3-C: Addendum Pathway Analysis

Table 3-C-1: Potential Pathway for Atmospheric Environment

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	General construction, operations, and decommissioning activities associated with the Whale Tail Pit and the haul road.	Construction, Operations, Closure	Climate	Greenhouse gas emissions from the Project can contribute to climate change.	Agnico Eagle will comply with regulatory emission requirements for GHG's (e.g., reporting GHG emissions to the Federal Greenhouse Gas Reporting Program if they exceed 50,000 tonnes CO2e/yr). The following environmental design and mitigation features will lessen the effects of Project operations on GHG emissions: • All vehicles will adhere to the 50 km/h speed limit. • Regular maintenance will be implemented for equipment and vehicles.	No Linkage	No linkage	There is no defined linkage that is considered valid between the Project emissions of GHG's and regional climate. As described by the federal government "*…the contribution of an individual project to climate change cannot be measured*" (FTPCCCEA, 2003). The GHG emissions from the Project will be estimated, but are too small to have any measurable effect on regional climate.	Previously assessed - no change (see Section 4.2.3.1)
2	Mining of the Whale Tail Pit	Operations	Climate	Additional 3 years of processing and use of supporting infrastructure at the Meadowbank mine site and the existing AWAR for delivery of materials and contributions for the Whale Tail Project itself can produce greenhouse gas emissions that contribute to climate change.	Agnico Eagle will comply with regulatory emission requirements for GHG's (e.g., reporting GHG emissions to the Federal Greenhouse Gas Reporting Program if they exceed 50,000 tonnes CO_2e/yr). The following environmental design and mitigation features will lessen the effects of Project operations on GHG emissions: • All vehicles will adhere to the 50 km/h speed limit. • Regular maintenance will be implemented for equipment and vehicles.	Primary	Primary	See Section 4.2.3.1	Updated to reflect greenhouse gas emissions predicted as a result of the Expansion Project - Agnico Eagle is committed to incorporating any new mitigation measures in the applicable management plan, if required.
3	Upgrading of the haul road from the Whale Tail Pit to the Meadowbank Mine	Construction, Closure	Air	Vehicle emissions and fugitive dust from construction and decommissioning of the haul road can affect air quality.	The following environmental design and mitigation features will reduce the effects of haul road upgrading on air quality: • Implement dust control measures, if needed on mine roads • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase. • Regular maintenance will be implemented for equipment and vehicles. • Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8 Appendix 8-E.1)	Secondary	Secondary	Combustion emissions and fugitive dust emissions generated during upgrading of the haul road will be small compared to emissions during haul road operations. Air dispersion modelling of the operations case will provide a conservative estimate of the wors case scenario eliminating the need to model construction-phase or decommissioning-phase emissions separately.	See Section 4.3.3
4	Traffic on the haul road from the Whale Tail Pit to the Meadowbank Mine	Operations	Air	Vehicle emissions and fugitive dust from traffic on the haul road can affect air quality.	The following environmental design and mitigation features will lessen the effects of haul road traffic on air quality: • Watering of roads and enforcing speed limits to suppress dust production. • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase • Regular maintenance will be implemented for equipment and vehicles • Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8 Appendix 8-E.1)	Primary	Primary	See Section 4.3.3.	Assessment updated to include emissions predicted from the Expansion Project activities in year 2022 - upgraded haul road traffic
5	Construction of the Whale Tail Pit	Construction	Air	Blasting, stationary and mobile combustion sources, and fugitive dust emissions during construction of the Whale Tail Pit can affect air quality.	The following environmental design and mitigation features will reduce the effects of Whale Tail Pit construction on air quality: • Best Management practices for controlling fugitive dust from construction activities • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase • Regular maintenance will be implemented for equipment and vehicles	Secondary	Secondary	Combustion emissions and fugitive dust emissions generated during the construction of the Whale Tail Pit will be small compared to emissions during mining operations. Air dispersion modelling of the operations case will provide a conservative estimate of the wors case scenario, thereby eliminating the need to model construction-phase emissions separately.	Previously assessed - no change (see Section 4.3.3)

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	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
6	Mining of the Whale Tail Pit	Operations	Air	Blasting, stationary and mobile combustion sources, and fugitive dust from mining activities in the Whale Tail Pit can affect air quality.	The following environmental design and mitigation features will lessen the effects of mining activities on air quality: • Watering of pit roads and enforcing speed limits to suppress dust production. • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase. • Regular maintenance will be implemented for equipment and vehicles. • Enclosures are used to reduce fugitive emissions at the processing facility. • Adherence to the Incinerator and Composter Waste Management Plan (Volume 8, Appendix 8-B.5). • Exhaust emissions from non-road vehicles will be managed through purchasing equipment that meet emission standards. Exhaust emissions from non-road vehicles will be managed through regular and routine maintenance of vehicles.	Primary	Primary	Results of the air quality model (e.g., dust deposition) will be passed to other valued components with assessment endpoints that are affected by air quality and/or atmospheric deposition (e.g., water quality).	Previously assessed - no change (see Section 4.3.3)
7	Mining of the Whale Tail Pit	Operations	Air	Additional 3 years of processing and use of supporting infrastructure at the Meadowbank mine site and the existing AWAR for delivery of materials can continue to affect air quality	• Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1) • Enclosures are used to reduce fugitive emissions at the processing facility. • Adherence to the Incinerator and Composter Waste Management Plan (Volume 8, Appendix 8-B.5)	Primary	Primary	See Section 4.3.3.3 and 4.3.3.3	Results from monitoring results from 2014 to 2017, considering comparable Meadowbank Mill throughput using ore from the Expansion Project and the short operations phase, the spatial and temporal effects of an extension on regional air quality are considered low and reversible once the Expansion Project and Meadowbank Mill are decommissioned
8	Decommissioning of the Whale Tail Pit	Closure	Air	Stationary and mobile combustion sources, and fugitive dust from decommissioning activities can affect air quality.	The following environmental design and mitigation features will reduce the effects of Whale Tail Pit construction on air quality: • Best Management practices for controlling fugitive dust from decommissioning activities • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase • Regular maintenance will be implemented for equipment and vehicles	Secondary	Secondary	Combustion emissions and fugitive dust emissions generated during the decommissioning of the Whale Tail Pit will be small compared to emissions during mining operations. Air dispersion modelling of the operations case will provide a conservative estimate of the wors case scenario, thereby eliminating the need to model decommissioning-phase emissions separately.	Previously assessed - no change (see Section 4.3.3)
9	Upgrading of the haul road from the Whale Tail Pit to the Meadowbank Mine	Construction	Noise and Vibration	Noise emissions from construction equipment can increase ambient noise levels. Blasting can result in ground vibration and increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of haul road construction on noise and vibration: • Best Management practices for controlling equipment noise emissions, including use of silencers on all engines. • Regular maintenance will be implemented for equipment and vehicles.	Primary	Primary	See Section 4.4.3	No change - see Section 4.4.3; Results from modelling completed for the Expansion Project indicate that construction effects are predicted to be less than Alberta Energy Regulator (AER Directive 038 and ISO 9613-2 technical standard, and less than existing ambient noise levels within the RSA. Should blasting be required, the setbacks indicated per modelling will be adhered to and captured under the Meadowbank Mine Noise Monitoring and Abatement Plan.
10	Traffic on the haul road from the Whale Tail Pit to the Meadowbank Mine	Operations	Noise	Noise emissions from vehicles on the haul road can increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of haul road operations on noise: • Best Management practices for controlling equipment noise emissions, including use of silencers on all trucks. • Enforcing speed limits. • Regular maintenance will be implemented for equipment and vehicles.	Primary	Primary	See Section 4.4.3	No change - see Section 4.4.3
11	Construction of the Whale Tail Pit	Construction	Noise and Vibration	Noise emissions from construction equipment can increase ambient noise levels. Blasting can result in ground vibration and increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of pit construction on noise and vibration: • Best Management practices for controlling equipment noise emissions, including use of silencers on all engines • Regular maintenance will be implemented for equipment and vehicles. • Adherence to the Noise Monitoring and Abatement Plan (Volume 8, Appendix 8-E.7)	Secondary	Secondary	Noise emissions and blasting activities during pit construction are expected to be comparable or less than similar emissions and activities during pit operations. Modelling of the operations case will provide a conservative estimate of the maximum emissions/blasting scenario, thereby eliminating the need to mode pit construction.	No change - see Section 4.4.3

Table 3-C-1: Potential Pathway for Atmospheric Environment

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
12	Mining of the Whale Tail Pit	Operations	Noise and Vibration	Noise emissions from mining equipment can increase ambient noise levels. Blasting can result in ground vibration and increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of pit operations on noise and vibration: • Best Management practices for controlling equipment noise emissions, including use of silencers on all trucks. • Periodic far-field noise monitoring to validate modelling and confirm adherence with applicable limits. • Regular maintenance will be implemented for equipment and vehicles. • Adherence to the Noise Monitoring and Abatement Plan (Volume 8, Appendix 8-E.7).	Primary	Primary	See Section 4.4.3	No change - see Section 4.4.3 - noise emissions and blasting activities are expected to be comparable to that assessed for the Approved Project. Should blasting be required, the setbacks indicated per modelling will be adhered to and captured under the Meadowbank Mine Noise Monitoring and Abatement Plan
13	Additional 3 years of processing and use of supporting infrastructure at the Meadowbank mine site and the existing AWAR for delivery of materials.	Operations	Noise	Noise emissions from equipment and activities at the Meadowbank mine site can increase ambient noise levels.	The most recent version of the Meadowbank Noise Monitoring and Abatement Plan (Volume 8, Appendix 8-E.7) describes a large number of specific noise mitigation measures that are incorporated in the design and operation of the Meadowbank mine (e.g., avoid nighttime trucking, where possible; avoid prolonged idling; keep equipment in good condition; place crushers in sheltered/enclosed locations, where possible) and commits to regular noise monitoring twice each year to ensure that noise conforms to appropriate target levels.	Secondary	Secondary	Noise emissions from the Meadowbank mine site will not change as a result of the Whale Tail Pit - they will be extended for 3 additional years. Noise effects associated with the Meadowbank mine have been well-characterized as part of an earlier regulatory process (Cumberland 2005a; Cumberland 2005b) and regular noise monitoring has confirmed that representative noise from Meadowbank mine operations conforms to acceptable target levels (e.g., Agnico Eagle 2014; Agnico Eagle 2015). Given the noise level and temporal extent of the impact, this pathway was considered minor. The wildlife impact assessment has considered the temporal extension of noise from existing facilities and roads.	No change - see Section 4.4.3
14	Decommissioning the haul road from the Whale Tail Pit to the Meadowbank Mine	Closure	Noise	Noise emissions from equipment involved in decommissioning can increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of haul road decommissioning on noise: • Best Management practices for controlling equipment noise emissions, including use of silencers on all engines. • Regular maintenance will be implemented for equipment and vehicles.	Secondary	Secondary	Noise emissions during haul road decommissioning are expected to be comparable or less than similar emissions during haul road construction. Modelling of the construction case should provide a conservative estimate of the maximum emissions scenario, thereby eliminating the need to model haul road decommissioning.	No change - see Section 4.4.3
15	Decommissioning of the Whale Tale Pit	Closure	Noise	Noise emissions from equipment involved in decommissioning can increase ambient noise levels.	The following environmental design and mitigation features will reduce the effects of pit decommissioning on noise: • Best Management practices for controlling equipment noise emissions, including use of silencers on all engines. • Regular maintenance will be implemented for equipment and vehicles.	Secondary	Secondary	Noise emissions during pit decommissioning are expected to be comparable or less than similar emissions during pit operations. Modelling of the operations case should provide a conservative estimate of the maximum emissions scenario, thereby eliminating the need to model pit decommissioning.	No change - see Section 4.4.3

Table 3-C-2: Potential Pathway for Terrain, Permafrost, Soils, and Vegetation

	Project Activity	Project Phase	Valued Components: Terrain	Permafrost	Soils	Vegetation	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Mine Infrastructure Footprint (e.g. open pits, site roads, access roads)	Construction, Operations and Closure	X		X	X	Physical loss or alteration of terrain and soil from the Project footprint , impacting vegetation and available wildlife habitat.	Compact infrastructure arrangement is designed to reduce the overall Project footprint. Minimizing the haul road width and length by designing roads as narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. For example, minimum haul road widths are defined under the Mine*Health and Safety Act*. Limit the use high value habitats to only what is required (e.g., esker, shorelines). Locating borrow sites as close to the haul road as practica Minimizing borrow areas by using suitable waste rock (e.g., Vault Pit waste rock) to the greatest extent practicable Restoring contours and reclaiming habitat after closure Avoid new disturbances by using existing ones where possible	Primary	Primary (Soil) Primary (Vegetation)	See Section 5.3.3.1 for terrain and soils and Section 5.4.3.1 for vegetation	No change - see Section 5.3.3.1 (Soil) No change - see Section 5.4.3 (Vegetation)
2	Mine Infrastructure Footprint (e.g. open pits, site roads, access roads)	Construction, Operations and Closure		X	X	X	Mine infrastructure footprint: Loss or alteration of local flows, drainage patterns (distribution), and drainage areas from the Project footprint and haul road can cause changes to soils, and vegetation.	Use of design features (i.e., dams, drainages, dykes, and diversions) that reduce changes to local flows, drainage patterns, and drainage areas. Implement slope stability criteria to manage erosion. Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks), where needed.	Secondary (Permafrost and Soils); Primary (Vegetation)	No linkage (Soil) Primary (Vegetation)	Flooding of terrestrial vegetation is expected to reach a maximum of 165.9 ha in July 2020 and continue to May 2022 (Golder 2016), affecting soil moisture. At post-closure, it is expected that hydrology conditions would return to baseline (Volume 6, Section 6.3). Due to the short nature and the limited area with expected flooding effects to permafrost and soil are expected to be minor. There is limited erosion potential because slope stability criteria will be implemented. See Section 5.4.3.1.2 for assessment of effect to vegetation.	Previously assessed - no change; see line 1 of this table and Section 5.3.3.1 (Soil) No change - see Section 5.4.3 (Vegetation)
3	Mine Infrastructure Footprint (e.g. open pits, site roads,	Construction		X		X	Physical loss or alteration of permafrost from the Project footprint can lead to changes in vegetation ecosystem structure and composition	Compact infrastructure arrangement is designed to reduce the overall Project footprint. Mine site infrastructure (buildings) foundations will be built on bedrock or pillars to minimize Project induced thawing of permafrost Short construction period for mine infrastructure Design roads as narrow as possible, while maintaining safe construction and operation practices and meeting legislated requirements. For example, minimum haul road widths are defined under the *Mine Health and Safety Act*. Design and construct roads using thaw-stable construction fills to minimize frost effects.	Secondary	No linkage	Environmental Design and Mitigation Features are expected to minimize permafrost loss due to the Project footprint during construction, given the short duration. Changes in water regimes and soil moisture associated with loss of permafrost can strongly influence plant species composition, and vegetation community structure. Measures will be taken to mitigate changes in hydrological characteristics through project design (e.g., minimizing project footprint) and though the reclamation of a stable closure landscape. With the minimal loss of permafrost during construction, it is expected that there will be minimal effect on vegetation.	Previously assessed - no change
4	Earthworks: Drilling, blasting, grading, trenching, excavation and backfilling, crushing activities, and dike construction	Construction	X	X	X		Physical changes, including degradation to the permafrost terrain and soils in the area of the mine site footprint and supporting infrastructure (i.e., haul roads)	Minimize footprint areas for stripping and removal of material. Use appropriately designed structural fill and thicknessto maintain and promote permafrost conditions. Where possible, stockpiling of rock and fill from quarries and borrow sites will be placed such that surface water is not diverted through the piles. Maximum quarry depths of 3 m are currently planned. Minimum setback distance of 31 m from the ordinary high water mark of waterbodies. Drainage from quarries or borrow sources will not flow directly into any waterbodies or watercourses. The road alignment has been chosen to avoid areas that are ice-rich and, therefore, more susceptible to disturbance. Thaw-stable construction fills will be used to construct the haul road. Fill thickness is designed to preserve the permafrost and promote permafrost growth into the thaw-stable road fills. Road fill material will be placed directly over the existing soil layer without cutting, stripping, or grubbing to avoid disturbing the subgrade materials. Placement of much of the road construction materials during winter will minimize disturbance to the permafrost Thick drifted snow greater than 1 m thick will be removed before the road fills are placed. Minimize depth of excavations to limit impact on active layer. Monitoring of the Whale Tail Dike will be undertaken to understand the hydraulic and thermal behaviour of the dike during filling Whale Tail (South Basin)	Primary (Terrain and Soils)	No linkage (Terrain and Soils)	Effects from earthworks in considered minor due to the implementation of environmental design and mitigation features. The construction and operation of the open pit, water management infrastructure is covered in separate pathways. See Section 5.3.3.1 under heading." and "Physical loss or permanent alteration of terrain and soils within the Project footprint…." Effects for vegetation are covered under the permanent lost of the Project footprint (see line 1 of this table).	Previously assessed - no change; see line 1 of this table and Section 5.3.3.1
5	Earthworks: Drilling, blasting, grading, trenching, excavation and backfilling, crushing activities, and dike construction	Construction		X			Physical changes to permafrost and active layer by quarry or borrow source excavation. Degradation of rock and soil slopes in proposed borrow sites due to annual freeze-thaw processes.	Minimize depth of quarrying to limit impact on active layer. Maximum quarry depths of 3 m are currently planned. Appropriate design of quarry walls to promote stability, and to minimize annual slope degradation Quarries will be shallow excavations and will be closed on completion using current industry standards and practices Appropriate design of quarries to manage water and minimize ponding of water within the quarries which would result in a deeper active layer.	Secondary	No linkage	Effects are expected to be minor because the active layer and permafrost table will equilibrate to final quarry/borrow source shape and profile.	Previously assessed - no change
6	Earthworks: Drilling, blasting, grading, trenching, excavation and backfilling, crushing activities, and dike construction	Construction			X	X	Soil disturbance, stockpiling and transport can change physical, biological, and chemical properties of soils. Site clearing, contouring, excavation and decommissioning can cause admixing, compaction, and soil erosion and changes soil quality.	The roads will be as narrow as possible, while maintaining safe construction and operation practices. Compact infrastructure arrangement is designed to reduce the overall Project footprint. Most of the overburden will be placed in the Waste Rock Storage Facility, except for a small amount used in operations, which will only be temporarily stockpiled. Overburden will be piled at the base of the Whale Tail WRSF and surrounded with waste rock to stabilize the material and then all the overburden stockpiled in the Whale Tail WRSF will be eventually covered with waste rock. Erosion control practices on steep slopes to limit wind and water erosion.	Primary (Soil); Secondary (Vegetation)	Primary (Soil) Secondary (Vegetation)	See Section 5.3.3.1 for soil assessment. Secondary for vegetation because soil disturbance and stockpiling can change physical, biological or chemical properties of soil, increase erosion potential and affect vegetation quantity and quality. However, mitigation measures will be implemented to minimize Project footprint, and keep vehicles off areas not designated for vehicles, and erosion control practices on steep slopes will limit wind and water erosion.	See Section 5.3.3.1

