Environment and Climate Change Canada
Environnement et Changement climatique Canada

Water Licence 8BC-EUR2131
Notification of Modification

1871 | 2021
1971 | 2021

Canada

Re: Water Licence 8BC-EUR2131. Notification of Modification - Eureka High Arctic Weather Station. Temporary Storage of Contaminated Soils, Fuel Storage Tank Systems Inspections and Repairs and Secondary Containment Area for Fuels and Hazardous Materials, Program of Works, and Blacktop Quarry

February 11, 2022

Hi Assol and Richard,

Environment and Climate Change Canada (ECCC) will be carrying out several modifications (i.e., an alteration to the physical works at the Eureka High Arctic Weather Station (HAWS) that introduces a new structure and does not alter the purpose or function of the work or include an expansion) to the activities described in Water Licence 8BC-EUR2131 (the Licence). The modifications are consistent with the following Nunavut Planning Commission's (NPC) Conformity Determinations and Nunavut Impact Review Board (NIRB) Screening Decisions:

- NPC File No. 149476 and NIRB File No. 21XN012
- NPC File No. 149617– Exempt from NIRB Screening
- NPC File No. 149587 – Exempt from NIRB Screening
- NPC File No. 149638 – Exempt from NIRB Screening
- NPC File No. 149619 – Exempt from NIRB Screening

The following sections are included for each modification:

1) Purpose of the Modification
2) Description of the Modification
3) Plans for Operation
4) Plans for Decommissioning

Updated versions of the Topographical Maps previously provided to NWB in June 2021 (Amendment Renewal Application, Attachment A) are included in **Attachment A** of this Memo.

Temporary Contaminated Soils Storage

Purpose of the Modification

Hydrocarbon affected soil has been identified at the Eureka High Arctic Weather Station (HAWS) within the existing runway apron as well as in the vicinity of the existing and proposed future raw water reservoir site. A Remedial Action Plan and Risk Assessment (RAPRA) currently in preparation will determine if the soils may be used as fill in non-environmentally sensitive locations or treated in the Landfarm. It will also inform the design of the Landfarm (e.g., the required capacity). The Purpose of the Temporary Contaminated Soils Stockpile is to store the hydrocarbon affected soil prior to construction of the Landfarm. For-construction drawings of the Landfarm and the RAPRA will be provided to the Nunavut Water Board in a separate Notification of Modification once available.

Description of the Modification

Contaminated soils are to be stored temporarily in two lined stockpiles. There is an existing temporary stockpile approved by the Nunavut Water Board and CIRNAC under the Licence and Land Use Permit (No. 8BC-EUR2131**,** No. N2017N0017), respectively. This Modification adds an additional temporary

stockpile placed adjacent to the existing stockpile. The temporary stockpile holding area(s) will be built to stockpile up to a total of 10,000 m^3. Design details of the additional temporary stockpile area are provided in **Attachment B**.

Plans for Operation

Operational activities include monthly sampling at EUR-6 during periods of observed flow of any runoff from the contaminated soils stockpile consistent with Part I of the Licence.

Plans for Decommissioning

Plans for decommissioning of the contaminated soils storage cells are consistent with the Interim Abandonment & Restoration Plan previously provided (June 2021 Amendment/ Renewal Application, Attachment F). The Abandonment and Restoration Objectives, and actions to be taken to achieve objectives for the "contaminated sites" apply to this Modification and remain unchanged.

Fuel Storage Tank Systems Inspections and Repairs

Purpose of Modification

There are ten above-ground fuel storage tanks contained in an existing tank farm and eleven other smaller above-ground fuel storage tanks around the HAWS. To comply with regulatory requirements for storage tank systems under federal jurisdiction (Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations), the fuel storage tanks at the Eureka High Arctic Weather Stations (HAWS) need to be inspected periodically and necessary repairs made.

Description of the Modification

Potential activities include:

- Inspections and audits of fuel systems and pipeline
- Replacement of pipeline supports
- Replacing/adding valves, bump knobs, monitoring and emergency shut off systems, sumps, and dispensing hoses
- Leveling and adding aggregate under tanks
- Tank replacements (if required, during initial information review, it doesn't appear any of the current tanks will need replacement)
- Potential for subsurface work depending on which monitoring system is chosen for the underground pipe sections
- Removal of fuel sludge to clean tanks for internal inspections and work. Up to 100 drums of sludge would be temporarily stored (for about 1 month) in a containment area near the fuel storage tank systems prior to being disposed of off-site at an approved facility
- Disposal of empty/damaged steel barrels (approximately 120, 205L barrels) from current tank supports in landfill if inert and off-site at an approved facility if hazardous

Plans for Operation

This Modification will operate in accordance with the Emergency Plan for Petroleum and Allied Petroleum Products and The Summary of Operation and Maintenance Procedures for Drinking Water,

Sewage, Solid Waste Disposal and Waste Treatment Facilities provided previously (June 2021 Amendment Renewal Application Attachment E and D).

Plans for Decommissioning

Plans for decommissioning the fuel storage tank systems areas is consistent with the Interim Abandonment & Restoration Plan previously provided (June 2021 Amendment Renewal Application Attachment F). The Abandonment and Restoration Objectives, and actions to be taken to achieve objectives for "Infrastructure" apply also to this Modification and remain unchanged.

Secondary Containment Area for Fuels and Hazardous Materials

Purpose of Modification

Temporarily store up to 400, 205L barrels of fuels and hazardous materials to support ongoing operations at the HAWS.

Description of the Modification

Two designated secondary containment areas for temporary storage of fuels and hazardous materials will be constructed in the summer of 2022. The first area extends north of the existing fuel drum area at the airstrip (Shown in **Attachment A, Figure 3**). The second area would be used as a designated area to temporarily store ECCC's existing petroleum oils and lubricants and is located near the Station (**Attachment A, Figure 2**). Both are equal in size and will store 200 barrels each.

Plans for Operation

This Modification will operate in accordance with the Emergency Plan for Petroleum and Allied Petroleum Products and The Summary of Operation and Maintenance Procedures for Drinking Water, Sewage, Solid Waste Disposal and Waste Treatment Facilities provided previously (June 2021 Amendment Renewal Application Attachment E and D).

Plans for Decommissioning

Plans for decommissioning the secondary containment areas is consistent with the Interim Abandonment & Restoration Plan previously provided (June 2021 Amendment Renewal Application Attachment F). The Abandonment and Restoration Objectives, and actions to be taken to achieve objectives for "Infrastructure" apply also to this Modification and remain unchanged.

Program of Works

Purpose of Modification

The Program of Works project involves improving the efficiency of three buildings: Main Complex, Pearl Laboratory, and the Power House. The purpose of the Program of Works is to both modernize and improve the efficiency of the buildings.

Description of the Modification

This may include, but is not limited to, modifications to the building envelope, insulation, roofs, LED conversion, electrical upgrades, air handling modifications, and grading modifications. Waste quantities

are unknown at this time but would be less that 100m^3 in total. If hazardous waste is identified during the design stage (in the Power House), it will be disposed of offsite. Waste may include windows, old insulation, dry wall, doors, etc. Reasonable efforts will be made to recycle at an approved facility. Inert material will be disposed of onsite at the landfill.

Plans for Operation

Work is planned to commence in summer of 2022. This Modification will operate in accordance with the Emergency Plan for Petroleum and Allied Petroleum Products and The Summary of Operation and Maintenance Procedures for Drinking Water, Sewage, Solid Waste Disposal and Waste Treatment Facilities provided previously (June 2021 Amendment/Renewal Application Attachment E and D).

