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Project

Site Options & Feasibility Report for the Nunavut Inuit Heritage Centre

Prepared for:

Inuit Heritage Trust

Prepared by

Qikiqtaaluk Business Development Corporation

Date

October 2022



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Qikiqtaaluk Business
Development Corporation



Inuit Heritage Trust
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PO Box 2080 Iqaluit, Nunavut
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Attention: Mr. Torsten Diesel

RE: Site Options and Feasibility Report: Nunavut Inuit Heritage Centre, Iqaluit, Nunavut

Qikiqtaaluk Business Development Corporation (QBDC) is pleased to provide Inuit Heritage Trust (IHT) with this Site Options and Feasibility Report for review.

QBDC has prepared this report in efforts to support IHT in any discussions that may be ongoing pertaining to the development of the Nunavut Inuit Heritage Centre. It provides a review of the potential site options for the facility, regulatory requirements, estimated capital costs, as well as potential funding opportunities.

Please do not hesitate to contact the undersigned if there are any questions or comments.

Sincerely,

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Introduction

Inuit Heritage Trust (IHT) retained Qikiqtaaluk Business Development Corporation (QBDC) to prepare a Site Options and Feasibility Report for the Nunavut Inuit Heritage Centre.

QBDC is wholly-owned subsidiary of Qikiqtaaluk Corporation (QC) – the Qikiqtani Region’s Inuit Development Corporation. QBDC’s services for the Site Options and Feasibility Report include project management, civil engineering and schematic design plans for three potential sites accompanied by contractor validation and estimation.

Background

In 2017 Nunavut Tunngavik Inc. and the Qikiqtani Inuit Association each pledged \$5 million to realize the creation of a Nunavut Inuit Heritage Centre (the Centre).

Facility Requirements

QBDC has assessed site options based on an assumed base building footprint. This footprint was determined based on discussions with IHT about programming. This information was relayed to Livingstone Architects who then determined an approximate site footprint that would support not only the base building but also outdoor programming space, amphitheater, outdoor activities area, and parking requirements.

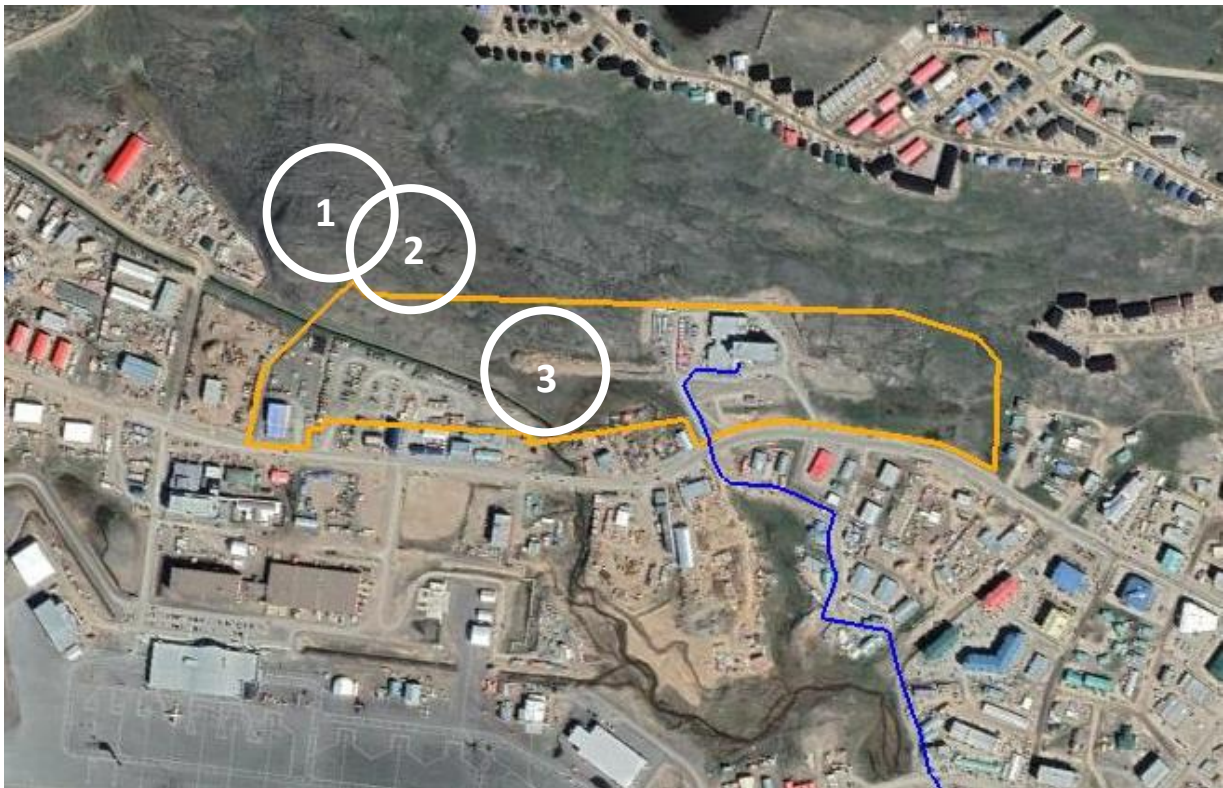
This site footprint is appropriate for use at the site feasibility assessment stage. It will require refinement as IHT progresses a facility design to confirm the site footprint can accommodate the base building, any outdoor spaces and by-law requirements.

