes listed below using the methods indicated. Full accreditation is granted unless stated otherwise in a note. Accreditation for U.S. Environmental Protection Agency (EPA) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) is for the latest version of the method. SM refers to EPA approved editions of “Standard Methods for the Examination of Water and Wastewater.” ASTM is the American Society for Testing and Materials. Other references are described in notes.

Matrix/Analyte	Method	Notes
Non-Potable Water		
n-Hexane Extractable Material (O&G)	EPA 1664A_1_1999	
Turbidity	EPA 180.1_2_1993	
Bromide	EPA 300.0_2.1_1993	
Chloride	EPA 300.0_2.1_1993	
Fluoride	EPA 300.0_2.1_1993	
Nitrate	EPA 300.0_2.1_1993	
Nitrate + Nitrite	EPA 300.0_2.1_1993	
Nitrite	EPA 300.0_2.1_1993	
Orthophosphate	EPA 300.0_2.1_1993	
Sulfate	EPA 300.0_2.1_1993	
Specific Conductance	SM 2510 B-97	
Solids, Total	SM 2540 B-97	
Solids, Total Dissolved	SM 2540 C-97	
Solids, Total Suspended	SM 2540 D-97	
Cyanide, Total	SM 4500-CN^- E-99	
Biochemical Oxygen Demand (BOD)	SM 5210 B-01	
Aluminum	EPA 200.8_5.4_1994	1
Antimony	EPA 200.8_5.4_1994	1
Arsenic	EPA 200.8_5.4_1994	1
Barium	EPA 200.8_5.4_1994	1
Beryllium	EPA 200.8_5.4_1994	1
Cadmium	EPA 200.8_5.4_1994	1

Matrix/Analyte	Method	Notes
Calcium	EPA 200.8_5.4_1994	1
Chromium	EPA 200.8_5.4_1994	1
Cobalt	EPA 200.8_5.4_1994	1
Copper	EPA 200.8_5.4_1994	1
Iron	EPA 200.8_5.4_1994	1
Lead	EPA 200.8_5.4_1994	1
Magnesium	EPA 200.8_5.4_1994	1
Manganese	EPA 200.8_5.4_1994	1
Molybdenum	EPA 200.8_5.4_1994	1
Nickel	EPA 200.8_5.4_1994	1
Potassium	EPA 200.8_5.4_1994	1
Selenium	EPA 200.8_5.4_1994	1
Silver	EPA 200.8_5.4_1994	1
Sodium	EPA 200.8_5.4_1994	1
Thallium	EPA 200.8_5.4_1994	1
Titanium	EPA 200.8_5.4_1994	1
Vanadium	EPA 200.8_5.4_1994	1
Zinc	EPA 200.8_5.4_1994	1
Mercury	EPA 245.1_3_1994	
Benzene	EPA 602	
Ethylbenzene	EPA 602	
m+p-xylene	EPA 602	
o-Xylene	EPA 602	
Toluene	EPA 602	
Xylenes (total)	EPA 602	
4,4'-DDD	EPA 608	
4,4'-DDE	EPA 608	
4,4'-DDT	EPA 608	
Aldrin	EPA 608	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	
alpha-Chlordane	EPA 608	
Aroclor-1016 (PCB-1016)	EPA 608	
Aroclor-1221 (PCB-1221)	EPA 608	
Aroclor-1232 (PCB-1232)	EPA 608	
Aroclor-1242 (PCB-1242)	EPA 608	
Aroclor-1248 (PCB-1248)	EPA 608	

Matrix/Analyte	Method	Notes
Aroclor-1254 (PCB-1254)	EPA 608	
Aroclor-1260 (PCB-1260)	EPA 608	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	
Chlordane (tech.)	EPA 608	
delta-BHC	EPA 608	
Dieldrin	EPA 608	
Endosulfan I	EPA 608	
Endosulfan II	EPA 608	
Endosulfan sulfate	EPA 608	
Endrin	EPA 608	
Endrin aldehyde	EPA 608	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	
Heptachlor	EPA 608	
Heptachlor epoxide	EPA 608	
Methoxychlor	EPA 608	
Toxaphene (Chlorinated camphene)	EPA 608	2
Solid and Chemical Materials		
Chromium VI	EPA 7196A_1_1992	
Total cyanide	EPA 9014_1996	
pH (non-aqueous)	EPA 9045D_2002	
Aluminum	EPA 6020A_(2/07)	1
Antimony	EPA 6020A_(2/07)	1
Arsenic	EPA 6020A_(2/07)	1
Barium	EPA 6020A_(2/07)	1
Beryllium	EPA 6020A_(2/07)	1
Cadmium	EPA 6020A_(2/07)	1
Calcium	EPA 6020A_(2/07)	1
Chromium	EPA 6020A_(2/07)	1
Cobalt	EPA 6020A_(2/07)	1
Copper	EPA 6020A_(2/07)	1
Iron	EPA 6020A_(2/07)	1
Lead	EPA 6020A_(2/07)	1
Magnesium	EPA 6020A_(2/07)	1
Manganese	EPA 6020A_(2/07)	1
Molybdenum	EPA 6020A_(2/07)	1

Matrix/Analyte	Method	Notes
Nickel	EPA 6020A_(2/07)	1
Potassium	EPA 6020A_(2/07)	1
Selenium	EPA 6020A_(2/07)	1
Silver	EPA 6020A_(2/07)	1
Sodium	EPA 6020A_(2/07)	1
Thallium	EPA 6020A_(2/07)	1
Titanium	EPA 6020A_(2/07)	1
Zinc	EPA 6020A_(2/07)	1
Mercury	EPA 7470A_1_1994	
Mercury	EPA 7471B_(1/98)	
Benzene	EPA 8021B_2_1996	
Ethylbenzene	EPA 8021B_2_1996	
Toluene	EPA 8021B_2_1996	
Xylenes (total)	EPA 8021B_2_1996	
4,4'-DDD	EPA 8081B_(2/07)	
4,4'-DDE	EPA 8081B_(2/07)	
4,4'-DDT	EPA 8081B_(2/07)	
Aldrin	EPA 8081B_(2/07)	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
alpha-Chlordane	EPA 8081B_(2/07)	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
Chlordane (tech.)	EPA 8081B_(2/07)	
delta-BHC	EPA 8081B_(2/07)	
Dieldrin	EPA 8081B_(2/07)	
Endosulfan I	EPA 8081B_(2/07)	
Endosulfan II	EPA 8081B_(2/07)	
Endosulfan sulfate	EPA 8081B_(2/07)	
Endrin	EPA 8081B_(2/07)	
Endrin aldehyde	EPA 8081B_(2/07)	
Endrin ketone	EPA 8081B_(2/07)	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
Heptachlor	EPA 8081B_(2/07)	
Heptachlor epoxide	EPA 8081B_(2/07)	
Methoxychlor	EPA 8081B_(2/07)	
Toxaphene (Chlorinated camphene)	EPA 8081B_(2/07)	2
Aroclor-1016 (PCB-1016)	EPA 8082A_(2/07)	

Matrix/Analyte	Method	Notes
Aroclor-1221 (PCB-1221)	EPA 8082A_(2/07)	
Aroclor-1232 (PCB-1232)	EPA 8082A_(2/07)	
Aroclor-1242 (PCB-1242)	EPA 8082A_(2/07)	
Aroclor-1248 (PCB-1248)	EPA 8082A_(2/07)	
Aroclor-1254 (PCB-1254)	EPA 8082A_(2/07)	
Aroclor-1260 (PCB-1260)	EPA 8082A_(2/07)	
C8-C10 Aliphatic EPH	WDOE EPH_(1997)	
C8-C10 Aromatic EPH	WDOE EPH_(1997)	
>C10-C12 Aliphatic EPH	WDOE EPH_(1997)	
>C10-C12 Aromatic EPH	WDOE EPH_(1997)	
>C12-C16 Aliphatic EPH	WDOE EPH_(1997)	
>C12-C16 Aromatic EPH	WDOE EPH_(1997)	
>C16-C21 Aliphatic EPH	WDOE EPH_(1997)	
>C16-C21 Aromatic EPH	WDOE EPH_(1997)	
>C21-C34 Alpihatic EPH	WDOE EPH_(1997)	
>C21-C34 Aromatic EPH	WDOE EPH_(1997)	
Total Pet Hydrocarbons - Diesel	WDOE NWTPH-Dx_(1997)	
Total Pet Hydrocarbons - Gasoline	WDOE NWTPH-Gx_(1997)	
C8-C10 Aromatic VPH	WDOE VPH_(1997)	
C5-C6 Aliphatic VPH	WDOE VPH_(1997)	
>C10-C12 Aliphatic VPH	WDOE VPH_(1997)	
>C10-C12 Aromatic VPH	WDOE VPH_(1997)	
>C12-C13 Aromatic VPH	WDOE VPH_(1997)	
>C6-C8 Aliphatic VPH	WDOE VPH_(1997)	
>C8-C10 Aliphatic VPH	WDOE VPH_(1997)	
1,1,1,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,1-Trichloroethane	EPA 8260C_(8/06)	
1,1,2,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,2-Trichloroethane	EPA 8260C_(8/06)	
1,1-Dichloroethane	EPA 8260C_(8/06)	
1,1-Dichloroethylene	EPA 8260C_(8/06)	
1,1-Dichloropropene	EPA 8260C_(8/06)	
1,2,3-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,3-Trichloropropane	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
1,2,4-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,4-Trimethylbenzene	EPA 8260C_(8/06)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260C_(8/06)	
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260C_(8/06)	
1,2-Dichlorobenzene	EPA 8260C_(8/06)	
1,2-Dichloroethane (Ethylene dichloride)	EPA 8260C_(8/06)	
1,2-Dichloropropane	EPA 8260C_(8/06)	
1,3,5-Trimethylbenzene	EPA 8260C_(8/06)	
1,3-Dichlorobenzene	EPA 8260C_(8/06)	
1,3-Dichloropropane	EPA 8260C_(8/06)	
1,4-Dichlorobenzene	EPA 8260C_(8/06)	
1,4-Difluorobenzene	EPA 8260C_(8/06)	
2,2-Dichloropropane	EPA 8260C_(8/06)	
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260C_(8/06)	
2-Chlorotoluene	EPA 8260C_(8/06)	
2-Hexanone	EPA 8260C_(8/06)	
4-Bromofluorobenzene	EPA 8260C_(8/06)	
4-Chlorotoluene	EPA 8260C_(8/06)	
4-Isopropyltoluene (p-Cymene)	EPA 8260C_(8/06)	
4-Methyl-2-pentanone (MIBK)	EPA 8260C_(8/06)	
Acetone	EPA 8260C_(8/06)	
Acrylonitrile	EPA 8260C_(8/06)	
Benzene	EPA 8260C_(8/06)	
Bromobenzene	EPA 8260C_(8/06)	
Bromochloromethane	EPA 8260C_(8/06)	
Bromodichloromethane	EPA 8260C_(8/06)	
Bromoform	EPA 8260C_(8/06)	
Carbon disulfide	EPA 8260C_(8/06)	
Carbon tetrachloride	EPA 8260C_(8/06)	
Chlorobenzene	EPA 8260C_(8/06)	
Chlorodibromomethane	EPA 8260C_(8/06)	
Chloroethane (Ethyl chloride)	EPA 8260C_(8/06)	
Chloroform	EPA 8260C_(8/06)	
cis-1,2-Dichloroethylene	EPA 8260C_(8/06)	
cis-1,3-Dichloropropene	EPA 8260C_(8/06)	
Dibromofluoromethane	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
Dibromomethane (Methylene bromide)	EPA 8260C_(8/06)	
Dichlorodifluoromethane (Freon-12)	EPA 8260C_(8/06)	
Ethanol	EPA 8260C_(8/06)	
Ethylbenzene	EPA 8260C_(8/06)	
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropan	EPA 8260C_(8/06)	
Hexachlorobutadiene	EPA 8260C_(8/06)	
Isopropylbenzene	EPA 8260C_(8/06)	
m+p-xylene	EPA 8260C_(8/06)	
Methyl bromide (Bromomethane)	EPA 8260C_(8/06)	
Methyl chloride (Chloromethane)	EPA 8260C_(8/06)	
Methyl tert-butyl ether (MTBE)	EPA 8260C_(8/06)	
Methylene chloride (Dichloromethane)	EPA 8260C_(8/06)	
Naphthalene	EPA 8260C_(8/06)	
n-Butylbenzene	EPA 8260C_(8/06)	
n-Propylbenzene	EPA 8260C_(8/06)	
o-Xylene	EPA 8260C_(8/06)	
Pentafluorobenzene	EPA 8260C_(8/06)	
sec-Butylbenzene	EPA 8260C_(8/06)	
Styrene	EPA 8260C_(8/06)	
tert-Butyl alcohol	EPA 8260C_(8/06)	
tert-Butylbenzene	EPA 8260C_(8/06)	
Tetrachloroethylene (Perchloroethylene)	EPA 8260C_(8/06)	
Toluene	EPA 8260C_(8/06)	
trans-1,2-Dichloroethylene	EPA 8260C_(8/06)	
trans-1,3-Dichloropropylene	EPA 8260C_(8/06)	
Trichloroethene (Trichloroethylene)	EPA 8260C_(8/06)	
Trichlorofluoromethane (Fluorotrichloromethane, Fr	EPA 8260C_(8/06)	
Vinyl chloride	EPA 8260C_(8/06)	
1,2,4-Trichlorobenzene	EPA 8270D_(2/07)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8270D_(2/07)	
1,2-Dichlorobenzene	EPA 8270D_(2/07)	
1,3-Dichlorobenzene	EPA 8270D_(2/07)	
1,4-Dichlorobenzene	EPA 8270D_(2/07)	
2,3,4,6-Tetrachlorophenol	EPA 8270D_(2/07)	
2,4,5-Trichlorophenol	EPA 8270D_(2/07)	
2,4,6-Trichlorophenol	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
2,4-Dichlorophenol	EPA 8270D_(2/07)	
2,4-Dimethylphenol	EPA 8270D_(2/07)	
2,4-Dinitrophenol	EPA 8270D_(2/07)	
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D_(2/07)	
2,6-Dichlorophenol	EPA 8270D_(2/07)	
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D_(2/07)	
2-Chloronaphthalene	EPA 8270D_(2/07)	
2-Chlorophenol	EPA 8270D_(2/07)	
2-Methylnaphthalene	EPA 8270D_(2/07)	
2-Methylphenol (o-Cresol)	EPA 8270D_(2/07)	
2-Nitroaniline	EPA 8270D_(2/07)	
2-Nitrophenol	EPA 8270D_(2/07)	
3,3'-Dichlorobenzidine	EPA 8270D_(2/07)	
3-Methylphenol (m-Cresol)	EPA 8270D_(2/07)	
3-Nitroaniline	EPA 8270D_(2/07)	
4,6-Dinitro-2-methylphenol	EPA 8270D_(2/07)	
4-Bromophenyl phenyl ether	EPA 8270D_(2/07)	
4-Chloro-3-methylphenol	EPA 8270D_(2/07)	
4-Chloroaniline	EPA 8270D_(2/07)	
4-Chlorophenyl phenylether	EPA 8270D_(2/07)	
4-Methylphenol (p-Cresol)	EPA 8270D_(2/07)	
4-Nitroaniline	EPA 8270D_(2/07)	
4-Nitrophenol	EPA 8270D_(2/07)	
Acenaphthene	EPA 8270D_(2/07)	
Acenaphthylene	EPA 8270D_(2/07)	
alpha-Terpineol	EPA 8270D_(2/07)	
Aniline	EPA 8270D_(2/07)	
Anthracene	EPA 8270D_(2/07)	
Benzo(a)anthracene	EPA 8270D_(2/07)	
Benzo(a)pyrene	EPA 8270D_(2/07)	
Benzo(g,h,i)perylene	EPA 8270D_(2/07)	
Benzo(k)fluoranthene	EPA 8270D_(2/07)	
Benzo[b]fluoranthene	EPA 8270D_(2/07)	
Benzoic acid	EPA 8270D_(2/07)	
Benzyl alcohol	EPA 8270D_(2/07)	
bis(2-Chloroethoxy)methane	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
bis(2-Chloroethyl) ether	EPA 8270D_(2/07)	
bis(2-Chloroisopropyl) ether	EPA 8270D_(2/07)	
Butyl benzyl phthalate	EPA 8270D_(2/07)	
Carbazole	EPA 8270D_(2/07)	
Chrysene	EPA 8270D_(2/07)	
Di(2-ethylhexyl)phthalate	EPA 8270D_(2/07)	
Dibenz(a,h) anthracene	EPA 8270D_(2/07)	
Dibenzofuran	EPA 8270D_(2/07)	
Diethyl phthalate	EPA 8270D_(2/07)	
Dimethyl phthalate	EPA 8270D_(2/07)	
Di-n-butyl phthalate	EPA 8270D_(2/07)	
Di-n-octyl phthalate	EPA 8270D_(2/07)	
Fluoranthene	EPA 8270D_(2/07)	
Fluorene	EPA 8270D_(2/07)	
Hexachlorobenzene	EPA 8270D_(2/07)	
Hexachlorobutadiene	EPA 8270D_(2/07)	
Hexachlorocyclopentadiene	EPA 8270D_(2/07)	
Hexachloroethane	EPA 8270D_(2/07)	
Indeno(1,2,3-cd) pyrene	EPA 8270D_(2/07)	
Isophorone	EPA 8270D_(2/07)	
Naphthalene	EPA 8270D_(2/07)	
Nitrobenzene	EPA 8270D_(2/07)	
n-Nitrosodimethylamine	EPA 8270D_(2/07)	
n-Nitrosodi-n-propylamine	EPA 8270D_(2/07)	
n-Nitrosodiphenylamine	EPA 8270D_(2/07)	
Pentachlorophenol	EPA 8270D_(2/07)	
Phenanthrene	EPA 8270D_(2/07)	
Phenol	EPA 8270D_(2/07)	
Pyrene	EPA 8270D_(2/07)	
Pyridine	EPA 8270D_(2/07)	
Ignitability	EPA 1010A - 2004	

Matrix/Analyte	Method	Notes

Accredited Parameter Note Detail

(1) Interim accreditation pending the successful completion of an on-site audit to verify method capabilities (WAC 173-50-100). (2) Provionional pending receipt of acceptable PT results no later than 4/3/13.

01/03/2013

Authentication Signature

Date

Alan D. Rue, Lab Accreditation Unit Supervisor

The State of Washington Department of Ecology

ALS Laboratory Group - Everett
Everett, WA

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective January 4, 2013 and shall expire January 3, 2014.

Witnessed under my hand on January 3, 2013

Alan D. Rue
Lab Accreditation Unit Supervisor

Laboratory ID
C601

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 488 • Manchester, WA 98353-0488 • (360) 871-8840

February 7, 2014

Mr. Glen Perry
ALS Environmental - Everett
8620 Holly Drive, Ste 100
Everett, WA 98208

Dear Mr. Perry:

Thank you for your application for renewal in the Environmental Laboratory Accreditation Program. Enclosed is a new Certificate of Accreditation covering the one-year period beginning January 4, 2014 and a current Scope of Accreditation.

Renewal of accreditation is based in part on review of your lab's performance over the past year as evidenced by participation in proficiency testing (PT) studies.

As a reminder, continued participation in the Ecology Lab Accreditation Program requires the lab to:

- Submit a renewal application and fees annually
- Report significant changes in facility, personnel, analytical methods, equipment, the lab's quality assurance (QA) manual or QA procedures as they occur
- Participate in proficiency testing studies semi-annually, with the following exception: **For each parameter where all PT results were satisfactory, you are required to submit only one PT result over this next year, and in subsequent years, as long as the results are satisfactory.**

YOUR RIGHT TO APPEAL

You have a right to appeal Ecology's decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this decision letter. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this decision:

- File your appeal and a copy of this decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk	**Department of Ecology** Attn: Appeals Processing Desk

300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW STE 301 Tumwater, WA 98501	PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

If you have any questions concerning the accreditation of your lab, please contact me at (360) 871-8844, fax (360) 871-8849, or by e-mail at alan.rue@ecy.wa.gov.

Sincerely,

Alan D. Rue
Lab Accreditation Unit Supervisor

The State of Washington Department of Ecology

ALS Environmental - Everett
Everett, WA

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective January 4, 2014 and shall expire January 3, 2015.

Witnessed under my hand on February 7, 2014

Alan D. Rue
Lab Accreditation Unit Supervisor

Laboratory ID
C601

WASHINGTON STATE DEPARTMENT OF ECOLOGY

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

SCOPE OF ACCREDITATION

ALS Environmental - Everett

Everett, WA

is accredited for the analytes listed below using the methods indicated. Full accreditation is granted unless stated otherwise in a note. Accreditation for U.S. Environmental Protection Agency (EPA) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) is for the latest version of the method. SM refers to EPA approved editions of "Standard Methods for the Examination of Water and Wastewater." ASTM is the American Society for Testing and Materials. Other references are described in notes.

Matrix/Analyte	Method	Notes
Non-Potable Water		
n-Hexane Extractable Material (O&G)	EPA 1664A_1_1999	
Turbidity	EPA 180.1_2_1993	
Bromide	EPA 300.0_2.1_1993	
Chloride	EPA 300.0_2.1_1993	
Fluoride	EPA 300.0_2.1_1993	
Nitrate	EPA 300.0_2.1_1993	
Nitrate + Nitrite	EPA 300.0_2.1_1993	
Nitrite	EPA 300.0_2.1_1993	
Orthophosphate	EPA 300.0_2.1_1993	
Sulfate	EPA 300.0_2.1_1993	
Specific Conductance	SM 2510 B-97	
Solids, Total	SM 2540 B-97	
Solids, Total Dissolved	SM 2540 C-97	
Solids, Total Suspended	SM 2540 D-97	
Cyanide, Total	SM 4500-CN^- E-99	
Biochemical Oxygen Demand (BOD)	SM 5210 B-01	
Aluminum	EPA 200.8_5.4_1994	1
Antimony	EPA 200.8_5.4_1994	1
Arsenic	EPA 200.8_5.4_1994	1
Barium	EPA 200.8_5.4_1994	1
Beryllium	EPA 200.8_5.4_1994	1
Cadmium	EPA 200.8_5.4_1994	1

Matrix/Analyte	Method	Notes
Calcium	EPA 200.8_5.4_1994	1
Chromium	EPA 200.8_5.4_1994	1
Cobalt	EPA 200.8_5.4_1994	1
Copper	EPA 200.8_5.4_1994	1
Iron	EPA 200.8_5.4_1994	1
Lead	EPA 200.8_5.4_1994	1
Magnesium	EPA 200.8_5.4_1994	1
Manganese	EPA 200.8_5.4_1994	1
Molybdenum	EPA 200.8_5.4_1994	1
Nickel	EPA 200.8_5.4_1994	1
Potassium	EPA 200.8_5.4_1994	1
Selenium	EPA 200.8_5.4_1994	1
Silver	EPA 200.8_5.4_1994	1
Sodium	EPA 200.8_5.4_1994	1
Thallium	EPA 200.8_5.4_1994	1
Titanium	EPA 200.8_5.4_1994	1
Vanadium	EPA 200.8_5.4_1994	1
Zinc	EPA 200.8_5.4_1994	1
Mercury	EPA 245.1_3_1994	
Benzene	EPA 602	
Ethylbenzene	EPA 602	
m+p-xylene	EPA 602	
o-Xylene	EPA 602	
Toluene	EPA 602	
Xylene (total)	EPA 602	
4,4'-DDD	EPA 608	
4,4'-DDE	EPA 608	
4,4'-DDT	EPA 608	
Aldrin	EPA 608	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	
alpha-Chlordane	EPA 608	
Aroclor-1016 (PCB-1016)	EPA 608	
Aroclor-1221 (PCB-1221)	EPA 608	
Aroclor-1232 (PCB-1232)	EPA 608	
Aroclor-1242 (PCB-1242)	EPA 608	
Aroclor-1248 (PCB-1248)	EPA 608	

Matrix/Analyte	Method	Notes
Aroclor-1254 (PCB-1254)	EPA 608	
Aroclor-1260 (PCB-1260)	EPA 608	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	
delta-BHC	EPA 608	
Dieldrin	EPA 608	
Endosulfan I	EPA 608	
Endosulfan II	EPA 608	
Endosulfan sulfate	EPA 608	
Endrin	EPA 608	
Endrin aldehyde	EPA 608	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	
Heptachlor	EPA 608	
Heptachlor epoxide	EPA 608	
Methoxychlor	EPA 608	
Solid and Chemical Materials		
Chromium, Hexavalent	EPA 7196A_1_1992	
Cyanide, Total	EPA 9014_1996	
pH	EPA 9045D_2002	
Aluminum	EPA 6020A_(2/07)	1
Antimony	EPA 6020A_(2/07)	1
Arsenic	EPA 6020A_(2/07)	1
Barium	EPA 6020A_(2/07)	1
Beryllium	EPA 6020A_(2/07)	1
Cadmium	EPA 6020A_(2/07)	1
Calcium	EPA 6020A_(2/07)	1
Chromium	EPA 6020A_(2/07)	1
Cobalt	EPA 6020A_(2/07)	1
Copper	EPA 6020A_(2/07)	1
Iron	EPA 6020A_(2/07)	1
Lead	EPA 6020A_(2/07)	1
Magnesium	EPA 6020A_(2/07)	1
Manganese	EPA 6020A_(2/07)	1
Molybdenum	EPA 6020A_(2/07)	1
Nickel	EPA 6020A_(2/07)	1
Potassium	EPA 6020A_(2/07)	1

Matrix/Analyte	Method	Notes
Selenium	EPA 6020A_(2/07)	1
Silver	EPA 6020A_(2/07)	1
Sodium	EPA 6020A_(2/07)	1
Thallium	EPA 6020A_(2/07)	1
Titanium	EPA 6020A_(2/07)	1
Zinc	EPA 6020A_(2/07)	1
Mercury	EPA 7470A_1_1994	
Mercury	EPA 7471B_(1/98)	
Benzene	EPA 8021B_2_(12/96)	
Ethylbenzene	EPA 8021B_2_(12/96)	
Toluene	EPA 8021B_2_(12/96)	
Xylene (total)	EPA 8021B_2_(12/96)	
4,4'-DDD	EPA 8081B_(2/07)	
4,4'-DDE	EPA 8081B_(2/07)	
4,4'-DDT	EPA 8081B_(2/07)	
Aldrin	EPA 8081B_(2/07)	
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
alpha-Chlordane	EPA 8081B_(2/07)	
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
delta-BHC	EPA 8081B_(2/07)	
Dieldrin	EPA 8081B_(2/07)	
Endosulfan I	EPA 8081B_(2/07)	
Endosulfan II	EPA 8081B_(2/07)	
Endosulfan sulfate	EPA 8081B_(2/07)	
Endrin	EPA 8081B_(2/07)	
Endrin aldehyde	EPA 8081B_(2/07)	
Endrin ketone	EPA 8081B_(2/07)	
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081B_(2/07)	
Heptachlor	EPA 8081B_(2/07)	
Heptachlor epoxide	EPA 8081B_(2/07)	
Methoxychlor	EPA 8081B_(2/07)	
Aroclor-1016 (PCB-1016)	EPA 8082A_(2/07)	
Aroclor-1221 (PCB-1221)	EPA 8082A_(2/07)	
Aroclor-1232 (PCB-1232)	EPA 8082A_(2/07)	
Aroclor-1242 (PCB-1242)	EPA 8082A_(2/07)	
Aroclor-1248 (PCB-1248)	EPA 8082A_(2/07)	

Matrix/Analyte	Method	Notes
Aroclor-1254 (PCB-1254)	EPA 8082A_(2/07)	
Aroclor-1260 (PCB-1260)	EPA 8082A_(2/07)	
C8-C10 Aliphatic EPH	WDOE EPH_(1997)	
C8-C10 Aromatic EPH	WDOE EPH_(1997)	
>C10-C12 Aliphatic EPH	WDOE EPH_(1997)	
>C10-C12 Aromatic EPH	WDOE EPH_(1997)	
>C12-C16 Aliphatic EPH	WDOE EPH_(1997)	
>C12-C16 Aromatic EPH	WDOE EPH_(1997)	
>C16-C21 Aliphatic EPH	WDOE EPH_(1997)	
>C16-C21 Aromatic EPH	WDOE EPH_(1997)	
>C21-C34 Alpihatic EPH	WDOE EPH_(1997)	
>C21-C34 Aromatic EPH	WDOE EPH_(1997)	
Total Pet Hydrocarbons - Diesel	WDOE NWTPH-Dx_(1997)	
Total Pet Hydrocarbons - Gasoline	WDOE NWTPH-Gx_(1997)	
C8-C10 Aromatic VPH	WDOE VPH_(1997)	
C5-C6 Aliphatic VPH	WDOE VPH_(1997)	
>C10-C12 Aliphatic VPH	WDOE VPH_(1997)	
>C10-C12 Aromatic VPH	WDOE VPH_(1997)	
>C12-C13 Aromatic VPH	WDOE VPH_(1997)	
>C6-C8 Aliphatic VPH	WDOE VPH_(1997)	
>C8-C10 Aliphatic VPH	WDOE VPH_(1997)	
1,1,1,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,1-Trichloroethane	EPA 8260C_(8/06)	
1,1,2,2-Tetrachloroethane	EPA 8260C_(8/06)	
1,1,2-Trichloroethane	EPA 8260C_(8/06)	
1,1-Dichloroethane	EPA 8260C_(8/06)	
1,1-Dichloroethylene	EPA 8260C_(8/06)	
1,1-Dichloropropene	EPA 8260C_(8/06)	
1,2,3-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,3-Trichloropropane	EPA 8260C_(8/06)	
1,2,4-Trichlorobenzene	EPA 8260C_(8/06)	
1,2,4-Trimethylbenzene	EPA 8260C_(8/06)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260C_(8/06)	
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
1,2-Dichlorobenzene	EPA 8260C_(8/06)	
1,2-Dichloroethane (Ethylene dichloride)	EPA 8260C_(8/06)	
1,2-Dichloropropane	EPA 8260C_(8/06)	
1,3,5-Trimethylbenzene	EPA 8260C_(8/06)	
1,3-Dichlorobenzene	EPA 8260C_(8/06)	
1,3-Dichloropropane	EPA 8260C_(8/06)	
1,4-Dichlorobenzene	EPA 8260C_(8/06)	
1,4-Difluorobenzene	EPA 8260C_(8/06)	
2,2-Dichloropropane	EPA 8260C_(8/06)	
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260C_(8/06)	
2-Chlorotoluene	EPA 8260C_(8/06)	
2-Hexanone	EPA 8260C_(8/06)	
4-Bromofluorobenzene	EPA 8260C_(8/06)	
4-Chlorotoluene	EPA 8260C_(8/06)	
4-Isopropyltoluene (p-Cymene)	EPA 8260C_(8/06)	
4-Methyl-2-pentanone (MIBK)	EPA 8260C_(8/06)	
Acetone	EPA 8260C_(8/06)	
Acrylonitrile	EPA 8260C_(8/06)	
Benzene	EPA 8260C_(8/06)	
Bromobenzene	EPA 8260C_(8/06)	
Bromochloromethane	EPA 8260C_(8/06)	
Bromodichloromethane	EPA 8260C_(8/06)	
Bromoform	EPA 8260C_(8/06)	
Carbon disulfide	EPA 8260C_(8/06)	
Carbon tetrachloride	EPA 8260C_(8/06)	
Chlorobenzene	EPA 8260C_(8/06)	
Chlorodibromomethane	EPA 8260C_(8/06)	
Chloroethane (Ethyl chloride)	EPA 8260C_(8/06)	
Chloroform	EPA 8260C_(8/06)	
cis-1,2-Dichloroethylene	EPA 8260C_(8/06)	
cis-1,3-Dichloropropene	EPA 8260C_(8/06)	
Dibromofluoromethane	EPA 8260C_(8/06)	
Dibromomethane	EPA 8260C_(8/06)	
Dichlorodifluoromethane (Freon-12)	EPA 8260C_(8/06)	
Ethanol	EPA 8260C_(8/06)	
Ethylbenzene	EPA 8260C_(8/06)	

Matrix/Analyte	Method	Notes
Ethyl-t-butylether (ETBE)	EPA 8260C_(8/06)	
Hexachlorobutadiene	EPA 8260C_(8/06)	
Isopropylbenzene	EPA 8260C_(8/06)	
m+p-xylene	EPA 8260C_(8/06)	
Methyl bromide (Bromomethane)	EPA 8260C_(8/06)	
Methyl chloride (Chloromethane)	EPA 8260C_(8/06)	
Methyl tert-butyl ether (MTBE)	EPA 8260C_(8/06)	
Methylene chloride (Dichloromethane)	EPA 8260C_(8/06)	
Naphthalene	EPA 8260C_(8/06)	
n-Butylbenzene	EPA 8260C_(8/06)	
n-Propylbenzene	EPA 8260C_(8/06)	
o-Xylene	EPA 8260C_(8/06)	
Pentafluorobenzene	EPA 8260C_(8/06)	
sec-Butylbenzene	EPA 8260C_(8/06)	
Styrene	EPA 8260C_(8/06)	
tert-amylmethylether (TAME)	EPA 8260C_(8/06)	
tert-Butyl alcohol	EPA 8260C_(8/06)	
tert-Butylbenzene	EPA 8260C_(8/06)	
Tetrachloroethylene (Perchloroethylene)	EPA 8260C_(8/06)	
Toluene	EPA 8260C_(8/06)	
trans-1,2-Dichloroethylene	EPA 8260C_(8/06)	
trans-1,3-Dichloropropylene	EPA 8260C_(8/06)	
Trichloroethene (Trichloroethylene)	EPA 8260C_(8/06)	
Trichlorofluoromethane (Freon 11)	EPA 8260C_(8/06)	
Vinyl chloride	EPA 8260C_(8/06)	
1,2,4-Trichlorobenzene	EPA 8270D_(2/07)	
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8270D_(2/07)	
1,2-Dichlorobenzene	EPA 8270D_(2/07)	
1,3-Dichlorobenzene	EPA 8270D_(2/07)	
1,4-Dichlorobenzene	EPA 8270D_(2/07)	
2,3,4,6-Tetrachlorophenol	EPA 8270D_(2/07)	
2,4,5-Trichlorophenol	EPA 8270D_(2/07)	
2,4,6-Trichlorophenol	EPA 8270D_(2/07)	
2,4-Dichlorophenol	EPA 8270D_(2/07)	
2,4-Dimethylphenol	EPA 8270D_(2/07)	
2,4-Dinitrophenol	EPA 8270D_(2/07)	

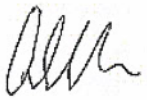
Matrix/Analyte	Method	Notes
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D_(2/07)	
2,6-Dichlorophenol	EPA 8270D_(2/07)	
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D_(2/07)	
2-Chloronaphthalene	EPA 8270D_(2/07)	
2-Chlorophenol	EPA 8270D_(2/07)	
2-Methylnaphthalene	EPA 8270D_(2/07)	
2-Methylphenol (o-Cresol)	EPA 8270D_(2/07)	
2-Nitroaniline	EPA 8270D_(2/07)	
2-Nitrophenol	EPA 8270D_(2/07)	
3,3'-Dichlorobenzidine	EPA 8270D_(2/07)	
3-Methylphenol (m-Cresol)	EPA 8270D_(2/07)	
3-Nitroaniline	EPA 8270D_(2/07)	
4,6-Dinitro-2-methylphenol	EPA 8270D_(2/07)	
4-Bromophenyl phenyl ether (BDE-3)	EPA 8270D_(2/07)	
4-Chloro-3-methylphenol	EPA 8270D_(2/07)	
4-Chloroaniline	EPA 8270D_(2/07)	
4-Chlorophenyl phenylether	EPA 8270D_(2/07)	
4-Methylphenol (p-Cresol)	EPA 8270D_(2/07)	
4-Nitroaniline	EPA 8270D_(2/07)	
4-Nitrophenol	EPA 8270D_(2/07)	
Acenaphthene	EPA 8270D_(2/07)	
Acenaphthylene	EPA 8270D_(2/07)	
alpha-Terpineol	EPA 8270D_(2/07)	
Aniline	EPA 8270D_(2/07)	
Anthracene	EPA 8270D_(2/07)	
Benzo(a)anthracene	EPA 8270D_(2/07)	
Benzo(a)pyrene	EPA 8270D_(2/07)	
Benzo(g,h,i)perylene	EPA 8270D_(2/07)	
Benzo(k)fluoranthene	EPA 8270D_(2/07)	
Benzo[b]fluoranthene	EPA 8270D_(2/07)	
Benzoic acid	EPA 8270D_(2/07)	
Benzyl alcohol	EPA 8270D_(2/07)	
bis(2-Chloroethoxy)methane	EPA 8270D_(2/07)	
bis(2-Chloroethyl) ether	EPA 8270D_(2/07)	
bis(2-Chloroisopropyl) ether	EPA 8270D_(2/07)	
Butyl benzyl phthalate	EPA 8270D_(2/07)	

Matrix/Analyte	Method	Notes
Carbazole	EPA 8270D_(2/07)	
Chrysene	EPA 8270D_(2/07)	
Di(2-ethylhexyl)phthalate	EPA 8270D_(2/07)	
Dibenz(a,h) anthracene	EPA 8270D_(2/07)	
Dibenzofuran	EPA 8270D_(2/07)	
Diethyl phthalate	EPA 8270D_(2/07)	
Dimethyl phthalate	EPA 8270D_(2/07)	
Di-n-butyl phthalate	EPA 8270D_(2/07)	
Di-n-octyl phthalate	EPA 8270D_(2/07)	
Fluoranthene	EPA 8270D_(2/07)	
Fluorene	EPA 8270D_(2/07)	
Hexachlorobenzene	EPA 8270D_(2/07)	
Hexachlorobutadiene	EPA 8270D_(2/07)	
Hexachlorocyclopentadiene	EPA 8270D_(2/07)	
Hexachloroethane	EPA 8270D_(2/07)	
Indeno(1,2,3-cd) pyrene	EPA 8270D_(2/07)	
Isophorone	EPA 8270D_(2/07)	
Naphthalene	EPA 8270D_(2/07)	
Nitrobenzene	EPA 8270D_(2/07)	
n-Nitrosodimethylamine	EPA 8270D_(2/07)	
N-Nitroso-di-n-propylamine	EPA 8270D_(2/07)	
n-Nitrosodiphenylamine	EPA 8270D_(2/07)	
Pentachlorophenol	EPA 8270D_(2/07)	
Phenanthrene	EPA 8270D_(2/07)	
Phenol	EPA 8270D_(2/07)	
Pyrene	EPA 8270D_(2/07)	
Pyridine	EPA 8270D_(2/07)	
Ignitability	EPA 1010A - 2004	

Matrix/Analyte	Method	Notes

Accredited Parameter Note Detail

(1) Interim accreditation pending the successful completion of an on-site audit to verify method capabilities (WAC 173-50-100).



02/07/2014

Authentication Signature
Alan D. Rue, Lab Accreditation Unit Supervisor

Date

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 23 January 2014
SERIAL NO.: 24
SPEC. REF.: 01 33 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 24
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		Geo Test Services, Inc.	Independent Laboratory Material Testing and Special Inspection Qualifications

Comment(s):

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **24**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/21/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 33 00**	**01 33 00-7**	**Geotest Laboratory Certification**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

GeoTest is Certified, Registered or Accredited by the following:

State of Washington - Certified:

Certified Engineering Corporation – Practicing geotechnical engineering as well as engineering geology, construction inspection and materials testing
Certified - Woman in Business Enterprise – WBE #W2F5913469

WABO (Washington Association of Building Officials) Registered: Since 1994

Registered as a Special Inspection Agency in the following categories:

- Reinforced Concrete
- Prestressed Concrete
- Shotcrete
- Structural Masonry
- Structural Steel & Welding
- Spray Applied Fire Resistive Materials
- Lateral Framing (Wood & Steel)
- Proprietary Anchors

A2LA (American Association for Laboratory Accreditation) Accredited: Since 1994

A2LA has accredited GeoTest Services Inc. in Bellingham and Arlington, WA for technical competence in the field of Construction Materials Testing & Construction Materials Engineering.

AASHTO (American Association of State & Highway Transportation Officials)

AMRL Proficiency Sample Program
CCRL (Cement & Concrete Reference Laboratory) - Concrete Proficiency Program

ICC (International Code Council) Certified:

Special Inspectors are certified their in respective inspection categories.

ACI (American Concrete Institute) Certified:

ACI Concrete Technician certification is required for ICC certification as a concrete special inspector

NICET - Certification Program - Level I & II Certified personnel in Soils, Concrete & Asphalt

Troxler – Certified personnel use of a Troxler Nuclear Densometer Gauge (soils & asphalt)

WSDOE (Washington State Department of Ecology)

Erosion & Sediment Control Lead Certified personnel

Oil Refinery Standards - GeoTest maintains company and personnel safety standards compliant with four petro-chemical refineries in our region. Safety certification includes: C-Stop, HZWOPPER, independent refinery certification, E-Verify, CPR, TWIX, PICS and Company Safety Manual and annual safety training.

BN Contractor ID Badge On-Line Course – GeoTest maintains company personnel that have completed the contractor orientation and badging through www.contractorbadge.com.

Quality System - GeoTest maintains an annually audited Quality System & Manual since 1994.

The State of Washington

DEPARTMENT OF LICENSING

Know All Persons By these presents that the Board of Registration for Professional Engineers and Land Surveyors acting under authority of Chapter 18.43 Revised code of Washington, hereby certifies that

Geo/Test Services, Inc.

having successfully satisfied the requirements of the law, as competent, has been enrolled as an

Engineering Corporation

and is qualified to perform professional engineering services in the State of Washington as of the 6th day of May 1999.

BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS STATE OF WASHINGTON

Given under the hand and seal of the Executive Director

This 13th Day of May 1999

Gregg A. Turner

EXECUTIVE DIRECTOR

No. C1334

STATE OF WASHINGTON
OFFICE OF MINORITY AND WOMEN'S BUSINESS ENTERPRISES
406 WATER STREET SW • POST OFFICE BOX 41160 • OLYMPIA, WASHINGTON 98504-1160
(360) 753-9693 • FAX (360) 586-7079

October 11, 2011

JULIE RICHARDSON
GEO/TEST SERVICES INC
741 MARINE DRIVE
BELLINGHAM, WA 98225

Certification Identification Number: W2F5913469

Dear Business Owner:

Congratulations! Your business has been recertified as a Women's Business Enterprise (WBE) for the State program. Its certification anniversary date is October 11, 2014. The firm's certification is based on the following:

Business Description:
INSPECTION TESTING, CONCRETE, MASONRY, SOILS, AGGREGATE, ASPHALT & STRUCTURAL STEEL

Primary North American Industry Classification System (NAICS) Code:
541380 - TESTING LABORATORIES

Other NAICS codes:
541690 - OTHER SCIENTIFIC AND TECHNICAL CONSULTING SERVICES

The state program requires the firm be reviewed for recertification every three years from its anniversary date. OMWBE will send the necessary forms for you to complete approximately sixty (60) days prior to their due date. If the forms are timely submitted, the firm will remain certified pending completion of OMWBE's review. Failure to timely submit the forms may result in the firm being decertified.

The state program requires the firm to notify OMWBE in writing of any changes in its ownership, control, size or activities, and provide supporting documentation describing the change(s). This information must be submitted within thirty (30) days of the change(s).

If you have any questions or need assistance, please do not hesitate to contact this office at (360) 753-9693.

Sincerely,

FOR THE DIRECTOR

ANGELA TAYLOR
Management Analyst 4

Washington Association of Building Officials

Special Inspection Agency

Certificate of Registration

GeoTest Services, Inc.

Arlington, Washington

The premise of the Washington Association of Building Officials (WABO) special inspection registration program is that the "special inspector" referred to in the State Building Code is a quality control organization with management and supervisory personnel, special inspectors and laboratory technicians, and the appropriate equipment and facilities to conduct special inspection and material testing in accordance with those standards stipulated in the State Building Code.

Types of Work

RC REINFORCED CONCRETE
PC PRESTRESSED CONCRETE
SC SHOTCRETE
SM STRUCTURAL MASONRY
SSB STRUCTURAL STEEL AND BOLTING
SW STRUCTURAL WELDING
FP SPRAY-APPLIED FIRE-RESISTIVE MATERIALS
PA PROPRIETARY ANCHORS

The agency name on this Certificate of Registration has, as prescribed in the State Building Code, demonstrated competence to the satisfaction of the building official specifying the services of a WABO registered special inspector, by qualifying for registration as an agency, as prescribed in the WABO Agency and Inspector performance Qualification Standard No. 1701 for the particular type(s) of work listed above.

April 1, 2014
EXPIRATION DATE

Julie Rogers
EXECUTIVE DIRECTOR

Washington Association of Building Officials
PO Box 7310
Olympia WA 98507-7310
Visit our web page at: www.wabo.org

Phone: 360-628-8669
Fax: 360-918-8021
Toll Free: 888-664-9515
E-mail: wabo@wabo.org

REGISTERED SPECIAL INSPECTION TESTING & INSPECTION AGENCY

GeoTest Services, Inc. — Arlington, Washington

20611 67TH AVE NE #A
ARLINGTON WA 98223

Phone: 360-435-1141
Fax: 360-435-1124

Agency Type of Work:

RC REINFORCED CONCRETE
PC PRESTRESSED CONCRETE
SC SHOTCRETE
SM STRUCTURAL MASONRY
SSB STRUCTURAL STEEL AND BOLTING
SW STRUCTURAL WELDING
FP SPRAY-APPLIED FIRE-RESISTIVE MATERIALS

Reinforced Concrete/Prestressed Concrete Compression Testing Machine Rated Capacity:

PA PROPRIETARY ANCHORS

National Accreditation or Inspection Certification: A2LA 31 JAN 2015

WABO Registration Expires: 01 APR 2014

Key Personnel Certificates of Registration Expires: 01 APR 2014

Technical Director: Grant W. Richardson

Supervising Lab Technician: David P. Bufalini
Ed J. Scheenstra

Special Inspection Field Supervisor: Daniel E. Weaver

RC	PC	SC	SM	SSB	SW	FP	LW	CF	PA
RC	PC	SC	SM	SSB	SW	FP			PA

** Denotes Registration is NOT current

Report date: 3/14/2013

American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

GEOTEST SERVICES, INC.

Arlington, WA

for technical competence in the field of

Construction Materials Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 21st day of February 2013.

President & CEO
For the Accreditation Council
Certificate Number 0489.02
Valid to January 31, 2015

For the tests to which this accreditation applies, please refer to the laboratory's Construction Materials Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

GEOTEST SERVICES, INC.
20611 – 67th Avenue NE, Unit A
Arlington, WA 98223
Grant W. Richardson Phone: 360 733 7318

Valid To: January 31, 2015 Certificate Number: 0489.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory for:

CONSTRUCTION MATERIALS ENGINEERING

ASTM: C1077 (Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation);
D3666 (Agencies Testing and Inspecting Road and Paving Materials);
D3740 (Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction);
E329 (Agencies Engaged in Construction Inspection and/or Testing)

CONSTRUCTION MATERIALS TESTING

Test Method:	**Test Description:**
Aggregates:	
ASTM C40	Organic Impurities in Fine Aggregates for Concrete
ASTM C117	Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C566	Total Evaporable Moisture Content of Aggregate by Drying
ASTM C702	Reducing Samples of Aggregate to Testing Size
ASTM D75*	Sampling Aggregates
ASTM D2419	Sand Equivalent Value of Soils and Fine Aggregate
Bituminous:	
ASTM D979*	Sampling Bituminous Paving Mixtures
ASTM D2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2726	Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950*	Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3549*	Thickness or Height of Compacted Bituminous Paving Mixture Specimens

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

Test Method:	Test Description:
ASTM D5444	Mechanical Size Analysis of Extracted Aggregate
ASTM D6307	Asphalt Content of Hot-Mix Asphalt by Ignition Method
Concrete:	
ASTM C31/C31M*	Making and Curing Concrete Test Specimens in the Field
ASTM C39/C39M	Compressive Strength of Cylindrical Concrete Specimens
ASTM C138/C138M*	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M*	Slump of Hydraulic-Cement Concrete
ASTM C172/C172M*	Sampling Freshly Mixed Concrete
ASTM C173*	Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M*	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C617	Capping Cylindrical Concrete Specimens
ASTM C1064/C1064M*	Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1140	Preparing and Testing Specimens from Shotcrete Test Panels
ASTM C1231/C1231M	Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders
Fireproofing:	
ASTM E605*	Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
ASTM E736*	Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
Masonry:	
ASTM C109/C109M (Compressive Strength Only)	Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
ASTM C579	Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C780* (Section A6)	Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C1019*	Sampling and Testing Grout
ASTM C1314	Compressive Strength of Masonry Prisms
Soils:	
ASTM D698	Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D4718	Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D6938*	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
Steel (Shop & Field)*:	
AWS D1.1, D1.3, D1.4, D1.8	Fabrication & Erection – Visual Welding
AISC/RCSC	Manual of Steel Construction (Fabrication & Erection – Visual & Bolting)

* This laboratory meets A2LA *R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these tests.

Washington Association of Building Officials

Special Inspection Agency

Certificate of Registration

GeoTest Services, Inc.

Bellingham, Washington

The premise of the Washington Association of Building Officials (WABO) special inspection registration program is that the "special inspector" referred to in the State Building Code is a quality control organization with management and supervisory personnel, special inspectors and laboratory technicians, and the appropriate equipment and facilities to conduct special inspection and material testing in accordance with those standards stipulated in the State Building Code.

Types of Work

RC REINFORCED CONCRETE
PC PRESTRESSED CONCRETE
SC SHOTCRETE
SM STRUCTURAL MASONRY
SSB STRUCTURAL STEEL AND BOLTING
SW STRUCTURAL WELDING
FP SPRAY-APPLIED FIRE-RESISTIVE MATERIALS
LW LATERAL WOOD
CF COLD-FORMED STEEL FRAMING
PA PROPRIETARY ANCHORS

The agency name on this Certificate of Registration has, as prescribed in the State Building Code, demonstrated competence to the satisfaction of the building official specifying the services of a WABO registered special inspector, by qualifying for registration as an agency, as prescribed in the WABO Agency and Inspector performance Qualification Standard No. 1701 for the particular type(s) of work listed above.

October 1, 2015
EXPIRATION DATE

Julie Rogers
EXECUTIVE DIRECTOR

Washington Association of Building Officials
PO Box 7310
Olympia WA 98507-7310
Visit our web page at: www.wabo.org

Phone: 360-628-8669
Fax: 360-918-8021
Toll Free: 888-664-9515
E-mail: wabo@wabo.org

REGISTERED SPECIAL INSPECTION TESTING & INSPECTION AGENCY

GeoTest Services, Inc. — Bellingham, Washington

741 MARINE DR
BELLINGHAM WA 98225

Phone: 360-733-7318
Fax: 360-733-7418

Agency Type of Work:

- RC REINFORCED CONCRETE
- PC PRESTRESSED CONCRETE
- SC SHOTCRETE
- SM STRUCTURAL MASONRY
- SSB STRUCTURAL STEEL AND BOLTING
- SW STRUCTURAL WELDING
- FP SPRAY-APPLIED FIRE-RESISTIVE MATERIALS
- LW LATERAL WOOD
- CF COLD-FORMED STEEL FRAMING
- PA PROPRIETARY ANCHORS

Reinforced Concrete/Prestressed Concrete Compression Testing Machine Rated Capacity: HIGH

National Accreditation or Inspection Certification: A2LA 31 JAN 2013

WABO Registration Expires: 01 OCT 2015

Key Personnel Certificates of Registration Expires: 01 OCT 2013

Technical Director: Grant W. Richardson

Supervising Lab Technician: Grant W. Richardson
Jerry D. Karber

Special Inspection Field Supervisor: Grant W. Richardson
Logan A. Senrud

RC	PC	SC	SM	SSB	SW	FP	LW	CF	PA
RC	PC	SC	SM	SSB	SW	FP			PA
							LW	CF	

** Denotes Registration is NOT current

Report date: 11/05/2012

American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

GEOTEST SERVICES INC.

Bellingham, WA

for technical competence in the field of

Construction Materials Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 12th day of February 2013.

President & CEO
For the Accreditation Council
Certificate Number 0489.01
Valid to January 31, 2015

For the tests to which this accreditation applies, please refer to the laboratory's Construction Materials Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

GEOTEST SERVICES, INC.
741 Marine Drive
Bellingham WA 98225
Grant W. Richardson Phone: 360 733 7318

Valid To: January 31, 2015 Certificate Number: 0489.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory for:

CONSTRUCTION MATERIALS ENGINEERING

ASTM: C1077 (Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation);
D3666 (Agencies Testing and Inspecting Road and Paving Materials);
D3740 (Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction);
E329 (Agencies Engaged in Construction Inspection and/or Testing)

AASHTO: R18 (Practice for Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories)

CONSTRUCTION MATERIALS TESTING

Test Method:	**Test Description:**
Aggregates:	
ASTM C29	Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C40	Organic Impurities in Fine Aggregates for Concrete
ASTM C70	Surface Moisture in Fine Aggregate
ASTM C117	Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C123	Lightweight Particles in Aggregate
ASTM C127	Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C142	Clay Lumps and Friable Particles in Aggregates
ASTM C566	Total Evaporable Moisture Content of Aggregate by Drying
ASTM C702	Reducing Samples of Aggregate to Testing Size
ASTM D75*	Sampling Aggregates
ASTM D2419	Sand Equivalent Value of Soils and Fine Aggregate
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
AASHTO T002	Sampling of Aggregates
AASHTO T011	Test for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T019	Bulk Density ("Unit Weight") and Voids in Aggregate

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Test Method:	Test Description:
AASHTO T027	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T084	Specific Gravity and Absorption of Fine Aggregate
AASHTO T085	Specific Gravity and Absorption of Coarse Aggregate
AASHTO T176	Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
AASHTO T248	Reducing Samples of Aggregate to Testing Size
AASHTO T304	Uncompacted Void Content of Fine Aggregate
AASHTO T335	Determining the Percentage of Fracture in Coarse Aggregate
Bituminous:	
ASTM D979*	Sampling Bituminous Paving Mixtures
ASTM D1188	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2726	Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950*	Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3549*	Thickness or Height of Compacted Bituminous Paving Mixture Specimens
ASTM D5361*	Sampling Compacted Bituminous Mixtures for Laboratory Testing
ASTM D5444	Mechanical Size Analysis of Extracted Aggregate
ASTM D6307	Asphalt Content of Hot-Mix Asphalt by Ignition Method
ASTM D6926*	Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927*	Marshall Stability and Flow of Bituminous Mixtures
AASHTO T30	Mechanical Analysis of Extracted Aggregate
AASHTO T166	Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens
AASHTO T168	Sampling Bituminous Paving Mixtures
AASHTO T209	Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
AASHTO T308	Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
WSDOT TM8	FOP for WAQTC for In Place Density of Hot Mix Asphalt Using the Nuclear Moisture Density Gauge
Concrete:	
ASTM C31/C31M*	Making and Curing Concrete Test Specimens in the Field
ASTM C39/C39M	Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C78/C78M*	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C138/C138M*	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M*	Slump of Hydraulic-Cement Concrete
ASTM C172/C172M*	Sampling Freshly Mixed Concrete
ASTM C173*	Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	Making and Curing Concrete Test Specimens in the Laboratory
ASTM C157/C157M	Length Change of Hardened Hydraulic-Cement Mortar and Concrete

Test Method:	Test Description:
ASTM C231/C231M*	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C495	Compressive Strength of Lightweight Insulating Concrete
ASTM C617	Capping Cylindrical Concrete Specimens
ASTM C684 (Method A)	Making, Accelerated Curing, and Testing Concrete Compression Test Specimens
ASTM C803*	Penetration Resistance of Hardened Concrete
ASTM C805/C805M*	Rebound Number of Hardened Concrete
ASTM C939*	Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
ASTM C1064/C1064M*	Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1140	Preparing and Testing Specimens from Shotcrete Test Panels
ASTM C1231/C1231M	Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders
AASHTO T022	Compressive Strength of Cylindrical Concrete Specimens,
AASHTO T023	Making and Curing Concrete Test Specimens in the Field
AASHTO T024	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
AASHTO T097	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
AASHTO T119	Slump of Hydraulic Cement Concrete,
AASHTO T121	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete,
AASHTO T141	Sampling Freshly Mixed Concrete
AASHTO T152	Air Content of Freshly Mixed Concrete by the Pressure Method
AASHTO T196	Air Content of Freshly Mixed Concrete by the Volumetric Method
AASHTO T231	Capping Cylindrical Concrete Specimens
AASHTO T309	Temperature of Freshly Mixed Hydraulic Cement Concrete
Fireproofing:	
ASTM E605*	Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
ASTM E736*	Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
Masonry:	
ASTM C109/C109M (Compressive Strength Only)	Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
ASTM C579	Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C780* (Section A6)	Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C1019*	Sampling and Testing Grout
ASTM C1314	Compressive Strength of Masonry Prisms
Soils:	
ASTM D421	Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
ASTM D422	Particle-Size Analysis of Soils
ASTM D558	Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM D698	Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D854	Specific Gravity of Soil Solids by Water Pycnometer
ASTM D1140	Amount of Material in Soils Finer than No. 200 (75-µm) Sieve
ASTM D1556*	Density and Unit Weight of Soil in Place by Sand-Cone Method

Test Method:	**Test Description:**
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2488*	Description and Identification of Soils (Visual-Manual Procedure)
ASTM D2974	Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718	Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D6938*	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
AASHTO T089	Determining the Liquid Limit of Soils
AASHTO T099	Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop
AASHTO T134	Moisture-Density Relations of Soil-Cement Mixtures
AASHTO T180	Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
AASHTO T310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
Steel (Shop & Field)*:	
AWS D1.1, D1.3, D1.4, D1.8	Fabrication & Erection – Visual Welding
AISC/RCSC	Manual of Steel Construction (Fabrication & Erection – Visual & Bolting)

* This laboratory meets A2LA *R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these tests.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/28/2013

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Rice Insurance LLC
1400 Broadway
P.O. Box 639
Bellingham WA 98227

CONTACT NAME: Sandi Jones
PHONE (A/C, No, Ext): (360)734-1161
FAX (A/C, No): (360)734-1173
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Hartford Fire Ins. Co. A XV	
INSURER B : Hartford Ins Co of Midwest AXV	37478
INSURER C : Seabright A-IX	
INSURER D : Hudson Specialty Ins Co A XV	
INSURER E :	
INSURER F :	

INSURED
GEO TEST SERVICES INC
741 MARINE DR

BELLINGHAM WA 98225

COVERAGES **CERTIFICATE NUMBER:** CL1332817293 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR [X] WA Stop Gap/Empl Liab. GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC			52SBAPS1329	4/2/2013	4/2/2014	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 2,000,000 $ 300,000 $ 10,000 $ 2,000,000 $ 4,000,000 $ 4,000,000
B	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS			52UECPE6011	4/2/2013	4/2/2014	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) Medical payments	$ 1,000,000 $ $ $ $
A	[X] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ 10,000			52SBAPS1329	4/2/2013	4/2/2014	EACH OCCURRENCE AGGREGATE	$ 2,000,000 $ 2,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		USL&H BB3121924	5/4/2013	5/4/2014	WC STATU-TORY LIMITS [X] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
D	Professional Liability Pollution Liability			ESB2420161202 ESB2420161202	4/2/2013 4/2/2013	4/2/2014 4/2/2014	Limit Limit	$2,000,000 $2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Troy Haskell/SAN

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Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 9 January 2014
SERIAL NO.: 26
SPEC. REF.: 32 20 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 26
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	A&R	1	Glacier	Import Sieve Analysis Data
2	MCN	2	Glacier	Import Chemical, Sieve, and Proctor Analysis
3	MCN	3	Glacier	Import Chemical Analysis (Pit Run)

Comment(s):

1. There appears to be 3 sieve analyses and 1 proctor analysis included in this submittal. It is not clear for which backfills the contractor is submitting analyses. Please resubmit with backfills clearly indicated on each analysis according to the specifications. Include proctor analyses for each backfill submitted with sieve analysis. For "Imported Backfill, (Pit Run)" additional information is required in the specifications, including liquid limit and plasticity index.

2. Chemical analysis is required for each backfill submitted. Submit chemical, sieve, proctor and any other data required for each backfill at the same time. Although it is desirable to have all project backfills submitted at one time, it is acceptable to receive separate submittals. To distinguish these submittals from each other, please submit as submittal "#26 – A,B,C…" as the letters correspond to specific backfills in the specifications, i.e. #26 – BC (pipe bedding and pit run) and #26 – EF (structural and subgrade).

3. There were a few minor concerns of the chemical analysis submitted for pit run, including its date of 2009. At Glacier's request, Department of Ecology is currently requesting newer chemical data from a project using pit run material from the same quarry. If successful, Ecology will review the material for approval.

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B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **26**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/23/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 20 00**	**31 20 00-5**	**Import Chemical Analysis Data**			
1	**31 20 00**	**31 20 00-5**	**Import Sieve Analysis Data**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

SCREENINGS - BOULDER HIL PIT

EDGE ANALYTICAL LABORATORIES

Burlington WA | 1620 S Walnut St - 98233
Corporate Office | 800.755.9295 • 360.757.1400 • 360.757.1402fax
Bellingham WA | 805 Orchard Dr Suite 4 - 98225
Microbiology | 360.671.0688 • 360.671.1577fax

Data Report

Client Name: Concrete Nor West
PO BOX 280
Mount Vernon, WA 98273

Reference Number: **09-08638**
Project: Scott Paper Mill, POA
Report Date: 6/17/09
Date Received: 6/15/09
Peer Review:

Sample Description: Pit Run Screenings - Boulder Hill Site
Lab Number: 18129
Sample Date: 6/15/09
Collected By: Unknown

CAS ID#	Parameter	Result	PQL	MDL	Units	DF	Method	Analyzed	Analyst	Batch	Comment
7440-41-7	**BERYLLIUM**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-47-3	**CHROMIUM**	25.0	10.9		mg/Kg	10	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-02-0	**NICKEL**	36.1	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-50-8	**COPPER**	16.9	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-66-6	**ZINC**	26.4	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-38-2	**ARSENIC**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7782-49-2	**SELENIUM**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-22-4	**SILVER**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-43-9	**CADMIUM**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-36-0	**ANTIMONY**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7440-28-0	**THALLIUM**	ND	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7439-92-1	**LEAD**	2.11	1.09		mg/Kg	1	6010B/3051	6/16/09	BJ	6010B-090616A	
7439-97-6	**MERCURY**	0.01	0.01		mg/Kg	1	7471A	6/16/09	CCN	HG_090616	

Notes:

ND = Not detected above the listed practical quantitation limit (PQL) or not above the Method Detection Limit (MDL), if requested.
PQL = Practical Quantitation Limit is the lowest level that can be acheived within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor

If you have any questions concerning this report contact Lawrence Henderson at the above phone number.

Form: cRslt_2.rpt

SCREENINGS - BOULD HILL PIT

EDGE ANALYTICAL LABORATORIES

QUALITY CONTROL REPORT
SURROGATE REPORT

Reference Number: 09-08638
Report Date: 06/17/09

Lab No	Analyte	Result	Qualifier	Units	Method	Limit
HCIDS_090616						
18129	O-TERPHENYL	99		%	NWTPH-HCID	

ɔtation:

A surrogate is a pure compound added to a sample in the laboratory just before processing so that the overall efficiency of a method can be determined.

The Acceptance Limits (or Control Limits) approximate a 99% confidence interval around the mean recovery.

SCREENINGS - BOULDER HILL PIT

EDGE ANALYTICAL LABORATORIES

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Bellingham WA | 805 Orchard Dr Suite 4 - 98225
Microbiology | 360.671.0688 • 360.671.1577fax

Hydrocarbon Data Report

Client Name: Concrete Nor West
PO BOX 280
Mount Vernon, WA 98273

Reference Number: **09-08638**
Project: Scott Paper Mill, POA
Report Date: 6/17/09
Date Received: 6/15/09
Peer Review:

Sample Description: Pit Run Screenings - Boulder Hill Site
Lab Number: 18129
Date 6/16/09

Sample Date: 6/15/09
Collected By: Unknown
Analyzed By: HY

Parameter	Result	Flag	DF	Cleanup Level	PQL	MDL	Units	Method	Batch	Comment
GASOLINE (C8 - C12)	**ND**		1	100	100	100	mg/Kg	NWTPH-HCID/3550B	HCIDS_090616	
DIESEL (C12 - C24)	**ND**		1	2000	100	50	mg/Kg	NWTPH-HCID/3550B	HCIDS_090516	
HEAVY HYDROCARBONS (>C24)	**ND**		1	2000	100	100	mg/Kg	NWTPH-HCID/3550B	HCIDS_090616	

Notation:
ND - A result of "ND" indicates that the compound was not detected above the Lab's Method Reporting Limit - MRL.
PQL = Practical Quantitation Limit is the lowest level that can be acheived within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor
Cleanup Level - The regulatory limit for Method A Cleanup Levels (MTCA, Chapter173-340 WAC) contaminants in the specified matrix. Amended Feb 12, 2001
The Cleanup level for Gasoline Range Organics (GRO) is 100 mg/Kg for gas mixtures without benzene and when the total ethylbenzene, toluene and xylenes are less than 1% of the gasoline concentration. The Cleanup level for GRO is 30 mg/Kg for all other mixtures.

If you have any questions concerning this report contact Lawrence Henderson at the above phone number.
Form: cHCID.rpt

Boulder Hill

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E-MAILED
Log

Hydrocarbon Data Report

Client Name: Concrete Nor West
PO BOX 280
Mount Vernon, WA 98273

Reference Number: 09-09257
Project: Scott Paper Clean-Up
Report Date: 6/29/09
Date Received: 6/24/09
Peer Review:

Sample Description: Screenings - Boulder Hill Pit
Lab Number: 19472
Date 6/26/09

Sample Date: 6/24/09
Collected By: Unknown
Analyzed By: HY

Parameter	Result	Flag	DF	Cleanup Level	PQL	MDL	Units	Method	Batch	Comment
BENZENE	ND		1	0.03	0.025	0.01	mg/Kg	8260B/5035A	GXS_000626	
TOLUENE	ND		1	7.0	0.10	0.01	mg/Kg	8260B/5035A	GXS_000626	
ETHYLBENZENE	ND		1	6.0	0.10	0.01	mg/Kg	8260B/5035A	GXS_000626	
TOTAL XYLENES	ND		1	9.0	0.20	0.01	mg/Kg	8260B/5035A	GXS_000626	
GAS Range Organics	ND		1	100/30*	25	15	mg/Kg	8260B/5035A	GXS_000626	

RECEIVED
JUL 02 2009

Notation:
ND - A result of "ND" indicates that the compound was not detected above the Lab's Method Reporting Limit - MRL.
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. = Dilution Factor
Cleanup Level - The regulatory limit for Method A Cleanup Levels (MTCA, Chapter173-340 WAC) contaminants in the specified matrix. Amended Feb 12, 2001
The Cleanup level for Gasoline Range Organics (GRO) is 100 mg/Kg for gas mixtures without benzene and when the total ethylbenzene, toluene and xylenes are less than 1% of the gasoline concentration. The Cleanup level for GRO is 30 mg/Kg for all other mixtures.

If you have any questions concerning this report contact Lawrence Henderson at the above phone number.

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Microbiology | 360.671.0688 • 360.671.1577fax

WSDOE Lab C1251

DATA REPORT

Client Name: Concrete Nor West
PO BOX 280
Mount Vernon, WA 98273

Reference Number: 09-09257
Project: Scott Paper Clean-Up

Lab Number: 19472
Field ID: Screenings
Sample Description: Boulder Hill Pit
Matrix: Soil
Sample Date: 6/24/09
Extraction Date: 6/25/09
Extraction Method: 3540C

Report Date: 7/1/09
Date Analyzed: 6/29/09
Analyst: GEB
Peer Review:
Analytical Method: 8082
Batch: 8082_090625

CAS	Compound	RESULT	Flag	UNITS	PQL	MDL	D.F.	COMMENT
12674-11-	AROCLOR 1016	ND		mg/Kg	0.1	0.1	1.00	
11104-28-	AROCLOR 1221	ND		mg/Kg	0.1	0.1	1.00	
11141-16-	AROCLOR 1232	ND		mg/Kg	0.1	0.1	1.00	
53469-21-	AROCLOR 1242	ND		mg/Kg	0.1	0.1	1.00	
12672-29-	AROCLOR 1248	ND		mg/Kg	0.1	0.1	1.00	
11097-69-	AROCLOR 1254	ND		mg/Kg	0.1	0.1	1.00	
11096-82-	AROCLOR 1260	ND		mg/Kg	0.1	0.1	1.00	
11100-14-	AROCLOR 1268	ND		mg/Kg	0.1	0.1	1.00	
1336-36-3	PCBS (Total Aroclors)	ND		mg/Kg	0.1	0.1	1.00	

Notes:
Flags are data qualifiers. If there are data qualifiers on your report definitions can be found on an accompanying sheet.
ND - indicates the compound was not detected above the PQL or MDL.
PQL = Practical Quantitation Limit is the lowest level that can be achieved within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor.

If you have any questions concerning this report contact Lawrence Henderson at the above phone number.

EDGE ANALYTICAL LABORATORIES

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WSDOE Lab C1251

DATA REPORT

Client Name: Concrete Nor West
PO BOX 280
Mount Vernon, WA 98273

Reference Number: 09-09257
Project: Scott Paper Clean-Up

Lab Number: 19472
Field ID: Screenings
Sample Description: Boulder Hill Pit
Matrix: Soil
Sample Date: 6/24/09
Extraction Date: 6/25/09
Extraction Method: 3540B

Report Date: 7/1/09
Date Analyzed: 6/29/09
Analyst: CO
Peer Review:
Analytical Method: 8270C
Batch: PAH_S090625

CAS	Compound	RESULT	Flag	UNITS	PQL	MDL	D.F.	COMMENT
90-12-0	1-METHYLNAPHTHALENE	ND		mg/Kg	0.05		1.00	
91-57-6	2-METHYLNAPHTHALENE	ND		mg/Kg	0.05		1.00	
208-96-8	ACENAPHTHYLENE	ND		mg/Kg	0.05		1.00	
83-32-9	ACENAPTHENE	ND		mg/Kg	0.05		1.00	
120-12-7	ANTHRACENE	ND		mg/Kg	0.05		1.00	
56-55-3	BENZ[A]ANTHRACENE	ND		mg/Kg	0.05		1.00	cPAH
50-32-8	BENZO[A]PYRENE	ND		mg/Kg	0.05		1.00	cPAH
205-99-2	BENZO[B]FLUORANTHENE	ND		mg/Kg	0.05		1.00	cPAH
191-24-2	BENZO[G,H,I]PERYLENE	ND		mg/Kg	0.05		1.00	
207-08-9	BENZO[K]FLUORANTHENE	ND		mg/Kg	0.05		1.00	cPAH
218-01-9	CHRYSENE	ND		mg/Kg	0.05		1.00	cPAH
53-70-3	DIBENZ[A,H]ANTHRACENE	ND		mg/Kg	0.05		1.00	cPAH
206-44-0	FLUORANTHENE	ND		mg/Kg	0.05		1.00	
86-73-7	FLUORENE	ND		mg/Kg	0.05		1.00	
193-39-5	INDENO[1,2,3,C,D]PYRENE	ND		mg/Kg	0.05		1.00	cPAH
91-20-3	NAPTHALENE	ND		mg/Kg	0.05		1.00	
85-01-8	PHENANTHRENE	ND		mg/Kg	0.05		1.00	
129-00-0	PYRENE	ND		mg/Kg	0.05		1.00	

Notes:

Flags are data qualifiers. If there are data qualifiers on your report definitions can be found on an accompanying sheet.
ND - Indicates the compound was not detected above the PQL or MDL.
PQL = Practical Quantitation Limit is the lowest level that can be acheived within specified limits of precision and accuracy during routine laboratory operating conditions.
D.F. - Dilution Factor.

If you have any questions concerning this report contact Lawrence Henderson at the above phone number.

QUALITY CONTROL REPORT
SURROGATE REPORT

Reference Number: 09-09257
Report Date: 07/01/09

Lab No	Analyte	Result	Qualifier	Units	Method	Limit
8082_090625						
19472	DECACHLOROBIPHENYL (Surr)	126		%	8082	Acceptance Limits 40-139%
	TETRACHLORO-M-XYLENE (Surr)	104		%		Acceptance Limits 38-137%
GXS_090626						
19472	d8-TOLUENE (Surr)	102		%	8260B	Acceptance Range: 50-150%
PAH_S090625						
19472	2 - FLUOROBIPHENYL (Surr)	75		%	8270C	Acceptance Limits 28-130%
	p-TERPHENYL-d14 (Surr)	94		%		Acceptance Limits 66-138%
	d5-NITROBENZENE (Surr)	73		%		Acceptance Limits 43-127%

*Notation:

A surrogate is a pure compound added to a sample in the laboratory just before processing so that the overall efficiency of a method can be determined.

The Acceptance Limits (or Control Limits) approximate a 99% confidence interval around the mean recovery.

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Pace Analytical™

www.pacelabs.com

BOULDER HILL

Report Prepared for:

Fran McAdow
Edge Analytical
1620 S. Walnut Street
Burlington WA 98233

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 1097986
Sample Receipt Date: 06/25/2009
Client Project #: 09.09257
Client Sub PO #: N/A
State Cert #: C218

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Nate Habte, your Pace Project Manager.

This report has been reviewed and prepared by:

Nate Habte, Project Manager
(612) 607-6407
(612) 607-6444 (fax)
natnael.habte@pacelabs.com

ACCREDITED IN ACCORDANCE WITH nelac

Report of Laboratory Analysis

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The results relate only to the samples included in this report.

Report Prepared Date:
July 2, 2009

Pace Analytical™

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on one sample submitted by a representative of Edge Analytical. The sample was analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using a modified version of USEPA Method 8290. Reporting limits were based on signal-to-noise measurements. The sample was received outside of the recommended temperature range of 0-6 degrees Celsius.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extract ranged from 39-94%. With the exceptions of two low values, which were flagged "P" on the results tables, the labeled standard recoveries obtained for this project were within the 40-135% target range specified in Method 8290. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

In one case, an interfering substance impacted the determination of a PCDD congener. The affected value was flagged "I" due to an incorrect isotope ratio.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These were below the calibration range of the method. Sample levels similar to the corresponding blank levels were flagged "B" on the results table and may be, at least partially, attributed to the background. It should be noted that levels less than ten times the background are not generally considered to be statistically different from the background.

A laboratory spike sample was also prepared with the sample batch using clean sand that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 87-101%. These results indicate a high degree of accuracy for these determinations. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

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Appendix A

Sample Management

Pace Analytical

1097486

CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)

PAGE 1 OF 1

REPORT TO: EDGE ANALYTICAL	BILL TO: SAME
ADDRESS: 1620 SOUTH WALNUT STREET	ADDRESS:
CITY: BURLINGTON STATE: WA ZIP: 98233	CITY: STATE: ZIP:
ATTN: FRAN MCADOW	PHONE: FAX:
PHONE: 360-757-1400 FAX: 360-757-1402	P.O.#: ATTN:
EMAIL:	☐ VISA ☐ M/C ☐ A/E EXPIRES /
PROJECT NAME: 09.09257	CARD#:

FOR LAB USE ONLY

REF#

CHECK REGULATORY PROGRAM:
- ☐ SAFE DRINKING WATER ACT
- ☐ CLEAN WATER ACT
- ☐ RCRA / CERCLA
- ☐ OTHER

EDGE ANALYTICAL LABORATORIES

Corporate
1620 S Walnut St
Burlington, WA 98233
1.800.755.9295

Microbiology
805 W. Orchard Dr. Suite 4
Bellingham, WA 98225

INSTRUCTIONS
1. USE ONE LINE PER SAMPLE LOCATION.
2. BE SPECIFIC IN TEST REQUESTS.
3. NEW LIST EACH METAL INDIVIDUALLY. NEW
4. CHECK OFF ANALYSIS TO BE PERFORMED FOR EACH SAMPLE LOCATION.
5. ENTER NUMBER OF CONTAINERS.

TURN AROUND TIME REQUIRED
- ☐ STANDARD
- ☐ HALF-DAY (50% SURCHARGE)
- ☐ QUICKEST (100% SURCHARGE) PHONE CALL REQ.
- ☐ EMERGENCY (PHONE CALL REQUIRED)

ANALYSIS REQUESTED

Due July 1st 2009

	SAMPLE ID	LOCATION	GRAB/ COMP.	SAMPLE MATRIX*	DATE	TIME	Dioxins & Furans (Soil)	All 17 Dioxin Furans Compounds						NUMBER OF CONTAINERS	SPECIAL INSTRUCTIONS/ CONDITIONS ON RECEIPT
1	19472.01			Soil	6/24/09	0700 am	X							1	001 Dioxins and Furans (Soil) All 17 Dioxin and Furans Compounds
2															
3															
4															
5															
6															
7															
8															
9															
10															

SAMPLED BY: PHONE: FAX: EMAIL: TOTAL CONTAINERS

SAMPLE RECEIPT REQUESTED (MUST INCLUDE FAX OR EMAIL) ☐

*W- WATER DW- DRINKING WATER SW- SURFACE WATER GW- GROUND WATER WW- WASTE WATER S- SOIL OL- OIL OTHER

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Pat Millar	6/24/09	1400	S Hunter/Pace	6/25/09	1050

	YES	NO	N/A
CUSTODY SEALS INTACT	☑	☐	☐
SAMPLE TEMP 4.8 °C SATISFACTORY	☐	☑	☐
SAMPLES RECEIVED INTACT	☑	☐	
CHAIN OF CUSTODY & LABELS AGREE	☑	☐	

FORM: COC 01-06-2009

Page 4 of 9

Pace Analytical

Sample Condition Upon Receipt

Client Name: Edge

Project # 1097986

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 1Z 976 W6 50 3548 4040 4

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____ Temp Blank: Yes _____ No ✓

Thermometer Used 80344042 179425 Type of Ice: Wet Blue None ☐ Samples on Ice, cooling process has begun

Cooler Temperature 1.6 °C Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 10/23/09 AM

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☑No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☐Yes ☑No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☑No ☐N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: SL		
All containers needing acid/base preservation have been checked. Noncomplance are noted in 13.	☐Yes ☑No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☑No ☐N/A	
Exceptions: VOA,Coliform, TOC, Oil and Grease, WI-DRO (water)	☐Yes ☑No	Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☑No ☐N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☐Yes ☑No ☐N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Person Contacted: Fran McAdow Date/Time: 6/25/09 @ 12:10 Field Data Required? Y / N

Comments/ Resolution: Temp waiver received
— 8290, T-6
— Due July 2nd will be fine

Project Manager Review: NAH Date: 6/25/09

NW 6/26/09 82

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Appendix B

Sample Analysis Summary

Pace Analytical™

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 8290 Sample Analysis Results

Client - Edge Analytical

Client's Sample ID	1947201		
Lab Sample ID	1097986001-R		
Filename	F90702A_04		
Injected By	SMT		
Total Amount Extracted	12.5 g	Matrix	Soil
% Moisture	6.2	Dilution	NA
Dry Weight Extracted	11.7 g	Collected	06/24/2009
ICAL ID	F90501	Received	06/25/2009
CCal Filename(s)	F90701A_16 & F90702A_09	Extracted	06/30/2009
Method Blank ID	BLANK-20508	Analyzed	07/02/2009 10:31

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.14	—	0.063 BJ	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	0.23	—	0.063 BJ	2,3,7,8-TCDD-13C	2.00	86
				1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	—	0.095	2,3,4,7,8-PeCDF-13C	2.00	82
Total TCDD	ND	—	0.095	1,2,3,7,8-PeCDD-13C	2.00	94
				1,2,3,4,7,8-HxCDF-13C	2.00	80
1,2,3,7,8-PeCDF	ND	—	0.057	1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	ND	—	0.043	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	—	0.050	1,2,3,7,8,9-HxCDF-13C	2.00	75
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	ND	—	0.058	1,2,3,6,7,8-HxCDD-13C	2.00	86
Total PeCDD	ND	—	0.058	1,2,3,4,6,7,8-HpCDF-13C	2.00	77
				1,2,3,4,7,8,9-HpCDF-13C	2.00	61
1,2,3,4,7,8-HxCDF	ND	—	0.047	1,2,3,4,6,7,8-HpCDD-13C	2.00	72
1,2,3,6,7,8-HxCDF	ND	—	0.050	OCDD-13C	4.00	39 P
2,3,4,6,7,8-HxCDF	ND	—	0.054			
1,2,3,7,8,9-HxCDF	ND	—	0.064	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	0.054	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	0.066	2,3,7,8-TCDD-37Cl4	0.20	89
1,2,3,6,7,8-HxCDD	ND	—	0.058			
1,2,3,7,8,9-HxCDD	ND	—	0.062			
Total HxCDD	ND	—	0.062			
1,2,3,4,6,7,8-HpCDF	ND	—	0.048	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	0.061	Equivalence: 0.12 ng/Kg		
Total HpCDF	ND	—	0.054	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	0.15	—	0.081 J			
Total HpCDD	0.35	—	0.081 J			
OCDF	ND	—	0.190			
OCDD	1.20	—	0.260 BJ			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit.

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Value below calibration range
B = Less than 10x higher than method blank level
P = Recovery outside target range

REPORT OF LABORATORY ANALYSIS

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Pace Analytical™

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 8290 Blank Analysis Results

Lab Sample ID	BLANK-20508	Matrix	Solid
Filename	F90702A_03	Dilution	NA
Total Amount Extracted	20.1 g	Extracted	06/30/2009
ICAL ID	F90501	Analyzed	07/02/2009 09:43
CCal Filename(s)	F90701A_16 & F90702A_09	Injected By	SMT

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.049	—	0.035 J	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	0.049	—	0.035 J	2,3,7,8-TCDD-13C	2.00	77
				1,2,3,7,8-PeCDF-13C	2.00	74
2,3,7,8-TCDD	ND	—	0.037	2,3,4,7,8-PeCDF-13C	2.00	80
Total TCDD	ND	—	0.037	1,2,3,7,8-PeCDD-13C	2.00	90
				1,2,3,4,7,8-HxCDF-13C	2.00	74
1,2,3,7,8-PeCDF	ND	—	0.024	1,2,3,6,7,8-HxCDF-13C	2.00	72
2,3,4,7,8-PeCDF	ND	—	0.023	2,3,4,6,7,8-HxCDF-13C	2.00	74
Total PeCDF	ND	—	0.023	1,2,3,7,8,9-HxCDF-13C	2.00	71
				1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	ND	—	0.025	1,2,3,6,7,8-HxCDD-13C	2.00	80
Total PeCDD	ND	—	0.025	1,2,3,4,6,7,8-HpCDF-13C	2.00	69
				1,2,3,4,7,8,9-HpCDF-13C	2.00	62
1,2,3,4,7,8-HxCDF	ND	—	0.018	1,2,3,4,6,7,8-HpCDD-13C	2.00	68
1,2,3,6,7,8-HxCDF	ND	—	0.016	OCDD-13C	4.00	39 P
2,3,4,6,7,8-HxCDF	ND	—	0.019			
1,2,3,7,8,9-HxCDF	ND	—	0.025	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	0.019	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	0.022	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	ND	—	0.029			
1,2,3,7,8,9-HxCDD	ND	—	0.032			
Total HxCDD	ND	—	0.028			
1,2,3,4,6,7,8-HpCDF	ND	—	0.021	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	0.031	Equivalence: 0.048 ng/Kg		
Total HpCDF	ND	—	0.026	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	—	0.054	0.040 I			
Total HpCDD	ND	—	0.040			
OCDF	0.180	—	0.082 J			
OCDD	0.590	—	0.140 J			

Conc = Concentration (Totals Include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
RL = Reporting Limit

Results reported on a dry weight basis and are valid to no more than 2 significant figures.
J = Value below calibration range
P = Recovery outside target range
I = Interference present

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Pace Analytical™

Method 8290 Laboratory Control Spike Results

Lab Sample ID	LCS-20509		
Filename	F90702A_01	Matrix	Solid
Total Amount Extracted	20.4 g	Dilution	NA
ICAL ID	F90501	Extracted	06/30/2009
CCal Filename(s)	F90701A_16 & F90702A_09	Analyzed	07/02/2009 08:09
Method Blank ID	BLANK-20508	Injected By	SMT

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.20	98	2,3,7,8-TCDF-13C	2.00	89
Total TCDF				2,3,7,8-TCDD-13C	2.00	96
				1,2,3,7,8-PeCDF-13C	2.00	91
2,3,7,8-TCDD	0.20	0.19	94	2,3,4,7,8-PeCDF-13C	2.00	99
Total TCDD				1,2,3,7,8-PeCDD-13C	2.00	110
				1,2,3,4,7,8-HxCDF-13C	2.00	92
1,2,3,7,8-PeCDF	1.00	0.99	99	1,2,3,6,7,8-HxCDF-13C	2.00	86
2,3,4,7,8-PeCDF	1.00	0.93	93	2,3,4,6,7,8-HxCDF-13C	2.00	92
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.00	88
				1,2,3,4,7,8-HxCDD-13C	2.00	96
1,2,3,7,8-PeCDD	1.00	0.87	87	1,2,3,6,7,8-HxCDD-13C	2.00	94
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.00	86
				1,2,3,4,7,8,9-HpCDF-13C	2.00	81
1,2,3,4,7,8-HxCDF	1.00	0.92	92	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	1.00	0.97	97	OCDD-13C	4.00	52
2,3,4,6,7,8-HxCDF	1.00	0.95	95			
1,2,3,7,8,9-HxCDF	1.00	0.95	95	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	1.00	0.93	93	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	1.00	0.95	95			
1,2,3,7,8,9-HxCDD	1.00	0.94	94			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.00	1.01	101			
1,2,3,4,7,8,9-HpCDF	1.00	0.98	98			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.00	0.92	92			
Total HpCDD						
OCDF	2.00	2.02	101			
OCDD	2.00	2.02	101			

Qs = Quantity Spiked
Qm = Quantity Measured
Rec. = Recovery (Expressed as Percent)
P = Recovery outside of target range
X = Background subtracted value

Y = RF averaging used in calculations
Nn = Value obtained from additional analysis
NA = Not Applicable
* = See Discussion

REPORT OF LABORATORY ANALYSIS

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CHAIN OF CUSTODY / ANALYSIS REQUEST (PLEASE COMPLETE ALL APPLICABLE SHADED SECTIONS)

PAGE ____ OF ____

REPORT TO: Concrete Nor'west	BILL TO: CNW	FOR LAB USE ONLY
ADDRESS: PO Box 280	ADDRESS: SAME	REF#
CITY: Mount Vernon STATE: ZIP: 98273	CITY: STATE: ZIP:	CHECK REGULATORY PROGRAM
ATTN: DAVE ENDERS	PHONE: FAX:	☐ SAFE DRINKING WATER ACT
PHONE: 757-3121 FAX: 757-9757	P.O.#: RAM-SPM ATTN: DAVE ENDERS	☐ CLEAN WATER ACT
EMAIL: davee@gravelpits.com	☐ VISA ☐ M/C ☐ A/E EXPIRES /	☐ RCRA / CERCLA
PROJECT NAME: Scott Paper Clean-up	CARD#	☐ OTHER

Corporate
1620 South Walnut St.
Burlington, WA 98233
1.800.755.9295

Microbiology
805 W. Orchard Dr. Suite 4
Bellingham, WA 98225

INSTRUCTIONS
1. USE ONE LINE PER SAMPLE LOCATION.
2. BE SPECIFIC IN TEST REQUESTS.
3. NEW LIST EACH METAL INDIVIDUALLY. NEW
4. CHECK OFF ANALYSIS TO BE PERFORMED FOR EACH SAMPLE LOCATION.
5. ENTER NUMBER OF CONTAINERS.

TURN AROUND TIME REQUIRED
- ☐ STANDARD
- ☐ HALF-TIME (50% SURCHARGE)
- ☒ QUICKEST (100% SURCHARGE) PHONE CALL REQ.
- ☐ EMERGENCY (PHONE CALL REQUIRED)

ANALYSIS REQUESTED

	SAMPLE ID	LOCATION	GRAB/ COMP.	SAMPLE MATRIX*	DATE	TIME	NUMBER OF CONTAINERS	SPECIAL INSTRUCTIONS/ CONDITIONS ON RECEIPT
1	Screenings	Boulder Hill Pit			6-24-09	7:00 AM		
2								
3								
4								5 day
5								Turn
6								
7								
8								
9								
10								

09-09257
19472
09-09257

SAMPLED BY: PHONE: FAX: EMAIL: TOTAL CONTAINERS

SAMPLE RECEIPT REQUESTED (MUST INCLUDE FAX OR EMAIL) ☐

*W- WATER SW- SURFACE WATER WW- WASTE WATER OL- OIL
DW- DRINKING WATER GW- GROUND WATER S- SOIL OTHER____

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	6-24-09				
			6.24.09	12:42	

	YES	NO	N/A
CUSTODY SEALS INTACT WT	☐	☐	☑
SAMPLE TEMP____°C SATISFACTORY	☑	☐	☐
SAMPLES RECEIVED INTACT	☑	☐	
CHAIN OF CUSTODY & LABELS AGREE	☑	☐	

FORM: COC 01-06-2009

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Q.C.	**Date Received:** 6-May-13	***ASTM D-2487 Unified Soils Classification System***
Project #: 13B006-05	**Sampled By:** Client	SW, Well-graded Sand with Gravel
Client: Concrete Nor'West	**Date Tested:** 7-May-13	***Sample Color:***
Source: Boulder	**Tested By:** V Duran	Brown
Sample#: B13-226		

ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications Pipe Zone Bedding
2012 WSDOT 9-03.14(1) Gravel Borrow 1" ~ Screenings
Sample Meets Specs ? Yes

$D_{(5)}$ = 0.114	mm	% Gravel = 44.8%	Coeff. of Curvature, C_c = 1.12
$D_{(10)}$ = 0.407	mm	% Sand = 50.9%	Coeff. of Uniformity, C_U = 14.73
$D_{(30)}$ = 1.655	mm	% Silt & Clay = 4.3%	Fineness Modulus = 4.88
$D_{(50)}$ = 4.023	mm	Fracture % = n/a	Liquid Limit = n/a
$D_{(60)}$ = 5.995	mm	Moisture %, as sampled = n/a	Plastic Limit = n/a
$D_{(90)}$ = 16.362	mm	Sand Equivalent= 64	Plasticity Index = n/a

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%		
10.00"	250.00		100%		
8.00"	200.00		100%		
6.00"	150.00		100%		
4.00"	100.00	100%	100%	100.0%	99.0%
3.00"	75.00		100%		
2.50"	63.00		100%		
2.00"	50.00	100%	100%	100.0%	75.0%
1.75"	45.00		100%		
1.50"	37.50		100%		
1.25"	31.50		100%		
1.00"	25.00	99%	99%		
3/4"	19.00	95%	95%		
5/8"	16.00		89%		
1/2"	12.50	82%	82%		
3/8"	9.50	74%	74%		
1/4"	6.30		61%		
#4	4.75	55%	55%	80.0%	50.0%
#8	2.36		38%		
#10	2.00	36%	36%		
#16	1.18		22%		
#20	0.850		17%		
#30	0.600		13%		
#40	0.425	10%	10%	30.0%	0.0%
#50	0.300		8%		
#60	0.250		7%		
#80	0.180		6%		
#100	0.150		6%		
#140	0.106		5%		
#170	0.090		5%		
#200	0.075	4.3%	4.3%	7.0%	0.0%

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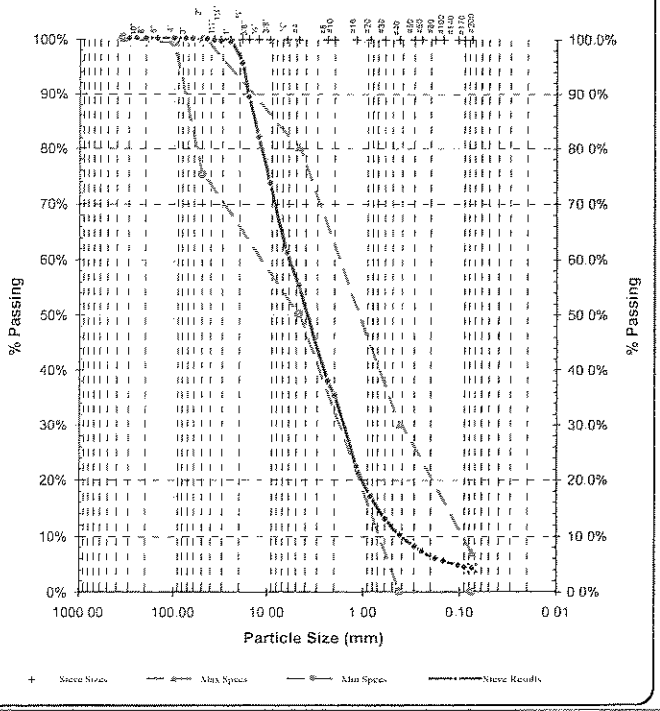
Grain Size Distribution



All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: _____

Reviewed by: _____

Corporate ~777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
NW Region ~2126 East Bakerview Rd., Suite #101 • Bellingham, WA 98226 • Phone (360) 647-6061 • Fax (360) 647-8111
SW Region ~2118 Black Lake Blvd. SW • Olympia, WA 98512 • Phone (360) 534-9777 • Fax (360) 534-9779
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.
Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Proctor Report

Project: P245 EA-18G Flight Simulator Facility
Project #: 13B113-01
Client: Advanced Technology Construction Corp.
Source: CNW - Boulder Pit
Sample#: B13-701

Date Received: 9-Oct-13
Sampled By: K. Walters
Date Tested: 10-Oct-13
Tested By: C. Meredith

Unified Soils Classification System, ASTM D-2487
SW, Well-graded Sand with Gravel
Sample Color
Olive

Sample Prepared:	Moist: X	Manual:	
	Dry:	Mechanical: X	
Test Standard:	ASTM D698:	AASHTO T 99:	Method
	ASTM D 1557: X	AASHTO T 180:	B

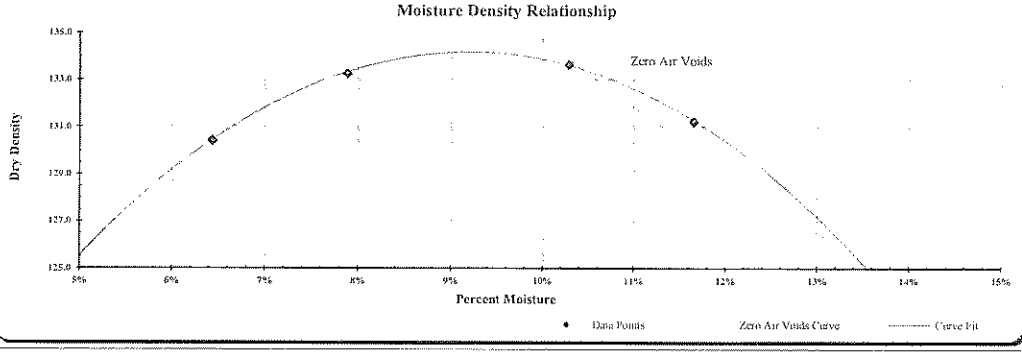
Assumed Sp. Gr.	Point Number	Percent Moisture	Dry Density
2.75	1	6.4 %	130.4
	2	7.9 %	133.2
	3	10.3 %	133.6
	4	11.7 %	131.2

Uncorrected Proctor Value
Max. Dry Density: 134.2 lbs/ft³ — Optimum Moist.: 9.2 %

Value w/ Oversize Correction Applied
Max. Dry Density: 139.2 lbs/ft³ — Optimum Moist.: 7.8%

ACCREDITED

Moisture Density Relationship



ASTM C-136

Sieve US	Size mm	Percent Passing	Specifications Max	Specifications Min
12.00"	300.00			
10.00"	250.00			
8.00"	200.00			
6.00"	150.00			
4.00"	100.00			
3.00"	75.00			
2.50"	63.00			
2.00"	50.00			
1.75"	45.00			
1.50"	37.50			
1.25"	31.50			
1.00"	25.00			
3/4"	19.00	100 %	100.0 %	99.0 %
5/8"	16.00			
1/2"	12.50	96 %	100.0 %	80.0 %
3/8"	9.50	83 %		
1/4"	6.30			
#4	4.75	57 %	66.0 %	46.0 %
#8	2.36			
#10	2.00	39 %		
#16	1.18			
#20	0.850	24 %		
#30	0.600			
#40	0.425	13 %	24.0 %	8.0 %
#50	0.300			
#60	0.250	8 %		
#80	0.180			
#100	0.150	6 %		
#140	0.106			
#170	0.090			
#200	0.075	4.7 %	10.0 %	0.0 %

Specs: Meets Specs? **Yes**
2012 WSDOT 9-03.9(3) Crushed Surfacing Top Course

ASTM D-4718, Misc. Oversize Correction Values — % Oversize Mat'l: 17%

% Oversize Retained	Corrected Density	Optimum Moisture	% Oversize Retained	Corrected Density	Optimum Moisture
5%	135.6	8.8%	20%	140.3	7.5%
10%	137.1	8.4%	25%	141.9	7.0%
15%	138.7	7.9%	30%	143.6	6.6%

% Gravel:	42.6%	$D_{(10)}$:	0.319
% Sand:	52.7%	$D_{(30)}$:	1.299
% Silt&Clay:	4.7%	$D_{(60)}$:	5.229
C_C:	1.01	LL:	n/a
C_U:	16.41	PL:	n/a
FM:	4.56	PI:	n/a
Fracture %:	99.0%	Sand Eq.:	76

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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: _____

Reviewed by: Curtis Shear

Digitally signed by Curtis Shear
DN: cn=Curtis Shear, o=Materials Testing & Consulting, Inc., ou=Laboratory Services, email=c_shear@mtc-inc.net, c=US
Date: 2013.10.15 11:37:09 -07'00'

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CONCRETE NOR'WEST

Division of Miles Sand Gravel Co.
PO Box 280
Mount Vernon, WA 98273
(360)757-3121

Aggregate Test Report

Product: 5/8" x 3/8" Chips Location: Butler Pit

Project: Stock Material Contractor:

U.S. Sieve #	Grams Retained	%SampleRetained	%Sample Passing	%Passing Spec.
Sample Size:	1106			
2 1/2 In.				
2 In.				
1 1/2 In.				
1 1/4 In.				
1 In.				
3/4 In.	0	0.0%	100.0%	
5/8 In.				
1/2 In.	240	21.7%	78.3%	
3/8 In.	668	60.4%	39.6%	
1/4 In.				
No.4	1070	96.9%	3.1%	
No.8				
No.10				
No.16				
No.30				
No.40				
No.50				
No.100				
No.200	11	99.0%	1.0%	

Testing:

Remarks:

Sampled By: J.K. Tested By: J.K.

Submitted By: Date: 4/17/2013

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 January 2014
SERIAL NO.: 29 and 29.2
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 29 and 29.2
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET	1	Glacier	Storm Water Pollution Prevention Plan
1	NET	1	Glacier	TESC

Comment(s):

1. This SWPPP satisfies both requirements for the SWPPP and the Temporary Erosion and Sediment Control Plan. Appendix A was modified to show turbidity sampling points.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **29.2**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/20/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**01 57 13**	**01 57 13-1**	**CESCL Documentation for Eric Hay and John Kilmanis**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Certificate of Completion

This certifies that

Eric Hay

Has completed the necessary course training for

Certified Erosion & Sediment Control Lead

in accordance with BMP 160 WSDOE SMMEW 9/04 SMMWW 8/12

Instructor _____

Phil Fortunato

Date 1/10/2014 ID# ECO-3-**1011320** Expires **1/10/2017**

ECO-3 Kent, Washington 253 931-8100 www.eco-3.com

Certificate of Completion

This certifies that

Eric Hay

Has completed the necessary course training for

Erosion & Sediment Control Lead

in accordance with EPA CGP Sec 3.10D "Qualified Personnel"

Instructor _____

Phil Fortunato

Date 1/10/2014 ID# ECO-3-EPA**1011320** Expires **1/10/2017**

Eco-3 Kent, Washington 253 931-8100 www.eco-3.com

Certificate of Completion

This certifies that

Eric Hay

Has completed the necessary course training for

Erosion & Sediment Control Inspector

in accordance with Oregon's 1200-C Permit, Schedule A.12.b.iii(1)

Instructor _____

Phil Fortunato

Date 1/10/2014 ID# ECO-3-1011320 Expires 1/10/2017

ECO 3 Kent, Washington 253 931-8100 www.eco-3.com

Certified
Erosion & Sediment Control Lead

Eric Hay

Has completed the necessary course training in Erosion & Sediment Control in accordance with WSDOE SMMWW 8/12

Instructor 

ID# ECO-3-1011320

Expires **1/10/2017**

Certified
Erosion & Sediment Control Lead

John Kilmanis

Has completed the necessary course training in Erosion & Sediment Control in accordance with WSDOE SMMWW 8/12

Instructor _____

ID# ECO-3-1011322 Expires **1/10/2017**

Certificate of Completion

This certifies that

John Kilmanis

Has completed the necessary course training for

Certified Erosion & Sediment Control Lead

in accordance with BMP 160 WSDOE SMMEW 9/04 SMMWW 8/12

Instructor _____

Phil Fortunato

Date 1/10/2014 ID# ECO-3-**1011322** Expires **1/10/2017**

Eco-3 Kent, Washington 253 931-8100 www.eco-3.com

Certificate of Completion

This certifies that

John Kilmanis

Has completed the necessary course training for

Erosion & Sediment Control Inspector

in accordance with Oregon's 1200-C Permit, Schedule A.12.b.iii(1)

Instructor _____

Phil Fortunato

Date 1/10/2014 ID# ECO-3-1011322 Expires 1/10/2017

ECO 3 Kent, Washington 253 931-8100 www.eco-3.com

Stormwater Pollution Prevention Plan

For
Cornet Bay Marina Remediation

Prepared For
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
425-649-7000

Owner	Developer	Operator/Contractor
Milton A Woods	N/A	Glacier Environmental Services Inc.
200 West Cornet Bay Road	~	PO Box 1097
Oak Harbor, WA 98277	~	Mukilteo WA 98275

Project Site Location
200 West Cornet Bay Road Oak Harbor WA

Certified Erosion and Sediment Control Lead
Alan Hall
206-446-5280
Eric Hay
425-737-2870

SWPPP Prepared By
Glacier Environmental Services
PO Box 1097
Mukilteo, WA, 98275
425-355-2826
Alan Hall, Manager

SWPPP Preparation Date
December 10, 2013

Approximate Project Construction Dates
December 16, 2013

Contents

Appendix A Site plans

- Vicinity map (with all discharge points)
- Site plan with TESC measures

Appendix B Construction BMPs

- Possibly reference in BMPs, but likely it will be a consolidated list so that the applicant can photocopy from the list from the SWMM.

Appendix C Alternative Construction BMP list

- List of BMPs not selected, but can be referenced if needed in each of the 12 elements

Appendix D General Permit

Appendix E Site Log and Inspection Forms

Appendix F Engineering Calculations (if necessary)

- Flows, ponds, etc…

1.0 Introduction

This Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities presents the minimum but not limited to measures to be implemented and maintained to minimize sediment and other pollutants in storm water discharges for the Cornet Bay Marina Remediation project.

The proposed work generally consists of temporarily moving the existing building, demolishing all slabs and foundations, replacing the wooden bulkhead with a steel sheet pile wall, excavating contaminated soil to the extent practicable, disposing of the contaminated soil offsite in a permitted facility, in-situ bio remediation, backfilling to original grades, restoring slabs and foundations, moving building back to its original location, replacing topsoil, hydroseeding and restoring parking areas. Some construction de-watering will be necessary to accommodate excavation below the water table. Water will be treated via a temporary onsite treatment system consisting of weir tanks, bag filtration, sand filtration, chitosan treatment and granular activated carbon. Treated water will be discharged directly to the bay through a pipe under an NPDES permit. Sampling and chemical analysis will be performed to confirm that discharge requirements are being met.

The climate for Oak Harbor is mild during summer when temperatures tend to be in the 60's and cold during winter when temperatures tend to be in the 40's.The warmest month of the year is August with an average maximum temperature of 66 degrees Fahrenheit, while the coldest month of the year is January with an average minimum temperature of 35 degrees Fahrenheit. The annual average precipitation in Oak Harbor is 20.24 Inches. Average rainfall during the months when work is scheduled to be conducted is: December 2.55 inches, January 2.44 inches, February 1.70, March 1.44 and April 1.54 inches.

The purpose of this SWPPP is to describe the proposed construction activities and all temporary and permanent erosion and sediment control (TESC) measures, pollution prevention measures, inspection/monitoring activities, and recordkeeping that will be implemented during the proposed construction project. The objectives of the SWPPP are to:

1. Implement Best Management Practices (BMPs) to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. Prevent violations of surface water quality, ground water quality, or sediment management standards.

3. Prevent, during the construction phase, adverse water quality impacts including impacts on beneficial uses of the receiving water by controlling peak flow rates and volumes of stormwater runoff at the Permittee’s outfalls and downstream of the outfalls.

This SWPPP was prepared using the Ecology SWPPP Template downloaded from the Ecology website on July 2, 2005. This SWPPP was prepared based on the requirements set forth in the Construction Stormwater General Permit, *Stormwater Management Manual for Western Washington* (SWMMWW 2005) and in the *Stormwater Management Manual for Eastern Washington* (SWMMEW 2004). The report is divided into seven main sections with several appendices that include stormwater related reference materials. The topics presented in the each of the main sections are:

- Section 1 – INTRODUCTION. This section provides a summary description of the project, and the organization of the SWPPP document.

- Section 2 – SITE DESCRIPTION. This section provides a detailed description of the existing site conditions, proposed construction activities, and calculated stormwater flow rates for existing conditions and post–construction conditions.

- Section 3 – CONSTRUCTION BMPs. This section provides a detailed description of the BMPs to be implemented based on the 12 required elements of the SWPPP (SWMMEW 2004).

- Section 4 – CONSTRUCTION PHASING AND BMP IMPLEMENTATION. This section provides a description of the timing of the BMP implementation in relation to the project schedule.

- Section 5 – POLLUTION PREVENTION TEAM. This section identifies the appropriate contact names (emergency and non-emergency), monitoring personnel, and the onsite temporary erosion and sedimentation control inspector

- Section 6 – INSPECTION AND MONITORING. This section provides a description of the inspection and monitoring requirements such as the parameters of concern to be monitored, sample locations, sample frequencies, and sampling methods for all stormwater discharge locations from the site.

- Section 7 – RECORDKEEPING. This section describes the requirements for documentation of the BMP implementation, site inspections, monitoring results, and changes to the implementation of certain BMPs due to site factors experienced during construction.

Supporting documentation and standard forms are provided in the following Appendices:

Appendix A – Site plans
Appendix B – Construction BMPs
Appendix C – Alternative Construction BMP list

Appendix D – General Permit
Appendix E – Site Log and Inspection Forms
Appendix F – Engineering Calculation

2.0 Site Description

The Cornet Bay Marina Site is located at 200 Cornet Bay Road in Oak Harbor on Whidbey Island. It is bounded on the north by Cornet Bay and on the south by Cornet Bay Road and mixed residential homes and light commercial land uses. A site vicinity map is provided in Appendix A. The site is 1.1 acres in size and includes a one-story Marina Building in the center of the site, and large gravel parking lot on the south side of the site. The topography of the site and surrounding properties gently slopes to the south toward Cornet Bay Road. Surficial soils consist of medium stiff fill material, gray, sandy silt, fine grained sand, trace of clay and scattered gravel. The site is well drained and groundwater depth varies due to tidal influence.

Runoff from the site generally drains from north to south to a grass lined swell along Cornet Bay Road. The catch basins convey runoff to a storm drain system that flows to the northeast corner of the site and discharges to Cornet Bay. The site borders Cornet Bay and a siltation boom will be installed and maintained by Glacier just off-shore of work areas to minimize siltation.

2.1 Existing Conditions

The Cornet Bay Marina Site is bounded on the west by Cornet Bay and on the east by Cornet Bay Road and mixed residential homes and light commercial land uses. Deception Pass State Park is immediately adjacent to the north of the Site. The marina was constructed in the 1960s and has been operated as a marina and general store since then. The Site, which covers approximately 1.1 acres of upland property, includes a store building, a gravel parking lot, a 330-foot-long aging wooden bulkhead that separates the upland facility from the marina. Fuel is provided to boats via a vaulted underground storage tank.

Previous earthquake severed fuel lines supplying gasoline and diesel fuels to the dock fueling stations, contaminated most of the marina area with fuel product.

Soil and groundwater has been contaminated by petroleum from several fuel line releases. Contamination has been spread almost across the entire property over the years. The known contaminants in soil and groundwater include:

- Gasoline;
- Diesel fuel;
- Benzene, toluene, ethyl benzene, xylene (BTEX).

The objective of this project is to excavate, load and transport as much Gasoline, Diesel and BTEX impacted soil as is practical for legal off-site disposal. To facilitate the excavation and removal of the contaminated material to the depths required, the existing marina building will be moved from its foundation to the nearby State Park, the foundation demolished, and other site items demolished to allow excavation to occur. An approximate 350 foot sheet pile wall will be

installed to replace the existing end-of-life wooden bulkhead. Impacted groundwater will be pumped, treated and discharged to Cornet Bay to facilitate excavation and backfill.

2.2 Proposed Construction Activities

The proposed remediation action on this site includes temporarily moving the existing building, demolishing all slabs and foundations, replacing the wooden bulkhead with a steel sheet pile wall, excavating contaminated soil to the extent practicable, disposing of the contaminated soil offsite in a permitted facility, in-situ bio remediation, backfilling to original grades, restoring slabs and foundations, moving building back to its original location, replacing topsoil, hydroseeding and restoring parking areas. Some construction de-watering will be necessary to accommodate excavation below the water table. Water will be treated via a temporary onsite treatment system consisting of weir tanks, bag filtration, sand filtration, chitosan treatment and granular activated carbon. Treated water will be discharged directly to the bay through a pipe under an NPDES permit. Sampling and chemical analysis will be performed to confirm that discharge requirements are being met

The following summarizes details regarding site areas:

- Total site area: 1.1 acres
- Disturbed area during construction: 1.1 acres

3.0 Construction Stormwater BMPs

The BMP activities presented in this document provide measures and controls necessary to mitigate potential pollutant sources.

3.1 The 12 BMP Elements

3.1.1 Element #1 – Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Trees that are to be preserved, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. In general, natural vegetation and native topsoil shall be retained in an

undisturbed state to the maximum extent possible. The BMPs relevant to marking the clearing limits that will be applied for this project include:

Stake and Wire Fence (BMP C104)

BMPs for marking clearing limits are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

3.1.2 Element #2 – Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized, yet where necessary, access points shall be stabilized to minimize the tracking of sediment onto public roads, and wheel washing, street sweeping, and street cleaning shall be employed to prevent sediment from entering state waters. All wash wastewater shall be controlled on site. The specific BMPs related to establishing construction access that will be used on this project include:

Stabilized Construction Entrance (BMP C105)

Alternate construction access BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

3.1.3 Element #3 – Control Flow Rates

In order to protect the properties and waterways downstream of the project site, stormwater discharges from the site will be controlled. The specific BMPs for flow control that shall be used on this project include:

No BMPs to be implemented

Site is relatively flat with a slight incline toward Cornet Bay Road. Runoff anticipated from the project will be minimal and all construction and ground water will be treated.

Alternate flow control BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

The project site is located west of the Cascade Mountain Crest. As such, the project must comply with Minimum Requirement 7 (Ecology 2005).

In general, discharge rates of stormwater from the site will be controlled where increases in impervious area or soil compaction during construction could lead to downstream erosion, or where necessary to meet local agency stormwater discharge requirements (e.g. discharge to combined sewer systems).

3.1.4 Element #4 – Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. The specific BMPs to be used for controlling sediment on this project include:

Silt Fence (BMP C233)

Storm Drain Inlet Protection (BMP C220)

Alternate sediment control BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

In addition, sediment will be removed from paved areas in and adjacent to construction work areas manually or using mechanical sweepers, as needed, to minimize tracking of sediments on vehicle tires away from the site and to minimize washoff of sediments from adjacent streets in runoff.

Whenever possible, sediment laden water shall be discharged into onsite, relatively level, vegetated areas (BMP C240 paragraph 5, page 4-102).

In some cases, sediment discharge in concentrated runoff can be controlled using permanent stormwater BMPs (e.g., infiltration swales, ponds, trenches). Sediment loads can limit the effectiveness of some permanent stormwater BMPs, such as those used for infiltration or biofiltration; however, those BMPs designed to remove solids by settling (wet ponds or detention ponds) can be used during the construction phase. When permanent stormwater BMPs will be used to control sediment discharge during construction, the structure will be protected from excessive sedimentation with adequate erosion and sediment control BMPs. Any accumulated sediment shall be removed after construction is complete and the permanent stormwater BMP will be restabilized with vegetation per applicable design requirements once the remainder of the site has been stabilized.

The following BMPs will be implemented as end-of-pipe sediment controls as required to meet permitted turbidity limits in the site discharge(s). Prior to the implementation of these technologies, sediment sources and erosion control and soil stabilization BMP efforts will be maximized to reduce the need for end-of-pipe sedimentation controls.

Construction Stormwater Filtration (BMP C251)

Construction Stormwater Chemical Treatment (BMP C 250) (implemented only with prior written approval from Ecology).

3.1.5 Element #5 – Stabilize Soils

Exposed and unworked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The specific BMPs for soil stabilization that shall be used on this project include:

Temporary and Permanent Seeding (BMP C120)

Mulching (BMP C121)

Nets and Blankets (BMP C122)

Plastic Covering (BMP C123)

Alternate soil stabilization BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the

NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

The project site is located west of the Cascade Mountain Crest. As such, no soils shall remain exposed and unworked for more than 7 days during the dry season (May 1 to September 30) and 2 days during the wet season (October 1 to April 30). Regardless of the time of year, all soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on weather forecasts.

In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be temporarily covered with plastic sheeting. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

3.1.6 Element #6 – Protect Slopes

All cut and fill slopes will be designed, constructed, and protected in a manner than minimizes erosion. The following specific BMPs will be used to protect slopes for this project:

Plastic Covering (BMP C123)

Alternate slope protection BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

3.1.7 Element #7 – Protect Drain Inlets

All storm drain inlets and culverts made operable during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided. Storm Drain Inlet Protection (BMP C220) will be implemented for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site. The following inlet protection measures will be applied on this project:

Sand Bag Check Dams (BMP C207)

Storm Drain Inlet Protection (BMP C220)

If the BMP options listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D), or if no BMPs are listed above but deemed necessary during construction, the Certified Erosion and Sediment Control Lead shall implement one or more of the alternative BMP inlet protection options listed in Appendix C.

3.1.8 Element #8 – Stabilize Channels and Outlets

Where site runoff is to be conveyed in channels, or discharged to a stream or some other natural drainage point, efforts will be taken to prevent downstream erosion. The specific BMPs for channel and outlet stabilization that shall be used on this project include:

No BMPs to be implemented

Site is relatively flat and no channeling is anticipated, all construction water will be treated.

Alternate channel and outlet stabilization BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

The project site is located west of the Cascade Mountain Crest. As such, all temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the expected peak 10 minute velocity of flow from a Type 1A, 10-year, 24-hour recurrence interval storm for the developed condition. Alternatively, the 10-year, 1-hour peak flow rate indicated by an approved continuous runoff simulation model, increased by a factor of 1.6, shall be used. Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems.

3.1.9 Element #9 – Control Pollutants

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean,

well-organized, and free of debris. If required, BMPs to be implemented to control specific sources of pollutants are discussed below.

During construction routine maintenance on construction equipment such as oil changes, filter replacements or replacement of major components are not expected. Spills large or small will be addressed in a timely manner to prevent off site migration of potential wastes.
Glacier and all of its subcontractors will be responsible for the proper identification, containerization, labeling, manifesting, storage and transport of any and all hazardous materials used, and hazardous wastes generated, in the course of their construction activities at the Project site.
Every effort will be made to reduce the volume and toxicity of all wastes generated during construction activities as outlined in the Environmental Protection Plan for this project.

3.1.10 Element #10 – Control Dewatering

All dewatering water from open cut excavation, foundation work, trench, or underground vaults shall be discharged into a controlled treatment system prior to discharge. Clean, non-turbid dewatering water will not be routed through the treatment system, and will be discharged to systems tributary to the receiving waters of the State in a manner that does not cause erosion, flooding, or a violation of State water quality standards in the receiving water. Highly turbid dewatering water from soils known or suspected to be contaminated, or from use of construction equipment, will require additional monitoring and treatment as required for the specific pollutants based on the receiving waters into which the discharge is occurring. Such monitoring is the responsibility of the contractor.

Alternate dewatering control BMPs are included in Appendix C as a quick reference tool for the onsite inspector in the event the BMP(s) listed above are deemed ineffective or inappropriate during construction to satisfy the requirements set forth in the General NPDES Permit (Appendix D). To avoid potential erosion and sediment control issues that may cause a violation(s) of the NPDES Construction Stormwater permit (as provided in Appendix D), the Certified Erosion and Sediment Control Lead will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix C after the first sign that existing BMPs are ineffective or failing.

3.1.11 Element #11 – Maintain BMPs

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with each particular BMPs specifications (attached).

Visual monitoring of the BMPs will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive, and is temporarily stabilized, the inspection frequency will be reduced to once every month.

All temporary erosion and sediment control BMPs shall be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.

3.1.12 Element #12 – Manage the Project

Erosion and sediment control BMPs for this project have been designed based on the following principles:

- Design the project to fit the existing topography, soils, and drainage patterns.
- Emphasize erosion control rather than sediment control.
- Minimize the extent and duration of the area exposed.
- Keep runoff velocities low.
- Retain sediment on site.
- Thoroughly monitor site and maintain all ESC measures.
- Schedule major earthwork during the dry season.

In addition, project management will incorporate the key components listed below:

Visual observations before, during, and after storm events may trigger the requirement to modify this SWPPP. Any breach, malfunction, leakage, or spill observed which could result in the discharge of pollutants to surface waters shall trigger the Contractor to amend the site specific SWPPP, if deemed necessary, to address changes in the physical condition of the Site or to maintain compliance in areas where the SWPPP is inadequate.
The responsible individuals for implementing and making any necessary revisions to this SWPPP are the following personnel, which comprise the Pollution Prevention Team:

Name	Title	Responsibility
Alan Hall 206-446-5280	Superintendent/ Alternate CESCL	Project Oversight, Documentation and Filing, Revisions to the SWPPP
Eric Hay 425-737-2870	QA-QC/Certified Erosion Control Lead	Implementation of ESCP for Construction, Installation and Implementation of BMP's, Inspection, monitoring and maintaining of BMP's Water Quality Inspection Reporting

As this project site is located west of the Cascade Mountain Crest, the project will be managed according to the following key project components:

Phasing of Construction

- The construction project is being phased to the extent practicable in order to prevent soil erosion, and, to the maximum extent possible, the transport of sediment from the site during construction.

- Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities during each phase of construction, per the Scheduling BMP (C 162).

Seasonal Work Limitations

- From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the local permitting authority that silt-laden runoff will be prevented from leaving the site through a combination of the following:

  - Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters; and

  - Limitations on activities and the extent of disturbed areas; and

  - Proposed erosion and sediment control measures.

- Based on the information provided and/or local weather conditions, the local permitting authority may expand or restrict the seasonal limitation on site disturbance.

- The following activities are exempt from the seasonal clearing and grading limitations:

- Routine maintenance and necessary repair of erosion and sediment control BMPs;

- Routine maintenance of public facilities or existing utility structures that do not expose the soil or result in the removal of the vegetative cover to soil; and

- Activities where there is 100 percent infiltration of surface water runoff within the site in approved and installed erosion and sediment control facilities.

Coordination with Utilities and Other Jurisdictions

- Care has been taken to coordinate with utilities, other construction projects, and the local jurisdiction in preparing this SWPPP and scheduling the construction work.

Inspection and Monitoring

- All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. This person has the necessary skills to:

  - Assess the site conditions and construction activities that could impact the quality of stormwater, and

  - Assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

- A Certified Erosion and Sediment Control Lead shall be on-site or on-call at all times.

- Whenever inspection and/or monitoring reveals that the BMPs identified in this SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible.

Maintaining an Updated Construction SWPPP

- This SWPPP shall be retained on-site or within reasonable access to the site.

- The SWPPP shall be modified whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.

- The SWPPP shall be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) days following the inspection.

3.2 Site Specific BMPs

Site specific BMPs are shown on the TESC Plan Sheets and Details in Appendix A. These site specific plan sheets will be updated annually.

3.3 Additional Advanced BMPs

The BMP implementation schedule listed below is keyed to proposed phases of the construction project, and reflects differences in BMP installations and inspections that relate to wet season construction. The project site is located west of the Cascade Mountain Crest. As such, the dry season is considered to be from May 1 to September 30 and the wet season is considered to be from October 1 to April 30.

- Mobilize and store all ESC and soil stabilization products: 12/16/13
- Install ESC measures: 12/17/13
- Install stabilized construction entrance: 12/18/13
- Begin clearing and grubbing: 1/2/14

4.0 Construction Phasing

Construction will be sequenced to minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking. Vegetation on the site will be preserved until the time that construction is expected to commence in that area. The preservation of existing vegetation shall be maximized where feasible.

5.0 Pollution Prevention Team

Visual observations before, during, and after storm events may trigger the requirement to modify this SWPPP. Any breach, malfunction, leakage, or spill observed which could result in the discharge of pollutants to surface waters shall trigger the Contractor to amend the site specific SWPPP, if deemed necessary, to address changes in the physical condition of the Site or to maintain compliance in areas where the SWPPP is inadequate.

The responsible individuals for implementing and making any necessary revisions to this SWPPP are the following personnel, which comprise the Pollution Prevention Team:

5.1 Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- Certified Erosion and Sediment Control Lead (CESCL) – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, etc.); to be called upon in case of failure of any ESC measures.

- Resident Engineer – For projects with engineered structures only (sediment ponds/traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative

- Emergency Ecology Contact – individual to be contacted at Ecology in case of emergency.

- Emergency Owner Contact – individual that is the site owner or representative of the site owner to be contacted in the case of an emergency.

- Non-Emergency Ecology Contact – individual that is the site owner or representative of the site owner than can be contacted if required.

- Monitoring Personnel – personnel responsible for conducting water quality monitoring; for most sites this person is also the Certified Erosion and Sediment Control Lead.

5.2 Team Members

Names and contact information for those identified as members of the pollution prevention team are provided in the following table.

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Alan Hall	206-446-5280
Resident Engineer	Jarod Fisher	(253) 835-6420
Emergency Ecology Contact	Northwest Regional Office Spill Notification,	425.649.7000
Emergency Owner Contact	Dundee Woods	360-632-7685
Non-Emergency Ecology Contact	Northwest Regional Office	425.649.7098
Monitoring Personnel/CESCL	Eric Hay	425-737-2870

6.0 Site Inspections and Monitoring

Monitoring includes visual inspection, monitoring for water quality parameters of concern, and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book. This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. However, if separated, the site log book but must be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

6.1 Site Inspection

All BMPs will be inspected, maintained, and repaired as needed to assure continued performance of their intended function. The inspector will be a Certified Erosion and Sediment Control Lead (CESCL) per BMP C160. The name and contact information for the CESCL is provided in Section 5 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all stormwater discharge points. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of stormwater discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

6.1.1 Site Inspection Frequency

Site inspections will be conducted at least once a week and within 24 hours following any discharge from the site. For sites with temporary stabilization measures, the site inspection frequency can be reduced to once every month if the site operator has successfully applied for inactive status for the site using the Permit Fee Activity Status Change Form, which can be found at the following web site.
http://www.ecy.wa.gov/programs/wq/permits/permit_fees/ConstructionActivityStatusChangeForm.pdf

6.1.2 Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in Appendix E. The site inspection log forms may be separated from this SWPPP document, but will be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

6.2 Stormwater Quality Monitoring

6.2.1 Turbidity Sampling

Monitoring requirements for the proposed project will include either turbidity or water transparency sampling to monitor site discharges for water quality compliance with the 2005 Construction Stormwater General Permit (Appendix D). Sampling will be conducted at all discharge points at least once per calendar week.

Turbidity or transparency monitoring will follow the analytical methodologies described in Section S4 of the 2005 Construction Stormwater General Permit (Appendix D). The key benchmark values that require action are 25 NTU for turbidity (equivalent to 32 cm transparency) and 250 NTU for turbidity (equivalent to 6 cm transparency). If the 25 NTU benchmark for turbidity (equivalent to 32 cm transparency) is exceeded, the following steps will be conducted:

1. Ensure all BMPs specified in this SWPPP are installed and functioning as intended.

2. Assess whether additional BMPs should be implemented, and document revisions to the SWPPP as necessary.

3. Sample discharge location daily until the analysis results are less than 25 NTU (turbidity) or greater than 32 cm (transparency).

If the turbidity is greater than 25 NTU (or transparency is less than 32 cm) but less than 250 NTU (transparency greater than 6 cm) for more than 3 days, additional treatment BMPs will be implemented within 24 hours of the third consecutive sample that exceeded the benchmark value. Additional treatment BMPs to be considered will include, but are not limited to, off-site treatment, infiltration, filtration and chemical treatment.

If the 250 NTU benchmark for turbidity (or less than 6 cm transparency) is exceeded at any time, the following steps will be conducted:

1. Notify Ecology by phone within 24 hours of analysis (see Section 5.0 of this SWPPP for contact information).

2. Continue daily sampling until the turbidity is less than 25 NTU (or transparency is greater than 32 cm).

3. Initiate additional treatment BMPs such as off-site treatment, infiltration, filtration and chemical treatment within 24 hours of the first 250 NTU exceedance.

4. Implement additional treatment BMPs as soon as possible, but within 7 days of the first 250 NTU exceedance.

5. Describe inspection results and remedial actions taken in the site log book and in monthly discharge monitoring reports as described in Section 7.0 of this SWPPP.

7.0 Reporting and Recordkeeping

7.1 Recordkeeping

7.1.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and,
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book and will be kept onsite during both work Phases for the duration of the project.

7.1.2 Records Retention

Records of all monitoring information (site log book, inspection reports/checklists, etc.), this Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements will be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage in accordance with permit condition S5.C.

7.1.3 Access to Plans and Records

The SWPPP, General Permit, Notice of Authorization letter, and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of this SWPPP will be provided to Ecology within 14 days of receipt of a written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with permit condition S5.G.

7.1.4 Updating the SWPPP

In accordance with Conditions S3, S4.B, and S9.B.3 of the General Permit, this SWPPP will be modified if the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect on the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

7.2 Reporting

7.2.1 Discharge Monitoring Reports

[Prior to October 2008] If cumulative soil disturbance is smaller than 5 acres: Discharge Monitoring Report (DMR) forms will not be submitted to Ecology because water quality sampling is not being conducted at the site.

If cumulative soil disturbance is 5 acres or larger: Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. Of there was no discharge during a given monitoring period, the Permittee shall submit the form as required, with the words "No discharge" entered in the place of monitoring results. The DMR due date is 15 days following the end of each month.

7.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit are not met, and it causes a threat to human health or the environment, the following steps will be taken in accordance with permit section S5.F:

1. Ecology will be immediately notified of the failure to comply.

2. Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.

3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

In accordance with permit condition S2.A, a complete application form will be submitted to Ecology and the appropriate local jurisdiction (if applicable) to be covered by the General Permit.

Appendix A – Site Plans

Appendix B – Construction BMPs

Preserving Natural Vegetation (BMP C101)

Stake and Wire Fence (BMP C104)

Stabilized Construction Entrance (BMP C105)

Silt Fence (BMP C233)

Storm Drain Inlet Protection (BMP C220)

Construction Stormwater Filtration (BMP C251)

Construction Stormwater Chemical Treatment (BMP C 250) (implemented only with prior written consent from Ecology)

Temporary and Permanent Seeding (BMP C120)

Mulching (BMP C121)

Nets and Blankets (BMP C122)

Plastic Covering (BMP C123)

Sand Bag Check Dams (BMP C207)

Appendix C – Alternative BMPs

The following includes a list of possible alternative BMPs for each of the 12 elements not described in the main SWPPP text. This list can be referenced in the event a BMP for a specific element is not functioning as designed and an alternative BMP needs to be implemented.

Element #1 - Mark Clearing Limits

High Visibility Plastic Fence (BMP C103)

Element #2 - Establish Construction Access

Wheel Wash (BMP C106)

Element #3 - Control Flow Rates

Check Dams (BMP C207)
Wattles (BMP C235)

Element #4 - Install Sediment Controls

Advanced BMPs: Water treatment system

Element #5 - Stabilize Soils

Surface Roughening (BMP C130)

Element #6 - Protect Slopes

Water Bars (BMP C203)
Triangle Silt Dike (BMP C208)

Element #8 - Stabilize Channels and Outlets

Check Dams (BMP C 207)

Element #10 - Control Dewatering

Water Bars (BMP C203)

Appendix D – General Permit

Appendix E – Site Inspection Forms (and Site Log)

The results of each inspection shall be summarized in an inspection report or checklist that is entered into or attached to the site log book. It is suggested that the inspection report or checklist be included in this appendix to keep monitoring and inspection information in one document, but this is optional. However, it is mandatory that this SWPPP and the site inspection forms be kept onsite at all times during construction, and that inspections be performed and documented as outlined below.

At a minimum, each inspection report or checklist shall include:

a. Inspection date/times

b. Weather information: general conditions during inspection, approximate amount of precipitation since the last inspection, and approximate amount of precipitation within the last 24 hours.

c. A summary or list of all BMPs that have been implemented, including observations of all erosion/sediment control structures or practices.

d. The following shall be noted:

i. locations of BMPs inspected,

ii. locations of BMPs that need maintenance,

iii. the reason maintenance is needed,

iv. locations of BMPs that failed to operate as designed or intended, and

v. locations where additional or different BMPs are needed, and the reason(s) why

e. A description of stormwater discharged from the site. The presence of suspended sediment, turbid water, discoloration, and/or oil sheen shall be noted, as applicable.

f. A description of any water quality monitoring performed during inspection, and the results of that monitoring.

g. General comments and notes, including a brief description of any BMP r repairs, maintenance or installations made as a result of the inspection.

h. A statement that, in the judgment of the person conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the SWPPP and the NPDES permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance, as well as a schedule of implementation.

i. Name, title, and signature of person conducting the site inspection; and the following statement: "I certify under penalty of law that this report is true, accurate, and complete, to the best of my knowledge and belief".

When the site inspection indicates that the site is not in compliance with any terms and conditions of the NPDES permit, the Permittee shall take immediate action(s) to: stop, contain, and clean up the unauthorized discharges, or otherwise stop the noncompliance; correct the problem(s); implement appropriate Best Management Practices (BMPs), and/or conduct maintenance of existing BMPs; and achieve compliance with all applicable standards and permit conditions. In addition, if the noncompliance causes a threat to human health or the environment, the Permittee shall comply with the Noncompliance Notification requirements in Special Condition S5.F of the permit.

Site Inspection Form

General Information			
Project Name:			
Inspector Name:		**Title:** **CESCL # :**	
Date:		**Time:**	
Inspection Type:	□ After a rain event □ Weekly □ Turbidity/transparency benchmark exceedance □ Other		
Weather			
Precipitation	Since last inspection	In last 24 hours	
Description of General Site Conditions:			

Inspection of BMPs							
Element 1: Mark Clearing Limits							
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP
Element 2: Establish Construction Access							
BMP:							
Location	Inspected			Functioning			Problem/Corrective Action
		Y	N		Y	N	NIP
BMP:							

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 3: Control Flow Rates

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 4: Install Sediment Controls

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 5: Stabilize Soils

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 6: Protect Slopes

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 7: Protect Drain Inlets

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

Element 8: Stabilize Channels and Outlets

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:

Location	Inspected		Functioning			Problem/Corrective Action
	Y	N	Y	N	NIP	

BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	

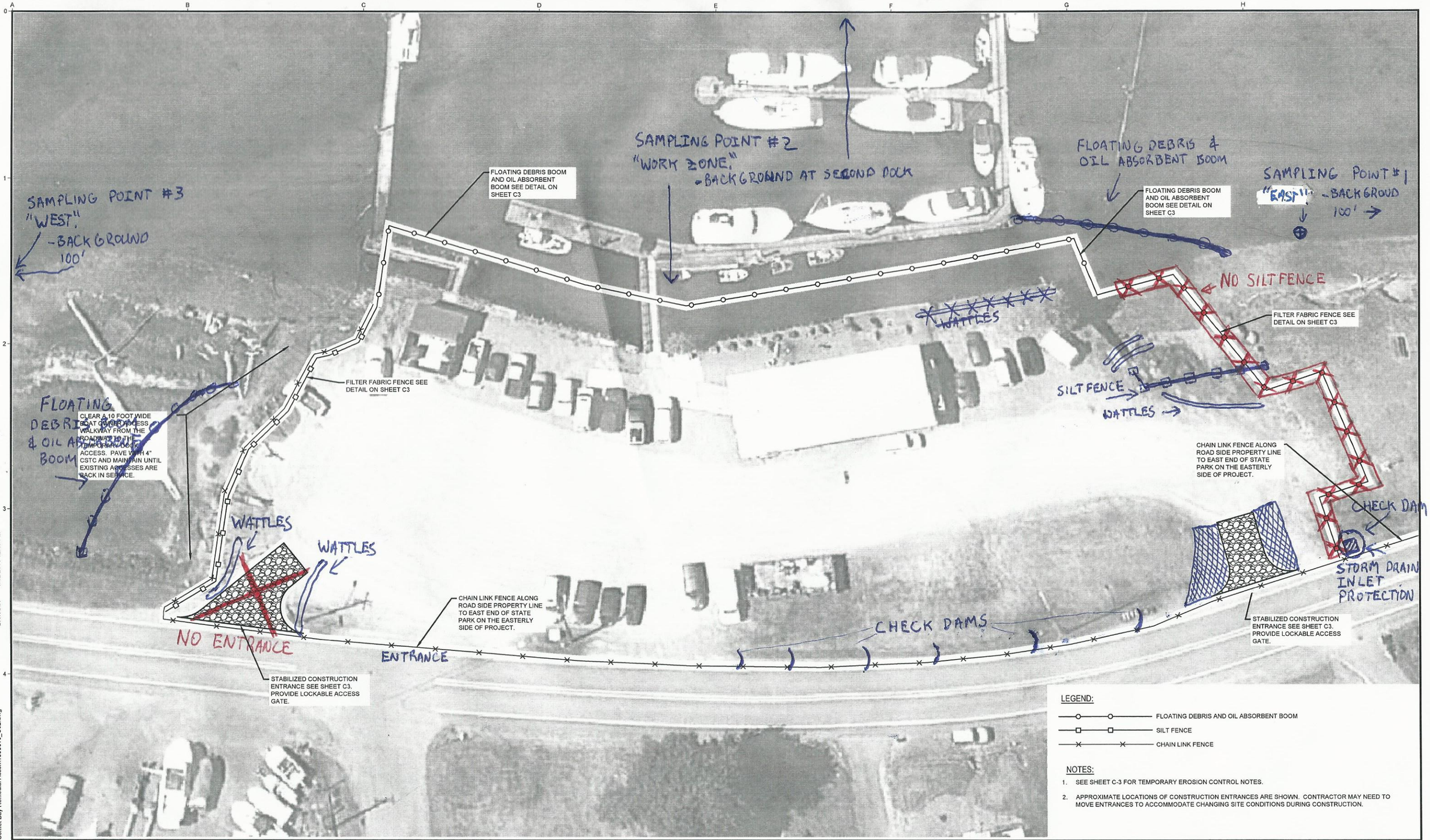
Element 9: Control Pollutants								
BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	
BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	
Element 10: Control Dewatering								
BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	
BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	
BMP:								
Location	Inspected			Functioning			Problem/Corrective Action	
		Y	N		Y	N	NIP	

Stormwater Discharges From the Site			
	Observed?		Problem/Corrective Action
	Y	N	
Location			
Turbidity			
Discoloration			
Sheen			
Location			
Turbidity			
Discoloration			
Sheen			

Water Quality Monitoring
Was any water quality monitoring conducted? □ Yes □ No If water quality monitoring was conducted, record results here:
If water quality monitoring indicated turbidity 250 NTU or greater; or transparency 6 cm or less, was Ecology notified by phone within 24 hrs? □ Yes □ No
If Ecology was notified, indicate the date, time, contact name and phone number below: Date: Time: Contact Name: Phone #:
General Comments and Notes Include BMP repairs, maintenance, or installations made as a result of the inspection.
Were Photos Taken? □ Yes □ No If photos taken, describe photos below:

Appendix F – Engineering Calculations

No Engineering Calculations for this Project



LEGEND:

- FLOATING DEBRIS AND OIL ABSORBENT BOOM
- SILT FENCE
- CHAIN LINK FENCE

NOTES:

1. SEE SHEET C-3 FOR TEMPORARY EROSION CONTROL NOTES.
2. APPROXIMATE LOCATIONS OF CONSTRUCTION ENTRANCES ARE SHOWN. CONTRACTOR MAY NEED TO MOVE ENTRANCES TO ACCOMMODATE CHANGING SITE CONDITIONS DURING CONSTRUCTION.

