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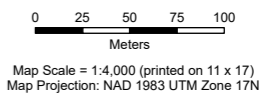


KM58 Vegetation and Soil Sampling Sites



Legend

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



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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(a) Landscape Overview — South-Southeast (Area2-C150)



(b) Landscape Overview — South-Southeast (Area 2-D150)

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 1, C-0, -75, -100	
	KM58, Area 2, D-0, -75, -100		KM58, Area 2, C-0, -75, -100	
	KM58, Area 3, D-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	<i>Carex membranacea</i>	Membranous Sedge	✓	✓	
	<i>Carex aquatilis</i>	Leafy Tussock Sedge	✓		
	<i>Carex fuliginosa</i> subsp. <i>misandra</i>	Short-Leaved Sedge	✓	✓	
	<i>Festuca rubra</i> subsp. <i>rubra</i>	Arctic Fescue	✓	✓	
	<i>Eriophorum callitrix</i>	Arctic Cottongrass	✓		
Forb/ Perennial Herb	<i>Drabas sp.</i>	White Arctic Whitlow-Grass	✓	✓	
	<i>Pedicularis lanata</i>	Woolly Lousewort	✓	✓	
	<i>Armeria sp.</i>	Arctic Thrif	✓		✓
	<i>Saxifraga oppositifolia</i>	Purple Saxifrage	✓	✓	
	<i>Silene acaulis</i>	Moss Champion	✓	✓	
Shrub/ Ericaceae	<i>Salix herbacea</i>	Snow-Bed Willow	✓	✓	
	<i>Salix arctica</i>	Arctic Willow	✓	✓	
	<i>Cassiope tetragona</i>	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.

