



## Project Introduction

Qulliq Energy Corporation (QEC) is proposing to construct and operate a new power plant in the Hamlet of Igloolik located in the Qikiqtaaluk Region of Nunavut (the Project). This multi-year project will include a new four-engine power generation facility with installed capacity of 3,450 kilowatts. The power plant will be designed for a 40-year life and will incorporate new technology to improve reliability, efficiency, operation, and safety. Construction will include a fuel system consisting of two 90,000 litre double-walled, 110% contained horizontal fuel tanks and fuel piping and pumping facilities. Additionally, QEC has plans for a Quonset garage, transformer storage, pole racks, oil and glycol drum storage, and waste disposal area with secondary containment. Space will be allocated for transient staff accommodations, sea cans for storage, and a back-up emergency generator. Upgrades to the existing distribution system will be required to connect to the new power plant. An approximately 250-metre fuel pipeline will be constructed to connect to the Petroleum Products Division (PPD) bulk fuel facility located to the south.

## Proponent Information

Qulliq Energy Corporation (QEC) is a Government of Nunavut (GN) territorial corporation. Through the operation of 25 stand-alone diesel power plants with a total installed capacity of approximately 76,000 kilowatts, QEC is the sole provider of electricity to approximately 15,000 customers in the territory. QEC provides mechanical, electrical, and line maintenance services from three regional centers: Iqaluit, Rankin Inlet and Cambridge Bay. QECs administrative activities are carried out at the Head Office in Baker Lake and the Corporate Office in Iqaluit.

QEC is committed to planning and developing cost effective and efficient ways to provide a safe, reliable and stable energy supply for all Nunavummiut.

## Project Background

Igloolik is a community with increasing demand for electricity, reflecting its growing population. According to the Nunavut Bureau of Statistics (2010), the population of Igloolik is estimated to reach 2,431 by 2026. The 2017 Community Plan (By-Law No. 197) for the Hamlet of Igloolik is based on a projected population of 2,915 people in the community by 2037.

The existing Igloolik power plant was constructed in 1974; at 44 years old, the plant has exceeded its design life. The installed firm capacity of the existing power plant is inadequate to meet the community's projected required firm capacity as early as 2022/2023. Without changes to the power generation infrastructure, the capacity shortfall will steadily increase with increased electricity demand in the community resulting in reduced plant reliability.

The building structure, foundation, and ancillary equipment are in poor condition, having started to deteriorate. Generator set 'G3' has exceeded its engine life hours and generator set 'G2' is approaching its end of use limit soon; both generators need to be replaced to maintain reliability of service in the community. The existing switchgear is not Arc resistant. This increases the fire and safety risk of the facility. As the systems continue to age and become more outdated, it will become more difficult to maintain the facility, and plant reliability will become an issue. Without reliable equipment, QECs customers are at risk of system failure.

A new power plant equipped with fuel-efficient generators and plant automation is expected to increase fuel efficiency and overall plant reliability.

## Existing Environment

The community of Igloolik is located on a small island in Foxe Basin, just off Melville Peninsula on the mainland of Nunavut. The island is 103 square kilometres in size and 18 kilometres long. The island is almost entirely split



by Turton Bay, and consists of several buttes that join the lowland plains where bedrock is partially covered by old, raised beaches (Englobe 2021a).

The bedrock geology of Igloolik is generally comprised of Precambrian rocks flanked by Paleozoic sediments, specifically dolomite, which forms most of the cliffs and underlies the lowlands, and limestone, which lies on top of the dolomite and forms the uppermost part of the buttes located on the island (Englobe 2021b). Bedrock outcrops are common in and around the Hamlet. The surficial geology of the Igloolik area generally comprises of either till, marine veneer, or gravel and shingle beaches, which generally consist of sand and gravel varying in thicknesses between 1 metre to over 5 metres in depth over the bedrock (Englobe 2021b). Highly weather limestone bedrock was encountered at the bottom of all boreholes, starting from depths ranging between 4.0 and 10.0 mbgs, and extending to depths ranging from 6.0 to 11.5 mbgs, the maximum depths of drilling (Englobe 2021b).

The location selected for the power plant is generally flat terrain with the exception of a steep slope at the back of the property. The easterly portion of the Site is characterized by terrain made up of broken rock, sloping toward the east from an elevation of approximately 45 metres to 39 metres over a distance of about 100 meters (Englobe 2021a). The westerly portion next to the road is gravel of various sizes with a few small patches of stunted vegetation (Englobe 2021a). A portion of the site is currently being used by Canadrill as sea can storage.

Igloolik lies within the zone of continuous permafrost with medium ice content. The active layer thickness is estimated to be approximately 1.5 m (Englobe 2021b). Surface drainage is poorly to moderately developed with surface ice encountered during the Englobe geotechnical investigation (2021b). There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east.

Igloolik is located within the Foxe Basin Plain Ecozone of the Northern Arctic Ecozone (Ecological Stratification Working Group 1995). It is characterized by discontinuous tundra vegetation such as purple saxifrage, *Dryas spp.* (e.g., mountain avens), and arctic willow, along with alpine foxtail, wood rush, and other saxifrage (Ecological Stratification Working Group 1995). Wet areas are documented as having a continuous cover of sedge, cottongrass, saxifrage, and moss (Ecological Stratification Working Group 1995). According to the Ecological Stratification Working Group (1995), terrestrial mammals include polar bear, arctic hare, arctic fox, lemming, and caribou. Representative birds include king eider, rock ptarmigan, northern fulmar, plover, hoary redpoll, and snow bunting (Ecological Stratification Working Group 1995).

The *Species at Risk Act* (SARA) establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either extirpated, endangered, threatened, or a special concern. According to the Environment and Climate Change Canada (ECCC) Species at Risk Public Registry, there are 22 Schedule 1 species at risk protected under the *Species at Risk Act*, that may occur in, or have ranges that overlap with, portions of the Nunavut Territory (Government of Canada 2021). This includes species such as: caribou, polar bear, ivory gull, buff-breasted sandpiper, red knot (*islandica* and *rufa* subspecies), peregrine falcon, barn swallow, and short-eared owl to name a few. Suitable habitat for some of these species is present in the vicinity of Igloolik; for example, species such as caribou, and polar bear are known to occur. However, the potential for schedule 1 species to be found within or immediately surrounding the proposed lot is anticipated to be low.

There are no designated wildlife areas, marine protected areas, territorial or national parks or Inuit owned lands in conflict with the power plant location; however, it is acknowledged that terrestrial and marine wildlife may be observed in the surrounding area. An archaeological impact assessment will be carried out in July 2021 to determine if archaeological sites are in potential conflict with the project.

## Alternatives Considered



QEC recognizes the need for a long-term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service. The existing plant deficiencies mean the “Do Nothing” option is not a viable option. Operating assets beyond their service life also places a larger burden on QEC’s maintenance and operations personnel by trying to maintain and operate assets that should be replaced.

