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## **MEMORANDUM**

From: Andrew MacKay, Envirochem                      Date: December 8, 2018  
To: Tiffany Paul, ECCC                                      Cc: Andre Olivier, PCT  
Anika Calder, VFPA                                          Colin Reddin, PCT  
Mark Adams, Envirowest  
  
RE: **PACIFIC COAST TERMINAL DREDGE WEEKLY MONITORING REPORT #1  
NOVEMBER 27-30, 2018**

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This report summarizes monitoring of PAH affected sediment dredging and disposal activities conducted in Port Moody Arm, BC for the week of November 27, 2018 – November 30, 2018. All work was conducted under relevant permits issued by VFPA, ECCC, DFO and Transport Canada.

### **Operations Overview**

The FRPD MacKenzie derrick dredged 1007m<sup>3</sup> of PAH affected sediment from designated locations (i.e., two dredge material management units) within the Imperial Oil (Imperial) pipeline Rights-of-Way located adjacent to (east of ) Reed Point Marina in Port Moody Arm, BC. All dredging and disposal activities occurred within a silt curtain frame (50' x 50'). Material was transferred to a sealed barge (RT 102) and transported for dewatering at Flavelle Cedar sawmill prior to disposal in the designated PAH disposal area within the new containment berm at depth (e.g., 9m-11m chart datum). Dewatering consisted of pump transfer to primary (Baker) settling tanks, addition of Chitosan flocculent followed by vac truck transfer to the PCT water treatment system. Total volume disposed was 629m<sup>3</sup>. The difference in dredged and disposed volumes (378m<sup>3</sup>) was attributed to: material consolidation and minor residual volumes in the barge; dewatering; and a sediment spill at Flavelle Cedar which has been reported under separate cover.

### **Turbidity Monitoring Results**

No exceedances of <8 NTU over 24 hours were measured. The turbidity curtain and effective duty cycles less than two (2) minutes resulted in average induced turbidity across all depths for the report period of 1.70 NTU. The peak (and single) induced turbidity measurement was 5.36 NTU.

### **Fish and Marine Mammal Observations**

No dead or distressed fish or marine mammals were observed in the dredge or disposal works areas.

### **Archaeological**

No cultural (archaeological) artifacts were observed in the dredge or disposal works areas.

### **Attachments**

Weekly Nov 27-30, 2018 Open Water Turbidity Monitoring Table  
Daily Open Water Turbidity Monitoring Reports Nov 27-30, 2018  
FRPD Weekly Production Reports

PCT PAH Dredging and Disposal Open Water Turbidity Monitoring Weekly Report (#1)

GENERAL LOCATIONS: PAH DREDGE IN ICL PIPELINE AREA, SOUTH BANK ADJACENT TO REED POINT MARINA  
PERIOD November 27, 2018 - November 30, 2018  
REPORTING UNITS: NTU

