APPENDIX E.10

RECLAMATION RESEARCH STUDIES

MARY RIVER PROJECT
RECLAMATION PILOT STUDY

Revegetation Survey & Preliminary Reclamation Trial

2021 Project Update

Prepared For
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EDI Project
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ENVIRONMENTAL DYNAMICS INC.
Down to Earth Biology

EXECUTIVE SUMMARY

EDI Environmental Dynamics Inc. (EDI) was retained to design and implement a reclamation Pilot Study at the Mary River Project. This investigation (and subsequent initiatives) is intended to enhance reclamation success at the Mary River Project and guide future reclamation activities that support the environmental compliance and sustainability of the Project. The study objectives are to:

1) Document the status of opportunistic post-disturbance revegetation at the Project;
2) Initiate preliminary reclamation trials that examine methods and approaches that are considered appropriate and adaptable to the inherent challenges of the Arctic environment; and,
3) Identify pathways and opportunities for future studies.

The first field component of this reclamation pilot study (Summer 2019) focused on surveying natural/unassisted revegetation at the Project, and then siting and establishing a preliminary trial design. The second field component (Summer 2021) expanded the number of survey locations and reclamation trial sites. This report summarizes the ongoing reclamation pilot study including Summer 2019 and 2021 assessments. So far, study plots were established at four (4) locations along the Tote Road at KM16, KM18, KM52 and within an abandoned airstrip near KM58. Reclamation trials were established at three (3) locations (KM16, KM18, KM52). These sites were selected to represent different revegetation timeframes, from 1-Year Post-Disturbance up to >60 Years Post-Disturbance. Landscape and terrain was typified by a combination of xeric or subxeric conditions and either regosolic or brunisolic cryosols characterized by restrictive growth substrates (comprised of unconsolidated/loose sandy materials, coarse parent materials and/or permafrost) and poor fertility. Vegetation — including various compositions and abundances of Arctic graminoids, forbs/perennial herbs, shrubs and ericaceous species, and a diversity of bryophytes and lichen — was representative of tundra heath.

Rates of natural revegetation in the Arctic are characteristically slow due to the region's climate, narrow growing season, and challenging site conditions and terrain. A key observation of the revegetation survey is that natural/unassisted revegetation does occur at the Project. Predictably, revegetation following disturbance appeared to be shaped by initial starting conditions, such as the level of landscape disturbance (i.e., landscape form and function), soil characteristics (i.e., nutrient availability and organic matter contant), and integrity of nearby 'undisturbed' vegetation (i.e., as a source of native seed).

Moreover, the reclamation trial was intended to apply and adapt reclamation best management practices and land management approaches (i.e., site/surface preparations) to the Project setting. Reclamation earthworks at KM16 and KM52 were completed in Summer 2019; earthworks at KM18 were completed in Summer 2021. Presently, two surface configurations were applied: 'rough and loose' and 'track-packing'. The reclamation trial's sample size (n=3) is small and presently represents a short-term timeframe, and therefore imposes some design limitations. However, it does provide insight into some of the conditions, challenges and opportunities at the Project.

AUTHORSHIP

Baffinland retained EDI to design and initiate a reclamation pilot study at the Mary River Mine Site. This report summarizes the rationale, methods and outcomes of the study and recommendations to expand the study's scope. The following EDI Environmental Dynamics Inc. personnel contributed to this Reclamation Pilot Study:

Patrick Audet, Ph.D., R.P.Bio.....Project Team Lead and Report Author
Jordyn Renaud, B.Sc., P.Biol.....Field Technician
Morgan Kanak, B.S.A. .....Field Technician
Yolanda Navarro, B.Tech. (GIS).....GIS/Mapping
Daryl Johannesen, M.Sc., P.Biol.....Senior Review
Mike Setterington, M.Sc., R.P.Bio., C.W.B. .....Senior Review and Project Oversight

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1 INTRODUCTION

The Mary River Mine Project (the Project) is an open-pit iron ore mine located in the Qikiqtani Region of Nunavut. The Project has been under construction since 2013 and operational since 2014 by Baffinland Iron Mines Corporation (Baffinland). Under the Project's Terms and Conditions, Baffinland is committed to timely and effective reclamation during appropriate phases of the Life-of-Mine so that post-disturbance landscapes are safe, stable and non-polluting and align with a suitable aesthetic and self-sustaining land use(s). Baffinland recognizes that appropriate studies and field trials are undertaken to inform and refine reclamation practices onsite that will benefit Final Reclamation and Closure objectives.

EDI Environmental Dynamics Inc. (EDI) was retained to review recent advances in Arctic mine reclamation, and examine strategies (i.e., to the extent possible and practical) that are expected to promote natural revegetation at the Project (EDI Environmental Dynamics Inc. 2019). Building from this desktop investigation, a reclamation pilot study was designed with the objectives to:

1) Document the status of opportunistic post-disturbance revegetation at the Project (i.e., natural and unassisted);
2) Initiate preliminary reclamation trials that examine methods and approaches that are considered appropriate and adaptable to the inherent challenges of the Arctic environment; and,
3) Identify pathways and opportunities for future studies.

The first field component of this reclamation pilot study (Summer 2019) focused on siting and establishing a preliminary trial design (EDI Environmental Dynamics Inc. 2020). The second field component (Summer 2021) expanded the number of study sites (reported herein).

This report summarizes the ongoing reclamation pilot study (including Summer 2019 and 2021 assessments). Collectively, these investigations (and any/all subsequent initiatives) are intended to enhance reclamation success in the Arctic and guide future reclamation activities that support the environmental compliance and sustainability of the Project.

2 POST-DISTURBANCE REVEGETATION SURVEY

2.1 SITE SELECTION AND SURVEY DESIGN

The first part of the reclamation pilot study focused on documenting the terrain and soil conditions and species composition, successional trajectories, and assumed revegetation rates occurring within disturbed Project areas. In consultation with Baffinland's Sustainable Development and Site Environment teams, EDI conducted a desktop review of the Project footprint's available ortho/aerial imagery to establish a preliminary list of potential study sites representative of developed, disturbed or temporarily decommissioned areas. These areas were then field scouted by Baffinland and EDI personnel (accounting for future development plans, logistics and safety) to finalize the sites included in the revegetation survey.

After confirming site selection and delineating disturbed vs. control areas, site layout and boundary markers were established at each study site to facilitate the survey of cover transects (100 or 150 m long), vegetation plots (1x1 m vegetation quadrats), and soil plots (30x30x30 cm soil survey pits) — described in Section 2.2. As shown (Figure 1a), the site layout was comprised of three (3) paired vegetation and soil survey plots distributed at the start, middle and end of the vegetation cover transect. Applying the same experimental design, control areas (i.e., deemed representative of pre-development [undisturbed] site conditions) were sited on adjacent land approximately 30 m from the Project footprint.

2019 SURVEY — KM52 AND KM16

During the 2019 field/survey period, EDI established two study sites along the Tote Road at KM52 and KM16 (Map 1). Since 2013, the Tote Road has been subject to ongoing re-alignment and maintenance activities, including surface earthworks and regrading. Study site KM52 was selected because it represented approximately 1-year post-disturbance and KM16 represented approximately 5-years post-disturbance (i.e., referring to disturbance associated with the road works; timeframe relative to the time of field survey). The site disturbance history at each location was discussed onsite with Road Maintenance personnel.

2021 SURVEY — KM18 AND KM58 (ABANDONED AIRSTRIP)

During the 2021 field/survey period, EDI established one site along the Tote Road at KM18 (adjacent to a construction borrow pit). Another site was established within an abandoned airstrip near KM58, approximately 500 m outside the Project footprint (Map 2). Survey site KM18 was selected because it was disturbed during construction of the nearby borrow pit and during ongoing road maintenance activities (disturbance timeline is not known), and because it reflected a different ecotype than previous field surveys. Survey sites at the KM58 Abandoned Airstrip (i.e., comprising three survey areas, due to the size of the disturbance footprint; Figure 1b) were selected as they represented >60-years post-disturbance and a unique location to investigate natural revegetation after disturbance (i.e., no seeding or planting and no reclamation earthworks and/or surficial preparations). Confirmation of the disturbance histories for the 2021 survey sites is ongoing.

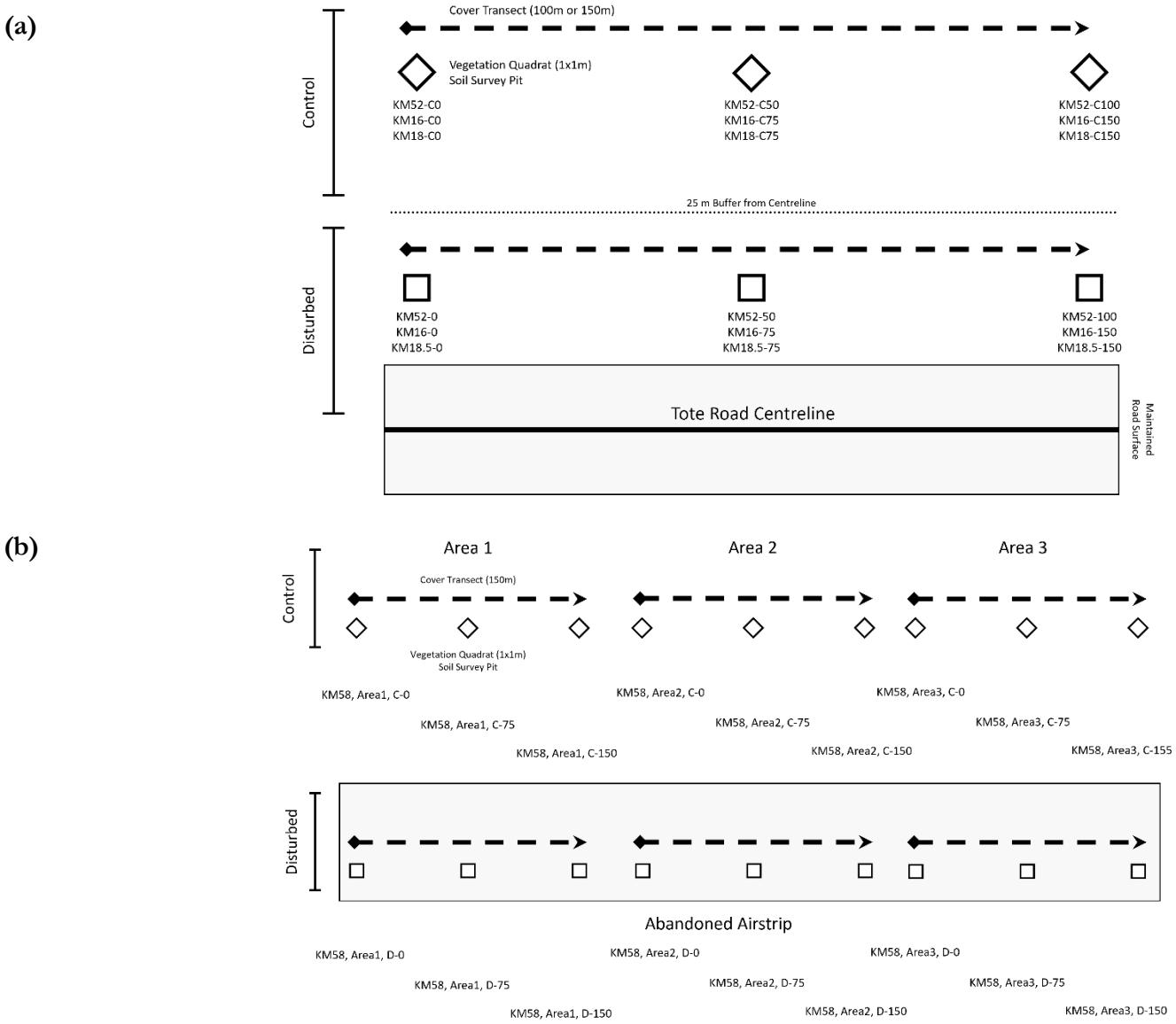

Figure 1. SCHEMA — Survey layout and sampling design (a) at KM52, KM18 and KM16, (b) near KM58.