The following two alternatives were evaluated and are described further below.

- Major plant upgrade
- Construct a new plant at a new location

### Major Plant Upgrade

A major plant upgrade would include replacement of major components and systems within the existing facility, including the generators, switch gear and fuel system. This option was determined to be not technically feasible for the following reasons:

- the plant buildings have deteriorated due to age and are beyond upgrading
- the existing plant footprint is too small to accommodate the space required for the new generator sets
- the existing plant site does not have sufficient land space to accommodate a plant expansion.

The existing power plant is located in an area defined by the Hamlet of Igloolik for community use. It is generally understood that the Hamlet of Igloolik is interested in the relocation of industrial land uses outside of the community core area where feasible (Igloolik Community Plan By-Law No. 187; 2017).

### Construct a new plant at a new location

Taking into consideration the space issues associated with upgrading the existing facility, QEC considered the construction of a new power plant at a suitable location in the community. QEC explored three different location options (Figure 1) and considered a number of criteria that are important in selection of a new power plant location including, but not limited to the following.

- Proximity to Petroleum Products Division (PPD) Tank Farm: If the power plant is located near the PPD Tank Farm then QEC may be able to have a direct pipeline connection for fuel transfers. This reduces the health and safety risks associated with trucking fuel.
- Sufficient space: QEC requires at least 8,500 square metres to accommodate the power plant building, fuel system, pole storage, transient unit, Quonset garage, and waste oil containment area.
- Current land use zoning: If an area is not currently zoned for industrial development, additional time may be required for re-zoning applications prior to securing land for the power plant.
- Flat and level: If an area is flat and level this reduces the cost and time associated with earthworks that would be required to prepare the site for construction.
- Airport Restrictions: Transport Canada Airport Zoning Regulations apply to areas within 4 kilometres of an airport. Additional permitting and approval required.
- Previous Disturbance/Development: Preference is to avoid impacts to native tundra areas. Additional cost and schedule implications if an area has not been previously disturbed or developed (e.g., survey, site investigations, earthworks).



- Proximity to Migratory Bird or Wildlife Areas or Cultural Sites: Close proximity to migratory bird sanctuary, wildlife area or cultural site may increase environmental permitting requirements and environmental monitoring during construction and operation.
- Evidence of Groundwater or Surface Drainages: If present, increases the potential need for ground or surface water management for the site (e.g., to avoid contamination). Development closer than 50 metres from natural surface drainages may result in additional permitting, environmental monitoring during construction/operations.
- Prevailing wind: Wind direction affects noise, odour and snow drifting considerations depending on if the wind prevails towards or away from the community.
- Known Contamination: May impact the type and extent of site investigation required and increase environmental risk. Additional permitting may be required if located within 450 metres of a waste disposal site.

QEC met with Igloolik Hamlet Council on August 11, 2020 to present three proposed location options for the new power plant and outline the pros and cons of each location. Following these discussions, the Hamlet issued a letter of acceptance of the “Option 2” location dated August 21, 2020 (Attachment A). Site investigations were completed in September 2020 and included the completion of a geotechnical evaluation, Phase I and limited Phase II environmental site assessment, and topographic survey.



*Figure 1: Alternative Location Options Considered for the Igloolik Power Plant Project (Image Source: Google Earth)*

### **Project Location and Components**

The results of the site investigations provided QEC with sufficient site specific information to confirm that “Option 2” would be technically feasible to support the construction and operation of the power plant. A preliminary site layout was prepared and a land application was submitted to the Hamlet of Igloolik on March 24, 2021. Subsequent to the application submission, QEC worked collaboratively with representatives of the Government of Nunavut (GN) Department of Community and Government Services (CGS) Planning and Lands Division to further refine the location. The resulting proposed location for the power plant considers the future plans of the Hamlet to establish a formal road easement for the existing road to the PPD bulk fuel facility as well as establish additional lots on the east side of the road for industrial land use (Figure 2). A revised land application was submitted on June 4, 2021.



**Figure 2: Location Selected for the Igloolik Power Plant Project**

The proposed lot is approximately 8,516 square metres located on unsurveyed, untitled Commissioner's land, east of Lot 1000 Plan 1567 (airport property), and approximately 225 metres north of the PPD bulk fuel facility. The proposed lot is identified as 'Lot A' with sketch number 609-SK-103. QEC's land application was presented to and approved by the Hamlet of Igloolik on June 17, 2021 (Motion Number 77; Attachment B).

The power plant will include a new four-engine power generation facility with installed capacity of 3,450 kilowatts based on a projected population of 2,915 people in the community by 2037 as identified in the 2017 Community Plan (By-Law No. 197). The power plant will be designed for a 40-year life and will incorporate new technology to improve reliability, efficiency, operation, and safety. Construction will include a fuel system consisting of two 90,000 litre double-walled, 110% contained horizontal fuel tanks and fuel piping and pumping facilities. Additionally, QEC has plans for a Quonset garage, transformer storage, pole racks, oil and glycol drum storage, and waste disposal area with secondary containment. Space will be allocated for transient staff accommodations, sea cans for storage, and a back-up emergency generator.

Upgrades to the existing distribution system will be required to connect to the new power plant. The main power plant building (40 metre by 23 metre) will include an office, electrical control room, mechanical room, and garage/workshop, in addition to the power generation hall. The detailed design is anticipated to include the installation of industrial scrubbers and hospital grade silencers on the radiator and exhaust system to assist in the reduction of noise and exhaust emissions. The new plant will also be capable of integrating renewable energy sources. The specific location and orientation of these components within the lot will be determined through detailed engineering; however, a preliminary site layout of the power plant is provided in Attachment C.



An approximately 250-metre fuel pipeline will be constructed to connect to the Petroleum Products Division (PPD) bulk fuel facility located to the south. The pipeline will be a combination of aboveground and underground construction.

**Schedule**

The project schedule is shown in Table 1.

**Table 1: Schedule for the Igloolik Power Plant Project**

Task	Timeline
Secure Land and Complete Archaeological Impact Assessment	March 2021 to March 2022
Detailed engineering design	April 2022 to March 2023
Contracting and Procurement	April 2023 to March 2024
Construction	April 2024 to December 2025 (seasonal)
Testing and Commissioning	January 2026 to March 2026
Plant Handover to QEC Staff	March/April 2026

**Construction Labour**

Based on previous project statistics, the anticipated total number of workers during construction is shown in Table 2. The contractor awarded the construction tender will ultimately determine their required labour force to meet project requirements.

**Table 2: Estimated Number of Construction Workers Required During Construction**

Construction Phase	Estimated Number of Workers	Estimated Time On-Site (Days)
Foundation and Land Development	15	90
Civil Works, Building Structure, Fuel System	35	250
Mechanical and Electrical Installations	15	180
Commissioning	20	60

Construction of the Project will be completed through a request for tender (RFT) process. As per the Nunavummi Nangminiqaqtunik Ikajuuti (NNI) Regulation, contractors will be obligated to meet mandatory Inuit labour levels for all construction work.

