Geotechnical Evaluation and Drainage Planning in Baker Lake, Nunavut

Final Report Rev-00

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Prepared for:
The Municipality of Baker Lake, Nunavut

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Executive Summary

Nunami Stantec Limited (Nunami Stantec) was contracted by the Municipality of Baker Lake (the Hamlet) to complete geotechnical and drainage planning for the hamlet.

The Municipality is looking to identify areas within the vicinity of the existing townsite that are suitable for future developments. As expressed in the terms of reference for this work, the areas must be within a reasonable walking distance of community services. The municipality is therefore requiring a geotechnical evaluation focusing primarily on three potential areas for planned future subdivisions to identify what portion of these areas are suitable for development and expected to support buildings and infrastructure. A drainage planning assessment is also required for the larger area and includes the existing built-up area of the townsite as well as the areas planned for future subdivision development.

A geotechnical investigation was completed in the Hamlet in June 2022. An air-track drill rig was used to advance 17 boreholes to varying depths with a maximum depth of 9.5 m. The boreholes were focused within the proposed future development areas (Phase A, Phase B, and Phase C). Visual observations of the three phases as well as the general Hamlet area were also completed by the Nunami Stantec Geotechnical Engineer.

In general, a layer of organics overlying a layer of till over bedrock was encountered in the boreholes. The bedrock, however, was not encountered at the depths drilled in all of the boreholes. Ground ice contents, inferred from observation of the drill return cuttings were generally considered low to moderate.

An assessment of the development suitability was completed, which considered the geotechnical investigation, drainage and terrain findings. The overall findings of the geotechnical investigation within Phase A through C identified that subsurface geotechnical conditions were generally not the limiting factor for determining development suitability of these potential development areas. Rather, the dominant factor affecting these potential development areas was typically drainage. Development suitability maps were created and are provided as part of this report. The development suitability maps indicate that it is feasible to proceed with land development within the proposed subdivisions; however, the design of drainage infrastructures should be implemented in certain areas to avoid adverse drainage conditions.

The drainage assessment and planning observations were completed in June to observe the drainage system under peak stress. Typical drainage issues noted in Baker Lake included road washouts, water ponding, culverts with reduced capacity and obstruction/overflow of ditches with poor definition and/or insufficient depth.

Based on the identified drainage deficiencies noted in the drainage assessment, 10 community-wide drainage recommendations were developed for Baker Lake, which consisted of the following:

- The ditch network coverage is insufficient for the road network
- Variable and often insufficient ditch depths and widths
- 32 culverts have damaged ends and were assessed a high priority for remediation
- 71 culverts are infilled and were assessed a high priority for remediation

- 11 culverts showed signs of erosion and scour at the culvert ends and were assessed a high priority for remediation
- 10 culverts have channel erosion, scour, or sings of other erosion or deposition upstream or downstream of the culvert
- Culvert marker poles were not present at most of the culverts
- Driveways were missing entrance culverts
- Emergency flooding equipment and supplies were not in reserve and a drainage monitoring program was not in place.

A total of five Identified Drainage Problem Areas (IDPA) were noted by the Hamlet. Specific, site-scale recommendations were provided for each IDPA. The recommendations were developed to address the specific cause of the drainage issue at the IDPA.

A proposed conditions drainage plan was developed for the three proposed development areas (Phase A, Phase B and Phase C). The drainage plan consisted of general development block grading and overland flow direction, proposed constructed channels/ditches and culverts. The development of the proposed conditions drainage plan considered existing drainage patterns and infrastructure, the inflows to the development block, the downstream receiving systems, the conceptual road and lot layout in the development blocks, the standards in CSA (2020), and other northern drainage best-management practices.

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Abbreviations

asl	above sea level
bgs	below ground surface
CGS	Community and Government Services
CSA	Canadian Standards Association
DEM	Digital Elevation Model
GN	Government of Nunavut
GSC	Geological Survey of Canada
IDPA	identified drainage problem area
km	kilometres
m	metres
MAAT	mean annual air temperature
MAGT	mean annual ground temperature
mm	millimetres
NISI	Northern Infrastructure Standardization Initiative
Nunami Stantec	Nunami Stantec Limited
SWSP	Smooth Wall Steel Pipe

Definitions and Terminology

Active layer – The top layer of ground that is subject to annual freezing and thawing in areas underlain by permafrost (Canadian Standards Association; CSA, 2014).

Catchment – The area which collectively drains to a specified outlet location.

Channel – A natural or apparently natural drainage feature with defined bed and banks and which conveys perennial, intermittent, or ephemeral flow.

Constraint – Naturally occurring features that have the potential to negatively affect the design, construction and maintenance of infrastructures. Examples of terrain constraints include slope steepness, drainage conditions, snow accumulation areas, steep bedrock ridges and ice-rich permafrost.

Cross Culvert – A culvert which conveys flow beneath a travelled road.

Cryostructure – The structural characteristics of frozen earth materials. Includes the amount, distribution, type and arrangement of ice within the frozen material (National Standard of Canada, 2017)

Culvert Invert – the bottom of the end of a culvert (upstream or downstream).

Ditch – A constructed or apparently constructed drainage feature with defined bed and banks and which conveys perennial, intermittent, or ephemeral flow.

Drainage Draw – A natural or constructed drainage feature which collects and conveys semi-concentrated flow but does not have defined bed and banks.

Drainage Pathway – General term to describe drainage direction; includes overland flow, drainage draws, ditches, and channels.

Entrance culvert – A culvert which conveys flow beneath a driveway.

Existing developed areas – Existing built-up areas of Baker Lake

Geohazard – Features or terrain conditions having the potential to lead to localized or widespread damage to property and threaten personal safety. Examples of geohazards are ground subsidence related to permafrost thaw degradation, landslide, flooding and shoreline erosion.

Ground ice – A general term referring to all types of ice contained in freezing and frozen ground (National Standard of Canada 2017).

Overland Flow – Surface drainage occurring in a non-channelized, mostly evenly distributed manner over the land.

Permafrost - Defined on the basis of temperature: it is ground (i.e. soil and/or rock) that remains at or below 0 °C for at least two consecutive years (French, 2007).

Planned future subdivisions Phase A, B and C, as outlined and described in the RFP.

Substrate – Is a general term for the type of soil or rock. A substrate may be gravel, silt or sand. A coarse substrate is typically a form of gravel.

Watershed – Analogous to a catchment but often used for larger scale applications and/or referring to a large river or lake (e.g., the Meliadine River watershed).

1 INTRODUCTION

1.1 General

Nunami Stantec Limited (Nunami Stantec) was contracted by the Municipality of Baker Lake to complete a geotechnical evaluation and drainage planning for the hamlet. As indicated in the Request for Quote (RFQ) developed by the Municipality and subsequent proposal presented by Nunami Stantec, the scope of work included the following key objectives:

Geotechnical evaluation component:

- Conduct a desktop terrain assessment for surficial geology, topography, sub-watersheds and drainage conditions. Identify terrain constraints, geohazards, and evaluate the impacts of climate change on local permafrost.
- Conduct a geotechnical field investigation consisting of visual observations and a borehole investigation for the existing townsite and future development areas.
- Develop a qualitative construction suitability map categorizing the study area as generally suitable for development, conditionally suitable for development or unsuitable for development.
- Provide recommendations regarding site works and/or preparations required for future developments.

Drainage assessment and planning component:

- Evaluate the existing community drainage infrastructure and provide recommendations regarding how local drainage can be improved,
- Develop a master drainage plan that will:
- Specify techniques to plan for and implement the Baker Lake community drainage system to account for the effects of a changing climate and permafrost regime,
- Describe practices for site and community planning that help to maintain the service life of community infrastructure, as well as the natural landscape processes through avoidance, mitigation and drainage system management practices, and
- Provide low cost, practical solutions that can be adapted and implemented given local constraints on capacity and resources.

1.2 Study Area

Baker Lake is located in the Kivalliq Region of Nunavut on mainland Canada. The hamlet is located at the mouth of the Thelon River on the northwest shore of Baker Lake, approximately 320 km inland from Hudson Bay.

As detailed in the RFQ and confirmed as part of the project kick-off meeting held on April 26, 2022, the study area for the geotechnical evaluation consists of the planned future subdivisions identified as **Phase A** through **Phase C** (see Figure 1.1, and Appendix C Figures C.1 and C.2).

The study area for the drainage planning assessment is larger and includes the existing built-up area of the townsite and the immediate environs (including areas of interest identified as Phase A to Phase C). The “immediate environs” refers to land where new subdivisions may be developed within a twenty-year planning horizon, which includes surveyed subdivisions and Municipal Reserve (MR) areas as identified on the Baker Lake Community Plan & Zoning By-Law presented in Appendix B.

For clarity, the study area of Phase A through C (as shown on the Appendix C figures) and discussed throughout this report differ from areas identified as “Future Development A, B, and C” shown on the Appendix B Community Plan, which are not explicitly discussed in this report.

Figure 1-1: Study Area

2 METHODOLOGY

2.1 Desktop Terrain Assessment

Conducting a desktop terrain assessment provides key insights regarding overall site conditions, distribution of landforms and surficial materials, as well as natural processes impacting a landscape. This assessment was initiated prior to the execution of the field program, which informed the planning and execution of the field activities. The information summarized below was then reviewed using field data.

2.1.1 Background Data Review

Information collected through existing reports, historical data and published literature is summarized in the following sections. Key data sources include (but are not limited to) the following:

- Bedrock geology and surficial geology by the Geological Survey of Canada (GSC; see in-text references)
- Watershed Study (Land Data Technologies 2009)
- Literature on permafrost, geohazards and potential effects of climate change (see in-text references)
- Available geotechnical investigation reports (Golder Associates 2006; EBA 2007; 3VG 2011; Nunami Stantec 2015; WESA 2015)

Additional reference and guideline documents accounted for as part of the geotechnical evaluation and drainage planning are include in the reference section.

Available satellite imagery and 1m Digital Elevation Model (DEM) received from CGS was used to inform on the local topography, distribution of surficial materials and geoprocesses occurring on the landscape. This data was reviewed using the ArcPRO software.

2.2 Geotechnical Investigation

2.2.1 Field Program

The field program was completed between June 3 and June 6, 2022 and focused on planned future subdivisions identified as Phase A, Phase B and Phase C (see Figure 1 and Appendix C Figures).

Borehole drilling was completed between June 3 and June 6, 2022 and consisted of drilling boreholes using an air-track drill supplied and operated by Canadrill Ltd. The borehole locations are shown on Figures C.1 to C.2 located in Appendix C. The drilling was conducted under the supervision of Nunami Stantec's geotechnical engineer who observed and recorded the subsurface conditions encountered during the investigation.

Target drilling locations were selected based on the findings of the desktop terrain assessment and focused on areas assumed representative of key terrain types present within each of the three planned future subdivisions. The borehole locations were established in the field by our Nunami Stantec field representative, with borehole coordinates recorded using a hand-held GPS unit.

A total of 17 boreholes (labelled as A1-A5, B1-B6, C1-C6) were drilled to depths ranging from 2.9 to 9.5 m below ground surface (bgs). Borehole coordinates, approximate elevations, and drilling depths are provided in Table 2-1.

Table 2-1 Borehole Locations and Elevations

Borehole No.	Area of Interest	Coordinates (UTM 83 W14)		Estimated Ground Surface Elevation[1] (m)	Depth Drilled (m)
		Northing (m)	Easting (m)		
BH22-A1	Phase A	7136353	643465	31.0	3.0
BH22-A2	Phase A	7136359	643561	33.0	5.0
BH22-A3	Phase A	7136367	643764	40.1	2.9
BH22-A4	Phase A	7136324	643483	29.7	4.0
BH22-A5	Phase A	7136324	643678	35.4	6.4
BH22-B1	Phase B	7136132	642580	10.4	8.9
BH22-B2	Phase B	7136142	642650	9.5	8.8
BH22-B3	Phase B	7136096	642613	9.7	9.5
BH22-B4	Phase B	7136048	642669	8.3	9.5
BH22-B5	Phase B	7135975	642723	5.9	9.1
BH22-B6	Phase B	7136009	642760	6.2	3.7
BH22-C1	Phase C	7135471	642389	4.8	5.5
BH22-C2	Phase C	7135605	642464	3.8	5.2
BH22-C3	Phase C	7135737	642346	7.1	5.2
BH22-C4	Phase C	7135734	642480	6.2	5.1
BH22-C5	Phase C	7135759	642575	3.0	5.5
BH22-C6	Phase C	7135900	642524	6.8	6.1

NOTES:
[1] Ground surface elevation obtained from satellite-derived DEM data

Soils were described and logged in accordance with the Unified Soil Classification System (USCS). Whenever observed in the air-track return cuttings, the cryostructures were described using nomenclature and classification derived from ASTM D4083 (Standard Practice for Description of Frozen Soils, Visual-Manual Procedure). On completion, the boreholes were backfilled with the drill cuttings.

2.2.2 Laboratory Testing

Samples recovered from the site were sealed in moisture tight bags and returned to the Stantec geotechnical laboratory in Winnipeg, Manitoba for detailed classification and testing. Laboratory testing was completed on selected samples and limited to the following:

- Moisture content (or gravimetric water content) (ASTM D2216)
- Particle size analysis (ASTM D422)
- Atterberg Limits (ASTM D4318)

The results of the laboratory testing are shown on the borehole records in Appendix D, and on the laboratory testing results provided in Appendix E.

2.3 Development Suitability Assessment

The culmination of the geotechnical evaluation consists of a development suitability map, which assigns suitability classes to site-specific conditions. The development suitability classification used for the assessment is based on the recently published Risk-Based Approach for Community Planning in Northern Regions (National Standard of Canada 2023), and considered the overall site conditions encountered within the study area. A summary of criteria used for assessing development suitability is presented in Table 2-2. Results of the assessment are summarized in Section 4, with figures presented in Appendix C.

Table 2-2 Criteria used for estimating development suitability

Classes Conditions
Terrain generally suitable for development (green areas[2]) • Permafrost with low to moderate ground ice content (isolated ice wedges may be present). • Well to moderately well drained soils[3]. • Flat to gently undulating topography. • Inactive or limited periglacial processes. No observed evidence of mass movement.
Terrain conditionally suitable for development (yellow areas[2]) • Permafrost with moderate ground ice content, may include areas of high ice content. • Permafrost features such as ice wedges may be present but not readily visible. • Moderately well drained to imperfectly drained soils[3]. • Surface seepage or drainage flow path visible. • Gently to moderately sloping topography. • Site showing limited evidence of past mass movements. • Site is adjacent to an area presenting unsuitable conditions.
Terrain unsuitable for development (red areas[2]) • Permafrost with elevated ground ice content. • Confirmed presence of extensive massive ice. • Observed indicators of unstable terrain (e.g., ground settlement, thermokarst development, thermo-erosion, gully erosion, landslide). • Poorly drained to very poorly drained soils[3]. • Areas immediately alongside stream channels where flooding may occur. • Slopes above 20 percent. • Thick organic soils. • Snow drifting and/or snow accumulation areas. • Site showing active evidence of mass movement. • Areas susceptible to flooding.
NOTES: [1] What is considered “generally suitable” for one type of infrastructure or land may be “conditionally suitable” for a different type of infrastructure or land use. The same is applicable to “conditionally suitable” or “unsuitable” classes. [2] Refers to color-coded units displayed on the construction suitability maps in Appendix C. [3] Drainage classes derived from the Canadian Soil Information System (Expert Committee on Soils Survey 1982) [4] Considerations regarding available construction equipment and potential foundation systems were not accounted for.

2.4 Drainage Assessment and Planning

In northern communities, surface drainage issues during the short summers and spring/fall shoulder seasons are often a challenge. Typical drainage issues include road washouts after extreme rainfall events, water ponding, culverts with reduced capacity, and obstruction/overflow of ditches with poor definition and/or insufficient depth. The CSA, through the *Community Drainage System Planning, Design, and Maintenance in Northern Communities* (CSA 2020), indicates that a drainage analysis should have due regard for a number of interconnected factors, including existing surface drainage infrastructure, climate data, site inspection data, bedrock and surficial geology maps, topographic data, permafrost features, hydrologic data (e.g., catchment area and drainage patterns), geotechnical investigation and available plans for future development. The activities and expectations of the local community, as well as overall public safety, should also be taken into account when performing drainage assessment and planning.

The drainage assessment and planning component of this project generally followed the guidance and protocols from Clause 4 of CSA (2020). As stated in CSA (2020), under ideal circumstances, drainage system planning and design using the CSA (2020) standard is completed in advance of development. With the exception of the planned future subdivisions (Phase A, B and C), the drainage infrastructure for Baker Lake has already been constructed. Drainage assessment and planning are therefore discussed separately for the existing developed areas (Section 2.4.1) and the planned future subdivisions (Section 2.4.2).

Within each of these two sections, drainage assessment (characterization of existing conditions) and drainage planning (alterations and improvements) are discussed in sequence. The drainage assessment and drainage planning tasks were based on the results of the desktop terrain mapping (Section 2.1) and the field assessments.

As noted in CSA (2020), field assessments of drainage are best performed during spring melt conditions, to observe the drainage system under peak stress due to (for example) seasonally high runoff volumes, potential culvert and ditch icing, and slope destabilization due to freeze/thaw cycles. This is why Stantec's field assessment took place from May 31st to June 3rd 2022 during spring melt.

2.4.1 Existing Developed Areas

The existing developed areas are illustrated on Figure C.3 to C.11 (Appendix C).

2.4.1.1 Drainage Assessment

The following activities were completed during the field assessment:

- Complete tour of Baker Lake with S. Dorey (Senior Administrative Officer at the Municipality of Baker Lake) and W. Tapatai (Transportation Forman at the municipality of Baker Lake) to identify locations and details of areas which have demonstrated notable drainage issues in the past, and where the Municipality of Baker Lake would like specific recommendations for improvement. These areas were referred to as identified problem areas, or IDPAs.

- Performed assessment of cause of drainage issues at IDPAs.
- Determined finalized catchment boundaries by ground truthing the preliminary catchment boundaries. Catchment delineation for Baker Lake was completed at a scale which functionally informed, or could inform, the drainage infrastructure. For example, two separate roadside ditches (each with a series of culverts) would have their own catchments. The point where these two ditches confluence would represent the downstream end of their respective catchments, and the upstream end of a third catchment for the downstream ditch.
- Delineated ditch (constructed) and channel (natural) network in the field using ESRI ArcGIS Collector with aerial imagery. For the purposes of this project, ditches and channels had defined bed and banks whereas drainage draws (which convey semi-concentrated overland flow) were low lying areas without bed and bank definition. Ditch measurements (geometry, slope) was considered beyond the scope of this project and was not performed in 2022.
- Completed a detailed inventory of culverts in Baker Lake, obtaining the following information:
    - Street that the culvert crosses under (street name, or driveway)
    - Location (northing/easting, referenced to NAD83 UTM Zone 15 CSRS)
    - Type (entrance or cross culvert)
    - Shape (circular, box, arch, other)
    - Material (corrugated metal, metal, plastic, other)
    - Diameter or dimensions (in mm)
    - Crushing of culvert ends (yes/no)
    - Infilling of culvert barrel with sediment (depth of sediment in mm)
    - Five photographs: upstream end of the culvert facing upstream, upstream end of the culvert facing downstream, downstream end of the culvert facing upstream, downstream end of the culvert facing downstream and view of the crossing road or entrance.
    - General observations regarding upstream and downstream ditch and embankment conditions
- Using the data collected during the field inspection, the following were measured, calculated, or determined:
    - Culvert condition ratings for five different categories (Table 2-3), based on general assessment methods from CSA (2020) and a modified version of MTO (2013) to suit the project objectives and infrastructure types found in Baker Lake
    - Priority levels for remediation (high, medium, low as outlined in Table 2-3) for each of the five culvert condition ratings

Table 2-3 Culvert Rating Methodology (modified from MTO 2013)

Category	Rating Methodology
Material - Metal Culverts	0 - New condition, may also exhibit slight discolouration of surface, galvanizing partially gone along invert. 1 - Discolouration of surface, galvanizing completely gone along invert but no layers of rust. Minor pinholes in pipe material located at end of pipe but not located beneath roadway. 2 - Layers of rust forming. Sporadic pitting of invert, minor pinholes forming throughout pipe. 3 - Heavy rust, thick scaling throughout pipe. Deep pitting, perforations throughout invert. 4 - Extensive heavy rust, extensive perforations throughout pipe. End sections corroded away. Bottom portion completely corroded exposing underlying granular. Partially to fully collapsed. Priority levels for remediation: High: 3-4 Medium: None Low: 0-2
Shape	0 - Smooth curvature in barrel. Span dimension within 3% of design. 1 - Smooth curvature in top half of barrel with flattening on bottom portion. Span dimension up to 5% greater than design. 2 - Slight distortion in one location on the top portion. Bottom has slight reverse curvature in one location. Span dimension up to 10% greater than design. Nonsymmetrical shape. 3 - Significant distortion throughout length. Lower 1/3 may be kinked. Span dimension up to 15% greater than design. 4 - Extreme deflection at isolated locations. Flattening at top of arch or crown. Bottom has reverse curvature throughout. Span dimension greater than 15% of design. Extremely non-symmetrical Priority levels for remediation: High: 3-4 Medium: 2 Low: 0-1
Capacity	0 - Little to no sediment build-up in pipe. Culvert ends are undamaged. Little to no debris blocking flow. 1 - Minor debris and sediment, less than 30% blockage. Possible infiltration of fine roots. No evidence of flooding of roadway or adjacent land. 2 - Major debris and sediment more than 30% blockage, flooding of roadway and/or adjacent properties. Possible infiltration of tap roots causing major flow restriction. Priority levels for remediation: High: 2 Medium: 1 Low: 0
Erosion and Scour	0 - Embankment, slopes, and at culvert outlet are intact and stable. 1 - Minor erosion of embankment, slope, or at culvert outlet less than 100mm around ends. Still protected or well vegetated. 2 - Major erosion of slope, embankment, or at culvert outlet greater than 200mm around culvert ends, guardrail displaced / settled, posts loosened / separated from soil. Priority levels for remediation: High: 2

Category	Rating Methodology
	Medium: None Low: 0-1
Upstream and Downstream Channel	0 - No evidence of channel bed or bank erosion. Intermittent patches of grass and exposed earth. 1 - Minor channel erosion. Minor damage to channel protection. 2 - Bank protection eroded. Bank protection debris causing blockage and more significant channel erosion. Deposition within channel impeding flow. Channel alignment causing scour holes, bank erosion, and is threatening end treatment. Major erosion of channel. Priority levels for remediation: High: 2 Medium: None Low: 0-1

Integration of observations in ESRI ArcGIS produced an existing conditions drainage map consisting of catchment boundaries, overland drainage pathways, drainage channels/ditches, and culverts. The map was accompanied by a detailed culvert inventory and by text summarizing the general drainage conditions in the developed areas of Baker Lake. Collectively, the existing conditions drainage map, detailed culvert inventory, and general summary of drainage conditions represented the drainage assessment. The drainage assessment provided the basis for drainage planning of the Baker Lake developed areas.

The results of the drainage assessment were compared to established industry standards and guidelines for northern communities and for local roads from CSA (2020) and MTO (2013) by completing the following:

- ROW were checked such that sufficient ROW width of 16 m to accommodate for travelled road surface, shoulders, walkway, snow storage and drainage ditches (CSA 2020) was present throughout the community
- Visual observations for positive drainage across roads to roadside ditches, ideally from the centreline road crown (CSA 2020) during the field assessment
- Visual observations to determine if roadside ditches have positive drainage and capacity to accommodate piling of snow, in accordance with typical dimensions provided in CSA (2020) during the field assessment
- Adequate culvert conditions (priority levels for remediation provided in Table 2-3Table 2-3) were assessed in the field
- Presence of marker post (CSA 2020) were assessed in the field

2.4.1.2 Drainage Planning

The planning task for existing developed areas adopted separate approaches for i) general drainage conditions and ii) the IDPAs:

For General Drainage Conditions:

Based on the general drainage conditions and comparisons to established industry standards outlined in Section 2.4.1.17, a series of community-wide recommendations were developed to improve the existing drainage system. The recommendations for culverts were more specific owing to the level of detail of the culvert inventory. The recommendations took into consideration the following:

- Qualitative assessment of cost efficiency for drainage improvements.
- The expectations and typical activities of the residents of Baker Lake should be, to the degree practicable, preserved.
- Construction equipment, materials, or windows may impact the plausibility or timeframe for implementation of drainage improvements.
- Baker Lake is the fourth largest settlement in Nunavut. The scale and level of entrenchment of the existing drainage infrastructure into the community is considerable. This differs from smaller northern communities, where large-scale changes to the drainage network can be made without significant disruption to the existing community or prohibitive capital costs. Therefore, large-scale alterations to the existing drainage boundaries or existing drainage network were not considered for the developed areas of Baker Lake (unless at an IDPA; see description below).

At IDPAs: Specific, site-scale recommendations were provided for each of the IDPAs. The recommendations were developed to address the specific cause of the drainage issue at the IDPA. Recommendations for each IDPA were illustrated on a map of the IDPA and described in text.

2.4.2 Planned Future Subdivisions

The planned future subdivisions (Phase A, B and C) are illustrated on Figure 1.1.

2.4.2.1 Drainage Assessment

During the field assessment, the preliminary catchments from the desktop terrain mapping were ground-truthed to confirm their locations. Overland drainage pathways and drainage channels/ditches were documented, and culverts were identified and characterized using the protocol outlined in Section 2.4.1.1. Surrounding drainage infrastructure and potentially sensitive environmental features were identified to inform inflows to the development block(s), and potential outfall locations from the development block(s). Low lying areas prone to seepage and ponding were noted to supplement the geotechnical investigation of construction suitability.

Integration of observations in ESRI ArcGIS produced an existing conditions drainage map consisting of catchment boundaries, overland drainage pathways, drainage channels/ditches, and culverts. The

existing conditions drainage map provided the basis for drainage planning of the planned development areas.

2.4.2.2 Drainage Planning

A proposed conditions drainage plan (map with text description) was developed consisting of general development block grading and overland flow direction, constructed channels/ditches, culverts, and outfall locations. The development of the proposed conditions drainage plan considered existing drainage patterns and infrastructure, the inflows to the development block, the downstream receiving systems, any nearby sensitive environmental features, the conceptual road and lot layout in the development blocks, the standards in CSA (2020), and other northern drainage best-management practices.

3 SUMMARY OF SITE CONDITIONS

The following sections summarize general site conditions based on a desktop review and terrain mapping.

3.1 Regional Setting

3.1.1 Bedrock Geology

The area lies within the Archean Rae Domain of the Western Churchill Province (Canadian Shield) and is underlain by Archean granitoid and gneissic rocks, and metamorphosed Archean and Proterozoic sedimentary and volcanic rocks (Hadlari et al., 2004).

3.1.2 Surficial Geology

Surficial geology mapping is available from maps produced by the GSC (Map 3-1985, Map 43-1989, Map 2120A), with the most recent mapping conducted by McMartin et al. (2008, Map 2120A).

The developed portion of the community mainly sits on beach ridges, till, washed till, and glaciolacustrine deposits (the glaciolacustrine material is not represented on published surficial geology maps due to the regional mapping scale). The till is generally sandy to silty with less than 25% clay sized particles. The material is noncalcareous and includes variable amounts of gravel to boulder size materials. The thickness of the till is generally less than 5 meters (m), and it generally sits on bedrock. In some areas the till is clay-rich and red (i.e., in comparison to the more usual grey) and forms a thicker plain. Sandy to silty till veneers (i.e., less than 1 m thick) are common, especially within proximity of exposed bedrock surfaces.

During deglaciation, the ice divide position was across the Pitz Lake basin and western part of Baker Lake, damming a large glacial lake in the Thelon River valley and Princess Mary Lake basin (i.e., west of Baker Lake). Marine waters inundated the Thelon basin to an elevation of 155 m west of Schultz Lake (northwest of Baker Lake), dropping to about 125 m near Baker Lake. This marine intrusion resulted in the formation of well-developed beach ridges that are visible both east and south of the community, and around higher hills inland to the west and north. The material generally consists of sand, gravel, cobbles, or boulders; are variable thickness and generally well sorted. Areas of washed till deposits (i.e., where fines have been progressively removed by former wave action) are also present locally.

Surficial mineral soils are generally covered by a layer of organic soil, especially in poorly drained low-lying areas where the organic soils are the thickest (generally under 1 m). Vegetation consists of moss and lichen and some sedge grasses.

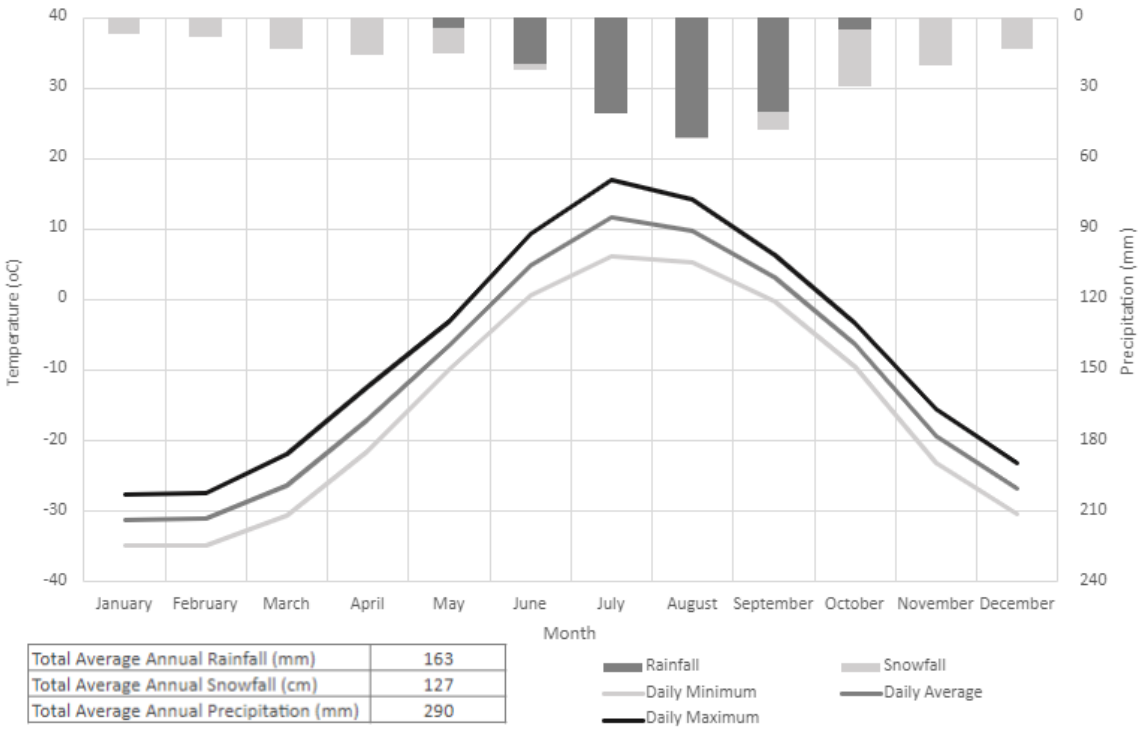
3.1.3 Topography

The developed portion of Baker Lake lies on terrain that slopes down towards the lake (i.e., south/southwest) at grades averaging 4 to 7 percent (%). The topography within the planned future subdivisions (i.e., Phase A through Phase C) remains fairly similar, with a natural terrain sloping towards the lake at an average grade of 7%.

Steeper grades in the order of 10-15% are present (e.g., downslope from the tank farm), even up to 40% (along the bedrock escarpment south from the Heritage Park); however, these areas remain undeveloped.

3.1.4 Climate

Climate Normals (1981 to 2010) including precipitation (snowfall and rainfall) and temperature are presented in Figure ***3.1***. The average daily mean temperature from the Baker Lake Airport from 1981 to 2010 is -11.3 °C (Environment Canada, 2015). The average annual precipitation is 272.5 mm with an average annual snowfall of 126.5 mm (Environment Canada, 2015). The average freezing and thawing indices over the last 30 years have been 4970 C° days and 900 C° days, respectively (EBA, 2011). Based on temperature data from 1979 to 2008, the Environment Canada Climate Station in the Baker Lake region shows a warming trend of 0.78 °C per decade.



Total Average Annual Rainfall (mm)	163
Total Average Annual Snowfall (cm)	127
Total Average Annual Precipitation (mm)	290

Figure 3-1: Temperature and Precipitation at Baker Lake A (1981 – 2010 Climate Normals)

Degree days for a given day are the number of degrees Celsius that the mean temperature is above or below a specified temperature. Degree days for a given period of time is the sum of those daily degrees Celsius values, across the given period of time. Heating degree days provide an estimate of the heating requirements for buildings, and consider temperatures below 18°C. Growing degree days are used in agriculture as an index of crop growth, and consider temperatures above 5°C. Figure 3.2 illustrates the heating degree days and growing degree days (based on 1981 – 2010 climate normal) at Baker Lake A (GoC 2022). Figure 3.2 indicates that heating of homes is required for much of the year, and vegetation growth is limited to the summer months (predominantly in July and August).

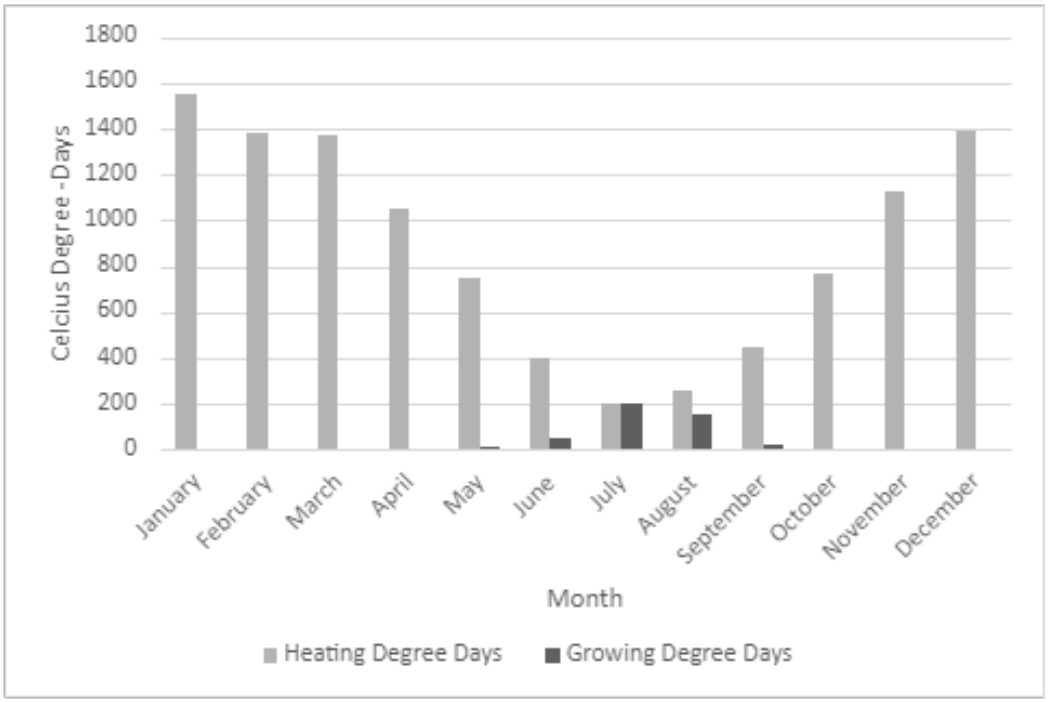
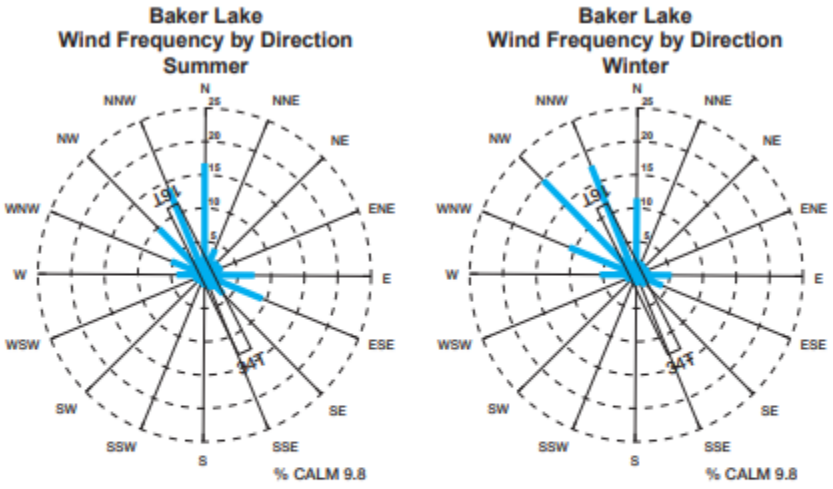


Figure 3-2: Degree Days at Baker Lake A (1981 - 2010 Climate Normals)

In the witner strong north-northwest winds are common across the entire area (Figure 3.3), frequently bringing blowing snow and blizzard conditions (Nav Canada, 2010). These extreme windy conditions can often last for days and result in considerable spatial redistribution of snowpack within the variable topography (e.g., snowdrift in certain areas, barren ground in others). Three snow fences are currently in place to prevent snow from reaching the community. During spring melt, areas downstream of the snow fences are impacted by increased surface runoff.



Percent wind 20 knots and greater																Baker Lake
DIRECTION	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	N
SUMMER	0.1	0.1	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.0	1.6	1.4
WINTER	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.4	2.0	7.1	7.9	3.3

SOURCE: Nav Canada (2010)

Figure 3-3: Wind Rosettes for Baker Lake Airport

3.1.5 Hydrology

The hydrology in Baker Lake is largely snowmelt driven although notable precipitation and runoff events can occur in the summer months. The spatial redistribution of snowpack over the winter is likely to result in increased runoff rates and volumes in catchments with snow accumulation. Ditch and culvert icing during spring melt is a common occurrence in northern communities, and may inhibit drainage in affected areas (CSA 2020).

Watershed (catchment boundary linework) and hydrology (mapped waterbodies and watercourses) provided by the Government of Nunavut were compared to the topographic and aerial imagery datasets in ESRI ArcGIS. Adjustments to the catchment boundary and watercourse/waterbody linework were made as necessary based on the topographic and aerial imagery datasets.

3.1.6 Permafrost

Permafrost mapping from the National Atlas of Canada shows the Baker Lake area as part of a continuous permafrost region (Natural Resources Canada, 1995). Data from the Geological Survey of Canada (2013) show a Mean Annual Ground Temperature (MAGT) of -7.9 °C. Additional reported ground temperatures values reported at sites located within the community range from -2.5 to -7.4 °C (EBA 2011) and -6 °C (EBA 2011). The reported depths to permafrost ranges from 1.0 to 2.8 m.

4 RESULTS

4.1 Geotechnical Investigation

4.1.1 General Observations

The following general observations were made 1) throughout the Hamlet of Baker Lake, and 2) within the specific areas of interest of potential future development (Phase A, B, and C):

Hamlet of Baker Lake

- A dominant factor negatively affecting the existing development within the townsite is drainage. The existing developed areas of town traverse relatively steep terrain with drainage generally flowing south to Baker Lake (see detailed discussion on current drainage conditions in section 4.3)
- Buildings throughout the community are generally constructed on granular pads, typically approximately 1 m thick. The following building foundation types were observed:
    - Pipe Piles: Typically 100 mm to 200 mm in diameter, supporting raised buildings typical of northern construction. From discussion with a local piling contractor within community (Canadrill Ltd.), they have installed pipe piles at several sites in Baker Lake. The typical practice in Baker Lake is to install rock-socketed piles (grouted several metres into the bedrock below the bedrock surface). Pipe piles were typically observed on larger, and newer buildings (school, government offices), but also on some residential buildings.
    - Pad and Jack: Typically constructed on a granular pad, approximately 1 m thick, supporting raised buildings. Various jack types were observed, including steel screw jacks, or simple wooden wedges/splices. Pad and jack foundations were typically observed on smaller, and older structures (typically residences), and were very common throughout the community.
    - Space frame: Typically constructed on a granular pad, approximately 1 m thick, supporting raised buildings. Space frame foundations were typically observed on medium-sized buildings (residences and some other buildings). Generally less frequently observed compared to either pipe pile or pad and jack foundations.
- From discussion with the Hamlet SAO, there are no known issues with building foundations associated with thaw settlement in the community. No signs of thaw settlement observed during site visit.
- No signs of active or historical mass movements within the community.

Phase A

- Slopes varying from approximately 5 to 8 %, generally sloping from north to south.
- Ground cover is typically moss with some grass.
- Upgrades to surface drainage would be required for development, to manage surface water flow though site.

Phase B

- Slopes varying from approximately 2 to 4 %, generally sloping from northwest to southeast.
- Ground cover is typically moss with some grass.
- Some ruts (presumably from construction vehicles or all-terrain vehicles) observed impacting growth of vegetation and resulting in some thaw degradation.
- Overland flow traversing the site observed during June site visit, presumably from Spring runoff. Overland flow does not cut deeply into terrain, and likely susceptible to meandering.
- Very wet terrain with standing water up to 0.3 m deep adjacent to overland flow areas.
- Upgrades to surface drainage would be required for development, to manage overland flow though site.
- Building up of individual building lots with granular pads (typical of within community) likely required for development.

Phase C

- Slopes varying from approximately 2 to 5 %, generally sloping from northwest to southeast.
- Ground cover is typically moss with some grass.
- Some ruts (presumably from construction vehicles or all-terrain vehicles) observed impacting growth of vegetation and resulting in some thaw degradation.
- Overland flow traversing the site observed during June site visit, presumably from Spring runoff. Overland flow does not cut deeply into terrain, and likely susceptible to meandering.
- Very wet terrain with standing water up to 0.3 m deep adjacent to overland flow areas.
- Upgrades to surface drainage would be required for development, to manage overland flow though site.
- Building up of individual building lots with granular pads (typical of within community) likely required for development.

4.1.2 Subsurface Conditions

The subsurface conditions (including stratigraphy, groundwater conditions, bedrock, and permafrost and seasonal frost conditions) have been inferred based on the investigation results obtained during the field and laboratory testing programs, and supported from available bedrock geology and permafrost mapping.

Detailed descriptions of the soil stratigraphy encountered during the field drilling program are shown on the borehole records provided in Appendix D which also includes summary sheets of the symbols and terms used on the records. In all boreholes where bedrock was encountered, no coring of the bedrock was completed. The bedrock was characterized based on visual observations of return cuttings, and from available bedrock geology mapping of the area.

The pertinent subsurface condition findings from the geotechnical investigation are outlined in the sections below.

Laboratory testing results are provided in Appendix E with results included on the borehole records where applicable.

4.1.3 Soil Stratigraphy - Phase A

Phase A of the geotechnical exploration program included a total of five (5) boreholes drilled to a maximum depth of 6.4 m. The soil stratigraphy observed in the boreholes is listed below.

4.1.3.1 Organics

A layer of organics was encountered at the surface of all boreholes, extending to a depth of 0.1 m. The organics layer mainly consisted of moss and grass.

4.1.3.2 Till

A layer of till was encountered underlying the organics in the boreholes, extending to depths ranging from 2.2 m to 5.4 m. The till layer was grey to brown in colour, and the main constituents were gravel and sand in BH22-A1, BH22-A4 and BH22-A5 and silty sand in BH22-A2 and BH22-A3. The moisture content ranged from 4 to 21 %.

4.1.3.3 Bedrock

Bedrock was encountered in the boreholes underlying the till layer at depths ranging from 2.4 m (elevation 28.6 m) and 5.4 m (elevation 30 m). The bedrock was granitic and the colour ranged from pink to red. It should be noted that the bedrock was not characterized by rock-coring, due to limitations of the air-track drilling method. The bedrock was characterized based on visual observations of return cuttings, and from available bedrock geology mapping of the area. The bedrock mapping indicate Baker Lake is located within the Canadian Shield with predominantly granitic gneiss or granodiorite bedrock.

The presence of bedrock was inferred based on observations from the drill progress/behaviour and the cuttings returned to surface by the air-track drill. Based on the drilling method, the quality of the bedrock (i.e., presence of fractures) could not be accurately assessed.

4.1.4 Soil Stratigraphy - Phase B

Six (6) boreholes, BH22-B1 to BH22-B6, were drilled as a part of Phase B of the drilling program. The soil stratigraphy observed in these boreholes is listed below.

4.1.4.1 Organics

A layer of organics was encountered at the surface of all boreholes, extending to a depth of 0.1 m. The organics layer mainly consisted of moss, lichen and grass.

4.1.4.2 Till

A layer of till was encountered underlying the organics in all the boreholes, extending to depths ranging from 3.2 m to 9.0 m. The till layer was grey to brown in colour, and the main constituents were gravel and silty sand. The moisture content ranged from 5 to 24 %.

4.1.4.3 Bedrock

Bedrock was encountered in boreholes BH22-B1 to BH22-B5 underlying the organics and till layer. The bedrock was granite and the colour ranged from pink to red. It should be noted that the bedrock was not characterized by rock-coring, due to limitations of the air-track drilling method. The bedrock was characterized based on visual observations of return cuttings, and from available bedrock geology mapping of the area.

4.1.5 Soil Stratigraphy - Phase C

Phase C included Six (6) boreholes, BH22-C1 to BH22-C6. The soil stratigraphy observed in these boreholes is listed below.

4.1.5.1 Organics

A layer of organics was encountered at the surface of all boreholes with an average thickness of 0.5 m. The organics layer mainly consisted of moss and grass.

4.1.5.2 Till

A till layer was encountered underlying the organics in all the boreholes, extending to depths ranging from 3.6 m to 5.1 m. The till layer was grey to brown in colour, and the main constituents were gravel and silty sand. Sandy lean clay was observed in BH22-C3. The moisture content ranged from 3 to 21%.

4.1.5.3 Bedrock

Bedrock was encountered in all the boreholes underlying the organics and till layer. The bedrock was granite and the colour ranged from pink to white. It should be noted that the bedrock was not characterized by rock-coring, due to limitations of the air-track drilling method. The bedrock was characterized based on visual observations of return cuttings, and from available bedrock geology mapping of the area.

4.1.6 Laboratory Test Results

Laboratory testing was performed on select representative soil samples collected from the field drilling program to assist in characterization of the soils. Moisture content tests were conducted on all soil samples recovered from the test pits and boreholes. Select representative soil samples were also tested for Atterberg limits (ASTM D4318) and particle size analysis (ASTM D422).

The results of the laboratory testing are shown on the detailed borehole records provided in Appendix D. Laboratory test results for Particle Size Analysis and Atterberg limits, are provided on the laboratory testing result sheets provided in Appendix E, and summarized in Table 4-1 and Table 4-2.

Table 4-1 Particle Size Analysis Results

Borehole	Sample Depth (m)	Soil Type	USCS Classification	Particle Size Distribution			
				Gravel (%) > 4.75 mm	Sand (%) 4.75 to 0.075 mm	Silt (%) 0.075 to 0.002 mm	Clay (%) < 0.002 mm
BH22-A1	1.7 – 2.0	Till	Silty Sand (SM)	6.7	54.1	27.3	11.9
BH22-A2	0.3 – 0.9	Till	Silty Sand (SM)	3.9	57.0	31.2	7.9
BH22-B1	1.5 – 2.1	Till	Silty Sand (SM)	12.9	44.6	31.4	11.1
BH22-C2	1.5 – 2.1	Till	Silty Sand (SM)	7.0	50.4	33.2	9.4
BH22-C4	2.1 - 2.6	Till	Silty Sand (SM)	5.0	50.4	35.7	8.9
BH22-C5	0.3 – 0.9	Till	Well-Graded Sand with Silt (SW-SM)	14.0	72.4	11.8	1.8

Table 4-2 Atterberg Limits Test Results

Borehole	Sample Depth (m)	Soil Type	USCS Classification	Liquid Limit	Plastic Limit	Plasticity Index
BH22-A2	0.3 – 0.9	Till	Silty Sand (SM)	18	13	5
BH22-B1	1.5 – 2.1	Till	Silty Sand (SM)	20	12	8
BH22-C2	1.5 – 2.1	Till	Silty Sand (SM)	17	10	6
BH22-C4	2.1 – 2.6	Till	Silty Sand (SM)	16	11	5

4.1.7 Groundwater and Soil Sloughing

The boreholes were checked for signs of groundwater seepage during drilling. Groundwater seepage observations are noted on the borehole records provided in Appendix D, and summarized on Table 4-3. Because of the air track drilling method used, observations on soil sloughing and final groundwater depth within the boreholes could not be accurately observed/measured.

Table 4-3 Groundwater Seepage Observations

Borehole	Groundwater Seepage	Source of Groundwater Seepage
BH22-A1	Moderate	Surface
BH22-A2	None	
BH22-A3	Heavy	Surface
BH22-A4	Moderate	Surface
BH22-A5	Moderate	Surface
BH22-B1	None	
BH22-B2	None	
BH22-B3	None	
BH22-B4	None	
BH22-B5	None	
BH22-B6	None	
BH22-C1	None	
BH22-C2	None	
BH22-C3	Minor	Surface
BH22-C4	None	
BH22-C5	None	
BH22-C6	None	

It should be noted that only short-term seepage conditions were observed in each borehole. Groundwater levels will normally fluctuate during the year and will be dependent on precipitation, surface drainage, seasonal frost and permafrost conditions, and potential exposure of permafrost to thawing conditions during excavation. In the summer and early fall, it is common for groundwater to become perched below grade, over the underlying frozen ground.

