Issued for Tender Specifications for the Environmental Site Remediation at Gordon Lake, Northwest Territories

Project No.: R.057573

Prepared by: Stantec Consulting

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PART 1 - GENERAL

1.1 PRECEDENCE

.1 Division 1 Sections take precedence over technical specification sections in other Divisions of this specification.

1.2 BACKGROUND INFORMATION

- .1 Background Information for the Gordon Lake Group Sites
 - .1 The Gordon Lake Group (GLG) Sites are nine mine and exploration sites (Burnt Island, Camlaren, Goodrock, Kidney Pond, Murray Lake, Storm Property, Treacy, Try Me and West Bay) located 110 km northeast of Yellowknife around Gordon Lake, Northwest Territories (NT). These nine sites are no longer maintained by the original occupants and therefore, Indigenous and Northern Affairs Canada (INAC), through the Contaminated Sites Program (CSP), are now responsible for the environmental remediation of these sites. INAC has retained Public Works and Government Services Canada (PWGSC) Northern Contaminated Sites Group to assist in coordinating the environmental remediation program on its behalf. All of the sites are located on Crown land, managed by the federal government.
 - .2 **Site Hazards:** Potential site hazards at the GLG sites include:
 - .1 Abandoned site buildings such as cabins and shacks;
 - .2 Abandoned infrastructure such as core racks, docks and concrete pads;
 - .3 Co-mingled, metals and petroleum hydrocarbon (PHC) impacted soil;
 - .4 Hazardous waste such as asbestos-containing material, lead-containing paint and batteries;
 - .5 Mine openings such as shafts;
 - .6 Non-hazardous waste such as wood and metal debris;
 - .7 Tailings;
 - .8 Trenches;
 - .9 Underground Workings;
 - .10 Unfired Explosives;
 - .11 Waste Rock:
 - .12 Wildlife.

For a comprehensive list of hazards see the Hazardous and Non-hazardous Material Inventory in Appendix A and the Site Wide Hazard Assessment report documented under the supplemental documents.

.3 **GLG Site Access:** Access to the sites in the summer is by fixed-wing aircraft on floats or helicopter. Winter access to the sites is via the Tibbitt to Contwoyto Winter Road Joint Venture (JV) that runs through the middle of Gordon Lake (north-south), connecting the Ingraham Trail (Highway 4) to the sites northeast of Yellowknife. Spur roads off the Tibbitt to Contwoyto Winter Road JV to each of the sites requiring road access would be required. A Routing Study included in the Remedial Action Plan (Stantec, 2016) presents proposed winter spur road routes, also presented on Drawing C-01. Note that sites with minimal work required should be considered for use of heli-portable equipment. The easting/northing and latitude/longitude coordinates for each site are presented in the table below.

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Coordinates for GLG Site Locations

Site	Distance to Yellowknife (m)	Easting	Northing	Latitude	Longitude
Burnt Island	93427	390583	6994487	63.063316	-113.165136
Try Me	83925	374546	6995744	63.069387	-113.483110
Murray Lake	81169	378134	6989336	63.013144	-113.407426
Goodrock	91652	391626	6990869	63.031177	-113.142138
Storm Property	89890	392362	6987434	63.000593	-113.125360
Camlaren	86059	388375	6986147	62.987838	-113.203133
Kidney Pond	78763	381568	6982743	62.955158	-113.334924
Treacy	77456	381077	6981363	62.942623	-113.343596
West Bay	78808	386382	6977315	62.908017	-113.236380

.2 Background Information for Burnt Island

- Site Description: Burnt Island is located on Gordon Lake, specifically located near the central portion of the lake towards the east side. Areas of Burnt Island include the Knutsen Camp, Tailings Impoundment Area, Shaft Area, Waste Rock Area, Old Saw Mill and Old Mill Area. The site consists of remains from the old gold mine projects. The Knutsen Camp includes an aboriginal grave site, a sump, a dock, several small cabins and building footprints, burn pits, and non-hazardous debris including (but not limited to) tin can dumps and drill core. The Shaft Area includes a shaft, a headframe, a pipe rack, a core rack, burn pits, drill rig with brakes containing asbestos material, waste rock and non-hazardous debris including (but not limited to) wood and metal debris. The Waste Rock Area includes waste rock piles, and a portal. The Old Sawmill Area contains non-hazardous debris including (but not limited to) a tin can dump, and wood and metal debris. The Old Mill Area includes mill buildings, trenches, a burn pit, and waste rock piles.
- Site History: Burnt Island is a former gold mine that was active in the 1940s, again in the 1980s and finally between 1989 and 1990. Between 1942 and 1945, exploration and development work began which included the construction of a camp, milling plant and the sinking of an inclined shaft. In the 1980s, activity recommenced with extensive exploration through diamond drilling and construction of an underground portal to access an ore zone which was located underneath the shaft. In 1993, some buildings and equipment were removed or demolished and boards were placed on the decline. There was also a report of 454 L of P-50 diesel fuel spilled at an unknown location on Burnt Island. The Burnt Island site has two active mineral claims held by Pasinex Resources Limited (expires in 2031) and Humphries (expires in 2029).
- .3 **Site Location:** The site is located approximately 93 km northeast of Yellowknife, NT on Gordon Lake at approximately 63.063°N and 113.165°W.
- .4 **Site Access:** Access roads at Burnt Island consist of narrow all-terrain vehicle (ATV) trails. The trails are generally located between the Tailings Impoundment Area, the Waste Rock

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Area and the Knutsen Camp Area. One dock is present on the southeast side of the site (near the Knutsen Camp) but is in a state of disrepair. The approach to the access trail from the water is relatively steep in this area of the site. The water level of Gordon Lake near the Old Mill Area was observed to have been very shallow and a steep bedrock outcrop was also observed at the Old Mill Area.

.3 Background Information for Camlaren

- Area North and Mine Area South), North Cabin and Zenith Island. The Mine Area (broken into Mine Area North and Mine Area South), North Cabin and Zenith Island. The Mine Area consists of various items from mining activities, including (but not limited to) the tailings containment area, collapsed structures, a wooden culvert, a trench, an old chimney, vent raise and pipe vents, mill pad, hoist pad, mine shaft cap, old dock, several burn pits, concrete divide, drums, a fuel tank, non-hazardous debris including crucibles, wood debris, metal debris, hoses, PVC piping and hazardous waste including burned batteries. The North Cabin area consists of old remnants including (but not limited to) remains of former structures, drums, burn pits and solid non-hazardous debris including (but not limited to) wood debris, metal debris, crucibles, tin cans, drill cores, stone stove, and hazardous waste including (but not limited to) burned batteries. Zenith Island consists of multiple trenches, waste rock piles, a shaft and non-hazardous debris including (but not limited to) wood debris, metal debris, tin cans, and drill rods
- Site History: Camlaren is a former gold mine that was first active in the late 1930s, after mineral claims on Muir and Zenith islands were staked in 1936. Between the late 1930s and the early 1960s, exploration on the islands was intermittent. Activities on the islands continued until 1982, when the site was decommissioned. During this time, old structures such as the manager's house, bunkhouse, cookhouse and assay lab were demolished and heavy equipment, structures, and bulk fuel storage tanks were removed. In 1991, the remaining buildings on-site were removed while some of the debris was dumped into shafts. The shafts and vent raise were capped with concrete. Camlaren has an active mineral claim held by Lakeland Resources that expires in 2018.
- .3 **Site Location:** The site is located approximately 86 km northeast of Yellowknife, NT on Gordon Lake at approximately 62.988°N and 113.203°W.
- .4 Site Access: Access roads at the site consist of narrow ATV trails on the southern portion of Muir Island. Historical information for Camlaren indicates that larger equipment accessed the site. A wooden culvert in disrepair is located in the centre of a trail that extends west of the tailings containment area. The former hoist pad was noted to be a large flat surface with little vegetation. No known docks, access roads or trails were observed at either the North Cabin Area or Zenith Island. Remnants of a former dock were observed on the southern portion of Muir Island.

.4 Background Information for Goodrock

- .1 **Site Description**: Goodrock is located on the eastern shore of Gordon Lake, southeast of Green Island. The site consists mainly of the Camp Area and Mill Area. The Camp Area includes (but not limited to) cabins, trenches, waste rock, an incinerator, drums, non-hazardous debris including tin cans, drill core, wood and metal debris and hazardous materials including batteries. The Mill Area includes (but not limited to) a north mine shaft, south pit, trenches, waste rock, crusher foundation, and non-hazardous debris including tin cans, drill cores, wood debris, metal debris, pipes, and crucibles.
- .2 **Site History:** In 1937, Goodrock was identified as having potential for profitable amounts of gold, tungsten and other valuable minerals. Mineral claims have been staked a minimum of eight separate times for the site. The first claim that was staked was in 1938, when three

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veins were trenched and a shaft was sunk to 40 feet at one vein. In 1942, an examination of the vein system was conducted and showed that tungsten ore was present, which was a valuable metal for the ongoing war effort at that time. Records of duration or volume of ore mined are not available.

- .3 **Site Location:** The site is located approximately 92 km northeast of Yellowknife, NT on Gordon Lake at approximately 63.031°N and 113.142°W.
- .4 Site Access: Access roads, trails or docks have not been observed at Goodrock, with the exception of a former dock in the Mill Area and a private dock in the Camp Area. Access to Goodrock from Gordon Lake during non-frozen conditions has previously been via helicopter and is considered difficult due to the marsh environment and various watercourses present between Gordon Lake and Goodrock Mill Area. A traditional snowmobile trail exists near the watercourse which passes the Mill Area.

.5 Background Information for Kidney Pond

- .1 Site Description: Kidney Pond is located on the southwestern portion of Gordon Lake, within Knight Bay. The site includes the 1983 Camp, Exploration Camp, 1939 Camp, Southeast Portal Area, Portal Area and Kidney Pond Area. The site consists of various remaining items from the historical mining activities. The 1983 Camp area includes (but not limited to) non-hazardous waste (including a wood platform, latrine, pipes, burn pits, crucibles and metal jars), hazardous waste (including battery remnants) and a dock. The Exploration Camp area includes (but not limited to) non-hazardous waste (including a cabin footprint, spent blasting caps, core boxes and cans), trenches and scattered waste rock. The 1939 Camp area includes non-hazardous waste (including a wood cabin with walls intact, former building, building footprint, core shack, drill core, core boxes, wood platform and cans). The Southeast Portal Area includes trenches. The Portal Area includes (but not limited to) non-hazardous waste (including a burn pit, core racks, drums, crucibles, blasting caps, an airtight stove, etc.), hazardous waste (including a battery), trenches, a portal and a large waste rock area. The Kidney Pond Area includes (but not limited to) non-hazardous waste (including a burn pit, cabin footprint, core racks and metal pipe), trenches and a potential dock.
- .2 **Site History:** Kidney Pond had its first claim staked in 1937, when samples were taken by Borealis Syndicate, 25% of which returned gold. The next claim was staked around 1944 and diamond drilling occurred until 1947. In 1978, the claim was re-staked and drilling ensued throughout the 1980s, with various claims staked. When gold prices rose in 1986, there was an attempt to try to upgrade zones that had been classified as potential ore reserves to proven ore reserve zones. Work ceased in 1987 because it was not economically feasible. Although new claims were staked after 1987, no recorded work was conducted on the site.
- .3 **Site Location:** The site is located approximately 79 km northeast of Yellowknife, NT on Gordon Lake at approximately 62.955°N and 113.335°W.
- .4 **Site Access:** Access roads at Kidney Pond consist of narrow ATV trails. One wooden dock in good condition exists at the 1983 Camp.

.6 Background Information for Murray Lake

Site Description: Murray Lake is located approximately 8 km west of Gordon Lake. Areas include the 1938/2008 Camp and the Trench Area. The site consists of various remaining items from the historical mining activities. The 1938/2008 Camp area includes (but not limited to) non-hazardous waste (including structure remains, burnt tent frames, sumps, wood waste and tin cans). The Trench Area includes (but not limited to) non-hazardous waste (including a burnt tent frame, structure remnants and various waste piles), a main shaft, a deep trench/shaft, several trenches and scattered waste rock.

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- Site History: In the 1930s, Murray Lake first gained interest for its potential to have a feasible amount of gold to mine. The first recorded claim was staked in 1937, but exploration did not commence until 1938. The exploration continued until 1939, when over 110 pits/trenches were excavated for gold, before closure of the site. The closure of the site continued until 1957 when the next claim was staked. The exploration projects were relatively small as the amount of mining activities depended on the fluctuating prices of gold. Various small claims were staked from the 1980s to 1993, although no records of the findings or operations were recorded. In the 1990s, forest fires occurred and were the probable cause for destroying the majority of structures present at the site. The Murray Lake claim was re-staked in 2003 and again in 2006 as a geological study was conducted. In 2008, Triple Dragon Resources Incorporated conducted exploration. The current mineral claim will expire in 2016, although several areas have been identified as having gold mineralization
- .3 **Site Location:** The site is located approximately 81 km northeast of Yellowknife, NT on Murray Lake at approximately 63.013°N and 113.407°W.
- .4 **Site Access:** There is a historical winter road connecting Murray Lake to Gordon Lake, which with refurbishment could allow winter access to the Murray Lake and Try Me sites if required. The waterbodies surrounding Murray Lake were noted to be shallow (i.e. West Bay as well as shallow shorelines within West Bay). Additionally, the non-frozen conditions of West Bay and various watercourses in the general area were reportedly marshy. No other known road, trails or docks were observed at Murray Lake.

.7 Background Information for Storm Property

- .1 **Site Description**: Storm Property is located on the east side of Gordon Lake, towards the middle of the span of the lake and includes the Shaft Area and Camp Area. The Shaft Area includes (but not limited to) trenches, a North and South Shaft, waste rock, and non-hazardous debris including drill core, metal spool, and wood and metal debris. The Camp Area includes (but not limited to) non-hazardous debris including tin can dumps, drill core, metal and wood debris, and hazardous materials including batteries.
- Site History: The initial claim was staked at Storm Property around 1941, with the initial exploration target being gold. Once exploration commenced, a profitable amount of tungsten ore was found. Diamond drilling was also concurrently being conducted, which resulted in a total of seven holes being drilled alongside two shafts as well as substantial trenching. Claims began to lapse in 1977, however were re-staked in 1980. Between 1977 and 1980, samples were assessed for gold, silver and tungsten. In the late 1990s, forest fires impacted the east side of Gordon Lake and destroyed many of the existing structures that were present at the site.
- .3 **Site Location:** The site is located approximately 90 km northeast of Yellowknife, NT on Gordon Lake at approximately 63.001°N and 113.125°W.
- .4 **Site Access:** No known access roads, trails or docks have been observed at Storm Property.

.8 Background Information for Treacy

Site Conditions: Treacy is located on the southwestern portion of Gordon Lake, within Knight Bay. The site includes the Mill Area and the Camp Area. The Mill Area includes (but not limited to) non-hazardous waste (including mill remains, a burn pit and garbage, hazardous waste (including lead-based paint on scattered wood debris), trenches (including East Trench and West Trench), tailings and waste rock. The Camp Area includes (but not limited to) non-hazardous waste (including structure remains, building pad, drums, can dumps and stove remnants).

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- .2 Site History: Treacy had its first claim staked in 1945 and trenching of veins began in 1947 for mineral extraction, including gold and sulphides. Eight diamond drill holes were completed in 1950 and processing of ore began. The processing of the ore at the site had appeared to be by mechanical means as opposed to chemical processing. In 1953, the milling of ore was discontinued and no substantial action was taken at the site until the claims lapsed in 1980. Claims were re-staked in 1982 and exploration began in 1985 for minerals. More claims were staked in 1994 and again in 2003, but lapsed in 2005.
- Site Location: The site is located approximately 78 km northeast of Yellowknife. NT on .3 Gordon Lake at approximately 62.943°N and 113.344°W.
- Site Access: No known access roads, trails or docks were observed at Treacy. Shallow .4 water depth and gentle approach in proximity of the Mill Area was observed.

.9 Background Information for Try Me

- .1 Site Conditions: Try Me is located near the shore of Mac Lake, which is approximately 12 km west of Gordon Lake. Areas include the Western Camp Area and Main Camp Area. The Western Camp includes (but not limited to) non-hazardous debris including wood and metal debris, drums, and tin cans and hazardous materials (batteries). The Main Camp Area includes (but not limited to) a mine shaft, trenches, waste rock, structure remain, core racks, drums, former dock, rail spur, hazardous waste (batteries), and non-hazardous debris including wood and metal debris.
- .2 Site History: Try Me staked its first claim in 1938, with the focus on the gold-bearing quartz vein. In 1940, the shaft was sunk and it reached a depth of nearly 40 feet in 1941. No further recorded mining activity occurred until 1989, when claims were transferred and the property was calculated to have an ore reserve of approximately 96,000 tons. With the transfer of the claim, additional drilling was conducted in 1990 on a ten meter grid to confirm the grade of the material and continuity of the top portion of the vein. Another claim was staked in 2003 and was scheduled to lapse in 2012; however no confirmation of a renewal of this claim has been specified.
- Site Location: The site is located approximately 84 km northeast of Yellowknife, NT on Mac .3 Lake at approximately 63.070°N and 113.483°W.
- .4 Site Access: No known access roads, trails or docks were observed at Try Me. Variable topography and significant vegetation were observed at the site.

.10 **Background Information for West Bay**

- Site Conditions: West Bay is located on the south portion of Gordon Lake, towards the east .1 side of the lake. The site consists mainly of a South Area, which includes (but not limited to) non-hazardous waste (including structure remains, core racks, drums and metals cans), hazardous waste (including batteries), a dock, trenches, an open pit, tailings and two large waste rock areas.
- .2 Site History: West Bay staked its first claim in the mid-1940s and began mining for gold in an open pit from 1947 to 1948. During this time, trenching and milling occurred concurrently. It was recorded that the ore was being processed on-site in a small mill operation with the use of a mercury amalgamation process, until work ceased in September of 1948. Work resumed when exploration drilling occurred from 1982 to 1984 and identified additional resources of gold around the area of the open pit. The second round of open pit mining occurred in 1990. In 1991, the ore material was transported to Yellowknife for processing. There has been no further mining activities reported.
- Site Location: The site is located approximately 79 km northeast of Yellowknife, NT on .3 Gordon Lake at approximately 62.908°N and 113.236°W.
- .4 Site Access: Access roads at West Bay consist mainly of narrow ATV trails. A cleared access trail was observed south of the waste rock piles. A former dock was reportedly

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located with the South Area, along the northern shoreline of Gordon Lake. A more gradual approach was observed from the water to West Bay in the most southern bay compared to the area of the former dock.

.11 Existing Camp: There are no usable existing camps at any of the GLG Sites. A tourist-outfit fishing lodge/camp is located on Gordon Lake (Sandy Point Lodge), approximately 3 km north of Burnt Island.

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.12 Supporting Documents will be provided as attachments to the posting on Buy and Sell and on Buzzsaw:

(https://projectpoint.buzzsaw.com/_bz_rest/#/_bz_rest/Web/Item/Items?folder=572574&count=50&st art=0&ownership=Home). Attachment 001 is the directory and provides a summary of all supporting documentation related to this project as summarized in the table below. Note, these documents are provided for informational purposes only. Work requested for this request for proposals is summarized in the specifications.

Site Name IEMS Site #	Report Title
Burnt Island SM220	Burnt Island Mine Phase III Environmental Site Assessment, report completed by SLR for PWGSC, dated March 2013
	Phase II Environmental Site Assessment SM220 - Burnt Island, report prepared by WESA for PWGSC, dated March 2010
Camlaren SM205	Camlaren Mine Phase III Environmental Site Assessment, report prepared by SLR for PWGSC, dated March 2013
	Phase II Environmental Site Assessment SM205 - Camlaren Mine, report prepared by WESA for PWGSC, dated March 2010
Goodrock SM466	Goodrock Mine Phase III Environmental Site Assessment, report prepared by SLR for PWGSC, dated March 2013
	Phase II Environmental Site Assessment SM466 - Goodrock Mine, report prepared by WESA for PWGSC, dated March 2010
Kidney Pond / Knights Bay	Kidney Pond Mine Phase III Environmental Site Assessment, report prepared by SLR for PWGSC, dated March 2013
SM474	Phase II Environmental Site Assessment SM474 - Kidney Pond/Knight Bay, report prepared by WESA for PWGSC, dated March 2010
Murray Lake SM488	Phase I/II Environmental Site Assessment Murray Lake Property SM490, report prepared by Columbia Environmental for PWGSC, dated March 2013
Storm Property SM471	Phase II Environmental Site Assessment SM471 - Storm Property, report prepared by WESA for PWGSC, dated March 2010
Treacy SM475	Treacy Mine Phase III Environmental Site Assessment, report prepared by SLR for PWGSC, dated March 2013
	Phase II Environmental Site Assessment SM475 - Treacy Mine, report prepared by WESA for PWGSC, dated March 2010
Try Me SM488	Phase I/II Environmental Site Assessment, Try Me Property (SM488), report prepared by Columbia Environmental for PWGSC, dated March 2013
Westbay/ Blackrock SM302	Phase I Environmental Site Assessment West Bay/Black Ridge Gold Mine SM 211 & SM 302, report prepared by Dillon Consulting Limited for PWGSC, dated March 2007

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Site Name IEMS Site #	Report Title	
	Phase II Environmental Site Assessment For West Bay/Blackridge Mine SM 302, report prepared by EBA for PWGSC, report dated April 2009	
	Phase III Environmental Site Assessment, West Bay Mine, Gordon Lake, Northwest Territories, report prepared by AECOM for PWGSC, dated March 31, 2010	
Overall Gordon Lake Group	Human Health and Ecological Risk Assessment (HHERA), Gordon Lake Mine Sites, report prepared by SLR for PWGSC, report dated March 2014	
	Status Memo, Gordon Lake Mine, report prepared by SLR for PWGSC, dated March 2014	
	Final Report – Technical Review of HHERA for Nine Former Mine Sites, Gordon Lakes, Northwest Territories, report prepared by Stantec Consulting Ltd., report dated March 7, 2014	
	 Final Report – Review of SSRTs, Summary, and Conclusions of the HHERA for Nine Former Mine Sites, Gordon Lakes, Northwest Territories, report prepared by Stantec Consulting Ltd, report dated March 31, 2014 	
	Basis of Estimate and Cost Estimate – Remediation of Nine Former Mine Sites, Gordon Lake, Northwest Territories, report prepared by Stantec Consulting Ltd., dated March 31, 2014	
	Remedial Options Analysis Gordon Lake Mines, Northwest Territories, report prepared by Stantec Consulting Ltd, dated March 31, 2014	
	 Supplemental Assessment of Site-Specific Remedial Targets for Nine Former Mine Sites, Gordon Lake, Northwest Territories, letter report prepared by Stantec Consulting Ltd. for PWGSC, dated December 15, 2014 	
	Gordon Lake Mine Site Borrow Assessment, report prepared by Stantec Consulting Ltd. for PWGSC, dated January 28, 2015	
	Final Report – Gordon Lake Gap Analysis, report prepared by Stantec Consulting Ltd. for PWGSC, dated February 27, 2015	
	 Addressing Environment Canada Concerns Re: Site-Specific Remedial Targets for the Gordon Lake Mine Sites, Northwest Territories, letter report prepared by Stantec Consulting Ltd. for PWGSC, dated March 31, 2015 	
	Final Report: Gordon Lake Group- Revised Gap Analysis, report prepared by Stantec Consulting Ltd. for PWGSC, dated July 17, 2015	
	Final Report: Gordon Lake Group- Revised Detailed Work Plan, report prepared by Stantec Consulting Ltd. for PWGSC, dated June 24, 2015	
	Archaeology Investigation: Final Permit Report, report prepared by Points West for Stantec Consulting, dated March, 2016	
	Final Report: Gordon Lake Group Gap Assessment Report, report prepared by Stantec Consulting Ltd. For PWGSC, dated March 16, 2016	
	Final Report : Gordon Lake Group Remedial Action Plan, report prepared by Stantec Consulting Ltd. for PWGSC/INAC, dated March 31, 2016	

SUMMARY OF WORK

1.3 DESCRIPTION OF WORK

- .1 Work of this Contract comprises the site remediation activities at the GLG Sites including, but not limited to, the following:
 - .1 Health and safety:
 - Prepare planning documents and submittals including but not limited to, Site-Specific Health and Safety Plan (SSHSP), as specified in Section 01 35 32 Site Specific Health and Safety Plan.
 - .2 Implement the SSHSP.
 - .2 Environmental protection:

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- .1 Prepare planning documents and submittals including but not limited to:
 Environmental Protection Plan, as specified in Section 01 35 43 Environmental
 Procedures; and Spill Contingency Plan, as specified in Section 01 35 32 Site
 Specific Health and Safety Plan.
- .2 Implement environmental protection measures.
- .3 Transportation infrastructures (dependant on site and access routes proposed by Contractor):
 - .1 Design and plan temporary ice road spurs off the Tibbitt to Contwoyto Winter Road JV for mobilization and demobilization of equipment, support facilities, and materials to/from the site. Coordinate with the Tibbitt to Contwoyto Winter Road JV to address logistics such as access, orientation and road royalties. Detail methods to determine ice road spur alignments within the Mobilization and Demobilization Plan.
 - .2 Ice road spurs construction to the GLG Sites:
 - .1 Construct in accordance with the authority having jurisdiction (AHJ) and/or applicable guidelines and regulations.
 - .2 Ice profiling will be required throughout the construction activities.
 - .3 Construct and provide access to borrow sources as required.
 - .4 Provide access to sites for required remediation equipment as required.
 - .5 Maintain site access infrastructure as required.
 - .6 Upgrade site trails as required to facilitate remediation activities.
 - .7 Install floating docks and/or helicopter landing pads and/or barge landing pads dependent on site and access method selected.
 - .1 Operate in accordance with the authority having jurisdiction (AHJ) and/or applicable guidelines and regulations including Department of Fisheries and Oceans.
 - .8 Prepare planning documents and submittals including but not limited to, Winter Road Construction Plan and Conditions Reports, as specified in Section 01 80 00 Winter Road and Site Access Upgrade Plan, as specified in Section 31 22 13 Grading and Earthworks Construction.
- .4 Seasonal mobilization and demobilization of all personnel, equipment, support facilities and materials to/from the GLG Sites required to complete the Work.
- .5 Impacted Soil:
 - .1 Excavate, on-site stockpile, transport and dispose of impacted soils.
 - Dispose of metals and co-mingled (i.e. metals and petroleum hydrocarbon) impacted soils in the Waste Rock and Soil Containment Area (WRSCA) or Tailings and Soil Containment Area (TSCA) (site dependent as outlined in the Hazardous and Nonhazardous Material Inventory in Appendix A).
 - .3 Treat petroleum hydrocarbon impacted soils in the Landfarm.
 - .4 Backfill and/or grade excavated impacted soil areas with non-impacting waste rock and/or other granular material (i.e. borrow material) where required.
 - .5 Prepare planning documents and submittals including but not limited to, Detailed Soil Remediation Plan, as specified in Section 02 61 00 Soil Remediation.

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.6 Hazardous Materials

- .1 Collect, consolidate, containerize, transport and dispose of solid hazardous materials and drum/tank contents off-site in accordance with the AHJ.
- .2 Prepare documents and submittals including but not limited to, Hazardous Materials Management Plan, as specified in Section 02 81 01 Hazardous Materials.

.7 Abandoned Site Buildings and Abandoned Infrastructure

.1 Dismantle and demolish remaining buildings and infrastructure, collect debris/waste, segregate waste streams, and transport and dispose of waste.

.8 Non-hazardous Waste

- .1 Incinerate unpainted wood and place ash waste (if non-hazardous) in the WRSCA or TSCA (site dependent).
- .2 Collect, consolidate, sort, transport and dispose of non-hazardous materials in the WRSCA or TSCA (site dependent).
- .3 Empty and clean drums and tanks and compact and dispose at either the WRSCA or TSCA (site dependent).

.9 Waste Rock

.1 Excavate, stockpile, transport and dispose of impacting waste rock in the WRSCA or TSCA (site dependent).

.10 Tailings

- .1 Excavate, stockpile, transport and dispose of tailings (from specific areas based on previous assessments) in the WRSCA or TSCA (site dependent).
- .2 Backfill and/or grade excavated impacted tailings areas with non-impacting waste rock and/or other granular material (i.e. borrow material) where required.
- .3 Cover the Tailings Area at Burnt Island with borrow material.

.11 Borrow/Quarry Sources:

- .1 Develop and reclaim borrow sources.
- .2 Prepare planning documents and submittals including but not limited to, Quarry Operations Plan, as specified in Section 31 05 16 Aggregate Materials.

.12 Provision of the following site support services:

- .1 Construct camps as specified in Section 01 54 00 Camp Facilities, including operation, maintenance, catering and janitorial service.
- .2 Provide and maintain Departmental Representative's Vehicles, as specified in Section 01 52 00 Construction Facilities.
- .3 Ensure safety, fire protection, office and medical services, as specified in Section 01 35 32 – Site Specific Health and Safety Plan.
- .4 Provide transportation services for Departmental Representative and Departmental Representative's support staff from Yellowknife to the GLG Sites.
- .5 Provide communication services for Contractor and Departmental Representative, as specified in Section 01 54 00 Camp Facilities.
- .6 Provide Wildlife Monitors, as specified in Section 01 35 32 Site Specific Health and Safety Plan.
- .7 Prepare Camp Facilities Plan and Plan of Construction Detailed, Camp Layout and Siting, as specified in Section 01 54 00 Camp Facilities.

.13 In addition to the above, site specific activities include the following:

- .1 Burnt Island
 - .1 Backfill the portal which is currently sealed with a wood structure over the opening.

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- .2 Backfill (if required to support a seal) the mine shaft and construct an engineered cap over the opening.
- .3 Cordon the surface areas above underground workings in areas that could be unstable to restrict access during remediation activities, in consultation with the mine inspector.
- .4 Place borrow material cover on the Tailings Area.

.2 Camlaren

- .1 Construct TSCA for existing tailings, impacted soils, waste rock, and non-hazardous waste, as specified in Section 31 22 13 Grading and Earthworks Construction and in Drawings No. C-CAM-06 to C-CAM-13.
 - .1 Prepare for construction.
 - .2 Place additional impacted material and non-hazardous materials.
 - .3 Install the engineered cover system.
 - .4 Install monitoring and instrumentation equipment.
- .2 Construct, operate and maintain a contaminated soils treatment system (Landfarm) for PHC impacted soil. Remediation of PHC impacted soil operation to be conducted at the on-site proposed Landfarm as specified in Section 31 22 13 Grading and Earthworks Construction and in Drawings No. C-CAM-14 to C-CAM-15.
 - .1 Prepare PHC Impacted Soil Treatment Plan.
 - .2 Decommission and regrade on-site Landfarm.
 - .3 Dispose/reuse treated soils.
- .3 Construct a permanent barrier surrounding the Stope/Crown Pillar Opening.
- .4 Cordon the surface area around the shaft and vent raise to restrict access (i.e. of heavy equipment.) during remediation activities.
- .5 Backfill the shaft (on Zenith Island) and construct an engineered cap over the opening.
- Backfill (if required to support a seal) the potential hollow area and construct an engineered cap (if required, depending on the backfilling stability).
- .7 Remove, crush and dispose of the hoist pad and mill pad in the TSCA.
- .8 Remove and dispose of the wooden culvert, then regrade the surrounding area.

.3 Goodrock

- .1 Backfill the North Mine Shaft and construct an engineered cap over the opening.
- .2 Backfill the South Pit.

.4 Kidney Pond

- .1 Construct WRSCA for existing waste rock, additional waste rock, impacted soils, and non-hazardous waste, as specified in Section 31 22 13 Grading and Earthworks Construction and in Drawings No. C-KID-08 to C-KID-16.
 - .1 Prepare for construction (i.e. place foundation material).
 - .2 Place additional impacted material and non-hazardous materials.
 - .3 Install the engineered cover system.
 - .4 Install monitoring and instrumentation equipment.
- .2 Backfill the portal and construct an engineered cap over the opening.

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- .3 Construct seep control system for portal seepage and install monitoring instrumentation (requirement to be confirmed based on summer 2016 data collection as indicated in Section 31 22 13 – Grading and Earthworks Construction).
- .4 Handle/dispose/detonate unfired explosives (i.e. blasting caps), if discovered, following recommendations of an explosives expert and in accordance with applicable guidelines and regulations.
- .5 Murray Lake
 - .1 Backfill the Main Shaft.
 - .2 Backfill the Deep Trench/Shaft.
- .6 Storm Property
 - .1 Backfill the South Mine Shaft.
 - .2 Backfill the North Mine Shaft.
- .7 Treacy
 - .1 Backfill the East Trench.
 - .2 Backfill the West Trench.
- .8 Try Me
 - .1 Backfill the shaft and/or construct an engineered cap over the opening (as required).
- .9 West Bay
 - .1 Construct a permanent barrier surrounding the Open Pit.

1.4 DEFINITIONS

- .1 Departmental Representative: Within the context of these Specifications, the term Departmental Representative refers to the person exercising the roles and attributes of Canada under the contract.
- Departmental Representative's Authorized Personnel: Within the context of these Specifications, the term Departmental Representative's Authorized Personnel refers to personnel appointed by Departmental Representative or authorized on site by Departmental Representative. Departmental Representative's Authorized Personnel provide recommendations/technical guidance to Departmental Representative as required, for the enforcement of these specifications.
- .3 Contractor: Principle Contractor as defined by the NWT Authorities Having Jurisdiction (AHJs), retained to undertake the Remediation Work as defined within the context of these specifications. The Contractor is the Prime Contractor, responsible for full discretion oversight and holds all liability.
- .4 Contractor's Site Superintendent: Contractor's resident site representative, who is authorized to make decisions on behalf of Contractor.
- .5 Provide: supply and install, operate, submit or any other procedure necessary to complete the work as intended.
- .6 Authorities Having Jurisdiction (AHJ): Government agency or sub-agency that regulates the codes and standards that are to be met during the remediation processes.
- .7 GLG Sites: the approximate locations of the GLG Sites are shown on Drawing C-01.

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- .8 Sub-contractor: A contractor under contract to Principle Contractor and subject to the same contract requirements as the Principle Contractor.
- .9 Mine Site Manager: person appointed as the manager for a mine as defined in the Mine Health and Safety Act (S.N.W.T. 1994, c.25), as amended.
- .10 Metals impacted soil: Soils containing concentrations of metals with Site Specific Remedial Targets (SSRTs), at concentrations greater than the SSRTs for the GLG Sites (Stantec Remedial Action Plan, 2016).
- .11 Petroleum Hydrocarbon (PHC) impacted soil: Soils containing concentrations of PHC fraction F1, F2 and/or F3 at concentrations greater than the SSRTs for the GLG Sites (Stantec Remedial Action Plan, 2016).
- .12 Co-mingled impacted soil: Soils containing both PHC impacted soil and Metals impacted soil as defined by the SSRTs for the GLG Sites (Stantec Remedial Action Plan, 2016)
- .13 Impacting Waste Rock: Waste rock material showing evidence of down-gradient impacts and identified as requiring remediation due to potential high risk associated with its potentially acid generating (PAG) and/or metal leaching (ML) characteristics.
- .14 Waste Rock and Soil Containment Area (WRSCA): Containment area for the disposal of non-hazardous waste, metals impacted soil, co-mingled impacted soil, tailings and impacting waste rock from Kidney Pond, Treacy, West Bay, and Try Me.
- .15 Tailings and Soil Containment Area (TSCA): Containment area for the disposal of non-hazardous waste, metals impacted soil, co-mingled impacted soil, tailings and impacting waste rock from Burnt Island, Camlaren and Goodrock.
- Landfarm: a facility for the ex situ treatment of petroleum hydrocarbon impacted soil that involves the placement, spreading and aeration of soils in thin layers or windrows.

1.5 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Requests for clarification and responses.
 - .4 Addenda.
 - .5 Change Orders.
 - .6 Reviewed shop drawings.
 - .7 Other modifications to Contract.
 - .8 Field test reports.
 - .9 Copy of approved Work Schedule.
 - .10 Manufacturers' installation and application instructions.
 - .11 Post in conspicuous location (Safety Board) in common area:

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- .1 Contractor EHS Policy.
- .2 Camp Rules and Zero Tolerance Policy.
- .3 Wildlife Policy.
- .4 Current list of Site Hazards (Site Wide Hazard Assessment).
- .5 MSDS binder(s).
- .6 Current list of Wildlife Sightings.
- .7 OSH Committee Meeting Minutes.
- .8 H&S signs as required by AHJ (Including but not limited to Fire Exit, Fire Extinguisher, First Aid Room, list of Medics and First Aid responders).
- .9 Emergency Response Team members.
- .12 Site Specific Health and Safety Plan (and all associated sections/plans)
- .13 Environmental Protection Plan (and all associated sections/plans)
- .14 Land Use Permit.
- .15 Water Licence.
- .16 Quarry Permit.
- .17 Labour conditions and wage Schedules.
- .18 Site Medic credentials.
- .19 Up-to-date record drawings.
- .20 Licence for radio communication.
- .21 All applicable Territorial permits and licences.
- .22 All applicable Federal permits and licences.
- .23 Copies of manifests and bills of loading.
- .24 Demolition Audit.
- .25 Hazardous material audit.
- .26 Worker Training Program.
- .27 Workers' Safety & Compensation Commission (WSCC) Notification of Project.
- .28 Letter of Good Standing with WSCC.
- .29 Kitchen permit and Food Handler Certification.
- .30 Burn permit.
- Other documents as specified and required by applicable guidelines, regulations, and authorities having jurisdiction.

1.7 WORK SCHEDULE

- .1 Provide and maintain Work Schedule in accordance with instructions of Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.
- .2 Keep the Departmental Representative advised of planned Work activities in accordance with the instructions of Section 01 33 00 Submittal Procedures.

1.8 CONTRACTOR USE OF SITE

- .1 Contractor use of site is restricted to the terms and conditions of the issued permits, and all applicable guidelines and regulations.
- .2 Do not disturb archaeological features as identified on the Drawings or as identified during the work.
- .3 Coordinate use of facilities and services under direction of Departmental Representative.

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- .4 Do not unreasonably encumber sites with materials or equipment.
- .5 Use of the site will comply with the environmental requirements of Section 01 35 43 Environmental Procedures.
- .6 Use of site is restricted as per Departmental Representative direction until substantial performance.
- .7 Sites are federal lands under INAC custody and all access must be authorized by the Departmental Representative. Lands between site property boundaries are GNWT lands under GNWT custody.
- .8 Commencement of demobilization will not occur without completion of Final Inspection and approval by Departmental Representative.

1.9 EXAMINATION OF SITE

- .1 Prior to mobilization, perform a Pre-Mobilization Site Visit to check field conditions and obtain actual conditions required to ensure correct execution of the Work, and notify Departmental Representative in writing, of all matters which could prejudice proper execution of the Work. Provide a minimum of fourteen (14) days notice to Departmental Representative prior to examining the site.
- .2 Commencement of mobilization constitutes acceptance of existing conditions, and verification of dimensions.

1.10 PERMITS AND LICENCES

- .1 INAC/PWGSC Representatives will obtain a Land Use Permit and Quarry Permit. All restrictions and requirements of these apply to Contractor.
- .2 Be responsible for obtaining and paying for all permits, licences and approvals associated with the development and operation of a construction camp.
- .3 Register, obtain and pay for all required licences and permits for individual tradesmen employed for Work as referenced in the various Sections of the Contract Specifications.
- Obtain and pay for any other licences or permits required to perform the activities required on site, e.g. burn permit, etc.
- .5 Provide supplemental information to the regulators for any necessary licence amendments or reporting requirements.
- .6 Pay all costs associated with complying with the requirements for the permits and licences noted in the above clauses.

1.11 SITE SUPERVISION

- .1 Designate Contractor's Site Superintendent to be on site at all times during construction, to have full authority to make decisions for Contractor, to be knowledgeable of the requirements of the contract, and to act upon Departmental Representative's instructions.
- .2 Employ Level 1 and Level 2 Supervisors on site as per GNWT WSCC Mine Health and Safety Act.
 Level 1 Supervisor to be on-site during the completion of all remedial activities at each site. The
 Level 1 Supervisor is responsible for providing direction to the on-site workforce. A Level 2
 Supervisor will be on-site when mine openings are being inspected and when the openings are being

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sealed, as a minimum. The Level 2 Supervisor is to be consulted throughout the completion of the remedial activities and is responsible for providing direction to the Site Superintendent.

.3 Notify Departmental Representative two (2) week in advance of Site Superintendent change and provide updated chain-of-command.

1.12 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings to assist with proper execution of the Work. These drawings will be issued for clarification only. Such drawings have the same meaning and intent as if they were included with plans referred to in Contract documents.

1.13 WORKER ORIENTATION SEMINAR

- .1 Develop, prior to the start of Work, course material for a Worker Orientation Seminar. The outline of this seminar will be approved by Departmental Representative and is intended to describe the remediation activities at the site, and provide instruction for the applicable health, safety, and environmental policies and regulations as related to the site Work activities. Course material will be prepared and presented in the English language and the local dialect.
- .2 Submit two (2) hard copies and one (1) electronic copy of the Worker Orientation Seminar course material to Departmental Representative for review at least 30 days prior to the seminar. Include information describing the facility to be used for conducting the seminars.
- .3 The Orientation Course will address, but is not necessarily limited to, the following topics:
 - .1 General Site Specific Health and Safety
 - .1 Team Work.
 - .2 Work attitudes/productivity.
 - .3 Anti-Harassment Policy.
 - .4 First aid procedures.
 - .5 Protective equipment and clothing.
 - .6 Safe operation of equipment and tools.
 - .7 WHMIS requirements.
 - .8 Wildlife awareness.
 - .9 Site-specific hazards.
 - .10 Key aspects of the Site Specific Health and Safety Plan.
 - .2 Project Communication
 - .1 Roles of Departmental Representative and Departmental Representative's authorized representatives.
 - .2 Roles of Contractor and Contractor's authorized representatives
 - .3 Lines of Project communication.
 - .3 Remediation Activities (Scope of Work): covering information listed in Section 1.3 Description of Work, including but not limited to:
 - .1 Demolition and containerization of demolition waste materials.
 - .2 Excavation and handling of contaminated soils.
 - .3 Asbestos abatement.
 - .4 Collection and disposal of site debris.
 - .5 Collection, containerization, and transportation of hazardous waste material.
 - .4 Regional Overview of the site
 - .1 Land use of area (hunting, fishing activities, etc.).

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- .2 Location of site relative to communities.
- .3 Heritage resources including location of gravesites.

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- .4 Climate.
- .5 Geology and hydrology.
- .6 Flora and fauna.
- .5 Project Organization/Schedule/Administration
 - .1 Personnel policies.
 - .2 Supervisory reporting relationships.
 - .3 Communication.
 - .4 Payroll and banking procedures.
 - .5 Work Schedules and hours.
 - .6 Camp rules.
- .6 Environmental Issues and Protection Procedures
 - .1 Climate.
 - .2 Land use.
 - .3 Water resources/fisheries.
 - .4 Terrestrial resources.
 - .5 Heritage resources.
 - .6 Spill contingency plans/procedures.
 - .7 Training activities
- .7 Work Specific Task Requirements
 - .1 Asbestos abatement.
 - .2 Contaminated soil clean-up.
 - .3 Demolition and material disposal.
 - .4 Transportation of Dangerous Goods (TDG).
 - .5 Permafrost protection.
 - .6 Environmental mitigation procedures.
 - .7 Emergency spill response training.
 - .8 Barrel collection and disposal/containerization.
- .4 Prior to personnel being on the site, conduct Worker Orientation Seminars for all supervisors, foremen, Contractor's general Workforce, Departmental Representative and Departmental Representative's Authorized Personnel staff based on the course material approved by Departmental Representative.
 - .1 Temporary guests and visitors that have not taken the Worker Orientation Seminar shall be accompanied by the Contractor and/or Departmental Representative at all times while on the site.
 - .2 No individual will be allowed on the site unaccompanied unless Workers Orientation Seminar training has been taken.
- Provide a training seminar for supervisors, foremen, Departmental Representative, Departmental Representative's on-site support staff and Contractor's general Work force. Each person on site will attend one of the seminars. Require each attendee to sign a record of attendance upon completion of the seminar. Retain, for Departmental Representative's review at any time, this record of attendance. Training/orientation will be provided for site visitors on an as-needed basis.

1.14 MEASUREMENT FOR PAYMENT

.1 Work under this contract will be paid for as follows:

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- .1 Lump sum pay items will be paid at the lump sum price tendered for the Lump Sum Amount (LSA) listed in the Basis of Payment Form.
- .2 Unit price items will be paid at the unit price tendered for each unit price item listed in the Basis of Payment Schedule.
- .2 Include costs for work, goods or services required in this section that are not covered by appropriate payment clauses in other sections in the Lump Sum Amount (LSA).
- .3 Notify Departmental Representative of planned Work activities in accordance with requirements of Section 01 33 00 Submittal Procedures, and at least two (2) days in advance of operations to permit required measurements for payment.
- .4 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PAYMENT PROCEDURES FOR TESTING LABORATORY SERVICES

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PART 1 - GENERAL

1.1 GENERAL

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.
- .2 Provide and pay for all transportation and analyses required for all Contractor's samples to an accredited laboratory to meet the requirements specified.
- .3 Provide and pay for all transportation required for all Departmental Representative samples to the Departmental Representative's designated testing laboratory.

1.2 SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to the Departmental Representative within thirty (30) days of Contract Award, details of Contractor's proposed methodology to complete sampling and testing requirements including but not limited to:
 - .1 The name of the Contractor's proposed analytical laboratory and a certificate showing current certification to ISO 17025 and/or Canadian Association for Laboratory Accreditation Inc. (CALA) as applicable depending on testing.
 - .2 Details of proposed sampling personnel and protocols.
 - .3 Details of the proposed sampling packaging and transportation methods.
 - .4 Quality Assurance and Quality Control procedures for sampling, transportation, and laboratory analysis.
- .3 Proposed methodologies are to meet or exceed requirements of specifications, certified laboratory requirements, and industry best practice. The Departmental Representative will review the Contractor's submittal and the analytical laboratory must be approved prior to the start of Construction
- .4 The proposed analytical laboratory must be independent from the Contractor.

1.3 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory required for the following:
 - .1 Confirmatory testing as described in 1.5 below.
 - .2 Testing contaminated soil for classification to meet licensed disposal facility acceptance requirements.
 - .3 Leachate testing associated with contaminated soil, rock, tailings and sediments for the purpose of determining suitability for placement in containment areas.
 - .4 Compaction and gradation testing.
 - .5 Testing associated with the identification and characterization of hazardous waste materials.
 - .6 Testing required for quality assurance.

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- .2 Contractor will appoint and pay for testing services for quality control of Contractor's own Work including the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities including, but not limited to, those prescribed in the Land Use Permit, Quarry Permit, Burn Permit, Water Use Permit and all other applicable permits and/or regulatory requirements.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing of potable water as described in Contract and/or Guidelines for Canadian Drinking Water Quality (GCDWQ).
 - .4 Testing of hazardous waste materials in accordance with all appropriate regulations for packaging, transport and off-site disposal.
 - .5 Testing of solvent rinsate used during cleaning of barrels.
 - .6 Testing to determine the disposal requirements of oil-absorbent material used as a filter for liquid wastes resulting from equipment decontamination, fuel tank/pipeline cleaning and barrel processing operations.
 - .7 Testing of water resulting from all dewatering operations.
 - .8 Testing of wastewater as defined in Section 01 35 15 Special Project Procedures for Contaminated Sites.
 - .9 Testing of sewage effluent as indicated in Section 01 54 00 Camp Facilities or as directed by Departmental Representative.
 - .10 Testing of Hydrocarbon Contaminated Soil as described in Section 02 55 13 Contaminated Soil.
 - .11 Testing of wash water resulting from all cleaning activities, including barrel washing and equipment decontamination.
 - .12 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .13 All tests required by Contractor to ensure conformance and quality control of Contractor's Work.
 - .14 Inspection and testing required by the conditions of permits issued for the Work.
- .3 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected Work.
- .4 The analytical testing laboratory designated by Contractor to carry out off-site tests, to be approved by Departmental Representative and certified by CALA for the specific tests required and in advance of analytical testing. Submit copies of the laboratory's CALA certification to Departmental Representative upon request. The proposed independent laboratory must be independent from the Contractor.

1.4 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide assistance and access to Work to be inspected and tested by Departmental Representative.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and testing.

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.2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of tests.

- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Instruct testing laboratory to include Departmental Representative on result distribution list via facsimile or e-mail.
- .5 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .6 Maintain interior temperatures of coolers at approximately 4 degrees Celsius during transport.
- .7 Assume all responsibility for samples compromised during transport including all costs for resampling, shipping, analysis, and any resulting delays.
- .8 Work to be done in accordance with industry best practice standards for the transfer and transportation of samples as well as the Contractor's Quality Assurance and Quality Control Plan.

1.5 CONFIRMATORY TESTING

- .1 Refer to the Remedial Action Plan (RAP) (Stantec, 2016) for the Site Specific Remedial Targets (SSRTs) established for each mine site to be used by the Departmental Representative in determining if the remediation work has been satisfactorily completed.
- .2 Confirmatory testing will be carried out on contaminated soil areas by Departmental Representative's testing laboratory as follows:
 - .1 The actual location, frequency and method of testing will be determined by Departmental Representative.
 - .2 Soil sampling will be carried out by Departmental Representative within the perimeter of each contaminated soil excavation and at depth within the completed excavation area, immediately upon completion of excavation.
 - .3 Delineation will be based on boundary samples meeting the SSRTs, as defined in the RAP (Stantec, 2016).
- .3 If required, classification testing will be carried out at waste material processing areas to classify and delineate contaminated soil and other materials.
- .4 It is anticipated that test results will be available within approximately fourteen (14) calendar days from the date that samples are transported from the site for laboratory analysis. Deliver Departmental Representative's samples to Departmental Representative's designated testing laboratory within two (2) days maximum from site departure.
- Be responsible for all costs associated with the packaging, preservation, handling and transport of Departmental Representative's samples from the site to Departmental Representative's designated testing laboratory. It is critically important that Contractor ensures that the samples are expeditiously delivered from the site and transferred to the designated testing laboratory depot. Where cargo transfers are required from charter to commercial air service, provide personnel at transfer locations to facilitate timely transfers.

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PAYMENT PROCEDURES FOR TESTING LABORATORY SERVICES

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.6 Assume all responsibility for samples damaged during transport including all costs for resampling, shipping, analysis and any resulting delays.

1.6 MEASUREMENT FOR PAYMENT

- .1 The provision of packaging, handling and off-site transport of Departmental Representative's samples to the Departmental Representative's designated testing laboratory will be measured for payment by weight and paid under Item 01 29 83-1, Packaging, Handling and Transport of Departmental Representative's Samples in the Basis of Payment Schedule.
- .2 The provision of Contractor's Testing Requirements, including sample packaging, handling, off-site transport and testing of Contractor's samples at an accredited laboratory of choice, will be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .3 Except as indicated above, Work under this section will not be measured. Indicate cost of the Work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

ISSUED FOR TENDER

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PART 1 - GENERAL

1.1 DEFINITIONS

.1 Project Start-Up Teleconference: conference call to be held within ten (10) days of Contract Award and to include the Contractor, Departmental Representative, and representatives from Indigenous and Northern Affairs Canada (INAC) and Public Works and Government Services Canada (PWGSC).

PROJECT MEETINGS

- .2 Pre-Construction Meeting: meeting to be held prior to Contractor Mobilization at location of Contractor's choice and to include the Contractor, Departmental Representative, and representatives from INAC and PWGSC.
- .3 Pre-Mobilization Site Visit: Contractor's visit to the site with Departmental Representative to check field conditions and obtain actual conditions required to ensure correct execution of the Work prior to site mobilization.
- .4 Construction Meetings: meetings to be held on-site at approximately weekly intervals during the construction season and to include the Contractor, major Sub-Contractors, and Departmental Representative.
- .5 Daily Safety Meeting: meeting to be held on-site daily during the construction season and to include Contractor, all construction staff, and on-site Departmental Representative.
- .6 Weekly Safety Meeting: meeting to be held on-site on a weekly basis during the construction season and to include Contractor, all construction staff, and on-site Departmental Representative.
- .7 Joint Occupational Health and Safety Committee Meeting: meeting as required by Authorities Having Jurisdiction (AHJs).
- .8 Monthly Meeting: meeting to be held on-site at approximately monthly intervals during the construction season and to include the Contractor, Departmental Representative, and representatives from INAC and PWGSC.
- .9 Inter-Season Meeting: meeting to be held between construction seasons at location of Contractor's choice and to include the Contractor, Departmental Representative, and representatives from INAC and PWGSC.
- .10 Community Meeting: meeting to be held prior to construction commencing, after each construction season, and upon completion of project. The meetings are to be held in English with a translator and shall be open to the public and advertised by appropriate means in advance.
- .11 Post-Construction Meeting: meeting to be held after completion of construction at location of Contractor's choice and to include the Contractor, Departmental Representative, and representatives from INAC and PWGSC.
- .12 Contract Closeout Meeting: meeting to be held upon completion of the program in Yellowknife with the Departmental Representative, and representatives from INAC and PWGSC. This meeting will include a lessons learned component.

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1.2 ADMINISTRATIVE

- .1 Responsibilities of Departmental Representative:
 - .1 Schedule and administer Project meetings, as defined in Section 1.1, throughout the progress of the Work, at the call of Departmental Representative.

PROJECT MEETINGS

- .2 Prepare agenda for meetings unless otherwise specified.
- .3 Distribute written notice of each meeting five (5) days in advance of meeting date, except for Daily Safety Meetings and Weekly Safety Meetings.
- .4 Preside at meetings unless otherwise specified.
- .5 Record the meeting minutes unless otherwise specified. Include significant proceedings and decisions. Identify actions by parties.
- .6 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and affected parties not in attendance.
- .2 Responsibilities of Contractor:
 - .1 Provide physical space and make arrangements for meetings.
 - .2 Representative of Contractor, Sub-Contractor and suppliers attending meetings will be gualified and authorized to act on behalf of party each represents.

1.3 PROJECT START-UP TELECONFERENCE MEETING

- .1 Within ten (10) days after award of Contract, hold a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. The meeting will be a teleconference between all parties in attendance.
- .2 Departmental Representative, Contractor, INAC, PWGSC, major Sub-Contractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned a minimum of five (5) days before meeting.
- .4 Departmental Representative will chair the meeting and take minutes. Meeting will be informal and agenda to include the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Preliminary Schedule of Work.
 - .3 Preliminary Schedule of submission of Work Plan and Cost Breakdown and other submissions.
 - .4 Preliminary requirements for temporary facilities, site security, camp facilities, equipment and proposed methods of mobilization and demobilization to minimize disturbances to the environment.
 - .5 Set-up of Pre-Construction Meeting.

1.4 PRE-CONSTRUCTION MEETING

- .1 As per Project Start-up Teleconference Meeting, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- Departmental Representative, Contractor, INAC, PWGSC, major Sub-Contractors, field inspectors and supervisors will be in attendance.

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.3 Establish time and location of meeting and notify parties concerned minimum ten (10) days before meeting.

