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Iqaluit

REQUEST FOR PROPOSAL
FOR THE PROVISION OF CONSULTANT SERVICES FOR

LONG-TERM CEMETERY STRATEGY

PROPOSAL CALL: THURSDAY JULY 7, 2022

PROPOSALS DUE: THURSDAY JULY 21, 2022, AT 3:00 PM EST

2022-RFP-035

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1. PROJECT OVERVIEW

The City is seeking to retain a Consultant to provide consulting services for the Long-Term Cemetery Strategy. The Consultant's team will be retained to provide technical and professional services for the Project.

The City invites individual firms or consortiums of firms to submit Proposals for the above-referenced Project in accordance with the terms and conditions of this Request for Proposal document.

1.1 Background

1.1.1 Location

Iqaluit is the capital of the Nunavut Territory and is located at the south end of Baffin Island near the end of Frobisher Bay (63°45'N latitude and 68°31'W longitude). Access to Iqaluit is provided by regular scheduled commercial aircraft year-round, snowmobile trails from other Baffin Island communities in the winter, and sealift from the port of Montreal and Valleyfield in the summer.

1.1.2 Geology and Terrain

Iqaluit's location is above the tree line and within the permafrost zone of Canada. The region generally consists of glacially scoured igneous/ metamorphic terrain. In some locations, a thin layer of organic material is found.

1.1.3 Climate

Iqaluit has an Arctic climate with an average January temperature of -21.5°C and July average temperature of 8°C. The annual precipitation is made up of 19.2 cm of rainfall and 255.0 cm of snowfall for a total of 43.0 cm of precipitation. The prevailing winds are northwest at 16.7 km/hr.

1.1.4 City Growth and Population

The City is the newest Capital City in Canada and as a result has experienced a period of rapid development and growth. Iqaluit is the seat of government for the Territory of Nunavut and is the home base of many federal and territorial government departments. The City is rapidly developing into a regional center for the territory with many northern businesses in Inuit organizations making it their base of operations. The current population of Iqaluit is estimated at about 7,000 people with an average annual growth rate between three and four percent.

1.1.5 Land Ownership System

Iqaluit has a unique land ownership system. The major landowners in Iqaluit are the Commissioner of Nunavut, the City and the regional Inuit associations. These entities in turn lease land to individuals, corporations and other government departments. The

City land is administered by a land acquisition by-law and by a Territorial Statute. Generally speaking, there is no private ownership of land.

1.2 Definitions

The following terms and definitions listed shall apply within this RFP:

City/ Client/ Owner	means the Municipal Corporation of the City; means the entity as defined in the Supplementary Conditions, which may be the same entity as the City as defined herein.
City Representative	means the individual, assigned to the Project, who will be representing the City.
City Website	means www.iqaluit.ca.
Class A Estimate	means an estimate that is accurate to +/- 10% that is used to establish cost for the construction of the Project and is based on 99% complete design package which is ready for tender.
Class B Estimate	means an estimate that is accurate within +/- 15% and is based on a 66% design development.
Class C Estimate	means an estimate that is accurate within +/- 20% and is based on a 33% design development.
Class D Estimate	means an estimate that is accurate within +/- 30% and is based on conceptual design sketches.
Closing Time	means the time set out in paragraph 4.1.
Contractor	means the entity who will be providing construction services to perform the work.
Construction Contract	means the executed agreement between the City and the Contractor for the work.
Evaluation Committee	means a committee appointed by the City in order to evaluate all submitted proposals in order to determine a preferred proponent.
Preferred Proponent	means the company or firm that has been selected by the City's Evaluation Committee and who will initially discuss the contract arrangements based upon acceptance of the proponent's proposal.

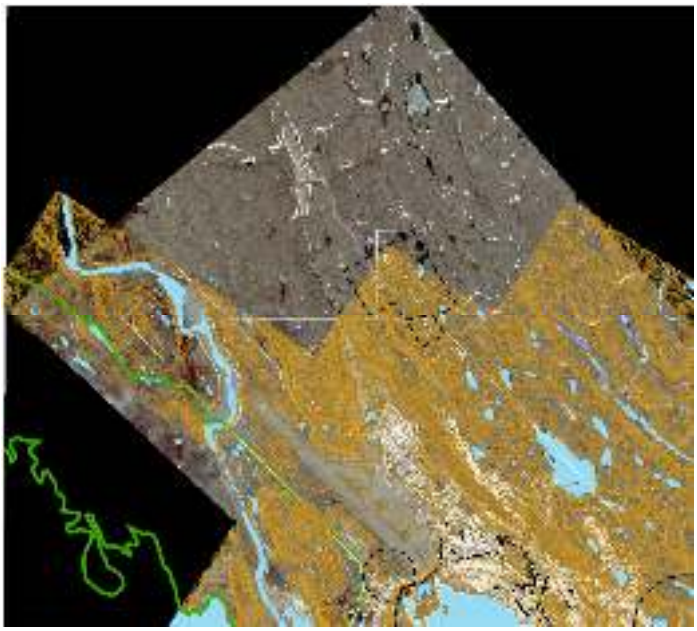
Consultant	means the Consultant who will provide the technical and professional services defined in the Request for Proposal.
Professional Services	means the technical and professional services to be provided by the Consultant for this contract.
Project	means the Long-Term Cemetery Strategy assignment.
Project Manager	means the Project Manager assigned by the City, who will be responsible for managing the execution of the Project.
Project Team	means the group of people which includes the City Representative, the Project Manager, the Discipline Design Leaders and any other person invited from time to time by the City Representative of the Project Manager.
Proponent	means a company or firm intending to submit a Proposal and from whom a Proposal submission was received.
Proposal	means the document submitted in response to the Request for Proposal.
Supplementary Conditions	means the Supplementary Conditions forming APPENDIX B.
This contract	means the Consultant contract for which this Request for Proposal is issued.
User group	means the City or the users of the facility for which the City is responsible.

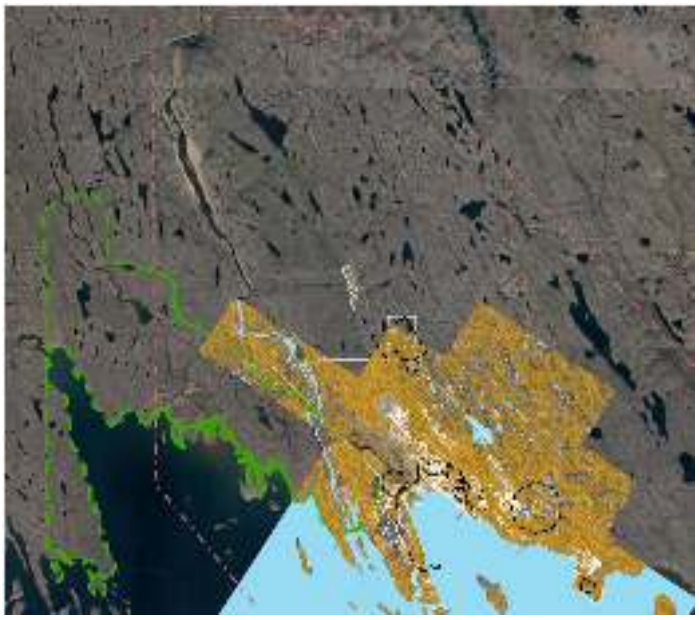
1.3 Project Scope

The City of Iqaluit's current cemetery is the Apex Cemetery, located east of the main city core in the community of Apex. The cemetery's Phase 1 area was introduced in 2014 and underwent civil/drainage improvements in 2021. The Phase 1 area is nearing capacity, and as such, the City will need to establish a new cemetery area to be used in the future.

This assignment will require a Consultant to assess current needs, conditions, practices, and data to inform the subsequent phases of the assignment. The Consultant will be required to assess factors such as the current cemetery's remaining footprint, current burial practices and operations processes, historical burial data, population projections. Some if this information is available within the attached

documents. Other information may require City engagement or inferences by the consultant. This will allow the Consultant to study potential sites to determine the preferred location for the next cemetery phase based on location, size, topography, geotechnical and drainage considerations, aesthetic conditions, public perception and opinion, and other factors as recommended by the consultant. A 50-year horizon will be used as the basis to determine the next phase or location to be developed. Two potential sites that have been identified at this time are the areas located directly adjacent (North, South, and/or East) to the current Apex Cemetery as well as a site located in Upper Base. The general location of the Upper Base site is shown in the screenshots below (indicated by the white box overlaid on the black dotted outline to the north of the City).





Once a preferred site is determined, the Consultant will also need to propose an overall project schedule based on the remaining lifetime of the current cemetery and projected design and construction timelines. Currently it is expected that the next cemetery location or phase will need to be introduced in 2025, however this is only the City's rough high-level estimate at this time. It will be up to the Consultant to determine the overall schedule. The Consultant will also be required to provide cost estimates for any further studies, due diligence, design, and construction.

More details on the scope and services requested through this RFP can be found in Section 6.

2. INSTRUCTIONS TO PROPONENTS

2.1 Submission

Proponents must submit their proposals by electronic submission (PDF format), through MERX **before 3:00 PM EST local Iqaluit time on July 21, 2022**. MERX can be accessed via the following website link – https://www.merx.com/. Proponents must address proposals to:

City of Iqaluit
Sumon Ghosh
Director, Engineering and Capital Projects
901 Nunavut Drive, P.O. Box 460
Iqaluit, Nunavut, X0A 0H0

Proponents will be required to submit a Technical and Financial Submission as part of their offer, in separate files. Files should be labeled as follows:

Technical Submission: *"TECHNICAL PROPOSAL – Long-Term Cemetery Strategy – Proponent Name"*

Financial Submission: "*FINANCIAL PROPOSAL – Long-Term Cemetery Strategy – Proponent Name"*

It is the Proponent's responsibility to confirm successful submission of the proposal to MERX prior to the deadline.

The final decision on whether to accept late Proposals is at the City's discretion.

2.2 Inquiries

All inquiries concerning this RFP are to be directed by email only to:

Jared Wright
jared.wright@colliersprojectleaders.com

To ensure consistency and fairness to all Proponents, all firms who have received the RFP will receive information with respect to significant inquiries in the form of written addenda or clarifications. Verbal explanations or instructions will not be binding.

The deadline for submitting inquiries will be on **Thursday July 14 at 3:00 PM EST local Iqaluit time**.

2.3 Addenda

If it is determined that an amendment is required to this RFP, a written addendum will be posted via Merx and the City's website. It is the Proponents responsibility to check Merx and the City's website to confirm whether an addendum has been posted. The only way this RFP may be added to or amended in any way is by a formal written addendum. No other communication whether written or oral from any person will affect or modify the terms of this RFP or may be relied upon by any Proponent.

The City may amend, supplement or otherwise modify this RFP at any time and from time to time prior to the Proposal submission date, only by written addenda.

2.4 Proponent Requirements

The successful Proponent must have a valid City of Iqaluit Business License prior to commencement of the Project. The Preferred Proponent shall apply for a license immediately upon notification of award, should they not hold a valid license.

2.5 Opening of the Proposals

There will be no public opening of the Proposals.

2.7 Validity of Offer

The proposals shall remain open for acceptance for a period of not less than sixty (60) calendar days from the closing date of this Request for Proposal.

2.8 Intended RFP Process Schedule

The City estimates the schedule for the Request for Proposal process milestones will be as follows:

***Table 1** – RFP Process Schedule*

Milestone	Date
Issue RFP	July 7, 2022
Last Day for Proponent Questions	July 14, 2022, at 3 PM
Last Date for Issue of Addendum	July 18, 2022
RFP Closes – Submission Deadline	July 21, 2022
Evaluation/Determination of Preferred Consultant	July 28, 2022
Approvals	August 11, 2022
Contract Award	August 18, 2022
Project Kick-Off Meeting	August 25, 2022

3. PROPOSAL REQUIREMENTS

Proponent submissions should be prepared in sections, with the content of each section as specified below. Concise submissions which address the section requirements are encouraged. Where a maximum number of pages are specified, each page is based on a single side of an 8 ½ x 11 sheet, with text no smaller than size 11 Arial font. The technical submission will be limited to twenty (20) pages single-sided with three (3) additional 11” x 17” pages for schedule and level of effort table. There are no page limits or restrictions to the financial submission.

The technical submission must not have any financial details included. If aspects of the financial offer are included in the technical submission, the City may choose to disqualify the Proponent.

3.1 Technical Submission Requirements

3.1.1 Section A – Understanding of the Project (10 points)

Provide a written statement demonstrating the Proponent's understanding of the overall Project, the goals and objectives of this assignment, and its relevance to the overall delivery of the Project. Identify any risks and challenges, based on the Proponents understanding of the Project, based on the information presented in this RFP, and provide mitigation measures which will ensure successful project delivery.

Provide a description of the Proponent's vision for the assignment by comparison and contrast to reference projects which are similar examples of the Proponent's work. The details of each project should be included at Section B. The Evaluation Committee is interested in understanding how these reference projects responded to the project requirements and how these relate to the Proponent's understanding of the requirements for this assignment.

3.1.2 Section B – Reference Projects (15 points – 5 points per project)

Provide information for Projects completed in the last 10 years that are relevant to this project. Provide three (3) reference projects. The projects listed should illustrate experience in the following areas:

.1 Acting as the primary design/engineering consultant for civil, environmental, or earthworks projects for the City of Iqaluit or in other arctic regions with similar climate, topography, and geography

.2 Acting as the primary design/engineering consultant for planning and preliminary design studies for cemeteries for the City of Iqaluit or in other arctic regions with similar climate, topography, and geography

.3 Acting as the primary design/engineering consultant for design and construction projects for cemeteries for the City of Iqaluit or in other arctic regions with similar climate, topography, and geography

The Proponent should describe their roles and responsibilities on each of the projects, whether the projects were joint ventures along with the names of the other parties of the joint venture, and a brief description of the project/ assignment. For each project, identify a Client contact and provide contact information (email and phone number). The Evaluation Committee may consult with the persons indicated as references by the Proponents in order to obtain feedback on the Proponent's performance on previous Projects and to understand the relationship between the Client and the Proponent. The technical ratings may be adjusted, based on the interviews and feedback from reference consultations. Proponents must ensure that phone numbers and e-mail addresses of references are accurate and still valid.

When identifying a reference project, the Proponent should consider how their project relates to the assignment described in this RFP, along with the goals and objectives of the overall Project. Photographs representing each reference project are encouraged.

3.1.3 Section C – Work Plan (25 points)

Provide a work plan detailing the methodology and approach to be taken to deliver the assignment, reflecting the schedule outlined in this Request for Proposal. Identify the proposed schedule along with key milestones for meetings with the City group. Include in this section a schedule for the provision of services, identifying the time required for the Proponent's work and a breakdown of the time (number of hours) allocated for each task and Consultant (if applicable) during the work identified in the Request for Proposal. Include a description of major tasks, sub-tasks, methods/ systems and personnel that the firm proposes to use for all services that are necessary to execute the work per the requirements of Section 6.

The Proponent shall describe what Inuit, local and Nunavut content, if any, shall be utilized.

3.1.4 Section D – Corporate Qualifications and Experience (5 points)

Provide a statement of qualifications for the Proponent and other major consultant firms included in the Design Team (civil, structural, mechanical, electrical, and process control engineers) including:

.1 Year founded as current corporate entity;

.2 Permanent office address; and

.3 List a maximum of 5 reference Projects (do not provide Project details as these should be listed in Section B.

3.1.5 Section E – Qualifications and Experience (15 points)

Provide an organizational chart describing the Proponent's Project Team for the assignment, which includes lead positions such as the Project Manager, Project Sponsor/Principle, engineers, designer, environmental and geotechnical specialists, communications specialists, and any other roles that are required to execute the work per the requirements of Section 6. Proponent to include key Sub-Consultant's (if applicable) along with their position within the Project Team. Provide a summary of key Project Team personnel, and include the information below:

.1 Name;

.2 Corporate affiliation;

.3 Role and title on the Project, including the period for which the individual is to be associated with the Project, and the extent of the individual's time that will be devoted to the Project during that period; and

.4 List any reference Projects provided in Section B (do not provide Project details) and describe the individual's role on each of the Projects.

Include the individual's resume immediately after the individual's summary. It is the City's understanding that the Project Team proposed by the Proponent in this section

will be committed to the full delivery of the assignment. Changes to the Proponent's Project Team must be approved by the City.

3.1.6 Section F – List of Sub-consultants

Provide a list of all consultants the Consultant will be looking to engage as "Sub-Consultants" for the execution of the Project.

3.1.7 Section G – Mandatory Submission Requirements (pass/fail)

Provide all mandatory requirements, as identified in Section 4.3. Proponents who fail to submit mandatory items will not proceed to the next phase of evaluation.

3.2 Financial Submission Requirements

3.2.1 Consultant's Professional Fees (30 points)

Submit a completed and unqualified Cost Submission Form, included in Appendix A, along with a Consultant's corresponding level of effort fee table, complete with positions, hours, rates, and fee breakdown, based on the work being requested under this RFP for a fixed fee contract. The level of effort table must be broken up based on major project tasks/ phases (i.e. detailed design phase, tender support, contract administrator/ site inspection, etc.).

The fee table must also include a breakdown on expenses/ disbursements, based on the requirements described in the Terms of Reference. The Proponent must use per diem rates established by the National Joint Council for the Territory of Nunavut. Accommodations will be provided by the City of Iqaluit at a City owned residence. The Proponent will be responsible for transportation requirements and must include this in their fee proposal for expenses/ disbursements. All expenses/ disbursements will be invoices at cost with no mark-up.

The completed Cost Submission Form and level of effort fee table shall form part of the contract document to be used between the City and the Preferred Proponent. The rates included in the fee table will be used in the event the scope of work is changed and provisions of the contract value to be changed during the project period.

The Financial Submission will not be opened until after the evaluation of the technical submission has been completed and satisfied per the required criteria.

4. EVALUATION

4.1 Evaluation Committee

The evaluation of Proposals will be undertaken by an Evaluation Committee appointed by the City. The Evaluation Committee may consult with technical, financial and other advisors, as the Evaluation Committee, in its sole discretion, may decide. The

Evaluation Committee will reach a consensus through discussions internal to the Committee.

4.2 Evaluation Stages

Proposals will be evaluated in four stages:

4.2.1 Evaluation of Mandatory Criteria

Proposals that do not meet the mandatory criteria will be rejected (Refer to Section 4.3 below).

4.2.2 Technical Evaluation – Total Value 70 Points

Subject to the Evaluation Committee's right to reject an unacceptable Proposal under Section 4.4, the Evaluation Committee will evaluate and score the Proposal information provided using Table 2 in Section 4.5 as a guide to assign scores. For each criterion, each Proposal will be assessed, and points will be awarded on the basis of the extent to which the requirements of the Request for Proposal documents are satisfied, and the comparative merit of the individual Proposal as compared to other Proposals.

Proposals will be ranked from highest to lowest in terms of meeting the City's requirements and containing technical merit. Proponents are required to achieve a minimum score of 70% (49/70 points) on the Technical Evaluation, in order to qualify for review of the Financial Submission.

4.2.3 Financial Evaluation – Total Value 30 Points

Financial evaluation of cost criteria will be conducted after evaluation of the technical criteria and reference checks.

A total of 30 points will be awarded on the basis of the fixed fee Proposal, and the distribution of fees to each phase of the Project.

The points for price will be awarded as follows:

The score for the Financial Submission will be in accordance with the following formula:

$$\textit{Proponent Score} = \frac{\textit{Lowest Financial Offer}}{\textit{Proponent Financial Offer}} \times 30 \textit{ points}$$

4.2.4 Selection

The Evaluation Committee will rank the Proponents, using the combined Technical and Financial score, from which it will select the Preferred Proponent. The Preferred Proponent's Proposal will be recommended to the City for the award of a contract for Consultant services based on the Proponents standing in the evaluation review process.

4.3 Mandatory Requirements

As indicated in Section 1 of this Request for Proposal, Proponents may be individual firms, or consortia of firms. In order for Proponent's Proposals to be considered for further evaluation they must demonstrate in their Proposals that the following mandatory requirements can be met.

Proponents must:

.1 Provide evidence satisfactory to City from the Proponent's insurer that the Proponent is able to obtain the insurance coverage as specified in APPENDIX E City's Standard Service Agreement;

.2 Include the submission of the Proponent's latest valid WSCC/ WSIB Certificate of Clearance;

.3 Include a completed sign-off of Proposal submission, as per the requirements in APPENDIX F; and

4.4 Rejection of Unacceptable Proposals

The Evaluation Committee may at any time reject a Proposal without completing a full evaluation (including a Proposal from a Proponent that complies with the Mandatory Requirements), if in the judgment of the Evaluation Committee further consideration of the Proposal would not be acceptable as the basis for a contract considering the evaluation criteria indicated in Section 4.5 below.

The City reserves the right without liability, cost or penalty, in its sole discretion to disqualify any Proposal before its full evaluation if the Proposal reveals a conflict of interest, incorrect information, or misrepresentation by the Proponent of any information provided in its Proposal. The City further reserves the right without liability, cost or penalty, in its sole discretion to disqualify any Proposal where there is evidence that the Proponent, its employees, agents or representatives colluded with one or more other Proponents or any of their respective employees, agents or representatives in the preparation of the Proposal.

4.5 Evaluation Criteria

The Evaluation Committee will evaluate eligible Proposals to determine the Proposal which best meets the needs of the City, using the weighting criteria indicated in Table 1 below as a guideline.

***Table 2** – RFP Evaluation Criteria*

EVALUATION CRITERIA	WEIGHTING
Technical Submission	
Section A – Understanding of the Project	10 points

Section B – Reference Projects	15 points
Section C – Work Plan	25 points
Section D – Corporate Qualifications and Experience	5 points
Section E – Qualifications and Experience	15 points
Technical Score Sub-Total:	**70 points**
Financial Submission	
Consultant Fees – Cost Submission Form	30 points
Financial Score Sub-Total:	**30 points**
Total RFP Evaluation Score:	**100 points**

5. TERMS AND GENERAL CONDITIONS

5.1 Terms and Conditions

5.1.1 Submission of a Proposal constitutes acknowledgement that the Proponent has read and agrees to be bound by all the terms and conditions of this Request for Proposal.

5.1.2 The City will not make any payments for the preparation of a response to this Request for Proposal. All costs incurred by a Proponent will be borne by the Proponent.

5.1.3 This is not an offer. The City does not, by virtue of this Proposal call, commit to an award of this Proposal, nor does it limit itself to accepting the lowest price or any Proposal submitted, but reserves the right to award this Proposal in any manner deemed to be in the City's best interest.

5.1.4 Proponents may not amend their proposal after the closing date and time but may withdraw their proposal at any time prior to acceptance by the City and issuing a Letter of Intent.

5.1.5 The City has the right to cancel this Request for Proposal at any time and to reissue it for any reason whatsoever, without incurring any liability and no Proponent will have any claim against the City as a result of the cancellation or reissuing of the Request for Proposal.

5.1.6 The City will not be responsible for any Proposal that does not indicate the Request for Proposal reference, and the Proponent's name.

5.1.7 The City will not be responsible for any Proposal that is delivered to any address or in any manner other than that provided in Section 2.1 of this Request for Proposal.

5.1.8 If a contract is to be awarded as a result of this Request for Proposal, it will be awarded to the Proponent whose Proposal for each service, in the City's opinion,

provides the best potential value to the City and is capable in all respects to perform fully the contract requirements and has the integrity and reliability to assure performance of the contract obligations.

5.1.9 If the City decides to award a contract based on a submission received in response to this Request for Proposal, the Successful Proponent will be notified of the intent to award in writing, and the subsequent execution of a written agreement shall constitute the making of a Contract. Proponents will not acquire any legal or equitable rights or privileges whatsoever until a Contract is signed by both parties. In the event of any inconsistency between this Request for Proposal, and any ensuing contract, the contract shall govern.

5.1.10 The contract will be in the form of the City's standard "City of Iqaluit Services Agreement" and it will contain the relevant provisions of this Request for Proposal, the accepted Proposal as well as such other terms as may be mutually agreed upon, whether arising from the accepted Proposal or as a result of any negotiations prior or subsequent thereto. The City reserves the right to negotiate modifications with any Proponent who has submitted a Proposal.

5.1.11 A copy of the Services Agreement is included as APPENDIX E.

5.1.12 Any amendment made by the City to the Request for Proposal will be issued in writing and sent to all who have received the documents.

5.1.13 An Evaluation Committee will review each Proposal. The City reserves the exclusive right to determine the qualitative aspects of all Proposals relative to the evaluation criteria.

5.1.14 Proposals will be evaluated as soon as practicable after the closing time. No detail of any Proposal will be made public except the names of all parties submitting Proposals.

5.1.15 The proposal and accompanying documentation submitted by the proponents are the property of the City and will not be returned.

5.1.16 Proponents must acknowledge receipt of any addenda issued by the City in their Proposal.

5.1.17 Proponents shall disclose in its Proposal any actual or potential conflicts of interest and existing business relationships it may have with the City, its elected or appointed officials or employees. The City may rely on such disclosure.

5.1.18 Proponents and their agents will not contact any member of the City Council, City Staff or City Consultants with respect to this Request for Proposal, other than the City Representative named in section 2.6, at any time prior to the award of a contract or the cancellation of this Request for Proposal.

5.2 No Collusion

By submitting a Proposal, the Proponent, and each firm, corporation or individual member associated with the Proponent's Proposal submission, represents and confirms to the City, with the knowledge and intention that the City may rely on such representation and confirmation, that its Proposal has been prepared without collision or fraud, and in fair competition with Proposals from other Proponents. Include confirmation of this under Item 3.1.8 of the Proposal submission.

5.3 Conflict of Interest

Proponents shall disclose any potential conflicts of interest and existing business relationships they may have with Colliers Project Leaders, the City, its elected officials or employees, or any known participants in the Project. The City may rely on such disclosure.

Under Item 3.1.8 of the Proposal submission, include confirmation of the Proponent's agreement to conform to the conflict of interest requirements and disclosures as indicated in Supplementary Conditions SC2 – CONFLICT OF INTEREST.

5.4 Accuracy of Information

While the City has used considerable efforts to ensure an accurate representation of information in the Request for Proposal, the information contained in this Request for Proposal is supplied solely as a guideline for Proponents. The City gives no representation whatsoever as to the accuracy or completeness of any of the information set out in this Request for Proposal, or any other background or reference information or documents prepared by third parties and made available to Proponents. Proponents will make an independent assessment of the accuracy and completeness of such information and will have no claim whatsoever against the City or its representatives, agents, consultants and advisors, with respect to such information.

5.5 Confidentiality

Proponents shall treat all information received through this Request for Proposal process and subsequent contract award as confidential and will not disclose such information to any person except with the prior written consent of the City.

Under Item 3.1.8 of the Proposal submission, include confirmation of the Proponent's agreement to conform to the confidentiality requirements as indicated in Supplementary Conditions SC1 – CONFIDENTIALITY. The Consultant shall ensure that all drawings, specifications and other documentation prepared for the Project and designated as confidential by the Owner, are prominently stamped on each page or sheet of each document with the word "CONFIDENTIAL" prior to release for construction bidding purposes or during the course of the Work.

5.6 Working Language

All Proposals must be written in English.

5.7 Terms of Payment

The Proponent shall be reimbursed monthly for works completed for each service provided. Invoices are to be submitted on a monthly basis, and shall include:

.1 the project title.

.2 the service contract number.

.3 a description of the work completed.

.4 billing summary, which includes the tasks as set forth in the costing submission, the proposed costs, cost to date, percentage invoiced to date, and the percentage of work completed to date for each task.

.5 backup for all disbursements (time sheets may be requested).

The monthly invoice should be reviewed as a draft by the Consultant and the Project Manager in order to validate the fee and services being claimed. The Proponent is to update the invoice (as required), as per comments/ feedback received from the Project Manager. The Project Manager and Proponent are to determine at the Project Kick-Off meeting the date which draft monthly invoices are to be reviewed.

The final invoice is to be submitted to the Project Manager for processing with the City. Invoices that are issued directly to the City's Accounts Payable Department will not be processed. Invoices must be submitted for payment by the 15th of every month, for previous months work (e.g. invoice must be submitted by February 15th for work completed up to January 31st).

No payment will be made for the cost of work incurred to remedy errors or omissions for which the contractor is responsible. No additional invoicing will be accepted above and beyond what the City has agreed to as per the contract. At no time shall the contract upset limit be exceeded without prior written authorization from the City.

5.8 Cash Flow Expenditure Forecast

The Proponent is to submit a cash flow expenditure forecast identifying how the Proponent anticipates invoicing the City on a monthly process, based on the established schedule. An update cash flow expenditure forecast is to be submitted with every monthly invoice.

5.9 WSIB/ WSCC Certificate

Under Item 3.1.8 of the Proposal submission, include submission of the Proponent's latest WSIB or WSCC Certificate of Clearance (failure to submit a certificate or letter of exemption from coverage with the Proposal may result in disqualification of the Proposal). Proponents with no WSCC coverage must apply to the Government of Nunavut with 10 working days of starting operations.

5.10 Health and Safety

The successful Proponent shall provide the City a copy of its Health and Safety plan within 5 calendar days of execution of the contract. The successful Proponent shall comply at all times with the City's health and safety requirements while working in Iqaluit.

5.11 Project Reporting

The Consultant will be required to provide monthly status reports, which must communicate the following: assignment status, work completed to date, work remaining, schedule progress (baseline and approved changes), and financial status (original contract value, current contract value, % complete vs. % spent). The report is to be submitted to the City's Project Manager.

6. CONSULTANT SCOPE OF WORK

The following sections describe the services to be provided by the Consultant.

6.1 Assessment/Investigation

Purpose: To study existing cemetery conditions, potential future sites, and confirm City's needs and requirements to inform the subsequent phases of the assignment.

The Consultant shall:

.1 Consult with the City to determine the exact locations for the 2 potential sites and to determine an exhaustive list of factors that will need to be evaluated to determine requirements, relative importance, and evaluation criteria for determining next cemetery location based on the two sites currently identified as potential locations for future use. The purpose of this task is to establish a template for the subsequent Options Analysis phase that will help identify site visit requirements and subsequent study tasks. Some factors to be considered are listed below, but the consultant will need to engage the City to confirm and finalize the factors to be considered under this study.

.a Space available, capacity, location, and aesthetic considerations

.b Topography

.c Geotechnical and environmental considerations

.e Drainage considerations

.f Constructability and operability

.g Regulatory and permitting considerations

.h Up to 3 other criteria as identified by the consultant and approved by the City

.2 Review City's records and data to determine factors, such as population projections, burial data, and GIS information, that will affect phasing and overall timeline for the lifetime of the new cemetery location and/or area, from the initiation of detailed design through to closing the cemetery as it reaches its capacity. The City will provide the successful Proponent with temporary access to the City's GIS system.

.3 Visit the City's current Cemetery to study footprint, space available, burial methods, operational methods and space requirements, and other factors that may need to consider when determining the overall phasing and spacing for introducing and using a new site.

.4 Visit both potential future sites to perform the following due diligence studies.

- Site Survey
- Geotechnical Investigation
- Phase I ESA

Refer to Appendix G for details of the required due diligence studies, which are applicable to both sites.

.5 Lead all meetings, including providing agendas and minutes, to successfully execute the scope specified under 6.1. Assume 3 formal meetings will be held, with the possibility of additional informal calls.

A non-exhaustive list of required deliverables for this phase is provided below:

.1 Agendas and minutes for all meetings, including a project needs and requirements scoping clarification meeting, an Evaluation Criteria review meeting, and an Assessment and Investigation Report review meeting.

.2 Evaluation Criteria and weighting, both draft and final with incorporation of City feedback.

.3 Site Visit Plan memo, detailing the plan, schedule, goals, and desired outcomes of the single trip to Iqaluit to perform the specified site visits.

.4 Assessment and Investigation Report, both draft and final with incorporation of City feedback. The report must discuss in a clear and organized fashion the following items at a minimum:

.a City records and data consideration as found to be relevant to carry out the study successfully.

.b Final Evaluation Criteria.

.c Due diligence findings for both sites.

.d Any other factors deemed relevant as part of this phase of the assignment.

6.2 Options Analysis Study

Purpose: Evaluate the 2 potential sites identified by the City, as well as any other site(s) recommended by the Consultant, based on the evaluation criteria, and relative importance, and provide a recommendation on the preferred site.

The Consultant shall:

.1 Complete the Options Analysis evaluation for all site considered under the study, with qualitative descriptions and justifications for all findings, ratings, and recommendations using the established criteria and weightings.

.2 Prepare technical documentation and input for public engagement, including a 1-page informational document with pros and cons for each site studies including drawings, sketches, and maps.

.3 Provide a final recommendation of the preferred site for the City's confirmation and acceptance, incorporating any public feedback as applicable.

.4 Lead all meetings, including providing agendas and minutes, to successfully execute the scope specified under 6.2. Assume 1 formal meeting will be held, with the possibility of additional informal calls.

A non-exhaustive list of required deliverables for this phase is provided below:

.1 Agendas and minutes for all meetings, including a Completed Options Analysis review meeting.

.2 1-page public consultation poster, both draft and final incorporating City feedback.

.3 Responses to technical inquiries from the public as needed. Inquiries may come from a public inquiry period or from the Cemetery Advisory Committee.

.4 Completed Options Analysis and qualitative analysis.

.5 Final Options Analysis Report and recommendation, incorporating City feedback following the submission of the completed Matrix.

6.3 Preliminary Engineering Design Study

Purpose: Complete the preliminary design study for the preferred option.

The Consultant shall:

.1 Establish the design criteria, for which the infrastructure will be designed to for detailed design (future, by others).

.2 Complete preliminary design, preliminary design drawings, and preliminary functional specification, and combine all into a final Preliminary Design Report which considers technical requirements/ assessments for:

.a Routing of drainage corridors and drainage infrastructure

.b Proposed locations of civil, environmental, and mechanical infrastructure

.c Grading and drainage improvements

.d Architectural, landscaping, and aesthetic features such as Burial layouts and spacings, parking locations, and miscellaneous as-needed aesthetic features

.e Site development strategy and phasing implementation processes

.f Projected lifespan of the site

.g Proposed project implementation schedule, including subsequent design and construction phases and site opening through to site closure

.h Class C Cost Estimate for detailed design and construction services

.i Proposed annual operations activities

.3 Lead all meetings, including providing agendas and minutes, to successfully execute the scope specified under 6.3. Assume 1 formal meeting will be held, with the possibility of additional informal calls.

A non-exhaustive list of required deliverables for this phase is provided below:

.1 Preliminary Design Report, draft and final incorporating City feedback.

.2 Agendas and minutes for all meetings, including a draft Preliminary Design Report review meeting.

7. SCHEDULE

7.1 Timelines

The Proponent must satisfy the general timelines identified below for the work.

Table 3 – *Project Schedule*

Milestone	Date
Project Kick-Off Meeting	August 25, 2022
Needs, scoping, and clarification meeting	September 2, 2022
Submission of Site Visit Plan memo	September 9, 2022
Completion of all-inclusive site visit	September 30, 2022
Submission of draft Options Analysis Matrix	October 14, 2022
Submission of final Options Analysis Matrix, incorporating feedback	October 28, 2022
Submission of draft Assessment and Investigation Report	November 18, 2022
Submission of final Assessment and Investigation Report, incorporating feedback	December 2, 2022
Submission of draft public consultation informational poster	December 16, 2022
Submission of final public consultation informational poster, incorporating feedback	January 13, 2023
Feedback during public consultation processes	January 13, 2023 – onwards
Submission of Completed Options Analysis Matrix	February 10, 2023
Submission of final Options Analysis Report, incorporating feedback	February 24, 2023
Submission of draft Preliminary Design Report	April 14, 2023

Submission of final Preliminary Design Report, incorporating feedback	April 28, 2023
Project Completion/Closeout	May 19, 2023

7.2 Submission Requirements

Proponent to prepare project schedule in the form of a Gantt chart. The schedule is to include dates for the commencement and completion of each major element of the work, as per the requirements of Table 3. The key elements of the schedule will detail the various assignment milestones. The schedule will form the baseline for assignment.

The schedule will form part of the contract documents. Changes to the project schedule must be approved by the Project Manager by means of a change order. A revised schedule must be submitted describing the approved changes.

APPENDIX A – COST SUBMISSION FORM

Proponent's Name: _____

Proponent's Address: _____

Proponent Email/ Telephone: _____

Provide the following cost breakdown for the services detailed herein that the Proponent is proposing to offer the City of Iqaluit.

Table A1 Fee Table

TASK	FEE
6.0 General – Fixed Fee	
1. General – Project Management, Meetings, Coordination, and Administration	$
6.0 Subtotal:	$
6.1 Assessment/Investigation – Fixed Fee	
2. Stakeholder Engagement, Consultations, Background Review, and Information Review	$
3. Evaluation Criteria Development and Finalization	$
4. Site Visit Plan Development and Finalization	$
5. Site Assessment and Investigations Report Development and Finalization	$
5. Site Activities – Current Site	$
6. Site Activities – Potential New Sites – Due Diligence Study 1 (basis of 2 sites)	$
7. Site Activities – Potential New Sites – Due Diligence Study 2 (basis of 2 sites)	$
8. Site Activities – Potential New Sites – Due Diligence Study 3 (basis of 2 sites)	$
9. Site Activities – Flights	$
10. Site Activities – Accommodations	$
11. Site Activities – Per Diem Meal Allowance, Vehicle Rental, and Gas	$
6.1 Subtotal:	$
6.2 Options Analysis – Fixed Fee	
12. Public Consultation Informational Distribution and As-Needed Technical Input	$

13. Options Analysis Matrix Filling and Completion	$
14. Options Analysis Report Development and Finalization	$
6.2 Subtotal:	$
6.3 Preliminary Design Study – Fixed Fee	
15. Preliminary Design Report	$
6.3 Subtotal:	$
SUMMARY	
6.0 subtotal	**$**
6.1 subtotal	**$**
6.2 subtotal	**$**
6.3 subtotal	**$**
OVERALL SUBTOTAL:	**$**
Applicable Taxes (GST):	**$**
TOTAL (INCLUDING GST):	**$**

Sub-Total: **$** _____

GST: **$** _____

TOTAL: **$** _____

Fees for changes to the work shall be as agreed upon prior to the commencement of services for the change as set out under the contract. For additional work, the proponent shall use the rates detailed below.

POSITION	TEAM MEMBER	Hourly Rates ($/hr.)
Principle/ Project Sponsor		
Project Manager		
Project Engineer		
Insert Position (s)		

Consultant to add positions as necessary. Each discipline shall provide names for each position as necessary.

END OF APPENDIX A

APPENDIX B – SUPPLEMENTARY CONDITIONS

Amend the General Conditions as follows:

Add SC1 Confidentiality

SC 1 Confidentiality

.1 The Consultant and the Consultant's employees and sub-Consultants shall not use, copy, disclose or otherwise communicate and information not available to the general public that was gained by them in the course of their duties related to this Contract, except as is necessary in the proper discharge of those duties. This obligation survives the Contract.

.2 All information provided by the Consultant is subject to the disclosure and protection provisions of applicable freedom of information and privacy legislation. Such Act allows any person a right of access to records in the Client's custody or control, subject to limited and specific exceptions.

Add SC2 Conflicts of Interest

SC 2 Conflicts of Interest

The Consultant and the Consultant's employees:

.1 shall conduct their duties related to this Contract with impartiality and shall, if they exercise inspection or other discretionary authority over others in the course of those duties, disqualify themselves from dealing with anyone with whom a relationship between them could bring their impartiality into question;

.2 shall not influence, seek to influence, or otherwise take part in a decision of the Client, knowing that the decision might further their private interests. Any communication with the City's elected officials before contract award shall result in disqualification of the Proponent.

.3 shall not accept any commission, discount, allowance, payment, gift, or other benefit that is connected, directly, or indirectly with the performance of their duties relating to this Contract, that causes, or would appear to cause, a conflict of interest, and

.4 shall have no financial interest in the business of a third party that causes, or would appear to cause, a conflict of interest in connection with the performance of their duties related to this Contract, and if such financial interest is acquired during the term of this Contract, the Consultant shall promptly declare it to the Client.

Add SC3 Project History File

SC 3 Project History File

.1 All project documentation shall be considered deliverables and shall form the core of the Project History File. A project history file is to be submitted to the Client prior to project closeout. It is the Consultants responsibility to ensure that the requirements for all deliverables be applied to all sub-consultants and vendors.

.2 All supporting and originating data (calculations, graphs, data, pictures, drawings checks, tables, etc.) that are developed and incorporated into the deliverable documentation shall be included in Project history file.

.3 All data collected as part of the Project and relating to the deliverables that have been organized into database tables and spreadsheets shall be included electronically as supporting data for the deliverable. This information will be incorporated into the project history file

.4 The project history file will be submitted electronically in a logical file folder structure.

END OF APPENDIX B

APPENDIX C – SUB-CONSULTANT LIST

The Proponent will engage and fully coordinate the work of the following sub-consultants listed to deliver the work:

Table C1 List of subconsultants

Consultant Name	Project Office Address	Discipline

END OF APPENDIX C

APPENDIX D – INFORMATION PROVIDED BY THE CITY

This schedule forms part of the contract for consulting services for the Long-Term Cemetery Strategy assignment. The City will provide the following information to the Consultant:

.1 Municipal Design Guidelines, City of Iqaluit – 2015

.2 Good Building Practices Guideline, Government of Nunavut – 2020

.3 April 2021 Apex Cemetery Remediation Final Design Report

.4 General Plan and Zoning By-Law Background Report June 2022

END OF APPENDIX D

APPENDIX E – CITY OF IQALUIT SERVICES AGREEMENT

BETWEEN: THE MUNICIPAL CORPORATION OF THE CITY OF IQALUIT

(hereinafter referred to as the "CITY OF IQALUIT")

OF THE FIRST PART

AND: <INSERT CONSULANT NAME>

(hereinafter referred to as the "Consultant")

OF THE SECOND PART

WHEREAS the CITY OF IQALUIT has requested the Consultant to provide engineering services for the <insert project name/ contract title>;

AND WHEREAS the Consultant has agreed to provide such services to the CITY OF IQALUIT in its proposal dated **<insert proposal date>**;

AND WHEREAS the CITY OF IQALUIT and the Consultant wish to set out the terms and conditions relating to the provision of such services;

THEREFORE, the CITY OF IQALUIT and the Consultant agree as follows:

1. SERVICES AND PAYMENT

1.1 The Consultant agrees to provide to the CITY OF IQALUIT those services set out in the job description and scope of work provided on **<insert proposal date>**. A copy of the proposal is attached as Appendix "A".

1.2 The CITY OF IQALUIT agrees to pay for the services described above, a total amount not greater than **<insert proposal amount>**, for the provision of professional services based on the Proposal dated **<insert proposal date>.**

2. TERM

2.1. This Contract shall commence on the **<insert contract start date>** and terminates on the **<insert contract termination date>** unless otherwise terminated in accordance with the provisions of this Contract.

3. NOTICE AND ADDRESS

3.1 Any notice required to be given herein or any other communication required by this contract shall be in writing and shall be personally delivered, sent by facsimile, or posted by prepaid registered mail and shall be addressed as follows:

i) If, to the CITY OF IQALUIT:

Amy Elgersma
Chief Administrative Officer
City of Iqaluit
P.O. Box 460
Iqaluit, NU
X0A 0H0
Fax: 979-5653

Reference:

ii) If to the Consultant at:

<Insert Consultant Representative Name>
<Insert Consultant/ Company Name>
<Insert Address>

3.2 Every such notice and communication, if delivered by hand, shall be deemed to have been received on the date of delivery or if sent by prepaid registered mail shall be deemed to have been received on the seventh day after posting, or if by facsimile, 48 hours after the time of transmission, excluding from the calculation weekends and statutory holidays.

4. COMPLETE AGREEMENT

4.1 This Contract and its attachments constitute the complete Contract between the parties. Except as provided herein, it supersedes and shall take effect in substitution for all previous agreements. It is subject to change only by an instrument executed in writing by the City.

4.2 If this Contract arises from a request for proposals or tender call, the provisions of the request for proposals or tender call and the Consultant's bid or proposal submission are incorporated into this Contract and may be used to clarify, explain or supplement this Contract, but shall not be used to contradict any express terms of this Contract.

4.3 In the event of a conflict between this Contract, the Consultant's bid or proposal submission, and the City's original tender bid instructions or Request for Proposals, the more recently prepared document shall govern to the extent of such inconsistency.

5. GENERAL TERMS

5.1 Any information obtained from or concerning any department of the CITY OF IQALUIT or clients of any department of the CITY OF IQALUIT, by the contractor, its agents or employees in the performance of any contract shall be confidential. The Consultant shall take such steps as are necessary to ensure that any such information is not disclosed to any other person and shall maintain confidential and secure all material and information that is the property of the CITY OF IQALUIT and in the possession of or under the control of the Consultant. This clause survives the termination of this contract.

5.2 Time shall in every respect be of the essence. The Consultant shall deliver the services specified in the contract and according to the project schedule on costs. The CITY OF IQALUIT may grant reasonable extensions to the Consultant for delays, if the Consultant can show those delays were caused by circumstances beyond the control of the Consultant.

5.3 The Consultant is an independent Consultant with the CITY OF IQALUIT and nothing in this contract shall be construed or deemed to create the relationship of employee and employer or of principal and agent between the CITY OF IQALUIT and the Consultant. The Consultant is solely responsible for payments of all statutory deductions or contributions including but not limited to pension plans, unemployment insurance, income tax, workers' compensation and the Nunavut Payroll Tax.

5.4 This contract shall be interpreted and governed in accordance with the laws of Nunavut and the laws of Canada as they apply in Nunavut.

5.5 No waiver by either party of any breach of any term, condition or covenant of this contract shall be effective unless the waiver is in writing and signed by both parties. A waiver, with respect to a specific breach, shall not affect any rights of the parties relating to other or future breaches.

5.6 The failure of either party at any time to require the performance of any provision or requirement of this contract shall not affect the right of that party to require the subsequent performance of that provision or requirement.

5.7 Title to any report, drawing, photograph, plan, specification, model, prototype, pattern, sample, design, logo, technical information, invention, method or process and all other property, work or materials which are produced by the Consultant in performing the contract or conceived, developed or first actually reduced to practice in performing the contract (herein called "the Property") shall vest in the CITY OF IQALUIT and the Consultant hereby absolutely assigns to the CITY OF IQALUIT the copyright in the property for the whole of the term of the copyright. The Consultant shall not be responsible for any loss or damage suffered by the City of Iqaluit or any third parties resulting from any unauthorized use or modification of the property, errors in transmission of the property, changes to the Property by others, the consequences of design defects due to the design of others, or defects in contract documents prepared by others, and the City of Iqaluit agrees to defend, indemnify, and hold the Consultant harmless from and against all claims, demands, losses, damages, liability and costs associated therewith. Subject to the foregoing, the Property may be relied by the City of Iqaluit for design and construction work undertaken by other parties with respect to the Services provided that such parties verify the accuracy and completeness of the Property to their satisfaction.

5.8 It is intended that all provisions of this agreement shall be fully binding and effective between the parties, but in the event that any particular provision or provisions or a part of one is found to be void, voidable or unenforceable for any reason whatever, then the remainder of the agreement shall be interpreted as if such provision, provisions, or part thereof, had not been included.

5.9 This contract may be extended by the written consent of the parties.

5.10 The CITY OF IQALUIT may delegate any of its authority and undertaking pursuant to this contract to any employee or contractor the CITY OF IQALUIT by notice in writing to the Consultant.

5.11 This contract shall ensure to the benefit of and be binding on the respective administrators, successors and assignment of each of the parties hereto.

6. CONSULTANT RESPONSIBILITIES

6.1 The Consultant shall indemnify and hold harmless, the CITY OF IQALUIT, its officers, employees, servants and agents from and against all claims, actions, causes of action, demands, losses, costs, damages, expenses, suits or other proceedings by whomsoever made, brought or prosecuted in any manner based upon or related to the negligent acts, errors, or omissions of the Consultant under this contract.

6.2 The Consultant shall be liable to the CITY OF IQALUIT for any loss or damage to property or equipment that is supplied to or placed in the care, custody or control of the Consultant for use in connection with the contract if such loss or damage is attributable to the negligence or deliberate acts of the Consultant or its employees or agents.

6.3 If, in the opinion of the CITY OF IQALUIT acting reasonably, the Consultant is in default in respect of any obligation of the Consultant hereunder, the CITY OF IQALUIT may rectify such default and pursue a claim against the Consultant for any direct costs associated with any such remediation, including a reasonable allowance for the use of the CITY OF IQALUIT's own employees or equipment.

6.4 The Consultant may not assign or delegate work to be done under this contract, or any part thereof, to any other party without the written consent of the CITY OF IQALUIT. In the case of a proposed assignment of monies owing to the Contractor under this contract, the consent in writing of the CITY OF IQALUIT must be obtained.

6.5 The Consultant shall keep proper accounts and records of the services for a period of 3 years after the expiry or termination of this agreement. At any time during the term of this contract or during the three years following the completion or termination of this agreement, the Consultant shall produce copies of such accounts and records upon the written request of the CITY OF IQALUIT.

6.6 The Consultant shall notify the CITY OF IQALUIT immediately of any claim, action, or other proceeding made, brought, prosecuted or threatened in writing to be brought or prosecuted that is based upon, occasioned by or in any way attributable to the performance or non-performance of the services under this contract.

6.7 If at any time the Consultant considers their estimates indicate costs will exceed the project budget, they will immediately advise the City of Iqaluit. If in the opinion of the City of Iqaluit, acting reasonably, the excess is due to design, costs factors or matters under the control or reasonably foreseeable by the Consultant, the CITY OF IQALUIT may require the Consultant to do everything by way of revision of the design to bring the cost estimate within the project budget. Costs of completing such revisions shall be based upon a level of compensation reasonably appropriate to the circumstances, including the reason for the revisions.

6.8 Except as required in the performance of services set out in this agreement, the Consultant must maintain as confidential all data and information made available to the Consultant, the CITY OF IQALUIT, or any other parties which is generated by or results from the Consultant's performance of the Services described in this Contract. All such data and information are the property of the City of Iqaluit. This clause shall survive the termination of the Contract.

7. TERMINATION

7.1 The CITY OF IQALUIT may terminate this contract at any time upon giving written notice to this effect to the Consultant if, in the opinion of the CITY OF IQALUIT, the Consultant is unable to deliver the service as required, the Consultant's performance of work is persistently faulty, in the event that the Consultant becomes insolvent or commits an act of bankruptcy, in the event that any actual or potential labor dispute delays or threatens to delay timely performance of the contract or the (Consultant Contractor) defaults or fails to observe the terms and conditions of the contract in any material respect.

7.2 This contract shall terminate as of the day for termination set out in the written notice and the Consultant shall forthwith invoice the CITY OF IQALUIT for work performed to the date of termination.

7.3 Any invoice submitted by the Consultant pursuant to clause 7.2 shall be reviewed by the CITY OF IQALUIT to assess the amount which is properly due and owing for work done by the Contractor prior to termination.

8. FINANCIAL

8.1 The CITY OF IQALUIT, having given written notice of a breach, may withhold or hold back in whole or in part any payment due the Consultant without penalty, expense or liability, if in the opinion of the Contracting Authority, the Consultant has failed to comply with or has in any way breached an obligation of the consultant. Any such hold back shall continue until the breach has been rectified to the satisfaction of the CITY OF IQALUIT.

8.2 The CITY OF IQALUIT may set off any payment due the Consultant against any monies owed by the Consultant to the CITY OF IQALUIT.

8.3 The City of Iqaluit will pay the Goods and Services Tax (GST).

8.4 Provided all terms and conditions on the part of the Consultant have been complied with, each invoice will be paid thirty (30) calendar days after receipt of the invoice, or thirty (30) calendar days after delivery of the services, whichever is later. Invoices from Nunavut Consultants (as defined by the CITY OF IQALUIT NNI Policy) will be paid twenty (20) calendar days after receipt of the invoice, or twenty (20) calendar days after receipt of the services, whichever is later.

8.5 The CITY OF IQALUIT may, in order to discharge lawful obligations or to satisfy lawful claims against the Consultant or a Subconsultant arising out of the execution of work, pay any amount, which is due and payable to the Consultant under the contract, if any, directly to the obligee of and the claimants against the Consultant or Subconsultant.

9. INSURANCE AND LIABILITY

9.1 The Consultant's liability to the City of Iqaluit for claims arising out of this Agreement, or in any way relating to the Services, will be limited to direct damages and to the re-performance, without additional compensation, of any Services not meeting a normal professional standard of care and such liability will, in the aggregate, not exceed the amount of $1,000,000.00. The limitations of liability will apply, to the extent permitted by law, whether Consultant's liability arises under breach of contract or warranty; tort, including negligence; strict liability; statutory liability; or any other

cause of action, and will extend to and include Consultant's directors, officers, employees, insurers, agents and sub-consultants.

9.2 In no event will either party be liable to the other party for indirect or consequential damages including without limitation loss of use or production, loss of profits or business interruption.

9.3 The Consultant shall, without limiting his obligations or liabilities hereto, obtain, maintain and pay for during the period of this agreement, the following insurance with limits not less than those shown:

a) Workers' Compensation insurance covering all employees engaged in the work in accordance with the statutory requirements of the Territory or Province having jurisdiction over such employees. If the Consultant is assessed any additional levy, extra assessment or super-assessment by a Workers' Compensation Board as a result of an accident causing injury or death to an employee of the Consultant or any sub-consultant, or due to unsafe working conditions, then such levy or assessment shall be paid by the Consultant at its sole cost and is not reimbursed by the CITY OF IQALUIT.

b) Employer's liability insurance with limits not less than $500,000 for each accidental injury to or death of the Consultant's employees engaged in the work. If Workers' Compensation insurance exists, then in such event, the aforementioned Employer's Liability insurance shall not be required but the Comprehensive General Liability policy referred to in item (d) herein shall contain an endorsement providing for Contingent Employers' Liability insurance.

c) Motor Vehicle, water craft and snow craft standard liability insurance covering all vehicles and/or craft owned or non-owned, operated and/or licensed by the Consultant and used by the Consultant in the performance of this agreement in an amount not less than one million dollars ($1,000,000.00) per occurrence for bodily injury, death and damage to property; and with respect to busses limits of not less than one million dollars ($1,000,000.00) for vehicle hazards and not less than one million dollars ($1,000,000.00) for Bodily Injury to or death of one or more passengers and loss of or damage to the passengers property in one accident.)

d) Comprehensive General Liability Insurance with limits of not less than two million dollars ($2,000,000.00) (inclusive) per occurrence for bodily injury, death and damage to property including loss of use thereof. Such insurance shall include but not be limited to the following terms and conditions:

- Products & Completed Operations Liability *
- Consultant's Protective Liability
- Blanket Contractual Liability
- Broad Form Property Damage
- Personal Injury Liability
- Cross Liability
- Medical Payments
- Non-owned Automobile Liability *
- Contingent Employers Liability *
- Employees as Additional Insureds *

**WHERE APPLICABLE*

e) Professional Liability Insurance with limits of not less than two hundred fifty thousand dollars ($250,000.00) per claim and five hundred thousand dollars ($500,000.00) in the annual aggregate, to cover claims arising out of the rendering of or failure to render any professional service under this contract or agreement.

All policies shall provide that thirty days written notice be given to the CITY OF IQALUIT prior to any cancellations of any such policies.

The Comprehensive General Liability Insurance policies shall name the CITY OF IQALUIT and any permitted sub-consultants as additional insureds only with respect to the terms of this contract and shall extend to cover the employees of the insureds hereunder.

The Consultant shall be responsible for any deductibles, exclusions and/or insufficiency of coverage relating to such policies.

The Consultant shall deposit with the CITY OF IQALUIT prior to commencing with the work a certificate of insurance evidencing the insurance(s) required by this clause in a form satisfactory to the CITY OF IQALUIT and with insurance companies satisfactory to the CITY OF IQALUIT.

IN WITNESS WHEREOF the parties hereto have set their hand and seals as of the date and year entered below.

FOR THE CITY OF IQALUIT:	FOR THE CONSULTANT:
_____	_____
Name/Title	Name/Title
_____	_____
Signature	Signature
_____	_____
Date	Date
_____	_____
Witness	Witness

END OF APPENDIX E

APPENDIX F – SIGNING SHEET

I/We, agree that we have received addenda ____ to ____ inclusive, and the Proposal Pricing includes provisions set out in such addenda.

I/We confirm agreement to conform to the confidentiality requirements as indicated in Supplementary Conditions SC1 – Confidentiality.

I/We confirm agreement to conform to the conflict of interest requirements and disclosures as indicated in Supplementary Conditions SC2 – Conflict of Interest.

Signer must have authority to bind the company.

Signed, and delivered at this _____ day of _____ 2022.

Signature of Name (Authorized official or principal who has authority to bind the company)

Legal Company Name

Address: # Street, Municipality, Province/ Territory, Postal Code

Name: Print or Type

Title

Email

Telephone #

END OF APPENDIX F

APPENDIX G – DUE DILIGENCE STUDIES

Due Diligence Study 1: Phase I Environmental Site Assessment

The consultant shall complete a Phase I Environmental Site Assessment (ESA) in accordance with the Government of Nunavut Guideline for Contaminated Site Remediation (2009) and CSA Standard Z768-01 (R2016).

Due Diligence Study 2: Site Survey

The consultant shall complete and produce an engineering site survey and AutoCAD topographical plan that includes the following information:

- General site topography including landscaping, ground elevations, property boundary and drainage
- Survey data for every 10 meters in every direction within the limit of work and the identification of major site features
- Roads to access the site and the road passing along the northern edge of the site
- Road ditches and invert elevations
- Other site features such as paved areas, culverts, water main valves, hydrants, etc.

Due Diligence Study 3: Geotechnical Investigation

Consultants shall assume that reasonable access is available to the Site. The consultant will be required to coordinate with all utilities and the City to allow for execution of the work. The consultant shall provide the results of all investigations and coordinate its work with the City.

Field work:

- The suggested total number of boreholes required to complete the assessment is six (6) per site, twelve (12) in total (assume average refusal depth of 3m however boreholes may need to be drilled to bedrock). When refusal is encountered, bedrock must be proven, core for a minimum distance of 1.5m. Borehole locations are to be determined from a review of background information, a site visit and/or consultation with the Project Manager, to determine the probable location of the future building and areas of potential environmental concern. Relocate to avoid obstructions as necessary, recording actual location on plan.
- Ensure that all underground services are located before drilling and provide all required locates prior to drilling. Provide the City with a copy of locates performed.
- Record geodetic elevation of ground surface at borehole locations and relate to a known benchmark.
- If permafrost is present, record the ice content.

- If unfrozen soil is present, perform Shelby Tube tests, Atterberg limits, sieves and soil chemistry.
- Report before equipment is removed from the Site, the following:
    - Extremely poor or unexpected soil conditions are encountered, necessitating drilling to a greater depth to locate bearing stratum;
    - Variable conditions, potentially necessitating more boreholes or dynamic cone penetration tests;
    - Recommendation for additional piezometers to support reliable tests; and
    - Good and / or uniform soil conditions which could reduce the number of boreholes.
    - Need for any additional testing
- Obtain samples of each soil type encountered, the first sample being at a depth not greater that 750 mm and succeeding samples at not more than 1500 mm increments of depth. Record whether samples are dry, moist or wet.
- Record penetration values of Standard Penetration Test at the top of each soil stratum commencing at 750 mm depth and at increments not greater than 750 mm down to appropriate bearing stratum.
- Restore site to its original state upon completion of on-site work.
- Remove monitoring wells per provisional regulations upon completion.

Reporting:

- The Geotechnical Report shall take into consideration the following factors: projected temperature increase, precipitation, extreme weather events and the rise of sea level.
- Submit a soil investigation report, complete with a Site Plan identifying the borehole locations and the proposed building footprint.
- Include (but not be limited to) in the report the following:
    - A detailed description of the soil investigation, including details of the method of soil boring used, a description of the general geology of the area and a drawing showing the actual location and elevation of the boreholes;
    - A description of the physical properties, cohesion and friction angles, soil constraints for at rest, active and passive conditions, unit weights for the various soil strata, found in each borehole and the elevation of the stabilized water table;
    - Summarize the results of all relevant boreholes, in a coordinated series of logs;
    - Any special conditions or irregularities;

- Water conditions and flow rates for drainage, including effect of weather;
- Recommendations for drainage and dewatering;
- Advice on any special construction difficulties that may be encountered;
- Possible effects of ground water during construction if the water table is close to or above the likely elevation of the bottom of excavations;
- Suitability of excavated material as backfill; and
- Any additional information of interest or significance.

END OF APPENDIX G

END OF RFP

DILLON CONSULTING

CITY OF IQALUIT

Design Report – Final

Apex Cemetery Remediation

April 2021 – 20-3451

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Appendices

1.0 Introduction

1.1 Background

Dillon Consulting Limited (Dillon) was retained by the City of Iqaluit (the City) to provide design services in support of the Apex Cemetery remediation improvements. The Apex Cemetery first opened to the public in October 2014, after a three year development program including a site selection, design, and construction. The site selection and design process included extensive consultation with City Staff, Council, Inuit elders, and the community to ensure the cemetery would respect local culture, traditions, and connections to the land.

Located in Apex, the new cemetery site was chosen due to its views of the water, access, topography, geology, and opportunities for future expansion of burial areas. The cemetery has looping pathways, distinct burial areas marked by boulders, and a ceremonial gathering space anchored by an archway of bowhead whale jaw bones that frame the view to Frobisher Bay.

Nonetheless, while recognized for its aesthetic design, the cemetery has been encumbered by drainage issues which have resulted in seasonal flood, localized ponding, and challenges with grave opening and closing. This issue has caused distress for families interring and visiting their loved ones, and challenges for City maintenance crews, undertakers, and faith leaders. The effects of climate change such as warmer temperatures and wetter summers, have anecdotally exacerbated the local site challenges. With a longer and warmer summer season, the active layer – defined as the seasonally thawed layer above permafrost, is believed to melt and infiltrate into pre-dug graves causing unpleasant burial conditions.

In order to improve the functionality of the site, the cemetery requires remediation measures to improve local drainage conditions and lessen the impacts of seasonal precipitation and melted water in the active layer.

1.2 Scope of Work

The purpose of this report is to provide the City a summary of the recommended remediation upgrades to improve the drainage and burial conditions in the Apex Cemetery. This report forms the basis of design of the proposed improvements and strategies. Detailed design drawings were prepared as part of this project and can be found in **Appendix A**. The proposed design considered the following components:

- Consideration to raise the entire site of the Cemetery with specified design height and consideration of maintaining site access from parking areas and pathways;
- Permafrost impacts and mitigation measures (including future climate considerations);
- Specification of fill material and crowning;

- Hydrologic and hydraulic conveyance capacity calculations for the 100-year return period rainfall event;
- Location, size, and dimensions for new or rehabilitated ditches, drainage ways, cemetery pathways/walkways, and parking;
- Summary of photograph and survey of each grave marker to outline improved system for identifying graves; and
- Considerations for future expansion.

To complement the remediation improvements, existing Standard Operating Procedures (SOPs) were also updated with this project and can be found in **Appendix B**.

2.0 Previous Practices

Based on discussions with the City, the operations and maintenance procedures were previously carried out by an independent third party and have recently been re-acquired by the City. The operations and maintenance procedures were to follow the Iqaluit Cemetery Standard Operating Procedures developed by LEES and Associates in 2014. It is unclear to what extent the SOPs previously developed by LEES and Associates were implemented by the independent third party, but it is believed that some of the existing site challenges may be attributed to not following adequate operations and maintenance practices. An example of this, is the sequencing of burial order (from low ground to higher ground) was not followed thus likely leading to leachate and odour problems during funerals.

3.0 Existing Conditions

3.1 Site Conditions

Dillon personnel was on-site at the Apex Cemetery in September of 2020, prior to fall freeze-up. The focus of the site investigation was to identify the drainage issues, carry out topographic survey, and document the location of the existing plot layouts and grave markers.

While on-site, Dillon personnel noted the lack of drainage and pooling of water within the cemetery. The localized ponding and pooling of water on-site results in existing plots being submerged under water during the spring and summer months, as well as pathways throughout the cemetery being inaccessible due to muddy and unstable conditions.

Figure 1: Areas of Ponding within the Cemetery

3.1.1 Current Operational Conditions

Due to the northern climate and tundra, graves must be pre-dug during the warmer months to allow for burial during the winter months. Currently, the City pre-digs approximately 50 plots during the late summer/fall season and these pre-dug graves are causing operational problems for the City staff as the pre-dug graves are accumulating surface and active layer water within the pre-dug grave wooden shoring structures. An example of this can be seen in **Figure 2**. Prior to a burial, this water is required to be pumped out of the pre-dug grave numerous times on the morning of the scheduled burial due to the water within the active layer continuing to rapidly migrate into the pre-dug grave.

Figure 2: Accumulation of Water within Pre-dug Grave

A second site operational challenge the City faces is the presence of human decay leachate in the water that collects in the pre-dug graves. This is believed to happen due to the shallow burials limited to being above the permafrost (active layer), as well as due to previous SOPs not being followed. As mentioned above, another contributing factor is that burials have not always been carried out in a proper plot sequence. That is, they did not follow a lower ground to higher ground order (from downstream locations to upstream locations), causing leachate to cross contaminate pre-dug graves, as they flowed from higher ground to lower ground plots; leading to unpleasant conditions and foul odours during funerals. Human decay leachate can also create adverse impacts to the environment and can be a health and safety risk to community members and City staff that may be exposed to the contaminated water.

3.2 Climate Change

The influences of the changing climate on the Apex Cemetery and its landscape were examined by considering trends in temperatures and precipitation over the past few decades and by incorporating climate change projections looking forward into the future. Both the Iqaluit airport climate data and the most recently updated gridded or mapped and interpolated climate data fields were used in the analyses. The climate change projections were based on 33 of the currently vetted climate change projection datasets from the 5th Intergovernmental Panel on Climate Change (IPCC) Assessment Report released in 2013. Dillon has a climate analysis system that incorporates all updated climate data and climate change projections issued by the IPCC and is currently assessing the next generation of climate change models, the 6th IPCC Assessment Report models, that should become officially available to general users within a couple of years.

Temperature variables were chosen to reflect the influences of climate warming in all seasons on gradual permafrost thaw and of anomalously "hot" summer temperatures on abrupt permafrost thaw and sudden subsidence of soils (sinkholes). All temperature variables were found to be increasing over time with significant increases into the future. The climate study also considered the role of precipitation trends (rainfall and snowfall totals) on flooding events and in exacerbating further permafrost thaw, adding in turn to flooding and drainage concerns. The analysis considered both climate station data and gridded or interpolated climate data and found declining trends in average and precipitation totals for all months except June. The declining trend in precipitation totals is a finding that applies for unknown reasons to other locations in eastern Baffin Island, perhaps reflecting the importance of the Arctic Oscillation and North Atlantic Oscillation phenomenon to the region's weather patterns. However, more detailed analysis of extreme or more intense rainfall events indicated increases in summer 3-day heavy or extreme rainfall events. The study also examined seasonal and estimated changes in rainfall and snowfall as having a potential role in the changing landscape of the Apex Cemetery.

This climate assessment could benefit from additional considerations of anomalous or hot summer temperature indicators (thawing indices) associated with rapid permafrost degradation, as well as additional analysis of excess rainfall indicators that can capture both of the influences of extreme or intense rainfall events as well as more frequent rainfall events. Studies on changes in seasonality of precipitation patterns and freezing and thawing cycling could also prove informative. In general, it would be informative to undertake a "forensics type" analysis of flooding and drainage issues and their weather and climate links, including "setup" conditions, and to further investigate other practices to remediate the combined impacts of permafrost degradation and flooding.

A detailed explanation and analysis of the climate trends and climate change projections can be found in **Appendix C**.

4.0 Design Considerations

4.1 Mitigation Strategies

Based on Dillon's site investigation, background information collection, and discussions with the City, the challenges of the Apex Cemetery can be categorized into two distinct issues; 1) surface water ponding / saturated soils throughout the site due to poor drainage, and 2) accumulation of active layer water within the pre-dug burial plots due to the seasonal melting of the active layer. The potential solutions for the first item above will be expected to be covered by the City under their capital expenditures program while the potential solutions for the second item will be expected to be covered under their operational program; thus, the following sections of the report have been split into two separate design considerations; capital and operational.

4.1.1 Capital Program Solutions – Grading and Drainage Improvements

To mitigate the local ponding / pooling of water and the resulting saturated soils, the optimal strategy is to improve the site grading and drainage network. A good grading and drainage plan will promote efficient surface water runoff and avoid water from infiltrating into the ground (which exacerbates local drainage challenges). In support of this strategy, Dillon prepared a grading and drainage improvement plan.

The proposed Apex Cemetery drainage plan includes regrading and infilling of the existing site (existing and unused burial plots), upgrading and redefining of the ditch networks, as well as the resetting of the existing culverts. The proposed drainage plan takes into account the *Community drainage system, planning, design and maintenance in northern communities* (CAN/CSA-S503-15) prepared by Canadian Standards Association and applies best management practices to the site. The amount of infill and grading required at the site is based on the need for positive drainage to be achieved and to eliminate any low-lying areas while also allowing for the site to be pedestrian accessible. Raising the crown of the central pathway will allow for positive drainage to be achieved from the central pathway outwards towards both the north and south ditch drainage networks. These networks will convey surface water downstream to the east of the cemetery, and into an existing man-made trapezoidal drainage channel north and east of the site.

The outer pathways (maintenance roads) around the cemetery have been designed to be super-elevated to drain towards the outside. This will result in cemetery runoff to sheet flow across the site, through the outer pathway and into the outer ditch. A ditch system along the inside of the pathway was considered and discussed with the City. However, an inner ditch system would create a physical barrier for pedestrians and would require dedicated intermittent pedestrian and vehicular crossings as well as culverts to convey flows through the crossings. Due to the cold climate, the culverts will likely freeze in the colder and shoulder months, and the City would have to spend considerable maintenance resources to clear the multiple culvert crossings and to keep them from being damaged during the winter months.

The outer ditch concept, while creating sheet flow across the outer pathway and potential icing during the shoulder seasons (spring and fall), will reduce the number of culverts required and is believed to be more resilient to freeze/thaw cycles and may prove to be more effective. Thus, the City did not oppose the outer ditch design concept.

The western boundary of the cemetery contains an existing ditch and culvert system that conveys flows to the south and the north away from the site. Culverts convey flows under existing parking areas and the outer pathway. The intention of the proposed grading improvements is to maintain the west ditch and culvert network. To accommodate the drainage concept, the parking areas and pathways were also designed to be regraded to convey surface runoff away from the parking areas and adjacent pedestrian walking zones while maintaining the existing parking capacity.

Based on the evaluation of the existing topography and discussions with the City, the ceremonial space to the east of the site as well as the scattering garden and the infant burial section to the south-east of the site are not to be disturbed as part of this project.

The drainage design computations for the capacity of the ditch and culvert networks were done using the rational method and included all contributing catchment areas. The drainage calculations were performed using the historical rainfall data, Intensity-Duration-Frequency (IDF) curve, for Iqaluit from Environment and Climate Change Canada. In lieu of using future climate change rainfall design data for the local drainage system design, the drainage systems were designed to accommodate climate change impacts by ensuring excess conveyance capacities in the ditches and culverts. The ditches were designed to accommodate the historical 100-year short duration storm event flows with extra freeboard to provide additional climate change impact resiliency. Similarly, the culverts were designed to convey flows much greater than the historical 100-year design in anticipation of future changes in flows and freezing/thawing conditions associated with climate change.

4.1.2 Operational Program Solutions – Burial Options

To mitigate exposure to the accumulation of contaminated water in the pre-dug burials, two alternative burial options are proposed; Option 1) above ground burial vaults (HDPE Crypts), and Option 2) insulating pre-dug burials. It should be noted that these operational alternatives are not standalone solutions and require the construction of a properly graded drainage plan and routine maintenance to operate properly and effectively. The following sections describe the two burial options in more detail.

4.1.2.1 HDPE Crypts (Burial Option 1)

A high-density polyethylene (HDPE) crypt is a burial vault typically used in below ground burials. After discussion with the City, to avoid encountering the contaminated active layer water, using an HDPE crypt above ground, rather than below ground, is proposed as the first burial option alternative. It is important to note that the proposed HDPE crypts are designed and intended for below ground use and using them for an above ground application may reduce the service life of the crypt. Typically, above ground HDPE products have a maximum life expectancy of approximately 25 years. The effects of

Ultraviolet (UV) deterioration can be expected (e.g. colour fading, warping, etc.) after the 25 year service life. HDPE products shielded from UV exposure can last significantly longer. To help mitigate the effects of UV exposure, the City could consider encasing the HDPE vaults. Options for encasing HDPE crypts could include but are not limited to; concrete structures, stone veneer cladding, granite cladding, as well as the more cost effective faux veneer stone cladding. Options for encasing the HDPE crypt have not been included within this design report or cost estimates.

The proposed HDPE crypt detail is designed to be inset into the ground by 300 mm and set on a granular pad that has a minimum thickness of 150 mm. The granular pad and inset will provide structural support to mitigate any settlement or moving of the crypt. A typical detail of the HDPE crypt is shown in **Figure 3**.

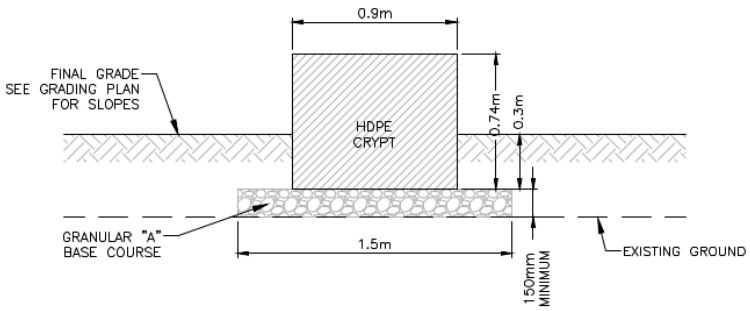


Figure 3: Typical HDPE Crypt Detail

Once the crypt is installed in the designated plot, keeping with traditional burial practices, stone cairns can be added to surround the crypt. This can further stabilize the crypt in place, provide UV protection, while also adding aesthetic accents to each of the burial plots. With the addition of stone cairns, it is important to note that the burial plot capacity within the cemetery is reduced based on how high around the crypt the stone cairns are desired. This is due to the stone cairns having to be placed at an approximate 2:1 slope around the crypt. For example, for the stone cairns to be placed to the top of the crypt, the horizontal spacing would require approximately 900 mm for the single burial plot; this is further illustrated in **Figure 4**.

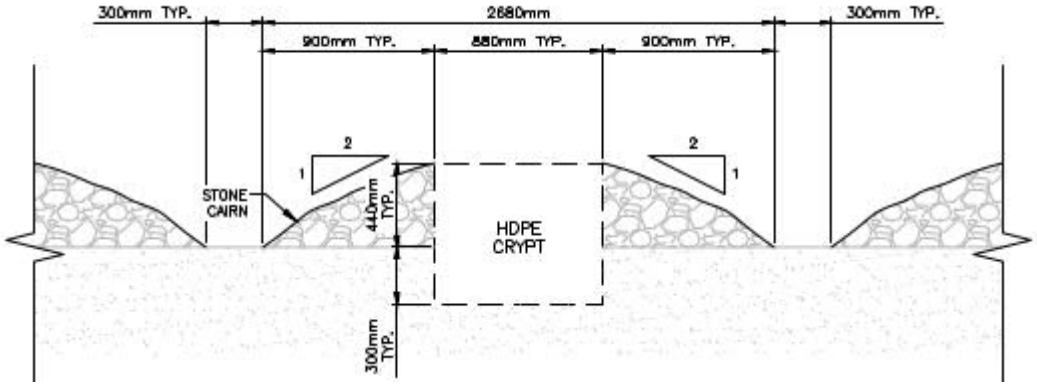


Figure 4: Typical HDPE Crypt Detail with Stone Cairn to the Top

4.1.2.2 Insulating Pre-dug Graves (Burial Option 2)

If in-ground burials are considered, a strategy to avoid contaminated active layer water from accumulating in the pre-dug graves is to insulate the ground around and within the pre-dug graves and keep the active layer frozen during the warmer months. This proposed burial option includes a framed insulation structure installed over top of the exposed pre-dug grave prior to the beginning of the thawing of the active layer in the spring/summer months. A typical detail of this option is shown in Figure 5. This framed insulation option uses 100 mm of rigid insulation that is framed in using 38 mm by 89 mm (2”x 4”) pressure treated lumber to allow re-use each year and is shown in Figure 6.

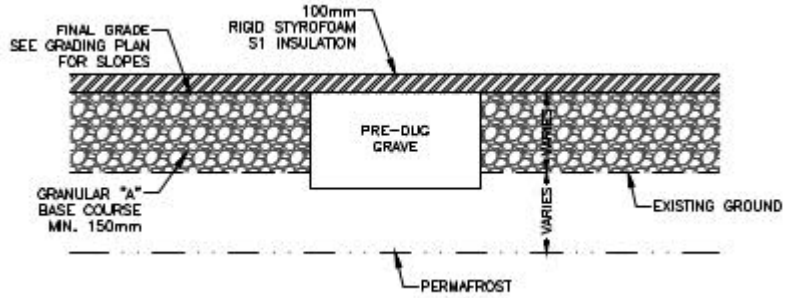


Figure 5: Typical Grave and Insulation Detail

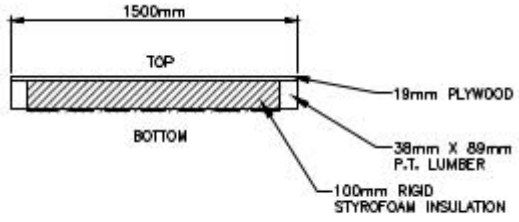


Figure 6: Typical Framed Insulation Detail

Additional insulation within the pre-dug grave can also be installed to further promote the active layer to remain frozen during the warmer months. This would include the installation of 50 mm thick rigid insulation on all four sides of the pre-dug grave between the native material and the wooden bracing inside the pre-dug grave. This additional insulation would only be installed for a one-time use as the insulation would remain in place and filled in during funeral grave backfilling.

4.2 Leachate Management

As mentioned in previous sections, pre-dug grave sites located downslope of existing burial plots appear to contain traces of leachate produced by human decay within the existing burial plots upslope. With this potentially being a health and safety risk to City staff and the public, the City collected water samples from the site and sent to Caduceon Environmental Laboratories for analysis.
Based on the analysis from the laboratory and their preliminary report, the majority of the constituents (colour, turbidity, TSS, metals, phosphorus, and COD) are typical of groundwater and only represent an exposure risk to people or the environment if brought or discharged to the surface. The bacteria and organic content within the leachate are slightly elevated compared to typical groundwater, but as stated above, only represent an exposure risk if in contact with the water or the water is brought to surface. Eliminating surface discharge and potential human contact will address risks associated with the contaminated water.

Leachate water from the cemetery could be collected and treated via standard treatment methods such as UV filtration; however, system optimization would need to be completed. Pre- and post-treatment water testing would also be required to improve system effectiveness. Optionally, the water could also be collected, transported, and treated at the wastewater treatment facility; otherwise it would not be suitable for direct discharge into receiving water bodies. The exact form of treatment should be evaluated following sample collection at the time of leachate water collection.

Changes in burial practices that eliminate the need to dig into the active layer and/or insulate the active layer could also eliminate the potential for contact with water in the active layer, eliminating the potential for exposure to the water. Exposure to leachate within the active layer can also be reduced by working from the low-lying areas to the higher areas.

5.0 Recommendations

It is important to note that, due to the complexity of the site conditions and limited data available to fully assess the root cause of the problems, the solutions and options provided are not expected to fully solve the two primary problems. Rather, they are meant to mitigate the problems and improve site conditions within practical and low cost means available to the City. To maximize the benefits of the proposed mitigation strategies, each of these recommendations will still require routine maintenance and grading adjustments to promote positive drainage away from the site. Routine maintenance and standard operating procedures for the capital and operational recommendations are provided in the SOP document found in **Appendix B**.

5.1 Capital Program Solutions – Grading and Drainage Improvements

The proposed grading and drainage plan is recommended to be implemented during the upcoming construction season. As mentioned in **Section 4.1.1**, the grading plan is designed to promote more effective surface runoff away from the site and mitigate local ponding of water and saturated soils. Due to the site being an active cemetery, construction strategies and methods must be taken into consideration to protect and respect the existing burials. It is recommended that during construction, fill and compaction techniques applied on existing burial plots be limited to hand placed methods with light equipment used where necessary. Heavy machinery and robust compaction techniques should be limited to the burial plots not currently occupied.

The existing 450 mm corrugated metal pipes (CMPs) on-site appear to be in good condition and are recommend to be re-used and reset at the proposed invert elevations for the implementation of the grading plan. The culverts have been evaluated based on their conveyance capacity for the 100-year short duration storm event flows with excess capacity to provide additional climate change impact resiliency. In addition to the resetting of the existing culverts, it is recommended that flexible high density polyethylene culvert markers be installed on both ends of each culverts. As culverts are buried beneath the snow during the winter months, culvert markers will identify both the inlet and outlet for routine maintenance when ice and snow build up occurs. An example of an installed culvert marker can be seen in **Figure 7**.

Figure 7: Example of a Culvert Marker Installed on a CSP Culvert

As previously stated, the proposed grading plan has been designed to not require the need to regrade the ceremonial space or scattering garden and the infant burial section areas, east of the main cemetery as the water conveyed from the grading plan is captured within the north and south ditches and then conveyed downstream through the existing ditch between the ceremonial space and the infant burial site. This ditch has modest longitudinal slopes; thus, to reduce erosion potential in the ditch and the transfer of sediment into the receiving channel, riprap lining is proposed on that part of the ditch.

5.2 Operational Program Solutions – Burial Options

The two proposed burial options, 1) above ground HDPE crypts and 2) insulated ground burials, are intended to mitigate the exposure of leachate water to community members and City staff and to mitigate potential environmental impacts. Both options are not known to have been used in a northern cemetery setting; thus, to test the effectiveness of the performance of each option and to get public consent, a pilot project is recommended.

To properly control pilot program variables and performance metrics, the pilot project is to be implemented following the completion of the capital grading and drainage plan works. With the drainage improvements in place, both of the proposed burial options should be tested over a full year's time in order to monitor and document the performance and efficiency of each burial option. By testing them over a full year, seasonal changes, in particular the spring freshet, thawing/freezing of the active layer, fall freeze-up, as well as potential extreme weather events (i.e., 100-year return period rainfall events) can be monitored. During the pilot project period it is also recommended that the required maintenance and frequency of maintenance activities are documented and included in the analysis of each option. The City may elect to test Option 2 (insulated burials) this spring / early summer prior to construction and prior to the active layer melting to test the effectiveness of keeping the active layer water frozen. If this occurs, the Option 2 insulation will be in place during construction and will need to be coordinated with the construction logistics.

Prior to the completion of the grading and drainage improvements, the City is expected to follow current burial protocols and as a result, exposure to leachate water in the pre-dug graves may continue. Under these interim conditions, if leachate water is encountered within the pre-dug graves the leachate should be treated prior to being discharged into a receiving water body. This can be accomplished by trucking leachate water to a wastewater treatment plan or facility that can treat to acceptable surface water quality standards. Interim tasks and procedures, including the requirements for leachate treatment, are further described within the SOPs found in **Appendix B**.