4.1.8 Permafrost and Ground Ice

Whenever observed in the air-track return cuttings, the cryostructures were described using nomenclature and classification derived from ASTM D4083 (Standard Practice for Description of Frozen Soils, Visual-Manual Procedure).

Ground ice content varied within the samples retrieved but was difficult to quantify due to the drilling method utilized (i.e., destructive drilling using an air track rig). Approximate amounts of ground ice based on field observations of disturbed samples have been included in the borehole logs.

Key observations regarding permafrost and ground-ice are summarized below.

Phase A:

- Ground ice contents within the till ranged between 0% to 20%, and as a whole were considered low to moderate.
- No visible signs of ice wedges or periglacial processes (e.g., mass movements)

Phase B:

- Ground ice contents within the till ranged between 0% to 20%, and as a whole were considered low to moderate.
- No visible signs of ice wedges or periglacial processes (e.g., mass movements)

Phase C:

- Ground ice contents within the till ranged between 0% to 60%, and as a whole were considered low to moderate.
- No visible signs of ice wedges or other periglacial processes (e.g., mass movements)

Determination of the active layer thickness was not possible due to the geotechnical investigation program taking place in early June, (i.e., several months before the active layer thickness can be measured, likely occurring late-September in Baker Lake).

4.2 Development Suitability Assessment

The qualitative development suitability assessment conducted as part of the project focused on terrain and geotechnical site conditions that could adversely affect land development within areas of interest being considered for development (Phase A, B, C).

Typical adverse conditions are generally associated with the following two main categories:

Terrain and/or geotechnical constraints consisting of naturally occurring features having the potential to negatively affect the design, construction and maintenance of infrastructure. Local examples of terrain or geotechnical constraints may include slope steepness, thick organic-rich soils, poor drainage conditions, the occurrence of fine-grained soils or ice-rich permafrost.

Landscape hazards consisting of features or conditions having the potential to lead to localized or widespread damage to property and threaten personal safety. Local examples of landscape hazards may include mass movements, gully erosion, thermokarst and ground subsidence, flooding or shoreline erosion.

Guided by the criteria listed in Table 2-2, the following suitability rating was used to classify the study area:

- ***Terrain generally suitable for development:*** Terrain classified as generally suitable for development consisted predominantly of areas with low to moderate ground ice, with well to moderately well drained soils, and flat to gently undulating topography. Based on the findings of the development suitability assessment, short to medium-term developments strategy should focus on terrain identified as generally suitable for development.
- ***Terrain conditionally suitable for development:*** Terrain conditionally suitable for development consisted predominantly of areas associated to the presence of moderately well drained to poorly drained soils. The application of best practices for construction and drainage management will be required.

- ***Terrain unsuitable for development:*** Terrain unsuitable for development consisted predominantly of areas associated to the presence of poorly drained to very poorly drained soils where visible stream channels or drainage flow paths were observed. This also includes areas directly within the observed overland drainage which are also susceptible to flooding. Although engineering measures and construction techniques could be applied to address these constraints, avoiding these locations is recommended.

Figure C.1 and C.2 (Appendix C) present the development suitability data for the three development phases and immediate surrounding areas.

Wherever development is to occur in areas presenting constraints and hazards, then appropriate design, construction and maintenance guidelines should be applied (see Section 6: Conclusion and Recommendations).

4.3 Drainage Assessment and Mapping

4.3.1 Existing Developed Areas

Figure 1.1 illustrates the existing conditions boundaries (catchments) for the overall Baker Lake study area. The catchment boundaries, drainage pathways, and drainage infrastructure are illustrated in greater detail on Figure C.3-through Figure C.11 in Appendix C. Culvert Characteristics are provided in Appendix F.

4.3.1.1 General Drainage Conditions

DRAINAGE ASSESSMENT

Catchments. The drainage assessment resulted in a total of 30 catchments within the Baker Lake developed and surrounding areas. The catchment delineation method resulted in smaller catchments within the developed community center, owing to the density of drainage infrastructure of interest (I.e., desired outfall points).

ROW Widths. Figure 4 from CSA (2020) recommends a 16 m wide ROW width for local roads. Desktop analysis indicated that the majority of ROW widths are greater than 16 m, although the road footprint is often offset to one side of the ROW.

Ditches and Channels. A total of 11 m of ditches and channel were delineated within the 30 catchments. 2,991 m of the delineated ditches were poorly defined, meaning the ditch did not have adequate depth and/or appropriate geometry to convey flow. 8 m of ditches were defined. Figure 5 from CSA (2020) recommends that ditches should be present on both sides of roads to convey roadway drainage coming from the road crest. In some cases, ditching on both sides of the road is not required due to the overall drainage patterns in the catchment or on the road. This is reflected in Figure 4 of CSA (2020). In the developed core of Baker Lake, 11.1 km of the ditches/channels are within 5 m of the road ROW and may be considered roadside drainage ditches. The total road network within the development core of Baker Lake is approximately 94.2 km; therefore, approximately 11.8% of the road network within Baker Lake's

developed core has roadside ditches. CSA (2020) generally recommends that roadside ditches be provided on at least one side of each road for snow accumulation and conveyance of runoff.

- Drainage deficiency: spatial coverage of the ditch network is insufficient for the road network.

The distinction between a ditch and channel (as defined in the Definitions and Terminology section) can be subjective. This was especially true for the Baker Lake drainage infrastructure because many of the roadside drainage features are informal (i.e., not intentionally constructed), or have little to no bed or bank definition putting them on the threshold of a ditch/channel. This wide, shallow drainage ditch design can be important in northern communities to allow for flexible vehicle access to buildings for servicing (e.g., septic pumpouts, fuel tank filling, water tank filing) (CSA 2020). However, the shallow ditch geometry in Baker Lake comes at the expense of reduced capacity for snow clearing in the winter and flow conveyance during runoff events in the spring, summer, and fall, as well as increased risk of ditch and culvert icing during the winter and during spring melt periods. In addition, the shallow ditch geometry facilitates the driving of vehicles, ATV's and snowmobiles in the ditch which can a) alter the geometry (impairing conveyance) b) compact snow piled in the ditch (increasing risk of ditch and culvert icing/blockages) and c) crushing of culvert ends (impairing conveyance). Depending on the road crest elevation and overall drainage patterns, the spilling or ponding of water on the road may also result from the shallow ditch geometry.

Minimum ditch dimensions provided by CSA (2020) include 2-4 m width and 0.75 m depth, although ditches should be sized as required to adequately convey the flows they are receiving. Hydraulic modelling should be completed in future ditch design. Ditch dimensions were not obtained in 2022, however depths of less than 0.75 m were frequently observed both in ditches/channels, and in roadside drainage features not formally categorized as ditches/channels.

- Drainage deficiency: variable and often insufficient ditch depths and widths (qualitative observation).

Culverts. A total of 164 culverts were inventoried in Baker Lake in the 2022 field program, consisting of 98 cross culverts and 66 entrance culverts. The location, IDs and drainage direction of each culvert are illustrated on Figure C.4 through Figure C.11 in Appendix C. The detailed database of culvert characteristics, along with datasheets for each culvert, are provided in Appendix F.

A breakdown of culvert type, material, and size are provided in *Table 4-4*. All culverts were circular in shape.

Table 4-4 Summary Characteristics of Culverts in Baker Lake

Culvert Type	Culvert Material	Culvert Diameter (mm)														Totals	
		140	160	400	500	600	700	750	800	900	1000	1100	1500	1600	1700		
Cross	CSP			2	15	51	5	1	2	2	7	3	3	3	1	95	98
	Steel	1	1		1											3	
Entrance	CSP			1	22	36		1	3		1					64	66
	Steel	1			1											2	
Totals		2	1	3	39	87	5	2	5	2	8	3	3	3	1	164	164

Culvert Condition Ratings: Barrel Material, Shape, Capacity, Erosion and Scour. *Table 4-5* provides a summary of culvert condition ratings for the 164 culverts inventoried in Baker Lake. The priority level for remediation, as defined in *Table 2-3*, is also indicated in *Table 4-5*.

Table 4-5 Summary of Culvert Condition Ratings

Condition Rating	Barrel Material (0-4)		Shape (0-4)		Capacity (0-2)		Erosion and Scour (0-2)		US/DS Channel (0-2)	
0	149	90.9%	50	30.5%	65	39.6%	44	26.8%	97	59.1%
1	12	7.3%	17	10.4%	28	17.1%	109	66.5%	53	32.3%
2	3	2%	65	39.6%	71	43.3%	11	6.7%	14	8.5%
3		0%	16	9.8%						
4		0%	16	9.8%						
NOTES Priority for remediation (based on Table 2-3):					High	Medium	Low (no highlight)			

Based on the results in *Table 4-5*, the following drainage deficiencies are noted:

- Drainage deficiency: 32 of the 164 culverts (19.5 %) have damaged ends with a high priority for remediation; and an additional 65 culverts have damaged ends with a medium priority for remediation.
- Drainage deficiency: 71 of the 164 culverts (43.3%) are infilled with a high priority for remediation.
- Drainage deficiency: 11 of the 164 culvers (6.7%) have erosion and scour in the vicinity of the culverts ends with a high priority for remediation.
- Drainage deficiency: 14 of the 164 culverts (8.5%) have channel erosion, scour, sedimentation, or other instability upstream or downstream of the culvert that threatens the culvert such that there is a high priority for remediation.

Culvert Marker Pole. Only 15 of the 164 culverts had functional marker poles at both ends of the culvert. The purpose of the marker poles is to identify culvert ends so that drivers and snowplows can avoid the culvert ends, therefore minimizing damage. The absence of culvert marker poles is likely a contributing factor to the high rate of culvert end damage (*Table 4-5*, Shape condition).

Other general drainage problems that were observed during the drainage assessment or otherwise expressed to Stantec included:

- Drainage deficiency: backyard or front yard ponding is a frequent occurrence.
- Drainage deficiency: several driveways are missing entrance culverts; this results in a blockage of the existing ditch and conveyance issues.
- Drainage deficiency: full complement of emergency flooding equipment and supplies is not held in reserve for emergency use.
- Drainage deficiency: drainage monitoring is completed on a response- or incident-basis; a formal drainage monitoring program is not currently in place.

DRAINAGE PLANNING

As discussed in Section 3.4.1.2, there is an extensive amount of existing drainage infrastructure within Baker Lake which is well-entrenched into the overall community infrastructure. Based on drainage deficiencies noted in the drainage assessment above, 10 community-wide drainage recommendations were developed for Baker Lake (Table 4-6). It is Stantec's opinion that implementation of these drainage recommendations is likely to improve drainage conditions within the existing community.

CSA (2020) recommends Smooth Wall Steel Pipe (SWSP) culverts as the preferred material where depth of cover or culvert icing issues are present. The structural strength and longer lifespan of SWSP culverts is advantageous for the long-term resiliency of the drainage plan, however SWSP is considerably more expensive than CSP. Depending on the drainage conditions and challenges at a given site and material availability, the increased cost of SWSP may be warranted.

Table 4-6 Community-Wide Drainage Recommendations

Drainage Deficiency [1]	Recommended Action(s)
Ditch network coverage insufficient for road network	Increase the density of drainage ditches alongside the road network in Baker Lake. The existing conditions drainage map delineates the existing ditch network relative to the road network and provides the foundation for Baker Lake to identify areas requiring additional roadside ditches. New ditches should meet the ditch geometry standards outlined in CSA (2020); that is, width of 4 m and depth of 0.75 m. These dimensions result in side slopes of approximately 2.7:1 (H:V) which should be reasonable for occasional servicing access by vehicles if required, but will also discourage everyday driving over the ditches which should preserve ditch geometry, conveyance capacity, and snow clearing capacity. If the ditching area has space constraints, the width of the ditch may be narrowed to a minimum of 2 m. Larger ditches may be required if inflows require increased conveyance capacity or if ditch or culvert icing is common in the area. As ditch construction may restrict access to properties, designated site access (driveways) and entrance culverts may need to be provided for private properties. Entrance culverts should have the required depth of cover, have marker posts installed, and have culvert end treatments applied to protect the ends from damage. Where warranted and/or practicable, efforts should be made to install SWSP culverts (CSA 2020). The Culvert diameter for entrance culverts should be at least 400 mm. If the culvert is located within a culvert chain, the culvert should be equal to or larger than the upstream culverts. Culvert invert elevations should be such that they connect directly to upstream and downstream ditch elevations and provide positive drainage through the culvert and through the overall drainage network. Verifying elevations for positive drainage conditions during installation may be completed by manual survey using a level and stadia rod or other comparable survey equipment.
Qualitative variable and often insufficient ditch depths and widths	Improve the geometry of existing drainage ditches. Where permafrost and soil conditions permit, existing ditches should be improved to meet, at a minimum, CSA (2020) guidelines. Recommendation actions for ditch design detailed in Ditch network coverage insufficient for road network drainage deficiency.
32 culverts have damaged ends with a high priority for remediation; an additional 65 culverts have damaged ends with a medium priority for remediation	Repair the damaged/crushed culvert ends to re-establish hydraulic conveyance capacity of the culvert. The 32 culverts requiring remediation are identified in the detailed culvert database in Appendix F. The severity of the damage will determine the required work at each culvert: i. Culverts with minor deformation at the ends may be bent back to the intended shape with appropriate tools ii. Where i) is not possible, culverts may be repaired by cutting off the damaged portion and either leaving it square (if remaining culvert projects from embankment) or adding a short section of new culvert with an appropriate coupling. Culverts with more substantial end damage may require a portion of the road to be dug up to reach a section of non-crushed culvert prior to coupling with the culvert extension. iii. For severely damaged culverts where crushing extends through substantial portions of the barrel, complete culvert replacement may be required. If the culvert is to be replaced, efforts should be made to install SWSP culverts (CSA 2020). For CSP culverts, the repaired culvert ends should be reinforced with a steel end stiffener (e.g., Figure 4.1 as extracted from CSA 2020) or comparable stiff steel collar. This end treatment will make the culvert ends more resistant to damage in the future. As the hardened end treatments will not deform in the same way as CSP culverts, they pose a potential safety hazard to vehicles or humans who are accustomed to driving over the culvert ends (before or after deformation). The installation of the hardened end treatments should be communicated to the local community in advance of implementation.

Drainage Deficiency [1]	Recommended Action(s)
	Where warranted and/or practicable, efforts should be made to install SWSP culverts (CSA 2020). SWSP culverts are also more resistant to end deformation and do not require end treatments. Multi-level culvert arrangements, as illustrated in Figure 9 of CSA (2020), can be considered if culvert icing is an issue. Culvert diameter should be equal to or larger than the upstream culverts.
71 culverts are infilled with a high priority for remediation	Clean out the sediment inside the culverts to re-establish culvert conveyance capacity. The 71 culverts requiring cleanouts are identified in the detailed culvert database in Appendix F. Cleaning out of the culverts can be completed hydraulically with a flusher truck, or potentially with a hose from a fire truck. Manual agitation of the sediment in the culvert with a shovel or pole can help loosen sediment and promote hydraulic flushing. If sediment accumulation is too substantial to flush using these methods, culvert replacement may be considered. Where warranted and/or practicable, efforts should be made to install SWSP culverts (CSA 2020). SWSP culverts are also more resistant to end deformation and do not require end treatments. Multi-level culvert arrangements, as illustrated in Figure 9 of CSA (2020), can be considered if culvert icing is an issue. Culvert diameter should be equal to or larger than the upstream culverts. Infilled culverts are often connected to ditches that have also been infilled. It is highly recommended that improvements to the ditch geometry (to match CSA 2020 standards and connecting to the culvert inverts) upstream and downstream of the culvert be completed in tandem with the culvert cleanout.
11 culverts have erosion and scour in the vicinity of the culvert ends with a high priority for remediation	The 11 culverts requiring repairs to the embankment or scour/erosion at culvert ends are identified in the detailed culvert database in Appendix F. It is worth investigating the cause of embankment or outlet erosion/scour prior to implementing a solution. For example, an embankment could be eroding due to flows entering the ditch from road spillage caused by nearby culverts being crushed or infilled. In this case, improving the conveyance of the crushed or infilled culverts may re-establish normal drainage patterns and alleviate the embankment erosion, and simple re-grading/re-dressing of the embankment slope is sufficient. In other cases, the embankment or outfall erosion/scour may be due to the quantity of water, slope of the culvert, or slope of the receiving system. In these scenarios, bank stabilization techniques such as angular rip rap, erosion matting or re-vegetation are well suited for stabilization.
14 culverts have channel erosion, scour, deposition or other instability upstream or downstream of the culvert that threatens the culvert such that there is a high priority for remediation	The 14 culverts requiring improvements to the channels upstream or downstream of the culvert are identified in the detailed culvert database in Appendix F. If erosion is the issue in the upstream or downstream channel(s), available coarse rock or rip rap are well suited to reduce erosion. A layer of non-woven geotextile fabric should be installed beneath the coarse substrate and keyed into the existing ground at the ends to reduce the winnowing of fines and undermining of the substrate. Well-graded substrate gradations (i.e., a range of diameters) should be used where possible to improve stability. The substrate should be graded to match the culvert invert of the affected end, and should slope gradually to the receiving system avoiding abrupt changes in ditch/channel gradient. If sedimentation is the issue in the upstream or downstream channel(s), excavation of the ditch geometry should be performed and ditch dimensions in accordance with upstream or downstream dimensions should be re-established. Sediment should be removed until ditch grade matches the culvert invert of the affected end, and should slope gradually to the receiving system avoiding abrupt changes in ditch/channel gradient.

Drainage Deficiency [1]	**Recommended Action(s)**
Culvert marker poles not present	Culvert marker poles should be installed at the upstream and downstream ends of each culvert in Baker Lake. Given the snow ploughing and buildup over the winter in Baker Lake, it is likely that marker posts may be damaged over the winter each year. The annual inspection, re-securing, or reinstalling of marker posts should be incorporated into the drainage monitoring program (last item in this table).
Driveways are missing entrance culverts	Install entrance culverts at all driveways. Where warranted and/or practicable, efforts should be made to install SWSP culverts (CSA 2020). Culvert diameter should be equal to or larger than the upstream culverts.
Emergency flooding equipment and supplies not in reserve	To enable emergency flooding response actions, the Hamlet should retain the following supplies in reserve for emergency use: • 600 mm CSP culverts • Sandbags • Rolls of 6 mil plastic sheeting (for use in sandbag berms) • Typical details for sandbag berms (e.g., *Sandbag Dike Construction* from Manitoba (undated), provided in Appendix F) • Gas-powered pumps and hoses for pumps • Erosion protection material (i.e., rip rap, erosion matting etc.) • List of competent individuals and contractors in drainage and civil engineering who can be contacted for emergency technical and construction assistance
Drainage Monitoring Program not in place	A drainage monitoring program should be developed and implemented. The existing drainage maps and culvert inventory provide the foundation for such a program. The components of a drainage monitoring program are outlined in CSA (2020) Clause 6 and include the following considerations/components: • Able to be executed by local competent individuals (e.g., town foreman or equipment and utility operators familiar with or trained in drainage systems) • Should incorporate risk of failure into project prioritization • Spring inspection and maintenance involving culvert inspections (following a similar method to that applied in this report) and any urgent actions, ditch and culvert blockage identification and removal, culvert marker post inventory and repair, litter and debris removal, and identification/documentation of ditch and culvert icing issues for future planning purposes • Summer inspection and maintenance following a similar approach to the spring inspection, but with snow-free conditions for better observation • Fall construction and repairs, when water levels in northern communities are typically the lowest • Drainage monitoring in the winter consists mainly of snow management considerations and planning for the spring melt

Figure 17
Example of culvert end treatment
(See Clause 5.6.4.8.)

Note: *This culvert end stiffener detail was developed by the Ministry of Transportation in Saskatchewan (2018). Originally intended for large diameter culverts (1.8 to 2.4 m diameter), a similar detail would also be useful for the smaller diameter culverts commonly seen in the communities. A wider stiffener band could be considered for culvert sections more prone to damage from maintenance equipment or crushing from traffic.*

Figure 4-1: Culvert End Treatment - Culvert End Stiffener (Figure 17 from CSA 2020)

4.3.1.2 Identified Drainage Problem Areas

DRAINAGE ASSESSMENT

A total of 5 IDPA's were identified by either S. Dorey (Senior Administrative Officer at the Hamlet of Baker Lake) or W. Tapatai (Transportation Foreman at the Hamlet of Baker Lake). The location of each IDPA is illustrated on Figure C.12 through to Figure C.16 in Appendix C. IDPA numbering was assigned geographically (west to east) and is not indicative of priority level. The drainage issue(s) at each IDPA is/are discussed below and are illustrated on Figure C.12 to Figure C.16 (Appendix C). Recommended actions are provided in Table 4-7.

IDPA #1: Ponding Downstream of Snow fence. IDPA #1 is located within catchment 110. Catchment 110 has no upstream contributing catchments during minor events but during major events such as spring melt, runoff from catchment 109 flows over 1st Road and contributes to catchment 110. Two snow fences are located within catchment 109. During the winter snow builds up behind these snow fences resulting in a large storage volume of runoff that is released during spring melt. The additional contribution of runoff from catchment 109 during spring melt and the lack of appropriately placed outlet culverts are likely the main cause of ponding that occurs at IDPA #1, a natural low point.

IDPA #2: Surface Flow Towards Power Plant. IDPA #2 is located within catchment 115. Catchment 115 has no upstream contributing catchments. At the upstream end of catchment 115 there is a snow fence. During the winter snow builds up behind the snow fence resulting in a large volume of runoff that is released during spring melt. This results in an excess of surface runoff towards the power plant. Most of the drainage through catchment 115 occurs by overland flow, until it is conveyed through culvert 115-02 towards the power plant. Culvert 115-03 was installed to divert runoff away from the power plant, however no channel exists to convey flow from culvert 115-02 towards 115-03. Therefore, upstream flows are still directed towards the power plant.

IDPA #3: Unnamed Lake Overflow. IDPA #3 is located at the boundary of catchment 129 and 108. Catchment 129 has no upstream contributing catchments. During high water conditions Unnamed Lake spills over the road rather than being conveyed through culvert 129-02. Culvert 129-02 appears to be undersized as the current outlet of Unnamed Lake and the downstream end is crushed. On November 3, the Hamlet stated that culvert 129-02 was just meant to be temporary.

IDPA #4: Ponding Cutting Across Road. IDPA #4 is located within catchment 115, the same catchment as IDPA #2. IDPA #4 is a low point that collects runoff which eventually cuts across the road. The ponding is most severe in the spring during snow melt, however rainfall events can also result in ponded water.

Upstream Culvert 115-01 drains snowmelt from the snow fences towards 14th Street. There is no existing ditch along 14th Street therefore runoff cuts across the road and ponds at IDPA #4, a natural low point.

IDPA #5: Turbid Water at Outlet. IDPA #5 Is located at the downstream end of catchment 108. Catchment 108 is a large catchment, with a drainage area totaling 176.6 ha. IDPA #5 is located at the downstream end of the drainage channel of catchment 108. As noted in the field in June 2022, noticeably turbid water enters IDPA #5 from the ditch along 1st Avenue. The Hamlet indicated that the outlet for the drainage channel is located within near the drinking water intake.

Drainage Planning

Specific recommendations were discussed in a Teams meeting with representatives from the Hamlet and the Government of Nunavut on November 3, 2022 for each of the 5 IDPAs summarized in Table 4-7, including the corresponding figure reference. Depending on the level of complexity of the recommended action, detailed engineering design may be required. Drainage conditions should be monitored following design and implementation of any of the drainage planning recommendations to detect any undesirable by-product impacts of the drainage improvement and inform adaptive or corrective action.

Table 4-7 IDPA Drainage Recommendations

Identified Drainage Problem Area (IDPA)	Summary of Drainage Issue[1]	Recommended Action(s)
IDPA #1	Ponding during spring melt	Create a ditch within catchment 109 to capture snowmelt and divert flows to existing culvert 109-04, west of the existing urban development of Baker Lake. Thereby allowing flows to bypass IDPA #1. This would minimize the potential for runoff to get to the low point at IDPA #1.
IDPA #2	Surface flow towards Power Plant	Create a ditch within catchment 111 and catchment 115 to capture snowmelt; remove culvert 115-02 and install a new culvert to bring snowmelt from catchment 111 to 115 to minimize the potential of runoff reaching the power plant.
IDPA #3	Unnamed Lake overflow	Replace Culvert 129-02 with two larger capacity structures with markers to prevent future crushing.
IDPA #4	Ponding cutting across road	Create a ditch within catchment 111 and catchment 115 to capture snowmelt. Create a ditch along 14th Street to prevent runoff from cutting across the road and reaching IDPA #4. Create a ditch behind 3114 and 3112 14th Street to minimize the potential of runoff flowing over the driveways. Install a new culvert at IDPA #4 and direct flows to the west to culvert 115-04.
IDPA #5	Turbid water at outlet	Create a ditch along 4th Crescent upstream of outlet to capture runoff before it picks up additional sediment along 1st Avenue. This proposed solution may not fully address the root of the issue at IDPA #5 as it is an issue that is primarily related to water quality. The municipality should determine the severity of the situation and whether IDPA #5 is in fact a drainage issue or an issue related to water quality.

4.3.2 Future Development Areas

4.3.2.1 Drainage Assessment

Existing drainage conditions in each of the planned future development areas are briefly summarized below.

Phase A

Phase A is an approximately 5.34 ha area directly north-east of the urban core of Baker Lake. Phase A lies on the boundary between catchments 109 and 110. Existing drainage in this area is illustrated in Figure C.17 in Appendix C. Phase A is located directly downstream of one of the existing snow fences that protects the community. No external catchments drain onto Phase A. There are currently no existing culverts within Phase A. There is an existing ditch along 1st Road within Phase A.

Phase B

Phase B is an approximately 6.35 ha area between the Baker Lake urban core and the Baker Lake Airport. Phase B lies on the boundary between catchment 106 (813.2 ha) and catchment 107 (168.9 ha). Existing drainage in this area is illustrated in Figure C.4 in Appendix C. There are currently no existing culverts within Phase B. There is an existing ditch along 1st Road within Phase B.

In general, Phase B is set within an undeveloped area between two major drainage draws. These drainage draws collect drainage from considerable upstream areas within catchment 106 and catchment 107. Conveyance along these drainage features alternates between channelized flow and dispersed overland flow through the vegetation within the low lying areas. The linework in Figure C.18 indicates the best estimate of the concentration of flow.

Phase C

Phase C is an approximately 31.96 ha area within catchments 105 and 106, located west of Phase B. Existing drainage in this area is illustrated in Figure C.4 in Appendix C. Phase C is set within a low lying, undeveloped area which collects drainage from considerable upstream areas within catchment 105 and 106 before discharging to Baker Lake. There are several culverts and a ditch that exist within Phase C along 1st Road. An existing drainage draw was located in the southwest corner of Phase C.

4.3.2.2 Drainage Planning

The drainage plan for each of the three development blocks are discussed below. The drainage plans are provided at the conceptual planning level; detailed engineering design has not been completed. Development of the drainage plans assumed that site grading could be completed in a way which resulted in the preferred drainage plan. Future engineering and site development works may require amendments to the conceptual drainage plan presented here. Detailed engineering of the site drainage infrastructure, incorporating quantitative analysis of runoff rates, volumes, and conveyance capacities of infrastructure (existing vs. proposed conditions), should be completed alongside the detailed engineering phases of the overall site development.

The conceptual drainage plans for the planned future subdivisions incorporated the following principles in accordance with CSA (2020) and general best management practices for drainage in developed areas:

- Existing drainage directions and boundaries should be preserved as much as practical.
- Road crown should occur in the centre; roadside ditches should be provided on both sides of the road where necessary
- Entrance culverts should be located at the driveway entrance of each lot
- Where warranted and/or practicable, efforts should be made to install SWSP culverts .
- Drainage from upstream areas between lots should be avoided where practical
- All culverts should meet minimum depth of cover requirements
- Culvert marker poles should be installed on both ends of each culvert
- Ditch outfalls should be located at an existing drainage feature; stable outlets and tie-ins should be provided
- Drainage monitoring should be completed to detect drainage issues and inform corrective or adaptive action.

Phase A

Figure C.17 in Appendix C illustrates the proposed conditions drainage plan for Phase A. The existing conditions drainage boundaries will be preserved with the exception of slight alterations between catchment 109 and catchment 110 to accommodate the road and lot layout and between 110 and 112 to allow for proper drainage out of the southeastern lots in Phase A.

A ditch north of Phase A is proposed to capture snowmelt from behind the snow fences prior to entering the Phase A footprint.

IDPA #1 is located directly downstream of Phase A, therefore an appropriate drainage outlet is required to ensure conditions are not exacerbated.

In total, the proposed drainage plan for Phase A includes 1 new cross culvert, 23 new entrance culverts, and approximately 373 m of new ditches.

Phase B

Figure C.18 in Appendix C illustrates the proposed conditions drainage plan for Phase B. The existing drainage boundary will be mostly preserved in proposed conditions as it will approximately run along the proposed road crest. Phase B is located between two main drainage draws in catchment 106 and 107. Proposed ditches within Phase B will tie into the existing ditch on 1st Road and cross to Baker Lake via culvert 106-04 to the west and culvert 107-02 to the east. Capacity of both culverts should be evaluated during detailed design.

Additional ditching along the west and east boundary of Phase B are proposed to potentially protect the community from the nearby drainage draws should they change course in the future.

In total, the proposed drainage plan for Phase B includes 2 new cross culverts, 18 new entrances culverts and approximately 695 m of new ditches.

Phase C

Figure C.19 in Appendix C illustrates the proposed conditions drainage plan for Phase C. Phase C is situated between two major drainage draws to the west and east. The west end of Phase C will outlet into the existing channel to the southwest of the proposed development area to culvert 105-03 and culvert 105-02. The eastern portion of the development area will be captured and sent to the southeast to culvert 106-02.

Development in Phase C is likely to result in increased runoff rates and volumes which, if directed entirely to the drainage feature at the southwest end of the development, may overwhelm the existing drainage feature. To mitigate this risk, a significant portion of Phase C will be directed away from the existing drainage feature to a single roadside ditch and be conveyed through a network of culverts to the existing culvert 106-02. The west end of Phase C will be directed towards the existing drainage feature to ultimately flow through culvert 105-03. Capacity of both culverts should be evaluated in detailed design. The proposed drainage plan will alter the existing boundaries of catchment 105 and catchment 106 to accommodate proposed drainage split.

In total the proposed drainage plan for Phase C includes 7 new cross culverts, 61 entrance culverts and approximately 3,585 m of new ditches.

5 CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Key Findings

5.1.1 Desktop Terrain Assessment

The bedrock in the area consists predominantly of Archean granitoid and gneissic rocks (Hadlari et al., 2004). Surficial geology within the community consists mainly of beach ridges, till, washed till, and glaciolacustrine deposits. Bedrock outcrops are present locally, however not in the proposed future subdivision identified as Phases A, B, and C. The topography with planned future subdivisions remains regular, with most slopes oriented towards the lake at an average grade of 7%.

No feature indicative of slope instabilities was identified within the study area. Although permafrost is present, no visual indicator of the occurrence of thaw subsidence or mass movements were observed. Imperfect to poor drainage conditions; however, were identified at several locations.

5.1.2 Geotechnical Investigation

The geotechnical investigation included a visual observation of Phases A, B, and C, and the general hamlet area, as well as advancing a total of 17 boreholes in Phases A, B, and C. Key findings of the borehole drilling generally included:

- Materials encountered were organics over till over bedrock with bedrock encountered in most holes.
- Ground ice contents were generally considered low and moderate.

The dominant factor affecting both the development suitability of the potential development areas as well as the existing developed areas was typically drainage (including potential occurrence of flooding and/or waterlogged soils along main drainage flow path; primarily following spring freshet and heavy rainfall events).

5.1.3 Development Suitability

The overall assessment and resulting development suitability maps (Appendix C, Figures C.1 and C.2) indicate that it is feasible to proceed with land development within the proposed subdivisions; however, the design of drainage infrastructures should be implemented in certain areas to avoid adverse drainage conditions. The proposed drainage plans for the subdivisions are presented on Figures C.12 to C.16 in Appendix C.

Key findings of the development suitability assessment include the following:

Terrain generally suitable for development was identified within all three areas considered for development. Short to medium-term development strategy should focus on terrain identified as generally suitable.

Terrain conditionally suitable for development was identified within, or immediately alongside the land parcels associated to Phase A, B, C. As previously mentioned, the main factor impacting development suitability at these locations are drainage concerns. The design of buildings and infrastructure should consider drainage conditions and terrain implications.

Terrain unsuitable for development was identified alongside lots with Phase B and Phase C, in areas where stream channels and overland flow paths are present. Typically, the drainage and flooding concerns in these areas are the primary limiting factor. Areas prone to snow drifting and accumulation are also considered unsuitable for development.

Although expected to affect relatively few of the areas identified, planning housing and other infrastructure development in areas with potentially unstable terrain relative to thaw degradation should be avoided.

Although engineering measures and construction techniques could be applied to address the above-mentioned constraints and geohazards, avoiding these locations is recommended when possible.

Where development is to occur in areas presenting constraints and geohazards, then appropriate design, construction and maintenance guidelines should be applied.

5.1.4 Drainage Assessment and Planning

The drainage component of this project was split into two parts:

1. Drainage assessment. The characterization and evaluation of the existing conditions relative to applicable standards and recommended best management practices
2. Drainage planning. Actions which may be taken to address existing drainage deficiencies and improve overall drainage conditions, as well as drainage infrastructure that should be implemented in areas of new development.

Drainage assessment and planning was completed for three different areas in Baker Lake:

- Entirety of the developed area
- Identified Drainage Problem Areas (IDPAs)
- Planned Future Subdivisions

5.1.4.1 Developed Area

Following desktop review of the general hydrology and climate in Baker Lake, a field assessment of the existing drainage system was completed. The field assessment included:

- Separate site tours to identify locations and details of areas which have demonstrated notable drainage issues in the past, and where the Hamlet would like specific recommendations for improvement. These areas were referred to as Identified Drainage Problem Areas (IDPAs).
- Refinement of catchment boundaries by ground-truthing drainage splits
- Delineation of ditch and channel network
- Completion of a detailed inventory of culverts in Baker Lake
- Documentation of other relevant components of the general drainage conditions in Baker Lake

The collected field data provided the information required to create a drainage map of the existing drainage system consisting of catchments, ditches/channels, culverts, and overland flow paths. The collected field data also provided the basis for evaluation of the drainage system against the drainage requirements outlined in CSA (2020), MTO (2013), and other relevant drainage best management practices. A total of 10 deficiencies for the overall drainage network in Baker Lake were identified; recommendations to address each of the 10 deficiencies were developed (Table 4-6).

5.2 Recommendations for Planned Future Subdivisions

Permafrost ground conditions and drainage concerns present unique but solvable challenges with regard to land development in the North. Site specific conditions, exacerbated by impacts of changing temperatures and precipitation patterns require adequate planning, design, and maintenance of drainage related infrastructure to ensure that minimal negative impacts and disruption occurs in the future.

Key policy guidance documents have been developed in recent years in relation to reducing the overall vulnerability of infrastructure in northern communities. For the current study, four key documents developed as part of the Northern Infrastructure Standardization Initiative (NISI) provide standards and recommendations regarding proper evaluation, design, construction, operation and maintenance of new and existing infrastructures. They consist of:

- CAN/BNQ 2501-500 Geotechnical Site Investigations for Building Foundations in Permafrost.
- CAN/CSA-S503-20 Community drainage system planning, design, and maintenance in northern communities.
- CSA-S501-14 Moderating the effects of permafrost degradation on existing building foundations.
- CSA PLUS 4011:19 Technical Guide: Infrastructure in permafrost: A guideline for climate change adaptation.

The following sections highlight key recommendations related to the development of new subdivision components in Baker Lake (i.e., road access, building pads and drainage infrastructure). The goal is not

to summarize the above cited documents, but rather to emphasize on key items with respect to future development in Baker Lake.

5.2.1 Appropriate Level of Geotechnical Investigations

Geotechnical site investigations are essential to ensure that a sufficient level of site-specific information is available to support appropriate design, construction, and maintenance of future infrastructures. The current evaluation should be considered a preliminary evaluation to support construction suitability from a geotechnical point of view. As the planning of future developments advances, additional geotechnical investigations should be conducted as they relate to the various stages of land development.

The geotechnical evaluation indicated that the materials encountered are generally classified as low sensitivity to thaw degradation (with low to moderate ice content). Soils containing massive ice or ice wedges are highly thaw sensitive and could exhibit significant settlement upon thawing. However, no massive ice feature (including ice wedges) was observed at Phase A, B, or C.

The following should be considered prior to site development:

- Site-specific geotechnical investigations should be conducted once more specific development plans are available. The investigation program should be based on CAN/BNQ 2501-500/2017 *Geotechnical Site Investigations for Buildings Foundations in Permafrost Zones* (National Standard of Canada 2017).
- The characteristics of readily available fill materials may impact the design and planning of future infrastructures. Proper assessment of the overall suitability of local borrow materials should be conducted.

5.2.2 Building Pads and Road Embankments

Structural fill consisting of a non-frost susceptible granular fill (i.e., well-graded sand and gravel containing less than 5 to 8 percent fines) should be used as building pad materials. If such material is not readily available, special attention should be given to ensure that an appropriate building foundation system is selected.

Effort should be given to grade building pads so that water drains away from the developed lots (i.e., pads will serve as a drainage barrier). Coarse-textured fill should be also placed on lots and roads characterized by poor drainage. Slope cuts and/or excavations should be limited to reduce potential permafrost degradation.

The thickness of the pads and road embankments should be designed to reduce any potential permafrost degradation, especially in terrain identified as conditionally suitable for development and unsuitable for development (when crossed). Generally, pad/embankments approximately 1.2 to 1.8 m thick placed above grade will reduce permafrost degradation. Thicker pads composed of coarser materials will reduce the potential for permafrost degradation and will drain water more effectively. Side slopes covered with coarse gravel or riprap will reduce erosion and localized sloughing. Compaction of the pads in controlled lifts is also key. For potential construction in areas with wet subgrades (typically within the conditionally

suitable areas for development), compaction should be limited to static compaction only (i.e., no vibratory compaction).

Pads and road embankments should be constructed during the summer months when the native subgrades are thawed.

5.2.3 Site Grading and Construction

Ground disturbance should be limited to the footprint of the proposed infrastructure as stripping and grading can trigger localized thermokarst or surface subsidence due to the melting of ground ice. Stripping of the surficial topsoil/organic layer should be avoided. The organic topsoil reduces heat flow into the ground and helps preserve the subgrade in a frozen state.

Proper surface water drainage will be essential to avoid surface erosion and preserve the permafrost during construction. If construction occurs during the thawing season, appropriate drainage management techniques should be in place before spring runoff. The construction of temporary berms is generally preferred over the excavation of drainage ditches or swales.

Building pads should be graded a 2% or more so that water drains away from the lots. Coarse-textured granular fill should be placed on lots and roads characterized by imperfect or poor drainage. Wherever required, slope cuts and/or excavations should be limited to reduce permafrost degradation.

5.2.4 Conceptual Drainage Plan

Proper surface water drainage is essential for the protection of infrastructure, private property, and the natural environment.

The conceptual drainage plans for Phase A, Phase B and Phase C are provided at the conceptual planning level in Figure C.17, C.18 and C.19 (respectively) in Appendix C. The conceptual drainage plans for the planned future subdivisions incorporated the following principles in accordance with CSA (2020) and general best management practices for drainage in developed areas:

- Existing drainage directions and boundaries should be preserved as much as practical.
- Road crown should occur in the centre; roadside ditches should be provided on both sides of the road
- Entrance culverts should be located at the driveway entrance of each lot
- Culverts should be SWSP
- Drainage from upstream areas between lots should be avoided where practical
- All culverts should meet minimum depth of cover requirements
- Culvert marker poles should be installed on both ends of each culvert
- Ditch outfalls should be located at an existing drainage feature; stable outlets and tie-ins should be provided

- Drainage monitoring should be completed to detect drainage issues and inform corrective or adaptive action.

Detailed engineering design has not been completed for the drainage plan. Future engineering and site development works may require amendments to the conceptual drainage plan presented here. Detailed engineering of the site drainage infrastructure, incorporating quantitative analysis of runoff rates, volumes, and conveyance capacities of infrastructure, should be completed alongside the detailed engineering phases of the overall site development.

5.2.5 Erosion Control

Erosion control measures should be included in the design of pads and embankments, especially next to drainage infrastructure (ditches/channels/culverts). Materials to consider are geotextiles and coarse substrate for armouring. More specifically:

- Coarse substrate (i.e., a blanket revetment constructed of rocks or rubble) should be used to armor segments of embankment located alongside culvert inlets/outlets. This material will limit potential erosion of fine fill material. Use of geotextiles or an appropriate filter design is also recommended. Coarse substrate aprons should also be used to mitigate potential erosion at culvert outlets.
- Limiting ground disturbance and potential damage to the native vegetation will minimize soil surface erosion. Maintaining the natural vegetative cover facilitates ground retention and minimizes surface erosion.
- Sediment controls should be used to prevent siltation of the culverts, which can cause the drainage system to function poorly. The installation of silt traps, re-vegetation (may be inappropriate for this environment), straw mulching and implementation of other erosion control measures are essential.

5.2.6 Inspection and Maintenance

A properly maintained and monitored drainage system will ensure a high level of efficiency and durability. To do so:

- Inspection and maintenance personnel should be responsible for maintaining the drainage system.
- The drainage infrastructure should be inspected on a weekly basis during melting season and/or after major rain events.
- Damaged culverts should be repaired or replaced.
- Erosion control measures should be implemented as soon as visible signs of surface erosion are identified.
- The cause of any malfunction of the drainage system should be identified and addressed as soon as possible.
- Blocked culverts should be cleared as soon as possible to restore surface water flow through the culvert.

- During winter, carry out frequent inspections to ensure that the drainage system is not damaged by snow removal or completely blocked by ice. Snow removal personnel should be aware of the location of the drainage infrastructure. Marker poles may be placed to warn operators of the presence of the culvert outlets.

6 CLOSURE

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of the Client within the Statement of General Conditions, and its agents to review the conditions and to notify Nunami Stantec should any of these not be satisfied. The statement of general conditions addresses the following:

- use of the report
- basis of the report
- standard of care
- interpretation of site conditions
- varying or unexpected site conditions
- planning, design, or construction

We trust that the information contained in this report is adequate for your present purposes. If you have any questions about the contents of the report, or if we can be of any other assistance, please do not hesitate to contact us at your convenience.

Yours very truly,

NUNAMI STANTEC LIMITED

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APPENDIX A Statement of General Conditions

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client and may not be used by any third party without the express written consent of Stantec, which may be withheld at Stantec's discretion. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the specific site and project scope as described by the Client. The contents of this report are applicable only to the site conditions encountered at the time of the investigation or study. If the proposed project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is engaged by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the reasonable skill and diligence required by customarily accepted professional practices and procedures normally provided in the performance of such services at the time when and the location in which the services were performed. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, and/or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work at specific field observation locations and/or through interpretation of both digital imagery and/or LiDAR data. Classifications and statements of condition have been made based on anticipated behavior of the materials or geomorphic processes and are interpretive in nature; no specific description should be considered exact, but rather should be considered reflective of the anticipated behaviour of materials or geomorphic processes. Extrapolation of in situ conditions can only be made to some limited extent beyond the observed locations. The extent depends on variability of the soil, superficial materials, bedrock, soil moisture and groundwater conditions as influenced by geological processes, construction activity, and land use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently in advance initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report adequately addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site

work relating to the recommendations included in this report should only be carried out in the presence of a qualified engineer or geoscientist; Stantec cannot be responsible for site work carried out without its representative being present.

APPENDIX B Community Plan

BAKER LAKE COMMUNITY PLAN AND ZONING BY-LAW

SCHEDULE 1 - COMMUNITY PLAN

SECTION 1. INTRODUCTION

1.1 Purpose of the Plan

The purpose of the Baker Lake Community Plan is to outline Council's policies for managing the physical development of the Hamlet for the next 20 years - to 2033. The Community Plan was created through a community consultation process and reflects the needs and desires of the Community. The Community Plan builds on previous plans, while incorporating new challenges, issues and needs identified by the Community.

1.2 Goals of the Community Plan

Community Plan policies emerge from the values of a community and its vision of how it would like to grow. The goals established for this Community Plan are:

1. To develop in an orderly fashion creating a safe, healthy, functional, and attractive community that reflects community values and culture.
2. To promote the Plan as a tool for making effective and consistent decisions regarding land use and development in the community.
3. To ensure an adequate supply of land for all types of uses to support the growth and change of the community.
4. To build upon community values of participation and unity to support community projects and local economic development.
5. To protect the natural beauty of "Nuna", protect viewpoints to the water, and retain waterfront and lakeshore areas for public uses and traditional activities.

1.3 Administration of the Plan

The Community Plan is enacted by By-law. Changes to the Plan can be made by amending the By-laws in accordance with the *Nunavut Planning Act*. The Community Plan should be reviewed and updated every five years as required by the *Nunavut Planning Act*. A Zoning By-law is also being enacted for the purpose of implementing detailed policies based on the Community Plan. All development must follow the intent of the Community Plan and Zoning By-law. The Community Plan includes Schedule 1 (Plan Policy Text), Schedule 2 (General Land Use Map) and Schedule 3a and 3b (Community Plan Map and Airport Area).

SECTION 2. COMMUNITY GROWTH AND PHASING POLICIES

At the time of preparation of this Plan, the population of Baker Lake was approximately 1,934 people. This Plan is based on a future population of 2,554 people by 2033, however a potential population of 2,754 is also considered in the case of increased mining activity. It is estimated that an additional 442 to 509 dwelling units will be required to meet the projected population growth, representing the need for approximately 24 to 28 hectares of land for residential development. A further 3 hectares are required for commercial uses, 2.8 hectares for community uses and approximately 10.7 hectares for industrial uses. The policies of Council are:

a) Plan for a 2033 population range of between 2,554 to 2,754 people.
b) Identify sufficient land on the Community Plan to meet the needs of the projected 2033 population.
c) Review the Community Plan in 5 years, in 2018, to re-assess actual rates of growth and community needs.
d) Council will generally phase new land development as follows:
   i.) **2013 - 2018:**
      - Build on existing vacant lots within the built-up area;
      - Develop Phase 1, 2, 3, and 4 residential subdivisions.
      - Develop additional industrial lots.
      - Develop commercial land near airport.
   ii.) **2018 - 2023**
      - Develop Phase 5 subdivisions (a, b, c).
      - Develop industrial subdivision near old landfill site, if required.
      - Develop new barge landing, dock and sealift area.
   iii.) **2023 - 2033**
      - Redesignate and develop Municipal Reserve areas (as required).
e) Council may change the phasing of development without amendment to this Plan.

SECTION 3. GENERAL POLICIES

The following policies of Council apply to all development in the Hamlet regardless of land use designation:

a) The development of lots shall be subject to the following lot development policies:
   i.) All service connections to buildings shall be easily accessed from the front yard on all lots and grouped together, where possible.
   ii.) Access to new buildings will avoid, where possible, main entrances on the south-southeast side to reduce problems associated with snow drifting.
   iii.) Buildings shall be sited to respect setbacks identified on the Zoning Chart.
   iv.) Any building over 500m^2 in gross floor area shall consider potential wind impacts on surrounding development. A wind study may be required by the Development Officer.
   v.) Culverts are required and shall be installed at the access points to lots.
   vi.) On any portion of a lot where fill is introduced, drainage shall be directed towards the public road. Exceptions may be made by the Development Officer. Where possible, drainage troughs shall not be located in Utility Right-of-Way or Easements.
   vii.) Road widenings may be obtained as required at the time of development or redevelopment of a lot in situations where the road right of way is less than 16 metres wide.
b) Consideration should be given to the development of a Master Drainage Plan for the entire community and the adoption of a snow piling by-law.
c) Utilities or communication facilities shall be permitted in any land use designation. Other than designated Rights-of-Way or Easements for Utility or Communication lines, Easements alongside roadways, marked between the edge of the roadway and lot lines, will be used for distribution lines, with a minimum clearance, as specified in the Utility Corporation's Joint Use Agreement.
d) The Hamlet will pile snow in locations to minimize downwind snow drifting and where spring melt run-off can be properly channeled to drainage ditches or water bodies.
e) The Hamlet shall avoid piling snow within at least 30.5m (100 feet) of any watercourse.
f) A minimum setback distance of 30.5m (100 feet) shall be maintained, except subject to terms and conditions of the Hamlet Council.
g) The Hamlet shall protect any cemeteries and sites of archaeological, ethnographical or historical significance from disturbance.
h) The Hamlet shall encourage development that minimizes emissions from fossil fuels, that are energy efficient and that consider alternative energy supply technology.
i) The Hamlet shall work with the Nunavut Planning Commission to ensure that the Baker Lake Community Plan and the future Kivalliq Regional Land Use Plan are compatible.