USE OF DOCUMENTS

THIS DOCUMENT, INCLUDING THE INCORPORATED DESIGNS, IS AN INSTRUMENT OF SERVICE FOR THIS PROJECT AND SHALL NOT BE USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF KENNEDY/JENKS CONSULTANTS.

NO.	REVISION	DATE	BY

SCALES

0 1"

0 25mm

IF THIS BAR IS NOT DIMENSION SHOWN, ADJUST SCALES ACCORDINGLY.

RICHARD C. GUGLIOMO — STATE OF WASHINGTON — 11523 — REGISTERED PROFESSIONAL ENGINEER

DESIGNED	RCG
DRAWN	BBH
CHECKED	RCG

WASHINGTON STATE DEPARTMENT OF ECOLOGY

CORNET BAY MARINA REMEDIATION

Kennedy/Jenks Consultants

FEDERAL WAY, WA

TEMPORARY EROSION AND SEDIMENT CONTROL, SILTATION BOOM, AND OIL ABSORBENT BOOM

FILE NAME	1396010_C02
JOB NO.	1396010.00
DATE	SEPTEMBER 2013
SHEET	C2

P:\CAD\13\1396010.00 Ecology Cornet Bay Remedial Action\1396010_C02.dwg

BRYANH 9/12/2013 12:46 PM

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 7 March 2014
SERIAL NO.: 33
SPEC. REF.: 02 41 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 33
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Glacier	Well Decommissioning Report

Comment(s):

1. There are 8 decommissioning documents in the report for 8 wells and only 6 well logs. The wells decommissioned are as follows: MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, and MW-10. Well logs contained in the report are MW-1 through MW-6. It is assumed that no unique Ecology ID tags could be found for wells listed f. through h below. MW-8 and MW-10 were listed and shown on drawing provided to Glacier and are assumed decommissioned with reports g. and h.
   a. B-11 = MW-1
   b. B-12 (A?) = MW-2
   c. B-13 = MW-3
   d. BAL-381 = MW-4
   e. BBB-368 = MW-5
   f. ____ = MW-6
   g. BHF = ?
   h. ____ = ?

© 2006 Kennedy/Jenks Consultants Inc. [F-2]

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **33**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **2/4/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**02 41 00**	**02 41 00-2**	**Well Decommissioning Report**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Appendix B2: Cornet Bay Well Logs

Department of Ecology	BOREHOLE LOG AND WELL CONSTRUCTION	ID Number: B-11 (AKA MW-1)	Page 1 Of 1
			Field Book No.:

Project Number:
Borehole Location:
Drilling Personnel:
Drilling Methods: HSA--4 1/4--ID, Mobile B-56
Sampling Methods: Split Spoon 18" in length
Field Geologist: Ching-Pi Wang
Date Started: 10/24/96
Depth Water First Encountered: 21 feet
Ground Surface:

Project Name: Cornet Bay Marina
Drilling Company: Tacoma Pump & Drill
Drill Rig Type/Number:
Bit Type/Size:
Hammer Wt: Drop:
Assistant:
Date Completed: 10/24/96
Completion Depth: 31 feet
Top of Well Casing:

Sampling: Sample No.	Blow Count	Recovery (in)	Depth (Feet bgs)	Approximate Well Construction	USCS Symbol	Lithologic Description	Remarks
B-11-5	3 7 6	8 in	0–7	Concrete; Bentonite Chips		GRAVEL with sand, brown, angular. Approx. 1/2" diameter.	Flush ground completion
						SILT, with gravel, gray	
						SILT, with gravel, gray	
						SILT, with sand, gray	
B-11-10	1 2 9	8 in	7–10	Top of Screen		SILT, very sandy, black, occasional gravel.	
			10–13			SILT, sandy, gray	
B-11-15	7 9 10	6 in	13–15	CSSI 10-20'		CLAY, sandy, brown, occasional rounded gravel.	May have perched water table at 15–17 feet bgs
B-11-20	4 15 8	18 in	19–20			CLAY, sandy, gray. Occ. gravel, rounded.	
			20–21				WL @ 21.0' on 10/28/96 @ 0815
			22–23			CLAY, sandy gray. Brown peaty material.	
B-11-25	5 10 11	8 in	24–25			CLAY, sandy, gray. Brown peaty material.	
			25–26	Sand			
B-11-30	5/5/6	10 in	26–30	Bentonite Chips		SAND, med-gnd, slightly silty, gray. Saturated.	3/4 Baroid "Hole Plug"

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address Cornet Bay Marina

City CORNET BAY

County ISLAND

Consulting Firm Tacoma Pump & Drilling

Unique Ecology Well IDTag No. B 11

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

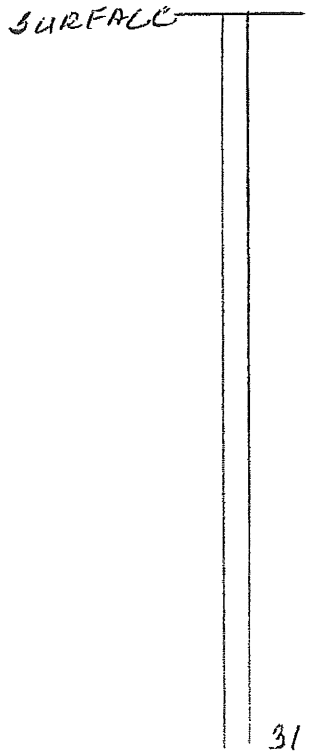
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-31

SCALE: 1"= _____ PAGE _____ OF _____

Department of Ecology

BOREHOLE LOG AND WELL CONSTRUCTION

ID Number: B-12A (AKA MW-2) (Renamed to B-12)

Page 1 Of 1

Field Book No.:

Project Number:
Borehole Location:
Drilling Personnel:
Drilling Methods: HSA-4 1/4-ID, Mobile B-56
Sampling Methods: Split Spoon 18" in length
Field Geologist: Ching-Pi Wang
Date Started: 10/24/96
Depth Water First Encountered: 7.5 feet
Ground Surface:

Project Name: Cornel Bay Marina
Drilling Company: Tacoma Pump & Drill
Drill Rig Type/Number:
Bit Type/Size:
Hammer Wt: Drop:
Assistant:
Date Completed: 10/25/96
Completion Depth: 25 feet
Top of Well Casing:

Sampling: Sample No.	Blow Count	Recovery (in)	Depth (Feet bgs)	Approximate Well Construction	USCS Symbol	Lithologic Description	Remarks
			0				Flush ground completion
			1	Concrete			
			2				
			3	Bentonite Chips			
			4	Sand			
B-12-5	2	3 in	5	Top of Screen		SILT, very sandy, with gravel, gray. Very strong petroleum odor.	Note: tide is high @ 1600 hrs
	2		6				
	2		7				WL @ 7.5 feet
			8				
			9				
B-12-10	5	9 in	10			SILT, very sandy with gravel (top 2-in of sample) Grades to SAND, fine-grd, very silty, brown & gray. Slight petroleum odor.	
	4		11				
	6		12				
			13	20 Slot Screen			
			14				
B-12-15	5	10 in	15			CLAY, very sandy, gray. Lower 2" is more sandy. No detectable petroleum odor. May have hit water table.	
	5		16				
	13		17				
			18				
			19				
	4	18 in	20			CLAY, slightly sandy. No detectable petroleum odor.	
	6		21				
	6		22				
			23				
			24				
	3	NR	25			CLAY, slightly sandy, gray.	
	4		26				
	5		27				
			28				
			29				
			30				

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address Cornet Bay Marina

City CORNET BAY

County ISLAND

Consulting Firm Tacoma Pump & Drilling

Unique Ecology Well IDTag No. B 12

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

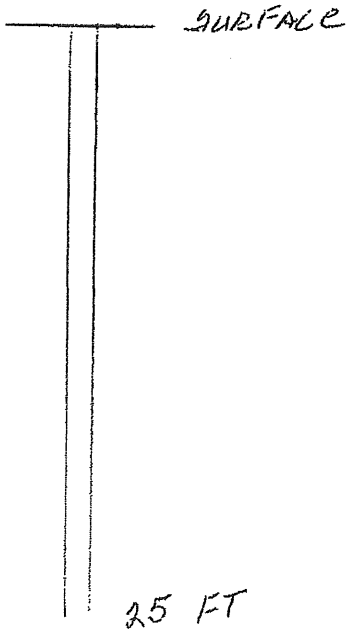
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-25

SCALE: 1"= _____ PAGE _____ OF _____

Department of Ecology	BOREHOLE LOG AND WELL CONSTRUCTION	ID Number: B-13 (AKA MW-3)	Page 1 Of 1 Field Book No.:

Project Number:
Borehole Location:
Drilling Personnel:
Drilling Methods: HSA-4 1/4-ID, Mobile B-56
Sampling Methods: Split Spoon 18" in length
Field Geologist: Ching-Pi Wong
Date Started: 10/25/96
Depth Water First Encountered: 4-5 feet
Ground Surface:

Project Name: Carnel Bay Marina
Drilling Company: Tacoma Pump & Drill
Drill Rig Type/Number:
Bit Type/Size:
Hammer Wt: Drop:
Assistant:
Date Completed: 10/25/96
Completion Depth: 20 feet
Top of Well Casing:

Sampling: Sample No.	Sampling: Blow Count	Sampling: Recovery (in)	Depth (Feet bgs)	Approximate Well Construction	USCS Symbol	Lithologic Description	Remarks
			0			Concrete	Flush ground completion
			1				
			2			Bentonite Chips	
			3			Sand	
			4			Strong petroleum odor from cuttings. Water in hole @ ~4-5'.	
			5			Top of Screen	
	10						
	6	3 in	6			Sand and gravel, silty, saturated. Slight petroleum odor. Gray.	Note: tide is receding
	7						
			7				
			8				
			9				
	10						
	10	6 in	10			SILT, grading to CLAY. Sandy, gray. Slight petroleum odor.	
	15		11				
			12				
			13			20 Slot Screen	
			14				
	10		15			Upper 9" SILT, sandy with sub-angular gravel, gray. Grades to CLAY, sandy with gravel. Slight petroleum odor.	
	9	18 in	16				
	14						
			17				
			18				
			19				
	28		20			SAND, dense (~4 in), med-grd, clean. Slight petroleum odor. Grades to CLAY, sandy, gray. Slight petroleum odor in clay.	
	18	10 in	21				
	17						
			22				
			23				
			24				
			25				
			26				
			27				
			28				
			29				
			30				

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address Cornet Bay Marina

City CORNET BAY

County ISLAND

Consulting Firm Tacoma Pump & Drilling

Unique Ecology Well IDTag No. B 13

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

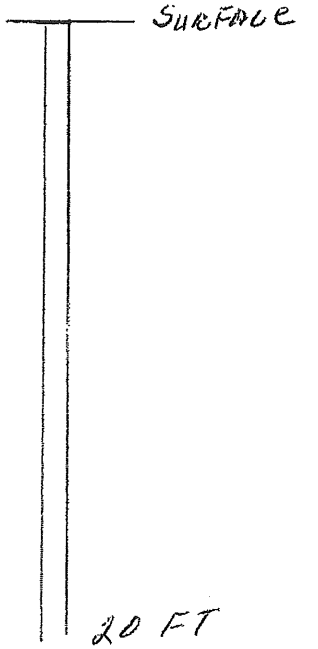
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-20

SCALE: 1"= _____ PAGE _____ OF _____

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	Deception Pass Marina, Comet Bay, WA
DRILLING COMPANY	Cascade Drilling
DRILLER	Tyler Day
DRILLING METHOD(S)	Direct-Push
DRILL BIT(S) SIZE	2-Inch
ISOLATION CASING	N/A
FROM / TO / FT.	N/A / N/A
BLANK CASING	2" Schedule 40 PVC Pipe
FROM / TO / FT.	0 / 4.5
SLOTTED CASING	2" Shedule 40 PVC Pre-Pack 0.010" Slots
FROM / TO / FT.	4.5 / 14.5
SIZE AND TYPE OF FILTER PACK	10/20 Sand (Pre-Pack); 2/12 Sand Above
FROM / TO / FT.	4 / 14.5
SEAL	Granular Bentonite
FROM / TO / FT.	1 / 4
GROUT	Concrete
FROM / TO / FT.	0 / 1

Well Name	MW-04
Project Name	Ecology Comet Bay
Project Number	1196012*00
ELEVATION AND DATUM	bgs
TOTAL DEPTH	15.0 ft. bgs
DATE STARTED	9/15/11
DATE COMPLETED	9/15/11
INITIAL WATER DEPTH (FT)	7.0
LOGGED BY	DKM
SAMPLING METHODS	MacroCore w/liner
WELL COMPLETION	☒ SURFACE HOUSING ☐ STAND PIPE ____ FT.

SAMPLES TYPE	RECOV (FEET)	PENETR RESST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3		0			0		SM	**Silty SAND with gravel** Tan/brown, sand, silt, gravel fill, no odor, no sheen.
								CL/ ML	**Silty CLAY with sand** Gray, silty clay, 10-15% sand, moderately stiff to stiff, high plasticity, moist, no odor, no sheen.
			5			0			**Sandy SILT** Brown/gray, silt with ~30% medium to fine sand, some gravel and clay, silty interbeds (typically 1-2" thick) and sandy interbeds (typically <1" thick) present locally, moderately stiff, moist to wet, slight odor and light sheen below ~13 feet, no odor and no sheen otherwise.
SS	3.5					0			
			10			0		ML	
						0			
SS	4			KJ-MW4-13		1.8			
			15			0.1		CL/ ML	**Silty CLAY** Gray, silty clay, stiff, moderately high plasticity, wet, no odor, no sheen.

KJ PNW ECOLOGY CORNET BAY BORING LOGS SEPT 2011.GPJ KJ PNW.GDT 5/8/13

F-40.1
(6-87) (3-88) (8-90)

SHEET 1 OF 1

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

RE06248

Consulting Firm Kennedy/Jenks Consultants

Unique Ecology Well IDTag No. BAL 381

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☐ Resource Protection

☒ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address DECEPTION PASS MARINA

City CORNET BAY

County ISLAND

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

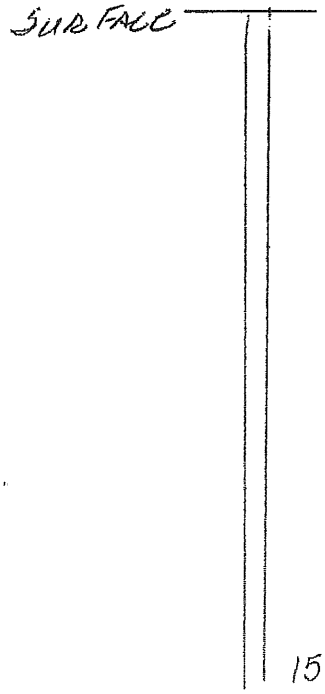
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/14/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-15

SCALE: 1"= _____ PAGE _____ OF _____

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	Deception Pass Marina, Comet Bay, WA
DRILLING COMPANY	Cascade Drilling
DRILLER	Tyler Day
DRILLING METHOD(S)	Direct-Push
DRILL BIT(S) SIZE	2-Inch
ISOLATION CASING	N/A
FROM / TO / FT.	N/A / N/A
BLANK CASING	2" Schedule 40 PVC Pipe
FROM / TO / FT.	0 / 5
SLOTTED CASING	2" Shedule 40 PVC Pre-Pack 0.010" Slots
FROM / TO / FT.	5 / 15
SIZE AND TYPE OF FILTER PACK	10/20 Sand (Pre-Pack); 2/12 Sand Above
FROM / TO / FT.	4 / 15
SEAL	Granular Bentonite
FROM / TO / FT.	1 / 4
GROUT	Concrete
FROM / TO / FT.	0 / 1

Well Name	MW-05
Project Name	Ecology Comet Bay
Project Number	1196012*00
ELEVATION AND DATUM	bgs
TOTAL DEPTH	20.0 ft. bgs
DATE STARTED	9/15/11
DATE COMPLETED	9/15/11
INITIAL WATER DEPTH (FT)	8.0
LOGGED BY	DKM
SAMPLING METHODS	MacroCore w/liner
WELL COMPLETION	☒ SURFACE HOUSING ☐ STAND PIPE ____ FT.

SAMPLES TYPE	RECOV (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2		0			0		SW	**Well-graded SAND with gravel** Brown, medium to coarse sand, 20-30% gravel, fill, no odor, no sheen.
			5			0		CL/ ML	**Silty CLAY with sand** Brown-gray to gray (bottom ~6 inches), silty clay, 10-15% fine to medium sand, some gravel, moderately stiff, moderately high plasticity, moist, no odor, no sheen.
SS	3					0.3			
			10			0.1		ML	**Sandy SILT** Gray, silt with ~30% fine to medium sand, 5-10% gravel, some clay, texture varies locally with sandy and silty interbeds (typically ~1" thick), moderately soft to moderately stiff (varies locally), medium plasticity, wet, slight odor locally, no sheen.
SS	3			KJ-MW5-12		2.7			
			15			1.6			**Lean CLAY** Gray, clay, moderately stiff to stiff, high plasticity, moist to wet, no odor, no sheen.
SS	4.5					0.7		CL	
						0.4			
			20			0.5			

KJ PNW ECOLOGY CORNET BAY BORING LOGS SEPT 2011.GPJ KJ PNW.GDT 9/9/13

F-40.1
(6-87) (3-88) (8-90)

SHEET 1 OF 1

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

RE06248

Consulting Firm Kennedy/Jenks Consultants

Unique Ecology Well IDTag No. BBB 368

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature [signature]

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address DECEPTION PASS MARINA

City CORNET BAY

County ISLAND

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
SURFACE 20 FT	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-20

SCALE: 1"= _____ PAGE _____ OF _____

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Deception Pass Marina, Comet Bay, WA		Well Name: MW-06	
DRILLING COMPANY: Cascade Drilling	DRILLER: Tyler Day	Project Name: Ecology Comet Bay	
DRILLING METHOD(S): Direct-Push	DRILL BIT(S) SIZE: 2-Inch	Project Number: 1196012*00	
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 20.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 4.5 FT.	DATE STARTED: 9/15/11	DATE COMPLETED: 9/15/11
SLOTTED CASING: 2" Shedule 40 PVC Pre-Pack 0.010" Slots	FROM 4.5 TO 14.5 FT.	INITIAL WATER DEPTH (FT): 8.0	
SIZE AND TYPE OF FILTER PACK: 10/20 Sand (Pre-Pack); 2/12 Sand Above	FROM 4 TO 14.5 FT.	LOGGED BY: DKM	
SEAL: Granular Bentonite	FROM 1 TO 4 FT.	SAMPLING METHODS: MacroCore w/liner	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		

SAMPLES TYPE	RECOV (FEET)	PENETR RESST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								SW	**Well-graded SAND with gravel** Tan/brown, sand, silt, gravel fill, no odor, no sheen.
SS	3					3.8		CL/	**Silty CLAY with sand** Tan/gray, silty clay, 5-15% sand, some gravel, moderately stiff, high plasticity, moist, slight odor below ~3.5 feet, no sheen.
						2.3		ML	
			5	KJ-MW6-4		55.3		SP/	**Poorly graded SAND with silt and gravel** Gray, fine to medium sand with 10-15% silt and 5-15% gravel, moderately dense, moist to wet, medium to strong odor, medium to heavy sheen.
SS	1					20.1		SM	
			10					ML	**Sandy SILT with gravel** Gray, sandy silt, 10-15% gravel, woody material present below ~13 feet, soft, wet, medium odor, medium sheen.
SS	3					303			
			15	KJ-MW6-14		3.0		ML	**Sandy SILT** Greenish-gray, silt with ~30% sand, some clay and gravel, moderately stiff, wet, slight to medium odor, light sheen.
SS	3					0		CL/	**Silty CLAY** Gray, silty clay, 5-10% sand and fine gravel, stiff, high plasticity, moist to wet, no odor, no sheen.
			20			0		ML	

KJ PNW_ECOLOGY CORNET BAY BORING LOGS SEPT 2011.GPJ KJ PNW.GDT 9/8/13

F-40.1
(5-87) (3-88) (8-90)

SHEET 1 OF 1

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Consulting Firm Kennedy/Jenks Consultants

Unique Ecology Well IDTag No. _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature [signature]

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address DECEPTION PASS MARINA

City CORNET BAY

County ISLAND

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

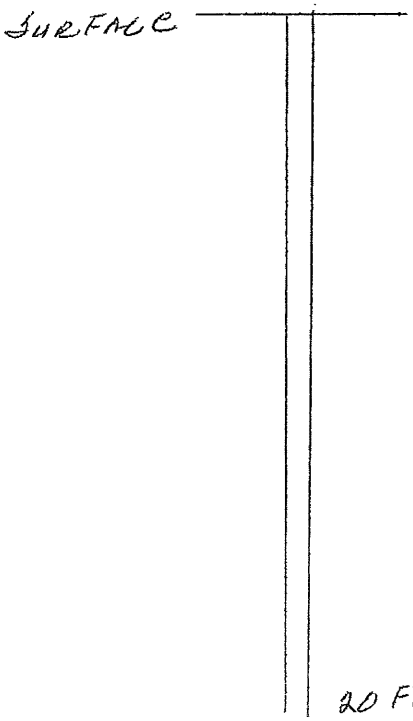
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-20

SCALE: 1"= _____ PAGE _____ OF _____

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

RE06496

Consulting Firm ESN Northwest

Unique Ecology Well IDTag No. BHF 146

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address Cornet Bay Marina

City CORNET BAY

County ISLAND

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

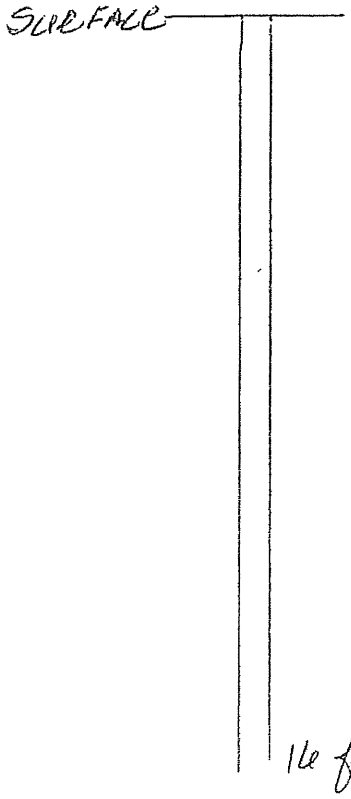
Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-16

SCALE: 1"= _____ PAGE _____ OF _____

Please print, sign and return to the Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. AE25255

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission *("x" in box)*

☐ Construction

☒ Decommission

ORIGINAL INSTALLATION Notice of Intent Number:

Consulting Firm ESN Northwest

Unique Ecology Well IDTag No. _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee

Name (Print Last, First Name) Scott, Fowler

Driller/Engineer /Trainee Signature [signature]

Driller or Trainee License No. 1612

If trainee, licensed driller's Signature and License Number:

Type of Well *("x in box)*

☒ Resource Protection

☐ Geotech Soil Boring

Property Owner DEPARTMENT OF ECOLOGY

Site Address Cornet Bay Marina

City CORNET BAY

County ISLAND

Location NE1/4-1/4 NW1/4 Sec 36 Twn 34 R 1

EWM ☒ or WWM ☐

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Min _____ Sec _____

Long Deg _____ Min _____ Sec _____

Tax Parcel No. N/A

Cased or Uncased Diameter 2-INCH Static Level _____

Work/Decommission Start Date 1/13/2014

Work/Decommission Completed Date 1/13/2014

Construction Design	Well Data	Formation Description
SURFACE 13 FT	Filled 2-inch schedule 40 PVC pipe with bentonite.	Bentonite 0-13

SCALE: 1"= _____ PAGE _____ OF _____

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 23 December 2013
SERIAL NO.: 34
SPEC. REF.: 02 43 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 34
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier	Structure Moving Plan

Comment(s):

1. Although this submittal is designate NET, we would appreciate receiving any printed brochure that WHM has that shows their experience.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **34**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/19/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**02 43 00**	**02 43 00-1**	**Structure Moving Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Structure Moving Plan

This plan has been prepared in a joint effort by Glacier and Whatcom House Movers for the Cornet Bay Marina Remediation Project. This plan is intended to outline the specific means and methods for moving, storing, and reinstalling the existing structure at the marina.

The structure relocation will be performed by Whatcom House Movers, under the direct supervision of Glacier Environmental Services, Inc. Whatcom House Movers has been relocating houses and structures since 1982, and has raised and moved hundreds homes, buildings, and structures of all sizes and shapes.

Personnel

The following are Key Personnel for the project:

Josh Edelstein has 15 years of house moving experience and received a degree in construction engineering at California State University.

Kevin Smith has 16 years of structure moving experience.

Description of Work

Equipment utilized will consist of a crane truck, a forklift, three sets of building dollies, and a series of synchronized, and self leveling hydraulic jacks.

Glacier has subcontracted a local contractor specializing in carpentry to prepare the building for moving and restore the building post-construction. Nautilus Construction, of Oak Harbor, will construct wood bracing in such a manner that will enable to building to keep its rigidity during the raising, moving process, and temporary storage on crib. Specifically, a series of 45 degree braces will be constructed out of 2x6 boards, and will run from the top of the windows to the existing 4x12 roof beams. To further strengthen the building, two 2x12 boards will be nailed together, and then attached horizontally to the vertical posts inside of the building walls, below the windows.

The current building has wood floor supported by pier blocks which, which have rotted. The flooring the will be cut from the rest of the structure and demolished after the building has been moved. The corners of the building will be surveyed prior to any alterations or moving to ensure that the new foundation is constructed to the exact building dimensions.

Whatcom House movers will install a series of steel beams to the building. Two 14-inch steel main beams will run lengthwise through entire building. These beams will be placed on the interior of the building, one foot from the exterior walls. Two 14-inch cross steel beams will be

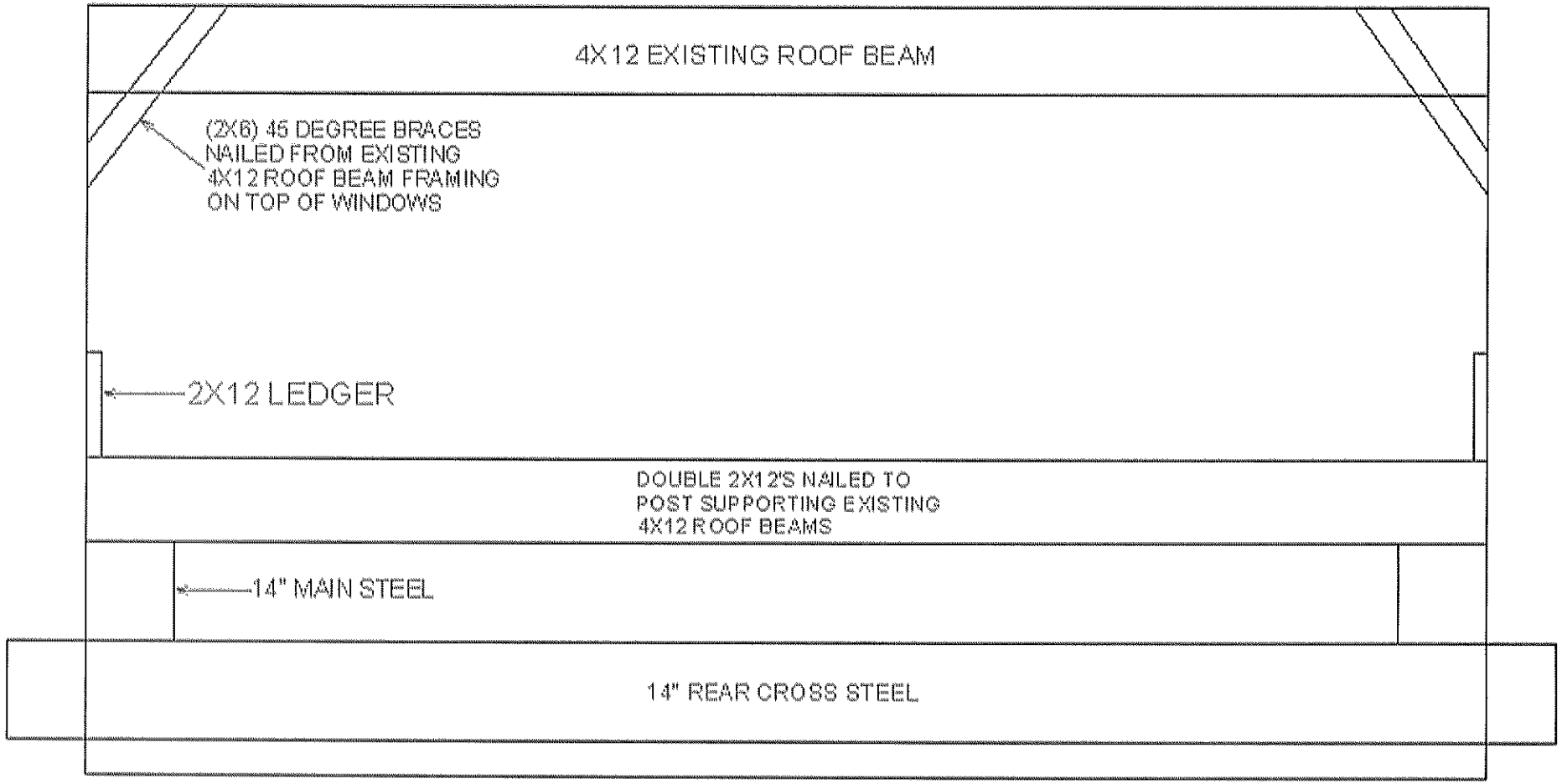
placed width wise of the building. They will be clamped off to the two main steel beams. This will form a lattice steel frame, which will support the weight of the building during the moving process. A steel bolster will be placed in front of the building underneath the main steel which the lead dolly will be placed under.

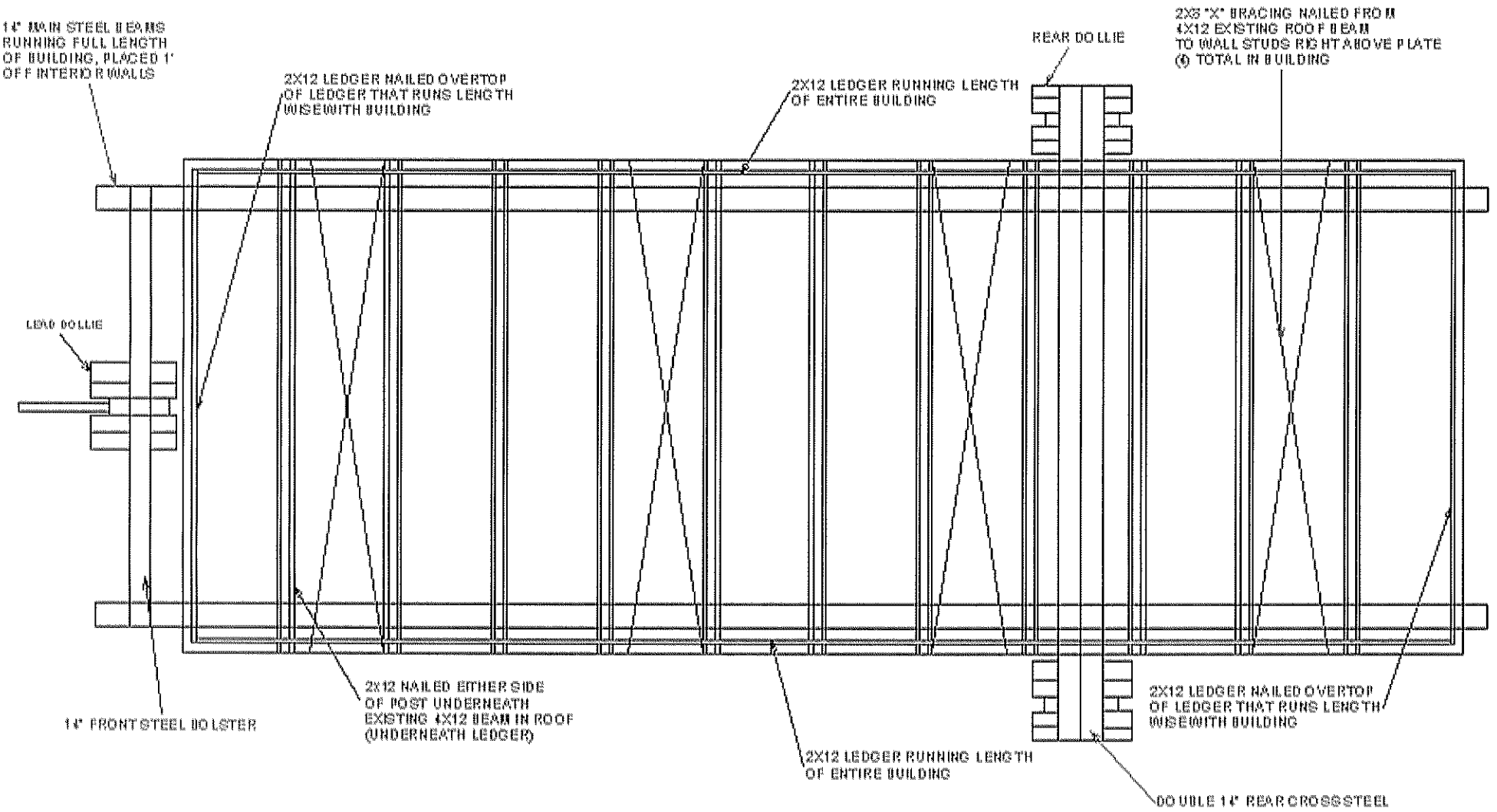
The cribbing and jacks will be installed to raise the building. Wooden cribbing piles will be erected beneath the building. The cribbing piles will be built by placing two pieces of wooden cribbing on the ground, next to each other. Then two more pieces of cribbing will be place on top, perpendicular to the original pieces. This will continue until the cribbing extends from the ground, up to the bottom of the steel beams. Once completed at each cribbing location, a 15 ton hydraulic jack will be placed in the center of each cribbing pile.

The 15-ton hydraulic jacks will be connected to a unified jacking system, which controls all of the jacks, and ensure that the building is lifted evenly from all jack points. The bottom plate of the building will be disconnected, and the building will be raised. As the hydraulic jacks are extending, additional cribbing will be installed; once the jacks reach the end of their stroke, the building will be lowered onto the cribbing. Once the weight is off of the jacks, they will be lowered and lifted up onto additional cribbing, allowing them to be reset, and continue lifting the building. When the building is high enough to allow the dollies to fit underneath, all three sets will be moved into position. The structure will then be lowered onto the dollies. Two dollies will be placed at the far ends of the rear cross mounted steel beam. The third dolly will be placed under the front steel bolster, and will be used for steering. Once the weight of the building is on the dollies, the jacks and cribbing structures will be removed, and the building will be ready to move.

A crane truck will be brought onto the jobsite, and connected the lead steering dolly. Once connected, it will tow the structure to its designated storage area in the adjacent state park. The same process, described above will be used to lift the building off of the dollies, and then lower them onto cribbing piles. The dollies will be removed, and the building will be supported on the cribbing piles for the duration of its storage.

Upon completion of the new foundation, the process will be reversed, and the building will be moved back into its original position. Using the aforementioned technique, the building will be raised and placed back onto the dollies. It will then be moved into position directly above the new foundation. It will then be lowered onto the foundation, and the steel beams will be removed from the structure.


4X12 EXISTING ROOF BEAM
(2X6) 45 DEGREE BRACES
NAILED FROM EXISTING
4X12 ROOF BEAM FRAMING
ON TOP OF WINDOWS
2X12 LEDGER
DOUBLE 2X12'S NAILED TO
POST SUPPORTING EXISTING
4X12 ROOF BEAMS
14" MAIN STEEL
14" REAR CROSS STEEL


14" MAIN STEEL BEAMS RUNNING FULL LENGTH OF BUILDING, PLACED 1' OFF INTERIOR WALLS
2X12 LEDGER NAILED OVERTOP OF LEDGER THAT RUNS LENGTH WISE WITH BUILDING
2X12 LEDGER RUNNING LENGTH OF ENTIRE BUILDING
REAR DOLLIE
2X6 "X" BRACING NAILED FROM 4X12 EXISTING ROOF BEAM TO WALL STUDS RIGHT ABOVE PLATE (4) TOTAL IN BUILDING
LEAD DOLLIE
14" FRONT STEEL BOLSTER
2X12 NAILED EITHER SIDE OF POST UNDERNEATH EXISTING 4X12 BEAM IN ROOF (UNDERNEATH LEDGER)
2X12 LEDGER RUNNING LENGTH OF ENTIRE BUILDING
2X12 LEDGER NAILED OVERTOP OF LEDGER THAT RUNS LENGTH WISE WITH BUILDING
DOUBLE 14" REAR CROSS STEEL

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 27 March 2014
SERIAL NO.: 37.1
SPEC. REF.: 03 21 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 37.1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Glacier/CT Sales, Inc	Concrete Steel Reinforcement

Comment(s):

1. Please see attached review from Sitts & Hill Structural Engineers. Note that reinforcing steel for the bulkhead sidewalk has not be reviewed or approved.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____ Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **37 R1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **3/21/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted) **37**

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	03 21 00	03 21 00-1	Reinforcement Bar Layout			
1	03 21 00	03 21 00-1	Reinforcement Bar Types			
1	03 21 00	03 21 00-1	Reinforcement Bar Details			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

☐NO EXCEPTION TAKEN ☒MAKE CORRECTIONS NOTED
☐REJECTED ☐REVISE AND RESUBMIT
☐SUBMIT SPECIFIED ITEM

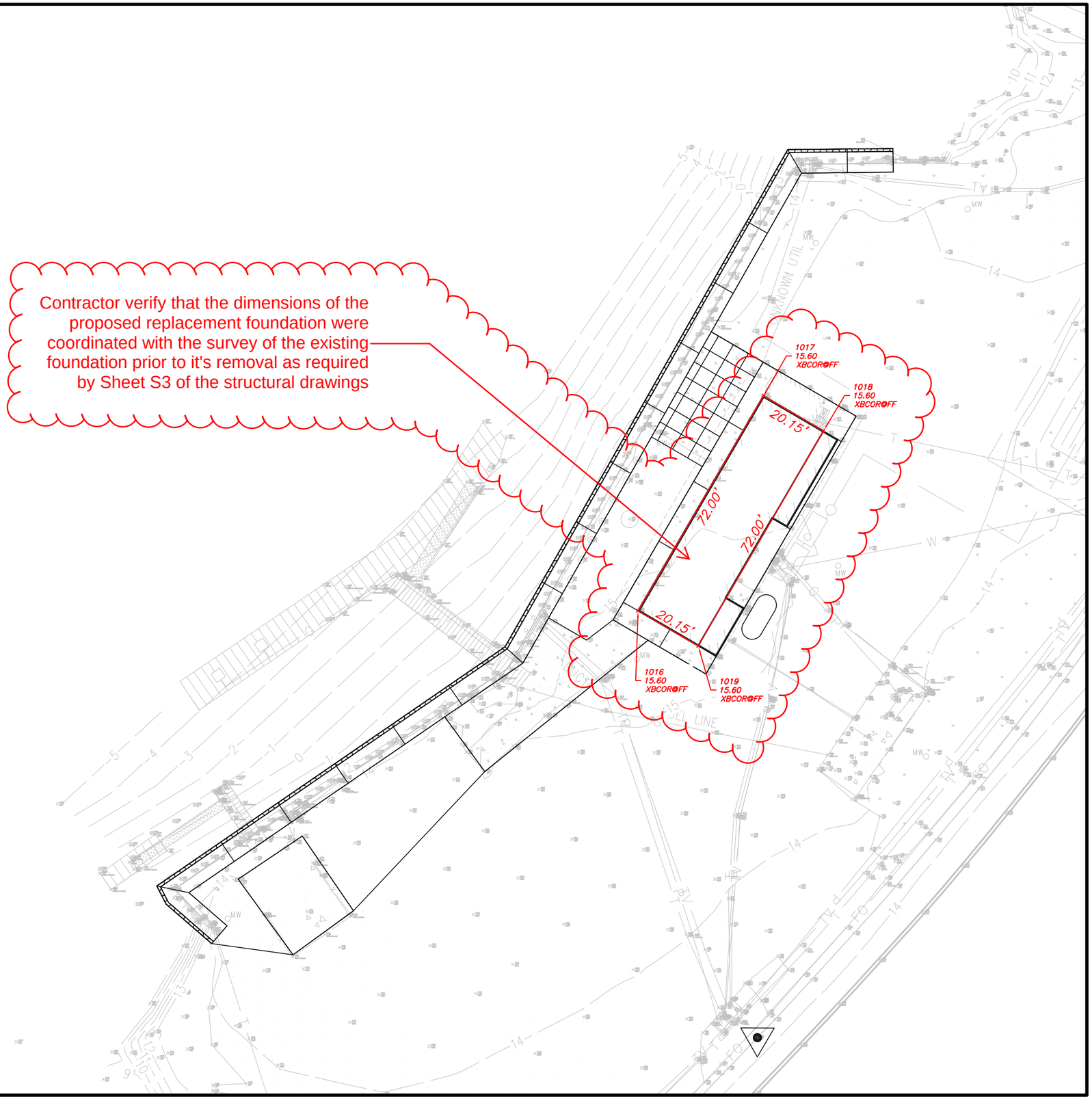
CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY ACTION SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR: ALL DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE, ALL FABRICATION DIMENSIONS AND PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATION OF HIS WORK WITH THAT OF ALL OTHER TRADES AND THE SATISFACTORY PERFORMANCE OF HIS WORK.

SITTS & HILL ENGINEERS, INC.
4815 CENTER STREET, TACOMA, WA 98409 (253) 474-9449

DATE: 03/26/2014 BY: labrecqueb

Review by Sitts & Hill Engineers limited to the replacement building foundation and slab on grade. The walkway along the bulkhead was NOT REVIEWED pending coordination with Kennedy/Jenks, and is not approved for fabrication

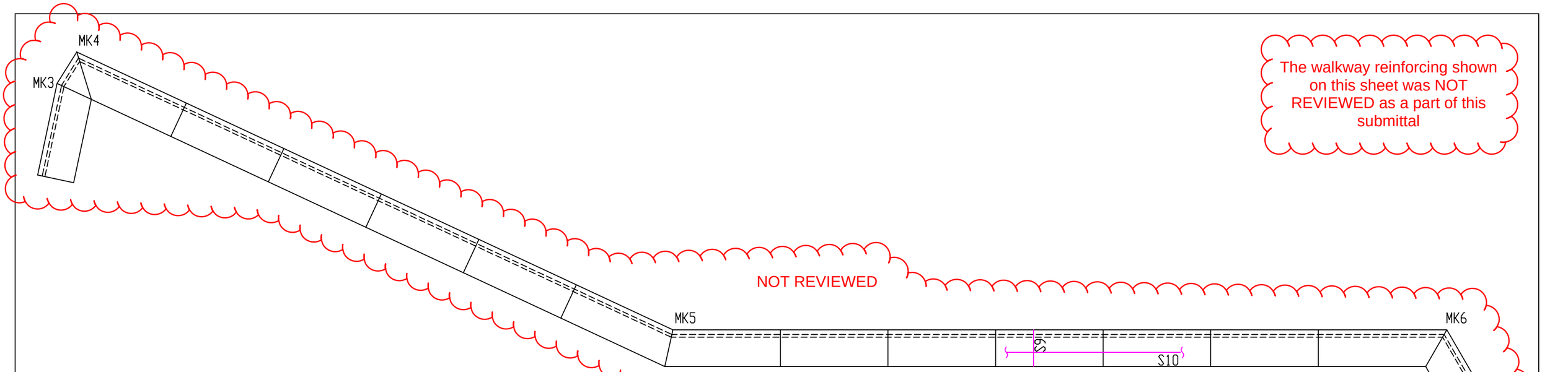
Contractor verify that the dimensions of the proposed replacement foundation were coordinated with the survey of the existing foundation prior to it's removal as required by Sheet S3 of the structural drawings



GRAPHIC SCALE
(us survey feet)

0 30

15 60



The walkway reinforcing shown on this sheet was NOT REVIEWED as a part of this submittal

NOT REVIEWED

THICKENED EDGE

F1 7/S5
8 #4 30-0 1/2 T&B
4 #4 17-1
4 #4 MK2 CB

F6 7/S5
4 #4 19-10 1/2 T&B
4 #4 MK2 CB

F7 7/S5
8 #4 30-0 1/2 T&B
4 #4 17-1
4 #4 MK2 CB

F8 7/S5
4 #4 19-10 1/2 T&B
4 #4 MK2 CB

BLDG SOG @ 12 LAP 2-8

S1 42 #4 30-0
21 #4 17-1
S2 73 #4 19-10

SLAB DWLS 7/S5

188 #4 MK2 SLAB DWLS @ 12

WALKWAY SOG @ 12 T&B LAP 2-8

S9 674 #4 6-7 @ 12 1/2 T&B
S10 96 #4 30-0 @ 12 TOP
8 #4 8-0
84 #4 30-0 @ 12 BOT
8 #4 8-0

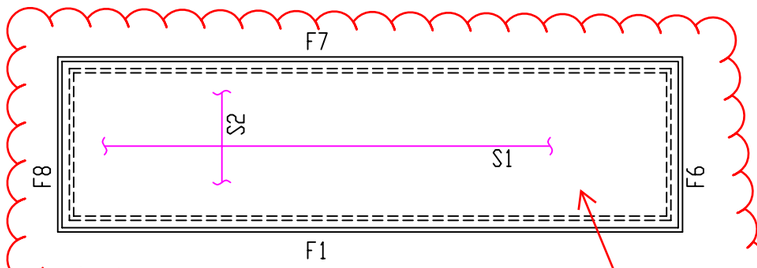
WALKWAY CORNER BARS

16 #4 MK3
16 #4 MK4
16 #4 MK5
16 #4 MK6

SLAB DWLS 8/S5

337 #4 MK2 SLAB DWLS @ 12 TOP

NOT REVIEWED



Layout of the foundation as shown does not match the foundation layout in the attached site plan - Contractor shall coordinate/verify that the building foundation layout and dimensions conform to the survey of the existing building foundation prior to removal and the requirements to support the relocated building

CT SALES Inc.	drwn.by DDC
	date 3-14-14
	rev. 3-19-14
contr. GLACIER ENVIRONMENTAL	rev. 3-21-14
job name CORNET BAY	job# 360-1
descrip. CIP	draw# R-1

JOB #: **360-1** CONTRACTOR: **GLACIER ENVIRONMENTAL** **CT Sales, Inc** PAGE # 1 OF 1

JOB NAME: **CORNET BAY**

7227 W Bostian Rd
Woodinville WA 98072-6008
PH (425) 483-0101 FAX (425) 485-9131

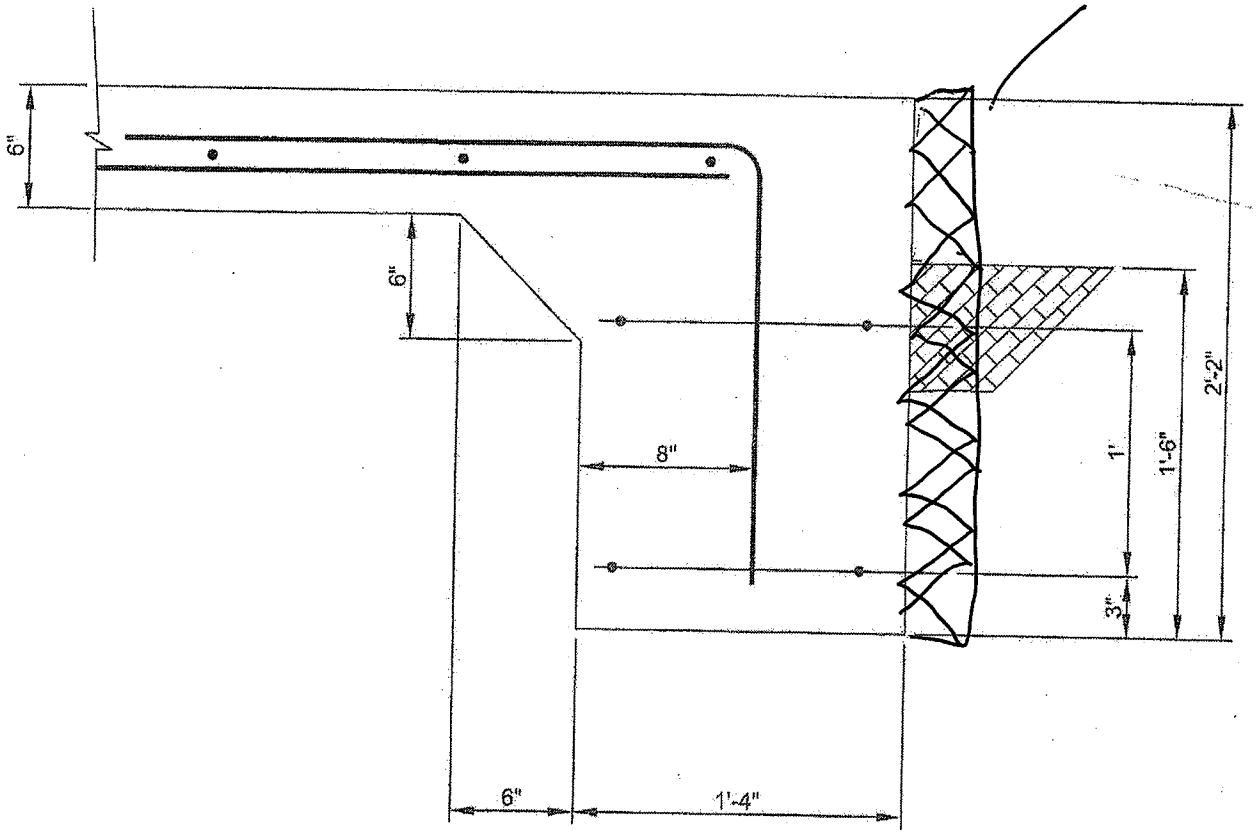
DETAILER: **DOC**

BENDING DETAILS **ALL REINF GRADE 60 UNO**

MARK	SZ	LENGTH	BEND TYPE	A	B	C	D	E	F/R	G	H	J	K	
1	4	5-4	2	2-8	2-8									
2	4	4-0	2	1-4	2-8									
3	4	5-4	19		2-8	2-8					0-11		2-6	
4	4	5-4	19		2-8	2-8					2-7¾		0-3¾	
5	4	5-4	19		2-8	2-8					1-1½		2-5	
6	4	5-4	19		2-8	2-8					2-3¾		1-4	
7														

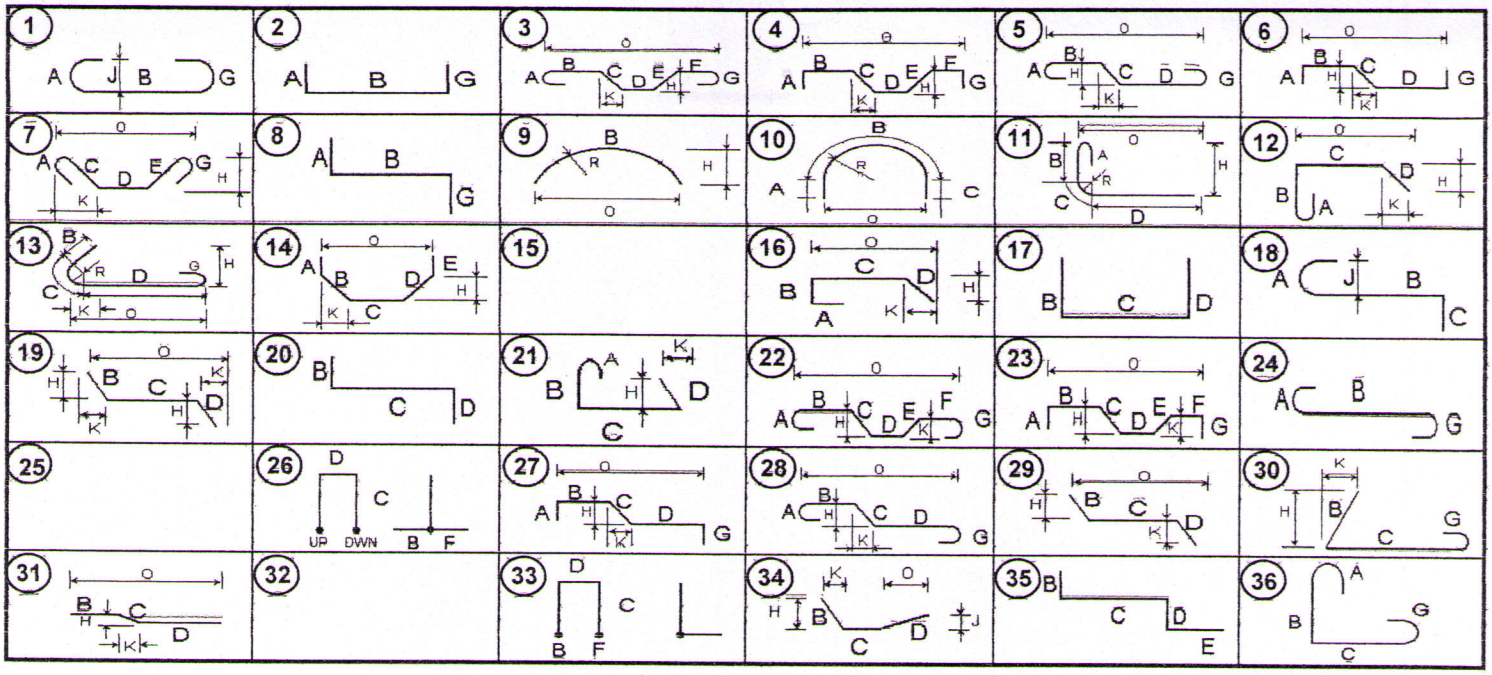
ALL ACI BEND TYPES EXCEPT SHOWN: **REFER TO DRAWING**

R-10 min



MODIFICATION TO DETAIL 6 ON SHEET S5 OF THE DRAWINGS FOR THE BUILDING SLAB REPLACEMENT.

APPROVED 3-14-14
ISLAND COUNTY BLDG. DEPT.
revision to 13-1081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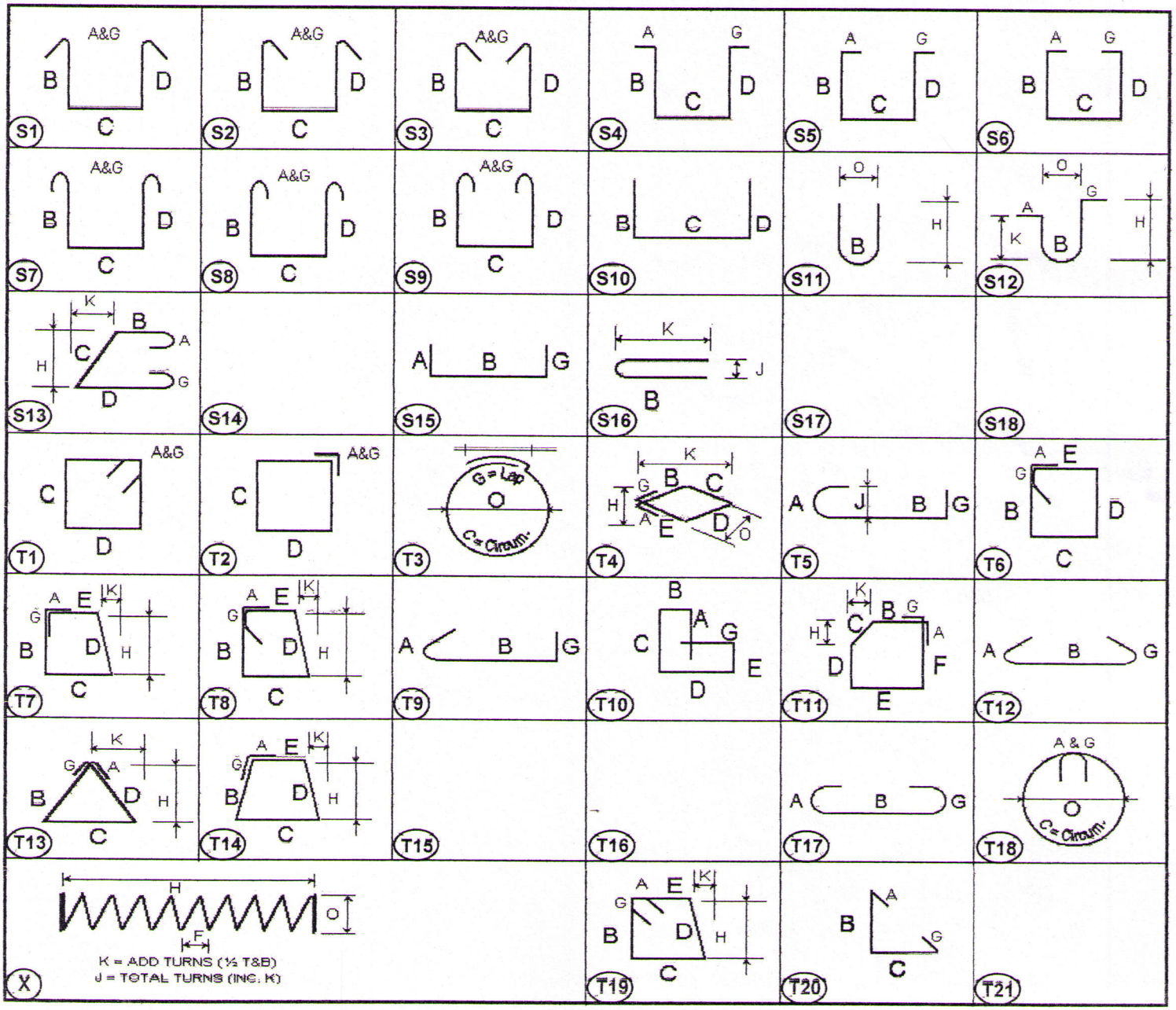

A&G
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
T1
T2
G = Lap
C = Circum.
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21
X
K = ADD TURNS (½ T&B)
J = TOTAL TURNS (INC. K)

GLACIER
environmental services, inc.

April 15, 2014

RE: Submittal 37.2 Response Questions and More Information

Jarod,

In response to Shop Drawing Response Letter (SDRL) No. 37.2, Glacier has the following questions or comments:

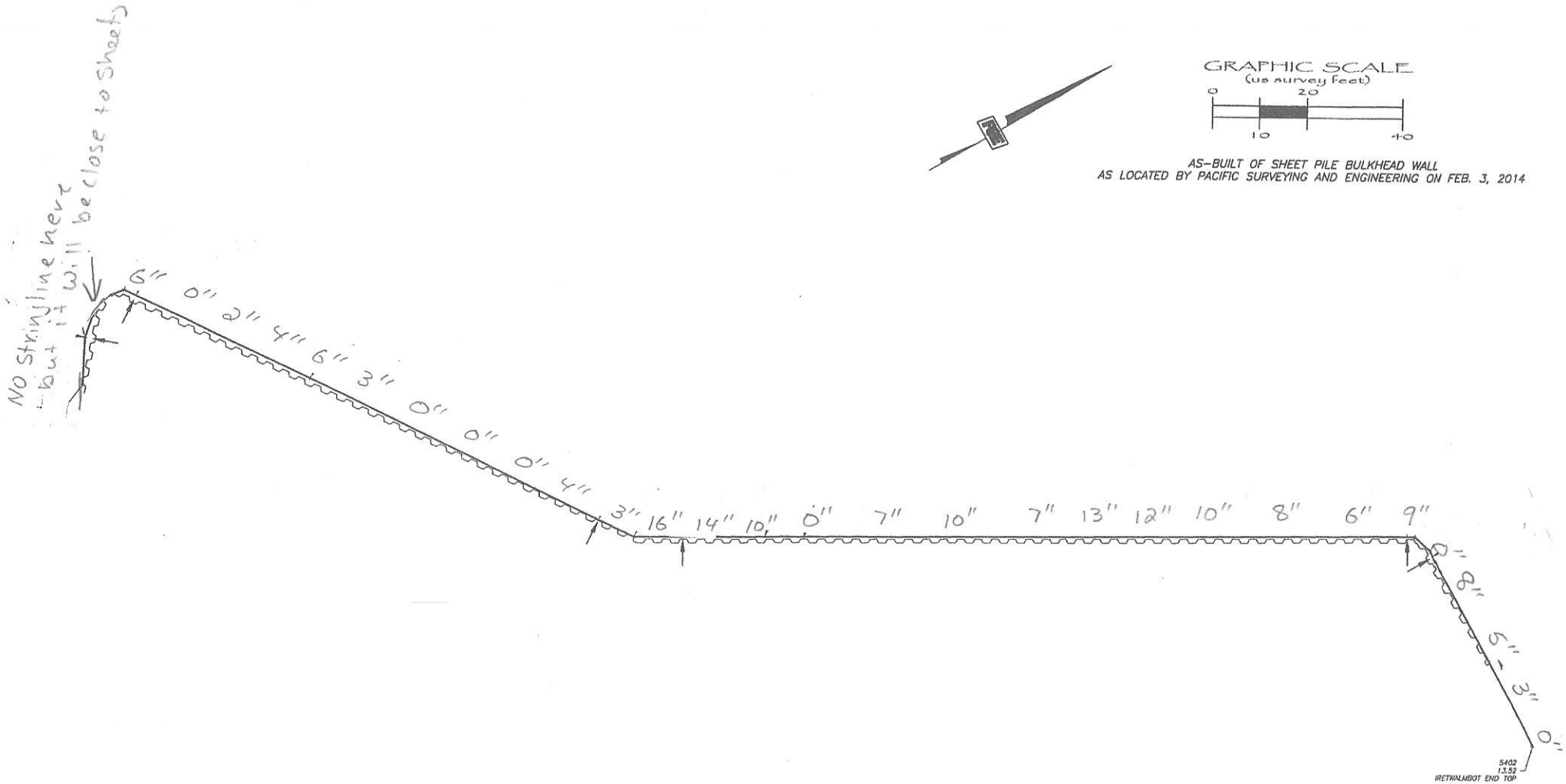
1. It is unclear from the redlined drawings at which point the (2) #4 bars that run along the outside edge of the concrete are required. We would not expect this to run the entire length of the sidewalk as some of the areas have no overhang and many have a very minimal overhang (4-inches and less). With the sheet pile tolerances allowed in the specification, some overhang would have been anticipated in the design. What amount of overhang is acceptable without the additional (2) #4 bars?

2. SDRL 37.2 asks Glacier to provide the details of our means and methods for forming and pouring the concrete cap to accommodate the overhang. Our intent is to place 1/8-inch steel plates in varying widths across the top of the sheet pile wall, this will act as the bottom form of the concrete cap and will remain in place for the life of the bulkhead. The sheets will be tack welded to the wall for stability while pouring. As mentioned above many areas have very little overhang; in areas that cantilever more, we may need to weld some struts (angle iron or bar steel) perpendicular to sidewalk to better support the steel plates, or use a thicker grade steel. The front face of the sidewalk/cap will be formed with falsework and stripped after the concrete has set. The end look of this will be as designed, but with a steel plate on the underside of the sidewalk. Drawing showing the approximate overhang along the wall is attached for your review.

Lauren Golembiewski

GRAPHIC SCALE
(us survey feet)
0 20
10 40

AS-BUILT OF SHEET PILE BULKHEAD WALL
AS LOCATED BY PACIFIC SURVEYING AND ENGINEERING ON FEB. 3, 2014



Shop Drawing Review Letters

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 9 May 2014
SERIAL NO.: 37.2R1
SPEC. REF.: 03 21 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 37.2
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET	1	Glacier/CT Sales	Reinforced Steel: Bulkhead Sidewalk

Comment(s):

1. Per the previous submittal 37.2, the contractor was to provide means and methods for forming and pouring the concrete. KJ has supplied the following sketch from discussions with the contractor. Please confirm the sketch is correct or provide comments to show means and methods.

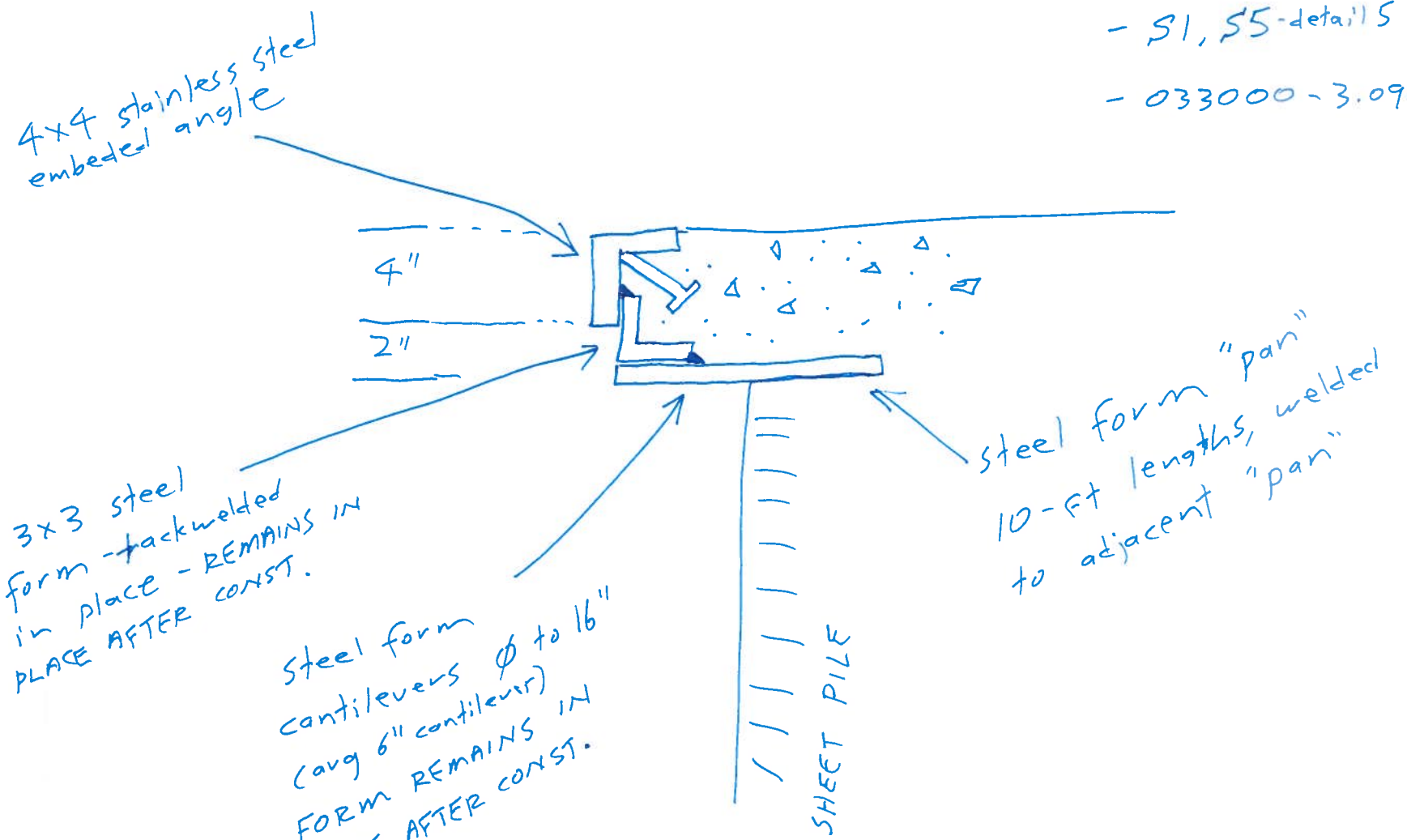
B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Jarod Fisher, P.E.

© 2006 Kennedy/Jenks Consultants Inc. [F-2]

- C10 shows concrete joints @ 20-ft
- S1, S5-details → joints
- 033000-3.09-joints



KP
5/7/2014

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **37.2**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **5/3/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted) **37**

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	03 21 00	03 21 00-1	**Revised Reinforcement Bar Layout for Sidewalk**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

7227 W. BOSTIAN RD.

WOODINVILLE WA 98072

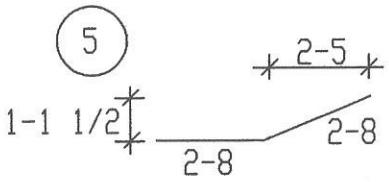
CT SALES Inc.

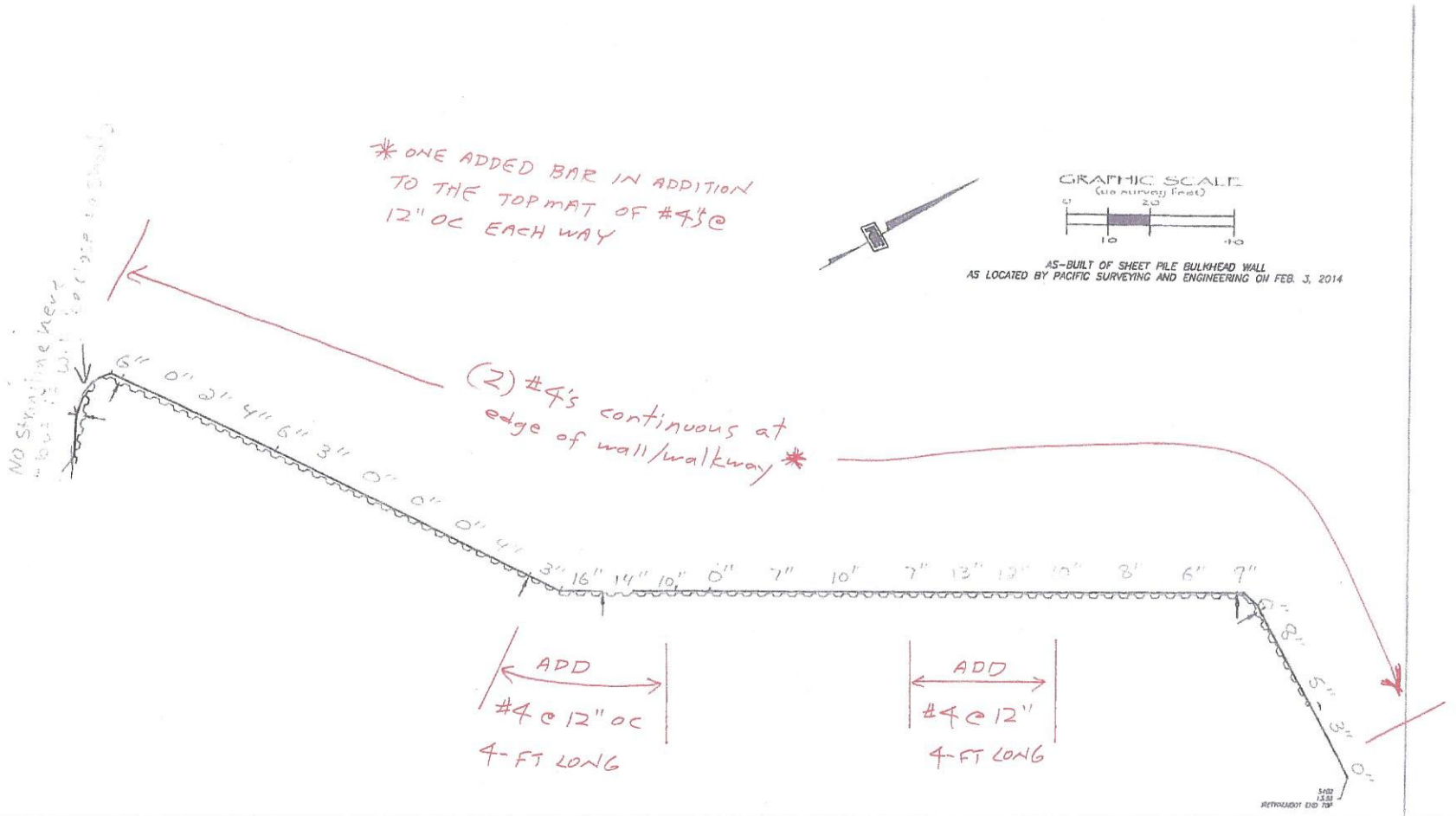
PH (425) 483-0101
FAX (425) 485-9131

DELIVER
W/SIDEWALK

contr.	GLACIER INVIRONMENTAL	GRADE 60	job# 659-1	REL	X
job name	CORNET BAY	DETAILER DOC	date 4-30-14	rev.	
descrip.	ADDED BAR 8/S5	PAGE# DS-1		1 OF 1	

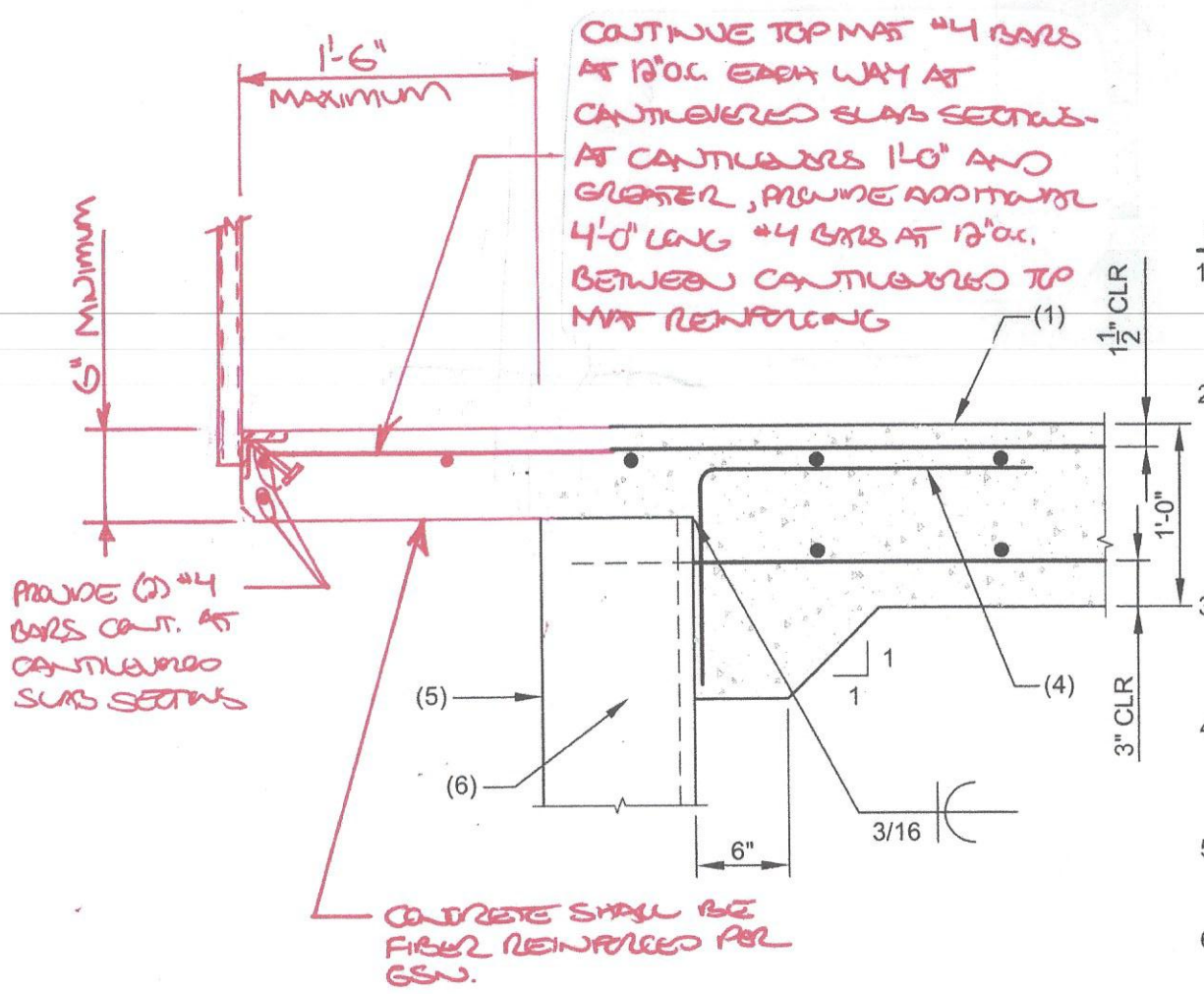
LOCATION	UNITS	NO	TOTAL	SIZE	LENGTH	MARK	DESCRIPTION
	2	3	6	4	19-9		LONG
	2	3	6	4	5-4	5	CB
	2	21	42	4	8-1		TRAN @ 12 ALT @ 6





CORNET BAY

KP 4/16/2014



NOTES:

1. 12" THICK CONCRETE SLAB ON GRADE WITH #4 BARS AT 12" O.C., EACH WAY TOP AND BOTTOM
2. HSS 2x2x3/16 STAINLESS STEEL GUARDRAIL POSTS-SPACE POSTS AT 6" O.C. (MAXIMUM) - SEE GUARDRAIL ELEVATION DETAIL 9/S5 FOR ADDITIONAL INFORMATION.
3. L4x4x1/4 STAINLESS STEEL EMBED ANGLE WITH 1/2" DIAMETER HEADED STUDS AT 24" O.C.
4. DOWELS TO MATCH AND LAP SLAB REINFORCING - PROVIDE 3" COVER, MINIMUM
5. STEEL SHEET PILE BULKHEAD WALL PER PLAN
6. CONTRACTOR SHALL PROVIDE CONCRETE FORM CLOSURE AS REQUIRED

CONCRETE SLAB AT SHEET PILE WALL

SCALE: N.T.S.

8
S5

DWG R-1

Del 4/4

CT SALES INC
7227 W BOSTIAN RD
WOODINVILLE WA 98072-6008
(425) 483-0101

MATERIAL LIST
JOB# 659-1 RELEASE 1
GLACIER ENVIRONMENTAL
GRADE 60
BUILDING SLAB

CORNET BAY

	QTY	SIZE	LENGTH	MARK		
Straight						
	58	4	30 - 0			
	81	4	19 - 10			
	31	4	17 - 1			
Heavy						
	206	4	4 - 0	2	1-4 | 2-8	

CUSTOMER C T SALES, INC.
7227 W BOSTIAN RD
WOODINVILLE, WA 98072

CASCADE STEEL Rolling Mills Inc.

CERTIFIED MILL TEST REPORT
(CMTR)
3200 NORTH HIGHWAY 99W
McMINNVILLE, OREGON 97128
(503) 472-4181 FAX (503) 434-5739

DATE	3-20-14
BILL OF LADING	12401760

DESCRIPTION	TEST NAME / UNIT OF MEASURE									
HEAT NO. / PRODUCT / GRADE	YIELD PSI	TENSILE PSI	ELONG. % 8 INCHES	NOM. WT %	BEND DEGREES	DEF.				
*027714 #4 615/60 GRADE REBAR ASTM A615-09a Grade 60 AASHTO M31-10	74,500	108,000	13	96	180 OK	OK				
*085614 #4 615/60 GRADE REBAR ASTM A615-09a Grade 60 AASHTO M31-10	72,500	109,000	11	96	180 OK	OK				
*027614 #4 615/60 GRADE REBAR ASTM A615-09a Grade 60 AASHTO M31-10	62,500	100,000	14	96	180 OK	OK				

CHEMICAL ANALYSIS

HEAT NO.	C %	Mn %	P %	S %	Si %	Cu %	Ni %	Cr %	Mo %	Sn %	CE %
027714	.41	1.13	.017	.037	.20	.28	.11	.15	.022	.016	.62
085614	.40	1.13	.027	.043	.21	.24	.08	.16	.019	.027	.62
027614	.41	1.14	.018	.042	.20	.29	.12	.16	.024	.018	.62

PO NUMBER(S): DAVE

CERTIFIED BY: _____
Customer Technical Service Manager
TOM MURPHY

* ALL MELTING AND MANUFACTURING PROCESSES FOR THE MATERIALS OCCURRED IN THE UNITED STATES.

CUSTOMER C T SALES, INC.
7227 W BOSTIAN RD
WOODINVILLE, WA 98072

CASCADE STEEL Rolling Mills Inc.

CERTIFIED MILL TEST REPORT
(CMTR)
3200 NORTH HIGHWAY 99W
McMINNVILLE, OREGON 97128
(503) 472-4181 FAX (503) 434-5739

DATE	1-22-14
BILL OF LADING	10742430

DESCRIPTION	TEST NAME / UNIT OF MEASURE									
HEAT NO. / PRODUCT / GRADE	YIELD PSI	TENSILE PSI	ELONG. % 8 INCHES	NOM. WT %	BEND DEGREES	DEF.				
*477313 #4 615/60 GRADE REBAR ASTM A615-09a Grade 60 AASHTO M31-10	70,500	105,000	15	96	180 OK	OK				

CHEMICAL ANALYSIS

HEAT NO.	C %	Mn %	P %	S %	Si %	Cu %	Ni %	Cr %	Mo %	Sn %	CE %
477313	.42	1.12	.016	.028	.19	.27	.09	.11	.021	.025	.63

PO NUMBER(S): 355-1

CERTIFIED BY: _____
Customer Technical Service Manager
TOM MURPHY

* ALL MELTING AND MANUFACTURING PROCESSES FOR THE MATERIALS OCCURRED IN THE UNITED STATES.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 19 March 2014
SERIAL NO.: 39
SPEC. REF.: 03 30 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 39
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCNR	1	Concrete Nor'west	Concrete Product Data

Comment(s):

1. The combined gradation of gravel and sand does not satisfy the specifications. The submittal shows 30% passing the No. 200 sieve. If an error, please resubmit combined gravel and sand gradations for evaluation. If the product is above the specified 0-2% passing the No. 200 sieve, resubmit a new product meeting the specifications or state why the product is being submitted.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **39**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **3/17/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**03 30 00**	**03 30 00-3**	**Concrete Product Data**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

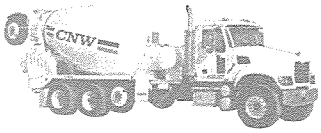
(THIS SPACE FOR ENGINEER)

To: Date:

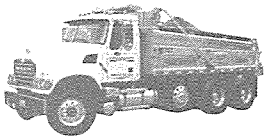
Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:



CONCRETE NOR'WEST
P.O. BOX 280 • MOUNT VERNON, WASHINGTON 98273-0280
(360) 757-3121 • FAX (360) 757-3816



MIX DESIGN March 14, 2014

Glacier Environmental Services, Inc.

REF: Cornet Bay Marina Remediation
Oak Harbor, WA

Mix 0260A570
General Concrete & Slabs

We suggest these concrete mix proportions (SSD weights for one cubic yard of concrete) for your information and appraisal.

MATERIALS WT. LBS.	VOL. CU. FT.	SSD
Water	4.09	255
Cement	2.90	570
Fly Ash		
Course Agg.	10.95	1850
Fine Aggregate	8.02	1340
Air	1.04	

Admix: MB Pozzolith 200N 23 oz. / c. yd.
MB AE90 3.5 oz. / c. yd.

Specified Compressive Strength
4000 p.s.i.

Cement Factor - sacks	Cement Type	W/C
6.06	I/II	.45

Slump			Max. Agg.
4"	+/-	1"	# 67

Air		
5 %	+/-	1.5 %

Proportioning criteria is based on data resulting from appropriate ASTM methods.

Concrete Nor'West

CONCRETE QUALITY CONTROL REPORT

PROJECTS: Various Concrete Nor'West Projects MIX: 0260A570
SUPPLIER: Concrete Nor'West
CEMENT: 6.06 Sack
f'c: 4000 psi
ADMIXTURES: Pozzolith 200N
AIR-ENTRAINMENT: Yes
W/C RATIO: 0.45

Lab No.	Cast date	Slump	Air	Compressive Strength 7 day	7 day	7 day avg.	28 day	28 day	28 day avg.
0111d40	1/16/13	3.00	5.60				5160	5150	5155
01120c8	2/14/13	6.50	6.00				4880	4980	4930
112187	2/21/13	4.00	5.60				5370	5710	5540
01121ce	2/25/13	5.25	6.60				4270	4560	4415
112258	2/27/13	6.50	5.40				4550	4390	4470
286345	8/7/13	5.00	4.00	3670		3670	4760	4960	4860
318347	8/28/13	4.75		4190		4190	5320	5340	5330
318482	9/5/13	3.00		5080		5080	5860	6010	5935
318493	9/6/13	3.50	4.50	3500		3500	4610	4670	4640
318523	9/6/2013	5.50	3.20	4920		4920	6010	5920	5965
318916	9/30/13	3.75	5.10				5350	5130	5240
318963	10/4/13	4.50	4.60	4550		4550	5600	5550	5575
319006	10/8/13	3.50	4.50	4980		4980	5370	5440	5405
102532	10/25/13	4.75		4000		4000	5410	5260	5335
323083	11/25/13	5.00	4.30	4600		4600	5110	5250	5180
Test Results:									
Average :		4.57	4.95			2821			5198
High:		6.50	6.60			5080			5965
Low:		3.00	3.20			0			4415
Std. Deviation:									456
# Tests:									

LEHIGH
HEIDELBERGCEMENT Group

Lehigh Cement, a division of Lehigh Hanson Materials Limited
7777 Ross Road
Delta, British Columbia, V4G 1B8
P.O. Box 950, V4K 3S6
ph: 604.946.0411

MILL TEST REPORT

Cement Type: ASTM Type I/II, AASHTO Type I
Low Alkali Portland Cement

Plant: Bellingham, WA

Certificate #: B1-157

Production Period:	Feb 01 2014 Feb 28 2014	Test Result	*ASTM C150 Specification*	*AASHTO M 85 Specification*
SiO2 (%)	*ASTM C114*	20.3	-	-
Al2O3 (%)	*ASTM C114*	5.0	*max. 6.0*	-
Fe2O3 (%)	*ASTM C114*	3.57	*max. 6.0*	-
CaO (%)	*ASTM C114*	64.2	-	-
MgO (%)	*ASTM C114*	1.2	*max. 6.0*	*max. 6.0*
SO3 (%)	*ASTM C114*	2.6	*max. 3.0*	*max. 3.0*
Na2O (%)	*ASTM C114*	0.26	-	-
K2O (%)	*ASTM C114*	0.34	-	-
TiO2 (%)	*ASTM C114*	0.28	-	-
C3S (%)	*ASTM C150*	59	-	-
C2S (%)	*ASTM C150*	12	-	-
C3A (%)	*ASTM C150*	7	*max. 8*	*max. 8*
C4AF (%)	*ASTM C150*	11	-	-
Equivalent Alkalies (%)	*ASTM C150*	0.48	*max. 0.60*	*max. 0.60*
Loss on Ignition (%)	*ASTM C114*	1.9	*max. 3.0*	*max. 3.0*
Insoluble Residue (%)	*ASTM C114*	0.15	*max. 0.75*	*max. 0.75*
Free Calcium Oxide (%)	*ASTM C114*	0.3	-	-
CO2 in Cement (%)	*ASTM C114*	1.1	-	-
CaCO3 in Limestone (%)	*ASTM C114*	98	*min. 70*	*min. 70*
Limestone in Cement (%)	*ASTM C150*	2.5	*max. 5.0*	*max. 5.0*
Vicat Setting Time Initial (minutes)	*ASTM C191*	118	*min. 45 max. 375*	*min. 45 max. 375*
Blaine Fineness (m2/kg)	*ASTM C204*	376	*min. 280*	*min. 280*
+325 mesh	*ASTM C430*	1.5	-	-
Air Content of Mortar (%)	*ASTM C185*	7	*max. 12*	*max. 12*
Autoclave Expansion (%)	*ASTM C151*	-0.02	*max. 0.80*	*max. 0.80*
Compressive Strength		MPa / psi		
3 Day	*ASTM C109/109M*	26.7 / 3870	*min. 12.0*	*min. 12.0*
7 Day	*ASTM C109/109M*	34.7 / 5030	*min. 19.0*	*min. 19.0*
28 Day	*ASTM C109/109M*	42.6 / 6180	-	-

This will certify that the above described cement meets the standard chemical and physical requirements of ASTM Specification C-150 for Type I and Type II Low Alkali Portland Cements and AASHTO Specification M-85 for Type I Low Alkali Portland Cement.

Siu Kei (S.K.) Ng
Plant Chemist

March 11, 2014

CNW
CONCRETE NOR'WEST

P.O. Box 280, Mount Vernon, Washington 98273-0280
Phone: (360) 757-3121 Fax: (360) 757-3816

Date: *Thursday, February 06, 2014*

Material Description: **Concrete Sand**

Gradings: ASTM C33 Sand

Sample Number: *0206-02*

Date Sampled: *02/06/14* **By:** *MC*

Date Completed: *2/6/14 3:04 PM* **By:** *MC*

Sample Moist: *822.8* **Total Moisture %:** *5.813%*

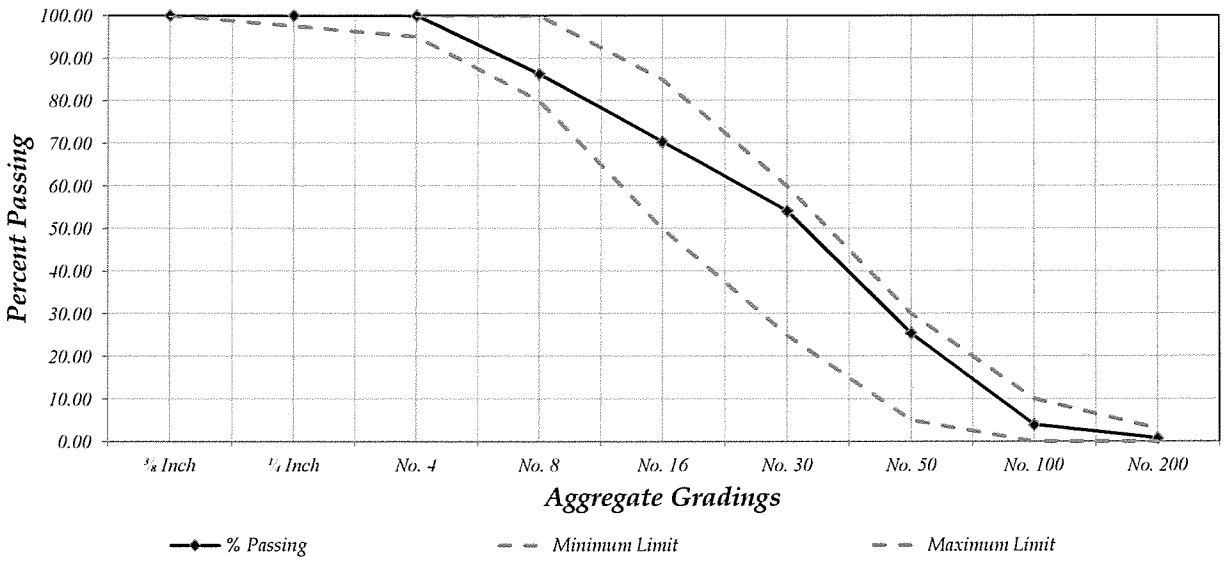
Sample Type: *Production* **Location:** *Boulder Hill IS-93 Stockpile*

Sample Dry: *777.6* **FM:** *2.600*

Wash Dry: *0.0* **Wash Loss %:**

ASTM C33/C33M - 13 Fine Aggregate (Table 1)

	Cummaltive	Amount Retained	Individual % Retained	% Retained	% Passing	Minimum Limit	Maximum Limit
2 Inch	0.0	0.0	0.0	0.0	***100.00***		
1-½ Inch	0.0	0.0	0.0	0.0	***100.00***		
1-¼ Inch	0.0	0.0	0.0	0.0	***100.00***		
1 Inch	0.0	0.0	0.0	0.0	***100.00***		
¾ Inch	0.0	0.0	0.0	0.0	***100.00***		
½ Inch	0.0	0.0	0.0	0.0	***100.00***		
⅜ Inch	0.0	0.0	0.0	0.0	***100.00***	*100*	
¼ Inch	0.0	0.0	0.0	0.0	***100.00***		
No. 4	0.3	0.3	0.0	0.0	***99.96***	*95*	*100*
No. 8	106.7	106.4	13.7	13.7	***86.28***	*80*	*100*
No. 16	230.5	123.8	15.9	29.6	***70.36***	*50*	*85*
No. 30	357.0	126.5	16.3	45.9	***54.09***	*25*	*60*
No. 50	579.9	222.9	28.7	74.6	***25.42***	*5*	*30*
No. 100	747.1	167.2	21.5	96.1	***3.92***	*0*	*10*
No. 200	771.7	24.6	3.2	99.2	***0.76***	*0*	*3*
PAN	776.7	5.0	0.64	99.88	***0.12***		



CONCRETE NOR'WEST

PO Box 280
Mount Vernon, WA 98273
(360)757-3121

Aggregate Test Report

Product:	Concrete 7/8" Rock Meets WSDOT 9-03.1(4)C # 67 Grading	Source of Material	Pit IS-93 Boulder Pit
Project:			

U.S. Sieve #	Grams Retained	%SampleRetained	%Sample Passing	%Passing Spec.
Sample Size:	1078			
2 1/2 In.				
2 In.				
1 1/2 In.	0	0.0%	100.0%	
1 1/4 In.				
1 In.	0	0.0%	100.0%	99-100%
3/4 In.	87	8.1%	91.9%	90-100%
5/8 In.				
1/2 In.	547	50.7%	49.3%	
3/8 In.	847	78.6%	21.4%	20-55%
1/4 In.				
No.4	1075	99.7%	0.3%	0-10%
No.8	1076	99.8%	0.2%	0-5%
No.10				
No.16				
No.30				
No.40				
No.50				
No.100				
No.200				

Testing:

Remarks:

Sampled By:	Ron Van Dam	Tested By:	J. K.
Submitted By:		Date:	1/8/2014

CONCRETE NOR'WEST

Division of Miles Sand Gravel Co.
PO Box 280
Mount Vernon, WA 98273
(360)757-3121

Aggregate Test Report

Product:	Combined Grading of # 67 rock and Concrete Sand For mix 0260570	Source of Material	Pit IS-93 Boulder Pit
Project:	Cornet Bay Marina Remediation Project	1" Combined Aggregates	

U.S. Sieve #	Grams Retained	%SampleRetained	%Sample Passing	%Passing Spec.
Sample Size:				
2 1/2 In.				
2 In.				
1 1/2 In.			100.0%	100%
1 1/4 In.				
1 In.			100.0%	90-100%
3/4 In.			95.3%	55-100%
5/8 In.				
1/2 In.				
3/8 In.			54.4%	45-75%
1/4 In.				
No.4			42.4%	35-60%
No.8			36.6%	27-45%
No.10				
No.16			29.6%	20-35%
No.30			22.7%	12-25%
No.40				
No.50			10.7%	3-15%
No.100			1.7%	0-5%
No.200			30.0%	0-2%

Testing:

Remarks:

Sampled By:

Tested By: D.E

Submitted By:

Date: 1/8/2014

BASF
The Chemical Company

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173/C 173M, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, "Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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NSF Certified to NSF/ANSI 61

BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ■ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

BASF

The Chemical Company

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterPozzolith® 200

Water-Reducing Admixture

Formerly Pozzolith 200 N *

Description

MasterPozzolith 200 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It meets ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Prestressed concrete
- Precast concrete
- Reinforced concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content required for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strengths

Guidelines for Use

Dosage: MasterPozzolith 200 admixture is recommended for use at a dosage of 3-4 fl oz/cwt (195-260 mL/100 kg) of cementitious materials for Type A applications and up to 6 fl oz/cwt (390 mL/100 kg) for Type B and D requirements. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterPozzolith 200 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 200 admixture may be used in combination with any BASF admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

MASTER® BUILDERS SOLUTIONS

Storage and Handling

Storage Temperature: MasterPozzolith 200 admixture should be stored above freezing temperatures. If MasterPozzolith 200 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 200 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 200 admixture has been exceeded.

Packaging

MasterPozzolith 200 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 200 admixture

Additional Information

For additional information on MasterPozzolith 200 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* Pozzolith 200 N became MasterPozzolith 200 under the Master Builders Solutions brand, effective January 1, 2014.

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NSF Certified to NSF/ANSI 61

BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

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23700 Chagrin Boulevard
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ■ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 19 March 2014
SERIAL NO.: 39
SPEC. REF.: 03 30 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 39-R1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Concrete Nor'west	Concrete Product Data

Comment(s):

1. Original gradation corrected from 30% at 200 No. Sieve to .44%.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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CONCRETE NOR'WEST

Division of Miles Sand Gravel Co.
PO Box 280
Mount Vernon, WA 98273
(360)757-3121

Aggregate Test Report

Product:	Combined Grading of # 67 rock and Concrete Sand For mix 0260570	Source of Material	Pit IS-93 Boulder Pit
Project:	Cornet Bay Marina Remediation Project	1" Combined Aggregates	

U.S. Sieve #	Grams Retained	%SampleRetained	%Sample Passing	%Passing Spec.
Sample Size:				
2 1/2 In.				
2 In.				
1 1/2 In.			100.0%	100%
1 1/4 In.				
1 In.			100.0%	90-100%
3/4 In.			95.3%	55-100%
5/8 In.				
1/2 In.				
3/8 In.			54.4%	45-75%
1/4 In.				
No.4			42.4%	35-60%
No.8			36.6%	27-45%
No.10				
No.16			29.6%	20-35%
No.30			22.7%	12-25%
No.40				
No.50			10.7%	3-15%
No.100			1.7%	0-5%
No.200			0.44%	0-2%

Testing:

Remarks:

Sampled By:

Tested By: D.E

Submitted By:

Date: 1/8/2014

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

Attention: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

Date: 19 March 2014
Serial No.: 39
Spec. Ref.: 03 30 00
Project: Cornet Bay Marina Remediation
K/J Job No.: 1396010.00
Submittal No.: 39-R2
Page: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Concrete Nor'west	Concrete Product Data
2	MCNR	2	Concrete Nor'west	Concrete Product Data

Comment(s):

1. Original gradation corrected from 30% at 200 No. Sieve to .44%.
2. Please re-submit concrete data showing 1.5 lb/cy fiber reinforcing per GSN S1 drawing notes. Per the GSN, fibers are required for all concrete flatwork.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Distribution		SDRL	Encl.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **39-R3**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **4/4/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1			**Concrete Product Data**	**CNW**		

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature C. Alan Hall C. Alan Hall

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

CNW
CONCRETE NOR'WEST
P.O. BOX 280 • MOUNT VERNON, WASHINGTON 98273-0280
(360) 757-3121 • FAX (360) 757-3816

MIX DESIGN March 14, 2014
Revised 4/4/14

Glacier Environmental Services, Inc.

REF: Cornet Bay Marina Remediation
Oak Harbor, WA

Mix 0260A570
General Concrete & Slabs

We suggest these concrete mix proportions (SSD weights for one cubic yard of concrete) for your information and appraisal.

MATERIALS WT. LBS.	VOL. CU. FT.	SSD
Water	4.09	255
Cement	2.90	570
Fly Ash		
Course Agg.	10.95	1850
Fine Aggregate	8.02	1340
Air	1.04	

Admix: MB Pozzolith 200N 23 oz. / c. yd.
MB AE90 3.5 oz. / c. yd.
1.5 lbs / c.. yd. Buckeye Ultra Fiber 500 4/4/14
Add fibers for flatwork use

Specified Compressive Strength
4000 p.s.i.

Cement Factor - sacks	Cement Type	W/C
6.06	I/II	.45

Slump			Max. Agg.
4"	+/-	1"	# 67

Air		
5 %	+/-	1.5 %

Proportioning criteria is based on data resulting from appropriate ASTM methods.

BUCKEYE
BUILDING FIBERS LLC

BUCKEYE UltraFiber 500®

Secondary Reinforcement Fiber for Concrete

Description:

Buckeye UltraFiber® 500 reinforcement fiber for concrete is 100% virgin specialty cellulose fiber with a patented alkaline resistant coating specifically engineered and manufactured in an ISO 9001 certified facility. UltraFiber 500® provides secondary reinforcement in concrete (temperature and shrinkage crack control) and meets ICC evaluation criteria for use in slab on grade. UltraFiber 500® is manufactured in the USA from renewable resources and complies with National Building Codes, ASTM C1116-08 and ASTM D7357-07. A dosage rate of 1.0 to 4.0 lb/yd^3 is recommended depending on the application. In areas where freeze/thaw performance is a significant factor, a 2.0 lb/cy dosage rate is strongly recommended with a 1.5 lb/cy dosage rate minimum.

Applications:

- Commercial & Residential Slabs
- Composite Metal Decks
- Paving
- Pervious Paving
- Curb and Gutter
- Slip Form
- Architectural & Decorative
- Pre-Cast
- Shotcrete
- Walls
- White Topping

Advantages:

UltraFiber 500® provides excellent secondary reinforcement from high fiber surface area, close fiber spacing, excellent bonding within the cement matrix, high fiber tensile strength, and easy dispersion in concrete so it is always positioned correctly. It is safe, easy to use, and offers superior finish-ability. UltraFiber 500® provides significant benefits in numerous applications.

Benefits:

- Alternate system to traditional secondary reinforcement in concrete
- Reduces the formation of intrinsic cracking in concrete
- Reduces concrete permeability and absorption.
- Improves concrete freeze/thaw resistance
- Improves concrete durability
- Provides enhanced hydration which improves concrete strength properties
- Improves concrete impact resistance
- Improves concrete shatter resistance
- Improves bond strength between rebar and cement paste

Concrete Fire Resistance:

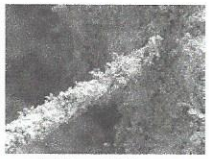
- UL Classified for use in all composite metal deck Designs No. D700, D800 & D900.
- UL Classified for use in composite metal deck Design No. D973 Reduced Thickness of NWC (normal weight concrete) while achieving a 2 Hour Fire Rating

Perfomance Characteristics:

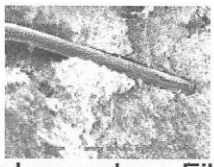
Water Absorption	Up to 80% of the fiber weight
Specific Gravity	1.10
Avg. Fiber Length	2.1 mm
Projected Fiber Diameter	18 um
Fiber Tensile Strength	90 -130 ksi
Alkali Resistance	High (ASTM D6942)

For additional information please contact us at 866.663.8999 or visit www.ultrafiber.com. This publication should not be construed as engineering recommendations or advice. Users of this product should determine its suitability for their own particular application. UltraFiber 500® is sold with no express or implied warranty; seller's sole liability for claims is limited to replacement of defective or nonconforming product.

UltraFiber® 500



UltraFiber
Excellent Bond



Polypropylene Fiber
Minimal Bond

UltraFiber 500® vs. Synthetic Fibers

Attribute, units	UF-500	Synthetic Fiber
Avg. Length, mm	2.1	16
Denier, g/9,000m	2.5	6
Diameter, um	18	30
Count, fibers/lb.	720,000,000	44,000,000
Density, g/cm^3	1.10	0.91
Tensile, N/mm^2	600 - 900	200 - 500
Surface area, cm^2/g	25,000	1,500
Fiber Spacing, um	640	950

Application Rate
The minimum application rate for Buckeye UltraFiber 500® is 1.0 lb/yd^3. A dosage of 1.5 lb/yd^3 is recommended for most commercial slab on grade applications. Dosages of 2.0 to 4.0 lb/yd^3 may be used for applications requiring maximum impact and/or abrasion resistance and crack control.

Mix Design
The addition of UltraFiber 500® reinforcing fibers at normal dosage rates does not require any mix design changes. UltraFiber 500® is compatible with typical admixtures and other mix constituents.

Finish-ability
UltraFiber 500® reinforcing fiber provides superior finish-ability and has no restrictions or barriers to normal finishing techniques. These finishes include: trowel, swirl, broom, exposed, decorative, colored, and stained. All finishes exhibit excellent results, and the finisher can use normal timing.

Compatibility
UltraFiber 500® reinforcing fiber is compatible with all normal concrete constituents and admixtures and will not adversely affect their performance or concrete workability.

Buckeye Building Fibers LLC
1001 Tillman
Memphis, TN 38108
866-663-8999
www.ultrafiber500.com

Usage Guideline
UltraFiber 500® reinforcing fiber can be used as an alternate system to provide secondary reinforcement. It cannot be used as an alternative for structural reinforcement. UltraFiber 500® fiber should not be used to alter the concrete design for thickness or strength. ACI recommended curing practices, joint spacing and depth should be followed.

Mixing Procedure
UltraFiber 500® reinforcing fibers disperse best when added at the beginning of the batching sequence. Follow normal mixing, time and speed, as recommended by ASTM C94.

Packaging
UltraFiber 500® reinforcing fibers are available in 1.0 pound and 1.5 pound, water-soluble bags. Larger 20 pound non-soluble bags are also available. For automated dispensing, 500 pound bulk bags are recommended.

Engineering Specification
Use only 100% virgin alkali-resistant cellulose fibers manufactured for use in concrete for secondary reinforcement. Dosage rates are 1.0 lb/yd^3 (minimum), 1.5 lb/yd^3 (recommended), and up to 4.0 lb/yd^3 for special applications. Buckeye UltraFiber 500® fiber is for the control of cracking due to plastic shrinkage and thermal expansion/contraction, to reduce water migration, and for increased impact capacity and shatter resistance. Fiber manufacturer must provide compliance with applicable building codes, ISO 9001 certification of manufacturing facility and ASTM C1116-08 compliance. Fibrous concrete reinforcement shall be manufactured by Buckeye Building Fibers LLC, 1001 Tillman, Memphis, TN 38108.
Phone: 866-663-8999, Fax: 901-320-8844

Website: www.ultrafiber500.com.

Spirit Bank Event Center
UltraFiber added @ 3.0 lbs/cyd

ICC EVALUATION SERVICE

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ICC-ES Evaluation Report

ESR-1032

Reissued February 1, 2014

This report is subject to renewal March 1, 2015.

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DIVISION: 03 00 00—CONCRETE
Section: 03 24 00—Fibrous Reinforcing

REPORT HOLDER:

BUCKEYE TECHNOLOGIES
1001 TILLMAN
MEMPHIS, TENNESSEE 38112
(901) 320-8100
www.ultrafiber500.com
ultrafiber500@bkitech.com

EVALUATION SUBJECT:

BUCKEYE ULTRAFIBER 500® VIRGIN CELLULOSE FIBERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code®* (IBC)
- 2009 *International Residential Code®* (IRC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Fiber durability.
- Crack control in concrete.
- Fire-resistance-rated construction
- Noncombustible construction

2.0 USES

Buckeye UltraFiber 500® virgin cellulose fibers are used as a fiber admixture in normal-weight concrete in buildings of any construction type for:

Reducing plastic shrinkage cracking of reinforced concrete and structural plain concrete.

Reducing shrinkage and temperature cracking in structural plain concrete slabs on grade.

Components of fire-resistance-rated floor/ceiling and floor-design assemblies.

3.0 DESCRIPTION

3.1 Cellulose Fibers:

Buckeye UltraFiber 500® is made from virgin cellulose fibers that have been chemically processed and then treated with a mineral-based chemical that results in an alkaline-resistant fiber. The fibers have an average denier of 2.8.

3.2 Structural Plain Concrete:

Structural plain concrete must comply with Section 1909 of the IBC. Concrete must be proportioned as normal weight and comply with applicable requirements set forth in Section 1904 of the IBC.

4.0 INSTALLATION

4.1 General:

Buckeye UltraFiber 500® virgin cellulose fibers must be dispersed uniformly through the concrete mixture in accordance with ASTM C 1116.

The fibers must be blended into the concrete mix at a minimum rate of $^3/_4$ pound per cubic yard (0.44 kg/m^3) of concrete. The dosage must not exceed 15 pounds per cubic yard (8.9 kg/m^3). When concrete slabs are exposed to abrasive and/or impact conditions (e.g. forklifts), the dosage rate must be a minimum of 1.5 pounds per cubic yard (0.89 kg/m^3) of concrete.

The manufacturer's published installation instructions using either a dispersible bag system or a bulk time metric system and this report must be strictly adhered to, and a copy of the manufacturer's installation instructions must be available at all times on the jobsite during installation.

4.2 Fire-resistance-rated Construction:

Buckeye UltraFiber 500® virgin cellulose fibers may be used as an alternative to welded wire fabric in concrete and steel floor units of listed fire-resistant-rated floor/ceiling and floor-design assemblies at a minimum dosage rate of 1.0 pound per cubic yard (0.59 kg/m^3) and maximum dosage rate of 2.0 pound per cubic yard (1.19 kg/m^3) of concrete for up to two-hour fire-resistance ratings. Concrete-steel form unit floor assemblies must be a minimum of No. 22 gage steel for fluted decks and No. 20/20 gage for cellular units, and must have minimum $2^1/_2$-inch-thick concrete over the top of the flutes. Except for substitution of the fibers for the welded-wire fabric, all other aspects of the fire-resistance-rated assembly must comply with its listing.

5.0 CONDITIONS OF USE

The Buckeye UltraFiber 500® virgin cellulose fibers described in this report comply with, or are a suitable alternative to what is specified in, those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

5.1 Design and construction of concrete utilizing the Buckeye UltraFiber 500® fibers must be in accordance with the requirements of the applicable codes and ACI 318, as applicable.

ICC-ES Evaluation Reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

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5.2 The fibers must be blended in accordance with the manufacturer's published instructions and Section 4.0 of this evaluation report. If there is a conflict between this report and the manufacturer's published installation instructions, this report governs.

5.3 The use of the fibers is limited to normal-weight concrete.

5.4 The fibers must not be used to replace any structural reinforcement. Structural reinforcement is described in Section 3.5 of ACI 318 (IBC).

5.5 For structural plain concrete, control joints, as required by Section 1909.3 of the IBC, must be provided.

5.6 For reinforced concrete, structural reinforcement and shrinkage and temperature reinforcement in accordance with Section 1907.12 of the IBC, must be provided.

5.7 Use of fibers must be approved by a registered design professional, if applicable.

5.8 A batch ticket, signed by a ready-mix representative, must be available to the code official upon request. The delivery ticket must include, in addition to the items noted in ASTM C 94, the type and amount of fibers added to the concrete mix.

6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Concrete with Virgin Cellulose Fibers (AC217), dated June 2010.

7.0 IDENTIFICATION

Each box of Buckeye UltraFiber 500® virgin cellulose fibers must be identified with the Buckeye Technologies name and/or trademark, address and telephone number; product trade name; dosage rate; use instructions; and the evaluation report number (ESR-1032).

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the product described in this report was evaluated for compliance with the requirements for the following legacy codes and earlier editions of the International Codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IBC)
- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)
- BOCA® *National Building Code*/1999 (BNBC)
- 1999 *Standard Building Code*© (SBC)
- 1997 *Uniform Building Code*™ (UBC)
- 1998 *International One- and Two-Family Dwelling Code*® (I1&2)

The Buckeye UltraFiber 500® virgin cellulose fibers described in this report comply with, or are a suitable alternative to what is specified in, the codes listed above, subject to the provisions of Sections 8.1 through 8.6.

8.1 Uses:

See Section 2.0.

8.2 Description:

See Section 3.0, except for the following modification:

Structural plain concrete provisions are found in Chapter 22 of ACI 318, Section 1922 of the UBC and Section 1909 of the 2003 IBC.

8.3 Installation:

See Section 4.0.

8.4 Conditions of Use:

See Section 5.0, except for the following modifications:

Section 5.4 is replaced by:

The fibers must not be used to replace any structural reinforcement. Structural reinforcement is described in Section 3.5 of ACI-318-02 (2006 and 2003 IBC), Section 3.5 of ACI 318-95 (BNBC and SBC) or Section 1903.5 of the UBC.

Section 5.5 is replaced by:

For structural plain concrete, control joints, as required by Section 1909.3 of the 2006 and 2003 IBC, Section 1922.3 of the UBC, Section 1909.4 of the BNBC or Section 1907.4 of the SBC, must be provided.

Section 5.6 is replaced by:

For reinforced concrete, structural reinforcement and shrinkage and temperature reinforcement in accordance with Section 1907.12 of the 2006 and 2003 IBC, Section 1907.12 of the UBC, or Section 7.12 of ACI 318-95 (BNBC and SBC), must be provided.

8.5 Evidence Submitted:

See Section 6.0.

8.6 Identification:

See Section 7.0.

Certification

Fibrous Concrete Reinforcement

Material:

Buckeye Building Fibers LLC certifies that **Buckeye UltraFiber 500®** fibers are made from 100% virgin specialty cellulose fiber with a patented alkaline resistant coating specifically engineered and manufactured for use as fibrous secondary reinforcement for concrete. **Buckeye UltraFiber 500®** meets the requirements of American Concrete Institute committee ACI 544 – Report on Fiber Reinforced Concrete – Chapter 5. **Buckeye UltraFiber 500®** meets the material specifications described in ASTM C-1116-09, Section 4.1.4 Type IV Natural Fibers and ASTM D-7357-07 Cellulose Fibers for Fiber-Reinforced Concrete.
Buckeye UltraFiber 500® fibers are manufactured in the USA.

Performance:

We further certify that concrete test specimens produced containing a minimum of 1.0 lbs./yd^3 (0.6 kg/m^3) of **Buckeye UltraFiber 500®** have been evaluated by independent test laboratories and have met or exceeded the specified values for Plastic Shrinkage Cracking (ICC AC-217, Annex A), Alkali Stability (ASTM D6942), Compressive Strength (ASTM C39), Flexural Strength (ASTM C78), Bond Strength (ASTM C234), and Freeze/Thaw Resistance (ASTM C666) as described in ICC Evaluation Service AC217, Acceptance Criteria for Concrete with Virgin Cellulose Fibers. **Buckeye UltraFiber 500®** has been classified by Underwriters Laboratories as 2 hour fire rated for use on all Composite Metal Deck Assemblies D700, D800 and D900 Designs.

Application:

Buckeye UltraFiber 500® is an alternate system to welded wire fabric when used for non-structural secondary reinforcement in hardened concrete.

Michael J. Schultz, P.E.
ACI Member No. 131082

Notary

ROBIN D. BLUE
Commission # EE 181267
Expires May 13, 2016
Bonded Thru Troy Fain Insurance 800-385-7019

REGISTERED PROFESSIONAL ENGINEER
MICHAEL J. SCHULTZ
19541
6/15/12
OKLAHOMA

BUCKEYE
Buckeye Building Fibers LLC
1001 Tillman Street
Memphis, TN 38108
901-320-8100

Designation: C 1116/C 1116M – 08

Standard Specification for Fiber-Reinforced Concrete[1]

This standard is issued under the fixed designation C 1116/C 1116M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers all forms of fiber-reinforced concrete that are delivered to a purchaser with the ingredients uniformly mixed, and that can be sampled and tested at the point of delivery. It does not cover the placement, consolidation, curing, or protection of the fiber-reinforced concrete after delivery to the purchaser.

1.2 Certain sections of this specification are also applicable to fiber-reinforced concrete intended for shotcreting by the dry-mix process when sampling and testing of concrete is possible only at the point of placement. In this case, the sections dealing with batching plant, mixing equipment, mixing and delivery, and measurement of workability and air content, are not applicable.

1.3 This specification does not cover thin-section glass fiber-reinforced concrete manufactured by the spray-up process that is under the jurisdiction of ASTM Subcommittee C27.40.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 The following precautionary statement pertains only to the test method portion, Sections 15 and 18, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 820/A 820M Specification for Steel Fibers for Fiber-Reinforced Concrete

C 31/C 31M Practice for Making and Curing Concrete Test Specimens in the Field

C 39/C 39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C 42/C 42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C 94/C 94M Specification for Ready-Mixed Concrete

C 125 Terminology Relating to Concrete and Concrete Aggregates

C 138/C 138M Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

C 143/C 143M Test Method for Slump of Hydraulic-Cement Concrete

C 150 Specification for Portland Cement

C 172 Practice for Sampling Freshly Mixed Concrete

C 173/C 173M Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C 231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C 387 Specification for Packaged, Dry, Combined Materials for Mortar and Concrete

C 567 Test Method for Determining Density of Structural Lightweight Concrete

C 666/C 666M Test Method for Resistance of Concrete to Rapid Freezing and Thawing

C 684 Test Method for Making, Accelerated Curing, and Testing Concrete Compression Test Specimens

C 685/C 685M Specification for Concrete Made by Volumetric Batching and Continuous Mixing

C 887 Specification for Packaged, Dry, Combined Materials for Surface Bonding Mortar

C 995 Test Method for Time of Flow of Fiber-Reinforced Concrete Through Inverted Slump Cone

C 1077 Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

C 1140 Practice for Preparing and Testing Specimens from Shotcrete Test Panels

[1] This specification is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.42 on Fiber-Reinforced Concrete.

Current edition approved Jan. 1, 2008. Published February 2008. Originally approved in 1989. Last previous edition approved in 2006 as C 1116/C 1116M – 06.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard.**

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C 1385/C 1385M Practice for Sampling Materials for Shotcrete
C 1399 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete
C 1436 Specification for Materials for Shotcrete
C 1480 Specification for Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Application
C 1550 Test Method for Flexural Toughness of Fiber Reinforced Concrete (Using Centrally Loaded Round Panel)
C 1602/C 1602M Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
C 1604/C 1604M Test Method for Obtaining and Testing Drilled Cores of Shotcrete
C 1609/C 1609M Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading)
C 1666/C 1666M Specification for Alkali Resistant (AR) Glass Fiber for GFRC and Fiber-Reinforced Concrete and Cement
D 6942 Test Method for Stability of Cellulose Fibers in Alkaline Environments
D 7357 Specification for Cellulose Fibers for Fiber-Reinforced Concrete

2.2 *ACI Standards and Reports:*
211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete[3]
211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete[3]
506.2 Specification for Materials, Proportioning and Application of Shotcrete[3]

3. Terminology

3.1 *Definitions*

3.1.1 For definitions of terms used in this specification, refer to Terminology C 125.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *manufacturer, n*—the producer who furnishes the fiber-reinforced concrete.

3.2.2 *purchaser, n*—the owner, or representative thereof, who buys the fiber-reinforced concrete.

4. Classification

4.1 This specification classifies fiber-reinforced concrete by the material type of the fiber incorporated.

NOTE 1—The performance of a fiber-reinforced concrete depends strongly upon the susceptibility of the fibers to physical damage during the mixing or shotcreting process, their chemical compatibility with the normally alkaline environment within cement paste, and their resistance to service conditions encountered within uncracked concrete or as a consequence of cracking, involving, for example, carbon dioxide, chlorides, or sulfates in solution with water and oxygen or ultraviolet light in the atmosphere. Improper methods of fiber addition to a concrete mix can lead to balling of some types of fiber; consult manufacturer for advice as to correct method before use. The magnitude of improvements in the mechanical properties of the concrete or shotcrete imparted by fibers can also reflect the material characteristics, geometry, and design of the fiber type.

4.1.1 *Type I Steel Fiber-Reinforced Concrete*—Contains stainless steel, alloy steel, or carbon steel fibers conforming to Specification A 820/A 820M.

4.1.2 *Type II Glass Fiber-Reinforced Concrete*—Contains alkali-resistant (AR) glass fibers conforming to Specification C 1666/C 1666M.

4.1.3 *Type III Synthetic Fiber-Reinforced Concrete*—Contains synthetic fibers for which documentary evidence can be produced confirming their long-term resistance to deterioration when in contact with the moisture and alkalis present in cement paste and the substances present in admixtures (see Note 2 and 4.2).

NOTE 2—Fibers such as polyolefins (polypropylene and polyethylene), nylon, and carbon have been shown to be durable in concrete.

4.1.4 *Type IV Natural Fiber-Reinforced Concrete*—Contains natural fibers for which documentary evidence can be produced confirming their long-term resistance to deterioration when in contact with the moisture and alkalis present in cement paste and the substances present in admixtures. When Type IV fiber-reinforced concrete contains cellulose fibers they shall conform to Specification D 7357.

NOTE 3—The classification, natural fibers, refers to a population of fibers that are manufactured from natural fibrous resources and are used for the first time in concrete. Depending on the initial raw material and the manufacturing process employed to produce the fiber, the final physical and chemical fiber properties in this general classification can vary greatly. Some natural fibers are susceptible to deterioration from exposure to alkalis; Test Method D 6942 may be used to determine the susceptibility of these fibers to deterioration as a result of exposure to alkalis in concrete. Conversely, many other natural fiber types are highly resistant to alkalis and can remain in concrete with no degradation for the complete product life cycle.

4.2 When the purchaser chooses to permit the use of fibers other than those complying with the classifications in 4.1, the manufacturer or supplier shall show evidence satisfactory to the purchaser that the type of fiber proposed for use shows long-term resistance to deterioration when in contact with the moisture and alkalis present in cement paste and the substances present in admixtures.

5. Basis of Purchase

5.1 The basis of purchase for fiber-reinforced concrete shall be in accordance with the *Basis of Purchase* Sections of Specification C 94/C 94M or Specification C 685/C 685M.

6. Ordering Information

6.1 In the absence of designated applicable general specifications, the purchaser shall specify the following:

6.1.1 Type of fiber-reinforced concrete required. See Section 4.

6.1.2 Type of cement at the purchaser's option, otherwise the cement shall be Type I meeting the requirements of Specification C 150;

6.1.3 Designated size, or sizes, of coarse aggregates;

[3] Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, http://www.aci-int.org.

Designation: D 7357 – 07

Standard Specification for Cellulose Fibers for Fiber-Reinforced Concrete[1]

This standard is issued under the fixed designation D 7357; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers minimum requirements for cellulose fibers intended for use in fiber-reinforced concrete, and other cementitious products.

1.2 This specification provides for measurement of properties, definition of types, typical properties, and prescribes testing procedures to establish conformance to these requirements.

1.3 In the case of conflict between a more stringent requirement of a product specification and a requirement of this specification, the product specification shall prevail. In the case of a conflict between a requirement of the product specification or a requirement of this specification and a more stringent requirement of the purchase order, the purchase order shall prevail. The purchase order requirements shall not take precedence if they, in any way, violate the requirements of the product specification or this specification; for example, by the waiving of a test requirement or by making a test requirement less stringent.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

C 1116 Specification for Fiber-Reinforced Concrete and Shotcrete

D 6942 Test Method for Stability of Cellulose Fibers in Alkaline Environments

2.2 *TAPPI (Technical Association of the Pulp and Paper Industry):*[3]

T 205 Forming handsheets for physical tests of pulps

T 222 Acid-insoluble lignin in wood and pulp

T 231 Zero-span breaking strength of pulp (dry zero-span tensile)

T 232 Fiber length of pulp by projection

T 233 Fiber length of pulp by classification

T 234 Coarseness of pulp fibers

T 236 Kappa number of pulp

T 259 Species identification of non-wood plant fibers

T 263 Identification of wood and fibers from conifers

2.3 *ACI (American Concrete Institute) Documents:*[4]

544.1R Committee Report on Fiber-Reinforced Concrete

2.4 *ICC-ES Documents:*[5]

AC 217 Acceptance Criteria for Concrete with Virgin Cellulose Fibers

3. Terminology

3.1 *Definitions:*

3.1.1 *alkaline stability, n*—resistance to strength loss due to exposure to alkaline environments, as measured in Test Method D 6942.

3.1.2 *coarseness, n*—linear density given in units of mg/100m. (See TAPPI T 234.) This unit is termed *decigrex*, and can be converted to the standard textile linear density unit, *denier*, which is weight in grams of 9000 meters of synthetic fiber.

3.1.3 *durability/compatibility with concrete, n*—resistance to strength loss based on ZSSR testing (Test Method D 6942) using saturated calcium hydroxide and 1N sodium hydroxide as alkaline environments. (See ICC-ES AC 217, section 4.6.)

3.1.4 *zero-span stability ratio (ZSSR), n*—the ratio of the zero-span tensile after exposure to an alkaline environment to the zero-span tensile of the control fibers (that is, fibers not exposed to an alkaline environment) as defined in Test Method D 6942.

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[1] This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.36 on Cellulose and Cellulose Derivatives.

Current edition approved June 1, 2007. Published June 2007.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Technical Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Norcross, GA 30092, http://www.tappi.org.

[4] Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, http://www.aci-int.org.

[5] Available from ICC-ES, 5360 Workman Mill Road, Whittier, CA 90601, http://www.icc-es.org, under "Approved Criteria."

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3.1.5 *zero-span tensile, n*—measurement of individual fiber strength, as defined in TAPPI Method T 231 based on testing standard handsheets made according to TAPPI Method T 205.

4. Classification

4.1 Cellulose fibers are described in ACI 544.1R-96, chapter 5 as a class of natural fibers. Specification C 1116 also uses the term natural fiber to describe cellulosic fibers.

4.2 Unknown cellulosic plant fibers must be identified as such or identified by appropriate microscopic examination. (TAPPI T 259 provides for the identification of non-wood plant fibers, and T 263 provides for the identification of fibers from conifers.)

4.3 If known, the common name and scientific classification of the fibers will be provided. For example, wood fibers derived from pulping slash pine trees should be designated; "slash pine (*Pinus elliottii*) fibers." A classification for mixed vegetable fibers would be 1:1 elephant grass (*Pennisetum purpureum*) and esparto (*Stipa tenacissima*).

4.4 Processed fibers shall also be classified by process. Process types are mechanical and chemical. Mechanical processes include stone ground (SG), refiner mechanical pulping (RMP), thermo-mechanical pulping (TMP), and chemi-thermo-mechanical pulping (CTMP). Chemical pulping includes the kraft process, the soda process, and the sulfite process.

5. Ordering Information

5.1 It shall be the responsibility of the purchaser to specify all requirements that are necessary for the product under this specification. Such requirements to be considered include, but are not limited to, the following:

5.1.1 ASTM designation and year of issue.

5.1.2 Quantity in kg (pounds or tons).

5.1.3 Type or types permissible (Section 4).

5.1.4 Manufacturers product code.

5.1.5 Whether Certificate of Analysis by the manufacturer is required.

6. Materials and Manufacture

6.1 The materials and manufacturing methods used shall be such that the fibers produced conform to the requirements in this specification.

7. Chemical Composition

7.1 Cellulosic fibers contain polysaccharides, lignin, extractives and minerals. The polysaccharides consist of cellulose (poly-1,4-β-D-anhydroglucopyranose) and hemicellulose (polymers of mixed pentoses and hexoses).

7.2 Unbleached, semibleached and fully bleached chemical wood pulps have cellulose as the predominant polymer. Unpurified vegetable fibers will have hemicelluloses as the predominate polymer.

7.3 Mechanical wood pulps will have approximately equal amounts of cellulose, hemicellulose, and lignin.

7.4 Purified chemical ("fully bleached") wood pulps do not contain lignin, but mechanical, unbleached, and semi-bleached pulps still retain some residual lignin. Fibers that are not lignin-free should be certified by the level of lignin present using either the kappa number test (TAPPI T 236) or the acid-insoluble lignin test (TAPPI T 222).

8. Physical Properties

8.1 The average fiber length of the cellulosic fibers will be specified based on projected length (TAPPI T 232), classified length (TAPPI T 233) or instrumental determination by a fiber analyzer.

8.2 The average fiber coarseness of the cellulosic fibers will be specified based on microscopic examination (TAPPI T 234) or instrumental determination by a fiber analyzer.

8.3 The average zero-span tensile strength of the cellulosic fibers will be specified based on standard testing and reported in grams, kilograms or breaking length (the test protocol will be consistent with TAPPI T 231).

9. Performance Requirements

9.1 Certified test results based on standard test methods may be required by the purchaser.

10. Other Requirements

10.1 As specified by purchaser.

11. Workmanship, Finish and Appearance

11.1 Fibers shall meet specifications for basis weight, brightness, viscosity, sheet density, dirts, and other parameters desired by purchaser.

12. Hazards

12.1 Cellulose fibers are generally regarded as safe, but care must be taken in storage since cellulose fibers are flammable. During processing cellulosic fines may be generated as dust, which could require the use of dusk masks. MSDS must be available.

13. Inspection

13.1 Unless otherwise specified in the purchase order or contract, the manufacturer is responsible for the performance of all inspection and test requirements specified herein. Except as otherwise specified in the purchased order or contract, the manufacturer may use his own or any other suitable facility for the performance of the inspection and test requirements specified herein unless disapproved by the purchaser.

13.2 The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to ensure that material conforms to prescribed requirements.

14. Rejection and Rehearing

14.1 *Rejection*—If any test fails to conform to the requirements of this specification, it shall be cause for rejection of the material represented by the test. Material that is found to be defective subsequent to its acceptance at the manufacturer's works may be rejected and manufacturer notified. Rejection of fibers shall be reported to the manufacturer promptly and in writing, stating the lot number from the bag or the box of the rejected fibers. Samples representing fibers rejected by the purchaser shall be preserved until disposition of the claim has been agreed to between the supplier and the purchaser.

14.2 *Rehearing*—When any test fails to meet requirements, a retest shall be allowed. This retest shall be performed on twice the number of randomly selected specimens originally tested. The results of the retest shall meet the requirements of this specification or the lot shall be rejected.

15. Certification

15.1 *Certification of Compliance/Analysis*—When specified in the purchase order or contract, the producer or supplier shall furnish a certificate of compliance/analysis stating the product was manufactured, sampled, tested, and inspected in accordance with this specification (including year of issue) and any other requirements designated in the purchased order or contract, and has been found to meet such requirements.

15.2 *Test Reports*—When specified in the purchase order or contract, test reports shall be furnished to the purchaser containing the results of all tests requires by this specification (including year of issue), and any other requirements designated in the purchase order or contract.

15.3 A signature or notarization is not required; however, the document shall clearly identify the organization submitting the document. Notwithstanding the absence of a signature, the organization submitting the document is responsible for its content.

16. Packaging and Package Marking

16.1 The product shall be packaged to provide adequate protection during normal handling and transportation. The type of packaging and gross mass (weight) of containers shall, unless otherwise agreed upon, be at the manufacturer's discretion provided that they are such as to ensure acceptance by common or other carriers for safe transportation at the lowest rate to the delivery point.

16.2 Each shipping container shall be clearly labeled and show manufacturer's name or trademark, product code, lot number or manufacturing code, and net mass (weight). At the manufacturer's discretion other information may be given.

17. Precision and Bias

17.1 For precision and bias statements, see the individual test standards referenced in this specification.

18. Keywords

18.1 acceptance testing; cellulose fibers; classification; fiber-reinforced concrete

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BUCKEYE UltraFiber 500®

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For Unsurpassed Secondary Crack Control and Automated Fiber Dispensing Technology

Comparison of UltraFiber 500® Alkali Resistant Cellulose Fiber versus Synthetic Polypropylene Fiber for Secondary Reinforcement @ 1.0 pounds per cubic yard

Fiber Characteristic	Buckeye UltraFiber 500®	Typical Polypropylene	Advantages of Using UltraFiber 500®
Plastic Properties	Min. Impact	Sig. Effects	UltraFiber 500® does not reduce concrete slump or increase air content resulting in better concrete workability, strength, and density
Placement/Finishing	No special finishing required	Special finishing required	No surface balling, blemishing, or fuzz resulting in a properly sealed, smooth surface and fewer call backs
Field Cured Strength Properties Compressive Strength* (psi)	5 - 15 % gain	Min. Impact	Enhanced internal curing of concrete results in greater compressive strength gains
Curing Effect	Improves/ Hydrophilic	No effect/ Hydrophobic	Improved cement hydration enhances concrete strength properties
Freeze/Thaw Resistance ASTM C666 (% ↑) P18 - 425 (% ↓)	 41 87	 --- ---	Consistently demonstrated improvements to freeze/thaw resistance result in more durable concrete
Concrete Permeability** (% ↓)	67	---	UltraFiber 500® reduces water permeability of stressed and unstressed concrete which minimizes the potential for corrosion of structural rebar
Absorbency Absorption Rate ($mm/s^{0.5}$) Water Absorbed (grams)	 0.0033 14.3	 0.0045 - 0.0054 18.3 - 21.8	Lower absorbency results in better long-term durability from less absorption of water due to more uniform voids and finer porosity
Paste Bonding	Bonding	No bonding	Better bonding with paste results in fewer microscopic voids and openings
Fiber Tensile Strength (KSI)	90 - 130	30 - 70	UltraFiber 500® fibers are as strong as steel
Fiber Count (fibers/lb)	720×10^6	44×10^6	Over 700 million crack-fighting fibers disperse evenly throughout the concrete, facilitating their ability to intersect micro-cracks as they may form, dispersing tensile stress, and reducing macro-cracks
Surface Area (cm^2/g)	25,000	1,500	UltraFiber 500® enhances surface bonding of fibers to concrete, improving bond strength and reducing plastic shrinkage cracking
Fiber Spacing* (µm)	640	950	Closer fiber spacing intercepts more micro-cracks, reducing their growth, ensuring unsurpassed plastic shrinkage cracking control
Fiber Dispersion	No Clumps	Clumps	More uniform dispersion into concrete provides a more uniform performance
Fiber Source	Plantation wood Stable Pricing	Fossil Fuels Erratic Pricing	American-made from a renewable natural resource

*In concrete at 1.5 lb/yd^3
**At 50% stress level

Certificate of Registration

Buckeye Florida, L.P.
One Buckeye Drive
Perry, FL 32348

Is hereby granted the right and license to use the QSR® Registered Firm Symbol and to be listed in the Quality Systems Registrars, Inc. "Register of Certified Quality Systems" under the conditions specified in QSR®'s Contract and ISO 9001:2008 for the following scope:

Sale, manufacture, delivery, and customer service of specialty wood cellulose products.

Exclusions: 7.3 Design and development; 7.5.4 Customer property.

The period of registration is from February 19, 2012 to February 18, 2015.
Registered Firm Since February 19, 1993.

Certificate Number: QSR-073

Scott R. Kleckner
President

February 8, 2012
Date

MGMT. SYS
RvA C 057

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www.qsr.com

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 9 April 2014
SERIAL NO.: 39
SPEC. REF.: 03 30 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 39.2
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	SpecChem	Liquid Curing Compound

Comment(s):

1. The SpecChem WB 25 liquid curing compound is acceptable. The SpecChem representative stated that a water cure prior to placing the WB 25 seemed redundant. The curing agent can be applied per the manufacturer's instructions in lieu of the curing process detailed in section 03 30 00 – 20. Please note, the contractor retains responsibility for appropriate curing of concrete and repair or replacement of any defective concrete. Also note that the submitted product is compatible with 'most' floor covering adhesives. It is the contractor's responsibility to ensure the linoleum cover will adhere to the concrete after applications of the curing compound.

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B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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Shop Drawing Review Letters

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 29 May 2014
SERIAL NO.: 44
SPEC. REF.: 05 50 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 44
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCNR	1	Glacier/Blue Star	Guardrail Shop Drawings
2	MCNR	2	Glacier/Blue Star	Guardrail Product Data

Comment(s):

1. Per Section 05 50 00 – 1.03 – D1, provide shop drawings showing "relationship of work to adjoining construction." Please include the following:
   a. Post layout over entire guardrail (location/quantity)
   b. Intermediate post supports if any
   c. Cable splice locations if any
   d. Corner configurations
2. Provide intermediate post support and bracing hardware if any is to be used. Also, provide the cable length and sections.

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B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Submittal No.: **44**

Contract #: C14500123

ATTN: **Jing Liu**

Date: **5/28/14**

Project **Cornet Bay Marina Remediation**

Owner **Dept of Ecology**

Project No. **13-028**

Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1			**Cable and Hardware for Sidewalk Guardrail**		**5 pages**	

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature *C. Alan Hall*

(THIS SPACE FOR ENGINEER)

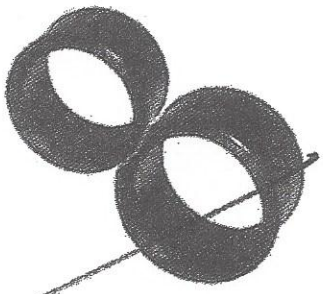
To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

Cable Grommets



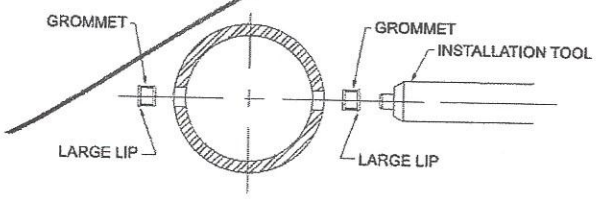
Cable grommets are offered for popular cable diameters of 1/8", 3/16" and 1/4". ***They help prevent rust in exterior applications or elsewhere where moisture is a factor,*** by providing a barrier between the cable and the painted or powder-coated surface through which the cable is drawn when being installed. Ultra-tec cable grommets are installed (after the paint or powder coating is applied) into holes in intermediate posts, cable braces and, in the case of the Invisiware radius ferrule, Push-Lock, and Pull-Lock fittings into the end post holes through which the cable exits. They are offered in black UV resistant Delrin®.

Delrin® is a registered trademark of E.I. DuPont de Nemours & Co.

Order cable grommets by diameter of cable and post through which the cable will be drawn.