PROJECT MEETINGS

- Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing. .4
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 18 - Construction Progress Schedules -Bar (GANTT) Chart.
 - .3 Schedule of submissions in accordance with Section 01 33 00 - Submittal Procedures including but not limited to:
 - .1 Site Specific Health and Safety Plan.
 - .2 Emergency Response Plan,
 - .3 Spill Contingency Plan,
 - .4 Wildlife Management Plan,
 - .5 Insurances and transcripts,
 - .6 Equipment to be used by Contractor,
 - .7 Proposed camp facilities in accordance with Section 01 54 00 - Camp Facilities,
 - 8. Location of equipment and proposed methods for mobilization and demobilization,
 - Shop drawings and samples. .9
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Delivery Schedule of specified equipment.
 - .6 Site security in accordance with Section 01 54 00 - Camp Facilities and Section 01 56 00 -Temporary Barriers and Enclosures.
 - Proposed changes, change orders, procedures, approvals required, mark-up percentages .7 permitted, time extensions, overtime, administrative requirements.
 - 8. Departmental Representative provided products.
 - Record drawings in accordance with Section 01 33 00 Submittal Procedures. .9
 - Maintenance manuals in accordance with Section 01 78 00 Closeout Submittals. .10
 - Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 -.11 Closeout Submittals.
 - .12 Monthly progress claims, administrative procedures, and hold backs.
 - .13 Appointment of inspection and testing agencies or firms.
 - .14 Regulatory Issues
 - .15 Aboriginal involvement and reporting.
 - .16 Project photograph requirements.
 - .17 Requirements for Waste Management.
 - Regulatory Review of all Permits required to complete work. .18

1.5 PRE-MOBILIZATION SITE VISIT

- Prior to mobilization, perform a Pre-Mobilization Site Visit to check field conditions and obtain actual .1 conditions required to ensure correct execution of the Work. Site visit to include, at a minimum:
 - .1 Winter road track survey of proposed winter road alignments.
 - .2 Helicopter landing area/dock area condition assessments.

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PROJECT MEETINGS Page 4 of 9

- .2 Provide a minimum of fourteen (14) days notice to Departmental Representative prior to examining the site.
- .3 Departmental Representatives, Contractor, INAC and PWGSC will be in attendance.
- .4 Notify Departmental Representative in writing by submitting a Pre-Mobilization Site Visit Report within seven (7) days of completing the visit, of all matters which could prejudice proper execution of the Work.
- .5 Include payment for this item in Section 01 11 00 Summary of Work.

1.6 CONSTRUCTION MEETINGS

- .1 During course of Work and weeks prior to Project completion, Departmental Representative will schedule weekly progress meetings.
- .2 Contractor, major Sub-Contractors involved in Work and Departmental Representative are to be in attendance.
- .3 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Regulatory Review.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Project Schedule review, identifying activities that are behind schedule and providing measures to regain slippage.
 - .8 Corrective measures and procedures to regain projected schedule.
 - .9 Revision to construction Schedule.
 - .10 Progress Schedule, during succeeding Work period.
 - .11 Review submittal Schedules: expedite as required.
 - .12 Maintenance of quality standards.
 - .13 Review proposed changes for effect on construction Schedule and on completion date.
 - .14 Health, Safety and Security issues.
 - .15 Correspondence from AHJ or expected visits from AHJ.
 - .16 Camp requirements
 - .17 Other business.
- .5 Provide written explanations on activities which are overrunning estimated time. If any such activities are on the critical path, indicate what corrective action will be taken to bring them back on Schedule.

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1.7 SAFETY MEETINGS

Daily Safety Meetings: To be held on-site daily during the construction season and to include Contractor, all on-site staff, on-site Departmental Representative and Departmental Representative's authorized personnel. The Daily Safety Meeting may be split into task or crew specific meetings as required. Record attendance and discussion topic(s) for daily safety meeting(s) and make available to Departmental Representative.

PROJECT MEETINGS

- .2 Weekly Safety Meeting: Contractor to preside over weekly meetings for all site personnel during the contraction season. Minutes are to be recorded and attendance taken. Post minutes and attendance list on-site and provide copy to Departmental Representative within three (3) days of the meeting. May be combined with weekly Construction Meeting.
- .3 Joint Occupational Health and Safety Committee Meeting: hold meeting according to attendance and frequency requirements of AHJs.

1.8 MONTHLY PROGRESS MEETINGS

- .1 Departmental Representatives will schedule Monthly Progress Meetings to be held on-site.
- .2 Departmental Representative, Contractor, INAC, PWGSC, major Sub-Contractors, field inspectors, and supervisors will be in attendance.
- .3 Departmental Representative will notify parties five (5) days prior to meetings.
- .4 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.
- .5 Agenda may include the following:
 - .1 Summary of the previous month's site activities.
 - .2 Comparison of progress achieved with the Project Schedule.
 - .3 Schedules and action Contractor plans to take to get back on Schedule, if required.
 - .4 Confirmation of quantities.
 - .5 Health, Safety and Security issues.
 - .6 Summary of interactions with AHJ.
 - .7 Work plan for the following month.
 - .8 Camp requirements.
 - .9 Other business.

1.9 INTER-SEASON MEETINGS

- .1 Request a meeting of parties in contract to discuss the previous and upcoming construction season and resolve issues arising from same.
- .2 Departmental Representative, Contractor, INAC, PWGSC, major Sub-Contractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum ten (10) days before meeting.

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- .4 Departmental Representative will preside.
- .5 Agenda may include:
 - .1 Summary of the previous season's site activities.
 - .2 Comparison of progress achieved with the Project Schedule.
 - .3 Schedules and action Contractor plans to take to get back on Schedule, if required.

PROJECT MEETINGS

- .4 Confirmation of quantities.
- .5 Health, Safety and Security issues.
- .6 Summary of interactions with AHJ.
- .7 Work plan for the following season, if any.
- .8 Camp requirements.
- .6 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within seven (7) days after meeting.

1.10 COMMUNITY MEETINGS

- .1 Prior to the commencement of work and after each construction season is completed, arrange meetings with Departmental Representative, INAC, PWGSC, local leaders, officials, authorities and public in Yellowknife. Be prepared to discuss local hiring practices and any other items of operations which may impact upon the local communities. Minutes will be taken by Departmental Representative. Provide a sign-in sheet for attendees.
- .2 Contractor is responsible for advertising the community meeting at least seven (7) days in advance of the meeting. The meeting must be advertised in the local paper, on local radio, and posted within the town office, arena and community centre (if applicable). Postings and radio advertisements are to be pre-approved by INAC and the Departmental Representative. Proof of advertising and postings must be presented to the Departmental Representative.
- .3 Conduct presentations via computer and projector using "Power Point" software or using a similar suitable presentation. Provide wording in English. Submit presentations to Departmental Representative for review a minimum of fourteen (14) days prior to each community meeting.
- .4 Provide and pay for the following associated with these meetings:
 - .1 Meeting facility rental
 - .2 Coffee, tea, pastries, cookies, etc.
 - .3 All associated advertising costs.
- .5 Meeting minutes are to be distributed by the Departmental Representative to key stakeholders and shall include questions asked and answers provided and a list of attendees. The list of attendees will be recorded by the Departmental Representative. Meeting minutes shall be distributed within ten (10) days of the meeting date.

1.11 POST-CONSTRUCTION MEETING

.1 Within ninety (90) days after completion of construction, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. The meeting will be a meeting between all parties in Edmonton, Alberta. The Departmental Representative will provide a venue for the meeting.

.2 Departmental Representative, Contractor, INAC, major Sub-Contractors, field representatives and supervisors will be in attendance.

PROJECT MEETINGS

- .3 Establish time and contact information for the meeting and notify parties concerned minimum fifteen (15) days before meeting.
- .4 Departmental Representative will chair the meeting and take minutes. Meeting will be informal and agenda to include, but is not limited to:
 - .1 Outstanding contractual issues.
 - .2 Holdback release.
 - .3 Aboriginal Opportunity Considerations (AOC) Content.
 - .4 Lessons learned.
 - .5 Outstanding submittals.
 - .6 Outstanding reporting requirements.

1.12 CONTRACT CLOSEOUT MEETING

- .1 Request a meeting of parties in contract to discuss the results of the construction season, and document issues arising from same and the implemented solutions and lessons learned.
- .2 Departmental Representative, Contractor, INAC, major Sub-Contractor, field inspectors, and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned a minimum of ten (10) days before meeting.
- .4 Departmental Representative will preside.
- .5 Agenda shall include at a minimum:
 - .1 Summary of the season's site activities.
 - .2 Comparison of progress achieved with the Project Schedule.
 - .3 Schedules and action Contractor plans to get back on Schedule, if required.
 - .4 Confirmation of quantities.
 - .5 Health, Safety, and Security issues.
 - .6 Summary of all interactions with AHJ.
 - .7 Work plan for the following season, if any.
 - .8 Camp requirements.
 - .9 Lessons learned.
- Departmental Representative will record minutes of meetings, circulate to attending parties, and affected parties not in attendance within seven (7) days after meeting.

1.13 SUBMITTALS

.1 Provide submittals to the Departmental Representative for review. Include submittals as noted in Table 01 33 00-1 in Section 01 33 00 – Submittal Procedures.

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PROJECT MEETINGS

1.14 MEASUREMENT FOR PAYMENT

- .1 Costs for the Project Start-up Teleconference are incidental to the work.
- All direct costs for the Pre-Construction Meeting are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule. This includes, but is not limited to, arranging for meeting facilities and travel and accommodation costs for Contractor's personnel only. The Departmental Representative will provide and pay for all costs related to the Departmental Representative attendance at the Pre-Construction Meeting.
- .3 All direct costs for the Pre-Mobilization Site Visit are to be included as lump sum under LSA in the Basis of Payment Schedule. This includes, but is not limited to, transportation to site for all participants and accommodation costs for Contractor's personnel only.
- .4 All direct costs for the Post-Construction Meeting are to be included as lump sum under LSA in the Basis of Payment Schedule. This includes, but is not limited to, travel and accommodation costs for Contractor's personnel only.
- .5 The facilitation of Construction Meetings will be measured for payment by the meeting held and paid under Item 01 31 19-1, Construction Meetings, in the Basis of Payment Schedule.
- The provision of return transportation from Yellowknife to the Gordon Lake mine sites of the Departmental Representative's personnel during the Monthly Meetings will be measured by the number of person return trips, as described in Section 01 54 00 Camp Facilities, and paid under item 01 54 00-3 Departmental Representative and Departmental Representative Authorized Personnel Return Transportation -Yellowknife to Site, in the Basis of Payment Schedule.
- .7 The facilitation of Monthly Progress Meetings will be measured for payment by the meeting held and paid under Item 01 31 19-2, Monthly Progress Meetings, in the Basis of Payment Schedule.
- .8 All direct costs for the Inter-Season Meetings are to be included in the unit price bid for Inter-Season Progress Meetings at Location of Contractor's Choice, Item 01 31 19-3, as indicated in Basis of Payment Schedule. Contractor will arrange for meeting facilities. Contractor will be responsible for travel and accommodation costs for its own personnel only.
- .9 The facilitation of Community Meetings in Dettah, N'Dilo and/or the Yellowknife area will be measured for payment by the number of meetings and paid under Item 01 31 19-4, Community Meetings, in the Basis of Payment Schedule. Payment will include provision for transportation of five (5) Departmental Representative(s) and/or Authorized Personnel from the Contractor's Charter Base to Community Meeting Location.
- .10 The facilitation of Contract Closeout Meeting will be measured for payment by the meeting held and paid under Item 01 31 19-5, Contract Closeout Meeting, in the Basis of Payment Schedule.
- .11 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under LSA in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PROJECT MEETINGS

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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

CONSTRUCTION PROGRESS SCHEDULE BAR (GANTT) CHART

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PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar (GANTT) Chart: graphic display of Schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized Project management system.
- .3 Baseline: original approved plan (for Project, Work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven (7) days Work week and define Schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of Work periods (not including holidays or other nonworking periods) required to complete activity or other Project element. Usually expressed as workdays or workweeks.
- .6 Milestone: significant event in Project, usually completion of major deliverable.
- .7 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout Project life cycle.

1.2 REQUIREMENTS

- .1 Ensure detailed Schedule is practical and remains within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Provide and maintain a work schedule showing anticipated progress stages and final completion of work within time period required by Contract.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence to this contract.
- .5 Prepare the schedule using critical path analysis techniques, showing resource loading. Identify tasks that lie on the critical path. Show total float for all activities.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit the Bar (GANTT) Chart for the Preliminary Project Schedule to Departmental Representative within seven (7) working days of receipt of acceptance (i.e. contract award date).

CONSTRUCTION PROGRESS SCHEDULE BAR (GANTT) CHART ISSUED FOR TENDER Section 01 32 18

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1.4 PROJECT SCHEDULE

Environmental Site Remediation

Gordon Lake Group Sites, NT

- .1 Develop detailed Project Schedule.
- .2 Ensure detailed Project Schedule includes the following as minimum milestone and activity types, as applicable to each Gordon Lake Group site:
 - .1 Award
 - .2 Shop Drawings, Samples
 - .3 Permits
 - .4 Pre-Mobilization Site Visit
 - .5 Winter road track survey
 - .6 Legacy winter road upgrades
 - .7 New winter road spur construction
 - .8 Borrow area and material development
 - .9 Floating dock construction
 - .10 Mobilization
 - .11 Camp setup
 - .12 Construction of project facilities including but not limited to camp, waste rock soil containment area, tailings and soil containment area, landfarming facility, and staging areas
 - .13 Seasonal mobilization and demobilization
 - .14 Construction of mine shaft caps
 - .15 Dewatering of trenches and shafts (where required)
 - .16 Structure demolition
 - .17 Non-hazardous debris collection and disposal
 - .18 Excavation, stockpiling (where required), transport and treatment (landfarming) of hydrocarbon contaminated soil
 - .19 Excavation, stockpiling (where required), transport and disposal of non-hazardous metals and/or hydrocarbon contaminated soil as well as waste rock or tailings identified as requiring disposal
 - .20 Collection and disposal (off-site) of hazardous debris and materials
 - .21 On-site burning of non-hazardous wood debris
 - .22 Backfilling/capping of mine trenches and shafts, where required
 - .23 Submission of waste manifests and disposal certificates.
 - .24 Regrading
 - .25 Restoration of disturbed areas
 - .26 Camp shut down
 - .27 Interim Certificate of Completion
 - .28 Demobilization
 - .29 Closeout Submittals
 - .30 Final Certificate of Completion
- .3 Submit preliminary construction progress Schedule in accordance with Section 01 33 00 Submittal Procedures to Departmental Representative, coordinated with Departmental Representative's Project Schedule.

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CONSTRUCTION PROGRESS SCHEDULE BAR (GANTT) CHART

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- .4 After review, revise and resubmit Schedule to comply with revised Project Schedule.
- During progress of Work, revise, update and resubmit the Project Schedule as directed by Departmental Representative. Provide the Revised Project Schedule a minimum of three (3) days prior to scheduled monthly meetings, or as directed by Departmental Representative.

1.5 PROJECT PROGRESS REPORTING

- .1 Update and submit Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.6 CONSTRUCTION MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind Schedule and provide measures to regain slippage. Activities considered behind Schedule are those with projected start or completion dates later than current approved dates shown on baseline Schedule.
- .2 Weather-related delays with their remedial measures will be discussed and negotiated.

1.7 COST AND QUALITY CONTROL

- .1 Provide a Contract Work Breakdown Structure (CWBS) based on Contractor's Cost Breakdown and any modifications requested by Departmental Representative as follows:
 - .1 CWBS to be an organization of the Work to be performed, services to be provided and data to be submitted by Contractor, as well as payments to be made to Contractor under the terms of the Contract.
 - .2 The CWBS to clearly define the Work elements of each item of the CWBS.
 - .3 The CWBS to include a breakdown of pay items included under Item BOPC -1, Balance of Project Costs in the Basis of Payment Schedule. All unit price, lump sum, and provisional cost sum allowance pay items included in the Basis of Payment Schedule to also be included in the CWBS.
 - .4 Prepare the CWBS in computerized spreadsheet format compatible with the most recent release of Microsoft Excel software. Provide CWBS in hard copy format.
 - .5 Submit the CWBS within thirty (30) days following contract award date.
 - .6 Update the CWBS monthly reflecting changes and items completed to date. Submit the updated CWBS along with the monthly project schedule updates.

.2 Equipment and Material Control:

- .1 Record data on status of construction material and equipment and report upon Departmental Representative's request.
- .3 Manpower Performance Measures:
 - .1 Record and report manpower listing for each company employed under this Contract, including Sub-Contractors (aboriginal/non-aboriginal) detailing daily man-hours during the current month and cumulative total to date and report upon Departmental Representative's request.
 - .2 Provide statistical reporting to the Departmental Representative on a monthly basis.

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- .3 Provide statistics related to lost time accidents upon Departmental Representative's request.
- .4 Monthly Performance Measures Templates are included in this specification in Appendix E.

1.8 MEASUREMENT OF PAYMENT

.1 Work under this section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

ISSUED FOR TENDER

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PART 1 - GENERAL

1.1 DEFINITIONS

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Contractor to provide submittals including but not limited to those listed in Submittal Table 01 33 00-1 at the end of this Section. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal is not to proceed until review is complete.
- .3 Present shop drawings and product data, in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Submit requests for payment for review and for transmittal to Departmental Representative.
- .6 Submit requests for interpretation of Contract Documents and obtain instructions through the Departmental Representative.
- .7 Submit and process substitutions through Departmental Representative.
- .8 Submit and process task authorizations and change orders through Departmental Representative.
- .9 Deliver closeout submittals for review to Departmental Representative.
- .10 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific Project will be returned without being examined and will be considered rejected.
- .11 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .12 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .13 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .14 Keep one reviewed copy of each submission on site.

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1.3 SHOP DRAWINGS SUBMISSION

- Indicate materials, methods of construction and attachment or anchorage, erection diagrams, .1 connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .2 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in Northwest Territories, Canada as required.
- .3 Submit Preliminary Shop Drawings ninety (90) days prior to mobilization. Submit Final Shop Drawings forty-five (45) days prior to mobilization.
- .4 Allow seven (7) days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative and receive written approval from the Departmental Representative prior to proceeding with Work.
- Make changes in shop drawings as Departmental Representative may require, consistent with .6 Contract Documents. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.
- .7 Verify in shop drawings:
 - .1 Field measurements:
 - .2 Field construction criteria;
 - .3 Catalogue numbers and similar data.
- .8 Accompany submissions with transmittal letter, in duplicate, containing:
 - Date. .1
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .9 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Sub-Contractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.

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- .2 Layout, showing dimensions, including identified field dimensions, and clearances.
- .3 Setting or erection details.
- .4 Capacities.
- .5 Performance characteristics.
- .6 Standards.
- .7 Operating weight.
- 8. Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent Work.
- .10 After Departmental Representative's review, distribute copies.
- Submit three (3) prints and an electronic copy of shop drawings for each requirement requested in .11 specification Sections and as Departmental Representative may reasonably request.
- .12 Delete information not applicable to Project.
- .13 Supplement standard information to provide details applicable to Project.
- .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, two (2) copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review does not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which remains with Contractor submitting same, and such review does not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

SAMPLES 1.4

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address site office.
- Notify Departmental Representative in writing, at time of submission of deviations in samples from .3 requirements of Contract Documents.
- Adjustments made on samples by Departmental Representative are not intended to change Contract .4 Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

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SUBMITTAL PROCEDURES

- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 PHOTOGRAPHS

- .1 Provide digital photos in "Joint Photographic Experts Group" (.jpg) format for Progress Photographs and Final Photographs.
- .2 Digital photographs to have a minimum of 2,592 x 1,944 pixel (5 Megapixel) resolution.
- .3 Progress and Final Photographs to be submitted on a compact disc (CD). Provide one (1) copy of the Progress Photographs, and two (2) copies of the Final Photographs.
- .4 Printed (colour) copies of digital photographs to be provided for Final Photographs only:
 - .1 Size: 100 mm x 125 mm.
 - .2 Two digital photographs per 215 x 280 mm page.
 - .3 Pages to be white, of photographic quality paper and to be three-hole punched, ready for insertion into a three-ring binder. Binder(s) to be vinyl, hard-covered, 3 inch D ring, sized for 215 x 280 mm paper, with spine pocket.
- .5 Identification: Typewritten or generated by computer, the name and number of the Project on cover and spine of binder and CD case. Each photograph to be labelled with the digital photo file name positioned so as to not interfere with the view of the main activity or feature presented on the photograph. Also provide a description of each photograph in photographic log format. Photographic log to be included with each computer disk, CD, and binder. Description to include:
 - .1 Digital photograph file name
 - .2 Name and description of feature
 - .3 View direction
 - .4 Date of exposure
 - .5 GPS location
 - .6 Before and after photograph of location (where appropriate)
- Quantity: Provide sufficient number of photographs to adequately describe the Work activities carried out during the reporting period. A minimum of two photographs taken from two viewpoints are to be provided for each clean-up/construction activity. Viewpoint locations for final digital photographs to be determined by Departmental Representative.
- .7 Provide "Before" and "After" photographs of the Site showing key areas before and after remediation from the same photographic viewpoint. Plot the viewpoint locations on the record drawing mark-up and provide a GPS location of the photos along with the bearing for direction of view. Consult with Departmental Representative to verify photographic viewpoints.
- .8 Submit progress photographs monthly with last weekly report or as directed by the Departmental Representative.
- .9 Provide two sets in two binders of final digital photographs.
- .10 Submit final photographs prior to final progress payment request.

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1.6 GIS SUBMISSIONS

.1 All submissions relating to Mackenzie Valley Land and Water Board (MVLWB) Permit Requirements are to conform to the MVLWB document entitled "Standards for Geographic Information Systems (GIS) Submissions" dated March 1, 2012.

1.7 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the submittal of shop drawings, samples, and photographs are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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TABLE 01 33 00-1

	CONTRACTOR SUBMITTAL SCHEDULE				
	Description	Date			
Section					
01 11 00	Worker Orientation Seminar material	30 days prior to seminar			
01 11 00	Record of Attendance at Training Seminar	Upon Departmental Representative's request			
01 29 83	Proposed sampling and testing methodology	Within 30 days of Contract Award			
01 29 83	CALA Laboratory Certification	Upon Departmental Representative's request			
01 31 19	Pre-Mobilization Site Visit Report	7 days following site visit			
01 31 19	Daily Safety Meeting Minutes	Upon Departmental Representative's request			
01 31 19	Weekly Safety Meeting Minutes	Within 3 days of Meeting			
01 31 19	Community Meeting Presentation	14 days prior to meeting			
01 31 19	Community Meeting Minutes	Within 10 days of Meeting			
01 32 18	Preliminary Project Schedule (Bar (GANTT) Chart)	7 days after Contract Award			
01 32 18	Updated Project Schedule	Upon Departmental Representative's request and 3 days prior to monthly meetings			
01 32 18	Contractor Work Breakdown Structure (CWBS) - Cash flow projections	30 days after Contract Award			
01 32 18	Updated CWBS	Monthly with progress statement			
01 32 18	Monthly Statistical Reporting	Monthly with progress statement			
01 33 00	Preliminary Shop Drawings	90 days prior to mobilization			
01 33 00	Final Shop Drawings	45 days prior to mobilization			
01 33 00	Progress Photographs	Monthly with progress statement			
01 33 00	Final Photographs	Prior to final progress payment request			
01 35 15	Hazardous Material Audit	30 days after Contract Award			
01 35 15	Wastewater Management Plan incl. Wastewater Treatment Facility Design	60 days after Contract Award			
01 35 15	Wastewater testing records	Prior to discharging water			
01 35 32	Draft Site Specific Health and Safety Plan (and all associated sections)	30 days after Contract Award			
01 35 32	Emergency Response Plan	With Site Specific Health and Safety Plan			
01 35 32	Wildlife Management Plan	With Site Specific Health and Safety Plan			
01 35 32	Spill Contingency Plan	With Site Specific Health and Safety Plan			
01 35 32	Fire Safety Plan	With Site Specific Health and Safety Plan			
01 35 32	Final Site Specific Health and Safety Plan (and all associated sections)	45 days prior to mobilization			
01 35 32	Updated Site Specific Health and Safety Plan (and all associated sections)	30 days prior to start of each construction season			
01 35 32	Site assessment of deficiencies in health, safety, medical/first aid supplies including schedule for upgrading deficiencies	As required			
01 35 32	Inventory of Contractor's health, safety, medical and first aid equipment and supplies including schedule for upgrading deficiences	Within 10 days of seasonal mobilization			
01 35 32	Proof of PPE certification (i.e., respiratory fit testing), as part of Site Specific Health and Safety Plan	Prior to Work activities			
01 35 32	Minutes of Weekly Safety Meetings	Weekly, within 3 days of meeting			
01 35 32	Incident and Accident Reports	Verbal report immediately followed by written report in 24 hours			
01 35 32	Notice of Work (file with AHJ)	Prior to commencing Work			
01 35 43	Details of Sewage / Disposal System	60 days after Contract Award			
01 35 43	Environmental Protection Plan (and all associated sections)	60 days prior to commencing Work			
01 35 43	Wildlife Protection Plan	With Environmental Protection Plan			
01 35 43	Historical, Archeological, Cultural Resources, Biological Resources and Wetlands Plan	With Environmental Protection Plan			
01 35 43	Erosion, Sediment and Drainage Control Plan	With Environmental Protection Plan			
01 35 43 01 35 43	Spill Control Plan Waste Management Plan	With Environmental Protection Plan With Environmental Protection Plan			
01 35 43	Copies of Environmental Agency Submittals/Approvals	As required			
01 35 43	Work Plans for Work Adjacent to Waterways	45 days prior to commencing Work			
01 35 43	Inventory of Contractor's Environmental Protection Supplies	45 days prior to mobilization			
01 41 00	Copies of MSDS	Upon delivery of materials to the Site			
01 45 00	Inspection and Testing Reports	As required			
01 52 00	Field Drawings Indicating Equipment and Fixtures	Upon Departmental Representative's request			
01 53 00	Draft Mobilization and Demobilization Plan and Construction Equipment List	30 days after Contract Award			
01 53 00	Final Mobilization and Demobilization Plan and Construction Equipment List	30 days prior to mobilization			
01 53 00	Draft Site Access Road Upgrading and Maintenance Plan	30 days after Contract Award			
01 53 00	Final Site Access Road Upgrading and Maintenance Plan	30 days prior to mobilization			
01 54 00	Camp Facilities Plan	20 days after Contract Award			
01 54 00	Plan of Construction Detailed, Camp Layout and Siting	45 days prior to installation			
01 54 00	Camp Facilities Inspection Report, including plan for corrective action for identified deficiencies	30 days prior to mobilization			
10 1 0 1 00	Toamp Facilities inspection Report, including plan for corrective action for identified deliciencies				
		· · ·			
01 54 00 01 54 00	Camp Licences, permits, authorizations Potable Water test results	30 days prior to camp start-up			
01 54 00	Camp Licences, permits, authorizations	30 days prior to camp start-up Before opening camp			
01 54 00 01 54 00	Camp Licences, permits, authorizations Potable Water test results	30 days prior to camp start-up			
01 54 00 01 54 00 01 54 00	Camp Licences, permits, authorizations Potable Water test results Proof of Adherence to Environmental Regulations Sketch of Proposed Field Laboratory	30 days prior to camp start-up Before opening camp Before opening camp			
01 54 00 01 54 00 01 54 00 01 54 00	Camp Licences, permits, authorizations Potable Water test results Proof of Adherence to Environmental Regulations	30 days prior to camp start-up Before opening camp Before opening camp 20 days prior to fabrication or construction			
01 54 00 01 54 00 01 54 00 01 54 00 01 54 00	Camp Licences, permits, authorizations Potable Water test results Proof of Adherence to Environmental Regulations Sketch of Proposed Field Laboratory Foodsafe Certification for all food preparation staff	30 days prior to camp start-up Before opening camp Before opening camp 20 days prior to fabrication or construction Prior to mobilization			

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TABLE 01 33 00-1

TABLE 01 33 00-1 CONTRACTOR SUBMITTAL SCHEDULE				
	Description Description	Date		
Section				
01 71 01	Survey Equipment Calibration Records	30 days prior to construction commencement each season		
	Surveyor Information	30 days prior to construction commencement each season		
	Survey Data Submissions	As required and with Progress Claims		
	Completion Certificate Final Site Survey	7 days prior to Final Inspection Prior to project completion		
	Closeout Submitals	30 days after the completion of each construction season		
	Winter Road Construction Plan and Conditions Reports	Prior to commencement of Work and every Monday morning during Work or as requested by Departmental Representative		
01 80 00	Catastrophic Indicent Plan	Prior to commencement of Work		
	Winter Road Schedule	Prior to commencement of Work		
	Winter Road Testing Results	As results become available		
	Product Data Waste Reduction Work Plan (including request to NT Mining Heritage Society) (part of Waste Management Plan)	Prior to commencemnt of Work 60 days prior to commencing Work (With Environmental Protection Plan)		
	Certified Transport Manifests, Chain of Custody Documentation, Weigh Bills, Bill of Lading, Receipts from Disposal Sites	As requested by Departmental Representative		
	Existing Conditions Survey	7 days prior to excavation		
	Notice of Excavation Work	7 days prior to excavation work		
	Notice of bottom of excavation	Upon reaching bottom of excavation		
	Detailed PHC Impacted Soil Treatment Plan	90 days prior to construction		
	Analytical Results related to Soil Treatment Soil Remodiation Operation Report	Within 1 week of receipt Monthly during the soil remediation activities		
	Soil Remediation Operation Report Interim Soil Remediation Report	Within 30 days of completion of each field season		
	Hazardous Materials Management Plan	Prior to mobilization		
02 81 01	Personnel qualifications and training certificate	Prior to commencing Work		
	Hazardous Materials Disposal Tracking Information	Prior to transportation off-site		
	Waste transport manifests, chains of custody, and transportation documentation	Prior to transportation off-site		
	Destruction Certificates Specifications of Hazardous Materials Containers	Within 14 days of destruction 45 days prior to mobilization		
02 81 01	Details of Hazardous Materials Processing Areas	1 week prior to commencing Work		
	Detailed Inventory of the Temporary Storage Area	Within 30 days of completion of each field season		
	Proposed drum processing methodology	45 days prior to mobilization		
	Proof of suitable arrangments for disposal of ACM	1 week prior to commencing Work		
02 82 00.01	Territorial and/or local requirements for Notice of Project Form	1 week prior to commencing Work		
02 82 00.01	Proof of Contractor's Asbestos Liability Insurance Copies of permits for transportation and disposal of ACM and records indicating waste has been received and properly disposed.	1 week prior to commencing Work		
	Copies of asbestos workers training/education records	1 week prior to commencing Work 1 week prior to commencing Work		
	Proof of respirator fitting and testing	1 week prior to commencing Work		
02 83 10	Proof of suitable arrangments for disposal of lead-based paint waste	1 week prior to commencing Work		
02 83 10	Territorial and/or local requirements for Notice of Project Form	1 week prior to commencing Work		
	Proof of General and Environmental Liability Insurance	1 week prior to commencing Work		
	Copies of permits for transportation and disposal of lead-based paint waste and records indicating waste has been received and properly disposed. Copies of workers training/education records for lead-based paint works	1 week prior to commencing Work 1 week prior to commencing Work		
	Copies of notification to AHJ and site workers of presence of lead-containing material on Site	2 days prior to commencing Work		
	Shop Drawings for formwork and falsework	As required		
03 20 00	Shop Drawings including placing of reinforcement	10 days prior to fabrication		
	Mix design and aggregate gradation curves	As required		
	Submit samples of aggregates, water and cement to be used, to an approved testing agency	As required		
	Submit schedule of proposed construction joints to the Departmental Representative Submit mill certificates for cement and supplementary cementing materials	As required As required		
	Submit details of proposed product substitutions (if any) with technical data sheets to demonstrate equivalency to product specified before proceeding with the work	At least 10 days in advance of concreting		
	Shop Drawings for metal fabrication	1 week prior to commencing Work		
	Proposed aggregate source	7 days prior to commencing production		
	Quarry Operations Plan	30 days of Contract Award		
	Site Access Upgrade Plan Construction Plan (TSCA and WPSCA Plans, Landfarm Construction Plan, Kidney Pend Portal Scon Management Plan)	Prior to mobilization		
31 22 13 31 22 13	Construction Plan (TSCA and WRSCA Plans, Landfarm Construction Plan, Kidney Pond Portal Seep Management Plan) Landfarm Design Plan	45 days prior to construction 45 days prior to construction		
	Dewatering Plan (as part of the Construction Plan) including drawings and design showing methods and equipment proposed to use for dewatering	1 week prior to commencing Work		
31 23 33.01	Testing and inspection results	As required		
	Equipment list for major equipment	Prior to commencing Work		
	Samples and sieve analyses	2 weeks prior to use		
	Manufacturer's Instruction, Product Literature and Data Sheets	4 weeks prior to commencing Work		
	Written Warranty from Manufacturer Signed Manufacturer Certification	2 weeks prior to commencing Work Prior to shipment of material to the site		
	Samples and Testing and Evaluation Reports	4 weeks prior to commencing Work		
	Manufacturer's Instruction, Product Literature and Data Sheets	4 weeks prior to commencing Work		
	Shop Drawings	4 weeks prior to commencing Work		
	Samples and Testing and Evaluation Reports	4 weeks prior to commencing Work		
	Manufacturer's Mill Test Data	4 weeks prior to commencing Work		
	Certificates, including Test Results Quality Assurance Test Results	2 weeks prior to delivery to site End of each shift		
U 1 UZ 18.UZ	Ruality Modulative Teat Nearlia	Ling of Each Shift		

SPECIAL PROJECT PROCEDURES FOR CONTAMINATED SITES

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PART 1 - GENERAL

1.1 DEFINITION

- .1 Process wastewater: Water from decontamination activities, water from dewatering work areas, potentially contaminated groundwater, contact water, and/or any other liquid effluent stream created or encountered during Work activities.
- .2 Contact water: Water that has been in physical contact with known petroleum hydrocarbon and/or metal contaminated soil, either in defined soil excavations or excavated soil in treatment areas or stockpiles.
- .3 Camp wastewater: Wash water, rinse water, water from operations of camp facilities, and/or any other liquid effluent stream created or encountered during camp activities.
- .4 Processed wastewater: Wastewater processed through the Wastewater Treatment Facility.
- .5 Treated wastewater: Processed wastewater which has been tested and shown to be in compliance with applicable discharge criteria and requirements of this Section and Section 01 35 43 – Environmental Procedures

1.2 REFERENCES

- .1 Transportation and Dangerous Goods Act, 1992.
- .2 Hazardous material information presented in Table 1 in Appendix A.

1.3 REGULATORY REQUIREMENTS

- .1 Comply with federal, territorial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
- .2 Comply with all terms and conditions of the Land Use Permit, Water License, Quarry Permit, and any other permits or licences obtained.

1.4 SUBMITTALS

- .1 All submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to the Departmental Representative a Wastewater Management Plan, conforming to requirements of Authorities Having Jurisdiction (AHJ) and Specifications as part of the Erosion, Sediment and Drainage Control Plan, prior to the commencement of earth works.
- .3 Submit to Departmental Representative, three (3) hard copies and one (1) electronic copy of the Hazardous Material audit thirty (30) days after contract award.

1.5 EQUIPMENT DECONTAMINATION FACILITY

.1 Prior to commencing Work involving equipment contact with potentially contaminated materials, remove soil lumps and particles from excavating and processing equipment and construct equipment decontamination pad to accommodate largest piece of on-site potentially contaminated equipment.

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- .2 Construct equipment decontamination pad in accordance with this specification and Contractor's approved Equipment Decontamination Facility Design.
- .3 Provide, operate, and maintain necessary equipment, pumps, and piping required to collect and contain equipment decontamination wastewater and sediment and transfer same to approved storage facilities.
- .4 At minimum, complete the following steps during equipment decontamination:
 - .1 Mechanically remove loose waste solids, grit, dirt, and debris by manual methods without using steam or high-pressure water to minimize water usage and potential for generation of contaminated rinsate.
 - .2 Should decontamination not be achieved using the above, use high-pressure, low- volume, hot water or steam supplemented by detergents or solvents as appropriate and approved by Departmental Representative. Perform an assessment as directed by Departmental Representative, to determine effectiveness of decontamination.
 - .3 Collect and dispose of the removed solid material and contaminated soil in appropriate onsite disposal area.
 - .4 Contain any rinsate if generated during the removal process, as contact water/wastewater.
- .5 Complete final decontamination of equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .6 Each piece of equipment may be inspected by Departmental Representative or designate after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed, if deemed necessary.
- .7 Take appropriate measures necessary to minimize drift of mist and spray during decontamination, including provision of wind splash screens, as required.

1.6 CONTAINMENT AREAS

- .1 Prior to commencing Work involving disposal of non-hazardous wastes, construct containment area at the Camlaren and Kidney Pond sites (i.e. Tailings and Soil Containment Area (TSCA) and Waste Rock and Soil Containment Area (WRSCA), respectively).
- .2 Construct TSCA and WRSCA in accordance with Contract.
- .3 Maintain and operate the TSCA and WRSCA in accordance with Contract, applicable regulations, and AHJ.

1.7 LANDFARMING FACILITY

- .1 Prior to commencing Work involving disposal of non-hazardous petroleum hydrocarbon-contaminated soils, construct landfarming facility at the Camlaren site.
- .2 Construct landfarming facility in accordance with Contract.
- .3 Maintain and operate landfarming facility in accordance with Contract, applicable regulations, and AHJ.

SPECIAL PROJECT PROCEDURES FOR CONTAMINATED SITES

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1.8 SOIL STOCKPILING FACILITIES

- .1 Provide, maintain, and operate storage/stockpiling facilities as specified in Section 31 23 33.01 Excavating, Trenching and Backfilling and Section 02 55 13 Contaminated Soil.
- .2 Install geomembrane liner below all proposed stockpile locations to prevent contact between stockpiled material and ground. With the exception of non-contaminated soil stockpiles, the geomembrane liner shall be raised at the edges to facilitate collection of any liquids draining from the soils. Cover all stockpiles with tarps capable of completely covering stockpiled material at all times, unless materials are being added to or taken from the stockpiles.
- .3 Segregate all contaminated soil from non-contaminated soil in separate stockpiles.
- .4 Segregate soils contaminated only by petroleum hydrocarbons from soils contaminated by metals in separate stockpiles.
- .5 The Contractor shall prevent any liquids from contaminated or impacted stockpiles from escaping the geomembrane liners. Liquids shall be contained and transferred to the wastewater treatment facility.

1.9 WASTEWATER TREATMENT FACILITY DESIGN REQUIREMENTS

- .1 Submit design, operation and maintenance details of wastewater treatment facilities conforming to requirements of AHJ sixty (60) days after contract award date. Wastewater treatment facility designs will be stamped by an Engineer registered or licensed to practice in the Northwest Territories.
- .2 Contain wastewater separately from the following sources:
 - .1 Camp Operations: including but not limited to, grey water, kitchen sumps, traps and blackwater.
 - .2 Contact water from dewatering or from the draining of water from soil in the event that submerged impacted soils are encountered.
 - .3 All other process wastewater; including but not limited to, wastewater streams from decontamination, process water, contact water and wash/rinse water.

.3 Wastewater Treatment Facilities:

.1 Design wastewater treatment facilities capable of treating and filtering contact water and/or process water generated from activities such as (but not limited to) excavations, process water and Work areas to meet the following requirements:

Parameter	Maximum Allowable Concentration
Volatile Hydrocarbons	15 mg/L
Extractable Hydrocarbons	5 mg/L
Oil and Grease	5 mg/L, non-visible
Non-Aqueous Phase Liquid / Free Product	Not Present
рН	6 to 9
Arsenic (total)	100 μg/L
Cadmium (dissolved)	10 μg/L
Chromium (total)	100 μg/L
Cobalt (dissolved)	50 μg/L
Copper (dissolved)	200 μg/L
Lead (dissolved)	50 μg/L
Mercury (total)	0.6 µg/L

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Parameter	Maximum Allowable Concentration
Nickel (dissolved)	200 μg/L
Zinc (total)	1,000 μg/L
Phenols	20 μg/L
PCBs	1,000 μg/L

.2 Design wastewater treatment facilities capable of treating and filtering water generated from camp operations to meet the criteria of the Water License (if licence is necessary), which are approximately in accordance to the following requirements:

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Parameter	Maximum Allowable Concentration
pH	6 to 9
Mineral Oil and Grease	5 mg/L, non-visible
Total Suspended Solids	100 mg/L
BOD	80 mg/L
Fecal Coliforms	10,000 CFU/dL
Residual Chlorine	0.1 mg/L

- .3 Provide separate storage for wastewater generated by camp operations and wastewater generated from remediation activities.
- .4 Water from dewatering trenches and mine openings will be disposed of in accordance with Section 31 23 15 Dewatering.
- .5 Ensure that discharges from site are in compliance with applicable permit requirements and limitations. Make adjustments to process or provide alternative equipment (at no additional cost) such that wastewater meets the applicable discharge criteria.
- .6 Provide suitable piping or mobile storage to transfer liquid/solid mixtures generated by dewatering operations which require water filtering to wastewater treatment facility.
- .7 Ensure wastewater treatment facilities are capable of receiving liquid/solid mixtures to not cause delay to dewatering operations.
- .8 Ensure wastewater treatment facilities are capable of oil/water separation.
- .9 In the event of a discrepancy between the above listed wastewater requirements and those provided in the Water Licence/Land Use Permit, the requirements in the Water Licence/Land Use Permit will govern.
- .10 Provide adequate storage for wastewater such that samples of wastewater can be obtained and analyzed prior to discharge.
- .11 Salvage of tanks on site is permitted, provided that the tanks are empty and clean prior to use.
- .12 Wastewater storage ponds meeting all requirements of AHJ are permitted.
- .13 Contractor is responsible for transporting and disposing of wastewater to an approved offsite disposal facility in the event that the on-site facility is not functioning. The Contractor is responsible for additional testing required by the off-site disposal facility.
- .4 Piping: Suitable material type, of sufficient diameter and structural thickness for purpose intended; satisfactorily tested for leaks with potable water in presence of Departmental Representative before handling wastewater.

.5 Installation:

.1 Provide labour, materials, and equipment and do Work required for setup and construction of wastewater treatment facility.

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- .2 Install component systems in accordance with installation procedures and as indicated.
- .3 Following installation of system, implement initial operation test in accordance with procedures developed by Contractor and submitted to Departmental Representative for review.
- .4 Install piping in accordance with manufacturer's instructions and test for leakage using potable water prior to commencing dewatering, treatment and filtering operations.
- .6 Initial Testing: Performance of wastewater treatment facility provided by Contractor will initially be determined by Departmental Representative.

.7 Operation:

- .1 Obtain and analyze influent and effluent samples required to operate the system.
- .2 Make system modifications required for effluent to satisfy effluent criteria based on analytical results.
- .3 Operate wastewater treatment facility by experienced, qualified personnel in accordance with manufacturer's instructions and procedures submitted by Contractor and approved by Departmental Representative.
- .4 Operate the wastewater treatment facility such that storage tanks and storage ponds are either empty at the end of the construction season or have allowances for expansion of water due to freezing.

.8 Decommissioning/Dismantling:

- .1 Decontaminate and remove salvageable components of wastewater treatment facility including water filtering system, pumps, piping, and electrical equipment.
- .2 Dispose of non-salvageable equipment and materials at approved on-site or off-site disposal facility. Decontaminate salvageable equipment within facility area as required prior to removal from site.

1.10 WASTEWATER STORAGE TANKS

- .1 Provide, operate, and maintain wastewater storage tanks to store wastewater.
- .2 Provide separate storage facilities for wastewater generated by camp operations and wastewater generated by remediation activities.
- .3 Discharges: Comply with applicable discharge limitations and requirements; do not discharge wastewater that does not conform to or is in violation of such limitations or requirements; and obtain Departmental Representative's approval prior to discharge of wastewater.
- .4 Provide pumps and piping to convey collected wastewater to designated wastewater storage tanks; provide wastewater storage tanks with minimum total live capacity of 20,000 L each such that effluent quality can be analyzed and approved prior to discharge on-site.
- .5 Install wastewater storage tanks in locations as approved by Departmental Representative.
- .6 Support tank(s) on temporary aboveground foundation(s).
- .7 Connect pumps, piping, valves, miscellaneous items, and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping, and miscellaneous items from freezing.

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- .8 Do not operate wastewater storage tanks until inspected and approved by Departmental Representative.
- .9 Notify Departmental Representative three (3) days minimum in advance of when wastewater storage tank is anticipated to be full.
 - Do not discharge additional liquids to filled tank following sampling by Departmental Representative.
 - .2 Departmental Representative will determine appropriate disposition of wastewater based on sample analysis.

1.11 WASTEWATER TREATMENT FACILITY DISCHARGE REQUIREMENTS

- .1 Provide adequate containment facilities for processed wastewater, prior to discharge, to complete testing and analytical requirements.
- .2 Water discharge on-site must be in compliance with applicable permits, authorizations and approvals. Make adjustments to Wastewater Treatment Facilities or provide alternative equipment, at no additional cost, such that processed wastewater meets applicable permit requirements and limits for discharge.
- .3 Wastewater discharges from the site must be in compliance with applicable permit requirements:
 - .1 Treated wastewater will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters, and will conform to the discharge requirements set out in the Land Use Permit and only upon approval from the Departmental Representative and AHJ.
 - .2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.
 - .3 No direct discharge to surface waters or wetlands is allowed.
 - .4 Contractor must obtain approval from the Department Representative and AHJ prior to discharging treated wastewater.
 - Transport and dispose of wastewater not meeting the applicable discharge requirement at off-site disposal facility as identified by Contractor and approved by the Departmental Representative, at the Contractor's expense.

1.12 DRUMS

- .1 Storage of Liquid Waste: use steel containers meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.
- .2 Storage of Solid Waste: use steel containers meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

1.13 DUST AND PARTICULATE CONTROL

- .1 Execute Work by methods to minimize raising dust from construction operations.
- .2 Implement and maintain dust and particulate control measures immediately during construction and in accordance with all applicable regulations and standards during work and in accordance with Section 01 35 43 Environmental Procedures

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1.14 EQUIPMENT DECONTAMINATION

- .1 Commence Work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational.
- .2 Decontaminate equipment, including tracks and buckets, after working in potentially contaminated Work areas and prior to subsequent Work or travel on clean areas.
- .3 Collect decontamination wastewater and sediments which accumulate on equipment decontamination pad. Transfer wastewater to designated wastewater storage tank.
- .4 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.15 WATER CONTROL

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- .1 Maintain excavations free of water.
- .2 Protect site from ponding or running water. Grade site to drain. Provide water barriers as necessary to protect site from soil erosion and from runoff of potentially impacted water and soil.
- .3 Prevent surface water runoff from leaving Work areas.
- .4 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material without testing and confirmation it meets applicable guidelines for discharge and approval has been provided by Departmental Representative and AHJ.
- .5 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of Work stoppage including at end of each working day, periods of heavy precipitation, and as directed by Departmental Representative. Contain waters in contact with stockpiled waste materials.
- .6 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.
- .7 Control surface drainage including ensuring that drainage paths are kept open, water is not directed across or over roads or pathways except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.
- .8 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
- .9 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other Work areas free from water.
- .10 Contain water from stockpiled materials. Transfer potentially contaminated surface waters to wastewater storage tanks separate from wastewater from camp operations.
- .11 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

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- .12 Contain and collect wastewater and transfer such collected wastewater to Contractor-supplied drums for off-site disposal or wastewater storage tanks/ponds for transfer to on-site treatment facilities.
- .13 Treat water to meet disposal criteria prior to discharging.

1.16 PROGRESS CLEANING

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- .1 Maintain cleanliness of Work and surrounding site to comply with federal, territorial, and local fire and safety laws, ordinances, codes, and regulations.
- .2 Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.17 FINAL DECONTAMINATION

- .1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .2 Perform decontamination as specified to satisfaction of Departmental Representative. Departmental Representative will direct Contractor to perform additional decontamination if required.

1.18 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from site.
- .2 Dispose of contractor generated waste materials, litter, debris, and rubbish off site.
- .3 Do not burn rubbish and waste materials on site unless a burn exemption is provided in accordance with the land use permit and approved by Departmental Representative and AHJ.
- .4 Do not bury rubbish and waste materials on site.
- .5 Do not discharge wastes into streams or waterways.
- Dispose of following materials at appropriate off-site facility identified by Contractor and approved by Departmental Representative: solid and liquid hazardous waste; non-contaminated litter and rubbish; disposable PPE worn during hazardous material handling and packaging, and final cleaning; other hazardous materials as directed by Departmental Representative; wastewater generated from final decontamination operations including wastewater storage tank cleaning; and lumber from decontamination pads.

1.19 TESTING

- .1 Carry out and pay for all testing required to confirm that Wastewaters comply with Wastewater Treatment and Discharge Criteria outlined in this Section. Submit records of this testing to Department Representative.
- .2 Carry out and pay for all testing required for the classification of waste and licensed disposal facilities acceptance requirements outlined in this Section and Section 01 29 83 Payment Procedures for Testing Laboratory Services.

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1.20 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the treatment of contaminated groundwater and contact water are to be included in the unit price item for Treated Groundwater and Contact Water, Item 01 35 15-1, as indicated in Basis of Payment Schedule.
- .2 Include all direct costs for the treatment of camp waste water included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .3 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar GANTT Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY STORAGE AREAS

- .1 Develop Temporary Storage Areas at Gordon Lake Mine Sites for the storage of containerized hazardous materials, non-hazardous materials, hydrocarbons and contaminated soil.
- .2 Prepare Temporary Storage Areas to comply with the following (at minimum):
 - .1 Provide an easy access to the off-site and on-site transport equipment.
 - .2 The area is to be free of standing/ponding water.
 - .3 Allow the containers to be flat and evenly distribute the weight of the containers to the supporting surface.
 - .4 The area must not be subject to flooding or excessive snow drifting.
 - .5 Supply, place, and compact additional granular fill as required.
 - .6 Surface water run-on to the area must be minimized.
 - .7 Size the area sufficiently so that it will accommodate all waste.
 - .8 Sufficiently compact the area to prevent the containers from settling into the ground.
- .3 Confirm the location of the Temporary Storage Areas with Departmental Representative at least one (1) week prior to commencing operations to allow for baseline sampling, if required.
- .4 The Temporary Storage Areas are to be located as follows:
 - .1 More than 30 metres away from any waterbody/wetland/spring.
 - On stable and compact ground and lined with a 20 mil impermeable geomembrane liner in accordance with Section 31 32 19.02 Geomembranes underneath all contents except non-hazardous materials.
 - .3 In an area not routinely accessed or essential to Contractor's employees or on-site personnel.
 - .4 More than 30 metres away from all flammable materials.

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- .5 Temporary Storage Areas must segregate the various types of materials, as specified in Section 02 81 01 Hazardous Materials, as follows:
 - .1 Containerized Hazardous Solid and Liquid Materials.
 - .2 Non-hazardous Materials (as required if waiting for containment area construction).

END OF SECTION

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PART 1 - GENERAL

1.1 SITE SPECIFIC HEALTH AND SAFETY REQUIREMENTS

- .1 Maintain and complete all health and safety, fire safety, and environmental compliance activities in accordance with applicable sections and Authorities Having Jurisdiction (AHJ).
- .2 Schedule a compliance meeting on an as required basis, as directed by Departmental Representative. Compliance meetings may be held in conjunction with regular meetings.
- .3 The intent of the compliance meeting is to review reporting and inspection requirements to meet the intent of the NWT Safety Act, the Water License, the Land Use Permit, regulatory, and other requirements as may be required.
- .4 Compliance meetings to be held at the Work site.
- .5 Departmental Representative will record minutes, chair the meeting and distribute minutes to parties of record prior to the next Scheduled meeting.
- .6 Compliance Meeting Attendees:
 - .1 Contractor: Manager and / or Supervisor(s), representatives of major Sub-Contractors, and others as necessary.
 - .2 Departmental Representative, and representatives of Independent Inspection Agencies.
 - .3 INAC representative(s).

.7 Agenda:

- .1 Review and approval of minutes of previous meeting.
- .2 Review of items of significance that could affect Work.
- .3 Review of site inspections and identified hazards.
- .4 Identify and record field observations, problems, and conflicts that must be noted in reports required by the AHJ.
- .5 Identify corrective measures and procedures to regain approval from AHJ.
- .6 Identification of requirements for maintenance of quality standards needed for compliance with applicable Codes and Legislation.
- .7 Review site safety and security issues.
- .8 Review environmental and regulatory compliance.
- .9 Other topics for discussion as appropriate to current status of the Work.

1.2 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

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- .2 Submit a Draft Site Specific Health and Safety Plan (SSHSP) no later than 30 days after contract award to the Departmental Representative for review. Any items, which are identified as missing, will be added and the plan revised, so as to incorporate the additional items. Submit three (3) hard copies and one (1) electronic copy of the Final SSHSP 45 days prior to crew mobilization. The revised safety plan will be submitted to the AHJ for review and recommendations to ensure all the elements required by the NWT Safety Act, OSHA Regulations, other AHJ, and Contract Specifications have been addressed.
- .3 Update the SSHSP at the beginning of each construction season and submit to the Departmental Representative no later than thirty (30) days before the start of the construction season.
- .4 The SSHSP will include, but is not limited to the following sections:
 - .1 A Statement of Contractor's Safety Policy.
 - .2 Safety Responsibilities of all on-site personnel.
 - .3 Safe Work Practices and/or Job Procedures.
 - .4 Camp Rules and their enforcement.
 - .5 Results of safety and health risk or hazard analysis for camp and construction activities.
 - .6 Procedures for, but not limited to, cold weather survival, remote Work and general worker health and safety.
 - .7 Procedures for confined space entry.
 - .8 Name and telephone number of Contractor's corporate Safety Officer and on-site Safety Representative.
 - .9 Emergency Response Plan.
 - .10 Wildlife Management Plan.
 - .11 Spill Contingency Plan
 - .12 Fire Safety Plan
 - .13 Details regarding the safe use of winter roads and other infrastructure related to site access, in accordance with Section 01 80 00 Winter Roads and Floating Dock.
 - .14 Site traffic rules and speed limits including those applicable during aircraft landing/takeoff.
 - .15 Call-in Procedures
 - .16 Safety Incident Reporting Mechanism
 - .17 Medivac phone numbers
 - .18 Helicopter/Aircraft companies phone numbers
 - .19 Ice Monitoring and Safety Procedures (IMSP)
 - .20 Corporate Policies on Workplace Harassment
 - .21 Drilling and Blasting Safety
 - .22 Quarrying, Crushing and Screening Safety
 - .23 Forestry Operations Safety
 - .24 Forest Fire Prevention and Management
 - .25 Shared Airspace Management
 - .26 Medivac Procedures
 - .27 Forest Fire Evacuation Procedures
 - .28 Barging Safety

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- .5 Conduct and submit to Departmental Representative, a site assessment of deficiencies in health, safety, and medical/first aid supplies as required. Submit to Departmental Representative a Schedule for upgrading deficiencies to meet requirements of AHJ.
- .6 The On-site Emergency Response Plan (ERP) is to address standard operating procedures to be implemented during emergency situations. Plans including procedures are to meet as a minimum the Safety Requirements below.
 - .1 Prepare and coordinate an ERP with contributions from appropriate authorities including the Government of the Northwest Territories (GNWT) Safety Act, Hospitals, RCMP, Ministry of Transportation, and Ministry of Health. Plan will identify the off-site Emergency Response Coordinator through whom all information and coordination will flow in the event of an incident.
 - .2 Departmental Representative will have Contractor's On-site ERP reviewed by AHJ and may request modifications or additions as necessary for the work.
- .7 Complete an inventory of Contractor's health, safety, medical and first aid equipment and supplies on-site to assess compliance with AHJ requirements. Submit the inventory to Departmental Representative within ten (10) days of mobilization each season. Include a schedule for upgrading deficiencies to meet requirements of AHJ.
- .8 The Personal Protective Equipment (PPE) Program will include, but is not limited to, the following:
 - .1 Donning and doffing procedures.
 - .2 PPE Selection based upon site hazards.
 - .3 PPE use and limitations of equipment.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Medical surveillance requirements for personnel assigned to work at site.
 - .9 Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.
 - .10 Contaminated site working and decontamination procedures for both personnel and equipment.
 - .11 Written respiratory protection program for project activities and proof of respiratory fit testing.
 - .12 Training for workers required to use PPE, as well as the records of training for those workers.