SECTION 4. LAND USE DESIGNATION

4.1 Residential

The Residential designation provides land for primarily residential uses, but also permits other small-scale conditional uses subject to the approval of Council. The policies of Council are intended to maintain an adequate supply of land for residential development, to build safe and livable neighbourhoods and to protect residential areas from incompatible development. The policies of Council are:

a) The Residential designation will be used primarily for housing with all types of dwelling types permitted. Other related residential uses such as a group home, a home occupation, or bed and breakfast will also be permitted.
b) Residential development will be phased so that a target minimum of 2 hectares of vacant surveyed land is available at any given time.

4.2 Community Core

The Community Core designation defines the core area of the community which provides a focal point for community amenities, cultural activities, and tourism. Given the important role the Community Core plays in defining community and cultural identity, specific policies are adopted for this area. Policies are aimed at maintaining the community uses and a mix of service commercial and tourism related uses, allowing limited types of residential uses, improving the character of development, increasing pedestrian safety and beautifying the streetscape. The policies of Council are:

a) The Community Core designation will permit all uses permitted in the Community Use designation and retail commercial and tourism or visitor-related uses. Residential uses will be conditionally permitted by Council and only multi-unit dwellings or dwelling units in non-residential buildings above the ground floor will be permitted.
b) Council may adopt a Downtown Beautification Plan which provides more details on the character of development in the Community Core and provides an action and phasing plan for improvements such as walkways, street lighting, paving, road widenings, signage, public art, as outlined in the Plan.
c) Council will consider granting a land credit to the GN Department of Education for future land applications in return for the re-alignment of the road on the west side of the High School.
d) Council shall seek opportunities and encourage the relocation of industrial uses and low density residential uses outside the Community Core over time by considering land swaps and/or other incentives.
e) Front yard parking will not be permitted for any new development of a significant size in the Community Core. Parking will be provided at the side or rear of the building. Parking spaces that require vehicles to back-out onto the municipal road will also not be permitted.
f) Give priority for the development of a defined walkway as shown on the Community Land Use Map. Monetary contributions for the construction of the walkway may be requested as a condition of development approval.

4.3 Community Use

The Community Use designation is intended to maintain an adequate supply of land for community uses, to provide easy access to public facilities and services, and to reserve significant and important locations for community uses. The policies of Council are:

a) The Community Use designation will be used primarily for public uses (i.e. social, cultural, religious, or educational) and government services.
b) Community facilities will be centrally located to ensure safe and convenient access by residents.

4.4 Commercial

The Commercial designation is intended to support local economic development by maintaining an adequate supply of land for commercial uses in a central location with good access from the community. The policies of Council are:

a) The Commercial designation will be used for commercial uses such as hotels, restaurants, retail, personal and business services, and offices
b) Residential uses shall be permitted when located above a ground floor commercial use.
c) Commercial facilities will be located along main roads, where possible, to provide safe and convenient access by residents.
d) Council will encourage the re-use or redevelopment of existing commercial sites within the existing townsite.

4.5 Open Space

The Open Space designation is intended to protect shoreline environments, maintain access to the sea and to reserve open spaces within the built up area for recreational uses and cultural events. The policies of Council are:

a) The Open Space designation will be used primarily for parks, walking trails, traditional and recreational uses such as beach shacks, harbour uses, boat storage, dog teams, community docks, temporary storage of sealift materials and equipment during sealift operations, and municipal infrastructure such as a water pump house. All uses are conditional and at the discretion of Council.
b) Owners of development will be required to maintain the development and keep the surrounding area tidy.
c) A playground should be located within 300m walking distance from any residence in the community.
d) Unless otherwise noted, all Commissioner's Land forming part of the 100-foot strip (30.5 m) along the seashore measured from the ordinary high water mark will be designated Open Space.
e) No development is generally permitted within 30 metres from the normal high water mark of any river or major creek. Council may consider the filling of a waterbody where is it needed for future development provided that the appropriate approvals are obtained.
f) Open Space corridors will be protected for trail connections and drainage channels.

4.6 Industrial

The Industrial designation is intended to reduce the negative effects and dangers associated with industrial uses such as noise, dust, odours, truck travel and the storage of potentially hazardous substances by concentrating these uses on the periphery of the townsite. The policies of Council are:

a) Permitted uses in the Industrial designation will include all forms of manufacturing, processing, warehousing and storage uses. Permitted uses will also include garages, power generation plants, and fuel storage.
b) Council will develop a new industrial subdivision near the old landfill site to minimize land use conflicts and to reserve land closer to the townsite for residential and community uses. Council will work with local businesses and government operations to identify opportunities to relocate over time non-conforming industrial uses (eg. garages, warehouses) to the new industrial subdivision.
c) Council will explore the opportunity of a public/private partnership with mining interests to develop a new dock and barge landing site at the east end of town.

4.7 Transportation

The Transportation designation is intended to protect and ensure the safe operation of airport and related activities such as the NavCanada communications site. The policies of Council are:

a) Permitted uses in the Transportation designation includes all activities related to air traffic and uses accessory to these activities such as related commercial activities and communications sites.
b) All development within the 4km boundary of the airport, as shown on Schedule 2, shall comply with the Baker Lake Airport Zoning Regulations. Development applications shall be referred to Nunavut Airports for review and approval where development is proposed adjacent to the airport and/or where development has the potential to interfere with airport operations.
c) All development within the Transportation Influence Zone of the communications facility is subject to the approval of NavCanada.
d) Council will discourage the use of travelled pathways that are not identified as public right-of-ways.

4.8 Hinterland

The Hinterland designation applies to all unsurveyed land within the Municipal Boundary not designated by another land use and is intended to protect the natural beauty and cultural resources of the land - 'Nuna' - while providing access for traditional, recreational and tourism activities, as well as quarrying. The policies of Council are:

a) The Hinterland designation generally permits traditional, tourism and passive recreational uses. Permitted uses also include dog teams, quarrying, and infrastructure projects for local economic development.
b) Council shall ensure that development does not negatively impact wildlife, wildlife habitat and harvesting and is consistent with the guiding principles of Inuit Qaujimajatuqangit.

4.9 Waste Disposal

The Waste Disposal designation is intended to identify existing or former waste disposal sites and ensure required development setbacks. The policies of Council are:

a) The Waste Disposal designation permits no development except those uses accessory to the operation or remediation of a waste disposal site.
b) The Hamlet shall prohibit the development of residential uses and uses involving food storage or food preparation within the 450 metre setback from any existing or former waste disposal site, pursuant to the General Sanitation Regulations of the Public Health Act
c) The Hamlet shall prohibit the development of any public road allowance or cemetery within a 90m setback from a waste disposal ground, pursuant to the General Sanitation Regulation of the Public Health Act.
d) The Hamlet will evaluate options for long-term sewage treatment. The evaluation will consider cost-effectiveness, the degree of environmental protection and the land use designation.
e) The Hamlet will evaluate all possible options for an integrated waste management system, including:
   a. the suitability of the existing landfill site for long-term use;
   b. the use of an incinerator;
   c. metal recovery projects; and
   d. complementary strategies, such as source reduction, reuse, and recycling of waste materials.

4.10 Granular Resources

The Granular Resources designation is intended to protect aggregate deposits for future extraction. The policies of Council are:

a) The Granular Resources designation does not permit any development except uses accessory to the operation or remediation of a quarry or gravel pit.

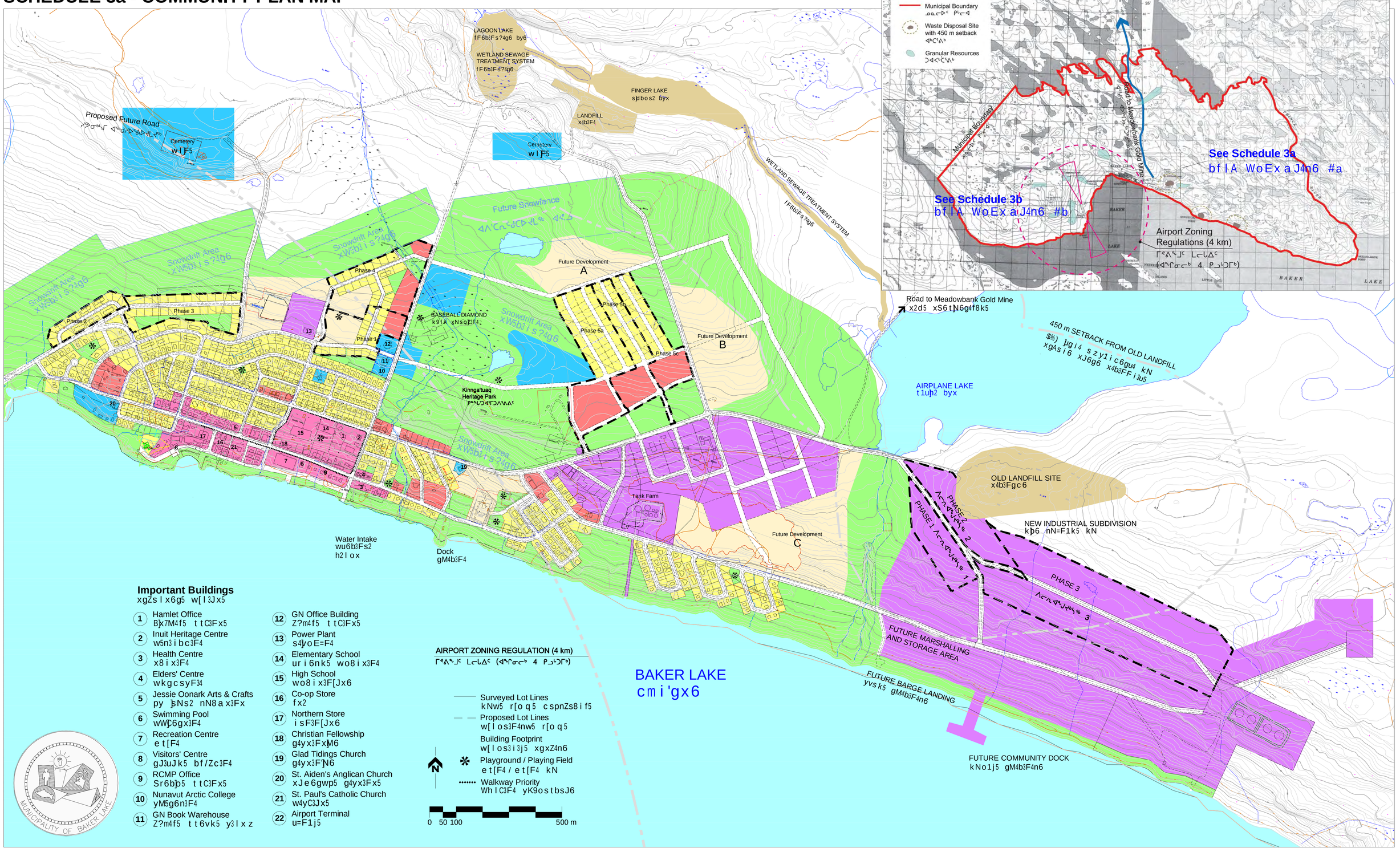
4.11 Municipal Reserve

The Municipal Reserve designation is intended to reserve land for the future growth of the community. The policies of Council are:

a) The Municipal Reserve designation does not permit any development except temporary uses approved by Council.
b) Municipal Reserve lands shall be redesignated by amendment to this Plan prior to being used for community expansion.
c) A conceptual road network is shown on some of the Municipal Reserve lands which considers connections with existing road network, future land uses, prevailing wind direction, solar orientation, drainage and topography. The concept may need to be changed according to community needs during the detailed subdivision design process.
d) Lands designated Municipal Reserve near the old power plant may be affected by significant environmental constraints to development, such as contaminated soils and poor drainage. All constraints shall be cleared of environmental constraints prior to the lands being redesignated for development.

SCHEDULE 2 - GENERAL LAND USE MAP

SCHEDULE 3a - COMMUNITY PLAN MAP

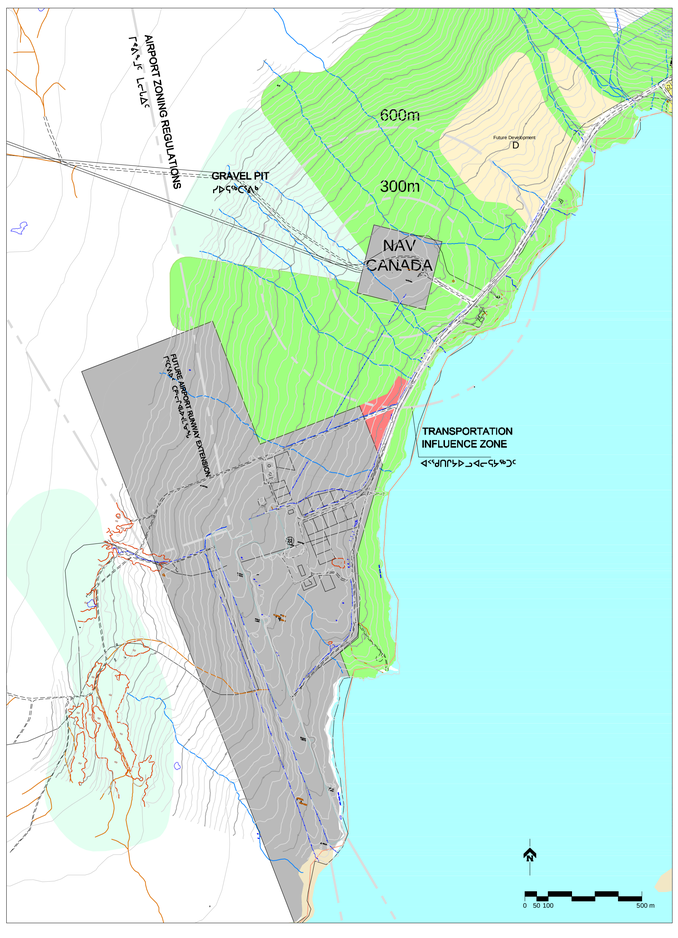


Important Buildings
xgZslx6g5 w[lƆJx5

1. Hamlet Office — Bʞ7M4f5 ttCƆFx5
2. Inuit Heritage Centre — w5nƆibcƆF4
3. Health Centre — x8ix3F4
4. Elders' Centre — wkgcsyFƔ4
5. Jessie Oonark Arts & Crafts — py ʖNs2 nN8ax3Fx
6. Swimming Pool — wWʗ6gx3F4
7. Recreation Centre — etF4
8. Visitors' Centre — gJƆuJk5 bf/ZcƆF4
9. RCMP Office — Sr6bþ5 ttCƆFx5
10. Nunavut Arctic College — yM5g6nƆF4
11. GN Book Warehouse — Z?m4f5 tt6vk5 yƆlxz
12. GN Office Building — Z?m4f5 ttCƆFx5
13. Power Plant — s4ɣoE=F4
14. Elementary School — uriɛ6nk5 wo8ix3F4
15. High School — wo8ix3F[Jx6
16. Co-op Store — fx2
17. Northern Store — isF3F[Jx6
18. Christian Fellowship — g4yx3FxM6
19. Glad Tidings Church — g4yx3F'N6
20. St. Aiden's Anglican Church — xJe6gwp5 g4yx3Fx5
21. St. Paul's Catholic Church — w4yCƆJx5
22. Airport Terminal — u=F1j5

MUNICIPALITY OF BAKER LAKE

SCHEDULE 3b - AIRPORT AREA



SCHEDULE 4 - ZONE REGULATIONS

	Permitted Uses	Conditional Uses	Zone Requirements
Residential	Dwelling, single-unit Dwelling, semi-detached or duplex Dwelling, rowhouse Park or playground Any accessory building, structure or use, subject to Section 5.1	Bed and breakfast Craft studio Day care centre Dwelling, multi-unit Dwelling, mini home Elders facility Group home Home occupation Secondary suite	(a) Setbacks (minimum) Front = 6 metres Rear = 6 metres Rear, backing onto an OS Zone = 2.5 metres Side (Exterior) = 4 metres Side (Interior) = 6 metres, or as required by the Fire Marshal Building Height (maximum) 8.5 metres (28 feet) (b) Despite the provisions of Section 6.3(a), for semi-detached dwellings or rowhouse dwellings located on separate, adjacent lots, the side yard where units are attached may be reduced to zero. (c) Parking or storage of a commercial vehicle having a gross vehicle weight of 4,500 kg or construction equipment including buildozers, backhoes, high hoes, and pay loaders is not permitted. (d) The following provisions will apply to Secondary Suites: (i) The suite forms part of a single unit or semi-detached dwelling; (ii) The suite is structurally attached or located within the principal dwelling; (iii) The suite does not exceed a floor area of 25% of the principal dwelling, or 60m² of gross floor area, whichever is less.
Commercial	Bank Commercial recreation Communications facility Convenience store Craft studio Day care centre Hotel Office Parking lot Personal service Restaurant Retail store Service shop	Dwelling unit(s) in a non-residential building provided that the dwelling unit(s) are above the ground floor. Home occupation	(a) Setbacks (minimum) Front = 6 metres Rear = 6 metres Side (Exterior) = 4 metres Side (Interior) = 6 metres, or as required by the Fire Marshal Building Height (maximum) 3 storeys, not to exceed 13 metres (b) No outdoor storage is permitted.
Community Use	Church Communications facility Community freezer Community hall or centre Day care centre Educational facility Elders facility Fire hall Government office Group home Health care facility Park or Playground Parking lot Police station Post office Any accessory building, utility, structure or use, subject to Section 5.1	Cemetery	(a) Setbacks (minimum) Front = 6 metres Rear = 6 metres Side (Exterior) = 6 metres Side (Interior) = 6 metres, or as required by the Fire Marshal Building Height (maximum) 13 metres (42.65 feet) (b) A covered or screened area for garbage and trade waste is required.
Community Core	Bank Commercial recreation Convenience store Craft studio Day care centre Hotel Office Park or playground Parking lot Personal service Restaurant Retail store Uses permitted in the Community Use Zone (CU)	Dwelling, multi-unit Dwelling unit(s) in a non-residential building provided that the dwelling unit(s) are above the ground floor Home occupation	(a) Setbacks (minimum) Front = 6 metres Rear = 6 metres Side (Exterior) = 4 metres Side (Interior) = 6 metres, or as required by the Fire Marshal Building Height (maximum) 10.7 metres (35 feet) (b) No outdoor storage is permitted.
Open Space	Archaeological site Beach shacks Boat storage Dock Monument, cairn, or statue Park or playground Shed to store equipment for traditional, cultural, and recreational activities taking place in the Zone. Snow fence Sports field Temporary outdoor storage of sealift equipment during sealift Washroom facility	Communications facility Dog teams Temporary tenting or camping	(a) The following provisions applies to all development in the Open Space Zone: Gross Floor Area (maximum) 25 sq.m. Building Height (maximum) 3.1 metres (10 feet) (b) No building or structure shall be located closer than 10m to any side or rear lot line. (c) Dog teams may not be located closer than 30.5 m to a water body.
Industrial	Automotive gas bar Automotive repair, sales or facility Building supply or contractors shop Caretaker unit Outdoor storage Rental shop Warehouse Communications facility Any accessory building, structure or use, subject to Section 5.1	Community freezer Barge staging and landing site with associated warehousing Hazardous goods storage Manufacturing plant Power plant Tank farm	(a) Setbacks (minimum) Front = 6 metres Rear = 8 metres Side (Exterior) = 6 metres Side (Interior) = 8 metres, or as required by the Fire Marshal Building Height (maximum) 10.7 metres (35 feet) (b) Only 1 caretaker unit is permitted on a lot. (c) Hazardous goods storage or tank farm uses shall not be permitted within 30.5 metres of any water course. (d) No commercial development involving food storage, handling or preparation shall be permitted within 450m of a waste handling facility.
Granular Resources		Quarry	
Waste Disposal		Waste disposal site Sewage treatment system	(a) No residential development or commercial development involving food storage, handling or preparation shall be permitted within 450 metres of a waste disposal site.
Hinterland	Archaeological site Dog team Temporary tenting or camping	Beach shack Cabin Quarry Cemetery Commercial harvesting Communications facility Permanent hunting and fishing cabins or camps Resource exploration and development Snow fence Tourist facilities Wind turbine Any accessory building, structure or use, subject to Section 5.1	(a) Any development within the Transportation Influence Zone as indicated on the Land Use Map shall be subject to the approval of NAV Canada. (b) No development is permitted within 150 metres downwind of any snow fence without the approval of council. (c) No development is permitted within 200 metres of a wind turbine. (d) No development is permitted within 100 metres of an Archaeological Site or Paleontological Site.
Transportation	Airport and related uses Communications facility Service shop Sea lift facility		(a) Any development within a 4000m radius of the airport reference point, as indicated on the Land Use Map, is subject to the Baker Lake Airport Zoning Regulations and shall be subject to the approval of NAV Canada and Nunavut Airports. (b) No development shall occur within 150m of the Non-Directional Beacon (NDB) Site.
Municipal Reserve			(a) The Municipal Reserve Zone identifies lands that may be interesting for future redevelopment. No development is permitted in the MR Zone unless of temporary nature, subject to Council approval.

BAKER LAKE COMMUNITY PLAN
BY-LAW No. 218

A By-law of the Hamlet of Baker Lake in Nunavut Territory to adopt a General Plan pursuant to the provisions of the *Planning Act*, RSNWT, 1988, c. P-7, s.4.

WHEREAS the Council of the Hamlet of Baker Lake has prepared a General Plan, referred to as the "Baker Lake Community Plan", in accordance with the *Planning Act*;

NOW THEREFORE, the Council of the Hamlet of Baker Lake, duly assembled, enacts as follows:

1. Schedules 1, 2, 3a and 3b of this By-law form part of this By-law.
2. This By-law may be cited as the "Baker Lake Community Plan".
3. This By-law shall come into full force and effect on the date of its Third Reading.
4. By-law No.172 of the Hamlet of Baker Lake, and all amendments thereto, is hereby repealed.

READ a first time this 13th day of December, 2012 A.D.

David Aksawnee, Mayor — Dennis Zettler, Senior Administrative Officer

After due notice and a Public Hearing, READ a second time this 7th day of March, 2013 A.D.

Joe Aupaluktuq, Mayor — Dennis Zettler, Senior Administrative Officer

APPROVED by the Minister of Community and Government Services this __ day of _____, 2013 A.D.

Minister

READ a third time this __ day of _____, 2013 A.D.

Joe Aupaluktuq, Mayor — Dennis Zettler, Senior Administrative Officer

BAKER LAKE ZONING BY-LAW
BY-LAW No. 219

A By-law of the Hamlet of Baker Lake in Nunavut Territory to adopt a Zoning By-law pursuant to the provisions of the Planning Act, RSNWT, 1988, c. P-7, s.13.

WHEREAS the Council of the Hamlet of Baker Lake has prepared a General Plan, and

WHEREAS it is deemed desirable to regulate certain uses of land and development within the Municipality,

NOW THEREFORE, the Council of the Hamlet of Baker Lake, duly assembled, enacts as follows:

1. Schedules 2, 3a, 3b and 4 of this By-law are declared to form part of this By-law.
2. This By-law may be cited as the "Baker Lake Zoning By-law".
3. This By-law shall come into full force and effect on the date of its Third Reading.
4. By-law No.173 of the Hamlet of Baker Lake, and all amendments thereto, are hereby repealed.

READ a first time this 13th day of December, 2012

David Aksawnee, Mayor — Dennis Zettler, Senior Administrative Officer

After due notice and a Public Hearing, READ a second time this 7th day of March, 2013

Joe Aupaluktuq, Mayor — Dennis Zettler, Senior Administrative Officer

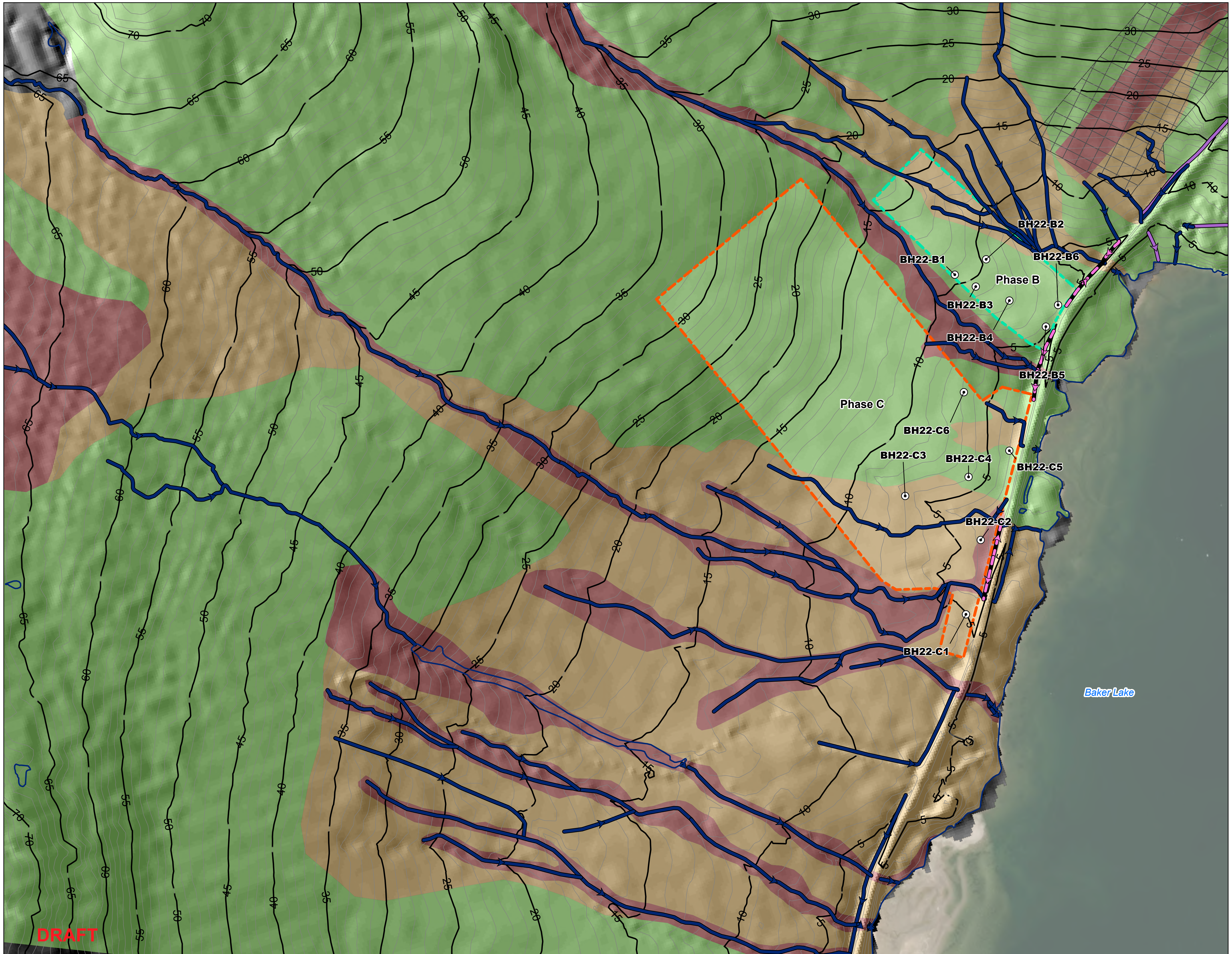
APPROVED by the Minister of Community and Government Services this __ day of _____, 2013

Minister

READ a third time this __ day of _____, 2013

Joe Aupaluktuq, Mayor — Dennis Zettler, Senior Administrative Officer

APPENDIX C Figures



NUNAMI STANTEC

- Borehole
- Intermediate Contour
- Index Contour
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- Phase B
- Phase C
- Snowdrift Area

Land development suitability

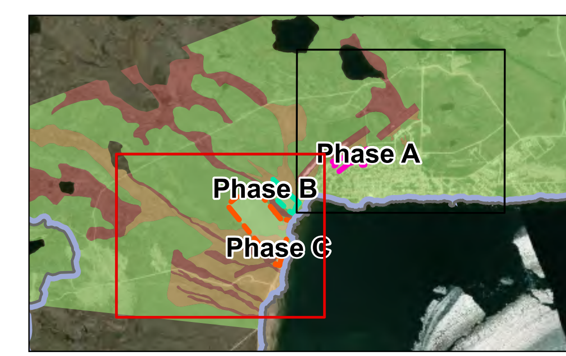
- Terrain suitable for development
- Terrain conditionally suitable for development
- Terrain unfavourable for development

0 140 280 metres

(At original document size of 11x17)
1:8,000

Notes

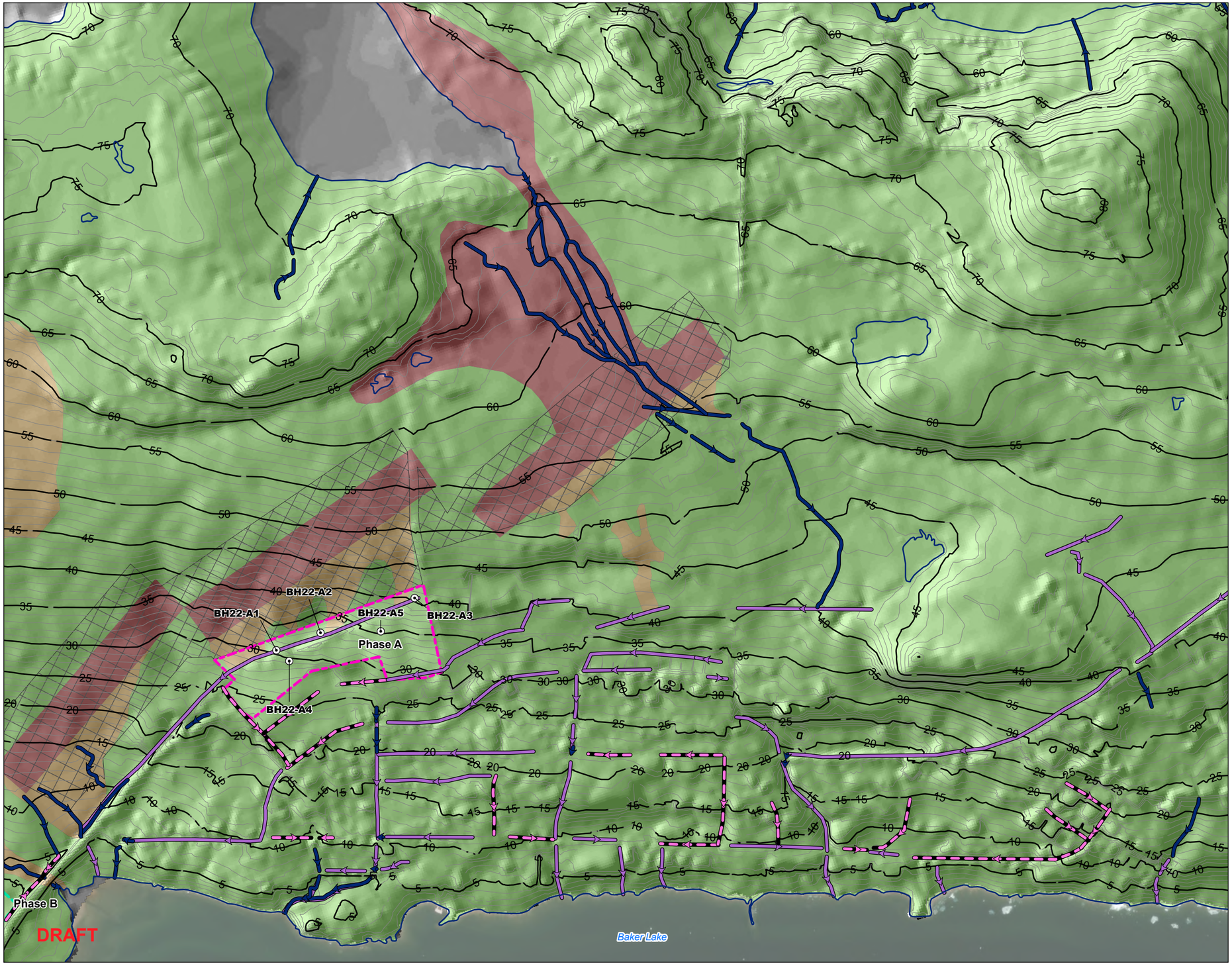
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar



Project Location Baker Lake, Nunavut	Prepared by LT on 2022-05-27 TR by EK on 2022-05-27
Client/Project Baker Lake Geotechnical Evaluation and Drainage Planning	144903259
Figure No. **C.1**	**DRAFT**

Title

Land Development Suitability



NUNAMI STANTEC

- Borehole
- Intermediate Contour
- Index Contour
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- Phase A
- Phase B
- Snowdrift Area

Land development suitability

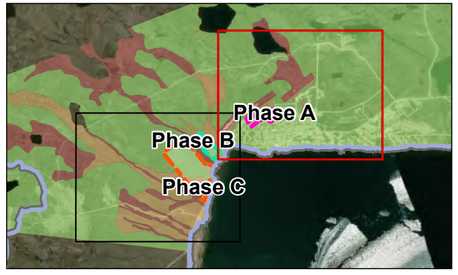
- Terrain suitable for development
- Terrain conditionally suitable for development
- Terrain unfavourable for development

N

0 140 280 metres

(At original document size of 11x17)
1:8,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Earthstar Geographics
World Imagery: Maxar



Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

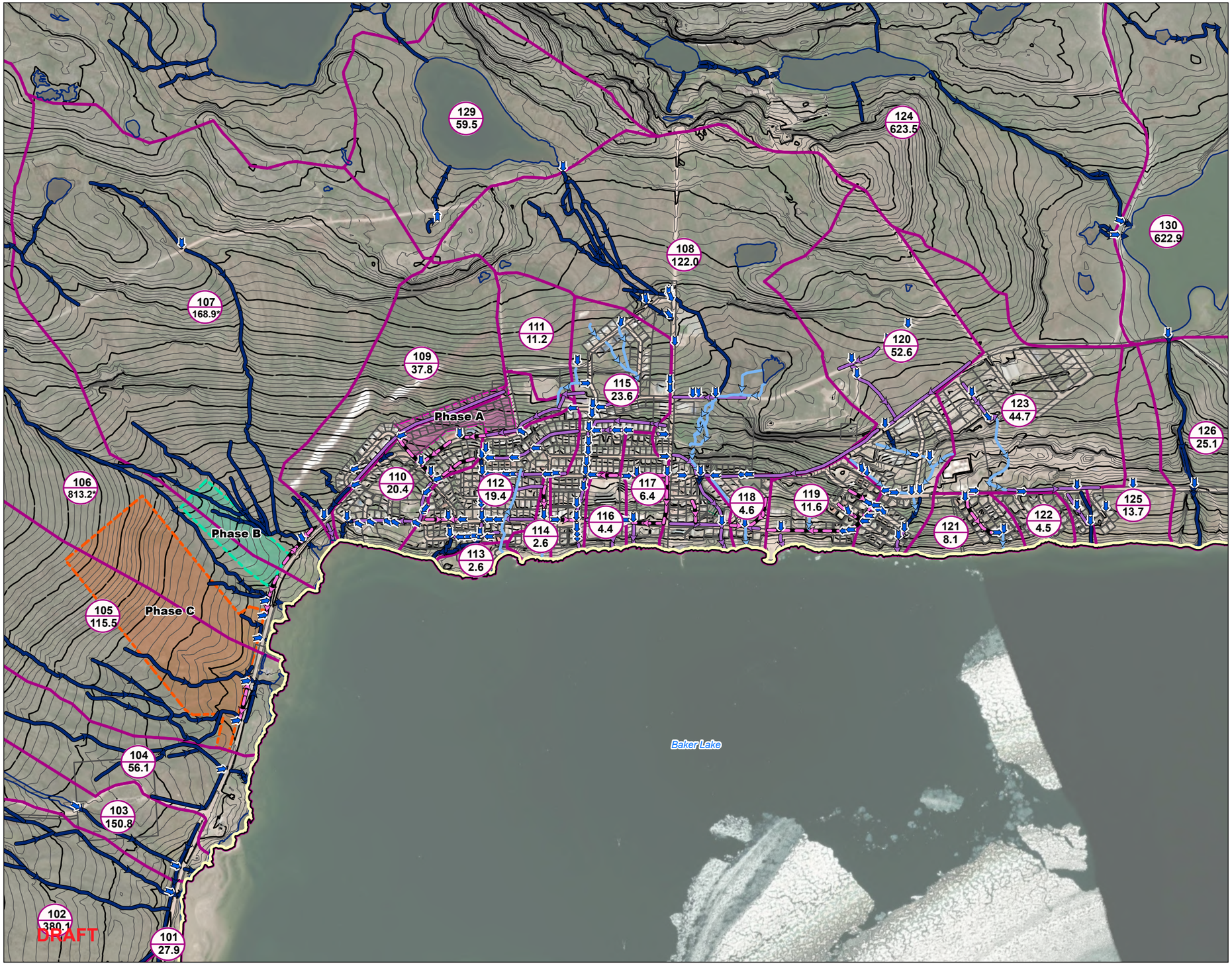
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.2

DRAFT

Title
Land Development Suitability



NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Boundary for Analysis
- Drainage Basin
- Parcel
- Phase A
- Phase B
- Phase C

Basin No. / Area (ha)

N

0 275 550 metres

(At original document size of 11x17)
1:15,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Earthstar Geographics
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

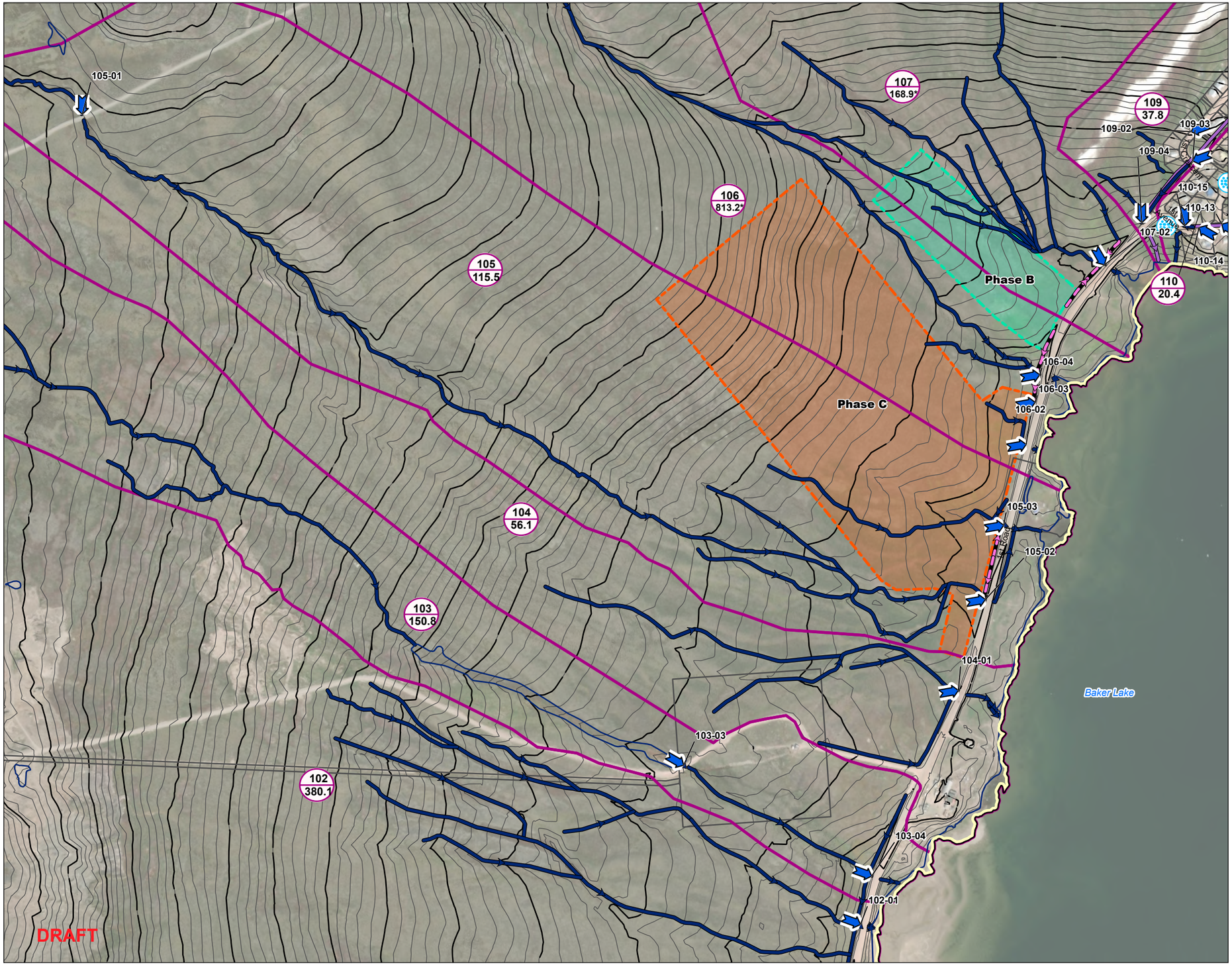
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.3

DRAFT

Title
Existing Conditions Drainage Map - Overview of Catchments and Drainage Infrastructure



NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
  *Drainage Divide uncertain - further assesment required.
- Parcel
- Phase B
- Phase C

Basin No. / Area (ha)

N

0 140 280 metres
(At original document size of 11x17)
1:8,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

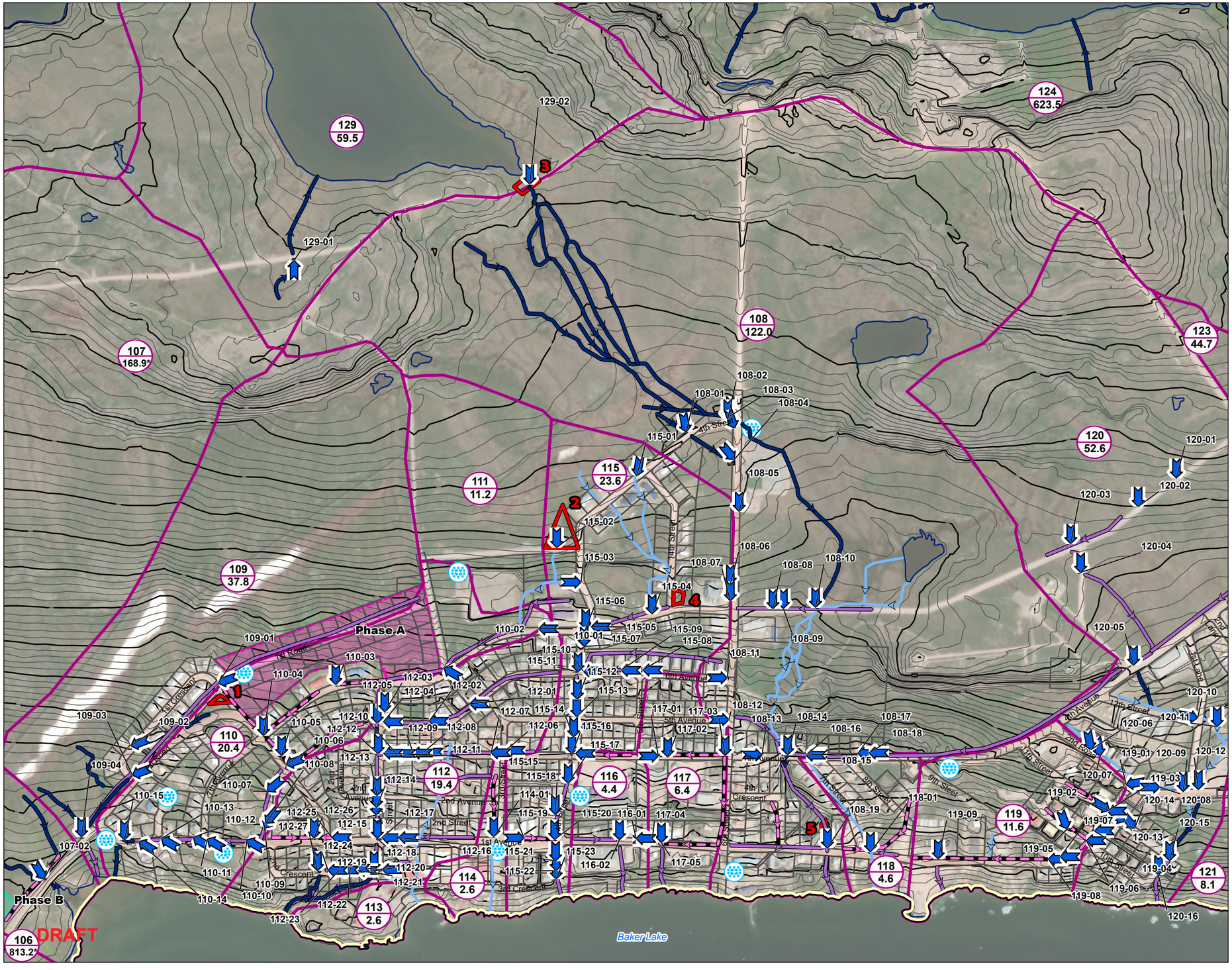
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.4

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure



NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
  *Drainage Divide uncertain - further assesment required.
- Parcel
- Phase A
- Phase B

Basin No. / Area (ha)

N

0 140 280 metres
(At original document size of 11x17)
1:8,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Earthstar Geographics
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

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Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.5

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure

NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
- Parcel

Basin No.
Area (ha)

N

0 140 280 metres
(At original document size of 11x17)
1:8,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Earthstar Geographics
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

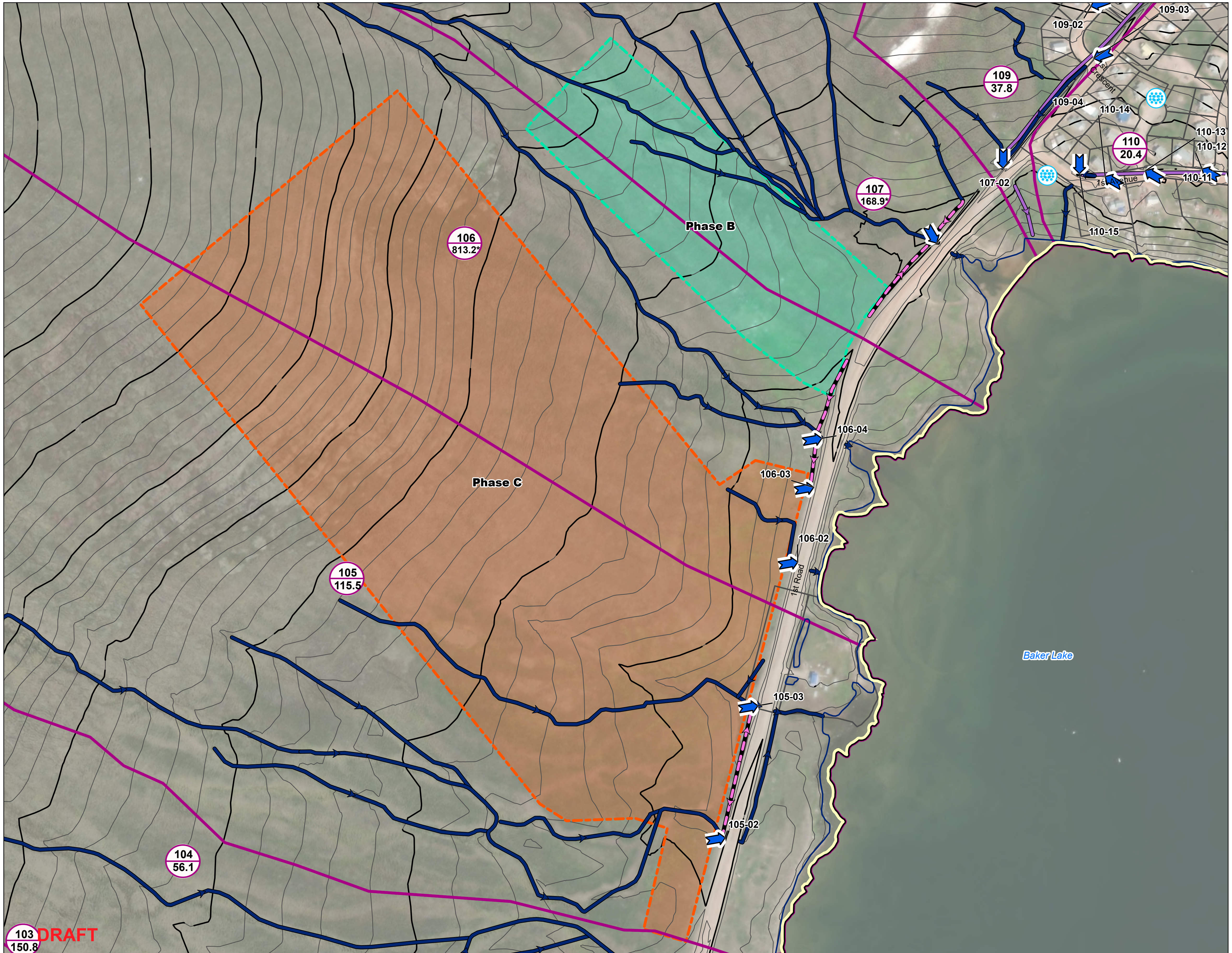
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.6

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure



NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
- *Drainage Divide uncertain - further assesment required.
- Parcel
- Phase B
- Phase C

