

NUNAVUT NUKKIKSAUTIIT CORPORATION

Project Proposal

Iqaluit Nukkiksautiit Project

August 2026

Submitted by
Dillon Consulting Limited

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Project Proposal – Iqaluit Nukkiksautiit Project

Dillon Consulting Limited (Dillon) is pleased to submit this Project Proposal for the Iqaluit Nukkiksautiit Project (INP) on behalf of the Nunavut Nukkiksautiit Corporation (NNC).

This Project Proposal summarizes the current proposed Project configuration, available baseline information, preliminary design basis, anticipated regulatory pathway, and current planning assumptions for the Iqaluit Nukkiksautiit Project. The information is provided to support the Nunavut Impact Review Board (NIRB) for project screening under the *Nunavut Planning and Project Assessment Act* (NuPPAA).

As the Project remains in the planning and preliminary design stage, certain construction-level details will continue to be refined through engineering studies, environmental fieldwork, Inuit engagement, Nunavut Water Board licensing, land use permitting, and other applicable regulatory processes.

Should you have any questions or require additional information in support of this submission, please do not hesitate to contact the undersigned.

Sincerely,

Dillon Consulting Limited

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cc: Keith Drover, Project Director, Nunavut Nukkiksautiit Corporation
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Acronyms, Abbreviations, Definitions

CAAQS	Canadian Ambient Air Quality Standards
CEA	Cumulative Effects Assessment
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
ECR	Environmental Commitments Register
EIA	Environmental Impact Assessment
ETIAS	Environmental Impact Assessment Scope
EIS	Environmental Impact Statement
EPP	Environmental Protection Plan
ESC	Erosion and Sediment Control
FEED	Front-End Engineering Design
GHG	Greenhouse Gas
GN	Government of Nunavut
HADD	Harmful alteration, disruption or destruction
HTA	Hunters and Trappers Associations
IAAC	Impact Assessment Agency of Canada
IQ	Inuit Qaujimajatuqangit (Inuit Traditional Knowledge)
INP	Iqaluit Nukkiksautiit Project
kV	Kilovolt

LPA	Local Project Area
MBCA	<i>Migratory Birds Convention Act</i>
Mm ³	million cubic meters
MW	Megawatt
NAD83	North American Datum 1983
NAPS	National Air Pollution Surveillance
NIRB	Nunavut Impact Review Board
NLUP	Nunavut Land Use Plan
NNC	Nunavut Nukkiksautiit Corporation
NPC	Nunavut Planning Commission
NRI	Nunavut Research Institute
<i>NuPPAA</i>	<i>Nunavut Planning and Project Assessment Act</i>
PDA	Project Development Area
QIA	Qikiqtani Inuit Association
RSA	Regional Study Area
<i>SARA</i>	<i>Species at Risk Act</i>
SAR	Species at Risk
SEIA	Socio-Economic Impact Assessment
TDG	Transportation of Dangerous Goods
TSS	Total Suspended Solids
VEC	Valued Ecosystem Component

Plain Language Summary

The Iqaluit Nukkiksautiit Project (INP or the Project) is an Inuit-led renewable energy project proposed for the Kuugaaluk River system on the Hall Peninsula. The Project is led by Nunavut Nukkiksautiit Corporation (NNC), a 100% Inuit-owned clean energy company. The purpose of the Project is to provide a reliable source of renewable electricity for Iqaluit and reduce reliance on diesel fuel imported from outside Nunavut.

The Project would include a hydroelectric facility with an installed generating capacity of up to 30 megawatts (MW) for the purpose of NIRB screening. Preliminary power and energy modelling has considered both 15 MW and 30 MW operating cases. The 15 MW case represents a lower operating scenario that may better reflect continuous or near-continuous generation under preliminary hydrologic assumptions, while the 30 MW case represents the proposed installed capacity and maximum design basis for screening. Final operating rules, generating output, reservoir drawdown, and seasonal production will be refined through detailed engineering, hydrologic monitoring, Inuit engagement, environmental assessment, and Nunavut Water Board licensing. Electricity would be produced by storing water from an existing lake and river system and releasing it through turbines. The main Project components would include a dam, reservoir, powerhouse, turbines, generators, spillways, intake structures, and other water control structures used to manage water levels and flows. The proposed reservoir is expected to cover approximately 7,136 hectares. Reservoir water levels would be managed to support power generation while maintaining downstream flow.

Other Project infrastructure would include three potential all-season access road route options, each approximately 66 km long, with one final route to be selected through detailed design, Inuit engagement, environmental fieldwork, and regulatory review. The 69 kV transmission line is proposed to be twinned with, and generally follow, the final selected all-season access road alignment. Temporary facilities, such as seasonal camps, laydown areas, work areas, and material borrow areas, would also be required during field studies and construction. Temporary areas would be removed or restored when they are no longer needed.

The Project is still in the planning and preliminary design stage. The size, location, and design of Project components will continue to be refined through engineering studies, environmental fieldwork, Inuit engagement, regulatory review, and future permitting. Details such as final road alignment, construction methods, water management plans, reservoir operating rules, and mitigation measures will be updated as more information becomes available.

The Project Area includes tundra, permafrost, freshwater systems, fish habitat, wildlife habitat, and areas used for Inuit travel and harvesting. Inuit Qaujimajatuqangit (IQ), or Inuit knowledge, has played an important role in shaping the Project to date. IQ helps inform decisions about Project siting, access routes, seasonal timing of work, wildlife protection, fish habitat, culturally important areas, and monitoring. NNC expects IQ and Inuit engagement to continue guiding Project planning, assessment, design, construction, and operations.

Environmental, socio-economic, and technical studies are ongoing. These studies include water flow, water quality, fish and fish habitat, wildlife, vegetation, permafrost, ground stability, archaeology, land use, and socio-economic conditions. The information collected can support future environmental assessment work if required, including preparation of an Environmental Impact Statement (EIS), and will help refine Project design, mitigation, monitoring, and safety measures.

The Project is being reviewed under the *Nunavut Planning and Project Assessment Act* (NuPPAA). It requires review by the Nunavut Planning Commission (NPC) and screening by the Nunavut Impact Review Board (NIRB). Based on current information, the Project does not require a federal impact assessment under *the Impact Assessment Act*. Federal, territorial, and other permits or authorizations will still be required for specific activities, including work in or near water, water use, land use, and works affecting navigable waters.

If approved and constructed, the Project has the potential to reduce diesel use in Iqaluit, subject to final design, approvals, construction, operations, and grid integration. It may also lower greenhouse gas emissions and improve long-term energy security. The Project may support Inuit employment, training, business opportunities, and participation in long-term asset management. NNC will continue to work with Inuit communities, regulators, and partners to support consideration of Inuit values, environmental protection, and territorial priorities as Project planning and regulatory review advance.

Executive Summary

The Iqaluit Nukkiksautiit Project (INP or “the Project”) is an Inuit-led renewable energy project proposed within the Kuugaaluk River system on the Hall Peninsula, approximately 60 kilometres (km) northeast of Iqaluit, Nunavut. The Project is being advanced by Nunavut Nukkiksautiit Corporation (NNC), a 100% Inuit-owned clean energy company, and is intended to provide a long-term renewable electricity source for Iqaluit and reduce reliance on imported diesel fuel.

For the purpose of NIRB screening, the Project is being assessed on the basis of an installed generating capacity of up to 30 MW. This installed capacity represents the current maximum screening envelope for the hydroelectric facility and associated infrastructure. Preliminary power and energy modelling includes both 15 MW and 30 MW operating cases to evaluate water availability, reservoir performance, seasonal generation potential, and operating constraints. The 30 MW installed capacity should not be interpreted as continuous firm output under all hydrologic conditions. Generation levels will vary based on inflow, reservoir storage, environmental flow requirements, maintenance, electricity demand, and operating rules. These matters will continue to be refined through future design, hydrologic assessment, aquatic studies, Inuit engagement, and Nunavut Water Board licensing.

The current Project concept includes a dam, reservoir, powerhouse, turbines, generators, spillways, intake structures, access roads, temporary camps, laydown areas, material borrow areas, transmission infrastructure, and a new substation near Iqaluit to connect the Project to the existing electrical system.

The Kuugaaluk River system, meaning “big river” or “large river area” in local terminology, is a large, interconnected watershed of rivers and lakes that supports Inuit travel, harvesting, fish and wildlife habitat, and other important ecological and cultural functions. Inuit Qaujimajatuqangit (IQ), or Inuit knowledge, has informed Project planning to date and will continue to support decisions related to Project siting, access routes, seasonal timing, fish and wildlife protection, culturally important areas, monitoring, and future mitigation planning.

This Project Proposal has been prepared to support review by the Nunavut Planning Commission (NPC) and screening by the Nunavut Impact Review Board (NIRB) under the *Nunavut Planning and Project Assessment Act* (NuPPAA). It provides information on the current proposed Project configuration, preliminary design basis, environmental and socio-economic setting, baseline studies, anticipated regulatory pathway, engagement approach, and screening-level planning assumptions.

The Project remains in the planning and preliminary design stage. Project component locations, footprints, construction methods, reservoir operating rules, water-use requirements, fuel storage, access arrangements, and mitigation measures will continue to be refined through engineering studies, hydrologic modelling, environmental fieldwork, Inuit engagement, Nunavut Water Board licensing, land use permitting, and other applicable regulatory processes.

Environmental, socio-economic, and technical studies are ongoing and include water flow, water quality, fish and fish habitat, vegetation, wildlife, permafrost, geotechnical conditions, archaeology, land use, and socio-economic conditions. Information collected through these studies will support future environmental assessment work, including preparation of an Environmental Impact Statement (EIS) if required, and will inform Project design, mitigation, monitoring, and adaptive management.

At this stage, the INP has the potential to contribute to reduced diesel consumption and greenhouse gas emissions in Iqaluit, subject to final design, approvals, construction, operations, and grid integration. The Project may also support long-term energy security, Inuit employment, training, business opportunities, capacity development, and participation in Project planning, construction, operations, monitoring, and long-term asset management.

NNC will continue to engage with Inuit rights holders, communities, regulators, and other parties as Project planning and regulatory review advance. As additional field data, engineering information, and community perspectives become available, the Project Proposal and supporting documentation will be updated to reflect the current Project basis and applicable regulatory requirements.

1.0 Introduction

The Iqaluit Nukkiksautiit Project (INP or “the Project”) is an Inuit-led renewable energy project. It proposes to build a hydroelectric power facility in the Kuugaaluk River system on the Hall Peninsula, approximately 60 km northeast of Iqaluit, NU. The Project is led by the Nunavut Nukkiksautiit Corporation (NNC), a 100% Inuit-owned clean energy company. The goal of the Project is to provide a reliable source of renewable electricity for Iqaluit and to reduce the use of diesel fuel brought in from outside Nunavut.

The Project would include a hydroelectric facility with an installed generating capacity of up to 30 MW for the purpose of NIRB screening. Preliminary power and energy modelling includes both 15 MW and 30 MW operating cases. Electricity would be produced by storing water from an existing lake and river system and releasing it through turbines. The main Project components would include a dam, reservoir, powerhouse, turbines, generators, spillways, intake structures, and other water-control structures used to manage water levels and flows. The proposed reservoir is expected to cover approximately 7,136 hectares at the current proposed Full Supply Level.

Other Project infrastructure would include three potential all-season access road route options, each approximately 66 km long, connecting Iqaluit to the Project site. The 69 kV transmission line is proposed to be twinned with, and generally follow, the final selected all-season access road alignment. A new substation near Iqaluit would connect the Project to the existing electrical system. Temporary facilities, such as seasonal camps, laydown areas, work areas, and material borrow sites, would be required during field studies and construction. Temporary areas would be removed or restored when they are no longer needed.

The following information is considered current proposed design-basis information for screening: Project location, general hydroelectric facility layout, proposed access road corridor, proposed transmission corridor, proposed reservoir Full Supply Level, proposed main Project components, construction camp concept, preliminary workforce accommodation strategy, aviation access approach, and conceptual construction sequencing.

The following information remains subject to refinement through future investigative studies and regulatory review: final access road alignment, final transmission pole or tower locations, final reservoir operating rules, construction water use volumes, final fuel storage volumes, final contractor equipment requirements, detailed construction methods, final camp servicing design, and final closure execution methods.

1.1 Project Proposal

Part 3 of the *Nunavut Planning and Project Assessment Act* (NuPPAA) sets out requirements for the assessment of project proposals in Nunavut. NNC is submitting this Project Proposal to support NIRB screening of the current proposed Project configuration.

1.1.1 Status of Information

Table 1 distinguishes between the current screening basis, preliminary design-basis information, ongoing baseline and investigative studies, and future construction-level details that will be confirmed through detailed engineering, contractor planning, Inuit engagement, Nunavut Water Board licensing, land use permitting, and other applicable regulatory review.

For screening purposes, the current proposed design basis includes:

- the Project location and general hydroelectric facility layout;
- the proposed reservoir Full Supply Level (FSL), Low Supply Level (LSL), and main Project components;
- three potential all-season access road route options;
- the proposed 69 kV transmission corridor, which is proposed to be twinned with the final selected all-season access road alignment;
- the construction camp concept and preliminary workforce accommodation strategy;
- the aviation access approach, which does not include permanent fixed-wing aircraft landing infrastructure as part of the current screening basis; and
- the conceptual construction sequencing, including site access, temporary facilities, major civil works, reservoir filling, commissioning, and transition to operations.

This Project Proposal is intended to serve as the controlling document for the NIRB screening record. Where minor discrepancies exist between this Project Proposal and appended historical or preliminary engineering materials, including the Tetra Tech Project Definition, the descriptions, footprints, volumes, screening assumptions, and commitments contained in this Project Proposal supersede the supporting appendices for the purpose of NIRB screening.

Since preparation of the initial July 2026 Project Proposal, NNC has developed additional screening-level information relating to construction equipment, mobilization, fuel consumption, blasting, material sourcing, aviation access, waste and wastewater management, operations infrastructure, dam safety and management-plan timing. This information has been incorporated into the applicable sections of this Project Proposal and forms part of the current screening basis. Contractor-specific equipment, final storage configurations, final source selection, detailed construction methods and permit-level management requirements remain subject to refinement.

The following information remains subject to future refinement: final access road alignment; final transmission pole or tower locations; final reservoir operating rules; final construction water-use volumes; final fuel storage volumes and tank configurations; contractor-specific equipment requirements; detailed construction methods; final camp servicing design; final monitoring locations, parameters, and reporting procedures; and final closure execution methods.

Baseline and investigative studies remain ongoing for several environmental, technical, and socio-economic disciplines, including terrestrial resources, wildlife, avian resources, aquatics, hydrology, hydrometric monitoring, geotechnical conditions, permafrost, geochemical conditions, archaeology, and socio-economic conditions. The available information supports NIRB screening and identifies the current understanding of potential Project interactions. Additional study results will continue to refine Project design, effects assessment, mitigation, monitoring, management plans, and future regulatory applications.

Where future refinements materially change the Project footprint, water use, waste management, discharge management, fuel storage, access configuration, or potential environmental and socio-economic interactions, NNC will provide updated information to NIRB and applicable regulators before advancing activities.

Table 1: Summary of Status of Information Collected

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
Project configuration	The screening configuration includes an up-to-30 MW hydroelectric facility, reservoir, dam, powerhouse, water-control structures, three access-road options, transmission corridor, temporary camp, material sources, laydown areas and supporting infrastructure.	Component locations and footprints will be refined through engineering, baseline studies, Inuit engagement and regulatory review.	Final construction drawings, specifications, as-built records and permit-specific management plans.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
Generating capacity	The Project is being screened for an installed capacity of up to 30 MW. Preliminary modelling includes 15 MW and 30 MW operating cases.	Generation modelling will be refined using hydrology, electricity demand, reservoir operating rules, environmental flows and operating constraints.	Final turbine and generator selection, operating limits, commissioning plan, interconnection requirements and operating procedures.
Reservoir and water management	The screening basis includes a Full Supply Level of 550 m, minimum operating level of 528 m, total storage of approximately 1.391 billion m ³ and live storage of approximately 1.092 billion m ³ . Reservoir filling, generation flows, spillway discharge, low-level outlet discharge and instream flow releases are included.	Filling rates, seasonal drawdown, downstream discharge, water quality, methylmercury, aquatic effects and instream flow requirements remain under study.	Final reservoir filling and operating plans, water-licence compliance points, flow-release requirements, monitoring stations and reporting procedures.
Dam safety	The final dam consequence classification has not been established. For screening purposes, a preliminary Significant consequence classification is being evaluated, subject to confirmation through dam-breach and downstream-consequence assessment. Permanent civil infrastructure is expected to have a service life	Dam-breach modelling, final consequence classification, inundation limits, design flood, seismic criteria, surveillance requirements, downstream notification procedures and emergency-response arrangements will be refined through detailed engineering.	Final Dam Safety Plan, dam-breach inundation study, Emergency Preparedness Plan, Emergency Response Plan, reservoir-filling plan and Operations, Maintenance and Surveillance Manual will be completed before reservoir filling and commissioning.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	greater than 100 years with appropriate inspection, maintenance and rehabilitation.		
Access road	Three approximately 66 km all-season access-road options are being screened; no preferred route has been selected. Bridges or open-bottom structures are anticipated for larger or sensitive crossings, with culverts considered for smaller drainage features.	Final route and crossing locations and types will be refined through engineering, geotechnical and environmental studies, Inuit engagement and regulatory review.	Final road alignment, dimensions, crossing designs, drainage, erosion controls, construction methods, traffic controls and as-built drawings.
Transmission line	An approximately 66 km, 69 kV overhead line would generally follow the selected access road. Screening assumptions include approximately 12–20 m wood poles, 80–100 m spans and an approximately 20 m right-of-way.	Final routing, pole locations, structure types, foundations, work areas, grounding and disturbance footprint will be refined through design and field investigations.	Final structure schedule, foundations, conductors, grounding, fibre optics, access areas, construction methods, restoration requirements and as-built drawings.
Construction staging and logistics	Major equipment and materials would generally arrive in Iqaluit by sealift and be staged at approved port or laydown areas before transport to site. Road transport would be the primary mobilization method once access is available, with limited winter-access	Sealift quantities, staging requirements, seasonal access, sequencing, workforce transport and contractor logistics remain under development.	Final construction execution, logistics, mobilization, traffic and seasonal-access plans, port agreements and site-specific environmental procedures.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	and air support where required.		
Construction equipment	The planning estimate includes approximately 105 major production and support units, including excavators, dozers, haul trucks, loaders, graders, drills, cranes, crushers, concrete equipment, pipelayers and service vehicles. Major equipment would generally be mobilized by sealift and road.	Equipment quantities, sizes, durations, shift requirements, productivity assumptions and contractor fleet composition will be refined.	Final contractor equipment list, mobilization schedule, maintenance plan, traffic plan, equipment fuel requirements, emissions controls and environmental procedures.
Borrow, quarry and aggregate sources	Preliminary investigations identify approximately 200 million m ³ of potential hard rock and approximately 33 million m ³ of potential sand and gravel. Up to approximately 5 million m ³ may be required for Project construction. Material would be sourced from within the reservoir area where suitable, with additional sources outside the reservoir if required.	Final source selection, footprints, material quality, extraction volumes, processing areas, haul routes and operating periods will be refined through investigations and design.	Final quarry and borrow plans, extraction limits, crushing layouts, haul-road designs, runoff controls, geochemical requirements and reclamation plans.
Blasting and explosives	Blasting may be required at quarries, road cuts, the dam foundation, powerhouse and portions of the penstock. Preliminary planning	Final quantities, locations, explosive types, blast frequency, magazine locations, setbacks and monitoring criteria will	Final Explosives Management Plan, licensed magazine design, blast plans, transport and security procedures, notification

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	assumes up to approximately 5 million m ³ of blasted rock and approximately 1,750–2,500 tonnes of blasting agent, subject to engineering confirmation.	be established through design and contractor planning.	protocols, vibration monitoring and environmental mitigation.
Aviation access	No constructed temporary or permanent fixed-wing airstrip is proposed. Helicopters would provide construction and emergency support. Twin Otter or float-equipped aircraft may be used on a limited basis where safe natural landing conditions are available.	Final helipad locations, temporary landing areas, flight frequencies, aviation-fuel requirements and wildlife constraints will be refined through logistics planning.	Final aviation logistics plan, helipad designs, operating procedures, flight schedules, fuel controls, wildlife mitigation and restoration procedures.
Construction camp and workforce accommodation	The temporary construction camp would typically accommodate approximately 50 people and up to 90 at peak. Water would be withdrawn and treated onsite. Sewage and greywater are assumed to be held and transported to an authorized facility in Iqaluit, subject to acceptance; modular onsite treatment remains an alternative. A small emergency shelter would remain during operations.	Final camp layout, occupancy, servicing, wastewater approach, storage, fire protection, emergency response and worker transportation remain under review.	Final camp design, water and wastewater systems, fire and emergency plans, waste and fuel-storage designs, operating procedures and closure plan.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
Fuel and hazardous materials	Estimated cumulative construction and commissioning fuel use is approximately 9.56 million L, primarily diesel. Approximately 200,000–450,000 L of diesel may be within the construction logistics system at one time. Fuel would be stored using approved containers, secondary containment and spill controls.	Peak inventory, tank sizes, storage locations, delivery frequency, refuelling methods and hazardous-material inventories remain to be confirmed.	Final Fuel Management, Spill Prevention and Response Plan and Hazardous Materials Management Plans, containment designs, tank specifications, transfer procedures and inspection requirements.
Waste and wastewater	Construction waste estimates include approximately 15–65 t/year of domestic waste, 50–250 t/year of construction debris, 5,000–20,000 L/year of used oil and hazardous liquids and 1–5 t/year of other hazardous solids. Sewage and greywater are estimated at 6–14 m ³ /day typically and 12–23 m ³ /day at peak. No permanent landfill, landfarm, incinerator or composter is included in the base case.	Final quantities, storage requirements, receiving-facility acceptance, hauling frequency, recycling opportunities and wastewater treatment or transport methods will be refined.	Final Waste and Wastewater Management Plans, storage layouts, wildlife-attractant controls, receiving agreements, treatment design, discharge criteria and shipment records.
Water use and discharge	Typical construction withdrawal, including camp use, is approximately 50–150 m ³ /day, with short-duration peaks up to	Final sources, volumes, operating rules, release requirements, discharge criteria, compliance locations and monitoring	Final water-management, reservoir-filling and operating plans, licence conditions, intake and fish-screening design,

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	approximately 500 m ³ /day. The preliminary 15 MW turbine flow is approximately 27.7 m ³ /s, while the maximum plant-flow screening value is approximately 71.5 m ³ /s. Instream flow releases are preliminarily estimated at 1–4 m ³ /s. These flows are separate from consumptive water use.	requirements will be refined through engineering, aquatic studies and water licensing.	flow controls, monitoring and reporting requirements.
Terrestrial studies	Available information supports screening-level understanding of vegetation, wetlands, terrain, landforms and habitat conditions.	Vegetation, wetland, terrain, rare-plant and habitat studies remain underway, along with disturbance-footprint refinement.	Final pre-construction surveys, vegetation-protection measures, restoration plans, site-specific mitigation and monitoring procedures.
Wildlife studies	Available information supports screening-level understanding of wildlife habitat, movement, sensitive areas and potential Project interactions.	Camera surveys, habitat assessments, species occurrence, movement, seasonal use and sensitive-area studies remain underway.	Final Wildlife Monitoring and Mitigation Plan, timing restrictions, site-specific mitigation, reporting procedures and adaptive-management triggers.
Avian studies	Available information supports screening-level understanding of migratory birds, raptors, nesting habitat and sensitive seasonal periods.	Breeding bird surveys, raptor and nest searches, habitat assessment and seasonal timing studies remain underway.	Final bird-protection measures, nest-management procedures, timing restrictions, pre-construction surveys and monitoring requirements.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
Aquatic studies	Available information supports screening-level understanding of fish, fish habitat, water quality, downstream flow needs and potential Project interactions.	Fish presence, habitat, movement, spawning and rearing areas, water quality, downstream habitat and reservoir-operation effects remain under study.	Final aquatic-effects assessment, fish-protection measures, in-water work plans, offsetting if required, monitoring programs and authorization conditions.
Hydrology studies	Preliminary information supports screening-level flow estimates, reservoir assumptions, low-flow assessment, flood assessment and instream flow planning.	Flow monitoring, water-balance refinement, low-flow analysis, flood assessment, climate sensitivity, reservoir filling and operational modelling remain underway.	Final hydrologic design inputs, reservoir operating rules, flood routing, flow-release requirements, compliance locations and reporting protocols.
Hydrometric monitoring	Hydrometric monitoring supports design, water licensing, reservoir operation, downstream flow management and instream flow refinement.	Monitoring-station operation, flow measurements, rating curves, downstream monitoring and data-quality review remain underway.	Final monitoring network, station locations, instrumentation, quality-control procedures, data management and water-licence reporting requirements.
Geotechnical studies	Preliminary geological and terrain information supports screening-level assessment of dam foundations, road design, material sources, powerhouse siting and constructability.	Boreholes, test pits, foundation assessment, quarry evaluation, slope stability and material-suitability studies remain underway.	Final geotechnical design report, foundation designs, material specifications, stabilization measures, construction quality control and monitoring.
Permafrost studies	Permafrost is a key consideration for foundations, roads, drainage, material sources	Ground temperature, ice content, active-layer conditions, thermal modelling, terrain	Final thermal design criteria, foundation treatments, embankment designs,

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	and long-term infrastructure performance.	sensitivity and infrastructure interactions remain under study.	monitoring instrumentation, maintenance requirements and adaptive-management procedures.
Geochemical studies	Geochemical considerations are included for excavation, quarry and borrow development, aggregate use, waste rock and water-quality protection.	Acid rock drainage and metal-leaching assessments, material characterization and runoff-quality studies remain underway.	Final geochemical management plan, material-handling criteria, segregation procedures, runoff controls, sampling and reporting requirements.
Archaeological and heritage studies	Available information supports screening-level understanding of archaeological sensitivity, cultural resources, travel routes and Inuit land-use areas.	Field surveys, site identification, avoidance planning, engagement and assessment of reservoir, road, transmission and construction areas remain underway.	Final Cultural and Heritage Resources Protection Plan, avoidance buffers, chance-find procedures, site-specific mitigation, monitoring and permit conditions.
Socio-economic studies	Available information and engagement support screening-level understanding of employment, training, business opportunities, accommodation, harvesting, land use and energy security.	Community engagement, labour and training assessment, local business capacity, accommodation, harvesting, well-being and distribution of benefits and effects remain under study.	Final employment, training and procurement plans, accommodation strategy, community communication procedures and monitoring commitments.
Inuit Qaujimagatuqangit and engagement	IQ and Inuit engagement have informed site selection, access routing, seasonal timing, fish and wildlife considerations,	Engagement will continue with Inuit rights holders, communities, organizations and regulators to inform	Final engagement commitments, issue tracking, community-monitoring roles, notification procedures

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
	cultural values and monitoring.	design, mitigation, monitoring and effects assessment.	and adaptive-management measures.
Environmental effects and mitigation	Potential effects and mitigation are assessed at a screening level using the current Project footprint, available baseline information, preliminary design and IQ.	The assessment will be refined as design advances and additional baseline, IQ and regulatory information becomes available.	Final Environmental Protection Plan, discipline-specific plans, contractor procedures, monitoring programs, adaptive-management triggers and compliance reporting.
Management plans and monitoring programs	The anticipated environmental and social management plans, monitoring programs and dam-safety documents are identified in Section 9.0 and Table 16. The table describes the general content and anticipated submission stage for each document.	Plan scope, responsible parties, monitoring locations, indicators, thresholds, reporting procedures and adaptive-management triggers will be refined through design, environmental assessment, Inuit engagement and regulatory review.	Permit-level plans will accompany applicable licence and permit applications. Final activity-specific plans will be completed before the related construction, reservoir-filling or operational activity begins.
Decommissioning and closure	Closure concepts include removal of temporary infrastructure, reclamation of disturbed areas, stabilization of material sources, restoration of drainage and management of reservoir drawdown where required.	Infrastructure disposition, reservoir management, reclamation, financial security, post-closure land use and monitoring will be refined with Inuit and regulatory input.	Final Closure and Reclamation Plan, security estimate, decommissioning drawings, waste-removal procedures, reclamation specifications and post-closure monitoring criteria.

Information Area	Current Status for NIRB Screening	Information Underway / To Be Refined	Future Construction-Level or Permit-Level Information
Regulatory coordination	Anticipated processes include NIRB screening, Nunavut Water Board licensing, land-use permitting, Fisheries Act review, navigation review, heritage permitting and other applicable approvals.	Regulatory requirements will continue to be refined through agency review, engagement, baseline studies and design development.	Final permit and licence applications, terms and conditions, compliance plans, reporting schedules and authorization-specific management plans.

1.1.2 Community Benefits and Inuit-Led Opportunities

The INP is intended to deliver long-term community and socio-economic benefits beyond the provision of renewable electricity. As an Inuit-led initiative, the Project is being developed to strengthen Inuit participation, leadership, and capacity in clean-energy development while supporting Iqaluit's transition away from diesel-based power generation.

The Project presents opportunities for Inuit employment and skills development across all phases of Project planning, construction, operations, and monitoring. These opportunities are expected to include participation in baseline field programs, environmental monitoring, construction activities, operations and maintenance, and long-term asset management. Training and capacity-building will be integrated into Project delivery to support the development of a local workforce with transferable skills in renewable energy, environmental management, and infrastructure operations.

Long-term Inuit ownership of the Project is a foundational element of the INP. By advancing an Inuit-owned renewable energy asset, the Project supports local energy planning, increased local control over essential infrastructure, and long-term economic benefits that remain within Nunavut communities.