Site Options

For the purpose of the initial assessment of the potential sites for the Centre the following assumptions were made, and criteria used:

- The Centre will be located in Iqaluit
- The Centre will be located within the Federal Road Development Area
- The Centre should permit a facility footprint of 4,700 m² +- with a total facility area of 12,000 m² +- along with associated By-Law requirements such as parking, drop off areas, loading docks, drive aisle and landscaping features etc. and within the developable land proposed
- The Centre can be located on undeveloped lands that require extension of servicing

Based on the above assumptions three site options were identified.



Option 1

Option 1 is located on the untitled municipal lands, bridging the western boundary of the Federal Road Development Area, north of the Inuit Owned Land. The site is located on a high elevation rock outcrop which would provide views and vistas of the City of Iqaluit and Frobisher Bay. It would require considerable blasting and reshaping of the land for development.



Option 2

Option 2 is located on the untitled municipal lands, at the western end of the Federal Road Development Area, just north of the Inuit Owned Land boundary. The site is located on a high elevation rock outcrop that would require considerable blasting and reshaping of the land for development.



Option 3

Option 3 is located west of the Aqsarniit Hotel within the Inuit Owned Land development area. The site is located on a lower elevation. The site would require fill prior to development. Access to the site would require minimal extension of the road and servicing infrastructure.





Regulatory Review

The proposed Nunavut Inuit Heritage Centre is within the City of Iqaluit's municipal boundaries and therefore is exempt from the Nunavut Planning Commission (NPC) regulatory project approval process. All regulatory authorizations relating to lot acquisition and a land lease are under the jurisdiction of the City of Iqaluit. All regulatory authorizations relating to construction and operations are under the jurisdiction of the City of Iqaluit and Government of Nunavut.

Municipal Regime

The following by-laws are applicable to acquiring land for the Nunavut Inuit Heritage Centre:

- Zoning By-law No. 889
- Land Administration By-law No. 897
- Iqaluit General Plan By-law No. 898 (includes the IOL Parcel E Development Scheme as an Annex to the By-law)

Land Tenure

Site options 1 and 2 are on untitled municipal land which is administered by the Commissioner of Nunavut. Site option 3 is on Inuit Owned Land which is administered by the Qikiqtani Inuit Association.

All three options require a legal survey to demark lot boundaries for the Centre. A preliminary sketch plan will need to be prepared that identifies the boundaries of the land needed for the Centre including associated parking, setbacks, etc.

Once the survey process for the untitled municipal land is complete, the land will be titled to the City of Iqaluit.

A key hurdle is that the City must dispose of Municipal Land in accordance with its Land Administration By-law. The By-law requires a competitive process in the disposal of land except in certain circumstances as described in Section 13 of the By-law. The exemption is primarily for "when a parcel of land is required by the City, the Territorial government, or the Federal government, or its agencies". The disposal of land to the Inuit Heritage Trust, as a non-profit society, would not qualify under Section 13. The City would therefore need to undertake a call for proposal process to award the lot to the winning proposal. Specific criteria for the development of the lot could be identified. The call for proposal process could take place at the Sketch Plan stage (i.e. prior to the legal survey being registered). It is difficult to predict the timeframe for this competitive process as it is driven by the City, however based on past experience, the time from when a call for proposal is issued to award could be around two months.

For site option 3 on the Inuit Owned Land, a lease can be executed through QIA's Lands and Resources division.



Municipal zoning

For Site 1 and 2 options, the untitled Municipal Land is designated Open Space in General Plan No. 898. Policy 2 states:

“Council shall consider permitting community-oriented and culturally significant public buildings, such as an archaeological or cultural interpretation centre, or providing a public amenity in the Open Space designation provided that: a) The use shall not detract from the primary function and use of the area; and b) Potential impacts such as sun shadowing, loss of important views, and traffic generation are mitigated.”

From this, it is interpreted that a General Plan amendment would not be required to permit the proposed Centre.

The untitled municipal land is zoned Open Area (OR). The permitted uses of OR Zone are:

- Cultural Interpretation centre
- Dog area
- Park
- Beach shack
- Camping structures, temporary
- Utility installation

A "cultural interpretation centre" is defined as:

“a building and/or other facility dedicated to interpretation and education about cultural resources such as archaeological, cultural, and burial sites, remains of historical and architectural value, and districts or landscapes of historic and scenic interest.

The proposed Centre is interpreted to not fit within this definition and therefore a zoning amendment would be required.

The interpretation regarding the General Plan and the Open Area zone would need to be confirmed with the City of Iqaluit.

For Site 3, the IOL lands are designated "Core Area" in the General Plan No. 898 and zoned "Commercial District" in the Zoning By-law No. 899. The proposed Centre is a permitted use in this Zone and would be subject to the Core Area Urban Design Guidelines. These Guidelines provide guidance on such things as streetscaping, parking requirements, site lighting, and built form and architectural character of buildings to be constructed. It also provides considerations for building siting, site access, visuals at ground level, building mass, landscaping elements, and materials, detailing and lighting.

Under By-law No. 774, the Inuit Owned Land area was rezoned from “Commercial” to “Core Area”. As per Section 4.7 of Iqaluit Zoning By-law No. 704,



“The design and architectural appearance and landscaping of developments in the Core Area, as defined in the General Plan, shall be in keeping with the Urban Design Guidelines set out in the General Plan, and with any other document or plan that the General Plan makes reference to.”