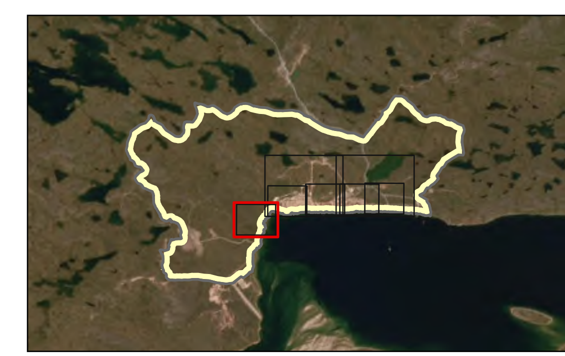
Basin No.
Area (ha)

N

0 80 160 metres

(At original document size of 11x17)
1:4,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics



Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project
144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.7
DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure

NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
  *Drainage Divide uncertain - further assesment required.
- Parcel
- Phase A
- Phase B

Basin No. / Area (ha)

N

0 80 160 metres
(At original document size of 11x17)
1:4,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

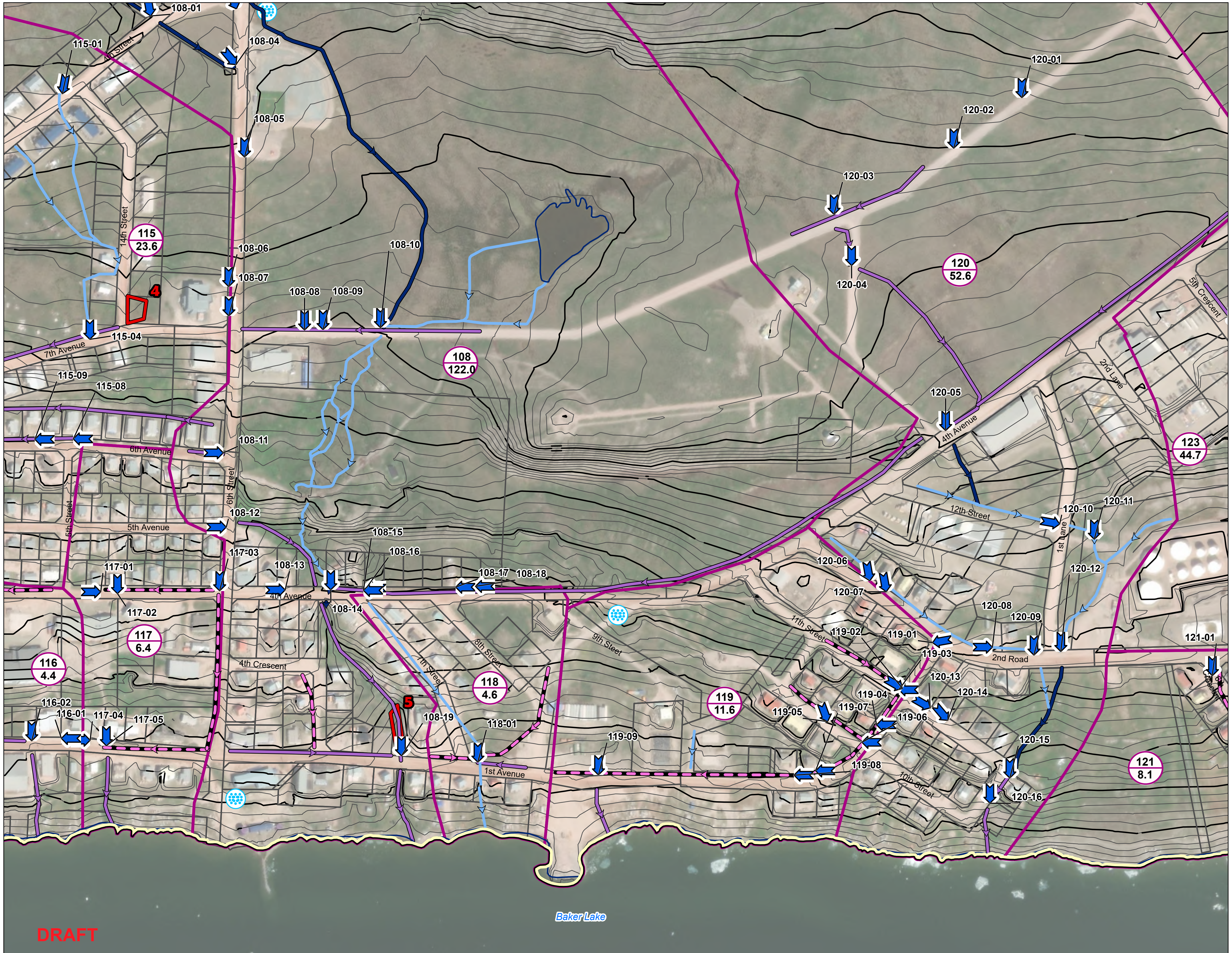
Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project
144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.8

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure



NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
- Parcel

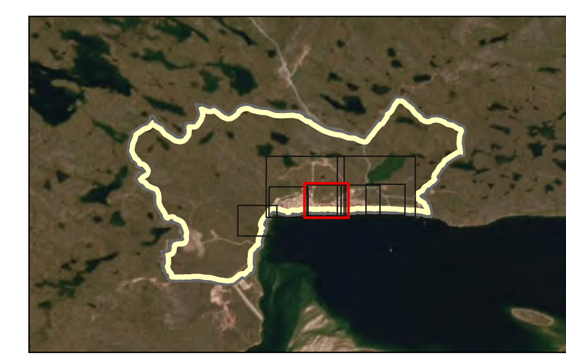
Basin No. / Area (ha)

N

0 80 160 metres

(At original document size of 11x17)
1:4,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics



Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project
144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.9
DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure

NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Snow Dump Location
- Boundary for Analysis
- Drainage Basin
- Parcel

Basin No. / Area (ha)

N

0 80 160 metres

(At original document size of 11x17)
1:4,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.10

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure

NUNAMI STANTEC

- Culvert
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Boundary for Analysis
- Drainage Basin
- Parcel
- Phase A
- Phase B
- Phase C

Basin No. / Area (ha)

N

0 80 160 metres

(At original document size of 11x17)
1:4,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

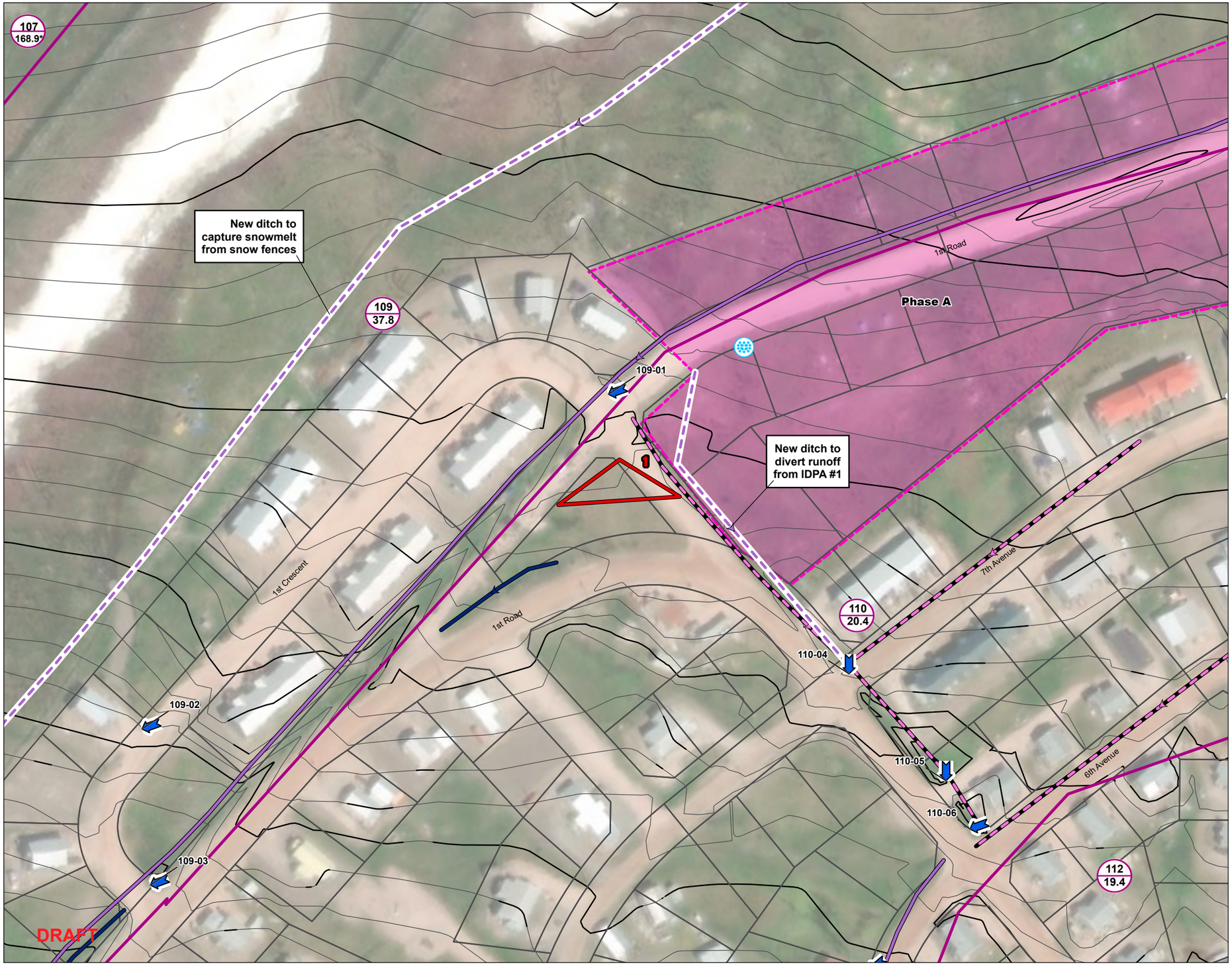
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.11

DRAFT

Title
Existing Conditions Drainage Map - Catchments and Drainage Infrastructure



NUNAMI STANTEC

- Culvert
- Snow Dump Location
- Ditch - Proposed
- Channel
- Ditch - defined
- Ditch - poorly defined
- Boundary for Analysis
- Identified Drainage Problem Area
- Drainage Basin
- Phase A

Basin No. / Area (ha)

N

0 25 50 metres

(At original document size of 11x17)
1:1,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

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Baker Lake
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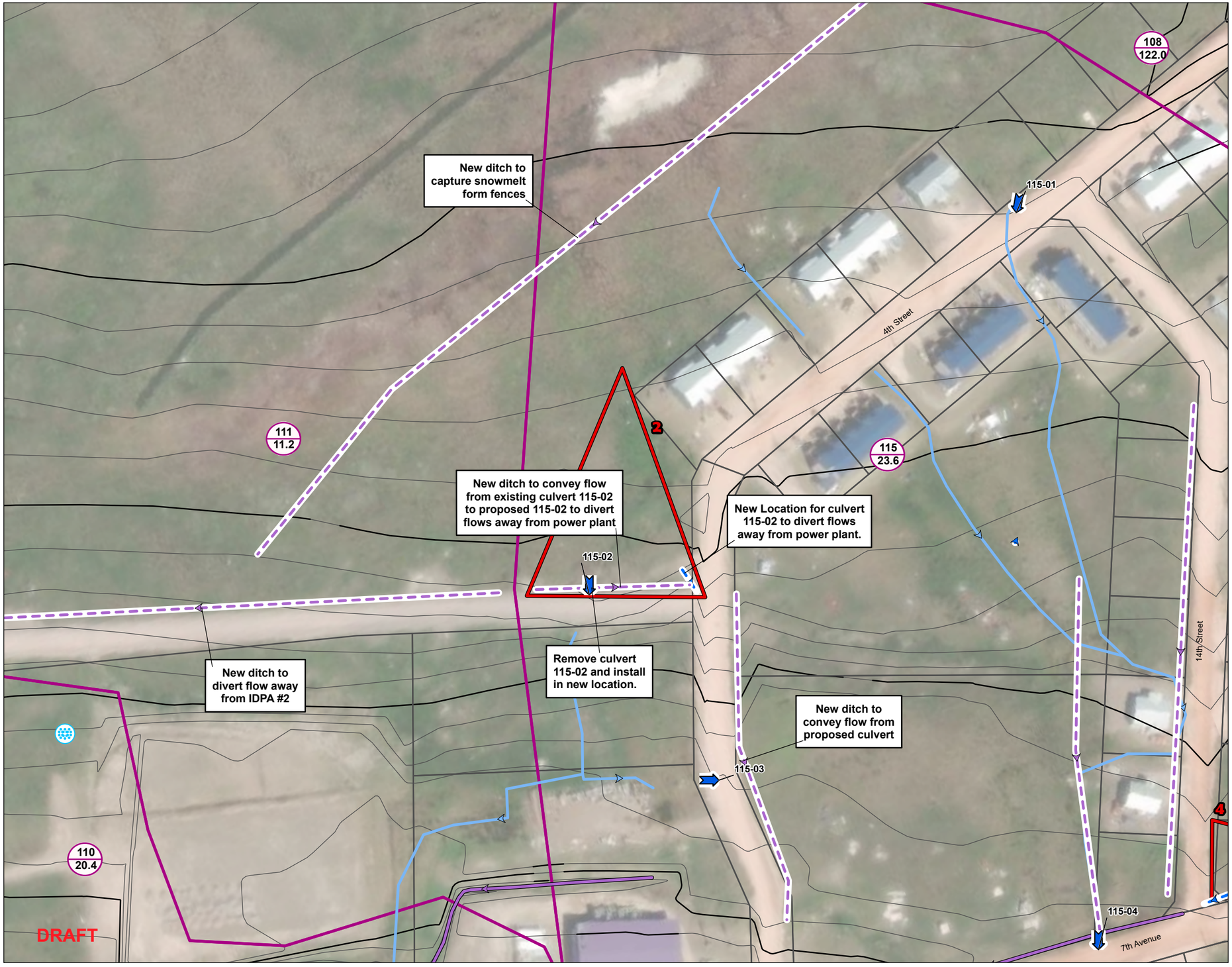
144903259

Figure No.
C.12

DRAFT

Title
Proposed Conditions Drainage Plan - IDPA #1



NUNAMI STANTEC

- Culvert
- Snow Dump Location
- Culvert - Proposed
- Ditch - Proposed
- Ditch - defined
- overland flow path
- Boundary for Analysis
- Identified Drainage Problem Area
- Drainage Basin

Basin No. / Area (ha)

N

0 25 50 metres

(At original document size of 11x17)
1:1,500

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

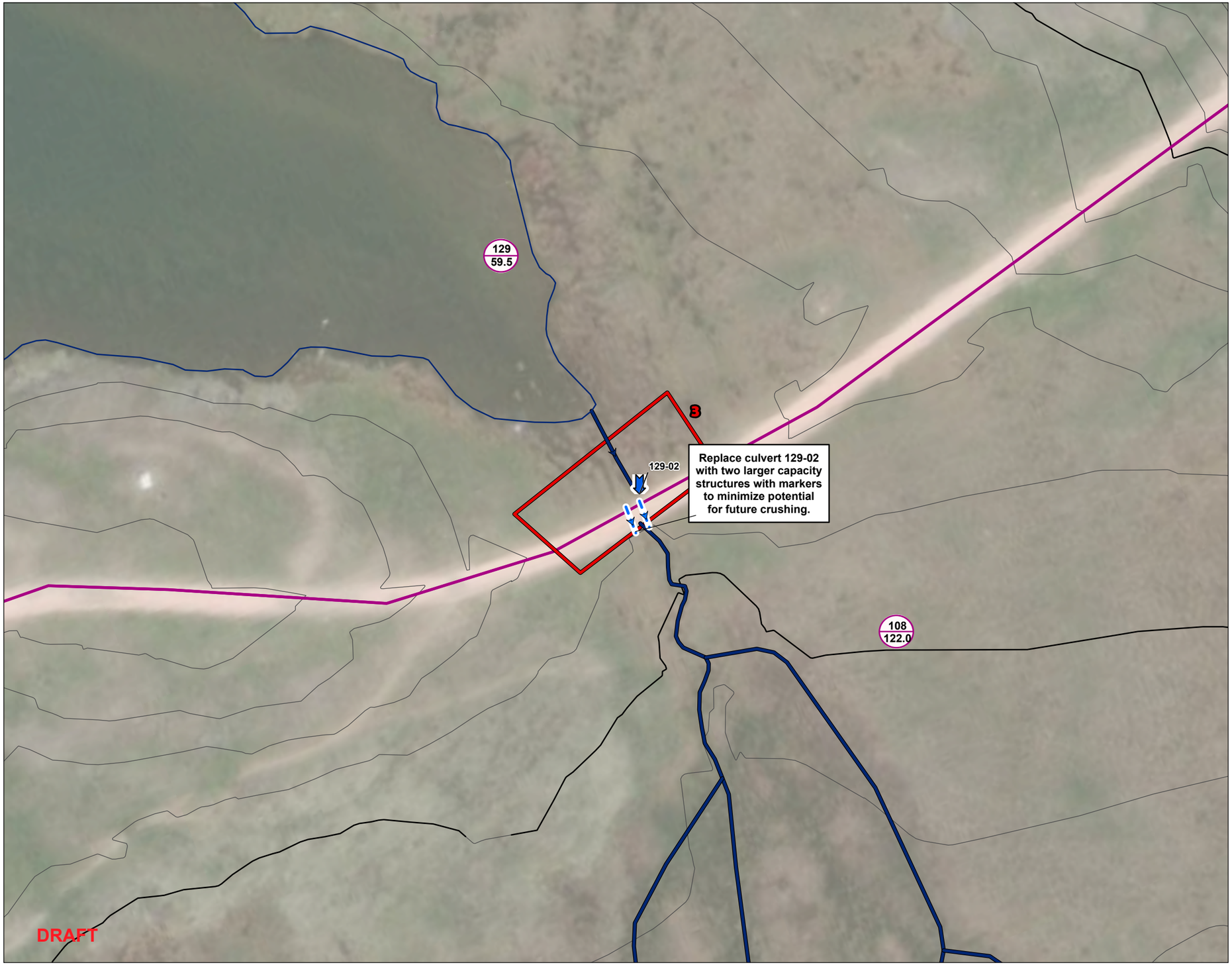
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.13

DRAFT

Title
Proposed Conditions Drainage Plan - IDPA #2



NUNAMI STANTEC

- Culvert
- Culvert - Proposed
- Shoreline; Waterbody
- Channel
- Boundary for Analysis
- Identified Drainage Problem Area
- Drainage Basin

Basin No. / Area (ha)

N

0 10 20 metres
(At original document size of 11x17)
1:1,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

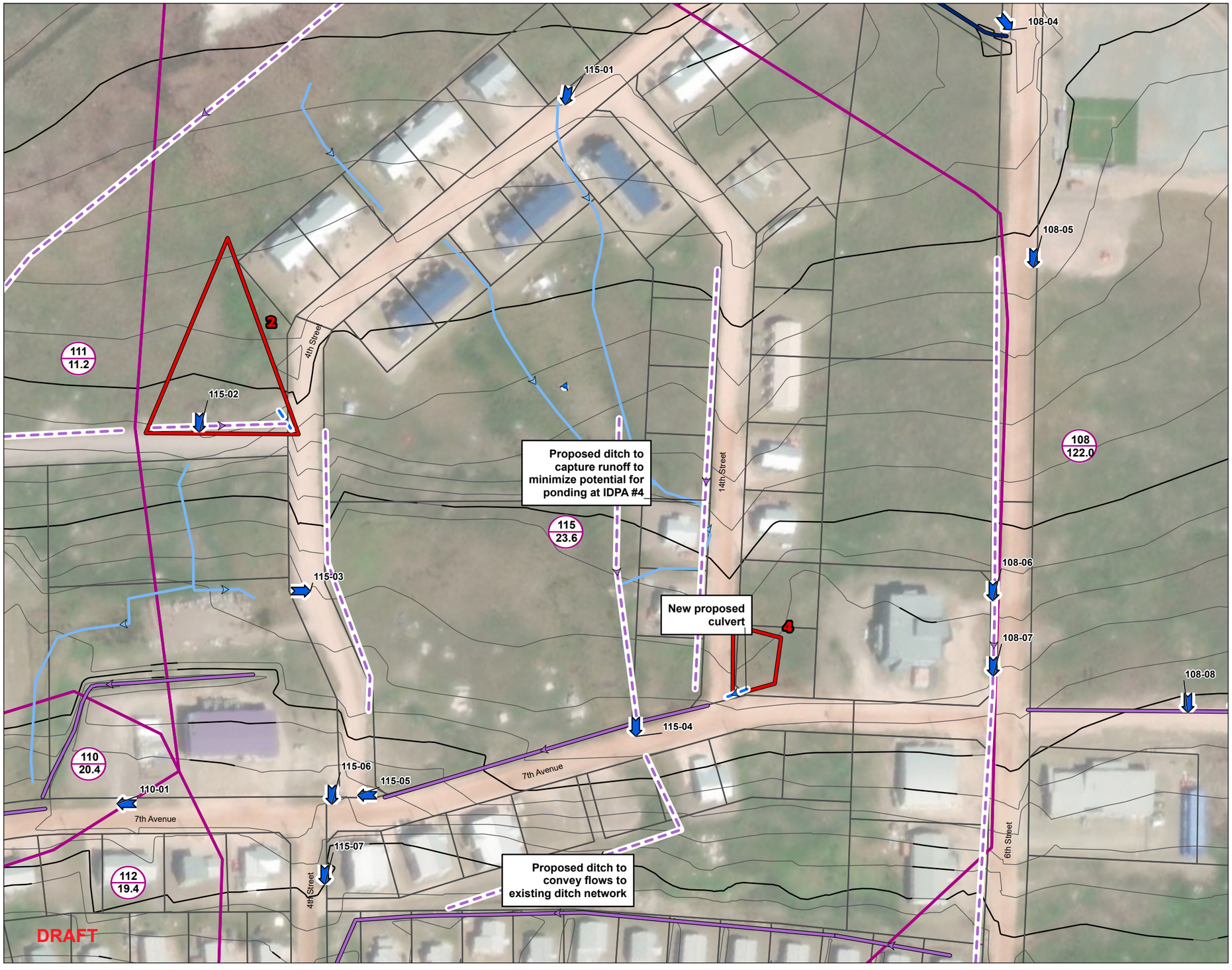
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.14

DRAFT

Title
Proposed Conditions Drainage Plan - IDPA #3



NUNAMI STANTEC

- Culvert
- Culvert - Proposed
- Ditch - Proposed
- Channel
- Ditch - defined
- overland flow path
- Boundary for Analysis
- Identified Drainage Problem Area
- Drainage Basin

Basin No. / Area (ha)

N

0 30 60 metres

(At original document size of 11x17)
1:1,750

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

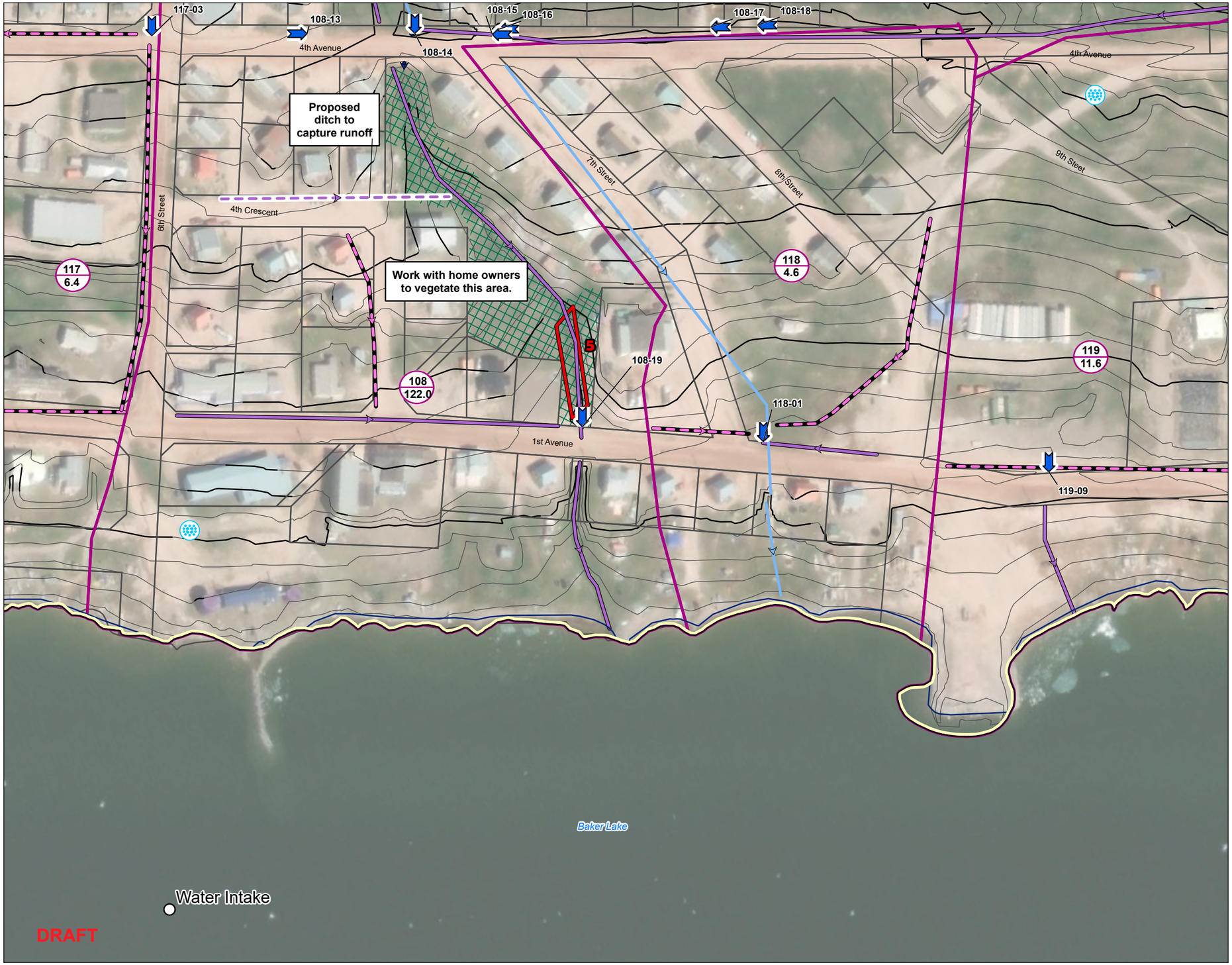
Client/Project
144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.15

DRAFT

Title
Proposed Conditions Drainage Plan - IDPA #4

S:\1232\projects\144903259\figures\report\existing_conditions\Existing_Conditions_Drainage_Maps.aprx Revised: 2022-06-06 By: LTrudell



NUNAMI STANTEC

- Culvert
- Water Intake
- Snow Dump Location
- Ditch - Proposed
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- overland flow path
- Boundary for Analysis
- Identified Drainage Problem Area
- Drainage Basin

Basin No. / Area (ha)

N

0 30 60 metres

(At original document size of 11x17)
1:1,900

Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Maxar

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

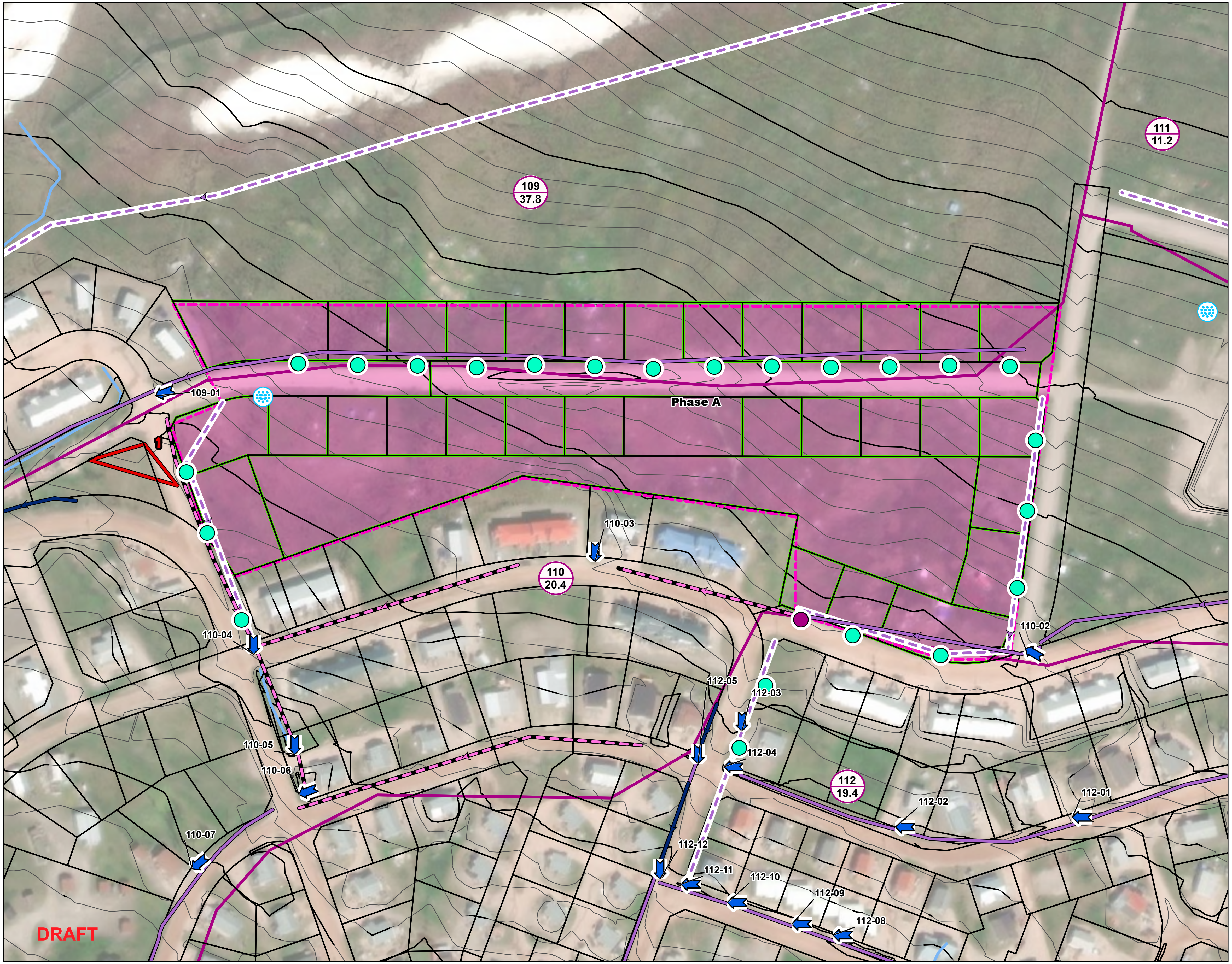
Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.16

DRAFT

Title
Proposed Conditions Drainage Plan - IDPA #5



NUNAMI STANTEC

Culvert
Proposed Cross Culvert
Proposed Entrance Culvert (at each driveway)
Snow Dump Location
Channel
Ditch - defined
Ditch - poorly defined
Overland flow path
Ditch - Proposed
Boundary for Analysis
Drainage Basin
Identified Drainage Problem Area
Phase A
Development Lot

Basin No.
Area (ha)

N

0 30 60 metres
(At original document size of 11x17)
1:2,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 15N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

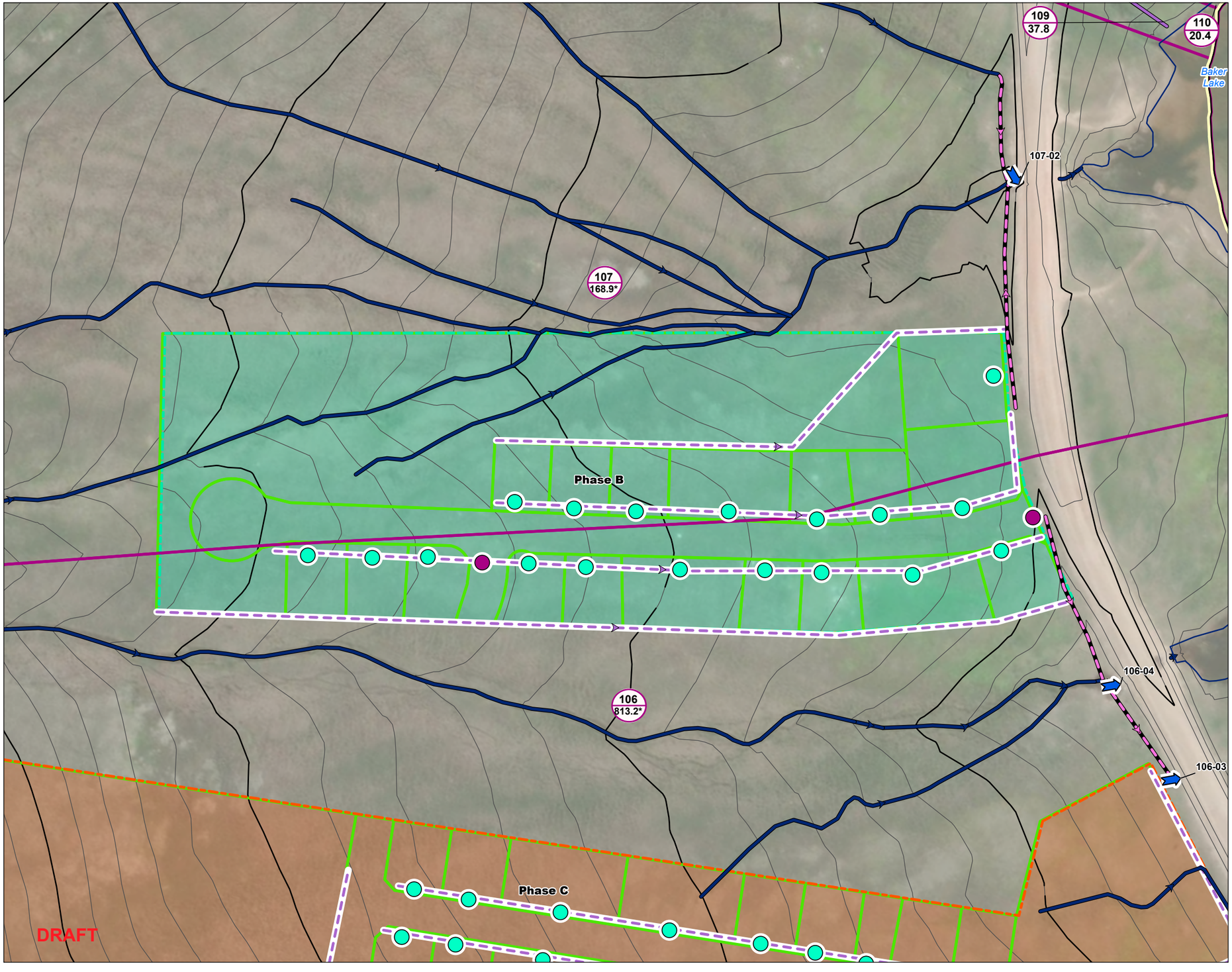
Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project 144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.17
DRAFT

Title
Proposed Conditions Drainage Plan - Development Phase A



NUNAMI STANTEC

- Culvert
- Proposed Cross Culvert
- Proposed Entrance Culvert (at each driveway)
- Shoreline; Waterbody
- Channel
- Ditch - defined
- Ditch - poorly defined
- Ditch - Proposed
- Boundary for Analysis
- Drainage Basin
- *Drainage Divide uncertain - further assesment required.
- Phase B
- Phase C
- Development Lot

Basin No. / Area (ha)

N

0 30 60 metres
(At original document size of 11x17)
1:2,000

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 15N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

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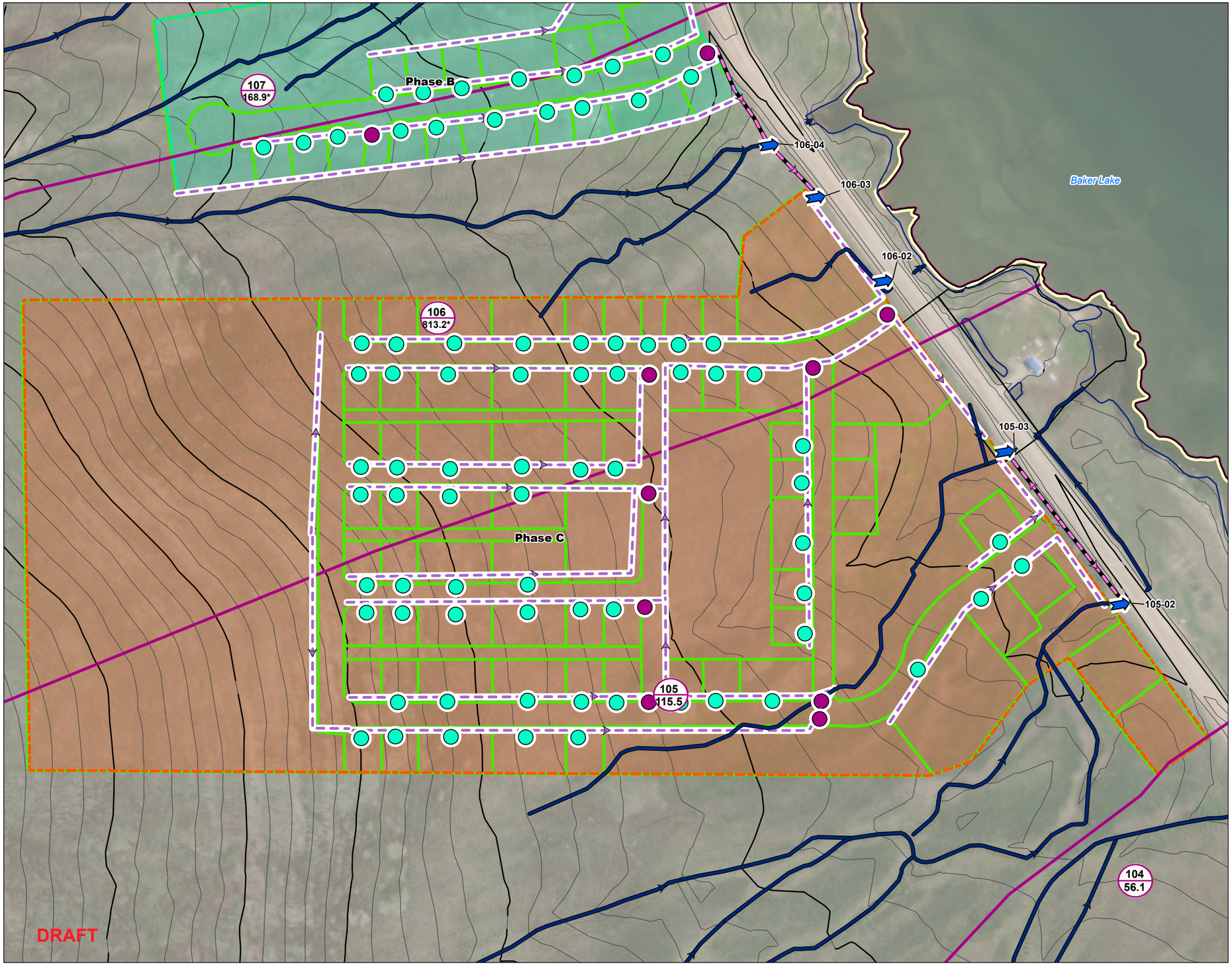
TR by EK on 2022-05-27

Client/Project
144903259
Baker Lake
Geotechnical Evaluation and Drainage Planning

Figure No.
C.18

DRAFT

Title
Proposed Conditions Drainage Plan - Development Phase B



NUNAMI STANTEC

- Culvert
- Proposed Cross Culvert
- Proposed Entrance Culvert (at each driveway)
- Shoreline; Waterbody
- Channel
- Ditch - poorly defined
- Ditch - Proposed
- Boundary for Analysis
- Drainage Basin
- *Drainage Divide uncertain - further assesment required.
- Phase B
- Phase C
- Development Lot

Basin No. / Area (ha)

N

0 50 100 metres

(At original document size of 11x17)
1:3,200

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 15N
2. Data Sources:
3. Background: World Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
World Imagery: Earthstar Geographics

Project Location
Baker Lake,
Nunavut

Prepared by LT on 2022-05-27
TR by EK on 2022-05-27

Client/Project
Baker Lake
Geotechnical Evaluation and Drainage Planning

144903259

Figure No.
C.19

DRAFT

Title
Proposed Conditions Drainage Plan - Development Phase C

APPENDIX D Borehole Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis

Rootmat	vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	mixture of soil and humus capable of supporting vegetative growth
Peat	mixture of visible and invisible fragments of decayed organic matter
Till	unstratified glacial deposit which may range from clay to boulders
Fill	material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure

Desiccated	having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	having cracks, and hence a blocky structure
Varved	composed of regular alternating layers of silt and clay
Stratified	composed of alternating successions of different soil types, e.g. silt and sand
Layer	> 75 mm in thickness
Seam	2 mm to 75 mm in thickness
Parting	< 2 mm in thickness

Terminology describing soil types

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris)

Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on Page 2. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

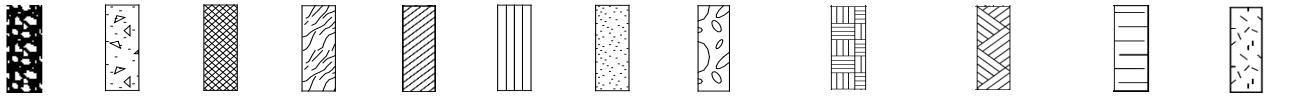
Terminology describing consistency of cohesive soils

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kg/cm^2 or kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



Asphalt | Concrete | Fill | Organics | Clay | Silt | Sand | Gravel Cobbles Boulders | Undifferentiated Bedrock | Sedimentary Bedrock | Metamorphic Bedrock | Igneous Bedrock

SAMPLE TYPE

AS, BS, GS	Auger sample; bulk sample; grab sample
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
SO	Sonic tube
SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby Tube or thin wall tube
SV	Shear vane
RC *HQ, NQ, BQ, etc.*	Rock Core; samples obtained with the use of standard size diamond coring bits.

WATER LEVEL

Measured: in standpipe, piezometer, or well

Inferred: seepage noted, or; measured during or at completion of drilling

RECOVERY FOR SOIL SAMPLES

The recovery is recorded as the length of the soil sample recovered in the direct push, split spoon sampler, Shelby Tube, or sonic tube.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test (SPT): the number of blows of a 140-pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50 for 75 mm or 50/75 mm). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60-degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Total Core Recovery (TCR) denotes the sum of all measurable rock core recovered in one drill run. The value is noted as a percentage of recovered rock core based on the total length of the drill run.

Solid Core Recovery (SCR) is defined as total length of solid core divided by the total drilled length, presented as a percentage. Solid core is defined as core with one full diameter.

Rock Quality Designation (RQD) is a modified core recovery that incorporates only pieces of solid core that are equal to or greater than 10 cm (4") along the core axis. It is calculated as the total cumulative length of solid core (> 10 cm) as measured along the centerline of the core divided by the total length of borehole drilled for each drill run or geotechnical interval, presented as a percentage. RQD is determined in accordance with ASTM D6032.

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock quality

Rock Mass Quality	Rock Quality Designation Number (RQD)	Alternate (Colloquial) Rock Mass Quality	
Very Poor Quality	0-25	*Very Severely Fractured*	*Crushed*
Poor Quality	25-50	*Severely Fractured*	*Shattered or Very Blocky*
Fair Quality	50-75	*Fractured*	*Blocky*
Good Quality	75-90	*Moderately Jointed*	*Sound*
Excellent Quality	90-100	*Intact*	*Very Sound*

Terminology describing rock strength

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

Terminology describing rock with respect to discontinuity and bedding spacing

Spacing (mm)	Discontinuities Spacing	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

BOREHOLE RECORD

BH22-A1

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **31.0m**

LOCATION: **Baker Lake, NU** | 7136353.0N 643465.0E | DATUM: **NAD83**

DATE BORED: **June 6, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	31.0			GS	1			[N_{bc}] below 0.05 m
	31.0	**ORGANICS:** moss and grass						
	30.4	Grey poorly-graded gravel (GP) with sand **TILL**		GS	2			
1		- brown clayey sand (SC) with gravel **TILL** below 0.6 m		GS	3			
	29.3							
2		- silty sand (SM) **TILL** below 1.7 m		GS	4			Vx (~20%) below 1.6 m Sieve/Hydro at 1.7 m G S M C 7% 54% 27% 12%
		- white, hard igneous or metamorphic rock from 2.0 to 2.1 m (suspected boulder)		GS	5			
	28.6							
		BEDROCK - pink to red, granitic		GS	6			
3	28.0	**End of Borehole** • Borehole terminated at a depth of 3.0 m. • Moderate groundwater seepage into borehole from surface.						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 445.3

ELEVATION (m): 31 30 29 28 27 26 25 24 23 22 21 20

4 5 6 7 8 9 10 11

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 3 m | Page 1 of 1

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BOREHOLE RECORD

BH22-A2

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **33.0m**

LOCATION: **Baker Lake, NU** | 7136359.0N 643561.0E | DATUM: **NAD83**

DATE BORED: **June 6, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	33.0			GS	1			
	32.9	**ORGANICS:** moss						
		Brown silty sand (SM) **TILL**						$[N_{bn}]$ below 0.08 m
				GS	2			Sieve/Hydro at 0.3 m G 4% S 57% M 31% C 8%
1								
				GS	3			Vx (~5%) below 1.2 m
2								
3								
4								
	28.4							
		BEDROCK - pink, granitic		GS	4			
5	28.0	**End of Borehole** • Borehole terminated at a depth of 5.0 m. • No groundwater seepage was observed during or upon completion of drilling.						
6								
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 531.1

ELEVATION (m): 33 32 31 30 29 28 27 26 25 24 23 22

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 5 m | Page 1 of 1

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BOREHOLE RECORD

BH22-A3

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 6, 2022**

BH COORDINATES [UTM 14W] 7136367.0N 643764.0E
PROJECT NO. : **144903259**
BH ELEVATION: **40.1m**
DATUM: **NAD83**
WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	40.1			GS	1			Frozen below 0.1 m
	40.0	**ORGANICS:** moss Brown silty sand (SM) **TILL**		GS	2			GS 2 sample wetted from surface water infiltration into borehole.
2	37.9	gravelly below 2.1 m		GS	3			
	37.2	**BEDROCK** - pink to red, granitic		GS	4			
3		**End of Borehole** • Borehole terminated at a depth of 2.9 m. • Surface water seepage into borehole while drilling up to 1.7 m depth. Steel sleeve used below 1.7 m depth to control surface water seepage. • Unable to characterize frozen ground ice structure due to disturbance from surface water seepage.						

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 690.1

ELEVATION (m): 40 39 38 37 36 35 34 33 32 31 30

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 2.9 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

BOREHOLE RECORD

BH22-A4

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 6, 2022**

BH COORDINATES [UTM 14W] 7136324.0N 643483.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **29.7m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	29.7			GS	1			
	29.6	**ORGANICS:** moss						
		Grey to brown poorly graded gravel (GP) with sand **TILL** - frozen, some clay		GS	2			
	26.0							
	25.7	**BEDROCK** bedrock presence inferred from drill rate, no return cuttings						
		End of Borehole • Borehole terminated at a depth of 4.0 m. • Moderate groundwater seepage into borehole from surface. • No reliable sample recovery below 1.0 m due to wetting of return cuttings from surface water seepage into borehole.						