Table 3-C-2: Potential Pathway for Terrain, Permafrost, Soils, and Vegetation

	Project Activity	Project Phase	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
			Terrain	Permafrost	Soils	Vegetation						
7	Earthworks: Drilling, blasting, grading, trenching, excavation and backfilling, crushing activities, and dike construction	Construction	X	X	X		Loss or alteration of local flows, drainage patterns (distribution), and drainage areas from quarries, borrows or haul road footprint can cause changes to terrain, permafrost and soils	Use of culverts and bridges that reduce changes to local flows, drainage patterns and drainage areas. Where possible, stockpiling of rock and fill from quarries and borrow sites will be placed such that surface water is not diverted through the piles with runoff to surface waterbodies. Minimum setback distance of 31 m from the ordinary high water mark of waterbodies. Drainage from quarries will not flow directly into any waterbodies or watercourses Borrow areas will be will be closed on completion using best management practices. Road design includes the use of localized drainage culverts to control and manage drainage adjacent to and under the roa	No Linkage	No linkage	Through the implementation of the Mine Site Surface Water Management Plan and Environmental Design Features and Mitigations outlined here, there is expected to be negligible alteration of drainage paths that would impact soils, terrain or permafrost	Previously assessed - no change
8	Mine Site Facilities Construction	Construction		X			Physical changes to permafrost due to temporary building footprint area and height	Minimize footprint area and limit exposure time.	No Linkage	No linkage	Buildings will be removed once construction of the permanent buildings are complete and the construction period is expected to be less than two years	Previously assessed - no change
9	Mine Site Facilities Construction	Construction, Operations	X	X			Physical gain of terrain and permafrost within the structural fills used to construct site facilities and infrastructure.	Minimize footprint areas of facilities and infrastructure while maintaining safe construction and operation practices. Use of thaw-stable materials in structural fills to support site facilities and infrastructure. Minimize footprint of roads while maintaining safe construction and operation practices. Use appropriate engineering design and construction practices for permafrost environments, including elevated structures where required to minimiz Submission of all design drawings to the Nunavut Water Board for approval, prior to construction.	No Linkage	No linkage	Thaw-stable structural fills will promote the development of permafrost within the fill materials and reduce the potential for permafrost degradation of thaw-unstable materials but changes will be negligible.	Previously assessed - no change
10	Mine Site Facilities Construction	Construction	X		X	X	Use of potential acid generating materials for road building materials and other supporting infrastructure can affect terrain and soil quality and subsequently vegetation.	Use of non-acid generating material for road construction.	No Linkage	No linkage	Acid generating materials will not be used for road construction; therefore there is no link to valued components.	Previously assessed - no change
11	Mine Site Facilities Construction	Construction		X			Placement of fill materials during the summer could insulate warm temperatures in subgrade soils leading to permafrost degradation. Use of structural fill pads for facilities; construction of site roads.	Where possible, use thaw-stable road fills for construction. Fill thickness is designed to preserve the permafrost and promote permafrost growth into the thaw-stable road fills Road fill material will be placed directly over the existing soil layer without cutting, stripping, or grubbing to avoid disturbing the subgrade soils. Placement of the road construction materials during winter will minimize disturbance to the permafrost Thick drifted snow greater than 1 m thick will be removed before the road fills are placed.	No Linkage	No linkage	To the greatest extent possible, Project components will be constructed in winter when the subgrade soils are frozen to prevent insulation of the thawed active layer therefore there is no link to the valued components.	Previously assessed - no change
12	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Operations		X			Snow clearing and stockpiling may result in the insulation of the active layer, incomplete freezing of the active layer, and subsequent thaw settlement.	Stockpile snow on thaw-stable materials, or in areas that are insensitive to tha settlement. Use appropriate drainage and water diversion structures to minimize water ponding during thaw. Stock pile snow on thaw-stable materials Use snow fencing where appropriate to minimize snow clearing requirements.	Secondary	No linkage	Thaw consolidation or settlement may result in a measurable but minor environmental change to permafrost, with no link to other valued components.	Previously assessed - no change
13	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Operations		X			Use of heavy equipment, vehicle circulation, and helicopte use may cause degradation of permafrost due to traffic frequency, vehicle weight.	Use of appropriate structural fills and thickness for site roads, lay-down areas, and pads.	No Linkage	No linkage	Use of appropriate structural fills and thickness for site roads, lay-down areas, and pads will negate changes to permafrost.	Previously assessed - no change
14	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Operations		X			Road use and maintenance activities: Permafrost degradation and thaw settlement along existing and haul road edges due to snow drifting and snow accumulation in lee of road; snow accumulation along toe of road shoulders from winter plowing; and pooling of water and ice lens growth.	Use of culverts and bridges that reduce changes to local flows, drainage patterns and drainage areas. Where possible, construct road along exposed ridge lines to reduce potential snow accumulation. Where possible, use thaw-stable road fills for construction. Annual road maintenance as required.	Secondary	No linkage	Subgrade soil near the toe of site roads and the haul road may experience deeper thaw penetration during each subsequent spring/summer season, which may lead to thaw consolidation. Thaw consolidation in ice rich soil at the toe of an embankment will result in the formation of tension cracks and small grabens inside the shoulder area. Thaw consolidation may result in a measurable, but minor environmental change, and is therefore considered secondary pathway.	Previously assessed - no change
15	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Construction, Operations			X	X	Air emissions, dust deposition, or chemical contamination on terrain, soils, and vegetation can potentially change the quality and/or chemical properties of soil and effecting vegetation.	Implement dust control measures on mine roads, when required. Road surfaces will be maintained through grading and the addition of granular material. Equipment and vehicles will comply with relevant non-road emission criteria at that time of purchase Regular maintenance of equipment and vehicles will be conducted to meet emission standards. Use of non-acid generating materials for road bed and fills. Enforcing speed limits will assist in reducing dust emissions Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1) Implement the spill plan for potential chemical spills, including hydrocarbons. Complete a Wildlife Screening Level Risk Assessment every 3 years	Secondary (Soil); Primary (Vegetation)	No linkage (Soil) Primary (Vegetation)	Environmental design features and mitigation have been incorporated into the Project to reduce potential effects from dust deposition. Air quality modelling results indicate maximum deposition rates of 0.38 kiloequivalent per hectare per year (keq/ha/y) within the Project Lease Boundary. While the 0.38 keq/ha/y maximum potential acid input (PAI) is predicted to be above the critical load of 0.25 keq/ha/y for sensitive soils (CASA 1996), it is expected that sensitive soils would likely not be affected by acid deposition relative to baseline conditions due to the short duration of emission (7 years). Therefore, metal emissions and PAI effects to soil are expected to be negligible to minor. Air missions generated during construction, operations and closure of the Whale Tail mine will be relatively small; therefore metal emissions and PAI effects to vegetation are expected to be negligible. Dust deposition is anticipated to affect vegetation quantity and quality within 100 m of the haul road, this is assessed in Section 5.4. The 2015 Air Quality and Dustfall Monitoring Report for the Meadowbank mine (Agnico Eagle 2015x) has shown a continual decline in dustfall exceedances on an annual basis with only 1 exceedance out of 48 in 2015. In addition, there have been no observed changes in soil/plant metal concentrations from the Wildlife Screening Level Risk Assessment (Agnico Eagle 2015x).	Previously assessed - no change (Soil) No change - see Section 5.4.3 (Vegetation)

Table 3-C-2: Potential Pathway for Terrain, Permafrost, Soils, and Vegetation

	Project Activity	Project Phase	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
			Terrain	Permafrost	Soils	Vegetation						
16	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Construction				X	Dust deposition may cover vegetation and lead to physical and/or physiological damage	Roads are designed as narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. Minimum haul road widths are defined under the Mine's Act. Refer to Item 15 for additional mitigation measure	Primary (Vegetation)	Primary (Vegetation)	Dust deposition is anticipated to affect vegetation quantity and quality within 100 m of the haul road, this is assessed in Section 5.4.	No change - see Section 5.4.3
17	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Operations	X	X			Physical alteration of terrain and permafrost within and beneath the tailings storage facility.	Use of existing facility at the Meadowbank Mine and maintain the same approved footprint. Continue to use appropriate facilities management methods to reduce the amount of ice trapped within the facility. Use appropriate deposition planning (i.e., tailings placed in layers to promote freezing).	No Linkage	No linkage	Existing tailings facility at Meadowbank Mine will be used and raised. This is anticipated to have no additional effect on permafrost. Current conditions of the permafrost and current predictions of permafrost condition at Meadowbank Mine are expected to be maintained.	Previously assessed - no change
18	Mine Site Operations and Maintenance, including use of existing facilities and AWAR				X	X	Surface water runoff from the mine facilities area can affect surface water quality, soil, and vegetation	Water Management Plan is approved and adhered to at existing facilities and Water Management Plan specific to the Whale Tail Pit areas has been developed and these plans have considered the containment and management of contact site water. Seepage and runoff from the waste rock storage facility will be managed via the Whale Tail Waste Rock Storage Facility Pond where the contact water will then be pumped to the Whale Tail Attenuation Pond for further treatment. Surface runoff seeping into the open pits will be collected in in-pit sumps. The collected water will be managed as contact water (collected, contained, monitored and treated if required to meet water license discharge standards before release). Natural construction materials will be tested before they are used to confirm that they are not potential acid draining or potential sources of metal leaching.	Secondary (Soil and Vegetation)	No linkage (Soil) Secondary (Vegetation)	Suspended solids in surface water runoff from the mine footprint can contain chemicals, which can change soil quality. Weathering of waste rock (e.g., waste rock spoils, coal stockpiles) may also cause changes to soil quality. However with the application of Water Management Plan and monitoring of sediment chemistry, dust, effects are expected to be minor. Water chemistry will also be monitored to mitigate effects to the receiving aquatic environment. Surface water runoff and seepage will be intercepted in diversion ditches and treated before release into the environment and water releases will be within the limits dictated by the water licence. The effects of sedimentation from surface runoff on soils from active mine area may be similar to the effects of dust deposition on soil quality (i.e. minor). Any effects to the receiving environment will be confined to the area surrounding or downstream of the Project. Subsequently the effect to soils and vegetation while potentially measurable is expected to be minor with th implementation of mitigation measures.	Previously assessed - no change (Soil)
19	Mine Site Operations and Maintenance, including use of existing facilities and AWAR					X	Introduction of non-native plant species can affect native vegetation	Inspection of newly shipped equipment/vehicles and clean as required. Enforce DOE guidelines regarding non-native plant species and incorporate protocols for monitoring non-native plant species	No Linkage	No linkage	No Linkage for vegetation with the implementation of best practices. Currently no evidence at the Meadowbank Mine that non-native plants are of concern.	Previously assessed - no change
20	Mine Site Operations and Maintenance, including use of existing facilities and AWAR	Construction, Operations,				X	Off-road vehicle access: Vehicles accidentally or purposefully leaving proposed exploration access road during and after construction ATV, and snowmobile use in landscape surrounding the proposed road	Restricting construction to designated roads. Designating and clearly delineating temporary workspaces during construction Clearly marking road edges Limiting vehicle access to road	No Linkage	No linkage	Off-road vehicle use during construction, operations, or closure may directly affect vegetation quantity. Restricting access to designated roads, and workspaces, and clearly marking road edges will mitigate impacts to vegetation. Off-road vehicle use on the existing AWAR is not expected to change from current practices and no additional effects are expected.	Previously assessed - no change
21	Waste Rock Storage Areas and Stockpiles	Operations	X	X			Physical alteration of terrain and permafrost within and beneath the waste rock piles.	Seepage and runoff from the waste rock storage facility will be managed via the Whale Tail Waste Rock Storage Facility Pond where the contact water will then be pumped to the Whale Tail Attenuation Pond for further treatment. This will minimize ponding around the facility. Where possible begin construction during winter months, when active layer is frozen. Place waste rock in lifts to promote freezing of pile.	Secondary	No linkage	Foundations of waste rock storage facilities currently frozen and will remain frozen as waste rock is placed. Waste rock piles will also freeze with time resulting in improved stability. The 2014 Meadowbank Annual Report state that below approximately 5.6 m from the surface the temperature at the Meadowbank Waste Rock Storage Facility remains below 0ºC all year long. Therefore minor changes only are expected to permafrost and terrain.	Previously assessed - no change
22	Waste Rock Storage Areas and Stockpiles	Operations			X	X	Leaching of dissolved metals from waste rock in the waste rock/overburden storage facilities may cause changes to water quality and soils, which may affect vegetation	Waste rock management procedures developed for potentially problematic waste rock/overburden material. Implement the Mine Waste Rock Management Plan (Volume 8, Appendix 8-A.1). Use of non-acid generating material at any watercourse crossings. Testing will verify lack of acid rock drainage and metal leaching potential. Any potentially acid generating (PAG) or high metal leaching waste rock will be segregated at source and placed into designated areas within the waste rock storage facility. Runoff and lateral seepage from the waste rock/overburden facilities will not be released directly to the environment during pre-production or operations. Use of climate control strategies for the development of the waste rock storage facility to act as a natural control to reduce the production of acid mine drainag and metal leachate. Over time potential PAG and high metal leaching rock will become permanently frozen with an active cover layer of non-PAG rock.	Secondary	No linkage	Changes to ground and surface water quality associated with leaching of constituents from waste rock and mining areas (e.g., road surfaces and stockpiles) could affect soil quality and vegetation quantity and quality. Changes to water quality are expected to be minor (Table 3-C-6). Waste rock storage facilities are located above permafrost Techniques to design the waste rock spoil to minimize the potential for the leaching of chemicals from waste rock and other mining areas will be implemented, including the diversion of clean runoff around mining areas, and treatment to remove suspended solids, which will result in negligible to minor changes to soil and vegetation.	Previously assessed - no change
23	Water Management Infrastructure	Construction, Operations		X			Ponding of water, or high volume flow during freshet may result in permafrost degradation due to thickening of the active layer. Water diversion and discharge may result in soil erosion.	Minimize ponding of water adjacent to roads, infrastructure, and facilities by promoting drainage and installing appropriate water diversion structures. Use appropriate water management methods to avoid water ponding and to control high volume potentially erosive flows. Manage snow accumulation locally	Secondary	No linkage	Snow acts as an insulating layer to the active layer and can restrict the deep penetration of the freezing front through the active layer during winter Over time this may result in deepening of the active layer at the toe of slopes but changes will be negligible.	Previously assessed - no change
24	Water Management Infrastructure	Operations	X	X	X		Freezing and plugging of culverts in the winter may result in: inadequate drainage during spring thaw and freshet, over-topping and erosion of road surface releasing silt ont terrain and soils; pooling of water adjacent to road flanks; potential instability and thaw settlement of road shoulders thaw settlement beneath and adjacent to culverts; and ice lens growth.	Use appropriate culvert design based on the site specific hydraulics. Where deemed appropriate, use of staggered culvert configuration to promote drainage during spring thaw and freshet. Regular inspection of the road to identify any areas where ponding of water along the road represents a risk, and installing additional culverts or drains to alleviate the risk.	No Linkage	No linkage	The use Environmental Design Features and Mitigation remove the linkage between freezing and plugging of culverts and impacts to permafrost, terrain and soils.	Previously assessed - no change

Table 3-C-2: Potential Pathway for Terrain, Permafrost, Soils, and Vegetation

	Project Activity	Project Phase	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
			Terrain	Permafrost	Soils	Vegetation						
25	Water Management Infrastructure			X	X	X	Dewatering of lakes and diversion of water may change downstream flows and water levels, affecting permafrost, soils, vegetation, and wildlife habitat.	Pumped discharge to receiving lake will only occur while water quality discharge criteria are met.	Primary (Vegetation); Secondary (Soils, Permafrost)	No linkage (Soils, Permafrost) Primary (Vegetation)	Vegetation is assessed in Section 5.4 because changes in soil moisture regime may result in changes to species abundance and diversity. Due to the short nature and the limited area with expected flooding effects to permafrost and soil are expected to be minor.	Previously assessed - no change (Soil) No change - see Section 5.4.3 (Vegetation)
								Pumped discharge will be directed to the lake environment, and not directly to outlets, to attenuate flow changes				
								Shoreline areas susceptible to extensive erosion will be addressed by appropriate erosion protection measuresmitigation measures based on adaptive management, or a combination of both, to reduce erosion and associated re-suspension of fine sediment				
								Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms				
26	Water Management Infrastructure				X	X	Cross-drainage structures for the mine site roads, may alter stream hydraulics and geomorphology, and can alter soils, vegetation, and wildlife habitat	Pumped discharge will be directed to the lake environment, and not directly to outlets, to attenuate flow changes	Secondary	No linkage	Changes in drainage flows and surface water levels can strongly influence plant species composition, and vegetation community structure. Measures will be taken to mitigate changes in hydrological characteristics through project design (minimizing project footprint) and though the reclamation of a stable closure landscape subsequently changes to soils and vegetation are considered minor.	Previously assessed - no change
								Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms				
					X			Cross-drainage structures will be designed for a 1:10 year precipitation event to meet DFO requirements for fish passage				
								Use of staggered culvert configuration, and removal of snow at the culvert inlet and outlet prior to the freshet to promote drainage during spring thaw and freshet.				
								Regular inspection of the road to identify any areas where ponding of water along the road represents a risk, and installing additional culverts to alleviate the risk.				
27	Open Pits	Operations	X	X			Open Pit mining result in physical loss or permanent alteration of terrain, soils, and permafrost within the mined out areas. Permafrost degradation and retreat due to excavation of open pits and potential groundwater inflows to the open pit during operations if depth extends below the base of permafrost.	Appropriate design of open pit walls to promote stability, and to minimize annu slope degradation	Primary	Primary	See Section 5.3.3.1	See line 1 of this table and Section 5.3.3.1
								Water inflows to the pit will require sumps and be pumped to the Attenuation Pond.				
								Use appropriate back filling methods for the placement of fill material. Initial permafrost retreat that may occur during the placement of backfill may be replaced by permafrost re-establishing within the backfilled areas.				
28	Open Pits	Construction, Operations	X	X			Dike construction, dewatering and open pit mining may result in terrain instability within the open pit mine due to exposure of sediments during dewatering and excavation of slopes during operation. Permafrost degradation may cause unstable slopes.	Appropriate design of open pit walls to promote stability, and to minimize annu slope degradation.	Secondary	No linkage	The Environmental Design Features and Mitigation will minimize the likelihood and extent of changes to terrain or permafrost. Therefore effects are expected to be negligible.	Previously assessed - no change
								Use of appropriate currently accepted permafrost engineering practices as part of dike construction and drawdown for open pit mine.				
	Underground mining	Construction, Operations		X			Underground mining resulting in physical loss or permanent alteration of permafrost within the mined out areas. Permafrost degradation and retreat due to excavation of the mined out areas coupled with the inflow of groundwater to the underground operations, as the proposed underground operation will extend below the permafrost.	Appropriate design of main mine shaft to circulate cold air and preserve the frozen state of the surrounding ground.	Not applicable - not assessed	Primary	Not applicable	See Section 5.3.3.1
								Appropriate design of underground mine shafts to promote stability.				
								Insulate water lines as they produce heat and can thaw adjacent frozen ground.				
								Water inflows to the underground excavations will require sumps and be pumped to the Attenuation Pond.				
								Use of appropriate currently accepted permafrost engineering practices for underground mines in permafrost zone.				
29	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage Area)	Construction, Operations		X			Use of petroleum products, and maintenance of vehicles may result in hydrocarbon spills infiltrating the active layer.	Appropriate operations and maintenance procedures in place for the operation of the fuel tank farm.	Secondary	No linkage	Environmental Design Features and Mitigation minimize the link between the active layer and spills.	Previously assessed - no change
								Appropriate re-fueling areas and procedures to minimize and capture spills.				
								Implement the spill plan for potential chemical spills, including hydrocarbons.				
30	Fuel Storage and use (includes Chemical and Hazardous material Storage and	Construction, Operations		X			Physical alteration of permafrost from latent heat of petroleum and fuel oil stored in tank farm.	Appropriate design and construction of fuel tank farm foundations using thaw-stable materials and to thickness' to promote permafrost growth and stability.	No Linkage	No linkage	Environmental Design Features and Mitigation negate the link to permafrost.	Previously assessed - no change
								Appropriate site maintenance buildings will be constructed.				
31	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage	Construction,	X	X	X		Permanent alteration of terrain, soils, and permafrost beneath the structural fills used to construct fuel tanks farm.	Appropriate design and construction of fuel tank farm foundations using thaw-stable materials and to thickness to limit permafrost degradation.	No Linkage	No linkage	Environmental Design Features and Mitigation negate the link to permafrost, terrain, and soils.	Previously assessed - no change
								Implement the spill plan for potential chemical spills, including hydrocarbons.				