2019 SURVEY
KM52 and KM16 Survey Locations

Baffinland

Milne Port

KM 16 Survey Location

KM 52 Survey Location

Mary River Mine Site

495000 502500 510000 517500 525000 532500 540000 547500 555000 562500 570000

7975000 7967500 7960000 7952500 7945000 7937500 7930000 7922500 7915000

Legend

- KM 16
- KM 52
- Tote Road
- Port
- Mine

0 5 10 15 20
Kilometers

N

Map Scale = 1:270,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

Disclaimer

EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

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Y. Navarro	P. Audet	Map 1	Date: 2019-08-28

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2021 SURVEY
KM18 and KM58 Survey Locations

Baffinland Iron Mines Corporation

Milne Port

KM 18 Survey Location

KM 58 Survey Location

Mary River Mine Site

495000 502500 510000 517500 525000 532500 540000 547500 555000 562500 570000

7975000 7967500 7960000 7952500 7945000 7937500 7930000 7922500 7915000

Legend

- KM 18
- Km 58
- Tote Road
- Port
- Mine

0 5 10 15 20
Kilometers

N

Map Scale = 1:270,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

• Main map. World Street Map. Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
• Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

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Y. Navarro	P. Audet		2021-10-08

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2.2 METHODS AND ANALYSES

Landscape, Terrain and Soil — Survey procedures for characterizing landscape, terrain and soil were based on methods described in the Field Manual for Describing Terrestrial Ecosystems — Land Management Handbook No. 25 (B.C. Ministry of Forests and Range and B.C. Ministry of Environment 2010) and The Canadian System of Soil Classification, 3rd Edition (Soil Classification Working Group 1998). Landscape features and terrain (e.g., slope grade, aspect, geomorphological process) were assessed at the transect scale. Soils were assessed at the plot scale. At each soil survey plot (Photo 1

Photo 1a), a shovel and hand trowel were used to expose a 30x30 cm area and dig up to a depth of 30 cm (being mindful not to disturb permafrost occurring below this depth) to access the subsoil layers (B or C horizons). Documented soil profile information included parent material, horizon depths, texture, colour, and structure. Soil samples were collected from the top 10–30 cm from each soil pit to analyze textural and nutritional attributes by ALS Environmental Laboratories.

Vegetation Surface Cover and Composition — Survey procedures for characterizing vegetation surface cover and composition were based on methods used in Baffinland's existing vegetation monitoring program, and described in the Canadian Tundra and Taiga Experiment (CANTTEX) — Field Manual (Bean and Henry 2003, Bean et al. 2003). Vegetation species lists within and directly adjacent to the survey plots were recorded using various taxonomic reference guides (Bean and Henry 2003, Aiken et al. 2011, Mallory and Aiken 2012); bryophytes and lichen taxons were not characterized at the species level and only recorded in terms of presence or absence. Vegetation cover and structural composition were assessed at the transect and plot scale. The surface projective cover[1] was calculated based on measurements at 1 m intervals along the 100 m or 150 m transect (Photo 1b). Surface projective cover within the 1x1 m vegetation quadrats was recorded at two basal strata (i.e., due to overlapping structural cover components) and calculated based on 100–200 measurements within the point-frame grid (Photo 1c).

Data Collection and Analysis — Field data summaries are summarized as means or data ranges. Some survey sites had sparse cover vegetation; therefore, field data were commonly consolidated into coarse structural groupings. No statistical analyses were applied due to small sample sizes. An example field data collection sheet is in Appendix A.

[1] Referring to the % presence or absence of exposed rock and bare soil, bryophytes, lichen, graminoids, forbs and shrubs.

Photo 1. SURVEY METHODS — Soil survey pit (a), cover transect (b), and vegetation quadrat (c).

2.3 2019 SURVEY | RESULTS

KM52 — 1-YEAR POST-DISTURBANCE

Map 3 shows the sampling layout at KM52. Table 1 summarizes landscape, terrain and soil attributes. Table 2 lists observed vegetation species within and directly adjacent to the survey plots. Table 3 summarizes the mean surface projective cover within vegetation quadrats. Figure 2 shows the total projective cover along the survey transect. Supporting information (e.g., georeferencing and lab analysis) is provided in Appendix B1.

Landscape, Terrain and Soil — Located near Katitkok Lake, the survey transects occur within a glaciofluvial and periglacial landform characterized by an undulating surface expression with nearly level to very gentle slopes with intermittent soils and frost-weathered bedrock (Photo 2a–b). Native (control) soils appeared to be Regosolic Turbic Cryosols as defined by an Om and Cy/Cgy/Cz sequence[2]. Control soil profiles (KM52-C0, -C50, -C100) were characterized by a discontinuous surface organic layer (Om, 0–2 cm in depth) and a sandy loam textured C horizon. If/where soils were present, the high incorporation of coarse parent materials (i.e., till and frost-weathered bedrock at the surface) resulted in a restrictive layer at 25–30cm in depth. The soil moisture regime was xeric (dry); no mottling or gleying[3] was observed within any of the soil profiles. Disturbed soil profiles (KM52-0, -50, -100) had no surface organic layer, a similarly textured sandy loam C horizon with a high incorporation of coarse parent materials, but no discernible subsoil structure due to the site's disturbance history.

Laboratory analysis determined that both control and disturbed sites had poor fertility [as indicated by low available nutrients, low electrical conductivity (EC) and adsorption potential] and little incorporated organic matter for both control and disturbed soils.

Vegetation Surface Cover and Composition — Given the landform attributes and soil conditions described above, vegetation cover in control areas was sparse (29% along the transect; 66% within quadrats) and composed of graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 3a–c). Whereas disturbed areas exhibited scarce cover vegetation (4% along the transect; <2% within quadrats), primarily composed of small/juvenile graminoids and forbs (Photo 3d–f) if/where present.

Short-leaved sedge (*Carex fuliginosa* subsp. *misandra*), mountain avens (*Dryas integrifolia*), purple saxifrage (*Saxifraga oppositifolia*), yellow saxifrage (*S. aizoides*), arctic bladderpod (*Physaria arctica*) and net-veined willow (*Salix reticulata*) were commonly observed within the study site — primarily in control areas. No exotic or non-native species were recorded. The presence and abundance of these species were generally consistent with known habitat descriptors for dry, rocky areas on plains and slopes that are characterized by imperfectly drained substrates composed of rocks, gravel, sand, silt, clay or till (Aiken et al. 2011).

[2] Om = Organic-mesic; Cy = C horizon with cryoturbation; Cgy = Cy with gleying; Cz = C horizon that is frozen due to permafrost.

[3] Referring to secondary soil colors in the soil profile not associated with compositional properties.

KM52
Vegetation and Soil Sampling Sites

Baffinland

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Survey Marker
- Cover Transect

0 25 50 75 100
Meters

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

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Y. Navarro	P. Audet	Map 3	Date: 2019-08-28

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Photo 2. KM52 — Landscape overview southeast (a) and northwest (b).

Photo 3. KM52 — Cover vegetation at KM52-C0, -C50 and -C100 (a-c) and KM52-0, -50 and -100 (d-f).

Table 1. KM52 — Summary of landscape, terrain and soil attributes.

Survey Area	KM52 — Disturbed	KM52 — Control
Survey Marker ID	**KM52-0, -50, -100**	**KM52-C0, -C50, -C100**
Landscape Attributes		
Geomorphological Process	Glaciofluvial and Cryoturbation	
Parent Material	Glacial Till and Bedrock	
Surface Expression	Undulating	
Slope Class Description	Nearly Level (Class 2: 0.5–2%) to Very Gentle Slopes (Class 3: 2–5%)	
Aspect	South	
Drainage	Well Drained	
Soil Moisture Regime	Xeric (Dry)	
Soil Attributes		
* Organic Matter Content	1.3% (±1.0 SD)	1.8% (±3.9 SD)
* pH	8.7 (±0.2 SD)	7.7 (±0.4 SD)
* Texture/Particle Size	Sandy Loam	Sandy Loam
Surface Organic Depth	<*None*>	<*Discontinuous*>
Rooting Depth	<1 cm	8–15 cm
Restrictive Layer	20-25 cm (Till)	23–29 cm (Till)
Nutritional Profile		
* Available Nitrate -N	1.8 ppm (±0.6 SD)	1.5 ppm (±0.9 SD)
* Available Phosphate-P	<*Below Detection Limit*>	<*Below Detection Limit*>
* Available Potassium-K	33.3 ppm (±3.5 SD)	24.7 ppm (±0.6 SD)
* Available Sulfate-S	<*Below Detection Limit*>	<*Below Detection Limit*>
* Electrical Conductivity	0.5 dS/m (±0.2 SD)	0.6 dS/m (±0.4 SD)
* Sodium Adsorption Ratio	0.4 (±0.1 SD)	0.3 (±0.0 SD)
* Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
*Mean values; Based on laboratory analyses of soil samples

Table 2. KM52 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex fuliginosa* subsp. *misandra***	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	***Dryas integrifolia***	**Mountain Avens**	✓	✓	
	Pedicularis lanata	Woolly Lousewort			✓
	Erysimum pallasii	Arctic Wallflower		✓	
	Saxifraga oppositifolia	**Purple Saxifrage**	✓		
	Saxifraga aizoides	**Yellow Saxifrage**	✓		
	Physaria arctica	**Arctic Bladderpod**	✓	✓	
Shrub/Ericaceae	***Salix reticulata***	**Net-Veined Willow**	✓		
Exotic Weeds	—	—	<*None Recorded*>		

*Recorded adjacent to study area // <**Bold**> Refers to high/predominant abundance.