PARAMETERS	BACKGROUND	OPERATING SAMPLES																				Daily Maximum Turbidity By Depth	Daily Average Turbidity By Depth	Maximum Induced Turbidity By Depth	
Location	W of derrick at DMMU 1	West of derrick DMMU 2	East of derrick DMMU 2	West of derrick DMMU 2	East of derrick DMMU 2	West of derrick DMMU 2	East of derrick DMMU 2	West of derrick DMMU 2	East of derrick DMMU 2	Disposal Site East of derrick	Disposal Site West of derrick	Disposal Site West of derrick	Disposal Site East of derrick	West of derrick DMMU 3	East of derrick DMMU 3	West of derrick DMMU 3	East of derrick DMMU 3	West of derrick DMMU 3	Disposal Site East of derrick	Disposal Site West of derrick	Disposal Site East of derrick				Disposal Site West of derrick
Date	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	27-Nov-18	28-Nov-18	28-Nov-18	28-Nov-18	28-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	30-Nov-18	30-Nov-18	30-Nov-18				30-Nov-18
Time	10:42 AM	12:34 PM	12:42 PM	2:01 PM	2:10 PM	2:55 PM	3:01 PM	4:06 PM	4:14 PM	10:18 AM	10:27 AM	2:13 PM	2:20 PM	9:55 AM	10:05 AM	12:13 PM	12:34 PM	2:11 PM	11:25 AM	11:32 AM	11:51 AM				11:58 AM
Surface	2.63	2.10	2.30	2.64	2.32	2.60	2.89	2.35	2.83	1.70	1.71	1.83	1.66	2.36	2.11	2.32	1.86	2.14	1.94	1.59	1.63				1.69
1m	1.40	2.14	1.80	2.99	2.35	2.41	2.54	2.81	2.23	1.69	1.46	1.95	2.02	1.89	2.05	1.78	1.63	1.98	1.28	1.59	1.35	1.38			
3m	0.63	1.20	0.65	0.66	0.82	0.82	0.69	1.39	0.70	1.08	1.75	0.84	0.96	1.30	1.29	1.17	0.94	1.79	1.96	1.49	1.56	1.58			
5m*	0.64	0.84	0.78	0.76	1.29	0.80	0.70	0.68	0.70	1.36	2.05	1.36	0.74	0.86	0.95	0.63	0.95	1.28	5.53	1.15	1.67	1.90			
Daily Maximum All Depths**	2.63	2.14	2.30	2.99	2.35	2.60	2.89	2.81	2.83	1.70	1.75	1.95	2.02	2.36	2.11	2.32	1.94	2.14	3.99	1.59	1.96	1.69			
Daily Average All Depths	1.55	1.81	1.58	2.10	1.83	1.94	2.04	2.18	1.92	1.70	1.64	1.54	1.55	1.85	1.82	1.76	1.81	1.97	3.04	1.56	1.65	1.55			

SUMMARY

Max Daily Induced Turbidity For The Week (NTU)	5.36 at 3m
Average Induced Turbidity For The Week (NTU)	1.70
# of Induced Turbidity Readings > 8 NTU	0
Duty Cycle Range	1:30 - 2:00 minutes

\* reference only to confirm sediment remaining at depth; not a regulatory sample report depth and not included in calculations  
\*\* excluding 5m reference depth



Pacific Coast Terminals Co. Ltd.  
PAH Dredge Monitoring  
Report #1

## SUMMARY

<b>Date</b>	Nov 27, 2018
<b>Monitoring Crew Members</b>	Andrew Mackay (ESI), Gail Slavik (ESI), Stephen Bonetti (ESI), James Haldane (MIB), Mitch Herron (Seaward), William Keating (Seaward)
<b>Activity Type</b>	PAH remedial dredge open water sampling
<b>Weather Conditions</b>	Partially cloudy
<b>Wind Direction</b>	SE
<b>Wind Speed</b>	< 5 knots near PCT
<b>Precipitation (mm)</b>	0
<b>Any Confounding Activities</b>	Remarks/Comments
<ul style="list-style-type: none"><li>• FRPD Mackenzie derrick, sealed scow</li><li>• Max induced turbidity 1.6 NTU</li><li>• Turbidity samples taken east and west of Derrick at surface, 1m, 3m and 5m.<ul style="list-style-type: none"><li>- All values reported in NTU.</li><li>- Sample taken at 5m are due diligence / reference only</li></ul></li><li>• No marine mammals/ fish species were observed in distress in work area</li><li>• No archaeological artifacts observed during dredge</li></ul>	

# OPEN WATER MONITORING

1 OF 9

Open Water Monitoring #

Start of Sample

10:42:00 AM PST

Tide

Ebb

Location

Float 29, Port Moody, BC V3H 3R5,  
Canada latitude: 49.29308170733243  
altitude: 1.0227457

longitude: -122.8782896821058 [ [viewMap](#) ]

Location Name

BACKGROUND - West of DDMU 1

Readings at Surface

2.63 NTU

Readings at 1m

1.4 NTU

Readings at 3m

0.63 NTU

Readings at 5m

0.64 NTU

End of Sample

10:44:00 AM PST

OPEN WATER MONITORING #

2 of 9

Start of Sample

12:34:00 PM PST

Tide

Ebb

Location

Float 29, Port Moody, BC V3H 3R5,  
Canada latitude: 49.29338833487877  
altitude: 1.2112234

longitude: -122.87864106536094 [ [viewMap](#) ]