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 564.7

ELEVATION (m): 29 28 27 26 25 24 23 22 21 20 19

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 4 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

BOREHOLE RECORD

BH22-A5

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 6, 2022**

BH COORDINATES [UTM 14W] 7136324.0N 643678.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **35.4m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	35.4			GS	1			
	35.3	**ORGANICS:** moss						
		Brown poorly graded sand (SP) with gravel **TILL**						[N_{Dn}] below 0.1 m
		- clayey		GS	2			
1								
		- grey below 1.5 m		GS	3			Vx (~10%) below 1.5 m
2								
				GS	4			
								[N_{Dn}] below 2.7 m
3	31.8							
		- poorly graded gravel (GP) with sand **TILL** below 3.6 m		GS	5			
4								
		- red rock fragments from 4.6 to 4.7 m (suspected boulder)		GS	6			
5	30.0							
		BEDROCK						
		- grey, granitic						
		- pink to red below 5.6 m		GS	7			
6	29.0							
		End of Borehole						
		• Borehole terminated at a depth of 6.4 m.						
		• Moderate groundwater seepage into borehole from surface.						
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 593.1

ELEVATION (m): 35 34 33 32 31 30 29 28 27 26 25

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 6.4 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

BOREHOLE RECORD

BH22-B1

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 4, 2022**

BH COORDINATES [UTM 14W] 7136132.0N 642580.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **10.4m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	10.4							
	10.4	**ORGANICS:** moss and lichen		GS	1			$[N_{bn}]$ below 0.05 m
		Brown to grey poorly-graded gravel (GP) with sand **TILL**		GS	2			
	9.5							
1		- silty sand (SM) **TILL** below 1.0 m		GS	3			
2				GS	4			Vx (~20%) below 1.5 m Sieve/Hydro at 1.5 m G S M C 13% 45% 31% 11% $[N_{bn}]$ nelow 2.1 m
3				GS	5			
4		- some gravel fragments between 4.2 and 5.4 m		GS	6			
5								
6				GS	7			
7								
8	2.2							
		BEDROCK - pink, granitic		GS	8			
	1.5							
9		**End of Borehole** • Borehole terminated at a depth of 8.9 m. • No groundwater seepage was observed during or upon completion of drilling.						
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER
437.4

ELEVATION (m)
10 9 8 7 6 5 4 3 2 1 0

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 8.9 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

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BOREHOLE RECORD

BH22-B2

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **9.5m**

LOCATION: **Baker Lake, NU** | 7136142.0N 642650.0E | DATUM: **NAD83**

DATE BORED: **June 5, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	9.5							
	9.5	**ORGANICS:** moss and lichen Brown silty sand (SM) **TILL**		GS	1			[N_{bn}] below 0.05 m
1								
				GS	2			Vx (~10%) below 1.5 m
2								
				GS	3			[N_{bn}] below 2.1 m
3								
				GS	4			Vx (~10%) below 3 m
				GS	5			[N_{bn}] below 3.7 m
4		- red granite inclusions between 3.7 and 3.8 m (suspected boulder)						
5				GS	6			
		- red granite inclusions between 5.5 and 5.8 m (suspected boulder)						
6	3.4							
		- poorly graded sand (SP) **TILL** below 6.1 m		GS	7			
7								
	1.6							
8		**BEDROCK** - pink to white, granite		GS	8			
	0.7							
9		**End of Borehole** • Borehole terminated at a depth of 8.8 m. • No groundwater seepage was observed during or upon completion of drilling.						
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

9 8 7 6 5 4 3 2 1 0 -1

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 8.8 m | Page 1 of 1

BOREHOLE RECORD

BH22-B3

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 4, 2022**

BH COORDINATES [UTM 14W] 7136096.0N 642613.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **9.7m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	9.7							
	9.7	**ORGANICS:** moss		GS	1			$[N_{bn}]$ below 0.05 m
		Brown to grey poorly-graded gravel (GP) with sand **TILL**		GS	2			
1	8.5							
		- silty sand (SM) **TILL** below 1.2 m		GS	3			$[N_{bn}]$ below 1.2 m
2				GS	4			Vx (~10%) below 2.1 m
								$[N_{bn}]$ below 2.4 m
3				GS	5			
4								
				GS	6			
5								
				GS	7			
6								
	1.8							
8		- poorly-graded sand (SP) **TILL** with some rock fragments from 7.9 to 8.8 m		GS	8			
	0.9							
9		**BEDROCK** - pink to white, granitic		GS	9			
	0.2							
		End of Borehole • Borehole terminated at a depth of 9.4 m. • No groundwater seepage was observed during or upon completion of drilling.						
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 379.2

ELEVATION (m): 9 8 7 6 5 4 3 2 1 0 -1

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 9.5 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

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BOREHOLE RECORD

BH22-B4

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **8.3m**

LOCATION: **Baker Lake, NU** | 7136048.0N 642669.0E | DATUM: **NAD83**

DATE BORED: **June 5, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	8.3							
	8.3	**ORGANICS:** moss, lichen, grass		GS	1			[N_{be}] below 0.05 m
		Brown poorly-graded sand (SP) with gravel **TILL**		GS	2			
1	7.1	- silty sand (SM) **TILL** below 1.2 m		GS	3			Vx (~10%) below 1.5 m
2								[N_{bn}] below 2.1 m
3				GS	4			
4				GS	5			
5		- red rock fragments between 4.5 and 4.7 m (suspected boulder)						
6								
7								
8		- red rock fragments between 7.6 and 7.7 m (suspected boulder)		GS	6			
	-0.5							
9		**BEDROCK** - pink to white, granitic		GS	7			
	-1.2							
10		**End of Borehole** • Borehole terminated at a depth of 9.5 m. • No reliable sample recovery between 4.3 and 7.6 m due to caving of cuttings back down the borehole. • No groundwater seepage was observed during or upon completion of drilling.						
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 514.2

ELEVATION (m): 8 7 6 5 4 3 2 1 0 -1 -2

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 9.5 m | Page 1 of 1

BOREHOLE RECORD

BH22-B5

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 5, 2022**

BH COORDINATES [UTM 14W] 7135975.0N 642723.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **5.9m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	5.9			GS	1			$[N_{bn}]$ below 0.05 m
	5.9	**ORGANICS:** moss, lichen, grass						
		Brown poorly-graded sand (SP) with gravel **TILL**		GS	2			
1	4.7							
		- silty sand (SM) **TILL** with trace gravel below 1.2 m		GS	3			
		- grey below 1.8 m						
2				GS	4			
3								
4								
5								
6								
7								
8				GS	5			
		- red granite rock fragment inclusions from 8.2 to 8.5 m (suspected boulder)						
9	-3.1			GS	6			
	-3.2	**BEDROCK** - red to pink, granitic						
10		**End of Borehole** • Borehole terminated at a depth of 9.1 m. • No groundwater seepage was observed during or upon completion of drilling.						
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 364.6

ELEVATION (m): 5 4 3 2 1 0 -1 -2 -3 -4 -5

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 9.1 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

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Stantec

BOREHOLE RECORD

BH22-B6

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **6.2m**

LOCATION: **Baker Lake, NU** | 7136009.0N 642760.0E | DATUM: **NAD83**

DATE BORED: **June 5, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	6.2			GS	1			
	6.1	**ORGANICS:** moss and lichen						[N_{bn}] below 0.07 m
		Brown poorly-graded sand (SP) with gravel **TILL** - increasing clay content with depth		GS	2			
1	5.0							[N_{bn}] below 1.2 m
		- silty sand (SM) with trace gravel **TILL** below 1.2 m		GS	3			Vx (~5%) below 1.5 m
2				GS	4			
3	2.5			GS	5			
4		**End of Borehole** • Borehole terminated at a depth of 3.7 m. • No groundwater seepage was observed during or upon completion of drilling.						
5								
6								
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 96.3

ELEVATION (m): 6 5 4 3 2 1 0 -1 -2 -3 -4

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 3.7 m | Page 1 of 1

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BOREHOLE RECORD

BH22-C1

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 3, 2022**

BH COORDINATES [UTM 14W] 7135471.0N 642389.0E
PROJECT NO. : **144903259**
BH ELEVATION: **4.8m**
DATUM: **NAD83**
WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	4.8							
0	4.8	**ORGANICS:** moss Grey to brown well-graded sand (SW) with gravel **TILL**		GS	1			[N_{bn}] below 0.05 m
1				GS	2			
2	2.4							
2		- silty sand (SM) **TILL** below 2.4 m		GS	3			
3				GS	4			
4	0.6							
4		**BEDROCK** - pink, granitic		GS	5			
5	-0.7			GS	6			
6		**End of Borehole** • Borehole terminated at a depth of 5.5 m. • No groundwater seepage was observed during or upon completion of drilling.						

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 422.1

ELEVATION (m): 4 3 2 1 0 -1 -2 -3 -4 -5 -6

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 5.5 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

BOREHOLE RECORD

BH22-C2

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 3, 2022**

BH COORDINATES [UTM 14W] 7135605.0N 642464.0E
PROJECT NO. : **144903259**
BH ELEVATION: **3.8m**
DATUM: **NAD83**
WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	3.8							
0	3.8	**ORGANICS:** moss		GS	1			$[N_{bn}]$ below 0.05 m
		Brown silty sand (SM) **TILL**		GS	2			
1								
		- grey below 1.5 m		GS	3			Vx (~20%) below 1.5 m Sieve/Hydro at 1.5 m G 7% S 50% M 33% C 9% $[N_{bn}]$ below 2.1 m
2								
		- trace gravel below 2.7 m		GS	4			
3	0.2							
		BEDROCK - pink to white, granitic		GS	5			
4								
5	-1.4							
		End of Borehole • Borehole terminated at a depth of 5.2 m. • No groundwater seepage was observed during or upon completion of drilling.						
6								
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 3 2 1 0 -1 -2 -3 -4 -5 -6 -7

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 5.2 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

BOREHOLE RECORD

BH22-C3

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 4, 2022**

BH COORDINATES [UTM 14W] 7135737.0N 642346.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **7.1m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	7.1			GS	1			$[N_{bn}]$ below 0.05 m
	7.1	**ORGANICS:** moss						
		Grey well-graded sand (SW) with gravel **TILL** - trace organics		GS	2			
1	5.6							
		- sandy lean clay (CL) **TILL** below 1.5 m		GS	3			Vbe (~40%) below 1.5 m Vbe (~20%) below 1.8 m
2								
				GS	4			
3								$[N_{bn}]$ below 3.0 m
4	2.7			GS	5			
		BEDROCK - pink, granitic						
5	1.9			GS	6			
		End of Borehole • Borehole terminated at a depth of 5.2 m. • Minor groundwater seepage into borehole from surface.						
6								
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER
460.4

ELEVATION (m)
7 6 5 4 3 2 1 0 -1 -2 -3

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 5.2 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

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BOREHOLE RECORD

BH22-C4

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **6.2m**

LOCATION: **Baker Lake, NU** | 7135734.0N 642480.0E | DATUM: **NAD83**

DATE BORED: **June 4, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	6.2							
	6.2	**ORGANICS:** moss		GS	1			[N_{bs}] below 0.05 m
		Brown poorly-graded sand (SP) with gravel **TILL**		GS	2			
1								
				GS	3			Vx (~10%) below 1.3 m
	4.4	- grey silty sand (SM) **TILL** below 1.8 m						[N_{bs}] below 1.8 m
2				GS	4			Sieve/Hydro at 2.1 m G 5% S 50% M 36% C 9%
3								
4	2.0							
		BEDROCK - pink to white, granitic		GS	5			
5	1.1							
		End of Borehole • Borehole terminated at a depth of 5.1 m. • No groundwater seepage was observed during or upon completion of drilling.						
6								
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 598.5

ELEVATION (m): 6 5 4 3 2 1 0 -1 -2 -3 -4

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 5.1 m | Page 1 of 1

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BOREHOLE RECORD

BH22-C5

CLIENT: **Hamlet of Baker Lake** | BH COORDINATES | PROJECT NO. : **144903259**

PROJECT: **Baker Lake Geotech and Drainage** | [UTM 14W] | BH ELEVATION: **3.0m**

LOCATION: **Baker Lake, NU** | 7135759.0N 642575.0E | DATUM: **NAD83**

DATE BORED: **June 4, 2022** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	3.0			GS	1			$[N_{bn}]$ below 0.05 m
	3.0	**ORGANICS:** moss Brown well-graded sand with silt (SW-SM) **TILL**		GS	2			Sieve/Hydro at 0.3 m G 14% S 72% M 12% C 2%
1	2.0	- grey silty sand (SM) **TILL** below 1.0 m		GS	3			Vbe (~20%) below 1 m $[N_{bn}]$ below 1.2 m
2				GS	4			
3				GS	5			
4	-1.8							
5	-2.5	**BEDROCK** - pink, granitic		GS	6			
6		**End of Borehole** • Borehole terminated at a depth of 5.4 m. • No groundwater seepage was observed during or upon completion of drilling.						
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 252.9

ELEVATION (m): 3 2 1 0 -1 -2 -3 -4 -5 -6 -7 -8

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Canadrill Ltd. | Logged By: AP

Drilling Method: 165 mm DTH Hammer | Reviewed By: CM

Completion Depth: 5.5 m | Page 1 of 1

BOREHOLE RECORD

BH22-C6

CLIENT: **Hamlet of Baker Lake**
PROJECT: **Baker Lake Geotech and Drainage**
LOCATION: **Baker Lake, NU**
DATE BORED: **June 4, 2022**

BH COORDINATES [UTM 14W] 7135900.0N 642524.0E
WATER LEVEL: **N/A**

PROJECT NO. : **144903259**
BH ELEVATION: **6.8m**
DATUM: **NAD83**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %	OTHER TESTS / REMARKS
0	6.8							
0	6.8	**ORGANICS:** moss and grass		GS	1			[N_{bn}] below 0.05 m
		Grey well-graded gravel (GW) with sand **TILL**		GS	2			
1				GS	3			Vbe (~60%) below 0.6 m
	5.3							[N_{bn}] below 0.9 m
2		- silty sand (SM) **TILL** below 1.5 m - trace gravel between 1.5 and 3.4 m		GS	4			
3				GS	5			
4				GS	6			
	2.0							
5		**BEDROCK** - white, extremely weak to 5.1 m - pink, granitic below 5.1 m		GS	7			
				GS	8			
6	0.7							
		End of Borehole • Borehole terminated at a depth of 6.1 m. • No groundwater seepage was observed during or upon completion of drilling.						
7								
8								
9								
10								
11								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT (N-value) BLOWS/0.3m
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER: 467

ELEVATION (m): 6 5 4 3 2 1 0 -1 -2 -3 -4

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Canadrill Ltd.
Drilling Method: 165 mm DTH Hammer
Completion Depth: 6.1 m

Logged By: AP
Reviewed By: CM
Page 1 of 1

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APPENDIX E Laboratory Test Results

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

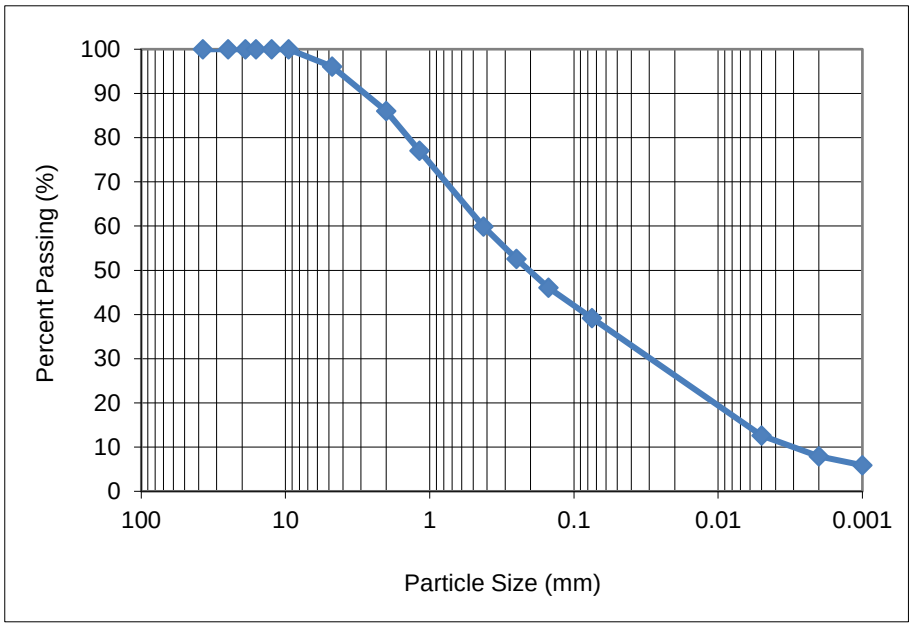
PROJECT NO. 144903259

REPORT NO. 1

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	100.0
9.5	100.0
4.75	96.1
2.00	86.0
1.18	77.1
0.425	59.8
0.250	52.6
0.150	46.1
0.075	39.1
0.005	12.6
0.002	7.9
0.001	5.9

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
3.9	10.1	26.2	20.7	31.2	7.9	5.9

COMMENTS:
Material tested was identified as being sampled from BH22-A2, 0.3-0.9 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

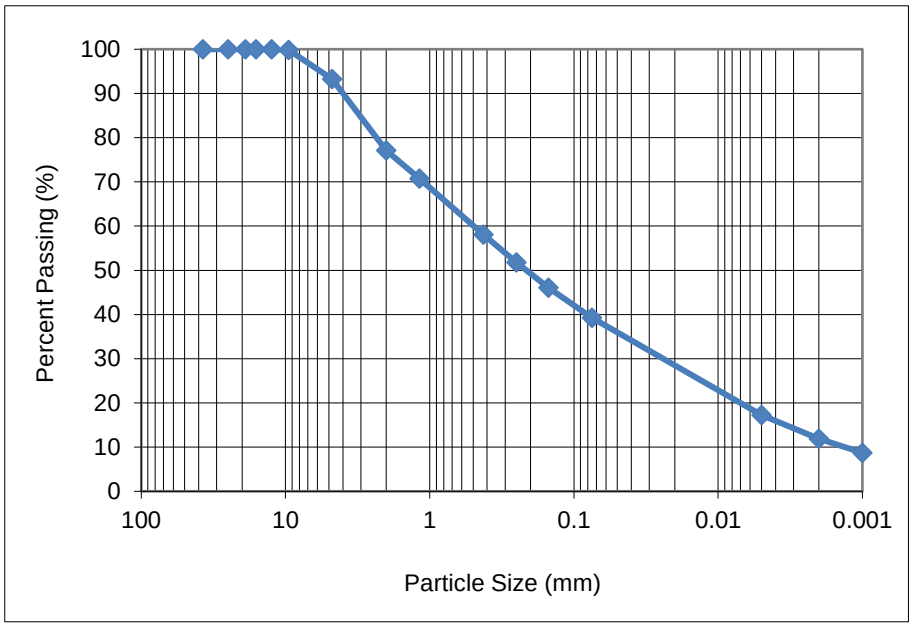
PROJECT NO. 144903259

REPORT NO. 2

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	100.0
9.5	99.8
4.75	93.3
2.00	77.1
1.18	70.7
0.425	58.1
0.250	51.7
0.150	46.1
0.075	39.2
0.005	17.3
0.002	11.9
0.001	8.7

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
6.7	16.2	19.0	18.9	27.3	11.9	8.7

COMMENTS:
Material tested was identified as being sampled from BH22-A1, 1.7-2.0 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

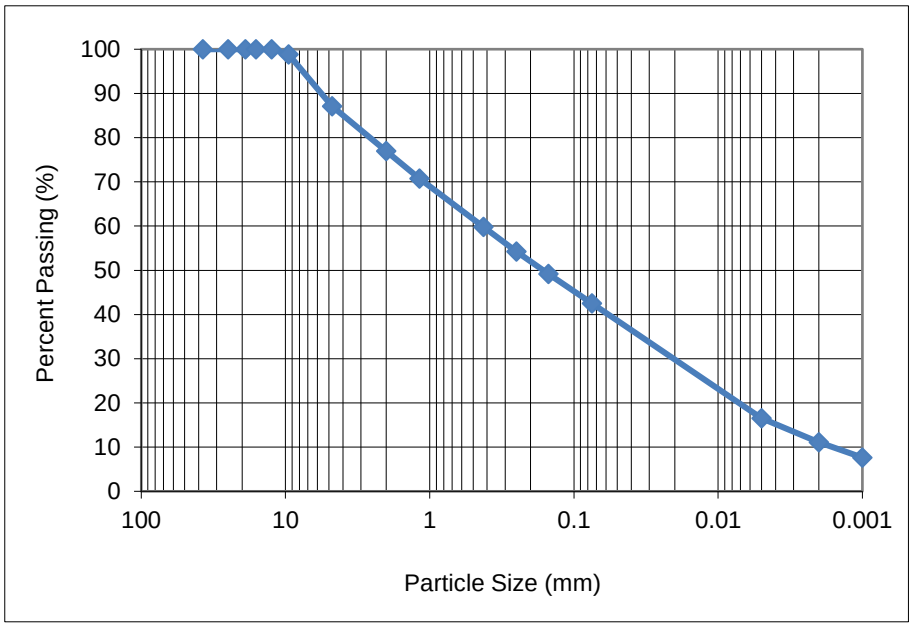
PROJECT NO. 144903259

REPORT NO. 3

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	100.0
9.5	98.8
4.75	87.1
2.00	76.9
1.18	70.8
0.425	59.8
0.250	54.3
0.150	49.2
0.075	42.5
0.005	16.5
0.002	11.1
0.001	7.6

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
12.9	10.2	17.1	17.3	31.4	11.1	7.6

COMMENTS:
Material tested was identified as being sampled from BH22-B1, 1.5-2.1 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

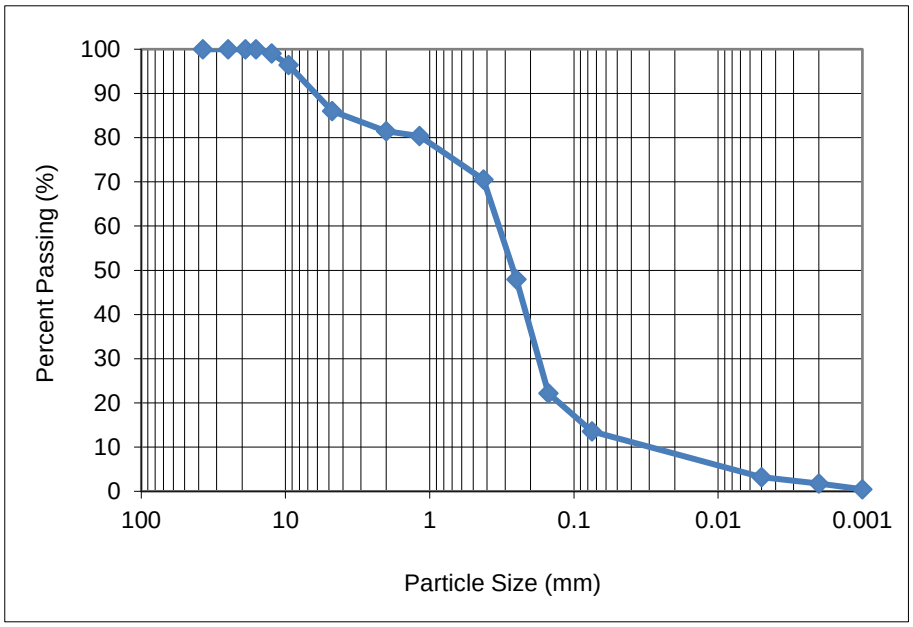
PROJECT NO. 144903259

REPORT NO. 4

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	99.0
9.5	96.4
4.75	86.0
2.00	81.4
1.18	80.3
0.425	70.5
0.250	47.9
0.150	22.2
0.075	13.6
0.005	3.2
0.002	1.8
0.001	0.5

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
14.0	4.6	10.9	56.9	11.8	1.8	0.5

COMMENTS:
Material tested was identified as being sampled from BH22-C5, 0.3-0.9 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

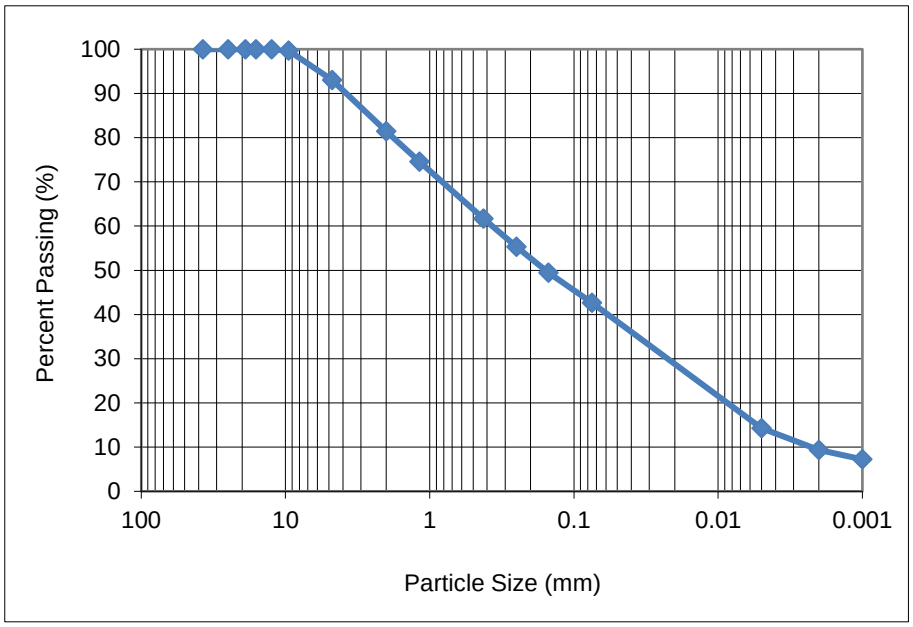
PROJECT NO. 144903259

REPORT NO. 5

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	100.0
9.5	99.7
4.75	93.0
2.00	81.5
1.18	74.6
0.425	61.7
0.250	55.3
0.150	49.5
0.075	42.6
0.005	14.3
0.002	9.4
0.001	7.2

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
7.0	11.5	19.8	19.1	33.2	9.4	7.2

COMMENTS:
Material tested was identified as being sampled from BH22-C2, 1.5-2.1 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500 - 311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

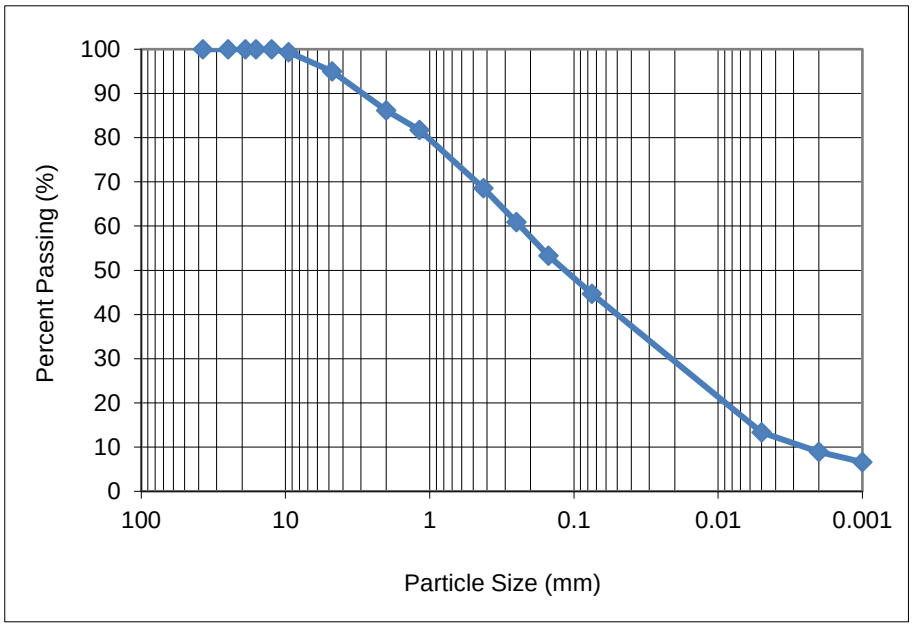
PROJECT NO. 144903259

REPORT NO. 6

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky



SIEVE SIZE (mm)	% PASSING
37.5	100.0
25.0	100.0
19.0	100.0
16.0	100.0
12.5	100.0
9.5	99.3
4.75	95.0
2.00	86.1
1.18	81.8
0.425	68.5
0.250	60.9
0.150	53.3
0.075	44.6
0.005	13.4
0.002	8.9
0.001	6.6

Gravel	Sand			Silt	Clay	Colloids
	Coarse	Medium	Fine			
5.0	8.9	17.6	23.9	35.7	8.9	6.6

COMMENTS:
Material tested was identified as being sampled from BH22-C4, 2.1-2.6 m.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P. Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

PROJECT NO. 144903259

REPORT NO. 1

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky

SAMPLE ID: BH22-A2, 0.3-0.9 m

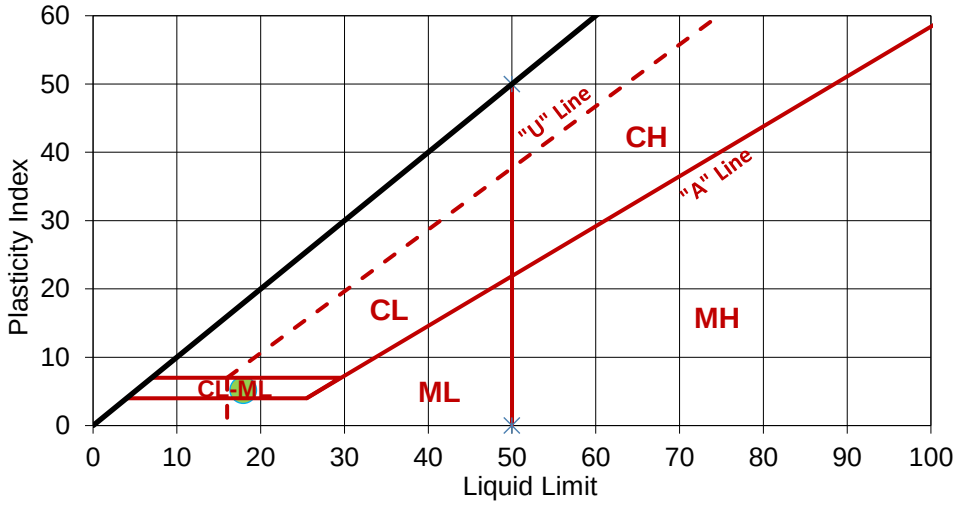
LIQUID LIMIT

TRIAL	1	2
BLOWS	22	22
MC (%)	18	18
Corr. MC (%)	18	18

PLASTIC LIMIT

TRIAL	1	2
MC (%)	13	13

LIQUID LIMIT, LL	18
PLASTIC LIMIT, PL	13
PLASTICITY INDEX, PI	5
AS REC'D MC (%)	6.1



COMMENTS:
No comments.

REPORT DATE 2022.Jun.16

REVIEWED BY Guillaume Beauce, P.Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

PROJECT NO. 144903259

REPORT NO. 2

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky

SAMPLE ID: BH22-B1, 1.5-2.1 m

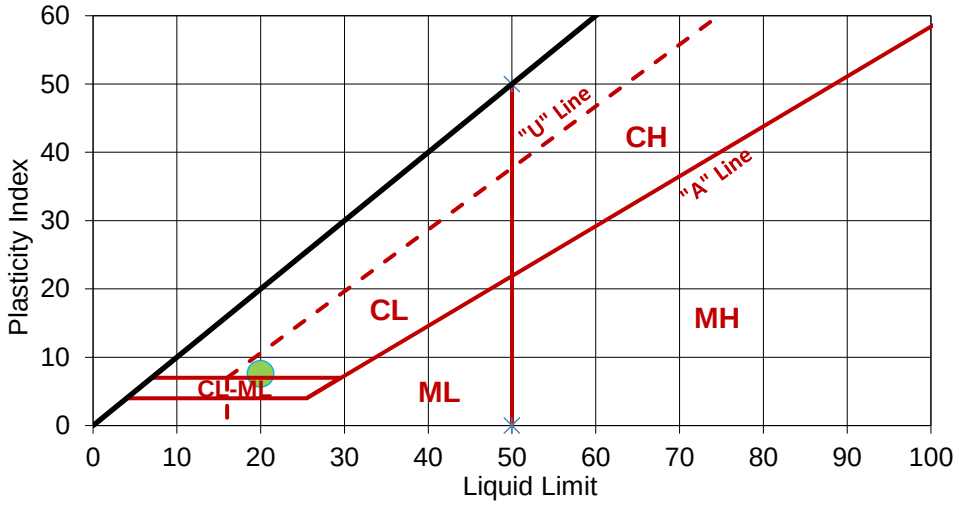
LIQUID LIMIT

TRIAL	1	2
BLOWS	28	28
MC (%)	20	20
Corr. MC (%)	20	20

PLASTIC LIMIT

TRIAL	1	2
MC (%)	12	12

LIQUID LIMIT, LL	20
PLASTIC LIMIT, PL	12
PLASTICITY INDEX, PI	8
AS REC'D MC (%)	21.6



COMMENTS:
No comments.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P.Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

PROJECT NO. 144903259

REPORT NO. 3

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky

SAMPLE ID: BH22-C2, 1.5-2.1 m

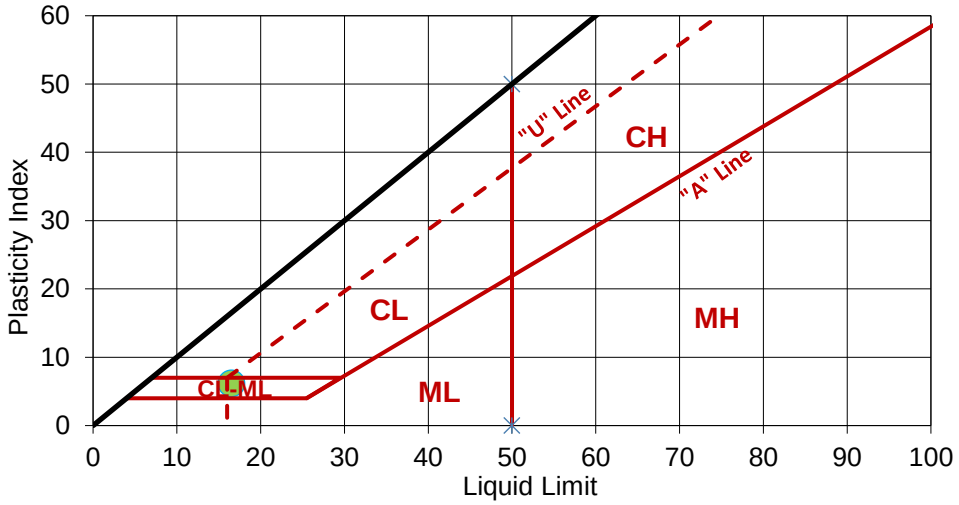
LIQUID LIMIT

TRIAL	1	2
BLOWS	27	27
MC (%)	16	16
Corr. MC (%)	16	17

PLASTIC LIMIT

TRIAL	1	2
MC (%)	10	10

LIQUID LIMIT, LL	17
PLASTIC LIMIT, PL	10
PLASTICITY INDEX, PI	6
AS REC'D MC (%)	18.7



COMMENTS:
No comments.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P.Eng.
Associate - Materials Testing Services

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Sydney Urwin

PROJECT Baker Lake Geotechnical and Drainage

PROJECT NO. 144903259

REPORT NO. 4

DATE SAMPLED: Not Provided
SAMPLED BY: Aron Piamsalee

DATE RECEIVED: 2022.Jun.10
SUBMITTED BY: Aron Piamsalee

DATE TESTED: 2022.Jun.15
TESTED BY: Kalena Chernesky

SAMPLE ID: BH22-C4, 2.1-2.6 m

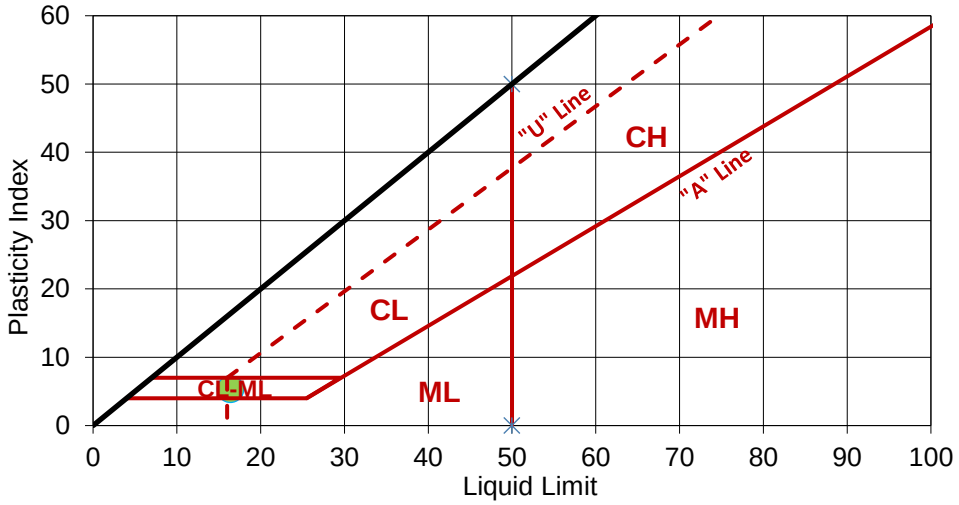
LIQUID LIMIT

TRIAL	1	2
BLOWS	21	21
MC (%)	17	17
Corr. MC (%)	16	16

PLASTIC LIMIT

TRIAL	1	2
MC (%)	11	11

LIQUID LIMIT, LL	16
PLASTIC LIMIT, PL	11
PLASTICITY INDEX, PI	5
AS REC'D MC (%)	11.3



COMMENTS:
No comments.

REPORT DATE 2022.Jun.20

REVIEWED BY Guillaume Beauce, P.Eng.
Associate - Materials Testing Services

APPENDIX F

Drainage Assessment Planning

	D	E	F	G	H	I	J	K	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	Culvert ID	Street / Location	Northing	Easting	Culvert Type	Shape	Material	Diameter or Dimensions (mm)	Marker Post Present (Y/N)	Crushing		Infill (mm)		Culvert Condition Rating (CSA 2020; MTO 2013)					Recommended Actions	Priority (None, Low, Medium, High)	Comments
2										Upstream	Downstream	Upstream	Downstream	Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)			
4	101-01	1st Road	64.307017	-96.068202	Cross	Round	Csp	1100	Y	Y	Y	0	0	0	2	0	1	0	repair culvert end	Medium	None
5	102-01	1st Road	64.310910	-96.063537	Cross	Round	Csp	1600	Y	Y	N			0	2	0	1	1	repair culvert end	Medium	None
6	103-03	N/A	64.314749	-96.068119	Cross	Round	Csp	800	N	N	N			0	0	0	1	0	No action	Low	None
7	103-04	1st Road	64.311659	-96.062385	Cross	Round	Csp	1600	Y	N	N	200	0	0	0	1	1	0	Flush	High	
8	103-01	N/A	64.328460	-96.091291	Cross	Round	Csp	500	N	N	Y			0	1	0	1	0	No action	Low	
9	103-02	N/A	64.329095	-96.088905	Cross	Round	Csp	500	N	Y	Y			0	4	0	1	0	Replace	High	Both ends crushed
10	104-01	1st Road	64.314260	-96.056246	Cross	Round	Csp	1600	Y	Y	Y	0	0	0	1	0	1	0	No action	Low	
11	105-01	N/A	64.315633	-96.053846	Cross	Round	Csp	600	N	N	N			0	0	0	1	0	No action	Low	
12	105-02	1st Road	64.329663	-96.082088	Cross	Round	Csp	1000	Y	Y	Y	150	200	0	1	1	1	0	Flush	High	
13	105-03	1st Road	64.316776	-96.052028	Cross	Round	Csp	1000	Y	Y	N	0	200	0	3	1	1	0	Replace	High	Upstream end crushed, infilled
14	106-01	N/A	64.330379	-96.064021	Cross	Round	Csp	1100	N	N	N			0	0	0	0	0	No action	None	
15	106-02	1st Road	64.318006	-96.049956	Cross	Round	Csp	1000	Y	Y	Y	500	500	0	3	2	2	1	Replace	High	Upstream end crushed, infilled
16	106-03	1st Road	64.318663	-96.048983	Cross	Round	Csp	1000	Y	Y	Y	150	150	0	2	1	1	0	Flush	High	Infilled, some crushing
17	106-04	1st Road	64.319102	-96.048398	Cross	Round	Csp	1500	Y	Y	Y	0	0	0	1	0	1	0	Repair culvert end	Low	Downstream end crushed
18	107-01	N/A	64.331396	-96.045091	Cross	Round	Csp	600	N	N	N			0	0	0	0	0	No action	None	
19	107-02	1st Road	64.320556	-96.044243	Cross	Round	Csp	1500	Y	N	Y	0	0	0	2	0	1	1	repair culvert end	Medium	Downstream end crushed
20	108-01	4th Street	64.324030	-96.012465	Cross	Round	Csp	600	N	Y	Y		600	0	4	2	2	0	Replace	High	
21	108-02	4th Street	64.323987	-96.010654	Cross	Round	Csp	600	N	Y	Y			0	2	0	1	0	Repair culvert end	Medium	
22	108-03	6th Street	64.324023	-96.010510	Cross	Round	Csp	600		N	Y			0	1	0	1	1	No action	Low	None
23	108-04	6th Street	64.323258	-96.010989	Cross	Round	Csp	600	N	N		0	600	0	0	2	0	0	Flush	High	Find downstream end
24	108-05	6th Street	64.322343	-96.011572	Cross	Round	Csp	600	N		Y		600	0	4	2	1	1	Replace	High	Find upstream end
25	108-06	6th Street	64.321161	-96.012999	Entrance	Round	Csp	500	N	Y	Y	100	300	0	4	2	2	1	Replace	High	None
26	108-07	7th Avenue	64.320881	-96.013239	Cross	Round	Csp	500	N	Y	Y	0	300	0	2	2	1	0	Replace	High	
27	108-08	7th Avenue	64.320472	-96.011688	Cross	Round	Csp	600	N	Y	Y	0	0	0	4	0	1	0	Replace	High	
28	108-09	7th Avenue	64.320410	-96.011278	Cross	Round	Csp	900	N	Y	N			0	0	0	0	1	No action	Low	None
29	108-10	7th Avenue	64.320221	-96.009996	Cross	Round	Csp	500	N	Y	Y	0	0	0	2	0	1	0	Repair both ends of culvert	Medium	Upstream end crushed
30	108-11	6th Street	64.319592	-96.014501	Cross	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	1	Replace	High	Ends cruhsed and infilled
31	108-12	6th Street	64.318871	-96.015054	Cross	Round	Csp	600	N	Y		200	600	0	1	2	1	0	Flush	High	Downstream end infilled
32	108-13	4th Avenue	64.318057	-96.014278	Entrance	Round	Csp	500	N	Y	Y	150	150	0	4	2	1	0	Replace	High	Culvert crushed and infilled
33	108-14	4th Avenue	64.317894	-96.013273	Cross	Round	Csp	1100	N	Y	Y			0	1	0	2	1	Stabilize bank	High	Upstream end crushed and banks on both ends unstable
34	108-15	4th Avenue	64.317771	-96.012557	Entrance	Round	Csp	800	N	Y	Y	100	200	0	1	1	0	0	Flush	Medium	
35	108-16	4th Avenue	64.317783	-96.012473	Entrance	Round	Csp	600	N	Y	N			0	0	0	0	0	No action	None	
36	108-17	4th Avenue	64.317469	-96.010497	Entrance	Round	Csp	500	N	Y	Y	200	200	0	4	2	0	0	Replace	High	
37	108-18	4th Avenue	64.317405	-96.010055	Entrance	Round	Csp	500	N	Y	Y			0	4	0	0	0	Replace	High	Crushed and infilled
38	108-19	1st Avenue	64.316051	-96.013096	Cross	Round	Csp	800	N	N	Y			0	1	0	1	1	No action	Low	
39	109-01	1st Crescent	64.322768	-96.034520	Cross	Round	Csp	600	N	Y	Y	200	150	0	4	2	1	0	Replace	High	Uptream and downstream end crushed
40	109-02	1st Crescent	64.322262	-96.038875	Entrance	Round	Csp	500	N	Y	N	0	300	0	1	2	1	0	Flush	High	Upstream end crushed, infilled
41	109-03	1st Crescent	64.321755	-96.039246	Cross	Round	Csp	700	N	Y	N	0	150	0	1	1	1	0	Flush	Medium	
42	109-04	1st Road	64.321031	-96.042155	Cross	Round	Csp	1000	Y	N	Y	0	200	0	1	1	1	0	Flush	Medium	
43	110-01	7th Avenue	64.321638	-96.021163	Entrance	Round	Csp	600	Y	Y	Y	200	200	0	2	2	1	0	Replace	High	Both ends crushed and infilled
44	110-02	7th Avenue	64.321572	-96.025443	Entrance	Round	Csp	600	N	Y	Y	200	200	0	2	2	1	0	Replace	High	Both ends crushed and infilled
45	110-03	7th Avenue	64.321990	-96.029939	Cross	Round	Csp	600	N	Y	Y	200	400	0	2	2	1	0	Replace	High	Both ends crushed and infilled
46	110-04	7th Avenue	64.321588	-96.033526	Cross	Round	Csp	500	N	Y	Y	250	250	0	3	2	1	0	Replace	High	Both ends crushed and infilled
47	110-05	1st Street	64.321130	-96.033109	Entrance	Round	Csp	800	N	Y	Y	0	0	0	2	0	0	0	Repair both ends of culvert	Medium	Both ends crushed
48	110-06	1st Street	64.320947	-96.033068	Cross	Round	Csp	1000	N	N	Y	0	0	0	0	0	1	0	No action	Low	
49	110-07	6th Avenue	64.320615	-96.034196	Entrance	Round	Csp	600	N	Y	N	0	0	1	0	0	1	1	No action	Low	None
50	110-08	6th Avenue	64.320082	-96.034734	Entrance	Round	Csp	600	N	Y	Y	0	150	0	2	1	0	0	Replace	High	Both ends crushed and infilled
51	110-09	6th Avenue	64.320005	-96.034848	Cross	Round	Csp	1000	Y	Y	Y	500	500	2	4	2	2	0	Replace	High	Both ends crushed and infilled
52	110-10	1st Avenue	64.319919	-96.035716	Cross	Round	Csp	400		Y	N	150	0	1	0	2	1	1	Flush	High	None
53	110-11	7th Avenue	64.320188	-96.037255	Cross	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
54	110-12	1st Avenue	64.320306	-96.037776	Entrance	Round	Csp	600	N	Y	Y	100	100	0	4	1	0	0	Replace	High	Both ends crushed and infilled
55	110-13	1st Avenue	64.320494	-96.039040	Cross	Round	Csp	600	N	Y	Y	150	150	0	4	1	1	0	Replace	High	Both ends crushed and infilled
56	110-14	1st Avenue	64.320584	-96.039976	Entrance	Round	Csp	800	N	N	Y	100	200	0	2	1	1	0	Replace	High	Both ends crushed and infilled
57	110-15	1st Avenue	64.320705	-96.040518	Cross	Round	Csp	600	N	N	N			0	0	0	1	0	No action	Low	
58	112-01	6th Avenue	64.320803	-96.024974	Entrance	Round	Csp	600		Y	Y	150	300	0	4	2	1	1	Replace	High	Both ends crushed and infilled
59	112-02	6th Avenue	64.320768	-96.026827	Entrance	Round	Csp	600	N	Y	Y	200	200	0	4	2	0	0	Replace	High	Both ends crushed and infilled
60	112-03	2nd Street	64.321212	-96.028423	Entrance	Round	Csp	500	N	Y	Y	500	200	0	3	2	1	2	Replace	High	Both ends crushed and infilled
61	112-04	2nd Street	64.321051	-96.028615	Entrance	Round	Csp	600	N	Y	Y	200	150	0	1	2	1	0	Flush	High	
62	112-05	6th Avenue	64.321066	-96.028887	Cross	Round	Csp	700	N	N	Y	0	100	0	0	1	1	0	Flush	Medium	
63	112-06	3rd Street	64.319782	-96.024249	Cross	Round	Csp	600	N	Y	Y	500	550	0	2	2	1	2	Replace	High	Both ends crushed and infilled
64	112-07	4th Avenue	64.319836	-96.024858	Entrance	Round	Csp	500	N	Y	Y	250	250	0	3	2	1	1	Replace	High	Both ends crushed and infilled
65	112-08	4th Avenue	64.320280	-96.027494	Entrance	Round	Csp	500	N	Y	Y	250	250	0	2	2	0	2	Replace	High	Both ends crushed and infilled
66	112-09	4th Avenue	64.320332	-96.027923	Entrance	Round	Csp	500	N	Y	Y	300	300	0	2	2	0	2	Replace	High	Both ends crushed and infilled
67	112-10	4th Avenue	64.320434	-96.028596	Entrance	Round	Csp	500	N	Y	Y	400	250	0	3	2	0	2	Replace	High	Both ends crushed and infilled
68	112-11	2nd Street	64.320519	-96.029079	Cross	Round	Csp	600	N	Y	Y	200	200	0	1	2	1	1	Flush	High	None
69	112-12	2nd Street	64.320544	-96.029298	Cross	Round	Csp	600	N	Y	Y	150	0	0	3	1	1	0	Replace	High	Both ends crushed and infilled
70	112-13	2nd Street	64.319835	-96.029969	Entrance	Round	Csp	600	N	Y	Y	0	100	1	3	1	1	0	Replace	High	Both ends crushed and infilled
71	112-14	2nd Street	64.319638	-96.030157	Entrance	Round	Csp	600	N	Y	Y	200	200	1	3	2	0	1	Replace	High	Both ends crushed and infilled
72	112-15	2nd Street	64.319514	-96.030281	Entrance	Round	Csp	600	N	Y	Y	150	150	0	2	1	1	0	Replace	High	Both ends crushed and infilled
73	112-16	1st Avenue	64.318985	-96.029732	Entrance	Round	Csp	500	N	Y	N	150	150	0	2	2	1	0	Replace	High	Both ends crushed and infilled
74	112-17	2nd Street	64.319094	-96.030396	Cross	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	0	Replace	High	Both ends crushed and infilled
75	112-18	1st Avenue	64.319109	-96.030587	Cross	Round	Csp	600	N	Y	N	100	0	0	2	1	1	0	Replace	High	Upstream end crushed, infilled
76	112-19	2nd Street	64.318546	-96.030851	Cross	Round	Csp	600	N	Y	Y	0	100	0	2	1	1	0	Replace	High	Both ends crushed and infilled
77	112-20	2nd Crescent	64.318579	-96.031190	Cross	Round	Csp	600	N	N	Y			0	2	0	1	0	Repair culvert end	Medium	Dwonstream end crushed
78	112-21	2nd Crescent	64.318688	-96.031811	Entrance	Round	Csp	600	N	Y	Y	600	200	0	4	2	1	1	Replace	High	Both ends crushed and infilled
79	112-22	2nd Crescent	64.318777	-96.032086	Entrance	Round	Csp	600	N	Y	Y	200	200	0	2	2	1	0	Replace	High	Both ends crushed and infilled
80	112-23	2nd Crescent	64.318818	-96.032546	Entrance	Round	Csp	600	N	Y	Y	200	200	0	1	2	0	0	Flush	High	
81	112-24	2nd Crescent	64.318882	-96.032992	Entrance	Round	Csp	500		Y	Y	200	200	0	1	2	0	0	Flush	High	
82	112-25	1st Street	64.319414	-96.032347	Cross	Round	Csp	500	N	Y	Y	100	100	0	3	1	1	0	Replace	High	Both ends crushed and infilled
83	112-26	1st Avenue	64.319518	-96.033052	Cross	Round	Csp	600	N	N	Y	150	100	1	2	1	0	0	Replace	High	Downstream end crushed and infilled
84	112-27	2nd Crescent	64.318943	-96.033410	Cross	Round	Csp	600	N	N	N	0	0	0	0	0	1	1	No action	Low	None
85	114-01	1st Avenue	64.318387	-96.025999	Cross	Round	Csp	500	N	N	Y			0	2	0	1	0	Repair culvert end	Medium	Downstream end crushed
86	115-01	4th Street	64.323606	-96.015058	Cross	Round	Csp	600	N	Y	Y			0	4	0	1	1	Replace	High	Both ends crushed
87	115-02	4th Street	64.322902	-96.019255	Cross	Round	Csp	500	N	N	N			0	0	0	2	0	Stabilize bank	High	Downstream bank rilling