**Operations Labour**

QEC has staff in the community of Igloolik that are responsible for the day to day operation of the power plant. This includes a Plant Superintendent (full time), and two Assistant Operators (part time). It is expected that existing staff will transition over to the new power plant once it has been constructed and commissioned. No new staffing is anticipated to be required as a result of this project.

QEC has regionally based power line technicians and maintenance crews based in Iqaluit, Rankin Inlet, and Cambridge Bay that travel to and from communities to provide support to the operations staff in each community on an as needed basis and respond to emergencies (e.g., power outages, generator maintenance).

**Construction Materials and Equipment**

The majority of construction materials for the Project will be delivered to the community by sealift. Some materials may be sourced locally or delivered via cargo plane depending on size and quantity.

Equipment anticipated to be required during construction will include but is not limited to the following.



- Excavator
- Backhoe
- Bulldozer
- Grader
- Compactor machines
- Dump trucks/articulated trucks
- Tower crane
- Pile boring/driving machine
- Boom truck
- Tele-handlers
- Fork lift
- Trailer
- Concrete Mixers
- Welding/steel cutting machines
- Testing, inspection and commissioning equipment

The contractor awarded the construction tender will be responsible for sourcing the equipment. This may include a combination of sub-contracting locally available equipment or bringing equipment to the community through the annual sealift.

Water required during construction will be the responsibility of the construction contractor (e.g., sourcing and obtaining applicable permits). It is anticipated that a water use and deposit of waste licence may be required to complete a hydrostatic test on the QEC fuel system pipelines and pipeline connection between the QEC fuel tanks and the PPD bulk fuel facility prior to putting into service.

For operations, QEC will connect to the Hamlet's utility system for provision of water and sewer service.

#### **Construction Environmental Protection Plan**

The contractor awarded the construction tender for the project will be required to have a project specific construction environmental protection plan. The construction environmental protection plan will outline the mitigation plans and procedures that will be implemented during construction to avoid or limit potential effects to the environment. It is anticipated that this plan will include, but is not limited to, the following areas of potential environmental concern:

- Air and Noise: strategies to reduce and control dust and construction related noise
- Sediment and Erosion Control: mitigation to limit the potential for erosion and sedimentation due to wind or water during construction
- Surface Water Management: plans to manage surface water on-site and around the construction site to limit unnecessary ponding water and effectively make use of existing community drainage corridors
- Wildlife Monitoring: strategies to avoid or limit interactions with wildlife by construction workers and avoid or limit potential effects on wildlife habitat should it be encountered (e.g., migratory bird nests)
- Spill Response: plans and procedures to respond to spills or other unplanned release of petroleum-based products as well as any other hazardous materials that may be stored onsite

#### **Fuel Management**

Fuel storage and handling during construction will be the responsibility of the contractor. Details regarding the location and volume of fuel storage or equipment refueling during construction are not known at this time. The contractor will be required to provide appropriate secondary containment for fuel storage and/or refueling location and have a refueling procedure and spill response plan included as part of their Fuel Management Plan.



During operation, QEC will store fuel in two 90,000 litre tanks on-site. The remaining fuel supply required for power plant operation will be stored at the existing PPD bulk fuel facility. The final design of QECs fuel system and the piping between the QEC power plant and the PPD bulk fuel facility will be determined as part of detailed engineering; however, the following specifications will be required.

- Two above ground, horizontal fuel storage tanks, each with a nominal capacity of 90,000 litres to operate 24 hours per day and 365 days per year with a minimum design life of 40 years.
- Fuel storage tanks will be shop fabricated as per the ULC S601 standard, will adhere to the National Fire Code of Canada (NFCC) and National Fire Protection Association (NFPA) 30 guidelines, and comply with Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products and local, territorial and federal act and regulation requirements.
- Fuel storage tanks will be double-walled with 110% containment, an interstitial space monitoring system and will be skid mounted
- Suitable leak detection monitoring system in accordance with Part 6 of the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- Applicable corrosion protection and monitoring in accordance with Section 3.8 of the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- Applicable overfill protection system with audible/visual alarm and automatic mechanism for shutting off the fuel supply such as per applicable standard.

The tanks will connect directly with the PPD bulk fuel facility by 4-inch diameter pipeline for fuel transfers. The fuel tanks will also connect with the day tank inside the power plant by 2-inch diameter pipeline. The day tank will supply fuel to the generators. The pipeline system will be designed to meet the federal Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, and the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. QEC will also work with PPD to confirm the pipeline connection is designed to meet facility specific requirements. This will include having a metering device to measure and record fuel delivery. Prior to operation, the QEC fuel system will be registered with the Federal Identification Registry for Storage Tank Systems.

In addition to being connected to the PPD bulk fuel facility, a truck refueling station will be constructed with applicable safety measures (e.g., bollards) and spill prevention. The truck refueling station will be used will the pipeline connection is constructed, and in the event pipeline maintenance is required.

The QEC environmental standard operating procedure (SOP) for bulk fuel transfers will be followed for the duration of any tank to tank or truck to tank fuel transfer. This includes regular dips to confirm fuel volumes and visual monitoring for the duration of the transfer.

### **Waste Management**

During construction, the contractor will be responsible for appropriately handling, storing, and disposing of all construction waste, including hazardous waste such as waste oil, in accordance with municipal and territorial requirements. This will be outlined in a Waste Management Plan as part of the overall construction environmental protection plan.



QEC has a number of environmental standard operating procedures (SOPs) that provide guidance on waste management during operations. Liquid waste (e.g., waste oil, waste fuel) is stored in drums or totes within secondary containment and disposed of as part of QEC’s annual waste shipment from the community. Domestic waste during operations will be disposed of in accordance with municipal and territorial requirements; this may include disposal of some waste at the community landfill with permission from the Hamlet or shipment south for disposal at an approved facility.

**Anticipated Permit Requirements**

The permits approvals anticipated to be required prior to starting construction of the project are listed in Table 3. Should additional permits or approvals be identified to be required throughout the process, QEC is committed to working with the applicable agency to obtain the necessary approvals in a timely manner.

*Table 3: Anticipated Permit Requirements*

<b>Agency</b>	<b>Permit Requirement</b>
Nunavut Planning Commission	Conformity Determination
Nunavut Impact Review Board	Screening Decision
Hamlet of Igloolik	Development Permit
Government of Nunavut – Community and Government Services	Lease agreement for new lot (Planning and Lands)
	Building Permit (Safety Services)
Government of Nunavut – Economic Development and Transportation	Assessment Letter (Nunavut Airports)
NavCanada	Land Use Proposal Review
Transport Canada	Aeronautical Assessment
Nunavut Water Board	Water Use and Deposit of Waste Licence for Hydrostatic Test

**Community Engagement**

QEC presented three proposed location options for the new power plant during a meeting with Igloolik Hamlet Council on August 11, 2020. The Hamlet issued a letter, dated August 21, 2020, accepting the “Option 2” location.

