Attention: Manager, Environmental Assessment Major Projects (EAMP)

RE: Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144: Weekly Environmental Report
October 31 to November 6, 2008

Distribution: Jennifer Simpson DFO
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Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon).

INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the
requirements of the FAA, has been included in this weekly report in Section 3—including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: October 31 through November 6, 2008.

Table 1. Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 31, 2008; 12:00 – 18:30</td>
<td>12 ° C, 8 km/hr NE, Overcast, rain</td>
<td>Force 2: Light Breeze (Small wavelets. Crests of glassy appearance, not breaking)</td>
<td>2</td>
</tr>
<tr>
<td>November 3, 2008; 12:30 – 16:30</td>
<td>8 ° C, 15 km/hr E, Overcast, light rain</td>
<td>Force 2: Light Breeze (Small wavelets. Crests of glassy appearance, not breaking)</td>
<td>6</td>
</tr>
<tr>
<td>November 5, 2008; 08:00 – 15:30</td>
<td>10 ° C, 20 km/hr NE, Overcast</td>
<td>Force 2: Light Breeze (Small wavelets. Crests of glassy appearance, not breaking)</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 1. Tidal data for Tsawwassen during the period of October 31 – November 7, 2008.
Source: http://www.tides.gc.ca/
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15, 2008 and extends through March 31, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works were on going during this monitoring period:

- VPD clamshell placement of Type 3 rip-rap slope protection in the Turning Basin,
- VPD clamshell placement of Type B scour protection east of Caisson 20 (C20),
- VPD clamshell placement of rock ballast and berm rock in Caisson 25 & 26 (C25 &C26),
- VPD clamshell clean-up dredging on east side of Caisson Trench (CT),
- VPD clamshell dredging east of caisson wharf,
- Delta Aggregates placement of General Fill Type 1 (GF1) behind Caisson 22 (C22),
- Geo-Pac land densification operations including vibrofloatation and compaction continued,
- Coring and chipping on the caisson wharf by DCL sub-contractor, NIB
- DCL *Lorraine* crane continued installation of Stage 2 coffer dam at the Pod 4 Perimeter Drain (P4PD) Lift Station (LS).
- DCL preparation works on the barge ramp steelworks continued.

1.3.2 **Ongoing and Upcoming Works**

- Current works will continue.
- Installation of culverts in the Tsawwassen First Nation (TFN) Salt-marsh Habitat Compensation was projected to begin November 12th but has been delayed until November 17th.
- Installation of the Barge Ramp is pending.
- Repairs (removal of excess Type 3 rip rap) and construction of the Sub-tidal Reef Compensation Habitat will recommence subject to equipment availability.
- Grouting between caisson cover slabs to occur on November 6
- Grouting at Lift Station to commence November 7
- Pouring of concrete on caisson wharf connecting slabs scheduled to commence November 20
• Cope wall concrete pour and water curing scheduled for December 3 with minor grouting occurring prior to pour
• Scour protection and underwater tremie pour tentatively to commence in January
• Isolation of the CT with continued construction of CD4, marine concrete pour of deadman structure and installation sheet pile wall to tentatively commence early December
• C26 Closure and two stage fish salvage plans to commence December 15th (stage 1 – behind temporary rock berm dike) and early January (stage 2 – behind sheet pile wall)
• DCL submitting fish salvage plans to DFO directly
• Removal of Lift Station sheet pile walls commencing November 10th.
• Lorraine crane to be moved offsite and replaced by November 14th

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered during the period of site works. During the period of Site works, Hemmera conducted three Site visits.

2.1.1 Water Quality

Marine Construction Works

On October 31, Hemmera monitored the caisson trench for turbidity impacts generated during Site works involving bern rock placement at C25. During this visit, the GF1 silt curtain at C22 was closed and snug at both ends. The northern silt curtain was opened while barges returned to the tug dock for the night but was to be replaced before placement of bern rock continued at the northern end of the caisson trench (CT). A turbidity plume ranging from 14 – 24NTU was delineated to 80 m wide within the CT and extending 30 m north of the CT at C26. Water quality measurements collected from surface samples within the immediate work area in the CT are included in Table 2.
Table 2. Turbidity Monitoring Results Collected During a Site Visit on October 31st, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C22/C23 / GF1 Silt curtain</td>
<td>1</td>
<td>E</td>
<td>1 m north of the GF1 silt curtain, 1 m W of berm filter</td>
<td>17:00</td>
<td>0.1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>C22/C23 / GF1 Silt curtain</td>
<td>80</td>
<td>E</td>
<td>1 m north of the GF1 silt curtain, 1 m E of PD</td>
<td>17:05</td>
<td>0.1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>40</td>
<td>N</td>
<td>40 m N of Berm rock placement at C25</td>
<td>17:10</td>
<td>0.1</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>C25</td>
<td>20</td>
<td>S</td>
<td>20 m S of Berm rock placement at C25</td>
<td>17:15</td>
<td>0.1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>C24/C25</td>
<td>40</td>
<td>S</td>
<td>40 m S of Berm rock placement at C25</td>
<td>17:20</td>
<td>0.1</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>10</td>
<td>N</td>
<td>50 m N of berm rock placement at C25</td>
<td>17:25</td>
<td>0.1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>30</td>
<td>N</td>
<td>80 m N of berm rock placement at C25</td>
<td>17:30</td>
<td>0.1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Background</td>
<td>200</td>
<td>NE</td>
<td>200 m Ne of C26</td>
<td>17:38</td>
<td>0.1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

On November 3, Hemmera monitored works in the CT during placement of GF1. The GF1 silt curtain was closed and snug with the shore at both ends. The northern silt curtain was open. Turbidity plumes were observed related to GF1, and Berm Filter (already in place). GF1 generated turbidity levels up to 24NTU behind the silt curtain. North of the Silt curtain turbidity ranged from 4 – 18NTU within 10 m, but fell within 5NTU of background levels by 100 m N. Wave action on Berm Filter Material generated a turbidity plume up to 18NTU which fell within 5NTU of Background within 30 m. Works on the ballast material were contained within the caissons and did not generate turbidity in the marine environment. Water quality measurement collected from surface samples within the CT and area of clamshell placement are included in Table 3. Hemmera observed rock placement by the VPD No. 4 and VPD No. 6 to be conducted as per best management practices with the clamshell placing material below the water surface. No substantial turbidity plumes appeared to be induced by these activities.
Table 3. Turbidity Monitoring Results Collected During a Site Visit on November 3rd, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m SW</th>
<th>NE Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td></td>
<td>200 m NE of C26</td>
<td>15:35</td>
<td>0.1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>C16</td>
<td>1</td>
<td>E Coring at cope wall</td>
<td>14:20</td>
<td>0.1</td>
<td>3</td>
<td>No visible turbidity</td>
</tr>
<tr>
<td>C22</td>
<td>5</td>
<td>N GF1 placement inside silt curtain</td>
<td>14:50</td>
<td>0.1</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>C22/C23/GF1 Silt</td>
<td>1</td>
<td>E 1m north of the GF1 silt curtain, 1 m W of berm filter</td>
<td>15:05</td>
<td>0.1</td>
<td>4</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C22/C23/GF1 Silt</td>
<td>1</td>
<td>N 1m north of the GF1 silt curtain, mid CT</td>
<td>15:10</td>
<td>0.1</td>
<td>5</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>GF1</td>
<td>10</td>
<td>N 3m north of the GF1 silt curtain, 1 m E of PD</td>
<td>15:00</td>
<td>0.1</td>
<td>17</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>GF1</td>
<td>80</td>
<td>N 75 m North of GF1 Silt Curtain, 3 m E of PD</td>
<td>0.1</td>
<td></td>
<td>3</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C24</td>
<td>1</td>
<td>E wave action on placed berm filter</td>
<td>14:45</td>
<td>0.1</td>
<td>18</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C25</td>
<td>30</td>
<td>N Wave action on Berm Filter</td>
<td>15:20</td>
<td>0.1</td>
<td>3</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C26</td>
<td>100</td>
<td>N Wave action on Berm Filter / 160 m N of GF1</td>
<td>15:25</td>
<td>0.1</td>
<td>3</td>
<td>No plume was observed leaving the CT.</td>
</tr>
<tr>
<td>No clamshell placement</td>
<td>6</td>
<td>W Clamshell rock placement in the Turning Basin</td>
<td>15:40</td>
<td>0.1</td>
<td>5</td>
<td>Temporarily inactive with clamshell in water, no visible turbidity plume</td>
</tr>
<tr>
<td>No. clamshell placement</td>
<td>4</td>
<td>S Clamshell rock placement east of C 20</td>
<td>15:45</td>
<td>0.1</td>
<td>2</td>
<td>No visible turbidity plume</td>
</tr>
<tr>
<td>C17/C18</td>
<td>0</td>
<td>gap between C17/C18</td>
<td>15:50</td>
<td>0.1</td>
<td>4</td>
<td>No visible turbidity plume</td>
</tr>
</tbody>
</table>
November 5, 2008 Hemmera again monitored GF1 and rock ballast placement in the CT for turbidity. During this visit it was noted that both silt curtains were in place to contain turbidity within the CT (Photos 1 & 2). As presented in Table 4 below, turbidity ranged from 13 – 16 NTU above background within the CT, with a dramatic drop to slightly less than background immediately north of the second silt fence. This indicates that when the silt fences are closed, they effectively contain turbidity.

It was also noted that DCL’s water crew worked very efficiently to open and close the curtain quickly when allowing the monitoring vessel, the Shark Bite, through, and that rock ballast was being placed in C26 following best practices; lowering rock to water’s surface before release.

<p>| Table 4. Turbidity Monitoring Results Collected During a Site Visit on November 5th, 2008 |
|----------------------------------|------------------|-----------------|----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE</th>
<th>SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Reference Station at Tail Hold Buoy</td>
<td>14:35</td>
<td>0.1</td>
<td>3.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Reference Station at Tail Hold Buoy</td>
<td>14:35</td>
<td>2.0</td>
<td>3.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolly G</td>
<td>30</td>
<td>N</td>
<td>N</td>
<td>GF1 placement</td>
<td>14:10</td>
<td>0.1</td>
<td>19.8</td>
<td>Also rock ballast placement on W side of C26 below water</td>
<td></td>
</tr>
<tr>
<td>Rolly G</td>
<td>30</td>
<td>N</td>
<td>N</td>
<td>GF1 placement</td>
<td>14:10</td>
<td>2.0</td>
<td>38.0</td>
<td>Also rock ballast placement on W side of C26 below water</td>
<td></td>
</tr>
<tr>
<td>Inside northern silt fence</td>
<td>100</td>
<td>N</td>
<td>N</td>
<td>GF1 placement</td>
<td>14:20</td>
<td>0.1</td>
<td>16.5</td>
<td>Also rock ballast placement on W side of C26 below water</td>
<td></td>
</tr>
<tr>
<td>Inside northern silt fence</td>
<td>100</td>
<td>N</td>
<td>N</td>
<td>GF1 placement</td>
<td>14:20</td>
<td>2.0</td>
<td>19.0</td>
<td>Also rock ballast placement on W side of C26 below water</td>
<td></td>
</tr>
<tr>
<td>Outside northern silt fence</td>
<td>10</td>
<td>N</td>
<td>N</td>
<td>Turbid water within northern silt fence</td>
<td>14:30</td>
<td>0.1</td>
<td>2.98</td>
<td>Just outside 2nd silt fence to measure its effectiveness</td>
<td></td>
</tr>
<tr>
<td>Outside northern silt fence</td>
<td>10</td>
<td>N</td>
<td>N</td>
<td>Turbid water within northern silt fence</td>
<td>14:30</td>
<td>2.0</td>
<td>3.54</td>
<td>Just outside 2nd silt fence to measure its effectiveness</td>
<td></td>
</tr>
</tbody>
</table>
Petroleum Hydrocarbons and other Deleterious Substances

On November 3, Hemmera Consulted Delta Aggregates mechanic on status of equipment leaks and was informed that one rock truck (V17) has chronic oil leak (Photo 3) requiring frequent maintenance. Hemmera documented that it is Delta Aggregates practice to monitor equipment leaks by daily fluid level checks and checks for staining on ground and equipment undergoes routine servicing every 250 hrs. At the time when this leak was observed Delta Aggregates trucks appeared to be parked for the night in Fill Area 1 east of Containment Dike 2 (CD2) at a distance greater than 15 m from HHWL. Prior to leaving site, Hemmera staff Informed DCL of ongoing leak status. In response to VFPAs request for increased containment of the chronic leak on the Lorraine, a new leak containment system for Lorraine crane was observed by Hemmera and no new staining was noted (Photo 4).

November 5, Hemmera observed concrete forms between caisson cover slabs prior to grouting that was scheduled to commence, weather permitting, on November 6th at C16 – C22. During this activity, gaps at the ends of the forms were noted (Photo 5). Hemmera discussed the need for further site preparation work prior to grouting to prevent accidental spills into the immediately adjacent marine environment and were informed by DCL that the ends would be sealed with foam, and plastic sheeting would be used to contain any spills.

2.1.2 Fish & Fish Habitat

Use of a clamshell dredge to recover excess overburden from the eastern edge of the CT was observed by Hemmera on November 5. Observations around the perimeter of the dredgeate scow revealed no signs of crabs or crab pieces and only three starfish were visible (Photo 6). The dredge barge crew indicated that an engineer inspector was onboard for ongoing crab observations.

Clean up clamshell dredging also occurred on east side of CT on November 3 that was not observed by Hemmera. A KCB inspector, on-board to monitor material type and progress, reported 15 clam buckets were removed with no evidence of crabs present. VFPA also reports that observers onboard the derrick during clamshell dredging have not observed any evidence of crabs or crab pieces.

Crab salvaging in advance of dredging and rock placement activities has been ongoing by DCL. Placement of crab pots in the areas north and east of the caisson wharf in the vicinity of areas planned to undergo dredging operations has been conduct by a member of the TFN. During the period of this report a total of 131 crabs, including 33 females, were relocated to an area south east of the site near the BC Ferried terminal. Daily crab salvage reports are included in Appendix A – Sharkbite Marine Crabtrap Monitor Sheets.
DCL has identified a tentative need for two-stage fish salvage following C26 closure. Hemmera has discussed with DCL the required notice period in advance of salvage to prepare resources and that water quality at time of salvage should meet criteria in *Fisheries Act* Authorization to maximize salvage efforts. Elevated turbidity in the salvage area may require postponement until the water has cleared. DCL indicated that they intend to submit plans for the fish/crab salvage to DFO directly.

### 2.1.4 Marine Mammals

Marine mammal monitoring (MMM) was conducted twice during this period of site works; November 3rd at 14:00 for 10 minutes from C17, and November 5th at 08:30 for 10 minutes from C16.

On November 3, one (1) leopard seal was observed immediately east of C17. No mammals were observed on November 5th.

### 2.1.5 Spill Response & Environmental Incident Reporting

The chronic leak on the *Lorraine* crane continues to be monitored that the spill containment measures are also relocated.

Hemmera also continues to monitor Delta Aggregates equipment to see that it is in good repair, free from leaks, and that spill containment measures are in place if required.

### 2.2 Action Items

#### 2.2.1 Follow up from Previous Reports

- No further works on the barge ramp has occurred.
- Hemmera continues to monitor the status of the *Lorraine* crane hydraulic leak.
- Hemmera continues to monitor the effectiveness of turbidity containment mitigation measures.
- Hemmera continues to monitor the ongoing crab salvage activities in the eastern CT and the Turning Basin. Hemmera will follow up with TFN that the pots are deployed and checked daily, crabs are released unharmed east of the Mulberry Harbour, a daily log is maintained, and a weekly summary is submitted.

#### 2.2.2 New and Current Action Items

- Hemmera will periodically monitor clam-shell dredging for the presence of crabs or crab pieces in the dredgeate during the fisheries sensitive period and follow up with VPD operators and KCB regarding sightings of crabs or crab pieces in dredgeate when not on Site.
- The need for formal methodologies and Environmental Management Plans (EMPs) to be communicated with adequate time for comment from DFO and for Hemmera to prepare its supporting environmental monitoring responsibilities was stressed at the DCL Coordination Meeting on November 5th, 2008. Hemmera will confirm schedules for upcoming concrete works for the cope wall and scour protection trench tremie pour with DCL, review methodologies and environmental management plans, and monitor for pH and turbidity impacts to marine waters.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

- Hemmera attended the weekly TSI Progress Meeting on November 5th to discuss upcoming works and the Matcon Civil Constructors Ltd. EMP for TSI finishing works.

- Matcon has selected 4Refuel as its fuel supplier and will establish an equipment refuelling area away from areas where storm drains installation will take place. A spill kit will be present at this area.

- Concrete pouring is tentatively scheduled to commence in January 2009. Mobilization activities observed on site did not appear to present any environmental issues.

3.1.2 Birds

- Numerous cormorants, loons and grebes were observed in the former Mulberry Harbour on October 31
- A flock of approximately 50 ducks were observed resting north of the PD October 31
- An eagle was observed on the moved former osprey next north of the PD October 31
- 4 grebes and numerous cormorants and loons were observed off C19 November 3
- 2 Blue Herons were observed on buoys N and NE of CT November 3
- Numerous waterfowl were observed offsite north of the PD November 3
- No observations were made November 5th

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.
Report prepared by:
HEMMERA

Julie McBride, B.ASc.
Environmental Engineering Specialist

Report prepared and peer reviewed by:
HEMMERA

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist
Project Manager

ATTACHMENTS: PHOTOGRAPH LOG, APPENDIX A – SHARKBITE MARINE CRABTRAP
MONITOR SHEETS
PHOTO 1: First silt fence containing GF1 turbidity in south of Caisson Trench - Nov. 5, 2008

PHOTO 2: Second silt fence containing turbidity in north of Caisson Trench - Nov. 5, 2008
PHOTO 3: Staining Delta Aggregates V17 -Nov. 3, 2008

PHOTO 4: Leak containment Lorraine crane – Nov. 3, 2008

File: 499-002.09 Report DFO # 08-040
Date: November 12, 2008
DFO Authorization 02-HPAC-PA1-000-000144

SITE: Deltaport Third Berth Environmental Monitoring
PHOTO 5: Seaward edge of gap for grout pour on caissons. Proper containment for upcoming pour not yet installed - Nov. 5, 2008

PHOTO 6: Dredgeate from east of Caisson Trench; inset, no evidence of crabs visible - Nov. 5, 2008
<table>
<thead>
<tr>
<th>Number of Traps</th>
<th>Position of Trap</th>
<th>Number of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pots 1-4</td>
<td>1 / 3</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>8 / 0 / 2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>7 / 1 / 2</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>1 / 0 / 0</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>0 / 0 / 0</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>0 / 0 / 0</td>
</tr>
<tr>
<td>7</td>
<td>Parted off Pots</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>7-10, dragged a hook</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>For 1 1/2 hrs no luck</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Will try tomorrow</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
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<tr>
<td>15</td>
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<tr>
<td>16</td>
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<td>17</td>
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<tr>
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<tr>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

M. Greenway

Turn over for Summary Comments
<table>
<thead>
<tr>
<th>Females - 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under size - 17</td>
</tr>
<tr>
<td>Legal - 2</td>
</tr>
<tr>
<td>Total - 26</td>
</tr>
</tbody>
</table>

Pots 5 & 6 on rip rap crabs
Like sandy bottom, line between 6-7 must be around some rock
Will drag some more when weather brakes.

All crab released off
O.C. Ferries south east of site
<table>
<thead>
<tr>
<th>Number of Traps</th>
<th>Position of Trap</th>
<th>Number of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>POT 1-4 SET TO THE EAST OF 1406 OFF</td>
<td>4 0 1</td>
</tr>
<tr>
<td>2</td>
<td>CAISSON 25-26</td>
<td>4 1 3</td>
</tr>
<tr>
<td>3</td>
<td>POT 5-10 SET TO THE EAST OF 1404-1402</td>
<td>3 0 2</td>
</tr>
<tr>
<td>4</td>
<td>OFF CAISSON 17-20</td>
<td>6 1 0</td>
</tr>
<tr>
<td>5</td>
<td>THIS POT HAS BOWY ON IT</td>
<td>3 0 3</td>
</tr>
<tr>
<td>6</td>
<td>COULD HAVE BEEN PICKED</td>
<td>5 0 1</td>
</tr>
<tr>
<td>7</td>
<td>2 1 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Turn over for Summary Comments
UNDER SIZE - 35
LEGAL SIZE - 3
FEMALES - 14
TOTAL 52

ALL CRAB RELEASED OUTSIDE SITE TO THE SOUTH EAST BY B.C. FERRIES

NO CRAB REPORTED BY 1404 DIGGING OF CAISSON 17-18
<table>
<thead>
<tr>
<th>Number of Traps</th>
<th>Position of Trap</th>
<th>Number of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pots 1-4 placed outside</td>
<td>0 0 1</td>
</tr>
<tr>
<td>2</td>
<td>1406 placing rip rap off</td>
<td>3 1 0</td>
</tr>
<tr>
<td>3</td>
<td>C-26</td>
<td>1 1 0</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Pots 5-10 set outside</td>
<td>3 0 0</td>
</tr>
<tr>
<td>6</td>
<td>1408, #2 placing rip rap off</td>
<td>5 1 3</td>
</tr>
<tr>
<td>7</td>
<td>Off C-19-20</td>
<td>4 0 2</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>0 0 0</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>3 1 1</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>6 0 3</td>
</tr>
<tr>
<td>11</td>
<td></td>
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<td>12</td>
<td></td>
<td></td>
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<td>14</td>
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<td>16</td>
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<tr>
<td>18</td>
<td></td>
<td></td>
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<tr>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

M. Greenway

Turn over for Summary Comments
UNDER SIZE - 37
LEGAL SIZE - 4
FEMALES - 12
TOTAL 53

POT #3 HAD A HOLE, REPAIRED HOLE
POT #8 COULD HAVE LANDED UPSIDE DOWN
POT REBAITED WITH HALIBUT HEADS
ALL CRAB RELEASED OUTSIDE
CHANNEL MARKERS OUT BY B.C. FERRIES
INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and
the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3—including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: November 7 through November 13, 2008.

Table 1. Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 12, 2008; 14:45 – 18:45</td>
<td>12 º C, 22 km/hr S, overcast, light rain</td>
<td>Force 4: Moderate Breeze (Small waves).</td>
<td>3.8</td>
</tr>
<tr>
<td>November 13, 2008; 09:30 – 12:30</td>
<td>8 º C, 52 km/hr gusting 72 km/h W, sunny, few clouds</td>
<td>Force 7: Moderate Gale (Sea heaps up, foam begins to streak).</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Figure 1. Tidal data for Tsawwassen during the period of November 7-14, 2008. Source: [http://www.tides.gc.ca/](http://www.tides.gc.ca/)
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15, 2008 and extends through March 31, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works were on going during this monitoring period:

- Placement of scour protection rock continued.
- Placement of General Fill Type 1 (GF1) continued.
- Geo-Pac land densification operations continued.
- Clamshell salvage of materials at east edge of mattress pursuant to SI#47.
- Clamshell clean up dredging in keyways and preparation works for keyway installation.
- GF1 filling of C21/C22 sinkhole following loses from keyway
- Installation of precast key between Caisson 20 & 21 (C20/21)
- Grouting/underpinning completed. Disassembly of cofferdam false works at POD4 Perimeter Drain (P4PD) Lift Station (LS)
- Caisson 16 (C16) saw-cutting completed.
- Chipping on east face of caisson wharf underway.
- Concrete placement in gap between cover slabs on C17 and C18 completed.
- Erection of C16-17 connection slab formwork
- Removal of pipe piles from west side of caissons.
- VPD No.8 returned to Site; mobilized crane fitted with crawler tracks to replace *Lorraine*

1.3.2 **Ongoing and Upcoming Works**

- Current works will continue.
- Installation of culverts in the Tsawwassen First Nation (TFN) Salt-marsh Habitat Compensation delayed until December 10th onward.
- Repairs (removal of excess Type 3 rip rap) and construction of the Sub-tidal Reef Compensation Habitat will recommence subject to equipment availability.
- Pouring of concrete connecting slabs on caisson wharf scheduled to commence November 20
- Cope wall concrete pour (water curing) scheduled for December 3; minor grouting occurring prior
- Crane wall concrete pour to commence December
- Marine concrete pour of deadman structure and installation sheet pile wall tentatively commencing early December
- Isolation of the CT with continued construction of CD4
- C26 Closure and two stage fish salvages planned to commence December 15th (stage 1 – behind temporary rock berm dike) and early January (stage 2 – behind sheet pile wall)
- Scour protection and underwater tremie pour tentatively scheduled to commence in January

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on two Site visits during the period of site works.

2.1.1 Water Quality

Marine Construction Works

Marine operations were limited during site visits on November 12 & 13th, 2008 due to high winds/water conditions.

Turbidity was visibly elevated above background levels in the CT and surface foam was observed north of the southern SC (Photos 1 & 2, respectively). Turbidity discharge from the CT associated with GF1 sinkhole losses was observed from the C21/C22 keyway space. This plume appeared to dissipate quickly under rough sea conditions. No turbidity measurements were taken on November 12th.

Turbidity measurements on November 13th indicated that turbidity generated from GF1, ranged from 34 – 18 NTU above background within the CT (Table 2). The plume appeared to disperse immediately north of the CT at C26 due to high wind and wave action.

The south GF1 SC was closed during November 12th and 13th site visits with a slight gap was observed at the east end of the SC (Photos 3 & 4). The north SC was open during both site visits (Photos 5 & 6) to accommodate rigs and marine traffic during poor weather/water conditions.
Petroleum Hydrocarbons and other Deleterious Substances

November 12th refuelling of the Geo-Pac pumping station by 4Fuel Mini Tanker was observed. No discharge or sheens were noted.

DCL crews undertaking maintenance on rigs in the CT November 12th had spill kits, drip pails and absorbent pads on hand.

*Lorraine* crane spill containment tarp and absorbent pads were observed in place at P4PD LS on November 12th & 13th.

Concrete bags covered with plastic were observed on C23 November 12th & 13th *(Photo 7)*. Concern regarding potential for storm surge waters to crest the level of the caissons was discussed with DCL. DCL indicated that if conditions require, equipment and supplies would be removed from caisson wharf.

November 13th filter cloth and plywood containment system was observed on the cutting platform directly above the marine environment on the face of C16. It was discussed with DCL that the system did not fully cover the platform *(Photo 8)* and they indicated improved housekeeping measures would be implemented.

### 2.1.2 Fish & Fish Habitat

November 13th observations of dredged material from the perimeter of the scow revealed no signs of crabs or crab pieces *(Photo 9)*. Crew indicated that approximately 20 buckets of material had been removed from the keyways and that no crabs/crab pieces had been observed.

TFN/DCL had two strings of crab pots in place for relocated crabs in advance of dredging and rock placement activities east of the CT. High winds/water conditions had delayed retrieval and deployment of any further crab pots. Crab salvage efforts were planned to resume as soon as possible.

### 2.1.4 Marine Mammals

At 16:10 on November 12th and 11:30 on November 13th from marine mammal monitoring was conducted within 1 km of the project area for ten minutes from C22 and C16 respectively. None were observed.

### 2.1.5 Spill Response & Environmental Incident Reporting

The chronic leak on the *Lorraine* crane continues to be monitored that the spill containment measures are also relocated.

Delta Aggregates equipment continues to be monitored to see that it is in good repair, free from leaks, and that spill containment measures are in place if required.
2.2  **ACTION ITEMS**

2.2.1  **Follow up from Previous Reports**

- Status of the *Lorraine* crane hydraulic leak continues to be monitored.
- The effectiveness of turbidity containment mitigation measures continues to be monitored.
- Hemmera continues to monitor the ongoing crab salvage activities in the eastern CT and the
  Turning Basin, and follow up with TFN that; the pots are deployed and checked daily, crabs are
  released unharmed east of the Mulberry Harbour, a daily log is maintained, and a weekly
  summary is submitted.