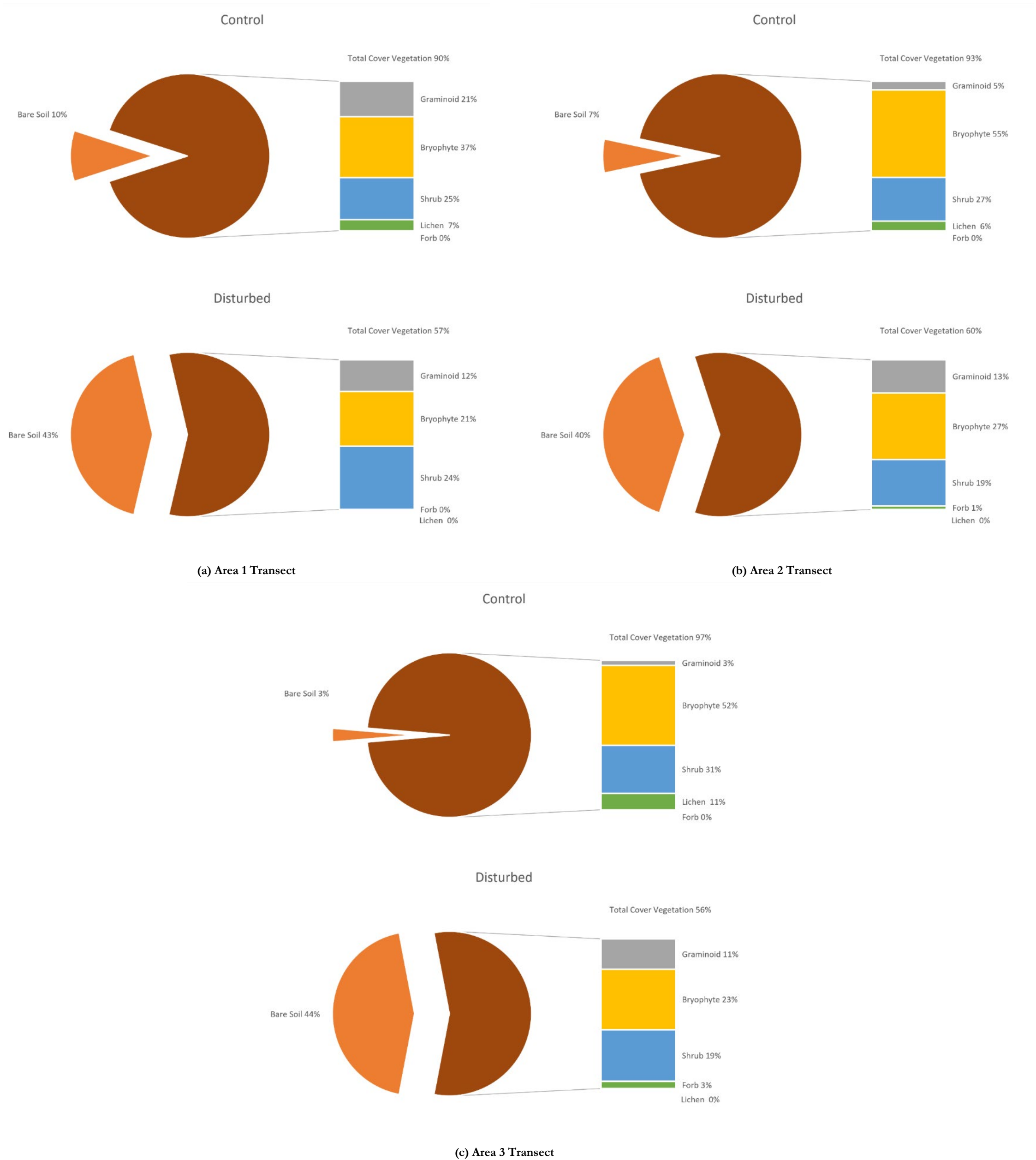


Figure 5. KM58 (Abandoned Airstrip) — Surface projective cover (%) along vegetation transects.



2.5 SUMMARY & DISCUSSION

2019 SURVEY — KM52 & 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 & KM58

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 mat composed 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 the dry-to-moist graminoid/dwarf shrub vegetation composition with species representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen. The abandoned airstrip — believed to be representative of >40-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 Section 2.1); 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 right of way and corresponding with the permissible Project area for earthworks and maintenance along the Tote Road.

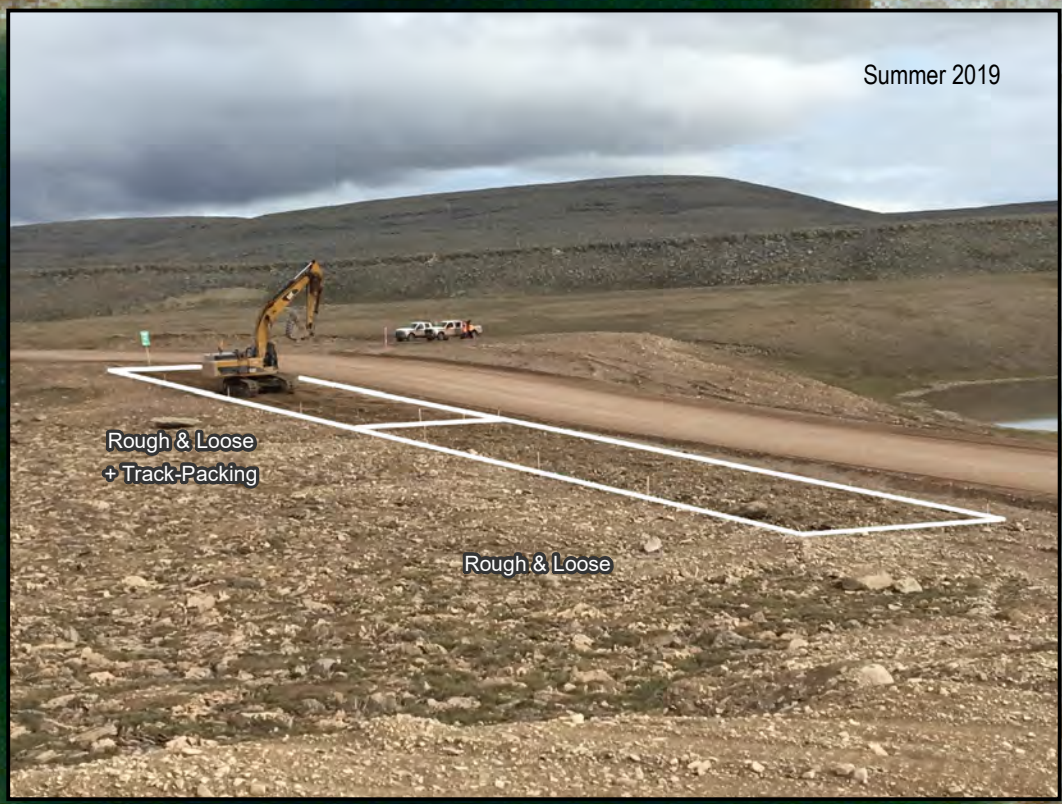
Surface Configurations— Drawing from reclamation best management practices and land management approaches used in mining, pipeline and transportation projects — and being applicable across a wide range of environments and terrain, including coarse-textured substrates, xeric landscapes and exposed slopes 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 favourable 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 m³ 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 (Sandy-Cobbly Site) and KM52 (Rocky Site) were completed in Summer 2019; earthworks at KM18 (Sandy Site) were completed in Summer 2021.

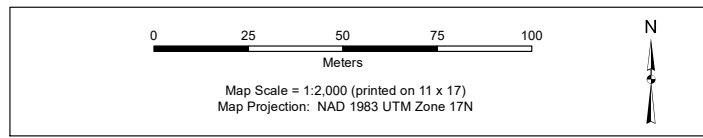


KM52
Layout of Preliminary Reclamation Trial



Legend

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



Data Sources

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

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