Plans for Decommissioning

Plans for decommissioning are consistent with the Interim Abandonment & Restoration Plan previously provided (June 2021 Amendment/Renewal Application Attachment F). The Abandonment and Restoration Objectives, and actions to be taken to achieve objectives for "building" apply also to this Modification and remain unchanged.

Blacktop Quarry

Purpose of the Modification

Obtain aggregate for use as fill for various construction projects

Description of the Modification

Up to 60,000 m^3 will be removed from Blacktop Quarry (Expired Quarry Permit 2015QP0051), and potentially 2 areas adjacent (east) of Black Top Quarry. A quarry permit application will be submitted to the Crown Indigenous Relations and Northern Affairs Canada.

Plans for Operation

Updated Quarry Operations Plan (June 2021 Amendment Renewal Attachment I) is included in **Attachment C.**

Plans for Decommissioning

Plans for decommissioning Blacktop Quarry are consistent with the Interim Abandonment & Restoration Plan previously provided (June 2021 Amendment Renewal Application Attachment F). The Abandonment and Restoration Objectives, and actions to be taken to achieve objectives for "West Remus Quarry" apply also to this Modification and remain unchanged.

Closing

ECCC is providing notification to the Nunavut Water Board at least 60-days prior to beginning the Modifications described herein as required by Part F of the Licence. It is ECCC's understanding that the Modifications are consistent with the terms of the Licence 8BC-EUR2131.

Sincerely,

CloutierDussault, JeanPhilippe

Digitally signed by: CloutierDussault, JeanPhilippe
DN: CN = CloutierDussault, JeanPhilippe C = CA O = GC OU = EC-EC
Date: 2022.02.16 10:00:03 -05'00'

Jean-Philippe Cloutier-Dussault
Property Manager, Assets, Real Property and Security Directorate
Environment and Climate Change Canada

jean-philippe.cloutier-dussault@ec.gc.ca

Attachment A

Topographical Maps, Indicating Components of the Undertaking

Legend

- Watercourse

N
W E
S

500 250 0 500 1,000 1,500 m

1:50,000

NAD 1983 UTM Zone 16N

Sources: NRCan
Imagery: Esri World Imagery

AECOM

Figure: 1

EUREKA HIGH ARCTIC WEATHER STATION
STATION SITE OVERVIEW

EUREKA HIGH ARCTIC WEATHER STATION
WATER LICENSE 8BC-EUR1621 2020 ANNUAL REPORT
PUBLIC SERVICES AND PROCUREMENT CANADA, EUREKA HAWS
Project No.: 60638794 Date: January 2022

Last saved by: STEPHANIE.CLARK (2022-01-18) Last Plotted: Tue Jan 18, 2022
Filename: \\na.aecomnet.com\LFS\AMER\Calgary-CACGY3\Legacy\CACGY5FS002\Library\Environment\GIS\Stephanie Clarke\Permitting & IAP\60638794_Eureka\02_MXDs\2020 Annual Report\Water License\H001_60638794_HAWS_Water_SiteOverview_20220118.mxd
Project Management Initials: Designer: Checked: Approved: ANSI B 279.4mm x 431.8mm

Legend

Watercourse

N
W E
S

50 25 0 50 100 150 m

1:5,000

NAD 1983 UTM Zone 16N

Sources: NRCan
Imagery: Esri World Imagery

AECOM

Figure: 2

EUREKA HIGH ARCTIC WEATHER STATION MAIN COMPLEX

EUREKA HIGH ARCTIC WEATHER STATION
WATER LICENSE 8BC-EUR1621 2020 ANNUAL REPORT
PUBLIC SERVICES AND PROCUREMENT CANADA, EUREKA HAWS
Project No.: 60638794 Date: February 2022

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Legend

- Watercourse
- Temporary Access Road
- Existing Access Road

NOTE:
The New Drum Crushing Site and Contaminated Soil Storage Cell are approximate locations

N
W E
S

75 37.5 0 75 150 225 m

1:7,500

NAD 1983 UTM Zone 16N

Sources: NRCan
Imagery: Esri World Imagery

AECOM

Figure: 3

EUREKA HIGH ARCTIC WEATHER STATION

WATER LICENSE 8BC-EUR1621 2020 ANNUAL REPORT

PUBLIC SERVICES AND PROCUREMENT CANADA, EUREKA HAWS

Project No.: 60638794 Date: January 2022

Last saved by: STEPHANIE.CLARK (2022-01-26) Last Plotted: Wed Jan 26, 2022
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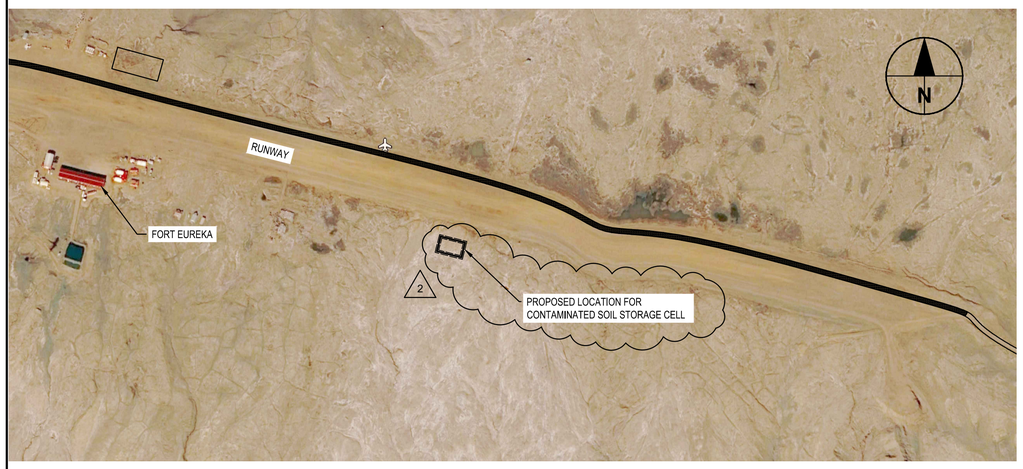
Attachment B