Table 3-C-2: Potential Pathway for Terrain, Permafrost, Soils, and Vegetation

			Valued Components								
	Project Activity	Project Phase	Terrain	Permafrost	Soils	Vegetation	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
32	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage Area)	Construction, Operations, Closure			X	X	Spills on the mine site or along the roads can affect surface water quality, soils, and vegetation	Equipment will be re-fueled, serviced, and washed away from stream crossing and on impermeable pads wherever possible. There will be a wash bay in the maintenance shop Implement emergency response and spill contingency plan. Vehicles properly loaded and loads appropriately covered where necessary. Hazardous materials and fuel will be stored according to regulatory requirements to protect the environment and worker Individuals working on site and handling hazardous materials will be trained to do so (e.g., WHMIS) Soils and rock contaminated by light hydrocarbons and from petroleum spills will be excavated and backhauled to the Meadowbank Mine. Soils contaminated with heavy hydrocarbons will be segregated, packaged and shipped to the south from the mine site for proper treatment and disposal. Fuel storage tanks will be situated in a lined and bermed containment area capable of containing 110 per cent of the contents of the largest tank. The storage tanks and fuel-dispensing systems will be constructed in accordance with current regulatory requirements and fire regulations. Fuel will be transported year-round by double-walled tanker trucks to the Whale Tail tank farm. Construction and mining equipment, machinery, and vehicles will be regularly maintained Ready access to an emergency spill clean-up kit for cleaning-up any spills.	No Linkage	No linkage	Chemical or hazardous material spills (e.g., petroleum products, reagents, explosives) on the mine site or haul road can affect vegetation quantity and quality. The Hazardous Materials and Waste Management Plan will be implemented to limit the frequency and extent of spills that result from Project activities.	Previously assessed - no change
33	Waste Management: Landfill, Landfarm, Sewage Treatment	Operation	X	X			Sewage Treatment and disposal: Physical alteration of terrain, soils, and permafrost due to earthworks, facilities construction, and ground disturbance.	Appropriately designed facility to contain and manage sewage. Minimize ground disturbance. Use appropriate engineering design and construction practices for permafrost environments.	Secondary	No linkage	Environmental Design Features and Mitigation negate the link to permafrost and terrain. See Effect pathway for impacts from the loss of the project footprint.	Previously assessed - no change
34	Waste Management: Landfill, Landfarm, Sewage Treatment	Operation		X			Management of the landfill may degrade permafrost.	Use appropriate waste management methods to operate the facilities within the proposed waste rock piles, to promote permafrost growth. Operate the landfill in an area of the waste rock pile that will not result in permafrost degradation.	No Linkage	No linkage	Landfill will be managed and operated within the waste rock storage facility. Permafrost will aggrade into the waste rock facility over time.	Previously assessed - no change
35	Mine Site Decommissioning	Closure		X			Flooding of pit at closure has the potential to increase the size of the existing talik below Whale Tail Pit. The talik may be closed, or it may be open, depending on the depth of the pit and the size of the pit lake that is formed.	Monitor pit lake water chemistry and temperature.	Primary	Primary	See Section 5.3.3.1	See Section 5.3.3.1
36	Mine Site Decommissioning	Closure	X	X			Demolition and removal of mine infrastructure: Physical gain of terrain and permafrost within the structural fills used to construct project components.	Following an approved Closure and Reclamation Plan, use appropriate demolition methods to remove mine site facilities and to render infrastructure impassible.	No Linkage	No linkage	Building components (concrete, steel) will be dismantled once mining ceases.	Previously assessed - no change
37	Mine Site Decommissioning	Closure		X			Ponding of water adjacent to facilities and infrastructure may degrade permafrost.	Water management and appropriate drainage and diversion around facilities; infrastructure graded to promote site drainage Adherence to an approved closure and reclamation plan at the time of closure	No Linkage	No linkage	Covered by Environmental Design Features and Mitigation	Previously assessed - no change
38	Mine Site Decommissioning	Closure		X	X		Ponding of water adjacent to site roads may degrade permafrost. Sediment and contaminant releases during removal of culverts can affect downstream soil and permafrost	Roads will be scarified, and water barred to promote drainage of water and limit ponding. Where possible, in-stream work will be limited to when watercourses are not flowing for ephemeral watercourses or when watercourses are frozen.	No Linkage	No linkage	Site roads and the main haul road will be decommissioned	Previously assessed - no change
39	Mine Site Decommissioning	Closure		X	X		Ripping of road surface and slopes can result in dust emissions and affect down-wind soil and terrain.	Minimize activity using appropriate equipment and re-establish drainage paths and promote permafrost re-equilibration within the decommissioned road bed. Make road surfaces impassable by vehicular traffic	No Linkage	No linkage	Environmental Design Features and Mitigation negate the link to permafrost and soils.	Previously assessed - no change
41	Mine Site Decommissioning	Closure		X	X	X	Residual ground disturbance can cause permanent loss and alteration of permafrost and soil	Limited Project footprint size. Implement a Closure and Reclamation Plan.	Primary	Primary	See Section 5.3.3.1 and 5.4	See Section 5.3.3.1
42	Mine Site Decommissioning	Closure			X	X	Long-term seepage from the facilities can change groundwater and surface water quality, which can affect soils and vegetation	Water quality will be monitored on site until it meets approved criteria for release. Landfill will be covered with waste rock pile and the waste rock pile will be monitored and water will be treated until it meets approved criteria for release the natural environment. Implement an approved Closure and Reclamation Plan.	Secondary	No linkage	Changes to ground water quality associated with long-term seepage from facilities could affect soil and vegetation quantity and quality. Techniques to minimize the potential seepage will be implemented, including maintaining activity at the sewage treatment plant for an initial period during decommissioning, capping the landfill with waste rock, and the implementation of the Closure and Reclamation Plan.	Previously assessed - no change

Table 3-C-3: Potential Pathway for Terrestrial Wildlife and Birds

Project Phase	Valued Components (Approved Project)							Valued Components (Expansion Project)							Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Rationale	Expansion Project - Rationale
	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals				
Construction, Operations	P	S	S	S	S	P	S	P	S	S	S	S	P	S	Direct loss and fragmentation of wildlife habitat from the Project footprint	Compact arrangement of Project infrastructure to reduce the overall project footprint. Where possible, clearing of vegetation would take place outside the migratory bird breeding season. Design roads as low and narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. See the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1) for additional details. Surveys of proposed granular sources for dens and nests will take place prior to construction. Detailed mitigation and monitoring is provided in the TEMP (Volume 8, Appendix 8-E.9).	Primary for caribou and upland birds and assessed in Section 5.5.7. This pathway is secondary for muskox, predatory mammals, raptors, water birds, and small mammals because their low population density and low percentage of habitat lost compared to the available habitat.	No change - revegetation of disturbed areas during closure and post-closure starting in 2026 will progressively offset lost habitat and reduce residual effects. Primary for caribou and upland birds and assessed in Section 5.5.3.
Construction, Operations	P	S	S	N	N	N	S	P	S	S	N	N	N	S	Barriers to migration, which may affect population connectivity and distribution	Wildlife will have the right-of-way and vehicle traffic will be minimized according to the TEMP. Maximum speed limits of 50 km/hr will be enforced. Wildlife log will be maintained. Roads will have low profiles to avoid barriers. Detailed mitigation is provided in the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1). Both mitigation and monitoring are provided in the TEMP (Volume 8, Appendix 8-E.9).	Primary for caribou and assessed in Section 5.5.7. This pathway does not have linkage to birds, as their movement is not restricted by roads, or small mammals as they will experience habitat loss but not barriers to movement. This is assessed as a secondary pathway for muskox as they are non-migratory and are in low abundance, predatory mammals who have large seasonal movements but low abundance and their use of the existing AWAR as a travel corridor has led to few mortalities (Gebauer et al. 2015).	No change - the mitigation employed for the Approved Project for design of components that may disrupt movement of caribou will be equally effective for the Expansion Project. Primary for caribou assessed in Section 5.5.3.
Construction, Operations, Closure, Post-closure	S	S	S	N	N	N	S	S	S	S	N	N	N	S	Physical hazards, causing injury or mortality to individual animals, can affect population sizes	Wildlife will have the right-of way. Traffic speeds will be enforced (maximum of 50 km/h on the haul road). Reduce speed to 30 km/h when caribou are observed from the haul road and Level 3 caribou mitigation is triggered as per the TEMP All employees will be provided with wildlife environmental awareness training. Drivers will be alerted when caribou are observed near the haul road. The presence of wildlife will be monitored and communicated to site personnel. Report all mine related injuries and mortalities. Detailed mitigation is included in the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1) and TEMP (Volume 8, Appendix 8-E.9). Littering and feeding of wildlife will be prohibited. Removal of physical hazards at closure and post-closure will be consistent with Meadowbank Mine and a new Interim Closure Plan for Whale Tail will be developed.	Pathway is assessed as no linkage for birds and secondary for caribou and muskox, predatory and small mammals because a few mortalities have occurred at Meadowbank Mine . No caribou or muskox have been killed at the Meadowbank Mine as a result of mining activity and none are expected at the Whale Tail Pit. Caribou have been killed on the AWAR but adaptive management has reduced the hazard from vehicle collisions by closing the AWAR during peak migrations. The same approach will be applied to the haul road. Wolverine and wolf have been killed at the Meadowbank Mine but no clear pattern has emerged. Each incident is investigated, reported and adaptive management has been applied to reduce these incidents. Continued monitoring of wildlife activity on site and adaptive management of issues as they arise will continue to mitigate any effect to wildlife survival and reproduction.	No change
Construction, Operations	N	N	N	N	S	N	N	N	N	N	N	S	N	N	Fish-out may lead to diving water bird mortality in fish nets	Based on Agnico Eagle experience at Meadowbank Mine fish-out water bird mortalities have not occurred and will continue to use same consistent practices	Water bird mortalities that result from the fish-out will be reported to Environment Canada (EC). While some mortalities are likely, they will be limited to the fish-out lakes. Thus, there may be local effects to water bird survival and reproduction due to drowning in fish nets and removal of the fish resource.	No change
Construction, Operations	N	N	N	N	P	P	N	N	N	N	N	P	P	N	Destruction of nests and flooding from construction activities including increased flows or water levels can increase risk of mortality to individual birds, which can affect population sizes	Land will be cleared outside the breeding season (June 1 to August 1) Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms. Mitigation to reduce impacts to nesting birds will be discussed with Environment Canada. Detailed mitigation is included in the TEMP (Volume 8, Appendix 8-E.9) and Water Quality Monitoring and Management Plan for Dike Construction Dewatering (Volume 8, Appendix 8-A.4).	Primary for water birds and upland birds and assessed in Section 5.5.7. No linkage for other VCs that don't nest on ground. Volume 6, Appendix 6-F provides the anticipated flooding area and schedule during the Whale Tail Lake (South Basin) and Northeast diversions. Results are also presented for the migratory bird nesting season (May 17 to August 15). Volume 6, Table 6-F-1 provides the total flooded and flooded terrestrial areas for bird nesting months of May, June, July, and August, during the diversion, at the start of each month.	Primary for caribou and upland birds and assessed in Section 5.5.3. No change - analysis indicates that the area affected will be reduced through the design for the Expansion Project, as will the resulting residual effects

Table 3-C-3: Potential Pathway for Terrestrial Wildlife and Birds

Project Phase	Valued Components (Approved Project)							Valued Components (Expansion Project)							Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Rationale	Expansion Project - Rationale
	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals				
Construction, Operations, Closure, Post-closure	S	S	N	N	S	S	S	S	S	N	N	S	S	S	Dust deposition may cover vegetation, change the amount of different quality habitats, and alter movement and behaviour	The following environmental design and mitigation features will lessen the effects of haul road traffic on air quality: • Watering of roads and enforcing speed limits to suppress dust production. • Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase. • Regular maintenance will be implemented for equipment and vehicles. • Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1). • Enforcing speed limits and limiting access to haul road to public (less traffic) will assist in reducing dust. • Scheduling of construction work in winter where possible. • Detailed mitigation is provided in the Whale Tail Haul Road Management Plan and TEMP.	While IQ suggests that behaviour of caribou has changed. Anticipated effects to vegetation from dust are assessed in Section 5.4.3. Pathway is assessed as no linkage for herbivores and carnivores. Dust levels are expected to be similar to levels at Meadowbank Mine. Herbivores are still present next to Meadowbank Mine. Changes to vegetation quality is anticipated to be minimal. , there have been no observed changes in soil/plant metal concentrations from the Wildlife Screening Level Risk Assessment that examined impacts of dust, therefore changes to wildlife are expected to be minimal.	No change - see Section 5.4.3 (Vegetation)
Construction, Operations, Closure	S	S	N	N	S	S	S	S	S	N	N	S	S	S	Use of fuels, oils and chemicals can lead to spills which can affect surface water quality, soils, vegetation, wildlife through exposure to toxins	All spills will be immediately reported, cleaned up and/or isolated from the receiving environment. Ready access to emergency spill kits. Regular maintenance of equipment to reduce oil leakage. Training in refueling procedures for site staff. Hazardous materials and fuel will be stored according to regulatory requirements. Detailed mitigation is provided in the Emergency Response Plan, Hazardous Materials Management Plan, Whale Tail Haul Road Management Plan and Spill Contingency Plan.	Assessed as a secondary to herbivores, as they ingest plants and soil and no linkage to carnivores. Adherence to management plans is expected to result in a low frequency and severity of spills, as has occurred at the Meadowbank Mine. Spills of fuel and oil have occurred at Meadowbank, but response has been quick and clean-up has occurred with negligible to minor, reversible short-term environmental impact, requiring minor remediation. There has never been a spill at Meadowbank resulting in moderate to serious environmental impact (Agnico Eagle 2011a).	No change
Construction, Operations, Closure	P	S	S	S	S	P	S	P	S	S	S	S	P	S	Sensory disturbance from Project activities can change the amount of different quality habitats, and alter wildlife movement, migration and behaviour	When caribou are observed near the road or mine speed limits will be reduced to 30km/hr in that area; and Level 3 caribou mitigation is triggered, as per the TEMP All employees will be provided with wildlife environmental awareness training. Traffic speeds will be enforced (i.e., maximum of 50 km/h on the haul road). Employees will be notified when caribou, muskox and predatory mammals are observed in the local study area. Wildlife provided the right-of-way Detailed mitigation is provided in the Noise Monitoring and Abatement Plan (Volume 8, Appendix 8-E.7), Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1) and TEMP (Volume 8, Appendix 8-E.9).	Primary for caribou and muskox and upland birds and assessed in Section 5.5.7. Noise and vibration from the Project will be similar to Meadowbank Mine and confined to the RSA. Noise levels and vibrations from the Project will decay to background levels within 8 km. Small mammals and raptors readily habituate to mine-related activities while water birds occur in low densities on the landscape that measureable impacts are not anticipated. Monitoring at Meadowbank Mine indicates that predatory mammals do not avoid the Mine and will habituate to it when attractants are present. With mitigation of attractants, very few predatory mammals will be attracted to the Project.	No change - see Section 5.5.3.3
Construction, Operations, Closure, Post-closure	S	S	S	S	S	S	S	S	S	S	S	S	S	S	Improved access for harvesting wildlife can affect population sizes	Enforce no hunting, trapping, harvesting or fishing policy for employees and contractors. Hunter harvest survey, consistent with the Meadowbank Mine will continue. Access to the Project will be controlled (gated at Meadowbank); Restricting public vehicle access beyond km 85 of Meadowbank All-weather Access Road. All efforts will be made to enforce a no shooting zone for the public along the road and around the Project site. All roads will be decommissioned and scarified during closure. Detailed mitigation is provided in the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1) and TEMP (Volume 8, Appendix 8-E.9), and Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1).	No caribou calving grounds are found within the Project RSA but caribou are seasonally present. Muskox harvest numbers in the Baker Lake area are limited by a quota (Agnico Eagle 2014), but muskox seem to have a general aversion to the Meadowbank AWAR (Agnico Eagle 2013); therefore, the presence of the haul road is thought to have little effect on muskox hunting patterns. Grizzly bears are often hunted because of a perceived or real threat to security, while wolves and Arctic foxes have been hunted for their fur (Agnico Eagle 2014). Restricted access to the haul road, the overland distance from the AWAR and the northern cost of fuel, is likely to make hunting difficult in this area and generally cost prohibitive. Residents of Baker Lake already have good access to RSA across land by snowmobile and ATV.	No change

Table 3-C-3: Potential Pathway for Terrestrial Wildlife and Birds

Project Phase	Valued Components (Approved Project)							Valued Components (Expansion Project)							Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Rationale	Expansion Project - Rationale
	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals				
Construction, Operations, Closure, Post-closure	N	N	S	N	S	N	N	N	N	S	N	S	N	N	Attractants may increase human-carnivore interactions and removal of individual animals which can affect wildlife population sizes	Littering and feeding of wildlife will be prohibited. Education and reinforcement of proper waste management practices to all workers and visitors to the site. Education on the risk associated with feeding wildlife and careless disposal of food wastes and liquids such as coffee and juices. Inspection of waste streams to ensure no attractants to predatory mammals. Food-related waste will be incinerated on a daily basis and general waste will be sent to the landfill and buried. All buildings will be skirted to the ground to limit opportunities for shelter. Detailed mitigation and monitoring is described in the TEMP.	Secondary for predatory mammals and upland birds. Learnings from Meadowbank Mine, and continual improvement through the mitigation and adaptive management processes described in the TEMP, and Wildlife Protection and Response Plan, should limit availability of attractants at the Project.	No change
Construction, Operation, Closure	N	N	N	S	S	S	N	N	N	N	S	S	S	N	Attraction of birds to Project facilities and infrastructure for roosting and nesting sites can affect mortality and productivity	Monitoring for bird nesting activity, including inspection of pit walls for Peregrine Falcon nests. Discharge raptors from establishing nests on artificial structures, pit walls, or other facilities. Detailed mitigation is described in the TEMP (Volume 8, Appendix 8-E.9).	Mines tend to create nesting habitat in quarries and pits for raptors (Gebauer et al. 2015; ERM 2015). Nesting on pit walls has become so common at Ekati that a monitoring program has been implemented. Monitoring of infrastructure and Project facilities for bird pre-nesting behaviour and the implementation of deterrents or limiting activities around nests that are deemed to be in a safe location are likely to limit effects on bird survival or productivity. When an established nest is found, the location is communicated to employees and a nest-specific management plan is developed.	No change
Operations, Closure, Post-closure	N	N	N	N	S	N	N	N	N	N	N	S	N	N	Use of water management facilities may increase bird mortality through exposure to contaminants and impact water bird health	Attenuation Pond will be monitored for use by water birds as part of the TEMP. Deterrents will be used if required. Attenuation Ponds will be monitored for water quality. Detailed mitigation is described in the Water Management Plan (Volume 8, Appendix 8-B.2) and TEMP (volume 8, Appendix 8-E.9).	Monitoring of infrastructure and Project facilities for water bird pre-nesting behaviour and the implementation of deterrents or limiting activities around nests that are deemed to be in a safe location are likely to limit effects on water bird survival or productivity. When an established nest is found, the location is communicated to employees and a nest-specific management plan is developed. A screening-level wildlife risk assessment was completed to investigate the risk to wildlife of dietary ingestion of contaminants present in the environment and released by Meadowbank Mine. The screening found that overall the Mine does not appear to be contributing excess risk to wildlife via the uptake of chemicals (AEM 2015b). Similar results are expected for the Project.	No change