Location Name

IOL Sed#2 West

Readings at Surface

2.1 NTU

Readings at 1m

2.14 NTU

Readings at 3m

1.20 NTU

Readings at 5m

0.84 NTU

End of Sample

12:37:00 PM PST

## OPEN WATER MONITORING #

3 OF 9

## Open Water Monitoring #

Start of Sample

12:42:00 PM PST

Tide

Ebb

Location

1351 Barnet Hwy, Port Moody, BC V3H 3L9,  
Canadalatitude: 49.29316692524524 altitude:  
3.389553longitude: -122.87441357050358 [ [viewMap](#) ]

Location Name

IOL Sed#2 East

Readings at Surface

2.3 NTU

Readings at 1m

1.8 NTU

Readings at 3m

0.65 NTU

Readings at 5m

0.78 NTU

End of Sample

12:45:00 PM PST

## OPEN WATER MONITORING #

4 OF 9

## Open Water Monitoring #

Start of Sample

2:10:00 PM PST

Tide

Ebb

Location

1343 Barnet Hwy, Port Moody, BC V3H 3L9,  
Canadalatitude: 49.29329860494406 altitude:  
3.184418longitude: -122.87497851077734 [ [viewMap](#) ]

Location Name

IOL Sed#2 East

Readings at Surface

2.32 NTU

Readings at 1m

2.35 NTU

Readings at 3m

0.82 NTU

Readings at 5m

1.29 NTU

End of Sample

2:15:00 PM PST

<b>Start of Sample</b>	2:01:00 PM PST
<b>Tide</b>	Ebb
<b>Location Name</b>	IOL Sed#2 West
<b>Readings at Surface</b>	2.64
<b>Readings at 1m</b>	2.99
<b>Readings at 3m</b>	0.66
<b>Readings at 5m</b>	0.76
<b>End of Sample</b>	2:04:00 PM PST

## Open Water Monitoring #

<b>Start of Sample</b>	2:55:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Float 29, Port Moody, BC V3H 3R5, Canada latitude: 49.293285800443215 altitude: -1.7784157 longitude: -122.87859994743792 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	IOL Sed#2 West
<b>Readings at Surface</b>	2.6 NTU
<b>Readings at 1m</b>	2.41 NTU
<b>Readings at 3m</b>	0.82 NTU
<b>Readings at 5m</b>	0.80 NTU
<b>End of Sample</b>	2:57:00 PM PST

## Open Water Monitoring #

<b>Start of Sample</b>	3:01:00 PM PST
<b>Tide</b>	Ebb
<b>Location Name</b>	IOL Sed#2 East
<b>Readings at Surface</b>	2.89
<b>Readings at 1m</b>	2.54
<b>Readings at 3m</b>	0.69
<b>Readings at 5m</b>	0.70
<b>End of Sample</b>	3:04:00 PM PST

## OPEN WATER MONITORING #

8 OF 9

<b>Start of Sample</b>	4:06:00 PM PST
<b>Tide</b>	Flood
<b>Location Name</b>	IOL Sed#2 West
<b>Readings at Surface</b>	2.35
<b>Readings at 1m</b>	2.81
<b>Readings at 3m</b>	1.39
<b>Readings at 5m</b>	0.68
<b>End of Sample</b>	4:10:00 PM PST

## OPEN WATER MONITORING #

9 OF 9

<b>Start of Sample</b>	4:14:00 PM PST
<b>Tide</b>	Flood
<b>Location Name</b>	IOL Sed#2 East
<b>Readings at Surface</b>	2.83
<b>Readings at 1m</b>	2.23
<b>Readings at 3m</b>	0.7
<b>Readings at 5m</b>	0.7
<b>End of Sample</b>	4:18:00 PM PST