Required Approvals for Development

Land Acquisition Phase – 10-14+ months

- Development Scheme - Amendment / Approval (may not be required for Sites 1 and 2 as per above)
- Zoning and By-Law Amendment / Approval
- Lease Agreement – City of Iqaluit
- Development Agreement - City of Iqaluit
 - Inclusive of Front-ended Infrastructure cost recovery - Akiuq Corporation
- Sketch Plan Approval – Government of Nunavut, City of Iqaluit
- Legal Survey
- Legal registry of Land Titles

Design & Construction Phase

- Development Permit - City of Iqaluit
- Development Agreement – City of Iqaluit
 - Inclusive of off-site service obligations
- Transport Canada Obstruction Clearance approvals / Airport zoning regulations
- Building Permit – GN Office of the Chief Building Official
- Occupancy Permit – GN Office of the Chief Building Official

Site Feasibility Assessment

QBDC retained Exp Inc to undertake an engineering assessment of each of the three site options. This assessment evaluates the feasibility of servicing the sites with water and sewer connected to the City’s municipal system and to estimate a level of construction effort required to build roads and extend services to the Centre.

Exp’s preliminary evaluation of the existing water systems indicates it will be able to support any of the three Centre development locations.

Exp’s findings are as follows.



EXP Report Findings

Transportation System

Existing Transportation Network

The IOL Parcel E is located adjacent to Federal Road, which is identified as a major transportation route within the City. Federal Road will provide the primary access to the lands. The IOL Parcel E currently has two access points from Federal Road which forms a crescent serving as access to the recently constructed IOL Hotel. There are currently no other roads within the IOL Parcel E.

Proposed Transportation Network

Interior Road Network

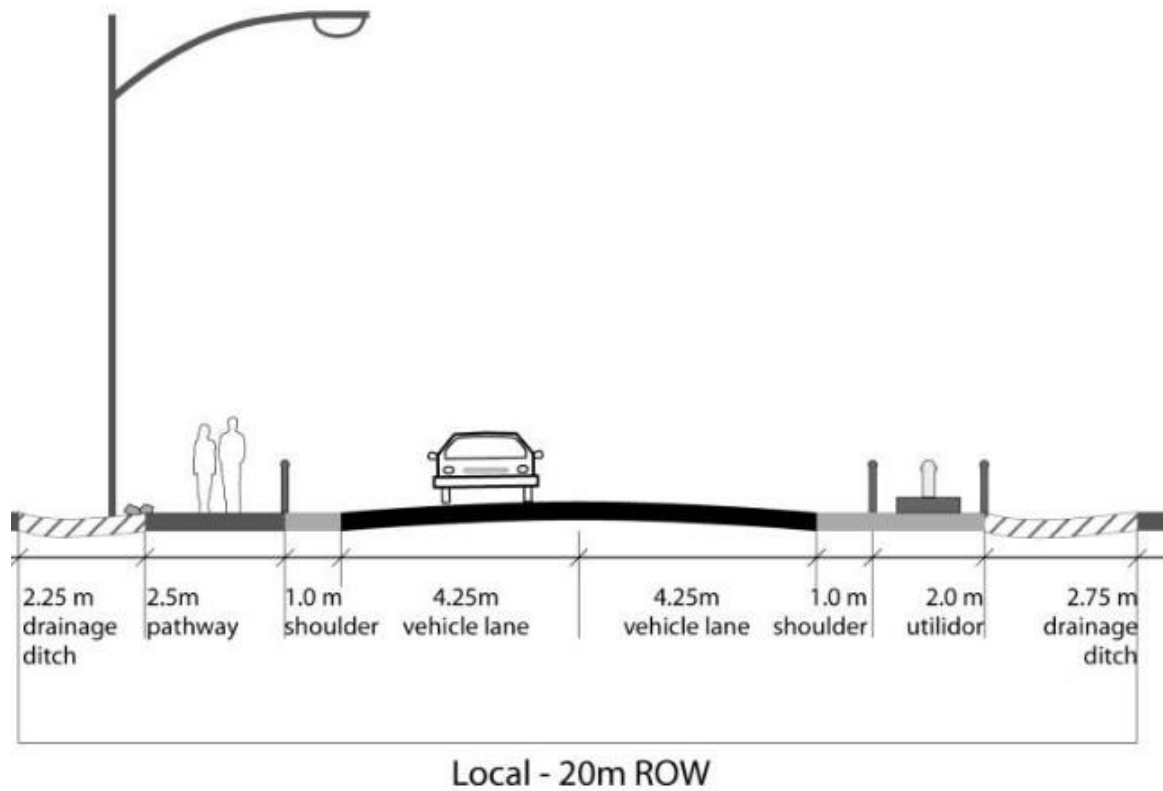
The road to be provided during the development of the NIHC will be constructed as a local road, in a fashion consistent with current practices in Iqaluit. The new road will form an extension from the existing road linking the IOL hotel to Federal Road. The road will be constructed with two 4.25 m lanes with a 1.0 m shoulder. This is consistent with the typical cross section provided in 6.4 of the General Plan and is shown on Figure 2.1. The interior roads will be constructed from local gravel and in general will be elevated above the existing ground. Drainage works, ditches and culverts associated with the road network will generally be located within the road allowance or within drainage easements. The preferable maximum grade on a local residential road is 8% with an absolute maximum grade of 10%. A preliminary road profile alignment and earthworks evaluation has been completed, which determined that a maximum slope of 8.0% can be maintained going up the hill from Parcel E into the Plateau South area. To provide some context of acceptable road steepness, the recently constructed Joamie Court subdivision in Iqaluit has a road slope of 8.0% near the Joamie school. The preliminary profile of the road extension to the furthest uphill site location Option 1 is enclosed for reference. The approximate location of the three site options are indicated along the proposed road extension on drawing C-200 enclosed