For-Construction Drawings of the Temporary Contaminated Soils Stockpile

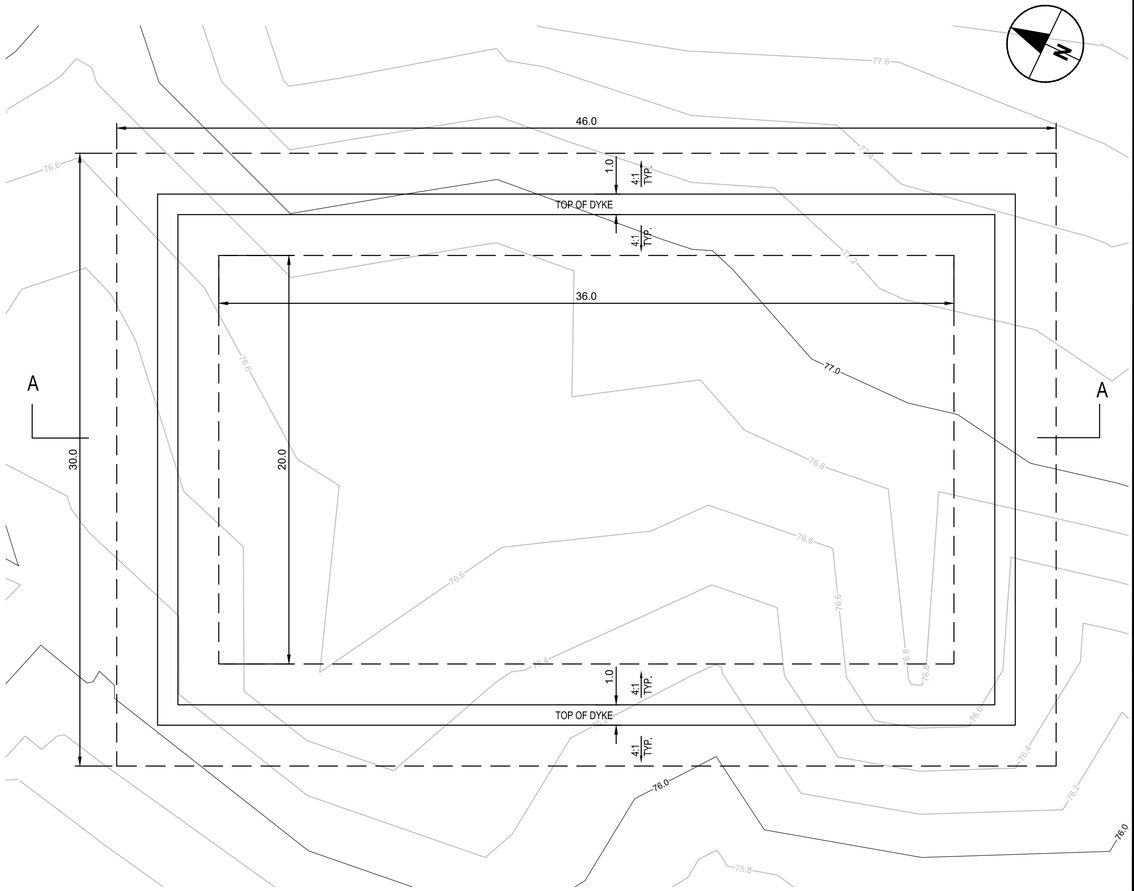


CONTAMINATED SOIL STORAGE CELL POTENTIAL LOCATION

Scale NTS

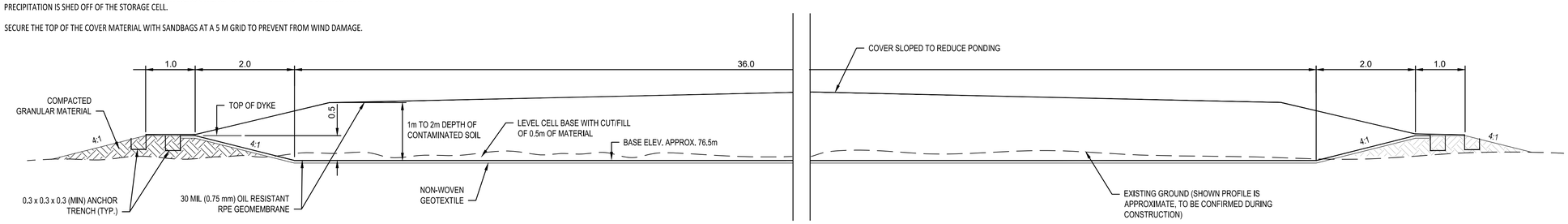
CONSTRUCTION NOTES:

1. PRIOR TO CONSTRUCTION, DELETERIOUS SOILS COMPRISING VEGETATION, TOPSOIL, AND THE SOFT/VERY SOFT, LOOSE, WET, DISTURBED, PORTION OF NATIVE SOILS, IF ANY, SHOULD BE REMOVED FROM THE STORAGE CELL FOOTPRINT.
2. FOLLOWING INITIAL SITE STRIPPING OF DELETERIOUS SOILS, AND PRIOR TO GRADING, AREAS IDENTIFIED FOR FILL PLACEMENT SHOULD BE COMPACTED. ANY SOFT AREAS SHOULD BE OVER-EXCAVATED AND BACKFILLED TO A MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD) USING GRANULAR BASE MATERIAL.
3. ALL FILL REQUIRED TO RAISE THE SUBGRADE ELEVATION SHOULD MEET THE REQUIREMENTS AS DEFINED IN SECTION 32 11 23 - AGGREGATE BASE COURSES.
4. FILL MATERIAL SHOULD BE PLACED IN LIFTS NOT EXCEEDING 150MM IN COMPACTED THICKNESS AND A MINIMUM DENSITY OF 98% SPMDD.
5. THE FINISHED SUBGRADE MUST BE FREE OF DEPRESSIONS.
6. THE CONTRACTOR SHALL ENSURE THAT LOCAL DRAINAGE PATTERNS ARE NOT ALTERED BY THE CONSTRUCTION.
7. CELL DYKES TO BE CONSTRUCTED USING GRANULAR BASE COURSE AS DEFINED IN SECTION 32 11 23, WITH 4:1 INTERIOR AND EXTERIOR SLOPES.
8. THE STOCKPILE OF CONTAMINATED SOIL SHALL BE COVERED BY A 30 mil (0.75 mm) OIL RESISTANT RPE GEOMEMBRANE LINER AFTER SOIL PLACEMENT IS COMPLETE. SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO INSTALLATION.
9. HANDLING AND INSTALLATION OF THE LINER SHALL FOLLOW MANUFACTURER'S RECOMMENDATIONS.
10. WELDING OF THE LINER SHEETS SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.
11. THE LINER MATERIAL SHALL NOT BE PUNCTURED DURING PLACEMENT.
12. SECURE THE COVER LINER IN A 0.5 m x 0.5 m x 0.5 m ANCHOR TRENCH ON THE EXTERIOR OF THE BERM SO THAT PRECIPITATION IS SHED OFF OF THE STORAGE CELL.
13. SECURE THE TOP OF THE COVER MATERIAL WITH SANDBAGS AT A 5 M GRID TO PREVENT FROM WIND DAMAGE.



1 | PROPOSED CONTAMINATED SOIL STORAGE CELL PLAN

Scale 1:100



A | PROPOSED CROSS SECTION, LINER AND GEOTEXTILE DETAILS

Scale 1:50

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

AECOM

ORIGINAL
SIGNED BY

P. BARSALOU

2020/06/23

PERMIT TO PRACTICE
AECOM Canada Ltd.
Signature SIGNED BY B.B.
SIGNED ON 06.23.2020
PERMIT NUMBER: P 639
The Association of Professional Engineers and Geophysicists of the NWT/NU.