To initiate the process of securing the land required for the project, a land application was submitted on March 24, 2021. Correspondence with representatives from the GN-CGS Planning and Lands Division assisted in optimizing the proposed lot location and on June 4, 2021 a revised land application was submitted. The proposed lot was approved by the Hamlet of Igloolik on June 17, 2021 (Motion Number 77).

**Potential Environmental and Socioeconomic Effects**

Potential environmental and socioeconomic effects resulting from the Project and the proposed mitigation that QEC will put in place is provided in Table 4.

**Table 4: Potential Environmental and Socioeconomic Effects Resulting from the Igloolik Power Plant Project**

Activity	Potential Environmental Effect	Positive or Negative Effect	Mitigation
Construction of all components of the Project	Construction of the power plant on a new lot will result in loss of space within the community for use by community members	Negative	<ul style="list-style-type: none"> <li>The area proposed for the power plant has been designated by the Hamlet as industrial land use and was the location previously identified by the Hamlet for the power plant, which suggests the Hamlet is interested in or willing to consider development of some kind in this area</li> <li>Location for the power plant is adjacent to an existing road to the PPD bulk fuel facility and airport lands are located immediately to the west; community members using this area will already be accustomed to some activity in the area (e.g., traffic)</li> <li>A portion of the selected location is currently being used by Canadrill as a storage location for sea cans</li> <li>Contractors will be required to have a construction environmental protection plan in place to limit the potential for adverse effects to the environment during construction activity</li> <li>Surrounding development in this area is industrial in nature (e.g., PPD bulk fuel facility)</li> </ul>
	Construction of the power plant on a new lot may result in loss of space for use by wildlife	Negative	<ul style="list-style-type: none"> <li>Contractors will be required to have a construction environmental protection plan in place to limit the potential for adverse effects to the environment during construction activity</li> <li>Contractor will be required to include wildlife management in their construction environmental protection plan; this will include measures to avoid or limit unnecessary habitat loss, and prohibit harassment of wildlife</li> <li>The location selected for the power plant is generally flat terrain with the exception of a steep slope at the back of the property and is covered with sparse vegetation and gravel</li> <li>There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east</li> <li>There are no designated wildlife areas, marine protected areas, territorial or national parks or Inuit owned lands in conflict with the power plant location; however, it is acknowledged that terrestrial and marine wildlife may be observed in the surrounding area</li> <li>The location selected for the power plant is within the municipal boundary and considered to have limited suitable habitat for wildlife</li> </ul>
	Construction of the power plant on a new lot may result in the disturbance or destruction of cultural or archaeological artifacts	Negative	<ul style="list-style-type: none"> <li>An archaeological impact assessment will be carried out in July 2021 to determine if archaeological sites are in potential conflict with the project and identify any necessary avoidance or mitigation measures</li> <li>In the event that cultural or archaeological artifacts are encountered, construction activity will stop and the Government of Nunavut Department of Culture and Heritage will be contacted</li> </ul>
	Construction of all components of the Project may contribute to permafrost degradation	Negative	<ul style="list-style-type: none"> <li>Highly weathered limestone bedrock was encountered at the bottom of all borehole locations starting from depths ranging between 4.0 and 10.0 metres below ground surface; the permafrost active layer thickness is estimated to be approximately 1.5 metres (Englobe 2021b)</li> <li>Rock-socketed piles are considered to be a feasible foundation type for the Igloolik power plant location considering the geotechnical conditions encountered (Englobe 2021b)</li> <li>Protection of permafrost and stability of the foundations/structural ground floor of the power plant shall be prime structural design considerations</li> <li>The foundation design for the power plant will be reviewed by a qualified professional with expertise in permafrost</li> <li>Piles will be used in structural supports where possible to limit ground/permafrost disturbance (e.g., pole and transformer racks)</li> </ul>
	Construction of all components of the Project may contribute to additional dust and noise in the community	Negative	<ul style="list-style-type: none"> <li>Contractors will be required to maintain equipment in good working order to reduce noise generation</li> <li>Construction will occur during typical working hours (e.g., 10 to 12-hour shift)</li> <li>Dust suppression (e.g., water) will be used on-site during construction as required</li> <li>Other development in the surrounding area is industrial in nature; likely that community members are accustomed to some level of dust and noise in this area from existing road and industrial activity</li> </ul>
	Contractor staff travelling in and out of the community during construction may impact the availability of community infrastructure and resources	Positive and Negative	<ul style="list-style-type: none"> <li>Use of community businesses during construction for accommodations, equipment rental, meals and groceries may bring increased revenue to these businesses</li> <li>Use of community businesses during construction may limit the availability of these services to others that may require them (e.g., visitors, other travelling labour)</li> <li>Reliance on restaurants and grocery stores in the community by construction staff may result in additional pressure on the food supply chain for the community; the contractor will be encouraged to work with food suppliers to accommodate the additional requirements of the construction laborers so as not to adversely impact the food supply for the community</li> </ul>
Fuel or hydraulic oil leak from equipment during construction	Fuel or hydraulic oil could leak or spill on to the ground resulting in contaminated soil or surface water	Negative	<ul style="list-style-type: none"> <li>Contractors will be required to use equipment in good working condition</li> <li>Contractors will be required to have a spill response plan as well as spill response equipment and materials available in the event of a leak or spill</li> <li>In the event of a spill or leak, contaminated soil will be collected for disposal at an approved facility</li> <li>Contractors will be required to have a fuel management plan in place that includes refueling procedures and proper bulk storage if applicable</li> </ul>