6.0 Cost Considerations

The following sections describe Class B cost estimates of both the capital and operational program improvements and recommendations. The capital program improvements, grading, and drainage plan is expected to be implemented during the summer of 2021, with the tender process expected to take place during the spring. During the preparation of tender documents, the cost estimate will be updated to a Class A estimate. The operational program solutions include cost estimates for two scenarios, 1) a contractor completing the work, and 2) City staff completing the work of the two proposed burial options to fully inform the City of Iqaluit as they develop a pilot approach and program.

The Class B cost estimates provided below, for both capital and operational improvements, include the following considerations:

- Material unit costs include annual sealift delivery costs from Montreal to Iqaluit.
- Material costs are based on purchasing in 2021 and do not include inflation for any materials purchased in succeeding years.
- The cleaning and maintenance of the site, including ditches and culverts, is to be completed by the City on a routine basis.

6.1 Capital Program Solutions – Grading and Drainage Improvements (Contractor)

Table 1: Capital Plan Cost Estimate

Items	Quantity	Units	Unit Price	Cost
25mm Granular Machine Placed - Supply, Haul, Placement	885	cu.m	$50.00	$44,250
25mm Granular Hand Placed - Supply, Haul, Placement	885	cu.m	$150.00	$132,750
Ditching	223	m	$150.00	$33,450
Reset of Existing 450 mm Culverts	70	m	$300.00	$21,000
Riprap D50=200 mm - Supply, Haul, Placement	30	cu.m	$380.00	$11,400
Culvert Markers	12	each	$60.00	$720
			Sub-Total	**$243,570**
			Contingency Allowance (15%)	**$36,536**
			Total	**$280,106**

6.2 Operational Program Solutions (Contractor) – Burial Options

The cost estimates provided in this section assume the proposed work is completed by a local contractor with the unit prices provided including the cost of labour as well as any other foreseen cost with the construction. The excavation unit prices provided below are based on discussions with the City and the current costs associated with a local contractor completing the burial activities.

6.2.1 HDPE Crypts (Contractor)

Table 2: Option 1A (HDPE Crypts) - Contractor

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	250	each	$800.00	$200,000
150mm thickness Granular Base (25 mm)	141	cu.m	$50.00	$7,031
Excavation	250	each	$420.00	$105,000
			Sub-Total	**$312,031**
			Contingency Allowance (15%)	**$46,805**
			Total	**$358,836**

Table 3: Option 1B (HDPE Crypts) - Contractor

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	164	each	$800.00	$131,200
150mm thickness Granular Base (25 mm)	92	cu.m	$50.00	$4,613
Stone Cairns (Riprap D50=200 mm)	117	cu.m	$380.00	$44,460
Excavation	164	each	$420.00	$68,880
			Sub-Total	**$249,153**
			Contingency Allowance (15%)	**$37,373**
			Total	**$286,525**

Table 4: Option 1C (HDPE Crypts) - Contractor

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	100	each	$800.00	$80,000
150mm thickness Granular Base (25 mm)	56	cu.m	$50.00	$2,813
Stone Cairns (Riprap D50=200 mm)	126	cu.m	$380.00	$47,880
Excavation	100	each	$420.00	$42,000
			Sub-Total	**$172,693**
			Contingency Allowance (15%)	**$25,904**
			Total	**$198,596**

6.2.2 Insulating Pre-dug Graves

Table 5: Option 2 (Installation of Insulation) - Contractor

Items	Quantity	Units	Unit Price	Cost
50 mm Rigid Styrofoam Insulation for within Wooden Structure (Optional)	1675	sq.m	$52.50	$87,938
100 mm Rigid Styrofoam Insulation for Top	250	sq.m	$105.00	$26,250
39 mm x 89 mm Pressure Treated Lumber	503	m	$15.00	$7,538
19 mm Pressure Treated Plywood	270	sq.m	$37.50	$10,125
Excavation	250	each	$1,400	$350,000
Wooden Structure for Inside Pre-dug Grave (Identical to Current Practices)				
38 mm x 235 mm Pressure Treated Lumber	5625	m	$19.50	$109,688
19 mm x 38 mm Bracing Stakes	2400	m	$3.00	$7,200
			Sub-Total	**$598,738**
			Contingency Allowance (15%)	**$89,811**
			Total	**$688,548**

6.3 Operational Program Solutions (the City) – Burial Options

The cost estimates provided in this section assume the proposed work is completed by City staff with the unit prices provided including only the cost of materials and shipping of the materials to Iqaluit. The construction and labour is assumed to be completed by City staff.

6.3.1 HDPE Crypts

Table 6: Option 1A (HDPE Crypts) – the City

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	250	each	$800.00	$200,000
150mm thickness Granular Base (25 mm)	141	cu.m	$50.00	$7,031
			Sub-Total	**$207,031**
			Contingency Allowance (15%)	**$31,055**
			Total	**$238,086**

Table 7: Option 1B (HDPE Crypts) – the City

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	164	each	$800.00	$131,200
150mm thickness Granular Base (25 mm)	92	cu.m	$50.00	$4,613
Stone Cairns (Riprap D50=200 mm)	117	cu.m	$380.00	$44,460
			Sub-Total	**$180,273**
			Contingency Allowance (15%)	**$27,041**
			Total	**$207,313**

Table 8: Option 1C (HDPE Crypts) – the City

Items	Quantity	Units	Unit Price	Cost
HDPE Crypts	100	each	$800.00	$80,000
150mm thickness Granular Base (25 mm)	56	cu.m	$50.00	$2,813
Stone Cairns (Riprap D50=200 mm)	126	cu.m	$380.00	$47,880
			Sub-Total	**$130,693**
			Contingency Allowance (15%)	**$19,604**
			Total	**$150,296**

6.3.2 Insulating Pre-dug Graves

Table 9: Option 2 (Installation of Insulation) – the City

Items	Quantity	Units	Unit Price	Cost
50 mm Rigid Styrofoam Insulation for within Wooden Structure (Optional)	1675	sq.m	$52.50	$87,938
100 mm Rigid Styrofoam Insulation for Top	250	sq.m	$105.00	$26,250
39 mm x 89 mm Pressure Treated Lumber	503	m	$15.00	$7,538
19 mm Pressure Treated Plywood	270	sq.m	$37.50	$10,125
Wooden Structure for Inside Pre-dug Grave (Identical to Current Practices)				
38 mm x 235 mm Pressure Treated Lumber	5625	m	$19.50	$109,688
19 mm x 38 mm Bracing Stakes	2400	m	$3.00	$7,200
			Sub-Total	**$248,739**
			Contingency Allowance (15%)	**$37,311**
			Total	**$286,048**

7.0 Closure

This report and recommendations presented herein are based on the site visit and topographic survey conducted by Dillon personnel in September 2020, review of available background documentation, and discussions with City staff. This report has been prepared for the exclusive use of the City of Iqaluit and its agents for the specific application described in this report.

We trust this information provided herein is satisfactory to the City of Iqaluit for the required Apex Cemetery remediation works.

If you have any question or concerns, please contact the undersigned.

Sincerely,

Dillon Consulting Limited

Keith Barnes, P.Eng.
Lead Engineer - Associate

Pablo Lopez, P.Eng.
Project Manager – Associate

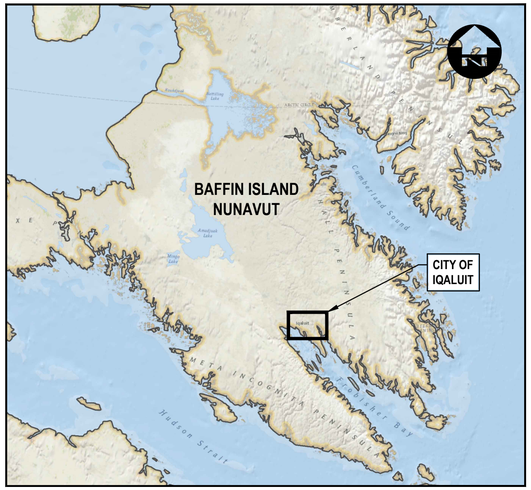
Appendix A

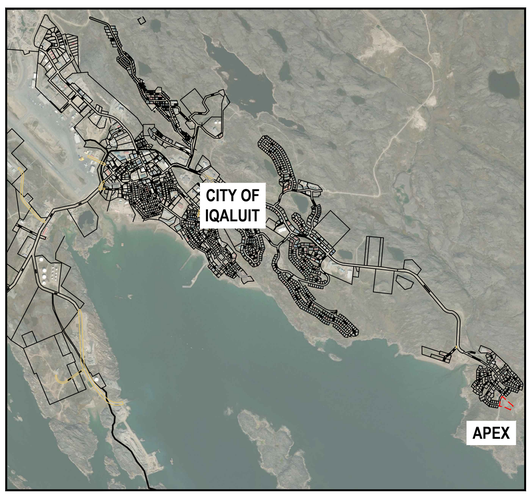
Apex Cemetery Remediation Design Drawings

CITY OF IQALUIT

APEX CEMETERY REMEDIATION

100% DESIGN ISSUED FOR FINAL REVIEW





SHEET LIST TABLE	
DWG.	DESCRIPTION
GRADING DESIGN	
E01	EXISTING SITE CONDITIONS
E02	EXISTING SITE PROFILES
G01	PROPOSED SITE PLAN
G02	PROFILES AND SECTIONS INDEX PLAN
G03	SITE DESIGN PROFILES
G04	PERIMETER PATH AND DITCH PROFILES
G05	MAIN SITE GRADING DESIGN - SECTIONS
G06	WEST DITCH AND PARKING PAD - SECTIONS
G07	NORTH PERIMETER PATH AND DITCH SECTIONS
G08	SOUTH PERIMETER PATH AND DITCH SECTIONS
G09	GRADING DESIGN - CUT FILL ANALYSIS
G10	TYPICAL DETAILS
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LANDSCAPING DESIGN	
LL-1	CEMETERY PLOT LAYOUT OPTION 1A
LL-2	CEMETERY PLOT LAYOUT OPTION 1B
LL-3	CEMETERY PLOT LAYOUT OPTION 1C
LL-4	CEMETERY PLOT LAYOUT OPTION 2

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DILLON PROJECT: 203451
DATE: 2021-04-23

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4	RE-ISSUED FOR 100% CLIENT REVIEW	2021.03.22	PL

DESIGN: JH	REVIEWED BY: PL
DRAWN: TPW	CHECKED BY: JH
DATE: APRIL 2021	
SCALE: 1:200	

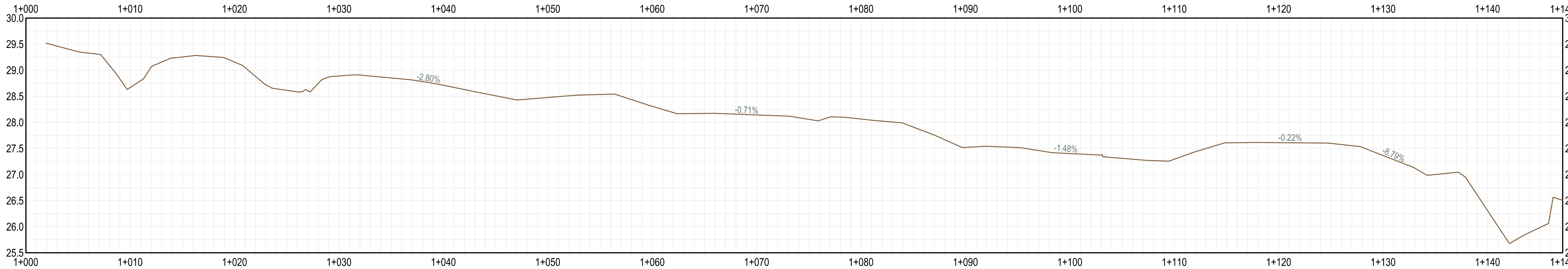
CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

PROJECT NO. 20-3451

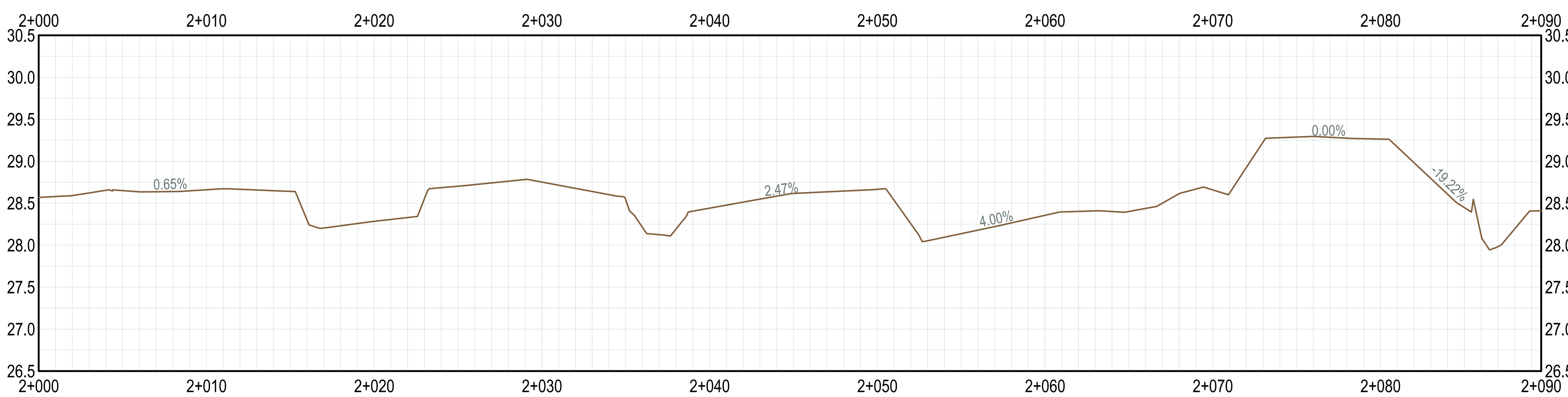
EXISTING SITE CONDITIONS

SHEET NO. **E01**

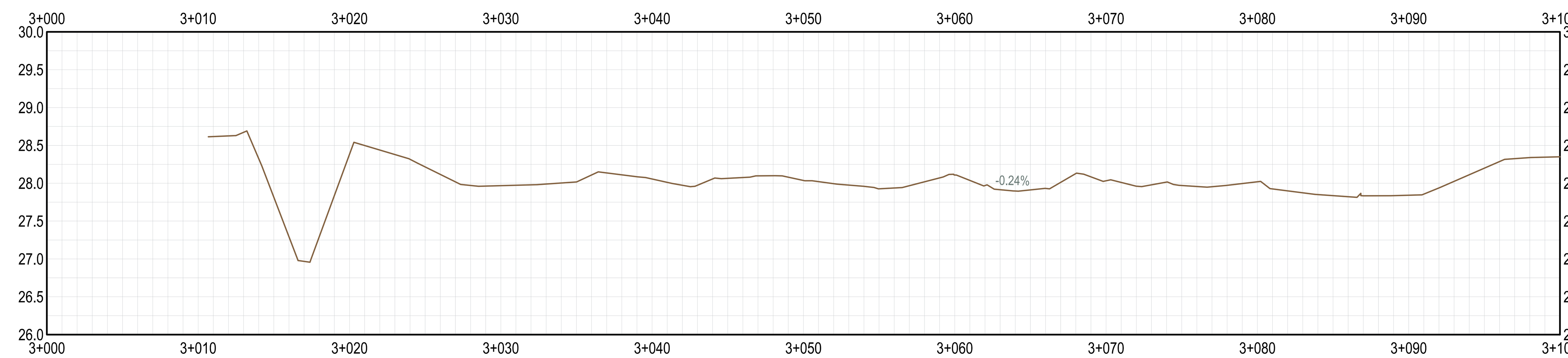
FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\41TPW\DMS48958\203451-02-CIV-SITEPLAN.DWG PLOTTED BY: TREVOR WOTHERSPOON
PLOT DATE: 2021-04-23 @ 1:47:11 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON.CTB



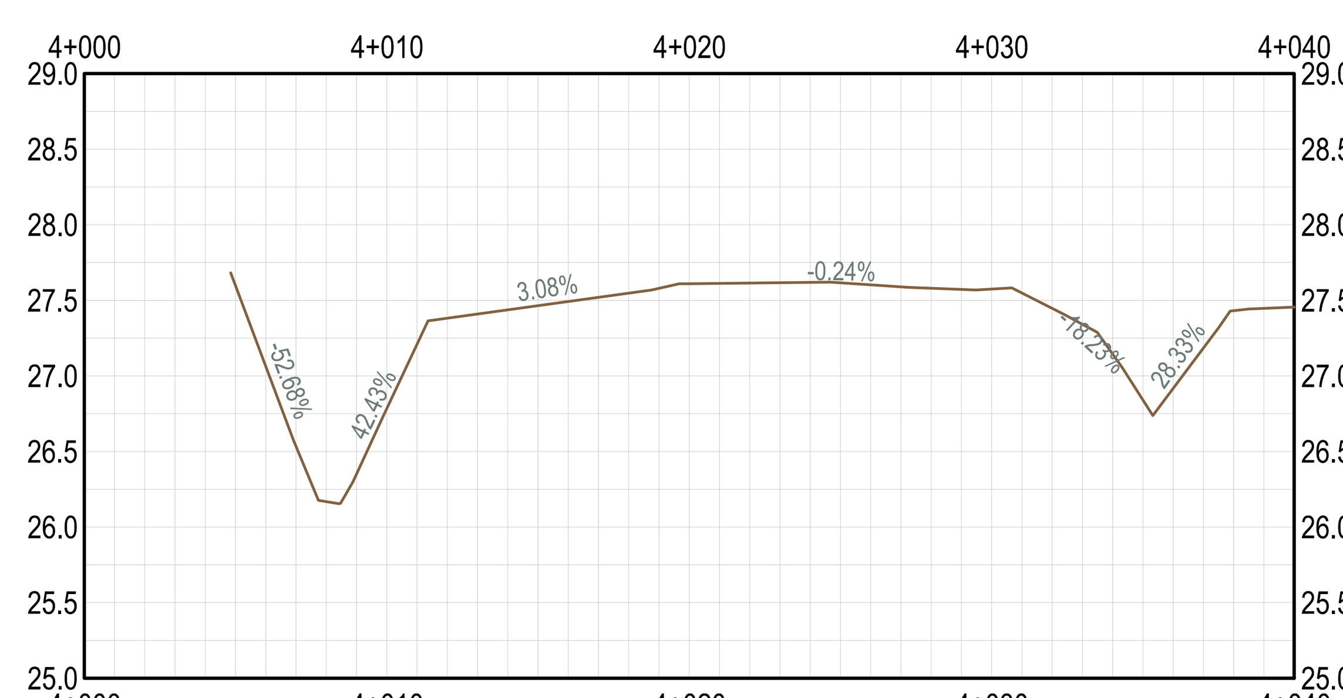
1 E01 SITE CENTER PROFILE 1
1:250H 1:50V



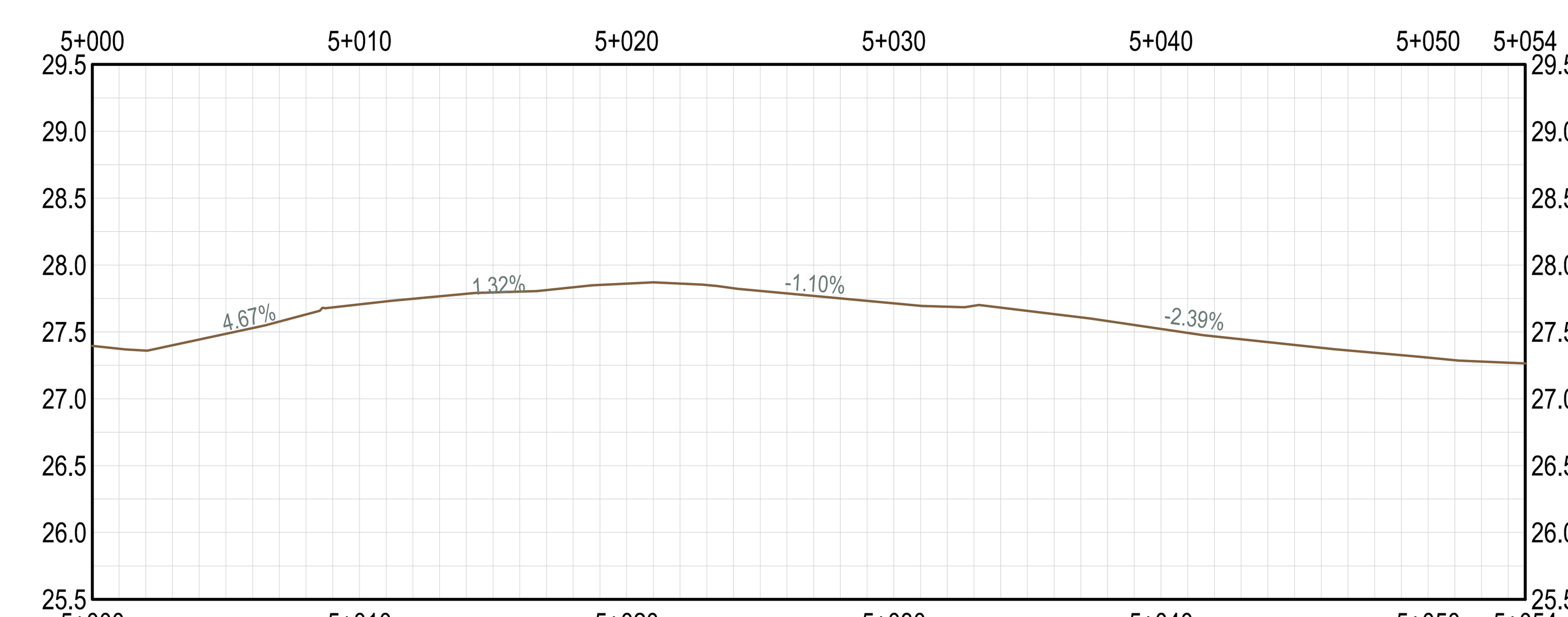
2 E01 EXISTING WEST DITCH PROFILE 2
1:250H 1:50V



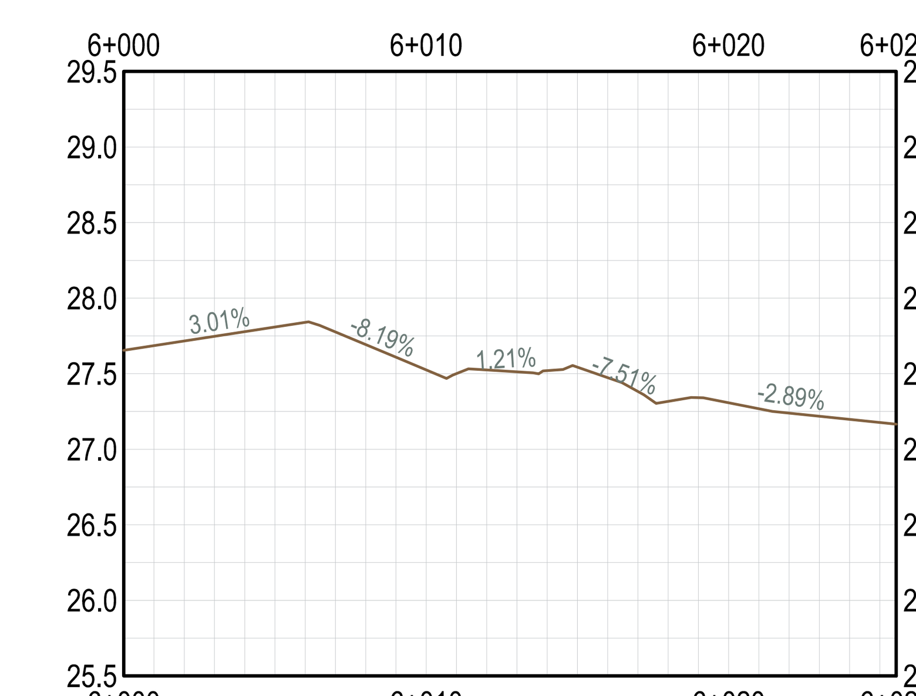
3 E01 EXISTING SITE PROFILE 3
1:250H 1:50V



4 E01 EXISTING CEREMONIAL SITE PROFILE 4
1:250H 1:50V



5 E01 EXISTING INFANT BURIAL SITE PROFILE 5
1:250H 1:50V



6 E01 EXISTING INFANT BURIAL SITE PROFILE 6
1:250H 1:50V

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DESIGN: JH	REVIEWED BY: PL
DRAWN: TPW	CHECKED BY: JH
DATE: APRIL 2021	
SCALE: 1:250 1:50	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

EXISTING SITE PROFILES

PROJECT NO. **20-3451**

SHEET NO. **E02**


SCALE 1:200
METRES
MACHINE PLACE GRANULAR FILL OUTSIDE OF EXISTING BURIAL PLOTS
MAINTENANCE PAD
EX DITCH
C4 PR.INV. N:7066805.29 E:527388.84 Elev:27.773m
C4 PR.INV. N:7066792.06 E:527385.34 Elev:27.843m
C3 PR.INV. N:7066788.91 E:527384.52 Elev:27.857m
C3 PR.INV. N:7066772.76 E:527381.32 Elev:27.939m
C2 PR.INV. N:7066769.62 E:527380.65 Elev:27.956m
C2 PR.INV. N:7066753.54 E:527378.02 Elev:28.037m
C1 PR.INV. N:7066736.49 E:527374.36 Elev:28.149m
C1 PR.INV. N:7066722.32 E:527371.94 Elev:28.237m
PR CULVERT 4
PR CULVERT 3
PR CULVERT 2
PR CULVERT 1
PARKING
PR REGRADED PARKING TO DRAIN NORTH INTO PR WEST DITCH MIN. 1.0% SLOPE SEE PROFILE 1, DWG. G03
SIMONIE MICHAEL LANE
PROPOSED WEST DITCH SEE PROFILE 1, DWG. G03 SEE SECTIONS DWG. G06
5.5m WIDE PATHWAY SLOPE=2.0% DRAINING TO DITCH TO NORTH
5.5m WIDE PATHWAY SLOPE=2.0% DRAINING TO DITCH TO SOUTH
PR NORTH DITCH DEPTH=MIN. 300mm SIDE SLOPES=3:1 SEE PROFILE 1 ON DWG. G04
PR SOUTH DITCH DEPTH=MIN. 300mm SIDE SLOPES=3:1 SEE PROFILE 2 ON DWG. G04
HAND PLACE APPROXIMATELY 705m³ GRANULAR FILL OVER/NEAR EXISTING BURIAL PLOTS TO AVOID DAMAGE
SEE DWG. G09 FOR DETAILED CUT AND FILL ELEVATIONS
PR 2.0m CROWNED GRAVEL PATHWAY SEE PROFILE 2 ON DWG. G03 FOR DESIGN GRADES SEE DWG. G11 FOR DETAILS
SLOPE VARIES (SEE SECTIONS DWG. G05)
INSTALL 100mmØ 2.7m LONG ULTRA TECH 9457 ULTRA-FILTER SOCK OR APPROVED EQUIVALENT (SEE DETAIL ON DWG. G11)
DIRECT PR NORTH DITCH TO EX CULVERT
EX 450mm CSP CULVERT
DIRECT PR SOUTH DITCH TO EX CULVERT
PLACE RIPRAP D50 = 200mm, 400mm THICK TO A DEPTH = 300mm
28.45
28.48
28.64
28.64
28.73
28.74
28.70
28.74
28.72
28.67
28.52
28.38
28.23
28.09
27.95
27.81
27.95
27.95
27.68
27.79
27.91
28.02
28.14
28.26
28.47
28.69
28.86
28.90
28.71
28.82
28.83
28.95
28.94
29.06
29.06
29.18
29.34
29.34
29.18
29.18
29.00
29.00
28.82
28.82
28.53
28.52
28.24
28.24
29.53
29.29
29.13
29.12
1+000
1+010
1+020
1+030
1+040
1+050
1+060
1+070
1+080
1+090
2+000
2+010
2+020
2+030
2+040
2+050
2+060
2+070
2+080
2+090
2+100
3+000
3+010
3+020
3+030
3+040
3+050
3+060
3+070
3+080
3+090
3+100
3+110
4+000
4+010
4+020
4+030
4+040
4+050
4+060
4+070
4+080
4+090
4+100
4+110
4+114
1.26%
1.19%
2.00%
29.5
29.0
28.5
28.0
27.5
27.0

NOTES:

1. CEMETERY LANDSCAPING FEATURES SUCH AS ROCK DELINEATORS AND DECORATIVE BOULDERS TO BE STORED AWAY FROM WORK SITE AND REINSTALLED AFTER FINAL SITE GRADE IS ACHIEVED.
2. ARCHITECTURAL ELEMENTS SUCH AS DECORATIVE SIGNS, GATES, AND POSTS TO BE SECURELY STORED OFF SITE AND REINSTALLED AFTER FINAL SITE GRADE IS ACHIEVED.
3. CULVERTS NOT LABELED TO BE REPLACED ARE TO REMAIN IN PLACE AND PROTECTED TO AVOID DAMAGE DURING CONSTRUCTION.

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DRAWN: TPW/BS	CHECKED BY: JH
DATE: APRIL 2021	
SCALE: 1:200	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

PROPOSED SITE PLAN

PROJECT NO. 20-3451

SHEET NO. **G01**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\41TPW\DMS48958\203451-02-CIV-SITEPLAN.DWG PLOTTED BY: TREVOR WOTHERSPOON
PLOT DATE: 2021-04-23 @ 1:48:10 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON.CTB

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DATE: APRIL 2021	
SCALE: 1:200	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

PROJECT NO. 20-3451

PROFILES AND SECTIONS INDEX PLAN

SHEET NO. G02

1 G01 **PROPOSED WEST DITCH AND PARKING PADS**
1:125H 1:25V

2 G01 **PROPOSED CENTER PATHWAY**
1:125H 1:25V

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DESIGN: JH | REVIEWED BY: PL
DRAWN: TPW/BS | CHECKED BY: JH
DATE: APRIL 2021
SCALE: 1:200

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IQALUIT APEX CEMETERY REMEDIATION

SITE DESIGN PROFILES

PROJECT NO. **20-3451**

SHEET NO. **G03**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\41TPW\DMS48958\203451-02-CIV-SITEPLAN.DWG PLOTTED BY: TREVOR WOTHERSPOON
PLOT DATE: 2021-04-23 @ 1:48:23 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON.CTB

	2+010	2+020	2+030	2+040	2+050	2+060	2+070	2+080	2+090	2+100	2+110
EX. GRADE	28.73	28.47	28.53	28.44	28.24	28.04	27.96	27.79	27.50	27.27	27.27
PR. GRADE		28.688	28.666	28.607	28.465	28.322	28.179	28.036	27.894	27.751	27.608
EX.DITCH CL			28.49	28.50	28.32	28.10	27.95	27.65	27.33	27.05	27.47
PR. DITCH				28.019	27.846	27.666	27.483	27.299	27.133	27.019	27.543

1 G01 NORTH PERIMETER PATH AND DITCH PROFILE
1:150H 1:30V

	4+010	4+020	4+030	4+040	4+050	4+060	4+070	4+080	4+090	4+100	4+110
EX. GRADE	29.70	29.14	28.60	28.31	28.17	27.97	27.85	27.74	27.70	27.52	27.34
PR. GRADE		29.150	28.845	28.630	28.416	28.201	28.083	27.968	27.853	27.738	27.622
EX.DITCH CL		28.55	28.57	28.34	28.20	27.97	27.84	27.77	27.71	27.46	
PR. DITCH		28.198	28.019	27.844	27.652	27.469	27.348	27.300	27.247		

2 G01 SOUTH PERIMETER PATH AND DITCH PROFILE
1:125H 1:25V

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DESIGN JH — REVIEWED BY PL
DRAWN TPW — CHECKED BY JH
DATE APRIL 2021
SCALE 1:150 1:30

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

PERIMETER PATH AND DITCH PROFILES

PROJECT NO. 20-3451
SHEET NO. G04

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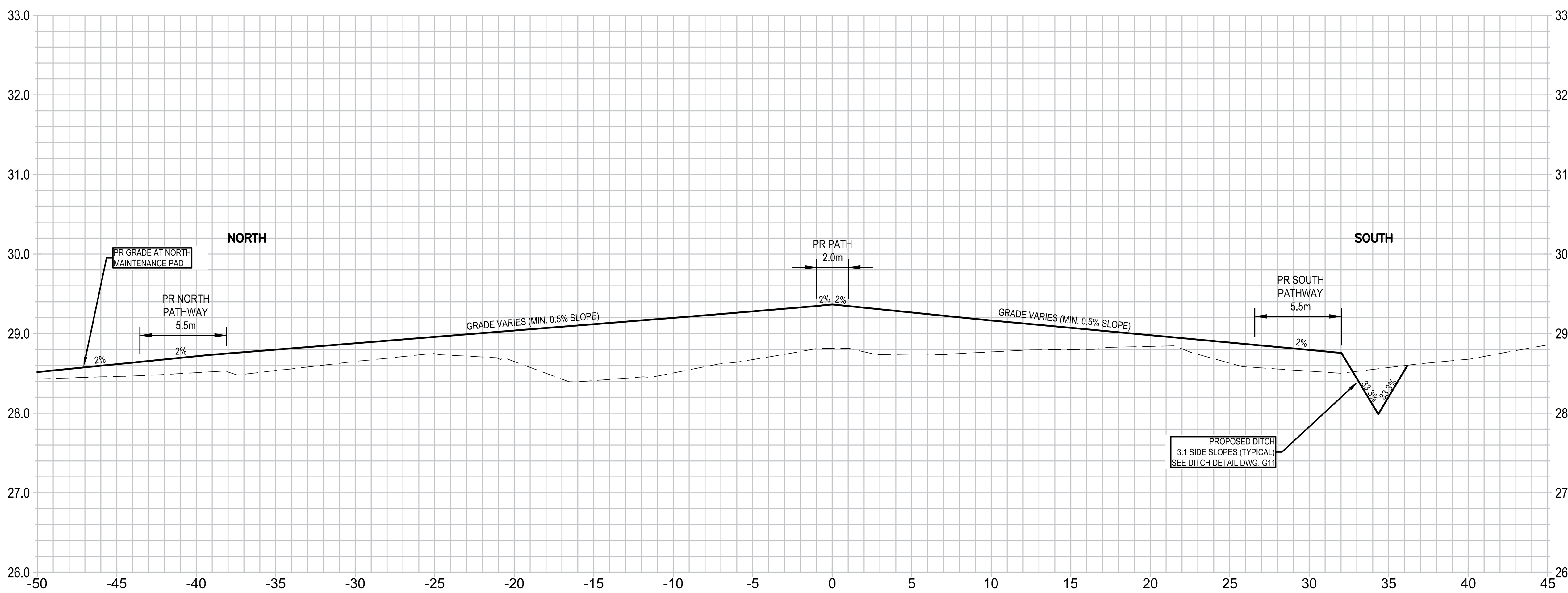
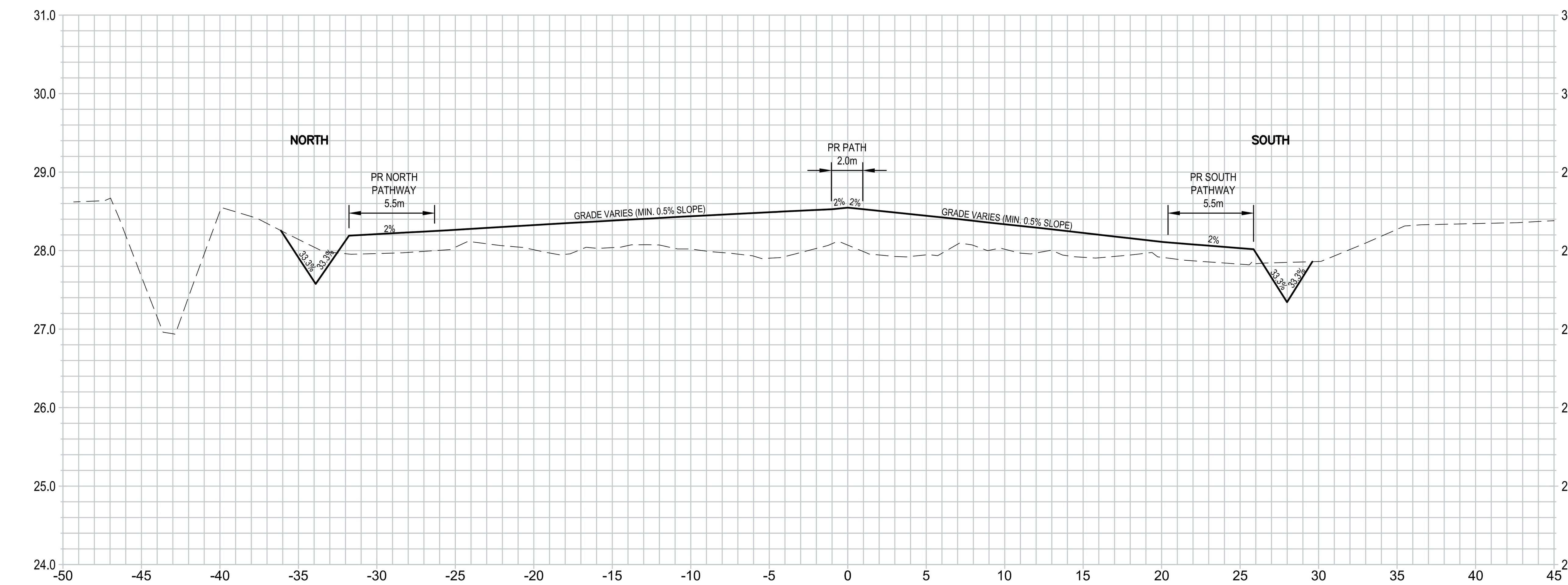
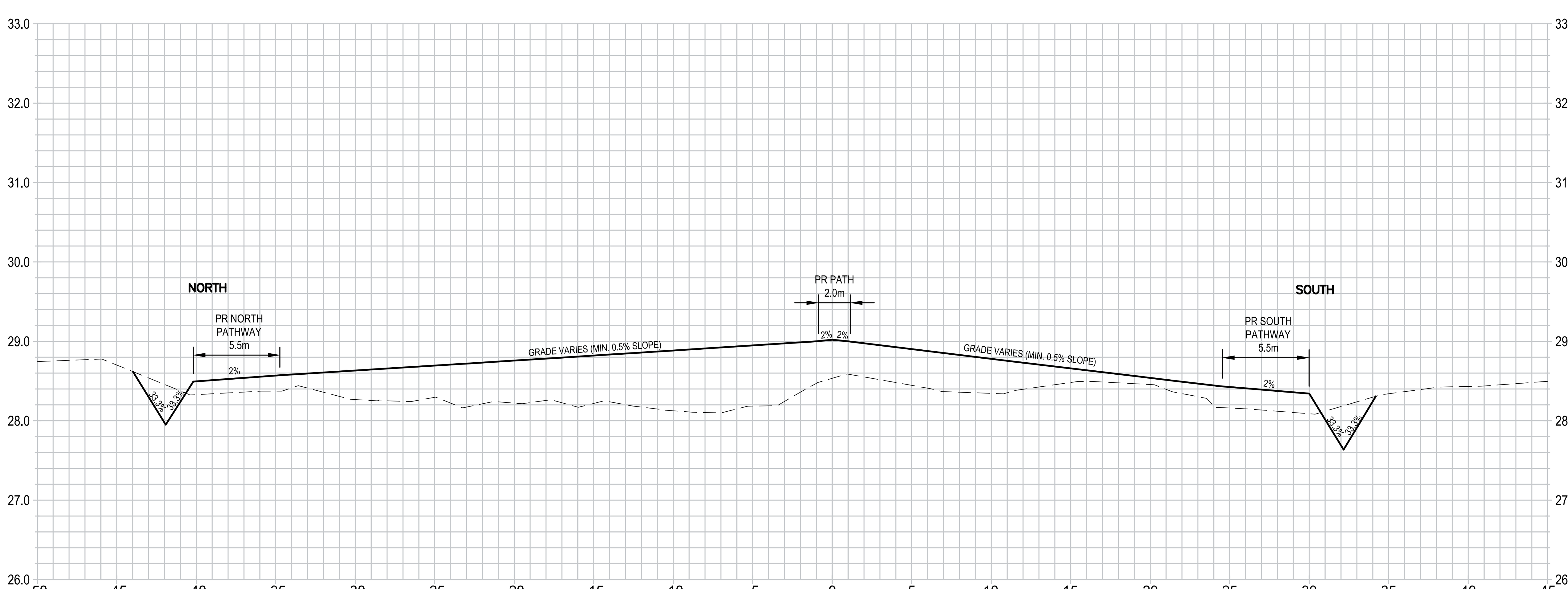


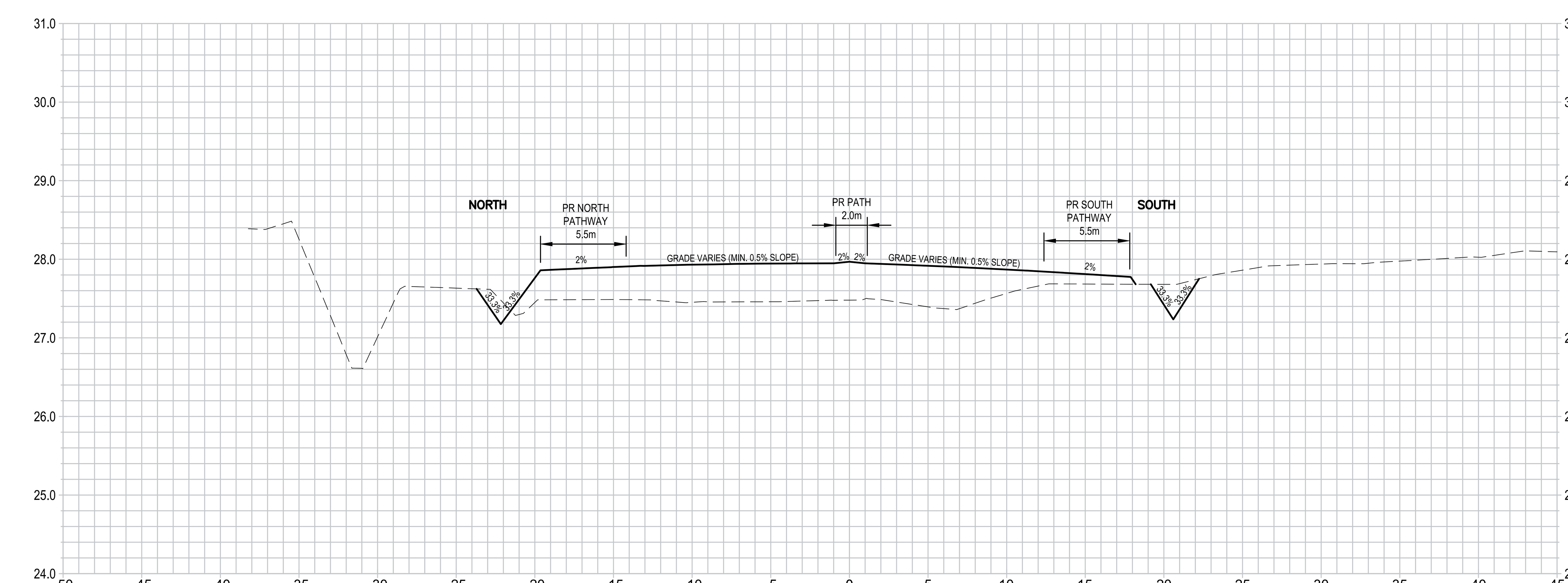
STATION 3+020.57



STATION 3+060



STATION 3+040



STATION 3+080

NOTE:
SEE ALIGNMENTS ON DWG.G02 FOR STATIONS

LEGEND:
— — — — EXISTING GRADE
———— PROPOSED GRADE

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DESIGN	REVIEWED BY
JH	PL
DRAWN	CHECKED BY
TPW/BS	JH

DATE: APRIL 2021

SCALE: 1:200

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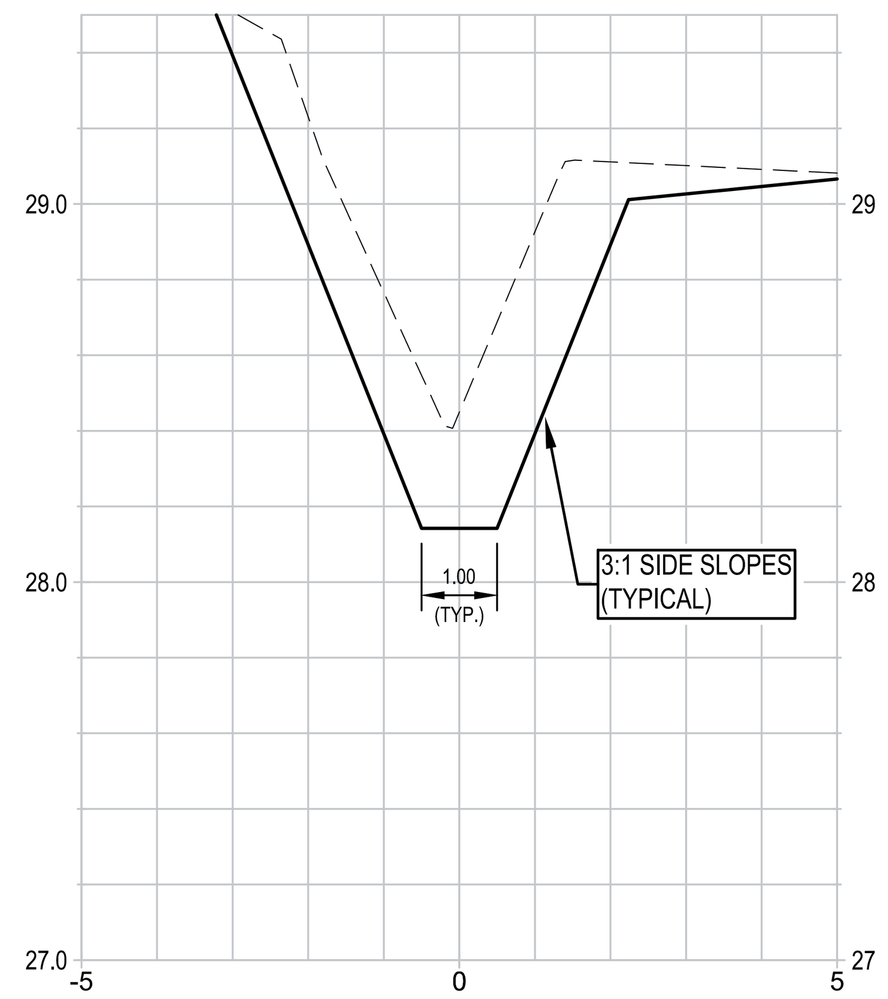
IQALUIT APEX CEMETERY REMEDIATION

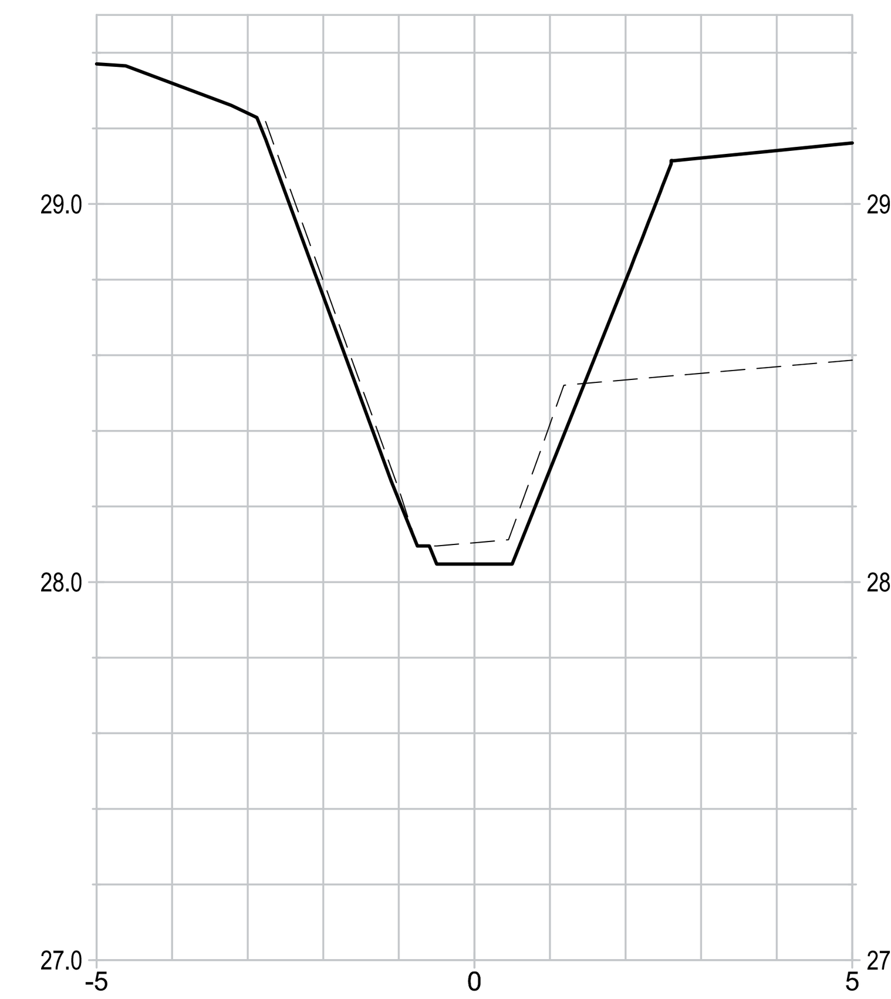
MAIN SITE GRADING DESIGN - SECTIONS

PROJECT NO. **20-3451**

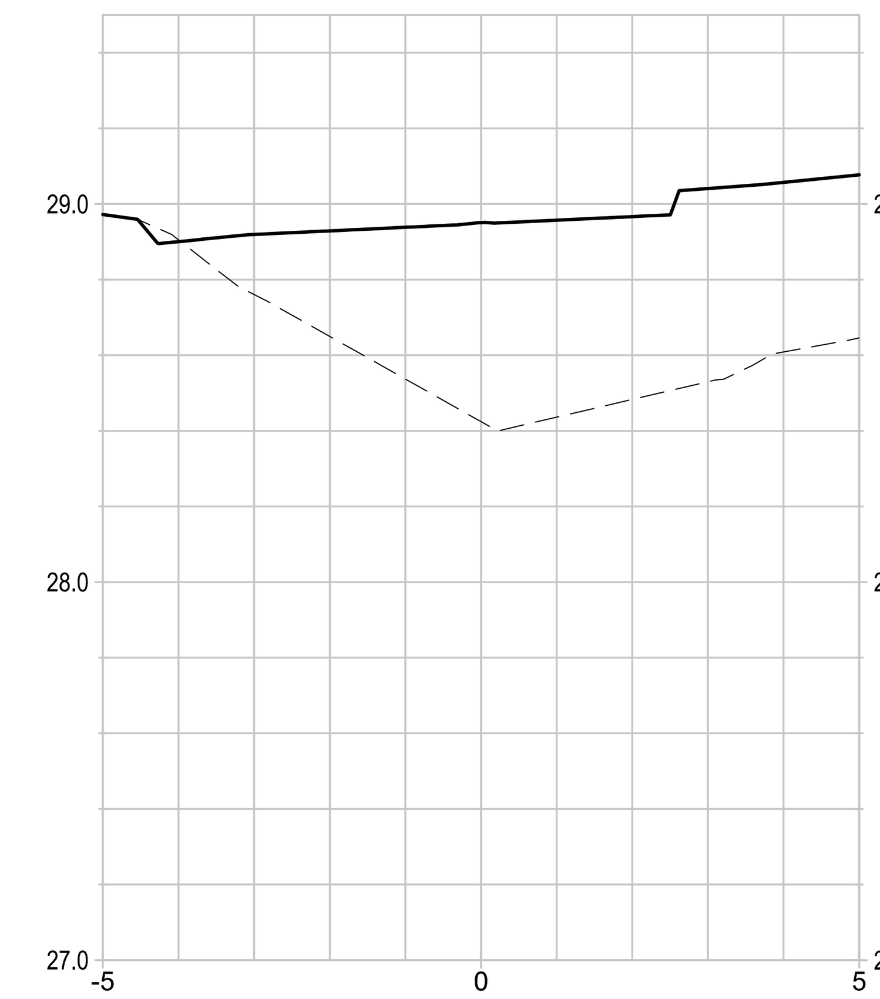
SHEET NO. **G05**



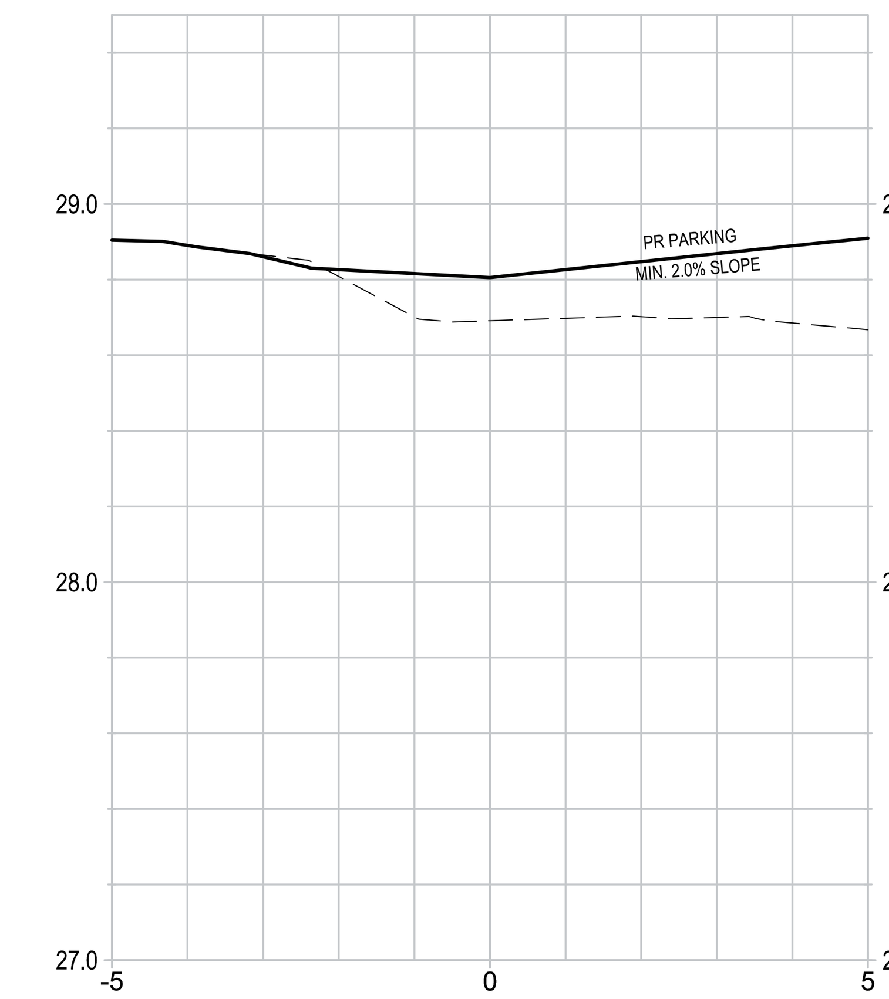
STATION 1+020



STATION 1+035

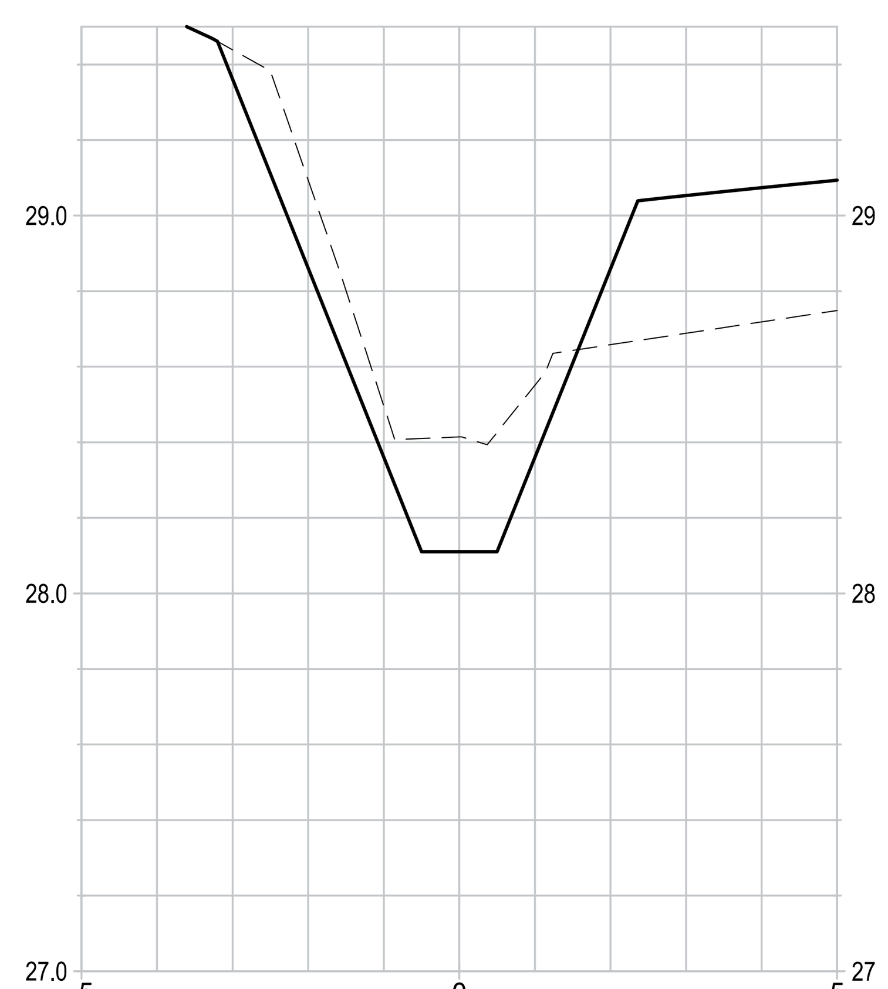


STATION 1+050

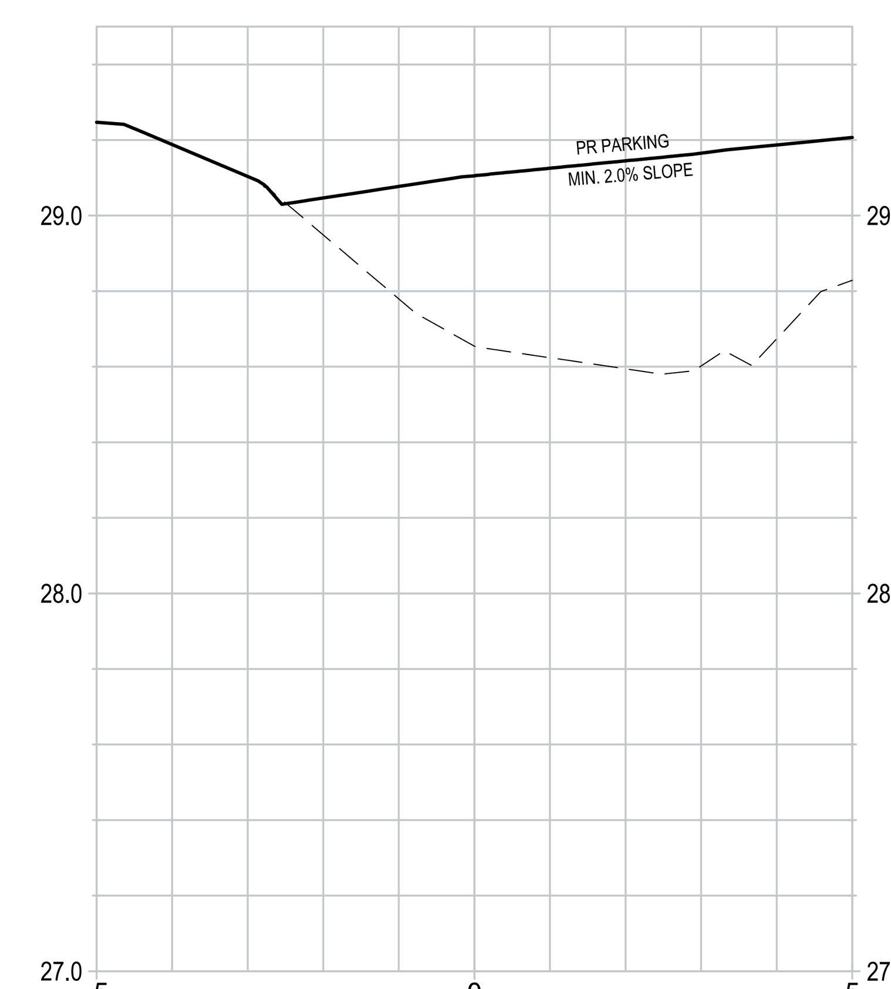


STATION 1+065

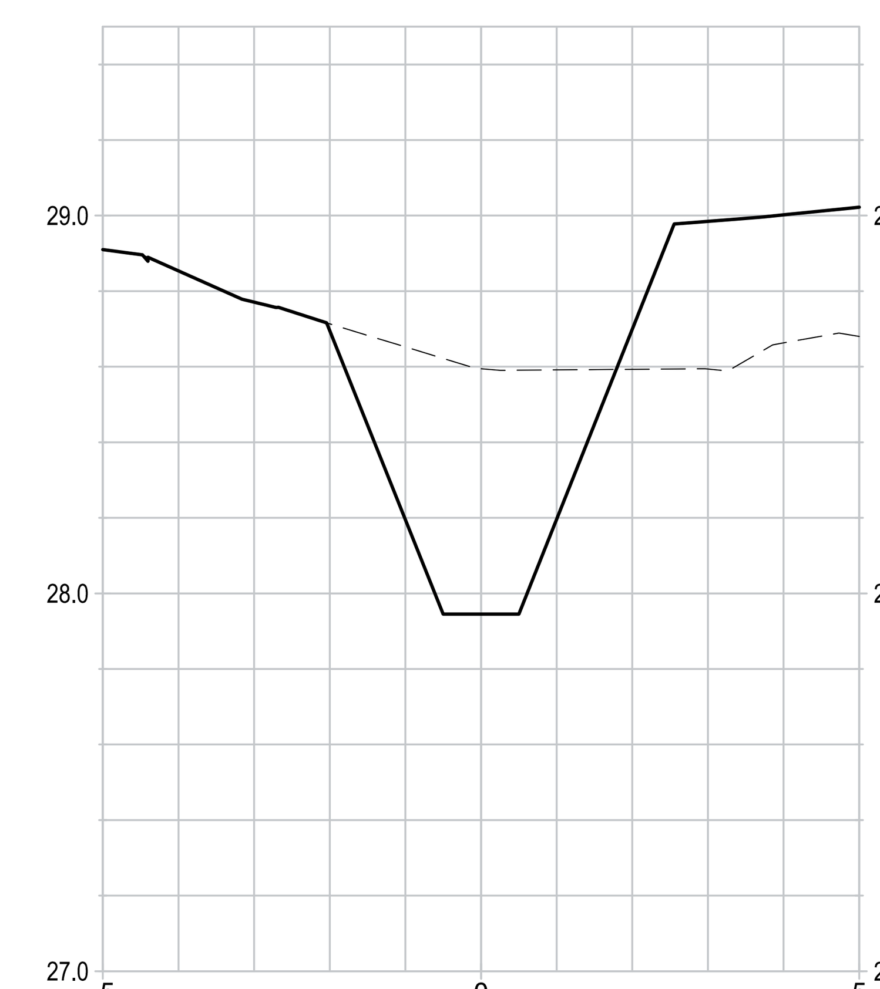
STATION 1+080



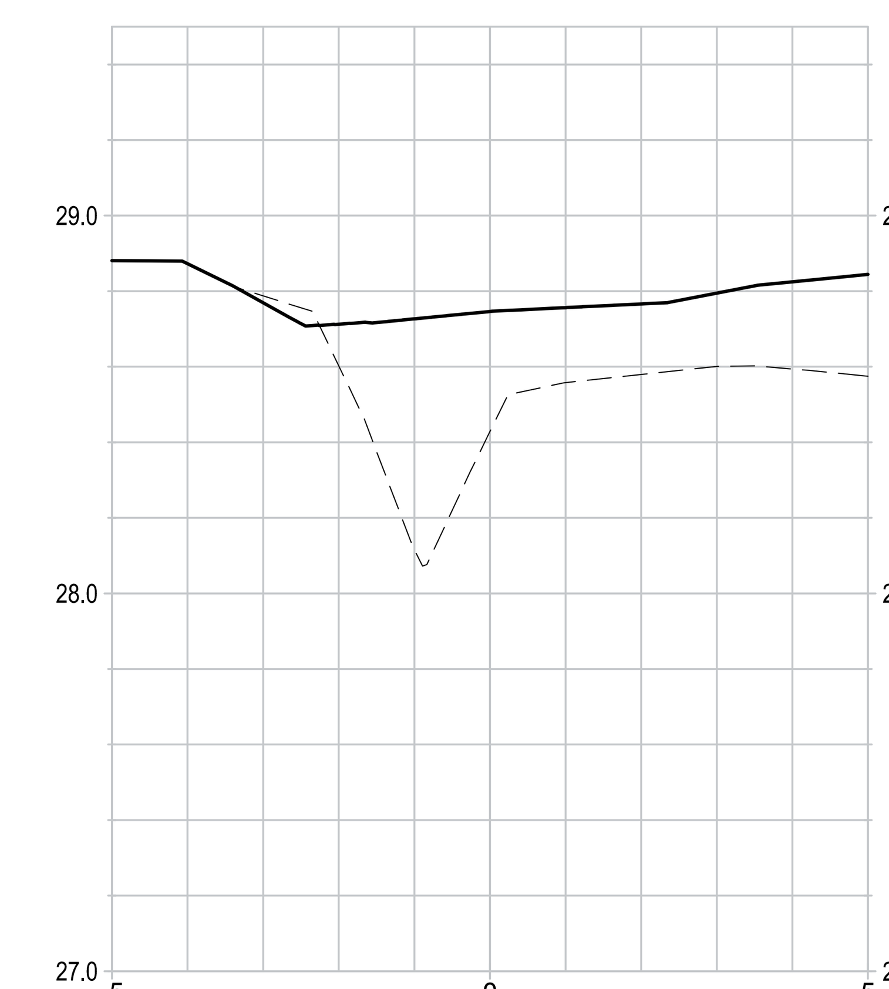
STATION 1+025



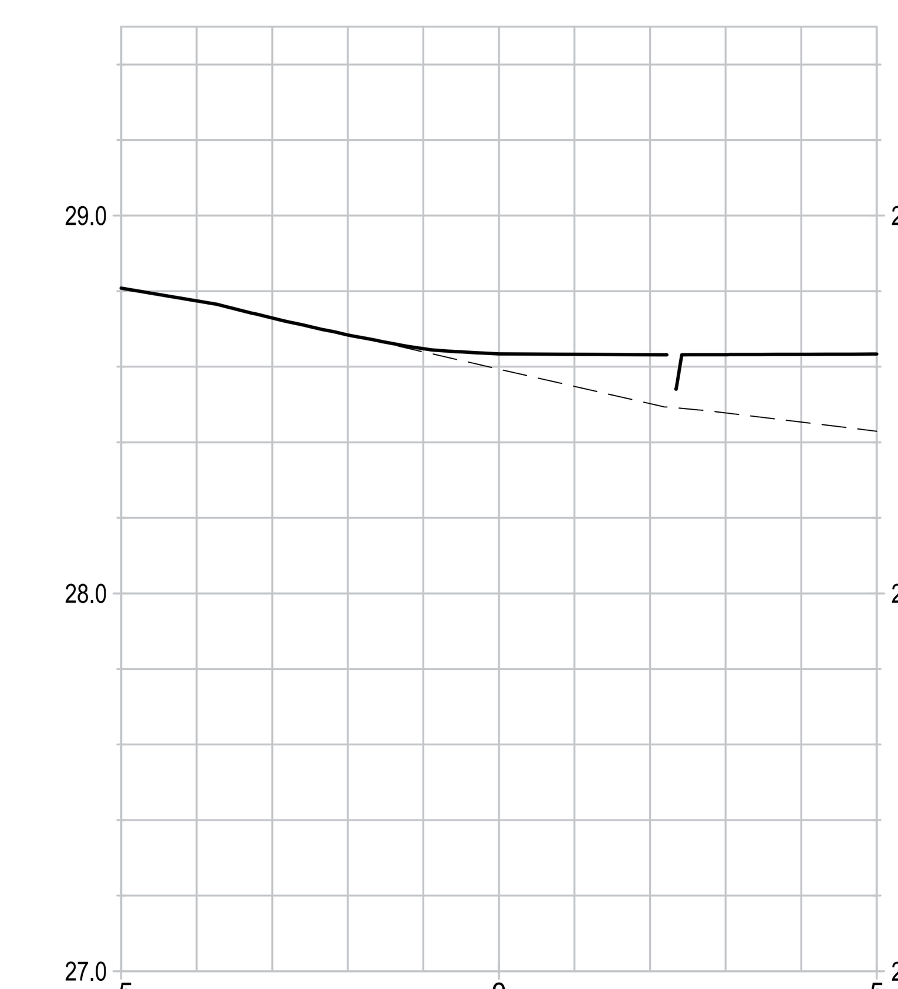
STATION 1+039.90



STATION 1+055

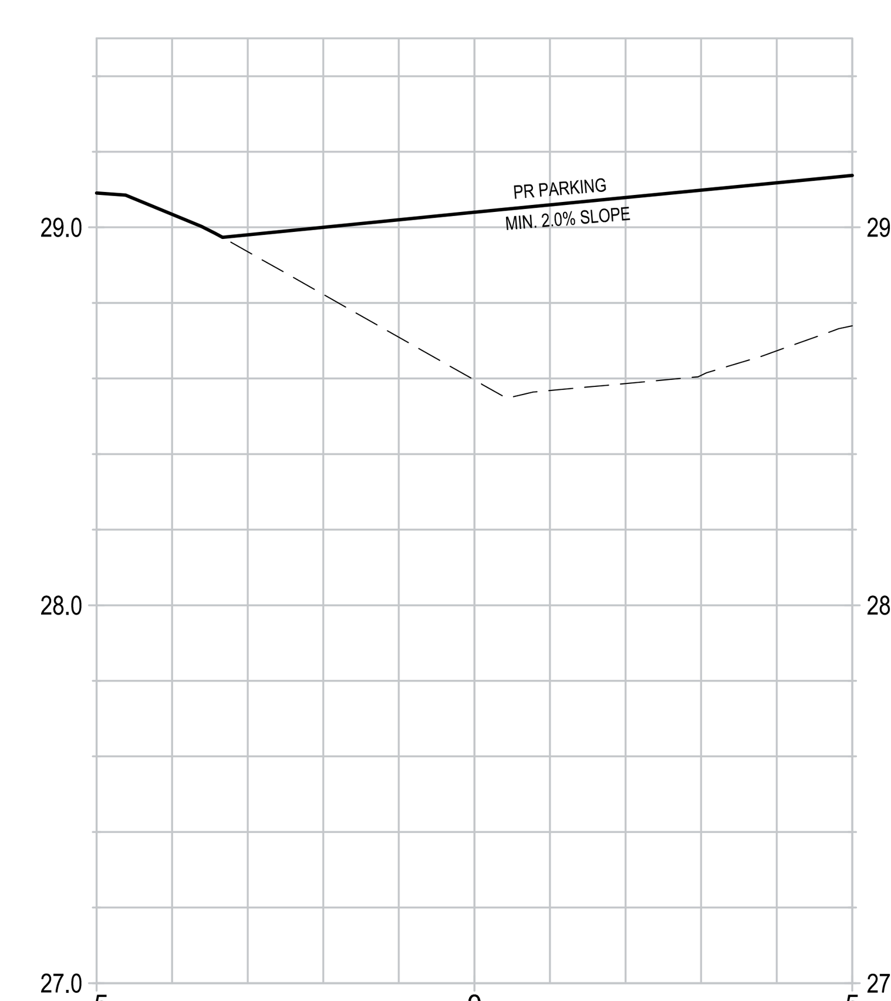


STATION 1+070

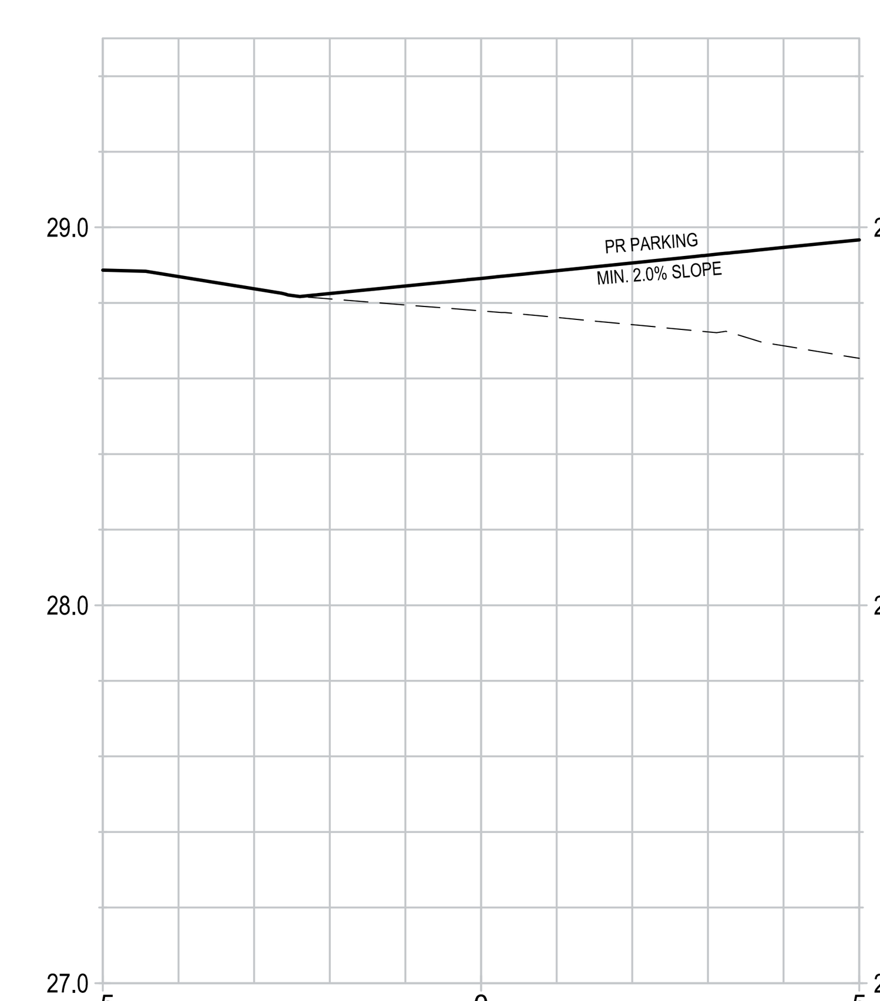


STATION 1+085

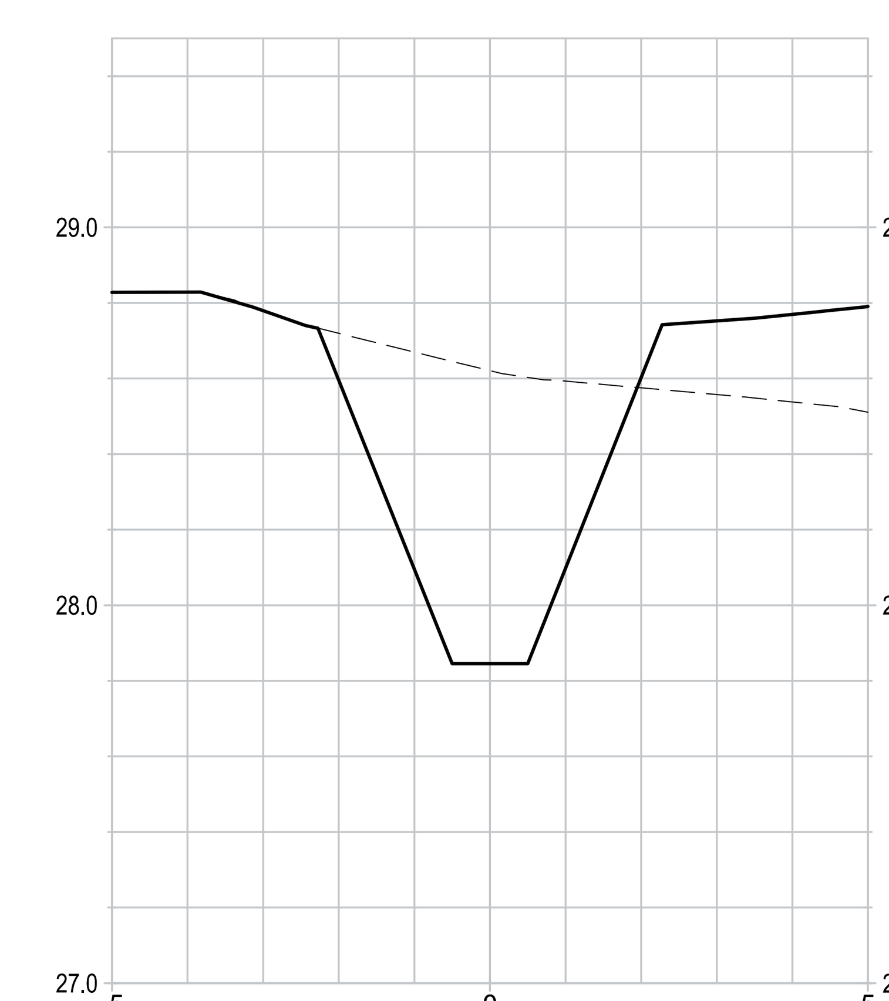
STATION 1+030



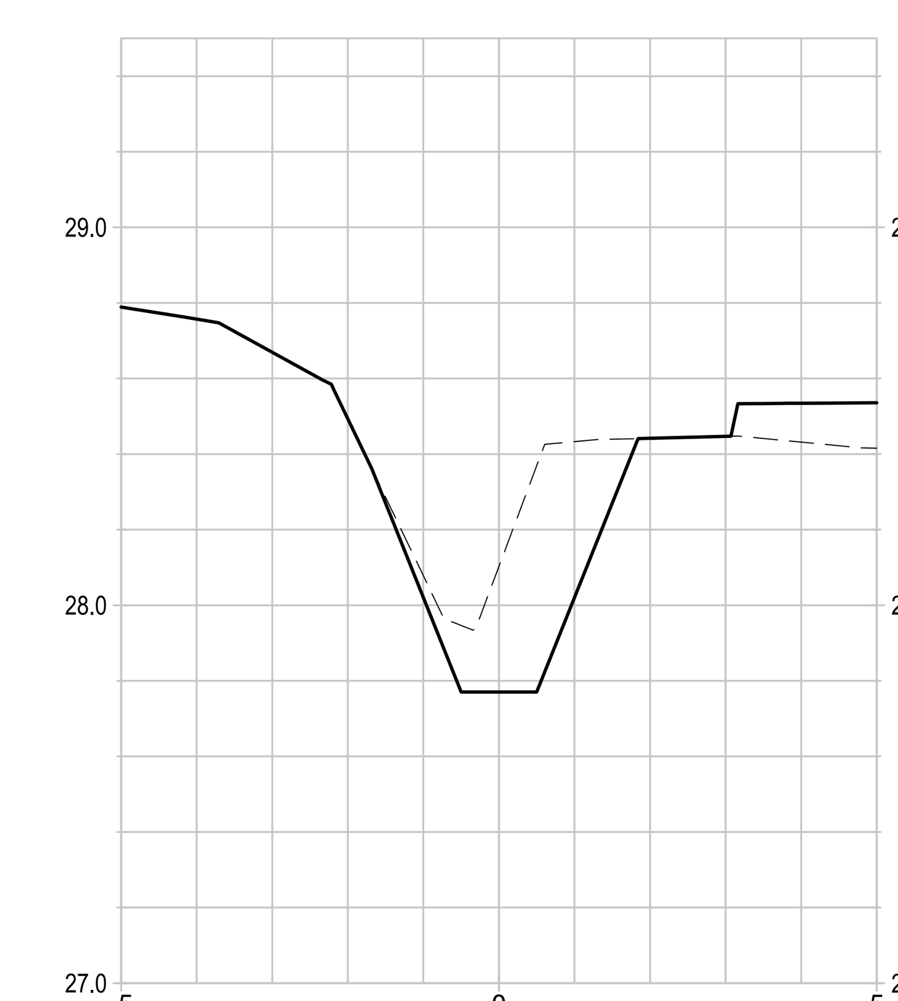
STATION 1+045



STATION 1+060



STATION 1+075



STATION 1+090

NOTE:
SEE WEST DITCH ALIGNMENT FOR STATIONS DWG. G02

LEGEND:
— — — — EXISTING GRADE
———— PROPOSED GRADE

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1	ISSUED FOR 66% CLIENT REVIEW	2020.11.27	PL

DESIGN: JH	REVIEWED BY: PL
DRAWN: TPW/BS	CHECKED BY: JH
DATE: APRIL 2021	
SCALE: 1:100 1:20	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

WEST DITCH AND PARKING PAD - SECTIONS

PROJECT NO. 20-3451

SHEET NO. **G06**

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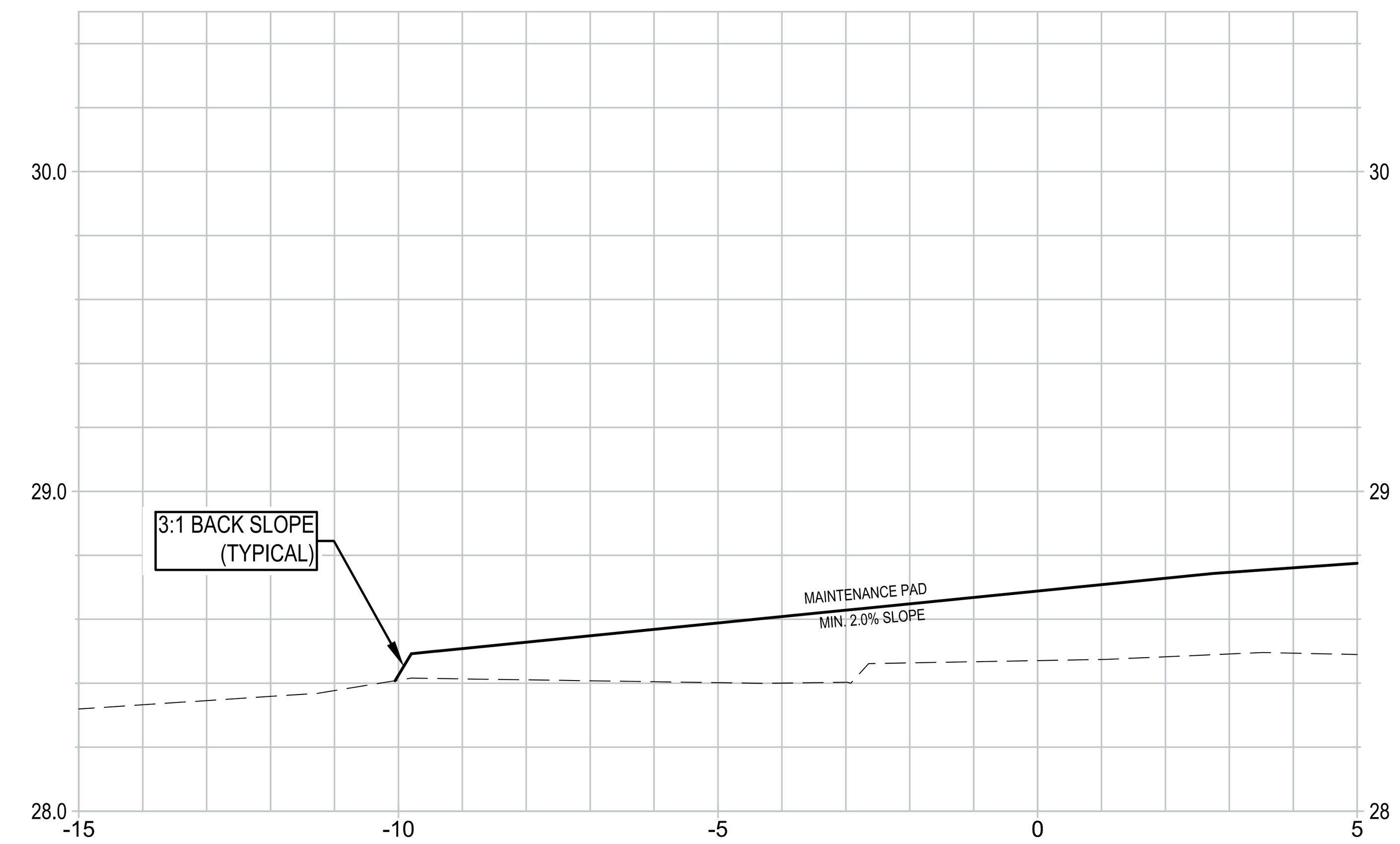