Revision	Description	Date
5		
4		
3		
2	FIELD INSTRUCTION 02	2021/09/22
1	ISSUED FOR CONSTRUCTION	2021/04/15
0	ISSUED FOR TENDER	2020/06/19

Client / client

Public Works and Government Services Canada

310-269 Main Street, R3C 1B3
Winnipeg, MB

Project title / Projet

NUNAVUT
EUREKA

EUREKA WATER AND SEWAGE SYSTEM

Designed by / Conçu par
A. FARROKHI

Drawn by / Dessiné par
G. LACOSTE

Approved by / Approuvé par
P. BARSALOU

PWGSC Project Manager / Administrateur de Projets TPSGC
M. MOGAN

Drawing title / Titre du dessin

CIVIL
CONTAMINATED SOIL STORAGE CELL PLAN, CROSS SECTION AND LOCATION PLAN

Project no./No. du projet	Drawing no./No. du dessin	Revision no.
R.037261.001	C-0009 OF	2

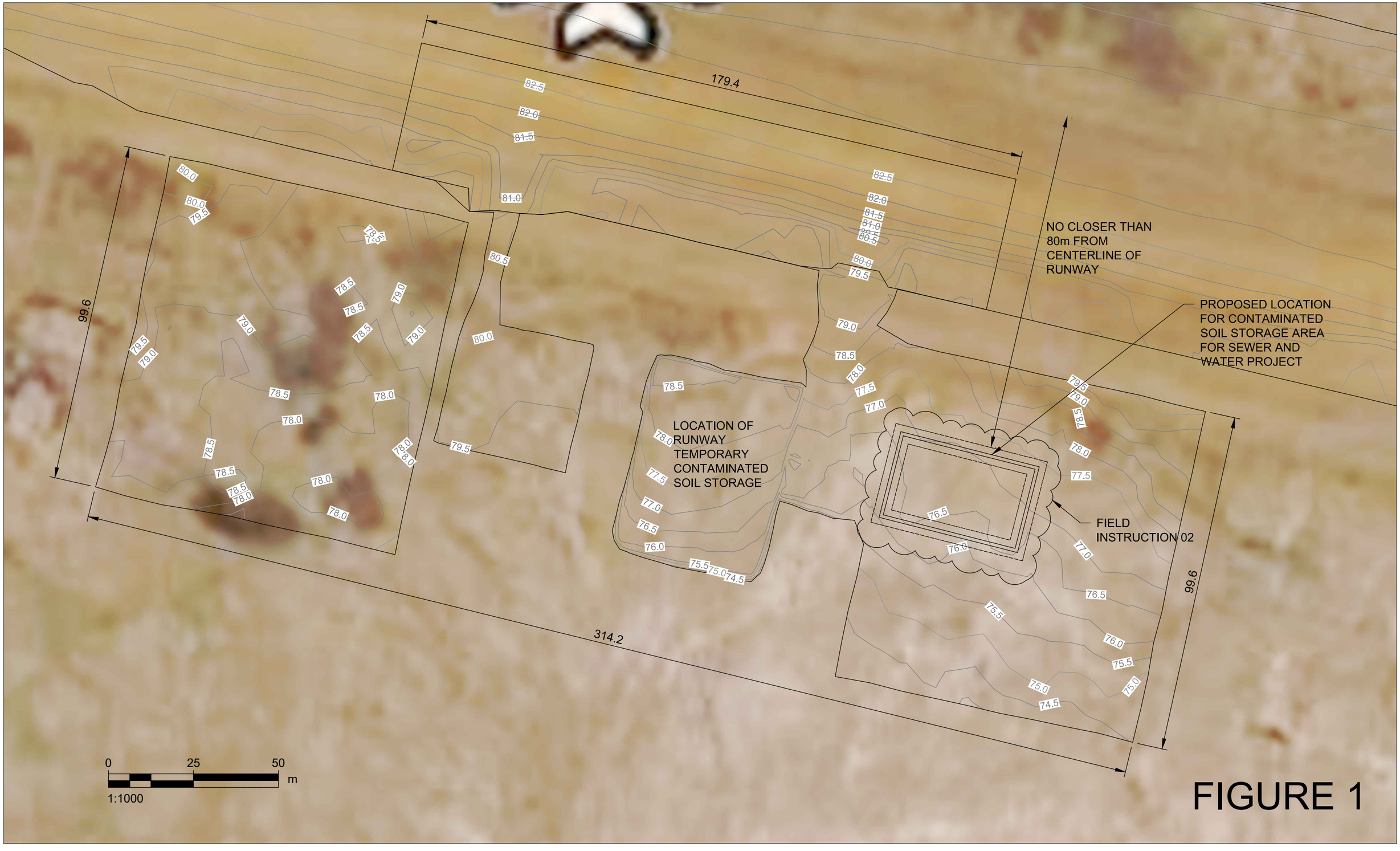

179.4
99.6
314.2
NO CLOSER THAN
80m FROM
CENTERLINE OF
RUNWAY
PROPOSED LOCATION
FOR CONTAMINATED
SOIL STORAGE AREA
FOR SEWER AND
WATER PROJECT
LOCATION OF
RUNWAY
TEMPORARY
CONTAMINATED
SOIL STORAGE
FIELD
INSTRUCTION 02
0
25
50
m
1:1000

FIGURE 1

Attachment C

Quarry Operation Plan

Revised Quarry Operations Plan

BLACKTOP CREEK AND WEST REMUS CREEK,
EUREKA, NUNAVUT

NUNA EAST LTD.

Date: January 2022

Revision: 3

Table of Contents

1.0 INTRODUCTION

Nuna East Ltd. ("Nuna East"), is an aboriginally owned contracting firm with resources of heavy equipment and personnel, involved in heavy construction, mining, winter road construction, site service and maintenance activities. Nuna has worked in the North for 25 years and is well versed in northern environments.

Nuna East was awarded the Eureka Recapitalization Runway Project in Nunavut, NT. The intent of this project is to rehabilitate the existing runway airside apron, as well as construct a new airside apron and upgrade the local access road. Mobilization for this work took place in late August 2015 however the project has been unable to proceed due to insufficient borrow material at the planned borrow site.

The original Quarry Operations plan was previously submitted in September 2015 for this project naming Blacktop Creek as the primary borrow source and quarry location. Revisions to this Quarry Operations Plan have been submitted over the past 6 years as the runway recapitalization project has been underway, which included the development of the Remus Creek West Quarry.

With the recent award of the Water and Wastewater Treatment Infrastructure project, the need for additional granular resources has been identified. Sourcing of the additional quantities may include extended areas of West Remus Creek and additional potential sources near Blacktop Creek. The attached maps in Section 2.1 identify all potential quarry development areas.

The Quarry Development Plan will commit to the best management practices of the quarry resource development at all potential areas including Remus Creek West and Blacktop Creek Nuna East will work in tandem with the Northern Development regulatory AANDC Land Resources Office to ensure these objectives are met during the initial start-up of the quarry operation and through to the completion of the current construction contracts.

2.0 DESCRIPTION OF THE DEPOSIT

2.1 TOPOGRAPHIC MAPS

Two maps captured from the National Topographic System Index Maps website included in the attachments to show the location of the quarry site relative to the High Arctic Weather Station at Eureka, both from high and low level. The proposed access road route, quarry location and temporary camp and fuel storage area are shown on Figures 1 and 2 below, along with a recent photograph of the area in Figure 3.