Activity	Potential Environmental Effect	Positive or Negative Effect	Mitigation
			<ul style="list-style-type: none"> <li>• There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east</li> </ul>
Fuel leak from the Fuel System during operation	Fuel stored within the QEC fuel system could leak on to the ground resulting in contaminated soil or surface water if it is not maintained	Negative	<ul style="list-style-type: none"> <li>• Fuel tanks will be shop fabricated as per the ULC S601 standard, NFCC and NFPA 30 guidelines</li> <li>• Fuel tanks and pipelines will be constructed and operated in compliance with Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products</li> <li>• Fuel storage tanks will be double-walled with 110% containment, an interstitial space monitoring system and will be skid mounted</li> <li>• Suitable leak detection monitoring system in accordance with Part 6 of the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.</li> <li>• Applicable corrosion protection and monitoring in accordance with Section 3.8 of the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.</li> <li>• Applicable overfill protection system with audible/visual alarm and automatic mechanism for shutting off the fuel supply such as per applicable standard.</li> <li>• The QEC fuel system will be inspected by QEC personnel on a monthly basis</li> <li>• The QEC fuel system will be inspected by a qualified third-party contractor in accordance with API 653 as required</li> <li>• A spill contingency plan and community specific spill plan will be updated to reflect the location of the new power plant</li> <li>• Spill response materials will be kept on-site during operations</li> </ul>
Fuel or oil leak from generators or other onsite activities during operation	Fuel or oil could leak or spill in the plant or on the ground resulting in contaminated soil or surface water	Negative	<ul style="list-style-type: none"> <li>• There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east</li> <li>• Surface water will be diverted around project components and towards drainage ditches established adjacent to roadways</li> <li>• In the event of a spill or leak, contaminated soil will be collected for disposal at an approved facility</li> <li>• Environmental SOPs will be followed by operations staff</li> <li>• A lined berm will be onsite for storage of new and waste hazardous products (e.g., fuel, oil, glycol)</li> <li>• Surface water will be collected within the secondary containment berm and will be disposed of under the direction of a local wildlife officer or conservation officer</li> <li>• A spill contingency plan and community specific spill plan will be updated to reflect the new power plant location</li> <li>• Spill response materials will be kept on-site during operations</li> </ul>
Fuel spill during fuel transfer	Fuel could spill on the ground resulting in contaminated soil or surface water	Negative	<ul style="list-style-type: none"> <li>• Fuel transfers will occur via pipeline connection with PPD Tank Farm (tank to tank)</li> <li>• A truck fill station will be constructed as a back-up fuel transfer option; an appropriate secondary containment box will be included in the design of the truck fill station</li> <li>• QEC Environmental SOPs will be followed for all fuel transfers; this includes visual monitoring for the duration of the transfer</li> <li>• There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east</li> <li>• A spill contingency plan and community specific spill plan will be updated to reflect the new power plant location</li> <li>• Spill response materials will be kept on-site during operation and will be readily available during fuel transfers</li> </ul>
Operation of the Power Plant	Operation of the new power plant may contribute to additional noise or dust in the community	Negative	<ul style="list-style-type: none"> <li>• The new power plant location is outside the community core; noise and dust that may be generated during operations is anticipated to have less effect on the community in comparison to the existing power plant located in the community core</li> <li>• Prevailing wind is from the northwest; therefore, there is limited potential for dust or noise to be directed towards the community</li> <li>• New, more efficient generators and equipment are anticipated to generate less noise and dust in comparison to the older equipment at the existing power plant</li> <li>• The exhaust system will include industrial scrubbers to remove additional pollutants and dust from the exhaust before being released from the power plant.</li> <li>• The design of the exhaust system will consider the use of hospital grade silencers to further reduce the noise produced during operations</li> </ul>
	The new power plant will be designed to meet the current and future energy needs of the community which will contribute to community growth	Positive	<ul style="list-style-type: none"> <li>• None proposed as this is a positive effect</li> </ul>
	The new power plant will be designed to be capable of incorporating power generation from renewable	Positive	<ul style="list-style-type: none"> <li>• None proposed as this is a positive effect</li> </ul>

Activity	Potential Environmental Effect	Positive or Negative Effect	Mitigation
	resources in the future that may contribute to further reductions in diesel fuel use		
	Operation of more efficient generators will result in a reduction in the amount of fuel used during operation of the power plant.	Positive	<ul style="list-style-type: none"> <li>• None proposed as this is a positive effect</li> </ul>
	Operation of more efficient generators will reduce the amount of fuel used during operation of the power plant which will result in the reduction of greenhouse gas emissions	Positive	<ul style="list-style-type: none"> <li>• None proposed as this is a positive effect</li> </ul>



## Potential Cumulative Effects

Construction of the project is anticipated to occur over two years (2024 through 2026) and the power plant will be designed for an operational life of 40 years (2026 to 2066). During this time, it is likely that the community will grow. The project must also consider the potential effects that changing climatic conditions may have on the surrounding environment and on the project itself.

According to the Igloolik Community Plan, an estimated 17 new dwellings will be required every year to meet the projected population growth of 2,915 people by 2037 and reduce current overcrowding (Igloolik Community Plan, By-Law No. 197, 2017). To accommodate growth, the community will require that already developed lands be efficiently used and that open space and undeveloped lands be developed for residential and other land uses. The location of the new power plant will use land that is already zoned for industrial use outside of the community core and is not anticipated to adversely effect the overall plans for community growth and expansion in the future from a land use perspective.

To support the future growth of the community, QEC must have the infrastructure in place to provide safe and reliable power. The existing power plant has exceeded its operational life and without changes to the power generation infrastructure, the capacity shortfall will steadily increase with increased electricity demand in the community resulting in reduced plant reliability within the next few years. Insufficient power generating infrastructure could become a limiting factor to future community growth. The proposed project is expected to address this concern until at least 2066. Additionally, should the community of Igloolik consider the development of renewable resource energy production in the future, the new power plant will be designed to integrate with renewable energy sources.

Infrastructure in Nunavut is vulnerable to climate change, many of Nunavut's buildings, roads and air-ports were not built to sustain the environmental pressures that are now being expected (Government of Nunavut 2014). Going forward, new infrastructure projects have the opportunity to incorporate consideration of a changing climate; adaptation of infrastructure also acts as a risk-reduction mechanism to permafrost degradation, changes to precipitation patterns and more (Government of Nunavut 2014). A climate resilience assessment was completed for the proposed new power plant. The assessment considers projected changes to a number of climate variables such as: mean temperature, thawing degree days, permafrost, total annual precipitation, winds and storms, flooding, and relative sea level rise. The results suggest that climate change hazards present either negligible or low risk to the power plant's performance and reliability subject to following best practices in the power plant design (BBA 2021). The proposed project will have the ability to cope with upcoming climate change which will further strengthen the overall community resilience to climate change (BBA 2021).

## Closure

This project is anticipated to provide an overall benefit to the Hamlet of Igloolik with more efficient use of diesel, a non-renewable resource, and the reduction of greenhouse gas emissions. It will also allow QEC to improve power generation infrastructure in the community, support continued community growth and achieve its mandate for the provision of safe, reliable electrical power to the communities it serves.

Should additional information be required please contact QEC's Health, Safety and Environment representative:

Megan Larose  
Health, Safety, and Environment Advisor  
Qulliq Energy Corporation  
Phone: 867 979 7553  
Email: [MLarose@qec.nu.ca](mailto:MLarose@qec.nu.ca)



## References

BBA. 2021. Climate Resilience Assessment Technical Report. Igloolik Community Diesel Power Plant. Final Report. BBA Document Number: 3421024-004000-4E-ERA-0002/R00. 31 pages. Prepared for Qulliq Energy Corporation. 2021-01-29.