## Pacific Coast Terminals Co. Ltd. PAH Dredge Monitoring Report #2

### SUMMARY

Date	November 28, 2018
Monitoring Crew Members	Andrew Mackay (ESI), Gail Slavik (ESI), Stephen Bonetti (Envirowest), James Haldane (MIB), William Keating (Seaward), Mitch Herron (Seaward)
Activity Type	Placement of material collected from DMMU #2
Weather Conditions	Overcast with rainy periods
Wind Direction	E
Wind Speed	0-5 knots.
Precipitation (mm)	15-20mm
Remarks/Comments	<ul style="list-style-type: none"><li>• Grab bucket used in the morning (operated for two hours(8:30-10:30)), Envirobucket used remainder of day (2:30-5:00)</li><li>• Material deposited from DMMU #2 to designated disposal area adjacent to west berm</li></ul>

### OPEN WATER MONITORING

<b>Start of Sample</b>	10:18:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.2878694695803 altitude: 1.6014494 longitude: -122.86269171752456 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	East of Derrick
<b>Readings at Surface</b>	1.70 NTU
<b>Readings at 1m</b>	1.69 NTU
<b>Readings at 3m</b>	1.08 NTU
<b>Readings at 5m</b>	1.36 NTU
<b>Remarks</b>	Placement of material of DAMMU #2 at disposal site.
<b>End of Sample</b>	10:21:00 AM PST

OPEN WATER MONITORING #

2 OF 8

<b>Start of Sample</b>	10:27:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Port Moody, BC latitude: 49.28914683875561 altitude: 3.230056 longitude: -122.8650944029194 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	West of Derrick
<b>Readings at Surface</b>	1.71 NTU
<b>Readings at 1m</b>	1.46 NTU
<b>Readings at 3m</b>	1.75 NTU
<b>Readings at 5m</b>	2.05 NTU
<b>Remarks</b>	Placement of DMMU#2 at disposal site.
<b>End of Sample</b>	10:31:00 AM PST

<b>Start of Sample</b>	2:13:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Barnet Hwy, Port Moody, BC latitude: 49.28907743659735 altitude: -0.6731653 longitude: -122.86475200217484 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	West of Derrick
<b>Readings at Surface</b>	1.83 NTU
<b>Readings at 1m</b>	1.95 NTU
<b>Readings at 3m</b>	0.84 NTU
<b>Readings at 5m</b>	1.36 NTU
<b>Remarks</b>	Offloading DMMU#2 at disposal site.
<b>End of Sample</b>	2:16:00 PM PST

<b>Start of Sample</b>	2:20:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.287752844439154 altitude: - 0.58731645 longitude: -122.86241630103706 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	East of Derrick
<b>Readings at Surface</b>	1.66 NTU
<b>Readings at 1m</b>	2.02 NTU
<b>Readings at 3m</b>	0.96 NTU
<b>Readings at 5m</b>	0.74 NTU
<b>Remarks</b>	Placement of DMMU#2 at disposal site.
<b>End of Sample</b>	2:23:00 PM PST

<b>Start of Sample</b>	3:16:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.2882011924398 altitude: 2.6843224 longitude: -122.86222661856829 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	
<b>Readings at Surface</b>	East of Derrick
<b>Readings at 1m</b>	1.71 NTU
<b>Readings at 3m</b>	1.71 NTU
<b>Readings at 5m</b>	0.92 NTU
<b>End of Sample</b>	1.10 NTU 3:19:00 PM PST

<b>Start of Sample</b>	3:23:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Port Moody, BC, Canada  latitude: 49.28900614851088 altitude: -0.85631543 longitude: -122.8643602320206 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	West of Derrick
<b>Readings at Surface</b>	1.76 NTU
<b>Readings at 1m</b>	1.74 NTU
<b>Readings at 3m</b>	1.19 NTU
<b>Readings at 5m</b>	0.91 NTU
<b>Remarks</b>	Placement of material from DMMU#2.
<b>End of Sample</b>	3:26:00 PM PST