1.3 CONSTRUCTION SAFETY MEASURES

- .1 Observe and enforce construction safety measures required by the latest revisions of: Northwest Territories Safety Act, National Building Code of Canada, National Fire Code of Canada, Workers' Safety and Compensation Commission (WSCC), the applicable Occupational Health and Safety Regulations, Mine Health and Safety Act, and Territorial and local statutes and authorities.
- Arrange regular safety meetings, to be held no less frequently than once per week. Record the minutes of such meetings and maintain a complete file for review by the appropriate authorities. Submit a copy of these meeting minutes to Departmental Representative within three (3) days of the meeting.

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- .3 Maintain at the site, six safety hats with liners, six safety glasses, and six safety hi-visibility vests for use by Departmental Representative and visitors. Maintain a supply of ear plugs.
- .4 Maintain a supply of Tyvek or equivalent disposable PPE suits of various sizes as required for Contractor's staff. Departmental Representative, and up to three visitors for the duration of the Work.
- .5 Comply with all applicable health and safety policies and procedures of Departmental Representative.
- Departmental Representative or his representative has the authority to stop Work on the contract if, in his/her opinion, the Work is being performed in an unsafe manner as required by the applicable safety legislation.
- .7 Verify that emergency procedures including appropriate First Aid facilities and First Aid personnel are in place at the Work Site. First Aid facilities and First Aid personnel must be in compliance with the NWT Safety Act.
- .8 Verify that procedures meet the WSCC and Employment and Social Development Canada (ESDC) requirements.
- .9 Develop, as part of Site Specific Health and Safety Plan written Contaminated Site Working and Decontamination procedures. Working procedures to outline personal protective equipment (PPE) requirements for various parts of site and for different operations.
- .10 Working Procedures and Decontamination procedures consistent with requirements of OSHA's 29 CFR 1910.120 HAZWOPER and territorial environmental regulations for:
 - .1 Working activities, where employees are likely to be exposed to 50% of Threshold Limit Values (TLV) listed by American Conference of Governmental Hygienists (ACGIH), TLVs and BEIs based on documentation of Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEI) 2004 and amendments thereto.
- .11 Hazardous Material Discovery
 - .1 Immediately stop Work, assess and mitigate the situation, and notify Departmental Representative (verbally and in writing) for further instructions with respect to abatement procedures required for asbestos conditions encountered when Work occurs in areas having materials resembling asbestos during course of Work.
- .12 Designate a Health and Safety Officer.

1.4 FILING OF NOTICE

.1 File Notice of Work with Federal and Territorial AHJ prior to commencement of Work.

1.5 REGULATORY REQUIREMENTS

- .1 Comply with specified standards, regulations and orders of AHJ to ensure safe operations at sites containing hazardous or toxic materials and other hazards (such as wildlife encounters, falls, etc.).
- .2 Employ Level 1 and Level 2 Supervisors on site as per GNWT WSCC Mine Health and Safety Act.
 Level 1 Supervisor to be on-site during the completion of all remedial activities at each site. The
 Level 1 Supervisor is responsible for providing direction to the on-site workforce. A Level 2
 Supervisor will be on-site when mine openings are being inspected and when the openings are being

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sealed, as a minimum. The Level 2 Supervisor is to be consulted throughout the completion of the remedial activities and is responsible for providing direction to the Site Superintendent.

.3 All equipment brought to the site must meet the Mine Health and Safety Act, equipment must have rotating beacons and vehicles must have beacons and buggy whips.

1.6 RESPONSIBILITY

- .1 Be responsible for safety of persons and property on site and for protection of public off site and environment to extent that they may be affected by the site and conduct of Work.
- .2 Control access to the site. Persons with business at the site and who are not Contractor's employees must be briefed on site specific health and safety issues, and provided with a copy of the SSHSP.
- .3 Contractor may refuse access to the site to any person not complying with site specific health and safety standards.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, territorial, and local statutes, regulations, and ordinances, and with Site-Specific Health and Safety Plan:
 - .1 Conduct appropriate safety training for all personnel working on the site.
 - .2 Conduct Work place safety inspections for all Work activities.
 - Maintain a log of first aid and safety supplies, and notify appropriate personnel for restocking after each incident, and periodical restocking to replace out dated or consumable (e.g., headache medicines, bandages) products.

1.7 HAZARD COMMUNICATION REQUIREMENTS

- .1 Hazard communication shall be conducted in accordance with Task Specific Meetings outlined in Part 1.11 of this Section.
- .2 Comply with Work Site Hazardous Materials Information System Regulations of the AHJ.
- .3 Provide Departmental Representative with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site; bound in one place and stored in accordance with the Site Specific Health and Safety Plan.

1.8 UNFORESEEN HAZARDS

- .1 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident, stop Work, assess, take steps to mitigate if necessary at that time and immediately advise Departmental Representative verbally and in writing.
- .2 Monitor potential low oxygen and Lower Explosive Limits areas with oxygen/LEL monitor if workers are working in and around area. These areas include but are not limited to trenches, excavations, and areas near machinery exhaust.

1.9 SAFETY AND HYGIENE

.1 Provide training for all persons entering the site in accordance with specified personnel training requirements, maintain log of who was trained, what training was provided, and by whom the training was conducted.

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- .2 Personal Protective Equipment (PPE):
 - .1 Furnish site personnel with appropriate PPE as required by legislation.
 - .2 Verify that safety equipment and protective clothing is kept clean and well maintained.
 - .3 Ensure all clothing and personal protective equipment used on site, must remain on site, to be either decontaminated or disposed of. No Work clothing is to leave the Work site without having been properly decontaminated. This includes, but is not limited to working coveralls.
 - .4 Outline and designate PPE for each site and Work activity in accordance with AHJ.
- .3 Develop written PPE care and use procedures to be included in the SSHSP and verify that procedures are strictly followed by site personnel including, but not limited to, the following:
 - Provisions for prescription eyeglasses with side shields worn as safety glasses and do not permit contact lenses on site within Work zones.
 - .2 Provisions, for footwear, are steel toed safety shoes or boots and are covered by rubber overshoes when entering or working in potentially contaminated Work areas.
 - .3 Dispose of or decontaminate PPE worn on site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Provisions for decontamination arising from entry or exit into contaminated areas.
- .4 Develop a written Respiratory Protection program to be included in the SSHSP and ensure that the program is strictly followed by site personnel; include the following procedures as minimum:
 - .1 Provide site personnel with extensive training in usage and limitations of, and fit testing for, air purifying respirators in accordance with specified regulations.
 - .2 Monitor, evaluate, and provide respiratory protection for site personnel.
 - .3 Verify that levels of protection as listed have been chosen to be consistent with site specific potential airborne hazards associated with major contaminants identified on site.
 - .4 Immediately notify Departmental Representative when level of respiratory protection required increases.
 - Verify that appropriate respiratory protection during Work activities is available and readily accessible; all personnel entering potentially contaminated Work areas will be supplied with and use appropriate respiratory protection.
 - .6 Assess ability for site personnel to wear respiratory protection.
 - .7 Verify that site personnel have passed respirator fit test prior to entering potentially contaminated Work areas.
 - .8 Verify that facial hair does not interfere with proper respirator fit.
 - .9 Submit proof of fit testing for site personnel to Departmental Representative. Update submission when new personnel are added to the Work or when new Work activities occur.
- .5 Heat Stress/Cold Stress: Implement heat stress and cold stress monitoring program as applicable and include in the SSHSP.
- .6 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
 - .3 Access to shower facilities.
 - .4 Provisions for proper disposal of contaminated PPE.

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1.10 SITE COMMUNICATIONS

- .1 Post emergency numbers near site telephones.
- .2 Staff will be equipped with radios, and emergency radio-in procedures will be established prior to commencing work. If radios do not provide sufficient range for continuous communication, Contractor to provide satellite phones or repeater stations and/or booster stations as required such that all workers are in live contact or have the ability to immediately contact base operations/wildlife monitors at all times.
- .3 Train personnel in the use of "buddy" system.
- .4 Provide alarm system to notify employees of site emergency situations or to stop Work activities if necessary. Identify emergency stations and muster points. Test alarm system regularly and train personnel to use alarm system as required.
- .5 Implement measure consistent with best practices for communications during the winter road construction and operations.

1.11 TASK-SPECIFIC SAFETY MEETING

- .1 Conduct task specific safety meetings (toolbox) as per Project requirements and as directed by Departmental Representative.
- .2 Conduct safety meetings with workers engaged in constructing, maintaining or traveling on winter roads. Workers must be instructed on the dangers inherent with winter roads, and hazard avoidance procedures.
- .3 Conduct safety meetings with workers engaged in outdoor Work under summer or winter conditions. Topics must include hot and cold stress, exhaustion, snowmobile safety, buddy systems, and any other items inherent in working outdoors in winter in isolated environments.
- Conduct mandatory daily safety meetings for personnel, and additionally as required by special or Work related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Include a discussion of the site hazards and dangerous work that workers will be exposed to that specific day. Hold additional safety meetings on an as needed basis or as specified by the AHJ. Keep records of meetings on file.

1.12 FUEL MANAGEMENT

- .1 All vehicle and equipment refuelling must be conducted by appropriately trained personnel using the effective PPE in a manner which meets or exceeds regulatory requirements including using drip pans.
- .2 Records of fuel usage by activity must be maintained.
- .3 All fuel transports including mobile refuelling trucks and fuel transport to stationary equipment such as generators or pumps or distributed storage areas, must occur in approved (CSA) containers with the notification and consent of site safety personnel.

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1.13 VEHICLE AND EQUIPMENT USAGE

- .1 Seatbelts must be worn at all times when vehicles or equipment is in operation.
- .2 Speed limits must be set and obeyed.
- .3 If road conditions are unsafe or marginally unsafe, maintain roads to acceptable standards. Do not risk property damage or injury.
- Vehicles are to not be idled for longer than 10 minutes (warm up) unless explicitly used as a place of refuge during animal encounters or for personnel working outdoors during winter operations. Exceptions are to be made in consultation with Departmental Representative.
- .5 Perform vehicle maintenance and lubrication of equipment in a manner that avoids spillage of fuels, oils, grease, and coolants. When refuelling equipment, use leak free containers and reinforced rip and puncture proof hoses and nozzles. Remain in attendance for duration of refuelling operation, and ensure that all storage container outlets are properly sealed after use.
- .6 Place drip pans under stationary equipment with potential leaks.
- .7 All equipment brought to the site must have rotating beacons and vehicles must have beacons and buggy whips.

1.14 FLAMMABLE LIQUIDS

- .1 The handling, storage and use of flammable liquids will be governed by but not limited to the following:
 - .1 current National Fire Code of Canada,
 - .2 the Land Use Permit,
 - .3 the Water Licence.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for Work purposes requires the permission of the permitting authority.
- .3 Do not transfer flammable liquids in the vicinity of open flames or any type of heat-producing devices.
- .4 Do not use flammable liquids having a flash point below 38°C such as naphtha or gasoline as solvents or cleaning agents.
- .5 Store flammable waste liquids, for disposal, in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Departmental Representative is to be notified when disposal is required.
- .6 Dispose of all flammable liquids in accordance with all applicable environmental regulations and with the requirements of Section 02 81 01 Hazardous Materials.

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1.15 STORAGE AND HANDLING OF FUEL

- .1 Locate fuel storage areas as approved by AHJ and as specified in the approved Fuel Management Plan as part of the SSHSP. Location to be reviewed by Departmental Representative. Provide secondary containment as required by AHJ.
- .2 Inspect fuel storage and dispensing facilities daily. Make available fire fighting and spill response equipment for immediate access at each fuel storage location.
- .3 Store all barrels containing fuel and /or hazardous materials in an elevated position, either on their side with bungs facing 9 and 3 o'clock position, or on pallets, upright, and banded.
- .4 All barrels to be individually identified. Label will be to industry standards and will provide all information necessary for health and safety and environmental purposes. Make available, to all personnel, Material Safety Data Sheets for all materials maintained at site or along rights-of-way.
- .5 All barrels/fuel containers to be labelled with INAC's name, and Contractor's name as required by the Land Use Permit. All tanks require registration, including assignment of a registration number with Environment Canada's Federal Identification Registry for Storage Tank Systems (FIRSTS).
- .6 Treat all waste petroleum products, including used oil filters as hazardous materials.
- .7 Conduct regular inspections of all machinery hydraulic, fuel and cooling systems. Repair leaks immediately.
- .8 Pre-assemble and maintain emergency spill equipment, including at least two fuel pumps, empty 200
 L barrels and absorbent material sufficient to clean up a 1000 litre spill at all fuel storage sites.
 Maintain spill mats or pan under mobile fuelling containers and a spill kit at the refuelling area.
- .9 Remove all full and empty barrels, fuel storage facilities and associated materials and equipment from site at conclusion of Work.
- .10 All fuel drums delivered to site, regardless of ownership, will be returned to supplier by Contractor for reuse or cleaned, crushed and disposed in accordance to Section 02 81 01 Hazardous Materials. Fuel drums, if transported, will comply with Section 02 81 01 Hazardous Materials and applicable regulations.

1.16 SPILL CONTINGENCY PLAN

- .1 Submit to Departmental Representative for approval, detailed Spill Contingency Plan as part of SSHSP. Update the Plan prior to each construction season as part of the seasonal update. Identify response capabilities by detailing response times, and types and volumes of spills to which Contractor can respond. Following information is required as a minimum:
 - .1 A description of pre-emergency planning.
 - .2 Personnel roles, lines of authority and communication, emergency phone numbers.
 - .3 Emergency alerting and response procedures.
 - .4 Evacuation routes and procedures, safe distances and places of refuge.
 - .5 Directions/methods of getting to nearest medical facility.
 - .6 Emergency decontamination procedures.
 - .7 Emergency medical treatment and First-Aid.
 - .8 Emergency equipment and materials.

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- .9 Emergency protective equipment.
- .10 Procedures for reporting incidents, and
- .11 Spill response and containment plans for all materials that could potentially be spilled.
- .2 Identify response capabilities by detailing response times, and types and volumes of spills to which Contractor can respond.
 - .1 Refer to INAC Guidelines for Spill Contingency Planning.
 - .2 Refer to the Office of the Regulator of Oil and Gas Operations (OROGO) requirements under the Oil and Gas Operations Act (S.N.W.T. 2014,c.14).

1.17 MEDICAL

- .1 Provide and maintain first aid and medical care and facilities for all workers as required by the Statutes of the NWT Safety Act.
- .2 Maintain first aid supplies and sick quarters separately from general living quarters when camp population normally ranges between 26 and 50 occupants.
- .3 Provide the appropriate NWT first aid kit, based on the number of workers, in accordance with the NWT Safety Act.
- .4 Establish an Emergency Response Plan acceptable to Departmental Representative, for the removal of any injured person to medical facilities or a doctor's care in accordance with applicable legislative and regulatory requirements. In the event that the Emergency Medical Technician (EMT) departs the site with patient, replace EMT as soon as possible.
- .5 Provide proof of First Aid credentials to Departmental Representative prior to the start of each construction season. Provide the appropriate number of first aid attendants on site in accordance with the NWT Safety Act (minimum of one) and a minimum of one person trained in Wilderness First Aid for each separated work group.
- .6 Emergency and First Aid Equipment:
 - .1 Locate and maintain emergency and first aid equipment in appropriate location on site including first aid kit to accommodate number of site personnel; portable emergency eye wash; fire protection equipment as required by legislation.
 - .1 The first aid attendant will be notified if crew members are working at multiple locations for the day. Crews will require having a first aid kit in their possession and a radio or satellite phone in order to contact the first aid attendant in case of an emergency.
 - .2 Locate sufficient self-contained breathing apparatus units; blankets and towels; stretcher; and 1 hand held emergency siren in all confined access locations.
 - .3 A minimum of one qualified first aid personnel must be present at the Work site at all times when Work activities are in progress; duties of first aid personnel may be shared with their other Work duties.
 - .4 Provide a full time EMT Emergency Medical Technician, c/w 1000 hours of classroom and practical training, 6 weeks of practical experience with required # of emergency response calls. The EMT will be territorially certified by a required exam and refresher exams every 2 years. An EMT is a highly trained medical professional who responds to medical and trauma emergencies in the pre-hospital setting ("in-field") for the purpose of stabilizing a patient's condition before and during transportation to an appropriate medical facility.

SITE SPECIFIC HEALTH AND SAFETY PLAN

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1.18 INCIDENTS AND ACCIDENT REPORTS

- .1 Immediately report, verbally, followed by a written report within 24 hours, to Departmental Representative, all incidents and accidents of any sort arising out of or in connection with the performance of the Work, giving full details and statements of witnesses. If death or serious injuries or damages are caused, report the accident promptly to Departmental Representative by telephone or facsimile in addition to any report required under federal and territorial laws and regulations.
- .2 If a claim is made by anyone against Contractor or Sub-Contractor on account of any accident, promptly report the facts in writing to Departmental Representative, giving full details of the claim.

1.19 SECURITY

- .1 Enforce the Camp Rules as provided under Section 01 54 00 Camp Facilities.
- .2 Limit site access only to persons employed on the Project. Unauthorized persons will be permitted on site only with the approval of Departmental Representative or Contractor.

1.20 WILDLIFE MANAGEMENT

- .1 Develop a Wildlife Management Plan, as part of the SSHSP, that includes bear and large mammal safety and as a minimum meets the following requirements:
 - .1 Firearms must be stored and used in accordance with all AHJ. Terms of Use for firearms must be submitted to Departmental Representative as part of SSHSP.
 - .2 All wildlife encounters and sightings must be reported to Departmental Representative as part of the weekly report.
 - .3 A sufficient number of people, with a minimum of one person, must be designated as a wildlife monitor and trained in firearms and wildlife deterrent use.
 - .4 All persons on-site must be made aware of wildlife attractants and proper procedures to be followed in the event of wildlife encounter.
 - .5 Alarmed trip wires installed around camp must be tested regularly and results reported to Departmental Representative as part of weekly report.

1.21 WILDLIFE MONITORS

- .1 Provide for the duration of the construction seasons, full-time wildlife monitors acceptable to Departmental Representative. Provide sufficient number of wildlife monitors with firearms and ammunition to protect the safety of all workers in all areas, day and night, including Departmental Representative and Departmental Representative's support staff during site operations.
- .2 Assign a wildlife monitor to accompany Departmental Representative and Departmental Representative's support staff during all inspections and soil/material sampling activities that take place away from the construction camp area.
- .3 All Wildlife Monitors are required to have a valid Firearm Certificate as per AHJ. Copies of the firearms certificates to be provided upon request by the Departmental Representative.
- .4 Assume full responsibility for reporting incidents associated with wildlife encounters.
- .5 Supply one All-Terrain Vehicle (ATV) as required, per wildlife monitor to facilitate his duties. Ensure wildlife monitors are fully trained in the safe use of the ATV equipment.

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- Provide the wildlife monitors with mobile communication radios with charging units for on-site communication between the wildlife monitors, Contractor base radio, and Departmental Representative and Departmental Representative's Authorized Personnel. If radios do not provide sufficient range for continuous communication, provide satellite phones.
- .7 Qualifications and training plans for wildlife monitors must be submitted to Departmental Representative as part of the Site Specific Safety Plan.
- .8 Where possible, use non-lethal ammunition to deter wildlife prior to the use of lethal ammunition.

1.22 FIRE SAFETY

- .1 Provide all fire prevention, fire protection and firefighting services at the Project site.
- .2 Implement a fire safety program that includes fire prevention, fire protection and firefighting requirements. Submit details of the fire safety program in writing to Departmental Representative for review as part of SSHSP prior to start of construction. Such review does not relieve Contractor from any obligations or responsibilities required by the Contract.
- .3 Ensure that any Sub-Contractors and other Contractor personnel on-site are briefed on fire safety requirements and are familiar with the fire prevention, fire protection and firefighting program.
- .4 Prepare a Fire Safety Plan to meet or exceed the most recent editions of the following codes and standards:
 - .1 NWT Safety Act.
 - .2 National Fire Code of Canada.
 - .3 Canada Labour Code.
- .5 Personnel designated for fire fighting services must be provided with training for any special hazards that may be present. These personnel must also be provided with protective equipment as required by AHJ.

1.23 REPORTING FIRES

- .1 A person discovering a fire and all fire related incidents will report immediately, by fastest available means, to Departmental Representative and site superintendent.
- .2 A person discovering a fire will if possible, remain in the vicinity to direct fire fighting personnel.

1.24 FIRE EXTINGUISHERS

.1 Provide and maintain fire extinguishers in sufficient quantity to protect, in an emergency, the Work in progress and the camp on site.

1.25 SMOKING PRECAUTIONS

- .1 Do not permit smoking in hazardous areas. Exercise care in the use of smoking materials in non-restricted areas.
- .2 Smoking is prohibited within the camp facilities unless in accordance with AHJ and as directed by Departmental Representative.

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SITE SPECIFIC HEALTH AND SAFETY PLAN

- .3 Provide and place signs prohibiting smoking in areas where smoking is not permitted.
- .4 Signs prohibiting smoking will be in English and will have black lettering not less than 50 mm high, with a 12 mm wide stroke on a yellow background. In lieu of lettering, symbols of not less than 150 mm by 150 mm may be used.
- .5 Smoking is prohibited within 7.5 metres of fuel storage and dispensing facilities.
- Provide and place signs indicating that smoking within 7.5 metres of fuel storage and dispensing facilities is not permitted, and that the vehicle ignition must be turned off while the vehicle is being refuelled. Provide at least one weather-resistant sign at each fuel dispensing location. The signs will have a minimum dimension of 200 mm and letters not less than 25 mm high. In lieu of lettering, signs may have international "No Smoking Ignition Off" symbols not less than 100 mm in diameter. Install signs in a location visible to all drivers approaching the dispensing location, and at the dispensing unit.
- .7 Provide designated outdoor camp smoking area that is at least 3m away from any entrances/exists to buildings. These areas must be equipped with fire-proof containers for ash and cigarette butts that are emptied regularly.
- .8 Cigarette butts cannot be left on the ground at both the worksites and around camp.
- .9 Fireproof cigarette disposal containers will be made available outside of camp perimeter.
- .10 No smoking while in or on machinery as well as while within vehicles.
- .11 Camp smoking policy will be in accordance with Section 25 of the WSCC Safety Act, Environmental Tobacco Smoke Worksite Regulations.

1.26 RUBBISH AND WASTE MATERIALS

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 Storage:
 - .1 Extreme care is required where it is necessary to store oily waste in Work areas to ensure maximum possible cleanliness and safety.
 - .2 Greasy or oily rags or materials subject to spontaneous combustion will be disposed of as hazardous material in a manner that prevents spontaneous combustion.

1.27 PRESSURIZED CYLINDERS

- .1 Work entails the handling and disposal of pressurized cylinders. Work will be in accordance with the National Fire Code of Canada, Occupational Health and Safety Legislation, and WHMIS.
- .2 Special precautions are necessary to safeguard life and property from damage by fire or explosives.
- .3 Eliminate all sources of ignition where pressurized cylinders and explosives are stored.
- .4 Provide proper substance-specific environmental conditions for storage, handling and transport of explosives:
 - .1 Keep dry and well ventilated.
 - .2 Keep as cool as possible and free from excessive or frequent changes of temperature.

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SITE SPECIFIC HEALTH AND SAFETY PLAN

- .3 Protect from direct sunlight.
- .4 Keep free from excessive and constant vibration.

1.28 HAZARDOUS SUBSTANCES

- .1 If the Work entails the use of any toxic or hazardous materials or chemicals, or otherwise creates a hazard to life, safety or health, Work will be in accordance with the National Fire Code of Canada, Occupational Health and Safety Legislation, WSCC, and WHMIS.
- .2 Departmental Representative is to be advised, and a "Hot Work" permit issued by Contractor's designated representative in all cases involving welding, burning or the use of blow torches and salamanders, in buildings or facilities. Special precautions are necessary to safeguard life and property from damage by fire or explosives.
- .3 Wherever Work is being carried out in dangerous or hazardous areas involving the use of heat, fire watchers, equipped with sufficient fire extinguishers, will be provided. The determination of dangerous or hazardous areas along with the level of precaution necessary for Fire Watch will be at the discretion of Contractor. Notify Departmental Representative prior to that determination.
- .4 Provide proper ventilation and eliminate all sources of ignition where flammable liquids, such as lacquers or urethanes are used.
- .5 Follow confined space (including Confined Space Permit) protocols and best practices, if entry required. Provide potential confined space inventory for the sites.

1.29 QUESTIONS AND CLARIFICATIONS

.1 Direct any questions or clarification to Departmental Representative.

1.30 UNIQUE HAZARDS

- .1 The hazards unique to each site are identified in Section 01 11 00 Summary of Work and supporting documents.
- .2 Ensure workers receive training specific to the PPE requirements for working at each site.
- .3 Ensure workers receive training specific to the PPE requirements for working with site-specific unique hazards including safe handling, disposal and emergency procedures.
- .4 The Contractor must follow the WSCC winter road building guidelines and the MHSA.
- .5 Issue copies of procedures to attendees at the pre-construction meeting for review.

1.31 MEASUREMENT FOR PAYMENT

.1 All costs for the preparation and completion of the Site Specific Health and Safety Plan, are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule. The lump sum price for the Site Specific Health and Safety Plan will be paid after a satisfactory Site Specific Health and Safety Plan has been submitted to Departmental Representative.

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- .2 The provision of Wildlife Monitors, including ATVs, will be measured for payment by the day that the services are provided. The provision of wildlife monitoring services will be paid under Item 01 35 32-1, Wildlife Monitors in the Basis of Payment Schedule.
- .3 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under LSA in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

ENVIRONMENTAL PROCEDURES

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PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 REGULATORY OVERVIEW

- .1 Comply with all applicable environmental laws, regulations and requirements of Federal, Territorial and other regional authorities, and acquire and comply with such permits, approvals and authorizations as may be required.
- .2 Comply with and be subject to those permits and approvals obtained from Departmental Representative to conduct the Work.
- .3 Pay specific attention to the following:
 - .1 Land Use Permit;
 - .2 Water License;
 - .3 Quarry Permit(s); and
 - .4 Associated legislation including the Mackenzie Valley Resource Management Act, the Mackenzie Valley Land Use Regulations and the Territorial Quarrying Regulations.
- .4 Pay specific attention to the Migratory Birds Convention Act, as amended in 1994.
- .5 Pay specific attention to the Fisheries Act.
- .6 Comply with the Treasury Board of Canada Secretariat's Policy on Green Procurement where practical and as directed by Departmental Representative.

1.3 SUBMITTALS

- .1 Submit all required Contractor submittals to satisfy environmental requirements directly to the responsible agency and Authorities Having Jurisdiction (AHJ).
- .2 Submit one (1) complete copy of all submittals and agency approvals to Departmental Representative.
- .3 All submittals in accordance with Section 01 33 00 Submittal Procedures.

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1.4 HISTORICAL OR ARCHAEOLOGICAL SITES

- .1 Historical and antiquities and items of historical or scientific interest such as cairns, tent rings, commemorative plaques, inscribed tablets, and similar objects found on-site or in structures to be demolished will remain the property of the appropriate AHJ.
- .2 Prior to commencing Work at the site, review the following with Departmental Representative:
 - .1 The extent of the archaeologically sensitive areas including gravesites.
 - .2 The methods to be used by Contractor to mark and protect the areas from construction/remediation activities.
- .3 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction/remediation activities, and await Departmental Representative's written instructions before proceeding with Work in this area.
- .4 Protect archaeological finds and similar objects found during course of Work.
- .5 General locations of previously identified heritage sites are indicated on Drawings C-BUR-01, C-BUR-02 (i.e. Burnt Island grave site) and C-CAM-01.

1.5 SITE MAINTENANCE

- .1 Keep the site free from the accumulation of waste materials and debris.
- .2 Upon completion of the Work, clean away and dispose of all surplus material, supplies, rubbish and temporary works leaving the site neat and tidy to the requirements of Departmental Representative and the Land Use Permit.

1.6 FIRES

- .1 Fires and burning of rubbish on site, other than waste incineration in accordance with the contract, is not permitted unless approved by Departmental Representative, with the exception of unpainted wood, as stated in Section 02 41 16 Structure Demolition.
- .2 Where fires or burning are permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged Work.
- .3 Provide supervision, attendance and fire protection measures as required by AHJ and in accordance with Section 02 41 16 – Structure Demolition.
- .4 Obtain all required permits from AHJ.
- .5 Comply with the Government of Northwest Territories Environment and Natural Resources (GNWT ENR) guidance document "Municipal Wastes Suitable for Open Burning", 1993.
 - .1 Any ash produced from open burning or incineration may also be subject to testing for contents of hazardous materials.
 - .2 Dispose of any ash material from open burning or incineration accordingly.

1.7 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

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.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner, or any other deleterious substances into waterways.

1.8 FUEL STORAGE

.1 Comply with Canadian Environmental Protection Act (CEPA) Petroleum Products Regulations, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (2008), CCME Codes of Practice and any regulations obtained from Territorial and other regional authorities, for setting up and operating temporary fuel tanks. Provide Departmental Representative with copies of permits prior to the start of construction in accordance to Section 01 33 00 – Submittal Procedures.

1.9 WATER MANAGEMENT

.1 Provide potable water for drinking and cooking in accordance to the Water License and Section 01 54 00 – Camp Facilities.

1.10 WASTEWATER MANAGEMENT

.1 Provide details for sewage and disposal system sixty (60) days after Contract Award in accordance to the Water License and Section 01 33 00 – Submittal Procedures.

1.11 PROCESS WASTEWATER DISCHARGE CRITERIA

- .1 Wash water, meltwater collection, rinse water resulting from the cleaning of fuel tanks and pipelines, contaminated groundwater, water from dewatering contaminated soil areas, camp waste water, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters, will meet the treatment requirements in Section 01 35 15 Special Procedures for Contaminated Sites, and will conform to the discharge requirements set out in the Land Use Permit and Water License.
- .2 Contractor must obtain approval from the Departmental Representative and AHJ prior to discharging treated wastewater.

1.12 CAMP WASTEWATER DISCHARGE CRITERIA

- .1 Camp Wastewater will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters and treated to conform to the discharge requirements set out in the Land Use Permit and Water Licence.
- .2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge (at no additional cost).
- .3 No direct discharge is allowed to wetlands or surface waters.
- .4 Contractor must obtain approval from the Departmental Representative and AHJ prior to discharging treated wastewater.

1.13 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways or drainage systems.

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.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

SITE CLEARING AND PLANT PROTECTION 1.14

- .1 Protect native vegetation on site and minimize disturbances outside the previously disturbed areas.
- .2 Demarcate areas adjacent to work areas as appropriate to protect native vegetation. This may include, but not be limited to use of snow fencing or burlap wrapping.
- .3 Minimize stripping of topsoil and vegetation.

1.15 WORK ADJACENT TO WATERWAYS

- Submit Work Plans for work to be undertaken in or near a waterbody, to Departmental .1 Representative for review forty-five (45) days prior to commencing the work. A separate plan to be submitted for the following Work activities:
 - .1 Construction of floating docks to be accessed by float planes at Camlaren, Kidney Pond, Treacy, and West Bay sites.
 - .2 Removing and recontouring of the wooden culvert at Camlaren.
- Work Plans to include the following: .2
 - Sketch of working area, including placement of erosion control, culverts, and temporary .1 roadways, as required.
 - .2 Reference to Department of Fisheries and Oceans (DFO) Operational Statements and/or Best Management Practices as applicable.
 - .3 Timing of Work.
 - .4 Specific details of erosion and sediment control works, materials to be used, and deployment and removal methods.
 - .5 List of equipment to be used in waterway.
 - .6 List of materials, including source and manufacturer, to be placed in waterway.
 - Work schedule including the sequence and duration of all related Work activities. .7
 - 8. Maintenance, monitoring, and final removal of erosion control, culverts, and roadway works.
 - .9 Reporting as required by AHJs.
- .3 Do not operate construction equipment in waterways during DFO restricted periods.
- .4 Do not use waterway beds for borrow material.
- .5 Do not dump excavated fill, waste material or debris in waterways.
- .6 Design and construct temporary crossings to minimize erosion to waterways.
- .7 Do not skid logs or construction materials across waterways.
- 8. Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .9 Do not blast under water or within 100 m of indicated spawning beds.

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- .10 Do not use shoreline grounds (30 metres from edge) as staging area, vehicle/equipment maintenance, parking, storage of fuel or for stockpiling of granular or other fill and other deleterious material storage.
- .11 If stream or drainage course crossing is required, use methodologies (in accordance with DFO requirements, and with consideration of DFO timing windows as well as any other requirements) to prevent sedimentation into waterbodies.
- .12 Do not refuel equipment (except for boats) within 30 m of water bodies or on ice.
- .13 Install fish exclusion nets or flow diversion to prevent fish from migrating to the work sites.
 - .1 If fish do migrate into the work sites, fish shall be captured and relocated from the work sites prior to start of construction. Nets or electro-shock methods can be used.
- .14 Effective sediment and erosion control measures to be installed prior to starting work to prevent entry of sediment into watercourses. Such measures to be inspected regularly and repaired if damaged by construction, precipitation or snowmelt.
- .15 Excavations should be no closer than 10 m (top of excavation slope) to a water body.

1.16 TEMPORARY WINTER ACCESS TRAIL ALIGNMENT

- .1 Contractor is responsible for selection of the winter access trail alignment. The proposed trail alignment will be included as part of the Mobilization and Demobilization Plan, detailed in Section 01 53 00, to be submitted to the Departmental Representative in accordance with Section 01 33 00 Submittal Procedures.
- .2 Assessment of potential environmental impact of the proposed winter access trail alignment, once determined, is to be completed in accordance with the requirements of the AHJs prior to final approval of the route by Departmental Representative.
- .3 Temporary winter access trail alignment shall be selected following consultation with the chosen departure community to avoid heavily used traditional areas, where practical.
- .4 Contractor will comply with the requirements of this Section and the requirements of the AHJs, including but not limited to the following:
 - .1 Construction and operation will only occur when the ground is frozen (e.g., December to April).
 - .2 Appropriate wildlife protection procedures and measures will be taken during construction and operation.
 - .3 Build-up and pre-packing of snow on winter access trail will be completed to a minimum of 0.10 m thickness to protect the underlying ground and vegetation.
 - .4 Water withdrawal along the access trail route will comply with appropriate protocols, including DFOs protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut.
- .5 Construction and decommissioning of ice bridges and snow fills will comply with the former DFO Operational Statement for Ice Bridges and Snow Fills.

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DUST, PARTICULATE AND POLLUTION CONTROL 1.17

- Maintain temporary erosion and pollution control features installed under this contract. .1
- .2 Control emissions from equipment and plan to local authorities' emission requirements.
- .3 Execute Work using methods to minimize raising dust and ash from decontamination operations. Implement and maintain dust and particulate control measures as determined necessary by applicable regulations and standards during Work and in accordance with AHJ.
- .4 Provide positive means to prevent airborne dust and ash from dispersing into atmosphere. The use of oil for dust control is prohibited. Provide details on the dust suppressant to the Departmental Representative for approval prior to use.
- .5 Prevent dust and ash from spreading beyond the immediate work area.
- .6 Departmental Representative or designate may stop work at any time when Contractor's control of dusts and particulates is inadequate for worker exposure during Work.
- .7 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures to resolve the problem. Make all necessary changes to operations prior to resuming work that may cause release of dusts. particulates or ash.
 - Prevent sandblasting and other extraneous materials from contaminating air beyond .1 application area, by providing temporary enclosures.
 - .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
 - .3 Provide dust control for temporary roads.

1.18 **ENVIRONMENT PROTECTION SUPPLIES**

- .1 Comply with federal and territorial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.
- .2 Provide erosion, sediment and drainage control supplies necessary to complete all requirements of the Work in compliance with federal and territorial fisheries and environmental protection legislation.
- .3 Erosion, sediment and drainage control supplies are to include, but are not limited to the following: Minimum of 300 m of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. These materials are to be used as necessary to prevent sediment transport into water bodies. Product acceptance will be based on compliance with the minimum/maximum average values found in Part 2 of this Section.
- Minimum of 300 lineal metres, and as required, of 200 mm diameter hydrophobic, sorbent booms. .4 These materials are to be used as necessary to prevent the migration of hydrocarbons.
- .5 Minimum of 150 lineal metres of reusable floating silt curtain, of appropriate depth to prevent sediment transport throughout water bodies. Product acceptance is based on compliance with the minimum/maximum values found in Part 2 of this Section.

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- Supply, transport, install and maintain erosion, sediment and drainage controls necessary to complete the Work in accordance with the requirements of Departmental Representative.
- .7 At the completion of construction, dispose of used silt fence off-site as non-Hazardous Waste. Dispose of used absorbent boom in accordance with Section 02 81 01 Hazardous Materials.
- .8 Unused Erosion, Sediment and Drainage Control supplies will remain the property of Departmental Representative until the completion of the Contract.
- .9 Submit a detailed inventory of environmental protection supplies forty-five (45) days prior to mobilization.
- .10 Supply a Standard Spill Response Kit at each site which includes a spill response kit designated for a marine or aquatic spill.

1.19 ENVIRONMENTAL PROTECTION PLAN

- .1 The Environmental Protection Plan (to be submitted sixty (60) days prior to commencing Work) constitutes the following specific Plans, which together will outline all necessary environmental protection and waste prevention measures:
 - .1 Wildlife Protection Plan.
 - .2 Historical, Archaeological, Cultural Resources, Biological Resources and Wetlands Plan.
 - .3 Erosion, Sediment and Drainage Control Plan.
 - .4 Spill Control Plan.
 - .5 Waste Management Plan.
- .2 Review the contents of the Plan with staff prior to commencement of work on site.

1.20 WILDLIFE PROTECTION PLAN

- .1 Submit a Wildlife Protection Plan that defines procedures for the protection of wildlife known to frequent the Project and surrounding areas (including the winter access trail following the final selection as part of the Mobilization and Demobilization Plan, detailed in Section 01 53 00). Wildlife Protection Plan will include but is not limited to the following:
 - .1 Avoidance of active animal dens.
 - .2 Avoidance of active nests.
 - .3 Potential access restrictions and/or disturbance minimizing with respect to migration activities.
 - .4 Minimizing disturbances caused by aircraft.
- .2 Submit the Wildlife Protection Plan to the Departmental Representative sixty (60) days prior to commencement of Work in accordance to Section 01 33 00 Submittal Procedures.

1.21 HISTORICAL ARCHAEOLOGICAL CONTROL

.1 Provide Historical, Archaeological, Cultural Resources, Biological Resources and Wetlands Plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on Project site: and/or identifies procedures to be followed if historical, archaeological, cultural resources, biological resources or wetlands not previously known to be on-site or in area are discovered during construction.

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- .2 Plan to include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.
- .3 Plan to include equipment and methods to be implemented for completion of Work as required in archaeological sensitive areas.
- .4 Submit the Historical, Archaeological, Cultural Resources, Biological Resources and Wetlands Plan to the Departmental Representative sixty (60) days prior to commencement of Work.

1.22 EROSION, SEDIMENT AND DRAINAGE CONTROL PLAN

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other Work areas. Prevent erosion and sedimentation.
- Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical. Strip vegetation, re-grade, or otherwise develop in such a way as to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Departmental Representative.
- .3 Provide and maintain temporary measures which may include but are not limited to silt fences, hay or straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and any other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction. Place silt fences in ditches to prevent sediments from escaping from ditch terminations.
- .4 Prior to or during construction, Departmental Representative may require the installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes, guardrails, temporary roads, and other measures appropriate to specific site conditions. Temporary improvements must remain in place and in operation as necessary or until otherwise directed by Departmental Representative.
- .5 Plan construction procedures to avoid damage to Work or equipment encroachment onto water bodies or drainage ditch banks. In the event of damage, promptly take action to mitigate effects. Restore affected bank or water body to pre-existing condition.
- .6 Do not disturb existing embankments or embankment protection.
- .7 Do not construct silt fences in flowing streams or in swales.
- .8 Periodically inspect earthworks to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- .9 If soil and debris from site accumulate in low areas, ditches, or other areas where, in Departmental Representative's determination, it is undesirable, remove accumulation and restore area to original condition.
 - .1 Do not pump water containing suspended materials into waterways or drainage systems.

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Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

- .10 Unless indicated or directed by Departmental Representative, remove temporary erosion and sediment control devices (including installed culverts) upon completion of Work. Spread accumulated sediments to suitable surface for seeding or dispose of, and shape area to permit natural drainage to satisfaction of Departmental Representative. Materials once removed become the property of the Contractor.
- .11 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative for review and approval sixty (60) days prior to commencement of Work. Plan to identify type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Territorial, and Municipal laws and regulations. Plan to specifically address the protection of water bodies, watercourses, fisheries, and the following:
 - .1 Details of grading Work to prevent surface drainage into or out of Work areas.
 - .2 Details of erosion control works and materials to be used for specific Work activities, including the deployment of silt fencing, floating silt curtains and containment booms during construction and excavation activities.
 - .3 Work Schedule including the sequence and duration of all related Work activities, with consideration of timing windows specified by DFO for in-water works.
 - .4 The treatment of site runoff to prevent siltation of watercourses.
 - .5 Dewatering procedures for excavated materials including silt removal procedures prior to discharge.
 - .6 Stabilizing procedures during excavation.
 - .7 Fish salvage efforts where applicable.
 - .8 Maintenance and monitoring of erosion control works.
 - .9 Contingency plans must also be included to address unexpected sediment and erosion risk including those associated with rain events with greater than 5 mm of precipitation.
 - .10 Comply with the requirements of all AHJ and the Crown EHS-MS.
- .12 All approved discharge from dewatering activities to be released onto the ground at a location that is a minimum of 30 m from natural drainage courses and 100 m from fish bearing waters.
- .13 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

1.23 SPILL CONTROL PLAN

- .1 Plan and execute construction as per Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .2 Prepare the Spill Control Plan in accordance with "Guidelines for Spill Contingency Planning", Water Resources Division Indian and Northern Affairs Canada (2007).
- .3 Submit the Spill Control Plan to the Departmental Representative sixty (60) days prior to commencement of Work in accordance to Section 01 33 00 Submittal Procedures.

ENVIRONMENTAL PROCEDURES

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1.24 WASTE MANAGEMENT PLAN

- .1 Plan and execute construction by Waste Management Plan identifying methods and procedures for management of drilling cuttings, other solid and liquid wastes, and sanitary waste which are directly derived from Work activities. This should include special provisions for managing hazardous solid and liquid waste. Contractor to identify the method(s) for separating waste materials for reuse and recycling and offsite disposal.
- .2 Prior to beginning of Work on site submit detailed Waste Reduction Workplan (as a component of the overall Waste Management Plan) as described in Section 02 41 16 Structure Demolition, and in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .3 Prepare the Waste Management Plan in accordance with MVLWB Waste Management Planning Guidelines.
- .4 Submit the Waste Management Plan to the Departmental Representative sixty (60) days prior to commencement of Work in accordance to Section 01 33 00 Submittal Procedures.

1.25 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.
- .2 Contractor, after receipt of such notice, will inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.26 MEASUREMENT FOR PAYMENT

- .1 Include all direct costs for the installation, supply and transport of the specified Environmental Protection activities including the silt fence and the sorbent booms and all necessary stakes and connecting hardware as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all under LSA in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 POLYPROPYLENE SILT FENCE

Silt fence: An assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile to be uniform in texture and appearance, having no defects, flaws, or tears that would affects its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure. Product acceptance will be based on compliance with the following minimum/maximum average values:

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- .1 Minimum Grab Tensile Strength (ASTM D4632): 520N
- .2 Maximum Elongation (ASTM D4632): 15%
- Minimum Puncture Strength (ASTM D4833): 250N .3
- .4 Maximum Apparent Opening Size (ASTM D4751): 500 µm
- .2 Net Backing: Industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.
- Posts: Sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow .3 minimum 450 mm embedment; post spacing 2.4 m maximum. Geotextile and net backing to be securely fastened to each post using suitable staples.

2.2 HYDROPHOBIC SORBENT BOOM

- .1 200 mm dia. Polypropylene material.
- .2 Minimum gallons absorbed per 3 m lengths: 50L.

2.3 **FLOATING SILT CURTAIN**

- Provide floating silt curtains meeting the United States Army Corps of Engineers Type II designation .1 and meeting the following values:
 - .1 Minimum Flotation Buoyancy: 250 N/m
 - .2 Minimum Floating Fabric Curtain Grab Tensile (ASTM D-5043): 1700 x 1650 N.
 - .3 Connectors: brass grommets nominally 300 mm o/c for lacing.
 - Ballast Chain: minimum 8 mm galvanized chain, 1.4 kg/m. .4
 - .5 Load Cable: minimum 8 mm galvanized, vinyl coated 7 x 19 wire rope, minimum loading 40 kN.
 - Constructed in panels. .6
- .2 Provide mooring lines and anchors as necessary to secure the floating silt curtain in position.

PART 3 - EXECUTION

NOT USED 3.1

.1 Not used.

END OF SECTION

Section 01 41 00

Page 1 of 4

PART 1 - GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including all amendments and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
- .3 Perform Work in accordance with the Specifications and meet or exceed all codes, standards and regulations applicable to the Work and issued under the authority of the Government of Canada and the Government of the Northwest Territories. Advise Departmental Representative of any discrepancies in the codes, standards and regulations applicable to the Work.

1.2 REFERENCES AND CODES - FEDERAL

- .1 Meet or exceed the governing codes, standards and guidelines, and regulations applicable to Work and issued under the authority of the Government of Canada including, but not limited to the following:
 - .1 Canada Labour Code Occupational Health and Safety (R.S.C. 1985, c.L-2).
 - .2 Canada Occupational Health and Safety Regulations (SOR/86-304), including:
 - .1 Part X Hazardous Substances.
 - .3 Canadian Environmental Protection Act (S.C. 1999, C.33)
 - .4 Controlled Products Regulations (SOR/88-66) a.SOR/2015.
 - .5 Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301).
 - .6 National Fire Code of Canada, 2010.
 - .7 Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c.34) a.2014, C.32.
 - .8 Transportation of Dangerous Goods Regulations (SOR/2015-100).
 - .9 Territorial Land Use Regulations (R-012 -2016).
 - .10 Migratory Birds Convention Act (S.C. 1994, c. 22).
 - .11 Fisheries Act (R.S.C., 1985, c. F-14)
 - .12 Guidelines for Canadian Drinking Water Quality (Health Canada, October 2014).
 - .13 Wastewater Systems Effluent Regulations (SOR/2012-139).
 - .14 Technical Document for Batch Waste Incineration (EC, 2010).
 - .15 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 1999) and amendments (online, 2016).
 - .16 Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil (CCME, 2001; revised June 25, 2012; viewed online, 2016).
 - .17 Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 1999) and amendments (online, 2016).
 - .18 Contaminated Sites Management Policy (INAC, 2002).
 - .19 A Federal Approach to Contaminated Sites (Contaminated Sites Management Working Group (CSMWG), 1999).
 - .20 NCSP Project Level Risk Management Guidance (INAC, 2008).
 - .21 Risk Management Guidance Document (INAC, 2006).
 - .22 Contaminated Sites Cost Estimating Guide (AANDC, 2013).
 - .23 Treasury Board Policy on Management of Real Property (TB, 2006).
 - .24 Material Safety Data Sheets (MSDS), Health Canada / Workplace Hazardous Materials Information System (WHMIS).
 - .25 Risk Management Tool and Reporting Tool User Guide (INAC, 2007)

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REGULATORY REQUIREMENTS

- .26 Environment, Health & Safety Management System Manual (INAC, 2008)
- .27 Environment, Health & Safety Standard Operating Procedures Manual (INAC, 2006)
- .28 Environment, Health and Safety Control Framework, Northern Contaminated Sites Program (INAC, 2008)
- .29 Environment, Health and Safety Audit Program Guide (INAC, 2008)
- .30 Construction Project Safety Management Guide, 5th Edition (PWGSC, 2008)
- .31 Abandoned Military Site Remediation Protocol (INAC, 2009)
- .32 National Building Code of Canada (2015)
- .33 Navigation Protection Act (R.S.C, 1985, c.N-22) SOR/2014-72
- .34 Canadian Environmental Assessment Act (S.C. 2012, c.19, s.52)
- .35 Mackenzie Valley Resource Management Act (S.C. 1998, c.25)
- .36 Species at Risk Act (S.C., 2002, c.29)
- .37 Canadian Electrical Code, 2015
- .38 Canada Shipping Act (S.C., 2001, c.26)
- .39 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .40 Department of Indian Affairs and Northern Development Northern Land Use Guidelines:
 - .1 Volume 5: Access Roads and Trails (2010).
 - .2 Volume 6: Camp and Support Facilities (2011).
 - 3 Volume 7: Pits and Quarries (2009).
- .41 Best Practice for Building and Working Safely on Ice Covers in Alberta, Government of Alberta (October 2009)
- .43 Arctic Waters Pollution Prevention Act (R.S.C., 1985, c. A-12), including:
 - .1 Arctic Waters Pollution Prevention Regulations (C.R.C., c. 354)
- .44 Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments, April 1976.

1.3 REFERENCES AND CODES – NORTHWEST TERRITORIES

- .1 Meet or exceed the governing codes, standards and guidelines, and regulations applicable to Work and issued under the authority of the Government of the Northwest Territories as follows:
 - .1 Occupational Health and Safety Regulations, NWT Reg 039-2015.
 - .2 Environmental Protection Act (R.S.N.W.T. 1988, c. E-7).
 - .3 Employment Standards Act (S.N.W.T. 2007, c.13), amended July 2, 2012.
 - .4 Public Health Act (S.N.W.T. 2007, c.17), in force September 14, 2009.
 - .5 Spill Contingency Planning and Reporting Regulations R-068-93
 - .6 Fire Prevention Act, R.S.N.W.T. 1988, c.F-6
 - .7 Transportation of Dangerous Goods Act (R.S.N.W.T. 1988, c.81 (Supp.)), in force August 1, 1991.
 - .8 Used Oil and Waste Fuel Management Regulations, R-064-2003, in force January 1, 2004.
 - .9 Work Site Hazardous Materials Information System Regulations (R.R.N.W.T 1990, c.S-2)
 - .10 Mine Health & Safety Act (S.N.W.T. 1994, c.25), amended R-095-2014.
 - .11 Workers' Compensation Act, S.N.W.T. 2007, c.21, amended S.N.W.T 2015, c. 13.
 - .12 Waters Act (S.N.W.T. 2014, c.18) All sections except 104 in force April 1, 2014.
 - .13 Safety Act (R.S.N.W.T., 1988, c.S-1) a. S.N.W.T. 2007, c. 21.

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REGULATORY REQUIREMENTS

1.4 STANDARDS AND GUIDELINES

- .1 Department of the Environment and Natural Resources, Government of the Northwest Territories:
 - .1 Guideline for the Management of Waste Antifreeze, September 1998
 - .2 Guideline for the Management of Waste Asbestos, April 2004
 - .3 Guideline for the Management of Waste Batteries, September 1998
 - .4 Guideline for the Management of Waste Lead and Lead Paint, April 2004
 - .5 Guideline for the Management of Waste Solvents, September 1998
 - .6 Guideline for Contaminated Site Remediation, November 2003
 - .7 Guideline for Ambient Air Quality Standards in the Northwest Territories, February 2014
 - .8 Guideline for Dust Suppression, June 2013
 - .9 Guideline for the General Management of Hazardous Waste in the NWT, February 1998
 - .10 Guideline for Industrial Waste Discharges in the NWT, April 2004
- .2 Guidelines for Safe Ice Construction (GNWT, 2015).
- .3 A field Guide to Ice Construction Safety, Department of Transportation, NWT, November 1996 Edition.
- .4 Environmental Guidelines for the Construction, Maintenance and Closure of Winter Roads in the Northwest Territories, by Stanley Associates for the Department of Transportation (Oct 1993).

1.5 PERMITS AND LICENSES

- .1 The following permits and licenses will be provided to Contractor when received by Indigenous and Northern Affairs Canada (INAC):
 - .1 Type "A" Water License (if necessary), granted by the Mackenzie Valley Land and Water Board in accordance with the Mackenzie Valley Resource Management Act.
 - .2 Type "A" Land Use Permit, granted by the Mackenzie Valley Land and Water Board in accordance with the Mackenzie Valley Resource Management Act.
 - .3 Quarry Permit(s), granted by INAC.
- .2 The contractor will be responsible for acquiring permits, authorizations, and/or licenses required for mobilization and demobilization. This includes, but is not limited to, CAT Train, and/or winter road/ice access and barging activities.
- Obtain permits from the respective Authorities Having Jurisdiction (AHJs) as required to complete the work, including but not limited to Burn Permits, camp permits, and timber permits.
- Any deviations from the current remediation plan may require land use permit amendments or field authorizations. Notify Departmental Representative of any proposed deviations so INAC can contact the appropriate agency to obtain approval for the deviation. Approval may take 45 to 90 days from the time of submission.

1.6 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Demolition of spray or trowel-applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition Work that is not identified in the Hazardous and Non-Hazardous Material Inventory in Appendix A and governed by a written work procedure, immediately stop Work and notify Departmental Representative. Refer to Section 02 82 00.01 - Asbestos Abatement (Minimum Precautions).

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REGULATORY REQUIREMENTS

- .2 Stop Work immediately and notify Departmental Representative upon discovery of the following materials that are not identified on the Drawings or in the Hazardous and Non-Hazardous Material Inventory in Appendix A during course of Work:
 - .1 Designated substances such as polychlorinated biphenyls (PCBs), asbestos, and mercury.
 - .2 Unknown and/or potentially hazardous substances.
 - .3 Items that may have archaeological, cultural or scientific significance.
 - .4 Unexploded Ordnance (blasting caps).
- .3 Work at site will involve contact with:
 - .1 Metal impacted soil.
 - .2 PHC (total petroleum hydrocarbons) impacted soils.
 - .3 Metal and PHC impacted soils.
 - .4 Potentially hazardous liquids and petroleum based products.
 - .5 Demolition debris with lead-based paints.
 - .6 Asbestos containing materials.