Canadian Council of Ministers of the Environment (CCME). 2003. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (PN 1326). ISBN 1-896997-33-3. Available at: [https://www.ec.gc.ca/lcpe-cepa/61B26EE8-AFB3-47AC-91AC-12AFBB0B549B/CCME\\_eng.pdf](https://www.ec.gc.ca/lcpe-cepa/61B26EE8-AFB3-47AC-91AC-12AFBB0B549B/CCME_eng.pdf)

Ecological Stratification Working Group. 1995. A National Ecological Framework for Canada. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull. 125 pages. Report and national map at 1:7,500,00 scale.

Englobe Corporation (Englobe). 2021a. Phase I Environmental Site Assessment Proposed Power Plant Location in Zone 17W Igloolik, Nunavut – Option 2. Final Report. Reference Number: P0023273.000-0100-0000-00. 124 pages. Prepared for: Qulliq Energy Corporation. February 2021.

Englobe Corporation (Englobe). 2021b. Geotechnical Investigation Proposed Power Plant Location in Zone 17W Igloolik, Nunavut – Option 2. Final Report. Reference Number: P0023273.000-0100-0000-00. 56 pages. Prepared for: Qulliq Energy Corporation. February 2021.

Government of Canada. 2021. Species at Risk Public Registry. Available at: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html> Accessed on: July 5, 2021.

Igloolik Community Plan, By-Law No. 197. March 2017. Igloolik Hamlet Council and Government of Nunavut Department of Community and Government Services.

Nunavut Bureau of Statistics. Nunavut Population Estimates and Projections by Community, 1996 to 2023. Source: Estimates - Statistics Canada, Projections - Nunavut Bureau of Statistics. Prepared by: Nunavut Bureau of Statistics, June 10, 2010.

Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. SOR/2008-197. Government of Canada. Last amended on October 26, 2020. Available at: <https://laws-lois.justice.gc.ca/PDF/SOR-2008-197.pdf>



# Attachment A

*Hamlet of Igloolik Letter of Acceptance*



# Municipality Of Igloolik

P.O. Box 30, Igloolik, NT X0A 0L0 Ph: 867-934-8830 Fax: 867-934-8757

August 21, 2020

Rick Hunt  
Director of Safety, Environmental and Facilities  
QEC Iqaluit

## Acceptance of Option 2 for New Power Plant

The Municipal Council of Igloolik and I would like to thank yourself and Mr. Flaherty for your presentation concerning the new Power plant slated for Igloolik.

It is nice to see that some Government agencies value the opinions of the Municipalities. Your approach working with Municipalities is a step in the right direction.

I can honestly say that the Council was opposed to all your options and had selected a different site closer to the recreation facilities.

Your presentation concerning fueling up the power and the environmental hazards of a fuel pursued the Council to select Option 2. The reason for that is perhaps some waste heat may be used for the airport garage.

The reason we wanted the plant by the recreation facilities was for the community and QEC to work together and hopefully the Municipality could access the waste heat. Unfortunately this is now not possible.

The Municipality has acquired a solar panel system for our Municipal offices. This will allow us a command center during emergencies.

The Municipal Council feels the biggest threat to our community is the weather. QEC has an excellent reputation in Igloolik to keep the power running. Your operators should be commended. In saying that the Municipal Council nor your staff can control the weather. Our biggest fear is that we have a severe windstorm or freezing rain storm in the winter months. We all realize it would take some time for QEC to mobilize a team and do any repairs required. This could take days not hours.

The Municipality has 2 buildings that we could use as evacuation centers. The Arena and the Community Hall. Unfortunately neither unit has back up power supply for power outages.

We are requesting assistance from QEC to help us provide back up power during these stressful times.

We are looking at a 100 watt solar panel system that we could run power to both facilities to keep the heat and water on. These 2 facilities could house about 500 people in an emergency. Our priority would be Elders and very young children..

WE understand that that any support would have to be a joint effort. The Municipality, QEC and perhaps the Federal Government could work together to provide the financial support to make our community a safer and better community to live.

I would like to thank QEC in advance for looking at our proposal and giving

Yours Truly



Greg Morash  
CAO  
Municipality of Igloolik

CC James Flaherty



# Attachment B

*Hamlet of Igloolik Motion Number 77*

# Hamlet Council of Igloolik Igloolik, NU

MOTION NUMBER: 77 Meeting # 11 DATE: June 17, 2021

MOVED BY: Peter Awa

SECONDED BY: Lionel Evaluajuk

That: the application by Qulliq Energy Corporation  
to lease unsurveyed land parcel identified  
as Lot A (sketch Number 609-5K-103) be  
approved.

FOR: 5

AGAINST: 0

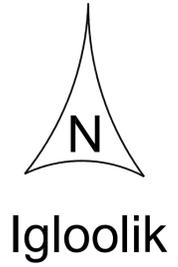
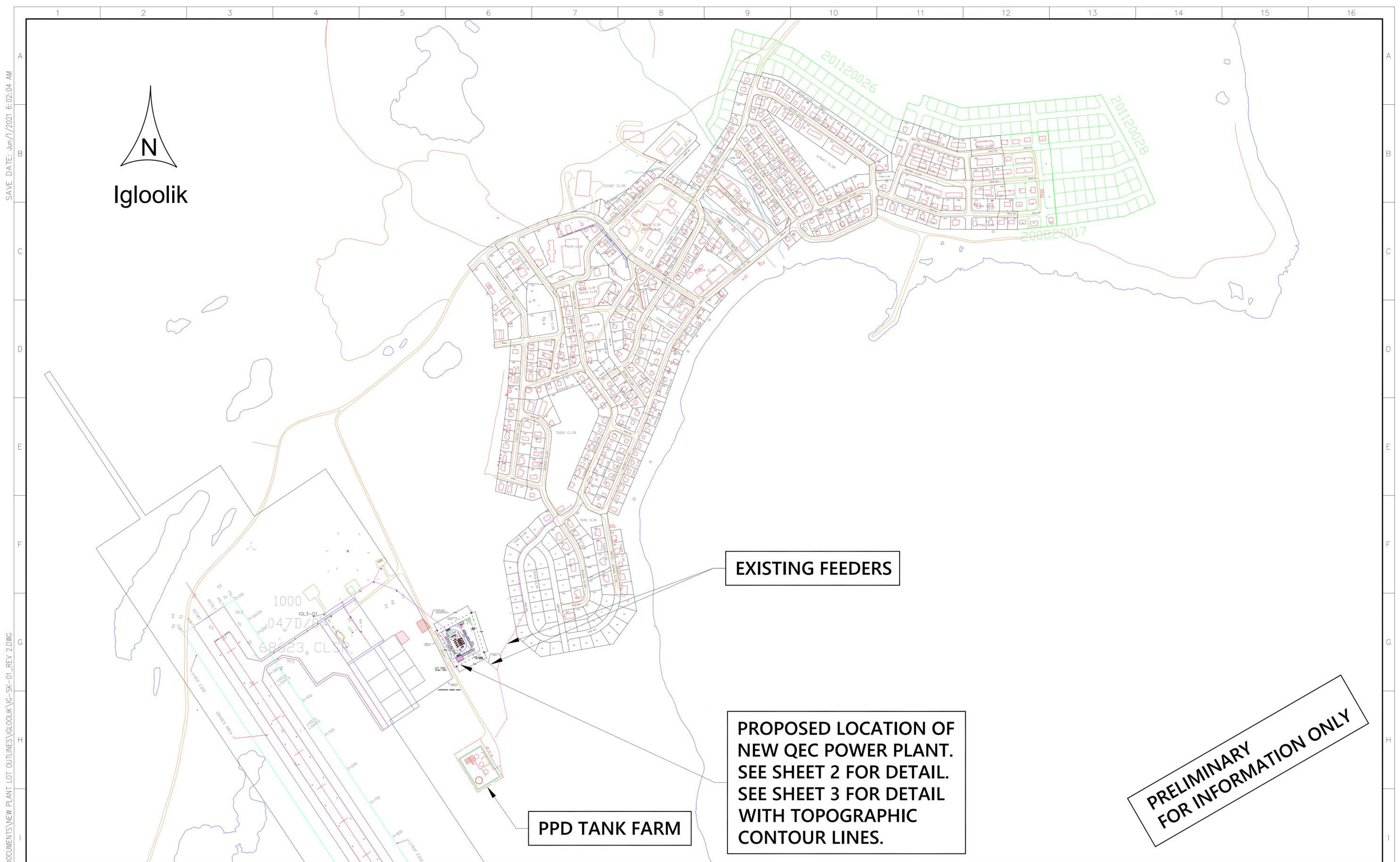
ABSTAIN: 0

