

PACIFIC NORTHWEST LNG - ADDENDUM TO THE ENVIRONMENTAL IMPACT STATEMENT

Summary of the Assessment
December 12, 2014

28.0 SUMMARY OF THE ASSESSMENT

This section provides a summary of the changes to the EIS from the Project changes.

Table 28-1 provides a summary of the potential effect of the Project on each valued component (VC), proposed mitigation measures for each effect, a summary of residual effects, and the significance determination for each project effect. Changes to the information presented in this table (compared to Table 28-1 of the EIS) are identified with underlined text.

Table 28-2 lists all of the proposed mitigation measures for each VC.

Table 28-3 provides a list of the proposed technically and economically feasible mitigation measures that would mitigate any significant adverse environmental effects on the Project on areas of federal interest.

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Table 28-1 Summary of Potential Effects, Proposed Mitigation Measures, Residual Adverse Effects, and their Significance

Potential Effects	Project Phase / Contributing Project Activity or Physical Works	Proposed Mitigation/ Commitments	Characterization of Residual Effects	Significance Threshold	Significance Determination
Air Quality					
Increase in criteria air contaminant (CAC) concentrations	<p>Construction Site preparation Onshore construction Vehicle traffic Dredging</p> <p>Operations LNG facility Marine terminal use Shipping</p>	<ul style="list-style-type: none"> Best achievable technology Best management practices. Natural gas leak detection program. Thermal oxidizer operation. Dust suppression. Equipment maintenance and low sulphur fuel. Vehicle idling restrictions. Adherence to MARPOL. 	<ul style="list-style-type: none"> The ecological context is that the atmosphere is expected to demonstrate a high degree of resilience to change in air quality Low in magnitude (effect is detectable but within normal variability of baseline conditions) Local in geographic extent (restricted to the LAA) Medium-term in duration (effect occurs for the life of the Project) Reversible Is continuous in frequency The likelihood of a residual effect of an increase in criteria air contaminant concentrations is high All predicted criteria air contaminant concentrations are well below the significance threshold of applicable ambient air quality objectives 	An effect on air quality would be considered significant if predicted concentrations of CACs exceed Canada or BC applicable objectives for ambient air quality (i.e., to be high in magnitude) and are of concern relative to the geographical extent of predicted exceedances and/or their frequency of occurrence.	Not significant with a high level of confidence
Greenhouse Gas Management					
Emission of GHG gases (CO ₂ , CH ₄ , N ₂ O) from LNG facility	<p>Construction Site preparation Onshore construction Vehicle traffic Dredging Marine construction</p> <p>Operations LNG facility Marine terminal use Shipping</p>	<ul style="list-style-type: none"> A Greenhouse Gas Management Plan will be implemented (Appendix J.4) A facility specific Fugitive Emission Management Program will be implemented PNW LNG will comply with requirements outlined under the British Columbia carbon tax, if applicable PNW LNG will comply with the annual British Columbia and Canada reporting and verification requirements PNW LNG will comply with any new legislation specific to GHG emissions from LNG facilities. 	<ul style="list-style-type: none"> The contribution of GHG emissions from the Project would cause a small material change relative to the total global emissions. 	A significant residual effect would cause a substantial material change in total global GHG emissions.	Not significant

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Potential Effects	Project Phase / Contributing Project Activity or Physical Works	Proposed Mitigation/ Commitments	Characterization of Residual Effects	Significance Threshold	Significance Determination
Acoustic Environment					
Increase in noise levels	<p>Construction Site preparation Onshore construction Dredging Marine construction</p> <p>Operations LNG facility Marine terminal use Shipping</p> <p>Decommissioning Dismantling project infrastructure</p>	<ul style="list-style-type: none"> Most construction will be scheduled between 7 a.m. and 10 p.m. Nighttime construction activity will be limited to low noise activities (no impact type pile driving or blasting). Pile driving using vibro-hammer, where feasible. Noise, Vibration, and Ambient Light Management Plan Use of building enclosures and/or silencers on large machinery and equipment A policy will be implemented to keep windows and doors closed when not in use Implementation of a noise complaint mechanism. Specification of acoustic performance of noise emission equipment (not exceeding 85 dBA at 1 m from equipment and 120 dBA for emergencies). <u>If workers shift change occurs during nighttime period, the traffic management plan will be updated to include measures to reduce effects of traffic noise from transportation of workers on the community.</u> 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (the effect takes place in an area currently disturbed by human development) Moderate in magnitude (effect is perceptible compared to baseline) Regional in extent (effects extend into the RAA for three receptors) Medium-term in duration (effect occurs for the life of the Project) Reversible Is continuous in frequency The likelihood of a residual effect of an increase in noise levels is high Permissible sound levels for the daytime and the nighttime at a receptor are predicted to be below BC OGC guidelines and Health Canada limits 	A significant residual adverse effect on the acoustic environment is defined as an increase in the existing ambient acoustic environment such that the permissible sound levels for the daytime and the nighttime at a receptor, as determined by the guidance of the BC OGC, are exceeded after mitigation has been implemented, or the noise effects exceeds the HC guideline prescribed limits.	Not significant With a moderate level of confidence
Ambient Light					
Increase in ambient lighting	<p>Construction Site preparation Onshore construction Vehicle traffic Operational testing and commissioning</p> <p>Operations LNG facility Marine terminal use</p>	<ul style="list-style-type: none"> Fixtures selected to reduce wasted or stray light. Adherence to design specifications. Use of a centralized lighting control system. Maintain a 30 m vegetation buffer. 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (the effect takes place in an area currently disturbed by human development) Low in magnitude (effect is detectable but reduced through design mitigation) Local in extent (effects are within the LAA) Long-term in duration (effect occurs for the life of the Project) Reversible Is continuous in frequency The likelihood of a residual effect of an increase in ambient lighting is low The Project will not exceed guidelines for light spill and glare within a suburban environment 	A significant adverse effect on ambient light is defined as an increase in project-related light emissions such that the guidelines for light spill and glare in a suburban environment are exceeded and the resulting conditions related to sky glow would be typical of an urban environment.	Not significant With a high level of confidence

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Potential Effects	Project Phase / Contributing Project Activity or Physical Works	Proposed Mitigation/ Commitments	Characterization of Residual Effects	Significance Threshold	Significance Determination
Vegetation and Wetland Resources					
Change in abundance of plant species of interest	Construction Site preparation	<ul style="list-style-type: none"> Incorporate traditional use plants into wetland compensation plans wherever possible and practical. Incorporate weed and invasive plant control measures during construction and operations. Implement a Species-at-Risk Discovery Contingency Plan. 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (the effect takes place in an undisturbed area) Low in magnitude Occurs within the PDA Long term Change in plant abundance within the PDA are reversible Occurs once in frequency The likelihood of a residual effect of a change in abundance of plant species of interest is high First Nations will be able to continue to access traditional use plant species within the RAA because traditional use plant species are common across the region and measures to offset effects on traditional use plant species will be incorporated into the Wetland Habitat Compensation Plan. No federally- or provincially-listed plant species were identified within the PDA during field studies, thus no effects related to these species are anticipated. No invasive plant species were detected in the LAA. 	<p>A significant adverse effect on vegetation and wetland resources includes:</p> <ul style="list-style-type: none"> An unmitigated loss of a species at risk Eliminating access to traditional use species by aboriginal groups within the regional assessment area. 	Not Significant With a moderate level of confidence
Change in abundance or condition of ecological communities	Construction Site Preparation Operation LNG facility	<ul style="list-style-type: none"> During construction, ecological communities of management concern located outside of the PDA will be marked and protected. Design and implement drainage and erosion control techniques to maintain the local surface and groundwater hydrology. Implement monitoring program to monitor effects of air emissions on ecological communities. 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (the effect takes place in an moderately disturbed area) Low in magnitude Regional in extent (potential effects of emissions extend to the RAA) Permanent Loss of plant communities within the PDA are irreversible Is continuous in frequency (effects from facility emissions) The likelihood of a residual effect of a change in abundance or condition of ecological communities is high The red-listed ecological community on Lelu Island will not be directly affected by the Project The loss of 0.12% of the extent of blue-listed ecological communities from within the RAA is much less than the 30% disturbance threshold within the RAA established in the CNCO. The loss of less than 1% of the extent of old forest within the RAA does not compromise the ability to maintain the 40% retention limit set forth in the CNCO. 	<p>A significant adverse effect on vegetation and wetland resources includes:</p> <ul style="list-style-type: none"> Loss of listed communities that result in losses greater than 5% of red-listed communities or 30% of a blue listed communities within the regional assessment area Loss of old forest resulting in 1) the loss of more than 40% of these specifically identified modal units, or 2) overall, result in the loss of more than 70% of the old forest in the regional assessment area. 	Not significant With a moderate level of confidence
Change in wetland functions	Construction Site Preparation	<ul style="list-style-type: none"> Delineate wetlands outside the PDA as environmentally sensitive areas, mark with fencing, and restrict construction access. Develop and implement the wetland compensation plan. Drainage and erosion control techniques designed to maintain the local surface and groundwater hydrology will be designed and implemented. 	<ul style="list-style-type: none"> With compensation there are no residual effects on loss of wetland function The ecological context is of low resilience (the effect takes place in an undisturbed area) Medium-term in duration (including time to restore wetland function through compensation) Reversible (with compensation) The likelihood of a residual effect of a change in wetland function is low A Wetland Habitat Compensation Plan will offset the loss of wetlands within the PDA to achieve no net loss of wetland functions within the RAA. 	<p>A significant adverse effect on vegetation and wetland resources includes:</p> <ul style="list-style-type: none"> Net loss of wetland function 	Not significant With a high level of confidence