2.2.2  **New and Current Action Items**

- Periodically monitor clam-shell dredging for the presence of crabs or crab pieces in the dredgeate
during the fisheries sensitive period and follow up with VPD operators and KCB regarding
  sightings of crabs or crab pieces when not on Site.

- Review methodologies and EMPs, and confirm schedules for C26 closure, upcoming concrete
  works (cope wall, crane wall, connecting slabs, deadman anchors), and scour protection trench
  tremie pour with DCL.

3.0  **SUPPLEMENTAL ENVIRONMENTAL MONITORING**

3.1.1  **Terminal Systems Inc.**

- Hemmera conducted a TSI site visit November 12th and observed the following;
  - Excavation for waterline installation and staging of concrete piping across the Site had
    commenced with excavation for water line tie-in at north end of Site underway
  - Welding on western operations pad undertaken.
  - Temporary fence installation underway along northern Site border.

- MATCON was consulted and indicated that the gravel/rock pad located at the western entrance
to the Site was to be the Site operations lay-down area, and will be used for re-fuelling of
equipment and for the storage of hazardous materials.

- No environmental concerns were noted
3.1.2 Birds

- Approximately 10 waterfowl were observed west of the perimeter dike, November 12th.
- Approximately 6 – 10 waterfowl were observed east of the caisson wharf, November 13th.

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

REPORT PREPARED BY:
HEMMERA

Julie McBride, B.ASc.
Environmental Engineering Specialist

Report prepared and peer reviewed by:
HEMMERA

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist
Project Manager

ATTACHMENTS: TABLE 2, PHOTOGRAPH LOG
### Table 2. Turbidity Monitoring Results Collected During Site Visit on November 13, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes (e.g. Location, plume extent, plume source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
<td>10:45</td>
<td>0.1</td>
<td>0.1</td>
<td>5 m east of C26</td>
</tr>
<tr>
<td>C22/C23/GF1 Silt Curtain</td>
<td>2</td>
<td>N</td>
<td>GF1 Fill Placement</td>
<td>10:30</td>
<td>0.1</td>
<td>34</td>
<td>Mid-point south silt curtain</td>
</tr>
<tr>
<td>West side CT</td>
<td>10</td>
<td>N</td>
<td>GF1 Fill Placement</td>
<td>11:10</td>
<td>0.1</td>
<td>35</td>
<td>S end of Rolly G</td>
</tr>
<tr>
<td>West side CT</td>
<td>20</td>
<td>N</td>
<td>GF1 Fill Placement</td>
<td>11:15</td>
<td>0.1</td>
<td>20.0</td>
<td>N end of Rolly G</td>
</tr>
<tr>
<td>West C24 in CT</td>
<td>40</td>
<td>N</td>
<td>GF1 Fill Placement</td>
<td>10:35</td>
<td>0.1</td>
<td>20.4</td>
<td>Midway between S and N silt curtain</td>
</tr>
<tr>
<td>West C26 in CT</td>
<td>80</td>
<td>N</td>
<td>GF1 Fill Placement</td>
<td>10:40</td>
<td>0.1</td>
<td>18.4</td>
<td>North end of CT, N silt curtain open</td>
</tr>
</tbody>
</table>
PHOTO 1: Turbidity visibly above background in CT.
Photo November 12, 2008

PHOTO 2: Surface turbidity visible north of the southern SC.
Photo November 12, 2008
PHOTO 3: Turbidity and gap in south SC at GF1 toe.
Photo November 12, 2008

PHOTO 4: Turbidity and surface foam at GF1 SC gap
Photo November 13, 2008
PHOTO 5: CT northern SC open with VPD rigs parked in shelter of the storm surge. Photo November 12, 2008

PHOTO 6: CT with north and south silt curtains. Photo November 13, 2008

File: 499-002.09 Report DFO # 08-041
Date: November 19, 2008
DFO Authorization 02-HPAC-PA1-000-000144

SITE: Deltaport Third Berth Environmental Monitoring
PHOTO 7: Plastic covered concrete on caisson wharf. Photo November 12, 2008

PHOTO 8: C16 Chipping platform with partial plywood & filter cloth coverage. Photo November 13, 2008
PHOTO 9: Dredgeate VPD No. 4. Photo November 13, 2008
Attention: Manager, Environmental Assessment Major Projects (EAMP)


Distribution: Jennifer Simpson DFO
Brad Fanos DFO
Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
Darrell Desjardin VFPA
Carrie Brown VFPA
Brian Atwell DCL
Trevor Reid VPD
Bill Clark KCB
Mike Willcox MOE
Geoff Wickstrom Hemmera
Simon Daniels TSI
Jim O’Dowd TSI

Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon)
INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0  SUMMARY OF SITE WORKS & OBSERVATIONS

1.1  PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: November 14th through November 20th, 2008.

Table 1: Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 18, 2008; 10:00 – 11:45 and 12:45 – 14:15</td>
<td>10 º C, 10 - 17 km/hr, sunny</td>
<td>Force 4: Moderate Breeze (Small waves)</td>
<td>Trace</td>
</tr>
<tr>
<td>November 19, 2008; 8:45 – 11:00 and 13:30 – 15:00</td>
<td>9 º C, 3 km/hr E, clear skies</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
</tbody>
</table>
1.2 Environmental Windows

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15\textsuperscript{th}, 2008 and extends through March 31\textsuperscript{st}, 2009. During the crab sensitive period the project’s \textit{Fisheries Act} Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 Description of Site Works & Observations

1.3.1 Works During Monitoring Period

The following works occurred during this monitoring period:

- Placement of scour protection Type A rock.
- Clamshell recovery of General Fill 1 (GF1) sands lost from the caisson wharf (C-Wharf).
- Placement of protection rock along turning basin northeast of the C-Wharf.
- Placement of precast keys and keyway works along caisson wharf.
- Placement of General Fill Type 1 (GF1) continued.
- Works at Caisson 16 (C16).
• Delta Aggregates (DA) – Limited GF1 placement in Caisson Trench (CT) adjacent to the Perimeter Dike (PD).

• Removal of excess rock berm from between caissons and installation and compacting of berm filter to underside of connecting slabs.

• Geo-Pac – Land densification operations continued.

• POD4 Perimeter Drain (P4PD) Lift Station (LS) works continued.

• DCL Lorraine on standby for completion of works at P4PD LS.

• DCL Manitowoc – mobile track crane maintenance in preparation operations.

• Assembly of in-situ concrete formwork at DCL laydown area.

• Placement of rebar for formworks at connecting slabs on C-Wharf.

1.3.2 Ongoing and Upcoming Works

• Placing of scour protection Type A rock continued.

• Placing of protection rock on turning basin slopes.

• Placement of precast keys and keyway works along the C-Wharf.

• Placement of General Fill Type 1 (GF1) continued.

• Continued works at Caisson 16 (C16).

• Land densification operations continued (Geo-Pac).

• POD4 Perimeter Drain (P4PD) Lift Station (LS) works continued.

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on two site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Placement of GF1 sands in the Caisson Trench (CT) were limited as a result of weather conditions and shut downs due to sand losses experienced through the C22/C23 keyway. During both monitoring events, turbidity was visibly elevated and minor quantities of surface foam present within the CT north of the southern silt curtain (SC) which was in place (Photo 1 and 2). Turbidity measurements on November 18th indicated that turbidity generated from placement of GF1 ranged from 27 – 40 NTU above background within the CT (see Appendix Table 2). Turbidity was visibly elevated north of the C26 but did not exceed
5 NTU above the background level on either November 18th or 19th. (see Appendix Table 3). The northern SC was in place and was intermittently opened to allow marine vehicle access to the CT and, on November 19th, to allow relocation of the Rolly-G.

Turbidity plumes from the CT associated with remedial works behind installed keyways were observed from the C18/C19, C19/C20 and C20/C21 keyway spaces (Photo 3) but appeared to dissipate within 10 meters to below 5 NTU above background. Filter cloth had been installed between the backfill and the keyways to help contain the fines (Photo 4).

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

On November 19th, an uncured pallet of grout was present on the C-Wharf. No works requiring grout were being conducted at this time. Storage of hazardous materials greater then 15 meters from the High-High Water Line (HHWL) was discussed with DCL.

2.1.2 Fish & Fish Habitat

November 18th and 19th monitoring clam-shell dredged material east of the C-Wharf (C22/C23) observed no crabs or crab pieces present (Photo 5 and 6). DCL indicated that crab salvage activities continue as per the agreed methodology. On November 19th a school of approximately 50 unidentified fish was noted east of the C-Wharf.

2.1.3 Marine Mammals

At 11:30 on November 18th and 14:45 on November 19th marine mammal monitoring was conducted within 1 km of the project area for ten minutes west of C17 and C22, respectively. No marine mammals were observed.

2.1.4 Spill Response & Environmental Incident Reporting

Delta Aggregates (DA) staging area on the pre-load sands was monitored and equipment appeared to be in good working order and no sign of spills or staining below parked equipment or vehicles were observed.

The Lorraine crane spill containment tarp was observed in place at the P4PD LS and accumulation of oil in the tarp was noted and discussed with DCL.
2.2 **ACTION ITEMS**

2.2.1 **Follow-up from Previous Reports**

- Monitored for presence of crabs or crab pieces in the dredgate and followed-up with TFN on crab salvage activities and reporting.
- Continued to monitor berm rock and berm filter placement, turbidity in the CT and the effectiveness of the SCs.
- Continued to monitor the status of the *Lorraine* crane hydraulic leak containment and mitigation measures.
- Monitored DA equipment to ensure that it is in good repair and free from leaks.

2.2.2 **New and Current Action Items**

- Monitor GF1, berm rock and berm filter placement in the CT, including turbidity monitoring and application of appropriate mitigation measures.
- Monitor Delta Aggregates equipment to see that it is in good repair and free from leaks.
- Status of the Lorraine crane hydraulic leak continues to be monitored until its removal from the site.
- Confirm schedules for C26 closure, upcoming concrete works (cope wall, crane wall, connecting slabs, deadman anchors), and scour protection trench tremie pour with DCL, review methodologies and environmental management plans.

3.0 **SUPPLEMENTAL ENVIRONMENTAL MONITORING**

3.1.1 **Terminal Systems Inc.**

No environmental concerns were noted.

3.1.2 **Birds**

- Approximately 7 waterfowl were observed west of the perimeter dike, November 18th.
- Approximately 20 waterfowl were observed west of the PD and one loon was observed east of the C-Wharf on November 19th. In addition, numerous bird species were observed along the causeway resting in the eel grasses northwest of the project area.

3.1.3 **Air Quality**

No dust concerns were noted during this period.
3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Attachments: Tables 2 and 3, Photograph Log
### Table 2: Turbidity Monitoring Results Collected During Site Visit on November 18th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes (e.g. Location, plume extent, plume source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
<td>13:35</td>
<td>0.1</td>
<td>4.38</td>
<td>Approximately 150 m north of GF1</td>
</tr>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
<td>13:35</td>
<td>0.1</td>
<td>2.88</td>
<td>Approximately 150 m north of GF1</td>
</tr>
<tr>
<td>CT</td>
<td>30</td>
<td>N</td>
<td>GF1</td>
<td>13:15</td>
<td>0.1</td>
<td>37.2</td>
<td>Toe of south SC</td>
</tr>
<tr>
<td>CT</td>
<td>30</td>
<td>N</td>
<td>GF1</td>
<td>13:15</td>
<td>0.1</td>
<td>44.8</td>
<td>Toe of south SC</td>
</tr>
<tr>
<td>CT</td>
<td>60</td>
<td>N</td>
<td>GF1</td>
<td>13:20</td>
<td>0.1</td>
<td>33.0</td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>60</td>
<td>N</td>
<td>GF1</td>
<td>13:20</td>
<td>0.1</td>
<td>33.0</td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>80</td>
<td>N</td>
<td>GF1</td>
<td>13:25</td>
<td>0.1</td>
<td>32.1</td>
<td>West of C26</td>
</tr>
<tr>
<td>CT</td>
<td>80</td>
<td>N</td>
<td>GF1</td>
<td>13:25</td>
<td>0.1</td>
<td>34.4</td>
<td>West of C26</td>
</tr>
<tr>
<td>Outside CT</td>
<td>100</td>
<td>N</td>
<td>Turbid water north of CT</td>
<td>13:30</td>
<td>0.1</td>
<td>9.82</td>
<td>North SC not in place during sampling</td>
</tr>
<tr>
<td>Outside CT</td>
<td>100</td>
<td>N</td>
<td>Turbid water north of CT</td>
<td>13:30</td>
<td>0.1</td>
<td>9.16</td>
<td>North SC not in place during sampling</td>
</tr>
</tbody>
</table>

### Table 3: Turbidity Monitoring Results Collected During Site Visit on November 19th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes (e.g. Location, plume extent, plume source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>200</td>
<td>N</td>
<td>None.</td>
<td>13:37</td>
<td>0.1</td>
<td>3.0</td>
<td>Background turbidity low</td>
</tr>
<tr>
<td>C16/C17 Keyway</td>
<td>20</td>
<td>E</td>
<td>C16/C17 keyway space</td>
<td>13:43</td>
<td>0.1</td>
<td>3.4</td>
<td>Beyond visible turbidity plume extent</td>
</tr>
<tr>
<td>C16/C17 Keyway</td>
<td>10</td>
<td>E</td>
<td>C16/C17 keyway space</td>
<td>13:45</td>
<td>0.1</td>
<td>3.5</td>
<td>Extent of visible plume</td>
</tr>
<tr>
<td>C16/C17 Keyway</td>
<td>0</td>
<td>E</td>
<td>C16/C17 keyway space</td>
<td>13:47</td>
<td>0.1</td>
<td>3.7</td>
<td>At point source</td>
</tr>
<tr>
<td>C17/C18 Keyway</td>
<td>0</td>
<td>E</td>
<td>C17/C18 keyway space</td>
<td>13:51</td>
<td>0.1</td>
<td>17.4</td>
<td>At point source</td>
</tr>
<tr>
<td>C17/C18 Keyway</td>
<td>10</td>
<td>E</td>
<td>C17/C18 keyway space</td>
<td>13:54</td>
<td>0.1</td>
<td>3.4</td>
<td>Extent of visible plume</td>
</tr>
<tr>
<td>Mouth of CT</td>
<td>100</td>
<td>N</td>
<td>GF1/CT</td>
<td>13:59</td>
<td>0.1</td>
<td>2.5</td>
<td>No plume visible</td>
</tr>
<tr>
<td>Mouth of CT</td>
<td>50</td>
<td>N</td>
<td>GF1/CT</td>
<td>14:04</td>
<td>0.1</td>
<td>3.2</td>
<td>No plume visible</td>
</tr>
<tr>
<td>Mouth of CT</td>
<td>0</td>
<td>N</td>
<td>GF1/CT</td>
<td>14:07</td>
<td>0.1</td>
<td>4.1</td>
<td>No plume visible</td>
</tr>
</tbody>
</table>
PHOTO 1: Southern silt curtain in place with foam seeping from gap at west end
Photo: November 18, 2008

PHOTO 2: Surface turbidity foam visible north of the southern silt curtain at GF1 toe.
Photo: November 19, 2008
PHOTO 3: Turbidity discharge plume observed east of C18/C19 keyway space.  
Photo: November 19, 2008

PHOTO 4: Filter cloth installation between backfill and keyway at C18/C19 observed prior to removal of backfill during keyway remedial work.  Photo November 19, 2008.
PHOTO 5: Clam-shell dredged material. Crab or crab pieces were not observed.
Photo November 18, 2008

PHOTO 6: Recovered sediments with no signs of crabs or crab pieces.
Photo November 19, 2008
December 2, 2008
File: 499-002.09

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC V6C 3S4

Attention: Manager, Environmental Assessment Major Projects (EAMP)

RE: Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144: Weekly Environmental Report
November 21 - 27, 2008

Distribution: Jennifer Simpson DFO
Brad Fanos DFO
Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
Darrell Desjardin VFPA
Carrie Brown VFPA
Brian Atwell DCL
Robert Windecker DCL
Trevor Reid VPD
Bill Clark KCB
Mike Willcox MOE
Geoff Wickstrom Hemmera
Simon Daniels TSI
Jim O’Dowd TSI

Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and
the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: November 21th through November 27th, 2008.

Table 1: Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 22, 2008; 9:45 – 14:45</td>
<td>9 º C, 4 km/hr, partly cloudy</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
<tr>
<td>November 24, 2008; 9:00 – 13:30</td>
<td>7 º C, 5 km/hr SSE, sunny</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
<tr>
<td>November 26, 2008; 13:00 – 16:30</td>
<td>6 º C, 5 km/hr NW, overcast</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>2.3 mm</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of November 21 - 27, 2008

Source: http://www.tides.gc.ca/
1.2 ENVIRONMENTAL WINDOWS

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s Fisheries Act Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS

1.3.1 Works During Monitoring Period

The following works occurred during this monitoring period:

- Placement of scour protection rock east of the caisson wharf (C-Wharf).
- Placement of protection rock along turning basin slope.
- Placement of berm rock for construction of cross dike at mouth of the caisson trench (CT).
- Placement of precast keys and keyway works along the C-Wharf.
- Clam-shell recovery of General Fill 1 (GF1) sands lost from the C-Wharf.
- Pouring of concrete connecting slabs along C-Wharf.
- Installing and compacting backfill up to underside of connecting slabs.
- Assembly of in-situ formwork for the cope wall at DCL laydown area C16-C17.
- Placement of rebar for formworks at connecting slabs on C-Wharf.
- Placement of general fill directed to the west side of the Stage 1 fill area, adjacent to the Perimeter Dike (PD).
- Removal of temporary piles at the tied bulk head.
- Placement of rebar for C17 Cope Wall.
- Geo-Pac - Land densification operations continued.
- POD4 Perimeter Drain (P4PD) Lift Station (LS) works continued.
- DCL Lorraine disassembled and awaiting demobilization from the site.

1.3.2 Ongoing and Upcoming Works

- Placing of scour protection east of the C-Wharf continued.
- Placement of precast keys and keyway works along the C-Wharf.
- Placement of General Fill Type 1 (GF1) continued.
- Continued works at Caisson 16 (C16).
- Land densification operations continued (Geo-Pac).
• POD4 Perimeter Drain (P4PD) Lift Station (LS) works continued and completion may begin this month.
• Pouring of connecting slabs along C-Wharf.
• Closure of the CT and cope wall works/concrete pour.

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on two site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Turbidity observed within the CT was minimal on November 22nd as GF1 activities were not conducted. The southern silt curtain (SC) had been relocated to the north end of the CT and a new southern SC was being assembled. Berm rock placement for the construction of the cross dike at the mouth of the CT was undertaken and placement using BMP was observed. A rig, scow and northern SC were in place at the north end of the CT to contain turbidity (Photo 1) with dump scow placing recovered sands within the CT intermittently. Turbidity measurements taken north of the northern SC were within 5 NTU of background (see Appendix Table 2). Concrete connecting slab pours were undertaken with formwork installed without gaps, and expansion foam used to decrease the potential for leaks. Concrete was placed with low slump with no leaks from the formwork or discharge to the marine environment observed (Photo 2). Plastic poly was on-hand and freshly poured concrete was covered with poly of filter cloth during curing.

Both SCs were in place on November 24th, however, a turbidity plume was visible extending approximately 10 m north of the northern SC. Water quality samples taken approximately 20 m north of the northern SC indicated that turbidity levels were below background (see Appendix Table 3).

On November 26th, the north SC was not in place during keyway placement, however, a derrick located inside the CT appeared to provide a partial barrier. The southern SC was opened intermittently to allow vessels to enter the CT. Water quality measurements indicated that turbidity was within 5 NTU of background north of the CT (see Appendix Table 4). Clamshell recovery of materials and placing of scour protection east of the C-Wharf did not generate turbidity plumes more then 5 NTU above background within 10 m (see Appendix Table 4).

Turbidity associated with remedial works behind keyways was not observed during this period of site works.
2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Housekeeping aboard the Rolly-G was observed to be stored either indoors or covered with secondary containment on November 22nd. On November 24th, a Geo-Pac dewatering pump located west of the C-Wharf did not have secondary fuel containment (Photo 3). This was discussed with DCL who indicated that appropriate measures would be taken.

Concrete truck used during connecting slab pour was relocated to area greater than 15 m from high water prior to washout.

2.1.2 Fish & Fish Habitat

Monitoring of clam-shell dredged material east of the C-Wharf observed no crabs or crab pieces present (Photo 4) during this period of site work. DCL indicated that crab salvage activities continue as per the agreed methodology.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted three times during this period of site works. No marine mammals were observed.

2.1.4 Spill Response & Environmental Incident Reporting

DA staging area on the pre-load sands was monitored and equipment appeared to be in good working order with no sign of spills or staining below parked equipment or vehicles observed. A leaking rock truck had been permanently removed off site and impacted soils had been excavated and removed for off site disposal.

The Lorraine crane has been dismantled and is scheduled to be demobilized from the site. A spill containment tarp remains in place. On November 26th, the spill containment tarp was observed to be full of liquid and a sheen was observed where overflow had occurred. It was discussed with DCL that the tarp should be regularly checked for oil/rain water accumulation.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- Monitored for presence of crabs or crab pieces in the dredgate and followed-up with TFN on crab salvage activities and reporting.
- Continued to monitor berm rock and berm filter placement, turbidity in the CT and the effectiveness of the SCs.
- Continued to monitor the status of the *Lorraine* crane hydraulic leak containment and mitigation measures.
- Monitored DA equipment to ensure that it is in good repair and free from leaks.
- Monitored concrete pour for connecting slab.

### 2.2.2 New and Current Action Items

- Monitor GF1, berm rock and berm filter placement in the CT, including turbidity monitoring and application of appropriate mitigation measures.
- Follow-up on secondary containment for dewatering pump.
- Monitor Delta Aggregates equipment to see that it is in good repair and free from leaks.
- Monitor status of the Lorraine crane hydraulic leak until its removal from site.
- Monitor concrete pours for connecting slabs to confirm that best management practices and mitigation measures are followed.
- Confirm methodologies and environmental management plans with DCL for C26 closure, upcoming concrete works (cope wall, crane wall, deadman anchors), and scour protection trench tremie pour.

### 3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

#### 3.1.1 Terminal Systems Inc.

No environmental concerns were noted.

#### 3.1.2 Birds

During each monitoring event, numerous waterfowl and Dunlin were observed north and northwest of the PD. On November 22\(^{nd}\), four Brant Geese were observed in Mulberry Harbour and a flock of unidentified birds was observed resting east of Berth 1. On November 26\(^{th}\), one cormorant and one grebe were observed immediately north of the PD.

#### 3.1.3 Air Quality

No dust concerns were noted during this period.

#### 3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.
Report prepared by:
HEMMERA

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Table 2: Turbidity Monitoring Results Collected During Site Visit on November 22th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>200</td>
<td>N</td>
<td>None.</td>
<td>12:20</td>
<td>0.1</td>
<td>2.7</td>
<td>Background turbidity low.</td>
</tr>
<tr>
<td>North side of North SC</td>
<td>5</td>
<td>N</td>
<td>CT Discharge</td>
<td>12:15</td>
<td>0.1</td>
<td>4.53</td>
<td>No visible plume evident. Rig, scow and SC recently returned to position following intermittent opening for access to CT.</td>
</tr>
</tbody>
</table>

Table 3: Turbidity Monitoring Results Collected During Site Visit on November 24th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>200</td>
<td>N</td>
<td>None.</td>
<td>11:30</td>
<td>0.1</td>
<td>2.7</td>
<td>Background turbidity low.</td>
</tr>
<tr>
<td>Outside 2nd Silt Curtain, north end of CT</td>
<td>100</td>
<td>N</td>
<td>GF1 filling on west side of CT</td>
<td>11:15</td>
<td>0.1</td>
<td>17.0</td>
<td>Plume extending to north end of CT</td>
</tr>
<tr>
<td>10m out from North Silt Curtain</td>
<td>110</td>
<td>N</td>
<td>GF1 filling west side of CT</td>
<td>11:20</td>
<td>0.1</td>
<td>12.9</td>
<td>Edge of visible plume</td>
</tr>
<tr>
<td>20m out from North Silt Curtain</td>
<td>120</td>
<td>N</td>
<td>GF1 filling west side of CT</td>
<td>11:25</td>
<td>0.1</td>
<td>1.6</td>
<td>Below background</td>
</tr>
<tr>
<td>Inside North Silt Curtain</td>
<td>95</td>
<td>N</td>
<td>GF1 filling west side of CT</td>
<td>11:35</td>
<td>0.1</td>
<td>18.3</td>
<td>Inside North SC at north end of Rolly-G</td>
</tr>
<tr>
<td>Background</td>
<td>200</td>
<td>N</td>
<td>None.</td>
<td>11:30</td>
<td>0.1</td>
<td>2.7</td>
<td>Background turbidity low.</td>
</tr>
<tr>
<td>Outside 2nd Silt Curtain, north end of CT</td>
<td>100</td>
<td>N</td>
<td>GF1 filling on west side of CT</td>
<td>11:15</td>
<td>0.1</td>
<td>17.0</td>
<td>Plume extending to north end of CT</td>
</tr>
</tbody>
</table>

Table 4: Turbidity Monitoring Results Collected During Site Visit on November 26th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>200</td>
<td>NE</td>
<td>C26</td>
<td>15:30</td>
<td>0.1</td>
<td>6</td>
<td>Background turbidity</td>
</tr>
<tr>
<td>Mid CT at C24</td>
<td>1</td>
<td>S</td>
<td>South of GF1 Silt curtain in plume</td>
<td>15:30</td>
<td>0.1</td>
<td>52</td>
<td>Visible turbidity from GF1</td>
</tr>
<tr>
<td>Mid CT at C24</td>
<td>10</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>15:30</td>
<td>0.1</td>
<td>40</td>
<td>Visible turbidity from GF1</td>
</tr>
<tr>
<td>Mid CT C25</td>
<td>50</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>15:30</td>
<td>0.1</td>
<td>31</td>
<td>Visible turbidity from GF1</td>
</tr>
<tr>
<td>Mid CT C26</td>
<td>90</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>15:30</td>
<td>0.1</td>
<td>11</td>
<td>Visible turbidity from GF1</td>
</tr>
<tr>
<td>North of CT</td>
<td>100</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>15:30</td>
<td>0.1</td>
<td>11</td>
<td>Visible turbidity from GF1</td>
</tr>
<tr>
<td>North of CT</td>
<td>150</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>15:30</td>
<td>0.1</td>
<td>8</td>
<td>No visible turbidity</td>
</tr>
</tbody>
</table>
PHOTO 1: Rig and scow orientated at the mouth of the CT to assist in the containment of turbidity. Photo: November 22, 2008

PHOTO 2: Connecting slab at C17/C18 with no leaks or discharge to the marine environment observed. Photo: November 22, 2008
PHOTO 3: Dewatering pump west of C-Wharf lacking secondary containment.
Photo: November 24, 2008

PHOTO 4: Recovered sands from east of the keyway with no signs of crabs or crab pieces.
Photo: November 26, 2008
INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and
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1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: November 28th through December 4th, 2008.

Table 1: Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 3, 2008; 09:00 to 16:30</td>
<td>9 ° C, 5 km/hr E, overcast</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
<tr>
<td>December 4, 2008; 07:15 to 10:30 and 11:30 to 12:00</td>
<td>3 ° C, 6 km/hr E, sunny</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of November 28th to December 4th, 2008

Source: http://www.tides.gc.ca/
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works occurred during this monitoring period:

- Placement of berm rock for construction of cross dike at mouth of the caisson trench (CT).
- Assembly of in-situ formwork for the cope wall at DCL laydown area C16-C17.
- Placement of scour protection rock east of the caisson wharf (C-Wharf).
- Construction of cope wall formwork at C17 and C18.
- Placement of general fill (GF1) in the CT.
- Geo-Pac - Land densification operations continued.
- DCL – concrete finishing of eyelets and general works along the C-Wharf.
- Chipping behind caisson 16 (C16).
- POD4 Perimeter Drain (P4PD) Lift Station (LS) works completed and waste water treatment plant reconnected.
- DCL *Lorraine* disassembled and awaiting demobilization from the site.

