

**SECTION 12.0**  
**PROPOSED COMPLIANCE AND**  
**EFFECTS MONITORING**  
**PROGRAMS**



**GOLDBORO**  
**LNG**

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## 12.0 PROPOSED COMPLIANCE AND EFFECTS MONITORING PROGRAMS

The Project will include the implementation of comprehensive monitoring programs (Table 12.0-1). These monitoring programs are the responsibility of Pieridae, and will be integrated into contractual arrangements with contractors and site workers. These programs will be fully documented in the Project EMP.

The objectives of the monitoring programs are to:

- assist in verifying effects predictions of the EA;
- confirm effectiveness of the mitigation measures proposed in the EA;
- determine the need for new mitigation strategies as required to address unanticipated adverse effects and/or ineffective mitigation;
- ensure proper implementation of the mitigation measures outlined in the EA; and
- ensure compliance with regulatory permits, approvals, and requirements.

Environmental management features for the Project include monitoring and maintenance programs such as EEM and ECM. These environmental management features will be refined and expanded on throughout the Project design. The EMP includes EEM for several VECs such as surface water quality, fish and fish habitat, including monitoring of the new surface water course/channel for stability and functioning.

Monitoring programs outlined in Table 12.0-1 will be designed to verify the effectiveness of the mitigative measures. The details of the monitoring programs (e.g., monitoring frequency/duration, specific locations, parameters, and reporting) will be determined in consultation with regulatory agencies and documented in the EMP.

Prior to the decommissioning and abandoning of the Goldboro LNG facilities, Pieridae will develop a decommissioning plan. The plan will specify decommissioning objectives, approach, activities, schedules, and site rehabilitation and will be developed in consultation with regulatory agencies. The details of the decommissioning monitoring will be determined on the basis of the decommissioning plan and in consultation with regulatory agencies and documented in the Project EMP.

**Table 12.0-1 Monitoring Programs**

VEC	Monitoring	Monitoring Area/Locations	Objective	Preconstruction	Construction	Operation	Decommissioning
Geology	<ul style="list-style-type: none"> <li>Assess acid generating potential of bedrock and if present develop management plan.</li> <li>Implement surface and groundwater monitoring as below.</li> </ul>	<ul style="list-style-type: none"> <li>Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that acid-generating materials are avoided or properly isolated/managed.</li> </ul>	√			
Soil	<ul style="list-style-type: none"> <li>Pre-construction survey and construction monitoring for the presence of mine tailings and, if discovered, completion of a risk assessment with prescribed management and specific monitoring requirements; risk assessment and appropriate management/monitoring may also be required for decommissioning activities.</li> </ul>	<ul style="list-style-type: none"> <li>Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that contaminated soil / sediment is not (re)mobilized in the local environment.</li> <li>Ensure implementation of adequate workers health protection.</li> </ul>	√	√		√
Groundwater Resources	<ul style="list-style-type: none"> <li>Detailed pre-blast inventory of water wells near blast areas, including analysis for general chemistry, metals and bacteria, and short-term pumping tests where possible.</li> <li>Groundwater monitoring (pre-development conditions, flow, water quality, sediment quality); may be continued during operation phase as part of the EEM.</li> </ul>	<ul style="list-style-type: none"> <li>All wells within 500 m of blast areas.</li> <li>Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Determine capacity of individual wells and aquifers pre-blasting.</li> <li>Assess baseline water quality of wells prior to blasting.</li> </ul>	√			
Surface Water Resources (freshwater)	<ul style="list-style-type: none"> <li>Pre-construction monitoring in Betty's Brook.</li> <li>Surface water monitoring (TSS concentrations and general chemistry during construction and decommissioning), including Meadow Lake.</li> <li>Monitoring the effectiveness of the erosion and sediment control measures, until the disturbed areas are sufficiently vegetated.</li> <li>Monitoring for efficacy of re-establishment of native flora until disturbed areas are sufficiently vegetated</li> <li>Monitoring to identify any signs of a changed hydrologic regime off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Selected locations within stream environment and at Meadow Lake intake location.</li> <li>Receiving water courses, upstream and downstream from proposed discharge locations (storm and wastewater).</li> <li>Betty's Brook crossing by water supply pipeline.</li> <li>Relocated channel within the Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Establish pre-development baseline conditions for Betty's Brook</li> <li>Ensure that erosion and sediment measures are effective.</li> </ul>	√	√	√	√