1.1.3 Regulatory Context

Table 2 lists the potential authorizations applicable to the development of the Project and the agencies expected to have a role in authorizing one or more aspects. At this early stage of the public review of the Project, NNC anticipates that further engagement with regulators will be needed to confirm required regulatory approvals to construct and operate the Project.

Table 2: Anticipated Approvals Required for the Project

Permit/Approval/ License/Authorization	Agency	Activity
Conformity Determination	Nunavut Planning Commission	Conformity to Land Use Plan Determination
NIRB Screening Decision Report /Project Certificate if required following Review	Nunavut Impact Review Board	Screening under NuPPAA to determine whether the Project may proceed without review, requires review, or should be modified or abandoned. If the Project is referred to and approved following a Review, a Project Certificate may be issued.
Type 'A' Water Licence	Nunavut Water Board	Water use, waste disposal and discharge to the environment for the Project
Class 'A' Land Use Permit	Crown Indigenous Relations and Northern Affairs Canada	Development of hydro dam and related infrastructure on Crown Land
Fisheries Authorization	Fisheries and Oceans Canada	Authorization and appropriate compensation for development of hydro dam and related infrastructure in waterbodies
Navigable Waters – Application for Approval	Transport Canada	Authorization to construct on any navigable body of water

1.1.4 Federal Impact Assessment Act

At this stage, the Project is not listed under the *Physical Activities Regulations* of the federal *Impact Assessment Act* (**Appendix A**). The Project has been identified on the federal Nation-Building Projects List, reflecting its strategic importance in advancing clean energy, energy security, and long-term infrastructure development in Nunavut. This designation is intended to facilitate coordination among federal departments and agencies.

Territorial review under the *Nunavut Planning and Project Assessment Act* (NuPPAA) remains the primary regulatory pathway for the Project. Federal involvement is expected to occur through discrete regulatory authorizations such as those under the *Fisheries Act* and the *Canadian Navigable Waters Act* and through coordinated processes where applicable, without altering statutory requirements or the independence of the NPC and NIRB. Any determination regarding the applicability of a federal impact assessment, including potential section 82 considerations, will be confirmed in consultation with the Impact Assessment Agency of Canada (IAAC) as Project scope and design continue to advance.

1.2 Proponent Information

Proponent: Nunavut Nukkiksautiit Corporation (NNC)

Type: 100% Inuit-owned clean energy corporation

Address: 200 – 5300 Qulliq Court
Iqaluit, NU X0A 2H0

Contact: **Keith Drover**, Project Director or Jill Byrne, Project Manager, NNC

Consultant: Dillon Consulting Limited – Environmental Assessment and Permitting Lead: Michelle Roche.

The Nunavut Nukkiksautiit Corporation (NNC) is a 100% Inuit-owned corporation created to pursue clean energy projects across the Qikiqtani Region. Partnerships have been created with Qikiqtani communities to invest in, own, and operate local renewable energy systems. NNC tailors renewable energy projects to the individual needs and resources of each community. This is accomplished by selecting the optimal mix of clean energy technologies such as solar, wind, hydro, tidal, and energy storage systems based on the determinants of each community. Their primary goal is to develop solutions that are affordable, reliable, and accessible to bring potential benefits to communities.

By developing projects with the intent to own them in partnership with communities for the entire life of the infrastructure, NNC strives to ensure all renewable energy projects in Nunavut are technically and financially sound for the benefit of future generations.

2.0 Project Overview

The Iqaluit Nukkiksautiit Project (“the Project”) is an impoundment hydropower facility in the Kuugaaluk area (also known as: McKeand River South), approximately 60 km northeast of Iqaluit. The goal of the Project is to provide Iqalungmiut with a reliable renewable energy source. The initial Project build-out includes a hydropower facility up to 30 MW to meet current and future electrical load demands for Iqaluit including heating and industry expansion. The hydropower facility is intended to reduce reliance on diesel generation and may serve as a primary renewable energy source for Iqaluit, subject to final design, approvals, operations, and grid integration.

The Project reflects a broader vision beyond energy generation alone. It is intended to serve as a lasting, Inuit-owned asset that supports local employment, training, and business development, while contributing to greater energy independence in Nunavut. In addition to its environmental and economic benefits, the Project is being developed with a strong emphasis on respecting Inuit knowledge, land use, and environmental values, ensuring that its design and implementation align with community priorities and long-term sustainability.

The main components of the Project include:

- The Main Dam;
- Reservoir;
- Low-Level Outlet Works;
- Spillway;
- Intake and Penstock;
- Powerhouse;
- Tailrace;
- Site Access Roads; and
- Substation and Transmission Line.

The key Project attributes are summarized in **Table 3**:

Table 3: Project Attributes

Attribute	Value
Dam Height - max (m)	~50
Dam Crest Elev. (m)	553
Spillway Crest Elev. (m)	550

Attribute	Value
Full Supply Level Elev. (m)	550
Low Supply Level Elev. (m)	528
Intake Invert Elev. (m)	512
Low Level Outlet (LLO) Invert Elev. (m)	506
Total Storage (dam ³)	1,391,033
Live Storage (dam ³)	1,091,703
Power Generating Capacity	Up to 30 MW

The design process is ongoing, and some values represent current preliminary design-basis estimates. For NIRB screening, the Project is being presented as a hydroelectric facility with an installed generating capacity of up to 30 MW. Preliminary power and energy modelling has considered both 15 MW and 30 MW operating cases. The 15 MW case provides a lower operating scenario for assessing water availability and year-round generation potential, while the 30 MW case represents the proposed installed capacity and maximum screening envelope. The final operating regime, including actual generating output, reservoir drawdown, instream flow releases, seasonal operating constraints, and discharge management, will be refined through further engineering, hydrologic monitoring, aquatic studies, Inuit engagement, and Nunavut Water Board licensing.

2.1 Project Location and Setting

2.1.1 Geographic Context

The INP is located within the Kuugaaluk River system on the Hall Peninsula, approximately 60 kilometres (km) northeast of Iqaluit (**Figure 1**). Site selection was guided by hydropower potential, low cultural conflict, and alignment with IQ site evaluation criteria (Nunavut Nukkiksautiit Corporation, 2025).

2.1.2 Coordinates and Mapping

The current proposed Project layout is shown in **Figures 1 to 10** and in the supporting spatial files submitted with this revised Project Proposal. **Table 4** summarizes the purpose of each figure and identifies how each figure supports NIRB’s review of the proposed Project components, routes, study areas, and temporary infrastructure.

The consolidated Project layout identifies the screening-level extent of the permanent and temporary Project components. The layout includes the dam, reservoir and inundation boundary, intake, spillway, low-level outlet, powerhouse, tailrace, access-road route options, preliminary watercourse crossings,

transmission corridor, substations, camp, emergency shelter, laydown and staging areas, borrow and quarry areas, crushing and screening areas, fuel-storage areas, waste-management areas, helicopter landing areas and other supporting infrastructure.

Components that remain subject to final design are shown as preliminary corridors, polygons or study areas. The Project assessment boundary has been developed to encompass the current screening envelope.

Table 4: Map Summary

Spatial Information	Figure / File	Purpose
Project Location	Figure 1	Shows Project location relative to Iqaluit and surrounding regional context
Local Project Area	Figure 2	Shows the proposed reservoir location
Regional Study Area	Figure 3	Shows the broader area used to frame environmental and socio-economic setting
Archaeological and environmental sensitivity overlays	Figure 4	Shows known sensitivity areas used to inform screening and future fieldwork
Environmental Study Areas	Figure 5	Shows study areas used for baseline and future assessment work
Land use	Figure 6	Shows known land-use context
Consolidated Project layout	Figure 7	Shows the current screening-level Project assessment boundary and all permanent and temporary Project components, including hydroelectric infrastructure, reservoir, access-road options, transmission corridor, substations, camps, staging and laydown areas, material sources, crushing and screening areas, fuel and waste-management areas, aviation areas and preliminary watercourse crossings.
Road and transmission alignment	Figure 9	Shows 3 proposed access road route and 69 kV transmission corridor
Reservoir configuration	Figure 10	Shows current proposed reservoir inundation boundary at FSL 550 m
Digital spatial files	GIS/KMZ/Shapefile package	Provides digital Project component boundaries and alignments for review

Figure 7 provides the consolidated screening-level Project layout. It identifies the dam, reservoir and inundation boundary, intake, spillway, low-level outlet, powerhouse, tailrace, access-road options, preliminary watercourse crossings, transmission corridor, substations, construction camp, emergency shelter, laydown and staging areas, potential borrow and quarry areas, crushing and screening areas, fuel-storage areas, waste-management areas, helicopter landing areas and other supporting infrastructure.

Components that remain subject to final selection or detailed design are shown as preliminary corridors, polygons or potential development areas. The Project assessment boundary has been developed to encompass the current screening envelope. All components carried forward for screening are located within the mapped Project assessment boundary. Updated spatial files accompany the revised Project Proposal and use the same component names and boundaries shown on Figure 7.

Figure 9 shows three potential all-season access road routes being carried forward for screening. The final all-season access road route has not yet been selected. Each route option would connect Iqaluit to the Project site over an approximate distance of 66 km.

The 69 kV transmission line is proposed to be twinned with, and generally follow, the final selected all-season access road alignment. Co-locating the transmission line with the selected access road corridor would support construction access, inspection, maintenance, and emergency response, while reducing the need for a separate linear corridor. Final route selection, road micro-alignment, transmission pole or tower locations, watercourse crossing details, and construction-level design refinements will be confirmed during detailed design, Inuit engagement, and applicable regulatory review.

Figure 10 shows the current proposed reservoir inundation boundary at a Full Supply Level of 550 m. The final construction-level reservoir boundary will be confirmed through hydrologic modelling, bathymetry, geotechnical investigations, engineering design, and regulatory review. Based on current mapping, the Project components are located on Crown land. Approximate coordinates for key Project features are summarized in **Table 5**. Coordinates are provided for screening and orientation purposes. Linear features, such as the access road and transmission line, are represented by approximate start and end points, with the detailed alignments provided in the supporting spatial files. Area-based features, such as the reservoir and temporary camp, are represented by approximate centroid or representative points, with boundaries provided in the supporting spatial files.

Table 5: Project Feature Locations (Approximate) (North American Datum 1983 [NAD83])

Project Feature	Latitude (N)	Longitude (W)
Dam	64.189769	-68.012175
Reservoir	64.168781	-67.909977
Access Road Start (High)	63.756403	-68.509738
Access Road End (High)	64.178917	-68.088568
Access Road Start (Direct)	63.756396	-68.509722
Access Road End (Direct)	64.179116	-68.088561
Access Road Start (Flatter)	63.756389	-68.509722
Access Road End (Flatter)	64.178984	-68.088809

2.1.3 Environmental and Cultural Setting

The Project Area (**Figure 1**) is characterized by Low Arctic tundra ecosystems, continuous permafrost, and a landscape shaped by frost action, shallow drainage networks, and glacial landforms. Vegetation communities include dry lichen tundra, mesic and wet graminoid tundra, and sparsely vegetated fellfield and riparian habitats (EcoLogic, 2025). Human activity in the area is seasonally limited, with intermittent travel, harvesting, and land use occurring along portions of the Kuugaaluk River System, as identified through IQ and early engagement with HTAs (NNC, 2025a).

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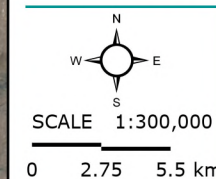
PROJECT LOCATION

FIGURE 1

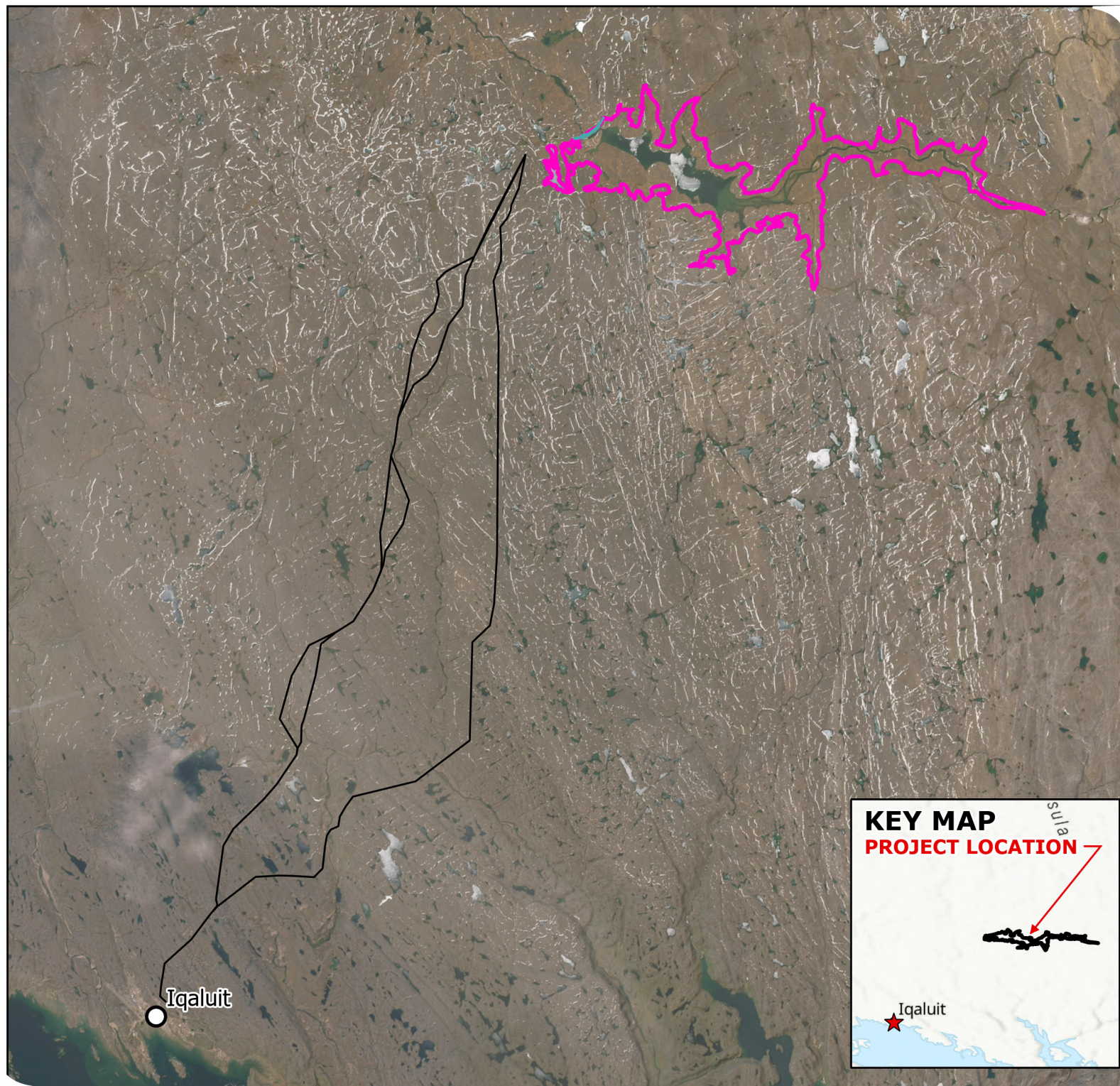
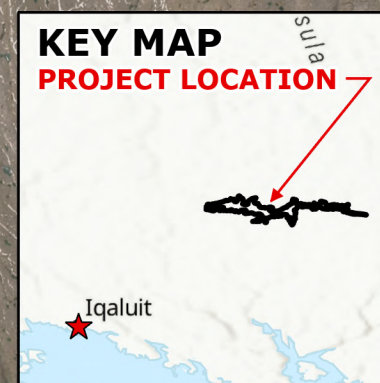
- Iqaluit
- Dam
- Potential Access Roads
- Main Reservoir

MAP DRAWING INFORMATION DATA
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CORPORATION, GOVERNMENT OF
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DILLON CONSULTING LIMITED, ECOLOGIC
CONSULTANTS LIMITED

MAP CREATED BY: -EES
MAP CHECKED BY: -MR
MAP PROJECTION: NAD 1983 CSRS UTM
Zone 19N



PROJECT: 25-1319
STATUS: DRAFT
DATE: 2026-07-02



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IQALUIT
NUKIKSAUTIIT PROJECT

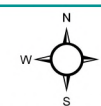
LOCAL PROJECT AREA

FIGURE 2

— Dam
□ Main Reservoir

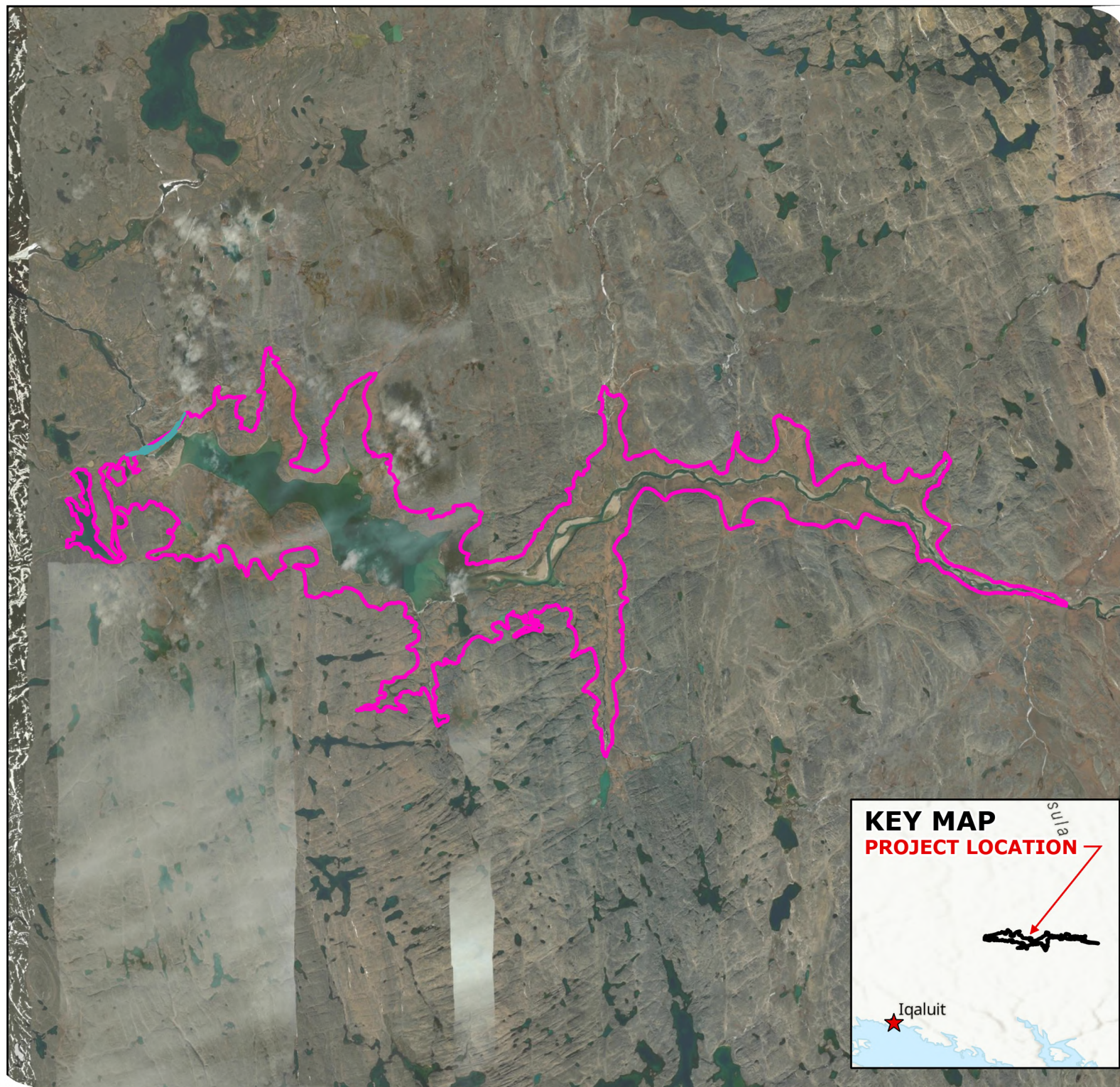
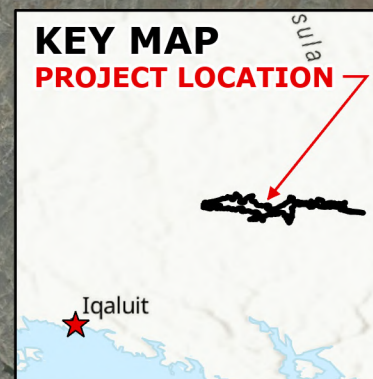
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MAP CHECKED BY: -MR
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Zone 19N



SCALE 1:150,000
0 1.25 2.5 km

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DATE: 2026-07-02



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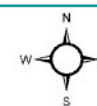
REGIONAL STUDY AREA

FIGURE 3

 Downstream Sampling Extent
 Summer Study Area

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Zone 19N



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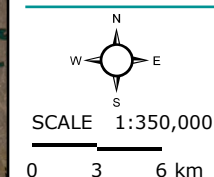
ARCHEOLOGICAL SENSITIVITY AREAS

FIGURE 4

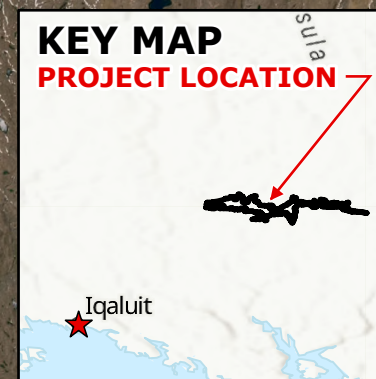
 Approximate Archeological Assessment Area 2025
 Proposed Archaeological Assessment Area 2026

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NUNAVUT, NATURAL RESOURCES CANADA,
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Zone 19N



PROJECT: 25-1319
STATUS: DRAFT
DATE: 2025-12-22



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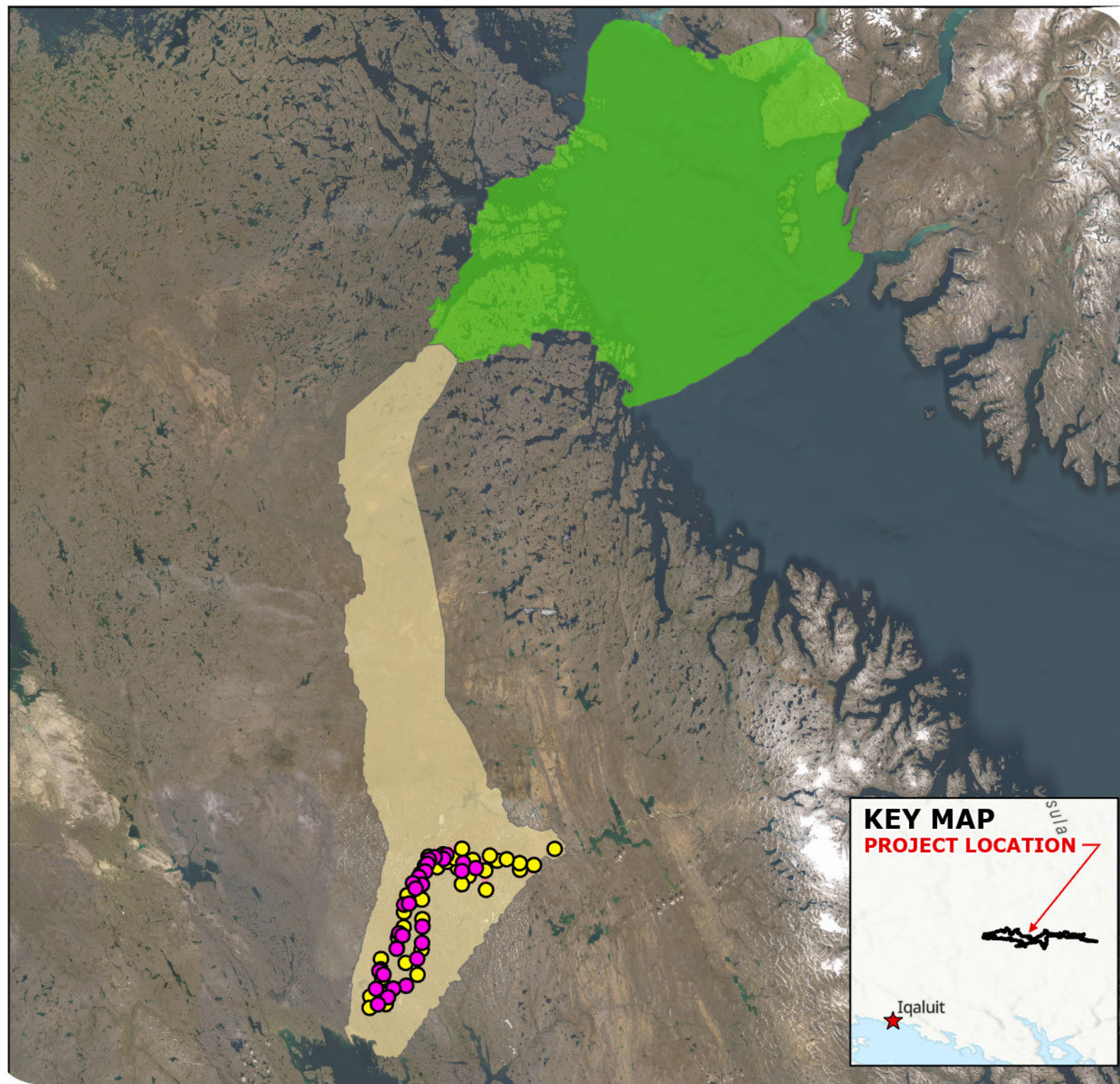
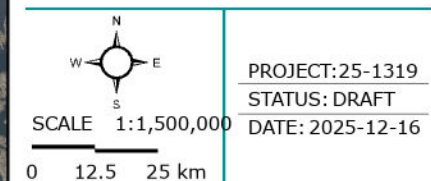
ENVIRONMENTAL STUDY AREAS

FIGURE 5

- Wildlife Transect
- Wildlife Camera
- Downstream Sampling Extent
- Summer Study Area

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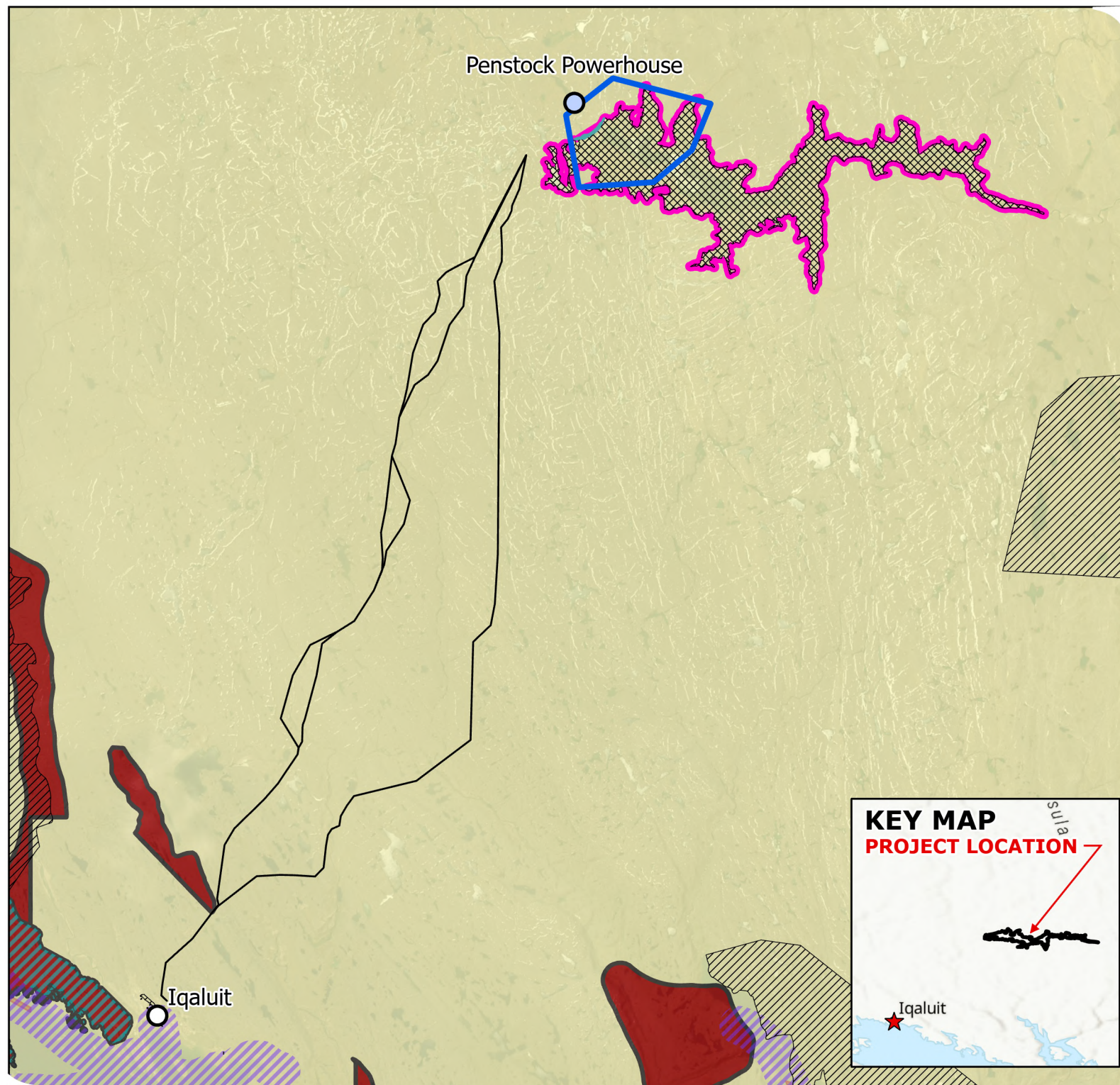


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LAND USE

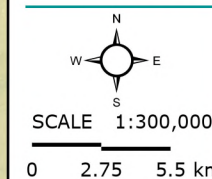
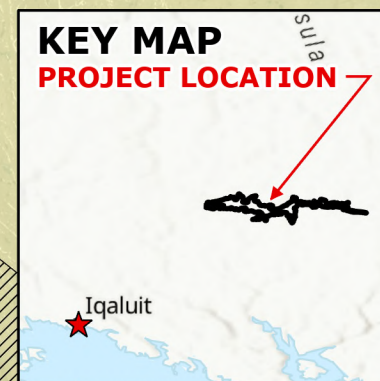
FIGURE 6



- Iqaluit
- Penstock Powerhouse
- Dam
- Potential Access Roads
- Transmission Lines
- Main Reservoir
- Approximate Temporary Camp Location
- Inuit Owned Lands
- Spillway
- Land Use Designations**
 - Conditional Use
 - Limited Use
 - Mixed Use
 - Overlay Zone
- Land Use Areas**
 - defense
 - settlement
 - pollution/waste
 - community use
 - commercial fisheries
 - water
 - transportation & communication
 - wildlife habitat
 - conservation

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MAP PROJECTION: NAD 1983 CSRS UTM
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PROJECT: 25-1319
STATUS: DRAFT
DATE: 2026-07-02

The region holds cultural significance due to its relationship to travel routes, seasonal harvesting patterns, and long-term Inuit use of inland waterways. Archaeological reconnaissance, cultural land-use mapping, and additional IQ documentation will be completed prior to confirming the final siting of project components, in accordance with territorial guidance and the recommendations of the Government of Nunavut (GN) (1993). These investigations will guide project design to avoid culturally important areas and support the protection of heritage resources.