CABLE DIA.	INTERMEDIATE POST MATERIAL (Not slotted for stairway)				INTERMEDIATE POST MATERIAL SLOTTED FOR STAIRWAY PITCH UP TO 37°		
	Schedule 40 1-1/4" 1-1/2" 2" PIPE	SQ. OR RECT. TUBE WITH .120" WALL	1/4" CABLE BRACE or SQ. OR RECT. TUBE WITH .250" WALL	1/2" FLAT BAR	Schedule 40 1-1/4" 1-1/2" 2" PIPE	SQ. OR RECT. TUBE WITH .120" WALL	1/4" CABLE BRACE or SQ. OR RECT. TUBE WITH .250" WALL
1/8" & 3/16"	G-C6-1	G-C6-2	G-C6-4	G-C6-.500	GI-C6-1	GI-C6-2	GI-C6-4
1/4"	G-C8-1	G-C8-2	G-C8-4	NA	GI-C8-1	GI-C8-2	GI-C8-4

Cable grommets are available in lots of 100 each.



CABLE DIA.	END POST MATERIAL USING RADIUS FERRULE, PUSH-LOCK or PULL-LOCK FITTINGS	
	Schedule 80 1-1/4"*, 1-1/2" or 2" PIPE	SQ. OR RECT. TUBE with .250" WALL*
1/8" & 3/16"	G-C6-3	G-C6-4
1/4"	G-C8-3	G-C8-4

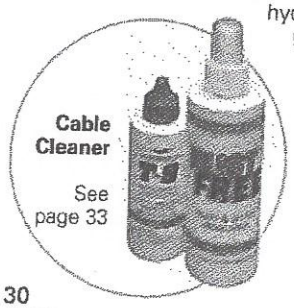
*Cable grommets not required with 1-1/4" pipe counterbored for use with 1-1/2" Push-/Pull-Locks, or with 2" or 3" tube if using like-length Push-/Pull-Locks.

Cable

Sizes offered. Five sizes of cable are offered for the Ultra-tec Cable Railing System: 1/8", 3/16", 1/4", 5/16" and 3/8".

Cable construction. For most applications, we recommend 1x19 construction, type 316 stainless steel cable. 1x19 construction cable is engineered to hold static loads without stretching, and it is relatively stiff. Other cable constructions can be used, such as 7x7 or 7x19, but they are rarely recommended because of their elevated levels of stretch and lower breaking strengths in comparison to 1x19 construction (see chart below).

Swaging — attaching fittings to cable. Our swageless fittings do not require swaging, since the hardware is attached to the cable by hand. Other Ultra-tec hardware is swaged using hydraulic presses that apply up to 55 tons of pressure to swage the fittings. Ultra-tec portable swagers are available for purchase or rent, or in many cases the factory can supply cable with fittings attached. It is worth noting that fittings cannot be successfully swaged onto 1x19 construction cable using hand swagers offered by others. In those instances, less desirable constructions must be used. That is never the case with Ultra-tec hardware.



See page 33

green
Ultra-tec® products contain at least 65% recycled content, helping you qualify for LEED® credits.

Cable coating. Cable can be special ordered with a PVC coating in any standard (PMS) color. PVC coated cable is not shown in our Design and Fabrication Guide for Metal Framed Railings, so special caution should be used if you are considering coated cable because hole specifications for frame components can change and, in some cases, special hardware may be required. If you are interested in using coated cable, please contact the factory for any necessary special hardware or design specifications.

MINIMUM BREAKING STRENGTHS (in Lbs.) FOR TYPE 316 STAINLESS STEEL CABLE

CABLE DIA.	1x19	7x7	7x19
1/8"	1,780	1,360	1,300
3/16"	4,000	3,300	2,900
1/4"	6,900	5,500	4,900
5/16"	10,600	7,600	7,600
3/8"	14,800	11,700	11,000

ISO 9001: 2008 Certified / U.S.A. Manufacturer

Ultra-tec® CABLE RAILING SYSTEMS

Ultra-tec CABLE RAILING SYSTEMS Perfect anywhere.

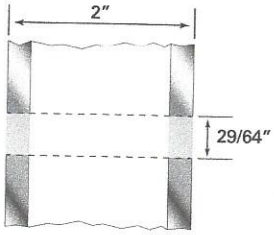
1-800-851-2961 ▪ 775-885-1443 ▪ Fax 775-885-2734
52 Heppner Drive ▪ Carson City, NV 89706
E-mail: info@ultra-tec.com Website: www.ultra-tec.com

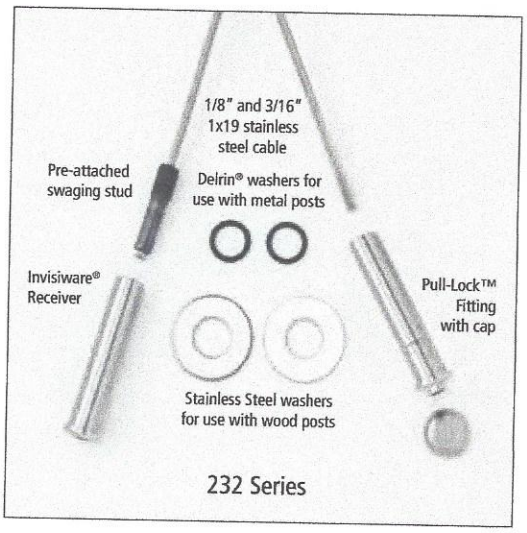
Kit 232 Series Installation Instructions for 2" Metal Posts

Hole size for 1/8" dia. cable installation:
Drill 5/32" hole clear through intermediate posts.

Hole size for 3/16" dia. cable installation:
Drill 7/32" hole clear through intermediate posts.

For both 1/8" and 3/16" dia. cable:
Drill 29/64" hole clear through both end posts.

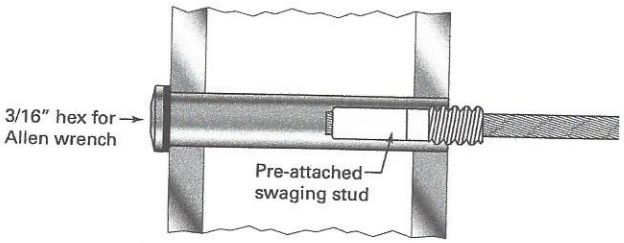




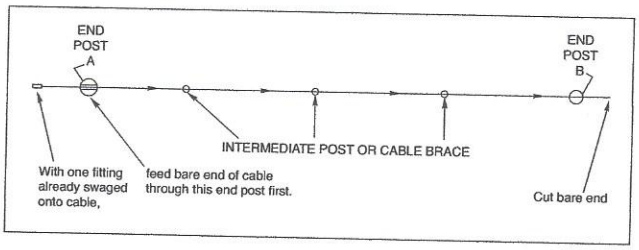
1. Install the tensioning end first with the 2" long Receiver.

2. Slip the Delrin washer over the body of the Receiver and insert the Receiver into the post.

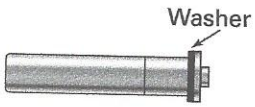
3. Start the threaded stud attached to the cable into the Receiver and turn 2 complete turns. This will thread about 1/3 of the stud into the Receiver.



4. Run the bare end of the cable through all your intermediate posts and through the end post where you will be installing the Pull-Lock fitting.



5. Slip the Delrin washer over the body of the Pull-Lock fitting.



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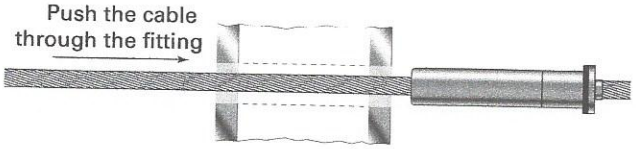
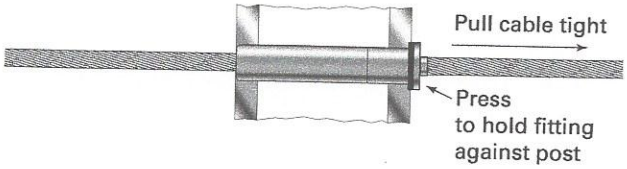
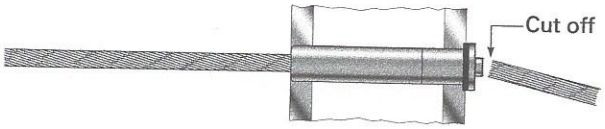
6. Push the cable into the hole in the front of the Pull-Lock fitting and pull the cable through. Twist the cable in the right hand direction as you push it into the fitting.



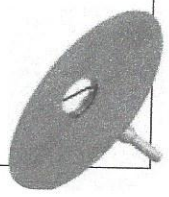
7. Push the Pull-Lock fitting along the cable and firmly into the hole in your post. Push it in as tightly as you can with your hand while pulling the cable through as tightly as you can.



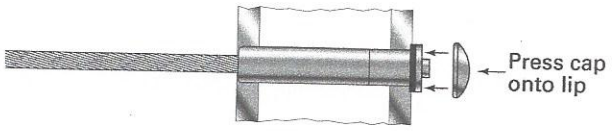
8. Cut the cable flush with the hole in the back of the fitting using a cut-off wheel.



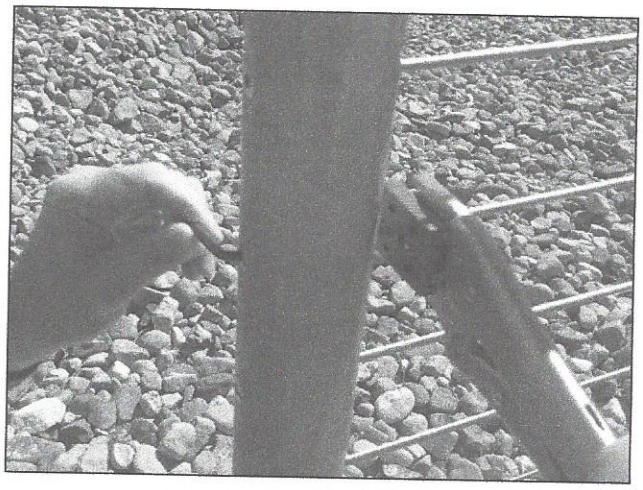
Cut-off Tool
Used to cut cable flush with the end of the Pull-Lock fittings, and to cut excess threads off stud-type Receivers. Includes mandrel and two cut-off wheels. Order **CUT-OFF KIT**

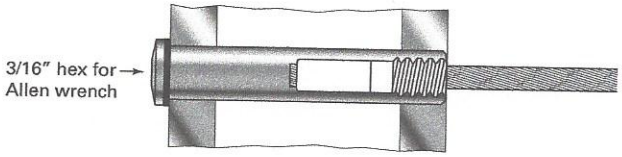


9. Press the cap onto the lip of the Pull-Lock fitting.



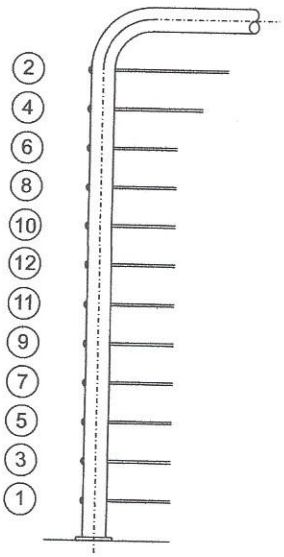
10. Go to the other end and tension the cable by holding the cable securely to prevent it from turning while you turn the Receiver with an Allen hex wrench. Be careful to protect the cable from damage while tensioning.





The swaging stud will be pulled into the Receiver by the tensioning.

11. Tension in sequence, beginning with the outside cables and moving back and forth toward the center. Finished cables should be tensioned to have only 1/4" of play when finger-pulled.



RECOMMENDED TENSIONING SEQUENCE

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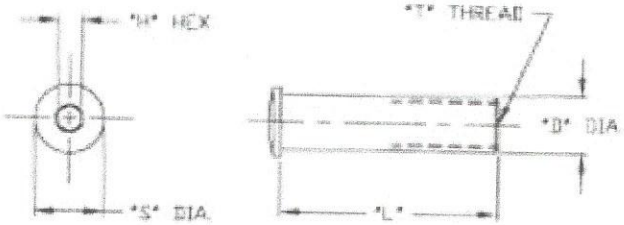
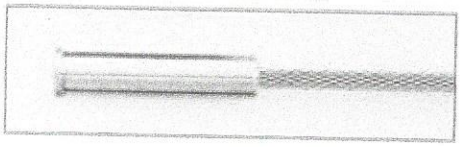
INVISIWARE® RECEIVER

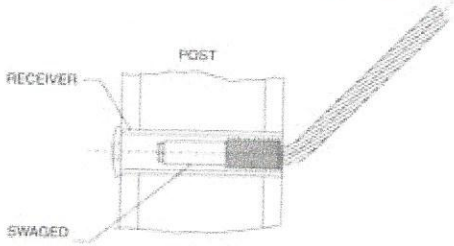
The Invisiware® receiver is designed to be used with our swaging stud. When the appropriate receiver is selected for a particular type and size of end post, the result is a tensioning mechanism that is hidden within the end post itself. Only the head area of the receiver will be exposed outside of the post. The head area is the domed shaped end of the receiver that is larger than the body of the receiver. It acts as a shoulder to support the tension of the cable as it is tightened. The outside of the domed head is broached with a hex broach to accept an Allen wrench to tension the cable.

Pipe end posts are counterbored to receive the head and to minimize its exposure on the outside of the post. On flat-sided end posts, the head rests flush against the surface of the post. The



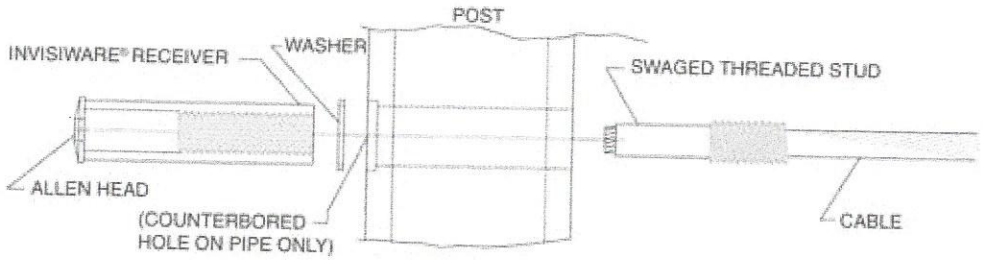
Invisiware® receiver can be used on stair pitches up to approximately 35º without drilling end posts on an angle. We include a plastic washer to act as a scratch resistant barrier between the head of the receiver and the surface of the post.





The Invisiware® receiver can be used in a horizontal position on stair end posts that have a pitch up to 35 degrees. This eliminates the need to bore hardware holes at an angle on stair runs.

HOW IT WORKS



green
Ultra-tec® products contain at least 65% recycled content, helping you qualify for LEED® credits.

TYPE 316 STAINLESS STEEL

CABLE DIA.	USE WITH STUD NO.	DIMENSIONS	FRAME OPTIONS							
			1-1/2" TUBE or 1-1/4" PIPE	1-1/2" PIPE	2" x 2" TUBE	2-3/8" TUBE	2" PIPE	2-1/2" TUBE	3" X 1" TUBE 2" X 1" TUBE	3-1/2" TUBE or 4" X 4" WOOD POST
1/8"	S-4	D = .437" H = 3/16" T = 5/16-24 S = .537"	R-6-12 L = 1.562"	R-6-22 L = 1.812"	R-6-32 L = 2.030"	R-6-72 L = 2.375"	R-6-42 L = 2.301"	R-6-82 L = 2.530"	R-6-52 L = 3.030"	R-6-62 L = 3.5625"
3/16"	S-6									
1/4"	S-8	D = .531" H = 7/32" T = 7/16-20 S = .646"	—	R-8-22 L = 1.812"	R-8-32 L = 2.030"	—	R-8-42 L = 2.301"	—	R-8-52 L = 3.030"	—
5/16"	S-10	D = .687" H = 5/16" T = 9/16-18 S = .865"	—	—	R-12-32 L = 2.030"	—	R-12-42 L = 2.301"	—	R-12-52 L = 3.030"	—
3/8"	S-12									

All Ultra-tec® hardware is manufactured in the United States of America.

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PULL-LOCK™ STOP-END FITTINGS

Pull-Lock™ fittings are designed for use with 1x19 L.H. lay strand only. They can be used with any tensioning device on the other end...but ***when used with our swageless tensioners, both ends can be put on the cable by hand*** without any swaging or special tools.

You can order your cables with a tensioner already on one end or you can install a tensioner on one end on site. Attach the tensioner on one end post, slip the Pull-Lock™ fitting into the other end post and pull the cable all the way through the Pull-Lock™ fitting. Tension the cables, then cut the excess cable off on the back side of the fitting with a 4" right angle grinder or a cutting wheel (available from the factory) that is used with your hand drill. Press on the stainless steel cap to cover the bare cable end, and you're done!

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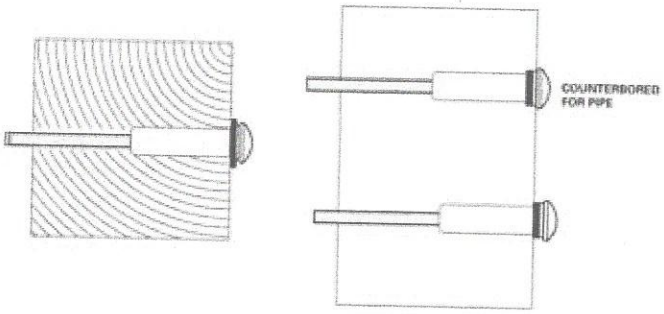
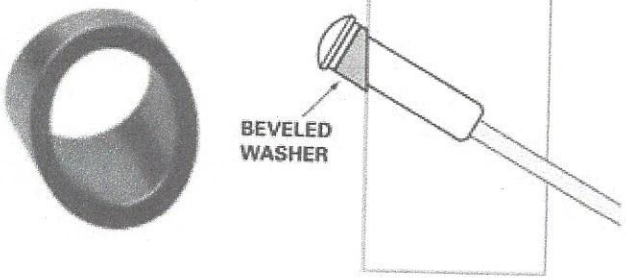
Ultra-tec® products contain at least 65% recycled content, helping you qualify for LEED® credits.



USE WITH METAL OR WOOD POSTS

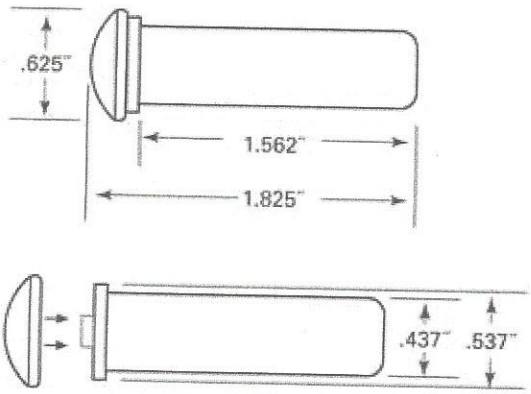
Pull-Lock™ fittings are used with pipe and with round, square, or rectangular metal tubing. When used with an end post 1-1/2" or more in thickness, ***the Pull-Lock™ fitting is hidden inside the end post,*** with only the head exposed on the outside of the post. Pipe ends are counterbored, so the full perimeter of the screw cap head rests on a flat surface in the pipe. The head rests on the outside wall of a flat-sided metal post. A plastic washer is included and acts as a scratch-resistant barrier between the screw cap head and the metal post. For wood applications, also order 7/16SAE stainless steel washer.

BEVELED WASHERS



STAINLESS STEEL BEVELED WASHERS

FOR PITCH OF	ORDER PART NO.
30° - 33°	BW32-6
34° - 36°	BW35-6
37° - 39°	BW38-6



Pull-Lock™ fittings are made of type 316 stainless steel, with the exception of internal components that are made of other types of stainless steel.

DESIGNED FOR USE WITH 1X19 L.H. LAY STRAND ONLY

	FRAME OPTIONS		
CABLE DIA.	1-1/2" TUBE or 1-1/4" PIPE	OTHER FRAMES	FOR WOOD, ALSO USE S.S. WASHER PART NO.
1/8"	PUL-4-12*	PUL-4	7/16SAE

*For appearance, ends are flat (rather than rounded) on PUL-4-12 for use with 1-1/2" tubes and 1-1/4" pipe.

All Ultra-tec® hardware is manufactured in the United States of America.

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Shop Drawing Review Letters

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

To: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

Attention: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

Date: 5 June 2014
Serial No.: 44.1
Spec. Ref.: 05 50 00
Project: Cornet Bay Marina Remediation
K/J Job No.: 1396010.00
Submittal No.: 44.1
Page: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	MCN	1	Glacier/Blue Star	Guardrail Shop Drawings

Comment(s):

1. [Sitts and Hill Structural Engineers] While the use of the Pull-Lock fitting is structurally acceptable, we do recommend that turnbuckles be provided to allow better field adjustment and to improve long term maintenance/adjustability of the system. If turnbuckles are not to be installed, we further recommend that the cables are not cut off until after the system has been reviewed and approved by the Building Inspector. This will allow more freedom to add/remove tension as required to satisfy the Inspector.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

Distribution		SDRL	Encl.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **44.1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **6/2/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted) **44**

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**05 50 00**	**05 50 00-1**	**Guardrail Shop Drawings**	**Blue Star**	**S5**	

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

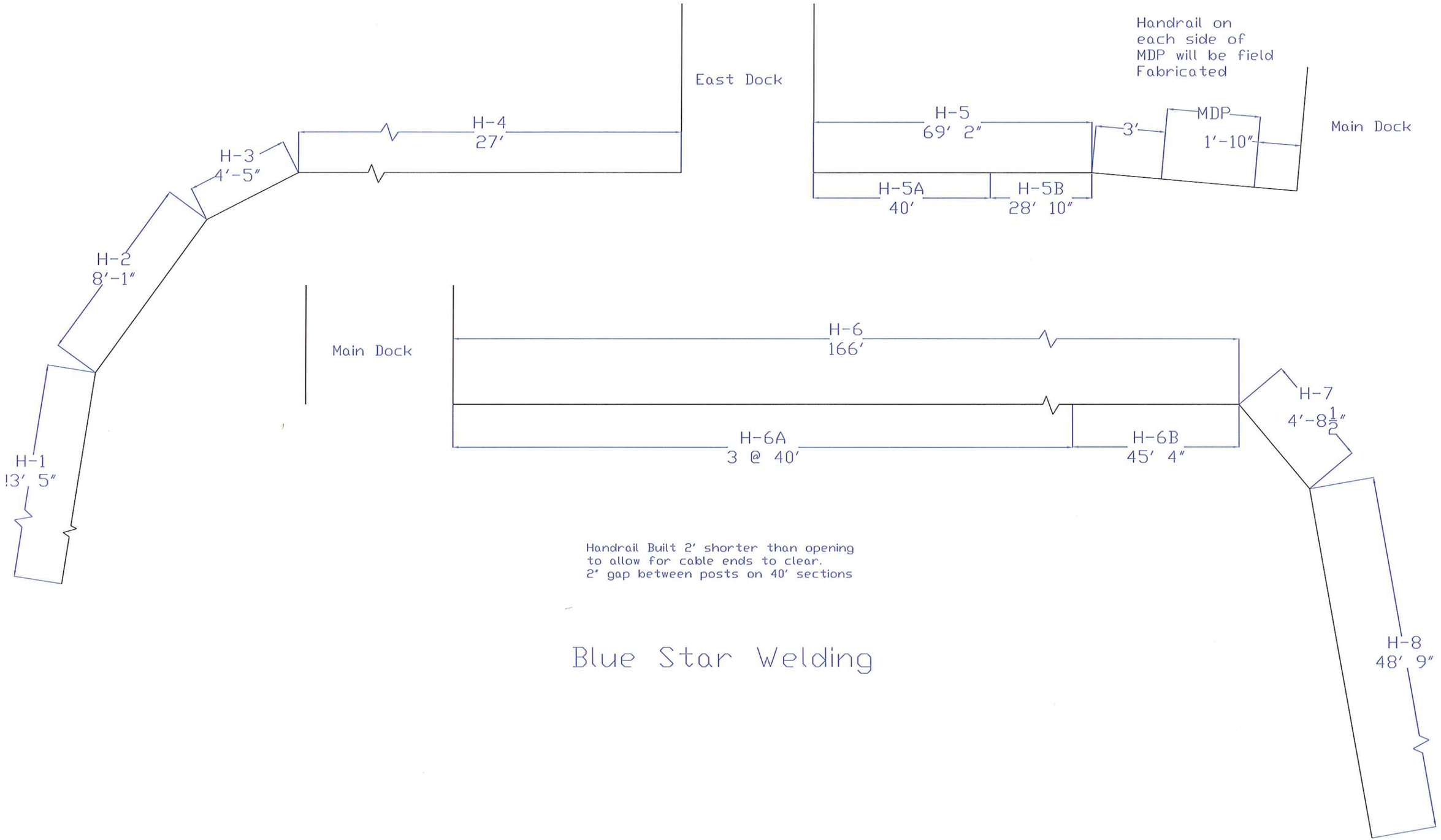
(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

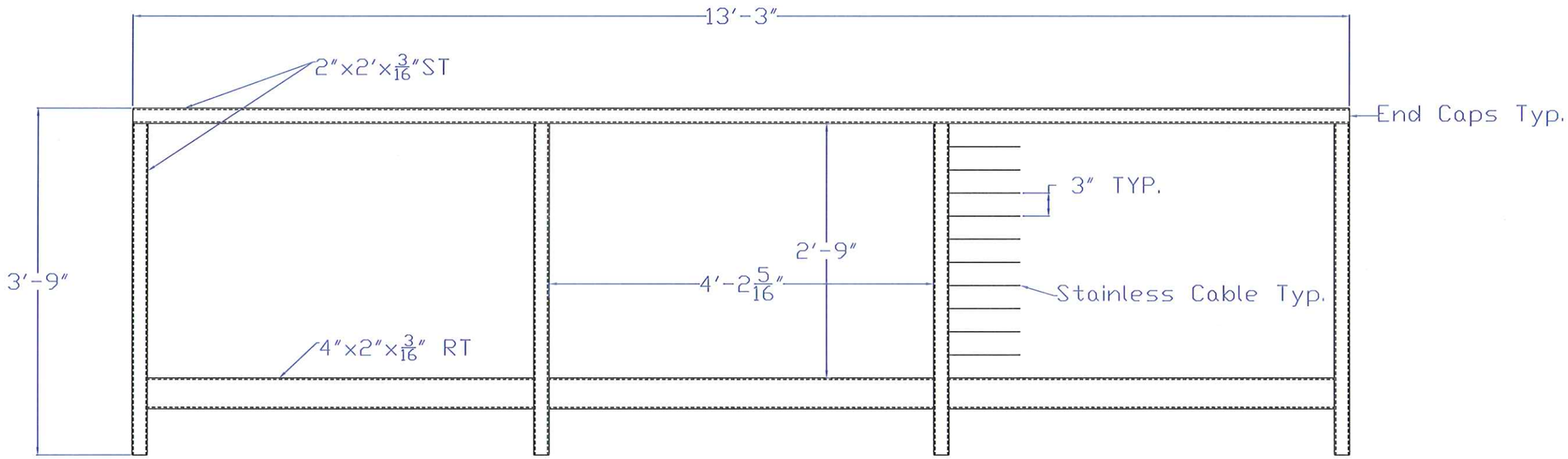
By: _____



Handrail Built 2′ shorter than opening
to allow for cable ends to clear.
2″ gap between posts on 40′ sections

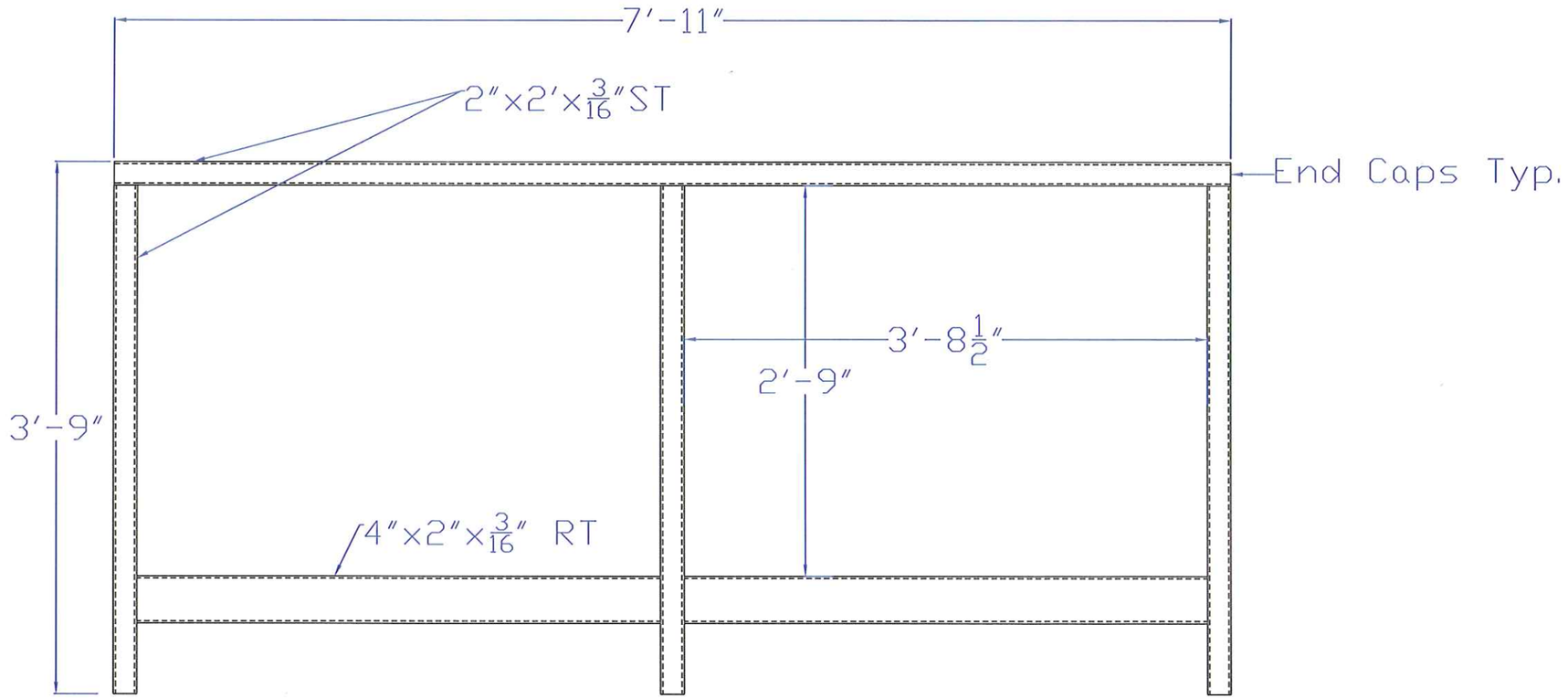
Blue Star Welding

Cornet Bay
H-1
QTY.-1



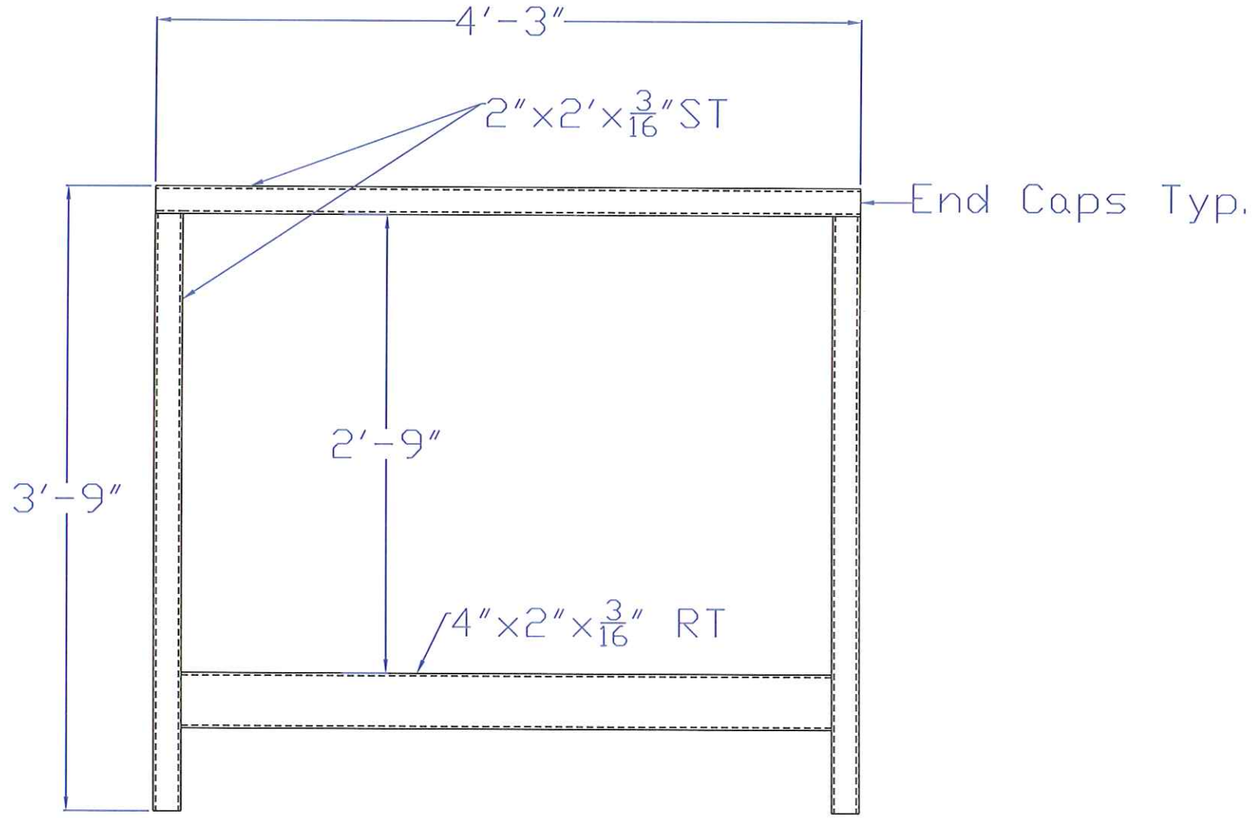
All material is 304 SS.
All posts drilled 3/8″ holes for cable.
Posts Are welded 3″ on to embed for 42″ height guardrail.
All welds 3/16″ grind welds smooth.
Mill Finish on material

Cornet Bay
H-2
QTY.-1



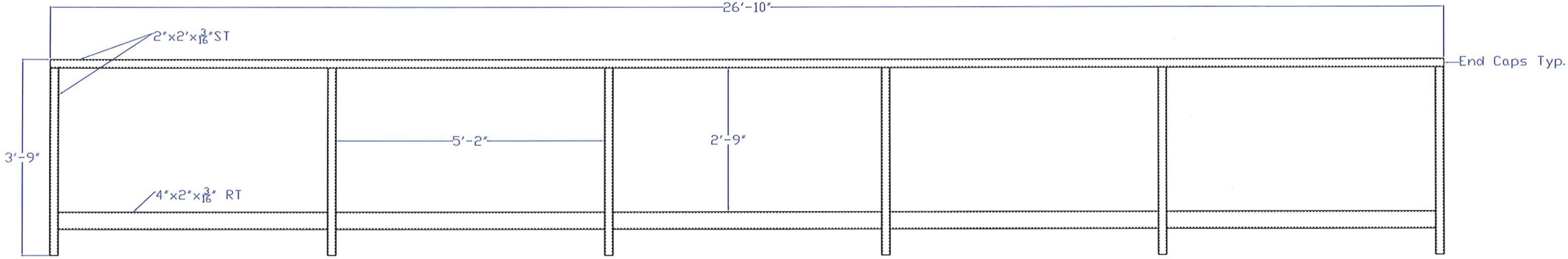
Reference Drawing H-1
For Addition Info

Cornet Bay
H-3
QTY.-1



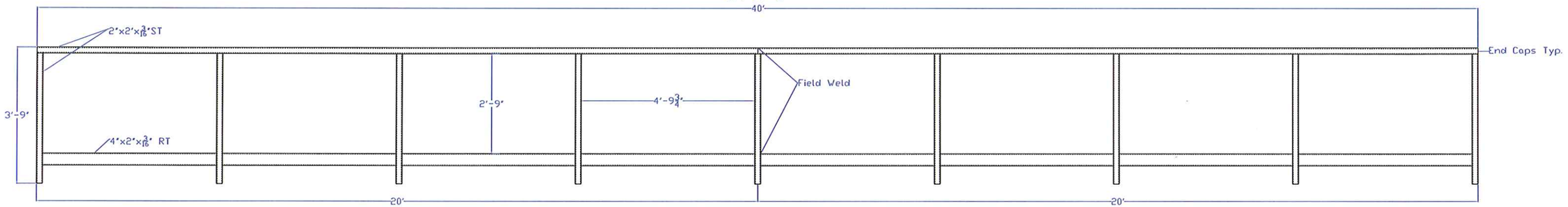
Reference Drawing H-1
For Addition Info

Cornet Bay
H-4
QTY.-1



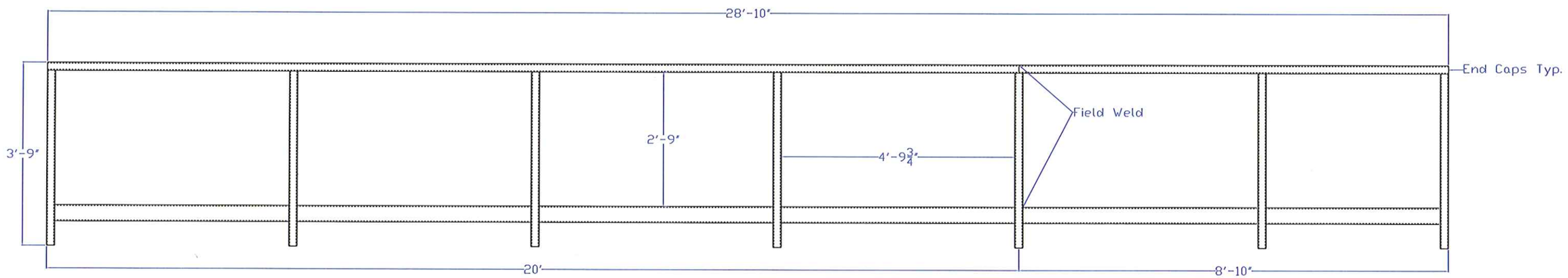
Reference Drawing H-1
For Addition Info

Cornet Bay
H-5A
QTY.-1



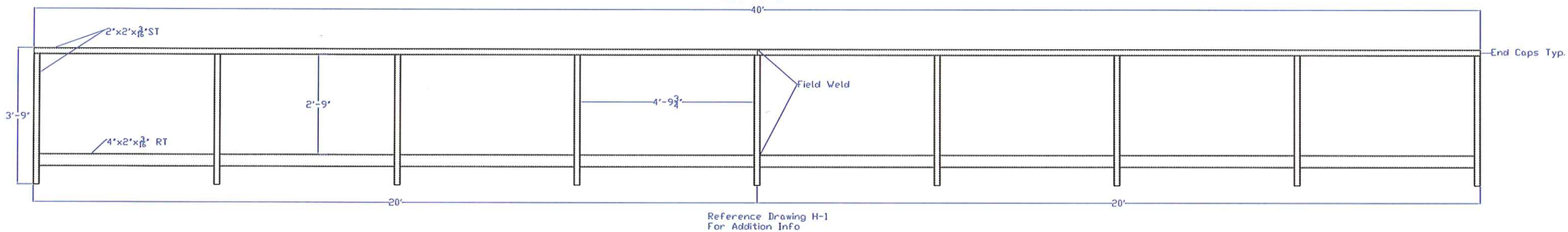
Reference Drawing H-1
For Addition Info

Cornet Bay
H-5B
QTY.-1



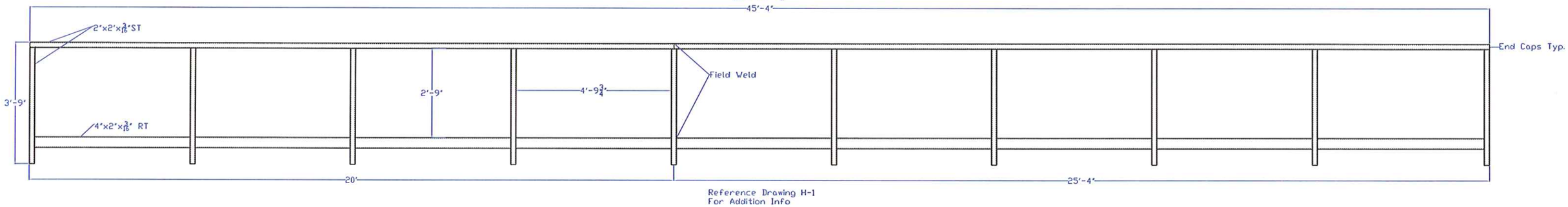
Reference Drawing H-1
For Addition Info

Cornet Bay
H-6A
QTY.-3



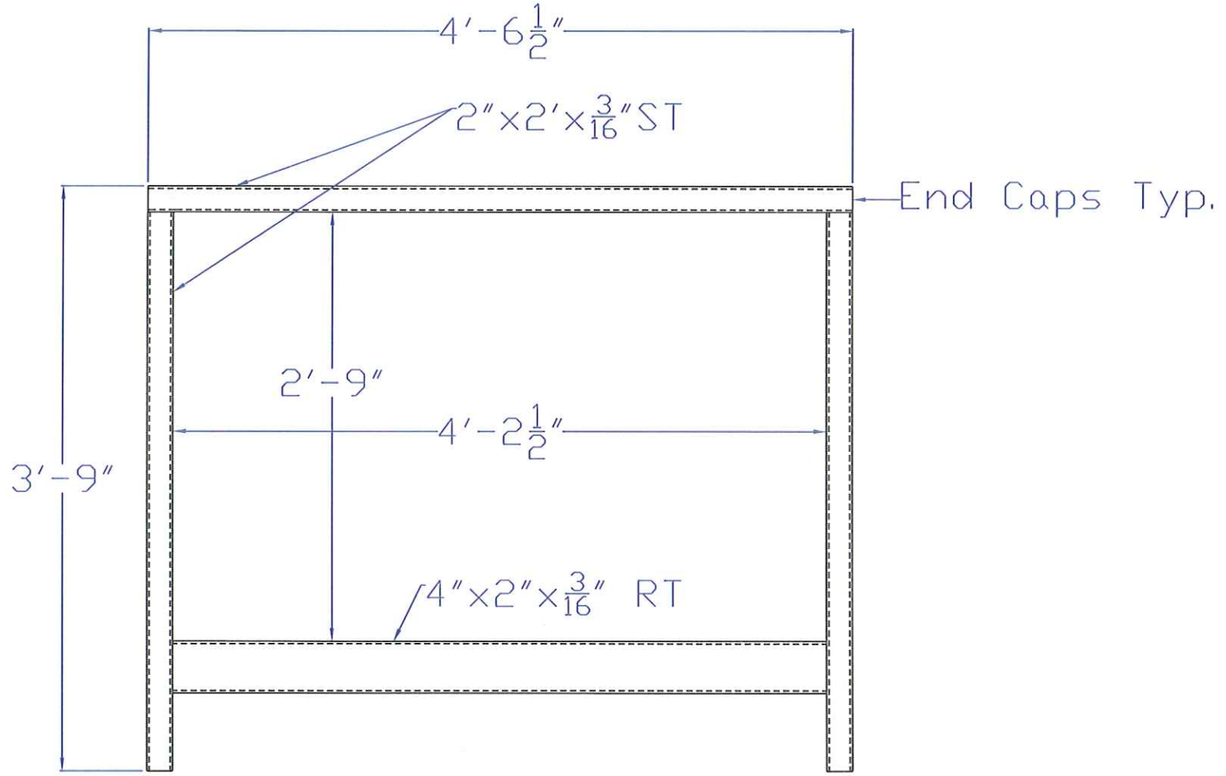
Reference Drawing H-1
For Addition Info

Cornet Bay
H-6B
QTY.-1



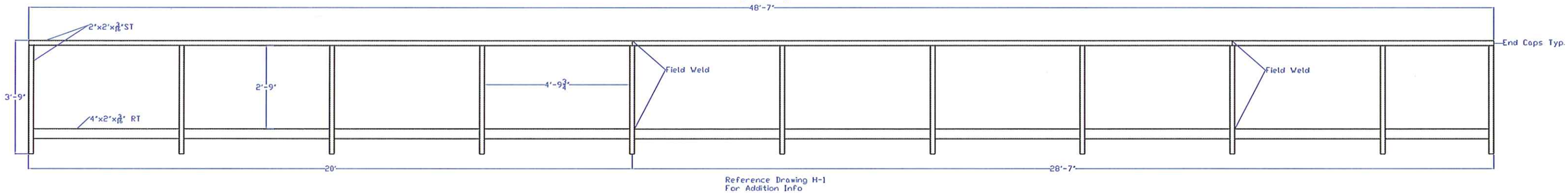
Reference Drawing H-1
For Addition Info

Cornet Bay
H-7
QTY.-1



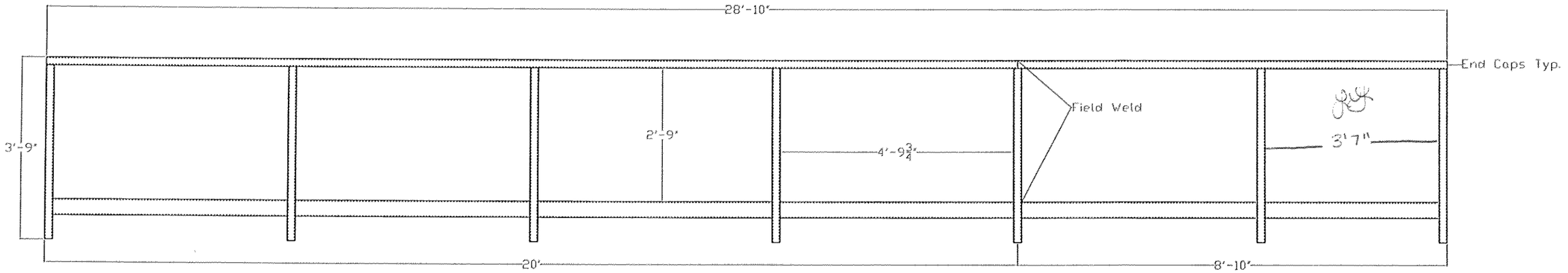
Reference Drawing H-1
For Addition Info

Cornet Bay
H-8
QTY.-1



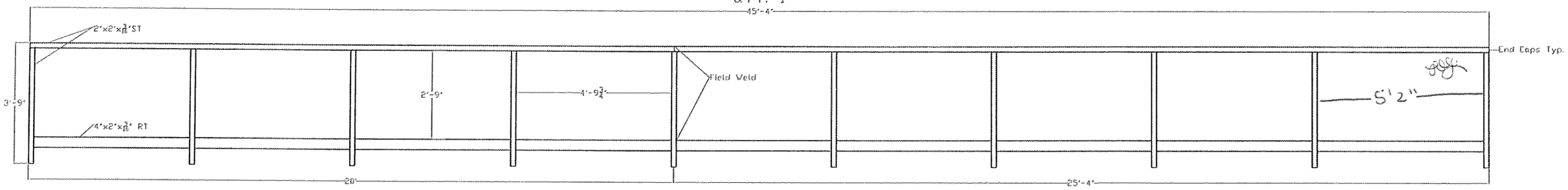
Reference Drawing H-1
For Addition Info

Cornet Bay
H-5B
QTY.-1



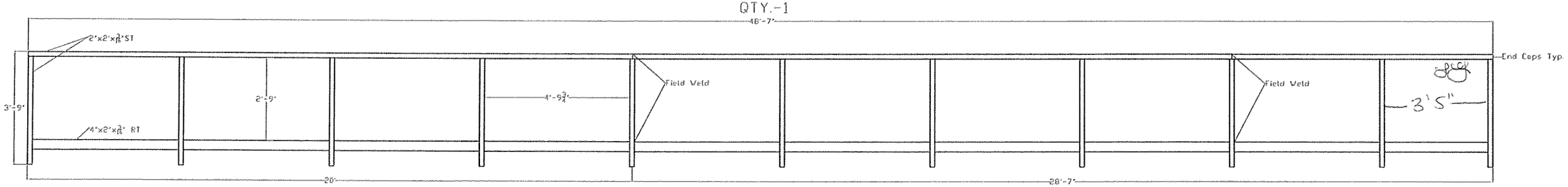
Reference Drawing H-1
For Addition Info

Cornet Bay
H-6B
QTY.-1



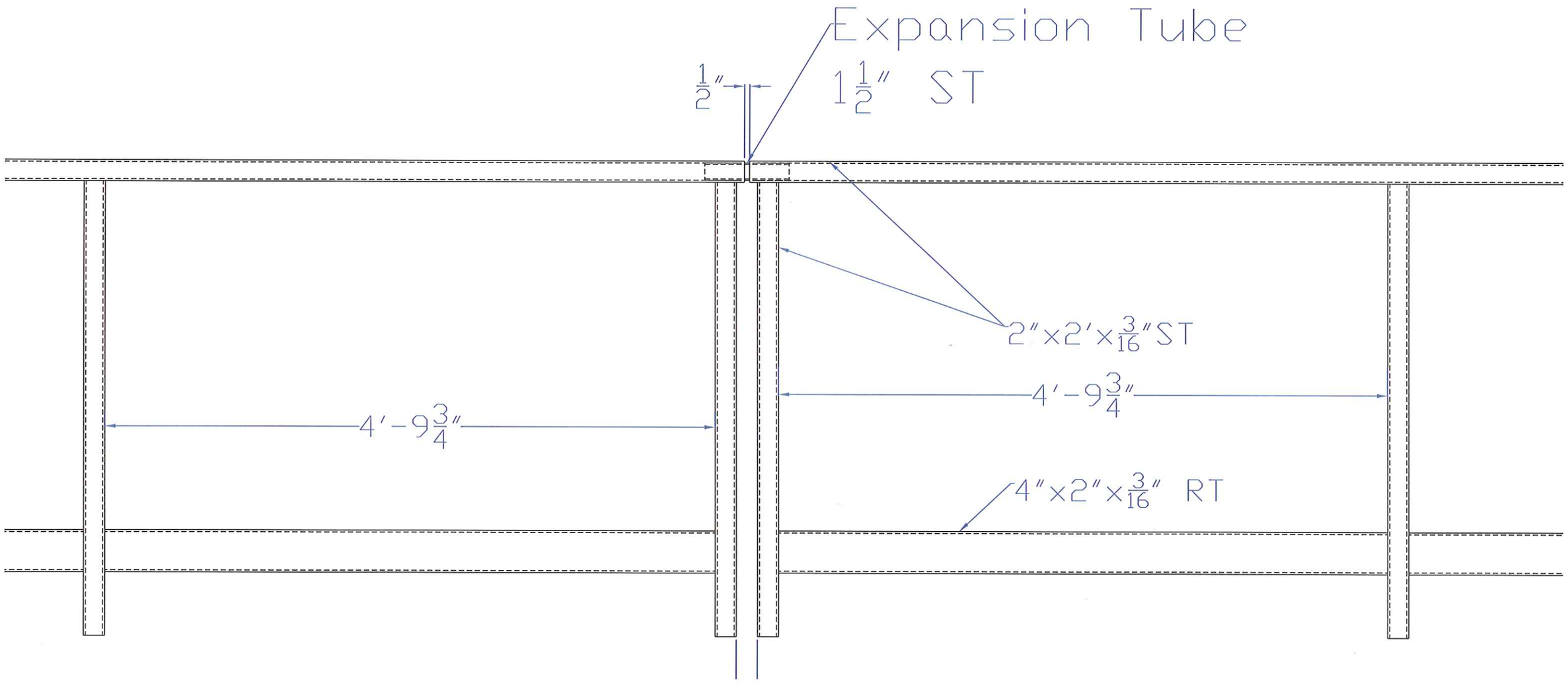
Reference Drawing H-1
For Addition Info

Cornet Bay
H-8
QTY.-1



Reference Drawing H-1
For Addition Info

Typ. At
Doulble
posts



Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 4 February 2014
SERIAL NO.: 45
SPEC. REF.: 05 50 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 45
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET		Glacier	Welder Certifications/Qualifications

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **45**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **4/21/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
4	**05 50 00**	**05 50 00-1**	**Welder Certifications**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Fabricator Qualification Statement

Blue Star Welding LLC has been in business in Whatcom County since 1982. We offer a wide variety of services and products. We specialize in structural building, bridge work and an assortment of metal fabrication.

Some of our recent jobs have been with the Department of Corrections, Puget Sound Energy, Yakima Community College, Bellingham Technical College and Department of Fish and Wildlife. All projects have been of the highest quality and workmanship.

We also provide a portable welding service that takes our crew all over the northwest. With our infield experience it benefits the preparation of steel in the shop for installation. Our Welders are WABO certified and are expected to perform at a high level.

We look forward to new challenges and building relationships with future customers.

Frank L Priebe,
Owner

6759 Lunde Road
Everson, WA 98247

PHONE 360-398-7647
FAX 360-398-2314
E-MAIL info@bluestarwelding llc.com

Washington Association of Building Officials
P. O. Box 7310, Olympia, WA 98507
888-664-9515 ◆ www.wabo.org

Certified Welder Card

DANIEL S STARBUCK
P O BOX 345
EVERSON WA 98247

Welder ID Number
W10669

Expires: JUL 1, 2014
Renew on or before expiration date

The welder named on this card is certified for the following:

Structural Steel: FCAW, Plate, All Positions, Up, E71T-1, 1/8" & over, w/backing
Structural Steel: SMAW, Plate, All Positions, Up, E7018, F4 & lower, 1/8" & over, w/backing
Reinforcing Steel: FCAW, Bar to Plate, All Positions, Up, E71T-X, No. 4 & Above

WABO welder certified process qualifications are outlined in WABO Standard 27-13 & in accordance with ANSI/AWS D1.1, D1.3, D1.4

THIS CARD IS THE PROPERTY OF WABO

Washington Association of Building Officials
P. O. Box 7310, Olympia, WA 98507
888-664-9515 ◆ www.wabo.org

Certified Welder Card

DUANE R ELLIS
3749 GRANDVIEW RD
FERNDALE WA 98248

Welder ID Number
W17242

Expires OCT 1, 2014
Renew on or before expiration date

-certified process qualifications are outlined in WABO
13 & in accordance with ANSI/AWS D1.1, D1.3, D1.4
S CARD IS THE PROPERTY OF WABO

r named on this card is certified for the following:
Steel: FCAW, Plate, All Positions, Up, E71T-X, 1/8" &
King

Washington Association of Building Officials
P.O. Box 7310, Olympia, WA 98507
888-664-9515 ◆ www.wabo.org

Certified Welder Card

KENNETH R DICKINSON
1655 BROOKWOOD DR
FERNDALE WA 98248

Welder ID Number: W17243

Expires: OCT 1, 2014

Renew on or before expiration date

The welder named on this card is certified for the following:

Structural Steel: FCAW, Plate, All Positions, Up. E71T-X, 1/8" & over, w/backing

WABO welder certified process qualifications are outlined in WABO Standard 27-13 & in accordance with ANSI/AWS D1.1, D1.3, D1.4

THIS CARD IS THE PROPERTY OF WABO

Shop Drawing Review Letters

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 9 May 2014
SERIAL NO.: 46
SPEC. REF.: 05 50 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 46
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET	1	Glacier/Blue Star	Guardrail
1	MCNR	2	Glacier/Blue Star	Guardrail

Comment(s):

1. See *Handrailing* under *Structural Steel* of Drawing S1 for additional installation information and requirements.
2. Re-submit product data with cable diameter noted. 3/16 min. diameter required.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **47**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **5/3/14**

Project **Cornet Bay Marina Remediation**

Project No. **13-028**

Owner **Dept of Ecology**

Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted) **37**

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1			**Shop Drawing for sidewalk guardrail**	**Blue Star**		
1			**Shop Drawing for embed angle for sidewalk**	**Blue Star**		

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

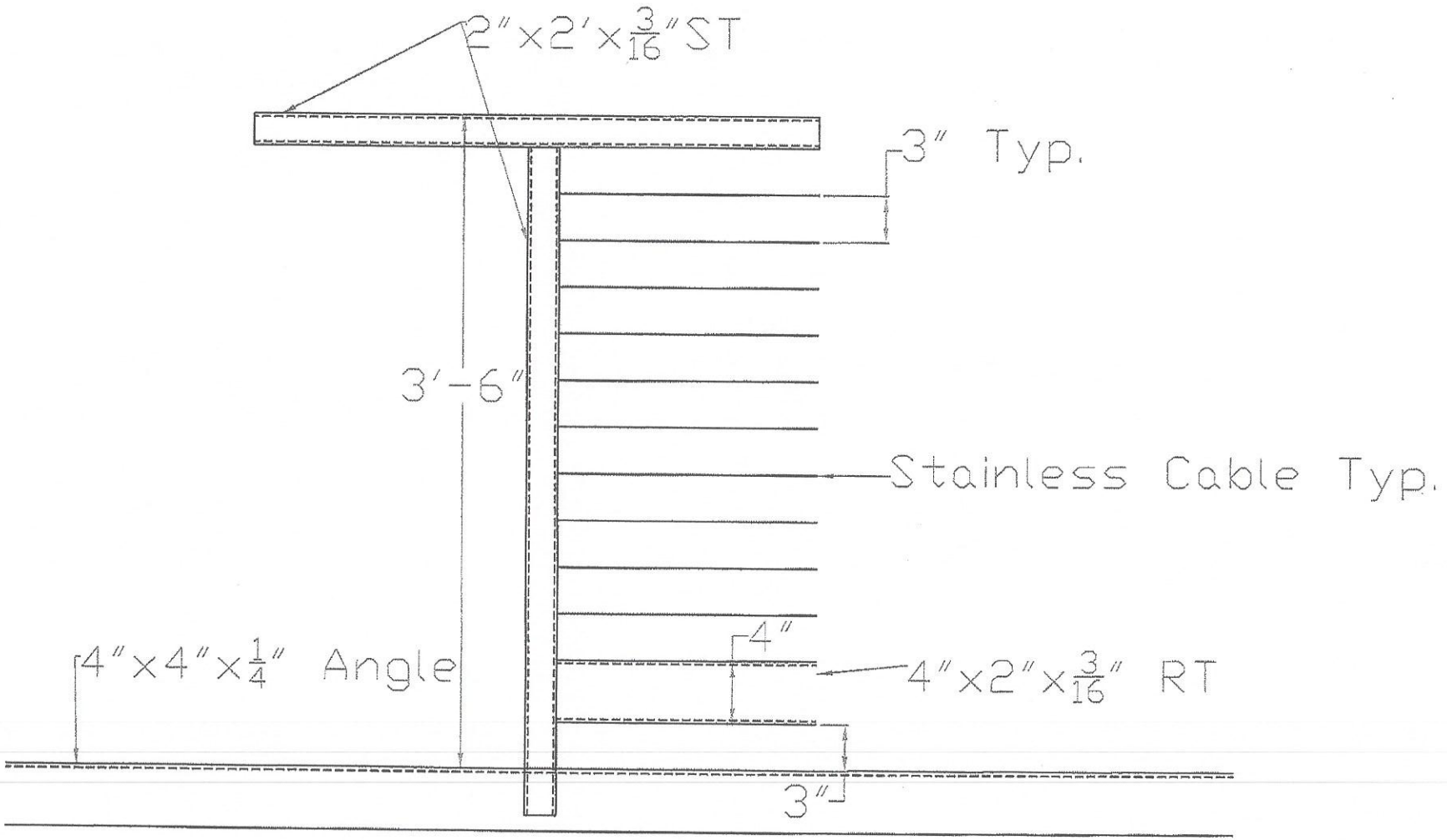
_____

_____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____


2"×2'×3/16" ST
3" Typ.
3'-6"
Stainless Cable Typ.
4"×4"×1/4" Angle
4"
4"×2"×3/16" RT
3"

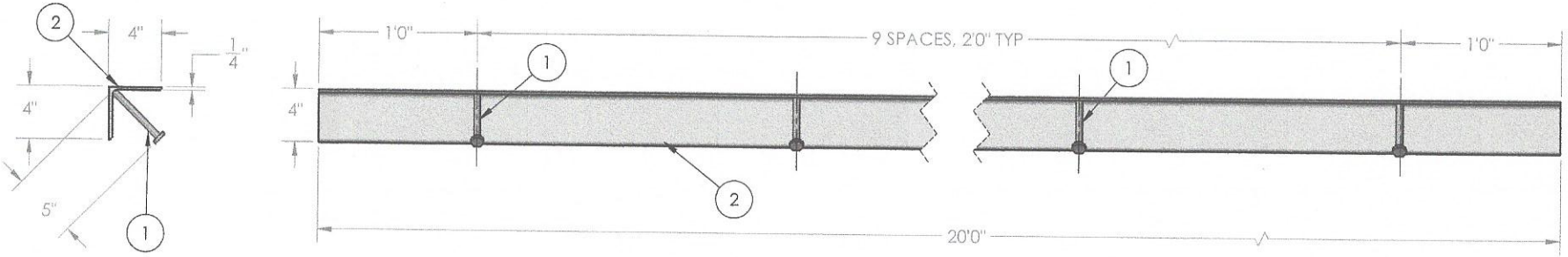
BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	10	1/2 X 5" STAINLESS HAS	4 3/4"
2	1	STAINLESS L4x4x0.25	20'

QTY: 17

NOTES:

- FINIST: BARE STAINLESS STEEL



TITLE: CORNET BAY		
EM-1		
BLUESTAR WELDING: 12700		
SCALE: NTS	APPROVED BY:	DRAWN BY: ZM
DATE: 4/28/14		REVISED:
CONTRACTOR: GLACIER ENVIRONMENTAL		
DRAWING NO. 2.0		SHEET 10 OF 10

Shop Drawing Review Letters

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 9 May 2014
SERIAL NO.: 46.1
SPEC. REF.: 05 50 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 46.1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

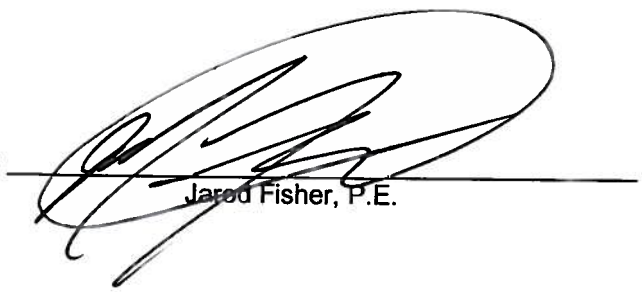
Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET		Glacier/Blue Star	E-Dock Reinforcement

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: 
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Submittal No.: **46.1**

Contract #: C14500123

ATTN: **Jing Liu**

Date: **5/3/14**

Project **Cornet Bay Marina Remediation**

Project No. **13-028**

Owner **Dept of Ecology**

Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1			**Shop Drawing for E-dock Float**	**Blue Star**		

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature ~~Eric Hay~~ C. Alan Hall

(THIS SPACE FOR ENGINEER)

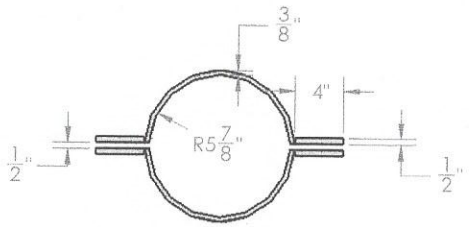
To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		



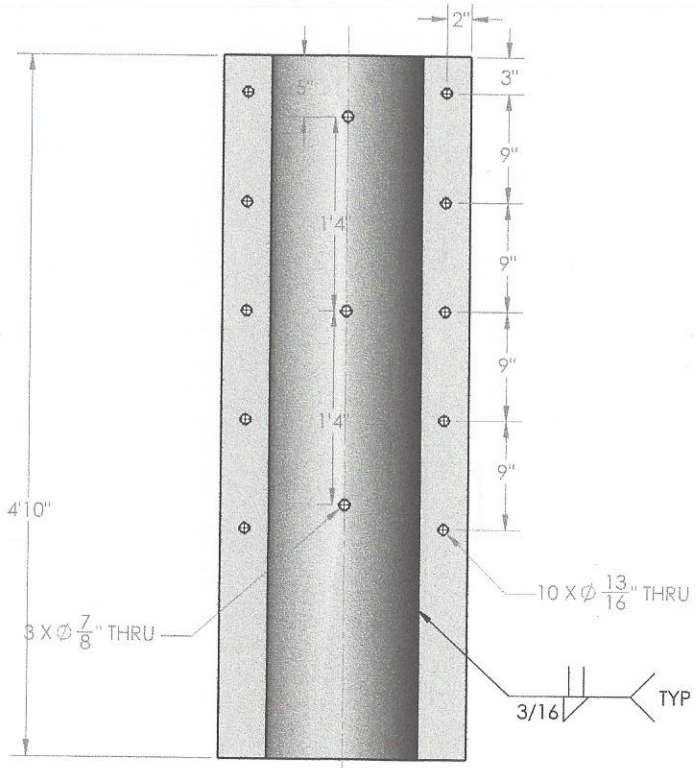
CIRCUMFERENCE: 37"

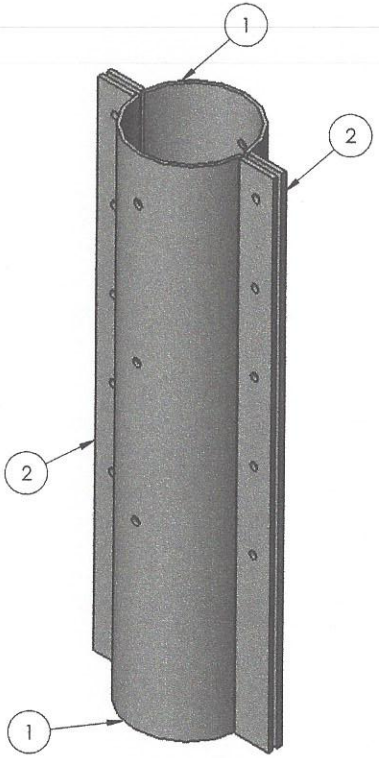
ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	2	PL 3/8"	4'-10"
2	4	PL 1/2 X 4"	4'-10"

QTY: 1

NOTES:

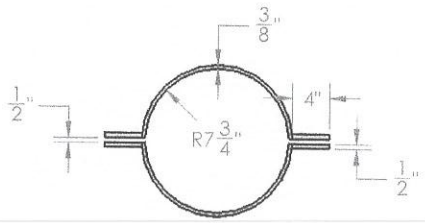
- FINIST: BARE STEEL





TITLE:	CORNET BAY
	PS-4
	BLUESTAR WELDING: 12700
SCALE: NTS	APPROVED BY:
DRAWN BY: ZM	
DATE: 4/28/14	REVISED:
CONTRACTOR:	GLACIER ENVIRONMENTAL
DRAWING NO.	1.6
SHEET 6 OF 9	

BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		



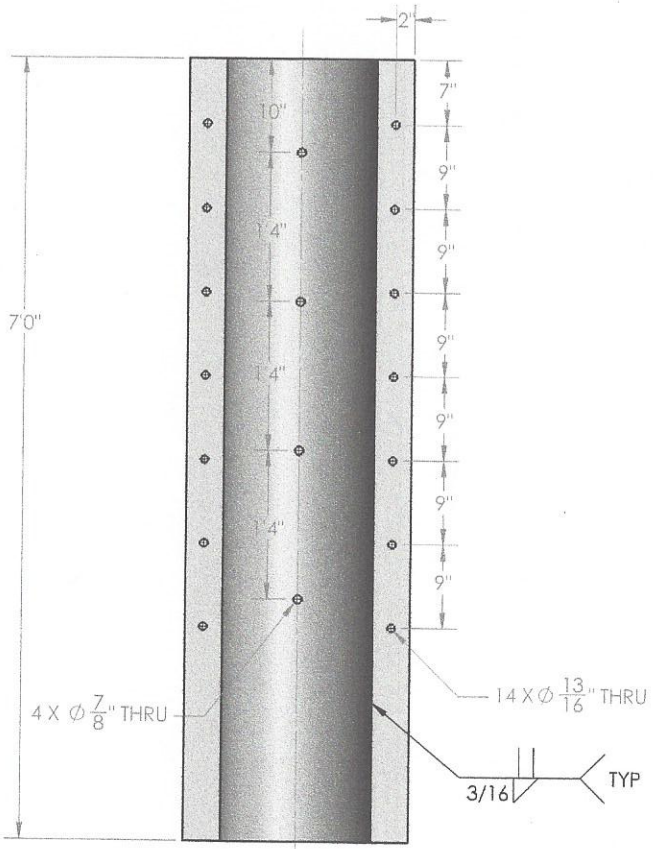
CIRCUMFERENCE: 48 3/4"

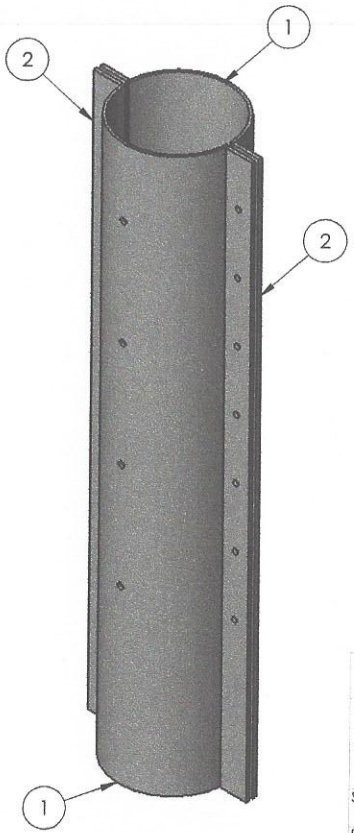
ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	2	PL 3/8	7'0"
2	4	PL 1/2 X 4"	7'0"

QTY: 1

NOTES:

- FINIST: BARE STEEL

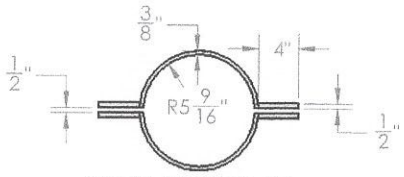




TITLE:	CORNET BAY
	PS-3
	BLUESTAR WELDING: 12700
SCALE: NTS	APPROVED BY:
DRAWN BY: ZM	
DATE: 4/28/14	REVISED:
CONTRACTOR:	GLACIER ENVIRONMENTAL
DRAWING NO.	1.5
SHEET 5 OF 9	

BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	2	PL 3/8	6'-8"
2	4	PL 1/2 X 4"	6'-8"

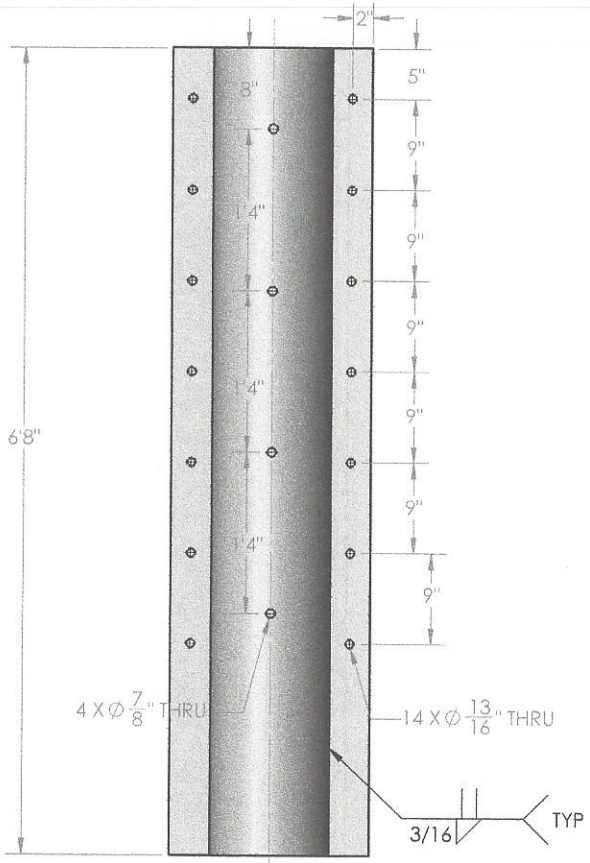


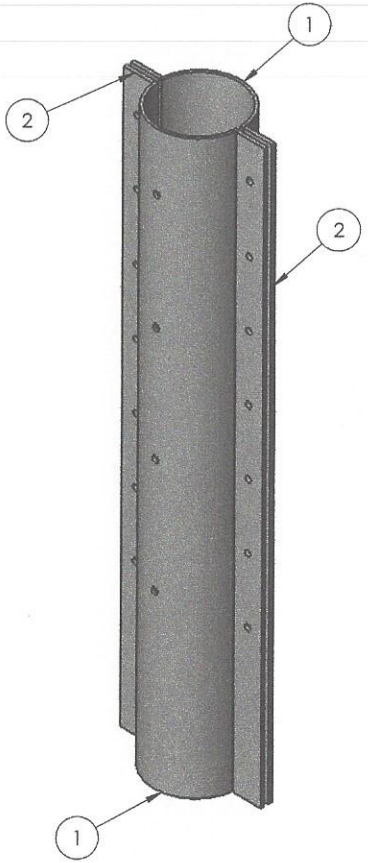
CIRCUMFERENCE: 35"

QTY: 1

NOTES:

- FINIST: BARE STEEL

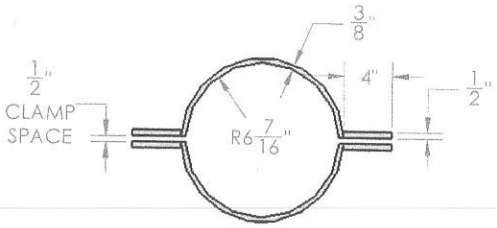




TITLE: CORNET BAY		
PS-2		
BLUESTAR WELDING: 12700		
SCALE: NTS	APPROVED BY:	DRAWN BY: ZM
DATE: 4/28/14		REVISED:
CONTRACTOR: GLACIER ENVIRONMENTAL		
DRAWING NO. 1.4		SHEET 4 OF 9

BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	2	PL 3/8	5'-1"
2	4	PL 1/2 X 4"	5'-1"

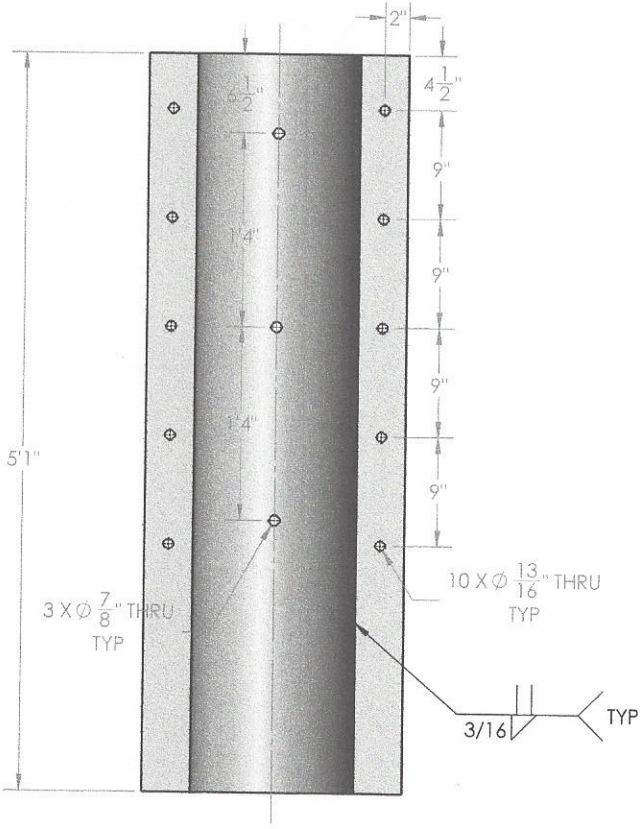


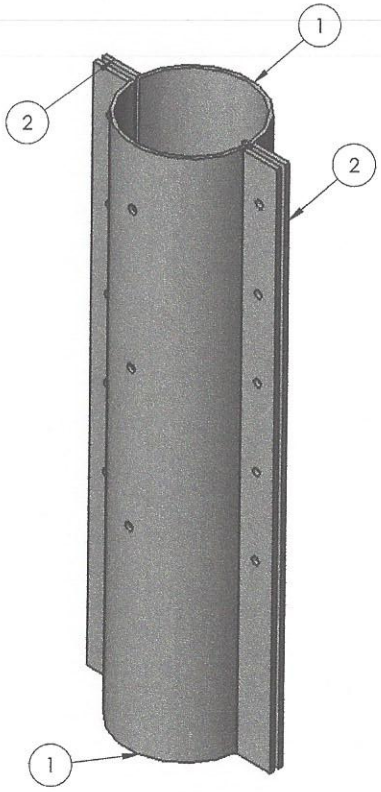
CIRCUMFERENCE: 40 1/4"

QTY: 1

NOTES:

- FINIST: BARE STEEL

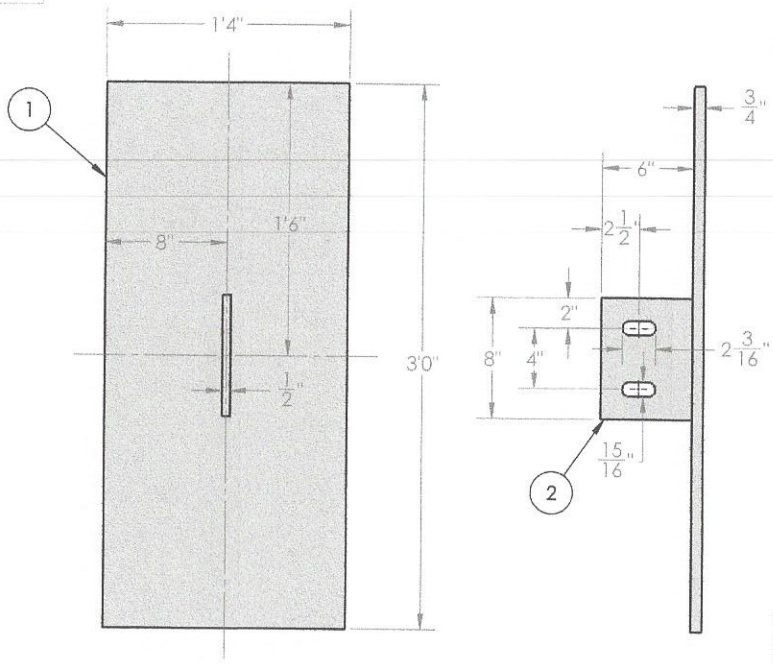




TITLE: CORNET BAY			
PS-1			
BLUESTAR WELDING: 12700			
SCALE: NTS	APPROVED BY:	DRAWN BY: ZM	
DATE: 4/28/14		REVISED:	
CONTRACTOR: GLACIER ENVIRONMENTAL			
DRAWING NO. 1.3		SHEET 3 OF 9	

BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		

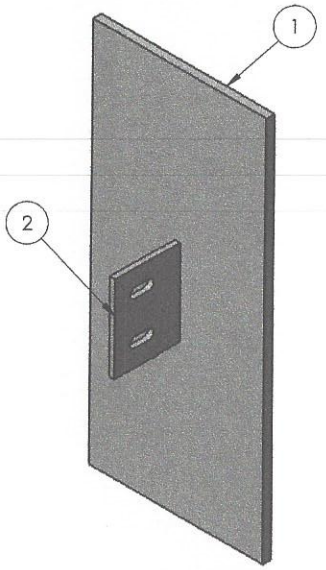
ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	PL 3/4 X 16"	36"
2	1	PL 1/2 X 6"	8"



QTY: 2

NOTES:

- FINIST: BARE STEEL

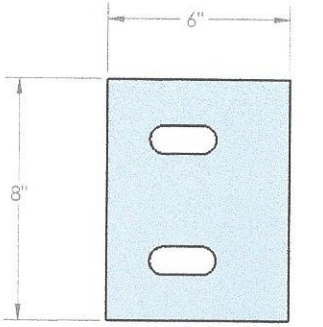


ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	PL 1/2 X 6"	8"

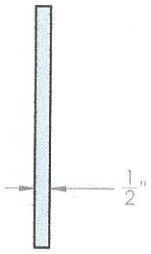
QTY: 4

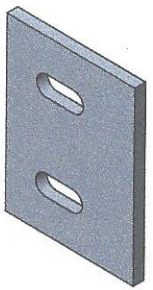
NOTES:

- FINIST: BARE STEEL



ALL DIMENSIONS
ARE SAME AS ABOVE





TITLE:	CORNET BAY
	PL-1
	BLUESTAR WELDING: 12700
SCALE: NTS	APPROVED BY:
DRAWN BY: ZM	
DATE: 4/28/14	REVISED:
CONTRACTOR:	GLACIER ENVIRONMENTAL
DRAWING NO.	1.2
SHEET 2 OF 9	

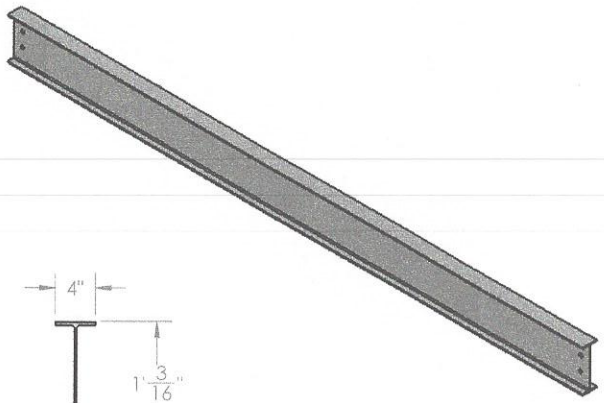
BLUESTAR QC		
	INITIAL	DATE
FABRICATION		
WELDING		
PAINT		

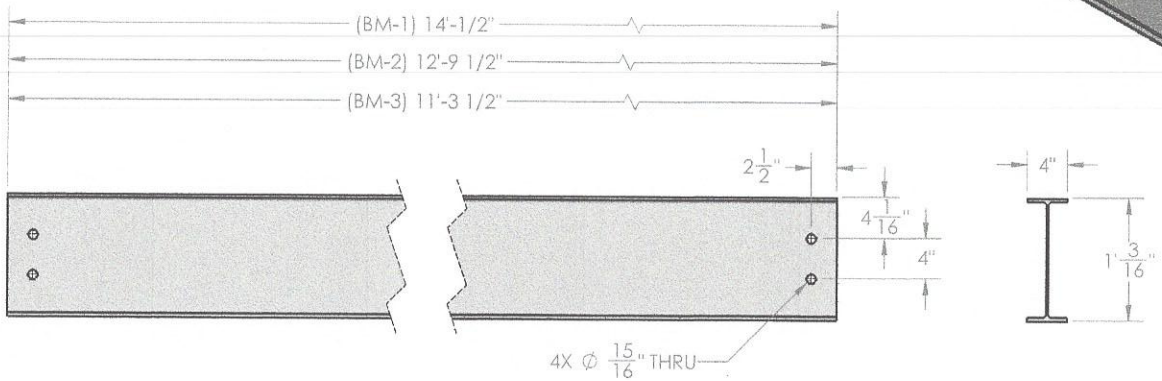
NOTES:

- FINIST: BARE STEEL

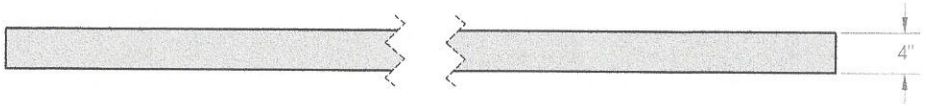
BM-1 QTY: 1
BM-2 QTY: 1
BM-3 QTY: 1

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	W12x19	13'11 1/2"





ALL DIMENSIONS
TYP OTHER END



TITLE:	CORNET BAY
	BM-1, BM-2, BM-3
	BLUESTAR WELDING: 12700
SCALE: NTS	APPROVED BY:
DRAWN BY: ZM	
DATE: 4/28/14	REVISED:
CONTRACTOR:	GLACIER ENVIRONMENTAL
DRAWING NO.	1.1
SHEET 1 OF 9	

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 April 2014
SERIAL NO.: 52
SPEC. REF.: 11 00 01
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 52
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET		Glacier	MDP & Meter Support

Comment(s):

1. Each 2x2 post needs to be welded to the embed angle and the steel sheets a minimum of 7 inches total as shown on the submittal.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Keith S Parker, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: on Behalf of Keith Parker
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **52**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **4/15/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	11 00 01		Main Distribution and Panel Installation		1	
1	11 00 01		Sheet Pile Wall Connection		2	
1	11 00 01		Location		3	

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Glacier proposes to incorporate the mounting framework of the MDP, CT Enclosure and Meter Base into the guardrail. We would accomplish this by welding four of the 2x2x3/16 SS guardrail posts onto the sheetpile bulkhead wall and building a framework using SS unistrut. (see attached drawings) By doing this it would not only allow us to make one move of the equipment and give us room to do the restoration work but it would incorporate the SS guardrail and cable into the framework giving a very finished and astatically pleasing look to the panel area.

Contractor Glacier Environmental Services, Inc. Signature C. Alan Hall

(THIS SPACE FOR ENGINEER)

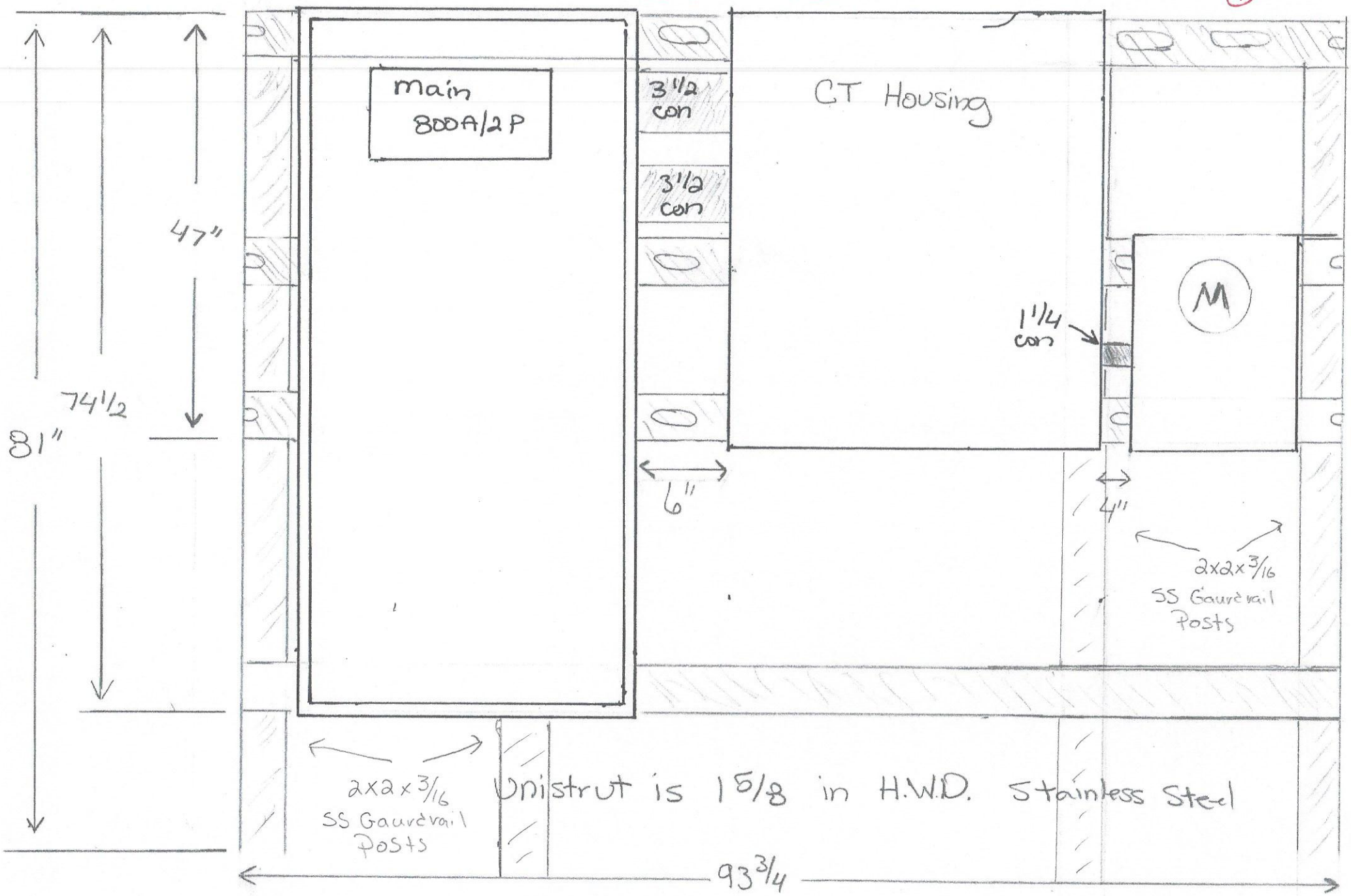
To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Main Distribution Panel and Meter



Main Distribution Panel Installation
Sheet Pile wall connection

②

S5

SCALE: N.T.S.

S5

:RETE SLAB
'H #4 BARS
.CH WAY
SLAB OVER 4"
:ASE COURSE

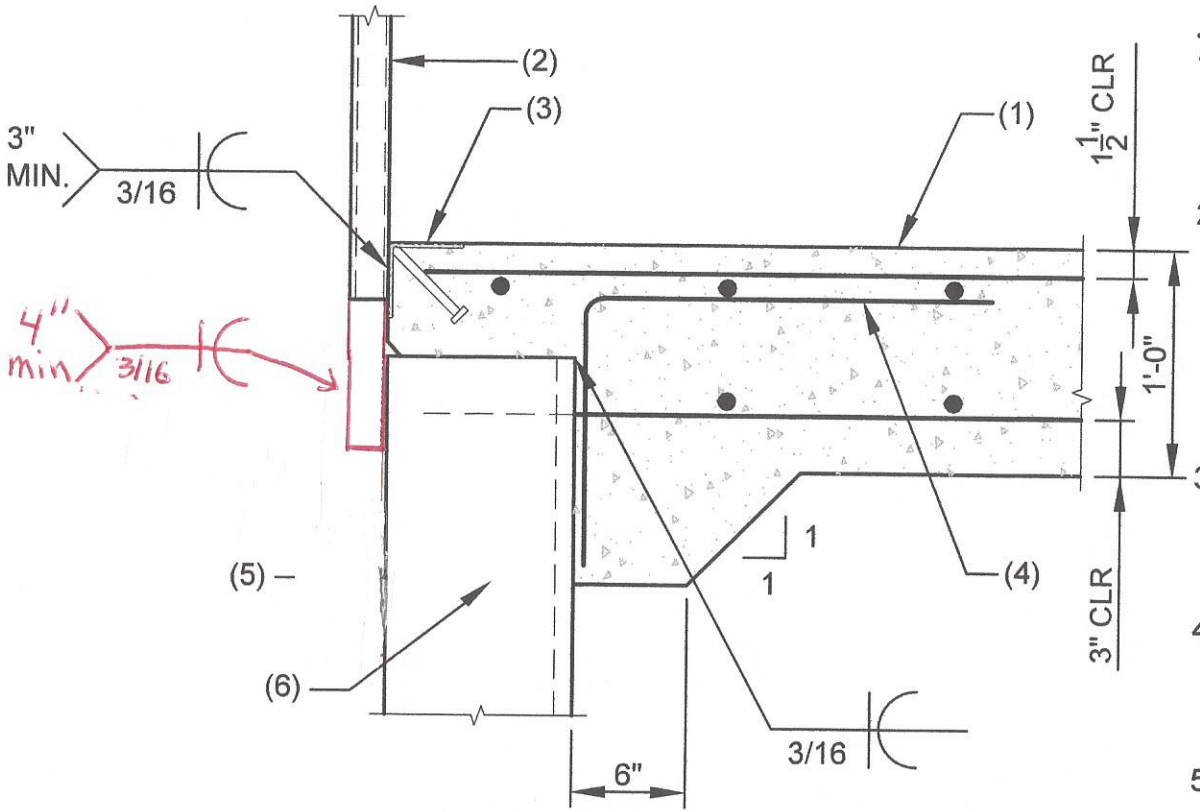
RN DOWN

)NT. TOP AND

' 12" O.C.,
ENDS

OR
AB ON GRADE
:EE PLANS
AL

)NT. AT TOP



NOTES:

1. 12" THICK CONCRETE SLAB ON GRADE WITH #4 BARS AT 12" O.C., EACH WAY TOP AND BOTTOM
2. HSS 2x2x3/16 STAINLESS STEEL GUARDRAIL POSTS-SPACE POSTS AT 6" O.C. (MAXIMUM) - SEE GUARDRAIL ELEVATION DETAIL 9/S5 FOR ADDITIONAL INFORMATION.
3. L4x4x1/4 STAINLESS STEEL EMBEI ANGLE WITH 1/2" DIAMETER HEADED STUDS AT 24" O.C.
4. DOWELS TO MATCH AND LAP SLA REINFORCING - PROVIDE 3" COVER, MINIMUM
5. STEEL SHEET PILE BULKHEAD WALL PER PLAN
6. CONTRACTOR SHALL PROVIDE CONCRETE FORM CLOSURE AS REQUIRED

7

CONCRETE SLAB AT SHEET PILE WALL

8

Main Distribution Panel Installation
Location west of Dock Entrance

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 April 2014
SERIAL NO.: 52
SPEC. REF.: 11 00 01
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 59
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		Glacier	Septic System

Comment(s):

1. Allowable loading for the unistrut and 2x2 posts is well in excess of the MDP and meter cabinet weights. Each 2x2 posts need to be welded to the embed angle and the steel sheets a minimum of 7 inches total as shown on the submittal. Glacier's proposed rack to hold the panels is made of 2x2x3/16 thick columns and P1000 unistrut braces. Unistrut braces are rated for 1,130-lbs beam load per each [Glacier will have 4]. Unistrut braces are rated for column load of 1,860 lbs. The 2x2 columns are much stronger than a Unistrut column. We don't have a weight of the panel, but it's likely in the 500-600 lb. range. The support structure as proposed by Glacier will support far in excess of the anticipated loads from the Main Distribution Panel and the meter cabinet. It does not seem warranted to require structural calculations since there are published load tables for unistrut that show this will be sufficient.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 April 2014
SERIAL NO.: 59
SPEC. REF.: 22 13 29.99
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 59
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		CNW	Concrete Tanks
2	NET		Aquaworx	IPC-D Duplex Control Panel
3	NET		Goulds	Model PE51M Pump
4	A&R	1	Glacier	Septic System

Comment(s):

1. Provide plan and section sketches that show the layout of the 2 tanks, piping connects between the tanks [including pipe type & diameter], and piping layout from the pumps to the existing mound system [including pipe type & diameter.]
2. Provide appropriately sized chain or cable for removing the pump for maintenance. Cable to attach to the pump lifting eye. Provide hook near the tank cover for other end of cable.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJ Project Coordinator:	Keith S. Parker, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **59**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **4/8/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	22 13 29.99		Concrete Tanks	CNW	2	
1	22 13 29.99		Control Panel	Aquaworx	1	
1	22 13 29.99		Effluent Pump	Goulds	1	

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

As determined during the meeting with Island County Health and the Island County approved installer we are proposing to install two concrete tanks (1000 gallon septic and 1000 gallon pump) with a traffic rated/reinforced lid which is typically what is installed in areas with a higher water table and traffic such as this project. The effluent pump we are submitting meets the existing mounds minimum head and flow from the original asbuilt.

Contractor Glacier Environmental Services, Inc. Signature *C. Alan Hall*

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

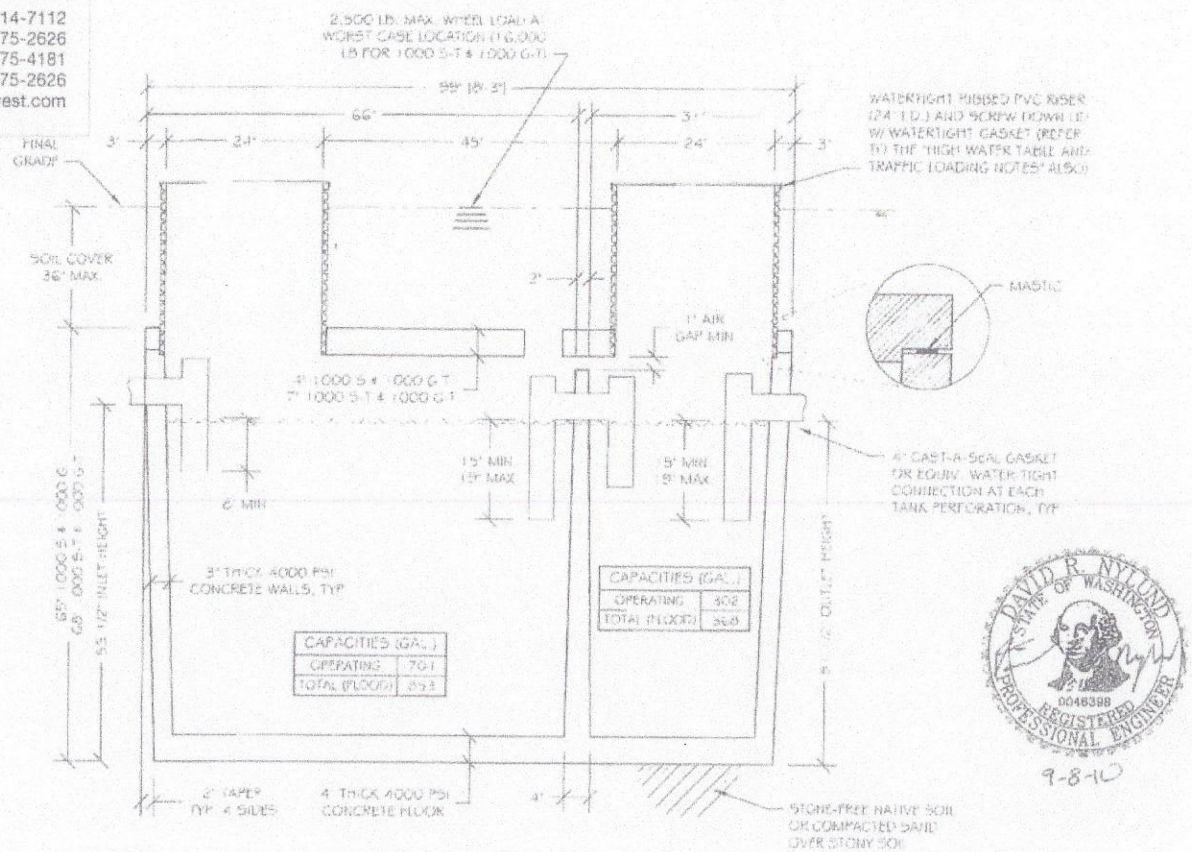
CNW
CONCRETE NOR'WEST

Office
35717 SR 20
Oak Harbor, WA 98277

Mailing Address
P.O. Box 280
Mount Vernon, WA 98273

Mike Williams
Precast - Sales
Cell: (360) 914-7112
Office: (360) 675-2626
Fax: (360) 675-4181
Dispatch Office: (360) 675-2626
mike.williams@concretenorwest.com

DETAIL OF I.D. TAG (LOCATE TAG INSIDE RISER OF ACCESS OPENING)



DAVID R. NYLUND — STATE OF WASHINGTON — 0046398 — REGISTERED PROFESSIONAL ENGINEER
9-8-10

GREASE INTERCEPTOR NOTES (1000 G & 1000 G-T MODELS ONLY)

1) GREASE INTERCEPTOR INLET BAFFLES MUST EXTEND TO AT LEAST WITHIN 15" OF THE TANK FLOOR.
2) INTERCOMPARTMENTAL AND OUTLET BAFFLES MUST EXTEND TO A POINT BETWEEN 6" AND 12" FROM THE TANK FLOOR.
3) OUTLET BAFFLES MUST EXTEND ABOVE THE LIQUID TO ALLOW SCUM STORAGE AND VENTING, BUT NOT LESS THAN 1" FROM THE UNDERSIDE OF THE TOP OF THE TANK.

ACCESS AND RISERS NOTES

1) MINIMUM ONE 18" Ø ACCESS OPENING PER COMPARTMENT. THE DISTANCE BETWEEN ACCESS OPENINGS IS NOT TO EXCEED 10'-0" CENTER TO CENTER.
2) RISERS MUST BE A MINIMUM OF 23" INSIDE DIAMETER.
3) RISER TO TANK AND RISER TO ADDITIONAL SECTIONS OF RISER CONNECTIONS MUST INCORPORATE JOINT GROOVES OR ADAPTERS TO PREVENT LATERAL MOVEMENT AND REMAIN WATERTIGHT.
4) ACCESS AND RISER OPENINGS MUST BE COVERED WITH A LOCKABLE LID OR OTHER SECURED LID.
5) ACCESS RISERS AND LIDS MUST BE STRUCTURALLY SOUND TO WITHSTAND ANTICIPATED SITE SPECIFIC LOADS.

SEALS AND GASKETS NOTES

1) SEALS AND GASKETS FOR INLET, OUTLET, AND INTERCOMPARTMENTAL FITTINGS MUST BE RESILIENT, WATERTIGHT, CORROSION-RESISTANT, AND FLEXIBLE.
2) SEALS MEETING ASTM C-1644 OR EQUIVALENT MUST BE USED AT THE TANK WALL-TO-PVC PIPING INTERFACE TO PREVENT LEAKAGE.

INSTALLATION INSTRUCTIONS

1) EXCAVATE TANK HOLE WITH VERTICAL WALLS TO 2 FEET LARGER THAN TANK ON ALL SIDES. BOTTOM OF HOLE MUST BE FLAT, LEVEL AND FREE OF WATER. HOLE MUST SLOPE DOWN 3" TO CENTER OF TANK.
2) INSTALL 6" MINIMUM OF 2" MINUS MATERIAL OR SAND ON BOTTOM OF EXCAVATED HOLE.
3) INSTALL TANK IN CENTER OF HOLE, KEEPING MINIMUM 1 FOOT VOID SPACE ON ALL SIDES.
4) INSTALL REST OF SYSTEM, AND AFFIX RISERS AS REQUIRED BY LOCAL JURISDICTION.
5) UPON APPROVAL TO BACKFILL, FILL VOID SPACE AROUND TANK WITH COMPACT GRANULAR (SANDY) SOIL FREE OF LARGE CLUMPS OF CLAY AND ROCKS OVER 2 INCHES IN DIAMETER. BACKFILL CAREFULLY AND EVENLY IN 18" LIFTS. MAXIMUM SOIL COVER IS 36".
6) IF REQUIRED, WATER TESTING TO BE DONE BY LOCAL JURISDICTION OR DOH SPECIFICATION.
7) FINAL GRADE THE SURFACE TO AVOID CHANELLING SURFACE WATER TOWARDS TANK.

BAFFLE NOTES

1) INLETS TO SEPTIC TANKS MUST EXTEND AT LEAST 6" BELOW THE LIQUID LEVEL.
2) OUTLETS TO SEPTIC TANKS MUST EXTEND BELOW THE LIQUID LEVEL AT LEAST 30% BUT NOT MORE THAN 40%.
3) INLET AND OUTLET DEVICES MUST HAVE A MINIMUM INSIDE DIAMETER OF 4" AND BE CONSTRUCTED OF PVC OR ABS CONFORMING TO OR EXCEEDING THE STANDARDS OF ASTM D 3034 OR ASTM D 2661, RESPECTIVELY.
4) INLETS AND OUTLETS MAY BE MOVED FROM THE LOCATIONS SHOWN PROVIDED THE HEIGHTS ARE NOT CHANGED AND THE PIPE CENTERS ARE LOCATED AT LEAST 6" FROM ANY EDGE AND AT LEAST 4" FROM ANY REBAR.

HIGH WATER TABLE AND TRAFFIC LOADING NOTES

1) FOR TANK MODEL 1000 S & 1000 G
A) MAXIMUM WATER TABLE AT TOP OF LID.
B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 2,500 LB CONCENTRATED LOAD.
2) FOR TANK MODEL 1000 S-T & 1000 G-T
A) WATER TABLE AT GROUND LEVEL.
B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 16,000 LB CONCENTRATED LOADS AT 14' INTERVALS (H20 RATING).
3) TRAFFIC RATED RISERS MUST MEET OR EXCEED THE STANDARDS OF ASTM C478 (1.3) AND WSDOT STANDARD PLAN B-30.90.00. FRAME AND COVER MUST MEET OR EXCEED THE STANDARDS OF ASTM A48 CL 35B.

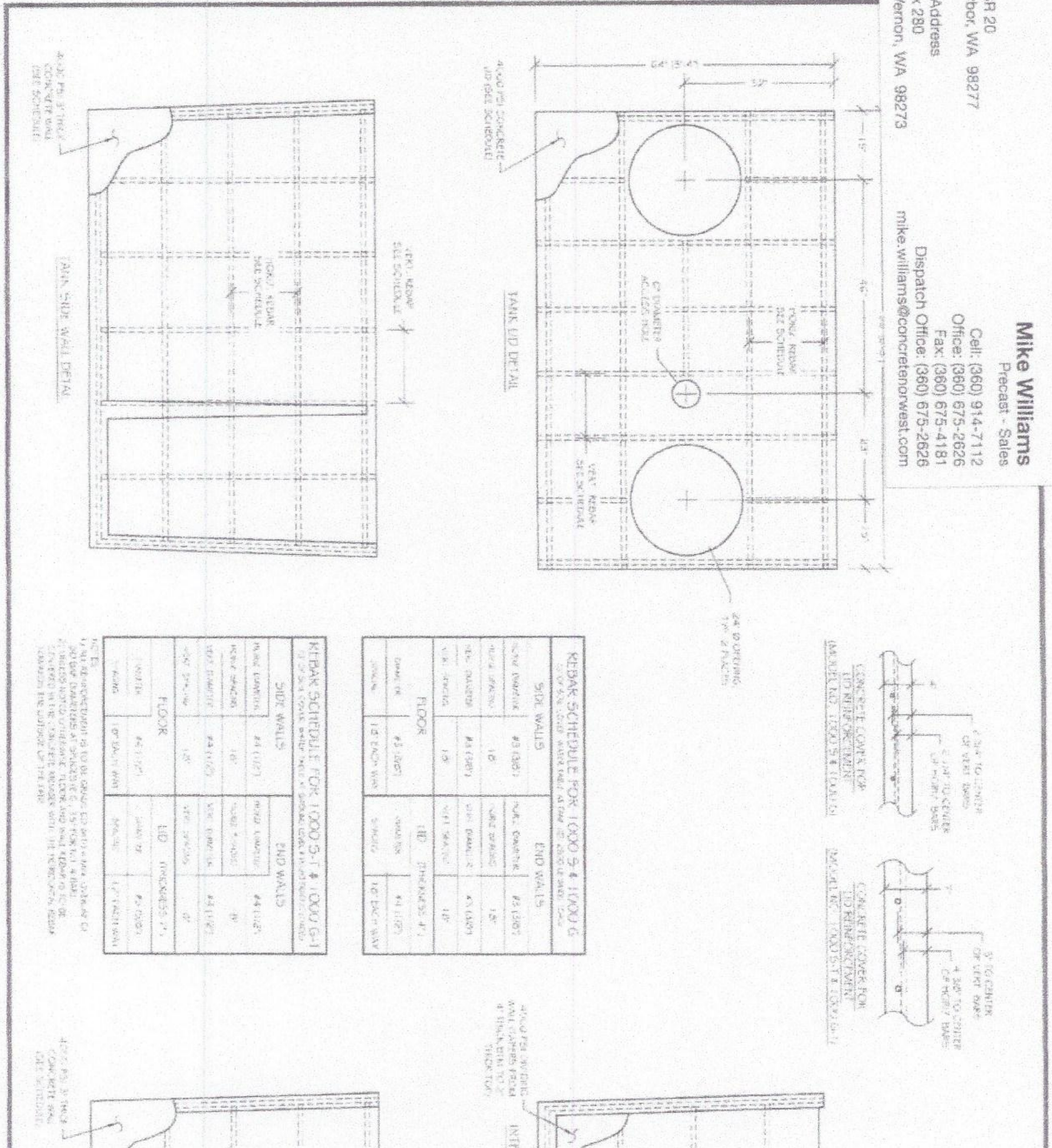
EK ENGINEERING INC. P.O. BOX 3097 BATTLE GROUND, WA 98604 PHONE: (360) 687-7668 FAX: (360) 687-7669	DATE: 9/08/10 DRAFTED BY: D.R.N. SCALE: NTS
TANK DETAILS FOR MODELS 1000 S, 1000 S-T, 1000 G & 1000 G-T KRIEG CONRETE PRODUCTS, INC.	PAGE: 4

CNW
CONCRETE NOR'WEST

Office
35717 SR 20
Oak Harbor, WA 98277

Mailing Address
P.O. Box 280
Mount Vernon, WA 98273

Mike Williams
Precast - Sales
Cell: (360) 914-7112
Office: (360) 675-2626
Fax: (360) 675-4181
Dispatch Office: (360) 675-2626
mike.williams@concretenorwest.com



EK ENGINEERING INC.

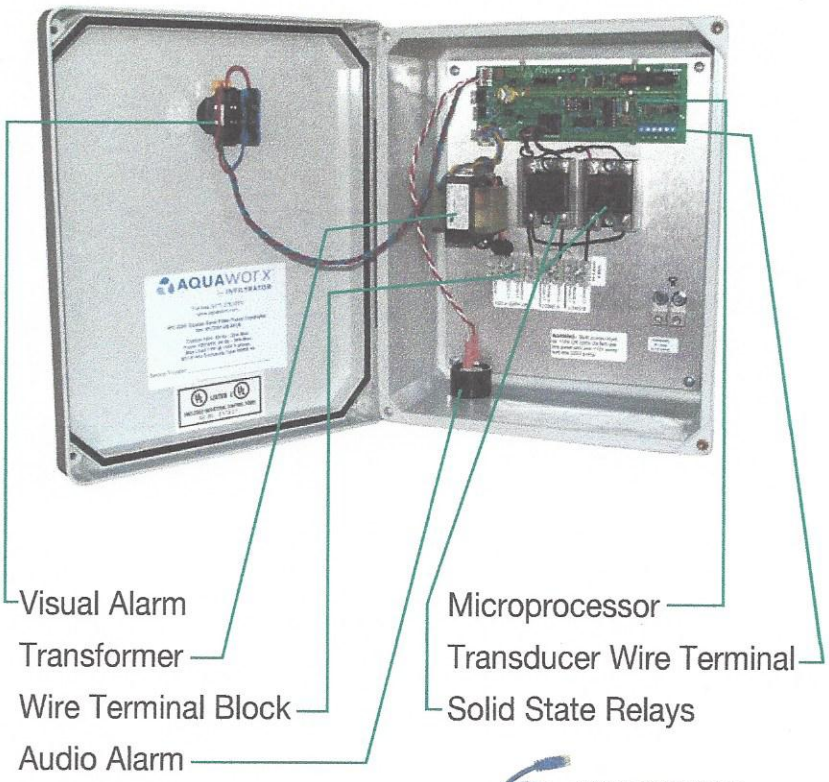
P.O. BOX 3097 BATTLE GROUND, WA 98604
PHONE: (360) 687-7668 FAX: (360) 687-7669

DATE: 9/08/10	TANK CONSTRUCTION & RE-BAR SCHEDULE FOR MODELS 1000 S, 1000 S-T, 1000 G & 1000 G-T	PAGE 5
DRAFTED BY: D.R.N.		
SCALE: NTS	KRIEG CONRETE PRODUCTS, INC	

AQUAworx by INFILTRATOR

IPC-D Duplex Control Panel
Technical Data Sheet

The Aquaworx Intelligent Pump Controller (IPC) Panel provides an innovative approach to time controlled pumping. Designed specifically for the onsite industry, the IPC Panel uses floatless pressure transducer technology. The IPC Panel monitors liquid levels, controls pumping time intervals, and logs events using the MARC (Mountable and Removable Controller) as the user interface. The data logging capabilities of the IPC Panel enables monitoring of multiple types of system events, which enhances operational assessment troubleshooting, and maintenance of the onsite system. The IPC-D Panel operates two alternating pumps, a single pressure transducer located in a single pump tank.



MARC Controller

STANDARD SPECIFICATIONS

- Enclosure dimensions: 13.3"H x 11.3"W x 5.8"D
- Weight: 8.5 lbs
- 115 VAC, 20 FLA, 1-HP Max, single phase, 60Hz
  220 VAC, 20 FLA, 2-HP Max, single phase, 60Hz
- NEMA 4X rated – constructed of UV-resistant fiberglass with stainless steel hinge
- Manual / Off / Auto Operation
- Audio / Visual Alarm – 95 decibel, with push to silence
- UL/cUL listed
- Built-in dose counter and pump run timer
- Solid-state relay
- Pressure transducer, liquid level sensing with no floats
- Transducer wire: 14-gauge, 3-wire connection (red, blue, black), rated for direct burial

FEATURES & BENEFITS

Floatless Transducer
Sensor mounted in pump chamber
- Simple 3-wire connection
- Reduces water tight connections in junction box
- Eliminates sewer gases in panel and crimped tubing

Data Logging
Date and time stamp for 4,000+ events
- Allows for system troubleshooting and timely diagnostics
- Allows design versus actual flow comparisons
- Identify water usage patterns

Veto Level Function
- Allows a programmable override

Easy Installation
- Only basic tools required: Screwdriver, pipe cutter, wirestripper, drill, step bit, tape measure

INFILTRATOR® systems inc.

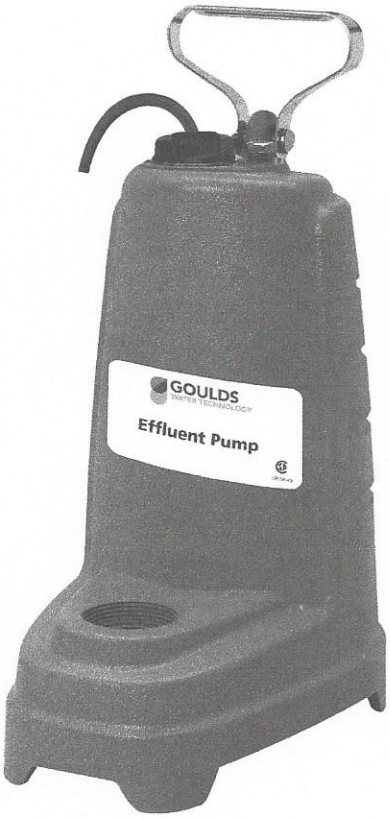
4 Business Park Road | P.O. Box 768 | Old Saybrook, CT 06475 | 860-577-7000 | Fax 860-577-7001
1-800-221-4436 | www.infiltratorsystems.com

U.S. Patents: 4,759,661; 5,017,041; 5,156,488; 5,336,017; 5,401,116; 5,401,459; 5,511,903; 5,716,163; 5,588,778; 5,839,844 Canadian Patents: 1,329,959; 2,004,564 Other patents pending. Infiltrator, Equalizer, Quick4, and SideWinder are registered trademarks of Infiltrator Systems Inc. Infiltrator is a registered trademark in France. Infiltrator Systems Inc. is a registered trademark in Mexico. Contour, MicroLeaching, PolyTuff, ChamberSpacer, MultiPort, PosiLock, QuickCut, QuickPlay, SnapLock and StraightLock are trademarks of Infiltrator Systems Inc. PolyLok is a trademark of PolyLok, Inc. TUF-TITE is a registered trademark of TUF-TITE, INC. Ultra-Rib is a trademark of IPEX Inc. © 2013 Infiltrator Systems Inc. All rights reserved. Printed in U.S.A.

R32 0613ISI

Contact Infiltrator Systems' Technical Services Department for assistance at 1-800-221-4436

TECHNICAL BROCHURE
BPE



FEATURES

- Corrosion resistant construction
- Cast iron body
- Thermoplastic impeller and cover.
- Upper sleeve and lower heavy duty ball bearing construction.
- Motor is permanently lubricated for extended service life.
- Powered for continuous operation.
- All ratings are within the working limits of the motor.
- Quick disconnect power cord, 20' standard length, heavy duty 16/3 SJTW with 115 or 230 volt grounding plug.
- Complete unit is heavy duty, portable and compact.
- Mechanical seal is carbon, ceramic, BUNA and stainless steel.
- Stainless steel fasteners

PE

SUBMERSIBLE EFFLUENT PUMP

GOULDS
WATER TECHNOLOGY
a xylem brand

APPLICATIONS

Specially designed for the following uses:

- Mound Systems
- Effluent/Dosing Systems
- Low Pressure Pipe Systems
- Basement Draining
- Heavy Duty Sump/Dewatering

SPECIFICATIONS

Pump – General:

- Discharge: 1½" NPT
- Temperature: 104°F (40°C) maximum, continuous when fully submerged.
- Solids handling: ½" maximum sphere.
- Automatic models include a float switch.
- Manual models available.
- Pumping range: see performance chart or curve.

PE31 Pump:

- Maximum capacity: 53 GPM
- Maximum head: 25' TDH

PE41 Pump:

- Maximum capacity: 61 GPM
- Maximum head: 29' TDH

PE51 Pump:

- Maximum capacity: 70 GPM
- Maximum head: 37' TDH

MOTOR

General:

- Single phase
- 60 Hertz
- 115 and 230 volts
- Built-in thermal overload protection with automatic reset.
- Class B insulation
- Oil-filled design
- High strength carbon steel shaft

PE31 Motor:

- .33 HP, 3000 RPM
- 115 volts
- Shaded pole design

PE41 Motor:

- .40 HP, 3400 RPM
- 115 and 230 volts
- PSC design

PE51 Motor:

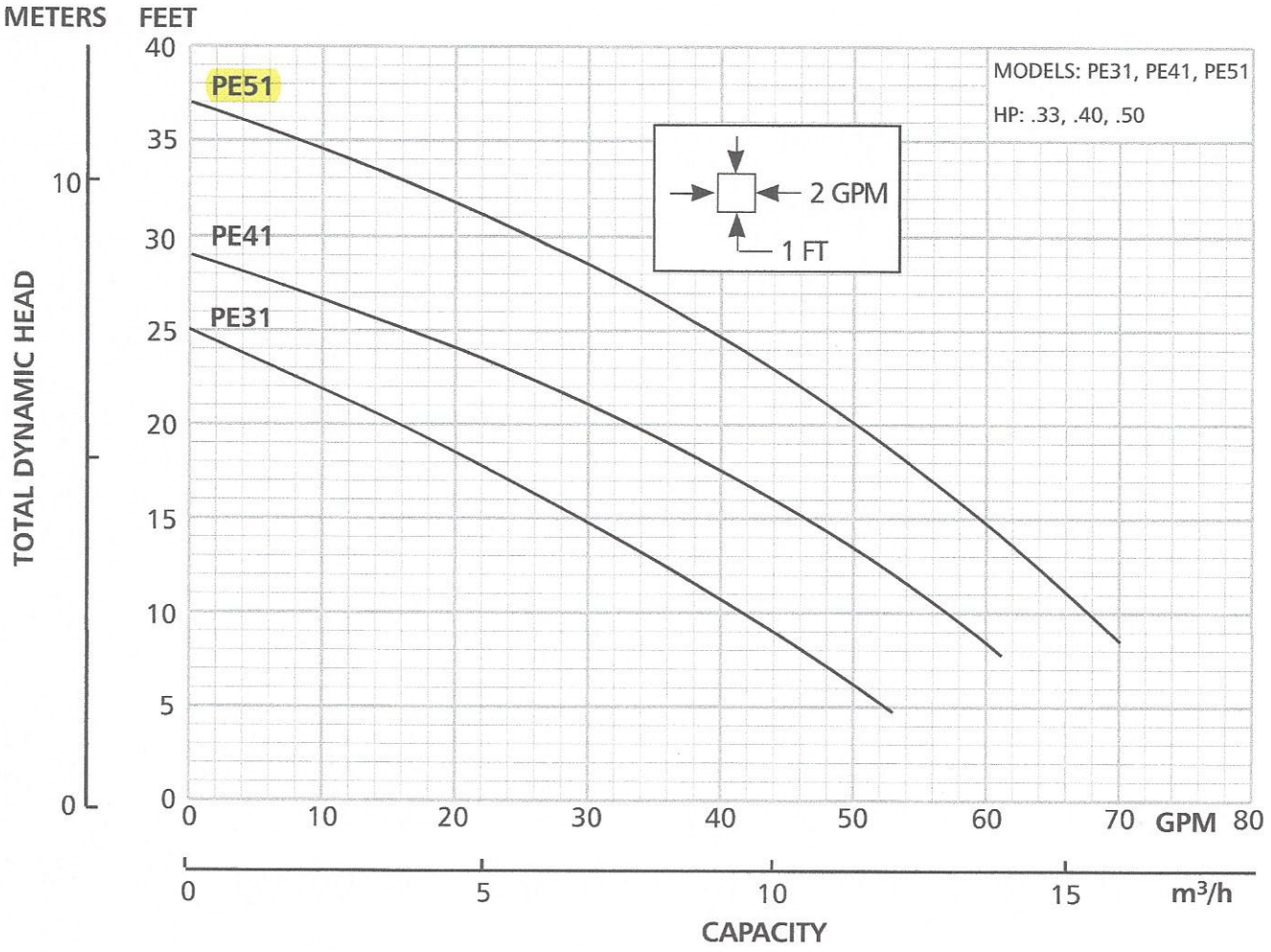
- .50 HP, 3400 RPM
- 115 and 230 volts
- PSC design

AGENCY LISTINGS

Tested to UL 778 and CSA 22.2 108 Standards
By Canadian Standards Association
File #LR38549

PUMP INFORMATION

Order No.	HP	Volts	Amps	Minimum Circuit Breaker	Phase	Float Switch Style	Cord Length	Discharge Connection	Minimum Basin Diameter	Maximum Solids Size	Shipping Weight lbs/kg
PE31M	0.33	115	12	20	1	Manual / No Switch	20'	1.5"	18"	.5"	31 / 14.1
PE31P1						Piggyback Float Switch					
PE41M	0.4		7.5	15		Manual / No Switch					
PE41P1						Piggyback Float Switch					
PE42M		230	3.7	10		Manual / No Switch					
PE42P1						Piggyback Float Switch					
PE51M	0.5	115	9.5	20		Manual / No Switch					
PE51P1						Piggyback Float Switch					
PE52M		230	4.7	10		Manual / No Switch					
PE52P1						Piggyback Float Switch					



PERFORMANCE RATINGS

PE31

Total Head (feet of water)	GPM
5	52
10	42
15	29
20	16
25	0

PE41

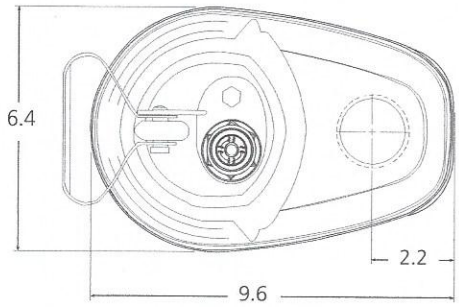
Total Head (feet of water)	GPM
8	61
10	57
15	46
20	33
25	16

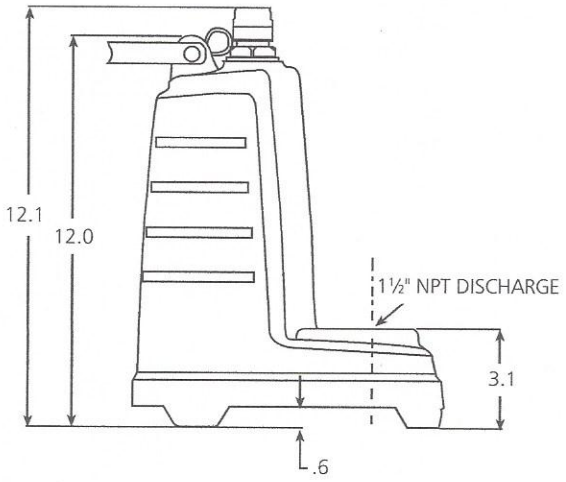
PE51

Total Head (feet of water)	GPM
10	67
15	59
20	50
25	39
30	26
35	8

DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)





xylem
Let's Solve Water

Xylem, Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210
Fax: (888) 322-5877
www.xyleminc.com/brands/gouldswatertechnology

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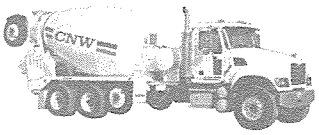
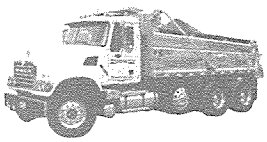


CONCRETE NOR'WEST
P.O. BOX 280 • MOUNT VERNON, WASHINGTON 98273-0280
(360) 757-3121 • FAX (360) 757-3816



MIX DESIGN April 15, 2014

Glacier Environmental Services, Inc.

REF: Cornet Bay Marina Remediation
Oak Harbor, WA

Mix 15PREPROPX
5000 psi with Fibers Mix Design
for Precast Tanks

We suggest these concrete mix proportions (SSD weights for one cubic yard of concrete) for your information and appraisal.

MATERIALS WT. LBS.	VOL. CU. FT.	SSD
Water	3.93	245
Cement	3.11	611
Fly Ash		
Course Agg. # 8	9.64	1620
Fine Aggregate	9.64	1610
Air (entrapped)	.68	

Admix:
BASF MasterGlenium 7500 34 oz. / c. yd.
10 lbs / c. yd. Propex Novomesh 950

Specified Compressive Strength
5000 p.s.i.

Cement Factor - sacks	Cement Type	W/C
6.5	I/II	.40

Slump			Max. Agg.
4"	+/-	1"	# 8

Air
Entrapped
2.5%

Proportioning criteria is based on data resulting from appropriate ASTM methods.

LEHIGH
HEIDELBERGCEMENT Group

Lehigh Cement, a division of Lehigh Hanson Materials Limited
7777 Ross Road
Delta, British Columbia, V4G 1B8
P.O. Box 950, V4K 3S6
ph: 604.946.0411

MILL TEST REPORT

Cement Type: ASTM Type I/II, AASHTO Type I
Low Alkali Portland Cement

Plant: Bellingham, WA

Certificate #: B1-157

Production Period:	Feb 01 2014 Feb 28 2014	Test Result	*ASTM C150 Specification*	*AASHTO M 85 Specification*
SiO2 (%)	*ASTM C114*	20.3	-	-
Al2O3 (%)	*ASTM C114*	5.0	*max. 6.0*	-
Fe2O3 (%)	*ASTM C114*	3.57	*max. 6.0*	-
CaO (%)	*ASTM C114*	64.2	-	-
MgO (%)	*ASTM C114*	1.2	*max. 6.0*	*max. 6.0*
SO3 (%)	*ASTM C114*	2.6	*max. 3.0*	*max. 3.0*
Na2O (%)	*ASTM C114*	0.26	-	-
K2O (%)	*ASTM C114*	0.34	-	-
TiO2 (%)	*ASTM C114*	0.28	-	-
C3S (%)	*ASTM C150*	59	-	-
C2S (%)	*ASTM C150*	12	-	-
C3A (%)	*ASTM C150*	7	*max. 8*	*max. 8*
C4AF (%)	*ASTM C150*	11	-	-
Equivalent Alkalies (%)	*ASTM C150*	0.48	*max. 0.60*	*max. 0.60*
Loss on Ignition (%)	*ASTM C114*	1.9	*max. 3.0*	*max. 3.0*
Insoluble Residue (%)	*ASTM C114*	0.15	*max. 0.75*	*max. 0.75*
Free Calcium Oxide (%)	*ASTM C114*	0.3	-	-
CO2 in Cement (%)	*ASTM C114*	1.1	-	-
CaCO3 in Limestone (%)	*ASTM C114*	98	*min. 70*	*min. 70*
Limestone in Cement (%)	*ASTM C150*	2.5	*max. 5.0*	*max. 5.0*
Vicat Setting Time Initial (minutes)	*ASTM C191*	118	*min. 45 max. 375*	*min. 45 max. 375*
Blaine Fineness (m2/kg)	*ASTM C204*	376	*min. 280*	*min. 280*
+325 mesh	*ASTM C430*	1.5	-	-
Air Content of Mortar (%)	*ASTM C185*	7	*max. 12*	*max. 12*
Autoclave Expansion (%)	*ASTM C151*	-0.02	*max. 0.80*	*max. 0.80*
Compressive Strength		MPa / psi		
3 Day	*ASTM C109/109M*	26.7 / 3870	*min. 12.0*	*min. 12.0*
7 Day	*ASTM C109/109M*	34.7 / 5030	*min. 19.0*	*min. 19.0*
28 Day	*ASTM C109/109M*	42.6 / 6180	-	-

This will certify that the above described cement meets the standard chemical and physical requirements of ASTM Specification C-150 for Type I and Type II Low Alkali Portland Cements and AASHTO Specification M-85 for Type I Low Alkali Portland Cement.

Siu Kei (S.K.) Ng
Plant Chemist

March 11, 2014

CNW
CONCRETE NOR'WEST

P.O. Box 280, Mount Vernon, Washington 98273-0280
Phone: (360) 757-3121 Fax: (360) 757-3816

Date: *Thursday, February 06, 2014*

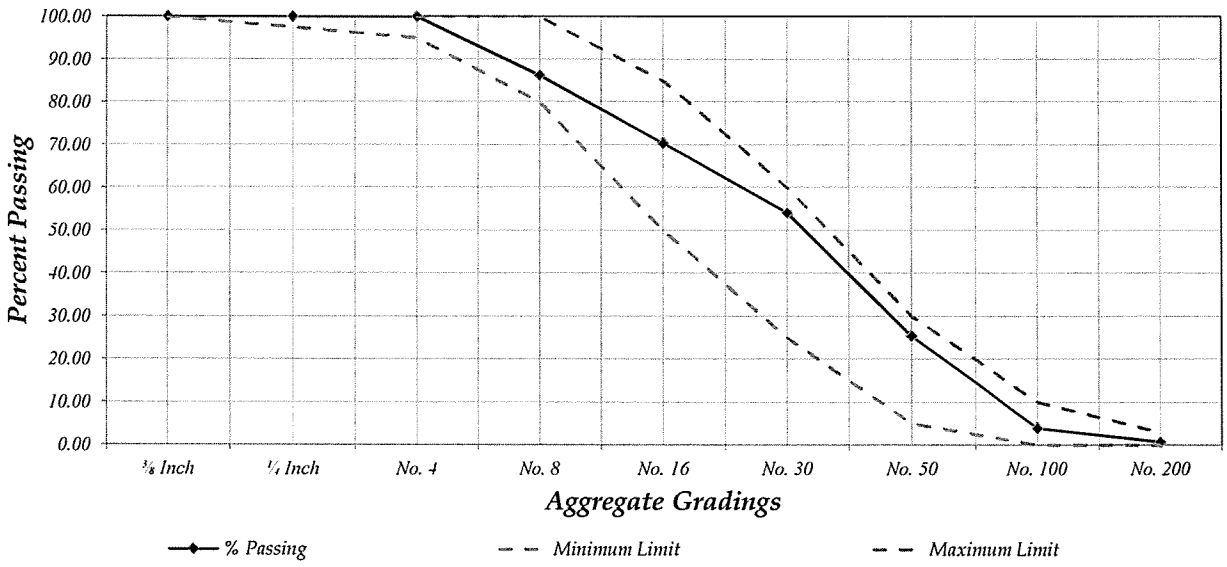
Material Description: **Concrete Sand**

Gradings: ASTM C33 Sand

Sample Number: *0206-02*		**Date Sampled:** *02/06/14*	**By:** *MC*
		Date Completed: *2/6/14 3:04 PM*	**By:** *MC*
Sample Moist: *822.8*	**Total Moisture %:** *5.813%*	**Sample Type:** *Production*	**Location:** *Boulder Hill IS-93 Stockpile*
Sample Dry: *777.6*	**FM:** *2.600*		
Wash Dry: *0.0*	**Wash Loss %:**		

ASTM C33/C33M - 13
Fine Aggregate (Table 1)

	Cummaltive	Amount Retained	Individual % Retained	% Retained	% Passing	Minimum Limit	Maximum Limit
2 Inch	0.0	0.0	0.0	0.0	***100.00***		
1-½ Inch	0.0	0.0	0.0	0.0	***100.00***		
1-¼ Inch	0.0	0.0	0.0	0.0	***100.00***		
1 Inch	0.0	0.0	0.0	0.0	***100.00***		
¾ Inch	0.0	0.0	0.0	0.0	***100.00***		
½ Inch	0.0	0.0	0.0	0.0	***100.00***		
⅜ Inch	0.0	0.0	0.0	0.0	***100.00***	*100*	
¼ Inch	0.0	0.0	0.0	0.0	***100.00***		
No. 4	0.3	0.3	0.0	0.0	***99.96***	*95*	*100*
No. 8	106.7	106.4	13.7	13.7	***86.28***	*80*	*100*
No. 16	230.5	123.8	15.9	29.6	***70.36***	*50*	*85*
No. 30	357.0	126.5	16.3	45.9	***54.09***	*25*	*60*
No. 50	579.9	222.9	28.7	74.6	***25.42***	*5*	*30*
No. 100	747.1	167.2	21.5	96.1	***3.92***	*0*	*10*
No. 200	771.7	24.6	3.2	99.2	***0.76***	*0*	*3*
PAN	776.7	5.0	0.64	99.88	***0.12***		



CNW
CONCRETE NOR'WEST

P.O. Box 280, Mount Vernon, Washington 98273-0280
Phone: (360) 757-3121 Fax: (360) 757-3816

Date: *Thursday, February 13, 2014*

Material Description: **Pea Gravel**

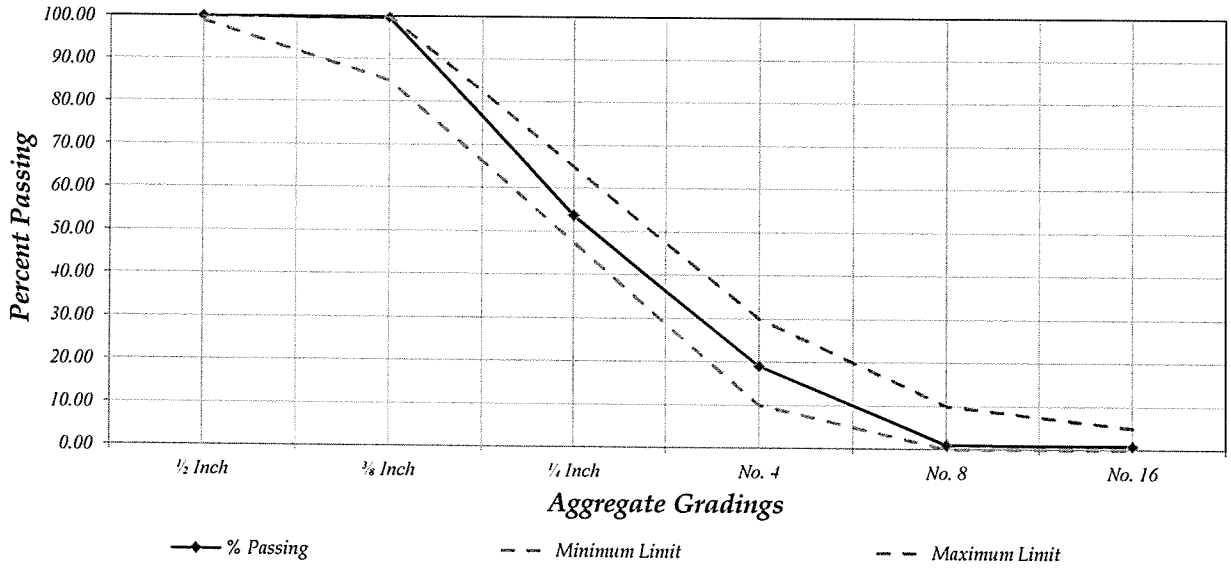
Gradings: AASHTO #8

Sample Number: *0213-06*	
Sample Moist: *1,226.6*	**Total Moisture %:** *2.705%*
Sample Dry: *1,194.3*	**FM:** *6.241*
Wash Dry: *0.0*	**Wash Loss %:**

Date Sampled: *02/12/14*	**By:** *MC*
Date Completed: *2/13/14 10:36 AM*	**By:** *MC*
Sample Type: *Production*	**Location:** *Boulder Hill IS-93 Stockpile*

2014 Standard Specifications 9-03.1(4)C - AASHTO #8

	Cummaltive	Amount Retained	Individual % Retained	% Retained	% Passing	Minimum Limit	Maximum Limit
2 Inch	0.0	0.0	0.0	0.0	***100.00***	-	-
1-½ Inch	0.0	0.0	0.0	0.0	***100.00***	-	-
1-¼ Inch	0.0	0.0	0.0	0.0	***100.00***		
1 Inch	0.0	0.0	0.0	0.0	***100.00***	-	-
¾ Inch	0.0	0.0	0.0	0.0	***100.00***	-	-
½ Inch	0.0	0.0	0.0	0.0	***100.00***	*99*	*100*
⅜ Inch	3.7	3.7	0.3	0.3	***99.69***	*85*	*100*
¼ Inch	552.7	549.0	46.0	46.3	***53.72***		
No. 4	966.6	413.9	34.7	80.9	***19.07***	*10*	*30*
No. 8	1,183.0	216.4	18.1	99.1	***0.95***	*0*	*10*
No. 16	1,184.3	1.3	0.1	99.2	***0.84***	*0*	*5*
No. 30	1,185.2	0.9	0.1	99.2	***0.76***	-	-
No. 50	1,187.5	2.3	0.2	99.4	***0.57***	-	-
No. 100	1,190.4	2.9	0.2	99.7	***0.33***	-	-
No. 200	1,192.3	1.9	0.2	99.8	***0.17***	-	-
PAN	1,194.1	1.8	0.15	99.98	***0.02***		



BASF

The Chemical Company

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
4	03 70 00	Mass Concrete
	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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NSF Certified to NSF/ANSI 61

BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

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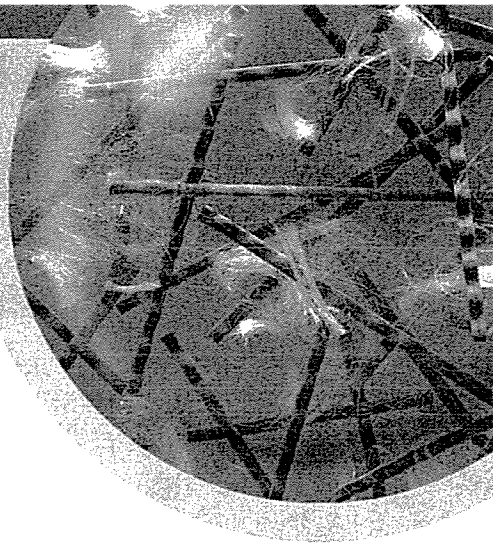
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ▪ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ▪ Fax: 905 792-0651

NOVOMESH® 950

PRODUCT DATA SHEET



NOVOMESH® 950 MACRO-SYNTHETIC FIBER BLEND

The new and improved Novomesh 950 secondary reinforcement system for concrete is a blend of polypropylene/polyethylene high performance macro-monofilament fibers with geometrically designed, patented sinusoidal deformations and 100% virgin polypropylene micro-synthetic fibers containing no reprocessed olefin materials. With a wider cross-section resulting in an increased surface area of the macro fiber, the new blend delivers improved adhesion in the concrete mix, increased bond strength and an overall increase in performance for toughness and crack holding capability. Novomesh 950 is engineered and manufactured for use as concrete reinforcement at a minimum addition rate of 5 lb/yd³ (3.0 kg/m³) and complies with ASTM C 1116/C 1116M, Type III fiber reinforced concrete.