Table 3. KM52 — Mean surface projective cover (%) within vegetation quadrats.

Survey Site (Survey Marker ID)	KM52 — Disturbed (KM52-0, -50, -100)	KM52 — Control (KM52-C0, -C50, -C100)
*Bare Soil/Rock	98.7% (±0.6 SD)	66.0% (±4.2 SD)
*Bryophytes/Lichen	<*None*>	16.3% (±2.2 SD)
*Litter	<*None*>	<*None*>
*Graminoids	<*None*>	6.2% (±0.4 SD)
*Forbs	1.3% (±0.6 SD)	9.6% (±3.7 SD)
*Shrubs/Ericaceae	<*None*>	1.9% (±3.3 SD)

*Means values // SD: Standard Deviation

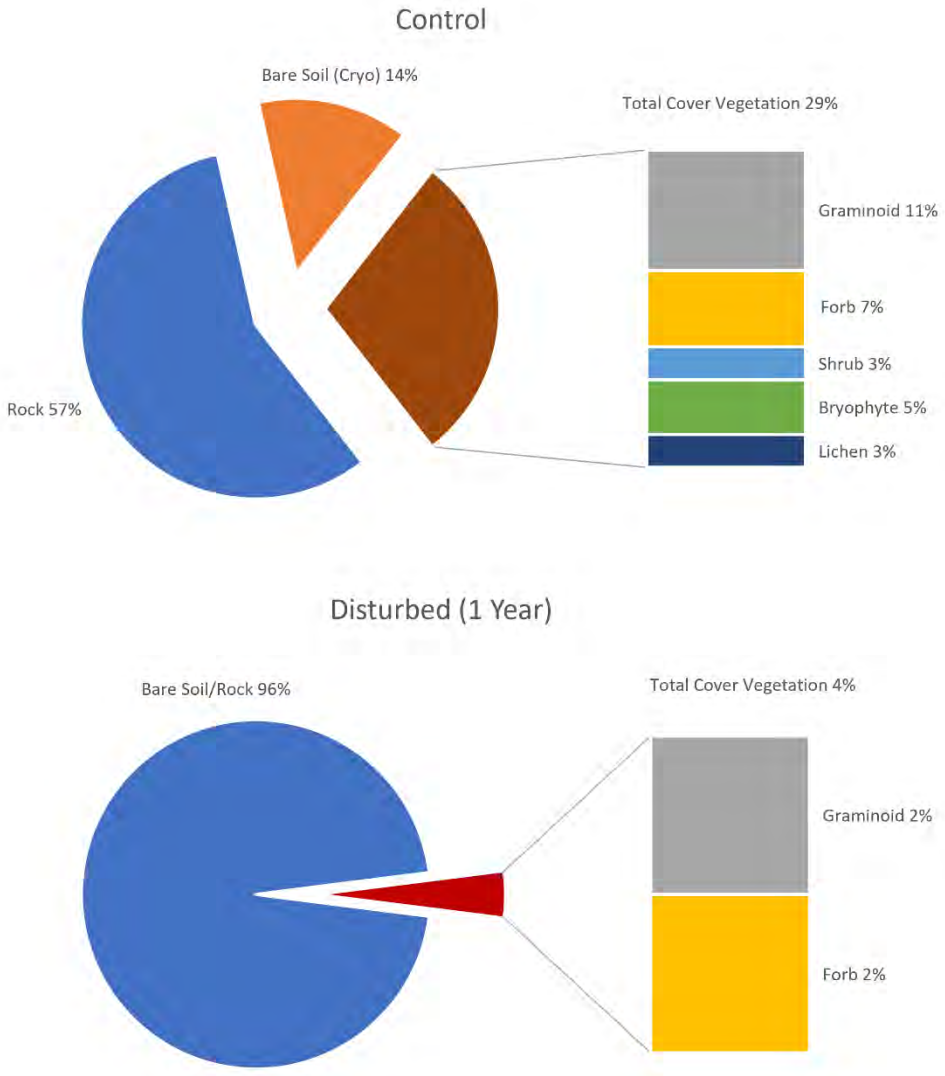

Figure 2. KM52 — Surface projective cover (%) along vegetation transect.

KM16 — 5-YEARS POST-DISTURBANCE

Map 4 shows the sampling layout at KM16. Table 4 summarizes landscape, terrain and soil attributes. Table 5 lists observed vegetation species within and adjacent to the study area. Table 6 summarizes mean surface projective cover within the vegetation quadrats. Figure 3 shows total projective cover along the survey transect. Supporting information (e.g., georeferencing and lab analysis) is provided in Appendix B2.

Landscape, Terrain and Soil — Located near Phillips Creek, the survey transects occur on an upland plateau with near-level slopes (Photo 4 a–b). The landscape is characterized by low-centred polygons (i.e., patterned ground caused by permafrost), resulting in an abundance of small hummocks and shallow depressions. Native (control) soils appeared to be Brunisolic Turbic Cryosols as defined by an Om and Bm/Bmy sequence[4]. Control soil profiles (KM16-C0, -C75, -C150) were characterized by a thin surface organic layer (Om, 4–6 cm in depth) followed by a sandy loam textured B horizon. The moderate incorporation of coarse parent materials (i.e., till) resulted in a restrictive layer at ~25 cm deep. The soil moisture regime was subxeric (dry); faint mottling[5] was observed in the soil profile. Disturbed soil profiles (KM16-0, -75, -150) were characterized by a discontinuous surface organic layer (Om, up to 2 cm deep, where present), a similar sandy loam B horizon with the incorporation of coarse parent materials and some discernible horizons or structure, but no mottling or gleying. Subsoils were intact, suggesting that the area had only been superficially disturbed.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little incorporated organic matter.

Vegetation Surface Cover and Composition — Vegetation cover in control areas was abundant (83% along the transect; 92% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 5a–c). Disturbed areas were characterized by discontinuous but still moderately abundant cover vegetation (51% along the transect; 40 within quadrats) primarily composed of graminoids and forbs/perennial herbs and few bryophytes or lichen species (Photo 5d–f).

Short-leaved sedge, membranous sedge (*C. membranacea*), mountain avens, dwarf fireweed (*Chamerion latifolium*), yellow oxytropis (*Oxytropis maydelliana* subsp. *melanocephala*), Arctic blueberry (*Vaccinium uliginosum* subsp. *microphyllum*), net-veined willow, and white mountain heather (*Cassiope tetragona*) were commonly observed both in control and disturbed areas. No exotic or non-native species were recorded. The presence and abundance of these species was generally consistent with known habitat descriptors for tundra heath that is characterized by imperfectly drained to moderately well-drained dry-to-moist substrates characterized by rocks, gravel, sand, silt and clay (Aiken et al. 2011).

[4] Om = Organic-mesic; Bm = B horizon affected by chemical alteration and/or weathering; Bmy = Bm with cryoturbation.

[5] This characteristic results from oxidizing and reducing conditions associated with a fluctuating water table and/or presence of an impermeable subsoil layer.

KM16
Vegetation and Soil Sampling Sites

Baffinland

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Survey Marker
- Cover transect

0 25 50 75 100
Meters

N

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

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Y. Navarro	P. Audet	Map 4	Date: 2019-08-28

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Photo 4. KM16 — Landscape overview southwest (a) and northeast (b).

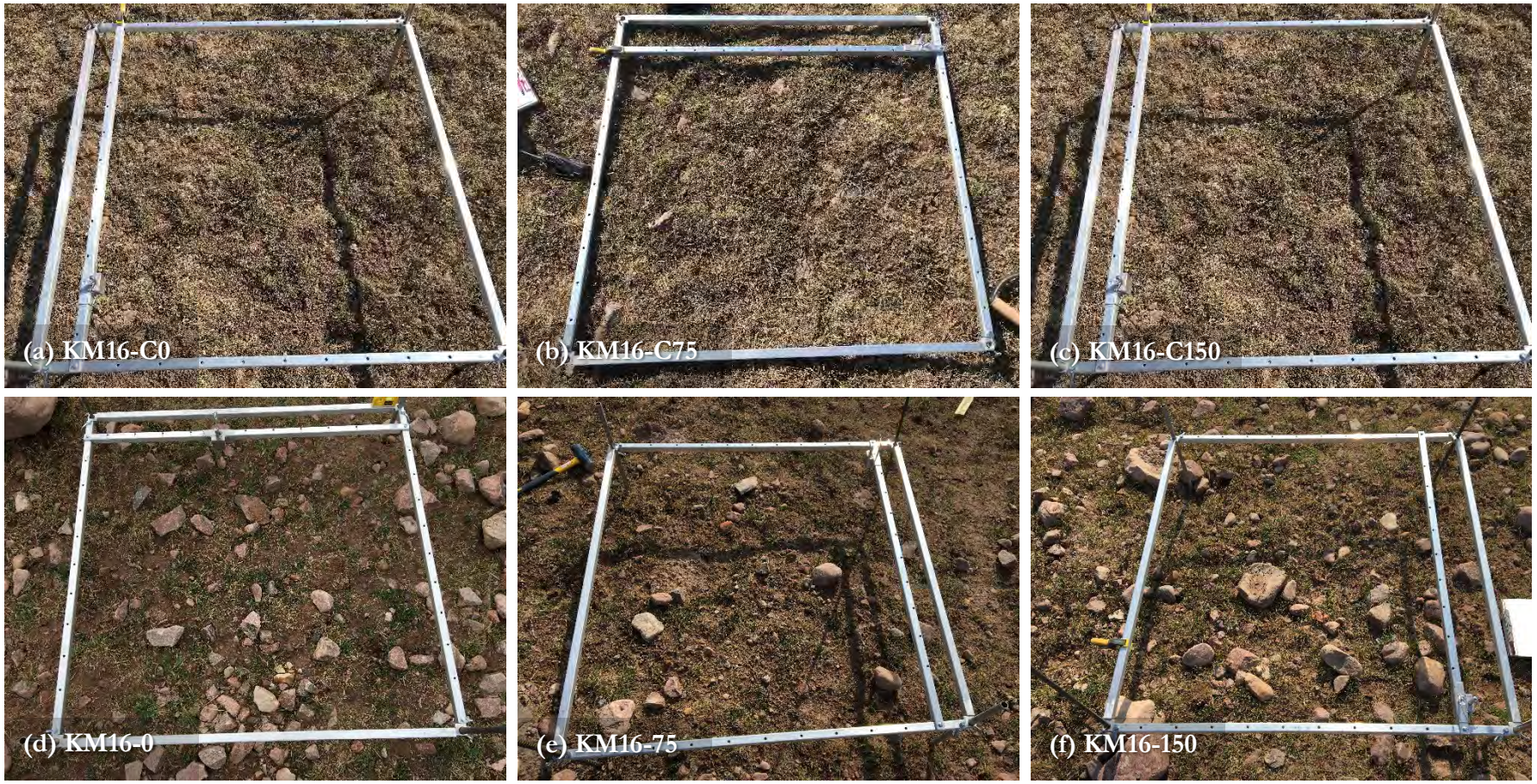


Photo 5. KM16 — Cover vegetation at KM16-C0, -C75 and -C150 (a-c) and KM16-0, -75 and -150 (d-f).