2.1.4 Land Use Compatibility

The INP is located on the Kuugaaluk River system, approximately 60 kilometres (km) northeast of Iqaluit, within the Qikiqtaaluk Region of Nunavut (**Figure 1**). Preliminary review of the NLUP indicates that the Project location is situated primarily within lands designated for resource development and general use, with no overlap with protected areas or special management. The Project is not within Inuit Owned Lands, Territorial or National Parks (**Figure 6**). **Figure 7** shows the proposed permanent components associated with the hydroelectric facility, including the dam, reservoir, powerhouse, access road, transmission line, substations, and related infrastructure, as well as the proposed access and transmission routes; however, final route selection and alignment will be determined following completion of investigative studies, engineering review, environmental fieldwork, and engagement.

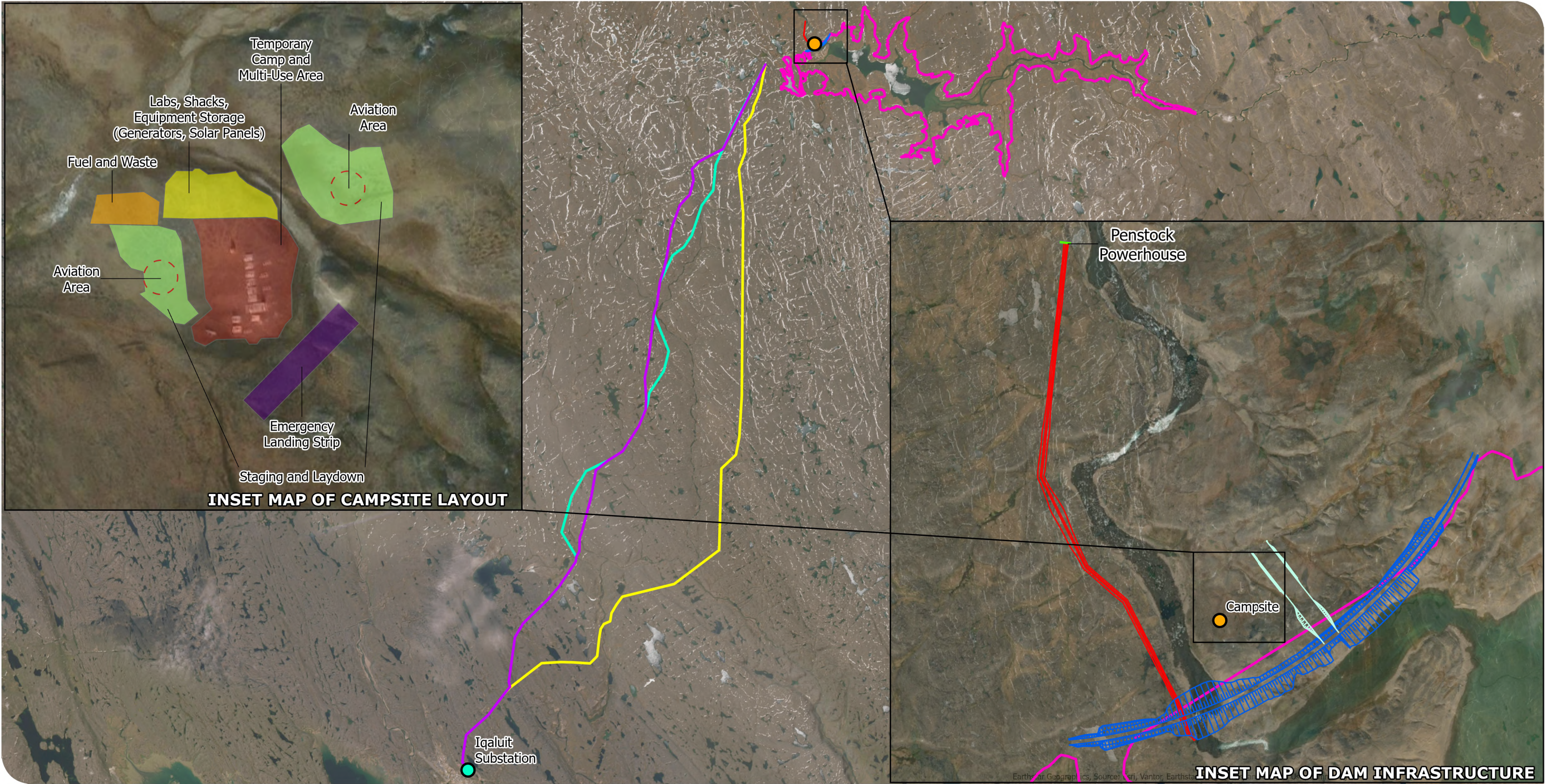
On February 2, 2026, the Nunavut Planning Commission (NPC) completed its review under NuPPAA and determined that the Project is located outside the boundaries of any applicable regional land use plan. Consequently, the project's conceptual design and land-use requirements proceed without conflicting with any active NLUP designations.

Table 6 summarizes the compatibility of major project components with applicable NLUP zones and designations.

Table 6: Compatibility of Major Project Components, Locations, Applicable NLUP Zones and Regulations

Project Components	Location/Land Tenure	NLUP Zone Classification	Compatibility Summary
Hydroelectric Facility (Dam, Spillway, Powerhouse)	Kuugaaluk River System, Qikiqtaaluk Region	Mixed Use	Compatible with permitted resource and infrastructure development uses. No conflicts identified.
Reservoir Area	Within Kuugaaluk River system watershed	Mixed Use	Compatible with permitted resource and infrastructure development uses. Water-level changes will be managed under territorial and federal authorizations.
Access Roads and Quarry Sites	Between Kuugaaluk River system site and Iqaluit corridor	Mixed Use (with a small portion adjacent to limited land use zone)	Compatible with infrastructure corridors permitted for resource and community access.
Transmission Line (to Iqaluit Grid)	Twinned along final access alignment to Iqaluit	Mixed Use	Compatible; no overlap with protected or restricted areas. Route refinement will avoid sensitive habitat.
Temporary Camps and Staging Areas	Near Kuugaaluk River system site on QIA-managed lands	Mixed Use	Compatible subject to land-use authorization. No conflicts identified.

Based on current design information, the INP is compatible with the objectives of the NLUP and supports sustainable development consistent with territorial and community priorities. Final confirmation of conformity will be documented through the NPC review process under the *NuPPAA*.



**NUNAVUT
NUKKIKSAUTIIT
CORPORATION**

IQALUIT
NUKKIKSAUTIIT PROJECT
CONSOLIDATED LAYOUT
FIGURE 7

- | | | | | | |
|--------------------|------------------------|--------------------|---------------------|-----------------------------------|--|
| Campsite | Potential Access Route | Option 3 | Spillway | Staging and Laydown | Emergency Landing Strip |
| Iqaluit Substation | Option 1 - Preferred | Dam | Penstock Powerhouse | Aviation Area | Labs, Shacks, Equipment Storage (Generators, Solar Panels) |
| | Option 2 | Penstock Pump Line | Main Reservoir | Temporary Camp and Multi-Use Area | Fuel and Waste |



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: -EES
MAP CHECKED BY: -MR
MAP PROJECTION: NAD 1983 CSRS UTM Zone 19N

SCALE 1:250,000

0 2.5 5 10 km

PROJECT: XX-XXXX STATUS: DRAFT DATE: 2026-08-04

2.2 Ancillary Infrastructure Improvements

Several infrastructure improvements will be required to support the main scope of the project. These scopes of work likely will not be executed directly by the Project Owner (NNC); however, would be established via contributions agreements with the relevant parties such as the City of Iqaluit (the City) and the Iqaluit Port (the Port). These scopes will support project construction and logistics while providing lasting community improvements.

Ancillary infrastructure improvements could include:

- Upgrades to the port to support additional offload capacity and laydown space;
- Road improvements between the Port and the City;
- Intersection improvements within the City along the designated transport route; and
- Permanent housing units within the City.

The primary plant control room would be located within the powerhouse. The facility would be remotely monitored and controlled by operations personnel in Iqaluit using the SCADA system and fibre-optic communications installed along the transmission route.

No separate communications tower is currently proposed. Critical control functions would be supported by the proposed 125 V DC battery system and an uninterruptible power supply. A standby generator at the powerhouse is also being considered for longer-duration backup power; its capacity, fuel type and storage requirements remain under design.

Operations infrastructure may also include the emergency shelter, maintenance and storage space within or adjacent to the powerhouse, localized fuel storage, security, lighting and emergency-response equipment.

3.0 Project Development Schedule

The Project development schedule is preliminary and will be refined as regulatory review, engineering, engagement, procurement, and construction planning advance. The schedule presented below is based on current planning assumptions and does not prejudice the outcome or timing of NPC conformity review, NIRB screening, any further NIRB Review or Project Certificate process if required, Nunavut Water Board licensing, land use permitting, or other required authorizations.

If the Project receives the required regulatory approvals and authorizations, construction is currently expected to occur over approximately three construction seasons, followed by reservoir filling, commissioning, and transition to commercial operation. The current screening-level schedule assumes construction could begin as early as summer 2028, subject to regulatory approvals, final design, contractor readiness, seasonal access, procurement, and NNC direction.

For planning purposes, the construction sequence is currently anticipated as follows:

- Year 1 – Mobilization and early works: mobilization, logistics setup, temporary access where authorized, construction camp establishment, laydown areas, and initial all-season access road construction.
- Year 2 – Major civil works: borrow and quarry development, continued access road construction, dam foundation preparation, intake works, powerhouse construction, and supporting site infrastructure.
- Year 3 – Headworks and electrical works: river diversion through intake works, dam and spillway completion, penstock installation, powerhouse completion, transmission line construction, and substation construction.
- Year 4 – Reservoir filling and commissioning: reservoir filling, system testing, commissioning, operational readiness activities, and transition to commercial operation.

The indicative schedule is summarized in **Table 7**. Dates are provided for screening and planning purposes only and may be revised as Project planning advances.

The current screening-level schedule assumes that construction could begin as early as summer 2028, subject to regulatory approvals, final design, procurement, contractor readiness, seasonal access and NNC direction. Equipment requirements and durations are presented by construction phase because the final contractor schedule has not been established.

Annual sealifts would deliver equipment and materials before the construction activities for which they are required. Any equipment or materials delivered before the commencement of construction would be stored at an approved Iqaluit staging or marshalling area and would not be mobilized to the Project site until applicable approvals and access arrangements are in place.

The current schedule anticipates approximately three principal construction seasons, followed by reservoir filling, wet commissioning and transition to commercial operations in approximately 2031

Table 7: Preliminary Schedule of Project Activities

Project Phase	Project Activity	Indicative Timing	Duration / Status
Pre-Construction	Consultation and engagement	2023 onward	Ongoing throughout planning, assessment, permitting, construction, and operations
Pre-Construction	Preliminary design	2024 onward	Ongoing; to be refined through investigative studies and engineering review
Pre-Construction	Environmental and regulatory review	2024 onward	Ongoing; includes NIRB, NWB, land use, and other applicable regulatory processes
Pre-Construction	Geotechnical drilling and investigative studies	Q3 2026 onward	Planned / ongoing, subject to applicable permits and field conditions
Pre-Construction	Detailed design	Indicatively Q2 2027 to Q1 2028	Subject to regulatory review outcomes, field study results, and NNC direction
Pre-Construction	Construction contracting and procurement	Indicatively Q4 2027 onward	Subject to approvals, funding, procurement strategy, and contractor availability
Construction	Mobilization and early works	Indicatively summer 2028	Includes logistics setup, temporary facilities, laydown areas, camp establishment, and early access works
Construction	Access road, camp, and site development	Year 1 of construction	Includes all-season access road construction, construction camp, laydown areas, and environmental controls

Project Phase	Project Activity	Indicative Timing	Duration / Status
Construction	Borrow development and major civil works	Year 2 of construction	Includes borrow/quarry development, dam foundation preparation, intake works, powerhouse construction, and supporting infrastructure
Construction	Dam, spillway, penstock, powerhouse, transmission, and substations	Year 3 of construction	Includes completion of major headworks, river diversion through intake works, penstock installation, powerhouse completion, transmission line, and substations
Commissioning	Reservoir filling and plant commissioning	Year 4, indicatively 2031	Subject to approved reservoir filling plan, flow release requirements, monitoring, testing, and regulatory conditions
Operations	Commercial operation	Following commissioning	Subject to successful commissioning, operational readiness, approvals, and grid integration

This schedule will be updated as the Project advances. Any material changes to the construction sequence, timing, water use, reservoir filling, access approach, or Project footprint will be communicated to NIRB and applicable regulators before the affected activity advances.

4.0 Project Description and Activities

The sections that follow present additional detail on the Project components, including the basis of their design, expected construction methods, as well as plans for operations, maintenance, and eventual decommissioning and closure.

4.1 Site Characteristics

4.1.1 Site Selection

The Project was selected by Iqalungmiut, who participated in NNC's engagement events, as the preferred option among several alternatives for providing long-term power supply with limited environmental and socioeconomic impacts. The site was selected due to its natural high-banked narrows in the river, which provides an ideal location for a dam in combination with an upstream storage reservoir. The reservoir portion allows seasonal inflows to be stored and managed to provide a reliable electricity source for the City of Iqaluit over the next 50+ years on a year-round basis. Detailed environmental screening and potential impacts on traditional lands uses and/or historical resource sites will be completed as the Project progresses. The site investigations are underway with major site activities being done in summer of 2026. Land use and Project impacts will be reviewed with rightsholders and stakeholders.

4.1.2 Geological Setting

The Project site is located at the ancient extents of the Frobisher Glacier margin. The site is characterized by terminal moraines deposits of fine-grained material including silts, sands, and gravels. Where not covered by thick glacial deposits, there are regions of exposed bedrock and veneers or blankets of glaciolacustrine deposits.

The presence of permafrost and subsurface ice to about 80 metres depth throughout the site poses additional Project challenges that will be addressed in the design process.

4.2 Power and Energy

For the purpose of this Project Proposal, the hydroelectric facility is described on the basis of an installed generating capacity of up to 30 MW. This is the screening basis for assessing the proposed Project footprint, major infrastructure, water management requirements, and potential environmental and socio-economic interactions. Preliminary power and energy modelling includes both 15 MW and 30

MW operating cases. These operating cases are used to understand reservoir performance, available flows, seasonal generation potential, and operating constraints. The 30 MW installed capacity does not represent continuous firm generation under all hydrologic conditions.

4.2.1 Water Supply

Based on the synthetic hydrologic record developed for the Project, the estimated annual average inflow is approximately 41.1 m³/s, equivalent to approximately 1,294.7 Mm³/year. Preliminary modelling indicates that this exceeds the estimated flow required for the 15 MW operating case, which is approximately 27.7 m³/s, or approximately 873,547,000 m³/year. The 15 MW operating case is therefore useful for assessing a lower, more continuous generation scenario under preliminary hydrologic assumptions. The proposed 30 MW installed capacity represents the screening basis and maximum design envelope. Preliminary modelling indicates that the 30 MW plant configuration could operate at an estimated capacity factor of approximately 49%, with output varying based on reservoir storage, inflow conditions, environmental flow requirements, demand, maintenance, and operating rules.

4.2.2 Energy Production

The Project will operate as an impoundment reservoir. The electricity is to be supplied to Qulliq Energy Corporation (QEC) who are expected to accept the energy as provided. Currently the QEC power plant does not coordinate its output with other plants.

Power and energy for the Project was determined based on following parameters:

- Francis-type turbines;
- Efficiencies and operating limits based on turbine supplier bid on previous projects;
- Assumed no lost generation revenue due to plant shutdown; and
- Conveyance system head loss include friction head loss, and minor head loss due to bends, contraction, and expansion.

Table 8 provides a summary of the calculated power and energy characteristics for the preliminary operating cases assessed to date. The estimated values are based on preliminary assumptions and do not represent final firm energy commitments. The 30 MW configuration represents the proposed installed capacity and maximum screening basis. The 15 MW case provides a lower operating scenario for evaluating water availability and continuous generation potential. Under the preliminary modelling, the 30 MW configuration has a lower estimated capacity factor than the 15 MW case because higher flow demand, head loss, reservoir refill limitations, environmental flow requirements, and seasonal low-flow conditions affect the amount of time the plant can operate at full output. Further details on power and energy estimates based on Iqaluit demand, hydrologic monitoring, reservoir operation, and environmental flow requirements will be provided as part of future design and licensing.

Table 8: Power and Energy Summary

Parameter	Value	Units
One or Two Turbines Capacity	Up to 30	MW
Maximum Plant Flow	71.5	m ³ /s
Minimum Plant Flow	6.6	m ³ /s
Number of Units	Up to 2	
Rated Turbine Efficiency	88	%
Normal Headwater Elevation	550.0	m
Normal Tailwater Elevation	480.0	m
Gross Head	70	m
Headloss at Maximum Flow	10.3	m
Electrical Efficiency	97	%
Lost-Generation Downtime	2.0	%
IFR	1 to 4	m ³ /s
Average Annual Energy	123	GWh
Capacity Factor*	49	%

Power generated from the Project facility will be sold to QEC on an accepted as produced basis.

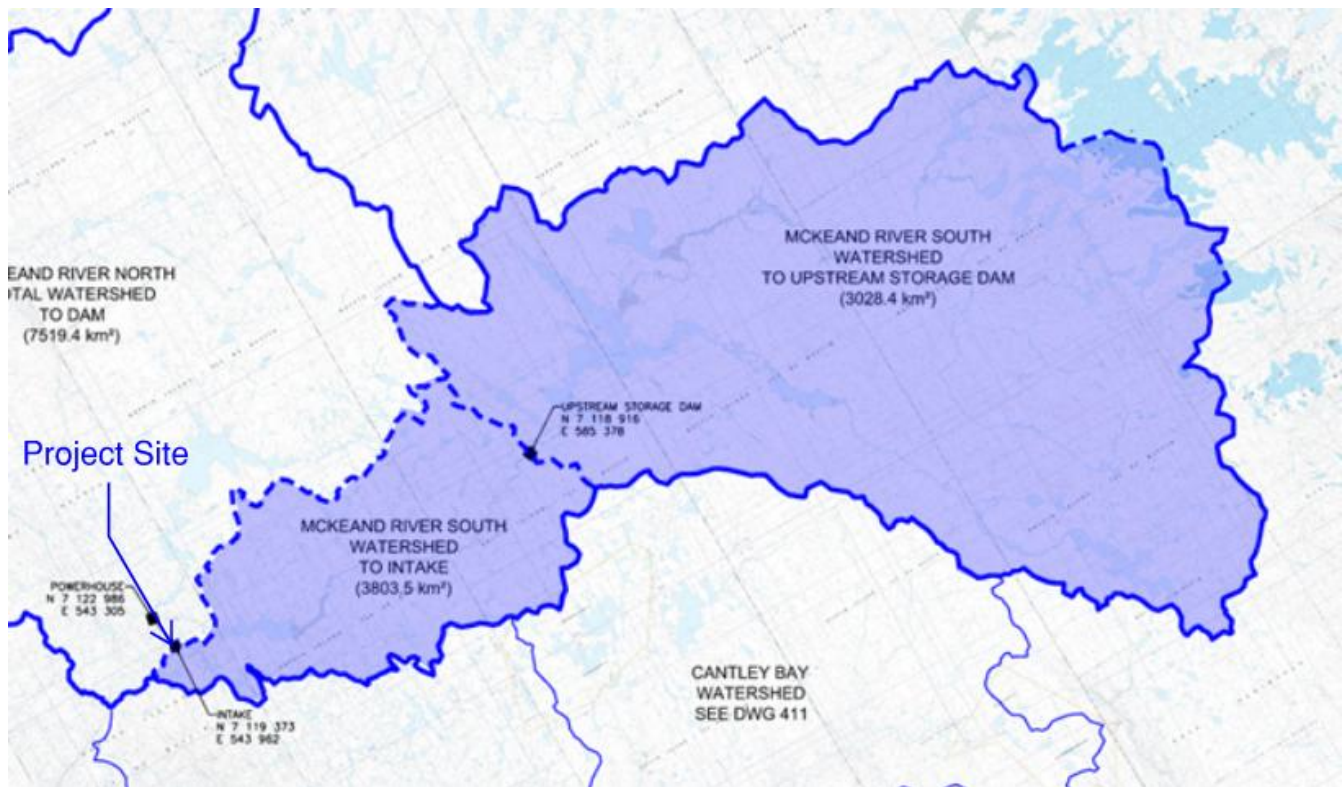
4.3 Water Availability

Project water information is divided into consumptive withdrawals, reservoir storage and non-consumptive operational flows. Construction water use and camp water use are temporary consumptive withdrawals. Reservoir storage represents water retained and regulated within the watershed. Turbine flow, instream flow release and downstream discharge represent operational flow pathways and may include overlapping volumes of water. These categories should not be added to calculate a total daily water-use volume.

4.3.1 Watershed

The Kuugaaluk headwaters lie east of the Project in the Hall Peninsula Ice Cap. Upstream of the Project site, the river flows east to west before turning north and eventually discharging into the ocean at Cumberland Sound. The Project drainage area is approximately 3,804 km².

Figure 8: Project Drainage Area



4.3.2 Project Flow Estimates

Historical flow records for the Kuugaaluk near the Project site are sparse. As a result, a synthetic flow record was derived using available daily flow records for the Kuugaaluk, transposing the river specific records to the Project site, and combining those records with a regression-based transposition of 44-years of flow data from the Iqaluit Kuunga (also known as Sylvia Grinnell). Additional details of the synthetic flow record development are provided in the Project Design Basis.

4.3.3 Intake Flow Estimates

River flows in the Iqaluit region show seasonal variation with peak monthly flows being observed in June through August each year. The months of December through May are characterized by very low flows or even 'zero' flow days. Daily records showing zero could mean that the watercourse is frozen to the bed or is due to the inability of regional hydrometric stations to capture accurate flow rates during periods of ice cover. **Table 9** illustrates the seasonal flow variations observed in the synthetic flow record.

Table 9: Estimated Mean Daily and Monthly Flow Volumes

*Mm³ – Millions of Cubic Meters

Month	Mean Daily Flow (m ³ /s)	Estimate Inflow Volume (Mm ³)
Jan	0.2	0.7
Feb	0.1	0.2
Mar	0.0	0.1
Apr	0.0	0.0
May	0.1	0.2
Jun	109.5	283.8
Jul	197.8	529.9
Aug	91.4	244.8
Sep	65.3	169.2
Oct	19.6	52.6
Nov	4.5	11.6
Dec	1.0	2.6
Annual Average	41.1	1,294.7

Satellite imagery from Google Earth and early site reconnaissance suggests that the upstream extent of the Kuugaaluk drainage area could be frozen through much of the year. As a result, water availability might be slightly less than estimated through the development of the synthetic data set which is based largely on the Iqaluit Kuunga River.

Alternatively, should future average temperatures in this region increase, the water availability could be higher than anticipated. The design engineer has arranged for the installation of a Project-specific hydrometric station immediately downstream of the proposed main dam as well as a weather station on site. This hydrometric station would provide real-time flow monitoring specific to the river at the Project site and subsequently improve our estimates of total water availability while also providing data specific base flows for the river.

4.3.4 Low Flow

During concept design, a routing model was developed for the three (3) lowest flow years on record, according to the source river data (1980 - 1982, inclusive). The results of this preliminary analysis suggest that projected inflows to the reservoir, combined with available reservoir storage, may support operation of the proposed facility through most periods; however, the 30 MW installed capacity is not expected to operate at full output under all hydrologic conditions. During longer seasonal low-flow periods, operations may need to be adjusted to maintain reservoir levels, meet instream flow release requirements, and manage downstream discharge. The final operating regime will be refined through additional hydrologic monitoring, reservoir modelling, aquatic assessment, Inuit engagement, and Nunavut Water Board licensing. Thus, water will continuously be discharged into the Kuugaaluk downstream of the powerplant throughout the year.

Operations would need to be adjusted during longer seasonal low-flow periods for the 30 MW system where full-time 30 MW demand could exceed water availability about 20% of the time over a synthetic '3-year low flow' period.

4.3.5 Floods

For typical seasonal flows, including freshet, water is expected to spill over the spillway weir during the months of July through November such that average daily flows immediately downstream of the powerhouse will range from 25 m³/s to 115 m³/s when the spillway is activated.

Flood estimates are required to understand the impact of flood flows on the reservoir level and to size the Project spillway. Currently there is no flood data for the Kuugaaluk intake location, so flood estimates were derived indirectly.

Flood flows for the Kuugaaluk at the Project site were estimated by developing a regional flood hydrology using two WSC stations at Iqaluit Kuunga and Apex rivers. The inflow hydrograph for the upper and main reservoir was generated by scaling a representative flood event for the Kuugaaluk. The upper reservoir inflow hydrograph was routed through the reservoir and the downstream reach before entering the main reservoir. This was combined with the direct inflow hydrograph to the main reservoir and was used for flood routing and sizing the spillway and other hydraulic components. **Table 10** summarizes the peak flood flow estimates for various return periods.

Table 10: Peak Flow Estimates

Return Period	Peak Flow Estimate (m ³ /s)
1000	1070
200	887
100	812
20	643

4.3.6 Ice

The ice regime at the Project site has not been well observed yet; however, lakes and ponds in the region are expected to be fully ice-covered by late October or early November. Similarly, the Kuugaaluk is assumed to be completely frozen by January.

Ice core data from Environment and Climate Change Canada (ECCC) shows regional thicknesses ranging from 0.4 m to 1.8 m. ECCC lake ice thickness records suggest maximum ice thickness for lakes at similar latitudes peaks at or near 1.7 m.¹ A portion of reservoir storage will be sequestered in the ice cover by the end of winter, necessitating the consideration of seasonal water availability and ice loads for the Project’s structural design.

Spring flows typically increase in late-May and peak in late-June or early-July. The open-water season typically extends from May to October.

4.3.7 Instream Flow Release (IFR)

The design capacity of IFR is currently assumed at ~10% of seasonal flows as an early design-capacity assumption, while 1–4 m³/s is the current screening-level planning range. However, IFR requirements will be determined as part of the environmental assessment for the Project. Further environmental assessment is underway, and final values are to be confirmed.

¹ Government of Canada. 2025. "Lake Ice Database." Environment and Climate Change Canada. Accessed March 6, 2025. <https://data-donnees.az.ec.gc.ca/data/water/scientificknowledge/lake-ice-database/?lang=en>.

4.4 Physical Components

4.4.1 Headworks

The Headworks are located downstream of a small set of falls at the outlet of a natural lake on the South Branch of the Kuugaaluk. This Project will increase the storage capacity of the existing lake.

The Headworks consist of the main dam, low-level outlet system (LLO works) for construction bypass and instream flow releases, intake with inlet channel to convey flow the hydro plant, and spillway for flood passage and excess flow release. The current design provides 3 m of freeboard above the full supply level elevation of 550 m. Freeboard is provided to reduce the risk of overtopping and to protect Project structures during wave runup, reservoir setup, and the passage of flood flows. The Headworks site and structure configuration are shown on the drawings in **Appendix A**.

4.4.1.1 Dam Safety Design Basis

The final dam consequence classification has not been established. For screening purposes, a preliminary Significant consequence classification is being evaluated based on potential effects on Project workers, land users, downstream environmental and cultural resources, Project infrastructure and the regional electrical system. This preliminary assumption will be confirmed or revised through a formal dam-breach and downstream-consequence assessment.

Permanent civil infrastructure is expected to have a useful life greater than 100 years with appropriate inspection, maintenance, rehabilitation and periodic safety review. Major mechanical and electrical components would have shorter service lives and would be refurbished or replaced as required.

The downstream-consequence assessment will consider workers, land users, cabins or camps, travel routes, aquatic habitat, culturally important areas, downstream infrastructure and effects associated with interruption of electricity generation.

A preliminary Dam Safety Plan will be developed during detailed design. A dam-breach inundation study and draft Emergency Preparedness and Emergency Response Plans will also be prepared during detailed design. Final dam-safety documentation, including the Dam Safety Plan, Operations, Maintenance and Surveillance Manual and Emergency Preparedness and Response Plans, will be completed before reservoir filling and commissioning.