	D	E	F	G	H	I	J	K	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
88	115-03	4th Street	64.322156	-96.018815	Cross	Round	Csp	600	N	N	N	150	0	0	0	1	0	0	Flush	Medium	
89	115-04	7th Avenue	64.321159	-96.016498	Cross	Round	Csp	500	N	Y	Y	100		0	3	1	1	0	Replace	High	Both ends crushed and infilled
90	115-05	4th Street	64.321331	-96.019073	Entrance	Round	Csp	600	N	Y	Y	200	200	0	2	2	1	0	Replace	High	Both ends crushed and infilled
91	115-06	7th Avenue	64.321333	-96.019322	Cross	Round	Csp	600	N	Y	Y	0	300	0	2	2	1	0	Replace	High	Upstream end crushed, both infilled
92	115-07	4th Street	64.321045	-96.019643	Entrance	Round	Csp	600	N	Y	Y	0	200	0	2	2	0	0	Replace	High	Both ends crushed and infilled
93	115-08	6th Avenue	64.320267	-96.017691	Entrance	Round	Csp	600	N	Y	Y	200	200	0	2	2	1	1	Replace	High	Both ends crushed and infilled
94	115-09	6th Avenue	64.320402	-96.018542	Entrance	Round	Csp	500	N	Y	Y	150	150	0	2	2	1	1	Replace	High	Both ends crushed and infilled
95	115-10	4th Street	64.320640	-96.020051	Entrance	Round	Csp	500	N	Y	Y	200		0	2	2	1	1	Replace	High	Both ends crushed and infilled
96	115-11	6th Avenue	64.320650	-96.020259	Cross	Round	Csp	600	N	Y	Y	100	400	0	0	2	1	1	Flush	High	Both ends crushed and infilled
97	115-12	4th Street	64.320189	-96.020690	Entrance	Round	Steel	500	N	Y	Y			2	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed
98	115-13	5th Avenue	64.319901	-96.020971	Cross	Round	Csp	500	N		Y	500		0	2	2	0	2	Replace	High	Both ends crushed and infilled
99	115-14	4th Street	64.319572	-96.021395	Entrance	Round	Csp	600	N	Y	Y	100	100	0	3	1	1	0	Replace	High	Both ends crushed and infilled
100	115-15	4th Street	64.319279	-96.021555	Cross	Round	Csp	500	N	Y	Y	400	200	0	2	2	0	1	Replace	High	Both ends crushed and infilled
101	115-16	4th Avenue	64.319298	-96.021710	Cross	Round	Csp	600	N	Y	Y	100	400	0	3	2	1	1	Replace	High	Both ends crushed and infilled
102	115-17	4th Street	64.318819	-96.022294	Entrance	Round	Csp	600	N	Y	Y			0	2	0	1	1	Repair both ends of culvert	Medium	Both ends crushed
103	115-18	4th Street	64.318374	-96.023260	Entrance	Round	Csp	600	N	Y	Y			0	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed
104	115-19	1st Avenue	64.318175	-96.024828	Entrance	Round	Csp	600	N	Y	Y	300	300	0	0	2	0	2	Align ditch with culvert	High	None
105	115-20	1st Avenue	64.317952	-96.023656	Cross	Round	Csp	600	N	N	Y			0	2	0	1	0	Repair culvert end	Medium	Downstream end crushed
106	115-21	4th Street	64.317582	-96.023937	Entrance	Round	Csp	600	N	Y	Y			0	3	0	1	0	Replace	High	Both ends crushed
107	115-22	4th Street	64.317412	-96.024058	Entrance	Round	Csp	600	N	Y	Y			0	2	0	0	0	Repair both ends of culvert	Medium	Both ends crushed
108	115-23	4th Street	64.317269	-96.024174	Entrance	Round	Csp	600	N	Y	Y			0	2	0	0	1	Repair culvert end	Medium	Downstream end crushed
109	116-01	1st Avenue	64.317447	-96.020445	Entrance	Round	Csp	600	N	Y	Y	250	100	0	0	2	2	1	Flush	High	None
110	116-02	1st Avenue	64.317531	-96.021119	Cross	Round	Csp	900	N	N	N	0	0	0	0	0	1	0	No action	Low	None
111	117-01	4th Avenue	64.318705	-96.018359	Entrance	Round	Csp	500	N	Y	Y	200	200	0	2	2	1	2	Replace	High	Both ends crushed and infilled
112	117-02	4th Avenue	64.318628	-96.018004	Cross	Round	Csp	600	N	N	Y	150	150	0	1	1	0	2	Flush	Medium	None
113	117-03	4th Avenue	64.318286	-96.015730	Cross	Round	Steel	160	N	N	N			1	0	0	0	2	Stabilize channel	High	Channel infilled, minimal conveyance of runoff
114	117-04	1st Avenue	64.317325	-96.019826	Entrance	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
115	117-05	1st Avenue	64.317215	-96.019515	Cross	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
116	118-01	1st Avenue	64.315715	-96.011465	Cross	Round	Csp	500	N	Y	N	0	0	0	0	0	1	1	No action	Low	None
117	119-01	1st Avenue	64.315214	-96.000451	Entrance	Round	Csp	600	N	Y	Y	0	400	0	2	2	0	2	Replace	High	Both ends crushed and infilled
118	119-02	1st Avenue	64.314886	-96.001496	Cross	Round	Csp	600	N	Y		300	600	0	2	2	0	2	Replace	High	Both ends crushed and infilled
119	119-03	11th Street	64.314887	-96.001584	Cross	Round	Csp	600		Y	Y	200	300	0	3	2	1	0	Replace	High	Both ends crushed and infilled
120	119-04	1st Avenue	64.314632	-96.002369	Entrance	Round	Csp	600	N	Y	Y	100	300	0	2	2	2	1	Replace	High	Both ends crushed and infilled
121	119-05	10th Street	64.314840	-96.003419	Entrance	Round	Csp	600	N	Y	Y	200	300	0	0	2	0	1	Flush	High	Both ends crushed and infilled
122	119-06	10th Street	64.314518	-96.002837	Cross	Round	Csp	700	N	Y	Y	100	500	0	2	2	1	1	Replace	High	Both ends crushed and infilled
123	119-07	1st Avenue	64.314412	-96.004094	Entrance	Round	Csp	600	N	Y	Y	100	500	0	2	2	1	1	Replace	High	Both ends crushed and infilled
124	119-08	1st Avenue	64.314449	-96.004606	Entrance	Round	Csp	500	N	Y	Y	100	200	0	2	2	0	1	Replace	High	Both ends crushed and infilled
125	119-09	1st Avenue	64.315158	-96.008915	Cross	Round	Csp	600	N	Y	N	0	200	0	2	2	1	1	Replace	High	Both ends crushed and infilled
126	120-01	7th Avenue	64.320101	-95.993945	Cross	Round	Csp	600		N	Y			1	2	0	0	0	Repair culvert end	Medium	Downstream end crushed
127	120-02	7th Avenue	64.319864	-95.995867	Cross	Round	Csp	500	N	N	N			0	0	0	1	0	No action	Low	
128	120-03	7th Avenue	64.319666	-95.999057	Cross	Round	Csp	600	N	N	N			1	0	0	0	0	No action	Low	
129	120-04	N/A	64.319113	-95.999095	Cross	Round	Csp	500	N	Y	N			0	0	0	1	1	No action	Low	None
130	120-05	4th Avenue	64.317195	-95.998398	Cross	Round	Csp	600	N	Y	Y			0	2	0	1	1	Repair culvert end	Medium	Upstream end crushed
131	120-06	2nd Road	64.316033	-96.001319	Entrance	Round	Csp	600	N	Y	Y	200	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
132	120-07	2nd Road	64.315869	-96.001046	Entrance	Round	Csp	600	N	Y	Y	200	400	0	0	2	0	2	Stabilize channel	High	Both ends crushed and infilled
133	120-08	2nd Road	64.314955	-95.999171	Entrance	Round	Csp	500	N	Y	Y	200	300	0	0	2	1	1	Flush	High	None
134	120-09	2nd Road	64.314729	-95.998321	Cross	Round	Csp	600	N	N	Y	0	400	1	0	2	1	0	Flush	High	
135	120-10	1st Lane	64.315889	-95.996663	Cross	Round	Csp	600		Y	N			0	0	0	1	1	No action	Low	None
136	120-11	1st Lane	64.315618	-95.996027	Cross	Round	Steel	500						0	0	0	0	1	No action	Low	None
137	120-12	2nd Road	64.314667	-95.997699	Cross	Round	Csp	600	N	Y	N			0	0	0	1	1	No action	Low	None
138	120-13	11th Street	64.314600	-96.001046	Entrance	Round	Csp	500		Y		400	500	0	3	2	0	1	Replace	High	Both ends crushed and infilled
139	120-14	11th Street	64.314418	-96.000764	Entrance	Round	Csp	500	N		Y	500	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
140	120-15	10th Street	64.313642	-95.999876	Entrance	Round	Csp	1000	N	Y	Y			0	2	0	1	0	Repair culvert end	Medium	Upstream end crushed
141	120-16	10th Street	64.313472	-96.000525	Entrance	Round	Csp	600	N	Y	N			0	2	0	1	0	Repair culvert end	Medium	Upstream end crushed
142	121-01	6th Crescent	64.313888	-95.994561	Entrance	Round	Csp	600	N	Y	Y	300	300	0	2	2	1	1	Replace	High	Both ends crushed and infilled
143	121-02	6th Crescent	64.312443	-95.992731	Entrance	Round	Csp	500	N	Y	Y			0	0	0	1	2	Flush	High	Channel infilled, minimal conveyance of runoff
144	121-03	6th Crescent	64.312393	-95.992615	Cross	Round	Csp	750				100	300	0	0	2	1	1	Flush	High	None
145	122-01	7th Crescent	64.312065	-95.989054	Cross	Round	Csp	700	N	Y	Y			0	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed
146	123-01	5th Crescent	64.317143	-95.991168	Entrance	Round	Csp	400	N	Y	Y	200		0	0	2	0	1	Flush	High	None
147	123-02	5th Crescent	64.316155	-95.990425	Cross	Round	Csp	700	N	Y				0	0	0	1	0	No action	Low	
148	123-03	2nd Road	64.314060	-95.993282	Entrance	Round	Csp	500	N	N	N			0	0	0	1	1	No action	Low	None
149	123-04	2nd Road	64.313456	-95.989798	Entrance	Round	Csp	600	N	Y	Y			2	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed
150	123-05	2nd Road	64.312919	-95.986012	Cross	Round	Csp	750		Y	Y	100	200	0	0	1	1	0	Flush	Medium	
151	123-06	8th Crescent	64.312272	-95.986580	Entrance	Round	Csp	500	N	Y	Y			0	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed
152	123-07	8th Crescent	64.311613	-95.986028	Cross	Circular	Csp	600	N	Y				0	0	0	1	1	No action	Low	None
153	124-01	N/A	64.320854	-95.975134	Cross	Round	Csp	600	Y	Y	Y		100	0	0	1	1	0	Flush	Medium	
154	124-02	N/A	64.320508	-95.975786	Cross	Round	Csp	600	Y	Y	Y		100	0	0	1	1	0	Flush	Medium	
155	125-01	2nd Road	64.312292	-95.981862	Cross	Round	Csp	500	N	N	N		150	1	0	2	1	1	Flush	High	None
156	125-02	8th Crescent	64.311563	-95.977334	Entrance	Circular	Steel	140	N	N	N			1	0	0	1	0	No action	Low	
157	126-01	2nd Road	64.310840	-95.973476	Cross	Round	Csp	1500	N	Y	Y			0	0	0	1	0	No action	Low	
158	127-01	2nd Road	64.310679	-95.972784	Cross	Round	Csp	600	N	N	N			0	0	0	0	0	No action	None	
159	127-02	2nd Road	64.310282	-95.970791	Cross	Round	Csp	600	N	Y	N			0	2	0	0	0	Repair culvert end	Medium	Upstream end crushed
160	127-03	2nd Road	64.309874	-95.968100	Cross	Round	Csp	600	N	N	N	0	100	0	0	1	0	0	Flush	Medium	
161	127-04	2nd Road	64.309423	-95.965242	Cross	Round	Csp	600	N	Y	Y			0	2	0	1	0	Repair both ends of culvert	Medium	Both ends crushed and infilled
162	127-05	2nd Road	64.309099	-95.963132	Cross	Round	Csp	600	N	N	N			0	0	0	1	0	No action	Low	
163	127-06	2nd Road	64.308290	-95.948433	Cross	Round	Csp	600	N	Y	Y			0	2	0	0	0	Repair culvert end	Medium	Downstream end crushed
164	128-01	N/A	64.329467	-96.025298	Cross	Circular	Steel	140	N	N	N			1	0	0	2	0	Stabilize banks	High	Significant erosion in each bank
165	129-01	N/A	64.329249	-96.014935	Cross	Round	Csp	600	N	N	N	100	100	0	0	1	0	0	Flush	Medium	
166	129-02	N/A	64.316654	-95.975128	Cross	Round	Csp	400	N	N	N	100	200	0	0	2	2	0	Flush	High	
167	130-01	4th Avenue	64.301805	-95.916701	Cross	Circular	Csp	1700	N	Y	N			0	0	0	0	0	No action	None	
168																					

Culvert Information		
Culvert ID		101-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1100
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3070174
Easting (m) [1]	-96.0682017

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Not shown on planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

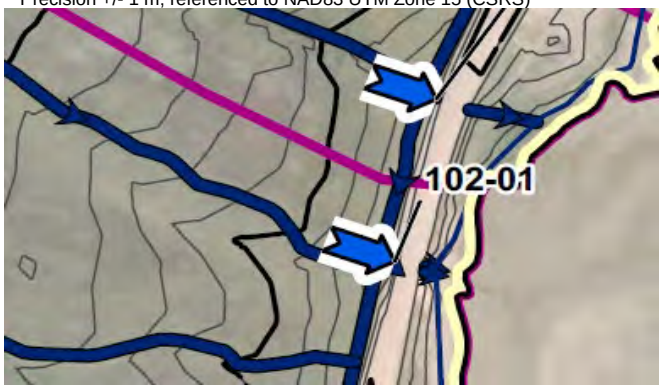
Downstream Culvert End

*NOTE: Information presented on this sheet is representative of conditions in **June 2022**. Current conditions may vary from what is provided on this sheet.*

Culvert Information		
Culvert ID		102-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1600
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.310910
Easting (m) [1]	-96.063537

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	1

Recommended Action(s):	repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		103-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.328460
Easting (m) [1]	-96.091291

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		103-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3290945
Easting (m) [1]	-96.0889046

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	0	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		103-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		800
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3147489
Easting (m) [1]	-96.0681187

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

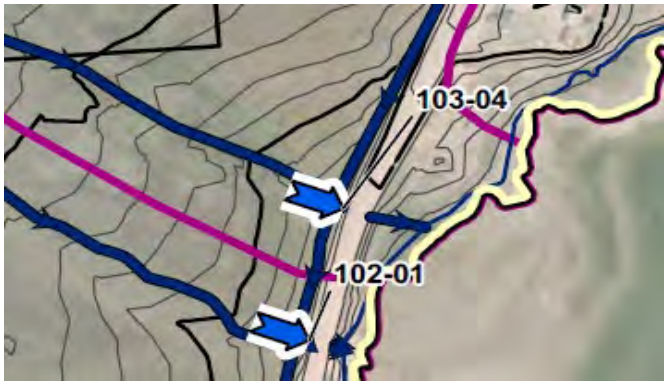
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		103-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1600
Marker Post Present		Y
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	200
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3116588
Easting (m) [1]	-96.0623847

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

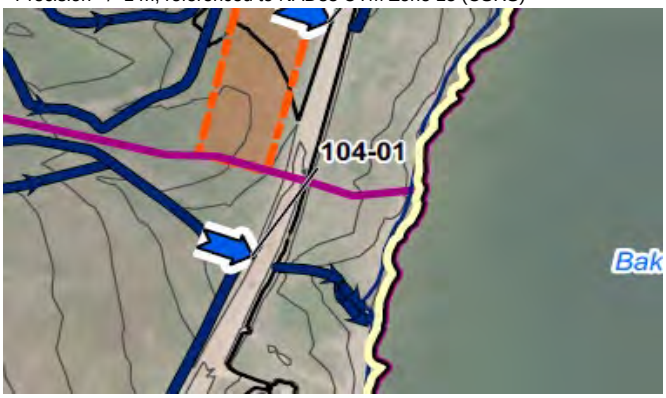
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		104-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1600
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3142601
Easting (m) [1]	-96.0562458

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		105-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3156326
Easting (m) [1]	-96.0538457

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		105-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	200
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.329663
Easting (m) [1]	-96.082088

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	1	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

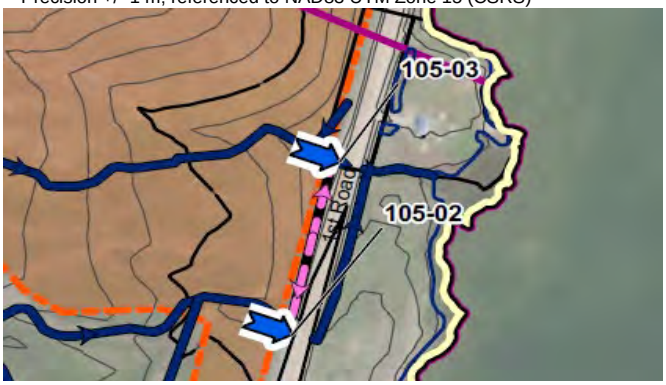
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		105-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	200
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3167763
Easting (m) [1]	-96.0520281

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		106-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1100
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.330379
Easting (m) [1]	-96.064021

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	0

Recommended Action(s):	No action	Priority:	None

Upstream View

Upstream Culvert End

Downstream View

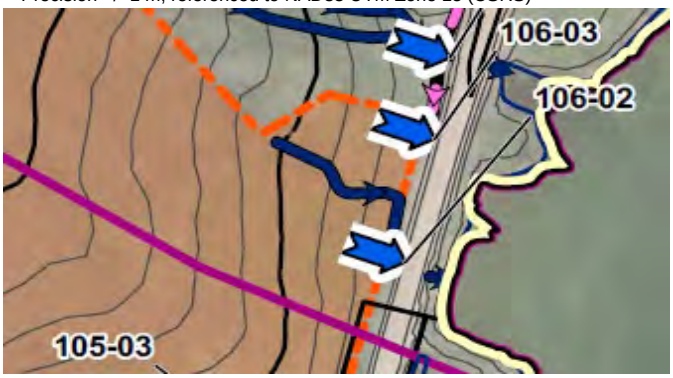
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		106-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	500
Other Comments	Upstream end crushed, infilled	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3180063
Easting (m) [1]	-96.0499563

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	2	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

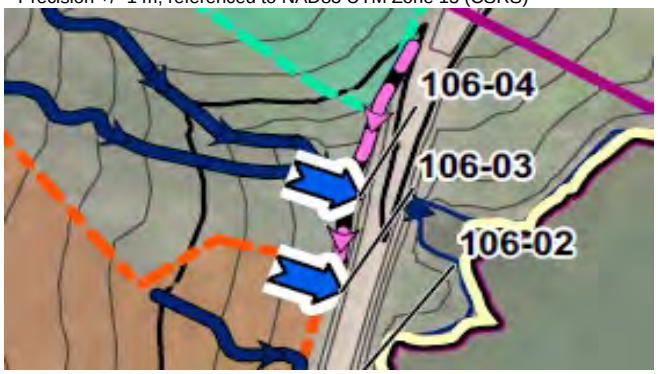
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		106-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3186634
Easting (m) [1]	-96.0489829

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

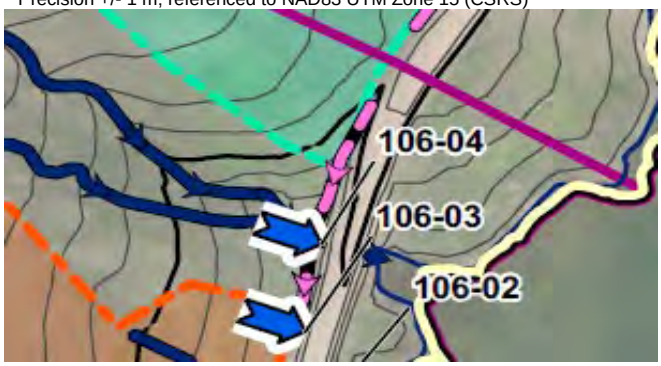
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		106-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1500
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3191023
Easting (m) [1]	-96.0483980

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		107-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3313962
Easting (m) [1]	-96.0450907

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	0

Recommended Action(s):	No action	Priority:	None

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		107-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1500
Marker Post Present		Y
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Downstream end crushed	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.3205556
Easting (m) [1]	-96.0442426

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	1

Recommended Action(s):	repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

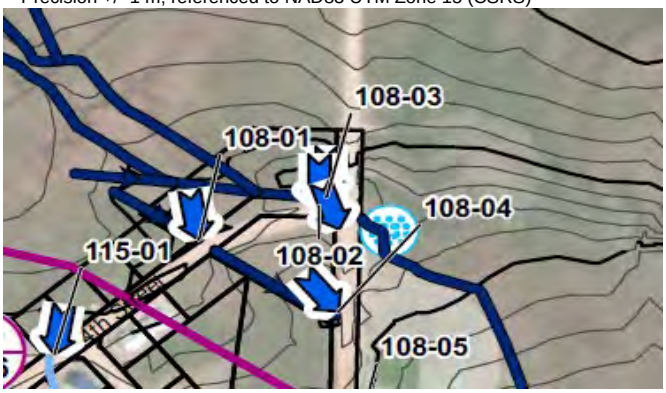
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	600
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3240303
Easting (m) [1]	-96.0124652

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	2	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

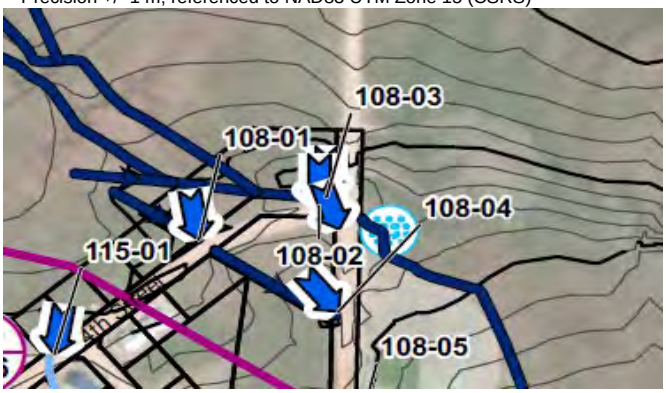
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3239868
Easting (m) [1]	-96.0106538

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

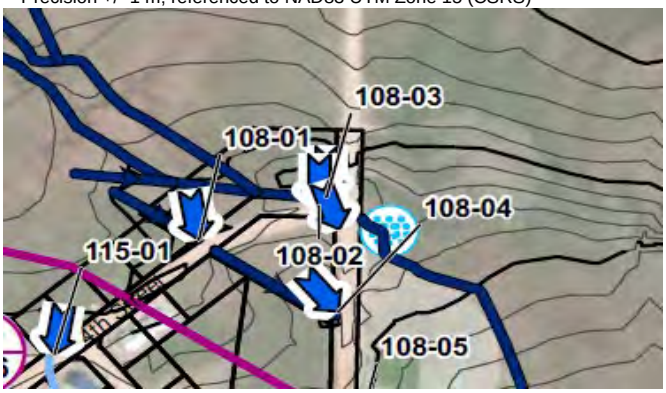
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		0
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.3240228
Easting (m) [1]	-96.0105096

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

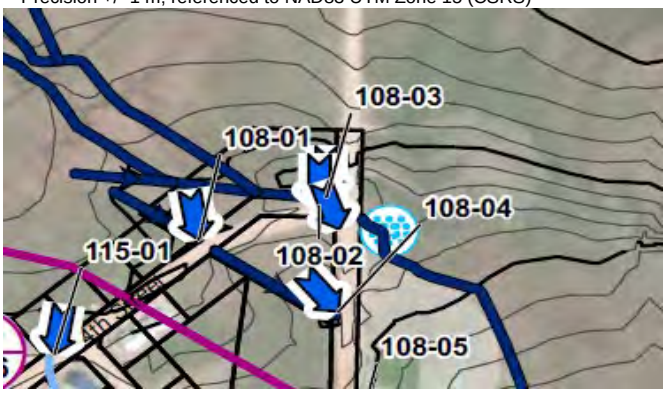
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	0
Infill Depth (mm)	Upstream	0
	Downstream	600
Other Comments	None	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.32325775
Easting (m) [1]	-96.01098907

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	0	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

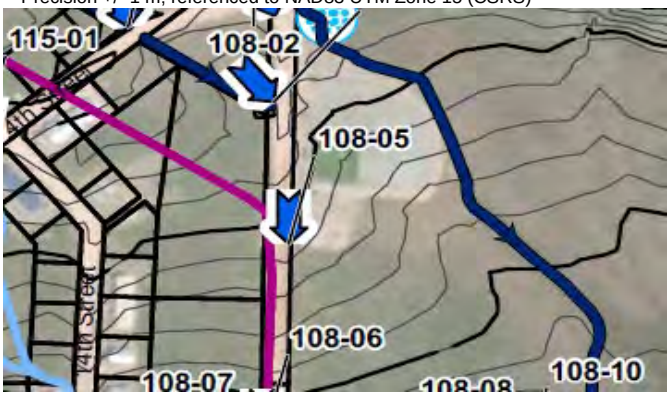
DS end of culvert not found

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	0
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	600
Other Comments	Find upstream end	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.3223429
Easting (m) [1]	-96.0115718

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	1	1

Recommended Action(s):	Replace	Priority:	High

Northern View

Upstream Culvert End

No photo available

Downstream View

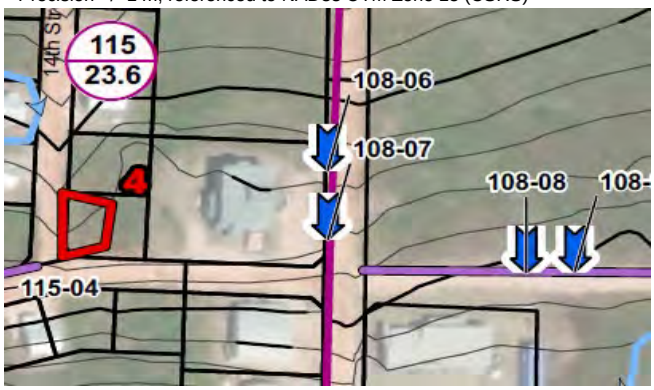
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-06
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	300
Other Comments	None	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.32116135
Easting (m) [1]	-96.01299870

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	2	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

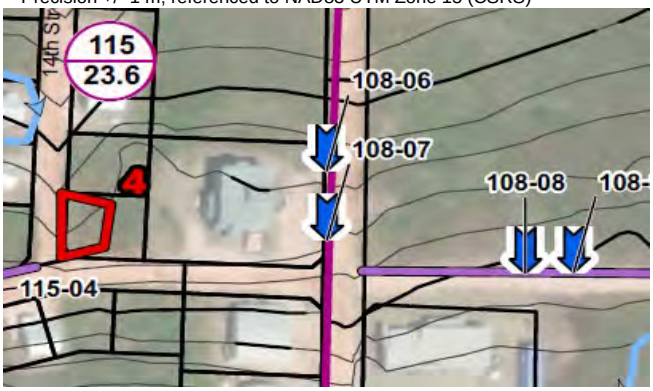
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-07
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	300
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3208810
Easting (m) [1]	-96.0132387

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

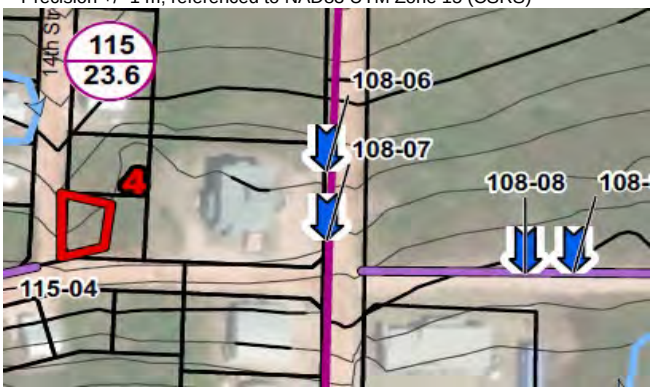
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-08
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3204721
Easting (m) [1]	-96.0116885

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	0	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

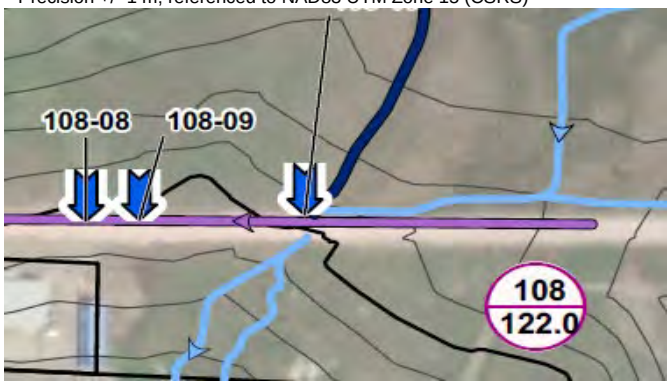
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-09
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		900
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.32040964
Easting (m) [1]	-96.01127759

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

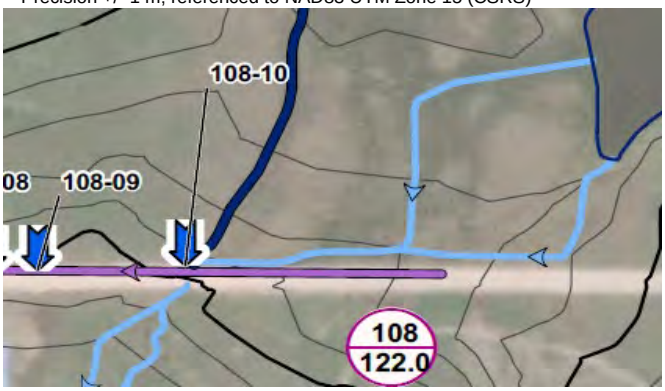
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-10
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.32022120
Easting (m) [1]	-96.00999639

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

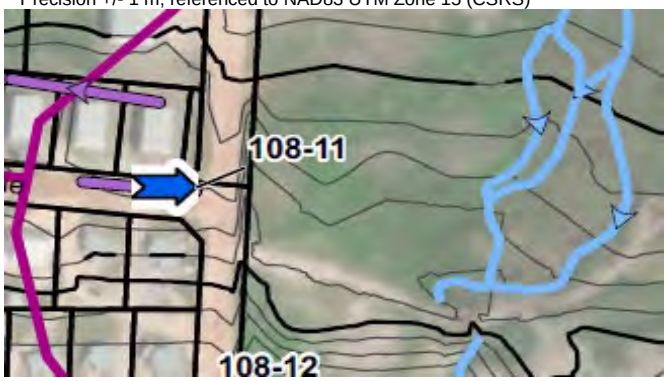
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-11
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Ends cruhsed and infilled	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.31959192
Easting (m) [1]	-96.01450051

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

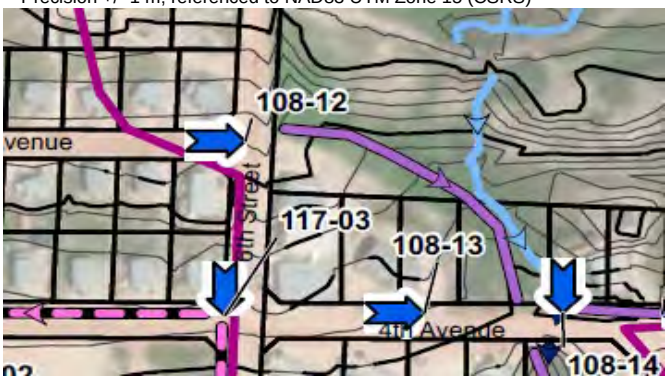
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-12
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	0
Infill Depth (mm)	Upstream	200
	Downstream	600
Other Comments	None	

Culvert Location	
Street	6th Street
Northing (m) [1]	64.31887115
Easting (m) [1]	-96.01505359

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

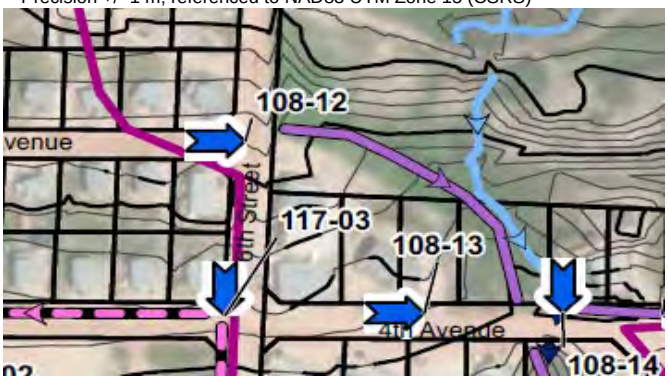
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-13
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.318057226
Easting (m) [1]	-96.014278349

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

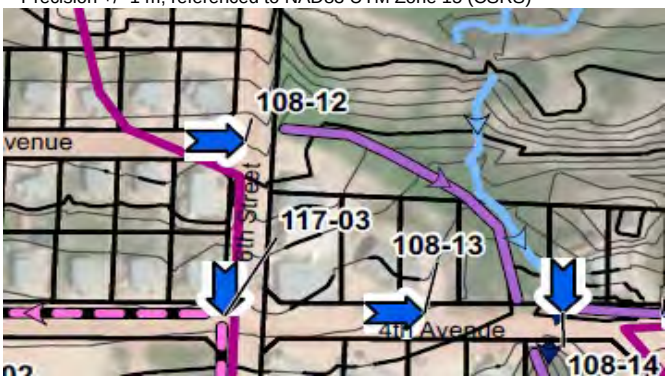
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-14
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1100
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Upstream end crushed and banks on both ends unstable	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.317894265
Easting (m) [1]	-96.013272969

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	2	1

Recommended Action(s):	Stabilize bank	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

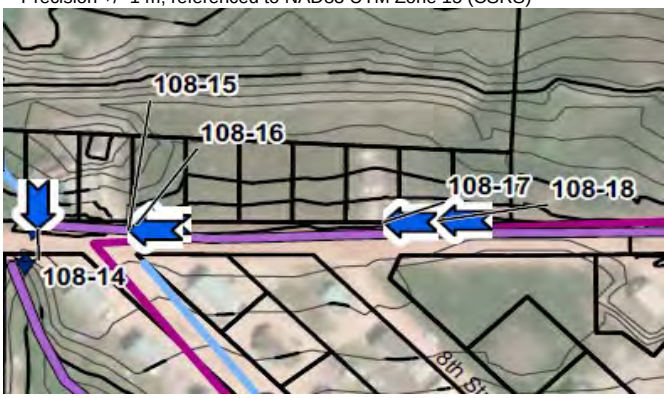
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-15
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		800
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	200
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.31777130891
Easting (m) [1]	-96.01255651115

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	1	0	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

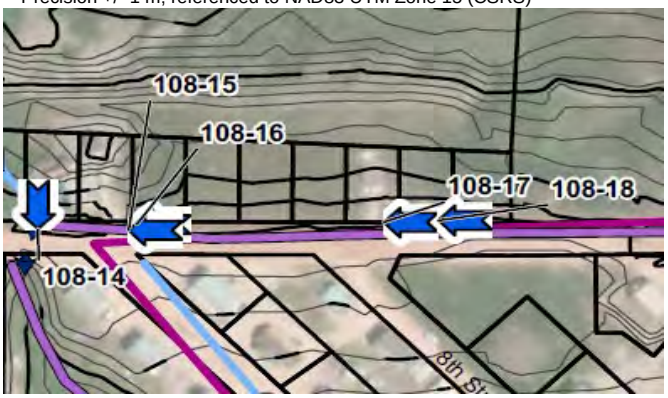
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-16
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.31778284
Easting (m) [1]	-96.01247287

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	0

Recommended Action(s):	No action	Priority:	None

Upstream View

Upstream Culvert End

Downstream View

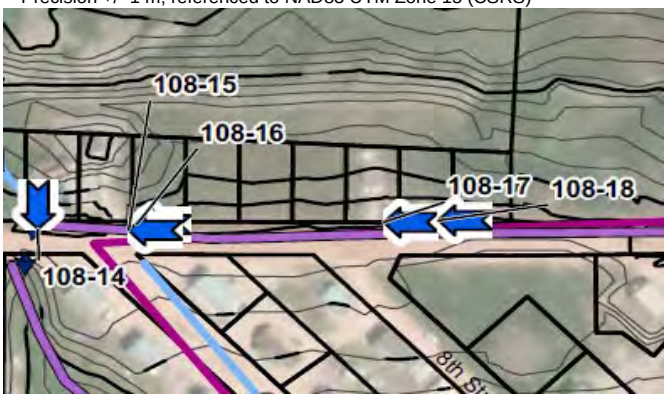
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-17
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.31746862
Easting (m) [1]	-96.01049691

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

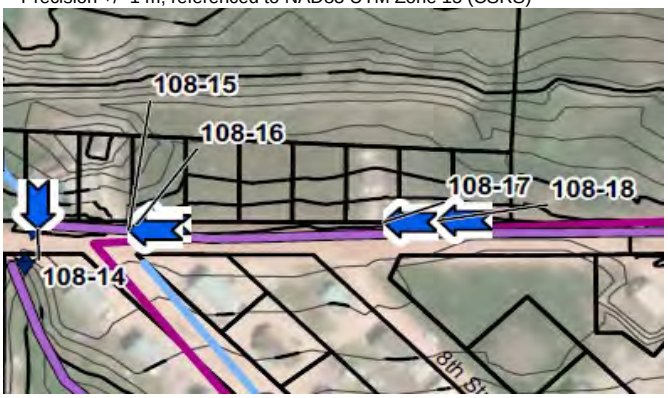
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-18
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.317404906
Easting (m) [1]	-96.010054893

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	0	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

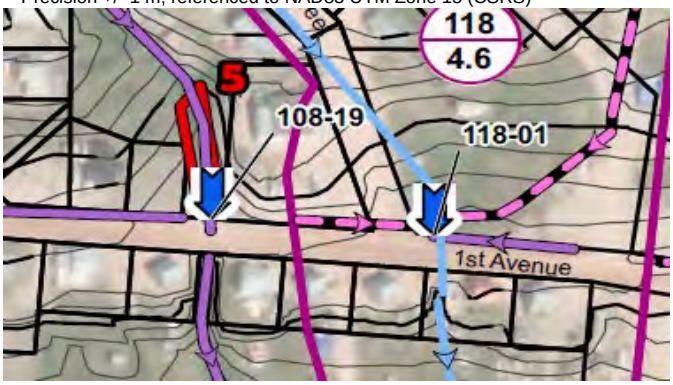
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		108-19
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		800
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	0	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.316051476
Easting (m) [1]	-96.013096005

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

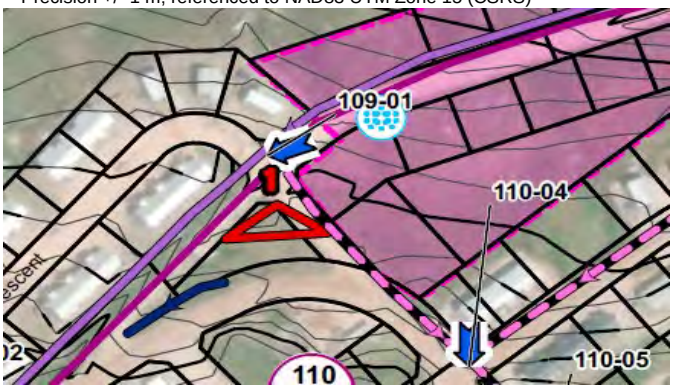
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		109-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	150
Other Comments	None	

Culvert Location	
Street	1st Crescent
Northing (m) [1]	64.32276761
Easting (m) [1]	-96.03451980

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

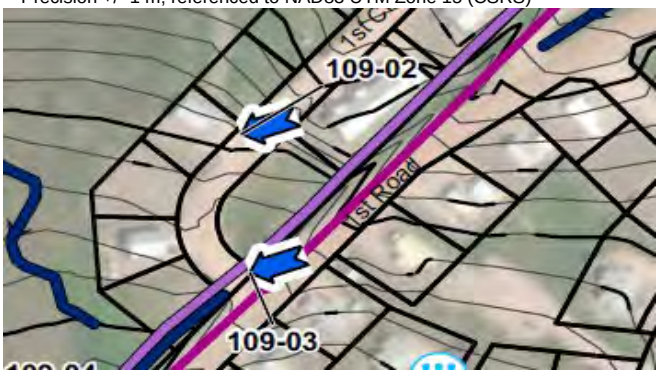
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		109-02
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	300
Other Comments	None	

Culvert Location	
Street	1st Crescent
Northing (m) [1]	64.3222623
Easting (m) [1]	-96.0388750

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		109-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		700
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	150
Other Comments	None	

Culvert Location	
Street	1st Crescent
Northing (m) [1]	64.32175480
Easting (m) [1]	-96.03924596

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

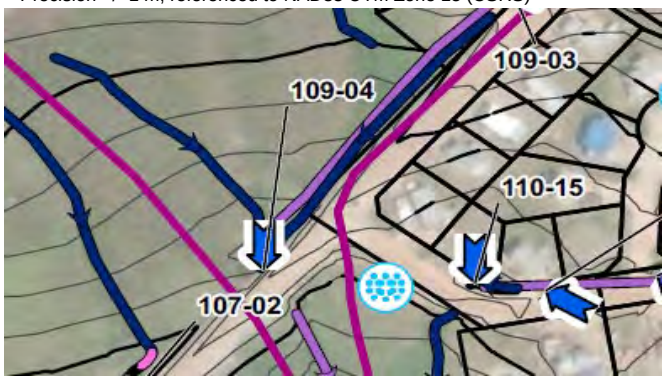
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		109-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	200
Other Comments	None	

Culvert Location	
Street	1st Road
Northing (m) [1]	64.32103085
Easting (m) [1]	-96.04215477

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

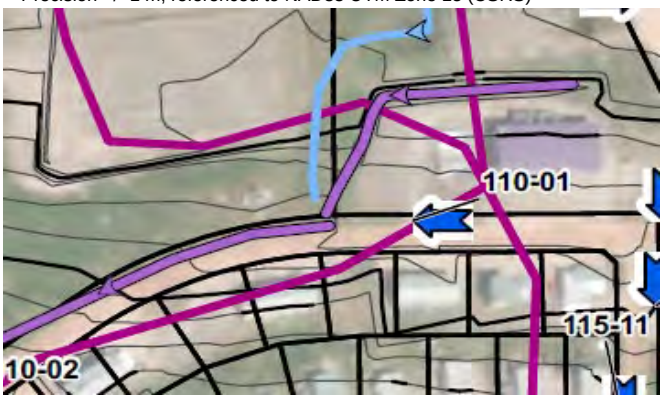
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.321637784
Easting (m) [1]	-96.021163199

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

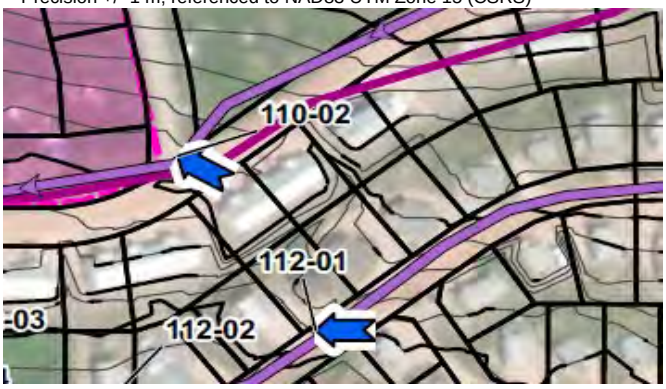
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-02
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.32157246
Easting (m) [1]	-96.02544312

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

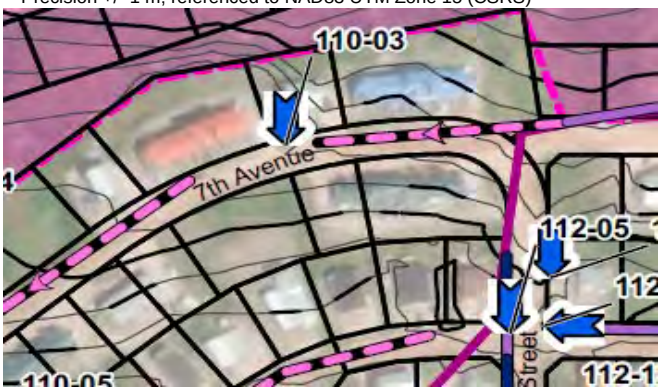
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	400
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.32198986
Easting (m) [1]	-96.02993916

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

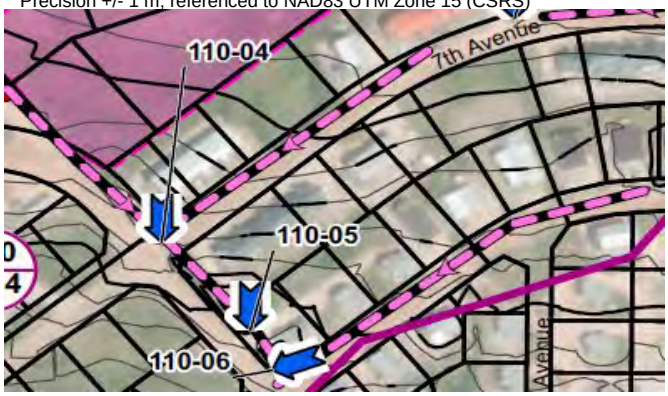
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	250
	Downstream	250
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3215875
Easting (m) [1]	-96.0335264

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-05
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		800
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Street
Northing (m) [1]	64.32113024
Easting (m) [1]	-96.03310947

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	0	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-06
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Street
Northing (m) [1]	64.3209474
Easting (m) [1]	-96.0330684

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

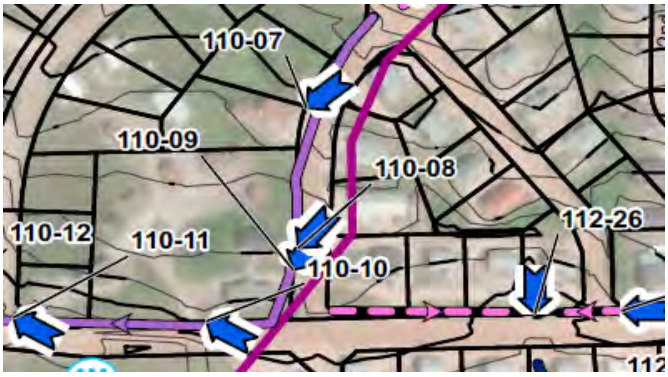
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-07
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3206150
Easting (m) [1]	-96.0341960

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

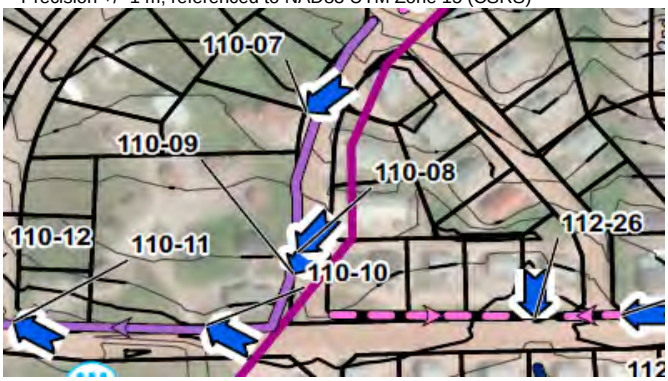
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-08
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	150
Other Comments	None	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3200822
Easting (m) [1]	-96.0347343