ADVANTAGES

Requires no minimum amount of concrete cover • Is always positioned in compliance with codes • Safe and easier to use than traditional reinforcement • Saves time and hassle

FEATURES & BENEFITS

- Macro-synthetic/micro-synthetic fiber blend for secondary reinforcement in lieu of welded wire reinforcement and light rebar
- Wider cross-section provides increased surface area for superior tight crack width control
- Inhibits formation of plastic shrinkage and plastic settlement cracks
- Provides impact, abrasion and shatter resistance
- Lowered water migration
- Provides higher levels of residual strength
- Provides improved durability
- Control of drying shrinkage and temperature cracking
- Good finishing characteristics
- Pumpable reinforcement

PRIMARY APPLICATIONS

Applicable to all types of concrete in the commercial market segment that require a synthetic system for secondary reinforcement and where steel reinforcement cannot be used. The commercial market segment can include stores, hotels, institutional, educational, health care, amusement, offices, churches and storage facilities.

- Slabs-on-ground
- Parking areas
- Exterior pavements
- Sidewalks/Driveways
- Overlays & toppings
- Non-magnetic applications
- Runways

DO SPECIFY NOVOMESH 950 FIBERS:

- Reduced plastic shrinkage cracking
- Alternative to traditional steel for temperature/shrinkage and flexural reinforcement
- Improved impact, shatter and abrasion resistance
- Improved residual strength
- Reduced water migration and damage from freeze/thaw
- Improved durability

DO NOT SPECIFY NOVOMESH 950 FIBERS:

- Increasing joint spacing beyond ACI and PCA guidelines
- Decreasing the thickness of slabs
- Replacing structural levels of steel reinforcement

CHEMICAL AND PHYSICAL PROPERTIES:

Polypropylene Component:

Absorption	Nil
Specific Gravity	0.91
Fiber Length	Multi-Design Gradation
Electrical Conductivity	Low
Melt Point	324°F (162°C)

Coarse Macro-Monofilament Polypropylene Component:

Absorption	Nil
Specific Gravity	0.91
Nominal Filament Diameter	0.033 in (0.83 mm)
Fiber Length	1.8 in (45 mm)
Electrical Conductivity	Low
Melt Point	328°F (164°C)

PROPEX® | THE ADVANTAGE CREATORS.™

CONCRETE SYSTEMS

NOVOMESH® 950

PRODUCT USE

MIXING DESIGNS AND PROCEDURES: Novomesh® 950 reinforcing is a mechanical, not a chemical process. The addition of Novomesh 950 does not require additional water or other mix design changes at normal rates. Novomesh 950 degradable bags are added to the mixer after batching the other concrete materials or during the addition of aggregates and water. Mixing time of at least 5 minutes at mixing speed is required as specified in ASTM C 94.

FINISHING: Novomesh 950 reinforced concrete can be finished with normal finishing techniques in accordance with ACI 304, Section C.3.

APPLICATION RATE: The standard application rate for Novomesh 950 is one 5 lb degradable bag per cubic yard (3.0 kg/m³) of concrete.

GUIDELINES

Novomesh 950 should not be used to replace structural, load-bearing reinforcement. Novomesh 950 fibers should not be used as a means of using thinner concrete sections than original design. Novomesh 950 should not be used to increase joint spacing past those dimensions suggested by PCA and ACI industry standard guidelines.

COMPATIBILITY

Novomesh 950 is compatible with all commonly used concrete admixtures and performance enhancing chemicals.

PACKAGING

Novomesh 950 fibers are available in 5 lb degradable bags. The macro-monofilament fiber is collated in small bundles within the degradable bag for rapid distribution. Novomesh 950 fibers are packaged, shrink-wrapped and palletized for protection during shipping.

TECHNICAL SERVICES

Trained Propex Concrete Systems specialists are available worldwide to assist and advise in specifications and field service. Propex Concrete Systems representatives do not engage in the practice of engineering or supervision of projects and are available solely for service and support of our customers.

REFERENCE DOCUMENTS

- ASTM C 94/C 94M Standard Specification for Ready-Mixed Concrete.
- ASTM C 1116/C 1116M Standard Specification for Fiber-Reinforced Concrete.
- ASTM C 1399 Standard Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete.
- ASTM C 1436 Standard Specification for Materials for Shotcrete.
- ASTM C 1550 Standard Test Method for Flexural Toughness of Fiber Reinforced Concrete (Using Centrally Loaded Round Panel).
- ASTM C 1609/C 1609M Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading). Replaces ASTM C 1018.
- JCI-SF4 Method of Test for Flexural Strength and Flexural Toughness of Fiber Reinforced Concrete.
- ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete.
- ACI 506 Guide for Shotcrete.

SPECIFICATION CLAUSE

Novomesh 950 shall be used for shrinkage and temperature protection of the concrete. Novomesh 950 is a blend of high performance macro-monofilaments with patented sinusoidal deformations and micro-synthetic polypropylene fibers. Application rate shall be a minimum of 5 lbs per cubic yard (3.0 kg/m³) of concrete. Fiber manufacturer shall document evidence of satisfactory performance history and compliance with ASTM C 1116/C 1116M, Type III fiber reinforced concrete. Fibrous concrete reinforcement shall be manufactured by Propex Concrete Systems, 6025 Lee Highway, Suite 425, PO Box 22788, Chattanooga, TN 37422, USA, tel: 423 892 8080, fax: 423 892 0157, web site: fibermesh.com.

PROPEX® | THE ADVANTAGE CREATORS.™

CONCRETE SYSTEMS

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6025 Lee Highway, Suite 425
PO Box 22788
Chattanooga, TN 37422
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INTERNATIONAL
Propex Concrete Systems Ltd.
Propex House, 9 Royal Court, Basil Close
Chesterfield, Derbyshire, S41 7SL.UK
Tel: +44 (0) 1246 564200
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www.fibermesh.com

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CS-516
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1/08

KRIEG CONCRETE PRODUCTS

TANK MODEL: 1000 X X
DATE MANUFACTURED: XX/XX/XX
MAX. DEPTH OF COVER: 3 FT.
LIQUID CAPACITY: 1006 GAL.

DETAIL OF I.D. TAG (LOCATE TAG INSIDE RISER OR ACCESS OPENING)

GREASE INTERCEPTOR NOTES (1000 G & 1000 G-T MODELS ONLY)

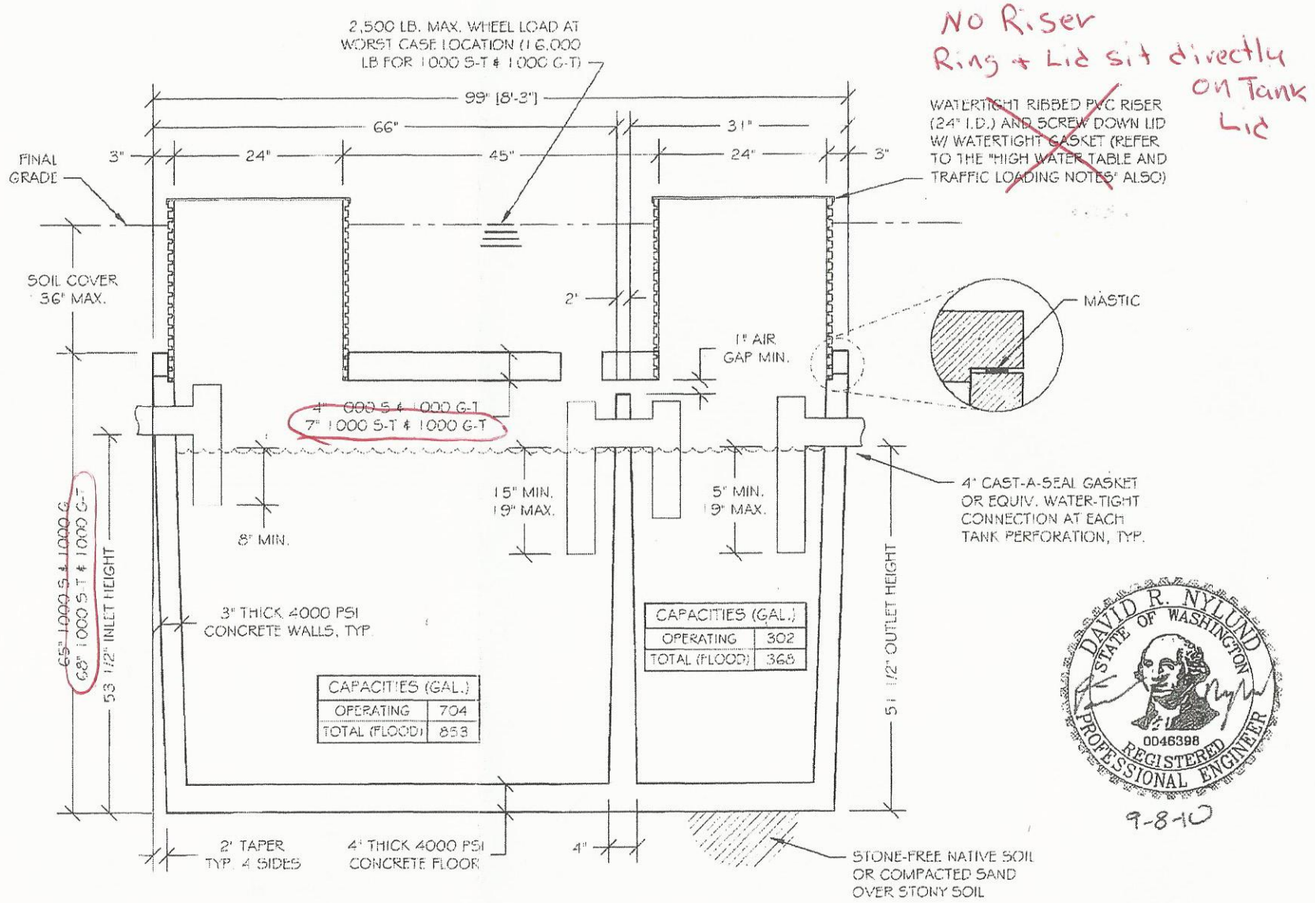
1) GREASE INTERCEPTOR INLET BAFFLES MUST EXTEND TO AT LEAST WITHIN 18" OF THE TANK FLOOR.
2) INTERCOMPARTMENTAL AND OUTLET BAFFLES MUST EXTEND TO A POINT BETWEEN 6" AND 12" FROM THE TANK FLOOR.
3) OUTLET BAFFLES MUST EXTEND ABOVE THE LIQUID TO ALLOW SCUM STORAGE AND VENTING, BUT NOT LESS THAN 1" FROM THE UNDERSIDE OF THE TOP OF THE TANK.

ACCESS AND RISERS NOTES

1) MINIMUM ONE 18" Ø ACCESS OPENING PER COMPARTMENT. THE DISTANCE BETWEEN ACCESS OPENINGS IS NOT TO EXCEED 10'-0" CENTER TO CENTER.
2) RISERS MUST BE A MINIMUM OF 23" INSIDE DIAMETER.
3) RISER-TO-TANK AND RISER-TO-ADDITIONAL SECTIONS OF RISER CONNECTIONS MUST INCORPORATE JOINT GROOVES OR ADAPTERS TO PREVENT LATERAL MOVEMENT AND REMAIN WATERTIGHT.
4) ACCESS AND RISER OPENINGS MUST BE COVERED WITH A LOCKABLE LID OR OTHER SECURED LID.
5) ACCESS RISERS AND LIDS MUST BE STRUCTURALLY SOUND TO WITHSTAND ANTICIPATED SITE-SPECIFIC LOADS.

SEALS AND GASKETS NOTES

1) SEALS AND GASKETS FOR INLET, OUTLET, AND INTERCOMPARTMENTAL FITTINGS MUST BE RESILIENT, WATERTIGHT, CORROSION-RESISTANT, AND FLEXIBLE.
2) SEALS MEETINGS ASTM C-1644 OR EQUIVALENT MUST BE USED AT THE TANK WALL-TO-PVC PIPING INTERFACE TO PREVENT LEAKAGE.



No Riser
Ring + Lid sit directly on Tank Lid

INSTALLATION INSTRUCTIONS

1) EXCAVATE TANK HOLE WITH VERTICAL WALLS TO 2 FEET LARGER THAN TANK ON ALL SIDES. BOTTOM OF HOLE MUST BE FLAT, LEVEL, AND FREE OF WATER. HOLE MUST SLOPE DOWN 3" TO CENTER OF TANK.
2) INSTALL 6" MINIMUM OF 2" MINUS MATERIAL OR SAND ON BOTTOM OF EXCAVATED HOLE.
3) INSTALL TANK IN CENTER OF HOLE, KEEPING MINIMUM 1 FOOT VOID SPACE ON ALL SIDES.
4) INSTALL REST OF SYSTEM, AND AFFIX RISERS AS REQUIRED BY LOCAL JURISDICTION.
5) UPON APPROVAL TO BACKFILL, FILL VOID SPACE AROUND TANK WITH COMPACT GRANULAR (SANDY) SOIL FREE OF LARGE CLUMPS OF CLAY AND ROCKS OVER 2 INCHES IN DIAMETER. BACKFILL CAREFULLY AND EVENLY IN 18" LIFTS. MAXIMUM SOIL COVER IS 36".
6) IF REQUIRED, WATER TESTING TO BE DONE BY LOCAL JURISDICTION OR DOH SPECIFICATIONS.
7) FINAL GRADE THE SURFACE TO AVOID CHANELLING SURFACE WATER TOWARDS TANK.

BAFFLE NOTES

1) INLETS TO SEPTIC TANKS MUST EXTEND AT LEAST 8" BELOW THE LIQUID LEVEL.
2) OUTLETS TO SEPTIC TANKS MUST EXTEND BELOW THE LIQUID LEVEL AT LEAST 30% BUT NOT MORE THAN 40%.
3) INLET AND OUTLET DEVICES MUST HAVE A MINIMUM INSIDE DIAMETER OF 4" AND BE CONSTRUCTED OF PVC OR ABS CONFORMING TO OR EXCEEDING THE STANDARDS OF ASTM D 3034 OR ASTM D 2680, RESPECTIVELY.
4) INLETS AND OUTLETS MAY BE MOVED FROM THE LOCATIONS SHOWN PROVIDED THE HEIGHTS ARE NOT CHANGED AND THE PIPE CENTERS ARE LOCATED AT LEAST 8" FROM ANY EDGE AND AT LEAST 4" FROM ANY REBAR.

HIGH WATER TABLE AND TRAFFIC LOADING NOTES

1) FOR TANK MODEL 1000 S & 1000 G:
   A) MAXIMUM WATER TABLE AT TOP OF LID
   B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 2,500 LB CONCENTRATED LOAD
2) FOR TANK MODEL 1000 S-T & 1000 G-T:
   A) WATER TABLE AT GROUND LEVEL
   B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 16,000 LB CONCENTRATED LOADS AT 14' INTERVALS (HS20 RATING)
3) TRAFFIC RATED RISERS MUST MEET OR EXCEED THE STANDARDS OF ASTM C478 (12) AND WSDOT STANDARD PLAN B-30.90.00. FRAME AND COVER MUST MEET OR EXCEED THE STANDARDS OF ASTM A48 CL35B.

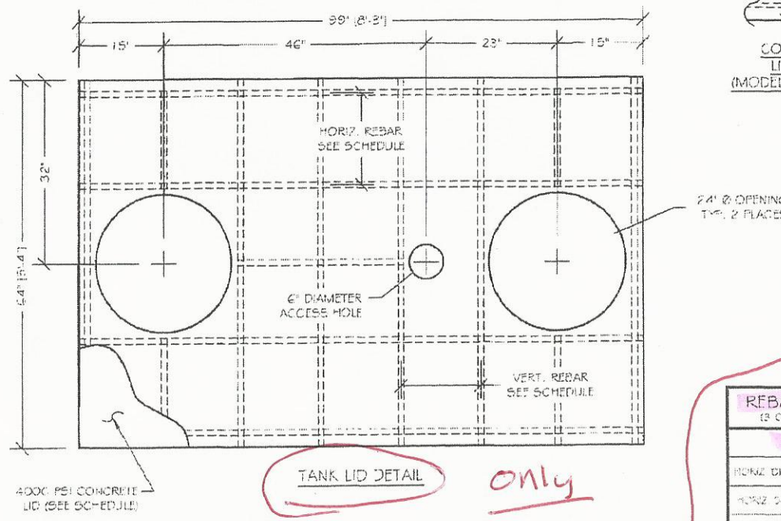
DAVID R. NYLUND
STATE OF WASHINGTON
0046398
REGISTERED PROFESSIONAL ENGINEER
9-8-10

PAGE: 4

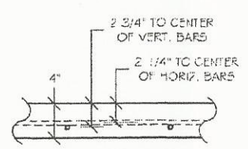
TANK DETAILS FOR MODELS
1000 S, 1000 S-T, 1000 G & 1000 G-T
KRIEG CONRETE PRODUCTS, INC.

DATE: 9/08/10
DRAFTED BY: D.R.N.
SCALE: NTS

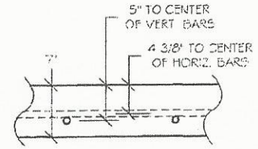
EK ENGINEERING INC.
P.O. BOX 3097 BATTLE GROUND, WA 98604
PHONE: (360) 687-7668 FAX: (360) 687-7669



TANK LID DETAIL only



CONCRETE COVER FOR LID REINFORCEMENT (MODEL NO. 1000 S & 1000 G)

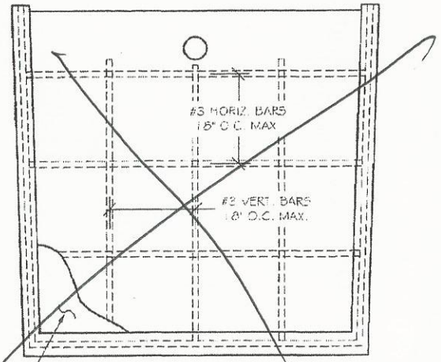


CONCRETE COVER FOR LID REINFORCEMENT (MODEL NO. 1000 S-T & 1000 G-T)

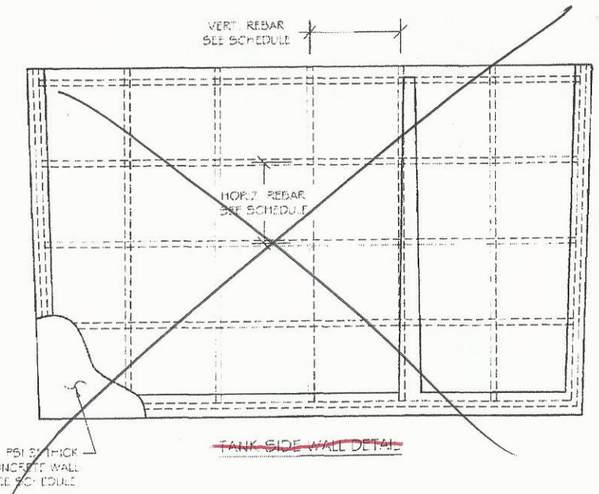
Note: No Rebar in Floor/walls. See Attached Fibermesh & Engineer's Letter

REBAR SCHEDULE FOR 1000 S & 1000 G
(2' OF SOIL COVER, WATER TABLE AT TANK LID, 2500 LB WHEEL LOAD)

SIDE WALLS		END WALLS	
HORIZ. DIAMETER	#5 (3/8")	HORIZ. DIAMETER	#5 (3/8")
HORIZ. SPACING	18"	HORIZ. SPACING	18"
VERT. DIAMETER	#3 (3/8")	VERT. DIAMETER	#3 (3/8")
VERT. SPACING	18"	VERT. SPACING	18"
FLOOR		LID (THICKNESS 4")	
DIAMETER	#3 (3/8")	DIAMETER	#4 (1/2")
SPACING	18" EACH WAY	SPACING	18" EACH WAY



INTERCOMPARTMENTAL WALL DETAIL

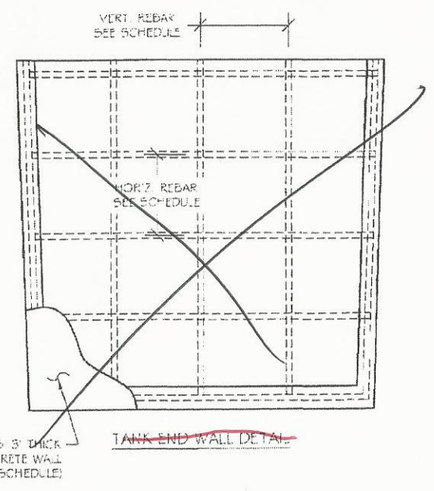


TANK SIDE WALL DETAIL

REBAR SCHEDULE FOR 1000 S-T & 1000 G-T
(2' OF SOIL COVER, WATER TABLE AT GROUND LEVEL & HS20 TRAFFIC LOADS)

SIDE WALLS		END WALLS	
HORIZ. DIAMETER	#4 (1/2")	HORIZ. DIAMETER	#4 (1/2")
HORIZ. SPACING	18"	HORIZ. SPACING	18"
VERT. DIAMETER	#4 (1/2")	VERT. DIAMETER	#4 (1/2")
VERT. SPACING	18"	VERT. SPACING	18"
FLOOR		LID (THICKNESS 7")	
DIAMETER	#4 (1/2")	DIAMETER	#5 (5/8")
SPACING	18" EACH WAY	SPACING	12" EACH WAY

NOTES:
1) ALL REINFORCEMENT IS TO BE GRADE 60 WITH A MIN. OVERLAP OF 40 BAR DIAMETERS AT SPLICES (E.G. 18" FOR NO. 4 BAR).
2) UNLESS NOTED OTHERWISE, FLOOR AND WALL REBAR IS TO BE CENTERED IN THE CONCRETE MEMBER WITH THE HORIZONTAL REBAR TOWARDS THE OUTSIDE OF THE TANK.



TANK END WALL DETAIL

DAVID R. NYLUND
STATE OF WASHINGTON
0046398
REGISTERED PROFESSIONAL ENGINEER
9-8-10

PAGE: 5

TANK CONSTRUCTION F-BAR SCHEDULE FOR MODELS tank 1000S, Lid only 1000G & 1000 G-T only

DATE: 9/08/10
DRAFTED BY: D.R.N.
SCALE: NTS

KRIEG CONRETE PRODUCTS, INC.

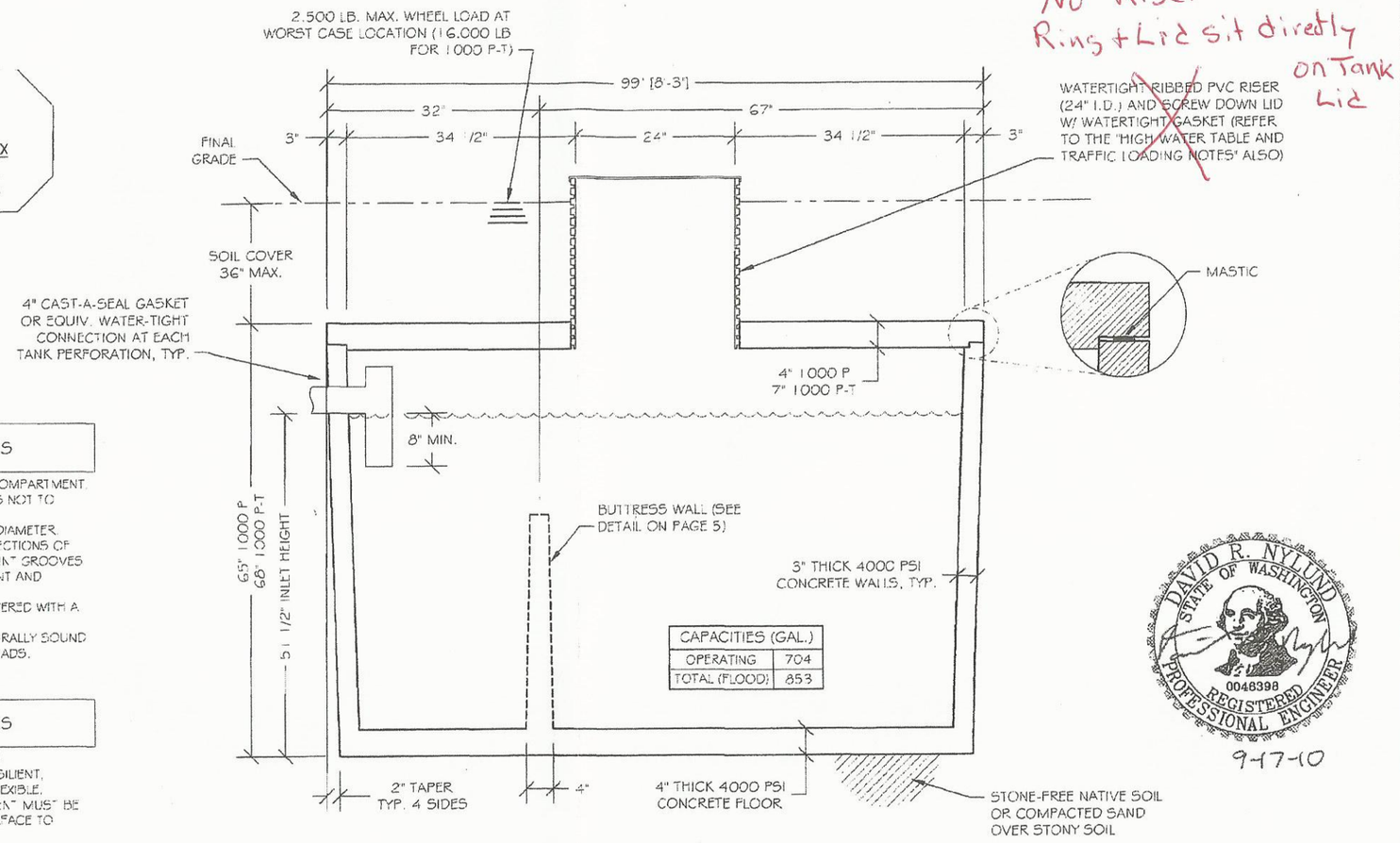
EK ENGINEERING INC.
P.O. BOX 3097 BATTLE GROUND, WA 98604
PHONE: (360) 687-7668 FAX: (360) 687-7669

No Riser
Ring + Lid sit directly on Tank Lid

KRIEG CONCRETE PRODUCTS

TANK MODEL: 1000 P X
DATE MANUFACTURED: XX/XX/XX
MAX. DEPTH OF COVER: 3 FT.
LIQUID CAPACITY: 1006 GAL.

DETAIL OF I.D. TAG (LOCATE TAG INSIDE RISER OR ACCESS OPENING)



ACCESS AND RISERS NOTES

1) MINIMUM ONE 18" Ø ACCESS OPENING PER COMPARTMENT. THE DISTANCE BETWEEN ACCESS OPENINGS IS NOT TO EXCEED 10'-0" CENTER TO CENTER.
2) RISERS MUST BE A MINIMUM OF 23" INSIDE DIAMETER.
3) RISER-TO-TANK AND RISER-TO-ADDITIONAL SECTIONS OF RISER CONNECTIONS MUST INCORPORATE JOINT GROOVES OR ADAPTERS TO PREVENT LATERAL MOVEMENT AND REMAIN WATERTIGHT.
4) ACCESS AND RISER OPENINGS MUST BE COVERED WITH A LOCKABLE LID OR OTHER SECURED LID.
5) ACCESS RISERS AND LIDS MUST BE STRUCTURALLY SOUND TO WITHSTAND ANTICIPATED SITE-SPECIFIC LOADS.

SEALS AND GASKETS NOTES

1) SEALS AND GASKETS FOR INLET, OUTLET, AND INTERCOMPARTMENTAL FITTINGS MUST BE RESILIENT, WATERTIGHT, CORROSION-RESISTANT, AND FLEXIBLE.
2) SEALS MEETINGS ASTM C-1644 OR EQUIVALENT MUST BE USED AT THE TANK WALL-TO-PVC PIPING INTERFACE TO PREVENT LEAKAGE.

INSTALLATION INSTRUCTIONS

1) EXCAVATE TANK HOLE WITH VERTICAL WALLS TO 2 FEET LARGER THAN TANK ON ALL SIDES. BOTTOM OF HOLE MUST BE FLAT, LEVEL, AND FREE OF WATER. HOLE MUST SLOPE DOWN 3" TO CENTER OF TANK.
2) INSTALL 6" MINIMUM OF 2" MINUS MATERIAL OR SAND ON BOTTOM OF EXCAVATED HOLE.
3) INSTALL TANK IN CENTER OF HOLE, KEEPING MINIMUM 1 FOOT VOID SPACE ON ALL SIDES.
4) INSTALL REST OF SYSTEM, AND AFFIX RISERS AS REQUIRED BY LOCAL JURISDICTION.
5) UPON APPROVAL TO BACKFILL, FILL VOID SPACE AROUND TANK WITH COMPACT GRANULAR (SANDY) SOIL FREE OF LARGE CLUMPS OF CLAY AND ROCKS OVER 2 INCHES IN DIAMETER. BACKFILL CAREFULLY AND EVENLY IN 18" LIFTS. MAXIMUM SOIL COVER IS 36".
6) IF REQUIRED, WATER TESTING TO BE DONE BY LOCAL JURISDICTION OR DOH SPECIFICATIONS.
7) FINAL GRADE THE SURFACE TO AVOID CHANELLING SURFACE WATER TOWARDS TANK.

BAFFLE NOTES

1) INLETS TO PUMP TANKS REQUIRE A SANITARY TEE OR BAFFLE (WHEN EFFLUENT IS PUMPED INTO TANK) AND MUST EXTEND MIN. 8" BELOW THE INVERT OF THE INLET.
2) INLET AND OUTLET DEVICES MUST HAVE A MINIMUM INSIDE DIAMETER OF 4" AND BE CONSTRUCTED OF PVC OR ABS CONFORMING TO OR EXCEEDING THE STANDARDS OF ASTM D 3034 OR ASTM D 2680, RESPECTIVELY.
3) THE INLET MAY BE MOVED FROM THE LOCATION SHOWN PROVIDED THE HEIGHT IS NOT CHANGED AND THE PIPE CENTER IS LOCATED AT LEAST 6" FROM ANY EDGE AND AT LEAST 4" FROM ANY REBAR.

HIGH WATER TABLE AND TRAFFIC LOADING NOTES

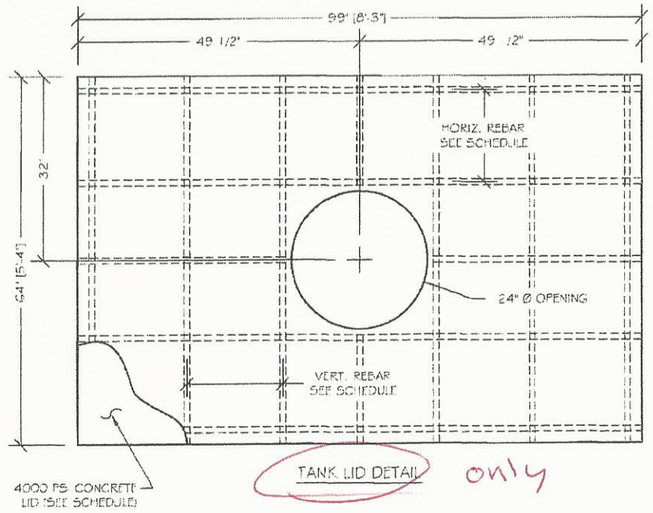
1) FOR TANK MODEL 1000 P:
   A) MAXIMUM WATER TABLE AT TOP OF LID
   B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 2,500 LB CONCENTRATED LOAD
2) FOR TANK MODEL 1000 P-T:
   A) WATER TABLE AT GROUND LEVEL
   B) MAXIMUM TRAFFIC LOADING NOT TO EXCEED 16,000 LB CONCENTRATED LOADS AT 14" INTERVALS (H520 RATING)
3) TRAFFIC RATED RISERS MUST MEET OR EXCEED THE STANDARDS OF ASTM C478 (12) AND WSDOT STANDARD PLAN B-30.90.00. FRAME AND COVER MUST MEET OR EXCEED THE STANDARDS OF ASTM A48 CL35B.

DAVID R. NYLUND
STATE OF WASHINGTON
0046398
REGISTERED
PROFESSIONAL ENGINEER
9-17-10

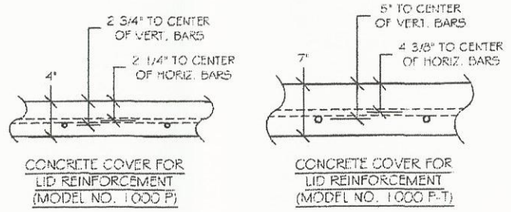
TANK DETAILS FOR MODELS
1000 P & 1000 P-T
KRIEG CONCRETE PRODUCTS, INC.

DATE: 9/17/10
DRAFTED BY: D.R.N.
SCALE: NTS

EK ENGINEERING INC.
P.O. BOX 3097 BATTLE GROUND, WA 98604
PHONE: (360) 687-7668 FAX: (360) 687-7669



TANK LID DETAIL only

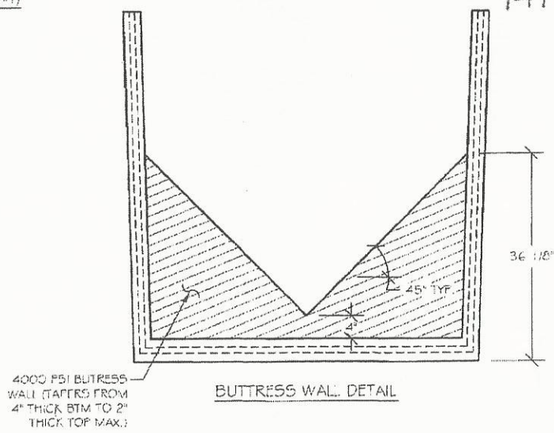


Note: No Rebar in Floor/walls. See attached Fibermesh & Engineer's letter.

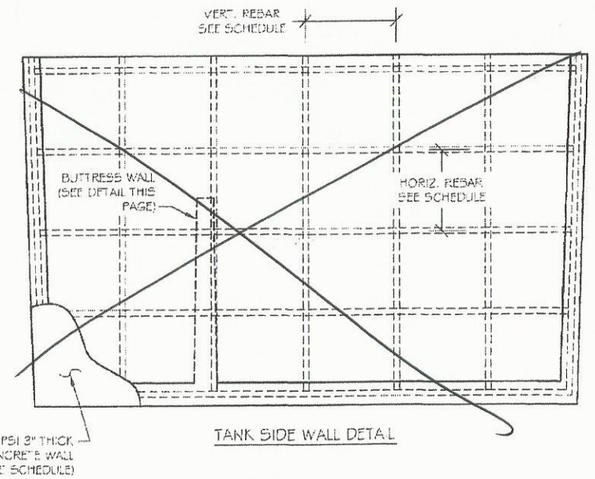
REBAR SCHEDULE FOR 1000 P (3'-0" SOIL COVER; WATER TABLE AT TANK LID; 2500 LB WHEEL LOAD)			
SIDE WALLS		END WALLS	
HORIZ. DIAMETER	#3 (3/8")	HORIZ. DIAMETER	#3 (3/8")
HORIZ. SPACING	18"	HORIZ. SPACING	18"
VERT. DIAMETER	#3 (3/8")	VERT. DIAMETER	#3 (3/8")
VERT. SPACING	18"	VERT. SPACING	18"
FLOOR		LID (THICKNESS 4")	
DIAMETER	#3 (3/8")	DIAMETER	#4 (1/2")
SPACING	18" EACH WAY	SPACING	18" EACH WAY

REBAR SCHEDULE FOR 1000 P-T (3'-0" SOIL COVER; WATER TABLE AT GROUND LEVEL & HS20 TRAFFIC LOADS)			
SIDE WALLS		END WALLS	
HORIZ. DIAMETER	#4 (1/2")	HORIZ. DIAMETER	#4 (1/2")
HORIZ. SPACING	18"	HORIZ. SPACING	18"
VERT. DIAMETER	#4 (1/2")	VERT. DIAMETER	#4 (1/2")
VERT. SPACING	18"	VERT. SPACING	18"
FLOOR		LID (THICKNESS 7")	
DIAMETER	#4 (1/2")	DIAMETER	#5 (5/8")
SPACING	18" EACH WAY	SPACING	12" EACH WAY

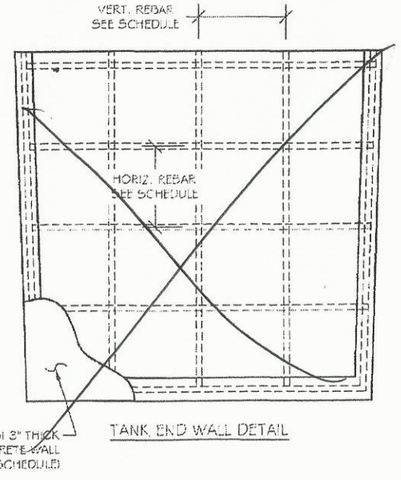
NOTES:
1) ALL REINFORCEMENT IS TO BE GRADE 60 WITH A MIN. OVERLAP OF 30 BAR DIAMETERS AT SPLICES (I.E. 5" FOR NO. 4 BAR).
2) UNLESS NOTED OTHERWISE, FLOOR AND WALL REBAR IS TO BE CENTERED IN THE CONCRETE MEMBER WITH THE HORIZONTAL REBAR TOWARDS THE OUTSIDE OF THE TANK.



BUTTRESS WALL DETAIL



TANK SIDE WALL DETAIL



TANK END WALL DETAIL

DAVID R. NYLUND
STATE OF WASHINGTON
0046398
REGISTERED PROFESSIONAL ENGINEER

9-17-10

PAGE: 5

TANK CONSTRUCTION & RE-BAR SCHEDULE FOR MODELS 1000 P & 1000 P-T Tank only 4d only

DATE: 9/17/10
DRAFTED BY: D.R.N.
SCALE: NTS

EK ENGINEERING INC.
P.O. BOX 3097 BATTLE GROUND, WA 98604
PHONE: (360) 687-7668 FAX: (360) 687-7669

KRIEG CONRETE PRODUCTS, INC.

Ek Engineering
HOUSE PLANS, SEPTIC DESIGNS AND ENGINEERING SERVICES
Consulting Engineers

P. O. Box 3097
Battle Ground, WA 98604

(360) 687-7668 Phone
(360) 687-7669 Fax

Online: www.EkEngineering.net
E-Mail: David@EkEngineering.net

Krieg Concrete Products, Inc.
Attn: Chuck Krieg
35717 SR 20
Oak Harbor, WA 98277

August 17, 2011

Re: Addendum for Novomesh® 950 Fiber for the Precast Concrete Tanks for Krieg Concrete Products, Inc. (Models 700 P, 1000 P, 1000 S, 1000 G, 1000 P D.Z., 1250 S, 1250 P, 1500 S & 1500 P)

Dear Chuck;

At your request, we hereby provide an engineering certification of equivalent reinforcement for Novomesh® 950 fiber in the side walls, end walls, and floor for the precast concrete septic tanks (model numbers listed above). The steel reinforcement details as per the original drawings are still a valid option. This certification is in accordance with the requirements of the 246272C WAC for on site sewage system tanks.

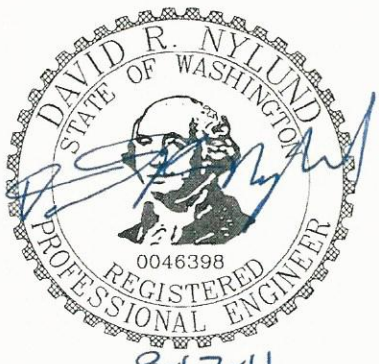
The attached calculations address the methodology for the fiber reinforced concrete alternative. Calculations for the following tank models are on the pages listed as follows:

- Model 700 P ..... page 1
- Models 1000 S, 1000 P, & 1000 G ..... page 2
- Model 1000 P D.Z. (Del Zotto) ..... page 3
- Models 1250 S & 1250 P ..... page 4
- Models 1500 S & 1500 P ..... page 5

Construct the tanks as per the details on the previously submitted drawings and reports. However, Novomesh® 950 fibers at a dosage of 10 lb/yd^3 may be mixed with 5000 psi concrete as an alternative to the steel reinforcement in the side walls, end walls, and floor. Note that the lids require adherence to the previous rebar requirements in all cases. Follow all manufacturer requirements for Novomesh® 950 fiber-reinforced concrete.

Sincerely;

David R. Nylund, P.E.



8-17-11

CC: Mamdouh El-Aarag, WA DOH

EK ENGINEERING
P.O. BOX 3097 ~ BATTLE GROUND, WA 98604 PH: (360) 687-7668 ~ FAX: (360) 687-7669

NOVOMESH® 950 FIBER CONVERSION CALCULATIONS

PROJECT FOR: KRIEG CONCRETE PRODUCTS, INC.
MODEL NO'S: 1000 P, 1000 S & 1000 G
DATE: 8/17/2011

Side Wall	Overall Wall Length	8	ft
	Wall Thickness	3	in
	Distance Between Supports	5.458	ft
	Max. Area of Rebar Required	0.072	in^2/ft
	Deflection of Wall	0.019	in
	Deflection/Length	0.00029	in/in
End Wall	Overall Wall Length	5.083	ft
	Wall Thickness	3	in
	Max. Area of Rebar Required	0.072	in^2/ft
	Deflection of Wall	0.016	in
	Deflection/Length	0.00026	in/in
Required Avg. Residual Strength		288	psi
Novomesh® 950 Dosage Required		10	lb/ft^3

Notes:
1. Overall length is measured as the distance between centers of supporting structural members. For instance, a 5' long wall (outside to outside) with 3" thick supporting walls on each end would be listed as 4'-9" long.
2. Distance between supports will be less than the overall length if there is a structural intercompartmental wall or buttress wall.
3. Area of rebar required is taken from spWall (a finite element program) and is the maximum of the horizontal and vertical directions.
4. The wall deflection is taken from spWall.
5. The deflection per length is the deflection divided by the overall length of the wall in inches (or the distance between supports, if less than the overall length).
6. Novomesh® 950 fiber may replace rebar where stresses and deflections are relatively low for the side walls, end walls, and floor. Tank lids are required to use rebar in all cases, although fiber may be used along with the rebar. The required fiber dosage is related to the required rebar (area per lineal foot) as follows:

As fy (0.4 h) = f't [b h^2 / 6], where

As = Area of steel required per lineal foot of section, in^2
fy = Yield strength of steel reinforcement per page 1
h = thickness of member (wall thickness) b = unit length of member (typically 12 inches)
f't = average residual strength (ARS) of fiber reinforced concrete (psi)
The ARS is determined using ASTM's Test Method C1399, Obtaining Average Residual Strength of Fiber Reinforced Concrete (FRC). The results of Engineering Report No. 18 by Propex Concrete Systems are as follows: 5 lb/yd^3 = 209 psi, 7.5 lb/yd^3 = 244 psi, and 10 lb/yd^3 = 434 psi.

7. Most tanks, even relatively small tanks, will require 10 lbs of Novomesh 950 fibers per cubic yard of concrete due to the minimum steel reinforcement requirements of ACI 318.
8. For complete tank details including design criteria, risers, inlets, and outlets, refer to the previously submitted tank drawings and reports.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 11 April 2014
SERIAL NO.: 64
SPEC. REF.: ~~26 00 00~~ 23 11 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 64
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
2.02	MCN	1	Shields, Harper, & Company	Fuel Piping and Accessories
2.02	MCN	2	Shields, Harper, & Company	Fuel Piping and Accessories
2.02	MCN	3	Shields, Harper, & Company/Glacier	Fuel Piping and Accessories
2.05	MCNR	4	Shields, Harper, & Company	Fuel Piping and Accessories
2.05	MCNR	5	Shields, Harper, & Company	Fuel Piping and Accessories
2.06	MCNR	6	Glacier	Fuel Piping and Accessories
2.06	A&R	7	Shields, Harper, & Company	Fuel Piping and Accessories
2.07	A&R	8	Glacier	Fuel Piping and Accessories

Comment(s):

1. **2.02 – Direct Bury Piping - XP Clamshell Swivel Fittings** – the MS-XP-175-200SS model identified installs on the end of 1.75" XP pipe w/ 2" NPT. Please confirm this is correct and model MS-XP-200-200SS is not required to install on 2.00" XP pipe w/ 2" NPT.
2. **2.02 – Marina/Aboveground Piping - XP Clamshell Swivel Fittings** – the MS-XP-175-200SS model identified installs on the end of 1.75" XP pipe w/ 2" NPT. Please confirm this is correct and model MS-XP-200-200SS is not required to install on 2.00" XP pipe w/ 2" NPT.
3. **2.02 – Marina/Aboveground Piping – Fireflex Connectors** – There are two models identified on this sheet. Please confirm model FF20X18M346XF is to be provided. Also, contractor to confirm piping connection sizes to the fuel tanks and associated pump piping.
4. **2.05 – Leak Detection and Alarm System** – Confirm NEMA 4X rating being submitted.
5. **2.05 – Leak Detection and Alarm System** – Please identify leak sensor wetted material being submitted for the ES825-200F.
6. **2.06 –Valve and Accessories** – Provide Master Padlocks, or equal, and 4 sets of keys to lock valves.
7. **2.06 –Valve and Accessories** – Submitted valves are not UL listed. Re-submit to meet specifications.
8. **2.07 – Piping Supports** – Submit support systems for piping under the main dock or as needed in other areas.

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B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **64**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **3/25/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**23 11 00**	**23 11 00-5**	**Facility Fuel Piping and Accessories Specifications**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 11 April 2014
SERIAL NO.: 64
SPEC. REF.: ~~26 00 00~~ 23 11 00 ~~22 13 29.99~~
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 64-R1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET		Glacier / Shields, Harper, & Co.	Fuel Piping and Accessories

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **64-R1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **4/10/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted) **64**

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**23 11 00**	**23 11 00-5**	**Resubmittal Facility Fuel Piping and Accessories Specifications**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Line Items 6 and 8 are off the shelve products and will be submitted by Glacier proior to installation but we would like approval on the piping products that have a lead time so we can get them ordered.

Contractor Glacier Environmental Services, Inc. Signature *C. Alan Hall*

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

CORNET BAY MARING REMEDIATION
IFB 1415 TCP

SECTION 23 11 00
FACILITY FUEL PIPING AND ACCESSORIES

SUBMITTED BY:
SHIELDS, HARPER & COMPANY
4591 PACHECO BLVD.
MARTINEZ, CA 94553
206-489-2373

2.02 – DFO AND GAS PRODUCT PIPING

Direct Bury Piping

Advantages

- A time proven material, Nylon 12 has been the primary layer of APT pipe for more than 12 years. Preferred by the world's largest auto makers, the fuel line material contains no polyethylene.
- No possibility of piping layer delamination due to the layered piping construction of high-grade material.
- Biofuel approved (E85 and biodiesel).

c UL us LISTED

XP Pressure and Suction Product Piping

The 1" size of APT piping can be used in both pressure and suction applications, and is ideal for providing remote feed and fill for heaters, boilers and emergency generators. The 1½", 1¾" and 2" sizes of APT product piping can be used in both pressure and suction applications, and are ideal for underground service station fuel delivery systems. The D-Series piping is a single wall, direct bury piping, while the SC-Series piping provides additional environmental security as a secondary contained direct bury pipe. Both feature controlled flexibility, even in low temperatures, permitting fast, easy installation.

Reel Size	Inches*	cm*
Master	91 × 31 × 74	231.1 × 78.7 × 188
Super master (S. Mast.)	91 x 49 x 74	231.1 x 124.5 x 188

Notes: 1. Do not store piping in direct sunlight.
2. UL971 listed to the January 2004 standards.

*Reel dia. × width × hub dia.

Model	Description	Ft.	Reel	Weight	
				Lbs.	Kg
XP-100-SC	1" secondary contained	250	Master	301	136
		500	Master	408	185
		2,500	S. Master	1299	589
XP-100-D	1" single wall	250	Master	258	117
		500	Master	320	145
XP-150-SC	1½" secondary contained	100	Master	250	113
		250	Master	333	151
		500	Master	470	213
		1,000	S. Master	789	358
		1,500	S. Master	1061	481
XP-150-D	1½" single wall	100	Master	225	102
		250	Master	270	122
		500	Master	570	259
		1,000	S. Master	536	243
		1,500	S. Master	686	311
XP-175-SC	1¾" secondary contained	100	Master	300	136
		250	Master	405	184
		500	Master	580	263
		1,000	S. Master	1076	488
XP-200-SC	2" secondary contained	100	Master	335	152
		200	Master	440	200
		350	Master	598	271
		700	S. Master	971	440
XP-200-D	2" single wall	100	Master	295	134
		200	Master	360	163
		350	Master	458	208
		700	S. Master	691	313

Advantages

- Ducted entry boots available for product pipe sizes 1" through 2" single or secondary contained product piping.
- Ducted entry boots are made from an oil- and gasoline-resistant nitrile rubber and employ stainless steel band clamps for maximum corrosion resistance.
- Entry boots can be serviced from the inside of the sump, eliminating the need for sump excavation.
- Ducting is to be used for retractability only. Secondary containment is achieved by using APT secondary contained (SC) pipe.

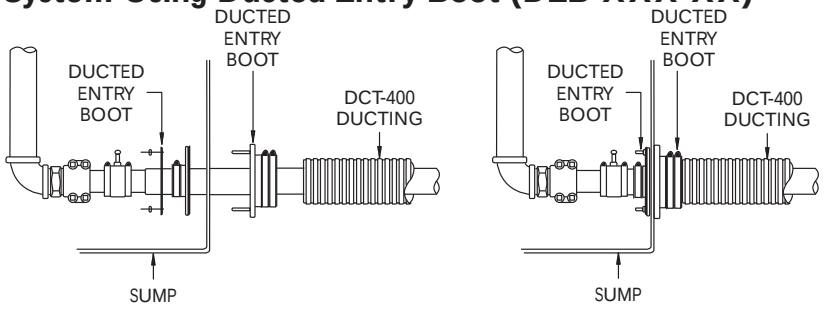
4" Ducting

APT ducting system allows for pipe removal without extensive excavation. The 4" inside diameter of the DCT-400 ducting allows APT product piping to easily slide through during installation or removal. Entries into sump walls are made with specially engineered ducted entry boots (DEB) or ducted bulkhead boots (DBB). The DCT-400 is used for retractability only and does not serve as a containment layer.

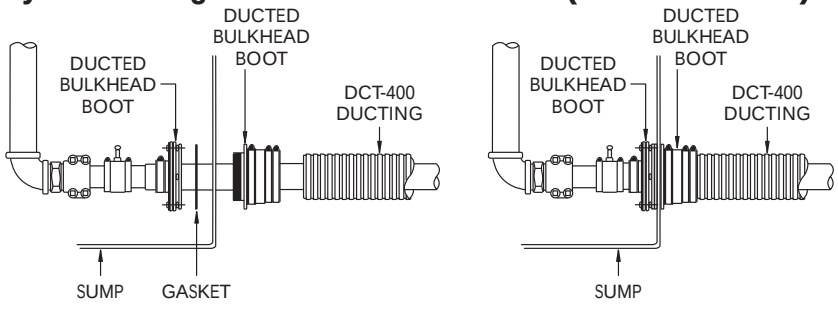
DCT-400-F

Model	Description	Units
DCT-400-100	4" corrugated ducting (for retractability only)	100 LF
DCT-400-250	4" corrugated ducting (for retractability only)	250 LF
DCT-400-F	Flexible ducting connector with clamps	EA
895-102-01	Ducting V-Seal	EA
895-101-01	Ducting Insert	EA

System Using Ducted Entry Boot (DEB-XXX-XX)



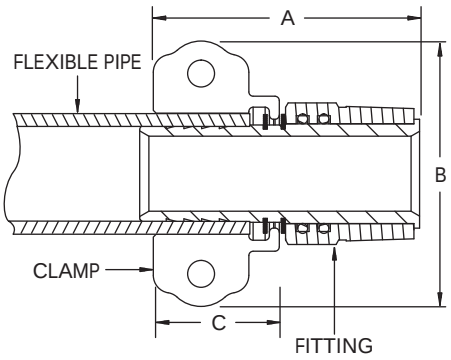
System Using Ducted Bulkhead Boot (DBB-XXX-XX)



XP Clamshell Swivel Pipe Fittings

When using APT product piping, continuous runs eliminate the need for in-line joints. Installers make connections inside accessible containment sumps using APT swivel fittings. These fittings are manufactured from solid brass or stainless steel with two flourocarbon O-rings protected in grooves located on the inside of the connector. Plated clamps secure the fittings to the pipe. XP-Series pipe clamps are labeled XP for easy identification.

Note: Use only XP-Series fittings with XP piping.



Model	A	B	C
MS-XP-150-150	4.00"	4.00"	1.75"
MS-XP-175-200	4.00"	4.00"	1.75"
MS-XP-200-200	4.50"	4.75"	2.25"

Brass Swivels

Model	Description
MS-XP-150-150	Installs on the end of 1½" single/secondary contained XP pipe with 1½" NPT
MS-XP-175-200	Installs on the end of 1¾" single/secondary contained XP pipe with 2" NPT
MS-XP-200-200	Installs on the end of 2" single/secondary contained XP pipe with 2" NPT

Stainless Steel Swivels

Model	Description
MS-XP-150-150SS*	Installs on the end of 1.50" single/secondary contained XP pipe with 1½" NPT
MS-XP-175-200SS*	Installs on the end of 1.75" single/secondary contained XP pipe with 2" NPT
MS-XP-200-200SS*	Installs on the end of 2.00" single/secondary contained XP pipe with 2" NPT

*Contact Customer Service for availability and lead times.

Advantages

- No special tools required so no project delays when swage machine is inoperative.
- NPT threads are installed quickly and securely, are available locally and are field proven.
- 100 psi rated working pressure.
- Stainless steel fittings biofuel approved (E85 and biodiesel).

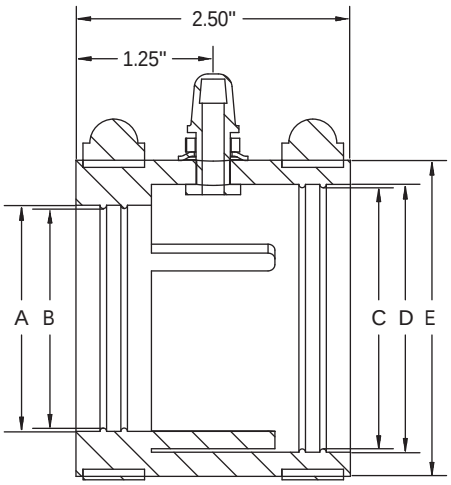
c UL US LISTED

Clamshell Secondary Test Boots

APT secondary test boots are designed for testing the integrity of secondary contained flexible piping when using APT clamshell fittings. Each boot has an air chuck for applying air pressure to the secondary containment jacket. Placing a boot on each end of the secondary containment jacket forms an airtight chamber for testing. After the testing is completed, slide the boots back on the pipe to open the secondary system. The boots remain on the pipe available for future testing as required by local regulations.

Advantages

- Secondary test boots slip over the end of the pipe prior to installation of end fittings.
- Boots are manufactured using fuel-resistant nitrile rubber and employ brass air chucks and stainless steel clamps for maximum corrosion resistance.
- Boots are easily clamped down with a screwdriver or 5/16" nut driver, forming an airtight chamber between the primary pipe and the secondary jacket.
- The secondary chamber is pressurized to 5-8 psi through air chuck to test system integrity.
- After pressure testing, the boots remain on the pipe for future use but are pulled back to permit back-flow of fuel leaks to the tank sump.



Model	A	B	C	D	E
STB-100	1.38"	1.32"	1.70"	1.76"	2.20"
STB-150	1.81"	1.75"	2.00"	2.06"	2.50"
STB-175	2.06"	2.00"	2.38"	2.44"	2.88"
STB-200	2.56"	2.50"	2.88"	2.94"	3.38"

Model	Description
STB-100	Secondary test boot for XP-100-SC pipe
STB-150	Secondary test boot for XP-150-SC pipe
STB-175	Secondary test boot for XP-175-SC pipe
STB-200	Secondary test boot for XP-200-SC pipe

Marina/Aboveground Piping

PIPING & CONTAINMENT

Piping

Advantages

- APT's XP marina/aboveground piping consists of XP pipe encased in metallic conduit, making it impact resistant and UV and fire protected.

XP Marina/Aboveground Product Piping

APT metallic ducted (MD) pipe is the ideal choice for aboveground and marina fuel delivery systems. The MD-Series piping system contains our XP product piping inside a flexible metallic conduit. This superior construction adds fire protection, impact resistance and UV stability to what is already the highest quality piping system. The MD-Series pipe is shipped with single wall or secondary contained pipe already installed into the metallic jacket, reducing installation time in the field. For marinas, the flexibility of this product easily handles variation in water levels and can be installed alongside or under docks.

Reel Size	Inches*	cm*
Master	91 × 33 × 74	231.1 × 83.8 × 187.9
Super master (S. Mast.)	91 × 52 × 74	231.1 × 132.1 × 187.9

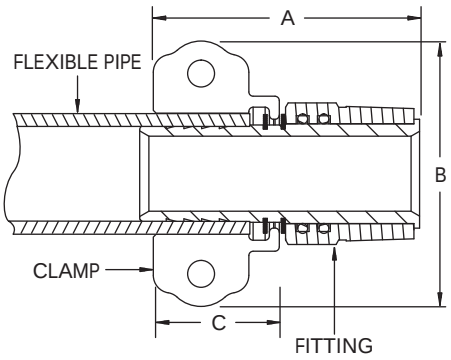
*Reel dia. × width × hub dia.

Model	Description	Ft.	Reel	Weight	
				Lbs.	Kg
XP-100-MD-250	1" secondary contained inside metallic duct	250	Master	628	285
XP-100-MD-500		500	Master	1,441	654
XP-100-MDD-250	1" single wall inside metallic duct	250	Master	566	257
XP-100-MDD-500		500	Master	1,316	597
XP-150-MD-250	1½" secondary contained inside metallic duct	250	Master	755	342
XP-150-MD-500		500	S. Master	1,700	771
XP-150-MDD-250	1½" single wall inside metallic duct	250	Master	705	320
XP-150-MDD-500		500	Master	1,594	723
XP-175-MD-250	1¾" secondary contained inside metallic duct	250	Master	826	375
XP-175-MD-500		500	S. Master	1,843	836
XP-200-MD-200	2" secondary contained inside metallic duct	200	Master	819	371
~~XP-200-MD-350~~		~~350~~	~~S. Master~~	~~1,804~~	~~818~~
XP-200-MDD-200	2" single wall inside metallic duct	200	Master	749	340
XP-200-MDD-350		350	S. Master	1,592	722

XP Clamshell Swivel Pipe Fittings

When using APT product piping, continuous runs eliminate the need for in-line joints. Installers make connections inside accessible containment sumps using APT swivel fittings. These fittings are manufactured from solid brass or stainless steel with two flourocarbon O-rings protected in grooves located on the inside of the connector. Plated clamps secure the fittings to the pipe. XP-Series pipe clamps are labeled XP for easy identification.

Note: Use only XP-Series fittings with XP piping.



Model	A	B	C
MS-XP-150-150	4.00"	4.00"	1.75"
MS-XP-175-200	4.00"	4.00"	1.75"
MS-XP-200-200	4.50"	4.75"	2.25"

Brass Swivels

Model	Description
MS-XP-150-150	Installs on the end of 1½" single/secondary contained XP pipe with 1½" NPT
MS-XP-175-200	Installs on the end of 1¾" single/secondary contained XP pipe with 2" NPT
MS-XP-200-200	Installs on the end of 2" single/secondary contained XP pipe with 2" NPT

Stainless Steel Swivels

Model	Description
MS-XP-150-150SS*	Installs on the end of 1.50" single/secondary contained XP pipe with 1½" NPT
MS-XP-175-200SS*	Installs on the end of 1.75" single/secondary contained XP pipe with 2" NPT
MS-XP-200-200SS*	Installs on the end of 2.00" single/secondary contained XP pipe with 2" NPT

*Contact Customer Service for availability and lead times.

Advantages

- No special tools required so no project delays when swage machine is inoperative.
- NPT threads are installed quickly and securely, are available locally and are field proven.
- 100 psi rated working pressure.
- Stainless steel fittings biofuel approved (E85 and biodiesel).

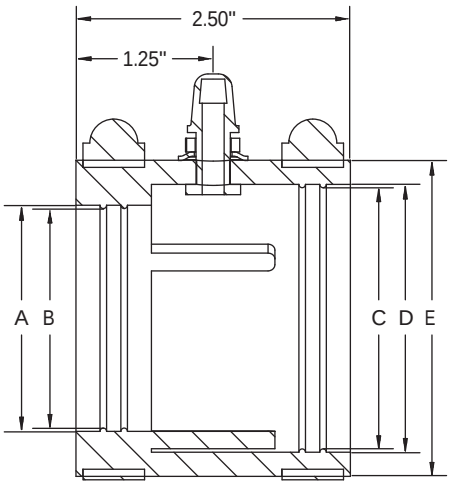
c UL US LISTED

Clamshell Secondary Test Boots

APT secondary test boots are designed for testing the integrity of secondary contained flexible piping when using APT clamshell fittings. Each boot has an air chuck for applying air pressure to the secondary containment jacket. Placing a boot on each end of the secondary containment jacket forms an airtight chamber for testing. After the testing is completed, slide the boots back on the pipe to open the secondary system. The boots remain on the pipe available for future testing as required by local regulations.

Advantages

- Secondary test boots slip over the end of the pipe prior to installation of end fittings.
- Boots are manufactured using fuel-resistant nitrile rubber and employ brass air chucks and stainless steel clamps for maximum corrosion resistance.
- Boots are easily clamped down with a screwdriver or 5/16" nut driver, forming an airtight chamber between the primary pipe and the secondary jacket.
- The secondary chamber is pressurized to 5-8 psi through air chuck to test system integrity.
- After pressure testing, the boots remain on the pipe for future use but are pulled back to permit back-flow of fuel leaks to the tank sump.



Model	A	B	C	D	E
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STB-150	1.81"	1.75"	2.00"	2.06"	2.50"
STB-175	2.06"	2.00"	2.38"	2.44"	2.88"
STB-200	2.56"	2.50"	2.88"	2.94"	3.38"

Model	Description
STB-100	Secondary test boot for XP-100-SC pipe
STB-150	Secondary test boot for XP-150-SC pipe
STB-175	Secondary test boot for XP-175-SC pipe
STB-200	Secondary test boot for XP-200-SC pipe

FLEX-ING™ SERVICE STATION HARDWARE

Features

- SB 989 compliant, successfull Praxair/ Tracer testing.
- All metal construction means one flex-connector for both above and below ground applications.
- Testable under full vacuum.
- UL Listed for above and below ground installation.
- An 18-8 alloy with titanium, 321 Stainless Steel inner core provides a long service life.
- Standard wall thickness with close pitch corrugations gives more flexibility.
- The 346 Integral Male Swivel ensures ease of installation with a multi-seal design.
- Thick, schedule 80 hex end fittings protect against deformation of the ends.
- 100% pressure tested to assure quality.
- 350 psi working pressure assembly exceeds UL 50 psi requirement on 3/4" - 3". 225 psi on 4".
- Custom lengths and configurations available call for details.
- Crush and kink resistant and rated for full vacuum service.
- EX Fit clamp and gasket are included with each assembly.

FLEX-ING™ FIREFLEX Flexible Connectors

FLEX-ING™premier above and below ground fire rated flexible connectors are available with either 346 swivel or EZ Fit technology.

FIREFLEX with EZ FIT Technology

EZ Fit union style coupling system makes connections in confined spaces simple and tight.

- Extremely flexible FIREFLEX hose for ease of installation.
- Compactness of couplings are ideal for small shallow boxes, sumps and pans.
- Assemblies can be disconnected and pulled out of in-line systems without breaking pipe.
- All metal construction, crush and kink resistant, full vacuum testable.
- Facilitates compliance for NFPA 30 & 30A.

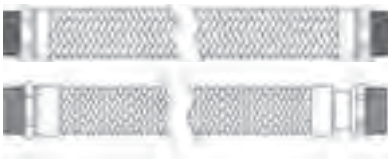
FIREFLEX EZ FIT with FRP Technology

Used with the EZ Fit coupling system, FIREFLEX with FRP connectors feature the FIBER-FLEX adapter that establishes a bonded connection from fiberglass pipe to the flexible connector.

- Ease of installation for reduced install time and cost.
- Reduces threaded connections to eliminate potential leak paths.
- Schedule 80, tapered glued fittings create a strong bond to fiberglass pipe.
- Reduces fitting quantity making more room inside of the sump.

¾" FIREFLEX Connectors

Model	Description
FFUL07X18HMXHM FFUL07X24HMXHM FFUL07X30HMXHM	¾" hex male x ¾" M346 hex male
FF07X18HMXM346 FF07X24HMXM346 FF07X30HMXM346	¾" hex male x ¾" M346 swivel

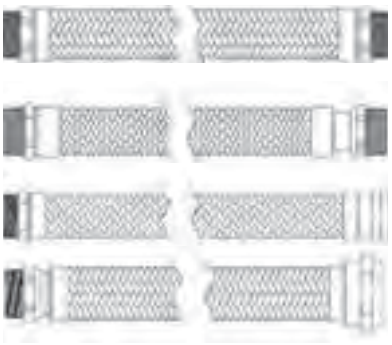


1" FIREFLEX Connectors

Model	Description
FFUL10X18HMXHM FFUL10X24HMXHM FFUL10X30HMXHM	1" hex male x 1" hex male
FF10X18HMXM346 FF10X24HMXM346 FF10X30HMXM346	1" hex male x 1" M346 swivel

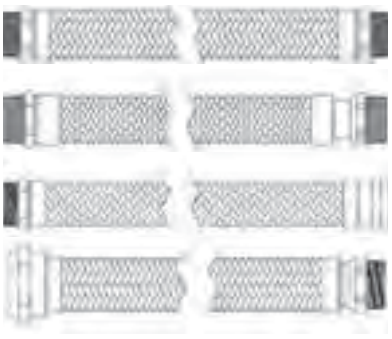
1½" FIREFLEX Connectors

Model	Description
FFUL15X15HMXHM FFUL15X18HMXHM FFUL15X24HMXHM FFUL15X30HMXHM	1½" hex male x 1½" hex male
FF15X18HMXM346 FF15X24HMXM346 FF15X30HMXM346	1½" hex male x 1½" M346 swivel
FFUL15X18HMX2F FFUL15X24HMX2F FFUL15X30HMX2F	1½" hex male x 2" female
FFUL15X18HMX2F FFUL15X24HMX2F FFUL15X30HMX2F	1½" male 346 swivel x 2" female



2" FIREFLEX Connectors

Model	Description
FFUL20X18HMXHM FFUL20X24HMXHM FFUL20X30HMXHM	2" hex male x 2" hex male
FF20X18HMXM346 FF20X24HMXM346 FF20X30HMXM346	2" hex male x 2" male M346 swivel
FFUL20X18HMXF FFUL20X24HMXF FFUL20X30HMXF	2" hex male x 2" female
FF20X18M346XF ~~FF20X24M346XF~~ ~~FF20X30M346XF~~	2" female x male 346 swivel



3" FIREFLEX Connectors

Model	Description
FFUL30X24MXM FFUL30X30MXM	3" male x 3" male
FFUL30X24MXF FFUL30X30MX	3" male x 3" female

1" FIREFLEX Connectors

Model	Description
FFUL40X24MXM FFUL40X30MXM FFUL40X36MXM	4" male x 4" male
FFUL40X24MXF FFUL40X30MXF FFUL40X36MXF	4" male x 4" male

Franklin Fueling Systems

XP Installation Guide Overview

Franklin Fueling Systems • 3760 Marsh Rd. • Madison, WI 53718 USA
Tel: +1 608 838 8786 • 800 225 9787 • Fax: +1 608 838 6433 • www.franklinfueling.com

Preface

Franklin Fueling Systems (FFS) manufactures XP series piping systems, which are designed to provide containment and transfer of product in your fueling system. XP series piping can be used in either pressure or suction applications.

XP series piping systems are installed in accordance with published FFS installation instructions by factory certified installers only. FFS cannot guarantee against leakage if the installation process is not followed properly or if the maintenance program is not adhered to. To ensure your system integrity, it is essential that an inspection program be in place and adhered to as outlined in our warranty. Refer to this installation guide, individual installation instructions, the APT product catalog, or visit the APT website at www.flexpipe.com for proper product and installation practices for your site design. If you need further assistance, contact FFS or an FFS sales representative immediately to ensure a proper system design and installation.

Important Reference Items

- All XP series flexible piping systems are UL 971 approved (File # MH17457) for use with A&M Fuels, CT Fuels, HB Fuels, and MV Fuels.
- XP series piping systems are for underground use only with the rated operating pressures and bend radii given in this document. XP series piping is not intended for use as connector pipe or with aboveground or marine applications.
- XP series piping systems are for use in normal soil applications.
- Sumps should be monitored to be kept free of debris and spilled product at all times; please refer to the XP Warranty for further details.

XP Piping Information Table

Direct Bury (D)	Primary Pipe Rating (psi)	Secondary Pipe Rating (psi)	Minimum Bend Radius
XP-100-D	100 (6.89 bar)	N/A	36" (92 cm)
XP-150-D	100 (6.89 bar)	N/A	36" (92 cm)
XP-175-D	100 (6.89 bar)	N/A	36" (92 cm)
XP-200-D	100 (6.89 bar)	N/A	36" (92 cm)
XP-200-D	100 (6.89 bar)	N/A	36" (92 cm)
XP-100-SC	100 (6.89 bar)	8 (0.55 bar)	36" (92 cm)
XP-150-SC	100 (6.89 bar)	50 (3.45 bar)	36" (92 cm)
XP-175-SC	100 (6.89 bar)	8 (0.55 bar)	36" (92 cm)
XP-200-SC	100 (6.89 bar)	8 (0.55 bar)	36" (92 cm)

Definitions & Acronyms

XP series piping with a **SC** suffix in the part number indicates that the piping is designed to be used as a PS, NV, or a VR system. XP series piping with a **D** suffix in the part number indicates that the piping is designed to be used as a PC, NV, or a VR system.

Aviation & Marine Fuels (A&M Fuels) - Motor vehicle and speciality aviation or marine use fuels for up to 100% kerosene or leaded gasoline.

Concentrated Fuels (CT Fuels) - Motor vehicle and alternate unblended fuels for up to 100% concentrations of Toluene, Methanol and Ethanol.

High Blend Fuels (HB Fuels) - Motor vehicle fuels with higher than normal gasoline blends with a maximum of 50% Methanol or 50% Ethanol.

Integral Primary/Secondary (PS) - A single pipe and/or fitting constructed at the manufacturer that combines both primary carrier and secondary containment with an interstitial space that can be monitored for leakage.

Motor Vehicle Fuels (MV Fuels) - Petroleum-based hydrocarbon fuel typically found in consumer dispensing stations, such as gasoline or diesel, including blended fuels with a maximum of 15% MTBE, 15% Methanol or 30% Ethanol.

Normal Vent (NV) - Pipe and/or fittings intended to transfer displaced air or fuel vapors from an underground tank to grade during filling and provide atmospheric pressure equalization.

Primary Carrier (PC) - Pipe and/or fittings intended for continuous contact with the flammable liquids in a system under normal use conditions.

Underground Nonmettallic (UGN)

Vapor Recovery (VR) - Pipe and/or fittings intended to transfer collected air and fuel vapors in a pressure vacuum system to an underground tank during dispensing.

Contacting FFS

Please feel free to contact us at:

Franklin Fueling Systems
3760 Marsh Road Madison, WI 53718 USA
Tel: +1 608 838 8786
Fax: +1 608 838 6433
Tel: USA & Canada 1 800 225 9787
Tel: Mexíco 001 800 738 7610

Franklin Fueling Systems GmbH
Rudolf-Diesel-Strasse 20
54516 Wittlich, Germany
Tel: +49 6571 105 380
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www.franklinfueling.com

Safety

This guide is meant as a system installation overview, and should be used in conjunction with part specific installation instructions. Refer to the installation documentation for the equipment described in this guide and any other related equipment for complete installation and safety information. To ensure your system integrity, it is essential that you follow all applicable installation instructions and federal, state, and local codes.

Warning **XP fittings must be installed in conjunction with XP piping. Using P-series clamshell fittings with XP pipe will result in improper assembly and potential fitting failure.**

Preparation & Materials

Inspection of Materials

FFS handles all XP series piping system components with care; however, rough handling (drops and impacts) may cause damage/leaks during storage or transit. Examine all piping for punctures, deep cuts, kinking or any other visible damage. Do not use any component of the XP series piping system that shows signs of damage. If any questions arise in regards to potential damage, please contact FFS immediately.

Storing Materials

APT piping primary and secondary jackets should not be exposed to direct sunlight. APT pipe is delivered on reels with a protective wrap which inhibits UV damage to the pipe during shipping. APT Secondary Contained (SC) pipe incorporates a scuff guard layer which protects the pipe in transit and adds a degree of UV protection to the pipe jackets. FFS recommends that the scuff guard layer not be exposed to direct sunlight for longer than three months or UV degradation may occur. It is the contractor's responsibility to cover entry boots installed above grade with a UV resistant cover or lid in order to eliminate UV exposure.

Keep sump lids and sump bases together, do not mix parts; number the lids and bases to avoid confusion. Do not store lids separate from sump bases for long periods of time. Install tank sump lids completely when work is not being performed inside sumps (especially during backfilling).

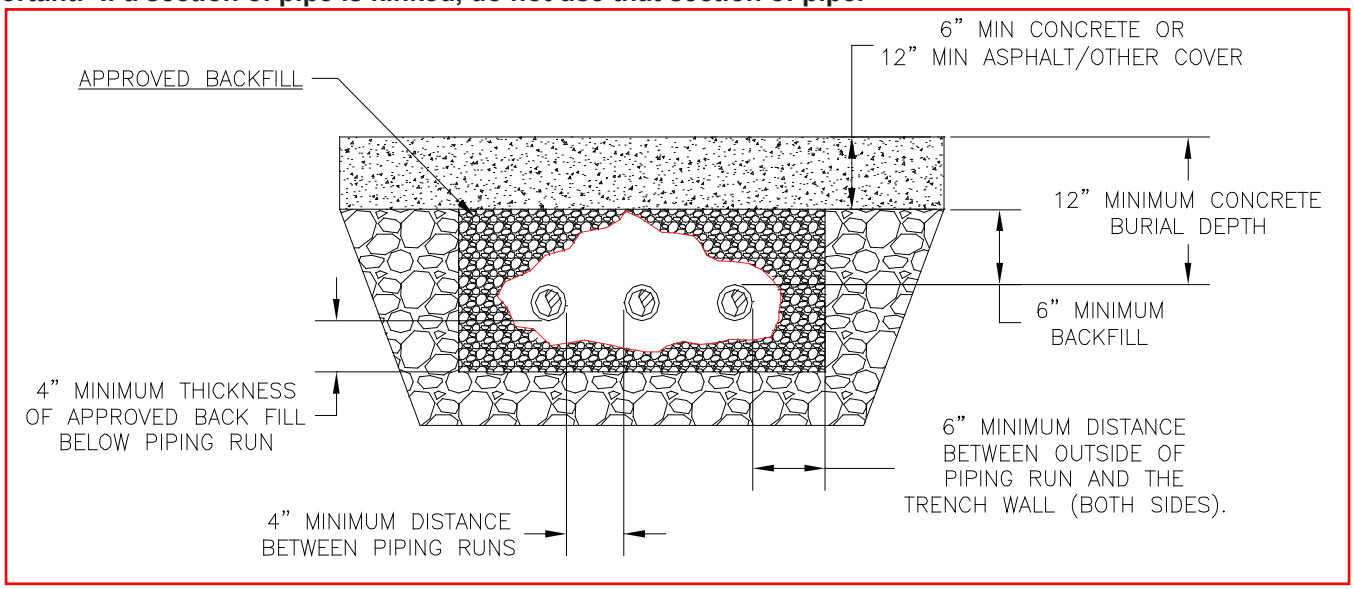
Installation Temperature Range

APT's flexible piping construction can be installed at a maximum recommended temperature of 135º F (57º C). Below 25º F (-4º C), APT flexible piping may become difficult to work with. When working with APT flexible piping below 25º F (-4º C), avoid pipe kinking or impacting because this may create damage to the primary and/or secondary layers. When working with APT flexible piping in cold temperatures, the pipe may stiffen which may increase the potential to kink the pipe during installation. Below 25º F (-4º C), the minimum bend radii may have to be increased to prevent kinking.

Trenches

Trenches should be dug straight when possible. If changes in direction are required, trench corners should be cut at 45º angles to allow for the piping run's proper bend radius. There must be a minimum of 6" (15.24 cm) of space between the outside of a piping run and a trench wall. The minimum allowable pipe bend radius for all XP series piping is 36" (92 cm).

Important: If a section of pipe is kinked, do not use that section of pipe.



Backfill Materials
Clean, compacted sand, pea gravel, or ⅛ to ¾" (3.2 to 19 mm) or smaller crushed rock (without sharp edges) should be used as backfill material. There must be a minimum of 4" (10.16 cm) of approved backfill material under, and between, piping runs. Backfill material must not be contaminated with any petroleum product or other contaminant and must meet the requirements published in APT's warranty.

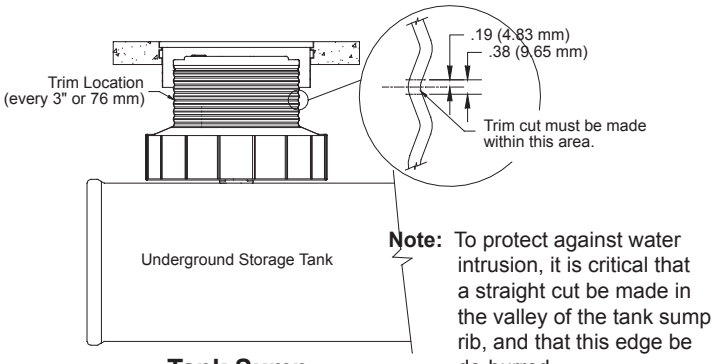
Spacing Requirements (Crossovers)
Avoid pipe crosses, but, if they are unavoidable, try to keep them close to, but not over, the tanks. Always maintain a minimum of 4" (10.16 cm) of backfill material under, and between, the piping runs. The backfill above the highest crossover pipe and each side of the piping must be a minimum of 6" (15.24 cm).

XP Burial Depths
In installations with traffic meeting AASHTO H20 wheel loading requirements, the pipe must be buried at least 12" (30.48 cm) deep with a minimum of 6" (15.24 cm) of backfill above the pipe and 6" (15.24 cm) of concrete above the backfill. For installations using asphalt or other burial material, the pipe must be buried at least 18" (45.72 cm) deep with a minimum of 6" (15.24 cm) of backfill above the pipe and 12" (30.48 cm) of asphalt and/or other burial material above the backfill.

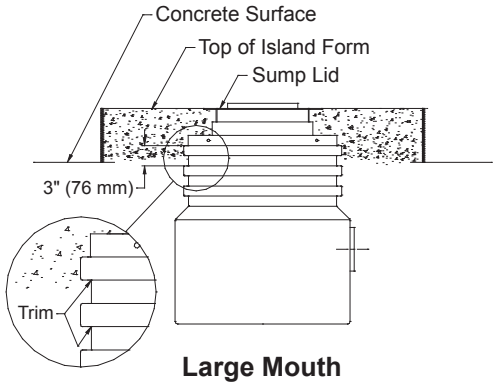
XP Piping Slopes
Product piping should slope back to the tank field at a minimum of ⅛" per foot (10.42 mm per meter).

Installation

Sump Cutdown
APT tank sumps come in a variety of models, but all sumps can be cut down in 3" (7.62 cm) increments to adjust to different burial depths and layouts. After cutting the sump, de-burr and sand the cut edge to create a proper sealing surface.



Tank Sump



Large Mouth Dispenser Sump

Sump Lids/Manholes
APT transition sumps, intermediate piping sumps, and one piece tank sumps all have a factory installed nitrile gasket to maintain a watertight seal between the sump and the cover. Ensure proper manhole installation to facilitate proper tank sump lid operation. Center the manhole skirt around the sump riser and lid - there should be a 1" (2.54 cm) minimum clearance between the bottom of the manhole lid and the top of the sump lid. In addition, there should be a minimum 1" (2.54 cm) clearance around the sides of the sump. The manhole skirt should extend below the tank sump lid to ensure proper operation of the sump lid and to keep backfill and debris from the lid sealing area. When installing a sump, make sure to leave the lid on during the backfill process to help prevent the sump from distorting. Pour a minimum of four inches of concrete around the manhole skirt.

Sump Mounting (TFAs)
APT tank fitting adapters (TFA's) attach the bottom of the sump to the 4" or 6" bung at the storage tank and seal on the outside of the sump using a nitrile gasket. When applying a uniform bead of urethane sealant to the top side of the TFA's nitrile gasket, FFS recommends using Bostik 1100 (or equivalent)**. Do not remove the TFA ring gasket - it is permanently adhered to the fitting and removing it could cause the seal to fail.**

Pipe Pulling

When dispensing pipe from a reel, always pull it from the bottom of the reel or the pipe may become kinked. If the pipe becomes kinked when taking it off of the reel, do not use the kinked section of pipe. When approaching the end of a reel of pipe, disconnect both ends of the pipe from the reel to avoid kinking.

Fittings

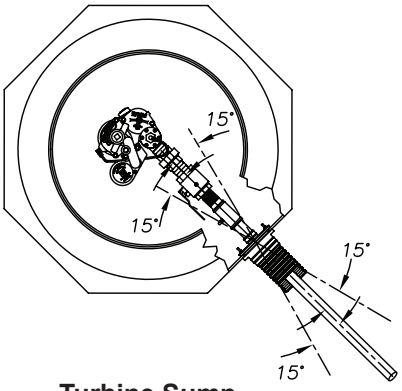
FFS requires that OEM fittings be used in all XP series piping systems. FFS offers a variety of options for XP series pipe fittings each with its own unique installation instructions. Each XP series fitting package will have detailed installation instructions specific to that design to ensure a proper, leak-tight assembly.

NPT threads are used on all fittings and should be sealed with a Teflon-based, gas and oil resistant pipe sealant. When completing the installation of a clamshell fitting, tighten the clamps so that they are metal to metal. Swage fitting installations must be done using only APT swage fitting tooling. Using other manufacturer's tooling will result in improper assembly and potential fitting failure.

FFS offers galvanized pipe connectors to prevent corrosion. Pipe connectors can be purchased locally as long as they are 150 lb malleable, standard with NPT threads.

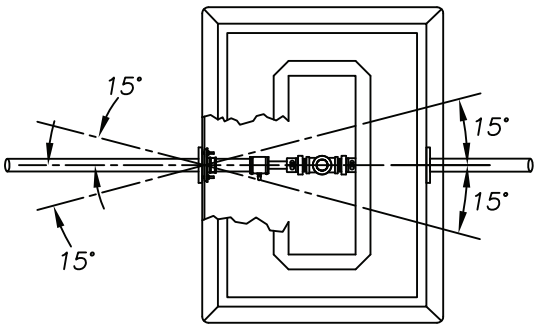
Boots

Entry boots come in sizes made to accommodate all pipe sizes including conduit and rigid pipe from ½" to 4" (13 mm to 10.16 cm). When installing pipe into entry boots, piping must not be more than 15 degrees from perpendicular to the sump walls. Entry angles in excess of 15 degrees from perpendicular can cause excessive stress, which may damage entry boots, kink pipe and/or cause environmental contamination. Entry boots should also not be installed in the bottom of any containment sump.



Turbine Sump

Note: Pipe must enter a dispenser sump or turbine sump at an angle less than 15° to eliminate strain on entry boots. Piping and fittings must be inline with the mating.



Dispenser Sump

Ducting

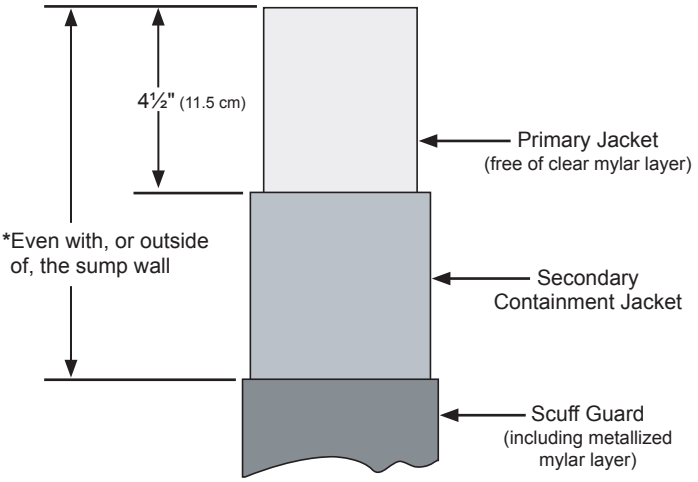
Ducting is available as a piping chase, which allows for removal after installation. APT ducting is not a containment layer, but it is air-testable. Pull the ducting and cut it to the proper length, but don't attach it to any entry boots at this time. Feed the primary pipe through the ducting using duct tape to keep the end of the pipe from catching on the ducting ribs as it's fed through.

Note: When installing pipe inside ducting, cut the ducting to the appropriate length to eliminate excessive bends.

Pipe Cutback

Once the pipe run is pulled and each section is cut to length, square off the end of the pipe, de-burr it, and then proceed with the cutback. If you are using SC (Secondary Contained) piping, cut back the scuff guard layer even with or outside of the sump wall and cut back the SC layer 4½" (11.5 cm). For further cutback details, see the process's complete description in the *DWC-XP-XXX Double Wall Cutter (SC) Installation Instructions*.

Pipe Layers



* The scuff guard must be cut back to be even with, or outside of, the sump wall ensuring that the entry boot seals on the SC jacket and not on the scuff guard layer.

Testing

All federal, state and local codes and governmental requirements for inspecting, testing, monitoring, and maintaining the system and property on which APT products are installed must be followed at all times. Refer to local codes for required pressures, test durations, and all other applicable codes. Test regulator kits and bypass tubes are available to aid in testing. Entry boots have shrader (tire) valve hardware for simple, standard connections.

After completing testing, relieve pressure from all elements of the piping system. Also, to create an “open” system for monitoring the piping secondary, pull back the secondary test boots (STB’s) to open the piping secondary to the containment sumps. APT piping is an “open system” unless otherwise required by local code or as part of a continuously monitored secondary system.

Operating Maximum

Primary pipe is CLU US listed for a 100 PSI (6.89 bar) maximum operating pressure.

Installation Testing

Primary Minimum/Maximum Test Pressure

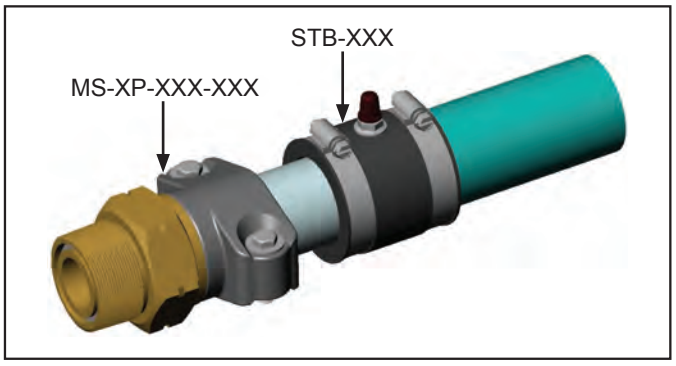
Apply an air source to the XP piping. Pressurize the line to between 50 and 100 psi (3.45 and 6.89 bar) and allow the pressure to settle. After piping is pressurized, soap all joints and fittings. If a leak in the termination fitting is discovered relieve the air pressure, retighten, and repressurize. The duration of the test may vary, check with the local authority or inspector to verify requirements. If no local requirements are specified, APT recommends a minimum of a 1 hour pressure test should be observed with no pressure loss. Upon completion of a passing pressure test, pressure can be relieved or pressure may be held until backfill and concrete is poured.

Note: If pressure is left on the piping system for an extended period of time, thermal expansion or contraction may cause the piping pressure to fluctuate.

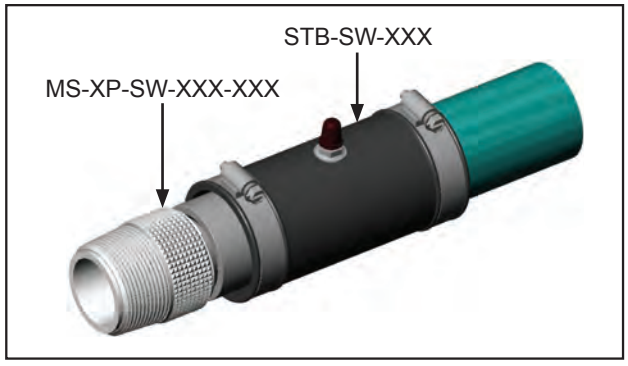
Secondary Piping Test Pressure

It is critical to verify that the scuff guard has been properly cut back outside of the containment sump so that the test boot seals to the outside of the ribbed secondary layer for this pressure test. If the test boots is not sealed directly onto the ribbed secondary layer, you could get false readings. Once the test boots are in place, pressurize the piping to between 5 and 8 PSI (0.34 and 0.55 bar). After the pressure has stabilized, disconnect the air supply and monitor the system for leakage. The line needs to remain pressurized for a minimum of one hour with no pressure loss detected in order for the piping to Pass. More detailed instructions on to how to perform this test can be found in our *TRK-100 Test Regulator Kit Installation Instructions* (771-115-00).

Note: XP-150-SC piping is UL listed for up to 50 PSI for use in closed system monitoring.



Clamshell SC Test Configuration



Swage SC Test Configuration

Note: “XP only” is etched on the collar of MS-XP-SW series fittings.

Ducting Test Pressure
Once the test boots are in place, pressurize the ducting to between 2 and 4 PSI (0.14 and 0.28 bar). After the pressure has stabilized, disconnect the air supply and monitor the system for leakage. The line needs to remain pressurized for 30 minutes with no pressure loss detected for the ducting to Pass. More detailed instructions on to how to perform this test can be found in our *TRK-100 Test Regulator Kit Installation Instructions* (771-115-00).

Sumps
Hydrostatically testing sumps is required to ensure that all sump penetrations are tight. Fill the sump with a water-based test solution so that every penetration into the sump is below the water line. FFS offers two methods to hydrostatically test an APT sump:

- TS-STS Sump Test System – This system measures level changes up to .002" (.05 mm) and will automatically pass or fail a sump in 15 minutes if the level drops more than the leak limit during the test.
- Manual measurement – Place a mark at the current water line after filling above all of the penetration fittings. Cover the sump so that no fluid can enter or evaporate out its top. Leave the sump for 1 hour and verify that water line has not moved. If the water line has not dropped below the mark in 1 hour, the sump has Passed.

Monthly/Annual/Semi-Annual Testing
Primary Minimum/Maximum Test Pressure
FFS does not require that piping be pressure tested for warranty compliance after the installation testing procedures above have been Passed. However, in some cases, there are federal, state, and/or local pressure testing schedules that must be followed. For pressure tests, it is recommended that XP series primary carrier piping be tested at a minimum of 50 PSI (3.45 bar). FFS recommends not exceeding 100 PSI (6.89 bar) on the primary carrier piping.

Secondary Test Pressure
FFS does not require pressure testing of the secondary containment layer for warranty compliance after the installation testing above has passed. However, in some cases, there are federal, state, and/or local pressure testing schedules that must be followed. For pressure tests, it is recommended that the XP series open system secondary containment be tested to between 5 and 8 PSI (0.34 and 0.55 bar) for a minimum of one hour with no pressure loss. APT piping is an “open system” unless otherwise required by local code or as part of a continuously monitored secondary system.

Ducting Test Pressure
FFS does not require pressure testing of the ducting for warranty compliance after the installation testing above has passed. However, in some cases there are federal, state, and/or local pressure testing schedules that must be followed. For pressure tests, it is recommended that ducting be tested to between 2 and 4 PSI (0.14 and 0.28 bar) for a minimum of 30 minutes with no pressure loss.

Sumps
FFS has no requirement for hydrostatically testing sumps after installation; however a detailed monitoring program is required to stay in compliance with the warranty conditions. Please see the Inspections section under the Records header in this document for more information on sump maintenance.

Records

Checklist

The *Installation Checklist and Warranty Start-Up Form* (F-8388) must be properly completed, signed by the APT factory certified installer and an authorized representative of the Purchaser/End User, and returned to FFS no later than sixty (60) days after the installation of the APT product for which a warranty claim is being made.

The *Sump Inspection Register* form or an EPA recommended/required check list form must be properly completed. This checklist must be kept on-site where the apt products are installed, and made available for FFS's inspection and copying upon request.

Inspections

Liquid sensors must be properly installed in each containment sump located on the property at which APT products are installed, *or* monthly visual inspections of all tank and dispenser sumps must be performed. Monthly visual inspections must be logged on *Sump Inspection Register* or an EPA recommended/required check list form at the time they are performed.

Inspections should include, but are not limited to, the following points:

- Looking for evidence of infiltration since the last inspection
- Checking for liquids or staining (new staining)
- Looking for excessive dirt/debris and corrosion
- Ensuring that lids are properly sealed
- Examining sumps for structural damage
- Verifying the condition of boots, piping, and other equipment

Sump sensors, if installed, must be tested annually and these test results logged on *Sump Inspection Register* immediately after they are performed. Any leaks detected by liquid sensors, inspections or other observations must be immediately corrected. Any leaks that are detected but not acted upon immediately to correct are considered negligence on the part of the Purchaser/End User and will void FFS's obligation under our warranty.

Submersible pumping systems that utilize electronic or mechanical line leak detection equipment must be properly installed, operated, and maintained in proper working order on the property at which APT products are installed at all times after APT products are first installed on the property.

Repairs

Sumps and the pipe's secondary jacket are spill containers, not storage vessels, for product and/or water. If leakage or damage is detected in any part of the system (either by inspection of the sump, a leak detector, or similar monitors), the problems are to be immediately investigated by the site operator. If leakage or damage to the piping system is verified, the manufacturer must be notified. Disabling or ignoring any of the previously mentioned leak detection methods may lead to further damage, could create a potentially deadly hazard, and will release FFS from any obligation under our warranty.

Clean up spilled liquids and remove vapors immediately. Clean out filters and remove gas rags from sumps immediately after maintenance. Extended exposure to gas and/or vapors can degrade system integrity (clean up within 72 hours recommended). If a component within your APT system comes into question, please immediately contact FFS or your local FFS sales representative. When you contact us, please provide: photos and/or a detailed visual inspection, a copy of the installation and startup information, and a copy of the *Sump Inspection Register*.

Written notice of any claim under our warranty must be given to FFS at the following address promptly after discovery of the circumstances giving rise to such claim:

Franklin Fueling Systems Inc.
3760 Marsh Road
Madison, WI 53718, U.S.A.

FFS shall have no obligation under our warranty if any of these conditions are not met.

Certification

All APT products must only be installed by APT factory certified installers and in accordance with published FFS installation instructions. All individuals installing APT products will be certified through a home study certification test. Although FFS or a representative may perform onsite or classroom training sessions, a passing grade of 10% or fewer missed questions is required for installer certification on APT products. Upon receipt of a certification packet from FFS, the individual seeking certification should review the packet materials, complete the enclosed certification test, and return the completed test and certification information to FFS. Upon receipt of a test with a passing grade, FFS will certify the individual as an installer of APT products. The certified individual will receive notification from FFS confirming acceptance as an installer of APT products. The individual will be certified for a period of two years after the date of acceptance as a certified installer. At the end of the two year period, all individuals will be required to recertify via another passing home study certification test. FFS reserves the right to change the certification packet, home study test, or any element of this process as required to ensure proper installer certification and/or recertification. As this process changes, FFS will work with individuals submitting for certification or recertification to older revisions to ensure that installers are properly trained. If you have any questions, please contact FFS for more information.

New York City Certificate of Approval #5100

Conditions of Approval

1. The Franklin Fueling System / APT, Inc. shall maintain the listing with the Underwriters Laboratories, Inc. for petroleum liquids containing alcohol and other types of additives used as motor fuel. Follow up program of the UL shall be maintained.
2. The flexible piping shall be continuous between tank sump and dispenser pans without joints in backfill and shall be installed with a proper pitch to allow leaks collected in the containment piping to drain to the tank sump.

   Be advised that this requirement would prohibit secondary containment piping from draining into a dispenser pan. We are aware that in some installations this requirement may not be practical. In order to comply with these criteria and have product piping passing through a dispenser pan with no termination of the secondary piping within such pan, you must provide a bypass tubing designed and specified by Advanced Polymer Technology, Inc. in the Certificate of Approval application.
3. The above referenced piping system shall be used for underground motor fuel piping installations and shall be installed in accordance only with the manufacturer's and UL requirements. The UL listing for this pipe requires that accessory fittings and sumps recommended by the manufacturer be used. This pipe may be used for state II vapor recovering piping underground portion of ventlines provided the installation is permitted by NYSDEC.
4. The above referenced coaxial, double-walled flexible piping shall be identified with a New York City Fire Department Certificate of Approval number. The number of such certificate shall be plainly and permanently stamped or otherwise fixed upon it by the manufacturer.
5. All other aspects of the installation shall comply with the requirements of the New York City Building and Fire Prevention Code including 3RCNY §21-20. Installation shall also conform to the applicable requirements of the NYS Department of Environmental Conservation and U.S. Environmental Protection Agency.
6. The New York City Fire Department Certificate of Approval does not constitute an endorsement or recommendation of your product by the Fire Department, but is a certification that your product, as represented, meets the standards as of the date of issuance.
7. The Fire Department reserves the right to withdraw this approval at any time in the event there is a reasonable doubt that the product does not operate or perform as required by the code, the conditions of this resolutions or as represented in your application.
8. The Certificate of Approval will be issued upon condition that the material or equipment's technology does not violate any patent, trade name, trade secret or other intellectual right.
9. The Fire Department's conditions of approval shall be enumerated in the installation manuals and brochures that will be provided to NYC buyers, users and installers.
10. As the manufacturer of this equipment/ material, you should be aware that any end users who fails to comply with the condition as outlined in the approval will be subject to enforcement action which may include fines and / or imprisonment.

Notes

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Franklin Fueling Systems

Marina Piping

Installation Guide Overview

secondarily contained MD & single wall MDD series piping

Overview

Franklin Fueling Systems's Metallic Ducted Marina Pipe (MD pipe) is a combination of our UL/ULC listed product piping and flexible UL360 listed metallic conduit. MD pipe is specifically designed for use on aboveground installations and is commonly used in marinas, fuel oil lines and emergency generator feed and return lines. The metallic ducting provides a liquid-tight protective covering to enhance resistance to crushing, kinking, abrasion and other types of physical damage. It also provides added fire and UV protection and it can be used in both freshwater and saltwater marina applications. MD series pipe is shipped with single wall or secondarily contained pipe already installed into the metallic ducting, reducing installation time and the associated labor costs.

The metal jacket, the innermost layer of the ducting, consists of a smooth, double strip-wound galvanized steel layer, which is flexible yet impact resistant. The galvanized steel layer is then covered with a 1/8 inch thick thermoplastic coating that provides additional sealing to the steel layer assuring fluid tightness. This thermoplastic coating also contains a fire retardant and provides the UV resistant material needed for aboveground applications.

Warranty, Testing, Record and Certification Information

Please refer to the *XP Installation Guide Overview* (771-232-00) for information on testing, records and certification. The *XP Series Warranty Certification and Site Maintenance Guide* (FFS-0029) contains both warranty information and 771-232-00.

Marina Basics

Each marina or aboveground installation using MD pipe is unique, requiring modification to the Franklin Fueling Systems (FFS) MD series system. There are however, some general procedures that are basic to all installations:

- To install MD series pipe, installers must posses knowledge of installation procedures required for FFS underground piping systems as noted in the *XP Installation Guide Overview* (771-232-00).
- FFS requires any connection area where lengths of pipe are terminated to be contained and monitored using leak detectors and monthly inspections. Piping connections, including those in MD series piping systems, must be made inside of approved containment areas to ensure environmental security. This means that containment sumps in underground and marina applications must be utilized and monitored.

Operating Pressures

FFS product pipe has a maximum UL/ULC listed operating pressure of 100psi.

Flow Rates

Please contact FFS Technical Service for flow rate calculations.

Bend Radius

Part Number	Description	Bend Radius
XP-100-MDD	1" Single Wall Pipe	36"
XP-150-MDD	1½" Single Wall Pipe	36"
XP-175-MDD	1¾" Single Wall Pipe	36"
XP-200-MDD	2" Single Wall Pipe	36"
XP-100-MD	1" Secondary Contained Pipe	36"
XP-150-MD	1½" Secondary Contained Pipe	36"
XP-175-MD	1¾" Secondary Contained Pipe	36"
XP-200-MD	2" Secondary Contained Pipe	36"

MD Buoyancy

Depending on the size of the MD series piping, it will have a buoyancy factor anywhere from neutral to 20% lighter than water before the product pipe is filled with fuel. After filling the primary pipe with fuel, the buoyancy factor will be anywhere from neutral to 20% heavier than water. The buoyancy factor aids in the handling of the pipe once in the water, which makes installation easier and faster in most applications.

APT MD Series Piping Buoyancy Table

Pipe Model	Metal Ducting	Carrier Pipe	Water Displacement, Grams		Weight per Linear Foot, Grams - Empty		Weight per Linear Foot, Grams - w/ Fuel	
			Freshwater	Saltwater	Weight	Result	Weight	Result
XP-100-MD	MD-200	P-100-SC	871 (31 oz)	897 (32 oz)	869 (31 oz)	Neutral	984 (35 oz)	Sinks
XP-150-MD	MD-250	P-150-SC	1277 (43 oz)	1315 (46 oz)	1080 (38 oz)	Floats	1310 (46 oz)	Neutral
XP-175-MD	MD-250	P-175-SC	1277 (43 oz)	1315 (46 oz)	1186 (42 oz)	Floats	1505 (53 oz)	Sinks
XP-200-MD	MD-300	P-200-SC	1892 (67 oz)	1949 (69 oz)	1610 (57 oz)	Floats	2073 (73 oz)	Sinks
XP-100-MDD	MD-150	P-100-D	558 (20 oz)	575 (20 oz)	N/A	N/A	N/A	N/A
XP-150-MDD	MD-200	P-150-D	871 (31 oz)	897 (32 oz)	829 (29 oz)	Floats	1059 (37 oz)	Sinks
XP-175-MDD	MD-250	P-175-D	1277 (43 oz)	1315 (46 oz)	1008 (36 oz)	Floats	1327 (47 oz)	Neutral
XP-200-MDD	MD-300	P-200-D	1892 (67 oz)	1949 (69 oz)	1455 (51 oz)	Floats	1918 (68 oz)	Neutral

Marina Sumps

Due to the increased environmental and fire hazards seen at marinas, FFS recommends aboveground or marina applications use stainless steel containment sumps. Check with all governing sources to ensure that the components used in your marina system are acceptable.

MD Pipe Pulling

As with direct bury piping, when dispensing pipe from a reel, always pull MD pipe from the bottom of the reel.

Warning **MD series piping is heavy, weighing about 2.8 pounds per foot for P-175-MD (a 500 foot reel of P-175-MD will weigh over 1400 pounds). Unreeling MD series pipe isn't as easy as unreeling single or double wall pipe due to both the weight of the pipe and its tendency to retract as it unreels, so stabilize the reel on solid ground during the pipe pulling process to help eliminate these issues. In addition, FFS recommends using two workers to pull the pipe and two workers to supervise the reel while pulling the MD series pipe off of the reel.**

Installation

Preparing MD Pipe

MD pipe can be cut using a hacksaw, reciprocating saw or steel pipe cutters. Due to the helical nature of the galvanized steel layer, it can be difficult to get a square cut. It's important that the galvanized steel layer be square cut though to allow for the full clamping pressure to be applied around the metallic ducting outside of the sump.

As a general rule, the metal jacket needs to be stripped back approximately 8" from the end of the product pipe. For a more accurate cut, first determine the proper location of the riser sections inside of the sump and then measure from the end of the barbed fitting to the outside of the sump wall (see Figure 1 where X equals this measurement). This is done to obtain the proper watertight seal around the metallic ducting using the appropriate entry boot.

Due to the process of pulling the product piping through the MD jacket at the factory, the MD ducting will stretch once on the reel. Make sure to cut your pipe length slightly longer to accommodate for any shrinkage (2-3% on average) after installation.

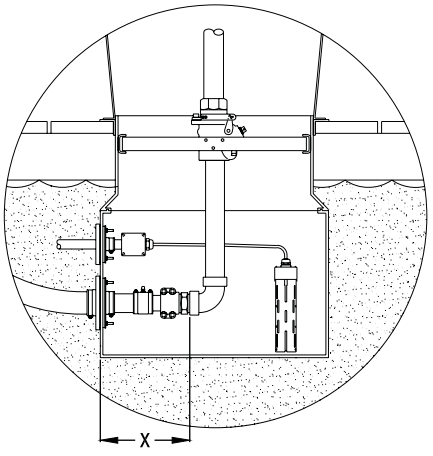


Figure 1

Trimming Back MD Pipe

Option #1

To strip back the metal ducting, pull one end of the product pipe far enough away from the metallic duct to avoid cutting through the product pipe when trimming the MD duct. Using a hacksaw or **reciprocating saw**, cut through the metallic duct at the desired location. Use a file to smooth any jagged edges on the ducting left by this procedure.

Option #2

To strip back the metallic ducting, place a band clamp at the point to which you wish to strip back too. Using this band clamp as a guide, make a circumferential cut all the way around the MD ducting, cutting through the plastic cover. Make a longitudinal cut from the band clamp to the end of the pipe, and pull away the plastic cover. To cut away the exposed metal layer, use a nibbler or low-profile shear. The metal coils can be loosened somewhat by “unwinding” them, then can be cut with the snips. Use a file to smooth any jagged edges left by this procedure.

Note: After removing the metal jacket, be sure to inspect the product pipe for any damage. File and remove all sharp edges and corners from the metal jacket that might scrape or cut into the piping or entry boot.

Note: It is recommended and good practice to conduct an initial air test on the secondary layer while on dry land. You can refer to the testing procedures outlined in the APT installation guide for underground system.

Sealing Pipe During Installation

During any installation of APT marina pipe that will be installed in or under water be sure to cap the ends of the primary pipe from water intrusion during installation.

- *If using an APT single wall MD system (XP-xxx-MDD)*, be sure to seal off the MD jacket and the product pipe from water intrusion during the installation.
- *If using an APT secondarily contained MD system* (XP-xxx-MD), be sure the SC jacket is sealed using a test boot prior to taking the pipe into the water, this will insure that water does not enter the interstitial layer of the SC product pipe. Again be sure to seal off the MD jacket and the product pipe from water intrusion during the installation.

Supporting MD Pipe

FFS piping connections are very strong and durable, but continual or repetitive high strain levels (as seen on marina applications) could cause fatigue and possible failure of the primary pipe connections. FFS requires that MD pipe be properly supported.

Fixed Dock Installation

When installing MD series pipe to fixed docks, piping may be run on the side of the dock or underneath it. The following are some examples of what can be used as pipe supports attached to the dock (not all possibilities are listed): Unistrut conduit hangers, “U” bolts, PVC pipe couplers or Hosebuns.

FFS recommends that MD pipe be supported evenly along the entire run and fed through a three or four inch PVC pipe secured to the under side of the dock. This procedure allows the pipe to move in relationship to the changing water levels inside of the PVC pipe, so extensive strain is relieved from the piping. Prior to entering a containment sump, the ends of a MD piping run **must** be rigidly secured to the dock and mounted properly to the entry boots located on the sump wall. Supports are required every three feet on the piping run to eliminate any sag in the piping run.

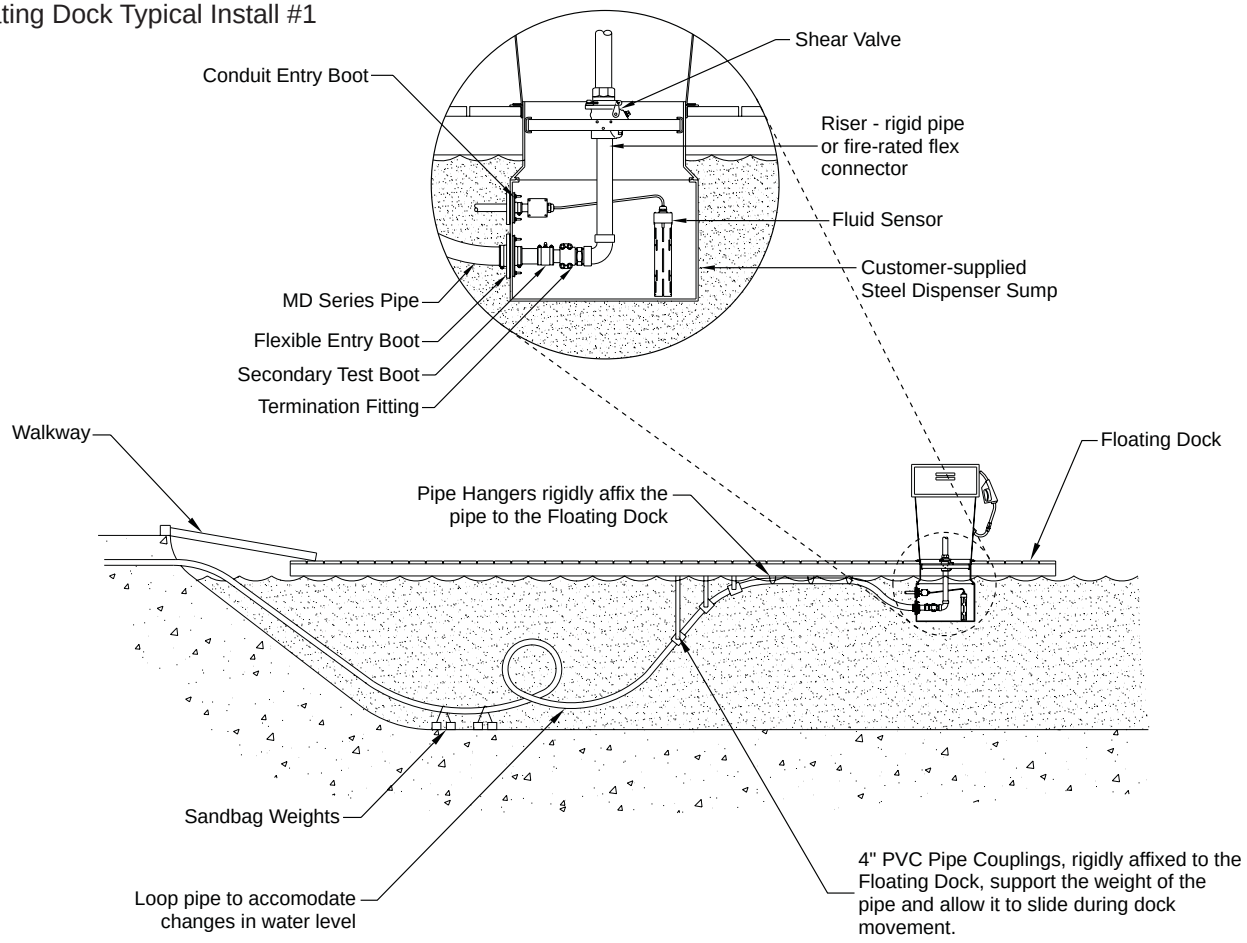
Floating Dock Installation

When installing MD series pipe under a floating dock, FFS recommends that the pipe be weighted down to keep it from moving freely during installation and coiled or looped underwater to compensate for any change in water levels. Weights such as sand bags or concrete forms connected by nylon or polypropylene rope and draped over the MD pipe can be use effectively. Please refer to Figures 2 & 3 for typical floating dock installation diagrams.

Warning **MD pipe must never come in contact with concrete forms, if they are used. Support along the run of pipe should be designed to allow free travel of the pipe to accommodate expansion and contraction.**

Figure 2

Floating Dock Typical Install #1



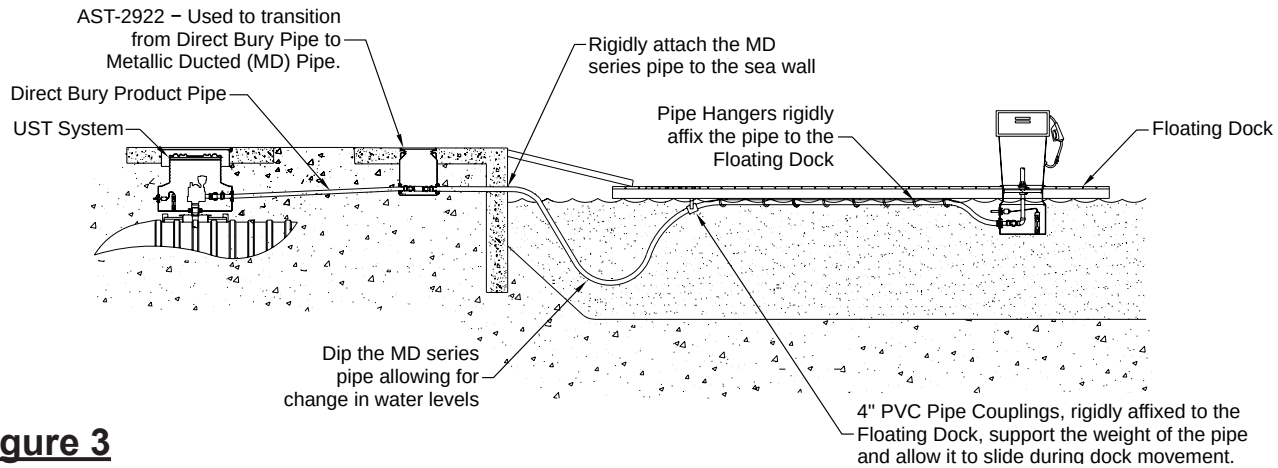


Figure 3

Floating Dock Typical Install #2

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2.03 – FUEL HOSE

Note: The plans and specs did not indicate the length of hose needed in this section. It is assumed that a 25’ length will work for the application. If the 25’ length is not correct, then adjustments will have to be made.

Hose Dimensions: 2" x 25', Coupled M x M

Petroleum Transfer Hose

Longhorn® AF (Alternative Fuel)

(Specification 4688AC, 4688AF)

Smooth Cover (4688AF)

Nom. I.D.		Nom. O.D.		Max. W.P.		Suction		Min. Bend Radius		Wt. Per Ft.		Standard Pack	Stock (X) or Minimum Order Qty.	Gates Item No.
(In.)	(mm)	(In.)	(mm)	(psi)	(MPa)	(In. Hg)	(mm Hg)	(In.)	(mm)	(Lbs.)	(Kg)			
1	25.4	1.50	38.1	150	1.03	30.0	762	3.0	76	.59	.27	100 ft.	X	4688-1700
1	25.4	1.50	38.1	150	1.03	30.0	762	3.0	76	.59	.27	200 ft.	400 ft.	4688-1701
1 1/4	31.8	1.75	44.5	150	1.03	30.0	762	4.0	102	.70	.32	100 ft.	X	4688-1702
1 1/4	31.8	1.75	44.5	150	1.03	30.0	762	4.0	102	.70	.32	200 ft.	400 ft.	4688-1703
1 1/2	38.1	2.02	51.3	150	1.03	30.0	762	4.0	102	.87	.40	100 ft.	X	4688-1704
1 1/2	38.1	2.02	51.3	150	1.03	30.0	762	4.0	102	.87	.40	200 ft.	400 ft.	4688-1705
2	50.8	2.52	64.0	150	1.03	30.0	762	6.0	152	1.10	.50	100 ft.	X	4688-1706
2	50.8	2.52	64.0	150	1.03	30.0	762	6.0	152	1.10	.50	200 ft.	400 ft.	4688-1707
2 1/2	63.5	3.05	77.5	150	1.03	30.0	762	8.0	203	1.47	.67	100 ft.	X	4688-1708
2 1/2	63.5	3.05	77.5	150	1.03	30.0	762	8.0	203	1.47	.67	200 ft.	400 ft.	4688-1709
3	76.2	3.53	89.7	150	1.03	30.0	762	9.0	229	1.86	.85	100 ft.	X	4688-1710
3	76.2	3.53	89.7	150	1.03	30.0	762	9.0	229	1.86	.85	200 ft.	400 ft.	4688-1711
4	101.6	4.57	116.1	150	1.03	30.0	762	12.0	305	2.59	1.18	100 ft.	X	4688-1712
4	101.6	4.57	116.1	150	1.03	30.0	762	12.0	305	2.59	1.18	200 ft.	400 ft.	4688-1713

Corrugated Cover (4688AC)

Nom. I.D.		Nom. O.D.		Max. W.P.		Suction		Min. Bend Radius		Wt. Per Ft.		Standard Pack	Stock (X) or Minimum Order Qty.	Gates Item No.
(In.)	(mm)	(In.)	(mm)	(psi)	(MPa)	(In. Hg)	(mm Hg)	(In.)	(mm)	(Lbs.)	(Kg)			
1	25.4	1.50	38.1	150	1.03	30.0	762	3.0	76	.59	.27	100 ft.	X	4688-1718
1	25.4	1.50	38.1	150	1.03	30.0	762	3.0	76	.59	.27	200 ft.	400 ft.	4688-1719
1 1/4	31.8	1.75	44.5	150	1.03	30.0	762	4.0	102	.70	.32	100 ft.	X	4688-1720
1 1/4	31.8	1.75	44.5	150	1.03	30.0	762	4.0	102	.70	.32	200 ft.	400 ft.	4688-1721
1 1/2	38.1	2.02	51.3	150	1.03	30.0	762	4.0	102	.87	.40	100 ft.	X	4688-1722
1 1/2	38.1	2.02	51.3	150	1.03	30.0	762	4.0	102	.87	.40	200 ft.	400 ft.	4688-1723
2	50.8	2.52	64	150	1.03	30.0	762	6.0	152	.59	.27	100 ft.	X	4688-1724
2	50.8	2.52	64	150	1.03	30.0	762	6.0	152	.59	.27	200 ft.	400 ft.	4688-1725
2 1/2	63.5	3.05	77.5	150	1.03	30.0	762	8.0	203	1.47	.67	100 ft.	X	4688-1726
2 1/2	63.5	3.05	77.5	150	1.03	30.0	762	8.0	203	1.47	.67	200 ft.	400 ft.	4688-1727
3	76.2	3.53	89.7	150	1.03	30.0	762	9.0	229	1.86	.85	100 ft.	X	4688-1728
3	76.2	3.53	89.7	150	1.03	30.0	762	9.0	229	1.86	.85	200 ft.	400 ft.	4688-1729
4	101.6	4.57	116.1	150	1.03	30.0	762	12.0	305	2.59	1.18	100 ft.	X	4688-1730
4	101.6	4.57	116.1	150	1.03	30.0	762	12.0	305	2.59	1.18	200 ft.	400 ft.	4688-1731

RECOMMENDED FOR: Longhorn AF is designed and engineered specifically for constant contact use in the transfer of alternative fuels such as bio-diesel, bio-diesel blends, ethanol and ethanol blends. It can also be used for constant contact use in the transfer of commercial gasolines, diesel fuels, oils and other petroleum products. It is ideal for tank truck, terminal loading and in-plant operations.

CAUTION: Service life of transfer hoses can be extended by draining hoses after use.

TEMPERATURE: -30°F to +180°F (-34°C to +82°C). Warning: Do not convey fuels over 120°F (+49°C). Contact Denver Product Application (303) 744-5070 for use at temperature extremes.

CONSTRUCTION:
Tube: Type C (Nitrile). Black.
Reinforcement: Synthetic, high tensile textile with steel wire helix.
Cover: Type C2 (Modified Nitrile). Black with red spiral stripe and green boarder.
Design Factor: 4:1

COUPLINGS: 7, 26, 49 or 78. (for ambient temperatures only). Reference the Hose Coupling Section.

PACKAGING: All lengths coiled and wrapped in polyethylene.

BRANDING: Continuous transfer label. Example: "GATES® LONGHORN® AF 150 PSI (1.03MPa) WP FLAME RESISTANT MSHA IC-4116 MADE IN U.S.A."

SPECIAL ORDER REQUIREMENTS: Special production runs require minimum order quantities of 400 feet for sizes through 4" and 200 feet for sizes above 4". If a special transfer label is required, contact Gates Corporation for minimum quantity.
Specific cut lengths available through the Cut Length Program. Contact Customer Service for details.

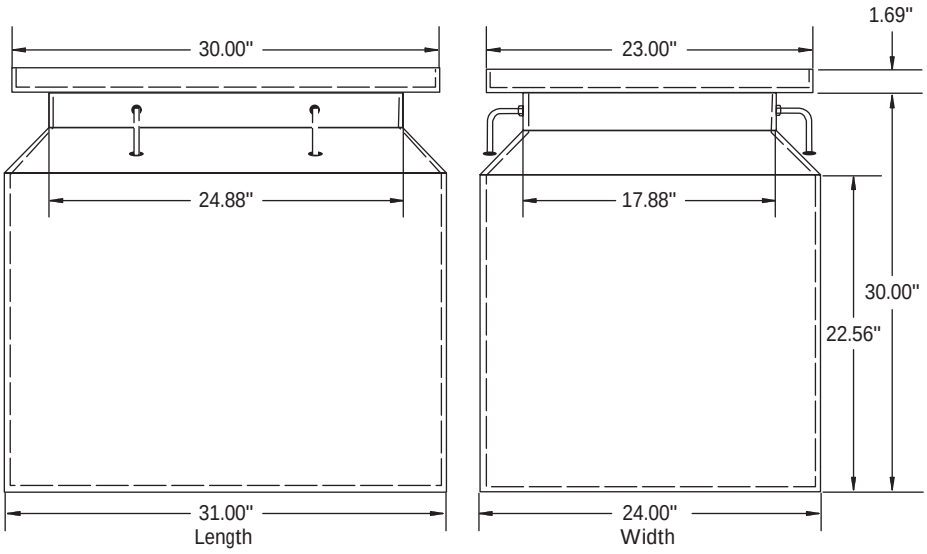
REMNANT LENGTHS: Remnant lengths are sometimes available in popular sizes at a discount. Contact Gates Corporation for pricing, order requirements and availability.

STANDARDS:
Tube: ARPM (Class A) High oil resistance.
Cover: ARPM (Class A) High oil resistance.
Meets MSHA 30 CFR 18.65. Flame resistant.

2.04 – SUMPS AND FITTINGS

Grade Level Transition Sump

The AST above or below ground transition sump is the practical, environmentally sound solution for remote dispensing from aboveground storage tanks. Steel and flexible piping enter the sump through the APT flexible entry boot. Inside the sump, the steel piping easily connects to flexible piping for a fueltight, continuous run to dispensers or an intermediate sump.

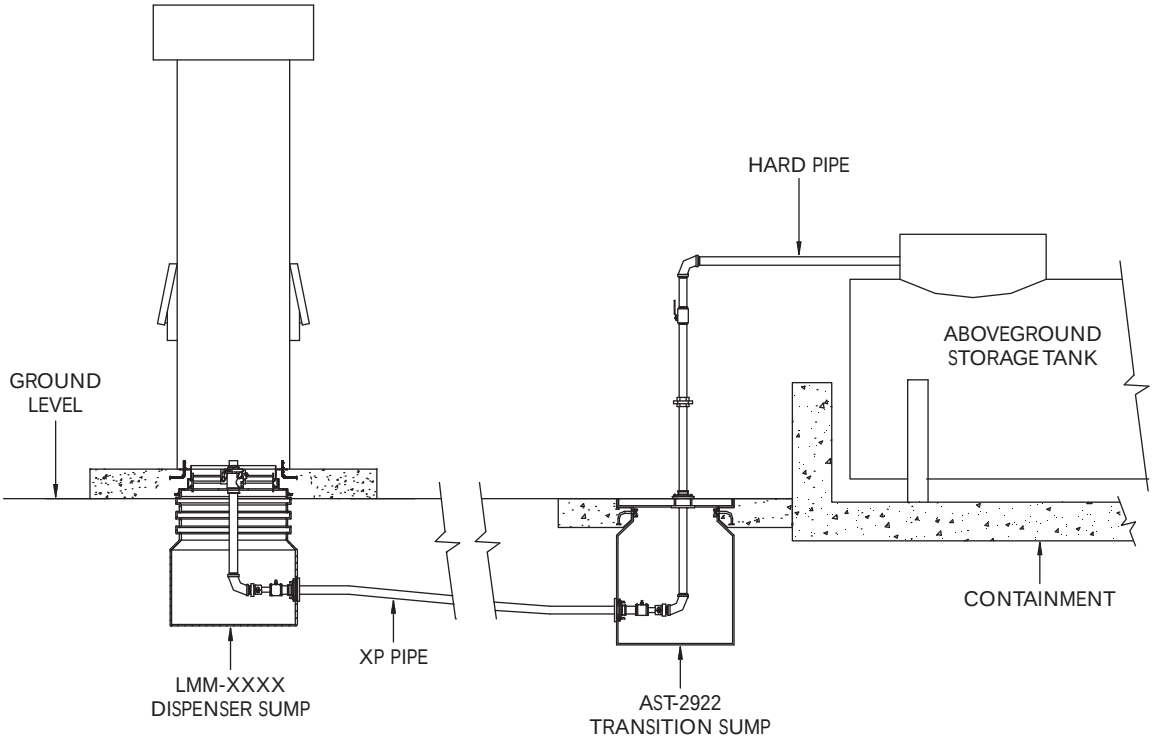


Advantages

- Transition sumps help meet environmental regulations by isolating metal piping from the soil.
- Transition sumps can be installed either inside or outside containment dikes.
- 30" burial depth allows the transition sump to be used as the system low point for leak detection.
- Load rated composite cover.
- Flexible entry boot provides a fueltight and watertight seal around the metal piping and flexible piping as it enters the sump lid and sidewall.
- H-20 load rating. Pipe entries installed in lids negate the load rating.

Model	Description
AST-2922	Aboveground storage tank transition sump
999-855-53	Replacement gasket
252-029-23	Replacement AST-2922 lid, grey
IP-400-B	Inspection replacement port, FEB style with replacement well cap

Above Grade Typical Application Drawing



PIPING & CONTAINMENT

Advantages

- Designed to be used with APT product piping, the entry boots are also ideal for use with rigid piping and electrical conduits.
- Flexible entry boots available in sizes from ½" through 4".
- Ducted entry boots available in sizes from 1½" through 2½". APT offers these ducted entry boots in an air testable version for easy testing of the 4" corrugated ducting.
- Boot size designations correspond directly to the pipe size being used.
- Any boot for a single wall pipe can be converted to a boot for a double wall pipe by simply removing the insert in the pipe opening.
- Entry boot can be serviced from inside the sump, eliminating the need for sump excavation.
- Made from oil- and gasoline-resistant nitrile rubber.
- Will work on round sumps of 36" or larger diameter.

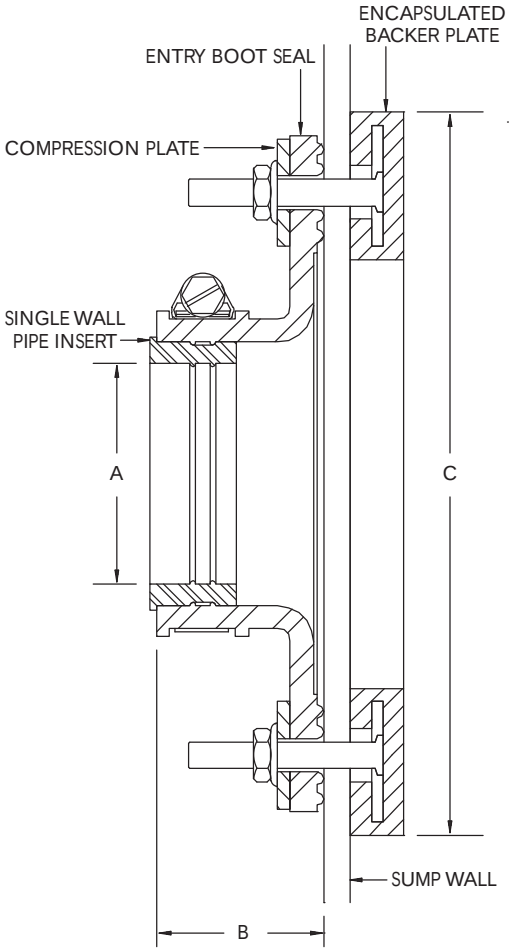
Flexible Entry Boots

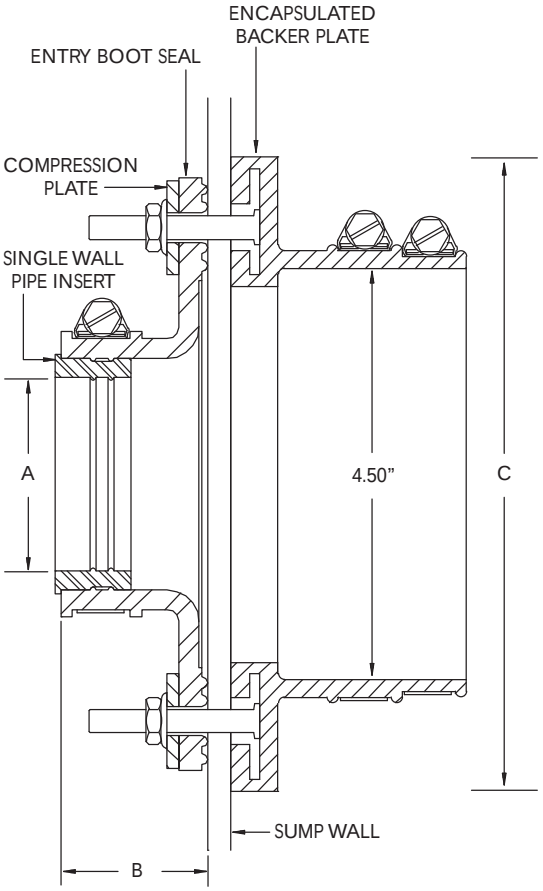
APT flexible entry boots are two-piece boots that double the sealing power of your entry boots. Stainless steel studs and corrosion-resistant nuts and washer plates make for the highest quality entry boot. APT offers a complete line of sizes for ½" through 4" single and secondary containment pipe. The 1½" through 2½" sizes are also available in a ducted boot version to accommodate the use of APT DCT-400 corrugated ducting for easy retractability.

Model	Description
FEB-050-D	Flexible entry boot for ½" electrical conduit
FEB-050-SC	Flexible entry boot for ¾" electrical conduit
FEB-075-D	Flexible entry boot for ¾" and 1" electrical conduit
FEB-075-D2	Double sided entry boot for ¾" and 1" electrical conduit
FEB-075-SC	Flexible entry boot for 1" electrical conduit
FEB-100-D	Flexible entry boot for XP-100-D
FEB-100-SC	Flexible entry boot for XP-100-SC
FEB-150-D	Flexible entry boot for XP-150-D
FEB-150-SC	Flexible entry boot for XP-150-SC
FEB-175-D	Flexible entry boot for XP-175-D
FEB-175-SC	Flexible entry boot for XP-175-SC and 2" single wall fiberglass
FEB-200-D	Flexible entry boot for XP-200-D
FEB-200-SC	Flexible entry boot for XP-200-SC
FEB-250-SC	Flexible entry boot for XP-250-SC
FEB-300	Flexible entry boot for 3" single wall fiberglass
FEB-300-R	Flexible entry boot for 3" single wall fiberglass
FEB-400-R	Flexible entry boot for 4" single wall fiberglass
FEB-400-F	Flexible entry boot for 4" double wall pipe

Model	Description
DEB-150-D	Ducted entry boot for XP-150-D
DEB-150-SC	Ducted entry boot for XP-150-SC
DEB-175-D	Ducted entry boot for XP-175-D
DEB-175-SC	Ducted entry boot for XP-175-SC
DEB-200-D	Ducted entry boot for XP-200-D
DEB-200-SC	Ducted entry boot for XP-200-SC
DEB-250-SC	Ducted entry boot for P-250-SC

Model	Description
DEB-150-DA	Air testable ducted entry boot for XP-150-D
DEB-150-SCA	Air testable ducted entry boot for XP-150-SC
DEB-175-DA	Air testable ducted entry boot for XP-175-D
DEB-175-SCA	Air testable ducted entry boot for XP-175-SC
DEB-200-DA	Air testable ducted entry boot for XP-200-D
DEB-252-DA	Air testable ducted entry boot for XP-200-SC and P-250-D
89510101	Ducting insert
89510201	Ducting v-seal





Flexible Entry Boots

Model	A	B	C	Mtg. Hole Size	Mtg. Studs
FEB-050-D	0.84"	1.50"	4.75"	2.00"	4
FEB-050-SC	1.05"	1.50"	4.75"	2.00"	4
FEB-075-D	1.05"	1.50"	4.75"	2.00"	4
FEB-075-SC	1.32"	1.50"	4.75"	2.00"	4
FEB-100-D	1.32"	1.50"	4.75"	2.00"	4
FEB-100-SC	1.70"	1.50"	4.75"	2.00"	4
FEB-150-D	1.75"	1.50"	6.75"	3.50"	8
FEB-150-SC	2.00"	1.50"	6.75"	3.50"	8
FEB-175-D	2.00"	1.50"	6.75"	3.50"	8
FEB-175-SC	2.40"	1.50"	6.75"	3.50"	8
FEB-200-D	2.50"	1.50"	6.75"	3.50"	8
FEB-200-SC	2.88"	1.50"	6.75"	3.50"	8
FEB-250-SC	3.24"	1.50"	6.75"	3.50"	8
FEB-300	3.50"	1.50"	8.00"	3.50"	10
FEB-300-R	3.50"	1.50"	6.75"	3.50"	8
FEB-400-R	4.50"	1.50"	8.00"	5.50"	10
FEB-400-F	4.94"	1.50"	8.00"	5.50"	10

Ducted Entry Boots

Model	A	B	C	Mtg. Hole Size	Mtg. Studs
DEB-150-D	1.75"	1.50"	6.75"	3.50"	8
DEB-150-SC	2.00"	1.50"	6.75"	3.50"	8
DEB-175-D	2.00"	1.50"	6.75"	3.50"	8
DEB-175-SC	2.40"	1.50"	6.75"	3.50"	8
DEB-200-SC	2.88"	1.50"	6.75"	3.50"	8
DEB-250-SC	3.24"	1.50"	6.75"	3.50"	8

Air Testable

Model	A	B	C	Mtg. Hole Size	Mtg. Studs
DEB-150-DA	1.75"	1.50"	6.75"	3.50"	8
DEB-150-SCA	2.00"	1.50"	6.75"	3.50"	8
DEB-175-DA	2.00"	1.50"	6.75"	3.50"	8
DEB-175-SCA	2.40"	1.50"	6.75"	3.50"	8
DEB-200-DA	2.50"	1.50"	8.00"	5.50"	10
DEB-252-DA	3.00"	1.50"	8.00"	5.50"	10

PIPING & CONTAINMENT

Termination Boots

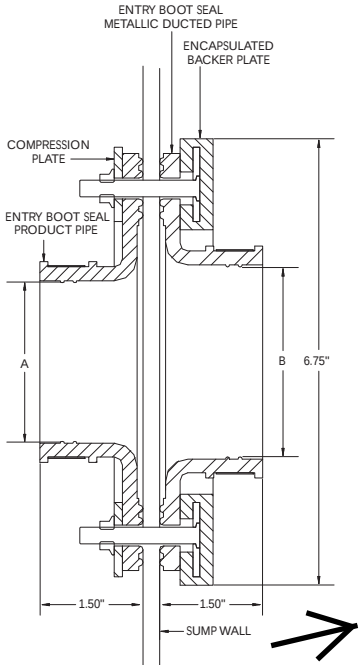
Advantages

- Same proven design features of APT standard flexible entry boots.
- Inner seal provides watertight seal around the single or secondary contained product pipe.
- The outer seal secures the MD layer to the sump wall.
- Double seals offer additional security for the harsh conditions of marina and aboveground applications.
- Made from gas- and oil-resistant nitrile rubber.
- Will work on round sumps of 36" or larger diameter.