1.3.2 **Ongoing and Upcoming Works**

- Construction of cross berm and placement of berm filter.
- Assembly of formwork for the cope wall and crane wall.
- Placement of GF1 in the CT.
- Closure of the CT and cope wall works/concrete tremie pour.
- Land densification operations continued (Geo-Pac).
- Continued works at C16.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on two site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

On December 3rd, foam generated by GF1 placement was observed overflowing the southern silt curtain (SC) (Photo 1). The northern silt curtain was open. Turbidity 10 m north of the southern SC was 21 NTU decreasing to 10 NTU 30 m north (see Appendix Table 2) and 6 NTU 1 m north of C26 (Photo 2). Background pH and turbidity for toe protection temie pour was collected along the face of the C-Wharf at 16.5 m depth and at surface (0.1 m). Turbidity ranged from 8 to 15 NTU and pH ranged from 7.70 to 7.84.

The southern and northern SCs were observed to be in place and closed on December 4th, 2008. Turbidity and minor quantities of foam were observed seeping through gaps on the SC, however, a scow and derrick located at the mouth of the CT appeared to assist in containing the turbidity (Photo 3). A turbidity plume was visible extending approximately 20 m north of C26 with turbidity levels returning to background levels within 30 m (Photo 4). Turbidity measurement taken northeast of the northern SC was found to be within 5 NTU of background (see Appendix Table 3).

A turbidity plume, extending approximately 10 m, was observed west of the PD (Photo 5). The source of the turbidity is unknown.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

During both monitoring event, grouting of eyelets on the C-Wharf was conducted (Photo 6). On December 3rd, curing concrete was observed to be uncovered and a “berm” around the concrete mixer did not sufficiently contain concrete or wash water. In addition, wet concrete visibly tracked over the tops of the caissons. DCL was reminded of FAA and EMP requirements for concrete works. Work practices were observed to have improved during the December 4th monitoring event.

2.1.2 Fish & Fish Habitat

Recovery of GF1 material east of the C-Wharf has been completed. DCL indicated that crab salvage activities continue as per the agreed methodology. TFN representative indicated that crabs caught were decreasing the number as the season progresses.
2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during this period of site works. No marine mammals were observed.

2.1.4 Spill Response & Environmental Incident Reporting

The *Lorraine* crane spill containment tarp was observed to have been removed. Evidence of spills or leaks below the crane was not observed. Delta Aggregates equipment was observed to be in good working order and spills or leaks below equipment was not observed.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- Monitoring for presence of crabs or crab pieces in the dredgate and followed-up with TFN on crab salvage activities and reporting has been completed. No crabs observed.
- DA equipment appeared free from leaks.
- Lorraine crane appeared free from leaks.
- Water pump secondary containment not in place.

2.2.2 New and Current Action Items

- Confirm methodologies, environmental management plans and monitoring plans with DCL for C26 closure, upcoming concrete works (cope wall, crane wall, deadman anchors), and scour protection trench tremie pour.
- Monitor concrete works for compliance with the FAA and EMPs.
- Monitor GF1, berm rock and berm filter placement in the CT, including turbidity monitoring and application of appropriate mitigation measures.
- Follow-up on secondary containment for dewatering pump.
- Monitor Delta Aggregates equipment to see that it is free from leaks.
- Monitor status of the Lorraine crane hydraulic leak until its removal from site.
- Continue to monitor berm rock and berm filter placement, turbidity in the CT and the effectiveness of the SCs.
3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

No environmental concerns were noted.

3.1.2 Birds

During each monitoring event, numerous waterfowl were observed along the crest protection, and surrounding area, north of the perimeter dike (PD). On December 3, one grebe was observed in the CT and 20 to 50 cormorants, loons and grebes were observed in the former Mulberry Harbour (MH) area.

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

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Attachments: Tables 2 and 3, Photograph Log
Table 2: Turbidity Monitoring Results Collected During Site Visit on December 3\textsuperscript{rd}, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>pH</th>
<th>Notes (e.g. Location, plume extent, plume source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C16</td>
<td>1</td>
<td>E</td>
<td>Caisson Wharf eastern toe / scour protection 150 m NE</td>
<td>13:30</td>
<td>16.5</td>
<td>7.80</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>C18/C19</td>
<td>1</td>
<td>E</td>
<td>Caisson Wharf eastern toe / scour protection placement 50 m NE</td>
<td>12:45</td>
<td>0.1</td>
<td>7.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C18/C19</td>
<td>1</td>
<td>E</td>
<td>Caisson Wharf eastern toe / scour protection placement 50 m NE</td>
<td>12:45</td>
<td>16.5</td>
<td>7.70</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>C22/C23</td>
<td>1</td>
<td>E</td>
<td>Caisson Wharf eastern toe / scour protection placement 150 m SE</td>
<td>12:50</td>
<td>16.5</td>
<td>7.72</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>1</td>
<td>N</td>
<td>Caisson Wharf northern toe</td>
<td>12:55</td>
<td>0.1</td>
<td></td>
<td>6</td>
<td>Background location</td>
</tr>
<tr>
<td>C26</td>
<td>1</td>
<td>N</td>
<td>Caisson Wharf northern toe</td>
<td>12:55</td>
<td>16.5</td>
<td>7.74</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>C25/C26</td>
<td>1</td>
<td>E</td>
<td>Concrete mixer on caisson wharf</td>
<td>13:00</td>
<td>0.1</td>
<td>7.84</td>
<td>9</td>
<td>No visible turbidity</td>
</tr>
<tr>
<td>C24/GF1 SC</td>
<td>10</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>13:10</td>
<td>0.1</td>
<td></td>
<td>21</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C25/GF1 SC</td>
<td>30</td>
<td>N</td>
<td>North of GF1 silt curtain</td>
<td>13:15</td>
<td>0.1</td>
<td></td>
<td>10</td>
<td>No visible turbidity</td>
</tr>
</tbody>
</table>

Table 3: Turbidity Monitoring Results Collected During Site Visit on December 4\textsuperscript{th}, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes (e.g. Location, plume extent, plume source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>100</td>
<td>NE</td>
<td>GF1</td>
<td>9:05</td>
<td>0.1</td>
<td>1.67</td>
<td>Background turbidity</td>
</tr>
<tr>
<td>North of C26 and northern SC</td>
<td>60</td>
<td>N</td>
<td>GF1</td>
<td>9:10</td>
<td>0.1</td>
<td>4.01</td>
<td>Placing of berm rock at north end of CT</td>
</tr>
<tr>
<td>Rolly-G at C25</td>
<td>30</td>
<td>N</td>
<td>GF1</td>
<td>9:15</td>
<td>0.1</td>
<td>8.01</td>
<td>Placing of berm rock at north end of CT</td>
</tr>
</tbody>
</table>
PHOTO 1: Foam overflowing the GF1 silt curtain. Photo: December 3, 2008

PHOTO 2: Minor quantities of foam drifting north of the CT. Turbidity levels were within background. Photo: December 3, 2008
PHOTO 3: Scow and derrick located at the mouth of the CT. Photo: December 4, 2008

PHOTO 4: Turbidity plume north of the northern silt curtain. Photo: December 4, 2008
PHOTO 5: Turbidity plume located west of the perimeter dike. Photo: December 4, 2008

PHOTO 6: Grouting of eyelets on caisson wharf. Photo: December 3, 2008
INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and
the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: December 5th through December 11th, 2008.

Table 1: Weather Data and Observations During Site Visits

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 5, 2008; 10:45 to 18:30</td>
<td>7 º C, 5 km/hr SE, overcast</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>0 mm</td>
</tr>
<tr>
<td>December 9, 2008; 14:00 to 21:30</td>
<td>7 º C, 15 km/hr SE, rain</td>
<td>Force 3: Gentle Breeze (Large wavelets, crests begin to break, scattered whitecaps)</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>December 10, 2008; 7:30 to 10:00 and 10:30 to 12:00</td>
<td>7 º C, 7 km/hr E, rain</td>
<td>Force 1: Light Air (Ripples without crests)</td>
<td>2.0 mm</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of December 5th to December 11th, 2008

Source: http://www.tides.gc.ca/
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works occurred during this monitoring period:

- Placement of berm filter on the south and north sides of the cross berm.
- Removal of piles at the proposed barge ramp location.
- Placement of Type 3 rip rap on the north-west approach basin slopes.
- Removal of piles at the former caisson cleaning facility (CCF).
- Assembly of in-situ formwork for the cope wall at DCL laydown area C16-C17.
- Placement of scour protection rock east of the caisson wharf (C-Wharf).
- Construction of cope wall and crane rail formwork on the C-Wharf.
- Placement of general fill (GF1) in the CT.
- Geo-Pac - Land densification operations continued.
- NIB – Cutting, coring and chipping at caisson 16 (C16) and on the C-Wharf.
- DCL Lorraine - awaiting demobilization from the site.
- Completed installation of pre-cast keys and lids.

1.3.2 **Ongoing and Upcoming Works**

- Assembly of formwork for the cope wall and crane wall and associated works.
- Placement of GF1 in the CT.
- Scour protection trench concrete tremie pour.
- Land densification operations continued (Geo-Pac).
- Continued works at C16.
- Fish salvage in conjunction with the upcoming CT closure.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

On December 5th, GF1 placement was ongoing in the CT with foam observed overflowing the SC (Photo 1). The northern SC was open. Construction of the cross-berm continued with berm filter placed on the south side. A derrick and scow were positioned at the north end of the caisson trench to contain berm filter (Photo 2). Samples collected at the north end of the CT had a maximum value of 23 NTU with turbidity returning to background levels within 30 m (see Appendix Table 2).

The first concrete pour for the Cope Wall at C17 was conducted on December 5th. DCL indicated that CO₂ tanks and a pH meter were on hand in the event of a spill and staff monitored the seaward joints during the pour. Turbidity did not exceed 5 NTU of background and pH remained between 6.5 and 9.0 (see Appendix Table 3). Minor drips were observed from the formwork joints and bolt holes (Photo 3), however, the volume of material released ranged from a few drops to approximately 0.25 litres. Newly poured concrete was covered with tarps overnight (Photo 4).

On December 9th, GF1 placement or material recovery was not occurring. Construction of the cross berm was near completion and turbidity 30 m north of the berm was 8 NTU (see Appendix Table 3). Wet curing on top of the Cope Wall was observed to flow inland towards the west. A concrete ridge along the middle of the cover slab created a pool of curing water on the eastern side of the cover slab (Photo 5). The pH ranged from 10.6 to 11.8. Waters were not observed to enter the marine environment; however, DCL indicated that during high tide waves had overtopped the caisson. DCL set up a dewatering pump which discharged inland and proposed that channels would be chipped into the concrete to prevent pooling.

GF1 placement was not occurring on December 10th. Turbidity north of the cross berm was slightly elevated (Photo 6); however, the southern SC and the cross berm assisted in containing turbidity (Photo 7).
2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

During power washing of the tied bulkhead on December 9th, poly was placed on the seaward side, spray was directed westward and wash water was contained in a bucket and disposed of inland. DCL indicated that no wash water had escaped into the marine environment.

The concrete staging area along the C-Wharf was observed to have been cleaned with concrete and waste waters removed.

The dewatering pump, located on the GF1 sands west and adjacent to the C-Wharf, was observed to have secondary containment (Photo 8).

2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted once during this period of site works. No marine mammals were observed.

2.1.4 Spill Response & Environmental Incident Reporting

On December 10th, DCL reported that a spill of unknown quality and origin was discovered in the morning. The spill smelled of diesel fuel and was visible east of the C-Wharf running the entire length of the Wharf. A “soap” was used to mitigate the spill. Evidence of the spill was not observed during monitoring.

Lorraine crane remains on site awaiting deployment. No evidence of leaks or spills was observed on the ground.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- Turbidity associated with GF1, berm rock and berm filter placement in the CT was monitored. Impacts were not observed.
- Monitored Cope Wall concrete pour and wet curing for compliance with the FAA, EMPs and BMPs. Impacts were not observed.
- Lorraine crane appeared free from leaks.
- Water pump secondary containment was in place.
2.2.2 New and Current Action Items

- Confirm methodologies, environmental management plans and monitoring plans with DCL for C26 closure, upcoming concrete works (cope wall, crane wall, deadman anchors), and scour protection trench tremie pour.
- Monitor salvage and dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.
- Monitor concrete works for compliance with the FAA, EMPs and BMPs.
- Monitor GF1, berm rock and berm filter placement in the CT, including turbidity monitoring, effectiveness of SC and application of appropriate mitigation measures.
- Continue to monitor Delta Aggregates equipment to see that it is free from leaks.
- Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.
- Conduct a fish salvage in conjunction with the upcoming CT closure.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.
No environmental concerns were noted.

3.1.2 TFN Salt March Rehabilitation
Monitoring was conducted on December 9th and 10th. A fish salvage and isolation of the area was conducted by Coast River Environmental Services Ltd. On December 8th and a check of the area was conducted on the 9th and 10th. One fish was relocated. No environmental concerns were noted.

3.1.3 Birds
Approximately 150 to 200 ducks and numerous Dunlin and Gulls were observed north of the PD and 20 to 50 cormorants, loons, and grebes were observed in the former Mulberry Harbour.

3.1.4 Air Quality
No dust concerns were noted during this period.

3.1.5 Noise Monitoring
No noise monitoring was conducted during this monitoring period.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
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Attachments: Tables 2 and 3, Photograph Log
### Table 2: Turbidity Monitoring Results Collected During Site Visit on December 5th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>pH</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form</td>
<td>11:00</td>
<td>0.1</td>
<td>7.73</td>
<td>6</td>
<td>Background</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>11:40</td>
<td>0.1</td>
<td>7.79</td>
<td></td>
<td>No visible plumes</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>11:58</td>
<td>0.1</td>
<td>7.80</td>
<td></td>
<td>Small plume</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>12:20</td>
<td>0.1</td>
<td>7.82</td>
<td></td>
<td>Small plume</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>12:30</td>
<td>0.1</td>
<td>7.79</td>
<td>4</td>
<td>No visible plumes</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>13:30</td>
<td>0.1</td>
<td>7.82</td>
<td>5</td>
<td>No visible plumes</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form – active pouring</td>
<td>14:40</td>
<td>0.1</td>
<td>7.83</td>
<td>7</td>
<td>No visible plumes</td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>Cope wall form –</td>
<td>17:34</td>
<td>0.1</td>
<td>7.85</td>
<td>3</td>
<td>No visible plumes</td>
</tr>
<tr>
<td>Background</td>
<td>200</td>
<td>NE</td>
<td>Northeast of C26</td>
<td>15:20</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>1</td>
<td>N</td>
<td>Berm filter placement at C26</td>
<td>15:25</td>
<td>0.1</td>
<td></td>
<td>23</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C26</td>
<td>10</td>
<td>N</td>
<td>Berm filter placement at C26</td>
<td>15:30</td>
<td>0.1</td>
<td></td>
<td>10</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>C26</td>
<td>30</td>
<td>N</td>
<td>Berm filter placement at C26</td>
<td>15:35</td>
<td>0.1</td>
<td></td>
<td>3</td>
<td>No visible turbidity</td>
</tr>
<tr>
<td>Tied Bulkhead</td>
<td>1</td>
<td>N</td>
<td>Berm filter placement at C26</td>
<td>15:40</td>
<td>0.1</td>
<td></td>
<td>10</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>Tied Bulkhead</td>
<td>10</td>
<td>N</td>
<td>Berm filter placement at C26</td>
<td>15:45</td>
<td>0.1</td>
<td></td>
<td>6</td>
<td>Visible turbidity</td>
</tr>
</tbody>
</table>

### Table 3: Turbidity Monitoring Results Collected During Site Visit on December 9th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time 24:00</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-berm</td>
<td>30</td>
<td>N</td>
<td>Cross-berm in the CT.</td>
<td>18:30</td>
<td>0.1</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>C17</td>
<td></td>
<td></td>
<td>Concrete curing waters on the cope wall – flowing</td>
<td>18:15</td>
<td></td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>C17</td>
<td></td>
<td></td>
<td>Concrete curing waters on the cope wall – ponding</td>
<td>18:15</td>
<td></td>
<td>11.7</td>
<td></td>
</tr>
</tbody>
</table>
PHOTO 1: GF1 placement in the CT with foam overflowing the SC. Photo: December 5, 2008

PHOTO 2: Derrick and scow located at the north end of the CT. Photo: December 5, 2008
PHOTO 3: Minor leak at bolt hole. Photo: December 5, 2008

PHOTO 4: Covering of formwork with tarps. Photo: December 5, 2008
PHOTO 5: Pooling water behind the concrete ridge. Photo: December 9, 2008

PHOTO 7: Southern SC and cross berm containing turbidity and foam.  
Photo: December 9, 2008

PHOTO 8: Dewatering pump with secondary containment.  Photo: December 10, 2008
January 8, 2009
File: 499-002.09

Attention: Manager, Environmental Assessment Major Projects (EAMP)

RE: Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144: Bi-weekly Environmental Report
December 19, 2008 to January 1, 2009

Distribution: Jennifer Simpson DFO
Brad Fanos DFO
Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
Darrell Desjardin VFPA
Carrie Brown VFPA
Brian Atwell DCL
Robert Windeler DCL
Trevor Reid VPD
Bill Clark KCB
Mike Willcox MOE
Geoff Wickstrom Hemmera
Simon Daniels TSI
Jim O’Dowd TSI

Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

Hemmera is pleased to submit this Bi-weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-
000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1, Figure 1 and Figure 2 below summarize weather and tidal data for the period covered in this report: December 19, 2008 through January 1, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 19 2008</td>
<td>Scattered Clouds, -2.3°C, wind 15 km/h NE</td>
<td>Force 3: Gentle breeze (Large wavelets. Crests begin to break; scattered whitecaps)</td>
<td>0.0</td>
</tr>
<tr>
<td>10:00-16:30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 22, 2008</td>
<td>Mainly sunny, 0°C, wind 19 km/h NW</td>
<td>Force 3: Gentle breeze (Large wavelets. Crests begin to break; scattered whitecaps)</td>
<td>0.0</td>
</tr>
<tr>
<td>10:30 – 11:45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 30, 2008</td>
<td>Overcast, 4°C, wind 10 km/h E (gusts up to 45 km/hr)</td>
<td>Force 3: Gentle breeze (Large wavelets. Crests begin to break; scattered whitecaps)</td>
<td>8.9</td>
</tr>
<tr>
<td>14:00 – 16:30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s Fisheries Act Authorization requires that “there shall be no works conducted which
would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS

1.3.1 Works During Monitoring Period

Due to a combination of holiday time and extreme weather conditions, minimal works were conducted on December 19, 20, 22, 23, 24, 29, 30, and 31. The following works occurred during this monitoring period:

- Continued placing scour protection east of the Caisson Wharf.
- Continued Cope Wall and Crane Rail formwork construction.
- Continued installation of the sheet pile wall at the north end of the CT.
- One concrete pour on the Cope Wall on December 19, 2008.
- Delta Aggregates – GF1 placement in CT.
- Geo-Pac – vibrofloatation and dynamic compaction.
- Works on the Pod 4 Perimeter Drain are ongoing. The installation of piping and manholes west of the caisson wharf has commenced.

1.3.2 Ongoing and Upcoming Works

- Land densification operations continued (Geo-Pac).
- Assembly of rebar and formwork for the cope wall and crane wall, and associated concrete pours will continue on the caisson wharf.
- Placement of GF1 in the CT will be completed in January.
- Scour protection trench concrete tremie pour is upcoming in January.
- Deadman anchor concrete pour is upcoming in January
- Completion of the sheet pile wall and CT closure in January
- Fish salvage in S2 fill area conjunction with CT closure.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Due to extreme weather conditions, minimal marine works were conducted. On December 19th, placement of Type A scour protection east of the Caisson Wharf (Photo 1) continued. VPD No. 6 was observed releasing some loads above the water line. However, the material was observed to contain minimal fines and at the time of monitoring turbidity was within background levels 10-30 m down gradient of active works (see attached water quality).

GF1 placement behind the cross-berm, and installation of sheet piles in the north end of the CT were able to proceed through the period of works as the area is partially sheltered by the caisson wharf.

Turbidity from GF1 placement (Photo 2) was observed to be contained by the cross-berm. While there was some visible turbidity in the area from wave action on the cross-berm and berm filter (Photo 3), turbidity levels 10-30 m north were within background levels. The lock block wall at the gap between C25 and C26 was observed not to have a filter cloth. On December 19th a turbidity plume up to 38 NTU and less than 30 m radius was observed emanating from this gap (Photo 4), but the plume was not present on December 22nd (Photo 5).

Installation of the sheet piles was not observed to generate turbidity levels above background (Photo 6). As a mitigation measure the support derrick was anchored across the end of the CT.

A cope wall concrete pour at C17 was observed on December 19th. The set-up was the same as the previous cope wall pour, with cement trucks operating more than 15 m inland of the HHWL and CO₂ mobilized to the immediate work area. DCL did not have their pH meter at the work site. Hemmera noted that in the event of a spill the pH meter would be required in order to effectively deploy the CO₂. No leaks were observed, and pH levels in the marine environment immediately adjacent to the pour were within background levels.

The first cope wall pour at C17, completed on December 12th, was observed on December 19th. Water curing has been completed and pH levels in the adjacent marine environment were within background levels.
The cope wall pour at C19, completed on December 18th, was also observed on December 19th. Water curing had begun and the north end was being power washed. The poly barrier put up on the seaward side during power washing was not properly sealed and wash water was observed flowing into the marine environment (Photo 7). More poly was used as a mitigation measure. DCL noted that the release occurred because their BMP was not followed by the employee. For previous and further power-washing DCL stated that the poly was and will be nailed tight to the formwork prior to commencement of works.

Water from the water curing was observed dripping into the marine environment (Photo 8). pH levels in the marine environment immediately adjacent were within background levels. However, DCL installed a pump (Photo 9) and agreed to put a berm along the caisson edge as needed. It was observed that, due to below freezing temperatures, pH impacted wash and curing waters were freezing and building up on the eastern edge of the caisson. The following observations were made to DCL: built up ice was observed to change water flow patterns and the new flow patterns should be observed for releases to the marine environment; also, when there is a thaw, these potentially pH impacted ice and waters should be contained and disposed of inland.

On December 30th, pH levels in the marine environment adjacent to these pours were monitored. All measurements were within background levels.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

An open pail of PVC pipe lubricant was observed unattended on the caisson wharf. Workers were informed and the pail was sealed and removed. As a general mitigation measure the manholes had been covered with plywood to prevent infiltration of debris (Photo 10).

Hemmera observed the application of foam sealant to the concrete formwork on December 19th (Photo 11). The bulk chemical storage was more than 15 m inland, with a hose running to the work area. None was observed to be released into the marine environment.

2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology. No clamshell dredging occurred in the marine environment during the period of works.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted once during this period of site works. No marine mammals were observed.
2.1.4 Spill Response & Environmental Incident Reporting

*Lorraine* crane remains on site awaiting deployment. No evidence of leaks or spills was observed on the ground.

A hydrocarbon sheen was observed inland from an unknown source. It was noted that this is the area where concrete trucks have been washing down during the ongoing concrete pours. DCL was reminded that equipment is to be clean and free from leaks prior to entering the site, and leaks and spills should be cleaned up immediately.

2.2 Action Items

2.2.1 Follow-up from Previous Reports

- Turbidity associated with GF1 placement in the CT was monitored. A turbidity plume up to 38 NTU and less than 30 m in radius was observed extending east of the caisson wharf on one day. Otherwise, turbidity was contained.

- Monitored Cope Wall concrete pour and wet curing for compliance with the FAA, EMPs and BMPs. Power washing did not follow the DCL BMP for containment of wash waters and some pH and turbidity impacted waters were released into the marine environment. Also, freezing temperatures interfered with the collection and containment of wash waters in general and may have resulted in the release of some pH impacted waters into the marine environment. However, pH levels were not observed to exceed the 6.5 – 9 range for marine life, and turbidity did not exceed 5 NTU above background at any time.

- Within 15m of the C18 manhole an open pail of PVC lubricant was observed. DCL was notified and removed it. As a mitigation measure, DCL had covered the manholes with plywood.

- Lorraine crane appeared free from leaks.

2.2.2 New and Current Action Items

- Monitor works within 15m of C18 manhole and all other open access points to the perimeter drain system for handling of deleterious substances.

- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming scour protection Tremie pour and the Deadman anchor which may occur concurrent with the CT closure.

- Conduct a fish salvage in conjunction with the upcoming final CT closure.

- Monitor GF1 placement in the CT for turbidity levels and the application of appropriate mitigation measures.
• Monitor salvage and dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.

• Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

During the period of works, this site was closed. No monitoring was conducted.

3.1.2 Birds

North of the perimeter dike approximately 100-150 ducks (Photo 12), a loon, a cormorant, a grebe, a bald eagle and several gulls were observed daily. On December 30\textsuperscript{th} two oyster catchers were also observed in this area. A duck was observed near the cross-berm on December 22\textsuperscript{nd}.

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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csargent@hemmera.com
Report prepared and peer reviewed by:
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mgeraghty@hemmera.com

Attachments: Table 2 and 3, Photograph Log
### Table 2: Water Quality Results Collected During Site Visit on December 19th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>SE corner of cope wall form, active pour.</td>
<td>13:00 0.1 7.85 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>SE corner of cope wall form, active pour.</td>
<td>16:00 0.1 7.94 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>1</td>
<td>E</td>
<td>SE corner of form, during power washing.</td>
<td>13:30 0.1 7.65 10</td>
<td></td>
<td></td>
<td>Visible turbidity</td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>1</td>
<td>E</td>
<td>SE corner during water curing</td>
<td>15:00 0.1 7.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C20</td>
<td>1</td>
<td>E</td>
<td>30 m southwest of active scour protection placement.</td>
<td>13:45 0.1 7.75 5</td>
<td></td>
<td></td>
<td>Background</td>
<td></td>
</tr>
<tr>
<td>C25/C26</td>
<td>1</td>
<td>E</td>
<td>Plume extending east of the caisson wharf from GF1 placement</td>
<td>14:00 0.1 38</td>
<td></td>
<td></td>
<td>Visible turbidity</td>
<td></td>
</tr>
<tr>
<td>C25/C26</td>
<td>30</td>
<td>SE</td>
<td>Plume extending east of the caisson wharf from GF1 placement</td>
<td>14:10 0.1 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-berm</td>
<td>30</td>
<td>N</td>
<td>CT closure berm and sheet pile wall installation.</td>
<td>14:20 0.1 36</td>
<td></td>
<td></td>
<td>Visible turbidity</td>
<td></td>
</tr>
<tr>
<td>Cross-berm</td>
<td>1</td>
<td>N</td>
<td>CT closure berm</td>
<td>14:30 0.1 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: Water Quality Results Collected During Site Visit on December 30th, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C17</td>
<td>1</td>
<td>E</td>
<td>NE corner of cope wall form, former pour</td>
<td>14:20 0.1 7.85 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>1</td>
<td>E</td>
<td>NE corner of cope wall form, former pour</td>
<td>14:25 0.1 7.89 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C23/C24</td>
<td>1</td>
<td>E</td>
<td>Vibrofloatation approximately 50 m inland</td>
<td>14:30 0.1 7.91 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C25/C26</td>
<td>1</td>
<td>E</td>
<td>Placement of GF1 behind the cross-berm</td>
<td>14:35 0.1 7.93 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C26</td>
<td>1</td>
<td>N</td>
<td>10-30 m north of cross-berm and works on the sheet pile wall.</td>
<td>14:40 0.1 8</td>
<td></td>
<td></td>
<td>Background</td>
<td></td>
</tr>
</tbody>
</table>
PHOTO 1: Placement of Type A scour protection east of C25. Photo December 19, 2008

PHOTO 3: Turbidity plume north of CT closure berm. Photo December 19, 2008


PHOTO 6: Installation of sheet piles at the north end of the CT. Photo December 19, 2008
PHOTO 7: Power wash waters entering the marine environment. Photo December 19, 2008

PHOTO 8: Wet curing waters entering the marine environment (icicles on platform). Photo December 19, 2008
PHOTO 9: De-watering pump diverting wet-cure waters inland. Photo December 19, 2008

PHOTO 10: Open pail of lubricant (red) adjacent to covered manhole. Photo December 30, 2008
PHOTO 11: Application of foam sealant and insulation to the formwork and the ongoing concrete pour at C17. Photo December 19, 2008

PHOTO 12: Ducks north of the Perimeter Dike. Photo December 22, 2008
December 23, 2008
Report # DFO 08-046

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC V6C 3S4

Attention: Manager, Environmental Assessment Major Projects (EAMP)

RE: Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144: Weekly Environmental Report
December 12 to December 18, 2008

Distribution:
Jennifer Simpson DFO
Brad Fanos DFO
Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
Darrell Desjardin VFPA
Carrie Brown VFPA
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INTRODUCTION

Hemmera is pleased to submit this Weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third
Berth (DP3) Expansion project as per *Fisheries Act* Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: December 12th through December 18th, 2008.