4.4.1.2 Main Dam

At concept design for the main dam is a rockfill / earth fill embankment with sheet pile core and a frozen foundation base on top of the existing permafrost and ice filled moraine and bedrock.

The details of the final configuration will depend on confirmation of the sub-surface conditions from the geotechnical drilling program in the summer of 2026 and confirmation of the quality of onsite materials for use of rockfill and/or earth fill embankment. The maximum dam height will be approximately 50 m and, although the dam configuration has yet to be finalized, the total crest length of the dam, including abutments, could be 1700 m to 1800 m long.

The Dam will include a thin upstream semi-impervious core layer (self sealing), erected sheet piles mounted on a soil plinth base or concrete plinth imbedded in bedrock, a modest grout curtain, drains, and a downstream frozen core connected to the existing bottom horizontal frozen base foundation. A series of vertical thermosyphons at ~10m spacing will be placed immediately along the sheetpile to maintain the downstream core and foundation base frozen once the reservoir water is impounded. The spillway will be a concrete lined spillway leading to a rock cut stilling basin. The spillway will be about 75 m wide and 150 m long, with under slab drainage, insulation and thermosyphons to maintain the existing frozen ground beneath it.

Riprap will be placed on the upstream face of the dam and on downstream channel sections to protect against erosion from waves and discharges from the reservoir.

4.4.1.3 Reservoir

At full supply level (FSL, elev: 550 m) the reservoir will be 4 km to 8 km wide and approximately 29 km long, covering approximately 7,136 ha based on current design-basis inundation mapping. The minimum operating level is 528 m, resulting in a total drawdown of 22m. The resulting live storage volume is approximately 1,091,703 dam³ or 1,100-million m³.

The reservoir will be operated to capture peak flows from the freshet targeting Full Supply Level (FSL) during the summer. As flows decrease starting in August, reservoir levels will begin to fall reaching near but usually above the minimum operating level by early June the following year.

At FSL, the shoreline perimeter is approximately 150 km. The water level will fluctuate during operations and, given preliminary models for 15 MW of initial years demand, water levels will typically fluctuate 3.7m on average as determined from the 41-years of power and energy modelling. This is based on the assumption of infinite load demand. Further details based on the actual demand for the City of Iqaluit will be provided as part of the design process.

4.4.1.4 Intake and LLO Works

Both Intake and LLO works will be housed adjacently in the same concrete well structure on the left abutment of the main dam.

The intake works convey flow from the reservoir into the penstock to the powerhouse to produce power. For the hydropower Intake, a short rock cut inlet channel leads to the portal entrance where the concrete intake structure is located. A rail system from the intake structure inlet pipe will be used to accommodate lifting of the trash rack for removal of debris during routine maintenance. With the intake arrangement and depth (~38 m), and limited vegetation upstream of the Project it is expected that there will be minimal debris to manage during operations.

A low-level outlet system (the LLO works) will provide a temporary bypass for inflows to the Project site during construction. When complete, the LLO works will pass the required Instream Flow Release (IFR) to the river channel downstream of the dam.

A headworks controls building mounted on top of the gate wells at the dam crest will provide control and maintenance access to Intake and LLO gate systems.

4.4.1.5 Spillway

An overflow spillway will be incorporated into the right dam abutment. It is expected that the spillway will only be activated intermittently, and it will be designed to pass the design flood according to the final dam classification (as per CDA Guidelines). The spillway width will depend on the final dam configuration and be subject to any controls systems that might be implemented to optimize the spillway discharge capacity and storage capacity for the reservoir (e.g., rubber weir to control spillway discharge elevation).

4.4.2 Penstock

The penstock will be either a large diameter steel pipe with welded joints or dual HDPE pipes each capable of handling the power flow requirements for the turbines. The HDPE option has the advantage of much fewer joints, no need for corrosion protection and simpler installation but requires two pipes and some additional footprint.

The penstock connects to the Headworks intake gate well. The penstock within the dam will be a single steel conduit concrete cased and founded on bedrock through the embankment.

For the single steel penstock option, the pipe will continue downstream in a shallow trench on an insulated cradle and be fully buried in an earth mound to provide support and protection. At the powerhouse a bifurcation will be installed to direct flow to each turbine.

For the dual HDPE option, a bifurcation will be installed at the dam toe and then the parallel HDPE pipes will similarly be placed in a shallow trench on an insulated cradle and fully buried in an earth mound to provide support and protection. At the powerhouse each penstock will connect to their respective turbine.

4.4.3 Powerhouse

The current concept assumes two horizontal Francis turbines; final unit number and selection remain subject to design, with up to two units carried for screening (**Table 8**). Francis turbines provide an economical and operationally simple hydropower option that functions well over a wide range of head and flow regimes. The powerhouse and building layout are shown in **Appendix A**.

A concrete foundation will be installed below grade, insulated with thermosyphons to maintain native frozen ground. The submerged turbine draft tubes will discharge to the tailrace which discharges into the Kuugaaluk downstream of the dam. A small control weir in the tailrace may be required to sustain minimum operation depths for the turbine.

The powerhouse building structure will be modular to facilitate transportation to site and ultimately construction. The powerhouse building is a well-insulated, metal clad building with a metal roof. A hoist and bridge crane system will be installed to facilitate installation of the powerhouse components and used for maintenance work over the life of the Project. Overhead access doors will allow removal of heavy equipment if required.

The electrical and control rooms will be a self-contained skid building set inside the powerhouse. Power generated from site will be connected to an onsite substation prior to being transmitted to Iqaluit.

4.4.4 Substation and Transmission

The Project includes an approximately 66 km, 69 kV overhead transmission line proposed to be twinned with, and generally follow, the final selected all-season access-road alignment. For screening purposes, the transmission line is assumed to use single-pole, three-phase wood-pole structures approximately 12–20 m high, with typical spans of approximately 80–100 m.

Foundations may include directly embedded drilled poles, micropiles, rock anchors or a combination of foundation types, depending on geotechnical conditions. Guys and anchors would be used at corners, dead ends and anti-cascade structures. The line would also carry a shield wire and fibre-optic communications cable.

An average right-of-way width of approximately 20 m is assumed for screening. Over approximately 66 km, this represents a corridor envelope of approximately 132 ha. Direct physical disturbance would be substantially smaller and concentrated at pole foundations, guy anchors, temporary pole-erection areas,

pulling and tensioning areas and localized access areas. Disturbance may be reduced where work areas overlap the access-road corridor.

Final structure type, pole spacing, foundation design, work areas and direct-disturbance footprint will be confirmed through detailed design and geotechnical investigation.

4.4.5 Access Road

Three potential all-season access-road route options, each approximately 66 km long, are being carried forward for NIRB screening. One final route would be selected through engineering, geotechnical investigation, environmental fieldwork, Inuit engagement and regulatory review. No final or preferred route has been confirmed at this stage.

The final route selection will include:

- Incorporation of the needs and desires of rightsholders and stakeholders in Iqaluit;
- Incorporation of natural ridges to avoid valley vegetation and water crossings where possible;
- Onsite access roads would be constructed to the powerhouse and across the main dam, and spillway. A single lane bridge will be constructed to provide access across the spillway; and
- Road construction comprises traditional rock quarries, gravel crushing, and hauling of fill materials. Some in-situ rock excavation along the route will be done to smoothen the alignment, minimize quarry sizes and reduce material hauling.

Access road width and height will be dependent on detailed engineering. Access road driving surface width will likely be between 6 and 9 meters, narrowing at bridges and possibly in some terrain to minimize disturbance.

A logistics study is currently underway to determine the details for infrastructure upgrades and air access support.

Watercourse-crossing locations and structure types have not been finalized. For screening purposes, larger, fish-bearing or environmentally sensitive watercourses are expected to use clear-span bridges or open-bottom structures where practicable. Smaller or intermittent drainage features may use appropriately sized culverts.

Crossing designs would maintain drainage and fish passage where required and would consider channel stability, permafrost, erosion, sediment transport and seasonal flow conditions. A preliminary crossing inventory will identify known and potential crossing locations, available fish-bearing information and the currently assumed crossing type.

4.4.6 Land Infrastructure

To minimize the project's overall physical footprint, the granular materials required for the dam and engineered fill will be sourced locally via onsite aggregate crushing and quarry development, primarily utilizing morainal and till deposits located directly within the future reservoir inundation zone (**Figure 10**).

To execute these major civil works and establish the reservoir, logistics and access must be carefully sequenced. Based on the preliminary design basis, the proposed reservoir has a Full Supply Level of 550 m, a Low Supply Level of 528 m, total storage of approximately 1,391,033 dam³, and live storage of approximately 1,091,703 dam³. These values remain preliminary and will be refined through bathymetry, hydrologic modelling, geotechnical investigations, engineering design, and regulatory review.

It is important to note that all outlined construction methods, staging, and sequencing are currently conceptual and provided primarily to support preliminary environmental assessments and regulatory reviews.

4.4.7 Worker Accommodation

Temporary camps will be established to support both ongoing investigative programs and future construction activities. At this stage, camp infrastructure is anticipated to include a temporary construction camp accommodating approximately 50 up to 90 personnel at peak construction. Camp facilities may include accommodation units or tents, kitchen and dining areas, sanitary facilities, fuel storage, waste storage, communications systems, laydown and staging areas, and supporting power and water servicing infrastructure. Final camp locations, layouts, servicing requirements, and duration of use will be confirmed through ongoing engineering, field investigations, and regulatory review.

4.4.7.1 Construction Camp

The construction camp, planned near the main dam site, will support the workforce during construction and reduce reliance on daily flights. It is expected to include accommodations, food services, water and wastewater systems, waste handling, fuel storage, maintenance and laydown areas, power, communications, and emergency response equipment. Camp locations and layouts will be refined through engineering, field studies, IQ, archaeological review, terrain assessment, and regulatory input to support access while minimizing environmental and cultural disturbance.

Camp operations will be managed through standard environmental protection measures, including fuel handling controls, secondary containment, waste segregation, wastewater management, wildlife attractant control, spill response, and site cleanup and restoration following demobilization. No

permanent operations camp is currently proposed, as long-term operations are expected to be managed primarily from Iqaluit.

Worker accommodation is required for a capacity of approximately 50 to 90 persons, depending on the final construction schedule, contractor staffing requirements, and execution strategy. Camp accommodation is currently expected to be established as early as 2028 and remain in operation until approximately summer 2031 subject to regulatory approvals, final design, contractor readiness, seasonal access, procurement, and NNC direction.

Currently, an on-site construction camp area is being considered which is estimated to occupy approximately 3 hectares near the current temporary camp location; however, the final area, layout, and location will be confirmed as engineering design, environmental studies, logistics planning, and regulatory review advance.

The on-site construction camp would include the facilities required to support temporary accommodation and construction operations at the Project site. These may include worker accommodation, kitchen and cafeteria facilities, potable water supply, wastewater collection and treatment, solid waste management, power supply, fuel storage, maintenance and storage facilities, communications, emergency response facilities, and other supporting services. Details of the proposed camp infrastructure have not been defined at this stage of Project development.

Water supply, wastewater management, solid waste management, fuel storage, and power supply systems will be designed, operated, and maintained in accordance with applicable regulatory requirements, permits, approvals, and accepted industry practices. Wastewater and solid waste generated at the camp will be managed to minimize potential effects on water quality, wildlife, fish habitat, vegetation, terrain, and public health. Fuel and hazardous materials associated with camp operation will be stored and handled using appropriate containment, spill prevention, inspection, and spill response measures.

The camp will be operated in a manner intended to limit interactions between workers and wildlife, reduce potential attractants, and maintain safe and orderly site conditions. Camp procedures are expected to address waste handling, wildlife awareness, traffic control, fire prevention, emergency response, worker orientation, and environmental protection requirements.

Most on-site camp facilities are expected to be temporary and will be removed following completion of construction. A portion of the camp infrastructure may be retained to support long-term operation and maintenance of the hydroelectric facility.

On-site permanent facilities may include limited emergency accommodation, maintenance or storage buildings, utilities, and related support infrastructure required for safe and reliable operation of the Project.

The final camp design, operating requirements, environmental protection measures, and reclamation requirements will be developed during subsequent phases of Project planning and will be subject to applicable regulatory review and approval.

4.5 Construction

Construction activities include but are not limited to:

1. Site preparation and grading.
2. Clearing, grubbing, and stripping of overburden.
3. Surveying and construction layout.
4. Excavation of soil, overburden, and bedrock.
5. Drilling and blasting.
6. Quarrying, aggregate production, crushing, and screening.
7. Hauling and transportation of materials and equipment.
8. Placement and compaction of fill materials.
9. Foundation preparation and rock treatment.
10. Construction dewatering and water management.
11. Installation of temporary works and erosion control measures.
12. Concrete batching, transportation, placement, and curing.
13. Cast-in-place concrete construction.
14. Precast concrete installation.
15. Structural steel fabrication and erection.
16. Pipe fabrication, welding, and installation.
17. Installation of mechanical and electrical equipment.
18. Utility and communications installations.
19. Transmission line and electrical infrastructure construction.
20. Equipment testing, commissioning, and start-up activities.
21. Site restoration and reclamation of temporary work areas.

During construction, the Project is expected to employ approximately 50 personnel during typical construction periods, with peak workforce requirements of up to approximately 90 personnel depending on final schedule, contractor staffing, and execution strategy. Construction is currently expected to occur over multiple seasons between approximately late 2028 or early 2029 and summer 2031, subject to permitting, final design, contractor planning, seasonal access constraints, and construction sequencing.

4.5.1 Project Requirements During Construction

Table 11 provides the current screening-level construction requirements for the Project. Values are preliminary and are intended to support NIRB screening. Final contractor-specific quantities, equipment selections, construction methods, storage configurations, and operating procedures will be refined through detailed design, contractor planning, Nunavut Water Board licensing, land use permitting, and other applicable regulatory review before construction.

Table 11: Screening-level Construction Requirements

Requirement	Current Screening Basis
Construction period	Approximately summer 2028 or early 2029 to summer 2031, subject to permitting, final design, contractor planning, seasonal access, and construction sequencing.
Reservoir filling and commissioning	Currently anticipated in 2031, following completion of major civil works, mechanical/electrical installation, system testing, and regulatory approvals.
Typical construction workforce	Approximately 50 personnel during typical construction periods.
Peak construction workforce	Up to approximately 90 personnel during peak construction periods, depending on final schedule, contractor staffing, and execution strategy.
Construction camp	Temporary onsite construction camp near the main dam site, supported by logistics, storage, and staging facilities in or near Iqaluit.
Access	Existing Iqaluit marine and aviation infrastructure, helicopter access, authorized temporary winter access where required, and the proposed approximately 66 km all-season access road once constructed.
Onsite access roads	Approximately 7 km of onsite access roads connecting the powerhouse, dam, spillway, laydown areas, camp, and other Project facilities, subject to detailed design.
Fuel source	Sealift delivery to Iqaluit, followed by road transport to the Project site once suitable access is available. Before completion of the all-season access road, limited fuel may be transported using authorized temporary access methods.
Fuel storage	Temporary fuel storage at the Iqaluit staging area, construction camp, headworks area, laydown areas, quarry or borrow areas, and selected work fronts.

Requirement	Current Screening Basis
Estimated maximum diesel storage within the Project construction logistics system at one time	Approximately 200,000 L to 450,000 L distributed between the construction camp, headworks area, laydown areas, quarry or borrow areas, and selected work fronts.
Estimated gasoline storage onsite at one time	Approximately 2,000 L to 10,000 L, primarily for small equipment, vehicles, tools, and emergency use.
Estimated propane storage onsite at one time	Approximately 10,000 L to 50,000 L water capacity equivalent, primarily for camp heating, cooking, and temporary support facilities.
Estimated Jet A storage onsite at one time	Approximately 5,000 L to 20,000 L, if aviation fuel storage is required for helicopter support. Aviation fuel may alternatively be managed from existing Iqaluit aviation infrastructure.
Water source	Project lake/reservoir area or other approved water source, subject to Nunavut Water Board authorization.
Estimated construction water withdrawal	Typical construction water withdrawal is expected to range from approximately 50 m ³ /day to 150 m ³ /day, with short-duration peak requirements of up to approximately 500 m ³ /day during concrete production, dust suppression, dewatering, or other high-demand construction activities.
Estimated annual construction water use	Approximately 15,000 m ³ /year to 75,000 m ³ /year, excluding reservoir impoundment and event-based construction dewatering.
Wastewater management	Camp wastewater and greywater will be managed through approved treatment, holding, transport, or disposal methods confirmed through the Nunavut Water Board process.
Waste management	Waste will be segregated and temporarily stored onsite before removal to approved facilities in Iqaluit or other approved disposal locations, as applicable.
Aggregate and borrow	Proposed use of local morainal and till deposits, including material within the future reservoir inundation zone where appropriate.
Explosives	Explosives may be required for rock excavation, quarry development, road construction, and civil works. Storage, transport, and use will follow applicable federal and territorial requirements.
Major equipment	Heavy construction equipment, haul trucks, loaders, excavators, dozers, cranes, concrete batch plant, crushing/screening equipment, generators, fuel trucks, and support vehicles.

Requirement	Current Screening Basis
Environmental controls	Erosion and sediment control, spill prevention and response, wildlife attractant controls, waste management, water management, dust control, inspections, and adaptive mitigation.

4.5.2 Major Equipment

The planning-level construction equipment estimate identifies an approximate peak fleet of 105 major production and service units across the principal equipment groups. The estimate excludes much of the light-vehicle, small-tool and minor support-equipment inventory.

The approximate peak fleet includes:

- 14 hydraulic excavators of various sizes;
- Eight track dozers;
- 26 articulated dump trucks;
- Four rigid quarry haul trucks;
- Ten wheel loaders;
- Eight graders and rollers;
- Four production or crawler blast drills;
- Two grout drill rigs;
- Four mobile cranes and two large mobile or crawler cranes;
- Three crusher units and two screens;
- Four concrete mixer trucks and two concrete pumps;
- Four pipelayers or sidebooms; and
- Eight fuel, mobile-service and mechanic-support vehicles.

Additional equipment would include a concrete batch plant, generators, dewatering systems, fuel tankers, water trucks, sewage and waste-haul vehicles, highway tractors, trailers, buses, pickups, snow-removal equipment and environmental monitoring equipment.

Major and specialized equipment would generally be delivered to Iqaluit by annual sealift, unloaded at the port or designated laydown areas and moved to the Project site using lowboy, step-deck or flatbed trailers once suitable access is available. Some standard vehicles and services may be sourced in Iqaluit. Routine air mobilization of major equipment is not anticipated. Air support would primarily transport personnel, urgent parts and small equipment.

The detailed screening-level equipment inventory, including approximate quantities, principal purpose, expected duration of use and mobilization method, is provided in **Appendix C**, Major Equipment and Mobilization Estimate. The inventory represents a planning estimate rather than a final contractor fleet.

The principal earthworks fleet, including excavators, dozers, haul trucks, loaders, graders and compaction equipment, would be used during access-road construction, quarry development, site preparation, dam construction and reclamation. Drill rigs, crushers and screens would be used during quarry development, rock excavation and aggregate production. Cranes and concrete equipment would support construction of the dam, powerhouse, spillway, intake, penstock, substation and transmission line. Pipelayers would primarily support penstock installation. Fuel, service, water, waste-haul and personnel-transport vehicles would operate throughout the active construction period.

Major and specialized equipment would generally be mobilized to Iqaluit by annual sealift and transported to the Project site by lowboy, step-deck or flatbed trailer once road access is available. Standard vehicles and selected support services may be sourced in Iqaluit. Temporary winter access may be used for limited early mobilization where authorized. Routine air mobilization of major equipment is not anticipated; air transportation would primarily support personnel, urgent parts and small equipment.

4.5.3 Materials and Equipment Staging

Existing port facilities in Iqaluit may be used during the open water season to receive equipment and materials. A temporary staging area may be established near the port to support the movement of materials through town, with an additional temporary staging area proposed approximately 3 km along the access road. These areas will be used to organize, sequence, and manage material transport from the port to the Project access corridor. Final staging locations, footprints, duration of use, traffic controls, environmental protection measures, and applicable approvals will be confirmed before use.

Major manufactured Project components, including turbines, generators, gates, transformers, electrical equipment, structural steel, penstock components, mechanical systems and specialized construction equipment, are expected to be procured from qualified suppliers outside Nunavut. These components would generally be transported to Iqaluit by sealift, unloaded and stored at an approved port or marshalling area and transported to the Project site using the all-season access road when available.

Smaller, time-sensitive or emergency materials may be transported by air. Cementitious materials, specialized concrete additives, explosives and selected mechanical and electrical components would also be imported. Rock, aggregate, earthfill and suitable backfill would be obtained from approved Project quarry and borrow sources to the extent practicable.

4.5.4 Material Sourcing

The overarching construction strategy for the Project is to minimize the import of bulk construction materials by maximizing the use of suitable local rock, aggregate and fill. Material sourcing will rely heavily on quarry development and onsite aggregate processing near the proposed dam site. Where

possible, borrow sources will be located directly within the future reservoir footprint (the inundation zone); this approach minimizes the project's overall physical footprint, protects undisturbed permafrost, and significantly reduces long-term site reclamation requirements.

4.5.4.1 Borrow Materials and Quantities

Preliminary geotechnical interpretation has identified more than approximately 200 million m³ of potentially available hard rock and approximately 33 million m³ of potentially available sand and gravel within the identified source areas. These values describe the estimated resource potentially available and do not represent the quantity expected to be extracted for Project construction.

The current screening-level Project allowance assumes that up to approximately 5 million m³ of rock, earthfill, granular material and aggregate may be required for the access roads, dam, spillway, intake, powerhouse, penstock, concrete production, laydown areas and other civil works. This allowance includes both unprocessed bulk fill and processed construction materials and will be refined through geotechnical investigations, material testing, final design and completion of the Project earthworks balance.

Preliminary engineering information supports a more specific estimate of approximately 153,000–230,000 m³ of compacted granular base and surfacing material for the approximately 66 km main access road and approximately 7 km of onsite roads. Including a preliminary allowance for processing losses, unsuitable fractions, handling and construction variability, the corresponding gross quarry or borrow production requirement is estimated at approximately 176,000–287,000 m³. This estimate excludes general road embankment fill, bridge and culvert approaches, temporary roads, camp and laydown pads, transmission work areas and other civil infrastructure.

Additional rock, earthfill, riprap, concrete aggregate and engineered fill will be required for the dam and associated hydraulic and civil structures. The quantities for these components cannot yet be reliably allocated among individual sources because final structure cross-sections, excavation quantities, material specifications and cut-and-fill reuse opportunities remain under development.

As much suitable material as practicable would be sourced from within the future reservoir inundation area to reduce permanent disturbance outside the reservoir footprint and limit haul distances. Some source areas may be required outside the reservoir where suitable materials are unavailable, insufficient or do not meet the required engineering specifications.

Potential material-source areas have been identified for screening, but final source selection has not been completed. Source-specific footprints, extraction quantities, processing areas, haul routes and operating periods will be refined through 2026 geotechnical investigations, detailed design and the applicable land-use and water-licensing processes.

4.5.4.2 Application-Specific Sourcing

- Access Roads: To construct the permanent and temporary access roads, granular materials will be sourced from borrow areas adjacent to the road alignment or processed onsite to meet structural requirements. The road design requires a 300 mm thick base course of 125 mm minus granular fill, topped with a 50 mm surface layer of 25 mm minus material;
- Concrete Work (Main Dam, RCC, and Structures): Because aggregate typically comprises 75% or more of concrete by volume, utilizing onsite sands, gravels, and crushed rock for the mix design is critical for efficiency. While the aggregate will be locally sourced, the required cement and specialized concrete additives will need to be imported and shipped to the site; and
- Penstock and Engineered Fill: The 2,000-meter trenched penstock will utilize the locally sourced sands and gravels for backfill, supplemented by high-density structural foam bedding to provide continuous support and insulation against freezing.

4.5.4.3 Blasting and Explosives

Blasting may be required at hard-rock quarries, localized rock cuts along the access-road alignment, the dam key trench and foundation, the powerhouse foundation, spillway and intake excavations and portions of the penstock alignment. The current screening estimate includes up to approximately 5 million m³ of blasted rock and approximately 1,750–2,500 tonnes of blasting agent over the construction period, subject to confirmation through detailed design.

Potential blasting agents may include bulk emulsion, ammonium nitrate/fuel oil products, packaged explosives, boosters and approved initiation systems. The final explosive type would be selected by the qualified blasting contractor based on rock conditions, excavation requirements, safety considerations and environmental constraints.

Blasting would occur intermittently during quarrying, access-road construction and major civil excavation. During peak quarry or foundation work, blasting could occur several times per week, primarily during daytime hours. Final blast frequency, timing, charge weight and sequencing would be established by the blasting contractor.

Explosives would be delivered in stages and the full Project requirement would not be stored onsite at one time. Explosives would be transported by authorized carriers and stored in secure licensed magazines at approved quarry or laydown areas. Final magazine locations and maximum inventories will be confirmed through contractor planning and applicable approvals.

Blasting setbacks would be established through site-specific blast design and would consider waterbodies, fish habitat, wildlife, active bird nests, archaeological and cultural sites, camps, public access and other sensitive receptors. Blasting near fish-bearing waters would be designed to meet

applicable Fisheries and Oceans Canada guidance for the use of explosives in or near Canadian fisheries waters.

Mitigation would include qualified blast design, warning and exclusion zones, controlled initiation, stemming, blast mats where required, vibration and air-overpressure controls, wildlife and nest checks, spill prevention, security measures and post-blast inspection.

A preliminary Explosives Management Plan will be provided with the applicable land-use or water-licence application where required. Final contractor-specific blast plans, magazine information, setbacks and monitoring procedures will be completed before explosives are mobilized to the Project site and before blasting begins.

4.5.5 Site Support Infrastructure

The construction water-use, waste volumes and fuel-storage quantities provided in this section are screening-level planning estimates developed from the current preliminary design basis, including the proposed hydroelectric facility, approximately 66 km access road, temporary construction camp, headworks construction, quarry and borrow activities, laydown areas, mobile equipment use, temporary power requirements, and construction sequencing. These values are intended to support NIRB screening and do not represent final contractor quantities. Final water-use volumes, waste volumes and fuel storage volumes, tank configurations, withdrawal locations, and management procedures will be refined through detailed design, contractor planning, Nunavut Water Board licensing, land use permitting, and other applicable regulatory review.

4.5.5.1 Water Use

Water will be required during construction for camp use, dust suppression, material compaction, concrete production, equipment washing, aggregate processing, construction dewatering, and other construction support activities. The primary construction water source is expected to be the Project lake/reservoir area or another approved water source, subject to Nunavut Water Board authorization.

For screening purposes, typical construction water withdrawal is expected to range from approximately 50 m³/day to 150 m³/day. Short-duration peak construction water requirements may reach up to approximately 500 m³/day during periods when concrete production, dust suppression, construction dewatering, and other water-demand activities occur at the same time. Estimated annual construction water use is expected to range from approximately 15,000 m³/year to 75,000 m³/year, excluding reservoir impoundment and event-based construction dewatering.

Table 12 provides the current screening-level construction estimate. Final withdrawal locations, maximum daily withdrawal volumes, annual volumes, intake screening, water treatment, discharge management, monitoring, and reporting requirements will be confirmed through the Nunavut Water Board licensing process before construction water use occurs.

Table 12: Estimated Water Use

Water Use Activity	Preliminary Screening Basis	Estimated Volume / Range	Proposed Management Approach
Camp potable and domestic water	Water for drinking, food preparation, washing, sanitary use, and camp support services. Estimate is based on a typical 50-person camp and peak accommodation needs of up to approximately 90 personnel.	Typical: 8 m ³ /day to 15 m ³ /day. Peak: 15 m ³ /day to 25 m ³ /day.	Treated or managed in accordance with applicable health, camp, and water licence requirements.
Concrete production	Water for concrete batching and civil works, including dam, powerhouse, intake, low-level outlet, spillway, foundations, and related structures.	Intermittent use of approximately 20 m ³ /day to 150 m ³ /day during active batching periods.	Withdrawn from an approved source; water use tracked and reported as required. Concrete wash water to be managed in designated containment or treatment areas.
Dust suppression	Water for dust control along active construction roads, laydown areas, quarry/borrow areas, and other disturbed surfaces.	Approximately 20 m ³ /day to 200 m ³ /day during dry, active construction periods.	Applied only where required; managed to reduce runoff and sediment transport.
Material compaction	Water for road construction, fill placement, embankment works, and other compaction activities.	Approximately 10 m ³ /day to 75 m ³ /day during active earthworks.	Managed to reduce sediment-laden runoff and avoid uncontrolled discharge to waterbodies.