FIGURE 1 – ACCESS ROAD AND BORROW LOCATION

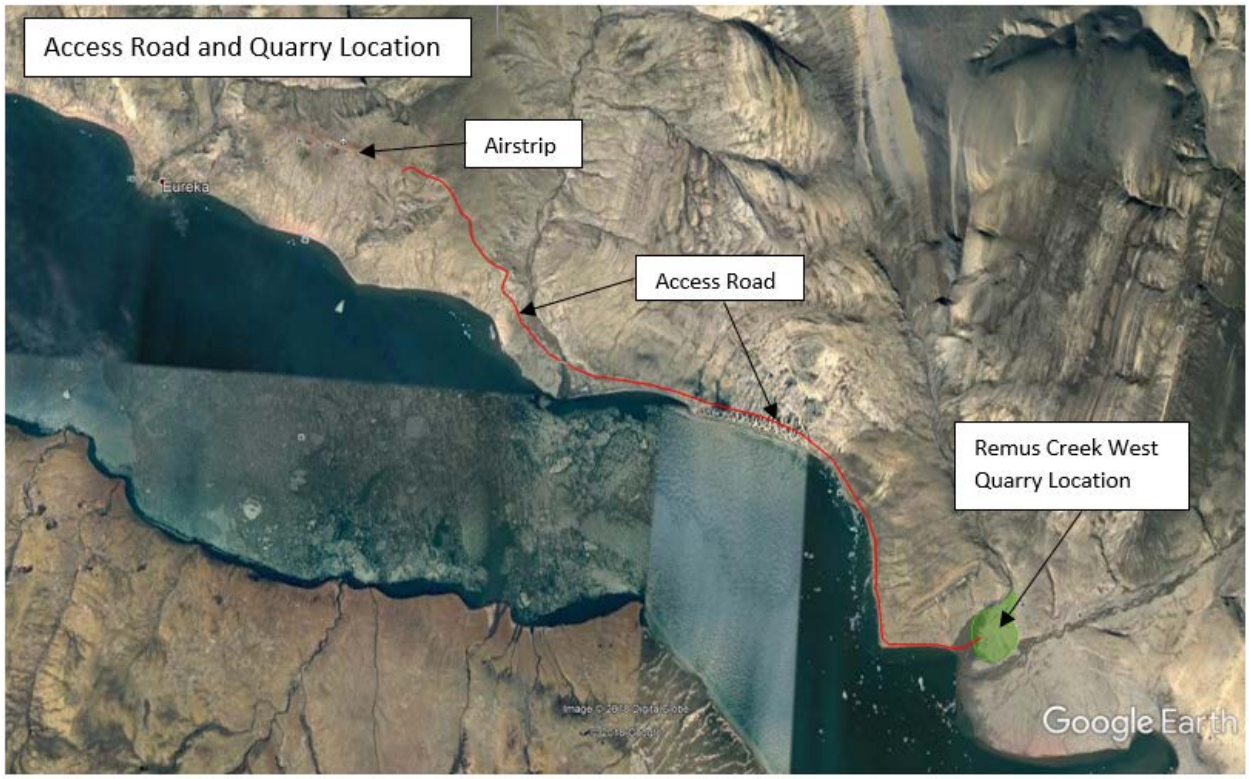


FIGURE 2 – CURRENT BORROW LOCATION

The estimated total surface area of the proposed borrow area at Remus Creek West as shown above is estimated to be 360,000 m2 and is expected to yield more than 325,000 m3 of raw granular material. The application for extension to the borrow area limits will add another 88,000 square meters of surface area for an increase of approximately 80,000 m3 of potential extraction volume.

The current program is expected to require extraction of approximately 325,000 m3 of material from within the full permitted area. The area for extraction will be determined on site based on visual assessment of the materials but will be within the approved boundaries only.

The proposed boundary extension is shown on the drawing on the following page.

FIGURE 3 – PROPOSED QUARRY BOUNDARY EXTENSION

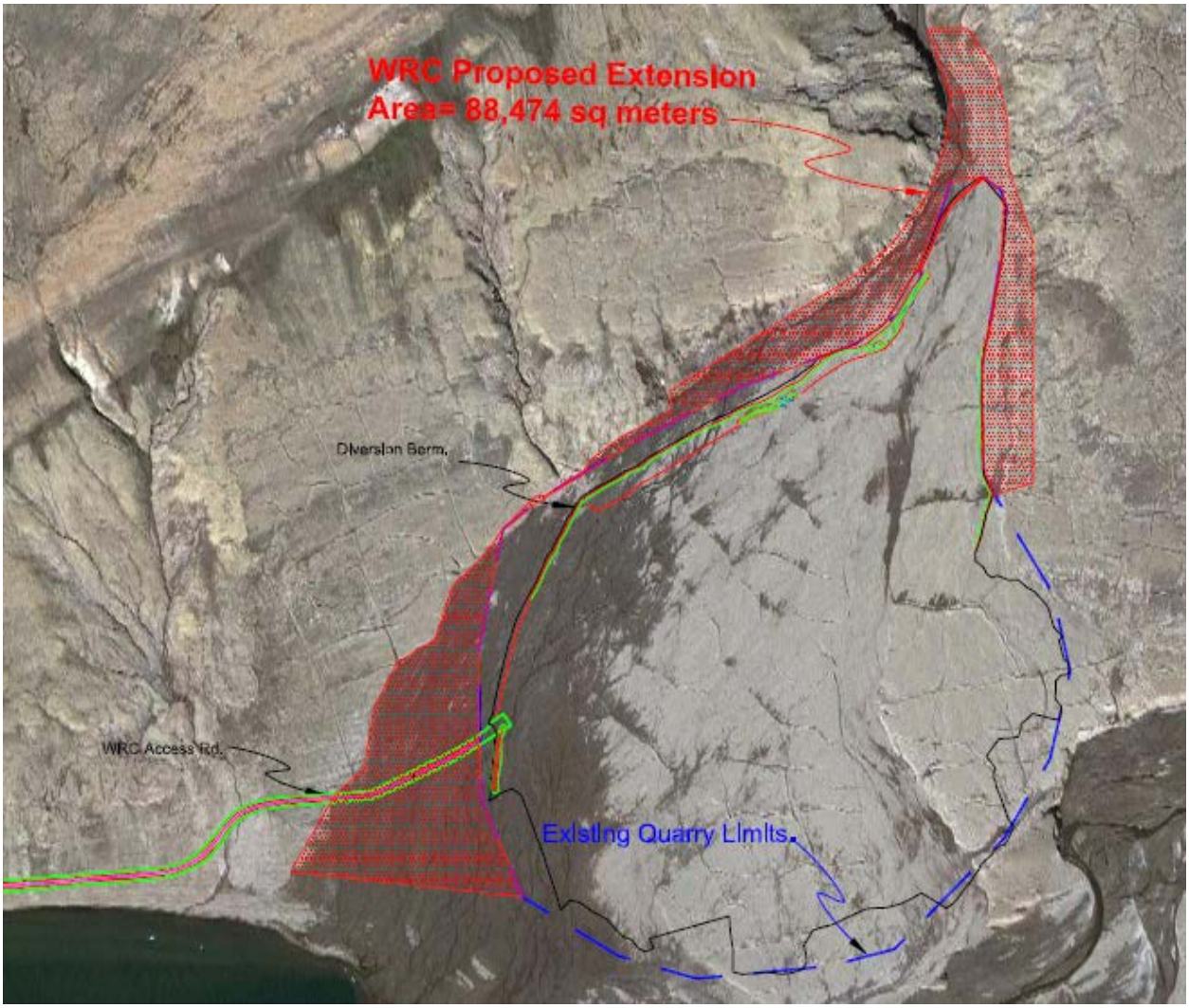
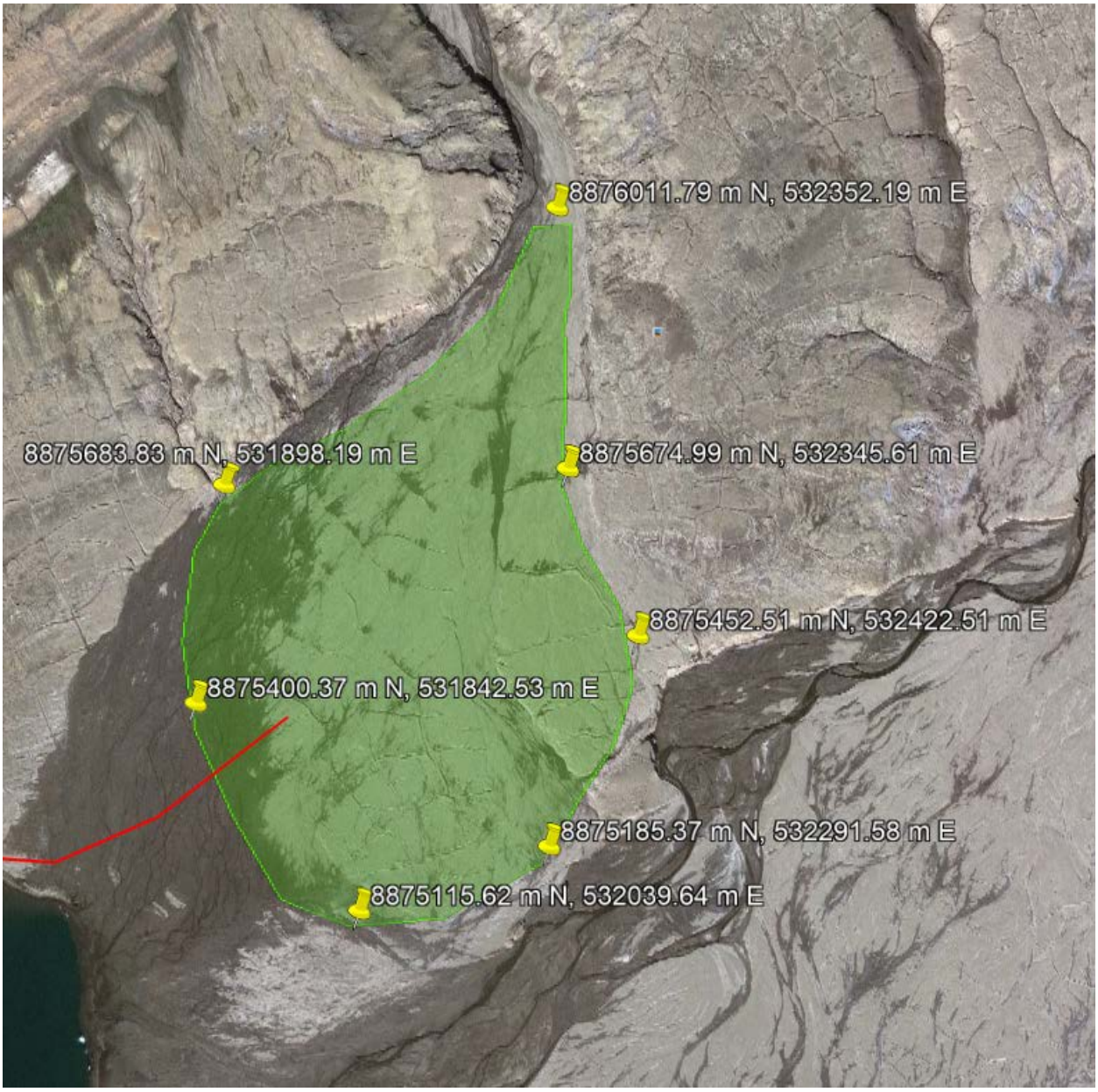