SR. ADMIN. OFFICER: 



# Attachment C

*Preliminary Site Layout of the Proposed Power Plant*



**EXISTING FEEDERS**

**PROPOSED LOCATION OF NEW QEC POWER PLANT. SEE SHEET 2 FOR DETAIL. SEE SHEET 3 FOR DETAIL WITH TOPOGRAPHIC CONTOUR LINES.**

**PPD TANK FARM**

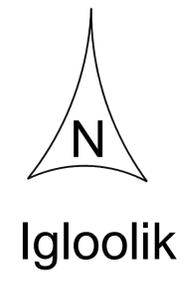
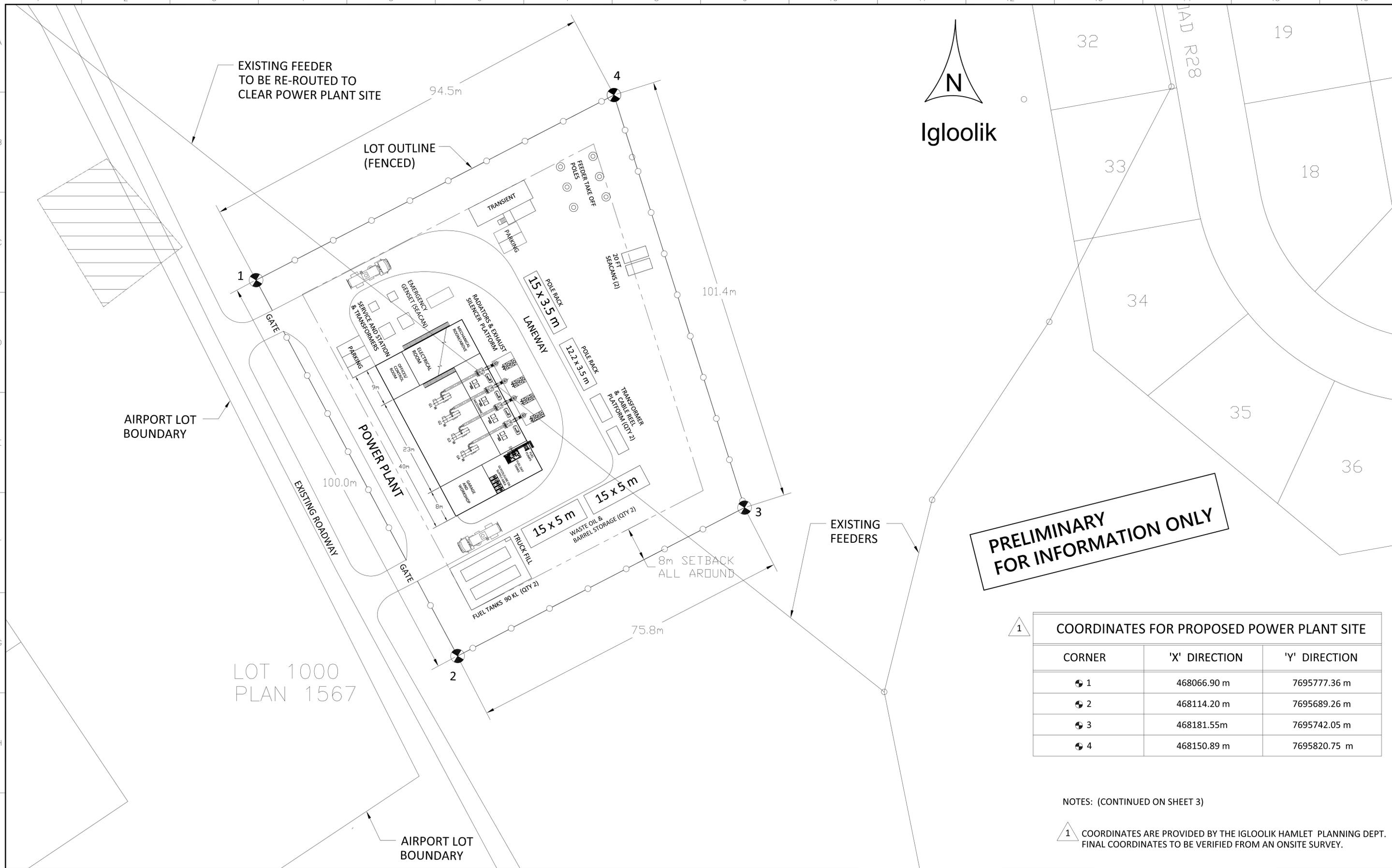
**PRELIMINARY FOR INFORMATION ONLY**

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										PROFESSIONAL STAMP		PERMIT STAMP		 Qulliq Energy Corporation Société d'énergie Qulliq Qulliq Alruvaktuunik Ikumatjuitit		LOCATION IGLOOLIK NUNAVUT															
																TITLE PROPOSED NEW POWER PLANT SITE PLAN															
		2 PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET. BL JUNE 1/2021 FOR REVIEW JUNE 1/2021														SCALE NTS															
		1 LOT SHIFTED NORTHEAST TO AVOID AIRPORT LOT. BL MAR 10/2021 FOR REVIEW MAR 10/2021														SHEET 1 OF 3															
		0 ORIGINAL BL FEB 1/2021 FOR REVIEW FEB 1/2021														DRAWING NO. IG-SK-01															
DRAWING NUMBER		DRAWING TITLE		REVISION LETTER		REVISION		PROJECT NUMBER		NAME		DATE		CHECKED BY		DESIGNED BY		STATUS OF DRAWING		DATE		REV.		REV. DATE							
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16	