1.7 WHMIS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.
- 2. Submit copies of Material Safety Data Sheets (MSDS) to Departmental Representative upon delivery of materials to site.
- .3 Provide inventory system to track movement of all workplace hazardous materials on and off site.

1.8 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.9 MEASUREMENT FOR PAYMENT

.1 Work under this section will not be measured. Include all under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

QUALITY CONTROL

- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such Work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative will pay cost of examination and replacement.

1.2 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

QUALITY CONTROL

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- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples, if required.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's Work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.7 REPORTS

- .1 Submit three (3) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to Sub-Contractor of Work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MEASUREMENT FOR PAYMENT

.1 Work under this Section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

QUALITY CONTROL

ISSUED FOR TENDER
Section 01 45 00
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PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

Section 01 51 00 Page 1 of 4

PART 1 - GENERAL

1.1 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities to facilitate all construction and camp activities.
- .2 Remove from site all such Work after use.
- .3 Provide all temporary utilities consisting of the design, supply, construction, maintenance, operation and removal of the utilities and services required to support the remediation of the site. Temporary utilities to meet requirements of Land Use Permit issued for the Work, satisfy requirements of Federal, Territorial and local Authorities Having Jurisdiction (AHJ), and comply with the requirements of Section 01 35 43 Environmental Procedures.

1.2 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 EXISTING SERVICES

- .1 The location of equipment and utility services specified or indicated on the Drawings is to be considered as approximate. The site has no known operational utility services.
- .2 Before commencing Work, establish location and extent of services in area of Work, and notify Departmental Representative of findings.
- .3 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .4 Record locations of maintained, joined, re-routed and abandoned service lines indicating horizontal distances and vertical elevations.
- .5 Take necessary precautions and prevent damage to existing services and facilities.
- .6 Repair and replace services or facilities damaged as a result of Contractor's operations at no additional cost to Departmental Representative.

1.4 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
- .2 Provide means to conserve water on-site, as suitable potable water sources may be limited or at a distance. Consider using tanks to store water.
- .3 Abide by terms of Water Licence regarding water usage.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

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TEMPORARY UTILITIES

- .2 Construction heaters used inside buildings must be vented to outside or be non-flameless type. Solid fuel salamanders (multi-fuel cast iron stoves) are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Provide adequate ventilation to meet health regulations for safe working environment.
 - .3 Protect Work and products against dampness and cold.
 - .4 Prevent condensation from forming on surfaces.
 - .5 Provide ambient temperatures and humidity levels for storage and installation of materials.
- .4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .5 Provide functioning carbon monoxide and smoke detectors in occupied areas.
- .6 Provide ventilation for temporary facilities as follows:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful elements.
- .7 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER AND LIGHT

- .1 Provide, operate, and maintain an electrical power supply system, in accordance with governing regulations, to service Contractor's site power requirements.
- .2 Install temporary facilities as necessary for power distribution, such as power cable and pole lines, subject to Departmental Representative's approval.
- .3 Provide lighting and power at site for use during Work by Contractor, Sub-Contractors, and Departmental Representative's support personnel including outdoor lighting for night shift as applicable.

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1.7 TEMPORARY COMMUNICATIONS FACILITIES

.1 Provide and pay for temporary telephone, fax, and data hook up equipment necessary for Contractor use and use of Departmental Representative in accordance with Section 01 54 00 – Camp Facilities.

TEMPORARY UTILITIES

1.8 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction, and governing codes, regulations and bylaws.

1.9 DRAINAGE

.1 Refer to Section 01 35 43 - Environmental Procedures.

1.10 SIGNS AND NOTICES

- .1 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction to be in English.
- .2 Maintenance and Disposal of Site Signs:
 - .1 Maintain approved signs and notices in good condition for duration of Project, and dispose of off-site on completion of Project, or earlier if directed by Departmental Representative.

1.11 MOBILIZATION AND DEMOBILIZATION

- .1 Provide temporary utilities to facilitate mobilization and demobilization activities including but not limited to water supply, power and light, heating and ventilation, communication, and fire protection.
- .2 Provide all temporary utilities consisting of the design, supply, construction, maintenance, operation and removal of the utilities and services required to support the mobilization to and demobilization from the site of all labour, equipment, materials, and supplies. Temporary utilities to meet requirements of the Land Use Permit issued for the mobilization/demobilization, satisfy requirements of Federal, Territorial and local Authorities Having Jurisdiction (AHJ), and comply with the requirements of Section 01 35 43 Environmental Procedures including those specific to the Winter Access Trail Alignment.

1.12 MEASUREMENT FOR PAYMENT

.1 Work under this section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

ISSUED FOR TENDER Section 01 51 00

TEMPORARY UTILITIES

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PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

Section 01 52 00 Page 1 of 5

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute Work expeditiously.
- .2 Remove from site all such Work after use.
- .3 Provide all temporary facilities consisting of the design, supply, construction, maintenance, operation and removal of the facilities and services required to support the remediation of the site. Provide temporary facilities as specified at the Work site, and any other location where temporary facilities are essential to the Work. Temporary facilities to meet requirements of Land Use Permit issued for the Work, satisfy requirements of Federal, Territorial and local Authorities Having Jurisdiction (AHJ), and comply with the requirements of Section 01 35 43 Environmental Procedures.
- .4 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment indicated or specified on Contract Documents are to be considered as approximate.
- .2 Inform Departmental Representative of impending installation and obtain approval for actual location if deviation from specified location is contemplated.
- .3 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.3 ACCESS AND DUST CONTROL

- .1 Provide and maintain adequate access, including snow removal, to all working areas of the site, camp, utilities and offices during all periods of Work by Contractor, Sub-Contractors and other Contractors performing Work for Departmental Representative.
- .2 Access includes removal of snow, as may be required, to gain access to site, as required, to meet the Project Schedule.
- .3 Maintain access to site for use by emergency response vehicles/aircraft.
- .4 Minimize dust creating activities and maintain dust control as specified in Section 01 35 43 –
 Environmental Procedures

1.4 HOISTING

- .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Sub-Contractors for use thereof.
- .2 Hoists to be operated by qualified operator.

ISSUED FOR TENDER

CONSTRUCTION FACILITIES

Section 01 52 00 Page 2 of 5

1.5 SITE STORAGE/LOADING

- .1 Confine Work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.6 VEHICLES

- .1 Provide sufficient vehicles (number and type) for use to perform the Work expeditiously and meet site safety requirements, including one (1) all-terrain vehicle (ATV) per wildlife monitor at larger sites (e.g. Burnt Island and Camlaren) as specified in Section 01 35 32 Site Specific Health and Safety for Contaminated Sites.
- .2 Supply one (1) crew-cab 4-wheel drive pickup truck for use by Departmental Representative and Departmental Representative's Authorized Personnel for the duration of this Project.
 - .1 Vehicles to be in new condition, having been driven for not more than 30,000 kilometres.
 - .2 Equip vehicles with heater, defroster, right and left hand mirrors, windshield washers, permanent type anti-freeze, spare wheel, jack, wheel wrench, snow tires with chains on drive wheels and spare, directional signals with two-way flasher, full width front seat and license in accordance with Territorial regulations.
- .3 Provide two (2) two-passenger four-wheel drive ATVs (John Deere Gator or equivalent) complete with hard enclosure for use by Departmental Representative for the duration of the Work. ATVs must meet the following minimum criteria:
 - .1 an original equipment manufacturer supplied pick-up style rear box suitable for carrying samples and equipment.
 - .2 675 cc gasoline or equivalent diesel engine;
 - .3 Roll-over protection system;
 - .4 Hard enclosure with glass windshield and windshield wipers;
 - .5 Buggy whips and rotating beacon;
 - .6 Tire repair kit and air pump.
- .4 Provide two (2) two-passenger snowmobiles. Snowmobiles will have original equipment manufacturer supplied windshields, side deflectors, and cargo box or cargo rack suitable for carrying samples and equipment. Equip snowmobile with buggy whips.
- .5 Provide safety equipment appropriate to each vehicle including but not limited to helmets.
- .6 The use of these vehicles will not be shared with Contractor.
- .7 Vehicles provided for purposes of this contract are accepted at risk of supplier whether in possession of supplier or Departmental Representative.
- .8 Deliver vehicles to location designated by Departmental Representative at the site.
- .9 Store vehicles in accordance with manufacturer's recommendations.
- .10 Maintain all vehicles in good running order for duration of Project. If vehicles are out of commission for any period of time, provide other replacement vehicles.

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- .11 Repair and maintain vehicles expeditiously.
- .12 Provide and pay for all fuel and lubricants required to operate the vehicles for the duration of the Project.
- .13 Provide applicable insurance for damage to vehicles under use by Departmental Representative or Departmental Representative's Authorized Personnel or absorb costs for damage to same.
- .14 Provide and maintain all site vehicles with appropriate health and safety supplies including first aid kits and fire extinguishers.

1.7 EQUIPMENT, TOOLS AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with Work activities.

1.8 SANITARY FACILITIES

- .1 Provide sanitary facilities for Work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Washroom facilities to be provided at, or in close proximity, to other respective camp facilities and Work areas.
- .4 Washroom facilities to have running hot and cold water for workers not able to return to camp facilities for lunch.

1.9 CONSTRUCTION SIGNAGE

.1 Maintain approved signs and notices in good condition for duration of Project, and dispose of off-site on completion of Project or earlier if directed by Departmental Representative.

1.10 START-UP AND WINTERIZING OF FACILITIES

- .1 Commission camp, vehicles and equipment at the beginning of each construction season.
- .2 Winterize and secure camp, equipment and vehicles at the end of each construction season.
- .3 When Project is closed down at end of construction season, keep facilities operational until close down is approved by Departmental Representative.

1.11 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, and roofs.
- .2 Provide as required by governing authorities.

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CONSTRUCTION FACILITIES

1.12 DRAINAGE

.1 Refer to Section 01 35 43 - Environmental Procedures and to specific sections in Division 2 of these Specifications for site drainage and pumping requirements.

1.13 SCAFFOLDING

- .1 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary for the completion of the work.
- .2 Construct and maintain scaffolding in a rigid, secure and safe manner.
- .3 Erect scaffolding independent of walls. Remove promptly when no longer required.
- .4 Design and construct scaffolding in accordance with CSA S269.2-M87. Provide details and procedures for ensuring all scaffolding equipment, materials, and construction practices meet all applicable regulations and site specific requirements.
- .5 Conform to safety requirements of Section 01 35 32, Site Specific Health and Safety Plan.

1.14 REMOVAL OR SHUTDOWN OF FACILITIES, CONTROLS, VEHICLES AND EQUIPMENT

- .1 Commission temporary facilities, controls, vehicles and equipment at the beginning of each construction season.
- .2 Winterize and secure temporary facilities, controls, vehicles, and equipment at the end of each construction season.
- .3 When project is closed down at end of each construction season, keep facilities operational until close down is approved by Departmental Representative.
- .4 Schedule and obtain approval from Departmental Representative to remove temporary facilities, controls, vehicles, and equipment from site.

1.15 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property, including archaeological/heritage sites from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.16 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the Start-up of Facilities are to be included in the unit price for Start-up of Facilities, Item 01 52 00-1, as indicated in Basis of Payment Schedule.
- .2 All direct costs for the Winterizing of Facilities are to be included in the unit price for Winterizing of Facilities, Item 01 52 00-2, as indicated in Basis of Payment Schedule.
- .3 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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Project No. R.057573
Environmental Site Remediation
Gordon Lake Group Sites, NT MOBILIZATION AND DEMOBILIZATION

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PART 1 - GENERAL

1.1 MOBILIZATION AND DEMOBILIZATION

- .1 Provide all labour, equipment and materials, and performance of all Work necessary for mobilization to, and demobilization from site. This will include all Departmental Representative provided supplies, equipment and material.
- .2 Mobilization to include transportation to site of Contractor's labour, equipment, materials, and assembling, erecting, and preparing site in readiness to start Work, all in accordance with Contractor's Schedule.
- .3 Demobilization to include dismantling and removal from site, of all Contractor's equipment, camp facilities and materials, waste resulting from clean-up of site and transportation of labour from site.
- .4 Decontaminate and clean all equipment used on the Project prior to demobilization according to Section 01 35 15 Special Procedures for Contaminated Sites.
- .5 Do not mobilize to the site without written authorization from the Departmental Representative.
- Summarize the proposed mode, route, equipment, labour and all other requirements for the mobilization and demobilization of all required equipment, materials, waste and personnel to complete the remediation of the project, as indicated in these specifications, in a Mobilization and Demobilization Plan.
- .7 All mobilization and demobilization methods to comply with the requirements of all applicable codes, standards, guidelines, approvals, authorizations and/or permits (including Land Use Permit and Water License). Comply with relevant Sections of this Specification including but not limited to Section 01 35 43 Environmental Procedures, Section 01 41 00 Regulatory Requirements, and Section 01 35 32 Site Specific Health and Safety for Contaminated Sites.
- .8 A Post-Demobilization site visit will be required as part of the Post-Demobilization Inspection as per Section 01 77 00 – Closeout Procedures.

1.2 SUBMITTALS

- .1 Submit Draft Mobilization and Demobilization Plan and Construction Equipment List (as included in proposal) in accordance with Section 01 33 00 Submittal Procedure for review by Departmental Representative thirty (30) days after contract award.
- .2 Submit to Departmental Representative, three (3) hard copies and one (1) electronic copy of the Final Mobilization and Demobilization Plan and Construction Equipment List a minimum of thirty (30) days prior to mobilization.
- .3 Submit Draft Site Access Road Upgrading and Maintenance Plan in accordance with Section 01 33 00
 Submittal Procedure for review by Departmental Representative thirty (30) days after contract award.
- .4 Submit to Departmental Representative, three (3) hard copies and one (1) electronic copy of the Final Site Access Road Upgrading and Maintenance Plan a minimum of thirty (30) days prior to mobilization.

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Gordon Lake Group Sites, NT MOBILIZATION AND DEMOBILIZATION

1.3

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MOBILIZATION AND DEMOBILIZATION PLAN AND CONSTRUCTION EQUIPMENT LIST

- .1 Provide a Mobilization and Demobilization Plan which shall include, but not be limited to, the following items:
 - .1 Proposed mode(s), route and timing.
 - .2 Mobilization strategy, health and safety and environmental protection, wildlife protection, camp facilities description, site sequencing, fuel management plan, communications plan, and other specific requirements to mobilization and demobilization.
 - .3 In-transit storage or staging areas.
 - .4 Equipment, labour and other requirements.
 - .5 Equipment and materials to be brought to the site to complete the remediation activities of the project, as indicated in the Specifications.
 - .6 Final Mobilization and Demobilization Plan will include any requirements specific to the review of the proposed winter access trail alignment.
 - .7 Winter Access Trail Upgrading and Maintenance Plan
 - .8 Proposed location and design of floating docks and/or barge landing areas, as required.
- .2 Submit to Departmental Representative thirty (30) days prior to mobilization, a complete final Construction Equipment List comprised of manufacturer name, model number, year, and hours for construction equipment that is being mobilized to the site. The Construction Equipment List shall include photographs of all equipment being mobilized to the site.

1.4 TEMPORARY WINTER ACCESS TRAIL ALIGNMENT

- .1 The Contractor is responsible for the selection of the winter access trail alignment in accordance with the Land Use Permit scope and map. The proposed trail alignment shall be included as part of the Mobilization and Demobilization Plan.
- Assessment of potential environmental impact of the proposed winter access trail alignment, once determined, is to be completed in accordance with the requirements of the Authorities Having Jurisdiction (AHJ) and Section 01 35 43- Environmental Procedures prior to final approval of the route by AHJs. Potential environmental impacts may include, but are not limited to, damage due to vehicles, fuel spills, and lost equipment through ice.
- .3 Temporary Winter Access Trail route shall be selected following consultation with the chosen departure community to avoid heavily used traditional areas, where practical.

1.5 MEASUREMENT FOR PAYMENT

- .1 Mobilization via winter road and/or secondary mobilization via air charter to be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Demobilization via winter road and/or secondary mobilization via air charter to be paid as lump sum under LSA in the Basis of Payment Schedule.
- .3 All costs for Mobilization of all equipment and materials, including the submission of the Mobilization and Demobilization Plan, are to be included as lump sum under LSA in the Basis of Payment Schedule. The lump sum price for mobilization is to include all labour, equipment, materials, meals, accommodation, flights and any other costs necessary to undertake work required.

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MOBILIZATION AND DEMOBILIZATION Page 3 of 3

- .4 All costs for Demobilization of all equipment and materials are to be included as lump sum under LSA in the Basis of Payment Schedule. The lump sum price for Demobilization is to include all labour equipment, materials, meals, accommodation, flights and any other costs necessary to undertake the work required. Payment for Demobilization will be made after satisfactory clean-up of the site, removal from the site of all equipment, materials, site demolition debris materials and contaminated soils, as indicated and submission to Departmental Representative of all Contractor submittals.
- .5 All costs for Transportation of Contractor's Personnel, including all transportation cost for crew rotations, meals in transit, accommodations in transit and any other cost necessary to mobilize and demobilize Contractor's Personnel are to be included as lump sum under LSA in the Basis of Payment Schedule.
- .6 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 – Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 CAMP FACILITIES

- .1 Prior to installation of camp facilities and service area submit a Camp Facilities Plan that addresses the minimum requirements outlined in this Section and the Contract Documents to Departmental Representative for review twenty (20) days after contract award date.
 - .1 Camp Facilities Plan to identify local water bodies to be used as water supplies for consumption and construction and non-drinking camp use (i.e., dust suppression, equipment decontamination, fire prevention, etc.).
 - .2 The location of the camp facilities must be approved by Departmental Representative. Submit location and layout of camp forty-five (45) days prior to mobilization. Submission is to include full details demonstrating compliance with all codes and standards.
- .2 The locations of the camp facilities must be provided with the Camp Facilities Plan and must be approved by Departmental Representative. Provide twenty (20) days after contract award date.
- .3 Camp facilities to be established and operated in accordance with local regulations and requirements of the Authorities Having Jurisdiction (AHJ).
- .4 Provide and operate complete camp facilities services, including provision, preparation and serving of food, for own workforce, Sub-Contractor's workforce, Departmental Representative, and Departmental Representative's authorized personnel as follows:
 - .1 Contractor and Sub-Contractor personnel including but not limited to Resident Contractor Representative, labour force, site medic, wildlife monitors, and surveyors.
 - .2 Resident Departmental Representative: four (4) personnel for duration of the Project.
 - .3 Specialist Inspectors: one (1) person for the duration of the Project.
 - .4 Allow for an additional three (3) personnel at any one time to accommodate the Departmental Representative's Authorized Personnel, INAC and PWGSC Personnel, visitors and shift change overlap.
 - .5 Separate sleeping quarters are to be provided for cook(s), cook's helpers, and for female staff.
- .5 Provision of camp facilities services consisting of but not limited to:
 - .1 Design, supply, installation, and operation and maintenance of camp facilities including:
 - .1 All associated facilities.
 - .2 Utilities and services required for camp facilities such as heating, lighting, fuel, potable, and domestic water systems.
 - .3 Sewage and greywater collection, treatment, and disposal systems.
 - .4 Waste, refuse and garbage collection and disposal system, including provision of dedicated camp garbage incinerator.
 - .5 Fire prevention.
 - .6 Alarm and firefighting system.
 - .7 Safety and security service, including wildlife management and fire prevention/protection systems.
 - .8 Water treatment system.
 - .9 Supply of potable drinking water.
 - .10 Meals and catering service.
 - .11 Shower/wash facilities.

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- .12 Sleeping and washroom facilities.
- .13 Bedding and bedding laundry services.
- .14 Janitorial services.
- .15 Personnel laundry facilities.
- .16 Recreational facilities.
- .17 Snow removal services.
- .18 Camp re-supply and staff rotation charter flights.
- .19 Office facilities including satellite communications (phone, fax, and internet).
- .20 First aid facilities and services.
- .21 Supply of potable water to all camps. Bottled water sourced from main camps may be used once provisions outlined in Section 1.2 are satisfied.
- .2 Obtain and pay for, as part of provision of camp facilities services all licenses, permits, and authorizations required to comply fully with all laws, ordinances and regulations of Federal, Territorial and local authorities in connection with the performance of Work of this Section.
- .6 Camp Facilities shall not be older than 20 years.
 - .1 Contractor to arrange to have the proposed camp facilities inspected by a third-party building inspector prior to mobilization.
 - .2 Submit inspection report to the Departmental Representative thirty (30) days prior to mobilization. The inspection report is to include planned corrective action for identified deficiencies.
 - .3 Contractor will address any recommendations arising from building inspector's report before camp facilities are paid.
 - .4 Contractor will maintain camp in good operating condition and provide adequate and suitable furnishings.
- .7 Provide and maintain a digital communication system for the Site consisting of full duplex and secure voice, real time fax, and high speed internet, available at all camp locations. Provide three (3) separate phone lines for the Departmental Representative. Communication system must accommodate virtual private network (VPN) connections. The communication system is to be based on monthly charges with unlimited internet access. Provide wireless 802.11 B/G/N network access points such that the entire camp area has wireless network access.
- .8 Maintain one (1) handheld satellite telephone on-site for emergency purposes or when the main communication system is non-functional. Use of the handheld satellite telephone for primary site communication for extended periods is not acceptable.
- .9 Shared use areas, kitchens, dining areas and sleeping quarters shall be maintained as smoke-free areas. Provide smoking areas at Contractor's discretion, in accordance with Federal, Territorial, and local regulations and guidelines.
- .10 Be responsible for security and surveillance of the camp and site facilities at all times, including during winter months and when the camps are not occupied. Provide security, site surveillance or other means to protect the camps and site facilities from vandalism and tampering.
- .11 Provide an electrified fence around the camps to provide warning of wildlife intrusions whenever wildlife monitors are not patrolling. A working wildlife deterrent is to be provided and a replacement will be made available within 24 hours should the primary system fail. Test the alarm systems as specified in Section 01 35 32 Site Specific Health and Safety Plan.
- .12 Incinerate all kitchen food waste in order to avoid attracting wildlife.
- .13 Comply with wastewater and sewage treatment, disposal and closure requirements as outlined in Section 01 35 15 Special Project Procedures for Contaminated Sites.

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.14 Demobilize Camp Facilities from site at completion of contract.

1.2 REGULATORY REQUIREMENTS

- .1 Camp facilities including utilities, services, location and operation is subject to Departmental Representative's approval and is to be designed, established and operated in accordance with applicable Federal, Territorial and local codes, regulations and requirements governing camp facilities. Comply with requirements of Environmental Regulatory Agencies, Water License, Land Use Permit, and the provisions of Section 01 35 43 Environmental Procedures.
- .2 Obtain applicable licenses, permits and authorizations associated with establishing camps. Submit proof of same to Departmental Representative within thirty (30) days of camp start-up. Pay for all costs for inspection of camp facilities and electrical facilities by AHJ. Display all applicable regulatory permits at the camp.
- .3 Provide water that meets Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ). Submit information on water, including the source and water quality test results to Departmental Representative prior to opening the camp facilities. Provision of potable drinking water includes the following:
 - .1 All potable water withdrawn from on-site water sources (including Freshwater Lake) will be treated to disinfect and meet Health Canada's GCDWQ. Contractor will provide and pay for equipment, supplies and materials required to treat the water.
 - .2 Maximum water withdrawal rate shall meet regulatory requirements.
 - .3 Contractor is responsible for payment for sampling and analyses of any camp facilities water supply, as indicated in Section 01 29 83 Payment Procedures for Testing Laboratory Services. The sampling and analysis is to be provided at the water supply source and at the distribution source prior to consumption. Results of all water quality testing are to be submitted to Departmental Representative as received.
- .4 Regular quality control testing (including weekly sampling/testing for coliforms) will be completed throughout the duration of the Project to meet the requirements of the Departmental Representative and AHJs. If results from the analyses exceed the GCDWQ and/or there is insufficient water supply, commercially sealed bottled water is to be provided.
- .5 Contractor is responsible for the provision of commercially sealed bottled water that meets Health Canada's GCDWQ until it is adequately demonstrated (by a minimum of two consecutive sets of analytical test results) that the local source meets the Health Canada GCDWQ. In the absence of analytical test results, local sources must not be used, and the supply of bottled water must be maintained. Submit information on bottled water, including the source and water quality test results to the Departmental Representative prior to opening the camp.
- .6 Comply with all requirements of the Water Use License, Land Use Permit and all other licenses, permits and authorizations.
- .7 Water takings to satisfy camp requirements to be in accordance with Fisheries Act for water takings from surface water bodies, including an intake end-of-pipe fish screen.
- .8 Operate the camps in accordance with the camp rules as specified in this Section and the provisions of Section 01 35 32 Site Specific Health and Safety Plan.
- .9 Comply with wastewater and sewage treatment, disposal and closure requirements as outlined in Section 01 35 15 Special Project Procedures for Contaminated Sites.

1.3 CAMP FACILITIES INSTALLATION AND REMOVAL

- .1 Mobilize equipment, camp facilities, personnel, and materials.
- .2 Establish approved temporary buildings, shops, offices and facilities as required.

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- .3 Place all camp facilities so as not to interfere with any construction or other site activities.
- .4 Carry out all Work necessary to protect environment, such as constructing pads (if required), prior to actual installation of camp facilities.
- .5 Locate camp generators minimum 30 m from any sleeping facility, camp kitchen or an area with constant human presence.
- .6 Winterize and secure camps, equipment, and vehicles at the end the construction season.
- .7 Upon completion of Work, remove camp facilities, clean up, and leave site in condition satisfactory to Departmental Representative. Upon removal of camp facilities, grade as necessary to match surrounding terrain and to provide positive drainage as directed by Departmental Representative.

1.4 SITE LOCATION

- .1 Locate camp facilities at Sites that provide for the safety and welfare of its residents for the duration of the Work. Contractor is responsible for the camp facilities locations within the Work areas.
- .2 Camp facilities locations to be established at locations which do not interfere with operations undertaken on sites. Consider the possibility of wildlife encounters when determining the layout of the Camps. Refer to bear or wildlife safety literature when selecting the camp layout, facility spacing, and location of the kitchen, food storage, washroom, and sleeping facilities.
- .3 The camp facilities will be distributed at specific Gordon Lake sites in accordance with the Contract Documents and as outlined in the approved Camp Facilities Plan.
- .4 Locate camp facilities within walking distance of the Work sites, if possible.
- .5 Locate camp facilities up wind (based on expected prevailing wind direction) of any locations in which materials may be burned.
- .6 Locate camp facilities on gravel pads. Pads must be constructed using aggregate sources from the designated borrow areas.
- .7 Locate camp facilities in areas of native overburden, and not on waste rock.
- .8 Locate the medic's center within one (1) kilometre of the Work sites. Co-locate the medic's center with an office, or other facility where other workers are present.
- .9 Locate the medic's center in the camp facilities, if the camp facilities are within one (1) kilometre of the Work.
- .10 Locate the communications center within the camp facilities.
- .11 Co-locate the communications center with an office, or other facility where other workers are present.
- .12 Locate any temporary shelter to be used as a workshop near the Work.
- .13 Construct an access road to the selected location, as needed or as directed by Departmental Representative.
- .14 Locate camp facilities at a minimum of 100 meters from the high water mark of any water body.
- Locate camp facilities in an area that has been previously disturbed, but outside of any remedial work areas, if possible. If camp is located on rock, provide sufficient material to maintain a trafficable surface.

1.5 MAINTENANCE

.1 Maintain camp facilities, power generators, fuel storage facilities, water lines, sewage system, garbage disposal containers, heating and cooling units, appliances and furniture in neat, clean and good operating condition and make repairs as necessary.

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- .2 Clean camp facilities daily. Clean and sanitize toilets, urinals, showers, washbasins, washing machines, and laundry tubs daily.
- .3 Keep all buildings and camp facilities free of insects, pests and wildlife through garbage control, proper screens, pesticides and other non-smoke producing methods of bug, pest and wildlife control.
- .4 Heat camp facilities to provide environmentally controlled conditions between 20 and 22 degrees C continuously.
- .5 Equip camp facilities with furnaces sized to heat rooms and adjacent corridor spaces.
- .6 Furnaces to have forced air circulation systems with minimum of one hot air outlet per room in sleeper trailers. Alternatively, trailers may be heated with electric space heaters.
- .7 In the event of temporarily vacating a camp, clean up and leave camp in safe, tidy and secure condition.

1.6 DEPARTMENTAL REPRESENTATIVE'S AND DEPARTMENTAL REPRESENATIVE'S AUTHORIZED PERSONNEL SLEEPING QUARTERS

- .1 Provide for sole use of Departmental Representative, one room for sleeping at each main camp. Space to be furnished in same manner as rooms used by Contractor's personnel.
- .2 Sleeping quarters for Departmental Representative and Departmental Representative's Authorized Personnel are to be within the camp complex, but segregated from those for Contractor's staff.
- .3 It is anticipated that Departmental Representative workforce will include both male and female personnel. Design and operate the camp facilities with due consideration of the separate and private requirements of this work force.
- .4 Provide, for use by Resident Departmental Representative, single sleeping quarters with a minimum floor area of 6 m².
- .5 For Departmental Representative's Authorized Personnel, provide a minimum of 4.6 m² of floor space for each occupant, with one dimension not to be less than 2 m.
- Sleeping quarters for other Departmental Representative's Authorized Personnel, as indicated in this Section, to provide for maximum double occupancy with a minimum floor area of 9.2 m². Design camp facilities such that specialist inspectors generally are accommodated in single occupancy rooms. Double occupancy of specialist inspectors will be considered by Departmental Representative for short period of time only, and at Departmental Representative's discretion.
- .7 Provide a minimum of 11 m³ of air space for each occupant.
- .8 Provide storage lockers and/or shelving to store personal items. Provide at least one (1) power outlet per occupant. Provide one (1) reading light above each bed.
- .9 Provide key locks and keys to the Departmental Representative and Departmental Representative's Authorized Personnel for sleeping quarters upon their use of these facilities.

1.7 DEPARTMENTAL REPRESENTATIVE'S AND DEPARTMENTAL REPRESENTATIVE'S AUTHORIZED PERSONNEL SITE OFFICE

- .1 Provide office accommodation and furniture on-site for Departmental Representative and special inspectors at each main camp. The use of this facility will not be shared with Contractor. Shared office and sleeping quarters for the Departmental Representative is not acceptable. Office space must be large enough to accommodate surveyors and additional specialist inspectors on a periodic basis.
- .2 Provide electrical lighting system, giving a minimum of 200 lux, using surface mounted, shielded commercial fixtures with 10% upward lighting component.

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- .3 Furnish office space with:
 - .1 Two (2) desks with top service not less than 150 cm (60") by 75 cm (30")
 - .2 Two (2) desk chairs
 - .3 Four (4) stacking type chairs
 - .4 Two (2) 4-drawer file cabinets, with locking mechanism
 - .5 One (1) plan table
 - .6 One (1) bookcase, not less than 90 cm wide by 30 cm deep by 120 cm high, complete with adjustable shelves.
 - .7 Two (2) waste paper baskets
 - .8 Four (4) duplex receptacles, 120 V, 60 Hz equipped with surge protection
 - .9 Two (2) Uninterruptible Power Supply (UPS) bars
 - .10 Stationary as required to support a small office.
- .4 Provide and maintain at Departmental Representative's office four (4) satellite phone lines or equivalent communication approved by Departmental Representative.
- Provide, for the use by Departmental Representative and Departmental Representative's Authorized Personnel, four (4) mobile communication radios, complete with charging units. The radios are to allow for on-site communication between Departmental Representative, Departmental Representative's Authorized Personnel and Contractor. The radios are to have a minimum range of 10 km.
- .6 It is critically important that the communication equipment provided by Contractor for Departmental Representative's use is reliable and of the highest quality. Immediately repair or replace faulty equipment. The equipment is to be operational from the day the Work commences.
- .7 Provide and maintain at Departmental Representative's office one Multiple Function Centre (MFC) with capabilities for printing, copying, faxing and scanning. This unit is to be for Departmental Representative's exclusive use and is to be Windows compatible with Parallel, USB, and Ethernet interfaces. Provide the MFC with all required consumable supplies such that it provides continuous operation. The MFC is required to also meet the following specifications:
 - .1 Print Function: Black and White and Colour with a minimum of 32 MB of memory.
 - .2 Copy Function: Black and White and Colour with capabilities for Automatic Document Feed (ADF) and Reduction/Enlargement.
 - .3 Scan Function: Black and White and Colour Scan capabilities with a minimum optical scan resolution of 600 x 2400 dot per inch (dpi) and capabilities to scan to email, image, OCR and file
- .8 A fridge or fridge space shall be available for Departmental Representative's sample storage prior to shipment off-site.
- .9 Provide and maintain one remote communications device (including internet) compatible with all site communications, one outlet for computer connections. Equip with surge protectors and an UPS bar. Provide access to reliable communications systems for Departmental Representative and support staff.

1.8 FIELD LABORATORIES

.1 Supply and pay for a field laboratory, complete with furniture, for the use by the Departmental Representative's Authorized Personnel. The lab will accommodate environmental analytical and geotechnical testing.

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- .2 Locate the field laboratory in the main camp complex and make ready for use three (3) days prior to the first day Work commences for which testing is required, and remain available for the duration for which testing is required.
- .3 The lab will be complete with heating system, lighting system, a minimum of four (4) 110 volt and one (1) 220 volt, 60 cycle electric outlets, water and sewer system, sink, work benches, garbage cans, stove/oven, hood and fan, refrigerator and freezer (as specified below), shelving and clothes rack, two (2) desks, two (2) 0.75 metre x 1.50 metre tables, three (3) chairs, one (1) four-drawer filing cabinet and adequate windows.
- .4 The lab will have a minimum floor area of 20 m², unless less space is accepted in writing by Departmental Representative.
- .5 Provide and maintain phone and internet service for the field laboratory.
- Equip the lab with a standard refrigerator with a total minimum capacity of 0.48 cubic metres (17 cubic feet) and a chest freezer with a total minimum capacity of 0.28 cubic metres (10 cubic feet). The refrigerators and freezer will remain the property of the Contractor upon completion of the project.
- .7 Equip the lab with the following granular material testing equipment:
 - .1 One (1) forced convection bench top laboratory oven with digital controls, stainless steel interior and suitable for effective drying of soil samples and large enough to fit the pan sizes outlined below
 - .2 One (1) 1.5" sample splitter
 - .3 One (1) polyethylene tarp for sample splitting: 1.8 m x 1.8 m minimum size
 - .4 One (1) 6" Proctor Mould for the Standard Proctor Test: ASTM 698
 - .5 One (1) Standard Proctor Hammer
 - .6 One (1) Motorized Sieve Shaker compatible with 200mm sieves
 - .7 One (1) Set of 200mm Sieves to include the following opening sizes in millimetres: 112, 80, 56, 40, 28, 20, 14, 10, 5, 2.5, 1.25, 0.630, 0.315, 0.160, 0.08, pan
 - .8 One (1) wash sieve (0.08 mm opening) with reinforced screen (300mm diameter), one 5mm wash screen (300mm diameter)
 - .9 One (1) brass sieve brush and one soft sieve brush
 - .10 Pans and Tares:
 - .1 each 8" x 4" x 2.5" metal
 - .2 each 11.5" x 9" x 2.5" metal
 - .3 each 18" x 10.5" x 6" metal
 - .4 each 19" x 11" x 4" metal
 - .5 loaf pans 80mm x 180mm (for use in oven)
 - .11 One (1) precision grade electronic scale with accuracy and readability to 0.1 grams and a minimum capacity of 20 kilograms.
 - .12 One (1) pair of oven mitts.
 - .13 One (1) metal scoop
 - .14 One (1) levelling rod
 - .15 One (1) rubber mallet
 - .16 One (1) scrub bucket
- .8 Clean lab at least two times per week, and maintain all electric lights, heating, water and sewer systems in good working condition during the period the laboratory is required. Maintain facility in acceptable condition.

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- .9 Provide power to the laboratory on a 24 hour/day basis while the remediation activities, requiring laboratory services, are in operation. Equip all power supplies with adequate surge protection. Damage to equipment resulting from power surges will be repaired or replaced at no cost to the Departmental Representative or his/her Authorized Personnel.
- .10 Submit to the Departmental Representative for review a sketch of the proposed laboratory, with the construction camp layout and siting plan as specified in this section, twenty (20) days prior to fabrication or construction.
- .11 Provide Departmental Representative with key-locks for the field laboratory prior to commencement of activities requiring laboratory services being in operation.

1.9 KITCHEN DINING COMPLEX

- .1 Functional design of kitchen to include all equipment necessary for food storage, preparation, cooking and serving three (3) meals daily (one meal will be bagged lunch) to meet camp population requirements.
- .2 Provide dishwashing and garbage handling equipment, consistent with required function of kitchen.
- .3 Provide seating capacity of dining area to meet maximum camp population requirements.
- .4 Store all non-perishable food supplies in adequate containers, kept in an orderly manner and under sanitary conditions, in vermin-proof enclosures.
- .5 Store all perishable food supplies in properly refrigerated indoor areas within camp facilities to preclude attraction of wildlife.
- .6 All food preparation staff are to have Foodsafe Certification with records provided to the Departmental Representative prior to mobilization.
- .7 Supply and operate kitchens as required to comply with federal and territorial regulations and obtain any necessary inspections, permits or approvals prior to operating the camp kitchens. Provide a copy of all documentation to the Departmental Representative upon receipt from the AHJ.

1.10 LINEN, BEDDING AND LAUNDRY

- .1 Supply three (3) blankets, two (2) sheets, one (1) bath towel, one (1) face cloth, and two (2) pillow and two (2) pillow cases for each person living in camp facilities.
- .2 Change two (2) sheets and one (1) pillow case weekly or whenever occupancy changes.
- .3 Launder sheets, pillow covers and towels regularly to provide weekly supply of clean linen and towels.
- .4 Provide clean blankets to all camp occupants. Clean blankets as conditions warrant.
- .5 Cooking staff to wear suitable kitchen attire. Launder kitchen attire daily.
- .6 Provide both personnel laundry facilities and facilities dedicated to the camp (e.g., bedding, kitchen linens). Provide additional laundry facilities for laundering of PPE (e.g., coveralls and other exterior clothing) at a separate location within or adjacent to Controlled Access Trailer.

1.11 ABLUTION AND LATRINE FACILITIES

- .1 Provide ablution and latrine facilities as per AHJ and codes requirements and as per camp occupancy requirements as follows:
 - .1 Flush toilets as required.
 - .2 Urinals as required.
 - .3 Wash basin of stainless steel, porcelain, with one mirror over each basin as required.

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- .4 Individual shower units with non-slip flooring together with adjacent dressing cubicles as required.
- .2 Maintain separate ablution and latrine facilities for female/male populations.
- .3 Maintain separate ablution and latrine facilities for Departmental Representative and Departmental Representative's Authorized Personnel. Maintain separate facilities for Departmental Representative's male and female staff.
- .4 Clean ablution and latrine facilities daily. Supply adequate amounts of paper towels, toilet tissue, and individual drinking cups in washrooms.
- .5 Supply and provide the supplies required to operate hand washing stations as required by regulation.

1.12 FOOD QUALITY AND SCHEDULE

- .1 Provide food of the highest quality giving a balanced diet and served under acceptable standards of cleanliness by experienced personnel. Groceries to be of top quality. Eggs and dairy products to be grade "A". Canned fruit and vegetables to be choice or fancy.
- .2 Beef to be Canada Grade "A", pork to be Grade "I", turkey, chicken or other fowl to be "utility" or better.
- .3 Provide choices of traditional food. Provide healthy choices in food preparation.
- .4 As a minimum, provide three (3) meals a day. Provide casual meals or fourth meals if irregular shifts are worked or irregular travel by personnel is required. Consult with Departmental Representative to set meal times for casual or fourth meals.
- .5 Main courses to be served at meals are classified as follows:
 - .1 First Line: Beef steak, roast beef, roast pork, veal cutlets, baked ham, ham steak, chicken, turkey, pork chops, roast lamb, roast veal, vegetarian lasagne, pasta with meatless sauce, quiche.
 - .2 Second Line: Fish, short ribs, spare ribs, stews, meat pies, liver, curried dishes, spaghetti and meatballs, sausages, Salisbury steak, Swiss steak, ground beef, corned beef, stir fries, vegetarian chilli, omelettes, vegetarian baked beans, vegetarian patties.
 - .3 Third Line: Hot dogs, vegetarian hot dogs, omelettes, chilli con carne, baked beans, chicken and turkey turnovers, dishes using leftover meats, bagels and cream cheese, soup and sandwiches.
- .6 Lunch is to include one second line item and a third line item. Do not repeat the same selection more than twice weekly. Provide a vegetarian option upon request.
- .7 Supper to include one first line and a choice between a second and third line. Do not repeat the same selection more than twice weekly. Beef steak to be served at least once per week. A vegetarian option to be available on request.
- .8 Breakfast to include fruit juice or fruits, coffee, tea, milk, hot and cold cereals, porridge, toast and preserves, peanut butter, hot cakes, eggs, bacon, ham and sausages. Serve breakfast line daily.
- .9 Provide box lunches for all camp occupants who will not be in camp facilities for noon meal.
- .10 Contractor will be given twelve (12) hours notice to serve fourth and/or casual meals to Work forces of other Contractors and Departmental Representative.
- .11 Provide "Mug Up" nightly at 2100 hours consisting of tea, coffee, hot chocolate, fruit juice and any leftover pastries at cook's discretion. Make coffee available at coffee breaks.
- .12 Provide beverages and snacks at all times. A variety of snacks should be available, including snacks that are appropriate for diabetics or persons with blood sugar concerns. Snacks may consist of fresh fruit or vegetables, granola bars, cheese and crackers, bannock, or other suitable items.

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- .13 Make available daily apples and oranges; serve other types of fresh fruit at least once per week. Fresh salads are to be provided daily.
- .14 Provide whole milk each day; powdered milk is not acceptable for drinking, but may be used for cooking.
- .15 Schedule food re-supply flights, as necessary to maintain variety in the menu and that fresh produce, milk and juice is continually available.

1.13 SERVICE FACILITIES

- .1 Install, hook-up, test and make necessary repairs to sewage, water supply, heating, and electrical services.
- .2 Situate power plant in camp facilities area to minimize noise, and prevent exhaust fumes from blowing through camp facilities during prevailing winds.
- .3 Ground all buildings and electrical equipment with an approved grounding system.

1.14 RECREATION

- .1 Provide an area for recreation for all camp occupants.
- Area to be of a size suitable for accommodating at least 50% of camp occupants, and to be suitably furnished with lounge, and stacking chairs.
- .3 Provide a TV and DVD player for use by camp occupants. Alternatively, provide a satellite system.
- .4 Provide a minimum of twenty (20) DVD Movies and rotate these movies every two weeks or provide a TV with satellite link.
- .5 Provide an assortment of books (soft cover) and magazines for reading.

1.15 CAMP FACILITIES RULES

- .1 Camp facilities of this size and nature in a remote location require that certain basic rules be established for mutual benefit of all camp occupants.
- .2 Prepare a set of camp facilities rules, for approval by Departmental Representative, ten (10) days prior to commencing operations.
- .3 In order to protect all camp occupants, the following activities are strictly prohibited and could result in dismissal and removal from site:
 - .1 Tampering with smoke or fire detectors/alarms, any other safety equipment or electrical outlets/fixtures.
 - .2 Possession and consumption or use of alcohol or illegal drugs.
 - .3 Possession or use of firearms, ammunition or other lethal weapons.
 - .4 Fighting, physical violence, stealing, vandalism or destruction of property.
 - .5 Harassment in any form.
 - The employee or visitors departure from the site for any of these reasons will be on the first available scheduled transportation. Should this person wish to leave immediately the costs will be the responsibility of the employee.
- .4 Make all camp residents familiar with all emergency procedures, exits, signals and alarms. Keep accesses to fire equipment clear at all times, and immediately report any damaged fire or safety apparatus to your supervisor.
- .5 Camp rules to include no recreational fishing.
- .6 Use of vehicles or equipment only when trained and authorized to do so.

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- .7 Use, adjust and repair equipment or machinery only when authorized by the supervisor.
- .8 Vehicle/Equipment checks must be completed and the logbook updated at the beginning of every shift or when starting any vehicle of piece of equipment. Seat belts must be worn at all times in vehicles and equipment.
- .9 Keep living areas as clean as possible.
- .10 Have warm emergency clothing available at all times during the wet or cold weather.
- .11 Keep clothing or other flammable goods away from baseboard heaters.
- .12 Ensure that personal items and clothing are marked for easy identification. Provide space for workers to hang wet clothing to dry prior to next shift.
- .13 Employees must store/remove all personal effects and belongings when going off rotation or permanently off site.
- No loose clothing, dangling neckwear, bracelets, rings or similar articles are to be worn where there is a risk of coming into contact with moving machinery or electrical energized equipment.
- .15 Keep workplace and equipment neat and orderly. Complete an inspection of your Work place tools and equipment prior to starting Work. Correct any hazards immediately.
- .16 Provide a copy of camp facilities rules to all camp occupants prior to or upon arrival in camp.
- .17 Enforce camp facilities rules.
- .18 Provide smoking rules and/or designated areas in accordance with Federal, Territorial, and local regulations and guidelines.

1.16 CONTROLLED ACCESS TRAILER

- Provide a suitably sized trailer to house the decontamination rooms for entire construction crew, Departmental Representative, inspectors and up to five (5) visitors to the site.
 - .1 The trailer is to have two (2) access doorways where construction workers and field personnel can enter from the construction side, change out their PPE and field clothes, and wash up prior to entering the camp facilities or clean side of the trailer.
- .2 Provide a washer and dryer, to be incorporated into the decontamination side of the trailer.
- .3 Provide the necessary utilities and connections to operate the decontamination trailer.
- .4 Provide a designated area for all construction equipment, located in such a manner as to minimize the potential for contaminated material (asbestos, soil, and the like) to enter the camp facilities.

1.17 EQUIPMENT, TOOLS AND MATERIALS

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with Work activities.

1.18 SANITARY FACILITIES

- .1 Washroom facilities are to be provided at, or in close proximity to, the respective camp facilities and Work areas.
- .2 Washroom facilities provided to have running hot and cold water for workers not able to return to the camp facilities for lunch.

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1.19 SECURITY

.1 Restrict access to camp facilities. Only persons employed on Project to be allowed normal access. Unauthorized persons will be permitted on site only with approval of Departmental Representative and/or Contractor.

1.20 ACCESS TO WORK

.1 Be responsible for the transport of personnel and equipment to the various Work areas on the site, including transport to and from camp each day.

1.21 TRANSPORTATION

- .1 Provide return air transportation services for Departmental Representative and Departmental Representative's Authorized Personnel from Yellowknife to the Gordon Lake Mine Sites.
- .2 It is anticipated that air transport of Departmental Representative's Authorized Personnel will be scheduled to coincide with the transport of Contractor's workforce to and from the site. Provide air transportation for Departmental Representative's personnel at a minimum frequency of one return trip per week and two additional trips per month scheduled according to Departmental Representative's request.
- .3 Departmental Representative will advise Contractor of Departmental Representative's and Departmental Representative's personnel air transportation requirements one (1) week in advance of trip departure.

1.22 REFUSE/GARBAGE MANAGEMENT

- .1 Store refuse and waste in wildlife-proof containers prior to incineration or off-site disposal.
- .2 Burnable refuse/waste may be incinerated by following burn schedule, and ensuring that it meets air quality guidelines.

1.23 FIRE PROTECTION EQUIPMENT

.1 Install and maintain fire protection equipment as specified in Section 01 35 32 - Site Specific Health and Safety for Contaminated Sites.

1.24 DECOMISSIONING OF SEWAGE TANKS AND LINES

- .1 Prior to decommissioning of wastewater lines, rinse lines with wash water. Sample, analyse, treat, and dispose, as required, wastewater in accordance with Section 01 35 15 Special Project Procedures for Sites and Section 01 35 43 Environmental Procedures.
- .2 Treat sludge as hazardous materials as specified under Section 02 81 01 Hazardous Materials and treat accordingly.

1.25 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.26 MEASUREMENT FOR PAYMENT

All costs for the supply, operation and maintenance of all camp facilities and equipment, including erection, connection, water treatment and sewage treatment, inspection of camp facilities and electrical facilities by officials, on-site mobile communication equipment, as well as the provision of catering, rooms, laundry and janitorial services for the camp facilities, and surveillance for the camp and site facilities (including times when camp is not occupied), are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.

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CAMP FACILITIES

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- .2 The provision of room and board and associated services for Departmental Representative and Authorized Personnel will be measured for payment by the person-day for each day that personnel reside overnight at the camp facilities. Departmental Representative's room and board will be paid under Item 01 54 00-1 in the Basis of Payment Schedule.
- .3 Provision of casual meals to visiting Departmental Representative's Authorized Personnel will be measured for payment by the number of meals served. Casual meals will be paid under Item 01 54 00-2 in the Basis of Payment Schedule.
- .4 The provision of air transportation from Yellowknife to the Gordon Lake Mine Sites of Departmental Representative's Authorized Personnel will be measured for payment by the number of person return trips and will be paid under Item 01 54 00-3 in the Basis of Payment Schedule.
- .5 All costs for the supply, installation and operation of satellite and/or long distance communication links for Departmental Representative and Authorized Personnel are to be included as lump sum under LSA in the Basis of Payment Schedule.
- .6 Include all direct costs for provision of consumable office supplies for Departmental Representative as lump sum under LSA in the Basis of Payment Schedule.
- .7 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 <u>INSTALLATION AND REMOVAL</u>

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.2 FENCING

.1 Provide fencing as indicated on Drawings or detailed in specifications. Protect from damage by equipment and construction procedures.

1.3 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, and roofs.
- .2 Provide as required by Authority Having Jurisdiction (AHJ).

1.4 ACCESS TO SITE

.1 Provide and maintain access roads, airstrips, as may be required for access to Work.

1.5 FIRE ROUTES

.1 Maintain access to Sites for use by emergency response vehicles.

1.6 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.7 MEASUREMENT FOR PAYMENT

.1 Work under this section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

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PART 1 - GENERAL

1.1 GENERAL

- .1 Use new material and like new equipment acceptable to Departmental Representative unless otherwise specified.
- .2 No later than twenty (20) days after contract award, submit the following information for materials and equipment proposed for supply:
 - .1 name and address of manufacturer.
 - .2 trade name, model and catalogue number,
 - .3 performance, descriptive and test data,
 - .4 manufacturer's installation or application instructions,
 - .5 evidence of arrangements to procure.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.
- .5 Provide material and equipment of specified design and quality, performing to published ratings, and for which replacement parts are readily available.

1.2 SUBMITTALS

.1 All submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 REFERENCE STANDARDS

- .1 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .2 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .3 Conform to latest date of issue of referenced standards in effect except where specific date of issue is noted.

1.4 QUALITY

- .1 Products, materials, and articles (referred to as products throughout specifications) incorporated in Work to be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacturer for any particular or like item throughout Work.

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1.5 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to require substitution of more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints, solvents and other liquids in heated and ventilated room. Refer to WHMIS MSDS for proper storage of all products used on site. Dispose oily rags and other combustible debris daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.7 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.9 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

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- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.10 COORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 MEASUREMENT FOR PAYMENT

.1 Work under this section will not be measured. Include all costs under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 -Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered surveyor, licensed to practice in the Northwest Territories, with a minimum of five (5) years of surveying experience, acceptable to Departmental Representative.
- .2 Surveyor cannot be an employee of Contractor.

1.2 REFERENCES

.1 Departmental Representative's identification of property limits and existing survey control point, where applicable.

1.3 SURVEY REFERENCE POINTS

- .1 Locate, establish, confirm, and protect control points prior to starting site Work. Preserve permanent reference points during construction.
- .2 Make no changes or relocations without prior written notice to Departmental Representative.
- .3 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .4 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

- .1 Establish two permanent bench marks on each of the nine mine sites, referenced to established bench marks by survey control points to tie in all sites. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Prepare a topographic map of work sites prior to demolition or excavation Work as directed by Departmental Representative to provide a baseline survey for quantity measurements.
- .4 Stake location of containment areas and landfarm in the field, and prepare a record drawing showing final location and contours of the containment areas.
- .5 Prepare drawings showing areas where repairs were undertaken.
- Layout area to be cleared at the containment area and landfarm sites, measure area(s) cleared, provide a drawing showing area cleared and calculations.
- .7 Maintain surveys for quantity calculations.
- .8 Survey locations of mine openings and provide drawings to Departmental Representative prior to start of design of seals. Survey mine openings following completion of seals, and provide drawings showing all appropriate details.
- .9 Survey locations of all environmental samples and geotechnical work as directed by Departmental Representative. Provide drawings showing all appropriate details to Departmental Representative as required.

1.5 SURVEY EQUIPMENT

.1 Maintain at site, for duration of the construction period, a complete set of survey equipment for occasional use by the Departmental Representative. Shared use of Contractor's survey equipment is acceptable.

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- .2 The use of either a Total Station unit or a GPS Real Time Kinetic unit is acceptable.
- .3 Calibrate all equipment prior to each construction season. Submit to the Departmental Representative documentation certifying the calibration of the equipment thirty (30) days prior to each construction season.

1.6 SURVEY MARKERS

- .1 Provide all survey markers and other items required to complete Work as specified, including, but not limited to:
 - .1 Pointed stakes (minimum 1.2 m in length, 12 mm thick, 38 mm wide)
 - .2 Pointed hubs (minimum 0.5 m in length, 20 mm thick, 38 mm wide)
 - .3 Nails (100 mm long), spikes (250 mm long), pins (1 m long), etc.
 - .4 Fluorescent paint, flagging, etc.
 - .5 Felt markers, chalk, wax pens, etc.
- .2 Maintain supply of survey markers for Departmental Representative's use.

1.7 RECORDS

.1 Maintain a complete, accurate log of control and survey Work as it progresses.

1.8 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative thirty (30) days prior to construction commencement.
- .2 Upon request of Departmental Representative, submit documentation to verify accuracy of field engineering Work. Maintain accuracy of 0.01 m vertically and 0.1 m horizontally. Submit data in UTM NAD83 Datum.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.
- .4 Submit all drawings electronically in accordance within PWGSC protocols for AutoCAD drawings and by hard copy. Hard copy drawings must be signed by a professional engineer registered in the Territories.
- .5 Submit survey data back-up for quantities claimed on Progress Claims.
- .6 Submit raw survey data in electronic form containing, at a minimum:
 - .1 Date of survey.
 - .2 Name of survey (e.g., Landfarm finished grade).
 - .3 Point numbers, Northing and Easting, elevation and description
- .7 Submit the record survey data file as the latest as constructed information. Submission of more than one (1) data file as record information for each facility is not acceptable.
- .8 At completion of all Work, a minimum of seven (7) days prior to requested final inspection, submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.
- .9 Submit to the Departmental Representative documentation certifying the calibration of the equipment thirty (30) days prior to construction commencement each season.

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1.9 MEASUREMENT FOR PAYMENT

- .1 Work identified in this section will be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule. Tendered price to include all labour, equipment, materials, meals, accommodation, flights, and any other costs necessary to undertake Work required.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Waste Management Plan: Relates to the Contractor's planned approach to handling demolition waste, as part of overall waste management.
- .2 Demolition Waste Audit: Refers to actual waste streams and disposal methods used.
- .3 Salvage: Inventory of items Contractor is required to protect from containment area disposal, in accordance with Section 01 11 00 Summary of Work, or additional items Contractor or Departmental Representative plans to salvage.