Water Use Activity	Preliminary Screening Basis	Estimated Volume / Range	Proposed Management Approach
Aggregate processing / crushing support	Water for dust control, aggregate handling, or washing where required.	Approximately 5 m ³ /day to 50 m ³ /day during active processing periods.	Used within designated areas with sediment control and runoff management.
Equipment washing	Water for controlled washing of vehicles and equipment.	Approximately 2 m ³ /day to 10 m ³ /day.	Conducted in designated areas with sediment and contaminant controls.
Construction dewatering	Water removed from excavations, foundations, or work areas.	Event-based; approximately 50 m ³ /day to 500 m ³ /day during active dewatering events, depending on location and conditions.	Managed through settling, filtration, energy dissipation, or other approved controls before discharge.
Hydrostatic testing / flushing	Water for testing or flushing of pipes, penstock sections, or related infrastructure, if required.	Event-based; approximately 100 m ³ to 500 m ³ per event.	Water to be reused where practical or discharged in accordance with approved water management procedures.
Reservoir impoundment and filling	Water retained behind the dam during reservoir filling.	Reservoir Full Supply Level: 550 m. Minimum operating level: 528 m. Live storage: approximately 1,091,703 dam ³ , or approximately 1,092 million m ³ .	Filling sequence, timing, downstream flow management, monitoring, and reporting to be confirmed through engineering, aquatic assessment, Inuit engagement, and NWB licensing.
Operational water use for generation	Water passed through turbines for hydroelectric generation. This is not expected to be a consumptive water use, as	Maximum plant flow: approximately 71.5 m ³ /s. Minimum plant flow: approximately 6.6 m ³ /s. For a 15 MW operating	Managed through approved reservoir operating rules, instream flow release requirements,

Water Use Activity	Preliminary Screening Basis	Estimated Volume / Range	Proposed Management Approach
	water will be discharged downstream through the powerhouse, low-level outlet, and/or spillway.	case, estimated flow requirement is approximately 27.7 m ³ /s, or approximately 873,547,000 m ³ /year.	downstream monitoring, and NWB licence conditions.
Instream flow release	Priority release to support downstream flow before generation.	Preliminary IFR range: 1 m ³ /s to 4 m ³ /s. A preliminary summer target of 4.0 m ³ /s has been identified for June to August planning purposes.	Final seasonal IFR values to be confirmed through hydrologic analysis, aquatic studies, IQ, engineering, and regulatory review.

The synthetic hydrologic record developed for the Project estimates an annual average inflow of approximately 41.1 m³/s, or approximately 1,294.7 Mm³/year. The current Project concept relies on reservoir storage to capture seasonal freshet flows and support year-round generation and downstream flow releases. Reservoir operating rules, discharge management, and monitoring requirements remain preliminary and will be refined through hydrologic modelling, bathymetry, aquatic assessment, Inuit engagement, and Nunavut Water Board licensing.

The above construction-phase water table provides the current screening-level basis for water use, wastewater management, dewatering, hydrostatic testing, construction runoff, and related discharge management during construction. Final water sources, withdrawal locations, daily water volumes, discharge locations, discharge criteria, wastewater handling methods, monitoring parameters, monitoring frequency, compliance points, and reporting format will be developed through detailed engineering, contractor planning, aquatic assessment, hydrologic review, Inuit engagement, and the Nunavut Water Board Type A Water Licence process. The Type A Water Licence application will provide detailed construction water management, wastewater management, discharge management, and monitoring information required before construction activities proceed.

4.5.5.2 Construction Waste Management

During construction, wastes generated at the temporary camp, laydown areas, construction work fronts, and support facilities will be segregated, stored, handled, transported, and disposed of in accordance with applicable federal, territorial, municipal, and facility-specific requirements. Waste management procedures will be developed in a Project-specific Waste Management Plan before construction.

Domestic waste, food waste, greywater, sewage, non-hazardous construction waste, hazardous waste, and other Project-related waste streams will be managed to reduce the potential for environmental release, wildlife attraction, nuisance odours, and health and safety risks to personnel. Food waste and food-contaminated materials will be stored in wildlife-resistant sealed containers and kept separate from other waste streams. Waste storage areas will be inspected regularly and maintained in a clean and orderly condition.

Where practical, recyclable or reusable materials such as clean wood, metal, plastics, drums, pallets, and packaging will be separated from general waste. Non-hazardous solid waste will be temporarily stored onsite and transported to approved facilities in Iqaluit or another approved receiving facility, subject to facility acceptance requirements.

Greywater and sewage generated at camp facilities will be managed through approved holding, treatment, transport, or disposal methods confirmed through the Nunavut Water Board licensing process and applicable municipal or facility requirements. Untreated sewage or greywater will not be discharged to the land or water unless authorized under applicable permits or licences.

Hazardous waste, including waste oil, lubricants, solvents, glycol, contaminated soil, contaminated snow or ice, batteries, fuel-contaminated materials, used spill response materials, tanks, drums, and other regulated materials, will be segregated from non-hazardous waste. Hazardous waste will be stored in labelled containers compatible with the waste type, placed in appropriate secondary containment where required, and transported by an authorized carrier to an approved receiving facility.

The types of waste expected to be generated during construction are listed in **Table 13**.

Table 13: Screening-Level Construction and Operations Waste Estimates

Waste Stream	Construction Estimate	Operations Estimate	Preliminary Management Approach
Domestic solid waste	75–125 kg/day typical; 135–225 kg/day peak; approximately 15–65 t/year	Approximately 0.5–2 t/year	Wildlife-resistant storage; authorized local disposal where accepted; shipment south where required
Sewage and greywater	6–14 m ³ /day typical; 12–23 m ³ /day peak; approximately 1,200–4,500 m ³ /year	Approximately 25–150 m ³ /year	Holding tanks and transport to an authorized receiving facility; modular onsite treatment remains an alternative

Waste Stream	Construction Estimate	Operations Estimate	Preliminary Management Approach
Recyclable and reusable materials	Included in domestic and construction totals and segregated onsite	Approximately 1–10 t/year during routine and major maintenance	Covered storage; reuse, local recycling where available or shipment south
Non-hazardous construction and maintenance debris	Approximately 50–250 t/year	Minor routine quantities; increased quantities during major maintenance	Reuse, recycling or disposal at an approved facility
Used oil and hazardous liquids	Approximately 5,000–20,000 L/year	Approximately 1,000–5,000 L/year	Labelled storage within secondary containment; licensed transport to an approved facility
Other hazardous solids	Approximately 1–5 t/year	Approximately 0.2–1 t/year	Segregated and labelled storage; shipment to an approved receiving facility
Contaminated soil, snow or ice	No routine generation; approximately 50–200 m ³ of contingency storage	Incident-dependent	Lined and covered temporary storage, characterization and approved treatment or disposal
Major maintenance waste	Not applicable	Approximately 10–50 t of solids and 10,000–25,000 L of liquids per major event	Planned removal by approved contractors to authorized receiving facilities

A permanent onsite landfill, landfarm, incinerator or composter is not included in the current base-case Project configuration. Waste accepted locally would be transported to an authorized facility in Iqaluit, subject to confirmation of facility acceptance. Hazardous waste, recyclable materials and other waste not accepted locally would be packaged and shipped south to approved receiving facilities.

No routine generation of contaminated soil, snow or ice is anticipated. Material generated following a spill would be placed in lined, covered and contained temporary storage, characterized and transported to an approved treatment or disposal facility. A temporary treatment cell or landfarm would only be considered if incident volumes warrant onsite treatment and the activity receives the required authorization.

Final receiving facilities, acceptance requirements and transportation arrangements will be identified in the Waste Management Plan before construction.

4.5.5.3 Fuel Source, Storage, and Containment

Construction-phase fuel is proposed to be delivered to Iqaluit by sealift and transported to the Project site by road once suitable access is available. Fuel required before completion of the all-season access road may be transported using authorized temporary access methods, subject to applicable permits and environmental protection requirements.

Onsite fuel storage is expected to be required at the temporary construction camp, headworks construction area, laydown areas, quarry or borrow areas, selected construction work fronts, and potentially at the helicopter landing area if aviation fuel is stored onsite. Fuel types may include diesel, gasoline, propane, Jet A, lubricants, hydraulic fluids, and other petroleum products required for construction equipment and camp operations.

For screening purposes, **Table 14** summarizes the screening level fuel storage estimates for location-specific planning. These volumes total volume accounts for all fuel moving through the supply chain simultaneously and will be distributed across multiple approved storage locations (e.g., camp, headworks, quarry). It does not represent a single remote tank farm or the maximum simultaneous storage at any one specific location. This estimate reflects the remote construction setting, the approximately 66 km access road, the construction camp, headworks construction, quarry/borrow activities, laydown areas, mobile equipment use, and backup power requirements. Final fuel storage volumes and tank configurations will be confirmed through detailed construction planning, contractor fuel-use estimates, applicable permits, and regulatory review before storage is established.

Table 14: Preliminary Maximum Fuel Storage Inventory by Location

Proposed Storage Location	Fuel Type	Approximate Maximum Storage Volume / Range	Storage Method	Containment Specification	Separation / Siting Controls
Iqaluit staging / marshalling area	Diesel, gasoline, propane, Jet A, lubricants, hydraulic fluids	Diesel: 100,000 L to 250,000 L. Gasoline: 2,000 L to 5,000 L. Propane: 10,000 L to 25,000 L water capacity equivalent. Jet A: 5,000 L to 20,000 L, if required.	Approved tanks, double-walled tanks, drums, cylinders, or approved containers.	Secondary containment sized in accordance with applicable code and regulatory requirements. Spill kits and inspection	Located in an approved staging area with controlled access, spill response equipment, and inspection procedures.

Proposed Storage Location	Fuel Type	Approximate Maximum Storage Volume / Range	Storage Method	Containment Specification	Separation / Siting Controls
				controls to be maintained.	
Temporary construction camp near main dam site	Diesel, propane, gasoline, lubricants	Diesel: 50,000 L to 100,000 L. Propane: 10,000 L to 30,000 L water capacity equivalent. Gasoline: 1,000 L to 5,000 L. Lubricants/hydraulic fluids: 1,000 L to 5,000 L.	Double-walled tank, enviro-tank, day tank, drums, cylinders, or approved containers.	Secondary containment for tanks and dispensing areas. Backup generator day tanks to be sized for approximately 24 hours of operation and equipped with secondary containment.	Sited away from waterbodies and sensitive areas to the extent practical. Refuelling to occur in designated areas where practical.
Headworks / dam construction area	Diesel, gasoline, lubricants, hydraulic fluids	Diesel: 100,000 L to 200,000 L. Gasoline: 1,000 L to 5,000 L. Lubricants/hydraulic fluids: 2,000 L to 10,000 L.	Temporary bulk tanks, day tanks, mobile fuel units, drums, or approved containers.	Secondary containment, spill kits, inspection program, and transfer controls. High/low-level alarms to be used where applicable.	Located outside active drainage pathways where practical and away from waterbodies to the extent practical.
Quarry / borrow areas	Diesel, lubricants, hydraulic fluids	Diesel: 25,000 L to 75,000 L. Lubricants/hydraulic fluids: 1,000 L to 5,000 L.	Mobile refuelling unit, temporary tank, drums, or approved containers.	Secondary containment for stationary storage and spill response equipment at active work fronts.	Refuelling to occur away from waterbodies where practical and within designated areas.

Proposed Storage Location	Fuel Type	Approximate Maximum Storage Volume / Range	Storage Method	Containment Specification	Separation / Siting Controls
Laydown areas and selected work fronts	Diesel, gasoline, lubricants, hydraulic fluids	Diesel: 10,000 L to 50,000 L. Gasoline: 1,000 L to 3,000 L. Lubricants/hydraulic fluids: 1,000 L to 5,000 L.	Approved containers, mobile equipment tanks, mobile fuel unit, or day tanks.	Drip trays, secondary containment where stationary storage occurs, spill kits, and routine inspections.	Stored in designated areas with housekeeping and inspection controls.
Helicopter landing area / aviation support area, if required	Jet A	5,000 L to 20,000 L if aviation fuel is stored onsite. Aviation fuel may alternatively be managed from existing Iqaluit aviation infrastructure.	Approved aviation fuel drums, double-walled tank, or approved aviation fuel storage system.	Secondary containment, spill response equipment, transfer controls, and inspection procedures.	Located at a designated aviation support area away from waterbodies and sensitive terrain to the extent practical.
Backup generators	Diesel	Approximately 500 L to 2,000 L per generator day tank, depending on generator size and final camp/equipment configuration.	24-hour day tanks or integrated generator tanks.	Secondary containment and high/low-level alarms where applicable.	Located on stable ground within designated generator areas, with spill response equipment nearby.

Note: Cumulative fuel consumption is separate from maximum simultaneous storage. The location-specific storage values are planning allocations and are not all expected to occur at their maximum values at the same time. The current screening basis assumes approximately 200,000–450,000 L of diesel may be present within the construction logistics system at one time.

Fuel storage and dispensing areas will be located away from waterbodies and environmentally sensitive areas to the extent practical. Fuel storage areas will use secondary containment, inspection procedures, spill response equipment, fire safety controls, trained personnel, and emergency response procedures.

Refuelling will occur in designated areas where practical. Spill prevention and response procedures will be included in the Project Environmental Protection Plan and Spill Prevention and Response Plan.

The estimates in **Table 14** represent preliminary screening-level storage quantities for NIRB review. Final fuel quantities will depend on contractor equipment selection, construction schedule, generator configuration, access timing, and the extent to which fuel can be staged from Iqaluit versus stored onsite. If final fuel storage volumes or locations materially differ from the screening basis, NNC will provide updated information to NIRB and applicable regulators before those storage areas are established.

4.5.6 Site Access and Aviation Infrastructure

No constructed temporary or permanent fixed-wing landing strip is included in the current Project scope. Twin Otter or similar fixed-wing aircraft may be used on a limited or emergency basis. Float-equipped aircraft may use McKeand Lake where the aircraft operator confirms that conditions are suitable and safe.

A designated helicopter landing area would be located near the principal camp and construction area. Temporary helicopter landing areas may also be used along the access road, transmission corridor and other remote work areas where safe and environmentally appropriate. During construction, helicopter activity may occur daily, with up to approximately three return flights per day during peak periods. During operations, helicopter use is expected to be intermittent but could occur daily during inspections, major maintenance or emergencies. Fixed-wing activity is expected to be less frequent and driven by emergency or specialized logistical requirements. Final landing locations, flight frequencies and aviation operating procedures will be refined during construction logistics planning.

4.5.6.1 Road Construction

Initial site mobilization will rely on the development of a temporary winter access road built over frozen ground to transport heavy construction equipment. This will be followed by the construction of a ~66 km all-season access road, which will advance from the project site outward toward Iqaluit. Construction access will rely on a combination of overland, sea, and air logistics. NNC focuses on modular design elements to facilitate transport to the site and construction of the infrastructure.

- **Road Access:** One final all-season access road route will be selected from the three route options carried forward for screening. The selected route is expected to be approximately 66 km long and would connect Iqaluit to the Project site. The 69 kV transmission line is proposed to be twinned with, and generally follow, the final selected all-season access road alignment, as shown conceptually on **Figure 9**.

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ROAD AND TRANSMISSION ALIGNMENT

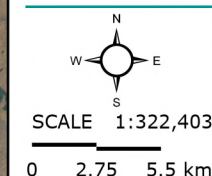
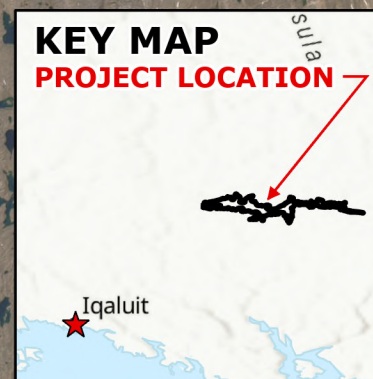
FIGURE 9

- McKeand S - Main Access Road - Direct
- McKeand S - Main Access Road - Flatter
- McKeand S - Main Access Road - High
- Powerhouse Access
- Upper Reservoir Access Road
- Main Reservoir
- Iqaluit Substation

Note: All structures will maintain a minimum of 3.0 clearance from the road edge.

MAP DRAWING INFORMATION DATA
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MAP CREATED BY: -EES
MAP CHECKED BY: -MR
MAP PROJECTION: NAD 1983 CSRS UTM
Zone 19N



PROJECT: 25-1319
STATUS: DRAFT
DATE: 2026-03-20

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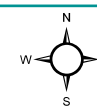
RESERVOIR CONFIGURATION

FIGURE 10

 Main Reservoir at Full Supply Level (550m)

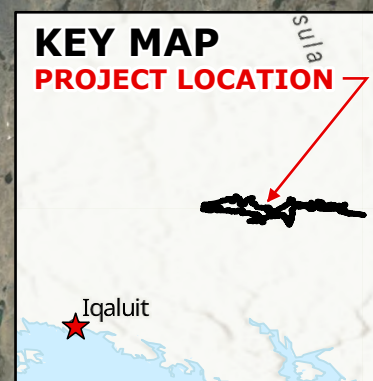
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MAP CHECKED BY: -MR
MAP PROJECTION: NAD 1983 CSRS UTM
Zone 19N



SCALE 1:135,000
0 1 2 km

PROJECT: 25-1319
STATUS: DRAFT
DATE: 2026-03-31



4.5.7 Construction Camp and Workforce Accommodation

The Project is proposed to use a phased workforce accommodation strategy. During construction, worker accommodation would be provided through a combination of temporary onsite accommodation near the main dam site and, where feasible, accommodation in Iqaluit.

The temporary onsite construction camp is currently proposed near the main dam site and is expected to accommodate approximately 50 personnel during typical construction periods, with peak workforce requirements of up to approximately 90 personnel depending on the final construction schedule, contractor staffing requirements, and execution strategy. The onsite camp footprint is currently estimated at approximately 3 hectares, with final layout and servicing details to be confirmed through detailed design and regulatory review.

The onsite construction camp may include accommodations, kitchen and dining facilities, potable water supply, wastewater collection and treatment, solid waste management, fuel storage, maintenance and storage areas, communications systems, temporary power supply, emergency response equipment, and environmental protection controls.

NNC is also evaluating the use of modular worker accommodation in Iqaluit to reduce pressure on temporary onsite facilities and support local housing legacy opportunities where feasible. If this option advances, municipal approvals, utility servicing requirements, traffic considerations, and community effects will be addressed through applicable permitting and engagement processes.

No permanent full-time operations camp is currently proposed. Long-term operations are expected to be managed primarily from Iqaluit through remote monitoring, scheduled inspections, and periodic maintenance visits. Limited onsite facilities may be retained for emergency response, dam safety inspections, maintenance, storage, or weather-related contingencies.

The temporary onsite construction camp is expected to accommodate approximately 50 personnel during typical construction periods and up to approximately 90 personnel during peak activity. The existing exploration camp consists of weather-haven-style tents and supporting kitchen, washroom, laboratory and storage facilities. It would be progressively expanded or replaced with weather-haven or modular units suitable for construction.

Camp units and materials would generally be delivered to Iqaluit by sealift and transported to the Project site using the access road. Water would be withdrawn from an approved onsite surface-water source using screened intakes and treated as required for potable or domestic use.

For screening purposes, sewage and greywater would be collected in holding tanks and transported to an authorized receiving facility in Iqaluit, subject to acceptance. Onsite modular treatment remains an alternative under evaluation.

No permanent full-service operations camp is proposed. A limited permanent emergency shelter would be retained for emergency response, dam-safety inspections and maintenance activities requiring an extended onsite presence.

4.5.7.1 Inuit Employment and Leadership

NNC is dedicated to strong Inuit representation and leadership. This commitment will guide all future hiring, rotation schedules, and project participation.

- **Demonstrated Track Record:** During the 2025 field season, NNC achieved a 70% Inuit employment rate. Furthermore, NNC's corporate partner, Qikiqtaaluk Corporation (QC), maintained strong Inuit employment rates of 50% in 2023 and 45% in 2024;
- **Operational Staffing:** Long-term day-to-day oversight of the facility will be performed from Iqaluit, reducing the need for continuous onsite staffing and maximizing accessible employment opportunities for residents; and
- **Contractor Requirements:** Hiring for both construction and operations will be refined through a formal tendering process. Contractors will be expected to align with NNC's commitments to Inuit employment and local procurement.

4.5.7.2 Training and Capacity Building

The project presents significant opportunities for skills development that will remain within the territory.

- **Integrated Training:** Capacity-building initiatives will be integrated into project delivery to support the development of a local workforce;
- **Transferable Skills:** Training will focus on providing workers with highly transferable skills in renewable energy, environmental monitoring, heavy equipment operation, and infrastructure management; and
- **Ongoing Mentorship:** A core principle of the project's "Phase Gate" engagement model includes ongoing Inuit mentorship and skills development as the project advances.

4.5.7.3 Workforce Accommodations and Logistics

To support the required workforce while managing impacts on the local community, the INP will utilize a phased accommodation strategy.

- **Onsite Temporary Construction Camp:** A temporary construction camp accommodating approximately 50 personnel will be established near the main dam site. This will support the workforce during peak construction, reduce weather-related delays, and minimize reliance on daily flights from Iqaluit; and

- **Community Housing Contribution:** For longer-term operational and construction needs, NNC will be evaluating the development of modular worker accommodations in Iqaluit, if required.

4.5.8 Preliminary Construction Sequence

The Project construction sequence will be developed during detailed design and refined based on regulatory requirements, environmental commitments, contractor input, logistics planning, procurement strategies, and site conditions. While the final construction approach has not been established, the anticipated progression of major construction activities is described below.

Logistics and Staging Infrastructure

Initial construction activities are expected to focus on the development of laydown areas, storage facilities, housing, and other supporting infrastructure in and around the City of Iqaluit. These facilities will support the housing and transportation of workers, receipt, storage, assembly, and hauling of construction materials and equipment prior to mobilization to the Project site. Establishing these facilities early will help support efficient logistics management for a large-scale project located in a remote environment and reduce negative impact to the City of Iqaluit.

Access Road Construction

Construction of the Project access road is expected to follow the establishment of staging infrastructure. The access road will provide a reliable transportation corridor between Iqaluit and the Project site for personnel, equipment, construction materials, and supplies. Completion of the access road will be a key enabling activity that supports the construction of all major Project components.

Site Establishment and Supporting Infrastructure

Following establishment of site access, construction activities are expected to focus on development of the temporary and permanent infrastructure required to support construction operations. This includes but is not limited to construction offices and camp, temporary access roads, laydown areas, quarry and borrow source development. Construction of the transmission line corridor and associated infrastructure may also commence during this phase where practical. These activities provide the resources and services required to support subsequent major civil construction works.

River Diversion and Headworks Preparation

Prior to construction of the main dam, facilities will be required to safely manage river flows through the construction area. This phase is expected to include construction of the low-level outlet works, temporary diversion facilities, foundation preparation, and development of dam abutments. Completing these works early allows major dam construction activities to proceed under controlled conditions while maintaining downstream flows and construction access. Timing of the diversion will be planned to avoid

the freshet period where flows in the river and risk of a flood event are highest. The dam is planned to reach sufficient height by the following freshet to minimize flood risk to the site.

Major Civil and Structural Construction

Construction of the principal Project infrastructure will proceed following river diversion and completion of main dam foundation preparation, principal infrastructure construction. This phase is expected to include construction of the main dam abutments, saddle dams, intake structures, penstock, powerhouse, switchyard, and associated civil works. These components represent the core infrastructure required to impound water, generate electricity, and connect the facility to the transmission system.

Mechanical and Electrical Installation

Installation of the major mechanical and electrical systems is expected to occur following completion of their respective portions of the civil/structural works required to support equipment installation. Activities include installation of gates, controls, turbines, generators, transformers, electrical systems, and other balance-of-plant equipment. The sequencing of these activities will be coordinated with the completion of the associated civil and structural works.

Reservoir Filling and Commissioning

The final phase of construction is expected to include system testing, commissioning, performance verification, and transition to operations. Reservoir impoundment and filling activities are anticipated to occur in parallel with commissioning activities, subject to regulatory approvals, environmental requirements, and operational readiness. This phase will confirm that the Project systems perform as intended prior to commencement of commercial operations.

The anticipated construction sequence is as follows:

- Establish logistics and staging infrastructure in or near Iqaluit, including material receiving, storage, assembly, worker support facilities, and transportation logistics;
- Establish authorized temporary access, where required, to support early mobilization of equipment and materials;
- Construct the approximately 66 km all-season access road between Iqaluit and the Project site;
- Establish onsite construction support infrastructure, including construction offices, temporary camp facilities, laydown areas, borrow areas, temporary access roads, and environmental protection controls;
- Construct river diversion and low-level outlet works to manage downstream flow releases during headworks construction;
- Prepare dam foundations, abutments, and related civil works;

- Construct the main dam, spillway, intake, penstock, powerhouse, switchyard, substations, and associated infrastructure;
- Construct the 69 kV transmission line and associated electrical interconnection infrastructure; and
- Complete mechanical and electrical installation, system testing, reservoir filling, commissioning, and transition to operations.

Final construction methods, seasonal timing, equipment requirements, and contractor sequencing will be refined through detailed design, contractor input, environmental commitments, and applicable regulatory approvals.

4.6 Operations and Maintenance

4.6.1 General

Once operational under normal conditions, the plant will operate 24 hours a day, year-round, subject to planned outages, maintenance, hydrologic conditions, and approved operating requirements. The plant will be designed with a fully automatic control system and supervisory control and data acquisition (SCADA) system. This will enable operation without personnel on-site full time. An operator will, however, conduct routine maintenance and inspections regularly, with attendance frequency based on inspection, maintenance, dam-safety and operational requirements. The plant will be continuously monitored by the control system with reports communicated to the operator located in town via fibre optic communications.

Prior to operation, management plans will be developed to govern the safe and reliable operation of the facility. Project specific operation plans are not defined at this point in time. However, typical operation plans for hydroelectric facilities include:

- Dam Safety Plan and Operations, Maintenance and Surveillance Manual;
- Emergency Preparedness and Response Plans;
- Emergency Response and Accident Risk Plan;
- Site Water Monitoring and Management Plan;
- Spill Prevention and Response Plan;
- Fuel Management Plan;
- Waste Management Plan;
- Hazardous Materials Management Plan;
- Aquatic Effects Monitoring Program;
- Wildlife Monitoring and Mitigation Plan;
- Follow-up and Adaptive Management Plan; and

- Closure and Reclamation Plan.

Final operational plans will incorporate applicable Project Certificate terms, water-licence conditions, final design, dam-safety requirements, operating procedures and commitments arising from Inuit engagement.

The project will be primarily remote-operated by a dedicated team of local operators along with resident skilled workers (millwrights, electricians, etc.). During normal operation, the site is expected to require periodic attendance by trained operators rather than continuous full-time staffing. Long-term workforce accommodation requirements have not yet been finalized; however, the objective is for the majority of operations team to be local to Iqaluit and housed in Iqaluit. Specialized work or larger maintenance programs may require an out-of-town work force for specialized skills.

The current operating concept is that some limited on-site accommodations will be available, intended for emergency use only or during larger maintenance programs.

Workforce accommodation strategies will be further evaluated as the project progresses and operational requirements become better defined.

Access to the site will be via the access road, and by helicopter in emergency conditions. Access frequency will vary seasonally and will depend on operational requirements. During periods of normal operation, site visits are expected to occur regularly to perform inspections, maintenance, and operational checks. Additional access may occur during major maintenance activities, dam safety inspections, or emergency response situations.

Maintenance needs are anticipated to be minimal. At a minimum, with the exception of regular planned outages and maintenance, occurring in typical 5-year periods, and major refurbishments approximately every 20 years. Regular inspections will occur in accordance with the Canadian Dam Safety (CDA) guidelines and applicable regulatory requirements. Specific details on the inspection and rehabilitation needs have not been developed at this time. With regular maintenance, the expected design life of a typical hydroelectric facility is greater than 100 years.

Operational procedures, staffing, access requirements, inspection frequency, maintenance needs, and operational controls shall be further defined as the project progresses.

4.6.2 Plant Control

The plant will be operated in an automatic mode by operations personnel in Iqaluit. The primary control requirement will be to meet the electrical load demands for Iqaluit. A head water level transducer will continuously monitor the intake water level and provide the prime control input to:

- Control the amount of water flowing through the turbines; and
- Control turbine operation to optimize energy generation within approved operating limits.

A remote alarm system will be provided to support monitoring of operations for the safety and protection of the environment, personnel and the plant.

Power will be generated at 13.8 kV and stepped up to 69 kV through a power transformer in a substation located adjacent to the powerhouse. Interconnection to QEC will be made via a transmission line to the point of delivery. Power may need to be stepped down to QEC’s 25 kV distribution voltage in a second substation in town, depending on the selected transmission voltage and selected connection point for the new power system. All critical control functions will be backed up by a 125 V DC battery system.

The plant will incorporate an automatic control system, which will adjust turbine wicket gates and valves providing fine flow control to maintain the water level at the intake. Power outages or interruptions on the utility side of the main plant power transformer may cause the plant to shut down and, when the conditions clear, to automatically re-start and come online. Critical shutdown functions will cause a lock-out and require an operator to visit the site to correct the problem and restart the machine.

The performance of the hydro facility was estimated based on the following outages as follows:

Utility not able to accept power (2 days per year):	0.5%
Forced outage (4 days per year):	1.0%
Planned outage (2 days per year):	0.5%
Total Outage:	2.0%

During operations, the plant will have several systems and procedural operating plans to act as controls for mitigation of risk to public safety and environment. Typical key operational controls include but are not limited to:

- Automated turbine and generator controls;
- Reservoir level monitoring and management systems;
- Spillway and outlet works operating procedures;
- Remote monitoring and alarm systems;

- Emergency shutdown capabilities and procedures;
- Dam safety monitoring instrumentation;
- Emergency preparedness and response procedures; and
- Operating procedures designed to maintain compliance with regulatory approvals and environmental commitments.

4.6.3 Operations Activities

The Project is intended to operate as a long-term hydroelectric generation facility and will be designed for largely automated operation with remote monitoring and control from Iqaluit. The facility will incorporate supervisory control and data acquisition (SCADA) systems, communications infrastructure, and automated control systems that allow routine operation of the hydroelectric facility without the need for continuous onsite staffing. Operations personnel will maintain oversight of facility performance, respond to alarms and abnormal operating conditions, and conduct routine inspections and maintenance.

Operations and maintenance activities will be undertaken to support the safe, reliable, and environmentally responsible operation of the hydroelectric facility, reservoir, transmission system, access infrastructure, and associated Project components. These activities will include routine inspections, monitoring, preventative maintenance, corrective maintenance, environmental compliance activities, and periodic equipment replacement throughout the operating life of the Project.