Table 4. KM16 — Summary of landscape, terrain and soil attributes.

Survey Area		KM16 — Disturbed	KM16 — Control
Survey Marker ID		**KM16-0, -75, -100**	**KM16-C0, -C75, -C100**
Landscape Attributes			
	Geomorphological Process	Glaciation and Cryoturbation	
	Parent Material	Morainal	
	Surface Expression	Level	
	Slope Class Description	Nearly Level (Class 2: 0.5–2%)	
	Aspect	West-Southwest	
	Drainage	Moderately Well Drained	
	Soil Moisture Regime	Subxeric (Dry)	
Soil Attributes			
*	Organic Matter Content	3.9% (±1.8 SD)	6.1% (±3.8 SD)
*	pH	7.2 (±0.4 SD)	7.4 (±0.5 SD)
*	Texture/Particle Size	Sandy Loam	Sandy Loam
	Surface Organic Depth	<*Discontinuous*>	Om/Oh = 4-6 cm
	Rooting Depth	13–17 cm	12-14 cm
	Restrictive Layer	15–23 cm (Till)	26 cm (Till)
Nutritional Profile			
*	Available Nitrate -N	1.4 ppm (±0.4 SD)	1.3 ppm (±0.6 SD)
*	Available Phosphate-P	<*Below Detection Limit*>	<*Below Detection Limit*>
*	Available Potassium-K	25.0 ppm (±2.6 SD)	29.3 ppm (±9.7 SD)
*	Available Sulfate-S	<*Below Detection Limit*>	<*Below Detection Limit*>
*	Electrical Conductivity	1.1 dS/m (±0.4 SD)	0.4 dS/m (±0.2 SD)
*	Sodium Adsorption Ratio	0.2 (±0.0 SD)	0.2 (±0.0 SD)
*	Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
Om: Organic-mesic; Oh: Organic-humic.
*Mean values; Based on laboratory analyses of soil samples

Table 5. KM16 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex membranacea***	**Membranous Sedge**	✓	✓	
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	*Bistorta vivipara*	Alpine Bistort		✓	
	Dryas integrifolia	**Mountain Avens**	✓	✓	
	Pedicularis lanata	Woolly Lousewort			✓
	Chamerion latifolium	**Dwarf Fireweed**			✓
	Oxytropis maydelliana* subsp. *melanocephala	**Yellow Oxytropis**	✓	✓	
	Saxifraga oppositifolia	Purple Saxifrage	✓	✓	
	Saxifraga aizoides	Yellow Saxifrage	✓	✓	
	Potentilla hyparctica	Arctic Cinquefoil		✓	
Shrub/ Ericaceae	***Vaccinium uliginosum* subsp. *microphyllum***	**Arctic Blueberry**	✓	✓	
	Salix reticulata	**Net-Veined Willow**	✓		
	Cassiope tetragona	**White Mountain Heather**	✓		
Exotic Weeds	—	—	*<None Recorded>*		

*Recorded adjacent to study areas // **Bold**> Refers to high/predominant abundance.

Table 6. KM16 — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM16 — Disturbed (KM16-0, -75, -100)	KM16 — Control (KM16-C0, -C75, -C100)
*Bare Soil/Rock	60.3% (±5.0 SD)	8.1% (±4.7 SD)
*Bryophytes/Lichen	2.3% (±3.2 SD)	54.1% (±7.7 SD)
*Litter	3.3% (±1.5 SD)	2.7% (±3.0 SD)
*Graminoids	20.0% (±5.3 SD)	12.9% (±8.9 SD)
*Forbs	10.0% (±1.7 SD)	14.0% (±7.9 SD)
*Shrubs/Ericaceae	4.0% (±2.0 SD)	8.3% (±10.5 SD)

*Mean values; SD: Standard Deviation

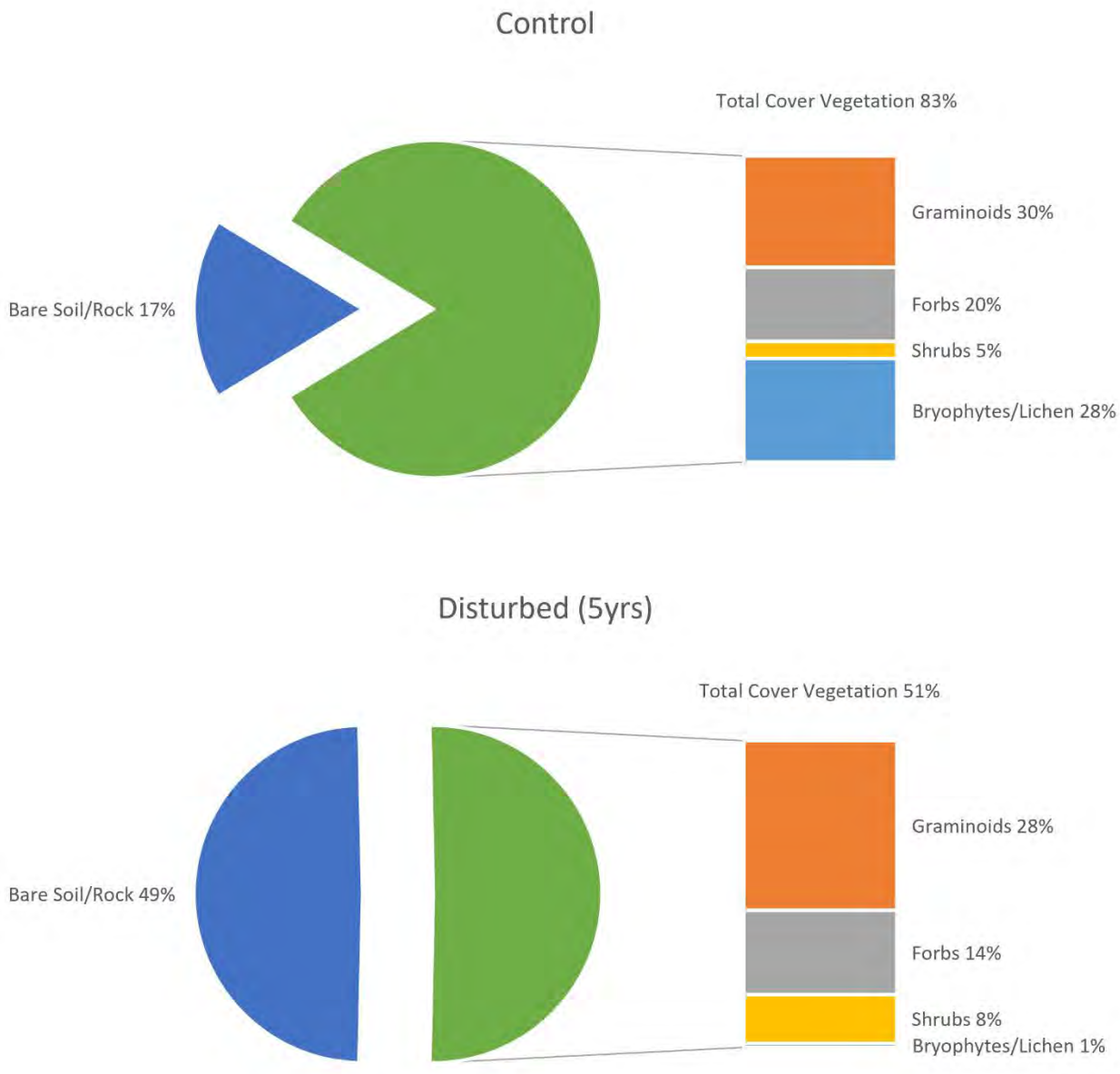


Figure 3. KM16 — Surface projective cover (%) along vegetation transect.

2.4 2021 SURVEY | RESULTS

KM18 — DISTURBANCE TIMELINE NOT KNOWN

Map 5 shows the sampling layout at KM18. Table 7 summarizes landscape, terrain and soil attributes. Table 8 lists observed vegetation species within and adjacent to the study area. Table 9 summarizes mean surface projective cover within the vegetation quadrats. Figure 4 shows total projective cover along the survey transect. Supporting information (e.g., georeferencing and lab analysis) is provided in Appendix B3.

Landscape, Terrain and Soil — Located along Phillips Creek, the survey transects occur on a sandy terrace with level slopes that are characterized by generally loose, well-drained and unconsolidated surficial geology, and no apparent bedrock (Photo 5a–b). Although terrain within the study area was homogenous and had little micro-topographical variations, the broader landscape indicated ground patterning associated with permafrost. Therefore, native (control) soils likely refer to Brunisolic Turbic Cryosols. Soil profiles at the control (KM18-C0, -C75, -C150) and disturbed locations (KM18-D0, -D75, -D150) were similarly characterized by a discontinuous surface organic layer followed by a sand textured B horizon. Little-to-no coarse parent materials (i.e., till) were observed. The restrictive layer (assumed to be permafrost) was not encountered. The soil moisture regime was xeric (dry); no mottling was observed in the soil profile.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little-to-no incorporated organic matter.

Vegetation Surface Cover and Composition — Vegetation cover in control areas was characterized by a discontinuous vegetative matte (40% along the transect; 90% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, and bryophytes (Photo 6a–b), but no lichen. Disturbed areas were also characterized by a discontinuous and uneven (i.e., patchy) vegetative cover (43% along the transect; 2% within quadrats) that was primarily composed of graminoids and forbs/perennial herbs (Photo 6c–d), but no shrubs, bryophytes or lichen.

Short-leaved sedge, mountain avens, yellow oxytropis, alpine (arctic) willow (*S. arctica*), alpine fescue (*Fescue brachyphylla*), and white arctic Whitlow-grass (*Drabas* sp) were commonly observed within survey plots both in control and disturbed areas. No exotic and/or non-native species were recorded.

KM18
Vegetation and Soil Sampling Sites

Baffinland
Iron Mines Corporation

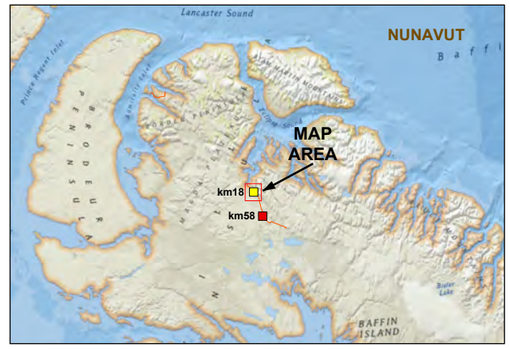
514125 514200 514275 514350 514425 514500

7965325 7965250 7965175 7965100 7965025

KM18-C100
KM18-C50
KM18-D100
KM18-C0
KM18-D50
KM18-D0

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Cover Transect



0 25 50 75 100 N
Meters

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

• Main map. Baffinland Iron Mines Corporation Imagery. 2020
• Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Disclaimer
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Drawn: Y. Navarro	Checked: P. Audet	**Map 5**	Date: 2021-10-08

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Photo 6. KM18 — Landscape overview at -C50 (a) and -D0 (b).