<table>
<thead>
<tr>
<th>Table 1: Weather Data and Observations During Site Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date and Time</strong></td>
</tr>
<tr>
<td>December 17, 2008 09:00 – 16:30</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of December 12th to December 18th, 2008

Source: http://www.tides.gc.ca/
1.2 ENVIRONMENTAL WINDOWS

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s Fisheries Act Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS

1.3.1 Works During Monitoring Period

The following works occurred during this monitoring period:

- Continued placing scour protection east of the Caisson Wharf.
- Continued Cope Wall and Crane Rail formwork construction.
- Cutting and coring on Caisson Wharf.
- Completion of the Caisson Trench (CT) cross-berm and Fish Salvage in S1 fill area.
- Construction of frameworks for sheet pile wall at north end of CT underway.
- Concrete pour for Cope Wall.
- Installation of manholes for the Pod 4 Perimeter Drain at C18.
- Delta Aggregates – GF1 placement in CT.
- Geo-Pac – vibrofloatation and dynamic compaction.

1.3.2 Ongoing and Upcoming Works

- Assembly of formwork for the cope wall and crane wall and associated works.
- Placement of GF1 in the CT.
- Scour protection trench concrete tremie pour.
- Land densification operations continued (Geo-Pac).
- Continued works at C16.
- Completion of sheet pile wall and CT closure.
- Fish salvage in S2 fill area conjunction with CT closure.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Cope wall concrete pour at C19 was observed on December 17th. The set-up was the same as the previous cope wall pour, with cement trucks operating more than 15 m inland of the HHWL and CO\textsubscript{2} mobilized to the immediate work area (Photo 1). No leaks were observed, and pH levels in the marine environment immediately adjacent to the pour were within background levels (Table 2). Due to high winds tarps were difficult to place immediately after works, but were installed as soon as the wind died down.

Works on the Pod 4 Perimeter Drain involved precast pieces with minimal grouting and pH levels in the newly installed manhole were within background levels. Installation of the manhole and associated piping for the Pod 4 Perimeter Drain was isolated from the marine environment with rubber bladders. A turbidity plume was visible extending approximately 30 m from the end of the hose attached to a dewatering pump that was diverting water from the manhole (Photo 2) to the marine environment (Photo 3). The plume was not accessible for sampling due to works and weather but was observed to cease once the dewatering pump was shut off when works were completed for the day.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

A fuel containment area has been constructed more than 15 m inland of the HHWL at the DCL trailers at C16 (Photo 4).

2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology.

Hemmera conducted a fish salvage on December 15, 2008 in the S1 fill area. Thirteen sets were completed with a 50 m seine net. A total of 1025 Pacific herring, 8 sculpin, 1 spider crab, 1 needlefish, and 1 blenny were salvaged.
2.1.3 **Marine Mammals**

Marine Mammal monitoring (MMM) was conducted once during this period of site works. Weather conditions limited visibility to within 0.5 km. No marine mammals were observed.

2.1.4 **Spill Response & Environmental Incident Reporting**

*Lorraine* crane remains on site awaiting deployment. No evidence of leaks or spills was observed on the ground. Hydrocarbon sheen was observed December 17th on the caisson cover slab ([Photo 5](#)). The source was likely diesel fuel spilled during refuelling of a generator or pump. DCL immediately cleaned it up with absorbent pads ([Photo 6](#)).

2.2 **ACTION ITEMS**

2.2.1 **Follow-up from Previous Reports**

- Turbidity associated with GF1, berm rock and berm filter placement in the CT was monitored. Impacts were not observed.
- Monitored Cope Wall concrete pour and wet curing for compliance with the FAA, EMPs and BMPs. Impacts were not observed.
- Lorraine crane appeared free from leaks.
- Water pump secondary containment was in place.

2.2.2 **New and Current Action Items**

- Monitor salvage and dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.
- Monitor concrete works for compliance with the FAA, EMPs and BMPs.
- Monitor GF1, berm rock and berm filter placement in the CT, including turbidity monitoring and application of appropriate mitigation measures.
- Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.
- Monitor works within 15 m of C18 manhole and all other open access points to the perimeter drain system for handling of deleterious substances.
- Conduct a fish salvage in conjunction with the upcoming final CT closure.
3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

Fugitive dust generation remained a challenge for the TSI finishing area, and TSI continued to use a water truck to mitigate this issue.

3.1.2 Birds

No observations were made during this period.

3.1.3 Air Quality

No dust generation was noted from within the DCL project area during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Report prepared and peer reviewed by:
HEMMERA

p.p

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist / Project Manager
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mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log
Table 2: Water Quality Results Collected During Site Visit on December 17, 2008

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C19</td>
<td>1</td>
<td>E</td>
<td>NE corner of cope wall pour at C19</td>
<td>11:30</td>
<td>0.1</td>
<td>7.95</td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>1</td>
<td>E</td>
<td>NE corner of cope wall pour at C19</td>
<td>15:30</td>
<td>0.1</td>
<td>7.75</td>
<td></td>
</tr>
<tr>
<td>C18</td>
<td>1</td>
<td>E</td>
<td>Inside the newly installed manhole</td>
<td>12:00</td>
<td>0.1</td>
<td>7.89</td>
<td>Water visibly turbid</td>
</tr>
</tbody>
</table>
PHOTO 1: Cope wall pour at C19. Note CO₂ (red line). Photo December 17, 2008

PHOTO 2: Dewatering from the newly installed manhole. Photo December 17, 2008

File: 499-002.09 Report # 08-046
Date: December 23, 2008
DFO Authorization 02-HPAC-PA1-000-000144

SITE: Deltaport Third Berth Environmental Monitoring
PHOTO 3: A visible turbidity plume released from the de-watering pump at C18. Photo December 17, 2008

PHOTO 4: Fuel containment cell constructed at C16. Photo December 17, 2008
PHOTO 5: Sheen on C19. Photo December 17, 2008

PHOTO 6: Quick spill response. Photo December 17, 2008

File: 499-002.09 Report # 08-046
Date: December 23, 2008
DFO Authorization 02-HPAC-PA1-000-000144

SITE: Deltaport Third Berth Environmental Monitoring
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and
Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: January 2, 2009 through January 8, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 7, 2009 08:45 – 12:45</td>
<td>Overcast, 6°C, wind 17 km/h ESE</td>
<td>Force 3: Gentle breeze (Large wavelets. Crests begin to break; scattered whitecaps)</td>
<td>29</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of January 2, 2009 to January 8, 2009
Source: http://www.tides.gc.ca/

1.2 ENVIRONMENTAL WINDOWS

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s Fisheries Act Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”
1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS

1.3.1 Works During Monitoring Period

Due to extreme weather conditions, no marine works were conducted on January 7th. Cope Wall and Crane Wall concrete pours were cancelled on January 6th and 7th. The following works occurred during this monitoring period:

- Continued placement of scour protection east of the Caisson Wharf.
- Continued Cope Wall and Crane Rail formwork construction.
- Continued installation of the sheet pile wall at the north end of the CT.
- Connecting slab concrete pours at Caisson 20 – 21 (C20/21) and C21/22.
- Placement of concrete for Cope Wall formworks at C17.
- Offsite hauling of excess preload sands from Stage 2 by DCL subcontractor has commenced.
- Works on the Pod 4 Perimeter Drain are ongoing including installation of piping and manholes west of the caisson wharf

1.3.2 Ongoing and Upcoming Works

- Land densification operations continued (Geo-Pac).
- Assembly of rebar and formwork for the cope wall and crane wall, and associated concrete pours will continue on the caisson wharf.
- Placement of GF1 in the CT to resume and be completed in January.
- Scour protection trench concrete tremie pour scheduled January 16
- Deadman anchor concrete pour completed by January 16
- Completion of the sheet pile wall and CT closure by January 14
- Fish salvage in S2 fill area conjunction with CT closure scheduled January 15.

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.
2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Due to extreme weather conditions, no marine works were conducted on January 7, therefore no marine works were observed during the period of this report.

Placement of GF1 activities did not occur during the reporting period. Installation of sheet pile wall at north end of CT did not appear to generate turbidity above background levels. The support derrick was observed to be positioned across the mouth of the CT as a mitigation measure. No turbidity measurements were taken during the reporting period.

Scheduled concrete pour for C20/21 connecting slab was cancelled on January 7th due to storm surge and high waves at caisson wharf. Formworks for the pour were observed (Photo 1) and appeared to be sealed from the marine environment along the waterside.

Placement of concrete on C17 for construction of support ledge for Cope Wall formworks was observed on January 7th. Forms for the support ledge appeared sealed and no leaks were observed (Photo 2). As water conditions prevented monitoring of pH levels in marine environment east of C17, no water quality measurements were taken during the reporting period.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

A portable generator was observed at manhole behind C16 without secondary containment (Photo 3). DCL was informed and indicated that it was not common practice to provide secondary containment for portable generators as they may be moved throughout the shift and are always removed at the end of a shift.

Hemmera observed wash down of concrete truck well inland of HHWL (approx. 50 m west of caisson wharf), no issues were noted.

January 5th Hemmera received notification from VPA that a silt curtain had been reported to have been caught up in the Deltaport inter-causeway. DCL indicated that recovery of the curtain was to occur during high tide on January 7th.

2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology. No clamshell dredging was observed during the period of works.
2.1.3  Marine Mammals

Due to extreme weather conditions on January 7th, no Marine Mammal monitoring (MMM) was conducted during this period of site works.

2.1.4  Spill Response & Environmental Incident Reporting

_Lorraine_ crane remains on site awaiting deployment. No evidence of leaks or spills was observed on the ground.

2.2  ACTION ITEMS

2.2.1  Follow-up from Previous Reports

- Monitored concrete placement at C17 for compliance with the FAA, EMPs and BMPs.
- Notified DCL that a generator was observed at manhole located west of C16 without secondary containment. As a mitigation measure, DCL indicated that equipment is removed at end of each shift.
- Lorraine crane appeared free from leaks.

2.2.2  New and Current Action Items

- Monitor works within 15m of C18 manhole and all other open access points to the perimeter drain system for handling of deleterious substances.
- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming scour protection Tremie and deadman anchor pours scheduled January 9th through January 16th.
- Conduct a fish salvage in conjunction with the final CT closure scheduled January 15th.
- Monitor GF1 placement in the CT for turbidity levels and the application of appropriate mitigation measures.
- Monitor salvage and dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.
- Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.
3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

Litter, damaged wind/dust suppression fences, and an open, unattended bag of calcium chloride were observed on the site on January 7th. Matcon indicated that appropriate and immediate actions would be taken to address the issues.

3.1.2 Birds

Numerous (30-50) waterfowl were observed north of the PD.

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Report prepared and peer reviewed by:
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Attachments: Photograph Log
PHOTO 1: Formworks in place and sealed for C20/21 Connecting Slab Pour.
Photo January 7, 2009

PHOTO 2: No leaks observed from placement of concrete for Cope Wall support ledge.
Photo January 7, 2009
PHOTO 3:3:Portable generator, no secondary containment
Photo January 7, 2009
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and...
Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: January 9, 2009 through January 15, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 9, 2009</td>
<td>Cloudy, 4°C, wind 17 km/h ESE</td>
<td>Force 3: Gentle breeze (Large wavelets. Crests begin to break; scattered whitecaps)</td>
<td>8</td>
</tr>
<tr>
<td>16:00 – 19:15</td>
<td>09:00 – 16:00</td>
<td>Overcast, 4°C, wind 10 km/h NW</td>
<td>Force 1: Light air (Scaly ripples, no foam crests)</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of January 9, 2009 to January 15, 2009
Source: http://www.tides.gc.ca/

1.2 ENVIRONMENTAL WINDOWS

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive
period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

**1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS**

**1.3.1 Works During Monitoring Period**

The following works occurred during this monitoring period:

- Continued placement of scour protection east of the Caisson Wharf.
- Completion of sheet pile wall at the north end of the Caisson Trench (CT) and closure of S2 fill area.
- Fish Salvage conducted in S2 fill area and follow up salvage in S1 fill area.
- Cope wall concrete pour at Caisson 19 (C19).
- Formworks construction and concrete pours for deadman anchors at cross-berm in CT.
- Placement of berm-filter at C26 south of cross-berm.

**1.3.2 Ongoing and Upcoming Works**

- Land densification operations continued (Geo-Pac).
- Assembly of rebar and formwork for the cope wall and crane wall, and associated concrete pours continue on the caisson wharf.
- Placement of GF1 in the CT to be completed in January.
- Scour protection trench concrete tremie pour scheduled January 16
- Works on the Pod 4 Perimeter Drain west of the caisson wharf
- Off-site hauling of excess preload sands continues.

**2.0 ENVIRONMENTAL MONITORING**

**2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS**

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.
2.1.1 Water Quality

2.1.1.1 Marine Construction Works

On January 9, 2009 Hemmera monitored the first of three concrete pours for the deadman anchor at the cross-berm in the CT. Formworks were isolated from the marine environment on the south side of the cross-berm in the CT (Photo 1) with no apparent potential for concrete or concrete leachate to directly reach the marine environment during pouring. The bottom of the excavation was observed to be well below the tide level prior to pouring (Photo 2). No leaks were observed. Crews indicated the top of the formworks would be covered with a tarp after pouring to prevent rain infiltration and speed curing time. The crew also indicated that the concrete would be set and dry prior to high tide. Within the S2 fill area adjacent to the pour, pH was measured at 7.73.

Curing concrete for connecting slabs at C20/21 and C21/22 was observed to be covered with filter cloth January 9th (Photo 3). A thin film of water from the wet cure process was observed to be pooled on top of the caissons immediately next to the pour area but did not appear to be flowing.

On January 14, 2009 Hemmera monitored the areas adjacent to the second deadman pour during the first high tide event following the pour. Approximately 0.7 m of the formworks were below the tide level (Photo 4). The pH of water in direct contact with the new concrete was measured at 8.0. North of the cross-berm, pH was measured at 7.7. Cope wall pour at C19 was also monitored. No leaks, spills or plumes were observed from the base of the forms (Photo 6). Turbidity and pH measurements were within background, Table 2.

Turbidity measurements from placement of berm-filter west of C26 in CT are presented in Table 2. Levels above background were only observed in area south of cross-berm that is isolated from the marine environment (Photo 5).

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Wash down of concrete trucks during the January 9th deadman anchor pour was observed along Perimeter Dyke access road, well inland of HHWL and north of perimeter drain installation works. No issues were noted.

2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology.

Hemmera conducted a fish salvage on January 15, 2008 in the S2 fill area. Nine sets were completed with a 50 m seine net. Due to a low fish presence, only 17 fish were salvaged, including bay pipefish, crescent gunnel, needlefish, sculpin, and surf smelt.
In addition, a follow-up salvage in the S1 fill area on January 14 & 15 prior to its final infilling, yielded approximately 1280 scuplin and 20 Dungeness crab.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted once during this period of site works and none were observed.

2.1.4 Spill Response & Environmental Incident Reporting

*Lorraine* crane remains on site awaiting redeployment. No evidence of leaks or spills was observed on the ground.

2.2 Action Items

2.2.1 Follow-up from Previous Reports

- Monitored deadman concrete pours for compliance with the FAA, EMPs and BMPs.
- Conducted a Fish Salvage in S2 fill area following isolation of CT
- Monitored turbidity in CT from placement of berm-filter

2.2.2 New and Current Action Items

- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming scour protection Tremie pour scheduled January 16th.
- Monitor salvage and clean-up dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.
- Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.

3.0 Supplemental Environmental Monitoring

3.1.1 Terminal Systems Inc.

No environmental concerns identified during the report period.

3.1.2 Birds

North of PD; 2 loons, 5 grebes, and 300 – 500 ducks were observed, and east of the Caisson Wharf; 6 cormorants were observed January 14th.

3.1.3 Air Quality

No dust concerns were noted during this period.
3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned at 604-669-0424 regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Report prepared and peer reviewed by:
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Attachments: Table 2, Photograph Log
<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE/SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadman Anchor, south of the cross-berm</td>
<td>1</td>
<td>N</td>
<td>Deadman Anchor pour January 13, placement of berm-filter at C26</td>
<td>10:00</td>
<td>0.1</td>
<td>8.0</td>
<td>40</td>
<td>Visible turbidity</td>
</tr>
<tr>
<td>Caisson Trench, S2, north of the cross-berm</td>
<td>1</td>
<td>N</td>
<td>Deadman Anchor pour January 13, placement of berm-filter at C26, and sheet pile wall installation</td>
<td>10:05</td>
<td>0.1</td>
<td>7.7</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>C25/C26</td>
<td>1</td>
<td>E</td>
<td>Deadman Anchor pour January 13, placement of berm-filter at C26</td>
<td>11:30</td>
<td>0.1</td>
<td>7.7</td>
<td>10</td>
<td>background</td>
</tr>
<tr>
<td>C19</td>
<td>1</td>
<td>SE</td>
<td>Active cope wall pour at C19</td>
<td>14:00</td>
<td>0.1</td>
<td>7.8</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
PHOTO 1: Formworks for deadman anchor well isolated from marine environment, south of cross-berm in CT. Photo January 9, 2009

PHOTO 2: Deadman pour area well above tide level prior to start of pour. Photo January 9, 2009
PHOTO 3: Curing concrete for C21/22 connecting slab covered with filter cloth.
Photo January 9, 2009

PHOTO 4: Deadman pour area and formworks infiltrated under high tide.
Photo 10:00 AM, January 14, 2009
PHOTO 5: Turbidity from placement of berm-filter at C26 isolated south of cross-berm. Photo January 14, 2009

PHOTO 6: Waters adjacent to the active cope wall pour at C19. Photo January 14, 2009
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and
Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: January 16, 2009 through January 22, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 16, 2009</td>
<td>Overcast, 3°C, wind 3 km/h NW</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
<tr>
<td>07:45 – 14:00 &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30 – 14:50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 21, 2009</td>
<td>Fog, 2°C, wind 0 km/h</td>
<td>Force 0: Calm (Flat seas)</td>
<td>0</td>
</tr>
<tr>
<td>08:45 – 10:45 &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00 – 14:30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 22, 2009</td>
<td>Overcast, 1°C, wind 3 km/h NW</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
<tr>
<td>10:25 – 14:45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of January 16, 2009 to January 22, 2009
Source: http://www.tides.gc.ca/
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works occurred during this monitoring period:

- Continued placement of scour protection east of the Caisson Wharf (CWharf).
- Installation of temporary whaler support brackets and works on tied bulkhead.
- Scour toe protection test panel marine concrete Tremie pour east of Caisson 17(C17).
- Placement and compaction of berm filter sand at C26 adjacent to the CWharf and south of the cross-berm.
- VPD No.8 demobilized from site.
- Sand and rock off-loaded from a scow to stockpiles on land.
- Off-site hauling of excess preload sands completed.
- Western crane rail excavation and foundation work initiated.

1.3.2 **Ongoing and Upcoming Works**

- Land densification operations to continue (Geo-Pac).
- Assembly of rebar and formwork for the cope wall and crane wall, and associated concrete pours continue on the caisson wharf.
- Placement of Stage 2 Preload sands as General Fill 1 (GF1) in the Caisson Trench (CT).
- Works on the Pod 4 Perimeter Drain west of the caisson wharf.
- Western crane rail excavation to continue with formwork and associated pours slated to commence.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

On January 16, 2009 Hemmera monitored the scour toe protection test panel marine concrete Tremie pour completed at the south end of C17. Prior to work beginning, the average background turbidity and pH were measured to be 4.7 NTU and 7.57, respectively.

Approximately 5 m$^3$ of concrete was placed to a depth of approximately -16 m CD into the test panel formwork using a Tremie line with diver assistance. Continuous monitoring of pH and regular monitoring of turbidity was conducted at two locations, one 2-3 metres from the active work area and a second 5-6 metres down-gradient of the placement location under a falling tide (Photo 1).

DCL was observed to follow Best Management Practices (BMPs) as outlined in the DCL Task Specific Environmental Management Plan (TSEMP) – Toe Protection Works (December 2008):

- CO$_2$ was on-hand for mitigation as required (Photo 2).
- Tremie line was tied off during mobilization and demobilization from placement location (Photo 3).
- Diver inspection for induced turbidity and signs of discharge were continuous.
- Concrete pump and rinsing was conducted greater than 15 m from the High-High Water line (HHWL) (Photo 4).
- Containment of excess concrete and rinse waters was observed as per BMPs (Photo 5).
- Turbidity was observed to remain within the maximum value of 25 NTU as outlined in the TSEMP.
- pH was observed to remain within the allowable range of 6.5 – 9.0 pH units as outlined in the TSEMP.

The placement of concrete took approximately 20 minutes, and no major turbidity discharges (Photo 6) or negative impacts were observed by or reported to Hemmera by the DCL divers. The maximum measured turbidity and pH values were observed not to exceed 10.9 NTU and 8.42, respectively. Both maximum measured values were observed at the down-gradient monitoring location.
A complete record of data collected during the course of the test Tremie pour is provided in Appendix A.

Crane wall and cope wall concrete pours undertaken at C19 on the CWharf were monitored. No concrete leaks were observed from formwork which had been sealed with foam (Photo 7) and CO\(_2\) was observed to be on-hand for mitigation if required (Photo 8). Potentially pH affected water was observed to flow inland away from the marine environment and no pH or turbidity impacts were identified. Water quality data is presented in Table 2.

### 2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Wash down of concrete trucks was routinely observed to occur well inland of HHWL as per BMPs. No issues related to the handling of concrete were noted during this period of site works.

Secondary containment was inspected at various locations for the accumulation of water resulting from recent high intensity snow and rainfall (Photo 9). The use of a tarp to reduce the potential for accumulation of water and the need to remove standing water was reviewed with DCL.

No spills or leaks were visible under parked Delta Aggregate rock trucks on January 21\(^{st}\).

Adsorbent booms were observed to be staged on the CWharf adjacent to the active work areas for deployment as necessary (Photo 10).

### 2.1.2 Fish & Fish Habitat

Crab salvage activities continue as per proposed methodology during clean-up dredging activities.

Hemmera inspected Salvage Area 1 (S1) and Salvage Area 2 (S2) on January 16\(^{th}\) for the presence of fish and none were observed. Immediately prior to backfilling of the S1 area immediately east of the deadman, DCL crew indicated that no fish were visible. Isolated water in the S2 Fill Area was also monitored on January 21\(^{st}\) for the presence of fish. No fish were visible and turbidity was measured to be 6 NTU above background at 10.07 and pH was within background at 7.73 (see Table 2).

### 2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted three times during this period of site works and none were observed.

### 2.1.4 Spill Response & Environmental Incident Reporting

Lorraine crane remains on site awaiting redeployment. No evidence of leaks or spills was observed on the ground. No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.
2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- Monitored scour toe protection marine Tremie concrete pour for compliance with the FAA, EMPs and BMPs.
- Monitored for turbidity and pH impacts associated with on-going concrete works.

2.2.2 New and Current Action Items

- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming construction phase scour toe protection Tremie pours.
- Monitor salvage and clean-up dredging activities (when ongoing) for the presence of crab and crab pieces and salvage activities during crab sensitive period.
- Continue to monitor status of the Lorraine crane hydraulic leak until its removal from site.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

No environmental concerns relevant to the FAA identified during the reporting period.

3.1.2 Birds

- January 16th: Approximately 100 loons and 20 ducks observed northwest of the Perimeter Dike (PD); 12 loons observed east of the CWharf; 6 gulls and 8 loons observed east of the CWharf during an MMM event.
- January 21st: 6 loons observed east of the CWharf during a MMM event.
- January 22nd: Approximately 200 ducks observed northwest of the PD; approximately 10 – 20 each of loons, cormorants, grebs and gulls observed within the project area; approximately 100 cormorants and loons observed east of C17 during MMM event.

3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

Ron Finch, EIT.
Environmental Engineer
604-669.0424 (124)
rfinch@hemmera.com

Report prepared and peer reviewed by:
HEMMERA

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist / Project Manager
604-669.0424 (199)
mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log, Appendix A

TABLE 2: WATER QUALITY DURING EBBING TIDE JANUARY 21, 2009

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE</th>
<th>SW</th>
<th>Point Source</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C19</td>
<td>20</td>
<td>N</td>
<td></td>
<td>Crane wall concrete pour C19</td>
<td>12:20</td>
<td>0.1</td>
<td>7.60</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>C25/26 keyway</td>
<td>1</td>
<td>E</td>
<td></td>
<td>Berm-filter placement in CT</td>
<td>12:25</td>
<td>0.1</td>
<td>7.72</td>
<td>2.47</td>
<td></td>
</tr>
<tr>
<td>S2 fill area west</td>
<td>5</td>
<td>N</td>
<td></td>
<td>Berm-filter placement in CT</td>
<td>12:40</td>
<td>0.1</td>
<td>7.73</td>
<td>10.07</td>
<td></td>
</tr>
<tr>
<td>of C26 North end</td>
<td></td>
<td></td>
<td></td>
<td>Background</td>
<td>12:53</td>
<td>0.1</td>
<td>7.78</td>
<td>3.93</td>
<td>Background</td>
</tr>
<tr>
<td>C24/25 keyway</td>
<td>1</td>
<td>E</td>
<td></td>
<td>Berm-filter placement in CT</td>
<td>13:00</td>
<td>0.1</td>
<td>7.79</td>
<td>2.64</td>
<td></td>
</tr>
</tbody>
</table>
PHOTO 1: Tremie test pour under way at C17 with monitoring locations outlined in red. Photo January 16, 2009

PHOTO 2: CO₂ tank on-hand on caisson wharf adjacent to placement location. Photo January 16, 2009
PHOTO 3: Tremie line tied off while being mobilized to mitigate potential discharges. Photo January 16, 2009

PHOTO 4: Concrete pump stationed greater than 15 metres from the HHWL – with reach across the caisson wharf for placement. Photo January 16, 2009
PHOTO 5: Excess concrete containment and wash water collection.
Photo January 16, 2009

PHOTO 6: Maximum turbidity discharge observed upon removal of the tied Tremie line from the placement location. Localized plume dissipated immediately. Photo January 16, 2009
PHOTO 7: Formworks sealed with foam. No leaks observed.
Photo January 21, 2009

PHOTO 8: Carbon Dioxide on hand during crane wall pour as per BMP.
Photo January 21, 2009
PHOTO 9: Above ground storage tank with water accumulation in secondary containment basin. Photo January 16, 2009

PHOTO 10: Adsorbent booms observed to be staged on the caisson wharf adjacent to the active work area. Photo January 16, 2009
APPENDIX A

Scour Protection Test Marine Concrete Tremie Pour Environmental Monitoring Data

Figure 1 displays continuous pH monitoring results collected from two monitoring intake lines labelled Active Work Area (2-3 metres from concrete placement location) and Down-gradient of Active Work Area (5-6 metres down-gradient from concrete placement location). Data points were collected and logged every second using a YSI 556 instrument.