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Terrestrial Wildlife and Marine Birds					
Change in wildlife habitat availability	<p>Construction Site preparation Onshore construction Dredging Marine construction Disposal at sea</p> <p>Operations LNG facility Marine terminal use Shipping</p> <p>Decommissioning Dismantling project infrastructure</p>	<ul style="list-style-type: none"> Maintain a 30 m vegetation buffer. Limit clearing limits of the PDA and temporary work space. Apply mitigation measures for acoustic environment. Implement Wetland Habitat Compensation and Fish Habitat Offsetting Strategies. Vessels will not exceed a speed of 16 knots within the LAA. Implement a Blasting Management Plan. <u>Install bat houses or other roost structures.</u> 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (effect occurs in a stable ecosystem and/or moderately disturbed environment) Moderate in magnitude (many individuals or hectares of habitat in a regional population are affected) Local in extent (potential effects are within the LAA) Long-term in duration (occurs across multiple breeding seasons/generations and Project phases) Reversible Occurs once in frequency The likelihood of a residual effect of a change in wildlife habitat availability is high 172 ha of wildlife habitat will be lost from construction of the Project; however the effects on habitat availability are not expected to affect the sustainability of regional terrestrial wildlife or marine bird populations. 	<p>A project effect is considered to be significant if habitat loss or alteration is predicted to influence the long-term sustainability of an identified local or regional wildlife population. Management of wildlife populations occurs at a regional level; the extent of which differs among species.</p> <p>The assessment considers the significance of change in habitat on a species-specific basis where management objectives have been identified for individual species (e.g., federal recovery strategies for SARA-listed species).</p>	<p>Not significant With a moderate level of confidence</p>
Risk of mortality	<p>Construction Site preparation Dredging Marine construction</p> <p>Operations LNG facility Marine terminal use</p>	<ul style="list-style-type: none"> Maintain 30 m vegetation buffer. Limit clearing to the PDA and temporary work space. Clearing activities will occur outside of the breeding season for terrestrial birds, amphibians, and bats. If clearing is required during these breeding periods, bird surveys will be conducted in advance. Removal of raptor nests within the clearing limits of the PDA will be subject to permit approval. Erect permanent fencing around the Project. Store waste and recycling materials on-site in wildlife-proof containers for permanent disposal at an approved facility. Prohibit feeding and harassment of wildlife. <u>Provide wildlife education and awareness information, including lighting effects (Environment Canada 2014c, d)</u> Reduce traffic between Prince Rupert, Port Edward, and the Project site through the use of buses, crew cab trucks, water taxis, and other group transportation options when practical. Adhere to posted speed limits on road and vessel transportation routes. Apply lighting mitigations. Implement Management Plans (e.g., <u>Transportation Management Plan</u>, Blasting Management Plan). Should an emergency flaring event occur a carcass search will be performed to record avian mortality after the event 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (effect occurs in a stable ecosystem and/or moderately disturbed environment) Moderate in magnitude (many individuals or hectares of habitat in a regional population are affected) Local in extent (potential effects are within the LAA) Long-term in duration (occurs across multiple breeding seasons/generations and Project phases) Reversible Occurs at multiple times at an irregular frequency The likelihood of a residual effect of increased risk of mortality is medium Wildlife mortality risk is expected to increase; however the change in mortality risk will not affect the sustainability of regional terrestrial or marine bird populations. 	<p>The effect of change in wildlife mortality would also be significant if project-related activities (e.g., vegetation clearing, artificial lighting) are predicted to influence the long-term sustainability of an identified local or regional wildlife population.</p>	<p>Not significant With a moderate level of confidence</p>

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Potential Effects	Project Phase / Contributing Project Activity or Physical Works	Proposed Mitigation/ Commitments	Characterization of Residual Effects	Significance Threshold	Significance Determination
Alteration of movement or behaviour patterns	Construction Site preparation Onshore construction Dredging Marine construction Operations LNG facility Marine terminal use Decommissioning Dismantling project infrastructure	<ul style="list-style-type: none"> Limit clearing limits of the PDA and temporary work space. Vessels will not exceed a speed of 16 knots within the LAA. Apply mitigation measures for acoustic environment. Equipment will be properly maintained. Implement Management Plans (e.g., <u>Transportation Management Plan</u>, <u>Blasting Management Plan</u>). 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (effect occurs in a stable ecosystem and/or moderately disturbed environment) Low in magnitude (few individuals or hectares of habitat in a regional population are affected) Local in extent (potential effects are within the LAA) Long-term in duration (occurs across multiple breeding seasons/generations and Project phases) Reversible Occurs at multiple times at an regular frequency The likelihood of a residual effect of alteration of movement or behaviour pattern is high Marine birds are expected to alter their movement patterns to avoid project infrastructure; however this is predicted to not affect the sustainability of regional marine bird population. 	A project effect is considered to be significant if project infrastructure or project-related activities are predicted to cause a substantial barrier to movement between important terrestrial or marine habitats (e.g., breeding and foraging) used by local or regional populations.	Not significant With a high level of confidence
Freshwater Aquatic Resources					
Change in (permanent alteration or destruction of) fish habitat	Construction Site preparation Onshore construction Operations LNG facility	<ul style="list-style-type: none"> Where practical, effects to the lower sections of Watercourses 8/9 and 11 will be avoided. Infilling lower sections of watercourses (near the intertidal area) will be avoided, where practical. Sediment and erosion control plan will be in place to avoid downstream effects. A 30 m vegetation buffer will be maintained around Lelu Island. 	<ul style="list-style-type: none"> The ecological context is of high resilience (effect occurs in an undisturbed environment) No measurable adverse effect on the function or use of the habitat; no measurable reduction in the size of the fish population Occurs within the PDA Long-term in duration (the effect extends from 1 to 5 years including time to restore habitat through compensation) Irreversible Occurs once The likelihood of a residual effect of a change in fish habitat is low No predicted loss of productivity of fish habitat. 	A net loss of the productive capacity of fish habitat after application of mitigation and offsetting-measures.	Not significant With a high level of confidence
Change in food and nutrient content	Construction Site preparation Onshore construction Operations LNG facility	<ul style="list-style-type: none"> A 30 m vegetation buffer will be maintained around Lelu Island. 	<ul style="list-style-type: none"> The ecological context is of high resilience (effect occurs in an undisturbed environment) Low in magnitude (effect is measurable, but on low quality, marginal or non-critical habitat) Occurs within the PDA Long-term in duration (the effect extends from 1 to 5 years including time to restore habitat through compensation) Irreversible Occurs once The likelihood of a residual effect of a change in food and nutrient content is low No adverse effect on nutrient or food supply. 	A reduction in streamflow or riparian cover (or both) in the PDA or acidification of surface waters near the PDA at a level that adversely affects nutrient and food supply in fish-bearing streams and estuarine/near shore environment.	Not significant With a high level of confidence
Increased risk of fish mortality	Construction Site preparation Onshore construction Operations LNG facility	<ul style="list-style-type: none"> Fish salvage program during construction. 	<ul style="list-style-type: none"> The ecological context is of high resilience (effect occurs in an undisturbed environment) No effect (No measurable adverse effect on the function or use of the habitat; no measurable reduction in size of the fish population) Occurs within the PDA Short-term in duration (the effect is less than 1 week) Irreversible Occurs once The likelihood of a residual effect of an increased risk of fish mortality is low No increase in the likelihood of fish mortality. 	The likelihood of fish mortality, after mitigation measures are implemented, at a level that interferes with the natural ability of fish populations to recover from the disturbance. Examples include total removal of a resident population, removal of a population with unique genetic pool or region-wide population effects.	Not significant With a high level of confidence

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Marine Resources					
Change in sediment or water quality	<p>Construction Dredging Marine construction Disposal at sea</p> <p>Operations Marine terminal use</p>	<ul style="list-style-type: none"> A 30 m vegetation buffer around Lelu Island. Sediment and erosion control measures will be used. Dredge operations will be conducted using methods that reduce sediment spill. TSS and turbidity will be monitored, the rate of the activity will be adjusted, or additional mitigation measures implemented as required. <u>In areas of low to moderate currents (≤ 1 knot), silt curtains will be installed around dredging and blasting activities if monitoring indicates that inferred TSS levels are greater than predicted.</u> <u>Dredging will occur at low tide, where possible.</u> <u>Dredged sediment will be disposed of at or near the center point of the Brown Passage disposal site, to minimize effects on water quality outside the site.</u> <u>Tugs with less powerful propulsion systems (Voith Schneider tugs) have been evaluated and will be used.</u> 	<ul style="list-style-type: none"> The ecological context is of high resilience Low to moderate in magnitude (effects result in a measurable change outside the range of natural variability but not posing a risk to population viability) Occurs within the LAA Long-term in duration (the effect continues for more than two years) Reversible Occurs either continuously or at multiple times at regular intervals The likelihood of a residual effect of a change in sediment or water quality is high Changes in sediment or water quality will be short-term and are not expected to affect fish health or marine resources as a whole. 	<p>A significant residual adverse effect on marine resources is one that results in any of the following:</p> <ul style="list-style-type: none"> A change in sediment or water quality that would result in toxicological risks to aquatic life, considering the water and sediment quality guidelines (and conservatism built into those guidelines) Any residual effect with a high likelihood of affecting population viability of fish or marine mammals (these effects are likely to be of high magnitude and permanent) Any residual effect with a high likelihood of causing mortality to species at risk (i.e., listed under SARA) 	<p>Not significant With a <u>high</u> level of confidence</p>
Change in (permanent alteration or destruction of) fish habitat	<p>Construction Dredging Marine construction Disposal at sea</p> <p>Operations Marine terminal use</p> <p>Decommissioning Dismantling project infrastructure</p>	<ul style="list-style-type: none"> <u>No offset habitats will be located on Flora Bank and Agnew Bank.</u> <u>Planned scour protection will be placed around tower platform below mud line through use of slightly larger substrate sized materials around the perimeter of tower platform based on 2D and 3D model outputs.</u> Hard multi-facetted shoreline protection material (e.g., rip-rap boulders) will be used where needed (e.g., trestle abutment) to promote colonization by marine biota. A Habitat Offsetting Plan will be developed and implemented to maintain productivity within the LAA. <u>Beneficial re-use of rock for fish offsets is being considered and will be determined in consultation with DFO</u> 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (under baseline conditions, the marine resources are occasionally exposed to anthropogenic effects and are sensitive to them) Moderate in magnitude (measurable change outside the range of natural variability but not posing a risk to population viability) Occurs within the LAA Permanent Reversible Occurs once The likelihood of a residual effect of a change in fish habitat is low Changes to fish habitat and sediment and water quality will be localized, and mitigation measures are considered effective and well established. 	<p>A significant residual adverse effect on marine resources is one that results in any of the following:</p> <ul style="list-style-type: none"> A change in sediment or water quality that would result in toxicological risks to aquatic life, considering the water and sediment quality guidelines (and conservatism built into those guidelines) Any residual effect with a high likelihood of affecting population viability of fish or marine mammals (these effects are likely to be of high magnitude and permanent) Any residual effect with a high likelihood of causing mortality to species at risk (i.e., listed under SARA) 	<p>Not significant With a moderate level of confidence</p>