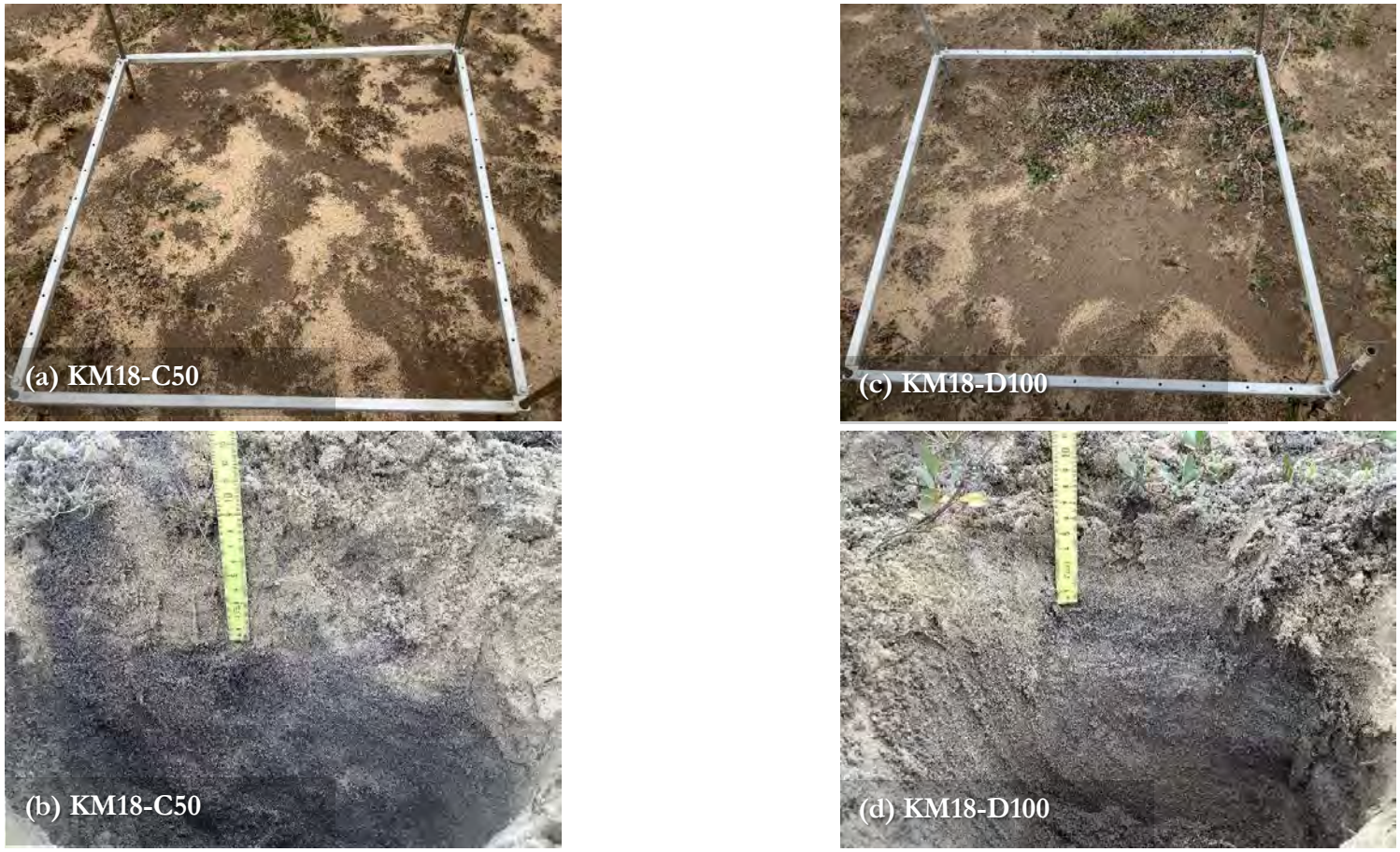


Photo 7. KM18 — Cover vegetation and soil profile at -C50 (a-b) and -D100 (c-d)

Table 7. KM18 — Summary of landscape, terrain and soil attributes.

Survey Area		KM18 — Disturbed	KM18 — Control
Survey Marker ID		**KM18-0, -75, -100**	**KM18-C0, -C75, -C100**
Landscape Attributes			
	Geomorphological Process	Glaciation and Cryoturbation	
	Parent Material	Morainal	
	Surface Expression	Level	
	Slope Class Description	Level (Class 1: 0-0.5%)	
	Aspect	No Predominant Aspect	
	Drainage	Moderately Well Drained	
	Soil Moisture Regime	Xeric (Dry)	
Soil Attributes			
*	Organic Matter Content	<1.0%	<1.0-1.7%
*	pH	7.0 (±0.1 SD)	6.7 (±0.3 SD)
*	Texture/Particle Size	Sand	Sand
	Surface Organic Depth	*<Discontinuous>*	*<Discontinuous>*
	Rooting Depth	10 cm	10 cm
	Restrictive Layer	*<None Detected — Assumed Permafrost>*	*<None Detected — Assumed Permafrost>*
Nutritional Profile			
*	Available Nitrate -N	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Phosphate-P	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Potassium-K	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Sulfate-S	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Electrical Conductivity	2.2 dS/m (±0.07 SD)	2.2 dS/m (±0.07 SD)
*	Sodium Adsorption Ratio	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
*Mean values; Based on laboratory analyses of soil samples

Table 8. KM18 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Festuca brachyphylla***	**Alpine Fescue**	✓	✓	
	Trisetum spicatum	Spike Trisetum	✓		
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	*Papaver radicatum*	Arctic Poppy	✓		
	Dryas integrifolia	**Mountain Avens**	✓	✓	
	Drabas sp.	**White Arctic Whitlow-Grass**	✓	✓	
	Chamerion latifolium	Dwarf Fireweed		✓	
	Oxytropis maydelliana* subsp. *melanocephala	**Yellow Oxytropis**	✓	✓	
	Saxifraga oppositifolia	Purple Saxifrage		✓	
	Chamerion latifolium	Dwarf Fireweed		✓	
	Physaria arctica	Arctic Bladderpod		✓	
Shrub/ Ericaceae	***Salix arctica***	**Alpine (Arctic) Willow**	✓	✓	
	Salix reticulata	Net-Veined Willow	✓		
Exotic Weeds	—	—	*<None Recorded>*		

*Only recorded adjacent/outside of the study areas // **Bold**> Refers to high/predominant abundance.

Table 9. KM18 — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM18 — Disturbed (-0, -75, -150)	KM18 — Control (-C0, -C75, -C150)
*Bare Soil	98.7% (±1.5 SD)	10.7% (±7.2 SD)
*Bryophytes	*<None>*	18.7% (±12.7 SD)
*Lichen	*<None>*	*<None>*
*Litter	*<None>*	0.3% (±0.6 SD)
*Graminoids	0.3% (±0.6 SD)	13.0% (±2.6 SD)
*Forbs	1.0% (±1.0 SD)	37.7% (±1.5 SD)
*Shrubs/Ericaceae	*<None>*	15.0% (±3.5 SD)

*Mean values; SD: Standard Deviation.

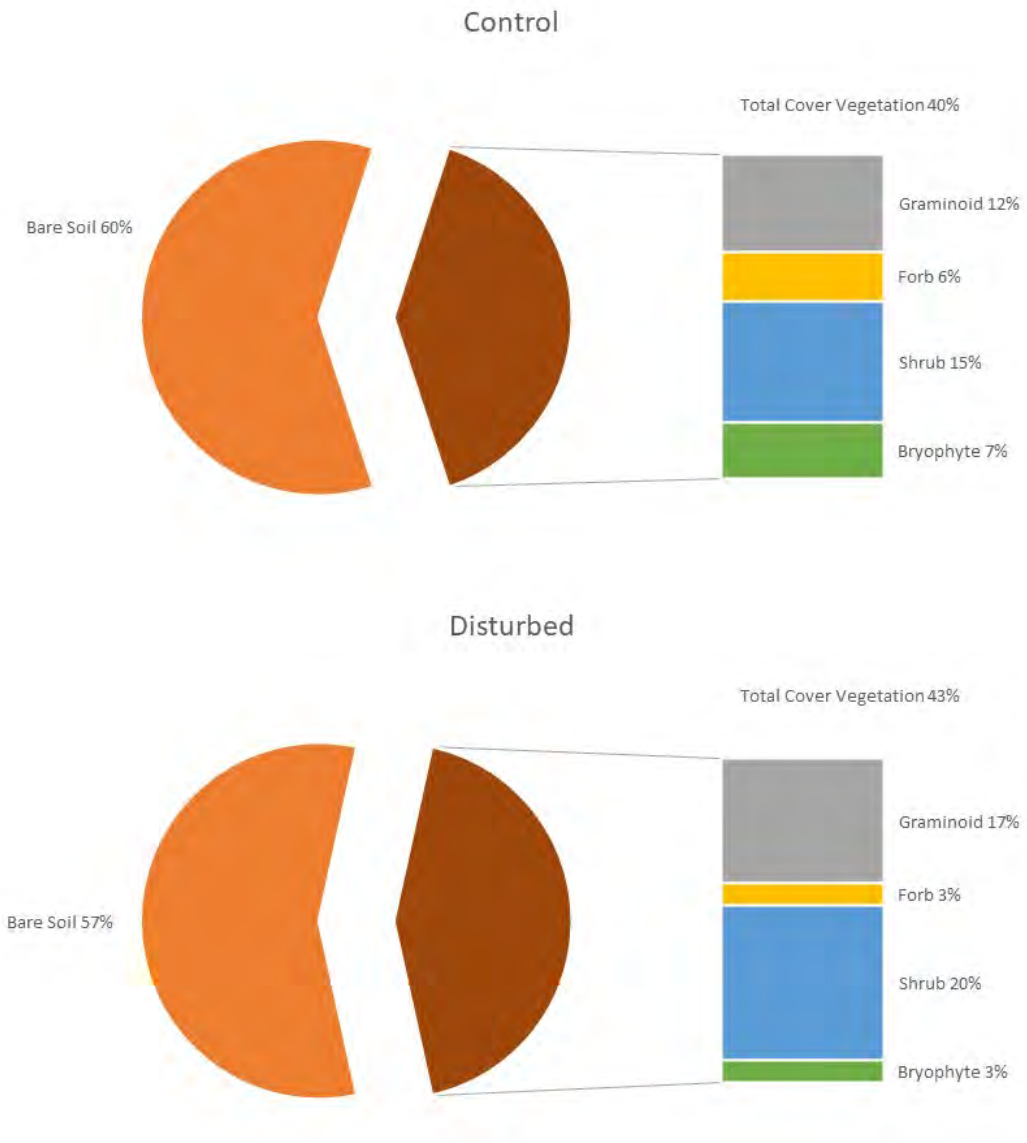


Figure 4. KM18 — Surface projective cover (%) along vegetation transect.