The proposed road granular structure will be consistent with current best practices in Iqaluit, as follows:

- Surface Course: 100mm Granular A
- Base Course: 200mm Granular B
- Roadway embankment material: Minimum 300mm Granular C



Local Road - Typical Cross Section





Water Distribution

Existing Water Supply, Treatment and Distribution

The water supply system servicing the City includes Lake Geraldine watershed, raw water storage (over winter), a water treatment plant, treated water storage, two water pressure booster stations, five reheat and recirculation stations and a water distribution piping network.

The City's water distribution system is comprised of five water systems or loops, and three pressure districts. The distribution system is operated on a looped philosophy to allow for recirculation and heat injection to provide freeze protection. Each looped distribution system includes a reheat and recirculation station. The majority of the City is in a pressure district which is supplied by gravity from the treated water storage. The IOL Parcel E lands fall within this pressure district. Static water pressure on Federal Road at IOL Parcel is approximately 680 kPa (100 psi). Lands north of IOL Parcel E (Plateau South) can be serviced below elevation 58 m can be serviced with suitable water pressure from Federal Road. The two other pressure districts are located at higher elevations and require a water booster station to provide sufficient water pressure.

The City's water supply and distribution system is sufficient to meet the added demands of the proposed NIHC development. Based on the existing topography and a preliminary earthworks evaluation for site development, the approximate elevations of the three potential site locations are below 58m and can be serviced from the existing watermain on Federal Road. The approximate elevations of the three potential site locations are as follows:

- Site Option 1: 53m
- Site Option 2: 47m
- Site Option 3: 25m

Proposed Water Distribution System

Thermal and Hydraulic Capacity Analysis for Site Options Feasibility

Geographically, the IOL Parcel E and Plateau South area is located in the main pressure district of Iqaluit, which is directly connected to the treated water storage. More specifically, the IOL Parcel E is located on a section of the City's water system referred to as the Airport Loop. This portion of the water system services the northern area of the City. Freeze protection is provided from the Trigram Building Reheat and Recirculation Station. Upgrades or relocation to the Trigram Reheat and Recirculation station is currently identified within the City's Capital Plan as a project required due to the aging condition of the existing facility.

Fire Flow analysis as part of the extension of the Federal Road Watermain showed that at a minimum the available water flow within the Airport Loop is 5,800 litres per minute. This level of water flow for fire protection should be considered in the design of the NIHC, and if it is determined that additional fire protection is required a more detailed analysis will be required. It is noted that the fire flow requirements of the new facility's sprinkler system are unknown at this time. In the event that flows and pressure



requirements of the NIHC fire protection system are greater than what can be provided by the Federal Road Watermain, an internal emergency pump may be required.

Expansion or extensions to the existing water system to service the IOL Parcel E and Plateau South must ensure that existing water circulation patterns are maintained. This is consistent with the studies undertaken by the City prior to construction of the airport loop watermain.

Freeze protection for the Airport water loop is provided by recirculation and heat injection at the Trigram Reheat facility. The capacity of the reheat station must be sufficient to replace the heat loss in the distribution system and to ensure that the water is returned at a reasonable temperature. The capacity of the re-heat stations is governed by the thermal capacity of the boilers. The boilers should have sufficient capacity with one boiler out of service to replace the heat loss in the distribution system. A freeze protection analysis was not carried out for this preliminary design. The City of Iqaluit's Water and Sewer Study (2002) analyzed the Trigram Reheat Station and concluded that it had sufficient heating capacity for an additional 15,000 metres of water main. Since 2002 there have been minimal changes to the water loop with the exception of adding the water main along Federal Road (approximately 1000m). As the proposed extension to the water system is well within the additional heating capacity of the Trigram building it was determined a freeze protection analysis is not required for this stage of the design development for either of the potential site locations.

The Airport Loop includes a 300 mm watermain along the Federal Road frontage of IOL Parcel E. Preliminary evaluation of the existing water systems indicates that the system will be able to support the domestic water requirements for the three potential NIHC development locations. Therefore, no major offsite works will be required to improve the water system's capacities or pressures.

Water Servicing Level of Construction Effort for Site Options

As discussed in the previous section, preliminary evaluation of the existing water systems indicates that the system will be able to support the domestic water use and fire protection requirements for the three potential NIHC development locations. Therefore, no major offsite works will be required to improve the water system's capacities or pressures. A preliminary layout for the water distribution system has been developed for the three potential NIHC site locations. These are illustrated in figures W1, W2 and W3 enclosed. The proposed network incorporates a looped piping arrangement extending from the recently constructed watermain servicing the IOL hotel. The connection point for all three proposed site locations is the existing access vault AV E adjacent to the hotel. It is expected that a new access vault will be required to replace existing AV E, allowing for the extension of the utilidor to service the new NIHC. Consistent with the current practices in Iqaluit, AVs will be shared by the water and sewer system and be spaced at a maximum of 120m apart. In accordance with City of Iqaluit Municipal Design Guidelines, the minimum pipe cover on watermain will be 2.5m. The average total height of access vaults will be 4.0m.