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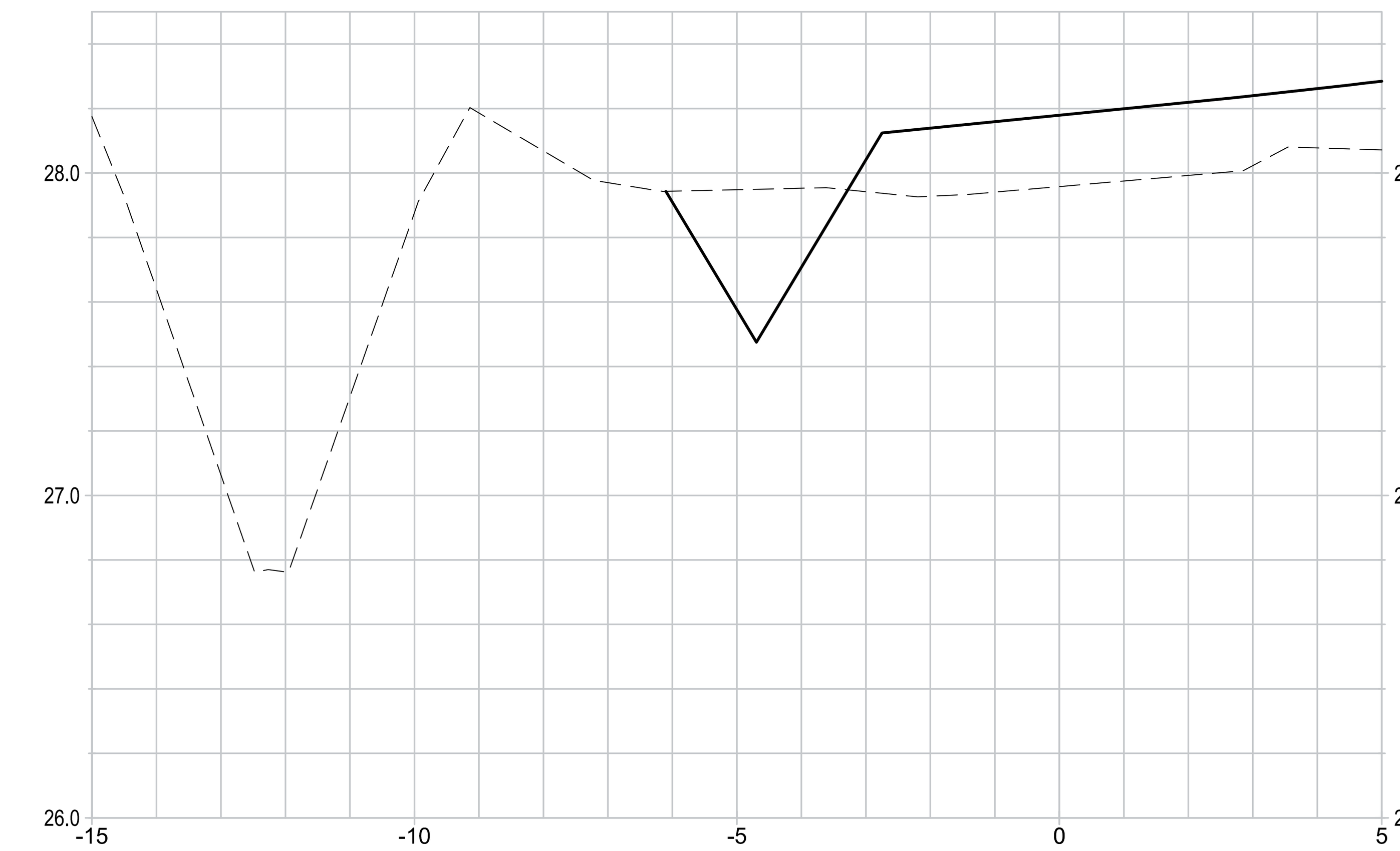

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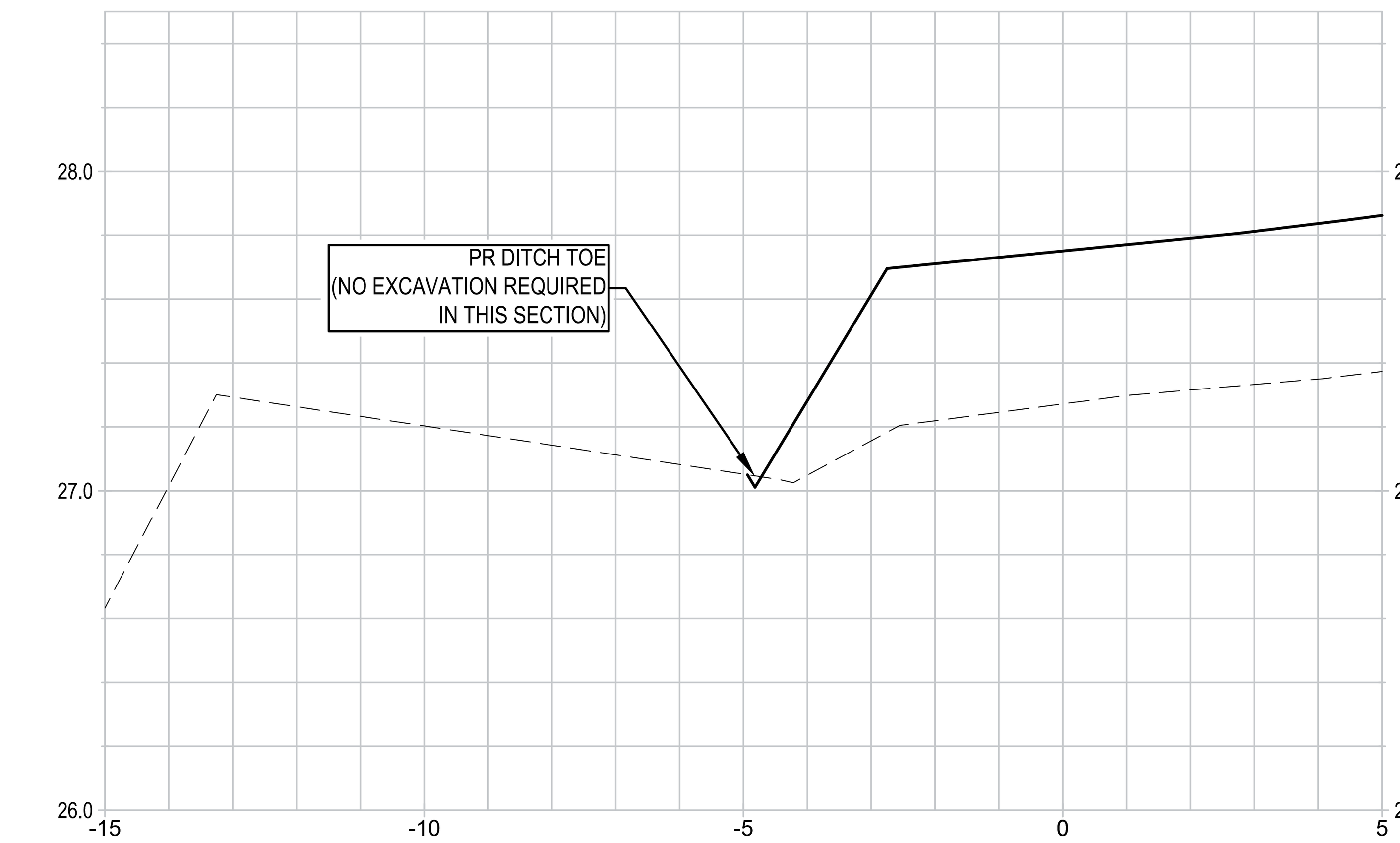

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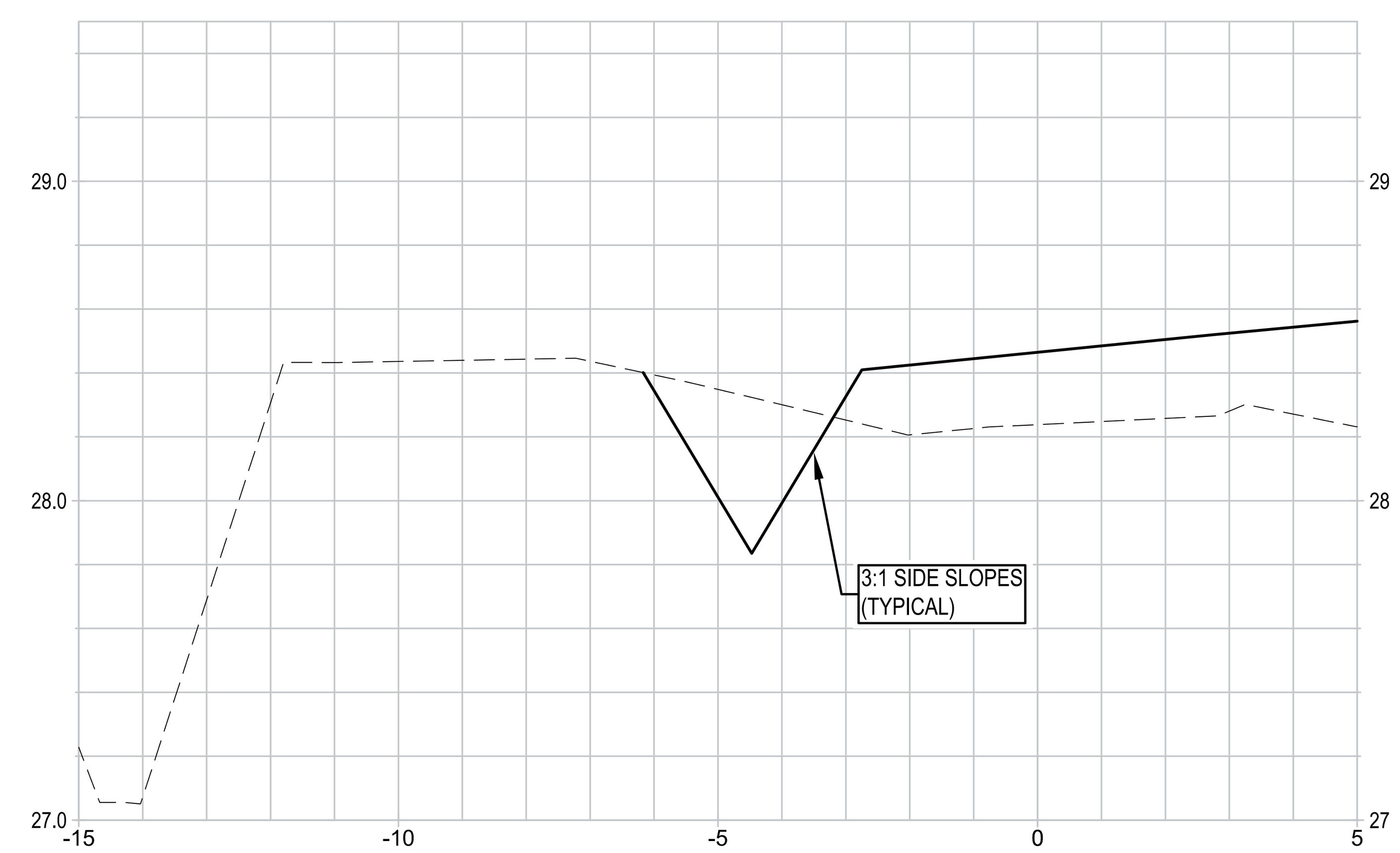

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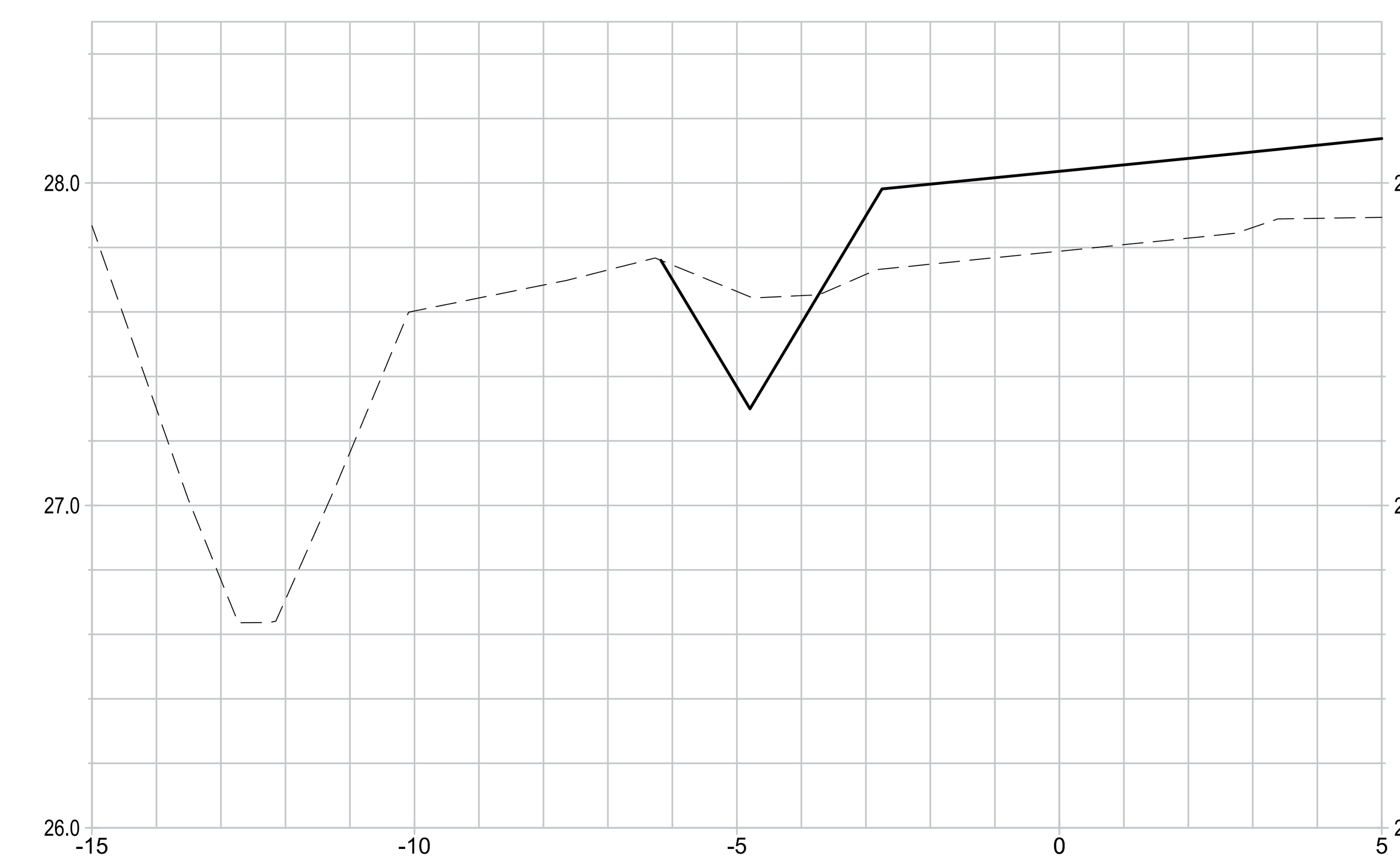

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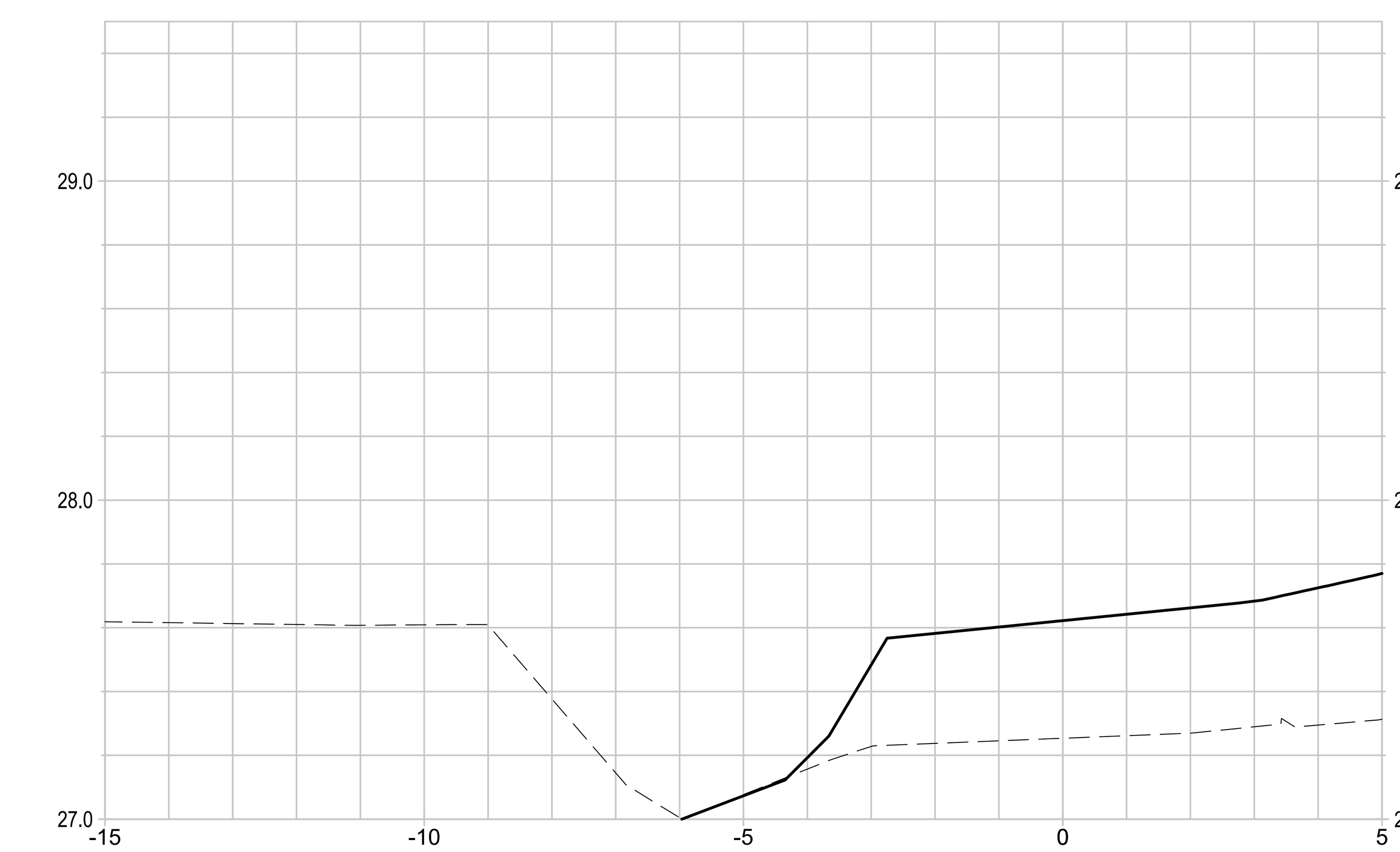

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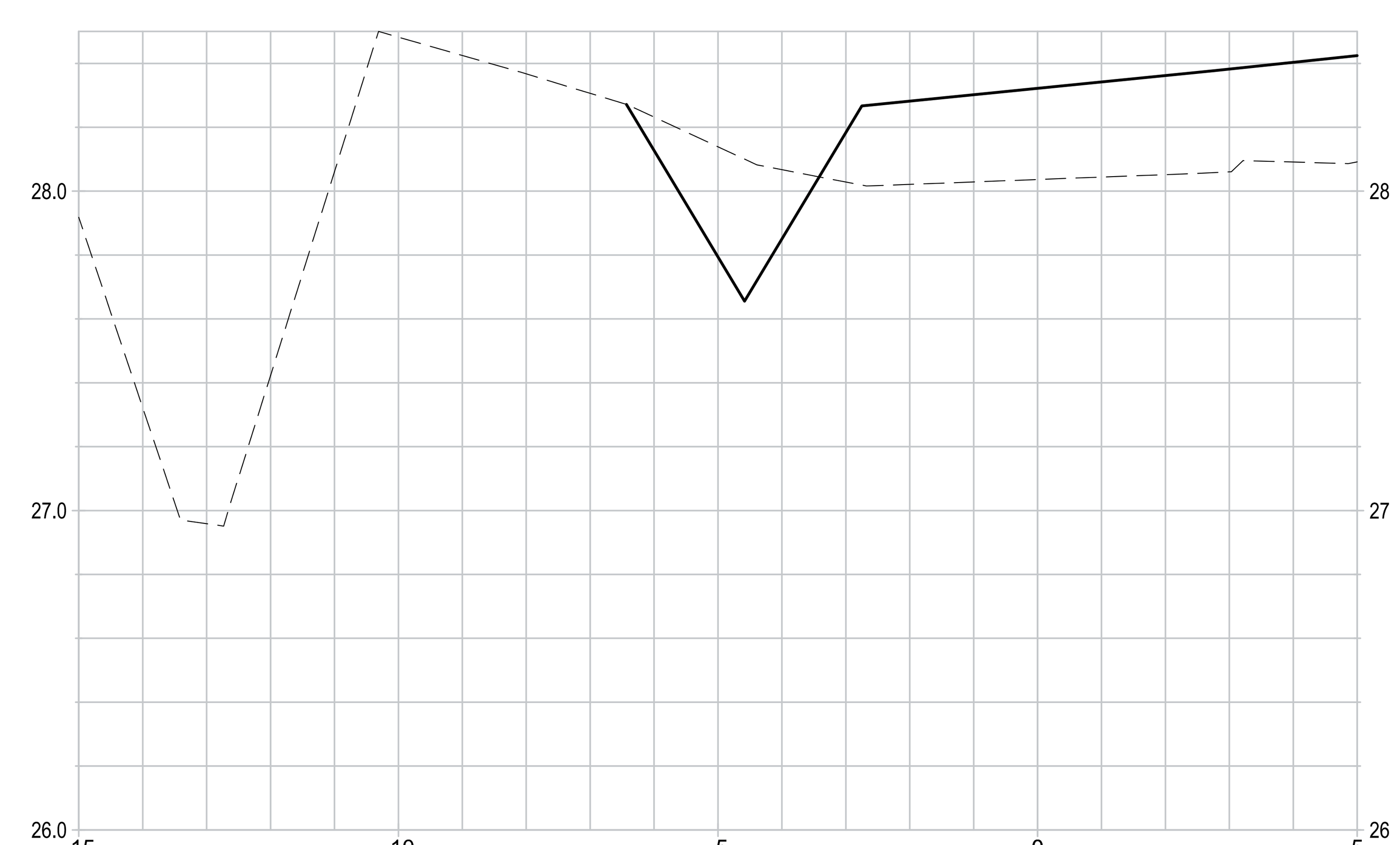

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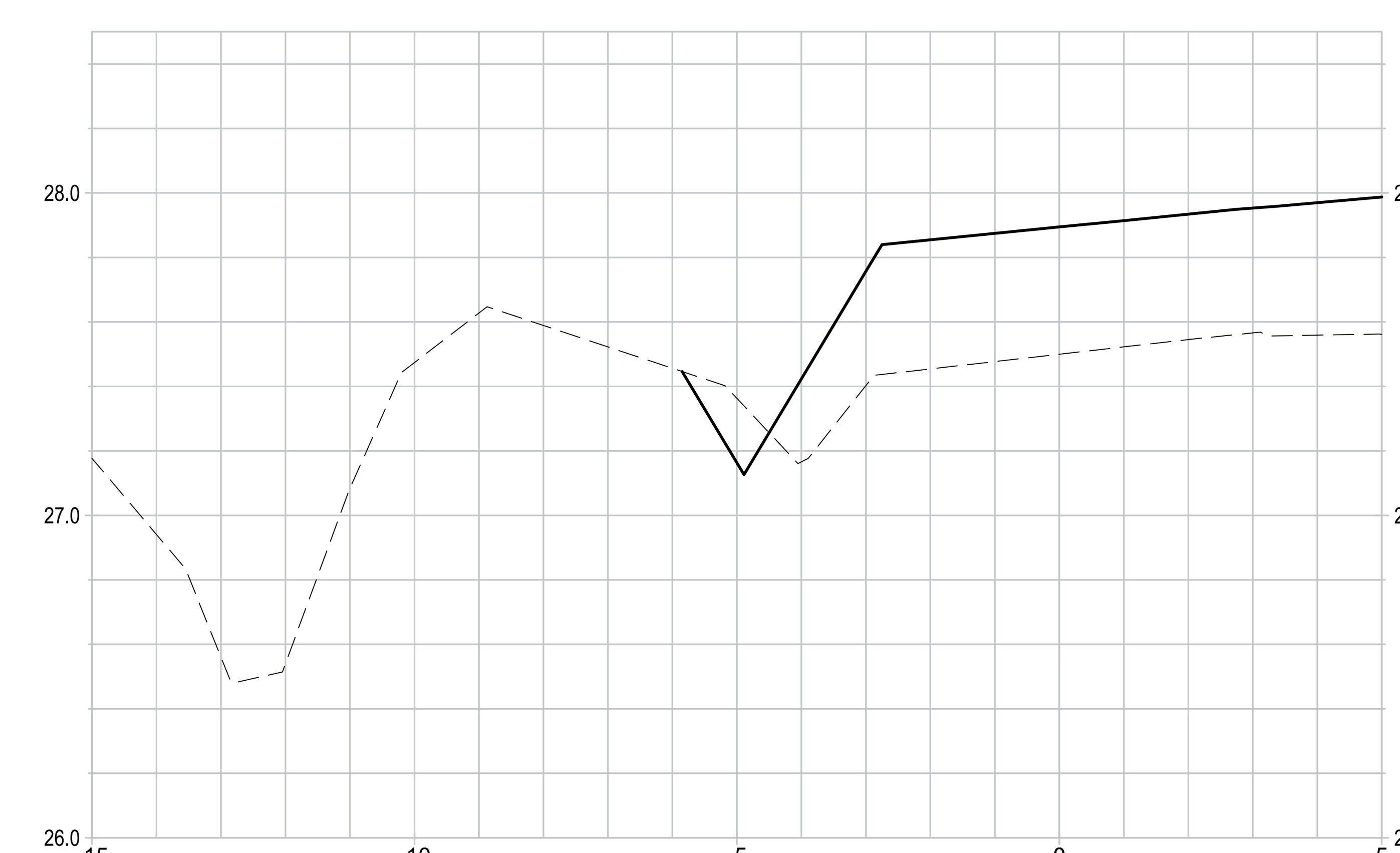

STATION 2+089.91

NOTE:
SEE NORTH PATH ALIGNMENT FOR STATIONS DWG. G02

LEGEND:
— — — — EXISTING GRADE
———— PROPOSED GRADE

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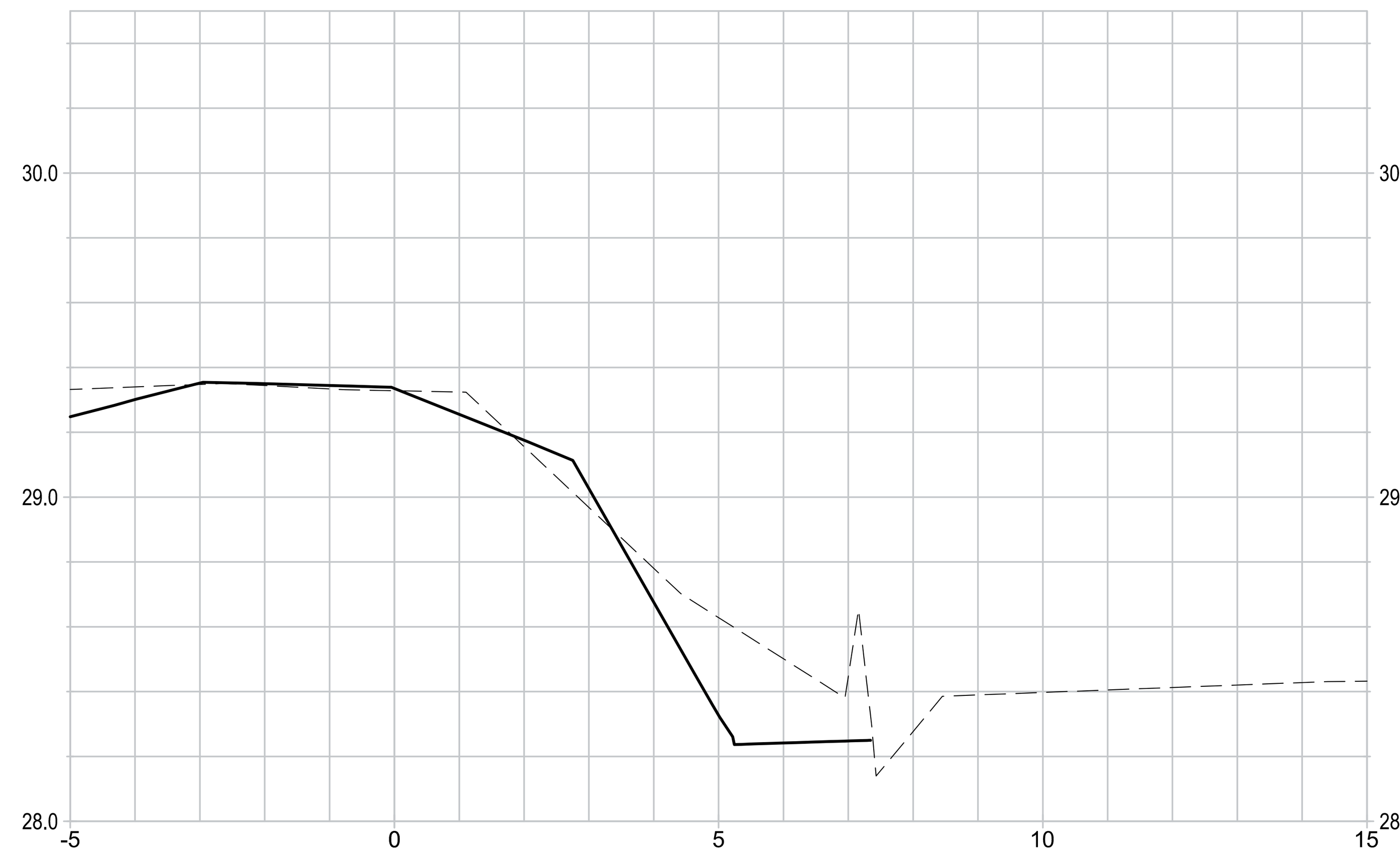
SCALE: 1:100 1:20	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

NORTH PERIMETER PATH AND DITCH SECTIONS

PROJECT NO. **20-3451**

SHEET NO. **G07**



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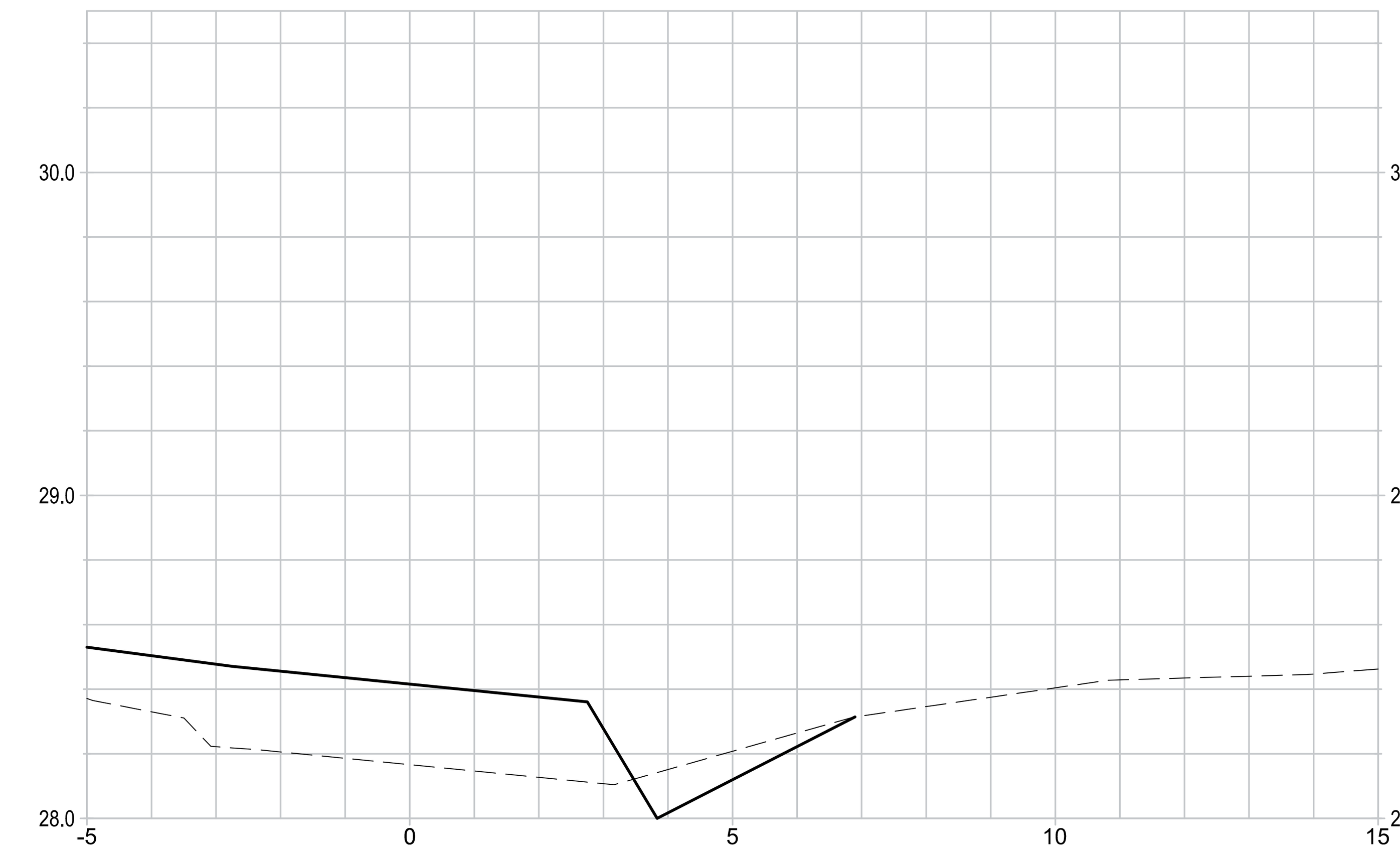

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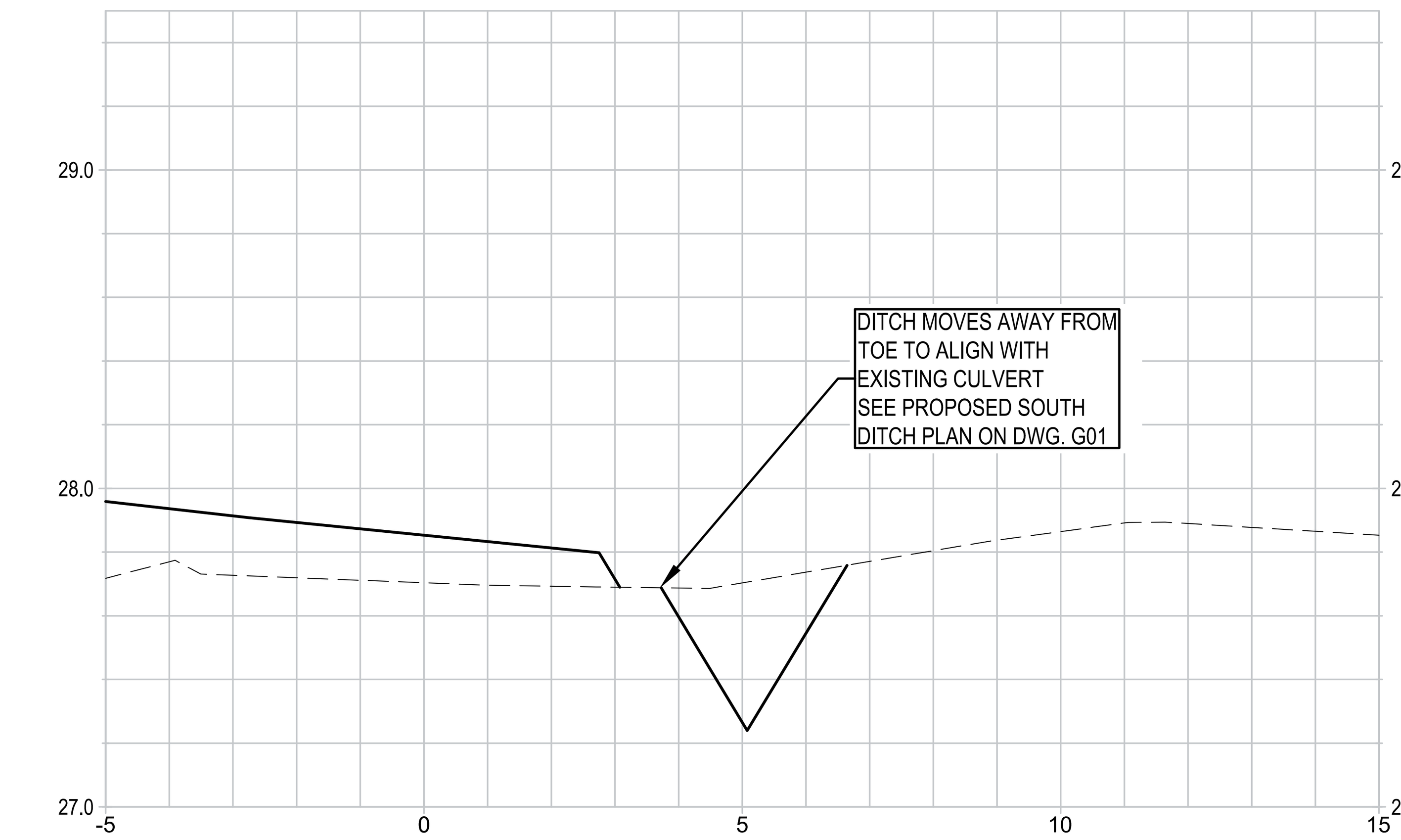

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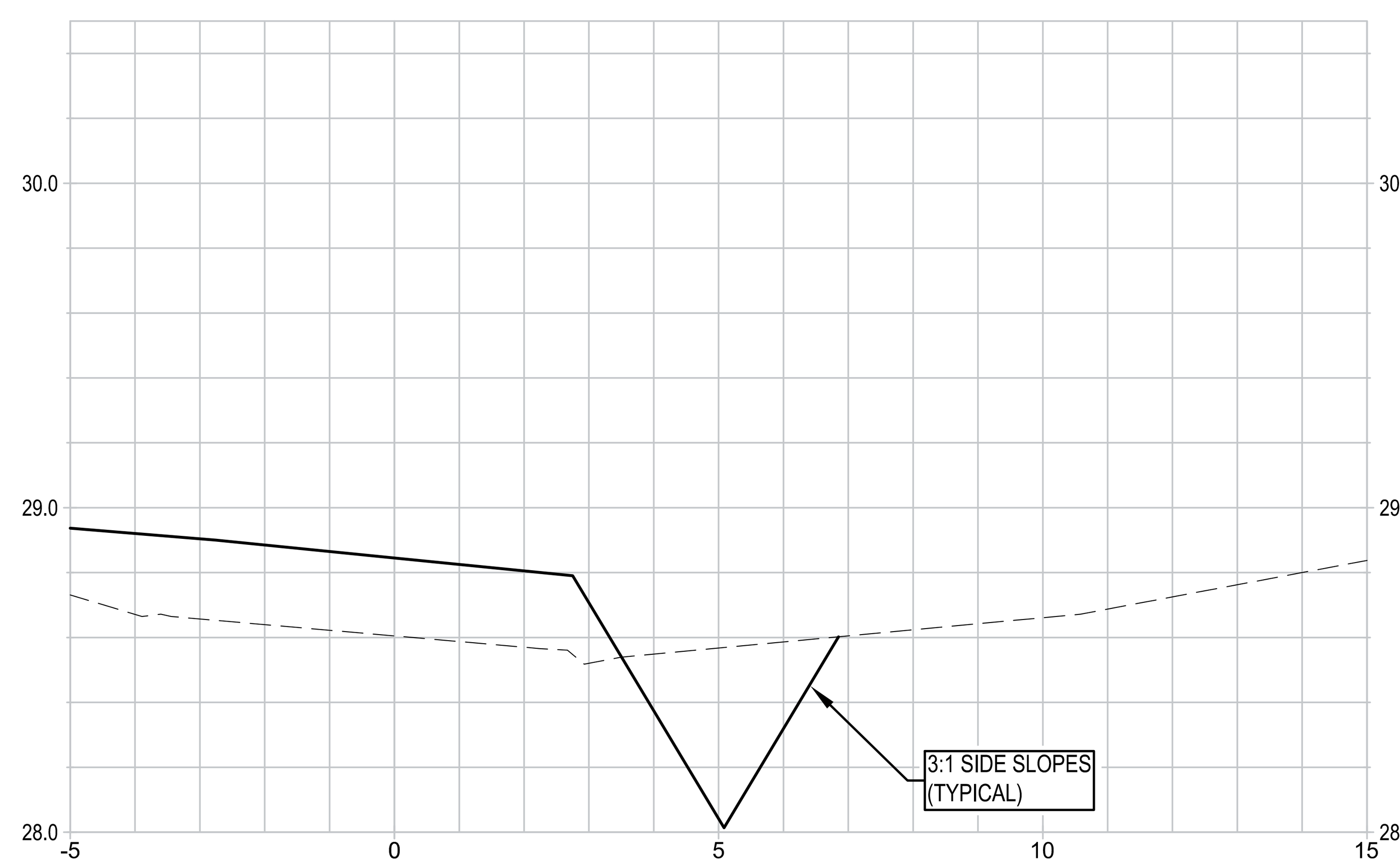

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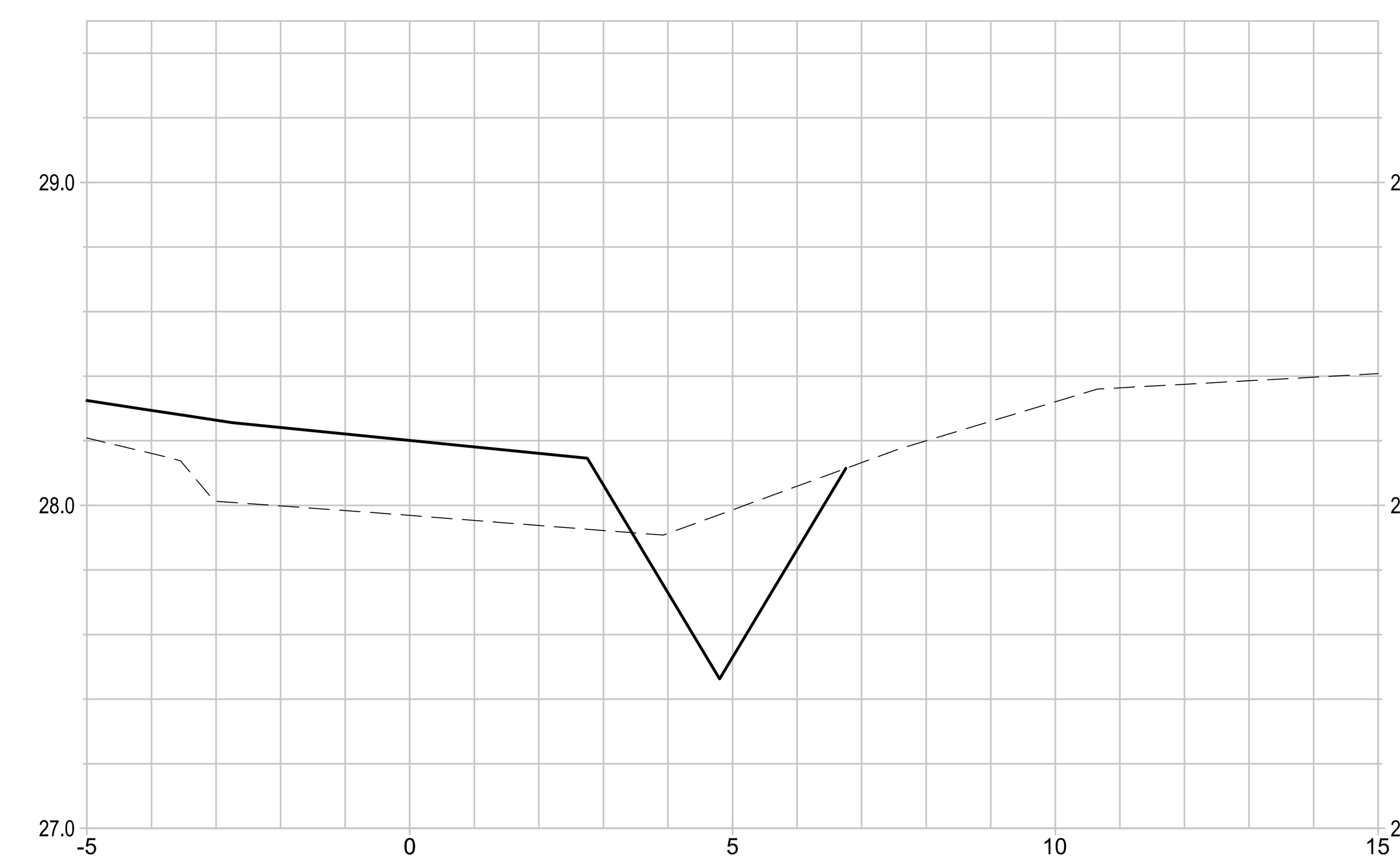

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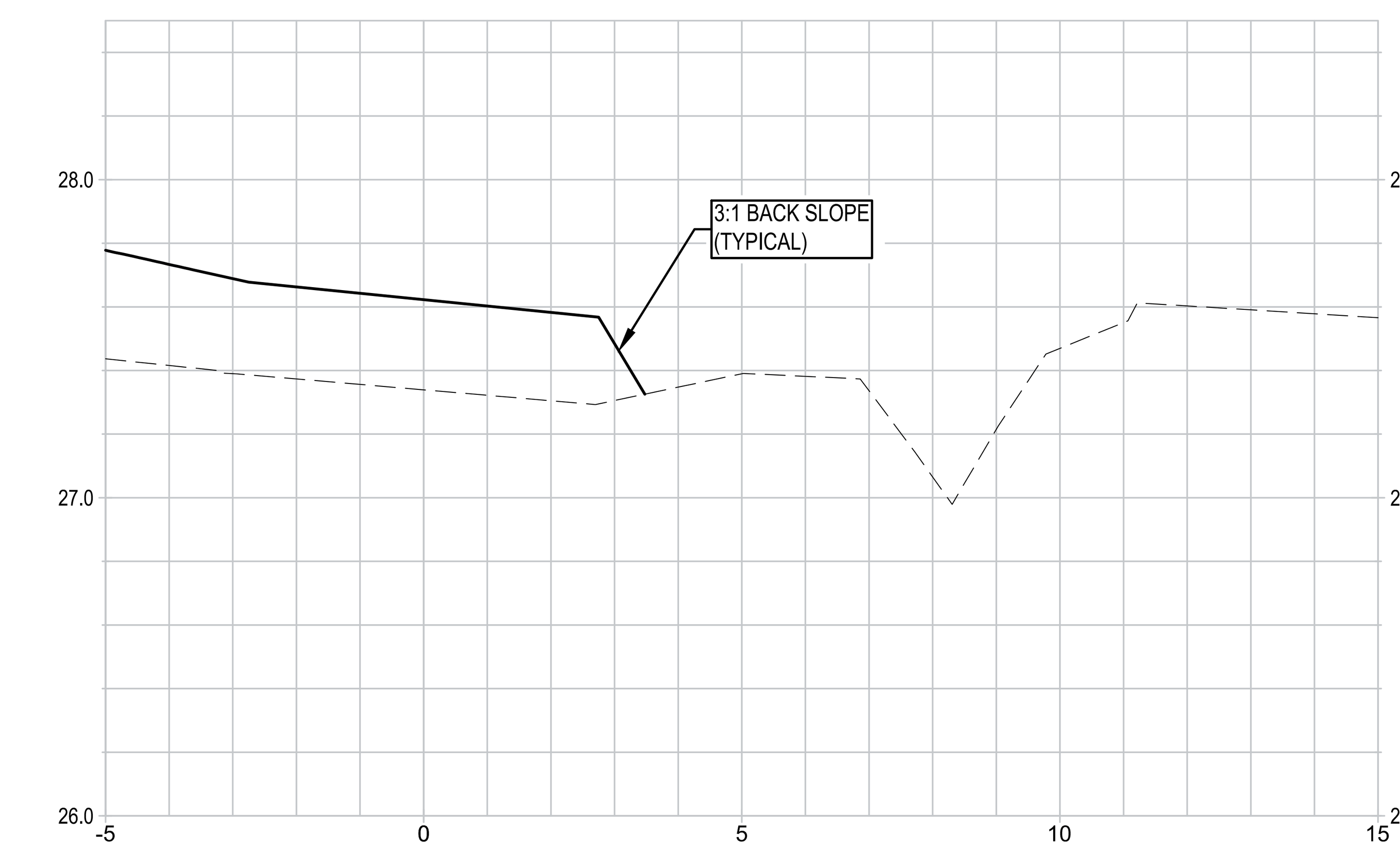

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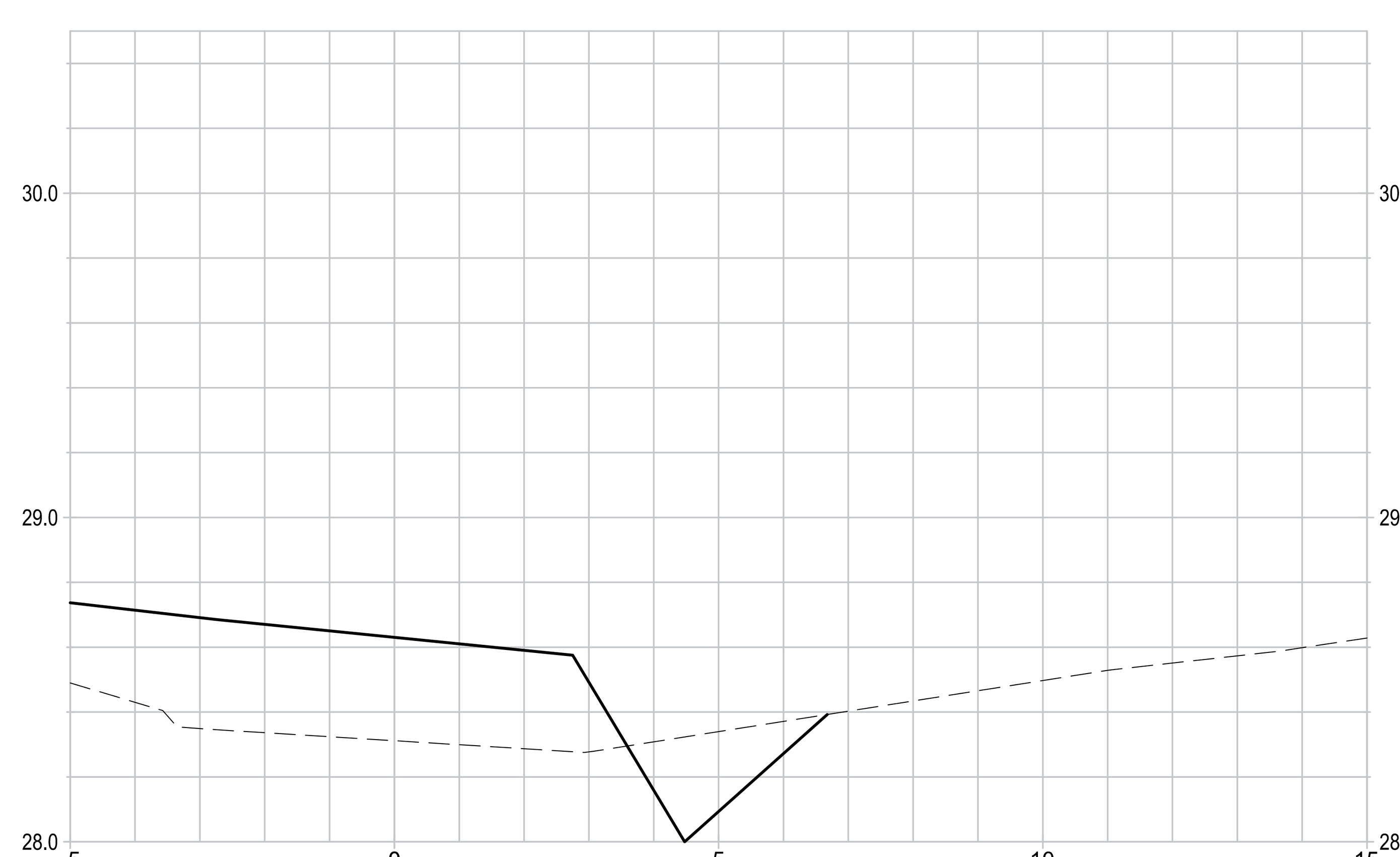

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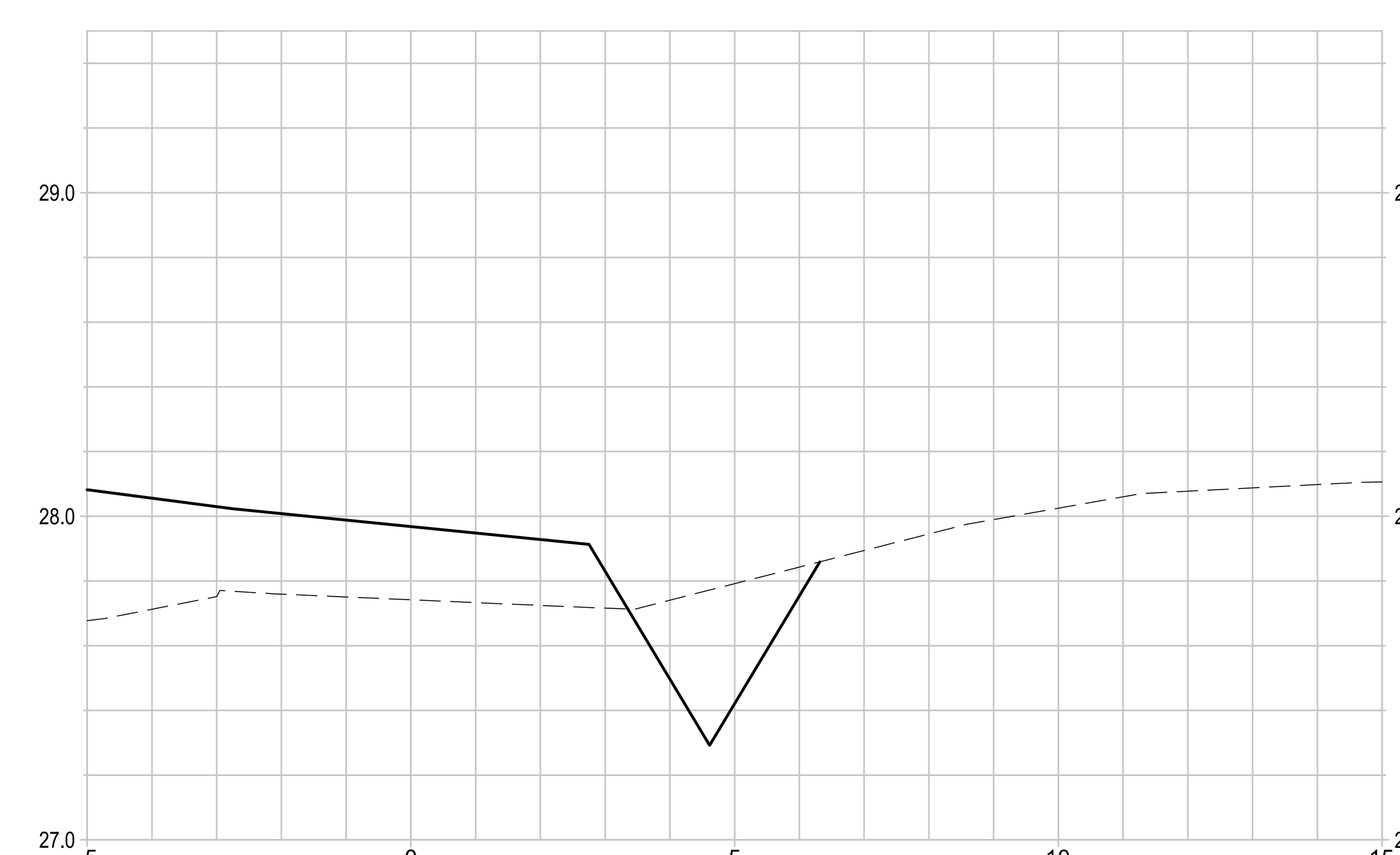

STATION 4+080

NOTE:
SEE SOUTH PATH ALIGNMENT FOR
STATIONS DWG. G02

LEGEND:
— — — — — EXISTING GRADE
———————— PROPOSED GRADE

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JH	PL
DRAWN	CHECKED BY
TPW	JH

DATE
APRIL 2021

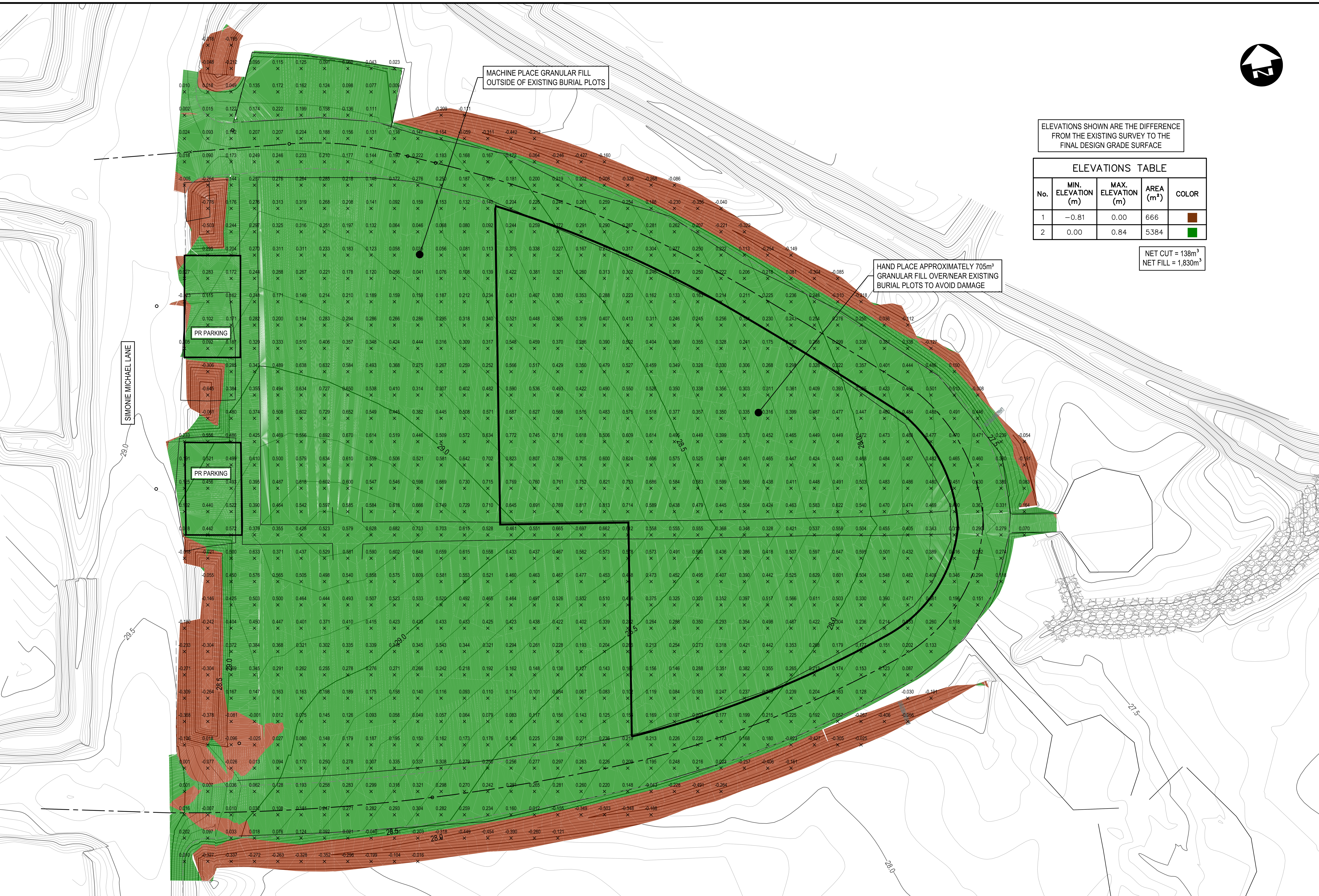
SCALE
1:100
1:20

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

SOUTH PERIMETER PATH AND DITCH SECTIONS

PROJECT NO.
20-3451

SHEET NO.
G08



ELEVATIONS SHOWN ARE THE DIFFERENCE FROM THE EXISTING SURVEY TO THE FINAL DESIGN GRADE SURFACE

ELEVATIONS TABLE

No.	MIN. ELEVATION (m)	MAX. ELEVATION (m)	AREA (m^2)	COLOR
1	−0.81	0.00	666	brown
2	0.00	0.84	5384	green

NET CUT = 138m^3
NET FILL = 1,830m^3

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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3	ISSUED FOR 100% CLIENT REVIEW	2021.01.18	PL
2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	PL
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.27	PL

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SCALE: 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

GRADING DESIGN - CUT FILL ANALYSIS

PROJECT NO. 20-3451

SHEET NO. G09

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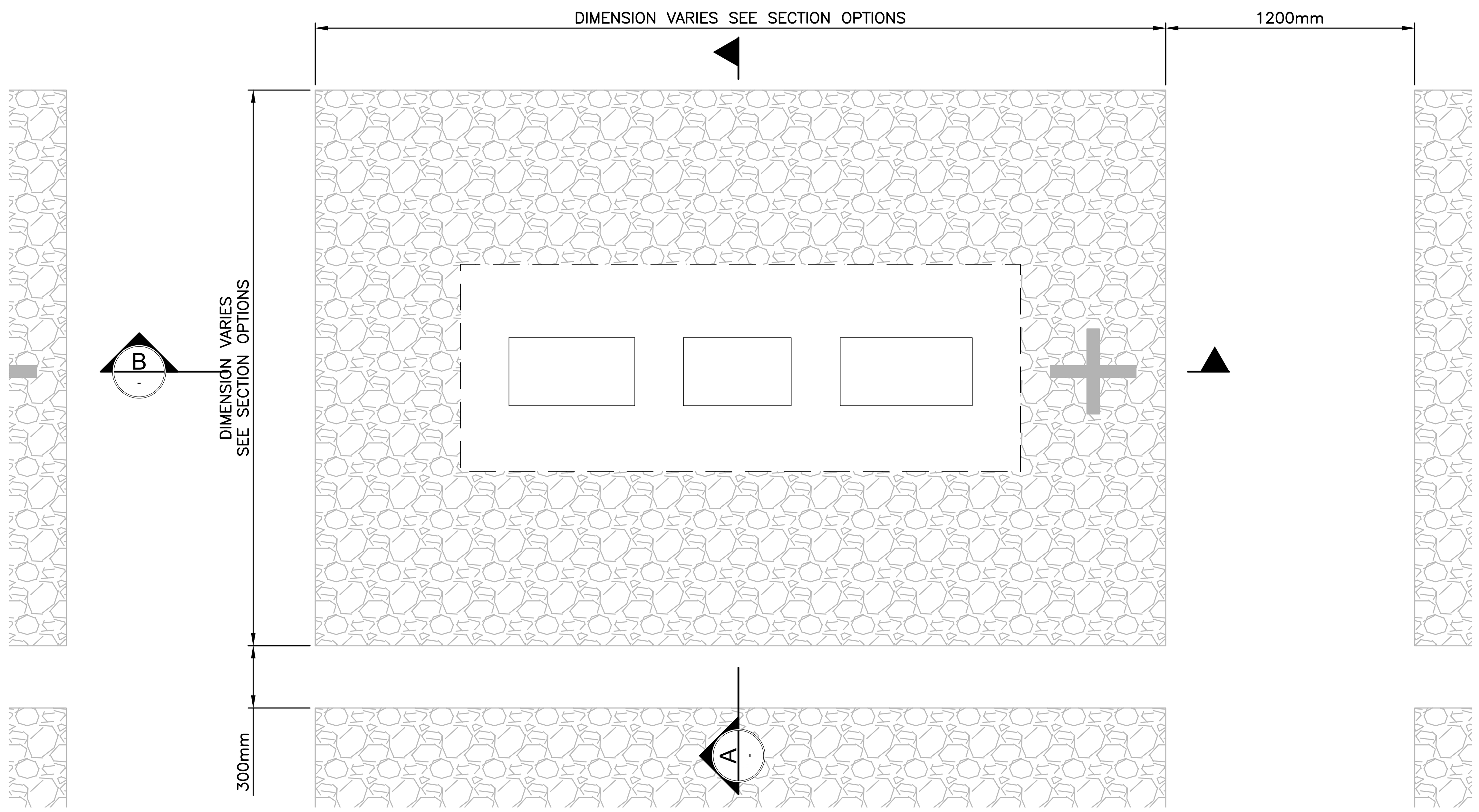
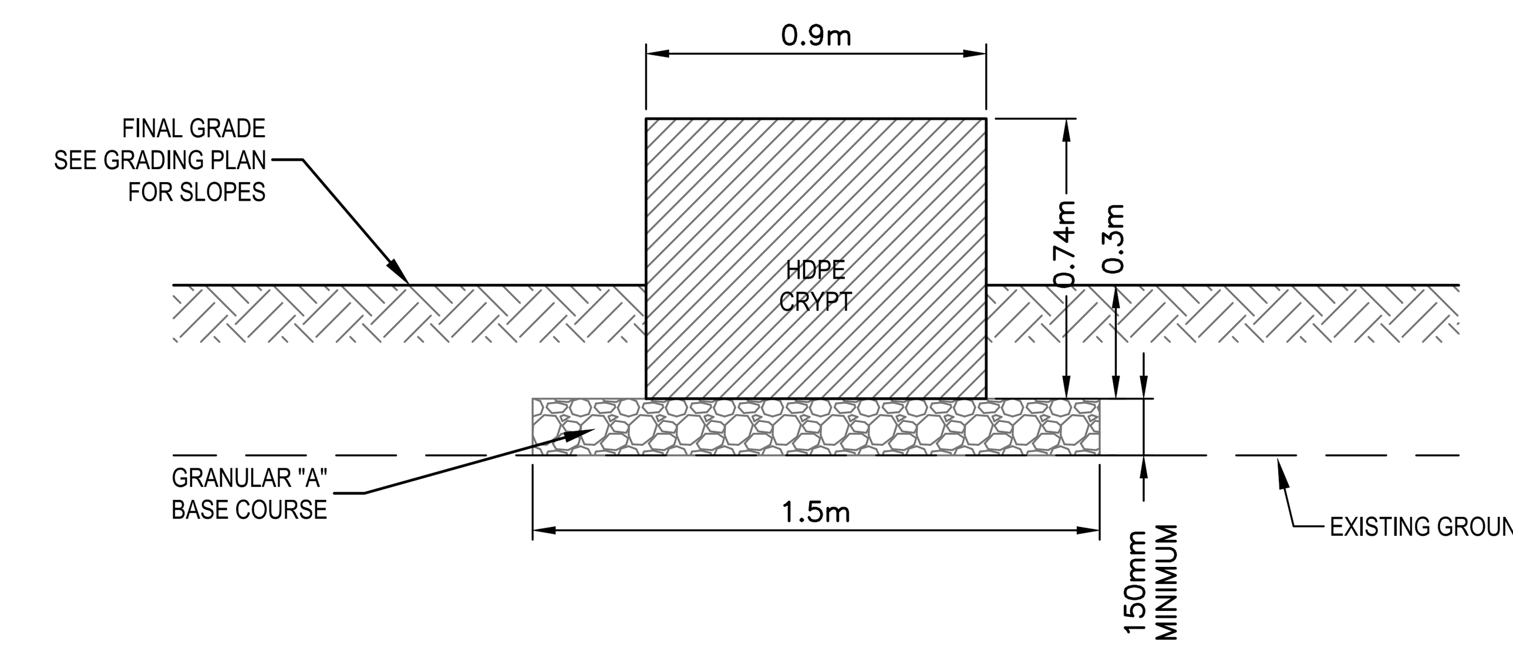
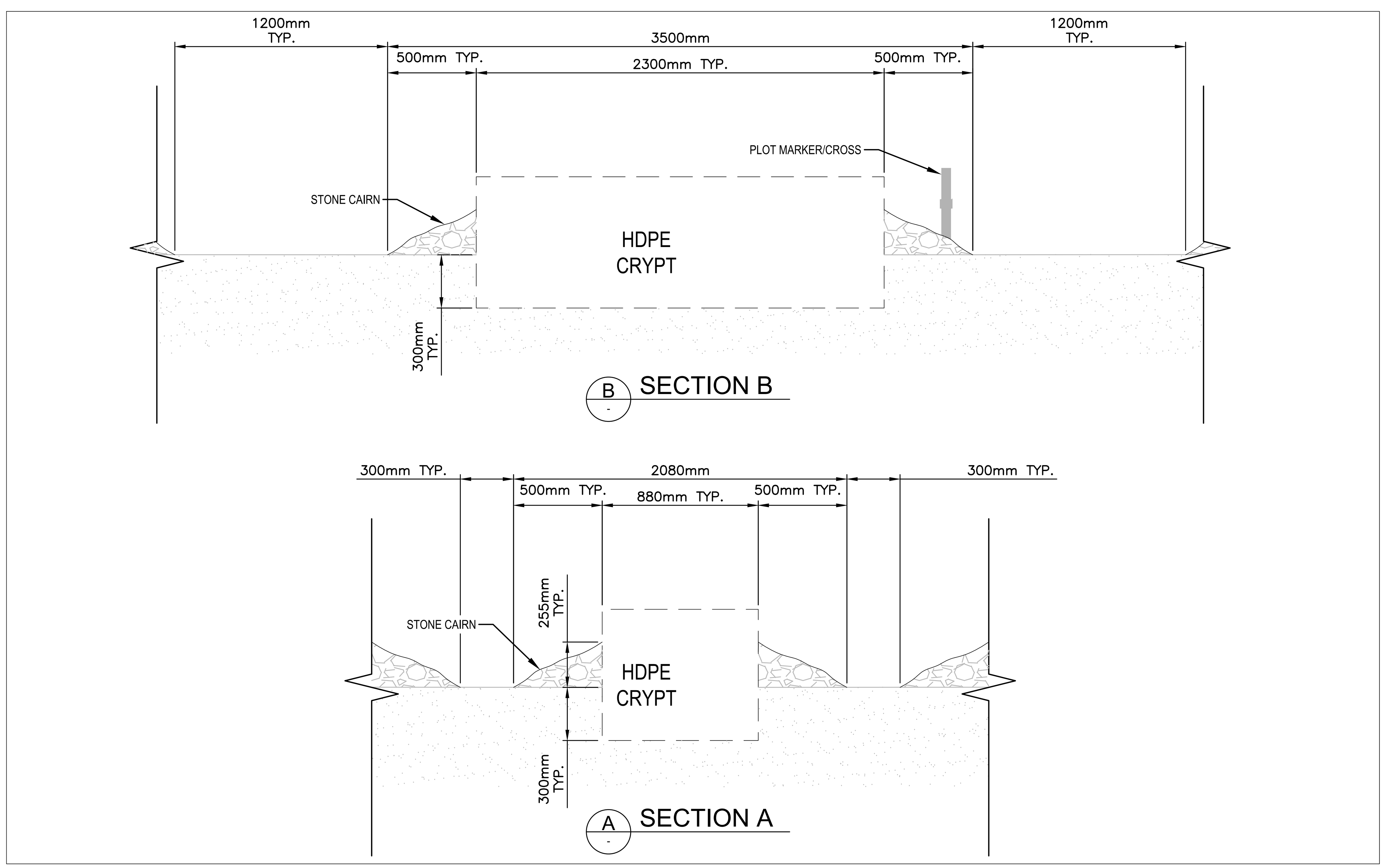


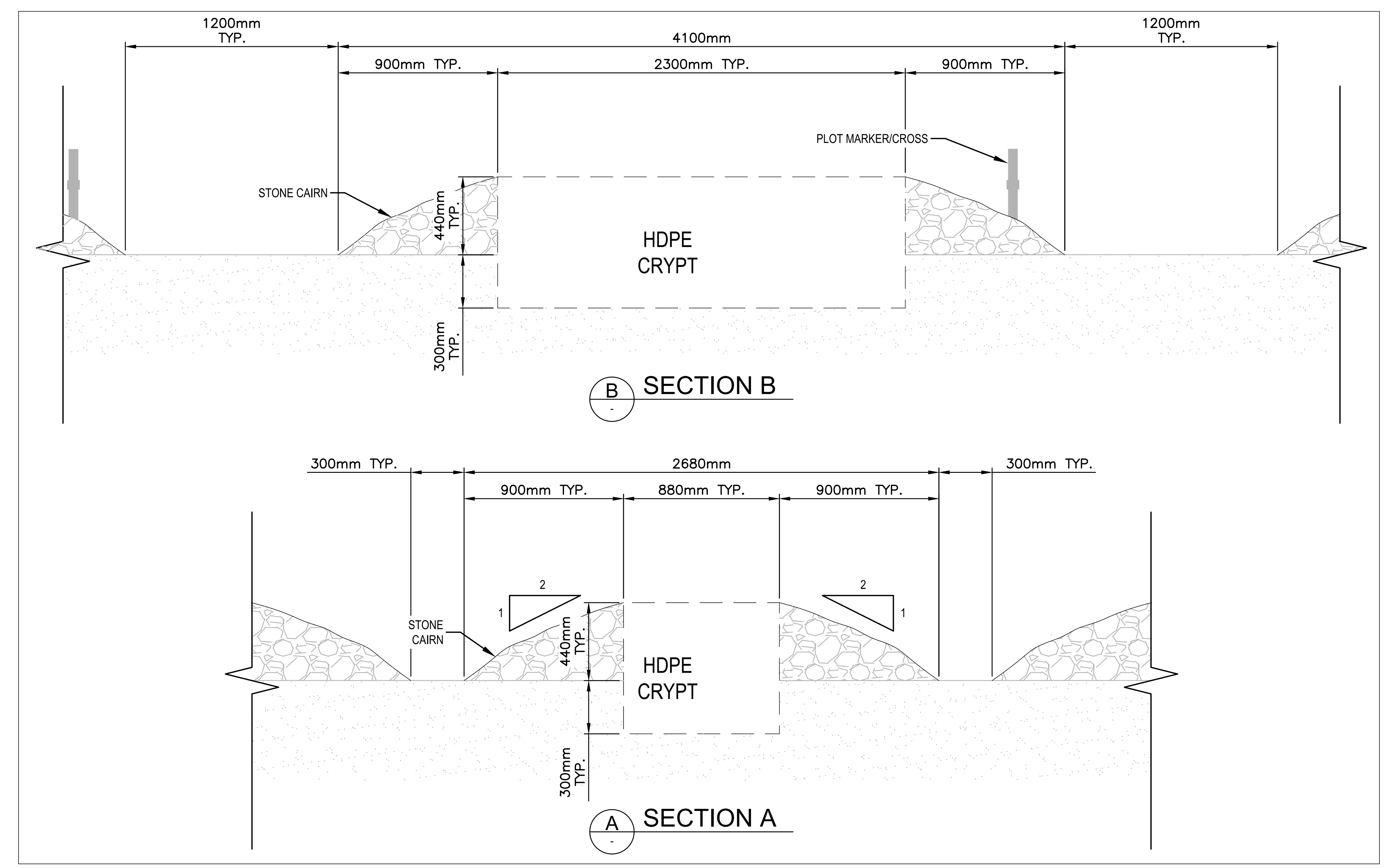
PLAN VIEW
1:20



TYPICAL HDPE CRYPT DETAIL (OPTION 1A)
1:20



OPTION 1B
1:20



OPTION 1C
1:20

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3	ISSUED FOR 100% CLIENT REVIEW	2021.01.18	PL
2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	PL
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.27	PL

DESIGN: JH
REVIEWED BY: PL
DRAWN: BS/TPW
CHECKED BY: JH
DATE: APRIL 2021
SCALE: 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

TYPICAL DETAILS

PROJECT NO. 20-3451

SHEET NO. **G10**

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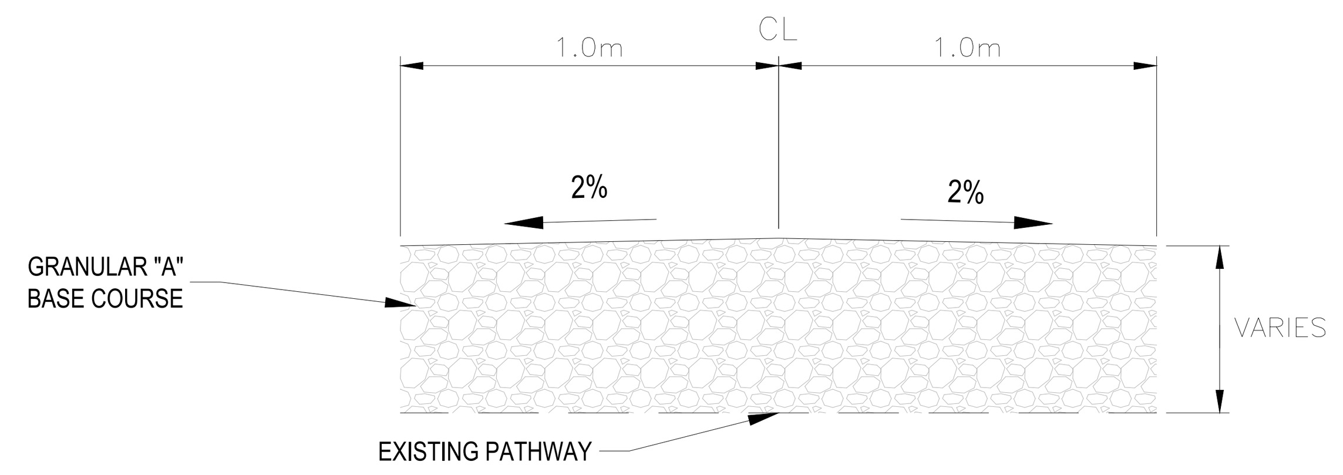
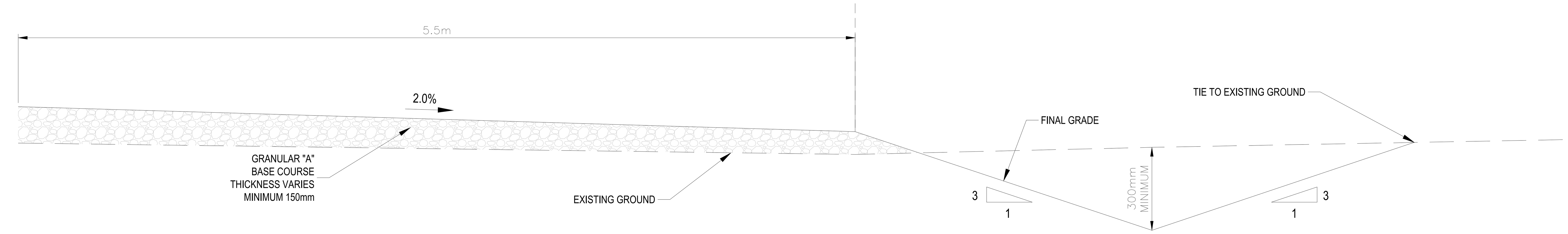
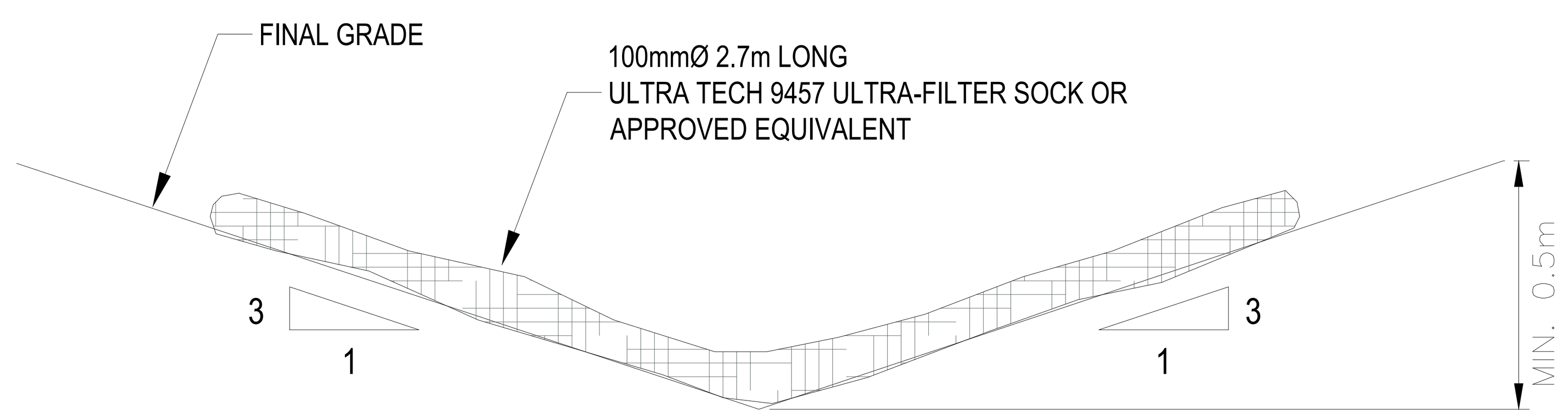


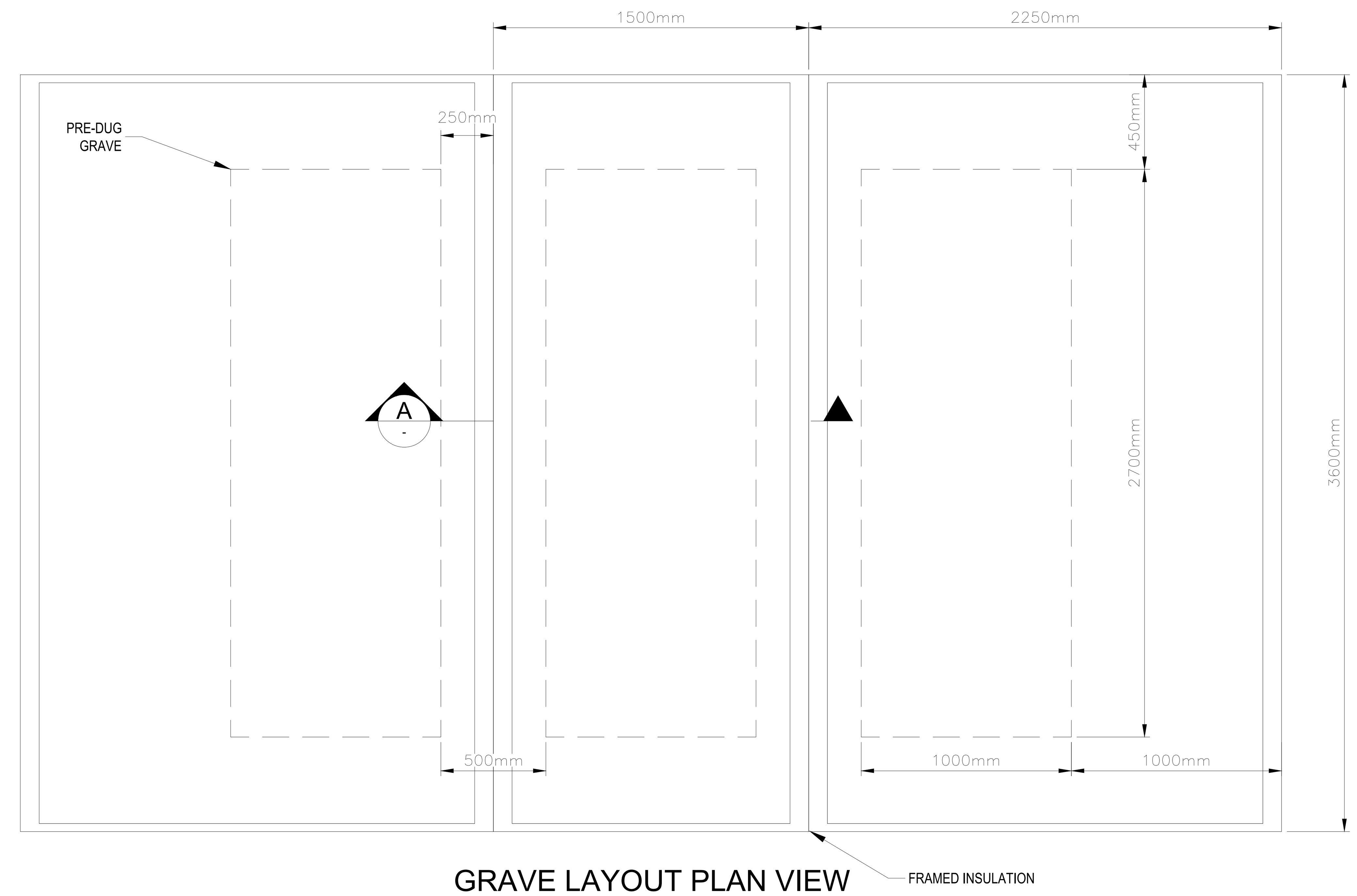
TYPICAL CENTER PATHWAY DETAIL
1:20



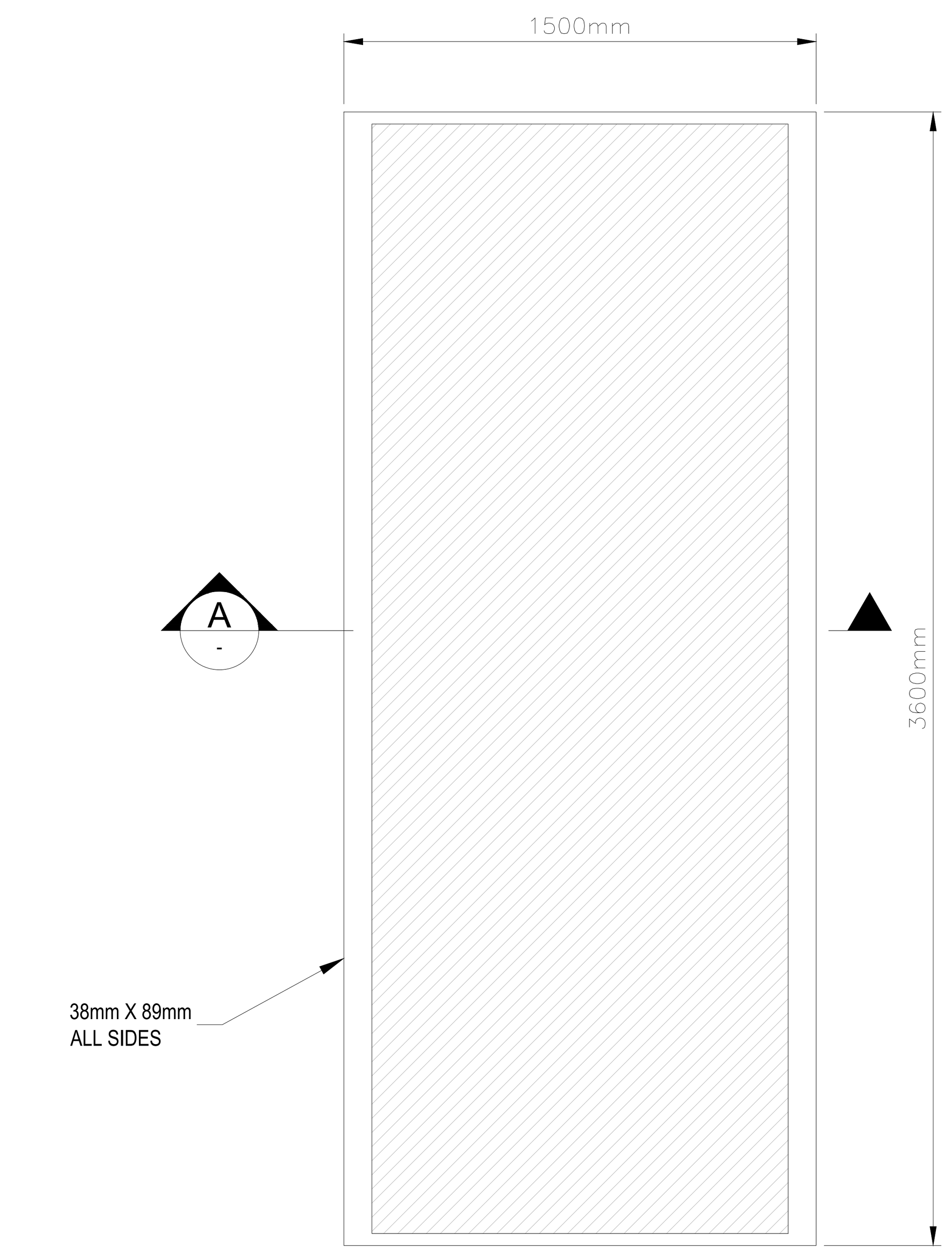
TYPICAL PATHWAY & DITCH DETAIL
1:20



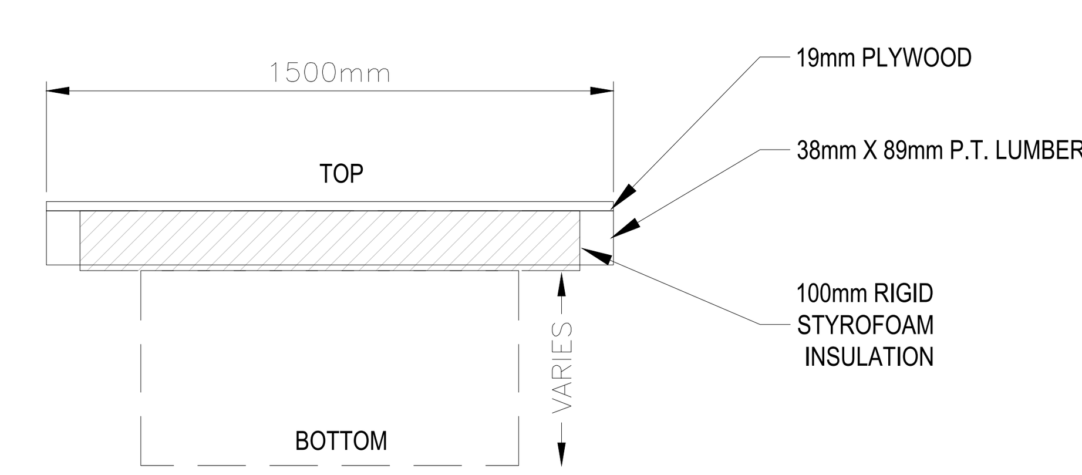
FILTER SOCK DETAIL
N.T.S.