KM58 (ABANDONED AIRSTRIP) — >60-YEARS POST-DISTURBANCE

Map 6 shows the sampling layout at the KM58 Airstrip. Table 10 summarizes landscape, terrain and soil attributes. Table 11 lists observed vegetation species within and adjacent to the study area. Table 12 summarizes mean surface projective cover within the vegetation quadrats. Figure 5 shows the total projective cover along the survey transect. Supporting information (e.g., georeferencing and lab analysis) is provided in Appendix B4.

Landscape, Terrain and Soil — Located south of Katitkok Lake, the survey transects occur on an upland plateau with near-level slopes (Photo 8a–b). Similar to the study site at KM16, the landscape is characterized by low-centred polygons resulting in an abundance of small hummocks and shallow depressions. Native (control) soils were deemed to be Brunisolic Turbic Cryosols as defined by an Om and Bm/Bmy sequence. Soil profiles (KM58-C0, -C75, -C150, Areas 1-3) were characterized by a thin surface organic layer (Om, 1–3 cm in depth) followed by a sand or sandy loam textured Ah or Bm horizon. Disturbed areas (KM58-D0, -D75, -D150, Areas 1-3) were otherwise characterized by a discontinuous surface organic layer followed by a sand or sandy loam textured Ae or Bm horizon; the disturbance footprint was clearly delineated by surface soil compaction. Little-to-no coarse parent materials (i.e., till) were observed and the restrictive layer (assumed to be permafrost) was not encountered. The soil moisture regime was xeric (dry); no mottling was observed in the soil profile.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little incorporated organic matter.

Vegetation Surface Cover and Composition — Vegetation cover in control areas was abundant (90–97% along the transects; 93–99% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 9a–b). Disturbed areas were characterized by a discontinuous but still moderately abundant vegetation cover (56–69% along the transects; 61–73% within quadrats) that was primarily composed of graminoids and forbs/perennial herbs and few or no bryophytes or lichen species (Photo 9 c–d).

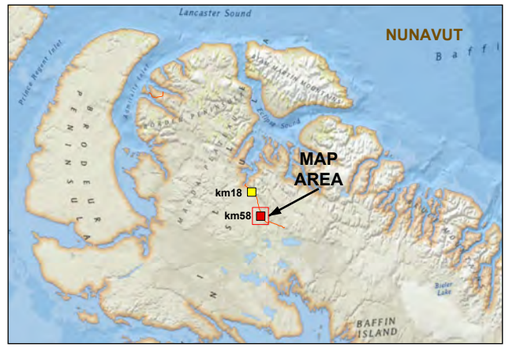
Short-leaved sedge, membranous sedge, arctic fescue, white arctic Whitlow-grass, moss campion, snowbed willow (*S. herbacea*), arctic willow (*S. arctica*) and white mountain heather were commonly observed within the control and disturbed areas. No exotic or non-native species were recorded.

KM58
Vegetation and Soil Sampling Sites

Baffinland Iron Mines Corporation

Legend

- Tote Road
- Tote Road (25m Buffer)
- Study Area
- Soil
- Vegetation
- Cover Transect



0 25 50 75 100
Meters

Map Scale = 1:4,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2020
- Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Disclaimer

EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:	Map 6	Date: 2021-10-12
Y. Navarro	P. Audet		

EDI Environmental Dynamics Inc.

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Photo 8. KM58 — Landscape overview at Area2-C150 (a) and Area2-D150 (b).

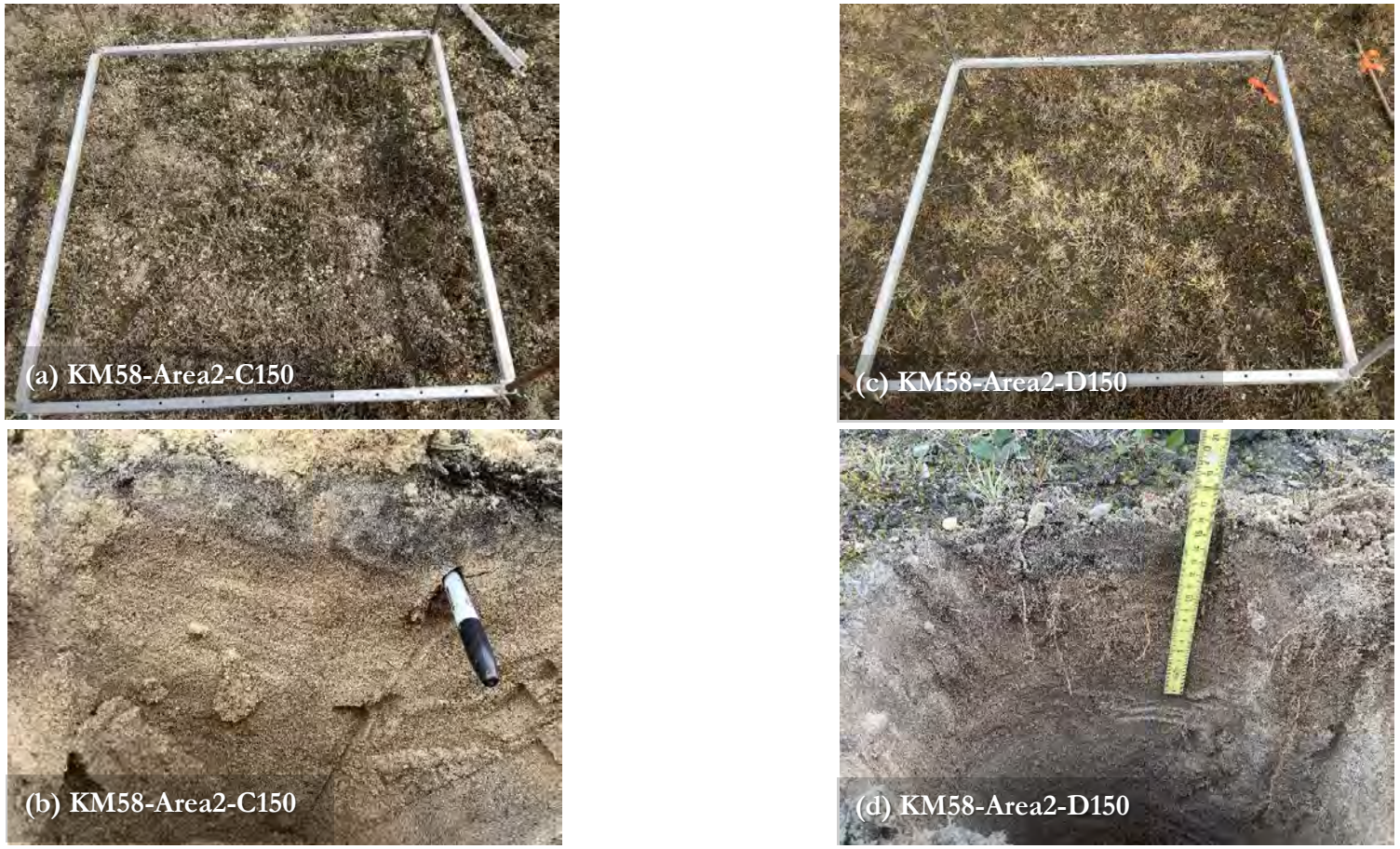


Photo 9. KM58 — Cover vegetation and soil profile at Area 2-C150 (a-b) and Area2-D150 (c-d)

Table 10. KM58 (Abandoned Airstrip) — Summary of landscape, terrain and soil attributes.

	Survey Area	KM58 — Disturbed	KM58 — Control
	Survey Marker ID	KM58, Area 1, D-0, -75, -100 KM58, Area 2, D-0, -75, -100 KM58, Area 3, D-0, -75, -100	KM58, Area 1, C-0, -75, -100 KM58, Area 2, C-0, -75, -100 KM58, Area 3, C-0, -75, -100
Landscape Attributes			
	Geomorphological Process	Glaciation and Cryoturbation	
	Parent Material	Morainal	
	Surface Expression	Level	
	Slope Class Description	Level (Class 1: 0-0.5%)	
	Aspect	No Predominant Aspect	
	Drainage	Moderately Well Drained	
	Soil Moisture Regime	Xeric (Dry)	
Soil Attributes			
*	Organic Matter Content	2.2% (±0.9 SD)	3.4% (±1.6 SD)
*	pH	4.8 (±0.5 SD)	4.9 (±0.6 SD)
*	Texture/Particle Size	Sand, Sandy Loam	Sand, Sandy Loam
	Surface Organic Depth	*<Discontinuous>*	Om/Oh = 1-3 cm
	Rooting Depth	15 cm	25-30 cm
	Restrictive Layer	*<None Detected — Assumed Permafrost>*	*<None Detected — Assumed Permafrost>*
Nutritional Profile			
*	Available Nitrate -N	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Phosphate-P	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Potassium-K	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Sulfate-S	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Electrical Conductivity	<10 dS/M	<10 dS/M
*	Sodium Adsorption Ratio	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
Om: Organic-mesic; Oh: Organic-humic.
*Mean values; Based on laboratory analyses of soil samples

Table 11. KM58 (Abandoned Airstrip) — Summary of observed vegetation.