Major operational activities are expected to include the following:

Access Road Maintenance

- Snow clearing and winter maintenance;
- Road grading and surface repairs;
- Inspection and maintenance of bridges, drainage features and water crossings;
- Repair of erosion, settlement, or localized damage; and
- Maintenance of access controls and safety features.

Dam Safety Inspections and Monitoring

- Routine and periodic inspections;
- Monitoring of dam performance and instrumentation;
- Monitoring of reservoir levels and water management facilities;
- Dam safety assessments and reviews by qualified personnel; and
- Maintenance and testing of critical safety systems.

Hydroelectric Facility Operations and Maintenance

- Operation and monitoring of facility performance;
- Inspection and maintenance of equipment and infrastructure;
- Testing and calibration of control, communications, and monitoring systems;
- Preventative and corrective maintenance activities; and
- Refurbishment or replacement of components as required.

Reservoir Operations and Monitoring

- Monitoring of reservoir conditions and water levels;
- Management of water releases and flow conditions;
- Monitoring of seasonal and ice-related conditions;
- Inspection and maintenance of reservoir-related infrastructure; and
- Environmental monitoring activities as required.

Transmission Line Maintenance

- Ground-based and aerial inspections;
- Inspection and maintenance of transmission infrastructure;
- Vegetation management within the right-of-way;
- Repairs following weather-related events or other damage; and
- Replacement of aging or damaged components.

Environmental Monitoring and Compliance

- Monitoring of environmental conditions and performance indicators;
- Inspection of environmental protection measures;
- Collection and reporting of environmental data; and
- Implementation of environmental management and mitigation measures as required.

4.6.4 Reservoir Operation

During operations, the reservoir would be managed to support electricity generation while maintaining required downstream flow releases. The reservoir Full Supply Level is currently proposed at 550 m, and the minimum operating level is currently proposed at 528 m. Reservoir operating rules, instream flow release requirements, discharge management, and monitoring requirements will be refined through hydrologic modelling, aquatic effects assessment, Inuit engagement, and future water licensing.

4.6.4.1 Water use and Discharge

Table 15 summarizes the current screening-level water-use and discharge-management values for construction-phase water withdrawal, reservoir impoundment and flow regulation, operational generation flows, instream flow releases, and discharge management. Final withdrawal locations, reservoir operating rules, IFR values, discharge criteria, compliance monitoring locations, and reporting requirements will be refined through detailed engineering, environmental assessment, Inuit engagement, and the Nunavut Water Board licensing process.

Table 15: Water use and Discharge Summary

Water use Activity	Preliminary Screening Basis	Estimated Flow / Volume	Proposed Management Approach
Construction-phase water withdrawal	Temporary withdrawal for camp services and construction support. Includes camp water, concrete production, dust suppression, compaction, aggregate processing/washing, equipment washing, and testing/flushing. Excludes reservoir impoundment and event-based dewatering.	Typical construction withdrawal: 50–150 m³/day. Short-duration peak withdrawal: up to 500 m³/day when multiple water-demand activities overlap. Estimated annual construction water use: 15,000–75,000 m³/year. Key subcomponents: camp water: 8–15 m³/day typical and 15–25 m³/day peak; concrete production: 20–150 m³/day; dust suppression: 20–200 m³/day; compaction: 10–75 m³/day; aggregate processing/washing: 5–50 m³/day; equipment washing: 2–10 m³/day; hydrostatic testing/flushing: 100–500 m³/event	Temporary construction withdrawal from approved source(s). Final sources, daily/annual limits, intake screening, treatment, discharge controls, monitoring, and reporting will be confirmed through NWB licensing.

Water use Activity	Preliminary Screening Basis	Estimated Flow / Volume	Proposed Management Approach
Reservoir impoundment and flow regulation	Reservoir storage and flow regulation to capture seasonal inflows, support generation, and maintain downstream releases. This is separate from construction withdrawal and represents the primary hydrologic alteration for screening.	Full Supply Level: 550 m. Minimum operating level / Low Supply Level: 528 m. Drawdown range: 22 m. Live storage: 1,091,703 dam³, equivalent to approximately 1,091.7 Mm³ or 1.092 billion m³. Total storage: 1,391,033 dam³, equivalent to approximately 1,391.0 Mm³ or 1.391 billion m³. Reservoir area at FSL: approximately 7,136 ha, based on Project reservoir mapping/configuration information.	Reservoir storage and flow regulation. Reservoir filling, drawdown, storage, downstream flow management, and monitoring will be refined through hydrologic modelling, aquatic assessment, Inuit engagement, engineering design, and NWB Type A licensing.
Operational generation flows	Non-consumptive operational water use. Water passes through turbines and is returned downstream through the powerhouse, low-level outlet, spillway, or a combination of release pathways.	Maximum plant flow: approximately 71.5 m³/s. Minimum plant flow: approximately 6.6 m³/s. 15 MW operating case: approximately 27.7 m³/s, equivalent to approximately 873,547,000 m³/year.	Operational generation flow, not consumptive withdrawal. Generation will be managed through reservoir operating rules, turbine controls, downstream flow requirements, and system demand. Installed capacity does not represent continuous firm generation under all hydrologic conditions.

Water use Activity	Preliminary Screening Basis	Estimated Flow / Volume	Proposed Management Approach
Instream flow releases	Priority downstream release to support aquatic habitat and downstream flow before, during, and after generation. IFR will be refined through hydrology, aquatic assessment, Inuit Qaujimajatuqangit, engineering, and regulatory review.	Preliminary IFR is currently assumed at approximately 10% of seasonal flows with final requirements to be confirmed through environmental assessment preliminary working range of 1–4 m³/s may be carried as a planning assumption, subject to confirmation. A preliminary summer planning target of 4.0 m³/s for June to August may be retained as a working assumption, not a final regulatory commitment.	Treat IFR as a priority release before generation. IFR may be maintained through turbine discharge, low-level outlet release, spillway flow, or combined release pathways. Final seasonal IFR values will be confirmed through NWB Type A licensing.
Discharge management	Variable or event-based discharges associated with construction dewatering, testing/flushing, spillway use, low-level outlet use, downstream discharge management, operations wastewater, maintenance dewatering/wash water, facility runoff, and monitoring.	Construction dewatering: 50–500 m³/day during active events. Spillway discharge: seasonal and variable when inflow exceeds reservoir storage and generation demand. It is expected that spillway activation during July through November, with average daily downstream flows ranging from approximately 25 m³/s to 115 m³/s when the spillway is activated. Low-level outlet discharge: event-based and operationally variable.	Manage through approved procedures, erosion and sediment controls, settling/filtration where required, containment, treatment, reuse where practical, and authorized discharge conditions. Contaminated water, concrete wash water, and untreated sewage/greywater will not be discharged unless authorized. Final criteria, compliance points, and reporting will be set through NWB Type A licensing.

Water use Activity	Preliminary Screening Basis	Estimated Flow / Volume	Proposed Management Approach
		Downstream discharge: variable with inflow, storage, generation, IFR, flood conditions, and operating rules. Operations domestic water/wastewater: less than 5 m³/day during maintenance visits. Maintenance dewatering, wash water, and runoff: event- and weather-dependent.	

This table provides the current screening-level basis for Project water use and discharge management. Construction-phase water withdrawal, construction dewatering, hydrostatic testing/flushing, operations domestic water, maintenance dewatering, wash water, and runoff values are screening-level planning estimates developed for NIRB and Nunavut Water Board planning purposes. They are not presented as final contractor water demands. The reservoir and operational generation values are based on the current preliminary design basis, while final operating rules, IFR values, discharge criteria, compliance locations, and monitoring requirements will be refined through hydrologic modelling, aquatic studies, Inuit engagement, engineering design, and Nunavut Water Board Type A licensing.

4.7 Decommissioning and Closure

The Project is intended to operate as a long-term hydroelectric generation facility. Permanent civil infrastructure, including the dam, reservoir water-control structures, powerhouse foundations, and major site infrastructure, is currently expected to have a design and service life greater than 100 years, subject to routine inspection, maintenance, refurbishment, and replacement of components as required. Major mechanical and electrical equipment will have shorter service intervals and may require refurbishment or replacement over typical 20-to-40-year cycles.

The operational life of the reservoir is tied to the operational life of the hydroelectric facility and is currently expected to exceed 100 years, subject to regulatory requirements, dam safety reviews, environmental monitoring, and future operational decisions.

Before Project decommissioning, NNC will prepare a Closure and Reclamation Plan informed by engineering assessment, environmental studies, IQ, regulatory requirements, and engagement with rightsholders and stakeholders. Closure options may include continued use, repurposing, stabilization in place, partial removal, full removal, reservoir drawdown, or restoration toward a natural flow regime, depending on the conditions and regulatory requirements at that time.

4.7.1 Headworks and Reservoir

At the end of the Project life, a detailed engineering assessment would be undertaken to determine the preferred approach for management of the dam, spillway, intake structures, low-level outlet works, and other water-retaining infrastructure.

Potential closure options may include complete removal, partial removal, stabilization in place, conversion for an alternate use, or a combination of these approaches. The preferred alternative would be selected based on technical feasibility, safety, environmental effects, future land use considerations, and regulatory requirements applicable at the time of closure.

Where removal is selected, activities may include controlled reservoir drawdown, modification or removal of water control structures, and the embankment dam(s) in part or whole, demolition of above-grade infrastructure, management of construction materials, stabilization of exposed areas, and restoration of affected lands and waterways. Where infrastructure is retained, measures would be implemented to support long-term public safety and structural stability.

Closure planning for the reservoir would be closely integrated with closure planning for the dam and associated water management infrastructure.

Depending on the selected closure strategy, the reservoir may remain in place, be partially drawn down, or be returned toward a natural flow regime. Reservoir management activities would be developed to minimize potential impacts associated with shoreline erosion, sediment mobilization, water quality changes, fish and fish habitat, and downstream flow conditions.

The final reservoir closure strategy would be supported by engineering studies, environmental assessments, and regulatory review completed at the time of decommissioning.

4.7.2 Powerhouse and Associated Facilities

The powerhouse, switchyard, substation, maintenance facilities, and other permanent buildings would be assessed to determine whether they should be removed, repurposed, or retained.

Typical closure activities may include removal of mechanical and electrical equipment, de-energization of electrical systems, demolition of structures, management of hazardous materials if present. The powerhouse and switchyard will have all equipment and buildings removed with materials salvaged

recycled or brought to landfill. Typically, foundations will be removed to a defined depth, and then the area reclaimed. Where appropriate stabilization of disturbed areas.

Where beneficial future uses are identified, certain facilities may be retained or repurposed subject to regulatory approval and stakeholder input.

4.7.3 Penstock

The buried penstock is currently anticipated to be left in place following decommissioning, unless future engineering assessments determine that removal provides a greater environmental or safety benefit. The penstock will be a substantial piece of infrastructure. Removal of the penstock would require significant excavation, disturbance of previously stabilized ground, modification of drainage patterns, and additional construction activities that may result in greater environmental impacts than leaving the infrastructure in place.

The penstock would be isolated from the water conveyance system via concrete plug or other mechanism, drained as appropriate, and stabilized to eliminate long-term safety or environmental risks.

4.7.4 Access Roads

The Project access road is currently anticipated to remain in place following closure unless future regulatory requirements, stakeholder input, or land-use objectives indicate otherwise.

Retention of the access road may provide ongoing benefits for regional access, monitoring, maintenance, emergency response, or future land use activities. Where portions of the road are no longer required, localized reclamation measures may be implemented to restore drainage patterns, stabilize slopes, and promote natural revegetation.

4.7.5 Transmission Line

At the end of Project operations, the transmission line and associated electrical infrastructure would be evaluated to determine whether continued use, repurposing, or removal is appropriate.

Where removal is selected, activities may include removal, salvage and recycling of conductors, electrical equipment, and structures. Foundations will be removed to a given depth below grade. Disturbed areas would be stabilized and reclaimed as appropriate for site conditions and future land use objectives.

4.7.6 Closure Planning

Prior to Project decommissioning, a comprehensive Closure and Reclamation Plan would be developed and updated as required to satisfy applicable regulatory requirements. The plan would be informed by engineering assessments, environmental studies, regulatory requirements, and engagement with rightsholders and stakeholders.

A conceptual Closure and Reclamation Plan will be developed in support of the environmental assessment and Type A Water Licence application. The plan will be updated periodically during construction and operations to reflect as-built conditions, monitoring results, regulatory requirements, Inuit engagement and changes in available closure technology. A final execution-level plan will be submitted before permanent closure activities begin.

Depending on the scope of the selected closure alternative, supporting plans and studies may include:

- Decommissioning and demolition plans;
- Reservoir drawdown and water management plans;
- Environmental protection plans;
- Spill prevention and response plans;
- Waste management plans;
- Hazardous materials management plans;
- Sediment and erosion control plans;
- Reclamation and revegetation plans;
- Wildlife protection and monitoring plans;
- Water quality monitoring plans;
- Public safety and site security plans;
- Traffic and transportation management plans; and
- Construction execution and sequencing plans.

The final closure strategy, supporting studies, and reclamation objectives will be developed closer to the end of the Project life when more information is available to evaluate alternatives and determine the most appropriate long-term outcome for the Project Area.

Conceptual Closure Plan

Closure planning for the INP will be guided by the principles of sustainability, IQ, and adaptive management, in alignment with NIRB guidance. Closure objectives are to return the PDA to safe, stable, and productive conditions that support ecosystem recovery, maintain water quality, and enable future Inuit land use consistent with community values.

Key closure considerations include:

- **Design Life and Durability:** The Project's permanent civil infrastructure, including the dam and powerhouse foundations, is designed for a service life of 100 years, with major equipment overhauls scheduled at 20-to-40-year intervals. Structures will be engineered to withstand 1:10,000-year seismic events and regional ice loads of up to 2.02 m thickness;
- **Ecosystem Function and Stability:** Activities during decommissioning will focus on restoring natural drainage, re-establishing tundra vegetation, and maintaining permafrost and terrain stability. Disturbed areas, including access roads, quarry sites, and temporary work areas, will be regraded and revegetated with native species suited to local climatic conditions;
- **Water Quality Protection and Reservoir Drawdown:** Reservoir drawdown will be conducted gradually to prevent erosion, sediment release, or abrupt hydrological change. Water quality will be monitored during and after drawdown to confirm that downstream aquatic ecosystems remain stable and suitable for fish and wildlife use;
- **Infrastructure Removal and Site Rehabilitation:** Infrastructure not required for ongoing power generation such as temporary camps, laydown areas, and non-essential access routes—will be dismantled and materials removed from site. Foundations, borrow areas, and disturbed soils will be contoured to match surrounding terrain and promote natural regeneration;
- **Adaptive Management and Climate Resilience:** Closure measures will be designed to accommodate projected climate change effects, including permafrost thaw, increased precipitation, and variable freeze–thaw cycles. Monitoring data will be reviewed regularly, and adaptive management actions will be implemented where performance indicators (e.g., slope stability, vegetation cover, water quality) deviate from expected trends; and
- **Inuit Land Use, IQ, and Community Participation:** Inuit knowledge and community input will guide reclamation priorities and post-closure land uses. Engagement with HTAs, Elders, and youth will continue throughout the closure phase to confirm culturally appropriate success criteria and preferred end uses of rehabilitated areas.

Post-closure monitoring is anticipated to continue for a minimum of five years, or longer if required, to verify physical stability, ecological recovery, and the effectiveness of adaptive measures. The conceptual closure plan will be refined as new information becomes available through ongoing baseline studies, design development, and regulatory review, and to incorporate recommendations from technical findings and community feedback. Updates will be made as part of the adaptive management process to reflect evolving climate, hydrological, and permafrost conditions. Post-closure monitoring duration and performance criteria will be finalized in consultation with NIRB and the Nunavut Water Board, informed by site-specific conditions and community input.

5.0 Existing Environment

The Project lies within the Northern Arctic ecozone, spanning the Meta Incognita Peninsula and Hall Peninsula Upland ecoregions. The regional landscape includes exposed bedrock plateaus, fjord-influenced coastal environments, and lake-plain systems associated with the Kuugaaluk River. Climate is Low Arctic, with short, cool summers, long winters, and continuous permafrost (EcoLogic, 2025).

To align with NIRB screening requirements, the Existing Environment section is organized under the following required headings:

- Climate and Permafrost;
- Atmospheric;
- Archaeological;
- Hydrology and Water Quality;
- Fish and Fish Habitat;
- Vegetation and Terrain;
- Wildlife (including Species at Risk); and
- Socio-Economic Environment and Inuit Land Use.

The environmental information presented in **Section 5.2** is intended to summarize baseline conditions and preliminary observations based on available data and the 2025 field programs within the Environmental Study Area (**Figure 5**). No conclusions regarding the magnitude or significance of potential effects are drawn at this stage. Baseline programs are ongoing and will continue over multiple field seasons to support future effects assessment and mitigation planning within the Regional Study Area (**Figure 3**). Each of the following subsection describes baseline conditions, sensitivities, and relevance to potential Project interactions.

5.1 Physical Environment

5.1.1 Climate and Permafrost

Regional climate conditions are characterized by a cold, polar climate, with mean annual air temperatures well below freezing, persistent high winds, and strong marine influences associated with Frobisher Bay. Seasonal patterns include long cold winters; short, cool summers; and highly variable snowfall and wind-driven snow redistribution. These factors shape local snow accumulation, surface water availability, and biological productivity, and are key drivers of ecological and hydrological processes in the Kuugaaluk River system (EcoLogic, 2025).

Permafrost in the region is continuous, with ground temperatures typically remaining below 0°C throughout the year. The active layer thaws only during the brief summer season, resulting in freeze–thaw cycles that influence soil stability, drainage, and vegetation patterns. Permafrost conditions also play a critical role in determining terrain sensitivity, slope stability, and potential responses to project-related ground disturbance. Initial field observations indicate variations in active-layer depth across terrain types, with deeper thaw in coarse, well-drained soils and shallower thaw in peat-rich or shaded areas (EcoLogic, 2025).

These climatic and permafrost conditions are central considerations for project planning, as they influence infrastructure design, access timing, baseline hydrology, and the selection of appropriate mitigation measures. Additional multi-year climate and permafrost monitoring will refine the understanding of seasonal variability and long-term trends relevant to the Project.

5.1.1.1 Landforms, Geology and Soils

Landforms range from rugged uplands with frost-shattered bedrock to gently rolling till veneers and glaciofluvial deposits. Common features include patterned ground, solifluction lobes, polygonal terrain, and shallow peat depressions (EcoLogic, 2025).

Thin mineral soils dominate uplands, while organic soils occur where drainage is impeded by permafrost (EcoLogic, 2025).

5.1.1.2 Potential Project Interactions

Potential interactions between the Project and climate, permafrost, and associated landforms include:

- Disturbance of thaw-sensitive soils and ice-rich permafrost during construction of access roads, transmission corridors, and Project infrastructure;
- Changes in surface drainage patterns and snow accumulation resulting from linear infrastructure and altered terrain;
- Increased risk of localized thaw settlement, erosion, or slumping in areas with high ground-ice content; and
- Implications for access timing, construction methods, and long-term infrastructure performance under changing climatic conditions.

These interactions represent cross-cutting considerations that may influence multiple Valued Ecosystem Components, including hydrology, aquatic habitat, vegetation, wildlife movement, and travel safety.

5.1.1.3 Proposed Approach and Future Work

Climate and permafrost conditions will be addressed as foundational environmental constraints in Project planning and design. Additional multi-year climate and permafrost investigations are planned to refine baseline understanding of seasonal variability, active-layer dynamics, and long-term trends relevant to the Project.

Future work will include targeted permafrost and terrain assessments, integration of regional climate datasets, and consideration of projected climate change effects on permafrost stability. Information collected through these programs will inform infrastructure design, access planning, mitigation measures, and adaptive management strategies, and will be incorporated into the Environmental Impact Statement (EIS).

5.1.2 Atmospheric

The Project Area is located within a cold Arctic climate zone characterized by long, cold winters; short, cool summers; strong and persistent winds; and highly variable snowfall influenced by wind redistribution. Atmospheric conditions are strongly affected by regional marine influences associated with Frobisher Bay. These climatic factors influence snow accumulation, surface water availability, permafrost stability, and seasonal accessibility within the Kuugaaluk River system.

Baseline regional climate data are available from long-term Environment and Climate Change Canada (ECCC) monitoring stations in Iqaluit, which provide representative information on temperature, wind patterns, precipitation, and extreme weather events. At the Project site, atmospheric conditions are expected to be similar to regional trends, with localized variation due to elevation, topography, and exposure.

5.1.2.1 Potential Project Interactions

Potential interactions between the Project and the atmospheric environment during early field investigations, construction, and operations may include:

- Temporary air emissions from diesel-powered equipment, generators, and vehicles;
- Localized dust generation associated with ground disturbance, vehicle traffic, and quarry or borrow activities;
- Short-term emissions associated with construction activities and camp operations; and
- Greenhouse gas emissions related to fuel use during construction and operations.

During operations, the Project is expected to substantially reduce regional greenhouse gas emissions through the displacement of diesel-generated electricity currently used to supply Iqaluit.

5.1.2.2 Proposed Approach and Future Work

At the Project Proposal stage, atmospheric effects are anticipated to be localized, temporary, and manageable through standard best management practices. Air quality effects will be assessed in greater detail during the EIS phase.

Targeted atmospheric and air quality studies, including the characterization of meteorological conditions and potential emission sources, are planned for the 2026 field season. These studies will support predictive modelling and effects assessment in the EIS, including comparison to applicable regulatory benchmarks such as the Canadian Ambient Air Quality Standards (CAAQS).

Mitigation measures, such as equipment maintenance, dust suppression, fuel management, and emissions controls, will be refined as Project design advances and incorporated into future environmental protection planning.

5.1.3 Archaeological and Heritage Resources

The Project Area lies within a region of long-standing Inuit land use and travel, and archaeological and heritage resources may be present within the Project Development Area and surrounding landscape. These resources may include archaeological sites, cultural features, travel routes, and areas of historical significance that reflect both historic and contemporary Inuit use of the land.

During the 2025 field assessment, areas of archaeological and cultural significance were identified in the vicinity of the proposed reservoir area through field reconnaissance and Inuit knowledge input (**Figure 4**). These findings confirm the presence of heritage sensitivities within the broader Project

Area and underscore the importance of careful planning as the Project advances.

Previous regional studies and IQ further indicate that archaeological and heritage resources are most likely to occur near water bodies, travel corridors, and prominent landforms within the Hall Peninsula landscape.

5.1.3.1 Potential Project Interactions

Potential interactions with archaeological and heritage resources may occur during ground-disturbing activities associated with field investigations, construction, and infrastructure development, including:

- Geotechnical drilling, trenching, or test pitting;
- Construction of access roads, camps, transmission corridors, and Project infrastructure; and
- Quarrying or borrow material extraction, if required.

Without appropriate planning and mitigation, such activities could result in disturbance or damage to previously unidentified archaeological or cultural resources.

5.1.3.2 Proposed Approach and Future Work

Archaeological and heritage resources will be managed in accordance with the *Nunavut Act*, the Nunavut Archaeological and Palaeontological Sites Regulations (NAPS Regulations), *Nunavut Land Claims Agreement* (NLCA), and applicable guidance from the Government of Nunavut Department of Culture and Heritage.

A staged archaeological assessment program is planned, beginning with desktop review and Inuit knowledge input, followed by field-based archaeological surveys in advance of any ground-disturbing activities. These surveys will be completed under the appropriate territorial permits and, where feasible, with Inuit participation in fieldwork.

Where archaeological or heritage resources are identified from the 2025 program, avoidance will be the preferred mitigation approach through Project design refinement. If avoidance is not feasible, site-specific mitigation measures will be developed in consultation with regulators and Inuit organizations.

A chance-find protocol will be implemented for all Project phases so that any previously unidentified archaeological or cultural resources encountered during fieldwork or construction are protected, with work halted and appropriate authorities notified.

Information collected through ongoing archaeological investigations will be incorporated into the EIS to support effects assessment, mitigation planning, and informed regulatory and community decision-making.

5.1.4 Hydrology and Water Quality

5.1.4.1 Hydrology

The hydrology of the Project Area is driven by a cold, polar climate with continuous permafrost, short melt seasons, and highly variable snowfall and runoff patterns. The INP is located within the Kuugaaluk River system, where streamflow is strongly influenced by snowmelt, periodic rainfall events, and freeze-thaw cycles. Initial hydrological investigations initiated in 2024 include continuous hydrometric monitoring at key locations, as well as characterization of snowpack, ice thickness, and permafrost conditions that influence surface-water behaviour.

These multi-year baseline studies are documenting base-flow conditions, seasonal variability, and interannual trends to support future evaluation of the natural water regime. As of 2025, hydrometric datasets remain limited, and additional monitoring is required to define long-term flow patterns, low-flow conditions, and freshet dynamics. No operational hydrology, reservoir rules, or flow targets have been developed at this stage. Current hydrology work is focused exclusively on baseline characterization, consistent with the early planning phase.

As monitoring data accumulate, they will support future assessments related to ecological flow needs, downstream water-level stability, fish migration and spawning periods, and the potential for flow-related changes to terrain or ice conditions. These datasets, together with engineering and environmental analyses completed in later phases, will inform a future application to the Nunavut Water Board under the Nunavut Waters and *Nunavut Surface Rights Tribunal Act* (2002).

5.1.4.2 Water Quality Program

A multi-season water-quality baseline program is underway to characterize the chemical, physical, and biological conditions of the Kuugaaluk River system. Sampling locations include upstream areas, the proposed reservoir footprint, and downstream reaches to capture spatial variability within the watershed. Parameters analyzed include:

- total suspended solids (TSS);
- nutrients (nitrogen, phosphorus);
- major ions;
- key metals (e.g., mercury, selenium, lead); and
- basic field parameters (pH, conductivity, dissolved oxygen, temperature).

Sampling frequency and analytical methods follow Canadian Council of Ministers of the Environment (CCME) Water-Quality Guidelines and relevant requirements of the *Fisheries Act* (1985). The baseline program is designed to establish reference conditions prior to any future development and to support predictive modelling of potential changes during the environmental assessment phase.

Water-quality information will also inform the human health, aquatic ecosystem, and country-foods components under the Valued Ecosystem Components (VEC) framework. As additional years of sampling are completed, the dataset will be used to evaluate natural variability, identify sensitive periods or parameters, and develop thresholds for future adaptive management.

5.1.4.3 Surface Water System

The Project is situated within the Kuugaaluk River system, which features a diverse and dynamic freshwater system influenced by continuous permafrost, glacial landforms, and steep topographic transitions. Key hydrological components include:

- Unnamed Lake, which corresponds to the proposed reservoir area;
- Multiple shallow tributaries, characterized by moderate gradients, gravel and cobble substrates, and clear, cold waters; and
- The Kuugaaluk River mainstem, exhibiting complex channel forms including riffles, rapids, cascades, chutes, and deep pools (Dillon, 2025).

Aerial, drone, and LiDAR surveys conducted in 2025 confirmed that channel morphology is strongly shaped by bedrock control, glacial deposits, and permafrost-dominated drainage pathways (Dillon, 2025). These factors contribute to distinct habitat types and influence seasonal flow distribution, sediment transport, and aquatic productivity.

Additional hydrological work including snow surveys, ice-thickness measurements, and refined watershed delineation will continue throughout the multi-year baseline program to support future impact assessment and design consideration.

5.1.4.4 Potential Project Interactions

Potential interactions between the Project and the hydrological and surface-water environment may include:

- Alteration of natural flow patterns and water levels associated with future water storage and controlled releases;
- Changes in sediment transport and deposition in response to altered flow regimes;
- Interactions between flow, ice formation, and permafrost that may influence downstream stability and travel conditions;
- Potential effects on aquatic habitat availability, connectivity, and seasonal access for fish and other aquatic organisms; and
- Implications for downstream water quality during construction or future operations, particularly during high-flow or ice-affected periods.

At this stage, these interactions are conceptual and are being considered to inform baseline data collection and future assessment needs, rather than to predict effects.

5.1.4.5 Proposed Approach and Future Work

Hydrological and surface-water studies will continue as part of a multi-year baseline program to strengthen understanding of natural variability, seasonal dynamics, and longer-term trends within the Kuugaaluk River system. Planned work includes continued hydrometric monitoring, expanded snow surveys, ice-thickness measurements, and refined watershed delineation.

As baseline datasets mature, they will support future assessments related to ecological flow requirements, fish migration and spawning periods, ice dynamics, and potential terrain or stability interactions. These datasets, together with engineering and environmental analyses undertaken in later phases, will inform the development of reservoir operating concepts and a future application to the Nunavut Water Board under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (2002).

Water-quality data will also inform aquatic ecosystem, human health, and country-foods components under the VEC framework. Over time, the dataset will be used to evaluate natural variability, identify sensitive periods or parameters, and support the development of thresholds and adaptive management measures for future project phases.

5.1.4.6 Operational Hydrology

Operational hydrology for the Project remains at a preliminary stage and will continue to be refined through baseline monitoring, hydrologic modelling, bathymetry, engineering development, Inuit engagement, aquatic studies, and regulatory review. Based on the preliminary design engineering, the synthetic hydrologic record estimates an annual average inflow of approximately 41.1 m³/s, or approximately 1,294.7 Mm³/year. A 15 MW operating case is estimated to require approximately 27.7 m³/s, or approximately 873,547,000 m³/year. The 30 MW plant configuration has a maximum plant flow of approximately 71.5 m³/s, a minimum plant flow of approximately 6.6 m³/s, and a preliminary estimated capacity factor of approximately 49%.

The Project concept relies on reservoir storage to capture seasonal freshet flows and support year-round generation and downstream flow releases. Final reservoir operating rules, discharge management requirements, instream flow release requirements, and monitoring requirements will be developed through hydrologic modelling, aquatic assessment, Inuit engagement, engineering review, and the Nunavut Water Board licensing process.