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Direct mortality or physical injury to fish or marine mammals	<p>Construction Dredging Marine construction Disposal at sea</p> <p>Operations Marine terminal use</p>	<ul style="list-style-type: none"> A Blasting Management Plan will be implemented. Fisheries and Oceans Canada's Blasting Guidelines will be implemented, including enforcing a safety radius of 500 m, and ensuring marine mammals are not present in the safety radius prior to blasting. Blasting will be conducted within DFO least-risk timing windows (approximately November 30 to February 15); exact dates to be refined based on additional studies and in consultation with DFO. The blasting design will consider appropriate measures to reduce overpressure. Dungeness crabs will be relocated from construction zones using proper handling techniques. In areas of low to moderate currents (≤ 1 knot), silt curtains will be installed around blasting activities if monitoring results indicate inferred TSS levels will be higher than the WQG outside the active work area. Dredging operations will be conducted using methods and/or equipment that reduces sediment spill. At the disposal site, sediment will be disposed within the previously used disposal area at or near the center point of the disposal site. TSS and turbidity will be monitored, the rate of the activity will be adjusted, or additional mitigation measures implemented as required. A Marine Pile Installation Management Plan will be implemented. Low noise pile installation techniques (i.e., vibratory installation methods) will be used except during seating of some piles into bedrock. In instances when an impact pile driver is required (e.g., during pile seating), bubble curtains with bubble-containment casing will be used and the impact hammer will be constructed of sound absorbent material. To mitigate for behavioural effects, a bubble curtain will also be used during low noise pile installation. In instances when the efficacy of bubble curtains is diminished by high currents, isolation casings that contain bubbles will be used in lieu of bubble curtains. Bubble curtains will be used during pile installation (i.e., vibratory and impact) at the inner MOF. The exact style of bubble curtain and/or casing used will be determined on a case by case basis. If it is determined that pile installation and dredging need to occur simultaneously, potential underwater noise levels will be modelled to inform mitigation measures, and a monitoring program will be developed. During all pile installation activities, a marine mammal observation program will be implemented. 	<ul style="list-style-type: none"> The ecological context is of moderate resilience (under baseline conditions, the marine resources are occasionally exposed to anthropogenic effects and are sensitive to them) Moderate in magnitude (measurable change outside the range of natural variability but not posing a risk to population viability) Occurs within the LAA Long-term in duration (effect continues through all project phases) Reversible Occurs continuously The likelihood of a residual effect of direct mortality or physical injury to fish or marine mammals is high Increases in potential for direct mortality and physical injury to fish and marine mammals are expected to occur during construction. Mitigation measures will reduce the potential for mortality and injury and residual effects are not expected to affect population viability of any species 	<p>A significant residual adverse effect on marine resources is one that results in any of the following:</p> <ul style="list-style-type: none"> A change in sediment or water quality that would result in toxicological risks to aquatic life, considering the water and sediment quality guidelines (and conservatism built into those guidelines) Any residual effect with a high likelihood of affecting population viability of fish or marine mammals (these effects are likely to be of high magnitude and permanent) Any residual effect with a high likelihood of causing mortality to species at risk (i.e., listed under SARA) 	<p>Not significant With a moderate level of confidence</p>

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Change in behaviour of fish or marine mammals	Construction Dredging Marine construction Disposal at sea Operations Marine terminal use Shipping Decommissioning Dismantling project infrastructure	<ul style="list-style-type: none"> Vessels will not exceed a speed of 16 knots within the LAA. LNG carrier vessel speed will be reduced to 6 knots when approaching the Triple Island Pilot Boarding Station. 	<ul style="list-style-type: none"> The ecological context is of low to moderate resilience (under baseline conditions, the marine resources are either rarely or occasionally exposed to anthropogenic effects and are sensitive or highly sensitive to them) Moderate in magnitude (measurable change outside the range of natural variability but not posing a risk to population viability) Occurs within the LAA Long-term in duration (effect continues through all project phases) Reversible Occurs either continuously or at multiple times at regular intervals The likelihood of a residual effect of a change in behaviour of fish or marine mammals is high Marine mammals, and to a lesser extent fish, are expected to experience changes in behaviour during project construction, operations, and decommissioning. Harbour porpoise are the marine mammals most likely to change their behaviour (e.g., avoid areas during construction), primarily during the construction period. Because of the short term duration of most effects, the viability of local populations will not be affected. 	A significant residual adverse effect on marine resources is one that results in any of the following: <ul style="list-style-type: none"> A change in sediment or water quality that would result in toxicological risks to aquatic life, considering the water and sediment quality guidelines (and conservatism built into those guidelines) Any residual effect with a high likelihood of affecting population viability of fish or marine mammals (these effects are likely to be of high magnitude and permanent) Any residual effect with a high likelihood of causing mortality to species at risk (i.e., listed under SARA) 	Not significant With a moderate level of confidence
Economic Environment					
Changes in regional labour supply and demand	Construction Operations Decommissioning	<ul style="list-style-type: none"> Work with training and educational facilities so that programs necessary to prepare regional residents for work on the Project are available. Require that all of workers complete grade 12 or have an appropriate equivalency. Develop career pathways that would allow local construction workers to transition into operational employment. Facilitate hiring and employment opportunities for RAA residents. Work with EPCC contractors to remove barriers to employment for RAA residents. Identify work packages that would be consistent with the capabilities of local and regional businesses to maximize local procurement opportunities. Work with First Nations to identify partnership or other arrangements that would increase the opportunities for their participation. 	<ul style="list-style-type: none"> The context is within a moderate level of resilience High in magnitude Regional in extent Long-term in duration Reversible Continuous in frequency The likelihood of a residual effect of changes in regional labour supply and demand is high 	A significant adverse residual effect on the economic environment is defined as highly distinguishable and is usually long term in duration. Such effects would exceed the capacity of existing or planned programs, services, or infrastructure, or would cause major changes in their cost, delivery, or quality.	Not significant With a moderate level of confidence
Changes in cost of living and economic activity	Construction Operations Decommissioning	<ul style="list-style-type: none"> Develop a project closure strategy that would reduce the adverse effects that project closure would have upon regional workers 	<ul style="list-style-type: none"> The context is within a moderate level of resilience High in magnitude Regional in extent Long-term in duration Reversible Continuous in frequency The likelihood of a residual effect is high 	A significant adverse residual effect on the economic environment is defined as highly distinguishable and is usually long term in duration. Such effects would exceed the capacity of existing or planned programs, services, or infrastructure, or would cause major changes in their cost, delivery, or quality.	Not significant With a moderate level of confidence