Background pH readings were collected prior to initiation of the pour, and monitoring continued following the completion of the pour until pH was observed to return to the background levels.

- Between approximately 45 minutes and 60 minutes the temporary disruption in pH trends was associated with the movement of the monitoring setup to accommodate a change in the concrete placement location.
- Concrete pour was initiated at the 64 minute mark and was complete at the 84 minute mark.
- Down-gradient pH during the pour peaked higher than pH near the active work area. This may be due to flow turbulence induced by the ebbing tide.
- pH was observed to peak at 8.42 at the down-gradient location from the 97 to the 100 minute mark.
- pH was observed to return to background levels at both monitoring locations by the 132 minute mark.
Scour Protection Test Marine Concrete Tremie Pour Environmental Monitoring Data continued…

Table 1 provides turbidity monitoring data that was collected during the course of the test marine Tremie pour. Turbidity measurements were collected using a Lamotte 2020e hand held turbidity meter. Discrete samples were taken from the continuous monitoring discharge flow lines for both the active work area and the down-gradient monitoring locations.

Table 1: Turbidity Monitoring During Tremie Pour

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>Turbidity (NTU)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Work Area</td>
<td>Down-gradient</td>
</tr>
<tr>
<td>3</td>
<td>5.1</td>
<td>3.8</td>
</tr>
<tr>
<td>21</td>
<td>5.0</td>
<td>3.1</td>
</tr>
<tr>
<td>60</td>
<td>7.9</td>
<td>3.6</td>
</tr>
<tr>
<td>83</td>
<td>10.4</td>
<td>6.3</td>
</tr>
<tr>
<td>94</td>
<td>5.8</td>
<td>7.0</td>
</tr>
<tr>
<td>101</td>
<td>5.7</td>
<td>6.4</td>
</tr>
<tr>
<td>107</td>
<td>6.2</td>
<td>10.9</td>
</tr>
<tr>
<td>116</td>
<td>7.5</td>
<td>8.1</td>
</tr>
<tr>
<td>143</td>
<td>4.4</td>
<td>6.0</td>
</tr>
<tr>
<td>172</td>
<td>4.4</td>
<td>3.8</td>
</tr>
</tbody>
</table>

The maximum measured turbidity was observed to be 10.9 NTU at the down-gradient monitoring location, which was below the limit of 25 NTU as specified in the DCL TSEMP. Localized turbidity was generated at the surface upon removal of the tied off Tremie line; however, it dissipated quickly and was minimized through application of BMPs.
February 4, 2009
File: 499-002.09

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC V6C 3S4

Attention: Manager, Environmental Assessment Major Projects (EAMP)


Distribution: Jennifer Simpson DFO
Brad Fanos DFO
Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
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Carrie Brown VFPA
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Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and
Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: January 23, 2009 through January 29, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 26, 2009 10:00 – 14:15</td>
<td>Sunny, 0°C, wind 9 km/h SE</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
<tr>
<td>January 28, 2009 09:00 – 13:00 &amp; 15:00 – 16:30</td>
<td>Clear, 4°C, wind 5 km/h NW</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of January 23, 2009 to January 29, 2009
1.2 **ENVIRONMENTAL WINDOWS**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **DESCRIPTION OF SITE WORKS & OBSERVATIONS**

1.3.1 **Works During Monitoring Period**

The following works occurred during this monitoring period:

- Continued placement of scour protection east of the Caisson Wharf.
- Continued above water works on tied bulkhead.
- Continued landside fill densification, including Geopac vibrodensification, ironing, and rolling.
- Fill materials off-loaded from a scow to stockpiles on land.
- Crane rail excavation and foundation work continued.
- Concrete pours for cope wall at C19 and C20, and at the crane wall.
- Continued preparation works of filling, compaction and rebar placement at the crane beam.

1.3.2 **Ongoing and Upcoming Works**

- Land densification operations to continue.
- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater tremie pour for caisson wharf toe protection to begin the week of February 9.
- Works on the Pod 4 Perimeter Drain west of the caisson wharf.

2.0 **ENVIRONMENTAL MONITORING**

2.1 **CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS**

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on three site visits during the period of site works.
2.1.1 Water Quality

2.1.1.1 Marine Construction Works

An active concrete pour on the cope wall, as well as curing procedures for the cope and crane walls were observed during this period. No adverse water quality impacts to the marine environment were noted. Curing concrete was covered with tarps as per Best Management Practices (BMPs) (Photo 1). Wash water was observed to accumulate on the landward side of the caisson wharf and not enter the marine environment (Photo 2). Turbidity and pH levels were observed to be within acceptable levels (Table 2).

While observing a cope wall pour on January 28, it was noted that concrete could splatter outside the form, and potentially enter the marine environment, through a 6” gap in that portion of the steel frame between the concrete form and the eastern plank walkway (Photo 3). Also, some hand tools with fresh concrete adhering were present on this walkway. DCL said that for future cope wall pours they would place a sheet of plywood over the 6” gap and would make an effort to direct the pump hose to prevent splatter outside the form. They will also make an effort to no place wet tools on the waterside walkway.

Placement of clean scour protection rock at C22/23 was observed to not generate a visible turbidity plume.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Staining was observed on the ground in the vicinity of a double-walled, diesel refuelling tank (Photo 4), possibly due to drips from the fuel nozzle during use. When informed, DCL said that plywood sheeting, or other suitable measures, would be implemented to provide containment of refuelling spills. A second fuel nozzle had been placed on its side and had leaked a small amount of fuel (Photo 5). DCL said they would correct this storage method.

The containment basin which was noted in the January 27 report (#09-003), has been emptied of water as per BMPs (also Photo 5). This basin was earlier noted as containing excess water following heavy precipitation events.

Wash down of concrete trucks was routinely observed to occur well inland of HHWL as per BMPs. No issues related to the handling of concrete were noted during this period of site works.

2.1.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities. This data is independently reported to DFO.
Hemmera inspected the not yet completely filled area north of the deadman anchors of Salvage Area 2 (S2) on January 26th for the presence of fish. None were visible. A fish salvage was conducted in this area on January 15, 2009 once this area had been isolated from the marine environment.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted during each of the two site visits during this period of site works and none were observed.

2.1.4 Spill Response & Environmental Incident Reporting

*Lorraine* crane remains on site awaiting redeployment. No evidence of leaks or spills was observed on the ground. No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- As described above, an external containment basin had been emptied of excess rain water as noted in the previous report (#09-003).
- Monitored for turbidity and pH impacts associated with on-going concrete works.
- No clamshell dredging occurred during this period of site works, therefore no crab monitoring of dredgeate was conducted.

2.2.2 New and Current Action Items

- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming construction phase scour toe protection Tremie pours.
- Monitor sub-tidal reef construction once this activity resumes.
- Monitor handling of deleterious substances on site.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

No environmental concerns relevant to the FAA were identified during the reporting period.

3.1.2 Birds

- January 26, 2 loons were observed east of C16 in the Mulberry Harbour. Northwest of the perimeter dike, 30-50 waterfowl were observed
• January 28, within 500 m north of the perimeter dike approximately 200 ducks, as well as 10 grebe, 5 loons, and 1 Great Blue Heron were observed. Within 100 m east of the C17, approximately 2 loons, 3 cormorants, and 2 seagulls were observed.

3.1.3 Air Quality

On both the TSI and DCL sites, water trucks were operating to prevent fugitive dust. No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

[Signature]

Environmental Scientist
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Report prepared and peer reviewed by:
HEMMERA

[Signature]

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Senior Environmental Scientist / Project Manager
604-669.0424 (199)
mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log
### Table 2: Water Quality Measurements on January 26 and 28, 2009

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE/SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cure water west of C19</td>
<td>2</td>
<td>W</td>
<td>Crane wall concrete pour C19</td>
<td>Jan 26</td>
<td>11:00</td>
<td>0.1</td>
<td>8.02</td>
<td></td>
<td>Accumulated cure water</td>
</tr>
<tr>
<td>East of C21</td>
<td>20</td>
<td>N</td>
<td>Cope wall and crane wall pours</td>
<td>Jan 26</td>
<td>11:10</td>
<td>0.1</td>
<td>7.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North end of C26</td>
<td></td>
<td></td>
<td>None</td>
<td>Jan 26</td>
<td>11:20</td>
<td>0.1</td>
<td>7.89</td>
<td></td>
<td>Background</td>
</tr>
<tr>
<td>C16</td>
<td>1</td>
<td>E</td>
<td>Background</td>
<td>Jan 28</td>
<td>12:15</td>
<td>0.1</td>
<td>7.34</td>
<td>6.9</td>
<td>Background.</td>
</tr>
<tr>
<td>East of C20</td>
<td>1</td>
<td>E</td>
<td>Cope wall pour at C20</td>
<td>Jan 28</td>
<td>12:30</td>
<td>0.1</td>
<td>7.76</td>
<td>7.9</td>
<td>No visible water quality impacts.</td>
</tr>
</tbody>
</table>
PHOTO 1: Curing crane wall concrete covered with tarps. January 26, 2009


PHOTO 5: Containment basin emptied of excess rain water. Fuel nozzle with drips.
January 28, 2009.
HEMMERA

February 11, 2009
File: 499-002.09
Report # DFO 09-005

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC  V6C 3S4

Attention:  Manager, Environmental Assessment Major Projects (EAMP)

RE:  Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144: Weekly Environmental Report
January 30, 2009 to February 5, 2009

Distribution:
Jennifer Simpson  DFO
Brad Fanos  DFO
Kristie Trainor  EC
Andrew Robinson  CWS
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Patrick Craig  VFPA
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Carrie Brown  VFPA
Brian Atwell  DCL
Robert Windecker  DCL
Amy Krause  DCL
Trevor Reid  VPD
Bill Clark  KCB
Mike Willcox  MOE
Geoff Wickstrom  Hemmera
Simon Daniels  TSI
Jim O’Dowd  TSI
David McAdam  TSI

Contractors:  Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac) and Delta Aggregates, Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

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1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: January 30, 2009 through February 5, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
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<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 3, 2009 09:00 – 10:30 &amp; 13:30 – 14:45</td>
<td>Clear, 5° C, wind 3 km/h NE</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
<tr>
<td>February 4, 2009 08:45 – 14:00</td>
<td>Sunny, 6° C, wind 4 km/h E</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 1: Tidal data for Tsawwassen during the period of January 30, 2009 to February 5, 2009
Source: [http://www.tides.gc.ca](http://www.tides.gc.ca)
1.2 **Environmental Windows**

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 **Description of Site Works & Observations**

1.3.1 **Works During Monitoring Period**

The following works occurred during this monitoring period:

- Continued placement of scour protection rock east of the Caisson Wharf.
- Continued landside fill densification, including Geopac vibro-densification, direct compaction, and rolling.
- Concrete pours for cope wall at Caisson 20 (C20), and at the crane wall.
- Duct bank foundation preparation, rebar placement and concrete placement commenced.
- Connecting slab pour at C22/C23 undertaken.
- Continued preparation works of filling, compaction and rebar placement at the crane beam.
- Tie-in rods installed at deadman anchor and C26 sheet pile wall.
- Placement of berm rock in S2 fill area north of deadman anchor.
- Recovery of toe protection test panel east of C17 for testing.

1.3.2 **Ongoing and Upcoming Works**

- Land densification operations to continue.
- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater tremie pour for caisson wharf toe protection to begin the week of February 9.
- Sub-tidal habitat compensation reef construction to resume starting the week of February 9.
2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on two site visits during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

Two active concrete pours on the C20 cope wall were observed during this monitoring period. Concerns raised by Hemmera following observations on January 28th regarding the potential for concrete to splatter outside the form, and potentially enter the marine environment were observed to have been addressed. DCL provided mitigation through implementation of a portable plywood strip to provide coverage of the 6” gap in that portion of the steel frame between the concrete form and the eastern plank walkway which remains open (Photo 1). On February 3rd DCL also indicated that they make an effort to direct the pump hose to prevent splatter outside of the form. Additionally, concerns regarding the placement hand tools covered with wet concrete continue to be intermittently observed, however DCL has indicated that they will make an effort to store equipment landside whenever possible.

No adverse water quality impacts to the marine environment associated with concrete works were noted during either site visit. Curing concrete was covered with tarps (Photo 2) and CO2 was observed to be on-hand as per Best Management Practices (BMPs). Cure water with elevated pH was observed to accumulate on the landward side of the caisson wharf but was not observed to enter the marine environment (Photo 3). Turbidity and pH levels were observed to be within acceptable levels and data collected during monitoring events is presented in Table 2.

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

A fuel nozzle has now been mounted to prevent fuel dripping and discharge in response to observations made on January 28th (Photo 4). A second portable fuel tank nozzle observed to be directed downward last week remains uncorrected (Photo 5).

Wash down of concrete trucks was routinely observed to occur well inland of HHWL as per BMPs.

2.1.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities. This data is independently reported to DFO.
2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted during each of the two site visits during this period of site works and none were observed.

2.1.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- As described above, the potential for concrete to splatter outside of the cope wall form, and potentially enter the marine environment was observed to have been addressed by DCL.
- Monitored for turbidity and pH impacts associated with on-going concrete works.
- No clamshell dredging occurred during this period of site works, therefore no crab monitoring of dredgeate was conducted.
- The containment of fuel and nozzle drips continues to be follow-up during site visits.

2.2.2 New and Current Action Items

- Monitor concrete works for compliance with the FAA, EMPs and BMPs, including the upcoming construction phase scour toe protection Tremie pours.
- Monitor sub-tidal reef construction once this activity resumes.
- Monitor handling of deleterious substances on site.

3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.

No environmental concerns relevant to the FAA were identified during the reporting period.

3.1.2 Birds

- February 3, 40 ducks, 2 loons and 5 grebe were observed northwest of the perimeter dike. Within 50 m south of C17 2 loons were observed.
- February 4, approximately 80 – 100 waterfowl were observed east of C16 in the Mulberry Harbour.
3.1.3 Air Quality

No dust concerns were noted during this period.

3.1.4 Noise Monitoring

No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

Ron Finch, EIT
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Attachments: Table 2, Photograph Log
Table 2: Water Quality Measurements on February 3\textsuperscript{rd} and 4\textsuperscript{th}, 2009

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C16</td>
<td>1</td>
<td>E</td>
<td>Background</td>
<td>Feb 3</td>
<td>14:15</td>
<td>0.1</td>
<td>7.89</td>
<td>1.5</td>
<td>Background</td>
</tr>
<tr>
<td>East of C20</td>
<td>1</td>
<td>E</td>
<td>Cope wall pour at C20</td>
<td>Feb 3</td>
<td>14:25</td>
<td>0.1</td>
<td>7.91</td>
<td>4.9</td>
<td>No visible water quality impacts</td>
</tr>
<tr>
<td>North end of C26</td>
<td>1</td>
<td>N</td>
<td>Background</td>
<td>Feb 4</td>
<td>11:45</td>
<td>0.1</td>
<td>7.83</td>
<td></td>
<td>Background</td>
</tr>
<tr>
<td>East of C20</td>
<td>5</td>
<td>S</td>
<td>Down-gradient of active C20 cope wall pour</td>
<td>Feb 4</td>
<td>11:10</td>
<td>0.1</td>
<td>7.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of C20</td>
<td>20</td>
<td>N</td>
<td>Up-gradient of active C20 cope wall pour</td>
<td>Feb 4</td>
<td>10:50</td>
<td>0.1</td>
<td>7.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated cure water west of C18/C19</td>
<td>2</td>
<td>W</td>
<td>Crane wall concrete pour at C19</td>
<td>Feb 4</td>
<td>11:00</td>
<td>0.1</td>
<td>10.38</td>
<td></td>
<td>Accumulated cure water landside of Caisson Wharf</td>
</tr>
</tbody>
</table>
PHOTO 1: Placement of plywood sheet to prevent concrete splatter from entering the marine environment. Photo February 3, 2009.

PHOTO 2: Completed cope wall pours covered as per BMPs. Photo February 4, 2009.
PHOTO 3: Cure water with elevated pH isolated from marine environment landside C18/19.
Photo February 4, 2009

PHOTO 4: Fuel nozzle placed in the position to prevent fuel dripping.
Photo February 3, 2009
PHOTO 5: Fuel nozzle pointing downwards.
Photo February 3, 2009
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per Fisheries Act Authorization 02-HPAC-PA1-000-000144 (FAA) and the environmental management plans (EMPs) produced by Deltaport Constructors Limited (DCL) and
Matcon Civil Constructors Ltd (Matcon). Environmental monitoring information, which was beyond the requirements of the FAA, has been included in this weekly report in Section 3 - including Terminal Finishing Works construction monitoring of Matcon activities on behalf of TSI, under Hemmera Project No. 1051-001.01.

1.0 SUMMARY OF SITE WORKS & OBSERVATIONS

1.1 PERIOD OF SITE WORKS

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: February 6, 2009 through February 12, 2009.

Table 1: Weather Data and Observations During Site Visit

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Weather Observations</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 9, 2009</td>
<td>Clear, 5°C, wind 3 km/h NE</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
<tr>
<td>12:20 – 13:45 &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30 – 15:30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Weather Data and Observations During Site Visit

Figure 1: Tidal data for Tsawwassen during the period of February 6, 2009 to February 12, 2009
Source: http://www.tides.gc.ca/

1.2 ENVIRONMENTAL WINDOWS

The DFO fisheries windows, as stated in the FAA, for the protection of adult ovigerous female Dungeness crab commenced on October 15th, 2008 and extends through March 31st, 2009. During the crab sensitive
period the project’s *Fisheries Act* Authorization requires that “there shall be no works conducted which
would result in a significant disturbance to the seabed of outer Roberts Bank which is situated in water
greater than -5 meters (m) chart datum (CD) deep at daily low water.”

1.3 DESCRIPTION OF SITE WORKS & OBSERVATIONS

1.3.1 Works During Monitoring Period

The following works occurred during this monitoring period:

- Continued placement of scour protection rock east of the Caisson Wharf.
- Continued landside fill densification, including vibro-densification, direct compaction, and rolling.
- Concrete pours for cope wall at Caisson 21 (C21), crane wall, crane beam, and infill slabs for C22 & C23.
- Continued preparation works of for cope wall, crane wall, and crane beam
- Continued filling of S2 area north of deadman anchors.

1.3.2 Ongoing and Upcoming Works

- Land densification operations to continue.
- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater tremie pour for caisson wharf toe protection to begin February 13.
- Sub-tidal habitat compensation reef construction to resume starting the week of February 16.

2.0 ENVIRONMENTAL MONITORING

2.1 CONSTRUCTION AND MARINE WORKS: MITIGATION & RECOMMENDATIONS

The following sections address environmental monitoring observations and include mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.1.1 Water Quality

2.1.1.1 Marine Construction Works

One active concrete pour on the C21 cope wall was observed during this monitoring period. Turbidity and pH measured in waters adjacent to the pour were within acceptable levels (*Table 2*) with no increased turbidity visible. DCL crew indicated that they planned to continue using a portable plywood strip to prevent concrete splatter from passing through a gap between the concrete form and the outer eastern walkway.
A CO₂ tank was easily accessible for pH mitigation immediately adjacent to the cope wall concrete pour (Photo 1).

A dewatering pump at C24 was observed to have well maintained secondary containment (Photo 2). Water quality in the adjacent marine environment was within acceptable limits (Table 1; Photo 3)

2.1.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Containment of fuel drips has been resolved for the portable fuel tank near C16, which had last been noted in Report #DFO 09-005 as needing attention. DCL has constructed a containment basin beneath this tank, and the basin was properly maintained and free of excess rain water (Photo 4).

2.1.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

2.1.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted during the site visit and none were observed.

2.1.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

2.2 ACTION ITEMS

2.2.1 Follow-up from Previous Reports

- DCL has improved fuel containment and handling within the vicinity of C16.
- Monitored for turbidity and pH impacts associated with on-going concrete works, particularly the cope wall pour at C21.
- No clamshell dredging occurred during this period of site works, therefore no crab monitoring of dredgeate was conducted.

2.2.2 New and Current Action Items

- The production scale tremie pour which was expected this week was postponed until February 13. This event will be monitored for potential pH and turbidity impacts.
- Monitor sub-tidal reef construction once this activity resumes.
3.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

3.1.1 Terminal Systems Inc.
No environmental concerns relevant to the FAA were identified during the reporting period.

3.1.2 Birds
- February 6, northwest of perimeter dike approximately 400 ducks, as well as 30 grebe and 5 loons were observed.

3.1.3 Air Quality
No dust concerns were noted during this period.

3.1.4 Noise Monitoring
No noise monitoring was conducted during this monitoring period.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
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Attachments: Table 2, Photograph Log
Table 2: Water Quality Measurements on February 6th, 2009

<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>pH</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C16</td>
<td>1</td>
<td>E</td>
<td>Background</td>
<td>Feb 6</td>
<td>13:20</td>
<td>0.1</td>
<td>6.71</td>
<td>0.8</td>
<td>Background.</td>
</tr>
<tr>
<td>East of C20</td>
<td>1</td>
<td>E</td>
<td>Cope wall pour at C21</td>
<td>Feb 6</td>
<td>14:40</td>
<td>0.1</td>
<td>7.95</td>
<td>0.5</td>
<td>No visible water quality impacts.</td>
</tr>
<tr>
<td>C24</td>
<td>0</td>
<td>-</td>
<td>Dewatering Pump</td>
<td>Feb 6</td>
<td>14:45</td>
<td>-</td>
<td>7.91</td>
<td>2.1</td>
<td>Discharge before entering marine environment.</td>
</tr>
<tr>
<td>C24</td>
<td>1</td>
<td>E</td>
<td>Dewatering Pump</td>
<td>Feb 6</td>
<td>14:45</td>
<td>0.1</td>
<td>7.93</td>
<td>0.6</td>
<td>Discharge after entering marine environment.</td>
</tr>
</tbody>
</table>
PHOTO 1: CO₂ tank ready of pH mitigation adjacent to cope wall pour. Photo February 6, 2009.

PHOTO 3: Discharge from dewatering pump. Photo February 6, 2009.

February 27, 2009
File: 499-002.09 and 1051-001.01

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC  V6C 3S4

Attention:  Manager, Environmental Assessment Major Projects (EAMP)

RE:  Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2: Weekly Environmental Report February 13, 2009 to February 19, 2009

Distribution:  Jennifer Simpson  DFO
Brad Fanos  DFO
Kristie Trainor  EC
Andrew Robinson  CWS
Juergen Baumann  VFPA
Patrick Craig  VFPA
Darrell Desjardin  VFPA
Carrie Brown  VFPA
Brian Atwell  DCL
Robert Windecker  DCL
Amy Krause  DCL
Trevor Reid  VPD
Bill Clark  KCB
Mike Willcox  MOE
Geoff Wickstrom  Hemmera
Simon Daniels  TSI
Jim O’Dowd  TSI
David McAdam  TSI

Contractors:  Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac), Delta Aggregates, and Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: Fisheries Act Authorizations (FAA) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). **Section 1** of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. **Section 3** and **Section 4** cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. **Section 5** covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI, also under Hemmera Project No. 1051-001.01.

## 1.0 BACKGROUND CONDITIONS FOR PERIOD OF SITE WORKS

### 1.1 ENVIRONMENTAL WINDOWS

The fisheries sensitive period for the protection of adult ovigerous Dungeness crab commenced on October 15th, 2008 and extends through to March 31st, 2009. The fisheries sensitive period for protection of juvenile salmonids begins on March 1st and continues through to August 15th, 2009.

### 1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

**Table 1** and **Figure 1** below summarize weather and tidal data for the period covered in this report: February 13 – 19, 2009.

**Table 1: Site Visit Timing and Weather Data**

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visited1 by Environmental Monitor</th>
<th>Weather Conditions2</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr3 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 13, 2009 07:00 – 10:30 &amp; 11:00 – 13:30</td>
<td>DCL DP3 MATCON TF</td>
<td>Clear, 6°C, wind 3 km/h NE</td>
<td>Force 1</td>
<td>0</td>
</tr>
<tr>
<td>February 17, 2009 13:15 – 16:15</td>
<td>DCL BR</td>
<td>Clear, 6°C, wind 3 km/h S</td>
<td>Force 1</td>
<td>0</td>
</tr>
<tr>
<td>February 18, 2009 07:30 – 11:15</td>
<td>DCL BR</td>
<td>Clear, 2°C, wind 3 km/h S</td>
<td>Force 1</td>
<td>0</td>
</tr>
<tr>
<td>February 19, 2009 08:15 – 12:00</td>
<td>DCL DP3 DCL BR MATCON TF</td>
<td>Clear, 4°C, wind 17 km/h NE</td>
<td>Force 4</td>
<td>0</td>
</tr>
</tbody>
</table>

---

1. DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
2. Source: www.weatheroffice.com
3. Source: www.weatheroffice.com
2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period
- Continued placement of scour protection rock north of Caisson 26 (C26).
- Continued landside fill densification, including vibro-densification, direct compaction, and rolling.
- Underwater toe protection (TPro) tremie concrete pours at C17
- Continued preparation works and concrete pours for cope wall, crane wall, and crane beam.

2.1.2 Ongoing and Upcoming Works
- Land densification operations completing final phase.
- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater tremie pours for caisson wharf TPro continuing.
- Sub-tidal habitat compensation reef construction resuming.

---

4 Source: http://www.tides.gc.ca/
2.2  **Environmental Monitoring: Observations & Mitigation**

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1  Water Quality

2.2.1.1  Marine Construction Works

The first and second underwater TPro tremie pours were observed on February 13 and 19 respectively. Turbidity and pH were continuously monitored in waters adjacent to the active placement location as well as 5 - 6 m downgradient of the pour, and were within acceptable levels. The maximum downgradient pH and turbidity values observed were 8.32 and 3.5 NTU. To demonstrate the observed trends, the complete data record collected during the February 13 tremie pour is provided in Appendix A.

Two CO$_2$ tanks were easily accessible for pH mitigation immediately adjacent to the TPro concrete pour (Photo 1). To mitigate the potential of concrete entering the marine environment, crews tied off the concrete tremie line during mobilization and demobilization to active placement location (Photo 2) and excess concrete was contained (Photo 3).

2.2.1.2  Petroleum Hydrocarbons and other Deleterious Substances

Adsorbent pads for potential hydrocarbon spills were observed on-hand adjacent to the concrete works staff trailer and staging area.

2.2.2  Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

DCL divers indicated that no crabs had been observed in the area of the TPro tremie pour either prior to or during concrete placement.

2.2.3  Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during the site visit and none were observed.

2.2.4  Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.
2.3 **ACTION ITEMS**

2.3.1 **Follow-up from Previous Reports.**
- Monitored for turbidity and pH impacts associated with on-going concrete works.
- No clamshell dredging was observed during this period of site works, therefore no crab monitoring of dredgeate was conducted.

2.3.2 **New and Current**
- Monitor sub-tidal reef construction once this activity resumes.

3.0 **MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3**

3.1 **ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION**

No environmental concerns relevant to the FAA were identified during the reporting period.

4.0 **SUPPLEMENTAL ENVIRONMENTAL MONITORING**

4.1 **BIRDS**
- February 13, 15 loons and 7 ducks were observed east of the C16 in the Mulberry Harbour, and west of the Perimeter Dike approximately 50 loons, 20 ducks and 20 grebs were observed.
- February 19, approximately 8 - 12 ducks were observed east of C16 in the Mulberry Harbour during marine mammal monitoring.

4.2 **AIR QUALITY**

No dust concerns were noted during this period.

4.3 **NOISE MONITORING**

No noise monitoring was conducted during this monitoring period.

5.0 **DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP**

5.1 **SUMMARY OF SITE WORKS DURING MONITORING PERIOD**

During this monitoring period, works on the temporary barge ramp began on February 17 and included the following activities:
- Placement of dike core rock using a land-based excavator.
- Relocation of the existing crest protection rock by excavator.
5.2 **ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION**

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.