Table 3-C-3: Potential Pathway for Terrestrial Wildlife and Birds

Project Phase	Valued Components (Approved Project)							Valued Components (Expansion Project)							Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Rationale	Expansion Project - Rationale
	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals	caribou	muskox	predatory mammals	raptors	water birds	upland birds	small mammals				
Operations, Closure, Post-closure	S	S	N	N	S	S	S	S	S	N	N	S	S	S	Uptake of metals by wildlife through ingestion of tailings, dust or leachate can affect health of individual animals, which can affect wildlife population sizes and wildlife health	If deemed necessary through monitoring, dust from roads will be managed through use of dust suppressants and enforcing speed limits and through other dust mitigation measures described above. Processing of ore will be done at Meadowbank Mine. Hazardous materials will be transported back to Meadowbank Mine for proper disposal. Any PAG or high metal leaching waste rock will be segregated at source and placed into designated areas within waste rock storage facilities to control acid generating reactions and the migration of contaminants. Leachate from the waste rock piles will be monitored and controlled and not released to the natural environment. Detailed mitigation is provided in the Operational ARD-ML Sampling and Testing Plan, Landfarm Design and Management Plan, Landfill Design and Management Plan, and Mine Waste Rock Management Plan, Air Quality and Dustfall Monitoring Plan, Whale Tail Haul Road Management Plan, Water Management Plan, CREMP and the TEMP (Volume 8).	Secondary for VCs that may ingest vegetation or soil. No linkage to carnivores. A screening-level wildlife risk assessment was completed to investigate the risk to wildlife of dietary ingestion of contaminants present in the environment and released by the mine. The screening found that overall the Mine does not appear to be contributing excess risk to wildlife via the uptake of chemicals (AEM 2015b). There will be no tailings generated at the Project as all ore will be processed at the Meadowbank Mine.	No change
Construction, Operation, Closure, Post closure	S	S	N	N	S	S	S	S	S	N	N	S	S	S	Cross-drainage structures for the mine site roads, and access road may alter stream hydraulics and geomorphology, and can alter wildlife habitat	Regular inspection of the road to identify any areas where ponding of water along the road represents a risk. Cross-drainage structures will be designed for a 1:10 year precipitation event or to meet DFO requirements for fish passage to avoid creating hydraulic barriers. Where deemed appropriate, use of staggered culvert configuration, and removal of snow at the culvert inlet and outlet prior to the freshet to promote drainage during spring thaw and freshet. Roads will be scarified and cross drainage structures will be removed at closure. Detailed mitigation is provided in the Water Quality and Flow Monitoring Plan (Volume 8, Appendix 8-B.4), TEMP (Volume 8, Appendix 8-E.9) and Water Management Plan (Volume 8, Appendix 8-E.2).	Secondary for VCs that may ingest vegetation or soil. No linkage to carnivores. The implementation of appropriate cross-drainage structures is expected to result in minor changes to stream flow velocity in the vicinity of the structures relative to baseline conditions and have negligible residual effects on soil, vegetation and wildlife habitat. The cross-drainage structures will be removed at closure and natural flows will be re-established. Thus, the effects on soil, vegetation and wildlife habitat from the alteration of stream flow are expected to have a negligible effect on wildlife habitat quantity or quality.	No change
Construction, Operations, Closure	S	S	N	N	S	S	S	S	S	N	N	S	S	S	Surface water runoff, seepage from the core mine facilities area and effluent can affect surface water quality, soil, vegetation, wildlife habitat	The Type A Water Licence will dictate the water quality requirements prior to release to the environment. Contact water will be managed on-site in accordance with the Water Management Plan. This water will be monitored for quality and if necessary transferred to the mine attenuation pond before discharge. Water collected from the open pit will be pumped to the attenuation pond where it will be treated prior to release. Granular materials will be tested before they are used to confirm that they are not potential acid draining or potential sources of metal leaching. Detailed mitigation is described in the Water Quality and Flow Monitoring Plan, AEMP, CREMP, TEMP, Operational ARD-ML Sampling and Testing Plan, and Water Management Plan (Volume 8) for additional mitigation.	Secondary for VCs that may ingest vegetation or soil. No linkage to carnivores. Monitoring of sediment chemistry, limnology, dust, water chemistry, phytoplankton and benthic invertebrates to mitigate effects to the receiving aquatic environment. Further, surface runoff and seepage will be intercepted in diversion ditches and treated prior to release to the environment, and water releases will be within the limits dictated by the water licence. Any effects to the receiving environment will be confined to the area surrounding or downstream of the Project.	No change

Table 3-C-4: Potential Pathway for Hydrogeology and Groundwater

	Project Activity	Project Phase	Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Lake	Construction, Operations and Closure	Groundwater quantity	Groundwater flow from un-dewatered lakes may be increased because of higher gradients towards dewatered lakes. May lower water levels in un-dewatered lakes	None	Secondary	Secondary	Groundwater quantity is assessed and discussed in Volume 6, Section 6.2. Surface water quantity is assessed and discussed in Volume 6, Section 6.3. Potential changes in groundwater regimes in lakes in local watersheds are expected to be negligible compared to surface water discharge regimes, resulting in negligible effects to surface water levels.	No change
2	Lake	Construction, Operations and Closure	Groundwater quantity	Groundwater flow from dewatered lakes may be reduced thereby reducing the flow to nearby un-dewatered lakes, thereby lowering water levels in those nearby lakes	None	Secondary	Secondary	Groundwater quantity is assessed and discussed in Volume 6, Section 6.2. Surface water quantity is assessed and discussed in Volume 6, Section 6.3. Potential changes in groundwater regimes in lakes in local watersheds are expected to be negligible compared to surface water discharge regimes, resulting in negligible effects to surface water levels.	No change
3	Open Pit	Closure	Groundwater quantity	Open pits may alter thermal regime and may produce an open talik below the pit were none existed. The presence of an open talik may alter the regional groundwater flow directions.	None	Secondary	Secondary	Static water levels will develop following closure that will reproduce the current regional groundwater flow conditions.	No change
4		Closure	Groundwater quality	Groundwater quality in pit lake may migrate through groundwater to downstream lakes if the gradient allows it. If the flow is high relative to the turn over rate of the receiving Lake, it could alter surface water chemistry	None	Secondary	Secondary	Groundwater flow from Whale Tail pit lake is predicted to take over 1000 years to reach DS1 (groundwater discharge zone for pit lake). This pathway is considered to have a minor linkage to hydrogeology.	Groundwater flow from Whale Tail pit lake, IVR pit lake or Underground is predicted to take over 1000 years to reach DS1 (groundwater discharge zone for pit lake). This pathway is considered to have a minor linkage to hydrogeology.
5	Mine Site Operations and Maintenance	Construction, Operation, Closure	Groundwater quality	Potential impacts on groundwater quality in relation to site waste management activities other than waste rock, including: handling and landfilling of waste; handling of contaminated ice, snow and/or soil; the management of historical contaminated material (e.g., previous spills, mishaps, releases, etc.), and sewage effluent discharges.	A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes the containment and management of contact water on-site designed to prevent impacts to site water quality. Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds where water quality will be monitored and treated if necessary prior to discharge.	No Linkage	No Linkage	All contact water will be managed on site and will not be released into the natural environment unless it meets Type A Water Licence criteria. It is not anticipated that the contact water on site would interact with groundwater.	No change
6	Site Water Management along the road (seepage and runoff)	Construction, Operation	Groundwater quality		Roads constructed on permafrost, which provides a barrier to downward flow of poor quality water to the deep groundwater regime. Use of non-acid generating material at any watercourse crossings. Testing will verify low potential for acid rock drainage and metal leaching. Testing will continue on new sources identified for road building. Current testing practices at Meadowbank Mine are effective at identifying non PAG rock for construction. Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation and will limit disturbance of lakes from activities. In-stream works will be constructed in winter, when possible, to avoid increased TSS and turbidity, and changes to water and sediment quality. Regular road inspections to check for ponding. Proposed roads will be as narrow as possible, while maintaining safe construction and operating practices.	Secondary	Secondary	To minimize disturbance to watercourses, construction and decommissioning activities at the watercourse crossings will mostly occur during winter when the streams are frozen or are not flowing. If construction or decommissioning activities are required during open water season, then the Fisheries and Oceans Canada (DFO) timing windows for in-water work will be followed. Any equipment used in the stream will be clean and inspected for leaks. These procedures will minimize the potential for erosion, sediment releases, and introduction of contaminants into the receiving streams. Standard erosion and sediment control measures (e.g., erosion mats, silt curtains) will be used. Roads and most of the infrastructure will be constructed on top of permafrost that will act as a barrier to downward migration of water to the deep groundwater regime.	No change
7	Waste Rock Storage Areas and Stockpiles	Operations, Closure	Groundwater quality	Seepage from waste rock storage facilities could result in changes to groundwater quality, which flow to surface water.	Waste rock storage facility is located above permafrost or lakes with closed taliks (i.e., unfrozen ground does not extend to groundwater regime beneath permafrost). A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes the containment and management of contact water on-site. Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds (and treated if required) prior to release to Mammoth Lake. Potential acid generating rock and metal leaching waste rock will be placed into designated areas within waste rock storage facility.	Secondary	Secondary	Waste rock storage facilities are located above permafrost or lakes with closed taliks (unfrozen ground does not extend to groundwater regime beneath permafrost). During operations seepage will be collected and treated , if necessary. At some point during closure, it is predicted that water treatment will no longer be required, at which time, all components of the water treatment facilities will be decommissioned. Groundwater inflow to the southern portion of Whale Tail Lake will occur from Lake A60 to the southeast. Hydraulic gradients following closure were used to estimate groundwater travel times from the Whale Tail Lake and the open pit to DS1. Based on the shortest travel time, water from Whale Tail Lake or the open pit was predicted to take over 1,000 years to reach Lake DS1. Consequently negligible effects to groundwater are predicted.	No change

Table 3-C-4: Potential Pathway for Hydrogeology and Groundwater

	Project Activity	Project Phase	Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
8	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage Area)	Construction, Operation, Closure	Water Quality	Spills and leaks during equipment operation may affect groundwater quality, which may affect surface water quality.	Permafrost will provide a barrier for downward flow of poor quality water to the deep groundwater regime. The Emergency Response and Spill Contingency Plan will be implemented, including ready access to an emergency spill clean-up kit for cleaning up any spills. Hazardous materials and fuel will be stored according to regulatory requirements to protect the environment and workers (i.e., Materials and Waste Management Plan). Storage tanks (e.g., fuel, engine oil, hydraulic oil, and waste oil and coolant) will be double walled, or located in lined and bermed containment areas. Hazardous wastes will be temporarily stored at the Whale Tail Pit site and transported to the Meadowbank Mine in appropriate containers to prevent exposure until they are shipped off site to an approved facility. Individuals working on site and handling hazardous materials will be given appropriate training (e.g. WHMIS). Soils from petroleum spill areas will be deposited at the Meadowbank Mine. Equipment will be re-fueled, serviced, or washed away from the watercourse crossings. Fuel, lubricants, hydraulic fluids, and other chemicals will be stored at least 31 m away from the high water mark of any waterbody, and in areas where any spillage can be contained. Construction equipment will be regularly maintained. As deemed feasible, construction of the roads will occur in the winter, so there would be opportunity to clean up any spills prior to spring thaw. Drivers will be appropriately qualified and cautioned. Emergency spill kits will be available wherever toxic materials or fuel are stored and transferred. Enforced speed limits.	No Linkage	No Linkage	Based on Agnico Eagle's experience at Meadowbank, accidental spills (e.g., fuel) have occurred but most of the spill volumes have been small and clean-up has occurred with only minor effects to the environment (Agnico Eagle 2015). Between 2011 and 2015 , 63 reportable spills were reported to the GN spill hot line. In 2015 there were 4 spills greater than 900 L at Meadowbank. In 2015 spill training was provided to employees. All spills are managed appropriately on site in accordance with Agnico Eagle's Spill Contingency Plan and there was no off site impact to any watercourses as a result of spills in 2015. In NIRB's 2011 annual report (NIRB 2011), it was noted that Meadowbank was kept in an impressively clean state with no apparent spills on location. It is anticipated the Meadowbank will continue to manage spills in the same manner and only minor and/or temporary impact are predicted to surface water. In addition, most of the equipment will be operated on top of continuous permafrost that will inhibit the downward movement of spills and leaks. Spills will be isolated to the active layer and direct spills to open taliks are not expected to occur. Therefore, impacts are not predicted to groundwater quality.	No change

Table 3-C-5: Potential Pathway for Surface Water Quantity

	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Mine Infrastructure Footprint (e.g. open pits, site roads, access roads)	Construction, Operations, Closure	Project footprint, which will physically alter watershed areas and drainage patterns, may change downstream discharge, water levels, and channel/bank stability in streams, and affect water quality, fish habitat, and fish	Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation. Access roads will be as narrow as possible, while maintaining safe construction and operation practices. Best management practices for erosion and sedimentation control (e.g., ground cover, silt fences and curtains, runoff management), where needed.	Primary	Primary	Section 6.3.3.1	No change - potential effects from operations are reversible at post-closure
2	Site Water Management: Dewatering of Project Footprint Lakes to Downstream Receiving Lakes	Construction, Operations	Dewatering of lakes may change discharges, water levels, and channel/bank stability in receiving and downstream waterbodies, and affect water quality, fish and fish habitat	Pumped discharge will be directed to the lake environment, and not directly to outlets, to attenuate flow changes.	Primary	Primary	Section 6.3.3.1	No change - potential effects from operations are reversible at post-closure
			Dewatering of lakes may result in ice damming and alter flow pathways	If feasible, pumped discharge to the receiving environment will cease during the winter.	Secondary	Secondary	Project lakes do not flow during the winter and the dewatering schedule was developed to mitigate potential effects. See Water Management Plan Section 4.4.2.	No change
3	Site Water Management: Watershed Modification by Diversion of Water	Construction, Operations	Alteration of watershed flow paths may change flows, water levels, and channel/bank stability in diverted and receiving waterbodies, and affect water quantity, water quality, fish and fish habitat	Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks), where needed. Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms.	Primary	Primary	Section 6.3.3.1	No change
4	General construction and operation of the proposed exploration access road	Construction, Operations	Cross-drainage structures for the roads may alter stream hydraulics and geomorphology	Cross-drainage structures will be designed for a 1:10 year precipitation event or to meet DFO requirements for fish passage to avoid creating hydraulic barriers. Rock aprons at culvert inlets and outlets will provide erosion protection and prevent localized erosion from concentrated high velocity flows above the peak 1:10 year rainfall event.	Secondary	Secondary	Cross-drainage structures provide a design conveyance for the 1:10 year event without overtopping the roadway, which will result in minor changes in stream velocity (preventing channel aggradation, degradation, erosion, or changes in bankfull width or depth). The implementation of appropriate cross-drainage structures is expected to result in minor changes to stream flow velocity in the vicinity of the structures relative to baseline conditions and have negligible residual effects on water quantity. Cross-drainage structures will be implemented to provide sufficiently low flow velocity such that spawning Arctic grayling, which may use watercourses crossed by the exploration access road for spawning or as a migration corridor, can navigate the structure under a specified design flow condition (i.e., 3-day delay; 1:10 year return flood condition). See Section 6.5.3 for an assessment of impacts to Artic Grayling.	No change

Table 3-C-5: Potential Pathway for Surface Water Quantity

	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
5		Construction, Operations	Freezing and plugging of culverts in the winter may result in over-topping and erosion of road surface releasing silt onto terrain and soils; ponding of water adjacent to road flanks; potential instability and thaw settlement of road shoulders; thaw settlement beneath and adjacent to culverts; inadequate drainage during spring thaw and freshet, and ice lens growth.	Where deemed appropriate, use of staggered culvert configuration, and removal of snow at the culvert inlet and outlet prior to the freshet to promote drainage during spring thaw and freshet.	Secondary	Secondary	The use of a staggered culvert configuration and regular inspection of the road will alleviate the risk of freezing and plugging of culverts.	No change
				Inspection prior to spring melt period to identify build-up of snow or ice, and take remedial action.				
				Regular inspection of the road to identify any areas where ponding of water along the road represents a risk, and installing additional culverts or drains to alleviate the risk.				
6		Construction, Operations	Cross-drainage structures for the roads may prevent navigability	Although none of the crossings along the haul road are considered navigable by TC, cross-drainage structures will be designed to allow navigation (i.e., bridge) for future crossings that may be deemed navigable waters by TC.	Secondary	Secondary	Cross-drainage structures for crossings with navigable waters will be designed in accordance to Transportation Association of Canada (TAC 2004) with a minimum freeboard of 1.0 m over the peak flow elevation and will not impede navigability. Traditional travel routes identified in Volume 7 Appendix 7-A will not be impacted.	No change
				Regular inspections will be completed				
7	Existing Meadowbank Infrastructure	Operations, Closure	Additional 3 years of processing and use of supporting infrastructure at the Meadowbank mine site and the existing AWAR for delivery of materials	No discharge at the Meadowbank Mine to the freshwater environment from processing.	No Linkage	No Linkage	There is no discharge to the outside environment. All process water will pumped to existing open pits at the Meadowbank Mine Site. Subsequently there are no changes expected to the hydrology around the Meadowbank site or road.	No change
				No additional footprint required				
				Adherence to the water quality and flow monitoring plan (Volume 8, Appendix 8-B.4)				
				Adherence to the existing Water Management Plan				
8	Open Pits	Operations, Closure	Removal of bedrock and ore material during the active mining of pits may change shallow groundwater quantity in local watersheds, and the water level in small waterbodies in local watersheds	Mined-out pit flooding will be augmented by active fresh water diversion active flooding will reduce the period required to flood the pits, and the period of time with increased hydraulic gradients between waterbodies.	Secondary	Secondary	Groundwater quantity is assessed and discussed in Volume 6, Section 6.2. Potential changes in groundwater regimes in lakes in local watersheds are expected to be negligible compared to surface water discharge regimes, resulting in negligible effects to water levels.	No change

Table 3-C-6: Potential Pathway for Surface Water Quality

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Whale Tail Pit Infrastructure Footprint (e.g., open pits, site roads, access roads)	Operations, Closure	Water Quality	Project footprint, which will physically alter watershed areas and drainage patterns, rates and quantities of diverted non-contact water to new watersheds, change downstream flows through flooding and dewatering, water levels, channel/bank stability in streams, and disturb lakes and may affect water quality	Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation and will limit disturbance of lakes from activities. Access roads will be as narrow as possible, while maintaining safe construction and operation practices. Minimum haul road widths will follow that defined under the *Mine Health and Safety Act* Erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks) where needed. Minimum setback distance of 31 m from the ordinary high water mark of waterbodies. Regular road inspections to check for ponding. To reduce the potential for erosion in channels due to higher than normal water flows and levels, natural drainage courses have been surveyed to evaluate capacity. Where practical, natural drainage patterns will be used to reduce the use of ditches and diversion berms. A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes designs to reduce changes to local flows, drainage patterns, and drainage areas. Monitoring during activities and use of adaptive management where necessary. Pumped water from the dewatered waterbodies will be directed through properly designed structures to the lake environment, and not to lake outlets, to prevent erosion in the receiving waterbodies and to attenuate flows. During dewatering activities, TSS will be monitored, and if necessary, treated before release downstream.	Primary	Primary	See Section 6.4.3.2	There will be an increase in the size of the Project footprint from the Approved Project to the Expansion Project, but footprint will be within the watersheds assessed for the Approved Project. Assessed as primary pathway for the expansion Project due to increase in timeline and overall quantity of water to be managed and diverted All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project See Section 6.2.3.2
2	Site Water Management (drainage and diversions)	Operations, Closure, Post-closure	Water Quality	Water management activities (dams, drainage, diversion, discharge, and dewatering) that will alter natural drainage paths and create a reservoir may cause a change in mercury cycling and bioaccumulation	A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes designs to reduce changes to local flows, drainage patterns, and drainage areas. Water that does not meet discharge criteria will be treated prior to discharge into Mammoth Lake. Use of turbidity curtains during dike construction to limit disturbance to lakes and waterbodies Monitoring during activities and use of adaptive management where necessary. Use of the Dewatering Dikes, Operations, Maintenance and Surveillance Manual developed by Agnico Eagle.	Primary	Primary	See Section 6.4.3.2	The Whale Tail South flooded lake (reservoir) will be maintained for longer for the Expansion Project. See Section 6.2.3.2
3	Earthworks: Drilling, blasting and excavation (includes Quarry/Borrow Pit) and Crushing activities for the haul road and Whale Tail Pit development	Construction, Operation	Water Quality	Surface water drainage through quarries and transport of blasting residuals and metals directly into watercourses can disturb lakes and affect surface water quality	Where possible, stockpiling of rock and fill from quarries and borrow sites will be placed such that surface water is not diverted through the piles with runoff to surface waterbodies; drainage from quarries will not flow directly into any waterbodies or watercourses. When there is seepage from a quarry that could enter a waterbody, a water quality sample will be collected and analyzed. Quarries will be inspected on a regular basis to monitor water ponding, particularly at spring melt. Best management practices for erosion and sediment control will be followed.	Secondary	Secondary	Using environmental design features and best practices, water from the quarries, which would be located at least 31 m from the high water mark for any waterbody, should not drain directly to waterbodies and thus there should be negligible effects to water quality and limit disturbance to lakes. Disturbance of lakes was specifically identified as a concern through IQ. Quarries will be inspected on a regular basis to identify any areas of water ponding, particularly during spring freshet. Management of the water in quarries will be managed according to the Whale Tail Haul Road Management Plan (Volume 8 Appendix 8-C.1). If there is noticeable flow from a quarry that could enter a waterbody, a water quality sample will be collected. Samples and results will be reported in the annual NWB report.	Additional earthworks will be required for the Expansion Project. All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
4	Site Water Management along the road (seepage and runoff)	Construction, Operation	Water Quality	Release of potentially acid generating materials from road building materials at the watercourse crossings can alter water quality	Non-acid generating material will be used at any watercourse crossings. Testing will verify lack of acid rock drainage and metal leaching potential. Testing will continue on new sources identified for road building. Current testing practices at Meadowbank Mine are effective at identifying non PAG rock for construction. Road contact water will be monitored during construction.	Secondary	Secondary	All esker samples tested from potential borrow sources show no potential to generate ARD and all release low concentrations of chemicals (within one order of magnitude of the CCME aquatic life criteria). The current waste rock monitoring program being followed by Agnico Eagle is effective at identifying non PAG waste rock mined at currently operating pits. Details are provided in the Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailing, Overburden and Sediment from the Whale Tail Pit and Road Aggregate Materials (Volume 5, Appendix 5-E). Road and construction materials that are non PAG and non metal leaching should not cause a change in downstream water and sediment quality, and as such the residual effects on surface water and sediment quality are considered to be negligible.	Widening of the road is required for the Expansion Project. All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
5	Mining and supporting infrastructure for the Whale Tail Pit and haul road	Construction, Operation	Water Quality	Activities from construction activities and mining operations (e.g., equipment, vehicles, buildings, open-pit mining, blasting) can create fugitive dust emissions and subsequent dust deposition may cause a change in water quality	Dust control measures will be implemented if needed on mine roads. Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase Enforcing speed limits (maximum speed 50 km/h) to suppress dust production. Roads will be designed as narrow as possible while maintaining safe construction practices; passing turnouts will be placed to accommodate multi-directional traffic. If deemed necessary through monitoring, dust from roads will be managed through use of dust suppressant. The running surface of the road will be maintained thereby reducing the generation of dust. There will be adherence to the Air Quality and Dustfall Monitoring Plan (volume 8, Appendix 8-E.1). Most personnel arriving at or leaving the site will be transported by bus, thereby reducing the amount of traffic (and dust).	Primary	Primary	See Section 6.4.3.1	Length of time of air emissions and overall quantity of air emissions will increase with the Expansion Project. See Section 6.2.3.1