1.2 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Record of wastes generated and disposed, broken down as follows:
 - .1 Volume of equipment removed from the sites.
 - .2 Volume of material burned prior to placing in the engineered containment area, if any.
 - .3 Volume of demolition debris, including ashes generated from building (s) that were burned, if any.
 - .4 Volume of demolition debris generated from buildings that were demolished without burning.
 - .5 Volume of broken concrete generated and hauled to the containment area.
 - .6 Volume of miscellaneous waste collected at the site and along shorelines.
 - .2 Record of inert waste material disposed including:
 - .1 Asbestos.
 - .2 Lead-based paint material.
 - .3 Record of chemicals and reagents collected for off-site disposal including:
 - .1 Chemicals and reagents located on site.
 - .2 Hydrocarbon sludges, and any other hydrocarbon wastes on site.
 - .3 Disposal of materials used to decontaminate equipment prior to demobilization.
 - .4 Record of materials protected from landfilling at the request of the NWT Heritage Society as discussed in Section 01 11 00 Summary of Work.
 - .5 Record of materials, separate from items requested by the NWT Heritage Society, salvaged by the Contractor.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Prepare and submit the following information.
 - .1 Prepare a Demolition Waste Management Plan outlining the Contractor's proposed method of handling each kind of waste stream on site, as part of the overall Waste Management Plan. Provide an estimate of the volumes anticipated for each waste stream.

Public Works and Government Services Canada

Project No. R.057573

Environmental Site Remediation

Gordon Lake Group Sites, NT

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- .2 Submit detailed list of items to be salvaged.
- .3 At the completion of the Work prepare and submit a Demolition Waste Audit Report containing all items listed in 1.2 above, with an explanation on any deviations from the Demolition Waste Management Plan.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 All salvaged materials that remain the property of the Contractor must be removed from the site following the completion of this contract.
- .2 All materials that are the property of the Departmental Representative must be removed from site as directed by the Departmental Representative.
- .3 Material that is removed cannot be stockpiled on any Crown Land.
- .4 Separate non-salvageable materials from salvageable items.

1.5 DISPOSAL OF WASTES

- .1 Dispose of demolition wastes in the containment area in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .2 Do not dispose of any waste into waterways or in site drains.
- .3 Keep records of construction waste including:
 - .1 Volume of waste by type, as indicated in paragraph 1.2.
- .4 Drain all equipment of fluids prior to placing in containment area.
- .5 Cut all material to sizes not exceeding 2 meters in any direction.

1.6 SCHEDULING

.1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

1.7 MEASUREMENT OF PAYMENT

- .1 All direct costs for demolition waste management and disposal will be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

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Environmental Site Remediation Gordon Lake Group Sites, NT CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL

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PART 3 - EXECUTION

3.1 APPLICATION

- .1 Perform Work in compliance with Section 02 41 16 Structure Demolition.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials upon completion of the Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.

END OF SECTION

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PART 1 - GENERAL

1.1 CLOSEOUT PROCEDURES

- .1 Notify Departmental Representative when Work is considered ready for Substantial Completion (fulfillment of essential obligations as required under the Contract).
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed Certificate of Substantial Completion.
- .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

1.2 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Sub-Contractors to conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Certificate of Substantial Completion, indicating status and deficiencies, will be issued by the Departmental Representative and signed by all parties. Contractor to correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for Final Inspection.
- .4 Submit written completion certificate to Departmental Representative seven (7) days prior to the requested final inspection.
- .5 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection. If Work is deemed complete by Departmental Representative, a Certificate of Completion shall be issued by the Departmental Representative and signed by the Contractor and the Departmental Representative.
- .6 Post-Demobilization Inspection: once demobilization is completed, Departmental Representative will request a Post-Demobilization inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

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1.3 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the Post-Demobilization Site Visit are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under LSA in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 FORMAT

- .1 Organize all closeout data in the form of an instructional manual, called Project Record Documents
- .2 Bind documents using Cerlox spines.
- .3 When multiple volumes are necessary, correlate data into related consistent groupings..
- .4 Cover: Identify each document with type or printed title 'Project Record Documents'; list title of Project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dxf or dwg format on CD, in the correct UTM coordinate system. The assumed projection and datum will be inserted as a text block in the model space.

1.2 CONTENTS - EACH VOLUME

- .1 Table of Contents:
 - .1 Title of Project.
 - .2 Date of submission
 - .3 Names, addresses, and telephone numbers of Contractor with name of responsible parties
 - .4 Schedule of products and systems, indexed to content of volume
 - .5 Summary of Health and Safety issues, Environmental issues and performance indicators.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of Sub-Contractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Include As-Built drawings as specified in this Section.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.

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1.3 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 01 – Survey Requirements, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.4 AS-BUILTS

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Task Authorizations.
 - .5 Change Orders and other modifications to the Contract.
 - .6 Reviewed shop drawings and product data.
 - .7 Field test records.
 - .8 Inspection certificates.
 - .9 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information, as required
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.

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- .5 References to related shop drawings and modifications.
 - .1 Field changes of dimension and detail.
 - .2 Changes made by Task Authorization, Change Order or Field Order.
- .6 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Task Authorization, Addenda and change orders.
- .7 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.6 RECORD DRAWINGS

- .1 Departmental Representative will provide to Contractor, two (2) sets of white prints and the CAD electronic files (.dwg or compatible) for record drawing purposes.
- .2 Maintain Project record drawings and record accurately deviations from Contract documents on one set of prints. Electronic format should be .dwg or compatible.
- .3 Record changes in red on prints, or on separate layer electronically.
- .4 At completion of Project and prior to final inspection, neatly transfer record notations to second set of drawings or final CAD electronic drawing (.dwg or compatible) and submit both sets to Departmental Representative. Forward information on completed areas at the end of each construction season.

1.7 OTHER RECORDS

- .1 Thirty (30) days after the completion of each construction season, submit the following to the Departmental Representative:
 - .1 Copies of all documents and permits obtained by the Contractor.
 - .2 Results of all testing carried out by the Contractor.
 - .3 Any other pertinent information.
 - .4 Copies of all shipping documents identifying the shipper, the receiver and all carriers involved in the transport of materials.
 - .5 Information as required by the Land Use Permit.
 - .6 Information as required by the Water License.
 - .7 Information as required by the Quarry Permit.
 - .8 Information as required by all other applicable regulatory bodies and Authorities Having Jurisdiction (AHJ).
 - .9 Copies of all Transportation of Dangerous Goods documentation.
 - .10 Copies of all waste manifests.
 - .11 Copies of all weigh scale tickets.
 - .12 Documentation as required for hazardous material management.
- .2 Consolidate the above information in one (1) document and submit two (2) hard copies and one (1) digital copy in Portable Document Format (PDF) to the Departmental Representative.

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1.8 MEASUREMENT FOR PAYMENT

- .1 All direct costs for the Project Record Documents (i.e. Closeout Submittals) are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under LSA in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

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PART 1 - GENERAL

1.1 LOCATION OF WORK

- .1 The Tibbitt to Contwoyto Winter Road Joint Venture (JV) runs through the middle of Gordon Lake (i.e. runs north-south), connecting the Ingraham Trail (Highway 4) to the mines northeast of Yellowknife, and may be used by the Contractor for the mobilization, demobilization and transportation between the Gordon Lake Group Sites. Coordinate with the Tibbitt to Contwoyto Winter Road JV to address logistics such as access, orientation and road royalties.
- .2 The Tibitt to Contwoyto Winter Road to the Gordon Lake Group Sites is shown on Drawing C-01. A track survey will be completed to confirm the alignment of the historical winter road, and of any new winter spur road(s).
- .3 The winter spur road(s) (i.e. small spurs to the GLG sites from the Tibbitt to Contwoyto Winter Road JV), as required, must follow one of the routes identified in the Land Use Permit. Any deviation will require an amendment to the permit and Board or Inspector approval prior to construction.
- .4 Four mine site locations (Camlaren, Kidney Pond, Treacy and West Bay) can undergo access enhancement for float planes in the form of floating docks if required.
- .5 A historical winter road connecting Murray Lake to Gordon Lake exists which, with refurbishment, can be used to access Murray Lake and Try Me if required and is shown on Drawing C-01. Verification that this route would be open during site activities would be required.
- .6 Any barge landing should be located with the work area included as part of the Land Use Permit.

1.2 SUBMITTALS

- .1 Submit to the Departmental Representative, via fax or e-mail attachment, the following information at the commencement of work and every Monday morning thereafter during the construction and operation of the winter spur road(s):
 - .1 Track survey results for the historical winter road and all planned winter spur road.
 - .2 Start date for construction of the winter spur road.
 - .3 Progress in winter road construction, indicating location and distance under construction, and distance and location completed.
 - .4 Completion date of initial construction.
 - .5 Proposed and actual opening and closing dates for all segments of the road.
 - .6 Estimated winter road carrying capacity during construction, and date when required winter road capacity requirements have been met.
 - .7 Profile the ice thickness and quality as often as necessary during construction to confirm that minimum weight limits are reached and during maintenance to confirm that those weight limits are maintained (at least two (2) profiling missions are expected over the winter spur road construction and maintenance season). Fax/e-mail profiling results to the Departmental Representative as soon as they are available.
 - .8 During the operating/maintenance phase, report dates when inspections were carried out.

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- .9 Summarize maintenance activities undertaken and nature of maintenance carried out, on a weekly basis.
- .10 Report date of closures due to reduced winter road weight capacity, adverse weather condition (including storms or thaw).
- .11 Report date of final closure, and date when decommissioning is complete.
- .12 Schedule assessment: In the event that progress of project work is likely behind schedule, indicate measures to be taken to bring project back on schedule, and inform the Departmental Representative in writing.
- .2 When the Departmental Representative is on site, submit required information directly to the Departmental Representative.
- .3 The centerline and width of the winter road will be established based on available data through a qualified third party professional survey and ice profiling firm retained by the Contractor.
- .4 Provide information as stipulated in the appended NWT Transportation Winter Road Rules document (see Appendix C).
- A description of the work related to the construction and operation of the winter road is to be included in the following plans: Site Specific Health and Safety Plan; Mobilization and Demobilization Plan; Waste Management Plan, as well as any other relevant submittals as outlined in Section 01 33 00 Submittal Procedures.
- .6 Copies of all required documentation are to be kept at the camp established for the winter road construction. The Departmental Representative is to have access to these documents upon request.
- .7 In the event that progress of project work impacts the schedule, indicate measures to be taken to bring project back on schedule, and inform Departmental Representative in writing.

1.3 REFERENCES

- .1 The Land Use Permit states requirements for minimal packed snow or ice thickness on the road; equipment requirements; control or prevention of flooding, erosion and subsidence of land; stream crossings; debris and brush removal; petroleum storage, and any other items deemed necessary for protection of the environment during the construction and maintenance of the winter road.
- .2 The Land Use Permit specifies the "spring break-up" date, beyond which date the Permittee will not conduct any activity associated with the land-use operation unless otherwise authorized by a Land Use Inspector.
- .3 The Land Use Permit specifies the route and alignment of the road.
- .4 Guidelines for the methods and procedures for winter road construction are contained in the following publications:
 - .1 Guidelines for Safe Ice Construction, Government of Northwest Territories (GNWT), 2015
 - .2 A Field Guide to Ice Construction Safety, Department of Transportation, GNWT, 2007.
 - .3 Environmental Operating Guidelines: Access Roads and Trails INAC (2010).
 - .4 Environmental Guidelines for the Construction, Maintenance and Closure of Winter Roads in the Northwest Territories by Stanley Associates for the Department of Transportation (Oct 1993).
 - .5 Best Practice for Building and Working Safely on Ice Covers in Alberta, Government of Alberta (October 2009)

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- .5 The road will be constructed to withstand (at a minimum) the weight associated with the heaviest load planned for transport.
- .6 The road will be a minimum 10 m wide on portages and a minimum 30 m wide on the lakes.
- .7 The road will be designed to withstand vehicle traffic at a speed of 40 km/hr.

1.4 CATASTROPHIC INCIDENT PLAN

- .1 Due to the nature of the work, incidents have occurred where equipment has broken through the ice, with, or without, loss of life. The contractor will prepare a plan to address catastrophic incidences of this nature. The plan should include as a minimum the following:
 - .1 Work area inspection and safety verification prior and during progress of active work.
 - Action to be taken by the first person at the scene of a catastrophic incident, who should be the partner, if the crew is working in close proximity to each other.
 - .3 Rescue, if equipment is only partially submerged and operator did not jump free.
 - .4 Rescue, if equipment is submerged and operator did not jump free.
 - .5 Communications.; List persons to be contacted and method of contact.
 - .6 Medivac procedures.
 - .7 Methods to contain any fuel/oil spills resulting from the incident.
 - .8 Planned method to extract equipment.
 - .9 Reporting.
- .2 Submit to Departmental Representative the Catastrophic Incident Plan in accordance with requirements of Section 01 33 00 Submittal Procedures prior to commencement of work.

1.5 QUALIFICATIONS

- .1 Be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the Specification.
- .2 Winter road builders must possess a minimum of five (5) years experience in major ice road construction.
- 3 Submit written proof of satisfactory experience of winter road builders to Departmental Representative prior to the start of ice road construction.
- .4 Third party ice profilers to be pre-qualified to perform the work.
- .5 Submit written proof of third party ice profilers' qualifications to Departmental Representative prior to the start of ice road construction.

1.6 WINTER ROAD HEALTH AND SAFETY

- .1 Include details of safety requirements and procedures for winter road work within the Site Specific Health and Safety Plan.
- .2 Submit in accordance with the requirements of Section 01 33 00 Submittal Procedures.

1.7 SAFETY AND SECURITY

.1 Contractor's winter road construction crew must have ice rescue training with current certification and maintain compliant ice rescue and hypothermia response kits in their camps.

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- .2 Contractor's winter road users are required to follow security procedures and requirements of the Tibbitt to Contwoyto winter road.
- .3 Dispatch responsibilities to remain with primary haul operator.

1.8 SCHEDULE

- .1 Provide the winter road schedule to the Authorities Having Jurisdiction (AHJ) and the Departmental Representative for review.
- .2 Winter road will not be used unless directed or authorized by the Land Use Inspector and Departmental Representative.

1.9 MEASUREMENT FOR PAYMENT

- .1 Payment of all costs for the winter road track survey will be paid on lump sum basis under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 All royalty costs for the use of the Tibitt to Contwoyto Winter Road JV will be paid on a lump sum basis under LSA in the Basis of Payment Schedule.
- .3 Construction of winter spur road(s) to be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .4 All costs for the maintenance of all winter spur roads at a minimum of the weight associated with the heaviest load planned for transport will be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .5 Payment of all costs for the construction/installation, maintenance, seasonal withdrawal/winterization, reinstatement, and final removal of floating docks at Camlaren, Kidney Pond, Treacy and West Bay sites will be paid as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .6 Except as otherwise indicated herein, Work under this section will not be measured. Include all costs under LSA in the Basis of Payment Schedule. Indicate cost of the Work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 CONSTRUCTION

- .1 Construct winter spur road(s), as required:
 - .1 Notwithstanding requirements specified in guidelines and Land Use Permit, the following conditions must be met:
 - .1 No new ground disturbances are anticipated while constructing the winter road for this project, with the exceptions of overland routes required to access the GLG sites.

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WINTER ROADS AND FLOATING DOCK

- .2 The winter road will be constructed and maintained with a minimum of 10 cm packed snow at all times of its use. If this cannot be met with existing site conditions, additional water will be placed to create an ice surface to protect underlying ground surface, vegetation, etc.
- .3 Only clean water and/or snow will be used in the construction of ice bridges.
- .4 Any ice bridges created will not hinder the flow of water.
- .5 No stream banks will be cut.
- .6 Approach grades on all lake and stream crossings will be minimized.
- .7 All ice bridges and snow fills will be removed prior to break-up.
- .8 A Spill Contingency Plan will be in place and spill kits available during construction and maintenance periods.
- .2 The road will be a minimum 10 m wide on portages and a minimum 30 m wide on the lakes.
- .3 The winter road will be designed by a professional engineer to withstand (at a minimum) the weight associated with the heaviest load planned for transport.
- .4 The road will be designed to withstand vehicle traffic at a speed of 40 km/hr.
- .2 Construct floating dock(s), as required:
 - .1 Floating docks will be designed to support the on- and off-loading and mooring of float planes up to Twin Otter.

3.2 MAINTENANCE

- .1 Maintenance of the road will be on an as needed basis, yet will be continuous for the period of operation.
- .2 Maintenance will include winter road repair work to maintain minimum weight limits, dragging, clearing and compacting snow after storms.
- .3 Maintenance will include levelling areas (wash boarding) where a vehicle traffic speed of 40 km/hr cannot be maintained.
- .4 The road will be re-opened for traffic within 24 hours of a road closure due to weather.
- .5 Maintenance will include rebuilding sections of portages where the required compacted snow or ice thickness is less than the thickness specified in the Land Use Permit or where road bases have been damaged through the over-use of chains, spin outs or ditching.
- Maintenance of floating docks will include maintaining buoyancy sufficient to accommodate personnel and cargo loads.
- .7 Profile the ice thickness and quality during the maintenance phase to confirm that weight limits are maintained. Profiling will be completed by a third party who will submit results of profiling immediately.

3.3 SIGNAGE

- .1 Speed signs will be posted at either end of the road. Alternatively, the Contractor may incorporate speed limits in the signboards at the beginning and end of the road. Speed signs to be posted at all the portages.
- .2 Post speed and warning signs at any locations where visibility is reduced and/or where curvature warrants a reduction in speed at each turn and hills.

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- .3 Maintain existing direction, speed and warning signs along route.
- .4 Kilometre Signs: With kilometre "0" being at the start of the winter road to the west of West Bay, place a kilometre sign every 2 kilometres up to the end of the winter road to the east of Try Me. Signs need not be elaborate, but lettering should be a minimum 150 mm high. The material selection and posts will be capable of withstanding arctic winter storms. Signs will be driven into the snow along the route, with lettering clearly visible to vehicles travelling in either direction.

3.4 TESTING

- .1 Thickness of winter road to be tested/evaluated as often as necessary until minimum design load matching the maximum planned load is obtained along the entire winter road covered by the contract.
- .2 Once minimum weight limit is achieved, then testing can be reduced to monitoring of weak locations and occasional testing during maintenance of road.
- .3 Test results are to be submitted to the Departmental Representative as they become available.

3.5 FINAL INSPECTION

.1 This winter road portion of this contract will be deemed to have been completed when a final inspection has been undertaken by the Departmental Representative, Contractor, Land Use Inspector, and all deficiencies have been corrected.

3.6 DECOMMISSIONING

- .1 Prior to closure of the winter road, remove signs on lakes and rivers and covers.
- .2 Prior to closure of the winter road, cover signs at either end of the road with 1200 mm x 2400 mm "Road Closed" signs and remove all equipment and other materials that may have been left along the road.
- .3 Clean-out all stream crossings in accordance with Land Use Permit.
- .4 Correct any deficiencies that the Land Use Inspector a may have noted in their final inspections.
- .5 Prior to site closure, remove floating docks and transport off-site.

END OF SECTION

SPECIAL PROJECT PROCEDURES
MINE OPENING SEAL

Section 01 81 00 Page 1 of 9

PART 1 - GENERAL

1.1 DESCRIPTION

Gordon Lake Group Sites, NT

.1 This section covers the requirements for the construction of seals and backfill for the mine openings (i.e., shafts, pits and portals) at the Gordon Lake Group Sites that need proper closure to comply with Territorial regulatory requirements. A brief description of each mine opening is provided in the table below with more information in the Appendices, including dimensions.

Site	Mine Opening	Estimated Backfill Volume (m ³)	Figure
Burnt Island	Mine Shaft – Backfill and engineered cap Portal Area - Backfill	475 586	C-BUR-03 C-BUR-04
		300	C-BOIX-04
Camlaren	Potential Hollow Area - Intrusive investigation, backfill and seal Shaft – Backfill and engineered cap	Unknown	C-CAM-03
		135	C-CAM-05
Goodrock	North Mine Shaft- Backfill and engineered cap	43	C-GOO-03
	South Pit - Backfill	81	
Kidney Pond	Portal - Backfilled, engineered cap and passive treatment system (Portal Seep Water Management System)	270	C-KID-06
Murray	Shaft - Backfill	23	C-MUR-03
Lake	Deep Trench/Shaft - Backfill	252	
Storm	North Mine Shaft - Backfill	68	C-STO-02
Property	South Mine Shaft - Backfill	68	
Try Me	Shaft – Backfill and engineered cap	30	C-TRY-02

- .2 Employ Level 1 and Level 2 Supervisors on site as per GNWT WSCC Mine Health and Safety Act. Level 1 Supervisor to be on-site during the completion of all remedial activities at each site. The Level 1 Supervisor is responsible for providing direction to the on-site workforce. A Level 2 Supervisor will be on-site when mine openings are being inspected and when the openings are being sealed, as a minimum. The Level 2 Supervisor is to be consulted throughout the completion of the remedial activities and is responsible for providing direction to the Site Superintendent.
- .3 For the purposes of this work a qualified person is a Professional Engineer licensed to practice in the Northwest Territories and has expertise in this field of work.
- .4 The information presented regarding the mine openings is based upon site conditions as described herein.
- .5 Photographs of known mine openings are included in Appendix D.

SPECIAL PROJECT PROCEDURES MINE OPENING SEAL

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1.2 ENVIRONMENTAL PROTECTION

.1 Ensure Work is done in accordance with Section 01 35 43 – Environmental Protection, the Land Use Permit, and all other applicable permits and licences.

1.3 WORK DESCRIPTION

- .1 Construct the engineered cap for the indicated mine openings (see Section 1.1.1) to the specifications outlined in this Section. Work includes, but is not limited to:
 - .1 Provision of all labour, equipment and materials required to complete the construction of the engineered cap including all necessary earthworks (including the relocation of non-impacting waste rock into the respective mine shafts), demolition, formwork, shoring and bracing required to complete the work and comply with applicable regulation.
 - .2 Restoration and grading of all areas affected by work as indicated.
- .2 Backfill the indicated mine openings (see Section 1.1.1) to the specifications outlined in this Section and in Section 31 23 33.01 Excavating, Trenching and Backfilling. The Work is to include, but is not limited to:
 - .1 Transport and placement of waste rock backfill at the mine openings as indicated.
 - .2 Restoration and grading of all areas affected by work as indicated.
 - .3 Compaction of waste rock is to conform to the specifications outlined in Section 31 22 13 Grading and Earthworks Construction.
- When working around the mine openings, a 3 m exclusion zone for equipment and people shall be established from the edge of the current openings for safety purposes. The 3 m exclusion zone can be waived if other mitigation measures are provided (e.g. fall arrest, remote operation of equipment, etc.). For the decline at Burnt Island, an exclusion zone shall be established for the first 15 m of the decline from the portal opening. At Kidney Pond, a 3 m exclusion zone near the decline opening shall be applied.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA A23.3-14 (R2014), Design of Concrete Structures
 - .2 CSA S269.1-1975 (R2008), Falsework for Construction Purposes
 - .3 CAN/CSA-S269.3-M92 (R2013), Concrete Formwork
 - .4 CAN/CSA-G3018-09. Carbon Steel Bars for Concrete Reinforcement
 - .5 CAN/CSA-A23.1-09/A23.2-09 (R2014) Concrete materials and methods of concrete construction/Test methods and standard practices for concrete
 - .6 CAN/CSA-A3000-13, Cementitious materials compendium
 - .7 CAN/CSA-G40.20-13/G40.21-13 General requirements for rolled or welded structural quality steel / Structural quality steel
 - .8 ASTM A240 / A240M 14 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - ASTM A778 01(2009) Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products
- .2 Council of Forest Industries of British Columbia (COFI)
- .3 Northwest Territories Mine Health & Safety Act

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SPECIAL PROJECT PROCEDURES MINE OPENING SEAL

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- .4 American Concrete Institute (ACI)
 - .1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .5 American National Standards Institute/American Concrete Institute (ANSI/ACI)
 - .1 ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement
- .6 American Society for Testing and Materials (ASTM)
 - .1 ASTM A775/A775M-07b (2014), Standard Specification for Epoxy-Coated Reinforcing Steel Bars
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- .7 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound
- .8 Ontario Regulation 240/00, Amended to O. Reg. 307/12
 - .1 Mine Development and Closure Under Part VII of the Act
- .9 Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories, AANDC/MVLWB, November 2013
- .10 Health, Safety and Reclamation Code for Mines in British Columbia, Ministry of Energy, Mines and Petroleum Resources, 2008

1.5 DESIGN REQUIREMENTS

- .1 Design, engineer, and construct: formwork and shoring and bracing formwork for the engineered cap (where applicable) over the mine shaft to conform to design and code requirements; resultant concrete to conform to required shape, line and dimensions, as indicated.
 - .1 The design and construction of mine seals is to conform to the design standards as set out in the Mine Health and Safety Act (S.N.W.T. 1994, c.25, amended R-095-2014)
- .2 The use of foam plugs to seal mine openings may be considered however can only be installed upon written direction by the Departmental Representative which is contingent upon the GNWT Mine's Inspector providing written approval of the engineered design.
- .3 Mine seals must meet requirements of MVLWB Guidelines for Mine Closure as well as the most stringent standards from Ontario and/or British Columbia.

1.6 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures:
 - .1 Product Data: Provide data on joint devices, attachment accessories, and admixtures.

1.7 QUALITY CONTROL

- .1 Unless otherwise specified, the Contractor will be responsible for Construction Quality Control (CQC). Contractor will engage and pay for the services of qualified third party, a Professional Engineer licensed to practice in the Northwest Territories, to perform CQC for monitoring and documenting the quality of the concrete formwork in accordance with the Specifications.
- .2 The Departmental Representative will be responsible for Construction Quality Assurance (CQA). The Departmental Representative will be responsible for observing and documenting periodic verification,

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checking, or testing for confirming that the quality of the cast-in-place concrete is in accordance with the Specifications.

- Unless otherwise specified, complete CQC inspection, sampling, testing or any other action, as considered necessary to ensure that the Work has been completed in accordance with the Drawings and Specifications. Notwithstanding the results of the Contractor's CQC program, compliance of the Work with the Drawings and Specifications will be defined by the results of the Departmental Representative's Construction Quality Assurance (CQA) program.
- .4 Any work that does not satisfy the requirements of the Drawings and Specifications, must be corrected in accordance with the requirements of the Specification or as directed by the Departmental Representative at the sole expense of the Contractor.
- .5 Acquire cement and aggregate from same source for all work.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store materials off ground in ventilated and protected manner to prevent deterioration from moisture.

1.9 MEASUREMENT OF PAYMENT

- .1 All direct costs for the closure of each mine opening are to be included as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule. This work will include, but is not limited to, the following:
 - .1 Inspections.
 - .2 Preparing surfaces.
 - .3 Provision of temporary safety fencing.
 - .4 All labour, equipment and materials required for the construction of engineered cap for the mine shafts.
 - .5 Relocation of impacting and non-impacting waste rock as required to facilitate the construction of the concrete caps and to backfill the openings.
 - .6 Dewater openings prior to placement of backfill.
 - .7 The above work items will not be measured for payment.
- .2 Except as indicated above, work under this section will not be measured. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 SEAL MATERIALS

- .1 Formwork materials:
 - .1 Form ties: use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
 - .2 Form release agent: non-toxic, biodegradable, and low VOC.
 - .3 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, and low VOC, free of kerosene, with viscosity between 15 and 24 mm2 /s (70 and 110s Saybolt Universal) at 40°C, flashpoint minimum 150°C, open cup.
 - .4 Falsework materials: to CSA S269.1-1975 (R2008)

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- .2 Concrete Reinforcement:
 - .1 Substitute different size bars only if permitted in writing by the Departmental Representative.
 - .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18-09, unless indicated otherwise.
 - .3 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1-09/A23.2-09 (R2014).
 - .4 Plain round bars: to G40.20-13/G40.21-13
- .3 Cast-In-Place Concrete:
 - .1 Portland cement: to CAN/CSA-A3000-13, Type GU.
 - .2 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
 - .3 Other concrete materials: to CAN/CSA-A23.1-09/A23.2-09 (R2014).
- .4 Accessories:
 - .1 Bonding Agent: Polymer resin emulsion and two-component modified epoxy resin.

2.2 MIXES

- .1 Proportion concrete in accordance with CAN/CSA-A23.1-09/A23.2-09 (R2014)...
- .2 Minimum compressive strength at 30 MPa as indicated.
- .3 Class of exposure: C-I to CAN/CSA-A23.1-09/A23.2-09 (R2014), Table 11.
- .4 Nominal maximum size of coarse aggregate: to CAN/CSA-A23.1-09/A23.2-09 (R2014).
- .5 Slump: to CAN/CSA-A23.1-09/A23.2-09 (R2014)...
- Air content: concrete to contain purposely entrained air in accordance with CAN/CSA-A23.1-09/A23.2-09 (R2014), Table 10.
- .7 Admixtures: to CAN/CSA-A23.1-09/A23.2-09 (R2014).

2.3 STAINLESS STEEL PIPE AND PLATE

.1 Stainless steel pipe and plate must be manufactured from ASTM-A240 annealed and pickled sheets and plates in accordance with ASTM A778 in type 304L stainless steel. Pipe must be 150 mm in diameter and manufactured to nominal pipe sizes as listed in ANSI B36.19. Plate dimensions are indicated.

PART 3 - EXECUTION

3.1 DEMOLITION OF MINE OPENING FACILITIES

- .1 Demolish and remove debris from the area over the mine openings described in Section 1.1.1, in accordance with Sections 02 41 16 Structure Demolition and 02 41 23 Debris and Miscellaneous Removals and as indicated.
- .2 Expose sound bedrock at each mine shaft or vent to allow for inspection by the Contractor's Engineer and the Departmental Representative

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3.2 EXAMINATION

- .1 Verify lines, levels and centers before proceeding with formwork. Confirm as indicated.
- .2 Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.3 ERECTION OF FORMWORK

- .1 Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of CAN/CSA-A23.1-09/A23.2-09 (R2014).
- .2 Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- .3 Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- .4 Align joints and make watertight. Keep form joints to a minimum.
- .5 Obtain approval before framing openings in structural members that are not indicated on Drawings.
- .6 Provide fillet and chamfer strips on external corners of walls.

3.4 APPLICATION OF FORM RELEASE AGENT

- .1 Apply form release agent on formwork in accordance with the Manufacturer's recommendations.
- .2 Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

3.5 INSERTS, EMBEDDED PARTS AND OPENINGS

- .1 Provide formed openings where required for items to be embedded in or passing through concrete work.
- .2 Locate and set in place items that will be cast directly into concrete. Coordinate location of equipment anchors with manufacturers.
- .3 Install accessories in accordance with the manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- .4 Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
- .5 Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM

.1 Forms are to remain in place for a minimum of seven (7) days and removed prior to the placement of backfill around and over the engineered cap.

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3.7 REINFORCEMENT PLACEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1-09/A23.2-09 (R2014).
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

3.8 PREPARATION

- .1 Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- .2 In locations where new concrete is dowelled into existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- .3 Remove hardened concrete and foreign materials from the inner surfaces of conveying equipment.
- .4 Complete formwork and dirt and water removal; position reinforcement and all embedded fixtures.
- .5 Ensure that all work is ready to receive concrete.

3.9 PLACING CONCRETE

- .1 Notify the Departmental Representative a minimum of one (1) working day prior to commencement of operations.
- .2 Use set retarding admixtures during hot weather only when approved by the Contractor's Engineer and reviewed with the Departmental Representative.
- .3 Ensure that reinforcement, inserts, embedded parts, formed joint fillers, joint devices and other appurtenances are not disturbed during concrete placement and that cover requirements are attained.
- .4 Thoroughly dampen soils at bottom of forms. Remove standing water in bottom of forms and below slab areas prior to placing concrete.
- All reinforcement must be continuous across joints of structural slabs. The surface of concrete at cold joints, if they occur, must be thoroughly cleaned and all laitance removed prior to placing adjoining concrete. Obtain bond by use of the specified bonding agent applied in accordance with manufacturer's instructions.
- .6 Place concrete as per CAN/CSA-A23.1-09/A23.2-09 (R2014).
- .7 If slump is measured below the value specified, water may be added only if neither the maximum water/cement ratio nor the maximum slump is exceeded.
- .8 No water is to be added to the mix following 45 minutes after initial batching.

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3.10 CONCRETE FINISHING

.1 Provide smooth formed concrete without secondary finishing.

3.11 CURING AND PROTECTION

- .1 Cure and protect concrete in accordance with with CAN/CSA-A23.1-09/A23.2-09 (R2014) and ASTM C309.
 - .1 Do not use curing compounds where bond is required by subsequent topping or coating.
- .2 Immediately after placement, protect concrete from premature drying, excessively hot temperatures, and mechanical damage.
- .3 Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.12 DEFECTIVE CONCRETE

- .1 Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- .2 Repair or replace defective concrete as instructed by the Departmental Representative.
- .3 Do not patch, fill, touch-up, repair, or replace exposed concrete except upon written direction of the Departmental Representative for each individual area.

3.13 QUALITY CONTROL

- .1 Quality control activities to be in accordance with Section 01 45 00 Quality Control.
- .2 Concrete testing: to CAN/CSA-A23.1-09/A23.2-09 (R2014) by testing laboratory designated and paid for by Departmental Representative.
- .3 Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- .4 Submit proposed mix design to the Departmental Representative for review ten (10) working days prior to commencement of Work.
- .5 The Departmental Representative may perform tests of cement and aggregates to ensure conformance with specified requirements.

3.14 SITE GRADING AND RESTORATION

- .1 Upon completion of work, remove debris and leave work sites clean to a condition satisfactory to the Departmental Representative.
- .2 Do not begin grading of mine opening areas until approval to do so is given in writing by the Departmental Representative.
- .3 Grade mine opening areas and restore all areas affected by work in accordance with Section 31 22 13 Grading and Earthworks Construction.

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END OF SECTION

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PART 1 - GENERAL

DESCRIPTION <u>1.1</u>

- .1 This section specifies the following:
 - Methods and procedures for demolition, removal and disposal of abandoned buildings and .1 building debris, abandoned infrastructure, concrete pads and a tank at the GLG Sites as indicated in Drawings and Specifications. An inventory of all non-hazardous and hazardous materials is provided as Appendix A to the specifications. A summary of the structures, concrete pads and tank planned for demolition is provided in the table below.

Site	Structures Requiring Demolition	Drawing
Burnt Island	Knutsen Camp Area:	C-BUR-02
	Former Cabins (3)	
	Dock	
	Shaft Area:	
	Core Rack	C-BUR-03
	Drill Rig	
	Headframe	
	Old Mill Area:	C-BUR-06
	Mill Building and Pump House	
Camlaren	South Muir Island (Mine Area South and Mine	C-CAM-02, C-CAM-03
	Area North):	
	Dock	
	Hoist Pad	
	Mill Pad	
	Wooden Culvert	
	Outhouse	
	Partially collapsed buildings (2)	
	Potential Hollow Area	
	North Cabin Area:	C-CAM-04
	Cabin	
	Partially intact shack	
	Stone Oven	
Goodrock	Camp Area	C-GOO-02
	Partially intact cabin	
	Mill Area	C-GOO-03
	Crusher Foundation (potentially will	
	require demolition)	
Kidney Pond	<u>1983 Camp:</u>	C-KID-02
	Dock	
	<u>1939 Camp:</u>	C-KID-04
	Core Shack	
	Cabin	
	Wood Platform	
	Portal Area:	C-KID-06
	Core Racks	
	Kidney Pond Area:	C-KID-07
	Core Racks	
Treacy	Mill Area:	C-TRE-02
	Mill Remains	
Try Me	Main Camp:	C-TRY-02
	Core Racks	
	Cabin and other wooden structures	
West Bay	South Area:	C-WES-02
	Core Racks	
	Dock	
	Former Buildings (3)	

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.2 Methods and procedures for demolition, removal and disposal of materials with lead-based paint as indicated in Drawing C-TRE-02. A summary of the materials with lead-based paint associated with structures is provided in the table below.

Site	Lead-containing Paint	Drawing
Treacy	Mill Area:	C-TRE-02
	Red paint on wood under metal Mill part,	
	wood by the lake, and wood from the trench.	

.3 Methods and procedures for demolition, removal and disposal of asbestos-containing materials (ACMs) as indicated on Drawing C-BUR-03. A summary of the ACM associated with the structure is provided in the table below.

Site	ACM Item	Drawing
Burnt Island	Shaft Area:	
	Brake pad on drill rig	C-BUR-03

1.2 RELATED SECTIONS

- .1 Section 01 31 18 Construction Progress Schedules Bar (GANTT) Chart.
- .2 Section 01 33 00 Submittal Procedures.
- .3 Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 Site Specific Health and Safety Plan.
- .5 Section 01 35 43 Environmental Procedures.
- .6 Section 01 56 00 Temporary Barriers and Enclosures.
- .7 Section 01 71 01 Survey Requirements.
- .8 Section 01 74 19 Construction/Demolition Waste Management and Disposal
- .9 Section 02 41 23 Debris and Miscellaneous Removals.
- .10 Section 02 81 01 Hazardous Materials
- .11 Section 02 82 00.01 Asbestos Abatement Minimum Precautions.
- .12 Section 02 83 10 Lead-based Paint Abatement Minimum Precautions.
- .13 Section 31 22 13 Grading and Earthworks Construction

1.3 REFERENCES

- .1 Canada Labour Code Part II-Occupational Health and Safety (R.S. 1985, c.L-2, amended 2014).
- .2 National Fire Code of Canada, 2010.
- .3 Canada Occupational Health and Safety Regulations (SOR/86-304), including:

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- .1 Part X Hazardous Substances.
- .4 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999 (S.C. 1999, c.33)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301).
 - .3 Marine Spark-Ignition Engine, Vessel and off-Road Recreational Vehicle Regulations (SOR/2011-10).
 - .4 Off-Road Compression-Ignition Engine Emission Regulations (SOR/2005-32).
 - .5 Off-Road Small Spark-Ignition Engine Emission Regulations (SOR/2003-355).
 - .6 On-Road Vehicle and Engine Emission Regulations (SOR/2003-2).
 - .7 Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).
 - .8 Ozone-Depleting Substances Regulations (SOR/99-7).
- .5 Transportation of Dangerous Goods Act (TDGA), 1992 (SC 1992, c.34)
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286).
- .6 Hazardous Products Act (R.S.C., 1985, c. H-3)
 - .1 Controlled Products Regulations (SOR/88-66).
 - .2 Workplace Hazardous Materials Information System.
- .7 Canadian Council of Ministers of the Environment (CCME).
 - .1 CCME 1326-2008, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
- .8 Canadian Standards Association
 - .1 CSA Standard Z94.4-93 (R1997) Selection, Use and Care of Respirators.
- .9 Canadian Standards Association International.
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .10 Underwriters' Laboratories of Canada (ULC).
 - .1 ULC/ORD-C107.19-1992, Secondary Containment of Underground Piping.
 - .2 ULC-S660-08, Standard for Non-metallic Underground Piping for Flammable and Combustible Liquids.

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- .11 Health Canada:
 - .1 Hazardous Products Act Workplace Hazardous Materials Information System (WHMIS) Requirements.
- .12 National Institute for Occupational Health and Safety (NIOSH)
 - .1 Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115
- .13 Department of Environment and Natural Resources, Government of the Northwest Territories
 - .1 Guideline for the General Management of Hazardous Waste in the Northwest Territories (1998).
 - .2 Guideline for Industrial Waste Discharges in the Northwest Territories (2004).
 - .3 Guideline for Ozone Depleting Substances and Halocarbon Alternatives (2007).
 - .4 Guideline for the Management of Waste Antifreeze (1998).
 - .5 Guideline for the Management of Waste Asbestos (2004).
 - .6 Guideline for the Management of Waste Batteries (1998).
 - .7 Guideline for the Management of Waste Lead and Lead Paint (2004).
 - .8 Guideline for the Management of Waste Paint (1998).
 - .9 Guideline for the Management of Waste Solvents (1998).
 - .10 Used Oil and Waste Fuel Management Regulations (2004).
 - .11 Spill Contingency Planning and Reporting Regulations (1998).
 - .12 Environmental Guideline for Contaminated Site Remediation (2003).
- .14 Environment Canada Technical Document for Batch Waste Incineration (2010).
- .15 Safety Act NWT. R.S.N.W.T. 1988, c.S-1.
- .16 Labour Standards Act. R.S.N.W.T 1988, c.L-1.
- .17 United States Department of Labor Occupational Health and Safety Administration. Occupational Health and Safety Standards, Toxic and Hazardous Substances, Hazard Communication (Part 1910, 1200).
- .18 Environment Canada. Identification of Fluorescent Lamp Ballasts Containing PCBs (1991).
- .19 Hazardous Waste Training Manual: Canadian LIUNA Contractors Training Council (1992).

1.4 DEFINITIONS

.1 Hazardous Material: Items or debris no longer used for their original purpose; now hazardous and intended for recycling, treatment or disposal. Also material that is designated "hazardous" under Territorial or Federal legislation; or as a "dangerous good" under the TDGA. This may include dangerous substances, dangerous goods, hazardous commodities and hazardous products, and may include but is not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or environment if handled improperly. Known hazardous material at the sites includes asbestos lead painted wood, and batteries.

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- .2 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .3 Hazardous Materials Specialist: Contractor representative responsible for supervising all hazardous waste activities as well as coordinating submittal and reporting requirements.
- .4 Intermediate Container: Containers, approved by Transport Canada, used for transportation of hazardous materials.
- .5 Air/ground shipping container: the container into which the intermediate containers are placed for purposes of shipping to a disposal facilities.
- .6 Contractor's Designated Hazardous Waste Facility: A Licensed Hazardous Waste Disposal Facility designated by the Contractor for the disposal of all hazardous materials specified under the provisions of this contract. The facility must be pre-approved by the Departmental Representative prior to beginning work. Contractor must provide documentation from the Designated Hazardous Waste Disposal Facility indicating full responsibility for all hazardous materials accepted from the sites.
- .7 Lead-containing Paint: Material that is coated with lead-based paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
- .8 Non-hazardous Waste: Materials that are not designated as hazardous under the Territorial or Federal legislation. Materials that do not meet the definition of hazardous materials as defined in Section 02 81 01- Hazardous Materials.
- .9 Physical hazard: poses a slip, trip or fall risk to personnel and wildlife, risk to damage to vehicles (for example all-terrain vehicle, snowmobile, etc.).
- .10 Temporary Storage Area(s): A designated area used for the consolidation and storage of containerized hazardous materials as specified in Section 01 52 00 Construction Facilities and Section 02 81 01 Hazardous Materials.
- .11 Unpainted Wooden Materials: Wooden debris that is not painted, chemically treated or contaminated in any way and is suitable for on-site incineration. Unpainted pressboard or plywood is considered unpainted wooden material.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Demolition Meetings:
 - .1 Convene pre-demolition meeting prior to beginning the work of this Section with the Contractor's Representative and Departmental Representative in accordance with Section 01 31 19 Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work.
 - .3 Co-ordination with other construction sub-trades as required.
 - .2 Hold project meetings every week.
 - .3 Ensure key personnel, site supervisor and subcontractor representatives attend.
 - .4 WMC must provide written report on status of waste diversion activity at each meeting.

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Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.2 Scheduling:

- .1 Employ necessary means to meet project times without compromising specified minimum rates of material diversion.
 - .1 In the event of an unforeseen delay, notify Departmental Representative in writing.

1.6 INSTRUCTION AND TRAINING

.1 Before commencing work, provide to Departmental Representative satisfactory proof that every worker has had instruction and training in potential health hazards of handling hazardous materials and in the use of applicable respirators and protective clothing. This training can be performed as part of a program to comply with the requirements of OSHA Hazard Communication Standard 29 CFR 1910.1200.

1.7 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 The WMC is responsible for fulfilment of reporting requirements.
- .3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan (as a component of the overall Waste Management Plan) in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites and indicate:
 - .1 Descriptions of and anticipated quantities in percentages of materials to be landfilled or disposed off-site.
 - .2 Schedule of selective demolition.
 - .3 Number and location of waste containers.
 - .4 Name and address of haulers, waste facilities and waste receiving organizations.
 - .5 Submit written request to the Northwest Territories Mining Heritage Society to confirm the items of interest, as listed in Section 01 11 00 Summary of Work, at the GLG Mine Sites and whether they are to be recovered.
- .4 Submit waste transport manifests, chain of custody documentation, weigh bills, bills of lading and receipts from authorized disposal facilities for material removed from site to the Departmental Representative and other regulatory agencies, as required.
 - .1 Written authorization from Departmental Representative is required to deviate from haulers, facilities and receiving organizations listed in Waste Reduction Workplan.
- .5 Where required by Authorities Having Jurisdiction (AHJ), submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures.
- .6 Submit drawings stamped and signed by qualified professional engineer registered in Northwest Territories, Canada.
- .7 Do not commence demolition work, including asbestos abatement removal, until the Contractor has demonstrated to the Departmental Representative that all required permits for the work have been obtained.

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1.8 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, TDGA, and applicable Territorial and Municipal regulations.

1.9 EXISTING CONDITIONS

- .1 The information presented on the Drawings and in the Specifications that describe the structures to be demolished is based upon site conditions described in the *Gordon Lake Remedial Action Plan*, prepared by Stantec Consulting Limited (2016).
- .2 Take over structures to be demolished based on their condition and quantity on the date that the Contractor mobilizes to the site.
- The information presented in the Appendices and Drawings, including photographs and inventory tables, provide brief descriptions for the structures and facilities to be demolished. These tables and drawings indicate only the major construction details and building systems, and are not to be construed as exact for final demolition requirements. Contractor is responsible for all work described in this Section, which includes the complete demolition and appropriate disposal of all structures designated for demolition unless otherwise noted on the Drawings or identified by the Departmental Representative.
- .4 The information presented in the Appendices indicates types and estimated quantities of Hazardous Waste Materials that have been previously identified, and must be removed and disposed of in accordance with these Specifications. Should other potentially Hazardous Waste Material, other than that already identified, be encountered in the course of demolition work, stop work immediately, and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.
- .5 Contractor is advised that site buildings to be demolished have been in a cold-soaked condition, and as a result, there may be paint flaking/chipping. Paint flakes/chips and well adhered paint are to be removed as described in Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
- A listing of the major building components of the structures is presented in Appendix A. Painted surfaces of the structures have been sampled and analyzed for PCBs and lead. Remove and dispose of materials with lead-based paint in accordance with Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
 - .1 Not all painted surfaces of structures and infrastructures to be demolished have been sampled and tested for lead-containing paint, PCB-containing paint or asbestos. Further testing by the Departmental Representative at the beginning of the first construction season may identify further asbestos or lead-containing paint.

1.10 PROTECTION

- .1 Environmental Protection
 - .1 Ensure Work is done in accordance with Section 01 35 43 Environmental Procedures.
 - .1 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Fires and burning of waste or materials (other than unpainted wood) is not permitted on site.

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- .3 Do not bury camp generated materials unless directed by the Departmental Representative to dispose of in the on-site engineered containment areas at either Camlaren (i.e. Tailings and Soil Containment Area) or Kidney Pond (Waste Rock and Soil Containment Area).
- .4 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses.
- .5 Ensure proper disposal procedures are maintained throughout project.
- .2 Do not pump water containing suspended materials into watercourses or onto adjacent land.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction, The Guideline for Industrial Waste Discharges in the Northwest Territories (GNWT, 2004) and as directed by Departmental Representative.
- .4 Prevent damage and minimize stripping of natural terrain, features and vegetation.
- .5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work, if necessary.
- .6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Provide dust control for all existing and temporary roads.
- .7 No mechanical equipment shall be used to remove structures from the water. Structures in waterbodies at depths greater than 0.5 m and/or greater than 10 m from the shoreline shall not be removed.

.2 Site Health and Safety

- .1 Take precautions to support structures as necessary prior to personnel entering and, if safety of building demolished or adjacent structures or services appear to be endangered, cease operations and notify the Departmental Representative.
- .2 Provide safe passage for persons around area of demolition.
- .3 Do not proceed with demolition work when weather conditions constitute a hazard to the workers and site. Prevailing weather conditions and weather forecasts are to be considered.
- .4 All personnel engaged in demolition activities are to wear and use protective clothing and equipment required for such work.
- When working with lead-painted material, asbestos, and other hazardous materials, workers are to wear protective clothing and equipment acceptable to Labour Canada or the Territorial department responsible for labour as suitable for exposure in the work area and as detailed in Section 02 81 01 Hazardous Materials. Follow NIOSH guidelines in providing protection for on-site personnel including contract employees, subcontractors, Departmental Representative, Departmental Representative's staff, and other authorized personnel.

1.11 FIRES

- .1 Comply with all regulatory requirements and obtain a Burn Permit, if required.
- .2 Burning of any painted and/or chemically treated materials is prohibited unless authorized in writing by Departmental Representative.
- .3 Where fires or burning is allowed, prevent staining or smoke damage to structures, materials or vegetation which are to be preserved. Restore, clean and return to new condition stained or damaged materials, structures, or vegetation.

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- .4 Provide supervision, attendance and fire protection measured in accordance with Section 01 35 32 Site Specific Health and Safety Plan for Contaminated Sites.
- .5 No in-situ / standing structure burning is permitted due to the forest fire risk.

1.12 SCHEDULING

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
 - .1 In event of unforeseen delay notify Departmental Representative in writing.

1.13 QUALIFICATIONS

- .1 Contractor and Contractor's workers to be thoroughly familiar with and knowledgeable about existing site conditions, scope of work, and requirements of the Specification.
- Only Contractor's workers able to provide a history of satisfactory experience in the area of hazardous materials management and who can satisfy the Territorial and Federal requirements will be permitted to supervise and conduct the work of this Section.
- .3 All activities involving the handling of hazardous materials are to be directly supervised by Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .4 Follow guideline such as those established in Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA Contractors Training Council (1992).
- .5 Contractor's personnel, who have been trained as described in this Section, are to instruct and direct all workers with respect to the waste management procedures, labour and safety practices to be followed in carrying out the work.
- .6 Provide all workers with protection appropriate to the potential type and level of exposure. Establish specific safety protocols prior to commencing clean-up activities.
- .7 Provide suitable personal protective clothing and equipment as required during the course of the work. Supply sufficient quantities and various sizes of protection equipment to fit all site personnel including the Departmental Representative, Departmental Representative's staff, and site visitors.
- .8 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) documentation and recording requirements.

1.14 MEASUREMENT FOR PAYMENT

- .1 Construction of the Temporary Storage Area(s) will not be included for payment under this section, but is to be provided as indicated in Section 01 52 00 Construction Facilities.
- .2 The supply of Hazardous Waste Containers for containerization of hazardous waste derived from Structure Demolition will not be included for payment under this section, but is to be provided as indicated in Section 02 81 01 Hazardous Materials.

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Transport and disposal of containerized hazardous material deemed to require off-site disposal to the Contractors Designated Hazardous Waste Disposal Facilities will not be included for payment under

.4 The following work items will be incidental to the work described in this Section, and will not be measured separately:

this section, but is to be provided as indicated in Section 02 81 01 – Hazardous Materials.

- .1 Collection and sorting of all debris, as required.
- .2 Cutting, crushing and placement of debris material in the WRSCA or TSCA (site dependent) for disposal as specified in Section 02 41 16 Structure Demolition and 02 41 23 Debris and Miscellaneous Removal.
- .3 Supply and placement of borrow material, as required by Departmental Representative, to backfill areas excavated to facilitate demolition requirements.
- .4 General site grading of areas disturbed by demolition operations as specified in Section 31 22 13 Grading and Earthworks Construction.
- Labour, materials, and equipment required to remove existing buried or partially buried materials, including non-concrete building foundations/posts.
- .6 Investigative work at the Potential Hollow Area.
- .7 Labour, materials, and equipment required to remove burned/partially burned structural materials.
- .5 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Char.

PART 2 - PRODUCTS

.3

2.1 MATERIALS

- .1 Polyethylene sheeting:
 - .1 6 mil (0.15 mm) minimum thickness for materials with lead-based paint.
- .2 Hazardous Waste Material Containers: Containers for storage and transport of hazardous demolition waste to be as described in Section 02 81 01 Hazardous Materials.
- .3 Appropriate personal protective equipment for asbestos and leachable-lead paint abatement, in accordance with Sections 02 82 00.01 - Asbestos Abatement - Minimum Precautions and 02 83 10 – Lead-Based Paint Abatement Minimum Precautions.
- .4 Appropriate materials and decontamination areas as described in Sections 02 82 00.01 Asbestos Abatement Minimum Precautions and 02 83 10 Lead-Based Paint Abatement Minimum Precautions.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL PROTECTION

.1 Complete work in accordance with Section 01 35 43 – Environmental Procedures and all other applicable standards and licenses.

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SAFETY AND PERSONNEL PROTECTION

- .1 Unless otherwise specified, carry out demolition work in accordance with Section 01 11 00 Summary of Work and Section 01 35 32 Site Specific Health and Safety for Contaminated Sites.
- .2 Some areas designated for demolition under this contract involve materials which contain lead-based paints, as well as other contaminants which are considered hazardous to human health.
- During the removal of materials with lead-based paint, follow the Personnel Protection Requirements specified for the abatement/removal of these paints in Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
- During the removal of ACMs, follow the Personnel Protection Requirements and decontamination requirements specified for the abatement/removal of asbestos in Sections 02 82 00.01 Asbestos Abatement Minimum Precautions.
- When working with materials with lead-based paint, ACMs, and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees, subcontractors, Departmental Representatives, Departmental Representative's staff, and other authorized personnel. Refer to Sections 02 82 00.01 Asbestos Abatement Minimum Precautions and 02 83 10 Lead-Based Paint Abatement Minimum Precautions.

3.3 PREPARATION

3.2

- .1 Inspect and verify with Departmental Representative items designated for demolition
- .2 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures as needed to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent areas and waterways, according to: requirements of AHJ.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .3 Remove rodents and vermin as required by Departmental Representative.
- .4 At Camlaren, mark off the Potential Hollow Area as identified on Drawing C-CAM-03.

3.4 REMOVAL OF HAZARDOUS MATERIALS

- .1 Remove contaminated, hazardous or dangerous materials from the structures.
- .2 Remove materials with lead-based materials from structures in accordance with Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions:
 - .1 Follow appropriate work procedures in accordance with Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
 - .2 Abate lead-based paint at the sites using trained lead abatement workers.

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.3 Materials with lead-based paint, or lead paint chips will be double bagged in approved 0.15 mm polyethylene disposal bags and placed in leak-proof drums. The drums must have a warning label stating that they contain lead waste. The exterior of the drums must be cleaned with a damp cloth or HEPA vacuum prior to removing from Work Area.