The quantities estimated for the required watermain extension to service each Site Option is summarized as follows:



Table 1 Summary of Quantities for Site Option Water Servicing

	Site Option 1	Site Option 2	Site Option 3
Length of Watermain (m)	1060	656	176
Supply and Recirculation 300mm dia pre-insulated HDPE			
Access Vaults (#)	6	4	2
Length of Road extension 20m ROW (m)	521	337	55

Wastewater Collection

Existing Wastewater Collection, Transmission and Treatment

The existing wastewater management system that serves the City includes the network of sanitary sewers, sewage pumping stations and a sewage treatment plant.

The City's wastewater treatment plant is located at the southern end of the airstrip. This plant, which currently provides primary treatment of wastewater, is in the process of upgrading and expansion. Those land uses situated within the IOL Parcel have been included in the estimates of infrastructure needs incorporated into the City General Development Plan. Thus, the sewage treatment needs arising from this development have been included in projections prepared by the City.

Prior to the construction of the IOL hotel, Parcel E did not have a gravity outlet to the City's existing network of sewers. There is now an existing sewage collection system serving the IOL hotel which is connected to the City's sewage collection network. Development of IOL Parcel E and Plateau South will lead to the discharge of additional sewage into the City sewers between AV 253 and the sewage treatment plant. The City has recently completed sewer upgrades between AV 253 and the sewage treatment plant. Preliminary evaluation of the existing sewage collection system indicates that the system will be able to support the flows from the proposed NIHC development, regardless of the site location selected.

Proposed Sanitary Sewer System

Sewer Servicing Level of Construction Effort for Site Options

As discussed in the previous section, preliminary evaluation of the existing sewer collection system indicates that the system will be able to support the NIHC development. All three potential site locations can be serviced by gravity by extending the sewer main from AV E adjacent to the IOL hotel. A preliminary layout for the sewer collection system has been developed for the three potential NIHC site locations. These are illustrated in figures S1, S2 and S3 enclosed. The connection point for all three proposed site locations is the existing access vault AV E adjacent to the hotel. It is expected that a new access vault will be required to



replace existing AV E, allowing for the extension of the utilidor to service the new NIHC. Consistent with the current practices in Iqaluit, AVs will be shared by the water and sewer system and be spaced at a maximum of 120m apart. In accordance with City of Iqaluit Municipal Design Guidelines, the minimum pipe cover on sewer main will be 3.0m. The average total height of access vaults will be 4.0m.

The quantities estimated for the required sewer main extension to service each Site Option is summarized as follows:

Table 2 Summary of Quantities for Site Option Sewer Servicing

	Site Option 1	Site Option 2	Site Option 3
Length of Sewer main (m) 200mm dia pre-insulated HDPE	530	328	88
Access Vaults (#)	6	4	2
Length of Road extension 20m ROW (m)	521	337	55



Additional Serviceable Land Area Considerations

Acknowledging that there is significantly greater level of effort and cost associated with the site options that are further from the connection point to existing road, sewer and watermain at the IOL hotel, it is important to consider the additional serviceable land that would be created when evaluating the three potential site options.

As was explained in previous sections, a preliminary road profile alignment and earthworks evaluation has been completed. This evaluation maintained a maximum proposed road slope of 8.0% going up the hill from Parcel E into the Plateau South area. To provide some context of acceptable road steepness for lot development, the recently constructed Joamie Court subdivision in Iqaluit has a road slope of 8.0% near the Joamie school. Residential developments have recently been developed along this segment of Joamie Court where the road slope is of 8.0%. The evaluation completed for this feasibility study accounted for earthworks extending 50m on both sides of the proposed road to create level land for future lot development on either side of the new road. There would be potential for water servicing and gravity sewer servicing along the entire length of new road and utilidor.

The schematic figures enclosed illustrate the serviceable land area that would be created by the road and utilidor extension. The estimated additional serviceable land area was separated between municipal land and IOL land. The total serviceable land area, in addition to the NIHC lands, that would be created for each of the potential site options is summarized as follows:

Table 3 Summary of Additional Serviceable Land Created for Site Option

	Serviceable IOL Land (ha)	Serviceable Municipal Land (ha)
Site Option 1	2.04	2.643
Site Option 2	2.04	0.997
Site Option 3	0.885	0



Earthworks

As stated in the previous section, the evaluation completed for this feasibility study accounted for earthworks extending 50m on both sides of the proposed road to create level land for future lot development on either side of the new road. There would be potential for water servicing and gravity sewer servicing along the entire length of new road and utilidor.

There is currently a low-lying area to the east of the existing hotel that would need to be raised for future development. This land covers an area of approximately 16,200m² which would need to be raised by at least 2.0m to allow for future development. Surplus material generated from earthworks required to construct the road and utilidor servicing the new NIHC site can be placed in this location for added value toward future development of the IOL Parcel E. The Cut volumes estimated include a swelling factor of 20%. The results of the preliminary earthworks analysis for the three site options are summarized in the following table:

Table 4 Summary of Earthworks Required for Site Options

	Site Option 1	Site Option 2	Site Option 3
Cut Volume (m³)	98,046	79,840	17,537
Fill Volume (m³)	92,032	80,894	14,550
Surplus+/-Deficit- (m³)	+6,000	-1,000	+2,900

It is important to note that the above estimates are based on the preliminary road alignment profile designed to service the potential site locations. The cut and fill volumes could be balanced during detailed engineering design so that there is little to no surplus or deficit of granular material generated from the earthworks required during construction. However, as noted above, there is value in surplus granular material generated which could be used to raise the low-lying area in the eastern portion of Parcel E for future development.