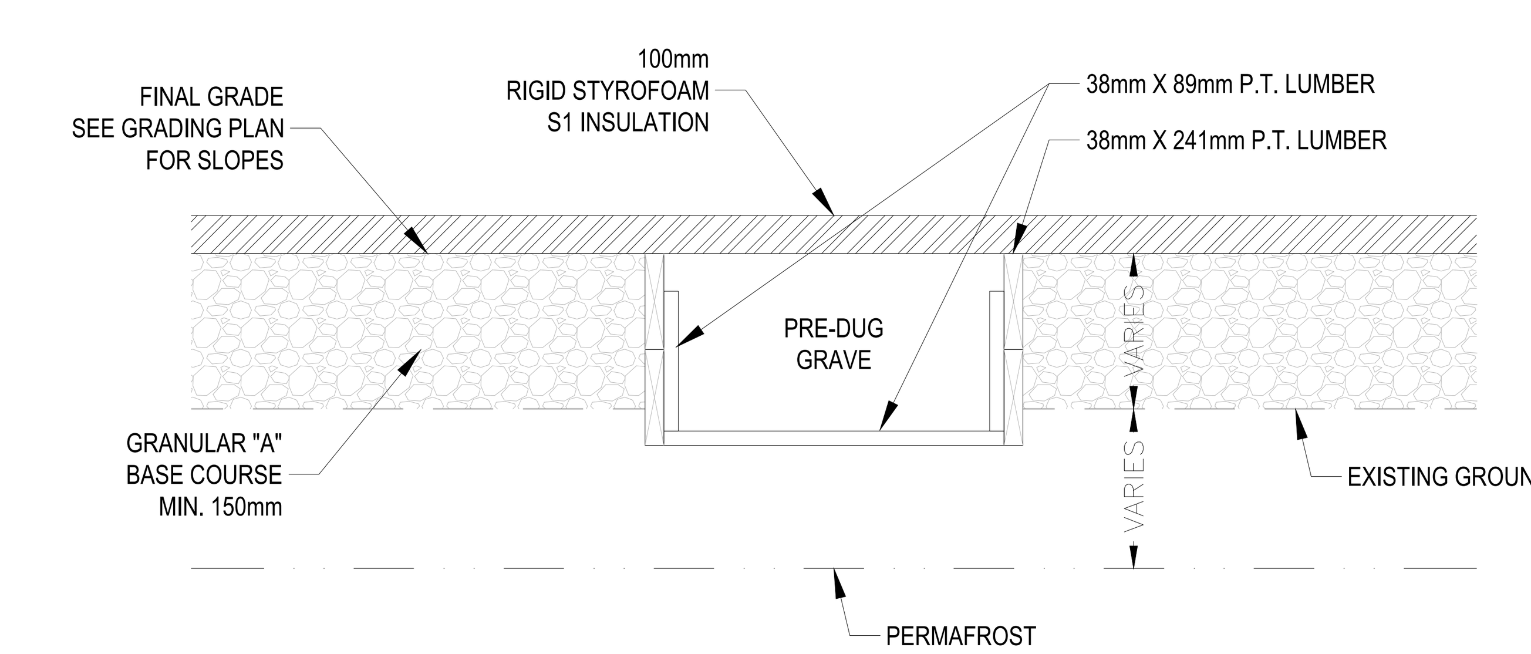
GRAVE LAYOUT PLAN VIEW
1:20



INSULATION FRAME COVER PLAN
1:20

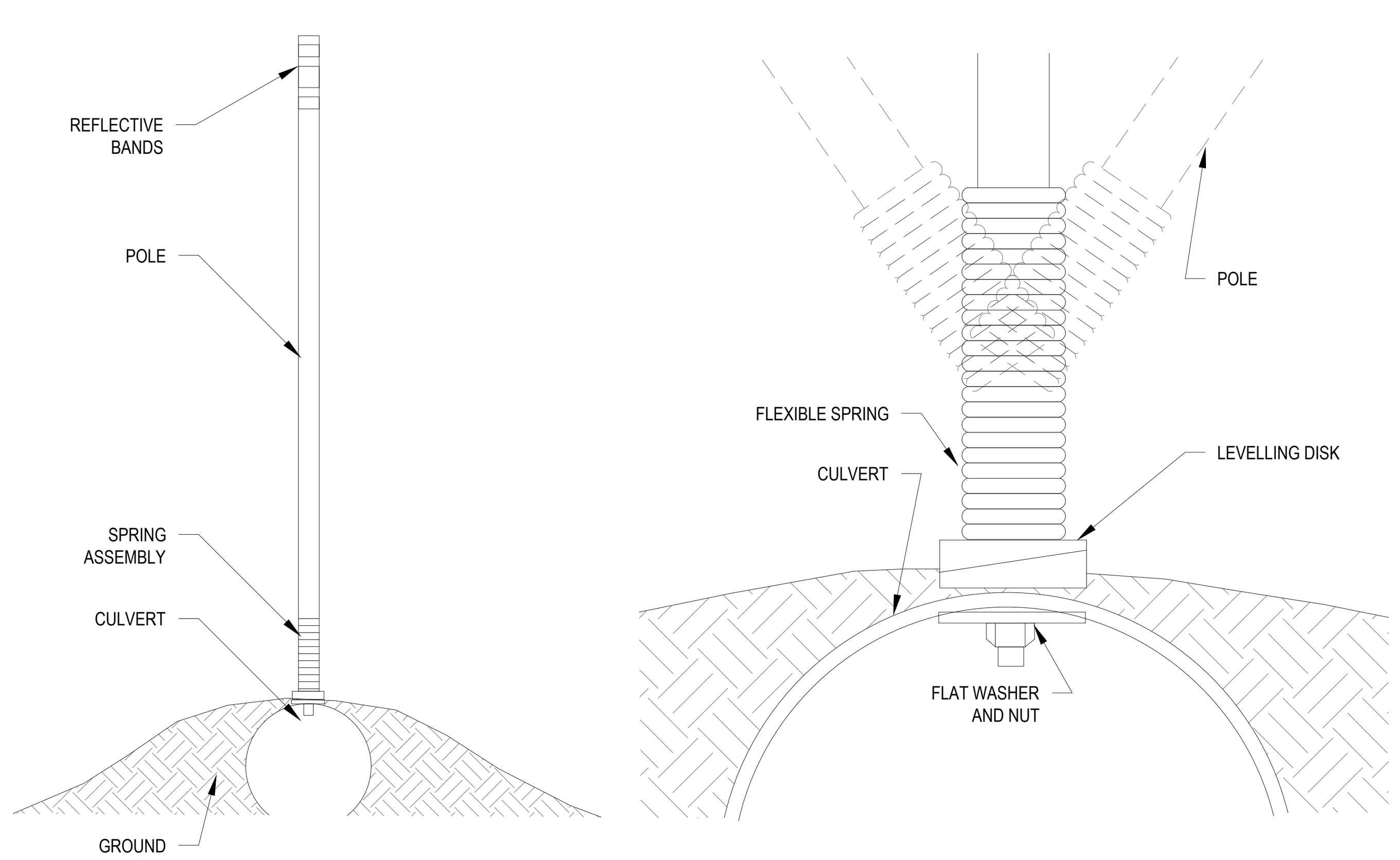


A SECTION A
1:20



INSULATION DETAIL OPTION 2
1:20

TYPICAL GRAVE DETAILS
AS SHOWN



CULVERT MARKER DETAIL
N.T.S.

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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5	100% DESIGN ISSUED FOR FINAL REVIEW	2021.04.23	PL
4	RE-ISSUED FOR 100% CLIENT REVIEW	2021.03.22	PL
3	ISSUED FOR 100% CLIENT REVIEW	2021.01.18	PL
2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	PL
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.27	PL

DESIGN: JH	REVIEWED BY: PL
DRAWN: BS/TPW	CHECKED BY: JH
DATE: APRIL 2021	
SCALE: 1:200	

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

TYPICAL DETAILS

PROJECT NO. **20-3451**

SHEET NO. **G11**

CEMETERY ROAD

REVISED PLOT LAYOUT

50 x 50 x 1200 WOODEN STAKES AT CORNER OF ROWS, TYP.

PROPOSED INFILL PLOT, TYP.

1.5m RECOMMENDED OFFSET FROM MARKER TO EDGE OF PATH TO ACCOMMODATE SNOW CLEARANCE.

EXISTING DRAINAGE DITCH

CEREMONIAL SPACE

EXISTING PLOTS, TYP.

INFANT AND SCATTERING GARDEN

SIMONIE MICHAEL LANE

PARKING

PARKING

GRAVEL PATH

GRAVEL PATH

SCALE 1:200 METRES

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\31C0BY\DM548958\203451-08-LAND-DES.DWG PLOTTED BY: BLAQUIERE, CORY
PLOT DATE: 2021-01-18 @ 5:00:57 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB KIT

Conditions of Use

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2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	CB
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.16	CB

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DRAWN: CB | CHECKED BY: PL
DATE: JAN. 2021
SCALE: 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

CEMETERY PLOT LAYOUT OPTION 1A
ABOVE GROUND LAWN CRYPTS
(WITHOUT MEMORIAL CAIRN)

PROJECT NO. 20-3451

SHEET NO. LL-1

CEMETERY ROAD

REVISED PLOT LAYOUT

50 x 50 x 1200 WOODEN STAKES AT CORNER OF ROWS, TYP.

PROPOSED INFILL PLOT, TYP.

1.5m RECOMMENDED OFFSET FROM MARKER TO EDGE OF PATH TO ACCOMMODATE SNOW CLEARANCE.

EXISTING DRAINAGE DITCH

SIMONIE MICHAEL LANE

PARKING

PARKING

GRAVEL PATH

GRAVEL PATH

CEREMONIAL SPACE

INFANT AND SCATTERING GARDEN

EXISTING PLOTS, TYP.

GG FF FF EE EE DD DD CC CC BB BB AA AA

LOT COUNT	
EXISTING PLOTS	124
NEW VAULTS (SEE FIGURE 8)	96
NEW INFILL VAULTS (SEE FIGURE 8)	4
NEW TOTAL	224

⊗ WOODEN STAKE

SCALE 1:200 METRES

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\31C0B\DMS48958\203451-08-LAND-DES.DWG PLOTTED BY: BLAQUIERE, CORY KIT
PLOT DATE: 2021-01-18 @ 5:06:38 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	CB
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.16	CB

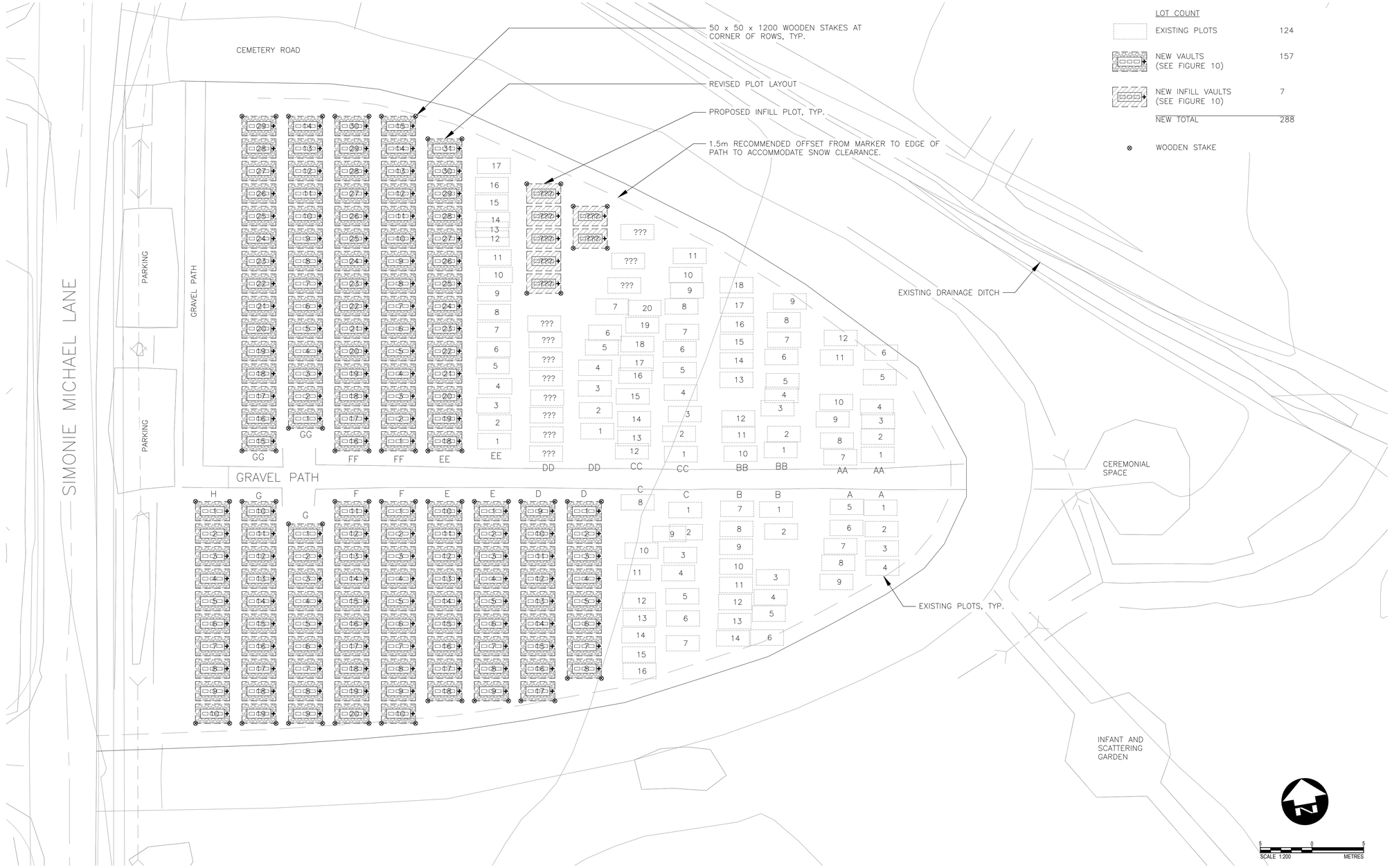
DESIGN CB | REVIEWED BY JH
DRAWN CB | CHECKED BY PL
DATE JAN. 2021
SCALE 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

CEMETERY PLOT LAYOUT OPTION 1B
ABOVE GROUND LAWN CRYPTS
(INCLUDING 900mm OFFSET FOR MEMORIAL CAIRN)

PROJECT NO. 20-3451

SHEET NO. LL-2



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2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	CB
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.16	CB

DESIGN: CB | REVIEWED BY: JH
DRAWN: CB | CHECKED BY: PL
DATE: JAN. 2021
SCALE: 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

CEMETERY PLOT LAYOUT OPTION 1C
ABOVE GROUND LAWN CRYPTS
(INCLUDING 500mm OFFSET FOR MEMORIAL CAIRN)

PROJECT NO. 20-3451

SHEET NO. LL-3

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\31C0B\DM548958\203451-08-LAND-DES.DWG PLOTTED BY: BLAQUIERE, CORY
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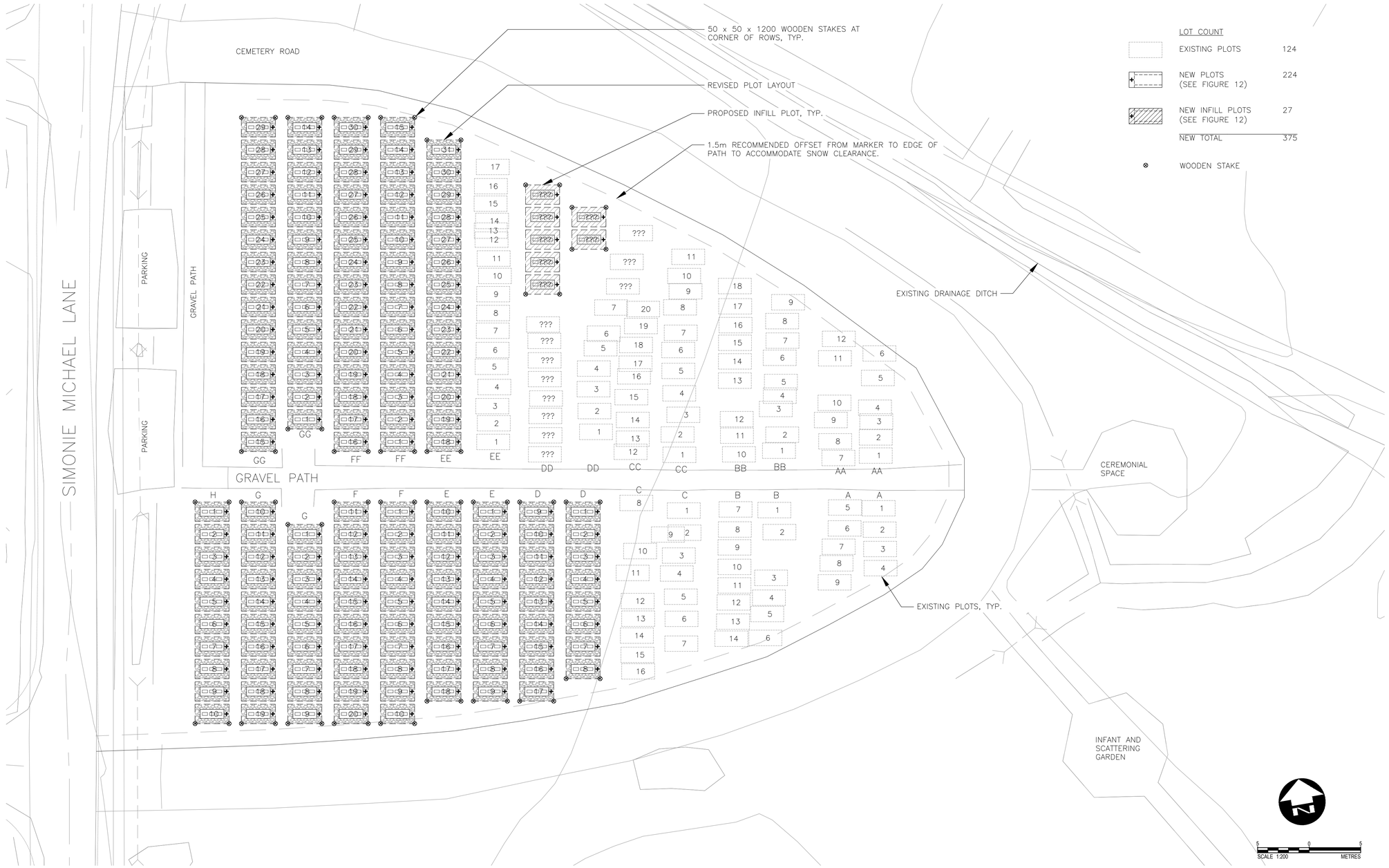

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PLOT DATE: 2021-01-18 @ 5:07:38 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB KIT

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2	ISSUED FOR 99% CLIENT REVIEW	2020.12.21	CB
1	ISSUED FOR 66% CLIENT REVIEW	2020.11.16	CB

DESIGN CB | REVIEWED BY JH
DRAWN CB | CHECKED BY PL
DATE JAN. 2021
SCALE 1:200

CITY OF IQALUIT
IQALUIT APEX CEMETERY REMEDIATION

PROJECT NO. 20-3451

CEMETERY PLOT LAYOUT OPTION 2
IN-GROUND CASKET BURIAL

SHEET NO. LL-4

Appendix B

Apex Cemetery Standard Operating Procedures

CITY OF IQALUIT

Apex Cemetery

Standard Operating Procedures

April 2021 – 20-3451

Table of Contents

Figures

Appendices

References

Standard Operating Procedures

These operating procedures have been modified from the previous version of this document (Iqaluit Cemetery Standard Operating Procedures, dated December 16, 2014) as needed based on recommendations presented in the Iqaluit Apex Cemetery Remediation design report and drawings and existing good management practices intended to maximize the environmental, fiscal and operational sustainability of any Cemetery.

This document illustrates two approaches for interment at Apex Cemetery: in-ground burial using pre-built insulation templates to mitigate active layer thaw and above-ground interment via burial vaults made of High Density Polyethylene (HDPE). The City of Iqaluit intends to investigate both approaches prior to deciding on a preferred approach going forward. All options have been presented in this Standard Operating Procedures manual with the understanding that only one will be ultimately selected.

To minimize operational risks and the on-site challenges currently being experienced by the City, it is essential to ensure the Standard Operating Procedures outlined in this document are followed and adhered to.

Annual Preparation for Summer Interments

2.1 Above Ground Burial Vaults

1. See Figure 7 for installation details.
2. Purchase number of burial vaults equal to number of interments from previous two years + 10%. Subtract any unused burial vaults from previous years.
3. Optional: round number of interments anticipated up to the nearest full row of plots.
4. Layout wooden stakes at corners of rows as per Figure 3 – 5.
5. Excavate to 450mm depth within area defined by pre-installed wooden stakes marking corner of rows and place and compact 150mm depth gravel base (see Figure 7), leaving 300mm below final grade for burial vaults.
6. Assemble and place burial vaults centred on individual plots (see figure 7, 8 or 10 for spacing dimensions, depending on preferred arrangement of burial vaults), backfill around burial vault with topsoil to original finished grade and compact.

Closure of previous year's plots not required. Note number of unused burial vaults for calculations noted in step 1 for future years.

Equipment: Backhoe, Pickup Truck, wooden stakes (50 x 50 x 1200), Burial vaults, granular 'A' base material, topsoil, hand tamper.
Tools: handheld GPS

2.2 In-Ground Burials

2.2.1 Preparation of New Pre-Dig Area

1. Preparation of new pre dig area should occur in fall to early winter (September 1st – November 30th) to mitigate thawing of active layer during the following summer's interments.
2. Number of pre-dug plots should be based on average number of interments over previous two years + 10%.
3. Order and install raised wooden bar/stake that can be viewed above snow cover. Install at corners of rows. See Figure 6.
4. Pre-dig the plots to dimensions specified in Figure 12.

5. Install shoring as per Figure 13.
6. Do not backfill. Plot to remain open until interment.
7. Lay insulation template over pre-dug graves and secure in place (See Figure 13).
8. GPS and record grave locations.

Equipment: Backhoe, Pickup Truck, insulation template, wooden stakes (50 x 50 x 1200)
Tools: Sod Cutter, handheld GPS

2.2.2 Closure of Previous Year's Pre-Dig Area

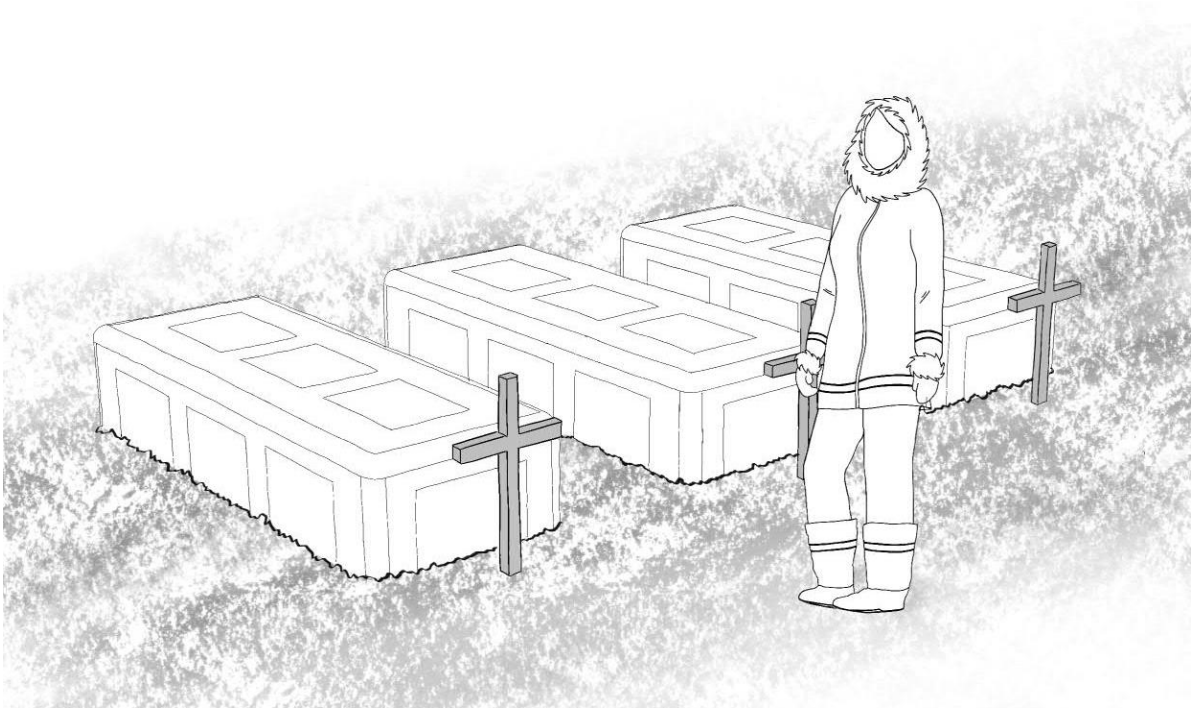
1. Plots not used during the year to be left as is: covered with insulation and counted towards the next year's pre-dug inventory.
2. Review area for differential settlement and ponding. Topsoil and compact noted areas to restore previous year's pre-dig area to original topography.
3. Ensure plot markers are positioned in straight line, aligned with wooden stakes.

Equipment: Backhoe, Pickup Truck, Watering truck
Tools: Rake

At-Need Burial Procedures

3.1 Above-Ground Burial vaults

The operating procedures outlined below will differ depending on if the City opts to proceed with option 1A, 1B or 1C as presented in the detailed design drawings and the appendices at the end of this document.



3.1.1 ADMINISTRATION (Take Order for Plot Opening)

1. Receive order for plot opening from City Clerk (telephone) with 48 hour notice.
2. City Clerk chooses the next available burial plot location.
3. Recommended interment/burial order: See recommended burial order (Figure 1)
4. City Clerk to record Section, Row, and Lot number on burial form (see Appendix A).

Equipment: N/A
Tools: Cellphone, Burial Form, burial sequence plan.

3.1.2 LAYOUT PLOT PRIOR TO OPEN/CLOSE CEREMONY

1. Spot burial vault location with two people plus supervisor, using cemetery map and row markers. First person spots location; second person individually spots and verifies the first person spotting.
2. Confirm location (Section, row, number) of burial vault on burial form.
3. Report and verify any discrepancies from the burial order by telephone with City Clerk.
4. After marking the burial vault, both the supervisor and lead hand double check to verify that the correct lot and grave number has been marked out.
5. Confirm equipment access route (see Figure 1). Lay plywood (or MUD-TRAKS ®) to protect existing adjacent burial vaults and/or plots

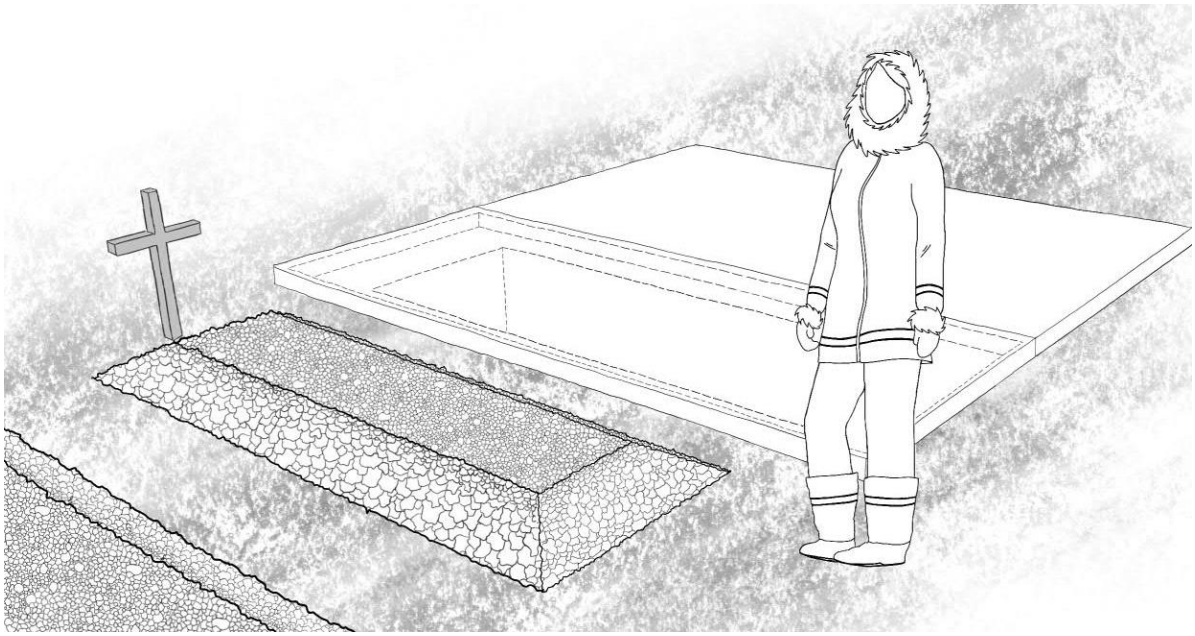
Equipment: N/A
Tools: Cell Phone, Min. ¾" plywood or "MUD-TRAKS"

3.1.3 OPENING PROCEDURES

1. Place plywood board to protect existing ground. Ensure size is adequate to accommodate stones for placement around burial vault. See Figure 7, 8 or 10 depending on configuration desired.
2. Provide a support for the lowering device to rest on. A strong frame of 2" x 10" [39mm x 235mm] wood planks can be assembled for this purpose (see Figure 14), or a purpose built aluminum plank system can be purchased.
3. Place greens to cover the wood frame and stones piled beside the open grave (see Figure 14). Alternatively, exterior carpet can be used as a cover, either loose or attached to the wood frame (Attached cover will wear out and dirty sooner than a loose cover).
4. Set up casket lowering device on the stable frame created with the planks (see Figure 14). Ensure lowering device is clean, and place safety straps in position. Install with trip lever at the foot of the burial vault.
5. Place requested memorial cross (depending on desired configuration) in clean appropriate container nearby.
6. Check area for tidiness. Clean area of debris and light snow at graveside and along funeral route. Check time of funeral and ensure equipment is out of sight during the service.
7. Seal casket prior to placing into the burial vault with caulking.
8. After lowering casket into burial vault, seal burial vault along seams with caulking. Water drainage openings at bottom of burial vault to remain unsealed to allow water to infiltrate into soil.
9. Place cross/plot marker as per Figure 9 or 11 depending on desired configuration.
10. Allow visitors to place stones along all sides of burial vault. Depending on desired configuration, see Figure 9 or 11 for maximum height of placed stones (i.e. max height of 255mm or 440mm).

Equipment: Pickup Truck, Lowering Device, Wooden or Aluminum Supports, Greens, 3-4" diameter blast rock or river rock.
Tools: Caulk Sealant

3.2 In-Ground Burials



3.2.1 ADMINISTRATION (Take Order for Plot Opening)

1. Receive order for plot opening from City Clerk (telephone) with 48 hour notice.
2. City Clerk chooses the next available burial plot location.
3. Recommended interment/burial order: See recommended burial order (Figure 2)
4. City Clerk to record Section, Row, and Lot number on burial form (Appendix A).

Equipment: N/A
Tools: Cellphone, Burial Form, burial sequence plan.

3.2.2 LAYOUT PLOT PRIOR TO OPEN/CLOSE CEREMONY

1. Spot grave location with two people plus supervisor, using cemetery map and row markers. First person spots location; second person individually spots and verifies the first person spotting. Second person may be the machinery operator who will dig the grave.
2. Find wooden stakes marking corners of row.
3. Measure along line connecting stakes to determine location of plot.
4. Confirm location (Section, row, number) on burial form.

5. Report and verify any discrepancies from the burial order by telephone with City Clerk.
6. After marking out grave, both the supervisor and lead hand double check to verify that the correct lot and grave number has been marked out.
7. Confirm equipment access route (see Figure 2). Lay plywood (or MUD-TRAKS ®) to protect plots along route.

Equipment: N/A
Tools: Cell Phone, Wood Template, Edger Shovel, Min. ¾" plywood or "MUD-TRAKS"

3.2.3 OPENING PROCEDURES

1. Safety is a prime concern. If visitors are present when a grave is opened or any type of machinery is being used, it is the responsibility of the machine operator to ensure that everyone (including all field staff) is at a safe distance before proceeding.
2. Set up digging equipment. Digging equipment not to be placed on insulation template.
3. Remove framed insulation and store in a designated area until the succeeding use. Leave shoring in place.
4. Confirm plot is dug to a depth of least 4' [1.2m] deep. Ensure there is a minimum 2' [0.6m] cover over the top of the casket.
5. No person is to enter a grave unless it has been shored.
6. Pump out any excess water that seeps into plot opening after it is dug. Water should be pumped out a minimum of 1 hour before casket and family arrive at the cemetery to allow site cleanup and removal of non-essential equipment. Water is potentially hazardous to the public as well as the environment. Pumped water should be contained and delivered to the wastewater treatment plant for treatment.
7. Water pumped from open plot to be disposed of at an approved water treatment site, at the direction of the City. Any water pumped from the Cemetery cannot be discharged into an open water course without prior water treatment for contamination.
8. Recommended PPE for handling potentially hazardous water as per procedures for handling sewage: Nitrile gloves and CSA safety glasses minimum.
9. Provide a support for family to stand on around the open grave, in case the sides collapse. A strong frame of 2" x 10" [39mm x 235mm] wood planks can be assembled for this purpose (see Figure 14), or a purpose built aluminum plank system can be purchased.

10. Place greens to cover the wood frame and soil piled beside the open grave (see Figure 14). Alternatively, exterior carpet can be used as a cover, either loose or attached to the wood frame (Attached cover will wear out and dirty sooner than a loose cover).
11. Set up casket lowering device on the stable frame created with the planks (see Figure 14). Ensure lowering device is clean, and place safety straps in position. Install with trip lever at the foot of the grave.
12. Place requested shovels and memorial cross by soil in clean appropriate container.
13. If the grave opening is prepared the night before, the insulation template can be left in place. Alternatively, a temporary grave cover can be constructed of a 2”x4” [39mm x 89mm] frame with 2”x4” [39mm x 89mm] cross members and covered with a thick plywood deck. The cover should be approx. 1½ times the length and width (~4.0m x 1.5m) of the grave to allow the frame to sit on solid ground, away from near the edge of the grave.
14. Check area for tidiness. Clean area of debris and light snow at graveside and along funeral route. Check time of funeral and ensure equipment is out of sight during the service.
15. Place all removed soil in a neat pile, to west side of pre-dug area, a short distance from grave – to allow family four sides of access to grave, but not too far for them to use to help fill in grave.
16. If backfill material freezes, use heat mats or remove and store backfill soil in heated location until funeral.

Equipment: Gas powered sump pump, Backhoe, Pickup Truck, Safety Gloves, Safety Glasses.
Tools: Min. ¾” plywood or “MUD-TRAKS”, Wood planks, Greens & mats, Broom, Lowering device and key, Safety straps, Long handled shovels, Wood planks, Plywood sheets, Snow blower

3.2.4 CLOSING PROCEDURES

1. Wait until funeral service at graveside has ended. Lay plywood or MUD-TRAKS® along route for equipment, as needed to minimize impact to surrounding plots.
2. Ensure backfill is mounded at top to maximum 200-250mm above adjacent ground level to accommodate settling.
3. Backfill from placed stockpile
4. Return the burial information form to the City Clerk – signed by both spotters, and dated.
5. Clean area, including memorial cross. Fill in any ruts and markings left by equipment.

6. Return equipment and tools to yard. Clean the lowering device, planks, greens and tools and store in a dry place.

Equipment: Backhoe, Pickup Truck.
Tools: Min. ¾" plywood or "MUD-TRAKS", Rake, Shovel, Broom

3.2.5 TOP DRESS AND FINE GRADING

1. Revisit the grave site approximately 2 weeks after interment. Level and tamp the grave and top dress with surplus backfill from excavation.
2. Once capacity has been reached on a full row of graves, temporarily remove and protect plot markers and fine grade to ensure positive drainage as per the cemetery grading plans.
3. Place plot markers back in order as per the cemetery's burial records. Bury to 1/3 depth.

Equipment: Backhoe, Pickup Truck,
Tools: Hand or gas powered tamper, Rake, Shovel, Broom

3.3 Additional Procedures for Infant and Cremation Plots

3.3.1 Infant and Cremation Burial

Procedures for the burial of infant or cremated remains are similar to casket burial, with the following exceptions:

1. The framed insulation template is not used. Pre-dug infant and/or cremation plots should be backfilled with sand, as per existing operating procedures.
2. Burial depth for cremation urns does not have to be 4' [1.22m] deep. 4' burial depth still recommended for infant caskets.
3. Backfill mound height to be max. 1/3rd the length of the shorter of: length of the plot or width of the plot.
4. Instead of a backhoe, the grave can be opened in one of two ways:
    4.1. With a 12 inch auger, or
    4.2. With a spade or shovel.

Equipment: 12" Auger
Tools: Spade or Shovel

3.4 Interim Operating Procedures for In-Ground Burials

Prior to completion of the proposed capital grading works at Apex Cemetery, standard operating procedures will generally be as per the previous section “In-Ground Burials”.

1. When pumping water from an opened plot prior to a funeral service, water is not to be discharged overland into an existing water body.
2. Pump water into a sewage transport truck and remove off site to the nearest waste water treatment plant.

Equipment: Sewage truck, equipment as per “In-Ground Burials” above
Tools: as per “In-Ground Burials” above

Maintenance Program

4.1 Weekly Tasks

1. Clear snow from roadway and pedestrian pathways in winter, as needed.
2. Remove garbage and debris. Clear any obstacle on the road or on a grave whenever in the cemetery.
3. Remove any old flowers or decorations that are a safety hazard or are unsightly.
4. Make note of any maintenance or safety issue that should be brought to the attention of cemetery administration.
5. If re-establishing surface vegetation, water regularly for the first growth season minimum. Watering for two growth seasons (2 years) recommended.

4.2 MONTHLY TASKS

1. Compact and top up gravel roadway and shoulder materials affected by water ponding, snowmelt or washouts.
2. Inspect interred in-ground burial plots for settlement at opening/excavation footprint and re-topsoil and compact as needed to ensure positive surface drainage.
3. Inspect above-ground burial vaults for scratches, cracks and damage. Repair cracks with scrap HDPE material. Refinish visible scratches.
4. Check memorial crosses, monuments for damage.

4.3 YEARLY TASKS

1. Pre-dig cemetery plots and close previous section (see Pre-dig Closure Checklist, above).
2. Clean out and inspect culverts at the cemetery each spring and fall before snow flies, and after snowmelt. If culverts are frozen shut, clear them to ensure free flowing conditions.
3. Inspect drainage swales annually and remove sediment build-up within the ditches. Inspect sediment filter socks within the ditches and replace as needed.
4. Inspect metal work hardware and repair any loose fasteners.
5. Install winter staking to mark the location of grave lot markers prior to snowfall (use min. 18” wooden stakes painted at end).

4.4 INTERMENT TASKS

1. Grave opening and closing – recommend minimum two City staff plus supervisor. See At-Need Burial Procedures above for detailed instructions.

4.5 HDPE BURIAL VAULT TASKS

1. HDPE products used above ground (i.e. exposure to sunlight) have a max. life expectancy of approximately 25 years. After this, advanced UV deterioration can be expected (colour fading, warping, etc.).
2. HDPE products shielded from exposure will last significantly longer due to reduced UV damage. If the Burial Vault is fully encased, colour deterioration may no longer be a concern.
3. Options for encasing Burial Vaults: Concrete walls, stone veneer cladding, granite cladding.
4. Concrete or stone cladding/veneer for burial vaults will have to be constructed independently of the burial vault itself.
5. Minimum of one 3/8” dia. Hole (two or three recommended for redundancy) to be drilled into vault and any outside cladding/casing to allow for ventilation.

Cemetery Equipment List

5.1 Recommended Items

Backhoe, Small	Kubota or equivalent for digging and backfilling a casket grave
Burial Form	Maintain a record of reserved or occupied plots.
Cell phone	Confirming the location of grave row and lot number with City Clerk prior to digging
Edger and shovel	Cutting around grave opening
Gas powered sump pump	Pumping out any excess water from grave prior to funeral
Graveside greens (synthetic turf)	Exterior carpet covering the wood frame beside the open grave
Hand held tamper	Compacting topsoil
Handheld GPS	Global Positioning System device used to establish latitude and longitudinal coordinates of interred plot markers.
HDPE Burial vault	Above-ground burial vault made from high density polyethylene. Maximus Burial Vault by Polyguard (or approved equivalent).
Insulation template	Void foam insulation sheet sized to cover full plot opening (1.0m x 2.7m) plus a 1.2m offset on all sides.
Long-handled shovels	Backfilling of the grave (if done by the family)
Lowering device with safety straps	Lowering of casket into grave or burial vault (lowering device should be on raised feet to accommodate above-ground burial vaults).
Pickup Truck	For transporting topsoil, fill material, etc. to cemetery
Plywood (¾") or MUD-TRAKS	Temporary protection of the tundra from equipment
Rake	Levelling and scarifying new topsoil
Safety Glasses	Hard plastic, CSA certified glasses meant for shielding eyes from physical damage or chemicals.
Safety Gloves	Non-latex, nitrile sanitary gloves to mitigate contact with hazardous chemicals.
Shovel, rake, broom	Cleaning grave area and filling in any ruts or markings left by equipment
Snow blower	Clearing snow from graveside and processional route prior to funeral
Wood (2" x 10") / or aluminum planks	Providing a support for family to stand on around the open grave.
Wood planks and plywood sheets	Temporary cover if grave is prepared the night before
Wooden stake	50 x 50 x 1200 (2" x 2" x 48") stake to mark corners of plot rows for layout purposes.

5.2 Discretionary Items

15’ x 15’ portable shade structure	Graveside set up
Small shed	On site storage of hand tools

Figures

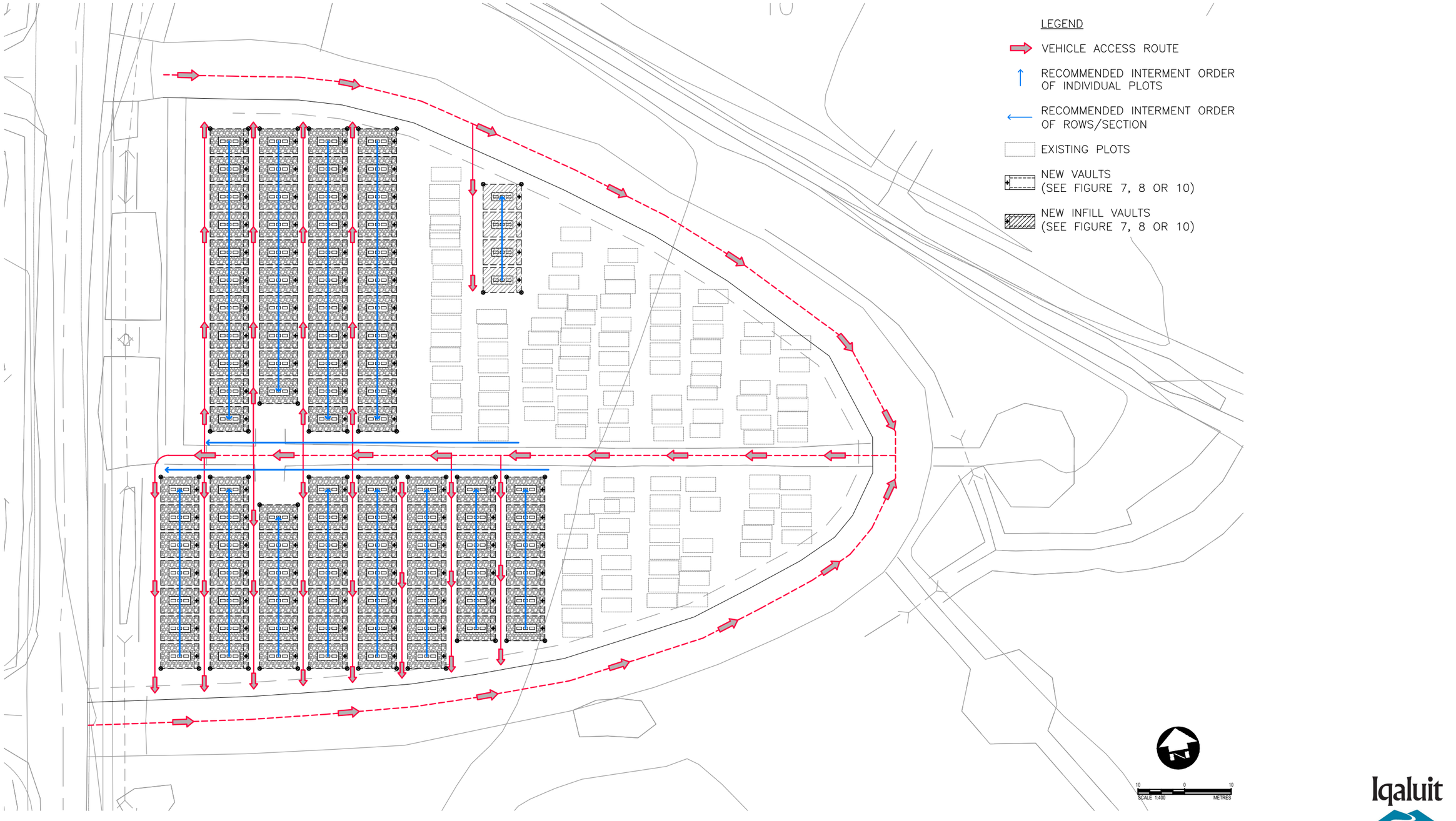


FIGURE 1: MAINTENANCE ACCESS PLAN - BURIAL VAULTS

IQALUIT APEX CEMETERY REMEDIATION

DILLON CONSULTING

Iqaluit

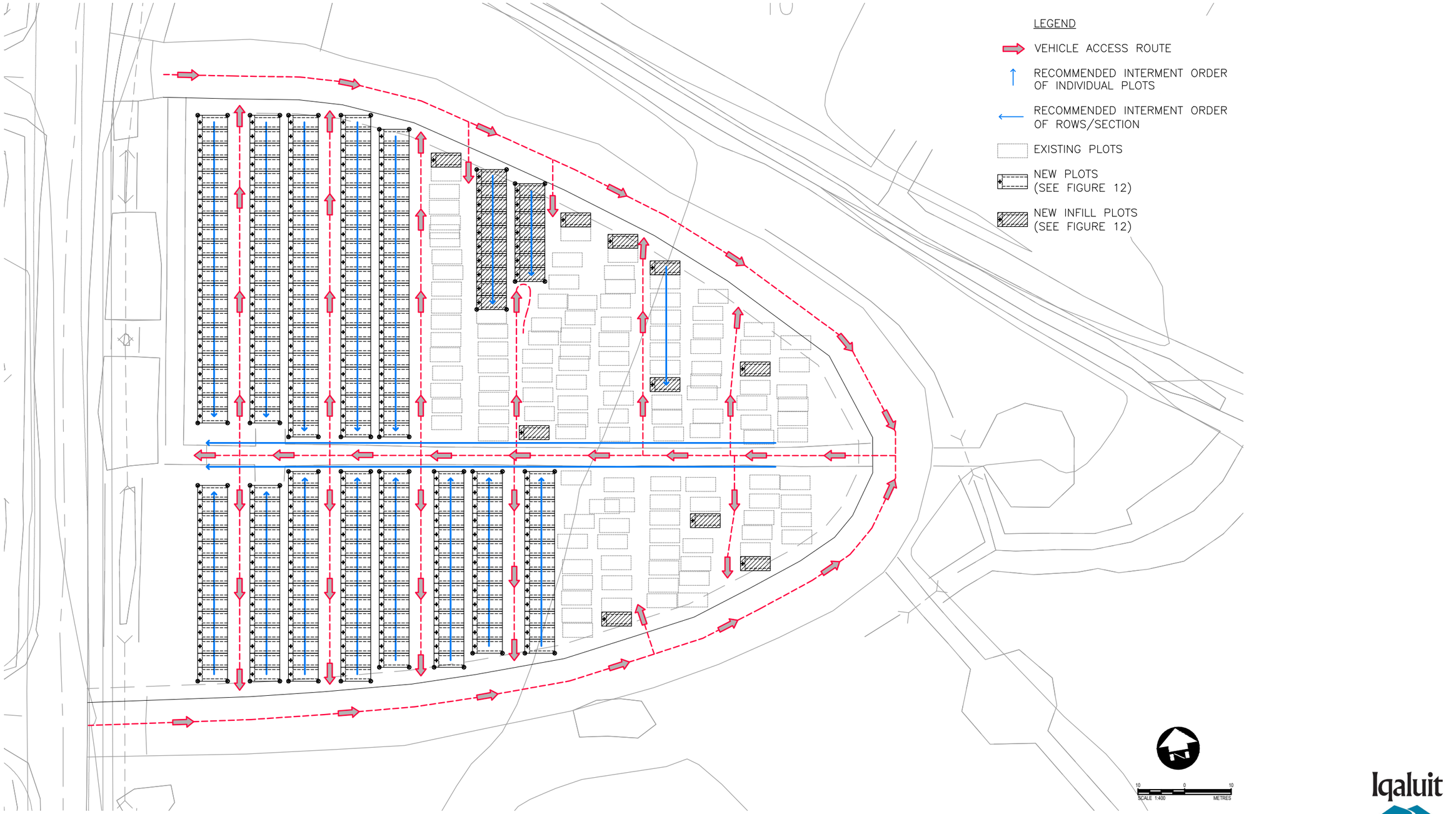


FIGURE 2: MAINTENANCE ACCESS PLAN - BURIALS

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 1A - ABOVE GROUND BURIAL VAULTS, NO MEMORIAL CAIRN

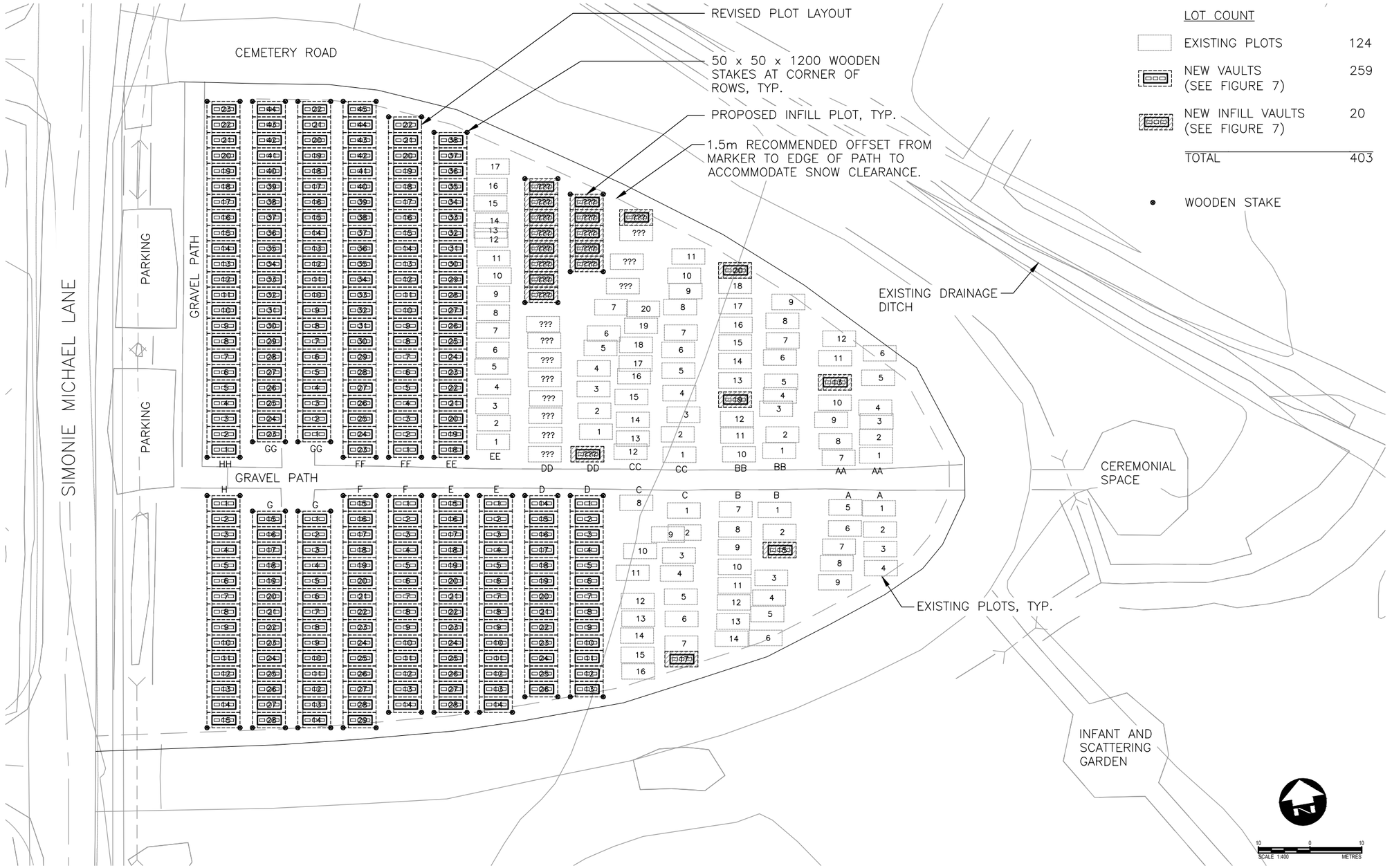

FIGURE 3: LOTTING LAYOUT

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 1B - ABOVE GROUND BURIAL VAULTS /W SMALL MEMORIAL CAIRN

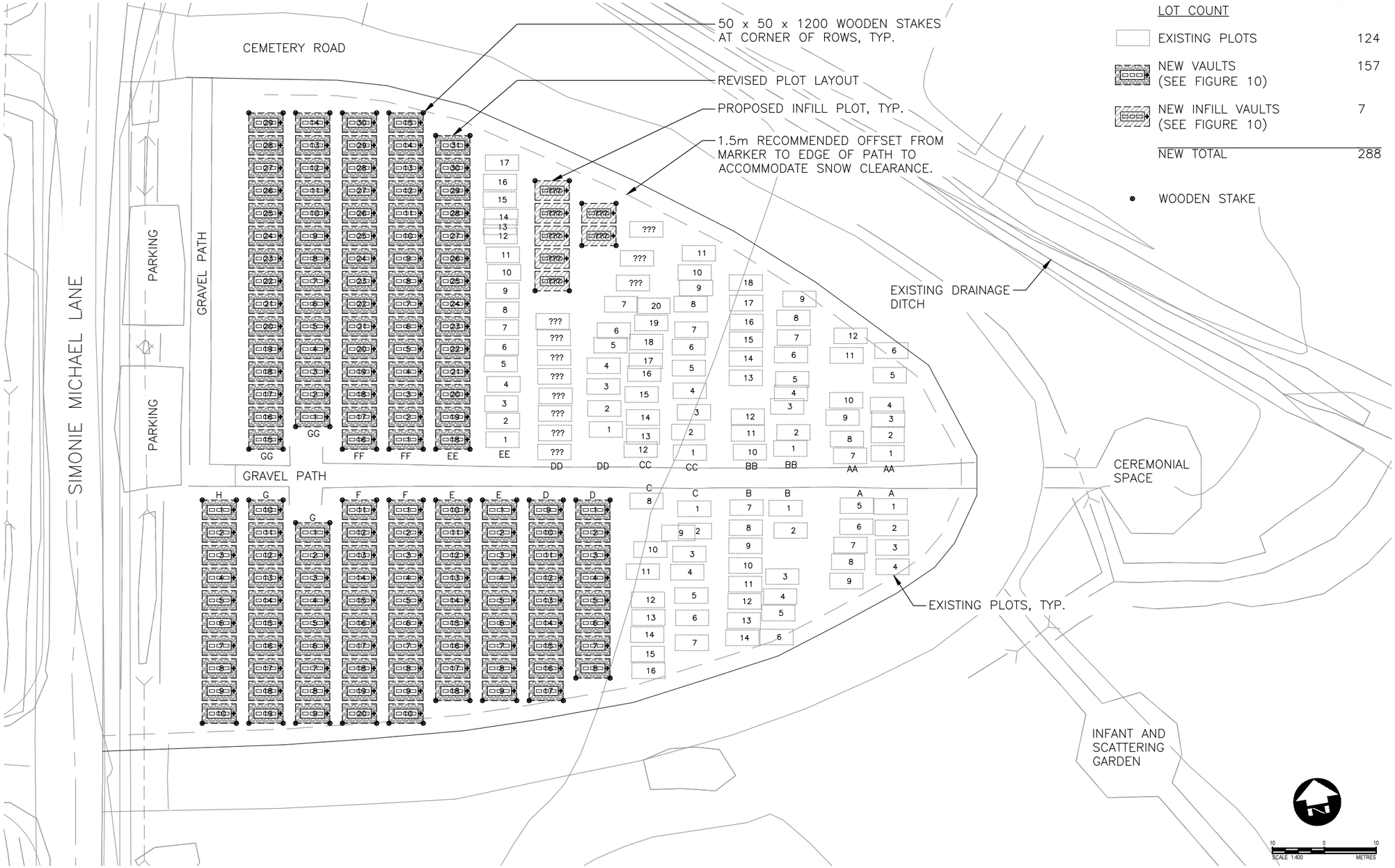

FIGURE 4: LOTTING LAYOUT

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 1C - ABOVE GROUND BURIAL VAULTS /W LARGE MEMORIAL CAIRN

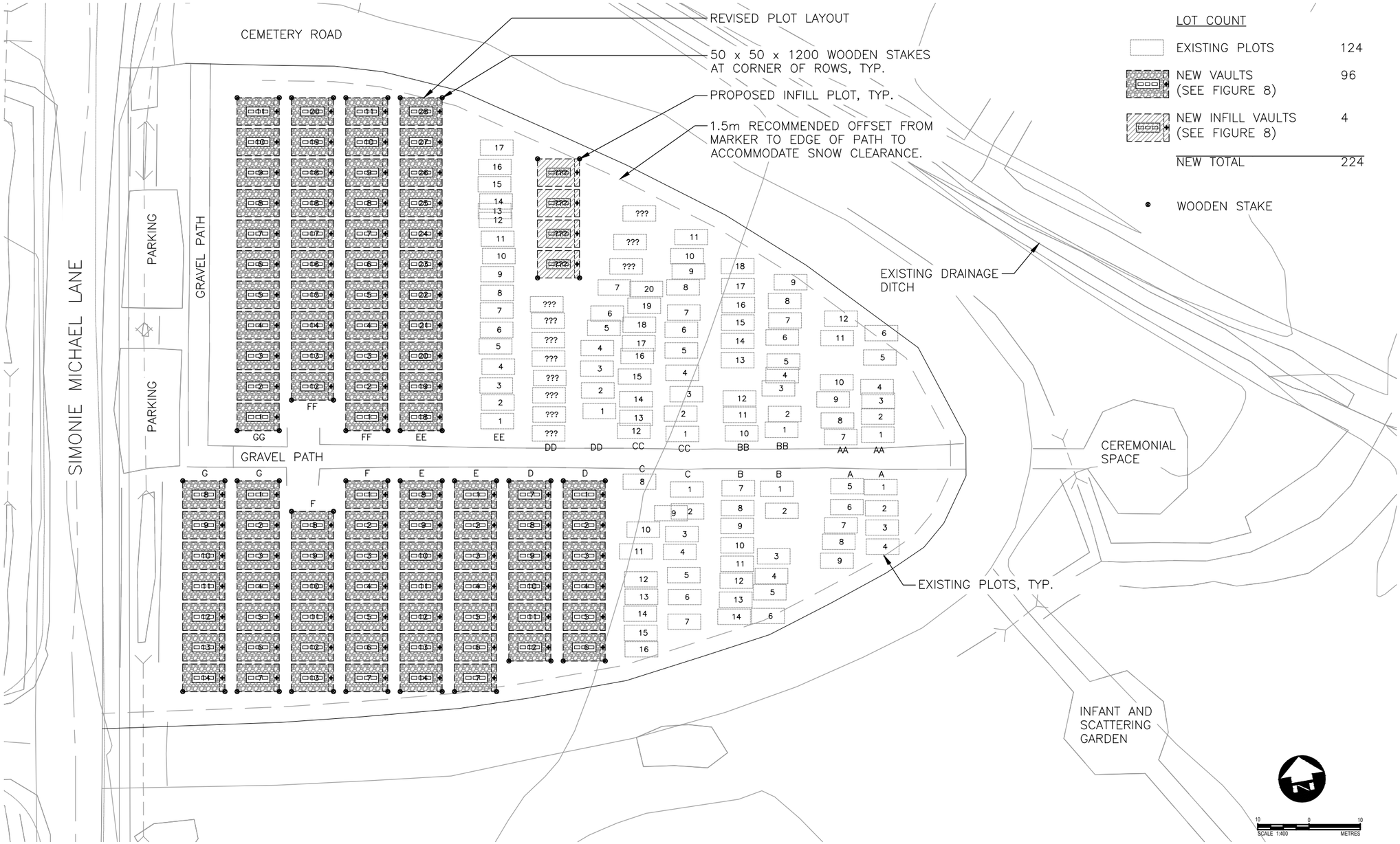

FIGURE 5: LOTTING LAYOUT

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 2 - IN-GROUND BURIAL WITH INSULATION

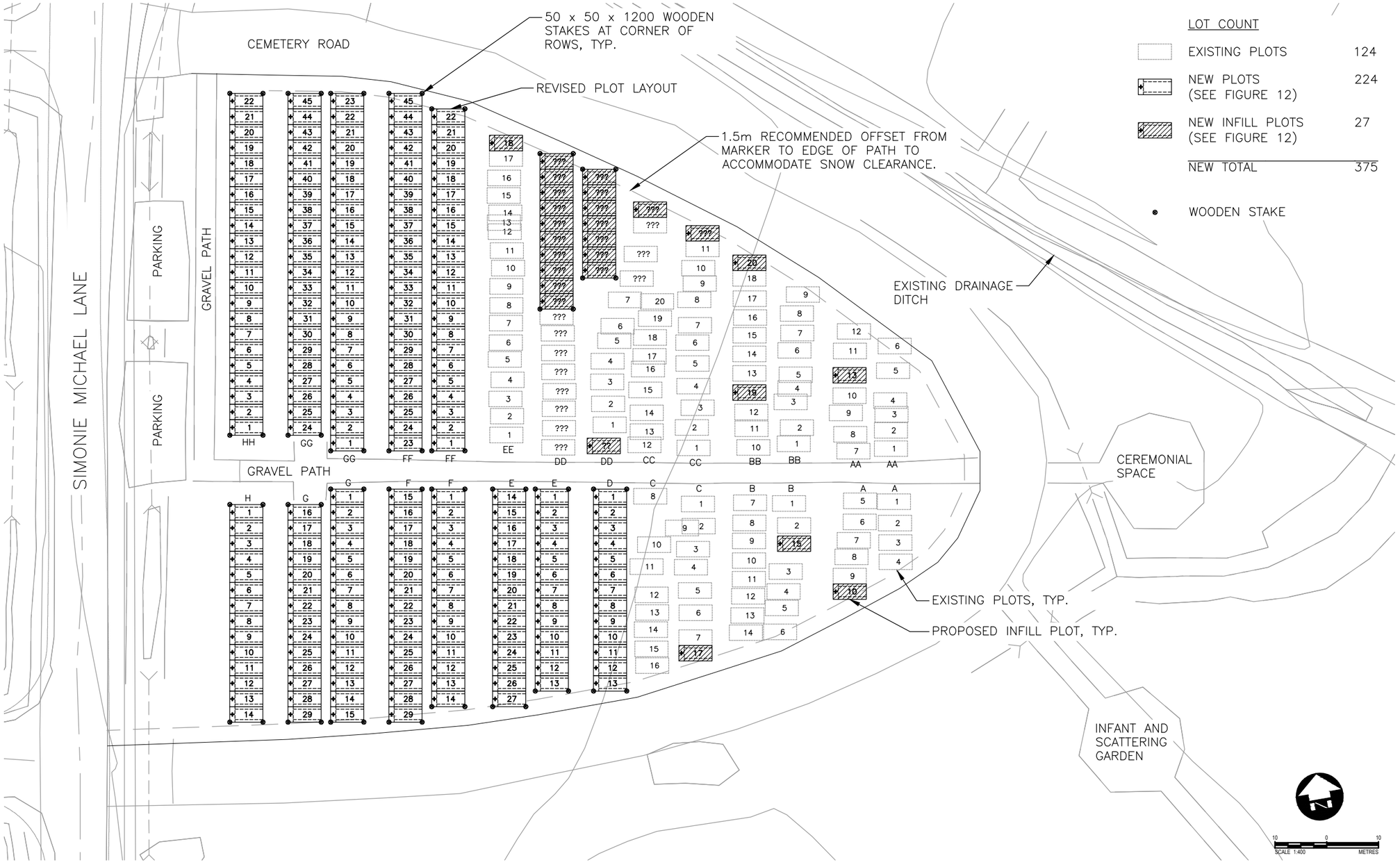

FIGURE 6: LOTTING LAYOUT

IQALUIT APEX CEMETERY REMEDIATION

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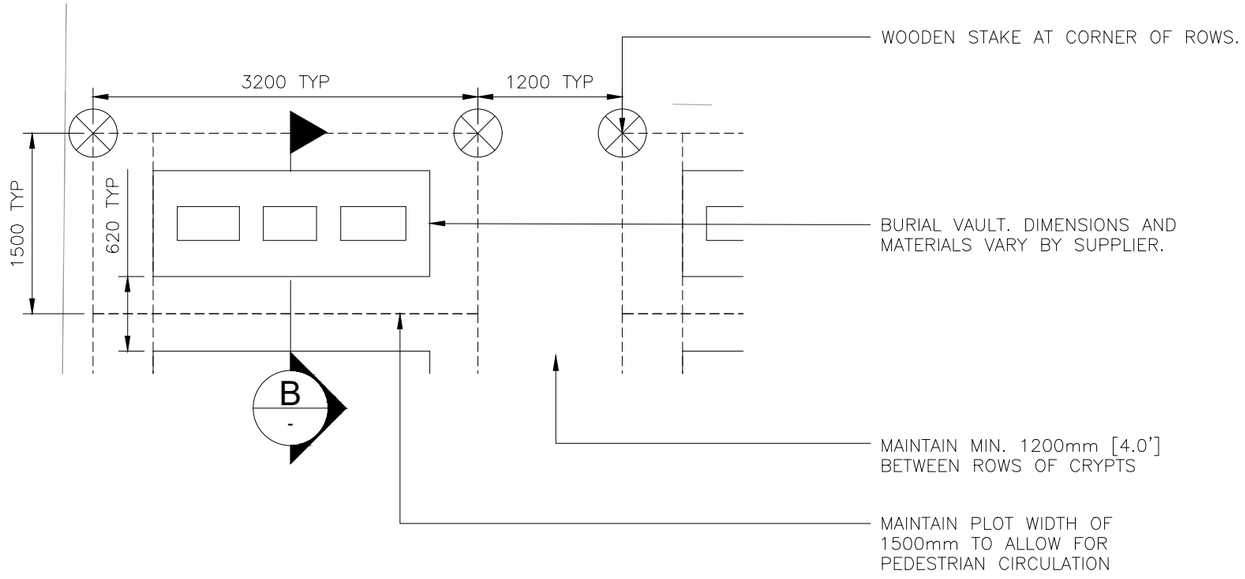
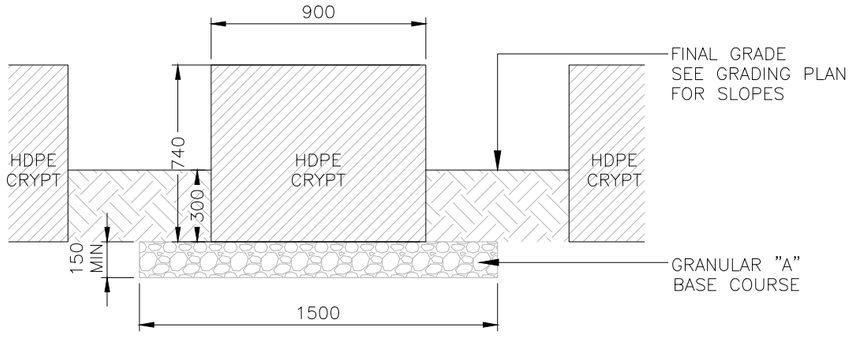
OPTION 1A - ABOVE GROUND BURIAL VAULTS, NO MEMORIAL CAIRN



PLAN VIEW



SECTION B - ABOVE GROUND BURIAL VAULTS - OPTION 1A: FRONT VIEW

FIGURE 7: TYPICAL PLOT DIMENSIONS AND INSTALLATION DETAIL

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 1B - ABOVE GROUND BURIAL VAULTS /W SMALL MEMORIAL CAIRN

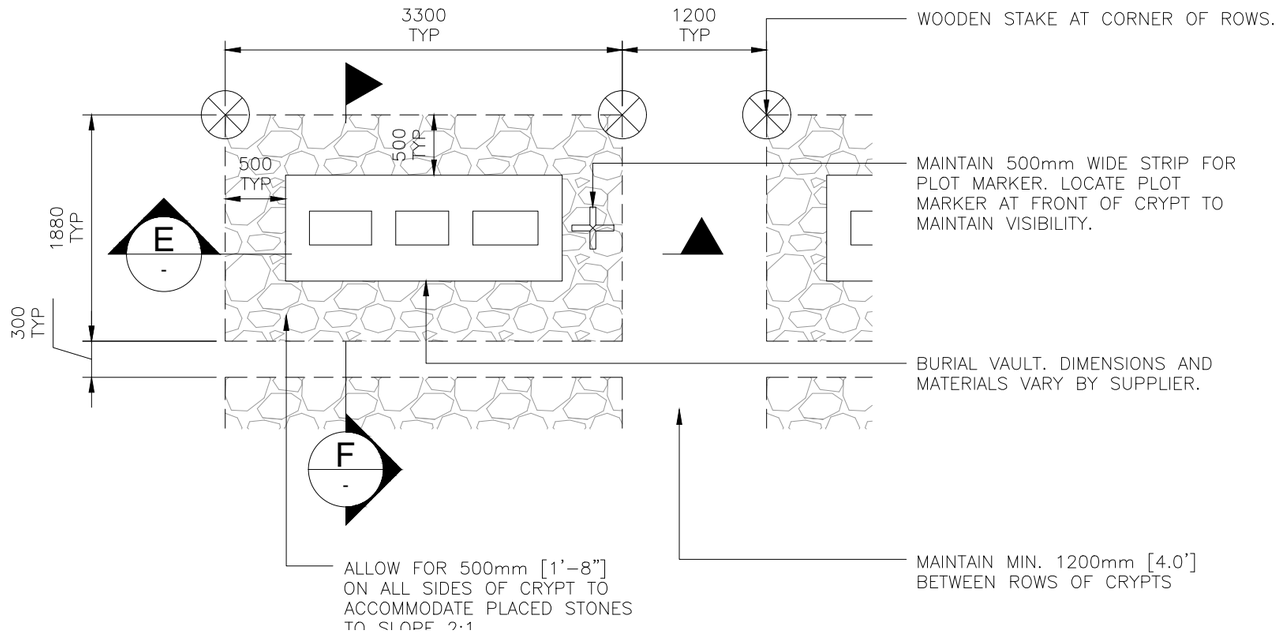

FIGURE 8: TYPICAL PLOT DIMENSIONS

IQALUIT APEX CEMETERY REMEDIATION

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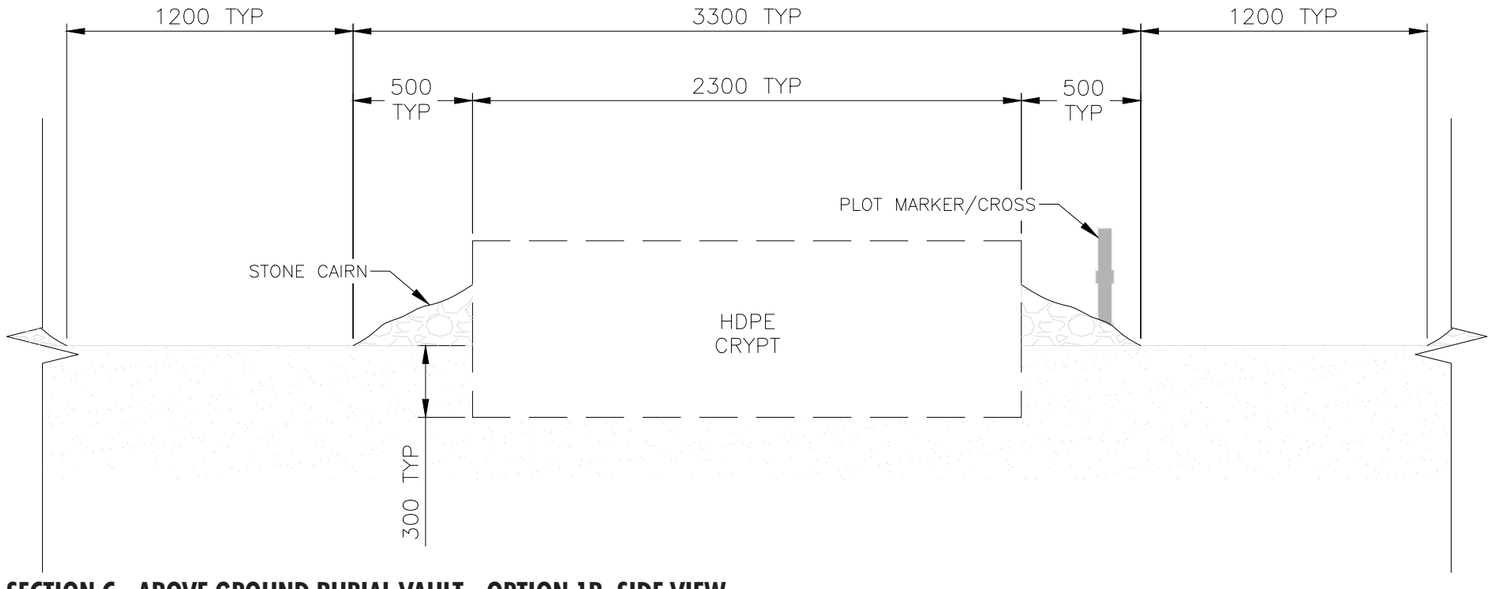
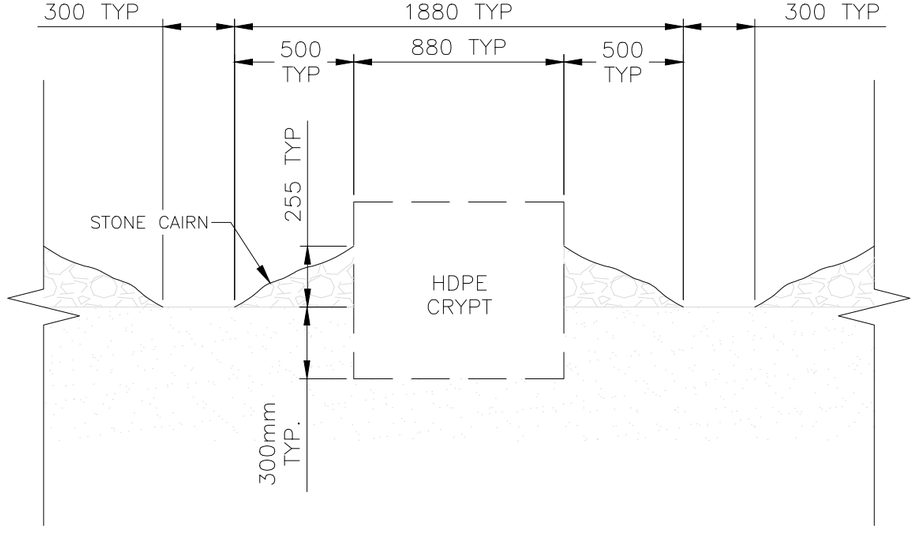
OPTION 1B - ABOVE GROUND BURIAL VAULTS, /W SMALL MEMORIAL CAIRN