- .4 Conduct the required inspections to ensure lead-based paint removal, prior to any demolition being carried out.
- .5 Dispose of the materials at the Contractor's Designated Hazardous Waste Facility.
- Following abatement, dispose of un-painted substrate materials in the Waste Rock and Soil Containment Area (WRSCA) and Tailings and Soil Containment Area (TSCA) (site dependent) in accordance with Section 02 41 23 Debris and Miscellaneous Removals.
- .3 Remove ACMs from structures, store and protect.
 - .1 Follow appropriate work procedures in accordance with Sections 02 82 00.01 (Asbestos Abatement Minimum Precautions).
 - .2 Abate ACMs at the sites using trained asbestos abatement workers, according to the Government of the Northwest Territories Guideline for the Management of Waste Asbestos, 2004.
 - .3 Asbestos waste will be double bagged in approved 6 mil yellow asbestos disposal bags and sealed with duct tape. The bags must have a warning label stating that it contains asbestos waste. The exterior of the bags must be cleaned with a damp cloth or HEPA vacuum prior to removing from work area.
 - .4 Conduct the required inspections and air monitoring during and post abatement. Ensure asbestos removal, prior to any demolition being carried out.
 - .5 Dispose of the materials at the Contractor's Designated Hazardous Waste Facility.

3.5 DEMOLITION

- .1 Blasting operations are not permitted during demolition.
- .2 Remove and collect all materials from structures containing material with lead-based paint and/or ACMs, as described above in section 3.4.2.
- .3 Where cutting is required, collect all cuttings and sawdust associated with demolition of structures in accordance with Section 02 81 01 Hazardous Materials. Conduct cutting operations such that toxins from paint or other building materials are not released to the atmosphere.
- .4 Remove existing equipment, services, and finishes from building. Remove any visible electrical cables and wiring.
- .5 Remove the unpainted, non-hazardous wood materials, store and burn on-site.
 - .1 Comply with all regulatory requirements, burning procedures and obtain Burn Permit, if required.
 - .2 Provide supervision, attendance and fire protection measures in accordance with Section 01 35 32 Site Specific Health and Safety Plan.
 - .3 Conduct a controlled burn under appropriate emissions controls, ideally where there is little vegetation, and at a time of year when moisture conditions are higher and there is a low likelihood of causing a forest fire.
 - .4 Provide an ash collection system capable of containing ash until it is sampled. A water-tight container from materials on- site is acceptable. Provide means to protect the ash from wind and water until it is sampled.

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- .5 Fire suppression equipment will be readily available and air monitoring will be conducted in accordance to the applicable guidelines.
- A leachate extraction test is to be carried out by Departmental Representative on the solid residual material resulting from the burning process. The leachate toxicity of the material will be determined in accordance with CEPA regulations. Residual materials found to be non-hazardous must be packaged and transported to the WRSCA or TSCA (site dependent). Package leachate toxic material in accordance with CEPA regulations, as required, and dispose of as described in this Section and Section 02 81 01 Hazardous Materials.
- .7 Conduct the burn in accordance with the applicable regulations.
- .6 Remove the non-hazardous materials (as described in Appendix A and in Drawings):
 - .1 Conduct the separation of non-hazardous materials from buildings and removal from debris areas. If removal of non-hazardous materials may cause the disturbance of hazardous materials, appropriate PPE must be implemented.
 - .2 Clean drums, tanks and fuel piping and remove residual fluids/fuels according to Section 02 81 01 Hazardous Materials.
 - .3 Cut up the tanks; crush the metal materials and drums.
 - .4 Dispose of materials following compaction in the non-hazardous landfills at either the WRSCA or TSCA.
- .7 Purge harmful and flammable vapours from fuel storage tank in accordance with applicable standards prior to cutting tanks. Upon request, submit the lower explosive limit (LEL) results of volatile organic compound (VOC) testing to Departmental Representative.
- .8 Cut structural steel in accordance with applicable standards. Remove lower structural framing and other heavy or large objects in a safe manner.
- .9 Compact non-hazardous materials to minimize space required during transport and/or disposal at the WRSCA or TSCA (site dependent).
- .10 Leave concrete in place on the sites, as directed by the Departmental Representative and where it does not pose a physical hazard.
 - .1 Demolish the concrete Hoist Pad and Mill Pad at Camlaren and potentially the Mill Pad at Goodrock (depending on impacted material excavation extent) as necessary during impacted soil excavation. Concrete pads to be broken down to a maximum length and width of 600 mm prior to placement in the TSCA.
- .11 Structures are to be demolished to concrete / rock foundations. Structure foundations may be left in place provided they do not extend above the ground surface and do not pose a physical hazard.
- .12 At the end of each day's work, leave Work in safe and stable condition minimizing or controlling identified hazards.
- .13 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .14 There is no special requirement for disposal of mould impacted building material (if encountered), as such, they can be disposed of in the WRSCA or TSCA (site dependent).
- .15 Remove the liquid organic content, store and protect prior to transport to the Contractor's Designated Hazardous Waste Facility.

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- .1 Secure all organic content in drums, ASTs, tanks, and fuel lines. This can include, but is not limited to: tightening of all valves, unions, junctions, installation of secondary containment, or transferring of fluids into empty drums.
- .16 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.
- .17 At end of each day's work, leave work in safe condition so that no part is in danger of falling.
- Demolish, containerize and transport to the on-site Temporary Storage Area all non-hazardous building components, building contents, and tanks identified for demolition.
- .19 Apply appropriate labelling and placards to the containers to be shipped off site in the Temporary Storage Area as required by TDGA.

3.6 POTENTIAL HOLLOW AREA

- .1 Investigate potential hollow area by means of excavating area in accordance with methods discussed in Section 31 23 33.01 Excavating, Trenching and Backfilling.
- .2 If area is excavated, backfill in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.

3.7 STOCKPILING

- .1 Establish a Temporary Storage Area(s) for the storage of containerized hazardous materials designated for off-site disposal generated during demolition operations on site as described in Section 02 81 01 Hazardous Materials.
 - .1 Label stockpiles, indicating material type and quantity.
 - .2 Stockpile materials designated for off-site disposal in location which facilitates removal from site, and which does not impede hauling procedures.
- .2 Stockpile non-hazardous materials for on-site disposal in a neat and orderly fashion in a Temporary Storage Area and as directed by Departmental Representative for compaction and disposal in the on-site containment areas (i.e. WRSCA or TSCA, site dependent). Stockpile materials in accordance with applicable fire and safety regulations. Separate from general waste stream each of following materials:
 - .1 Wood waste
 - .2 Metal
 - .3 Other non-hazardous waste
- .3 Supply separate, clearly marked areas for categories of waste material, crush as appropriate.
- .4 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

3.8 REMOVAL FROM SITES

- .1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.
- .2 Remove stockpiles of non-hazardous materials once the WRSCA and TSCA are completed.

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.3 Remove stockpiles of hazardous waste materials for off-site disposal option once packaging and collection of the materials is complete.

3.9 SALVAGE OF DEMOLITION MATERIALS

- .1 The facilities and structures to be demolished may have salvage value. Contractor will continue to be responsible for the disposal of materials for reuse/recycling.
 - .1 The Departmental Representative shall be notified of potential salvageable or historical items before processing. If the Departmental Representative determines the salvageable items have potential recycling value, then the profits of recycling shall be shared between the Crown and the Contractor.
- .2 Fuel storage tanks designated for disposal cannot be reused or salvaged, except if accepted by the Departmental Representative for on-site temporary storage of wastewater or effluent.
- .3 Sign a Waiver Form provided by the Departmental Representative for any salvaged materials.

3.10 SITE GRADING AND RESTORATION

- .1 Upon completion of demolition work, remove debris and leave work sites clean to a condition satisfactory to Departmental Representative.
- .2 Grade building sites and restore all areas affected by demolition work in accordance with Section 31 22 13 Grading and Earthworks Construction.
- .3 Reshape or backfill in accordance with Section 31 22 13 Grading and Earthworks Construction, areas excavated to facilitate demolition requirements.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the collection, dismantling, sorting, handling, transport, compaction, incineration and/or disposal of scattered debris throughout and adjacent to each of the Sites. An inventory of all non-hazardous and hazardous materials is provided as Appendix A to the specifications.
- .2 The limits of known scattered debris are provided in the Drawings. A summary of the debris areas, and the non-hazardous materials contained within them, is provided in the table below (hazardous materials are covered in Section 02 81 01 Hazardous Materials).

Site	Debris Areas	Drawing
Burnt Island	Knutsen Camp: Near the cabins – tin can dumps, wood and metal debris, building footprint Around the dock – wood debris, tires Near the grave site – burn pits Trail – drill cores	C-BUR-02
	Shaft Area: Wood and metal debris, drill cores, partially intact tent frame (on the North trail).	C-BUR-03
	Old Saw Mill: Tin can dump, wood and metal debris	C-BUR-05
	Old Mill Area: Burn pit – potential wood and metal debris Mill building – wood and metal debris, drum (1) Former dock remnants	C-BUR-06
Camlaren	Mine Area North: Wood and metal debris, tin cans, empty drums, burn pits	C-CAM-02
	Mine Area South: Wood and metal debris, tin cans, empty drums, burn pits, cable, fuel tank, former dock remnants	C-CAM-03
	North Cabin Area: Wood and metal debris, tin cans, empty drums, burn pits, crucibles, drill core, building footprints	C-CAM-04
	Zenith Island: Wood and metal debris, burn pits	C-CAM-05
Goodrock	Camp Area: Tin cans, drill core, scrap metal, wood debris	C-GOO-02
	Mill Area: Tin cans, drill core, wood debris, pipes, crucibles, metal waste, former dock remnants (timbers)	C-GOO-03

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Site	Debris Areas	Drawing
Kidney Pond	<u>1983 Camp:</u>	C-KID-02
	Wood and metal debris (including former latrine and wood platform),	
	crucibles, burn pits Exploration Camp:	C-KID-03
	Wood and metal debris, tin cans, building footprints	O KID 00
	1939 Camp:	C-KID-04
	Wood and metal debris, tin cans, drill core, core boxes, building	
	footprints	
	Portal Area:	C-KID-06
	Wood and metal debris, tin cans, tires, crucibles, burn pits	0.1/10.07
	Kidney Pond Area: Wood and metal debris, burn pits, former dock remnants, building	C-KID-07
	footprint	
Murray Lake	1938/2008 Camp:	C-MUR-02
	Wood and metal debris, former structure remnants	
	Trench Areas:	C-MUR-03
	Wood and metal debris	
Storm	Shaft Area:	C-STO-02
Property	Wood and metal debris, drill core, metal spool	0.070.00
	Camp Area: Wood and metal debris, tin cans, drill core, drums	C-STO-03
Treacy	Mill Area:	C-TRE-02
ricacy	Wood and metal debris, miscellaneous garbage	0 11KE 02
	Camp Area:	C-TRE-03
	Wood and metal debris, tin cans, empty drums, stove, structure	
	remains	
Try Me	Main Camp:	C-TRY-02
	Wood and metal debris, drill core, drums, timbers (former dock), rail	
	track Western Comp	C-TRY-03
	Western Camp: Wood and metal debris, empty drums, tin cans	U-1K1-03
West Bay	South Area:	C-WES-02
	Wood and metal debris, tin cans, empty drums, rail track	0 1120 02

No mechanical equipment shall be used to remove wood/debris from the water. Wood/debris in .3 waterbodies at depths greater than 0.5 m and/or greater than 10 m from the shoreline shall not be removed.

1.2 **RELATED SECTIONS**

- .1 Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- Section 01 35 32 Site Specific Health and Safety Plan. .4
- Section 01 35 43 Environmental Procedures. .5
- .6 Section 02 41 16 – Structure Demolition.
- .7 Section 02 61 00.01 - Soil Remediation.

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- 8. Section 02 81 01 - Hazardous Materials
- .9 Section 02 82 00.01 - Asbestos Abatement Minimum Precautions.
- .10 Section 02 83 10 – Lead-Based Paint Abatement Minimum Precautions.

1.3 **REFERENCES**

- Canada Labour Code Part II-Occupational Health and Safety (R.S. 1985, c.L-2, amended 2014). .1
- .2 National Fire Code of Canada, 2010.
- .3 Canada Occupational Health and Safety Regulations (SOR/86-304), including:
 - Part X Hazardous Substances.
- Department of Justice Canada (Jus). .4
 - Canadian Environmental Protection Act (CEPA), 1999 (S.C. 1999, c.33)
 - Export and Import of Hazardous Waste and Hazardous Recyclable Material .1 Regulations (SOR/2005-149).
 - .2 Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301).
 - .3 Marine Spark-Ignition Engine, Vessel and off-Road Recreational Vehicle Regulations (SOR/2011-10).
 - .4 Off-Road Compression-Ignition Engine Emission Regulations (SOR/2005-32).
 - Off-Road Small Spark-Ignition Engine Emission Regulations (SOR/2003-355). .5
 - On-Road Vehicle and Engine Emission Regulations (SOR/2003-2). .6
 - Storage Tank Systems for Petroleum Products and Allied Petroleum Products .7 Regulations (SOR/2008-197).
 - Ozone-Depleting Substances Regulations (SOR/99-7). 8.
- Transportation of Dangerous Goods Act (TDGA), 1992 (SC 1992, c.34) .5
 - Transportation of Dangerous Goods Regulations (SOR/2001-286).
- .6 Hazardous Products Act (R.S.C., 1985, c. H-3)
 - Controlled Products Regulations (SOR/88-66). .1
 - .2 Workplace Hazardous Materials Information System.
- .7 Canadian Council of Ministers of the Environment (CCME).
 - CCME 1326-2008, Environmental Code of Practice for Aboveground and Underground .1 Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
- Canadian Standards Association 8.
 - CSA Standard Z94.4-93 (R1997) Selection, Use and Care of Respirators.
- .9 Canadian Standards Association International.
 - CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .10 Underwriters' Laboratories of Canada (ULC).
 - ULC/ORD-C107.19-1992, Secondary Containment of Underground Piping.

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.2 ULC-S660-08, Standard for Non-metallic Underground Piping for Flammable and Combustible Liquids.

.11 Health Canada:

- Hazardous Products Act Workplace Hazardous Materials Information System (WHMIS) .1 Requirements.
- .12 National Institute for Occupational Health and Safety (NIOSH)
 - Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115
- .13 Department of Environment and Natural Resources, Government of the Northwest Territories
 - Guideline for the General Management of Hazardous Waste in the Northwest Territories .1 (1998).
 - .2 Guideline for Industrial Waste Discharges in the Northwest Territories (2004).
 - .3 Guideline for Ozone Depleting Substances and Halocarbon Alternatives (2007).
 - .4 Guideline for the Management of Waste Antifreeze (1998).
 - .5 Guideline for the Management of Waste Asbestos (2004).
 - .6 Guideline for the Management of Waste Batteries (1998).
 - .7 Guideline for the Management of Waste Lead and Lead Paint (2004).
 - 8. Guideline for the Management of Waste Paint (1998).
 - .9 Guideline for the Management of Waste Solvents (1998).
 - .10 Used Oil and Waste Fuel Management Regulations (2004).
 - .11 Spill Contingency Planning and Reporting Regulations (1998).
 - .12 Environmental Guideline for Contaminated Site Remediation (2003).
- .14 Environment Canada Technical Document for Batch Waste Incineration (2010).
- Safety Act NWT. R.S.N.W.T. 1988, c.S-1. .15
- .16 Labour Standards Act. R.S.N.W.T 1988, c.L-1.
- .17 United States Department of Labor Occupational Health and Safety Administration, Occupational Health and Safety Standards, Toxic and Hazardous Substances, Hazard Communication (Part 1910, 1200).
- .18 Environment Canada. Identification of Fluorescent Lamp Ballasts Containing PCBs (1991).
- .19 Hazardous Waste Training Manual: Canadian LIUNA – Contractors Training Council (1992).

1.4 **DEFINITIONS**

- .1 Known debris: Scattered or accumulated visible debris on existing ground surface, including open storage areas, partially buried debris within 0.5 metres of the existing ground, or debris located within the upper 0.5 m of water bodies and consisting of hazardous and/or non- hazardous material, and that:
 - .1 has been identified on the Drawings as debris to be removed; or
 - .2 is located approx. within 50 metres of any access trail or water course on the site.

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- .3 is located within a waterbody, within 10 m of the shoreline.
- .2 Unknown debris: Scattered debris on the existing ground surface, partially buried debris and/or debris that may be exposed during site remediation consisting of hazardous and/or non-hazardous material other than the Known Debris described above.
- .3 Hazardous materials: Items or debris no longer used for their original purpose; now hazardous and intended for recycling, treatment or disposal. Also material that is designated as "hazardous" under Territorial or Federal Legislation; or as a "dangerous good" under the TDGA. This may include dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly including but not limited to lead, PCBs, asbestos, and batteries.
- .4 Untreated wooden debris: Wooden debris that is not painted or chemically treated in any way and is suitable for on-site burning/incineration. Unpainted pressboard or plywood would be considered untreated wooden debris.
- Non-hazardous materials: Materials that are not designated as hazardous under Territorial or Federal Legislation and can be disposed of in the Waste Rock and Soil Containment Area (WRSCA) or Tailings and Soil Containment Area (TSCA) (site dependent), and which do not meet the definition of hazardous materials as defined in Section 02 81 01 Hazardous Materials.
- .6 Physical hazard: Poses a slip, trip or fall risk to personnel and wildlife, risk to damage any vehicle (for example ATV, snowmobile, etc.).
- .7 Hazardous Materials Specialist: Contractor representative responsible for supervising all hazardous waste activities as well as coordinating required submittal and reporting requirements.

1.5 MEASUREMENT FOR PAYMENT

- .1 The supply of Hazardous Waste Containers for containerization of hazardous waste for off-site disposal derived from Debris Removal will not be included for payment under this Section, but is to be provided as indicated in Section 02 81 01 Hazardous Materials.
- .2 The off-site transport and disposal of all hazardous materials to the Contractor's Designated Hazardous Waste Disposal Facility from Debris and Miscellaneous Removals will not be included for payment under this Section, but is to be provided as indicated in Section 02 81 01 Hazardous Materials.
- .3 Collection, transport and off-site disposal of liquids from within vehicles or other machinery will be included as part of Section 02 81 01 Hazardous Materials.
- .4 Placement and regarding of granular fill material in areas where Debris and Miscellaneous Removals have occurred will not be included for payment under this Section, but will be paid as indicated in Section 31 22 13 Grading and Earthworks Construction.
- .5 The following work items will be incidental to the work described in this Section, and will not be measured separately:
 - .1 Collection and sorting, as required of all debris.

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- .2 Cutting, crushing and placement of non-hazardous debris into the WRSCA or TSCA (site dependent) for disposal as specified in Section 31 22 13 Grading and Earthworks Construction.
- .3 Reshaping or regrading areas associated with the removal of debris as specified in Section 31 22 13 Grading and Earthworks Construction.
- .4 Labour, materials and equipment required to remove existing buried or partially buried materials, or visible foreign materials along the shoreline or in the waterbodies adjacent to the sites, as shown on the Drawings.
- .6 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Hazardous Waste Containers for hazardous materials to be in accordance with Section 02 81 01 Hazardous Materials.
- .2 Appropriate personal protective equipment for hazardous materials in accordance with other related Sections.
- .3 Appropriate materials and decontamination areas as described in Sections 02 82 00.01 Asbestos Abatement Minimum Precautions.

PART 3 - EXECUTION

3.1 PROTECTION PROCEDURES

- .1 Environmental protection measures, including containment of ash from burning of untreated wood, are to be in accordance with the requirements specified in Section 01 35 43 Environmental Procedures.
- .2 Remove oil, antifreeze, fuel and brake fluid from vehicles and equipment to be shipped and disposed of off-site in accordance with the applicable regulations and guidelines.
- .3 Protect historic and archaeological features as specified in Section 01 35 43 Environmental Procedures.
- .4 Conduct removal of debris known to contain hazardous materials in accordance with Sections 02 82 00.01 Asbestos Abatement Minimum Precautions and 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
- .5 Conduct drum processing and disposal activities in accordance with Section 02 81 01 Hazardous Materials.

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3.2 REMOVAL AND SORTING

.1 Examine the site in order to assess the material type and nature of the debris.

.2 Non-Hazardous Debris

- .1 Proceed with collection of debris if, based on the visual assessment, the debris is determined to be non-hazardous.
- .2 Contractor's Hazardous Materials Specialist to continually monitor the operation to identify potentially hazardous materials.
- .3 Immediately suspend the operation if suspected hazardous material or debris is encountered and report to the Departmental Representative.
- .4 Collect and sort by hand debris requiring removal located in close proximity to archaeological features. Confirm debris removal requirements with Departmental Representative prior to commencing debris removal work in close proximity to archaeological features.
- .5 Store suspicious material in a secured area in secured containers and, if the nature of the material or debris can't be confirmed, notify Departmental Representative about the findings. Testing for classification of hazardous products will be carried out and paid for by Departmental Representative.
- .6 Completely remove partially buried debris unless otherwise indicated by Departmental Representative.
- .7 Clean all empty drums and drums with aqueous liquid waste (if any), in accordance with the requirements of Section 02 81 01 Hazardous Materials. Crush the clean, empty drums in a manner to reduce the total original drum volume by a minimum of 75 percent prior to disposal at the WRSCA and TSCA (site dependent).
- .8 Advise Departmental Representative of any stained soils encountered during debris removal operations. If authorized by Departmental Representative, excavate stained and contaminated soil areas identified during debris removal operations, in accordance with the requirements of Section 02 55 13 Contaminated Soil. Testing for classification and confirmatory testing will be carried out and paid for by Departmental Representative.
- .9 Vent compressed gas cylinders until empty and dispose of in either the WRSCA or TSCA (site dependent).
- .10 Remove concrete pads in place on the site, as defined in Section 02 41 16 Structure Demolition. Leave concrete pads in place if directed by the Department Representative, and where they do not pose a physical hazard.
- .11 Dispose of non-hazardous debris at either the WRSCA or TSCA (site dependent) as per Section 31 22 13 Grading and Earthworks Construction.

.3 Hazardous Debris – Lead-Based Paint

- .1 Collect, handle, and dispose of materials with lead-based paint in accordance with Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions
- .4 Hazardous Debris Batteries.
 - .1 Collect and containerize all batteries. Transport and dispose of batteries off-site in accordance with Section 02 81 01 Hazardous Materials
- .5 Hazardous Debris Liquid contents (if any) of barrels, drums, tanks, vehicles
 - .1 Collect, handle, and dispose of liquid waste in accordance with Section 02 81 01 Hazardous Materials.

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3.3 ON-SITE BURNING OF UNTREATED WOODEN DEBRIS

- .1 Remove the unpainted, non-hazardous wood materials, store and burn on-site.
 - .1 Comply with all regulatory requirements, burning procedures and obtain Burn Permit, if required.
 - .2 Provide supervision, attendance and fire protection measures in accordance with Section 01 35 32 Site Specific Health and Safety Plan.
 - .3 Conduct a controlled burn under appropriate emissions controls, ideally where there is little vegetation, and at a time of year when moisture conditions are higher and there is a low likelihood of causing a forest fire.
 - .4 Provide an ash collection system capable of containing ash until it is sampled. A water-tight container from materials on- site is acceptable. Provide means to protect the ash from wind and water until it is sampled.
 - .5 Fire suppression equipment will be readily available and air monitoring will be conducted in accordance to the applicable guidelines.
 - A leachate extraction test is to be carried out by Departmental Representative on the solid residual material resulting from the burning process. The leachate toxicity of the material will be determined in accordance with CEPA regulations. Residual materials found to be non-hazardous must be packaged and transported either the WRSCA or TSCA (site dependent). Package leachate toxic material in accordance with CEPA regulations, as required, and dispose of as described in this Section and Section 02 81 01 Hazardous Materials.
 - .7 Conduct the burn in accordance with the applicable regulations.

3.4 OFF-SITE DISPOSAL FACILITIES

.1 Provide off-site transport of containerized hazardous debris to Contractor's Designated Hazardous Waste Disposal Facility as per the requirements of Section 02 81 01 - Hazardous Materials.

END OF SECTION

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INSTRUMENTATION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the supply and installation of:
 - .1 Vibrating Wire Piezometers at the Tailings and Soil Containment Area (TSCA) in three locations
 - .2 Monitoring wells at the Waste Rock and Soil Containment Area (WRSCA) in three locations and at the TSCA in three locations.
 - .3 Monitoring wells at the Landfarm in three locations.
 - .4 Monitoring wells at the Kidney Pond Portal Seep Water Management System (PSWMS) in three locations, and weir flow data logger at one location.
 - .5 Ground thermistors at the TSCA in two locations, PSWMS in two locations and at the WRSCA in two locations.
 - .6 Survey control monuments as required
- .2 All instrumentation is to be installed under the supervision of the Departmental Representative.
- .3 Complete the installation of the survey control monuments prior to the start of construction activities.
- .4 Complete the installation of the monitoring wells at the Landfills and Landfarm prior to placement of any waste/soil in the facilities.

1.2 MEASUREMENT FOR PAYMENT

- .1 Include all costs as a cost per metre of well installed for the drilling of boreholes (for thermistors, groundwater monitoring wells, vibrating piezometers and permanent survey control), in Item 02 51 00-1 Borehole Drilling in the Basis of Payment Schedule. Cost to include but is not limited to:
 - .1 Transport to site equipment required to complete the work.
 - .2 All drilling supplies and temporary borehole casings.
- .2 Include all costs for the supply and installation of Vibrating Wire Piezometers in Item 02 51 00-2 Vibrating Wire Piezometer in the Basis of Payment Schedule. Cost to include but is not limited to:
 - .1 Vibrating wires and software required for functional vibrating wire piezometers.
- .3 Include all costs for the supply and installation of monitoring wells in Item 02 51 00-3 Monitoring Well Installation in the Basis of Payment Schedule. Cost to include, but is not limited to:
 - .1 Well supplies, bentonite, permanent well casings, barricades and all other supplies required for functional water wells.
- .4 Include all costs for the supply and installation of thermistors, including all accessories, in Item 02 51 00-4 Thermistor Installation in the Basis of Payment Schedule. Cost to include, but is not limited to:
 - .1 Cables and software required for functional thermistor.
- .5 Include all costs for the supply and installation of permanent survey control monuments, including all accessories, in Item 02 51 00-5 Survey Control Installation in the Basis of Payment Schedule. Include all costs as costs per number of complete installation as specified herein.

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INSTRUMENTATION Page 2 or

- Include all costs for the supply and installation of data loggers for the thermistors, including all accessories, in Item 02 51 00-6 Data Logger Installation in the Basis of Payment Schedule. Include all costs as costs per number of complete installation as specified herein.
- .7 Include all costs for the supply and installation of the weir system, including the water and air pressure loggers and flow sensor, associated data loggers and all accessories, in Item 02 51 00-7 Weir System Installation in the Basis of Payment Schedule. Include all costs as costs per number of complete installation as specified herein.
- .8 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 DRILLING EQUIPMENT

- .1 Equipment capable of accessing required locations for installation.
- .2 Equipment capable of drilling 125 mm diameter holes in various subsurface conditions, including soil, waste rock and bedrock.
- .3 Equipment capable of penetrating into frozen and unfrozen soils, including through coarse fragments, ice and saturated soils.

2.2 MONITORING WELLS

- .1 50 mm, nominal diameter, Schedule 10 #304 stainless steel pipe with watertight end caps (top and bottom).
- .2 50 mm (nominal diameter), Schedule 10 #304 stainless steel screen, 1.0 m maximum section length with flush threads both ends. Screen slot size to be 0.5 mm.
- .3 All pipe and screen to remain in protection wrapping until installation.
- .4 Filter sock, complete with stainless steel band clamps as cover over monitoring well screen.

2.3 THERMISTOR CABLE WELL

.1 50 mm (nominal diameter), Schedule 80 PVC as required to make the complete installation.

2.4 CASINGS FOR VIBRATING WIRE

- .1 50 mm, nominal diameter, Schedule 10 PVC pipe with watertight end caps (top and bottom).
- .2 50 mm (nominal diameter), Schedule 10 PVC screen, 1.0 m maximum section length with flush threads both ends. Screen slot size to be 0.5 mm, two (2) sections.
- .3 All pipe and screen to remain in protection wrapping until installation.

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.4 Filter sock, complete as cover over screen.

2.5 GROUND TEMPERATURE (THERMISTOR) CABLES

- .1 Thermistor Cables shall operate in a minimum temperature range of -40 to 35 degrees Celsius.
- .2 Connectors: Cable to be supplied shall be compatible with data logger.
- .3 Identification Tag: to be permanently installed, indicating the site name and the ground temperature cable serial number.
- .4 Cable lengths are shown on Drawings.
- .5 Thermistor Calibration: Provide copies of calibration data to the Departmental Representative prior to shipping to site, including information on calibration methodology.

2.6 DATA LOGGERS

- .1 Data Storage Unit: Provide one data logger for each thermistor cable installation, and one for the Kidney Pond PSWMS.
- .2 The data loggers shall be compatible with all data logging instruments required.
- .3 The data logger shall have a minimum battery and memory capacity for 2 years
- .4 Measurement frequency needs to be adjustable, with the ability for multiple daily data recording (e.g. every 1, 6, 8 or 12 hours).
- .5 The data logger shall be waterproof and rainproof.
- .6 Provide two separate sets of interface cables including USB capable connectors.
- .7 The data logger shall have a connector compatible with the thermistor cable described in Clause 2.6 of this Section, and with pressure loggers.
- .8 Program data loggers to read cables at frequency agreed to by the Departmental Representative. Provide Windows Dataview plus software on site to monitor, retrieve data and reset the data logger. Software to be registered to the Departmental Representative and specific project site. Provide specific project format files for the data loggers.
- .9 Provide to the Departmental Representative, three copies of the Operations and Maintenance Manuals for the data loggers.
- .10 Each data logger should be clearly labelled with an identification number.
- .11 Each data logger shall be installed together with the same thermistor cable that was calibrated to.

2.7 MONITORING WELL AND VIBRATING WIRE PROTECTIVE CASING

- .1 150 mm diameter galvanized, Schedule 40 steel pipe, threaded as required,
- .2 Threaded, locking steel cap for monitoring wells.

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.3 Keyed pad-locks to be provided by contractor and keys for said pad-locks to be provided to the Departmental Representative and Owner.

INSTRUMENTATION

2.8 GROUND TEMPERATURE CABLE (THERMISTOR) PROTECTIVE CASING

- .1 Provide a data logger housing unit coated with electrostatic paint and with a locking cap.
- .2 Keyed pad-locks to be provided by contractor and keys for said pad-locks to be provided to the Departmental Representative and Owner.

2.9 VIBRATING WIRE PIEZOMETERS

1 Vibrating Wire Piezometers rated for low pressures 0 to 100kPa, operating temperatures -40 to 70°C. Two multilevel vibrating wires for each location.

2.10 PRESSURE LOGGERS

- .1 Water
 - .1 Automatic temperature compensation (0 to 50°C)
 - .2 Memory capacity for up to 120,000 readings at intervals from 1/8 sec to 99 sec
 - .3 0.05% full-scale accuracy, full scale pressure range from 1 atm to 20 atm
 - .4 10-year battery life
 - .5 Operating temperature -20°C to 80°C
- .2 Air
 - .1 Automatic temperature compensation (-10 to 50°C)
 - .2 Memory capacity for up to 120,000 readings, readings at intervals from 1/8 sec to 99 sec
 - .3 ±0.05 kPa accuracy
 - .4 10-year battery life.
 - .5 Operating temperature -20°C to 80°C

2.11 OPEN CHANNEL FLOW SENSOR

- .1 Doppler Area/Velocity Flow Sensor
 - .1 Externally powered via waterproof urethane data/power cable
 - .2 Maximum channel width: 3m
 - .3 Velocity range: ± 0.025 to ± 8.0 m/s
 - .4 Resolution: 1mm at 1.0 m/s
 - .5 Accuracy ±1% up to 3.0 m/s
 - .6 Minimum operating depth: 40mm
 - .7 Operating temperature: 0-60° C

2.12 THERMISTOR BACKFILL MATERIAL

- .1 Inert and free of organic material.
- .2 Sand, well sorted

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INSTRUMENTATION

2.13 FILTER SAND

- .1 Inert and free of organic material.
- .2 #20 #40 sand.

2.14 BENTONITE SEAL

.1 Bentonite product certified as polymer, granular, and organic free.

2.15 GROUT

.1 Pre-blended, cementitious, ready to use, pile and rock bolt grout, suitable for placement into substrates to -10 °C.

2.16 PAINT

.1 Fluorescent orange that is suitable for environment and substrate.

2.17 SURVEY CONTROLS

- .1 25 mm (nominal diameter), steel pipe, threaded or welded as required.
- .2 The steel pipe shall have a flange welded to base. Flange size should be not less than the hole diameter less 50 mm.
- .3 Grease to be an acceptable "food grade" product.

2.18 KIDNEY POND PORTAL WEIR PLATE AND BOX

- .1 Fixed weir plate
 - .1 Thin-plate 90° v-notch, 600 mm notch depth
 - .2 6.35 mm plate thickness, hot-dipped galvanized steel, dimensions 1,500 mm wide by 1,100 mm high in Section 05 50 00 Metal Fabrications (basic).
 - .3 60° downstream bevel at free edge, 2.03 mm offset from upstream edge
 - .4 Bolted and sealed to upstream concrete weir box wall with 100 mm overlap (removable for maintenance or replacement).

.2 Weir box

- .1 High strength reinforced concrete (35 MPa @ 28 days) weir box and drain retaining wall, with hot-dipped galvanized steel reinforcement, as specified in Section 03 10 00 Concrete Forming and Accessories, Section 03 20 00 Concrete Reinforcing and Section 03 30 00 Cast-in-Place Concrete.
- .2 Hot-dipped galvanized welded steel bar grating and locking access doors. Welded Bar Grating, Galvanized Hot Dipped, GW 175 Smooth, Welded Construction, 44mm x 4.8mm Bearing Bars, 30.2mm on Center, Regular Cross Bars 102mm on Center, 915mm Width x 6,100 mm Length (Span), as specified in Section 05 50 00 Metal Fabrications (basic).

.3 Staff / level gauge

.1 High visibility, direct read level gauge with 10.95 mm black letters / numerals on a high visibility yellow-green background.

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.4 Probe well

.2

.1 Ø50.8 mm diameter 316 stainless steel tube with Ø50.8 mm opening mounted to concrete weir box sidewall with stainless steel clamshell mount and concrete bolts (for the installation of a submerged pressure logging probe), as specified in Section 05 50 00 – Metal Fabrications (basic).

INSTRUMENTATION

Dual scale graduated in 2 mm, 1 cm, 1/100-foot, and 1/10-foot increments.

- .5 Sensor mounting brackets
 - .1 316 stainless steel brackets and bolts as required for sensor mounting.

PART 3 - EXECUTION

3.1 INSTALLATION OF MONITORING WELLS

- .1 Provide the Departmental Representative a minimum of 10 days notice prior to the drilling program to allow scheduling of inspection services. The Departmental Representative will be in attendance for the duration of the drilling program.
- .2 Layout monitoring wells at locations as indicated on Drawings and confirm the final drilling locations with the Departmental Representative prior to drilling.
- .3 Install monitoring well at locations and to the depths as indicated on the Drawings or as directed by Departmental Representative.
- .4 Use a suitable drill rig to drill 125 mm diameter holes for the monitoring wells.
- .5 Make available on site, temporary hole casing material and install as required to prevent sloughing of drill hole.
- .6 Grout the well pipe in place at the depth indicated using grout according to manufacturer's recommendations. Place grout in hole so as not to contaminate the upper portion of the hole, or the slotted section of the well pipe.
- .7 Record the depth of the top of the grout.
- .8 Backfill remainder of the hole with clean filter sand to a minimum of 150 mm above the screen portion of the well pipe. Gradually remove hole casing material (if used) during backfilling operations.
- .9 Place a granular bentonite seal around the well pipe approximately 300 to 500 mm thick on top of the sand filter. Place hydrated bentonite chips above the bentonite seal to at surface. Mound ground surface material to a height of approximately 150 mm around the perimeter of the well to promote hydration of the bentonite chips.
- .10 Measure stick up of well pipe from ground surface.
- .11 Place protective casing and lockable cap over well pipe. Paint metal casing, cap and marker posts (if required) with fluorescent orange paint.
- .12 Survey location and top of casing elevation of all monitoring wells.

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3.2 INSTALLATION OF VIBRATING WIRE PEIZOMETERS

.1 Follow similar procedure as above in 3.1 for Monitoring Wells. Install vibrating wire piezometers inside PVC casings. The sensors should be installed at the screen section of casings as illustrated on the drawings. After placement fully grout the casing.

INSTRUMENTATION

3.3 INSTALLATION OF GROUND TEMPERATURE CABLES (THERMISTORS)

- .1 Install ground temperature cables at the locations and to the depths indicated on Drawings C-CAM-14, C-KID-14 and C-KID-16 or as directed by the Departmental Representative. Final locations of the ground temperature cables are to be confirmed in the field by the Departmental Representative.
- .2 Take precautions not to damage liner materials when installing ground temperature cables.
- .3 Use a suitable excavator or drill rig to install vertical thermistors below the original ground surface. If using excavator, compact granular fill material to 95% of Maximum Dry Density in accordance with ASTM D698. Use hand equipment to ensure compaction requirements are met.
- .4 If drilling is to be used to install ground temperature cables, confirm in advance that there is no evidence of buried debris by the excavation of test pits. If excavation is used to install the ground temperature cables in landfill areas, use suitable precautions in excavating of the landfill. If debris is encountered, stop immediately. Proceed as directed by the Departmental Representative.
- .5 Make available on site hole casing material and install as required to prevent sloughing of the hole.
- .6 Grout the pipe in place according to grout manufacturer's recommendations.
- .7 Place the data housing and lockable cap over the pipe.
- .8 Paint caps with fluorescent orange paint.
- .9 Install the data logger in the data housing so that it can be easily removed and replaced.
- .10 Install grounding rod 2.5 m below ground surface and connect grounding rod to data logger and data housing.
- .11 The Departmental Representative will complete the ground temperature cable installation report.

 Advise the Departmental Representative 96 hours prior to the installation. Provide required information for completion of report, upon Departmental Representative's request.
- .12 The Departmental Representative will confirm the data logger and ground temperature cable operation by downloading data after 100 hours of operation. Repair any malfunctions at no expense to the Departmental Representative.
- .13 Record borehole log information when drilling hole. Record depth and survey locations of ground temperature cables.

3.4 INSTALLATION OF KIDNEY POND PSWMS FLOW MONITORING STATION

.1 Submit shop drawings for weir box and drain retaining wall concrete reinforcement and security grating to Departmental Representative for approval.

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- .2 Supply and construct weir box, drain retaining wall and security grating and locking door in accordance with overall configuration indicated on Drawings and in accordance with approved shop drawings.
- .3 Divert water during construction of PSWMS in a manner that is approved by Departmental Representative.
- .4 Submit sensor mounting bracket shop drawings for approval by Departmental Representative.
- .5 Provide and install data loggers, pressure loggers and open channel flow sensors and any required mounting brackets per approved shop drawings.

3.5 INTALLATION OF PERMANENT SURVEY CONTROL MONUMENTS

- .1 Install one permanent survey control monument per mine site at locations directed by the Departmental Representative, to a minimum depth of 5 metres if bedrock is not encountered.
 - .1 If bedrock is encountered, depth may be reduced at the discretion of the Departmental Representative, to maintain 0.15 metres embedment.
- .2 Make available on site hole casing material. Install hole casing in the drill hole as required to prevent sloughing.
- .3 Apply "food-grade" grease to the 25 mm steel pipe before installation.
- .4 Grout the control monument in the hole for the lower 2 m only. Use Sika Grout Arctic 100 or Set-45 Grout according to the manufacturer's recommendations. Grout must be suitable for placement into substrates to -10 °C. Fill the remaining void with sand.
- .5 Control monument must be flush with ground surface upon completion. Ensure positive drainage away from survey monument.
- Following set-up of the grout, tie-in survey control monuments to the site survey coordinate system. Survey horizontal accuracy to 0.1 cm and vertical accuracy to 1 cm. Mark with a drill hole or punch the top of the 25 mm steel pipe. Provide coordinates and elevation data at this mark to the Departmental Representative for each monument installed.
- .7 Construct visible markers around the survey control monuments to prevent damage and facilitate identification. Immediately replace or repair, at contractors cost, any monuments damaged by the Contractor.

3.6 PROTECTION OF MONITORING WELLS AND GROUND TEMPERATURE CABLES

- .1 Construct clearly visible barricades to protect the installed monitoring wells and ground temperature cables. Immediately replace, at Contractor's cost, any existing and installed monitoring wells and ground temperature cables damaged by the Contractor.
- .2 Provide access to any ground temperature cable and monitoring well, and cooperate with the Departmental Representative when the Departmental Representative is obtaining groundwater samples, and recording ground temperature and pore pressure readings.

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CONTAMINATED SOIL Page 1 of 13

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the excavation, handling, transport and disposal of impacted soil, impacted tailings and/or impacting waste rock requiring remediation at the Sites including supply, placement and compaction of granular fill to replace the excavated impacted soil and/or waste rock to original grade, and reshaping of the area. Locations and volumes of contaminated soil requiring excavation are indicated on Drawings and in Appendix A. Excavation and disposal requirements for impacted soil, impacted tailings and impacting waste rock requiring remediation include the following:
 - .1 Petroleum impacted soil.
 - .1 Excavation and on-site transport of the impacted soil to the Landfarm for treatment.
 - .2 Metal impacted soil.
 - .1 Excavation and on-site transport of the impacted soil to the Waste Rock and Soil Containment Area (WRSCA) or Tailings and Soil Containment Area (TSCA) (site dependent).
 - .2 Disposal of the impacted soil by placement in the containment area.
 - .3 Co-mingled impacted soil.
 - .1 Excavation and on-site transport of the impacted soil to the WRSCA or TSCA (site dependent).
 - .2 Disposal of the impacted soil by placement in the containment area.
 - .4 Impacted Tailings.
 - .1 Excavation and on-site transport of tailings to the WRSCA.
 - .2 Disposal of the tailings by placement in the WRSCA.
 - .5 Impacting waste rock requiring remediation.
 - .1 Excavation and on-site transport of the waste rock to the WRSCA or TSCA (site dependent).
 - .2 Disposal of the waste rock by placement in the containment area.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .3 Section 01 35 32 Site Specific Health and Safety Plan.
- .4 Section 01 35 43 Environmental Procedures.
- .5 Section 01 78 00 Closeout Submittals.
- .6 Section 02 61 00 Hydrocarbon Soil Treatment.
- .7 Section 31 05 16 Aggregate Materials.
- .8 Section 31 22 13 Grading and Earthworks Construction

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CONTAMINATED SOIL

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.9 Section 31 23 33.01 – Excavating, Trenching, and Backfilling.

1.3 DEFINITIONS

- .1 Petroleum hydrocarbon impacted soil is defined as soil exceeding the Site Specific Remedial Targets (SSRTs) for petroleum hydrocarbons. Refer to the SSRTs provided in the Remedial Action Plan (Stantec, 2016) and in the table below.
- .2 Metals contaminated soil is defined as soil exceeding the Site Specific Remedial Targets (SSRTs) for metals. Refer to the SSRTs provided in the Remedial Action Plan (Stantec, 2016), and in the table below.
- .3 Co-mingled hydrocarbon and metal contaminated soil is defined as soil exceeding the Site Specific Remedial Targets (SSRTs) for both petroleum hydrocarbons and metals. Refer to the SSRTs provided in the Remedial Action Plan (Stantec, 2016), and in the table below.
- .4 Tailings are defined as finely ground rock particle material rejected from a mill after most of the recoverable ore minerals have been extracted. On-site tailings were evaluated against the SSRTs for metals. Refer to the SSRTs provided in the Remedial Action Plan (Stantec, 2016), and in the table below. When compared to the SSRTs, specific tailings at the Treacy and West Bay sites were determined to be impacted tailings requiring remediation; all other tailings at the GLG sites will not require remedial action.
- .5 Impacting waste rock requiring remediation is waste rock that has the potential for metal leaching (ML) and/or acid rock drainage (ARD) into the surrounding environment.
- .6 Clean Soil: Soil that has been sampled, analyzed and determined to have contaminant concentrations below the CCME guidelines or the SSRTs outlined in the Remedial Action Plan (Stantec, 2016), and in the table below.
- .7 Petroleum Hydrocarbons (PHCs): Hydrocarbon products described by laboratory analysis as lubricating oil and grease, fuel oil, diesel and/or gasoline.
- .8 PHC Fractions F1 to F4: Breakdown of PHCs into four fractions on the basis of number of carbon atoms, as defined in the Canada-Wide Standards for PHCs in Soil (updated 2012).
- .9 Free Product: The presence of a layer of separated phase liquid PHC product.
- .10 Hazardous Contaminated Soil Containers: A container, of the appropriate type and size necessary to contain the Hazardous Material placed in it, as required by the TDGA.
- .11 Site Specific Remedial Targets (SSRTs): Remedial targets outlined in the Remedial Action Plan (Stantec, 2016). The SSRTs are summarized in the following table:

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Final Recommended SSRTs (mg/kg) .1

COPC	CCME SGQ _{HH} (Residential)	Background	Final SSRT
Arsenic	31	44.4	69
Cobalt	n/a	15.6	130
Lead	140	17.9	332
Mercury, inorganic	6.6	0.085	13
PHC F1	700		700
PHC F2	1,000	111	1,000
PHC F3	2,500	2,910	2,910

CONTAMINATED SOIL

1.4 **REFERENCES**

- Applicable environmental and health and safety laws and regulations for the Northwest Territories .1 and Canada.
- .2 Canadian Environmental Quality Guidelines by Canadian Council of the Ministers of the Environment (CCME), 1999 updated 2007.
- Alberta Environment, Alberta Users Guide for Waste Managers, 1996. .3
- .4 Department of Justice (Jus)
 - Transportation of Dangerous Goods Act (TDGA), 1992 (SC1992, c.34) .1
 - .2 Transportation of Dangerous Goods Regulations (SOR/2001-286).
- .5 Stantec Consulting Ltd. Gordon Lake Group Mine Sites NWT, Remedial Action Plan. 2016.
- Mine Environment Neutral Drainage (MEND) Report 1.16.1b, 1991. Acid Rock Drainage Prediction .6 Manual. MEND website at http://mend-nedem.org/wp-content/uploads/2013/01/1.16.1b.pdf
- .7 Guideline for Industrial Waste Discharges in the NWT (GNWT), April, 2004
- 8. Canadian Standards Association (CSA).
 - Signs and Symbols for the Workplace [CAN-Z321-96 (R2006)]. .1
- .9 National Institute for Occupational Safety and Health (NIOSH).
 - Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: .1 NIOSH Publications No. 85 115.
- Hazardous Waste Worker Training Manual: Canadian LIUNA-Contractors Training Council, 1992. .10
- .11 United States Department of Labor Occupational Health and Safety Administration. Occupational Health and Safety Standards, Toxic and Hazardous Substances, Hazard Communication (Part 1910, 120).
- CCME. Canada-Wide Standard for Petroleum Hydrocarbons in Soil, updated June 2012. .12

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1.5 QUALIFICATIONS

.1 Be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the Specification.

CONTAMINATED SOIL

- .2 Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and who can satisfy Federal and Territorial requirements will be permitted to carry out the work of this Section. Contractor's Superintendent responsible for the work of this Section is to have appropriate level of experience in the area of hazardous waste management.
- .3 Follow at all times, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA Contractors Training Council, 1992.
- .4 All activities involving the handling of hazardous materials, including Hazardous Contaminated Soil, are to be directly supervised by Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .5 Contractor's personnel trained as described in this Section are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .6 Provide workers, Department Representative and Department Representative's staff when required with protection appropriate to the potential type and level of exposure. Establish specific safety protocols in the Site Specific Health and Safety Plan.
- .7 Provide suitable safety clothing and equipment as required during the course of the work.
- .8 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) and Interprovincial Movement of Hazardous Waste Regulation (IMHWR) documentation and recording requirements.

1.6 SITE CONDITIONS

- .1 Suspend operations whenever climatic conditions are unsatisfactory for excavating or backfilling to conform with this Specification.
- .2 After occurrence of heavy rains, do not operate equipment in designated areas until the material has dried sufficiently to prevent excessive rutting.
- .3 The Contractor is advised that the ground in low-lying areas may be saturated. Dewater saturated ground and ponded areas as required, complying with this Section.
- .4 Prior to commencing excavation work, remove debris, snow, ice and standing water from areas to be excavated and backfilled.
- .5 During excavation of contaminated soil, maintain a stable excavation and dewater as required or as directed by the Department Representative.

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1.7 ENVIRONMENTAL PROTECTION

- .1 Environmental protection measures are to be in accordance with the requirements specified in Section 01 35 43 Environmental Procedures.
- .2 Protect natural and man-made features required to remain undisturbed including but not limited to benchmarks, existing buildings, surface and underground service and utility lines not designated for demolition, and instrumentation excavations.

CONTAMINATED SOIL

.3 The release of all water resulting from the dewatering of ponded contaminated soil areas and the decontamination of equipment is to conform to the Wastewater Discharge Criteria outlined in Section 01 35 43 - Environmental Procedures and Section 01 35 15 - Special Project Procedures for Contaminated Sites.

1.8 PERSONNEL PROTECTION

- .1 Some areas designated for clean-up under this contract involve soils and hazardous materials which contain inorganic elements, PHCs, and other contaminants which are considered hazardous to human health.
- .2 When working with inorganic elements, PHCs, and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and Subcontractors, Department Representative and other authorized site personnel. Provide details of protective clothing and equipment required for each work area in the Site Specific Health and Safety Plan as required by Section 01 35 32 Site Specific Health and Safety Plan.
- .3 Supply sufficient quantities of designated protection equipment to fit all site personnel including Department Representative and authorized visitors. Educate workers as to risks, and train in safe work practices.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Divert wastes as indicated in Drawings and Appendix A. A summary of the disposal location of the impacted soil, tailings and impacting waste rock requiring remediation is provided in the tables below:

.1 Petroleum Hydrocarbon Impacted Soil

Site	Location	Approximate Volume (m ³)	Disposal Location	
Burnt Island	Shaft Area (two locations)	57		
	Waste Rock Area (four locations)	192		
Camlaren	Mine Area South (four locations)	475		
	Mine Area North (three locations)	366	Landfarm	
Kidney Pond	1983 Camp (four locations)	177		
	Portal Area (two locations)	221		
Treacy	Mill Area (one location)	19		
West Bay	South Area (two locations)	101		

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.2 Metals Impacted Soil

	mpacted Soil		
Site	Location	Approximate Volume (m ³)	Disposal Location
Camlaren	Mine Area (North) (four locations)	1,477	TSCA
	Mine Area (South) (eight locations)	9,393	
	North Cabin (one location	9	
	Zenith Island (two locations)	435	
Goodrock	Mill Area (one location)	14	TSCA
Kidney Pond	1983 Camp Area (one location)	15	WRSCA
	Exploration Camp (two locations)	21	
	Kidney Pond Area (one location)	34	
	Portal Area (one location)	60	
Murray Lake	1938/2008 Camp (one location)	5	TSCA
Storm Property	Camp Area (one location)	4	TSCA
Treacy	Mill Area (one location)	200	WRSCA
	Camp Area (one location)	6	
West Bay	South Area (four locations)	578	WRSCA

.3 Co-mingled Impacted Soil

Site	Location	Volume (m ³)	Disposal Location
Burnt Island	Old Mill Area (one location)	32	TSCA
Camlaren	Mine Area (South) (one location)	255	TSCA
Kidney Pond	Portal Area(three locations)	1,786	WRSCA
West Bay	South Area (one location)	17	WRSCA

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.4 Impacted Tailings

impacted railings			
Site	Location	Volume (m³)	Disposal Location
Treacy	Mill Area (one location)	13	WRSCA
West Bay	South Area (one location)	318	WRSCA

CONTAMINATED SOIL

.5 Impacting waste rock requiring remediation

Site	Location	Volume (m³)	Disposal Location
Camlaren	South Muir Island	4,093	TSCA
	South Muir Island (Tailing Containment Area)	8,895	Do nothing- Berms may be altered/covered during upgrade of Tailings Containment Area to TSCA
	Zenith Island (three locations)	323	TSCA
Kidney Pond	Waste Rock Area	12,596	WRSCA (re-organize waste rock in the area to construct berms and cover for the WRSCA).
	Kidney Pond Area Trenches	175	WRSCA
Treacy	Near Mill Area trenches and tailings	116	WRSCA

1.10 **EXISTING CONDITIONS**

- .1 Review the Remedial Action Plan (Stantec, 2016) summarizing the extent of contaminated soil (note these specifications and attached Drawings take precedence).
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of the natural ecosystem which may be affected by the Work.
 - .2 As much as possible, protect the natural ecosystem from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

1.11 SUBMITTALS

- Make submittals in accordance with Section 01 33 00 Submittal Procedures. .1
- Quality Control in accordance with Section 01 45 00 Quality Control. .2
 - .1 Submit survey of existing conditions as described in Article 1.10 of this Section.
 - Submit to Departmental Representative written notice at least seven (7) days prior to .2 excavation work, to ensure cross sections are taken.
 - Submit to Departmental Representative written notice when limits of excavation are reached .3 (i.e., bottom and sides).

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MEASUREMENT OF PAYMENT 1.12

The excavation of PHC Impacted Soil from site areas will be measured for payment by site by the .1 cubic metre of contaminated soil as determined from survey method identified in Section 31 22 13 -Grading and Earthworks Construction. PHC Impacted Soil Excavation will be paid under Item 02 55 13-1 in the Basis of Payment Schedule which includes sub-items: Item 02 55 13-1-1: Burnt Island; Item 02 55 13-1-2: Camlaren; Item 02 55 13-1-3: Kidney Pond; Item 02 55 13-1-4: Treacy; and Item 02 55 13-1-5: West Bay. The scope of work for Item 02 55 13-1, includes:

CONTAMINATED SOIL

- .1 Excavation of PHC Impacted Soil as indicated on the Drawings.
- .2 Removal, sorting, segregation, transport and disposal of all non-hazardous debris from excavated soils to the WRSCA or TSCA (site dependent). Off-site transport and disposal of hazardous materials is included in Section 02 61 33 - Hazardous Materials.
- Handling and transport of PHC Impacted Soil to the Landfarm and placement within the .3 landfarm in accordance with Section 31 22 13 -Grading and Earthworks Construction and Section 02 61 00.01 - Hydrocarbon Soil Treatment.
- The supply, placement and compaction of granular fill to replace the excavated PHC .4 Impacted Soil to original grade, and re-shaping of the area. Approximate backfill volumes are displayed in Appendix A.
- .2 The excavation of Metal Impacted Soil from site areas at will be measured for payment by site by the cubic metre of excavated Metal Impacted Soil as determined from survey method identified in Section 31 22 15 - Grading, Metal Impacted Soil excavations will be paid under Item 02 55 13-2 in the Basis of Payment Schedule which includes sub items: Item 02 55 13-2-1: Camlaren; Item 02 55 13-2-2: Goodrock; Item 02 55 13-2-3: Kidney Pond; Item 02 55 13-2-4: Murray Lake; Item 02 55 13-2-5: Storm Property; Item 02 55 13-2-6: Treacy; and Item 02 55 13-2-7: West Bay. The scope of work for Item 02 55 13-2 includes:
 - .1 Excavation of Metal Impacted Soil from all site areas as indicated on the Drawings.
 - .2 Removal, sorting, segregation and transport of all debris from excavated areas (if needed). Disposal of non-hazardous debris in the WRSCA or TSCA (site dependent). Off-site transport and disposal of hazardous materials is included in Section 02 61 33 - Hazardous Materials.
 - Handling and transport of Metal Impacted Soil to the WRSCA or TSCA (site dependent) and .3 placement within containment area in accordance with Section 31 22 13 - Grading and Earthworks Construction.
 - .4 The supply, placement and compaction of granular fill to replace the excavated impacted soil to original grade and re-shaping of the area. Approximate backfill volumes are displayed in Appendix A.
- .3 The excavation of Co-mingled Impacted Soil from site areas will be measured for payment by site by the cubic metre of impacted soil as determined from survey method identified in Section 31 22 15 -Grading. Co-mingled Impacted Soil excavations will be paid under Item 02 55 13-3, in the Basis of Payment Schedule including sub-items: Item 02 55 13-3-1: Burnt Island; Item 02 55 13-3-2: Camlaren: Item 02 55 13-3-3: Kidney Pond: and Item 02 55 13-3-4: West Bay. The scope of work for Item 02 55 13-3 includes:
 - Excavation of Co-mingled Impacted Soil as indicated on the Drawings. .1
 - Removal, sorting, segregation and transport of all debris from excavated soil. Disposal of .2 non-hazardous debris in the WRSCA or TSCA (site dependent). Off-site transport and disposal of hazardous materials is included in Section 02 61 33 - Hazardous Materials.