Drainage

Existing Drainage

The IOL Parcel E is a generally flat, natural tundra area located at the base of a steep exposed bedrock slope. There is a deep drainage channel that crosses the site in the north-west portion of the site. There is also a drainage course located across Federal Road from the IOL Parcel E, near the intersection with Sikituuq Street. There are several minor culverts located along Federal Road which convey storm water drainage from the north side of Federal Road and abutting IOL Parcel E lands towards the south.

Proposed Drainage

The development scheme for the IOL Parcel E includes a series of interior roads. Roadside swales and ditches will be constructed to capture and convey drainage from the adjacent lands. Drainage will be conveyed towards the existing drainage outlets. The roadside ditches will also serve to lower the ground water in the area by providing an outlet for the subsurface water.

The development of building sites will require the development of site drainage plans to address the site drainage within each future block.



Summary of Site Options Findings

The site feasibility assessment has evaluated the feasibility of servicing the three potential sites with water and sewer connected to the City's municipal utilidor and estimated the level of construction effort required to build roads and extend services to the building. The extent of servicing required to support development of the NIHC has been evaluated and schematic design drawings illustrating site access roads, new access vaults, water/sewer piping are enclosed.

Preliminary evaluation of the existing water systems indicates that the system will be able to support the domestic water requirements for the three potential NIHC development locations. Therefore, no major offsite works will be required to improve the water system's capacities or pressures. Evaluation of the existing sewer collection system indicates that the system will be able to support the NIHC development. All three potential site locations can be serviced by extending the sewer and watermain from AV E adjacent to the IOL hotel.

A preliminary road profile alignment and earthworks evaluation has been completed, which determined that a maximum slope of 8.0% can be maintained going up the hill from Parcel E into the Plateau South area. The evaluation completed for this feasibility study accounted for earthworks extending 50m on both sides of the proposed road to create level land for future lot development on either side of the new road. There would be potential for water servicing and gravity sewer servicing along the entire length of new road and utilidor. Acknowledging that there is significantly greater level of effort and cost associated with the site options that are further from the connection point to existing road, sewer and watermain at the IOL hotel, it is important to consider the additional serviceable land that would be created when evaluating the three potential site options.

The quantities estimated for the three site options, indicating the level construction effort, are summarized as follows:



Table 5 Summary of Overall Quantities for Site Options

	Site Option 1	Site Option 2	Site Option 3
Length of Watermain (m)	1060	656	176
Length of Sewer main (m)	530	328	88
Length of Road (m)	521	337	55
Access Vaults (#)	6	4	2
Serviceable land Municipal (ha)	2.643	0.997	0
Serviceable land IOL (ha)	2.04	2.04	0.885
Cut Volume (m³)	98,046	79,840	17,537
Fill Volume (m³)	92,032	80,894	14,550
Surplus+/-/Deficit- (m³)	+6,000	-1,000	+2,900



New Development Cost Estimates

QBDC has prepared the following Class D estimate for developing and providing water and sewer servicing. This estimate was prepared with consideration of:

- Costing for recent construction works completed in Iqaluit
- Recent escalation in construction costs

The construction estimates were provided by Kudlik Construction to give confidence that they were reflective of current market and ground conditions.



Table 6: Class D Construction Estimate for New Site Works

Budget Estimate infrastructure*	Option 1	Option 2	Option 3
Construction Estimate	13,470,000	10,485,000	2,550,000
Design (5% of Construction)	673,500	629,100	127,500
Construction Design Inspections	400,000	250,000	150,000
Utility Distribution (QEC)	450,000	275,000	100,000
Regulatory & permitting	350,000	225,000	75,000
Legal Survey & Land Registration	300,000	200,000	75,000
Subtotal	15,643,500	12,064,100	3,077,500
PM Fee (5%)	782,175	603,205	153,875
Subtotal	16,425,675	12,667,305	3,231,375
Contingency & Development Fee (15%)	2,463,851	1,900,096	484,706
Project Estimate	18,889,526	14,567,401	3,716,081
Total (rounded)	18,900,000	14,600,000	3,700,000

*Costs do not include City contribution to existing IOL infrastructure, IOL land acquisition costs, or contribution to off-site servicing costs.

The construction estimates included the following analysis:

Option 1

- Construction of 521 meters of new road;
- The supply and installation of 1060 meters of new water and recirculation HDPE d:300 mm insulated;
- The supply and installation of 530 meters of new sewer HDPE d:200 mm dr11 insulated;
- The supply and installation of 6 new access vaults;
- Supply and installation of insulation above the utilidor and under the access vaults;
- The excavation for the utilidor trench including blasting work;



- The blasting work and excavation for each 50 m side of the new road according to the profile and sections for approx. 81,705 m³;
- Crushing operation of approx. 98,046 m³ of material to produce 0-200 mm material;
- Backfill the required area to match the profile for approx. 92,032 m³
- Stockpiling excess material for later use for approx. 6,011 m³
- Supply, install and compact the subbase and base material for the new road, 300 mm of 0-56 mm material and 200 mm of 0-20 mm material.
- The cost for the service lateral work was not included, but the average pricing to get 100 mm carrier pipe and sanitary sewer lateral from main to 1 m passed property line is \$13,500/each.

