Site Visit Report: SV-2020-02-25

Trans Mountain Expansion Project – Westridge Marine Terminal Visit

Date	2020-02-25	**Time on site**	9:30 am	**Time off site**	1:00 pm
DFO attendees	S. W.				
IAMC attendees	None				

On-site contractor/equipment	**Role**
Trans Mountain	Site Management
KLTP	Prime construction contractor
Hemmera	Underwater noise monitoring and marine mammal monitoring during pile driving.
Hydra Marine Services	SCUBA divers conducting visual inspection of the bubble curtain prior to impact pile driving on breasting dolphin (BD) 5c.
Keller	Conducting deep soil mixing to strengthen soils (on-land works).
DB Columbia DB Olympia	Derrick barges (DB) Columbia Olympia working in the nearshore on sheet pile cell arc 7a and 8a.
DB General DB Burrard	DB General working offshore on BD piles 5 and 6 (preparing to impact pile drive). DB Burrard conducting preparatory works (placing steel girders) on LP1 and LP2 for construction of the superstructure.
DB Bremerton	DB Bremerton working on removing rock obstruction associated with installation of sheet pile cell 5.

IAMC Indigenous Monitor Observations and Comments

Due to additional site-specific safety requirements, an Indigenous Monitor was not able to accompany DFO on this site inspection.

Site Visit Report: SV-2020-02-25

Time	Inspection Activity

0930	DFO met representatives at the KASK site including:
	• Kiewit-Ledcor Trans Mountain Partnership (KLTP)
	  ○ Environmental Manager [A.A]
	• Trans Mountain (TM)
	  ○ Chief Environmental Inspector [B.J]
	  ○ TM Environmental Inspector (TM EI [S.D])
	  ○ Regulatory Lead [K.M]
	  ○ Construction Manager [T.A]
	  ○ Indigenous Monitor [M.J]
	KLTP gave DFO a reminder of muster points and emergency procedures.
	TM provided an overview of on-going works at the WMT including:
	• Upland activities (road widening; western water treatment plant; Eastern and western water treatment plants are now operational);
	• Onshore activities (piping and concrete demolitions works to support deep soil mixing; deep soil mixing);
	• Nearshore/in-water (works on arc cells 7a and 8a);
	• Offshore (pile driving BD piles 5 and 6; works on loading platform cells LP1 and LP2).
	Other items discussed:
	• TM poured concrete to cap a few piles last week in offshore waters; measures to contain concrete worked well; no issues to report.
	• Triton completed a fish salvage in arc cells 6a and 9a. Species such as pipefish, sculpins, crab were salvaged.
	• TM installed a fish exclusion net to prevent fish from entering arc cell 6a, since arc cell 6a will only be infilled in 2-3 weeks. DFO suggested that, prior to infilling, Triton conduct another fish salvage to verify that no fish have managed to enter the cell.
	• Weight has been added to the deepest three rings of the bubble curtain to bring the rings closer together; based on underwater noise monitoring measurements, having the rings closer together appears to further reduce underwater noise at depth during impact pile driving.
	• TM is constructing a new bubble curtain (consisting of two ‘L-shaped’ sections) that will be placed on the seafloor to form a square around the base of the pile and be approximately 3 m from the pile being driven, to further reduce underwater noise at depth. TM’s intent is to have this additional bubble curtain completed by February 28.
	• TM indicated that it has not regraded the slope of the foreshore near the new dock and gangway (to reduce erosion) due to space constraints; the slope will be regraded and the polysheeting replaced by coco matting once Keller has moved (Photo 1).
	• TM is delaying works on the temporary marine construction office.