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- .3 Handling and on-site transport of Co-mingled Impacted Soil to the WRSCA or TSCA (site dependent) and placement within containment area in accordance with Section 31 22 13 Grading and Earthworks Construction.
- .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area. Approximate backfill volumes are displayed in Appendix A.
- .4 The excavation of Tailings from site areas will be measured for payment by site by the cubic metre of excavated Tailings as determined from survey method identified in Section 31 22 13 Grading and Earthworks Construction. Tailings excavation will be paid under Item 02 55 13-4 in the Basis of Payment Schedule including sub-items: Item 02 55 13-4-1: Treacy; Item 02 55 13-4-2: West Bay. The scope of work includes:
 - .1 Excavation of Tailings as indicated on the Drawings.
 - .2 Removal, sorting, segregation and transport of all debris from excavated tailings. Disposal of non-hazardous debris in the WRSCA or TSCA (site dependent). Off-site transport and disposal of hazardous materials is included in Section 02 61 33 Hazardous Materials.
 - .3 Handling and on-site transport of Tailings to the WRSCA or TSCA (site dependent) and placement within containment area in accordance with Section 31 22 13 Grading and Earthworks Construction.
 - .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area, in those cases where excavation requires removal of material to below the pre-tailings original grade to be determined in concert with the Departmental Representative. Approximate backfill volumes are displayed in Appendix A.
- The excavation of Impacting Waste Rock from site areas will be measured for payment by site by the cubic metre of excavated Waste Rock as determined from survey method identified in Section 31 22 13 Grading and Earthworks Construction. Waste Rock excavations will be paid under: Item 02 55 13-5 in the Basis of Payment Schedule including sub-items: Item 02 55 13-5-1: Camlaren; Item 02 55 13-5-2: Kidney Pond; and Item 02 55 13-5-3: Treacy. The scope of work includes:
 - .1 Excavation of impacting waste rock requiring remediation as indicated on the Drawings.
 - .2 Removal, sorting, segregation and transport of all debris from excavated Waste Rock.
 Disposal of non-hazardous debris in the WRSCA or TSCA (site dependent). Off-site
 transport and disposal of hazardous materials is included in Section 02 61 33 Hazardous
 Materials.
 - .3 Handling and on-site transport of Waste Rock to the WRSCA or TSCA (site dependent) and placement within containment area in accordance with Section 31 22 13 Grading and Earthworks Construction.
 - .4 The supply, placement and compaction of granular fill to replace the excavated contaminated soil to original grade, and reshaping of the area, in those cases where excavation requires removal of material to below the pre-waste rock original grade to be determined in concert with the Departmental Representative. Approximate backfill volumes are displayed in Appendix A.
- .6 The treatment and disposal of PHC Impacted Soil in the Landfarm will not be included for payment under this section, but will be provided as indicated in Section 02 61 00 Hydrocarbon Soil Treatment.
- .7 The excavation of any unknown Hazardous Contaminated Soil identified at the site, including the supply and transport to the site of containers for Hazardous Contaminated Soil, including

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leakproof/hydrocarbon resistant liners as required, will not be included for payment under this section, but will be provided as indicated in Section 02 61 33 – Hazardous Material.

CONTAMINATED SOIL

- .8 No extra payment will be made for soil removed from beyond the specified limits of excavation, unless such removal has been specifically directed by the Departmental Representative. The volume of contaminated soil excavation beyond the specified limits that have been approved by Departmental Representative will be determined by survey.
- .9 All costs associated with the clean-up or treatment of contamination of areas within or surrounding the contaminated soil handling areas due to the migration of contaminants from those areas as a result of Contractor's actions or inactions are the responsibility of Contractor. These costs are to include all costs of investigation to determine the extent of contamination migration, as well as soil excavation and treatment costs.
- .10 The following activities are considered incidental to the work identified by Items 02 55 13-1 through 02 55 13-3 in the Basis of Payment Schedule and will not be measured separately:
 - .1 Site access road construction, maintenance and rehabilitation including construction of watercourse/drainage course crossings to facilitate site remediation activities as required for construction including placement of granular material and installation and removal of culverts.
 - .2 Installation of monitoring equipment as required to confirm and/or calibrate process requirements, as applicable.
 - .3 Testing for the disposal and disposal of wastewater or other process effluents, as applicable.
 - .4 Any necessary excavation to facilitate testing of contaminated soils.
 - .5 Equipment decontamination including preparation and operation of the equipment decontamination area.
 - .6 Provision of all necessary safety equipment and clothing, as specified in Section 01 35 32-Site Specific Health and Safety Plan.
 - .7 Any requirements of permits.
 - .8 Loading, hauling, backfilling and compacting select granular fill materials at the excavation limits. Contractor is advised that areas susceptible to erosion will require Type 1 granular fill as surface materials.
 - .9 Grading of backfilled excavations to prevent ponding and blending in with the surrounding terrain, as directed by Departmental Representative.
 - .10 Excavation of contaminated soils within permafrost-affected zones.
 - .11 Water for moisture conditioning, compaction, and dust control.
 - .12 Surveying and calculation of granular material quantities for progress payment purposes.
 - .13 Re-shaping and re-grading of borrow areas and Contractors laydown areas including the supply, placement and compaction of granular material.
 - .14 Draining of wet areas prior to re-grading operations.
 - .15 Provision of liners beneath contaminated soil stockpiles in accordance with Section 01 35 15
 Special Project Procedures for Contaminated Sites.
- .11 Costs for the dewatering of excavations will not be measured for payment under this section, but will be provided as indicated in Section 31 23 15 Dewatering.
- .12 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the

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Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

CONTAMINATED SOIL

PART 2 - PRODUCTS

2.1 **MATERIALS**

- .1 Fill:
 - .1 If required, use fill from borrow sources outlined in Section 31 05 16 - Aggregate Materials.
- .2 Environmental Protection Supplies: as per Section 01 35 43 - Environmental Procedures.

2.2 **EQUIPMENT**

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.
- .2 Trucks:
 - .1 Cleaned meticulously between loads of contaminated materials and clean fill.
 - .2 Cleaned meticulously at end of work day.
 - .3 Cover truck bodies with tarpaulins during transportation.
 - .4 Use watertight truck bodies for transporting contaminated soil.

PART 3 - EXECUTION

EXCAVATION OF IMPACTED SOIL. TAILINGS AND IMPACTING WASTE ROCK REQUIRING 3.1 REMEDIATION, STOCKPILING, AND BACKFILLING

- Contractor to initiate and complete topographic survey in advance of excavation operations for initial .1 cross sections to be taken.
- Remove all surface debris prior to excavation. Remove all debris from excavated soil, sort, .2 containerize and store appropriately.
- .3 Layout and excavate areas of impacted soil to the limits as indicated. All layouts are to be field verified by Department Representative prior to excavation.
- .4 Prior to excavation of impacted areas, remove all surface snow/ice and direct surface water run-off around the excavation.
- .5 Suppress dust generated during excavation operations with a water spray. Prevent surface water from entering the excavated area.
- .6 Stockpile impacted soil in Temporary Storage areas designated by Departmental Representative in accordance with Section 01 35 15 - Special Procedures for Contaminated Sites including the use of liners below all stockpiled soil. Cover impacted materials from precipitation to reduce leachate pending transportation to disposal area. Place stockpiles of contaminated soil at a distance from the excavation equal to the depth of the excavation. Stockpile height not to exceed 2 meters.

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CONTAMINATED SOIL

- .7 Transport impacted soils, tailings and impacting waste rock requiring remediation in a manner such that no soil or liquid will be spilled during transport.
- .8 Place soils as per Section 31 22 13 Grading and Earthworks Construction.
- .9 Place metals impacted and co-mingled impacted soil as intermediate fill in the WRSCA and TSCA as per Section 31 22 13 Grading and Earthworks Construction.
- .10 Place impacting waste rock requiring remediation in the WRSCA or TSCA, site dependent as per Section 31 22 13 Grading and Earthworks Construction.
- .11 Place PHC Impacted soil in the Landfarm as per Section 02 61 00 Hydrocarbon Soil Treatment.
- .12 Use a volatile organic compound (VOC) instrument to continuously measure the concentrations of VOC during impacted soil excavation operations. When the concentrations of VOC exceed 20% LEL, temporarily halt work until ventilation (natural or induced) reduces the concentration levels to a safe working level.
- .13 Dewater ponded impacted soil areas, as required, in accordance with Section 31 23 15 Dewatering. Maintain soil excavations free of standing water during soil removal, and confirmatory sampling activities. Comply with the requirements of the Waste Water Discharge Criteria indicated in Section 01 35 15 Special Project Procedures for Contaminated Sites and Section 01 35 43 Environmental Procedures.
- .14 When excavating impacted soil areas intermingled with waste rock, screen excavated material to remove waste rock of cobble size or greater (i.e. rocks over 64 mm in diameter).
 - .1 Stockpile waste rock temporarily and separately from impacted soil in areas designated by Departmental Representative.
 - .2 Reshape the screened non-impacting waste rock requiring remediation as per Section 31 22 13 Grading and Earthworks Construction.
 - .3 Place impacted soil and impacting waste rock requiring remediation as per this Section and Section 31 22 13 Grading and Earthworks Construction.
- .15 Minimize damage to permafrost during the excavation. Provide permafrost protection measures while excavation remains open.
- .16 When excavating in the vicinity of a drainage course or a body of water, erect silt fences, floating silt curtains and/or containment berms to prevent the release of sediment and deleterious materials into the water in accordance with the requirements of Section 01 35 43 Environmental Procedures, for Work in or Adjacent to Waterways. Also, excavations should be no closer than 10 m (top of excavation slope) to a water body.
- .17 Decontaminate the equipment used for the excavation of Contaminated Soil in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites before commencing impacted soil excavation at another location.
- Notify Departmental Representative when the bottom of excavation is reached. The Department Representative will collect confirmatory soil samples after reaching the impacted soil excavation limits indicated on Drawings. No further excavation of the soil will proceed until the results of confirmatory samples are assessed by the Departmental Representative.

CONTAMINATED SOIL

- Do not operate equipment in impacted soil areas that have been excavated until Department Representative has confirmed, based on the results of confirmatory testing, that no further excavation of impacted soil in the area is required.
- .20 Do not proceed with backfilling operations until completion of the following:
 - .1 Survey of the ground profile upon completion of the final excavation limits and Departmental Representative has inspected and approved final excavation limits.
 - .2 The confirmatory soil results indicate that soils along the final excavation limits meet the applicable guidelines and confirmed by Departmental Representative.
- .21 Areas to be backfilled are to be free from debris, snow, ice, water and frozen ground. Do not use backfill material which is frozen or contains ice. snow or debris.
- As directed by the Departmental Representative, supply Granular Fill to backfill excavation areas as specified in Section 31 22 13 Grading and Earthworks Construction.

3.2 EROSION, SEDIMENT AND DRAINAGE CONTROLS

- Prior to commencement of the work, install temporary erosion, sediment and drainage controls to prevent siltation and disruption of water bodies in accordance with this Section and Section 01 35 15
 Special Project Procedures for Contaminated Sites and Section 01 35 43 Environmental Procedures.
- .2 Erosion, sediment and drainage controls are to be maintained during all stages of work.
- .3 At the completion of impacted soil excavation, remove the erosion, sediment and drainage controls, as directed by Departmental Representative. Dispose of all non-granular erosion, sediment and drainage control materials off-site.

3.3 EQUIPMENT DECONTAMINATION

- .1 Decontaminate equipment that comes into contact with the impacted soils by steam cleaning or other means acceptable to the Departmental Representative in a separate area capable of containing the waste generated by cleaning operations. Decontaminate as outlined in Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .2 Collect and dispose any impacted soil that leaks, spills or otherwise leaves the equipment during transport from the area of work to the decontamination area.
- .3 Remove and dispose of material that becomes contaminated as a result of Contractor's operation at no additional cost.
- .4 Dispose of liquid waste in accordance with the Waste Water Discharge Criteria outline in Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .5 Treat any waste soil resulting from the decontamination procedure as hydrocarbon contaminated soil or metal contaminated soil depending on the source of the material and handle it accordingly.

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PART 1 - GENERAL

DESCRIPTION 1.1

- This Section specifies the requirements for the treatment of Petroleum Hydrocarbon (PHC) Impacted .1 Soil at the Gordon Lake Group (GLG) Sites, including the following:
- .2 Submission of a PHC Impacted Soil Treatment Plan.
- .3 Provision of proprietary equipment, materials, labour, and supplies as required, to support the soil treatment program.
- .4 Handling and storage of material, equipment, and supplies required for the soil treatment process.
- Treatment of PHC Impacted Soil to specified treatment criteria using landfarming techniques chosen .5 by the Contractor and reviewed by the Departmental Representative.
- .6 Design and implementation of an impacted soil sampling and laboratory testing program to monitor, calibrate, and verify the impacted soil treatment process.
- .7 Decommissioning and deconstruction of the Landfarm following completion of soil treatment operations.
- Construction of the Landfarm detailed on Drawings C-CAM-14 and C-CAM-15 to be utilized for the 8. treatment of PHC Impacted Soil is included under Section 31 22 13 - Grading and Earthworks Construction. Geotextile and Geomembrane liner requirements are included under Sections 31 32 19.01 – Geotextiles and 31 32 19.02 – Geomembranes, respectively.
- .9 Contractor is to immediately notify Department Representative if Contractor believes that the proposed treatment system will not yield suitable results within the time frame specified due to the nature of the contaminant, soil conditions, or site conditions.

1.2 **RELATED SECTIONS**

- .1 Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 15 – Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 – Site Specific Health and Safety for Contaminated Sites.
- .5 Section 01 35 43 – Environmental Procedures.
- .6 Section 02 55 13 - Contaminated Soil

1.3 **REFERENCES**

Applicable environmental and health and safety laws and regulations for the Northwest Territories .1 and Canada.

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HYDROCARBON SOIL TREATMENT

- .2 Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health by Canadian Council of the Ministers of the Environment (CCME), 1999 updated 2007.
- .3 Stantec Consulting Ltd. Gordon Lake Remedial Action Plan (2016).
- .4 Canadian Standards Association (CSA).
 - .1 Signs and Symbols for the Workplace CAN-Z321-96 (R2006).
- .5 National Institute for Occupational Safety and Health (NIOSH).
 - 1 Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115.
- .6 Hazardous Waste Worker Training Manual: Canadian LIUNA-Contractors Training Council, 1992.
- .7 United States Department of Labor Occupational Health and Safety Administration. Occupational Health and Safety Standards, Toxic and Hazardous Substances, Hazard Communication (Part 1910, 120).

1.4 DEFINITIONS

.1 Treated Soil: Soil, previously classified as PHC Impacted Soil, that has been treated, sampled, analyzed, and determined to contain concentrations of PHCs lower than the Site Specific Remedial Targets as outlined in the Remedial Action Plan (Stantec, 2016). The SSRTs are summarized below:

COPC	CCME SGQ _{нн} (Residential)	Background	Final SSRT
F1	700		700
F2	1,000	111	1,000
F3	2,500	2,910	2,910

- .2 Landfarm: The soil treatment facility where PHC Impacted Soil is to be treated to reduce PHC concentrations to less than the SSRTs.
- .3 Site Specific Remedial Targets (SSRTs): Site specific criteria, defined in the Remedial Action Plan, Stantec, 2016.

1.5 QUALIFICATIONS

- .1 Contractor is to be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and requirements of the Specification.
- Only Contractor's Soil Remediation Specialist, capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and remediation of PHC-impacted soil in Arctic environments, will be permitted to carry out the work of this Section.
- .3 Follow at all times, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA Contractors Training Council, 1992.

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HYDROCARBON SOIL TREATMENT

- .4 All activities involving the handling of hazardous materials, are to be directly supervised by Contractor's Soil Remediation Specialist, who has successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .5 Personnel trained as described above are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .6 Provide suitable safety clothing and equipment as required during the course of the work.

1.6 EXISTING CONDITIONS

- .1 Review the Drawings and following documents for details regarding the location and extent of hydrocarbon contaminated soil.
 - .1 Stantec Consulting Ltd. GLG Mine Sites NWT, Remedial Action Plan (2016).
- .2 For PHC impacted soil quantities at individual mine sites, see Section 1.9 of 02 55 13 Contaminated Soil.

1.7 SITE CONDITIONS

- .1 During or after occurrence of heavy rains, do not operate equipment in designated areas until the material had dried sufficiently to prevent excessive rutting.
- .2 Remove debris, snow, ice and standing water from areas prior to construction of the Soil Treatment Facility or placement of soil within the Facility.

1.8 PROTECTION

- .1 Environmental protection measures are to be in accordance with the requirements of Section 01 35 43 Environmental Procedures.
- .2 Decontaminate equipment in accordance with Section 01 35 15 Special Procedures for Contaminated Sites.
- .3 The release of all Wastewater shall conform to the Wastewater Discharge Criteria indicated in Section 01 35 15 Special Procedures for Contaminated Sites.

1.9 PERSONAL PROTECTION

- .1 When working with PHCs and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department as suitable for exposure in the Work Area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and subcontractor, Departmental Representative and other authorized site personnel.
- .2 Air quality shall be monitored during hydrocarbon soil remediation activities according to the requirements of the Authorities Having Jurisdiction (AHJ). Safety precautions shall be implemented dependent on the results of air quality monitoring such as temporarily halting work until ventilation (natural or induced) reduces the concentration levels to a safe working level.

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- .3 Include requirements for protective clothing for the work outlined in this section in the Site Specific Health and Safety Plan specified in Section 01 35 32 Site Specific Health and Safety Plan for Contaminated Sites.
- .4 Supply sufficient quantities of designated protection equipment to fit all site personnel including Departmental Representative and authorized visitors. Supply at least five sets of protection equipment for Departmental Representative and authorized visitors.

1.10 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit a Detailed PHC Impacted Soil Treatment Plan outlining the treatment methodology and equipment proposed by the Contractor to complete the PHC Impacted Soil treatment. Soil Treatment Plan must be acceptable to AHJs. Submit the Plan ninety (90) days prior to construction.
- .3 At minimum, the Detailed PHC Impacted Soil Treatment Plan is to detail the following:
 - .1 The chosen soil treatment method.
 - Description of why the chosen treatment methodology is appropriate for site locations and conditions including past experience and relevant technical documentation. Include confirmation that the chosen treatment methodology is appropriate for use at the designed Landfarm specified on Drawings C-CAM-14 and C-CAM-15.
 - .3 The equipment, materials, and supplies required to conduct the treatment, including provisions to deal with equipment breakdown.
 - .4 Labour and temporary facilities required for the implementation of the treatment program.
 - The size, shape, and location of the Landfarm if not consistent with proposed landfarm presented on Drawings C-CAM-14 and C-CAM-15. Approval from Departmental Representative required should proposed design be altered. Details of the Contractor's impacted soil sampling and laboratory testing methodology, personnel, and protocols to calibrate, monitor, and verify the effectiveness of the impacted soil treatment process. Sampling methodology is to meet or exceed requirements of industry best practice and FCSAP Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils, 2013
 - .6 Schedule of predicted treatment durations.
 - .7 Details of the handling and storage of material, equipment, and supplies required for the soil treatment process.
 - .8 Details of the final placement of treated soils.
 - .9 Details for the final decommissioning of the treatment area and associated facilities.

.4 Reporting:

.1 Reports of any analytical testing with respect to but not exclusively the soil treatment, shall be presented to the Departmental Representative within one (1) week of receipt.

1.11 SIGNS

.1 Signage: Provide and erect signage at access points to the Soil Treatment Facility. Signage is to be visible from all sides of these areas. The English Version of the signs is to read:

CAUTION, CONTAMINATED SOIL TREATMENT AREA RESTRICTED ACCESS.

.1 Post a similar sign in French and in the language of local dialect.

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.2 Graphic Symbols: All lettering is to conform to CAN3-Z321-77, or latest edition thereof. All lettering is to be black, not less than 100 mm high, with a 25 mm wide stroke, on a white background.

1.12 MEASUREMENT FOR PAYMENT

- .1 Treatment of PHC Impacted Soil will be measured for payment by cubic metre of PHC Impacted Soil excavated, based on survey methods outlined in Section 31 22 15 - Grading, and will be paid under the unit price Item 02 61 00-1, Treatment of PHC Impacted Soil in the Basis of Payment Schedule. Item 02 61 00-1 will have the same cubic metre volume as payment item 02 55 13-1 - PHC Impacted Soil excavation.
- .2 The scope of work for Payment Item 02 61 00-1 is to include all direct work associated with the operation of the Landfarm, according to the accepted PHC Impacted Soil Treatment Plan, including the following:
 - Provision of all materials, equipment, labour and supplies necessary to operate the .1 Landfarm.
 - .2 Removal, treatment and discharge of Contact Water, as required to facilitate treatment operations.
 - .3 Provision and erection of signage as described.
 - .4 Reporting and record keeping.
 - .5 Equipment decontamination including preparation and operation of an equipment decontamination area, as applicable.
 - .6 Provision of all necessary safety equipment and clothing.
 - .7 Any requirements of permits.
 - 8. Final disposal of treated soil.
 - .9 Decommissioning of landfarm.
- .3 All costs associated with the cleanup or treatment of contamination of areas within or surrounding the Soil Treatment Facility or due to the migration of contaminants from the soil being treated as a result of Contractor's actions or inactions are the responsibility of the Contractor. These costs are to include all costs of investigation to determine the extent of contamination migration, as well as soil excavation and treatment costs.
- No separate pay item is to apply to the work practice requirements, including personal protection, of .4 this Section. Costs are to be included in the applicable payment items to which this Section applies.
- .5 Provision of all materials, equipment, labour and supplies to construct the Landfarm specified on Drawing C-CAM-15 will not be considered for payment under this Section and will be measured separately under Sections 31 22 13 - Grading and Earthworks Construction, Section 31 32 19.01 -Geotextile, and Section 31 32 19.02 – Geomembrane.
- .6 Installation of monitoring equipment, as specified on Drawing C-CAM-15, will be measured separately under Section 02 51 00 – Instrumentation.
- .7 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Fill:
 - .1 If required, use fill from borrow sources outlined in Section 31 05 16 Aggregate Materials.
- .2 Geomembrane and Geotextile:
 - .1 All Geomembrane used for soil remediation must be in accordance with Section 31 32 19.01-Geotextiles and 31 32 19.02 Geomembranes.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Handling and storage of material, equipment, and supplies required for the soil treatment process upon their arrival at site.
- .2 Operate the landfarm in the most efficient manner necessary to complete treatment in the minimum time frame possible.
- .3 Soil Management:
 - .1 Store, transport, and eliminate off-site or treat residues generated by soil treatment process in accordance with applicable federal and/or territory standards, requirements and regulations.
 - .2 Do not dilute contaminated soil with less contaminated soil.
- .4 Groundwater Management:
 - .1 Dispose or treat groundwater in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites.
 - .2 Treat or incinerate residues, including free product (if present) generated by water treatment process in accordance with federal and/or territorial standard, requirements and regulations or store, transport and dispose off-site.

3.2 SOIL TREATMENT PROCESS REQUIREMENTS

- .1 Construct the Landfarm specified on Drawings C-CAM-14 and C-CAM-15 in accordance with Section 31 22 13 Grading and Earthworks Construction, in consultation with the Departmental Representative to satisfy AHJ requirements.
- .2 Treat PHC Impacted Soil as described in the accepted PHC Impacted Soil Treatment Plan.
- .3 Remove, handle and transport Treated Soil to the disposal location(s) approved by the Departmental Representative.

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TESTING 3.3

- Carry out and pay for all testing required to confirm and/or calibrate treatment process requirements .1 and to confirm that contaminated soils have been treated to specified contaminant levels. This testing is to include a baseline sampling and analysis program in the area of the stockpile and treatment areas to verify existing conditions, as well as a confirmatory testing program.
- .2 Duplicates of a minimum of 10 percent of the samples extracted will be collected for Contractor's confirmatory testing program by the Departmental Representative. Costs for this testing will be the responsibility of the Departmental Representative.
- .3 Contaminated soil will be designated as treated soil if the results of the laboratory analytical testing of a composite sample obtained from five discrete soil sample locations representative of a 100 cubic metre soil volume indicate concentration levels of PHCs to be less that the applicable remediation criteria.
 - .1 Any soil that does not meet SSRTs will be placed within the Tailings and Soil Containment Area (TSCA) prior to capping.

3.4 CONTACT WATER AND FREE PRODUCT

.1 Handle and treat Contact Water encountered during the soil treatment operation as described in Section 02 35 15 – Special Procedures for Contaminated Sites.

3.5 SOIL DISPOSAL

- .1 Dispose of all Treated Soil in locations greater than 30 m from water bodies and in accordance with AHJ.
- Treated soil shall be used as cover for the Tailings and Soil Containment Area (TSCA) in accordance .2 with Section 31 22 13 – Grading and Earthworks Construction.
 - Any soil not used for cover in the TSCA shall be disposed of by placing and trackpacking in .1 low piles less than 1.5 metres high with sides that have a maximum slope of 1 vertical to 5 horizontal.

3.6 **DECOMMISSIONING**

- Upon completion of Landfarm activities, decommission and reclaim Landfarm area. Decommission .1 and reclamation to include, but not be limited to:
 - Removal and off-site disposal of geomembrane and geotextile material at the Contractor's .1 approved waste disposal facility.
 - .2 Recontouring of berms to mimic natural topography.
 - .3 Ensure surface water ponding does not occur.

3.7 REPORTING

- .1 Submit to the Departmental Representative on a monthly basis during PHC Impacted Soil treatment activities, a PHC Impacted Soil Treatment Operation Report which is to include the following information, as applicable to the treatment process:
 - .1 volume of contaminated soil excavated;
 - .2 schedule of treatment process activities:
 - .3 date and application rates of amendments added to the soil;

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- .4 results of visual inspection program;
- .5 effluent and contaminated soil test results, including the results of the baseline sampling and analytical program;
- .6 climate data including average daily temperature, dates of precipitation events, and amount of precipitation.
- .2 Within thirty (30) days of completion of each season/year of work, submit to Departmental Representative an Interim Soil Remediation Report. This report is to include, but not necessarily be limited to, the following information as applicable to the treatment process:
 - .1 nature and volume of treated soil;
 - .2 equipment usage;
 - .3 fuel and/or power usage;
 - .4 environmental monitoring and inspection records;
 - .5 temperature and precipitation records for the duration of the work season;
 - .6 results of all testing including sampling procedures, analytical procedures, analytical results, and QA/QC procedures for baseline and confirmatory testing programs;
 - .7 proposed modifications to the treatment process, as required; and,
 - .8 any other information required to meet the Water Licence and Land Use Permit annual report requirements.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 The Section specifies the requirements for the collection, containerization and disposal of Hazardous Waste Materials. The general locations of Hazardous Waste Materials are indicated on Drawings.
- .2 An Inventory of the known Hazardous Waste Materials is included in Appendix A in the Hazardous and Non-hazardous Waste Inventory table.
- .3 Hazardous materials at the Gordon Lake Group Sites include:
 - .1 Asbestos Brake Pads: to be removed from drill rig and transferred to staging area prior to off-site disposal.
 - Organic Liquid in Drums (including potential for diesel, Jet A, Jet B, and/or heating oil): drum contents to be verified by Departmental Representative prior to drums being placed in overpack drums and hauled to staging area. Overpack drums to be transported off-site for treatment and/or disposal depending on drum contents.
 - .3 Total Lead Paint on Wood: Paint to be left in place on wood and wood to be transported to the staging area prior to off-site disposal.
 - Other Hazardous Materials: includes <6 m³ of batteries, and <7 m³ of unfired explosives. Batteries to be transported to staging area for sorting prior to off-site disposal; unfired explosives to be disposed of as per recommendations of explosives expert.

1.2 RELATED REQUIREMENTS

- .1 Section 01 32 18 Construction Project Schedules Bar (GANTT) Chart.
- .2 Section 01 33 00 Submittal Procedures.
- .3 Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 Site Specific Health and Safety Plan.
- .5 Section 01 35 43 Environmental Procedures.
- .6 Section 01 52 00 Construction Facilities.
- .7 Section 01 78 00 Closeout Submittals.
- .8 Section 02 41 16 Structure Demolition.
- .9 Section 02 41 23 Debris and Miscellaneous Removals.
- .10 Section 02 61 00 Hydrocarbon Soil Treatment.
- .11 Section 02 82 00.01 Asbestos Abatement Minimum Precautions
- .12 Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions
- .13 Section 31 22 13 Grading and Earthworks Construction

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1.3 REFERENCES

- .1 Canada Labour Code (R.S.C., 1985, c.L-2)
 - .1 Canada Occupational Health and Safety Regulations (SOR/86-304).
 - .1 Part X Hazardous Substances.
- .2 National Fire Code of Canada, 2010.
- .3 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999 (S.C. 1999, c.33)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301).
 - .3 Marine Spark-Ignition Engine, Vessel and off-Road Recreational Vehicle Regulations (SOR/2011-10).
 - .4 Off-Road Compression-Ignition Engine Emission Regulations (SOR/2005-32).
 - .5 Off-Road Small Spark-Ignition Engine Emission Regulations (SOR/2003-355).
 - .6 On-Road Vehicle and Engine Emission Regulations (SOR/2003-2).
 - .7 Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).
 - .8 Ozone-Depleting Substances Regulations (SOR/99-7).
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992 (SC1992, c.34).
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286).
 - .3 Hazardous Products Act (R.S.C., 1985, c. H-3)
 - .1 Controlled Products Regulations (SOR/88-66).
 - .2 Workplace Hazardous Materials Information System.
- .4 Canadian Standards Association
 - .1 CSA Standard Z94.4-93 (R1997) Selection, Use and Care of Respirators.
- .5 Indian and Northern Affairs Canada, Abandoned Military Site Protocol (2008) DEW Line Cleanup (DLCU) Tier II Criteria.
- .6 Department of Environment and Natural Resources, Government of the Northwest Territories.
 - .1 Guideline for the General Management of Hazardous Waste in the Northwest Territories (1998).
 - .2 Guideline for Industrial Waste Discharges in the Northwest Territories (2004).
 - .3 Guideline for Ozone Depleting Substances and Halocarbon Alternatives (2007).
 - .4 Guideline for the Management of Waste Antifreeze (1998).
 - .5 Guideline for the Management of Waste Asbestos (2004).
 - .6 Guideline for the Management of Waste Batteries (1998).
 - .7 Guideline for the Management of Waste Lead and Lead Paint (2004).
 - .8 Guideline for the Management of Waste Paint (1998).
 - .9 Guideline for the Management of Waste Solvents (1998).
 - .10 Used Oil and Waste Fuel Management Regulations (2004).
 - .11 Spill Contingency Planning and Reporting Regulations (1998).
 - .12 Environmental Guideline for Contaminated Site Remediation (2003).

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- .7 National Institute for Occupational Safety and Health (NIOSH).
 - .1 Occupational Safety and Health Guidance Manual for Hazardous Materials Site Activities: NIOSH Publications No. 85 115.
- .8 United States Department of Labor Occupational Health and Safety Administration. Occupational Health and Safety Standards, Toxic and Hazardous Substances, Hazard Communication (Part 1910, 120).
- .9 Environment Canada Technical Document for Batch Waste Incineration (2010).
- .10 Environment Canada. Identification of Fluorescent Lamp Ballasts Containing PCBs (1991).
- .11 Hazardous Waste Training Manual: Canadian LIUNA Contractors Training Council (1992).
- .12 Safety Act NWT. R.S.N.W.T. 1988, c.S-1.
- .13 Occupational Health and Safety Regulations, R-039-2015.
- .14 Labour Standards Act. R.S.N.W.T 1988, c.L-1.

1.4 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism specifically listed or meeting hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: Items or debris no longer used for their original purpose; now hazardous and intended for recycling, treatment or disposal. Also material that is designated "hazardous" under Territorial or Federal legislation; or as a "dangerous good" under the TDGA. This may include dangerous substances, dangerous goods, hazardous commodities and hazardous products, and may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or the environment if handled improperly.
- .3 Volatile organic compounds (VOCs): organic compounds that have boiling points roughly in the range of 50 to 250 °C (122 to 482 °F), such as several compounds within gasoline and many solvents.
- .4 Debris: Visible debris on or within 0.5 metres of the existing ground surface, or material that has been identified on the Drawings as debris, consisting of hazardous and non-hazardous material.
- Lead-based painted materials: Material that is coated with lead-based paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
- .6 "Processing" refers to the sampling, testing, packaging, and containerization of hazardous materials.
- .7 Hazardous Waste Container: A container, of the appropriate type and size necessary to contain the Hazardous Material placed in it, as required by the TDGA.
- .8 Hazardous Material Processing Area: A designated area, accepted by the Departmental Representative, for the consolidation, processing and containerization of hazardous waste materials.
- .9 Temporary Storage Area: The designated area used for the consolidation and temporary storage of containerized hazardous materials, non-hazardous waste and impacted soil as specified in Section 01 52 00 – Construction Facilities and within this Section.

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.10 Contaminated Groundwater: Groundwater encountered during contaminated soil or debris excavation that contains free product or does not conform to the wastewater discharge criteria outlined in Section 01 35 15 - Special Project Procedures for Contaminated Sites.

- .11 Free Product: Separated phase liquid petroleum hydrocarbon product.
- .12 Contractor's Designated Hazardous Waste Disposal Facility: A Licensed Hazardous Waste Disposal Facility designated by the Contractor for the disposal of all hazardous materials specified under the provisions of this contract. The facility must be pre-approved by the Departmental Representative prior to beginning work. Contractor must provide documentation from the Contractor's Designated Hazardous Waste Disposal Facility indicating full responsibility for all hazardous materials accepted from the sites.
- .13 Known Hazardous Material: Material designated as hazardous in accordance with the definition of hazardous materials in this Section, and which is identified for collection and disposal in the specifications and Drawings.
- .14 Unknown Hazardous Material: Material designated as hazardous in accordance with the definition of Hazardous Materials material in this section, and which has not been specifically identified for collection and disposal in specification and Drawings.
- .15 Calibrated scale: A scale that has been calibrated using a minimum of three known weights to ensure the scale is outputting the correct measurement. Known weights must be within the range of weights of materials being weighed. Calibration entails placing a known weight on the scale and then the scale is adjusted until it yields a correct corresponding weight measurement.
- Leachable Soil: Soil containing contaminants that when subject to Toxicity Characteristic Leaching Procedure (TCLP) analysis, leach contaminants at concentrations in excess of those specified in CEPA regulations or regulations governing methods of disposal (e.g., Guideline for Industrial Waste Discharges in the Northwest Territories (2004)). Handling and disposal are regulated under Federal and Territorial regulations. Contractor to comply with all applicable regulations.

1.5 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 32 Site Specific Health and Safety Plan, and 01 35 43 Environmental Procedures to Departmental Representative.
- .3 Provide Hazardous Materials Management Plan to Departmental Representative prior to mobilization that identifies hazardous materials, usage, location, personal protective equipment requirements, disposal procedures and arrangements.
- .4 Submit qualifications and training certificates for all Contractor's personnel performing Work as described under this Section prior to commencing Work.
- .5 Submit the hazardous materials disposal tracking information including final inventories of containers and disposal details to Departmental Representative prior to transportation off-site.
- .6 Submit waste transport manifests, chains of custody, and transportation documentation to the Departmental Representative and the Authority Having Jurisdiction (AHJ), as required, prior to transportation off-site and in accordance with applicable regulations.

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- .7 Submit destruction certificates to the Departmental Representative within fourteen (14) days of destruction.
- .8 In the event of an environmental incident or damage to waste containers, notify the Departmental Representative and applicable AHJ.

1.6 QUALIFICATIONS AND PERSONNEL PROTECTION

- .1 Contractor's worker must be thoroughly familiar with and knowledgeable about existing site conditions, scope of work, and requirements of the Specification.
- .2 Submit qualifications and training records prior to commencing Work under this Section, for all Contractor's personnel completing Work as described in this Section.
- .3 Follow at all time, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: NIOSH Publication No. 85-115, or Hazardous Waste Worker Training Manual: Canadian LIUNA – Contractors Training Council, 1992.
- Only Contractor's personnel capable of demonstrating a history of satisfactory experience in the area of hazardous waste management and who can satisfy Federal and Territorial requirements will be permitted to supervise and direct the Work of this Section.
- All activities involving the handling of hazardous materials are to be directly supervised by Contractor's personnel who have successfully completed a 40-hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other accepted equivalent training courses such as the Canadian Hazardous Waste Workers Program.
- .6 Contractor's personnel trained as described in this Section are to instruct and direct all workers with respect to the waste management procedures and labour and safety practices to be followed in carrying out the work.
- .7 Provide suitable safety clothing and equipment as required during the course of the Work. Supply sufficient quantities of protection equipment to fit all site personnel including Departmental Representative, Departmental Representative's staff, and site visitors.
- .8 Provide workers with protection appropriate to the potential type and level of exposure. Establish specific safety protocols prior to commencing clean-up activities.
- .9 Trained and certified personnel are required to complete all Transportation of Dangerous Goods Act (TDGA) and Interprovincial Movement of Hazardous Waste Regulation (IMHWR) documentation and recording requirements.

1.7 MEASUREMENT FOR PAYMENT

- .1 The supply of Hazardous Waste Containers, including liners, for the containerization of Hazardous Waste will be measured for payment by the functional interior storage volume, in cubic metres, of the container. Supply of Hazardous Waste Containers will be paid under Item 02 81 01-1 as indicated in the Basis of Payment Schedule.
- .2 The collection, containerization and on-site transport to the Temporary Storage Area of all Hazardous Waste derived from Structure Demolition will not be included for payment under this section, but will be included as specified in Section 02 41 16 Structure Demolition.

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- .3 The collection, containerization and on-site transport to the Temporary Storage Area of all Hazardous Waste derived from Debris Removal will not be included for payment under this section, but will be included as specified in Section 02 41 23 Debris Removal.
- .4 Be responsible for all costs associated with any repackaging of container contents resulting from the failure by the Contractor to properly pack, handle and secure the container and/or contents
- .5 Unknown hazardous material is that material designated as hazardous in accordance with the definition of hazardous waste material in Clause 1.4.1 of this section and which has not been specifically identified for collection or disposal as part of other work components.
- .6 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Description:
 - .1 Bring only quantities of hazardous material required to perform Work on the sites.
 - MSDS for suggested hazardous materials are to be approved by the Departmental Representative prior to transporting to the sites.
 - .3 Upon approval, maintain MSDS in proximity to where materials are being used.

 Communicate this location to personnel who may have contact with hazardous materials.

.2 Hazardous Materials Containers:

- .1 Containers must satisfy the requirements of the most recent edition of the TDGA and all applicable regulations, and in particular, the requirements for intermediate bulk containers for marine/air/ground transport of hazardous materials.
- .2 Submit specifications of the containers to Departmental Representative for review a minimum of 45 days prior to mobilization. These details are to include written confirmation from Transport Canada that Contractor's proposed containers satisfy TDGA regulatory requirements for marine/air/ground transport.
- .3 Containers are to include all necessary liners to satisfy the TDGA requirements for marine/air/ground transport.
- .4 With respect to packaging and containerization requirements of hazardous materials, all requirements of the TDGA and Regulations and CEPA Interprovincial Movement of Hazardous Waste must be met.
- .5 Provide access for Departmental Representative to inspect all Hazardous Waste Material Packaging as directed by Departmental Representative.

.3 Solvent (Drum Rinse)

.1 Minimum flash points within the MSDS for solvents must be submitted to Departmental Representative prior to shipment to the sites. The solvent shipped to the sites are to remain the property of Contractor.

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PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- .1 Conduct all Work in accordance with all appropriate federal and territorial legislation, and international conventions.
- .2 Individuals shipping and receiving hazardous materials are to be licensed under the TDGA and Regulations, and appropriate federal and territorial environmental acts and regulations.
- Only trained individuals or individuals working under the direct supervision of trained persons are to handle or transport dangerous goods.
- .4 Establish Hazardous Materials Processing Area at the sites near the Temporary Storage Area(s), where hazardous materials are present, for the storage of potentially hazardous materials for inspection, testing, classification and packaging, as well as for the consolidation, and packaging of drum liquids, and for the cleaning of drums. Provide measures to mitigate release of contaminants to the environment including, but not limited to liners, silt fences, sorbent materials, ditching and grading, etc.
- .5 Establish (a) Temporary Storage Area(s) at the Site(s) in accordance with Section 01 52 00 Construction Facilities to provide a secure area for hazardous material storage prior to shipment for disposal as described in this Section.

3.2 PROTECTION

- .1 Complete all work in an environmentally acceptable manner. Comply with requirements of Section 01 35 43 Environmental Procedures, Section 02 82 00.01 Asbestos Abatement minimum Precautions, and 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
- .2 Avoid releasing any hazardous materials into the environment during handling and storage.
- .3 In the event of a spill, implement the emergency response plan and take appropriate action.
- .4 Any wastewater created from the cleaning of fuel tanks, pipelines and drums is to conform to the wastewater discharge criteria in Section 01 35 15 Special Project Procedures for Contaminated Sites prior to release. Wash water should be treated to meet the discharge criteria, or dispose of any liquid effluent not conforming to the Discharge Criteria as a waste material at Contractor's own cost, in accordance with the requirements of this Section.
- 5 Departmental Representative is to carry out baseline soil sampling and analyses of the Temporary Storage Area and Hazardous Materials Processing Area at each of the sites, where hazardous materials will be stored, prior to commencing work, and confirmatory sampling following the decommissioning of the areas. The Contractor is responsible for any soil impacts resulting from the improper storage and handling of hazardous materials over the duration of site activities. In the event of such impacts, the Contractor is to submit to Departmental Representative a plan for site remediation in accordance with all Federal and Territorial Regulations to be enacted upon immediately following approval by Departmental Representative. All clean-up costs, including but not limited to excavation and disposal, will be borne by Contractor.
- .6 Personal Protective Equipment (PPE), as per Section 01 35 32 Site Specific Health and Safety Plan, is to include clothing, protective suits, respirators, etc. in accordance with NIOSH Guidelines and to comply with anticipated and potential emergency conditions.

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.7 Site personnel in the vicinity of the debris removal operations or handling hazardous material are required to wear PPE in accordance with NIOSH guidelines.

- .8 Provide a full range of clean-up and protective equipment at the site to contain and clean-up spills, and protect personnel, as detailed in the Spill Contingency Plan and specified in Section 01 35 32 Site Specific Health and Safety Plan. The clean-up equipment is to include booms (sorbent and containment), sorbents for clean-up, fire extinguishers for A-B-C fires, overpacks for contaminated soils, pumps, hand shovels, picks and containment barriers, such as plastic sheeting. Personal protective equipment is to include clothing, protective suits, respirators, etc. to comply with potential emergency conditions and in accordance with NIOSH quidelines.
- .9 Handle materials containing asbestos or suspected to contain asbestos in accordance with Section 02 82 00.01 Asbestos Abatement Minimum Precautions.
- .10 Handle materials containing lead paint or suspected to contain lead paint in accordance with Section 02 83 10 Lead Based Paint Abatement Minimum Precautions.
- .11 The contractor is responsible for safely venting, containerizing and disposing of all unknown substances within pressurized cylinders and fire extinguishers that are on site.

3.3 HAZARDOUS MATERIALS PROCESSING AREA

- .1 Establish Hazardous Materials Processing Areas at each of the Sites, where hazardous materials are present, for the purpose of:
 - .1 Sorting, packaging, sampling, and processing of unknown and known hazardous materials; and,
 - .2 Consolidation and Processing of drums and drum contents, including packaging for off-site shipment, and cleaning of drums.
- .2 Establish Hazardous Materials Processing Areas to:
 - .1 Be of sufficient size and capacity to accommodate the volume of material and number of drums to be processed at any one time.
 - .2 Minimize the handling of hazardous materials.
 - .3 Provide for the sampling, testing, and packaging of hazardous materials, drum contents and wash water.
 - .4 Isolate hazardous materials, drum contents and wash water from other work operations.
 - Provide access for consolidation, packaging, cleaning of drums, and transporting containers to the Temporary Storage Areas.
 - .6 Be leak-proof and able to contain all runoff water, spills, and leaks so as not to impact the environment.
 - .7 Provide safe working conditions for all personnel working in and around these areas.
 - .8 Meet the requirements of AHJ.
- .3 The Hazardous Materials Processing Areas are to be located as follows:
 - .1 At least 30 metres away from any water body or drainage course.
 - On stable ground which is not subject to flooding or seasonal saturation and lined with a 30 mil impenetrable geomembrane liner in accordance with Section 31 32 19.02 Geomembranes underneath all contents except non-hazardous materials.
 - .3 In a previously disturbed area if possible.
 - .4 In a location that will not impede other work.

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HAZARDOUS MATERIALS

- .4 Submit the details of the Hazardous Materials Processing Areas to Departmental Representative at least one (1) week prior to commencing operations.
- .5 Do not construct the Hazardous Materials Processing Areas until baseline sampling has been completed by the Departmental Representative at each of the sites.
 - .1 Immediately clean up any spills, leaks, or other releases of liquid or sediment from this area using proper techniques.
 - .2 The Departmental Representative will complete confirmatory sampling following the decommissioning of the Hazardous Materials Processing Areas.

3.4 TEMPORARY STORAGE AREAS

- .1 Develop Temporary Storage Areas at each of the sites for the storage of containerized hazardous materials, non-hazardous waste and impacted soil and containerized drum/tank contents.
- .2 Temporary Storage Area must comply with the requirements identified in Section 01 52 00 Construction Facilities of these Specifications.
- .3 The location and size of the Temporary Storage Area must allow for the minimization of handling of materials, isolate materials from other work operations and provide for the collection and removal of materials from each of the sites.
- .4 Segregate materials within the Temporary Storage Area as follows:
 - .1 Impacted Soil (prior to transport of material to either the Landfarm, Waste Rock and Soil Containment Area (WRSCA) or the Tailings and Soil Containment Area (TSCA), dependent on the site and type of impacted soil).
 - .2 Containerized Hazardous Solid and Liquid Materials (if any).
 - .3 Containerized Drum and Tank Contents (including rinsate).
 - .4 Non-hazardous Materials (prior to transport of material to either the WRSCA or TSCA, site dependent).
- .5 Store materials in their appropriate packaging containers in accordance with the TDGA requirements.
- .6 No stacking of containers will be allowed during storage.
- .7 In accordance with Section 01 78 00 Closeout Submittals, submit to Departmental Representative a detailed inventory of the Temporary Storage Area within thirty (30) days of completion of each field season, indicating the location and contents of each container and assigned internal tracking numbers (as required) and packaging configuration.
- .8 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use will be shipped on site in amounts approved by the Departmental Representative.
- .10 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
- .11 Storage of quantities of flammable and combustible liquids exceeding a volume (determined by the Departmental Representative) for work purposes requires the written approval of the Departmental Representative.

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- .12 Transfer of flammable and combustible liquids is prohibited within buildings or where ventilation is not considered adequate.
- .13 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
- .14 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
- .15 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .16 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled and in active work areas.

3.5 REMOVAL AND SORTING OF HAZARDOUS MATERIALS

- .1 Continually monitor remediation operations to identify potentially hazardous material.
- .2 Immediately suspend operations if suspected hazardous material is identified and obtain visual confirmation of the nature of the material.
- .3 Store suspicious material in a secured area or secured container, if the nature of the material or debris cannot be confirmed. Inform Departmental Representative about the findings. The suspicious material needs to be controlled until the nature of the material is confirmed by Departmental Representative. Sampling and testing of the material for classification will be conducted and paid for by Departmental Representative.
- .4 Remove hazardous materials derived from demolition work from their place of origin in accordance with Section 02 41 16 Structure Demolition, place in approved containers, and transport containers to the Temporary Storage Area.
- .5 Remove asbestos in accordance with Section 02 82 00.01 Asbestos Abatement Minimum Precautions.
- .6 Handle materials containing lead paint or suspected to contain lead paint in accordance with Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions.
- .7 Advise Departmental Representative of any stained soils encountered during hazardous material removal operations. Excavate stained and impacted soil areas, identified during removal operations upon approval from Departmental Representative and in accordance with the requirements of Section 02 55 13 Contaminated Soil. Testing for confirmation of impacts will be carried out and paid for by Departmental Representative.
- .8 Submit specifications of the containers for handling and disposal of hazardous materials to Departmental Representative for review and approval prior to commencement of site remediation activities. Include all required approvals, as well as a description of the type and volume of containers.

3.6 DRUM PROCESSING

.1 Flow diagrams for the methodology for the processing, clean-up and disposal of is shown on Figures 1 and 2 at the end of this Section.

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HAZARDOUS MATERIALS

.2 Submit for review forty-five (45) days prior to mobilization, a detailed description of the proposed drum processing methodology, including oil/water separation, water treatment, and containers to be used for the disposal of hydrocarbon absorbent materials and hydrocarbon drum contents. The description must include product/manufacturer information and specifications for each of the products to be used.

.3 Inspection:

- .1 All drums must be inspected by Departmental Representative and Contractor. The purpose of the inspection is to identify the process for opening, sampling, testing and handling of the drums. The inspection is to address the following items as a minimum:
 - .1 Symbols, words, or other marks on the drum that identify its contents, and/or that its contents are hazardous; e.g., radioactive, explosive, corrosive, toxic, flammable.
 - .2 Symbols, words, or other marks on the drum that indicate it contains discarded laboratory chemicals, reagents, or other potentially dangerous materials in small-volume containers.
 - .3 Signs of deterioration such as corrosion, rust, or leaks at seams, rims, and V grooves.
 - .4 Evidence of spills or other contamination on the top and sides of the drum.
 - .5 Signs that the drum is under pressure such as bulging and swelling.
 - .6 Signs that the drum has been painted with lead paint (e.g. scaly paint). If a drum appears to be painted with lead paint, do not disturb such material until instructed by Departmental Representative.
- .4 Test areas around drums that show evidence of holes, rust points, or openings using a VOC instrument prior to movement. If levels exceed 20 percent LEL as measured by the VOC, conduct all handling, storage, and transportation operations in accordance with the appropriate sections of the NIOSH guidelines, National Fire Code of Canada, and the TDGA for flammable and combustible materials.

.5 Drum Opening:

- .1 Pressurized drums are extremely hazardous. Open with extreme caution. Use only non-sparking equipment to open drums (i.e. brass or beryllium). Provide all personnel opening drums with appropriate safety equipment and protective clothing. Open drums in accordance with the procedures outlined in the Occupational Safety and Health Administration (OSHA) Code of Federal Regulations Title 29, Part 1910, Section 120 (29 CFR 1910.120) Hazardous Materials Operations and Emergency Response (HAZWOPER).
- .2 If the bungs of a drum can be readily moved, then open the drum slowly, allowing time for any pressure in the drum to be released before the bungs are fully removed.
- .3 If the bungs of a drum cannot be readily moved, or if inspection suggests opening the drum may present a special hazard, vent the drums remotely to relieve any internal pressure that may be present prior to opening. Conduct remote drum venting using a suitable device.
- .4 Conduct the remote venting operation at a safe distance from other site operations, and from behind suitable walls or barricades.
- .5 All drums are to be clearly numbered on the lid and side of the drum and cross referenced to sample numbers.
- .6 Do not transport drums until it has been determined that they are not pressurized, do not leak, and are sufficiently sound for transport.

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- .6 Sampling and testing of drum contents:
 - .1 Samples of the contents of the drums for determination of disposal requirements are to be collected by the Departmental Representative. Samples as required by the Contractor's Designated Hazardous Waste Disposal Facility are to be collected by the Contractor.
 - .2 Combine drum contents that are determined, through field screening, visual observations and labeling to contain the same liquids.
 - .3 Consolidate drum contents only in the Materials Processing Areas.
 - .4 Do not consolidate drum contents consisting of black oil.
 - .5 Collect drums and store at the Materials Processing Areas.
 - .6 Liquid samples are to be inspected and classified by the Contractor as containing water or organic materials.
 - .7 Based on the results of the analysis by the Contractor and/or Departmental Representative; treat drum contents in accordance with the requirements detailed in Figure 2 at the end of this section.
 - .8 The Departmental Representative will perform the necessary QA/QC analysis and review of the results obtained by the Contractor.

.7 Disposal of drum contents:

- .1 Dispose of drums containing rust and sediment as empty drums, as described below.
- .2 For small volumes agitation with oil-absorbent material to remove any organic material is acceptable.
- .3 Collect aqueous contents for disposal in accordance with wastewater discharge criteria, Section 01 35 15 - Special Project Procedures for Contaminated Sites.
- .4 Test used oil-absorbent material to determine treatment and disposal requirements.
- .5 Dispose of drum contents at the Contractor's Designated Hazardous Waste Disposal Facility.
- Should the Contractor propose incineration as an alternative to off-site disposal, and should such a request be accepted by the Departmental Representative, incinerator is to be a dual chamber, forced air, fuel fired POL incinerator type, and all material to be incinerated must meet the following criteria on site in accordance with site permit requirements and the Environmental Guideline for the Burning and Incineration of Solid Waste (EGBISW):
 - .1 PCBs < 2 ppm
 - .2 Chlorine < 1000 ppm
 - .3 Cadmium < 2 ppm
 - .4 Chromium < 10 ppm
 - .5 Lead < 100 ppm
 - .6 Glycol/Alcohol <2%
- .7 Contents and used oil-absorbent material designated for disposal off-site at a licensed disposal facility will be packaged as required in accordance with TDGA regulations. Contents may be combined with compatible materials for shipping purposes in accordance with TDGA regulations, as required.
- Leachate extraction tests and total CCME metals analysis are to be carried out by Departmental Representative on the solid residual material resulting from any incineration process. The leachate toxicity of the material will be determined in accordance with CEPA regulations. Dispose of materials found not to be leachate toxic and that meet appropriate metals guidelines, as hydrocarbon contaminated soil as described in Section 02 55 13 Contaminated Soil. Package leachate toxic material in accordance with TDGA regulations, and dispose of off-site.