Table 3-C-6: Potential Pathway for Surface Water Quality

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
6	Mining and supporting infrastructure for the Whale Tail Pit and haul road	Construction, Operation	Water Quality	Activities from construction activities and mining operations (e.g., equipment, vehicles, buildings, open-pit mining, blasting) can alter air and dust emissions (including sulphur dioxide, nitrogen oxides, and particulate matter) and subsequent deposition may cause a change in water quality	Construction equipment and trucks will be equipped with industry-standard emission control systems. Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase Exhaust emissions from non-road vehicles will be managed through regular and routine maintenance of vehicles. SO_2 emissions from non-road vehicles and stationary equipment will be reduced through the use of low emission diesel fuel. There will be adherence to existing air quality monitoring plan to detect changes in air quality There will be adherence to water quality monitoring and adaptive management in the CREMP to detect changes in water quality	Primary	Primary	See Section 6.4.3.1	Length of time of air emissions and overall quantity of air emissions will increase with the Expansion Project. See Section 6.2.3.1
7	Dike Construction	Construction, Closure	Water Quality	Release of sediment during construction of the dike in Whale Tail Lake may cause changes in water quality, affecting fish and other aquatic life	Erosion and sediment control measures will be implemented during dike construction, where appropriate (e.g., installation of silt curtains for turbidity control). The dike will be constructed using non-potentially acid-generating rock or low potential for metal leaching material. There will be adherence to the Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (Volume 8, Appendix 8-A.4), including installation of turbidity curtains and monitoring.	Secondary	No linkage	Erosion and sediment control measures will be implemented (e.g., installation of silt curtains) for turbidity control. During summer construction, turbidity curtains will be installed near the portion of the alignment where dike construction will occur, which is an approach demonstrated at other northern mining projects and according to the Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (Volume 8 Appendix 8-A.2). Enhanced TSS settlement is anticipated under-ice in the areas in close proximity to dike construction. Turbidity monitoring will be conducted at designated locations, consistent with the monitoring conducted at the Meadowbank Mine and presented in the Plan. Non- potentially acid generating, chemically inert material will be used to construct the dike to prevent leaching of metals into water. A closure plan will be developed, which will include management of dike breaching and removal activities to limit the potential for effects to water quality and fish and fish habitat. At closure, breaching and removal of sections of the dike will only occur when water quality within the diked area meets specifications in the Type A Water Licence. Through the described mitigation, the release of sediment from dike construction and breaching of the dike is expected to result in short-term, localized, and minor changes to water quality in the adjacent environment of the dike.	No new in-lake dike construction is required for the Expansion Project. This pathway was assessed for the Approved Project and does not apply to the Expansion Project
8	Development of Supporting Infrastructure for Whale Tail Pit and the haul road	Construction, Operation, Closure	Water Quality	Sediment releases from infrastructure (including watercourse crossings), road construction, and decommissioning of the road can affect quality of nearby surface waters	Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation and will limit disturbance of lakes from activities. Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks) will be followed where needed to limit disturbance to lakes. In-stream works will be constructed in winter, when possible, to avoid increased TSS and turbidity, and changes to water and sediment quality. Where applicable, construction runoff will be captured and managed to minimize suspended solids. Regular road inspections will be done to check for ponding. Proposed roads will be as narrow as possible, while maintaining safe construction and operating practices.	Secondary	Secondary	To minimize disturbance to watercourses, as deemed feasible, construction and decommissioning activities at the watercourse crossings will mostly occur during winter when the streams are frozen or are not flowing. If construction or decommissioning activities are required during open water season, then the Fisheries and Oceans Canada (DFO) timing windows for in-water work will be followed. Any equipment used in the stream will be clean and inspected for leaks. These procedures will minimize the potential for erosion, sediment releases, and introduction of contamination. All construction and decommissioning activities will be subject to an erosion and sediment control plan, and best management practices will be used that include standard erosion and sediment control measures (e.g., erosion mats, silt curtains). Through the use of best management practices and monitoring, effects to water and sediment quality are expected to be minor; however, a water quality monitoring will be conducted to observe conditions.	Additional infrastructure (e.g., widening of the roads, water storage ponds, drainage collection systems) are required for the Expansion Project. All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
9	Mine Site Operations and Maintenance, including the use of existing infrastructure at Meadowbank Mine and the haul road	Operation and Closure	Water Quality	Runoff from mine site infrastructure and roads can affect surface water quality	Road cross fill (surface slope from road centre line to edge of road) and side slope will be designed to encourage drainage. Best management practices for erosion and sediment control (e.g., silt curtains, runoff management) will be implemented as needed to limit disturbance to lakes. No changes to the existing footprint of the AWAR or the Meadowbank Mine is planned. Water Management Plan is approved and adhered to at existing facilities and Water Management Plan specific to the Whale Tail Pit areas has been developed and these plans have considered the containment and management of contact site water. Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds (and treated if required), prior to release. Water quality in attenuation ponds will be monitored and managed such that the discharge meets discharge limits. Any potentially acid generating (PAG) or high metal leaching waste rock will be segregated at source and placed into designated areas within the waste rock storage facility. Adherence to the Operational ARD/ML Testing and Sampling Plan (Volume 8, Appendix 8-E.5) and the Mine Waste Rock Management Plan (Volume 8, Appendix 8-A.1).	Secondary	Secondary	Given the risk posed by contact water to change receiving environment water quality, and to disturb lakes, several environmental design features have been included to prevent release of untreated contact water into receiving waterbodies. A key environmental design feature during construction will be to adhere to the Operational ARD/ML Testing and Sampling Plan. (PAG) and NAG material should any PAG waste rock be found in continuing studies. Runoff and lateral seepage from the waste rock/overburden facilities will not be released directly to the environment during pre-production or operations. During the pre-production and operation phases, all surface water runoff from the areas of the mine facilities or that has been in contact with any mine facilities or processes will be captured through a series of collection ditches and sumps. Contact water from open pits will be pumped to the Attenuation Pond, along with surface water from the other facilities. Water collected in the Attenuation Pond will either be used for air road dust suppression or will be discharged as an effluent into Mammoth Lake through a diffuser. Any discharge will meet Type A Water Licence limits. During the closure phase, contact water will be treated to discharge limits and at some point during closure, treatment will no longer be required, and the water treatment facilities will be decommissioned, but all runoff will be required to meet discharge limits. Subsequently, changes to water quality from runoff are expected to be minor.	This pathway is still valid as assessed for the Expansion Project. The only addition is that water collected in the Attenuation Pond will either be used for air road dust suppression or will be discharged as an effluent to the receiving environment through a diffuser. All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
10	Construction and operation of roads	Construction, Operation	Water Quality	Cross-drainage structures for the mine site roads may alter stream hydraulics and geomorphology, and alter water quality	Rock aprons at culvert inlets and outlets will provide erosion protection and prevent localized erosion from concentrated high velocity flows. Regular road inspections to check for ponding. Removal of snow at the culvert inlet prior to freshet.	Secondary	No linkage	In most cases, cross-drainage structures provide a design conveyance for the 1:10 year event without overtopping the roadway, which will result in minor changes in stream velocity, preventing channel aggradation, degradation, erosion, or changes in bankfull width or depth. The implementation of appropriate cross-drainage structures is expected to result in minor changes to stream flow velocity in the vicinity of the structures relative to baseline conditions and have negligible residual effects on water quantity. To protect water and sediment quality, best management practices for erosion and sedimentation control (e.g., ground cover, silt fences and curtains, runoff management) will be used, subsequently minor changes only are expected to water and sediment quality.	All road drainage structures will be installed under the Approved Project and updates will not be required for the Expansion Project. This pathway was assessed for the Approved Project and does not apply to the Expansion Project

Table 3-C-6: Potential Pathway for Surface Water Quality

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
11	Development of Supporting Infrastructure for Whale Tail Pit and the haul road	Construction and operation of roads	Water Quality	Freezing and plugging of culverts in the winter may result in over-topping and erosion of road surface releasing silt into watercourses during freshet and affect water quality	Where deemed appropriate, use of staggered culvert configuration to promote drainage during spring thaw and freshet. Regular inspection of the road to identify any areas where ponding of water along the road represents a risk, and installing additional culverts to alleviate the risk.	Secondary	No linkage	Overall, drainage from the road is a small component of total drainage in the area, and any contribution from the road and effects on water and sediment quality should be negligible. Where deemed appropriate, the use of staggered culvert configuration and regular inspection of the road during operation will alleviate the risk of freezing and plugging of culverts, which could result in ponding and overflow, which in turn could increase erosion and input of sediment into watercourses. Removal of snow at the culvert inlet and outlet prior to the freshet will promote drainage during spring thaw and freshet.	All road drainage structures will be installed under the Approved Project and updates will not be required for the Expansion Project. This pathway was assessed for the Approved Project and does not apply to the Expansion Project
12	Site Water management: Seepage and Runoff	Operation and Closure	Water Quality	Vertical and lateral seepage from the waste rock storage facility may enter nearby waterbodies and change water quality (i.e., metal concentrations).	A Water Management Plan has been developed and describes the containment and management of contact water on-site. Seepage will be captured at sumps and diverted to the Attenuation Pond. All ponds collecting seepage will be designed to prevent release into the surrounding aquatic environment. Facility discharge water will be monitored for water quality, and treated as required, prior to discharge.	Secondary	Secondary	Waste rock storage facilities are located above permafrost or lakes with closed taliks (unfrozen ground does not extend to groundwater regime beneath permafrost). During operations seepage will be collected and treated. At some point during closure, it is predicted that treatment will no longer be required, and, therefore, all components of the water treatment facilities will be decommissioned. Groundwater inflow to the southern portion of Whale Tail Lake will occur from Lake A60 to the southeast. Hydraulic gradients following closure were used to estimate groundwater travel times from the Whale Tail Lake and the open pit to DS1. Based on the shortest travel time, water from Whale Tail Lake or the open pit was predicted to take over 1,000 years to reach Lake DS1. Environmental design features and mitigations reduce the potential risk of contaminants entering surface water, subsequently effects to surface water quality and sediment quality are expected to be minor.	Additional waste rock storage facilities will be developed for the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
13	Site Water management: Seepage and Runoff	Operation	Water Quality	Seepage of pore water though, or underneath, incompletely frozen dikes to adjacent watersheds may change water quality in local watersheds.	A Water Management Plan has been developed and describes containment and management of contact water on-site. The dikes will be designed and constructed to control seepage. Performance of the dikes will be monitored and appropriate remediation applied, if required.	Secondary	Secondary	Waste rock that meets the requirements for building material will be crushed, screened, and used for the construction of dikes, foundations, laydown pads, and roads. There is potential for arsenic as well as other parameters (i.e., chloride, fluoride, cadmium, lead, and selenium) to be present in the waste rock leachate. Waste rock used for construction will be analyzed and segregated according to the Operational ARD/ML Testing and Sampling Plan. Runoff will be monitored and remediation at closure will be employed, if required. Therefore, changes to water and sediment quality are expected to be minor.	A series of diversion dikes and channels will continue to be used for water management of the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
14	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage Area)	Construction , Operation, Closure	Water Quality	Spills and leaks from equipment or accidents can affect surface water quality	The Spill Contingency Plan (Volume 8, Appendix 8-D.5) will be implemented, including ready access to an emergency spill clean-up kit for cleaning up any spills. Hazardous materials and fuel will be stored according to regulatory requirements to protect the environment and workers and will be stored at the Meadowbank Mine. Storage tanks (e.g., fuel, engine oil, hydraulic oil, and waste oil and coolant) will be double walled, or located in lined and bermed containment areas. Hazardous wastes will be temporarily stored at Whale Tail Pit and then transported to the Meadowbank Mine in appropriate containers to prevent exposure until they are shipped off site to an approved facility. Individuals working on site and handling hazardous materials will have appropriate training (e.g. WHMIS) Soils from petroleum spill areas will be deposited at the Meadowbank Mine Landfarm Equipment will be re-fueled, serviced, or washed away from the watercourse crossings. Fuel, lubricants, hydraulic fluids, and other chemicals will be stored at least 31 m away from the high water mark of any waterbody. Construction equipment will be regularly maintained. Emergency spill kits will be available wherever toxic materials or fuel are stored and transferred. Speed limits will be enforced.	Secondary	No linkage	Based on Agnico Eagle's experience with the Meadowbank, accidental spills (e.g., fuel) have occurred, but most of the spill volumes have been small, and clean-up has occurred with only minor effects to the environment (Agnico Eagle 2015). Between 2011 and 2015, 63 reportable spills were reported to the GN spill hot line. In 2015 there were four spills greater than 900 L at Meadowbank. In 2015 spill training was provided to employees. All spills are managed appropriately on site in accordance with Agnico Eagle's Spill Contingency Plan and there was no off site impact to any watercourses as a result of spills in 2015. In NIRB's 2011 annual report (NIRB 2011), it was noted that Meadowbank was kept in an impressively clean state with no apparent spills on location. It is anticipated the Meadowbank will continue to manage spills in the same manner and only minor impacts are predicted.	For the Expansion Project, the annual quantity of fuel and other hazardous materials will not change but the length of time required for these materials will increase. This pathway was assessed for the Approved Project and there is no change for the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
15	Mining Activities and Water Management	Construction, Operation, Closure	Water Quality	Release of treated mine effluent (including sources from sewage, WRSF pond, and attenuation pond) may cause changes to surface water quality (i.e., nutrient and metal concentrations) in Mammoth Lake in operations and closure.	A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes containment of contact water through the use of diversions, attenuation ponds, and treatment facilities during construction, operations, and closure. Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds. Treated sewage will be piped to the attenuation pond Water quality in attenuation ponds will be monitored and managed such that the discharge entering Mammoth Lake meets Type A Water Licence discharge limits. If water quality does not meet discharge limits, it will be circulated and re-treated. Other applicable design features and mitigation, as outlined in the Interim Closure and Reclamation Plan.	Primary	Primary	See Section 6.4.3.3	Assessment of effluent discharge to Mammoth Lake during open-water conditions was assessed under the Approved Project For the Expansion Project, there will be one winter discharge of reverse osmosis treated water See Section 6.2.3.3
16	Water Management Infrastructure, including existing infrastructure that will be used the Meadowbank Mine site, the haul road, and the Whale Tail Pit	Construction, Operation, Closure	Water Quality	Process and potable water use resulting in reduced water levels can affect water quality in Whale Tail Lake and Nemo Lake.	Manage pumping rates so total annual discharge from Whale Tail and Nemo Lake does not drop below the 10-year dry condition. Water withdrawal rate(s) will be controlled to avoid effects on the source water lake(s). Capture and reuse site water to reduce fresh water requirements.	Secondary	Secondary	At Whale Tail Pit, the source of freshwater during a portion of construction and operations will be Nemo Lake, and the source of water for during closure and for pit flooding, will be Whale Tail Lake. Freshwater requirements for freshwater during operations is 241m^3/day and approximately 48m^3/day during construction and closure (Volume 1, Project Description). Where possible, process water will be reused to reduce the need for freshwater. The water demand relative to available source water makes potential effects to water and sediment quality in Nemo and Whale Tail Lake as a minor pathway, with negligible residual effects expected on water and sediment quality.	Process and potable water use will be required for longer under the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project