Option 2

- Construction of 337 meters of new road;
- The supply and installation of 656 meters of new water and recirc HDPE d:300 mm insulated;
- The supply and installation of 328 meters of new sewer HDPE d:200 mm dr11 insulated;
- The supply and installation of 4 new access vaults;
- Supply and installation of insulation above the utilidor and under the access vaults;
- The excavation for the utilidor trench including blasting work.
- The blasting work and excavation for each 50 m side of the new road according to the profile and section received on March 28, for approx. 66,536 m³;
- Crushing operation of approx. 79,840 m³ of material to produce 0-200 mm material;
- Backfill the required area to match the profile for approx. 80,894 m³
- Stockpiling excess material for later use for approx. 100 m³
- Supply, install and compact the subbase and base material for the new road, 300 mm of 0-56 mm material and 200 mm of 0-20 mm material.
- The cost for the service lateral work was not included, but the average pricing to get 100 mm carrier pipe and sanitary sewer lateral from main to 1 m passed property line is \$13,500/each.

Option 3

- Construction of 55 meters of new road;
- The supply and installation of 176 meters of new water and recirc HDPE d:300 mm insulated;
- The supply and installation of 88 meters of new sewer HDPE d:200 mm dr11 insulated;
- The supply and installation of 2 new access vaults;
- Supply and installation of insulation above the utilidor and under the access vaults;
- The excavation for the utilidor trench including blasting work.
- The blasting work and excavation for each 50 m side of the new road according to the profile and section received on March 28, for approx. 14,375 m³;
- Crushing operation of approx. 17,537 m³ of material to produce 0-200 mm material;
- Backfill the required area to match the profile for approx. 14,550 m³
- Stockpiling excess material for later use for approx. 2900 m³
- Supply, install and compact the subbase and base material for the new road, 300 mm of 0-56 mm material and 200 mm of 0-20 mm material.
- The cost for the service lateral work was not included, but the average pricing to get 100 mm carrier pipe and sanitary sewer lateral from main to 1 m passed property line is \$13,500/each.



Past Development Costs to be Recovered

Federal Road Development

In 2017 the Qikiqtani Inuit Association and the Qikiqtaaluk Corporation signed a development land lease to develop a parcel of Inuit Owned Land in Iqaluit along Federal Road. This development represents the first privately and Inuit-led land development in Nunavut.

Presently, the only completed development within the IOL is the Aqsarniit Hotel and Conference Center (AHCC). Part of the necessary site servicing works included the installation of a new gravity sewer outlet as only water distribution infrastructure existed within the Federal Road municipal utilidor. This required roughly 630 m of gravity sewer piping south of Federal Road to provide an outlet tying into the City's existing sewer network.

The piping was sized with considerations for future additional growth and now provides a local outlet within the IOL lands which can service future developments. The sewer was designed to accommodate a large population of residential as well as commercial establishments. It was envisioned that not only the IOL would be connecting to this outlet, but also establishments on adjacent municipal lands. To provide a simplified order of magnitude, the sewer outlet is capable of adequately conveying flows generated by roughly 4,000 people for residential water uses. The 630 m sewer line is presented in Figure 1 as a blue line



Figure 2: Front-ended Sanitary Infrastructure



Development Cost Sharing

There are several methods in which the cost for such land development projects can be shared, with the two most common approaches being: incremental, or proportional cost-sharing. These agreements are structured around the ultimate municipal servicing scheme and determining site contributions through a unit of measure such as sewage generation rates. The challenge applying this to the IOL and adjacent lands is that the ultimate servicing and development details are still in flux and previously estimated generation rates cannot be fairly relied on for the purposes of cost allocation.

This limits possible approaches to sharing or distributing costs incurred for the construction of the shared infrastructure with all parties involved. At this point a fairer approach may consider basing cost allocation as a function of readily serviceable land (area). This approach is not ideal as the definition of “readily serviceable land” is challenging to determine definitive areas or boundaries. But it would provide a more definitive, stable, and fair unit of measure when compared to contributing sewage rates without knowing the ultimate municipal servicing details.

Using this approach development investments could be recovered by the developer through an Agreement with the land owner. The Agreement would stipulate the terms and conditions of a model that realizes the developed recovering this upfront investment as the servicing infrastructure comes online for new developments.

QBDC retained Creva Group to support determine the proportionate share of the total cost to be allocated to the Nunavut Inuit Heritage Centre development, as well as the recoverable amount.

Creva’s findings are as follows.

CREVA INC Report Findings

Methodology and Assumptions

- a) Allocations have been calculated based on the serviceable are of land created by the investment in infrastructure.
- b) To determine the value of serviceable land Creva relied on:
 - i. NCC and QPI recently formed a partnership to develop two commercial lots on the plateau. These lots were fully serviced with a Utilidor connection at the lot line. The land for the partnership was contributed by NCC at an agreed upon value of \$1 million per lot. The area of Lot #214 is 38,100 square feet or 0.354 hectares and they received a development permit for a 43,200 square foot building for a building to land ratio of 1.13 times.



The corresponding ratio for the Hotel site on the IOL is 0.77 times, reflecting a more institutional use which was a 30% less efficient land use in terms of the size of the income producing property that can be built on the site. Applying this discount to the commercial mixed-use value per ha results in an estimated land value of \$2,000,000 per ha of serviced institutional land.

- ii. As a point further of comparison, the City of Iqaluit completed a lottery for fully serviced residential lots in the Joamie Court subdivision. The average price per square foot of land per se was \$20.18 per square foot or \$2.17 million per ha.