MD-Series Flexible Entry Boots

When using the APT metallic ducted (MD) pipe, the use of the MD-Series flexible entry boot is required. These boots are similar in design to our standard flexible entry boots, except they include an additional seal that faces outward to secure the MD layer of the pipe to the sump wall, and terminate the single or secondary contained piping on the inside of the sump for a watertight seal.

Model	Description
FEB-075-MDD	Flexible entry boot for P-075-MD
FEB-075-MD	Flexible entry boot for P-075-MD
FEB-100-MDD	Flexible entry boot for XP-100-MDD
FEB-100-MD	Flexible entry boot for XP-100-MD
FEB-150-MDD	Flexible entry boot for XP-150-MDD
FEB-150-MD	Flexible entry boot for XP-150-MD
FEB-175-MDD	Flexible entry boot for XP-175-MDD
FEB-175-MD	Flexible entry boot for XP-175-MD
FEB-200-MDD	Flexible entry boot for XP-200-MDD
FEB-200-MD	Flexible entry boot for XP-200-MD



MD-Series Flexible Entry Boots

Model	A	B	Mtg. Hole Size	Mtg. Studs
FEB-075-MDD	1.05"	1.70"	2.00"	4
FEB-075-MD	1.32"	2.00"	3.50"	8
FEB-100-MDD	1.32"	2.00"	3.50"	8
FEB-100-MD	1.70"	2.40"	3.50"	8
FEB-150-MDD	1.75"	2.40"	3.50"	8
FEB-150-MD	2.00"	2.88"	3.50"	8
FEB-175-MDD	2.00"	2.88"	3.50"	8
FEB-175-MD	2.40"	2.88"	3.50"	8
FEB-200-MDD	2.50"	3.50"	3.50"	8
FEB-200-MD	2.88"	3.50"	3.50"	8

Rigid Entry Boots

Model	Description
REB-150-SC	Rigid entry boot for XP-150-SC double wall pipe
REB-175-SC	Rigid entry boot for XP-175-SC double wall pipe
REB-200-SC	Rigid entry boot for XP-200-SC double wall pipe

Split Test Boots

Model	Description
SPTB-150	Split test boot for XP-150-SC double wall pipe
SPTB-175	Split test boot for XP-175-SC double wall pipe
SPTB-200	Split test boot for XP-200-SC double wall pipe

2.05 – LEAK DETECTION AND ALARM SYSTEM

Note: The specified part number for the leak detection panel is not a good number. We are submitted on a model LC2000 series in lieu of the LC2004 that is specified.

2.05 - LEAK DETECTION AND ALARM SYSTEM

4, ~~8, 12 or 16~~-Input Discriminating/Non-Discriminating Secondary Containment Leak/Point Level Alarm Console with Printer Option

Console

- Dimensions (W x H x D): 11.8” x 11.5” x 4.75” (300 mm x 292 mm x 121 mm)
- Weight: 14 lb (6.4 kg) (w/ Printer)
- Operating Temperature: -40 ºF to 160 ºF (-40 ºC to 70 °C) w/o Printer
  -5 ºF to 140 ºF (-20 ºC to 60 °C) w/ Printer
- Humidity: 95% Non-condensing
- Enclosure Rating: Locking NEMA 12 (IP52), NEMA 4 (IP56) or NEMA 4X (IP56) (304 S.S.)
- Power Requirements: 115/230 VAC ±15% (w/o Printer) Switchable, 50-60 Hz, 20 W Max.
  8-16 VDC or 16-60 VDC Optional
- Memory: Configuration / Setup Data – EEPROM, 50 year data retention, no batteries
  Log Reports and Real-Time Clock – Lithium Battery-Backed RAM, 5-10 year data retention
- Audible Alarm: 85 db
- Summary Visual Alarm: Optional White LED Strobe Summary Alarm Indicator, Visible from 300’ (91 m)
- Display: Ultra-High Intensity Normal (Green), Product (Red) and Water (Yellow) Alarm LEDs, Green Power LED, Visible from 75’ (23 m)
- Insert Labels: Pre-Printed or User-Printable/Writeable Polyester Pocket Insert Labels and Emergency Contact Label
- Communications: RS-232 Included Standard, RJ-13 Jack
  RS-485 Included Standard, Plug-In Terminal Block (For Pneumercator Peripherals)
  Internal, Secured Modem, Fax / Modem, Ethernet Network Interface or ModBus Optional
- Sensor Capacities: 4, 8, 12 or 16 Discriminating or Non-Discriminating Sensors, Supervised Wiring Ready
- I / O, Non-Haz.: Standard: 2 Relays, 1 Form C, Rated: 10 A @120 VAC; 6 A @240 VAC, w/ 2 Opto-Isolated Inputs
  Expansion Options: (1 slot available)
  4 Relays, 1 Form C, Rated: 10 A @120 VAC; 6A @240 VAC, w/ 4 Opto-Isolated Inputs
  8 Relays, 1 Form A, Rated: 5 A @120 VAC; 5A @240 VAC w/ 8 Opto-Isolated Inputs
  16 Relays, 1 Form A, Rated: 5 A @120 VAC; 5A @240 VAC

PNEUMERCATOR Liquid Level Control Systems
Pneumercator Company, Inc.
1785 Expressway Drive North
Hauppauge, New York 11788
Tel: 631-293-8450
Fax: 631-293-8533
http://www.pneumercator.com

Sensors

- ES825-200F — Electronic, Discriminating - Containment, Manway and Piping Sumps, Dispenser Pan, Dry Annular
- ES825-100F — Electronic, Non-Discriminating - Containment, Manway and Piping Sumps, Dispenser Pan, Dry Annular
- LS600LD — Float, Containment, Manway and Piping Sumps, Dispenser Pan
- LS600xx — Multi-Float, High / Low Level and Pump Control
- RSU800/810 — Float, Wet Annular / Reservoir
- LS610 — Float, Dry Annular
- HS100D — Polymer / Float – Wet Well, 10’ (3 m) to 25’ (7.6 m) depth
- HS100ND — Polymer – Dry Containment, 1’ (0.3 m) to 15’ (4.6 m) length

Most sensors are available with Fault-Detect Supervised sensor and wiring option. Add “F” Suffix to Model Number

Remote Audible/Visual Alarms

- RA400 — Addressable (up to 16), Multi-Drop, Programmable Remote Annunciator
- RA400W — Wireless Programmable Remote Annunciator (Requires MPX200)

Certifications / Approvals

- UL/cUL Approved, File #E139464
- FCC Part 15B, Part 68
- City agency approvals pending
- Third-Party Approved, EPA-Compliant for Secondary Leak Detection

Note: Specifications subject to change without notice. 10-24-2013

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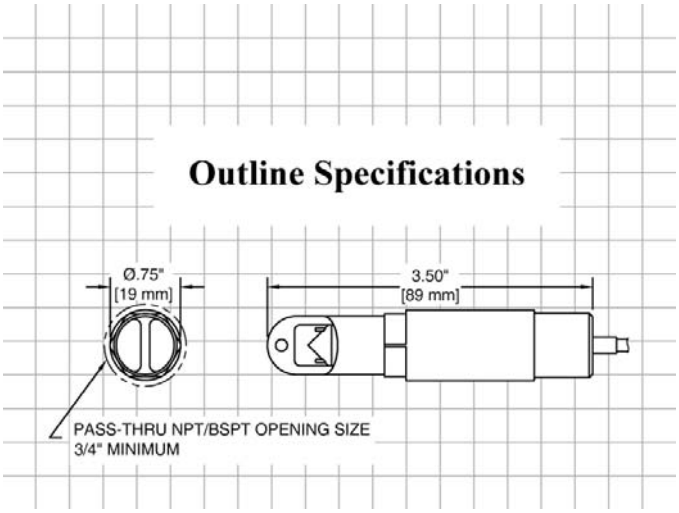
2.05 - LEAK DETECTION AND ALARM SYSTEM

Product-Distinguishing Secondary Containment Leak Sensor with Fault Detection



Product Description

The Model ES825-200 Series is a solid state, electronic, product distinguishing leak sensor utilizing both electro-optical and conductivity technologies to detect and differentiate between hydrocarbon-based liquids and water in secondary containment applications. The sensor contains no moving parts, is unaffected by vapors, and due to its compact size is ideal for interstitial spaces. When connected with a LC2000/TMS series controller, the ES825-200 Series supports Pneumercator's FAULT-DETECT supervised wiring technology, which automatically detects sensor or field wiring faults.

Applications

- Dry Annular Space in Double-Wall Tanks
- Containment, Manway and Piping Sumps
- Dispenser Pan
- Turbine Enclosures

Specifications

- Technology: Electro-optic and conductivity, no moving parts
- Wetted Materials: Polysulfone, TPU, PVC (F), FEP Teflon (XF), Epoxy, Polypropylene, and 316SS
- Operating Temperature: -5 ºF to 165 ºF (-20 ºC to 75 ºC) (F); -65 ºF to 185 ºF (-55 ºC to 85 ºC) (XF)
- Cable: 22AWG, 3-Conductor, PVC-jacketed, (FEP Teflon-jacketed for XF), 25' Length
- Pass-thru NPT/BSPT Opening Size: Minimum ¾"
- Location Approval*: UL Class I, Div 1, Groups C and D; cUL Class I, Zone 0, Group IIB
- Compatible with: LC2000, TMS2000, and TMS3000

Installation

Sensor may be suspended by its cable, placed on the containment or sump floor, or thru-wall mounted via a ¼" FNPT opening. For dry annular applications, sensor may be pulled through using fish tape attached to sensor pull ring, or pushed through with a section of ½" ENT (not included) attached to the back end of the sensor.

Certifications/Approvals

- UL/cUL Approved, File #E139464
- Third-Party EPA Listed*

Ordering

- ES825-200F PVC-Jacketed Cable
- ES825-200XF FEP Teflon-Jacketed Cable, Extended Temperature Range

*When used in conjunction with the LC2000/TMS series controllers

Note: Specifications subject to change without notice. 04-01-2013

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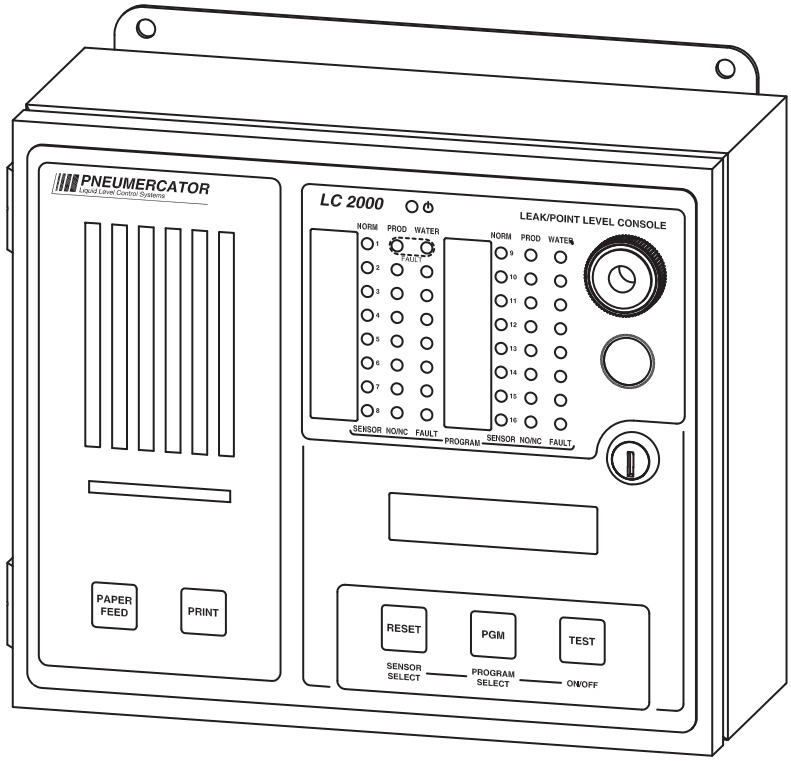
PNEUMERCATOR
Liquid Level Control Systems

LEAK/POINT
LEVEL ALARM
CONSOLE

INSTALLATION MANUAL



DRAWING NO. 20068 REV. N/C

MODEL LC2000

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1785 EXPRESSWAY DRIVE NORTH
HAUPPAUGE, NY 11788

TEL: (631) 293-8450
FAX: (631) 293-8533
http://www.pneumercator.com

Note: A separate OPERATING MANUAL is available, but NOT required for LC2000 installation.

TABLE OF CONTENTS

⚠ IMPORTANT SAFETY INFORMATION

This manual contains instructions for installing electrical hardware in explosion hazard areas.
The following warnings must be considered to be in compliance with accepted codes.
Any inquiries about this manual, or to return defective equipment should be directed to:

PNEUMERCATOR COMPANY
1785 EXPRESSWAY DRIVE NORTH
HAUPPAUGE, NY 11788
Attention: Technical Services
TEL: (631) 293-8450
FAX: (631) 293-8533
TOLL FREE: (800) 209-7858
www.pneumercator.com

⚠ WARNING

Installation must be in strict accordance with this manual as adopted from the following codes:
- ISA RP12.6, "Installation of intrinsically Safe Instrument Systems in Class I Hazardous Locations."
- UL - Underwriters Laboratories
- NFPA 70, "National Electric Code."
- NFPA 30A, "Automotive and Marine Service Station Code."
FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

⚠ WARNING

Alteration, modification or replacement with non-factory components could impair the intrinsic safety of this equipment, void the warranty and void the UL Listing. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

SECTION 1 – PRODUCT DESCRIPTIONS

1.1 GENERAL SYSTEM OVERVIEW

The LC2000 is a fully integrated secondary containment leak detection and point-level alarm system that will interface to all of the TMS series sensor model types, including discriminating and non-discriminating electronic or mechanical secondary containment leak sensors as well as single and multi-point level float sensors. The system is available with a capacity of 4, 8, 12 or 16 sensor inputs. Figure 1-1 shows a typical block diagram of how a system should be configured for installation, providing a general overview of the possible combinations of sensors, remote alarms and other optional equipment that may be required for the specific installation. Note that a detailed wiring diagram can be found in Section 3 of this manual.

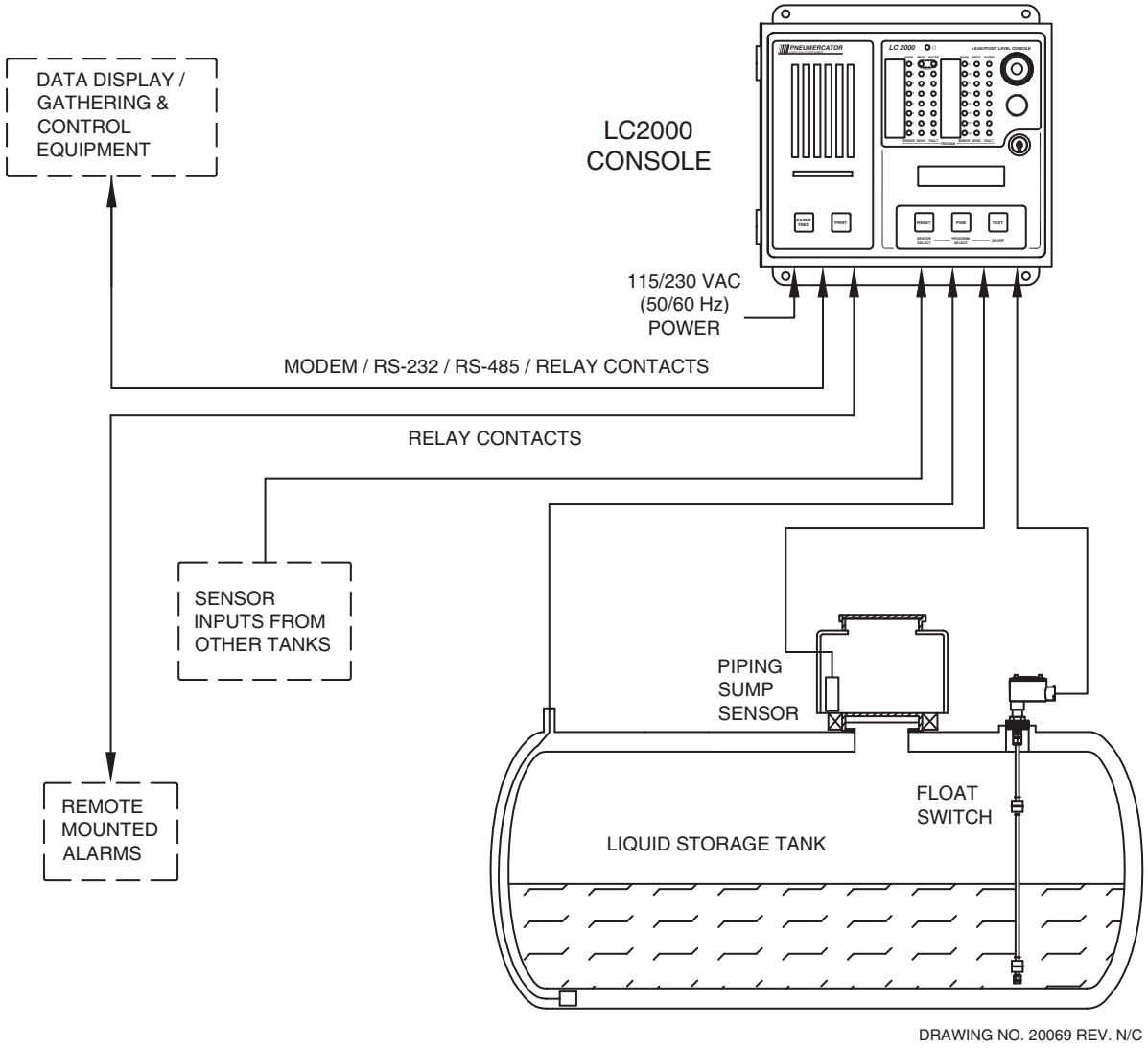


Figure 1-1 - Typical System Block Diagram

1.2 CONTROL CONSOLE DESCRIPTION

Figure 1-2 illustrates the standard LC2000 outline and dimensions. All standard configurations are equipped with either 4, 8, 12 or 16 sensor inputs, 1 RS-232 serial port, 1 RS-485 serial port, 2 Fully programmable relay outputs/2 dry contact closure inputs and NEMA 12 enclosure. Additional relays, printer and various communications option card(s) may also be installed.

The front panel of the LC2000 is available in four different configurations as listed below:

LC2000-1... Console without display or printer
LC2000-2... Console with display, no printer
LC2000-3... Console with display and internal printer
LC2000-4... Console with display and internal printer w/autowinder

⚠ WARNING

Installation MUST be done by qualified personnel familiar with local wiring codes and explosion hazard electrical safety practices. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

The standard LC2000 console enclosure is NEMA 12-rated for indoor installation. An optional NEMA 4/4X enclosure is available for outdoor installation. Confirm enclosure rating on the approval label located on the exterior, left-hand side of the enclosure before installation outdoors. See Figure 1-2 below for mounting flange locations and dimensions.

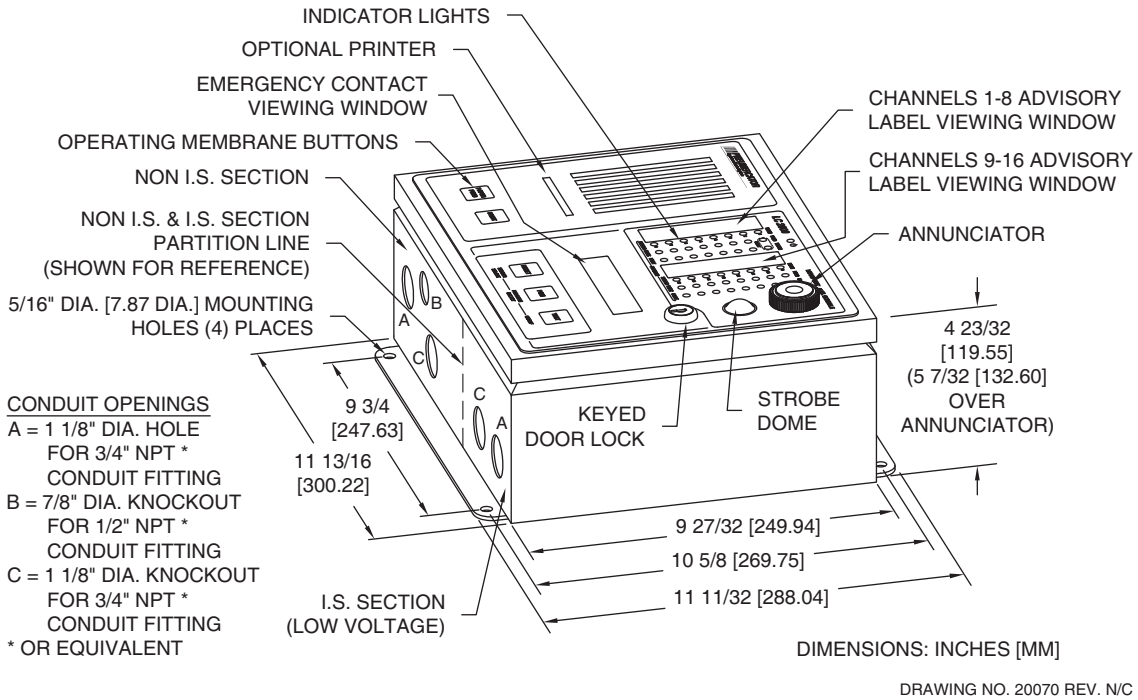


Figure 1-2 - LC2000 Console Outline

⚠ WARNING

The console is designed for Ordinary Location, Non-Hazardous installation only, as defined by Underwriters Laboratories (UL) and the National Electrical Code (NEC). DO NOT install where flammable vapors may be present. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

The console should be located in an area that is easily accessible to the personnel responsible for operation and maintenance of the system. Metal conduiting is recommended and may be required by local codes. All outdoor conduits must be watertight.

All conduit entries are provided on the bottom of the enclosure. Remove conduit knockouts only for those entries being used. If a knockout is removed but the entry will not be used, it must be sealed with an appropriate plug.

⚠ WARNING

Do not drill or modify enclosure. Use only knockouts provided. FAILURE TO COMPLY WILL VOID WARRANTY AND MAY PRESENT A SAFETY HAZARD RESULTING IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

⚠ WARNING

Conduit entries must only be used for their designated purpose in order to assure safe operation and to maintain safety certification. FAILURE TO COMPLY WILL VOID WARRANTY AND MAY PRESENT A SAFETY HAZARD RESULTING IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

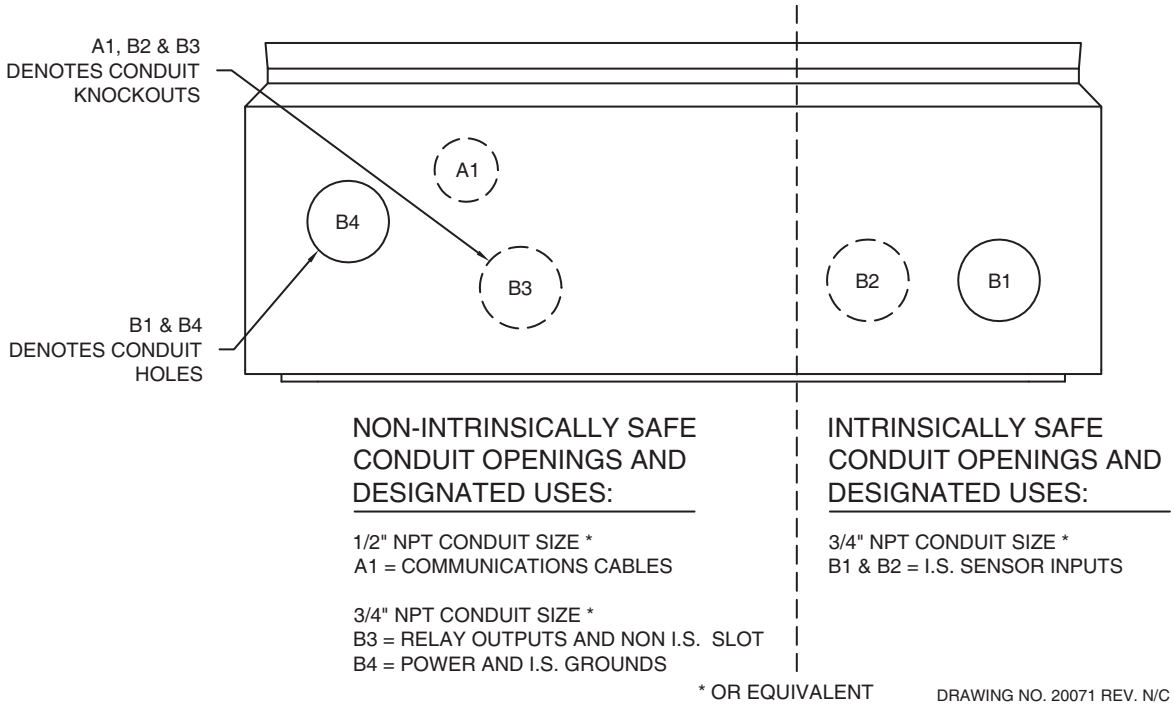


Figure 1-3 - LC2000 Designated Conduit Locations

1.3 AVAILABLE SENSOR TYPES

As described in Section 1.1, the LC2000 will interface to all of the TMS series sensor model types, including discriminating and non-discriminating electronic or mechanical secondary containment leak sensors as well as single and multi-point level float sensors. Figures 1-4 through 1-8 show five (5) typical sensor types offered by Pneumercator. Other non-Pneumercator mechanical types may be used; however, their use with LC2000 should be approved prior to attempting to wire them into the system.

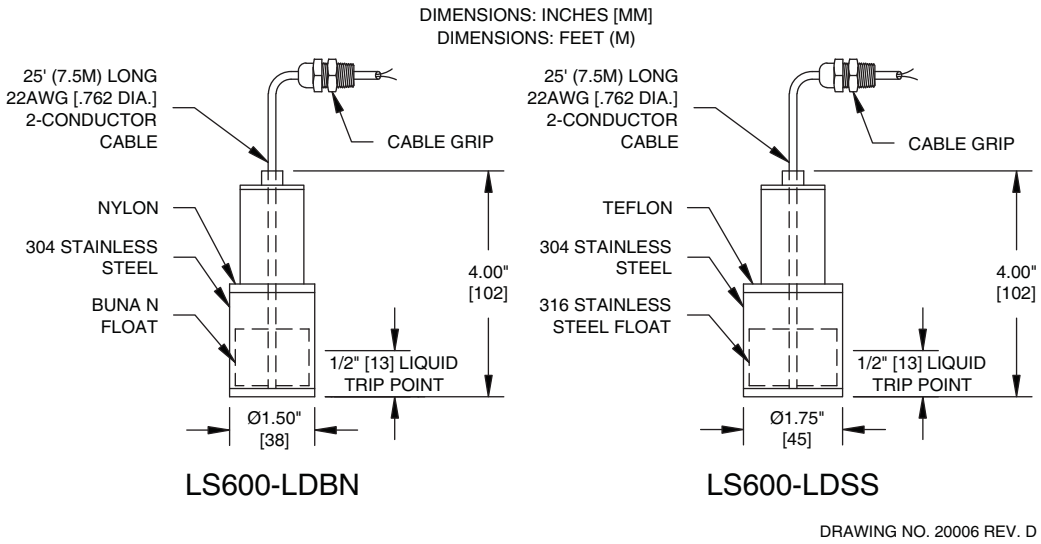


Figure 1-4 – LS600 LD Series

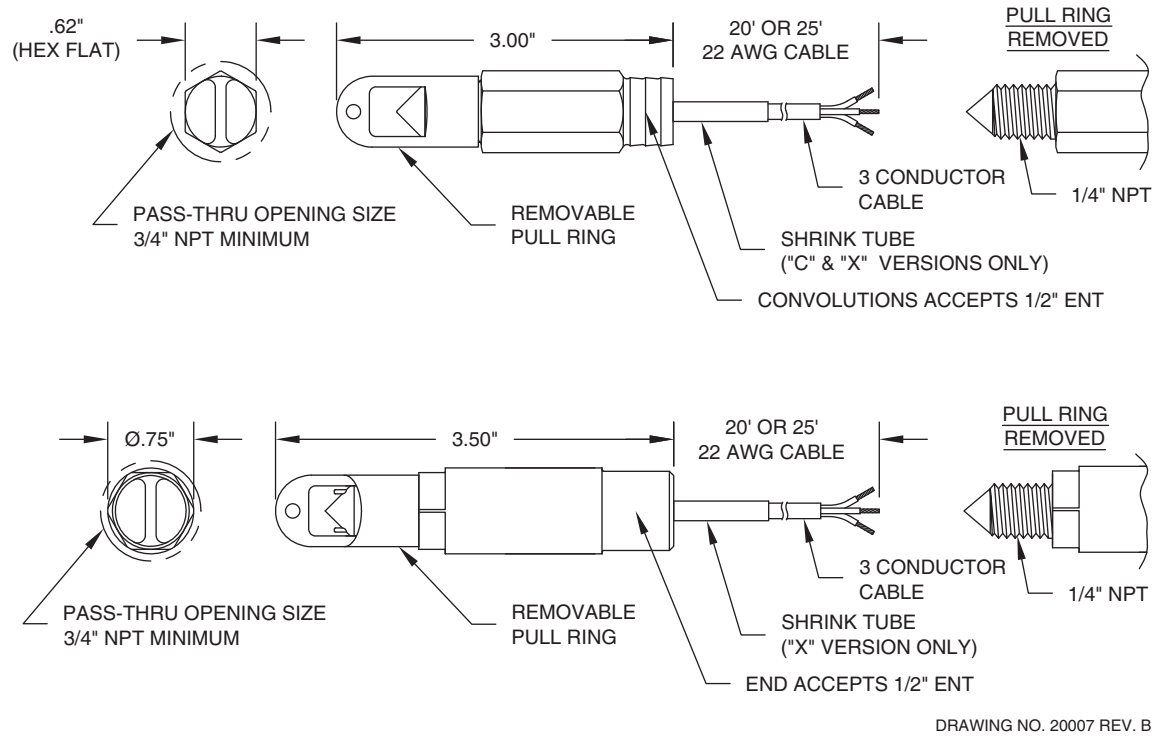


Figure 1-5 – ES825 Series

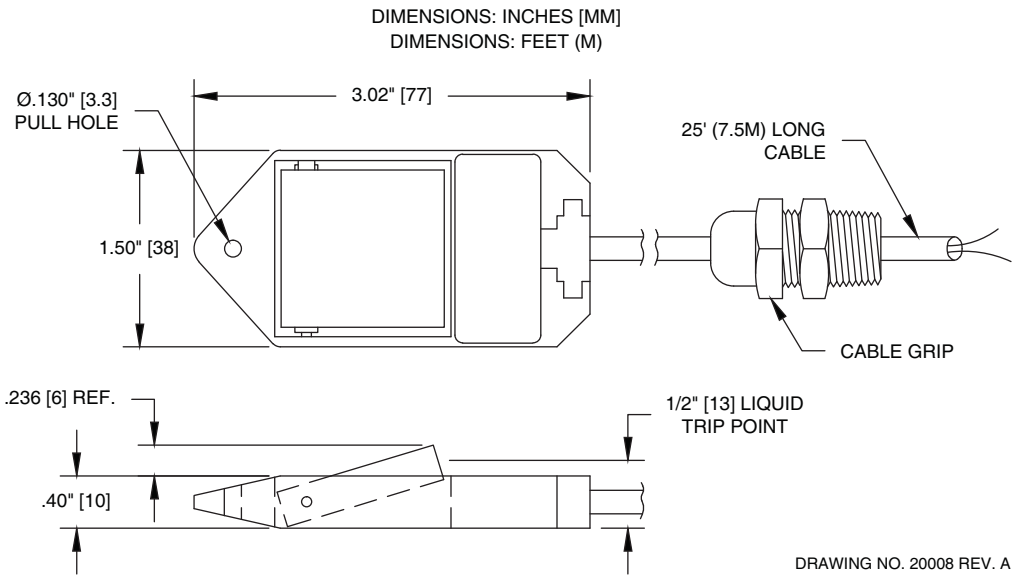


Figure 1-6 – LS610

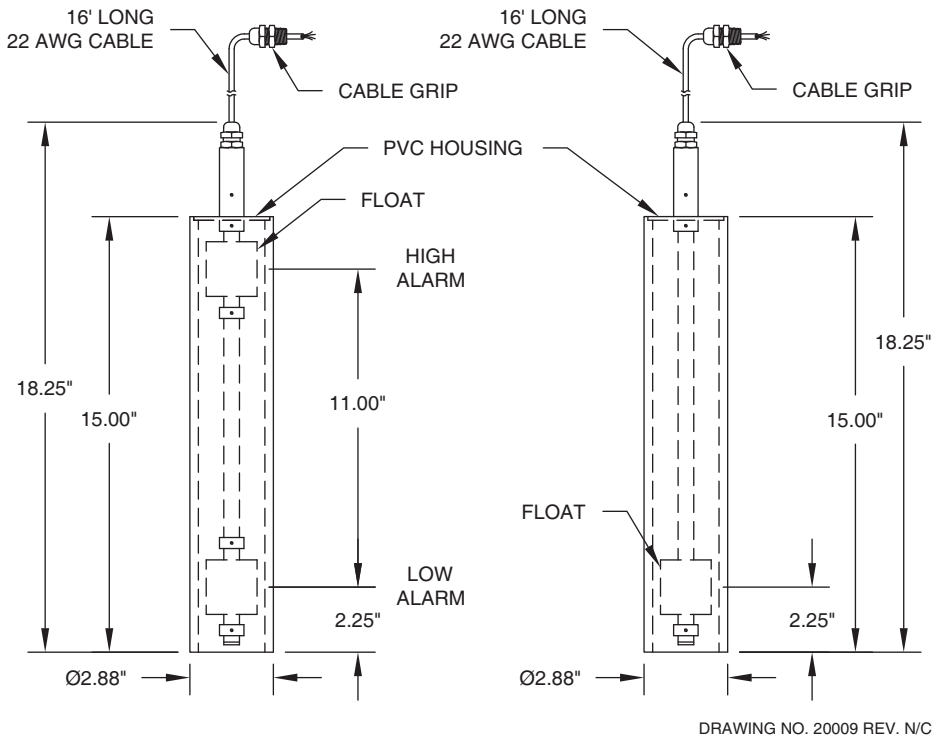
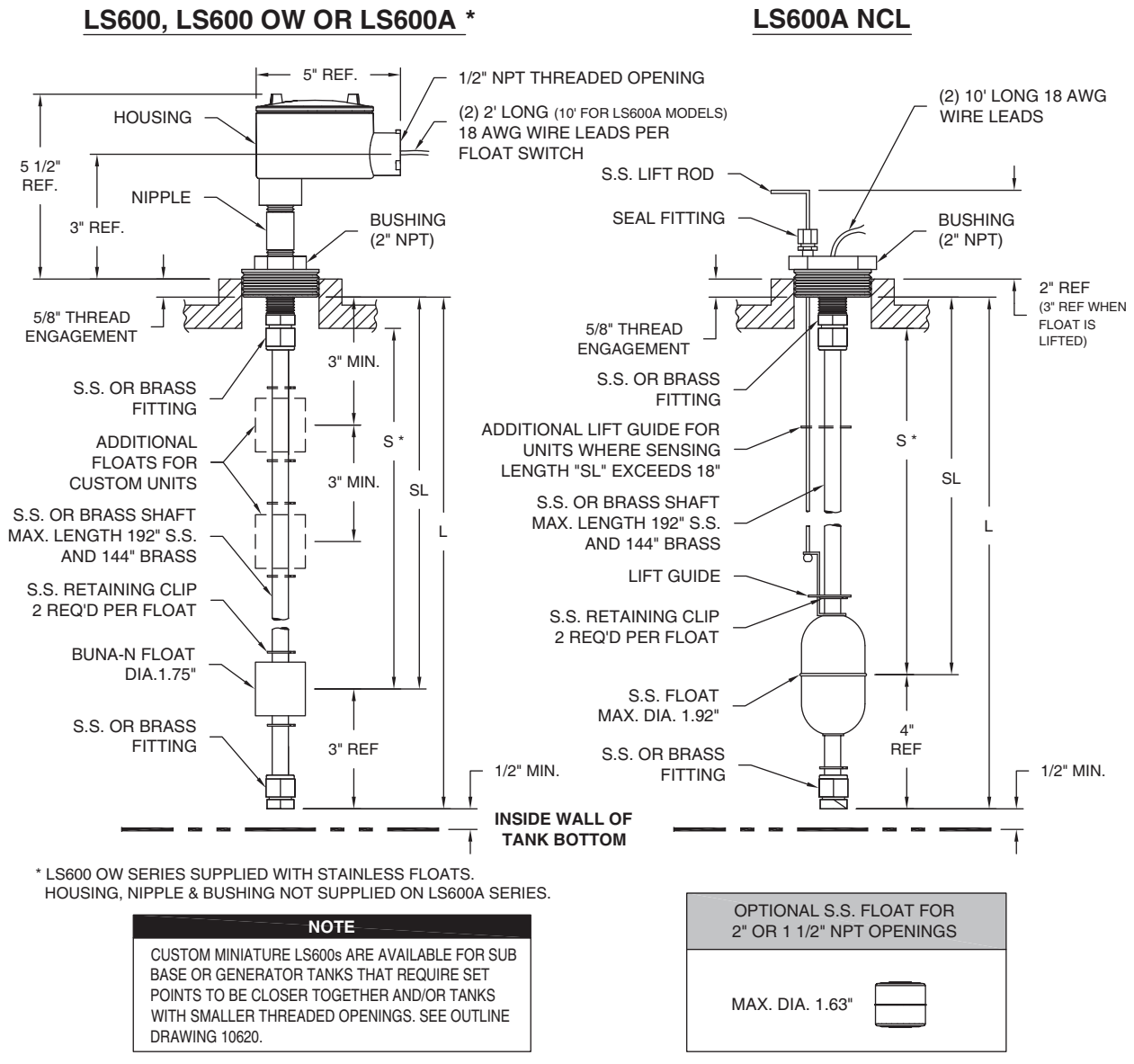


Figure 1-7 – RSU800



* LS600 OW SERIES SUPPLIED WITH STAINLESS FLOATS.
HOUSING, NIPPLE & BUSHING NOT SUPPLIED ON LS600A SERIES.

NOTE

CUSTOM MINIATURE LS600s ARE AVAILABLE FOR SUB BASE OR GENERATOR TANKS THAT REQUIRE SET POINTS TO BE CLOSER TOGETHER AND/OR TANKS WITH SMALLER THREADED OPENINGS. SEE OUTLINE DRAWING 10620.

OPTIONAL S.S. FLOAT FOR
2" OR 1 1/2" NPT OPENINGS

MAX. DIA. 1.63"

DRAWING NO. 20057 REV. A

Figure 1-8 – LS600

SECTION 2 – INSTALLATION DETAILS

2.1 INSTALLATION CHECKLIST

⚠ WARNING

Do NOT apply power to the LC2000 until its installation has been checked and found to be in accordance with these instructions; National Electric Code; Federal, State and Local codes; and other applicable safety codes. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

The following points should be reviewed in preparation for installation, and again when installation is complete.

1. Review Figure 3-1 to ensure that all of the safety/wiring requirements have been met.

2. Check that all equipment at job site matches the DESIGN DRAWING SPECIFICATIONS for the tank sizes and control features required.

3. The console should be located as close as possible to the demarcation point of the hazardous area. **Never mount inside the hazardous area.**

4. POWER to the console should be properly wired to a DEDICATED 120/240 VAC CIRCUIT BREAKER. No other equipment can be powered from the same circuit breaker as the LC.

5. System cannot be connected to equipment that uses or generates more than 250 volts with respect to earth.

6. All LC2000 grounds must be terminated at the GND BUSS BAR in the same service panel as LC2000 power. A grounding rod, coldwater pipe or other connection should not be used. Refer to Figure 3-3 for illustrated details.

7. **Do not drill or modify enclosure.** Use only knockouts provided. Failure to comply will void warranty and may present a safety hazard.

8. I.S. cabling should be selected from the Cable Selection Chart in Figure 3-2. Each sensor wire/cable run SHOULD NOT EXCEED THE MAXIMUM DISTANCE RATING ON THE CABLE SELECTION CHART. Color-coding or numbering is highly recommended.

9. WATERPROOFING FIELD WIRE SPLICES using factory supplied splice kits is required for proper system operation.

2.2 CONTROL CONSOLE INSTALLATION

Console location should be selected for the operator's convenience, or as specified on the DESIGN DRAWINGS. DO NOT install the console in a hazardous-classified location.

⚠ WARNING

The console is designed for Ordinary Location, Non-Hazardous installation only, as defined by Underwriters Laboratories (UL) and the National Electrical Code (NEC). DO NOT install where flammable vapors may be present. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

Select a flat wall surface and prepare it with four wall-mounting inserts to accept up to 1/4-inch size bolts. Allow sufficient room for door to open and for conduit runs to enter ONLY THE CONSOLE BOTTOM. See Figure 1-2 for console dimensions.

Note that the console is divided into two electrical areas:

NON-INTRINSICALLY SAFE (LEFT SIDE)	INTRINSICALLY SAFE (RIGHT SIDE)
for Power, Relay Control and Communications	for Sensor Inputs

Figure 2-1 shows the console interior, again indicating intrinsically safe and non-intrinsically safe separation. **THIS SEPARATION MUST BE MAINTAINED**. Also, conduits containing sensor wiring may **NOT** be co-mingled with **ANY** other wiring, regardless of voltage. Refer to Section 3 for electrical conduit and wiring.

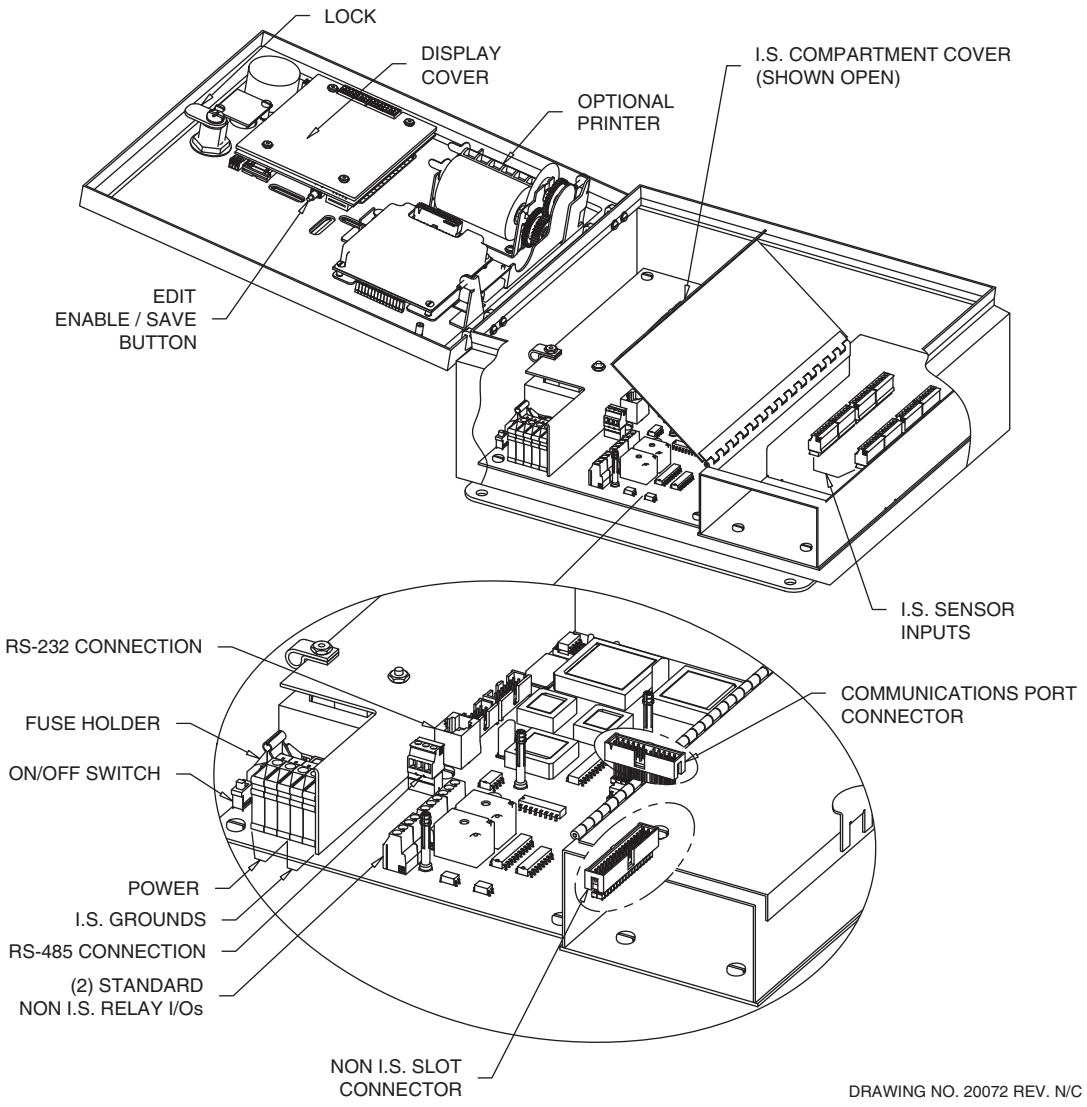


Figure 2-1 - Control Console Interior

2.3 SENSOR INSTALLATION - GENERAL

The interstitial or double-wall space of steel tanks and vaulted tanks as well as many other secondary containment areas can be fitted with either DISCRIMINATING or NON-DISCRIMINATING leak sensors. Also, for float type sensors, switch actuation may be factory set for either NORMALLY OPEN or NORMALLY CLOSED.

NOTE: For convenience, installation information for most sensors is provided in the following sections. However, it is recommended that the installer refer to the installation instructions provided with each sensor for more detailed or possibly more current information.

2.3.1 LEAK SENSOR INSTALLATION IN STEEL AND VAULTED TANKS

Check the specific design drawings for the job, or choose the sensor type desired from Figures 1-4 and 1-5. Install sensor per Figure 2-2 as follows:

1. Remove the watertight CORD CONNECTOR supplied by sliding it off the sensor cable.
2. Thread the watertight CONNECTOR into the top of a 2" by 1/2" reducer bushing or monitor pipe cap pre-tapped for a 1/2" NPT hole. (The use of any standard monitor cap from 2" to 4" pipe size is recommended. The cap or reducer bushing IS NOT SUPPLIED with the sensor and must be provided by the installer).
3. Measure the "MOUNTING HEIGHT" from top to bottom of monitoring pipe.
4. Feed the sensor cable through the watertight CONNECTOR from the BOTTOM SIDE of the REDUCER (or CAP) fitting to a cable length suitable for the MOUNTING HEIGHT; or to allow sensor to rest on the monitor pipe bottom; or as required by local codes. Cable may be cut or extended to proper length.
5. Re-tighten the CORD CONNECTOR to fix the sensor cable length.
6. Mate the REDUCER or CAP to the top of the monitor pipe. Tighten the CONNECTOR to ensure a WATERTIGHT SEAL.
7. Route the sensor cable to the junction box and complete the wiring installation in accordance with Section 3.

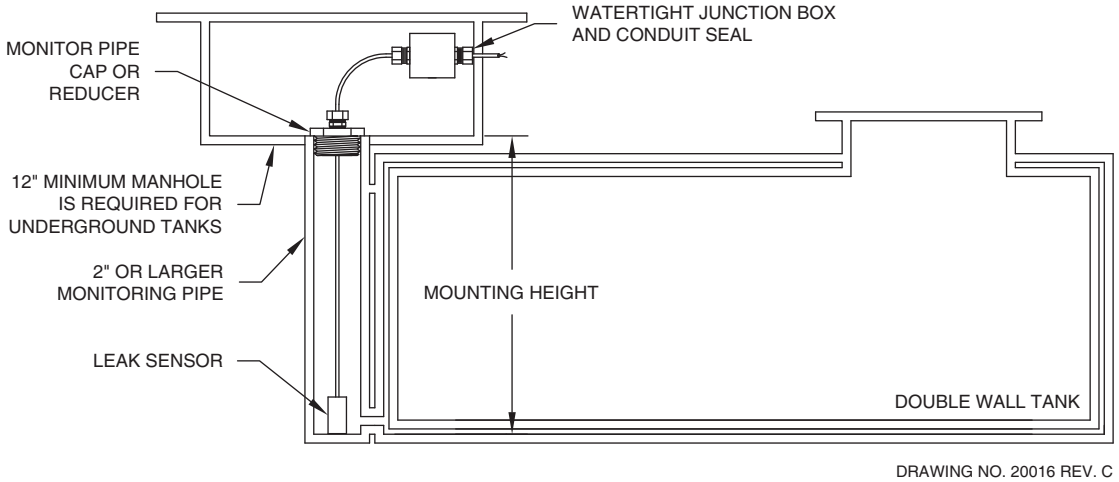


Figure 2-2 - Leak Sensor Installation - Steel Vaulted Tanks

2.3.2 LEAK SENSOR INSTALLATION IN PIPING SUMPS AND DISPENSER PANS

Check the specific design drawings for the job, or choose the sensor type desired from Figures 1-4 and 1-5. Install sensor per Figure 2-3 as follows:

1. Measure the "MOUNTING HEIGHT" from conduit or junction box to the bottom of the SUMP (or MANHOLE, VAULT or DISPENSER PAN).

2. Feed the sensor cable through the watertight CONNECTOR to length suitable for the MOUNTING HEIGHT; or to allow sensor to rest on the containment bottom; or as required by local codes. Feed an additional 12 inches past the CONNECTOR for splicing inside the junction box; cable may be cut to proper length.

3. Thread the CONNECTOR into the WATERTIGHT JUNCTION BOX and tighten the CONNECTOR cord grip over the cable to insure a WATERTIGHT SEAL. The sensor should rest on the containment floor or as required by local codes.

4. Complete the wiring installation in accordance with Section 3.

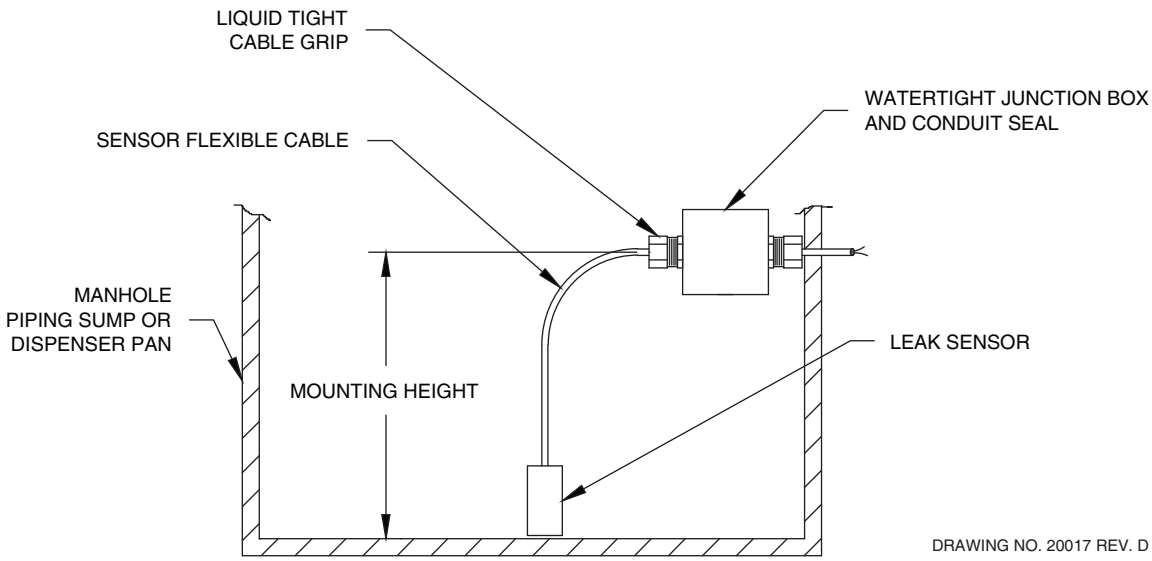


Figure 2-3 - Leak Sensor Installation in Piping Sumps, Manholes, and Dispenser Pans

2.3.3 LEAK SENSOR INSTALLATION IN FIBERGLASS TANK ANNULUS

The annular space of fiberglass tanks can be fitted with either a "DRY ANNULUS" type sensor, models ES825 (Figure 1-5) and LS610 (Figure 1-6), or a "WET RESERVOIR" sensor model RSU800 (Figure 1-7). The wet reservoir is also referred to as the HYDROSTATIC METHOD. Check the specific design drawings for the job, or choose the type sensor desired from Figures 1-5 through 1-7. Install sensor per Figures 2-4 or 2-5.

Instructions per Figure 2-4, DRY ANNULUS SENSOR:

1. Calculate the sensor cable's MOUNTING LENGTH from tank size data so the sensor rests at tank bottom; or use the following method.

   Determine the cable's MOUNTING LENGTH by adding the cable measurement M from the table at the right to the RISER HEIGHT. Mark the cable at that length. **DO NOT CUT THE CABLE.**

2. Remove the watertight CORD CONNECTOR supplied by sliding it off the cable.

3. Thread the CONNECTOR into the top of a 2" by 1/2" reducer bushing or riser pipe cap pre-tapped for a 1/2" NPT hole. (The use of any standard monitor cap from 2" to 4" pipe size is recommended. The cap or reducer bushing IS NOT SUPPLIED with the sensor and must be provided by the installer).

4. At riser top, attach the annular space PULL CORD (this is part of the tank supplier's pre-installed accessories) to the sensor's PULL HOLE.

CABLE MEASUREMENT FROM END OF SENSOR

Tank Dia.	Cable M
4 Feet	81 in.
6 Feet	118 in.
8 Feet	150 in.
10 Feet	194 in.
12 Feet	222 in.

5. Pull the free end of the PULL CORD out of the riser while feeding the sensor into the riser and through the annular space until the sensor is at the bottom centerline of the tank. The MOUNTING LENGTH MARK should be about 5 INCHES above the open riser. Adjust its position as necessary and, without disconnecting the PULL CORD, coil its excess inside the riser pipe.

6. Feed the sensor cable through the BOTTOM of the riser cap (or bushing), and through the CORD CONNECTOR while positioning cap over the riser pipe. Mate riser and cap.

7. Tighten CONNECTOR over the cable to ensure a WATERTIGHT SEAL.

8. Complete the wiring installation in accordance with Section 3.

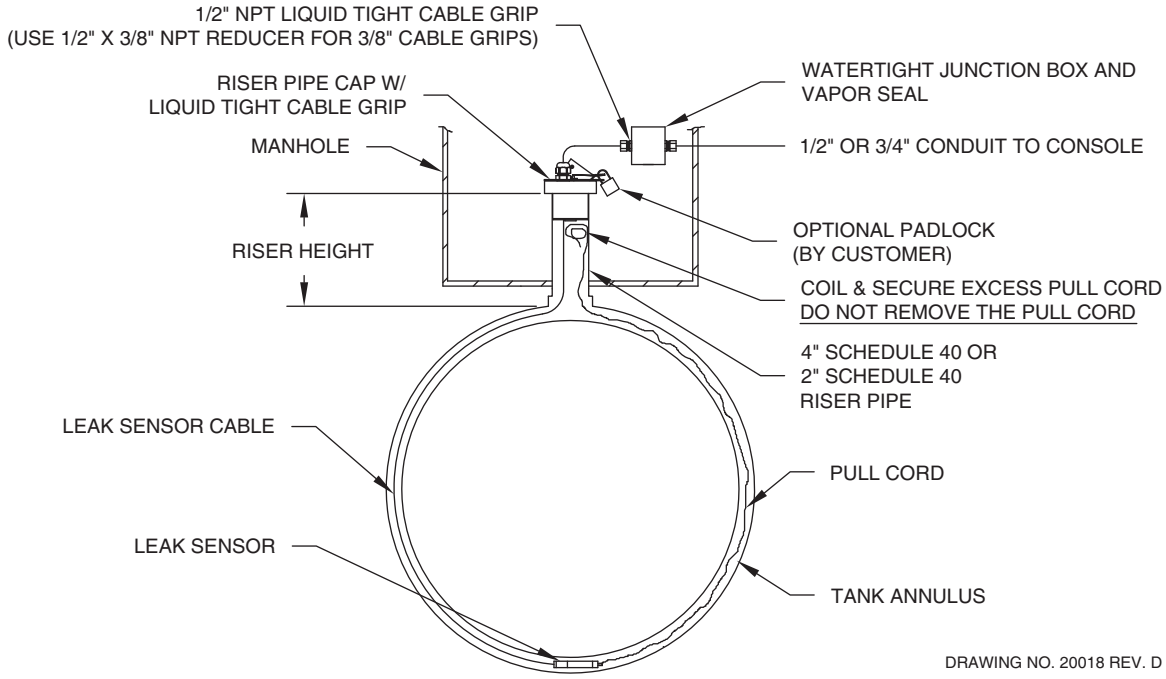


Figure 2-4 - Dry Leak Sensor Installation in Fiberglass Tanks

2.3.4 HYDROSTATIC LEAK SENSOR INSTALLATION IN FIBERGLASS TANK RESERVOIRS

The model RSU800 sensor uses a dual float that senses a HIGH and LOW liquid level within the reservoir. If a tank leak occurs through either wall of the DOUBLE-WALL tank the liquid level in the reservoir changes. When it reaches the upper or lower limits of the sensor a contact closure is transmitted to the control console.

Instructions per Figure 2-5, HYDROSTATIC LEAK SENSOR:

1. The tank reservoir should be fitted with a 4 inch RISER PIPE and CAP, supplied by THE INSTALLER. The riser should be at least 12 inches long as measured from the reservoir opening. The riser cap may be any standard type, but as a minimum it should have a 3/8" NPT tapped hole to accept the CORD GRIP CONNECTOR SUPPLIED BY PNEUMERCATOR, or contain its own suitable cord grip. (An alternate method is to drill and tap the wall of the riser pipe). The use of a riser cap with a VENT TUBE is only recommended where local installation requires one.

2. If the riser cap does not contain its own cord connector, thread the PNEUMERCATOR SUPPLIED CONNECTOR into the tapped hole using sealing compound as required. (Alternately, the CONNECTOR may be threaded into the sidewall of the riser).

3. Slowly lower the sensor into the riser until it rests on the reservoir bottom. The top portion should extend into the riser pipe for support from tipping over. The liquid level in the reservoir should be at about 7 inches up the sensor's height for optimum performance. (See Figure 1-7 for float travel set point limits).

4. Feed the sensor cable through the BOTTOM of the riser cap (or pipe wall), and through the CORD CONNECTOR. Leave just enough slack inside the riser pipe so the sensor remains on the bottom, and will not tip over.

5. Mate the riser and cap; tighten the CONNECTOR over the cable to ensure a WATERTIGHT SEAL.

6. Complete the wiring installation in accordance with Section 3.

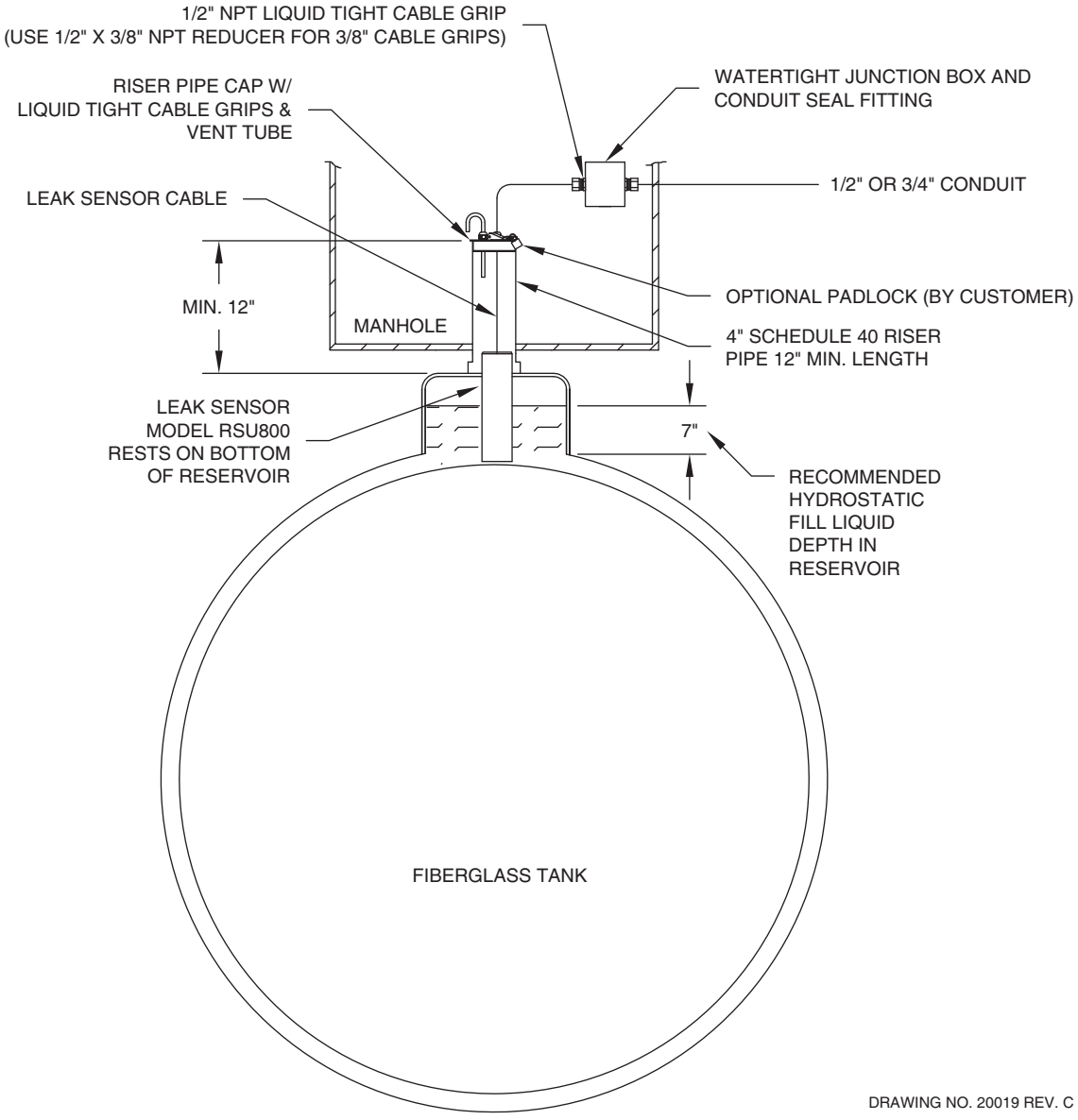


Figure 2-5 - Hydrostatic Leak Sensor Installation in Fiberglass Tanks

SECTION 3 – WIRING INSTALLATION AND DIAGRAMS

⚠ CAUTION

Sensors connected to the LC2000 are usually installed in explosion hazard areas typical of liquid hydrocarbon fuel tanks. For these applications, it is CRITICAL that electrical conduit and wiring be installed by qualified installers familiar with all provisions of the National Electrical Code relating to equipment intended for use in EXPLOSION HAZARD areas. The primary concern is to maintain physical separation between intrinsically safe and non-intrinsically safe wiring by running separate conduit attached to the control console at the designated knockouts. ALL conduits carrying sensor wiring into the hazardous area MUST be fitted with standard vapor seal-off fittings at all field junction boxes and again where the conduit first enters the non-hazardous area. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

3.1 SYSTEM INTRINSIC SAFETY WIRING (SENSOR WIRING)

Figure 3-1 illustrates wiring installation requirements that must be followed in order to establish and maintain an intrinsically safe installation. Careful attention must be given to maintaining mechanical segregation between intrinsically safe and non-intrinsically safe wiring throughout the installation.

SENSOR WIRING INSTALLATION. Refer to Figures 1-4 through 1-8 for console conduit openings and specific sensors that will be wired into the LC2000 system. Install wiring as follows:

1. It is recommended that the conduit runs be mapped out prior to installation for best efficiency. The LC2000 provides two ¾" knockouts, each designated for up to eight (8) sensor cables. Rigid conduit is recommended, but local codes may have less stringent requirements.

⚠ CAUTION

All LC2000 sensor wiring may be run in the same conduit. NO OTHER WIRING MAY BE RUN IN THESE CONDUITS. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

2. At appropriate locations along the conduit runs (see Figures 2-2 through 2-5) install watertight couplings and approved VAPOR SEAL-OFF fittings.

3. At each sensor location install a WATERTIGHT ELECTRICAL JUNCTION BOX. Allow enough room around the sensor tank fitting for proper installation of the sensor and all conduit/junction box fittings, and for later removal if necessary.

4. Attach the conduit at the LC2000 console ONLY to one of the two ¾" conduit knockouts located on the bottom RIGHT SIDE designated for the sensors. Use NEMA 4 weathertight fittings for outdoor locations.

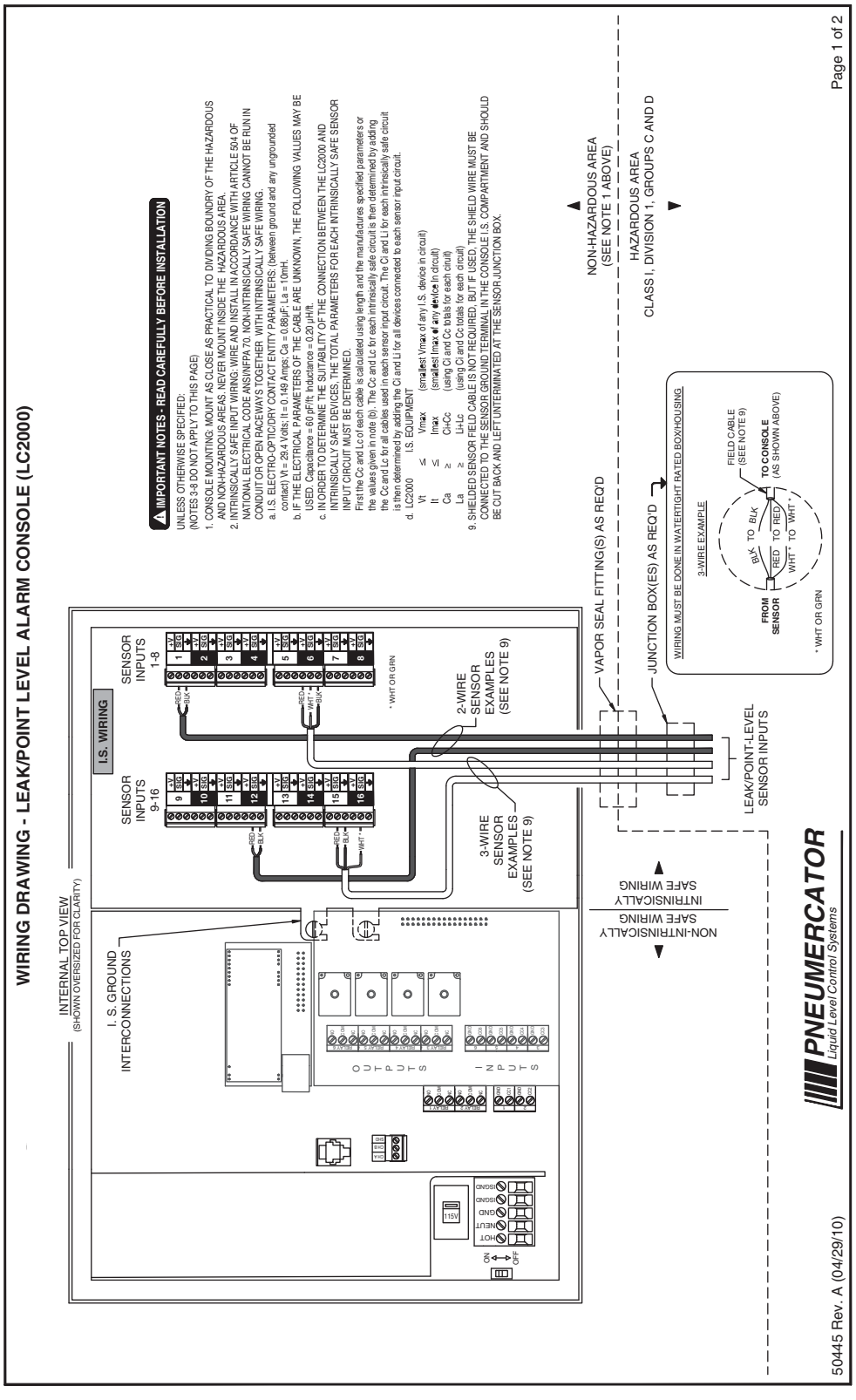


Figure 3-1a - Intrinsically Safe Wiring Diagram

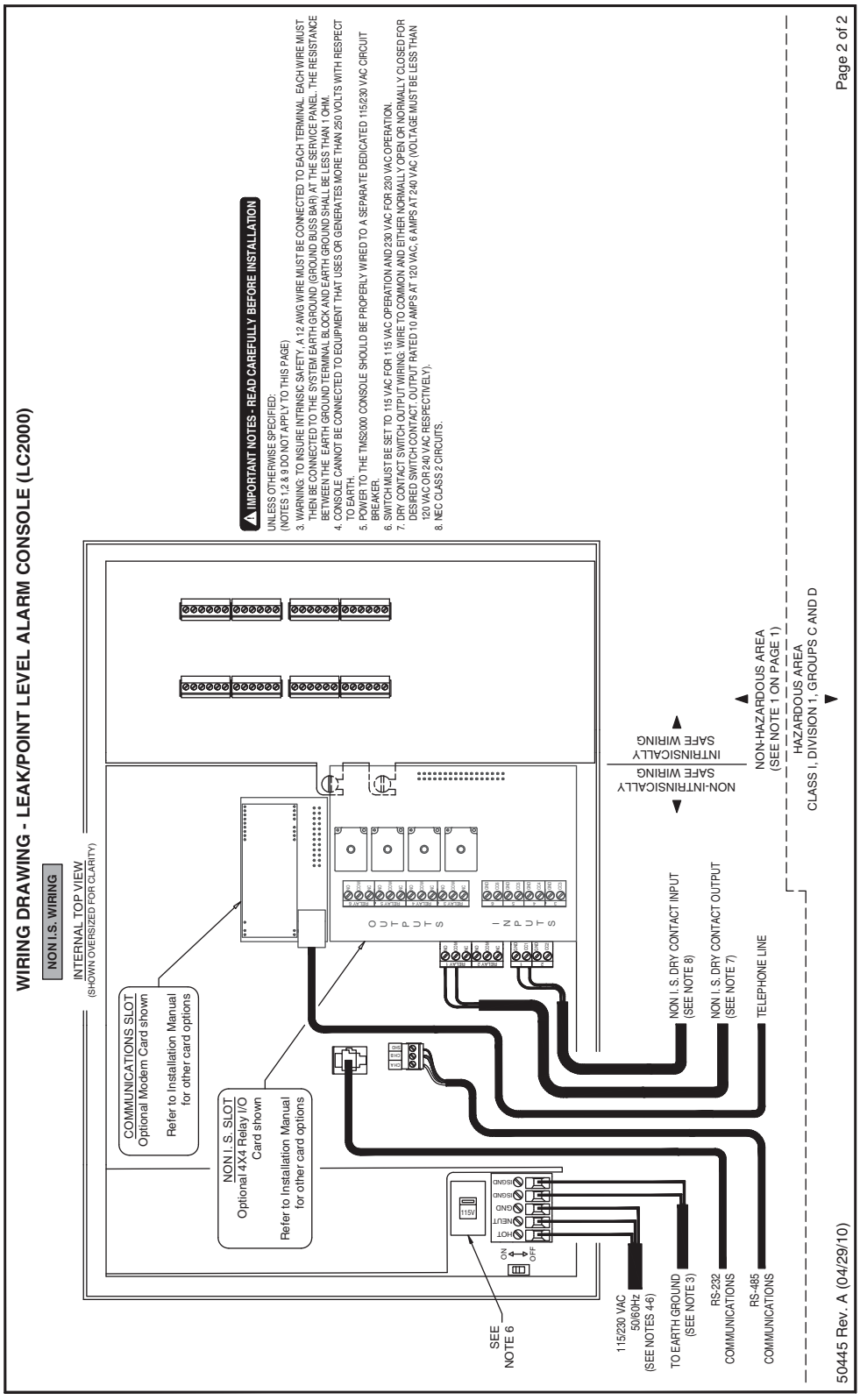


Figure 3-1b – Non-Hazardous Wiring Diagram

CABLE SELECTION GUIDE FOR INTRINSIC SAFETY

TYPE (SEE NOTE 2)	MANUFACTURERS BELDEN	ALPHA	COLOR CODE	GROUP C TOTAL LENGTH FEET (SEE NOTE 3)	GROUP C CHANNEL MAXIMUM LENGTH FEET (SEE NOTE 4)	GROUP D TOTAL LENGTH FEET (SEE NOTE 3)	GROUP D CHANNEL MAXIMUM LENGTH FEET (SEE NOTE 4)
3-WIRE OPTO-SENSOR ES825 series, ES820-100 (ELS-1100)							
NS	8443	1173C	BLK / RED / GRN (BELDEN) BLK / RED / WHT (ALPHA)	2700	2700	11300	5500
S	9608	6327	BLK / RED / WHT	2600	2600	11000	5500
S	-	2403C	BLK / RED / WHT	3800	3800	16000	5500
S, B	83553	-	BLK / REDIWHT	2700	2700	11000	5500

NOTES:

1.) ALL CABLES SPECIFIED HAVE A NOMINAL PAIR INDUCTANCE OF 0.2uH/FT.

2.) TYPE SPECIFIERS
NS = NON-SHIELDED
S = SHIELDED
B = DIRECT BURIAL (IF ALLOWABLE PER LOCAL CODES)

3.) TOTAL LENGTH:

LEAK SENSORS - TOTAL COMBINED CABLE LENGTH FOR ALL LEAK SENSORS

4.) CHANNEL MAXIMUM LENGTH: MAXIMUM CABLE LENGTH PER SENSOR.

5.) FOR OPTO-SENSORS, SHIELDED CABLE IS NOT REQUIRED, BUT IF USED IN THE APPLICATION, THE SHIELD MUST BE CONNECTED TO “SHD” TERMINAL IN CONSOLE I.S. COMPARTMENT.

LC2000 Cable Selection Guide.eps 01-17-07

Figure 3-2 - Intrinsically Safe Cable Selection Guide

5. Pull properly marked 2 or 3 conductor cable (depending on sensor requirements) for each sensor through the conduit leaving at least 24 inches excess at both console and junction box ends for final connections. The field wires must be resistant to hydrocarbon liquids; type THHN or MTW, 22 AWG is recommended.

6. Fill all conduit VAPOR SEAL-OFF FITTINGS with approved filling compound and tighten all conduit fittings.

7. Splice all sensor wires to the respective conduit wires at each WATERTIGHT JUNCTION BOX. (See Figure 3-4 for a recommended procedure). Maintain correct color-coding and polarity between wires.

8. Connect sensor wires to the LC2000 INPUT TERMINALS following Figure 3-1. Maintain correct polarity between wires and respective terminal points.

9. Sensors should be logically identified as to location and type and recorded on the sensor map provided in this manual, SECTION 3.6.

⚠ CAUTION

Sensor wires are to be connected ONLY to the designated input terminals of the INTRINSIC SAFETY compartment. Do NOT allow sensor wires to cross over into the non-intrinsically safe section. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

3.2 POWER WIRING INSTALLATION

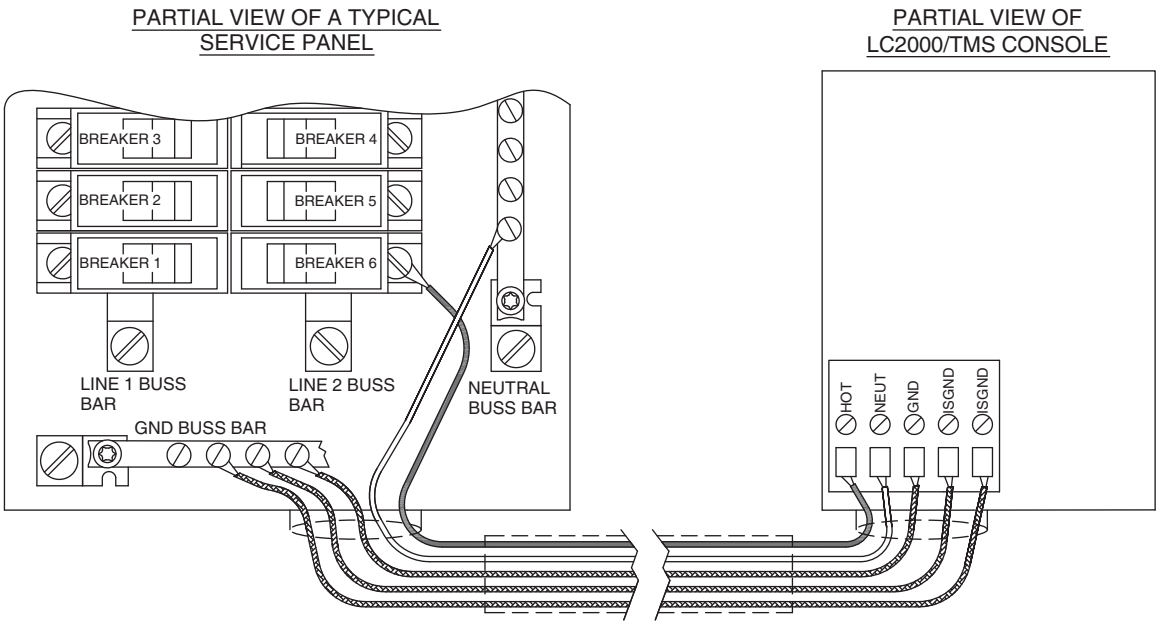
1. Confirm that the 115/230 VAC selector switch in the LC2000 is set correctly.

2. The LC2000 **MUST** be wired to a dedicated circuit breaker for intrinsically safe applications. This is an NEC code requirement for intrinsically safe apparatus. Wire in accordance with Figure 3-3 LC2000 AC WIRING.

3. The TWO (2) Intrinsically Safe (IS) grounds designated on the AC terminal block MUST be connected to EARTH GROUND at the service panel providing AC power. Connection must be made using 12AWG wiring providing a resistance to ground no greater than 1 ohm. Refer to Figure 3-3 LC2000 AC WIRING.

4. HOT, NEUTRAL, GND and the two IS GROUNDS should be run in the same ¾" conduit.

IMPORTANT! LC2000 AND TMS SERIES GROUND WIRING INSTRUCTIONS



NOTE:
ALL GROUNDS MUST BE TERMINATED AT THE GND BUSS BAR IN THE SAME SERVICE PANEL AS LC2000 AND/OR TMS POWER. A GROUNDING ROD, COLDWATER PIPE OR OTHER CONNECTION SHOULD NOT BE USED.

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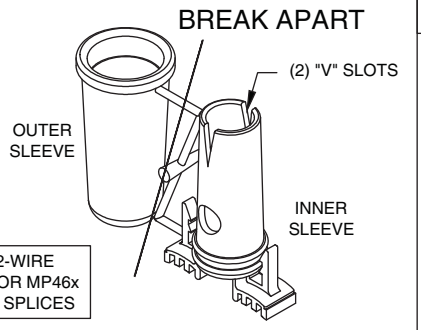
Figure 3-3 – LC2000 AC Power Wiring

3.3 SENSOR WIRING & SPLICES

WIRE SPLICE AND SEAL INSTRUCTIONS - 2 CONDUCTOR PAIRS KIT 10585-2

WARNING: USE CONNECTORS ONLY FOR THEIR DESIGNATED PURPOSE. DO NOT USE FOR AC WIRING.

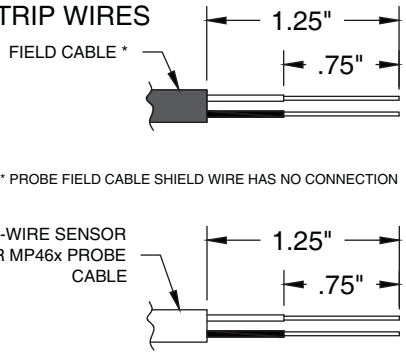
1



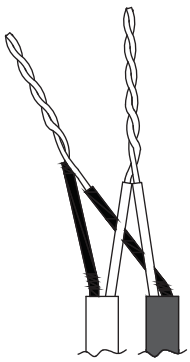
USE TO SEAL 2-WIRE SENSOR AND/OR MP46x PROBE CABLE SPLICES

SPLICE SEAL WIRE CONNECTOR PROVIDED BY PNEUMERCATOR

2 STRIP WIRES

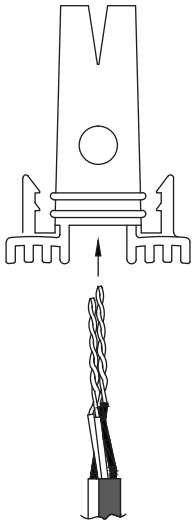


3



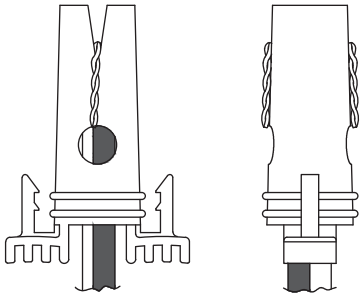
TWIST WIRES

4



INSERT

5



PULL ONE TWISTED LEAD PAIR THROUGH EACH "V" AND BEND OVER

6

SNAP ON OUTER SLEEVE

DO NOT ROTATE OR TWIST OUTER SLEEVE

DO NOT REUSE

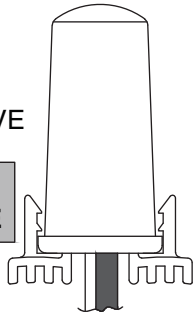


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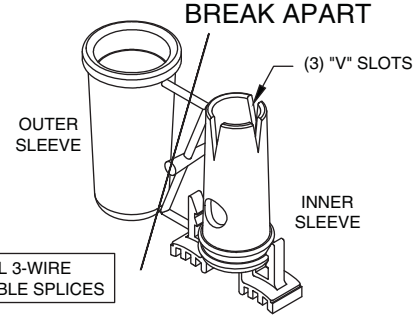
Figure 3-6 - 2-wire sensor Splice Kit Instructions

WIRE SPLICE AND SEAL INSTRUCTIONS - 3 CONDUCTOR PAIRS KIT 10585-3

WARNING: USE CONNECTORS ONLY FOR THEIR DESIGNATED PURPOSE. DO NOT USE FOR AC WIRING.

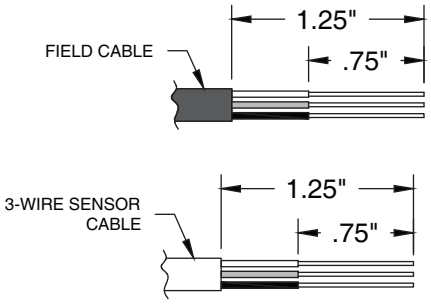
1 BREAK APART



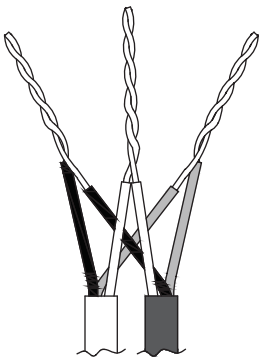
USE TO SEAL 3-WIRE SENSOR CABLE SPLICES

SPLICE SEAL WIRE CONNECTOR PROVIDED BY PNEUMERCATOR

2 STRIP WIRES

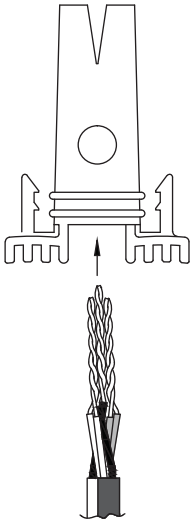


3



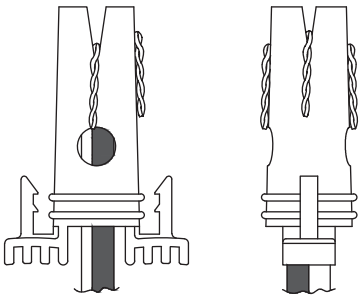
TWIST WIRES

4



INSERT

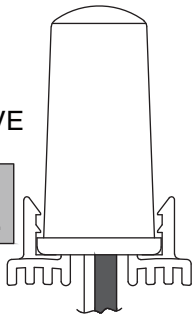
5



PULL ONE TWISTED LEAD PAIR THROUGH EACH "V" AND BEND OVER

6

SNAP ON OUTER SLEEVE



DO NOT ROTATE OR TWIST OUTER SLEEVE

DO NOT REUSE

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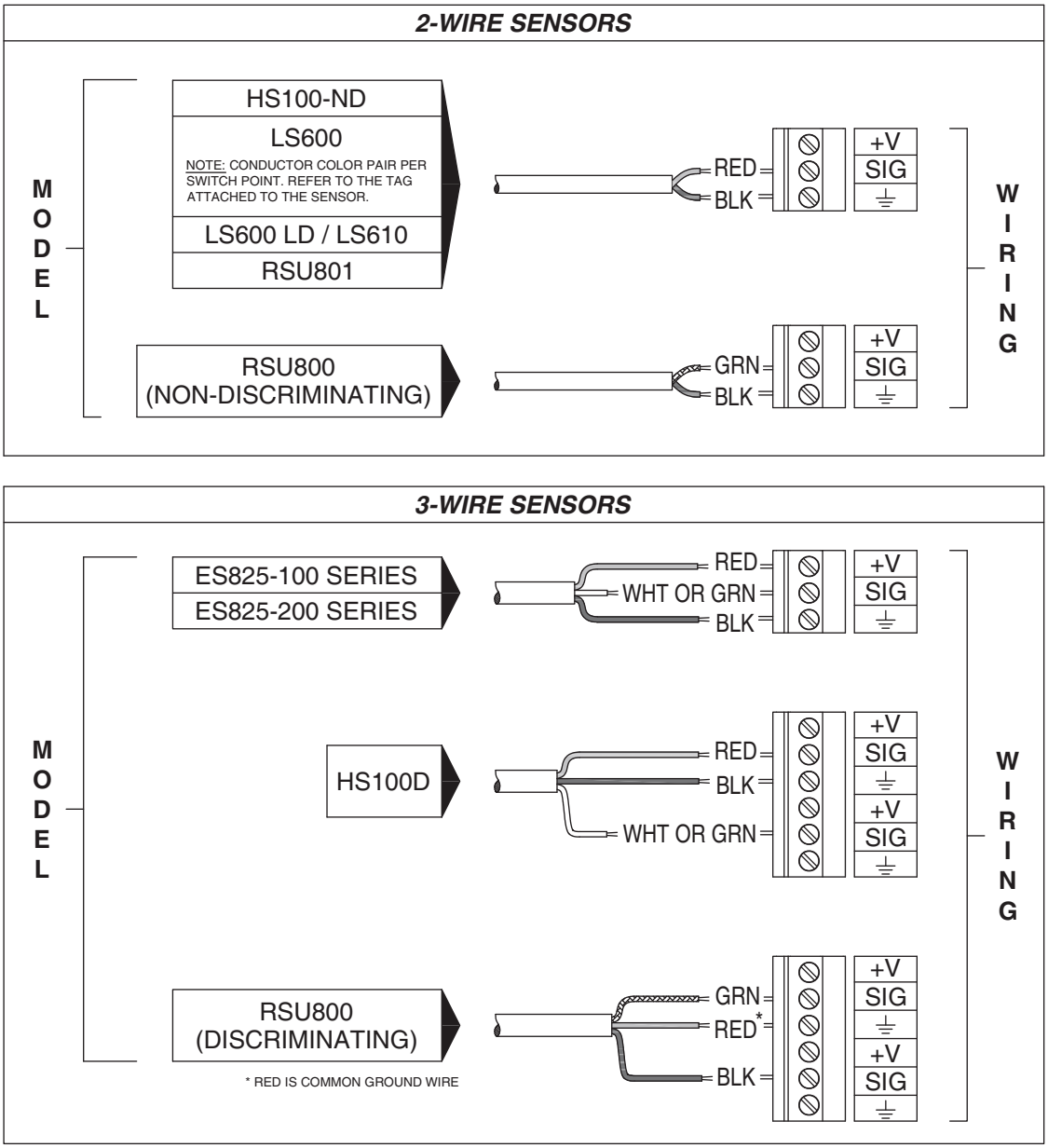
Figure 3-7 - 3-wire sensor Splice Kit Instructions

IMPORTANT! LC2000 SENSOR WIRING INSTRUCTIONS

IDENTIFY THE TYPE OF SENSOR(S) TO BE INSTALLED. WIRING MUST BE TERMINATED ON THE TERMINALS INDICATED BELOW TO ENSURE CORRECT OPERATION.



Questions? Contact Technical Support at (800) 209-7858

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Figure 3-8 - LC2000 sensor wiring

3.4 PROGRAMMABLE RELAY OUTPUTS/CONTACT CLOSURE INPUTS

The LC2000 provides dry contact closure inputs and relay contact closure outputs that are user-programmable via TMSComm communications interface. Each input is programmable for relay control and alarm functions as well as remote relay acknowledgement or gating functions. Each relay output is programmable to trigger on any combination of events, including leak or point level sensor alarm, contact closure input or system error. Additionally, relays are individually programmable for failsafe mode; delayed shutoff, latching for pump up/down controls. Typical relay applications include remote annunciation, pump and siphon break/flow control valve operation, and other user-defined switch closure inputs. These relays also provide a simple and straightforward interface to most programmable logic controllers, building management systems, and similar input monitoring devices.

The standard LC2000 includes two (2) dry contact closure inputs and two (2) relay contact closure outputs as illustrated in Figure 3-9 below. Also shown is an optional 4 Input/4 Relay Output Card. An optional 8 Input/8 Relay Output Card or 16 Relay Output Card are also available.

⚠ CAUTION

Relay output and contact closure input terminals are located on the NON-INTRINSICALLY SAFE side of the console. ALL wiring to these terminals MUST enter through the designated conduit opening. Refer to FIGURE 1-3. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

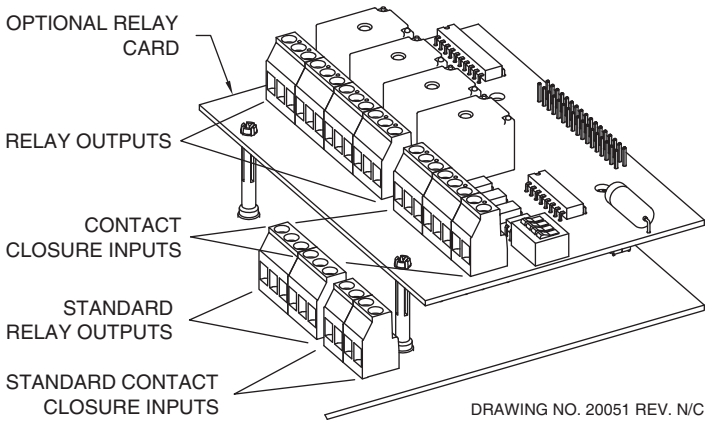


Figure 3-9 - Relay Output/Contact Closure Input Layout
(Optional 4 Relay Output/4 Contact Closure Input Expansion Card shown)

3.5 DATA COMMUNICATIONS WIRING

The non-intrinsically safe area is equipped with three (3) communications ports that are assigned as follows:

One (1) EIA RS-232 Interface to remote computer, PLC or external modem.

One (1) EIA RS-485 Interface to remotely located PNEUMERCATOR smart peripheral devices.

One (1) for use with an optional communications interface card. Available options include modem, fax/modem, Ethernet TCP/IP, ModBus RTU, LonWorks (w/gateway).

Figure 3-10 shows the locations of these connections.

⚠ CAUTION

All communication terminations are located in the NON-INTRINSICALLY SAFE side of the LC2000 console. ALL wiring to these terminals MUST enter through the designated conduit opening. Refer to FIGURE 1-3. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

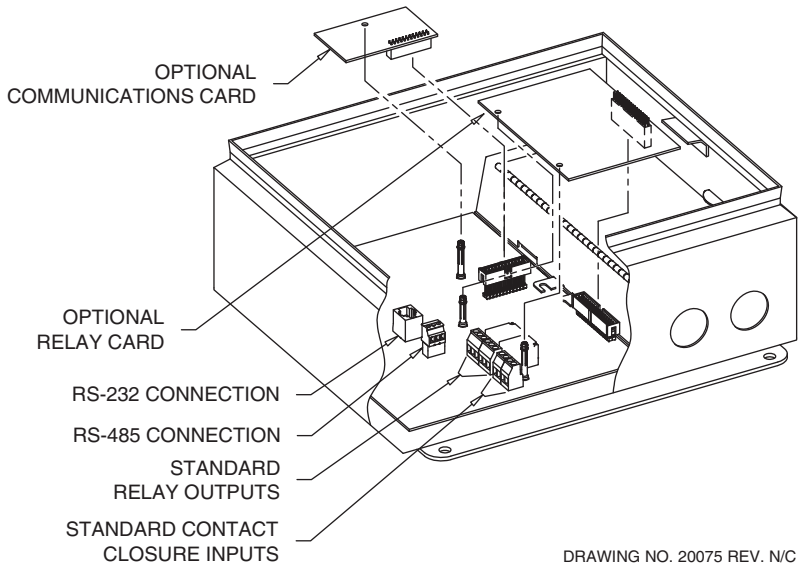


Figure 3-10 - Non-Hazardous Expansion Option Installation

3.6 LABEL INSERT CARRIER INSTRUCTIONS

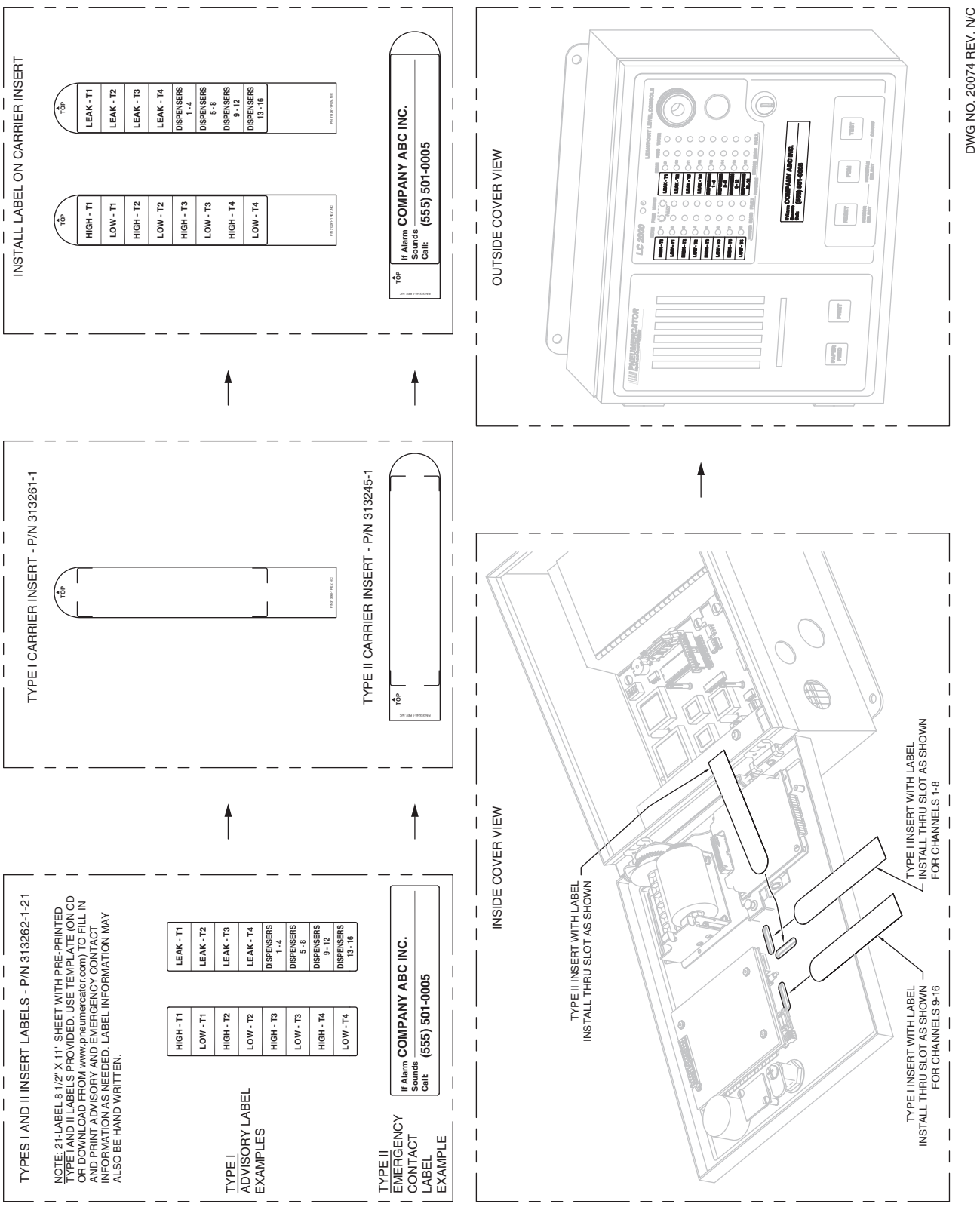


Figure 3-11 – Label Insert Carrier Instructions

3.7 INPUT/OUTPUT MAP

The INPUT/OUTPUT MAP below should be completed by the electrical installer as each sensor or contact closure input and relay control output function is wired to the LC2000 system. This will provide the equipment operator a means of identifying each field device for proper system setup programming and maintenance. The INPUT/OUTPUT MAP should be kept with the LC2000 console.

INPUT/OUTPUT MAP

INPUT #	SENSOR FUNCTION	SENSOR NAME
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

INPUT #	CONTACT CLOSURE(CC) INPUT FUNCTION	CC NAME
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

RELAY#	RELAY FUNCTION	RELAY NAME
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

PNEUMERCATOR LC SERIES

LIMITED WARRANTY

LC Series

Pneumercator, here and after referred to as **PCO**, warrants its **LC Series** family of products to be free of defects in material and workmanship for a period of **Twelve (12) months** from date of installation or **Fifteen (15) months** from date of invoice, whichever comes first.

During the warranty period on the **LC Series**, **PCO,** or factory third party independent representatives will repair or replace the product at the location where it is installed at no additional cost to the customer.

Packages must be inspected upon receipt for damage, missing parts, and/or manuals. **PCO** must be contacted by telephone immediately with a description of damaged or missing parts so replacements can be sent. Written details must be sent within **thirty (30) days.**

Pneumercator will not be responsible for shipping charges incurred by the customer.

Warranty repair coverage invoices will be paid if **all** the following conditions are met:

- PCO has acknowledged and authorized warranty work to be done by issuing a *Warranty Repair Number*.
- Start-up Service technician has been trained by PCO
- Warranty start-up form has been submitted to PCO
- Technician fills out and submits a PCO "Service Report"
- Parts (if any) used are returned to PCO with a proper WRGA (*Warranty Return Goods Authorization)*
- Returned parts are found to be defective.

Repair time will be paid according to PCO document "Standard Warranty Labor Charge Schedule"

If the Warranty Registration/Start up Check List has been completed and returned on file with the factory and the product is installed in accordance with the specific PCO Installation Product Manual, PCO will activate and meet warranty criteria as described above. Warranty criteria shall be voided if any product has been subjected to misuse, negligence, damage from acts of nature (lightning, wind, rain, etc.) or is in violation of the products design intent, disregard to warnings, instructions, modified or repaired by unauthorized personnel or improperly installed. Given that the third party independent contractor has installed the equipment in accordance with the specific product instruction manual, and followed all precautions, PCO will fulfill the terms stated in our warranty obligation.

Under no circumstances does the warranty provide a remedy in excess of the equipment. No other expressed or implied warranty is given by PCO. PCO shall not be liable for consequential damages or any expenses incurred by the user.

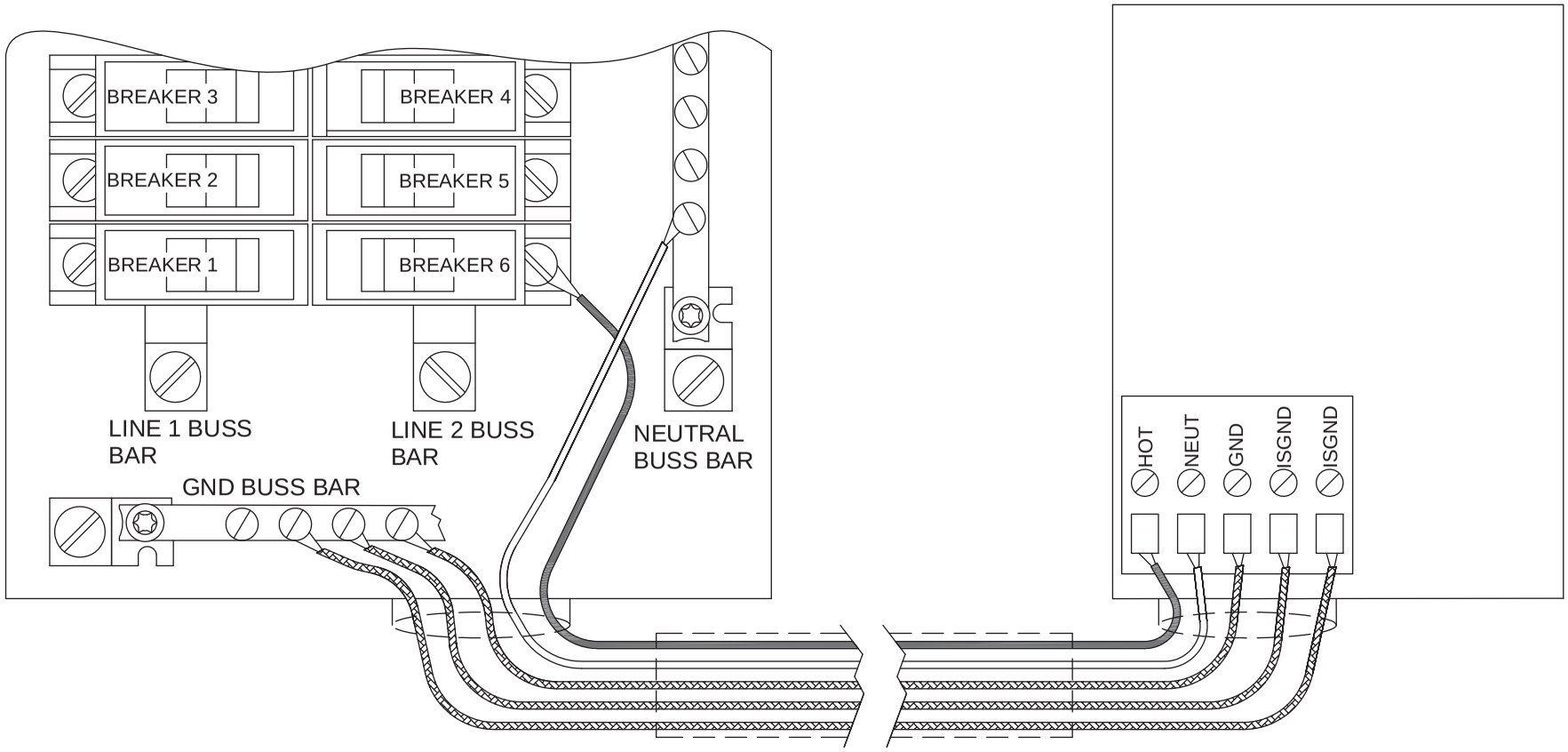
Distributed by:

PNEUMERCATOR
Liquid Level Control Systems
1785 Expressway Drive North
Hauppauge NY 11788
(631) 293-8450 Fax (631) 293-8533

IMPORTANT! LC2000 AND TMS SERIES GROUND WIRING INSTRUCTIONS

PARTIAL VIEW OF A TYPICAL SERVICE PANEL

PARTIAL VIEW OF LC2000/TMS CONSOLE



NOTE:
ALL GROUNDS MUST BE TERMINATED AT THE GND BUSS BAR IN THE SAME SERVICE PANEL AS LC2000 AND/OR TMS POWER. A GROUNDING ROD, COLDWATER PIPE OR OTHER CONNECTION SHOULD NOT BE USED.

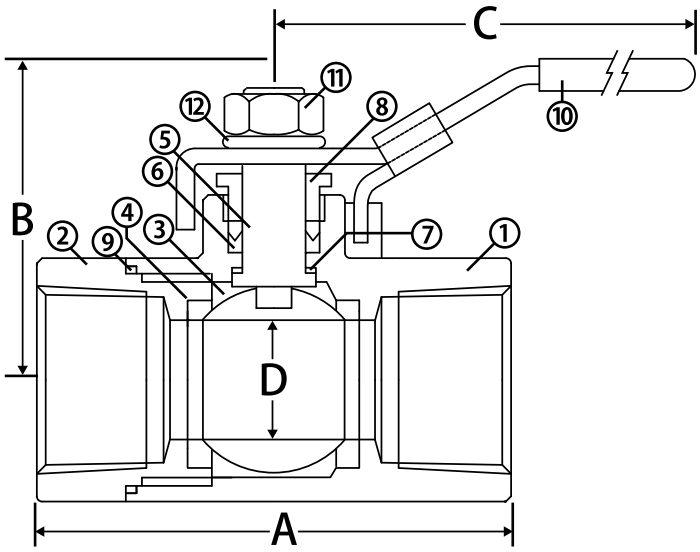
2.06 – VALVE AND ACCESSORIES

Padlocks with keys are not part of Shields Harper’s scope of supply.

Stainless Steel Ball Valve

2 Piece • Standard Port • Threaded Connection • 2000 WOG

T-SS-2000N



Features

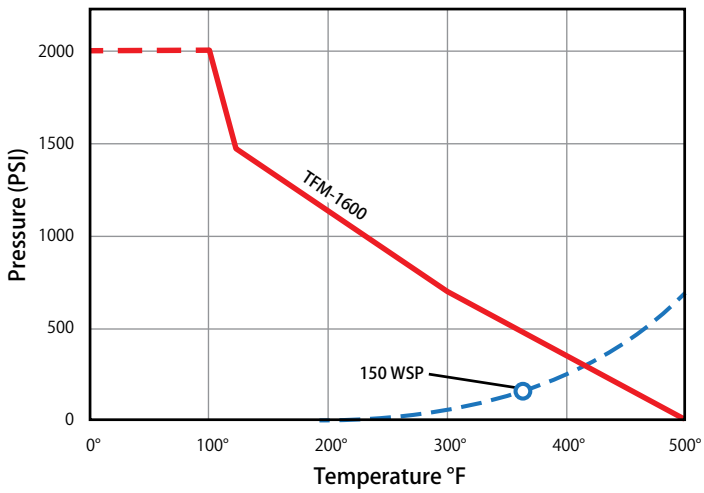
- Solid ball construction
- 29 in-HG vacuum rating
- Latch lock may be locked in open or closed position
- 100% leak tested
- Wetted surfaces contain less than .25% lead content

Approvals

- UL Listed 842 (49RO)
  - MHKZ - Manual valves
  - YQNZ - Compressed gas shut-off valves
  - YRBX - Flammable liquid shut-off valves
  - YRPV - Gas shut-off valves
  - YSDT - LP gas shut-off valves
  - YQAR - Anhydrous ammonia shut-off valves
- Conforms to API 598
- Thread: ANSI B1.20.1 (NPT)
- MSS SP-110
- NACE Certified

Valve Seat Rating

2000 WOG - 150 WSP



Material Specifications

No.	Part	Materials
1	Body	CF8M Stainless Steel
2	End Connection	CF8M Stainless Steel
3	Ball	CF8M Stainless Steel
4	Seat (2)	Hostaflon® TFM 1600
5	Stem	316 Stainless Steel
6	Packing (2)	RPTFE
7	Stem Seal	Hostaflon® TFM 1600
8	Packing Gland	316 Stainless Steel
9	Body Seal	Hostaflon® TFM 1600
10	Handle	304 Stainless Steel
11	Handle Nut	304 Stainless Steel
12	Lock Washer	304 Stainless Steel

Dimensions

Part No.	Size	A	B	C	D
100-931	1/4"	2.34	1.94	4.06	0.44
100-932	3/8"	2.34	1.94	4.06	0.49
100-933	1/2"	2.34	1.94	4.06	0.49
100-934	3/4"	2.63	2.21	4.06	0.59
100-935	1"	2.98	2.49	4.29	0.79
100-936	1-1/4"	3.49	3.08	5.71	0.98
100-937	1-1/2"	3.84	3.24	5.71	1.26
100-938	2"	4.80	3.66	7.09	1.50

Note: Information subject to change without notice.

2.07 – PIPE SUPPORTS

Pipe supports are not part of Shields Harper’s scope of supply.

CORNET BAY

RESUBMITTAL COMMENTS

SECTION 23 11 00

FACILITY FUEL PIPING AND ACCESSORIES

SUBMITTAL NO. 64

1. The incorrect item was indicated. The MS-XP-200-200SS will be provided and is indicated on these submittals.
2. The incorrect item was indicated. The MS-XP-200-200SS will be provided and is indicated on these submittals.
3. The model FF20X18M346XF flex connector will be provided. This is indicated on these submittals.
4. The panel will be provided with a NEMA 4X enclosure as specified.
5. The wetted materials will be made of polysulfone, which is typical for use with gasoline and diesel.
6. Padlocks to be supplied by Glacier.
7. Valves have been resubmitted with a UL-listed valve.
8. Piping supports to be supplied by Glacier.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 20 March 2014
SERIAL NO.: 69
SPEC. REF.: 26 00 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 69
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Milbank	Electrical Panelboard
2	MCN	2	Milbank	Electrical Panelboard
3	MCNR	3	Electrical Sub	Panelboard Anchorage design/sketch
4	MCN	4	Glacier	Meterbase and CT can

Comment(s):

1. In accordance with 26 00 00 2.09, panelboard shall have bolt-on circuit breakers. Submittal indicates plug-on breakers.
2. In accordance with 26 00 00 2.09, provide panelboard with key-lockable door.
3. In accordance with 26 00 00 1.04, provide sketch of panelboard anchorage design.
4. New CT enclosure and meter base are included in the submittal. These were not required by the contract documents. If it's part of means and methods, please confirm that these are acceptable to PSE.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

© 2006 Kennedy/Jenks Consultants Inc. [F-2]

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **69**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **3/17/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**26 00 00**	**26 00 00-2**	**Electrical Cabinet Product Data**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

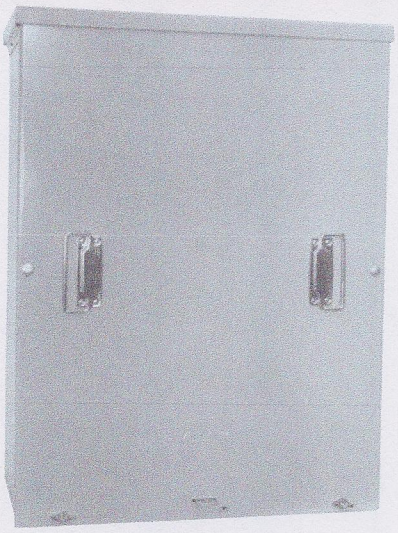
To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

MILBANK



CT18249-SC

CT203611-HC

SCREW COVER

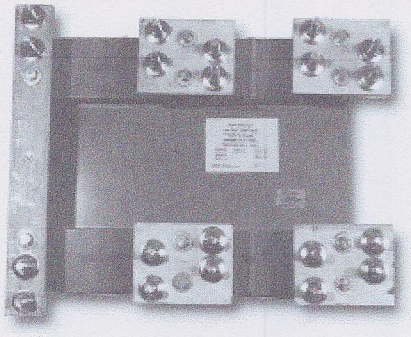
CATALOG NUMBER	C.T. RACKS	SIZE W" X H" X D"	FRONT COVER
CT24329-SC	C, M	24 X 32 X 9	1 PIECE
CT242411-SC	A4, C, M	24 X 24 X 11	1 PIECE
CT243011-SC	A4, C, M	24 X 30 X 11	1 PIECE
CT243611-SC	A4, C, J, M	24 X 36 X 11	1 PIECE
CT244811-SC	A, C, D, G, J, M	24 X 48 X 11	1 PIECE
CT303011-SC	A4, B4, C, E, L, M	30 X 30 X 11	1 PIECE
CT303611-SC	A4, B4, C, E, J, K, L, M	30 X 36 X 11	1 PIECE
CT303614-SC	A4, B4, C, E, J, K, L, M	30 X 36 X 14	1 PIECE
CT363611-SC	A4, B4, C, E, J, K, L, M	36 X 36 X 11	1 PIECE
CT364211-SC	A4, B4, C, E, J, K, L, M	36 X 42 X 11	2 PIECES
CT364811-SC	A, B, C, D, E, F, G, H, J, K, L, M	36 X 48 X 11	2 PIECES
CT364814-SC	A, B, C, D, E, F, G, H, J, K, L, M	36 X 48 X 14	2 PIECES
CT424211-SC	A4, B4, C, E, J, K, L, M	42 X 42 X 11	2 PIECES
CT484811-SC	A, B, C, D, E, F, G, H, J, K, L, M	48 X 48 X 11	2 PIECES

HINGE COVER

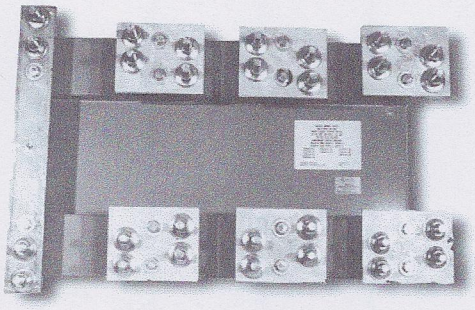
CATALOG NUMBER	C.T. RACKS	SIZE W" X H" X D"	FRONT COVER
CT203611-HC	C	20 X 36 X 11	1 PIECE
CT243011-HC	A4, C, M	24 X 30 X 11	1 PIECE
CT243611-HC	C, M	24 X 36 X 11	1 PIECE
CT244811-HC	A, C, D, G, J, M	24 X 48 X 11	1 PIECE
CT303611-HC	A4, B4, C, E, J, K, L, M	30 X 36 X 11	1 PIECE
CT304811-HC	A, B, C, D, E, F, G, H, J, K, L, M	30 X 48 X 11	1 PIECE
CT363611-HC	A4, B4, C, E, J, K, L, M	36 X 36 X 11	1 PIECE
CT364811-HC	A, B, C, D, E, F, G, H, J, K, L, M	36 X 48 X 11	1 PIECE
CT484811-HC	A, B, C, D, E, F, G, H, J, K, L, M	48 X 48 X 11	2 PIECE
CT364814-HC	A, B, C, D, E, F, G, H, J, K, L, M	36 X 48 X 14	2 PIECE
CT484814-HC	A, B, C, D, E, F, G, H, J, K, L, M	48 X 48 X 14	2 PIECE

ENCLOSURE: These units are rated Type 3R, powder coated, and constructed of galvanized steel.
MOUNTING RACK: Select CT mounting rack from next page.
MOUNTING: 1/4-20 welded studs.

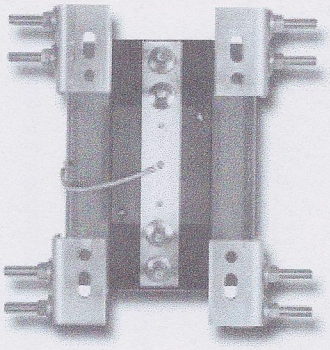
Utility requirements for this equipment may vary. Always consult the serving utility for their requirements before ordering or installing equipment in this catalog.



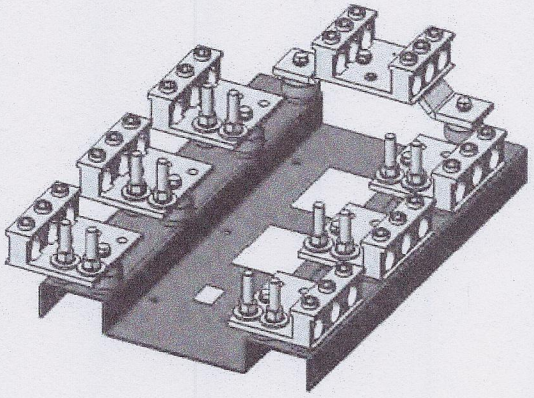
K4797



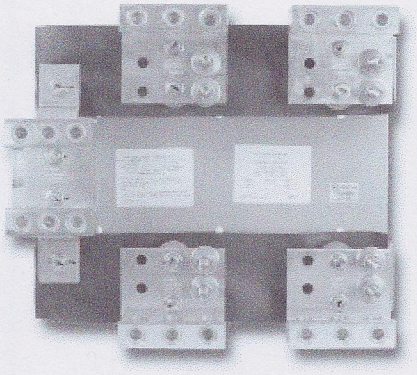
K4798



K4793 / K4795



K4722



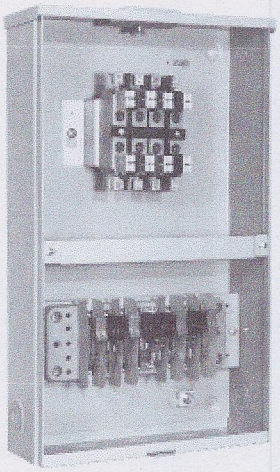
K4729

CURRENT TRANSFORMER ENCLOSURE MOUNTING RACKS

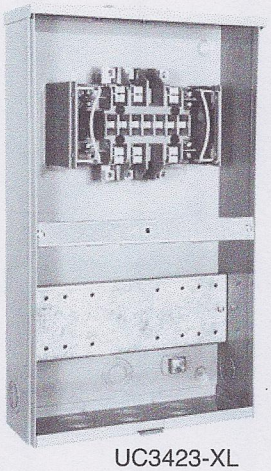
CODE	CATALOG NUMBER	AIC RATING	AMPS	VOLTS	TYPE OF SERVICE	TERMINATION TYPE
A4	K4797	50K	400	600	1Ø3W	1/2-13 studs on 1-3/4" centers
A	K4797	50K	800	600	1Ø3W	1/2-13 studs on 1-3/4" centers
B4	K4798	50K	400	600	3Ø4W	1/2-13 studs on 1-3/4" centers
B	K4798	50K	800	600	3Ø4W	1/2-13 studs on 1-3/4" centers
C	K4793	10K	201-400	600	1Ø3W	1/2-13 studs on 1-3/4" centers
D	K4795	10K	401-800	600	1Ø3W	1/2-13 studs on 1-3/4" centers
E	K4794	10K	201-400	600	3Ø4W	1/2-13 studs on 1-3/4" centers
F	K4796	10K	401-800	600	3Ø4W	1/2-13 studs on 1-3/4" centers
G	K4729	50K	800	600	1Ø3W	(3) #4 - 600 or (6) #1 - 250
H	K4722	50K	800	600	3Ø4W	(3) #4 - 600 or (6) #1 - 250
J	K4903	50K	400	600	1Ø3W	(1) #4 - 600 or (2) #1 - 250
K	K4904	50K	400	600	3Ø4W	(1) #4 - 600 or (2) #1 - 250
L	K5747	50K	800	600	3Ø4W	Line: 1/2-13 studs on 1-3/4" centers Load: (3) #4 - 600 or (6) #1 - 250
M	K5752	50K	800	600	1Ø3W	Line: 1/2-13 studs on 1-3/4" centers Load: (3) #4 - 600 or (6) #1 - 250

Select CT enclosures from previous page.

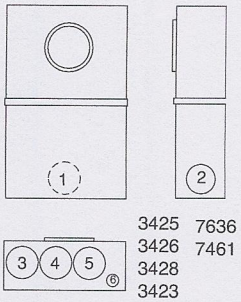
Utility requirements for this equipment may vary. Always consult the serving utility for their requirements before ordering or installing equipment in this catalog.

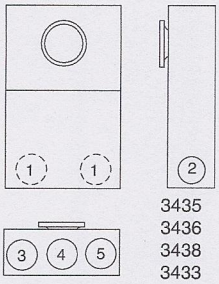


UC3438-XL-TS080025
(with test switch factory installed)



UC3423-XL





RINGLESS—WITH PROVISION FOR TEST SWITCH–TWO PIECE FRONT

NO. OF TERMS	SERVICE	CATALOG NUMBER	HUB	CONNECTORS	BY-PASS	DIMENSIONS			CONCENTRIC K.O.'S					
						D"	W"	H"	1	2	3	4	5	6
5	OH / UG	**UC3425-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½
6	OH / UG	**UC3426-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½
8	OH / UG	**UC3428-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½
13	OH / UG	**UC3423-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½

*RING TYPE—TEST SWITCH FACTORY PREWIRED—TWO PIECE FRONT APPROVED FOR TUCSON ELECTRIC POWER

NO. OF TERMS	SERVICE	CATALOG NUMBER	HUB	CONNECTORS	BY-PASS	DIMENSIONS			CONCENTRIC K.O.'S					
						D"	W"	H"	1	2	3	4	5	6
6	OH	**UC7636-YL-TGE-DES**	1¼"	#14 - #2	TEST SWITCH	4⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½
13	OH	**UC7461-YL-TGE-DES**	1¼"	#14 - #2	TEST SWITCH	4⅛	12	20	1¼	1¼	1¼	1¼	1¼	¼,½

*RING TYPE—WITH PROVISIONS FOR TEST SWITCH—EUSERC COMPLIANT–TWO PIECE FRONT

NO. OF TERMS	SERVICE	CATALOG NUMBER	HUB	CONNECTORS	BY-PASS	DIMENSIONS			CONCENTRIC K.O.'S					
						D"	W"	H"	1	2	3	4	5	6
5	OH / UG	**UC3435-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	2	2	2	2	2	—
6	OH / UG	**UC3436-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	2	2	2	2	2	—
8	OH / UG	**UC3438-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	2	2	2	2	2	—
13	OH / UG	**UC3433-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	2	2	2	2	2	—
15	OH / UG	**UC3434-XL**	C.P.	#14 - #2	NONE	5⅛	12	20	2	2	2	2	2	—

***SEALING RINGS:** Ring type units are supplied with one **MR-4**, screw type, sealing ring.

PREWIRING: If factory prewiring is required consult factory before ordering. Please include meter socket catalog number, test switch number, meter form number, and a copy of your wiring diagram.

TEST SWITCH COVERS: Units on this page can be used with clear lexan cover (except units **7636** and **7461**).

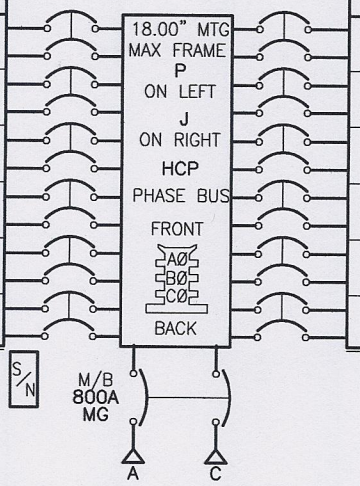
CONNECTORS: Units are supplied with sleeve type connectors (#14-#2)

HUBS: For proper hub selection see the hub suffix chart in accessory section.

Utility requirements for this equipment may vary. Always consult the serving utility for their requirements before ordering or installing equipment in this catalog.

–	----	--	--/--/--	–	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P	PHASE BUS CONN
1		FA	90/2	AC
3		FA	90/2	AC
5		FA	90/2	AC
7		FA	90/2	AC
9		FA	90/2	AC
11		FA	90/2	AC



PHASE BUS CONN	RATING AMP/P	TYPE	ACCESSORIES	CKT NO
AC	90/2	FA		2
AC	90/2	FA		4
AC	90/2	FA		6
AC	90/2	FA		8
AC	90/2	FA		10
AC	90/2	FA		12

PHYSICAL DATA

ENCLOSURE Type 3R/5/12
FRONT CAT#: Trim w/Box
BOX CAT#: HC4268WP
DIMENSIONS:
68''H x 42''W x 12.95''D
WIRE BENDING SPACE:
TOP – 11.66
BOTTOM – 16.18
RIGHT SIDE – 8.77
LEFT SIDE – 8.66
PBA: 412
BUSSING: Copper
Tin Plated
OPTIONAL FEATURES:
ALUMINUM SOLID NEUTRAL
ALUMINUM GROUND BAR
STANDARD MAINS AND FEEDERS
MECHANICALLY RESTRAINED

ELECTRICAL DATA

SYSTEM: 120/240V 1Ph 3W 60Hz
System Ampacity: 800A
10kA SYMS. SCCR
MAIN: MAIN BREAKER MG 800A
Bottom FEED
65kA AIR
INCOMING CONDUCTORS(S) PER NEC:
(3) 3/0 – 500 kcmil
BRANCH MOUNTING TYPE: PLUG-ON
----------BRANCH SUMMATION----------
12 – 90A/2P FA

JOB NAME:	CORNET BAY	EQUIPMENT DESIGNATION:	
JOB LOCATION:	SEATTLE WA	EQUIPMENT TYPE:	I-Line (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	(Q2C)	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	March 14 2014		

SQUARE D by Schneider Electric

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 23 January 2014
SERIAL NO.: 73
SPEC. REF.: 32 20 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 73
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier/ Norwest Concrete	Import Material Testing: A. Crushed Rock of CSTC
2	NET		Glacier/ Norwest Concrete	Import Material Testing: B.1 Pipe Zone Bedding
3	NET	2	Glacier/ Norwest Concrete	Import Material Testing: C. Imported Backfill (pit run)
4	MCN	3	Glacier/ Norwest Concrete	Import Material Testing: F. Subgrade Material

Comment(s):

1. Crushed rock is suitable for material E. Structural Backfill per the specifications.
2. This material is the same as Pipe Zone Bedding and satisfies both 2.01 B and C materials of the specifications. No plasticity index or liquid limit is applicable to this material since it is rock.
3. This material does not comply with WSDOT 9-03(5)B #3 aggregate sieve gradations. The submitted material is well graded. It is slightly finer in the larger gradations but less fine in the smaller gradations. This material is acceptable for use as subgrade and CAN BE USED FOR material C. Imported Backfill (pit run) if the contractor chooses. It cannot be used as pipe zone bedding and the contractor assumes responsibility for any increased material costs associated with using the subgrade material as substitute for imported backfill.

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B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **73**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/22/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 20 00**	**31 20 00-4**	**#73 A Crushed Surfacing Top Course Sieve and Proctor**			
1	**31 20 00**	**31 20 00-4**	**#73 B-1 Gravel Backfill for Pipe Zone Sieve and Proctor**			
1	**31 20 00**	**31 20 00-4**	**#73 C Imported Backfill Sieve and Proctor**			
1	**31 20 00**	**31 20 00-5**	**#73 F Subgrade Material Sieve and Proctor**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Proctor Report + Sieve

Project: P245 EA-18G Flight Simulator Facility
Project #: 13B113-01
Client: Advanced Technology Construction Corp.
Source: CNW - Boulder Pit
Sample#: B13-701

Date Received: 9-Oct-13
Sampled By: K. Walters
Date Tested: 10-Oct-13
Tested By: C. Meredith

Unified Soils Classification System, ASTM D-2487
SW, Well-graded Sand with Gravel
Sample Color
Olive

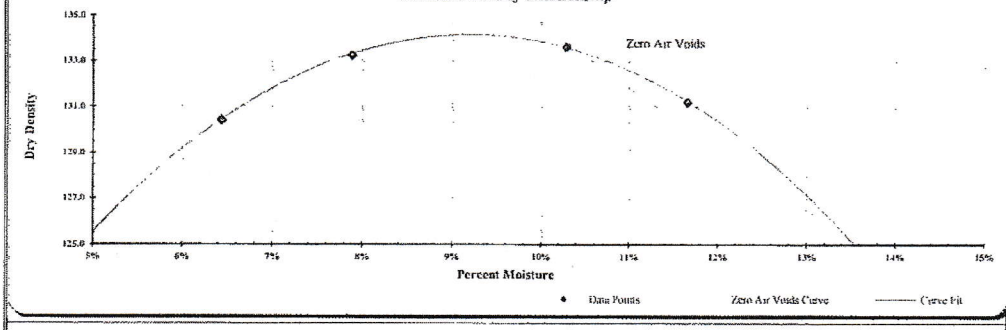
Sample Prepared:	Moist: X		Manual:	
	Dry:		Mechanical: X	
Test Standard:	ASTM D698:		AASHTO T 99:	Method
	ASTM D 1557: X		AASHTO T 180:	B

Assumed Sp. Gr.	Point Number	Percent Moisture	Dry Density
2.75	1	6.4 %	130.4
	2	7.9 %	133.2
	3	10.3 %	133.6
	4	11.7 %	131.2

Uncorrected Proctor Value
Max. Dry Density: 134.2 lbs/ft³ — Optimum Moist.: 9.2 %

Value w/ Oversize Correction Applied
Max. Dry Density: 139.2 lbs/ft³ — Optimum Moist.: 7.8%

Moisture Density Relationship



ASTM D-4718, Misc. Oversize Correction Values
% Oversize Mat'l: 17%

% Oversize Retained	Corrected Density	Optimum Moisture	% Oversize Retained	Corrected Density	Optimum Moisture
5%	135.6	8.8%	20%	140.3	7.5%
10%	137.1	8.4%	25%	141.9	7.0%
15%	138.7	7.9%	30%	143.6	6.6%

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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

ASTM C-136

Sieve US	Size mm	Percent Passing	Specifications Max	Specifications Min
12.00"	300.00			
10.00"	250.00			
8.00"	200.00			
6.00"	150.00			
4.00"	100.00			
3.00"	75.00			
2.50"	63.00			
2.00"	50.00			
1.75"	45.00			
1.50"	37.50			
1.25"	31.50			
1.00"	25.00			
3/4"	19.00	100 %	100.0 %	99.0 %
5/8"	16.00			
1/2"	12.50	96 %	100.0 %	80.0 %
3/8"	9.50	83 %		
1/4"	6.30			
#4	4.75	57 %	66.0 %	46.0 %
#8	2.36			
#10	2.00	39 %		
#16	1.18			
#20	0.850	24 %		
#30	0.600			
#40	0.425	13 %	24.0 %	8.0 %
#50	0.300			
#60	0.250	8 %		
#80	0.180			
#100	0.150	6 %		
#140	0.106			
#170	0.090			
#200	0.075	4.7 %	10.0 %	0.0 %

Specs: Meets Specs? Yes
2012 WSDOT 9-03.9(3) Crushed Surfacing Top Course

% Gravel: 42.6%	$D_{(10)}$: 0.319
% Sand: 52.7%	$D_{(30)}$: 1.299
% Silt&Clay: 4.7%	$D_{(60)}$: 5.229
C_u: 1.01	LL: n/a
C_c: 16.41	PL: n/a
FM: 4.56	PI: n/a
Fracture %: 99.0%	Sand Eq.: 76

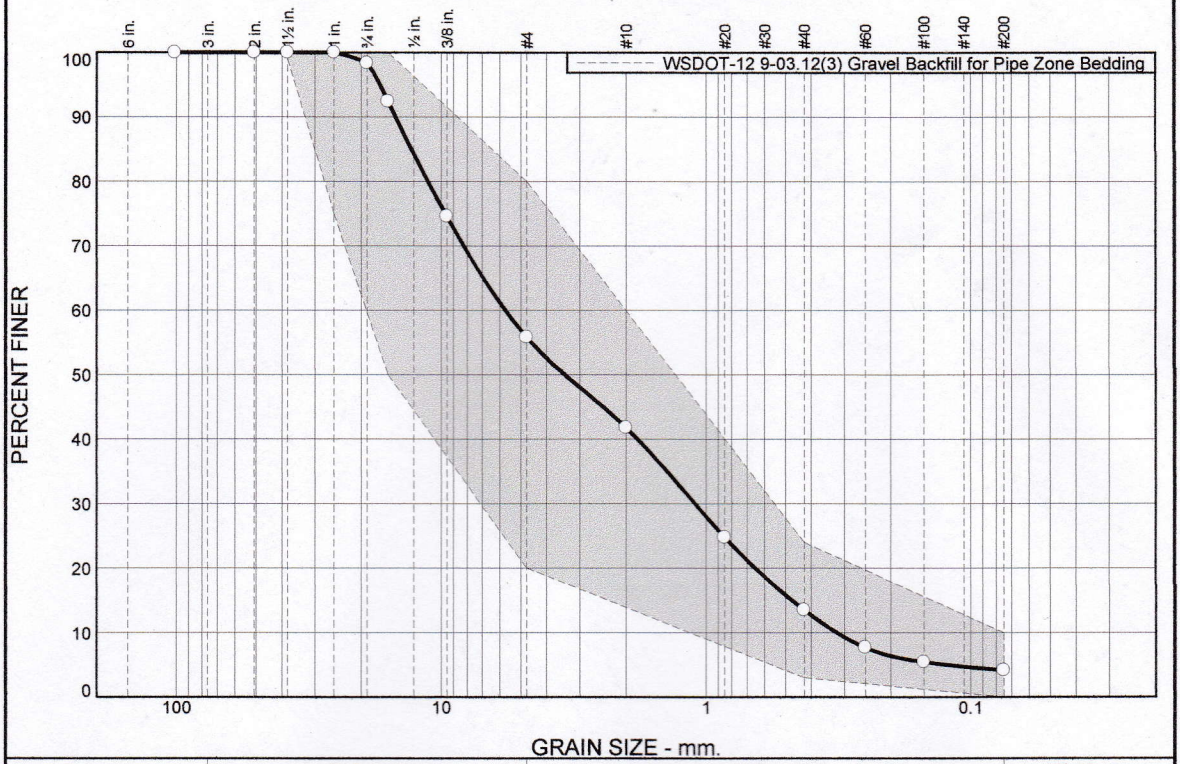
Comments: _____

Reviewed by: Curtis Shear

Digitally signed by Curtis Shear
DN: cn=Curtis Shear, o=Materials Testing & Consulting, Inc., ou=Laboratory Services, email=c_shear@mtc-inc.net, c=US
Date: 2013.10.15 11:37:05 -07'00'

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
NW Region ~ 2126 East Bakerview Rd., Suite #101 • Bellingham, WA 98226 • Phone (360) 647-6061 • Fax (360) 647-8111
SW Region ~ 2118 Black Lake Blvd. SW • Olympia, WA 98512 • Phone (360) 534-9777 • Fax (360) 534-9779
Visit our website: www.mtc-inc.net

Sieve Analysis Test Report - ASTM C136/C117



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0	2	42	14	28	10	4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100		
2"	100		
1-1/2"	100	99 - 100	
1"	100	75 - 100	
3/4"	98		
5/8"	92	50 - 100	
3/8"	75		
#4	56	20 - 80	
#10	42		
#20	25		
#40	14	3 - 24	
#60	8		
#100	5		
#200	4.2	0.0 - 10	

* WSDOT-12 9-03.12(3) Gravel Backfill for Pipe Zone Bedding

Material Description

Import Backfill/Gravel Backfill for Pipezone Bedding, WSDOT 9-03.12(3)
poorly graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 14.8894 D_{85}= 12.9700 D_{60}= 5.7209
D_{50}= 3.4177 D_{30}= 1.1011 D_{15}= 0.4725
D_{10}= 0.3202 C_u= 17.87 C_c= 0.66

Classification

USCS= SP AASHTO= A-1-a

Remarks

Sample meets gradation/SE specification.
Sand Equivalent: 60 (Spec: 35 min)
Sample is non-plastic (ASTM 4318).