5.2.1 **Water Quality**

5.2.1.1 **Marine Construction Works**

- The marine works excavator was observed to follow best practices placing material above waterline then pushing with bucket to advance fill material and thus mitigate turbidity (Photo 4). This excavator was observed to only operate from the imported dike core rock, and its tracks were kept in the dry.

- Visible turbidity plumes (Photo 5) of up to 14.2 NTU above background were noted on February 17 & 18 (Table 2) and appeared to dissipate within 2 - 50 m downgradient of the dike works. DCL was informed of these turbidity levels and implemented a silt curtain for mitigation.

- Turbidity from marine works on February 19 was observed to be contained by the silt curtain (Photo 6), with turbidity 5 m down-gradient only 3.7 NTU above a background of 2 NTU, while turbidity within the active work area was 90.8 NTU (Table 2)

- DCL surveyor confirmed that the works were within the allowed project footprint.

- Observation was made for potential erosion of the intertidal mudflats adjacent to the barge ramp works, and no such erosion was noted.

5.2.1.2 **Petroleum Hydrocarbons and other Deleterious Substances**

- February 19 excess grease was identified on MATCON excavator arm. Matcon was advised and grease was removed prior to work commencing.

- The excavator, with tracks above water, was used to conduct dredging below the water line using the excavator arm for recovery of crest protection rock (Photo 7).

5.2.2 **Fish & Fish Habitat**

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue during the crab sensitive period with relocation well beyond the project footprint. This data is reported independently to DFO.

5.2.3 **Marine Mammals**

Marine mammal monitoring was conducted once during the reporting period with none observed. DCL and Matcon also did not report any whale sightings during this period.
5.2.4 Spill Response & Environmental Incident Reporting

On February 17, the excavator, which was working on the new dike core, developed a hydraulic fluid leak on its arm. Work immediately stopped and the leaked fluid was mopped up with on-hand adsorbent pads. Both the excavator and rock trucks were equipped with spill response supplies. No discharge to the marine environment was visible. Work was suspended until the following day to allow for repairs.

5.3 ACTION ITEMS

5.3.1 New and Current

- Monitor turbidity levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Beginning March 1, check that marine works are conducted in the dry or in isolation of fish bearing waters.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

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Report prepared and peer reviewed by:
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Attachments: Table 2, Photograph Log, Appendix A
<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time (24:00)</th>
<th>Depth (m)</th>
<th>Turb (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter Dike</td>
<td>20</td>
<td>S</td>
<td>Background</td>
<td>2/17/09</td>
<td>14:25</td>
<td>0.1</td>
<td>0.7</td>
<td>Upgradient of works</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>20</td>
<td>N</td>
<td>Dike rock placement</td>
<td>2/17/09</td>
<td>14:15</td>
<td>0.1</td>
<td>14.9</td>
<td>Downgradient of works.</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>50</td>
<td>N</td>
<td>Dike rock placement</td>
<td>2/17/09</td>
<td>14:20</td>
<td>0.1</td>
<td>1.5</td>
<td>Downgradient of works.</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>20</td>
<td>S</td>
<td>Background</td>
<td>2/18/09</td>
<td>08:15</td>
<td>0.1</td>
<td>0.8</td>
<td>Upgradient of works</td>
</tr>
<tr>
<td>Placed dike rock.</td>
<td>2</td>
<td>W</td>
<td>Dike rock placement</td>
<td>2/18/09</td>
<td>07:55</td>
<td>0.1</td>
<td>7.0</td>
<td>Adjacent to placed rock.</td>
</tr>
<tr>
<td>Placed dike rock.</td>
<td>2</td>
<td>N</td>
<td>Dike rock placement</td>
<td>2/18/09</td>
<td>08:05</td>
<td>0.1</td>
<td>4.0</td>
<td>Adjacent to placed rock.</td>
</tr>
<tr>
<td>Placed dike rock.</td>
<td>2</td>
<td>S</td>
<td>Dike rock placement</td>
<td>2/18/09</td>
<td>08:15</td>
<td>0.1</td>
<td>1.6</td>
<td>Adjacent to placed rock.</td>
</tr>
<tr>
<td>Background</td>
<td>100</td>
<td>N</td>
<td>Background north of tied bulkhead</td>
<td>2/19/09</td>
<td>18:45</td>
<td>0.1</td>
<td>2.0</td>
<td>Background</td>
</tr>
<tr>
<td>New dike</td>
<td>1</td>
<td>N</td>
<td>Turbidity emanating from newly placed dike materials</td>
<td>2/19/09</td>
<td>15:56</td>
<td>0.1</td>
<td>18.9</td>
<td>Up-gradient of silt curtain; ebbing tide</td>
</tr>
<tr>
<td>New dike</td>
<td>1</td>
<td>S</td>
<td>Turbidity emanating from newly placed dike materials</td>
<td>2/19/09</td>
<td>15:59</td>
<td>0.1</td>
<td>7.1</td>
<td>Not enclosed by silt curtain</td>
</tr>
<tr>
<td>New dike</td>
<td>1</td>
<td>N</td>
<td>Turbidity emanating from newly placed dike materials</td>
<td>2/19/09</td>
<td>18:02</td>
<td>0.1</td>
<td>6.8</td>
<td>Down-gradient of silt curtain; ebbing tide</td>
</tr>
<tr>
<td>Down-gradient of silt curtain</td>
<td>5</td>
<td>N</td>
<td>Work area</td>
<td>2/19/09</td>
<td>18:28</td>
<td>0.1</td>
<td>5.7</td>
<td>Down-gradient of silt curtain; ebbing tide</td>
</tr>
<tr>
<td>Within isolated work area</td>
<td>10</td>
<td>E</td>
<td>Work area</td>
<td>2/19/09</td>
<td>19:05</td>
<td>0.1</td>
<td>90.8</td>
<td>Within isolated work area</td>
</tr>
<tr>
<td>Adjacent to rock placement area</td>
<td>10</td>
<td>S</td>
<td>Work area</td>
<td>2/19/09</td>
<td>19:10</td>
<td>0.1</td>
<td>33.3</td>
<td>Open water, up-gradient; ebbing tide</td>
</tr>
</tbody>
</table>
PHOTO 1: C17 Toe Protection pour area with 2 CO₂ tanks staged to provide mitigation as necessary. Photo February 19, 2009

PHOTO 2: Tremie line tied off during mobilization and removal. Photo February 13, 2009

PHOTO 5: Weak turbidity plume adjacent to rock berm after works complete. Photo February 18, 2009.

PHOTO 7: Excavator conducting dredging of crest protection rock with arm below water level. Photo February 19, 2009.
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: Fisheries Act Authorizations (FAA) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). **Section 1** of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. **Section 3** and **Section 4** cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. **Section 5** covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI, also under Hemmera Project No. 1051-001.01.

### 1.0 BACKGROUND CONDITIONS FOR PERIOD OF SITE WORKS

#### 1.1 ENVIRONMENTAL WINDOWS

The fisheries sensitive period for the protection of adult ovigerous Dungeness crab commenced on October 15<sup>th</sup>, 2008 and extends through to March 31<sup>st</sup>, 2009. The fisheries sensitive period for protection of juvenile salmonids commenced on March 1<sup>st</sup> and continues through to August 15<sup>th</sup>, 2009.

#### 1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

**Table 1** and **Figure 1** below summarize weather and tidal data for the period covered in this report: February 20 - 26, 2009.

**Table 1: Site Visit Timing and Weather Data**

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visted&lt;sup&gt;1&lt;/sup&gt; by Environmental Monitor</th>
<th>Weather Conditions&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr&lt;sup&gt;3&lt;/sup&gt; (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 20, 2009 10:00 – 13:00, 13:00 – 14:00, &amp; 18:45 – 22:00</td>
<td>DCL DP3 MATCON TF DCL BR</td>
<td>Clear, 9°C, wind 3 km/h W</td>
<td>Force 1: Light Air (Scaly ripples, no foam crests)</td>
<td>0</td>
</tr>
<tr>
<td>February 21, 2009 10:00 – 15:50</td>
<td>DCL BR</td>
<td>Clear, 8°C, wind 3 km/h S</td>
<td>Force 1: Light air (ripples without crests)</td>
<td>0</td>
</tr>
</tbody>
</table>

---

<sup>1</sup> DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
<sup>2</sup> Source: www.weatheroffice.com
<sup>3</sup> Source: www.weatheroffice.com
<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Location</th>
<th>Weather Conditions</th>
<th>Force Description</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 23, 2009 09:00 – 18:00</td>
<td>DCL BR</td>
<td>Partly cloudy, 9°C, wind 8 km/h N</td>
<td>Force 2: Light breeze (small wavelets, crest of glassy appearance, not breaking)</td>
<td>3.3</td>
</tr>
<tr>
<td>February 24, 2009 08:00- 15:15</td>
<td>DCL BR</td>
<td>Overcast, 7°C, wind 0 km/h</td>
<td>Force 0: Flat</td>
<td>2.0</td>
</tr>
<tr>
<td>February 25, 2009 10:30 - 14:00, 14:00 – 14:45, &amp; 14:00 – 18:45</td>
<td>DCL DP3 MATCON TF DCL BR</td>
<td>Light rain, 5°C, wind 17 km/h SSE</td>
<td>Force 3: Gentle breeze (Large wavelets: crests begin to break; scattered whitecaps)</td>
<td>3.8</td>
</tr>
<tr>
<td>February 26, 2009 08:30- 15:30</td>
<td>DCL BR</td>
<td>Overcast, 1°C, wind 1 km/h</td>
<td>Force 1: Ripples without crests</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 1: Tsawwassen Tidal data

2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Placement of scour protection rock at Caisson 19 (C19).

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4 Source: http://www.tides.gc.ca/
• Continued landside fill densification, including vibro-densification, compaction testing, and rolling.
• Crane wall concrete pour at C22 and crane beam concrete pour at C17/18
• Continued preparation and formworks construction on the crane wall, crane beam and power pit structures.
• Concrete coring at C25/26.
• Excavation and installation of duct banks east of Caisson Wharf

2.1.2 Ongoing and Upcoming Works

• Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
• Underwater tremie pours for caisson wharf TPro temporarily suspended.
• Installation of underground services, backfilling and compaction east of Caisson Wharf.
• Sub-tidal habitat compensation reef construction resumed.

2.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 Water Quality

2.2.1.1 Marine Construction Works

On February 20 Hemmera observed the wet-curing of the most recent cope wall pour, and an ongoing cope wall concrete pour at C20. No curing waters, concrete fines, or concrete impacted waters were observed entering the marine environment. DCL re-stated that formwork is carefully observed for cracks and filled with foam during form assembly and before pouring starts. Concrete coring at C26 was also observed using wet vacs to contain concrete impacted water. An o-ring seal was not in placed on the vac. Evidence of a small leak which entered the marine environment was observed and the operator was reminded to be proactive in preventing the release of concrete impacted waters into the marine environment.

2.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

On February 20, 2009 Hemmera conducted an audit of the Handling and Management of Deleterious substances on VPD Marine vessels. Both rigs on site, the1406 and the 1402 were visited. Sanitation and chronic antifreeze leak on VPD No.1406 were identified as potential issues. DCL was informed and indicated that follow up measures had been taken with location of portable toilet facilities in vicinity of
Seaspan dock. And that regular monitoring including placement of absorbent pads has been implemented for mitigation of chronic leak until repair can be undertaken in next 1-2 weeks.

Small quantities of oil and lubricant (< 20 L) were observed at three inactive work areas immediately adjacent to the marine environment (Photos 1). Litter and garbage were also observed at various locations around the site. DCL was informed and indicated that new labourers had recently been hired to address housekeeping issues and would be instructed to remove fuel and deleterious substances from manholes and unattended areas to prevent accidental releases.

### 2.2.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

### 2.2.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during the site visits and none were observed.

### 2.2.4 Spill Response & Environmental Incident Reporting

February 20, a sheen was observed on the water adjacent to the Diver support barge. The source of the sheen was unknown (Photo 2).

On February 25 a hydrocarbon sheen was observed on the roadway near the site entrance (Photo 3). A DCL employee was observed providing clean up with absorbent pads.

No spills or environmental incidents were reported to Hemmera during this period of site works.

### 2.3 Action Items

#### 2.3.1 Follow-up from Previous Reports.

- Monitored for turbidity and pH impacts associated with on-going concrete works.
- Monitored for storage and handling of fuel and other deleterious substances.

#### 2.3.2 New and Current

- Continue to monitor for impacts of ongoing concrete works, fuel containment, and handling of deleterious substances.
- Monitor sub-tidal reef construction once this activity resumes.
3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

No environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 BIRDS

- February 20, 20 gulls and 25 cormorants or loons were observed east of C16 in the Mulberry Harbour, and 25 ducks were observed north of C26.
- February 25, 2 loons were observed east of C16 in the Mulberry Harbour during marine mammal monitoring.

4.2 AIR QUALITY

No dust concerns were noted during this period.

4.3 NOISE MONITORING

No noise monitoring was conducted during this monitoring period.

5.0 DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP

5.1 SUMMARY OF SITE WORKS DURING MONITORING PERIOD

During this monitoring period, works on the temporary barge ramp included the following activities:

- Placement of dike core rock using a land-based excavator.
- Relocation of the existing crest protection rock by excavator.
- Deployment of additional silt curtain (SC).
- Material recovery by clamshell dredge.

5.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.
5.2.1 Water Quality

5.2.1.1 Marine Construction Works

- The marine works excavators were observed to operate with tracks kept in the dry on new dike core rock.
- Material recovery from marine rig using clamshell dredge commenced on February 23.
- Active work area was fully enclosed by SC (Photo 4) and material stockpiled on scow fitted with filter cloth and concrete blocks at south end to mitigate against turbid water discharge to the marine environment (Photo 5).
- Turbidity generated from dredging works appeared contained within SC with maximum turbidity measured at 42.5 NTU above background within SC and returned to background within 10 m of SC (Table 2).
- Turbid water discharge from runoff from the scow (Photo 6) was measured at 12.8 NTU above background (Table 2), however the turbidity plume was not observed to migrate from the immediate area.
- DCL surveyor confirmed that the works were within the allowed project footprint.
- Observation was made for potential erosion of the intertidal mudflats adjacent to the barge ramp works, and no such erosion was noted.

5.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

- February 20 excess grease was identified on arm of MATCON excavator working on dike above water line. Matcon was advised and grease was removed.
- Clamshell bucket was inspected for excess grease prior to dredging works on February 24 and 26, none was present.

5.2.2 Fish & Fish Habitat

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue during the crab sensitive period with relocation well beyond the project footprint. This data is reported independently to DFO.

Material stockpiled on the scow was inspected for signs of crab or crab pieces on two occasions on February 23 with none observed.

5.2.3 Marine Mammals

Marine mammal monitoring was conducted daily during the reporting period with none observed. DCL and Matcon also did not report any whale sightings during this period.
5.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 ACTION ITEMS

5.3.1 New and Current

- Monitor turbidity levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Beginning March 1, check that marine works are conducted in the dry or in isolation of fish bearing waters.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

[Signature]

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604-669.0424 (179)
jmcbride@hemmera.com

Report prepared and peer reviewed by:
HEMMERA

[Signature]

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist / Project Manager
604.669.0424 (199)
egeraghty@hemmera.com

Attachments: Table 2, Photograph Log
Table 2: Water Quality Measurements

<table>
<thead>
<tr>
<th>Location</th>
<th>m (NE SW)</th>
<th>Point Source</th>
<th>Date</th>
<th>Time</th>
<th>Depth</th>
<th>Turbidity (NTU)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter Dike</td>
<td>30 (S)</td>
<td>Background</td>
<td>2/20/09</td>
<td>21:10</td>
<td>0.1</td>
<td>1.9</td>
<td>Upgradient of works</td>
</tr>
<tr>
<td>Placed dike rock.</td>
<td>5 (E)</td>
<td>Crest protection removal</td>
<td>2/20/09</td>
<td>20:55</td>
<td>0.1</td>
<td>8.4</td>
<td>5 m from active bucket work below water within silt fence.</td>
</tr>
<tr>
<td>Placed dike rock.</td>
<td>2 (NE)</td>
<td>Crest protection removal</td>
<td>2/20/09</td>
<td>20:50</td>
<td>0.1</td>
<td>3.6</td>
<td>2 m downgradient of silt fence during active work below water.</td>
</tr>
<tr>
<td>Seaspan Dock.</td>
<td>40 (E)</td>
<td>Crest protection removal</td>
<td>2/20/09</td>
<td>20:40</td>
<td>0.1</td>
<td>3.3</td>
<td>40 m downgradient of active below water work.</td>
</tr>
<tr>
<td>Background</td>
<td>200 (NE)</td>
<td>Background buoy northeast of tied bulkhead</td>
<td>2/23/09</td>
<td>13:25</td>
<td>0.1</td>
<td>0.5</td>
<td>Background</td>
</tr>
<tr>
<td>Background</td>
<td>500 (E)</td>
<td>Background in Mulberry Harbour E of Caisson 16</td>
<td>2/23/09</td>
<td>13:15</td>
<td>0.1</td>
<td>0.6</td>
<td>Background</td>
</tr>
<tr>
<td>Background</td>
<td>10 (N)</td>
<td>Background immediately north of Caisson 26</td>
<td>2/23/09</td>
<td>13:05</td>
<td>0.1</td>
<td>0.8</td>
<td>Background</td>
</tr>
<tr>
<td>Isolated Work Area from Dike</td>
<td>1 (N)</td>
<td>Turbidity emanating from dike material</td>
<td>2/23/09</td>
<td>09:30</td>
<td>0.1</td>
<td>5.2</td>
<td>Within SC prior to initiation of work; ebbing tide</td>
</tr>
<tr>
<td>Adjacent to Dike outside SC</td>
<td>10 (SE)</td>
<td>Scow run-off plume</td>
<td>2/23/09</td>
<td>10:30</td>
<td>0.1</td>
<td>2.7</td>
<td>Down-gradient of silt curtain; ebbing tide</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>10 (E)</td>
<td>Scow run-off plume</td>
<td>2/23/09</td>
<td>11:09</td>
<td>0.1</td>
<td>1.2</td>
<td>Down-gradient of silt curtain; Low tide</td>
</tr>
<tr>
<td>Isolated Work Area from Dike</td>
<td>1 (N)</td>
<td>Turbidity induced by clamshell material recovery</td>
<td>2/23/09</td>
<td>11:20</td>
<td>0.1</td>
<td>15.8</td>
<td>SC noted to contain majority of induced turbidity</td>
</tr>
<tr>
<td>North end of Scow</td>
<td>30 (N)</td>
<td>Run-off plume at southern end of scow</td>
<td>2/23/09</td>
<td>13:39</td>
<td>0.1</td>
<td>0.3</td>
<td>Up-gradient; flooding tide</td>
</tr>
<tr>
<td>South of SC</td>
<td>10 (S)</td>
<td>Work Area discharge</td>
<td>2/23/09</td>
<td>13:42</td>
<td>0.1</td>
<td>0.8</td>
<td>Down-gradient; flooding tide</td>
</tr>
<tr>
<td>South of SC</td>
<td>2 (S)</td>
<td>Work Area discharge</td>
<td>2/23/09</td>
<td>13:44</td>
<td>0.1</td>
<td>1.0</td>
<td>Down-gradient; flooding tide</td>
</tr>
<tr>
<td>Isolated Work Area from Dike</td>
<td>1 (N)</td>
<td>Turbidity induced by clamshell material recovery</td>
<td>2/23/09</td>
<td>14:14</td>
<td>0.1</td>
<td>43.0</td>
<td>SC noted to contain majority of induced turbidity</td>
</tr>
<tr>
<td>Location</td>
<td>m</td>
<td>NE SW</td>
<td>Point Source</td>
<td>Date</td>
<td>Time</td>
<td>Depth</td>
<td>Turbidity (NTU)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---</td>
<td>-------</td>
<td>-------------------------------------------</td>
<td>----------</td>
<td>--------</td>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>Adjacent to Dike outside SC</td>
<td>10</td>
<td>SE</td>
<td>Scow run-off plume &amp; Work Area discharge</td>
<td>2/23/09</td>
<td>14:17</td>
<td>0.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>10</td>
<td>E</td>
<td>Scow run-off plume &amp; Work Area discharge</td>
<td>2/23/09</td>
<td>14:20</td>
<td>0.1</td>
<td>13.3</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>10</td>
<td>E</td>
<td>Scow run-off plume &amp; Work Area discharge</td>
<td>2/23/09</td>
<td>14:20</td>
<td>0.1</td>
<td>13.3</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>100</td>
<td>S</td>
<td>Background</td>
<td>2/24/09</td>
<td>9:50</td>
<td>0.1</td>
<td>1.10</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>50</td>
<td>N</td>
<td>Dredging works</td>
<td>2/24/09</td>
<td>9:30</td>
<td>0.1</td>
<td>2.32</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>25</td>
<td>N</td>
<td>Dredging works</td>
<td>2/24/09</td>
<td>9:35</td>
<td>0.1</td>
<td>3.40</td>
</tr>
<tr>
<td>Seaspan Dock.</td>
<td>3</td>
<td>N</td>
<td>Dredging works</td>
<td>2/24/09</td>
<td>9:40</td>
<td>0.1</td>
<td>9.92</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>100</td>
<td>S</td>
<td>Background</td>
<td>2/26/09</td>
<td>14:35</td>
<td>0.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Northeast buoy</td>
<td>50</td>
<td>N</td>
<td>Background</td>
<td>2/26/09</td>
<td>14:10</td>
<td>0.1</td>
<td>4.1</td>
</tr>
<tr>
<td>North side of the scow</td>
<td>30</td>
<td>N</td>
<td>Dredging works</td>
<td>2/26/09</td>
<td>14:20</td>
<td>0.1</td>
<td>8.4</td>
</tr>
<tr>
<td>East side of the scow</td>
<td>10</td>
<td>N</td>
<td>Dredging works</td>
<td>2/26/09</td>
<td>14:25</td>
<td>0.1</td>
<td>7.6</td>
</tr>
<tr>
<td>Inside SC</td>
<td>10</td>
<td>S</td>
<td>Dredging works</td>
<td>2/26/09</td>
<td>14:30</td>
<td>0.1</td>
<td>36.5</td>
</tr>
</tbody>
</table>
PHOTO 1: Lubricant containers observed near marine environment. Photo February 20, 2009

PHOTO 2: Sheen adjacent to diver support barge. Photo February 20, 2009

PHOTO 4: Active work area enclosed by silt curtain. Photo February 23, 2009.
PHOTO 5: Scow equipped with filter cloth and lock blocks at south end for mitigation of turbid runoff waters. Photo February 23, 2009.

PHOTO 6: Turbidity plume from runoff dissipates within 10 m of immediate area. Photo February 24, 2009
March 11, 2009  
File: 499-002.09 and 1051-001.01  

Fisheries and Oceans Canada  
Pacific Region  
Suite 200 – 401 Burrard Street  
Vancouver, BC  V6C 3S4  

Attention:  Manager, Environmental Assessment Major Projects (EAMP)  

RE:  Deltaport Third Berth Project: Fisheries Act Authorization  
02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2: Weekly Environmental Report February 27, 2009 to March 5, 2009  

Distribution:  Jennifer Simpson  DFO  
Brad Fanos  DFO  
Kristie Trainor  EC  
Andrew Robinson  CWS  
Juergen Baumann  VFPA  
Patrick Craig  VFPA  
Darrell Desjardin  VFPA  
Carrie Brown  VFPA  
Brian Atwell  DCL  
Robert Windecker  DCL  
Amy Krause  DCL  
Trevor Reid  VPD  
Bill Clark  KCB  
Mike Willcox  MOE  
Geoff Wickstrom  Hemmera  
Simon Daniels  TSI  
Jim O’Dowd  TSI  
David McAdam  TSI  

Contractors:  Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac), Delta Aggregates, and Matcon Civil Constructors Ltd (Matcon)  

INTRODUCTION  

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: *Fisheries Act* Authorizations (FAA) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Section 1 of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. Section 3 and Section 4 cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. Section 5 covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI, also under Hemmera Project No. 1051-001.01.

1.0 BACKGROUND CONDITIONS FOR PERIOD OF SITE WORKS

1.1 ENVIRONMENTAL WINDOWS

The fisheries sensitive period for the protection of adult ovigerous Dungeness crab commenced on October 15th, 2008 and extends through to March 31st, 2009. The fisheries sensitive period for protection of juvenile salmonids commenced on March 1st and continues through to August 15th, 2009.

1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: February 27 - March 5, 2009.

Table 1: Site Visit Timing and Weather Data

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visited1 by Environmental Monitor</th>
<th>Weather Conditions2</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr3 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 27, 2009 10:30-18:00, 13:30 – 14:00 &amp; 15:00 – 15:30</td>
<td>DCL DP3 DCL BR MATCON TF</td>
<td>Partly cloudy, 7° C, wind 11 km/h W</td>
<td>Force 3: Gentle breeze (Large wavelets: crests begin to break; scattered whitecaps)</td>
<td>0</td>
</tr>
<tr>
<td>March 2, 2009 9:30-15:00</td>
<td>DCL BR</td>
<td>Mostly cloudy, 11° C, wind SE 8 km/h</td>
<td>Force 2: Light breeze. Small wavelets. Crests of glassy appearance, not breaking</td>
<td>9.8</td>
</tr>
<tr>
<td>March 3, 2009 10:30 – 11:30 &amp; 11:30 – 12:30</td>
<td>DCL BR MATCON TF</td>
<td>Cloudy, 6° C, wind E 4 km/h</td>
<td>Force 1: Light air. Ripples without crests.</td>
<td>3.8</td>
</tr>
</tbody>
</table>

1 DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
2 Source: www.weatheroffice.com
3 Source: www.weatheroffice.com
March 4, 2009
08:45 – 18:15
DCL DP3
DCL BR
Cloudy, 6°C, wind SW
4 km/h
Force 1: Light air. Ripples
without crests. 4.2

March 5, 2009
10:00 – 15:00
DCL BR
Sunny, 6°C, wind NE 1
km/h
Force 1: Light air. Ripples
without crests. 0

Figure 1: Tsawwassen Tidal data⁴

2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Construction works on Sub-tidal habitat compensation reefs.
- Crane wall, cope wall, crane beam, connecting slab, and duct bank formworks and associated concrete pours.
- Toe protection (TPro) prep works and underwater tremie concrete pour at Caisson 19/20 (C19/20)
- Continued GF1 material placement and roller compaction west of Caisson Wharf (CW).
- Excavation and backfilling of underground services and crane beam bedding compaction

⁴ Source: http://www.tides.gc.ca/
2.1.2 Ongoing and Upcoming Works

- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater TPro tremie concrete pours to resume March 16.
- Underwater grout repair works scheduled for March 13.
- Installation of underground services, backfilling and compaction west of Caisson Wharf continues.

2.2 Environmental Monitoring: Observations & Mitigation

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 Water Quality

2.2.1.1 Marine Construction Works

On February 27 Hemmera observed a scour TPro tremie concrete pour starting at C19/C20 moving north. The average background turbidity and pH were measured to be 1.5 NTU and 7.69, respectively.

Approximately 72 m\(^3\) of concrete was placed to a depth of approximately -16 m chart datum into the TPro formwork using a Tremie line with diver assistance. Continuous monitoring of pH and regular monitoring of turbidity was conducted at two locations; approximately 2 - 3 metres from the active work area and 4 -5 m down-gradient of the placement location under a falling tide.

A turbidity spike was measured (maximum of 111 NTU) at the placement location at 11:40, and was observed to induce a maximum pH of 10.34 units. As per DCL Task Specific Environmental Management Plan (TSEMP), CO\(_2\) was mobilized at 11:40 as precautionary mitigation of potential pH impacts (Photo 1). Upon mobilization of the CO\(_2\) lines a regulator leak was detected. DCL was notified and crews were immediately dispatched to provide maintenance to both tanks and regulators present on the Caisson Wharf. The effective operation of both tanks was tested by Hemmera upon completion of repairs. Application of CO\(_2\) was continued in the placement location until such time that the pH returned within the allowable range of 6.5 – 9.0 pH units.