Start of Sample	4:23:00 PM PST
Tide	Flood
Location	Port Moody, BC, latitude: 49.28950210572154 altitude: 3.6790445 longitude: -122.8646644112867 [ <a href="#">viewMap</a> ]
Location Name	West of Derrick
Readings at Surface	1.94 NTU
Readings at 1m	1.83 NTU
Readings at 3m	1.45 NTU
Readings at 5m	1.05 NTU
Remarks	Placement of material from DMMU#2.
End of Sample	4:25:00 PM PST

Start of Sample	4:30:00 PM PST
Tide	Flood
Location	Port Moody, BC latitude: 49.288321137474185 altitude: 0.87611777 longitude: -122.86196786921738 [ <a href="#">viewMap</a> ]
Location Name	East of Derrick
Readings at Surface	1.77 NTU
Readings at 1m	1.97 NTU
Readings at 3m	1.15 NTU
Readings at 5m	1.48 NTU
Remarks	Placement of DMMU#2 material.
End of Sample	4:35:00 PM PST

## MARINE MAMMAL OBSERVATIONS #

Time Observed	2:50:00 PM PST
Location	Port Moody, BC latitude: 49.29109499593515 altitude: 0.0055529685 longitude: -122.85865644979157 [ <a href="#">viewMap</a> ]

<b>Species</b>	Harbour Seal
<b>Behaviour Summary</b>	Didn't appear to be in distress. Seen eating.
<b>Remarks/ Comments</b>	Located 150-200m north of work area.

## SUMMARY

**Date** November 29, 2018

**Monitoring Crew Members** Andrew Mackay (ESI), Gail Slavik (ESI), James Haldane (MIB), Mitch Herron (Seward), William Keating (Seaward)

**Activity Type** Continued extraction of DMMU 3 material.

**Wind Speed** 0-20 knots

### OPEN WATER MONITORING #

1 OF 5

<b>Start of Sample</b>	9:55:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Float 29, Port Moody, BC latitude: 49.29365672175707 altitude: 0.46175343 longitude: - 122.87787445832312 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	DMMU 3 West of Derrick
<b>Readings at Surface</b>	2.36 NTU
<b>Readings at 1m</b>	1.89 NTU
<b>Readings at 3m</b>	1.3 NTU
<b>Readings at 5m</b>	0.86 NTU
<b>Remarks</b>	Background;
<b>End of Sample</b>	9:57:00 AM PST

<b>Start of Sample</b>	10:05:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Port Moody, BC latitude: 49.292857328698965 altitude: 2.8752372 longitude: -122.8743958986122 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	DMMU 3 east of Derrick
<b>Readings at Surface</b>	2.11 NTU
<b>Readings at 1m</b>	2.05 NTU
<b>Readings at 3m</b>	1.29 NTU
<b>Readings at 5m</b>	0.95 NTU
<b>Comments</b>	Organic debris in water: bark, leafs. Adjacent derrick FRPD RE MacKenzie (IOL Pipeline removal) mobilizing from adjacent area (potential confounding activity). Cycle times at 10:20 was 2min 54sec. FRPD went on break after 1st cycle.
<b>End of Sample</b>	10:07:00 AM PST

<b>Start of Sample</b>	12:13:00 PM PST
<b>Tide</b>	Ebb
<b>Location</b>	Float 29, Port Moody, BC latitude: 49.29319068794073 altitude: 2.3964086 longitude: -122.87847862590372 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	DMMU 3 West of Derrick
<b>Readings at Surface</b>	2.32 NTU
<b>Readings at 1m</b>	1.78 NTU
<b>Readings at 3m</b>	1.17 NTU
<b>Readings at 5m</b>	0.63 NTU
<b>Remarks</b>	Potential confounding activity - adjacent pipeline removal (50m northwest)
<b>End of Sample</b>	12:16:00 PM PST



## OPEN WATER MONITORING #

4 OF 5

Start of Sample	12:34:00 PM PST
Tide	Ebb
Location	Port Moody, BC latitude: 49.29267026187581 altitude: 3.9351158 longitude: -122.87482260718858 [ <a href="#">viewMap</a> ]
Location Name	DMMU3 east of Derrick
Readings at Surface	1.86 NTU
Readings at 1m	1.63 NTU
Readings at 3m	1.94 NTU
Readings at 5m	0.95 NTU
Remarks	RE Mackenzie pipeline operating adjacent (50m)