Table 3-C-6: Potential Pathway for Surface Water Quality

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
17	Water Management	Construction, Operation	Water Quality	Dewatering of waterbodies may change flows, water levels, channel/bank stability, and water quality (e.g., suspended sediments, nutrients, metals) in receiving and downstream waterbodies.	During dewatering activities, TSS will be monitored, and if necessary, treated before release downstream. Pumped water from the dewatered waterbodies will be directed through properly designed structures to the lake environment, and not to lake outlets, to prevent erosion in the receiving waterbodies and to attenuate flows. Erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks) will be implemented where needed.	Primary	Primary	See Section 6.4.3.2	Additional dewatering is required for the Expansion Project See Section 6.2.3.2
18	Open Pits	Operation	Water Quality	Release of pit water inflows to local watersheds may affect water quality in local watersheds.	Groundwater inflow to the pits or other dewatered areas will not be directly released to local watersheds. All pit water will be pumped to the Attenuation Pond for management and treated prior to release.	Secondary	Secondary	Minimal water is expected in the Whale Tail open pit because it is above the permafrost, which will reduce the inflows of groundwater. Groundwater inflows are provided in Volume 6, Section 6.2.3.1. The short mine of life of the open pit will also reduce the opportunity for groundwater inflow. However, any water that is present in the open pits will be pumped to the attenuation pond for re-use or treated and discharged to the receiving environment therefore impacts to water and sediment quality in local watersheds is expected to be minimal.	Any pit water collected during Operations will be managed in the same manner for the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
19	Open Pits	Operation	Water Quality	Removal of bedrock and ore material may change or alter existing faults and change contaminant transport processes in subsurface and surface water quality	Mined-out pit flooding will be augmented by fresh water diversion.	No Linkage	No linkage	Based on the hydrogeological model, the groundwater flow from Whale Tail pit lake is predicted to take over 1000 years to reach DS1 (groundwater discharge zone for pit lake). Volume 6, Section 6.2.3 1, provides supporting evidence. This pathway is considered to have a minor linkage to hydrogeology and thus it is expected to have no linkage to surface water.	Groundwater flow from Whale Tail pit lake, IVR pit lake or Underground is predicted to take over 1000 years to reach DS1 (groundwater discharge zone for pit lake). This pathway is considered to have a minor linkage to hydrogeology and is expected to have no linkage to surface water.
20	Mine Site Decommissioning	Closure	Water Quality	Removal of project infrastructure (e.g., roads, dikes, etc.) may change flows and cause of release sediment and contaminants and can affect water quality	A Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1) has been developed and describes measures for permanent closure. All bridges and culverts will be removed and original drainage patterns restored. Stream crossings will be rehabilitated and instream work will be limited to the extent possible and will follow DFO operational guidance and timing windows. Dikes will be breached to allow for fish passage; removal of dikes will be timed to minimize release of sediments. Chemicals will be removed from the mine site. Roads will be scarified, allowing native plants to re-establish, and slopes will be stabilized against erosion.	Secondary	No Linkage	Through the use of best management practices and monitoring during construction, operation, and decommissioning, effects to water and sediment quality are expected to be negligible; however, a water quality monitoring and reporting plan will be conducted to observe conditions. The present reclamation and closure plan for the Meadowbank Mine and for the Whale Tail Pit includes the roads and will feature erosion and sedimentation protection during the decommissioning phase. Thus the residual effects on surface water and sediment quality are considered to be negligible.	Mine site decommissioning procedures do not change between the Approved and Expansion Projects This pathway was previously assessed All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
21	Decommissioning (e.g., roads, buildings, waste rock storage facilities)	Closure	Water Quality	Activities required for covering and reclaiming the waste rock storage facilities may cause release of contaminants and can affect water quality.	A Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1) has been developed and describes measures for permanent closure. The waste rock storage facilities have been designed for long-term stability. The waste rock storage facilities will have a 2 to 4 m cover. There will be adherence to the Operational ARD/ML Testing and Sampling Plan (Volume 8, Appendix 8-E.5) and the Mine Waste Rock Management Plan (Volume 8, Appendix 8-A.1). The surface of the waste rock storage facilities will be graded to blend into the existing topography and to shed water from the surface.	Secondary	Secondary	During operations the water quality in the waste rock storage facility pond are expected to meet the Type A effluent limits for all parameters except arsenic, TDS and mercury. Based on modelling, post-closure, at the waste rock storage pond, some parameters exhibit average predicted concentrations that are above the water quality guidelines for protection of aquatic life, including: arsenic, cadmium, copper, fluoride, lead, mercury, selenium, and uranium. All average concentrations are within the same order of magnitude as the water quality guidelines for protection of aquatic life, with the exception of arsenic, fluoride and cadmium. While closure activities are occurring, contact water off the waste rock will be monitored, collected and treated, if necessary prior to discharge to the receiving environment. The Mine Site and Downstream Receiving Water Quality Prediction Report provide details of expected water quality. Section 6.4.3 discusses the primary impact to water quality from all facilities in closure and post-closure, including the waste rock storage facilities.	Additional waste rock storage facilities will be developed and then decommissioned for the Expansion Project All environmental design features, mitigation, and rationale from the Approved Project, apply to the Expansion Project
22	Pits (reconnection to downstream environment)	Closure	Water Quality	Water quality in flooded open pit may be higher than objectives and reconnection of drainages may affect downstream water quality.	A Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1) has been developed and describes measures for permanent closure. The pits are designed to have stable slopes during mining and post-closure. The pits will be progressively reclaimed as excavation is completed. Water quality in the pits will be monitoring continuously during the flooding process. The open pit will be kept disconnected form the surrounding waterbodies until the pit water meets Type A conditions for breaching. Water will be treated from the waste rock storage pond if it is unacceptable for discharge.	Primary	Primary	See Section 6.4.3.3	Additional pits are part of the Expansion Project See Section 6.2.3.3
23	Pits (flooding)	Closure	Water Quality	Pumping of water from Whale Tail Lake (South Basin) to fill the pit at closure and increase the elevation in Whale Tail Lake (North Basin) can affect water quality in Whale Tail Lake.	A Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1) has been developed and describes measures for permanent closure. The pit is designed to have stable slopes during mining and post-closure The pits will be flooded, with water from Whale Tail Lake, following completion of pit operations. Water quality in the pits will be monitoring continuously during the flooding process. All diversion dikes will be kept intact as a barrier between open pits and surrounding waterbodies until the pit water meets acceptable concentrations for release to the environment. Water will be treated if it is unacceptable for discharge.	Primary	Primary	See Section 6.4.3.2	The pits developed through the Expansion Project will be flooded with water from South Whale Tail Lake but on a different schedule than the Approved Project See Section 6.2.3.2 and 6.2.3.3
24	Waste Rock Storage Areas and Stockpiles	Closure	Water Quality	Runoff and leaching from the waste rock storage facilities and mine footprint may change surface water quality (i.e., metal concentrations).	A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes the containment and management of contact water on-site. Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds (and treated if required) prior to release to Mammoth Lake. Any potentially acid generating (PAG) or high metal leaching waste rock will be segregated at source and placed into designated areas within the waste rock storage facility.	Primary	Primary	Section 6.4.3.3	Additional waste rock storage facilities will be developed for the Expansion Project; long-term runoff quality and quantity has been considered See Section 6.2.3.3
				Release of treated mine effluent	A Water Management Plan (Volume 8, Appendix 8-B.2) has been developed and describes containment of contact water through the use of diversions, attenuation ponds, and treatment facilities during construction, operations, and closure.				

Table 3-C-6: Potential Pathway for Surface Water Quality

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
25	Mining Activities and Water Management	Construction, Operation, Closure	Water Quality	Release of treated mine effluent (including sources from sewage, waste rock storage facility ponds, and attenuation pond) may cause changes to surface water quality (i.e., nutrient and metal concentrations) in downstream receiving environment.	Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds. Treated sewage will be piped to the attenuation pond Water quality in attenuation ponds will be monitored and managed such that the discharge entering Mammoth Lake meets Type A Water Licence discharge limits. If water quality does not meet discharge limits, it will be circulated and re-treated. Other applicable design features and mitigation, as outlined in the Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1).	N/A	Primary	N/A	New pathway See Section 6.2.3.3

Table 3-C-7: Potential Pathways for Fish and Fish Habitat Valued Components (Arctic Char, Arctic Grayling, Lake Trout, and Round Whitefish Fishery)

	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Mine Infrastructure Footprint (e.g., open pits, dikes, WRSFs, site roads, access roads)	Construction, Operations, Closure	The construction of the Northeast, Whale Tail, and Mammoth dikes, Whale Tail, and IVR Pit and WRSF for the Expansion Project, dewatering of the diked area in Lake A17 (Whale Tail Lake) and Lake A16 (Mammoth Lake), (\and dewatering and use of Lake A53 as the IVR Attenuation Pond for the Expansion Project, will result in the direct loss or alteration of fish habitat.	Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation. Best management practices for erosion and sedimentation control (e.g., ground cover, silt fences and curtains, runoff management), where needed. Where practical, natural drainage patterns will be used to reduce the use of ditches and diversion berms. A Interim Closure and Reclamation Plan (Volume 8, Appendix 8-F.1) has been developed and describes measures for permanent closure. The dikes are temporary structures, to be removed during the closure phase, as per the Water Management Plan (Volume 8, Appendix 8-B.2)	Primary (A1 assessment area) No linkage (C1, C38 and A69 assessment areas)	Primary (A1 assessment area) No linkage (C1, C38 and A69 assessment areas)	The primary pathway for Arctic Char, Lake Trout, and Round Whitefish in the A1 assessment area was addressed in detail in Section 6.5.3.2.1. This pathway has no linkage to VC fish species in other assessment areas of the RSA because of the compact layout of the mine effects are\ restricted to headwater lakes and streams in the A1 assessment area.	No change - the primary pathway for Arctic Char, Lake Trout, Burbot, and Round Whitefish in the A1 assessment area was addressed in detail in Section 6.5.4.2.2.
2	Mine Infrastructure Footprint (e.g. open pits, site roads, access roads)	Construction, Operations, Closure	The construction of the Haul Road may result in the direct loss or alteration of fish habitat.	Roads aligned to cross streams of low quality habitat to the extent possible. Where possible, in-stream works will be constructed in winter when watercourses are dry or frozen to the bed. In-stream works will be conducted according to DFO timing windows to avoid critical periods for fish. Clear span bridges at crossings km 16.0, km 23.9, km 32.3, and km 44.8 will maintain fish passage or will be used to minimize blockages to fish movement. Design roads as narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. For example, minimum haul road widths are defined under the *Mine Health and Safety Act*, NWT (Nu). A Interim Closure and Reclamation Plan has been developed and describes measures for permanent closure. All bridges and culverts will be removed at closure and original drainage patterns restored. Stream crossings will be rehabilitated and instream work will be limited to the extent possible and will follow Fisheries and Oceans Canada (DFO) operational guidance and timing windows.	Secondary (Haul road and A1 assessment areas) No linkage (C1, C38 and A69 assessment areas)	Secondary (Haul road and A1 assessment areas) No linkage (C1, C38 and A69 assessment areas)	Measureable residual effects to VC fish species are not expected from the construction of the Haul Road. The implementation of proven engineering designs and best management practices and polices during construction and operation of the Haul Road are expected to minimize, if not eliminate, any effects to VC fish species, as described in similar environmental assessments in Nunavut (Agnico Eagle 2014). Agnico Eagle will follow recommendations set out in DFO letter of advice for the exploration access road, dated March 14, 2016.	No change
3	Mine Infrastructure Footprint (e.g. open pits, site roads, access roads)	Construction, Operations, Closure	The construction of the North-East, Whale Tail, and Mammoth dikes will alter access to tributary streams and lakes (i.e., habitat connectivity) in the LSA, and may result in habitat loss for Lake Trout, Arctic Char, and Round Whitefish.	Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation. The dikes are temporary structures, to be removed during the closure phase, as per the Water Management Plan (Volume 8, Appendix 8-B.2)	Primary (A1 assessment area) No linkage (A69, C1, and C38 assessment areas)	No linkage	The primary pathway for Arctic Char, Lake Trout, Burbot and Round Whitefish in the A1 assessment area was addressed in detail in Section 6.5.3.2.1. This pathway has no linkage to VC fish species in other assessment areas of the RSA because of the compact layout of the mine effects are\ restricted to headwater lakes and streams in the A1 assessment area.	No change – this effect is considered previously assessed - mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project
4	Haul Road Operation	Construction, Operations, Closure	Potential overexploitation of fish stocks due to improved road access can lead to changes in the abundance and distribution of fish	Mining staff will not be allowed to hunt or fish while on their work rotation; Agnico Eagle will develop and enforce "no hunting, trapping, harvesting or fishing policy" for employees and contractors, which will be consistent with the Meadowbank Mine. All roads will be decommissioned during closure. Detailed mitigation is provided in the Whale Tail Pit Haul Road Management Plan (Volume 8, Appendix 8-C.1), the TEMP (Volume 8, Appendix 8-E.9) and is condition of the NIRB PC No 4 that will continue to be enforced.	Secondary	Secondary	Restricted use of the haul road is likely to make fishing access difficult in the area; residents of Baker Lake already have good access to the RSA across land by snowmobile and ATV (also see Table 3-C-3).	No change
5	Site Water Management - Road Infrastructure	Construction, Operations, Closure	Crossing structures may alter stream hydraulics and geomorphology affecting passage for migratory fish (e.g., blocking or delaying fish movements on streams)	Clear span bridges at crossings km 3.4, 10.7, 16.0, 20.0, 23.9, 26.1, 32.3, 43.5, 44.8 and embedded culvert at crossing 11.1 will maintain fish passage or will be used to minimize blockages to fish movement. Watercourses will be regularly inspected upstream and downstream of the crossings for erosion, scour, and flow blockages. Regular inspection of the road to identify any areas where ponding of water along the road represents a risk, and installing additional culverts or drains to alleviate risk, where required. Rock aprons at culvert inlets and outlets will provide erosion protection and prevent localized erosion from concentrated high velocity flows above the peak 1:10 year rainfall event. Cross-drainage structures will be designed and constructed such that structures will not create a hydraulic barrier to fish passage and will convey peak flows corresponding to 1:10 year rainfall event. Use of staggered culvert configuration, and removal of snow at the culvert inlet and outlet prior to the freshet to promote drainage and increased conveyance of flow during spring thaw and freshet. All bridges and culverts will be removed and original drainage patterns restored. Stream crossings will be rehabilitated and instream work will be limited to the extent possible and will follow DFO operational guidance and timing windows.	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Using environmental design features and best practices (also see Table 3-C-5), there should be no effects from the watercourse crossing structures on fish passage and thus there should be negligible effects to the fishery.	No change
6	Earthworks: Drilling, blasting and excavation (includes Quarry/Borrow Pit) and Crushing activities	Construction, Operations, Closure	Introduction of blasting residue (nitrogen compounds) to surface water can alter water and sediment quality, affecting fish habitat quality and fish health	Only the required amount of explosive will be used as necessary for the amount of rock or borrow material to be blasted. Where possible, stockpiling of rock and fill from quarries and borrow sites will be placed such that surface water is not diverted through the piles with runoff to surface waterbodies; drainage from quarries will not flow directly into any waterbodies or watercourses. Borrow and rock quarry activity will be at least 31 m from the high water mark of any waterbody. Borrow pits and quarry will be excavated and sloped for positive drainage. Quarries will be inspected on a regular basis to monitor water ponding, particularly at spring melt. Drainage from borrow pits and quarry will not flow directly into any waterbodies or watercourses. When there is ponded water in the rock quarry or borrow pits that could enter a waterbody or watercourse, a water quality sample will be collected and analyzed, and the results used to determine appropriate mitigation measures (e.g., prevent runoff from entering waterbody or watercourse). To avoid and mitigate Serious Harm to Fish, Agnico Eagle will continue to adhere to blasting requirements and will continue to use practices consistent with those used at the Meadowbank Mine. Agnico Eagle will engage with DFO, when required.	No Linkage	No Linkage	The use of environmental design features and best practices (also see Table 3-C-6) will any eliminate effects from blasting residues on fish health and habitat quality. Water from the quarries, which would be located at least 31 m from the high water mark for any waterbody, should not drain directly to waterbodies and thus there should be negligible effects to water quality and limit disturbance to lakes. Disturbance of lakes was specifically identified as a concern through IQ. Quarries will be inspected on a regular basis to identify any areas of water ponding, particularly during spring freshet. However, if there is noticeable flow from a quarry that could enter a waterbody, a water quality sample will be collected. Samples will be analyzed for physical parameters, nutrients (i.e., phosphorus and nitrogen), and trace metals.	No change
7	Earthworks: Drilling, blasting and excavation (includes Quarry/Borrow Pit) and Crushing activities	Construction, Operations, Closure	Blasting near fish-bearing waterbodies may result in pressure changes and vibrations, and affect fish mortality and reproduction	Applicable guidelines for set-back distances and quantities of explosives will be followed. To avoid and mitigate Serious Harm to Fish, Agnico Eagle will continue to adhere to blasting requirements and will continue to use practices consistent with those used at the Meadowbank Mine. Agnico Eagle will engage with DFO, when required. Lessons learned from the Meadowbank Mine will be applied.	Secondary (Haul road and A1 assessment area) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul road and A1 assessment area) No linkage (A69, C1, and C38 assessment areas)	Agnico Eagle will follow best practices and applicable guidelines provided by DFO such that there will be no measurable residual effects from blasting on fish health.	No change

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	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
8	Earthworks: Drilling, blasting and excavation (includes Quarry/Borrow Pit) and Crushing activities	Construction, Operations, Closure	Release of potential acid generating materials from quarry locations and from road building materials at the watercourse crossings can alter water and sediment quality, affecting fish habitat quality and fish health	Use of non-acid generating material at watercourse crossings; testing will verify lack of acid rock drainage and metal leaching potential. The rock quarry and borrow pits will be located and constructed in a manner where runoff will not be released directly into a watercourse or waterbody. Any PAG or high metal leaching waste rock will be segregated at source and placed into designated areas within the waste rock storage facilities.	No Linkage	No Linkage	All esker samples tested from potential borrow sources show no potential to generate ARD and all release low concentrations of chemicals (within one order of magnitude of the CCME aquatic life criteria). The current waste rock monitoring program being followed by Agnico Eagle is effective at identifying non PAG waste rock mined at currently operating pits. Details are provided in the Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailing, Overburden and Sediment from the Whale Tail Pit and Road Aggregate Materials. Road and construction materials that are non PAG and non metal leaching should not cause a change in downstream water and sediment quality, and as such the residual effects on surface water and sediment quality are considered to be negligible (for more information, see Table 3-C-6).	No change
9	General Construction / Decommissioning Activities	Construction, Operations, Closure	Sediment releases from infrastructure and road construction / decommissioning can affect quality of nearby surface waters and fish habitat quality.	Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks), where needed to limit disturbance to lakes and streams. In-stream works will be in winter during dry or frozen-to-bed conditions, when possible, to avoid increased TSS and turbidity, and changes to water quality. Proposed roads will be as narrow as possible, while maintaining safe construction and operating practices. Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation and will limit disturbance of lakes from activities. Where applicable, runoff from construction / decommissioning activities will be captured and managed to minimize suspended solids (e.g., discharged into an attenuation pond to settle out suspended sediments) Road alignment will avoid direct drainage into surface waterbodies. Road cross fill (surface slope from road centre line to edge of road) and side slope designed to encourage drainage. Where possible, in-stream works will be constructed in winter when watercourses are frozen. In-stream works will be conducted according to DFO timing windows to avoid critical periods for fish. Bridge abutment installation will span majority of the active channel (i.e., outside of the high-water mark), and if feasible, construction will occur in winter. Disturbed areas along the streambanks will be stabilized and allowed to revegetated upon completion of work. At closure, drainage patterns will be re-established as close to pre-construction conditions as possible, select non-contact water diversion ditches will be retained to promote surface water drainage.	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	To minimize disturbance to watercourses, construction and decommissioning activities at the watercourse crossings will mostly occur during winter when the streams are frozen or are not flowing. If construction or decommissioning activities are required during open water season, then the Fisheries and Oceans Canada (DFO) timing windows for in-water work will be followed. Any equipment used in the stream will be clean and inspected for leaks. These procedures will minimize the potential for erosion, sediment releases, and introduction of contamination (also see Table 3-C-6). All construction and decommissioning activities will be subject to an erosion and sediment control plan, and best management practices will be used that include standard erosion and sediment control measures (e.g., erosion mats, silt curtains). Through the use of best management practices and monitoring, effects to water quality, and subsequently the fishery, are expected to be negligible.	No change
10	Site Water Management	Construction, Operations	During the construction of the Whale Tail, Mammoth, and WRSF dikes, water diversions will result in a reduction of water levels in Lake A16 (Mammoth Lake) and downstream locations, affecting fish and fish habitat.	A Water Management Plan will be implemented.	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	This pathway was evaluated in detail in Fish and Fish Habitat Section 6.5.3.3. Effects to flows and water levels are expected to diminish at downstream locations, including the A69 assessment area (see Surface Water Hydrology Section 6.3.3.1.2).	No change - pathway was evaluated in detail in Fish and Fish Habitat Section 6.5.4.2.2. and Surface Water Hydrology Section 6.3.3.1.2.2
11	Dike Construction / Decommissioning	Construction, Closure	Release of sediment from dike construction/removal activities may cause changes in water quality, affecting fish and fish habitat in in Lake A17 (Whale Tail Lake) and Lake A16 (Mammoth Lake)	Use of the Dewatering Dikes, Operations, Maintenance and Surveillance Manual developed by Agnico Eagle. During summer construction, turbidity curtains will be installed near the portion of the alignment where dike construction will occur, which is an approach demonstrated to be successful at other northern mining projects. Non- potentially acid generating, chemically inert material (i.e., granite) will be used to construct the dike to prevent leaching of metals into water. Turbidity monitoring during dike construction will be conducted at designated locations throughout open-water and under-ice conditions, within and outside of the zone of the turbidity curtains. In the event that TSS concentrations approach monitoring thresholds, a review of local conditions and activities will be conducted. A closure plan will be developed which will include management of dike breaching and removal activities to limit the potential for effects to water quality and fish and fish habitat.	Secondary (A1 assessment area) No linkage (A69, C1, and C38 assessment areas)	Secondary (A1 assessment area) No linkage (A69, C1, and C38 assessment areas)	Through the described mitigation, the release of sediment from dike construction and breaching of the dike is expected to result in short-term, localized, and minor changes to water quality in the adjacent environment of the dikes, resulting in negligible effects to fish habitat and the health of VC fish species	No change
12	General mining activities and use of vehicles	Construction, Operations, Closure	Activities from construction activities and mining operations (e.g., equipment, vehicles, buildings, open-pit mining, blasting) can create fugitive dust emissions and subsequent dust deposition may cause a change in water quality, affecting fish habitat and fish health.	Implement dust control measures, if needed on mine roads. Equipment and vehicles will comply with relevant non-road emission criteria at the time of purchase Enforcing speed limits (maximum speed 50 km/h) to suppress dust production. Design road as narrow as possible while maintaining safe construction practices; passing turnouts will be placed to accommodate multi-directional traffic. If deemed necessary through monitoring, dust from roads will be managed through use of dust suppressant. The running surface of the road will be maintained thereby reducing the generation of dust. Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1) Most personnel arriving at or leaving the site will be transported by bus, thereby reducing the amount of traffic (and dust).	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	This pathway was assessed in Surface Water Quality Section 6.4.3.1. The effects of dust are predicted to have a negligible effect on water quality, and therefore on fish and fish habitat	No change
13	General mining activities and use of vehicles	Construction, Operations, Closure	Activities from construction activities and mining operations (e.g., equipment, vehicles,) can alter air emissions (including Sulphur dioxide and nitrogen oxides) and subsequent deposition may cause a change in water quality, affecting fish habitat and fish health.	Adherence to water quality monitoring and adaptive management in the CREMP to detect changes in water quality Construction equipment and trucks will be equipped with industry-standard emission control systems. Compliance with regulatory emission requirements will be met. Exhaust emissions from non-road vehicles will be managed through regular and routine maintenance of vehicles. SO_2 emissions from non-road vehicles and stationary equipment will be reduced through the use of low emission diesel fuel. Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1) to detect changes in air quality	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	This pathway was assessed in Surface Water Quality Section 6.4.3.1. The effects of air emissions are predicted to have a negligible effect on habitat quality.	No change
14	Site Water Management	Construction, Operations	During the construction and operations of the Whale Tail, Mammoth, and WRSF dikes, water diversions will result in a reduction of water levels in Lake A16 (Mammoth Lake) and downstream locations, affecting fish and fish habitat.	The Water Management Plan will be implemented.	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	This pathway was evaluated in detail in Fish and Fish Habitat Section 6.5.3.3. Effects to flows and water levels are expected to diminish at downstream locations, including the A69 assessment area (see Surface Water Hydrology Section 6.3.3.1.2).	No change