SECTION C - ABOVE GROUND BURIAL VAULT - OPTION 1B: SIDE VIEW



SECTION D - ABOVE GROUND BURIAL VAULT - OPTION 1B: FRONT VIEW

FIGURE 9: INSTALLATION DETAIL

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 1C - ABOVE GROUND BURIAL VAULTS /W LARGE MEMORIAL CAIRN

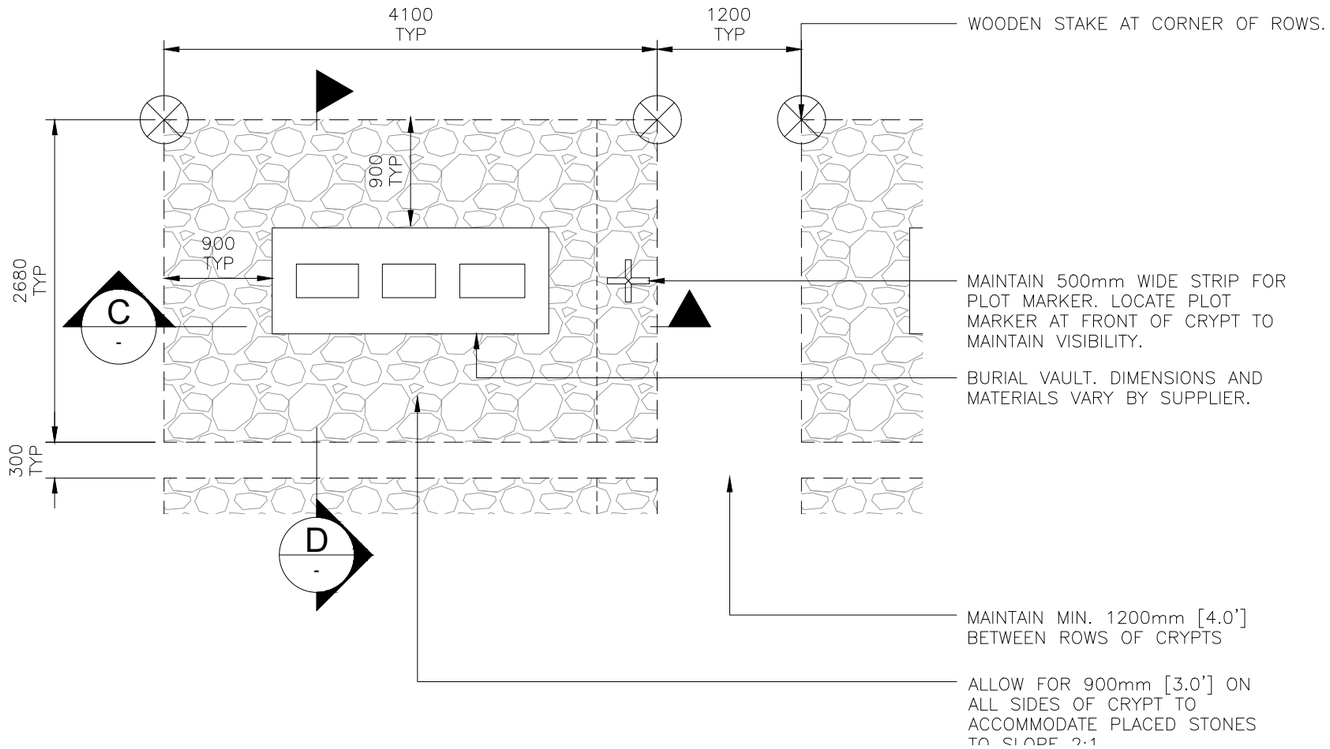
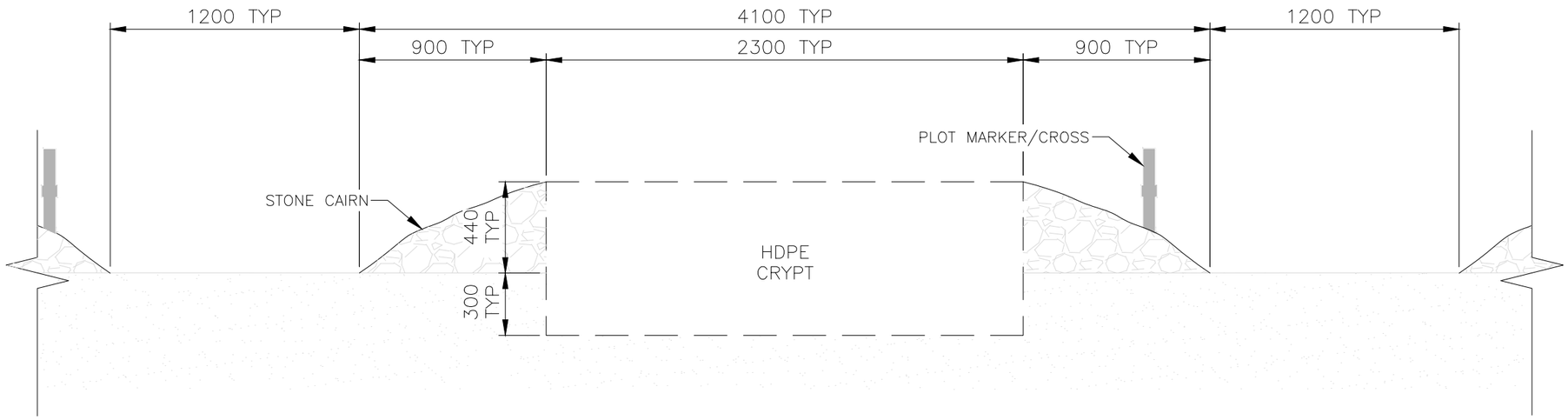


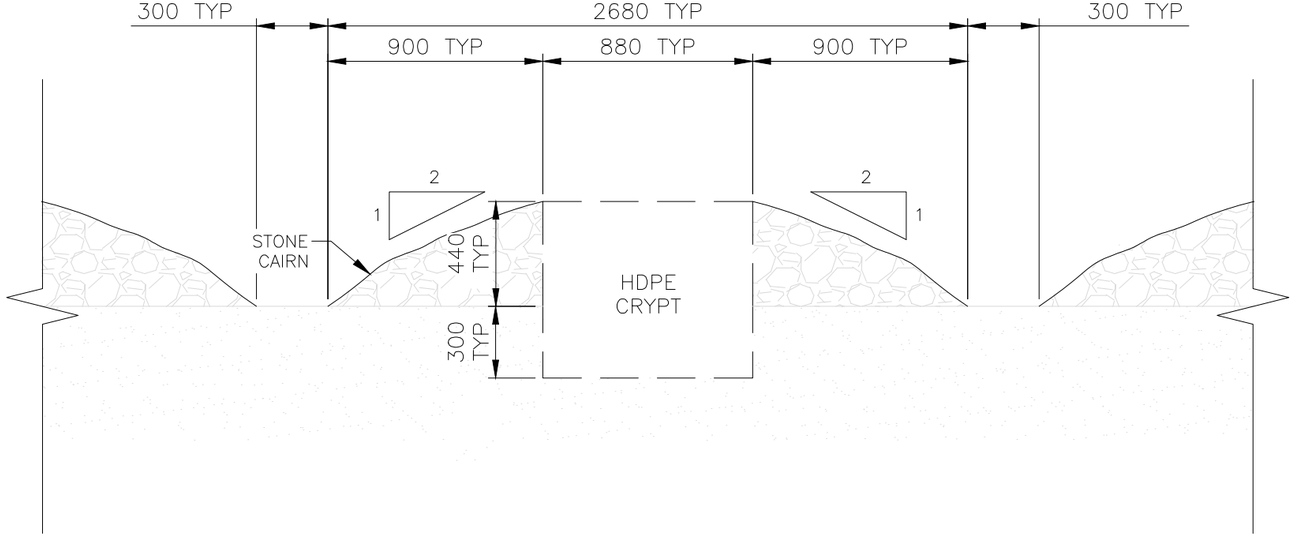
FIGURE 10: TYPICAL PLOT DIMENSIONS

IQALUIT APEX CEMETERY REMEDIATION

OPTION 1C - ABOVE GROUND BURIAL VAULTS /W LARGE MEMORIAL CAIRN



SECTION E - ABOVE GROUND BURIAL VAULT - OPTION 1C: SIDE VIEW



SECTION F - ABOVE GROUND BURIAL VAULT - OPTION 1C: FRONT VIEW

FIGURE 11: INSTALLATION DETAIL

IQALUIT APEX CEMETERY REMEDIATION

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OPTION 2 - IN-GROUND BURIAL WITH INSULATION

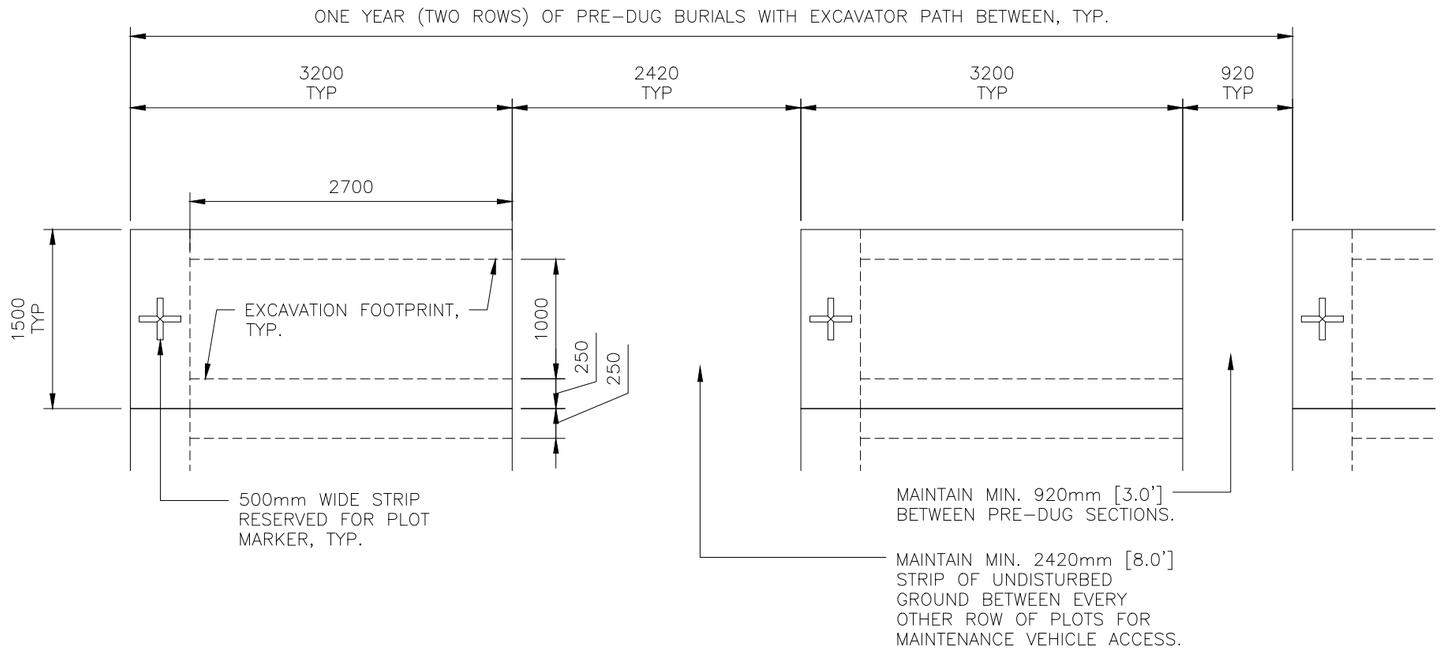

FIGURE 12: TYPICAL PLOT DIMENSIONS

IQALUIT APEX CEMETERY REMEDIATION

DILLON CONSULTING

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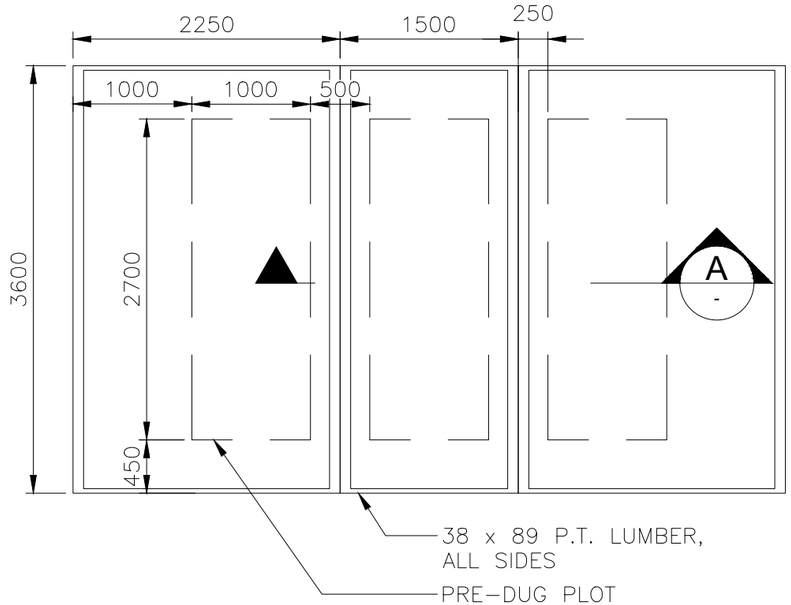
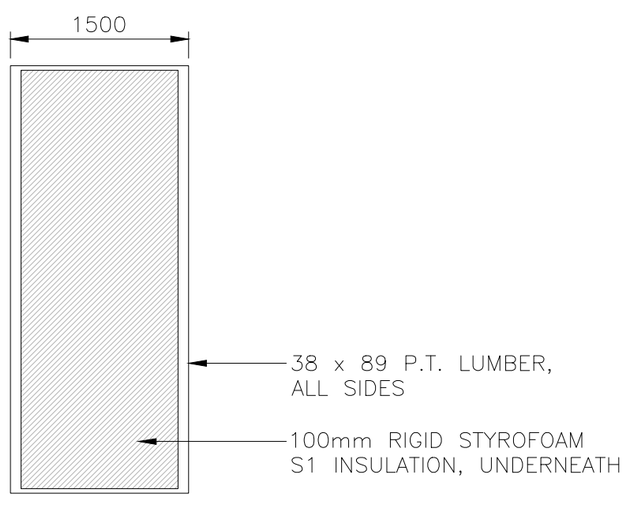
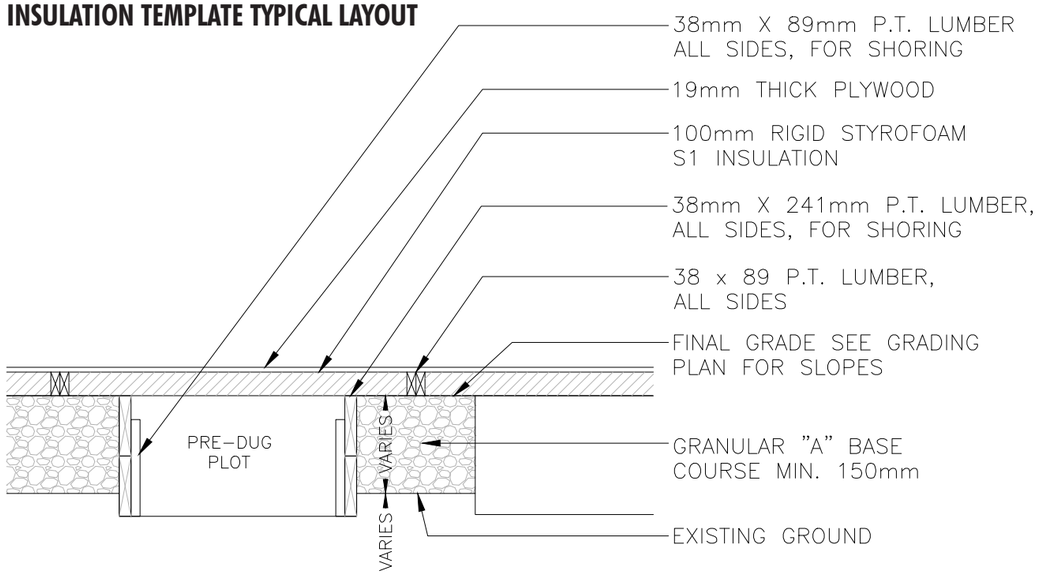
OPTION 2 - IN-GROUND BURIAL WITH INSULATION





INSULATION TEMPLATE PLAN VIEW

INSULATION TEMPLATE TYPICAL LAYOUT



SECTION A - INSULATION OVER IN-GROUND BURIAL

FIGURE 13: INSTALLATION DETAIL

IQALUIT APEX CEMETERY REMEDIATION

DILLON CONSULTING

Iqaluit

FIGURE 14: EXAMPLE PHOTOS OF TYPICAL OPEN/CLOSE SETUP

Appendix A

Burial Form

Burial form

NAME OF DECEASED: _____
FUNERAL DATE AND TIME: _____
PLOT LOCATION
Section : _____ Row : _____ Lot # : _____

PLOT WAS OPENED ON THE _____ DAY OF _____, 20_____.

PLOT DEPTH : _____ FEET

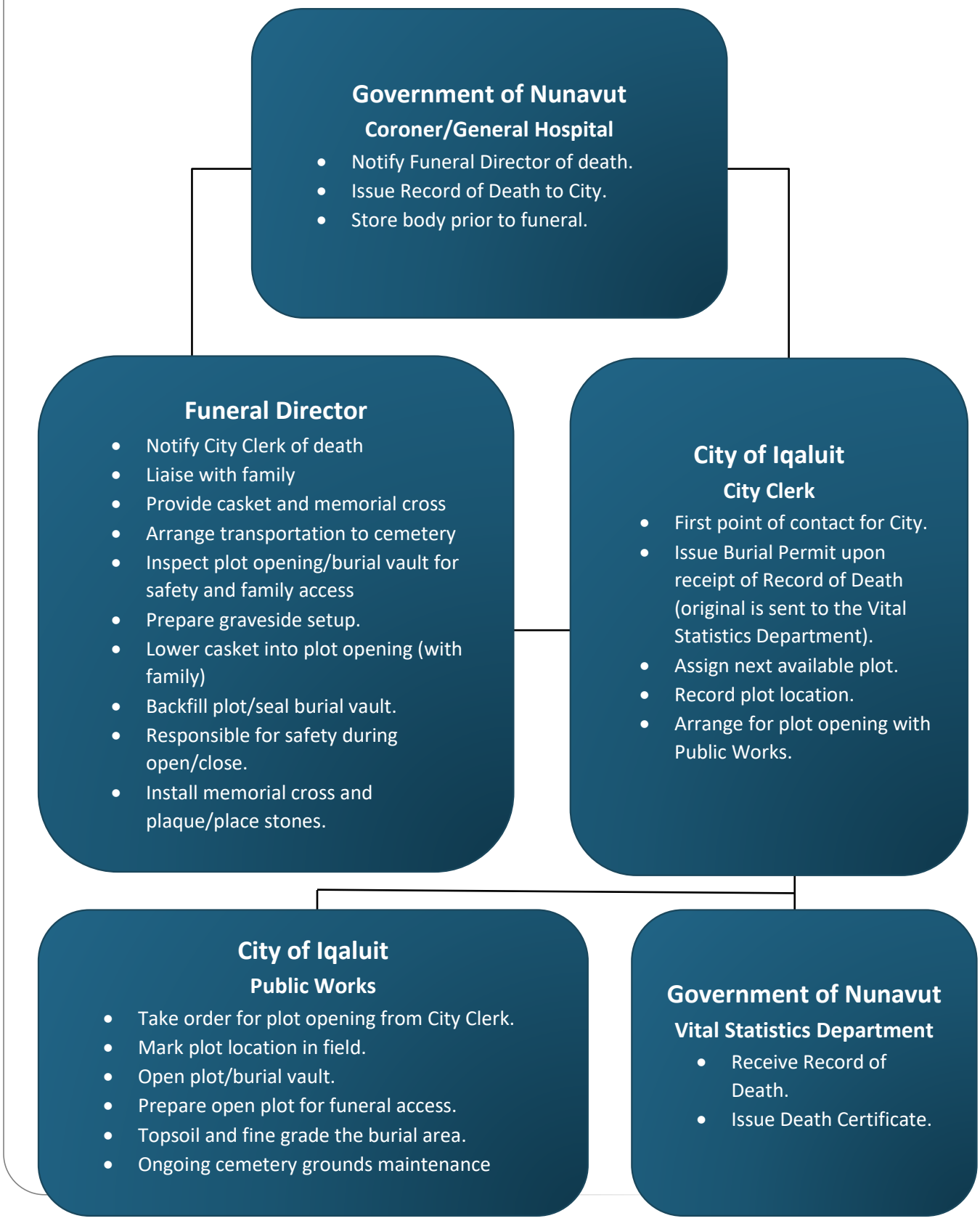
CEMETERY STANDARD OPERATING PROCEDURES WERE FOLLOWED.
□ YES □ NO
CARE WAS TAKEN TO MINIMIZE IMPACTS TO THE TUNDRA DURING GRAVE DIGGING.
□ YES □ NO
PLOT LOCATION WAS SPOTTED WITH TWO PEOPLE (SPOTTER AND MACHINERY OPERATOR).
□ YES □ NO

_____	_____	_____
Name (Spotter)	Initials	Date
_____	_____	_____
Name (Machinery Operator)	Initials	Date

Return completed form to the City Clerk.

Appendix B

Organizational Chart


Government of Nunavut
Coroner/General Hospital
• Notify Funeral Director of death.
• Issue Record of Death to City.
• Store body prior to funeral.
Funeral Director
• Notify City Clerk of death
• Liaise with family
• Provide casket and memorial cross
• Arrange transportation to cemetery
• Inspect plot opening/burial vault for safety and family access
• Prepare graveside setup.
• Lower casket into plot opening (with family)
• Backfill plot/seal burial vault.
• Responsible for safety during open/close.
• Install memorial cross and plaque/place stones.
City of Iqaluit
City Clerk
• First point of contact for City.
• Issue Burial Permit upon receipt of Record of Death (original is sent to the Vital Statistics Department).
• Assign next available plot.
• Record plot location.
• Arrange for plot opening with Public Works.
City of Iqaluit
Public Works
• Take order for plot opening from City Clerk.
• Mark plot location in field.
• Open plot/burial vault.
• Prepare open plot for funeral access.
• Topsoil and fine grade the burial area.
• Ongoing cemetery grounds maintenance
Government of Nunavut
Vital Statistics Department
• Receive Record of Death.
• Issue Death Certificate.

References

1. Iqaluit Cemetery Standard Operating Procedures, Lees + Associates, December 16, 2014.
2. Consolidation of Cemetery Regulations R-038-2019, Public Health Act, January 9, 2020.
3. City of Iqaluit, New Cemetery Project drawings, Issued for Construction - Sept. 10, 2013

Appendix C

Climate Influences on the Apex Cemetery

Climate Influences on the Apex Cemetery: A Summary

The influences of the changing climate on the Apex Cemetery and its landscape were examined by considering trends in temperatures and precipitation over the past few decades and by incorporating climate change projections looking forward into the future. Both the Iqaluit airport climate data and the most recently updated gridded or mapped and interpolated climate data fields were used in the analyses. The climate change projections were based on 33 of the currently vetted climate change projection datasets from the 5th Intergovernmental Panel on Climate Change (IPCC) Assessment Report released in 2013. Dillon has a climate analysis system that incorporates all updated climate data and climate change projections issued by the IPCC and is currently ingesting the next generation of climate change models, the 6th IPCC Assessment Report models, that should become officially available to general users within a couple of years.

Temperature variables were chosen to reflect the influences of climate warming in all seasons on gradual permafrost thaw and of anomalously "hot" summer temperatures on abrupt permafrost thaw and sudden subsidence of soils (sinkholes). All temperature variables were found to be increasing over time with significant and increasing increases into the future. The climate study also considered the role of precipitation trends (rainfall and snowfall totals) on flooding events and in exacerbating further permafrost thaw, adding in turn to flooding and drainage concerns. The analysis considered both climate station data and gridded or interpolated climate data, and found declining trends in average and precipitation totals for all months except June. The declining trend in precipitation totals is a finding that applies for unknown reasons to other locations in eastern Baffin Island, perhaps reflecting the importance of the Arctic Oscillation and North Atlantic Oscillation phenomenon to the region's weather patterns. However, more detailed analysis of extreme or more intense rainfall events indicated increases in summer 3-day heavy or extreme rainfall events. The study also examined seasonal and estimated changes in rainfall and snowfall as having a potential role in the changing landscape of the Apex Cemetery.

This climate study could benefit from additional considerations of anomalous or hot summer temperature indicators (thawing indices) associated with rapid permafrost degradation, as well as additional analysis of excess rainfall indicators that can capture both of the influences of extreme or intense rainfall events as well as more frequent rainfall events. Studies on changes in seasonality of precipitation patterns and freezing and thawing cycling could also prove informative. In general, it would be informative to undertake a "forensics type" analysis of flooding and drainage issues and their weather and climate links, including "setup" conditions, and to further investigate other practices to remediate the combined impacts of permafrost degradation and flooding.

The Changing Climate and the Landscape

Recent research studies have indicated that ice rich permafrost soils in parts of the Canadian Arctic are thawing some 70 years earlier than initially indicated. Initially, it was assumed that climate warming would bring a slow, steady erosion of permafrost that could be measured in centimeters of additional thawing over decades to centuries, with a similar pace for its carbon release. But, where ground ice content is high, recent research and observations from Arctic latitudes have indicated that abrupt thaw can happen in centimeters to meters in a matter of months following an anonymously "hot" summer. The rapid transfer of heat from air to soil in Arctic environments has been observed in a number of recent studies in Canada's Arctic (e.g., Farquharson et al, 2019), where a single short-lived but intense "hot" summer event can force widespread permafrost active layer deepening and ongoing landscape degradation and subsidence lasting for decades.

Generally, as the ice that holds the soils together disappears under rapid thaw, it can result in sinkholes (thermokarsts) in ice rich soils. This rapid thaw and subsidence persists and can expand over the next several decades, as shown in **Figure A-1**. In most cases, the "sinkholes" are also associated with flooding risks, especially under intense rainfall events that also, in turn, speed up the permafrost thawing and subsidence. The permafrost degradation is also associated with ground disturbance and can result in increased coastal erosion risks. A scientific concern with this cycle is that rapid thawing of permafrost also could release large quantities of stored greenhouse gases, unleashing a feedback loop that could, in turn, fuel even faster climate changes over the Arctic (and planet).

Heavy rainfall summers are associated with Arctic flooding hazards and with additional permafrost thaw and subsidence in ice rich soils. A study from Fairbanks, Alaska that monitored longer term rainfall and permafrost thaw in ice rich soils (Douglas et al, 2020) indicated that an additional 7 mm of permafrost thaw is likely for every 10 mm of summer rainfall exceeding average summer amounts, regardless of whether the rainfall was the result of an intense and heavy rainfall or many wet days. It is likely that permafrost thawing or degradation from excess summer rainfall would be more sensitive in the Apex Cemetery area than in Fairbanks due to less vegetative cover and generally colder permafrost conditions. The addition of thick gravel cover could help to buffer for permafrost thaw sensitivity and improve drainage.

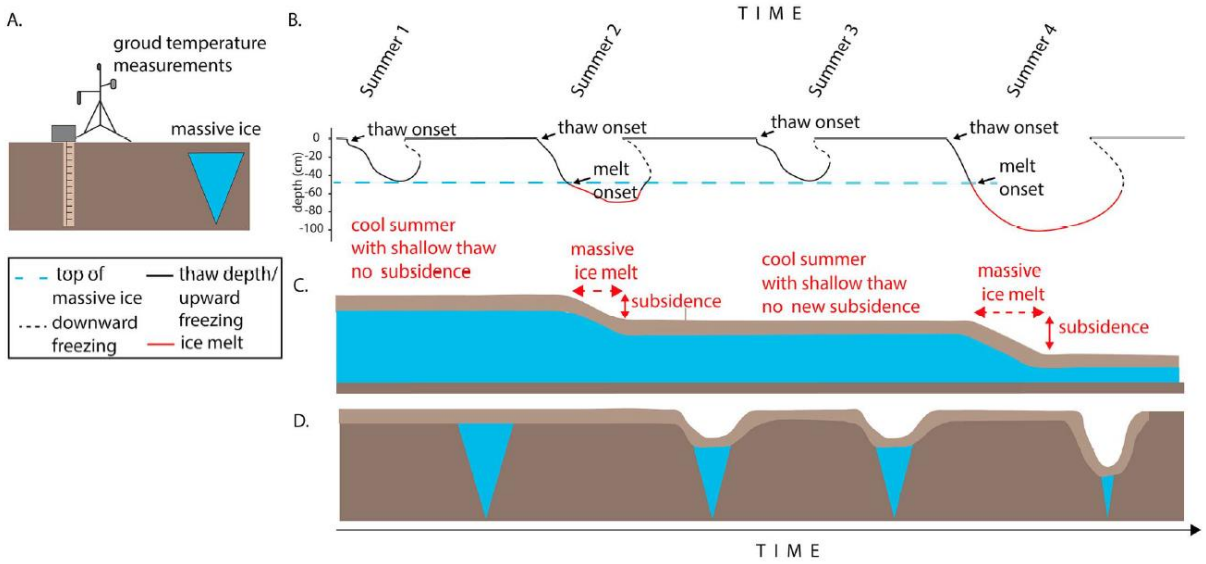


Figure A-1. Schematic showing how the first very warm summer and others that follow lead to rapid ice-wedge permafrost degradation in High Arctic regions.

Climate Trends

Like other parts of Nunavut, the climate of the Apex Cemetery area is warming consistently over all seasons. As shown in **Appendix 1**, mean annual temperatures over the Iqaluit area have warmed steadily since 1981 and are projected to continue warming into the future under climate change. By the 2050s period (2041-2070), mean annual temperatures are projected to warm by around 5°C relative to climate projection baseline values for the period 1981-2010. Periods of anomalous winter warmth and freeze-thaw cycling are also becoming more frequent during many years.

Careful analysis of climate station and gridded climate data indicates that seasonal and annual precipitation amounts from snowfall and rainfall have been declining in the area since the 1970s. The exception in the historical records is the month of June, where trends are slightly increasing. These trends in precipitation for eastern Nunavut and eastern Baffin Island in particular differ from those of other parts of Nunavut and their cause is not clear. Multi-decadal atmospheric oscillations due to a global phenomenon known as the Arctic Oscillation and North Atlantic Oscillation are important influences on weather patterns in eastern Baffin Island and may be driving these recent precipitation trends. Climate change model projections for the next 30 year call for increases in rainfall and snowfall amounts as seen in **Appendix 2**, although there is a small possibility that climate change models may not be yet able to capture these trends and other dynamics in play.

Concurrent to these trends in precipitation have been shifts in the seasonality of the precipitation types and amounts. Due to recent changes in precipitation measurements (i.e., recent automated measurements do not differentiate rainfall from snowfall amounts) and to general declines in the quality and types of climate data, it is difficult to discern the contributions to trends from rainfall and from

snowfall. Based on analysis of daily minimum and maximum temperatures and daily total precipitation amounts, it is estimated that the annual snowfall totals in the Iqaluit area have been decreasing recently while annual rainfall totals have remained mostly steady or at least declined more slowly.

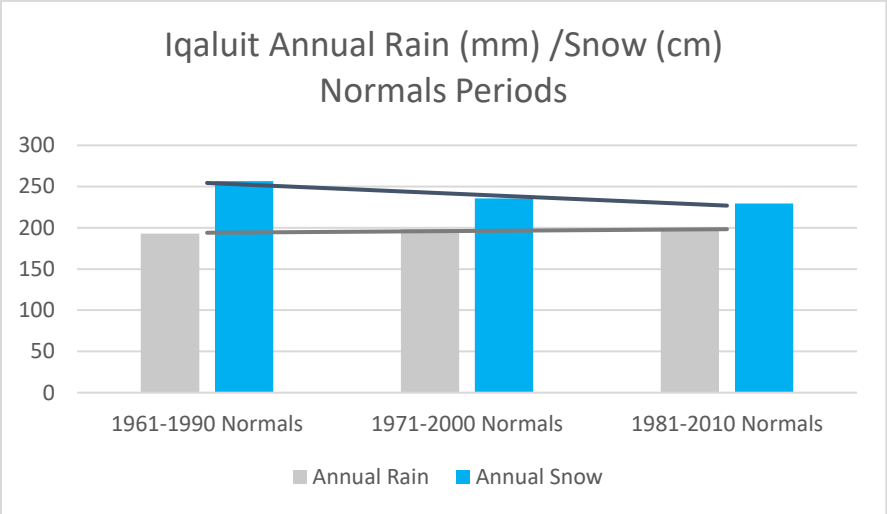


Figure A-2. Estimated trends in snowfall amounts relative to rainfall amounts based on successive 30-year climate average periods (called Climate Normals).

Trends for heavier or more intense rainfall *events* can be captured through the extreme 3-day summer precipitation amounts for each year. **Figure A-3** below shows small increases in 3-day extreme rainfall amounts each year, especially representative of the most recent years. Note that the climate record for 3-day rainfall extremes at Iqaluit Airport is quite variable from summer to summer and has significant missing data gaps. Nonetheless, the available data does highlight the near record summer rainfall of July, 2016 (>80 mm over 3 days) that resulted in the overflow of the Apex River and wash out of the Apex Bypass Road. A record rainfall amount of over 131 mm was measured at the Iqaluit Airport in July, 2016, as seen in **Appendix 2**. Heavy 3-day rainfalls of 50 mm were also noted in July, 2020 and in the summer of 2018 (missing data). Local newspaper reports indicate that ongoing flooding, drainage, and sinkhole issues at the Apex Cemetery were notable during the 2016, 2018, and 2020 rainfall summers.

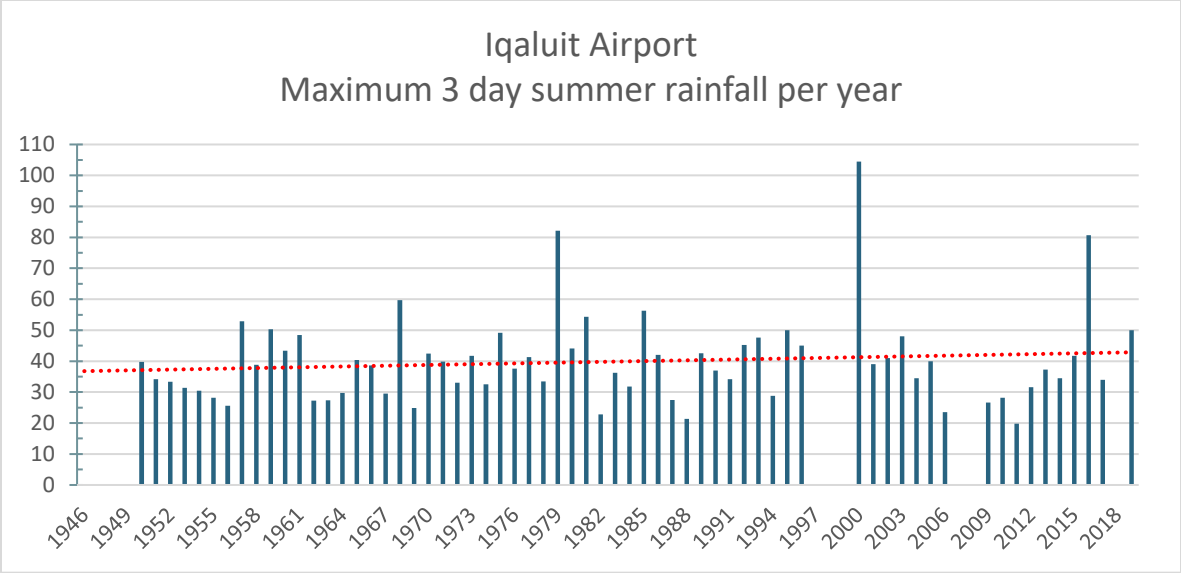


Figure A-3: Iqaluit Airport - Maximum 3 day Summer Rainfall per Year

Climate Change Projections

The climate projections shown in **Appendix 1 and 2** are based on an ensemble of 33 peer reviewed or internationally vetted climate change model sets developed for the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report that was released in 2013. The climate change projections for the Iqaluit area used here assume the higher "business as usual" greenhouse gas emission scenario known as RCP8.5. Dillon is currently in the process of collecting and assessing the next generation of IPCC AR6 climate models that should be released officially with the 6th IPCC Assessment Report, expected officially within the next year or two.

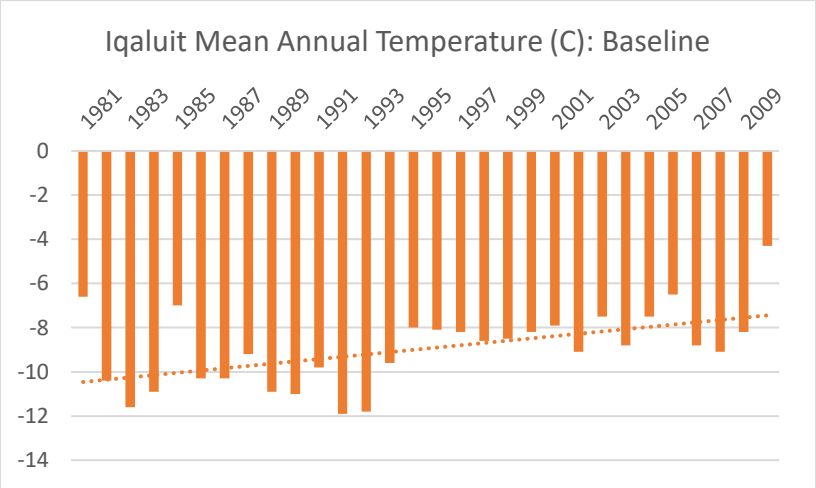
All climate change projections use gridded data outputs, and these outputs vary in scale. All of the model outputs were calibrated to a common grid that meshes with the baseline or current climate field, 1981-2010. The climate change projections then represent changes from this current or baseline climate. For the projections shown in the **Appendix 1 and 2**, climate change outputs from the 33 IPCC climate model sets were combined as an ensemble to reflect a future 2020s period (2011-2040), 2050s period (2041-2070), and a 2080s period (2071-2100).

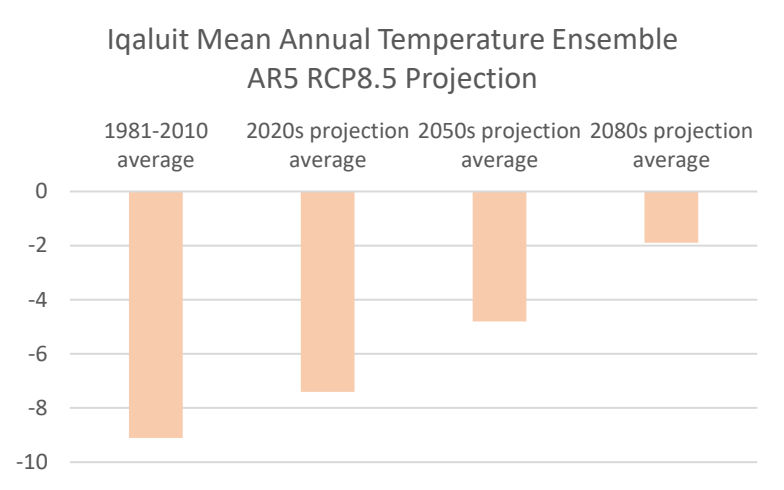
References

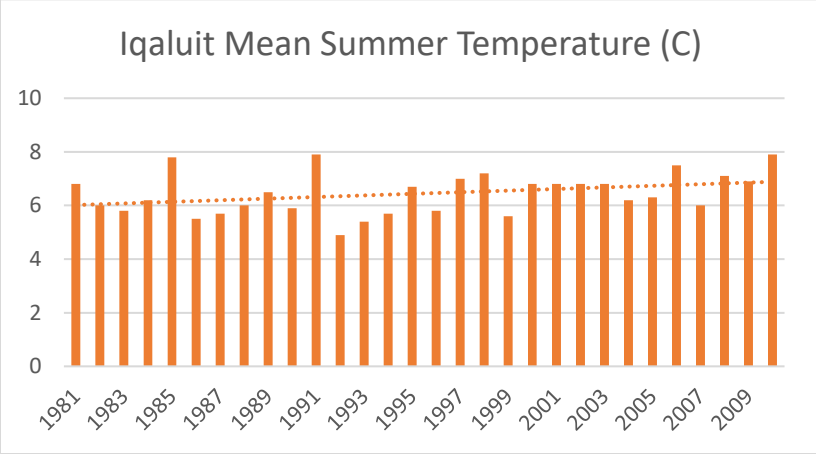
Douglas, T.A., Turetsky, M.R. & Koven, C.D. Increased rainfall stimulates permafrost thaw across a variety of Interior Alaskan boreal ecosystems. Nature npj Clim Atmos Sci 3, 28 (2020). https://doi.org/10.1038/s41612-020-0130-4

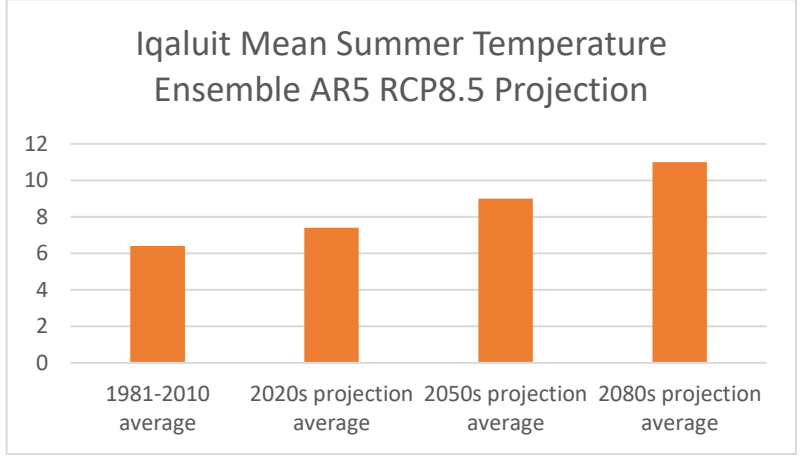
Farquharson L M, Romanovsky V E, Cable W L, Walker D A, Kokelj S and Nicolsky D, 2019: Climate change drives widespread and rapid thermokarst development in very cold permafrost in the Canadian high arctic. *Geophys. Res. Lett.* 4 6681–9.

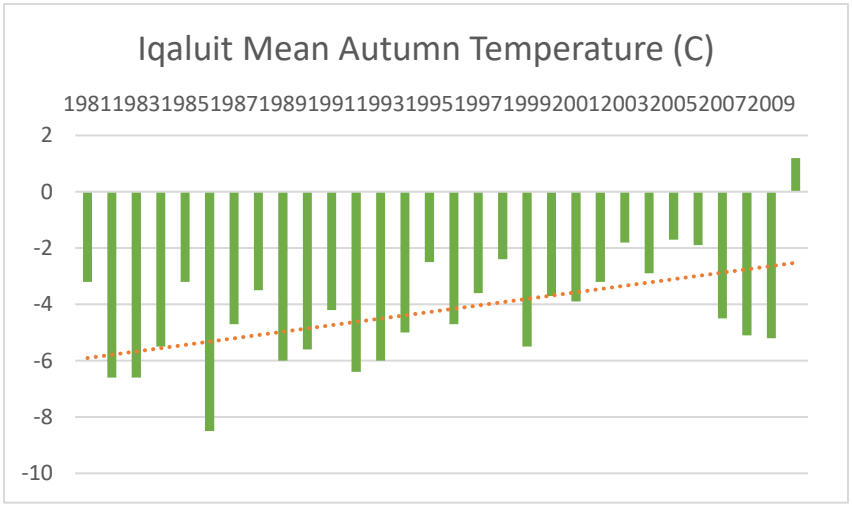
Appendix 1: Temperature Trends and Future Projections under High Greenhouse Gas Emission Assumptions

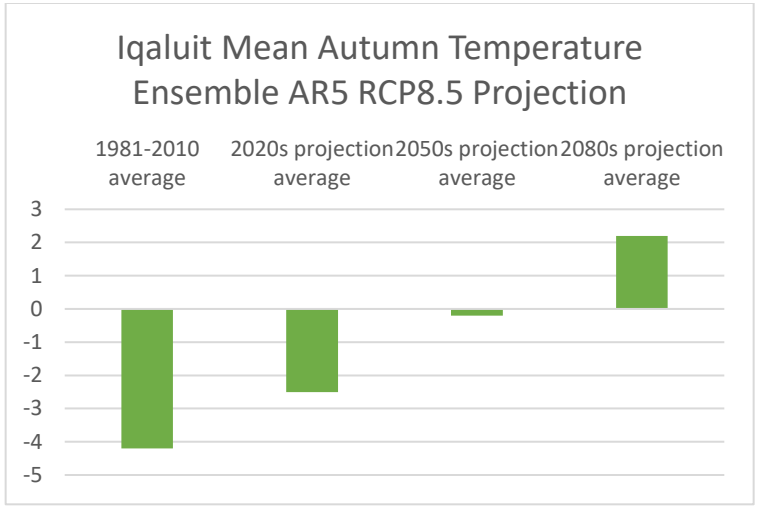


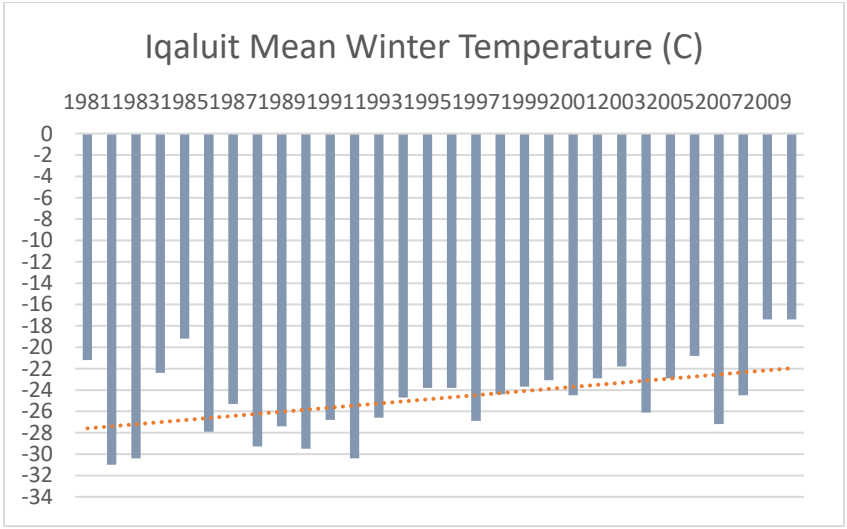


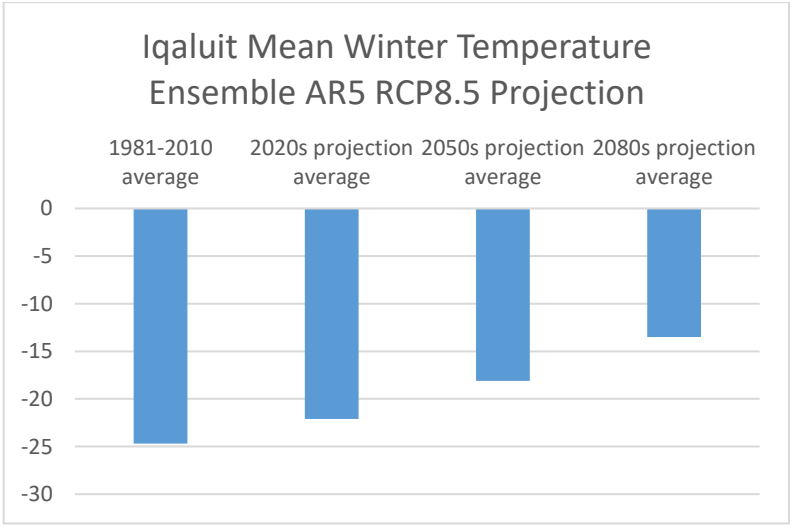





Iqaluit Mean Autumn Temperature (C)
1981198319851987198919911993199519971999200120032005200720092
2
0
-2
-4
-6
-8
-10

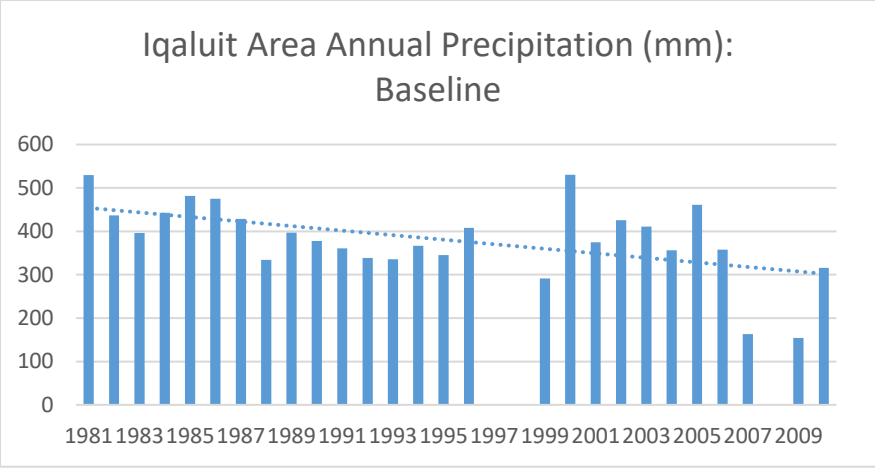

Iqaluit Mean Autumn Temperature
Ensemble AR5 RCP8.5 Projection
1981-2010 average
2020s projection average
2050s projection average
2080s projection average
3
2
1
0
-1
-2
-3
-4
-5

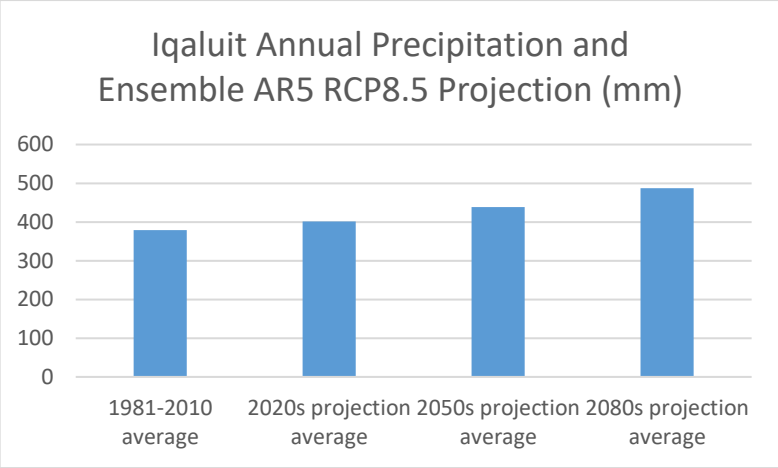

Iqaluit Mean Winter Temperature (C)
1981198319851987198919911993199519971999200120032005200720092
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34

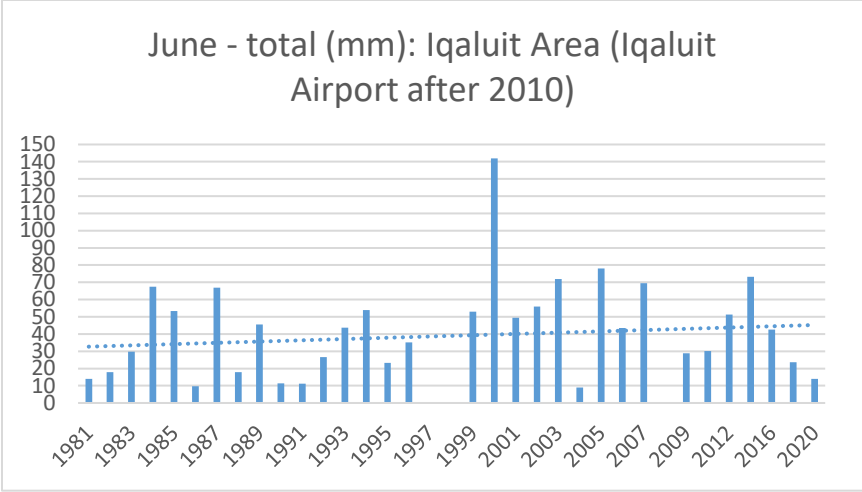

Iqaluit Mean Winter Temperature
Ensemble AR5 RCP8.5 Projection
1981-2010 average
2020s projection average
2050s projection average
2080s projection average
0
-5
-10
-15
-20
-25
-30

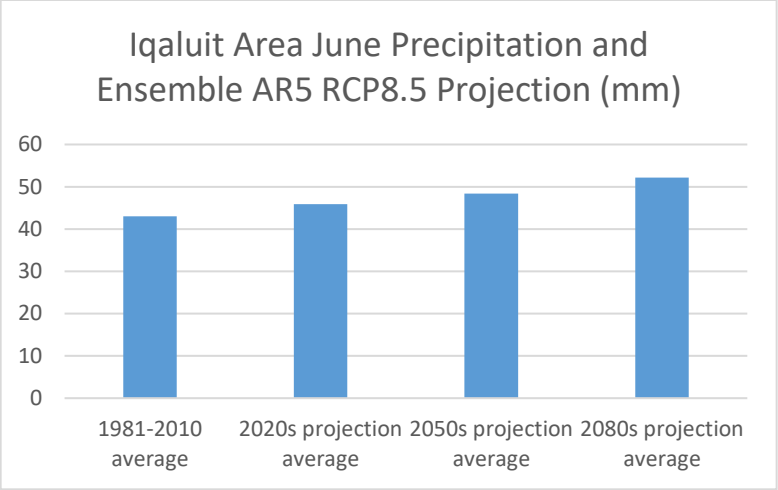
Appendix 2: Precipitation Trends and Future Projections under High Greenhouse Gas Emission Assumptions

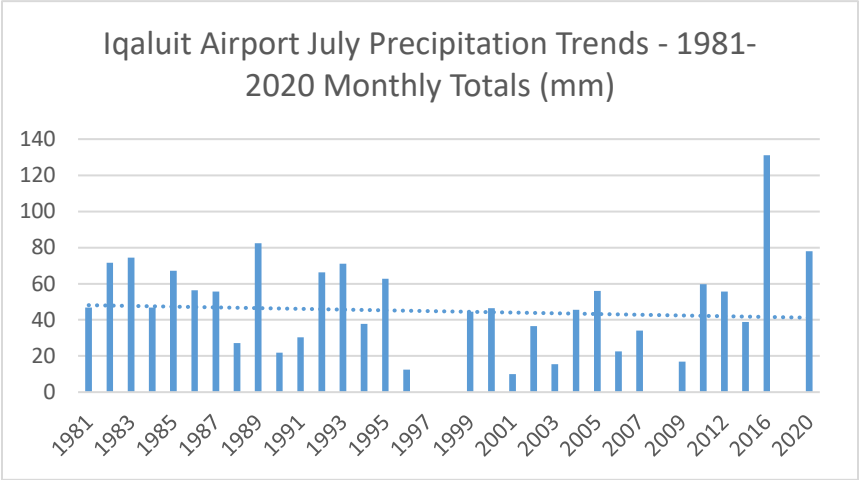
The following precipitation trend figures differ in format from those provided in **Appendix 1** for temperatures and focus on annual and monthly summer rainfall trends (June, July, and August). Note that recent summer precipitation (rainfall) trends from 1981-2020 for all seasons/months other than June are downwards, but climate change projects from an ensemble of 33 climate models indicate future increases in all seasons. Gaps in climate data records and particularly in precipitation records have become significant since the mid-1990s, explaining the blank records shown in the figures below.

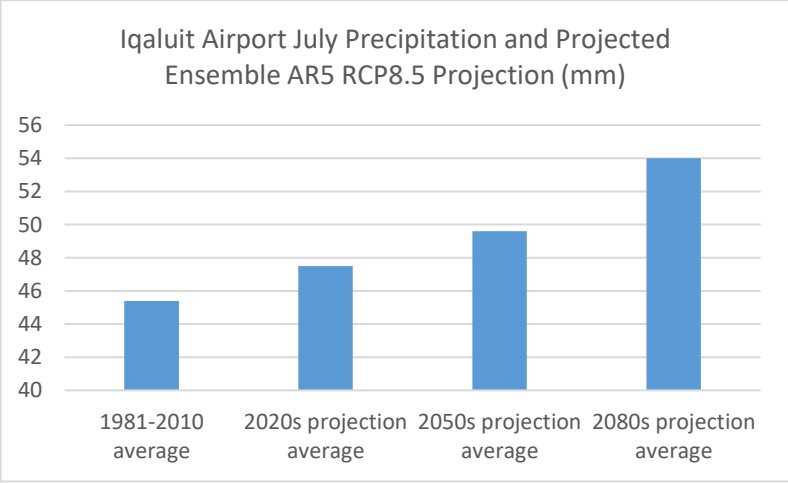


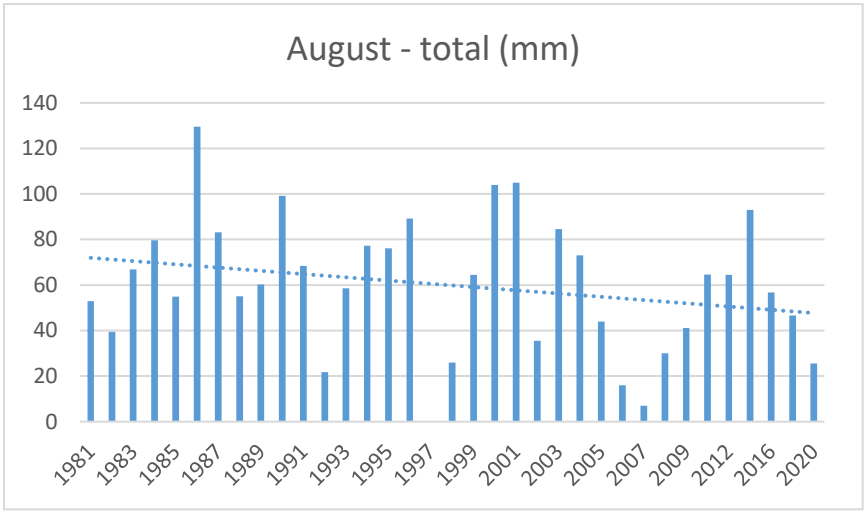


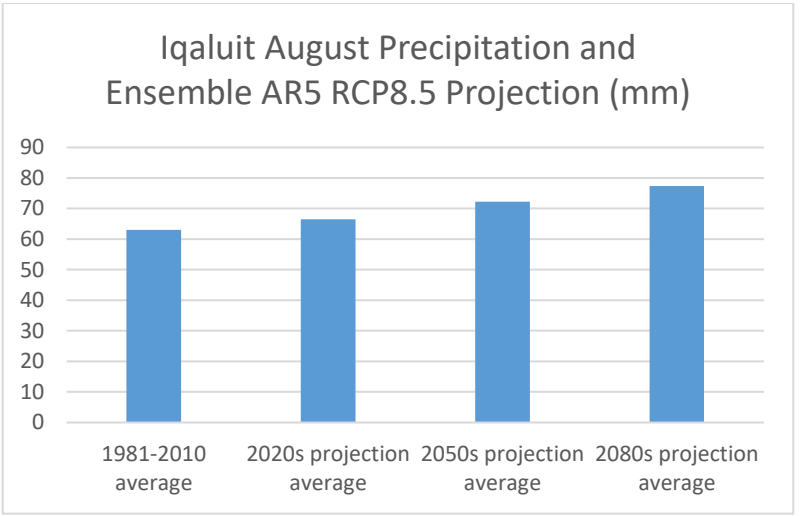

June - total (mm): Iqaluit Area (Iqaluit Airport after 2010)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2012
2016
2020

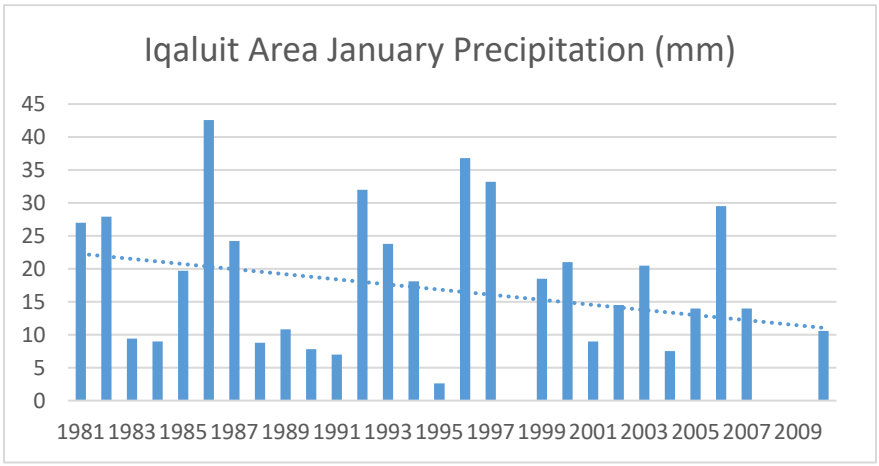

Iqaluit Area June Precipitation and Ensemble AR5 RCP8.5 Projection (mm)
60
50
40
30
20
10
0
1981-2010 average
2020s projection average
2050s projection average
2080s projection average

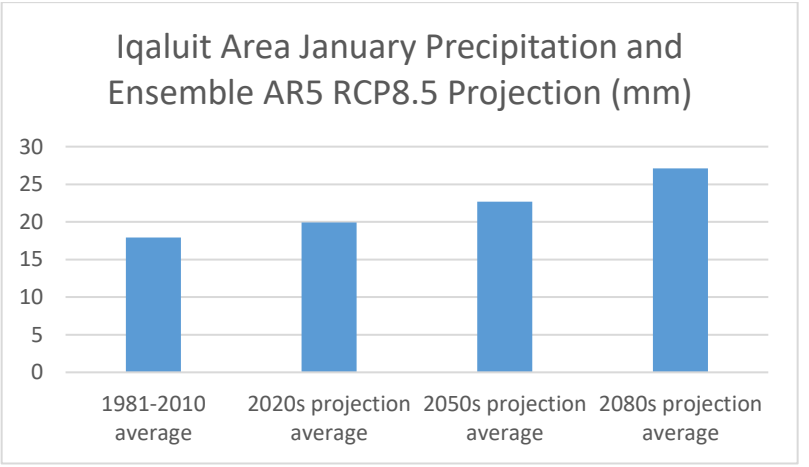

Iqaluit Airport July Precipitation Trends - 1981-2020 Monthly Totals (mm)
140
120
100
80
60
40
20
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2012
2016
2020


Iqaluit Airport July Precipitation and Projected Ensemble AR5 RCP8.5 Projection (mm)
56
54
52
50
48
46
44
42
40
1981-2010 average
2020s projection average
2050s projection average
2080s projection average


August - total (mm)
140
120
100
80
60
40
20
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2012
2016
2020


Iqaluit August Precipitation and Ensemble AR5 RCP8.5 Projection (mm)
90
80
70
60
50
40
30
20
10
0
1981-2010 average
2020s projection average
2050s projection average
2080s projection average


Iqaluit Area January Precipitation (mm)
45
40
35
30
25
20
15
10
5
0
1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009


Iqaluit Area January Precipitation and Ensemble AR5 RCP8.5 Projection (mm)
30
25
20
15
10
5
0
1981-2010 average
2020s projection average
2050s projection average
2080s projection average

Appendix D

Communications Summary Report

DILLON CONSULTING

CITY OF IQALUIT

Apex Cemetery Remediation

Communications Summary

April 2021 - 20-3451

1.0 Introduction

Dillon Consulting Limited (Dillon) was engaged by the City of Iqaluit (the City) to develop plans to address ongoing water and drainage issues at the Apex Cemetery. As part of this work, options for the cemetery were presented to Elders and citizens for their feedback and to inform the City's decision on how to proceed. In a Cemetery Advisory Committee Meeting on February 18, 2021, the Committee presented to Council the public consultation process and the proposed improvements to the Apex Cemetery. This was approved unanimously with Motion #21-03. This report provides a summary of the feedback collected through the public consultation between February 19, 2021 and March 5, 2021. This includes distribution of an information sheet and public service announcements on the City website, Facebook and Twitter; a public radio call-in show; an in-person meeting with Elders; and correspondence to the City via email, mail, and a phone line.

2.0 Cemetery Advisory Committee Meeting

On February 18, 2021, a Cemetery Advisory Committee meeting took place where Chief Administrative Officer Amy Elgersma explained the design and remediation of the Apex Cemetery and Communications and Customer Service Manager Lisa Milosavljevic presented the public consultation process. The committee approved the public consultation process with Motion #21-03. Committee members present at the meeting were Joanasie Akumalik, Councillor, City of Iqaluit; Jodi Durdle-Awa, Director of Policy Services, Department of Family Services – via Teleconference; Ross Paterson, Manager of Infrastructure Programs, Community & Government Services – via Teleconference; and Kenny Bell, Mayor of Iqaluit, ex officio. Present from City Administration were Amy Elgersma, Chief Administrative Officer; Tammy Ernst-Doiron, City Clerk; Lisa Milosavljevic, Communications and Customer Service Manager; Jeanie Eeseemailee, Senior Interpreter/Translator; Rod Mugford, Municipal Enforcement Chief; Shane Turner, Superintendent Water/Sewer; and Ainiak Korgak, City Community Liaison.

3.0 Information Sheet

To outline proposed improvements to the Apex Cemetery, Dillon and the City developed a plain language, two-page information sheet which described both this summer's work to address the cemetery's drainage issues, and pilot program options to reduce water in the graves. The options were shown using design drawings and conceptual sketches to give readers an idea of how each option would look in practice, and a table listed the pros and cons of each option (including graphic depictions of the relative cost, and number of graves that the cemetery could hold using each option). Methods and a timeline for the public to provide their input to the City were also listed, including email and mailing addresses, a dedicated info phone line with hours to call, and a CBC Radio call-in show. The sheet was

posted on the City's website on February 19, 2021, with feedback accepted until March 5, 2021. The information sheet was also available for pick-up at City Hall for interested residents. A copy of the final version of the information sheet is appended to this report.

4.0 CBC Radio Show

On February 23, 2021, the City took part in a phone-in show on CBC Radio's Nipivut program over the noon hour to describe the proposed work at Apex Cemetery and answer questions from the public. Taking part on behalf of the City were Councilor Joanasie Akumalik, CAO Amy Elgersma and Communications Community Liaison Ainiak Korgak.

Councilor Akumalik provided a brief overview on the capital work proposed for the summer of 2021, which includes raising the height of the cemetery by half a metre with sloping down to the perimeter of the cemetery, upgrading the existing drainage system to capture water build-up so that it drains away from the cemetery, and raising the ground where the existing graves are, which will be done by hand. This overview also included a description of how future burials may be carried out, by using vaults or insulated graves.

During the call-in portion of the radio show, 7 people called in with their comments. A summary of the comments can be found below.

Comment	Response
With water from the cemetery draining into Tarr Inlet, will this affect if people can harvest clams from the clam beds at the inlet?	The City has not yet considered this, however there will be periodic testing in the future.
Good to hear that the raising of graves will be done by hand.	N/A
Who selected the current cemetery site?	The City hired consultants who made recommendation to former City engineers and then City Council made a decision. The City has different consultants to assist with this project and the City is very involved, as is the Cemetery Advisory Committee.
The current cemetery is getting full already, is the City considering another site? Family members buried in the old Iqaluit Cemetery are hard and impossible to find where they are buried. Who is responsible for finding where people are buried?	N/A
Embalming should not be done. Adding gravel will not help with the current water issues. Tarr Inlet has clams, sculpins and seaweed that people harvest.	N/A

Knows that the area where the Apex Cemetery is located is wet, as her children played there. Perhaps the old cemetery can still be used for burials, where the area is used for parking and walkways. Need benches to sit on, especially for elders.	N/A
Daughter is buried at the Apex Cemetery and appreciates that raising of existing graves will be done by hand.	N/A

Note: There was a primary public radio call-in show that took place to inform Nunavummiut about the cemetery remediation project on September 17, 2020. Cemetery Advisory Committee members City Councillor Akumalik, Martha Nowdlak (Health Systems Navigator, Nunavut Tunngavik Inc.), and City of Iqaluit's Chief Administrative Officer, Amy Elgersma, took part in a two-hour CBC radio show to hear about experiences and concerns from residents on the Apex Cemetery and explain the remediation project.

5.0 Qammaq Elders Info Session

On February 26, 2021, the City held an in-person info session with local Elders to describe the plans for improving the Apex Cemetery. In general, the comments on the proposed plans were positive and attendees were generally in favour of shallower or above-ground graves with rocks alongside. The importance of being able to located loved ones was also raised. A summary of comments provided by the Elders on this subject is provided below.

Comments from Elders' Info Session
Can we do a test area before a large scale work is done to the site? (referring to the raising of the site/adding fill
Graves do not have to be dug to 5 feet depth. Shallow burials work better.
We don't want to lower coffins into water.
The graves are dug too deep.
I learned from my grandmother (from Pangnirtung) to put 6 rocks on each side of the coffin to be buried, so that it doesn't sink. We did this for my daughter and my husband.
I want to be buried above ground.
When I am buried, I don't want to wash away to the sea.
We have a difficult time locating loved ones in the old cemetery. There are no markers in some cases.
We want to be able to find our loved ones in the cemetery.

6.0 Emailed Feedback

The City invited feedback from the public on the proposed improvements by email to info@iqaluit.ca between February 19th and March 5th. Two emails were received during this period, and each is summarized below.

Email #1 – Conor Goddard

The respondent had a generally negative view of the proposals for future burials, noting that he feels none of the proposed options are adequate, and he doesn't want to be buried in a "rubber maid vault." The respondent wondered if the consultants met with the Inuit community in any sort of meaningful way or hired an Elder for their perspective, and suggested that instead of the proposed options, no excavation be done and that traditional surface cairns be explored as an option. They did acknowledge that there may be litigious barriers to such a solution, but at least hoped it would be ruled out as an option before proceeding.

Email #2 – Jeremy Debicki

This respondent also had a generally negative view of the proposals, deeming both "unacceptable," but focused more on the environmental perspective of "shipping up plastic tubs or putting insulation in the ground." They stated that the land is riddled with plastic pollution and now in death we are considering adding more wasted, and noted that the idea of slowly rotting in a sealed container is not appealing, and that sealing a body in plastic would prevent the natural return of the body to the land. They suggested doing more research into burials that are environmentally friendly, and wondered if the City has talked to other municipalities in Nunavut and other northern countries for advice and knowledge for dealing with burials in the tundra. The respondent also suggested that the proposed solution seems commercialized and not societal, stating they would prefer to be buried in a shroud covered by rocks placed by family members. They also suggested that if the current location is unsuitable, to consider walking with knowledge holders to find another location, but if we have to build up the graveyard with gravel, then let's build it up. Finally, they pointed out the need to create a burial ceremony that works, as running a generator and pump is undignified during a funeral service.

7.0 Summary

In summary, the feedback received by the City on the proposed improvements to Apex Cemetery was generally positive, aside from the two emails submitted by residents. Participants of the radio call-in show and the Elders info session seemed to be generally supportive of the City's plans, while bringing up points for consideration around the importance of being able to locate family members' graves, and impacts of water run-off into Tarr Inlet on clams and other sea life. Testing the improvements on a small area first, as mentioned in the Elders session, may also help to reinforce public opinion. While two

emails were received in opposition to the proposed approaches, the lack of other public response suggests a general acceptance of the proposed options, particularly given the considerable effort put in to communicating the proposed work to the public.

Appendix A

Information Sheet

The City of Iqaluit is looking for your input on proposed improvements to the Apex Cemetery

The Apex Cemetery location is a peaceful place for reflection overlooking Tarr Inlet, but the site has struggled with **drainage problems**.

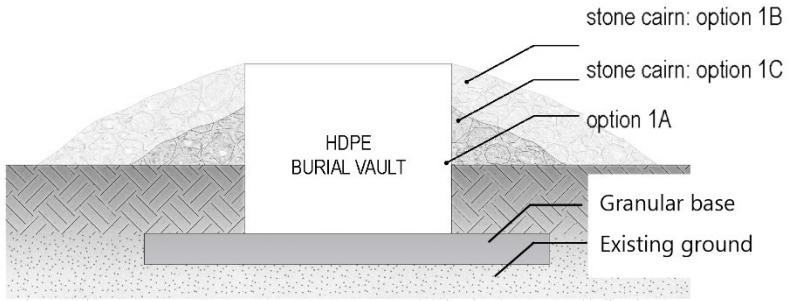
This summer, work will take place to raise the ground at the cemetery by adding granular material and by improving ditching to help with drainage conditions. Improvements to the cemetery's parking lot and pathways will also be made.

To reduce the amount of water accumulating in graves, the City is also considering options for future burial design. These options would be **unique to Iqaluit** and are examples of adapting to **site conditions** and a **changing climate**.

Each option differs in cost and design of the site. The City's cemetery operation and maintenance procedures will be updated to reflect the chosen design. These designs would be reflected in future burials only.

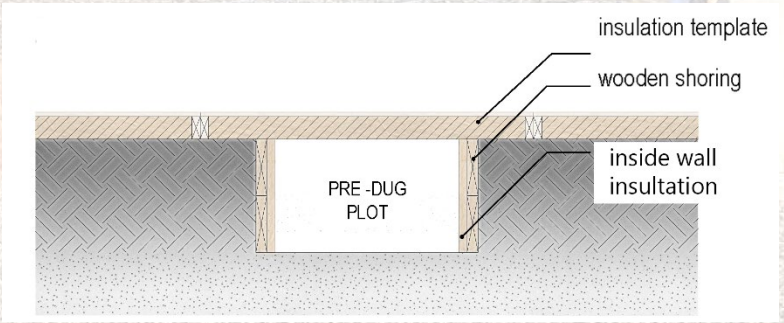
Option 1: Burial Vaults

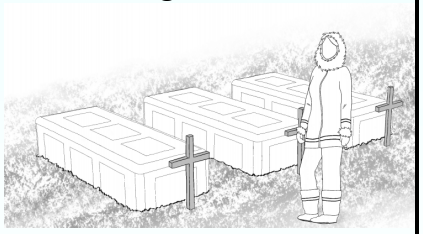
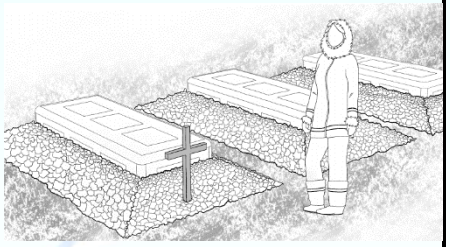
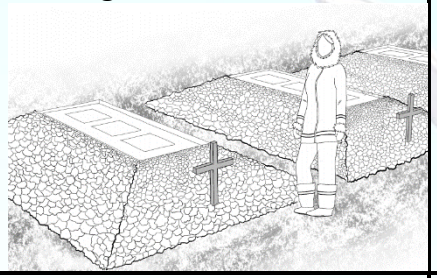
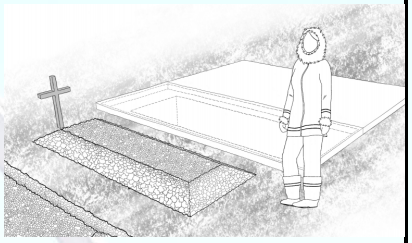
This option would use above-ground burial vaults made of an industrial plastic called High-Density Polyethylene (HDPE) that are partially inset into the ground. The intent of the above-ground burial vaults is to avoid disturbing the active layer above the permafrost. There are three designs to choose from, with the main difference being the height of the stone cairn alongside the graves.



Option 2: Insulated Graves

This option would continue to use the current in-ground wooden burial boxes but with additional insulation. This insulation material would line the top and sides of a pre-dug grave. After a funeral, the surface of a grave would look very similar to existing graves.



Option:	**1-A: Burial Vault with no Stones alongside**	**1-B: Stones alongside part of the Burial Vault**	**1-C: Stones alongside to the full height of Burial Vault**	**2: Insulated Graves**
				
ADVANTAGES	• Eliminates water in graves during funerals • Low maintenance requirements	• Eliminates water in graves during funerals • Low maintenance requirements	• Eliminates water in graves during funerals • Low maintenance requirements • Lowest cost option	• Reduces water in graves during funerals • No reduction in the amount of graves the cemetery will be able to hold • Visually similar to current cemetery
DIS-ADVANTAGES	• Burial vault more exposed to the elements	• Fewer graves can be accommodated at the site due to the space taken up by stones alongside burial vaults	• Lowest amount of future graves at the site due to stones alongside burial vaults	• Most expensive option • Requires most site maintenance • May not fully eliminate water in graves
COST	$	$$	$$$	$$$$
NUMBER OF GRAVES	□□□□□	□□□□	□□□	□□□□□□

Give Us Your Thoughts:

The City of Iqaluit will accept feedback until March 5th at 4:30 p.m.

- **Send an Email:** info@iqaluit.ca
- **Write a Letter:**
  City of Iqaluit, PO Box 460
  Iqaluit, NU, X0A 0H0
- **Call our info line:**
  867-979-5603
  9 – 11:30 a.m.
  Monday - Friday
- **Radio call-in show:**
  February 23rd, 12 – 1 p.m.
  Nipivut CBC Radio 91.1 FM
  867-979-6100

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Iqaluit

Iqaluit

CITY OF IQALUIT GENERAL PLAN & ZONING BY-LAW

BACKGROUND REPORT
JUNE, 2022

CITY OF IQALUIT GENERAL PLAN & ZONING BY-LAW

BACKGROUND REPORT
JUNE, 2022

RE:PUBLIC exp.

Table of Contents

PART I - INTRODUCTION + COMMUNITY CONTEXT
1.0 INTRODUCTION

1.1 Project Overview

The City of Iqaluit is undertaking the development of a new General Plan and Zoning By-law, replacing the existing documents originally adopted in 2010. A General Plan (GP) is a long-range planning document that guides and manages growth, development, redevelopment within a municipality over a period of typically 20-years. It establishes the City's overall development goals, objectives, and land use policies to ensure that the present needs of the City do not compromise its future needs. A Zoning By-law (ZBL) is a regulatory document that implements the GP's policies through regulation. The ZBL also establishes the system through which development is permitted in the City. The existing General Plan and Zoning By-law were adopted in 2010 and it has been more than a decade since they were last comprehensively reviewed, however some updates have been undertaken during this time, with the most recent being completed in 2021. There are many reasons that this review is being undertaken including:

- Renewing the City's vision for itself and ensuring it is reflective of the City's aspirations;
- Ensuring conformity with territorial legislation and policies;
- Undertaking updated population projections and land needs assessments to ensure there is an adequate supply of urban land to meet future population needs; and
- Incorporating policies and regulations that reflect current development best practices.

1.2 Purpose of this Report

This report constitutes the background report for both the GP and ZBL. Overall, this report seeks to establish the research and analytical foundations for the development of both documents, as outlined in Section 3 of the Nunavut Planning Act. Specifically the purpose of this report is threefold, to:

- review and analyse the City's existing conditions and context, including providing an overview of the legislative and policy framework under which the documents operate;
- identify key issues, opportunities, and best practices that may be addressed or incorporated into the development of a new GL and ZBL; and
- undertake growth projections for the City and analyse and assess the amount of land required to accommodate future growth in the City.

1.3 Report Structure

This report has been divided into three parts as outlined below:

Part I – Introduction & Community Context – introduces the project and study area, providing an overview of Iqaluit's geography, history, and demographic make-up and the legislative context in which the review is taking place.

Part II – Existing Conditions Review & Analysis – incorporates the major findings of the research and analysis carried out by the project team. The part is further divided into four sections based on topic – Land Use, Infrastructure, Environment & Resources, and Community Culture. Chapters are generally organized to identify the challenges, issues and opportunities associated with the subject; outlining select best practices and/or trends; and concluding with recommended strategic directions for consideration in the new General Plan and Zoning By-law.

Part III – Future Needs & Strategic Directions – includes population projection and land needs assessment and provides a summary of the findings from the background review, highlighting the key issues and recommendations identified by the project team. These will help shape the topics for further consultation with stakeholders as the project team begins to develop policy directions.

1.4 What is a General Plan and Zoning By-law?

A General Plan is a municipal statement of policy that outlines a vision for how a municipality will grow and develop over a period of time (typically 20 years). To achieve this vision, the GP will guide decision-making on matters such as housing, economic development, land use and development, protection of the natural environmental, and the provision of infrastructure. Accompanying this statement of policy are a series of maps or schedules that identify where in the municipality specific policies apply and identify where general groupings of land use are planned to occur. These maps will outline land use, transportation routes, infrastructure location (both existing and planned), development constraints, and natural features.

Complementing the GP is the Zoning By-law, a regulation that is designed to achieve the goals of the policies of the General Plan by regulating development and land use on a more detailed basis. Zoning By-laws are structured to contain regulations based on the policies outlined in the GP and are accompanied by zoning maps or schedules that divide a municipality into various zones, related to each the various regulations in the By-law.

Figure 1 Stakeholders for General Plan and Zoning By-Law

1.5 Who Are We Planning For?

With its mix of long-term and short-term residents, Inuit and non-Inuit population, elders, youth, and cultural backgrounds/ languages from around the world, the City upholds a high standard of engagement; especially on matters of planning and development. As part of the project, community stakeholders will be engaged through a mix of passive and active methods of engagement, ranging from web-based informational content and online surveys; to focus group workshops; to traditional open houses and public meetings. This mix is intended to capture feedback in a functional and meaningful way. A consultation strategy for the project was prepared in collaboration with City staff to ensure inclusivity, and the graphic above provides a high-level look at the stakeholders that will be involved in the project.