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Changes to municipal government finances	Construction Operations Decommissioning	<ul style="list-style-type: none"> Consultations with municipal governments will continue to monitor whether the Project is creating issues, in terms of effects on municipal finances or demands for infrastructure or services. A community investment program will be developed. 	<ul style="list-style-type: none"> The context is within a moderate level of resilience High in magnitude Regional in extent Long-term in duration Reversible Continuous in frequency The likelihood of a residual effect of changes to municipal government finances is high 	A significant adverse residual effect on the economic environment is defined as highly distinguishable and is usually long term in duration. Such effects would exceed the capacity of existing or planned programs, services, or infrastructure, or would cause major changes in their cost, delivery, or quality.	Not significant With a moderate level of confidence
Navigation and Marine Resource Use					
Interference with marine navigation	Construction Dredging Marine construction Operations Marine terminal use Decommissioning Dismantling project infrastructure	<ul style="list-style-type: none"> Implement a Marine Communications Plan. Establish safety zones during construction. Lighting design to reduce stray lighting. Installation of navigational aids. Updated navigational charts. Sufficient clearance (11.3 m above HHW) for vessels up to gillnetter size will be provided beneath the Lelu Island bridge and <u>a portion of the suspension bridge</u> Use of escort vessels to confirm the route is clear and that other vessels do not intrude safety zones. Tugs will be used for the safe transit and docking of LNG carriers. Limits on environmental conditions under which operations can be conducted safely (visibility, day-time operations, wind) will be set. Traffic management and routing options will be assessed to determine if de-confliction of LNG carrier routes is necessary for small craft. <u>Participate in a construction coordination committee led by PRPA to address potential effects of construction on marine users within the PRPA boundaries. In addition to other PRPA tenants, commercial fishers will also be invited to participate.</u> 	<ul style="list-style-type: none"> The context is within a low level of disturbance Moderate in magnitude Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of interference with marine navigation is moderate The Project will not result in a permanent and non-permitted impairment to navigation. 	A significant adverse residual effect on navigation and marine resource use occurs when a permanent and non-permitted impairment to navigation and marine use in areas of high importance.	Not significant With a high level of confidence
Effects on fishing, recreation and marine use (including marine tourism)	Construction Dredging Marine construction Operations Marine terminal use Shipping Decommissioning Dismantling project infrastructure	<ul style="list-style-type: none"> A Marine Communications Plan will be implemented. Sufficient clearance (11.3 m above HHW) for vessels up to gillnetter size will be provided beneath the Lelu Island bridge and <u>a portion of the suspension bridge.</u> Effects related to navigation (see Section 15.4.2) Other effects related to marine resources will be mitigated (see Section 13 Marine Resources). <u>Participate in a construction coordination committee led by PRPA to address potential effects of construction on marine users within the PRPA boundaries. In addition to other PRPA tenants, commercial fishers will also be invited to participate.</u> 	<ul style="list-style-type: none"> The context is within a moderate level of disturbance Moderate in magnitude Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of effects on fishing and recreation and marine use is moderate The Project will not result in a permanent and non-permitted impairment to marine use. 	A significant adverse residual effect on navigation and marine resource use occurs when a permanent and non-permitted impairment to navigation and marine use in areas of high importance.	Not significant With a <u>high</u> level of confidence

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Interference with Air Navigation	Construction Facility construction Marine construction Operations Facility operation Marine terminal use Decommissioning Dismantling project infrastructure	<ul style="list-style-type: none"> Use proper marking and lighting as required by Standard 621.19 of the <i>Canadian Aviation Requirements</i> for the flare stack and the bridge Work with the applicable agencies to update navigational charts and distribute NOTAMs (notices to airmen). 	<ul style="list-style-type: none"> The context is within a high level of disturbance Low in magnitude Effects are within the extent of the PDA Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of effects on air navigation is high <ul style="list-style-type: none"> The Project will not result in a permanent and non-permitted impairment to air navigation 	A significant adverse residual effect on navigation and marine resource use occurs when a permanent and non-permitted impairment to navigation and marine use in areas of high importance.	Not significant With a high level of confidence
Infrastructure and Services					
Change in traffic and pressure on transportation infrastructure	Construction Site preparation Onshore construction Vehicle traffic Waste management and disposal	<ul style="list-style-type: none"> A Transportation Management Plan will be implemented to outline preferred ground transportation corridors, provide policies for the movement of loads, outline policies and procedures for the use of the Prince Rupert Airport and the Northwest Regional Airport Terrace-Kitimat, provide policies for the movement of workers, and require PNW LNG to engage in frequent communication between MOTI, RCMP, PRPA and the council members of Port Edward and Prince Rupert. 	<ul style="list-style-type: none"> The context is within a moderate level of resilience (infrastructure and services are able to accommodate changes with minor impacts to viability). Low in magnitude (effects cannot be distinguished from baseline) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of change in traffic and pressure on transportation infrastructure is moderate <ul style="list-style-type: none"> Demands on infrastructure and services are expected to be within capacity. Standards of service are not expected to be below current levels for an extended period of time. 	A significant adverse residual effect on infrastructure and services is one that results in demands on infrastructure or services above and beyond capacity, such that standards of service are routinely and persistently reduced below current levels for an extended period of time.	Not significant With a moderate level of confidence
Change in housing availability and affordability	Construction Onshore construction	<ul style="list-style-type: none"> A camp will be used to house workers during construction. An accommodation plan will be implemented to establish communication with city and district planners in Port Edward and Prince Rupert, provide housing policies for non-local temporary workers who are not housed in the construction camp on Lelu Island, and outline camp management policies and practices. 	<ul style="list-style-type: none"> The context is within a moderate level of resilience (infrastructure and services are able to accommodate changes with minor impacts to viability). Low in magnitude (effects cannot be distinguished from baseline) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of change in housing availability and affordability is high <ul style="list-style-type: none"> Demands on infrastructure and services are expected to be within capacity. Standards of service are not expected to be below current levels for an extended period of time. 	A significant adverse residual effect on infrastructure and services is one that results in demands on infrastructure or services above and beyond capacity, such that standards of service are routinely and persistently reduced below current levels for an extended period of time.	Not significant With a moderate level of confidence

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Change in infrastructure and community services	Construction Onshore construction Waste management and disposal	<ul style="list-style-type: none"> A First Nations and community training and employment strategy will be implemented that will ensure that local communities, including First Nations, have access to training and employment opportunities provided by the Project. A community crime prevention initiative between RCMP and PNW LNG will be developed A PNW LNG Project engagement plan will be implemented. An emergency response plan will be established and implemented with BC OGC, PRFR, PEFD, PRPA, and the RCMP. Mandatory awareness programs for employees will be implemented regarding fire suppression systems. Recreational facilities will be provided on site at the construction camp. Waste management, disposal, and recycling programs of construction and domestic waste will be implemented. 	<ul style="list-style-type: none"> The context is within a high level of resilience (infrastructure and services are well developed and able to accommodate change). Moderate in magnitude (a measurable change that can be accommodated elsewhere in the RAA) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of change in infrastructure and community services is high Demands on infrastructure and services are expected to be within capacity. Standards of service are not expected to be below current levels for an extended period of time. 	A significant adverse residual effect on infrastructure and services is one that results in demands on infrastructure or services above and beyond capacity, such that standards of service are routinely and persistently reduced below current levels for an extended period of time.	Not significant With a moderate level of confidence
Visual Quality					
Reduction in visual quality	Construction Site preparation Onshore construction Dredging Marine construction Operations LNG facility Marine terminal use Shipping	<ul style="list-style-type: none"> A 30 m mature vegetation buffer will be retained around Lelu Island, except at access points, and will reduce the visual impact of the Project. <u>Use of full cutoff optics and dark sky approved lighting where possible.</u> 	<ul style="list-style-type: none"> The context is within a moderate level of resilience High in magnitude (a measurable change exceeds visual quality objectives) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of reduction in visual quality is high The average baseline existing visual condition of preservation with some views of high importance; preservation of visual quality is not a principal planning objective in consideration of other applicable planning objectives in the assessment area. 	A residual effect on visual quality would be considered significant if the average post development existing visual condition within the LAA exceeds the range of disturbance within the Partial Retention visual quality class where: <ul style="list-style-type: none"> The average baseline existing visual condition was either Preservation, Retention or Partial Retention The viewpoints from which the change is viewed is of moderate to high importance Preservation of visual quality is a principal planning objective, in consideration of other applicable planning objectives in the assessment area. 	Not significant With a moderate level of confidence

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Community Health and Well-Being					
Changes in social determinants of health	<p>Construction Site preparation Onshore construction Dredging Marine construction</p> <p>Operations LNG facility Marine terminal use Shipping</p>	<p><u>PNW LNG will provide:</u></p> <ul style="list-style-type: none"> • Training, employment and business opportunities • An employee assistance program • A vaccination policy • Workplace hygiene policies • Contractor boot camps • <u>Joint Camp Management Committee</u> • <u>Accommodation plan</u> • <u>Drug and alcohol policies</u> • <u>Cultural awareness programs.</u> <p><u>Mitigation measures will be implemented through obligations with EPCC contractor(s) include:</u></p> <ul style="list-style-type: none"> • <u>Health Risk Assessment</u> • <u>Joint Camp Management Committee</u> • <u>On-Site Security Measures - jointly provided by EPCC contractor(s) and camp owner</u> • <u>Camp Code of Conduct.</u> 	<ul style="list-style-type: none"> • The context is within a resilient community • Moderate in magnitude (effect is measurable and will not affect quality of life) • Regional in extent (effects extend to the RAA) • Long-term in duration (effects last for the life of the Project) • Reversible • Continuous in frequency • The likelihood of a residual effect of changes in social determinants of health is high • The project is not expected to increase demands on community and health services or infrastructure that exceeds current capacity or result in a routine and persistent standard of service. 	A significant adverse effect on community health and well-being is one that results in changes to social determinants of health that will directly and indirectly, place increased demands on community and health services or infrastructure that exceeds current capacity, such that standards of service are routinely and persistently reduced below current levels for an extended period of time, potentially resulting in adverse health outcomes.	Not significant With a moderate level of confidence
Change in diet and nutrition	<p>Construction Site preparation Onshore construction Marine construction Operational testing and commissioning</p> <p>Operations LNG facility Marine terminal use Shipping</p>	<ul style="list-style-type: none"> • Mitigation measures presented in biophysical, land and marine use and human health sections of the application serve as mitigation measures reducing residual effects on change in diet and nutrition. • Public awareness and informational sessions will be available. 	<ul style="list-style-type: none"> • The context is within a resilient community • Moderate in magnitude (effect is measurable and will not affect quality of life) • Local in extent (effects are within the LAA) • Long-term in duration (effects last for the life of the Project) • Irreversible • Continuous in frequency • The likelihood of a residual effect of change in diet and nutrition is high • The project is not expected to increase demands on community and health services or infrastructure that exceeds current capacity or result in a routine and persistent standard of service. 	A significant adverse effect on community health and well-being is one that results in changes to diet and nutrition that will directly and indirectly, place increased demands on community and health services or infrastructure that exceeds current capacity, such that standards of service are routinely and persistently reduced below current levels for an extended period of time, potentially resulting in adverse health outcomes.	Not significant With a moderate level of confidence