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	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
15	Waste Rock Storage Areas and Stockpiles	Construction, Operation, Closure	Leachate, and seepage from the WRSFs may change water and sediment quality (i.e., metal concentrations) in nearby waterbodies, affecting fish habitat quality and fish health.	A Water Management Plan has been developed and describes the containment and management of contact water on-site. Contact water will be monitored and managed through the Storage and Attenuation Ponds. The IVR Diversion will divert clean runoff from the upper watershed of the IVR Pit to the Nemo Lake watershed. Seepage will be captured at sumps and diverted to the Attenuation Ponds. All ponds collecting seepage will be designed to prevent release into the surrounding aquatic environment. Facility discharge water will be monitored for water quality, and treated as required, prior to discharge. Performance of the dikes will be monitored throughout their construction and operating life.	Secondary (A1 assessment area) No linkage (Haul Road, A69, C1, and C38 assessment areas)	Secondary (A1 assessment area) No linkage (Haul Road, A69, C1, and C38 assessment areas)	Waste rock that meets the requirements for building material will be crushed, screened, and used for the construction of dikes, foundations, laydown pads, and roads. Use of the waste rock in construction will take into account that leachate draining from the waste rock may contain trace metals in concentrations that exceed CCME freshwater aquatic life guidelines. There is potential for arsenic as well as other parameters (i.e., chloride, fluoride, cadmium, lead, and selenium) to be present in the leachate. Waste rock used for construction will be monitored and remediation will be employed, if required. Changes to water quality, and therefore, fish, are expected to be minor. This pathway was also addressed in Table 3-C-6.	No change
16	Site Water Management	Construction, Operation, Closure	Runoff from mine site infrastructure and roads can affect surface water and sediment quality, affecting fish habitat quality and fish health	Road cross fill (surface slope from road centre line to edge of road) and side slope designed to encourage drainage. Best management practices for erosion and sediment control (e.g., silt curtains, runoff management) will be implemented, as needed to limit disturbance to lakes. No changes to the existing footprint of the AWAR or the Meadowbank Mine site Water Management Plan is approved and adhered to at existing facilities and Water Management Plan specific to the Whale Tail Pit areas has been developed and these plans have considered the containment and management of contact site water Runoff and seepage from the Project site will be diverted to sumps and the attenuation pond (and treated if required) prior to release. Water quality in attenuation ponds will be monitored and managed such that the discharge meets discharge limits. Potential acid generating rock and metal leaching waste rock will be segregated at source and placed into designated areas within waste rock locations Adherence to the Operational ARD/ML Testing and Sampling Plan (Volume 8, Appendix 8-E.5) and the Mine Waste Rock Management Plan (Volume 8, Appendix 8-A.1).	Secondary (Haul Road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul Road and A1 and D watershed assessment areas) No linkage (A69, C1, and C38 assessment areas)	Given the risk posed by contact water to the receiving environment water quality, environmental design features have been included to prevent release of untreated contact water into receiving waterbodies (also see Table 3-C-6). A key environmental design feature during construction will be the use of separate waste management procedures for the potentially acid generating (PAG) rock and adherence to the Operational ARD/ML Testing and Sampling Plan. Also, the Whale Tail deposit mineralization sulphur content is relatively low and is generally contained within the rocks that form the ore. Thus, the majority of waste rock is non-acid generating (non PAG) based on the low sulphur content and presence of excess carbonate buffering capacity. Approximately 25% of samples are characterized as PAG, mostly associated with waste rock from the central greywacke and chert lithologies. Runoff and lateral seepage from the waste rock/overburden facilities will not be released directly to the environment during operations. All surface water runoff from the areas of the mine facilities or that has been in contact with any mine facilities will be captured through collection ditches and sumps. Contact water from open pits will be pumped to the Attenuation Pond, along with surface water from the other facilities. Water collected at Attenuation Pond will either be used to supplement fresh water from Nemo Lake or be discharged as an effluent into Mammoth Lake through a diffuser outfall. Any discharge will meet Portage limits discharge criteria, or water license discharge criteria, whichever is lower. During closure, contact water will be treated to discharge limits and at some point treatment will no longer be required, and the water treatment facilities will be decommissioned. All runoff will be required to meet discharge limits. Changes to water quality (and fish habitat quality) from runoff are expected to be negligible.	No change - Contact water from open pits will be pumped to the Attenuation Ponds, along with surface water from the other facilities. Water collected at Attenuation Ponds will either be used to supplement fresh water from Nemo Lake or be discharged as an effluent into Mammoth Lake or alternative discharge locations (Lake 1 or Lake 5) through a diffuser outfall. Any discharge (i.e., to Mammoth Lake, Lake 1, or Lake 5) will meet Portage limits discharge criteria, or water license discharge criteria, whichever is lower.
17	Site Water Management	Construction, Operation, Closure	Process and potable water use resulting in reduced water levels can affect fish habitat quantity and quality in Lake A17 (Whale Tail) and Lake C38 (Nemo).	Manage pumping rates so total annual discharge from Whale Tail and Nemo Lake does not drop below the 10-year dry condition. Water withdrawal rate(s) will be controlled to avoid effects on the source water lake(s). Capture and reuse site water to reduce fresh water requirements.	Secondary (A1 and C38 assessment areas) No linkage (Haul Road, A69 and C1 assessment areas)	Secondary (A1 and C38 assessment areas) No linkage (Haul Road, A69 and C1 assessment areas)	At Whale Tail Pit, the source of process and potable water during construction and operations will be Nemo Lake, and the source of water for closure will be Whale Tail Lake. Freshwater requirements for process and potable water during operations is 241 m^3/day and approximately 48 m^3/day during construction and closure (Volume 1, Project Description). Where possible, process water will be reused to reduce the need for freshwater. The water demand relative to available source water makes potential effects to water and sediment quality in Nemo and Whale Tail Lake as a minor pathway, with negligible residual effects expected on water quality, and therefore fish. This pathway was also evaluated in Table 3-C-6.	No change - the rationale presented for the Approved Project applies to the IVR Pit
18	Site Water Management	Operation	Alteration of watershed flow paths may increase downstream flows and water levels, and affect channel/bank stability in diverted and receiving waterbodies, affecting fish and fish habitat	A Water Management Plan will be implemented. Pumped water from the dewatered lakes will be directed through properly designed structures to prevent erosion in the receiving waterbodies. Pumped discharge will be directed to the lake environment, and not directly to outlets, to attenuate flow changes. Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks), where needed. Where practical, natural drainage patterns will be used to reduce the use of ditches or diversion berms.	Secondary (A1, A69, C1, and C38 assessment areas) No linkage (haul road assessment area)	Secondary (A1, A69, C1, and C38 assessment areas) No linkage (haul road assessment area)	This pathway was assessed in Surface Water Hydrology Section 6.3.3.1. It is expected that an increase in flows and water levels will result in an overall increase of available fish habitat.	No change
19	Site Water Management	Construction, Operation	Water diversions for the Whale Tail and Northeast dikes during construction and operations will flood tributary lakes and streams, and will result in the alteration of fish habitat.	A Water Management Plan will be implemented. Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks), where needed.	Primary (A1 assessment area) No linkage (Haul Road, A69, C1, and C38 assessment areas)	No linkage	This pathway was assessed in Fish and Fish Habitat Section 6.5.3.2.	No change – this effect is considered previously assessed - mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project
20	Site Water Management - Dewatering	Construction, Operation	The dewatering of the diked area in Lake A17 (Whale Tail Lake) and Lake A16 (Mammoth Lake), and smaller waterbodies in the northeast area for the Expansion Project, will result in the removal and subsequent mortality of fish from the area during the proposed fish-out	A fish-out of the diked area of Whale Tail and Mammoth lakes, and smaller waterbodies in the northeast area for the Expansion Project, will be conducted before and during dewatering phase; the fish-out plan will be designed and implemented in consultation with DFO and local Inuit communities, and will consider recommendations in Tyson et al. (2011).	Primary (A1 assessment area) No linkage (haul road, A69, C1, and C38 assessment areas)	Primary (A1 assessment area) No linkage (haul road, A69, C1, and C38 assessment areas)	This pathway was assessed in Fish and Fish Habitat Section 6.5.3.2.	No change - pathway was assessed in Fish and Fish Habitat Section 6.5.4.2.2.
21	Site Water Management - Dewatering	Construction, Operation	Impingement and entrainment of fish in intake pumps during dewatering may cause injury and mortality to fish, affecting abundance and distributions	Appropriately sized fish screens, which meet DFO guidelines, will be fitted to pumps to limit fish access and to limit fish entrained to the smaller species and life stages	Secondary (A1 Assessment area) No linkage (haul road, C1, C38 and A69 assessment areas)	Secondary (A1 Assessment area) No linkage (haul road, C1, C38 and A69 assessment areas)	Using environmental design features and best practices, the effects to the fishery from impingement and entrainment during dewatering should be minor.	No change

Table 3-C-7: Potential Pathways for Fish and Fish Habitat Valued Components (Arctic Char, Arctic Grayling, Lake Trout, and Round Whitefish Fishery)

	Project Activity	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
22	Fuel Storage and use (includes Chemical and Hazardous material Storage and Explosives Storage Area)	Construction, Operation, Closure	Spills and leaks can affect water and sediment quality of nearby surface waters, affecting habitat quality and fish health	The Spill Contingency Plan will be implemented, including ready access to an emergency spill clean-up kit for cleaning up any spills. Hazardous materials and fuel will be stored according to regulatory requirements to protect the environment and workers and will be stored at the Meadowbank Mine. Storage tanks (e.g., fuel, engine oil, hydraulic oil, and waste oil and coolant) will be double walled, or located in lined and bermed containment areas. Hazardous wastes will be temporarily stored at Whale Tail Pit site and then transported to the Meadowbank Mine in appropriate containers to prevent exposure until they are shipped off site to an approved facility. Individuals working on site and handling hazardous materials will have appropriate training (e.g. WHMIS) Soils from petroleum spill areas will be deposited at the Meadowbank Mine Landfarm Equipment will be re-fueled, serviced, or washed away from the watercourse crossings. Fuel, lubricants, hydraulic fluids, and other chemicals will be stored at least 31 m away from the high water mark of any waterbody. Construction equipment will be regularly maintained. Emergency spill kits will be available wherever toxic materials or fuel are stored and transferred. Enforced speed limits.	No Linkage	No Linkage	Based on Agnico Eagle's experience at the Meadowbank Mine, accidental spills (e.g., fuel) have occurred, but most of the spill volumes have been small, and clean-up has occurred with only minor effects to the environment (Agnico Eagle 2015). Between 2011 and 2015, 63 reportable spills were reported to the GN spill hot line. In 2015, there were 4 spills greater than 900 L at Meadowbank. In 2015, spill training was provided to employees. All spills are managed appropriately on site in accordance with Agnico Eagle's Spill Contingency Plan and there was no offsite impact to any watercourses as a result of spills in 2015. In NIRB's 2011 annual report (NIRB 2011), it was noted that Meadowbank was kept in an impressively clean state with no apparent spills on location. It is anticipated that Meadowbank will continue to manage spills in the same manner and only minor impacts would be predicted to surface water quality with no effects to the productivity of the fishery. This pathway was also evaluated in Table 3-C-6.	No change
23	Mining Activities and Water Management	Construction, Operations, Closure	Release of treated mine effluent (including sources from sewage, WRSF pond, and attenuation pond contact) may cause changes to surface water quality and sediment quality (i.e., nutrient and metal concentrations) in receiving environment lakes in operations and closure.	A Water Management Plan has been developed and describes containment of contact water through the use of diversions, attenuation ponds, and treatment facilities during construction, operations, and closure. Runoff and seepage from the Project site will be diverted to sumps and the attenuation pond. Treated sewage will be piped to the Attenuation Ponds Water quality in Attenuation Ponds will be monitored and managed such that the discharge entering Mammoth Lake, Whale Tail Lake, or the alternative discharge locations (Lake 1 or Lake 5) meets discharge limits. If water quality does not meet discharge limits, it will be circulated and re-treated. Other applicable design features and mitigation, as identified in the Interim Closure and Reclamation Plan	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (haul road, C1 and C38 assessment areas)	Primary (A1 and D watershed assessment area) Secondary (A69 assessment area) No linkage (haul road, C1 and C38 assessment areas)	Changes to surface water quality from effluent discharges are assessed in Section 6.4.3.3. Predicted concentrations were compared to site-specific water quality objectives developed for the Project, CCME protection of aquatic life guidelines, Health Canada protection of drinking water quality guidelines, and baseline concentrations. Contaminants of potential concern were identified. Metal concentrations were carried forward into the Human Health and Ecological Risk Assessment (Appendix 3-B). Changes to nutrients (i.e., dissolved phosphorus) were carried into the Fish and Fish Habitat section and evaluated in detail in Section 6.5.4.3.2. Changes to water quality are expected to diminish downstream of proposed discharge locations (see Surface Water Quality Section 6.4.3.3).	No change
24	Mine Site Decommissioning	Closure	Removal of project infrastructure may alter flows, and release sediment and contaminants into nearby waterbodies, affecting fish habitat quality and fish health	An Interim Closure and Reclamation Plan has been developed and describes measures for permanent closure. All bridges and culverts will be removed and original drainage patterns restored. Stream crossings will be rehabilitated and instream work will be limited to the extent possible and will follow DFO operational guidance and timing windows. Roads will be scarified, allowing native plants to re-establish, and slopes will be stabilized against erosion. The surface of the waste rock storage facilities will be graded to shed water from the surface. Drainage patterns will be re-established as close to pre-construction conditions as possible, select non-contact water diversion ditches will be retained to promote surface water drainage. Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management and rip-rap on banks), as needed.	Secondary (Haul road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Secondary (Haul road and A1 assessment areas) No linkage (A69, C1, and C38 assessment areas)	Through the use of best management practices and monitoring during construction, operation, and decommissioning, effects to water and sediment quality are expected to be negligible; however, a water quality monitoring and reporting plan will be conducted to observe conditions. The present reclamation and closure plan for the Meadowbank Mine and for the Whale Tail Pit includes the roads and will feature erosion and sedimentation protection during the decommissioning phase. Thus the residual effects on surface water and sediment quality are considered to be negligible. This pathway was also evaluated in Table 3-C-6.	No change
25	Site Water Management -Reflooding	Closure	Reflooding of the diked area in Lake A17 (Whale Tail Lake) and Lake A16 (Mammoth Lake) at closure will reduce water levels in Lake A16 (Mammoth Lake) and downstream locations, resulting in effects to fish and fish habitat.	A Surface Water Management Plan will be implemented.	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (Haul Road, C1 and C38 assessment areas)	This pathway was evaluated in detail in Fish and Fish Habitat Section 6.5.3.3. Effects to flows and water levels diminish at downstream locations, including the A69 assessment area (see Surface Water Hydrology Section 6.3.3.1.5), where effects to fish and fish habitat are expected to be negligible.	No change
26	Water Management - Reflooding	Closure	Water quality concentrations in flooded pits may exceed objectives, and if reconnected to pre-construction flow paths may affect downstream water and sediment quality, affecting fish health and habitat quality	A Interim Closure and Reclamation Plan has been developed and describes measures for permanent closure. The pits are designed to have stable slopes during mining and post-closure. The pits will be progressively reclaimed as excavation is completed. Water quality in the pits will be monitoring continuously during the flooding process. The open pit will be kept disconnected form the surrounding waterbodies until the pit water meets acceptable concentrations for release to the environment. Water will be treated if it is unacceptable for discharge.	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (C1 and C38 assessment areas)	Primary (A1 assessment area) Secondary (A69 assessment area) No linkage (C1 and C38 assessment areas)	The pathway was evaluated in Fish and Fish Habitat Section 6.5.3.3, and in Surface Water Quality Section 6.4.3.3. Any changes in surface water quality during reconnection of the diked area are expected to be localized within Lake A17 (Whale Tail Lake) and Lake A16 (Mammoth Lake), with negligible effects to fish and fish habitat at downstream locations, including the A69 assessment area.	No change

Table 3-C-8: Potential Pathway for Heritage Sites

	Project Activity	Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
1	Mine Site Facilities and Supporting Infrastructure Construction	Construction	Heritage Sites	Construction activity leading to ground alteration that affects physical heritage resources	Complete heritage assessment for the Project footprint to identify archaeological sites present. For Additional measures refer to Item 2	Secondary	Secondary	Negligible residual effects once mitigation measures applied	No change - The same approach as in the Approved Project will be followed for the Expansion Project, as outlined in the updated Archaeological Management Plan – Agnico Eagle commits to conducting additional archaeological assessments for any previously unassessed Project footprint locations in archaeologically sensitive areas. Should any archaeological sites be identified in proposed quarries, they will not be developed
2	Mine Site Operations and Maintenance	Operations	Heritage Sites	Activities such as regrading embankments, shoulder stabilization or new borrow sources if required; changes in water levels; accidents or malfunction; and increased tourism to sites in project area as a result of improved access that results in site damages	Alter or adjust the location of a Project component or activity to fully avoid impacts on culturally important sites such as graves; otherwise mitigate and conduct heritage resource surveys in accordance with the GN department of Culture and Heritage. For archaeological sites that will be adversely affected by the Project, and where more passive mitigation strategies (e.g., capping, relocation) are not viable for those locations, preservation by systematic recording (i.e., excavation or documentation) is an option. Complete additional heritage baseline assessment for any changes to the Project footprint in areas considered to have potential to contain heritage resources. Agnico Eagle will mark the perimeter of heritage sites to be avoided with flagged stakes or similar, will erect “no work zone” signage, and, if in a potentially high traffic area, will erect snow fencing or similar barrier to prevent entry. Agnico Eagle will monitor condition of site barriers. Agnico Eagle will include no work areas on project drawings. Provide awareness training for Agnico Eagle and Contractors that includes general guidelines for the appropriate response to the inadvertent discovery of known or suspected archaeological materials.	Secondary	Secondary		
3		Operations	Heritage Sites	Additional 3 years of processing and use of supporting infrastructure at the Meadowbank mine site and the existing AWAR for delivery of materials	The existing AWAR and Meadowbank Mine are approved and licensed and heritage resources within these footprints have been previously mitigated. Complete heritage assessment for the Meadowbank Project footprint to identify archaeological sites present was completed prior to construction of these facilities.	No Linkage	No Linkage	There is no change to the existing footprint. Therefore there are no heritage sites that will be impacted.	No change
4	Mine Site Decommissioning	Closure	Heritage Sites	Closure, reclamation and post-closure activities such as scarifying roads, breaching of dikes, removal of buildings if occurring outside original footprint	Refer to Item 2	Secondary	Secondary	Negligible residual effects once mitigation measures applied	No change