While the initial phases of community engagement are still ongoing at the time of writing and will continue throughout all phases of the project, a summary of findings from the initial staff workshop and community survey will be appended to the report under **Appendix A** upon completion. The inclusion of this feedback is intended to supplement the findings of the background review.

Figure 2 Context Map

2.0 GEOGRAPHIC & CLIMATIC CONTEXT

Iqaluit is located in the Everett Mountains which rise from Koojesse Inlet at Frobisher Bay on the southernmost part of Baffin Island. Well to the east of Nunavut's mainland, and northeast of Hudson Bay, Iqaluit has a tundra climate with long cold winters and brief summers. Average monthly temperatures are below freezing for eight months of the year. Iqaluit averages just over 400 mm of precipitation annually, much wetter than many other localities in the Arctic Archipelago, with the summer being the wettest season.

Temperatures of the winter months are comparable to other northern communities further west on the continent such as Yellowknife. Summer temperatures are, however, much colder due to its easterly maritime position affected by the cold waters of the Baffin Island Current. This means that the tree line is much further south in the eastern part of Canada. The climate of Iqaluit is also colder than Gulf Stream locations on the same latitude. The lowest temperature ever recorded was –45.6 °C on February 10, 1967, while the highest temperature ever recorded in Iqaluit was 26.7 °C on July 21, 2008.

Although it is north of the natural tree line, there are some short, south-facing imported black spruce (*Picea mariana*) specimens protected by snowdrifts in the winter, in addition to a few shrubs, which are woody plants. These include the Arctic willow (*Salix arctica*), which is characterized by its low height. The Arctic willow may be up to around 7.6 m horizontally, but only 150 mm tall.

Average Temperatures

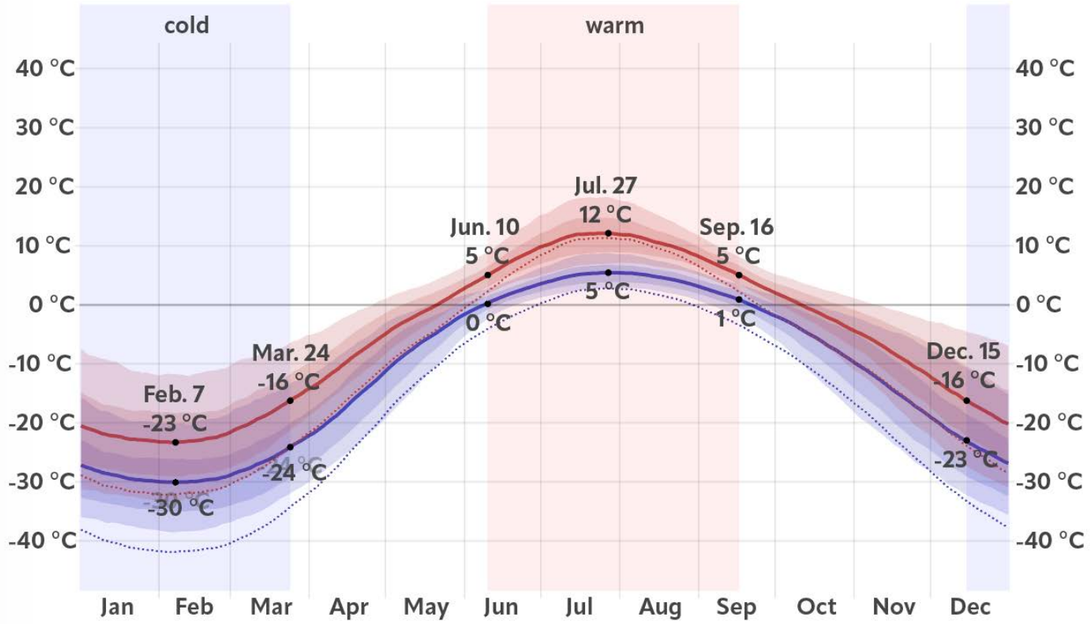


Figure 3 Average Temperatures

Sunlight Duration

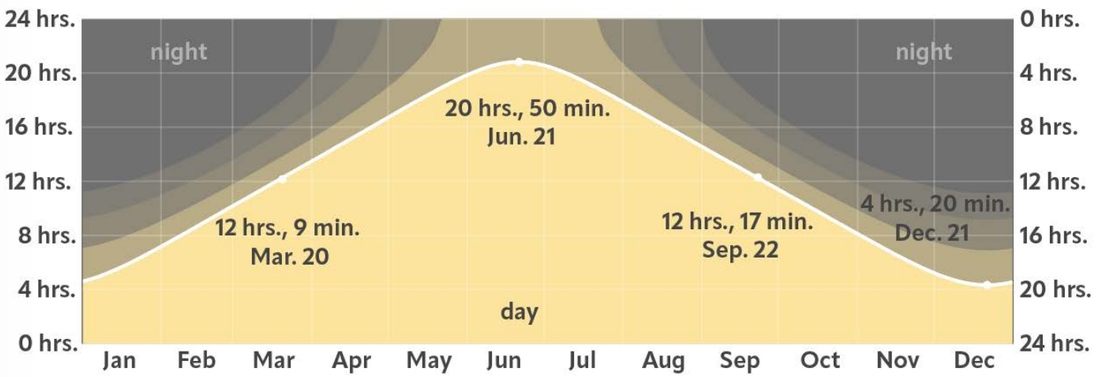


Figure 4 Average Sunlight Duration

3.0 IQALUIT TIMELINE

Formation of Baffin Island (75 to 11,000 years ago)
The southernmost peninsula of Baffin Island is an escarpment along Frobisher Bay. During most of the Wisconsin Age, precipitation in the area is thought to have been low, and there is evidence that the higher parts of the escarpment remained above the ice. Cirques with submerged floors show that during a considerable part of the glacial age sea level was lower than today. Strand lines indicate very great depression of the land in the late Wisconsin Age, possibly connected with an increase of ice in the Hudson Strait area as precipitation increased after the disappearance of the topographic barrier of the main Laurentide Ice Sheet. When the sea level was between 64 and 55 metres the overflow from an ice-dammed lake cut two great gorges and formed a large bay-head delta. The dam may have been the northern margin of an ice sheet centered in the Quebec-Labrador Peninsula. There is evidence of a warmer period in the recent past, and the present small icecaps are probably the rejuvenated relics of a larger icecap.

Indigenous Peoples Arrival (3200 BC to 1000 AD)
Pre-Dorset, Dorset, Thule, and Inuit peoples arrived across the Bering Strait approximately 3000 BC. Archeological evidence along the Sylvia Grinnell River just outside of modern-day Iqaluit suggests that the area around Iqaluit has been occupied by Indigenous Peoples for approximately 3,500 years noting that Indigenous Peoples, while semi-nomadic, had been returning continuously to the area around Iqaluit during this time. The name Iqaluit itself comes from the Inuktitut which means 'place of many fish'.

European Arrival (1000s to 1900s)
The Norse sagas and current scholarship suggest that the first Europeans to arrive on Baffin Island were the Norse around 1000 AD however it is unknown whether they explored the area around present-day Iqaluit. The first recorded European arrival in Iqaluit occurred in 1576 when Englishman Sir Martin Frobisher sailed into Frobisher Bay believing that he had found the 'northwest passage' and a trade route to China. This precipitated European contact and intermittent settlement in the area around Iqaluit over the next 300 years primarily from whaling operations, fur traders, missionaries, and explorers that peaked in the 19th century before the collapse of commercial whaling in the early 1900s.

Early Settlement (1900s to 1960s)
During the early 20th century three major settler institutions began establishing permanent operations in and around present-day Iqaluit: the Hudson's Bay Company who established a permanent trading post near Iqaluit in 1914; the Catholic and Anglican Churches; and the Royal Canadian Mounted Police. The 1930s saw a crash in fur prices that caused many European fur trader back to the south. In 1942 during the Second World War, Iqaluit became the location of a major US Airforce Base and the Hudson's Bay Company moved their existing trading post from Ward Inlet to present-day Apex. These two developments marked the beginnings of the creation of the present city. During the 1950s the area became the centre for the US/Canada DEW Line construction and many Inuit came to settle the area for local services including telephone service.

Development of a Capital City (1960s to present)
By 1963 the US military had left and the remaining settlement began to coalesce into village. The first community council was formed in 1964 and in 1970 the community was officially recognized as 'Frobisher Bay', becoming a village in 1974 and a town in 1980. In 1987 the town was renamed 'Iqaluit' and in 1995 it was selected as the capital of the new territory of Nunavut, officially taking on that role in 1999. This new era has been characterized by a period of rapid population growth of over 30% between 1996 and 2006 with the town officially being recognized as a City in 2001. Expansion was fuelled primarily by a combination of high birthrates and a significant influx of people and professionals arriving to support for the newly created territorial government and to provide additional services and amenities expected by the growing population.

Figure 5 Iqaluit Timeline

4.0 DEMOGRAPHICS

4.1 Population Growth

At the time of writing, available 2021 census data was limited solely to census subdivision area population counts. In order to present a complete and more consistent overview of demographics for the City, 2016 data was used. Notwithstanding this, the 2021 population count is provided in Section 4.1 for comparison purposes.

The 2016 census population count for Iqaluit was 7,740, an increase of 1,556 residents over the past decade and 3,520 since 1996. This represents growth of 83% over the 20-year period since the 1996 Census. This rate is extremely high compared to the rate of growth experienced in Nunavut and to Canada as a whole, with the population almost doubling since 1996. Much of this growth occurred between 1996 and 2006 when Nunavut was established as a territory and Iqaluit was named the capital. As illustrated in Figure 6 below, growth in the City has been fairly constant and consistent since the 1986 census.

As shown in Figure 6, despite a relatively steady climb in population from 1996, Iqaluit's population saw a loss of 4% between 2016 and 2021. A combination of factors is likely responsible, including pauses in construction over the last 3 to 4 years, infrastructure challenges, housing costs, as well as the COVID-19 pandemic in 2020, which likely resulted in slower rates of growth and even outmigration of residents for work, housing, or health reasons.

4.2 Gender & Age Structure

As highlighted in Table 1, Iqaluit's population is ageing. With an average age of 31.1 years in 2016, the population is much younger than that of Canada (average 41 years) but slightly older than that of Nunavut as a whole (average 27.7 years). Of particular note, the population is much older than it was in 1996, signaling a significant demographic change. In 2016, children under the age of 15 represented 24.9% of the total population while seniors (adults over the age of 65) represented only 3%. This is up significantly from 1996 when 31% of the population was under the age of 15 and only 1.5% was over the age of 65.

Iqaluit's changing population is reflected in the population pyramids for 1996 and 2016 (Figures 7 & 8), which illustrate the breakdown of the population by age group and gender. In 1996, the pyramid was more triangular,

Evolution of the Population 1986 - 2016

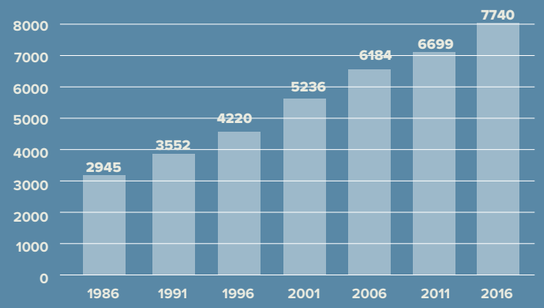


Figure 6 Population Growth

Population Characteristics

	1996	2016
Total Population 2016	**4,220**	**7,740**
% Population Aged Under 15	**31%**	**24.9%**
% Population Aged Over 65	**1.5%**	**3%**

Table 1 Population Characteristics

Population Pyramid, 1996 Population

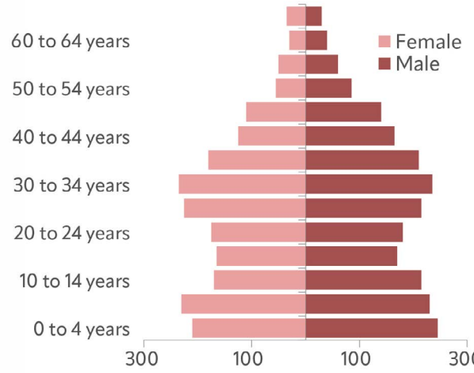


Figure 7 Population 1996 Pyramid

indicating lower life expectancy. The lack of width at the bottom of the pyramid represents a more stationary/consistent growth rate. In 2016, the pyramid was more box-shaped, indicating longer life expectancy and an ageing population. The bottom of the pyramid has not changed significantly since 1996, continuing to reflect stationary/consistent growth.

4.3 Household Size

Over time, average household size has decreased in Iqaluit. In 2016, the average household size was 2.8 persons, a significant decrease from 3.2 persons in 1996. Household size in Iqaluit is much lower than for Nunavut as a whole (3.6) but remains much higher than the Canadian average of 2.4.

Average Household Size, 1996 vs. 2016

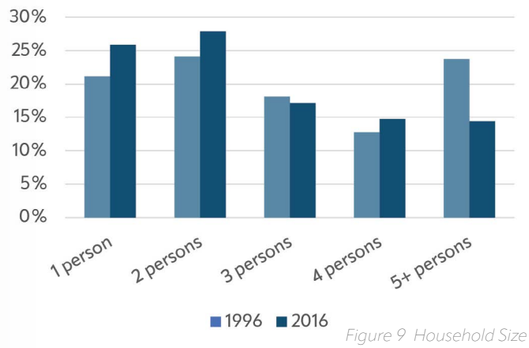


Figure 9 Household Size

Population Pyramid, 2016 Population

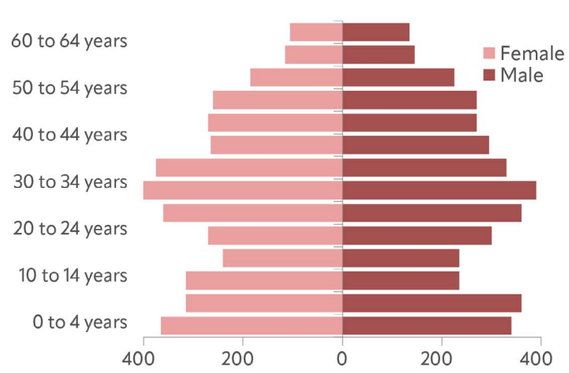


Figure 8 Population 2016 Pyramid

The decreasing average household size has implications for the type and number of houses that will be required to accommodate future growth. The majority of Iqaluit's population is now made up of single-person or two-person households, with 54% (2,240 people) in Iqaluit living in one or two-person households.

The Census indicates that the number of households with 5 or more persons has decreased significantly from 23% of households in 1996 to 14% in 2016, however, the actual number may be higher due to transience in the population, 'couch-surfing' and regular undercounting during the Census.

Note: In 1996, Statistics Canada presented household sizes of "4-5 persons" as one category. As such, the "4-5 person" category was divided in half to estimate 4 and 5+ person households for the purposes of this chart.

4.4 Dwelling Type

Statistics Canada data on household and dwelling characteristics shows that in 2016, a significant majority of housing constituted apartments[1], followed by row houses and single and semi-detached houses.

Occupied Private Dwelling Type, 1996

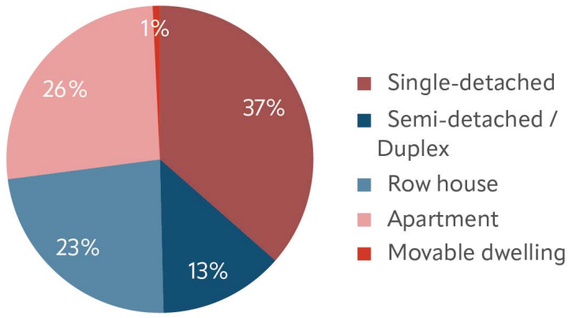


Figure 10 Dwelling Types 1996

Occupied Private Dwelling Type, 2016

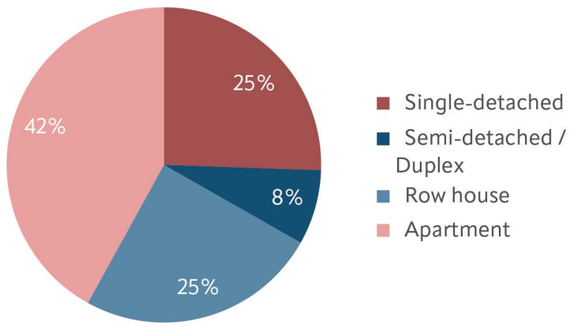


Figure 11 Dwelling Types 2016

Decreasing average household size is reflected in the type of dwellings that are being constructed. In 2016, occupied private dwellings in Iqaluit comprised 42% apartments, 32% single- or semi-detached houses and 25% row houses. This represents a significant change since 1996, when most dwelling units were single and semi-detached houses (50%) and apartments represented only 26% of dwelling types. The proportion of row houses has remained approximately the same. It is notable that many of the new "apartment" dwellings constructed since 1996 are stacked row dwellings as defined in Iqaluit's Zoning By-law.

4.5 Language

In 1996, more than half of the population (54%) identified Inuktitut as their mother tongue. At that time, 36% of the population identified their mother tongue as English and 6% as French. In 2016, the percentage of population identifying English as their mother tongue (46%) was greater than the percentage of population identifying Inuktitut (40%). By comparison, the percentage of the population identifying French as their mother tongue remained steady over that period (Figure 12). In 2016, 70% of the population indicated that they most often spoke English at home and only 23% indicated that they most often spoke Inuktitut. In other words, of the population who identified Inuktitut at their mother tongue, only 56% speak it most often at home. This represents a change since 1996, when 77% of the population identifying Inuktitut as their mother tongue also spoke it most often at home.

Mother Tongue, 1996 vs 2016

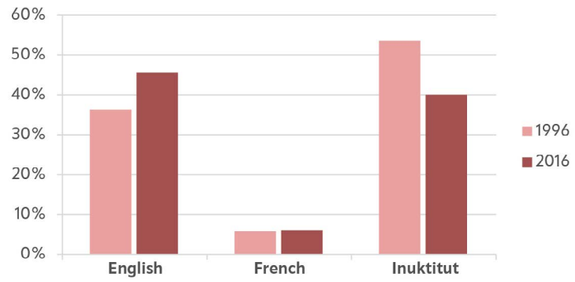


Figure 12 Mother Tongue

5.0 PLANNING FRAMEWORK

The following section outlines the federal and territorial planning framework along with the general implications for the development of the City's General Plan and Zoning By-law.

5.1 Nunavut Planning Act

Nunavut's current ***Planning Act*** was originally passed by the Legislature of the Northwest Territories in 1988 and was subsequently adopted by the Government of Nunavut upon the creation of the Territory in 1999. The ***Planning Act*** establishes the legislative basis for municipal land use planning in Nunavut and the establishment of the three primary planning tools of the system: general plans, zoning by-laws, and development schemes, along with general planning administration, land division, and enforcement provisions.

With regards to the development of a general plan the Act requires that the plan must:

- be prepared under the direction of qualified planning officers or qualified planning consultants, to be appointed by and responsible to the council;
- be prepared on the basis of surveys and studies of land use, population growth, the economic base of the municipality, the needs of the municipality relating to transportation, communication, public services and social services and any other factors that are relevant to the preparation of a general plan;
- include a map showing the division of the land that is to be included in the general plan into areas of permitted land use classes that the council considers necessary for the purposes of the general plan;
- include proposals as to the content of a zoning by-law;
- include proposals relating to the provision of public roadways, services, public buildings, schools, parks and recreation areas and the reservation of land for these and other public and community purposes;
- include a schedule setting out the sequence in which specified areas of land may be developed or redeveloped and in which the public services and facilities referred to in paragraph (e) should be provided in specified areas;
- include proposals relating to the financing and programming of public development projects and capital works to be undertaken by the municipality or other public authorities having jurisdiction within the area included in the general plan; and
- include any other written statements, reports, charts and drawings that may be necessary to express and illustrate the proposals contained in the general plan.

With regards to the development of a zoning by-law, the Act requires that the by-law must:

- be based on a general plan or on a survey of the existing land uses and conditions of land and buildings in the municipality; and
- specify for each zone the uses of land and buildings that are permitted or conditionally permitted or prohibited in the zone, subject only to the regulations that may be contained in the zoning by-law.
- provide for the appointment of a development officer, who shall be an official of the municipality;

authorize the development officer to receive applications for development permits; and require that where an application for a development permit is approved, an official of the municipality must post a notice of the approval conspicuously on the property for which the application has been approved.

Further the Act stipulates that zoning by-laws may contain provisions for the purpose of:

- regulating in any zone the ground area, floor area, height and bulk of buildings, and the height of fences, walls and hedges; the depth, dimensions and area of yards, courts, off-street parking areas and other open spaces to be provided around buildings, and the maintenance of these spaces; the placement, location, arrangement and maintenance of buildings on their sites and their relationship to other buildings and to streets and property lines; the placement, height and maintenance of fences, walls, hedges, shrubs, trees and other objects where their regulation is necessary to maintain proper visibility for the safe movement of traffic; the design, character and appearance of buildings; the nature and amount of the access to sites that may be required or allowed or not allowed from adjoining highways and public roadways but allowing at least one place of access to a site from an adjoining public roadway; the use, location, design and construction of off-street parking and loading facilities; and the public display of signs and advertisements and prohibiting or controlling the placement, construction, height, size and character of signs and advertising devices;
- specifying conditions under which dilapidated signs and advertisements may be required by resolution of council to be renovated or removed;
- specifying as to any zone the minimum site area and dimensions of parcels required for particular sizes of buildings or uses of lands or of buildings; maximum and minimum permissible densities of population, which may be expressed in the zoning by-law as a ratio of habitable rooms per hectare or as a number of dwelling units per site area or in a similar manner; and the facilities to be provided for off-street parking or loading of vehicles, which may be expressed in the zoning by-law in terms of the minimum number of parking or loading stalls or the minimum area for parking or loading required to be provided for particular sizes of buildings or uses of land or of buildings;
- regulating the erection of buildings within a specified distance of any lake, river or water- course; on land that is subject to flooding or subsidence or is low- lying, marshy or unstable, and; within a specific distance from any airfield or airport; and imposing building regulations or adopting and constituting as building regulations the regulations published under the titles of the ***National Building Code of Canada*** with such modifications to them as the council, with the approval of the Director, may determine.
- In specifying the facilities to be provided for off-street parking a zoning by-law may provide that an owner of land to be developed may, subject to the approval of the council provide the required off-street parking on land other than on the land to be developed; or at the option of the owner and in place of providing off-street parking, pay to the municipality an amount of money on the terms that the council considers reasonable in return for equivalent public parking space to be provided by the municipality elsewhere in the zone.
- Authorize a development officer to consider and decide on applications for development permits and to exercise, on behalf of the council, the powers of the council to address unauthorized construction.
- Prohibit the erection of a building on any site where it would otherwise be permitted

under the zoning by-law where, in the opinion of the council or a development officer satisfactory arrangements have not been made by the developer for the supply to the building of water, electric power, sewage and street access, or any of them, including payment of the costs of installing or constructing any such utility by the developer;

- Determining whether a specific use of land or a building that is not provided for in the zoning by-law with respect to any zone is similar in character and purpose to another use of land or a building that is included in the list of permitted uses specified for that zone in the zoning by-law.

Implications for the General Plan & Zoning By-law

- The Act forms the legislative framework for the development of the General Plan and Zoning By-law and the approval process.
- Through its provisions it establishes the scope of matters that municipalities in Nunavut can govern under general plans and zoning by-laws, as well as the minimum content requirements.

5.2 Nunavut Planning and Project Assessment Act & Land Use Plan (Draft)

Is an act of the federal government that establishes a regime for land use planning and project assessment outside of municipalities. It recognizes the importance of responsible economic development and conservation and protection of ecosystems and establishes the continuation of the Nunavut Planning Commission (NPC) and Nunavut Impact Review Board (NIRB) that were originally created by the Nunavut Agreement, and defines their powers, duties, and functions, including how their members are appointed. It also defines the roles and authorities of Inuit, and the federal and territorial governments. Additionally, the Act, establishes a 'one window' approach to the review process where all resource development projects commence by submitting a project proposal to the NPC.

With regards to the draft Nunavut Land Use Plan, the Nunavut Agreement and the Nunavut Planning and Project Assessment Act establish the purposes and required content of the Land Use Plan. The Agreement lists a variety of social, cultural, economic and environmental factors to consider in the development of land use plans, and includes the following statement in section 11.3.2: "The purpose of a land use plan shall be to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, taking into account the interests of all Canadians, and to protect, and where necessary, to restore the environmental integrity of the Nunavut Settlement Area." To that end, the Land Use Plan can be described as primarily a resource management plan for both wildlife and mineral resources.

Implications for General Plan & Zoning By-law

- The Act and the draft Land Use Plan are generally applicable to areas outside of municipalities and as such have little impact on the development of a new general plan and zoning by-law.
- Notwithstanding the above, the draft Land Use Plan does outline the particular importance of Frobisher Bay as fish and wildlife habitat and recommendations for land use along the waterfront should respect this.

5.3 Aeronautics Act & Iqaluit Airport Zoning Regulations

The Aeronautics Act is federal legislation that governs the civil aviation in Canada and has been in effect since 1985. While the legislation addresses a wide range of matters related to civil aviation, it specifically contains regulations to prevent lands adjacent to, or in the vicinity of airports from being used or developed in a manner that would cause interference with signals or communications to and from aircraft or to and from those facilities. Airport zoning regulations (AZR) restrict the heights of buildings, structures, and objects (including natural features such as vegetation) on regulated land. Iqaluit's AZR are contained in regulation SOR/2014-16 of the Aeronautics Act. Transport Canada enacts AZR to:

- protect aircraft from hazards (e.g., bird strikes and electronic signal interference);
- protect existing airport operations (e.g., airspace management and emergency response); and
- ensure that future development near an airport stays compatible with the safe operation of aircraft and of the airport itself.

5.4 Iqaluit Strategic Plan

In June 2017, the City adopted the Iqaluit Strategic Plan, a planning document that outlines key program priorities for a five-year period, from 2017 until 2022. The Plan establishes the following Vision Statement that guides Council's decision-making and resource allocation: "Iqaluit will be an inspirational arctic leader, grounded in the culture of our people, where knowledge and investment are encouraged, and families grow strong and healthy." The Plan's Vision Statement is support by a mission statement as well as a set of values. These together provide the overall framework for all policies, programs, and services, helping to align resources with priorities. The Plan establishes six areas of key strategic priorities, each supported by a goal statement, which are:

- Good Governance
- Inuit Culture, Tradition and Cultural Diversity
- Fiscal Sustainability
- Sustainable Infrastructure
- Service Excellence
- Community and Economic Development

Implications for General Plan & Zoning By-law

The following actions have been identified in the City's Strategic Plan accompanied by potential implications for the General Plan and Zoning By-law:

- The City will develop a by-law to require businesses to have Inuktitut signage. The Zoning By-law currently regulates signage. The requirement for Inuktitut signage could be integrated into the Zoning By-law.
- The City will create an overlay map of traditional land use, historical and current. The General Plan uses a Cultural Heritage Symbol to identify significant cultural sites to protect them. This approach could be modified or expanded to address traditional land uses.
- The City will review and complete a transportation/road plan. The completion of a Transportation Master Plan (TMP) is already reflected in current policy in the General Plan. A TMP was completed and adopted by the City in April 2022. Policies in the GP should be updated to ensure effective implementation of the TMP.
- The City will fund a Drainage system plan. A Master Drainage Plan (MDP) was prepared and adopted by the City in 2019. Policies in the GP should be updated to ensure effective implementation of the MDP.

- The City will expand online community engagement programs to improve the city's ability to consult electronically with the public including regular online surveys. Additional engagement practices could be incorporated into the General Plan

5.5 Land Administration By-law (No. 897)

The mandate for land administration in Nunavut is primarily defined in the Nunavut Land Claims Agreement, Article 14, which identifies the administrative and implementation responsibilities of the planning and land administration in the territory. A municipal land administration by-law (LAB) contains the municipal council's rules and procedures for making decisions about real property transactions involving municipal land. The LAB ensures that all decisions are made consistently and fairly. The City's by-law outlines the process and regulations around land leases, land acquisition and disposal, land pricing methods, revenue through land administration, environmental management, quarry administration, land use permits, property taxation and assessment, and the role of the Planning and Lands Administrator.

Implications for General Plan & Zoning By-law

- As the primary landowner in the community, the City, through its powers and responsibilities outlined under the LAB, can facilitate better opportunities for achieving/implementing certain objectives in the GP.

5.6 Transportation Master Plan

The City of Iqaluit Transportation Master Plan (TMP) was adopted in April 2022. In preparing this document, the City's transportation and mobility network was comprehensively evaluated to inform a number of strategic recommendations that come together to form a contemporary, forward-thinking plan that takes a multi-modal approach to transportation planning. While the planning horizon for the TMP is 10 years, it does look beyond 2030 in its proposed implementation plan consideration of Future Development Areas A & B, which are not expected to be developed in the next decade.

Implications for General Plan / ZBL

- The TMP outlines the City's existing and proposed road network, including design widths, which should be incorporated into the General Plan to ensure that new development is properly sited and provided any required road dedications
- The TMP also contains both a recreational and pedestrian mobility network that should also be incorporated into the General Plan and any new developments
- Finally the TMP also outlines a conceptual routes for a potential public transit system
- The TMP recommends turning lanes at a number of intersections which may require road widening to accommodate. Policies in the GP to facilitate/support these road widenings around these key intersections should be considered, such as requirements for ROW dedication as a condition of development
- The GP should include supporting policy speaking to the recommendation of an Iqaluit Transit Pilot in the TMP
- The GP should contemplate policy that supports further improvements to the pedestrian and active transportation network, either through specific policies for improving public realms or recommendation for further planning exercises (i.e. development of public realm plan). Policies affecting site design/site plan control should be reviewed to ensure they are supportive of pedestrian connections, mobility, wayfinding, and accessibility
- Supporting policy in the GP should be considered that enables the pursuit of low-cost pilot programs in strategic areas focused on pedestrian mobility and safety
- GP policies related to parking should be reviewed for consistency with the recommendations presented in the TMP to ensure best practices are implemented.

5.7 Recreation Master Plan

In 2020 the City adopted a recreation master plan that is intended to guide the recreation and leisure priorities of the City from 2020-2030. Reflecting the unique challenges and opportunities found in Iqaluit, the plan recognizes that recreation facilities are not only physical but also spiritual places that serve purposes of healing, socialization, free play, and alleviating loneliness. There are five key strategies that are identified to shift to a customer focus:

- Improving communication;
- Identifying priority customers;
- Delivering programmes collaboratively;
- Delivering facilities collaboratively; and
- Re-organizing service delivery
- GP mapping should identify recreational lands/parks managed by the City.
- Recreation-focused policies should be reviewed in the GP to ensure support for the provision and improvement of recreational facilities/amenities

While there are some spatial and long-range planning implications for both the General Plan and Zoning By-law, most of the recommendations and conclusions arising from the Recreation Master Plan are more organizational and programmatic, than spatial.

Implications for General Plan / ZBL

- The Master Plan calls for a: Parks, Trails, and Open Space Master Plan; Municipal Parks Development Standards & Design Guidelines Plan; Heritage Plan; and the development of a city-wide strategy for arts, culture, and heritage. These plans should also be identified in the General Plan as initiatives that Council should consider.
- Identify and support established spontaneous activities by providing basic amenities such as benches, waste receptacles and signage at unorganized sites.
- The plan also contains two municipal-wide assessments (winter and summer) of recreational facilities both formal and informal that should be mapped and identified for the purposes of the General Plan review.

5.8 Iqaluit Housing Action Plan

The City of Iqaluit Housing Action Plan was developed with and for the community through the Mayor's Task Force on Housing and is intended to improve the current and future housing challenges facing Iqaluit. It aims to see the City act as a driving force

to address the housing crisis by enabling development partners, non-profits, and residents to plan, build and maintain a diversity of housing types that meet a variety of needs, through a supportive regulatory and policy framework, strategic planning, and advocacy as well as collaboration with the Government of Nunavut, Government of Canada, Inuit organizations and other key stakeholders. To that end, the plan intends to see the development of 1,400 additional housing units in Iqaluit over ten years (2022 to 2031) to support current and future community member housing needs. Of these 1,400 units, 50% are to be targeted as below-market affordable housing to support Iqaluit's residents in greatest need for housing. To achieve the objectives of the plan, seven strategies and 17 corresponding actions were developed, based on the analysis and recommendations from the Mayor's Task Force on Housing.

Implications for General Plan / ZBL

- One of the primary actions outlined in the Housing Action Plan is to Increase infrastructure capacity to support the development of at least 50% of the 1400 units of housing required in the City, prioritized in the core area (Downtown), by the end of 2024, and to continue increasing infrastructure capacity so as to accommodate the remaining units needed by the end of 2026.
- Implementation of design interventions and policies to support a multi-modal and connected winter city by reviewing existing design standards and policies that guide the design of public and private spaces, identifying policy framework gaps regarding walkability, connectivity, and winter city design. To offset potential impacts to reduced parking requirements, the City should also explore additional areas where on-street parking could be permitted.
- Reduction or elimination of parking requirements for residential developments and explore the possibility of providing on-street parking
- Enabling a greater diversity of housing and evaluate dwelling size requirements in the Zoning By-law to permit greater flexibility
- Evaluating and refining the development review process as outlined in the Zoning By-law
- Developing and implementing an arson and crime reduction strategy
- Creating a data collection framework for housing and perform ongoing data collection

5.9 Iqaluit Development Schemes

Under the Planning Act, municipalities can prepare 'development schemes' (or neighbourhood level master plans) for specific areas of a municipality. Development schemes can provide for:

- the acquisition, assembly, consolidation, subdivision and sale or lease by the municipality of lands and buildings;
- reserve land for future acquisition for public roadways, public uses and buildings and open space;
- specify the way any area of land is to be used, subdivided or developed and regulate or prohibit the construction of buildings that would interfere with the carrying out of the development scheme; and
- make available any land for any use including residential, commercial, recreational, institutional, and industrial uses.

In Iqaluit there are three development schemes that have been adopted and appended to the General Plan since its creation in 2010: the Plateau Development Scheme developed in 2004 for the Plateau neighbourhood; the Inuit Owned Land (IOL) Parcel 'E' Development Scheme developed in 2014 for IOL lands located along Federal Road south of the Plateau neighbourhood; and the Future Development Area B Development Scheme developed in 2015 for lands located between the Road to Nowhere and Niaqunngusiariaq Road. While the Plateau Development Scheme has been largely 'built out', the IOL Parcel 'E' Development Scheme and the Area B Development Scheme are still in the early stages of build-out.

Implications for General Plan / ZBL

- All three development schemes will need to be incorporated in the new General Plan and a review the policies and conceptual layouts of both areas will need to be conducted to ensure both neighbourhoods (most notably the IOL and Area B) are integrated into the wider urban fabric

5.10 Core Area & Capital District Redevelopment Plan

The Core Area & Capital District Redevelopment Plan, developed in 2004, is a planning framework that details design themes and strategies for redevelopment of the City's central area including a significant action / implementation plan to realize the number of proposed improvements and a design programme for the City's central area and includes detailed design guidelines. This study seeks to provide the City of Iqaluit with the planning direction necessary to make strategic decisions about development, infrastructure improvements, and parking needs in a unified and coherent way. Correspondingly, defining elements and design guidelines seek to reinforce this distinct area of the City, improving public realm features, connectivity between open spaces, and accessibility for pedestrians. A central objective of this plan is to respond to safety concerns by providing an approach to pedestrian walkways, parking, light standards, and landscaping that is unique to the constraints presented by an artic context.

Implications for General Plan / ZBL

- Given the age of the Plan (approaching 18 years), an assessment should be undertaken of the relevancy of the proposals and guidelines outlined in the Plan, notably as many of the proposals included in the plan are composed of capital improvements.
- Based on the assessment above, the General Plan may recommend the development of a planning programme that would see the Plan formally reviewed and updated.

PART II -EXISTING CONDITIONS REVIEW & ANALYSIS

LAND USE

6.0 CITY STRUCTURE & URBAN DESIGN

As noted previously, Iqaluit is a relatively new city in comparison to its counterparts in the South having only taken shape beginning in the 1940s. Despite this, occupation of the area around Iqaluit stretches back at least 3,500 years. The topic of Iqaluit's city structure and urban design relate to the spatial organization and composition of the City itself and the composition and quality of the public realm and it's spaces including streetscape, building design, and the design of the City's open spaces. City structure and urban design have direct implications on the quality of life of residents, the ability to service development, and how the City reflects the lifestyles and local culture and heritage.

6.1 Current Context

Iqaluit's development is greatly shaped by its geography and climate. Surrounded by Sylvia Grinnell Park, the Koojesse Inlet, the Iqaluit International Airport and the rolling tundra to the north of the City, within these boundaries, the city's structure has primarily been characterized by functional needs, placing primary importance on infrastructure such as roads, power networks, and housing with historically limited design of the public realm. However, since 2003, the City has made significant strides in urban visioning and architectural controls including the General Plan and Zoning By-Law, Core Area and Capital District Plan, and through the creation of development schemes for the Plateau Development Scheme, Future Development Area B Development Scheme, and the Parcel 'E' Development Scheme. These plans and urban design standards have allowed for more thoughtful development of built form, neighbourhood design, and streetscapes.

Historical Development – The City's structure is comprised of clustered neighbourhoods established throughout Iqaluit's incremental growth. Permanent settlement began through the development of the "Lower Base", established by the US Air Force in the 1940s, home to hangars, machine shops, and barracks. A second neighbourhood, named "Ikaluit" grew around the traditional fishing lands in the area. Small unplanned neighbourhoods which flourished around the settlement were given the same name. These settlements consisted of Inuit tents, qammat (Inuit houses with rigid walls) and wooden shelters on the level ground southeast of the Koojesse Inlet. The third developed area was established on higher grounds northeast of the airbase. This area was the site of the Distant Early Warning (DEW) Line associated with the Cold War. This area, now known as the "Upper Base", was closed in 1961.

Following the construction of the Upper Base, the Canadian authorities designed and built the Apex neighbourhood, specifically for the area's Inuit population. Since the 1970s, the Qikiqtani General Hospital and the Nunavut Artic College have been developed northwest of the Apex. Following the development of Apex, the Federal Government concentrated new development east of the airport, now called Astro Hill. This neighbourhood was dominated by the mixed-use federal building commonly called the Brown Building. A new Hudson's Bay Company store and schools were located lower down the Astro

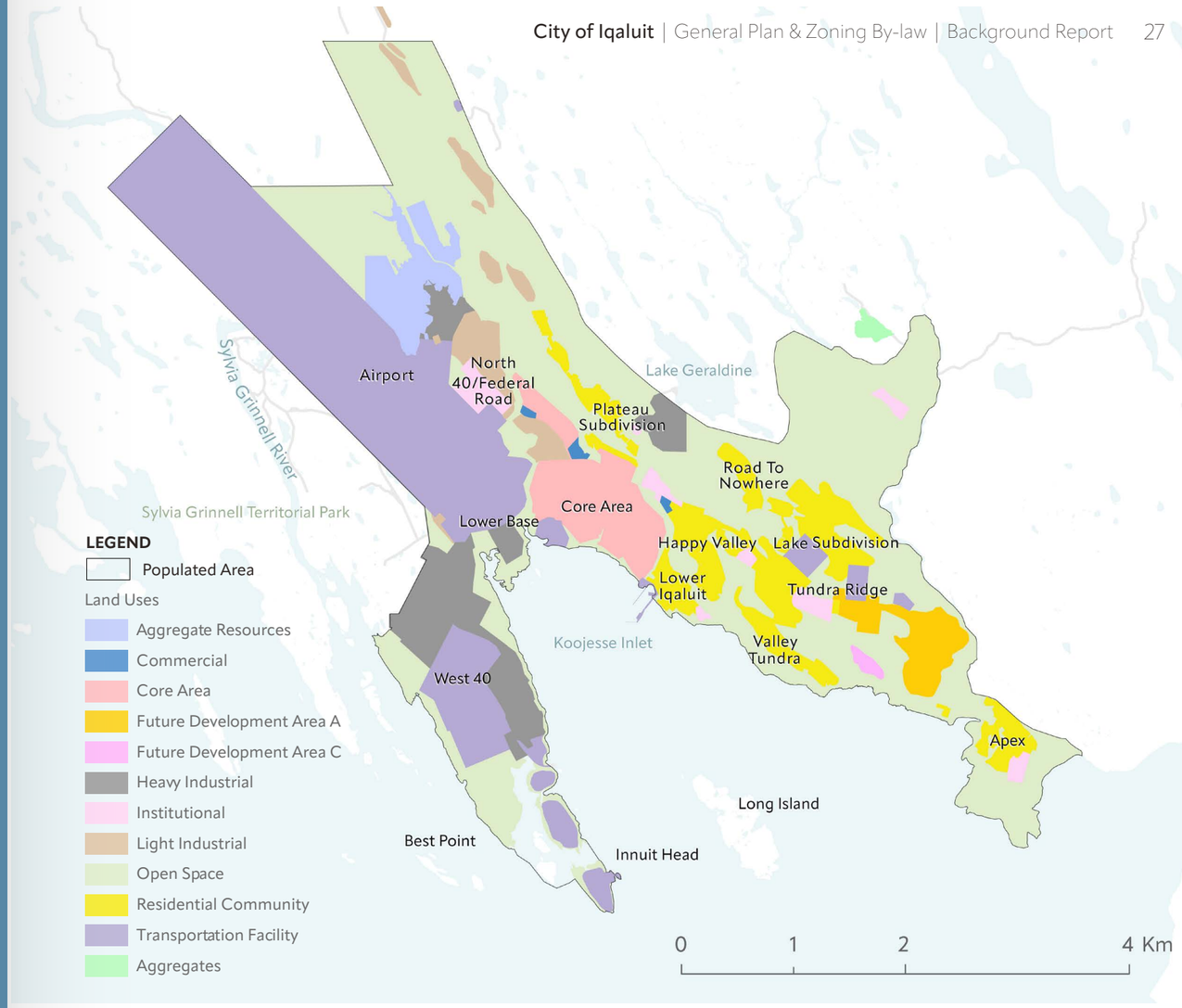


Figure 13 Land Use Map

Hill and housing was added throughout the next decade. Since the 1970s residential subdivisions have spread southeast to Happy Valley, Tundra Valley, and Tundra Ridge, and northwest towards Upper Base (the Plateau). Development and redevelopment of the Core Area and Capital District has also taken place, created the largest concentration of mixed-use, commercial, and retail facilities and housing.

The City Structure Today – The present-day City is structured around the Core Area or downtown area containing the greatest concentration and diversity of uses and built form, primarily a mix of commercial, institutional, and residential uses. Emanating outward from the Core Area are primarily residential and industrial areas characterized by a high-level of segregated land use and linear development patterns reflecting the lands hilly terrain and the area's escarpments. Subsequently, large tracts of undevelopable land separate these various areas from one-another. The Apex neighbourhood in particular is a discrete urban area which, as noted previously, developed as a separate parallel community alongside Iqaluit, and

located approximately 5km away from the Core Area.

As shown in figure 13, the City is clustered into primarily single land uses. The neighbourhoods in the City are strongly defined with residential, industrial and commercial lands with the exception of the Core Area, as the main centre of mixed-use functions.

Low Density residential areas are developed with predominantly single-detached or semi-detached units, Medium Density Residential are 3 or more units in a ground-oriented housing form (i.e. exterior entrance, including stacked row dwellings), and High Density Residential is for apartment units. Low Density Residential development (single detached and semis) still occupies the largest share of residential land occupying 61% of total residential land. Medium Density development occupies 27% of total residential land, and High Density occupies 12% of total residential land. According to the Iqaluit Sustainable Community Plan, 75% of the total housing built over the last ten years has been apartment or multiplex housing.

Commercial land use includes all office uses, including both government and commercial offices, commercial retail, business services, hospitality services, etc. The vast majority of these uses are located in the Core Area with one or two commercial lots located in the neighbourhoods outside the Core Area. Commercial built form is generally composed of a mix of building types from single-storey commercial use to multi-storey commercial office buildings, to multi-storey mixed-use buildings with commercial uses on the ground floor and residential uses above.

Institutional land use includes educational facilities, health facilities, recreation and community facilities, day cares, places of worship, correctional facilities, and similar uses. There are currently 39 ha of "institutional" land used in Iqaluit. Nunavut Arctic College, Inuksuk and Nakasuk Schools and the Qikiqtani Regional Hospital form a larger cluster of institutional uses in the geographic centre of the City. Other significant nodes include the correctional facilities in the North 40; the cluster of Aqsarniit to AWG Arena along the Road to Apex; and a cluster of smaller institutional uses in Apex.

Industrial uses are generally split into heavy and light industrial areas. Light industrial uses are concentrated in the North 40 area with a cluster along Akilliq Drive in the West 40. Old light industrial uses have been increasingly demolished in the Core Area to make way for new commercial and mixed-use development. Heavy industrial uses are primarily in the West 40 with the largest parcels being the sewage lagoon, tank farm and the City's landfill site and leachate treatment. The North 40 pit and adjacent landfarm operation (i.e. soil remediation) forms another significant cluster.

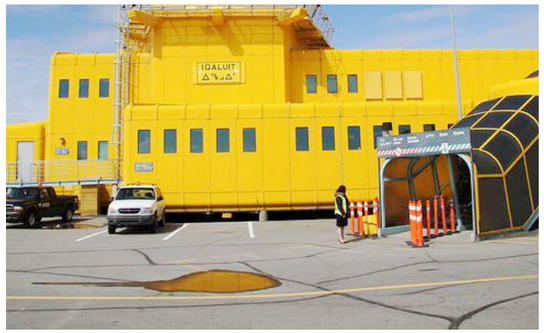
Urban Design Plans and Controls – There are no city-wide urban design guidelines or controls in Iqaluit, however certain neighbourhoods are governed by area-specific guidelines and controls. The Core Area & Capital District Redevelopment Plan, developed in 2004, is a planning framework that details design themes and strategies for redevelopment of the City's central area including a significant action / implementation plan to realize the number of proposed improvements and a design programme for the City's central area and includes detailed design guidelines. This study seeks to provide the City of Iqaluit with the planning direction necessary to make strategic decisions about development, infrastructure improvements, and parking needs in a unified and coherent way. Correspondingly, defining elements and design guidelines seek to reinforce this distinct area of the City, improving public realm features, connectivity between open spaces, and accessibility for pedestrians. A central objective of this plan is to respond to safety concerns by providing an approach to pedestrian walkways, parking, light standards, and landscaping that is unique to the constraints presented by an artic context.

In addition to the Core Area & Capital District Redevelopment Plan, there are also design guidelines and controls contained within the City's three development schemes that provide greater detail and direction on the design of these specific neighbourhoods.

Neighbourhood Layout and Site Photos

The City of Iqaluit is divided into 13 neighbourhoods as shown in Figure 14. Site photos of each neighbourhood have been included within the following section.

Figure 14. Neighbourhood Map



Airport

Core Area

Plateau Subdivision




Happy Valley




Lower Iqaluit




Road to Nowhere and Lake Subdivision




Tundra Valley




Tundra Ridge




Apex


North 40/Federal Road


West 40

6.2 Challenges, Issues, & Opportunities

Spread Out Urban Form – Relatively speaking, the urban area of the City structure is sprawled compared communities of a similar size in the south. This sprawling urban form is a result of the City's hilly terrain that leaves significant areas of the City undevelopable and in some cases difficult to access by foot because of steep grade changes. This urban form also creates significant servicing issues and costs as there is simply a larger geographic area to service, and one which also requires significant engineering solutions to overcome to service these areas (including costs to provide water and sanitary servicing, garbage collection, or emergency services).

Construction & Climatic Cost – A limited construction season, little to no domestic production of building materials, and limited transportation connections to the south add significant cost and logistical challenges to development in the City, which in-turn often leads to urban design considerations not being prioritized or considered as an after-thought. Further the region's harsh climate requires specialized knowledge in both urban planning, architecture, and landscape architecture to produce urban environments that are responsive to the unique arctic way of life in the City and can withstand the region's climate.

Celebrating Inuit Culture – As the capital city of the Inuit settlement area of Nunavut, the City of Iqaluit plays a special role in representing the Inuit and Nunavut on both the national and international stage. The City's urban fabric provides an expansive canvas to interpret and represent the distinct and rich Inuit culture through architecture, public art, signage, wayfinding, and infrastructure. Identifying ways to create built form and urban design that reflect and celebrates local culture and lifestyles builds community, civic pride, and can create a more responsive city.

Growth Rate & Housing Crisis Impact on Design – Throughout the 1990s and early 2000s Iqaluit experienced a substantial increase in population that exacerbated an existing housing crisis and required significant resources to be allocated to fast-paced construction of buildings and housing. As the housing supply in Iqaluit has never kept pace with demand, there have been significant pressures to approve new residential development expeditiously and with as few obligations as possible under the auspices of addressing the City's massive housing supply issue. In this context, addressing concerns related to the design and fit of new development are put aside to address the primary issue of supply.

A Constrained Urban Landscape – The geography of Iqaluit is quite constrained by its terrain, the location of the Airport, the water, permafrost locations, and contaminated sites. This places numerous constraints on where new development can be built and can create long term viability and compatibility issues for existing development if not properly sited.

6.3 Best Practices & Trends

Winter City Design – is an urban planning and design concept for communities in northern latitudes that encourages them to plan their transportation systems, buildings, and recreation around the idea of using their infrastructure during all four seasons, rather than just fair-weather seasons. In communities where the winter city concept has been implemented, it has made a positive impact on the lives of residents, improving winter livability, increasing tourism, and strengthening the economy during what had been a traditional down time. The concept has been responsible for helping many communities see the opportunities that winter offers and helping many residents in the north acknowledge that winter can be an enjoyable time of year and that not everyone need move to warmer climates. It has often been said that many communities in northern latitudes are living in denial of their northern climate. As evidence, they point to the fact that many northern cities are designed in much the same way that southern/warm-climate cities are designed.

Arctic Landscape Practice –Contemporary landscape architecture is increasingly concerned with cities that are founded on principles of stability and permanence where change or uncertainty often in the forms of rich and complex landscape and urban systems are "typically erased, filled, leveled, denuded, marginalized or stabilized". Instead, the impacts of climate change and increasing prospects of urbanization and infrastructural development in the Arctic offer an opportunity to re-think the urban field itself, both within and beyond the Iqaluit - as a tool to uncover the underlying vulnerabilities of the built environment in this extreme and highly dynamic territory, and as a future framework for design to shape sustainability that is grounded in locality and its local context "a way out of sustainability's dead-end preoccupation with methodologies and technologies" that has long steered the design principles in the north.

6.4 Strategic Directions

- Need to develop and incorporate policies into the General Plan that will support the redevelopment and intensification of underutilized lands and buildings to ensure that these resources are being effectively used and reducing the need to expand onto 'greenfield' sites
- At over 15 years of age, consider developing policies in the plan which would support an update to the Core Area & Capital District Redevelopment Plan
- Given the sprawling nature of the City's built form (due namely to its geography) new developments and develop schemes should be built outwards from community nodes to increase walkability and accessibility of the City to all residents
- Minimum density targets for new residential development should be established in the General Plan and Zoning By-law
- The focus of the Zoning By-law should be on regulating typologies and forms as opposed to uses to create more distinctive and cohesive neighbourhood design
- Little comprehensive constraints mapping currently exists and the General Plan and Zoning By-law should explore more ways to identify and regulate development against the City's constraints
- Explore policy shifts to allow for more flexibility in "mixed-use" developments other than traditional ground floor commercial/institutional scenarios.
- Review future development areas and the infrastructure required to support those areas, and what the land delivery model will be for the City moving forward. If private land development, and thus private financing, is pursued as an option to increase the available land supply, there will be a need for more policies and regulations to ensure land is being developed to acceptable municipal standards.

7.0 HOUSING

The supply and suitability of housing in Iqaluit is a long-standing issue both in the City and across Nunavut. High birth and growth rates, immigration, a short construction season, logistical challenges of shipping building materials, limited housing developers, and the impacts of overcrowding and a harsh climate have all negatively impacted both the quantity and quality of housing supply in the City. As a basic human need, the provision of housing has massive impacts on public health, quality of life, family stability, the attraction and retention of business and labour, and personal safety. Further, as the larger user of land in the City, housing provision also has direct impacts on servicing and infrastructure costs, municipal revenues, and urban form.

7.1 Current Context

The Nunavut Housing Corporation's (NHC) Blueprint for Action discusses the need for a full "housing continuum" in Nunavut, referring to a range of housing choices that collectively offer appropriate and affordable housing options to suit what people can spend on housing at any given time of their lives. The housing continuum includes emergency shelters, public housing, transitional housing for people needing some support to be more independent, rental housing (affordable rentals and market rentals), alternative housing (co-op housing), and homeownership. Their Blueprint for Action states, "in order to move away from its costly dependency on public housing, Nunavut requires a full housing continuum representing a range and diversity of affordable and appropriate housing options to meet the needs of Nunavummiut". However, the Blueprint for Action describes how Nunavut currently has a broken housing continuum, as illustrated in the image below (also applicable to the Iqaluit context).

The NHC notes there is a significant gap for 'housing vulnerable' people seeking to moving into rental housing. With shelters and group homes at capacity, a significant waitlist to access public housing, and only one alternative non-market rental option, there are few options for accessing affordable rental housing. The lack of options means 'housing vulnerable' people are often trapped in a cycle of insufficient and inadequate housing, deteriorating social conditions, and a deepening dependence on government housing, meaning the needs of the most vulnerable – women and children, youth, elders, and those living in poverty – are not being adequately addressed.

There is also a significant gap for transitioning people seeking to move from rental housing into 'home ownership' is unaffordable for all but a very few. Thus, even when economic development produces steady employment and improves financial security, the high cost and limited offerings for home ownership compel many people to continue as public housing tenants or in staff housing. This in turn means less public housing is available and longer wait times for those in a housing vulnerable situation. The limited options for housing in Iqaluit also negatively impact the recruitment and retention of employees for governments, corporations, and non-profit societies.

In 2016, only 23% of homes in Iqaluit were privately owned. This compares to 68% home ownership rates in the rest of Canada. As noted by the Nunavut Housing Corporation, supporting the homeownership market in the territory is an important goal, as each new homeowner reduces demand on government provided housing in terms of rental units in the public or staff housing inventory, alleviates

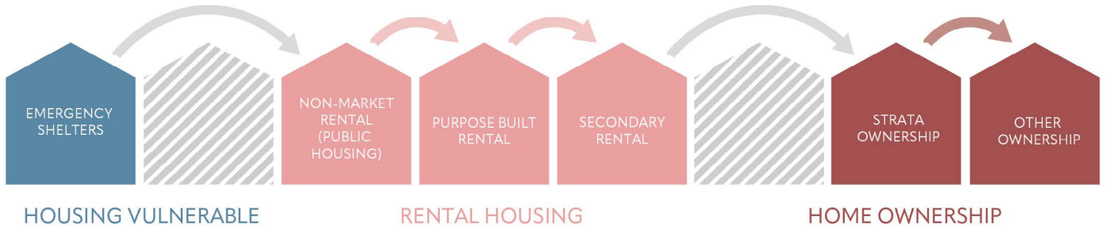


Figure 15 Housing Transitions

overcrowding, further develops the private housing market and reduces reliance.

However, there are many factors that put the price of an average home in Iqaluit beyond the reach of most people. These factors include low-income levels; a lack of savings and/or poor financial literacy; difficulties in obtaining bank financing; the size and quality of homes relative to their price; high operating costs; perceived and actual risks in the housing market; a transient population; and heavy dependence on staff housing and public housing. In addition, housing in Iqaluit is particularly expensive as there is a land supply problem which may be inflating prices further. Essential goods and services cost two to three times more than in southern Canada, and household operating costs can be five to ten times more expensive. The short building season and shorter shipping season mean that construction projects last more than one year.

Canada Mortgage and Housing Corporation (CMHC) recommends that the carrying cost of shelter, which includes mortgage, taxes, heat, and utilities, should not exceed 30% of household gross income. By this measure, only households earning more than $145,000 could purchase a $547,631 home (the average house price recorded by CMHC for transactions in 2020).

There is an increasing divide between economic classes, resulting in increasing disparity between those who can and cannot afford homeownership. In 2005, the City introduced an 'Affordable Lot Policy' in the Plateau Development Scheme. This policy designated some lots as "affordable lots" that were to be sold to developers at 75% of their actual cost, with the remaining 25% of the cost absorbed by all surrounding lots in the subdivision. Developers of these lots were required to sell the built units at a discounted rate targeted as affordable to a given income percentile, to account for the lot-price savings. The housing form was not prescribed, only that leasehold title (i.e. ownership) was a requirement. A total of 15 units were successfully constructed and sold under this program. The units were a combination of condominiums (4-plexes) and subdivided row dwellings. There were no criteria for purchasers in terms of income levels, nor any requirement to continue to deliver this affordability through subsequent sales. Although the scale of the program was small and purchasers were not required to meet any eligibility criteria, the program did encourage developers to provide alternative housing forms to single-detached dwellings which are prohibitively expensive for most households. The two fourplex condominiums constructed in Phase 1 were the first purpose-built condominiums in Iqaluit. Since then, 25 additional condominium units have been constructed in the Plateau Subdivision.

According to an analysis conducted by the City's Planning Department, there was an average of 2.5 years before the first resale of "Affordable Lot" units. This compares to a control sample that had an average of 3.1 years before first resale. For both, the average percentage increase in terms of resale profit was 37-38%. Of the units that were resold a second time, the second "Affordable Lot" resale price was a 51% increase on the original sale price, compared to the control group lots that increasing 43% to 50% over the original sale price. This means that while the "Affordable Lot" program was clearly effective in reducing the original sale price of the affected units, it had no impact on perpetual affordability with subsequent resale priced to market rates. The program only benefited original owners.

In 2010, the Government of Nunavut offered its employees the opportunity to purchase condominiums through its GN Staff Condo Program. Staff could buy units at the cost of construction. In 2010 the price for some of these units was less than $200,000, and Iqaluit-based employees bought 47 units. In 2017-2018, the Government of Nunavut is expecting to repeat the Staff Condo Program by offering 62 dwelling units for condominium ownership. The units are existing market rental units that have been purchased by the GN with the intent of converting the units to condominium ownership (i.e. strata title). Staff will have the option to buy units at market rates. Due to the small size of the units, they are expected to be relatively "affordable" compared with much of what is currently on the market. With these new units anticipated to be on offer, the GN Staff Condo Program is significantly increasing the amount of privately-owned dwelling units in Iqaluit.

Two other programs offered by the Nunavut Housing Corporation currently support affordable homeownership in Iqaluit. The Nunavut Down payment Assistance Program offers support of up to $30,000 to eligible homeowners for their first down payment on a home. Eligibility includes being a resident for at least one year. The program starts forgiving the down payment assistance after 5 years in the home and is fully forgiven after 10 years in the home. This is a popular program in Iqaluit. There were 37 approved applications in the 2015-2016 year. The Nunavut Housing Corporation Rent-to-Own Program offers a discounted price for public housing tenants wishing to buy their own units. This program is not frequently used in Iqaluit and Rent-to-Own applications were approved in 2015-2016, nor any other community in Nunavut.

One non-profit homeownership support program exists in Iqaluit. Habitat for Humanity builds a new home every 2 to 3 years, with help from volunteer labour and fundraising. The organization is in the process of completing its 4th home in Iqaluit under the program. The City uses provisions in its Land Administration By-law (i.e. "site-specific factors") to provide a lot at a 25% reduction on the cost of the lot. Construction costs are kept low, and selected families for the built home have mortgage support through the Habitat for Humanity program. Recently, the Senate Report on housing in Inuit Nunangat recommended "that CMHC continue to provide funding to Habitat For Humanity's Indigenous Housing Program". Due to its hard-won and limited funds, however, HFH's current program in Iqaluit is small in scale.

The combined efforts of these programs suggest there could be approximately 100 households moving to home ownership over the next year or two. Few other alternative homeownership support programs have emerged in Iqaluit, although some have been discussed, including co-operative housing, community land trusts, and co-housing ownership. The recent Senate Report recommended that the CMHC, "in co-

operation with the relevant provincial, territorial and Inuit housing authorities, explore ways to support homeownership, such as co-operative and cohousing ownership, home buy-back and grant programs, that are suited to community needs in the Northwest Territories, Nunavut, Nunavik and Nunatsiavut".

7.2 Challenges, Issues, & Opportunities

There has been a historic chronic housing shortfall in Iqaluit characterized by long public housing waitlists, over capacity shelters and group homes, a lack of transitional housing and affordable housing, and a shortage of senior's homes. There are many factors that affect the provision of affordable housing. Some factors are socio-economic in nature and others relate to land and housing, such as the supply of serviced land, the range of available housing types, and access to public housing. These factors are discussed in greater detail below:

Employment rate and wealth - Iqaluit has the strongest employment rate in Nunavut, with the employment rate of people 15 years or older at 70% in 2010, compared to Nunavut's average of just over 50%. There is a rising middle and upper class in Iqaluit, with 13% of the population in 2010 (aged 15 years and older) having a recorded income of more than $100,000 after taxes. In fact, about 2,500 people in Iqaluit (roughly 1/3 of the population) are in families positioned in the top decile amongst other Canadians, meaning they are amongst the richest in the country. At the same time, shelters are full and the public housing waitlist currently sits at approximately 160-200 families. This significant income disparity has consequences for housing in Iqaluit; some people are securing quality staff housing through their GN or Federal jobs or can afford costly homes, while others struggle just to move out of emergency shelters or access public housing.

Population Mobility – Iqaluit's population is far more mobile than the rest of Nunavut. The last full Census in 2016 indicated that the percentage of Iqaluit's population that lived in a different province or territory one year ago was 7.3% (compared to Nunavut at 3.3%), and five years ago was 22.1% (compared to Nunavut at 9.4%). Full census data for 2021 has not yet been released; however it is expected that Iqaluit's interprovincial/territorial mobility will remain high when compared with 2016. There are many young graduates who come to work in Iqaluit for a few years to establish their careers, before departing. Many have no intention to remain beyond five years and would not consider the purchase of a home. There is also a great deal of intra-territorial migration, with people moving to Iqaluit from other communities in Nunavut for work, college, or institutional reasons (i.e. health, education, shelters, corrections). This in-migration into Iqaluit puts pressure on housing and will require a steady increase in the number and variety of housing options in Iqaluit.

Many people coming to Iqaluit to work are shorter-term "job tourists", which is a term used to describe individuals who travel to Nunavut for the purpose of work but do not reside in the region (e.g. construction workers, accountants, researchers, medical professionals such as doctors, nurses and dentists). The amount of labour income earned in Nunavut but paid to non-resident "job tourists" grew sharply from $121 million in 2007, to $291 million in 2012 (NEO, 2013, p. 38). Also, in some situations housing units are reserved for these job tourists, and as a result this housing stock is not available to residents. It is noteworthy that job tourists and those accessing institutional services (e.g. students at Nunavut Arctic College, people in the correctional facilities, and people staying at the medical boarding home) are transient residents and are not included in the Census

population count. The total number of job tourists and other transient residents at any given time in Iqaluit is unknown, however they do require housing and municipal services, despite the City not receiving associated per capita funding streams since they are not officially counted.

Dependency ratio – The total demographic dependency ratio is the ratio of the combined youth population (0 to 19 years) and senior population (65 or older) to the working-age population (20 to 64 years). It is expressed as the number of "dependents" for every 100 "workers". The dependency ratio is an age-population ratio used to measure the pressure on the productive population. In 2016, Iqaluit's dependency ratio was 53 dependents per 100 workers, compared to Nunavut's ratio of 82, and Canada's ratio of 55 (calculated using data from Statistics Canada, 2017). This means for a significant proportion of Iqaluit's population, there are far fewer dependents (both children and seniors) on each worker than compared with either Canada or Nunavut. It is probable that a significant number of people in Iqaluit aged between 20-64 years have no dependents. This reality is reflected in the high proportion (54%) of 1 or 2-person households in Iqaluit. It likely also contributes to the wealth of that segment of the population.

Household size & Housing Types – Section 4.1.2 of this Report contains information on household size. It was reported that a total of 54% of households in Iqaluit in 2016 were 1 or 2-person households. As noted in Section 4.1 of this report, the 2016 Census indicated that 42% of dwelling units in Iqaluit are apartments (includes stacked row dwellings), 32% were single- or semi-detached houses; and 25% were row houses. The high number of apartments likely services a good portion of the 54% of 1 and 2-person households in Iqaluit. However, there is significant overcrowding in Iqaluit's housing, which means there is significant over-housing too, with more affluent smaller households often occupying more expensive and more spacious structural types of housing.

Serviced Land Supply – Land development has been limited by the capacity of City of Iqaluit's staffing, budgets, and cash flow. In recent years, the City's limited Land Development Reserve Fund and reluctance to borrow to finance new subdivisions has prevented the pursuit of more substantial subdivision development. Also, City policy is to require all new developments to be serviced with utilidor, which increases the upfront costs of developing new subdivisions and leasable lots while decreasing the long-term operation costs. A federal limit on Government of Nunavut's borrowing capacity, known as the "debt cap", prevents the GN from participating more extensively in public-private partnerships and borrowing to assist municipalities in land development, build housing and other related infrastructure. Construction costs continue to rise with limited sector competition. The Nunavut Housing Corporation's Blueprint for Action acknowledges challenges in the coordination of land and infrastructure, as well as the need for improved capital planning and increased municipal capacity for land planning. With little available funding for new land development projects, Iqaluit has not delivered any new significant lands for development since 2012, aside from the Joamie Court Subdivision in 2018, which saw 25 lots being made available for a mix of low and medium density housing types. The lack of new serviced land despite continued growth is likely driving up the value of land in the City, which in turn negatively impacts housing affordability.

7.3 Best Practices & Trends

Supporting Affordability Programmes & Tenures – There are many potential alternatives to market-based homeownership include co-operative rental housing, or not-for-profit rental cohousing and community land trusts. While the General Plan and Zoning By-law cannot dictate land tenure, they can require private sector land developers and home builders to identify 'how' they intend to embed long-term housing affordability into their developments. Furthermore, as the City is often the ultimate title-holder of the vast majority of land in the City, it has tremendous power to dictate how the growth of equity can be managed in individual dwelling units and developments through lease agreements.

Improving Supply of Serviced Land – This does not necessarily mean continuously designating more and more residential land for development (thereby increasing urban sprawl) but it does mean that the City should analyse and monitor its supply and availability of zoned and serviced land (often known as 'shovel ready' land) in order to ensure it is readily available to provide additional housing supply. This also means guarding against land speculation and banking by the private sector, where it may exist. When the supply of zoned and serviced residential land falls below a certain threshold it may trigger the need for the City to increase supply.

Allow For 'Soft Density' – Increasing the supply of housing does not always mean having to redevelop low density housing with high density housing, but rather can mean allowing the introduction of additional residential units to be created by converting single detached dwellings to duplexes, or allowing for the creation of secondary suites, granny suites, studio apartments, etc in low density settings. These forms of housing may not be able to accommodate large families, but can easily accommodate small households and special needs households (i.e. individuals who live alone, transient workers, elders, or family members who may need some assistance with independent living).

Notwithstanding these uses are currently provided for in the general plan zoning by-law, policies should be reviewed to ensure they are enabled and not overly restricted. Many municipalities in other jurisdictions such as Ontario, have loosened up standards for the establishment of additional residential units in an effort to improve housing availability and affordability outcomes.

7.4 Strategic Directions

- A definition of affordable housing may need to be included in the General Plan. Currently, guidance is provided for what is considered "affordable" in the Land Development Guidelines affordable housing target and in the "Affordable Lot Policy".
- Review the affordable housing targets in the GP Land Development Guidelines, and the Affordable Lot Policy that is currently used to implement the Guideline, to address the issue of perpetual affordability.
- Consider supportive policies for non-profit housing organizations.
- Consider whether the current zoning provisions are permissive enough for the location of shelters, group homes and other kinds of residential care facilities, and secondary suites.
- Consider whether new policies in the GP or new provisions in the ZBL are needed to support the delivery of affordable housing, such as density bonusing (ie. in exchange for dedicating a certain percentage of units for affordable housing), implementing alternative development designs and standards for public housing or non-market housing developments (eg. reduced parking standards), and financial incentives (eg. deferral or waiving of certain fees and charges). Note that fees and charges are subject to the Fees and Charges By-law.
- Short-term rental policies should be reviewed to ensure minimal impacts on availability / affordability of housing for Iqaluit residents.
- Review the enabling policy in the GP regarding a Development Charges By-law and ensure the policy covers the full scope of what such a by-law could cover, including charges to support non-market housing projects.

8.0 ECONOMIC DEVELOPMENT & EMPLOYMENT

Economic development covers a wide range of activities that generally involve ensuring that the City provides sufficient opportunities for all forms of business and commerce from retail operations, offices, and other business spaces, and industrial, warehousing, and logistics facilities. These elements of the City not only provide employment opportunities and income for residents, but also provide goods and services for both residents, visitors, and businesses alike. As an important economic and logistics hub for Nunavut, the economic wellbeing of the City has far reaching impacts across the territory.

8.1 Current Context

To help understand the current context of economic activity and employment in Iqaluit, it is important to understand the spatial distribution of where these activities are situated. While most of the land use designations in the General Plan provide for some degree of economic activity, from home-based businesses in residential areas to manufacturing uses in the industrial areas, the primary designations that accommodate most commerce and employment uses include the Core Area, Commercial, Heavy/Light Industrial, and Institutional Designations.

To help better understand the distribution of designated lands on Figure 16, the table below shows a breakdown of the level of existing development within these designations. Land needs are further evaluated in Section 6.5.

Three major areas are designated for industrial uses, as shown in the land use schedules of the general plan: the West 40, North 40, and Upper Base areas.

A mix of open storage, warehousing, contracting, heavy vehicle storage/equipment repair uses dominate the industrial uses in the City. These uses are all captured under the Light Industrial designation in the general plan. Much of the remaining Heavy Industrial lands accommodate waste management and bulk fuel storage.

Designation	Gross Area (ha)	No. Vacant Parcels	Vacant/Undeveloped Area (ha)
Commercial	4	6	0.3
Core Area	92	36	4.1
Heavy Industrial	184	5	4.7
Light Industrial	58	17	3.8
Institutional	34	6	6.7
Total	372.5 ha	70	10.6 ha

***Please note that vacant parcel counts and areas shown above are based on GIS data available at the time of writing. Actual numbers may vary.**

Table 2 Land Use Areas

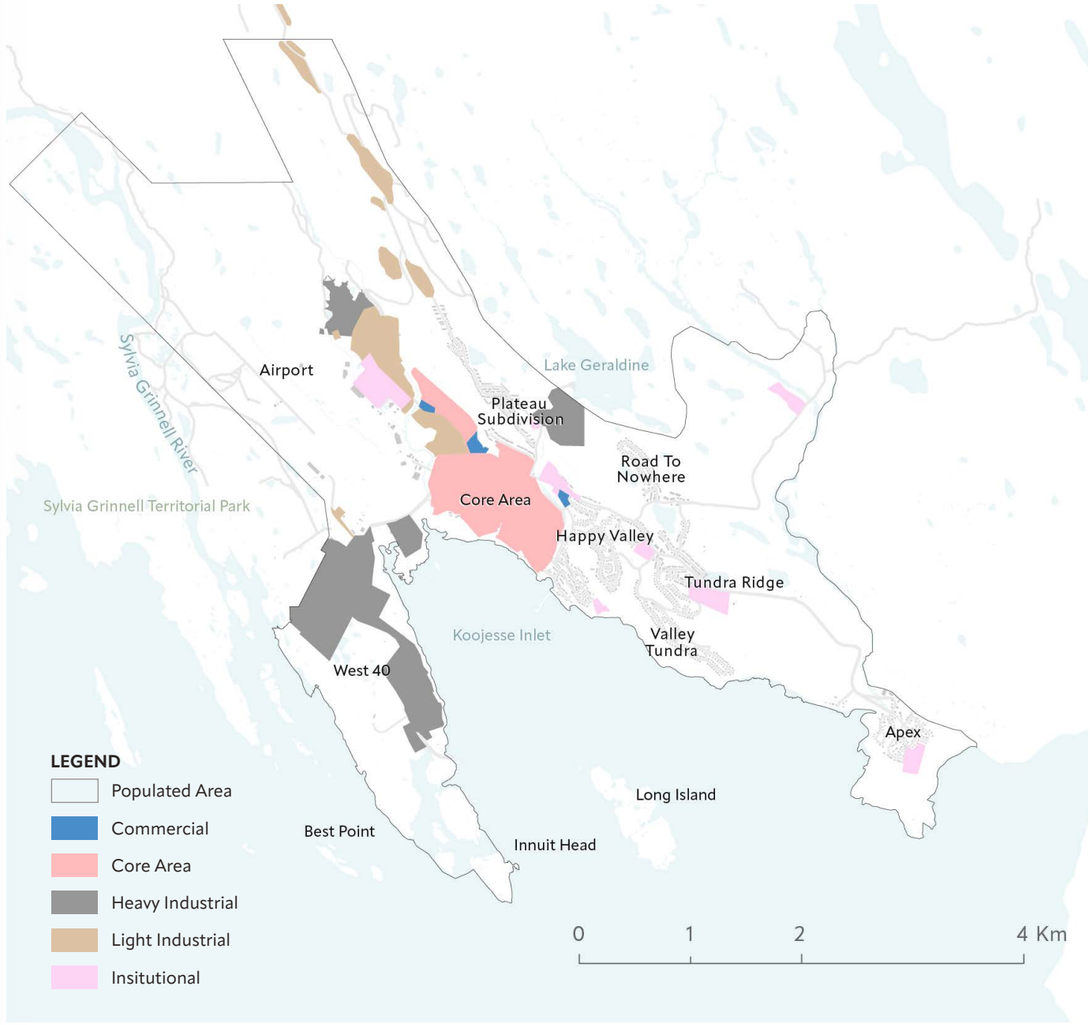


Figure 16 Economic Development and Emplyment Land Use Map

The General Plan designates several areas for Light Industrial development in the Upper Base area but none of these lands have been subdivided and developed. With new investment in major transportation infrastructure in Iqaluit (i.e. airport improvements, future deep sea port), the demand for industrial land is expected to increase. A significant portion of the designated Heavy Industrial lands in the West 40 are subject to an ongoing GN-City land transfer and/or have contamination and therefore there are current barriers to the land being utilized.

There is only one active mine in the Baffin Region, which is Baffinland. Peregrine Diamonds has been actively exploring for several years and continues to discover more kimberlites. Mining developments in central and western Nunavut currently have very limited impact on economic activity in Iqaluit.

Iqaluit currently obtains granular material from the North Forty Quarry, with the extraction of gravel, sand and rock for construction. North Forty Quarry, with the extraction of gravel, sand and rock for construction. The material is expensive due to the high degree of processing required. A small aggregate deposit along Upper Base Road (i.e. Trail Road facility) was depleted within 5 years of opening. A second much larger deposit (i.e. Northwest Deposit) is located further northwest of the townsite but requires the construction of a road. This deposit is already designated in the General Plan. These operations require significant lands for processing and stockpiling.

The construction industry in Iqaluit is dependent upon the availability of land to develop or redevelop, as well as infrastructure capacity. Over the last five years significant efforts have been put into the expansion of infrastructure, including extensions and upgrades to the utilidor, redevelopment of the Small Craft Harbour, and ongoing construction of the Deep Sea Port. Other notable developments during this time included a 3-storey commercial office building, major renovations to the Qikiqtani Corrections & Healing Centre, the Aqsarniit Hotel and Conference Centre, and another new 4-storey hotel complex. Despite these developments, residential construction has been quite limited. The construction industry will benefit from the next large subdivision development, likely to be the Inuit Owned Land development located off Federal Road.

There has been an increase in the supply and demand of warehouses in Iqaluit that are used for many kinds of storage. This industry will continue to grow as a result of the introduction of the new deep-water port and expanded airport. There must be sufficient and appropriately-located land set aside for these uses; one location for this expansion is the causeway area, which is expected to serve as a landing site and staging area for the goods transported by sea.

As mentioned, the Core Area is the centre of economic activity in Iqaluit and contains most of the commercial businesses, services, and institutional facilities. There is a high demand for centralized commercial space in the City, which has been found to be linked closely to the demand for housing. In discussions with staff, it is apparent that businesses are having a hard time finding space and/or growing because they can't find the space they need or because there is insufficient housing for employees. One of the primary issues resulting from this shortage is increased commercial floor space costs. Due to this, more residents and local businesses are turning to home-based businesses, encouraging more sprawled commercial growth, often away from the Core Area. Notwithstanding this, the costs of establishing home-based businesses due to planning approvals or other requirements can also hinder a healthy business climate.

There also appears to be an emergence of grocery store alternatives to complement the existing stores. These are primarily grocery delivery companies without storefronts. These business locations may need to be controlled in terms of site and size, and require different land uses than their retail competitors (e.g. IqaluEAT), possibly within a light industrial setting with compatible warehousing uses.

The number of restaurants in Iqaluit has grown incrementally in the past years; the high cost of renting dining establishments remains a deterrent and there is a scarcity of new locations. Recently a restaurant was converted out of a single detached residence, removing it from the housing stock. As Iqaluit grows over the next few years, additional sites for eating establishments will be in demand. As an additional note, there has been a recent increase operating in the number of food trucks in the downtown core.

The public sector remains the largest contributor to and principal force in Nunavut's economy, but the transportation sector, cultural and social infrastructure, health infrastructure, retail and hospitality sector, and the construction sector all continue to play a role. Institutional uses are largely captured under the Institutional and Core Area Designations in the General Plan but are also observed in the Commercial Designation as well. Many of Iqaluit's major institutional uses, such as City Hall, the Legislative Assembly and Nakasuk School are located in the Core Area and are permitted uses within this designation. Similar institutions outside the Core Area, such as the Qikiqtani Regional Hospital, the men's and women's correctional facilities, Joamie School, and the AWG Complex Arena are designated Institutional.

In 2019, the Nunavut Arctic College (NAC) completed an expansion of its main campus facility for increased technical and vocational training programs, as well as increased future university degree programs. The number of students was expected to rise to approximately 300 students, which would have a direct impact upon student housing provided by the College, as well as additional staffing needs. Additional lands should be considered near the campus for student residences as well as staff housing.

The increase in economic activity in Iqaluit means there is an increased demand for private health services, including counseling and therapy, massage, physiotherapy, chiropractic care, dentistry, and more. The number of private offices available to, and suitable for, health professionals is limited. There is a concentration of these uses inside the Core Area, however, some are located outside the Core Area along main roads, and smaller-scale buildings along local roads. The range of retail goods and services provided in Iqaluit continues to diversify and new offices are being constructed to support new government positions, non-profit organizations, Inuit organizations and businesses.

8.2 Challenges, Issues, & Opportunities

The Airport – The Airport is one of Iqaluit's largest private sector employers and main gateways to the City (and Territory) for goods and people. Considering the community's dependence on importing goods, materials, and services via air and sea, it comes as no surprise that much of the industrial activity in Iqaluit is focused around the International Airport. The major facilities in and around the airport lands, as well as the associated communication systems are important economic generators as the primary gateways to Iqaluit. That being said, it's understood that the industrial area immediately east of the Airport lands is undergoing a transition to accommodate a greater mix of uses. The new GP and ZBL will need to carefully consider ways to continue leveraging the airport as a central hub of economic activity and ensure complementary land uses are maintained in strategic locations nearby.

Deep Sea Port – The much-anticipated development of the Deep Sea Port located at the causeway in Iqaluit will be significant for Iqaluit's economy. The port has the potential to bring more business for airlines, hotels, and food services, as well as sustain local industrial sectors associated with logistics and warehousing. Once the deep-sea port is built, summer sealift vessels will be able to offload 24/7, instead of the current high-tide constraints. The transportation sector is expected to expand to offer more services, warehousing and staging, fuelling, logistics, tourism, and retail with the completion of the deep sea port.

Small Craft Harbour – The improvements to Iqaluit's Small Craft Harbour (all-tide boat moorage and protected all-tide boat launching) presents significant economic opportunities for enhanced tourism services, and greater access to harvesting, hunting, and cultural activities – not to mention an increase of waterfront activity. Further, with the investment in the small craft harbour and the relocation of the current sea lift activities in the Core Area, there is an opportunity to initiate efforts for the redevelopment of the beachfront from the breakwater to the sea lift beach area and the surrounding establishments (museum, visitor centre, Iqaluit Square Park, Elders Centre). This would be of significant benefit to the tourism sector and improve public access to and enjoyment of the waterfront. The opportunity for a Waterfront Study and/or Plan should be revisited in the General Plan.

Appropriately Located Employment Lands – The location of adequate industrial land for warehousing and staging is a challenge. The City is in the process of securing significant land transfers in the West 40 area which will provide a large supply of lands suitable for industrial development. A number of land parcels have contamination but these are largely restricted to lands that are already subject to airport leases, and therefore does not impact the business activity on those lands. The transfer of these lands are subject to remediation.

Challenging Business Environment – According to the City's 2015 Community Economic Development Plan, there are several constraints facing businesses such as: market isolation, high overhead and limited local markets, the high cost of freight, securing a place to do business and the high cost of operations and maintenance. Lack of equity for entrepreneurs, public housing policy regarding owning a business while in a unit needs to be examined, as does the lack of available land and the lack of commercial space. Additionally, there is a three-way "chicken or egg" scenario when it comes to the relationship between housing, infrastructure, and employment in Iqaluit that needs to be addressed in the General Plan; the lack of housing is often the result of a lack of infrastructure, which in-turn catalyzes many of the hardships felt by employers and employees in the community.

8.3 Best Practices & Trends

Business Incubation – A business incubator is an organization that helps start-up companies and individual entrepreneurs to develop their businesses by providing a range of services including business development services and office space and sometimes venture capital financing. The National Business Incubation Association (NBIA) defines business incubators as a catalyst tool for either regional or national economic development. NBIA categorizes its members' incubators by the following five types: academic institutions; non-profit development corporations; for-profit property development ventures; venture capital firms, or a combination of the above. In the Iqaluit context incubators can provide much needed services and spaces to small business owners and home-based businesses who are looking to expand and grow. These incubators or similar spaces with subsidized costs can provide an important bridge between a home-based and more traditional commercial business located within a dedicated space/ building.

Tourism – According to the City of Iqaluit Community Economic Development Plan (2015), Qikiqtaaluk region attracts the highest percentage of visitors and Iqaluit, being the gateway to the rest of the region and Territory, has a great potential to attract visitors passing through the community on route to another destination. While there is potential for increased tourism activity in Iqaluit, there is limited local tourism infrastructure. This situation stands to be significantly improved with the development of the boat launch and breakwater, as well as any improvements along the Iqaluit beachfront area. Introducing more tourism pathways and trails and increasing the number of tourism establishments are potential areas of interest to the City under their Community Economic Development Plan (2015). There is an increased interest in marketing to business travellers (as the largest tourist segment in Nunavut), as well as additional cruise travel traffic anticipated with improved marine facilities and the deep seaport.

Further opportunities to bolster the tourism base in Iqaluit may come with the completion of the Deep Sea Port; however, sufficient accommodations for travellers need to be carefully considered, as demand has increased steadily over the last few years, whether it be for events and attendees, or vacationers. For example, when large events and conferences take place in Iqaluit (i.e. Nunavut Mining Symposium, Nunavut Trade Show), conference attendance is limited to the availability of rooms in Iqaluit. This situation would benefit from improvements to the infrastructure base in the City (as with other aspects like housing and commerce). This situation has improved with the recent completion and opening of the Aqsarniit Hotel and Conference Centre in 2020, and the Frobisher Inn and Koojesse Conference continue to play important roles in accommodating travel and events, along with a number of other smaller venues in the City.