The maximum measured turbidity and pH values at the down-gradient location were observed not to exceed 3.3 NTU and 8.48, respectively (Table 2). Both maximum measured values were within the limits outlined in the TSEMP, and no significant turbidity discharges or negative impacts were reported to Hemmera by the DCL divers.


**2.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances**

Concrete pours were monitored February 27 on the Cope Wall (CO) and Crane Wall (CW) at C23 and C24, respectively. Wet concrete was visible on the exterior of joints of both the CO (Photo 2) and the CW forms. The CO joints exhibiting discharge were adjacent to the marine environment. DCL was advised that special attention is required, particularly adjacent to the marine environment, to ensure formwork is adequately sealed. DCL indicated that joints would be thoroughly reviewed prior to placement of fresh concrete.

CO and CW pours were covered once placement was complete as per best practices (Photo 3), however at the end of the day a connecting slab was observed to be left uncovered (Photo 4).

On February 27 Hemmera conducted stockpile sampling of barge ramp dredgeate for DCL in accordance with BC Ministry of Environment Technical Guidance 1 on Contaminated Sites.

**2.2.2 Fish & Fish Habitat**

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

DCL Divers noted that no crabs were present in the formwork or the immediate area prior to initiation of the TPro tremie concrete pour conducted February 27.

**2.2.3 Marine Mammals**

Marine Mammal monitoring (MMM) was conducted twice during the site visit and none were observed.

**2.2.4 Spill Response & Environmental Incident Reporting**

No spills or environmental incidents were reported to Hemmera during this period of site works.

**2.3 ACTION ITEMS**

**2.3.1 Follow-up from Previous Reports.**

- Monitored for turbidity and pH impacts associated with on-going concrete works.
- Monitored for storage and handling of fuel and other deleterious substances.

**2.3.2 New and Current**

- Continue to monitor for impacts of ongoing concrete works, fuel containment, and handling of deleterious substances.
- Monitor sub-tidal reef construction.
3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

No environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 BIRDS

No birds were observed in the project area monitored during this period.

4.2 AIR QUALITY

No dust concerns were noted during this period.

4.3 NOISE MONITORING

No noise monitoring was conducted during this monitoring period.

5.0 DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP

5.1 SUMMARY OF SITE WORKS DURING MONITORING PERIOD

During this monitoring period, works on the temporary barge ramp included the following activities:

- Dredging of crest protection material from Tug Basin slopes completed.
- Depth sounding surveys of Tug Basin with survey boat.
- Clamshell placement of Type 3 material in Tug Basin.
- Placing/trimming Type 3 material on slope.
- Placement of material at toe of Temporary Barge Ramp.

5.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.
5.2.1 Water Quality

5.2.1.1 Marine Construction Works

- During dredging activities on February 27 the active work area was effectively contained from the open marine environment by the new dike core to the south and the silt curtain (SC) to the north, east and west.
- Turbidity impacts were observed to be effectively contained within vicinity of work area. Measurement of turbidity levels indicated that turbidity dissipated to within 1.4 NTU of background at 50 m N of the SC, and 2.9 NTU above background at 100 m S of the SC (Table 2).
- During works a plume developed due to leakage from the SC. DCL was notified and made repairs to the SC immediately (Photo 5).
- March 2 elevated turbidity levels due to propeller wash from survey boat and clamshell placement of Type 3 material (maximum value 29.7 NTU above background) were contained in work area, dissipating within 20 m downgradient of SC (Photo 6).
- MATCON indicated that excavator was inspected prior to commencing night time dredging at low tide on March 4 and it was found to be free from excess grease and leaks.
- The area dredged by excavator was fully enclosed by SC and material removed replaced immediately following dredging. No turbidity discharges were noted from works.
- March 5 elevated turbidity levels due to propeller wash from survey boat were measured at 10.4 NTU above background and were observed to be contained within SC.
- DCL confirmed that works were conducted within project footprint.
- Observation was made for potential erosion of the intertidal mudflats adjacent to the barge ramp works, and no such erosion was noted.

5.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

DCL indicated that the clamshell excavator was inspected for grease excess and leaks prior to works commencing on February 27 and none were present.

5.2.2 Fish & Fish Habitat

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue during the crab sensitive period with relocation well beyond the project footprint. This data is reported independently to DFO.

5.2.3 Marine Mammals

Marine mammal monitoring was conducted daily during the reporting period with none observed.
5.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 ACTION ITEMS

5.3.1 New and Current

- Monitor turbidity levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Beginning March 1, check that marine works are conducted in the dry or in isolation of fish bearing waters.

We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Report prepared and peer reviewed by:
HEMMERA

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Senior Environmental Scientist / Project Manager
604.669.0424 (199)
mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log
<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
<th>NE SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time</th>
<th>Depth</th>
<th>Turbidity (NTU)/pH</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>1</td>
<td>E</td>
<td>Background North of Tremie Pour C19/C20 from Caisson Wharf</td>
<td>2/27/09</td>
<td>10:20</td>
<td>- 14.5</td>
<td>1.5/7.69</td>
<td>Background</td>
</tr>
<tr>
<td>TPro Placement</td>
<td>1</td>
<td>E</td>
<td>TPro Pour</td>
<td>2/27/09</td>
<td>11:40</td>
<td>-14.6</td>
<td>9.26/111</td>
<td>Max turbidity</td>
</tr>
<tr>
<td>TPro Placement</td>
<td>1</td>
<td>E</td>
<td>TPro Pour</td>
<td>2/27/09</td>
<td>11:50</td>
<td>-14.5</td>
<td>10.34/34.8</td>
<td>Max pH</td>
</tr>
<tr>
<td>TPro Down-gradient</td>
<td>1</td>
<td>E</td>
<td>TPro Pour</td>
<td>2/27/09</td>
<td>11:52</td>
<td>-14.5</td>
<td>8.48/3.3</td>
<td>Max Down-gradient turbidity and pH; ebbing tide</td>
</tr>
<tr>
<td>TPro Placement</td>
<td>1</td>
<td>E</td>
<td>TPro Pour</td>
<td>2/27/09</td>
<td>12:30</td>
<td>-14.5</td>
<td>8.36/7.1</td>
<td>End of pour</td>
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<tr>
<td>C23 CO pour</td>
<td>3</td>
<td>E</td>
<td>Completed CO pour</td>
<td>2/27/09</td>
<td>1:00</td>
<td>0.1</td>
<td>7.62/1.9</td>
<td>Down-gradient; ebbing tide</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>100</td>
<td>S</td>
<td>Background</td>
<td>2/27/09</td>
<td>13:10</td>
<td>0.1</td>
<td>3.9</td>
<td>Southeast corner of the Perimeter Dike</td>
</tr>
<tr>
<td>Temporary Barge Dike</td>
<td>10</td>
<td>W</td>
<td>Background</td>
<td>2/27/09</td>
<td>13:10</td>
<td>0.1</td>
<td>5.2</td>
<td>South side of Temporary Barge Ramp</td>
</tr>
<tr>
<td>Inside SC</td>
<td>10</td>
<td>N</td>
<td>Material placement works</td>
<td>2/27/09</td>
<td>13:00</td>
<td>0.1</td>
<td>5.3</td>
<td>North side of Temporary Barge Ramp</td>
</tr>
<tr>
<td>NE Buoy</td>
<td>50</td>
<td>N</td>
<td>Background</td>
<td>2/27/09</td>
<td>16:55</td>
<td>0.1</td>
<td>0.2</td>
<td>50 m N of Seaspan Dock</td>
</tr>
<tr>
<td>Inside SC</td>
<td>10</td>
<td>N</td>
<td>Material placing works</td>
<td>2/27/09</td>
<td>17:00</td>
<td>0.1</td>
<td>3.1</td>
<td>10 m north of the Temporary Barge Ramp</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>70</td>
<td>S</td>
<td>Background</td>
<td>3/02/09</td>
<td>11:25</td>
<td>0.1</td>
<td>4.10</td>
<td>South side of TBD at Perimeter Dike</td>
</tr>
<tr>
<td>Toe of TBR</td>
<td>0</td>
<td></td>
<td>Turbidity from propeller wash</td>
<td>3/02/09</td>
<td>11:00</td>
<td>0.1</td>
<td>33.8</td>
<td>Elevated turbidity at toe of TBR from propeller wash</td>
</tr>
<tr>
<td>North side of TBR</td>
<td>20</td>
<td>NE</td>
<td>Turbidity from propeller was</td>
<td>3/02/09</td>
<td>11:05</td>
<td>0.1</td>
<td>2.95</td>
<td>Edge of visible turbidity</td>
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<tr>
<td>South side of TBR</td>
<td>40</td>
<td>S</td>
<td>None</td>
<td>3/02/09</td>
<td>11:10</td>
<td>0.1</td>
<td>3.77</td>
<td>South side of TBR</td>
</tr>
<tr>
<td>South side of TBR</td>
<td>20</td>
<td>S</td>
<td>Background</td>
<td>3/02/09</td>
<td>14:25</td>
<td>0.1</td>
<td>2.14</td>
<td>Background</td>
</tr>
<tr>
<td>Inside SC at TBR</td>
<td>15</td>
<td>W</td>
<td>Clamshell placement Type 3 material</td>
<td>3/02/09</td>
<td>14:20</td>
<td>0.1</td>
<td>29.5</td>
<td>Edge of induced turbidity plume inside SC</td>
</tr>
<tr>
<td>Location</td>
<td>m</td>
<td>NE SW</td>
<td>Point Source</td>
<td>Date</td>
<td>Time</td>
<td>Depth</td>
<td>Turbidity (NTU)/pH</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>----------</td>
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<td>-------</td>
<td>-------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>North side of SC</td>
<td>30</td>
<td>N</td>
<td>Clamshell placement Type 3 material</td>
<td>3/02/09</td>
<td>14:35</td>
<td>0.1</td>
<td>10.43</td>
<td>Turbidity observed to dissipate within 10 m of SC</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>50</td>
<td>S</td>
<td>Background</td>
<td>3/05/09</td>
<td>11:20</td>
<td>0.1</td>
<td>2.44</td>
<td>South side of TBD at Perimeter Dike</td>
</tr>
<tr>
<td>Seaspan Dock</td>
<td>70</td>
<td>N</td>
<td>Background</td>
<td>3/05/09</td>
<td>11:25</td>
<td>0.1</td>
<td>3.96</td>
<td>NW corner of Seaspan Dock</td>
</tr>
<tr>
<td>Toe of BR</td>
<td>15</td>
<td>NE</td>
<td>Turbidity from propeller wash</td>
<td>3/05/09</td>
<td>13:20</td>
<td>0.1</td>
<td>12.80</td>
<td>Elevated turbidity at toe of TBR from propeller wash</td>
</tr>
<tr>
<td>Toe of BR</td>
<td>15</td>
<td>NE</td>
<td>Follow up measurement</td>
<td>3/05/09</td>
<td>14:20</td>
<td>0.1</td>
<td>6.75</td>
<td>Repeated measurement at toe of TBR an hour later</td>
</tr>
</tbody>
</table>
PHOTO 1: Monitoring setup with placement and down-gradient location highlighted in red and CO² line highlighted in green. Photo February 27, 2009

PHOTO 2: Concrete discharge observed from CO formwork. Photo February 27, 2009
PHOTO 3: Cope wall concrete pour covered with tarps as per best practices.
Photo February 27, 2009.

PHOTO 4: Concrete connecting slab left uncovered at end of day.
Photo February 27, 2009.
PHOTO 5: DCL crews repairing silt curtain. Photo February 27, 2009.

PHOTO 6: Turbidity plume from propeller wash contained within silt curtain. Photo March 2, 2009.
March 18, 2009
File: 499-002.09 and 1051-001.01

Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC V6C 3S4

Attention: Manager, Environmental Assessment Major Projects (EAMP)

RE: Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2: Weekly Environmental Report March 6, 2009 to March 12, 2009

Distribution: Jennifer Simpson DFO
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Kristie Trainor EC
Andrew Robinson CWS
Juergen Baumann VFPA
Patrick Craig VFPA
Darrell Desjardin VFPA
Carrie Brown VFPA
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Trevor Reid VPD
Bill Clark KCB
Mike Willcox MOE
Geoff Wickstrom Hemmera
Simon Daniels TSI
Jim O’Dowd TSI
David McAdam TSI

Contractors: Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac), Delta Aggregates, and Matcon Civil Constructors Ltd (Matcon)

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1.1 ENVIRONMENTAL WINDOWS

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Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: March 6 - March 12, 2009.

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<th>Weather Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr³ (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 6, 2009 13:45-16:00</td>
<td>DCL BR</td>
<td>Clear, 8°C, wind 10 km/h SE</td>
<td>Force 1: Ripples without crests.</td>
</tr>
<tr>
<td>March 9, 2009 7:15-15:45</td>
<td>DCL BR</td>
<td>Overcast, snowing, 1°C, wind 5 km/h NE</td>
<td>Force 1: Light air. Ripples without crests.</td>
</tr>
<tr>
<td>March 10, 2009 7:15-15:45</td>
<td>DCL BR</td>
<td>Clear sky, -1°C, Wind 5 km/h NE</td>
<td>Force 1: Ripples without crests.</td>
</tr>
<tr>
<td>March 11, 2009 9:00- 15:00</td>
<td>DCL DP3 DCL BR MATCON TF</td>
<td>Sunny,3°C, wind 6 km/h NW</td>
<td>Force 2: Light breeze. Small wavelets. Crests of glassy appearance, not breaking</td>
</tr>
<tr>
<td>March 12, 2009 9:00 – 15:30</td>
<td>DCL DP3 DCL BR MATCON TF</td>
<td>Sunny,6°C, wind 5 km/h NE</td>
<td>Force 1: Light air. Ripples without crests.</td>
</tr>
</tbody>
</table>

1 DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
2 Source: www.weatheroffice.com
3 Source: www.weatheroffice.com
2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Construction works on Sub-tidal habitat compensation reefs.
- Formworks and rebar construction on crane wall and cope wall and associated concrete pours.
- Toe protection (TPro) prep works
- Placement and roller compaction of General Filling (GF1) behind Caisson Wharf (CW).
- Excavation and backfilling of underground services.

2.1.2 Ongoing and Upcoming Works

- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater TPro tremie concrete pours to resume March 19.
- Underwater grout repair works scheduled for March 13.

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4 Source: http://www.tides.gc.ca/
• Installation of underground services, backfilling and compaction west of Caisson Wharf continues.

2.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 Water Quality

2.2.1.1 Marine Construction Works

Sub-tidal reef construction was monitored for turbidity impacts from placement of Type 3 bedding rock. The rig was temporarily inactive during monitoring; however, no turbidity was visible or noted from measurements (Table 2).

Coring/drilling works at C18 were observed to follow best practices, including vacuum suction to prevent concrete particles from entering the marine environment. Down-gradient turbidity was observed to be within 5 NTU of background readings (Photo 1).

A cope wall concrete pour at C23B was observed, with turbidity and pH measured in waters adjacent to the pour within acceptable levels and no visible turbidity was observed. Best practices were observed to be followed, including a CO2 tank readily accessible, use of tarps to cover curing concrete, and concrete rinsing conducted greater than 15 m from the water’s edge. However, fresh concrete on hand tools were observed on the outer walkway (Photo 2).

2.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

On March 12 formwork placements using divers were monitored in the vicinity of C20. No visible turbidity was observed during the formworks. A portable fuel container was observed on the VPL deck (Photo 3). DCL was notified and the container was removed from the deck. The measured turbidity and pH values in the vicinity of diving site were within the limits outlined in the TEMP.

A fuel tank with no containment basin and with a fuelling nozzle on the ground was observed south of the Seaspam dock on the northern position of the site at 15:30 (Photo 4). The area around the tank was observed to be free of fuel stains.

2.2.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.
2.2.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during the site visits and none were observed.

2.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were reported to Hemmera during this period of site works.

2.3 ACTION ITEMS

2.3.1 Follow-up from Previous Reports

- Monitored for turbidity and pH impacts associated with on-going concrete works.
- Monitored for storage and handling of fuel and other deleterious substances.
- Monitored sub-tidal reef construction.

2.3.2 New and Current

- Continue to monitor for impacts of ongoing concrete and coring works, fuel containment, and handling of deleterious substances.

3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

On March 12 a fuel stain was observed at west side of site near vehicle entrance (Photo 5). MATCON indicated that they would immediately follow up with Site Spill Coordinator to mitigate the stain. Also, on the south end of the site two small fuel cans without secondary containment were observed. No leaks were visible. MATCON will provide secondary containments for small fuel cans for future use.

No other environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 BIRDS

No birds were observed in the project area monitored during this period.

4.2 AIR QUALITY

No dust concerns were noted during this period.

4.3 NOISE MONITORING

No noise monitoring was conducted during this monitoring period.
5.0 DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP

5.1 SUMMARY OF SITE WORKS DURING MONITORING PERIOD

During this monitoring period, works on the temporary barge ramp included the following activities:

- Trimming Type 3 material from the slope into a split scow.
- Pile driving and pile placement.
- Clamshell placement of Type 3 material around driven piles.
- Placement of Type 1 riprap material at toe of Temporary Barge Ramp.
- Cutting and welding of pile splices.

5.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.

5.2.1 Water Quality

5.2.1.1 Marine Construction Works

- Turbidity impacts during trimming activities and material placement in the vicinity of work area were observed to be contained within the SC and to dissipate within 15 minutes.
- On March 9, turbidity generated from pile driving works outside the SC was within acceptable level of 1.3 NTU above background (Table 2).
- During the work in the dry on March 10, rip rap was being pushed with the excavator bucket into the water at the base of the piles, according to best management practices (Photo 6).
- At turbidity plume of 9.4 NTU above background was observed 30 m NW of the barge ramp works on March 10, but did not appear to be directly caused by barge ramp works. Turbidity within the SC was only 4.9 NTU above background (Table 2).
- Two small turbidity plumes were observed on March 12 due to fine material leaking at the south end of the barge. The plumes dissipated within 5 m.
- DCL confirmed that works were conducted within project footprint.
- Observation was made for potential erosion of the intertidal mudflats adjacent to the barge ramp works, and no such erosion was noted.
5.2.2 Petroleum Hydrocarbons and other Deleterious Substances

On March 11, VPD diesel generators for welding and cutting tools were located near the barge ramp. The equipment was greater than 15 m from HHWL and appeared free of leaks.

5.2.3 Fish & Fish Habitat

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue during the crab sensitive period with relocation well beyond the project footprint. This data is reported independently to DFO.

No fish were observed in the vicinity of works within the Tug Basin.

5.2.4 Marine Mammals

Marine mammal monitoring was conducted daily during the reporting period with none observed.

5.2.5 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 ACTION ITEMS

5.3.1 New and Current

- Monitor turbidity levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Check that equipment operating near or over the marine environment is free of leaks and excess grease.
- Due to the current fish sensitive period, check that marine works are conducted in the dry or in isolation of fish bearing waters.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
HEMMERA

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Report prepared and peer reviewed by:
HEMMERA

Michael Geraghty, M.Sc., P.Geo.
Senior Environmental Scientist / Project Manager
604.669.0424 (199)
mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log
<table>
<thead>
<tr>
<th>Location</th>
<th>m</th>
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<th>SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time</th>
<th>Depth</th>
<th>Turbidity (NTU)/pH</th>
<th>Notes</th>
</tr>
</thead>
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<td>Background</td>
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<td>E</td>
<td></td>
<td>Pile Driving</td>
<td>3/09/09</td>
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<td>15 E from the work point</td>
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<td>Background</td>
<td>3/10/09</td>
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<td>4.4</td>
<td>South side of BR at Perimeter Dike</td>
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<td>S</td>
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<td>Rip rap placement</td>
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<td>11:25</td>
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<td>15 E from the work point</td>
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<td>NW corner of Seaspan Dock</td>
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<td>13.8</td>
<td>NW corner of Seaspan Dock</td>
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<tr>
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<td>8.2</td>
<td>S side of BR</td>
</tr>
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<td>3</td>
<td>2.40</td>
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<td>3</td>
<td>2.46</td>
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<td>Pile installation</td>
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<td>2.88</td>
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<td>Inside SC</td>
<td>2</td>
<td>W</td>
<td></td>
<td>Pile installation</td>
<td>3/11/09</td>
<td>14:20</td>
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<td>10.50</td>
<td>Turbidity contained within SC</td>
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<td>Outside SC</td>
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<td>W</td>
<td></td>
<td>Pile installation</td>
<td>3/11/09</td>
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<td>0.1</td>
<td>3.50</td>
<td>Turbidity dissipates within 5 m of SC</td>
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<tr>
<td>C16</td>
<td>1</td>
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<td></td>
<td>Background</td>
<td>3/12/09</td>
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<td>4.26/6.86</td>
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<td>Point Source</td>
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<td>Time</td>
<td>Depth</td>
<td>Turbidity (NTU)/pH</td>
<td>Notes</td>
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<td>-------</td>
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<tr>
<td>East of C18</td>
<td>15</td>
<td>E</td>
<td>Down-gradient of C18 coring works</td>
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<td>11:15</td>
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<td>C20</td>
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<td>Up-gradient of diving site</td>
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<td>5.01/7.57</td>
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<td>C23</td>
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<td>3/12/09</td>
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<td>7.69/7.44</td>
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<tr>
<td>North end of C26</td>
<td>50</td>
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<td>Background</td>
<td>3/12/09</td>
<td>11:55</td>
<td>0.1</td>
<td>2.90/6.87</td>
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<tr>
<td>Seasan dock</td>
<td>25</td>
<td>SE</td>
<td>Riprap placement</td>
<td>3/12/09</td>
<td>14:30</td>
<td>0.1</td>
<td>2.13</td>
<td>Background</td>
<td></td>
</tr>
<tr>
<td>Perimeter dyke east of BR</td>
<td>50</td>
<td>S</td>
<td>Riprap placement</td>
<td>3/12/09</td>
<td>14:35</td>
<td>0.1</td>
<td>4.04</td>
<td>Background</td>
<td></td>
</tr>
<tr>
<td>W of crest protection</td>
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<td>W</td>
<td>Riprap placement</td>
<td>3/12/09</td>
<td>14:40</td>
<td>0.1</td>
<td>6.36</td>
<td>Turbidity dissipates within 5 m of SC</td>
<td></td>
</tr>
<tr>
<td>inside SC</td>
<td>25</td>
<td>W</td>
<td>Riprap protection</td>
<td>3/12/09</td>
<td>14:45</td>
<td>0.1</td>
<td>2.98</td>
<td>Turbidity contained within SC</td>
<td></td>
</tr>
<tr>
<td>W of crest protection</td>
<td>10</td>
<td>SW</td>
<td>Riprap placement</td>
<td>3/12/09</td>
<td>14:55</td>
<td>0.1</td>
<td>11.6</td>
<td>Measure taken immediately after clamshell is lifted</td>
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<tr>
<td>outside SC</td>
<td>10</td>
<td>SW</td>
<td>Follow up Measurement</td>
<td>3/12/09</td>
<td>15:05</td>
<td>0.1</td>
<td>7.62</td>
<td>Repeated measurement after 10 minutes</td>
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</table>
PHOTO 1: Turbidity near C18 observed during coring works.
Photo March 12, 2009

PHOTO 2: Hand tools with fresh concrete on the outer walkway during cope wall pouring.
Photo March 12, 2009

PHOTO 4: Fuel tank with fuelling nozzle on the ground. Photo March 12, 2009.
PHOTO 5: Fuel stain on the ground near western site entrance.
Photo March 12, 2009.

PHOTO 6: Excavator operating in the dry on an ebbing tide.
Photo March 10, 2009
March 25, 2009
Report # DFO 09-011
Fisheries and Oceans Canada
Pacific Region
Suite 200 – 401 Burrard Street
Vancouver, BC  V6C 3S4

Attention:  Manager, Environmental Assessment Major Projects (EAMP)

RE:  Deltaport Third Berth Project: Fisheries Act Authorization
02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2: Weekly Environmental Report March 13, 2009 to March 19, 2009

Distribution:  Jennifer Simpson  DFO
Brad Fanos  DFO
Kristie Trainor  EC
Andrew Robinson  CWS
Juergen Baumann  VFPA
Patrick Craig  VFPA
Darrell Desjardin  VFPA
Carrie Brown  VFPA
Kim Keskinen  VFPA
Brian Atwell  DCL
Robert Windecker  DCL
Amy Krause  DCL
Trevor Reid  VPD
Bill Clark  KCB
Mike Willcox  MOE
Geoff Wickstrom  Hemmera
Simon Daniels  TSI
Jim O’Dowd  TSI
David McAdam  TSI

Contractors:  Klohn Crippen Berger Ltd. (KCB), Deltaport Constructors Ltd. (DCL), Vancouver Pile Driving Ltd. (VPD), Fraser River Pile and Dredge (FRPD), Geopac West Ltd. (Geopac), Delta Aggregates, and Matcon Civil Constructors Ltd (Matcon)

INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: Fisheries Act Authorizations (FAA) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Section 1 of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. Section 3 and Section 4 cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. Section 5 covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI, also under Hemmera Project No. 1051-001.01.

1.0 BACKGROUND CONDITION FOR PERIOD OF SITE WORKS

1.1 ENVIRONMENTAL WINDOWS

The fisheries sensitive period for the protection of adult ovigerous Dungeness crab commenced on October 15th, 2008 and extends through to March 31st, 2009. The fisheries sensitive period for protection of juvenile salmonids commenced on March 1st and continues through to August 15th, 2009.

1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: March 13 - 19, 2009.

Table 1: Site Visit Timing and Weather Data

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visited1 by Environmental Monitor</th>
<th>Weather Conditions2</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr3 (mm)</th>
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</thead>
<tbody>
<tr>
<td>March 13, 2009 11:00 – 15:45</td>
<td>DCL BR</td>
<td>Clear, 8°C, no wind</td>
<td>Force 1: Ripples without crests.</td>
<td>0</td>
</tr>
<tr>
<td>March 16, 2009 8:45 – 12:30</td>
<td>DCL DP, DCL BR, MATCON TF</td>
<td>Overcast, 5°C, wind 25 km/h SE</td>
<td>Force 4: Small waves.</td>
<td>8.2</td>
</tr>
<tr>
<td>March 17, 2009 9:30 – 17:15</td>
<td>DCL BR</td>
<td>Overcast, 5°C, no wind</td>
<td>Force 1: Ripples without crests.</td>
<td>0.5</td>
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<tr>
<td>March 18, 2009 10:00 – 16:30</td>
<td>DCL BR</td>
<td>Overcast, 6°C, wind 10 km/h NE</td>
<td>Force 4: Moderate breeze. Small waves.</td>
<td>0.3</td>
</tr>
<tr>
<td>March 19, 2009 9:00 – 15:45</td>
<td>DCL DP, DCL BR, MATCON TF</td>
<td>Light rain, 7°C, wind 2 km/h NE</td>
<td>Force 1: Light air. Ripples without crests.</td>
<td>7.6</td>
</tr>
</tbody>
</table>

1 DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
2 Source: www.weatheroffice.com
3 Source: www.weatheroffice.com
2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Construction works on Sub-tidal habitat compensation reefs.
- Formworks and rebar construction on the cope wall and crane wall C24-26.
- Crane beam formworks and concrete pour west of caisson Wharf (CWharf).
- Concrete drilling/chipping at C23.
- Excavation and backfilling of underground services west of CWharf.

2.1.2 Ongoing and Upcoming Works

- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater TPro tremie concrete pours to resume March 23.
- Installation of underground services, backfilling and compaction west of Caisson Wharf continues.

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4 Source: http://www.tides.gc.ca/
2.2 **ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION**

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 **Water Quality**

2.2.1.1 **Marine Construction Works**

On March 16, crane beam concrete pour west of CWharf was observed greater than 15 m inland of HHWL with no apparent pathway for concrete, concrete leachate or rinse water to reach the marine environment.