Location: CNW - Boulder Hill
Sample Number: 5538-2

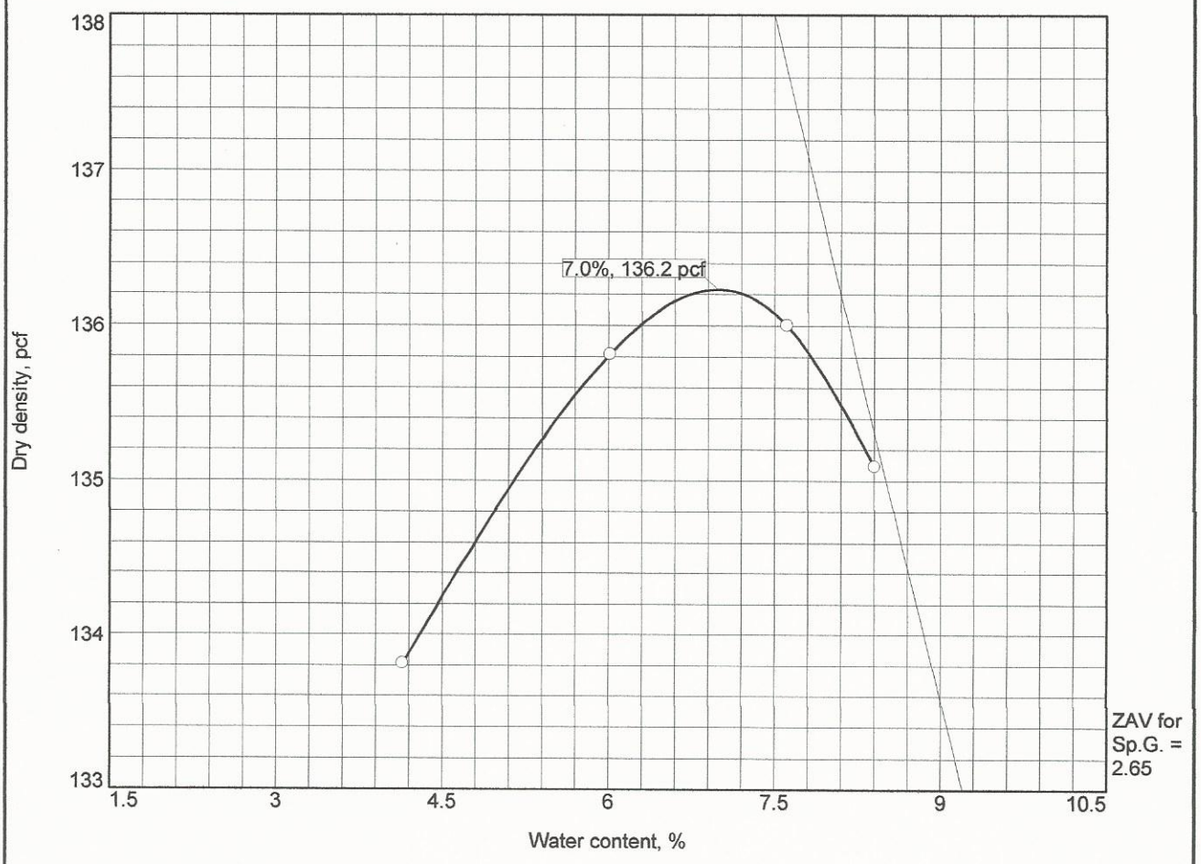
Date: 1-14-14

GeoTest
741 Marine Drive
Bellingham, WA 98225
www.GeoTest-Inc.com

Client: Glacier Environmental Services
Project: Cornet Bay Marina Remediation
251 Cornet Bay Road, Oak Harbor, WA
Project No: 14-0010 **Report No.** SA005

Tested By: TF **Checked By:** GR

Moisture-Density (Proctor) Test Report



Test specification: ASTM D 698-07 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	SP				NV		2	4.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 136.2 pcf Optimum moisture = 7.0 %	Import Backfill/Gravel Backfill for Pipezone Bedding, WSDOT 9-03.12(3) poorly graded sand with gravel

Project No. 14-0010 **Client:** Glacier Environmental Services
Project: Cornet Bay Marina Remediation
251 Cornet Bay Road, Oak Harbor, WA **Date:** 1-14-14
○ **Location:** CNW - Boulder Hill **Sample Number:** 5538-2

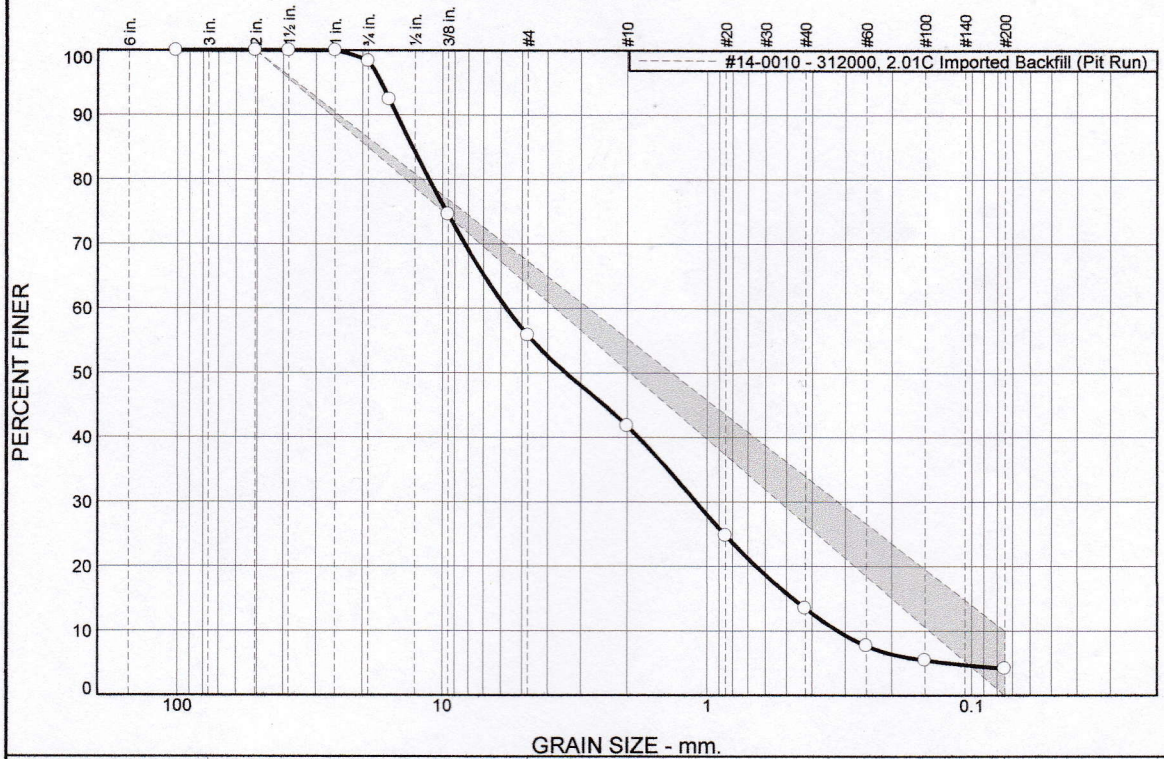
Remarks:
SPG: assumed

GEOTEST 741 Marine Drive Bellingham, WA 98225 www.GeoTest-Inc.com

Report No. SP003

Tested By: TF **Checked By:** GR

Sieve Analysis Test Report - ASTM C136/C117



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
0	2	42	14	28	10	4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100		
2"	100	100	
1-1/2"	100		
1"	100		
3/4"	98		
5/8"	92		
3/8"	75		
#4	56		
#10	42		
#20	25		
#40	14		
#60	8		
#100	5		
#200	4.2	0.0 - 10	

* #14-0010 - 312000, 2.01C Imported Backfill (Pit Run)

Material Description

Imported Backfill (Pit Run) - (312000 - 2.01C)
poorly graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 14.8894 D_{85}= 12.9700 D_{60}= 5.7209
D_{50}= 3.4177 D_{30}= 1.1011 D_{15}= 0.4725
D_{10}= 0.3202 C_u= 17.87 C_c= 0.66

Classification

USCS= SP AASHTO= A-1-a

Remarks

Sample meets Imported Backfill gradation specification.
Sand Equivalent: 60
Sample is non-plastic (ASTM 4318).

Location: CNW - Boulder Hill
Sample Number: 5538-1

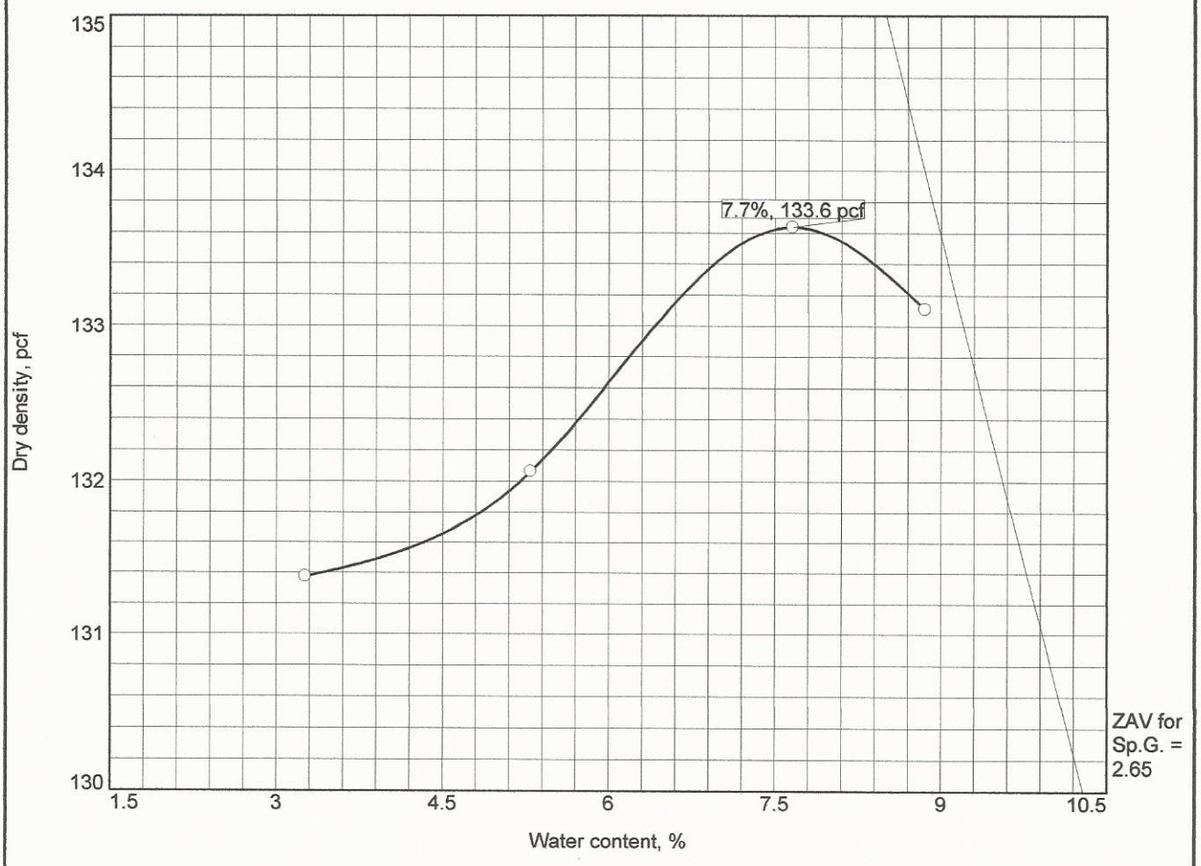
Date: 1-14-14

GeoTest
741 Marine Drive
Bellingham, WA 98225
www.GeoTest-Inc.com

Client: Glacier Environmental Services
Project: Cornet Bay Marina Remediation
251 Cornet Bay Road, Oak Harbor, WA
Project No: 14-0010 **Report No.** SA004

Tested By: TF **Checked By:** GR

Moisture-Density (Proctor) Test Report



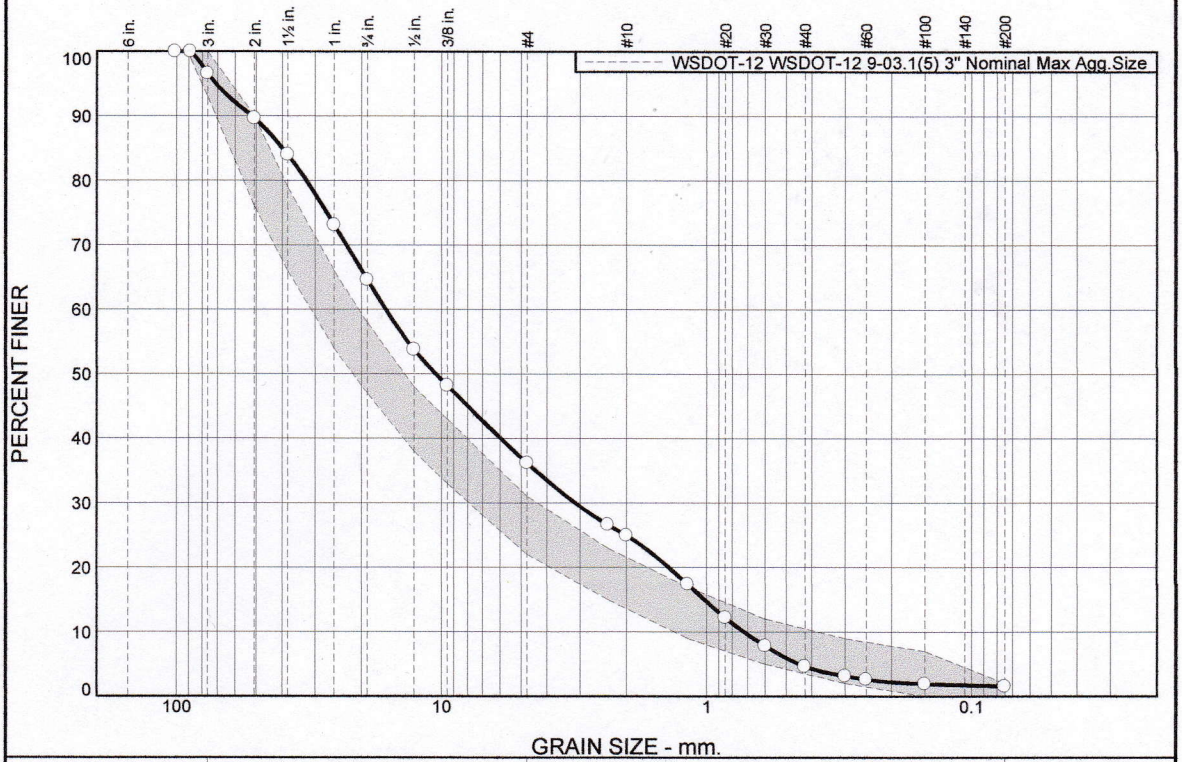
Test specification: ASTM D 698-07 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	GP				NV		35	1.5

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 133.6 pcf Optimum moisture = 7.7 %	Imported Backfill (Pit Run) - (312000 - 2.01C) poorly graded gravel with sand
Project No. 14-0010 **Client:** Glacier Environmental Services **Project:** Cornet Bay Marina Remediation 251 Cornet Bay Road, Oak Harbor, WA **Date:** 1-14-14 ○ **Location:** CNW - Boulder Hill **Sample Number:** 5537	**Remarks:** SPG: assumed *No rock correction >30% retained on 3/4" sieve.
GEOTEST 741 Marine Drive Bellingham, WA 98225 www.GeoTest-Inc.com	**Report No.** SP001

Tested By: TF **Checked By:** GR

Sieve Analysis Test Report - ASTM C136/C117



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt
3	32	29	11	20	3	2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100		
3-1/2"	100	99 - 100	
3"	97	93 - 100	
2"	90	76 - 90	
1-1/2"	84	66 - 79	X
1"	73	54 - 66	X
3/4"	65	47 - 58	X
1/2"	54	38 - 48	X
3/8"	48	33 - 43	X
#4	36	22 - 31	X
#8	27	15 - 23	X
#10	25		
#16	17	9 - 17	
#20	12		
#30	8	5 - 12	
#40	5		
#50	3	2 - 9	
#60	3		
#100	2	0 - 7	
#200	1.5	0.0 - 2.0	

* WSDOT-12 WSDOT-12 9-03.1(5) 3" Nominal Max Agg.Size

Material Description

Imported Backfill (Pit Run) - (Subgrade Material 312000 - 2.01F)
WSDOT 9-03.1(5)B 3" Nominal Max Aggregate
poorly graded gravel with sand.

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 52.0719 D_{85}= 39.8283 D_{60}= 16.2240
D_{50}= 10.5183 D_{30}= 3.1335 D_{15}= 1.0197
D_{10}= 0.7214 C_u= 22.49 C_c= 0.84

Classification

USCS= GP AASHTO= A-1-a

Remarks

Sample does not meet gradation specification.
Sample is non-plastic (ASTM 4318).
Sand Equivalent: 68

Location: CNW - Boulder Hill
Sample Number: 5537-3

Date: 1-14-14

GeoTest
741 Marine Drive
Bellingham, WA 98225
www.GeoTest-Inc.com

Client: Glacier Environmental Services
Project: Cornet Bay Marina Remediation
251 Cornet Bay Road, Oak Harbor, WA
Project No: 14-0010 **Report No.** SA003

Tested By: TF **Checked By:** GR

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 7 March 2014
SERIAL NO.: 73.1
SPEC. REF.: 32 20 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 73.1
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

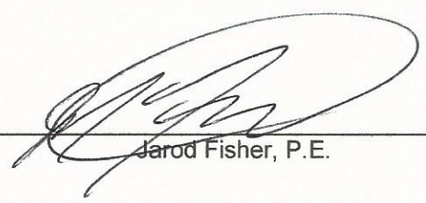
Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET		Glacier/ Concrete Nor'West	Import Material Testing: B.2 Gravel Backfill for Drains

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: 
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **73.1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **2/20/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 20 00**	**31 20 00-4**	**#73 B-2 Gravel Backfill for Drains**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: _____ Date: _____

Enclosed are _____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By: _____

CNW
CONCRETE NOR'WEST

P.O. Box 280, Mount Vernon, Washington 98273-0280
Phone: (360) 757-3121 Fax: (360) 757-3816

Date: *Thursday, February 06, 2014*

Material Description: **Drain Rock**

Gradings: AASHTO #4

Specific Gravity: *0.00*

Sample Moist: *4,511.8*

Total Moisture %: *0.708%*

Sample Dry: *4,480.1*

FM: *6.143*

Wash Dry: *0.0*

Wash Loss %:

Date Sampled: *02/06/14* **By:** *MC*

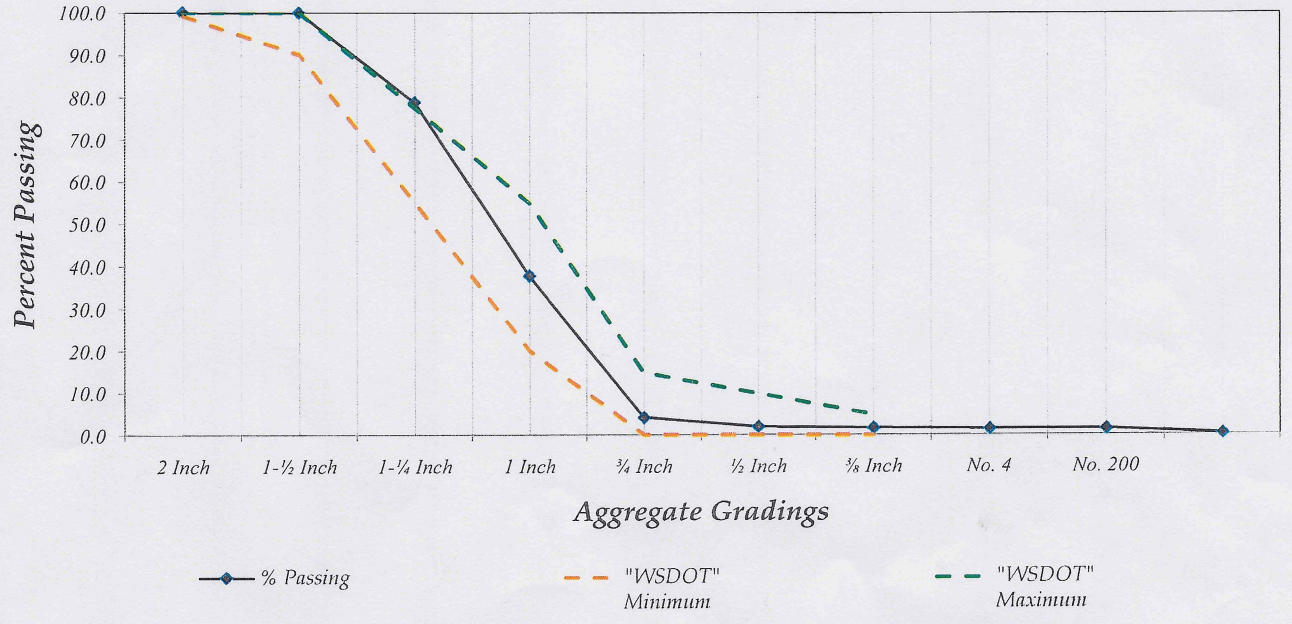
Date Completed: *02/06/14* **By:** *MC*

Sample Type: *Production*

Location: *Boulder Hill IS-93 Stockpile*

2014 Standard Specifications 9-03.1(4)C - AASHTO #4

	Cummaltive	Amount Retained	Individual % Retained	% Retained	% Passing	"WSDOT" Minimum	"WSDOT" Maximum
2 Inch	0.0	0.0	0.0	0.0	*100.0*	*99*	*100*
1-½ Inch	0.0	0.0	0.0	0.0	*100.0*	*90*	*100*
1-¼ Inch	949.8	949.8	21.2	21.2	*78.8*		
1 Inch	2,787.8	1,838.0	41.0	62.2	*37.8*	*20*	*55*
¾ Inch	4,294.2	1,506.4	33.6	95.9	*4.1*	*0*	*15*
½ Inch	4,391.5	97.3	2.2	98.0	*2.0*		
⅜ Inch	4,403.4	11.9	0.3	98.3	*1.7*	*0*	*5*
No. 4	4,414.0	10.6	0.2	98.5	*1.5*		
No. 8	4,417.8	3.8	0.1	98.6	*1.4*		
No. 16	4,420.9	3.1	0.1	98.7	*1.3*		
No. 200	4,466.5	45.6	1.0	99.7	*0.3*		
PAN	4,479.7	13.2	0.29	99.99	*0.01*		



Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 7 March 2014
SERIAL NO.: 74
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 74
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

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MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET	1	Glacier / Geotest Inc	Density/Moisture Reports

Comment(s):

1. Any subsequent report issues will be addressed separately via email or other means.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	x
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **74**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **2/12/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 20 00**	**31 20 00-9**	**Field Density/Moisture Report for 2/11/14**	**Geotest**		

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

GEOTEST

741 Marine Drive, Bellingham, WA 98225 www.geotest-inc.com
20611 67th Ave. NE. Unit A. Arlington, WA 98223
phone: (360) 733.7318 toll free: (888) 251.5276 fax: (360) 733.7418

FIELD DENSITY/MOISTURE REPORT
Nuclear Gauge * ASTM D6938

PROJECT: Cornet Bay Marina Remediation
JOB #: 14-0010
ADDRESS: 251 Cornet Bay Road, Oak Harbor, WA
REPORT #: FD001
PERMIT #:
DATE: 2/11/2014
CLIENT: Glacier Environmental Services
PAGE #: 1 of 1
CONTRACTOR: TBD
INSPECTOR: Joe Goshorn-Maroney

Compaction Of: Pit Backfill

Field Data:

Test #	Location	Depth/ Elev (ft)	DT/ BS (in)	Wet Density (pcf)	Field Moisture (%)	Dry Density (pcf)	Lab #	Compaction % Attained	Compaction % Required	Pass/ Fail
1	SW Side of Pit	1' ASL	DT/12	137.4	6.8	128.7	1	**96**	95	P
2	NE Side of Pit	2' ASL	DT/12	144.8	5.0	137.9	1	**103**	95	P
3	SW Side of Pit	2' ASL	DT/12	145.1	5.5	137.6	1	**103**	95	P
4	SW Side of Pit	3' ASL	DT/12	140.1	5.3	133.0	2	**98**	95	P
5	NE Side of Pit	3' ASL	DT/12	143.8	6.2	135.4	2	**99**	95	P
6	SW Side of Pit	4' ASL	DT/12	141.6	6.3	133.2	2	**98**	95	P
7	NE Side of Pit	5.5' ASL	DT/12	143.0	5.5	135.6	2	**100**	95	P
8	SW Side of Pit	5' ASL	DT/12	141.3	5.8	133.6	2	**98**	95	P

Lab Sample #	Soil Type	Source	Max. Dry Density (pcf)	Optimum Moisture (%)	Retained On #4 (%)	Test Method
1-5537	PGG w/S	CNW - Boulder Pit	133.6	7.7	64	ASTM D1557/D4718
2-5538	PGS w/G	CNW - Boulder Pit	136.2	7.0	44	ASTM D1557/D4718
3-			0.0			None

Gauge Make/Model/Serial#: Troxler / 3440 / 67887
M/D Standard Count: 750 / 2713

Comments: ASL = Above Sea Level

GeoTest was on-site as requested to test the compaction of backfill material. The bottom 1'-2' of the pit was backfilled using pit run and the subsequent lifts were screenings. It should be noted that the proctor for the pitrun (Lab #5537) was not rock corrected. GeoTest noted that the compacted pitrun appeared to be firm and unyielding. All density tests attained the required compaction and the contractor was notified.

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Reviewed by

This report shall not be reproduced except in full, without the written approval of GeoTest Services, Inc.
The above test results relate only to the sample (or location) tested.

741 Marine Drive, Bellingham, WA 98225 www.geotest-inc.com
20611 67th Ave. NE. Unit A. Arlington, WA 98223
phone: (360) 733.7318 toll free: (888) 251.5276 fax: (360) 733.7418

FIELD DENSITY/MOISTURE REPORT
Nuclear Gauge * ASTM D6938

PROJECT: Cornet Bay Marina Remediation
JOB #: 14-0010
ADDRESS: 251 Cornet Bay Road, Oak Harbor, WA
REPORT #: FD002
PERMIT #:
DATE: 2/14/2014
CLIENT: Glacier Environmental Services
PAGE #: 1 of 1
CONTRACTOR: TBD
INSPECTOR: Joe Goshorn-Maroney

Compaction Of: Area 4 and 2 Backfill

Field Data:

Test #	Location	Depth/ Elev (ft)	DT/ BS (in)	Wet Density (pcf)	Field Moisture (%)	Dry Density (pcf)	Lab #	Compaction % Attained	Compaction % Required	Pass/ Fail
1	Area 4 SW side	6.5 ASL	DT/12	141.5	5.7	133.0	1	**100**	95	P
2	Area 4 NE side	6.5 ASL	DT/12	139.5	5.1	132.7	1	**99**	95	P
3	Area 2 SE side	6 ASL	DT/12	140.8	5.3	133.8	1	**100**	95	P
5	Area 4 SW side	7.5 ASL	DT/12	144.6	6.4	135.9	2	**100**	95	P
6	Area 4 NE side	7.5 ASL	DT/12	141.8	6.4	133.2	2	**98**	95	P
7	Area 2 Center	7 ASL	DT/12	143.1	6.3	134.6	2	**99**	95	P

Lab Sample #	Soil Type	Source	Max. Dry Density (pcf)	Optimum Moisture (%)	Retained On #4 (%)	Test Method
1-5537	PGG w/ S	CNW - Boulder Pit	133.6	7.7	64	ASTM D1557/D4718
2-5538	PGS w/ S&G	CNW - Boulder Pit	136.2	7.0	44	ASTM D1557/D4718
3-			0.0			None

Gauge Make/Model/Serial#: Troxler / 3440P/ 60559
M/D Standard Count: 653 / 2801

Comments: ASL = Above Sea Level

GeoTest was on-site as requested to test the compaction of backfill material. The bottom first two lifts of Area's 2 and 4 were pit run and the subsequent lifts were screenings. It should be noted that the proctor for the pitrun (Lab #5537) was not rock corrected. GeoTest noted that the compacted pitrun appeared to be firm and unyielding. All density tests attained the required compaction and the contractor was notified.

COPIES: Glacier Environmental Services

Reviewed by

This report shall not be reproduced except in full, without the written approval of GeoTest Services, Inc.
The above test results relate only to the sample (or location) tested.

GEOTEST

741 Marine Drive, Bellingham, WA 98225 www.geotest-inc.com
20611 67th Ave. NE. Unit A. Arlington, WA 98223
phone: (360) 733.7318 toll free: (888) 251.5276 fax: (360) 733.7418

FIELD DENSITY/MOISTURE REPORT
Nuclear Gauge * ASTM D6938

PROJECT: Cornet Bay Marina Remediation
JOB #: 14-0010
ADDRESS: 251 Cornet Bay Road, Oak Harbor, WA
REPORT #: FD006
PERMIT #:
DATE: 2/27/2014
CLIENT: Glacier Environmental Services
PAGE #: 1 of 1
CONTRACTOR: TBD
INSPECTOR: Joe Goshorn-Maroney

Compaction Of: Import Backfill - Area 5

Field Data:

Test #	Location	Depth/ Elev (ft)	DT/ BS (in)	Wet Density (pcf)	Field Moisture (%)	Dry Density (pcf)	Lab #	Compaction % Attained	Compaction % Required	Pass/ Fail
1	Area 5 W side	7 ASL	DT/12	140.6	7.1	131.3	1	**98**	95	P
2	Area 5 NW Corner	8 ASL	DT/12	139.5	6.7	130.5	1	**98**	95	P
3	Area 5 E side	8 ASL	DT/12	144.1	7.8	133.7	2	**98**	95	P
4	Area 5 Center	9 ASL	DT/12	138.4	6.2	130.3	2	**96**	95	P

Lab Sample #	Soil Type	Source	Max. Dry Density (pcf)	Optimum Moisture (%)	Retained On #4 (%)	Test Method
1-5537	PGG w/S	CNW - Boulder Hill Pit	133.3	7.7	64	ASTM D1557/D4718
2-5538-2	PGS w/G	CNW - Boulder Hill Pit	136.3	7.0	44	None
3-			0.0			None

Gauge Make/Model/Serial#: Troxler / 3440P / 60559
M/D Standard Count: 632 / 2796

Comments: ASL = Above Sea Level

GeoTest was on-site as requested to test the compaction of import backfill in Area 5. The contractor placed and compacted one 2' lift of subgrade material (Lab Sample 5537) then proceeded to place screenings (5538-2) in 1-2' lifts over the subgrade.

All tests attained the required compaction.

Kevin Richardson
Reviewed by

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This report shall not be reproduced except in full, without the written approval of GeoTest Services, Inc.
The above test results relate only to the sample (or location) tested.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 4 February 2014
SERIAL NO.: 75
SPEC. REF.: 32 20 00
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 75
PAGE: 1 of 2

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Glacier/ Nor'West Concrete	Import Material Chemical Analysis

Comment(s):

1. Analytical chemical 2009 analysis was provided by Glacier for the Concrete Nor'West Boulder Pit quarry as part of submittal #26. KJ and Ecology asked for newer data. At the request of Glacier, Ecology received newer data from a DOE "Plywood" project in Anacortes, WA that used the same quarry. From this data set KJ requested additional analysis for NWTPH-GRO, NWTPH-DRO, and BTEX to further update the analytical from the "Plywood" project. Glacier has provided this analysis as part of submittal No. 75. KJ also required a signed letter from the quarry stating that the import materials being provided are all from the same source and analytical was performed on this source. Any new import materials such as topsoil or other not from this source will require separate analytical and submittals.

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Lauren Miles-Golembiewski
Glacier Environmental Services Inc.
4 February 2014

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **75**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/22/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 20 00**	**31 20 00-6**	**Import Material Chemical Analysis**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

November 6, 2013 Analytical Report for Service Request No: K1311829

Kevin Richardson
Geo Test Services
741 Marine Drive
Bellingham, WA 98225

Dear Kevin:

Enclosed are the results of the samples submitted to our laboratory on October 17, 2013. For your reference, these analyses have been assigned our service request number K1311829.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3275. You may also contact me via Email at Chris.Leaf@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Chris Leaf
Project Manager

CL/aj

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 USA | PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp. Part of the ALS Group An ALS Limited Company

Environmental www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): K1311278

Date 10/15/13 Page 1 Of 1

PROJECT ID:
REPORT TO COMPANY: GeoTest Service Inc
PROJECT MANAGER: Kevin Richardson
ADDRESS: ~~[illegible]~~ 741 Marine View Dr.
Bellingham WA 98225
PHONE: 360-920-1141 FAX:
P.O. #: E-MAIL: kevinr@geotestinc.com
INVOICE TO COMPANY: GeoTest
ATTENTION: Janice Patience
ADDRESS: 741 Marine View Dr.
Bellingham, WA 98225

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1.																					
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Kevin Richardson, GeoTest, 10/15/13, 5:15pm
Received By: SDavis/ALS-KCDC 10/17/13 0940
2. Relinquished By:
Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER: Specify: See Attached

* Turnaround request less than standard may incur Rush Charges

PC CL

Cooler Receipt and Preservation Form

Client / Project GeoTest Service Request *K13* 11278

Received: October 17, 13 Opened: 10/17 By: SD Unloaded: 10/17 By: SD

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where?_____
   If present, were custody seals intact? Y (N) If present, were they signed and dated? Y (N)

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
NDm							8037 3511 9569	

4.. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* N/A

5. Were custody papers properly filled out (ink, signed, etc.)?	NA	(Y) see	N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.*	NA	(Y)	(N)*
7. Were all sample labels complete (i.e analysis, preservation, etc.)?	NA	(Y)	N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*	NA	(Y)	N
9. Were appropriate bottles/containers and volumes received for the tests indicated?	NA	(Y)	N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*	(NA)	Y	N
11. Were VOA vials received without headspace? *Indicate in the table below.*	(NA)	Y	N
12. Was C12/Res negative?	(NA)	Y	N

1st 5th 7/13 Sample ID on Bottle	Sample ID on COC	Identified by:
X Sample 1	none	

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
Sample 1	1, 8oz			✓						

Notes, Discrepancies, & Resolutions: Cooler had no cooling agent OR pkg. material. I will attached broken sample label to 2nd page.

See pg 2 of 2 for additional discrepancies

ALS Environmental

44124

CHAIN OF CUSTODY

44124

1317 South 13th Ave. Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

SR# 113148

COC Set____ of____

COC#_____

Project Name: 13-0599	Project Number: 13-0599
Project Manager: Kevin Richardson	
Company: GeoTest Services Inc.	
Address: 741 Marine View Dr., Bellingham, WA	
Phone #: 360-920-1146	email: kevinr@geotestinc.com
Sampler Signature:	Sampler Printed Name: Daniel Craig

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	7D TS-MET / Total Solids	14D 8082A / PCB	14D 8270D / SVOLL	28D 7471B / Hg	180D 6010C / Metals T	1	2	3	4	5	Remarks
1. Lakeside - Anacortes (S1)		10/22/13	8:45		3	X	X	X	X	X						
2. Lakeside - Anacortes (S2)		10/22/13	8:40		3	X	X	X	X	X						
3.																
4.																
5.																
6.																
7.																
8.																
9																
10.																

TAKE SAMPLES TO EXTRALTIONS LAB IMMEDIATELY FOR RUSH ANALYSIS.

Report Requirements

- __ I. Routine Report: Method Blank, Surrogate as required
- X II. Report Dup., MS, MSD as required
- __ III. CLP Like Summary (no raw data)
- __ IV. Data Validation Report
- __ V. EDD

Invoice Information

P.O.# 13-0599

Bill To: GeoTest

Turnaround Requirements

__ 24 hr __ 48 hr.
X 5 Day
__ Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al (As) Sb Ba Be B Ca (Cd) Co (Cr) (Cu) Fe (Pb) Mg Mn Mo Ni K (Ag) Na Se Sr Ti Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

I've been working with Chris Leaf. We have sent previous samples and these need to be run the same criteria (WAC 173-204-320). Need results on this on 10/30/13. RUSH TAT! Thank you for your efforts -Kevin Richardson

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Daniel Craig	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm: GeoTest Services	Firm: 12/23/13 1038	Firm	Firm	Firm	Firm
Date/Time: 10/23/13	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

ALS

PC CL

Cooler Receipt and Preservation Form

Client / Project: Geotest Service Request K13 11480

Received: 10/23/13 Opened: 10/23/13 By: [illegible] Unloaded: 10/23/13 By: [illegible]

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where?_____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
0.1	0.1	-	-	0	382		8043 7769 6747	

4.. Packing material: *Inserts* *Baggies* *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* paper

5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

HSOR

*Notes, Discrepancies, & Resolutions:*_____

*Page*____ *of*____

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): K1311350

Date 10-15-13 Page 1 Of 1

PROJECT ID:
REPORT TO COMPANY: GeoTest Services Inc
PROJECT MANAGER: Kevin Richardson
ADDRESS: 741 Marine View Dr.
7 Bellingham WA
PHONE: 360-920-1146 FAX:
P.O. #: E-MAIL: Kevinr@geotest-inc.com
INVOICE TO COMPANY: GeoTest Services Inc.
ATTENTION: ~~Todd~~ Zoe Hart
ADDRESS:

ANALYSIS REQUESTED

OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐								NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1.																												
2.																												
3.																												
4.																												
5.																												
6.																												
7.																												
8.																												
9.																												
10.																												

7 Run tests per WAC. Same as last Samples. Call with questions

LABORATORY COPY

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Kevin Rw, GeoTst, 10-18-13, 4:13pm
   Received By: H Smith 10/19/13 0980
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 Standard | (5) | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard | 3 | 1 | SAME DAY

OTHER:
Specify:

* Turnaround request less than standard may incur Rush Charges

CL

PC ##

Cooler Receipt and Preservation Form

Client / Project: GeoTest Service Request *K13* 11350

Received: 10/19/13 Opened: 10/19/13 By: KD Unloaded: 10/19/13 By: KD

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where?_____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
8.3	8.4	—	—	+.1	337		8034 4889 3885	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* hard pack ice
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y (N)*
9. Were appropriate bottles/containers and volumes received for the tests indicated? (NA) Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

RUSH

Notes, Discrepancies, & Resolutions: * Boulder Hill - Sample 1 10/18/13 1313

Boulder Hill - Sample 2 10/18/13 1313

Belleville Pit - S1 10/18/13 1458

Belleville Pit - S2 10/18/13 1458

*Page*____ *of*____

COLUMBIA ANALYTICAL SERVICES, INC.
LOG-IN and RE-ISSUE INFORMATION SHEET

Date: 10/31/13

K 1311278, K1311350, K1311480

Sample ID's K1311278-001 ↓ -002

K1311350-001 -002 -003 ↓ -004

K1311480-001 ↓ -002

Received information for this request from:

_____ Project Chemist _____ Bottle Order __X__ Client _____ Bottles

_____ Others (Specify) _____

Re-issue Instructions: Run 9060 TOC ASAP

Re-issue Due Date: Nov 4, 2013 48 hr / 2 Bda

Special Instructions:

RUSH

Analytical Report

Client:	Geo Test Services	**Service Request:**	K1311829
Project:		**Date Collected:**	10/15/13 - 10/22/13
Sample Matrix:	Sediment	**Date Received:**	10/17/13 - 10/23/13
Analysis Method:	9060	**Units:**	Percent
Prep Method:	Method	**Basis:**	Dry, per Method

Carbon, Total Organic (TOC)

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Sample 1	K1311829-001	**1.72**	0.10	1	11/05/13 15:04	11/5/13	
Sample 1 Dup	K1311829-002	**1.99**	0.10	1	11/05/13 16:21	11/5/13	
Boulder Hill-Sample 1	K1311829-003	ND U	0.10	1	11/05/13 16:36	11/5/13	
Boulder Hill-Sample 2	K1311829-004	ND U	0.10	1	11/05/13 16:49	11/5/13	
Belleville Pit-S1	K1311829-005	ND U	0.10	1	11/05/13 17:03	11/5/13	
Belleville Pit-S2	K1311829-006	ND U	0.10	1	11/05/13 17:53	11/5/13	
Lakeside-Anacortes (S1)	K1311829-007	ND U	0.10	1	11/05/13 18:07	11/5/13	
Lakeside-Anacortes (S2)	K1311829-008	ND U	0.10	1	11/05/13 18:21	11/5/13	
Method Blank	K1311829-MB	ND U	0.10	1	11/05/13 14:50	11/5/13	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311829
Project		**Date Collected:**	10/15/13
Sample Matrix:	Sediment	**Date Received:**	10/17/13
		Date Analyzed:	11/05/13

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	Sample 1	**Units:**	Percent
Lab Code:	K1311829-001	**Basis:**	Dry, per Method

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1311829-001DUP Result	Average	RPD	RPD Limit
Carbon, Total Organic (TOC)	9060	0.10	1.72	1.76	1.74	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311829
Project:		**Date Collected:**	10/15/13
Sample Matrix:	Sediment	**Date Received:**	10/17/13
		Date Analyzed:	11/5/13
		Date Extracted:	11/5/13

Duplicate Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name:	Sample 1	**Units:**	Percent
Lab Code:	K1311829-001	**Basis:**	Dry, per Method
Analysis Method:	9060		
Prep Method:	Method		

		Matrix Spike K1311829-001MS			Duplicate Matrix Spike K1311829-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Carbon, Total Organic (TOC)	1.72	7.02	4.62	115	6.78	4.64	109	70-122	3	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311829
Project:		**Date Analyzed:**	11/05/13
Sample Matrix:	Sediment	**Date Extracted:**	11/05/13

Lab Control Sample Summary
Carbon, Total Organic (TOC)

Analysis Method:	9060	**Units:**	Percent
Prep Method:	Method	**Basis:**	Dry, per Method
		Analysis Lot:	366876

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1311829-LCS	0.285	0.28	104	72-122

January 20, 2014

Mr. Alan Hall
Glacier Environmental Services, Inc.
PO Box 1097,
Mukilteo, WA 98275

Dear Mr. Hall,

On January 17th, 1 sample was received by our laboratory and assigned our laboratory project number EV14010090. The project was identified as your Cornet Bay. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Laboratory Group A Campbell Brothers Limited Company

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. PO Box 1097, Mukilteo, WA 98275	DATE: ALS JOB#: ALS SAMPLE#:	1/20/2014 EV14010090 -01
CLIENT CONTACT:	Alan Hall	DATE RECEIVED:	1/17/2014
CLIENT PROJECT:	Cornet Bay	COLLECTION DATE:	1/17/2014 2:45:00 PM
CLIENT SAMPLE ID	Boulder Hill Pit	WDOE ACCREDITATION:	C601

DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	01/20/2014	DLC
Benzene	EPA-8021	U	0.030	1	MG/KG	01/20/2014	DLC
Toluene	EPA-8021	U	0.050	1	MG/KG	01/20/2014	DLC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	01/20/2014	DLC
Xylenes	EPA-8021	U	0.20	1	MG/KG	01/20/2014	DLC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	01/20/2014	EBS
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	01/20/2014	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**117**	01/20/2014	DLC
TFT	EPA-8021	**116**	01/20/2014	DLC
C25	NWTPH-DX	**92.9**	01/20/2014	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc.	DATE:	1/20/2014
	PO Box 1097,	ALS SDG#:	EV14010090
	Mukilteo, WA 98275	WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Alan Hall		
CLIENT PROJECT:	Cornet Bay		

LABORATORY BLANK RESULTS

MBG-011514S - Batch 7537 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	01/16/2014	DLC

MB-011514S - Batch 7537 - Soil by EPA-8021

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8021	U	0.030	1	MG/KG	01/16/2014	DLC
Toluene	EPA-8021	U	0.050	1	MG/KG	01/16/2014	DLC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	01/16/2014	DLC
Xylenes	EPA-8021	U	0.20	1	MG/KG	01/16/2014	DLC

MB-011714S - Batch 7548 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	01/20/2014	EBS
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	01/20/2014	EBS

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ALS Laboratory Group A Campbell Brothers Limited Company

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. PO Box 1097, Mukilteo, WA 98275	DATE: ALS SDG#: WDOE ACCREDITATION:	1/20/2014 EV14010090 C601
CLIENT CONTACT:	Alan Hall		
CLIENT PROJECT:	Cornet Bay		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 7537 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range - BS	NWTPH-GX	67.0			01/16/2014	DLC
TPH-Volatile Range - BSD	NWTPH-GX	64.1	4		01/16/2014	DLC

ALS Test Batch ID: 7537 - Soil by EPA-8021

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
Benzene - BS	EPA-8021	95.2			01/16/2014	DLC
Benzene - BSD	EPA-8021	96.4	1		01/16/2014	DLC
Toluene - BS	EPA-8021	99.2			01/16/2014	DLC
Toluene - BSD	EPA-8021	99.5	0		01/16/2014	DLC
Ethylbenzene - BS	EPA-8021	99.2			01/16/2014	DLC
Ethylbenzene - BSD	EPA-8021	96.9	2		01/16/2014	DLC
Xylenes - BS	EPA-8021	100			01/16/2014	DLC
Xylenes - BSD	EPA-8021	99.0	1		01/16/2014	DLC

ALS Test Batch ID: 7548 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range - BS	NWTPH-DX	98.6			01/17/2014	EBS
TPH-Diesel Range - BSD	NWTPH-DX	102	3		01/17/2014	EBS

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
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Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1401090

Date _____ Page _____ Of _____

PROJECT ID:	Cornet Bay
REPORT TO COMPANY:	Glacier Environmental
PROJECT MANAGER:	Alan Hall
ADDRESS:	PO Box 1097
	Mukilteo WA 98275
PHONE:	425-355-2826 FAX:
P.O. #:	13-028 E-MAIL: alan@glacierenviro.com
INVOICE TO COMPANY:	
ATTENTION:	Alan
ADDRESS:	

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. Baldorhill Pit	1/17/14	2:45	soil	1	X	X	X	X												2	
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: C. Alan Hall 1/17/14 4:15
   Received By: ALS 1/17/14 4:15
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 (Standard) | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) | 3 | X | SAME DAY

OTHER:

Specify: _____

* Turnaround request less than standard may incur Rush Charges

GEOTEST

741 Marine Drive
Bellingham, WA 98225

20611-67th Avenue NE
Arlington, WA 98223

PHONE
360 733_7318

TOLL FREE
888 251_5276

FAX
360 733_7418

October 30, 2013
Job No. 13-0599

Strider Construction, Co. Inc.
4721 Northwest Drive
Bellingham, WA 98226

Attn.: Jerry Curtis, Project Manager

Re: Chemical Analysis Summary Report
Wyman's - Habitat Mitigation Site (Project Pier 1) – Import Fill Qualification
Concrete Nor'West Pits (Belleville – M-268 & Boulder Hill – IS-93)

Dear Mr. Curtis,

GeoTest Services, Inc. is pleased to present this summary report for our chemical analysis sampling conducted at the Belleville Pit located at 8198 Old Hwy. 99 N Rd. in Burlington, WA and the Boulder Hill Pit located at 229 E Henni Rd. in Oak Harbor, WA. Our understanding is that the subject mines will be utilized to import material for the Wyman's - Habitat Mitigation Site (Project Pier 1) located at the Port of Anacortes, Washington. Attached to this letter you will find four sample results (two from each mine) of the chemical analysis testing performed by ALS, dated October 29th, 2013 (service request number K1311350).

Scope of Services

The scope of our services consisted of sampling the subject pits (Belleville and Boulder Hill) and shipping the four samples (two from each pit) to ALS Environmental Laboratory in Kelso, WA. Specifically the scope of our services included the following:

- Sampling of the 1½" dredged screened stockpile at the Belleville Pit in Burlington, WA and the west bank at the Boulder Hill Pit in Oak Harbor, WA.
- Submittal of the obtained samples to an independent analytical laboratory for analysis.
- Generation of this summary report.

Soil Sampling Methodology

Belleville Pit:
GeoTest obtained two samples from the Belleville Pit on October 18th, 2013. The samples were obtained from the 1½" dredged screened stockpile at the end of a conveyor belt. Sample labeled as Belleville Pit-S1 was obtained on the north side of the stockpile. Sample labeled as Belleville Pit-S2 was obtained on the south side of the stockpile. The material was being dredged and screened and several stockpiles were observed including a stockpile with large cobbles. During the time of our sampling, we observed no indications of potential contamination sources within the subject sand and

gravel mine. Soil sample labeled Belleville Pit-S1 was transferred into one eight oz. jar and two four oz. jars at the pit. Soil sample labeled Belleville Pit-S2 was transferred into one eight oz. jar and two four oz. jars labeled Belleville Pit-S2. All of the sample containers provided by the analytical laboratory were pre-cleaned with no preservatives necessary. Each container was placed immediately in a cooler and shipped overnight via FedEx on October 18th, 2013 to ALS Laboratory Group, located in Kelso, Washington. Sample collecting, handling, chain of custody records and protocol were maintained throughout the project.

Boulder Hill Pit:

GeoTest obtained two samples from the Boulder Hill Pit on October 18th, 2013. The samples were obtained from the west bank approximately six feet above existing ground surface. It is our understanding that the west bank is where material will be mined from for the Wyman's project. Sample labeled as Boulder Hill-Sample 1 was obtained from the north side of the west bank. Sample labeled as Boulder Hill-Sample 2 was obtained on the south side of the west bank. During the time of our sampling, we observed no indications of potential contamination sources within the subject sand and gravel mine. Soil sample labeled Boulder Hill-Sample 1 was transferred into two eight oz. jars at the pit. Soil sample labeled Boulder Hill-Sample 2 was transferred into two eight oz. jars at the pit. All of the sample containers provided by the analytical laboratory were pre-cleaned with no preservatives necessary. Each container was placed immediately in a cooler and shipped overnight via FedEx on October 18th, 2013 to ALS Laboratory Group, located in Kelso, Washington. Sample collecting, handling, chain of custody records and protocol were maintained throughout the project.

Sampling Summary

In accordance with the client's request and the project requirements, the samples were analyzed in accordance with WAC 173-204 for 8 specific metals by methods 6010C and 7471B, polychlorinated biphenyls (PCBs) by method EPA 8082A and semivolatile organic compounds (SVOC) by method EPA 8270D.

Results of the analysis were received on October 29, 2013 and verified that the subject material proposed for use was free of any identified contamination, based on the analysis performed, with all results well below the referenced WAC 173-204-320, Table 1, Marine Sediment Quality Standards. The individual laboratory data sheets and the chain of custody form are attached to this report for reference.

Limitations

We assume the sampled and/or subsurface conditions are representative of the subject site. However, subsurface conditions may vary with time and between locations evaluated. We have prepared this report exclusively for the use of Strider Construction Co., Inc. and their representatives. This report is not intended for use by others and the information contained herein is not applicable to other materials or sites.

The analyses and conclusions provided in this report are based on sampling performed by GeoTest Services Inc., state and federal regulatory guidelines and our experience and judgment. Our work has been performed in a manner consistent with the level of

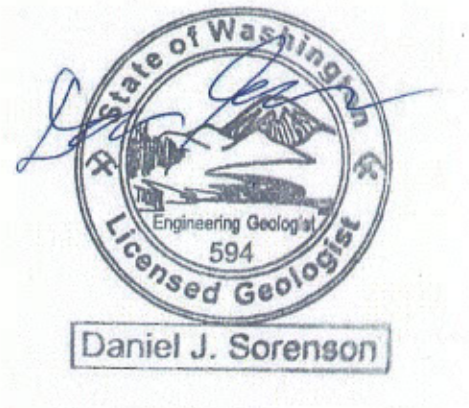
care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in this area. No warranty, expressed or implied, is made.

As a condition of our services, it is understood that, to the fullest extent permitted by law, our clients agree to defend, indemnify and hold harmless GeoTest Services, Inc., its owners, employees, subcontractors and agents, from any (past, present, or future) pollution-related claims or damages at the site, including potential claims from third parties that may name GeoTest Services, Inc., as a claimant.

We appreciate the opportunity to be of service to you on this project. If any questions should arise regarding this report, please contact the undersigned.

Respectfully submitted,
GeoTest Services, Inc.

Kevin Richardson
Project Manager



Dan Sorenson L.E.G.
Engineering Geologist
Environmental Professional

Attachments: Chemical Analysis Lab Results/Chain of Custody (41 pages)

October 29, 2013 Analytical Report for Service Request No: K1311350

Kevin Richardson
Geo Test Services
741 Marine Drive
Bellingham, WA 98225

Dear Kevin:

Enclosed are the results of the samples submitted to our laboratory on October 19, 2013. For your reference, these analyses have been assigned our service request number K1311350.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3275. You may also contact me via Email at Chris.Leaf@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Chris Leaf
Project Manager

CL/mj

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 USA | PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp. Part of the ALS Group An ALS Limited Company
Environmental www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#ccl	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Geo Test Services	**Service Request No.:**	K1311350
Project:	NA	**Date Received:**	10/19/2013
Sample Matrix:	Sediment		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt

Four sediment samples were received for analysis at ALS Environmental on 10/19/2013. The samples were received in good condition and consistent with the accompanying chain of custody form except as noted on the cooler receipt and preservation form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Total Metals

No anomalies associated with the analysis of these samples were observed.

PCB Aroclors by EPA Method 8082

Second Source Exceptions:
The analysis of PCB Aroclors by EPA 8082A requires the use of dual column confirmation. The Initial Calibration Verification (ICV) evaluation criteria were not met on the confirmation column for Aroclor 1232 in CAL12822. The ICV criteria were met on the alternate column. The data quality was not affected. No further corrective action was necessary.

No other anomalies associated with the analysis of these samples were observed.

Semivolatile Organic Compounds by EPA Method 8270

Calibration Verification Exceptions:
The following analytes were flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS26\1028F003.D: Benzo(b)fluoranthene. In accordance with the EPA Method, 80% or more of the CCV analytes must have passed within 20% of the true value. The remaining analytes are allowed a 40% difference as per the ALS SOP. The CCV met these criteria. No further corrective action was required.

No other anomalies associated with the analysis of these samples were observed.

Approved by 

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): K1311350

Date 10-15-13 Page 1 Of 1

PROJECT ID:	
REPORT TO COMPANY:	GeoTest Services Inc
PROJECT MANAGER:	Kevin Richardson
ADDRESS:	741 Marine View Dr. Bellingham WA
PHONE:	360-920-1146 FAX:
P.O. #:	E-MAIL: Kevin@geotest-inc.com
INVOICE TO COMPANY:	GeoTest Services Inc.
ATTENTION:	~~Todd~~ Zoe Hart
ADDRESS:	

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1.																						
2.																						
3.																						
4.																						
5.																						
6.																						
7.	SS	Run tests per WAC. Same as last Samples. Call with questions																				
8.																						
9.																						
10.																						

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Kevin Rev, GeoTest, 10-18-13, 4:13pm
   Received By: K Smith 10/19/13 0930
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 (Standard) | (5) | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) | 3 | 1 | SAME DAY

OTHER: Specify:

* Turnaround request less than standard may incur Rush Charges

LABORATORY COPY

CL

PC ##

Cooler Receipt and Preservation Form

Client / Project: GeoTest Service Request *K13* 11350

Received: 10/19/13 Opened: 10/19/13 By: KD Unloaded: 10/19/13 By: KD

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where?_____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
8.3	8.4	—	—	+.1	337		8034 4859 3885	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* hard pack ice
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y (N)*
9. Were appropriate bottles/containers and volumes received for the tests indicated? (NA) Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

RUSH

Notes, Discrepancies, & Resolutions: *Boulder Hill - Sample 1 10/18/13 1313

Boulder Hill - Sample 2 10/18/13 1313

Belleville Pit - S1 10/18/13 1458

Belleville Pit - S2 10/18/13 1458

*Page*____ *of*____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
Boulder Hill-Sample 1	K1311350-001	10/18/2013	10/19/2013	10/24/2013	92.7	
Boulder Hill-Sample 2	K1311350-002	10/18/2013	10/19/2013	10/24/2013	95.3	
Belleville Pit-S1	K1311350-003	10/18/2013	10/19/2013	10/24/2013	95.3	
Belleville Pit-S2	K1311350-004	10/18/2013	10/19/2013	10/24/2013	92.2	

ALS Group USA, Corp.
dba ALS Environmental

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Geo Test Services **Service Request:** K1311350
Project Name:
Project No.:

Sample Name:	Lab Code:
Batch QC1D	K1310745-001D
Batch QC1S	K1310745-001S
Batch QC2D	K1311196-001D
Batch QC2S	K1311196-001S
Boulder Hill-Sample 1	K1311350-001
Boulder Hill-Sample 2	K1311350-002
Belleville Pit-S1	K1311350-003
Belleville Pit-S2	K1311350-004
Method Blank	K1311350-MB

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Date Collected:**	10/18/13
Project Name:	NA	**Date Received:**	10/19/13
Matrix:	SEDIMENT	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: Boulder Hill-Sample 1 **Lab Code:** K1311350-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	4.1	2.0	10/21/13	10/22/13	4.1	U	
Cadmium	6010C	0.2	2.0	10/21/13	10/22/13	0.2	U	
Chromium	6010C	0.8	2.0	10/21/13	10/22/13	21.5		
Copper	6010C	0.8	2.0	10/21/13	10/22/13	33.0		
Lead	6010C	2.1	2.0	10/21/13	10/22/13	2.2		
Mercury	7471B	0.02	1.0	10/22/13	10/23/13	0.02		
Silver	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Zinc	6010C	1.0	2.0	10/21/13	10/22/13	36.6		

% Solids: 92.7

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Geo Test Services
Project No.: NA
Project Name: NA
Matrix: SEDIMENT

Service Request: K1311350
Date Collected: 10/18/13
Date Received: 10/19/13
Units: mg/Kg
Basis: DRY

Sample Name: Boulder Hill-Sample 2 **Lab Code:** K1311350-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.7	2.0	10/21/13	10/22/13	3.7	U	
Cadmium	6010C	0.2	2.0	10/21/13	10/22/13	0.2	U	
Chromium	6010C	0.7	2.0	10/21/13	10/22/13	17.5		
Copper	6010C	0.7	2.0	10/21/13	10/22/13	20.0		
Lead	6010C	1.9	2.0	10/21/13	10/22/13	2.5		
Mercury	7471B	0.02	1.0	10/22/13	10/23/13	0.03		
Silver	6010C	0.7	2.0	10/21/13	10/22/13	0.7	U	
Zinc	6010C	0.93	2.0	10/21/13	10/22/13	28.5		

% Solids: 95.3

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Date Collected:**	10/18/13
Project Name:	NA	**Date Received:**	10/19/13
Matrix:	SEDIMENT	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: Belleville Pit-S1 **Lab Code:** K1311350-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.8	2.0	10/21/13	10/22/13	3.8	U	
Cadmium	6010C	0.2	2.0	10/21/13	10/22/13	0.2	U	
Chromium	6010C	0.8	2.0	10/21/13	10/22/13	18.7		
Copper	6010C	0.8	2.0	10/21/13	10/22/13	17.1		
Lead	6010C	1.9	2.0	10/21/13	10/22/13	2.2		
Mercury	7471B	0.02	1.0	10/22/13	10/23/13	0.02	U	
Silver	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Zinc	6010C	0.94	2.0	10/21/13	10/22/13	29.7		

% Solids: 95.3

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Date Collected:**	10/18/13
Project Name:	NA	**Date Received:**	10/19/13
Matrix:	SEDIMENT	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: Belleville Pit-S2 **Lab Code:** K1311350-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.8	2.0	10/21/13	10/22/13	3.8	U	
Cadmium	6010C	0.2	2.0	10/21/13	10/22/13	0.2	U	
Chromium	6010C	0.8	2.0	10/21/13	10/22/13	24.7		
Copper	6010C	0.8	2.0	10/21/13	10/22/13	25.7		
Lead	6010C	1.9	2.0	10/21/13	10/22/13	2.5		
Mercury	7471B	0.02	1.0	10/22/13	10/23/13	0.02	U	
Silver	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Zinc	6010C	0.94	2.0	10/21/13	10/22/13	37.5		

% Solids: 92.2

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Geo Test Services
Service Request: K1311350
Project No.: NA
Date Collected:
Project Name: NA
Date Received:
Matrix: SEDIMENT
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank
Lab Code: K1311350-MB

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	4.0	2.0	10/21/13	10/22/13	4.0	U	
Cadmium	6010C	0.2	2.0	10/21/13	10/22/13	0.2	U	
Chromium	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Copper	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Lead	6010C	2.0	2.0	10/21/13	10/22/13	2.0	U	
Mercury	7471B	0.02	1.0	10/22/13	10/23/13	0.02	U	
Silver	6010C	0.8	2.0	10/21/13	10/22/13	0.8	U	
Zinc	6010C	1.0	2.0	10/21/13	10/22/13	1.0	U	

% Solids: 100.0

Comments:

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Units:**	MG/KG
Project Name:	NA	**Basis:**	DRY
Matrix:	SOIL	**% Solids:**	99.9

Sample Name: Batch QC1S **Lab Code:** K1310745-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	84.1		3.9	U	98.10	85.7		6010C
Cadmium	75 - 125	8.7		0.2		9.81	86.6		6010C
Chromium	75 - 125	38.1		2.5		39.20	90.8		6010C
Copper	75 - 125	48.8		5.7		49.10	87.8		6010C
Lead	75 - 125	91.0		7.2		98.10	85.4		6010C
Silver	75 - 125	8.7		0.8	U	9.81	88.7		6010C
Zinc	75 - 125	90.0		4.6		98.10	87.1		6010C

An empty field in the Control Limit column indicates the control limit is not applicable

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Units:**	MG/KG
Project Name:	NA	**Basis:**	As Rec
Matrix:	SOIL		

Sample Name: Batch QC2S **Lab Code:** K1311196-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Mercury	80 - 120	0.49		0.08		0.41	100.0		7471B

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

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DUPLICATES

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Units:**	MG/KG
Project Name:	NA	**Basis:**	DRY
Matrix:	SOIL	**% Solids:**	99.9

Sample Name: Batch QC1D **Lab Code:** K1310745-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		3.9	U	3.9	U			6010C
Cadmium		0.2		0.2	U	200.0		6010C
Chromium		2.5		2.5		0.0		6010C
Copper	20	5.7		5.8		1.7		6010C
Lead		7.2		6.6		8.7		6010C
Silver		0.8	U	0.8	U			6010C
Zinc		4.6		4.6		0.0		6010C

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

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DUPLICATES

Client:	Geo Test Services	**Service Request:**	K1311350
Project No.:	NA	**Units:**	MG/KG
Project Name:	NA	**Basis:**	As Rec
Matrix:	SOIL		

Sample Name: Batch QC2D **Lab Code:** K1311196-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Mercury		0.08		0.08		0.0		7471B

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals
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LABORATORY CONTROL SAMPLE

Client: Geo Test Services **Service Request:** K1311350

Project No.: NA

Project Name: NA

Aqueous LCS Source: **Solid LCS Source:** ERA D076-540

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits		%R
Arsenic				94.5	98.3		82	117	104.0
Cadmium				60.5	57.3		83	117	94.7
Chromium				70.4	66.9		82	118	95.0
Copper				79.6	85.1		84	116	106.9
Lead				91.8	88.2		82	118	96.1
Mercury				3.73	3.67		72	128	98.4
Silver				34.4	35.1		66	134	102.0
Zinc				140	135		82	118	96.4

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Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Polychlorinated Biphenyls (PCBs)

Sample Name:	Boulder Hill-Sample 1	**Units:**	mg/Kg
Lab Code:	K1311350-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1221	ND	U	0.11	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1232	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1242	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1248	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1254	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1260	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	87	43-148	10/25/13	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Polychlorinated Biphenyls (PCBs)

Sample Name:	Boulder Hill-Sample 2	**Units:**	mg/Kg
Lab Code:	K1311350-002	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1221	ND	U	0.11	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1232	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1242	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1248	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1254	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1260	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	87	43-148	10/25/13	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Polychlorinated Biphenyls (PCBs)

Sample Name:	Belleville Pit-S1	**Units:**	mg/Kg
Lab Code:	K1311350-003	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1221	ND	U	0.11	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1232	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1242	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1248	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1254	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1260	ND	U	0.052	1	10/22/13	10/25/13	KWG1311883	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	83	43-148	10/25/13	Acceptable

Comments:

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Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Polychlorinated Biphenyls (PCBs)

Sample Name:	Belleville Pit-S2	**Units:**	mg/Kg
Lab Code:	K1311350-004	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1221	ND	U	0.11	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1232	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1242	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1248	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1254	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	
Aroclor 1260	ND	U	0.054	1	10/22/13	10/25/13	KWG1311883	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	78	43-148	10/25/13	Acceptable

Comments:

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Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA

Polychlorinated Biphenyls (PCBs)

Sample Name:	Method Blank	**Units:**	mg/Kg
Lab Code:	KWG1311883-4	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1221	ND	U	0.099	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1232	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1242	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1248	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1254	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	
Aroclor 1260	ND	U	0.050	1	10/22/13	10/24/13	KWG1311883	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	81	43-148	10/24/13	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Geo Test Services **Service Request:** K1311350
Project:
Sample Matrix: Sediment

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3541 **Units:** Percent
Analysis Method: 8082A **Level:** Low

Sample Name	Lab Code	Sur1
Batch QC	K1311278-001	100
Boulder Hill-Sample 1	K1311350-001	87
Boulder Hill-Sample 2	K1311350-002	87
Belleville Pit-S1	K1311350-003	83
Belleville Pit-S2	K1311350-004	78
Method Blank	KWG1311883-4	81
Batch QCMS	KWG1311883-1	70
Batch QCDMS	KWG1311883-2	103
Lab Control Sample	KWG1311883-3	102

Surrogate Recovery Control Limits (%)

Sur1	Decachlorobiphenyl	43-148

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

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QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Extracted:**	10/22/2013
Sample Matrix:	Sediment	**Date Analyzed:**	10/24/2013 - 10/25/2013

Matrix Spike/Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs)

Sample Name:	Batch QC	**Units:**	mg/Kg
Lab Code:	K1311278-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A	**Extraction Lot:**	KWG1311883

		Batch QCMS KWG1311883-1 Matrix Spike			Batch QCDMS KWG1311883-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1016	ND	0.444	0.705	63	0.637	0.701	91	23-145	36	40
Aroclor 1260	ND	0.462	0.705	65	0.656	0.701	94	24-148	35	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Extracted:**	10/22/2013
Sample Matrix:	Sediment	**Date Analyzed:**	10/24/2013

Lab Control Spike Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method:	EPA 3541	**Units:**	mg/Kg
Analysis Method:	8082A	**Basis:**	Dry
		Level:	Low
		Extraction Lot:	KWG1311883

Lab Control Sample
KWG1311883-3
Lab Control Spike

Analyte Name	Result	Spike Amount	%Rec	%Rec Limits
Aroclor 1016	0.851	1.00	85	42-122
Aroclor 1260	0.917	1.00	92	50-124

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Boulder Hill-Sample 1	**Units:**	ug/Kg
Lab Code:	K1311350-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	28	1	10/22/13	10/28/13	KWG1311653	
1,4-Dichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
1,2-Dichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzyl Alcohol	ND	U	19	1	10/22/13	10/28/13	KWG1311653	
2-Methylphenol	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
4-Methylphenol†	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
2,4-Dimethylphenol	ND	U	46	1	10/22/13	10/28/13	KWG1311653	
Benzoic Acid	ND	U	400	1	10/22/13	10/28/13	KWG1311653	
1,2,4-Trichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Naphthalene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobutadiene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
2-Methylnaphthalene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Acenaphthylene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dimethyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Acenaphthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dibenzofuran	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Fluorene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Diethyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
N-Nitrosodiphenylamine	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Pentachlorophenol	ND	U	92	1	10/22/13	10/28/13	KWG1311653	
Phenanthrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Di-n-butyl Phthalate	ND	U	19	1	10/22/13	10/28/13	KWG1311653	
Fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Butyl Benzyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benz(a)anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Chrysene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Bis(2-ethylhexyl) Phthalate	ND	U	92	1	10/22/13	10/28/13	KWG1311653	
Di-n-octyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(b)fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(k)fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	

Comments:

Analytical Results

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Collected: 10/18/2013
Date Received: 10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Boulder Hill-Sample 1
Lab Code: K1311350-001

Extraction Method: EPA 3541
Analysis Method: 8270D

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(a)pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Indeno(1,2,3-cd)pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dibenz(a,h)anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(g,h,i)perylene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Phenol-d6	46	20-86	10/28/13	Acceptable
Nitrobenzene-d5	48	27-91	10/28/13	Acceptable
2-Fluorobiphenyl	53	25-97	10/28/13	Acceptable
2,4,6-Tribromophenol	38	10-119	10/28/13	Acceptable
Terphenyl-d14	64	33-129	10/28/13	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

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Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Boulder Hill-Sample 2	**Units:**	ug/Kg
Lab Code:	K1311350-002	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	27	1	10/22/13	10/28/13	KWG1311653	
1,4-Dichlorobenzene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
1,2-Dichlorobenzene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Benzyl Alcohol	ND	U	18	1	10/22/13	10/28/13	KWG1311653	
2-Methylphenol	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
4-Methylphenol†	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
2,4-Dimethylphenol	ND	U	45	1	10/22/13	10/28/13	KWG1311653	
Benzoic Acid	ND	U	400	1	10/22/13	10/28/13	KWG1311653	
1,2,4-Trichlorobenzene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Naphthalene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobutadiene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
2-Methylnaphthalene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Acenaphthylene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Dimethyl Phthalate	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Acenaphthene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Dibenzofuran	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Fluorene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Diethyl Phthalate	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
N-Nitrosodiphenylamine	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobenzene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Pentachlorophenol	ND	U	89	1	10/22/13	10/28/13	KWG1311653	
Phenanthrene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Anthracene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Di-n-butyl Phthalate	ND	U	18	1	10/22/13	10/28/13	KWG1311653	
Fluoranthene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Pyrene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Butyl Benzyl Phthalate	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Benz(a)anthracene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Chrysene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Bis(2-ethylhexyl) Phthalate	ND	U	89	1	10/22/13	10/28/13	KWG1311653	
Di-n-octyl Phthalate	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Benzo(b)fluoranthene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Benzo(k)fluoranthene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	

Comments:

Analytical Results

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Collected: 10/18/2013
Date Received: 10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Boulder Hill-Sample 2
Lab Code: K1311350-002

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8270D

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(a)pyrene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Indeno(1,2,3-cd)pyrene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Dibenz(a,h)anthracene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	
Benzo(g,h,i)perylene	ND	U	8.9	1	10/22/13	10/28/13	KWG1311653	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Phenol-d6	49	20-86	10/28/13	Acceptable
Nitrobenzene-d5	50	27-91	10/28/13	Acceptable
2-Fluorobiphenyl	57	25-97	10/28/13	Acceptable
2,4,6-Tribromophenol	42	10-119	10/28/13	Acceptable
Terphenyl-d14	69	33-129	10/28/13	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Collected: 10/18/2013
Date Received: 10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Belleville Pit-S1
Lab Code: K1311350-003

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8270D

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	27	1	10/22/13	10/28/13	KWG1311653	
1,4-Dichlorobenzene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
1,2-Dichlorobenzene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Benzyl Alcohol	ND	U	18	1	10/22/13	10/28/13	KWG1311653	
2-Methylphenol	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
4-Methylphenol†	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
2,4-Dimethylphenol	ND	U	45	1	10/22/13	10/28/13	KWG1311653	
Benzoic Acid	ND	U	400	1	10/22/13	10/28/13	KWG1311653	
1,2,4-Trichlorobenzene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Naphthalene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobutadiene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
2-Methylnaphthalene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Acenaphthylene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Dimethyl Phthalate	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Acenaphthene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Dibenzofuran	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Fluorene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Diethyl Phthalate	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
N-Nitrosodiphenylamine	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobenzene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Pentachlorophenol	ND	U	90	1	10/22/13	10/28/13	KWG1311653	
Phenanthrene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Anthracene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Di-n-butyl Phthalate	ND	U	18	1	10/22/13	10/28/13	KWG1311653	
Fluoranthene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Pyrene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Butyl Benzyl Phthalate	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Benz(a)anthracene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Chrysene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Bis(2-ethylhexyl) Phthalate	ND	U	90	1	10/22/13	10/28/13	KWG1311653	
Di-n-octyl Phthalate	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Benzo(b)fluoranthene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Benzo(k)fluoranthene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	

Comments:

Analytical Results

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Collected: 10/18/2013
Date Received: 10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Belleville Pit-S1
Lab Code: K1311350-003

Extraction Method: EPA 3541
Analysis Method: 8270D

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(a)pyrene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Indeno(1,2,3-cd)pyrene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Dibenz(a,h)anthracene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	
Benzo(g,h,i)perylene	ND	U	9.0	1	10/22/13	10/28/13	KWG1311653	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Phenol-d6	40	20-86	10/28/13	Acceptable
Nitrobenzene-d5	42	27-91	10/28/13	Acceptable
2-Fluorobiphenyl	47	25-97	10/28/13	Acceptable
2,4,6-Tribromophenol	36	10-119	10/28/13	Acceptable
Terphenyl-d14	65	33-129	10/28/13	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Belleville Pit-S2	**Units:**	ug/Kg
Lab Code:	K1311350-004	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	28	1	10/22/13	10/28/13	KWG1311653	
1,4-Dichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
1,2-Dichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzyl Alcohol	ND	U	19	1	10/22/13	10/28/13	KWG1311653	
2-Methylphenol	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
4-Methylphenol†	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
2,4-Dimethylphenol	ND	U	46	1	10/22/13	10/28/13	KWG1311653	
Benzoic Acid	ND	U	400	1	10/22/13	10/28/13	KWG1311653	
1,2,4-Trichlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Naphthalene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobutadiene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
2-Methylnaphthalene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Acenaphthylene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dimethyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Acenaphthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dibenzofuran	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Fluorene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Diethyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
N-Nitrosodiphenylamine	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobenzene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Pentachlorophenol	ND	U	92	1	10/22/13	10/28/13	KWG1311653	
Phenanthrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Di-n-butyl Phthalate	ND	U	19	1	10/22/13	10/28/13	KWG1311653	
Fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Butyl Benzyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benz(a)anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Chrysene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Bis(2-ethylhexyl) Phthalate	ND	U	92	1	10/22/13	10/28/13	KWG1311653	
Di-n-octyl Phthalate	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(b)fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(k)fluoranthene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	

Comments:

Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	10/18/2013
Sample Matrix:	Sediment	**Date Received:**	10/19/2013

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Belleville Pit-S2	**Units:**	ug/Kg
Lab Code:	K1311350-004	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(a)pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Indeno(1,2,3-cd)pyrene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Dibenz(a,h)anthracene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	
Benzo(g,h,i)perylene	ND	U	9.2	1	10/22/13	10/28/13	KWG1311653	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Phenol-d6	48	20-86	10/28/13	Acceptable
Nitrobenzene-d5	48	27-91	10/28/13	Acceptable
2-Fluorobiphenyl	56	25-97	10/28/13	Acceptable
2,4,6-Tribromophenol	47	10-119	10/28/13	Acceptable
Terphenyl-d14	67	33-129	10/28/13	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	KWG1311653-5	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Phenol	ND	U	20	1	10/22/13	10/28/13	KWG1311653	
1,4-Dichlorobenzene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
1,2-Dichlorobenzene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Benzyl Alcohol	ND	U	14	1	10/22/13	10/28/13	KWG1311653	
2-Methylphenol	ND	U	7.5	1	10/22/13	10/28/13	KWG1311653	
4-Methylphenol†	ND	U	7.5	1	10/22/13	10/28/13	KWG1311653	
2,4-Dimethylphenol	ND	U	33	1	10/22/13	10/28/13	KWG1311653	
Benzoic Acid	ND	U	400	1	10/22/13	10/28/13	KWG1311653	
1,2,4-Trichlorobenzene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Naphthalene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobutadiene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
2-Methylnaphthalene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Acenaphthylene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Dimethyl Phthalate	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Acenaphthene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Dibenzofuran	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Fluorene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Diethyl Phthalate	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
N-Nitrosodiphenylamine	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Hexachlorobenzene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Pentachlorophenol	ND	U	66	1	10/22/13	10/28/13	KWG1311653	
Phenanthrene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Anthracene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Di-n-butyl Phthalate	ND	U	14	1	10/22/13	10/28/13	KWG1311653	
Fluoranthene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Pyrene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Butyl Benzyl Phthalate	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Benz(a)anthracene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Chrysene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Bis(2-ethylhexyl) Phthalate	ND	U	66	1	10/22/13	10/28/13	KWG1311653	
Di-n-octyl Phthalate	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Benzo(b)fluoranthene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Benzo(k)fluoranthene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	

Comments:

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Collected: NA
Date Received: NA

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: KWG1311653-5

Extraction Method: EPA 3541
Analysis Method: 8270D

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(a)pyrene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Indeno(1,2,3-cd)pyrene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Dibenz(a,h)anthracene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	
Benzo(g,h,i)perylene	ND	U	6.6	1	10/22/13	10/28/13	KWG1311653	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Phenol-d6	50	20-86	10/28/13	Acceptable
Nitrobenzene-d5	52	27-91	10/28/13	Acceptable
2-Fluorobiphenyl	57	25-97	10/28/13	Acceptable
2,4,6-Tribromophenol	42	10-119	10/28/13	Acceptable
Terphenyl-d14	78	33-129	10/28/13	Acceptable

† **Analyte Comments**

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol

Comments:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Geo Test Services **Service Request:** K1311350
Project:
Sample Matrix: Sediment

Surrogate Recovery Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3541 **Units:** Percent
Analysis Method: 8270D **Level:** Low

Sample Name	Lab Code	Sur1	Sur2	Sur3	Sur4	Sur5
Boulder Hill-Sample 1	K1311350-001	46	48	53	38	64
Boulder Hill-Sample 2	K1311350-002	49	50	57	42	69
Belleville Pit-S1	K1311350-003	40	42	47	36	65
Belleville Pit-S2	K1311350-004	48	48	56	47	67
Method Blank	KWG1311653-5	50	52	57	42	78
Boulder Hill-Sample 1MS	KWG1311653-1	48	49	55	53	59
Boulder Hill-Sample 1DMS	KWG1311653-2	44	44	48	48	59
Lab Control Sample	KWG1311653-3	43	43	49	50	59
Duplicate Lab Control Sample	KWG1311653-4	33	32	36	35	46

Surrogate Recovery Control Limits (%)

Sur1 = Phenol-d6	20-86	Sur5 = Terphenyl-d14	33-129
Sur2 = Nitrobenzene-d5	27-91		
Sur3 = 2-Fluorobiphenyl	25-97		
Sur4 = 2,4,6-Tribromophenol	10-119		

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Geo Test Services	**Service Request:**	K1311350
Project:		**Date Extracted:**	10/22/2013
Sample Matrix:	Sediment	**Date Analyzed:**	10/28/2013

Matrix Spike/Duplicate Matrix Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Boulder Hill-Sample 1	**Units:**	ug/Kg
Lab Code:	K1311350-001	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270D	**Extraction Lot:**	KWG1311653

		Boulder Hill-Sample 1MS			Boulder Hill-Sample 1DMS					
		KWG1311653-1 Matrix Spike			KWG1311653-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Phenol	ND	132	228	58	117	228	51	15-98	12	40
1,4-Dichlorobenzene	ND	128	228	56	117	228	51	19-93	9	40
1,2,4-Trichlorobenzene	ND	134	228	59	122	228	53	23-99	9	40
Acenaphthene	ND	145	228	64	128	228	56	10-132	12	40
Diethyl Phthalate	ND	140	228	62	111	228	49	10-135	23	40
Pentachlorophenol	ND	119	228	52	101	228	44	10-123	16	40
Pyrene	ND	170	228	75	169	228	74	17-129	0	40
Benzo(a)pyrene	ND	169	228	74	168	228	73	13-126	1	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Extracted: 10/22/2013
Date Analyzed: 10/28/2013

Lab Control Spike/Duplicate Lab Control Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3541
Analysis Method: 8270D

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1311653

	Lab Control Sample KWG1311653-3 Lab Control Spike			Duplicate Lab Control Sample KWG1311653-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Phenol	135	250	54	98.8	250	40	27-97	31	40
1,4-Dichlorobenzene	131	250	52	95.9	250	38	28-89	31	40
1,2-Dichlorobenzene	131	250	52	96.5	250	39	27-91	30	40
Benzyl Alcohol	108	250	43	74.7	250	30	25-103	36	40
2-Methylphenol	131	250	52	94.3	250	38	18-95	32	40
4-Methylphenol	143	250	57	101	250	40	17-99	35	40
2,4-Dimethylphenol	409	750	55	298	750	40	10-93	31	40
Benzoic Acid	114	750	15	107	750	14	10-96	6	40
1,2,4-Trichlorobenzene	137	250	55	99.0	250	40	27-94	32	40
Naphthalene	137	250	55	98.4	250	39	27-93	32	40
Hexachlorobutadiene	135	250	54	97.9	250	39	25-96	32	40
2-Methylnaphthalene	147	250	59	104	250	41	27-96	34	40
Acenaphthylene	158	250	63	107	250	43	33-99	39	40
Dimethyl Phthalate	168	250	67	114	250	45	39-100	39	40
Acenaphthene	148	250	59	101	250	41	32-91	37	40
Dibenzofuran	152	250	61	103	250	41	34-92	38	40
Fluorene	153	250	61	103	250	41	32-96	39	40
Diethyl Phthalate	166	250	66	119	250	47	41-100	33	40
N-Nitrosodiphenylamine	143	250	57	99.4	250	40	36-96	36	40
Hexachlorobenzene	161	250	64	113	250	45	40-99	35	40
Pentachlorophenol	137	250	55	108	250	43	21-97	24	40
Phenanthrene	165	250	66	118	250	47	39-98	34	40
Anthracene	163	250	65	115	250	46	40-98	35	40
Di-n-butyl Phthalate	181	250	72	139	250	56	42-109	26	40
Fluoranthene	170	250	68	129	250	51	42-104	28	40
Pyrene	190	250	76	141	250	56	45-106	30	40
Butyl Benzyl Phthalate	178	250	71	136	250	54	45-111	27	40
Benz(a)anthracene	177	250	71	133	250	53	44-108	28	40
Chrysene	169	250	68	128	250	51	46-108	28	40
Bis(2-ethylhexyl) Phthalate	183	250	73	208	250	83	47-110	13	40
Di-n-octyl Phthalate	180	250	72	141	250	56	45-109	24	40
Benzo(b)fluoranthene	186	250	74	138	250	55	46-106	30	40
Benzo(k)fluoranthene	157	250	63	117	250	47	47-107	29	40
Benzo(a)pyrene	187	250	75	138	250	55	42-110	30	40
Indeno(1,2,3-cd)pyrene	205	250	82	157	250	63	47-109	27	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Geo Test Services
Project:
Sample Matrix: Sediment

Service Request: K1311350
Date Extracted: 10/22/2013
Date Analyzed: 10/28/2013

Lab Control Spike/Duplicate Lab Control Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3541
Analysis Method: 8270D

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1311653

	Lab Control Sample KWG1311653-3 Lab Control Spike			Duplicate Lab Control Sample KWG1311653-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Dibenz(a,h)anthracene	169	250	68	124	250	49	47-106	31	40
Benzo(g,h,i)perylene	157	250	63	117	250	47	44-108	29	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

CNW
CONCRETE NOR'WEST
P.O. BOX 280 • MOUNT VERNON, WASHINGTON 98273-0280
(360) 757-3121 • FAX (360) 757-3816

January 24, 2014
Mr. Eric Hay QAQC Officer
Glacier Environmental Services, Inc.
PO Box 1097
Mukilteo, WA 98275

RE: Cornet Bay Project
Certification of Origin Letter

Mr. Eric Hay,

We have submitted the following products for supply to the project designated as "Coronet Bay" located on north Whidbey Island.

CSTC (crushed surfacing top course)
CSBC (crushed surfacing base course)
Ready Mix Rock (backfill for drains)
Gravel Borrow
Pea Gravel
Sand

These products are mined directly from the Boulder Pit, 229 E Henni Road, Oak Harbor WA. Only materials mined from the Boulder Pit will be delivered to the Coronet Bay project by Concrete Nor'West. These products will meet the environmental standards as we have previously so stated.

Submitted by,

Dave Enders

Dave Enders
Asst. General Manager
Concrete Nor'West

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 7 March 2014
SERIAL NO.: 76
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 76
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	NET			Dewatering Water Treatment Plan

Comment(s):

1.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	x
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **76**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **2/5/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 23 19**	**31 23 19-1**	**Dewatering and Water Treatment Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Dewatering Water Treatment Plan

Cornet Bay Marina Remediation Project
Oak Harbor, WA

Prepared For

Glacier Environmental Services, Inc.
Lynnwood, WA

Prepared By

Clear Creek Systems, Inc.
12604 Interurban, Ave South, Suite 100
Tukwila, WA
(253) 670-4054

Prepared On

December 31, 2013

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Introduction

This submittal package has been prepared consistent with Section 31 23 19 (Dewatering and Dewatering Water Treatment) of the Cornet Bay Marina Remediation Project specifications. This submittal package is organized based on the information provided in the specifications and includes the following:

- Dewatering Water Treatment System Design and Sizing Criteria
- Equipment Description and Technical Specifications
- Water Treatment Process Description and Drawings
- Water Treatment System Operations, Monitoring and Maintenance Procedures

Purpose

This Dewatering Water Treatment Plan (DWTP) has been developed to meet the permitting requirements of Washington State Department of Ecology (Ecology) and submittal requirements of the Cornet Bay Remediation Project specifications. **This DWTP will also serve as an addendum to the project's existing stormwater pollution prevention plan (SWPPP) and may also serve as an informative tool for those not familiar with construction site water treatment.**

Introduction

Clear Creek Systems, Inc. (CCS) was contracted by Glacier Environmental Services, Inc. (Glacier) to assist with the management and treatment dewatering water associated with remediation activities at the Cornet Bay Marina which is located at 200 Cornet Bay Road in Oak Harbor, WA. The project site consists of approximately 1.1 acres, and is being remediated for historical petroleum hydrocarbon contamination. The project area and location of the chemical water treatment system on the site is shown in Attachment 1.

The purpose of the project is to clean up petroleum hydrocarbon impacted soils and consists of relocation of an existing store, installation a sheet pile wall, installation of a temporary dewatering and dewatering water treatment system, excavation exportation of contaminated soils, importation and placement of clean structural fill and site restoration which includes placement of the store in its original location. During excavation and dewatering phase of the project, construction stormwater runoff and dewatering water will be directed to a chemical water treatment system, located at the north end of the site (Attachment 1), for treatment prior to discharge from the site. The treatment system consists of settling tanks, a Chitosan Enhanced Sand Filtration (CESF) system and granular activated carbon (GAC) – Attachment 2. The treatment system is being implemented to supplement (not replace) conventional best management practices (BMPs) for the management and treatment of construction stormwater and dewatering water.

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Regulatory Background

The project was issued a Construction Stormwater General Permit (Permit No. WAR301251) on September 20, 2013. The permit was transferred from the Department of Ecology to Glacier on December 12, 2013 and an Administrative Order was issued to Glacier on December 11, 2013. The NPDES permit documents are included in Attachment 3 of this plan.

CESF is a flow through water treatment technology that was developed for construction site applications between 1999 and 2003. The technology gained regulatory approval from Ecology in 2003. Ecology issues use level designations (ULDs) for various chitosan products and the process (CESF) that the product is utilized. This dewatering water treatment plan is intended to cover the use of StormKlear™ LiquiFloc™ chitosan acetate and the use level designation for has been included as Attachment 4.

CESF will be implemented, in conjunction with GAC, to ensure that discharges from the site do not contain pollutants at concentrations above the indicator levels shown in the Administrative Order:

Parameter	Indicator Level	Unit	Analytical Method	Detection Level	Quantitation Level
TOTAL PETROLEUM HYDROCARBONS AND BTEX					
Gasoline-Range Hydrocarbons (NWTPH-Gx)	250[a]	µg/L	Ecology NWTPH-Gx	250	250
Diesel and Heavy Oil-Range Hydrocarbons (NWTPH-Dx)	250[a]	µg/L	Ecology NWTPH-Dx	250	250
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	2[a]	µg/L	EPA SW 846 8021/8260	1	2
NPDES CONSTRUCTION STORMWATER GENERAL PERMIT BENCHMARKS					
Turbidity	25	NTU	SM2130*	NA	NA
pH	6.5-8.5	SU	pH Meter	NA	NA

a: No surface water standard, value is laboratory quantitation level.
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons Gasoline Extended Range
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons Diesel Extended Range
*: Or equivalent.

Project Approach

Consistent with project specifications, CCS recommends the installation of a 100 gpm range chitosan-enhanced sand filtration (CESF) system utilizing StormKlear™ LiquiFloc™, an Ecology-approved chitosan polymer. CESF is a proven technology that has been utilized to treat billions of gallons of construction stormwater/dewatering water in Washington State during the past decade. CESF is a flow through treatment technology which includes automated water quality monitoring and both the CESF process and the StormKlear™ LiquiFloc™ polymer have been approved for use by Ecology (Attachment 4). CESF will be implemented on the north side of the project to treat construction stormwater and dewatering water (Attachment 1). CESF will be utilized to reduce turbidity and adjust pH (when necessary) to acceptable levels prior to final polish filtration with GAC to remove hydrocarbons (Attachment 2).

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Dewatering Water Treatment System Sizing

The dewatering water treatment system has been sized to 100 gpm based on the flows anticipated from the dewatering system. Bender Consulting, LLC prepare a dewatering design report for the project that describes the anticipated dewatering rates for the project. The report is included as Attachment 5 to the dewatering water treatment plan. According to the dewatering report the following flow rates are anticipated:

- **Vacuum Dewatering System (Initial Drawdown Period of 7-Days) – 85 gpm**
  Note: The Initial drawdown period will occur before excavation begins therefore, no open excavation sump dewatering will occur during the drawdown period.
- **Vacuum Dewatering System (Following Initial Drawdown Period) – 43-60 gpm**
- **Open Excavation Sump Dewatering – 30-40 gpm**

The maximum flow rate to the treatment system during the initial drawdown period is 85 gpm and the sustained flow rate to the treatment system during excavation activities will range from approximately 73 gpm to 100 gpm. The treatment system has been sized to treat the maximum anticipated flow rate of 100 gpm. It should be noted that the treatment system includes an 18,000 gallon surge capacity which provide 3 hours of surge capacity to allow for routine treatment system maintenance and peak flows from the dewatering system.

Treatment System Equipment

The 100 gpm chemical water treatment system is shown in the attached schematic drawing (Attachment 2) and includes following major components:

- (1) – 18,000 gallon open top weir style settling tank. Provides the necessary 1 hour hydraulic retention time and the under/over weir design for providing oil/water separation and oil boom deployment.
- (1) – 18,000 gallon settling tank. Provides operational surge capacity for peak flows, routine maintenance shut downs and filtration media backwashing.
- (1) –5-hp centrifugal filtration system pump. The pump transfers settled water from the surge tank, through the sand filtration system, through the GAC vessels and to the discharge location.
- (1) – 100 gpm range industrial sand media filter.
- (1) – CCS Monitoring Module (includes polymer storage/delivery, water quality instrumentation, flow measurements and programmable logic controller)
- (2) – CM 72 cubic foot adsorptive media vessels plumbed in series. Each vessel provides 5 minutes of empty bed contact time with the GAC media.
- Miscellaneous interconnecting valving, plumbing and hoses.

Equipment cut sheets for the major components listed above are provided in Attachment 6.

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Dewatering Water Treatment Process

The water treatment system equipment and the process flow is shown in Attachment 1. Dewatering water will be collected and treated as follows:

1. A dewatering system designed by Bender Consulting, LLC and installed by others will provide dewatering water to the treatment system from a vacuum well dewater wells (Attachment 5).
2. Dewatering water may also be pumped to the treatment system form open excavation sumps by the contractor on an as needed basis.
3. The dewatering water from the vacuum well points and the excavation sumps will combine in a single 4" PVC force main that feeds the treatment system. Prior to discharging to treatment system weir tank, the flow rate of the combined dewatering flow rate and total volume will be measured and recorded by an inline flow meter.
4. The treatment system operator will monitor the pH and turbidity of dewatering water to determine if pretreatment for pH or turbidity is necessary.
5. If pretreatment for elevated pH is necessary, carbonic acid in the form of carbon dioxide (CO_2) will be utilized consistent with BMP C252. The inline pH neutralization system includes influent and effluent pH probes, a CO_2 regulator and a CO_2 flow meter.
6. When pretreatment for elevated turbidity is necessary, the treatment system operator will utilize an appropriate dose rate (typically 0.5 to 1.0 ppm) of StormKlear™ LiquiFloc™. The dose rate will be determined based on the flow rate, jar testing (when necessary) and the chemical metering pump calibration cylinder.
7. Dewatering water will then enter into the under weir end of an 18,000 gallon open top weir tank where primary settling and oil/water separation will occur. As required in the specifications the upstream side of the over weir will be outfitted with a hydrophilic oil adsorbent boom. The volume of water upstream of the over weir will act as dead storage and will remain full during the treatment process. Water on the downstream side of the over weir will flow via gravity to the treatment system surge tank.
8. An 18,000 gallon surge tank will receive flow via gravity from the treatment system weir tank. The surge tank will provide the operational capacity necessary to provide consistent operations and surge capacity for routine maintenance shut downs, filtration media backwashing and peak dewatering flows.
9. When the surge tank reaches a predetermined level (typically ½ full), the treatment system operator will initiate water treatment system operations.
10. CCS will monitor flow, pH and turbidity. If elevated pH (pH > 8.5) or turbidity (NTU > 200), pretreatment will be implemented prior to water entering the 18,000 gallon tanks.
11. Settled water will be pumped from the 18,000 gallon surge tank to the CESF treatment system. As water is pumped to the sand filtration skid, influent flow, pH and turbidity will be monitored by the treatment system monitoring module.
12. When necessary, the CCS treatment system technician will add a final polishing dose of StormKlear™ LiquiFloc™ (typically less than 0.5 ppm dose rate) prior to the sand filtration skid.

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The dose rate will be determined based on the flow rate, jar testing (when necessary) and the chemical metering pump calibration cylinder.

13. The discharge of the CESF system will be routed to lead/lag GAC vessels for the hydrocarbon contaminant removal process. The discharge from the GAC vessels is monitored for pH and turbidity and flow prior to discharge (the hydrocarbon removal process is described below).
14. Data from the flow meters, pH probes and turbidimeters is logged in the system's microprocessor. The data is downloaded weekly and included in required monthly discharge monitoring reports. The data is recorded every 15 minutes but monitored continuously.
15. In the unlikely event that predetermined water quality parameters are not met, the microprocessor will actuate a valve system that diverts the discharge to the stormwater back to the weir tank (termed a recycle event). This prevents any unintentional discharge of off spec water.
16. As the treatment process progresses, the sand filter will periodically and automatically backwash to maintain the quality of the sand media. In the event that GAC vessels require backwashing, the treatment system operator will manually backwash them individually. Backwash water is discharged to weir tank and is eventually reprocessed through the dewatering water system.

Hydrocarbon Contaminant Removal Process

The dewatering water treatment system includes provisions and equipment necessary for hydrocarbon contaminant removal. At all times, the discharge from the CESF system will be routed through the hydrocarbon contaminant removal process.

Hydrocarbon removal will occur through the use of adsorptive media contained within pressure vessels. The media vessels have been sized to provide five minutes of empty bed contact time and are configured in a lead/lag configuration. A sampling port is provide between the lead and lag vessels so that breakthrough can be identified when it occurs. A third standby vessel is being provided to assure that the lead vessel can be replaced within 24 hours should breakthrough be discovered in the initial lead vessel. Should breakthrough occur, the lag vessel will be moved to the lead position and the unused standby vessel will be placed in the lag position. CCS is providing virgin coconut based GAC:

- **Granular Activated Carbon (GAC) Media** will be utilized in the lead, lag and standby vessels. Each 72 cubic foot vessel will contain 2,000 lbs of GAC media for a total of 6,000 lbs. Each vessel will provide an empty bed contact time of 5 minutes.

The product specification for the adsorptive media is provided in Attachment 7. Testing and disposal of spent adsorptive media is described in the site specific Operations & Maintenance Manual (Attachment 8).

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Chemical Water Treatment System Operations & Maintenance

The site specific operations and maintenance procedures for this chemical water treatment system are included in Attachment 8 – Site Specific Operations and Maintenance (O & M) Manual for the Cornet Bay Marina Remediation Project. All water treatment system operations personnel will review the O&M Manual prior to working at the site. A copy of the O&M Manual will be kept onsite and available for reference at all times throughout the life of the project.

Ecology Authorization for Utilizing Chemical Treatment

Implementation of construction site water treatment requires the approval of Ecology and the City of Oak Harbor, WA. Ecology has streamlined the approval process to accommodate unforeseen circumstance by relying on a self-certification process which requires signatures of the NPDES permit holder and the site operator. Once the form is completed and reviewed by Ecology for completeness, authorization is granted. A copy of the form is included in Attachment 9.

The certification language addresses the following elements:

1. *" The Stormwater Pollution Prevention Plan (SWPPP) includes the chemical treatment system specifications and design."*

   The CESF equipment is designed, maintained and operated consistent with conditions within the use designation document for CESF (Attachment 4). The treatment system design criteria for CESF is contained within Attachment 4, a schematic drawing is included in Attachment 2.

2. *"The erosion and sediment control best management practices (BMPs) on the site use all known, available, and reasonable methods of treatment (AKART) and I ensure that these BMPs will be maintained at AKART throughout the life of the construction project."*

   The construction project is a remediation project consisting of excavation and exportation of contaminated soils and importation and placement of clean fill material. As work progresses, applicable conventional BMPs are installed and maintained at the site. The project CESCL will conduct routine ESC inspections and lead the efforts to implement and maintain BMPs as necessary.

3. *" I reviewed the best management practices on site or those proposed in the SWPPP and believe they will not interfere with the use of chitosan enhanced sand filtration (CESF)."*

   Occasionally, the application of poly acrylamides or guar for dust suppression or as a binder in hydroseed applications can cause and interference in the CESF treatment process. To date these sorts of applications have not occurred. In addition, landscaping materials such as compost can leach organic material that interferes with CESF. At this point, compost landscaping materials are not envisioned for use until the site undergoes final landscape stabilization and therefore are unlikely to cause interference with the CESF process. The contractor will coordinate with CCS before any of these materials applied at the site. CCS will evaluate the materials impact on the treatment process prior to their onsite use.

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4. *"I verified through jar tests that the site soil is conducive to CESF treatment."*

Since soils onsite are contaminated, CCS was unable to export samples from the site for laboratory jar testing. CCS reviewed the soils report and we confirm that we have used CESF with similar soils. Based on our experience with similar soils, we anticipate a pretreatment dose rate of 0.3 – 0.5 ppm chitosan and a final polishing (pre sand filter) dose rate of 0.0 – 0.5 ppm chitosan. Jar testing will be conducted, as required, to determine the appropriate dose rate by the treatment system operator. Actual dose rates utilized during CESF treatment system operations will be logged on the operations log sheets.

5. *"I verified that any treated discharged water enters a stream or a stormwater system that discharges to surface waters, not a lake, marine environment, or other water body."*

The discharge is to marine waters as is acceptable under the Use Level Designation for StormKlear™ LiquiFloc™

6. *"I verified that the CESF operators received Ecology-approved training."*

CCS is an Ecology-approved CESF trainer and employs staff of trained CESF operators. Untrained personnel are not authorized to conduct CESF system operations. CCS will be responsible for the initial operations of the CESF treatment system and will train Glacier personnel to operate the treatment system. When Glacier personnel have satisfactorily completed the training program, CCS will issue certificates of completion and will provide the names of the trained personnel to Ecology. A list of Ecology-approved CESF operators is included in Attachment 10.

7. *"I read, understand, and will follow all conditions and design criteria in the applicable use level designation(s)."*

The use level designation for StormKlear™ LiquiFloc™ is included in this document as Attachment 4. CCS will design, operate, maintain and monitor the CESF system consistent with the appropriate use level designation.

8. *" I notified the appropriate local government of the intent to use chemical treatment on a site located in their jurisdiction, and they agree that the system design and use of chemicals is acceptable."*

Appropriate State and Local authorities have been notified of the intent to use chemical treatment on this project and will receive a copy of this treatment plan.

9. *"I will keep the use level designation, operation and maintenance manual, and training certificate on-site prior to the use of chitosan acetate."*

A copy of this treatment plan, operator certificates, monitoring logs and the site specific startup/shutdown procedures will be kept onsite for the life of the project. Certified operators are listed in Attachment 10.

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10. *"Where necessary, a licensed engineer designed the system correctly including system sizing, pond sizing, and flow requirements."*

This treatment plan was prepared by a Certified Professional in Erosion and Sediment Control (CPESC) and Certified Professional in Stormwater Quality (CPSWQ) utilizing the Ecology's guidance in the CESF ULD (Attachment 4).

11. *"I verify that discharge will not affect downstream conveyance systems or stream channels."*

The discharge location is to a 150' long offshore discharge pipe. The CESF operator will monitor the discharge location during initial startup of the system and conduct periodic inspection thereafter to verify that the discharge is functioning properly and not causing disturbance of marine sediments.

Treatment System Monitoring - CESF System

Ecology requires flow through CESF systems to include continuous monitoring of sand filter influent and effluent pH, turbidity and flow. The CESF system, supplied by CCS, includes a monitoring system capable of achieving this requirement. Data is logged at required intervals and can be viewed or downloaded by CESF operations personnel from remote locations. The data logging system can be programmed to control the valve system that directs the discharge to a bypass in the event that predetermined pH and turbidity values are not met. For instance preset discharge limits for this project will be pH between 6.5 - 8.5 and a maximum turbidity of 10 NTU as required in the ULD (Attachment 4).

In addition to the microprocessor and data logging system, manual measurements and inspection are recorded on an hourly basis on daily treatment system log sheets. The daily log sheets that will be used on this project are included in Attachment 11 of this document. Manual monitoring parameters include:

- Raw water pH and turbidity
- Flow totalizer (hourly volume)
- Flow rate
- Chitosan dose rate (mg/L or ppm)
- Sand filter influent/effluent pressure
- Receiving water pH and Turbidity
- Equipment condition
- Residual chitosan test results
- Backwash functionality

Ecology requires periodic residual chitosan testing to verify that the system discharge does not contain chitosan. A colorimetric field test has been developed to analyze discharge samples to verify that residual chitosan does not exist in the effluent (Attachment 12). When the effluent is monitored for residual chitosan, a discrete grab sample of homogeneous sand filter discharge is collected and analyzed within 30 minutes of the system startup and 2 hours after startup to confirm a discharge concentration

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below 0.2 ppm. The test is repeated whenever there is a change in dosage, or a significant change in influent turbidity or flow rate (20% or greater).

Treatment System Monitoring – Required by Administrative Order

The treatment system will also require monitoring as outlined in the project Administrative Order (Attachment 3). The Administrative Order establishes Indicator Levels for the Cornet Bay Marina. Indicator Levels express a pollutant concentration used as a threshold, below which a pollutant is considered unlikely to cause a water quality violation, and above which it may. Indicator Levels in this project's Administrative Order were derived from practical quantitation levels for the cited analytical method. The monitoring parameters and Indicator Levels are provided in the table below:

Parameter	Indicator Level	Unit	Analytical Method	Detection Level	Quantitation Level
TOTAL PETROLEUM HYDROCARBONS AND BTEX					
Gasoline-Range Hydrocarbons (NWTPH-Gx)	250[a]	µg/L	Ecology NWTPH-Gx	250	250
Diesel and Heavy Oil-Range Hydrocarbons (NWTPH-Dx)	250[a]	µg/L	Ecology NWTPH-Dx	250	250
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	2[a]	µg/L	EPA SW 846 8021/8260	1	2
NPDES CONSTRUCTION STORMWATER GENERAL PERMIT BENCHMARKS					
Turbidity	25	NTU	SM2130*	NA	NA
pH	6.5-8.5	SU	pH Meter	NA	NA
a: No surface water standard, value is laboratory quantitation level. NWTPH-Gx: Northwest Total Petroleum Hydrocarbons Gasoline Extended Range NWTPH-Dx: Northwest Total Petroleum Hydrocarbons Diesel Extended Range *: Or equivalent.					

The frequency of sampling and testing of total petroleum hydrocarbons and BTEX (as described above) is as follows:

- **Sampled between the lead and lag GAC vessels – Daily**
- **Sampled from the discharge of the lag GAC vessel – Daily**
- **Sampled at a point (sample port) prior to discharge into Cornet Bay – Weekly**

The sampling date of any two consecutive weekly dewatering monitoring samples should be at least six days apart and no more than eight days apart, unless directed by Ecology. If the dewatering discharge is intermittent rather than continuous, sampling should take place at the beginning of each discharge cycle.

All monitoring data must be prepared by a laboratory registered or accredited under the provisions of Chapter 137-50 WAC, *Accreditation of Environmental Laboratories.* A list of Ecology-accredited laboratories can be located at https://fortress.wa.gov/ecy/laboratorysearch/ on Ecology's website.

All sampling data must be reported monthly on Discharge Monitoring Reports (DMRs) using Ecology's electronic secure online system WQWebDMR, in accordance to permit condition S5.B (Attachment 3). IF

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the measured concentration is below the detection level, the Glacier Environmental Servicers shall report single analytical values below detection as “less than the detection level (DL)” by entering “<” followed by the numeric value of the detection level (e.g. “<0.1”). All other values above the DL must be reported s the numeric value.

Any discharge to water of the state (Cornet Bay) in exceedance of the contaminant Indicator Level in the table above, except for turbidity and pH criteria, shall be reported according to Permit condition S5.F, Noncompliance Notification (Attachment 3).

Quality Assurance and Quality Control (QA/QC)

QA/QC procedures are an important component of delivering quality data and demonstrating compliance with State water quality standards and NPDES permit requirements. Project QA/QC requirements include:

- Properly trained technicians
- Routine equipment calibration and cleaning consistent with manufacture’s recommendations
- Comparison of pH and turbidity data collected from the automated monitoring system and manual measurements with hand-held instruments
- Proper sampling procedures, duplicate samples, spilt samples and method blanks
- Data review and validation by qualified project management

Water Treatment Contingency Plan

Ecology’s use designation for CESF requires a provision in the project SWPPP which includes a contingency plan for treatment upsets and the presence of residual chitosan in the effluent. There are a number of circumstances that can cause a treatment system upset which can be rectified through preventive measures and corrective actions. Major treatment system upsets are rare however minor issues do occur from time to time. Examples of the most common operational issues and the means to resolve them are provided below:

- **Equipment failure** – CESF systems include mechanical, electrical and chemical components that must all work in conjunction with one another to achieve water clarification. The most common equipment failures include pumps, generators, electronic components, pipe leaks and other minor issues. Preventative measures to reduce such issues include proper maintenance and inspection of treatment system equipment. Spare equipment will be kept onsite or within reasonable distance for those components that are more prone to failure. Course of action – In the event of an equipment failure, the treatment system operator should cease operations and the component should be replaced with spare parts. Larger equipment components such as a pumps, generators and filters are available from a number of local rental companies.

- **Plumbing failure** – Plumbing components such as pvc pipes and hoses can develop leaks, break or become damaged by construction activities, prolonged exposure to sun and freezing temperatures. Preventative measures - Spare parts and hoses will be left onsite to address minor issues and drains will be installed to prevent freeze damage. Most of the hard piping on this project consists on high density polyethylene piping which is more durable and less prone to failure than PVC piping. Corrective actions – In the event of a break or leakage, the treatment

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system will be shut down and the faulty components will be replaced with onsite materials or materials available from local suppliers.

- **pH upset** – Construction activities frequently include concrete pours, concrete demolition and soil hardening materials which can cause the pH to increase to levels above 8.5. Although unusual, low pH conditions can arise from the presence of high concentrations of organic acids leaching form detritus such as fall leaf litter, straw mulch or compost. Preventative measures – The CESF operator will conduct weekly site evaluations and discuss the scope of concrete work with the construction contractor to minimize the potential for high pH impacts. The CESF operator will conduct weekly site evaluations and discuss the scope of work related to potential sources of detritus material. Corrective actions – In the event pH becomes elevated, gaseous carbon dioxide from a local supplier will be utilized to neutralize pH consistent with BMP C252 (Attachment 4). In the event that low pH conditions occur, sodium bicarbonate or another base such as sodium hydroxide will be utilized to increase pH to an acceptable range for CESF water treatment and discharge (pH = 6.5 – 8.5).

- **Treatment chemistry interference** – Occasionally, issues can arise with the effectiveness of the treatment chemistry. The issues are often attributed to interference caused by polyacrylamides or guar binders used in hydroseeding and organic materials leaching from common soil stabilization practices such as compost or straw mulch. Preventative measures include laboratory testing of all hydroseeding binders prior to onsite use and communication with the onsite contractor prior to use of organic material stabilization practices (mulch). Corrective actions - In the event that onsite water becomes contaminated with polyacrylamides, the pH will be lowered to a level sufficient to brake the polyacrylamide bonds and then readjusted to a neutral pH prior to going through the CESF process.

  In the unlikely event that chitosan is ineffective at removing sediment, other approved polymers will be screened and treatment will continue in a batch configuration until the issue is resolved. If treatability issues arise from leaching organic material, approved polymers such as polyaluminum chloride or alum will be used in conjunction with CESF to achieve requisite discharge values. In the event that alternative treatment actions are required, CCS will contact the Ecology and the City of Seattle to inform them of the intended treatment resolution.

- **Detection of residual chitosan** – The residual chitosan test is colorimetric and detects the starch-like structure of chitosan. From time to time, a false positive can be detected due to the presence of another starch on the filter paper that is used for the test. Preventative measures include storing filter papers in a sealed container, handling the filter paper while wearing a new pair of disposable gloves, and following the correct test procedure (See Attachment 9). Corrective measures – In the event of a positive residual chitosan, the treatment system will be put into recirculation mode while additional samples are collected and the polymer dose rate is verified and recorded. The sample will be split and two additional residual chitosan tests will be performed (by separate treatment system operators when possible). If they both come back negative, the system will be redirected to discharge and more frequent testing will occur. In the unlikely event that the test results are positive, the system will be shut down and the chemical and mechanical components of the treatment system will be evaluated to determine the root cause of the issue. The test results will be reported immediately to Ecology.

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- **Pretreated water is below 50 NTU** - From time to time, pretreatment may result in a turbidity below 50 NTU, especially when pretreated stormwater is allowed to settle in a pretreatment pond or series of tanks for a long period of time. If this situation occurs, the CESF operator will immediately conduct more frequent jar tests to determine the appropriate pretreatment dose rate and adjust the chitosan delivery rate for pretreatment that results in a pretreatment turbidity greater than 50 NTU. In addition, the treatment system operator will conduct more frequent residual chitosan tests.

Health and Safety Plan (HASP)

CCS maintains an active health and safety program and we have developed a site specific HASP for this project to cover our activities at the site.

Conclusion

CESF is being implemented on the Cornet Bay Marina project in Oak Harbor, WA to reduce the turbidity of stormwater and dewatering water prior to final polish with GAC and discharge to a temporary marine outfall. CESF has become a standard BMP, however, Ecology does require that a completed Request for Chemical Treatment Form be submitted prior to the start of operations. The treatment system is being to comply with the project Administrative Order. Implementation of CESF will compliment, not replace, other conventional BMPS to maintain compliance with the project NPDES permit. As described above, the treatment system will be designed, operated, maintained and monitored consistent with the requirements of the chitosan use designation found in Attachment 4. The CESF treatment system will remain in place until the site is fully stabilized and water treatment is no longer necessary to meet water quality standards.

Contractor Contact Information:

Alan Hall
Project Manager
Glacier Environmental Services, Inc.
(206) 446-5288
alanh@glacierenviro.com

Lauren Golembiewski
NPDES Permit Representative
Glacier Environmental Services, Inc.
(425) 355-2826
LMiles@glacierenviro.com

Clear Creek Systems, Inc. Personnel:

Jason Martino
NW Operations Manager & Sr. Project Manager
(661) 201-8562
jmartino@clearcreeksystems.com

Clinton Lindgren
Water Treatment System Technician
(206) 778-7568
clindgren@clearcreeksystems.com

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The information contained within this DWTP and its attachments were prepared by a Certified Professional in Stormwater Quality and Certified Professional in Erosion and Sediment Control.

Jason Ziemer, CPESC & CPSWQ
Clear Creek Systems, Inc.
12604 Interurban Ave. South, Suite 100
Tukwila, Washington 98168
(253) 670-4054
jziemer@clearcreeksystems.com

CPSWQ No. 0651

CPESC No. 5468

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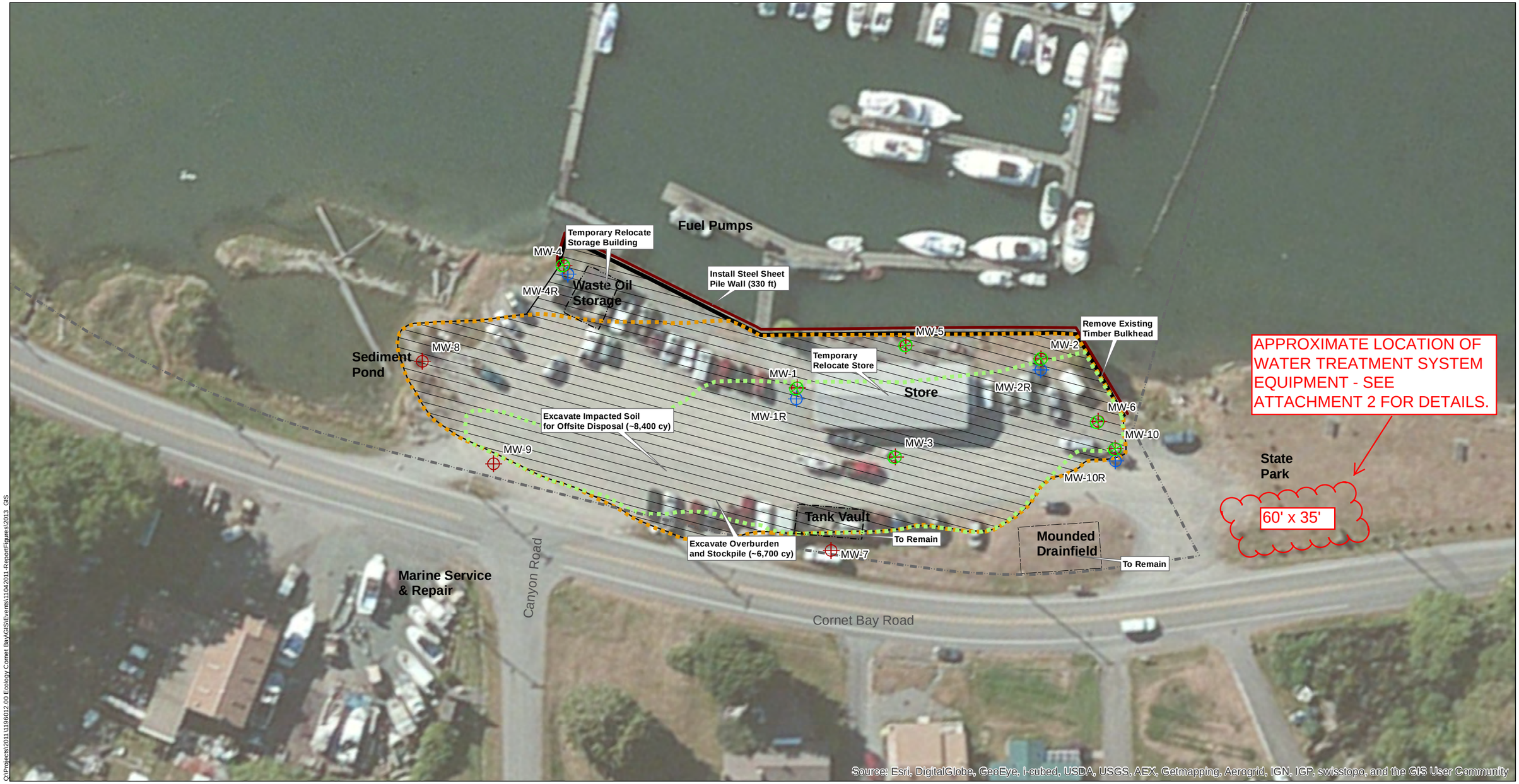
ATTACHMENT 1

SITE DRAWING – TREATMENT SYSTEM LOCATION



Q:\Projects\2011\11196012.00 Ecology Cornet Bay\GIS\Events\11042011-ReportFigures\2013_GIS

Legend

- Existing Monitoring Wells (Total of 10)
- Abandon Monitoring Wells (Total of 7)
- Proposed New Monitoring Well (Total of 4)
- Gas and Benzene Area Exceeding MTCA Method A Soil Cleanup Levels
- Benzene Area Exceeding MTCA Method A Soil Cleanup Levels
- Excavation Area
- New Steel Sheet Pile Wall
- Approximate Property Boundary
- Existing Timber Bulkhead

NOTE:
All locations are approximate.
Approximate property boundary obtained from Survery performed on 17 November 2011.Boundary located on east portion of site is identified as right-of-way.
Aerials Express 0.3 to 0.6m resolution imagery for metropolitan areas and the best available United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) imagery and enhanced versions of United States Geological Survey (USGS) Digital Ortho Quarter Quad (DOQQ) imagery for other areas. For more information on this map, visit us online at http://goto.arcgisonline.com/maps/World_Imagery

N

0 30 60

Scale: Feet
1 inch = 51 feet

Kennedy/Jenks Consultants

Engineering Design Report
Cornet Bay, Washington

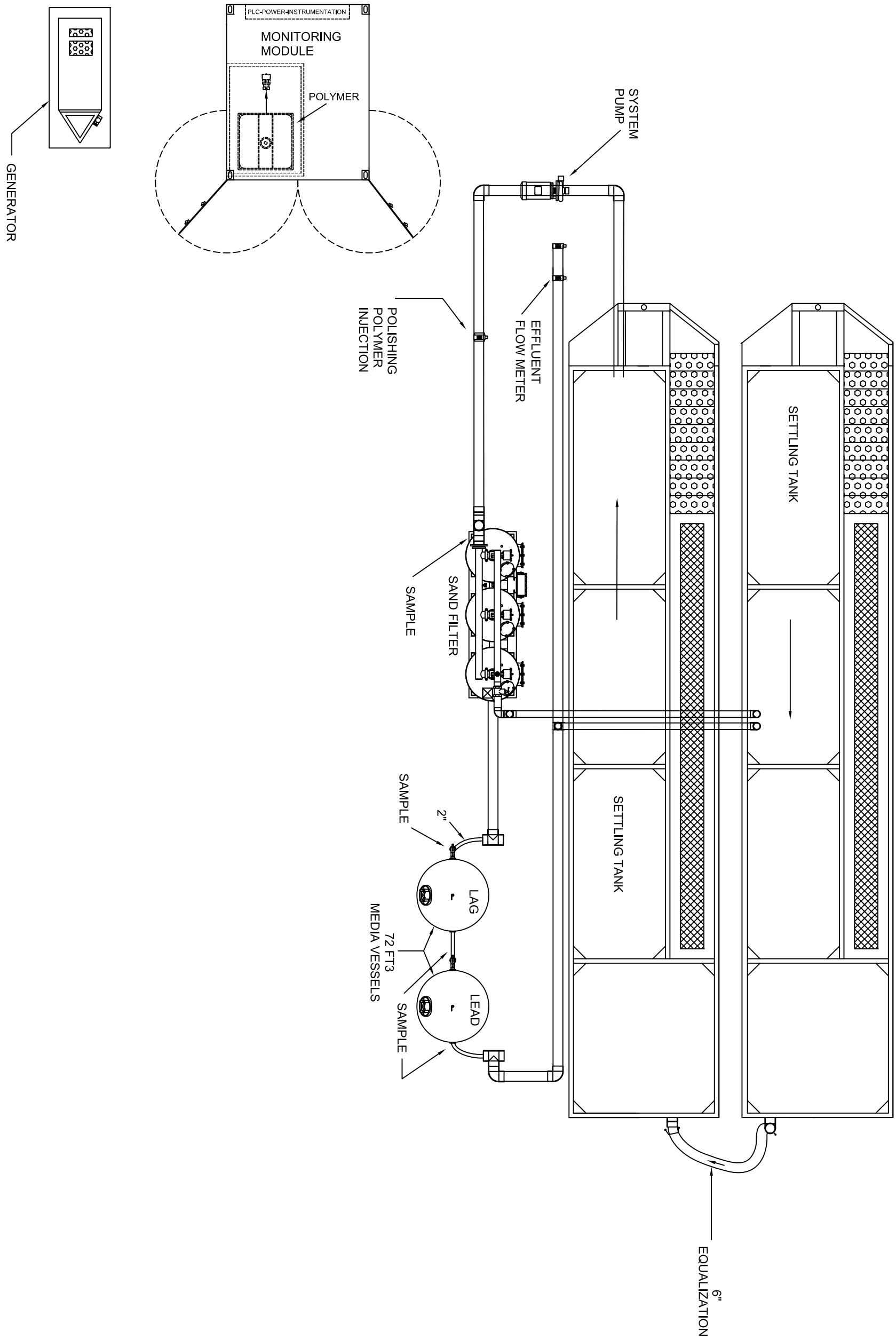
Remedial Action Plan

1396010*00
August 2013

Figure 8

ATTCHMENT 2

DEWATERING WATER TREATMENT SYSTEM SCHEMATIC DRAWING



©

CLEAR CREEK SYSTEMS, INC.	TITLE OF DRAWING: CORNET BAY REMEDIATION - 200 GPM RANGE SYSTEM WITH MEDIA		NOTES:
DATE: 01-07-14	DRAWN BY: JSM	VERSION: 1	1. 2. 3.

ATTACHMENT 3

NPDES PERMIT, TRANSFER OF COVERAGE & ADMINISTRATIVE ORDER

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

September 20, 2013

Robert Warren
Washington Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

RE: Coverage under the Construction Stormwater General Permit

Permit number:	**WAR301251**	
Site Name:	**Cornet Bay Marina**	
Location:	**200 Cornet Bay Road**	
	Oak Harbor, WA	**County: Island**
Disturbed Acres:	**1.1**	

Dear Mr. Warren:

The Washington State Department of Ecology (Ecology) received your Notice of Intent for coverage under Ecology's Construction Stormwater General Permit (permit). This is your permit coverage letter. Your permit coverage is effective on September 20, 2013. **Please retain this permit coverage letter with your permit (enclosed), stormwater pollution prevention plan (SWPPP), and site log book. These materials are the official record of permit coverage for your site.**

Please take time to read the entire permit and contact Ecology if you have any questions.

Appeal Process
You have a right to appeal coverage under the general permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this letter. This appeal is limited to the general permit's applicability or non-applicability to a specific discharger. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal, you must do the following within 30 days of the date of receipt of this letter:

- File your appeal and a copy of the permit cover page with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and the permit cover page on Ecology in paper form - by mail or in person (see addresses below). E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Address and Location Information:

Street Addresses:	**Mailing Addresses:**
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board (PCHB) 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903

Electronic Discharge Monitoring Reports (WQWebDMR)
This permit requires that Permittees submit monthly discharge monitoring reports (DMRs) electronically using Ecology's secure online system, WQWebDMR. To sign up for WQWebDMR go to: www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html. If you have questions, contact Tonya Wolfe at (360) 407-7097 (Olympia area), or (800) 633-6193/option 3, or email WQWebPortal@ecy.wa.gov.

Ecology Field Inspector Assistance
If you have questions regarding stormwater management at your construction site, please contact Tracie Walters of Ecology's Northwest Regional Office in Bellevue at tracie.walters@ecy.wa.gov, or (425) 649-4484.

Questions or Additional Information
Ecology is committed to providing assistance. Please review our web page at: www.ecy.wa.gov/programs/wq/stormwater/construction/. If you have questions about the construction stormwater general permit, please contact Clay Keown at clay.keown@ecy.wa.gov, or (360) 407-6048.

Sincerely,

Bill Moore, P.E., Manager
Program Development Services Section
Water Quality Program

Enclosure

Issuance Date: December 1, 2010
Effective Date: January 1, 2011
Expiration Date: December 31, 2015

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Kelly Susewind, P.E., P.G.
Water Quality Program Manager
Washington State Department of Ecology

TABLE OF CONTENTS

LIST OF TABLES

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions within this permit for additional submittal requirements. Appendix A provides a list of definitions. Appendix B provides a list of acronyms.

Table 1. Summary of Permit Report Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S5.A and S8	High Turbidity/Transparency Phone Reporting	As Necessary	Within 24 hours
S5.B	Discharge Monitoring Report	Monthly*	Within 15 days of applicable monitoring period
S5.F and S8	Noncompliance Notification	As necessary	Immediately
S5.F	Noncompliance Notification – Written Report	As necessary	Within 5 Days of non-compliance
G2.	Notice of Change in Authorization	As necessary	
G6.	Permit Application for Substantive Changes to the Discharge	As necessary	
G8.	Application for Permit Renewal	1/permit cycle	No later than 180 days before expiration
G9.	Notice of Permit Transfer	As necessary	
G20.	Notice of Planned Changes	As necessary	
G22.	Reporting Anticipated Non-compliance	As necessary	

SPECIAL NOTE: *Permittees must submit Discharge Monitoring Reports (DMRs) to the Washington State Department of Ecology monthly, regardless of site discharge, for the full duration of permit coverage. Refer to Section S5.B of this General Permit for more specific information regarding DMRs.

Table 2. Summary of Required On-site Documentation

Document Title	Permit Conditions
Permit Coverage Letter	See Conditions S2, S5
Construction Stormwater General Permit	See Conditions S2, S5
Site Log Book	See Conditions S4, S5
Stormwater Pollution Prevention Plan (SWPPP)	See Conditions S9, S5

SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal and Tribal lands as specified in Special Condition S1.E.3.

B. Operators Required to Seek Coverage Under this General Permit:

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

   a. Clearing, grading and/or excavation that results in the disturbance of one or more acres and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

      i. This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

   b. Any size construction activity discharging stormwater to waters of the State that the Department of Ecology ("Ecology"):

      i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

      ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b. above):

   a. Construction activities that discharge all stormwater and non-stormwater to ground water, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

   b. Construction activities covered under an Erosivity Waiver (Special Condition S2.C).

   c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

C. Authorized Discharges:

1. Stormwater Associated with Construction Activity. Subject to compliance with the terms and conditions of this permit, Permittees are authorized to discharge stormwater associated with construction activity to surface waters of the State or to a storm sewer system that drains to surface waters of the State. (Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.)

2. Stormwater Associated with Construction Support Activity. This permit also authorizes stormwater discharge from support activities related to the permitted construction site (for example, an on-site portable rock crusher, off-site equipment staging yards, material storage areas, borrow areas, etc.) provided:

   a. The support activity relates directly to the permitted construction site that is required to have a NPDES permit; and

   b. The support activity is not a commercial operation serving multiple unrelated construction projects, and does not operate beyond the completion of the construction activity; and

   c. Appropriate controls and measures are identified in the Stormwater Pollution Prevention Plan (SWPPP) for the discharges from the support activity areas.

3. Non-Stormwater Discharges. The categories and sources of non-stormwater discharges identified below are authorized conditionally, provided the discharge is consistent with the terms and conditions of this permit:

   a. Discharges from fire-fighting activities.

   b. Fire hydrant system flushing.

   c. Potable water, including uncontaminated water line flushing.

   d. Pipeline hydrostatic test water.

   e. Uncontaminated air conditioning or compressor condensate.

   f. Uncontaminated ground water or spring water.

   g. Uncontaminated excavation dewatering water (in accordance with S9.D.10).

   h. Uncontaminated discharges from foundation or footing drains.

   i. Water used to control dust. Permittees must minimize the amount of dust control water used.

   j. Routine external building wash down that does not use detergents.

   k. Landscape irrigation water.

   The SWPPP must adequately address all authorized non-stormwater discharges, except for discharges from fire-fighting activities, and must comply with Special

Condition S3. At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges:

The following discharges to waters of the State, including ground water, are prohibited.

1. Concrete wastewater.
2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.1 (see Appendix A of this permit).
4. Slurry materials and waste from shaft drilling.
5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
6. Soaps or solvents used in vehicle and equipment washing.
7. Wheel wash wastewater, unless discharged according to Special Condition S9.D.9.d.
8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.
2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.
3. Stormwater from any federal project or project on federal land or land within an Indian Reservation except for the Puyallup Reservation. Within the Puyallup

Reservation, any project that discharges to surface water on land held in trust by the federal government may be covered by this permit.

4. Stormwater from any site covered under an existing NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

5. Stormwater from a site where an applicable Total Maximum Daily Load (TMDL) requirement specifically precludes or prohibits discharges from construction activity.

S2. APPLICATION REQUIREMENTS

A. Permit Application Forms

1. Notice of Intent Form/Timeline

a. Operators of new or previously unpermitted construction activities must submit a complete and accurate permit application (Notice of Intent, or NOI) to Ecology.

b. The operator must submit the NOI at least 60 days before discharging stormwater from construction activities and must submit it on or before the date of the first public notice (see Special Condition S2.B below for details). The 30-day public comment period required by WAC 173-226-130(5) begins on the publication date of the second public notice. Unless Ecology responds to the complete application in writing, based on public comments, or any other relevant factors, coverage under the general permit will automatically commence on the thirty-first day following receipt by Ecology of a completed NOI, or the issuance date of this permit, whichever is later, unless Ecology specifies a later date in writing.

c. Applicants who propose to discharge to a storm or sewer system operated by Seattle, King County, Snohomish County, Tacoma, Pierce County, or Clark County must also submit a copy of the NOI to the appropriate jurisdiction.

d. If an applicant intends to use a Best Management Practice (BMP) selected on the basis of Special Condition S9.C.4 (“demonstrably equivalent” BMPs), the applicant must notify Ecology of its selection as part of the NOI. In the event the applicant selects BMPs after submission of the NOI, it must provide notice of the selection of an equivalent BMP to Ecology at least 60 days before intended use of the equivalent BMP.

e. Permittees must notify Ecology regarding any changes to the information provided on the NOI by submitting an updated NOI. Examples of such changes include, but are not limited to,

i. changes to the Permittee’s mailing address,

ii. changes to the on-site contact person information, and

iii. changes to the area/acreage affected by construction activity.

2. Transfer of Coverage Form

The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided the Permittee submits a Transfer of Coverage Form in accordance with General Condition G9. Transfers do not require public notice.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must contain:

1. A statement that "The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit."

2. The name, address and location of the construction site.

3. The name and address of the applicant.

4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the number of acres to be disturbed.

5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system.

6. The statement: "Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, P.O. Box 47696, Olympia, WA 98504-7696 Attn: Water Quality Program, Construction Stormwater."

C. Erosivity Waiver

Construction site operators may qualify for an erosivity waiver from the CSWGP if the following conditions are met:

1. The site will result in the disturbance of fewer than 5 acres and the site is not a portion of a common plan of development or sale that will disturb 5 acres or greater.

2. Calculation of Erosivity "R" Factor and Regional Timeframe:

   a. The project's rainfall erosivity factor ("R" Factor) must be less than 5 during the period of construction activity, as calculated using either the Texas A&M University online rainfall erosivity calculator at: http://ei.tamu.edu/ or EPA's calculator at http://cfpub.epa.gov/npdes/stormwater/lew/lewcalculator.cfm. The period of construction activity starts when the land is first disturbed and ends with final stabilization. In addition:

   b. The entire period of construction activity must fall within the following timeframes:

      i. For sites west of the Cascades Crest: June 15 – September 15.

      ii. For sites east of the Cascades Crest, excluding the Central Basin: June 15 – October 15.

      iii. For sites east of the Cascades Crest, within the Central Basin: no additional timeframe restrictions apply. The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches. For a map of the Central Basin (Region 2), refer to http://www.ecy.wa.gov/pubs/ecy070202.pdf.

3. Construction site operators must submit a complete Erosivity Waiver certification form at least one week before disturbing the land. Certification must include statements that the operator will:

   a. Comply with applicable local stormwater requirements; and

   b. Implement appropriate erosion and sediment control BMPs to prevent violations of water quality standards.

4. This waiver is not available for facilities declared significant contributors of pollutants as defined in Special Condition S1.B.1.b.

5. This waiver does not apply to construction activities which include non-stormwater discharges listed in Special Condition S1.C.3.

6. If construction activity extends beyond the certified waiver period for any reason, the operator must either:

   a. Recalculate the rainfall erosivity "R" factor using the original start date and a new projected ending date and, if the "R" factor is still under 5 and the entire

project falls within the applicable regional timeframe in Special Condition S2.C.2.b, complete and submit an amended waiver certification form before the original waiver expires; or

b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), ground water quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges not in compliance with these standards are not authorized.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

1. Comply with all permit conditions, including planning, sampling, monitoring, reporting, and recordkeeping conditions.

2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater technical manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the Phase I Municipal Stormwater Permit are approved by Ecology.)

D. Where construction sites also discharge to ground water, the ground water discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to ground water through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

S4. MONITORING REQUIREMENTS, BENCHMARKS AND REPORTING TRIGGERS

Table 3. Summary of Primary Monitoring Requirements

Size of Soil Disturbance[1]	Weekly Site Inspections	Weekly Sampling w/ Turbidity Meter	Weekly Sampling w/ Transparency Tube	Weekly pH Sampling[2]	Requires CESCL Certification?
Sites that disturb less than 1 acre, but are part of a larger Common Plan of Development	Required	Not Required	Not Required	Not Required	No
Sites that disturb 1 acre or more, but fewer than 5 acres	Required	Sampling Required – either method[3]		Required	Yes
Sites that disturb 5 acres or more	Required	Required	Not Required[4]	Required	Yes

A. Site Log Book

The Permittee must maintain a site log book that contains a record of the implementation of the SWPPP and other permit requirements, including the installation and maintenance of BMPs, site inspections, and stormwater monitoring.

B. Site Inspections

The Permittee's (operator's) site inspections must include all areas disturbed by construction activities, all BMPs, and all stormwater discharge points. (See Special Conditions S4.B.3 and B.4 below for detailed requirements of the Permittee's Certified Erosion and Sediment Control Lead [CESCL]).

[1] Soil disturbance is calculated by adding together all areas affected by construction activity. Construction activity means clearing, grading, excavation, and any other activity that disturbs the surface of the land, including ingress/egress from the site.

[2] If construction activity results in the disturbance of 1 acre or more, and involves significant concrete work (1,000 cubic yards of poured or recycled concrete over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer stormwater collection system that drains to other surface waters of the State, the Permittee must conduct pH monitoring sampling in accordance with Special Condition S4.D.

[3] Sites with one or more acres, but fewer than 5 acres of soil disturbance, must conduct turbidity or transparency sampling in accordance with Special Condition S4.C.

[4] Sites equal to or greater than 5 acres of soil disturbance must conduct turbidity sampling using a turbidity meter in accordance with Special Condition S4.C.

Construction sites one acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a certified CESCL. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

1. The Permittee must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. The Permittee must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

   Based on the results of the inspection, the Permittee must correct the problems identified by:

   a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

   b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

   c. Documenting BMP implementation and maintenance in the site log book.

2. The Permittee must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The Permittee may reduce the inspection frequency for temporarily stabilized, inactive sites to once every calendar month.

3. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

   a. Site conditions and construction activities that could impact the quality of stormwater, and

   b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

4. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the manual referred to in Special Condition S9.C.1 and 2).

5. The Permittee must summarize the results of each inspection in an inspection report or checklist and enter the report/checklist into, or attach it to, the site log book. At a minimum, each inspection report or checklist must include:

    a. Inspection date and time.

    b. Weather information, the general conditions during inspection and the approximate amount of precipitation since the last inspection, and precipitation within the last 24 hours.

    c. A summary or list of all implemented BMPs, including observations of all erosion/sediment control structures or practices.

    d. A description of the locations:

        i. Of BMPs inspected.

        ii. Of BMPs that need maintenance and why.

        iii. Of BMPs that failed to operate as designed or intended, and

        iv. Where additional or different BMPs are needed, and why.

    e. A description of stormwater discharged from the site. The Permittee must note the presence of suspended sediment, turbidity, discoloration, and oil sheen, as applicable.

    f. Any water quality monitoring performed during inspection.

    g. General comments and notes, including a brief description of any BMP repairs, maintenance or installations made following the inspection.

    h. A summary report and a schedule of implementation of the remedial actions that the Permittee plans to take if the site inspection indicates that the site is out of compliance. The remedial actions taken must meet the requirements of the SWPPP and the permit.

    i. The name, title, and signature of the person conducting the site inspection, a phone number or other reliable method to reach this person, and the following statement: "I certify that this report is true, accurate, and complete to the best of my knowledge and belief."