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

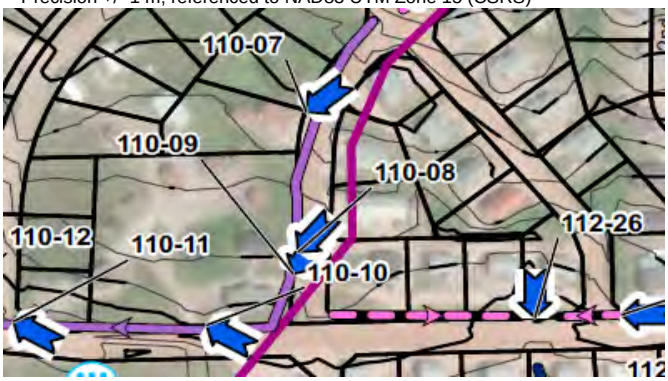
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-09
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	500
Other Comments	None	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3200048
Easting (m) [1]	-96.0348482

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
2	4	2	2	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

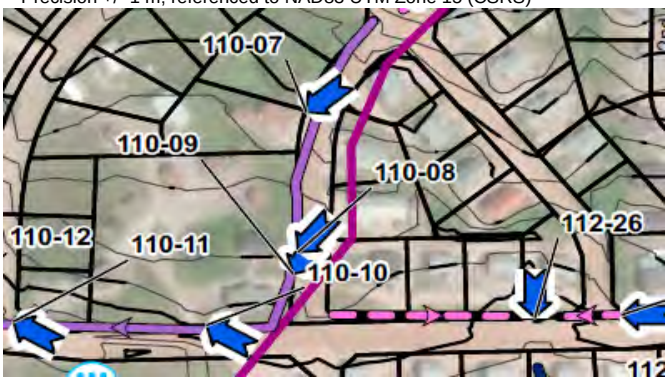
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-10
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		400
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	150
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.31991926
Easting (m) [1]	-96.03571588

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

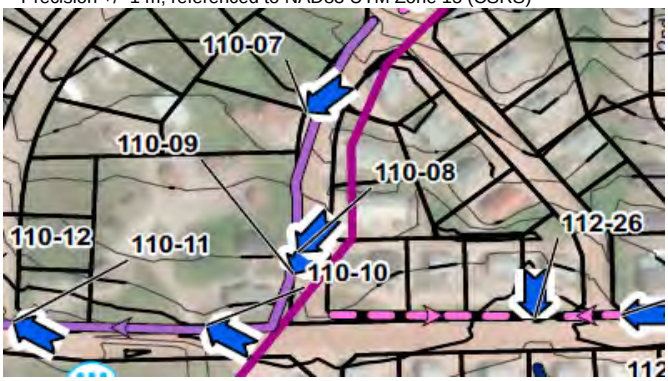
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-11
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.32018787
Easting (m) [1]	-96.03725533

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-12
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	100
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.320306474
Easting (m) [1]	-96.037775920

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	1	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

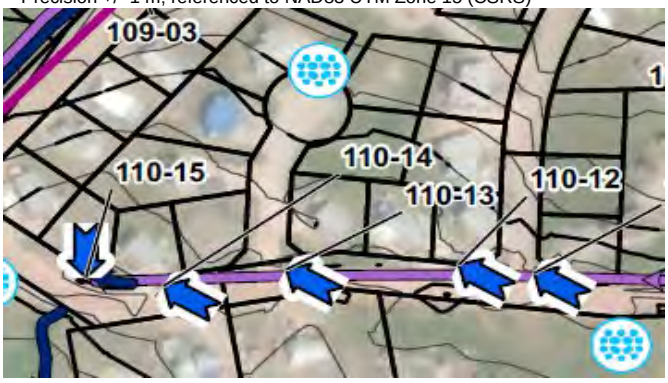
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-13
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3204941
Easting (m) [1]	-96.0390405

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

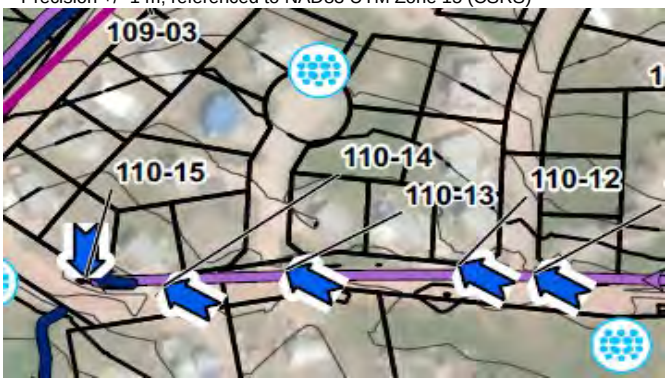
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-14
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		800
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	200
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3205836
Easting (m) [1]	-96.0399764

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

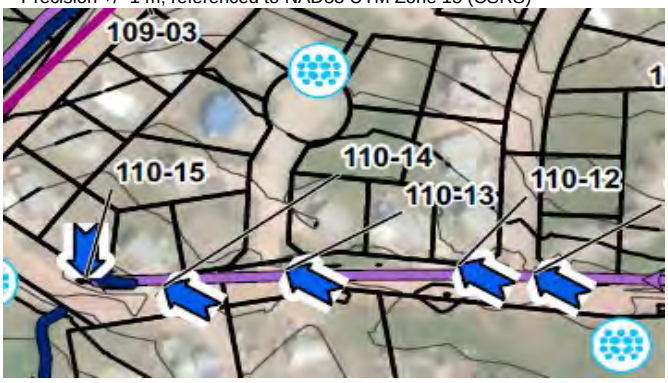
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		110-15
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3207048
Easting (m) [1]	-96.0405182

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

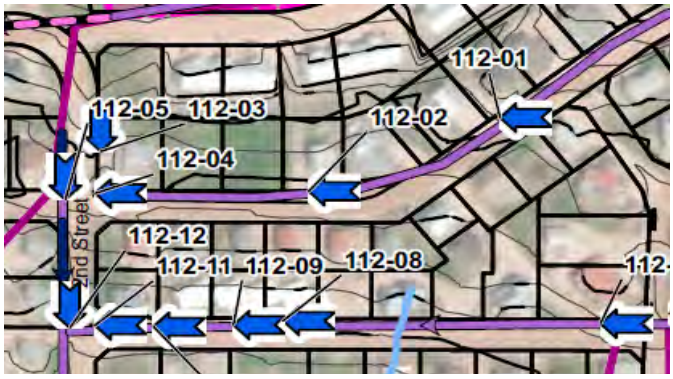
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3208027
Easting (m) [1]	-96.0249737

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

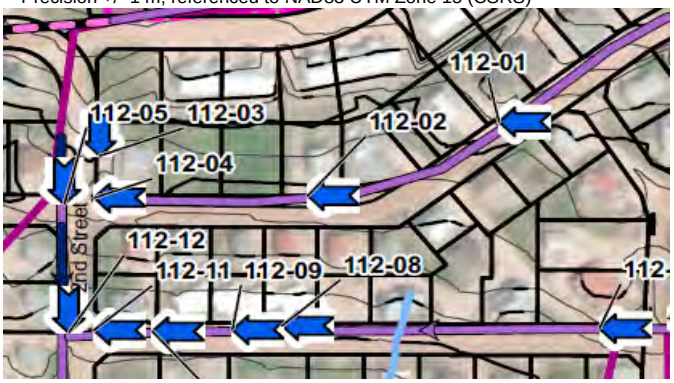
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-02
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3207679
Easting (m) [1]	-96.0268273

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

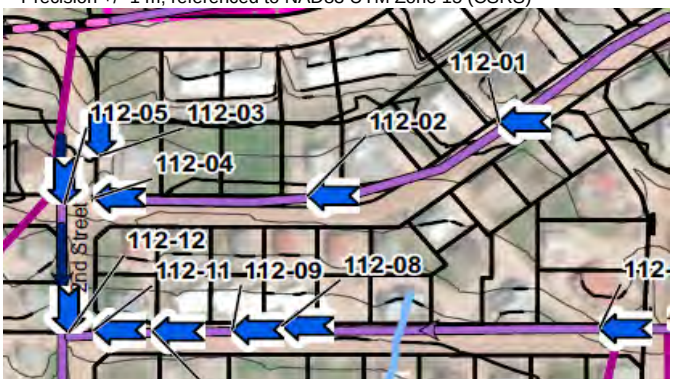
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-03
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3212123
Easting (m) [1]	-96.0284227

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	1	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

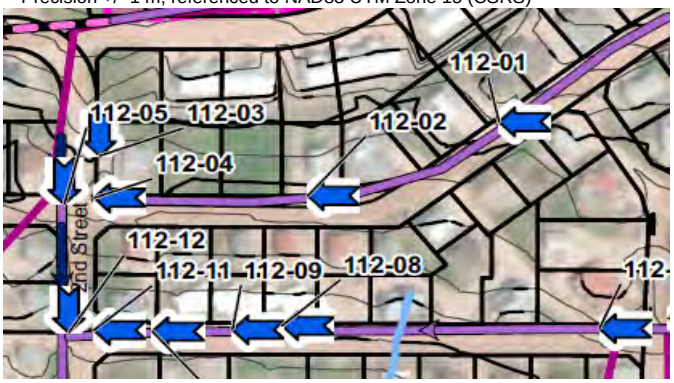
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-04
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	150
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3210509
Easting (m) [1]	-96.0286151

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

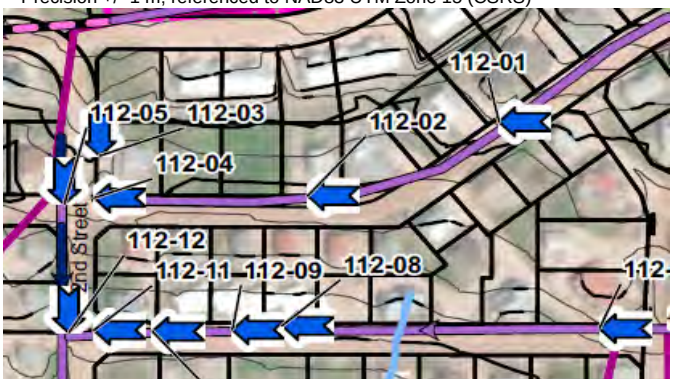
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		700
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3210661
Easting (m) [1]	-96.0288869

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

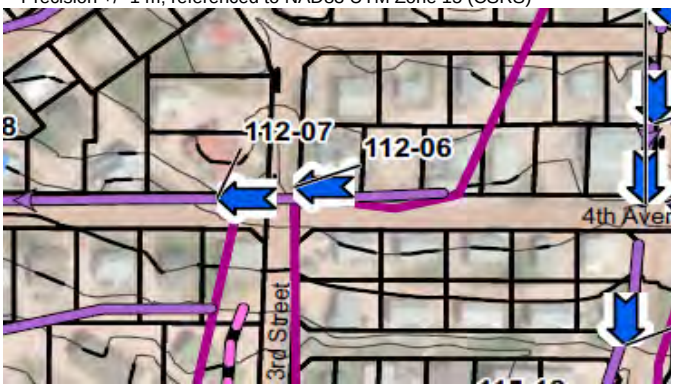
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-06
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	550
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	3rd Street
Northing (m) [1]	64.319782
Easting (m) [1]	-96.024249

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

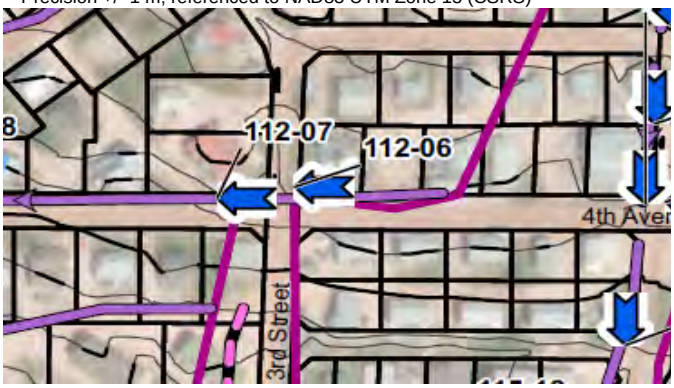
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-07
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	250
	Downstream	250
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3198357
Easting (m) [1]	-96.0248578

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

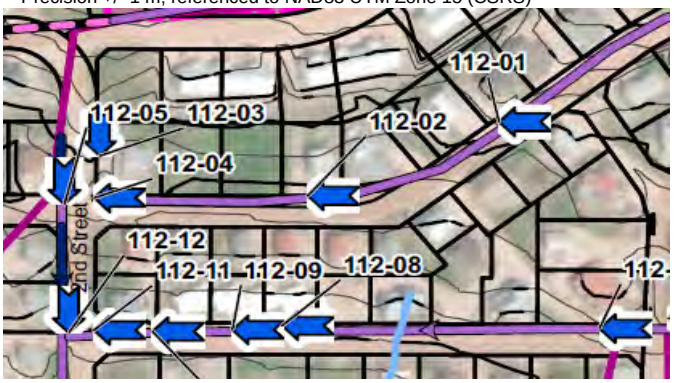
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-08
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	250
	Downstream	250
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3202798
Easting (m) [1]	-96.0274940

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

0

Downstream View

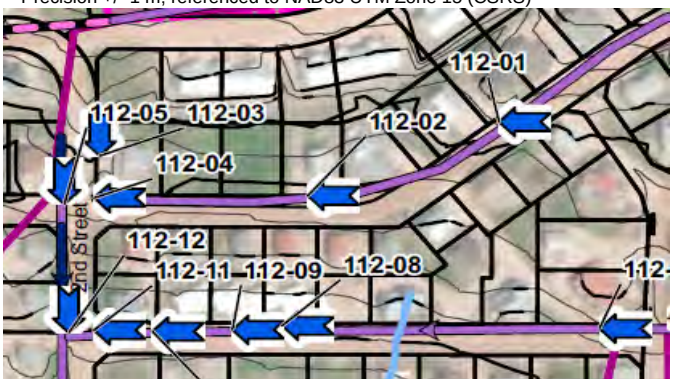
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-09
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.32033213
Easting (m) [1]	-96.02792338

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

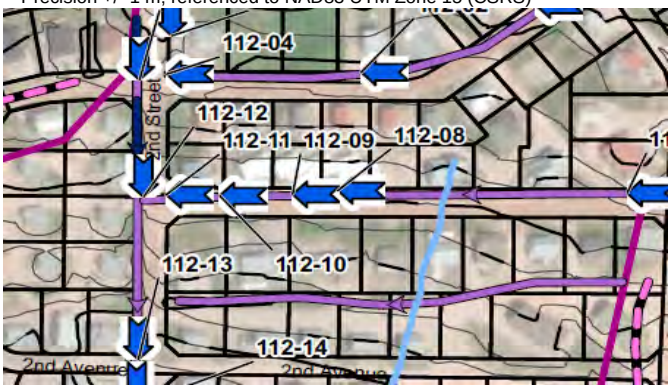
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-10
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	400
	Downstream	250
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3204345
Easting (m) [1]	-96.0285965

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

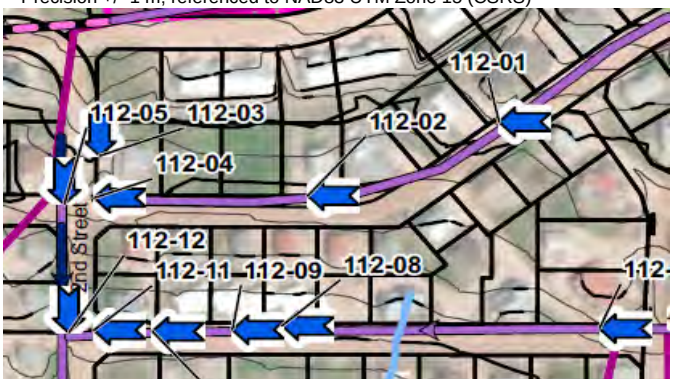
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-11
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3205194
Easting (m) [1]	-96.0290792

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

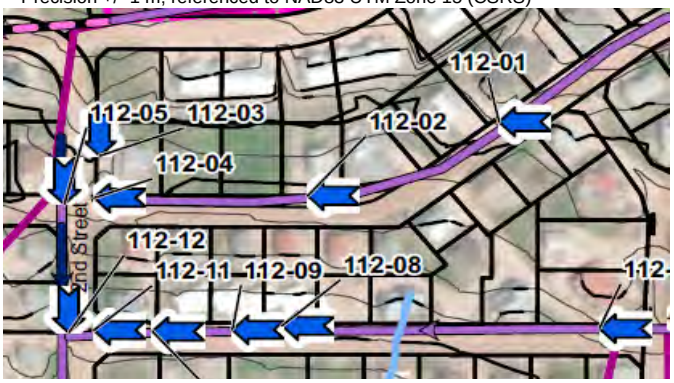
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-12
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.320544
Easting (m) [1]	-96.029298

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

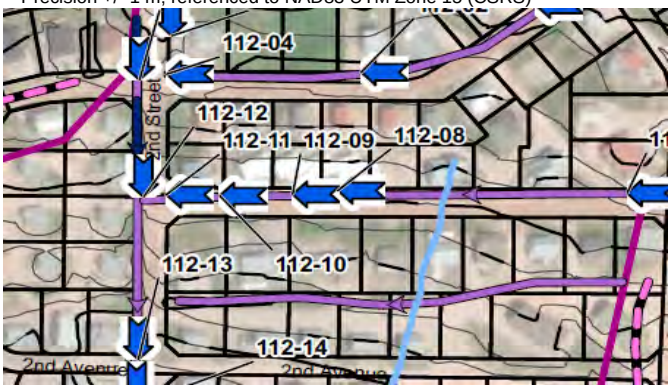
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-13
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3198349
Easting (m) [1]	-96.0299687

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

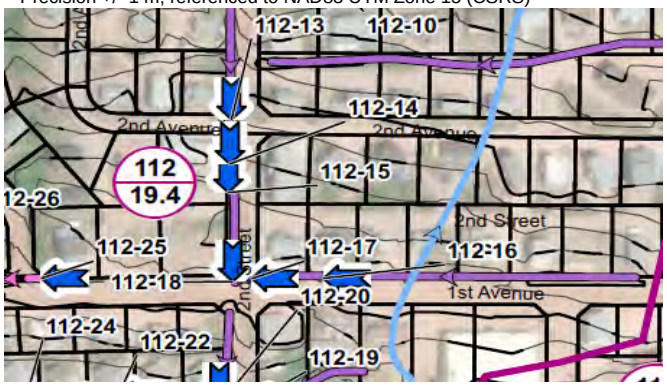
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-14
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3196385
Easting (m) [1]	-96.0301566

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	3	2	0	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

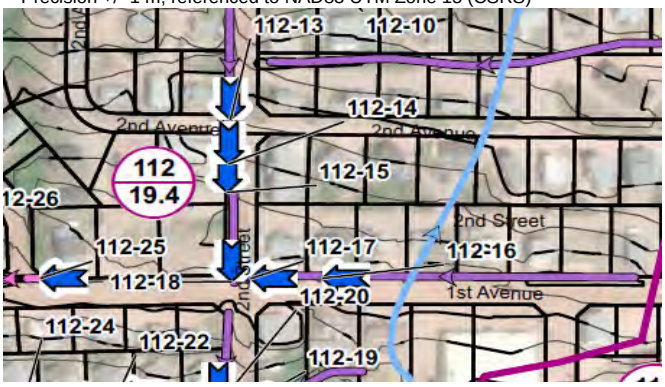
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-15
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3195139
Easting (m) [1]	-96.0302808

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

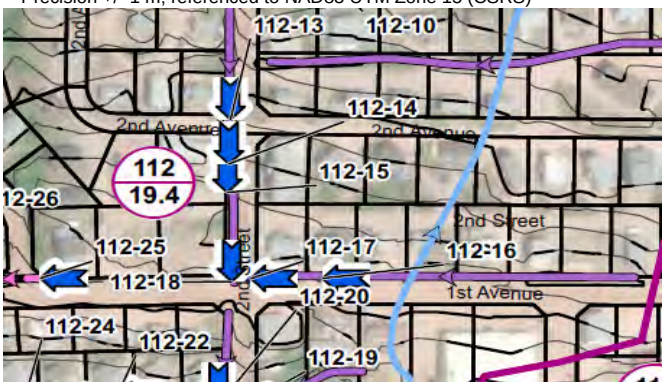
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-16
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3189853
Easting (m) [1]	-96.0297319

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

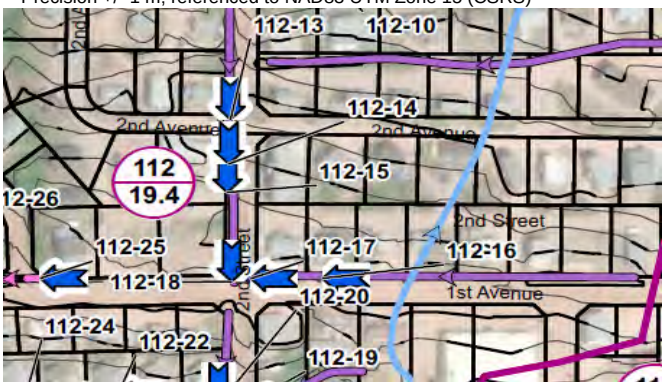
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-17
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3190938
Easting (m) [1]	-96.0303963

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

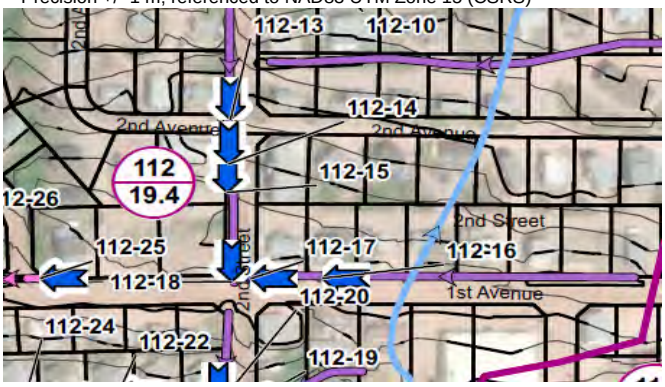
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-18
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	100
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.31910902
Easting (m) [1]	-96.03058709

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

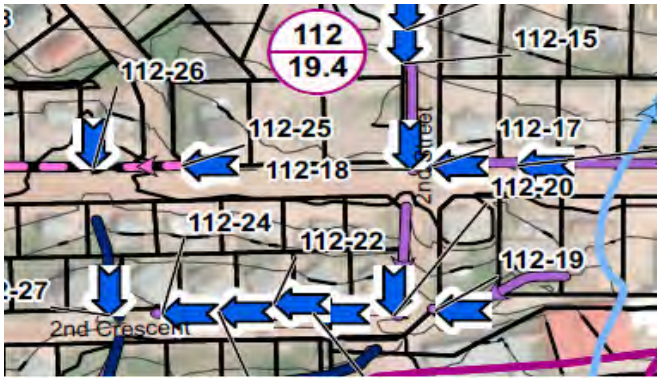
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-19
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	2nd Street
Northing (m) [1]	64.3185455
Easting (m) [1]	-96.0308505

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

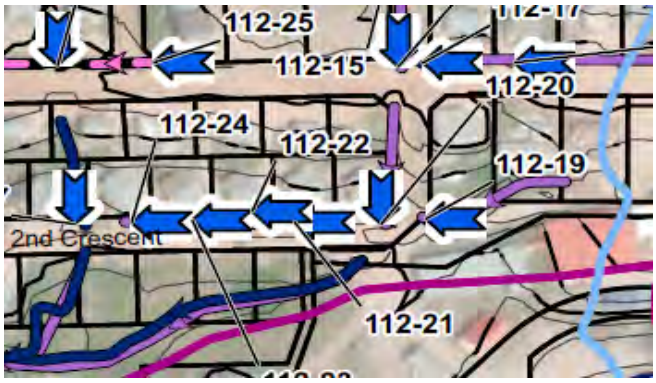
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-20
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64.3185794
Easting (m) [1]	-96.0311900

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

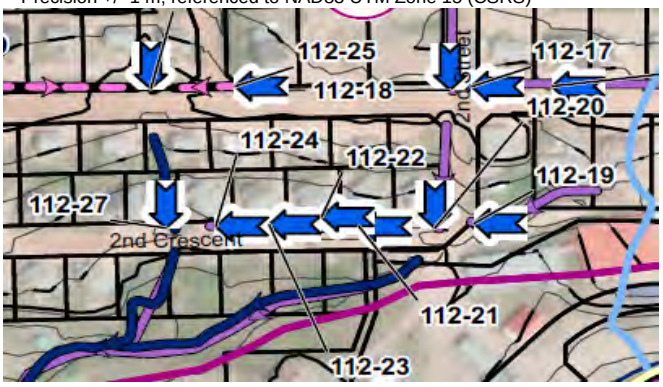
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-21
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	600
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64.31868834
Easting (m) [1]	-96.03181093

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

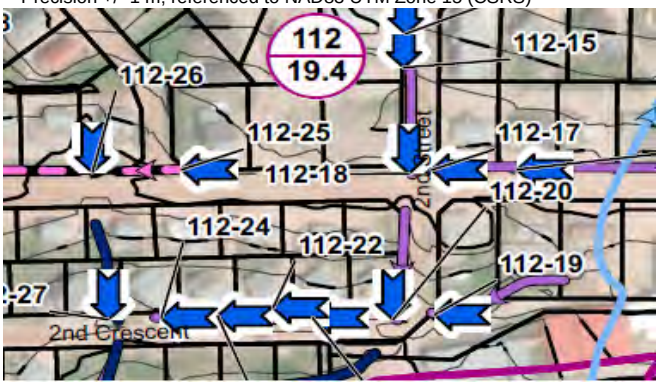
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-22
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64
Easting (m) [1]	-96

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

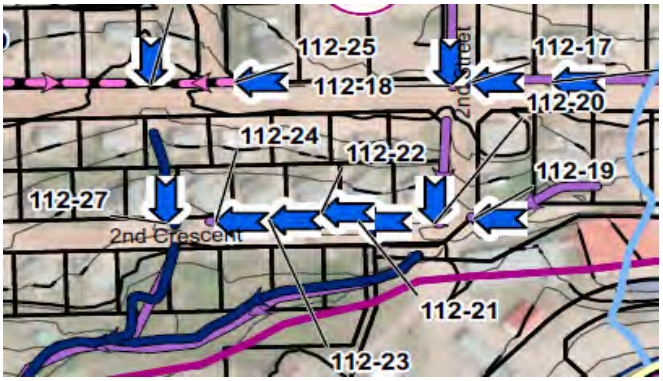
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-23
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64.3188178
Easting (m) [1]	-96.0325459

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	0	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

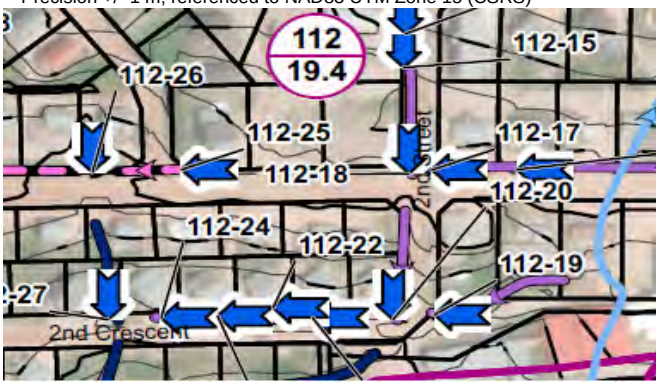
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-24
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64.31888230
Easting (m) [1]	-96.03299240

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	2	0	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

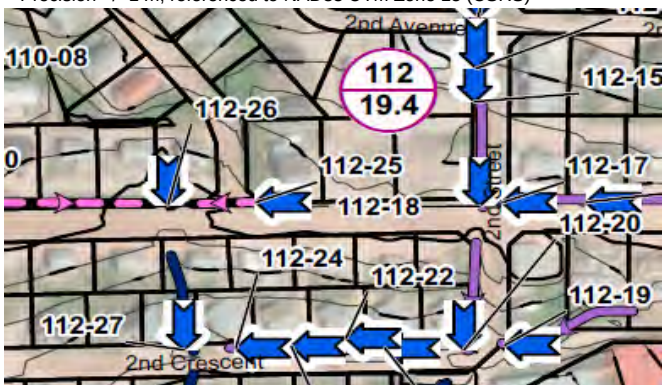
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-25
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	100
Other Comments	None	

Culvert Location	
Street	1st Street
Northing (m) [1]	64.319414
Easting (m) [1]	-96.032347

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

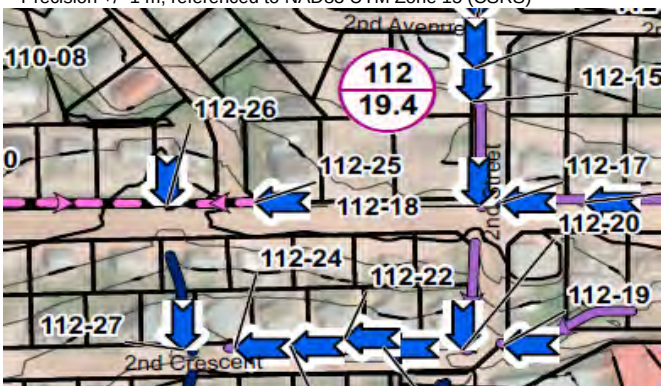
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-26
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	100
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3195184
Easting (m) [1]	-96.0330522

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	2	1	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

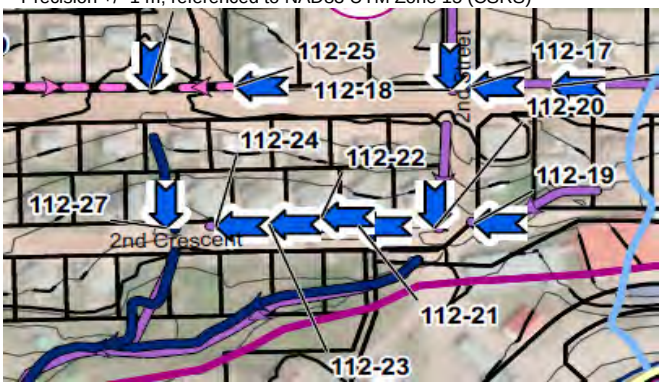
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		112-27
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Crescent
Northing (m) [1]	64
Easting (m) [1]	-96

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

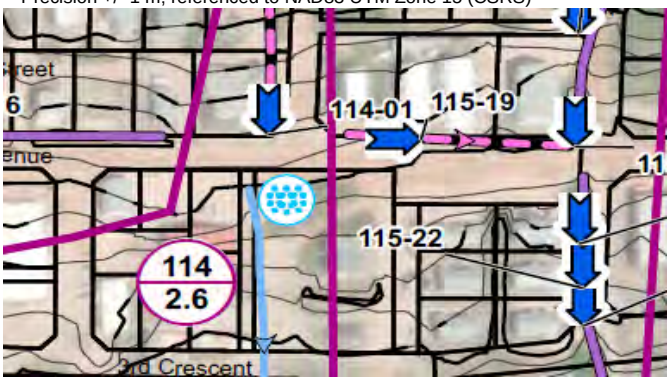
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		114-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.318387
Easting (m) [1]	-96.025999

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Both ends crushed	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.323606
Easting (m) [1]	-96.015058

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	4	0	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

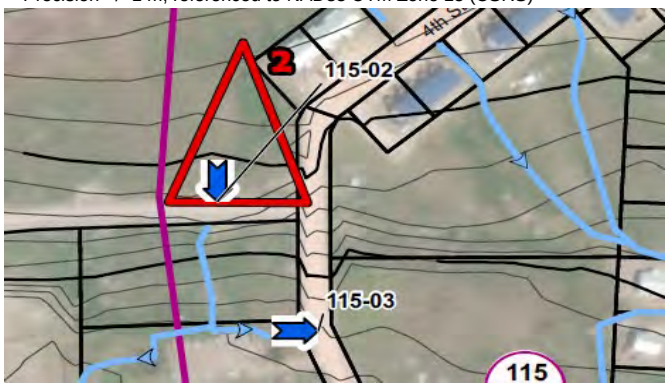
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.322902
Easting (m) [1]	-96.019255

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	2	0

Recommended Action(s):	Stabilize bank	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

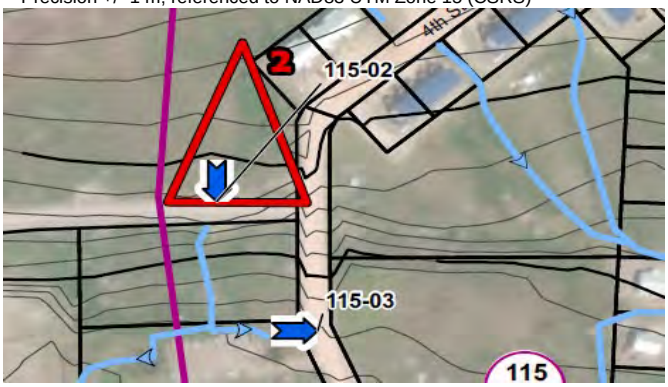
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	150
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3221561
Easting (m) [1]	-96.0188154

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	0	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

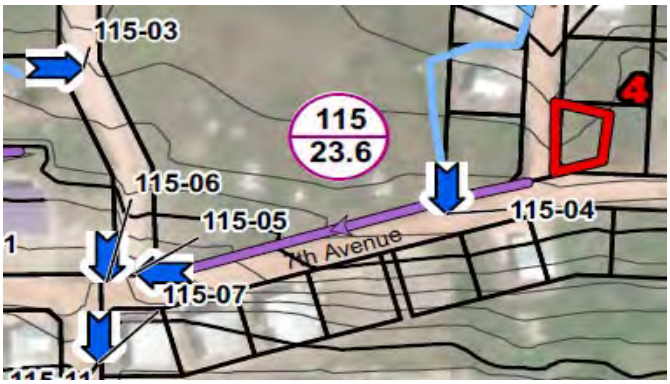
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3211592
Easting (m) [1]	-96.0164979

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

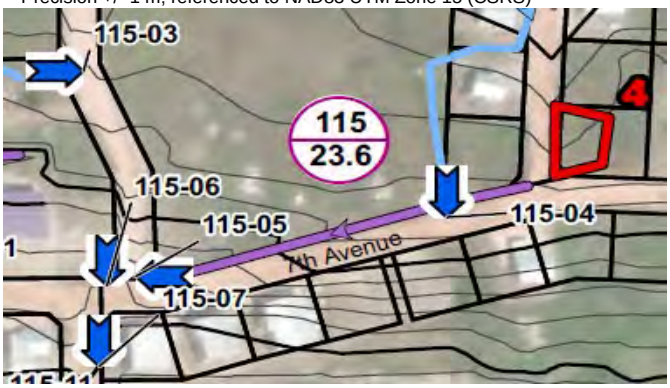
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-05
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.32133116
Easting (m) [1]	-96.01907302

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

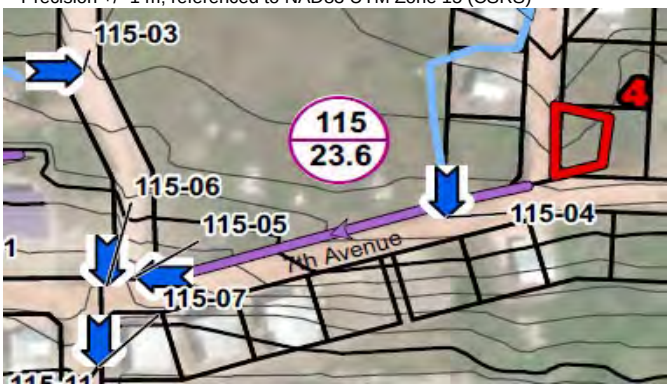
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-06
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	300
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3213331
Easting (m) [1]	-96.0193223

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

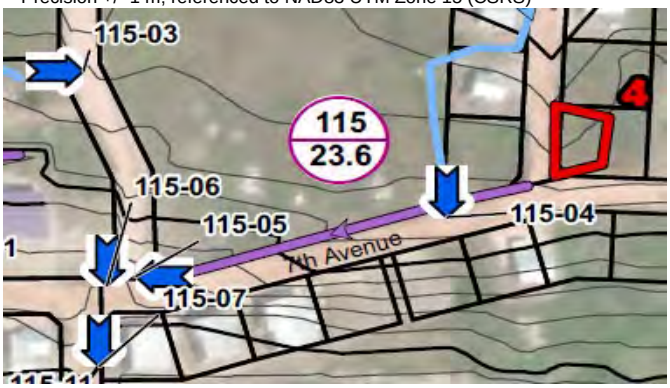
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-07
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	200
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3210451
Easting (m) [1]	-96.0196432

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

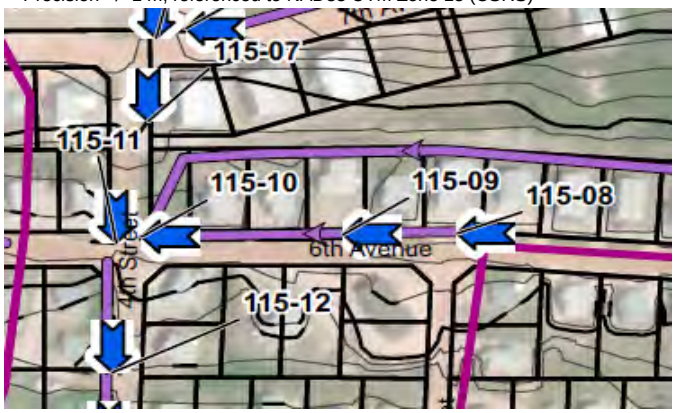
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-08
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3202671
Easting (m) [1]	-96.0176911

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

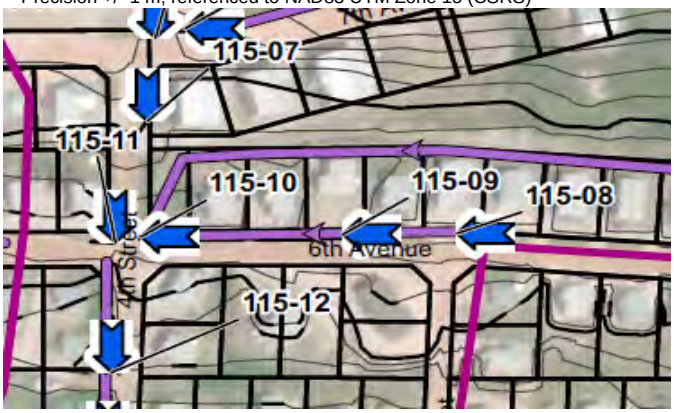
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-09
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3204022
Easting (m) [1]	-96.0185415

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

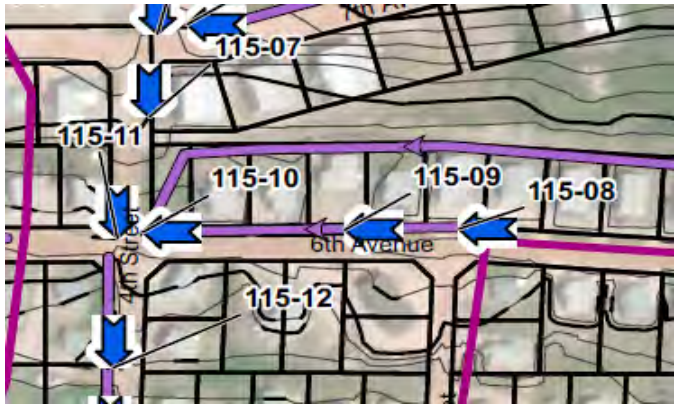
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-10
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	0
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3206399
Easting (m) [1]	-96.0200507

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

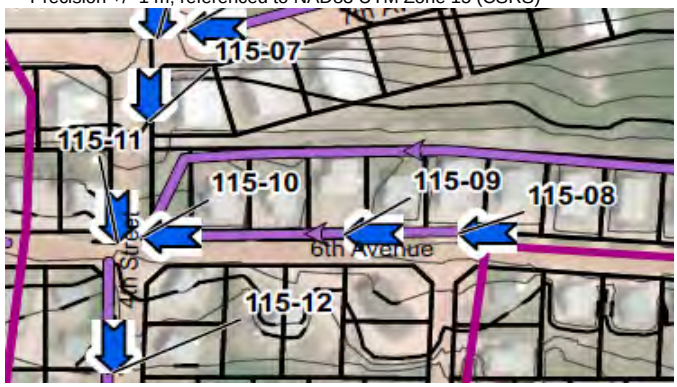
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-11
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	400
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	6th Avenue
Northing (m) [1]	64.3206499
Easting (m) [1]	-96.0202587

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

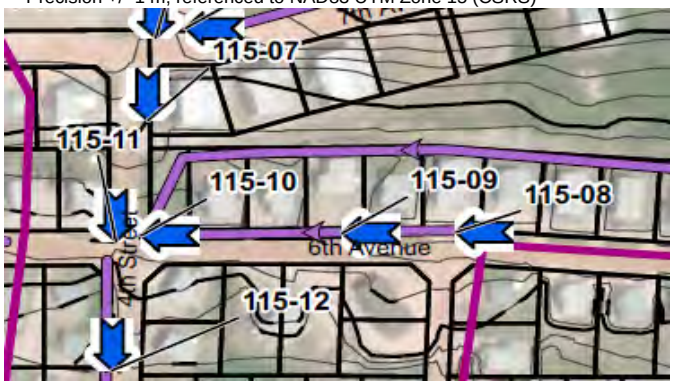
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-12
Type		Entrance
Shape		Round
Material		Steel
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.32018930
Easting (m) [1]	-96.02068967

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
2	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

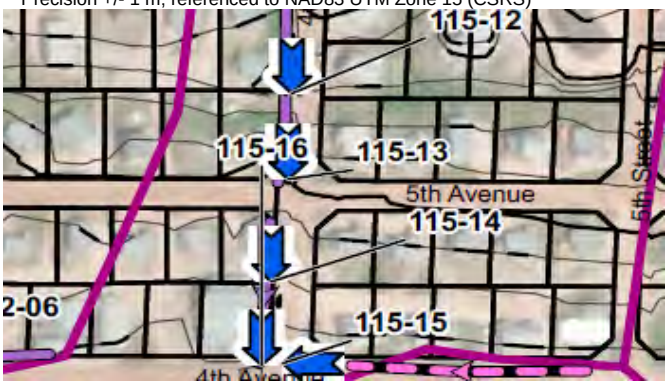
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-13
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	0
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	0
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	5th Avenue
Northing (m) [1]	64.3199011
Easting (m) [1]	-96.0209713

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-14
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	100
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3195721
Easting (m) [1]	-96.0213948

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	1	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-15
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	400
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3192795
Easting (m) [1]	-96.0215551

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-16
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	400
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3192976
Easting (m) [1]	-96.0217097

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

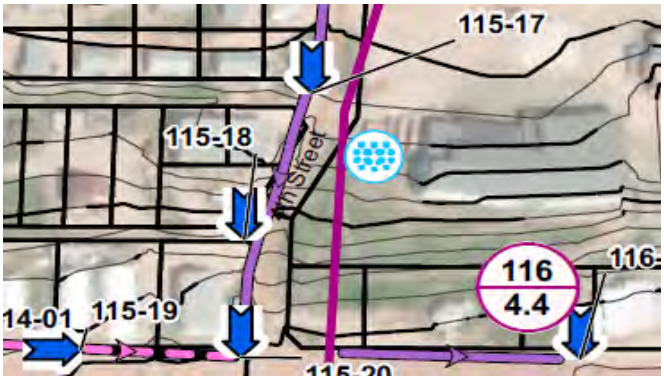
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-17
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Both ends crushed	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.318819
Easting (m) [1]	-96.022294

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	1

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

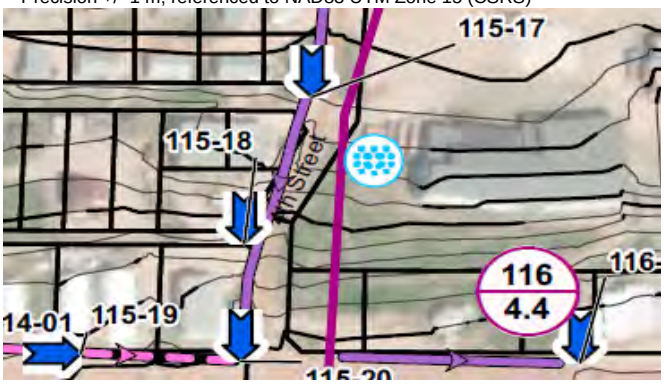
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-18
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3183736
Easting (m) [1]	-96.0232595

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

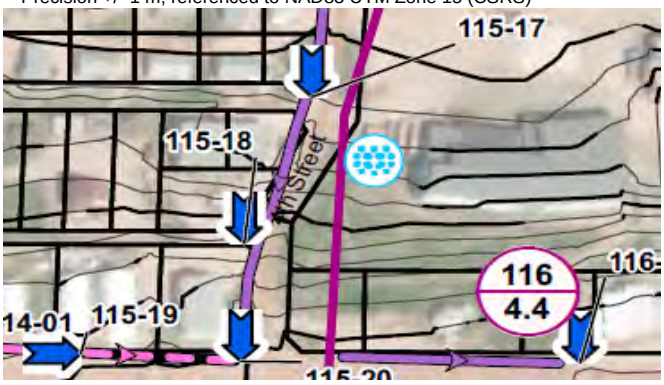
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-19
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3181754
Easting (m) [1]	-96.0248282

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	0	2

Recommended Action(s):	Align ditch with culvert	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

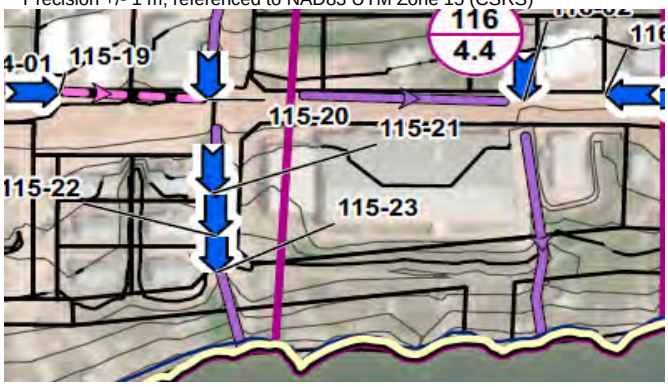
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-20
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3179516
Easting (m) [1]	-96.0236557

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

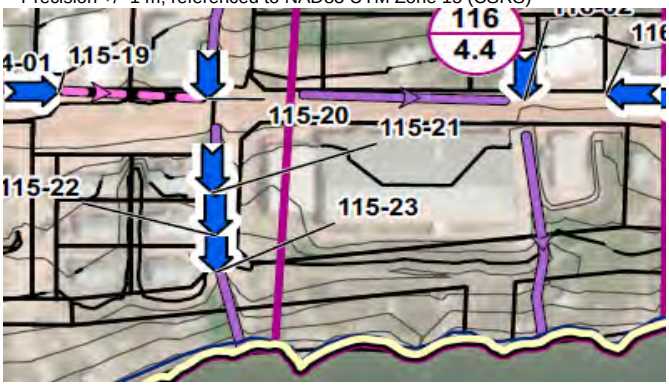
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-21
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.317582
Easting (m) [1]	-96.023937

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	0	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

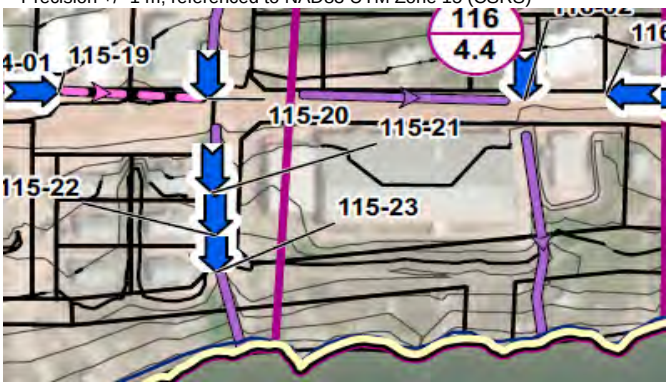
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-22
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3174123
Easting (m) [1]	-96.0240582

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	0	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

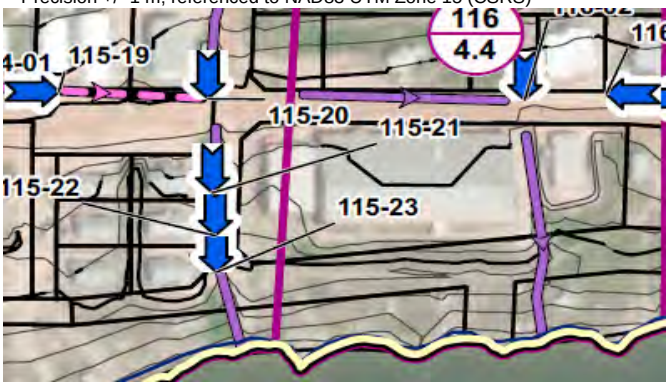
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		115-23
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Downstream end crushed	

Culvert Location	
Street	4th Street
Northing (m) [1]	64.3172694
Easting (m) [1]	-96.0241745