VEC	Monitoring	Monitoring Area/Locations	Objective	Preconstruction	Construction	Operation	Decommissioning
Air Quality	<ul style="list-style-type: none"> <li>Month-long periods of ambient air quality monitoring during summer months for the first year of operation</li> <li>Dust monitoring during construction and decommissioning to determine necessity / effectiveness of dust abatement measures.</li> </ul>	<ul style="list-style-type: none"> <li>At fence line of the facility.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that levels of TSP, NO<sub>2</sub>, SO<sub>2</sub> and CO are within NS Ambient Air Quality objectives.</li> <li>Ensure that dust abatement is effective, if required.</li> </ul>			√	
Acoustic Environment	<ul style="list-style-type: none"> <li>Preconstruction monitoring at nearest receptors (ambient noise).</li> <li>Monitoring during daytime, night-time, and an overall 24 hour period during the early operational phase to verify compliance with regulatory guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>Vicinity of selected receptor location.</li> <li>At fence line of the facility.</li> </ul>	<ul style="list-style-type: none"> <li>Compliance monitoring (NSE guidelines for Environmental Noise).</li> </ul>	√		√	
Terrestrial Habitat and Fauna	<ul style="list-style-type: none"> <li>Monitoring of bird strikes; in case of abnormal incidences, consider lighting or operating adjustments.</li> <li>Monitoring of the implementation of EPP provisions concerning herbicide application or road salt (operation phase).</li> </ul>	<ul style="list-style-type: none"> <li>Entire site areas during construction, operations and rehabilitation.</li> <li>Along water pipeline corridor and adjacent to intake structure.</li> </ul>	<ul style="list-style-type: none"> <li>Detect and remove introduced plant species before they become invasive.</li> <li>Ensure that there are no unintended effects on adjacent flora from application of herbicides.</li> </ul>		√	√	√
Wetlands	<ul style="list-style-type: none"> <li>Monitoring of the successful implementation of wetland mitigation measures (i.e., the successful rehabilitation of wetlands or re-creation of habitat functions affected by construction).</li> <li>Monitoring the efficacy of the erosion and sediment control measures, until the disturbed wetland areas are sufficiently vegetated.</li> <li>Monitoring to identify any signs of a changed hydrologic regime.</li> </ul>	<ul style="list-style-type: none"> <li>Wetlands in Project footprint and within the Project zone of influence.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure successful implementation of wetland mitigation measures and detect and remove introduced plant species before they become invasive.</li> <li>Ensure that erosion and sediment control measures are effective.</li> <li>Ensure that site hydrology is not impacted by Project site construction.</li> <li>Identify unintended negative impacts (if any) and develop additional mitigation (if required).</li> </ul>		√	√	√

VEC	Monitoring	Monitoring Area/Locations	Objective				
				Preconstruction	Construction	Operation	Decommissioning
Fish and Fish Habitat	<ul style="list-style-type: none"> <li>Monitoring of the effectiveness of the freshwater fisheries offset with input from DFO and documented in Project EMP.</li> <li>Monitoring for effectiveness of mitigation measures for impacts on aquatic habitat including Meadow Lake.</li> <li>Monitoring of the new diversion channel for stability and ecological functioning.</li> </ul>	<ul style="list-style-type: none"> <li>Selected locations within stream environment.</li> <li>Receiving water courses, upstream and downstream from proposed discharge locations (storm and wastewater).</li> <li>Relocated channel within the Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Confirmation of effectiveness of habitat compensation plan.</li> <li>Identify unintended negative impacts (if any) and develop additional mitigation (if required).</li> </ul>		√	√	√
Oceanographic Conditions	<ul style="list-style-type: none"> <li>Bathymetry and current monitoring during design as part of FEED and during the initial years of terminal operation.</li> </ul>	<ul style="list-style-type: none"> <li>Wharf and navigation channel to mouth of Stormont Bay.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure safe vessel operation.</li> <li>Confirm effects predictions pertaining to sediment transport/deposition.</li> </ul>			√	
Marine Habitat and Wildlife	<ul style="list-style-type: none"> <li>Marine habitat survey adjacent to terminal to confirm effect predictions (e.g., effects of propeller wash).</li> <li>Physical assessment of the bottom conditions at the site proposed for compensation prior to implementation of habitat compensation.</li> <li>Monitoring of the marine fisheries offset plan (including juvenile and adult lobster densities) over a three-year period.</li> <li>Stormwater runoff (discharge quality and quantity)</li> <li>Monitoring of Project-related issues/concerns of local fishing industry throughout Project planning, construction, and operation.</li> </ul>	<ul style="list-style-type: none"> <li>Stormont Bay, within the area of marine fisheries offset plan.</li> <li>Stormwater drainage.</li> <li>Local fishermen.</li> <li>CLC.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure bottom conditions are appropriate for habitat improvement measures.</li> <li>Document success of the habitat compensation with respect to lobster production.</li> <li>Ensure that TSS concentrations meet regulatory standards.</li> <li>Ensure that concerns of local fishing industry are communicated, so that if issues arise, they may be addressed.</li> </ul>	√	√	√	
SAR	<ul style="list-style-type: none"> <li>Tape Grass survey.</li> <li>Follow up bat monitoring (in support of recovery program if warranted)</li> <li>BFL survey (only if Project footprint expands beyond current surveyed areas).</li> </ul>	<ul style="list-style-type: none"> <li>Project area of influence.</li> </ul>	<ul style="list-style-type: none"> <li>Establish baseline for EMP/EPP development and EEM (if required), subject to regulatory review.</li> </ul>	√	√	√	