1030	Arrive at the Westridge Marine Terminal.
1030-11:15	Walk along foreshore • DFO observed sorbent rings placed around the remaining wooden piles of the mostly-demolished small utility dock, to

	absorb creosote from the piles (Photo 2). These remaining piles will be removed at a later date. • Observed deep soil mixing columns (Photo 3) and sediment and erosion control measures in place (Photo 4). • TM EI indicated that the eastern section of the yellow turbidity curtain will be replaced in a few weeks; the turbidity curtain only has an approximately 4-6 month lifespan.
1115	Visit to the DB General • The TM EI showed DFO the new bubble curtain (Photo 5). • DFO observed a SCUBA diver from Hydra Marine [T.H] on site to inspect the bubble curtain to ensure it is functioning as designed prior to the start of impact pile driving for BD 5c. • DFO spoke to a KLTP representative [A.P] who is responsible for monitoring the gauges on the manifold for the bubble curtain to verify flow and pressure. KLTP confirmed that no issues were noted during installation of one of the curtains the previous day. DFO scanned the bubble curtain checklist being used by KLTP to verify functioning of the curtains. • DFO observed two representatives from Hemmera setting up underwater noise monitoring equipment for impact pile driving. Hemmera provided DFO an overview of the underwater noise monitoring software its uses to record noise levels measured by both hydrophones (Photo 6). DFO clarified that DFO recommends the deepest hydrophone be placed *within* two meters of the seafloor, and not *at* two meters of the seafloor. • Hemmera confirmed that there are four marine mammal observers on-site to monitor for marine mammals and that the marine mammal exclusion zone is currently set to 1 km from the pile; the harbor seal specific exclusion zone is 150 m from the pile. • The TM EI confirmed they are adhering to the more conservative underwater noise threshold of 207 dB during impact pile driving as a precautionary measure. • TM mentioned they are looking at the potential applicability of underwater acoustic deterrents for seals to discourage them from entering the exclusion zone (i.e., within 150 m of the pile for harbour seals) prior to or during impact pile driving; seals present within the exclusion zone regularly delay impact pile driving and delay overall construction. • DFO intended to observe the DB General conducting impact pile driving during the site visit, but pile driving was delayed due to seals.

Site Visit Report: SV-2020-02-25

GENERAL AND MISCELLANEOUS MITIGATION MEASURES

Measures specified within the Westridge Marine Terminal Fisheries Act Authorization Conditions:

Schedule
2.2.6 All nearshore in-water Project construction activities (within a 50-m horizontal distance seaward of the higher high water large tide level) at the Westridge Marine Terminal shall only be carried out during a work timing window from August 16 to March 15 each year.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
Comments
Nearshore works were taking place within the work timing window.
Action Items
N/A
Monitoring
3.1 A qualified environmental professional must be on-site during the carrying on of in-water works, undertakings and activities, and shall monitor the works, undertakings or activities on a systematic and on-going basis to ensure that standards and avoidance measures to avoid impacts to fish and fish habitat are effective, and that unauthorized impacts to fish and fish habitat are avoided.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
Comments
Trans Mountain EI and the Trans Mountain Indigenous Monitor (TM IM) were on site at the time of the inspection.
Action Items
N/A
Marine Mammal Observations
2.2.7 In-water construction activities must cease if any marine mammal is observed adjacent to or within the project area such that there is risk of direct physical harm to the marine mammal. Construction activities may only resume once the marine mammal has been confirmed to have left the immediate area or has not been sighted for 30 minutes.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
Comments
A harbour seal was observed within the 150 m harbour seal specific marine mammal exclusion zone prior to the start of impact pile driving. Works were delayed, but there was at no point risk of directly physical harm.
Action Items
N/A
Temporary Structures and Decommissioning of Existing Structures
The application for a *Fisheries Act* authorization states that a floating debris boom will be secured around the work area to collect drifting debris during demolition of the existing utility dock (page 3.1).
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
2.2.5 Temporary structures installed below the high-water mark shall be decommissioned and removed when they are no longer being used for construction purposes.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments

N/A
Action Items
N/A
Pump Intake Screening
2.2.2 Water intakes of any pumps shall be designed and screened in accordance with specifications outlined in the Addendum, Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guidelines* (Fisheries and Oceans Canada 1995), and Fisheries and Oceans Canada's *Guidelines for Minimizing Entrainment and Impingement of Aquatic Organisms at Marine Intakes in British Columbia* (Fisheries and Oceans Canada 1991).
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
Comments
DFO observed a screened water pump in operation at sheet pile cell 3.
Action Items
N/A
Fish Salvage
2.2.3 Fish salvage and relocation shall be conducted, as appropriate, prior to the start of construction activities so as to avoid and minimize adverse impacts to fish.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments
No fish salvage activities were occurring at the time of the site inspection.
Action Items
N/A
Integrity of Habitat Offsets
4.7 The Proponent shall not carry on any works, undertakings or activities that will adversely disturb or impact the offsetting measures.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments
The offsetting measures had yet to be installed at the time of the inspection.
Action Items
N/A

Site Visit Report: SV-2020-02-25

MITIGATION MEASURES SPECIFIC TO PILE DRIVING

Measures specified within the Westridge Marine Terminal Fisheries Act Authorization Conditions:

Underwater Sound Pressure Level Reduction
2.2.8 A vibratory hammer will be used for pile driving where practical and feasible, and all in-water pile driving activities will be monitored via hydrophone to ensure underwater peak pressures do not result in adverse impacts to fish.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
2.2.9.1 To avoid death of fish, mitigation measures (e.g., bubble curtain around the full wetted length of the pile, fish exclusion, etc.) must be implemented.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments
No vibratory or impact pile driving was occurring at the time of the site inspection.
Action Items
N/A
Underwater Sound Pressure Level Monitoring
2.2.9.2 Monitoring via underwater noise recordings must be conducted continuously and within 10 meters of the pile being driven to verify that underwater sounds do not exceed the 30 kPa (209.5 dB re: 1 µPa) threshold for injury to finfish.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
2.2.9.3. Outside of the least risk window for Burrard Inlet (August 16 – February 28), a more conservative underwater sound threshold of 22.5 kPa (207 dB re: 1 µPa) will be adhered to, and monitored, to prevent injury to finfish. If sound levels exceed this threshold, or a fish kill is observed despite mitigation measures being in place, pile driving activities are to cease immediately and mitigation methods are to be reviewed and modified in consultation with DFO.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
2.2.9.4 If underwater noise recordings indicate that sound levels are likely to exceed the applicable threshold defined in conditions 2.2.9.2 or 2.2.9.3, the Proponent will take appropriate action with the goal of preventing the exceedance from occurring. These actions may include adjusting the force of the hammer, adjusting the mitigation measures already in place to increase their effectiveness, or implementing additional mitigation measures.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
2.2.9.5 Upon commencement of pile driving, or recommencement after a delay of 30 minutes or more, pile installation shall ramp-up by starting with less frequent impact strikes of lower force. This ramp-up period is designed to enable any fish that may be in the area time to leave the area prior to the generation of peak pressure and noise levels for pile installation.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments
No vibratory or impact pile driving was occurring at the time of the site inspection.
Action Items
N/A
Marine Mammal Monitoring
2.2.9.6 Prior to commencement of pile driving, or recommencement after a delay of 30 minutes or more, visual monitoring must be conducted to determine if marine mammals are present within an exclusion zone of 1 km (except for harbor seals, which will have an exclusion zone of 150 m).
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
2.2.9.7 Work may only commence if marine mammals and harbor seals are not observed in their respective exclusion zones for 30 minutes.