C. Turbidity/Transparency Sampling Requirements

1. Sampling Methods

    a. If construction activity involves the disturbance of 5 acres or more, the Permittee must conduct turbidity sampling per Special Condition S4.C.

    b. If construction activity involves 1 acre or more but fewer than 5 acres of soil disturbance, the Permittee must conduct either transparency sampling **or** turbidity sampling per Special Condition S4.C.

2. Sampling Frequency

    a. The Permittee must sample all discharge locations at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site).

    b. Samples must be representative of the flow and characteristics of the discharge.

    c. Sampling is not required when there is no discharge during a calendar week.

    d. Sampling is not required outside of normal working hours or during unsafe conditions.

    e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

    f. Sampling is not required before construction activity begins.

3. Sampling Locations

    a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

    b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

    c. The Permittee must identify all sampling point(s) on the SWPPP site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

    d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

4. Sampling and Analysis Methods

    a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTU).

    b. The Permittee performs transparency analysis on site with a 1¾-inch-diameter, 60-centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm). Transparency tubes are available from: http://watermonitoringequip.com/pages/stream.html.

Table 4. Monitoring and Reporting Requirements

Parameter	Unit	Analytical Method	Sampling Frequency	Benchmark Value	Phone Reporting Trigger Value
Turbidity	NTU	SM2130 or EPA 180.1	Weekly, if discharging	25 NTU	250 NTU
Transparency	cm	Manufacturer instructions, or Ecology guidance	Weekly, if discharging	33 cm	6 cm

5. Turbidity/Transparency Benchmark Values and Reporting Triggers

The benchmark value for turbidity is 25 NTU or less. The benchmark value for transparency is 33 centimeters (cm). Note: Benchmark values do not apply to discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus; these discharges are subject to a numeric effluent limit for turbidity. Refer to Special Condition S8 for more information.

a. Turbidity 26 – 249 NTU, or Transparency 32 – 7 cm:

If the discharge turbidity is 26 to 249 NTU; or if discharge transparency is less than 33 cm, but equal to or greater than 6 cm, the Permittee must:

i. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

ii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iii. Document BMP implementation and maintenance in the site log book.

b. Turbidity 250 NTU or greater, or Transparency 6 cm or less:

If a discharge point's turbidity is 250 NTU or greater, or if discharge transparency is less than or equal to 6 cm, the Permittee must complete the reporting and adaptive management process described below.

i. Telephone the applicable Ecology Region's Environmental Report Tracking System (ERTS) number within 24 hours, in accordance with Special Condition S5.F.

- Central Region (Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, Benton): (509) 575-2490

- Eastern Region (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400

- Northwest Region (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000

- Southwest Region (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

These numbers are also listed at the following web site: http://www.ecy.wa.gov/programs/wq/stormwater/construction/permit.html

ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

iii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iv. Document BMP implementation and maintenance in the site log book.

v. Continue to sample discharges daily until:

a) Turbidity is 25 NTU (or lower); or

b) Transparency is 33 cm (or greater); or

c) The Permittee has demonstrated compliance with the water quality limit for turbidity:

1) No more than 5 NTU over background turbidity, if background is less than 50 NTU, or

2) No more than 10% over background turbidity, if background is 50 NTU or greater; or

d) The discharge stops or is eliminated.

D. pH Sampling Requirements -- Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, **and** involves significant concrete work (significant concrete work means greater than 1000 cubic yards poured concrete or recycled concrete used over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area

drains to surface waters of the State or to a storm sewer system that drains to surface waters of the state, the Permittee must conduct pH monitoring as set forth below. Note: In addition, discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for high pH are subject to a numeric effluent limit for pH; refer to Special Condition S8.

1. For sites with significant concrete work, the Permittee must begin the pH monitoring period when the concrete is first poured and exposed to precipitation, and continue weekly throughout and after the concrete pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 (su).

2. For sites with engineered soils, the Permittee must begin the pH monitoring period when the soil amendments are first exposed to precipitation and must continue until the area of engineered soils is fully stabilized.

3. During the applicable pH monitoring period defined above, the Permittee must obtain a representative sample of stormwater and conduct pH analysis at least once per week.

4. The Permittee must monitor pH in the sediment trap/pond(s) or other locations that receive stormwater runoff from the area of significant concrete work or engineered soils before the stormwater discharges to surface waters.

5. The benchmark value for pH is 8.5 standard units. Anytime sampling indicates that pH is 8.5 or greater, the Permittee must either:

    a. Prevent the high pH water (8.5 or above) from entering storm sewer systems or surface waters; or

    b. If necessary, adjust or neutralize the high pH water until it is in the range of pH 6.5 to 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO_2) sparging or dry ice. The Permittee must obtain written approval from Ecology before using any form of chemical treatment other than CO_2 sparging or dry ice.

6. The Permittee must perform pH analysis on site with a calibrated pH meter, pH test kit, or wide range pH indicator paper. The Permittee must record pH monitoring results in the site log book.

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Phone Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTU phone reporting level, the Permittee must call Ecology's Regional office by phone within 24 hours of analysis. The web site is http://www.ecy.wa.gov/programs/wq/stormwater/construction/permit.html. Also see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G13 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WebDMR program. To find out more information and to sign up for WebDMR go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

Mailing Address:
Department of Ecology
Water Quality Program
Attn: Stormwater Compliance Specialist
PO Box 47696
Olympia, WA 98504-7696

Permittees who obtain a waiver not to use WebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees shall submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with "no discharge" entered in place of the monitoring results. For more information, contact Ecology staff using information provided at the following web site: http://www.ecy.wa.gov/programs/spills/response/assistancesoil%20map.pdf

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of three years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this

permit. This period of retention must be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

D. Recording Results

For each measurement or sample taken, the Permittee must record the following information:

1. Date, place, method, and time of sampling or measurement.
2. The first and last name of the individual who performed the sampling or measurement.
3. The date(s) the analyses were performed.
4. The first and last name of the individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

E. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Special Condition S4 of this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the Permittee's DMR.

F. Noncompliance Notification

In the event the Permittee is unable to comply with any part of the terms and conditions of this permit, and the resulting noncompliance may cause a threat to human health or the environment, the Permittee must:

1. Immediately notify Ecology of the failure to comply by calling the applicable Regional office ERTS phone number (find at http://www.ecy.wa.gov/programs/spills/response/assistancesoil%20map.pdf) or refer to Special Condition S4.C.5.b.i.
2. Immediately take action to prevent the discharge/pollution, or otherwise stop or correct the noncompliance, and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to Ecology within five (5) days of becoming aware of the violation.
3. Submit a detailed written report to Ecology within five (5) days, unless requested earlier by Ecology. The report must contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6)).

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Refer to Section G14 of this permit for specific information regarding non-compliance.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

   a. General Permit.

   b. Permit Coverage Letter.

   c. Stormwater Pollution Prevention Plan (SWPPP).

   d. Site Log Book.

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

   a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

   b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

      i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; or

      ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; or

      Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

S6. PERMIT FEES

The Permittee must pay permit fees assessed by Ecology. Fees for stormwater discharges covered under this permit are established by Chapter 173-224 WAC. Ecology continues to assess permit fees until the permit is terminated in accordance with Special Condition S10 or revoked in accordance with General Condition G5.

S7. SOLID AND LIQUID WASTE DISPOSAL

The Permittee must handle and dispose of solid and liquid wastes generated by construction activity, such as demolition debris, construction materials, contaminated materials, and waste materials from maintenance activities, including liquids and solids from cleaning catch basins and other stormwater facilities, in accordance with:

A. Special Condition S3, Compliance with Standards.

B. WAC 173-216-110.

C. Other applicable regulations.

S8. DISCHARGES TO 303(D) OR TMDL WATER BODIES

A. Sampling and Numeric Effluent Limits For Certain Discharges to 303(d)-listed Water Bodies

1. Permittees who discharge to segments of water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorus, must conduct water quality sampling according to the requirements of this section, and Special Conditions S4.C.2.b-f and S4.C.3.b-d, and must comply with the applicable numeric effluent limitations in S8.C and S8.D.

2. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters (Category 5) that exists on January 1, 2011, or the date when the operator's complete permit application is received by Ecology, whichever is later.

B. Limits on Coverage for New Discharges to TMDL or 303(d)-listed Waters

Operators of construction sites that discharge to a 303(d)-listed water body are not eligible for coverage under this permit *unless* the operator:

1. Prevents exposing stormwater to pollutants for which the water body is impaired, and retains documentation in the SWPPP that details procedures taken to prevent exposure on site; or

2. Documents that the pollutants for which the water body is impaired are not present at the site, and retains documentation of this finding within the SWPPP; or

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

    a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the water body; or

    b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the water body are subject to compliance schedules designed to bring the water body into attainment with water quality standards.

    Operators of construction sites are eligible for coverage under this permit if Ecology issues permit coverage based upon an affirmative determination that the discharge will not cause or contribute to the existing impairment.

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTU effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTU. In order to use the water quality standard requirement, the sampling must take place at the following locations:

    a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

    b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge**.**

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit shall sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

Table 5. Turbidity, Fine Sediment & Phosphorus Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Sampling Frequency	Numeric Effluent Limit[1]
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130 or EPA180.1	Weekly, if discharging	25 NTU, at the point where stormwater is discharged from the site; OR In compliance with the surface water quality standard for turbidity (S8.C.1.a)

[1]Permittees subject to a numeric effluent limit for turbidity may, at their discretion, choose either numeric effluent limitation based on site-specific considerations including, but not limited to, safety, access and convenience.

D. Discharges to Water Bodies on the 303(d) List for High pH

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for high pH must conduct pH sampling in accordance with the table below, and comply with the numeric effluent limit of pH 6.5 to 8.5 su (Table 6).

Table 6. pH Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled/Units	Analytical Method	Sampling Frequency	Numeric Effluent Limit
High pH	pH /Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5

2. At the Permittee's discretion, compliance with the limit shall be assessed at one of the following locations:

   a. Directly in the 303(d)-listed water body segment, inside the immediate area of influence of the discharge; or

   b. Alternatively, the permittee may measure pH at the point where the discharge leaves the construction site, rather than in the receiving water.

3. Discharges that exceed the numeric effluent limit for pH (outside the range of 6.5 – 8.5 su) constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit shall sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or Another Pollution Control Plan

1. Discharges to a water body that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/index.html for more information on TMDLs.

    a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

        i. The Permittee must sample discharges weekly or as otherwise specified by the TMDL to evaluate compliance with the specific waste load allocations or requirements.

        ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

    b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

2. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus that is completed and approved by EPA before January 1, 2011, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after the operator's complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

S9. STORMWATER POLLUTION PREVENTION PLAN

The Permittee must prepare and properly implement an adequate Stormwater Pollution Prevention Plan (SWPPP) for construction activity in accordance with the requirements of this permit beginning with initial soil disturbance and until final stabilization.

A. The Permittee's SWPPP must meet the following objectives:

1. To implement best management practices (BMPs) to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. To prevent violations of surface water quality, ground water quality, or sediment management standards.

3. To control peak volumetric flow rates and velocities of stormwater discharges.

B. General Requirements

1. The SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

   a. Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

   b. Potential erosion problem areas.

   c. The 12 elements of a SWPPP in Special Condition S9.D.1-12, including BMPs used to address each element.

   d. Construction phasing/sequence and general BMP implementation schedule.

   e. The actions to be taken if BMP performance goals are not achieved—for example, a contingency plan for additional treatment and/or storage of stormwater that would violate the water quality standards if discharged.

   f. Engineering calculations for ponds and any other designed structures.

2. The Permittee must modify the SWPPP if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is, or would be, ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The Permittee must then:

   a. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the inspection or investigation.

   b. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than 10 days from the inspection or investigation. If

installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period,

c. Document BMP implementation and maintenance in the site log book.

The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. Stormwater Management Manual for Western Washington (most recent edition), for sites west of the crest of the Cascade Mountains; or

2. Stormwater Management Manual for Eastern Washington (most recent edition), for sites east of the crest of the Cascade Mountains; or

3. Revisions to the manuals listed in Special Condition S9.C.1. & 2., or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; or

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manuals, including:

   a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

   b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 12 elements below in Special Condition S9.D.1-12 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

   a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

b. Retain the duff layer, native top soil, and natural vegetation in an undisturbed state to the maximum degree practicable.

2. Establish Construction Access

   a. Limit construction vehicle access and exit to one route, if possible.

   b. Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.

   c. Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.

   d. If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport of the sediment to a controlled sediment disposal area.

   e. Conduct street washing only after sediment removal in accordance with Special Condition S9.D.2.d. Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

3. Control Flow Rates

   a. Protect properties and waterways downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by local plan approval authority.

   b. Where necessary to comply with Special Condition S9.D.3.a, construct stormwater retention or detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (for example, impervious surfaces).

   c. If permanent infiltration ponds are used for flow control during construction, protect these facilities from siltation during the construction phase.

4. Install Sediment Controls

   The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must design, install and maintain such controls to:

   a. Construct sediment control BMPs (sediment ponds, traps, filters, etc.) as one of the first steps in grading. These BMPs must be functional before other land disturbing activities take place.

   b. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of

resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion:

West of the Cascade Mountains Crest
During the dry season (May 1 - Sept. 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest

During the dry Season (July 1 - September 30): 30 days
During the wet season (October 1 - June 30): 15 days

*Note: The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches.

e. The Permittee must stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

f. The Permittee must stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

g. The Permittee must minimize the amount of soil exposed during construction activity.

h. The Permittee must minimize the disturbance of steep slopes.

i. The Permittee must minimize soil compaction and, unless infeasible, preserve topsoil.

6. Protect Slopes

a. The Permittee must design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

b. The Permittee must divert off-site stormwater (run-on) or ground water away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.

c. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

i. West of the Cascade Mountains Crest: Temporary pipe slope drains must handle the peak 10-minute velocity of flow from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow velocity from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute velocity of flow from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow velocity from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

a. Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.

b. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.

c. Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

d. Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.

e. Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

f. Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. (Also refer to the definition for "concrete wastewater" in Appendix A--Definitions.)

g. Adjust the pH of stormwater if necessary to prevent violations of water quality standards.

h. Assure that washout of concrete trucks is performed offsite or in designated concrete washout areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.

i. Obtain written approval from Ecology before using chemical treatment other than CO_2 or dry ice to adjust pH.

10. Control Dewatering

a. Permittees must discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, into a

controlled conveyance system before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other treatment or disposal options may include:

   i. Infiltration.

   ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

   iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies.

   iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

   v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

    a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

    b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

    a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

    b. Inspection and monitoring -- Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

    c. Maintaining an updated construction SWPPP -- Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4 and S9.

E. SWPPP – Map Contents and Requirements

The Permittee's SWPPP must also include a vicinity map or general location map (for example, a USGS quadrangle map, a portion of a county or city map, or other appropriate map) with enough detail to identify the location of the construction site and receiving waters within one mile of the site.

The SWPPP must also include a legible site map (or maps) showing the entire construction site. The following features must be identified, unless not applicable due to site conditions:

1. The direction of north, property lines, and existing structures and roads.
2. Cut and fill slopes indicating the top and bottom of slope catch lines.
3. Approximate slopes, contours, and direction of stormwater flow before and after major grading activities.
4. Areas of soil disturbance and areas that will not be disturbed.
5. Locations of structural and nonstructural controls (BMPs) identified in the SWPPP.
6. Locations of off-site material, stockpiles, waste storage, borrow areas, and vehicle/equipment storage areas.
7. Locations of all surface water bodies, including wetlands.
8. Locations where stormwater or non-stormwater discharges off-site and/or to a surface water body, including wetlands.
9. Location of water quality sampling station(s), if sampling is required by state or local permitting authority.
10. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

S10. NOTICE OF TERMINATION

A. The site is eligible for termination of coverage when it has met any of the following conditions:

1. The site has undergone final stabilization, the Permittee has removed all temporary BMPs (except biodegradable BMPs clearly manufactured with the intention for the material to be left in place and not interfere with maintenance or land use), and all stormwater discharges associated with construction activity have been eliminated; or
2. All portions of the site that have not undergone final stabilization per Special Condition S10.A.1 have been sold and/or transferred (per General Condition G9), and the Permittee no longer has operational control of the construction activity; or

3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

The termination is effective on the date Ecology receives the NOT form, unless Ecology notifies the Permittee within 30 days that termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

Permittees transferring the property to a new property owner or operator/permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

GENERAL CONDITIONS

G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this general permit must be consistent with the terms and conditions of this general permit. Any discharge of any pollutant more frequent than or at a level in excess of that identified and authorized by the general permit must constitute a violation of the terms and conditions of this permit.

G2. SIGNATORY REQUIREMENTS

A. All permit applications must bear a certification of correctness to be signed:

1. In the case of corporations, by a responsible corporate officer of at least the level of vice president of a corporation;

2. In the case of a partnership, by a general partner of a partnership;

3. In the case of sole proprietorship, by the proprietor; or

4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to the Ecology.

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

C. Changes to authorization. If an authorization under paragraph G2.B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G2.B.2 above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering

information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy – at reasonable times and at reasonable cost -- any records required to be kept under the terms and conditions of this permit.

C. To inspect -- at reasonable times – any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor – at reasonable times – any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, or

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

A. Violation of any term or condition of this permit.

B. Obtaining coverage under this permit by misrepresentation or failure to disclose fully all relevant facts.

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

D. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

E. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations.

F. Nonpayment of permit fees or penalties assessed pursuant to RCW 90.48.465 and Chapter 173-224 WAC.

G. Failure of the Permittee to satisfy the public notice requirements of WAC 173-226-130(5), when applicable.

The Director may require any discharger under this permit to apply for and obtain coverage under an individual permit or another more specific general permit. Permittees who have their coverage revoked for cause according to WAC 173-226-240 may request temporary coverage under this permit during the time an individual permit is being developed, provided the request is made within ninety (90) days from the time of revocation and is submitted along with a complete individual permit application form.

G6. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, whenever a material change to the construction activity or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least sixty (60) days prior to any proposed changes. Filing a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G7. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit will be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G8. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit.

G9. TRANSFER OF GENERAL PERMIT COVERAGE

Coverage under this general permit is automatically transferred to a new discharger, including operators of lots/parcels within a common plan of development or sale, **if**:

A. A written agreement (Transfer of Coverage Form) between the current discharger (Permittee) and new discharger, signed by both parties and containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the Director; and

B. The Director does not notify the current discharger and new discharger of the Director's intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also submit an updated application form (NOI) to the Director indicating the remaining permitted acreage after the transfer.

G10. REMOVED SUBSTANCES

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G14. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G15. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in Special Condition S5.F, and; 4) the Permittee complied with any remedial measures required under this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G16. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G17. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G18. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G19. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G20. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: for sites 5 acres or larger, a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G21. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to Ecology, it must promptly submit such facts or information.

G22. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least forty-five (45) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, must be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

G23. REQUESTS TO BE EXCLUDED FROM COVERAGE UNDER THE PERMIT

Any discharger authorized by this permit may request to be excluded from coverage under the general permit by applying for an individual permit. The discharger must submit to the Director an application as described in WAC 173-220-040 or WAC 173-216-070, whichever is applicable, with reasons supporting the request. These reasons will fully document how an individual permit will apply to the applicant in a way that the general permit cannot. Ecology may make specific requests for information to support the request. The Director will either issue an individual permit or deny the request with a statement explaining the reason for the denial. When an individual permit is issued to a discharger otherwise subject to the construction stormwater general permit, the applicability of the construction stormwater general permit to that Permittee is automatically terminated on the effective date of the individual permit.

G24. APPEALS

A. The terms and conditions of this general permit, as they apply to the appropriate class of dischargers, are subject to appeal by any person within 30 days of issuance of this general permit, in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

B. The terms and conditions of this general permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within 30 days of the effective date of coverage of that discharger. Consideration of an appeal of general permit coverage of an individual discharger is limited to the general permit's applicability or nonapplicability to that individual discharger.

C. The appeal of general permit coverage of an individual discharger does not affect any other dischargers covered under this general permit. If the terms and conditions of this general permit are found to be inapplicable to any individual discharger(s), the matter

shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G25. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G26. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

c. Ecology is properly notified of the bypass as required in Special Condition S5.F of this permit.

4. A planned action that would cause bypass of stormwater and has the potential to result in noncompliance of this permit during a storm event.

   The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

   a. a description of the bypass and its cause

   b. an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.

   c. a cost-effectiveness analysis of alternatives including comparative resource damage assessment.

   d. the minimum and maximum duration of bypass under each alternative.

   e. a recommendation as to the preferred alternative for conducting the bypass.

   f. the projected date of bypass initiation.

   g. a statement of compliance with SEPA.

   h. a request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated.

   i. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

5. For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above must be considered during preparation of the Stormwater Pollution Prevention Plan (SWPPP) and must be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

   Ecology will consider the following before issuing an administrative order for this type bypass:

   a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

   b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

   c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

APPENDIX A – DEFINITIONS

AKART is an acronym for "all known, available, and reasonable methods of prevention, control, and treatment." AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants and controlling pollution associated with a discharge.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which was completed and approved by EPA before January 1, 2011, or before the date the operator's complete permit application is received by Ecology, whichever is later.

Applicant means an operator seeking coverage under this permit.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: stormwater associated with construction activity, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer means an area designated by a local jurisdiction that is contiguous to and intended to protect a sensitive area.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Calendar Day A period of 24 consecutive hours starting at 12:00 midnight and ending the following 12:00 midnight.

Calendar Week (same as Week) means a period of seven consecutive days starting at 12:01 a.m. (0:01 hours) on Sunday.

Certified Erosion and Sediment Control Lead (CESCL) means a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the SWMM).

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.

Combined Sewer means a sewer which has been designed to serve as a sanitary sewer and a storm sewer, and into which inflow is allowed by local ordinance.

Common Plan of Development or Sale means a site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phased projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a

consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When stormwater comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to waters of the state, including ground water.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land. Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of “hazardous substance” and WAC 173-340-200.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.
2. The pollutant removal performance expected from the BMPs selected.
3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of stormwater to improve quality and/or to reduce the mass flow rate of discharge.

Dewatering means the act of pumping ground water or stormwater away from an active construction site.

Director means the Director of the Washington Department of Ecology or his/her authorized representative.

Discharger means an owner or operator of any facility or activity subject to regulation under Chapter 90.48 RCW or the Federal Clean Water Act.

Domestic Wastewater means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration or surface waters as may be present.

Ecology means the Washington State Department of Ecology.

Engineered Soils means the use of soil amendments including, but not limited, to Portland cement treated base (CTB), cement kiln dust (CKD), or fly ash to achieve certain desirable soil characteristics.

Equivalent BMPs means operational, source control, treatment, or innovative BMPs which result in equal or better quality of stormwater discharge to surface water or to ground water than BMPs selected from the SWMM.

Erosion means the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Erosion and Sediment Control BMPs means BMPs intended to prevent erosion and sedimentation, such as preserving natural vegetation, seeding, mulching and matting, plastic covering, filter fences, sediment traps, and ponds. Erosion and sediment control BMPs are synonymous with stabilization and structural BMPs.

Final Stabilization (same as fully stabilized or full stabilization) means the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as riprap, gabions or geotextiles) which prevents erosion.

Ground Water means water in a saturated zone or stratum beneath the land surface or a surface water body.

Hazardous Substance means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous sub-stance as defined in RCW 70.105.010(14) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42 U.S.C., Sec. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director

by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See Well.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH monitoring period means the time period in which the pH of stormwater runoff from a site must be tested a minimum of once every seven days to determine if stormwater pH is between 6.5 and 8.5.

Point source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See Fact Sheet for further explanation.)

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the CWA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the CWA.

Pollution means contamination or other alteration of the physical, chemical, or biological properties of waters of the State; including change in temperature, taste, color, turbidity, or odor of the waters; or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the State as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare; or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish or other aquatic life.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product (40 CFR 122.1).

Receiving water means the water body at the point of discharge. If the discharge is to a storm sewer system, either surface or subsurface, the receiving water is the water body to which the storm system discharges. Systems designed primarily for other purposes such as for ground water drainage, redirecting stream natural flows, or for conveyance of irrigation water/return flows that coincidentally convey stormwater are considered the receiving water.

Representative means a stormwater or wastewater sample which represents the flow and characteristics of the discharge. Representative samples may be a grab sample, a time-proportionate composite sample, or a flow proportionate sample. Ecology's Construction Stormwater Monitoring Manual provides guidance on representative sampling.

Sanitary sewer means a sewer which is designed to convey domestic wastewater.

Sediment means the fragmented material that originates from the weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation means the depositing or formation of sediment.

Sensitive area means a water body, wetland, stream, aquifer recharge area, or channel migration zone.

SEPA (State Environmental Policy Act) means the Washington State Law, RCW 43.21C.020, intended to prevent or eliminate damage to the environment.

Significant Amount means an amount of a pollutant in a discharge that is amenable to available and reasonable methods of prevention or treatment; or an amount of a pollutant that has a

reasonable potential to cause a violation of surface or ground water quality or sediment management standards.

Significant concrete work means greater than 1000 cubic yards poured concrete or recycled concrete over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a pollutant(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. A few examples of source control BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the sanitary sewer or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm drain means any drain which drains directly into a storm sewer system, usually found along roadways or in parking lots.

Storm sewer system means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying stormwater. This does not include systems which are part of a combined sewer or Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or Manual means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat pollutants in stormwater.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of stormwater.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Temporary Stabilization means the exposed ground surface has been covered with appropriate materials to provide temporary stabilization of the surface from water or wind erosion. Materials include, but are not limited to, mulch, riprap, erosion control mats or blankets and temporary cover crops. Seeding alone is not considered stabilization. Temporary stabilization is not a substitute for the more permanent "final stabilization."

Total Maximum Daily Load (TMDL) means a calculation of the maximum amount of a pollutant that a water body can receive and still meet state water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDL calculations must include a "margin of safety" to ensure that the water body can be protected in case there are unforeseen events or unknown sources of the pollutant. The calculation must also account for seasonable variation in water quality.

Treatment BMPs means BMPs that are intended to remove pollutants from stormwater. A few examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Transparency means a measurement of water clarity in centimeters (cm), using a 60 cm transparency tube. The transparency tube is used to estimate the relative clarity or transparency of water by noting the depth at which a black and white Secchi disc becomes visible when water is released from a value in the bottom of the tube. A transparency tube is sometimes referred to as a "turbidity tube."

Turbidity means the clarity of water expressed as nephelometric turbidity units (NTU) and measured with a calibrated turbidimeter.

Uncontaminated means free from any contaminant, as defined in MTCA cleanup regulations. See definition of "contaminant" and WAC 173-340-200.

Waste Load Allocation (WLA) means the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality based effluent limitation (40 CFR 130.2[h]).

Water quality means the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

Waters of the State includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW, which include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Well means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. (See Injection well.)

Wheel wash wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When stormwater comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX B – ACRONYMS

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
CFR	Code of Federal Regulations
CKD	Cement Kiln Dust
cm	Centimeters
CTB	Cement-Treated Base
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ESC	Erosion and Sediment Control
FR	Federal Register
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SWMM	Stormwater Management Manual
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USC	United States Code
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WQ	Water Quality
WWHM	Western Washington Hydrology Model

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
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December 12, 2013

Lauren Golembiewski
Glacier Environmental Services, Inc.
P.O. Box 1097
Mukiteo, WA 98275

RE: Transfer of coverage under the Construction Stormwater General Permit

Permit number:	**WAR301251**	
Site Name:	**Cornet Bay Marina**	
Location:	**200 Cornet Bay Road**	
	Oak Harbor, WA	**County: Island**
Disturbed Acres:	**1.1**	

Dear Ms. Golembiewski:

The Washington Department of Ecology (Ecology) received your Transfer of Coverage form for coverage under the Construction Stormwater General Permit. Our records have been updated to show Glacier Environmental Services, Inc. as responsible for permit coverage effective December 12, 2013. **Please retain this transfer of permit coverage letter with your permit (enclosed), stormwater pollution prevention plan (SWPPP), and site log book. These materials are the official record of permit coverage for your site.**

Please take time to read the entire permit and contact Ecology if you have any questions.

Electronic Discharge Monitoring Reports (WQWebDMR)
This permit requires that Permittees submit monthly discharge monitoring reports (DMRs) electronically using Ecology's secure online system, WQWebDMR. To sign up for WQWebDMR go to: www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html. If you have questions, contact Tonya Wolfe at (360) 407-7097 (Olympia area), or (800) 633-6193/option 3, or email WQWebPortal@ecy.wa.gov.

Electronic Discharge Monitoring Reports (WQWebDMR)
This permit requires that Permittees submit monthly discharge monitoring reports (DMRs) electronically using Ecology's secure online system, WQWebDMR. To sign up for WQWebDMR go to: www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html. If you have questions, contact Tonya Wolfe at (360) 407-7097 (Olympia area), or (800) 633-6193/option 3, or email WQWebPortal@ecy.wa.gov.

Ecology Field Inspector Assistance
If you have questions regarding stormwater management at your construction site, please contact Tracie Walters of Ecology's Northwest Regional Office in Bellevue at tracie.walters@ecy.wa.gov, or (425) 649-4484.

Questions or Additional Information
Ecology is committed to providing assistance. Please review our web page at: www.ecy.wa.gov/programs/wq/stormwater/construction/. If you have questions about the construction stormwater general permit, please contact Clay Keown at clay.keown@ecy.wa.gov, or (360) 407-6048.

Sincerely,

Bill Moore, P.E., Manager
Program Development Services Section
Water Quality Program

Enclosure

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
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December 11, 2013

Ms. Lauren Miles-Golembiewski
Glacier Environmental Services, Inc
3415 121st Street SW
Lynnwood, WA 98087

Order Docket No.	10404
Site Location	Cornet Bay Marina, 200 Cornet Bay Road, Oak Harbor, WA

Re: Administrative Order

Dear Ms. Miles-Golembiewski:

The Department of Ecology (Ecology) has issued the enclosed Administrative Order (Order) requiring Glacier Environmental Services to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) – Water Pollution Control.
- Chapter 173-201A Washington Administrative Code (WAC) Water Quality Standards for Surface Waters of the State of Washington.
- Permit: National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit WAR301251.

If you have questions please contact Tracie Walters at (425) 649-4484 or twal461@ecy.wa.gov.

Sincerely,

Guald Hinz for...

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office

Enclosure: Administrative Order No. 10401

By Certified Mail No.: 7008 1140 0000 2359 8763

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF AN ADMINISTRATIVE ORDER AGAINST Lauren Miles-Golembiewski Glacier Environmental Services, Inc	)))))	ADMINISTRATIVE ORDER DOCKET NO. 10404

To: Glacier Environmental Services, Inc
3415 121st Street SW
Lynnwood, WA 98087

Order Docket No.	10404
Site Location	Cornet Bay Marina, 200 Cornet Bay Road, Oak Harbor, WA

The Department of Ecology (Ecology) has issued this Administrative Order (Order) requiring Glacier Environmental Services, Inc (Glacier Environmental Services) to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) – Water Pollution Control.
- Chapter 173-201A Washington Administrative Code (WAC) Water Quality Standards for Surface Waters of the State of Washington.
- Permit: National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit WAR301251.

This is an Administrative Order in association with General Condition G13 (Additional Monitoring) as set forth in the Construction Stormwater General Permit. RCW 90.48.120(2) authorizes Ecology to issue Administrative Orders to accomplish the purposes of Chapter 90.48 RCW.

ORDER TO COMPLY

Description:

Glacier Environmental has applied for coverage under the Construction Stormwater General Permit (Permit) for construction activities associated with the construction site known as Cornet Bay Marina. Glacier Environmental Services reported that the construction site contains contaminated soil and groundwater which may be discharged due to the proposed construction activity. The Construction Stormwater General Permit does not have water quality sampling or benchmarks for gasoline-range hydrocarbons (NWTPH-Gx), diesel and heavy oil-range hydrocarbons (NWTPH-Dx), or benzene, toluene, ethyl benzene and xylenes (BTEX) (see Table 1); however, the permit requires compliance with the Water Quality Standards for Surface Water of the State of Washington (Water Quality Standards).

This Order establishes Indicator Levels for the Cornet Bay Marina. Indicator Levels express a pollutant concentration used as a threshold, below which a pollutant is considered unlikely to

cause a water quality violation, and above which it may. Indicator Levels in this Administrative Order were derived from practical quantitation levels for the cited analytical method.
Glacier Environmental Services must take the following actions to remain in compliance with NPDES Permit WAR301251.

- Glacier Environmental Services shall use storage tanks and/or weir tanks, media filtration, and granular-activated carbon columns to treat any contaminated dewatering water or stormwater comingled with dewatering water (dewatering water) prior to discharge to surface water.
- All dewatering water, stormwater, and stormwater comingled with dewatering water (water) must be sampled weekly and tested for the parameters listed in Table 1. If all parameters are equal to or below the benchmarks or Indicator Levels in Table 1, the water may be discharged to waters of the state. If any of the Indicator Levels listed in Table 1 are exceeded, the water must not be discharged to waters of the state until the water has been treated and retested to determine that all parameters are equal to or below the Indicator Levels in Table 1. If the indicator levels for turbidity or pH listed in Table 1 are exceeded, Construction Stormwater General Permit (Permit) condition S4.C.5 and S4.D.5 applies.
- Have all pre-treatment and treatment systems in place prior to any discharge of dewatering water to surface water.
- Sampling for gasoline-range hydrocarbons (NWTPH-Gx), diesel-range hydrocarbons (NWTPH-Dx), and benzene, toluene, ethylbenzene and xylene (BTEX) must be reported on the required Discharge Monitoring Report (DMR).
- All sampling data must be reported monthly on Discharge Monitoring Reports (DMRs) using Ecology's electronic secure online system WQWebDMR, in accordance to permit condition S5.B. If the measured concentration is below the detection level, then Glacier Environmental Services shall report single analytical values below detection as "less than the detection level (DL)" by entering "<" followed by the numeric value of the detection level (e.g. "<0.1"). All other values above DL must be reported as the numeric value.
- If Glacier Environmental Services conducts sampling for the above parameters more frequently than required by this Order, then Glacier Environmental Services must include the results of this monitoring in the calculation and reporting of the data submitted in the monitoring reports.
- All monitoring data must be prepared by a laboratory registered or accredited under the provisions of Chapter 137-50 WAC, *Accreditation of Environmental Laboratories.*
- If a modification of this Order is desired, a written request shall be submitted to Ecology; and if approved, Ecology will issue an approval letter or an amendment to this Order.
- The sampling dates of any two consecutive weekly dewatering monitoring samples should be at least six days apart and no more than eight days apart, unless directed by Ecology. If the dewatering discharge is intermittent rather than continuous, sampling should take place at the beginning of each discharge cycle.
- Any discharge to waters of the state in exceedance of the contaminant Indicator Level in Table 1, except for turbidity and pH criteria, shall be reported according to Permit condition S5.F, Noncompliance Notification.

If any monitoring result exceeds a benchmark listed on Table 1, immediately notify Tracie Walters (425) 649-4484, twal461@ecy.wa.gov and Raman Iyer (425) 649-4424, riye461@ecy.wa.gov.

Ecology retains the right to make modifications to this Order through supplemental order, or amendment to this Order, if it appears necessary to further protect the public interest. Transfer of NPDES WAR301251 may require an additional and/or separate Administrative Order.

This Order does not exempt Glacier Environmental Services from any Construction Stormwater General Permit requirement.

Table 1.

Parameter	Indicator Level	Unit	Analytical Method	Detection Level	Quantitation Level
TOTAL PETROLEUM HYDROCARBONS AND BTEX					
Gasoline-Range Hydrocarbons (NWTPH-Gx)	250[a]	µg/L	Ecology NWTPH-Gx	250	250
Diesel and Heavy Oil-Range Hydrocarbons (NWTPH-Dx)	250[a]	µg/L	Ecology NWTPH-Dx	250	250
BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes)	2[a]	µg/L	EPA SW 846 8021/8260	1	2
NPDES CONSTRUCTION STORMWATER GENERAL PERMIT BENCHMARKS					
Turbidity	25	NTU	SM2130*	NA	NA
pH	6.5-8.5	SU	pH Meter	NA	NA

a: No surface water standard, value is laboratory quantitation level.
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons Gasoline Extended Range
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons Diesel Extended Range
*: Or equivalent.

FAILURE TO COMPLY WITH THIS ORDER

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do both of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel Road SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Tracie Walters
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Phone: (425) 649-4484
Email: twal461@ecy.wa.gov

MORE INFORMATION

- Pollution Control Hearings Board Website: www.eho.wa.gov/Boards_PCHB.aspx
- Chapter 43.21B RCW – Environmental and Land Use Hearings Office – Pollution Control Hearings Board: http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B
- **Chapter 371-08 WAC – Practice And Procedure**
  http://apps.leg.wa.gov/WAC/default.aspx?cite=371-08
- **Chapter 34.05 RCW – Administrative Procedure Act**
  http://apps.leg.wa.gov/RCW/default.aspx?cite=34.05
- **Laws:** www.ecy.wa.gov/laws-rules/ecyrcw.html
- **Rules:** www.ecy.wa.gov/laws-rules/ecywac.html

SIGNATURE

Gerald Lenney for ...
Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office

Dec. 11, 2013
Date

ATTACHMENT 4

STORMKLEAR™ LIQUIFLOC™ USE LEVEL DESIGNATION

WASHINGTON STATE DEPARTMENT OF ECOLOGY

September 2013

USE DESIGNATIONS FOR EROSION AND SEDIMENT CONTROL

For

Chitosan-Enhanced Sand Filtration using 1% StormKlear® LiquiFloc™ chitosan acetate solution

Ecology's Decision:

Based on Ecology's review of HaloSoure Inc.'s (HI) application submissions and the findings by the Chemical Technical Review Committee (CTRC), Ecology is hereby issuing the following use designations for the Chitosan Enhanced Sand Filtration (CESF) technology for adequately controlling small particulate turbidity (clays, silt, etc.) in stormwater discharges at construction sites:

1. **General Use Level Designation for the CESF technology with the discharge of chitosan acetate treated water to retention systems capable of infiltrating all storms to the ground with no discharge to surface water. The operator shall base the design of the infiltration system on the criteria in Volume V of Ecology's most recent Stormwater Manual for Western Washington (SWMMWW) or Chapter 6 of the Stormwater Management Manual for Eastern Washington (SWMMEW). The operator shall strictly adhere to the design and operational criteria for the CESF specified in this document. You must keep records showing that you achieved total retention on site.**

2. **General Use Level Designation for the CESF technology with a discharge of chitosan acetate treated water from the sand filters to temporary holding ponds or basins then discharged to surface water (batch treatment). The operator shall strictly adhere to the design and operational criteria specified in this document.**

3. **General Use Level Designation for the CESF technology with the chitosan acetate treated discharges conveyed directly or indirectly to surface water (flow-through system). The operator may direct discharge to streams, lakes, and marine waters.**

This designation has no expiration date, but it may be amended or revoked by Ecology and is subject to all conditions contained in this use level designation.

Conditions Applicable to CESF under this designation

1. **Formal written approval from Ecology is required for the use of chemical treatment at each site. You must obtain written approval from the appropriate Ecology regional office.**

2. **This use level designation applies only to StormKlear® LiquiFloc™ (1% chitosan acetate solution).**

3. **The chitosan dose rate for water entering the filters shall not exceed 1 mg/L StormKlear® LiquiFloc™ (as chitosan by weight). Operators must record all calibration results simultaneously with the flowrates. Operators must keep all records on site.**

4. **The operator shall implement source control procedures to the maximum extent feasible to minimize the need for the use of additional chitosan acetate for the pretreatment of stormwater.**

5. **Operators may use additional StormKlear® LiquiFloc™ (amounts greater than 1 mg/L chitosan by weight) to pretreat water that exceeds 600 NTU. Operators may use a portion of the 1 mg/L StormKlear® LiquiFloc™ to pretreat water less than or equal to 600 NTU. Pretreatment must occur in a tank or basin dedicated to pretreatment. All pretreated water must enter the sand filters. Pretreated water must have no less than 50 NTU and no more than 600 NTU before final dosing. This will help ensure that free chitosan does not enter the CESF system. In addition, 1 mg/L StormKlear® LiquiFloc™ (chitosan by weight) is sufficient to treat water in this range. The operator must continuously monitor water exiting the pretreatment tanks for turbidity. An automatic integrated turbidity sensor shall be located on the output from the pretreatment tanks or basins. This sensor will alert the operator when turbidity values fall outside of the 50 to 600 NTU range. If this occurs, operators can reroute the out of spec water to the untreated stormwater pond, shut the system down, or conduct additional residual chitosan tests. One of these actions must occur each time the alarm goes off. The operator must use jar tests to determine proper pretreatment dosing and proper treatment dosing.**

6. **This approval applies to discharges to streams, lakes, and marine water bodies. HaloSource provided additional aquatic toxicity testing for discharges to other waterbodies.**

7. **The operator shall conduct jar tests at startup to determine the dosage level of chitosan acetate solution. Additional jar tests will be conducted when influent turbidity changes by 20% or greater. The operator shall record jar test results**

in the daily operating log. If the results of the jar test indicate that the dose needs adjustment, the operator shall document the jar testing results and the indicated dose rate change in the daily operating log.

8. **During CESF operation, the operator shall continuously monitor water quality influent and effluent for pH, turbidity, and flow. For batch treatment systems, the operator must continuously monitor only water discharged from the batch treatment basins or tanks for pH, turbidity, and flow during discharge.**

9. **The operator shall continuously meter and record discharge flowrate. For batch treatment systems, the operator must continuously monitor only water discharged from the batch treatment basins or tanks for flowrate.**

10. **The operator shall monitor the effluent for residual chitosan or aquatic toxicity. If you monitor effluent for aquatic toxicity, you must use the most sensitive test reported in the intended use plan. If you monitor the effluent for residual chitosan, you must collect and analyze a discrete grab sample of homogeneous sand filter discharge within 30 minutes of the onset of operation and 2 hours after startup to confirm a discharge concentration below 0.2 ppm. You must repeat the test is to be repeated whenever there is a change in dosage, or a significant change in influent turbidity or flowrate (20% or greater). For batch treatment systems, you need to monitor only water discharged from the batch treatment basins or tanks. For batch treatment systems, you must collect and analyze an additional grab sample of the potential batch treatment discharge for aquatic toxicity or residual chitosan before any discharge from treatment basins or tanks can occur.**

11. **The operator shall complete an Operating Period Information Form for each operating period (system startup, operation, and shutdown). At a minimum, the form shall include the following:**
    - **A record of each recycle event**
    - **A record of each backwash event**
    - **Actions taken when a recycle event occurs**
    - **Actions taken when excessive backwashing is occurring**
    - **A record of pump calibration**
    - **A record of chitosan use for pretreatment**
    - **A record of chitosan dosage immediately prior to filters**
    - **A record of test results for chitosan residual in the effluent**

Weekly, the supervisor shall examine the forms completed the previous week. The supervisor shall sign each daily form indicating his review. The form shall document actions taken in response to any abnormal conditions observed by the operator.

12. **At all construction sites, at the end of the operating period, a delegated responsible person shall record their assessment of the operational efficiency of the CESF process, any upsets, the sand filter discharge chitosan**

concentrations, and any other relevant observations that relate to CESF proper operation. They must also certify the acceptability of the CESF discharge to surface water.

13. **Discharges from the CESF system shall not cause or contribute to receiving water quality violations and shall comply with the discharge requirements of the State of Washington Construction Stormwater General Permit, AKART, and local government requirements for turbidity and other applicable pollutants. The operator must use this designation document as the basis for Stormwater Pollution Prevention Plans (SWPPPs) for all construction projects where you plan to use chitosan treatment.**

14. **Discharges from the CESF system under these designations shall achieve performance goals of a maximum instantaneous discharge of 10 NTU turbidity and a discharge pH within a range of 6.5-8.5. These limits reduce interferences associated with the residual chitosan test.**

15. **The CESF facility contractor shall guarantee that the CESF system, when used as directed, will not produce treated water that exhibits aquatic toxicity caused by chitosan added as a treatment agent.**

16. **The CESF system operators shall trained technicians certified through an Ecology-approved training program that includes classroom and field instruction. The CESF operator must remain on-site during CESF operation. The technician must have the following minimum training requirements:**

Prerequisites:

- **Current certification as a Certified Erosion and Sediment Control Lead (CESCL), through an Ecology-approved CESCL training course.**
- **Fundamental knowledge of, high-pressure sand filter systems.**
- **Fundamental knowledge of water pumping and piping systems.**
- **Fundamental knowledge of stormwater discharge regulations for applicable region/locale.**
- **Fundamental knowledge of stormwater quality testing procedures and methods for parameters applicable to the region/locale.**

Classroom (8 hours)

- **Stormwater regulatory framework and requirements**
- **Stormwater treatment chemistry (chitosan, pH, coagulation, filtration, etc.)**
- **Stormwater treatability (how to do jar testing)**
- **Treatment system components and their operation**
- **Treatment system operation**
- **Troubleshooting**

In the field (32 hours)

- **Operating the treatment system**
- **Entering data in the system operations log**
- **Testing turbidity and pH**
- **Optimizing chitosan dose rate**

- **Water quality sampling and testing (turbidity and pH)**
- **Residual Chitosan Test**

17. **The SWPPP is to include a field procedure, accepted by the Department of Ecology, for detecting residual chitosan in stormwater discharges sensitive to 0.2 ppm.**

18. **During the planning of the project, the operator must evaluate the adverse potential impacts on chitosan efficiency of the use of other erosion and sediment control practices.**

Design Criteria for CESF Systems:

1. **You must design systems using the relevant portions of the most current versions of BMP C250 and BMP C251 of the SWMMWW and the SWMMEW. System design must consider downstream conveyance system integrity.**

2. **The facility shall employ a minimum of three (3) sand filter pods to ensure adequate backwashing capacity. The operator must discharge backwash slurry from the sand filters to a holding cell that is separate from the temporary storage cell for the incoming turbid stormwater. The overflow from the backwash slurry detention cell can overflow into the detention basin for the incoming turbid stormwater.**

3. **The operating flow rate shall not exceed 15 GPM per square foot of sand bed filtration area.**

4. **You must use filtration media approved in the Sand Filtration Treatment Facilities section (Volume V, Chapter 8) of the most recent Stormwater Management Manual for Western Washington in the filter pods. Minimum sand bed depth shall be 18 inches, underlain with a minimum of 6 inches of 1-inch crushed rock.**

5. **The CESF system shall include a flow-regulating valve on the input to and output of the sand filter. These regulating valves will reduce the maximum output of the pump as required and facilitate proper backwash.**

6. **The CESF system treated water output shall be equipped with an automatic integrated turbidity and pH sensor capable of shutting the system down if the output turbidity or pH exceeds preset values. You shall install an audible alarm and warning light on the treatment system to alert the operator in the event of a system failure.**

7. **You shall completely enclose the CESF control system (including metering pump, chitosan storage, and instrumentation) in a secure structure with locking door. You shall store the chitosan liquid concentrate in a non-corrosive storage tank. You shall install secondary containment on the Chitosan storage tank,**

metering pump, and tubing. There shall be an anti-siphon valve on the metering pump discharge tubing.

8. **The operator shall perform Chitosan injection with a LMI-brand C77 chemical metering pump, or equivalent. The operator must calibrate the metering pump within 15 minutes of the beginning of each operating period. You shall recalibrate the metering pump when a significant change occurs in either the flow or influent turbidity.**

Applicant: HaloSource, Inc., chitosan vendor and technical consultant

Frank Kneib, National Sales Manager

Applicant Address: 1631 220th Street SE, Suite 100
Bothell, Washington 98021

Application Documents:

- Application for Conditional Short Term Use Designation for Chitosan Enhanced Sand Filtration, July 1, 2003, Peter Moon, P.E. and Paul Geisert, P.E., Price Moon Enterprises, Inc. for Natural Site Solutions, LLC. (NSS)
- Chitosan-Enhanced Sand Filtration. Engineering Report .with Addendum, NSS, May 15th, 2003
- Chitosan-Enhanced Sand Filtration System. Operation and Maintenance Manual. NSS, April 30, 2003.
- Toxicity Evaluations of Chitosan-based Products, Liqui-Floc and Gel-Floc: December 2002 and March 2003, AMEC Earth & Environmental Northwest Bioassay Laboratory, 5009 Pacific Hwy. East, Suite 2, Fife, WA 98424. (253) 922-4296.
- Understanding the Freshwater Aquatic Toxicity of Chitosan When Used in Engineered Sand Filtration Stormwater Treatment Systems; March 27, 2003. John Macpherson, CPESC, NSS.
- Analytical Testing Demonstrating the Inability of a Solution of Chitosan Acetate to Penetrate a Model Sand Filter; John Macpherson, NSS.
- Quality Assurance Project Plan, Third Version, January 12, 2004, John MacPherson, NSS
- Technical Engineering Evaluation Report (TEER) For The Chitosan-Enhanced Sand Filtration Technology for Flow-Through Operations, Gary Minton, February 28, 2006
- Rainbow trout (Oncorhynchus mykiss) Chronic Toxicity Screening of Stormwater Treated by Chitosan Enhanced Sand Filtration Flow-Through System – Redmond, Washington, ECO-Endeavors, Inc, June 2, 3004
- Toxicity testing for Liqui-Floc: Final Report, Nautilus Environmental, LLC, September 30, 2004
- Colorimetric Determination of Residual Chitosan in Treated Stormwater: Field Test, Natural Site Solutions, LLC, July, 2004
- Certification of Residual Chitosan Test by AM TEST Laboratories, October 27, 2005

- Chitosan-Enhanced Sand Filtration System Using StormKlear™ LiquiFloc™ Operations and Maintenance Manual, HaloSource, February, 2007
- Expanded Approval of CESF Treatment Using Liquifloc 1%, Department of Ecology, September 19, 2013

Applicant's Use Level Request:

General use level designation for the operation of chitosan-enhanced sand filtration (CESF) technology for the reduction of turbidity in construction site stormwater.

Applicant's Performance Claims:

For construction site stormwater runoff with a turbidity of less than 600 NTU (influent), a properly engineered and deployed *Chitosan-Enhanced Sand Filtration System* will remove greater than 95% of the turbidity, producing effluent that will consistently meet the State surface water discharge standards.

Chemical Technical Review Committee (CTRC) Recommendation:

The CTRC finds sufficient evidence to recommend to Ecology to grant a GULD for flow-through treatment that can remove turbidity from stormwater at construction sites within acceptable limits for chitosan enhanced sand filtration using StormKlear® LiquiFloc™ 1% chitosan acetate.

Findings of Fact:

1. A CESF system charged with #30 crushed silica sand has demonstrated the ability to reduce turbidity caused by the disturbance of sediment on construction sites by 97.44 percent (overall average) when operated at a flowrate of approximately 15 gallons per minute per square foot of filtration surface area. This translates to a flowrate of approximately 500 GPM when using a 48-inch diameter, 4-pod sand filter module. HaloSource monitored over 1500 operating periods over a two-year period. Data from these operating periods show that discharge graphs were always below 10 NTU. Any discharge that exceeded 10 NTU was recycled. Recycle rates ranged from 4-17%.

2. Influent turbidity levels above 600 NTU demonstrated the potential to cause a slow degradation of the turbidity removal performance by the system resulting in eventual system failure. CESF systems shall be limited to influent turbidity levels of 600 NTU or less. Turbidity levels above 600 NTU shall be allowed additional settlement time or be pretreated.

3. Water with a pH range outside the CESF treatment window of 6.5 to 8.5 shall be pretreated to achieve this range. This application did not cover the pretreatment process.

4. In the CESF treatment systems that have been constructed and operated to date, we have observed no aquatic toxicity in the treated filtrate.

5. The chitosan acetate polymer component, used for water treatment, is non-toxic to humans and other mammals, which makes it somewhat unique in the universe of treatment agents. Chitosan acetate does, however, exhibit toxicity to rainbow trout. Therefore, you should use Chitosan acetate at a maximum dose rate of 1 mg/L as chitosan acetate by weight as a conservative measure to ensure no possibility of toxicity to rainbow trout in receiving water.

6. HaloSource provided a design/operation/maintenance manual, which includes information on selecting, sizing, assembling, operating and maintaining a CESF system.

7. NSS and HaloSource provided a significant amount of aquatic toxicity data demonstrating that they expect the discharge residual of the chitosan acetate polymer to be within toxicity levels acceptable to Ecology when used as directed.

8. NSS and HaloSource provided other supporting information including system limitations and constraints, system specifications and warranty information.

Description of the Technology:

Chitosan-enhanced sand filtration (CESF) is a stand-alone construction site water treatment technology, which is comprised of four basic components:

- Stormwater transfer pump
- Chitosan addition
- Pressurized multi-pod sand filtration
- Interconnecting treatment system piping

You can use CESF as a flow-through stormwater treatment technology that utilizes chitosan, a natural biopolymer, in conjunction with pressurized sand filtration to remove turbidity (suspended sediment). Each treatment system is designed and installed to be operated on an as need basis, pumping water from a retention basin whenever the water level of the retention basin is high enough to warrant processing. When someone transfers stormwater from the retention basin to the sand filtration unit, they introduce chitosan to stormwater to coagulate suspended solids producing larger particles, which they retain within a sand filter. The filtration systems are equipped with automatic backwash systems, which will backwash the collected sediment from the individual filter pods as necessary to maintain the hydraulic capacity of the filtration media. This feature allows the treatment system to operate on a continuous flow-through basis. A link to a diagram of the system is included here:

Recommended Research and Development

Ecology encourages HaloSource, Inc. to pursue continuous improvements to the CESF system. To that end, Ecology recommends the following actions:

- Further field testing is necessary to determine the optimum dose rate for various influent concentrations.
- Conduct further research to create a more reliable residual chitosan test. Develop a test that quantifies chitosan concentrations.
- Determine how different soil types affect chitosan treatment.
- Determine aquatic threshold for marine species.

Contact Information:

Applicant: Frank Kneib, National Sales Manager
Storm and Industrial Water Division
Toll Free: 888-282-6766 ext. 1970
Office: 425-974-1970
Fax: 425-556-4120
Cell: 602-334-3474
Email: fkneib@halosource.com

Applicant Website: www.halosource.com

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

Ecology: Douglas C. Howie, P.E.
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
April 2008	Original Draft use-level-designation document
August 2010	Modified contact information
September 2013	Added ability to discharge to lakes and marine waters

EXPANDED APPROVAL OF CESF TREATMENT USING LIQUIFLOC 1%
September 19, 2013

The chitosan-enhanced sand filtration (CESF) stormwater treatment system using HaloKlear LiquiFloc™ containing 1% chitosan acetate has been granted General Use Level Designation in Washington State. Natural Site Solutions, LLC submitted the original Intended Use Plan dated November 18, 2004 to describe how the LiquiFloc concentration will be kept below its toxic threshold to key species. The intended use plan describes how a CESF system is operated so that the chitosan dose concentration is always below the most sensitive toxic threshold. After being dosed to a concentration that is below the toxic threshold, the chitosan concentration in the stormwater will be reduced further by binding to suspended solids and then binding to the sand filter before being discharged.

The following list includes the toxicity tests and species that were performed and has added the results from the mysid 7-day survival and growth test. The approval is now expanded to include discharges to any surface water in the state, including lakes and marine waters.

Toxicity Tests and Results

Toxicity Testing Results for LiquiFloc 1% (as mg/L of chitosan acetate)

Test	**Endpoint**	**EC_{50} (mg/L)**	**EC_{25} (mg/L)**
Daphnia pulex 48-hr acute	survival	23.2	18.3
rainbow trout 96-hr acute	survival	1.73	1.28
fathead minnow 96-hr acute	survival	6.42	1.26
rainbow trout 7-day survival & growth	survival	1.54	1.21
	weight	> 2.5	> 2.5
fathead minnow 7-day survival & growth	survival	> 10	9.32
	weight	> 10	6.88
rainbow trout embryo viability	viability	> 10	> 10
fathead minnow embryo-larval survival & teratogenicity	survival	> 10	> 10
	development	10	10
mysid 7-day survival & growth	survival	> 4	> 4
	weight	> 4	0.98

Intended Discharge Concentration

The intended discharge concentration is conservatively estimated to be 0.1 mg/L. The Residual Chitosan Field Screening Test has been performed hundreds of times on treatment system effluent. The detection limit of this procedure is 0.1 mg/L and no chitosan has ever been detected in effluent. In addition, clean water containing 2 mg/L of chitosan was passed through a sand filter in a bench scale test and no chitosan was detected in the filtrate using a procedure with a detection limit of 0.03 mg/L.

Safety Margin for the Most Sensitive Response (mysid weight)

The toxic thresholds are all greater than three times the intended discharge concentrations. Therefore, the safety margins are not considered to be narrow. In addition, 14-day flow-through toxicity testing with rainbow trout was done in 2004 at a construction site in Redmond, Washington with the result of 100% survival. No confidence building period of flow-through or *in-situ* toxicity testing is needed. The data support the future approval of chitosan concentrations above 1.06 mg/L in very turbid stormwater prior to sand filtration without needing to change the goal of the intended use plan of keeping the dose concentration below the toxic threshold.

Maintenance of Safety Margin

Chitosan acetate can effectively treat stormwater turbidity up to 600 NTU without using a concentration above 1.06 mg/L. 1.06 mg/L chitosan is below its toxic threshold of 1.21 mg/L in clear water. In addition, chitosan will be removed from solution by binding to solids and by being withheld in the sand filter. The safety margin will certainly be maintained if the treatment concentration is kept to 1.06 mg/L or below. Any mechanical failure of the positive displacement metering pump will immediately cause a reduction in LiquiFloc dosing so pump failure is only a problem for treatment effectiveness and not safety margin maintenance.

The following dose rate table shall be used to ensure both treatment plant effectiveness and a chitosan concentration below 1.06 mg/L prior to sand filtration.

Dose Rate Table for LiquiFloc (1% chitosan acetate) Based on Flow and Turbidity

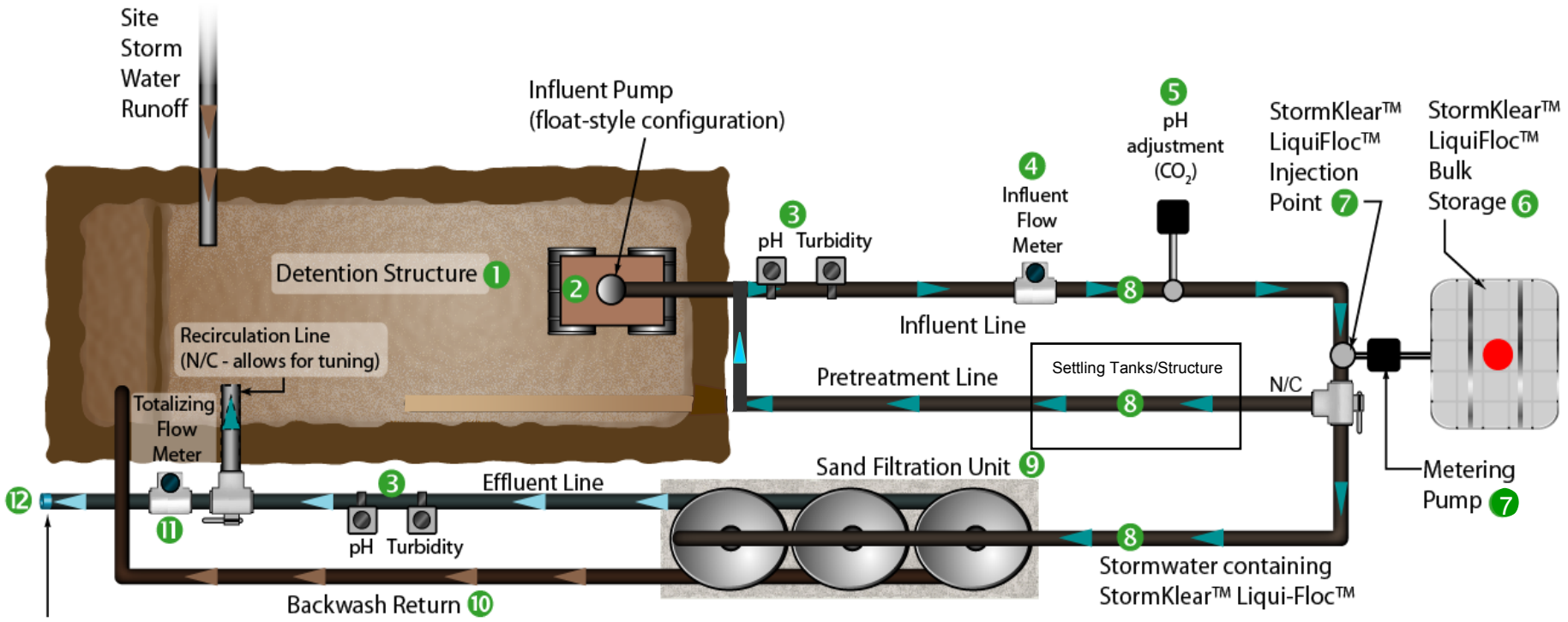
turbidity	stormwater flow rate	LiquiFloc dose rate	chitosan concentration
50 - 200 NTU	200 gpm	20 ml/min or 0.32 gph	0.26 mg/L
	300 gpm	30 ml/min or 0.48 gph	
	400 gpm	40 ml/min or 0.64 gph	
	500 gpm	50 ml/min or 0.8 gph	
	600 gpm	60 ml/min or 0.96 gph	
	700 gpm	70 ml/min or 1.11 gph	
200 - 400 NTU	200 gpm	40 ml/min or 0.64 gph	0.53 mg/L
	300 gpm	60 ml/min or 0.96 gph	
	400 gpm	80 ml/min or 1.27 gph	
	500 gpm	100 ml/min or 1.6 gph	
	600 gpm	120 ml/min or 1.91 gph	
	700 gpm	140 ml/min or 2.23 gph	
400 - 600 NTU	200 gpm	80 ml/min or 1.27 gph	1.06 mg/L
	300 gpm	120 ml/min or 1.91 gph	
	400 gpm	160 ml/min or 2.54 gph	
	500 gpm	200 ml/min or 3.17 gph	
	600 gpm	240 ml/min or 3.81 gph	
	700 gpm	280 ml/min or 4.45 gph	

Checking formula:
chitosan concentration in mg/L = (ml/min LiquiFloc x 0.01 x 1 g/ml x 1000 mg/g)/system flow rate in liters/min
liters/min = gpm x 3.78 liters/gal

Safety Margin Checklist

- Only HaloKlear LiquiFloc™ containing 1% chitosan acetate shall be used.
- The metering pump shall be calibrated using a calibration cylinder at startup and every time that the LiquiFloc dose rate needs changed. The calibration shall be recorded in the log. The stroke frequency shall be set as high as possible and the stroke length adjusted to provide the correct dosing.
- The system flow rate and the turbidity of both influent and effluent shall be measured hourly and recorded in the log.
- No chitosan-treated water shall be discharged to surface water without first being sand-filtered.
- Secondary containment for the LiquiFloc storage container and the metering pump shall be at least equal to the volume of the storage container.
- Spill adsorbent material shall be readily available to immobilize any spill of LiquiFloc during handling.
- If the treatment system is located less than 50 feet from surface water, a 1-foot high earthen berm shall be constructed and maintained down-gradient as additional spill containment.
- The occasional use of the Residual Chitosan Field Screening Test to confirm a discharge concentration below 0.1 is encouraged in order to further build confidence in CESF system safety.

Schematic Diagram of CESF System



Note: Pretreatment line shown is conceptual, additional equipment/piping may be required.
If you use pretreatment dosing, you can read water quality after settling at the influent pH and turbidity location.

Rev2.1

ATTACHMENT 5

BENDER CONSULTING, LLC – DEWATERING DESIGN REPORT

September 9, 2013

BENDER
CONSULTING, LLC
Applied Groundwater Solutions

PMB 154
1992 South Elger Bay Road
Camano Island, WA 98282

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www.benderllc.com

Mr. Steve Miles
Glacier Environmental Services, Inc.
4416 Russell Rd
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Draft DEWATERING DESIGN RECOMMENDATIONS, CORNET BAY MARINA REMEDIATION, WHIDBEY ISLAND, WASHINGTON

Dear Steve:

This letter presents our dewatering design recommendations for the Cornet Bay Marina Remediation Project on Whidbey Island, Washington. This letter is intended to provide the basis of design, and design recommendations for the installation and operation of the dewatering system as required in Section 7-08.3(1)D of the Specifications. This letter does not detail the specific equipment intended for construction of the system, specific dewatering component layout, or schedule. This plan has been prepared based on the geotechnical report available for this project, the plans, our experience, and our conversations with you.

PROJECT DESCRIPTION

The project consists of excavation and remediation of contaminated soil at the existing marina facility on Cornet Bay. The maximum work area dimensions are about 120 by 400 feet. Most of the excavation will be less than 12 or 15 feet, but excavation depths up to 18 feet are anticipated.

The site soils consist primarily of fill placed on tide lands that extended the marina land surface out into the bay. The north and south ends of the landward extension are ballasted by rip rap that extends from the bay side of the area toward land. The southeastern part of the project is bordered by the access road, and then an upland area further to the east.

A sheet pile wall will be installed on the northeast length of the site, which is adjacent to Cornet Bay. The sheet piles will extend to a minimum of elevation -33 feet. Top of pile elevation is to be 13.5 feet; as such, the sheet piles will be a minimum of 45.5 feet long.

Anticipated excavation depths are provided in the plans; these will vary across the site but can extend to depth of up to 18 feet. The excavation will typically be deepest near the sheet pile wall, and shallowest as the excavation approaches the existing roadway.

SUBSURFACE CONDITIONS

The dewatering design recommendations presented in this letter are based on the soil and groundwater data provided in the geotechnical report authored by GRI. titled "Geotechnical Investigation, Sheet Pile Bulkhead Wall, Cornet Bay Marina, Oak Harbor, Washington" dated August 30, 2013. The geotechnical

report contains logs of three borings drilled in preparation for the engineering report, limited grain size analyses and other engineering data and recommendations.

The soils underlying the site consist of fill, sand, clay, and deep silt and sand. The fill consists of sandy silt with trace clay and gravel. The maximum fill depth encountered by the borings was 12.5 feet.

The fill is underlain by silty sand in borings B-1 and B-3. The depth to the bottom of the silty in B-1 was 17 feet, and 12.5 feet in B-3.

Stiff silty to sandy clay was encountered below the silty sand and fill in the borings. This unit was underlain by a silty sand at depth; this unit is below the area of interest with respect to excavation and dewatering of the site.

The principle variable used in dewatering designs is hydraulic conductivity, also known as permeability. The excavation will be in soils that will exhibit moderate to low permeabilities. Pumping or slug tests that could be used to identify the hydraulic characteristics of the soils were not performed. Grain size analyses of soil samples collected from the borings can be used to estimate soil hydraulic conductivity, but these were very limited.

Though the fill consists primarily of sandy silt, for the purposes of the dewatering design we consider the fill and underlying silty sand to be the same hydraulic unit; this is conservative with respect to groundwater discharge volumes from a dewatering system. All of the grain size samples indicted that these two soil types have greater than 15 percent fines, and typically more than 30 percent fines. Since the permeability of these soils is governed by their silt content; these soils will exhibit moderate to low permeability. Based on the data provided, we use a design range in soil permeability of $8x10^{-3}$ to $1x10^{-3}$ feet per minute.

The hydraulic conductivity of the underlying clay will be very low, and is typically less than $1x10^{-4}$ feet per minute. We consider the clay to be a perching unit; the unit will not yield groundwater to wells or well points.

Monitoring wells were not installed in the borings or test pits. The geotechnical report indicates that tidal levels fluctuate between elevations -1 and 12 feet. Other antidotal data indicates that groundwater lies between 2 and 12 feet below ground surface. Given the fairly low permeability of the site soils, we anticipate that groundwater levels in the fill and silty sand soils have a relatively small tidal fluctuation. To be conservative, we assign a design groundwater level elevation of 10 feet, or 2 feet below existing ground surface.

GROUNDWATER CONTROL SYSTEM DESIGN APPROACH AND RECOMMENDATIONS

This section provides the design assumptions and dewatering approach for excavation of the site.

Site excavation will be performed in soils of relatively low permeability. The soils may be recharged in part by tidal fluctuations, and by precipitation and limited runoff. Groundwater that infiltrates the fill and silty sand soils will likely percolate down to and perch on the top of the silty clay soils, and will then discharge to the bay.

The aquifer is located proximate to a saltwater body. The saltwater body creates a positive hydraulic condition that will limit drawdown and increase the amount of water to be pumped to meet the dewatering objectives. Because the soils will exhibit low permeabilities, we use a hydraulic efficiency of 40 percent.

The sheet pile wall that will be installed along the length of the site adjacent to the bay will act as an impervious groundwater cutoff. Sheet piles have been demonstrated to act as impervious barriers to groundwater flow. Since the sheet piles will be imbedded deep into the underlying clay, we would expect no infiltration to the site from the bay. Even if leaks developed at the sheet pile interlocks, the site soils exhibit low permeabilities and seepage rates could be easily controlled using sumps.

The bottom of the fill and silty sand aquifer will be proximate to or above the base of the excavation. The permeability of the soils is below values which we typically design dewatering systems for; this is because the radius of influence from a dewatering system would be so close that the dewatering wells would be scattered throughout the excavation, would only provide small yields of limited duration, and would conflict with excavation. As such, it is our opinion that sumping is the most applicable means of groundwater control. Trenches can be formed during excavation and routed to sumps; sumps can be moved throughout the excavation as needed.

Calculations were performed to estimate seepage rates into the excavation using the range in permeabilities for the fill and silty sand soils as presented above. Calculations were performed for the greatest head requirement of 16 feet to provide a maximum estimate of seepage quantities. The calculations used the Dupuit-Forcheimer relationship to estimate the hydraulic gradient towards the trench once excavated. Figure 1 shows the calculated seepage gradient assuming an 18 foot cut using the average hydraulic conductivity estimate. Darcy's Law was then used to estimate the groundwater discharge rate to the trench, and then a 100 foot long cut as shown on the figure. Based on the calculation results, the total seepage and discharge per lineal foot of an excavation 16 feet below the water table could be 0.6 gpm per lineal foot; the potential discharge rate for a 100-foot section of open trench could be 58 gpm. We assume that such an excavation length and depth is unlikely, it is our opinion that planning for a seepage rate of 30 to 40 gpm would be reasonable for water treatment and disposal purposes.

The bay is proximate to the ends of the excavation and can provide a source of water to the excavation. Because the excavation is proximate to the bay at the north and south ends, it would be prudent to have some measure of groundwater control in these areas. In our opinion, use of large diameter dewatering

wells to dewater the site is not a feasible means for dewatering because the saturated aquifer thickness below the alignment is too thin to allow for overlapping cones of depressions from the dewatering wells; as such, well spacings would need to be too close to be economically viable. The site appears to be well suited for vacuum based well points. These are small diameter wells that remove groundwater based on a vacuum applied at a pump. The maximum design limit for vacuum lift of water is about 18 to 20 feet; this is greater than depth to the top of the underlying silty clay, so the geometry works well for well points.

The design calculations were performed using analytical modeling based on the Theis and Jacob formulas and the principle of superposition. Well points were modeled on 10-foot centers. The well point alignment was simulated to start at the sheet pile wall and then continued shoreward between 160 and 100 feet as shown on Figure 2. Figure 3 shows the calculation results for a 160-foot long well point system. The target drawdown was to the top of the silty clay layer found between 12 and 17 feet below grade. Incorporated into this calculation is the presence of the saltwater body and associated positive boundary. This figure shows the calculated groundwater elevation profile about 10 feet landward of the well point system alignment. As shown, the calculated discharge rates were between 1 and 4.5 gpm per well point, or between 16 and 72 gpm for the system in the first week of dewatering. Based on our understanding of the site hydrogeology, we would anticipate a discharge rate of about 50 gpm or less for the 160-foot long system and 35 gpm or less for the 100-foot long system. These rates should decline by 30 to 50 percent after the first week of operation.

Because the excavation is shallow along the landward side of the excavation, we recommend the use of trenches and sumps to control seepage. These can be placed as necessary.

DESIGN RECOMMENDATIONS

Groundwater control at this site will be performed using trenches, sumps, and well points. Sumps and trenches will be used as necessary to remove seepage or localized perched groundwater. The well point systems will be used to cut-off seepage from the bay.

The following provides specific information for construction and operation of the system.

Well Points: Well points should be constructed of minimum 1.5-inch-diameter PVC and have a 3-foot long 30-slot screen section and interior suction pipe to the bottom of the well point. Well points should be drilled or jetted to a depth of 17 feet or a maximum of 6 inches into the underlying clay.

A Colorado Product 10-20 washed, rounded sand filter pack should be placed in the annular space between the borehole wall and well point casing up to the static water table. A bentonite pellet seal should be placed between the top of the sand pack and ground surface. The seal should be hydrated. All

well points should have valves placed in-line to control vacuum pressure and flow at each well point. Well points should be installed in accordance with WAC 173-160.

Vacuum Pump: A vacuum pump capable of creating at least 22-inches (Hg) of vacuum across each well point should be provided. The pump should have a continuous power supply and be capable of providing continuous vacuum in the system throughout the length of the project. Because the well point systems are relatively short, one pump could be used for both systems. The systems would be connected by a length of solid PVC pipe based on the pump and discharge locations. Two vacuum pumps could also be used.

Development: The well points should be developed immediately upon completion. Development methods should utilize flow surging. Development will improve the hydraulic connection with the aquifer and should provide a clean dewatering effluent with time. Development water should be discharged to a settling tank.

Piping and Discharge: The discharge piping from the pump should be minimum 4-inch diameter HDPE or PVC. The pipe diameter must be sized according to the flow rates provided herein and the available discharge total head from the pump. Discharge will be to the treatment system. The piping should be configured to suit traffic and excavation, and should be protected from damage in areas of traffic. Air leaks in the piping and components must be minimized such that there is greater than 18-inches of vacuum at each well point at all times.

Flowmeters: A flowmeter should be installed on the mainline discharge from the dewatering system. Alternatively, the treatment system flowmeter can be used to measure discharge rates. The flowmeter should be installed such that there is a full pipe of water and that some backpressure is exerted on the meter. Flow meters should be installed according to manufacturer's recommendations on distances to joints, elbows, etc.

Power: We understand that power will be supplied by portable generators or diesel driven pumps.

Sumps: Sumps will be required during excavation. Sumps should be cased in a perforated housing or well screen surrounded by a washed, rounded gravel pack to avoid pumping of fines.

Well Decommissioning**:** The dewatering wells and well points should be decommissioned according to WAC 173-160.

Monitoring: The static water level in the well points should be measured prior to dewatering. Discharge rates should be monitored daily. The system should be checked daily for air leaks and all well point headers be adjusted to minimize air flow into the system and to maximize vacuum at the well point. All measurements should be recorded in a dewatering project log.

Operation: The systems should be operated continuously. Dewatering should commence a minimum of 7 days prior to excavation. The well points systems will only have a limited influence in dewatering the site, as their purpose is to mainly cut-off inflow from the bay. As such, sump systems should be available at the time of excavation.

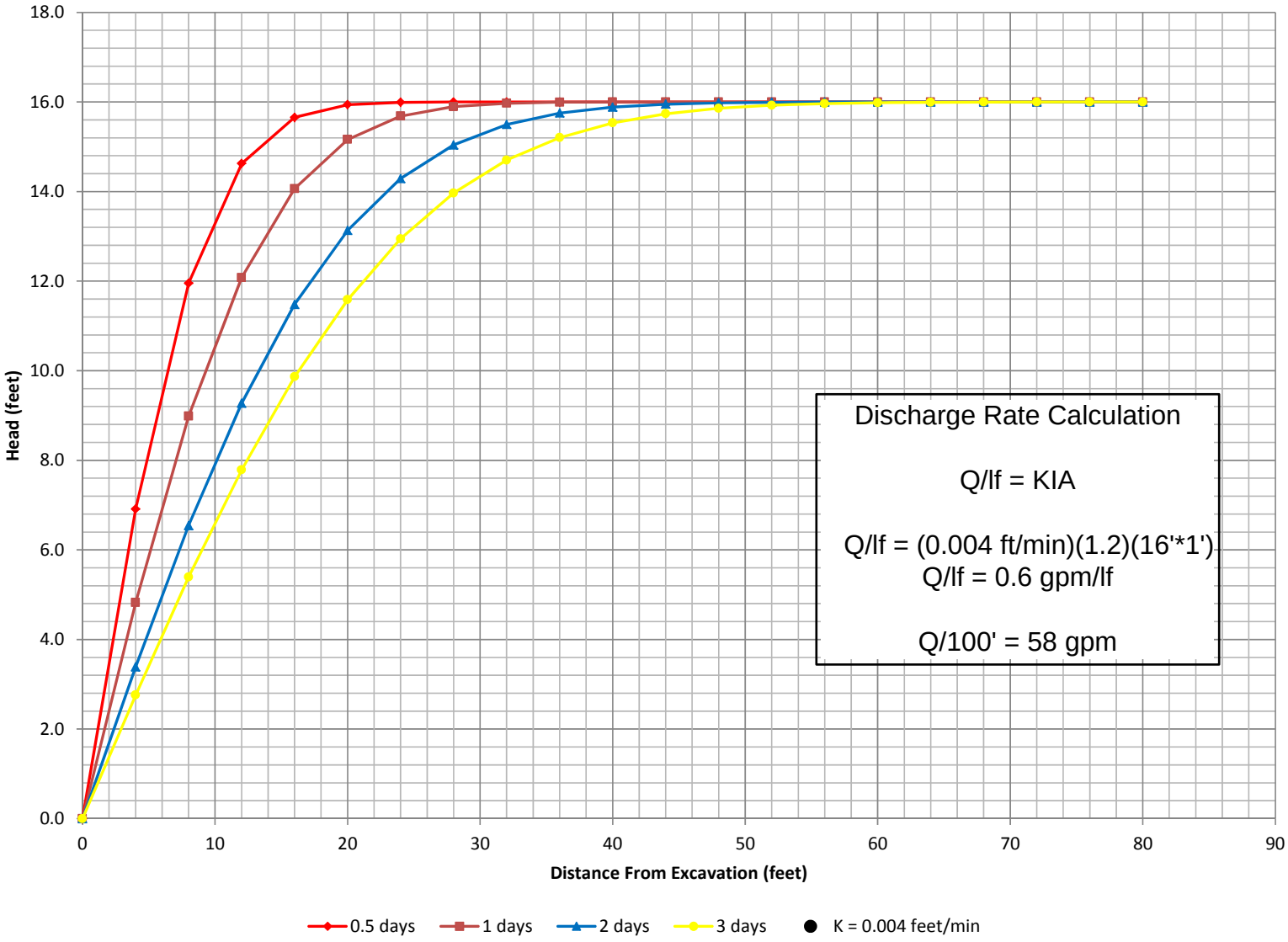
The dewatering design recommendations provided herein have been oriented to the various soil conditions observed at the site, further variations may exist. As such, we recommend that our staff be present during initial system installation and startup. Should well discharge rates and groundwater level drawdown not be similar than presented herein, we should be contacted so that we may observe the system performance and revise our design recommendations as necessary.

Thank you for the opportunity to be of service. Please call us at (360) 631-5600 should you have any questions or comments.

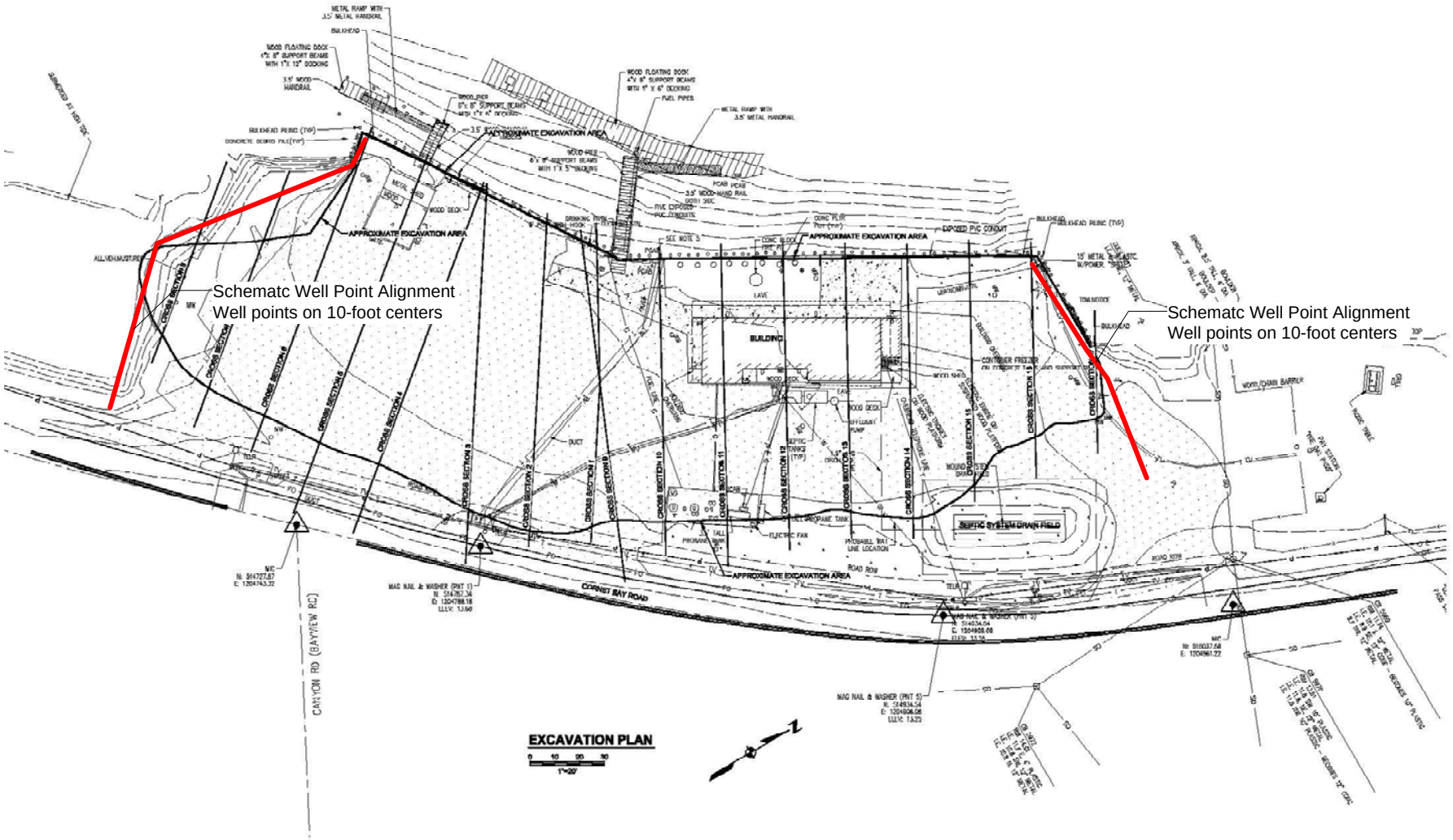
Sincerely,

Scott F. Bender L.H.G., C.G.W.P.

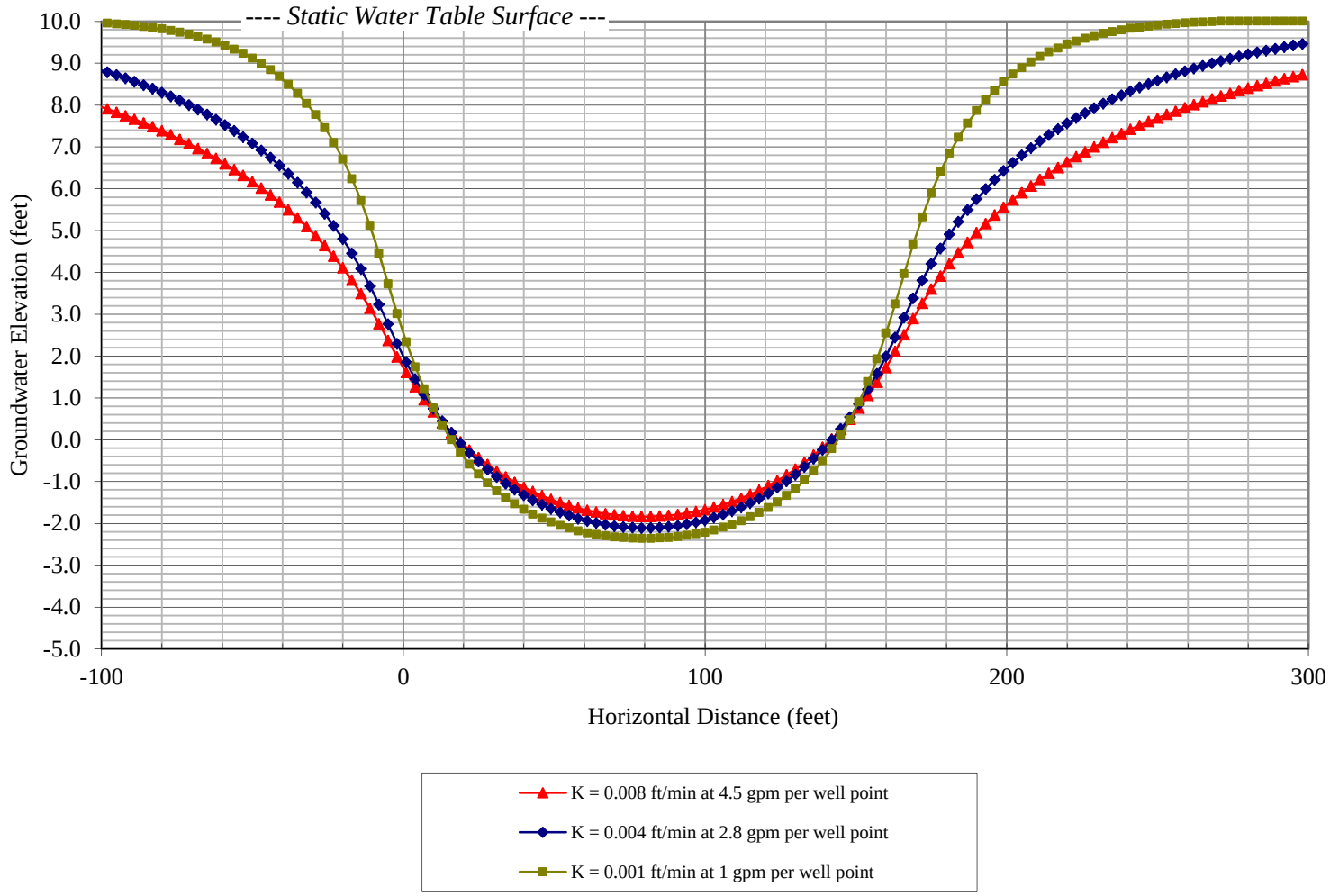
Enclosures: Figure 1. Calculated Seepage Rates
Figure 2. Schematic well Point System Alignments
Figure 3. Calculated Groundwater Elevation Profile Parallel to Well Point System



BENDER CONSULTING, LLC *Applied Groundwater Solutions*	Cornet Bay Marina Rehabilitation Dewatering Design Recommendations Glacier Environmental Services, Inc.	Calculated Seepage Face Medium Hydraulic Conductivity	Project Number 1115-01 Figure 1



BENDER CONSULTING, LLC *Applied Groundwater Solutions*	Cornet Bay Marina Rehabilitation Dewatering Design Recommendations Glacier Environmental Services, Inc.	Schematic Well Point System Alignments	Project Number 1115-01 Figure 2



BENDER CONSULTING, LLC
Applied Groundwater Solutions

Cornet Bay Marina Rehabilitation
Dewatering Design Recommendations
Glacier Environmental Services, Inc.

Calculated Groundwater Elevation
Profile Parallel to Well Point System

Project Number
1115-01

Figure 3

ATTACHMENT 6

DEWATERING WATER TREATMENT SYSTEM EQUIPMENT SPECIFICATIONS

CHITOSAN EHANCED SAND FILTRATION

FEATURES

- Industrial sand media filter
- Monitoring module with instrumentation
- Influent/effluent pH, turbidity and flow
- pH neutralization system
- Polymer storage and metering system
- Data logging and telemetry transmission
- High pressure system feed pump
- Flow rates from 100 to 10,000 gpm

APPLICATIONS

- Construction Stormwater Treatment
- Dewatering Water Treatment
- Environmental Remediation
- Industrial Stormwater Treatment
- Ph Neutralization
- Wastewater Treatment

TECHNICAL

- Footprint – 250 to 500 square feet
- Scalable to fit any application
- Web-based alarm notification
- Automate controls
- Meets WA Dept. of Ecology Requirements

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SAND FILRTRATION

MODELS AND FLOW RATES

- SF-100 – 75 to 100 gpm
- SF-150 – 100 to 150 gpm
- SF-200 – 150 to 200 gpm
- SF-400 – 300 to 400 gpm
- SF-600 – 450 to 600 gpm
- Compressed air- 5 cfm minimum at 60 psi supplied by intergrally mounted compressor
- Requires 110 V AC

MATERIAL SPECIFICATIONS

- Operational pressure – 30-50 psi and 100 psi max.
- Capacity- 75-600 gpm (normal flow range)
- Compressed air- 5 cfm minimum at 60 psi supplied by intergrally mounted compressor
- Requires 110 V AC

FEATURES

- Skid mounted high rate automatic backwashing sand media filter designed for general-purpose water filtration of organic and inorganic solids.
- Ultra 116 automatic filter controller.
- Flush activation based on elapsed time and/or pressure differential.
- Back flush of 107 gpm, automatic (10 psi differential pressure over clean pressure drop, or manual mode)

TECHNICAL

- Filtration- down to 20-30 microns without polymer
- Filtration – down to > 1 micron with FlocClear™ 2% chitosan acetate polymer
- Dimensions, weight and volume of media varies depending on model
- Filtration skid includes inlet/outlet flange connections.

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CESF MONITORING MODULE

FEATURES

- Compact footprint (8’ x 10’)
- Influent/effluent pH, turbidity and flow monitoring
- Programmable logic controller with web-based data transmission
- Chemical metering pumps
- Secondary polymer containment
- Easy track data logging and data transfer
- Automated controls and alarm notifications
- Power distribution, lights, heat and outlets

APPLICATIONS

- Stormwater Treatment
- Dewatering Water Treatment/Monitoring
- Water Quality Monitoring
- Chitosan Enhanced Sand Filtration
- Ph Neutralization
- Environmental Remediation

TECHNICAL

- Dimensions 8’ x 10”
- 350 gallon Chemical Storage Capacity
- 10 gph @ 50 psi Metering Pumps
- Steel Structure with Security Locks
- 5,500 lb. dry weight

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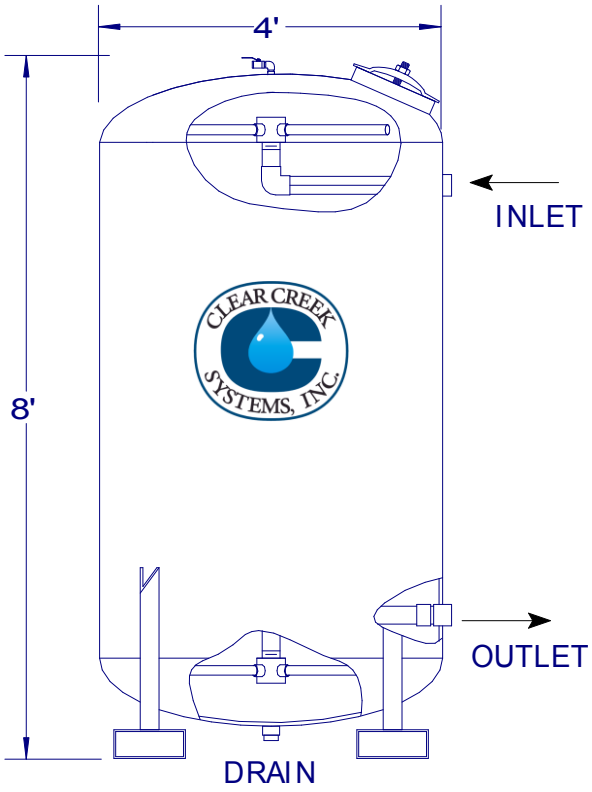
MEDIA FILTRATION

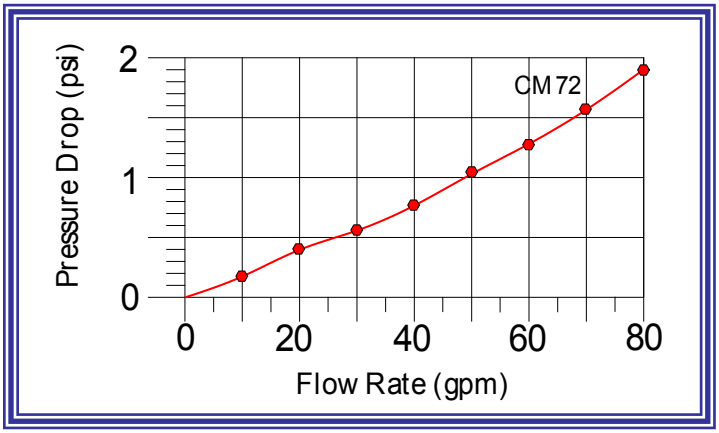
CM-72 MEDIA VESSEL



CM-72

- MEDIA VESSEL
- 75 PSI

Model #	Media Capacity	Maximum Recommended Flow Rate	Estimated Weight Empty
CM-72	72 Cubic Feet	85 gpm	925 Pounds



FEATURES

- Durable carbon steel construction.
- Epoxy lined interior
- Hydrotested to 90 psi for a maximum operating pressure of 75 psi.
- Lifting lugs and forklift guides to facilitate moving and placement.
- Lower PVC collection hub and laterals positioned for maximum media utilization.
- Upper PVC distribution hub and laterals allow for back-washing and/or up-flow operation.
- 2'' Quick Coupler influent/effluent connections.

TECHNICAL

- Media capacity by weight.

GAC	2,000 pounds
EC100	4,000 pounds

- 12″ X 16″ elliptical manway for easy access.

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Easy-to-clean, smooth-wall interior

18,000 Gallon
Open-Top Weir Tank

Capacity: 18,060 gal (430 bbl)
Height: 13'
Width: 8'
Length: 43' 6"
Tare Weight: 30,000 lbs

All sizes are approximate

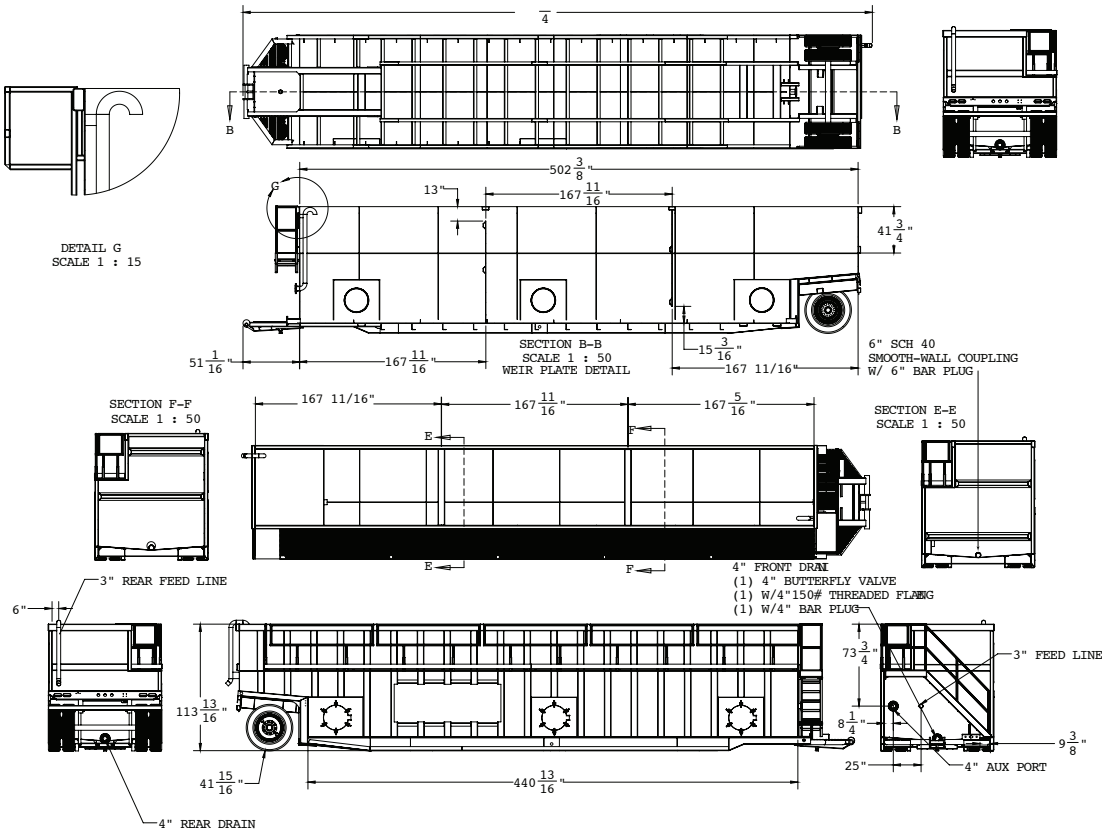
At Adler Tank Rentals, we are committed to providing safe and reliable containment solutions for all types of applications where performance matters.

Designed with internal weirs to promote faster separation of oils and particulate contaminants from stored groundwater, the 18,000 Gallon Open-Top Weir Tank can efficiently accommodate flows of up to 100 GPM or more in either pump-through or batch-treatment capacities.

Mechanical Features

- 3" fill line
- Three (3) standard 22" side-hinged manways
- Multiple 4" valved fill/drain ports, including floor-level valves for low point drain out
- Sloped and V bottom for quicker drain out and easier cleaning
- Easy-to-clean design with smooth-wall interior, no corrugations and no internal rods
- Front-mounted ladderwell for top access
- Fixed rear axle for increased maneuverability
- Nose rail cut-out for easy access when installing hose and fittings on the front/bottom of tank
- Internal baffles, or weirs (over and under), to accelerate settling of unwanted solids and fine sediments; may also be used in the separation of unwanted floating materials
- Can be used in a pump-through or batch-treatment capacity
- Flows of up to 100 GPM achievable depending on circumstances; may also be modified to achieve higher flows while maintaining efficiency
- One (1) front and one (1) rear 4" valved fill/drain port

18,000 Gallon Open-Top Weir Tank



Safety Features

- Non-slip step materials on ladderwells and catwalks
- "Safety yellow" rails and catwalks for high visibility
- Safe operation reminder decals
- Built-in stair and walkway

Options

- Weirs
- Audible alarms, strobes and level gauges (digital and mechanical)

Comprehensive Service

Adler Tank Rentals provides containment solutions for hazardous and non-hazardous liquids and solids. We offer 24-hour emergency service, expert planning assistance, transportation, repair and cleaning services. All of our rental equipment is serviced by experienced Adler technicians and tested to exceed even the most stringent industry standards.

ADLER TANK RENTALS

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ATTACHMENT 7

GRANUAR ACTIVATED CARBON (GAC) SPECIFICATIONS

Granular Activated Carbon

FEATURES

- Made from grades of bituminous coal
- High surface area for maximum absorption
- Designed for liquid phase applications
- Suitable for hydraulic transfers
- Ability for thermal reactivation cycles
- Meets all properties of ANSI/AWWA B-604

APPLICATIONS

- Hydrocarbon removal
- Contaminant removal
- Odor removal
- Use in addition to other filter media
- Construction, Industrial, Remediation

Properties and Specifications

PROPERTIES	VALUE	TESTING METHOD
Iodine Number	900 mg/g	AWWA B604
Abrasion Number (min.)	75	ASTM D3802
Moisture as Packed (max.)	4%	ASTM D2867
Apparent Density	0.50 g/cc	ASTM D2854
Mesh Size greater than 8 mesh (max.) less than 30 mesh (max.)	8x30 5% 5%	U.S. Sieve
Surface Area (typical)	1050 m^2/g	BET N2
Ash Content	12%	ASTM D2866

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ATTCHMENT 8

DEWATERING WATER TREATMENT SYSTEM OPERATIONS & MAINTENANCE MANUAL

CLEAR CREEK SYSTEMS, INC.

Operations & Maintenance Manual

For

Dewatering Water Treatment System Operations

At

Cornet Bay Marina Remediation Project

Prepared on

January 7, 2014

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Site Specific Active Treatment System Overview

The treatment system consists of a 100 gpm Chitosan Enhanced Sand Filtration System with polishing filtration provided by granular activated carbon (GAC) media. The major treatment system components include the following:

- (1) – 18,000 gallon open top weir style settling tank. Provides the necessary 1 hour hydraulic retention time and the under/over weir design for providing oil/water separation and oil boom deployment.
- (1) – 18,000 gallon settling tank. Provides operational surge capacity for peak flows, routine maintenance shut downs and filtration media backwashing.
- (1) –5-hp centrifugal filtration system pump. The pump transfers settled water from the surge tank, through the sand filtration system, through the GAC vessels and to the discharge location.
- (1) – 100 gpm range industrial sand media filter.
- (1) – CCS Monitoring Module (includes polymer storage/delivery, water quality instrumentation, flow measurements and programmable logic controller)
- (2) – CM 72 cubic foot adsorptive media vessels plumbed in series. Each vessel provides 5 minutes of empty bed contact time with the GAC media.
- Miscellaneous interconnecting valving, plumbing and hoses.

The general operational process includes the following steps:

Dewatering water will be collected and treated as follows:

1. A dewatering system designed by Bender Consulting, LLC and installed by others will provide dewatering water to the treatment system from a vacuum well dewater wells (Attachment 5).
2. Dewatering water may also be pumped to the treatment system form open excavation sumps by the contractor on an as needed basis.
3. The dewatering water from the vacuum well points and the excavation sumps will combine in a single 4” PVC force main that feeds the treatment system. Prior to discharging to treatment system weir tank, the flow rate of the combined dewatering flow rate and total volume will be measured and recorded by an inline flow meter.
4. The treatment system operator will monitor the pH and turbidity of dewatering water to determine if pretreatment for pH or turbidity is necessary.
5. If pretreatment for elevated pH is necessary, carbonic acid in the form of carbon dioxide (CO_2) will be utilized consistent with BMP C252. The inline pH neutralization system includes influent and effluent pH probes, a CO_2 regulator and a CO_2 flow meter.
6. When pretreatment for elevated turbidity is necessary, the treatment system operator will utilize an appropriate dose rate (typically 0.5 to 1.0 ppm) of StormKlear™ LiquiFloc™. The dose rate will be determined based on the flow rate, jar testing (when necessary) and the chemical metering pump calibration cylinder.

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7. Dewatering water will then enter into the under weir end of an 18,000 gallon open top weir tank where primary settling and oil/water separation will occur. As required in the specifications the upstream side of the over weir will be outfitted with a hydrophilic oil adsorbent boom. The volume of water upstream of the over weir will act as dead storage and will remain full during the treatment process. Water on the downstream side of the over weir will flow via gravity to the treatment system surge tank.
8. An 18,000 gallon surge tank will receive flow via gravity from the treatment system weir tank. The surge tank will provide the operational capacity necessary to provide consistent operations and surge capacity for routine maintenance shut downs, filtration media backwashing and peak dewatering flows.
9. When the surge tank reaches a predetermined level (typically ½ full), the treatment system operator will initiate water treatment system operations.
10. CCS will monitor flow, pH and turbidity. If elevated pH (pH > 8.5) or turbidity (NTU > 200), pretreatment will be implemented prior to water entering the 18,000 gallon tanks.
11. Settled water will be pumped from the 18,000 gallon surge tank to the CESF treatment system. As water is pumped to the sand filtration skid, influent flow, pH and turbidity will be monitored by the treatment system monitoring module.
12. When necessary, the CCS treatment system technician will add a final polishing dose of StormKlear™ LiquiFloc™ (typically less than 0.5 ppm dose rate) prior to the sand filtration skid. The dose rate will be determined based on the flow rate, jar testing (when necessary) and the chemical metering pump calibration cylinder.
13. The discharge of the CESF system will be routed to lead/lag GAC vessels for the hydrocarbon contaminant removal process. The discharge from the GAC vessels is monitored for pH and turbidity and flow prior to discharge (the hydrocarbon removal process is described below).
14. Data from the flow meters, pH probes and turbidimeters is logged in the system's microprocessor. The data is downloaded weekly and included in required monthly discharge monitoring reports. The data is recorded every 15 minutes but monitored continuously.
15. In the unlikely event that predetermined water quality parameters are not met, the microprocessor will actuate a valve system that diverts the discharge to the stormwater back to the weir tank (termed a recycle event). This prevents any unintentional discharge of off spec water.
16. As the treatment process progresses, the sand filter will periodically and automatically backwash to maintain the quality of the sand media. In the event that GAC vessels require backwashing, the treatment system operator will manually backwash them individually. Backwash water is discharged to weir tank and is eventually reprocessed through the dewatering water system.

Hydrocarbon Contaminant Removal Process

The chemical water treatment system includes provisions and equipment necessary for hydrocarbon contaminant removal. If hydrocarbon contaminants are identified at the site and the possibility of their transport through dewatering water or stormwater exists, the discharge of the chemical water treatment system will be routed through the hydrocarbon contaminant removal process.

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Hydrocarbon removal will occur through the use of adsorptive media contained within pressure vessels. The media vessels have been sized to provide five minutes of empty bed contact time and are configured in a lead/lag configuration. A sampling port is provide between the lead and lag vessels so that breakthrough can be identified when it occurs. CCS is providing the following adsorptive media:

1. **Granular Activated Carbon (GAC) Media** will be utilized in the lag vessels. Each 72 cubic foot vessel will contain 2,000 lbs of GAC media for a total of 4,000 lbs. A third standby vessel will be onsite and available should breakthrough be detected between the lead and lag vessel. Should this occur, the operator will move the lag vessel to the lead position and plumb the new vessel into the lag position.

Clear Creek Systems, Inc.
Pretreatment:

1. When Should Pre-treatment be used?

Pretreatment should be used if the turbidity of water is too high to effectively treat directly into the sand filter or the pH range of the water is not within the range of (6.5-8.5). Water samples should be obtained from the source and tested to determine if pre-treatment is required. An additional tank/reservoir should be used as the pre-treatment discharge. **DO NOT** discharge back into source water. This treatment system includes a pretreatment weir tank.

2. Turbidity and pH.

Water samples should be obtained from the source and tested for turbidity and pH. If source water/influent does not meet the above requirements pre-treatment needs to be done. An additional tank/reservoir should be used as the pre-treatment discharge. **DO NOT** discharge treated water back into source water.

If pH is not within range adjust the pH using the CO_2 flow control meter. In the MM an electric solenoid turns on/off automatically based on programmed settings from the WebMaster. If the pH is not within range (6.5-8.5), the solenoid valve will open, but will not adjust the amount of gas released into the system. The adjustment of flow needs to be done by an operator. This may take some time to identify the proper rate to minimize CO_2 consumption. If source water is $\geq$ 200 NTU use StormKlear™ Chitosan injection to lower the NTU reading below 200 NTU. Use the following documents for calibrating the proper dose of StormKlear™ Chitosan. Polymer Jar Testing Procedures, Polymer Feed Rate Calculations, and On-Line Polymer Pump Adjustment.

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Preparation For Treatment:

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1. Monitoring Module Piping.

Monitoring Module is very flexible and has many potential piping set ups. This is job and space dependant. Piping connects to the MM by using flanges and bolts. Blind flanges are used to cover unused pipes and for closing the recirculation pipes. Do not forget your gaskets and to tighten the bolts using a star pattern.

3. NTU Meters.

NTU meters used in the MM are GF Signet 4150 Turbidimeters. The GF Signet 4150 process turbidity meter allows for the measurement of the turbidity of process water on-line and has been designed to meet the design criteria specified by the US EPA 180.1 on turbidity measurement. Located in the MM you will see there are two meters. One of the turbidity meters is used to measure the process water upstream of the media filters and the second is to measure the discharge from the media filters. For information and Calibration of the GF Signet 4150 Turbidimeters see: GF Signet 4150 Turbidimeters Owner's Manual. A copy of the calibration procedures in keep in the equipment manual that is stored in the treatment system monitoring module.

4. pH Meters.

pH meters used in the MM are Walchem Model WDS-PHW differential pH electrodes. Information on maintenance and calibration can be found in: Walchem Model WDS-PHW differential pH electrodes Owner's Manual. A copy of the calibration procedures in keep in the equipment manual that is stored in the treatment system monitoring module.

5. Flow Meters.

Flowmeters used in the MM are Signet 515/2536 Rotor-X Flow Sensors. Check flowmeter K values and proper installation. K values can be found using instruction for Signet 515/2536 Rotor-X Flow Sensors (Clear Creek Systems Inc. Proper installation of a flowmeter is to have at least 15 diameters of unobstructed pipeline upstream and at least 5 diameters of unobstructed pipeline downstream of the flowmeter. A copy of the calibration procedures in keep in the equipment manual that is stored in the treatment system monitoring module.

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MONITORING MODULE STARTUP:

1. Manual Valves.

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Open all appropriate manual valves. Valves can be located on the piping, directly downstream of the pump, monitoring module, media filters, and StormKlear™ Chitosan totes. This is dependent on the jobsite.

2. Inspect Electrical.

Inspect all electrical connections and grounding rods. Upon startup have all breaker, power panels, and switches turned to the off position.

3. Power Source.

Power requirements for the MM are Single Phase 120/240V with a maximum of 60A. When choosing a power source this is important to note, because on the job site there will generally be a Three Phase 480V generator used to run pumps. Depending on the job site an alternate generator or electrical service maybe needed.

4. Turn Power On.

Turn on power source whether this being a generator or other service. Then flip the breaker, turn the power panel to auto and turn the WebMaster on. The WebMaster is a computer, which has been programmed to open and close automatic valves based on certain criteria. Criteria used, is based on the State of Washington's Department of Ecology. If the standards programmed into the WebMaster are not met they will close the valves and put the system into a recirculation mode until the criteria has been met. Upon startup the WebMaster is automatically in the recirculation mode. This allows time for the operator to make any changes or calibrations he/she needs to do without discharging dirty water.

5. Metering Pump.

StormKlear™ Chitosan injection pump will be calibrated upon start up and every 8-hour during the operation of the StormKlear™ Chitosan metering to document the dosage. All calibration results must be recorded simultaneously with the flow rates and the records kept on site. This can be accomplished using Polymer Jar Testing Procedures, Polymer Feed Rate Calculations, and On-Line Polymer Pump Adjustment (Clear Creek Systems Inc.).

6. First Check.

WebMaster programmed guidelines at this sample site are $\leq$ 600 NTU for turbidity and between the pH range (6.5-8.5). Once achieved the WebMaster will automatically open actuated valves discharging water to a 3-tank media filtration unit. Inspect pressure gauges and automatic backwash settings for proper operation. Media Filtration Document (Clear Creek Systems Inc.).

7. Check After Media Filter.

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After, water is discharged from media filters; it is measured for turbidity and pH once more. If water meets WebMaster programmed limits, valves automatically open again discharging the water to the environment. Performance goals are set by Washington's Department of Ecology and are a minimum of 95% of NTU turbidity, a maximum discharge of 10 NTU turbidity, and a discharge pH within a range of (6.5-8.5).

8. Residual StormKlear™ Chitosan Testing.

Testing for residual StormKlear™ Chitosan is a must and a priority. Discharge from the monitoring module must be maintained below 0.1 ppm residual StormKlear™ Chitosan acetate polymer at all times. At least two samples must be collected during each operating period and analyzed for residual StormKlear™ Chitosan polymer. The samples must be collected one and two hours after the onset of each operating period.

9. Record Keeping.

At the end of each 8hr shift, a delegated responsible person must record his/her assessment of the operational efficiency of the Active Treatment System (ATS) process, any upsets, the media filter discharge StormKlear™ Chitosan concentrations (where applicable) and any other relevant observations that relate to ATS proper operation. They must also certify the acceptability of the ATS discharge to surface water.

Polymer Jar Testing Procedures, Polymer Feed Rate Calculations, and On-Line Polymer Pump Adjustment

Polymer Jar Testing

The following test procedures are designed to accomplish two goals. The Phase One steps will provide you the general polymer dosage range required to treat the sample being tested. The Phase Two steps will provide you the fine tuned polymer dosage required for the sample being tested. The calculations at the end of this document will provide you the StormKlear™ Chitosan feed rate needed to treat the transfer line going to the Clean Pond.

Preparation

You will need the following laboratory equipment to conduct these tests:
Six 1 Quart Jars or 500 ml Beakers
One 100 ml Graduated Cylinder or 500 ml Graduated Beaker
Two 1 ml syringes
Two 5 ml syringes
Two Stir Rods
One ounce Full Strength (1%) StormKlear™ Chitosan

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Prior to conducting any jar tests, make sure that all of your laboratory equipment is as clean as possible. This will help prevent your tests from showing inaccurate results due to extraneous factors (polymer from previous tests, dirt, contaminants, etc.).

Make a fresh 1% solution of the full strength StormKlear™ Chitosan in one of the quart jars. Measure 500 ml of water with the graduated cylinder into a jar, remove 5 mls of water with a 5 ml syringe, and then add 5 mls of full strength (1% stock solution) StormKlear™ Chitosan into the jar. Mix thoroughly.

Phase One - General Polymer Dosage

1. In five 1 quart jars, add 200 mls of the water to be tested.
2. Add 1 ml of the diluted StormKlear™ Chitosan to the first jar, 2 mls to the second jar, 3 mls to the third jar, 4 mls to the fourth jar, and 5 mls to the fifth jar. After each addition, swirl the jar thoroughly to mix the polymer with the sample.
3. Allow the 5 treated samples to sit undisturbed for 5 minutes, then check each jar for flocculation. Select the sample that exhibits acceptable flocculation using the least amount of polymer.
4. If no flocculation occurs, repeat steps 1 through 3 but start the first jar at 6 mls of polymer, 7 mls in the second jar, 8 mls in the third jar, 9 mls in the fourth jar, and 10 mls in the fifth jar.
5. Select the jar that exhibits acceptable flocculation and note the number of mls polymer it required to produce the result.
6. The number of mls of diluted StormKlear™ Chitosan it required to treat the sample multiplied by 100 is the GENERAL polymer dosage range (G; G = Gal polymer per MGal water treated) for the water being tested.

Example: The best flocculation is shown by the sample treated with 6 mls of diluted FlocClear Chitosan. Six times 100 equals 600, so the General Polymer Dosage is 600 G/MGal.

Phase Two – Fine Tuning The General Polymer Dosage

1. Measure 200 mls of the water to be tested into each of the 5 jars.
2. Into the first jar add the same number of mls diluted polymer that you determined for the General Polymer Dosage in Phase One. Mix thoroughly.
3. In the second jar, add 0.2 mls LESS diluted polymer than in the first jar. In the third, fourth, and fifth jars, consecutively add 0.2 mls LESS diluted polymer than in the previous jar. Mix each jar thoroughly after polymer addition. Let stand for 5 minutes.
4. Select the jar the exhibits acceptable flocculation using the least amount of diluted polymer. Note the number of mls diluted polymer it required to produce results.
5. The number of mls diluted polymer it required to produce acceptable flocculation multiplied by 100 is the Fine Tuned Polymer Dosage.

Example: The best flocculation is shown by the sample treated with 5.4 mls of diluted FlocClear Chitosan. One hundred times 5.4 equals 540, so the Fine Tuned Polymer Dosage is 540 Gal/MGal. Now you can calculate how much FlocClear Chitosan you need to feed to the transfer line to produce good flocculation in the Clean Pond.

Polymer Feed Rate Calculations

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Once you have the Fine Tuned Polymer Dosage, you can proceed to calculate the polymer feed rate you will use to treat the water tested at system start up.

Once you have determined the Fine Tuned Polymer Dosage, you can proceed to calculate the polymer feed rate you will need to treat the water you have tested. Multiply the Fine Tuned Polymer Dosage by the System Flow Rate, and then divide that number by 17,000. The resulting number is the approximate number of gallons of StormKlear™ Chitosan you need to feed to treat the raw water at the designed system flow rate. This is the hourly feed rate of StormKlear™ Chitosan you need to feed into the transfer line going to the Clean (aka settling) Pond.

Example: The Fine Tuned Polymer Dosage is 540 G/MGal, 540 multiplied by 600 (gpm) equals 324,000, 324,000 divided by 17,000 equals 19.059, the feed rate in gallons per hour of StormKlear™ Chitosan needed in the transfer line going to the Clean Pond. Now you can set your StormKlear™ Chitosan pump at that feed rate and make small adjustments as needed to produce good flocculation in the Clean Pond.

On-Line Polymer Feed Rate Adjustment

At this point, you are ready to start treating water from the Retention Pond. Many times when the polymer pump is set at the calculated feed rate, flocculation does not occur in the treated water. You may need to adjust the polymer feed rate so that you can get the same flocculation results in the pond as you obtained in the jar tests. The polymer feed rate that you have calculated for the system is the starting point for the polymer pump setting. Using this adjustment procedure, it is easy to make any necessary changes and zero in on the best polymer feed rate to use on the transfer line water.

Set the polymer pump to feed your calculated dosage to the transfer line. Use the calibration tube setup to make sure that the actual polymer flow rate is at the calculated feed rate. Allow the system 30-60 seconds to stabilize at that polymer flow rate and then obtain a sample of the transfer line water just before it enters the Clean Pond. Mark the pump feed rate settings on the sample jar and set the jar down so it can settle out the floc.

Now we want to adjust the polymer feed rate to three lower settings and three higher settings than the calculated feed rate. After each 5% polymer pump adjustment, confirm the polymer feed rate using the calibration tube. Decrease the polymer feed rate by 5% and obtain a sample of the treated water. Mark the jar with the polymer feed rate and set it next to the first sample you obtained and allow the floc to settle out. Repeat the 5% feed rate decrease two more times and obtain samples after each decrease. Now set the polymer feed rate at 5% higher than the calculated feed rate and obtain a sample of the treated water. Repeat the 5% feed rate increase two more times and obtain a sample of the treated water after each increase. You should now have 7 sample jars to inspect, one at the calculated polymer feed rate, three at lower than calculated and three at higher than calculated polymer feed rates.

After 15 minutes have passed, inspect the sample jars for flocculation. Good flocculation is defined as the water being clear and the floc settled out in the bottom of the jar. If no sample exhibits good flocculation, continue increases/decreases in 5% increments in polymer feed rate until you find the feed rate that produces acceptable results. If one or more samples exhibit acceptable flocculation, select the one jar that exhibits the clearest water and best settled floc layer. Check the polymer pump settings marked on the jar and adjust the polymer pump to those settings. Confirm the actual polymer feed rate

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using the calibration tube and record it on the Daily Log Sheet. As a last check, obtain one more sample of treated water to make sure flocculation is acceptable going into the Clean Pond.

Calculation Worksheet

List of variables for following calculations:

G = gallons of polymer / Million gallons of water treated
S = Jar test sample volume
D = Jar test dose volume
F = System flow rate
P = ppm (mg/L) of pure StormKlear™ Chitosan
% = Percent solution (1% stock solution StormKlear™ Chitosan = 100%)
GPH = Gallons per hour

Notes from Jar Test:

General Polymer Dose (vol) = _____
Fine Tuned Polymer Dose (vol) = _____
General Jar Test Sample (vol) = _____
Fine Tuned Jar Test Sample (vol) = _____
Percent Solution Strength (%) = _____
System Flow Rate = _____ GPM

Equations:

Gallons of Polymer per Million Gallons of Water Treated

$$G = \left[\left(\frac{D}{S} \right) \times (\%) \times \left(10^6\right) \right]$$

- if FlocClear Chitosan solution is prepared to the standard strength for Jar Tests then equation can be simplified to:

$$G = \left[\left(\frac{D}{200} \right) \times \left(10^4\right) \right]$$

- Further, if raw water sample volume for Jar Tests are held constant then equation can be simplified to:

Every 1ml dose of a 1% solution in 200ml sample adds 100 G/MGal or 1ppm.

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ppm (mg/L) Polymer Dosage

$$ppm = \left[\frac{G}{100} \right]$$

Polymer Dose Rate (GPH)

$$GPH = \left[\frac{(G \times F)}{17{,}000} \right]$$

$$\frac{Gal}{Hour} = \frac{Gal.}{Min.} x \frac{Gal.(polymer)}{MGal.(water)} x \frac{MGal.}{10^6 Gal.} x \frac{60 Min.}{Hour}$$

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Site-Specific
Standard Operating Procedures
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These written procedures may need to be modified from time to time due to the site-specific variations that can occur. Each site will undoubtedly have variations from other sites, and those variations can be incorporated into this guide.

Site Start-Up

1. First read the entire ATS Plan.
2. Check generator fuel & oil levels. Make sure that all equipment control switches are in the off position so that nothing will begin operating unexpectedly when the generator is turned on. Start generator following the "Generator Operational Procedure" if applicable.
3. Open or close the valves appropriate to your desired operation. Check every valve. Don't assume that any valve is in the same position that you left it.
4. Open the valve at the bottom of the polymer tote bin and all valves coming from or going to the metering pump or pumps that you are going to use.
5. Make a general site check. Inspect site for damage or vandalism. Check your discharge point. Make sure that all erosion control measures are intact.
6. Turn on the LMI or PC polymer metering pumps. Make certain these pumps prime and are pumping fluid.
7. Start transfer pump to feed water to the clean pond.
8. Immediately after starting the transfer pump, take a flock sample. Make sure that the sample shows good separation of clear water and settling floc. If it doesn't, adjust the polymer dosage until you get good separation and clear water on top.
9. Start the filter system pump to process and discharge water in recirculation mode at first. When you are sure that your system effluent water meets your discharge requirements, it is ok to begin discharging water off site. Once operational, recheck your discharge point to make sure that the discharge flow has not damaged any of the erosion control measures. Your discharge water should not increase in turbidity after it leaves your hose or pipe.
10. When system is operational, put sand filter into manual backwash.

Site Monitoring

1. Within 5 minutes of starting transfer pump, obtain sample from transfer line to check on flocculation. Adjust polymer pump as needed to produce desired floc formation. Check on floc formation every 15 minutes.
2. Check both Sand and GAC Filter pressures to make sure they are functioning properly. Maximum sand filter inlet pressure is 60 psi.
3. Within 30 minutes of system start-up, test discharge water NTU and residual StormKlear™ Chitosan levels. Record the results on the log sheet.

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4. The log sheet lists all the parameters that should be checked during operation. These parameters should be checked on an hourly basis.
5. Residual StormKlear™ Chitosan testing should be performed at least two times each shift.
6. GAC filters should be backwashed when the pressure differential reaches 30 psi or when flow can no longer be maintained through the unit at the system designed flow rates. Spent cartridges should be properly disposed of in suitable trash containers.
7. Perform and record a daily draw down test to determine the polymer feed rate (for polymer drawdown instructions see the "Chemical Metering Pumps" section of this manual). This will allow you to both know your dosage and predict consumption. Also, do a drawdown any time that you have to adjust your polymer pump up or down more than 10%. Always note the drawdown results on the log sheet and/or daily report.

Site Shutdown

1. Thirty minutes before you shut down systems, perform a manual backwash on the sand filter.
2. Once backwash cycle is completed, shut down filter pump.
3. Shut down transfer pump.
4. Turn off the LMI/PC polymer metering pumps.
5. Close the tote bin valve to the polymer pumps.
6. Turn off generator.
7. Lock up trailer.
8. Secure site for theft prevention.

Paperwork

1. First read the CCS Effluent Monitoring Plan.
2. Fill out a Log Sheet with all of your test results for each day of operation.
3. Fill out an Effluent Monitoring Report along with your Log Sheet.
4. Fill out a Daily Report with all pertinent information for each day of operation. Only one Daily Report needs to be filled out per day even if two or more shifts are operating (12am-11:59pm).
5. Record any relevant site activity on the appropriate sheet.
6. Fill out a Delivery Slip for ANY equipment, polymer, or cartridge filters brought on to the site. Note the delivery and delivery slip number on the daily report under "New equipment brought to site".
7. Turn in the Daily Reports and Log Sheets for the week to the site Project Manager. These reports must be turned in at least once each week. This is mandatory for each site.

Maintain AT ALL TIMES a clean working environment. Our sites can be very visible at times and it is important that we keep the site clean. The image you project is reflective of how people will view CCSI. Police the entire area on a daily basis. Trash bags are available and it is strongly suggested that you use them.

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Operational Procedures For The Clear Creek Systems, Inc. Multi-Pod Sand Filter

This procedure is intended only as a general guide to the operation and maintenance of the sand filters CCSI employs at our client sites. Experience has taught us that there are several variables one should watch carefully in order to keep the sand filter functioning properly. We have also included several methods one can use to improve the sand filter performance should the effluent quality decrease below acceptable levels.

General Parameters

Initial Start-Up

1. Before you start pumping water to the sand filter, check all the valves on the entire system to make sure they are in the proper open/closed positions. This includes checking the valves on the particle filter after the sand filter and the system discharge valve.
2. Make sure the control panel is energized and that the backwash settings are where you want them.
3. Open the ¾" vent valves on the top of each filter pod. This allows the vessel to fill completely and maintain proper hydraulic flow patterns inside the vessel.
4. Record the flow meter totalizer readings on the daily log sheet.
5. Start the treatment system pump.
6. As the water fills each vessel, the vent valve will release trapped air until the vessel is full of water. Close the vent valve on each vessel when it starts releasing a steady flow of water. During operation, occasionally vent each vessel to release any trapped air in the vessel.
7. Once all the pods are full and water is flowing through the sand filter, check the inlet and outlet pressure gauges. It is strongly recommended that the inlet pressure be kept below 60 psi at all times. The sand will compact quickly above that pressure and will require manually breaking up the sand if that happens.
8. Check the flowmeter on the outlet of the sand filter to set the proper flow rate through the unit.
9. Adjust the sand filter inlet and outlet valves until you have the desired flow rate and pressures through the filter.
10. Once you have established the desired flowrate, check the inlet pressure to make sure you are not exceeding 60 psi.
11. Sample the sand filter influent and effluent water and test the NTU level of both samples.
12. Now start the supplemental sand filter influent polymer (polisher) pump if needed. This pump adds a small amount of polymer at the beginning of the filtration system. You will need this "polisher" on if your discharge water is too high in NTU. If the influent to your sand filter is 100NTU or below, you can usually get your discharge water in compliance with the use of the polisher polymer. If the influent is over 100NTU, you will need to recirculate the entire pond, retreating it with polymer and allowing the floc to settle. The polymer feed rate should be quite low, normally 1-2 quarts per hour. It is best to have the polymer pump pulsing at 100% speed with the pump stroke setting as low as possible. This improves polymer distribution in the water entering the sand filter.

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13. Re-test the sand filter effluent water NTU level and compare it to the first sample you tested. Adjusting the polymer pump in small increments will allow you to find the polymer feed rate that produces the lowest NTU reading exiting the sand filter. After making a polymer pump feed rate adjustment, wait at least 10 minutes before you re-test the effluent NTU level.

Normal On-Line Operational Guidelines

Under normal operating conditions, the following parameters should be monitored and recorded on an hourly schedule. It would be prudent to check these items 1-2 times in-between the hourly recorded checks.

1. Check and record all influent and effluent pressure readings. Do not exceed 60 psi on the influent pressure. Sand filter design is based predominantly upon flow rate through the unit, not pressure. There is no "best" pressure to maintain on the unit as long as the influent pressure is below 60 psi.
2. Check and record the pressure differential gauge. The maximum differential pressure you should allow is 10 psi. If pressure differential exceeds 10 psi, contact the Project Manager immediately.
3. At 10 psi pressure differential, the sand filter needs to be backwashed. It is recommended that you put the unit into a manual backwash cycle to get the pressure differential back down where it belongs, 2-4 psi.
4. The sand filter control panel allows you to adjust the automatic backwash cycle. You can vary the frequency of the automatic backwash cycle as well as the length of time each pod backwashes. Set the frequency of the backwash cycle so that the pressure differential is still below 10 psi when the backwash cycle begins. Set the length of time each pod backwashes according to how long it takes the backwash line sight glass water to clear. For this process to work properly, the backwash flowrate MUST be at least 70 gpm. Flow rates below 70 gpm will provide insufficient upward water flow to remove the particulate matter within the sand bed. Take jar sample from the backwash line since the site glass can be tinted by the sun and loose clarity.

The "Hard" Backwash

Over the course of time, the pressure differential may not decrease as it should with the normal backwash cycle. In this case, you can perform what could be called a "hard" backwash to more thoroughly backwash the sand bed.

1. Put the pod into the manual backwash mode with the solenoid located on the pneumatic valve on top of the pod.
2. Once the manual backwash begins, slowly restrict the main effluent valve to force more water out of the sand filter via the opened backwash line.
3. Continue to restrict the effluent valve until you can see sand leaving the pod via the backwash line. Then open the effluent valve just enough that you no longer see sand in the backwash line.
4. Leave the pod in manual backwash until the backwash line sight glass is showing clean water.

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5. Take the pod out of manual mode with the solenoid for 30 seconds, and then put it back into manual backwash again. This disrupts the flow patterns in the pod and can help remove more particulate matter.
6. When the sight glass again indicates clean water, put the pod back into normal service mode and continue this process on each pod of the sand filter train.

Manual Air Sparging

When the pressure differential of the sand filter fails to respond to normal or hard backwash procedures, it may be necessary to utilize air sparging to restore the sand bed to acceptable performance levels. This is a manual process and requires the sand filter train to be taken out of service.

1. Take the sand filter out of service.
2. Drain the water in the pods down just low enough so that the top manhole covers can be removed. Do not completely drain the pods.
3. Set up the air compressor with the air lance next to the pod.
4. With the water level in the pod just above the sand, begin pushing the air lance down into the sand bed to break up any compacted sand. This will also help disperse any high concentrations of particulate matter accumulated in the sand bed.
5. Continue with air-lancing for at least 15-20 minutes or until you can "feel" no pockets of compacted sand in the bed.
6. To rinse the particulate from the bed, replace the manhole cover, switch the solenoid to the manual backwash position, close the main effluent valve, and turn on the sand filter pump.
7. Manually backwash the pod until you have clean water in the backwash line sight glass.
8. Repeat this process on each pod.

Chemical Metering Pumps

Chemical metering pumps are used in ATS systems to accurately control the amount of treatment chemicals we inject into the water flows. There are two basic types of pumps we employ for this purpose: diaphragm and progressive cavity. Each type of pump is discussed here in this manual. As with any electrical device, make sure that the power supply and cords are protected from water to help prevent shorting out and possible electrical shock when using these devices.

Diaphragm Pumps (Liquid Metronics Inc., Pulsatrol, Precision, Etc.)

This type opf pump is essentially nothing more than a solenoid mechanism that repeatedly pushes up against a flexible diaphragm in the pump head. The pumping rate can be adjusted via two methods:

1. The stroke length can be increased or decreased which changes the volume of liquid pumped with each stroke of the pump.
2. The speed of the pump stroke mechanism can also be increased or decreased to change the amount of liquid pumped through the pump head.

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There is a plate located on the front of the pump which will tell you the maximum pumping capacity of the pump. Once you have figured out the amount of liquid you need to pump, the stroke and speed adjustment knobs can be set to the appropriate settings*. The calculation for this is:

(pump speed %)(pump stroke %)(pump max. capacity) = pumping rate

* This is an approximation only. A drawdown tube can be used for more accuracy if desired. To perform a drawdown test, close the valve on the polymer supply vessel and open the valve to the drawdown tube. The polymer pump will draw polymer suction from the drawdown tube now. The drawdown tube is marked volumetrically. Time the polymer pump for 30 seconds and note the amount of polymer removed from the drawdown tube. The volume of polymer pumped multiplied by 120 will give you the hourly feed rate.

The next two pages of this manual are the instruction sheet for the liquid ends on LMI pumps and an exploded view of the liquid end. It is important to pay particular attention to the check valve seats, balls, & springs to make sure they are inserted properly into the pump head. Teflon tape should not be used on any of the liquid end parts when being assembled, and the parts should be hand tightened only.

These pumps can be set up for suction draw up into the pump head or with a flooded suction from the bottom of the chemical vessel.

When you are starting up the pump, NEVER use your mouth on ANY suction or discharge parts in order to draw liquid up into or through the pump head to get it going.

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Liquid End Sheet

LE-35HV

When pumping solutions, make certain lhal all tubing is securely attached to the fillings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

Note: See parts list for materials of construction

A. INSTALLING INJECTION CHECK VALVE

1. **The purpose of the injection check valve is to prevent backflow from the treated line.**
2. **A*Vi"* NPT female fitting with sufficient depth will accept the injection check valve.**
3. **To insure correct seating of the ball inside the injection check valve, the injection check valve should be installed upwards (vertically) into bottom of the pipe.**

B. CONNECTING DISCHARGE TUBING

NOTE: ***Cut tubing to length needed for discharge line.***

1. **Route tubing from the injection check valve to the metering pump, making sure it does not touch hot or sharp surfaces, or is bent so sharply that it kinks.**
2. **Slide the small end of the couplingnut onto tubing, then slide on the clamp ring.**
3. **Push tubing on the valve housing nozzle so that tubing flares out and butts up against valve housing and will not go any further.**
4. **Slide the clamp ring and coupling nut to the threads and engage. While pushing the tubing onto the valve housing nozzle, tighten the coupling nut by hand until tubing is held securely in place.**

Excessive force will crack or distort fittings. DO NOT USE PIPE WRENCH.

C. CONNECTING SUCTION TUBING
Flooded Section (Preferred Method)

1. **Mount pump 12" above the floor with the head extending beyond mounting surface so the suction tubing curves gently away from the pump to prevent kinking.**
2. **Install !/2" or ^{s}/i" NPT shut off valve, with at least $^{3}A"$ clear way through the valvej into reservoir. This is necessary to stop flow from reservoir while servicing the pump.**
3. **Install barbed connector (one of two supplied) into the valve. Attach $^{15}/_{16}$" O.D. Vinyl tubing to the barbed connector. Secure with the hose clamp provided (use shortest length of suction tubing necessary).**
4. **Connect the other end of the suction fitting at the pump and secure with the hose clamp provided.**

D. CONNECTING SUCTION TUBING
Suction Lift (Pump Sitting on a Barrel: Maximum Lift 3.5 ft)

1. **Connect the suction tubing to the barbed suction fitting on the pump. Secure with the hose clamp provided.**
2. **Cut tubing so it will only reach within 1 "of the bottom of the barrel.**
3. **If tubing curl is a problem, fabricate a 1" Polypropylene or PVC pipe as a tubing straightener (pipe should be slightly longer than the depth of the barrel for ease of removal).**
4. **Place the tubing straightener over the suction tubing and lower into the barrel.**

E. PRIMING

1. **Temporarily remove tubing from the injection check valve and hold the end of tubing so it is above the level of the pump.**
2. **Start pump. Set at 80% speed and 100% stroke.**
3. **As soon as solution is visible through translucent discharge tubing, just past the discharge valve, stop the pump.**
4. **The pump is now primed.**
5. **Reconnect tubing to the injection check valve.**

NOTE:

(a) Pump is normally self-priming if suction lift is not more than 5ft (1.5 m). valves in the pump are wet with water (pump is shipped from factory with water in pump head) and the above steps** (D. Priming) **are followed.

(b) If the pump does not self prime, remove discharge valve housing and ball and pour water or solution slowly into discharge port until head is filled. Follow step** D. Priming **thereafter.