No apparent potential for concrete to enter the marine environment was observed DCL coring/drilling works conducted on landward side of C23.

DCL was notified about scattered concrete debris observed during crane beam formworks > 15 m inland of HHWL west of CWharf on March 19. The debris was collected shortly after the notification.

2.2.1.2 **Petroleum Hydrocarbons and other Deleterious Substances**

VPD diesel generator that was being used for coring/drilling works was located > 15 m from HHWL and appeared to be free of leaks with no staining observed on the ground.

No visible spills or leaks were found underneath parked Delta Aggregates rock trucks.

2.2.2 **Fish & Fish Habitat**

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

2.2.3 **Marine Mammals**

Marine Mammal monitoring (MMM) was conducted twice during the site visits and none were observed.

2.2.4 **Spill Response & Environmental Incident Reporting**

No spills or environmental incidents were reported to Hemmera during this period of site works.

2.3 **ACTION ITEMS**

2.3.1 **Follow-up from Previous Reports**

- Monitored for turbidity impacts associated with on-going coring/drilling works.
- Monitored for storage and handling of fuel and other deleterious substances.
2.3.2 New and Current

- Continue to monitor for impacts of ongoing concrete and coring works, fuel containment, and handling of deleterious substances.

3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

MATCON reported that spill response procedures including soil excavation, bagging and removal had been initiated following staining observed onsite March 12, 2009.

General site housekeeping has been observed as good. No evidence of the spill or staining was observed by Hemmera during the reporting period. Two excavators were observed with spill kits in place and free of excess grease.

As per MATCON indication during site visit on March 12, 2009, fuel containers and portable gasoline generators were found stored in secondary containments (Photos 1 and 2).

No other environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 BIRDS

No birds were observed in the project area monitored during this period.

4.2 AIR QUALITY

No dust concerns were noted during this period.

4.3 NOISE MONITORING

No noise monitoring was conducted during this monitoring period.

5.0 DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP

5.1 SUMMARY OF SITE WORKS DURING MONITORING PERIOD

During this monitoring period, works on the temporary barge ramp included the following activities:

- Welding of pile extensions.
- Trimming excess material from the toe of Temporary Barge Ramp (BR); re-grading the BR.
- Pile driving and pile placement.
• Clamshell placement of Type 3 material around driven piles.
• Removing of Type 1 riprap material from the Tug Basin at the base of BR.
• Material placement at the base of the crest protection.
• Placement of rebar for deadman anchor at BR in preparation for concrete pour.

5.2 Environmental Monitoring: Observations & Mitigation

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.

5.2.1 Water Quality

5.2.1.1 Marine Construction Works

• During the work in the dry on March 13, the excavator operated with the bucket below the water level during material trimming from the BR toe (Photo 3). The silt curtain (SC) was in place during the trimming works.
• Increased turbidity generated by the bucket works below the water level was observed for approximate 30 min. Turbidity was observed to be contained inside the SC.
• The SC did not isolate the pile driving works on March 16, although these works did not increase turbidity above background levels (Table 1).
• A small turbidity plume was noted during the ebbing tide on March 17; the turbidity was observed to be contained inside the SC and dissipated within 3 m (Photo 4).
• On March 19 DCL was advised to enclose the deadman anchor work area with the SC prior to concrete pour on March 20. The SC to remain in place during the stripping of formwork and grouting works on Saturday afternoon.
• No fish were observed in the vicinity of the Barge Ramp or Tug Basin during the reporting period.
• DCL confirmed that works were conducted within project footprint.
• Observation was made for potential erosion of the intertidal mudflats adjacent to the barge ramp works, and no such erosion was noted.

5.2.2 Petroleum Hydrocarbons and other Deleterious Substances

• On March 13, the excavator was inspected for excess grease prior to commencement of work.
5.2.3 Fish & Fish Habitat

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue with relocation well beyond the project footprint. This data is reported independently to DFO.

No fish were observed in the vicinity of works within the Tug Basin.

5.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 ACTION ITEMS

5.3.1 New and Current

- Monitor turbidity and pH levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Check that equipment operating near or over the marine environment is free of leaks and excess grease.
- Due to the current fish sensitive period, check that marine works are conducted in the dry or in isolation of fish bearing waters.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Report prepared by:
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Attachments: Table 2, Photograph Log
<table>
<thead>
<tr>
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<th>NE SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time</th>
<th>Depth</th>
<th>Turbidity (NTU)/pH</th>
<th>Notes</th>
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<td>S</td>
<td>Background</td>
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<td>12:05</td>
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<td>2.0</td>
<td>South side of BR at Perimeter Dike</td>
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<tr>
<td>Inside SC</td>
<td>20</td>
<td>E</td>
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<td>3/13/09</td>
<td>11:55</td>
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<td>4.0</td>
<td>20 E from the work point</td>
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<td>40</td>
<td>NW</td>
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<td>3/13/09</td>
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<td>0.1</td>
<td>2.1</td>
<td>NW corner of Seaspan Dock</td>
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<td>15</td>
<td>S</td>
<td>Background</td>
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<td>11:20</td>
<td>0.1</td>
<td>8.0</td>
<td>Prior to pile driving</td>
</tr>
<tr>
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<td>10</td>
<td>N</td>
<td>Background</td>
<td>3/16/09</td>
<td>11:22</td>
<td>0.1</td>
<td>6.6</td>
<td>Prior to pile driving</td>
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<tr>
<td>South side of BR – inside SC</td>
<td>30</td>
<td>S</td>
<td>Pile driving</td>
<td>3/16/09</td>
<td>11:40</td>
<td>0.1</td>
<td>5.2</td>
<td>No turbidity noted</td>
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<td>10</td>
<td>W</td>
<td>Pile driving</td>
<td>3/16/09</td>
<td>11:45</td>
<td>0.1</td>
<td>9.0</td>
<td>No turbidity noted; SC was being moved around by boat</td>
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<td>100</td>
<td>S</td>
<td>Background</td>
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<td>3.3</td>
<td>Ebbing tide</td>
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<td>3/17/09</td>
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<td>6.8</td>
<td>SE corner of the BR</td>
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<td>NE corner of Seaspan Dock</td>
<td>40</td>
<td>N</td>
<td>Rip rap trimming</td>
<td>3/17/09</td>
<td>13:05</td>
<td>0.1</td>
<td>11.8</td>
<td>Measurement taken during ebbing tide</td>
</tr>
<tr>
<td>Inside SC</td>
<td>15</td>
<td>E</td>
<td>Rip rap trimming</td>
<td>3/17/09</td>
<td>13:15</td>
<td>0.1</td>
<td>16</td>
<td>Measurement taken during material removing</td>
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<tr>
<td>Perimeter Dike</td>
<td>100</td>
<td>S</td>
<td>Background</td>
<td>3/17/09</td>
<td>15:25</td>
<td>0.1</td>
<td>2.8</td>
<td>Confirmatory sampling-ebbing tide</td>
</tr>
<tr>
<td>Inside SC</td>
<td>15</td>
<td>E</td>
<td>Rip rap trimming</td>
<td>3/17/09</td>
<td>15:35</td>
<td>0.1</td>
<td>10.1</td>
<td>Confirmatory sampling</td>
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<td>15:43</td>
<td>0.1</td>
<td>4.0</td>
<td>Confirmatory sampling</td>
</tr>
<tr>
<td>Inside SC</td>
<td>15</td>
<td>S</td>
<td>Material placement</td>
<td>3/18/09</td>
<td>10:25</td>
<td>0.1</td>
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<td>N of Seaspan Dock</td>
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<td>N</td>
<td>Material placement</td>
<td>3/18/09</td>
<td>10:40</td>
<td>0.1</td>
<td>6</td>
<td>Measurement taken during material placement works</td>
</tr>
<tr>
<td>Perimeter Dike</td>
<td>100</td>
<td>S</td>
<td>Background</td>
<td>3/18/09</td>
<td>10:50</td>
<td>0.1</td>
<td>2.7</td>
<td>SE corner of the Perimeter Dike</td>
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</tbody>
</table>
PHOTO 1: Small fuel canister in secondary containment near electrical tie-in works.
Photo March 19, 2009.

PHOTO 2: Portable gasoline generator in secondary containment as per BMP.
Photo March 19, 2009.
PHOTO 3: Excavator’s bucket below water level, with SC in place. Photo March 13, 2009.

PHOTO 4: Visible turbidity plume generated during the ebbing tide. Photo March 17, 2009.
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: Fisheries Act Authorizations (FAAs) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). Section 2 of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. Section 3 and Section 4 cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. Section 5 covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI, as required by BR FAA, under Hemmera Project No. 1051-001.03.

1.0 BACKGROUND CONDITIONS FOR PERIOD OF SITE WORKS

1.1 ENVIRONMENTAL WINDOWS

The fisheries sensitive period for the protection of adult ovigerous Dungeness crab commenced on October 15th, 2008 and extends through to March 31st, 2009. The fisheries sensitive period for protection of juvenile salmonids commenced on March 1st and continues through to August 15th, 2009.

1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

Table 1 and Figure 1 below summarize weather and tidal data for the period covered in this report: March 20 – 26, 2009.

Table 1: Site Visit Timing and Weather Data

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visited1 by Environmental Monitor</th>
<th>Weather Conditions2</th>
<th>Sea Conditions (Beaufort Wind Scale)</th>
<th>Precipitation Past 24 hr3 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 20, 2009 15:00 – 18:30</td>
<td>DCL BR</td>
<td>Overcast, 7°C; wind 2 km/h NE</td>
<td>Force 1: Ripples without crests.</td>
<td>3.3</td>
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<tr>
<td>March 21, 2009 15:45 – 18:15</td>
<td>DCL BR</td>
<td>Overcast, 6°C; wind 0.2 km/h NE</td>
<td>Force 1: Ripples without crests.</td>
<td>0</td>
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<tr>
<td>March 24, 2009 14:30 – 17:30</td>
<td>DCL BR</td>
<td>Cloudy, 10°C, wind S 21 km/h</td>
<td>Force 4: Moderate breeze. Small waves</td>
<td>6.0</td>
</tr>
</tbody>
</table>

---

1 DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)
2 Source: www.weatheroffice.com
3 Source: www.weatheroffice.com
2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Construction works on Sub-tidal habitat compensation reefs.
- Cope wall and crane wall rebar construction, formworks and concrete pours at Caisson 24 (C24) and C26.
- Crane beam formworks and concrete pour west of caisson Wharf (CWharf).
- Concrete drilling/chipping at C20.
- Excavation and backfilling of underground services west of CWharf.

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4 Source: http://www.tides.gc.ca/
2.1.2 Ongoing and Upcoming Works

- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater TPro tremie concrete pours continuing twice weekly.
- Installation of underground services, backfilling and compaction west of Caisson Wharf continues.

2.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 Water Quality

2.2.1.1 Marine Construction Works

On March 23, cope wall and crane wall concrete pours at C24 and C26 were covered with tarps as per best practices. Crews conducting hand placement of concrete at C17 were observed to have tools and concrete buckets stored on landward side of crane wall. Mixing of concrete was also observed on landward side of crane wall for mitigation of the potential for wet concrete to enter marine environment.

Hemmera conducted a spot check of underwater toe protection (TPro) concrete tremie pour at C20 on March 26. No visible turbidity plume was observed (Photo 1). DCL confirmed that approximately 72 m$^3$ of concrete was placed to a depth of approximately -16 m chart datum. Two CO$_2$ tanks were on-hand for mitigation if required. DCL divers continuously inspected for induced turbidity and none was noted. Washdown of concrete pump and equipment was conducted greater than 15 m from the High-High Water line (HHWL) with containment of excess concrete and rinse waters observed as per best practices.

Hemmera observed coring works at C20 and noted that crews continue to use vacuum suction to prevent concrete particles from entering the marine environment. No visible turbidity was observed in the vicinity of coring works on March 26.

2.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

Refuelling tanks west of C26 were observed with handles properly stowed. Containment structure underneath the tanks was free of excess water. No staining was observed on the ground in the vicinity of the tanks (Photo 2).
2.2.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities, including this week at the reef habitat compensation area. This data is independently reported to DFO.

On March 26, DCL divers reported that no crabs had been observed in the area of TPro concrete pour prior to commencing works.

2.2.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during the site visits and none were observed.

2.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were reported to Hemmera during this period of site works.

2.3 Action Items

2.3.1 Follow-up from Previous Reports

- Monitored for turbidity impacts associated with on-going coring/drilling works.
- Monitored for storage and handling of fuel and other deleterious substances.

2.3.2 New and Current

- Continue to monitor for impacts of ongoing concrete and coring works, fuel containment, and handling of deleterious substances.

3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 Environmental Monitoring: Observations & Mitigation

No environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 Birds

March 23, 2 loons and were observed east of C26 during marine mammal monitoring, and on March 26, 5 ducks and were observed east of C22 during marine mammal monitoring.

4.2 Air Quality

No dust concerns were noted during this period.
4.3 **Noise Monitoring**

No noise monitoring was conducted during this monitoring period.

5.0 **Deltaport Constructors Ltd: Temporary Barge Ramp**

5.1 **Summary of Site Works During Monitoring Period**

During this monitoring period, works on the temporary barge ramp included the following activities:

- Completed concrete pour for deadman anchor and stripping of formworks.
- Placement and compaction of granular fill (GF) material at deadman anchor.
- Installation of 3 tie-rods with PVC sleeves at deadman anchor with GF placement on top.
- Assembly of rebar cages inside piles for pouring of concrete plugs/pile reinforcement.

5.2 **Environmental Monitoring: Observations & Mitigation**

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.

5.2.1 **Water Quality**

5.2.1.1 **Marine Construction Works**

- Concrete pour for deadman anchor was conducted in the dry ([Photo 3](#)). No turbidity or pH impacts were measured in waters adjacent to the work area during the pour ([Table 2](#)).

- Turbidity and pH were observed to remain within acceptable ranges (< 5 NTU above background and within 6.5 to 9.0 pH units respectively), during subsequent site visits following pouring of deadman anchor.

- Silt Curtain (SC) was observed in place ([Photo 4](#)) and to effectively contain turbidity generated from placement and compaction of GF at deadman anchor ([Table 2](#)).

5.2.2 **Petroleum Hydrocarbons and other Deleterious Substances**

- On March 24 a container of diesel fuel was observed on top of the deadman anchor during compaction works ([Photo 5](#)). Crews were informed and the container was immediately removed and placed in the fuel containment structure at C26.

- Heavy equipment working near the water appeared free of excess grease and leaks. Crews also indicated that it is common practice for operators to inspect all machinery prior to commencing works.
5.2.3 **Fish & Fish Habitat**

DCL indicated that crab salvage activities had been conducted prior to rock placement and would continue with relocation well beyond the project footprint. This data is reported independently to DFO.

No fish were observed in the vicinity of works within the Tug Basin during the reporting period.

5.2.4 **Spill Response & Environmental Incident Reporting**

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 **ACTION ITEMS**

5.3.1 **New and Current**

- Monitor turbidity and pH levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Check that equipment operating near or over the marine environment is free of leaks and excess grease.
- Due to the current fish sensitive period, check that marine works are conducted in the dry or in isolation of fish bearing waters.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

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mgeraghty@hemmera.com

Attachments: Table 2, Photograph Log
Table 2: Water Quality Measurements

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<th>Location</th>
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<th>NE</th>
<th>SW</th>
<th>Point Source</th>
<th>Date</th>
<th>Time</th>
<th>Depth</th>
<th>Turbidity (NTU)/pH</th>
<th>Notes</th>
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<td>0.1</td>
<td>6.5 / -</td>
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<td>- / 7.9</td>
<td>Taken immediately after concrete placement</td>
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<td>- / 7.9</td>
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<td>North end of Seaspan dock 100 N Deadman Anchor</td>
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<td>N</td>
<td></td>
<td>Placement/ Compaction of GF at deadman anchor</td>
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<td>3.27 / -</td>
<td>Background</td>
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<td>Point Source</td>
<td>Date</td>
<td>Time</td>
<td>Depth</td>
<td>Turbidity (NTU)/pH</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>----</td>
<td>-------</td>
<td>--------------------------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>-------</td>
<td>-------------------</td>
<td>------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Toe of BR</td>
<td>10</td>
<td>N</td>
<td>Placement/ Compaction of GF at deadman anchor</td>
<td>3/24/09</td>
<td>15:20</td>
<td>0.1</td>
<td>9.49/-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside SC</td>
<td>20</td>
<td>N</td>
<td>Placement/ Compaction of GF at deadman anchor</td>
<td>3/24/09</td>
<td>15:25</td>
<td>0.1</td>
<td>4.44/-</td>
<td>Turbidity visibility dissipates within 10 m of works</td>
<td></td>
</tr>
<tr>
<td>East end of SC</td>
<td>20</td>
<td>E</td>
<td>Placement/ Compaction of GF at deadman anchor</td>
<td>3/24/09</td>
<td>15:30</td>
<td>0.1</td>
<td>4.59/-</td>
<td>Turbidity contained within SC</td>
<td></td>
</tr>
</tbody>
</table>
PHOTO 1: No visible turbidity during spot check of underwater TPro tremie pour. Photo March 26, 2009

PHOTO 2: Fuel containment structure free of excess water and evidence of leaks or staining. Photo March 23, 2009
PHOTO 3: Barge Ramp deadman anchor concrete pour conducted in dry.  
Photo March 20, 2009

PHOTO 4: Silt curtain in place to contain turbidity from placement and compaction of granular fill material at Barge Ramp.  Photo March 24, 2009
PHOTO 5: Diesel container observed at Barge Ramp deadman anchor
Photo March 24, 2009
INTRODUCTION

Hemmera is pleased to submit this weekly Environmental Report to Fisheries and Oceans Canada (DFO) summarizing environmental monitoring results and observations during construction of the Deltaport Third Berth (DP3) Expansion project as per the following: Fisheries Act Authorizations (FAAs) 02-HPAC-PA1-000-000144 and 02-HPAC-PA1-000-000144-2; and the environmental management plans (EMPs)
produced by Deltaport Constructors Limited (DCL) and Matcon Civil Constructors Ltd (Matcon). **Section 2** of this report covers DCL’s construction activities for the Deltaport Third Berth under Hemmera Project No. 499-002.09. **Section 3** and **Section 4** cover monitoring information which was beyond the requirements of the original FAA, including monitoring of Matcon’s terminal finishing works on behalf of Terminal Systems Inc (TSI), under Hemmera Project No. 1051-001.01. **Section 5** covers monitoring of DCL’s construction of the Tug Basin Temporary Barge Ramp (BR) for TSI under Hemmera Project No. 1051-001.02.

### 1.0 BACKGROUND CONDITIONS FOR PERIOD OF SITE WORKS

#### 1.1 ENVIRONMENTAL WINDOWS


#### 1.2 SITE OBSERVATION TIMING, WEATHER AND TIDES

**Table 1** and **Figure 1** below summarize weather and tidal data for the period covered in this report: March 27 - April 2, 2009

**Table 1: Site Visit Timing and Weather Data**

<table>
<thead>
<tr>
<th>Date and Time of Site Visits</th>
<th>Sites Visited(^1) by Environmental Monitor</th>
<th>Weather Conditions(^2)</th>
<th>Sea Conditions (\text{Beaufort Wind Scale})</th>
<th>Precipitation Past 24 hr(^3) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 27, 2009 12:15-14:45</td>
<td>DCL BR</td>
<td>Overcast, (7^\circ) C, wind 5 km/h ENE</td>
<td>Force 1: Light air. Ripples without crests</td>
<td>1</td>
</tr>
<tr>
<td>March 30, 2009 10:30 – 11:30 11:30 – 12:00 12:00 – 13:00</td>
<td>DCL DP3, MATCON TF, DCL BR</td>
<td>Cloudy, (5^\circ) C, wind E 18 km/h</td>
<td>Force 3: Gentle breeze. Large wavelets. Crests begin to break; scattered whitecaps</td>
<td>1</td>
</tr>
<tr>
<td>March 31, 2009</td>
<td>DCL BR</td>
<td>Cloudy, (8^\circ) C, wind NNE 16 km/h</td>
<td>Force 3: Gentle breeze. Large wavelets. Crests begin to break; scattered whitecaps</td>
<td>2</td>
</tr>
<tr>
<td>April 01, 2009</td>
<td>DCL BR</td>
<td>Overcast, (5^\circ) C, wind SSE 1.6 km/h</td>
<td>Force 1: Light air. Ripples without crests</td>
<td>16</td>
</tr>
<tr>
<td>April 02, 2009, 13:00 – 13:30 16:30 – 18:30</td>
<td>DCL DP3, MATCON TF, DCL BR</td>
<td>Mix of sun and cloud, (6^\circ) C, wind NE 12 km/h</td>
<td>Force 1: Ripples without crests</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^1\) DCL Third Berth (DCL DP3), DCL Temporary Barge Ramp (DCL BR), Matcon Terminal Finishing (MATCON TF)  
\(^2\) Source: www.weatheroffice.com  
\(^3\) Source: www.weatheroffice.com  

Hemmera Files 499-002.09, 1051-001.01 & 1051-001.02  
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2.0 DELTAPORT CONSTRUCTORS LTD: CONSTRUCTION OF DP3

2.1 SITE WORKS

2.1.1 Works During Monitoring Period

- Cope wall, crane wall and crane beam rebar and formworks construction with associated concrete pours Caisson 25 (C25) and C26.
- Underwater Toe Protection (TPro) prep works and tremie concrete pours C20 – 22.
- Installation of underground services and associated concrete pours west of Caisson Wharf (CWharf) adjacent to Perimeter Dike (PD).
- Drilling and welding works on crane rail adjacent to crane beam.
- Placement and compaction of fill between crane wall and cope wall and west of crane beam to C25.
- Construction works at subtidal habitat compensation reefs.

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4 Source: http://www.tides.gc.ca/
Hemmera Files 499-002.09, 1051-001.01 & 1051-001.02
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2.1.2 Ongoing and Upcoming Works

- Assembly of rebar and formwork for the cope wall, crane wall, and crane beam, and associated concrete pours to continue.
- Underwater TPPro tremie concrete pours continuing twice weekly.
- Installation of underground services, backfilling and compaction west of Caisson Wharf continues.

2.2 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

This section addresses environmental monitoring observations, and includes mitigation and recommendations for environmental issues encountered on one site visit during the period of site works.

2.2.1 Water Quality

2.2.1.1 Marine Construction Works

On March 30, Hemmera observed the active cope wall concrete pour at C25. Forms appeared to have been sealed with expanding foam as per best practices. A minor leak was observed at the junction between the form and culvert on the landward side of the cope wall formworks (Photo 1) although expansion foam had been applied. CO₂ tanks were also observed on hand in the immediate vicinity of the pour for mitigation of potential pH impacts if necessary (Photo 2).

On April 2, a scour TPPro Tremie concrete pour was completed starting at C21/22 moving north. Approximately 72 m³ of concrete was placed to a depth of approximately -16 m chart datum. Hemmera observed that the works were conducted following Best Management Practices (BMPs). No visible turbidity plume was observed or reported to Hemmera by the DCL divers. Two CO₂ tanks were on-hand for mitigation if required, and the tremie line was tied off during mobilization and demobilization from placement location (Photo 3).

2.2.1.2 Petroleum Hydrocarbons and other Deleterious Substances

On March 30, a pail of concrete was observed on top of the cope wall at C24 (Photo 4). The pail was open and appeared to have been left by previous crews as none were working in the immediate vicinity. DCL crew member at the C25 cope wall pour was informed and removed the container immediately.

Washdown of concrete pump and containment of excess concrete and rinse water was observed > 15 m HHWL during April 2 tremie pour. The active work area was also observed to be free of deleterious substances.

No fuel containers were observed within 15 m of HHWL during the report period. The fuel containment structure at C26 appeared free of excess water with no evidence of staining or leaks observed.

Hemmera Files 499-002.09, 1051-001.01 & 1051-001.02
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2.2.2 Fish & Fish Habitat

DCL continues crab salvage activities in advance of any underwater clamshell activities. This data is independently reported to DFO.

2.2.3 Marine Mammals

Marine Mammal monitoring (MMM) was conducted twice during the site visits and none were observed.

2.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were reported to Hemmera during this period of site works.

2.3 ACTION ITEMS

2.3.1 Follow-up from Previous Reports

- Monitored for impacts associated with on-going concrete works.
- Monitored for storage and handling of fuel and other deleterious substances.

2.3.2 New and Current

- Continue to monitor for impacts of ongoing concrete and coring works, fuel containment, and handling of deleterious substances.

3.0 MATCON CIVIL CONSTRUCTORS LTD: TERMINAL FINISHING OF DP3

3.1 ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION

No environmental concerns relevant to the FAA were identified during the reporting period.

4.0 SUPPLEMENTAL ENVIRONMENTAL MONITORING

4.1 BIRDS

On March 30, approximately 80 – 100 ducks and loons were observed NE of C26 during marine mammal monitoring. And at 12: 30, 8 blue herons were observed on crest protection NW of Barge Ramp works. April 2, approximately 20 ducks were observed NW of C21 during marine mammal monitoring.

4.2 AIR QUALITY

No dust concerns were noted during this period.
4.3 **NOISE MONITORING**

No noise monitoring was conducted during this monitoring period.

5.0 **DELTAPORT CONSTRUCTORS LTD: TEMPORARY BARGE RAMP**

5.1 **SUMMARY OF SITE WORKS DURING MONITORING PERIOD**

During this monitoring period, works on the temporary barge ramp included the following activities:

- Completed concrete pour inside piles north of deadman anchor;
- Rebar and formworks construction for abutment concrete pour;
- Completed pouring of first stage of abutment concrete works;
- Stripping of formworks, backfilling and continued rebar construction for abutment headwall/wingwall.

5.2 **ENVIRONMENTAL MONITORING: OBSERVATIONS & MITIGATION**

A qualified Hemmera Environmental Monitor was on site every day of marine works to observe each new activity seaward of the HHWL, as well to observe potential impacts from ongoing works. The following section summarizes environmental monitoring observations for potential concerns, and includes implemented mitigation measures encountered on site visits during the period of site works.

5.2.1 **Water Quality**

5.2.1.1 **Marine Construction Works**

- Concrete works were conducted during ebbing tides, in the dry.
- No CO₂ tanks were observed on hand for pH mitigation during March 27 concrete pour inside piles although plywood sheet was used to prevent concrete from entering the marine environment ([Photo 5]).
- CO₂ tanks were observed on hand for pH mitigation during April 1 abutment concrete pour.
- No pH or turbidity impacts were observed in waters adjacent to concrete pours during or following placement of concrete ([Table 2]).
- Silt curtain (SC) was observed in place during all works.
- Compared with an historical photo taken prior to BR construction, no signs of erosion were visible on the adjacent mudflats at a low tide of 1 m ([Photos 6 & 7]).
5.2.2 Petroleum Hydrocarbons and other Deleterious Substances

- Excess concrete was collected on plywood and contained in plastic on top of Barge Ramp for further removal
- No excess grease or spills of deleterious substances were observed during the reporting period.

5.2.3 Fish & Fish Habitat

- A school of approximately 50 small fish, possibly salmonids, were observed in the vicinity of Tug Basin, at the south end of Seaspan Dock on April 1.

5.2.4 Spill Response & Environmental Incident Reporting

No spills or environmental incidents were observed by, or reported to Hemmera during this period of site works.

5.3 Action Items

5.3.1 New and Current

- Monitor turbidity and pH levels and silt curtain deployment.
- Monitor for handling and storage of deleterious substances.
- Check that impacts are limited to the authorized area.
- Monitor for potential erosion of the intertidal mudflat.
- Check that equipment operating near or over the marine environment is free of leaks and excess grease.
- Due to the current fish sensitive period, check that marine works are conducted in the dry or in isolation of fish bearing waters.
We trust that you find this summary satisfactory. Please feel free to contact the undersigned regarding any questions or further information that you may require.

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Attachments: Table 2, Photograph Log