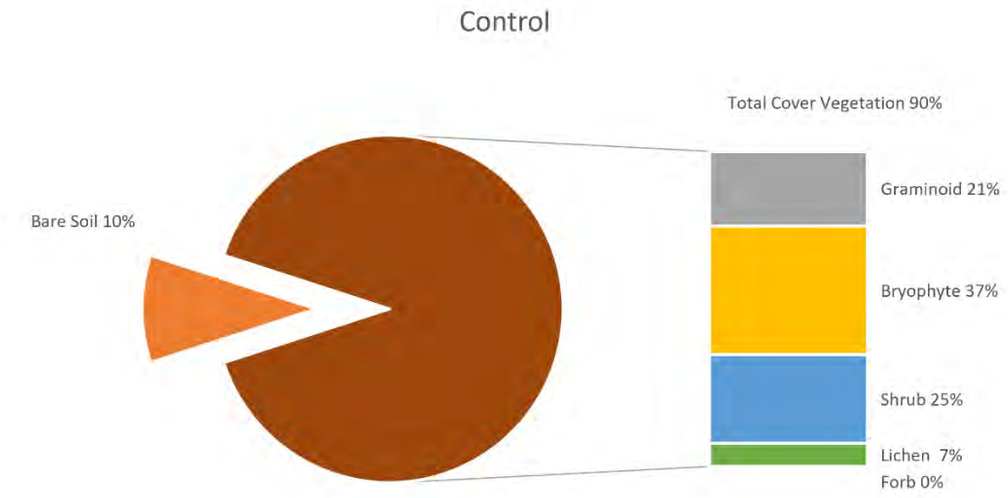
Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex membranacea***	**Membranous Sedge**	✓	✓	
	Carex aquatilis	Leafy Tussock Sedge	✓		
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
	Festuca rubra subsp. rubra	**Arctic Fescue**	✓	✓	
	Eriophorum callitrix	Arctic Cottongrass	✓		
Forb/ Perennial Herb	***Drabas sp.***	**White Arctic Whitlow-Grass**	✓	✓	
	Pedicularis lanata	**Woolly Lousewort**	✓	✓	
	Armeria sp.	Arctic Thrif	✓		✓
	Saxifraga oppositifolia	**Purple Saxifrage**	✓	✓	
	Silene acaulis	**Moss Campion**	✓	✓	
Shrub/ Ericaceae	***Salix herbacea***	**Snow-Bed Willow**	✓	✓	
	Salix arctica	**Arctic Willow**	✓	✓	
	Cassiope tetragona	**White Mountain Heather**	✓	✓	
Exotic Weeds	—	—	*<None Recorded>*		

*Recorded adjacent to study areas // **Bold**> Refers to high/predominant abundance.

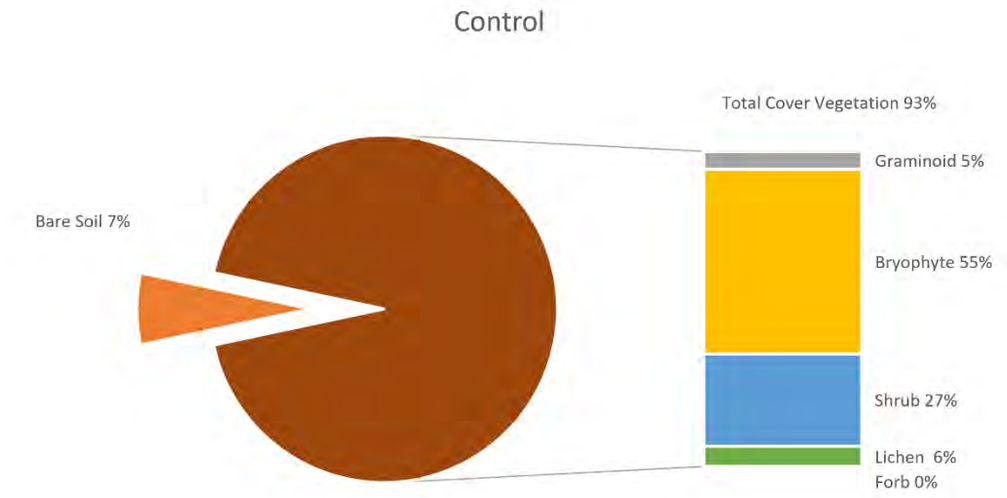
Table 12. KM58 (Abandoned Airstrip) — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM58 — Disturbed (-0, -75, -150)			KM58 — Control (-C0, -C75, -C150)		
	Area 1	Area 2	Area 3	Area 1	Area 2	Area 3
*Bare Soil/Rock	39.0% (±16.4 SD)	34.3% (±28.5 SD)	27.3% (±8.4 SD)	7.6% (±12.4 SD)	0.3% (±0.6 SD)	4.7% (±6.4 SD)
*Bryophytes	33.3% (±13.3 SD)	36.0% (±9.6 SD)	40.3% (±5.7 SD)	33.0% (±12.5 SD)	42.3% (±7.6 SD)	41.3% (±5.5 SD)
*Lichen	2.7% (±3.1 SD)	0.7% (±1.1 SD)	0.3% (±0.6 SD)	25.0% (±12.1 SD)	25.7% (±3.5 SD)	22.3% (±5.1 SD)
*Litter	0.3% (±0.6 SD)	2.7% (±2.5 SD)	0.0% (±0.0 SD)	2.6% (±4.6 SD)	0.0% (±0.0 SD)	0.0% (±0.0 SD)
*Graminoids	11.3% (±4.6 SD)	11.0% (±6.6 SD)	5.7% (±1.5 SD)	7.6% (±12.4 SD)	1.0% (±0.0 SD)	0.3% (±0.6 SD)
*Forbs	2.0% (±2.0 SD)	1.0% (±0.0 SD)	1.3% (±1.5 SD)	0.3% (±0.6 SD)	0.0% (±1.5 SD)	0.0% (±0.0 SD)
*Shrubs/Ericaceae	11.3% (±4.6 SD)	14.3% (±10.2 SD)	25.0% (±1.0 SD)	23.7% (±8.5 SD)	29.3% (±5.9 SD)	31.3% (±4.2 SD)

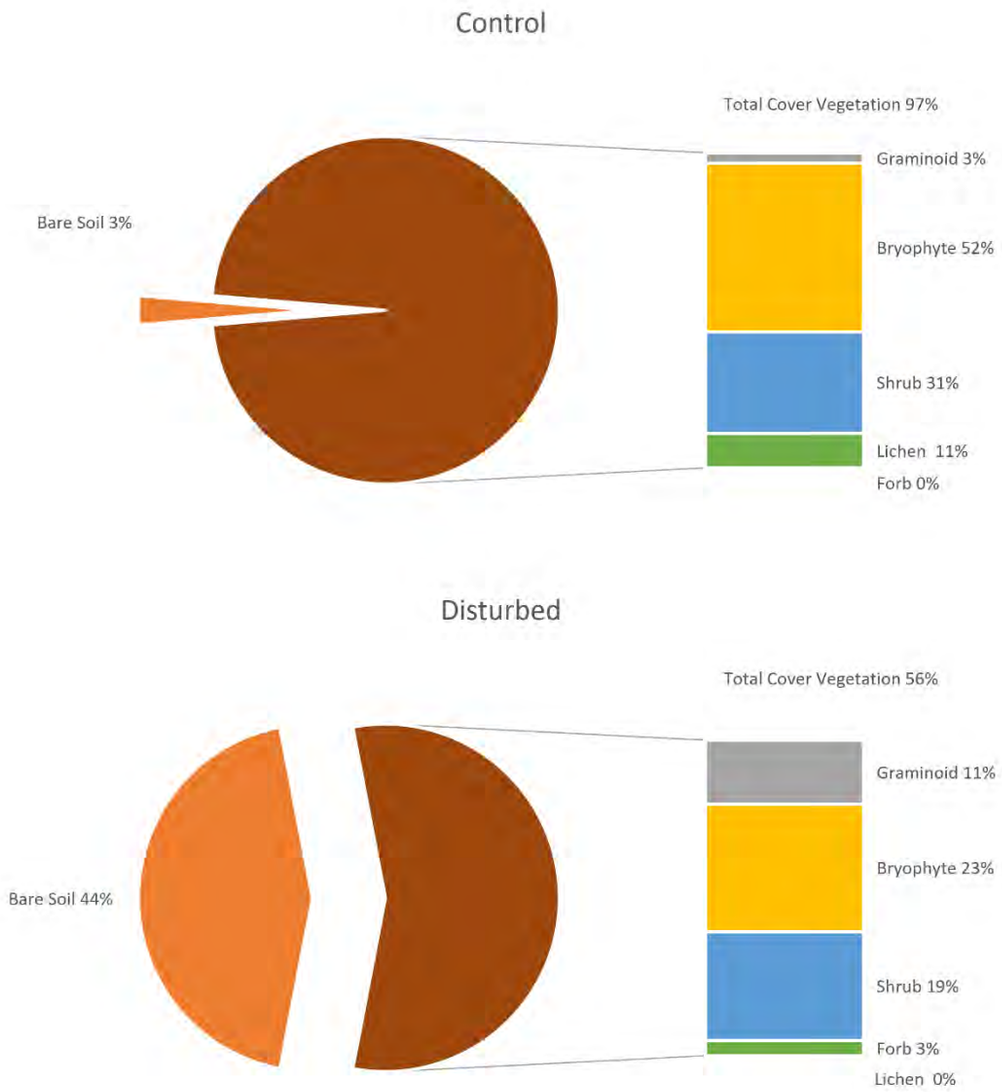
*Mean values; SD: Standard Deviation.



(a) Area 1 Transect



(b) Area 2 Transect



(c) Area 3 Transect

Figure 5. KM58 (Abandoned Airstrip) — Surface projective cover (%) along vegetation transects.

2.5 SUMMARY AND DISCUSSION

2019 SURVEY — KM52 AND KM16

The purpose of this revegetation survey was to examine and document opportunistic post-disturbance revegetation (i.e., natural vegetation encroachment) within the Project footprint. Rates of natural revegetation in the Arctic are characteristically slow in part due to the region's extreme climate and narrow growing season, but also its challenging site conditions and terrain.

At KM52 and KM16, soils and terrain were defined by xeric or subxeric conditions (respectively) and characterized by restrictive growth substrates (comprised of coarse parent materials) and poor fertility. Consistent with the premise that natural revegetation would be low, KM52 (1-year post-disturbance) exhibited a high level of soil/substrate disturbance that corresponded with low/scarce cover vegetation composed primarily of graminoids and perennial herbs and forbs (if/where present). On the other hand, KM16 exhibited less severe soil/substrate disturbance corresponding with moderately low cover vegetation comprised of graminoids and perennial herbs and forbs, and even some sparse shrubs, bryophytes and lichen.

Given the uncertainty regarding the disturbance histories at both survey locations, findings suggest that KM16 may not have been disturbed or only at a surficial level. Revegetation following disturbance appears to be commensurate to the condition and integrity of the soil and nearby vegetation and proximity to ongoing disturbance. It is expected that revegetation would require a longer timeframe where more severe changes to landscape components, i.e., implying more significant changes in the initial condition.

2021 SURVEY — KM18 AND KM58 (ABANDONED AIRSTRIP)

At KM18, soils and terrain were defined by xeric conditions and characterized by a loose, unconsolidated growth substrate with little-to-no coarse parent material and poor fertility. Unlike KM52 and KM16 (described above) vegetation cover at KM18 was characterized by a discontinuous and uneven (i.e., patchy) vegetative matte comprised of graminoids, forbs/perennial herbs and shrubs with few bryophytes and no lichen.