6. **If difficulty is experienced on the initial prime, apply vacuum to discharge tubing by suitable means, such as a hand suction pump. Difficulty should not reoccur after pump is primed with a viscous liquid.**

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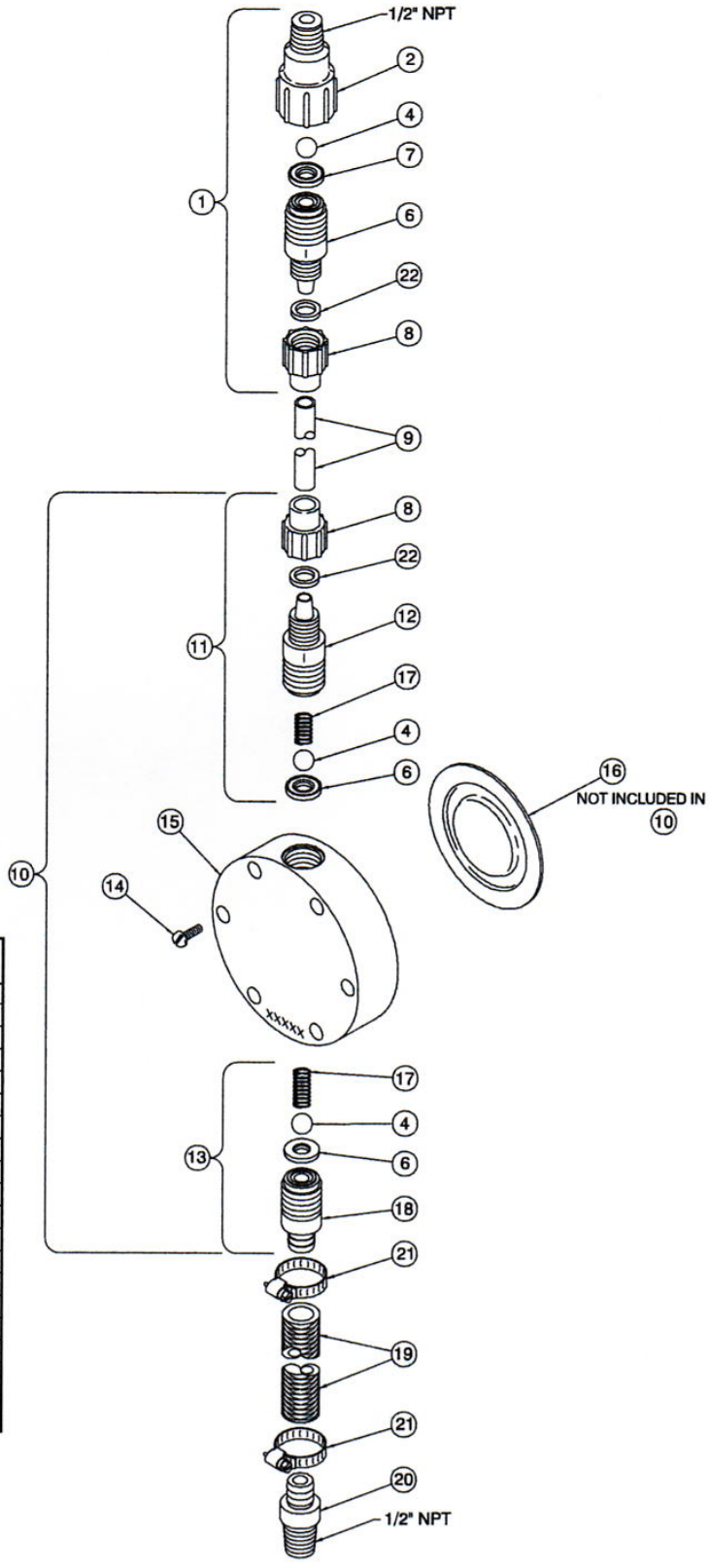
NOTE:
Threaded connections into pump head are 1"-12 straight threads. **DO NOT USE TEFLON® TAPE.** These joints are sealed by seal ring valve seats (item 6 on exploded view).



KEY NO.	PART NO.	DESCRIPTION	QTY
1	27080	Injection Check Valve Assembly	1
2	25108	Injector Fitting	1
4	25042*	Ball, Stainless Steel	3
6	25128*	Seal Ring, PTFE	3
7	25106	Valve Seat, Polypropylene	1
8	10411	Coupling Nut, Polypropylene	2
9	10142-10	Tubing, Polyethylene, .5" O.D.	1
10	31584	Head Assembly, LE-35HV	1
11	27052	Discharge Valve Assembly	1
12	25173	Valve Housing, Polypropylene	1
13	27053	Suction Valve Assembly	1
14	10340	Screw, 10-24 x 3/4" SS	6
15	25906-3	Head, 6.0 High Viscosity	1
16	25719*	Liquifram™, 6.0 PTFE Face	1
17	25558*	Spring, Stainless Steel	2
18	25649	Valve Seat, Polypropylene, Barbed	1
19	25651-3.5	Tubing, Vinyl, .938" O.D.	1
20	25650	Connector, Barbed, ½" NPT	1
21	25652	Hose Clamp	2
22	37203	Clamp Ring	2

*Parts included in Spare Parts Kit Sp-35HV.

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Specifications subject to change without notice.

Liquifram is a trademark of Liquid Metronics, Inc.
Teflon is a registered trademark of E. I. du Pont de Nemours & Co., Inc.

Operational Procedures For The Clear Creek Systems, Inc. Media Vessels

INSTALLATION AND STARTUP

It is highly recommended that you read this manual prior to installation in order to familiarize yourself with the considerations regarding the operation of a liquid adsorber.

1) Install vessel on a leveled foundation that can support its working load.
2) Open manway and inspect laterals and other internal fixtures for integrity.
3) Inspect outer fixtures on vessel for mechanical damage and integrity (valves, rupture disk, relief valve, gauges, etc).
4) Close all valves and manways.
5) Decide whether to operate vessel in upflow or downflow mode, and connect to process piping accordingly
6) Fill the vessel with Media
7) Perform bed conditioning as described in Bed Conditioning Section.
8) Vessel is ready for process flow

BED CONDITIONING PROCEDURE

1) Soak the media for a minimum of eight (8) hours to allow entrapped air to displace from between the granules and from the pores of the granules. Not doing so will cause foaming during backwash

2) Back wash at the rate of (10-12) gpm/ft2 for a period of 30 minutes, per back wash procedure. An extended backwash period is required to remove any fines created from handling, and to remove air pockets that may have been trapped in the bed.

The backwash flow rate should be controlled during this initial bed conditioning, so that the media can expand and stratify. Stratifying a media bed during conditioning locates the smaller granules at the top of the bed away from the lower collection assembly, which could cause: blockage, restricting the service flow rate, increasing pressure drop, or resulting in unpredictable breakthrough readings (breakthrough meaning contaminates that are passing through the media bed).

If a media bed is not back washed prior to operation, but is back washed later in the operation, particles that were originally at the top of the bed, and are now fully exhausted, may rearrange and go to the bottom of the bed, causing breakthrough readings before the bed is fully exhausted.

Back washing as part of conditioning eliminates air pockets, assures that the vessel is full with water, and displaces the air that was released from the media. The wetting period in which the air totally dissipates from within the pores of the media is approximately forty-eight (48) hours. Only the initial backwash removes the fines air that is trapped between the granules and some of the air from the pores. Periodically, a short backwash will remove the air that migrated from the pore structure and may have possibly formed air pockets that encourage channeling.

Initial effluent may be discolored. This will last for several bed volumes. When starting up this newly charged absorber, put effluent to sump until it runs clear. When effluent is clear, start normal discharge. NOTE: Carbon fines do not pose an environmental hazard, but they are aesthetically unpleasant if discharged to a receiving stream. Going to the sump for first few bed volumes allows this water to be pumped to front end of process where carbon fines will be removed by setting an/or sand filtration (see bed conditioning procedure).

BACKWASH PROCEDURE

If this is your first backwash prior to operation, refer to "bed conditioning" in the previous section.

Always open and close backwash valves slowly. Ramp-up to increase the flow rate to prevent damaging the equipment, particularly the internal piping. It is not unusual to take several minutes to reach full backwash flow.

Backwash flow rate should be approximately 10-12 gallons per minute per square foot of crossectional bed area. The backwash rate should be started at 3 gallon per minute per square foot and gradually increased to achieve 25% bed expansion. If a maximum backwash rate of 10-12 gpm/ft^2 is applied all at once, it may displace the entire media bed as a plug and damage the upper distribution laterals. The backwash rate should be maintained for 10-15 minutes or until backwash water clears. This will evacuate the suspended solids that have been mechanically filtered or deposited on the media bed, causing channeling and/or increased pressure drop and reducing flow rate and effectiveness. As mentioned previously, periodical backwash will displace air that was released from the pores furing the early part of the operation. Once all the air is released from the pores, the bed is considered "fully seasoned" and is no longer a consideration.

CARBON SAMPLING PROCEEDURES FOR DISPOSAL

Spent carbon must be profiled to determine if it is hazardous or non-hazardous. This determination can be achieved either by generator knowledge, testing, or a combination of the two. Clear Creek Systems, Inc. can assist the client in the necessary paperwork,

but it is the client's responsibility to fill out the carbon profile sheet and conduct any needed test.

If a carbon sample is going to be tested, approximately one quart of representative spent carbon should be obtained. The carbon media sample should be taken approximately six inches below the surface of the carbon bed. The carbon sample should be as free from moisture as possible. The sample container(s) will preferably be glass with a Teflon coated cap. The sample should be kept cool before and during shipment to the laboratory.

A leach procedure will have to be run on the sample then the leachate has to be analyzed for contaminants that were present in the waste water stream (i.e. oil, gasoline, and/or VOC's – metals if present in waste stream).

On average, it takes one to two weeks to get the results of the laboratory testing. Faster turnaround can be achieved, but the cost is higher. This is important to keep in mind when planning a change out or project shutdown because the carbon cannot be removed from the site until it has been properly classified.

The "Spent Carbon Profile Sheet" needs to be filled out by the generator. It (and any needed testing will then be submitted to a regeneration facility for hazardous or non-hazardous classification. The "Spent Carbon Profile Sheet" will vary depending on the regeneration facility selected.

RESIN SAMPLING PROCEEDURES FOR DISPOSAL

The resin sampling procedures are the same as the carbon sampling procedures.

HAZARDS WITH CERTAIN PROCESS CONDITIONS

Under certain process conditions activated carbons may show an affinity for atmospheric oxygen, or may interact with process streams to generate potentially toxic or hazardous levels of hydrogen sulfide, methane, ethanol, carbon dioxide and other gases. These effects can become pronounced in a relatively confined space, such as the headspace of an adsorber. Should entry to confined spaces containing activated carbon become necessary, appropriate ventilation and other safety practices for potentially flammable, toxic or oxygen-deficient environments should be followed.

To avoid possible combustion of the carbon or the material being adsorbed, caution is recommended in contacting activated carbon with strong oxidizing agents such as chlorine.

NEED FOR GROUNDING OF CARBON SYSTEMS

In certain systems, high voltage static electrical charges may accumulate to levels of shock or ignition hazard. As a precaution against possible ignition or shock, all carbon treatment systems should be adequately grounded.

DANGER!

Wet granular activated carbon adsorbs oxygen, therefore creates an oxygen deficient environment. In a confined space where activated carbon is wetted, a hazardous environment is created. SUCH AN ENVIRONMENT MAY BE FATAL. Do not use a respirator in such an environment. You must use live air equipment.

Investigation of this matter was prompted by an accident, which occurred on a project in which a granular activated carbon system was being installed. Studies conducted in vessels similar to that in which the accident occurred have shown that low oxygen content exists in vessels containing wet carbon. Laboratory experiments conducted since that time also have revealed that commercial activated carbons n a wet or moist condition will lower the oxygen content of an isolated space. Indications are as follows:

1) The phenomenon occurs with wet activated carbon of all common types.
2) The rate of oxygen uptake naturally varies with the degree of exposure of the wet carbon to the air. Thus it is relatively rapid in a drained bed.
3) There is some indication of a limit to carbon's capacity for oxygen, however, the prudent action should be to assume that all carbon, wet or dry, will exhibit this oxygen-depleting characteristic.

Therefore: All confined spaces containing activated carbon, should be presumed as hazardous. Appropriate safety measures should always be taken before entering, as well as when workers are in a confined space OSHA regulations pertaining to confined space entry and oxygen depleted environments should be strictly adhered to.

ATTACHMENT 9

ECOLOGY REQUEST FOR CHEMICAL TREATMENT FORM

DEPARTMENT OF ECOLOGY
State of Washington

Request for Chemical Treatment Form

Permit Number WAR301251

☐ **Industrial Stormwater Permit**
☒ **Construction Stormwater Permit**

Permittee Information

Permittee name: Lauren Golembiewski

Permittee company name: Glacier Environmental Services, Inc.

Permittee address: PO Box 1097 Mukilteo , WA 98275

Permittee phone number: 425-355-2826

Site Information

Site name: Cornet Bay marina

Site address: 2000 Cornet Bay Road, Oak Harbor, WA

Proper parcel number, if known:

Site contact name: Alan Hall

Site contact phone number: 206-446-5280

Name of receiving water body: Cornet Bay

Treatment System Operator Information

Operator or Company Name: Clear Creek Systems, Inc.

Operator address: 12604 Interurban Avenue South, Suite 100

Tukwila, WA 98168

Operator phone number: 206-695-2120

Check Treatment Option Being Requested

☐ Chitosan enhanced sand filtration with discharge to infiltration
☐ Chitosan enhanced sand filtration with discharge to temporary holding ponds (batch)
☐ Chitosan enhanced sand filtration with discharge to surface waters (flow-through) – **Streams Only**
☐ Electrocoagulation
☒ Other Chitosan enhanced sand filtration with discharge to marine waters

Check chemical being requested

☐ FlocClear™ (2% chitosan acetate solution)
☒ StormKlear™ LiquiFloc™ (1% chitosan acetate solution)
☐ ChitoVan™ (1% chitosan acetate solution)
☐ StormKlear ™ LiquiFloc ™ (3% Chitosan acetate solution)
☐ Other _____

Treated water discharges to Cornet Bay (marine waters) as allowed under the General Use Level Designation for chitosan enhanced sand filtration with StormKelar LiquiFloc 1%.

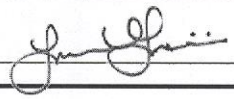
Estimate of Treatment Period

Begin date: 01/13/14 End date: 4/15/13

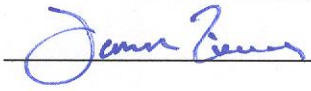
I hereby certify that the following information is correct:

- The Stormwater Pollution Prevention Plan (SWPPP) includes the chemical treatment system specifications and design.
- The best management practices (BMPs) on the site use all known, available, and reasonable methods of treatment (AKART) and I ensure that these BMPs will be maintained at AKART.
- I reviewed the best management practices on site or those proposed in the SWPPP and believe they will not interfere with the use of chemical treatment.
- I verified through jar tests that the site soil is conducive to chemical treatment.
- ~~I verified that any treated discharged water enters a stream or a stormwater system that discharges to flowing fresh water, not to lakes, marine environments, or other quiescent water bodies.~~
- I verified that the CESF operators received Ecology-approved training.
- I read, understand, and will follow all conditions and design criteria in the applicable use level designation(s).
- I notified the appropriate local government of the intent to use chemical treatment on a site located in their jurisdiction, and they agree that the system design and use of chemicals is acceptable.
- I will keep the use level designation, operation and maintenance manual, and training certificate on-site prior to the use of chitosan acetate.
- Where necessary, a licensed engineer designed the system correctly including system sizing, pond sizing, and flow requirements.
- I verify that discharge will not affect downstream conveyance systems or stream channels.

Permittee name (printed) Lauren Golembiewski

Permittee signature  Date: 1/3/14

Operator name (printed) Jason Ziemer

Operator signature  Date: 01/02/14

Your authorization to use the requested chemical treatment begins once Ecology reviews and approves your completed application.

Please send your completed request to:

Doug Howie
Department of Ecology
Water Quality Program
PO Box 47600
Olympia, WA 98504-7600

To send electronically, scan signed and dated application and email to: douglas.howie@ecy.wa.gov

To ask about the availability of this document in a format for the visually impaired, call the Water Quality Program at 360-407-6401. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

ATTCHMENT 10

ECOLOGY'S LIST OF CERTIFIED CESF OPERATORS

12/26/2013 Latest Update

Name	Certification Expiration Date	Trained By
Anderholm, Axel	1/5/2014	Clear Creek Systems
Anselment, Joe	10/20/2014	Creative Courses LLC
Apshaga, Meghan	10/29/2015	Clear Water Services
Armstrong, Lyle	10/23/2014	Dungeness Environmental
Aspinwall, Rob	10/5/2015	Clear Creek Systems
Barnes, Mannie	2/4/2014	Clear Water Compliance Services
Berkstresser, Dan	12/16/2014	OSI Equipment and Repair
Bernhardt, Kyle	2/17/2014	WaterTectonics
Blazovich, Chris	11/8/2016	OSW Equipment
Blevins, Ryan	1/5/2014	Clear Creek Systems
Brandon, Ben	10/29/2015	Clear Water Services
Broers, Ed	10/10/2016	Creative Courses
Burgett, Dan	7/18/2014	Clear Creek Systems
Carlin, Chris	10/29/2015	Clear Water Services
Carrico, David	10/29/2015	Clear Water Services
Clager, Tyrone	10/29/2015	Clear Water Services
Crane, Sean	10/5/2015	Clear Creek Systems
Crittenden, Terry	1/26/2016	OSW Equipment
Dalton, Nicholas	5/3/2014	WaterTectonics
Davis, Mike	10/5/2015	Clear Creek Systems
Dennis, Brian	10/29/2015	Clear Water Services
Diaz, Alex	10/5/2015	Clear Creek Systems
Doherty, Neil	10/29/2015	Clear Water Services
Dorning, Brian	12/17/2015	OSW Equipment
Edman, Seth	10/29/2015	Clear Water Services
Edmunds, Sean	10/5/2015	Clear Creek Systems
Ellis Bill	10/5/2015	Clear Creek Systems
Forbush, Bill	10/4/2015	WaterTectonics
Freadman, Wes	2/6/2014	Creative Courses, LLC.
Freiberg, Glen	2/6/2014	Creative Courses, LLC.
Gaiser, Derek	10/10/2016	Clear Creek Systems
Gannon, Joe	10/5/2015	Clear Creek Systems
Gannon, Tim	10/5/2015	Clear Creek Systems
Gaynor, William	2/4/2014	Clear Water Compliance Services
Georing, Ben	1/12/2014	OSW Equipment
Gibson, Ryan	2/28/2016	OSW Equipment
Greenough, Mark	10/29/2015	Clear Water Services
Grimstad, Kris	7/18/2014	Clear Creek Systems
Groves, Nathan	2/17/2014	WaterTectonics
Hanson, Eric	2/17/2014	WaterTectonics

12/26/2013 Latest Update

Name	Certification Expiration Date	Trained By
Harris, Michael	10/10/2016	Creative Courses LLC
Henry, Stephen	10/20/2014	Creative Courses LLC
Heunish, Eric	7/7/2014	Dungeness Environmental
Heunish, Nick	2/5/2016	OSW Equipment
Hiliker, Mark	2/17/2014	WaterTectonics
Holloway, Nate	10/29/2015	Clear Water Services
Holman, Curt	10/29/2015	Clear Water Services
Jackson, Rory	10/5/2015	Clear Creek Systems
Jenkins, Jeremy	7/31/2015	Clear Creek Systems
Jonasson, Dale	1/26/2016	OSW Equipment
Joseph, Kyle	10/5/2015	Clear Creek Systems
Keister, Jay	2/6/2014	Creative Courses LLC
Kinkead, Doug	10/10/2016	Creative Courses, LLC.
Kumer, Kim	10/26/2014	Clear Water Compliance Services
Land, Kenny	7/18/2014	Clear Creek Systems
Landrus, Jake	2/17/2014	WaterTectonics
Lem, Marko	7/18/2014	Clear Creek Systems
Lindgren, Clinton	1/31/2016	Clear Creek Systems
Linke, Rob	12/27/2015	Clear Water Services
Lipinski, Dan	10/29/2015	Clear Water Services
Lish, Enoch	10/5/2015	Clear Creek Systems
MacDonald, Nicholas	1/26/2016	OSW Equipment
Macpherson, John	10/2/2016	OSW Equipment
Mandelin, John	10/29/2015	Clear Water Services
Martino, Jason	10/5/2015	Clear Creek Systems
McCamey, Mike	1/5/2014	Clear Creek Systems
McCullough, Kent	1/26/2016	OSW Equipment
McIntire, Dennis	7/31/2015	Clear Creek Systems
McLean, Michael	10/20/2014	Creative Courses LLC
Meeds, Russell	1/20/2015	OSW Equipment
Miller, Dave	11/4/2014	Creative Courses, LLC.
Mitchell, Jeff	2/17/2014	WaterTectonics
Morrissey, Michael	1/31/2016	Clear Creek Systems
Murphy, David	10/20/2014	Creative Courses LLC
Newsome, Doug	2/6/2014	Creative Courses LLC
Niles, Jake	12/27/2015	Clear Water Services
Odd, Lenny	10/29/2015	Clear Water Services
Olson, Todd	10/29/2015	Clear Water Services
Overby, Robin	10/5/2015	Clear Creek Systems
Perry, Ben	12/11/2016	OSW Equipment

12/26/2013 Latest Update

Name	Certification Expiration Date	Trained By
Peterson, Brett	5/3/2014	WaterTectonics
Pomykal, Joe	10/10/2016	Creative Course
Pritzi, Nathaniel	7/18/2014	Clear Creek Systems
Quigg Neil	10/23/215	WaterTectonics
Quigg, Charlie	10/23/215	WaterTectonics
Rhodes, Pat	1/20/2015	OSW Equipment
Richards, Chris	10/10/2016	Creative Courses, LLC.
Rick, Brian	11/7/2015	OSW Equipment
Ringenberg, Tim	1/26/2015	Clear Creek Systems
Ringstad, Matt	10/29/2015	Clear Water Services
Robbins, Neil	10/29/2015	Clear Water Services
Sample, Ryan	7/18/2014	Clear Creek Systems
Shea, Mark	10/26/2014	Clear Water Compliance Services
Sherer, Frank	5/4/2015	Clear Creek Systems
Sjoberg, Jakob	1/20/2015	OSW Equipment
Smith, Dan	10/10/2016	Creative Courses
Sommer, Kristine	10/29/2015	Clear Water Services
Sydow, Phyllis	7/18/2014	Clear Creek Systems
Tarter, Rich	2/4/2014	Clear Water Compliance Services
Taylor, Brad	7/7/2014	Dungeness Environmental
Thorwart, Jim	10/10/2016	Creative Courses, LLC.
Toland, Todd	10/29/2015	Clear Water Services
Vojvoda, Joe	7/18/2014	Clear Creek Systems
Wahls, Jeff	5/3/2014	WaterTectonics
Walker, Taylor	10/12/2015	Clear Water Services
Weaver, John	5/3/2014	WaterTectonics
Webb, Michael	11/21/2016	Clear Creek Systems
Welter, Vern	10/29/2015	Clear Water Services
Wyeth, Sid	10/29/2015	Clear Water Services
Ziemer, Jason	10/5/2015	Clear Creek Systems
Zimmerman, Alex	2/6/2014	Creative Courses, LLC.
Zwiefelhofer, Joseph	10/10/2016	Creative Courses, LLC.

ATTACHMENT 11

CESF OPERATIONAL DATA SHEETS

[

Clear Creek Systems, Inc. Data Log Sheet: CBR

Glacier Environmental Services - Cornet Bay Marina Remediation Project

Oak Harbor, WA

	Name:				**Day/Date:**					**System GPM:**		
Time												
Raw Water Treatment												
pH - Raw												
NTU - Raw												
Flow Rate (gpm)												
Flow Totalizer												
Pretreatment Dose (ppm)												
Speed & Stroke												
CESF System												
Sand Filter Dose (ppm)												
Speed & Stroke												
Influent pH												
Effluent pH												
Influent Turbidity (NTU)												
Effluent Turbidtity (NTU)												
Influent psig												
Discharge psig												
Flow Rate (gpm)												
Residual Chitodan Test												
Flow Totalizer												
							Background NTU----->				pH/°C---->	

Clear Creek Systems, Inc. Data Log Sheet: CBR

Glacier Environmental Services, Inc. - Cornet Bay Marina Remediation Project

Oak Harbor, WA

Name:	Day/Date:	System GPM:

Event (Backwash or Recycle)	Time	Description of Response (Normal/Abnormal Backflush &/or Issues Causing Recycle Events).

Summary of Operations:

Project Manager Review	Name:	Date:	Certification Signature:

ATTACHMENT 12

STORMKLEAR™ LIQUIFLOC™ 1% CHITOSAN ACETATE

RESIDUAL CHITOSAN TEST PROCEDURE

StormKlear Residual Chitosan Test Instructions

Reliable and effective TSS and turbidity control

- BMPs for sediment control
- Dewatering
- General water treatment

StormKlear® water treatment products are natural, proven and cost-effective flocculants for sediment control.

StormKlear® by HaloSource

RESIDUAL CHITOSAN TEST

DESCRIPTION

This test determines the presence of free residual chitosan in treated stormwater. The test is designed as a “Pass/Fail”, with the “Fail” criteria as values exceeding 0.1 mg/l free chitosan.

The test compares a field water sample with a blank and a standard solution of 0.1 mg/l chitosan. If there is greater than 0.1 ppm of free residual chitosan then a brown pink purple color with develop on the test filter. If the color is as dark as the standard then the test is a fail and the treated water has more than 0.1 ppm of chitosan.

EQUIPMENT SUPPLIED IN KIT

- Two 1 liter bottles
- One filter holder
- One 140 ml syringe
- One 3 ml syringe
- Three plastic eyedroppers
- Sodium sulfate solution
- StormKlear Liquifloc™ 1% chitosan acetate sample
- Three 1 liter open tubs
- 200 glass fiber filters
- One 10 ml syringe
- One 1 ml syringe
- One forceps
- Iodine test solution

NOT SUPPLIED IN THE KIT

Clean water for making a blank solution, standard solution & general rinsing between stages (distilled water if in a lab, tap water if in the field, but not the stormwater).

1.0 MAKE UP THE STANDARD SOLUTION

1.1 Fill both the 1 liter jars with clean water up to the ring just below the neck (as shown below).

1.2 With the 10 ml syringe, draw out 10 ml of Liquifloc 1% and transfer it into one of the 1 liter jars. Cap and mix well.

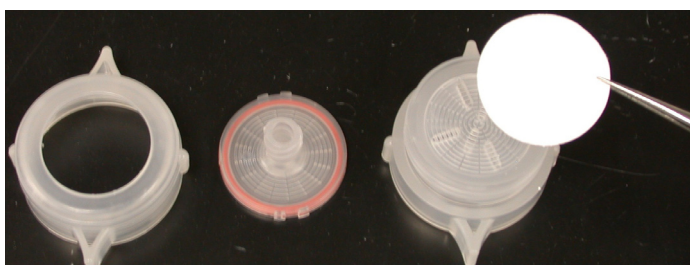
1.3 With the 1 ml syringe, draw out 1 ml of the solution above and put it in the second liter bottle. Cap and mix well. This is the 0.1 ppm or mg/L chitosan standard.

2.0 TEST PROCEDURE

2.1 The following steps are the same for the blank (done on clean water), the standard solution, and the test sample:

2.2 Collect at least 200 ml of sample in one of the 1 liter tubs.

2.3 With the forceps, load a clean glass filter into the filter holder and secure.



2.4 With the 140 ml syringe, filter a little over 200 ml of sample by following these directions; fill the syringe with sample, then secure the filter holder on the end of the syringe, and expel the material through the filter into the second 1 liter tub. This takes more than one draw, so remove the filter before refilling the syringe.

- Do not expel the sample out too forcefully; this “craters” the filter & can affect the results.
- Do not draw sample back up through the filter because this will damage it.
- If the sample has high turbidity, more than one filter may have to be used. Turbidities above 100 NTU generally use too many filters to be practical.
- The filters are one time use only.

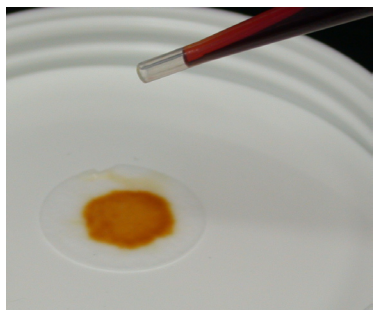
2.5 With the 3 ml syringe, draw out 2 ml of the sodium sulfate solution, add it to the filtered sample tub & mix (the syringe itself is a handy mixer in the field; wash between uses).

2.6 Load a clean glass filter into the filter holder and secure.

2.7 With the 140 ml syringe, filter 200 ml sample, secure the filter holder on the end, then expel the material through the filter (discard the filtrate).

2.8 Open the filter holder and with the forceps, transfer the wet pad to the worksheet.

2.9 With the eyedropper, place one drop of iodine into the center of the pad (as shown in picture below). Filter (in the same manner as the test sample) the blank and standard 0.1 ppm solutions and collect the filters to compare with the test sample.



2.10 There should be some immediate color, but allow 5 to 60 minutes for more color to develop. Compare the test sample with the blank and the standard.

- The blank should be light yellow color.
- The standard should have a light brown/pink-purple color.
- If the sample has a lighter color than the standard, then it has less than 0.1 mg/l free chitosan—“Pass”. If it is as brown/pink-purple, or darker brown/black, then it is “Fail”.
- For multiple samples, they can all be placed on the worksheet, then iodine treated at the same time, so the colors develop concurrently.
- Note: do not place the wet pad on unprotected paper; the starch in the paper will turn the pad a bright blue and spoil the test.

2.11 Rinse out tubs & syringes with clean water, such as tap or deionized water, between each sample.

HaloSource, Inc.

StormKlear Water Treatment Solutions are a product of HaloSource, Inc. HaloSource manufactures reliable, tested and effective water treatment solutions, including some of the leading products in the pool and spa industry. Their significant experience in storm water treatment technologies has been a result of more than 15 years as a water science technologies company.

StormKlear® by HaloSource

1725 220th St. SE, Suite 103, Bothell, WA 98021
Phone 888-282-6766 • Fax 425-882-2476
www.halosource.com • www.stormklear.com

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LiquiFloc is a trademark of HaloSource, Inc.

Patent Pending

Rev. 5054-02

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **78.0**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/02/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 32 19**	**31 32 19-1**	**MSE Wall Product Data**	**Landtek Supply**		
1	**31 32 19**	**31 32 19-1**	**MSE Wall Product Data**	**Tencate Mirafi**		
1	**31 32 19**	**31 32 19-1**	**MSE Wall Product Data**	**Tencate Mirafi**		
1	**31 32 19**	**31 32 19-1**	**MSE Wall Product Data**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Please review these materials as alternate materials for the MSE Wall.

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Welded Wire Form and Strut Specifications:

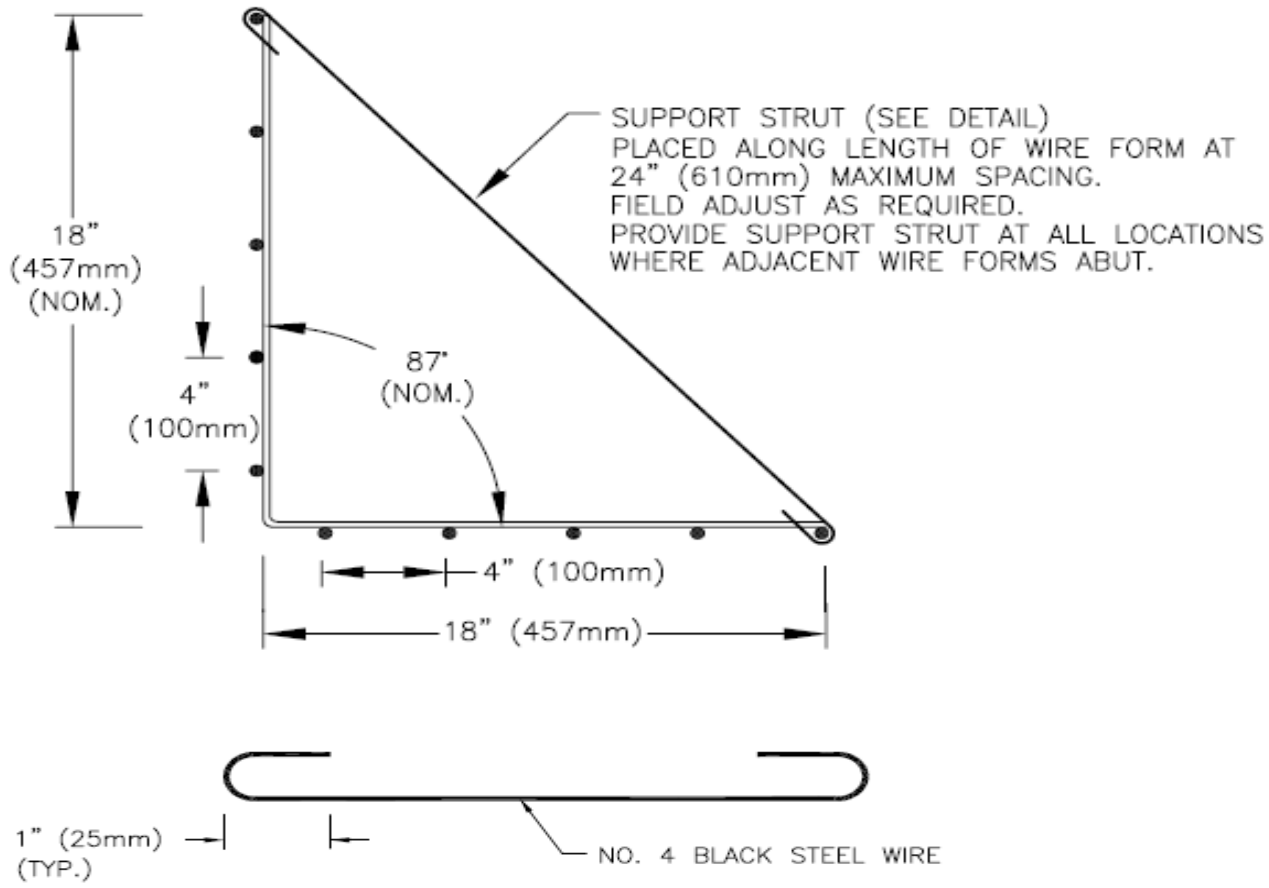
- Welded Wire Forms:
  - No. 4 steel wire
  - Form pattern: 4” x 4”
  - Length: 10’
  - Height: 18”
  - Width: 18”
  - Weight: 27 lbs.
  - All steel wire forms comply with ASTM A82
  - All fabrication meets ASTM A185
  - Black, galvanized or epoxy coated steel upon request

- Struts:
  - No. 4 steel wire
  - Length: 25.1”
  - Weight: .32 lbs.
  - All steel wire forms comply with ASTM A82
  - All fabrication meets ASTM A185
  - Black, galvanized or epoxy coated steel upon request

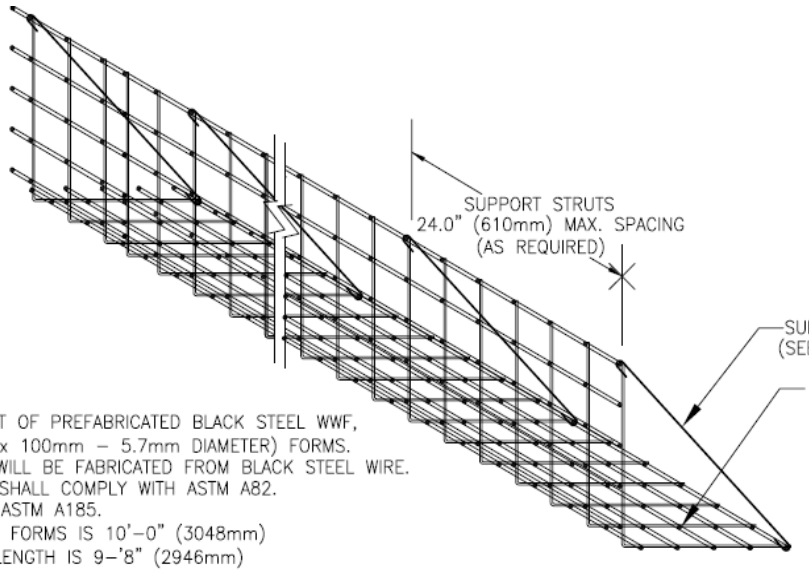
Galvanized Welded Wire Forms – Stone Face

Black Welded Wire Forms – Vegetated Face

Landtek Construction Supply
880 Brauer Road - Oxford, MI 48371
Contact: Adam Timpf
atimpf@landtekdesignbuild.com
(248) 388-2187 (P)
(248) 969-1447 (F)



SUPPORT STRUT DETAIL



NOTES:
1. SLOPE FACING TO CONSIST OF PREFABRICATED BLACK STEEL WWF, 4x4–W4.0xW4.0 (100mm x 100mm – 5.7mm DIAMETER) FORMS.
2. ALL FORMS AND STRUTS WILL BE FABRICATED FROM BLACK STEEL WIRE.
3. STEEL WIRE AND STRUTS SHALL COMPLY WITH ASTM A82. FABRICATION SHALL MEET ASTM A185.
4. OVERALL LENGTH OF WIRE FORMS IS 10'–0" (3048mm) EFFECTIVE CONSTRUCTED LENGTH IS 9–'8" (2946mm) WITH 2" (50mm) OVERLAP AT ENDS.

Landtek Construction Supply
880 Brauer Road - Oxford, MI 48371
Contact: Adam Timpf
atimpf@landtekdesignbuild.com
(248) 388-2187 (P)
(248) 969-1447 (F)

TENCATE Mirafi

Mirafi® 160N

Mirafi® 160N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 160N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D 4632	kN (lbs)	0.7 (160)	0.7 (160)
Grab Tensile Elongation	ASTM D 4632	%	50	50
Trapezoid Tear Strength	ASTM D 4533	kN (lbs)	0.3 (60)	0.3 (60)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	2101.1 (305)	
Puncture Strength[1]	ASTM D 4833	kN (lbs)	0.4 (95)	
CBR Puncture Strength	ASTM D 6241	kN (lbs)	1.8 (400)	
Apparent Opening Size (AOS)[2]	ASTM D 4751	mm (U.S. Sieve)	0.212 (70)	
Permittivity	ASTM D 4491	sec^{-1}	1.4	
Flow Rate	ASTM D 4491	$l/min/m^2$ ($gal/min/ft^2$)	4481.4 (110)	
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70	

[1] ASTM D 4833 has been replaced with ASTM D 6241
[2] ASTM D 4751: AOS is a Maximum Opening Diameter Value

Physical Properties	Test Method	Unit	Typical Value
Weight	ASTM D 5261	g/m^2 (oz/yd^2)	220.4 (6.5)
Thickness	ASTM D 5199	mm (mils)	1.7 (65)
Roll Dimensions (width x length)	--	m (ft)	4.5 x 91 (15 x 300)
Roll Area	--	m^2 (yd^2)	418 (500)
Estimated Roll Weight	--	kg (lb)	99 (217)

Disclaimer: TenCate assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

TENCATE GEOSYNTHETICS
Americas

Miragrid® 5XT

Miragrid® 5XT geogrid is composed of high molecular weight, high tenacity polyester multifilament yarns which are woven in tension and finished with a PVC coating. Miragrid® 5XT geogrid is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

TenCate Geosynthetics Americas is accredited by a2La (The American Association for Laboratory Accreditation) and Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP). NTPEP test data.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
			Machine Direction
Tensile Strength (at ultimate)	ASTM D6637	lbs/ft (kN/m)	4700 (68.6)
Tensile Strength (at 5% strain)	ASTM D6637	lbs/ft (kN/m)	1740 (25.4)
Creep Reduced Strength	ASTM D5262	lbs/ft (kN/m)	2975 (43.4)
Long Term Allowable Design Load[1]	GRI GG-4(b)	lbs/ft (kN/m)	2575 (37.6)

[1] NOTE: Long Term Allowable Design values are for sand, silt and clay

Physical Properties	Unit	Typical Value
Mass/Unit Area (ASTM D5261)	oz/yd^2 (g/m^2)	9.8 (332)
Roll Dimensions (width x length)	ft (m)	12 x 150 (3.6 x 46)
Roll Area	yd^2 (m^2)	200 (165)
Estimated Roll Weight	lbs (kg)	130 (59)

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Miragrid® is a registered trademark of Nicolon Corporation

Disclaimer: TenCate assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

Creep Reduced Strength (ASTM D5262), and Long Term Allowable Design Load (GRI GG-4(b)) is not covered by our current A2LA accreditation.

Made in USA

365 South Holland Drive
Pendergrass, GA 30567

Tel 706 693 2226
Tel 888 795 0808

Fax 706 693 4400
www.tencate.com

FGS000531
ETQR17

GEOSYNTHETIC RETAINING WALL
Classes 1 and 2 Non-aggressive Environments

Note 1: May be used for Class 1 and 2 walls and slopes in non-aggressive environments. Acceptability of the product for a specific contract bid item requires that the approved long-term geosynthetic strength as listed in Table 1 below meet or exceed the required long-term strength specified in the contract. The ultimate tensile strength listed in Table 1 is to be used for lot specific acceptance once the product arrives at the project site. (See Acceptance Code 1022)

Table 1. Long-term and ultimate strengths of geosynthetic products qualified for use in Classes 1 and 2 walls and reinforced slopes, non-aggressive environments.

Product	Ref. No.	Year last Updated	[1]T_{ult} (lb/ft)	Long-Term Strength Reduction Factors			[2]Long-Term Tensile Strength, T_{al} (lb/ft)	[3]Low Strain Creep Stiffness, $J_{2\%}$ (lbs/ft)
				RF_{ID}	RF_{CR}	RF_D		
Fortrac 20 MD - Huesker	2002-073	2002	1500	1.15	1.59	1.15	713	
Fortrac 35 MD - Huesker	2002-073	2002	2400	1.1	1.59	1.15	1200	
Fortrac 55 MD - Huesker	2002-073	2002	3710	1.1	1.59	1.15	1860	
Fortrac 80 MD - Huesker	2002-073	2002	5380	1.1	1.59	1.15	2690	
Fortrac 110 MD - Hueske	2002-073	2002	7410	1.1	1.59	1.15	3710	
Geotex 4X4, MD - Propex	1999-051	1999	4800	1.15	5.6	1.3	569	
Geotex 4X4, XMD - Propex	1999-051	1999	4800	1.10	3.4	1.3	980	
Miragrid 3XT, MD - TenCate	1993-921	2009	3151	1.12	1.56	1.3	1387	21300
Miragrid 5XT, MD - TenCate	1993-921	2009	4295	1.12	1.56	1.3	1891	27400
Miragrid 7XT, MD - TenCate	1993-921	2009	5699	1.12	1.56	1.3	2509	34800
Miragrid 8XT, MD - TenCate	1993-921	2009	6994	1.12	1.56	1.3	3079	41600
Miragrid 10XT, MD - TenCate	1993-921	2009	9694	1.12	1.56	1.3	4180	54800
Miragrid 18XT, MD - TenCate	1993-921	2009	9357	1.12	1.56	1.3	4120	54100
Miragrid 20XT, MD - TenCate	1993-921	2009	12412	1.12	1.56	1.3	5465	70200
Miragrid 22XT, MD - TenCate	1993-921	2009	17748	1.12	1.56	1.3	7814	98400
Miragrid 24XT, MD - TenCate	1993-921	2009	25364	1.12	1.56	1.3	11167	139000
ParaGrid 30/05, MD – Linear Composites		2010	3425	1.1	1.39	1.3	1723	20200
ParaGrid 40/05, MD – Linear Composites		2010	4110	1.1	1.39	1.3	2068	23600
ParaGrid 50/05, MD – Linear Composites		2010	4452	1.1	1.39	1.3	2240	25300
ParaGrid 60/05, MD – Linear Composites		2010	4795	1.1	1.39	1.3	2412	27000
ParaGrid 65/05, MD – Linear Composites		2010	5479	1.1	1.39	1.3	2756	30400
ParaGrid 70/05, MD – Linear Composites		2010	6164	1.1	1.39	1.3	3101	33700
ParaGrid 80/05, MD – Linear Composites		2010	6849	1.1	1.39	1.3	3446	37100
ParaGrid 90/05, MD – Linear Composites		2010	7534	1.1	1.39	1.3	3790	40500
ParaGrid 100/05, MD – Linear Composites		2010	8562	1.1	1.39	1.3	4307	45600
ParaGrid 110/05, MD – Linear Composites		2010	10274	1.1	1.39	1.3	5169	54000
ParaGrid 125/05, MD – Linear Composites		2010	11986	1.1	1.39	1.3	6030	62500
ParaGrid 150/05, MD – Linear Composites		2010	12329	1.1	1.39	1.3	6203	64200
ParaGrid 175/05, MD – Linear Composites		2010	13699	1.1	1.39	1.3	6892	70900
ParaGrid 180/05, MD – Linear Composites		2010	3425	1.1	1.39	1.3	1723	20200
ParaGrid 200/05, MD – Linear Composites		2010	4110	1.1	1.39	1.3	2068	23600
Raugrid 3x3N, MD - Luckenhaus		2010	2055	1.1	1.55	1.3	927	6750
Raugrid 4x2N, MD - Luckenhaus		2010	2740	1.1	1.55	1.3	1236	10300

[1]T_{ult} is determined using ASTM D6637 for geogrids and ASTM D4595 for geotextiles. The value provided in the table represents the manufacturer's Minimum Average Roll Value (MARV) or minimum value for the product. WSDOT acceptance test results for the product as delivered to the project must be greater than or equal to this value.

[2]T_{al} is determined at a design life of 75 years and is based on the MARV or minimum value for T_{ult} provided in this table.

[3]$J_{2\%}$ is the creep stiffness determined at a strain level of 2% after 1,000 hours of loading, based on the MARV or minimum value for T_{ult} provided in this table.

RF_{ID} = installation damage reduction factor, RF_{CR} = creep reduction factor, RF_D = durability reduction factor.

MD = Machine Direction (longitudinal direction), XMD = Cross Machine Direction (transverse direction)

GEOSYNTHETIC RETAINING WALL
Classes 1 and 2 Non-aggressive Environments

Note 1: May be used for Class 1 and 2 walls and slopes in non-aggressive environments. Acceptability of the product for a specific contract bid item requires that the approved long-term geosynthetic strength as listed in Table 1 below meet or exceed the required long-term strength specified in the contract. The ultimate tensile strength listed in Table 1 is to be used for lot specific acceptance once the product arrives at the project site. (See Acceptance Code 1022)

Table 1. Long-term and ultimate strengths of geosynthetic products qualified for use in Classes 1 and 2 walls and reinforced slopes, non-aggressive environments.

Product	Ref. No.	Year last Updated	[1]T_{ult} (lb/ft)	Long-Term Strength Reduction Factors			[2]Long-Term Tensile Strength, T_{al} (lb/ft)	[3]Low Strain Creep Stiffness, $J_{2\%}$ (lbs/ft)
				RF_{ID}	RF_{CR}	RF_D		
Raugrid 5x2N, MD - Luckenhaus		2010	3425	1.1	1.55	1.3	1545	13800
Raugrid 6x3N, MD - Luckenhaus		2010	4110	1.1	1.55	1.3	1854	17200
Raugrid 8x3N, MD - Luckenhaus		2010	5480	1.1	1.55	1.3	2472	23800
Raugrid 11x3N, MD - Luckenhaus		2010	7535	1.1	1.55	1.3	3399	33000
Raugrid 13x3N, MD - Luckenhaus		2010	8905	1.1	1.55	1.3	4018	38700
Raugrid 15x3N, MD - Luckenhaus		2010	10275	1.1	1.55	1.3	4636	44100
SF20, MD - Synteen		2010	1939	1.18	1.58	1.3	800	8390
SF35, MD - Synteen		2010	3055	1.18	1.58	1.3	1260	11900
SF55, MD - Synteen		2010	4199	1.18	1.58	1.3	1732	15600
SF80, MD - Synteen		2010	7398	1.18	1.58	1.3	3052	29800
SF90, MD - Synteen		2010	8500	1.18	1.58	1.3	3507	30900
SF110, MD - Synteen		2010	10207	1.18	1.58	1.3	4211	37600
SF350, MD - Synteen		2010	27400	1.18	1.58	1.3	11305	124000
SG150, MD - Stratagrid		2010	1875	1.1	1.5	1.3	874	8530
SG200, MD - Stratagrid		2010	3600	1.1	1.5	1.3	1678	26500
SG350, MD - Stratagrid		2010	5000	1.1	1.5	1.3	2331	42400
SG500, MD - Stratagrid		2010	6400	1.1	1.5	1.3	2984	20500
SG550, MD - Stratagrid		2010	8150	1.1	1.5	1.3	3800	31100
SG600, MD - Stratagrid		2010	9100	1.1	1.5	1.3	4242	35600
SG700, MD - Stratagrid		2010	11800	1.1	1.5	1.3	5501	37600
Tensar UX1400MSE MD		2010	4800	1.12	2.59	1.1	1504	26100
Tensar UX1500MSE MD		2010	7810	1.1	2.59	1.1	2492	41000
Tensar UX1600MSE MD		2010	9870	1.1	2.59	1.1	3149	53800
Tensar UX1700MSE, MD		2010	11990	1.1	2.63	1.1	3768	69100
Tensar UX1400HS MD		2010	4800	1.12	2.59	1.1	1504	26100
Tensar UX1500HS MD		2010	7810	1.1	2.59	1.1	2492	41000
Tensar UX1600HS MD		2010	9870	1.1	2.59	1.1	3149	53800
Tensar UX1700HS, MD		2010	11990	1.1	2.63	1.1	3768	69100
Tensar BX1100, MD	1994-038	1994	850	1.15	5.0	1.3	113	
Tensar BX1100, XMD	1994-038	1994	1300	1.15	5.0	1.3	175	
Tensar BX1120, MD	1994-038	1994	850	1.15	5.0	1.3	113	
Tensar BX1120, XMD	1994-038	1994	1300	1.15	5.0	1.3	175	
Tensar BX1200, MD	1994-038	1994	1200	1.1	5.0	1.3	168	

[1]T_{ult} is determined using ASTM D6637 for geogrids and ASTM D4595 for geotextiles. The value provided in the table represents the manufacturer's Minimum Average Roll Value (MARV) or minimum value for the product. WSDOT acceptance test results for the product as delivered to the project must be greater than or equal to this value.

[2]T_{al} is determined at a design life of 75 years and is based on the MARV or minimum value for T_{ult} provided in this table.

[3]$J_{2\%}$ is the creep stiffness determined at a strain level of 2% after 1,000 hours of loading, based on the MARV or minimum value for T_{ult} provided in this table.

RF_{ID} = installation damage reduction factor, RF_{CR} = creep reduction factor, RF_D = durability reduction factor.

MD = Machine Direction (longitudinal direction), XMD = Cross Machine Direction (transverse direction)

GEOSYNTHETIC RETAINING WALL
Classes 1 and 2 Non-aggressive Environments

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Table 1. Long-term and ultimate strengths of geosynthetic products qualified for use in Classes 1 and 2 walls and reinforced slopes, non-aggressive environments.

Product	Ref. No.	Year last Updated	[1]T_{ult} (lb/ft)	Long-Term Strength Reduction Factors			[2]Long-Term Tensile Strength, T_{al} (lb/ft)	[3]Low Strain Creep Stiffness, $J_{2\%}$ (lbs/ft)
				RF_{ID}	RF_{CR}	RF_D		
Tensar BX1200, XMD	1994-038	1994	1970	1.1	5.0	1.3	274	

[1]T_{ult} is determined using ASTM D6637 for geogrids and ASTM D4595 for geotextiles. The value provided in the table represents the manufacturer's Minimum Average Roll Value (MARV) or minimum value for the product. WSDOT acceptance test results for the product as delivered to the project must be greater than or equal to this value.
[2]T_{al} is determined at a design life of 75 years and is based on the MARV or minimum value for T_{ult} provided in this table.
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RF_{ID} = installation damage reduction factor, RF_{CR} = creep reduction factor, RF_D = durability reduction factor.
MD = Machine Direction (longitudinal direction), XMD = Cross Machine Direction (transverse direction)

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **79.0**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/02/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 32 19**	**31 32 19-2**	**MSE Wall Shop Drawings**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Please review these materials as alternate materials for the MSE Wall.

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

SPECIFICATIONS FOR REINFORCED SOIL RETAINING WALL WITH WIRE-BASKET FACING

General:

1. The contractor shall have an approved set of plans and specifications on site at all times during the construction of the wall. The wall layout is the responsibility of the contractor.
2. A professional engineer or representative should observe and monitor the construction of the wall.
3. Miragrid 5XT and Mirafi 160N shall be used for this project. All materials shall be approved by the geotechnical engineer prior to installation.
4. The contractor may use longer geosynthetic reinforcement lengths than the design sections for ease of construction. The lengths may not be shorter unless approved by the geotechnical engineer.

Subgrade Preparation:

1. The ground should be prepared by removing surficial unsuitable soil, down to dense, inorganic, native soils as approved by the geotechnical engineer.
2. A generally level bench with a minimum width equal to the design length of the reinforcing geotextile is required for placement of the reinforced fill.
3. The excavation site shall be cleaned of all excess material and protected, as necessary, from construction traffic to maintain the integrity of the subgrade.
4. Minimum embedment is 1 foot.

Geogrid Placement:

1. The reinforcement shall be rolled out, cut to length, and laid at the proper elevation, location, and orientation. Orientation of the reinforcement is of extreme importance since reinforcing geotextile vary in strength with roll direction. The contractor shall be responsible for the correct orientation.
2. Geosynthetic reinforcement shall be placed at the location and elevations shown on the plans.
3. Geosynthetic reinforcement shall be wrapped back into soil mass at least 3 feet to stabilize the wall face.

Fill Placement:

1. Structural fill, consisting of granular import soils or on-site material with no material greater that 3/4 inch in size, would then be placed upon the subgrade and geogrid. If larger rock is used in the fill, additional layers of geogrid may need to be used in reinforcement. The contractor shall minimize damage to geogrid by placing the first lift of structural fill with a 1-foot thickness. The geotechnical engineer shall approve the material to be placed in the reinforced zone before placement.
2. Structural fill should have parameters equal to or better than those stated for the reinforced wall fill with less then 5% passing the number 200 sieve, washed sieve.
3. Fill soils in wall area shall be compacted to at least 95% of Maximum Dry Density (MDD) as determined by ASTM D-698 Maximum Dry Density.
4. The soil shall be placed in relatively uniform horizontal lifts not exceeding 12 inches in thickness. The lift thickness shall not exceed the manufacturer's recommended depth for the compactive device used on the project.
5. Soil density tests should be performed as designated by the geotechnical engineer.

Design Parameters:

Reinforced Wall Facing Fill:
Reinforced Wall Fill 34 deg 68 PCF
Retained Backfill 32 deg 66 PCF
Foundation Soil 30 deg 128 PCF

Design parameters provided by geotechnical engineer.
Groundwater was included in bearing capacity design.
Differential hydrostatic water of 5 feet is included in the design.

AASHTO LRFD 2010 design method used to determine geosynthetic reinforcement length and strength.

External Loading:

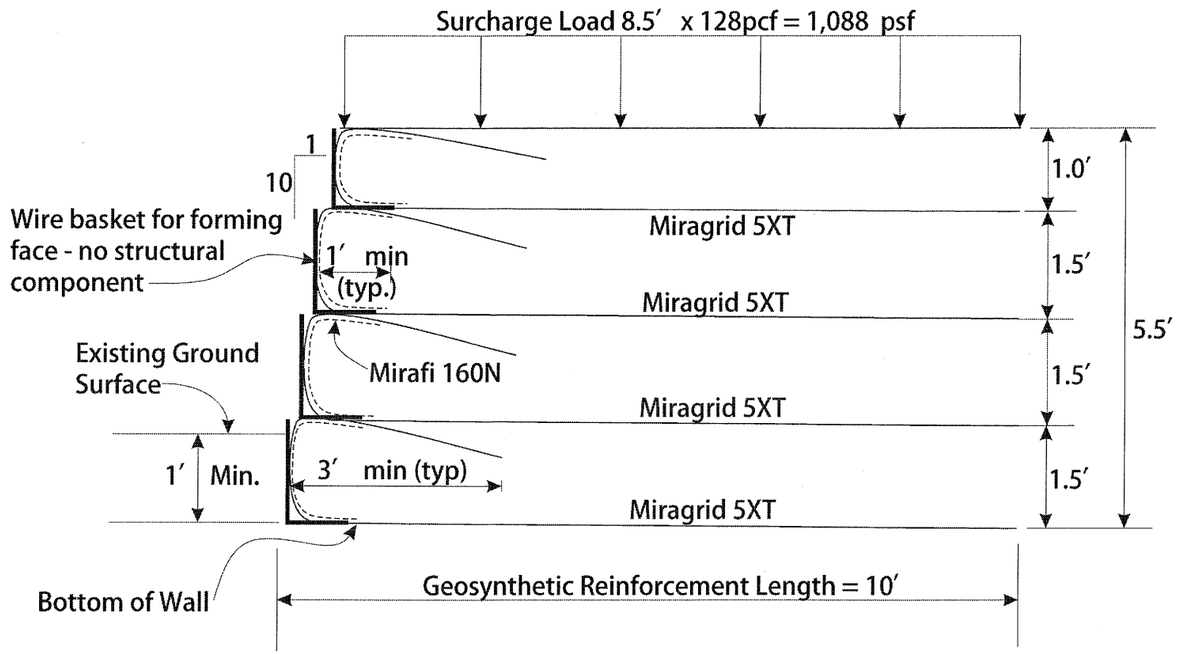
8.5'x 128 pcf = 1,088 psf soil surcharge
Seismic acceleration =0.323, Fpqa = 1.1 per soil class E, and 1-inch allowable movement during seismic event.

Inspection:

The construction shall be periodically inspected under the direction of an engineer registered in the state of Washington with experience in the design of reinforced earth retaining walls.

Note: Design has not been involved with any part of this project other than completing the MSE design with the parameters given. Approval of this specification constitutes acceptance of the parameters used and methodology of the design.

Typical Wall Cross Section (not to scale)



1/2/2014

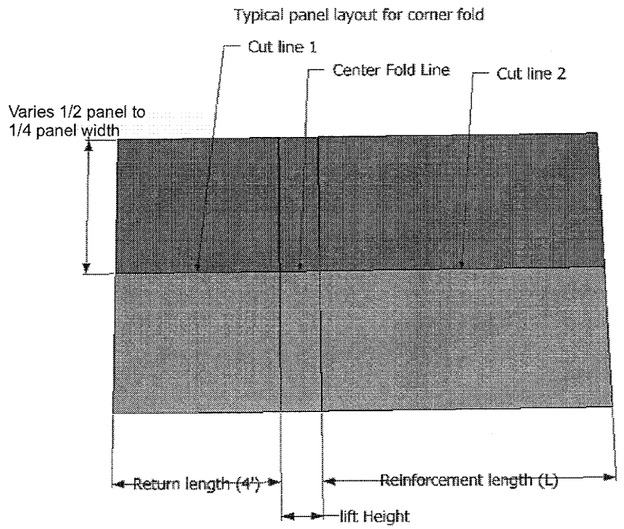
ROBINSON NOBLE

PM: RBP
January 2014
2544-022A

Figure 1

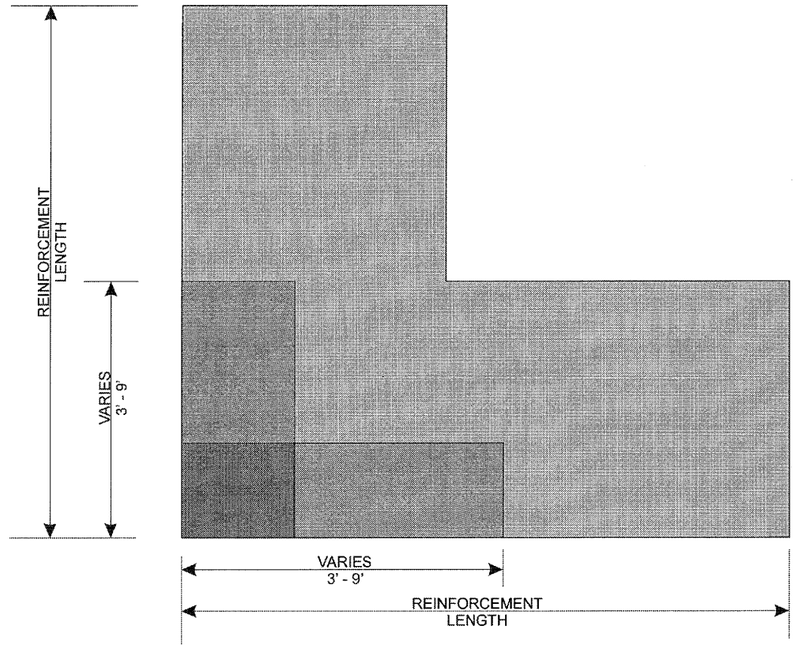
MSE Wall Design

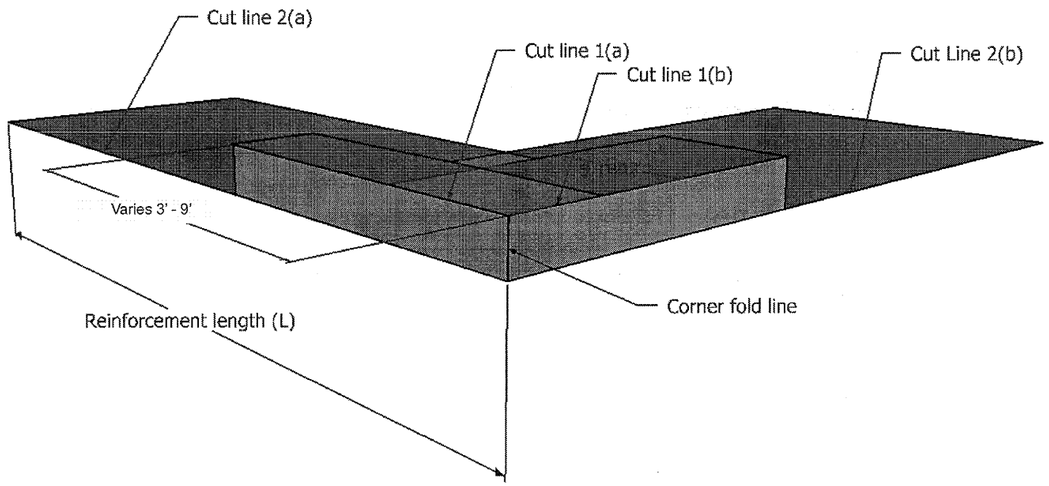
ACF West, Inc: Cornet Bay Marina Bulkhead



Typical Geogrid Corner Diagram

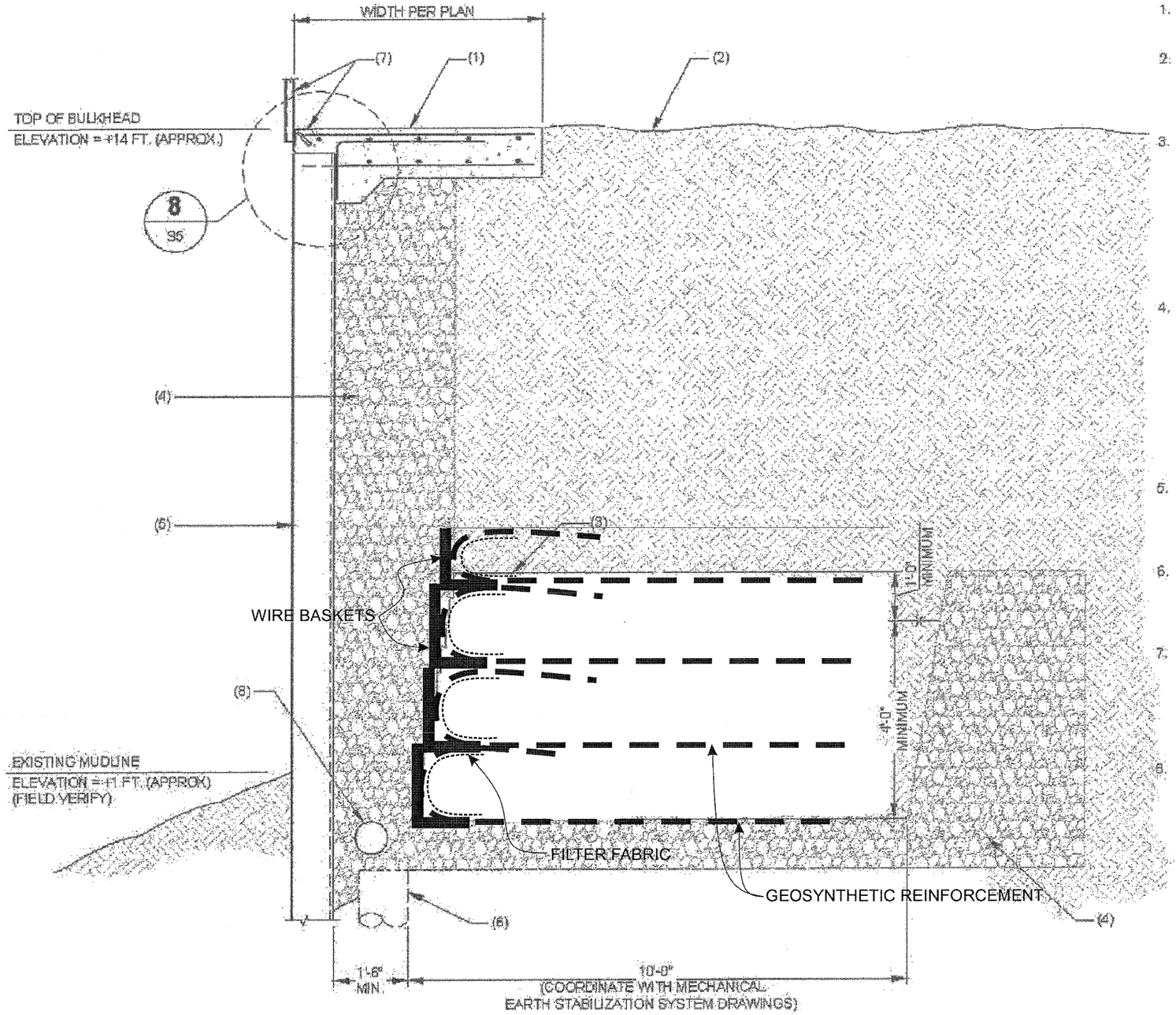
Typical Corner Plan View
(not to scale)





Note: Each wrap shall end with this corner detail.

ROBINSON NOBLE		PM: RBP January 2014 2544-022A		Figure 2 Corner Detail ACF West, Inc: Cornet Bay Marina Bulkhead



NOTES:

1. CONCRETE APRON SLAB PER PLAN.
2. FINISH GRADE AS OCCURS - VERIFY ELEVATION OF FINISH GRADE WITH CIVIL DRAWINGS
3. MECHANICAL EARTH STABILIZATION SYSTEM BY GEOSYSTEMS OR APPROVED EQUAL. COORDINATE WITH DESIGN DOCUMENTS AND DRAWINGS PREPARED BY GEOSYSTEMS FOR ADDITIONAL INFORMATION.
4. 18" (MINIMUM) FREE DRAINING BLANKET AROUND MECHANICAL EARTH STABILIZATION SYSTEM – INSTALL BETWEEN WALL FACE AND REINFORCED ZONE AFTER MECHANICAL EARTH STABILIZATION SYSTEM INSTALLATION IS COMPLETE
5. STEEL SHEET PILE BULKHEAD WALL PER PLAN - EMBED TO TIP ELEVATION = -33 FT (MINIMUM).
6. EXISTING PORTION OF CREOSOTE TREATED TIMBER PILE BULKHEAD WALL TO REMAIN
7. STAINLESS STEEL GUARDRAIL AND STAINLESS STEEL EMBED ANGLE. SEE PLANS AND DETAILS 8/S5 AND 9/S5 FOR ADDITIONAL INFORMATION
8. 8" BULKHEAD DRAIN WITH DISCHARGE WELLS. SEE CIVIL SHEETS FOR DRY WELL INFORMATION AND LOCATIONS

ROBINSON NOBLE

PM: RBP
January 2014
2544-022A

Figure 3

Wall Detail

ACF West, Inc: Cornet Bay Marina Bulkhead

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **80.0**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/02/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**31 32 19**	**31 32 19-2**	**MSE Design Calculations**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Please review these materials as alternate materials for the MSE Wall.

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

AASHTO 2007-2010 (LRFD)
Cornet Bay Marina

MSEW(3.0): Update # 14.93

PROJECT IDENTIFICATION

Title: Cornet Bay Marina
Project Number:
Client: ACF West
Designer: RBP
Station Number: 1

Description:

MSE wall with wire baskets and wrapped face.

Company's information:

Name: Robinson Noble, Inc
Street: 17625 130th Avenue NE
Suite 102
Woodinville, WA 98077
Telephone #: 425 488-0599
Fax #:
E-Mail:

Original file path and name: P:\Jobs\3350-3374\3353 ACF West, Inc. - Cornet Bay Mari.....
.....a Bulkhead\MSEW1.BEN

Original date and time of creating this file: Mon Dec 23 10:52:54 2013

PROGRAM MODE:

ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

1/2/2014

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License number MSEW-301529

SOIL DATA

REINFORCED SOIL

Unit weight, γ	68.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	34.0 °

RETAINED SOIL

Unit weight, γ	66.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	128.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	30.0 °
Equivalent cohesion, $c_{equiv.}$	0.0 lb/ft ^{2}

Water table is at wall base elevation

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.2827 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ = 62.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 30.14 N γ = 22.40

SEISMICITY

Maximum ground acceleration coefficient, An = 0.355
Design acceleration coefficient in Internal Stability: Kh = Am = 0.389
Design acceleration coefficient in External Stability: Kh_d = 0.203 => Kh = Am = 0.253
(Kh in External Stability is based on allowable displacement, d = 25 mm. using AASHTO 2008-2010 equation)

Kae (Kh > 0) = 0.4860 Kae (Kh = 0) = 0.3073 Δ Kae = 0.1787
Seismic soil-geogrid friction coefficient, F* is 67.0% of its specified static value.

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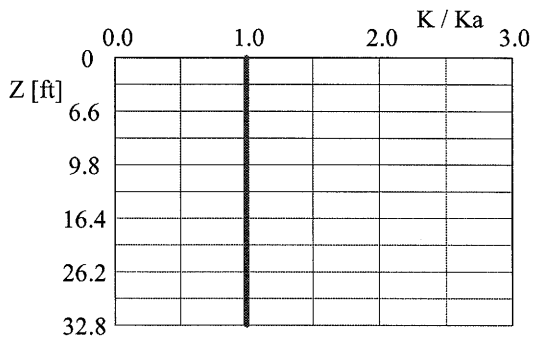
INPUT DATA: Geogrids (Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	4700.0				
Durability reduction factor, RFd	1.30				
Installation-damage reduction factor, RFid	1.12				
Creep reduction factor, RFc	1.45	N/A	N/A	N/A	N/A
CDR for strength	N/A				
Coverage ratio, Rc	1.000				
Friction angle along geogrid-soil interface, ρ	21.33				
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	N/A	N/A	N/A	N/A
Scale-effect correction factor, α	0.7				

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

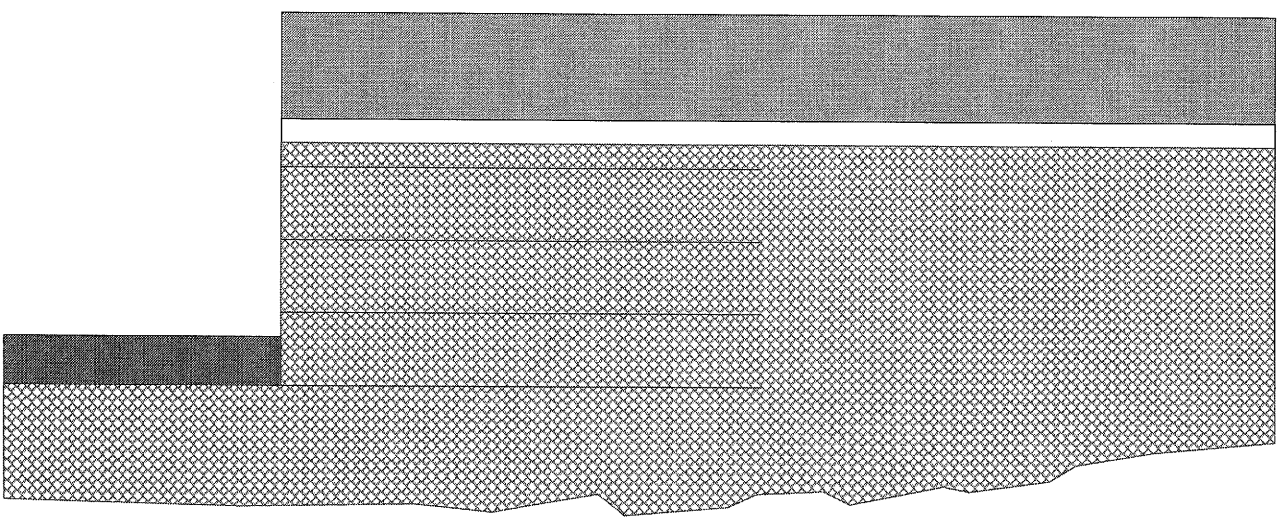
Design height, Hd	5.50	[ft]	{ Embedded depth is E = 1.00 ft, and height above top of finished bottom grade is H = 4.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	0.0	[deg]	
Backslope rise	0.0	[ft]	Broken back equivalent angle, I = 0.00° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 1088.0 [lb/ft ²]

Hydrostatic water pressure exist in analysis. hw1 = 0.00 and hw2 = 5.00 ft.

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 [ft]

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AASHTO 2007-2010 (LRFD) Input Data

INTERNAL STABILITY

Load factor for vertical earth pressure, EV, from Table 3.4.1-2:	$\gamma_{p\text{-}EV}$	1.35	
Load factor for earthquake loads, EQ, from Table 3.4.1-1:	$\gamma_{p\text{-}EQ}$	1.00	
Load factor for live load surchrge, LS, from Figure C11.5.5-3(b): (Same as in External Stability).	$\gamma_{p\text{-}LS}$	1.75	
Load factor for dead load surchrge, ES: (Same as in External Stability).	$\gamma_{p\text{-}ES}$	1.50	

Resistance factor for reinforcement tension from Table 11.5.6-1:	ϕ	Static	Combined static/seismic
Geogrid:		0.90	1.20

Resistance factor for reinforcement tension in connectors from Table 11.5.6-1:	ϕ	Static	Combined static/seismic
Geogrid:		0.90	1.20

Resistance factor for reinforcement pullout from Table 11.5.6-1:	ϕ	0.90	1.20

EXTERNAL STABILITY

Load factor for vertical earth pressure, EV, from Table 3.4.1-2 and Figure C11.5.5-2:		Static	Combined Static/Seismic	
Sliding and Eccentricity	$\gamma_{p\text{-}EV}$	1.00	$\gamma_{p\text{-}EQ}$	1.00
Bearing Capacity	$\gamma_{p\text{-}EV}$	1.35	$\gamma_{p\text{-}EQ}$	1.35

Load factor of active lateral earth pressure, EH, from Table 3.4.1-2 and Figure C11.5.5-2:	$\gamma_{p\text{-}EH}$	1.50
Load factor of active lateral earth pressure during earthquake (does not multiply P_{AE} and P_{IR}):	$(\gamma_{p\text{-}EH})_{EQ}$	1.50
Load factor for earthquake loads, EQ, from Table 3.4.1-1 (multiplies P_{AE} and P_{IR}):	$\gamma_{p\text{-}EQ}$	1.00

Resistance factor for shear resistance along common interfaces from Table 11.5.6-1:		Static	Combined Static/Seismic	
Reinforced Soil and Foundation	ϕ_τ	1.00		1.00
Reinforced Soil and Reinforcement	ϕ_τ	1.00		1.00

Resistance factor for bearing capacity of shallow foundation from Table 11.5.6-1:		Static	Combined Static/Seismic
	ϕ_b	0.65	0.65

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, CDR = 2.11, factored bearing load = 2032 lb/ft².
Foundation Interface: Direct sliding, CDR = 1.648, Eccentricity, e/L = 0.0811, CDR-overturning = 6.16

	GEOGRID			CONNECTION							
#	Elevation [ft]	Length [ft]	Type #	CDR [pullout resistance]	CDR [connection break]	CDR [geogrid strength]	Geogrid strength CDR	Pullout resistance CDR	Direct sliding CDR	Eccentricity e/L	Product name
1	0.00	10.00	1	N/A	N/A	N/A	3.333	12.446	1.114	0.0811	Mirafi 5xt
2	1.50	10.00	1	N/A	N/A	N/A	1.850	6.312	1.684	0.0407	Mirafi 5xt
3	3.00	10.00	1	N/A	N/A	N/A	2.169	6.709	2.993	0.0150	Mirafi 5xt
4	4.50	10.00	1	N/A	N/A	N/A	2.236	6.213	8.370	0.0023	Mirafi 5xt

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, CDR = 2.06, factored bearing load = 2058 lb/ft².
Foundation Interface: Direct sliding, CDR = 1.516, Eccentricity, e/L = 0.0899, Fs-overturning = 5.56

	GEOGRID			CONNECTION							
#	Elevation [ft]	Length [ft]	Type #	CDR [pullout resistance]	CDR [connection break]	CDR [geogrid strength]	Geogrid strength CDR	Pullout resistance CDR	Direct sliding CDR	Eccentricity e/L	Product name
1	0.00	10.00	1	N/A	N/A	N/A	4.156	10.103	1.025	0.0899	Mirafi 5xt
2	1.50	10.00	1	N/A	N/A	N/A	2.382	5.363	1.574	0.0441	Mirafi 5xt
3	3.00	10.00	1	N/A	N/A	N/A	2.786	5.681	2.853	0.0159	Mirafi 5xt
4	4.50	10.00	1	N/A	N/A	N/A	2.879	5.280	8.189	0.0023	Mirafi 5xt

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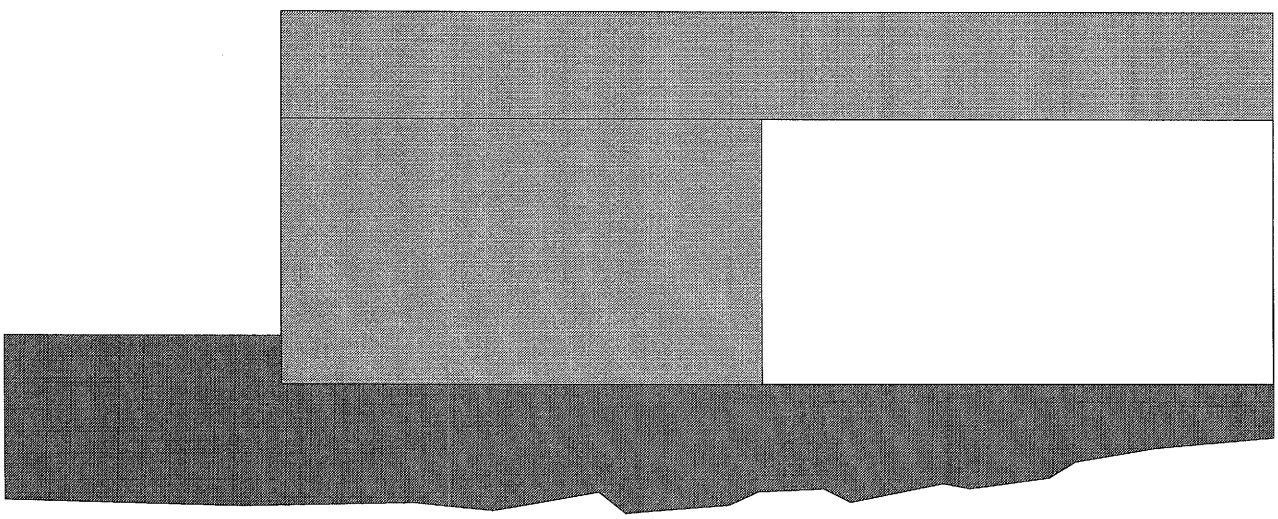
BEARING CAPACITY for GIVEN LAYOUT

	STATIC	SEISMIC	UNITS
(Water table is at wall base elevation)			
Factored bearing resistance, q-n	4285	4232	[lb/ft ^{2}]
Factored bearing load, σ_V	2032.5	2058	[lb/ft ^{2}]
Eccentricity, e	0.51	0.57	[ft]
Eccentricity, e/L	0.051	0.057	
CDR calculated	2.11	2.06	
Base length	10.00	10.00	[ft]

Unfactored applied bearing pressure = (Unfactored R) / [L - 2 * (Unfactored e)] =
Static: Unfactored R = 11497.65 [lb/ft], L = 10.00, Unfactored e = 0.57 [ft], and Sigma = 1296.84 [lb/ft ^{2}]
Seismic: Unfactored R = 11497.65 [lb/ft], L = 10.00, Unfactored e = 0.63 [ft], and Sigma = 1315.85 [lb/ft ^{2}]



SCALE:

0 2 4 6 [ft]

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DIRECT SLIDING for GIVEN LAYOUT (for GEOGRID reinforcements)

Along reinforced and foundation soils interface: CDR-static = 1.648 and CDR-seismic = 1.516

#	Geogrid Elevation [ft]	Geogrid Length [ft]	CDR Static	CDR Seismic	Geogrid Type #	Product name
1	0.00	10.00	1.114	1.025	1	Mirafi 5xt
2	1.50	10.00	1.684	1.574	1	Mirafi 5xt
3	3.00	10.00	2.993	2.853	1	Mirafi 5xt
4	4.50	10.00	8.370	8.189	1	Mirafi 5xt

ECCENTRICITY for GIVEN LAYOUT

At interface with foundation: e/L static = 0.0811, e/L seismic = 0.0899; Overturning: CDR-static = 6.16, CDR-seismic = 5.56

#	Geogrid Elevation [ft]	Geogrid Length [ft]	e / L Static	e / L Seismic	Geogrid Type #	Product name
1	0.00	10.00	0.0811	0.0899	1	Mirafi 5xt
2	1.50	10.00	0.0407	0.0441	1	Mirafi 5xt
3	3.00	10.00	0.0150	0.0159	1	Mirafi 5xt
4	4.50	10.00	0.0023	0.0023	1	Mirafi 5xt

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RESULTS for STRENGTH

Live Load included in calculating Tmax

#	Geogrid Elevation [ft]	Tavailable [lb/ft]	Tmax [lb/ft]	Tmd [lb/ft]	Specified minimum CDR static	Actual calculated CDR static	Specified minimum CDR seismic	Actual calculated CDR seismic	Product name
1	0.00	2004	601.17	60.40	N/A	3.333	N/A	4.156	Mirafi 5xt
2	1.50	2004	1082.96	55.58	N/A	1.850	N/A	2.382	Mirafi 5xt
3	3.00	2004	923.79	50.77	N/A	2.169	N/A	2.786	Mirafi 5xt
4	4.50	2004	896.17	45.95	N/A	2.236	N/A	2.879	Mirafi 5xt

RESULTS for PULLOUT Live Load included in calculating Tmax

#	Geogrid Elevation [ft]	Coverage Ratio	Tmax [lb/ft]	Tmd [lb/ft]	Le [ft]	La [ft]	Avail.Static Pullout, Pr [lb/ft]	Specified Static CDR	Actual Static CDR	Avail.Seism. Pullout, Pr [lb/ft]	Specified Seismic CDR	Actual Seismic CDR
1	0.00	1.000	601.2	60.4	10.00	0.00	7482.0	N/A	12.446	6684.0	N/A	10.103
2	1.50	1.000	1083.0	55.6	9.20	0.80	6835.5	N/A	6.312	6106.3	N/A	5.363
3	3.00	1.000	923.8	50.8	8.40	1.60	6197.5	N/A	6.709	5536.4	N/A	5.681
4	4.50	1.000	896.2	45.9	7.61	2.39	5568.2	N/A	6.213	4974.3	N/A	5.280

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AASHTO 2007-2010 (LRFD)
Cornet Bay Marina

MSEW(3.0): Update # 14.93

PROJECT IDENTIFICATION

Title: Cornet Bay Marina
Project Number:
Client: ACF West
Designer: RBP
Station Number: 1

Description:

MSE wall with wire baskets and wrapped face.

Company's information:

Name: Robinson Noble, Inc
Street: 17625 130th Avenue NE
Suite 102
Woodinville, WA 98077
Telephone #: 425 488-0599
Fax #:
E-Mail:

Original file path and name: P:\Jobs\3350-3374\3353 ACF West, Inc. - Cornet Bay Mari.....
.....MSEW1 no bouyant.BEN

Original date and time of creating this file: Mon Dec 23 10:52:54 2013

PROGRAM MODE:

ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

1/2/2014

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SOIL DATA

REINFORCED SOIL

Unit weight,	γ	130.0 lb/ft ^{3}
Design value of internal angle of friction,	ϕ	34.0 °

RETAINED SOIL

Unit weight,	γ	128.0 lb/ft ^{3}
Design value of internal angle of friction,	ϕ	32.0 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight,	$\gamma_{equiv.}$	128.0 lb/ft ^{3}
Equivalent internal angle of friction,	$\phi_{equiv.}$	30.0 °
Equivalent cohesion,	$c_{equiv.}$	0.0 lb/ft ^{2}

Water table is at wall base elevation

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.2827 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ = 62.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 30.14 N γ = 22.40

SEISMICITY

Maximum ground acceleration coefficient, An = 0.355
Design acceleration coefficient in Internal Stability: Kh = Am = 0.389
Design acceleration coefficient in External Stability: Kh_d = 0.203 => Kh = Am = 0.253
(Kh in External Stability is based on allowable displacement, d = 25 mm. using AASHTO 2008-2010 equation)

Kae (Kh > 0) = 0.4860 Kae (Kh = 0) = 0.3073 Δ Kae = 0.1787
Seismic soil-geogrid friction coefficient, F* is 67.0% of its specified static value.

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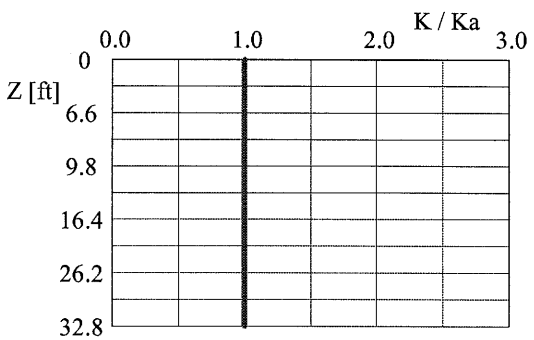
INPUT DATA: Geogrids (Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	4700.0				
Durability reduction factor, RFd	1.30				
Installation-damage reduction factor, RFid	1.12				
Creep reduction factor, RFc	1.45	N/A	N/A	N/A	N/A
CDR for strength	N/A				
Coverage ratio, Rc	1.000				
Friction angle along geogrid-soil interface, ρ	21.33				
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	N/A	N/A	N/A	N/A
Scale-effect correction factor, α	0.7				

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

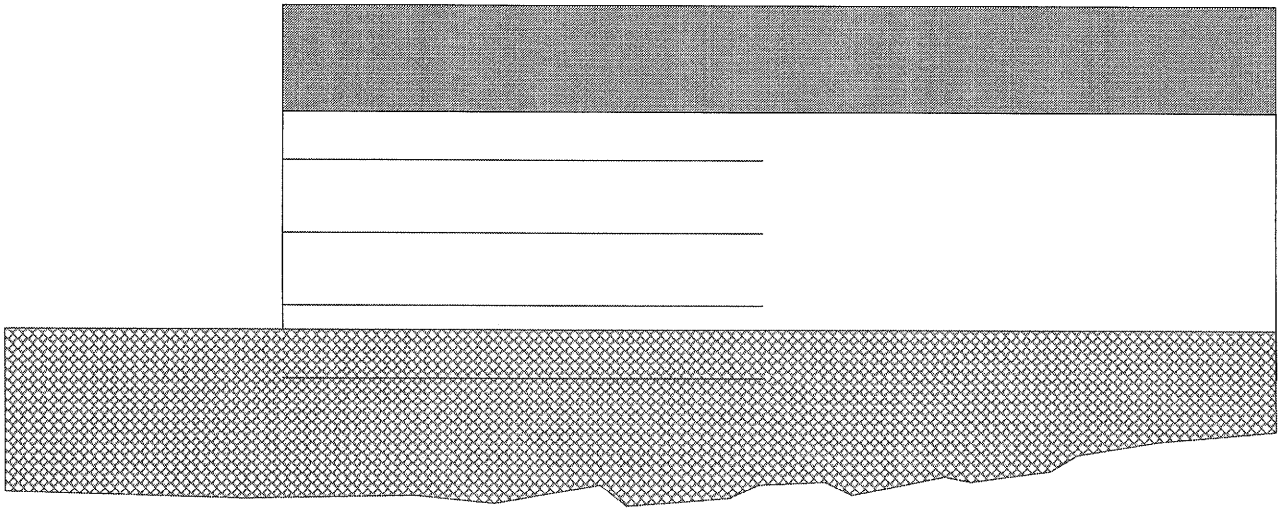
Design height, Hd	5.50	[ft]	{ Embedded depth is E = 1.00 ft, and height above top of finished bottom grade is H = 4.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	0.0	[deg]	
Backslope rise	0.0	[ft]	Broken back equivalent angle, I = 0.00° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 1088.0 [lb/ft ²]

Hydrostatic water pressure exist in analysis. hw1 = 1.00 and hw2 = 1.00 ft.

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 [ft]

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AASHTO 2007-2010 (LRFD) Input Data

INTERNAL STABILITY

Load factor for vertical earth pressure, EV, from Table 3.4.1-2:	$\gamma_{p\text{-}EV}$	1.35		
Load factor for earthquake loads, EQ, from Table 3.4.1-1:	$\gamma_{p\text{-}EQ}$	1.00		
Load factor for live load surchrge, LS, from Figure C11.5.5-3(b): (Same as in External Stability).	$\gamma_{p\text{-}LS}$	1.75		
Load factor for dead load surchrge, ES: (Same as in External Stability).	$\gamma_{p\text{-}ES}$	1.50		

Resistance factor for reinforcement tension from Table 11.5.6-1:	ϕ	Static	Combined static/seismic	
Geogrid:		0.90		1.20

Resistance factor for reinforcement tension in connectors from Table 11.5.6-1:	ϕ	Static	Combined static/seismic	
Geogrid:		0.90		1.20
Resistance factor for reinforcement pullout from Table 11.5.6-1:	ϕ	0.90		1.20

EXTERNAL STABILITY

Load factor for vertical earth pressure, EV, from Table 3.4.1-2 and Figure C11.5.5-2:		Static	Combined Static/Seismic	
Sliding and Eccentricity	$\gamma_{p\text{-}EV}$	1.00	$\gamma_{p\text{-}EQ}$	1.00
Bearing Capacity	$\gamma_{p\text{-}EV}$	1.35	$\gamma_{p\text{-}EQ}$	1.35

Load factor of active lateral earth pressure, EH, from Table 3.4.1-2 and Figure C11.5.5-2:	$\gamma_{p\text{-}EH}$	1.50
Load factor of active lateral earth pressure during earthquake (does not multiply P_{AE} and P_{IR}):	$(\gamma_{p\text{-}EH})_{EQ}$	1.50
Load factor for earthquake loads, EQ, from Table 3.4.1-1 (multiplies P_{AE} and P_{IR}):	$\gamma_{p\text{-}EQ}$	1.00

Resistance factor for shear resistance along common interfaces from Table 11.5.6-1:		Static	Combined Static/Seismic	
Reinforced Soil and Foundation	ϕ_τ	1.00		1.00
Reinforced Soil and Reinforcement	ϕ_τ	1.00		1.00

Resistance factor for bearing capacity of shallow foundation from Table 11.5.6-1:		Static	Combined Static/Seismic
	ϕ_b	0.65	0.65

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, CDR = 1.62, factored bearing load = 2734 lb/ft².

Foundation Interface: Direct sliding, CDR = 2.764, Eccentricity, e/L = 0.0530, CDR-overturning = 9.43

	GEOGRID			CONNECTION							
#	Elevation [ft]	Length [ft]	Type #	CDR [pullout resistance]	CDR [connection break]	CDR [geogrid strength]	Geogrid strength CDR	Pullout resistance CDR	Direct sliding CDR	Eccentricity e/L	Product name
1	0.00	10.00	1	N/A	N/A	N/A	3.791	21.432	1.869	0.0530	Mirafi 5xt
2	1.50	10.00	1	N/A	N/A	N/A	2.031	9.761	2.534	0.0289	Mirafi 5xt
3	3.00	10.00	1	N/A	N/A	N/A	2.282	8.801	3.837	0.0122	Mirafi 5xt
4	4.50	10.00	1	N/A	N/A	N/A	2.268	6.825	8.958	0.0021	Mirafi 5xt

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, CDR = 1.57, factored bearing load = 2779 lb/ft².

Foundation Interface: Direct sliding, CDR = 2.334, Eccentricity, e/L = 0.0641, Fs-overturning = 7.79

	GEOGRID			CONNECTION							
#	Elevation [ft]	Length [ft]	Type #	CDR [pullout resistance]	CDR [connection break]	CDR [geogrid strength]	Geogrid strength CDR	Pullout resistance CDR	Direct sliding CDR	Eccentricity e/L	Product name
1	0.00	10.00	1	N/A	N/A	N/A	4.393	15.713	1.578	0.0641	Mirafi 5xt
2	1.50	10.00	1	N/A	N/A	N/A	2.521	7.872	2.217	0.0335	Mirafi 5xt
3	3.00	10.00	1	N/A	N/A	N/A	2.827	7.080	3.500	0.0135	Mirafi 5xt
4	4.50	10.00	1	N/A	N/A	N/A	2.830	5.546	8.599	0.0022	Mirafi 5xt

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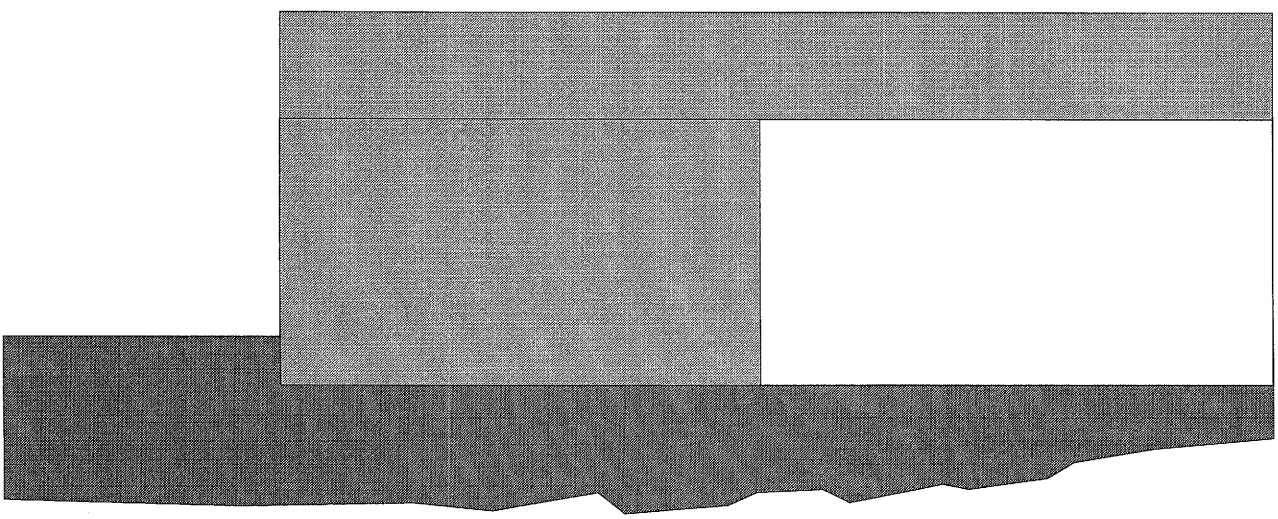
BEARING CAPACITY for GIVEN LAYOUT

	STATIC	SEISMIC	UNITS
(Water table is at wall base elevation)			
Factored bearing resistance, q-n	4426	4353	[lb/ft ^{2}]
Factored bearing load, σ_V	2733.6	2779	[lb/ft ^{2}]
Eccentricity, e	0.36	0.44	[ft]
Eccentricity, e/L	0.036	0.044	
CDR calculated	1.62	1.57	
Base length	10.00	10.00	[ft]

Unfactored applied bearing pressure = (Unfactored R) / [L - 2 * (Unfactored e)] =
Static: Unfactored R = 17405.52 [lb/ft], L = 10.00, Unfactored e = 0.35 [ft], and Sigma = 1872.76 [lb/ft ^{2}]
Seismic: Unfactored R = 17405.52 [lb/ft], L = 10.00, Unfactored e = 0.43 [ft], and Sigma = 1906.06 [lb/ft ^{2}]



SCALE:

0 2 4 6 [ft]

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DIRECT SLIDING for GIVEN LAYOUT (for GEOGRID reinforcements)

Along reinforced and foundation soils interface: CDR-static = 2.764 and CDR-seismic = 2.334

#	Geogrid Elevation [ft]	Geogrid Length [ft]	CDR Static	CDR Seismic	Geogrid Type #	Product name
1	0.00	10.00	1.869	1.578	1	Mirafi 5xt
2	1.50	10.00	2.534	2.217	1	Mirafi 5xt
3	3.00	10.00	3.837	3.500	1	Mirafi 5xt
4	4.50	10.00	8.958	8.599	1	Mirafi 5xt

ECCENTRICITY for GIVEN LAYOUT

At interface with foundation: e/L static = 0.0530, e/L seismic = 0.0641; Overturning: CDR-static = 9.43, CDR-seismic = 7.79

#	Geogrid Elevation [ft]	Geogrid Length [ft]	e / L Static	e / L Seismic	Geogrid Type #	Product name
1	0.00	10.00	0.0530	0.0641	1	Mirafi 5xt
2	1.50	10.00	0.0289	0.0335	1	Mirafi 5xt
3	3.00	10.00	0.0122	0.0135	1	Mirafi 5xt
4	4.50	10.00	0.0021	0.0022	1	Mirafi 5xt

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RESULTS for STRENGTH

Live Load included in calculating Tmax

#	Geogrid Elevation [ft]	Tavailable [lb/ft]	Tmax [lb/ft]	Tmd [lb/ft]	Specified minimum CDR static	Actual calculated CDR static	Specified minimum CDR seismic	Actual calculated CDR seismic	Product name
1	0.00	2004	528.48	115.47	N/A	3.791	N/A	4.393	Mirafi 5xt
2	1.50	2004	986.47	106.26	N/A	2.031	N/A	2.521	Mirafi 5xt
3	3.00	2004	878.15	97.05	N/A	2.282	N/A	2.827	Mirafi 5xt
4	4.50	2004	883.41	87.84	N/A	2.268	N/A	2.830	Mirafi 5xt

RESULTS for PULLOUT

Live Load included in calculating Tmax

#	Geogrid Elevation [ft]	Coverage Ratio	Tmax [lb/ft]	Tmd [lb/ft]	Le [ft]	La [ft]	Avail.Static Pullout, Pr [lb/ft]	Specified Static CDR	Actual Static CDR	Avail.Seism. Pullout, Pr [lb/ft]	Specified Seismic CDR	Actual Seismic CDR
1	0.00	1.000	528.5	115.5	10.00	0.00	11326.6	N/A	21.432	10118.4	N/A	15.713
2	1.50	1.000	986.5	106.3	9.20	0.80	9629.5	N/A	9.761	8602.3	N/A	7.872
3	3.00	1.000	878.1	97.1	8.40	1.60	7728.4	N/A	8.801	6904.0	N/A	7.080
4	4.50	1.000	883.4	87.8	7.61	2.39	6029.7	N/A	6.825	5386.5	N/A	5.546

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Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 16 December 2013
SERIAL NO.: 83
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 83
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
A&R = Amend and Resubmit
NR/AR = Not Reviewed/Accepted for Record
MCN = Make Corrections Noted No Resubmittal Required
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	K/J Action	Refer to Comment	Manufacturer or Supplier	Title of Submittal / Drawing
1	NET	1		Bulkhead Sheet Pile Shop Drawing

Comment(s):

1. Please note that the steel sheet piles should not be galvanized.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: Richard C. Guglomo for
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **83**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/10/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**32 62 16**	**2**	**Bulkhead Sheet Pile Shop Drawing**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature

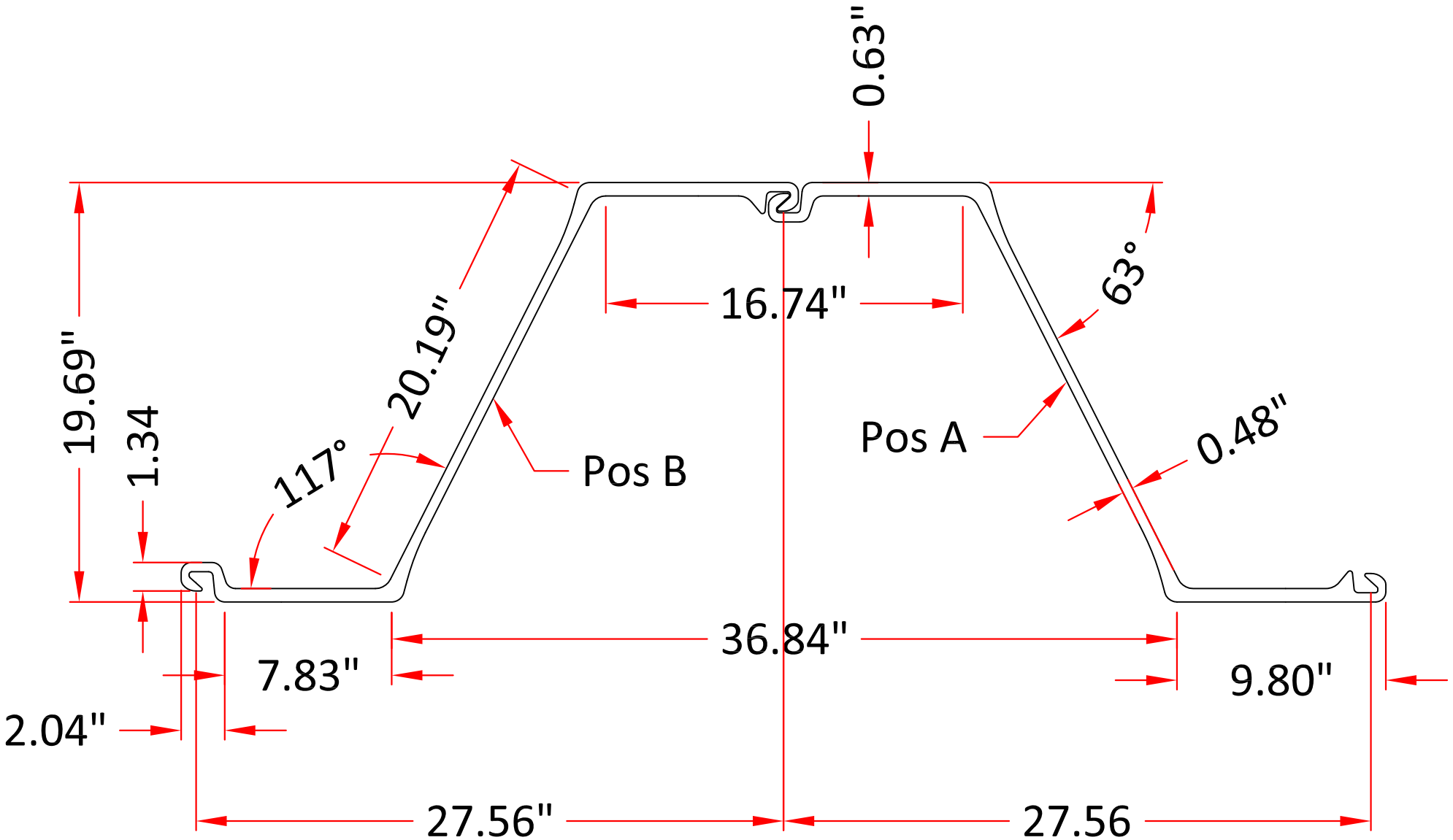
(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

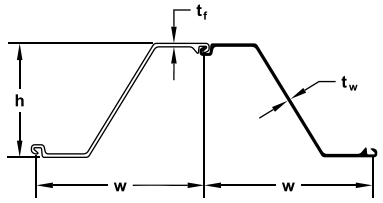


Typical AZ38-700N Form I

skylinesteelI
a NUCOR company

AZ

AZ Hot Rolled Steel Sheet Pile



SECTION	Width (w) in (mm)	Height (h) in (mm)	THICKNESS Flange (t_f) in (mm)	THICKNESS Web (t_w) in (mm)	Cross Sectional Area in^2/ft (cm^2/m)	WEIGHT Pile lb/ft (kg/m)	WEIGHT Wall lb/ft^2 (kg/m^2)	SECTION MODULUS Elastic in^3/ft (cm^3/m)	SECTION MODULUS Plastic in^3/ft (cm^3/m)	Moment of Inertia in^4/ft (cm^4/m)	COATING AREA Both Sides ft^2/ft of single (m^2/m)	COATING AREA Wall Surface ft^2/ft^2 (m^2/m^2)
AZ 12-700	27.56 700	12.36 314	0.335 8.5	0.335 8.5	5.82 123.2	45.49 67.7	19.81 96.7	22.4 1205	26.3 1415	138.3 18880	5.61 1.71	1.22 1.22
AZ 13-700	27.56 700	12.40 315	0.375 9.5	0.375 9.5	6.36 134.7	49.72 74.0	21.65 105.7	24.3 1305	28.6 1540	150.4 20540	5.61 1.71	1.22 1.22
AZ 13-700-10/10	27.56 700	12.42 316	0.394 10.0	0.394 10.0	6.63 140.4	51.85 77.2	22.58 110.2	25.2 1355	29.8 1600	156.5 21370	5.61 1.71	1.22 1.22
AZ 14-700	27.56 700	12.44 316	0.413 10.5	0.413 10.5	6.90 146.1	53.96 80.3	23.50 114.7	26.1 1405	31.0 1665	162.5 22190	5.61 1.71	1.22 1.22
AZ 12-770	30.31 770	13.52 343.5	0.335 8.50	0.335 8.50	5.67 120.1	48.78 72.60	19.31 94.30	23.2 1245	27.5 1480	156.9 21430	6.10 1.86	1.20 1.20
AZ 13-770	30.31 770	13.54 344.0	0.354 9.00	0.354 9.00	5.94 125.8	51.14 76.10	20.24 98.80	24.2 1300	28.8 1546	163.7 22360	6.10 1.86	1.20 1.20
AZ 14-770	30.31 770	13.56 344.5	0.375 9.50	0.375 9.50	6.21 131.5	53.42 79.50	21.14 103.20	25.2 1355	30.0 1611	170.6 23300	6.10 1.86	1.20 1.20
AZ 14-770-10/10	30.31 770	13.58 345	0.394 10.0	0.394 10.0	6.48 137.2	55.71 82.9	22.06 107.7	26.1 1405	31.2 1677	177.5 24240	6.07 1.85	1.20 1.20
AZ 18	24.80 630	14.96 380.0	0.375 9.50	0.375 9.50	7.11 150.4	49.99 74.40	24.19 118.10	33.5 1800	39.1 2104	250.4 34200	5.64 1.72	1.35 1.35
AZ 17-700	27.56 700	16.52 419.5	0.335 8.50	0.335 8.50	6.28 133.0	49.12 73.10	21.38 104.40	32.2 1730	37.7 2027	265.3 36230	6.10 1.86	1.33 1.33
AZ 18-700	27.56 700	16.54 420.0	0.354 9.00	0.354 9.00	6.58 139.2	51.41 76.50	22.39 109.30	33.5 1800	39.4 2116	276.8 37800	6.10 1.86	1.33 1.33
AZ 19-700	27.56 700	16.56 420.5	0.375 9.50	0.375 9.50	6.88 145.6	53.76 80.00	23.41 114.30	34.8 1870	41.0 2206	288.4 39380	6.10 1.86	1.33 1.33
AZ 20-700	27.56 700	16.58 421	0.394 10.0	0.394 10.0	7.18 152.0	56.11 83.5	24.43 119.3	36.2 1945	42.7 2296	299.9 40960	6.10 1.86	1.33 1.33
AZ 26	24.80 630	16.81 427.0	0.512 13.00	0.480 12.20	9.35 198.0	65.72 97.80	31.79 155.20	48.4 2600	56.9 3059	406.5 55510	5.91 1.80	1.41 1.41
AZ 24-700	27.56 700	18.07 459.0	0.441 11.20	0.441 11.20	8.23 174.1	64.30 95.70	28.00 136.70	45.2 2430	53.5 2867	408.8 55820	6.33 1.93	1.38 1.38
AZ 26-700	27.56 700	18.11 460.0	0.480 12.20	0.480 12.20	8.84 187.2	69.12 102.90	30.10 146.90	48.4 2600	57.1 3070	437.3 59720	6.33 1.93	1.38 1.38
AZ 28-700	27.56 700	18.15 461.0	0.520 13.20	0.520 13.20	9.46 200.2	73.93 110.00	32.19 157.20	51.3 2760	60.9 3273	465.9 63620	6.33 1.93	1.38 1.38
AZ 24-700N	27.56 700	18.07 459.0	0.492 12.5	0.354 9.0	7.71 163.3	60.28 89.7	26.26 128.2	45.3 2435	52.3 2810	409.3 55890	6.30 1.92	1.37 1.37
AZ 26-700N	27.56 700	18.11 460	0.531 13.5	0.394 10.0	8.33 176.4	65.11 96.9	28.37 138.5	48.4 2600	56.1 3015	437.8 59790	6.30 1.92	1.37 1.37
AZ 28-700N	27.56 700	18.15 461	0.571 14.5	0.433 11.0	8.95 189.5	69.95 104.1	30.46 148.7	51.4 2765	59.9 3220	466.5 63700	6.30 1.92	1.37 1.37
AZ 36-700N	27.56 700	19.65 499.0	0.591 15.00	0.441 11.20	10.20 216.0	79.70 118.60	34.61 169.00	66.8 3590	76.5 4110	656.2 89610	6.76 2.06	1.47 1.47
AZ 38-700N	27.56 700	19.69 500.0	0.630 16.00	0.480 12.20	10.87 230.0	84.94 126.40	37.07 181.00	70.6 3795	81.1 4360	694.5 94840	6.76 2.06	1.47 1.47
AZ 40-700N	27.56 700	19.72 501.0	0.669 17.00	0.520 13.20	11.53 244.0	90.18 134.20	39.32 192.00	74.3 3995	85.7 4605	732.9 100080	6.76 2.06	1.47 1.47
AZ 42-700N	27.56 700	19.65 499.0	0.709 18.00	0.551 14.00	12.22 259.0	95.49 142.1	41.57 203.00	78.2 4205	90.3 4855	766.0 104930	6.76 2.06	1.47 1.47
AZ 44-700N	27.56 700	19.69 500.0	0.748 19.00	0.591 15.00	12.89 273.0	100.73 149.9	43.83 214.00	81.9 4405	94.9 5105	804.1 110150	6.76 2.06	1.47 1.47
AZ 46-700N	27.56 700	19.72 501.0	0.787 20.00	0.630 16.00	13.55 287.0	105.97 157.7	46.08 225.00	85.7 4605	99.5 5350	842.2 115370	6.76 2.06	1.47 1.47
AZ 46	22.83 580	18.94 481.0	0.709 18.00	0.551 14.00	13.76 291.2	89.10 132.60	46.82 228.60	85.5 4595	98.5 5295	808.8 110450	6.23 1.90	1.63 1.63
AZ 48	22.83 580	18.98 482.0	0.748 19.00	0.591 15.00	14.48 306.5	93.81 139.60	49.28 240.60	89.3 4800	103.3 5553	847.1 115670	6.23 1.90	1.63 1.63
AZ 50	22.83 580	19.02 483.0	0.787 20.00	0.630 16.00	15.22 322.2	98.58 146.70	51.80 252.9	93.3 5015	108.2 5816	886.5 121060	6.23 1.90	1.63 1.63

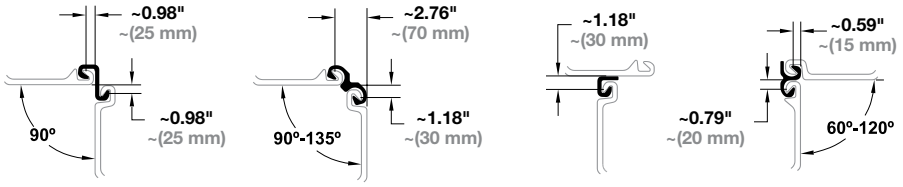
AZ

AZ Hot Rolled Steel Sheet Pile

Available Steel Grades										
AMERICAN			CANADIAN			EUROPEAN			AMLoCor**		
ASTM	YIELD STRENGTH		CSA G40.21	YIELD STRENGTH		EN 10248	YIELD STRENGTH			YIELD STRENGTH	
	(ksi)	(MPa)		(ksi)	(MPa)		(ksi)	(MPa)		(ksi)	(MPa)
A 328	39	270	Grade 260 W	38	260	S 240 GP	35	240	Blue 320	46	320
A 572 Gr. 42	42	290	Grade 300 W	43	300	S 270 GP	39	270	Blue 355	51	355
A 572 Gr. 50	50	345	Grade 350 W	51	355	S 320 GP	46	320	Blue 390	57	390
A 572 Gr. 55	55	380	Grade 400 W	58	400	S 355 GP	51	355			
A 572 Gr. 60	60	415				S 390 GP	57	390			
A 572 Gr. 65	65	450				S 430 GP	62	430			
A 690	50	345				S 460 AP	67	460			
A 690*	57	390									

*Not available for AZ 36-700N and larger. ** Corrosion resistant steel, check for availability

Corner Piles



C 14
Grade: S 355 GP
Weight: 9.68 lb/ft
(14.4 kg/m)

Omega 18
Grade: S 430 GP
Weight: 12.10 lb/ft
(18.0 kg/m)

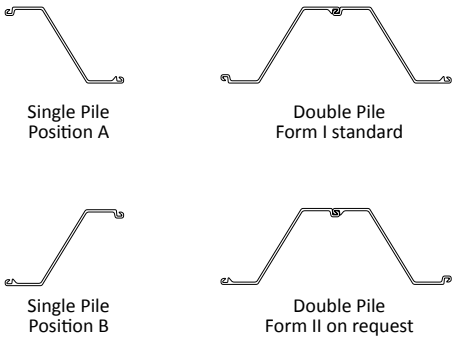
C 9
Grade: S 355 GP
Weight: 6.25 lb/ft
(9.3 kg/m)

Delta 13
Grade: S 355 GP
Weight: 8.73 lb/ft
(13.0 kg/m)

Delivery Conditions & Tolerances

	ASTM A 6		EN 10248	
Mass	± 2.5%		± 5%	
Length	+ 5 inches	– 0 inches	± 200 mm	
Height			± 7 mm	
Thickness			≤ 8.5 mm	± 0.5 mm
			> 8.5 mm	± 6%
Width			± 2%	
Double Pile Width			± 3%	
Straightness			0.2% of the length	
Ends out of Square			2% of the width	

Delivery Forms



Single Pile
Position A

Double Pile
Form I standard

Single Pile
Position B

Double Pile
Form II on request

Maximum Rolled Lengths*

AZ	101.7 feet	(31.0 m)
C 9	59.1 feet	(18.0 m)
C 14	59.1 feet	(18.0 m)
Delta 13	55.8 feet	(17.0 m)
Omega 18	52.0 feet	(16.0 m)

* Longer lengths may be possible upon request.

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 22 January 2014
SERIAL NO.: 84
SPEC. REF.: Number
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 84
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Glacier	Sheet Pile Mill Certifications

Comment(s):

1. Please submit a certificate of compliance for the 6 sheets of AZ26-700N for the 25 foot increase of bulkhead wall along the east end.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **84**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/21/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED

Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**32 62 16**	**32 62 16-2**	**Sheet Pile Manufacturer's Certificate**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

skylinesteel
a NUCOR company

Date: 1/21/14

Certificate of Compliance

Dawson Pile Driving
Glacier Environmental

Project Name: Washington State Department of Ecology – Cornet Bay Remediation
JOB# 1396010
Skyline Project# 82864

Skyline Steel certifies that the Arcelor Mittal mill certification documents with reference# PO30714 for material shipped on this project have been verified to comply with project grade/specification requirements.

Please reference all bill of ladings with Skyline project number 82864 and material tally below.

New, Hot Rolled, AZ, Steel Sheet Piling per ASTM A572 gr.50

- 74 pairs AZ38-700N x 50' 3700 LF / 314.28 Tons

Nam Nguyen
Skyline Steel Representative

301 54th Ave. East Suite 100
Fife, WA 98424
Ph: 253.922.2727 | Fax 253.922.2728
www.skylinesteel.com

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106571

from 18.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	38.527To	10	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

B07 Heat Nr	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0,19	1,59	0,040	0,050	0,40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,0[illegible]	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106571

from 18.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
28.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYF-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,008
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106571

from 18.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6

A02

Heat Nr	Tensile Test YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106664

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A08

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	19.263To	5	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

Heat Nr	Heat Analysis (%)								
B07	C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,07	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106664

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6

A02

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYF-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,008
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106664

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6
A02

Heat Nr	Tensile Test YS psi C11	UTS psi C12	A200 % C13
B07			
Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A08
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106665

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Ord.Item	B01 Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	46.232To	12	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

Heat Nr	Heat Analysis (%)								
B07	C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,07	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106665

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYF-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,003
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS	UTS	A200
	psi	psi	%
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106665

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6
A02

Heat Nr	Tensile Test YS psi C11	UTS psi C12	A200 % C13
B07 Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A06
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106668

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	53.937To	14	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

Heat Nr	Heat Analysis (%)								
B07	C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,07	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106668

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYF-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,008
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS	UTS	A200
	psi	psi	%
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106668

from 19.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Tensile Test		
	YS	UTS	A200
	psi	psi	%
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106701

from 20.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	15.411To	4	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

B07 Heat Nr	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max:	0.19	1.59	0.040	0.050	0.40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,07	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106701

from 20.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYP-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,008
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS	UTS	A200
	psi	psi	%
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106701

from 20.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
28.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Tensile Test YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900106689

from 21.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6
A02

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000070	AZ38-700N-DOUBLE	15.240	26.969To	7	APB-65194 AOT-65773 AOS-65775 AVT-66520 BBE-66943 BBF-66944 BBD-66945 BBA-66956 BBB-66957 BBC-66958 BAW-66987 AZC-67042 AZR-67043 AZT-67044 BAY-67045 AYF-67095 BAX-76988 BAZ-77040

Heat Nr	Heat Analysis (%)								
B07	C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.19	1.59	0.040	0.050	0.40				
APB-65194	0,13	1,11	0,027	0,017	0,19	0,007	0,003	0,008	0,009
AOT-65773	0,14	1,14	0,018	0,024	0,20	0,009	0,003	0,008	0,009
AOS-65775	0,13	1,12	0,019	0,030	0,19	0,008	0,003	0,006	0,009
AVT-66520	0,14	1,44	0,024	0,022	0,22	0,011	0,003	0,003	0,093
-66520	0,13	1,42	0,024	0,022	0,22	0,011	0,003	0,003	0,093
BBE-66943	0,13	1,14	0,025	0,026	0,17	0,011	0,003	0,007	0,007
BBF-66944	0,15	1,17	0,024	0,028	0,21	0,009	0,003	0,007	0,007
BBD-66945	0,14	1,13	0,028	0,031	0,19	0,009	0,003	0,006	0,005
BBA-66956	0,07	1,47	0,021	0,021	0,20	0,010	0,003	0,002	0,052
BBB-66957	0,14	1,13	0,027	0,016	0,21	0,010	0,004	0,007	0,007

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EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106689

from 21.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM
A02 **A 6**

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA

A06

Heat Nr	Heat Analysis (%)								
	C	MN	P	S	SI	N	AL	NB	V
Min									
Max	0,19	1,59	0,040	0,050	0,40				
BBC-66958	0,14	1,13	0,022	0,017	0,21	0,010	0,003	0,006	0,007
BAW-66987	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
AZC-67042	0,15	1,16	0,017	0,029	0,20	0,010	0,003	0,007	0,008
AZR-67043	0,15	1,13	0,025	0,029	0,20	0,011	0,003	0,008	0,007
AZT-67044	0,12	1,06	0,020	0,032	0,17	0,009	0,003	0,006	0,005
BAY-67045	0,13	1,14	0,023	0,030	0,19	0,009	0,002	0,006	0,007
AYF-67095	0,15	1,16	0,022	0,018	0,19	0,010	0,005	0,008	0,008
BAX-76988	0,14	1,48	0,018	0,021	0,20	0,009	0,003	0,007	0,008
BAZ-77040	0,14	1,22	0,018	0,030	0,18	0,008	0,002	0,005	0,010

Heat Nr	Tensile Test		
	YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
APB-65194	56985	77720	24,0
APB-65194	56550	79170	23,6
AOT-65773	56405	79170	23,6
AOT-65773	55970	78155	23,9
AOS-65775	55825	75690	24,6
AOS-65775	57275	75545	24,6
AVT-66520	72065	91350	19,6
-66520	68730	87580	21,3
BBE-66943	51620	76415	24,1
BBE-66943	56260	79170	23,6
BBF-66944	53215	76850	23,5
BBF-66944	59305	82505	22,7
BBD-66945	54085	78880	22,2
BBD-66945	56985	80040	23,4

Klecker Roberto
porteur de la signature spéciale

EN 10168

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany
A01

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Certificate No L8900106689

from 21.11.2013 A03

A08 Our reference : 1400011488
A07 Your reference : PO 30714
26.09.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
Georgia Sales Office
3250 Peachtree Ind. Blvd. Suite 203
30096-Duluth
USA
A08

ASTM A 572 GRADE 50

B02

Manufacturer's test certificate according to ASTM A 6
A02

Heat Nr	Tensile Test YS psi	UTS psi	A200 %
B07	C11	C12	C13
Min	50000	65000	18.0
Max			
BBA-66956	58145	75835	23,2
BBA-66956	59740	78445	23,8
BBB-66957	55535	76705	22,1
BBB-66957	55535	76125	24,5
BBC-66958	52200	76995	22,4
BBC-66958	58145	79460	23,5
BAW-66987	58725	83375	23,4
BAW-66987	60755	79460	23,5
AZC-67042	51765	77285	22,4
AZC-67042	62060	76560	23,2
AZR-67043	59015	82360	23,9
AZR-67043	59015	81635	22,9
AZT-67044	55390	78445	24,8
AZT-67044	55680	75255	24,7
BAY-67045	51910	77140	22,0
BAY-67045	58000	76560	24,3
AYF-67095	52490	77430	22,5
AYF-67095	52925	77720	22,6
BAX-76988	67860	91060	18,9
BAX-76988	60320	80040	23,3
BAZ-77040	63655	83520	23,7
BAZ-77040	60610	83085	22,5

Klecker Roberto
porteur de la signature spéciale

EN 10168

SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **84.1**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **1/23/14**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**32 62 16**	**32 62 16-2**	**Sheet Pile Manufacturer's Certificate**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

skylinesteel
a NUCOR company

Date: 1/23/2014

Glacier Environmental Services, Inc
Attn: Eric Hay
PO Box 1097
Mukilteo, WA 98275

Certificate of Compliance

Project Name: Washington State Department of Ecology – Cornet Bay Remediation
Job # 1396010
Skyline Project # 83003

Skyline Steel certifies that the Arcelor Mittal mill certification documents with reference to PO B84652 for material shipped on this project have been verified to comply with the project grade/specification requirements.

Please reference all bill of ladings with Skyline Steel Project # 83003 and Material Talley below.

New, Hot Rolled AZ Steel Sheet Pile per ASTM A 572 gr. 50

- 6/pairs AZ26-700 x 35' 210lf, 27.5 wall feet / 14.52 tons.

Regards,

David Ozolin
Sales Representative

301 54th Ave E
Fife, WA 98424 USA
T: +1.253.922.2727
F: +1.253.922.2728
www.skylinesteel.com

Sales agent:
SKYLINE STEEL LLC - STOCK
8 Woodhollow Road, Suite 102
07054-2820-Parsippany

A05
ArcelorMittal Belval & Differdange
Service Gestion - Qualité
66, rue de Luxembourg, LU-4221 Esch-sur-Alzette
R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900099928
from 13.06.2013 A03

A09 Our reference: 1400010312
A07 Your reference: B-84652
08.06.2013
Consignee :SKYLINE STEEL LLC

ASTM A 572 GRADE 60

B02

Manufacturer's test certificate according to ASTM A 6
A02

SKYLINE STEEL LLC
WASHINGTON SALES OFFICE
301 54TH AVENUE EAST, SUITE 100
98424-FIFE
USA
A08

Ord.Item	001 Product	Length	013 Weight	008 Bars	007 Heat Nr
000050	AZ26-700-DOUBLE	21.338	43.888To	10	O-48522 ADE-62982 AAR-63383

Heat Nr 007	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.22	1.59	0.040	0.050	0.40				
O-48522	0,14	1,45	0,013	0,016	0,20	0,007	0,003	0,032	0,018
ADE-62982	0,14	1,48	0,022	0,019	0,21	0,011	0,003	0,002	0,092
AAR-63383	0,14	1,48	0,017	0,035	0,20	0,011	0,003	0,003	0,088

Heat Nr 007	Tenslie Test YS psi 011	UTS psi 012	A200 % 013
Min	60000	75000	16.0
Max			
O-48522	66265	89755	19,8
O-48522	70325	88015	21,2
ADE-62982	63945	76125	23,2
ADE-62982	64090	83375	20,1
AAR-63383	74965	92075	17,7
AAR-63383	63220	83375	20,1

Kiecker Roberto
porteur de la signature spéciale

EN 10168

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R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900099936
from 13.06.2013 A03

A08 Our reference: 1400010812
A07 Your reference: B-84652
06.06.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
WASHINGTON SALES OFFICE
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98424-FIFE
USA

A05

ASTM A 572 GRADE 60

B02

Manufacturer's test certificate according to ASTM
A02 A 6

Ord.Item	B01 Product	Length	B13 Weight	B09 Bars	B07 Heat Nr
000050	AZ26-700-DOUBLE	21.336	43.888To	10	O-48522 ADE-62982 AAR-63383

Heat Nr B07	C	Mn	P	S	Si	N	Al	Nb	V
	Heat Analysis (%)								
Min									
Max	0.22	1.59	0.040	0.050	0.40				
O-48522	0,14	1,45	0,023	0,016	0,20	0,007	0,003	0,032	0,018
ADE-62982	0,14	1,48	0,022	0,019	0,21	0,011	0,003	0,002	0,092
AAR-63383	0,14	1,48	0,017	0,035	0,20	0,011	0,003	0,003	0,088

Heat Nr B07	YS psi C11	UTS psi C12	A200 % C13
	Tensile Test		
Min	60000	75000	18.0
Max			
O-48522	66265	89755	19,8
O-48522	70325	88015	21,2
ADE-62982	63945	76125	23,2
ADE-62982	64090	83375	20,1
AAR-63383	74965	92075	17,7
AAR-63383	63220	83375	20,1

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Service Gestion - Qualité
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R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900100072
from 14.06.2013
A03

A08 Our reference: 1400010812
A07 Your reference: B-84652
06.06.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
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USA
A06

ASTM A 572 GRADE 60
B02

Manufacturer's test certificate according to ASTM A 6
A02

Ord.Item	901 Product	Length	913 Weight	908 Bars	907 Heat Nr
000050	AZ26-700-DOUBLE	21.336	26.333To	6	O-48522 ADE-62982 AAR-63383

Heat Nr 907	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.22	1.59	0.040	0.050	0.40				
O-48522	0,14	1,45	0,023	0,016	0,20	0,007	0,003	0,032	0,018
ADE-62982	0,14	1,48	0,022	0,019	0,21	0,011	0,003	0,002	0,092
AAR-63383	0,14	1,48	0,017	0,035	0,20	0,011	0,003	0,003	0,088

Heat Nr 907	Tensile Test YS psi 911	UTS psi 912	A200 % 913
Min	60000	75000	16,0
Max			
O-48522	66265	89755	19,8
O-48522	70325	88015	21,2
ADE-62982	63945	76125	23,2
ADE-62982	64090	83375	20,1
AAR-63383	74965	92075	17,7
AAR-63383	63220	83375	20,1

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Service Gestion - Qualité
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R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900100520

from 25.06.2013 A03

A08 Our reference : 1400010812
A07 Your reference : B-84852
06.06.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
WASHINGTON SALES OFFICE
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USA
A06

ASTM A 572 GRADE 60

B02

Manufacturer's test certificate according to ASTM A 6
A02

B01 Ord.Item	Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000050	AZ26-700-DOUBLE	21.336	13.166To	3	O-48522 ADE-62982 AAR-63383

Heat Nr B07	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0,22	1,59	0,040	0,050	0,40				
O-48522	0,14	1,45	0,023	0,016	0,20	0,007	0,003	0,032	0,018
ADE-62982	0,14	1,48	0,022	0,019	0,21	0,011	0,003	0,002	0,092
AAR-63383	0,14	1,48	0,017	0,035	0,20	0,011	0,003	0,003	0,088

Heat Nr B07	Tensile Test YS psi B11	UTS psi B12	A200 % B13
Min	60000	75000	16.0
Max			
O-48522	66265	89755	19,8
O-48522	70325	88015	21,2
ADE-62982	63945	76125	23,2
ADE-62982	64090	83375	20,1
AAR-63383	74965	92075	17,7
AAR-63383	63220	83375	20,1

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R.C. Luxembourg Section B 27.031

ArcelorMittal

Plant:
A01 ACRPS Belval

Certificate No L8900100561
from 28.08.2013
A03

A08 Our reference: 1400010812
A07 Your reference: B-84652
06.06.2013
Consignee :SKYLINE STEEL LLC

SKYLINE STEEL LLC
WASHINGTON SALES OFFICE
301 54TH AVENUE EAST, SUITE 100
98424-FIFE .
USA
A06

ASTM A 572 GRADE 60
B02

Manufacturer's test certificate according to ASTM A 6
A02

Ord.Item	B01 Product	Length	B13 Weight	B08 Bars	B07 Heat Nr
000050	AZ26-700-DOUBLE	21.336	4.389To	1	O-48522 ADE-62982 AAR-63383

B07 Heat Nr	Heat Analysis (%) C	Mn	P	S	Si	N	Al	Nb	V
Min									
Max	0.22	1.59	0.040	0.050	0.40				
O-48522	0,14	1,45	0,023	0,016	0,20	0,007	0,003	0,032	0,018
ADE-62982	0,14	1,48	0,022	0,019	0,21	0,011	0,003	0,002	0,092
AAR-63383	0,14	1,48	0,017	0,035	0,20	0,011	0,003	0,003	0,089

B07 Heat Nr	Tensile Test YS psi B11	UTS psi B12	A200 % B13
Min	60000	75000	16.0
Max			
O-48522	66265	89755	19,8
O-48522	70325	88015	21,2
ADE-62982	63945	76125	23,2
ADE-62982	64090	83375	20,1
AAR-63383	74965	92075	17,7
AAR-63383	63220	83375	20,1

Kiecker Roberto
porteur de la signature spéciale

EN 10168

Shop Drawing Review Letter

Kennedy/Jenks Consultants

32001 32nd Avenue South
Federal Way, Washington 98001
www.KennedyJenks.com

TO: Glacier Environmental Services Inc.
PO Box 1097
Mukilteo, WA 98275

ATTENTION: Lauren Miles-Golembiewski (425-355-2826)
lmiles@glacierenviro.com

DATE: 16 January 2014
SERIAL NO.: 89
SPEC. REF.: 32 62 16
PROJECT: Cornet Bay Marina Remediation
K/J JOB NO.: 1396010.00
SUBMITTAL NO.: 89
PAGE: 1 of 1

A. The action(s) noted below have been taken on the enclosed drawing(s).

NET = No Exceptions Taken
MCN = Make Corrections Noted No Resubmittal Required
A&R = Amend and Resubmit
MCNR = Make Corrections Noted Resubmittal Required
RR = Rejected, Resubmit

Item	*K/J Action*	*Refer to Comment*	*Manufacturer or Supplier*	*Title of Submittal / Drawing*
1	MCN	1	Glacier	Water Quality Control Plan

Comment(s):

1. This is Submittal 89 not 93. It belongs here because it should be part of the sheet pile installation specs which originally ended at 88. Inserting that after 88 results in this being 89. Please correct your original documents and schedule of submittals to reflect the change.

B. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all other trades, and performing its work in a safe and satisfactory manner.

DISTRIBUTION		SDRL	ENCL.
Contractor	Laurel Golembiewski	x	x
KJ Project Manager	Ty Schreiner	x	
KJProject Coordinator:	Richard C. Guglomo, P.E.	x	x
KJ Resident Engineer:	Jarod Fisher, P.E.	x	x
Ecology PM	Jing Liu	x	x
Ecology Construction Engineer	Brian Sato, P.E.	x	x
Ecology Contract Officer	Joe Ward, P.E.	x	x
File		x	x

By: _____
Jarod Fisher, P.E.

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SUBMITTAL TRANSMITTAL

Glacier Environmental Services Inc.

Submittal No.: **89**

TO: **Department of Ecology**
3190 160th Ave SE
Bellevue, WA 98008

Contract #: C14500123

ATTN: **Jing Liu**

Date: **12/31/13**

Project **Cornet Bay Marina Remediation** Project No. **13-028**

Owner **Dept of Ecology** Location: **Oak Harbor, WA**

Previous Transmittal No. (if resubmitted)

USE ONE FORM PER ITEM SUBMITTED						
Qty.	Spec. Section No.	Spec. Page No.	Item Description and Use	Manufacturer	Dwg. No(s).	Approval Status (Engineer)
1	**32 62 16**	**32 62 16-1**	**Water Quality Protection and Monitoring Plan**			

By this submittal, the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the project requirements and the Contract Documents. Deviations from the Contract Documents are noted below.

DEVIATIONS:

Contractor Glacier Environmental Services, Inc. Signature Eric Hay

(THIS SPACE FOR ENGINEER)

To: Date:

Enclosed are ____ Copies of the above item. Approval status as noted above is in accordance with the following legend:

A. No Exceptions Taken
B. Make Corrections Noted
   1. No Resubmittal
   2. Partial Resubmittal Required
C. Amend and Resubmit
D. Rejected- Resubmit

By:

Water Quality Protection and Monitoring Plan

This plan has been prepared by Glacier Environmental Services, Inc. for the Cornet Bay Marina Remediation Project. This plan is intended to outline the specific means and methods for the monitoring and protection of the excellent quality estuarine waters of Cornet Bay. The purpose of this plan will be to guarantee the constant monitoring and protection of the waters surrounding the mixing zone, where all in-water work will be taking place.

The State of Washington Department of Ecology Project Manual for the Cornet Bay Marina Remediation has listed the waters surrounding the Cornet Bay Marina as "Excellent Quality" estuarine waters, which fall under the protection of WAC 173-201A-210. This legislation regulates the usage of marine waters, to ensure the protection of marine animal habitat, and specifically outlines the maximum turbidity allowed in marine water. Exceptions to this turbidity restriction are allowed to occur within a *mixing zone*, which is an area described by a 150 foot radius around any necessary in-water work that has the potential to exceed the maximum Nephelometric Turbidity Units (NTUs) as established by Table 210(1)(e). Some work involved with the Cornet Bay Marina Remediation project will exceed the maximum turbidity allowed. As a result, a mixing zone will be utilized around the area of any work that has the potential to exceed maximum turbidity limitations. The size and location of mixing zones is outlined in WAC 173-201A-400, and has been used to determine the nature of the mixing zone used at Cornet Bay Marina.

A. Locations of Samples: Samples will be taken along the edge of the established mixing zone perimeter, which in this case will be 150 feet, in all directions, surrounding the area of work that is creating excessive turbidity. Testing will occur in locations along the mixing zone perimeter that are most visually indicative of containing excessive turbidity. It is the intention of this plan to actively seek out any instance of high NTU release, and monitor these areas over other areas which clearly do not have any turbidity. If excessive turbidity is not visually identifiable, one sample location will be determined randomly around the perimeter.

Every time a sample is taken, as described above, a coinciding background sample will be taken, which will be used to determine the background levels of turbidity in Cornet Bay. The background samples will be taken in the nearby vicinity of the mixing zone, but will intentionally avoid any areas that may have been influenced by work at the Cornet Bay Marina. The intention of obtaining the second sample is to provide data to contrast existing Cornet Bay water quality, against mixing zone perimeter water quality, and determine what effect, if any, has been caused by work on the Cornet Bay Marina.

B. Number of Samples: A minimum of two samples will be taken daily, when work is occurring that has the potential to cause excessive turbidity in the mixing zone. The first

sample will be along the mixing zone perimeter, and the second sample will be a coinciding background sample. In the event that no areas of excessive turbidity can be seen, only the two samples will be taken. If there is an indication of excessive turbidity, samples will be taken along the mixing zone perimeter in areas most likely to exceed maximum NTU limitations. In the instance of multiple areas being tested at the same time, only one background test will occur.

C. Parameter to be Sampled: The only parameter to be sampled will be that outlined in WAC 173-201A-210(1)(e) Aquatic Life Turbidity Criteria. As identified by the State of Washington Department of Ecology Project Manual for Cornet Bay Marina Remediation, this water is considered "Excellent Quality" estuarine water, and must meet the following criteria as is outlined in Table 210(1)(e):

"Turbidity must not exceed:

- 5 NTU over background when the background is 50 NTU or less; or
- A 10 percent increase in turbidity when the background turbidity is more than 50 NTU."

D. Equipment: Sampling for turbidity will be accomplished with a turbidometer properly calibrated to according to the owner's manual.

E. Best Management Practices (BMPs): Floating silt fence will be used to prevent the migration of silt generated from work on the Cornet Bay Marina.

F. Detection of Exceedances: If, at any time during construction, water is tested and exceeds 5 NTU over background conditions when the background turbidity is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU, we will immediately take action to stop, contain, and prevent unauthorized discharges or otherwise stop the violation and correct the problem. After such an event, we will assess the efficacy of the site BMPs and update or improve the BMPs used at the work site in an effort to reduce or prevent recurrence of the turbidity exceedance.