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Human and Ecological Health					
Change in human health	Construction Dredging Operations LNG facility Marine terminal use Shipping	See mitigations for Air Quality, Acoustic Environment, Ambient Light, and Marine Resources in Table 28-2.	<ul style="list-style-type: none"> The context is low resilience due to the potential effects on sensitive receptors Low in magnitude (exposures are near health-based guidelines) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of change in human health is low 	<p>The significance thresholds are relative to the baseline level.</p> <p>Concentration Ratios:</p> <ul style="list-style-type: none"> If the baseline CR for air inhalation is less than 1.0, the significance threshold is reached when predicted CR is greater than 1.0. If the baseline CR for air inhalation is greater than 1.0, the significance threshold is reached when predicted CR is greater than baseline CR + 0.2. <p>Hazard Quotients:</p> <ul style="list-style-type: none"> If the baseline HQ for food ingestion is less than 0.2, the significance threshold is reached when predicted HQ is greater than 0.2. If the baseline HQ for food ingestion is greater than 0.2, the significance threshold is reached when predicted HQ is greater than baseline HQ + 0.2. <p>Incremental Lifetime Cancer Risk:</p> <ul style="list-style-type: none"> An ILCR greater than 1 in 100,000 indicates the potential for cancer health risks, or predicted ILCR that is greater than 10^{-5}. 	Not significant With a high level of confidence
Changes in ecological health	Construction Dredging Operations LNG facility Marine terminal use Shipping	See mitigations for Air Quality, Acoustic Environment, Ambient Light, and Marine Resources in Table 28-2.	<ul style="list-style-type: none"> The context is of moderate resilience (effect occurs in a stable ecosystem and is not likely to contribute to change ecological health) Low in magnitude (exposures are near health-based guidelines) Local in extent (effects are within the LAA) Long-term in duration (effects last for the life of the Project) Reversible Continuous in frequency The likelihood of a residual effect of change in ecological health is low 	The significance threshold for the RQ is 1, where the RQ is the ratio between predicted chemical concentrations divided by the health standard for each ecological species.	Not significant With a high level of confidence
Heritage and Archaeological Resources					
Destruction or disturbance of culturally modified trees	Construction Site preparation Onshore construction	<ul style="list-style-type: none"> Systematic Data Recovery (SDR) studies for CMT sites will be conducted by systematically recording a representative sample of CMT features. Use of a Chance Find Protocol during Project construction. 	<ul style="list-style-type: none"> The Project is within an largely undisturbed context (there are negligible disturbances within the PDA) Low/moderate in magnitude (could be low or moderate in magnitude, depending on the archaeological context) Local in extent (effects are within the PDA) Effects are permanent and irreversible Occurs once The likelihood of a residual effect of destruction or disturbance of CMTs is low With mitigation measures in place there unmitigated project-related disturbance to, or destruction of, CMTs will be avoided. 	A significant adverse residual effect on archaeological or heritage resources is defined as a project related effect that results in any unmitigated project-related disturbance to, or destruction of, heritage resources.	Not significant With a high level of confidence

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Potential Effects	Project Phase / Contributing Project Activity or Physical Works	Proposed Mitigation/ Commitments	Characterization of Residual Effects	Significance Threshold	Significance Determination
Destruction or disturbance of archaeological or heritage sites	Construction Site preparation Onshore construction Dredging Marine construction	<ul style="list-style-type: none"> Work affecting archaeological or heritage sites will cease until the site can be properly assessed by a professional archaeologist. SDR studies on affected heritage sites (if found). Archaeological or heritage resources of low significance may also be mitigated. Use of a Chance Find Protocol during Project construction. 	<ul style="list-style-type: none"> The Project is within an largely undisturbed context (there are negligible disturbances within the PDA) Low/high in magnitude (could be low or high in magnitude, depending on the archaeological context) Local in extent (effects are within the PDA) Effects are permanent and irreversible Occurs once The likelihood of a residual effect of destruction or disturbance of archaeological or heritage sites is low With mitigation measures in place there unmitigated project-related disturbance to, or destruction of, heritage resources will be avoided. 	A significant adverse residual effect on archaeological or heritage resources is defined as a project related effect that results in any unmitigated project-related disturbance to, or destruction of, heritage resources.	Not significant With a high level of confidence
Current Use of Land and Resources for Traditional Purposes					
Change in the use of land and resources for traditional purposes by Aboriginal people	Construction Site preparation Onshore construction Dredging Marine construction Disposal at sea Site clean-up and reclamation Operations LNG facility and supporting infrastructure on Lelu Island Marine terminal use Shipping Decommissioning Dismantling facility and infrastructure Dismantling of marine terminal and MOF Site clean-up and reclamation	<ul style="list-style-type: none"> Other mitigation measures for effects on the Current Use of Land and Resources for Traditional Purposes are found in the following valued components: Vegetation and Wetland Resources, Terrestrial Wildlife and Marine Birds, Marine Resources, Navigation and Marine Resource Use, Freshwater Aquatic Resource, Human and Ecological Health, Archaeological and Heritage Resources, Air Quality, Ambient Light, Acoustic Environment, and Visual Quality. 	<ul style="list-style-type: none"> See Section 21 	See Section 21	Not significant

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Table 28-2 Summary of Mitigation Measures

Potential Effect	Proposed Mitigation
Air Quality	
Increase in criteria air contaminant (CAC) concentrations	<ul style="list-style-type: none"> Best achievable technology will be incorporated into project design to reduce air emissions. Control technologies will focus on managing NO_x emissions. PM_{2.5} emissions will be managed through the use of smokeless flare technology. CO and hydrocarbon emissions (e.g., VOCs) will be reduced by optimizing combustion. Thermal oxidizers will be used to oxidize H₂S, to achieve negligible H₂S emission effects, oxidize VOCs, and vaporize any hydrocarbon solids in the waste gas stream before venting. Best management practices for the processing systems will be instituted and maintained (i.e., use of treated feed gas as fuel for power generation). A natural gas leak detection program will be implemented. LNG carriers and assist tugs will adhere to applicable marine emission standards (MARPOL). Dust associated with the use of facility roads will be reduced by using dust suppressants, and surface paving. Vehicle and off-road equipment will undergo regular tuning and maintenance. Vehicle idling times during all project phases will be kept to a minimum.
Greenhouse Gas Management	
Emission of GHG gases (CO ₂ , CH ₄ , N ₂ O) from LNG facility	<ul style="list-style-type: none"> A Greenhouse Gas Management Plan will be implemented (Appendix J.4) A facility specific Fugitive Emission Management Program will be implemented PNW LNG will comply with requirements outlined under the British Columbia carbon tax, if applicable PNW LNG will comply with the annual British Columbia and Canada reporting and verification requirements PNW LNG will comply with any new legislation specific to GHG emissions from LNG facilities.
Acoustic Environment	
Increase in noise levels	<ul style="list-style-type: none"> Most construction will be scheduled between 7 a.m. and 10 p.m. Nighttime construction activity will be limited to low noise activities (no impact type pile driving or blasting). Pile driving using vibro-hammer, where feasible. Noise, Vibration, and Ambient Light Management Plan Use of building enclosures and/or silencers on large machinery and equipment A policy will be implemented to keep windows and doors closed when not in use Implementation of a noise complaint mechanism. Specification of acoustic performance of noise emission equipment (not exceeding 85 dBA at 1 m from equipment and 120 dBA for emergencies). If workers shift change occurs during nighttime period, the traffic management plan will be updated to include measures to reduce effects of traffic noise from transportation of workers on the community.
Ambient Light	
Increase in ambient lighting	<ul style="list-style-type: none"> A 30 m mature vegetation buffer will be retained around Lelu Island to reduce effects of increased light Construction lighting will be selected to reduce spill-over light and will include shielded fixtures, where appropriate Operational lighting will be selected to reduce spill-over light and will include shielded fixtures, where appropriate Design principles (such as those within the Canada Green Building Council LEED guidelines (LEED 2004) and the International Commission on Illumination (CIE 2003) will be used where applicable and consistent with overarching requirements of safety and security A centralized lighting control system will be used to selectively turn off lights when not required.
Vegetation and Wetland Resources	
Change in abundance of plant species of interest	<ul style="list-style-type: none"> In the development of the wetland compensation plan, traditional use species present in the PDA will be used for planting wherever possible and practical. Standard mitigation to prevent any introduction and spread of noxious weeds and invasive plants. A Species-at-Risk Discovery Contingency Plan will be developed and followed to address any chance-discoveries of plant species at risk during construction.
Change in abundance or condition of ecological communities	<ul style="list-style-type: none"> Ecological communities of management concern located adjacent to construction limits will be clearly marked to alert workers to these features and ensure they are protected, and the use of herbicides will be restricted near such communities. Drainage and erosion control techniques designed to maintain the local surface and groundwater hydrology will be designed and implemented. A monitoring program will be implemented to monitor effects of air emissions on ecological communities.