The market for short term rentals and other bed and breakfast operations has also recently grown to fill gaps – a trend that will likely continue out of necessity due to the shortage of housing and accommodations. However, one of the main challenges with this is, while short term rentals can provide economic and tourism opportunities for the City and income for residents, they can also remove long-term tenant housing stock from the market, and impacting permanent residents.

Circular Economies – A circular economy is an economic / business concept that moves away from a 'linear' economic process (i.e. extraction, use, and disposal of resources) to a 'circular' economic process whereby the system retains and recovers as much value as possible from resources by reusing, repairing, refurbishing, remanufacturing, repurposing, or recycling products and materials. At its core, a circular economy is about using valuable resources wisely, thinking about waste as a resource instead of a cost, and finding innovative ways to better the environment and the economy. In the Iqaluit context given the logistical challenges delivering goods and materials, as well as the costs associated with waste disposal, the concept of developing circular economic systems likely has a stronger business case, than in many areas in the rest of Canada.

Impacts of Climate Change – Despite the Arctic's wealth of extractable resources and diversified shipping routes connecting the world's continents, over the centuries few mariners have risked the frigid temperatures and inhospitable environment. However warming temperatures and a rapidly increasing rate of glacial melt may unlock the economic potential over the coming decades. As global temperature rise is causing the Arctic to warm at almost twice the rate as anywhere else in the world, which is rapidly increasing the rate of sea ice loss. Since the 1980s, the volume of Arctic Sea ice has decreased by 75%, and the region could experience ice-free summers by 2050, if not earlier. A transforming Arctic may soon become a new centre of market activity and a race to uncovered natural resources including fisheries, reserves of oil and gas, and

minerals such as iron ore, copper, nickel, zinc phosphates and diamonds. Melting sea ice is also increasing the navigability of the Arctic Ocean, creating new shipping routes which are traversable for longer periods of time throughout the year.

Notwithstanding potential 'improved' conditions for global market/economic connections to the City resulting from climate change, there are concerns that the decreasing number of sea ice days will almost certainly impact the ability for local hunters/fishers to participate in the land-based economy. There may also be increased concern for the safety of locals and tourists venturing out on to the ice/water during 'shoulder' seasons, given the increasing variability of ice conditions.

8.4 Strategic Directions

- General review of land use designations in the West 40 and North 40 areas, considering future opportunities for extension of piped services as well as synergies with deep sea port.
- Review opportunity for waterfront study and to create more public and community uses close to the waterfront given the future discontinuation of the sealift beach area and the construction of a small craft harbour.
- Protect major transportation facilities and ensure compatibility of surrounding land uses by ensuring that the federal and territorial regulations and guidelines are implemented in both the General Plan and Zoning By-law.
- Review the adequacy of existing lands designated for commercial and mixed-use development.
- Review the suitability of lands in the vicinity of the future deep sea port for new industrial land for material staging (open storage) and warehousing.
- Consider merging of the light industrial and heavy industrial designations in the General Plan and using the zoning by-law for ease of use.
- Development standards in the Core Policy area should be reviewed to ensure opportunities for development/ redevelopment are supported.
- One of the primary tourism 'pulls' to Iqaluit is its access/proximity to the natural environment and features. The General Plan should look to identify tourism 'assets', and introduce policies intended to support their preservation and role. One of the easiest ways to do this would be through the identification of assets on a map.
- The City should consider opportunities to directly support or sponsor incubator-like organizations or spaces intended as a 'business gathering space' to help local entrepreneurs learn and build skills, knowledge, as well as offering physical space that can be rented and used by local businesses for various activities. The Pinnguaq Iqaluit Makerspace is one example of such a space that has been implemented to date, and GP policies could potential further support for like-minded endeavours.

INFRASTRUCTURE

9.0 DRINKING WATER SYSTEM

The water supply system serving the City of Iqaluit includes the Lake Geraldine watershed, raw water (over-winter) storage, a water treatment plant, treated water storage, two water pressure booster stations and water distribution piping. The General Plan designates the Lake Geraldine and the Niaqunguk River watersheds as a Watershed Protection Area. The watersheds are protected under General Plan policies. The Niaqunguk River watershed is identified as a potential future supplementary water source.

9.1 Current Context

This supplemental water supply has since been used to "top up" Lake Geraldine, prior to Fall freeze-up. The lake is generally considered to be a high-quality water source, and water supply flows by gravity to the City's water treatment plant. The City's water supply demands generally exceed the Lake Geraldine watershed capability from year to year, although this ultimately depends upon the moisture available in any given year. In anticipation of a potential shortfall in water supply, the City implemented a water re-supply system from the Niaqunguk (Apex) River in 2018, located 1.5 km east of Lake Geraldine. This supplemental water supply has since been used to "top up" Lake Geraldine, when needed.

Water treatment in the City received a major upgrade in 2005 and provided sufficient treatment capacity until 2021. As part of this project, treatment was upgraded to a multibarrier process consisting of coagulation, flocculation, filtration, and disinfection. The water treatment and reservoir system in Iqaluit can currently support a population of approximately 11,300. Treated water is stored in a 2-cell reservoir (4,500 cubic metres) prior to distribution into the community through seven independent water districts via a buried insulated piping network. Work is currently underway for a subsequent upgrade to the City's water treatment system, targeting an increase in capacity and improvements to the treatment process.

The water distribution system in Iqaluit generally consists of two primary methods: a municipal system consisting of shallow-buried, urethane-foam insulated, high-density polyethylene pipe; and trucked water delivery to independent storage tanks on properties. Through its approximately 32 km of water distribution piping, the City's piped water distribution system distributes approximately 90% of the water used in the community. Treated water flows from the reservoir by gravity to the distribution system, which consists of seven independent water pressure and water recirculation zones. Five of the zones are fed by gravity and the remainder are served by two district booster pump houses.

9.2 Challenges, Issues, & Opportunities

There are a few challenges that present themselves in Iqaluit in respect of the water system, the most significant being associated with adequacy of the water supply. While the City has been faced with water quality issues in the past, the two most recent crises in late 2021 and early 2022, both resulting from fuel contaminants in the water supply, highlighted just how pressing the situation was (and still is). Other common issues are associated with infrastructure design and sizing, which

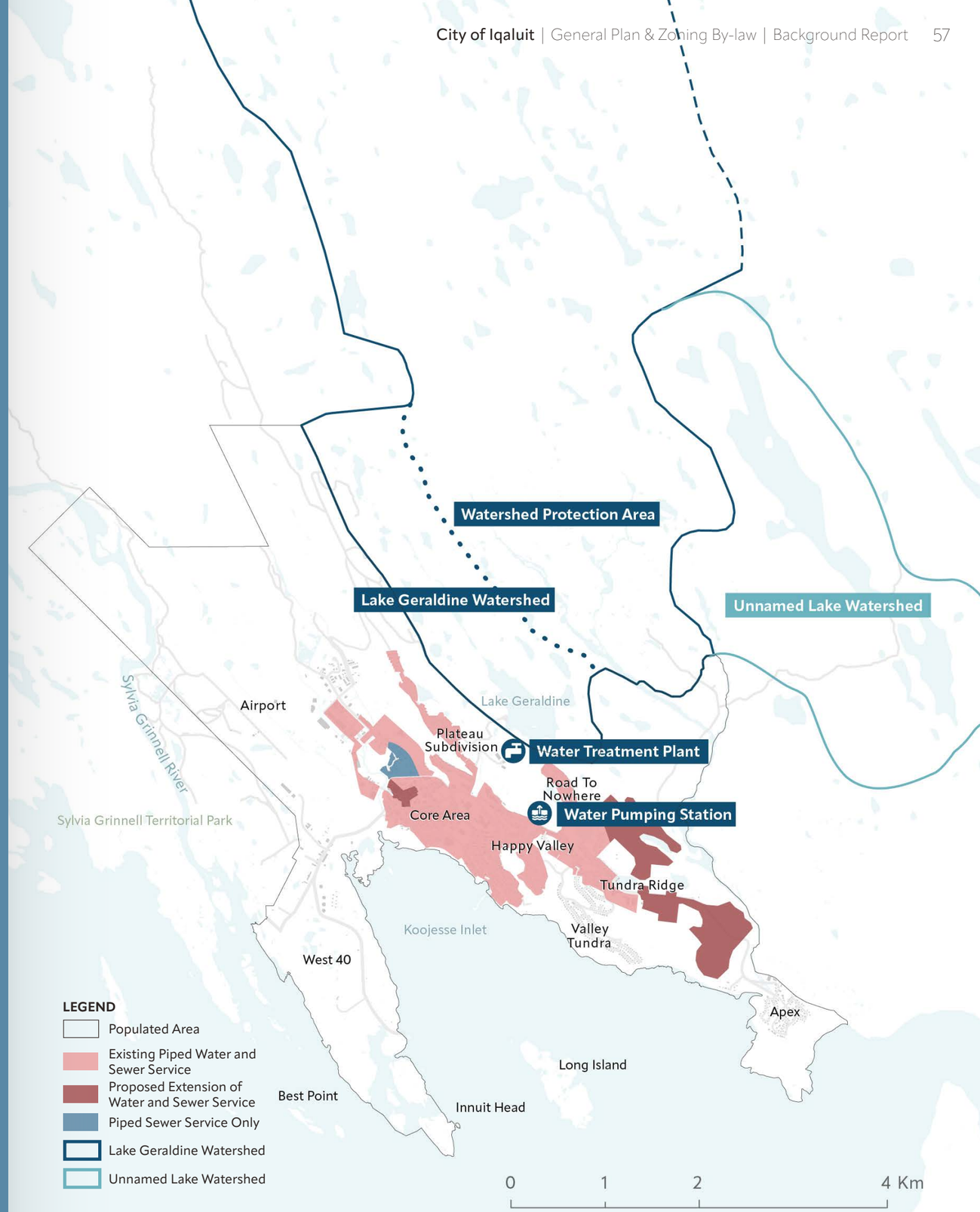


Figure 17 Drinking Water System

have the potential to lead to sprinkler flow concerns in buildings.The demand for water keeps the water network moving and stops it from freezing, and there are "bleeders" installed in buildings where there has been a problem with freezing water. Due to freezing issues, any equipment that is not located in an insulated building will not pass the test of time. As mentioned, the Niaqunguk River has been identified as a supplementary water source, and a "Unnamed Lake" Lake a further 3.2 km to the east may also serve as a supplementary water source in the future.

The cost of the insulated systems are very expensive and alternative concepts for access to the systems has been investigated. The results of this limited study suggested that the costs associated with the robust nature of the access systems was warranted, given the demanding environment in which the systems must perform.

The installation of water mains (new or remedial) creates a complex project because of the technical issues associated with the permafrost ground conditions, the existing alignment of the pipes, the remedial work required on the access points of the system, legacy contamination concerns, and the logistics of providing temporary servicing. The permafrost ground conditions have an active layer that may extend as deep as 3 metres and produce very wet and unstable ground conditions.

In discussion with staff, it is understood that the Lake Geraldine reservoir is estimated to be able to support a population of roughly 8,300. Supplementary water supply is provided via water from Niaqunnguk River, which is pumped to top off Lake Geraldine Reservoir in the Fall prior to freeze-up. This fixed volume of water must then be managed to last until the Spring thaw when water will begin to replenish the water supply in Lake Geraldine. On top of the regular use of water, other periodic and unplanned demands include bleeds, building fires, landfill fires, watermain leaks, and other emergencies such as flushing the water network after the 2021 fuel contamination at the water treatment plant. Until Lake Geraldine can be replenished year-round, water supply levels must be constantly monitored, and risk assessed. This is one of the main reasons no major land development projects may occur until the water supply problem is resolved.

On a positive note, in early 2022 the Government of Canada announced $214 million to address the major infrastructural issues with the City's water system. This funding will see the creation of a new water reservoir and major improvements to the existing system and infrastructure. These improvements will not only see the City address recurring issues with contamination and quality concerns, but will also open the City up to more opportunities to address the housing crisis through new development.

9.3 Best Practices & Trends

The City has designated Lake Geraldine and the Niaqunguk River watersheds as Watershed Protection Areas. The formalization of these areas provides a land use framework for limiting traffic in and around these areas.

With respect to permafrost, the active layer is getting thicker and the best approach to withstand freeze back pressure is to account for structural movement relative to the pipe. Digging deeper to find frost will add cost at an exponential rate. The pressure in the watermain helps fight freeze back forces and as such watermain collapse is uncommon.

Aging infrastructure is an issue for communities regardless of latitude, but the remedial work associated with infrastructure in the far north presents unique demands because of the geography, climate, and, in some cases, geology.

Water is an expensive commodity in the Arctic and therefore system optimization regarding water use and water temperature will have significant cost savings. The best means to advance optimization is with a water model.

The City is advancing a project to develop a hydraulic model of its water distribution network which will provide a detailed understanding of the current system operations, and provide a tool for system troubleshooting as well as planning for system upgrades and expansions. Model results will also be utilized for thermal analysis of the water districts. This will provide opportunities for optimization of the heat addition to the water supply to be explored which may provide some significant cost savings on the energy used to reheat the recirculating water. The first phase of the project has been completed with the objective of developing a working hydraulic model using all of the system data based upon records of construction and operational data available for each of the City's seven water districts. This stage of the work has identified system deficiencies for maintenance and repairs. Phase 2 of the project will complete hydrant flow tests throughout the distribution system required to calibrate the hydraulic model.

9.4 Strategic Directions

- The City would benefit greatly from the development of an Infrastructure Master Plan (IMP). An IMP will comprehensively master plan the City's existing and planned infrastructure in a manner that considers planned growth directions and can inform where areas of new growth should be located.
- Further the City would also benefit greatly from the development of an Asset Management Plan (AMP). An AMP is a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future water system challenges.
- The water treatment plant has sufficient capacity to meet the needs of a City-wide population of 11,300. Based on the General Plan's medium growth projection, the City may achieve this population threshold between 2036 and 2041. As such, regular monitoring of reserve capacity should be introduced during the life-span of the plan and planning should take place to expand capacity in the system in the later-half of the life of the General Plan
- Further to the above noted recommendation, triggers should be introduced in the General Plan that require more regular monitoring and reporting of reserve capacity in the City's water system to ensure there is sufficient capacity to support new development
- On-site or individual water collection or purifying systems should be permitted in the Zoning By-law to ensure that individual property owners can supplement piped or trucked water supplies.
- With the recent announcement of Federal funding to support improvements and upgrades to the City's water infrastructure, policies should be reviewed to ensure new (re) development is aligned with available/planned services.
- The City should consider including servicing policies or criteria that outline requirements for minimum water tank sizes, utilidor connection criteria/triggers, approvals processes, inspections, as part of the DP process/approval.
- In some of the older development areas of the City, sewer and water pipes encroach on private/leased land but do not have registered easements associated with them. The GP should include a policy(ies) related to securing appropriate easements for City infrastructure.

10.0 SANITARY SEWAGE SYSTEM

The existing wastewater management system includes a network of gravity sewers, two sewage pumping stations and a sewage treatment plant. Development Areas A and B are both situated on the periphery of the existing community near the upstream ends of the sewer system. Provision of sewer servicing into these areas will entail the extension of infrastructure into the development areas, together with downstream improvements to accommodate additional sewage flow.

10.1 Current Context

The sewer collection systems in Iqaluit generally consist of shallow-buried, urethane-foam insulated, high-density polyethylene pipe, and trucked sewage collection from sewage holding tanks on individual properties/ independent systems. The piped sewer system flows by gravity with slopes generally greater that 0.5 percent and collects approximately 90 percent of the sewage generated in the community. The City has approximately 30 kilometres of sanitary sewer. The City of Iqaluit's wastewater treatment plant is located at the end of the airstrip. The plant provides primary treatment of wastewater to the 2.2 million litres of wastewater produced per day in Iqaluit. The existing sewage treatment plant was designed to provide a useful life of 20 years. This facility currently provides a modest level of treatment using screens and filters to remove solids before the water is released into Koojesse Inlet. The filtered solids (sewage sludge) are disposed of in the municipal Landfill. The wastewater treatment plant includes a sewage lagoon which is used for backup when the treatment plant is shut down for repair and maintenance.

Iqaluit issued a design/build request for proposal (RFP) for secondary treatment in 1997 to replace the existing primary lagoon system, which had been operating since the late 1970's. The project was never commissioned and was ultimately abandoned. A consultant was retained in 2004 to complete the design for an extensive rehabilitation of the facility. The design was able to incorporate the existing facility but required two additions to the building; one addition for primary treatment completed in 2006, and another addition for secondary clarifiers, which was not completed due to unavailability of funding. In 2015, work began to complete the secondary treatment portion of the facility, and MBBR (moving bed bioreactor) technology was selected for this purpose. This process has incorporated the original concrete bioreactors cells into the project. A septage receiving system was also added to the facility. The project has been completed and commissioned, the capital cost was $25-million.

The treated wastewater effluent is discharged into the surface waters of Koojesse Inlet at the surface, approximately 50 metres from the sewage treatment plant. The wastewater treatment plant may be bypassed into the original sewage lagoon to provide limited detention and treatment if the sewage treatment plant must be taken entirely out of service.

The biosolids produced by the sewage treatment facility include primary treatment biosolids and secondary treatment biosolids. These biosolids are deposited into biosolid drying beds located adjacent to the wastewater treatment plant. Once dried, the biosolids are deposited at the landfill.

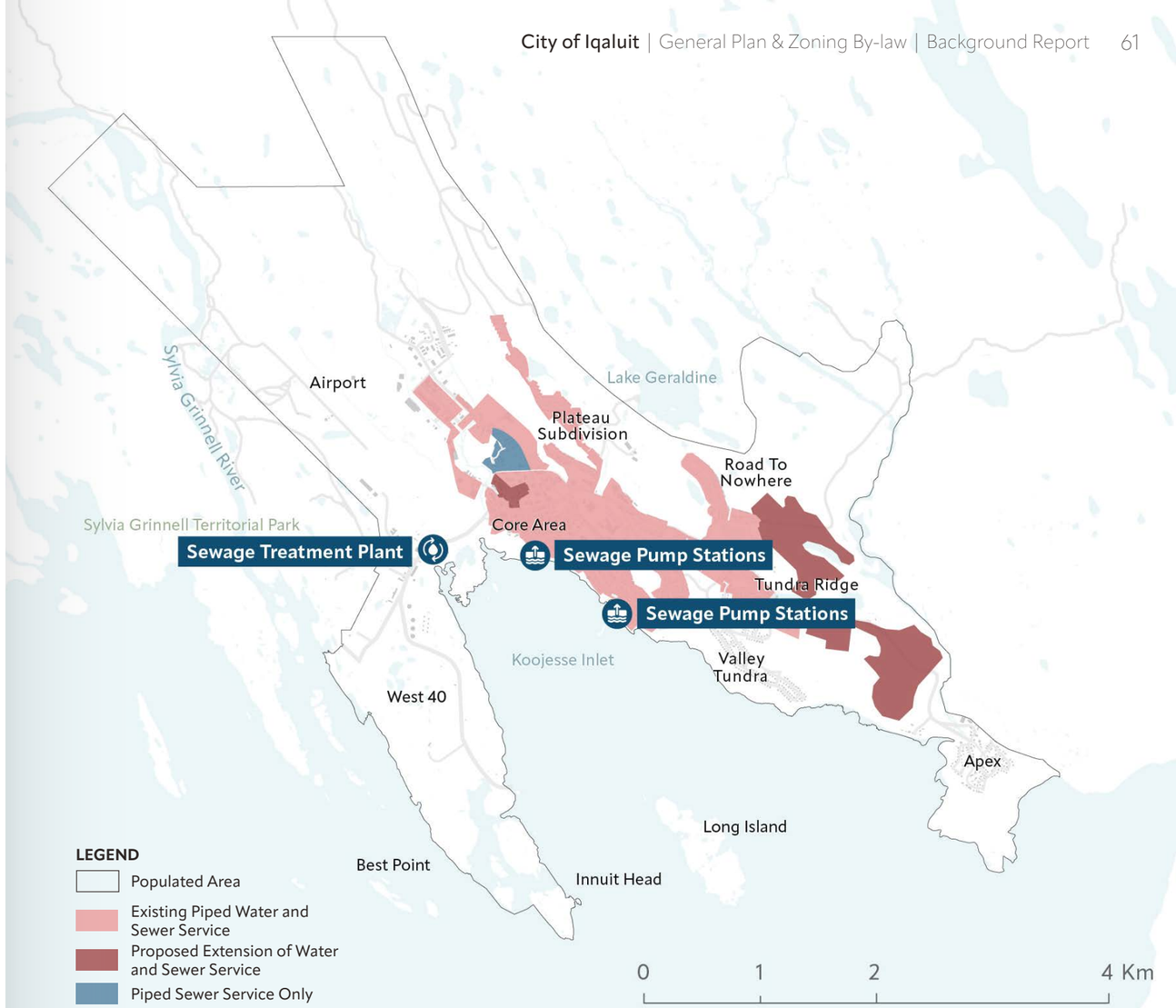


Figure 18 Sewage Treatment System and Serviced Areas

10.2 Challenges, Issues, & Opportunities

The primary challenges with sewage in Iqaluit are the potential freezing of sewer lines, most commonly caused by a loss of grade with the sewer lines shifting in the active layer of the permafrost. The sewer is more vulnerable to freeze back and collapse, rendering the sewer ineffective. There is excessive bleeding of potable water into the sewers by the City and residents as a means of preventing freezing pipes, this causes an issue with excessive wasting of water.

The City currently requires applications for all new developments to include and water and sewer demand and capacity related studies. If the City's sewer mapping indicates any downstream sewers are at or near capacity, a condition of approval is that an interim sewage storage solution is required on-site until such

time as the capacity of the downstream sewer is upgraded. The on-site interim sewage system normally consists of a sewage tank with a time release to the piped system during non-peak hours. The interim servicing solution adds a significant cost to any development in piped service areas where downstream sewers are at capacity.

The remedial work has included the installation of a surge tank in the new development. The following key points were identified in the review of the City's sewer and sewage treatment systems:

- The entire sewer system was re-assessed on theoretical capacities and current loading conditions. While a more conservative approach, this provided an effective means of understanding the capacity of the system.
- In order to ensure the best outcomes and health of the sanitary sewer system, all designs for new development and/or connections must follow the City's standards.
- Detailed information on sewage flow patterns is largely unavailable at this time for the City – notwithstanding this, the system does contain a few alternative routing options to alleviate capacity issues if they do arise.
- Two of the primary culprits contributing to sewer issues are excessive water system bleeds and liberal water use by residents/businesses
- Rights of way are wide and contain ample room for removal/replacement of infrastructure when needed.

It should be noted that, at the time of writing, the City of Iqaluit is current reviewing its Sewer and Water Development Charges By-law. Specific consideration is being given to potential increased charges to help recover a portion of the capital costs associated with upgraded sewer infrastructure, as these works can be quite a financial burden on the City alone.

10.3 Strategic Directions

- The City would benefit greatly from the development of an Infrastructure Master Plan (IMP). An IMP will comprehensively master plan the City's existing and planned infrastructure in a manner that considers planned growth directions and can inform where areas of new growth should be located.
- Further the City would also benefit greatly from the development of an Asset Management Plan (AMP). An AMP is a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future water system challenges.
- Triggers should be introduced in the General Plan that require more regular monitoring and reporting of reserve capacity in the City's sanitary sewer system to ensure there is sufficient capacity to support new development
- For private development approvals the City should consider enforcing sewer camera inspections and adherence to the City of Iqaluit Municipal Design standards
- The City should continue ensuring development is connected to the municipal system where possible, as individual onsite systems still pose a number of challenges and concerns for implementation in the Arctic. A review of current GP servicing policies should be undertaken to ensure that (re)development is appropriately accommodated. Similar to the recommendation related to water policies, the City should consider including servicing policies or criteria that outline minimum requirements for matters such as utilidor connection criteria/triggers, approvals processes, inspections, as part of the DP process/approval.
- In some of the older development areas of the City, sewer and water pipes encroach on private/leased land but do not have registered easements associated with them. The GP should include a policy(ies) related to securing appropriate easements for City infrastructure.

11.0 MUNICIPAL DRAINAGE

In its simplest meaning, drainage refers to the channeling of natural drainage patterns and removal of surface and sub-surface water to prevent ponding or flooding. In urban contexts drainage is particularly important due the number of impermeable artificial surfaces that exist such as building roofs, roads, and parking lots as water cannot be absorbed into the ground or flow naturally into creeks, streams, or rivers. There are also environmental considerations in this regard as collected water in urban settings can also carry significant amounts of pollutants carried from building and road surfaces.

11.1 Current Context

The City of Iqaluit surface water (drainage) management consists of swales, ditches, and culverts generally associated with roadways and right of ways, which are intended to provide positive drainage for runoff created from snowmelt and rainfall. Most of the runoff is generated from snow melt in the spring of each year. The drainage system generally connects with a series of streams and runoff corridors throughout the community which ultimately discharge into Koojesse Inlet. The overall efficacy of the drainage system is challenged on an annual basis with the spring melt, where issues occur with all aspects, including swales, ditches, and culverts. These issues cause flooding to varying degrees, which in turn can cause deterioration of the gravel roads, which may form potholes.

11.2 Challenges, Issues, & Opportunities

As mentioned, the overall success of the drainage is challenged on an annual basis with the spring melt, as well as the occasional summer rainstorm. Issues occur with all aspects of the drainage system, in association with flow blockages which cause limitations with flow capacity in swales, ditches, and culverts. The dominant flow capacity issue may occur with culvert blockage because of ice formation during spring melt. Ice formation in culverts may be a recurring problem in culverts that may be previously cleared. Another significant issue occurs with the runoff from the road surfaces because if a roadway does not have a sufficient "crown" the runoff will not drain and will form puddles that may cause a deterioration in the road surface.

The series of streams and runoff corridors provide another opportunity for drainage management by providing a "large" capacity conduit for conveying runoff for ultimate discharge into Koojesse Inlet.

A buried drainage management system is not used in any communities of Nunavut; this runoff management system would have chronic and serious issues with freezing and blockage. A surface runoff management system offers the opportunity for visual assessments, which allow for easier and more timely remedial measures.

11.3 Best Practices & Trends

Research Northern Best Practices – A survey of standard and best drainage practices used in other northern communities in Canada, Alaska, Greenland, Scandinavia, and Russia should be conducted to determine whether better approaches to drainage could be used to improve efficiency and effectiveness of the City's drainage system.

Approving New Development – new development/redevelopment should be informed by minimum standards for investigating drainage impacts and/or design of drainage features prior to development (grading plans, stormwater management, etc.) to avoid creating or exacerbating drainage issues.

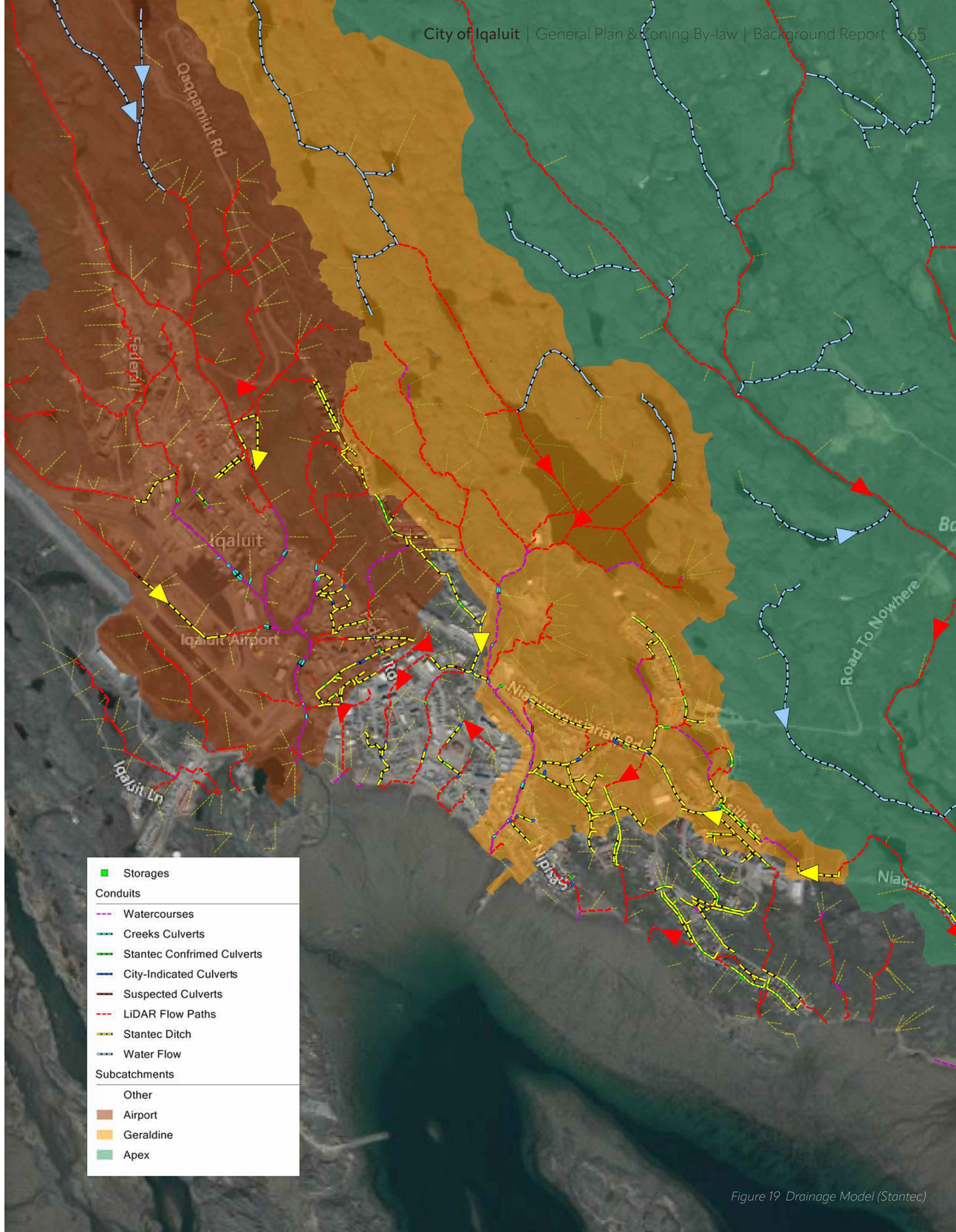


Figure 19 Drainage Model (Stantec)

11.4 Strategic Directions

- The City of Iqaluit is known to have overland flow issues, specifically on major roadways. Moreover, corrosion, sedimentation and erosion issues have been identified in many of the City's culverts. To make sure that these issues are addressed for the future, upgrades and repairs, as well as updated design standards are necessary, including:
    - The Level of Service (LOS) for the ditch design;
    - IDF curves, which will provide design basis for the future upgrades / new development;
    - Culvert installation techniques, and apron design specifications;
- The Asset Management Plan (AMP) will also be a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future infrastructure challenges.
- New policies should be included in the GP to enable the City to require additional information and/or works related to assessing or upgrading local drainage infrastructure (either as part of a complete application or condition of development approval), where there is concern about impacts to existing conditions.
- Mapping of drainage 'constraint' or 'challenge' areas should be considered in the GP to help identify problem areas where additional information/care needs to be incorporated into the (re)development approval process to ensure minimal impacts.

12.0 TELECOMMUNICATIONS & TECHNOLOGY

Adequate telecommunications infrastructure and service levels are crucial to maintaining equitable opportunities in many aspects of life, including work, education, recreation, and leisure – this is especial true in northern communities who rely extensively on digital connectivity to address their physical remoteness. The successful growth of a modern city also relies on this infrastructure and the accessibility of technology.

12.1 Current Context

"Nunavut's Infrastructure Gap", a 2020 report prepared by Nunavut Tunngavik Inc. (NTI), defines and explores the various issues with infrastructure in Nunavut, which includes a gap analysis for telecommunications. NTI notes that Nunavut is the only province or territory in Canada without access to any terrestrial fibre-optic infrastructure, resulting in slow, unreliable internet that often does not meet demand. As Nunavut's most populous centre and the territory's most prominent economic hub, this has presented challenges to both residents and commerce in Iqaluit. NTI further notes that there is a broad consensus that closing the Internet gap in Nunavut would help shrink other gaps in well-being that are intensified by territory's geographic barriers and relative isolation. Further to this, while many aspects of work and social life have already been shifting to a digital medium, COVID-19 only further exacerbated this issue.

The Government of Nunavut is currently pursuing solutions to bring more affordable and reliable high-speed internet to Nunavut, specifically Iqaluit, through the installation of seabed fibre-optic lines. One such is a $209 million project, originally involving a fibre link between Nuuk, Greenland, and Iqaluit, which was slated for completion in 2023. However, in 2021, the territory opted to revise the project to connect Iqaluit instead to the Nunavik coast, as reported by Nunatsiaq News on February 14, 2022. The project is now slated for completion in 2025 which, despite delays, would be a welcome upgrade from the current GEO networks currently used. In addition to the territory's plans, there are also other competing plans to bring more affordable and reliable high-speed to Nunavut, which is good news for the City in terms of accommodating future growth and development (as well as competition within the northern telecommunications market).

12.2 Challenges, Issues, and Opportunities

Some of primary gaps that exist across the territory and in Iqaluit include:

- **Lack of access to terrestrial broadband** (I.e. in-ground lines) - all of Nunavut, including Iqaluit, is served by Geostationary (GEO) satellite, which is prone to interference, latency, and limited capacity issues.
- **Insufficient speeds** to keep up with the rest of Canada – based on 2018 data from the CRTC, Nunavut is the only jurisdiction in Canada where no households have access to internet speeds above 25 Mbps. As of 2019, plans advertising speeds of 15 Mbps are available in Iqaluit.
- **LTE coverage (phone service)** - based on 2018 data from the CRTC, mobile coverage in Nunavut lagged behind other Canadian jurisdictions, though it is worth mentioning that Iqaluit is assumed to have greater access to connections that most communities in the territory.

- **High Costs** – all of the above gaps contribute to exorbitant costs for telecommunications services, which in many cases further limits the ability for people to connect.

12.3 Best Practices & Trends

Smart Cities – A 'smart city' is a concept that refers to urban areas that uses different types of electronic methods, voice activation methods and sensors to collect specific data. This includes data collected from citizens, devices, buildings and assets that is processed and analyzed to monitor and manage traffic and transportation systems, utilities, water supply networks, waste, crime detection, information systems, schools, libraries, hospitals, and other community services. Information gained from that data is used to manage assets, resources, and services efficiently; in return, that data is used to improve operations across the city.

Remote Working – Also known as teleworking is an employment arrangement in which employees do not commute to a central place of work, but rather using telecommunications technology and high-speed internet, work is able to be undertaken essentially anywhere in the world, a trend that increased dramatically during the global Covid-19 pandemic. The implications of remote working for a City such as a Iqaluit are far reaching given that a substantial part of the City's workforce is transient and has the ability to undertake their work remotely as opposed to being physically in the City. This can have implications on housing needs, the amount of physical workspace required for individual workers, as well as the size and configuration of housing to accommodate workspaces and stations. It can also be argued that some of the above implications present more of a challenge for a community like Iqaluit. One of the main concerns is that remote work allows for businesses and organizations to cast their employment 'net' beyond the geographical boundaries of the City, which can further exacerbate issues with low Inuit employment rates.

Digital Main Streets – Is a subset of e-commerce that is focused on developing small-scale traditional commercial operators (retail store owners, artisans, artists, craftsmen, etc.) with online and digital platforms with the expressed purpose of expanding their customer base and therefore strengthening their physical presence in their existing community. For a city like Iqaluit's there is a substantial opportunity to expand the City's existing business base and open these businesses up to new markets, particularly for Nunavut and Iqaluit-specific goods and services such as raw materials, Inuit art, and local food.

12.4 Strategic Directions

- Telecommunications infrastructure gap is most appropriately addressed at the territorial level, and is largely outside of the scope of a general plan or zoning by-law, however it is important to recognize that this gap does have an influence on development and growth in the City, and opportunities to encourage and support solutions should be explored.
- While the long-term impacts of remote working on the supply of commercial and office space have yet to be assessed, the General Plan and Zoning By-law should have policies that facilitate this trend including policies and regulations around co-working and home-based businesses
- The City should consider developing a digital transformation plan that would see the City become a northern leader in smart-city applications

13.0 SOLID WASTE MANAGEMENT

Solid waste management refers to facilities and operation involved in the collection, processing, and disposal of solid waste in the City including garbage disposal, recycling, and composting. This does not include toxic waste management which, like many communities across the country, is handled and processed at specialised facilities. While solid waste management is often seen as a more of an operational consideration than a spatial consideration, it is relevant to discuss this issue as it relates to ensure the appropriate infrastructure and facilities are planned for the future population.

13.1 Current Context

The City of Iqaluit is responsible for the collection and disposal of solid waste, providing a regular collection service that currently deposits waste at the West 40 landfill. It has been reported that the capacity of the West 40 landfill has been exceeded, but additional capacity has been obtained through several unintended landfill fires and strategic building up of the site over the years.

Based upon a details waste management planning study, detailed options were developed and analysed in conjunction with community input. As a result of this work a new solid waste was management site was recommended along with a new solid waste program.

The site chosen for the new landfill is referred to as the Northwest site, which at the time it was recommended was 6 km beyond the existing road system. The cost of the access road was prohibitive at the time, which delayed site implementation until project funding could be shared with the access road for the adjacent to future granular source.

The program plans for the new landfill include; landfilling with open windrow composting (curb-side pick-up); bulky recycling (scrap metal, appliances, etc.); end of life vehicle program; reuse center; hazardous waste management program; and public education program. This recommended program is the most cost-effective option over the lifespan of the new site. It is also the most affordable program option in terms of capital and operating costs.

13.2 Challenges, Issues, & Opportunities

The City must improve its solid waste infrastructure to sustain growth and the existing population. Actions have been undertaken by a number of groups and organizations to divert waste from the landfill, however, a new waste disposal site is required. Council is actively reviewing options for a new waste disposal site. The City is currently drafting a Solid Waste Management Plan which will identify the location of the next solid waste management facility and outline the solid waste management programs that the City will undertake to establish and operate this new site.

In addition to the development of the Solid Waste Management Plan, the following are additional challenges, issues, and opportunities related to solid waste:

- There is a significant need to remediate legacy solid waste sites in various locations around the community. This includes the former North 40 Landfill site and the West 40 Landfill site, which will be capped and closed in the near future.

Figure 20 Waste Sites

- Costs associated with waste diversion, particularly for transportation of diverted waste is significant
- Ownership will continue to be a challenge for the decommissioning of legacy waste disposal sites (this is one of the primary issues for the North 40 site)
- The City has identified a potential site for a waste transfer and diversion facility in the North 40

13.3 Best Practices & Trends

Alternative Methods & Capacity Management
Any new waste management facility needs to include alternative methods of waste management such as waste diversion and composting of organic material. The facility must be located an adequate distance from any land use that can be affected by odors, runoff of surface and subsurface contaminated water, or gas migration. The facility must also be set back a reasonable distance to minimize unsightly appearances.

The new Iqaluit waste management facilities and the associated programs may divert over 40 percent of the waste from disposal and can extend the lifespan of the new solid waste management site by approximately 15 years compared to the status quo. The recommended composting program provides environmental benefits by conserving landfill space, reducing odors, reducing leachate, and providing a suitable cover material for the landfill. Environmental impacts will be further limited through a run-off management program, hazardous waste management program, and the recycling of scrap metal and bulky items.

Human & Financial Resources
In implementing best practices, the City of Iqaluit must allocate adequate financial/human resources and training to make sure that the new facility follows best management practices and protects the surrounding land and water.

13.4 Strategic Direction

- Review the solid waste management policies in the GP to address future waste management sites/closures and adjacent development to ensure maximum effectiveness
- General review of land use designations in the West 40 and North 40 areas, considering future opportunities for extension of piped services.

14.0 ENERGY GENERATION SYSTEMS

The energy system in Iqaluit is vital in providing electricity and heating for homes, businesses, and industry. The way this energy is created and distributed can significantly impact human and environmental health, and economic development. Iqaluit faces many opportunities and challenges in reaching existing and future capacities, as well as renewable energy targets set out by the federal government. Developing policies and regulations which support efficient, cost effective, and/or renewable energy networks will be vital in promoting a more resilient and affordable system. The following sections will define the current context, issues, opportunities, and best practices for the energy system in Iqaluit.

14.1 Current Context

The Energy System – Electricity in the City is provided by the Qulliq Energy Corporation (QEC). QEC is a territorial corporation that is 100% owned by the Government of Nunavut. It is the only generator and distributor of electrical energy in the territory, operating 25 stand-alone diesel power plants in 25 communities. Iqaluit is powered by two diesel power plants. The main power plant is a recently expanded diesel facility with a maximum generating capacity of 13.6 megawatts, located to the south of Geraldine Lake on Saputi Road. The secondary power plant is located on Federal Road. To power these plants, there are diesel storage tanks beside the main power plant and a diesel tank farm on West 40. The government of Nunavut is responsible for the purchasing of fuel which is brought in via ship in early summer. This fuel is transferred to the diesel tank farm by pipeline along the causeway. The pipe system pumps fuel from the tank farm to the power plants and fuel trucks are the backup for delivery. Power lines are used to transport electricity to the entire community.

According to the QEC, the average load in Iqaluit is 6.6 MW and the annual energy consumption is 57.8 GWh per year. Iqaluit requires 7.5 megawatts (MW) of power to fully function in the summer. The peak demand is 9MW. Between 2009 and 2011, the Iqaluit power system had a reliability of 99.8%, with an average of 14 outages per year, with an average of 15 hours per year. A 2007 report stated that Iqaluit burned approximately 12 million litres of fuel to generate electricity, which is one-third of the total consumed in Nunavut.

Alternative Energy Projects – While diesel generation is the main source of energy in Iqaluit, steps have been taken to find alternatives to energy production, distribution, and consumption. Currently, there are a number of projects which have introduced or tested alternatives at a small scale. These projects include:

- A custom wind turbine designed for Iqaluit. The project was relocated to Rankin Inlet, mainly due to better economics (1990s)
- A small-scale photovoltaic (solar energy) system was installed at the Nunavut Arctic College's main Nunatta Campus. According to a study in 2004, the system has delivered on average approximately 2,000 kWh of electricity on an annual basis with no interruption of delivery (1995)
- Energy efficient LED street lighting
- The Iqaluit Smart Grid Project: allows real-time monitoring of customer energy consumption, flows, and adjustments in energy supply based on demand

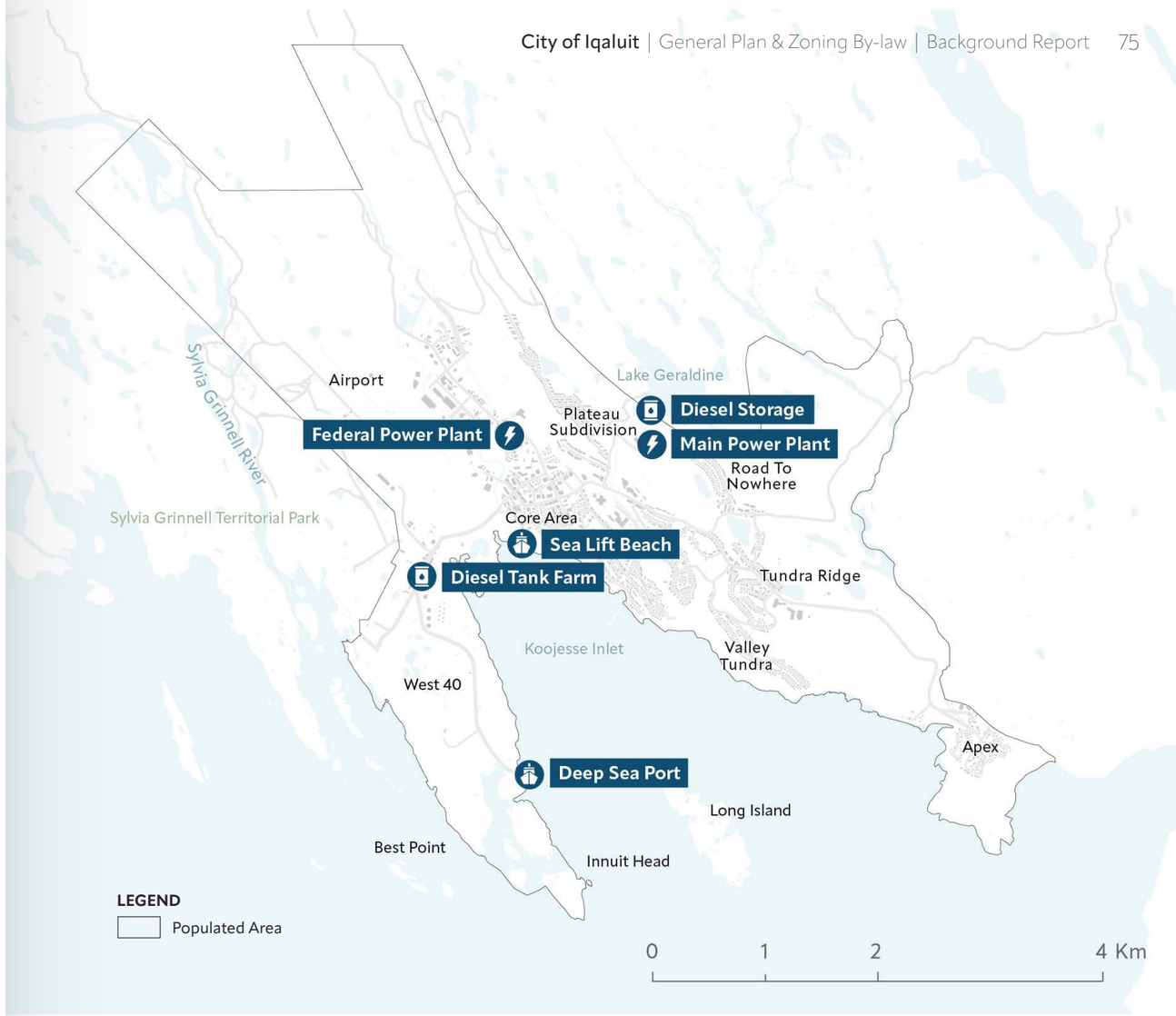


Figure 21 Energy System

- The QEC Net Metering Program: allows residential and municipal electricity customers to produce their own electricity through small scale renewable energy sources. QEC implemented an AMI system for its customers in Iqaluit. Over 4,000 smart meters were installed in QEC customer's homes throughout Iqaluit.
- Solar pilot project installed on QEC's power plant
- Recycled thermal energy produced from QEC diesel plant is now used for the hospital
- New development standards were implemented by the City for the Plateau Subdivision to improve the energy performance of buildings
- The Nunavut Housing Corporation has several homeowner programs to assist in upgrading energy efficiency of homes. Their programs include the Home Renovation Program, in addition to the Homeowners' Energy Efficiency Rebate Program

14.2 Challenges, Issues, & Opportunities

An Island System – The energy system in Nunavut is unique, as it does not have a shared transmission grid. This means each community relies on independent power plants called "micro grids". Micro grids allow for less dependency on a larger network, but also cannot share electricity between communities in the case of an outage. With no option to import power from outside the territory or distribute between communities, each community must rely completely on the capacities of local diesel plants. If an outage occurs, there is an emergency generator kept on site, but this is the only secondary resource. Because of Arctic limitations, there are not many alternatives for connecting communities.

The Cost of Diesel – There are significant costs associated with diesel power due to the buying cost, importing costs (via sealift), and the space needed for storing the fuel within the community. The baseline electricity prices in Iqaluit are higher than those elsewhere in Canada. The average price in February 2020 was 17.4 cents per kilowatt-hour (kWh) in Canada, while the nonsubsidized rates in Iqaluit were 58.6 cents/kWh. Most residential and commercial consumers receive subsidies which reduce the high costs of electricity. The high costs of non-subsidized electricity may contribute to the fact that Iqaluit has the lowest energy usage per capita in Canada.

Alternative Energy Sources – The federal government has committed to working with Indigenous communities, including Iqaluit, to transition from diesel power to renewable energy by 2030. Yet, there are many constraints for Iqaluit to develop new energy infrastructure as an Arctic community. Responding to the population growth of the city through advancements to the existing diesel system is already an essential task. A central issue to the development of new energy infrastructure is the costs of imported goods and services. For example, the costs of importing the materials and services for wind turbine developments were estimated at $300 per ton in Iqaluit in 2015, exponentially increasing the costs of renewable energy. Additionally, the territory will need to maintain back-up diesel generators with ay renewable power resource, creating redundant costs. If new infrastructure is proposed, the city must also identify and develop large tracts of land assets which can have significant impacts on infrastructure and environmental conditions. Nonetheless, there has been studies which identify the potential of geothermal, wind, solar, and district heating in Iqaluit.

Hydroelectric – There is capacity for hydroelectric power in Iqaluit. In 2012-2013, Qulliq Energy Corporation initiated a feasibility study on two potential hydro-electric sites located across Frobisher Bay. If completed, the dams could provide Iqaluit with a capacity of 18 megawatts of electrical power, enough to sustain Iqaluit until 2040 using projected energy requirements. Two potential sites were identified for the project: Jaynes Inlet and Armshow South (Bay of Two Rivers). With an estimated cost of $300-500 million, the hydro dam is on a permanent hold since 2015.

Geothermal – Geothermal energy is created from heat beneath the earth's surface. It can be used to directly heat buildings, or used to create electricity. Through a prefeasibility study in 2018, QEC identified potential geothermal resources in the territory. The report suggests options for future study areas which could have sufficient potential for geothermal activity.

Wind – In March 2016, QEC studied the viability of wind power generation in all 25 communities in Nunavut. The study concluded that Iqaluit has the appropriate traits for a larger wind project using Enercon turbines (for example the E70 2.3 MW). The study simulation for a 3 wind turbine and 6 turbine project, with a 1 MW/1 MWh battery energy storage system

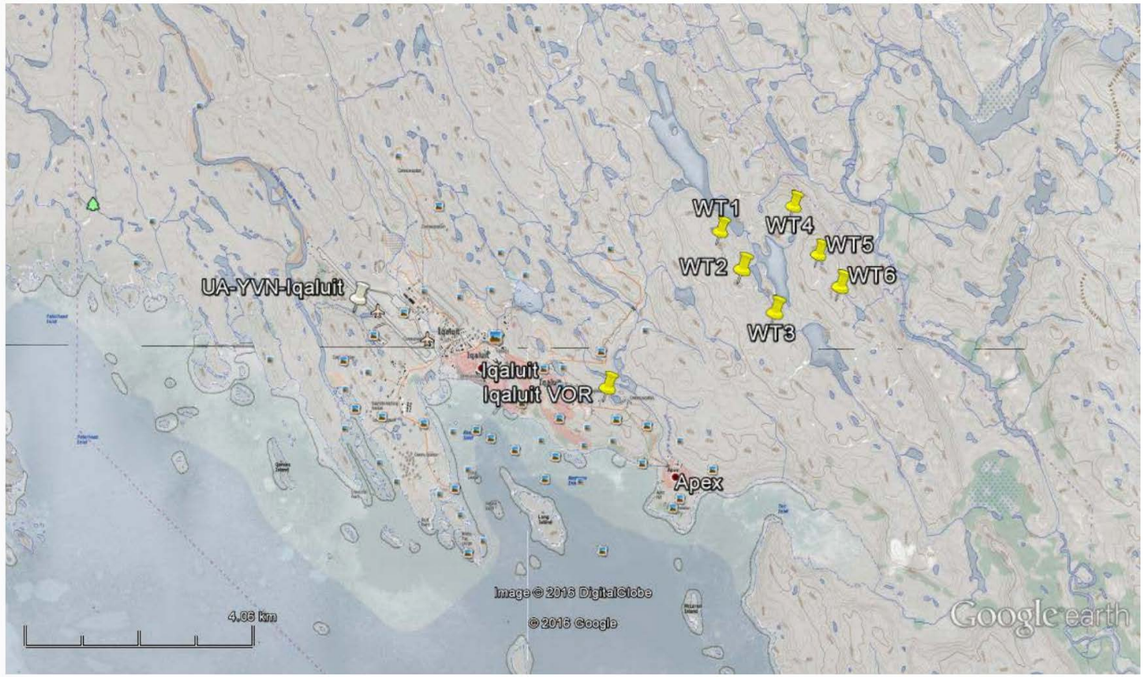


Figure 22 Potential Turbine Locations Iqaluit, QEC & J.P Pinard Consulting

for grid stability, indicates that 15.4 GWh of wind energy would be generated annually. This would displace 24.5% of the diesel generation. The study used the wind turbine locations as shown in the map above. The study revealed that wind generation is a viable option in Iqaluit in the future and located high potential areas for wind generation.

Solar - There are two types of solar panels which can provide energy. The first, is Solar Photo Voltaic (PV) where electricity is generated from solar energy. The other is solar thermal, where this energy is directly used for heating purposes. Of course, the difficulties lie in the winter months, where there is significantly less sun in the daytime. Nonetheless, there is still proven potential for solar energy projects in Iqaluit with a few solar projects located in the community. Solar is a viable method for residents and housing organizations to implement their own strategies for renewable energy in their homes.

District Heating –District heating, known as residual heat, is thermal energy provided from a central source. It can be used for building heating, water heating, and process heating. District heating can be maintained at relatively low costs once set in place and can drastically reduce carbon emissions. In 2020 The City of Iqaluit and QEC signed an agreement to connect the Aquatic Centre, Water Treatment Plant, Water Booster Station and Water Reheat Station through a district heating system. While the residual heat from the power plant has now been fully utilized, the project presents a successful implementation of district heating within the city and sets a precedent for future opportunities for this practice.

14.3 Best Practices & Trends

Rankin Inlet Wind Farm – The Rankin Inlet Wind Farm consists of a $12M investment in a 2MW project. This project can provide enough energy for 500 homes, providing 5,200 MWh of renewable energy. The project uses blade heating technology allowing for seasonal energy production. Norther Energy Capital and the Kivalliq Inuit Association have been using the project to strategically spread economic opportunities and outcomes throughout the community as well as build capacity for future projects.

Vuntut Gwitchin First Nation's Solar Farm – In Old Crow, Yukon, the Vuntut First Nation has developed a solar farm which is capable of meeting the community's needs, replacing 190,000 litres of diesel fuel a year (25% reduction). In the summer of 2020, the community was able to turn off their diesel generators for the first time in 50 years, reducing the impact of pollution and noise within the community.

14.4 Strategic Directions

- Approving new land for development must consider the connection of buildings to municipal power services – support planning and project processes that allow for renewable energy solutions at the site level, such as solar and district heating
- Ensure that the existing right of ways for utility connections for the transport of fuel to shipping facilities are protected and maintained.
- Ensure ideal locations for renewables such as wind turbines are preserved where possible.
- Ensure the future expansion of diesel storage is considered through future land use plans.
- Maintain and build upon building standards which incorporate wind-lock entries, heat recovery ventilators, and energy star windows
- Examine the appropriateness of energy efficient building standards such as the R-2000 standards and LEED Certification for new development.

15.0 TRANSPORTATION & GOODS

The City has a network of roads, walking trails, and snowmobile trails with access to the sea ice in the winter. In addition to this infrastructure, the City also has major transportation facilities that are designated and protected with special policies in the General Plan ("Transportation Facility"). These major facilities such as the airport lands, marine facilities, air and marine communication systems, occupy almost 450 hectares of land in the City and are important economic generators in addition to provide their basic transportation functions.

15.1 Current Context

The City of Iqaluit has a local road system that connects to the nearby community of Apex in the east to the Sylvia Grinnell Territorial Park in the west. The road system is local and is not connected to a highway system or any other nearby settlements in the Territory. Niaqunngusiariaq Road (also knows as the Road to Apex) forms a key east-west spine connecting the City with the nearby community of Apex. Other key roadways include Queen Elizabeth, Miwik Street, and Federal Road. All key intersections in the City of Iqaluit currently operate as stop-controlled intersections. There are currently no traffic control signals present in the City. Based on the findings of the 2022 Transportation Master Plan (TMP), some of the higher volume intersections (Four Corners intersection, Niaqunngusiariaq Road/Saputi Road intersection) in the City need improvements in order to accommodate future growth in the City. These are all generally located within the gateways to the Core Area

The City has seen high growth in automobile ownership rates and therefore is experiencing new strains in demand for parking. Free parking has further increased demand on the parking network, with deficiencies in parking availability noted especially west of Four Corners and at the Iqaluit Airport. As a unique city that sees a variety of transportation modes in use, other vehicle types such as snowmobiles, trailers, and trucks should be considered in determining future parking needs.

Iqaluit does not have a public transit network. There are several private services in operation (Caribou Cabs, hotel shuttles) that seek to fill this role; however, these solutions have been found to be insufficient in terms of meeting demand.

With regards to its active transportation network, Iqaluit currently has a limited, disconnected network of active transportation facilities, primarily comprised of informal trails and a small number of relatively new sidewalks. As new developments are constructed, such as at Astro Hill, active transportation infrastructure will assist in reducing traffic congestion and promoting healthier lifestyles for residents.

Snowmobiling is a popular mobility option for the local community. Not only are snowmobiles much more affordable relative to automobiles, but their size and versatility offer a good alternative. Iqaluit should seek to promote the use of snowmobiles as an efficient transportation solution which co-exists safely with other forms of transportation such as vehicles and active transportation. One of the primary concerns arising from the review of the road and mobility network was the lack of a cohesive infrastructure/ routes for snowmobiles or other 'off-road' vehicles.

The airport is an important mover of both people and goods into the City and territory and almost every flight is carrying cargo either to or from Iqaluit. This is important because the only other option for import/export from the region is by boat, which is limited to a small seasonal window due to sea ice. Iqaluit's Community Economic Development Plan notes that around fifty percent of people in Nunavut rely on the Iqaluit International Airport for perishable food, mail, cargo, medical travel, and economic activity.

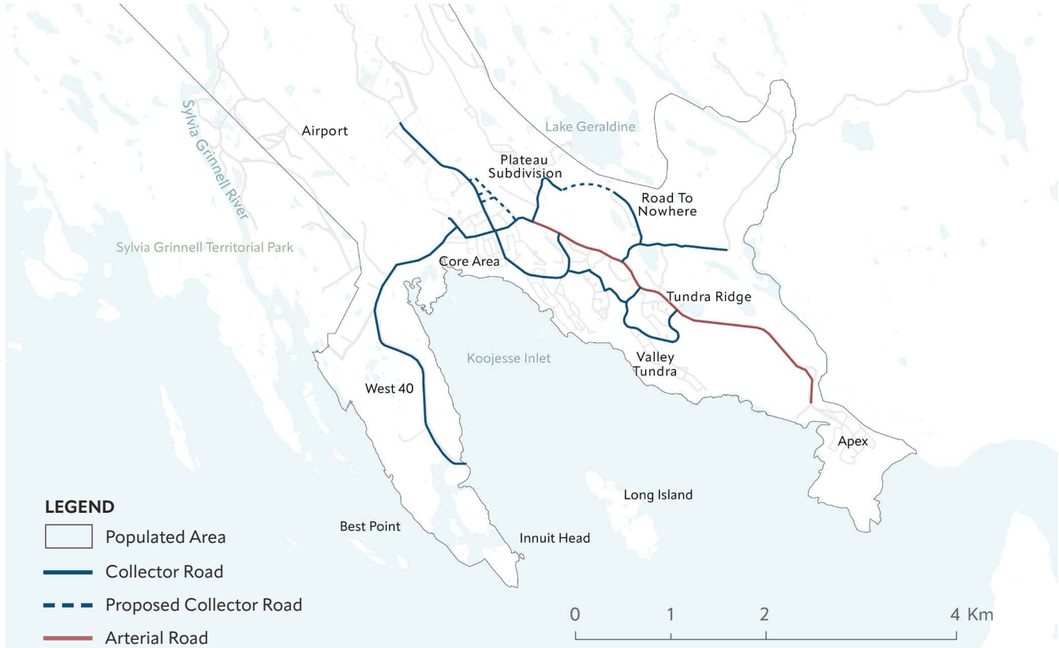


Figure 23 Primary Roads

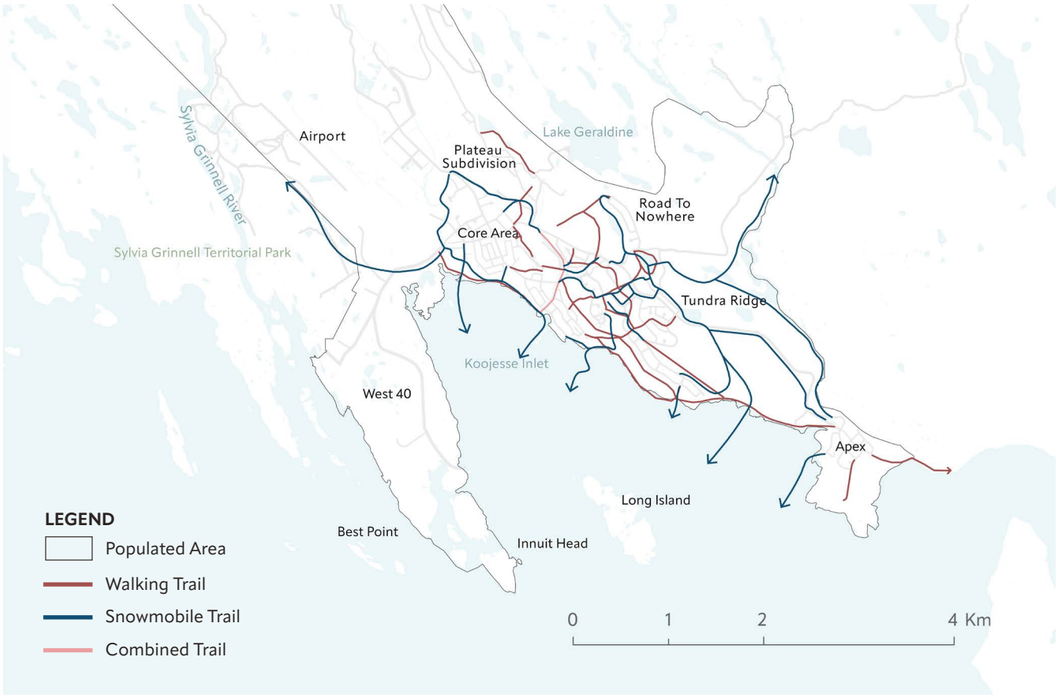


Figure 24 Trails

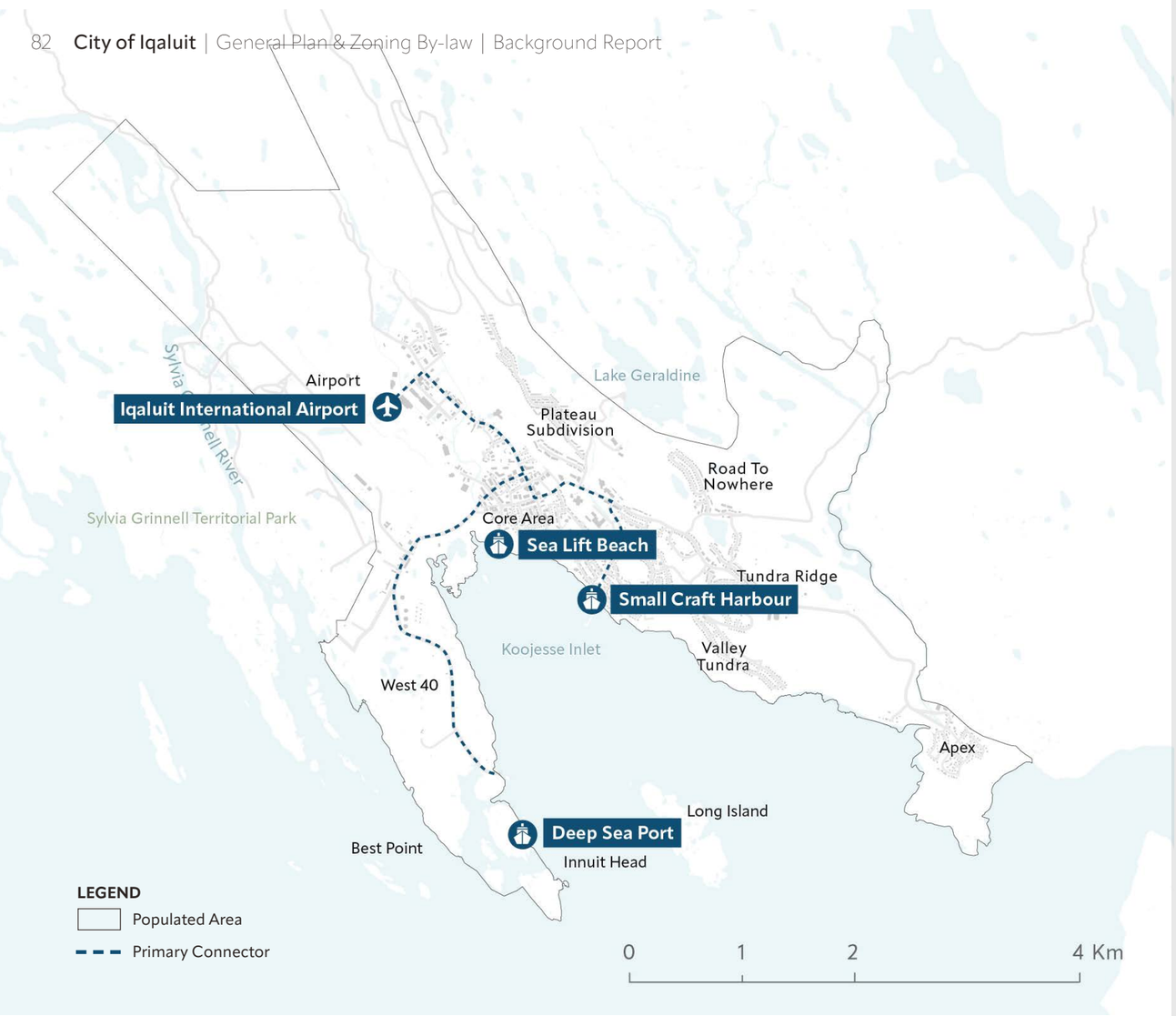


Figure 25 Transport Points

Transport Canada implemented Airport Zoning Regulations for Iqaluit in 2014, which are supported by the Airport Zoning Plan E3265. Unlike other Airport Zoning Regulations, Iqaluit's Outer Surface Area (4-km radius from airport reference point) has been modified to exclude most of the built-up area of the City which is within 4-km of the airstrip. This is because most the built-up area of town is either at the same elevation or higher than the airport, which would have severely restricted building heights. Further coordination with Transport Canada will need to be carried out in preparation of the new plans to ensure any concerns or potential impacts are mitigated.

The Airport is supported by air navigation systems – the NDB site in the West 40 and the VOR/DME site along Niaqungusiariaq Road just past the AWG Arena. These sites are currently protected in the General Plan. The VOR/DME Site presents a constraint to development given the proximity of Future Development Areas A & B. NavCanada is in the process of removing ground-based VOR technology in communities across Canada in favour of satellite-based systems. However, it is understood that NavCAN wishes to retain redundancy of systems in certain communities, including Iqaluit. As the VOR equipment will need to be upgraded over the next five years, there is a potential opportunity to relocate the VOR site to a location where the facility will not constrain future development. Additional sites should be explored that minimize conflicts.

The Canadian Department of National Defence has a Forward Operating Location (FOL) facility (i.e. hangar) on the south side of the airstrip that has associated safety setback distances (i.e. inhabited building distance and vulnerable building distance). These protective distances should also be noted in the General Plan.

The anticipated completion of the Deep Sea Port located at the causeway in Iqaluit will be significant for Iqaluit's economy. According to a study originally commissioned by the City of Iqaluit in 2005, it is possible that the Deep Sea Port could: reduce the number of cargo-ship days by 80 percent; reduce the number of petroleum ship days by 60 percent; create an estimated 14 to 25 fishing vessel landings (where none currently occur); and increase cruise ship landings by 4 or more per season. The port also creates opportunities for fisheries to offload their catch in Nunavut. Currently, Nunavut's fishing vessels sail to Greenland to do this. This could bring more business for airlines, hotels, and food services, as well as local warehouses and other industrial users or retailers.

The Government of Nunavut wishes to improve the small craft facilities at the current breakwater (boat launch) by providing protected all-tide boat moorage and protected all-tide boat launching. The improvements include renovating extending the existing breakwater, constructing a new breakwater to the northwest and in filling in a small section of the seashore lands along Sinaa Street to create a boat ramp and ramp staging area, and adding small craft floats and access ramps during boating season. The small craft harbour is intended to be used by small and offshore fishing boats, cruise ship tenders, and tour boats. The anticipated development presents significant economic opportunities for enhanced tourism services, and greater access to harvesting, hunting, and cultural activities. The small craft harbour will effectively be a new gateway to the City for cruise ship visitors. The development area is subject to a General Plan and Zoning By-law Amendment to change the land use designation to Transportation Facility and Transportation Zone.

15.2 Challenges, Issues, and Opportunities

- A current challenge that will continue to be faced by the City as it grows is the accommodation of mobility needs in an arctic climate. Careful consideration needs to be given to how mobility challenges can be addressed through development standards and public realm design.
- In the winter months the roads freeze and the thaw times are increased. Draining the water as quickly as possible should be the top priority. The roads in Iqaluit are generally not crowned enough and it prevents proper drainage because water may pond on the road surface before it runs off. Ponding of water on a frozen road section will cause thaw and deterioration.
- Drainage in the City is a major catalyst in most of the infrastructure-related challenges experienced, especially when it comes to road and ditch condition, construction, and maintenance.

- Iqaluit has employed several road surfacing strategies include: asphaltic concrete; cold mix concrete; and gravel. Asphaltic concrete remains and extraordinarily expensive road surfacing strategy and may not be the most strategic use of capital funds. Cold mix concrete is a strategic surfacing strategy for limited amounts of resurfacing such as remediation for small areas associated with infrastructure placement. Gravel roads remain the main surfacing strategy for Iqaluit.
- The location of adequate industrial land for warehousing and staging is a challenge for the new ports, particularly due to lack of road infrastructure, servicing, and potential contamination of lands due to past uses
- Delays with the Deep Sea Port and limitation on nature of uses permitted for activities at this time
- Once the deep-sea port is built, summer sealift vessels will be able to offload 24/7, instead of the current high-tide constraints. The port will provide greater efficiency in terms of offloading cargo, and has the possibility to increase competition in the shipping industry.
- The City is in the process of securing a land transfer in the West 40 area which will provide some available lands. A future land transfer of significant additional lands is also envisioned, however, the lands have contamination, and the transfer would be subject to environmental remediation of the lands.
- Future industrial lands are envisioned along Upper Base Road, as currently shown in the General Plan, however, the only road connection from West 40 to North 40 is currently through the Core Area.
- With the investment in the small craft harbour and the relocation of the current sea lift activities in the Core Area, there is an opportunity to initiate efforts for the redevelopment of the beachfront from the breakwater to the sea lift beach area and the surrounding establishments (museum, visitor centre, Iqaluit Square park, Elders Centre). This would be of significant benefit to the tourism sector and improve public access to and enjoyment of the waterfront
- The TMP identifies the need to improve a number of road intersections, including signalization and turning lanes. As there is currently no signalization and all intersections currently operate as single lanes, an Arctic-specific design approach is required. Lane delineation and signal visibility will be issues in the context of gravel roads, blowing snow and frequent high winds.
- Upgrades to Akilliq Drive linking the Core Area to the vacant West 40 lands and Deep Sea Port are planned. The upgrades will facilitate the development of this area and improve road safety.
- The Airport Master Plan dates to 2011 and is currently being updated. The Master Plan update will give consideration to improving parking at the Airport, expansion of airside commercial activity to support regional transportation, and creating a new road link from the new Airport Terminal Building to Mivvik Street.

15.3 Best Practices & Trends

- Co-locating logistics and warehousing adjacent to shipping facilities
- In many jurisdictions, different development standards are applied based on the class or type of road serving/flanking a site (I.e. greater setbacks, restrictions on egress/ingress, signage, site triangles, etc.). The current GP does class roadways on Schedule 'D'; however, policies are quite general in how they direct development along varied classes of roads (from a roadway protection and framing perspective).
- Seeking equitable design standards for roadways and transportation corridors - ensuring everyone can share the road
- 'Overbuilding' of roads is sometimes pursued by municipalities to account for settlement and ensure proper road drainage is maintained – while upfront costs and resources required can be higher for overbuilding, it often increases road longevity/time before maintenance is required
- Over the years, municipalities have moved away from thinking of roads as a sole means for transporting cars and other vehicles, and incorporating a multi-modal approach to road (re)design. Often, wider right of ways are taken to allow for incorporation of pedestrian, bike, and other non-vehicular travellers along established movement corridors.

15.4 Strategic Directions

- The City completed a Transportation Master Plan (TMP) in early 2022, which provides a number of comprehensive recommendations for improvements to the City's transportation network. These recommendations consider future growth, current/future population density, incline (slope), access to major destinations, and network connectivity. Key recommendations in the TMP that could have implications/be incorporated into the GP include:
    - Undertake a Transit Study to guide the launch of a transit pilot and then full rollout of a transit system;
    - Develop a Pedestrian Safety & Walkways Plan, in tandem with a Signage and Wayfinding Plan;
    - Assess proposed parking management measures and start implementation of select measures.
- Many of the recommendations focus on "formalising" existing informal trails throughout the community to improve safety and presence.
- The GP should contain supporting policy related to applicable recommendations in the TMP
- The opportunity for a Waterfront Study and/or Plan should be revisited in the General Plan, with policies to complement improvements to the Small Craft Harbour.
- The "noise cone", "outer surface area", and other constraint features associated with the airport should be appropriately mapped in the general plan
- Indicate the "Outer Surface Area" of the Iqaluit Airport Zoning Regulations on Figure A of the General Plan.
- Protect major transportation facilities and ensure compatibility of surrounding land uses – policies in the Transportation Facility designation should be expanded to include the pending completion of the Deep Sea Port and upgrades to the Small Craft Harbour, which are very limited at this time.
- Policies should also be added to identify the marine range facilities located in the Core Area and any associated protective policies.
- New policy needed to address DND's Forward Operating Location (FOL) facility (i.e. hangar) on the south side of the airstrip that has associated safety setback distances (i.e. inhabited building distance and vulnerable building distance).
- The implementation of an effective AMP will be vital to address the future road challenges.
- Review existing policies in Section 6.4.5 and ensure supportive policies in the General Plan for a future transit system.
- Protect major transportation facilities and ensure compatibility of surrounding land uses.
- Review road cross sections with consideration for road cross sections explored in the Future Development Area B Development Scheme.
- Considering the Airport Master Plan is in the process of being updated, GP policies and ZBL regulations should be reviewed to ensure consistency and reflection of strategic directions from Airport Master Plan.

ENVIRONMENT & RESOURCES

16.0 NATURAL ENVIRONMENT & CLIMATE CHANGE

The natural environment includes the land, water, air, vegetation, and wildlife and the systems that link these elements together, while climate change refers to the long-term changes to temperatures and weather patterns as a result of human activity and includes its impacts on the natural environment and its supporting systems. A healthy natural environment is critical to the viability of the City and the continuity Inuit traditions and culture. Additionally, so is managing and mitigating against the impacts of climate change.

16.1 Current Context

Iqaluit is currently facing climate change challenges and the community will experience increasing issues in the future. Climate change has the potential to impact Iqaluit in a number of areas including buildings, roads, and water and sanitation systems. Additional impacts on the community, including emergency response, economic development, access to the land and sea, and traditional hunting practices will all require adaptation to the impacts of climate change as well.

The forecast projection for temperature reported in the period between 2010 and 2039 is an increase of 1.8 Celsius, with a temperature range of 1.3 to 2.4 Celsius. The greatest seasonal increase in temperature is projected for winter. The forecast projection for temperature reported in the period between 2040 and 2069 period is an increase of 3.1 Celsius, with a temperature range of 2.5 to 4.3 Celsius. The greatest seasonal increase in temperature is also projected for winter. (Iqaluit Climate Change Adaptation Plan, 2010)

The wide range of estimates for sea-level change expected in the next 90 years, ranging from no change to 70 cm sea-level rise, will have a wide potential range of impacts on the shoreline of Iqaluit and the infrastructure adjacent to it including: docking facilities, waste discharge areas, and the community's ongoing access to the shorelines and beach activities. Each of these issues will have a variety of potential adaptation measures that could be implemented over time.

There are no explicit observations of climate change related impacts at this time, but there is speculation of impacts associated with failures in the water and sewer conveyance systems, and speculation on several abnormal and extreme weather events.

16.2 Challenges, Issues, & Opportunities

The infrastructure in Iqaluit was built using past data and standards, and these standards may no longer be valid for the forecasted changes. Climate change poses a significant risk to infrastructure and increases vulnerability and exposure to conditions the infrastructure was not designed to withstand. The changes in permafrost, the frequency and severity of extreme weather events, precipitation, the coastal environment, and ultraviolet radiation are all ways the infrastructure is being damaged.

Permafrost has been traditionally used as a foundation system for infrastructure systems. The warming temperatures will increase the seasonal active layer and change the base line temperature of the permafrost, for example permafrost with a baseline temperature of minus 5 C could warm by several degrees and fall into the category of warm permafrost, which is considerably more vulnerable to disturbance.

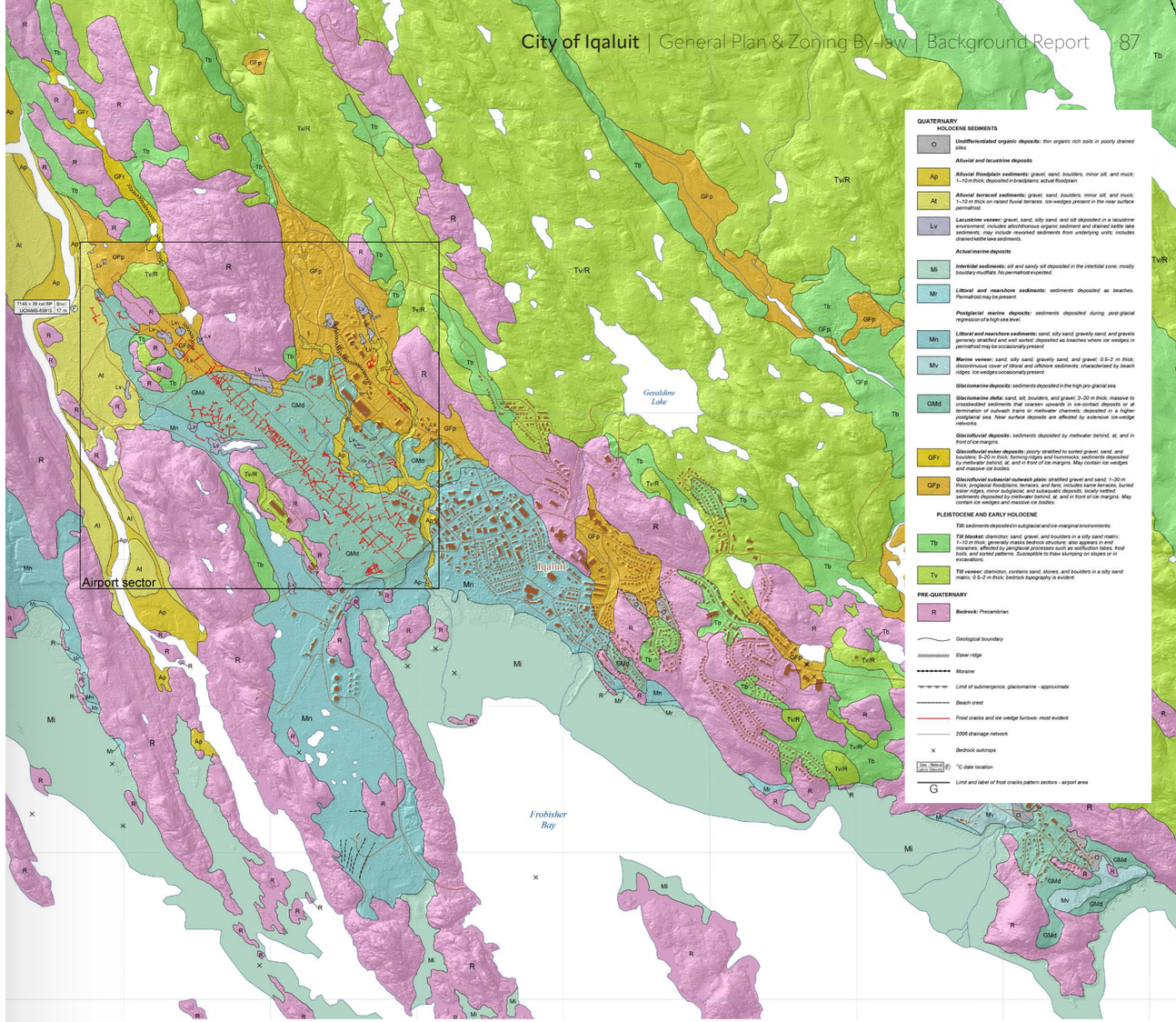


Figure 26 Surficial Geology (Stantec Drainage Plan, 2019)

Buildings, roads, buried pipes, drainage systems, landfill/waste disposal sites, and coastal infrastructure are all at risk.

As noted by Stantec in the Master Drainage Plan, 2019 the figure above shows the surficial geology of Iqaluit. The areas in pink are bedrock, greens are till (sand, stones, gravel), yellows are river sediments (mostly clays), greys are organic material, oranges are sandy and gravelly meltwater deposits, and blues and teals are marine deposited sediments such as silts and sands. Infiltration would be impossible at locations with bedrock at surface and would be impractical in soils with low infiltration rates (clayey or silty soils). Sandy soils are those most suited for infiltration.

The areas with marine deposited sediments are soils which are more likely to contain ice-rich permafrost. These soils would heave and sink more than other soil types if undergoing freeze-thaw cycles. Any infiltration of warm water into the soils could melt the permafrost and cause damage to nearby infrastructure.

The Government of Nunavut itself in its guide to homeowners recommends against allowing water to pool around foundations, for fear that it could melt permafrost and result in differential settlement of the piles

In addition to sea-level rise, coastal stability is influenced by the frequency and intensity of extreme events, such as major autumn storms. Indirectly, changes to the extent and duration of sea ice, such as the time of autumn freeze up, can also make the coastline more exposed if more storms occur over open water, allowing waves to form. There is little information on waves in Frobisher Bay, but the beaches along the waterfront and at the cemetery point to the effects of occasional wave action. Generally, the bedrock shoreline in and around Iqaluit is not influenced by erosion; however, the stability of the tidal flats of Koojesse Inlet under warming conditions is unknown and could be impacted by changing wave conditions. If a storm were to occur on an extreme high tide, there is a potential for flooding and wave damage to low-lying shorefront properties.

Increased precipitation and variability in temperature will affect storm water generation and infiltration throughout the community, affecting infrastructure and community access to the land, and increasing hazards.

A particular issue in lower Iqaluit is the legacy hydrocarbon contamination associated with the fuel management of the Lower Base area of the original military base in Iqaluit. The extent of the contamination is extensive and the potential change in permafrost will influence how this contamination may be managed.