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**PRELIMINARY FOR INFORMATION ONLY**

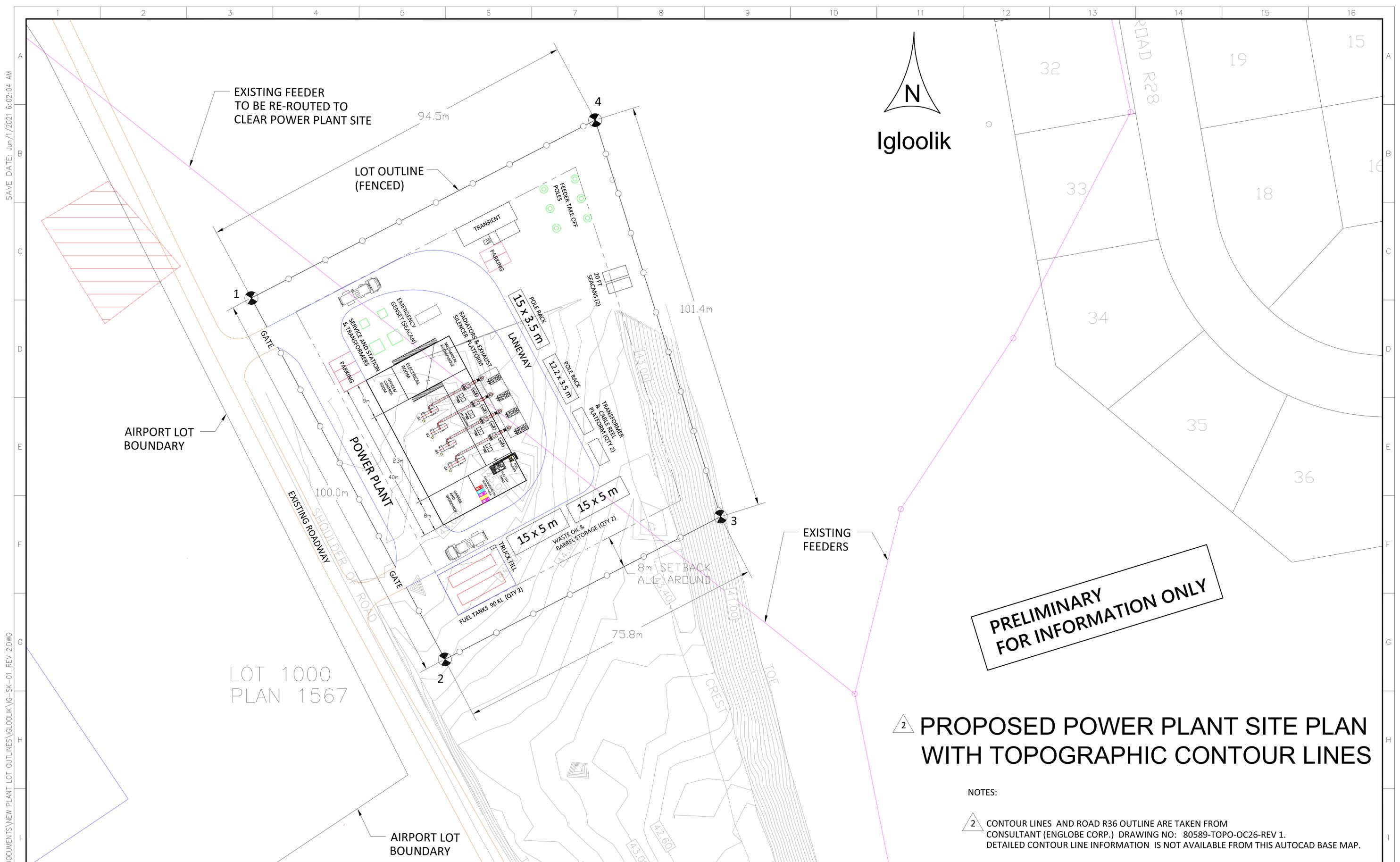
1 COORDINATES FOR PROPOSED POWER PLANT SITE		
CORNER	'X' DIRECTION	'Y' DIRECTION
1	468066.90 m	7695777.36 m
2	468114.20 m	7695689.26 m
3	468181.55m	7695742.05 m
4	468150.89 m	7695820.75 m

NOTES: (CONTINUED ON SHEET 3)

1 COORDINATES ARE PROVIDED BY THE IGLOOLIK HAMLET PLANNING DEPT. FINAL COORDINATES TO BE VERIFIED FROM AN ONSITE SURVEY.

DRAWING NUMBER	DRAWING TITLE	REVISION LETTER	REVISION	PROJECT NUMBER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
0	REFERENCE DRAWINGS									
1			LOT SHIFTED NORTHEAST TO AVOID AIRPORT LOT.		BL	MAR 10/21			FOR REVIEW	MAR 10/21
2			PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET.		BL	JUNE 1/2021			FOR REVIEW	JUNE 1/2021

PROFESSIONAL STAMP	PERMIT STAMP		LOCATION	IGLOOLIK NUNAVUT
			TITLE	PROPOSED NEW POWER PLANT SITE PLAN
SCALE	SHEET	DRAWING NO.	REV.	REV. DATE
NTS	2 OF 3	IG-SK-01	2	JUNE 1/2021



**PRELIMINARY  
FOR INFORMATION ONLY**

**2 PROPOSED POWER PLANT SITE PLAN  
WITH TOPOGRAPHIC CONTOUR LINES**

NOTES:  
 2 CONTOUR LINES AND ROAD R36 OUTLINE ARE TAKEN FROM CONSULTANT (ENGBLOBE CORP.) DRAWING NO: 80589-TOPO-OC26-REV 1. DETAILED CONTOUR LINE INFORMATION IS NOT AVAILABLE FROM THIS AUTOCAD BASE MAP.

DRAWING NUMBER	DRAWING TITLE	REVISION LETTER	REVISION	PROJECT NUMBER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
	REFERENCE DRAWINGS									
		2	PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET.		BL	JUNE 1/2021			FOR REVIEW	JUNE 1/2021
		1	LOT SHIFTED NORTHEAST TO AVOID AIRPORT LOT.		BL	MAR 10/2021			FOR REVIEW.	MAR 10/2021
		0	ORIGINAL		BL	FEB 1/2021			FOR REVIEW.	FEB 1/2021

PROFESSIONAL STAMP	PERMIT STAMP		LOCATION IGLOOLIK NUNAVUT
			TITLE PROPOSED NEW POWER PLANT SITE PLAN
SCALE NTS	SHEET 3 OF 3	DRAWING NO. IG-SK-01	REV. 2
		REV. DATE JUNE 1/2021	

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