☐ Compliant	☐ Non-compliant	☒ Not observed/unknown	☐ Not applicable
2.2.9.8 Exclusion zones must be monitored continuously during impact pile driving. If a marine mammal or marine mammals are observed within their respective exclusion zone, pile driving activities must cease until all marine mammals leave their respective exclusion zone or they have not been sighted for 30 minutes within their respective exclusion zone.			
☐ Compliant	☐ Non-compliant	☒ Not observed/unknown	☐ Not applicable
2.2.9.9 If underwater noise recordings reveal that the threshold of 160 dB is exceeded at the 1 km exclusion zone boundary, the exclusion zone radius must be widened to a new outer limit, where sound recordings demonstrate that the 160 dB threshold is not exceeded. Conditions 2.2.9.6 to 2.2.9.8 will need to be complied with within this new exclusion zone.			
☐ Compliant	☐ Non-compliant	☒ Not observed/unknown	☐ Not applicable
2.2.9.10 Pile driving may only be carried out during daylight hours to enable effective visual monitoring of marine mammal exclusion zones.			
☐ Compliant	☐ Non-compliant	☒ Not observed/unknown	☐ Not applicable
Comments			
Trans Mountain was preparing to conduct impact pile driving when a Hemmera marine mammal observer saw a seal in the exclusion zone. As a result, Trans Mountain delayed the start of impact pile driving activities. DFO left the site before impact pile driving commenced.			
Action Items			
N/A			

Measures specified within the Westridge Marine Terminal Environmental Protection Plan:

Fish Salvage			
35. Immediately following the installation of each sheet pile cell, and prior to excavation and infilling of that cell, conduct a salvage of commercial, recreational and Aboriginal (CRA) fishery species via crab and fish trapping/netting and seines (where appropriate). Release captured CRA fishery species in a suitable habitat at least 500 m away from marine construction activities.			
☐ Compliant	☐ Non-compliant	☐ Not observed/unknown	☒ Not applicable
Comments			
No fish salvage activities were occurring at the time of the site inspection.			
Action Items			
N/A			
Turbidity Monitoring			
43. Should visual monitoring during in-water pile installation indicate concern regarding turbidity levels, the Environmental Inspector will arrange for in situ sampling of turbidity (nephelometric turbidity units). Should turbidity levels exceed specified thresholds, pile driving will temporarily be halted.			
☐ Compliant	☐ Non-compliant	☐ Not observed/unknown	☒ Not applicable
Comments			
No in-water pile installation activities were occurring at the time of the site visit.			
Action Items			
N/A			

MITIGATION MEASURES SPECIFIC TO FORESHORE CONSTRUCTION

Riparian Planting and Material Handling
Westridge Marine Terminal Fisheries Act Authorization Conditions
2.2.4 Disturbed riparian areas shall be replanted as appropriate, with native non-invasive species of vegetation.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Westridge Marine Terminal Environmental Protection Plan Commitments
30. Unless otherwise approved by DFO, retain all excavated [marine] material and dispose at a land-based facility in accordance with applicable regulations.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Comments
No material was being excavated at the time of the site inspection.
Action Items
N/A

Water Quality Maintenance and Monitoring
Westridge Marine Terminal Fisheries Act Authorization Conditions
2.2.1 Effective sediment and erosion control measures (e.g., a turbidity curtain, etc.) shall be implemented before starting construction and shall be maintained during construction activities, as appropriate, to avoid the deposit and dispersion of sediment into the marine environment.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
2.2.10 A turbidity curtain must be used to isolate the work area during the excavation of riprap in order to contain marine sediment suspended in the water column and limit the extent of sediment dispersion. During severe weather conditions that may reduce the effectiveness of, or impede the visual monitoring of, the turbidity curtain (e.g., > 70 km/h winds, or dense fog), works, undertakings or activities that may increase suspended sediment concentrations within the turbidity curtain or adversely affect the integrity of the turbidity curtain, must be suspended.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Westridge Marine Terminal Environmental Protection Plan Commitments
29. During in-water excavation or rip rap, conduct water quality monitoring (WQM) as per the Water Quality Management Plan during Rip Rap Removal (Appendix H of this EPP). Conduct WQM to assess the effectiveness of the turbidity curtain and modify turbidity curtain deployment, if required.
☐ Compliant ☐ Non-compliant ☐ Not observed/unknown ☒ Not applicable
Westridge Marine Terminal Sediment and Erosion Control Plan Commitments
The in-water sediment curtain will remain intact during Foreshore construction activities to ensure sediment laden water is not discharged into Burrard inlet.
☒ Compliant ☐ Non-compliant ☐ Not observed/unknown ☐ Not applicable
Comments
The turbidity curtain remains in place around the sheet pile cells and attaches to the foreshore. Another turbidity curtain is in place around the western foreshore area (e.g., around gangway and flexi-float dock.
Action Items
N/A
Additional comments or action items
N/A

Photo 1. Polysheeting along shoreline to reduce erosion; yellow turbidity curtain in place to contain turbid water.