NNC is continuing to advance the hydrologic baseline and technical basis for future water management planning through expanded field monitoring and modelling. This includes downstream and upstream hydrometric monitoring, continuous reservoir monitoring, supplemental reservoir bathymetry, baseline coastal monitoring, snow and ice measurements and development of a preliminary reservoir water balance and downstream hydraulic model. These studies are intended to improve understanding of inflow, storage, evaporation, ice processes, discharge behaviour, and downstream hydraulic response under both baseline and future Project and filling conditions.

The current Project concept identifies instream flow release (IFR) as a priority release before generation. A preliminary summer IFR target of 4.0 m³/s has been identified for planning purposes for the June to August period, while winter flow requirements are currently expected to be met through continuous generation flow. However, IFR values, seasonal release rules, and low-flow operating assumptions remain preliminary and will require further confirmation through hydrologic analysis, aquatic studies, IQ, engineering development, and regulatory engagement.

NNC is also collecting real-time hydrometric data to support calibration and refinement of the synthetic hydrologic record and to inform future effects assessment, reservoir operating concepts, and licensing requirements. A future application to the Nunavut Water Board for a Type 'A' Water Licence will be

informed by this ongoing work, together with future engineering and environmental assessment studies. NNC also anticipates ongoing technical engagement with NWB staff to confirm information needs as Project planning advances.

5.2 Biological Environment

5.2.1 Aquatic Ecosystems and Fish Habitat

The aquatic environment within the Kuugaaluk River system is characteristic of a cold, oligotrophic Arctic watershed shaped by bedrock geology, glacial processes, and continuous permafrost. Drone, LiDAR, and aerial-based assessments from 2025 indicate a diverse and dynamic channel network that supports a range of habitat types important for Arctic fish species, particularly Arctic char (*Salvelinus alpinus*).

The mainstem river and its tributaries exhibit complex channel morphology, including riffles, rapids, cascades, pools, and bedrock-controlled chutes. These features create varied hydraulic conditions that influence habitat suitability for different life stages of fish. Substrates are predominantly composed of gravel, cobble, and boulder materials, providing well-drained, stable conditions that can support spawning and juvenile rearing habitats.

Tributary streams entering the proposed reservoir area are generally shallow with moderate gradients, reflecting limited depositional environments and strong geomorphic control. These tributaries contribute cold, well-oxygenated water and provide additional connectivity throughout the watershed.

Overall, the system is defined by clear, cold, and nutrient-poor (oligotrophic) waters with minimal aquatic vegetation. These characteristics are typical of Arctic freshwater ecosystems and support a narrow but well-adapted suite of aquatic species. This habitat structure is consistent with known preferences of Arctic char, the only species confirmed to date within the Project Area (Dillon, 2025).

5.2.1.1 Fish Species Presence

Arctic char (*Salvelinus alpinus*) is the only fish species confirmed to occur within the Kuugaaluk River system to date. During the 2025 field program, 28 Arctic char were harvested opportunistically by local community members, providing the only verified records of fish presence within the Project Area (Dillon, 2025).

Although several additional species such as:

- Arctic grayling (*Thymallus arcticus*);
- Lake whitefish (*Coregonus clupeaformis*);
- Ninespine stickleback (*Pungitius pungitius*);

- Threespine stickleback (*Gasterosteus aculeatus*); and
- Lake trout (*Salvelinus namaycush*).

All are considered regionally possible based on broader Nunavut distributions; however, none have been documented within the Kuugaaluk River system through either historical studies or the 2025 aquatic assessments.

5.2.1.2 Fish Habitat Suitability

Based on established Arctic char habitat preference criteria (Evans *et al.* 2002) and the results of the 2025 drone, LiDAR, and aerial imagery analysis, the Kuugaaluk River system contains several habitat features indicative of high suitability for various life stages of Arctic char. Riffles and gravel-to-cobble substrates located downstream of the proposed reservoir footprint provide favourable spawning habitat, offering the appropriate mix of substrate size, flow conditions, and oxygenation required for egg deposition and incubation.

In addition, pools and run habitats distributed throughout the system provide important rearing areas for juveniles and serve as movement corridors for adults, supporting seasonal migrations and access to feeding and overwintering habitats.

Preliminary assessments further indicate that upstream reaches and multiple tributaries may also provide suitable spawning, rearing, and migration habitat, although these areas require field-based verification during the next phase of aquatic studies (Dillon, 2025).

5.2.1.3 Potential Project Interactions

Potential interactions between the Project and aquatic ecosystems and fish habitat may include:

- Alteration of flow regimes and water levels that influence habitat availability, connectivity, and suitability for different life stages of Arctic char;
- Changes in sediment transport, deposition, or substrate composition that could affect spawning and rearing habitats;
- Modification of channel morphology or tributary connectivity associated with future infrastructure development;
- Potential barriers to fish movement or migration if connectivity is altered; and
- Changes in water temperature, ice conditions, or water quality that may influence habitat function.

At this stage, these interactions are identified conceptually to inform baseline data collection and future assessment needs and do not represent predicted effects.

5.2.1.4 Proposed Approach and Future Work

Aquatic ecosystem and fish habitat studies will continue as part of a multi-year baseline program designed to confirm habitat use, seasonal patterns, and interannual variability within the Kuugaaluk River system. Future work will include field-based habitat validation, fish presence and movement surveys, and integration of Inuit Qaujimajatuqangit related to fish behaviour, harvesting areas, and seasonal use.

As datasets mature, they will support future assessments of habitat sensitivity, fish passage considerations, and ecological flow needs, and will inform the development of mitigation and monitoring strategies. Information from these studies will be incorporated into the EIS and will support regulatory review under the *Fisheries Act* and future licensing considerations under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*.

5.2.2 Vegetation and Terrain

Baseline fieldwork completed in 2025 documented a range of Low Arctic tundra, wetland, riparian, and frost-influenced ecosystems within the LSA. Vegetation patterns are closely linked to terrain, permafrost conditions, drainage, and substrate type, resulting in distinct ecosystem units across upland, mesic, wetland, and fluvial environments (EcoLogic, 2025).

5.2.2.1 Upland and Barren Tundra

Upland areas are characterized by exposed bedrock, thin soils, and strong wind exposure. Dominant terrain and vegetation features include:

- Dry Lichen and Sparse Tundra on upper slopes and ridge crests, composed of *Dryas integrifolia*, *Salix arctica*, dwarf heather species, mosses, and lichen mats;
- Fellfield and Blockfield terrain, where frost-shattered bedrock supports minimal vegetation and reflects high terrain sensitivity; and
- Bedrock Outcrop and Talus slopes with limited plant cover but potential nesting habitat for cliff-associated bird species.

These landforms reflect the influence of periglacial processes, continuous permafrost, and low nutrient availability (EcoLogic, 2025).

5.2.2.2 Mesic and Wet Tundra

Mid-slope and low-lying areas support more moisture-retentive vegetation communities:

- Mesic Graminoid Tundra occurs where drainage is imperfect, often with patterned ground indicative of active permafrost; and

- Wet Graminoid Tundra, fens, and shallow peat wetlands develop in zones with perched water tables and poor drainage, dominated by sedges and mosses.

These ecosystems are sensitive to surface disturbance and thermokarst due to the presence of ice-rich permafrost (EcoLogic, 2025).

5.2.2.3 Riparian and Fluvial Complexes

Vegetation along stream and river corridors reflects dynamic hydrological and geomorphic processes:

- Glaciofluvial terraces, gravel bars, and seasonally flooded benches support low shrubs, sparse graminoids, and early successional vegetation; and
- Willow patches occur in more stable riparian zones, providing important cover and movement corridors for wildlife.

These areas are characterized by variable substrate sizes (gravel to boulder), periodic flooding, and strong ice-related disturbance (EcoLogic, 2025).

5.2.2.4 Coastal and Near-Coastal Heath Tundra

Although limited within the Local Study Area, more productive Shrub–Heath Tundra communities may occur closer to fjord environments, where snow capture, moisture availability, and nutrient accumulation are greater (EcoLogic, 2025).

5.2.2.5 Vegetation Species

Common species observed during 2025 field surveys include:

- Dwarf shrubs: *Dryas integrifolia*, *Betula nana*, *Salix arctica*;
- Graminoids: *Carex*, *Eriophorum*, *Dupontia*, *Luzula*; and
- Bryophytes and lichens: extensive moss mats, liverworts, and crustose and fruticose lichen cover.

These functional groups reflect the cold, nutrient-limited conditions typical of Low Arctic landscapes (EcoLogic, 2025).

5.2.2.6 Data Gaps and Future Work

Because 2025 surveys occurred outside the optimal growing and flowering period, species-level identification was limited. A more detailed vegetation inventory—including rare plant surveys, community mapping, and biomass characterization—will be conducted during the 2026 field season to complete the baseline dataset (EcoLogic, 2025).

5.2.2.7 Potential Project Interactions

Potential interactions between the Project and vegetation and terrain may include:

- Disturbance or removal of tundra vegetation during construction of access roads, transmission corridors, camps, and other infrastructure;
- Soil compaction, erosion, or vegetation loss in areas with thin soils or frost-sensitive substrates;
- Increased susceptibility to thermokarst development and altered drainage patterns in ice-rich permafrost zones;
- Fragmentation of vegetation communities and localized changes in habitat structure; and
- Challenges to natural revegetation in areas with limited soil development and short growing seasons.

At this stage, these interactions are identified to inform baseline data needs and future assessment considerations rather than to predict effects.

5.2.2.8 Proposed Approach and Future Work

Vegetation and terrain studies will continue as part of a multi-year baseline program designed to refine ecosystem mapping, confirm species composition, and identify sensitive habitats. Because 2025 surveys occurred outside the optimal growing and flowering period, species-level identification was limited.

A more detailed vegetation inventory will be completed during the 2026 field season, including rare plant surveys, community-level mapping, and biomass characterization. This data will support improved understanding of ecosystem distribution, sensitivity to disturbance, and recovery potential.

Information generated through these studies will inform future impact assessment, mitigation planning (e.g., micro-siting, avoidance of sensitive habitats, reclamation approaches), and long-term monitoring strategies, and will be incorporated into the EIS.

5.2.3 Wildlife

5.2.3.1 Remote Camera Observations

Baseline wildlife surveys conducted during the 2025 field season indicate that the Project Area supports a range of terrestrial wildlife species typical of the Low Arctic tundra environment. Observations confirm regular seasonal use of the Local Study Area (LSA) by several mammal and bird species, with wildlife distribution closely linked to tundra vegetation, terrain features, and travel corridors.

A network of 23 wildlife cameras deployed across the LSA recorded multiple species during the August–September 2025 monitoring period. Species detected include:

- Barren-ground caribou (*Rangifer tarandus groenlandicus*), with frequent detections across multiple camera locations;
- Arctic hare (*Lepus arcticus*);
- Arctic fox (*Vulpes lagopus*); and
- Ptarmigan (*Lagopus spp.*) and other tundra bird species.

Caribou were consistently recorded across many camera sites, indicating regular seasonal use of the area during the late summer and early fall period (EcoLogic, 2025).

5.2.3.2 Wildlife Transects

During the 2025 summer field surveys, twenty-nine ground-based wildlife transects were completed within the LSA. These surveys documented the presence of:

- Barren-ground caribou;
- Arctic fox;
- Arctic hare; and
- Several tundra bird species.

Late-season timing limited the detectability of migratory birds and raptors, and survey results are therefore considered preliminary with respect to avian diversity and seasonal use (EcoLogic, 2025).

5.2.3.3 Species at Risk

Barren-ground caribou were documented within the Project Area during the 2025 field program. This population is classified as Threatened by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is currently under consideration for listing under Schedule 1 of the *Species at Risk Act* (SARA).

No additional federally listed SARA species were detected during the 2025 field surveys.

5.2.3.4 Potential Project Interactions

Potential interactions between the Project and wildlife may include:

- Disturbance or displacement of wildlife resulting from increased human presence, aircraft activity, noise, and vehicle traffic;
- Interference with wildlife movement patterns, particularly for wide-ranging species such as caribou;
- Sensory disturbance affecting foraging, resting, or movement behaviour; and
- Temporary changes in habitat availability associated with future infrastructure development.

At this stage, these interactions are identified to inform baseline data needs and future assessment considerations rather than to predict effects.

5.2.3.5 Proposed Approach and Future Work

Wildlife studies will continue as part of a multi-year baseline program to improve understanding of species presence, seasonal use, and movement patterns within and surrounding the Project Area. Future work will focus on expanding temporal coverage to include spring and early summer periods, when wildlife activity and sensitivity may differ from late-season conditions.

Planned studies include continued operation and expansion of the wildlife camera network, additional transect surveys, and targeted surveys for migratory birds and raptors during appropriate seasonal windows. IQ and local observations will continue to inform survey design, interpretation of results, and identification of sensitive areas or periods.

Information generated through these programs will support future effects assessment, mitigation planning (e.g., timing restrictions, micro-siting of infrastructure), and monitoring strategies, and will be incorporated into the EIS.

5.3 Socio-economic Environment

The existing socio-economic environment will be identified and described during 2026. The following are the objectives of the Socio-economic Impact Assessment:

1. Develop a Socio-Economic Impact Assessment (SEIA) that identifies current conditions, predicts both positive and negative potential socio-economic impacts, and proposes mitigation and enhancement measures;
2. Collaboratively conduct an Inuit-focused community engagement in Iqaluit with NNC, for the purpose of developing a SEIA, providing inclusive, intergenerational participation and Free, Prior, and Informed Consent. This engagement will be planned in close partnership with NNC and executed by NNC. NNC will maintain consistent communication with QIA throughout the duration of engagement activities, so that any necessary troubleshooting is handled with context and cultural sensitivities in mind; and
3. Prepare a Socio-Economic Monitoring and Reporting Plan, outlining indicators, responsibilities, and community-driven mechanisms for tracking project impacts over time. Identifying Inuit preferences around monitoring and reporting should be integrated into engagement activities referenced above.

6.0 Environmental Effects and Mitigation

6.1 Valued Ecosystem and Socio-Economic Components

The proposed Valued Ecosystem Components (VECs) for the INP will be identified through the impact assessment screening process, early engagement with Hunters and Trappers Associations (HTAs), Elders, and community representatives, and review of applicable Nunavut Impact Review Board (NIRB) guidance (NNC, 2025b).

At this stage, Valued Socio-Economic Components (VSECs) have not been formally scoped. VSECs will be identified and assessed through a broader, integrated socio-economic assessment planned for 2026, informed by ongoing engagement, IQ, and advancing Project design.

However, the human environment has been considered at a high level for the purposes of early impact assessment screening, to identify potential interactions related to land use, harvesting, community well-being, and socio-economic considerations. This early screening does not constitute a full socio-economic assessment.

As consultation and engagement continue, the list of VECs and VSECs may be refined to reflect new information, IQ, and community-defined priorities.

Proposed VEC and VSEC Categories:

- Terrestrial Environment: wildlife (caribou, polar bear, migratory birds, raptors, furbearers), vegetation communities, and rare or sensitive plant species;
- Aquatic Environment: fish (char) and fish habitat, benthic invertebrates, periphyton, riparian vegetation, and surface-water quality;
- Atmospheric Environment: air quality, greenhouse-gas emissions, noise, and vibration; and
- Human Environment: health and safety, economic, country foods and harvester confidence, land use and travel safety, cultural and archaeological resources, local employment and procurement opportunities, and public and rightsholder concerns.

These proposed components will form the foundation of the effects assessment, baseline studies, and cumulative-effects analysis. Refinements to indicators, boundaries, and thresholds will occur through

continued engagement, field findings, and integration of IQ to maintain alignment with community values and regulatory expectations.

The proposed VECs and VSECs are considered preliminary and will be validated and refined through continued community engagement, baseline data collection, and feedback from NIRB during the screening and scoping phases.

6.2 Potential Effects and Mitigation

Potential environmental and socio-economic effects for the INP have been identified through the EIAS scoping process and early consultation with HTAs, QIA, and community representatives. The mitigation measures outlined below are preliminary and will be refined as baseline information and design details advance.

- **Fish and Fish Habitat:** Possible effects include sedimentation, altered flows, and habitat fragmentation. Mitigation will include erosion- and sediment-control measures, seasonal in-water work timing windows, stabilization of disturbed shorelines, and habitat-offsetting consistent with Department of Fisheries and Oceans (DFO) policy. Adaptive management triggers will be based on turbidity, flow, and fish-use monitoring results;
- **Wildlife and Vegetation:** Disturbance to wildlife and habitat will be reduced through construction-timing restrictions, flight-path and access-route management, and prevention of food-waste attraction. Reclamation of disturbed areas and progressive revegetation will restore vegetation structure and function. Wildlife monitoring will verify response to noise and movement barriers;
- **Atmospheric Environment:** Air emissions and dust will be managed through equipment maintenance, water-based dust suppression, and vehicle-speed limits. Noise and vibration will be reduced by limiting heavy construction to daytime hours and maintaining equipment mufflers. Conditions will be monitored at sensitive receptors to confirm compliance with GN and federal standards;
- **Archaeological and Heritage Resources:** Ground-disturbing activities may interact with archaeological or cultural resources, including areas of archaeological significance identified near the proposed reservoir during the 2025 field assessment, as well as previously unidentified sites. Mitigation will focus on avoidance through project design refinement, completion of permitted archaeological surveys in advance of ground disturbance, and implementation of a chance-find protocol requiring work stoppage and notification of authorities if resources are encountered;
- **Human Health and Country Foods:** Potential exposure to contaminants such as methylmercury will be tracked through fish and water-quality monitoring. Results will be shared through plain-

language reports and community sessions with harvesters. Traditional-foods confidence will be incorporated into health-indicator monitoring and adaptive follow-up; and

- Socio-Economic Environment: Potential effects relate to workforce logistics, training access, and local participation. Mitigation focuses on Inuit employment, training, and contracting, along with early coordination with local suppliers and service providers. Engagement will continue to identify community-defined success measures for benefits distribution.

Mitigation will follow the hierarchy:

- Avoid;
- Minimize;
- Restore; and
- Offset.

Commitments will be tracked through an Environmental Commitments Register (ECR) and reviewed regularly through adaptive management to maintain alignment with project performance objectives and community expectations (NNC, 2025b).

The mitigation commitments identified through the assessment will be implemented through the Environmental Protection Plan and the component-specific plans and monitoring programs listed in **Table 16**. The Environmental Protection Plan will provide the overarching requirements for environmental compliance, inspections, reporting and corrective action. Discipline-specific plans will provide detailed controls for water, waste, fuels, hazardous materials, roads, quarries, blasting, air quality, noise, aquatic resources, wildlife, cultural resources and closure.

6.3 Alternatives Considered

NNC evaluated multiple renewable-energy options through an Inuit-led “Phase Gate” process that balanced environmental, technical, social, and cultural factors. Early feasibility work identified 17 potential power-system configurations, including hydroelectric, wind, solar, hybrid, and diesel-based options (NNC, 2025a). NNC is committed to strong Inuit representation and leadership throughout all phases of the Project, reflected in the organization’s field and administrative staffing. During the first field season, NNC achieved a 70% Inuit employment rate, and Qikiqtaaluk Corporation (QC); NNC’s corporate arm maintained 50% Inuit employment in 2023 and 45% in 2024. This commitment will continue to guide hiring, training, and participation as the Project advances.

Phase 1 – Identification of Opportunities

Preliminary screening confirmed that Iqaluit's dependence on diesel created long-term environmental and financial risks due to greenhouse-gas emissions, transport costs, and supply reliability. Findings from the Tusaqtavut Study on Inuit Land Use highlighted community interest in locally managed renewable power that advances energy independence and reflects IQ values (NNC, 2025a).

Phase 2 – Evaluation of Renewable Options

Seventeen renewable-energy configurations were assessed at candidate sites near Iqaluit. Screening criteria were developed jointly with Inuit rightsholders and included:

- technical and hydrological feasibility;
- anticipated effects on wildlife, fish habitat, and terrain;
- distance to Iqaluit and access logistics; and
- cultural and socio-economic alignment with Inuit priorities (NNC, 2025a; NNC, 2025b).

Through a ranked-ballot process, the Kuugaaluk River system site received the highest level of community support. The location offered stable hydrology, moderate proximity to Iqaluit, minimal overlap with harvesting areas, and consistency with local preferences for water-based renewable energy. QIA and community rightsholders endorsed advancing Kuugaaluk to the design phase (NNC, 2025a).

Phase 3 – Refinement of the Concept

Field programs in 2024 collected LiDAR, drone imagery, and geotechnical samples. Results indicated that the proposed dam site contained more gravel and less exposed bedrock than earlier desktop studies suggested (NNC, 2025a, p. 13). These findings guided several design adjustments:

- a smaller reservoir to reduce sedimentation and protect permafrost integrity;
- modified dam height and penstock alignment to match terrain conditions;
- evaluation of a secondary reservoir upstream to maintain generation capacity during low-flow periods; and
- consideration of supplemental wind generation to stabilize output during freeze-up or drought conditions (NNC, 2025a).

6.3.1 Adaptive and Iterative Design Approach

Project development follows an adaptive management framework consistent with NIRB guidance and the EIAS (NNC, 2025b). As new baseline, design, and socio-economic information become available, the preferred configuration will be refined to reduce effects on VECs and VSECs.

Design refinements will incorporate projected changes in climate, permafrost, and hydrology. Ongoing engagement with HTAs, Elders, and the Qikiqtani Inuit Association (QIA) will continue to shape project adjustments, keeping environmental, technical, and cultural objectives aligned (NNC, 2025a; NNC, 2025b). NNC's commitment to Inuit leadership and participation including ongoing focus on Inuit hiring, training, and representation remains a core component of this adaptive process.

6.4 Cumulative Effects

The cumulative-effects assessment for the INP evaluates how Project-related changes may interact with other past, present, and reasonably foreseeable activities within the RSA, consistent with NIRB's environmental assessment framework. The RSA encompasses the Kuugaaluk River system surrounding the proposed reservoir, downstream connections to Cumberland Sound, and areas used for harvesting, travel, and other land-based activities.

For screening-level purposes, the following activities identified through the screening level assessment and community engagement have been selected for inclusion in the cumulative-effects assessment:

- Transportation corridors, including all-season and winter travel routes that may influence wildlife movement, access patterns, and harvest areas;
- Quarrying and granular-resource extraction, including existing and proposed borrow sources that may contribute to terrain disturbance, dust, noise, and habitat alteration;
- Community expansion and municipal infrastructure, including growth of Iqaluit's serviced areas, waste-management infrastructure, and utility upgrades;
- Regional land use, including known harvesting areas, travel corridors, and seasonal use patterns identified by HTAs, Elders, and land users;
- Climate-driven changes, such as permafrost thaw, shifting rainfall patterns, altered freeze-thaw cycles, ice-regime changes, and resulting effects on hydrology, terrain stability, wildlife movement, and country-food access; and
- Other renewable-energy and infrastructure proposals that may emerge during the assessment period and have potential to overlap spatially or temporally with INP activities.

These activities form the basis for identifying cumulative pathways related to wildlife movement, fish and fish habitat, water quality, terrain stability, country foods, socio-economic well-being, and climate resilience.

Potential cumulative interactions include:

- Regional changes in surface-water quality or flow regimes affecting aquatic habitat;
- Incremental disturbance to wildlife movement corridors and migratory pathways;
- Combined effects on permafrost, terrain stability, sediment transport, and erosion potential; and

- Regional implications for harvesting access, travel safety, and country-food confidence.

The screening level assessment indicates that cumulative effects are anticipated to be low to moderate with the mitigation measures proposed for the Project. A full cumulative-effects analysis including refined RSA boundaries, quantified pathways of interaction, measurable indicators, and significance determination will be completed as part of the EIS. IQ and community-identified values will guide the selection of VECs and VSECs and inform the cumulative-effects evaluation across the RSA.

6.4.1 Assessment Focus and Pathways

Cumulative Effects Assessment (CEA) pathways will be examined across environmental and socio-economic domains and will include:

- Wildlife and Habitat Connectivity: potential additive disturbance from transportation corridors, quarrying, or community expansion affecting caribou movement, denning areas, and migratory bird use;
- Aquatic Systems: changes to fish habitat and water quality from overlapping land use, erosion, or runoff associated with other regional activities; and
- Human Environment: combined influences on health, country-foods confidence, and socio-economic stability where multiple projects, infrastructure, and climate pressures intersect.

Each pathway will be evaluated using NIRB criteria; magnitude, geographic extent, duration, frequency, reversibility, and context while incorporating both scientific analysis and IQ perspectives on limits and resilience.

6.4.2 Climate Change and Adaptive Management

Climate change is recognized as a cumulative driver that interacts with project effects on permafrost, hydrology, and species movement. The CEA will integrate regional climate datasets and GN projections to characterize long-term temperature, precipitation, and freeze-thaw trends. Adaptive management will be embedded in monitoring programs so that mitigation measures can be modified if environmental or socio-economic indicators diverge from expected trends.

Examples of adaptive responses include revising erosion or drainage systems in response to thaw settlement, adjusting flow management during variable hydrological conditions, or enhancing wildlife monitoring where cumulative disturbance nears community-defined thresholds.

6.4.3 IQ and Community Input

IQ and community knowledge will guide the selection of spatial boundaries, VECs, and thresholds of concern. Engagement with HTAs, Elders, and residents will identify overlapping land uses, harvesting areas, and cumulative pressures not captured through scientific datasets. Cumulative pathways will be discussed during community workshops to confirm linkages most relevant to well-being and land use.

6.4.4 Monitoring and Reporting

Project monitoring will be coordinated through the Follow-up and Adaptive Management Plan and the Environmental Commitments Register. Discipline-specific monitoring will be undertaken through the Aquatic Effects Monitoring Program, Wildlife Monitoring and Mitigation Plan, Site Water Monitoring and Management Plan, Air Quality Monitoring and Management Plan, Noise Abatement Plan and other applicable plans identified in **Table 16**.

Monitoring results will be compared with assessment predictions, regulatory criteria and Project-specific thresholds. Results will be reviewed with Inuit partners and applicable regulators. Where observed conditions differ materially from predicted outcomes, NNC will evaluate the cause, implement corrective measures, adjust mitigation or monitoring and document the response through the adaptive-management process.

6.5 Accidents and Malfunctions

Potential accidents and malfunctions include fuel or hazardous-material spills, vehicle collisions, aviation incidents, blasting incidents, wildfire, equipment failure, loss of communications or plant control, uncontrolled water releases, spillway or outlet malfunction, dam failure and extended interruption of electricity generation.

A Project-wide Emergency Response and Accident Risk Plan will identify credible accident scenarios, evaluate potential consequences and establish prevention, preparedness, communication, evacuation, notification, response and recovery procedures. A construction-phase version will be completed before major construction mobilization and updated before operations.

Dam-specific emergencies will be addressed through separate Emergency Preparedness and Emergency Response Plans developed using the dam-breach and inundation assessment. These plans will address warning and notification systems, downstream communication, response roles, evacuation coordination, emergency reservoir management, exercises and periodic updates.

Emergency plans will be coordinated with the Spill Prevention and Response Plan, Fuel Management Plan, Explosives Management Plan, Dam Safety Plan and Operations, Maintenance and Surveillance

Manual. Emergency exercises will be undertaken at frequencies established through the applicable plans and regulatory requirements.

6.6 Fuel and Hazardous Materials Management

All fuels and hazardous materials will be stored, handled, and transported in accordance with the Transportation of Dangerous Goods Regulations (2001) and the *Canadian Environmental Protection Act* (1999). Screening-level estimates are provided in **Section 4.5.5**; final contractor-specific quantities will be confirmed later.

6.6.1 Temporary Camp

Temporary camp infrastructure will require the storage and handling of fuel and other hazardous materials to support accommodation, heating, electricity generation, vehicle and equipment operation, and general site servicing during investigative and construction activities. Fuel storage associated with temporary camps will be located within designated areas and managed in accordance with applicable regulatory requirements and standard spill prevention and response procedures. Final details respecting fuel types, storage volumes, containment measures, and transfer procedures will be developed during subsequent design and construction planning. Where feasible, camp-related fuel storage and handling areas will be sited and operated to reduce risk to nearby waterbodies, sensitive terrain, wildlife habitat, and areas identified through IQ and field studies.

6.6.2 Logistics and Storage

Construction-phase fuel will be delivered via sealift to the Iqaluit deep-water port and transported to the site via the access road. Temporary bulk storage tanks will be established at the headworks and construction camp areas. Backup generators will utilize 24-hour day tanks equipped with secondary containment and high/low-level alarms.

At this early stage, the exact types and quantities of fuel and hazardous materials required for future Project phases will be finalized through the project tendering process, when contractors provide their proposed equipment, fuel requirements, and material handling procedures.

The construction equipment fuel inventory estimates cumulative fuel consumption over construction and commissioning. The current base estimate is approximately 9.56 million L, comprising approximately 9.27 million L of diesel, 0.285 million L of gasoline and 5,040 L of Jet A. This value does not represent storage capacity or the quantity stored onsite at one time.

The current planning sensitivity for cumulative construction consumption is approximately 6.69–12.43 million L. Actual consumption will depend on equipment selection, shifts, haul distances, weather, idling, temporary-power demand and construction methods.

The current screening basis assumes approximately 200,000–450,000 L of diesel may be present within the construction logistics system at one time. Fuel would be distributed among approved Iqaluit staging areas, the construction camp, headworks, quarries, laydown areas and selected work fronts. Final peak inventory, tank sizes and storage allocation will be confirmed through construction logistics planning.

6.6.3 Spill Prevention and Response

Spill prevention and response will be governed by the Project-specific Spill Prevention and Response Plan, supported by the Fuel Management Plan, Hazardous Materials Management Plan and Environmental Protection Plan. These plans will establish requirements for fuel and hazardous-material storage, secondary containment, transfer and refuelling, inspections, spill kits, worker training, reporting, containment, recovery, cleanup, remediation and follow-up monitoring.