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Potential Effect	Proposed Mitigation
Change in wetland functions	<ul style="list-style-type: none"> • Wetlands outside the PDA will be delineated as environmentally sensitive areas during construction, marked with fencing, and construction access will be restricted within these areas. • Drainage and erosion control techniques designed to maintain the local surface and groundwater hydrology will be designed and implemented. • Implementation of a wetland habitat compensation plan consisting of: <ul style="list-style-type: none"> – Securement, plus restoration or creation, of 120 ha of wetlands through a legally binding agreement. – A five-year effectiveness monitoring program for the restored or created wetlands. – Bog restoration benefiting a minimum of 116 ha of coastal bog ecosystems through funding the immediate research and restoration priorities of the Burns Bog Management Plan and Burns Bog Ecological Conservancy Area Management Plan. – Contributions to local trail and/or parks improvements. The purpose of the improvements will be to increase access to traditional use plants within the traditional territories of potentially-affected First Nations and to improve the aesthetic, educational, and/or recreational values of wetlands in the vicinity of Prince Rupert, Port Edward and the North Coast. • PNW LNG will invite participation of Aboriginal Groups and Environment Canada in development and implementation of the Wetland Habitat Compensation Plan.
Terrestrial Wildlife and Marine Birds	
Change in wildlife habitat availability	<ul style="list-style-type: none"> • Boundaries of the PDA will be clearly marked and clearing, grading or dredging, construction, and temporary storage of materials of terrestrial and marine habitat will be limited to within the PDA boundaries. • If temporary workspace or storage areas are required beyond the extent of the PDA, they will be located in existing cleared areas to the extent possible. • A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection). • Wetland habitat compensation will include restoration and compensatory activities to recover the loss of wetland habitat function to terrestrial mammals, amphibians, and birds. • Fish habitat offsetting will include restoration and compensatory activities to recover the net loss of marine fish habitat used for foraging by marine birds. • LNG carriers, tugs, and barges will not exceed a speed of 16 knots within the LAA. • Mitigations for the acoustic environment will reduce noise disturbance to adjacent terrestrial and marine habitats. • A Blasting Management Plan will be implemented • PNW LNG will install bat houses, BrandenBark™, or other roosting structures to compensate for loss of bat roosting habitat. Roosting structures will be installed in suitable habitats in the Prince Rupert region to compensate for roosting habitat removed by the PDA. PNW LNG will invite appropriate federal, provincial, municipal agencies and/or research organizations to participate in determining the final locations.
Risk of mortality	<ul style="list-style-type: none"> • A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection). • Boundaries of the PDA will be clearly marked and clearing, grading or dredging, construction, and temporary storage of materials of terrestrial and marine habitat will be limited to within the PDA boundaries. • Guidelines for restricted activity periods to protect wildlife and marine birds will be followed. Clearing activities will occur outside of the breeding season for terrestrial birds, amphibians, and bats (April 9 through August 7), and will avoid the breeding period for raptors (January 5 through September 6). • If clearing is required during these breeding periods, bird surveys will be conducted in advance of vegetation clearing by a BC-certified Registered Professional Biologist to comply with the <i>Migratory Birds Regulations</i> of the <i>Migratory Birds Convention Act</i> and the <i>BC Wildlife Act</i>. Buffers will be established around active nests and clearly marked to show the extent of clearing (BC MOE 2013). • If raptor nests are identified within the clearing limits of the PDA and require removal, this would be subject to permit approval under Section 34 of the <i>BC Wildlife Act</i>, where the <i>Act</i> applies. • Permanent fencing will be erected around the Project. • Feeding and harassment of wildlife will be prohibited. • Wildlife education and awareness training will be provided. • Traffic between Prince Rupert, Port Edward, and the Project site will be reduced through the use of buses, crew cab trucks, water taxis, and other group transportation options when practical. This will primarily apply to travel required for shift changes. • Operators of Project-related ground and marine transportation will adhere to posted speed limits. • A Project Waste Management Plan will be implemented and ensure that wastes and recycling materials will be temporarily stored on site in wildlife-proof containers and regularly transferred to an approved disposal or sorting facility. • To mitigate potential light-induced mortality, lighting mitigations will follow objectives contained within the Canada Green Building Council LEED guidelines and the International Commission on Illumination (LEED 2004; CIE 2003; Section 9). The use of exterior lighting (including portable lighting structures) at the LNG facility, the MOF, marine terminal, trestle, berth, and on berthed vessels will be limited where practical and permissible under federal safety and navigation regulations. • A Blasting Management Plan will be implemented. • Educational materials will be provided to all employees and contractors to increase awareness of lighting effects on migratory birds. Educational posters will be posted in public locations during peak bird migration periods to remind personnel to implement lighting mitigation during sensitive timing windows. Guidance for this mitigation will be taken from Environment Canada's policy on <i>Incidental Take of Migratory Birds in Canada</i> (Environment Canada 2014c) and avoidance guidelines on <i>General Nesting Periods of Migratory Birds in Canada</i> (Environment Canada 2014d) • Should an emergency flaring and LNG facility shutdown event occur during project operations (see Section 22 of the EIS) a carcass search will be performed to record avian mortality after the emergency event.
Alteration of movement or behaviour patterns	<ul style="list-style-type: none"> • Boundaries of the PDA will be clearly marked and clearing, grading or dredging, construction, and temporary storage of materials of terrestrial and marine habitat will be limited to within the PDA boundaries. • LNG carriers, tugs, and barges will not exceed a speed of 16 knots within the LAA. • Mitigation for the acoustic environment will reduce noise disturbance to adjacent terrestrial and marine habitats. • Equipment will be properly maintained.

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Potential Effect	Proposed Mitigation
Freshwater Aquatic Resources	
Change in (permanent alteration or destruction of) fish habitat	<ul style="list-style-type: none"> A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection). Where practical, effects to the lower sections of Watercourses 8/9 and 11 will be avoided. Infilling lower sections of watercourses (near the intertidal area) will be avoided, where practical Erosion and sediment control measures will be implemented to protect downstream water quality, where required
Change in food and nutrient content	<ul style="list-style-type: none"> A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection).
Increased risk of fish mortality	<ul style="list-style-type: none"> Fish salvage will be conducted prior to infilling of fish-bearing streams WC 8/9 and WC 11.
Marine Resources	
Change in sediment or water quality	<ul style="list-style-type: none"> A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points. Sediment and erosion control measures will be used (e.g., sediment fences) for land-based construction, particularly at the shoreline, to reduce TSS inputs into the water. Dredging operations will be conducted using methods and/or equipment that reduces sediment spill. Turbidity will be monitored in real time during in-water construction activities (i.e., blasting, dredging, and ocean disposal) and compared to predicted TSS levels (through use of a turbidity-TSS calibration curve) and WQG. In the event that calculated TSS levels exceed modelled predictions outside of the active work area (defined as the immediate area surrounding operating construction equipment) or disposal site, the rate of the activity will be adjusted (e.g., slowed), or additional mitigation measures implemented (e.g., silt curtains) to minimize the spatial extent of elevated TSS. In areas of low to moderate currents (≤ 1 knot), silt curtains will be installed around dredging and blasting activities if monitoring indicates that inferred TSS levels are greater than predicted (Appendix G.12). Studies suggest that effectiveness of silt curtains is reduced when currents exceed about 1 knot. Silt curtains are expected to be most effective in the inner, sheltered areas of the MOF. Currents in Porpoise Channel (outer MOF) are likely to be too strong to permit effective use of silt curtains Dredging will occur at low tide, where possible. Dredged sediment will be disposed of at or near the center point of the Brown Passage disposal site, to minimize effects on water quality outside the site. Tugs with less powerful propulsion systems (Voith Schneider tugs) have been evaluated and will be used.
Change in (permanent alteration or destruction of) fish habitat	<ul style="list-style-type: none"> No offset habitats will be located on Flora Bank and Agnew Bank. Planned scour protection will be placed around tower platform below mud line through use of slightly larger substrate sized materials around the perimeter of tower platform. Hard multi-faceted shoreline protection material (e.g., rip-rap boulders) will be used where needed (e.g., trestle abutment) to promote colonization by marine biota. A Habitat Offsetting Plan will be developed and implemented to maintain productivity within the LAA. Beneficial re-use of rock for construction of fish habitat offset is being considered and will be determined in consultation with Fisheries and Oceans Canada.