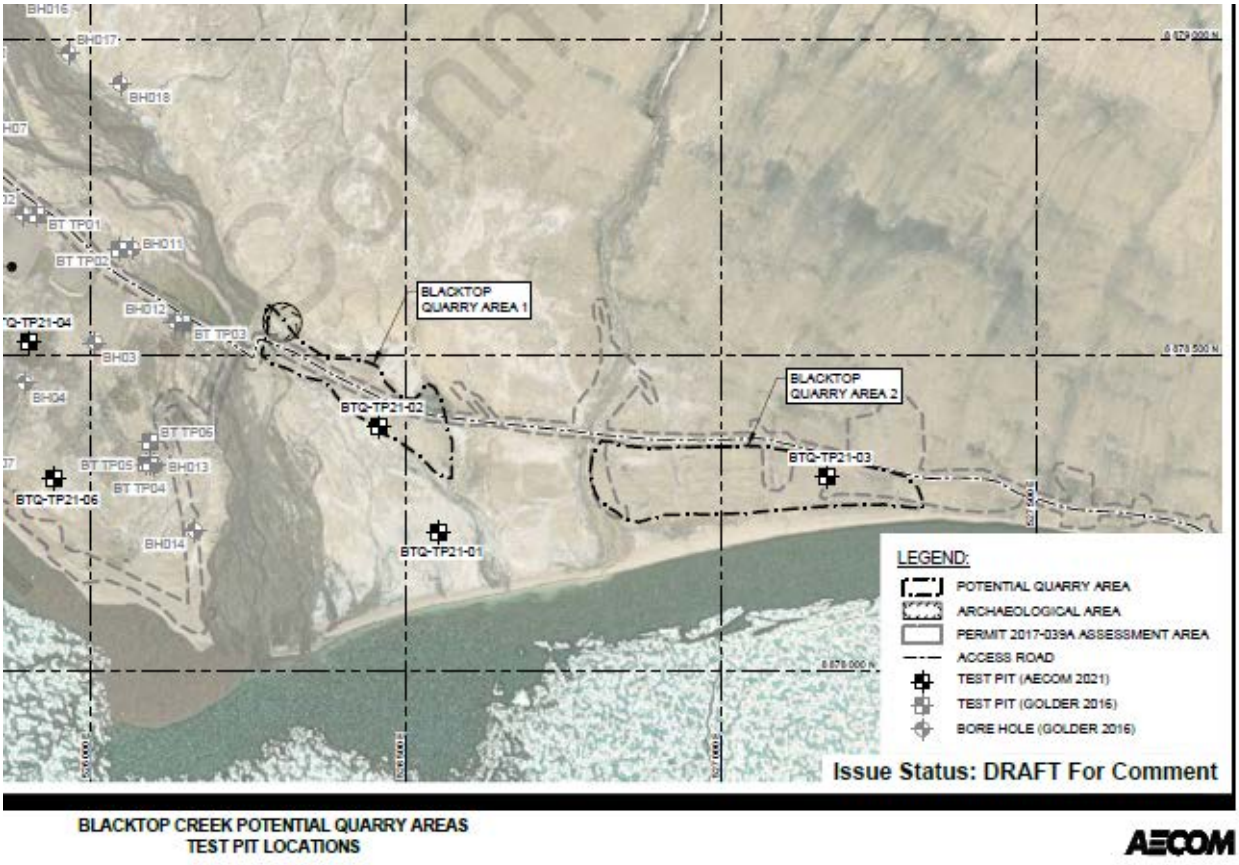
FIGURE 4 – QUARRY LOCATION COORDINATES



2.2 "NEW" ADDITIONAL POTENTIAL QUARRY DEVELOPMENTS – 2022

Geotechnical investigation and sampling programs conducted during the summer of 2021 have identified new potential sources of granular resources as shown on the maps below.