Table 3-C-9: Potential Pathway for Traditional Land Use

Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Construction, Operations, and Closure	TLU: Wildlife Harvesting	Project activities may affect continued opportunities for traditional wildlife harvesting	Compact arrangement of Project infrastructure to reduce the overall project footprint. Design roads as low and narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. See the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1) for additional details. Surveys of proposed granular sources for dens and nests will take place prior to construction. Wildlife will have the right-of-way and vehicle traffic will be minimized according to the TEMP. Maximum speed limits of 50 km/hr will be enforced. Roads will have low profiles to avoid barriers. Traffic volumes will be managed and roads closed when large numbers of caribou are present, in consultation with the HTO, GN, and KIA according to the TEMP. All employees will be provided with wildlife environmental awareness training. Drivers will be alerted when caribou are observed near the haul road. Littering and feeding of wildlife will be prohibited. Employees will be notified when caribou, muskox and predatory mammals are observed in the local study area. Detailed mitigation is provided in the TEMP (Volume 8, Appendix 8-C.1). Where possible, clearing of vegetation would take place outside the migratory bird breeding season. Removal of physical hazards at closure and post-closure will be consistent with Meadowbank Mine and the Whale Tail Interim Closure Plan (Appendix 8-F.1). Land will be cleared outside the breeding season (June 1 to August 1). Mitigation to reduce impacts to nesting birds will be discussed with Environment Canada. All spills will be immediately reported, cleaned up and/or isolated from the receiving environment. Ready access to emergency spill kits. Regular maintenance of equipment to reduce oil leakage. Training in refueling procedures for site staff. Hazardous materials and fuel will be stored according to regulatory requirements. Detailed mitigation is provided in the Emergency Response Plan, Hazardous Materials Management Plan, Whale Tail Haul Road Management Plan and Spill Contingency Plan (Volume 8). Dust mitigation measures will be applied as outlined in Table 3-C-1 and 3-C-3. Monitoring for bird nesting activity. Birds showing nesting activity will be discouraged from nesting and roosting on site infrastructure. Detailed mitigation is described in the TEMP (Volume 8, Appendix 8-E.9). Attenuation Ponds will be monitored for use by water birds as part of the TEMP. Deterrents will be used if required. Attenuation Ponds will be monitored for water quality. Detailed mitigation is described in the TEMP (Volume 8, Appendix 8-E.9). Enforce no hunting, trapping, harvesting or fishing policy for employees and contractors. Hunter harvest survey, consistent with the Meadowbank Mine will continue. Access to the Project will be controlled (gated at Meadowbank); Restricting public vehicle access beyond km 85 of Meadowbank All-weather Access Road. All efforts will be made to enforce a no shooting zone for the public along the road and around the Project site. All roads will be decommissioned and scarified during closure. Detailed mitigation is provided in the Whale Tail Haul Road Management Plan (Volume 8, Appendix 8-C.1), Interim Closure Plan and Reclamation Plan (Volume 8, Appendix 8-F.1) and TEMP (Volume 8, Appendix 8-E.9). Any PAG or high metal leaching waste rock will be segregated at source and placed into designated areas within waste rock storage facilities to control acid generating reactions and the migration of contaminants. Leachate from the waste rock piles will be monitored and controlled and not released to the natural environment. Detailed mitigation is provided in the Operational ARD-ML Sampling and Testing Plan, Landfarm Design and Management Plan, Landfill Design and Management Plan, and Mine Waste Rock Management Plan, Air Quality and Dustfall Monitoring Plan, Haul Road Management Plan, Water Management Plan, AEMP, CREMP and the TEMP (Volume 8). Continue social management approach identified in Sections 5.4, 5.5 and 5.6 of the Socio-Economic Management and Monitoring Plan Adhere to mitigation measures outlined in Table 3-C-3.	Primary for Traditional Land Use of Caribou and Waterfowl/Geese Secondary for Traditional Land Use of Muskox, Ptarmigan, Furbearers/Predatory Mammals	Primary	Primary pathway for harvesting of caribou and waterfowl/geese (see Section 7.3.3.2). Upland birds were not identified as a preferred species for harvesting by Baker Lake harvesters, other than ptarmigan which are harvested closer to the community. No environmentally significant effects were anticipated for the other wildlife VCs, including muskox, predatory mammals (Arctic wolf, wolverine, grizzly bear), raptors and small mammals, following the implementation of mitigation measures. Muskox and grizzly bears were not identified as preferred species for harvesting. The Project area was not identified as a preferred area for trapping activities, and furbearers will still be available for harvesting in preferred trapping locations closer to the community, and in the greater region. Subsequently, the primary pathway for continued opportunities for traditional wildlife harvesting is limited to caribou and waterfowl harvesting.	No change

Table 3-C-9: Potential Pathway for Traditional Land Use

Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Construction, Operations, and Closure	TLU: Fishing	Project activities may affect continued opportunities for traditional fishing	Adhere to mitigation measures outlined in Table 3-C-7.	Primary	Primary	The Project is expected to affect traditional fishing (Sections 7.3.2.1.2; 7.3.3.2), and so has been carried forward for assessment as a primary pathway.	No change - Primary pathway for traditional fishing, when considering the results of the fish assessment, traditional land use patterns, and IQ values and community concerns (Section 7.3.2.1.2).
			Compact layout of the surface facilities within local watersheds will limit the area that is disturbed by construction and operation.				
			Best management practices for erosion and sedimentation control (e.g., ground cover, silt fences and curtains, runoff management), where needed.				
			Where practical, natural drainage patterns will be used to reduce the use of ditches and diversion berms.				
			Use of design features to reduce changes to local flows, drainage patterns, and drainage areas.				
			Roads aligned to cross streams of low quality habitat to the extent possible.				
			Design roads as narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. For example, minimum haul road widths are defined under the *Mine Health and Safety Act, NWT (Nu)* .				
			Diversion channels will be designed to provide fish habitat and conditions allowing for passage of Arctic char, lake trout, and Arctic grayling where necessary.				
			Adherence to the Water Management Plan (Volume 8, Appendix 8-B.2).				
			Quarries will be inspected on a regular basis to monitor water ponding, particularly at spring melt; when there is flow from a quarry that could enter a waterbody, a water quality sample will be collected and analyzed.				
			The dike will be constructed using not contain potentially acid-generating rock or low potential for metal leaching material				
			In-stream works will be constructed in winter, when possible, to avoid increased TSS and turbidity, and changes to water and sediment quality.				
			Mining staff will not be allowed to hunt or fish while on their work rotation; Agnico Eagle will develop and enforce “no hunting, trapping, harvesting or fishing policy” for employees and contractors, which will be consistent with the Meadowbank Mine.				
			Runoff and seepage from the Project site will be diverted to sumps and attenuation ponds (and treated if required), prior to release.				
			Water quality in attenuation ponds will be monitored and managed such that the discharge meets discharge limits.				
			Any potentially acid generating (PAG) or high metal leaching waste rock will be segregated at source and placed into designated areas within the waste rock storage facility.				

Table 3-C-9: Potential Pathway for Traditional Land Use

Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Construction, Operations, and Closure	TLU: Plant Gathering	Project activities may affect continued opportunities for traditional plant harvesting	Adherence to the mitigation measures for vegetation outlined in Table 3-C-2.	Primary	Primary	Primary pathway for traditional plant harvesting, due to the consideration of results from the vegetation assessment, traditional land use patterns, and IQ values (Section 7.3.3.2).	No change
			Compact infrastructure arrangement is designed to reduce the overall Project footprint.				
			Minimizing the haul road width and length by designing roads as narrow as possible, while maintaining safe construction and operation practices, and meeting legislated requirements. For example, minimum haul road widths are defined under the Mine *Health and Safety Act* .				
			Limit the use high value habitats to only what is required (e.g., esker, shorelines).				
			Implement a Closure and Reclamation Plan, restoring contours and reclaiming habitat after closure.				
			Implement the spill plan for potential chemical spills, including hydrocarbons.				
			Best management practices for erosion and sedimentation control (e.g., silt curtains, runoff management, armouring of banks, sloping of banks), where needed.				
			Use of design features (i.e., dams, drainages, dykes, and diversions) that reduce changes to local flows, drainage patterns, and drainage areas.				
			Design and construct roads using thaw-stable construction fills to minimize frost effects.				
			Seepage and runoff from the waste rock storage facility will be managed via the Whale Tail Waste Rock Storage Facility Pond where the contact water will then be pumped to the Whale Tail Attenuation Pond for further treatment.				
			Use of non-acid generating materials for road bed and fills.				
			Implement dust control measures on mine roads, when required.				
			Road surfaces will be maintained through grading and the addition of granular material.				
			Equipment and vehicles will comply with relevant non-road emission criteria at that time of purchase.				
			Use of non-acid generating materials for road bed and fills.				
			Enforcing speed limits will assist in reducing dust emissions.				
			Implement the Spill Contingency Plan (Volume 8, Appendix 8-D.5) for potential chemical spills, including hydrocarbons.				
			Waste rock management procedures developed for potentially problematic waste rock/overburden material. Implement the Mine Waste Rock Management Plan.				
			Hazardous materials and fuel will be stored according to regulatory requirements to protect the environment and workers.				
			Adherence to the Air Quality and Dustfall Monitoring Plan (Volume 8, Appendix 8-E.1).				

Table 3-C-9: Potential Pathway for Traditional Land Use

Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Construction, Operations, and Closure	TLU: Culturally Important Sites	Project activities may affect continued opportunities for the use of culturally important sites	Adherence to mitigation measures outlined in Table 3-C-8 and those related to noise under Table 3-C-1. Complete heritage assessment for the Project footprint to identify archaeological sites present. Alter or adjust the location of a Project component or activity to fully avoid impacts on culturally important sites such as graves; otherwise mitigate and conduct heritage resource surveys in accordance with the GN department of Culture and Heritage. For archaeological sites that will be adversely affected by the Project, and where more passive mitigation strategies (e.g., capping, relocation) are not viable for those locations, preservation by systematic recording (i.e., excavation or documentation) is an option. Complete additional heritage baseline assessment for any changes to the Project footprint in areas considered to have potential to contain heritage resources. Agnico Eagle will mark the perimeter of heritage sites to be avoided with flagged stakes or similar, will erect “no work zone” signage, and, if in a potentially high traffic area, will erect snow fencing or similar barrier to prevent entry. Agnico Eagle will monitor condition of site barriers. Agnico Eagle will include no work areas on project drawings. Provide awareness training for Agnico Eagle and Contractors that includes general guidelines for the appropriate response to the inadvertent discovery of known or suspected archaeological materials. Provide ongoing consultation with the community of Baker Lake (specifically Elders and the HTO Members), and provide opportunities for participation in heritage resource surveys and mitigation measures. The following environmental design and mitigation features will reduce the effects of haul road operations on noise: • Best Management practices for controlling equipment noise emissions, including use of silencers on all trucks • Enforcing speed limits • Regular maintenance will be implemented for equipment and vehicles Implement the mitigation measures outlined in the Noise Monitoring and Abatement Plan that was developed for the Meadowbank mine site in 2009 (Agnico Eagle 2009) and refined in 2013 (Agnico Eagle 2013).	Primary	Primary	Primary pathway for the use of culturally important sites, due to the consideration of results from the heritage resources assessment and noise assessment, traditional land use patterns, and IQ values (Section 7.3.3.2).	No change
Construction, Operations, and Closure	TLU Access	Project activities may change access to traditional use areas	Use minimal sized footprint. The haul road will be closed to the public. Access to the Project will be controlled (gated at Meadowbank); Restricting public vehicle access beyond km 85 of Meadowbank All-weather Access Road. Enforce no hunting, trapping, harvesting or fishing policy for employees and contractors. Hunter harvest survey, consistent with the Meadowbank Mine will continue. Agnico Eagle will work with local wildlife harvesters to ensure the preferred ATV and snowmobile crossing areas are well identified for both hunters and operators on the road.	No linkage	No linkage	The Project area is primarily used as a travel corridor between Baker Lake and the Back River area to access preferred TLU sites, and it continues to be used opportunistically. Use of the Project area has increased recently due to the construction of the Meadowbank all-weather road. Access is via trails used by ATVs in the summer and snowmobiles in the winter, some of which may intersect with the Project area. The Haul Road will be closed to the public and will have controlled access at the mine site, and will only be available to Agnico Eagle staff and contractors. The Haul Road does not connect with any communities in Kivalliq or beyond. Agnico Eagle will consult with land users to identify important travel routes that potentially intersect the Project footprint, and will install ATV or snowmobile crossing areas along the Haul Road and signage for vehicles. The Project is not expected to change current access to or use of the AWAR.	No change

Table 3-C-9: Potential Pathway for Traditional Land Use

Project Phase	Valued Components	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Construction, Operations, and Closure	TLU: Marine Resource Harvesting	Project activities may affect continued opportunities for traditional marine resource harvesting	Implement a marine mammal and seabird observer program onboard Project vessels. Implementation of the Shipping Management Plan, Oil Pollution Emergency Plan, Spill Contingency Plan, and Emergency Response Plan.	N/A	Primary	N/A	Primary pathway when considering the results of the marine resource assessment, traditional land use patterns, and IQ values and community concerns (Section 7.3.2.1.5). No linkage to disturbance to preferred sites or access because the shipping frequency/volume for the Expansion Project is expected to remain the same as for Meadowbank mine (no net increase in shipping activity). The shipping route will also remain the same. Social and economic factors from the Project affecting participation in traditional land resource use activities has no linkage because of the existing low representation at Meadowbank by Chesterfield Inlet residents and the small labour force that is available for the Expansion Project.

Table 3-C-10: Potential Pathway for Socio-economics

Valued Components	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
Economic Development	Construction / Operations	The Project will contribute to territorial economic activity via expenditures, procurement and Gross Domestic Product contributions	Not applicable	Primary	Primary	Project contribution will be large relative to territorial economy	No change - see Appendix 7-B, Section 7-B-1.4.2
		The Project will contribute to government revenues through the payment of taxes and royalties		Primary	Primary	Project contribution will be large relative to territorial economy	
		The Project will contribute to local business development through procurement and contacting		Primary	Primary	Project contribution will be large relative to business capacity	
Employment and Training	Construction / Operations	The Project will result in direct, indirect and induced employment opportunities	Use of existing Meadowbank Mine workforce.	Primary	Primary	Project contribution will continue a large amount of existing employment	No change - see Appendix 7-B, Section 7-B-1.4.3
		The Project will result in direct, indirect and induced incomes	Use of existing Meadowbank Mine workforce.	Primary	Primary	Project contribution will be large relative to labour force and incomes	
		The Project will provide training opportunities for its workforce	Continue existing training initiatives for the Project's workforce.	Primary	Primary	Education and training builds long-term capacity in the labour force Taken together, the pathway is: Support for Training and Education	
		The Project will contribute to community education					
Individual and Community Wellbeing	Construction to Post-Closure	The Project may contribute to intra- and/or inter-territorial migration and associated population and demographic change in communities	Use of existing Meadowbank Mine workforce; Housing out-of-area workers in on-site camp; Fly-in/fly-out to and from Kivalliq communities.	No Linkage	No linkage	Project is not expected to generate employment-driven migration	No change
	Construction / Operations	Project incomes may enhance individual and community wellness by providing access to education, nutritious food, and recreation, and by reducing poverty	Continue social management approach identified in Sections 5.3, 5.5, 5.6, 5.7 and 8.0 of the Socio-Economic Management and Monitoring Plan	Primary	Primary	Community investment can have a long-term positive effect on life in a community, especially where outside sources are limited Taken together, the pathway is: Continued Community Investment	No change - see Appendix 7-B, Section 7-B-1.4.4
	Construction to Closure	The Project may enhance individual and community wellness by continuing community contributions and the IIBA					
	Construction / Operations	The Project will continue existing individual and family wellness programming (e.g., EFAP)					
	Construction to Post-Closure	The Project may improve health and safety awareness amongst employees, their families, and their communities	Continue social management approach identified in Sections 5.3, 5.4 and 5.6 of the Socio-Economic Management and Monitoring Plan	Primary	Primary	Health and safety awareness can have significant, long-lasting implications	
	Construction to Closure	The Project may result in accidental injury or emergencies	Continue social management approach identified in Sections 5.4 and 5.6 of the Socio-Economic Management and Monitoring Plan	Primary	Primary	A single accident can be catastrophic if it results in loss of life	
	Construction to Post-Closure	Project incomes may adversely affect family and community cohesion through social ills (e.g., substance abuse, sexual misconduct, family violence, crime)	Continue social management approach identified in Sections 5.4, 5.5 and 5.6 of the Socio-Economic Management and Monitoring Plan	Primary	Primary	Social ills can linger after a Project is gone, and can have a significant adverse effect on people Taken together, the pathway is: Changes in Family and Community Cohesion	
		Project incomes may exacerbate income inequality, social disparity, and, potentially, related conflict in families and crime in communities	Continue social management approach identified in Section 5.5 of the Socio-Economic Management and Monitoring Plan				
		Project rotational employment may adversely affect family and community cohesion related to extended time away from family and community	Continue social management approach identified in Sections 5.4, 5.5 and 5.6 of the Socio-Economic Management and Monitoring Plan	Primary			
	Construction to Closure	Project-related nuisance effects (noise, increased traffic, dust, visual disturbances) could affect people's quality of life	Use existing Meadowbank Mine infrastructure; Housing out-of-area workers in on-site camp; Fly-in/fly-out to and from Kivalliq communities; Implement noise and air quality mitigations including: Adherence to the • Air Quality and Dustfall Monitoring Plan. • Enclosures are used to reduce fugitive emissions at the processing facility. • Adherence to the Incinerator and Composter Waste Management Plan • Best Management practices for controlling equipment noise emissions, including use of silencers on all trucks • Enforcing speed limits. • Regular maintenance will be implemented for equipment and vehicle.	No Linkage	No linkage	The Project will use existing mine infrastructure, and is far from communities	No change
Infrastructure and Services	Construction to Post-Closure	Project-induced migration can increase demand for housing and associated crowding	Use of existing Meadowbank Mine workforce; Housing out-of-area workers in on-site camp; Fly-in/fly-out to and from Kivalliq communities.	No Linkage	No linkage	No Project employment-driven migration or population change is anticipated	No change
		Project-induced migration can increase demand on physical infrastructure		No Linkage	No linkage		No change
		Project-induced migration can increase demand for social and healthcare services		No Linkage	No linkage		No change
		Project-induced migration can increase demand for emergency and protective services		No Linkage	No linkage		No change
	Construction to Closure	Population growth and demographic change		Not applicable - not assessed	Primary	Not applicable	See Appendix 7-B, Section 7-B-1.4.5 - the direct labour requirement of the Expansion Project is not expected to induce a meaningful scale of intra-regional migration within Kivalliq

Table 3-C-10: Potential Pathway for Socio-economics

Valued Components	Project Phase	Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Expansion Project - Pathway Assessment	Approved Project - Rationale	Expansion Project - Rationale
	Construction to Closure	Change in demand for and availability of housing		Not applicable - not assessed	Primary	Not applicable	See Appendix 7-B, Section 7-B-1.4.5 - in-migration of any scale can exacerbate pressure on already constrained housing conditions
	Construction to Closure	Change in demand for and capacity of services and infrastructure		Not applicable - not assessed	Primary	Not applicable	See Appendix 7-B, Section 7-B-1.4.5 - as with housing, even a small level of population-driven change in demand for services and infrastructure can create pressure requiring management in an already constrained system
Governance	Construction to Closure	The Project could impact the operation of governments	The Project will operate in a manner compliant with all governing bodies.	No Linkage	No linkage	The Project will operate in a manner compliant with all governing bodies	No change
Non-Traditional Land Use	Construction to Closure	Project disturbances could impact commercial outfitting or fishing	The Project does not interact with commercial fishing and other tourism initiatives and it does not interact with parks or protected areas.	No Linkage	No linkage	No known commercial activity is expected to interact with the Project	No change
		Project disturbances could impact tourist canoeing on major rivers		No Linkage	No linkage	The Project will not alter the navigability of the Thelon River	No change
		Project disturbances could impact the use of parks and protected areas		No Linkage	No linkage	The Project is not in close proximity to any known parks or protected areas	No change
		Project activities could conflict with regional or municipal land use planning initiatives	The Project will comply with all relevant land use planning in its vicinity.	No Linkage	No linkage	The Project will comply with all relevant land use planning in its vicinity	No change