Photo 2. White sorbent rings placed around creosote piles remaining from demolition of small utility dock. Piles to be removed at a later date.

Photo 3. Deep soil mixing columns along foreshore.

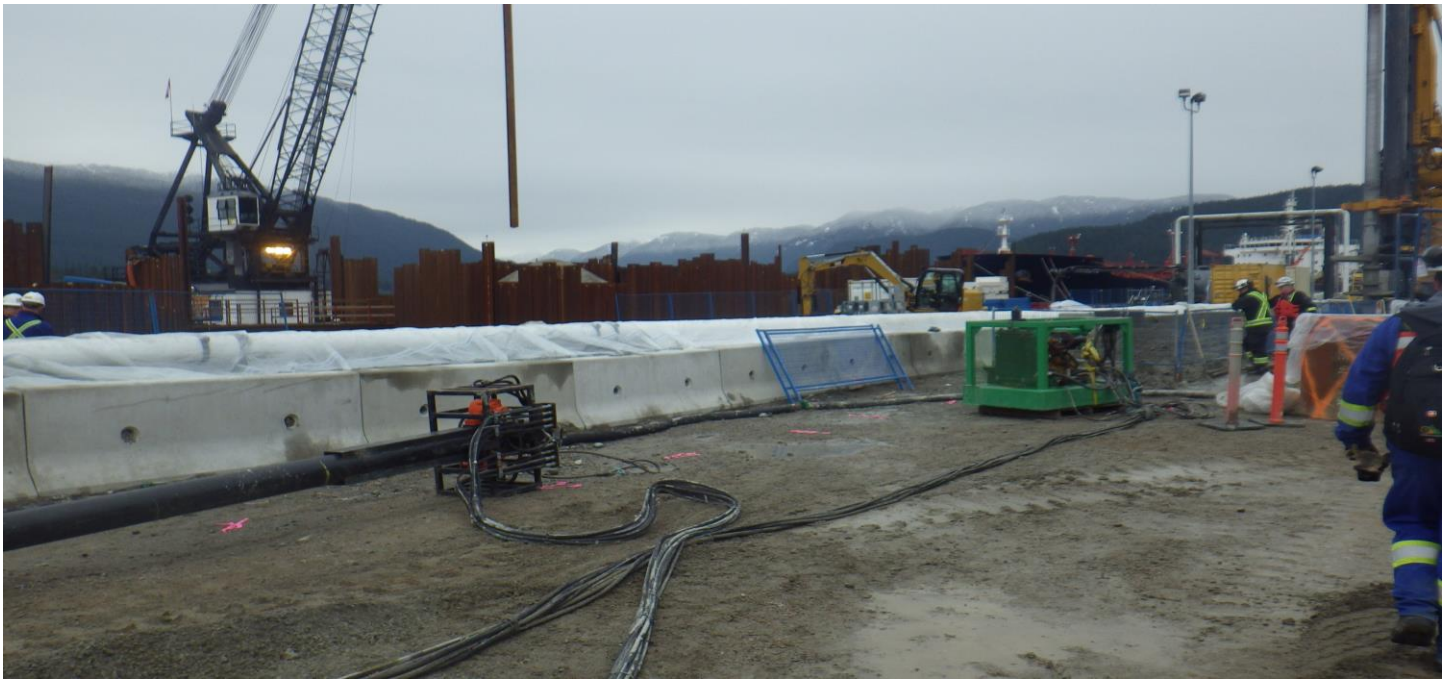

Photo 4. Lock blocks in place to prevent erosion of sediment-laden water or other materials into the marine environment from on shore works.