## OPEN WATER MONITORING #

5 OF 5

Start of Sample	2:11:00 PM PST
Tide	Ebb
Location	Float 27, Port Moody, BC latitude: 49.29329780866326 altitude: 1.725338 longitude: -122.87896611739218 [ <a href="#">viewMap</a> ]
Location Name	DMMU 3 West of Derrick
Readings at Surface	2.14 NTU
Readings at 1m	1.98 NTU
Readings at 3m	1.79 NTU
Readings at 5m	1.28 NTU
Remarks	Adjacent derrick idle. Debris in water: leaf, fines, logs, cedar ends, fir needles,
End of Sample	2:14:00 PM PST

## MARINE MAMMAL OBSERVATIONS #

Time Observed	2:00:00 AM PST
Species	Harbour Seal
Behaviour Summary	Didn't appear to be in distress
Remarks	Observed east of Derrick along shoreline.

## SUMMARY

<b>Date</b>	Nov 30, 2018
<b>Monitoring Crew Members</b>	Gail Slavik (ESI), Mitch Herron (Seaward)
<b>Activity Type</b>	PAH Sediment placement from DMMU 3.
<b>Weather Conditions</b>	Overcast with showers
<b>Precipitation (mm)</b>	15-20
<b>Any Confounding Activities</b>	None. Other comments: <ul style="list-style-type: none"><li>- no marine mammals observed.</li><li>- no archaeological artifacts observed.</li><li>- Derrick set up along eastern line of PAH sediment disposal site.</li><li>- approximately 1 hour left of unloading/placement of material (scow full)</li></ul>
	Cycle Time <ul style="list-style-type: none"><li>- 11:39am</li><li>- 1min 46sec</li><li>- 1min 52sec</li><li>- 1min 51sec</li></ul>

## OPEN WATER MONITORING

## OPEN WATER MONITORING #

1 OF 4

<b>Start of Sample</b>	11:25:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.28958564215572 altitude: 4.264309 longitude: -122.86443795725266 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	East of Derrick
<b>Readings at Surface</b>	1.84
<b>Readings at 1m</b>	1.28
<b>Readings at 3m</b>	5.99
<b>Readings at 5m</b>	5.53
<b>End of Sample</b>	11:28:00 AM PST

## OPEN WATER MONITORING #

2 OF 4

<b>Start of Sample</b>	11:32:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	1537 Barnet Hwy, Port Moody, BC V3H, Canada latitude: 49.28812734787286 altitude: 0.9998131 longitude: -122.8612361290705 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	West of Derrick
<b>Readings at Surface</b>	1.59
<b>Readings at 1m</b>	1.59
<b>Readings at 3m</b>	1.49
<b>Readings at 5m</b>	1.15
<b>End of Sample</b>	11:35:00 AM PST

## OPEN WATER MONITORING #

3 OF 4

<b>Start of Sample</b>	11:53:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.28961685397596 altitude: -0.58911514 longitude: -122.86453038465498 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	East of Derrick
<b>Readings at Surface</b>	1.63
<b>Readings at 1m</b>	1.35
<b>Readings at 3m</b>	1.96
<b>Readings at 5m</b>	1.67
<b>End of Sample</b>	11:56:00 AM PST

<b>Start of Sample</b>	11:58:00 AM PST
<b>Tide</b>	Flood
<b>Location</b>	Unnamed Road, Port Moody, BC, Canada latitude: 49.288007056775236 altitude: 1.5417747 longitude: -122.86130953343469 [ <a href="#">viewMap</a> ]
<b>Location Name</b>	West of Derrick
<b>Readings at Surface</b>	1.69
<b>Readings at 1m</b>	1.38
<b>Readings at 3m</b>	1.58
<b>Readings at 5m</b>	1.9
<b>End of Sample</b>	12:02:00 PM PST

# Fraser River Pile & Dredge (GP) Inc.

PHONE (604) 522-7971  
FAX (604) 521-7530

## FLAT SCOW DISPLACEMENT CALCULATION SHEET

LOAD # 1

SCOW NAME: perley

PLACEMENT LOCATION

PCT

Dredge Area Zone 2

NOTES / COMMENTS First load of contaminated material  
dredged from area 2. The RT 102 was loaded & has the same  
displacement as the Perley (noted for formula purposes)

P.B.	S.B.
P.S.	S.S.