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Potential Effect	Proposed Mitigation
Direct mortality or physical injury to fish or marine mammals	<p>Burial, Crushing, or Blasting</p> <ul style="list-style-type: none"> • A Blasting Management Plan will be implemented • Fisheries and Oceans Canada’s Blasting Guidelines will be implemented, including enforcing a safety radius of 500 m, and ensuring marine mammals are not present in the safety radius prior to blasting. A marine mammal observation program will be implemented and marine mammal observers (MMOs) will terminate blasting activities if cetaceans or marine mammals listed under the <i>Species at Risk Act</i> (SARA) enter the 500 m blasting safety radius (detailed below under ‘underwater noise’) • Blasting will be conducted within DFO least-risk timing windows (approximately November 30 to February 15); exact dates to be refined to reflect local conditions, based on pre-construction field surveys and in consultation with DFO to reduce mortality to fish during important lifecycle stages • The blasting design will consider appropriate measures to reduce overpressure, through the optimum use of explosives for rock blasting. Where possible (i.e., if low tides occur during daytime hours), blasting will be timed with low tides to reduce the number of detonations that occur underwater • Dungeness crabs will be relocated from construction zones using proper handling techniques and strategies that limit stress • In areas of low to moderate currents (≤ 1 knot), silt curtains will be installed around blasting activities if monitoring results indicate inferred TSS levels will be higher than the WQG outside the active work area. Studies suggest that effectiveness of silt curtains is reduced when currents exceed about 1 knot. Silt curtains are expected to be most effective in the inner, sheltered areas of the MOF. Currents in Porpoise Channel (outer MOF) are likely to be too strong to permit effective use of silt curtains. <p>Turbidity and TSS</p> <ul style="list-style-type: none"> • Dredging operations will be conducted using methods and/or equipment that reduces sediment spill • Dredged sediment will be disposed of at or near the center point of the Brown Passage disposal site, to minimize effects on water quality outside the site • Turbidity levels in accessible areas of the water column will be monitored during disposal. • Turbidity will be monitored in real time during in-water construction activities (i.e., blasting, dredging, and ocean disposal) and compared to predicted TSS levels (through use of a turbidity-TSS calibration curve) and WQG. In the event that calculated TSS levels exceed modelled predictions outside of the active work area (defined as the immediate area surrounding operating construction equipment) or disposal site, the rate of the activity will be adjusted (e.g., slowed), or additional mitigation measures implemented (e.g., silt curtains) to minimize the spatial extent of elevated TSS. <p>Underwater Noise</p> <ul style="list-style-type: none"> • A Marine Pile Installation Management Plan (see Appendix J.12) which outlines the reduced noise pile installation techniques that will be used when low noise installation methods are not technically feasible (e.g., due to unfavourable substrate) will be implemented • Low noise pile installation techniques (i.e., vibratory installation methods) will be used except during seating of some piles into bedrock • In instances when an impact pile driver is required (e.g., during pile seating), bubble curtains with bubble-containment casing will be used and the impact hammer will be constructed of sound absorbent material. To mitigate for behavioural effects, a bubble curtain will also be used during low noise pile installation (see Section 13.5.5.2 of Appendix A) • In instances when the efficacy of bubble curtains is diminished by high currents, isolation casings that contain bubbles will be used in lieu of bubble curtains • Bubble curtains will be used during pile installation (i.e., vibratory and impact) at the inner MOF. The exact style of bubble curtain and/or casing used will be determined on a case by case basis, taking into consideration the type of activity (and predicted sound levels) and oceanographic conditions (e.g., current speed). In situ field validation of the effectiveness will be measured/monitored during the first seven days of each style of curtain/casing implemented to confirm underwater sound levels produced following implementation of this mitigation • If it is determined that pile installation and dredging need to occur simultaneously, potential underwater noise levels will be modelled to inform mitigation measures, and a monitoring program will be developed. • During all pile installation activities, a marine mammal observation program will be implemented. Marine mammal observers will monitor a safety radius (i.e., exclusion zone) around pile installation, including during pile seating, and will halt the activities if cetaceans (of any species) or other marine mammal species that are listed under SARA enter this zone • The Environmental Monitoring Management Plan will be implemented.
Change in behaviour of fish or marine mammals	<ul style="list-style-type: none"> • LNG carriers, tugs, and barges will not exceed a speed of 16 knots within the LAA. • LNG carrier vessel speed will be reduced to 6 knots when approaching the Triple Island Pilot Boarding Station.
Economic Environment	
Change in regional labour supply and demand	<ul style="list-style-type: none"> • Work with training and educational facilities so that programs necessary to prepare regional residents for work on the Project are available • Require that all of workers complete grade 12 or have an appropriate equivalency in order to prevent young people from leaving school prematurely. • Develop career pathways that would allow local construction workers with the skills necessary to transition into operational employment • Facilitate hiring and employment opportunities for RAA residents by posting qualifications and skill requirements in advance of construction and operation • Work with EPCC contractors to remove barriers to employment for RAA residents, including literacy and Grade 12 training, childcare, occupational training and support for Aboriginal workers from local First Nations • Identify work packages that would be consistent with the capabilities of local and regional businesses to maximize local procurement opportunities • Work with First Nations to identify partnership or other arrangements that would increase the opportunities for their participation.
Change in cost of living and economic activity	<ul style="list-style-type: none"> • Develop a project closure strategy that would reduce the adverse effects that project closure would have upon regional workers
Change to municipal government finances	<ul style="list-style-type: none"> • Consultations with municipal governments will continue to monitor whether the Project is creating issues, in terms of effects on municipal finances or demands for infrastructure or services. • A community investment program will be developed.

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Navigation and Marine Resource Use	
Interference with marine navigation	<ul style="list-style-type: none"> • A Marine Communications Plan will be implemented, which identifies measures so that all marine traffic is made aware of any Project construction activities and that details the local marine communications and project-related safety procedures. • Safety zones will be established during construction that specify “no go” areas. • Lighting will be designed to reduce stray lighting. • Navigational aids will be installed on structures where required to enhance navigation safety. • Navigational charts will be updated to show the MOF and trestle and berth locations. • Sufficient clearance (11m above HHW) for vessels up to gillnetter size will be provided beneath the Lelu Island bridge and a portion of the suspension bridge • Escort vessels will be used to confirm the route is clear and safe and that other vessels do not intrude safety zones. • Tugs will be used for the safe transit and docking of LNG carriers. • Traffic management and routing options will be assessed to help small craft know which route a carrier will follow, if deemed necessary by the port and pilots based on analysis of TERMPOL studies. • Limits on environmental conditions under which operations can be conducted safely (visibility, day-time operations, wind) will be set consistent with results from the TERMPOL studies, consultation with pilots, and LNG terminal practices throughout the industry. • Participate in a construction coordination committee led by PRPA to address potential effects of construction on marine users within the PRPA boundaries. In addition to other PRPA tenants, commercial fishers will also be invited to participate.
Effects on fishing, recreation, and marine use (including marine tourism)	<ul style="list-style-type: none"> • A Marine Communications Plan will be implemented, which identifies measures so that all marine traffic is made aware of any Project construction activities and that details the local marine communications and project-related safety procedures. • Sufficient clearance (~11m above HHW) for vessels up to gillnetter size will be provided beneath the Lelu Island bridge and a portion of the suspension bridge • Effects related to navigation (see Section 15.4.2) will be mitigated. • Other effects related to marine resources will be mitigated (see Section 13 Marine Resources). • Participate in a construction coordination committee led by PRPA to address potential effects of construction on marine users within the PRPA boundaries. In addition to other PRPA tenants, commercial fishers will also be invited to participate.
Interference with air navigation	<ul style="list-style-type: none"> • Use proper marking and lighting as required by Standard 621.19 of the <i>Canadian Aviation Requirements</i> for the flare stack and the bridge • Work with the applicable agencies to update navigational charts and distribute NOTAMs (notices to airmen).
Infrastructure and Services	
Change in traffic and pressure on transportation infrastructure	<p>A transportation management plan will be implemented to:</p> <ul style="list-style-type: none"> • Outline preferred ground transportation corridors. • Provide policies for the movement of dangerous goods, heavy, oversized and regular loads; convoys will be prohibited. • Outline policies and procedures for the use of the Prince Rupert Airport and the Northwest Regional Airport Terrace-Kitimat for project-related activities. • Provide policies for the movement of workers to and from construction sites and airports; where possible workers will be transported by bus or crew-cab truck. • Require PNW LNG to engage in frequent communication between MOTI, RCMP, PRPA and the council members of Port Edward and Prince Rupert to address potential concerns and changes in demand of infrastructure and services.
Change in housing availability and affordability	<ul style="list-style-type: none"> • A camp will be used to house workers during construction <p>An accommodation plan will be implemented to:</p> <ul style="list-style-type: none"> • Establish communication with city and district planners in Port Edward and Prince Rupert as a means of responding to potential community grievances and changes in demand for housing infrastructure. • Provide housing policies for non-local temporary workers who are not housed in the construction camp on Lelu Island; policies will outline preferred accommodations and require workers be housed in both Port Edward and Prince Rupert when not in housed in the construction camp to lower the demand in a single community. • Outline camp management policies and practices.
Change in infrastructure and community services	<ul style="list-style-type: none"> • A First Nations and community training and employment strategy will be implemented that will ensure that local communities, including First Nations, have access to training and employment opportunities provided by the Project. The long-term objective of the strategy is to maximize access to long-term career opportunities during the operational phase of the Project by local populations through enhanced skills training programs and outreach efforts (used to identify local labour talent). • A community crime prevention initiative between RCMP and PNW LNG will be implemented through the Transportation Management Plan and Accommodation Plan. The initiative will encourage PNW LNG and RCMP to collaborate and communicate project updates and activities that could influence community safety. The initiative will additionally help facilitate an understanding of project-related traffic concerns. • A PNW LNG Project community engagement plan will assist communities in planning for an influx of workers. The plan will include initiatives to address potential effects and will facilitate communication with the community and provide a framework from which to respond to community grievances. The plan will also provide details on how best to maximize economic opportunities related to the Project. • An emergency response plan will be established and implemented with BC OGC, PRFR, PEFD, PRPA, and the RCMP including mandatory LNG specific emergency response training (EMS and firefighting). • Mandatory awareness programs for employees will be implemented regarding fire suppression systems installed onsite, with key employees trained in fire suppression according to legislation requirements. • Recreational facilities will be provided on site at the construction camp to reduce potential demand on infrastructure and municipal services. • Waste management, disposal, and recycling programs of construction and domestic waste targeted at reducing demand on municipal landfill facilities and operations will be implemented.