Spill controls will apply to NNC and all contractors. Refuelling and hazardous-material transfer will occur within designated areas and away from waterbodies where practicable. Spill-response equipment will be maintained at fuel-storage areas, camps, work fronts and mobile equipment locations based on the materials and quantities present.

Any spill that meets or may meet a reportable quantity will be reported to the Nunavut Spill Report Line by the party responsible in accordance with applicable requirements. Spill records, corrective actions and follow-up monitoring will be documented and incorporated into compliance reporting.

6.7 Waste Management

Solid and liquid wastes associated with future construction and camp operations will be managed in accordance with the Nunavut Environmental Guidelines for General Management of Special and Hazardous Waste. A Project-specific Waste Management Plan will be implemented to guide the segregation, handling, storage, transport, and disposal of all waste streams generated during Project activities.

6.7.1 Waste Handling and Systems

At this early stage, the specific waste-handling systems and equipment to be used have not yet been determined and will be confirmed through the project tendering process, once contractors identify the camp infrastructure and waste-management methods they propose. NNC will provide updated information to regulators and communities as these details are finalized.

To reduce environmental risks, waste will be segregated and securely contained, with organic materials stored in wildlife-proof containers and other non-organic wastes collected for transport to approved disposal facilities.

6.7.2 Hazardous Waste and Liquids

Waste oils, lubricants, and other hazardous wastes will be managed in accordance with the Project-specific Waste Management Plan and collected for off-site disposal at an approved facility in Iqaluit or shipped south under Transportation of Dangerous Goods (TDG) manifest control, consistent with applicable regulatory requirements.

Hazardous liquids, including used oil, lubricants, solvents and contaminated water, will be stored in compatible labelled containers within secondary containment. These materials will be characterized where required and transported to an approved receiving facility in Iqaluit or shipped south under applicable Transportation of Dangerous Goods requirements. Management procedures will be detailed in the Waste Management Plan and Hazardous Materials Management Plan.

6.7.3 Sewage and Greywater

Construction-phase sewage and greywater generation is estimated at approximately 6–14 m³/day under typical conditions and approximately 12–23 m³/day during peak occupancy. Annual construction-phase generation is estimated at approximately 1,200–4,500 m³/year.

For screening purposes, the current base servicing assumption is collection in holding tanks and transport by vacuum truck to an authorized receiving facility in Iqaluit, subject to confirmation of municipal or facility acceptance. The construction logistics estimate includes a vacuum sewage and greywater truck making approximately two to three trips per week during active construction.

A modular onsite treatment system remains an alternative under evaluation. If selected, treated effluent would only be discharged at an approved location and in accordance with Nunavut Water Board licence requirements. Untreated sewage or greywater would not be discharged directly to the environment. Treatment residuals would be transported to an approved receiving facility.

Operations wastewater is estimated at approximately 25–150 m³/year, depending on attendance and maintenance activities. Final sewage and greywater arrangements will be documented in the Waste Management Plan and Site Water Monitoring and Management Plan. The plans will identify the selected collection or treatment system, storage capacity, haul frequency, receiving facility, discharge criteria if applicable, monitoring requirements, contingency measures and management of treatment residuals.

6.7.4 Spill Reporting

In the event of a spill, the Responsible Party will report any spill that is greater than, or may be greater than, the reportable quantities defined under the Spill Prevention and Response Plan and Reporting Regulations (1993) to the Nunavut Spill Report Line, in accordance with regulatory requirements.

6.7.5 Temporary Camps Waste Management

Temporary camps will also generate domestic solid waste, food waste, sewage, greywater, and other non-hazardous and hazardous waste streams during field and construction activities. Camp waste management requirements will be addressed through site-specific procedures developed for the Project and will include waste segregation, secure storage, routine collection, and removal or disposal at appropriate approved facilities, as applicable. Sanitary wastes and wastewater generated at temporary camps will be managed using temporary systems appropriate to the scale and duration of camp use and consistent with applicable permitting requirements. Following demobilization, temporary camp areas not required for ongoing Project activities will be cleaned up and restored to the extent practical.

6.8 Air Quality and Greenhouse Gases

Baseline air-quality data collected from the National Air Pollution Surveillance (NAPS) station in Iqaluit will be supplemented, where appropriate, by site-specific monitoring at the proposed powerhouse and camp areas. Air quality parameters to be considered include nitrogen dioxide (NO₂), sulphur dioxide (SO₂), particulate matter (PM_{2.5} and PM₁₀), and carbon dioxide equivalents (CO₂e).

Air dispersion modelling using AERMOD will be conducted to predict potential localized effects associated with construction-phase dust and emissions, as well as operational sources where applicable. Model results will be compared against the Canadian Ambient Air Quality Standards (CAAQS) to support the identification of mitigation measures and confirm regulatory compliance.

Preliminary energy modelling indicates that the Project has the potential to significantly reduce diesel-based electricity generation at the Iqaluit power plant. Quantitative estimates of diesel displacement and associated greenhouse gas reductions will be confirmed through detailed operational modelling and will be reported in subsequent regulatory submissions as project design advances.

The Air Quality Monitoring and Management Plan will identify construction and operational emission sources, dust-control measures, equipment and vehicle requirements, monitoring methods, reporting procedures, complaint response and adaptive-management thresholds. A preliminary framework will be developed for the environmental assessment, with final construction requirements completed before major earthworks, quarrying and road construction.

6.9 Noise and Vibration

Potential noise and vibration sources include blasting, drilling, crushing, hauling, heavy equipment, helicopters, generators, road traffic, powerhouse equipment and transmission-line construction.

Mitigation may include equipment maintenance, mufflers, operating-hour restrictions, siting of stationary equipment, blast notification, vehicle-speed controls and separation from sensitive receptors where practicable.

A Noise Abatement Plan will identify major sources and sensitive receptors, establish operating controls and notification procedures, and describe monitoring, complaint response and corrective measures. The plan will incorporate Inuit and community information regarding harvesting, wildlife sensitivity and acceptable noise and vibration conditions.

Engagement during environmental assessment, design, construction, operations and closure will be guided by a Community Involvement Plan. The plan will describe communication methods, engagement schedules, issue tracking, construction notifications, community feedback mechanisms, plain-language reporting, Inuit monitoring opportunities and procedures for communicating Project changes, monitoring results and emergency information. A preliminary plan will be developed in support of environmental assessment and updated before construction.

8.0 Integration of Inuit Qaujimajatuqangit (IQ)

The Project is being advanced as an Inuit-led initiative intended to support long-term energy security for Iqaluit, reduce reliance on imported diesel fuel, and create meaningful opportunities for Inuit participation in Project planning, construction, operations, and monitoring. Specific benefit pathways, employment approaches, and community-based programs will be further developed in collaboration with Inuit organizations and communities as Project planning and assessment advance.

The incorporation of IQ into the INP is an ongoing process and is not considered complete at this stage. IQ will continue to serve as a foundational element throughout all phases of Project development. As design work progresses, baseline programs expand, and engagement with Inuit partners deepens, additional IQ will be identified and integrated into Project decision-making. Inuit values, harvesting knowledge, cultural priorities, and land-based insights directly inform how the Project is conceived, evaluated, and refined. Consistent with NIRB expectations, the following subsections describe the specific ways in which IQ has informed and influenced Project decisions to date.

8.1 Influence of IQ on Site Selection and Project Alternatives

IQ highlighted the importance of selecting a site with:

- minimal overlap with high use harvesting areas;
- limited interaction with major inland travel routes; and
- avoidance of culturally sensitive landforms such as eskers and historical camps.

During Inuit-led screening of sixteen renewable energy options and multiple hydroelectric locations, communities identified the Kuugaaluk River system as the site least likely to interfere with active harvesting or culturally meaningful travel corridors. As a result, several technically feasible alternatives such as Nunngarut and Jaynes Inlet were removed from consideration due to IQ-identified concerns related to cultural use, wildlife congregation areas, and winter travel safety.

Design implication: The INP's current location reflects IQ-led site screening outcomes, not only technical or engineering feasibility.

8.2 Road and Transmission Line Routing Refined Using Inuit Qaujimajatuqangit

Through mapping sessions, Elders and harvesters identified:

- known caribou movement corridors;
- water crossings traditionally used during winter travel;
- areas with unstable snow and ice conditions; and
- landscape features (e.g., eskers) used for navigation or cultural purposes.

This knowledge informed a series of design refinements:

- Primary access road alignments were shifted to avoid key caribou routes observed by Inuit monitors and confirmed during 2025 field programs;
- Transmission line corridor options excluded areas identified as high confidence harvesting zones and raptor nesting habitat; and
- Quarry locations and camp sites were adjusted to avoid berry-picking areas, small-game hunting sites, and culturally important landforms.

Design implication: Micro-routing and corridor selection now incorporate IQ-derived constraints on an equal basis with technical and environmental criteria.

8.3 Seasonal Timing of Activities Informed by Harvesting Knowledge

IQ from HTAs and harvesters resulted in the integration of seasonal considerations into planning and scheduling, including:

- avoiding disturbance during caribou migration, calving, and fall harvesting periods;
- planning in-water work outside of Arctic char migration and spawning windows documented through community interviews;
- adjusting aerial surveys to avoid periods when low-flying aircraft disrupt waterfowl staging or harvesting; and
- scheduling quarry and road work to reduce interactions with winter snowmobile routes that support inland travel and country food harvesting.

Design implication: Field programs, construction sequencing, and access planning incorporate seasonal timing windows defined through IQ.

8.4 Changes to Aquatic Design Based on Inuit Knowledge of Fish Movements

Community meetings and harvester interviews provided information on:

- upstream and downstream char migration pathways;
- overwintering pools;
- areas prone to ice instability; and
- preferred harvesting locations.

This knowledge influenced several elements of aquatic design:

- Fish passage considerations (e.g., fish ladder or alternative structures) were included at the conceptual stage;
- Instream Flow Requirements were informed by community-defined flow patterns rather than modelled hydrology alone; and
- Baseline water quality stations were sited at locations identified by harvesters as sensitive or seasonally variable.

Design implication: IQ directly shaped dam, spillway, and flow-release concepts well before detailed engineering.

8.5 Caribou Corridor Protection Through Design Refinement

IQ provided clarity on caribou use areas not captured through 2025 camera data alone, including:

- traditional herd movement routes between inland feeding zones and coastal areas;
- areas of avoidance near human activity; and
- localized slopes and snow conditions that influence travel.

As a result:

- Several road alignment options on the south and west sides of the reservoir were removed from consideration;
- Monitoring design now includes IQ-defined disturbance indicators, such as behavioural changes or altered crossing locations; and
- Buffer distances in the EIAS reflect IQ-derived tolerances, with further community review planned before finalizing the EIS.

Design implication: Linear infrastructure placement reflects both IQ and western wildlife modelling, giving equal weight to community-based knowledge.

8.6 Cultural and Archaeological Protection Guided by Inuit Qaujimajatuqangit

IQ contributed detailed understanding of:

- long-used travel routes;
- former camps, tool-making areas, and food preparation sites; and
- areas with high potential for buried archaeological materials.

In response:

- Archaeological reconnaissance methodologies were co-developed with Inuit monitors;
- Access routes and temporary camp footprints were shifted to avoid culturally sensitive areas; and
- Stop-work and heritage resource procedures were updated to align with community expectations on how to respectfully handle newly discovered cultural materials.

Design implication: Cultural protection and avoidance measures are informed directly by IQ, rather than relying solely on post-discovery mitigation.

These commitments will be formalized through the Cultural and Heritage Resources Protection Plan. The plan will include protective buffers, worker awareness, avoidance requirements, chance-find procedures, stop-work and notification protocols, monitoring requirements and engagement with Inuit organizations and territorial heritage authorities. The plan will be finalized before ground-disturbing construction begins.

8.7 Shaping the VEC Framework Using Inuit Qaujimajatuqangit

IQ shaped the selection and definition of several VECs and socio-economic indicators, including:

- travel safety and reliability as a distinct valued component;
- confidence in country foods as a human health indicator;
- visual landscape character linked to harvesting experience and sense of place; and
- noise and vibration thresholds aligned with harvester experience rather than generic standards.

Design implication: Several VECs, particularly those relevant to human use—exist because IQ identified them as central to community well-being.

8.8 Monitoring and Adaptive Management Co-Developed with Inuit

IQ has also guided the approach to monitoring and adaptive management by ensuring:

- Inuit monitors are embedded across all baseline programs (wildlife, aquatic, terrestrial, permafrost);
- community knowledge defines thresholds and triggers for adaptive management (e.g., unacceptable changes in caribou or char behaviour); and
- annual data review sessions with Inuit partners will guide iterative refinement of design and mitigation.

Design implication: Monitoring programs respond to community-identified concerns and integrate IQ-defined indicators alongside technical parameters.

The Follow-up and Adaptive Management Plan will establish how scientific monitoring and IQ-derived indicators will be reviewed together. It will define thresholds, decision responsibilities, reporting, corrective actions and procedures for modifying mitigation or monitoring where Project performance differs from predictions or community expectations.

9.0 Environmental and Social Management System

Environmental and social management plans, monitoring programs and dam-safety documents will be developed progressively as Project design, environmental assessment, licensing and construction planning advance. Table 16 identifies the anticipated documents, their general content and the stage at which each document is expected to be provided.

Preliminary plan frameworks will support the Environmental Impact Statement if a NIRB Review is required. Permit-level plans will accompany applicable Nunavut Water Board, land-use and other regulatory applications. Final activity-specific plans will incorporate regulatory terms and conditions, final design and contractor procedures and will be completed before the associated activity begins.

Each final plan will identify its scope, responsible parties, applicable requirements, mitigation measures, monitoring methods, reporting procedures, training requirements, adaptive-management triggers, document-control procedures and review frequency.

The Emergency Response and Accident Risk Plan will address Project-wide construction and operational accidents and malfunctions. The Emergency Preparedness and Response Plans will address dam-specific emergencies, including dam breach, inundation, downstream warning and emergency reservoir management.

Table 16 identifies the anticipated plan or program, its general content and the stage at which it is expected to be submitted or implemented. Permit-level plans will accompany the applicable regulatory applications, while final activity-specific plans will be completed before the associated construction, reservoir-filling or operational activity begins.

Table 16: Anticipated Environmental and Social Management Plans, Programs and Manuals

Plan, Program or Manual	Brief Content	Anticipated Submission or Implementation Timing
Environmental Protection Plan	Provides overarching environmental requirements, roles, inspections, compliance tracking, reporting and corrective actions.	Preliminary framework with applicable applications; final before major construction mobilization.

Plan, Program or Manual	Brief Content	Anticipated Submission or Implementation Timing
Emergency Response and Accident Risk Plan	Addresses Project-wide accident scenarios, prevention, communications, evacuation, notification, response and recovery.	Before mobilization; operational update before commissioning.
Fuel Management Plan	Covers fuel transport, storage, transfer, dispensing, containment, inspections, fire prevention and closure of fuel-storage areas.	With applicable land-use and water-licence applications; final before bulk fuel is mobilized or stored onsite.
Explosives Management Plan	Addresses explosive transport, storage, security, magazine management, blast planning, exclusion zones, notification and incident response.	With applicable permit applications where required; final before explosives are transported to site or blasting begins.
Spill Prevention and Response Plan	Establishes spill prevention, reporting, containment, recovery, cleanup, remediation and follow-up monitoring.	With applicable land-use and water-licence applications; final before construction mobilization and updated by Project phase.
Site Water Monitoring and Management Plan	Covers withdrawals, dewatering, runoff, erosion and sediment control, discharge, water-quality and flow monitoring and corrective actions.	With the Type A Water Licence application; final before water withdrawal, dewatering or discharge begins.
Waste Management Plan	Addresses waste identification, segregation, storage, recycling, transport, treatment, disposal and receiving facilities.	With the Type A Water Licence application; final before camp expansion or construction.
Hazardous Materials Management Plan	Covers inventories, compatibility, labelling, storage, handling, transport, disposal, inspections and training.	With applicable permit applications; final before hazardous materials are mobilized onsite.
Roads Management Plan	Addresses road construction, drainage, crossings, traffic, maintenance, dust, erosion, wildlife interactions and access controls.	Preliminary framework with the land-use application; final before access-road construction.

Plan, Program or Manual	Brief Content	Anticipated Submission or Implementation Timing
Quarry Management Plan	Covers quarry and borrow development, extraction, blasting, crushing, stockpiling, runoff, geochemistry, reclamation and closure.	With applicable land-use and water-licence applications; final before quarry or borrow development.
Air Quality Monitoring and Management Plan	Addresses dust and emission sources, mitigation, monitoring, reporting, complaints and adaptive-management thresholds.	Before major earthworks, quarrying or road construction.
Noise Abatement Plan	Covers noise and vibration sources, sensitive receptors, operating controls, blasting notifications, monitoring and complaint response.	Before blasting and major construction.
Aquatic Effects Monitoring Program	Monitors hydrology, water quality, fish, fish habitat and downstream aquatic conditions to verify effects and mitigation.	Preliminary program with the Draft EIS and Type A Water Licence application; construction component before in-water work and operational component before reservoir filling.
Wildlife Monitoring and Mitigation Plan	Addresses wildlife avoidance, seasonal restrictions, nest protection, caribou interactions, stop-work procedures and monitoring.	Before clearing, road construction or other major ground disturbance.
Cultural and Heritage Resources Protection Plan	Establishes avoidance, buffers, awareness, chance-find procedures, stop-work protocols, reporting and engagement.	With applicable heritage permits; final before ground-disturbing construction.
Community Involvement Plan	Addresses engagement, issue tracking, notifications, feedback, plain-language reporting and Inuit participation in monitoring.	Developed and implemented during assessment and updated before construction and operations.
Closure and Reclamation Plan	Defines closure objectives, infrastructure disposition, water management, waste removal, stabilization, reclamation and monitoring.	Conceptual plan with Type A Water Licence application; periodically updated; final execution plan before closure.

Plan, Program or Manual	Brief Content	Anticipated Submission or Implementation Timing
Follow-up and Adaptive Management Plan	Establishes indicators, thresholds, reporting, decision responsibilities, corrective actions and mitigation adjustments.	Before construction and updated to reflect licence and Project Certificate requirements.
Dam Safety Plan and Operations, Maintenance and Surveillance Manual	Establishes dam-safety governance, inspections, instrumentation, surveillance, operating limits, maintenance and safety reviews.	Preliminary Dam Safety Plan during detailed design; final plan and manual before reservoir filling and commissioning.
Emergency Preparedness and Response Plans	Provide dam-specific emergency procedures, inundation mapping, warning, notification, evacuation coordination, exercises and updates.	Draft plans following dam-breach assessment during detailed design; final before reservoir filling and operations; tested and updated periodically.

10.0 Closing

This Project Proposal has been prepared to support NIRB screening of the current proposed Project configuration. The information presented reflects the Project design basis, baseline information, and planning assumptions available at this stage.

Several Project elements remain subject to refinement through investigative studies, engineering review, Inuit engagement, environmental fieldwork, Nunavut Water Board licensing, land use permitting, and other applicable regulatory processes. Where final construction-level details are not yet available, this submission identifies the current screening basis and the process through which additional information will be developed.

NNC will continue to update Project information as design, baseline studies, engagement, and regulatory review advance. If future refinements materially change the Project footprint, water use, fuel storage, discharge management, construction approach, or potential environmental and socio-economic interactions, NNC will provide updated information to NIRB and applicable regulators before advancing the affected activity.

Appendix A

IAAC Response - Iqaluit
Nukkiksautiit Project



Roche, Michelle <mroche@dillon.ca>

Iqaluit Nukkiqsautiit Project

PNR / RPN (IAAC/AEIC) <pnr-rpn@iaac-aeic.gc.ca>

5 November 2025 at 19:35

To: "Roche, Michelle" <mroche@dillon.ca>, Jill Byrne <jbyrne@qcorp.ca>

Cc: "Lachine, Tracy (IAAC/AEIC)" <Tracy.Lachine@iaac-aeic.gc.ca>, "Lefebvre, Allisson (IAAC/AEIC)"

<Allisson.Lefebvre@iaac-aeic.gc.ca>, "PNR / RPN (IAAC/AEIC)" <pnr-rpn@iaac-aeic.gc.ca>, "Federal Lands / Territoire Domanial (IAAC/AEIC)" <FederalLands-TerritoireDomanial@iaac-aeic.gc.ca>

Hi Michelle and Jill.

It was great to meet you both. Thank you for providing us with the introduction to the project

As discussed in our meeting, the *Physical Activities Regulations* are not triggered by the project. Given this, we would not be assessing the project any further and do recommend that you continue your conversations with NIRB. Regarding your questions to federal funding and questions that relate to section 81-91 of the *Impact Assessment Act*, please see below.

The obligations under sections 81 to 91 of the IAA would apply to non-designated projects on federal lands, including posting public notices on the Canadian Impact Assessment Registry and conducting an environmental effects determination, while considering the factors listed under section 84 of the IAA. We would strongly encourage you to reach out to the responsible authority.

I have included our colleagues with the Federal Lands team of our Legislative and Regulatory Affairs department (federallands-territoiredomanial@iaac-aeic.gc.ca) and they would be happy to assist you in determining whether section 82 of the IAA applies to this project. If section 82 of the IAA is not applicable to this project, then there is no need to post the project to the Registry at this time.

For more information, please refer to the IAAC guidance for projects on federal lands: [Projects on federal lands and outside Canada: Guidance on Sections 81 to 91 of the Impact Assessment Act - Canada.ca](#).

Further information on the IAA and associated regulations can be found at <https://www.canada.ca/en/impact-assessment-agency.html>.

Kindly let me know if you have any further questions.

Sincerely,

Param Joshi

(he/him/il)

Policy Analyst, Prairie and Northern Region
Impact Assessment Agency of Canada / Government of Canada
Param.Joshi@iaac-aeic.gc.ca / Tel: 587-340-2336

Analyste des politiques, Région des Prairies et du Nord
Agence d'évaluation d'impact du Canada / Gouvernement du Canada
Param.Joshi@iaac-aeic.gc.ca / Tél. : 587-340-2336



Roche, Michelle <mroche@dillon.ca>

Iqaluit Nukkiqsautiit Project

PNR / RPN (IAAC/AEIC) <pnr-rpn@iaac-aeic.gc.ca>

24 November 2025 at 13:48

To: "mroche@dillon.ca" <mroche@dillon.ca>

Cc: "Federal Lands / Territoire Domanial (IAAC/AEIC)" <FederalLands-TerritoireDomanial@iaac-aeic.gc.ca>, "jbyrne@qcorp.ca" <jbyrne@qcorp.ca>, "PNR / RPN (IAAC/AEIC)" <pnr-rpn@iaac-aeic.gc.ca>

Hi Michelle,

Thank you for reaching out to our federal lands team.

I believe our earlier communication may have caused some confusion, so I would like to clarify the following:

Because the project is located within the Nunavut Settlement Area, the *Impact Assessment Act* (IAA) does not apply, in accordance with section 7 of the *Nunavut Planning and Project Assessment Act*. The IAA is not applicable in the Nunavut Settlement Area or the Outer Land Fast Ice Zone. As a result, the IAA does not apply regardless of whether the project would otherwise be considered a designated project under the *Physical Activities Regulations* of the IAA or is situated on federal lands (i.e., section 82 of the IAA does not apply).

We appreciate you doing your due diligence and should you need anything further please let us know.

Sincerely,

Param Joshi

(he/him/il)

Policy Analyst, Prairie and Northern Region
Impact Assessment Agency of Canada / Government of Canada
Param.Joshi@iaac-aeic.gc.ca / Tel: 587-340-2336

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Param.Joshi@iaac-aeic.gc.ca / Tél. : 587-340-2336

From: Roche, Michelle <mroche@dillon.ca>

Sent: Thursday, November 13, 2025 8:19 AM

To: Federal Lands / Territoire Domanial (IAAC/AEIC) <FederalLands-TerritoireDomanial@iaac-aeic.gc.ca>

Cc: Jill Byrne <jbyrne@qcorp.ca>

Subject: Fwd: Iqaluit Nukkiqsautiit Project

Good Morning,

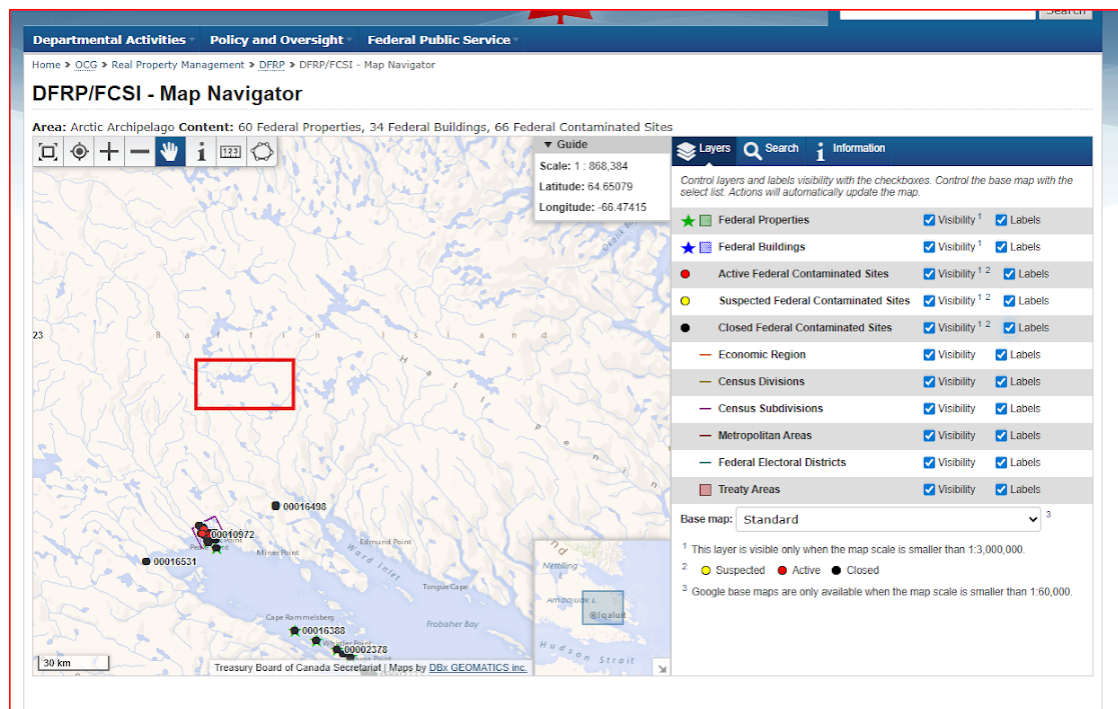
Following our recent meeting with the Impact Assessment Agency of Canada (IAAC), it was confirmed that the Physical Activities Regulations are not triggered by the project.

In an effort to complete our due diligence, I have reviewed the Directory of Federal Real Property (DFRP) and can confirm that no federal lands have been identified within the project footprint (see below).

We would, however, like to confirm with your team that there are indeed no federal lands associated with this project and that the obligations under Section 82 of the Impact Assessment Act (IAA) do not apply. I have attached a figure outlining the project footprint below.

Please let us know if you require any additional information to support this confirmation.

Latitude 64.17054 Longitude -67.91505



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[Quoted text hidden]

References

EcoLogic Consultants Ltd. (2025). Iqaluit Nukkiksautiit Project: 2025 Terrestrial Field Summary Report. Prepared for the Nunavut Nukkiksautiit Corporation. November 2025.

Dillon Consulting Limited. (2025). Iqaluit Nukkiksautiit Project: 2025 Aquatic Environment Baseline Assessment. Prepared for the Nunavut Nukkiksautiit Corporation. November 2025.

Evans, M., et al. (2002). Fish Habitat Use and Preferences in Arctic and Subarctic Regions. (Referenced for Arctic char habitat suitability in Dillon 2025.)

Environment and Climate Change Canada. (1999). Canadian Environmental Protection Act, 1999. Government of Canada. <https://laws-lois.justice.gc.ca/eng/acts/C-15.31/>

Environment and Climate Change Canada. (2002). Species at Risk Act, S.C. 2002, c. 29. Government of Canada. <https://laws-lois.justice.gc.ca/eng/acts/S-15.3/>

Environment and Climate Change Canada. (2022). Migratory Birds Regulations, 2022. Government of Canada. <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-134/>

Government of Canada. (1985). Fisheries Act, R.S.C., 1985, c. F-14. <https://laws-lois.justice.gc.ca/eng/acts/F-14/>

Government of Canada. (1993). Nunavut Act, S.C. 1993, c. 28. <https://laws-lois.justice.gc.ca/eng/acts/N-28.6/>

Government of Canada. (2002). Nunavut Waters and Nunavut Surface Rights Tribunal Act, S.C. 2002, c. 10. <https://laws-lois.justice.gc.ca/eng/acts/N-28.8/>

Government of Canada. (2013). *Nunavut Planning and Project Assessment Act (NuPPAA)*, S.C. 2013, c. 14. <https://laws-lois.justice.gc.ca/eng/acts/N-28.81/>

Government of Nunavut. (1993). Heritage Resources Act, S.N.W.T. 1988, c. H-3 (Nunavut).

Government of Nunavut. (2003). Wildlife Act, S.Nu. 2003, c. 26.

Nunavut Impact Review Board. (2023). Guide to Preparing Project Descriptions. Iqaluit, NU: Nunavut Impact Review Board.

Nunavut Nukkiksautiit Corporation (NNC). (2025a). Iqaluit Nukkiksautiit Project Hydro Booklet – January 2025. Iqaluit, NU.

Qikiqtani Inuit Association. (2024). Qikiqtani Clean Energy Framework. Iqaluit, NU.

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