16.3 Best Practices & Trends

Any new infrastructure in Iqaluit will need to be designed with climate change design criteria and constructed with climate technical specifications. These specifications need to be able to withstand projected changes in climate, resulting in permafrost melt, rising sea levels, relative land level rise, increased temperatures, precipitation, and extreme weather events.

To address the unique challenges and climatic conditions found in the North, the Standards Council of Canada (SCC), Government of Canada (GC), and a range of Northern stakeholders with representatives from Yukon, Northwest Territories, Nunavut, and Nunavik developed a series of infrastructure standards designed to help building owners and operators, as well as those responsible for public and community infrastructure in the North, build and maintain infrastructure in a changing climate. As part of this initiative, a number of specific standards and guides have been prepared to address:

- Building in Permafrost;
- Dealing with Extreme Weather;
- Designing with Climate Change and Risk in Mind; and,
- Community Systems from Start to Finish

These materials are a great resource that should be specifically referenced within planning and regulatory documents like the General Plan and Zoning By-law to ensure more resilient projects

Climate change is a recognized phenomenon issue in the Arctic north, with expectations for serious issues for all community infrastructure. There is speculation that climate change will influence water and sanitation, but the specific implications in Iqaluit have not been thoroughly examined. Several instances related to water quality and water quantity have been reported, with speculation that climate change may have had an influencing factor. For example, a water quality issue with the water supply for the City of Yellowknife was reported and it was suggested that the degradation of a river embankment may have caused high turbidity levels in the Yellowknife River water supply. This same phenomenon could occur in Iqaluit.

16.4 Strategic Directions

- The GP should include policies encouraging data collection and sharing as part of the development process to help track climate-related environmental changes (ex. Geotechnical data related to the depth of the active layer).
- The GP should contain policy or direct reference to the design guides prepared as part of the Northern Infrastructure Standardization Initiative, and any design standards incorporated into the GP should take these guides into consideration to ensure consistency.
- The GP should contain policy enabling or encouraging the City to undertake or lead Climate-related analyses in conjunction with partners such as GN, QIA, Government of Canada, and public stakeholders to investigate, for example:
    - Precipitation changes over time and relation to runoff management;
    - Permafrost changes and impacts on buildings/infrastructure;
    - Migratory patterns and other natural wildlife indicators; and/or
    - Weather patterns and impacts on the urban area, surrounding lands, and water.

17.0 AGGREGATE RESOURCES EXTRACTION

Natural resources is a broad term that refers to any resource that exists naturally (i.e. without human action) and includes both non-renewable (such as fossil fuels) and renewable resources (such as wind). However, in relation to the City's General Plan and Zoning By-law, natural resources more specifically refers to aggregate and granular extraction (rock, sand, and gravel) that is used for the development of roads, sidewalks, parking lots, and building foundations. Planning for, and managing, aggregate resource extraction is critical for the development and maintenance of the City.

17.1 Current Context

The City of Iqaluit has historically made use of a variety of gravel sources in and around the community. The quality of the granular materials has varied and the legacy activities of the sites, particularly the "North 40", created challenges for site development and management. The main issue for the North 40 area was the historical use of the site as a landfill and repository for old barrels, resulting in contamination issues. Today, all material is currently sourced via blasting in the North 40 quarry sites, followed by processing of material to the desired size and grade.

The current quarry site in the "Trail Deposit" has been in operation for approximately 14 years. At the time of construction, it was anticipated that the deposit would supply gravel for 15 to 20 years (between 2022 and 2027) of construction activity in Iqaluit.

A geotechnical assessment of an area referred to as the Northwest Granular Deposit (Northwest Deposit), was completed in 2005. This site is located approximately 6 km northwest from the nearest existing road within the City of Iqaluit, NU. The purpose of the geotechnical assessment was to quantify and classify the quality of granular material present in support of general decisions on the viability of the deposit for development. The total estimated volume of usable borrow material within the area investigated by boreholes is between 800,000 m^3 to 1,000,000 m^3 of granular material, and a 35-year operating horizon.

The Northwest Deposit was recommended for development as a borrow source capable of meeting the City of Iqaluit requirements for 10 years and beyond for an initial phase. Class 1 and/or Class 2 material was encountered, and similar material is visible throughout most of the remaining deposit.

The boreholes have verified the thickness of these surficial deposits, which are significant with an average thickness of 3.8 m throughout the area explored. Furthermore, additional material usable as general subgrade fill (Class 3 material) and/or blending with Class 1 and Class 2 to create desired gradations is present in mass quantities directly beneath the Class 1 and Class 2 layers.

17.2 Challenges, Issues, & Opportunities

- The development of the Northwest granular deposit will require completion of the access road
- Material from northern granular deposits (i.e. those found around Iqaluit) often is of lower quality
- The management of quarry sites in Iqaluit has been left to the contracting community, and therefore may not be considered adequate quarry management that reflects the interests of the City of Iqaluit and all of the contracting community

17.3 Best Practices & Trends

Aggregate extraction is an invasive process by nature. Without a defined approach to how potential sites are evaluated, identified, extracted from, or reclaimed following extraction, there can be considerable negative impacts to the environment and surrounding lands. To address these concerns up front, many jurisdictions implement policies or plans to directly address and guide all aspects of aggregate activity management – from investigating potential impacts before site establishment to reclamation at end of site life. The City of Iqaluit has recently engaged a consultant to prepare a Quarry Management and Restoration Plan (QMRP).

Further to the above, aggregate activities are often a cross-jurisdictional process involving different levels of government and approval bodies. As such, many local municipalities in Canada will often rely on existing guidelines or policies developed by upper levels of government (ex. "Mine Site Reclamation Policy for Nunavut") to help regulate these uses through reference in a General Plan or Zoning By-law. This allows for consistency in application of requirements and can help to guide processes without having to draft all-new policy, but also does not limit the municipality from adopting or creating their own requirements for these uses which may go above and beyond what may be considered a minimum standard.

17.4 Strategic Direction

- The Northwest Deposit is planned to be the aggregate source of the City for the next 35 years.
- Policies in the GP should be developed to directly reference the future QMRP in order to provide stronger guidance and regulation of site operation and restoration.
- In addition to referencing the QMRP, GP should also directly reference existing policy such as the "Mine Site Reclamation Policy for Nunavut" prepared by the Government of Canada to help provide further guidance in the regulation of aggregate activities. This should be complementary and secondary to the QMRP, once adopted.
- Land use mapping in the GP identifying aggregate resource deposits/reserves should incorporate influence areas around these sites.

COMMUNITY & CULTURE

18.0 RECREATION & LEISURE

This section provides an overview of recreation and leisure in the City of Iqaluit, relying heavily on the groundwork carried out in the development of the Iqaluit Recreation Master Plan 2020-2030. The Recreation Master Plan is intended to guide the scope and priorities of the Recreation Department in Iqaluit for the next ten years from 2020-2030. The Plan reflects the unique challenges and opportunities found in Iqaluit, such as its location, geology and terrain, climate, population and demographics, and the land ownership system among other things.

18.1 Current Context

The City has a strong and well-established culture of recreation, and a variety of different offerings to the community based on the season. The map below provides a high-level overview of the spatial distribution of the recreation and open space network in the community, highlighting lands designation "Open Space" as well as the location of indoor facilities.

To help provide a closer look at the current recreational opportunities in Iqaluit, two seasonal amenity maps are provided below, taken from the Iqaluit Recreation Master Plan 2020-2030.

The table below displays the "formal" recreational facilities were inventoried during the Master Plan process:

It comes as no surprise that Iqaluits indoor facilities see the heaviest use during the winter months, while in the warmer weather, Iqalummiut prefer to use the land, water, and other outdoor facilities for recreation. Particularly now with COVID-19, the importance of a variety and mix of indoor and outdoor facilities/opportunities for recreation is paramount to a healthy and vibrant community

Within the populated area, many of the indoor and outdoor recreational facilities are situated in a variety of designations, with the primary being Open Space. Some of the more integrated facilities are in the Core Area or Institutional designation, and many of the smaller parks and trails are located in the Residential Community designations.

Indoor Facilities	Outdoor Facilities
• Abe Opik Hall • Aquatic Centre • Arnaitok Arena • Curling Rink • Arctic Winter Games Arena • Youth Centre (part of AWG) • Elders' Qammaq	• 9 playgrounds • 2 maintained basketball courts • 4 parks and plazas • 4 trails • 2 outdoor ice rinks • 1 baseball diamond • 1 breakwater

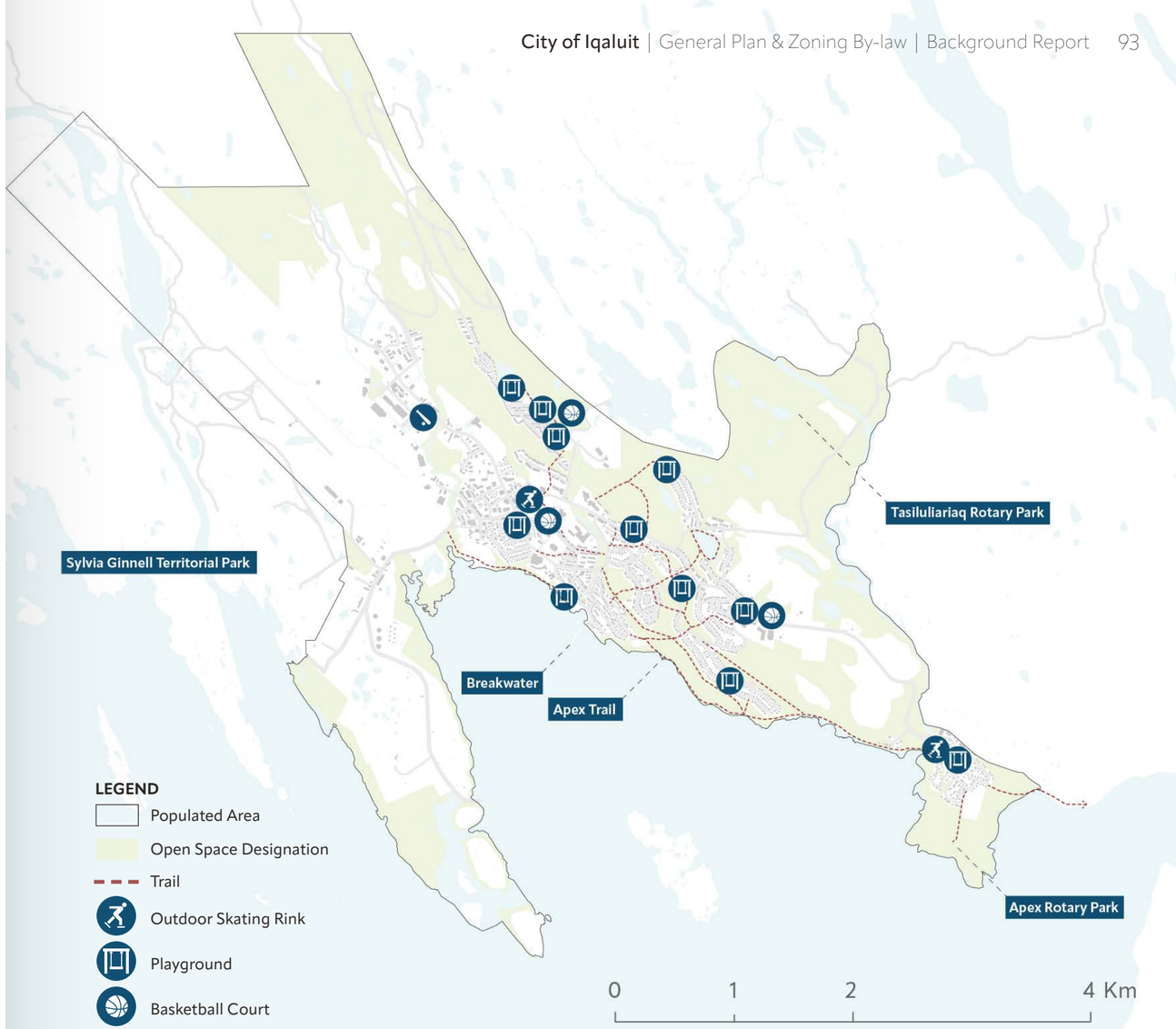


Figure 27 Outdoor Facilities

In addition to the more formalized recreational opportunities in the City, a vast majority of more traditional activities take plan on Nuna (Inuktitut word referring to the land), which is located outside of the populated area. Access to Nuna for fishing, hunting, snowmobiling, berry picking, and camping is very important to both residents and visitors alike. There are also cultural heritage resources in Nuna that need to be protected.

18.2 Challenges, Issues, & Opportunities

The 2020 Recreation Master Plan conducted a comprehensive Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis related to parks and recreation that can be used to assist with strategic directions in the general plan and zoning by-law. This SWOT analysis was reviewed and applicable excerpts are provided below.

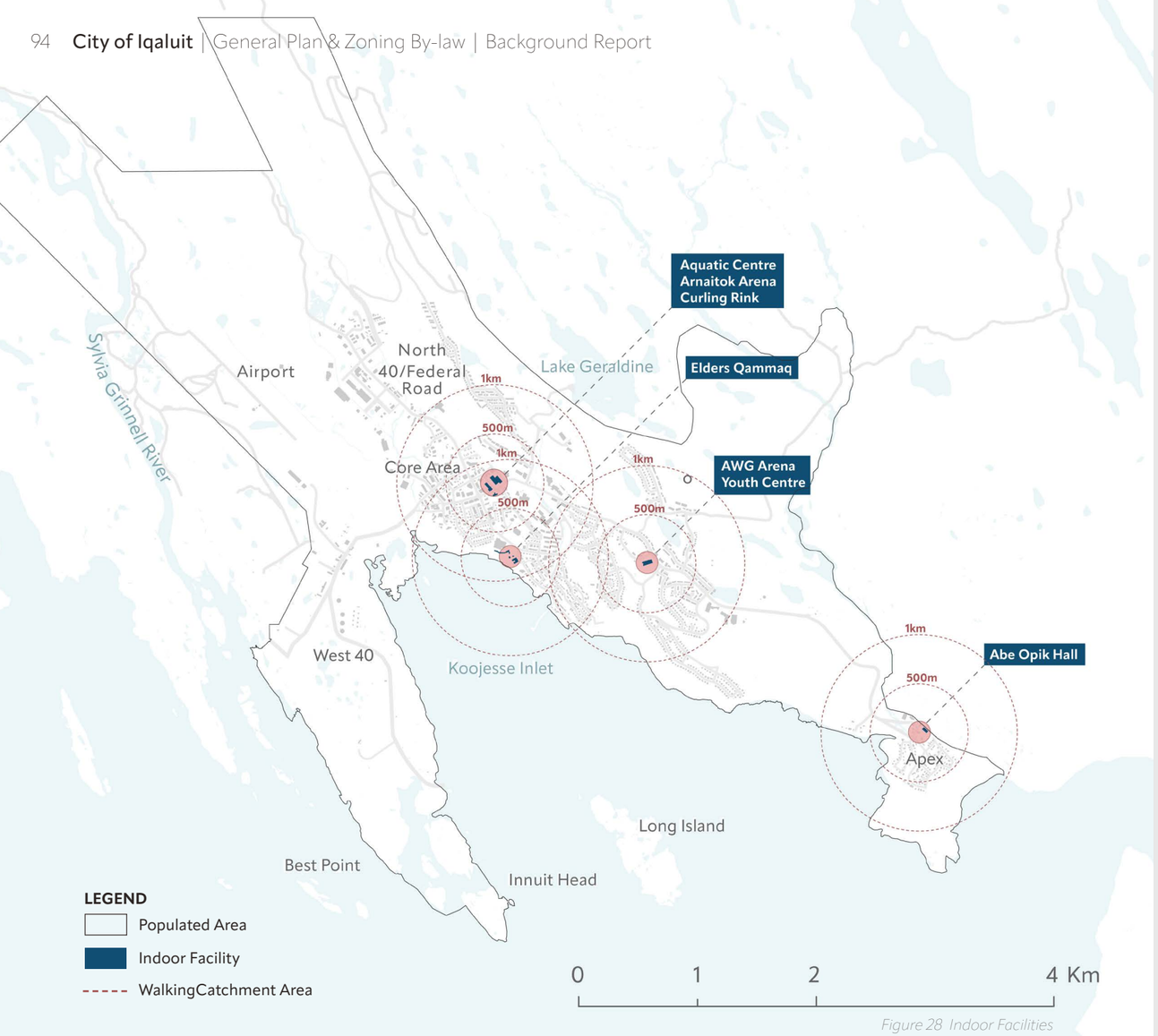


Figure 28 Indoor Facilities

Strengths

- The Aquatic Centre is a very successful facility, well used and provides both programmed and non-programmed activities
- Iqaluit has easy access to outdoor natural amenities
- Access to provincial and federal funding around recreation and culture
- Apex trail is a very well-used facility
- Qammaq is a well-respected facility in the community
- Very strong spontaneous cycling culture in Iqaluit's young population
- Youth centre is well-used
- Strong culture of third party recreational providers

Weaknesses

- Limited outdoor facilities in the City
- Limited cultural programs and facilities
- Lack of indoor multi-use facility for winter use
- Lack of connectivity/integration of formal/informal trail network throughout the City

Opportunities

- Potential to evaluate the feasibility of a new indoor multi-use facility for winter use
- Curling rink could be potential retrofitted to fulfill greater multi-use function
- Colocation and fostering of "recreation hub" based on connections between the aquatic centre, Arnaitok arena, curling rink and parking lot (entire block)
- Utilize policy tools to support outdoor activities such as hunting and fishing
- Utilize policy tools to develop and support tourism capacity in the City
- Prioritize the development of a new youth Qammaq / explore potential sites that are centrally located
- Utilize policy tools to supporting funding and partnership opportunities to formalize and integrate community trail / pedestrian system

Threats

- Ignoring the strong environmental, social, and economic context of the City
- Human resources/continuity
- Limited internet access/communication infrastructure
- Financing for implementable goals
- Limited transit/transportation options access
- Lack of reserve fund for recreation and parks
- Diversity in recreational opportunities during certain times of the year

Sylvia Grinnell Territorial Park – Located approximately 1 kilometre west of the populated area, this park is a significant territorial and municipal asset in terms of recreation. It offers a range of opportunities for hiking and is a well-known fishing spot popular among locals. Camping within the park is also a common attraction for many residents and visitors alike, given excellent access to trails and the Sylvia Grinnell River.

Small Craft Harbour Improvements (pending) – The completion of the improvements at the small craft harbour in Koojesse Inlet will inlclude a new high-tide ramp, new vehicle turning circle on the causeway, and improvements to the existing low-tide ramp and parking area. One of the ultimate goals of these improvements is to create greater access for small boat/shoreline users at both the recreational and commercial level – hunters, fishers, subsistence harvesters, outfitters, and recreational users of all sorts will benefit from the improvements. This access will be facilitated by allowing for safe, all-tide access. The improvements also present significant economic opportunities as a new gateway to the City for cruise ship visitors.

18.3 Best Practices & Trends

The City's recently completed Recreation Master Plan. The plan outlined a number of best practices related to recreation and leisure. The following have a spatial component and are relevant to the development of the new General Plan and Zoning By-law:

Recreational Activities – 'Life sports' (or sports that can be done throughout one's entire life) have become more popular. They include passive, spontaneous, non-competitive recreation such as biking, kayaking, tennis and swimming, jogging/walking and, across all age groups, video games. According to a 2008 US study referenced in the Recreation Master Plan (2020), the following outdoor activities are

projected to have the highest rates of growth in terms of participation to 2030:

- Developed skiing;
- Visiting interpretive sites such as nature centres, zoos, as well as historic and prehistoric sites;
- Day hiking;
- Viewing/photographing birds; and
- Activities oriented toward viewing and photographing nature have been among the fastest growing activities, both in terms of number of participants and activity days of participation.
- Equestrian activities.

Despite the projected growth of the above activities in the noted study, the northern context of Iqaluit needs to be taken into consideration and some may not be appropriate for a local setting (i.e. equestrian activities). In an Iqaluit context, activities oriented toward viewing and photographing nature, as well as hiking are likely to remain the preferred fast-growing activities, both in terms of number of participants and activity days of participation.

Facilities Provision – Providing close-to-home access to recreation hubs, social services, health and services is important. Flexibility is also key to the planning, site, and design of recreational and leisure facilities allowing opportunities for small private leisure and recreational businesses to establish themselves in communities as public facilities downsize. Further there is a preference for multi-functional buildings and re-purposing of existing buildings. There is a general trend away from new physical infrastructure, and instead cities are moving towards events spaces and uses and an emphasis on integrating the outdoor recreation environment with indoor facilities. Strategies include:

- Indoor/outdoor walking trails, indoor/outdoor child play areas, and indoor/outdoor aquatic facilities.
- Views from inside facilities to the outdoors
- Creating seasonal playgrounds outside recreational buildings using snow by building tunnels lined with tubes, snow slides, structures, etc.

18.4 Strategic Directions

- The GP policies should seek to complement and support the recommendations and implementation plan contained in the 2020 Recreation Master Plan.
- The GP should include wayfinding policies and design guidelines to improve legibility and formalization of skidoo, walking, and other recreational trails.
- The GP should include multi-use trail design standards or encourage the development of design guidelines for them.
- Existing City-owned/managed recreation sites and facilities should be identified on General Plan schedules
- The GP references Crime Prevention Through Environmental Design (CPTED) in some policy; however, it is outlined in very general terms and does not provide clear direction as to what standards are applicable. The GP should consider more specific references to CPTED design principles in relation to the design and improvement of recreational facilities, as well as development in general.

- The GP should outline conceptual trail extensions and connections (similar to how the future collector roads are handled on Figure D) and outline associated policy in support

19.0 CULTURE & HERITAGE

A community's culture and heritage is composed of both tangible and intangible elements. Tangible elements include buildings, structures, art, artefacts, or physical locations that help tell the story of a community, a place, or a people. Intangible elements include stories, histories, that give meaning to a place, as well as people and events who have made a mark on a community or a place. In the context of a general plan and zoning by-law, culture and heritage are tools and resources that are used to help create authentic and responsive environments for a community that build civic pride and remind a community of their past and are often related to either heritage conservation (the protection of places of historical importance) or cultural promotion (the incorporation of cultural elements into the public realm through art, design, and landscape).

19.1 Current Context

As the largest city in Nunavut, the Territorial capital, and an important regional transportation hub, Iqaluit has a significant number of cultural institutions for a City of its size. Many are located in the Core Area of the City, but others are located outside the Core Area on lands designated Institutional. These institutions provide the platform for delivering important services to residents, visitors, and the transient population. Some of the primary culture and heritage institutions and uses include:

Nunavut Arctic College and University – In late 2018, the NAC completed an expansion to its main campus facility to bolster its technical and vocational training programs, as well as increase future university degree programs. The expansion was anticipated to induce a greater number of students (originally anticipated to be 300), which would have direct impacts on student housing that is provided by the College (it already does not meet demand). It is unknown at this time as to whether the expansion resulted in increased enrollment and staffing, and COVID-19 presumably affected level of operations significantly throughout 2020 and 2021.

Nunavut Heritage Centre – The creation of a Nunavut Heritage Centre is written into the Nunavut Agreement (the founding legislation for the creation of Nunavut) but has not been fulfilled to date. There has been steady interest for the Nunavut Heritage Centre to be built in the capital city of Iqaluit. There are some recent plans to include this Heritage Centre within the Inuit Owned Land development off Federal Road. The GN has for some time had a reserve on land east of the AWG Arena (south of Niaqunngusiariaq Road) for a future new Legislative Assembly and Heritage Centre. The intention is that the Nunavut Heritage Centre will allow for the repatriation of Nunavut's artifacts and art, to be displayed as permanent or temporary exhibits for residents of Nunavut and visitors. This significant new piece of cultural infrastructure will generate and strengthen the cultural and tourism sectors, as well as the academic sector (with the anticipation of hosting international researchers).

Nunavut Performing Arts Centre – For the past eight years, Qaggiavuut Perfoming Arts Society has been building momentum towards the establishment of a Nunavut Performing Arts Centre to be located in Iqaluit. In 2017, they launched a $50 million fundraising campaign to build this new cultural facility. Potential sites for this large centre have not yet been identified, but the facility is expected to house a professional stage, raked seating, rehearsal rooms, and state-of-the-art theatre technology.

Iqaluit Community Tukisigiarvik Society – Tukisiarvik Society is a community wellness centre that supports all residents of Iqaluit to learn more about Inuit culture and society. The centre offers many programs, including daily food and nutrition, hygiene and showering, sewing and hunting programs, tool making, Inuit counselling (couples, family, addictions, mental health), and land camps.

Social enterprise, co-working spaces and studios – There has been a growing interest from local artists who want a professional studio for a safe site to create and for retail sale opportunities. The Nunavut Arts and Craft Association has been a strong advocate for the development artist studios for over a decade. Too, there is an increasing interest in the social enterprise movement, including developments like the Inclusion Café and the IqaluitHUB, as well as non-profit organizations seeking co-working spaces for collaboration and growth. Appropriate venues are a challenge for these projects to develop.

Schools – While the Department of Education in the recent past anticipates that no new schools are planned for Iqaluit in the next decade, land for a new school will be needed within the next 20 years. The Ecole des Trois Soleils is currently constructing an addition to the school to offer a French language high school program. Too, recently the Iqaluit District Education Authority publicly raised the issue of school capacity with overcrowding in elementary school classrooms and talk of needing portables in future years, as reported by CBC and Nunatsiaq News in 2017. A school site of approximately 1 hectare in size is identified in the Development Scheme for Future Development Area "B" along the Road to Nowhere.

Sled Dog Teams – The number of traditional sled dog teams appears to be stable or growing. The majority of dog teams are located along Hubbard Lane in the West 40 area. However, their occupancy is not formalized and the City wishes to develop these lands for new industrial lots. This has led to tension between dog team owners, City officials and other users as the demand for land increases. The City has a Dog Team By-law; however, a schedule containing designated locations has never been adopted. The specific identification of dog team areas may be beyond the scope of the GP, though specific mention of the Dog Team By-law in the GP may provide clarity on the administration of the matter.

Cultural Heritage Sites - Further to these cultural institutions and uses, there six 'cultural heritage' sites designated in the existing General Plan as follows:

- West 40 Archaeological Site I
- West 40 Archaeological Site II
- Hudson's Bay Company Trading Post
- Iqaluit Square
- Nunatta Sunakkutaangit Museum
- "Four Corners" in Downtown Iqaluit

Under the General Plan, these sites are afforded some protection from development, as well as unsympathetic / inappropriate development adjacent to these areas.

19.2 Challenges, Issues, & Opportunities

Limited Cultural Heritage Protection – The existing General Plan contains many policies that speak to cultural heritage and cultural heritage resources, however in the absence of passing a designating by-law under Section 105 of the Cities, Towns, and Villages Act, cultural heritage resources significantly lack protected status and can be subject to inappropriate alternation, redevelopment, and inappropriate adjacent development. The value in proceeding through a formal designation process, is found in the analysis and identification of the 'cultural heritage attributes' of each resource (i.e. the reasons that each resource is special or worthy of protection).

Unique Sense of Place – While every community is different in their own way, Iqaluit can truly claim to have a unique sense of place not found anywhere else in Canada. It's location, geography, history, and diversity all play a role in helping to define its uniqueness. General plans in particular have a significant role in shaping development to ensure it reflects the values of a community and its uniqueness.

Role of Institutions & Institutional Buildings – Public institutions including the City, Territorial, and Federal Governments, educational and medical institutions, and cultural and religious facilities play an important role in the community both functionally but also symbolically. Public and institutional bodies in particular have a leadership role to play in ensuring high quality architectural and urban design that reflects both the community and the institution itself. Iqaluit has a number of architecturally important buildings including: Nunavut Arctic College & University, the Legislative Assembly Building, and St. Jude's Anglican Church, for example. These striking and unique buildings are defining elements of Iqaluit and help to 'set the tone' for the quality of architecture that should be expected in the City.

19.3 Best Practices & Trends

Participatory / Co-Design – Participatory design or co-design is an approach to design of buildings and public spaces that attempts to actively involve all stakeholders the design process to help ensure the result meets their needs and is usable. Participatory design is an approach which is focused on processes and procedures of design and is not a design style. The term is used in a variety of fields including urban design, architecture, landscape architecture, and urban planning, as a way of creating environments that are more responsive and appropriate to their inhabitants' and users' cultural, emotional, spiritual, and practical needs and often results in the development of more innovative concepts and ideas. Participatory design has been used in many settings and at various scales from a room to a street, to a neighbourhood to a city. The creation of culturally responsive architecture and urban environments in the North has long been a topic of discussion and debate in the academic world. Building upon Iqaluit's past practice of consultative design in the Plateau Development Scheme and the Core Area Redevelopment Plan, the introduction of participatory design principles and practices into neighbourhood design in the City has the potential to have a positive impact on the creation of urban development that reflects its residents' unique needs.

Standards for Heritage Conservation – The Standards and Guidelines for the Conservation of Historic Places in Canada is a pan-Canadian guide to heritage conservation and preservation jointly prepared by all federal, provincial, and territorial governments (including the Government of Nunavut) and provides guidance to achieve good conservation practice based on a consistent, pan-Canadian set of conservation principles and guidelines. The intent of the document is to offer results-oriented guidance for sound decision-making when planning for, intervening on, and using an historic place. With regards to the development of cultural heritage policies in the General Plan, the Standards and Guidelines for the Conservation of Historic Places should be consulted.

Placemaking – is a conceptual approach to the planning, design and management of the public realm that seeks to capitalize on a community's tangible and non-tangible assets, with the intention of creating public spaces that promote people's health, happiness, and well-being. It is both a process and a philosophy that makes use of urban design principles. The concept originated in the 1960s, when urban theorists developed ground-breaking ideas about designing cities that catered to people by focusing on the importance of lively neighbourhoods and inviting public spaces. The term came into use in the 1970s by landscape architects, architects, and urban planners to describe the process of creating squares, plazas, parks, streets and waterfronts that will attract people because they are pleasurable or interesting. The Iqaluit context provides an interesting case study in which to create a city that both reflects and supports Inuit culture and traditional cultural practices.

19.4 Strategic Directions

- As noted in the City's Strategic Plan, the City should develop a by-law to require businesses to have Inuktitut signage. The requirement for Inuktitut signage could be integrated into the Zoning By-law.
- Also noted in the Strategic Plan, is direction that the City will create an overlay map of traditional land use, historical and current which could eventually be accomplished through the General Plan.
- The General Plan should include the development of an urban design framework and a framework for the implementation of participatory / co-design principles for the development of future neighbourhoods and perhaps certain large-scale developments.
- The Standards and Guidelines for the Conservation of Historic Places in Canada should be consulted to ensure that heritage conservation policies, particularly archaeological processes, reflect the most current best practice in Canada.
- The General Plan should build upon the existing culture and heritage policies of the existing plan to provide additional policy direction on how to preserve both cultural heritage sites in the City as well as the City's unique sense of place.
- The General Plan should explore ways to advance the formal designation of sites in Iqaluit under Section 105 of the Cities, Towns, and Villages Act.
- Policies should be explored in the General Plan to encourage the use of design competitions, and co-design of important buildings and spaces in the City.
- The GP should include more policy direction on the identification and preservation of culturally important or significant sites in the land development process, so as to protect them or dedicate them to specific uses.

20.0 CABINS

20.1 Current Context

Many residents of Iqaluit own cabins on the land outside the built-up are of the community. The cabins are used seasonally, or year-round, and are generally set up and used for overnight or extended stays. Many cabins are located outside the municipal boundary (Federal and IOL lands), but a significant number are located within the municipal boundary. Cabin owners do have leases or land use permits that grant them occupancy rights.

Cabins are not defined in the current Zoning By-law and are not a permitted use in any Zone. ***Beach Shacks*** are permitted in the ***Open Space (OR)*** and ***Municipal Reserve (MR) Zones***, but to be considered a ***Beach Shack*** the structure must be located close to a beach and be used as part of the land-based economy. The majority of beach shacks in Iqaluit are located on the Beach IOL lands managed by QIA. ***Camping Structures*** are also permitted in the ***OR*** and ***MR Zones*** but must be temporary or seasonal in nature. There is no current regulation for buildings used for recreational purposes or other land-based activities that are permanent or semi-permanent.

Since 2011, the City has noted an increase in the construction of cabins within the Municipal Boundary, particularly in the West 40 and along the Sylvia Grinnell River. There has been an associated increase in complaints and issues related to cabins. Satellite imagery and site visits have confirmed that there are approximately 100 cabins located within the Municipal Boundary. Despite a City Council moratorium on cabin construction in July 2020, cabins continue to be constructed within the municipal boundary.

The City is facing several issues related to unregulated cabin construction:

- **Cabins can pose a safety risk to owners and the community.** Cabins are being constructed without Development or Building Permits. There are no building or fire safety standards being enforced. There are also reports of cabins being occupied by underhoused community members, which increases the safety concerns.
- **Cabins are being constructed in undesirable areas, including within environmentally and culturally sensitive areas.** Cabins and access trails are being constructed too close to Sylvia Grinnell River, and within wildlife habitats, migration routes, traditional hunting, fishing, and harvesting areas, and the Apex River watershed. Cabins have also been constructed in the area reserved for the future gravel pit and new landfill.
- **Cabin activities are creating nuisances and conflicts.** There is no system of garbage and waste disposal for cabins. Construction activity results in noise and debris, without regulations to ensure safety, mitigate impacts and control material disposal. There have also been complaints about disorderly conduct in cabin areas. Cabins are also creating essentially private spaces on land intended for public enjoyment.
- **There are no municipal services to cabin areas.** The location of cabins makes it prohibitively expensive for the City to provide water, wastewater, garbage, road maintenance and emergency services. Given the access issue, there is no enforcement to ensure that cabin owners are properly managing their own activities.
- **There is no method to identify cabin ownership**. The City has no records of cabin ownership. Consequently, owners cannot be contacted to address issues or complaints, including derelict or abandoned cabins.
- **Cabins are a potential impediment to future development and expansion**. The City intends to develop the West 40, where many cabins are located. The removal or relocation of cabins may impose a barrier to the timely advancement of development. There is also a risk of cabin owners attempting to assert rights to the land.
- **The General Plan and Zoning By-law** Comprehensive Review presents the opportunity for the City to develop policies and provisions to regulate cabins.

20.2 Challenges and Opportunities

- Several challenges and opportunities have been identified to implementing cabin regulations:
- **Requires development control (Zoning By-law) regulations.** The City will need to establish regulations related to the size, type of construction, access, and separation of cabins. The City will also need to determine if cabins will require Development Permits. Currently, any building over 10 m2 requires a Development Permit, and most if not all cabins exceed this size. Currently, Development Permit applications are not received for development where no grant of occupancy (lease or land use permit) is presented. Development regulation would allow the City to address or mitigate the negative impacts of the current cabin construction, including controlling the size, construction, and location of cabins. Permits also allows the City to impose conditions of approval that can be used as an enforcement mechanism. The City will also be able to track cabin ownership through a database or mapping.
- **Requires a system of granting land occupancy rights under the Land Administration By-law.** The City would need to establish a method of approving the occupancy of land for cabin owners. The tools currently available in the Land Administration By-law, leases and Land Use Permits, both present challenges when applied to cabins. Provisions for "temporary leases" in LAB 897 provide an opportunity to lease land for up to 5 years using a standard lease. The 5-year renewal period would provide opportunity for inspection and enforcement. An annual rental fee can be charged, up to 10% of the value of the land.
- **Results in an administrative burden to the City.** Given the number of cabins, the leasing and development approval processes, and any annual fee collection will require considerable staff time to review, approve and administer. The full recovery of administrative costs through application and rental fees may not be possible. Excessive costs may discourage compliance with new regulations given the current no fee situation. To reduce administrative costs, the City could choose to only receive applications for cabin locations at a certain time each year and apply a uniform renewal date for all cabins. The City could engage temporary help to assist with processing cabin approvals at this time each year.
- **Requires addressing existing cabins.** Cabins have been constructed both before and during the City's moratorium.

Given the large number of existing cabins, regulations will need to be clear regarding how these existing cabins will be treated under the new regulations. Some cabins located in unsuitable areas may need to be relocated or removed entirely.

- **May result in additional road and servicing activities.** The City may include a waiver of liability to provide road access or services as part of any approval. However, increased travel to cabin locations and usage of cabins may result in the City providing some degree of road maintenance or servicing to control or minimize impacts.
- **May result in an additional municipal enforcement burden.** The location of potential cabins would result in challenges to ensuring that cabin owners are complying with the conditions of approval. Monitoring of cabin approvals would likely be complaint driven but there would still be an increase in municipal enforcement efforts to ensure compliance.
- **May make it difficult to clear cabins if required, including for future development**. Approval and permit issuance would convey certain rights to the cabin owners for a specified period. However, given the semi-permanent nature of cabins, it may be difficult to compel the removal or relocation of the cabins if the City does not wish to renew the permit or lease.
- **Requires cooperation with CGS to address cabins on untitled Municipal Land.** The GN Community and Government Services Department have confirmed that they do not wish to have the responsibility for administering a cabin permit process. However, most cabins are located on untitled Municipal Land and CGS will therefore need to be involved in issuing any grant of occupancy to the land.
- **Must respect the right to Outpost Camps under the Article 7 of the Nunavut Agreement.** The "Outpost camp" definition does not seem to apply to most cabins around Iqaluit. Also, "outpost camps" are limited in the Agreement to being located beyond a one-mile radius of any community building, structure, or other facility on lands under surface lease or owned in fee simple. It will be important that the Nunavut Agreement be reviewed to ensure Agreement principles and policies regarding Inuit access to land are being respected.

20.3 Best Practices and Trends

Northwest Territories

The Government of the Northwest Territories uses a Recreational Lease for Commissioner's Land and a Cabin Lease for Territorial Lands. For both, the lessee is given the exclusive right to use the land and make improvements for a specified period. Lease applicants can use an online mapping tool, ATLAS, to review land availability. Cabin locations are required to respect setbacks from environmentally and culturally sensitive and hazardous locations. Each application undergoes a departmental review process and consultation with Indigenous governments. The application fee is $250. The annual rent is charged at 10% of the Land Value of the leased parcel, with a minimum of $840 per year. Among other lease conditions, the lessee is responsible for any environmental degradation caused by their occupancy.

The Territorial Government provides criteria regarding cabin construction. The building footprint is limited to a maximum of 100 m^2 and the height is limited to 8 m. The requirement for a development permit is determined by the local Community Government. For example, the City of Yellowknife interprets cabins under the zoning by-law as a ***single detached dwelling unit***. Cabins are therefore subject to the same development permitting process and zoning provisions.

After updating their land management standards for cabins, the Territorial Government implemented a program to identify and manage cabins that had been built without a lease. Cabins that comply with the current standards were encouraged to obtain a lease. Cabins that could not comply were identified for removal. This program has cost an estimated $6 million for 700 cabins.

CIRNAC

CIRNAC issues recreational leases for cabins on federal lands outside the Municipal Boundary. There are approximately 60 cabins on Crown Land within 5 km of Iqaluit. The leases are generally 5 to 10 years in length. The application fee is $150. The Land Administration Committee reviews applications to ensure they comply with all required setbacks and provisions within 30 days of receipt. The standard lease area is 300 m by 300 m (9 ha). Individual lease areas are identified using a metes and bounds description. An annual rental fee of $150 is payable at the beginning of each year. The lessee is required to comply with the conditions of the lease. The lease also waives CIRNAC's responsibility to provide road access or services.

20.4 Strategic Directions

Policies for cabins could be added to the General Plan with cabins generally permitted in the ***Nuna*** land use designation. Cabins could also be defined and added as a conditional use in the ***Open Space (OR)*** and ***Municipal Reserve (MR) Zones***. Special Provisions for cabins created in the Zoning By-law. Provisions could include:

- Setback distances from certain uses or zones such as the Sylvia Grinnell Territorial Park, the Populated Area boundary, aggregate resources designation (i.e. new gravel pit), heavy industrial designation (i.e new landfill) , traditional hunting or berry-picking areas, significant waterways (e.g. Sylvia Grinnell River), archaeological sites, and the watershed protection area.
- Separation distances between cabins (e.g. 300 m).
- Development standards for site development such as:
    - Maximum footprint or total floor area of cabin;
    - Maximum height of cabin;
    - Restrictions on number and size of out-buildings;
    - Method of construction to allow cabins to be removed or relocated with minimal impact, if necessary. Restrictions on heating methods, servicing, and waste disposal.
- Cabins will also need to be regulated through the Land Administration By-law. The lease or permit would establish an area of permitted occupancy and include the requirement that the cabin meet all regulations established in the Zoning By-law. Approval of leases or land use permits could be given to a special committee that convenes annually to review and approve cabin applications.
- To address existing cabins, the City should publish an interactive map to allow the community to participate in identifying cabin location and ownership. The owners of existing cabins, outside of restricted areas, should be contacted and encouraged to apply for a permit.

21.0 FOOD

Food affects the daily lives of everyone. It brings together communities, creates economic growth, and provides energy and nutrients for residents. The "food system" is a multi-scale network which includes food production, processing, distribution, consumption, and disposal. A strong and resilient food system can improve food security and assure a higher quality of life for the community.

The relationship between the food system and City Planning is often complex, but many policies and regulations can impact the way that food reaches people. A city regulates food sales, provides business licenses, supports community gardens, promotes healthy eating programs, and can assure that appropriate transport infrastructure is provided to distribute nutritious goods. Specifically, the General Plan and Zoning By-law can encourage supportive policies, land uses and zoning regulations which improve the accessibility and availability of food. The following section will review the current context, challenges, and opportunities of the food system in Iqaluit in relation to the General Plan and Zoning By-Law.

21.1 Current Context

The current food system in Iqaluit relies on the input from the community, government programs and incentives, local businesses, and retailers. The following expands on the existing conditions of the five stages of the food system in the city:

- Production: Hunting, Harvesting, Growing
- Processing
- Distributing and Retailing
- Disposal and Waste Management

Production: Hunting, Harvesting, and Growing – Food "produced" within Iqaluit is primarily provided by active harvesting and hunting from the land. Harvesters provide char, caribou, seal walrus, clams, berries, plants, and more. These foods, termed "Country Food", are a significant source of sustenance provided on a local scale. Early winter is often the most difficult time to access local food as there is less hunting in the community, there is unideal weather conditions, increased expenses, and sometimes due to lack of employment.

In terms of traditional agricultural production, most resources are quite limited in the area. There are several plants which grow naturally (mosses, grasses, low flowers, berries, shrubs, etc), but there are little options for producing fruits and vegetables in the growing season. There are some programs which offer unique solutions for growing food in the climate. The Iqaluit Community Greenhouse Society operates a community greenhouse which is active between June and September and grows vegetables for the Qayuwtuvik Soup Kitchen and the Iqaluit Food Bank.

Processing – Foods produced within Iqaluit are processed in several ways. In some cases, individuals process their goods privately or in market. Guidance on safe and efficient processing of Country Foods have been released by the Government of Nunavut. Additionally, the Amaruq Hunter and Trappers Association have acquired approval for government funding for a Country Foods processing plant in the city in order to improve the distribution and safe processing of Country Foods amongst the community.

Figure 29 Food Facilities

Distributing and Retailing – In Iqaluit, most food products arrive by air and what is harvested is transported from the land or the sea. This creates a dependency on infrastructure which supports air transport as well as factors which allow for access to the sea and the land. Goods brought in from outside the territory have a premium of up to $18 per kilogram. The high cost of transportation creates challenging prioritization on expenditure.

Imported and local foods are largely distributed to grocery stores, convenience stores, coffee shops, cafeterias, and restaurants which provide food to residents. Community food programs in Iqaluit are widely used and valued and peak attendance generally occurs in early winter. The Qayuwtuvik Soup Kitchen is open daily, and the Iqaluit Food Bank is open every two weeks. Country Foods are often distributed through hunters, feasts, markets and stores. For those who have lowered access to food

sharing, the Tukisigiarvik Society provides a resource to access Country Food. Lastly, there is Nutrition North, which subsidizes the supply of nutritional food to northerners.

Waste Management – Currently all of the community's solid waste is managed at the City of Iqaluit's West 40 Landfill. While there are new plans for municipal composting, food waste is placed in the landfill.

21.2 Challenges, Issues, & Opportunities

Climate Change – As climate change impacts the Arctic condition, there are unknown consequences to the collection of country food in Iqaluit. Changing patterns of arctic species may significantly impact the availability and accessibility of country food from Iqaluit. Yet, there may be some opportunities with the changing climate.

As climatic changes take place, there may be more opportunities to produce food in the city, but it is important to consider the significant impact on the surrounding environment. In their paper, ***The environmental consequences of climate-driven agricultural frontiers,*** Lee et al. Examine the devastating effects of potential expansion of southern agricultural practices into northern climates.

Food Insecurity – According to the 2007-08 Inuit Health Survey, 70.5 per cent of Inuit adults live with food insecurity. Food insecurity describes lack of access to sufficient and healthy food. The daily consumption of country food has decreased over time due to factors such as socioeconomic changes, environmental concerns, hunting restrictions and financial challenges.

In terms of store food, despite the Nutrition North Canada program, many people in the community are struggling to put food on the table. There is a lack of knowledge about how to prepare nutritious meals with less expensive ingredients, and a need for basic budgeting. Elders are at risk for food insecurity, both in terms of store food and Country Food. Elders are often supporting dependents through providing food and shelter; these Elders are often already on tight budgets. At the same time, the sharing of food with Elders is decreasing because the market value of country food is increasing. Coordinating opportunities between organizations can be a challenge.

Waste Management – Food waste can significantly impact waste management and increase the output of emissions from the community. While there have been discussions and plans to introduce composting in the Iqaluit Solid Waste Management Plan, no composting program has been introduced to date. According to the Iqaluit Sustainable Community Plan, residents have been frustrated with solid waste issue and waste management facilities are reaching maximum capacity.

21.3 Best Practices & Trends

Inuvik Community Greenhouse – In 1999 the Inuvik hockey arena was repurposed to support the Inuvik Community Greenhouse. The facility has 174 individual plots that measure eight by four feet and rented for a $50 annual fee. The organization receives funding from the Government of Canada and the Northwest Territories. The greenhouse's ground floor consists of individual plots available to community members while the second floor consists of a commercial greenhouse (Public Health Agency of Canada, 2009). The commercial greenhouse produces

Figure 30 Inuvik Community Greenhouse

and markets bedding plants and hydroponic produce, which helps to offset operational costs (Public Health Agency of Canada, 2009). Beyond food and plant production, the Inuvik Community Greenhouse serves as a center for school groups, workshops, and is among Inuvik's top tourism destinations (Public Health Agency of Canada, 2009)

Tr'ondëk Hwëch'in Teaching and Working Farm – Located just outside Dawson City, Yukon, the Tr'ondëk Hwëch'in Teaching and Working Farm or Nänkäk nishi tr'ënòshe gha hëtr'ohǫh'ąy, meaning "land where we learn to grow our food" in Hän, provides sustainable fresh produce to the community and instruction to students on essential homestead farming skills, such as seed production, planning techniques, marketing and sales and basic carpentry. The farm, a partnership between the Tr'ondëk Hwëch'in First Nation and Yukon College with funding support from the Yukon's Training Policy Committee, sits on a 45-metre by 22-metre plot of land with plans for expansion, which will include more growing space, greenhouses, livestock and plots for traditional plants and berries.

In the spring and summer of 2016, the farm and school saw its first crop of 20 students, ranging in age from 16 to 64 mostly from the Tr'ondëk Hwëch'in First Nation, and its harvest included potatoes, carrots, beets, onions, peas, kale and corn, supplemented by students' individual research plots with beans, cauliflower, cabbage, brussels sprouts and sunflowers.

Working Together project – This project works to identify, promote and support healthy lifestyles in the Yukon and Northwest Territories. It is led by the Arctic Institute for Community-Based Research and funded by the Public Health Agency of Canada's Innovation Strategy (2013-2017) Through many different initiatives, such as cooking classes, youth leadership and

mental wellbeing workshops and community gardener gatherings, to name a few, the project is creating a strong network of people committed to addressing northern food insecurity.

One such initiative is the Healthy Living Inventory and Mapping Tool, which has plotted existing healthy eating and active living programs, such as food banks, school breakfast and lunch programs, community gardens and traditional food workshops, across both territories to allow program coordinators, recreation leaders and others access to what's happening in their communities.

21.4 Recommended Strategic Directions

- Flexibility for community gardens and experimental food projects should be considered and allowed in various land use designations.
- There is potential to allow for and promote community gardens and food production on city owned lands. Establish potential regulations which would allow for interim uses for food production on such properties.
- Review, identify, and protect important access routes to the land, sea ice, and water including roads, snowmobile trails, and ATV trails.
- Under the current Zoning By-law, food and beverage processing is only permitted within the Light Industrial Zone. Flexibility for food processing uses (including country food) should be introduced to encourage collective an organized processing and distribution of country food.
- In the preparation of the General Plan, assure the strategic directions in the Airport Master Plan are supported.
- Designate land in new significant development areas to allow opportunity for commercial or community activities that support food provisioning.

PART III - FUTURE NEEDS & STRATEGIC DIRECTION

22.0 POPULATION PROJECTIONS

The Nunavut Bureau of Statistics (NBS) and Statistics Canada are the primary sources of information for population growth in Iqaluit and Nunavut. At the territorial level, the NBS periodically releases population estimates as well as growth projections. Their Population Projections, published in 2014, provide estimates to 2035 broken down by region (Baffin, Kivalliq and Kitikmeot) and by community using 2011 Census data (adjusted for net under coverage). A projection for Iqaluit is included in the 'Baffin Community Population Projections'. The Nunavut Economic Outlook (2013) published by the Nunavut Economic Forum generated six different demographic projections for Nunavut to 2032. The growth rates projected for the territory can be used to project / estimate Iqaluit's future population. Although Statistics Canada does not provide population projections, historical Census data can be used to calculate past annualized growth rates, which can then be used to project Iqaluit's future growth rates.

22.1 Who is Included in Iqaluit's Population Count

As there is a large group of transient[1] persons in Iqaluit, it is important to clarify who is included in Iqaluit's population count. The following were created based on the instructions for completing the 2016 Census; they describe how people, including transient workers, are counted. Included in Iqaluit's population count are:

persons who had their main residence at an address in Iqaluit on enumeration day[2], including persons who were temporarily away; and

persons staying at an address in Iqaluit temporarily on enumeration day and who have no main residence elsewhere.

Not included in Iqaluit's population count are:

students studying in Iqaluit on enumeration day who return to live elsewhere with their parents at some point during the year;

persons who have a spouse or common-law partner elsewhere who are temporarily working in Iqaluit on enumeration day (assuming they return home to their spouse periodically);

persons who are in an Iqaluit institution for less than six months on enumeration day and who live elsewhere for the remainder of the year; and

persons staying at a secondary residence in Iqaluit on enumeration day who have their main residence elsewhere in Canada.

Thus there are potentially significant numbers of persons who spend six months or more in Iqaluit who are not reflected in the population count. For example, Nunavut Arctic College has indicated they will have approximately 500 regular students with the opening of their new Campus Building. If 30% of those students (~150 students) return to their home communities during the school break, they would not be counted as part of the Iqaluit population even though they may reside there for eight months of the year. There is also assumed to be fairly significant levels of transient workers in the transportation (e.g. aviation, taxi), hospitality (e.g. chefs), and construction industry. These are workers that have spouses or common-law partners in the south and return home periodically but may spend cumulatively more than six months in Iqaluit. Note that it is anticipated that the majority of the workers residing in the Airport Temporary Workers Residence in the West 40, with 64 rooms, would be transient workers not included in the population count.

Data does not appear to be available to accurately estimate the number of students or workers who may be in Iqaluit at any given time but who were not included in the population count. As there are clear rules for Census population counts, attempting to correct population estimates to account for transient workers and students would be a challenging exercise. In this respect, clearly noting that the base population does not include many transient students and workers may be the most appropriate approach given the current lack of data.

1 For the purposes of this report, a 'transient' is defined as a person who is staying or working in Iqaluit for only a short time (i.e. part of the year).

2 Canada's official 2016 Census day was May 10, 2016 however northern and remote parts of the country, including Nunavut, were enumerated in February and March 2016.

22.2 Population Projections

The planning horizon for the new General Plan is a 20-year planning horizon running from 2021 to 2041. As such, three population projection scenarios were calculated to 2041 namely: low, medium, and high growth scenarios as represented in Table # below. During the development of this report Statistics Canada was in the process of releasing the results of the 2021 Census, however only limited datasets were available at the time of the writing of this report. As such, the 2016 Census datasets were used.

	Low Growth Scenario	Medium Growth Scenario	High Growth Scenario
2016	7,923	7,923	7,923
2021	8,445	8,739	8,955
2026	8,949	9,592	10,073
2031	9,328	10,343	11,132
2036	9,670	11,110	12,255
2041	10,013	11,863	13,411

Table 3 Growth Scenarios

Three population growth rates were developed to create a broad range of scenarios for the purposes of discussion and analysis. The projections in Table 1, below, represent a spectrum of low, medium, and high growth scenarios for Iqaluit from 2021 to 2041.

22.4 Methodology

Establish the Baseline Population – Establishing the baseline population is the process by which the present population of the city is calculated. For this exercise an adjusted population count from Statistics Canada's 2016 Census was used. The objective of a census is to provide detailed information on the population at a single point in time. Inevitably, however, a small portion of the population is not counted or is double-counted for a variety of reasons. To determine how many individuals were missed or counted more than once, Statistics Canada conducts postcensal coverage studies of a representative sample of individuals. Results of these studies in combination with the census counts are used to produce current population estimates, which consider net under coverage.

For each Census, net under coverage rates are published by province/territory and are generally available 2-3 years following the release of census counts. The projections presented in this report were prepared using 2016 population estimates, which were

generated based on Nunavut's under coverage rate in the 2016 Census of 2.36%. The population count for Iqaluit in 2016 Census was 7,740. Applying a 2.36% under coverage rate to the population count provides a 2016 population estimate for Iqaluit of 7,923.

Development of Growth Scenarios – After establishing the baseline population of the City, available datasets were investigated to calculate various possible growth scenarios. Three data sources were used to develop each scenario:

- The most recent population projections from the Nunavut Bureau of Statistics (2014-2035);
- The most recent population projections from the Nunavut Economic Forum (2013-2032); and
- Historic population growth rates from Statistics Canada (2006-2016).

From these datasets an average annualized growth rate (AAGR) was identified as follows:

- Nunavut Bureau of Statistics projects an AAGR of 1.1%;
- Nunavut Economic Forum projects an AAGR of 1.8%; and
- Statistics Canada identified a historical growth rate from 2006-2016 of 2.3%.

The AAGR was used as the baseline growth rate for each scenario and was subsequently adjusted for each year to 2041 based on the Nunavut Bureau of Statistics annual growth rates to 2035 to consider variations in birth, deaths, and migration levels that were anticipated by the Bureau. The Bureau's methodology predicted that over their identified period, the death rate would rise significantly higher than the birth rate for the entire territory. As migration was predicted to remain constant at its historical average, it was anticipated that annual growth would decrease in Nunavut over time. To prepare projections for each of Nunavut's communities, the Bureau assigned regional birth and migration attributes according to the community's population size. Death attributes were calculated using a survival table and each community was assigned the Nunavut attributes because the survival table is only available at the territorial level. The remaining growth rates between 2035 and 2041, were extrapolated from the Bureau's projected annual growth rates between 2030-2035.

Based on the calculations conducted, the projections based on the Nunavut Bureau of Statistics dataset produced the lowest growth scenario, followed by the Nunavut Economic Forum's projections (forming the medium growth scenario); and the historical population growth from Statistics Canada, forming the high growth scenario.

22.5 The Recommended Growth Scenario

There are numerous implications when choosing the recommended growth scenario on the development of the General Plan and Zoning By-law namely the preferred growth scenario will be used to:

- establish the amount of land needed to accommodate the projected future population of Iqaluit to 2041;
- establish feasible intensification targets to accommodate a portion of the future population within the existing built up area of the City; and,
- identify the extent of infrastructure improvements or expansions needed to accommodate the future population of the City.

In reviewing the growth scenarios, it is noted that the average of the three growth scenarios totals 11,762 which constitutes a 0.7% deviation from the medium growth scenario or a difference of 101 persons over a 20-year planning horizon and illustrating an even distribution between the three scenarios. As a result of the analysis, the medium growth scenario is the recommended growth rate to be used as the basis for the General Plan.

23.0 LAND NEEDS ANALYSIS

23.1 Residential Land Needs

Residentially designated lands are composed of lands that are used, almost exclusively, for residential purposes including single detached dwellings, multi-unit buildings, apartment buildings, and even certain types of quasi-institutional residential uses such as group homes, retirement homes, and long-term care facilities. Often also permitted within residential designations are some small-scale commercial uses such as cafés, laundromats, and convenience stores as well as institutional uses such as schools, churches, and community centres.

Current Occupied Residential Land Supply (in ha)	136
Current Number of Dwelling Units	3419
Project Average Household Size in 2041	2.25
Projected Number of Dwelling Units in 2041	5272
Required Number of New Dwelling Units Between 2021 and 2041	1853
Current Population with Core Housing Need	2745
Total Number of New Housing Units Required in 2041	4598
Planned Units (Area 'B' Development Scheme)	490
Planned Units (IOL Parcel 'E' Development Scheme)	185
Net Number of New Housing Units Required in 2041	3923
Current Vacant Residential Land Supply	0
New Units Through Redevelopment (50% of required supply)	1,962
Minimum Density for New Residential Units	70 units / ha
Zoned and Vacant Residential Lots (in ha)	0
Land of Future Development Area 'A' and 'C' (in ha)	49
Additional Land Requirements to accommodate required dwelling units	**0 ha**

Table 4 Residential Land Needs

23.2 Commercial Land Needs

Commercially designed lands are composed of lands that are used, almost exclusively, for commercial purposes and can include retail stores, office buildings, hotels, restaurants, and clinics and can also include developments with residential uses incorporated into them such as commercial buildings with residential uses on the upper storeys. They may also include institutional uses as well. There is currently 26 ha of land designated as "commercial" with an additional 5 ha of "mixed use" land where typically the ground floor of the building is used for commercial purposes. Thus, there is a total of 31 ha of land used for commercial in the City. Most of these uses are in the Core Area with one or two commercial lots typically located in the neighbourhoods outside the Core Area.

Yearly Average new GFA Commercial Space Constructed Between 2011-2021	3,540 m^2
Projected Amount of Commercial GFA Between 2021-2041	70,800 m^2
Projected GFA of Commercial Space (IOL Parcel 'E' Development Scheme)	24,700 m^2
Net Projected Commercial GFA Between 2021-2041	46,100 m^2
Required Land for Projected Commercial Growth Between 2021-2041*	59,930 m^2
Current Vacant Commercial Land Supply	44,000 m^2
Vacant Commercial Land Supply (Area 'B' Development Scheme)	6,900 m^2
Additional Required Commercial Land Supply	**9,030 m^2 (0.9 ha)**

** Based on a 30% open space / square metre of commercial GFA*

Table 5 Commercial Land Needs

23.3 Industrial Land Needs

The "industrial" land use category is split into "Heavy Industrial" and "Light Industrial" with the categorization following the range of permitted uses in the Zoning By-law. There is currently 110 ha of land used for light industrial uses and 71 ha of land used for heavy industrial uses, for a total of 181 ha of land used for industrial purposes. Light industrial uses are concentrated in the North 40 area with a cluster along Akilliq Drive in the West 40. Old light industrial uses have been increasingly demolished in the Core Area to make way for new commercial and mixed-use development. Heavy industrial uses are primarily in the West 40 with the largest parcels being the sewage lagoon, tank farm and the City's landfill site and leachate treatment. The North 40 pit and adjacent landfarm operation (i.e. soil remediation) forms another significant cluster.

Yearly Average new GFA Industrial Space Constructed Between 2011-2021	1,691 m^2
Projected Amount of Industrial GFA Between 2021-2041	33,820 m^2
Required Land for Projected Industrial Growth Between 2021-2041*	50,730 m^2
Current Vacant Industrial Land Supply	90,000 m^2
Planned Industrial Lands (Area 'B' Development Scheme)	0 m^2
Planned Industrial Lands (IOL Parcel 'E' Development Scheme)	21,300 m^2
Additional Required Industrial Land Supply	**0 m^2**

** Based on a 50% open space / square metre of industrial GFA*

Table 6 Industrial Land Needs

23.4 Other Land Use Needs

The "institutional" category of land use includes educational facilities, health facilities, recreation and community facilities, day cares, places of worship, correctional facilities, and similar uses. There is currently 39 ha of "institutional" land used in Iqaluit. Nunavut Arctic College, Inuksuk and Nakasuk Schools and the Qikiqtani Hospital form a larger cluster of institutional uses in the geographic centre of the City. Other significant nodes includes the correctional facilities in the North 40, the cluster of Aqsarniit to AWG Arena along the road to Apex, and a cluster of smaller institutional uses in Apex. The "transportation" category of land use includes the airstrip, marine facilities (sea lift beach and West 40 causeway), and air/marine navigation and communication systems. These uses represent 447 ha of land in Iqaluit, more than half of the approximately 800 ha of land used in the City. The anticipated construction of the small craft harbor and deep sea port will add to this land use in the future.

Yearly Average new GFA Institutional Space Constructed Between 2011-2021	1,556 m^2
Projected Amount of Industrial GFA Between 2021-2041	31,120 m^2
Required Land for Projected Institutional Growth Between 2021-2041*	46,680 m^2
Current Vacant Institutional Land Supply	0 m^2
Planned Institutional Lands (Area 'B' Development Scheme)	18,700 m^2
Planned Institutional Lands (IOL Parcel 'E' Development Scheme)	10,960 m^2
Additional Required Institutional Land Supply	**17,020 m^2 (1.7 ha)**

** Based on a 50% open space / square metre of institutional GFA*

Table 7 Other Land Needs

Notwithstanding the projected need of an additional 1.7 ha of institutionally designated land in Iqaluit, institutional land uses are extremely difficult to 'pre-plan' for at the municipal level as they are often built in an ***ad hoc*** manner (i.e. the need for a new school, church, or hospital is determined by the institution themselves and not through market forces). As such, the City will need to continue to be prepared to add additional institutional lands on an as-needed basis.

24.0 SUMMARY CONCLUSIONS & STRATEGIC DIRECTIONS

Through the development of this report the project team has outlined a number of considerations to guide the development of a new general plan and zoning by-law for the City of Iqaluit. The following is a summary of these considerations:

24.1 Planning Framework

- The Nunavut Planning Act forms the legislative framework for the development of the General Plan and Zoning By-law and the approval process.
- Through its provisions it establishes the scope of matters that municipalities in Nunavut can govern under general plans and zoning by-laws, as well as the minimum content requirements.
    - The Nunavut Planning and Project Assessment Act and the draft Land Use Plan are generally applicable to areas outside of municipalities and as such have little impact on the development of a new general plan and zoning by-law.
    - Notwithstanding the above, the draft Land Use Plan does outline the particular importance of Frobisher Bay as fish and wildlife habitat and recommendations for land use along the waterfront should respect this.
    - As applicable federal legislation, the Airport Zoning Regulations will need to be incorporated into the General Plan with accompanying policies, particularly for the evaluation of development proposals within the vicinity of the Airport.
    - Further these regulations should be considered for incorporation into the Zoning By-law as well, possibly as an 'overlay'.
    - The land use guidelines regarding land uses adjacent to airport will need to be reviewed and incorporated into the General Plan most notably the Noise Exposure Forecasts (NEF) and Noise Exposure Projections (NEP) contours.
- The following actions have been identified in the City's Strategic Plan accompanied by potential implications for the General Plan and Zoning By-law:
    - The City will develop a by-law to require businesses to have Inuktitut signage. The Zoning By-law currently regulates signage. The requirement for Inuktitut signage could be integrated into the Zoning By-law.
    - The City will create an overlay map of traditional land use, historical and current. The General Plan uses a Cultural Heritage Symbol to identify significant cultural sites to protect them. This approach could be modified or expanded to address traditional land uses.
    - The City will review and complete a transportation/road plan. The completion of a Transportation Master Plan is a current policy in the General Plan.
    - The City will fund a Drainage system plan. The completion of a Master Drainage Plan for the City could be included as a policy in the General Plan.
    - The City will expand online community engagement programs to improve the city's ability to consult electronically with the public including regular online surveys. Additional engagement practices could be incorporated into the General Plan
- As the City's Land Administration By-law outlines the process for land division and administration, the proposed policies of the General Plan and the regulations of the Zoning By-law will need to be developed in compliance with the provisions of the by-law.
- The draft Transportation Master Plan (TMP) outlines the City's existing and proposed road network, including design widths, which should be incorporated into the General Plan to ensure that new development is properly sited and provided any required road dedications
- The TMP also contains both a recreational and pedestrian mobility network that should also be incorporated into the General Plan and any new developments
- Finally the TMP also outlines a conceptual routes for a potential public transit system that should be considered in the development of the General Plan.
- The City's Recreation Master Plan calls for a: Parks, Trails, and Open Space Master Plan; Municipal Parks Development Standards & Design Guidelines Plan; Heritage Plan; and the development of a city-wide strategy for arts, culture, and heritage. These plans should also be identified in the General Plan as initiatives that Council should consider.
- The plan also contains two municipal-wide assessments (winter and summer) of recreational facilities both formal and informal that should be mapped and identified for the purposes of the General Plan review.
- Iqaluit's Housing Action Plan calls for an increase infrastructure capacity to support the development of at least 50% of 1,400 housing units required in the City, prioritized in the Core Area, and further to increase infrastructure capacity to support the development of the final 50% of the 1,400 units of housing required in the City, prioritized in the Core Area (or downtown).
- Implementation of design interventions and policies to support a multi-modal and connected winter city by reviewing existing design standards and policies that guide the design of public and private spaces, identifying policy framework gaps regarding walkability, connectivity, and winter city design. To offset potential impacts to reduced parking requirements, the City should also explore additional areas where on-street parking could be permitted.
- Reduction or elimination of parking requirements for residential developments and explore the possibility of providing on-street parking
- Enabling a greater diversity of housing and evaluate dwelling size requirements in the Zoning By-law to permit greater flexibility
- Evaluating and refining the development review process as outlined in the Zoning By-law
- Enabling automatic land lease extensions and reducing land administration costs
- Developing and implementing an arson and crime reduction strategy
- Creating a data collection framework for housing and perform ongoing data collection
- All three approved development schemes will need to be incorporated in the new General Plan and a review the policies

and conceptual layouts of both areas will need to be conducted to ensure both neighbourhoods (most notably the IOL and Area B) are integrated into the wider urban fabric

- Given the age of the Core Area & Capital District Redevelopment Plan (approaching 18 years), an assessment should be undertaken of the relevancy of the proposals and guidelines outlined in the Plan, notably as many of the proposals included in the plan are composed of capital improvements.
- Based on the assessment above, the General Plan may recommend the development of a planning programme that would see the Plan formally reviewed and updated.

24.2 City Structure & Urban Design

- Need to develop and incorporate policies into the General Plan that will support the redevelopment and intensification of underutilized lands and buildings to ensure that these resources are being effectively used and reducing the need to expand onto 'greenfield' sites
- At over 15 years of age, consider developing policies in the plan which would support an update to the Core Area & Capital District Redevelopment Plan
- Given the sprawling nature of the City's built form (due namely to its geography) new developments and develop schemes should be built outwards from community nodes to increase walkability and accessibility of the City to all residents
- Minimum density targets for new residential development should be established in the General Plan and Zoning By-law
- The focus of the Zoning By-law should be on regulating typologies and forms as opposed to uses to create more distinctive and cohesive neighbourhood design
- Little comprehensive constraints mapping currently exists and the General Plan and Zoning By-law should explore more ways to identify and regulate development against the City's constraints
- Explore policy shifts to allow for more flexibility in "mixed-use" developments other than traditional ground floor commercial/institutional scenarios.
- Review future development areas and the infrastructure required to support those areas, and what the land delivery model will be for the City moving forward. If private land development, and thus private financing, is pursued as an option to increase the available land supply, there will be a need for more policies and regulations to ensure land is being developed to acceptable municipal standards.

24.3 Housing

- A definition of affordable housing may need to be included in the General Plan. Currently, guidance is provided for what is considered "affordable" in the Land Development Guidelines affordable housing target and in the "Affordable Lot Policy".
- Review the affordable housing targets in the GP Land Development Guidelines, and the Affordable Lot Policy that is currently used to implement the Guideline, to address the issue of perpetual affordability.
- Consider supportive policies for non-profit housing organizations.
- Consider whether the current zoning provisions are permissive enough for the location of shelters, group homes and other kinds of residential care facilities, and secondary suites.
- Consider whether new policies in the GP or new provisions in the ZBL are needed to support the delivery of affordable housing, such as density bonusing (ie. in exchange for dedicating a certain percentage of units for affordable housing), implementing alternative development designs and standards for public housing or non-market housing developments (eg. reduced parking standards), and financial incentives (eg. deferral or waiving of certain fees and charges). Note that fees and charges are subject to the Fees and Charges By-law.
- Short-term rental policies should be reviewed to ensure minimal impacts on availability / affordability of housing for Iqaluit residents.
- Review the enabling policy in the GP regarding a Development Charges By-law and ensure the policy covers the full scope of what such a by-law could cover, including charges to support non-market housing projects.

24.4 Economic Development & Employment

- General review of land use designations in the West 40 and North 40 areas, considering future opportunities for extension of piped services as well as synergies with deep sea port.
- Review opportunity for waterfront study and to create more public and community uses close to the waterfront given the future discontinuation of the sealift beach area and the construction of a small craft harbour.
- Protect major transportation facilities and ensure compatibility of surrounding land uses by ensuring that the federal and territorial regulations and guidelines are implemented in both the General Plan and Zoning By-law.
- Review the adequacy of existing lands designated for commercial and mixed-use development.
- Review the suitability of lands in the vicinity of the future deep sea port for new industrial land for material staging (open storage) and warehousing.
- Consider merging of the light industrial and heavy industrial designations in the General Plan and using the zoning by-law for ease of use.
- Development standards in the Core Policy area should be reviewed to ensure opportunities for development/ redevelopment are supported.
- One of the primary tourism 'pulls' to Iqaluit is its access/proximity to the natural environment and features. The General Plan should look to identify tourism 'assets', and introduce policies intended to support their preservation and role. One of the easiest ways to do this would be through the identification of assets on a map.
- The City should consider opportunities to directly support or sponsor incubator-like organizations or spaces intended as a 'business gathering space' to help local entrepreneurs learn and build skills, knowledge, as well as offering physical space that can be rented and used by local businesses for various activities. The Pinnguaq Iqaluit Makerspace is one example of such a space that has been implemented to date, and GP policies could potential further support for like-minded endeavours.

24.5 Drinking Water System

- The City would benefit greatly from the development of an Infrastructure Master Plan (IMP). An IMP will comprehensively master plan the City's existing and planned infrastructure in a manner that considers planned growth directions and can inform where areas of new growth should be located.
- Further the City would also benefit greatly from the development of an Asset Management Plan (AMP). An AMP is a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future water system challenges.
- The water treatment plant has sufficient capacity to meet the needs of a City-wide population of 11,300. Based on the General Plan's medium growth projection, the City may achieve this population threshold between 2036 and 2041. As such, regular monitoring of reserve capacity should be introduced during the life-span of the plan and planning should take place to expand capacity in the system in the later-half of the life of the General Plan
- Further to the above noted recommendation, triggers should be introduced in the General Plan that require more regular monitoring and reporting of reserve capacity in the City's water system to ensure there is sufficient capacity to support new development
- On-site or individual water collection or purifying systems should be permitted in the Zoning By-law to ensure that individual property owners can supplement piped or trucked water supplies.
- With the recent announcement of Federal funding to support improvements and upgrades to the City's water infrastructure, policies should be reviewed to ensure new (re)development is aligned with available/ planned services.
- The City should consider including servicing policies or criteria that outline requirements for minimum water tank sizes, utilidor connection criteria/triggers, approvals processes, inspections, as part of the DP process/approval.
- In some of the older development areas of the City, sewer and water pipes encroach on private/leased land but do not have registered easements associated with them. The GP should include a policy(ies) related to securing appropriate easements for City infrastructure.

24.6 Sanitary Sewage System

- The City would benefit greatly from the development of an Infrastructure Master Plan (IMP). An IMP will comprehensively master plan the City's existing and planned infrastructure in a manner that considers planned growth directions and can inform where areas of new growth should be located.
- Further the City would also benefit greatly from the development of an Asset Management Plan (AMP). An AMP is a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future water system challenges.
- Triggers should be introduced in the General Plan that require more regular monitoring and reporting of reserve capacity in the City's sanitary sewer system to ensure there is sufficient capacity to support new development
- For private development approvals the City should consider enforcing sewer camera inspections and adherence to the City of Iqaluit Municipal Design standards
- The City should continue ensuring development is connected to the municipal system where possible, as individual onsite systems still pose a number of challenges and concerns for implementation in the Arctic. A review of current GP servicing policies should be undertaken to ensure that (re)development is appropriately accommodated. Similar to the recommendation related to water policies, the City should consider including servicing policies or criteria that outline minimum requirements for matters such as utilidor connection criteria/triggers, approvals processes, inspections, as part of the DP process/approval.
- In some of the older development areas of the City, sewer and water pipes encroach on private/leased land but do not have registered easements associated with them. The GP should include a policy(ies) related to securing appropriate easements for City infrastructure.

24.7 Municipal Drainage

- The City of Iqaluit is known to have overland flow issues, specifically on major roadways. Moreover, corrosion, sedimentation and erosion issues have been identified in many of the City's culverts. To make sure that these issues are addressed for the future, upgrades and repairs, as well as updated design standards are necessary, including:
  - The Level of Service (LOS) for the ditch design;
  - IDF curves, which will provide design basis for the future upgrades / new development;
  - Culvert installation techniques, and apron design specifications;
- The Asset Management Plan (AMP) will also be a comprehensive document that will help the City manage their infrastructure assets and will be a tool to help inform future decisions. Iqaluit is undergoing a number of economic and demographic changes and will need to make a number of planned investments to the existing infrastructure to support and prepare for future growth. The implementation of an effective AMP will be vital to address the future infrastructure challenges.
- New policies should be included in the GP to enable the City to require additional information and/or works related to assessing or upgrading local drainage infrastructure (either as part of a complete application or condition of development approval), where there is concern about impacts to existing conditions.
- Mapping of drainage 'constraint' or 'challenge' areas should be considered in the GP to help identify problem areas

where additional information/care needs to be incorporated into the (re)development approval process to ensure minimal impacts.

24.8 Telecommunications & Technology

- Telecommunications infrastructure gap is most appropriately addressed at the territorial level, and is largely outside of the scope of a general plan or zoning by-law, however it is important to recognize that this gap does have an influence on development and growth in the City, and opportunities to encourage and support solutions should be explored.
- While the long-term impacts of remote working on the supply of commercial and office space have yet to be assessed, the General Plan and Zoning By-law should have policies that facilitate this trend including policies and regulations around co-working and home-based businesses
- The City should consider developing a digital transformation plan that would see the City become a northern leader in smart-city applications

24.9 Solid Waste Management

- Review the solid waste management policies in the GP to address future waste management sites/closures and adjacent development to ensure maximum effectiveness
- General review of land use designations in the West 40 and North 40 areas, considering future opportunities for extension of piped services.

24.10 Energy Generation Systems

- Approving new land for development must consider the connection of buildings to municipal power services – support planning and project processes that allow for renewable energy solutions at the site level, such as solar and district heating
- Ensure that the existing right of ways for utility connections for the transport of fuel to shipping facilities are protected and maintained.
- Ensure ideal locations for renewables such as wind turbines are preserved where possible.
- Ensure the future expansion of diesel storage is considered through future land use plans.
- Maintain and build upon building standards which incorporate wind-lock entries, heat recovery ventilators, and energy star windows
- Examine the appropriateness of energy efficient building standards such as the R-2000 standards and LEED Certification for new development.

24.11 Transportation & Goods Movement

- The City completed a Transportation Master Plan (TMP) in early 2022, which provides a number of comprehensive recommendations for improvements to the City's transportation network. These recommendations consider future growth, current/future population density, incline (slope), access to major destinations, and network connectivity. Key recommendations in the TMP that could have implications/be incorporated into the GP include:
  - Undertake a Transit Study to guide the launch of a transit pilot and then full rollout of a transit system;
  - Develop a Pedestrian Safety & Walkways Plan, in tandem with a Signage and Wayfinding Plan;
  - Assess proposed parking management measures and start implementation of select measures.
- Many of the recommendations focus on "formalising" existing informal trails throughout the community to improve safety and presence.
- The GP should contain supporting policy related to applicable recommendations in the TMP
- The opportunity for a Waterfront Study and/or Plan should be revisited in the General Plan, with policies to complement improvements to the Small Craft Harbour.
- The "noise cone", "outer surface area", and other constraint features associated with the airport should be appropriately mapped in the general plan
- Indicate the "Outer Surface Area" of the Iqaluit Airport Zoning Regulations on Figure A of the General Plan.
- Protect major transportation facilities and ensure compatibility of surrounding land uses – policies in the Transportation Facility designation should be expanded to include the pending completion of the Deep Sea Port and upgrades to the Small Craft Harbour, which are very limited at this time.
- Policies should also be added to identify the marine range facilities located in the Core Area and any associated protective policies.
- New policy needed to address DND's Forward Operating Location (FOL) facility (i.e. hangar) on the south side of the airstrip that has associated safety setback distances (i.e. inhabited building distance and vulnerable building distance).
- The implementation of an effective AMP will be vital to address the future road challenges.
- Review existing policies in Section 6.4.5 and ensure supportive policies in the General Plan for a future transit system.
- Protect major transportation facilities and ensure compatibility of surrounding land uses.
- Review road cross sections with consideration for road cross sections explored in the Future Development Area B Development Scheme.
- Considering the Airport Master Plan is in the process of being updated, GP policies and ZBL regulations should be reviewed to ensure consistency and reflection of strategic directions from Airport Master Plan.

24.12 Natural Environment & Climate Change

- The GP should include policies encouraging data collection and sharing as part of the development process to help track climate-related environmental changes (ex. Geotechnical data related to the depth of the active layer).
- The GP should contain policy or direct reference to the design guides prepared as part of the Northern Infrastructure Standardization Initiative, and any design standards incorporated into the GP should take these guides into consideration to ensure consistency.

- The GP should contain policy enabling or encouraging the City to undertake or lead Climate-related analyses in conjunction with partners such as GN, QIA, Government of Canada, and public stakeholders to investigate, for example:
    - Precipitation changes over time and relation to runoff management;
    - Permafrost changes and impacts on buildings/infrastructure;
    - Migratory patterns and other natural wildlife indicators; and/or
- Weather patterns and impacts on the urban area, surrounding lands, and water.

24.13 Aggregate Resources Extraction

- The Northwest Deposit is planned to be the aggregate source of the City for the next 35 years.
- Policies in the GP should be developed to directly reference the future QMRP in order to provide stronger guidance and regulation of site operation and restoration.
- In addition to referencing the QMRP, GP should also directly reference existing policy such as the "Mine Site Reclamation Policy for Nunavut" prepared by the Government of Canada to help provide further guidance in the regulation of aggregate activities. This should be complementary and secondary to the QMRP, once adopted.
- Land use mapping in the GP identifying aggregate resource deposits/reserves should incorporate influence areas around these sites.

24.14 Recreation & Leisure

- The GP policies should seek to complement and support the recommendations and implementation plan contained in the 2020 Recreation Master Plan.
- The GP should include wayfinding policies and design guidelines to improve legibility and formalization of skidoo, walking, and other recreational trails.
- The GP should include multi-use trail design standards or encourage the development of design guidelines for them.
- Existing City-owned/managed recreation sites and facilities should be identified on General Plan schedules
- The GP references Crime Prevention Through Environmental Design (CPTED) in some policy; however, it is outlined in very general terms and does not provide clear direction as to what standards are applicable. The GP should consider more specific references to CPTED design principles in relation to the design and improvement of recreational facilities, as well as development in general.
- The GP should outline conceptual trail extensions and connections (similar to how the future collector roads are handled on Figure D) and outline associated policy in support

24.15 Culture & Heritage

- As noted in the City's Strategic Plan, the City should develop a by-law to require businesses to have Inuktitut signage. The requirement for Inuktitut signage could be integrated into the Zoning By-law.
- Also noted in the Strategic Plan, is direction that the City will create an overlay map of traditional land use, historical and current which could eventually be accomplished through the General Plan.

- The General Plan should include the development of an urban design framework and a framework for the implementation of participatory / co-design principles for the development of future neighbourhoods and perhaps certain large-scale developments.
- The Standards and Guidelines for the Conservation of Historic Places in Canada should be consulted to ensure that heritage conservation policies, particularly archaeological processes, reflect the most current best practice in Canada.
- The General Plan should build upon the existing culture and heritage policies of the existing plan to provide additional policy direction on how to preserve both cultural heritage sites in the City as well as the City's unique sense of place.
- The General Plan should explore ways to advance the formal designation of sites in Iqaluit under Section 105 of the Cities, Towns, and Villages Act.
- Policies should be explored in the General Plan to encourage the use of design competitions, and co-design of important buildings and spaces in the City.
- The GP should include more policy direction on the identification and preservation of culturally important or significant sites in the land development process, so as to protect them or dedicate them to specific uses.

24.16 Cabins

- Policies for cabins could be added to the General Plan with cabins generally permitted in the ***Nuna*** land use designation. Cabins could also be defined and added as a conditional use in the ***Open Space (OR)*** and ***Municipal Reserve (MR) Zones***. Special Provisions for cabins created in the Zoning By-law. Provisions could include:
    - Setback distances from certain uses or zones such as the Sylvia Grinnell Territorial Park, the Populated Area boundary, aggregate resources designation (i.e. new gravel pit), heavy industrial designation (i.e new landfill) , traditional hunting or berry-picking areas, significant waterways (e.g. Sylvia Grinnell River), archaeological sites, and the watershed protection area.
    - Separation distances between cabins (e.g. 300 m).
    - Development standards for site development such as:
        - Maximum footprint or total floor area of cabin;
        - Maximum height of cabin;
        - Restrictions on number and size of out-buildings;
        - Method of construction to allow cabins to be removed or relocated with minimal impact, if necessary. Restrictions on heating methods, servicing, and waste disposal.
    - Cabins will also need to be regulated through the Land Administration By-law. The lease or permit would establish an area of permitted occupancy and include the requirement that the cabin meet all regulations established in the Zoning By-law. Approval of leases or land use permits could be given to a special committee that convenes annually to review and approve cabin applications.
    - To address existing cabins, the City should publish an interactive map to allow the community to participate in identifying cabin location and ownership. The owners of existing cabins, outside of restricted areas, should be contacted and encouraged to apply for a permit.

24.17 Food

- Flexibility for community gardens and experimental food projects should be considered and allowed in various land use designations.
- There is potential to allow for and promote community gardens and food production on city owned lands. Establish potential regulations which would allow for interim uses for food production on such properties.
- Review, identify, and protect important access routes to the land, sea ice, and water including roads, snowmobile trails, and ATV trails.
- Under the current Zoning By-law, food and beverage processing is only permitted within the Light Industrial Zone. Flexibility for food processing uses (including country food) should be introduced to encourage collective an organized processing and distribution of country food.
- In the preparation of the General Plan, assure the strategic directions in the Airport Master Plan are supported.
- Designate land in new significant development areas to allow opportunity for commercial or community activities that support food provisioning.


Iqaluit