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	0	1

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

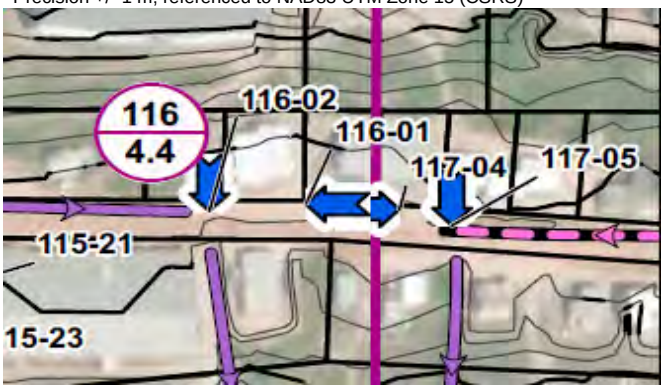
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		116-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	250
	Downstream	100
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.317447
Easting (m) [1]	-96.020445

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	2	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

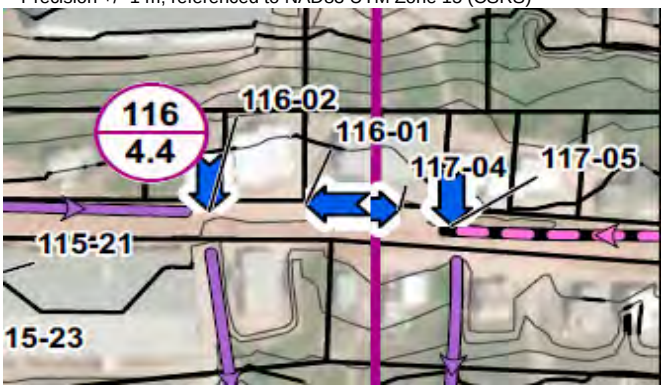
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		116-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		900
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.317531
Easting (m) [1]	-96.021119

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

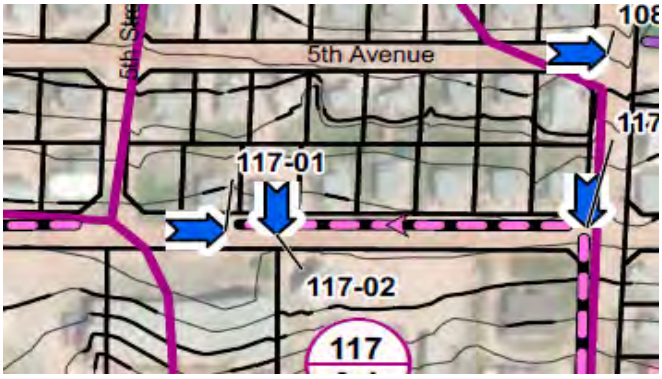
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		117-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3187050
Easting (m) [1]	-96.0183592

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

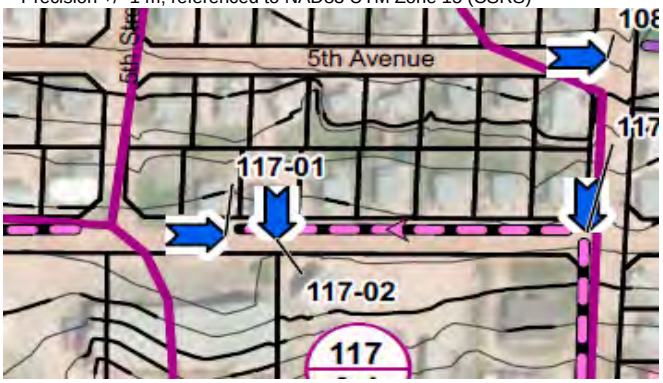
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		117-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	150
	Downstream	150
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.318628
Easting (m) [1]	-96.018004

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	1	1	0	2

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

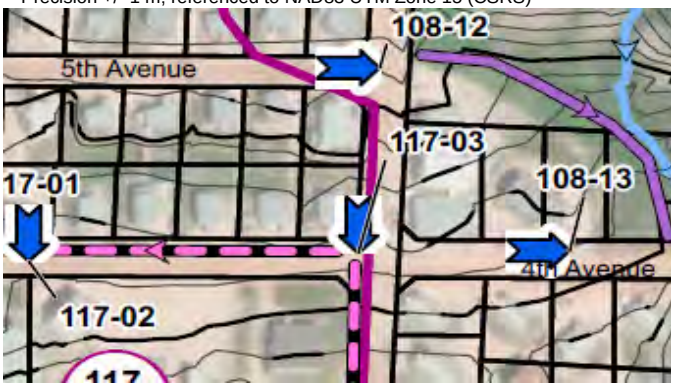
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		117-03
Type		Cross
Shape		Round
Material		Steel
Diameter or Dimensions (mm)		160
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Channel infilled, minimal conveyance of runoff	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3182859
Easting (m) [1]	-96.0157295

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	0	0	2

Recommended Action(s):	Stabilize channel	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

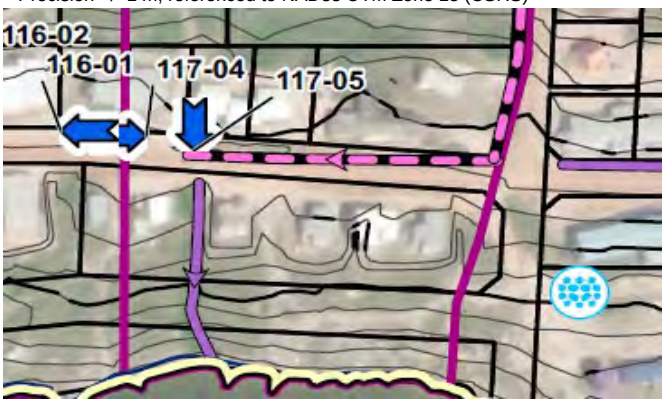
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		117-04
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3173250
Easting (m) [1]	-96.0198264

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

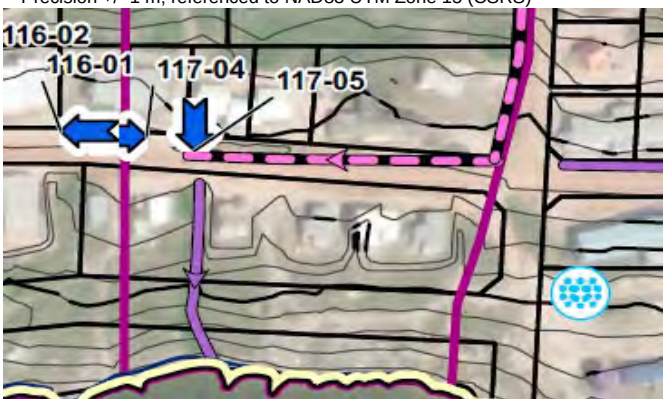
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		117-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3172146
Easting (m) [1]	-96.0195154

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

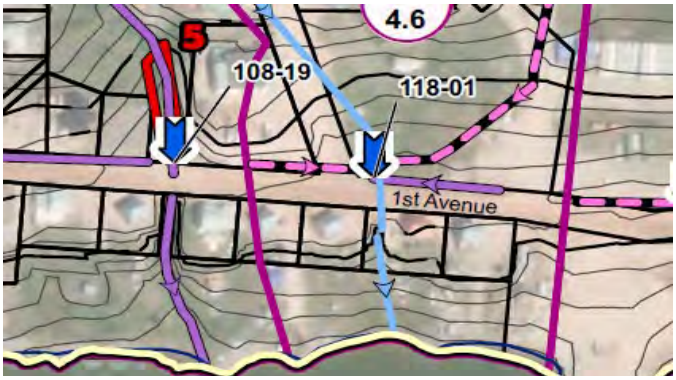
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		118-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.315715
Easting (m) [1]	-96.011465

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

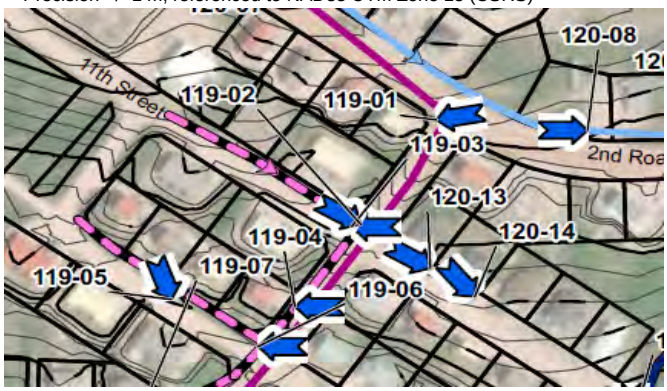
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	400
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3152144
Easting (m) [1]	-96.0004508

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

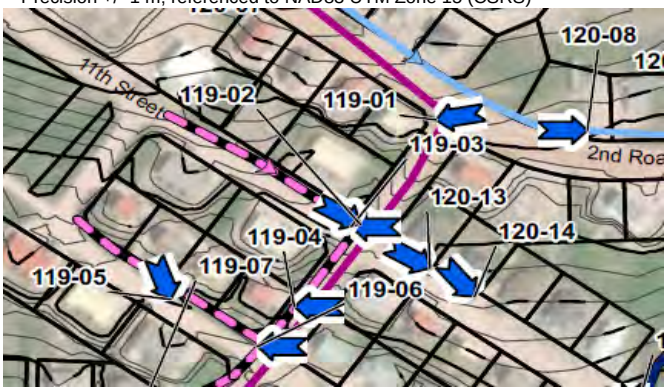
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	0
Infill Depth (mm)	Upstream	300
	Downstream	600
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.314886
Easting (m) [1]	-96.001496

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	2

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

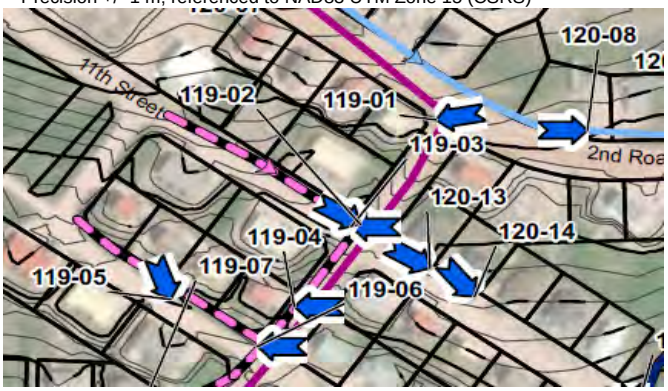
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	300
Other Comments	None	

Culvert Location	
Street	11th Street
Northing (m) [1]	64.314887
Easting (m) [1]	-96.001584

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	1	0

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

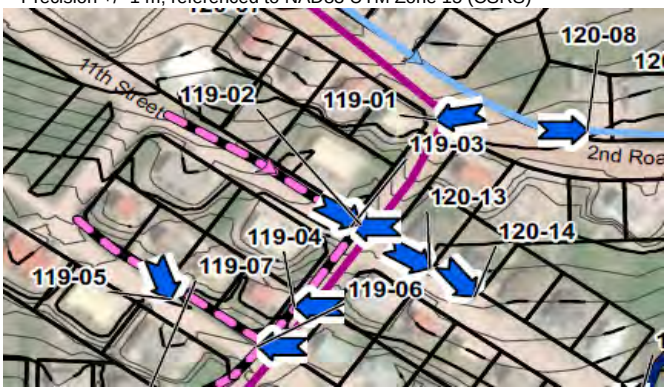
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-04
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.3146319
Easting (m) [1]	-96.0023686

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	2	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

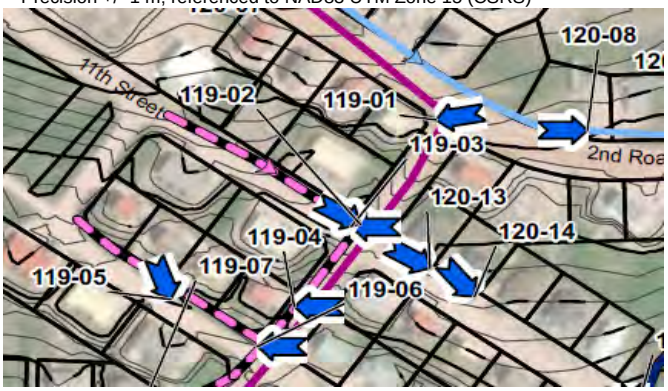
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-05
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	10th Street
Northing (m) [1]	64.3148398
Easting (m) [1]	-96.0034188

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	0	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

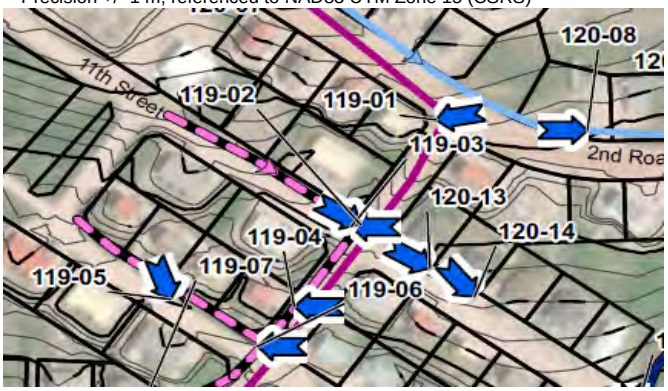
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-06
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		700
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	500
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	10th Street
Northing (m) [1]	64.314518
Easting (m) [1]	-96.002837

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

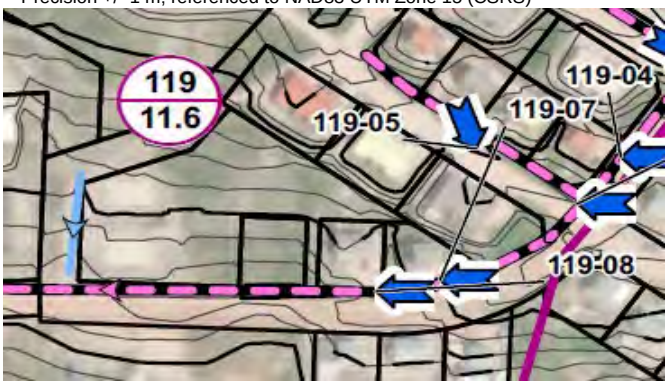
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-07
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	500
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.314412
Easting (m) [1]	-96.004094

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

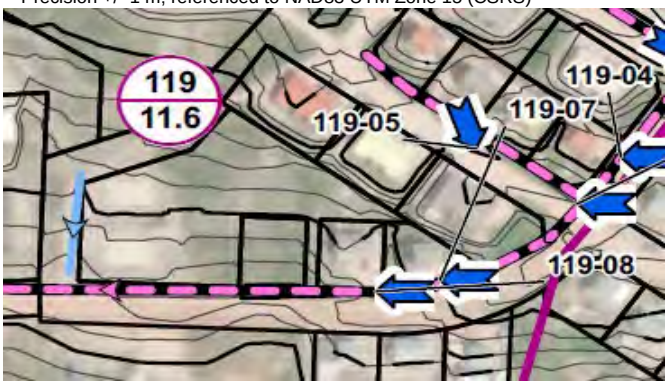
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-08
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64.314449
Easting (m) [1]	-96.004606

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	0	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		119-09
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	200
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	1st Avenue
Northing (m) [1]	64
Easting (m) [1]	-96

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

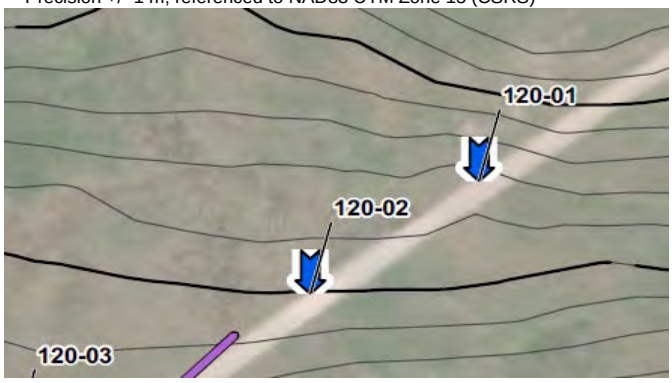
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		0
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.320101
Easting (m) [1]	-95.993945

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	2	0	0	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

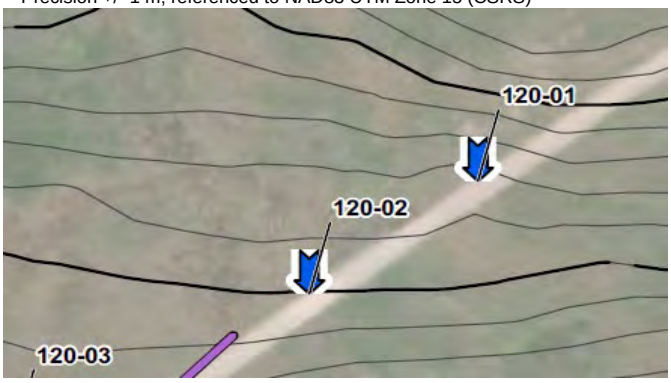
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.3198644
Easting (m) [1]	-95.9958672

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View	Upstream Culvert End
No photo of US, Looking US	

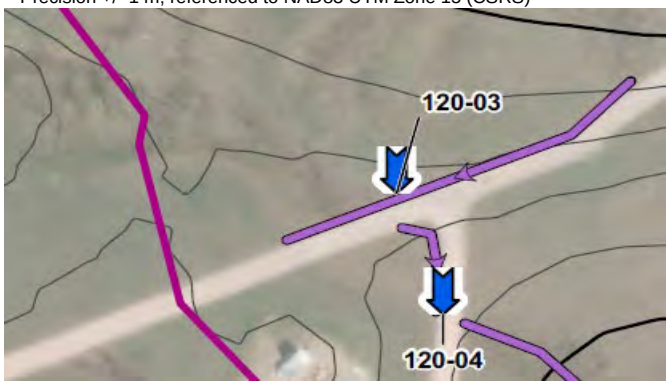
Downstream View	Downstream Culvert End
No photo of DS, looking DS	No photo of DS end of culvert

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Avenue
Northing (m) [1]	64.319666
Easting (m) [1]	-95.999057

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	0	0	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

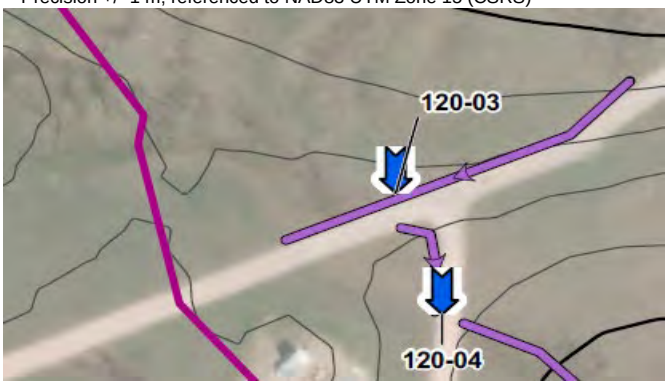
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3191127
Easting (m) [1]	-95.9990949

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Upstream end crushed	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.3171948
Easting (m) [1]	-95.9983977

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	1

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-06
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3160329
Easting (m) [1]	-96.0013188

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-07
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	400
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3158692
Easting (m) [1]	-96.0010456

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	0	2

Recommended Action(s):	Stabilize channel	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

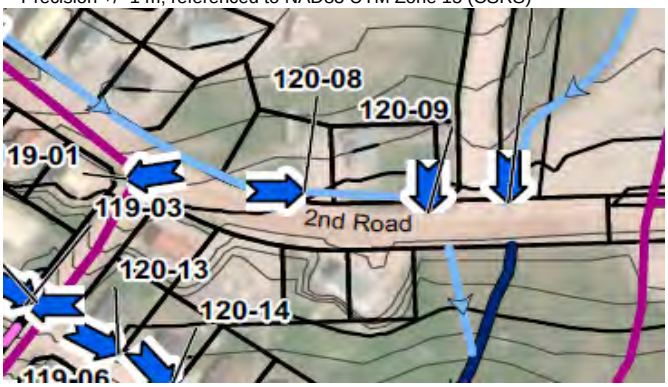
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-08
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	300
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3149552
Easting (m) [1]	-95.9991708

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

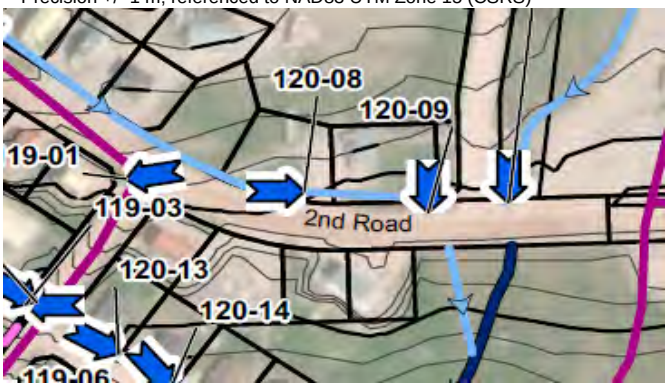
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-09
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	400
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3147291
Easting (m) [1]	-95.9983214

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	2	1	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

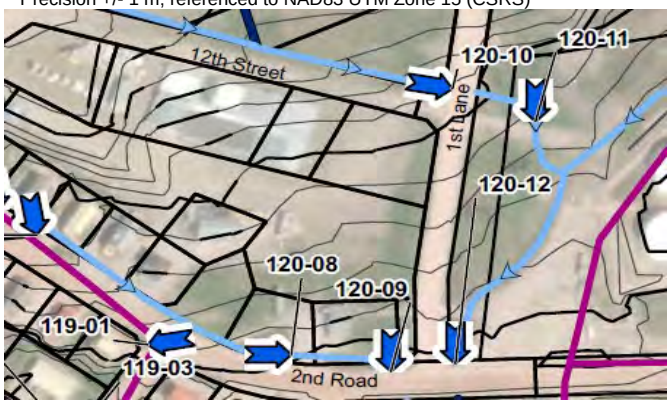
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-10
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Lane
Northing (m) [1]	64.3158891
Easting (m) [1]	-95.9966634

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-11
Type		Cross
Shape		Round
Material		Steel
Diameter or Dimensions (mm)		500
Marker Post Present		0
End Crushing	Upstream	0
	Downstream	0
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	1st Lane
Northing (m) [1]	64.3156184
Easting (m) [1]	-95.9960270

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-12
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3146665
Easting (m) [1]	-95.9976990

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

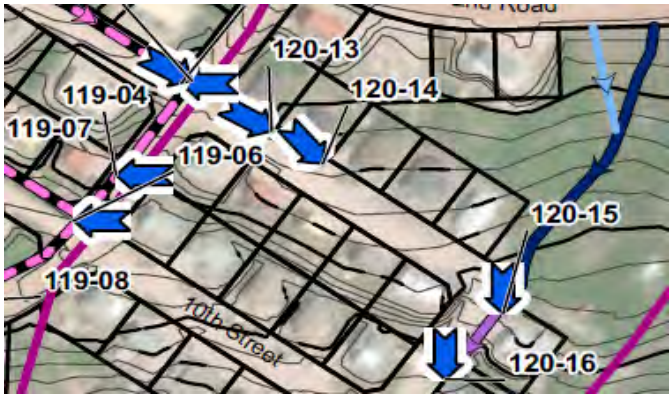
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-13
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	0
Infill Depth (mm)	Upstream	400
	Downstream	500
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	11th Street
Northing (m) [1]	64.314600
Easting (m) [1]	-96.001046

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



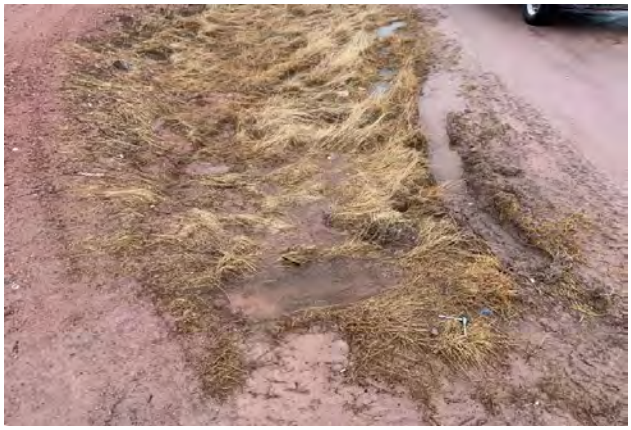
Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	3	2	0	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View



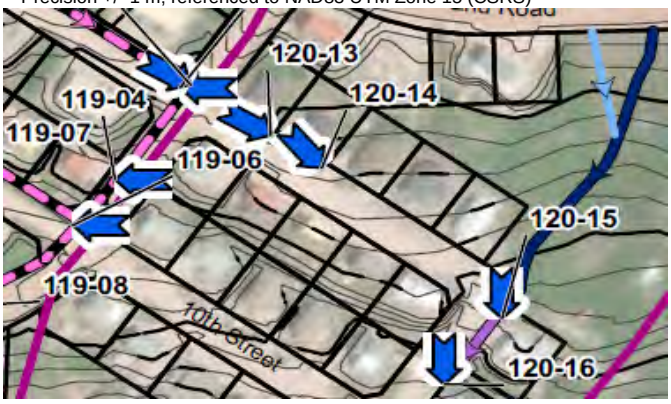
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-14
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	0
	Downstream	Y
Infill Depth (mm)	Upstream	500
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	11th Street
Northing (m) [1]	64.31441751
Easting (m) [1]	-96.00076415

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

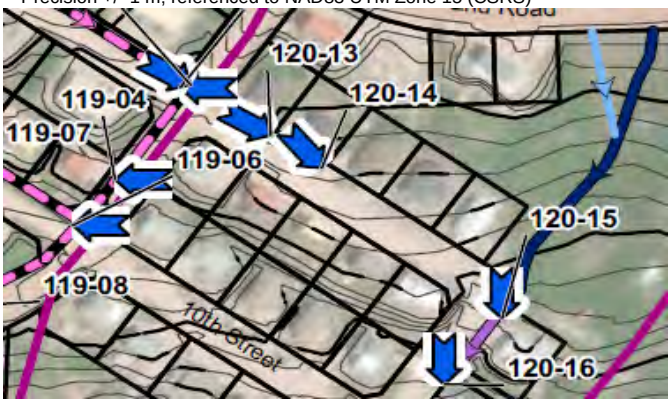
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-15
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1000
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	10th Street
Northing (m) [1]	64.3136417
Easting (m) [1]	-95.9998765

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

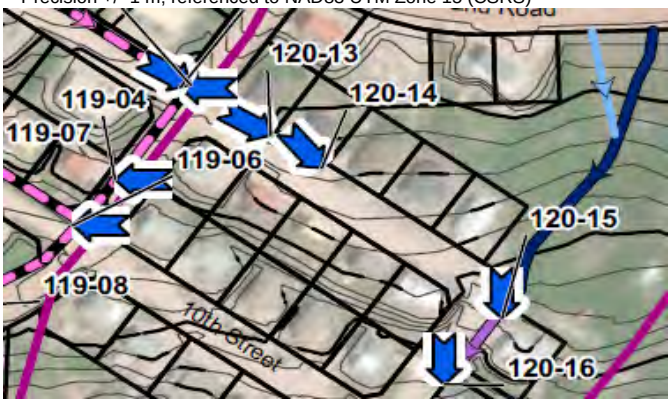
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		120-16
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	10th Street
Northing (m) [1]	64.31347229
Easting (m) [1]	-96.00052500

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

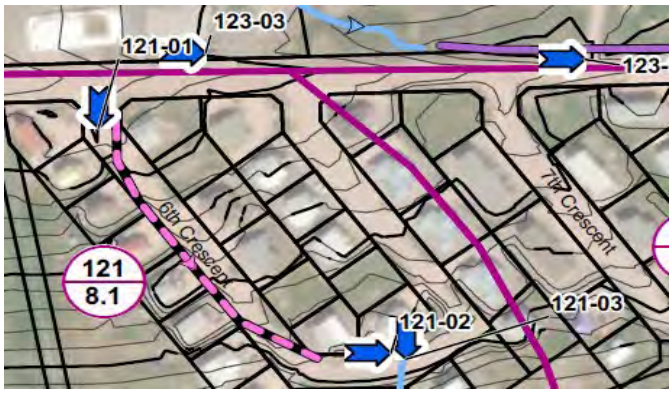
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		121-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	300
	Downstream	300
Other Comments	Both ends crushed and infilled	

Culvert Location	
Street	6th Crescent
Northing (m) [1]	64.3138880
Easting (m) [1]	-95.9945615

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	2	1	1

Recommended Action(s):	Replace	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

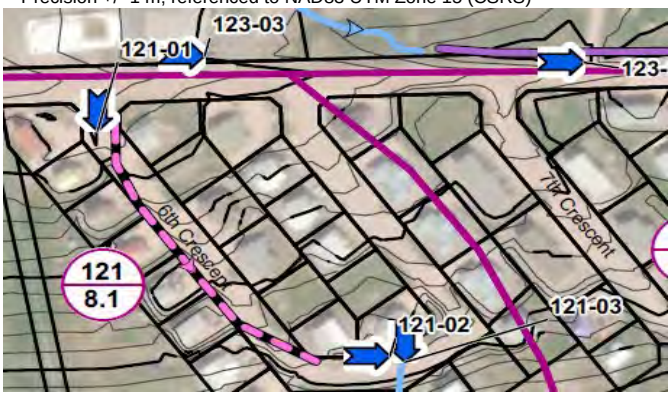
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		121-02
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	Channel infilled, minimal conveyance of runoff	

Culvert Location	
Street	6th Crescent
Northing (m) [1]	64.312443
Easting (m) [1]	-95.992731

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	2

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

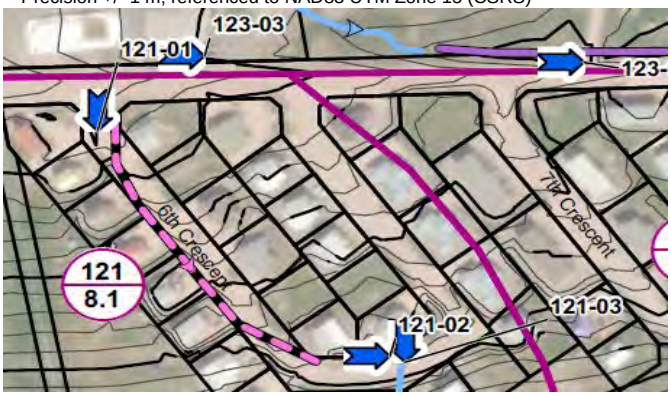
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		121-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		750
Marker Post Present		0
End Crushing	Upstream	0
	Downstream	0
Infill Depth (mm)	Upstream	100
	Downstream	300
Other Comments	None	

Culvert Location	
Street	6th Crescent
Northing (m) [1]	64.3123929
Easting (m) [1]	-95.9926147

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

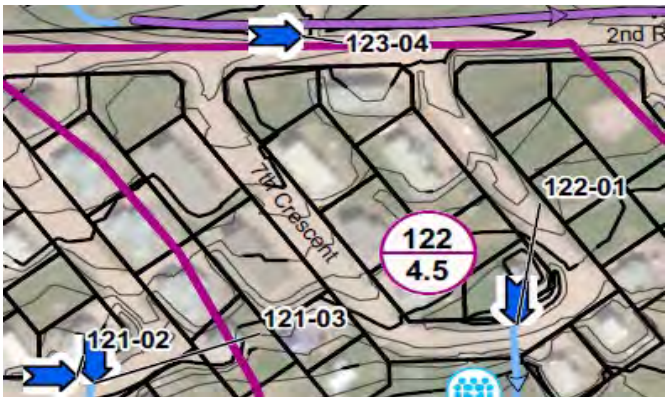
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		122-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		700
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	7th Crescent
Northing (m) [1]	64.3120651
Easting (m) [1]	-95.9890536

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-01
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		400
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	200
	Downstream	0
Other Comments	None	

Culvert Location	
Street	5th Crescent
Northing (m) [1]	64.3171432
Easting (m) [1]	-95.9911678

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	0	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		700
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	0
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	5th Crescent
Northing (m) [1]	64.316155
Easting (m) [1]	-95.990425

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

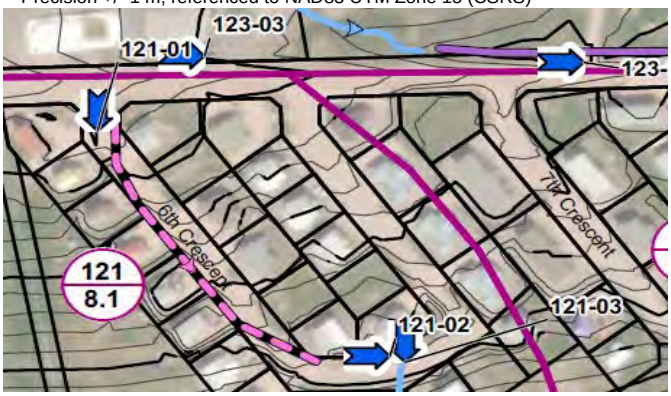
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-03
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.314060
Easting (m) [1]	-95.993282

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-04
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.313456
Easting (m) [1]	-95.989798

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
2	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

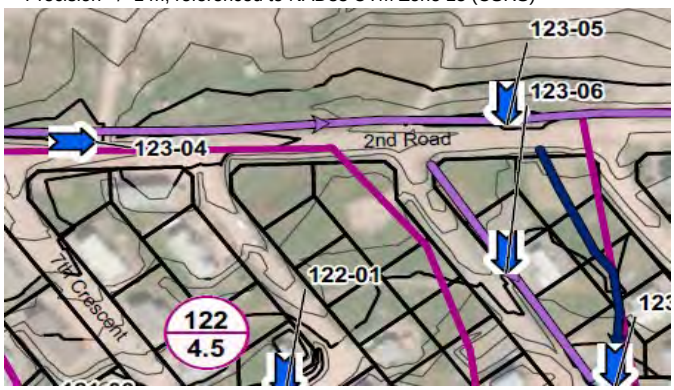
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		750
Marker Post Present		0
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	100
	Downstream	200
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3129193
Easting (m) [1]	-95.9860125

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

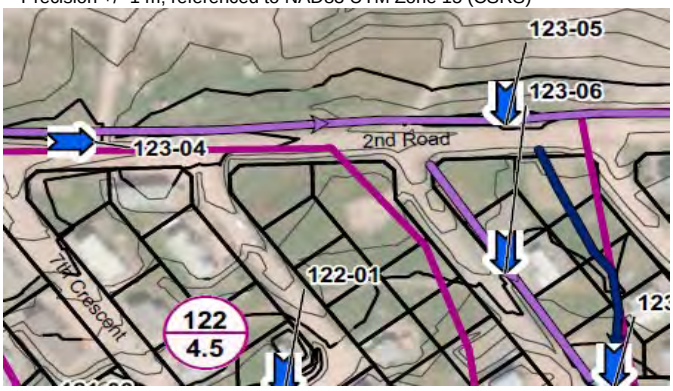
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-06
Type		Entrance
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	8th Crescent
Northing (m) [1]	64.312272
Easting (m) [1]	-95.986580

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		123-07
Type		Cross
Shape		Circular
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	0
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	8th Crescent
Northing (m) [1]	64.311613
Easting (m) [1]	-95.986028

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	1

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

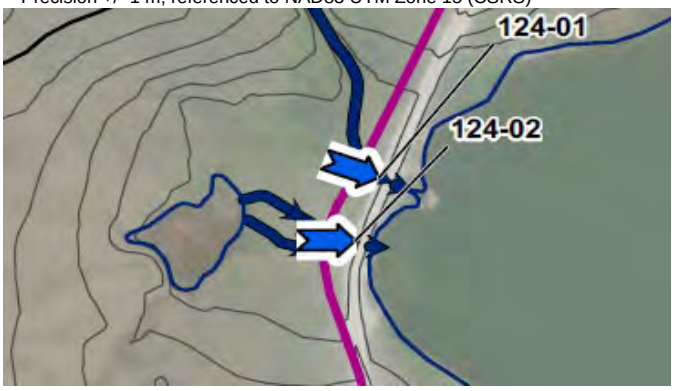
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		124-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.320854
Easting (m) [1]	-95.975134

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

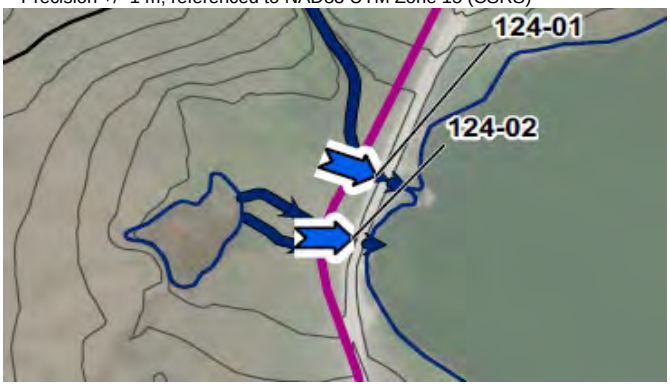
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		124-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		Y
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.320508
Easting (m) [1]	-95.975786

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	1	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

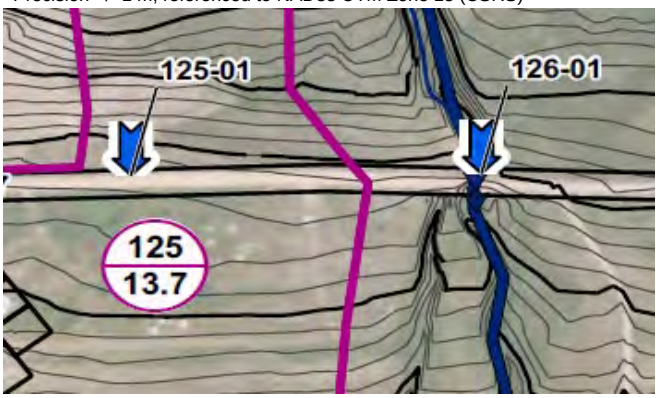
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		125-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		500
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	150
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3122919
Easting (m) [1]	-95.9818620

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	2	1	1

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		125-02
Type		Entrance
Shape		Circular
Material		Steel
Diameter or Dimensions (mm)		140
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	8th Crescent
Northing (m) [1]	64.311563
Easting (m) [1]	-95.977334

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

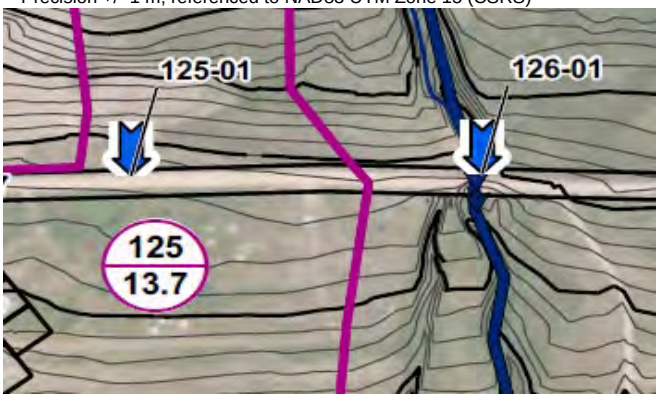
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		126-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		1500
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3108404
Easting (m) [1]	-95.9734763

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View

Upstream Culvert End

Downstream View

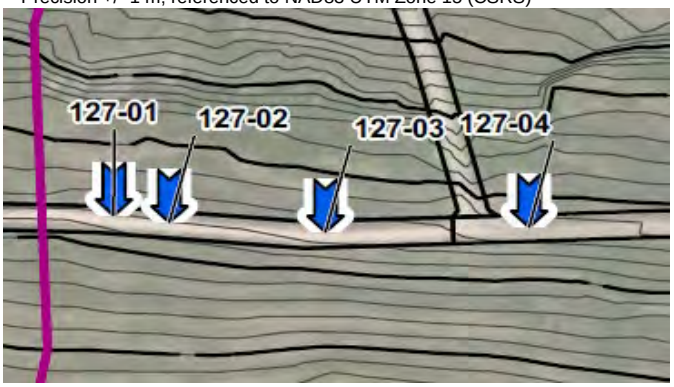
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.31067879
Easting (m) [1]	-95.97278397

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	0

Recommended Action(s):	No action	Priority:	None

Upstream View

Upstream Culvert End

Downstream View

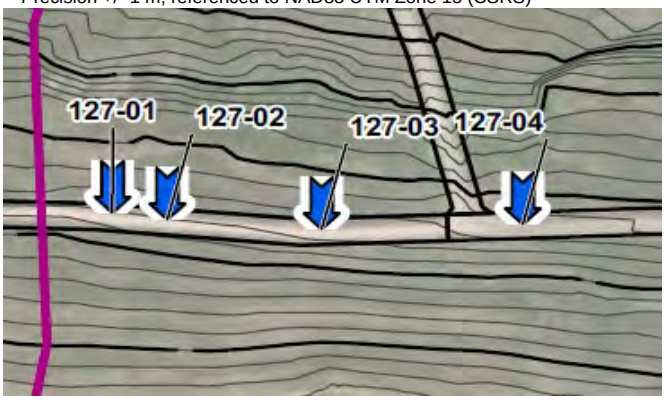
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3102821
Easting (m) [1]	-95.9707914

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	0	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

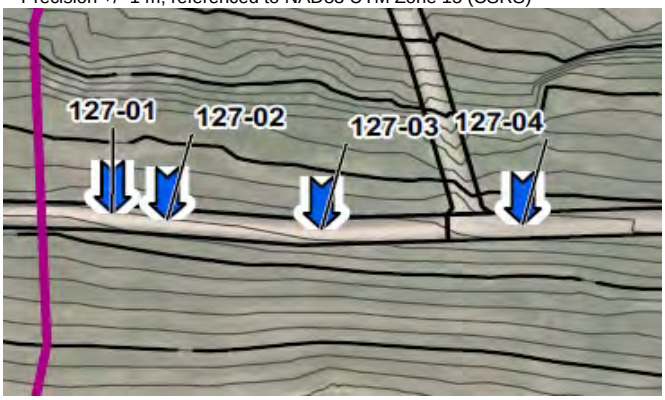
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-03
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	100
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3098743
Easting (m) [1]	-95.9680997

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	0	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

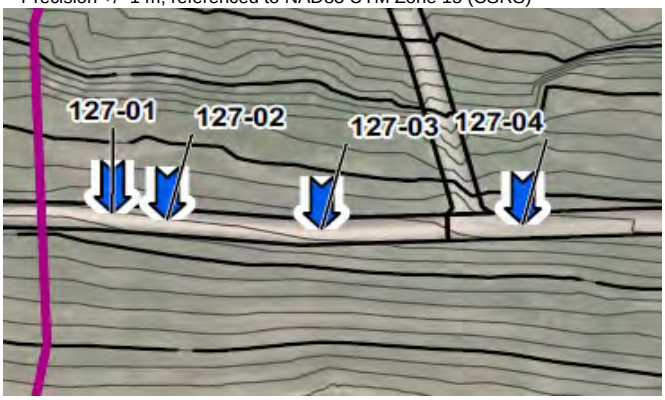
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-04
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3094226
Easting (m) [1]	-95.9652424

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	1	0

Recommended Action(s):	Repair both ends of culvert	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

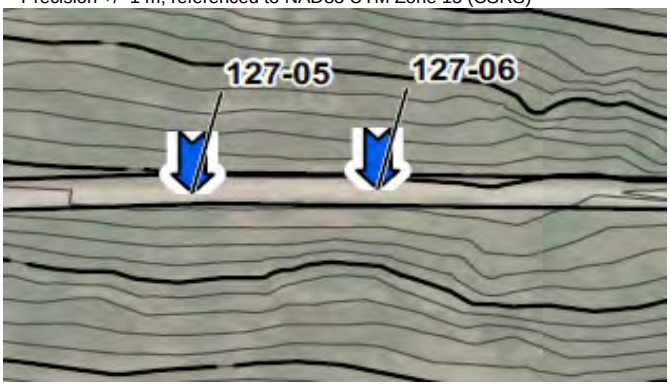
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-05
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3090994
Easting (m) [1]	-95.9631316

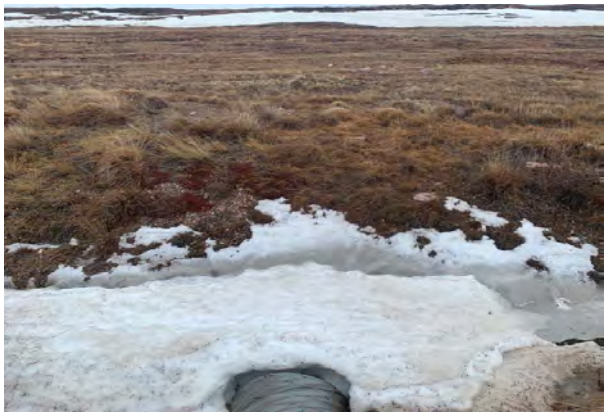
[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	1	0

Recommended Action(s):	No action	Priority:	Low

Upstream View



Upstream Culvert End

Downstream View

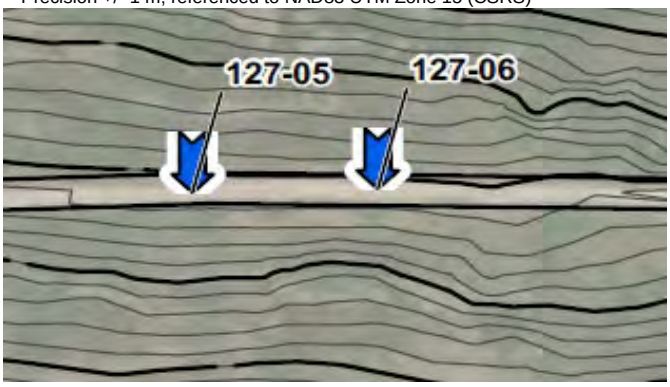
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		127-06
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	Y
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	2nd Road
Northing (m) [1]	64.3082903
Easting (m) [1]	-95.9484327

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	2	0	0	0

Recommended Action(s):	Repair culvert end	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		128-01
Type		Cross
Shape		Circular
Material		Steel
Diameter or Dimensions (mm)		140
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64
Easting (m) [1]	-96

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

No planform map view

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
1	0	0	2	0

Recommended Action(s):	Stabilize banks	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		129-01
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		600
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	100
	Downstream	100
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.32924906
Easting (m) [1]	-96.01493520

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)

Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	1	0	0

Recommended Action(s):	Flush	Priority:	Medium

Upstream View

Upstream Culvert End

Downstream View

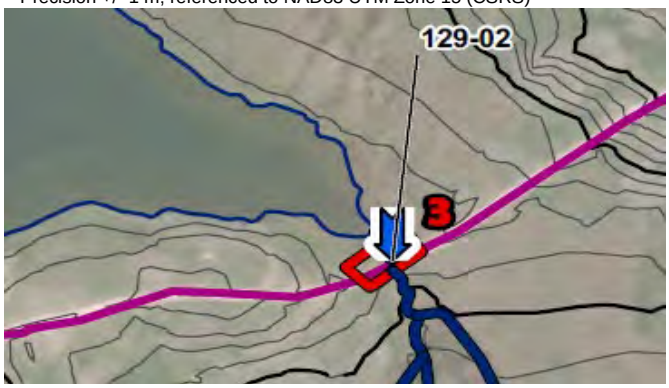
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		129-02
Type		Cross
Shape		Round
Material		Csp
Diameter or Dimensions (mm)		400
Marker Post Present		N
End Crushing	Upstream	N
	Downstream	N
Infill Depth (mm)	Upstream	100
	Downstream	200
Other Comments	None	

Culvert Location	
Street	N/A
Northing (m) [1]	64.3166537
Easting (m) [1]	-95.9751282

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	2	2	0

Recommended Action(s):	Flush	Priority:	High

Upstream View

Upstream Culvert End

Downstream View

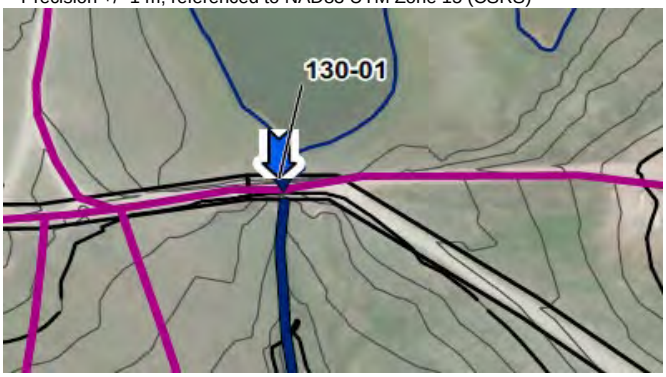
Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.

Culvert Information		
Culvert ID		130-01
Type		Cross
Shape		Circular
Material		Csp
Diameter or Dimensions (mm)		1700
Marker Post Present		N
End Crushing	Upstream	Y
	Downstream	N
Infill Depth (mm)	Upstream	0
	Downstream	0
Other Comments	None	

Culvert Location	
Street	4th Avenue
Northing (m) [1]	64.301805
Easting (m) [1]	-95.916701

[1] Precision +/- 1 m; referenced to NAD83 UTM Zone 15 (CSRS)



Culvert Condition Ratings (MTO 2013)				
Barrel Material (0-4)	Shape (0-4)	Capacity (0-2)	Erosion and Scour (0-2)	US/DS Channel (0-2)
0	0	0	0	0

Recommended Action(s):	No action	Priority:	None

Upstream View

Upstream Culvert End

Downstream View

Downstream Culvert End

NOTE: Information presented on this sheet is representative of conditions in June 2022. Current conditions may vary from what is provided on this sheet.