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Visual Quality	
Reduction in visual quality	<ul style="list-style-type: none"> A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection). <u>Use of full cutoff optics and dark sky approved lighting where possible.</u>
Community Health and Well Being	
Change in social determinants of health	<p><u>PNW LNG will provide:</u></p> <ul style="list-style-type: none"> Training, employment and business opportunities An employee assistance program A vaccination policy Workplace hygiene policies Contractor boot camps <u>Joint Camp Management Committee</u> <u>Accommodation plan</u> <u>Drug and alcohol policies</u> <u>Cultural awareness programs.</u> <p><u>Mitigation measures will be implemented through obligations with EPCC contractor(s) include:</u></p> <ul style="list-style-type: none"> <u>Health Risk Assessment</u> <u>Joint Camp Management Committee</u> <u>On-Site Security Measures - jointly provided by EPCC contractor(s) and camp owner</u> <u>Camp Code of Conduct.</u>
Change in diet and nutrition	<ul style="list-style-type: none"> Mitigation measures presented in biophysical, land and marine use and human health sections of the application serve as mitigation measures reducing residual effects on change in diet and nutrition. Public awareness and informational sessions will be available.
Human and Ecological Health	
Change in human health	<ul style="list-style-type: none"> Mitigation measures listed in the following sections of this table (Table 28-2) will mitigate effects on human health (see mitigations for Air Quality, Acoustic Environment, Ambient Light, and Marine Resources)
Change in ecological health	<ul style="list-style-type: none"> Mitigation measures listed in the following sections of this table (Table 28-2) will mitigate effects on ecological health (see mitigations for Air Quality, Acoustic Environment, Ambient Light, and Marine Resources)
Archaeological and Heritage Resources	
Destruction or disturbance of culturally modified trees	<ul style="list-style-type: none"> Systematic Data Recovery (SDR) studies for CMT sites will be conducted by systematically recording a representative sample of CMT features, consisting of: <ul style="list-style-type: none"> Detailed recording as outlined in the CMT Handbook (Archaeology Branch 2001) Stem round collection Monitoring of CMT removal by a crew comprised of a professional archaeologist and a local First Nations representative Direct dating by stem-round sampling Production of a comprehensive report A Chance Find Protocol document will be used during Project construction in the event that unrecorded CMTs are encountered.
Destruction or disturbance of archaeological or heritage sites	<ul style="list-style-type: none"> Work affecting archaeological or heritage sites will cease until the site can be properly assessed by a professional archaeologist SDR studies will be conducted on affected heritage sites (if found), consisting of: <ul style="list-style-type: none"> Scientific excavation and/or surface collection studies Collection and analysis of artifacts, faunal remains, botanical remains, and other archaeological remains Collection and processing of carbon samples for dating Completion of other appropriate specialized analytical processes (e.g., geochemical analysis of stone tools, blood residue analysis) Analysis and interpretation of all recovered data Cataloguing of all collected artifacts and their subsequent curation in an approved facility Production of a comprehensive report Archaeological or heritage resources of low significance may also be mitigated through a program of archaeological monitoring carried out during construction A Chance Find Protocol document will be used during Project construction and implemented in the event that unrecorded archaeological or heritage sites are encountered.

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Potential Effect	Proposed Mitigation
Current Use of Lands and Resources for Traditional Purposes	
Change in the use of land and resources for traditional purposes by Aboriginal people	<p>Mitigation measures for the following valued components will mitigate effects on the Current Use of Land and Resources for Traditional Purposes:</p> <ul style="list-style-type: none"> • Vegetation and Wetland Resources • Terrestrial Wildlife and Marine Birds • Marine Resources • Navigation and Marine Resource Use • Freshwater Aquatic Resources • Human and Ecological Health • Archaeological and Heritage Resources • Air Quality • Ambient Light • Acoustic Environment • Visual Quality

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28.1 MEASURES TO MITIGATE SIGNIFICANT ADVERSE EFFECTS ON AREAS OF FEDERAL INTEREST

Table 28-3 provides a list of the proposed technically and economically feasible mitigation measures that would mitigate any significant adverse environmental effects on the Project on areas of federal interest.

Table 28-3 Measures to Mitigate Potential Significant Adverse Effects of the Project

Valued Component	Proposed Mitigation/Compensation
Multiple	<p>PNW LNG will ensure a construction and operational Environmental Management Plan (EMP) is prepared and adhered to and will be made up of the following component plans:</p> <ul style="list-style-type: none"> • Air Quality and Greenhouse Gas Management Plan • Noise, Vibration, and Ambient Light Management Plan • Emergency Response/Environmental Emergency Plan • Transportation Management Plan • Marine and Freshwater Resources Management Plan • Vegetation Management Plan • Waste Management Plan • Blasting Management Plan • Marine Pile Installation Plan • Dredging Management Plan • Accommodation Plan • Heritage Resources Management Plan • Environmental Monitoring Management Plan
Multiple	<p>Toward the end of the Project life, PNW LNG must develop and implement as required a decommissioning plan in accordance with requirements of the PRPA and regulations in force at that time and in consultation with regulatory agencies to the satisfaction of relevant regulatory agencies. PRPA requirements related to decommissioning will be included within the lease to PNW LNG.</p>
Air Quality	<p>A natural gas leak detection program must be implemented.</p>
Acoustic Environment	<p>Large machinery such as gas turbine generators and refrigerant compressors will be located in enclosures with minimum acoustic sound transmission loss rating.</p>
Acoustic Environment	<p>A policy will be implemented to keep building windows closed and doors closed when not in use to reduce noise emissions.</p>
Vegetation and Wetland Resources Terrestrial Wildlife and Marine Birds	<p>A wetland compensation plan will be implemented.</p>
Vegetation and Wetland Resources Terrestrial Wildlife and Marine Birds	<p>A Species-at-Risk Discovery Contingency Plan will be developed and followed to address any chance-discoveries of plant species at risk during construction.</p>

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Valued Component	Proposed Mitigation/Compensation
Vegetation and Wetland Resources Terrestrial Wildlife and Marine Birds Marine Resources Archaeological and Heritage Resources	A 30 m vegetation buffer will be retained around the perimeter of Lelu Island, except at access points (e.g., at the bridge, pioneer dock, MOF, trestle, and pipeline interconnection). The vegetation management plan will be implemented which includes maintaining vegetation within the buffer during operations.
Terrestrial Wildlife and Marine Birds	PNW LNG will attempt to complete vegetation clearing activities outside of the breeding season for terrestrial birds, amphibians, and bats (April 9 through August 7), and the breeding period for raptors (January 5 through September 6).
Terrestrial Wildlife and Marine Birds	If clearing during breeding season is unavoidable, a nest survey will be conducted in advance of the clearing by a qualified professional to ensure compliance with applicable legislation (the <i>Migratory Birds Convention Act</i> and/or the <i>BC Wildlife Act</i>).
Terrestrial Wildlife and Marine Birds	A wetland compensation plan will be implemented.
Terrestrial Wildlife and Marine Birds	Bat houses, BrandenBark™, or other roosting structures will be installed to compensate for loss of bat roosting habitat.
Freshwater Resources	Fish salvage will be conducted prior to infilling of fish-bearing streams WC 8/9 and WC 11.
Marine Resources	Turbidity will be monitored in real time during in-water construction activities (i.e., blasting, dredging, and ocean disposal) and compared to predicted TSS levels (through use of a turbidity-TSS calibration curve) and WQG. In the event that calculated TSS levels exceed modelled predictions outside of the active work area (defined as the immediate area surrounding operating construction equipment) or disposal site, the rate of the activity will be adjusted (e.g., slowed), or additional mitigation measures implemented (e.g., silt curtains) to minimize the spatial extent of elevated TSS.
Marine Resources	Dredged sediment will be disposed of at or near the center point of the Brown Passage disposal site, to minimize effects on water quality outside the site
Marine Resources	Voith Schneider tugs will be used.
Marine Resources	A Habitat Offsetting Plan will be developed and implemented to maintain productivity within the LAA; no offset habitats will be located on Flora Bank or Agnew Bank
Marine Resources	Planned scour protection will be placed around tower platform below mud line through use of slightly larger substrate sized materials around the perimeter of tower platform

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Valued Component	Proposed Mitigation/Compensation
Marine Resources	<p>A Blasting Management Plan will be implemented (as part of EMPs listed above) for underwater blasting, including:</p> <ul style="list-style-type: none"> • Fisheries and Oceans Canada’s Blasting Guidelines will be implemented, including enforcing a safety radius of 500 m, and ensuring marine mammals are not present in the safety radius prior to blasting. A marine mammal observation program will be implemented and marine mammal observers (MMOs) will terminate blasting activities if cetaceans or marine mammals listed under the <i>Species at Risk Act</i> (SARA) enter the 500 m blasting safety radius (detailed below under ‘underwater noise’) • Blasting will be conducted within DFO least-risk timing windows (approximately November 30 to February 15); exact dates to be refined to reflect local conditions, based on pre-construction field surveys and in consultation with DFO to reduce mortality to fish during important lifecycle stages
Marine Resources	Dungeness crabs will be relocated from construction zones
Marine Resources	Low noise techniques (such as vibratory hammer with bubble curtain) will be used to install piles, where technically feasible. If an impact pile driver is used a marine mammal observation program will be implemented. The marine pile installation management plan will be implemented; it outlines the reduced noise pile installation techniques that will be used when low noise installation methods are not technically feasible (e.g., due to unfavourable substrate).
Navigation and Marine Resource Use	Sufficient clearance (11.3 m above HHW) will be provided beneath the Lelu Island access bridge and the suspension bridge spans that best supports navigation by small vessels (i.e., gill-netters) to and from Porpoise Channel over Flora Bank.
Navigation and Marine Resource Use	Participate in a construction coordination committee led by PRPA to address potential effects of construction on marine users within the PRPA boundaries. In addition to other PRPA tenants, commercial fishers will also be invited to participate.
Archaeological and Heritage Resources	Systematic Data Recovery (SDR) studies for CMT sites will be conducted by systematically recording a representative sample of CMT features. A detailed final report will be completed to ensure that the data and results of analyses are available to other archaeologists and First Nations.
Archaeological and Heritage Resources	The Heritage Resources Management Plan will be implemented including a chance find protocol to be used during Project construction in the event that unrecorded archaeological or heritage sites are encountered.