VEC	Monitoring	Monitoring Area/Locations	Objective	Preconstruction	Construction	Operation	Decommissioning
Economy	<ul style="list-style-type: none"> <li>Monitoring of expenditures and contract awards.</li> <li>Monitoring of Project-related community/stakeholder concerns (e.g., during construction: supply/demand related to accommodation).</li> </ul>	<ul style="list-style-type: none"> <li>The Project.</li> <li>Local municipalities.</li> <li>Real estate agencies.</li> <li>CLC.</li> <li>Other appropriate committees.</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate the business development strategies benefits predictions.</li> <li>Determination of the effectiveness of accommodation strategies.</li> </ul>		√	√	
Employment	<ul style="list-style-type: none"> <li>Monitoring of Project-related employment (numbers, location of primary residence, occupational category, and gender status).</li> </ul>	<ul style="list-style-type: none"> <li>The Project.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the Project's economic significance.</li> <li>Demonstrate effectiveness of hiring, training, and retention strategies.</li> </ul>		√	√	
Fisheries	<ul style="list-style-type: none"> <li>Monitoring in response to concerns expressed by local fishing community, subject to regulatory review.</li> </ul>	<ul style="list-style-type: none"> <li>Project wharf, jetty and areas of concern (to be determined).</li> </ul>	<ul style="list-style-type: none"> <li>To ensure that terminal construction does not affect fisheries.</li> </ul>		√	√	
Marine traffic	<ul style="list-style-type: none"> <li>Monitoring of Project-related vessel movement (e.g., marine traffic schedules and volumes).</li> </ul>	<ul style="list-style-type: none"> <li>Project vessel schedule.</li> <li>Wharf, jetty, approach channel and areas of concern (to be determined).</li> </ul>	<ul style="list-style-type: none"> <li>Maintain record of marine activities for the purpose of coordinating with the local fishing and boating community and adaptive management.</li> </ul>		√	√	
Transportation	<ul style="list-style-type: none"> <li>Monitoring of Project-related traffic volumes will be made available to the NSTIR and Public Works.</li> </ul>	<ul style="list-style-type: none"> <li>Regional access roads.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of traffic data to assist NSTIR and Public Works to evaluate highway safety.</li> </ul>		√	√	
Safety	<ul style="list-style-type: none"> <li>Monitoring of on-site accidents (for reporting to the NS Worker's Compensation Board, NS Occupational Health and Safety, and RCMP, as applicable).</li> </ul>	<ul style="list-style-type: none"> <li>Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of accident records to assist in safety planning and prevention strategies.</li> </ul>		√	√	
Aboriginal Interests.	<ul style="list-style-type: none"> <li>Monitoring of progress and implementation of MOU and CBA.</li> </ul>	<ul style="list-style-type: none"> <li>All parties to the MOU and subsequent agreements.</li> </ul>	<ul style="list-style-type: none"> <li>To ensure that the Aboriginal community is able to participate and benefit from opportunities presented by the Project.</li> </ul>	√	√	√	√

VEC	Monitoring	Monitoring Area/Locations	Objective	Preconstruction	Construction	Operation	Decommissioning
Heritage Resources Including Archaeology.	<ul style="list-style-type: none"> <li>Construction monitoring by a permitted archaeologist of any subsurface ground disturbances within 30 m of the identified heritage resources within the Project impact area.</li> </ul>	<ul style="list-style-type: none"> <li>Giffin Lead.</li> <li>Skunk Den Mine.</li> <li>Hattie's Belt.</li> <li>David Buckley House.</li> <li>Red Head Cemetery.</li> </ul>	<ul style="list-style-type: none"> <li>Proper documentation and conservation of resources if any are found.</li> <li>Obtain data for use/documentation in the Project Information Centre.</li> </ul>	√	√		
	<ul style="list-style-type: none"> <li>Preconstruction survey by a permitted archaeologist of portions of the proposed water pipeline route, consisting of a visual survey. If any heritage features are observed then additional testing may be required by the regulator.</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 500 m along final water pipeline route, near the water intake at Meadow Lake and near the temporary construction camp.</li> </ul>	<ul style="list-style-type: none"> <li>Proper documentation and conservation of resources if any are found.</li> <li>Obtain data for use/documentation in the Project Information Centre.</li> </ul>	√	√		
	<ul style="list-style-type: none"> <li>Preconstruction survey of ten identified heritage resources in coastal areas in order to assess current condition and potential impact of construction and operation generated waves.</li> </ul>	<ul style="list-style-type: none"> <li>Sculpin Cove 1-5.</li> <li>McMillan Mine.</li> <li>Hurricane Mine.</li> <li>Dung Cove.</li> <li>Giffin's Mill.</li> <li>Deep Panuke Historic Site.</li> </ul>	<ul style="list-style-type: none"> <li>Minimize adverse effects on potential archaeological resources close to the coastal shorelines.</li> <li>Proper documentation and conservation of resources if any are found.</li> </ul>	√	√	√	