For our purposes, and to maintain a conservative approach, we have applied a value of \$2.1 million per ha to the institutional lands created in the three options.

- c) For Options 1 and 2, the City of Iqaluit Lands benefit from existing infrastructure both on the IOL as well as off-site services south of Federal Road. The cost of each option incorporates an allocation of these costs as applicable.
- d) In each option, surplus land suitable for residential development is being created. We have valued this land based on a mix of residential uses using minimum lot areas based on the requirements as defined in City of Iqaluit zoning by-law 704. Our value per lot is considered conservative as these are “ready to go” lots. The infrastructure costs include the cost of blasting and shaping the lands to create level building lots with services at the lot line. City lots typically do not include this level of improvement to the actual lot.

Summary of CREVA Report Findings

The total estimated cost for each of the three options including contribution to the existing IOL infrastructure, land acquisition and off-site servicing costs is estimated as:

	Option 1	Option 2	Option 3
Capital Cost	18,890,000	14,568,000	3,720,000
City contribution to existing IOL infrastructure	1,629,000	1,116,000	-
IOL land acquisition	340,000	340,000	-
Contribution to off-site servicing costs	337,000	157,000	-
Total Estimated Cost (rounded)	\$21,190,000	\$16,180,000	\$3,720,000

If the objective was the lowest cost solution for the creation of a lot on which to build the Nunavut Inuit Heritage Centre, Option 3 is clearly preferred. Having said this, all three options result in the creation of badly needed residential land infrastructure which can be used to generate additional benefits to the community.



- When expressed as the cost per square meter of serviceable land created, the comparison is as follows:

Option	Cost PSM of Serviceable Land
Option 1	\$ 307.00
Option 2	\$ 357.00
Option 3	\$ 135.00

- The estimated total value of the serviced lots and the resulting net value after deducting costs for the three options is as follows:

Option	Serviceable Land Value	Net Value
Option 1	\$ 24,050,000	\$ 2,860,000
Option 2	\$ 15,765,000	\$ (414,000)
Option 3	\$ 8,587,000	\$ 4,867,000

Again, from a financial cost benefit perspective, Option 3 is preferred. The cost of Option 2 exceeds the benefits and as such this Option should not be pursued. Option 1 is marginally positive (benefit = +/- 12% of value created), however this option has the potential to create serviced residential land on which approximately 234 residential units could be developed as compared to 44 with Option 3.

- Options 1 and 2 expand the area of benefiting lands that contribute to the legacy costs associated with Phase One of the IOL, both on-site and off-site. When this infrastructure was developed it was engineered with future expansion in mind and as such has the capacity to handle the flow associated with development of the City owned lands. The potential cost recovery for each option is as follows:

	Option 1	Option 2
City Land Contribution to the IOL Infrastructure Cost	\$ 1,629,000	\$ 1,116,000
Contribution to Off-Site Costs	\$ 337,000	\$ 157,000
Total	\$ 1,966,000	\$ 1,273,000

- Any funding in the form of grants and/or subsidies received to cover all or part of the infrastructure cost can be returned in whole or in part by the value of the lots created, depending on the nature of the benefit that the entity providing the funding wants to convey to the end user of the lot. In the most generous case, the end user would receive the full benefit of the value of the lot by way of a prepaid equity lease.



Government Programs & Investment Opportunities

The Feasibility Report will provide IHT with an evaluation of capital and operational funding opportunities. QBDC envisions that the Site Feasibility Report will lay the groundwork for IHT to present a shovel-ready project to funding agencies therefore providing a more attractive proposal. Several opportunities have been identified including:

1. Second call for the Federal Green and Inclusive community Buildings is expected for which part of this facility would likely be eligible.
2. Indigenous Community Infrastructure Fund – infrastructure projects such as cultural facilities. \$259.6M was allocated to Nunavut. NTI is currently working on how to administer the funding. Deadline for their decisions is June 2022.
3. Canada Community Revitalization Fund – up to \$1M for not-for-profit organizations, municipalities, and Indigenous communities to build new community infrastructure, bring people back to public spaces safely as health measures ease, and create jobs and stimulate local economies.
Deadline: Continuous intake as funding remains
<https://www.canada.ca/en/atlantic-canada-opportunities/campaigns/covid19/canada-community-revitalization-fund.html>
4. Government of Nunavut Culture and Heritage Contributions:
Heritage Facilities – develop and/or renovate heritage facilities, including museums, art centre, and performance spaces
Maximum of \$500,000 contribution
 - a. Heritage Centre Core Funding – operation of community heritage centres in Nunavut, including museums.
Maximum of \$100,000 contribution
5. Government of Nunavut – EDT
 - a. Community Tourism and Cultural Industries – Schedule C: Asset Improvements
Develop new and repair/upgrade existing arts/cultural infrastructure
Application deadlines: April 15, August 15, December 15
Maximum of \$100,000
 - b. Strategic Investments Program – Nunavut Economic Foundations Fund
supports a wide range of projects entered into by organizations and municipalities, including infrastructure which supports economic development
Maximum of \$25,000.



Conclusion

The Site Feasibility and Options Report presents the groundwork for IHT to open dialogue and confidently discuss costing for the Nunavut Inuit Heritage Centre. If IHT decides to pursue Site 1 or Site 2 ongoing conversations will need to be had with QIA and the City of Iqaluit to detail how the land development process will advance for the currently land-locked municipal lands above the Inuit Owned Land