At the KM58 Abandoned Airstrip, the study area (similar to KM16) is characterized by an upland plateau with tundra heath vegetation composition with species representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen. The abandoned airstrip — believed to be >60-years post-disturbance — has a clearly delineated disturbance footprint and apparent soil compaction. Although the site's disturbance history is incomplete, vegetation cover and composition appear to be on a suitable revegetation trajectory whereby the site is stable, productive and comprised of similar species and cover % to the adjacent undisturbed areas. This study location represents a compelling investigative setting for natural revegetation as it is likely (considering the time since abandonment) that no seeding or planting and no reclamation earthworks or surficial preparations have been applied. It will be necessary to determine (to the extent possible) initial site conditions and the levels of disturbance at this location before deriving recommendations on revegetation based on these observations.

3 RECLAMATION TRIAL

3.1 TRIAL DESIGN

Site Layout — The second portion of the reclamation pilot study focused on initiating preliminary reclamation trials at the Project. The locations of the reclamation trials correspond with the KM52, KM16, and KM18 post-disturbance revegetation survey areas (described in Sections 2.1.1 and 2.1.2); reclamation trial design and layout are shown on Map 7, Map 8, and Map 9. At each trial location, a 100x10 m (at KM52) or 150x10 m trial strip (at KM16 and KM18) was delineated, all within the 25 m buffer from the centreline of the ROW and corresponding with the permissible Project area for earthworks and maintenance along the Tote Road. Refer to Map 1 and Map 2 for trial site distributions along the Tote Road.

Surface Configurations — Drawing from reclamation best management practices and land management approaches used in mining, pipeline and transportation projects — and being applicable across a wide range of environments and terrain, including coarse-textured substrates, xeric landscapes and exposed slopes in the general Project area — two surface configurations were applied: (1) 'rough and loose' and (2) 'track-packing':

- Rough and loose refers to the use of a digging bucket to dig small depressions and generate low-profile mounds within a given landscape (Polster 2013). This method creates surface heterogeneity and micro-site conditions favorable to seed establishment and germination (in the absence of direct/drill seeding) and facilitates soil preparation conducive to root proliferation and water infiltration.
- Track-packing (i.e., surface imprinting) refers to using tracked earthwork equipment to create surface roughness (Neville 2003). This method is typically used to reduce the erosion potential of exposed soils by enhancing surface stability and generate micro-site conditions for seed establishment.

Either of these methods are technically feasible and could be used at the Mary River Project. The 'rough and loose' surface configuration was applied to the entire reclamation test strip at KM52, KM16 and KM18 (i.e., to the extent possible due to the loose/unconsolidated substrate); 'track-packing' was applied to half (1/2) of each test strip. The final surface preparations were then inspected to verify the stability of surface materials and that erosion and sedimentation risk was not elevated.

Logistical Parameters and Controls — All earthworks were carefully monitored to limit maximum excavation depths (<35 cm) to prevent potential adverse effects on permafrost. Surface configurations were photo-documented (Photo 10a–b, Photo 11a–b and Photo 12a-b) and geo-referenced (refer to Appendix B1, Appendix B2 and Appendix B3) to facilitate follow-up monitoring. All surficial earthworks were completed by a qualified and experienced operator using a CAT 345D Excavator equipped with a standard-sized 122 cm wide, 4-toothed bucket. This equipment has a maximum digging depth of 8.9 m and a bucket capacity up to 3.8 m^3 maximum volume. The excavator was clean and arrived at each site 12h before site preparation. All earthworks (including pre-work communications and post-work inspections) required approximately 4h per test strip from start to finish.

Timeline — Reclamation earthworks at KM16 and KM52 were completed in Summer 2019; earthworks at KM18 were completed in Summer 2021.

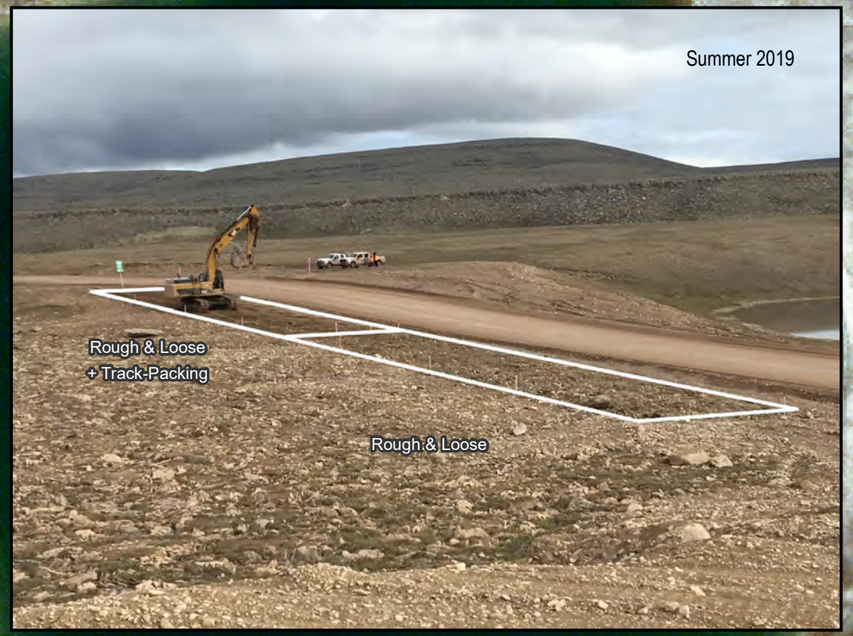
KM52
Layout of Preliminary Reclamation Trial

Baffinland

525825 525900 525975 526050 526125 526200 526275 526350

7936375 7936300 7936225 7936150 7936075 7936000 7935925

KM52-100
KM52-C100
KM52-50
KM52-C50
KM52-0
KM52-C0



Legend

- Survey Marker
- Tote Road
- Excavation Boundary
- Tote Road (25m Buffer)

0 25 50 75 100
Meters

N

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:		
Y. Navarro	P. Audet	Map 7	Date: 2019-08-28

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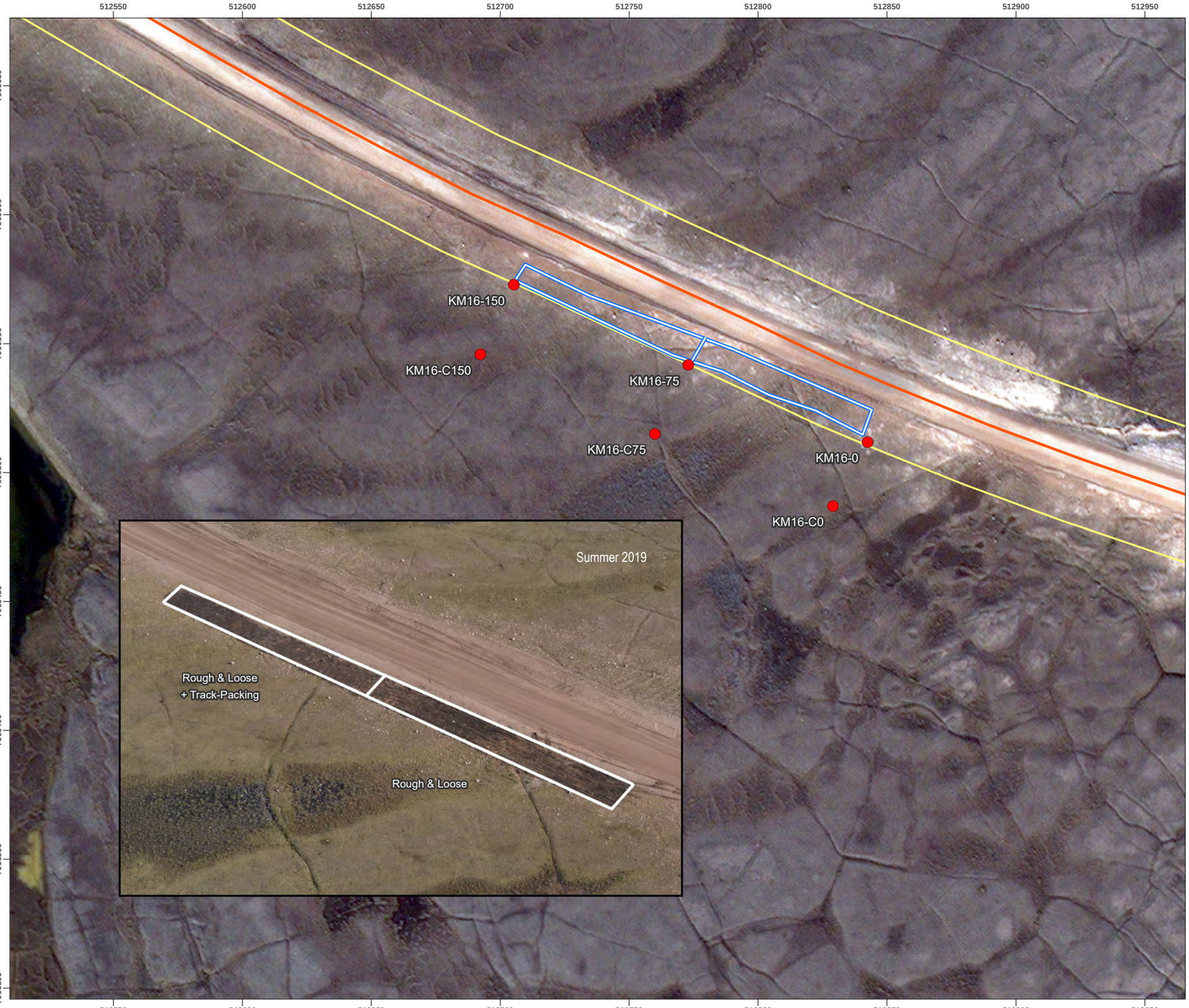
Path: L:\PROJECTS\2019\19IY0005_Baffinland\Mapping\Report\19IY0005_km52_Reclamation_Pilot_Study.mxd

KM16
Layout of Preliminary Reclamation Trial

Baffinland

Legend

- Survey Marker
- Tote Road
- Reclamation Treatment Boundary
- Tote Road (25m Buffer)



0 25 50 75 100
Meters

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

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Drawn:	Checked:		
Y. Navarro	P. Audet	Map 8	Date: 2019-08-28

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KM18
Layout of Preliminary Reclamation Trial

Baffinland
Iron Mines Corporation

514000 514050 514100 514150 514200 514250 514300 514350 514400 514450 514500 514550

7965400 7965350 7965300 7965250 7965200 7965150 7965100 7965050 7965000 7964950

KM18-C100
KM18-C50
KM18-D100
KM18-C0
KM18-D50
KM18-D0

Legend

- Tote Road
- Reclamation Treatment Boundary
- Tote Road (25m Buffer)
- Survey Marker

0 25 50 75 100
Meters

N

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2020
- Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

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Drawn:	Checked:		
Y. Navarro	P. Audet	**Map 9**	Date: 2021-10-12

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