Light Measure inches at PCT	
<b>A</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	27/11/2018
P.B.	100
S.B.	101
P.S.	90
S.S.	92
TOTAL	383
AVG.	95.75
TONS	308

Loaded Measure inches at PCT (Water)	
<b>B</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	27/11/2018
P.B.	58
S.B.	50
P.S.	52
S.S.	48
TOTAL	208
AVG.	52
TONS	1187

Loaded Measure inches at PCT (Dewatered)	
<b>C</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	28/11/2018
P.B.	59
S.B.	50
P.S.	60
S.S.	51
TOTAL	220
AVG.	55
TONS	1124

Light After offloading inches at PCT	
<b>D</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	28/11/2018
P.B.	89
S.B.	74
P.S.	91
S.S.	76
TOTAL	330
AVG.	82.5
TONS	566

CALCULATED BY: RP SUBTRACTION 'B'-'A' (DREDGED QUANTITY) 879 TONS  
SUBTRACTION 'B'-'C' -(WATER QUANTITY) 63 TONS

CHECKED BY: RK SUBTRACTION 'C'-'D' - (PLACED QUAN) 558 TONS

DREDGED QUAN (M3) 498

PLACED QUAN (M3)

316

797 TONNES

57 TONNES

506 TONNES

# Fraser River Pile & Dredge (GP) Inc.

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## FLAT SCOW DISPLACEMENT CALCULATION SHEET

LOAD # 2

SCOW NAME: perley

PLACEMENT LOCATION

PCT

Dredge Area Zone 3

NOTES / COMMENTS 2nd load of contaminated material  
dredged from area 3. The RT 102 was loaded & has the same  
displacement as the Perley (noted for formula purposes)

P.B.	S.B.
P.S.	S.S.

Light Measure inches at PCT	
<b>A</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	29/11/2018
P.B.	89
S.B.	74
P.S.	91
S.S.	76
TOTAL	330
AVG.	82.5
TONS	566

Loaded Measure inches at PCT (Water)	
<b>B</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	29/11/2018
P.B.	54
S.B.	47
P.S.	30
S.S.	26
TOTAL	157
AVG.	39
TONS	1463

Loaded Measure inches at PCT (post spill)	
<b>C</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	30/11/2018
P.B.	116
S.B.	52
P.S.	71
S.S.	8
TOTAL	247
AVG.	61.75
TONS	998

Light After offloading inches at PCT	
<b>D</b>	
WEATHER	
CALM	X
CHOPPY	
taken by	RP
Date	30/11/2018
P.B.	95
S.B.	103
P.S.	72
S.S.	82
TOTAL	352
AVG.	88
TONS	446

CALCULATED BY: RP SUBTRACTION 'B'-'A' (DREDGED QUANTITY) 897 TONS  
SUBTRACTION 'B'-'C' -(WATER QUANTITY) 465 TONS

CHECKED BY: RK SUBTRACTION 'C'-'D' - (PLACED QUAN) 552 TONS

814 TONNES  
422 TONNES

501 TONNES

DREDGED QUAN (M3) 509

PLACED QUAN (M3)

313



Pipeline removal derrick (left) and PAH dredge derrick (right) working safely in proximity near Reed Point



PAH affected sediment ponar sample to be submitted for DAS chemical analysis.



Mackenzie derrick using silt curtain for turbidity control and placing PAH affected sediment into sealed scow.



Qinsy software used by operations to control dredge cut (e.g., green-blue is target 0.5m depth on ground).