FIGURE 5 – NEW BLACKTOP CREEK QUARRY SOURCES



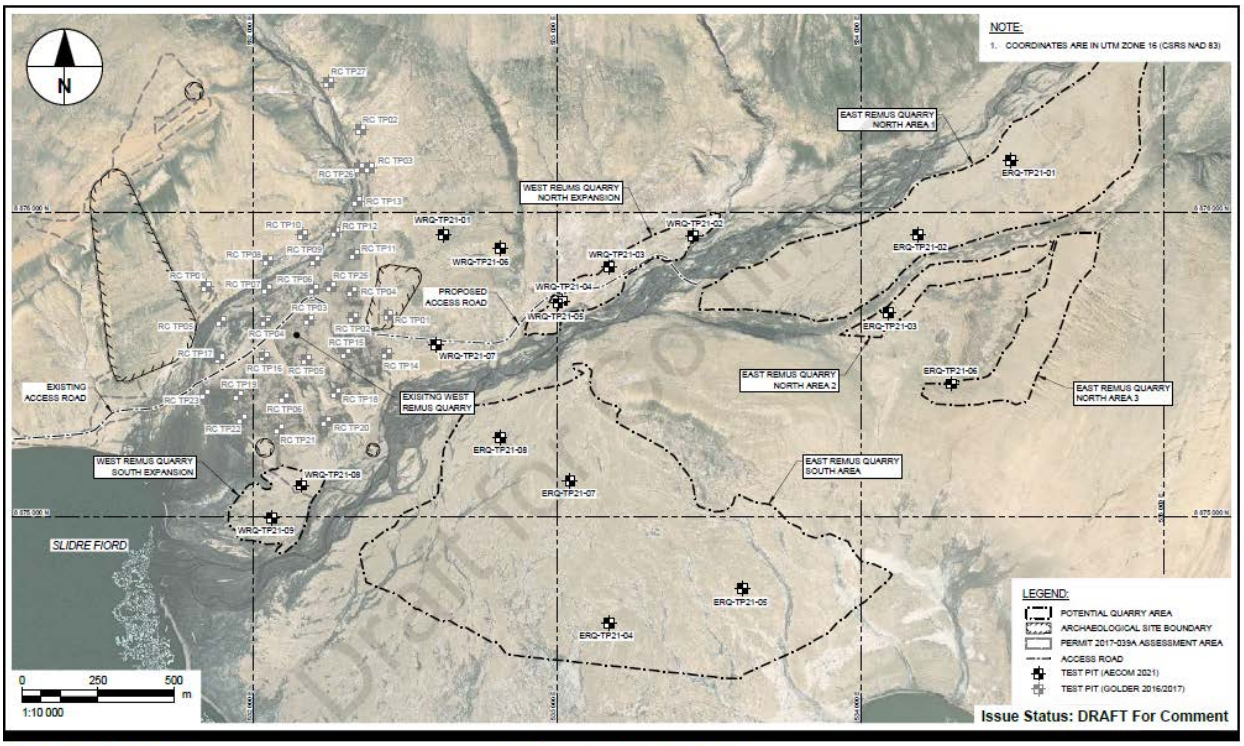
Blacktop Quarry Area 1 and Blacktop Quarry Area 2 are both located to the east of the bridge installed at Blacktop Creek in 2018 as part of the access road construction to Remus Creek West. The runs through and adjacent to these two new potential sources.

Nuna is aware that Blacktop Quarry Area 1 surrounds an identified archaeological site that will require a 30 m buffer area, where no disturbance will be permitted.

Nuna is also aware that Blacktop Creek Quarry Area 2 is adjacent to the ocean and must comply with the current Land Use Permit and Water License requirements in this area in respect of:

a) 31 m buffer undisturbed buffer zone between the quarry limit and high water mark
b) Excavation depth shall be limited to 1 m above the high water mark, or groundwater table

FIGURE 6 – NEW REMUS CREEK WEST SOURCES



Eureka High Arctic Weather Station
2021 Geotechnical Borrow Investigation
Eureka, Nunavut
Project No.: 60663416 Date: 2021-10-14

REMUS CREEK POTENTIAL QUARRY AREAS
TEST PIT LOCATIONS

AECOM
Figure: 2

The areas shown above have been identified in the AECOM Geotechnical Borrow investigation report compiled in 2021.

2.3 TEST PIT PROGRAM RESULTS

According to Golder Associates Geotechnical Report and visual observations made during the 2016 and 2017 geotechnical investigations, the surficial soils at Remus Creek West consist of sand, gravel and cobbles. A summary of the laboratory test results is presented in Figure 4.

FIGURE 4 – LABORATORY TEST SUMMARY RESULTS

Table 4: Summary of Laboratory Testing Results from West Remus Creek

Test	Test Pit ID									
	RC TP02	RC TP03	RC TP04	RC TP06	RC TP07	RC TP09	RC TP11	RC TP15	RC TP16	RC TP25
Dry Rodded Bulk Density (kg/m^3)	1,328	1,427	1,456	1,456	1,456	1,512	1,470	1498	1,526	1470
Freeze/Thaw Average Loss (%)	12.3	9.2	6.6	11.8	9.8	8.8	8.0	8.6	10.9	8.6
LA Abrasion (%)	34.6	42.0	48.1	40.6	36.5	46.4	39.1	33.8	35.7	42.1
Micro-Deval (%)	33.6	37.6	35.8	35.0	33.1	37.4	35.5	35.1	40.2	35.1
Petrographic Number	148	140.8	145.6	145.4	127.8	142.6	122.6	135.4	144.2	127.4
Primary Rock, %	Diabese, 38.7	Sandstone, 29.3	Sandstone, 36.7	Diabese, 28.2	Diabese, 23.7	Carbonate, 28.3	Sandstone, 31.1	Diabase, 30,1	Carbonate, 32.4	Sandstone, 26.3
Secondary Rock, %	Sandstone, 12.2	Diabese, 26.9	Carbonate, 16.8	Carbonate, 18.6	Carbonate, 23.6	Diabase, 23.6	Diabase, 23.7	Quartzite, 19.1	Sandstone, 15.3	Diabae, 23.5
					Quartzite, 21.1					

3.0 SITE PREPARATION

3.1 ACCESS

Upgrading of an existing trail that extends from the current Eureka runway to the Remus Creek West borrow area will be required. The trail is currently a light vehicle road only without a permanent crossing at Blacktop Creek. The length of the access road is approximately 12 km south east from the airstrip and generally follows the shoreline of Slidre Fjord. Nuna East will construct this road upgrade using the proposed Remus Creek West quarry as a borrow source, including an all-season crossing at the Blacktop Creek location.

A temporary culvert crossing will also be required at the eastern limit of the proposed quarry area to cross West Remus Creek. Suitably sized culverts will be installed at an optimum location to provide minimum disturbance to the natural flow. The crossing will be observed frequently during operations and maintained as required at the beginning and end of each construction season.

The upgraded road will then provide year-round access to the Remus Creek West borrow area and provide a primary haul route from the quarry to the runway at some future date.

The proposed road alignment and general location of the borrow source is shown in Figure 1 above.

Access within the borrow area is generally unrestricted and requires little to no preparation. The entire area is comprised of exposed sand and gravel with negligible vegetation or other organic material. Traffic patterns within the quarry will be determined to limit traffic to those specific areas required for quarry operations and to limit unnecessary travel in areas that will not be disturbed at this time.

3.2 SITE CLEARING

There will be no requirement for site clearing, vegetation removal or topsoil salvage at the proposed quarry location. Observations at the site indicate the site to be clear of vegetation and organic surficial soils.