Photo 5. Base of the new bubble curtain that will be placed on the seafloor to further attenuate underwater noise at depth during impact pile driving. The new curtain will consist of two 'L-shaped' sections that join together to form a square.

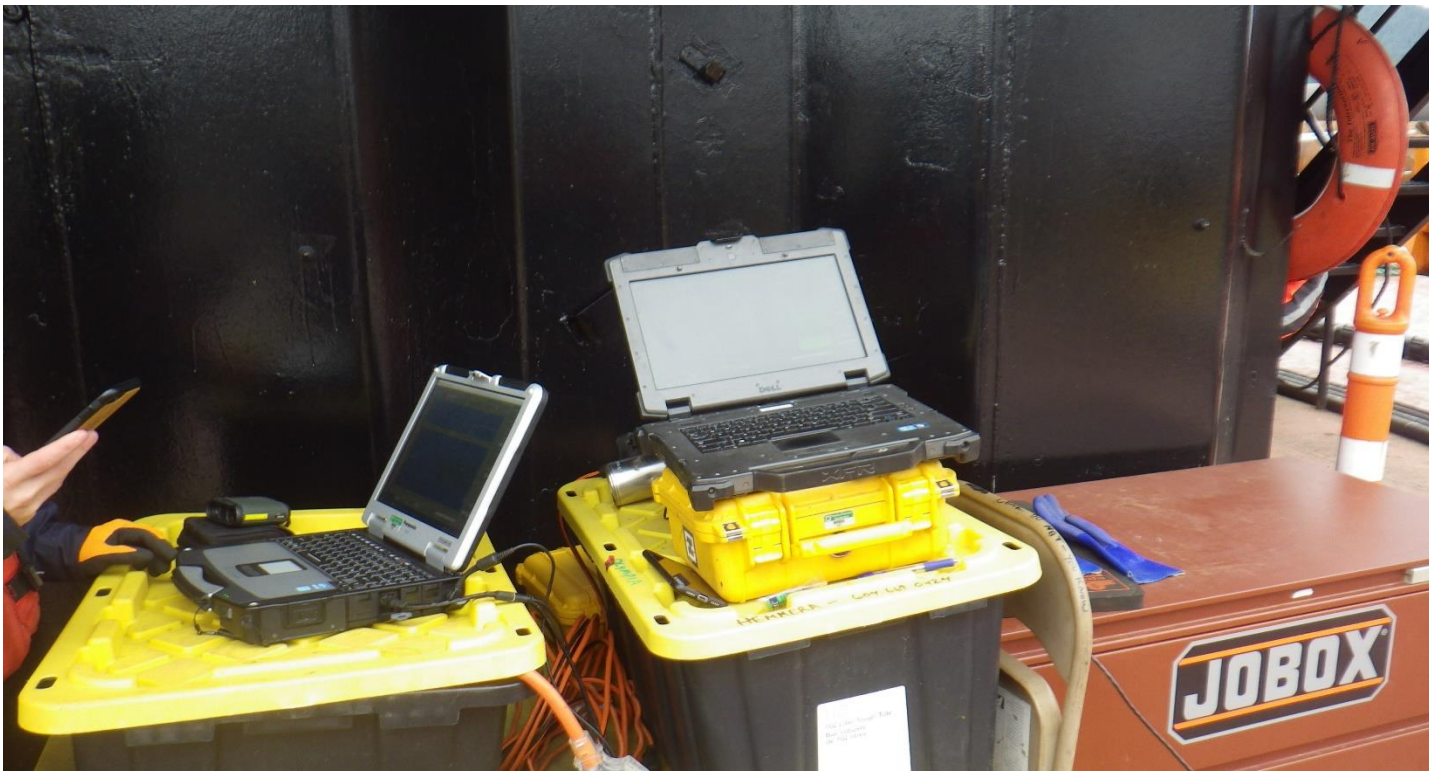

Photo 6. Computers used to record underwater noise levels measured by two hydrophones (one at mid-depth and one within two meters of the seafloor) during impact pile driving.