3.3 BUILDINGS OR OTHER FACILITIES

2020 Revision: The construction camp has not been set up at Remus Creek West as previously proposed. All camp facilities are installed near the Eureka runway. This will continue to be the operational plan through 2022.

One mobile washcar has been positioned at Remus Creek West to provide washroom facilities and small lunchroom for the construction crew. Potable water is delivered to the washcar by truck and sewage is removed by vacuum truck and disposed of at the HAWS facilities.

Fuel will be stored in 4,995 liters double wall containment capsules at a designated laydown area near the crusher location. Fuel will then be distributed using a fuel lube truck with no greater than 4,995 liters on board at any time.

3.4 TOPOGRAPHIC SURVEY FOR FUTURE VOLUME CHECKS

A private legal surveying company will be contracted to perform all of the survey requirements for the project including the quarry site development. They will use up to date technology of satellite surveying/imagery, AutoCAD and end area method for calculation of the volumes.

The estimated quantities for extraction is 325,000 m3 of raw granular material, as required for access road construction ~~only~~, runway rehabilitation and production of crushed products for future HAWS projects.

An original ground topographic survey will be completed prior to quarry activities and repeated upon completion of quarrying to obtain a final measurement of the materials excavated from the quarry source. The final quantities used will be submitted to INAC, Lands Resources Officer on a required monthly reporting form.

4.0 QUARRYING OPERATION

4.1 QUARRY DEVELOPMENT

The quarry site development will use conventional stripping methods with progressive excavation in thawed material. Additional depth of cut will be achieved after removal of the initial layer and subsequent thawing of freshly exposed material.

The quarry will be developed using a D8 Dozer, 980 loader and a 320 excavator. The dozer will cut and push material into stockpiles and windrows as appropriate such that the loader and/or excavator can more readily load the material into haul trucks.

There are no drill & blast requirements.

The total area that will be developed to meet the project's needs is approximately 448,000 m2. To the extent possible the excavations will be of uniform depth over a wide area to maintain positive surface drainage.

Reclamation procedures/methods will be in place to ensure cleanup, trimming and tidiness of the quarry.

4.2 EQUIPMENT

The equipment proposed for the access road construction and quarry development will be as follows:

Description	Weight (Kg)
Pick-up F350	3,636
Pick-up F350	3,636
Pick-up F350 w/ Truck Cap	3,636
Flatdeck F550	3,359
Mechanic Truck F550	5,456
Lube / Fuel Truck	13,100
Roll-off / Vac Truck	11,340
Spare components for vac truck (flatdeck, potable water tank)	9,071
Winch Tractor	13,640
Scissor deck trailer	8,000
Packer CS563	11,818
Skid Steer 257B c/w forks, bucket bound on top	4,091
Dozer D6	21,047
Dozer D7	24,600
Dozer D8T	42,573
Excavator 320EL	24,730
Loader 980 H	39,909
Loader 980 G c/w forks & bucket	39,909
Loader 966	25,000
Grader 14H	20,454

Rock Truck 730	25,550
Rock Truck 730	25,550
Rock Truck 730	25,550
Jaw Plant 25" x 42"	57,240
Power Tower 6' X 8'	24,690
Stacking Conveyor with Hopper36" x 50"	18,200
Screen Plant 6" x 20"	45,068
Cone Plant 40"	29,563
Bin wall, cross conveyor	18,000
Screen Plant (new)	44,000
20' Sea Can - hose press	9,890
Washroom / Lunchroom (Wheeled) (survival shack)	10,000
Washroom / Lunchroom (Wheeled) (survival shack)	10,000
QA/QC Trailer	8,145
Office Trailer	9,000
30 man tent camp	155,273
Duel Burner Incinerator	27,500
Generator 275kw	9,000

4.3 EROSION PROTECTION

Regular inspection and remedial action will be in place to capture any erosion problems that may arise during the quarry development such as ditching and maintaining proper drainage.

Silt fence will be on hand and installed as necessary to mitigate silt transport from the quarry operation into nearby waterways.

4.4 SETBACKS

The quarry site has a natural sloping terrain and therefore a 100 m setback will be established between the quarry development and the existing water courses. Setbacks will be surveyed and staked before any construction can proceed. Positive drainage will be a natural progression in the quarry design and stripping/farming approach. Since these activities will be surveyed by grade calculation, slope values and positive drainage will be maintained. The pit floor will also have a positive grade applied for drainage to flow and will not create a ‘ponding effect’. Grades will not exceed 4% in value to avoid any adverse flow and erosion problems.

Temporary diversion of the natural flow paths may be required in order to access the granular materials near the western perimeter of the proposed quarry. If necessary, this will only be done during the low flow season, after freshet has subsided. The flow path will be returned to its original location after removal of granular material is completed at the end of the season.

5.0 AGGREGATE PROCESSING

5.1 CRUSHING

It is anticipated that the crushing plant will produce approximately 200,000 m3 of aggregate Crushing will proceed throughout the 2019, 2020 and 2021 construction seasons. Work is expected to commence annually in early July and shut down in late September.

5.2 STORAGE AREA OVERSIZE MATERIAL

It is not expected to encounter oversized cobles that cannot be processed during the development of the quarry. No other reject material is anticipated during the quarrying operation.

5.3 STORAGE AREA FOR FINISHED PRODUCTS

It is expected that all the processed quarry material will be consumed and hauled to the project location. All products will be consumed and hauled away, no stockpiles of produced aggregate materials will remain at the quarry locations when the work is complete. A detailed and final quantity list of the quarry materials consumed will be provided at the end of the project.

6.0 RECLAMATION

6.1 DESIRED FUTURE CONDITION OF THE SITE & ENVIRONMENTAL PROTECTION

Nuna East will have an ongoing cleanup plan in order to keep up with the required progression of the work. The quarry site will be kept level and tidy on completion of the quarry activities. In the event that the quarry floor soil is contaminated. The remediation plan will be to immediately clean up the area and place the contaminated soils into drums and keep stored on to a lined pad in preparation for transporting off site to a certified land fill. All contaminated drums will be labeled as such with TDG and DFO requirements.

At the completion of the quarry development, the typical cut depth is expected to be no more than about 1 m deep. Trimming of the slopes will be completed with to 3H to 1V grades.

The pit floor will be graded with a dozer to promote free drainage. Baselines and survey elevations will be set into place in order to ensure proper drainage. This will remain consistent through the quarry development.

6.2 WATER DIVERSION AND PROTECTION

As described previously, the quarry development will ensure positive drainage for the quarry floor. On completion of the operations and final clean-up of the quarry, the positive drainage course will be improved to enhance drainage requirements. Based on the initial development of the quarry, no disruption to drainage courses will be encountered. No ‘man made materials’ will be placed i.e. culverts, drainage structures, etc. into the quarry development. Upon completion of the project, the culvert described in Section 3.1 above will be removed and the creek bed restored to natural condition.

6.3 SLOPING/BENCHING

Nuna East will maintain a progressive maintenance program ensuring that the quarry is kept sloped and contoured throughout the project. Experienced operators will adhere to the Northern Land Use Guidelines for the reclamation of the quarry.

6.4 CAMP RECLAMATION AND WASTE DISPOSAL

Camp facilities will not be installed or operated at the quarry site.

6.5 ROAD CLOSURE

The upgraded haul road from the airstrip to the quarry site will be handed over to the ECCC site manager upon completion.