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.8 Cleaning and disposal of drums:

- .1 Steam clean empty drums resulting from the consolidation of drum contents. Clean to remove oil, sludge, wax, tar and other fuel residue adhering to the surface.
- .2 If residue remains, apply a manual detergent cleaning method. For heavily oil soaked surfaces, a second detergent application may be required. Steam clean drums after detergent application.
- Only in the event that two detergent applications prove ineffective, use an appropriate solvent rinse for residue removal. Solvent rinsate material is to be tested by Departmental Representative to determine disposal requirements. If the solvent rinsate meets the criteria indicated above, incinerate the material on-site. If the solvent rinsate is in excess of the criteria, package the material in accordance with TDGA regulations, as required, for disposal off site at Contractor's licensed disposal facilities.
- .4 Recycling of steam cleaning rinsate is permitted if steam cleaning rinsate is passed through an oil-water separator. Oily waste residue separated by agitation and removed with oil-absorbent material to remove any organic material is permitted.
- The resulting rinsate is to be tested by Departmental Representative for the wastewater discharge criteria in Section 01 35 15 Special Project Procedures for Contaminated Sites. If the concentrations of the rinsate are greater than the indicated levels, then package the rinsate in accordance with TDGA regulations, as required, for disposal off site at Contractor's Designated Hazardous Waste Disposal Facility.
- Dispose of the used oil-absorbent material and/or oily liquid waste in excess of the concentrations indicated in this section.
- .7 Crush all empty drums prior to containerization. Crush the drums to reduce the total original drum volume by a minimum of 75 percent. Containerize empty drums as non-hazardous materials or hazardous materials (if lead paint detected from any sampling) in accordance with Section 02 41 23 Debris and Miscellaneous Removals.

3.7 CLEANING OF FUEL TANKS/ASTS

- .1 Debris at the sites may consist of fuel tanks and ASTs which may contain fuel.
- .2 Prior to the demolition and removal of fuel tanks and ASTs:
 - .1 Remove all liquids contained in the tank for offsite disposal at a licenced facility. Liquids will be packaged as required in accordance with TDGA regulations, as described above. Should the Contractor propose incineration as an alternative to off-site disposal, and should such a request be accepted by the Departmental Representative, incinerate in a container to prevent soil or water contamination and ensure an oxygen-rich environment to promote complete combustion. Incineration to occur in accordance with Section 01 35 32 Site Specific Health and Safety Plan.
 - .2 Rinse tanks with water to remove any residual product. Filter the wash water through oilabsorbent material or oil/water separator.
 - .3 Test the used oil-absorbent material to determine disposal requirements. Incinerate oilabsorbent material meeting the following criteria on-site or package for disposal off-site at Contractor's licensed disposal facilities:
 - .1 PCBs < 2 ppm
 - .2 Chlorine < 1000 ppm
 - .3 Cadmium < 2 ppm
 - .4 Chromium < 10 ppm
 - .5 Lead < 100 ppm
 - .6 Glycol/Alcohol < 2%

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.4 Treat if necessary and discharge remaining waste wash water in accordance with the wastewater discharge criteria outlined in Section 01 35 15 - Special Project Procedures for Contaminated Sites.

- .5 The oil-absorbent material containing contaminants in excess of the above criteria should be packed in accordance with TDGA regulations, as required, for disposal off site at a licensed disposal facility.
- The Contractor is to submit purging and off-gassing safe work procedures for approval by the Departmental Representative prior to commencing off-gassing. The safe work procedures must follow applicable regulations and guidelines.
- .7 Degass all tanks in accordance with the approved safe work practices. Use nitrogen for degassing, as required, if ventilation and purging methods fail. Monitor areas surrounding tanks and pipeline for vapour build up during degassing.
- .8 Following degassing, check interior explosive vapour concentrations which must be less than 20 percent LEL prior to demolition.

3.8 COLLECTION AND DISPOSAL OF BATTERIES

- .1 Collect and containerize all batteries for off-site shipment.
- .2 Transfer battery containers to the Temporary Storage Area for storage prior to transportation to final disposal site.
- .3 Ship battery containers off-site to Contractor's Designated Hazardous Waste Disposal Facility, as approved by the Departmental Representative.

3.9 EXPLOSIVES

- .1 Unfired explosives shall be assessed by an explosives expert and addressed based on their recommendations. Known unfired explosives are located at Kidney Pond but could be located at other GLG sites.
- .2 Previously fired explosives and remains of explosives fired during remediation (if any) will be containerized and disposed off-site.

3.10 PACKAGING, LABELLING AND INVENTORY OF CONTAINERS

- .1 Provide a numbering system and maintain an inventory of all containers to be transported and disposed of off-site.
- .2 Package and label each "hazardous material" in accordance with the "Class" and "Packaging Group" as per the TDGA.
- .3 Submit to Departmental Representative, a copy of the inventory of the contents of each container.

3.11 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for transport off-site
 - .1 Dispose of hazardous waste materials in accordance with applicable federal and territorial acts, regulations, and guidelines.

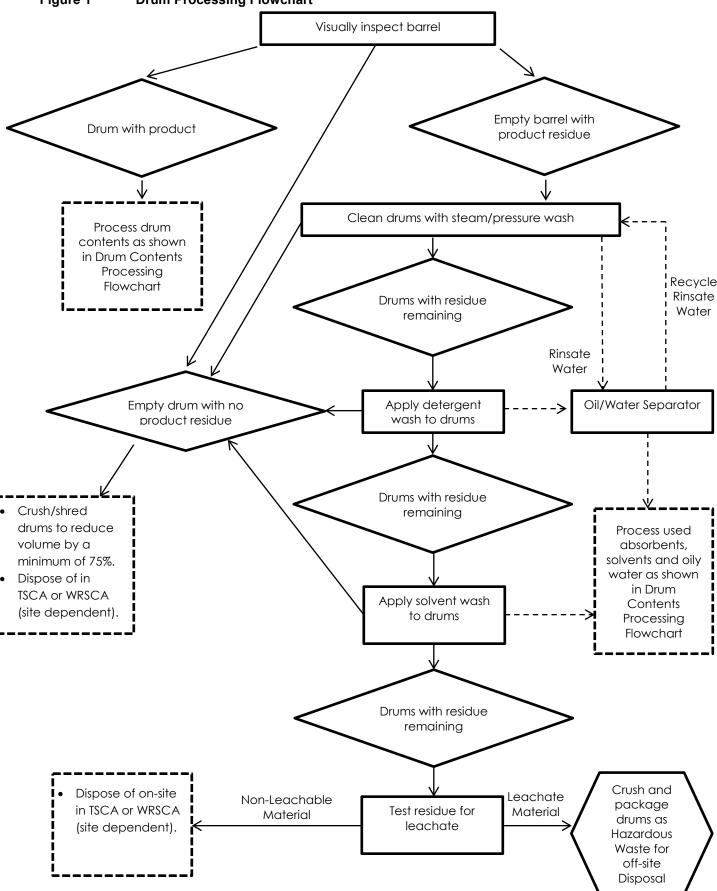
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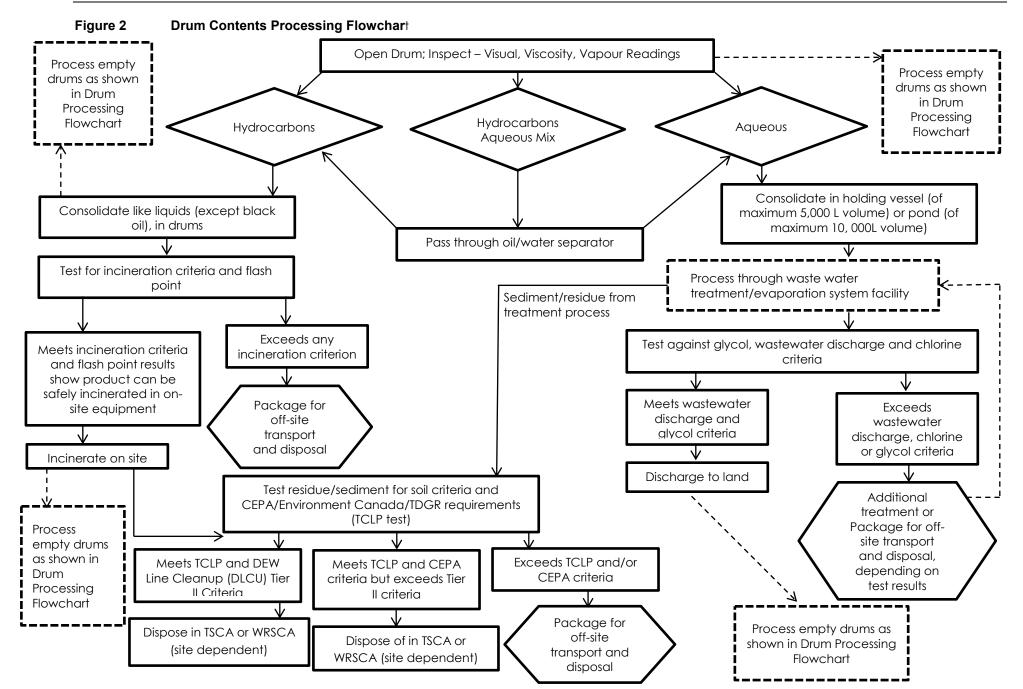
.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Diluting or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable territorial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION







PART 1 - GENERAL

1.1 DESCRIPTION

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removing non-friable asbestos-containing material as listed in Appendix A, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated. If removal is to incorporate any of these methods, then work procedures are to be upgraded as approved by the Departmental Representative.
- .2 This section shall apply to the following equipment material and location:
 - .1 Drill Rig Brake Pad at Burnt Island (containing Chrysotile Asbestos)

1.2 RELATED SECTIONS

- .1 Section 01 31 18 Construction Progress Schedules Bar (GANTT) Chart.
- .2 Section 01 33 00 Submittal Procedures.
- .3 Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 Site Specific Health and Safety Plan.
- .5 Section 01 35 43 Environmental Procedures.
- .6 Section 02 41 16 Structure Demolition.
- .7 Section 02 41 23 Debris and Miscellaneous Removal.
- .8 Section 02 81 01 Hazardous Materials.

1.3 REFERENCES

- .1 Canada Labour Code (R.S.C., 1985, c.L-2)
 - .1 Canada Occupational Health and Safety Regulations (SOR/86-304).
 - .1 Part X Hazardous Substances.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999 (S.C. 1999, c.33).
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992 (SC1992, c.34)
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286).
 - .3 Hazardous Products Act (R.S.C., 1985, c. H-3)
 - .1 Controlled Products Regulations (SOR/88-66).
 - .2 Workplace Hazardous Materials Information System.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN Standard 1.205-2003, Sealer of Asbestos Fibre Releasing Materials.

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- .2 CSA Standard Z94.4-93 (R1997) – Selection, Use and Care of Respirators.
- Department of Environment and Natural Resources, Government of the Northwest Territories .4
 - Guideline for the Management of Waste Asbestos (2004). .1
- .5 Workers Safety & Compensation Commission.
 - .1 Code of Practice on Asbestos Abatement (2012).
- .6 Safety Act NWT. R.S.N.W.T. 1988, c.S-1.
- .7 Labour Standards Act. R.S.N.W.T 1988, c.L-1.

DEFINITIONS 1.4

- HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of .1 collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Department Representative and representatives of regulatory agencies.
- .6 Competent worker person: in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the Territorial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 Friable material: means material that:
 - When dry, can be crumbled, pulverized or powdered by hand pressure, or .1
 - Is crumbled, pulverized or powdered.
- 8. Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area where nonprotected personnel are present.
- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

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.12 Supervisor: Contractor's worker able to provide a history of satisfactory experience in the area of asbestos abatement that can satisfy Territorial and federal requirements and will be permitted to supervise the work in this Section. The supervisor responsible for the work of this Section is to have a minimum of five (5) years of experience in the area of asbestos abatement.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 Submittal Procedures:
 - .1 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of Authorities Having Jurisdiction (AHJ).
 - .2 Submit Territorial and/or local requirements for Notice of Project Form.
 - .3 Submit proof of Contractor's Asbestos Liability Insurance.
 - .4 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
 - Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
 - Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
- .2 Health and Safety:
 - .1 Perform construction occupational health and safety in accordance with Section 01 35 32 Site Specific Health and Safety Plan.
 - .2 Safety Requirements: Worker Protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Territorial AHJ. The respirator is to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator identified to have damaged or deteriorated parts shall be replaced prior to further use. When not in use, respirators shall be stored in a convenient, clean and sanitary location. The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker is not to be assigned to

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- operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn. The Contractor is to provide suitable footwear relevant to the safe work procedure. This may be steel toed rubber boots or steel toed boots extending above the ankle.
- .2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .4 Facilities for washing hands and face shall be provided where the main point of ingress and egress has been identified for the Asbestos Work Area.
- .5 Ensure workers wash hands, face, and respirator when leaving Asbestos Work Area.
- Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.
- .7 If at any time the contractor, Departmental Representative or analytical confirmation shows that the protection factor of the minimum asbestos abatement procedure is inadequate, work procedures are to be upgraded to intermediate or high risk work procedures or additional controls must be requested by the contractor in writing for approval by the Departmental Representative.

1.7 ACM DISPOSAL

- .1 Disposal of asbestos waste generated by removal activities must comply with Federal, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm bags. Label bags with appropriate warning labels.
- .2 Transport waste by an approved means to the Temporary Storage Area on-site until wastes can be disposed of at the Contractor's approved off-site Waste Disposal Facility. Provide manifests describing and listing waste created.

1.8 EXISTING CONDITIONS

- .1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of using minimum precautions during this Project are identified in Appendix A and on Drawing C-BUR-03.
- .2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

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1.9 INSTRUCTIONS

- .1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

1.10 SIGNS

.1 Signage: Display signs in all work areas where access to a contaminated area is possible. The English version of the signs is to read:

CAUTION, ASBESTOS HAZARD AREA. UNAUTHORIZED ENTRY PROHIBITED. WEAR PROTECTIVE EQUIPMENT.

- .2 Post a similar sign in the language of the local dialect.
- .3 Sign letters: all lettering is to be HELVETICA Medium font. The letter size is to be:

English:

Caution, Asbestos Hazard Area. 25 mm Unauthorized entry prohibited: 19 mm Wear Protective Equipment 19 mm

1.11 MEASUREMENT FOR PAYMENT

- .1 The abatement, separation, packaging, and disposal of asbestos debris will not be measured for payment and should be included in the price for demolition of the structures as described in Section 02 41 16 Structure Demolition and 02 81 01 Hazardous Materials including but not limited to the following:
 - .1 Supply of all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of asbestos waste containers.
 - .2 Construction of temporary enclosures.
 - .3 Handling, separation and disposal of asbestos materials from other debris and miscellaneous materials.
 - .4 Preparation of asbestos inventory.
 - .5 Temporary storage of asbestos as required, prior to transport to the Contractor's approved Waste Disposal Facility.
 - .6 Transportation to and disposal of asbestos at Contractor's approved Waste Disposal Facility.

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.2 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Drop Sheets:
 - .1 Polyethylene: 0.15 mm thick.
 - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages (English and French) that is visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 PROCEDURES

- .1 Complete occupational health and safety in accordance with Section 01 35 32 Site Specific Health and Safety Procedures for Contaminated Sites.
- .2 Before beginning Work, isolate Asbestos Work Area using, minimum, pre-printed cautionary asbestos warning signs in both official languages (English and French) in upper case 'Helvetica Medium' letters reading as follows, where number is parenthesis indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm)/ BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.
- .3 Before beginning work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages (English and French) that are visible at access routes to Asbestos Work Area.
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .4 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

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NT ASBESTOS ABATEMENT – MINIMUM PRECAUTIONS

- .5 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low velocity fine mist sprayer.
 - .2 Perform Work to reduce dust creation to lowest levels practicable.
 - .3 Work may be subject to air monitoring under Contractor's Quality Assurance program, and to visual inspection under Contractor's Quality Assurance Program and by Departmental Representative.
 - .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .6 Frequently and at regular intervals during Work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.

.7 Cleanup:

- .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
- .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
- .3 Seal double bagged asbestos waste material and dispose at the Contractor's Designated Hazardous Waste Disposal Facility. Dispose in accordance with the requirements of the Territorial and Federal AHJ.
- .4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section includes the requirements and procedures for handling and disposal of lead-based paint chips and substrate materials.
- .2 Lead-containing coatings to remain on substrate except when deemed unfeasible.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing coatings by manual scraping as deemed feasible by the Contractor and as approved by the Departmental Representative, and handling of paint chips and substrate with lead-based paint.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 Construction Progress Schedules Bar (GANTT).
- .2 Section 01 33 00 Submittal Procedures.
- .3 Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 32 Site Specific Health and Safety Plan.
- .5 Section 01 35 43 Environmental Procedures.
- .6 Section 02 41 16 Structure Demolition.
- .7 Section 02 41 23 Debris and Miscellaneous Removals.
- .8 Section 02 81 01 Hazardous Materials

1.3 REFERENCES

- .1 Canada Labour Code (R.S.C., 1985, c.L-2)
 - .1 Canada Occupational Health and Safety Regulations (SOR/86-304).
 - .1 Part X Hazardous Substances.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992 (SC1992, c.34)
 - .1 Transportation of Dangerous Goods Regulations (SOR/2001-286).
 - .3 Hazardous Products Act (R.S.C., 1985, c. H-3)
 - .1 Controlled Products Regulations (SOR/88-66).
 - .2 Workplace Hazardous Materials Information System
- .3 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.

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- .4 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .5 U.S. Department of Labour Occupational Safety and Health Administration (OSHA) Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation 29 CFR 1926.62-2007.
- .6 Underwriters' Laboratories of Canada (ULC)

1.4 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representative(s).
- .3 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 μg/m³) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead based paint by methods noted in paragraph 1.1.
- .6 Competent worker: in relation to specific work, means a worker who,
 - .1 Is qualified because of knowledge, training, and experience to perform the work.
 - .2 Is familiar with the referenced provincial and federal laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of potential or actual danger to health or safety in the work.
- .7 Lead-based paint: Material that is coated with paint that has been analyzed and determined to contain total lead concentrations in excess of 600 ppm.
- .8 Lead dust: when wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
- .9 Work Area: Area of the site that includes the location of the material which has lead-based paint, the container in which this material is placed prior to removal for off-site disposal, and the area in between, i.e. over which the material will be moved, if necessary.
- .10 Occupied Area: Areas of building or work site that is outside Work Area.

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1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit written proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead-based paint waste in accordance with requirements of Authority Having Jurisdiction (AHJ).
- .3 Submit Territorial/Provincial and/or local requirements for Notice of Project Form.
- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof that lead-based paint waste has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.
 - .3 Provide proof that supervisory personnel have attended a lead abatement course, of not less than two (2) days duration, approved by Departmental Representative. Minimum of one (1) supervisor for every ten (10) workers

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Perform construction occupational health and safety in accordance with Section 01 35 32 Health and Safety Plan.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers and visitors in Work Area include:
 - .1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of (10), acceptable to Authority Having Jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide sufficient amount of filters. Half mask respirator: half-mask particulate respirator with N,R or P series filter, and 100 % efficiency could be provided.
 - .2 Disposable-type protective clothing, with snug-fitting cuffs at wrists, ankles, and neck.

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.2 Requirements for Workers:

- Remove street clothes in clean change room and put on respirator with new filters or reusable filters and clean disposable coveralls before entering Work Area. Remove gross contamination from clothing before leaving Work Area. Place contaminated work suits on the polyethylene sheeting before rolling for disposal. Upon completion of lead abatement, clean footwear thoroughly using soap and water.
- .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
- .4 Facilities for washing hands and face shall be provided adjacent to the Work Areas. Workers must wash hands, face, and respirators when leaving Work Area.
- .5 Provide and post on-site the procedures described in this Section in three official languages (English, French, and language of local dialect).
- No person required to enter a lead abatement Work Area may have facial hair that affects seal between respirator and face.
- .7 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors for Work Areas.
 - .2 Instruct Authorized Visitors in use of protective clothing, respirators, and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering and exiting from Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Territorial/Provincial and municipal regulations.
- .2 Disposal of lead waste generated by removal activities must comply with federal, territorial and municipal regulations. Dispose of lead waste (including paint chips) in sealed double thickness 6 mil (0.15 mm thick) bags and then leak proof drums. Label containers with appropriate warning labels.
- .3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.
- .4 For each container of lead-based paint waste: identify waste and weight in kilograms of the waste.

1.8 EXISTING CONDITIONS

- .1 Summaries of lead-based painted materials to be abated and disposed of using minimum precautions are presented in Appendix A and included on Drawing C-TRE-02.
- .2 Notify Departmental Representative of suspect lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.9 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Territorial department responsible for labor.

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- .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.10 MEASURMENT FOR PAYMENT

- .1 The abatement, separation, packaging, transport and disposal of materials with lead-based paint from buildings and structures to be demolished and debris areas are included in the price for demolition of the structures as described in Section 02 41 16 Structure Demolition, Section 02 41 23 Debris and Miscellaneous Removals and in Section 02 81 01 Hazardous Materials including, but not limited to the following:
 - .1 Supply of all materials, labour, and equipment necessary to perform the work in accordance with these specifications, including the supply and transport to the site of lead waste containers.
 - .2 Construction of temporary enclosures and drop sheets when necessary.
 - .3 Handling, separation and disposal of lead-based painted materials from other debris and miscellaneous materials.
 - .4 Preparation of lead-based paint waste inventory.
 - .5 Transport and off-site disposal of lead-based paint and painted material.
- .2 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fibreglass reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .3 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible (in English, French and language of local dialect) when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

.1 Approved Supervisor must remain within work area during disturbance, removal, or handling of lead-based paints.

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3.2 PREPARATION

.1 Work Area:

- .1 Cordon off Work Areas (areas where removal of lead-based paint is to be undertaken, if required, or where material with lead-based paint is placed into 0.15 mm polyethylene bags, either of which should ideally be at the location where the material with lead-based paint is found, to minimize potential for spreading of lead-based paint)) using temporary measures such as pylons or snow/sand fences.
- .2 At point of access to Work Areas, install warning signs in three official languages (English, French, and language of local dialect) in upper case "Helvetica Medium" letters reading as follows were number in parentheses indicates font size to be used:
 - .1 CAUTION LEAD HAZARD AREA (25 mm)
 - .2 NO UNAUTHORIZED ENTRY (19 mm)
 - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm)
 - .4 BREATHING IN LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm)
- .3 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.

.2 Do not start work until:

- .1 Arrangements have been made for disposal of waste.
- .2 Tools, equipment, and materials waste containers are on site.
- .3 Notifications have been completed and preparatory steps have been taken.

3.3 LEAD ABATEMENT

- .1 If there is flaking paint that could fall off with very little disturbance, lay down a sheet of 0.15 mm polyethylene sheeting and place the material with lead-based paint on the sheeting.
- .2 Remove flaking paint that could fall off with minimal disturbance, using manual scraping, being careful to contain the paint chips on the polyethylene sheeting.
- .3 Remove materials with adhered lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags, doubled, and place in labelled leak-proof drums for transport.
- .4 Seal filled drums. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

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3.5 FINAL CLEANUP

- .1 Following cleaning, proceed with final clean-up.
- .2 Remove polyethylene sheet by rolling it away from the edges to centre of Work Area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED SECTIONS

Gordon Lake Group Sites, NT

- .1 Section 013300 Submittals
- .2 Section 03200 Concrete Reinforcement
- .3 Section 03300 Cast-in-Place Concrete

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction.
 - .2 CAN/CSA-O86-01, Engineering Design in Wood (consolidated).
 - .3 CAN/CSA O121-08, Douglas Fir Plywood.
 - .4 CAN/CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
 - .5 CAN/CSA-S269.3-M92 (R2008), Concrete Formwork.

1.3 DESIGN

.1 Design of concrete formwork and falsework shall be the responsibility of the Contractor.

1.4 SUBMITTALS

- .1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 Submittal Procedures.
- .2 Indicate method and schedule of construction, materials, arrangement of joints, ties, shores and location of embedded parts including waterstops and anchor bolts.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Formwork materials: Use plywood and wood formwork materials to CSA-O121.
- .2 Only new formwork shall be used for exposed concrete surfaces.
- .3 Form ties: Use removable or snap-off metal ties, fixed or adjustable length.
 - .1 Use only ties with ends removable to a distance of not less than 38mm from the face of the finished concrete.
 - .2 Form ties with a removable cone cast in the concrete shall produce a cone hole not more than 25mm in diameter.
 - .3 For liquid holding structures and exterior walls below grade, use coil type ties with force fit waterstop disc or integral waterstop.

CONCRETE FORMING AND ACCESSORIES

- .4 Form release agent:
 - .1 Use chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
 - .2 Form release agent shall be non-toxic and shall not contain any ingredients that could be a source of contamination of potable water.
- .5 Falsework materials: To CSA S269.1.

PART 3 - EXECUTION

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.
- .5 Submit details of any openings not indicated on structural drawings for review by the Departmental Representative before framing openings not indicated.
- .6 Align form joints and make watertight. Keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners of concrete members, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Remove forms so that no damage occurs to the concrete.
- .2 Consider the location, character of the structure, weather and other conditions influencing the curing of concrete, in determining the time for removal of forms. (Refer to Section 03 30 00 Cast-In-Place Concrete and CSA A23.1).
- .3 Leave shores in place until concrete has attained sufficient strength to adequately support its own weight together with construction loads likely to be imposed.
 - .1 Vertical Surfaces minimum 24 hrs

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CONCRETE FORMING AND ACCESSORIES

- .2 Other Surfaces Until concrete has attained 65% of the specified 28 day strength, unless otherwise approved by the Departmental Representative.
- .4 Re-use of formwork and falsework subject to requirements of CSA A23.1.

END OF SECTION

Section 03 20 00 CONCRETE REINFORCING Page 1 of 3

ISSUED FOR TENDER

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 013300 Submittals
- .2 Section 03100 Concrete Forming and Accessories
- .3 Section 03300 Cast-in-Place Concrete

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-09: Concrete Materials and Methods of Concrete Construction
 - .2 CAN/CSA-A23.3-04(R2010): Design of Concrete Structures
 - .3 CSA G30.5-M1983 (R1998): Welded Steel Wire Fabric for Concrete Reinforcement
 - .4 CAN/CSA-G30.18-M92 (R2009): CarbonSteel Bars for Concrete Reinforcement
 - .5 CAN/CSA G40.20-04/G40.21-04 R2009)General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel
 - .6 Concrete Reinforcing Steel Institute— Reinforcing Steel Manual of Standard Practice

1.3 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of material to be supplied a minimum of five (5) days prior to scheduled work

1.4 SUBMITTALS

- .1 Submit shop drawings to Departmental Representative including placing of reinforcement in accordance with Section 01 33 00 Submittal Procedures, at least ten (10) days before fabrication.
- .2 Indicate on shop drawings, bar-bending details, bar schedule, quantities of reinforcement, sizes, spacings, locations of reinforcement splices, and concrete cover, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with RISC Reinforcing Steel Manual of Standard Practice.
- .3 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

1.5 SUBSTITUTES

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Reinforcing steel: hot-dip galvanized billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

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CONCRETE REINFORCING

- .2 Cold drawn annealed steel wire ties: to CSA G30.3, hot-dip galvanized.
- .3 Welded steel wire fabric, hot-dip galvanized: to CSA G30.5, provide in flat sheets only,
- .4 Chairs, bar supports & spacers to CAN/CSA A23.1
- .5 Injectable adhesive shall be hybrid adhesive formulated to include resin and hardener to provide optimal curing speed as well as high strength and stiffness.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada
- .2 Location of reinforcement splices other than those shown on placing drawings only if permitted by Departmental Representative.

2.3 DELIVERY, STORAGE AND HANDLING

- .1 Ship bar reinforcement in standard bundles, clearly identified in accordance with bar bending details and lists.
- .2 Store reinforcement to prevent deterioration or contamination by dirt, detrimental rust, loose scale, paint, oil or other foreign substance likely to destroy or reduce bond.
- .3 Do not straighten or re-bend reinforcement in any manner.
- .4 Do not use bars kinked or bent by improper handling or storage.

PART 3 - EXECUTION

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated on reviewed shop drawings.
- .2 When field bending, bend without heat, applying a slow and steady pressure.
- .3 Replace bars that develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1.
- .2 Ensure cover to reinforcement is maintained during concrete pour.
- .3 Clean reinforcing steel bars prior to placing concrete.
- .4 Welding of reinforcement will not be permitted.
- Splice reinforcement only as shown on the approved drawings or if approved by the Departmental Representative.
 - .1 Bar splices shall conform to CSA-A23.3 (Class B), unless noted.

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CONCRETE REINFORCING

- .2 Lap adjacent sheets of wire fabric to provide an overlap of at least one cross wire spacing plus 50mm, measured between the outermost cross wires of each sheet.
- .6 Support reinforcement as follows:
 - .1 Beams, walls, and columns laterally support reinforcement with supports in pairs on opposite faces.
 - .2 Do not use supports that will be forced into the supporting formwork or soil by the weight of the reinforcement or other construction loads.
 - .3 Separate layers of bars by precast mortar blocks, bars or equally suitable devices. Do not use pebbles, pieces of broken stone or brick, metal pipe or wooden blocks.
 - .4 Do not place bars on layers of fresh concrete as the work progresses or install bars during placing of concrete.
- .7 Corner Bars: Install corner bars in walls and beams to match the larger size of normal reinforcement unless otherwise noted on the approved drawings.
- .8 Where reinforcement is drilled and grouted into existing concrete, reinforcement shall be secured using injectable adhesive in strict accordance with manufacturer's published recommendations, ensuring that reinforcing bars in existing concrete are not cut.
 - .1 Unless noted on Construction Drawings or elsewhere in these Specifications, obtain Departmental Representative's approval before drilling and grouting reinforcement.

3.3 INSPECTION

- .1 Notify Departmental Representative to permit inspection after placement is completed. Reinforcing for all concrete pours shall be inspected and approved after placing and prior to concreting.
- .2 Provide adequate notice of scheduled pours to facilitate inspection of reinforcement (minimum of 48 hours).

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

.1 Where Contract Drawings reference Standard Drawings and these Standard Drawings conflict with these Specifications in terms of material characteristics, these specifications shall govern.

1.2 RELATED SECTIONS

- .1 Section 01300 Submittal Procedures.
- .2 .Section 03100 Concrete Forming and Accessories.
- .3 .Section 03200 Concrete Reinforcement.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM C309-07: Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .2 ASTM D1227 95(2007) Standard Specification for Emulsified Asphalt used as a protective coating for Roofing.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000-08: Cementitious Materials Compendium.
 - .2 CAN/CSA-A23.1-09: Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-A23.2-09: Test Methods and Standard Practices for Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90: Multicompound, Chemical Curing Sealing Compound.

1.4 SUBMITTALS

- .1 Submittals shall be in accordance with Section 01 33 00 Submittal Procedures and as specified herein:
 - .1 If required by Department Representative, submit mix design and aggregate gradation curves for review at least 10 days in advance of concreting.
 - .2 Submit samples of aggregates, water and cement to be used, to an approved testing agency, if required by the Departmental Representative.
 - .3 Submit schedule of proposed construction joints to the Departmental Representative for review.
 - .4 Submit mill certificates for cement and supplementary cementing materials required by Departmental Representative.
 - .5 Submit details of proposed product substitutions (if any) with technical data sheets to demonstrate equivalency to product specified before proceeding with the work, at least 10 days in advance of concreting.

ISSUED FOR TENDER
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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Portland cement: to CAN/CSA-A3001. Use type GU.
- .2 Blended hydraulic cements: to CAN/CSA A3001-03.
- .3 Other cementing materials: to CAN/CSA-A3000 & A23.1.
- .4 Grout: 50 MPa Non-shrink grout mix.
- .5 Hydrophilic Rubber Waterstop:
 - .1 Provide rubber adhesive, epoxy gel and single component hydrophilic sealant in accordance with manufacturer's written recommendations.
- .6 Premoulded joint filler: asphalt expansion joint filler
- .7 Sub-drains at base of Retaining Walls and other structures to be Perforated PVC pipe wrapped in Filter fabric where indicated on drawings
- .8 Joint Sealer: Flexible-Flowable Joint filler for vertical or overhead control joints.
- .9 Bonding Agent: Cement Modified Epoxy Resin
- .10 Dampproofing where shown to be to ASTM D1227 95(2007) Standard Specification for Emulsified Asphalt

2.2 CONCRETE MIXES

- .1 Contractor shall be responsible for concrete mix design.
- .2 Proportion concrete in accordance with CAN/CSA-A23.1.
- .3 Minimum compressive strength at 28 days as indicated on Drawings and as noted below:
 - .1 35 MPa for concrete containing reinforcing steel and all curbs, retaining walls, toe walls and other formed structures.
 - .2 15 MPa for concrete benching and lean concrete mudslabs.
- .4 Nominal maximum size of coarse aggregate: to CAN/CSA-A23.1.
- .5 Slump: to CAN/CSA-A23.1.
- .6 Air content: concrete to contain purposely entrained air in accordance with CSA-A23.1, Table 10. In no case shall air content be less than 4%.
- .7 Do not change concrete mix without prior revision by Departmental Representative. Should change in material source be proposed, Departmental Representative shall review new mix design.

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PART 3 - EXECUTION

3.1 INSPECTION

- .1 The Departmental Representative will inspect forms, foundations, reinforcing steel, construction joints, mixing, conveying and placing equipment before concreting.
 - .1 Provide minimum of 48 hours notice prior to placing concrete.
 - .2 Inform Departmental Representative of proposed method(s) for protection of concrete during placing and curing of concrete during adverse weather prior to placing of concrete.

3.2 PREPARATION

- .1 Do not place concrete on soil that has been softened by mechanical disturbance or moisture.
- .2 Retighten forms at construction joints.
- .3 Roughen, thoroughly remove foreign matter and laitance, and saturate the hardened concrete at construction joints with water prior to concreting.
- .4 Saturate granular subgrade prior to placing concrete and maintain in damp state until completion of placement operation. Do not place concrete into standing water.
- .5 Make suitable arrangements to prevent damage to fresh concrete by adverse weather conditions, such as rain, wind or extreme temperatures.
- .6 Concrete shall not be poured against fozen ground, frozen concrete, frozen rock, frozen stone or into frosted formwork.
- .7 Prepare all sleeves and ducts to be cast into concrete at the same time as the concrete formwork to ensure that correct assembly and fit is obtained.

3.3 INSERTS

- .1 Place all inserts and embedded hardware in accordance with Section 13 of CSA-A23.3 (unless noted).
- .2 Do not eliminate or displace reinforcement to accommodate hardware.
- .3 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

3.4 WATERSTOP

- .1 Installation of waterstops to be in accordance with manufacturer's written recommendations.
- .2 Store waterstops to protect from oil, dirt, sunlight and premature exposure to water.
- .3 Provide keyway in joint face of first concrete pour to accept waterstop.
 - .1 Locate hydrophilic waterstop in middle third of wall or slab, ensuring minimum 50mm cover at all times.
- .4 Clean concrete surface using wire brush or other mechanical means to remove all laitance, dirt and other debris or foreign matter.

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- .5 Cut hydrophilic waterstop to fit, cutting ends square (or at proper angle for mitred corners) with shears or sharp blade to fit splices together without overlaps.
- .6 Seal splices using cyanacrylate adhesive.
- .7 Bond to concrete surface in accordance with manufacturer's written recommendations to suit concrete surface conditions.

3.5 PLACING OF CONCRETE

- .1 According to CSA A23.1, and as specified herein.
- .2 All formwork shall be cleaned of all debris, loose material, snow and ice immediately prior to pouring.
- .3 Ensure proper placement and support of reinforcement and embedded material immediately ahead of a pour.
- .4 Do not temporarily displace reinforcement for convenience in placing concrete.
- .5 Do not use wood or other temporary spreaders or spacers.
- .6 Do not insert reinforcement into fresh concrete unless approved by Department Representative.
- .7 Pumping of concrete shall be permitted only after review of equipment and mix.
- .8 Confine concrete in a suitable vertical drop pipe to within 1.0 m or less of the concrete in place.
- .9 Set screeds accurately for level surfaces or to maintain cambers as required.
- .10 .Ensure that concrete is adequately consolidated in the forms.
- .11 Place concrete in such a manner that the concrete in the form is still plastic and can be integrated with fresh concrete.
- To prevent segregation, deposit concrete in approximately horizontal layers of 300 to 450 mm thickness, as near as possible to its final position.
- .13 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .14 Do not place load upon new concrete until adequate strength has been attained.

3.6 PLACING GROUT

.1 Grout under baseplates and machinery using procedures in accordance with manufacturer's written recommendations that result in 100% contact over grouted area.

3.7 COLD WEATHER

.1 When the air temperature is at or below 5°C, or when there is a possibility of it falling to that limit within 24 hours of placing, the requirements according to CSA A23.1 shall be met.

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- .2 Calcium chloride to 2% may only be used upon written approval of the Departmental Representative.
- .3 Withdraw protection and heat gradually so that air temperature around the concrete does not drop more than 15 OC per day.
- .4 Concrete shall be protected from alternate freezing and thawing for 14 days.
- .5 Provide enclosures for heating such that air circulation is maintained.
- .6 Frozen concrete will be rejected.

3.8 HOT WEATHER

- .1 Hot weather shall be considered to be an air temperature in the shade, of 23°C or greater.
- .2 Hot weather methods shall conform to CSA A23.1.
- .3 The concrete temperature at the time of placing in hot weather shall not exceed those specified in CSA A23.1. In the event that this limit is exceeded the concrete operations shall be suspended until the constituent materials of concrete are cooled.
- .4 Retarding admixtures shall be used only if approved by the Departmental Representative prior to use in the concrete.

3.9 JOINTS

- .1 Construction, and/or control joints shall be provided where required and as shown on the plans or according to CSA A23.1. Control joints should be spaced at maximum 6 meters or less unless otherwise indicated.
- .2 Carefully finish all face edges exposed to view true to line and elevation. Apply a neat cement paste or approved bonding agent to the hardened concrete immediately in advance of the fresh concrete.
- .3 Make all construction, or control joints in accordance with details shown on the drawings, layout to be submitted by Contractor for approval by Departmental Representative.
- .4 Construction joint layouts shown on the drawings take precedence over above requirements.

3.10 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials shall be carried out by an independent Certified Testing Laboratory approved by the Departmental Representative in accordance with CAN/CSA-A23.1 and A23.2.
- .2 Contractor shall provide and maintain adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the initial curing period.
 - .1 Adequate facilities shall include a protected, designated area with provision for a continuous power supply to comply with CSA Test Method A23.2-3C.
- .3 The Departmental Representative may request additional cylinders. Cure cylinders on job site under same conditions as concrete which they represent.

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- .1 Cost of testing additional cylinders that comply with contract specifications will be paid for by the Departmental Representative.
- .2 Cost of testing additional cylinders that do not comply with contract specifications will be paid for by the contractor.
- .4 Inspection and/or testing by the Departmental Representative will not augment or replace Contractor Quality Control, nor relieve him of contractual responsibilities.

3.11 FINISHING

- .1 To CSA A23.1 and as specified herein:
- .2 Ordinary surface finish.
 - .1 Use on concrete surfaces not exposed to view in the completed structure.
 - .2 Chip off fins and irregular projections.
 - .3 Patch honeycomb and fill tie holes with mortar containing approved bonding agent. Mix according to manufacturer's directions.
- .3 Rubbed finish.
 - .1 Use on formed concrete exposed to view in the completed structure.
 - .2 Remove fins and projections, patch honeycomb and fill tie holes as required.
 - .3 Saturate with water and rub with medium coarse carborundum stone using a small amount of cement sand mortar.
 - .4 Continue rubbing until a uniform surface with no irregularities is obtained. Do not remove the paste produced by this rubbing.
 - .5 Carry out final rubbing with a fine stone and water.
 - .6 After the surface is dry, remove loose powder by rubbing with burlap.
 - .7 Leave final surface free from unsound patches, paste, powder and objectionable marks.
- .4 Floated surface finish.
 - .1 Strike off the compacted concrete to the cross-section and elevation shown on the drawings. Keep a slight excess of concrete in front of the screed at all times.
 - .2 Obtain a uniform surface by floating as necessary. If floating is not completed before excess water appears at the surface, remove this water before continuing with floating.
 - .3 Add or remove concrete during floating as required to obtain a surface with no more than 3 mm deviation from the required surface in any 3 metre length.
 - .4 Do not overwork the concrete surface. Float only enough to obtain a dense uniform surface.
- .5 Broomed finish.
 - .1 Exterior walkways, driveways or landings, shall receive a broomed non-slip surface.
 - .2 After completion of Article 3.11.4.4, broom to produce a non slip surface with regular corrugations not more than 3 mm deep.
- .6 Troweled finish.
 - .1 After completion of Article 3.11.4.4, trowel to produce a dense smooth finish.

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3.12 CURING

- .1 Cure and protect concrete in accordance with CSA-A23.1.
- .2 Do not use curing compounds where bond is required by subsequent pours or topping.

3.13 FORM REMOVAL

- .1 Forms shall not be removed until removal operations will cause no damage to concrete surfaces.
- .2 See Clause 11 CSA-A23.1 for specific requirements.

3.14 PATCHING & FINISHING OF HARDENED CONCRETE

- .1 Patching, if required and if allowed, shall be done immediately after stripping.
- .2 All form ties shall be cut back a minimum of 25 mm and all tie holes shall be neatly patched and rubbed down.

3.15 WATERPROOFING

- .1 Preparation of concrete surfaces for damp proofing and waterproofing shall conform to CSA A23.1.
- .2 Application shall conform to manufacturer's recommendations.

3.16 CONCRETE SPECIALTIES

- .1 Provide and install all concrete specialties as shown on the drawing and/or as necessary to complete the concrete work.
- .2 Included are fibreboard expansion joint covers, water stop and bond breakers.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

.1 Comply with Division 1 General Requirements.

1.2 <u>REFERENCES</u>

- .1 CAN/CSA S16.1 M Limit States Design of Steel Structures.
- .2 CAN/CSA G40.21 M General Requirements for Rolled or Welded Structural Quality Steel.
- .3 CAN3 S157 M Strength Design in Aluminum.
- .4 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
- .5 CSA W47.2 M Certification of Companies for Fusion Welding of Aluminum.
- .6 CSA W55.3 M Resistance Welding Qualification Code for Fabricators of Structural Members used in Buildings.
- .7 CSA W59 M Welded Steel Construction (Metal Arc Welding).
- .8 CSA W59.2 M Welded Aluminum Construction.
- .9 ASTM A307 Specification for Carbon Steel Bolts and Studs, 60000 psi.
- .10 .ASTM A325 Specification for High-Strength Bolts for Structural Steel Joints.
- .11 .CISC/CPMA 2 75a A Quick Drying Primer for use on Structural Steel.

1.3 SUBMITTALS

.1 Shop Drawings: Submit shop drawings one (1) week before fabrication commences of each metal fabrication item, showing in large scale fabrication details, thickness, anchors, location and finishes. Submit shop drawings to Departmental Representative in accordance with Section 01 33 00 – Submittal Procedures

1.4 QUALITY ASSURANCE

- .1 Ensure workmanship of the highest quality throughout by employing only metal workers that have demonstrated the highest skills in this type of work and qualified welders certified to weld the materials used in fabrication of the miscellaneous metals.
- .2 Welding Procedure for Steel
 - .1 Comply with CSA W47.1 and W59-M.
- .3 Welding Procedure for Aluminum
 - .1 Submit certification that companies which will be welding aluminum are CSA accepted.
 - .2 Comply with CSA W47.2-M, W59-M and CSA W59.2-M.

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1.5 DELIVERY, STORAGE AND HANDLING

.1 Provide protective coating on aluminum items.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Where anchors, lifting hooks, screws, bolts, nuts, washers, hangers and other fasteners are not specifically shown or specified, provide such items with at least the strength and corrosion resistance properties of the metal fabrication for which they are required.
- .2 Structural Steel and Loose Lintels: CAN/CSA G40.21 M, Grade 300W. Use Grade 350W for W shapes.
- .3 Structural Steel for Hollow Sections: CAN/CSA G40.21 M, Grade 350W, Class H.
- .4 Steel anchors, studs, taps and bolts: ASTM A307, Grade B carbon steel.
- .5 Aluminum Alloys
 - .1 HA.5 SG11R-T6 for structural shapes (6351-T6).
 - .2 HA.4 GS11N-T6 for sheets and plates (6061-T6).
 - .3 HA.7 GS11N-T6 for tubes (6061-T6).
- .6 Primer: CISC/CPMA 2 75a unless otherwise required for finish coating under Section 09900.
- .7 Isolation coating: CAN/CGSB 1.108 M, quick drying asphalt utility enamel.
- .8 High Strength Bolts ASTM A325.

2.2 FINISHES

- .1 Rough Edges and Mill Scale
 - .1 Following completion of fabrication of any item, grind rough edges straight and finish smooth. Remove mill scale and rust.
- .2 Galvanizing
 - .1 Hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .3 Electrolytic Corrosion
 - .1 Backpaint metal surfaces in contact with dissimilar metal or concrete or masonry, with bituminous paint, 1.0 mm DFT minimum.
 - .2 Paint galvanized metal surfaces to be in contact with or encased in concrete with rust inhibitive epoxy coating ICI Devoe Coating: Devran 201. Prepare surfaces to SSPC SP1, apply paint to 125 microns DFT.

.4 .Aluminum

1 Restore aluminum to original mill finish after fabrication. Buff and brighten exposed aluminum surfaces, which have been damaged during construction.

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- .2 Where aluminum is intended to be in contact with dissimilar metals, concrete, or masonry, paint the surfaces to be in such contact with aluminum coloured bituminous paint.
- .3 Use anodizing quality aluminum where anodizing is required.

.5 Carbon Steel

- .1 Where carbon steel is intended to be exposed to atmospheric conditions, hot dip galvanize the metal fabrications.
- .2 Where carbon steel is intended to be in contact with concrete, brick or mortar, hot dip galvanize the surfaces to be in such contact.

.6 Anodized Finish

.1 Anodizing Architectural Class I Anodic Coating 0.018 mm (0.7 mil) thickness, one hour coating 215 RI (AA C22A41 clear) preceded by a caustic etch.

2.3 ANCHORS AND FASTENERS

- .1 Anchors, Studs, Taps and Machine Bolts
 - .1 For structural connections at platforms, support frames and similar items, use ASTM A325 carbon steel bolts.
 - .2 Where such structural connections will be normally exposed to atmospheric conditions use ASTM A325 carbon steel bolts hot-dip galvanized to ASTM A153.
 - .3 Unless otherwise specified or detailed use hot dip galvanized or stainless steel anchors and fasteners.
 - .4 Use corrosion resistant fasteners of stainless steel or aluminum for Corrosion resistant items to be fastened.
- .2 Nuts: ASTM A563 and the recommended nut grade and style listed in Appendix X1, Table X1 thereof. Where connections will be normally exposed to atmospheric conditions use Grade C3 or DH3.
- .3 Washers: Bolted connections hardened steel washers conforming to ASTM F436.
- .4 Bolts or Studs Used as Anchors: 75 x 75 x 10 mm steel plate welded to the bolt head or stud.
- .5 Grout: Set by Master Builders Technologies Ltd. M Bed Standard or Sika Grout 212 by Sika Canada Inc.
- .6 Drilled anchors: Hilti stainless steel HVA, HSL, or Kwik bolts as indicated or accepted.
- .7 Anchor grout for submerged and exterior conditions: Epoxy acrylate resin HVA by Hilti Ltd.

2.4 FABRICATION - GENERAL

- .1 Where possible, verify dimensions on site before preparing shop drawings or proceeding with shop work. Fit and shop assemble insofar as possible various sections of the work and deliver to the project site in the largest practical sections.
- .2 The general dimensions and details of the metal fabrications are shown on the Drawings where practical. Such details and dimensions are suggested concepts for design.

METAL FABRICATIONS

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- .3 Assume responsibility for the correctness of the actual detailed dimensions used in fabrication and carefully check the same, by field measurement.
- .4 Variations from suggested details are subject to acceptance in writing by the Departmental Representative. Such acceptance does not in any way waive the above mentioned responsibility.
- .5 Wherever overlapping or contacting surfaces cannot be avoided, completely seal weld these surfaces. Rusting or deterioration of finish in such areas will require remedial seal welding and refinishing.
- .6 Fabricate the work true to dimensions and square. Accurately fit members with hairline joints, and join using adequate fastening.
- .7 Construct finished work free from distortion and defects detrimental to appearance and performance.
- .8 File or grind exposed welds smooth and flush. Finish joint to match adjacent surface finish. Do not leave grinding marks. Construct internal and external corners with sharp lines. Provide continuous welds unless otherwise accepted by the Departmental Representative in writing. Brighten and buff aluminum welds to match appearance of adjacent surface.
 - .1 Remove weld spatter and slag. After finish grinding and smoothening welds, passivate welds with pickling paste.
 - .2 Preheat members thicker than 19 mm before welding.
- .9 Weld aluminum in accordance with CSA W47.2.
 - .1 Use weld rod No. 5356 for clear anodized aluminum of 6063 T5 alloy.
- .10 Fabricate metal work complete with components required for anchoring to concrete; bolting or welding to structural steel frames; standing free; or resting in frames or sockets, in a safe and secure manner.
- .11 Countersink exposed fastenings, where such are accepted in writing, and make as inconspicuous as possible with bolts cut off flush with nuts. Construct fastenings of the same material and finish as the base material on which they occur.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- .1 Install work of this Section using skilled craftsmen and in accordance with manufacturer's recommendations where applicable.
- .2 Install metal fabrications in the correct locations and positions, plumb, level, structurally sound, securely fastened, free from defects detrimental to finished appearance and to acceptance of the Departmental Representative.
- .3 Perform drilling of steel, concrete or masonry to fasten the work of this Section.
- .4 For aluminum and stainless steel items, and exterior locations, use stainless steel anchors.
- .5 After installation, spot prime bolt heads and nuts, field rivets, field welds and any abrasions or damage to the shop coat of primer.

METAL FABRICATIONS

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- .6 Apply isolation coating to surfaces between dissimilar metals, and between metal and concrete, mortar, grout or masonry.
- .7 Where items are specified to be installed by other Sections, fabricate items to the appropriate trade with necessary instructions and templates required for proper installation. Include required fastenings, such as screws, bolts, expansion shields and similar items.
- .8 Tolerances: CAN/CSA S16.1 M.
- .9 Deliver items to be cast into concrete with instructions for setting.

3.2 INSTALLATION – ANCHORS AND FASTENERS

- .1 Arrange bolts with sufficient length to embed 100 mm in the structural concrete and to project the threaded position a minimum of 50 mm above the proposed elevation of the base plate or mounting plate.
- .2 Set anchor bolts accurately in holes in concrete using plywood templates prepared from manufacturer's shop drawings. Set items in grout. Use anchor grout for submerged and exterior conditions.
- .3 Do not offset bolts by deformation.
- .4 For submerged conditions where bolts are used, use lock nuts or nuts with lock washer.

END OF SECTION

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AGGREGATE MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies general requirements for the processing of aggregates to be incorporated into the work as granular fill.
- .2 It is anticipated that there will be no requirement for crushing of granular materials to satisfy grading specifications. There may be requirements for select, blend, and/or screen granular materials to satisfy gradation specifications, as indicated in this Section. Moisture conditioning of material from borrow sources to satisfy granular fill may be required.
- .3 Activities that may require aggregate include the following:
 - .1 Tailings and Soil Containment Area, aggregate required based on berm and cover design Waste Rock and Soil Containment Area, aggregate required based on berm and cover design
 - .2 Camlaren Landfarm aggregate required based on berm design
 - .3 Kidney Pond Portal Seep Water Management System (PSWMS) aggregate required based on drain and berm design
 - .4 Tailings Impoundment Soil Area (Burnt Island) cover, volume as required
 - .5 Backfill of excavations, volume as required
 - .6 Staging Areas and camp(s), volume as required
 - .7 Road repairs/improvements, volume as required

1.2 RELATED SECTIONS

- .1 Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart
- .2 Section 01 33 00 Submittal Procedures
- .3 Section 02 61 00 Hydrocarbon Soil Treatment
- .4 Section 31 22 13 Grading and Earthworks Construction
- .5 Section 31 23 33.01 Excavating, Trenching, and Backfilling

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - .2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM C117-13, Standard Test Method for Materials Finer than 75 μm Sieve in Mineral Aggregates by Washing.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

1.4 POTENTIAL BORROW SOURCES

.1 Abide by conditions of the Land Use Permit, Water License, Quarry Permit and/or other requirements of Authorities Having Jurisdiction (AHJ).

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.2 Sources of borrow materials to be incorporated into Work requires approval by Departmental Representative. Potential areas of borrow material are indicated on Drawing C-01.

- .3 Defined borrow areas (sources) and stockpiles are to be used. Approval to excavate borrow material from a previously undisturbed area will be granted by Departmental Representative based on areas that do not require new access roads, areas that have minimal ice-rich permafrost, and areas located away from water bodies only when all previously identified sources area depleted or are determined by Departmental Representative to be unsuitable.
- .4 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least seven (7) days prior to commencing production. Departmental Representative will conduct confirmatory sampling of borrow material, if required, to determine if any contamination is present.
- .5 If, in the opinion of the Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, locate an alternate source or demonstrate that material from the source in question can be processed to meet specified requirements.
- Should a change of material source be proposed during Work, advise Departmental Representative one (1) week in advance of proposed change to allow sampling and testing.
- .7 Acceptance of a material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- .8 Geotechnical information, including borrow assessment and the results of laboratory analysis of soil samples obtained from the site are included in the Remedial Action Plan report (Stantec, 2016) and in Appendix B.

1.5 QUALITY CONTROL

- .1 Aggregate will be subject to sampling by Departmental Representative during production, at the source and/or at the place of work. The aggregate is to meet the required specifications, regardless of the place of sampling.
- .2 Provide Departmental Representative with access to aggregate source and processed aggregate material for purpose of sampling and testing.
- .3 Samples are to be obtained according to industry accepted practices.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.
- .5 Notify Departmental Representative whenever unsuitable materials are encountered in borrow areas.

1.6 SUBMITTALS

.1 Submit a Draft Quarry Operations Plan in accordance with Section 01 33 00 - Submittal Procedures for review by the Departmental Representative thirty days after contract award. Plan to include the following as a minimum:

Sections devoted to Site Design, Water Management, Site Development, Operations, Closure and Reclamation

- .1 The equipment and supplies required to develop borrow sources.
- .2 Labour and temporary facilities required for excavation, stockpiling and screening material.
- .3 Details of the handling and storage of granular material.
- .4 Details of the reclamation of the stockpiled granular sources.

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AGGREGATE MATERIALS

1.7 MEASUREMENT FOR PAYMENT

- .1 Location and development of borrow sources including stripping, processing, handling, stockpiling, transport, replacement of organics, and any necessary restoration will be incidental to the work of Section 31 22 13 Grading, and will not be measured separately.
- .2 Except as indicated above, work under this section will not be measured. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
- .3 Fine aggregates satisfying requirements of applicable section are to be one (1), or a blend of the following:
 - .1 Natural sand.
 - .2 Screened sand
- .4 Coarse aggregates satisfying requirements of applicable section are to be composed of naturally formed particles of stone.
- .5 Class 1 Granular Fill:
 - .1 Class 1 Granular Fill is select material obtained from excavations or borrow areas approved by Departmental Representative, generally consisting of pit-run, screened stone, gravel and sand in an unfrozen state and free from rocks larger than 75 mm, waste or other deleterious material.
 - .2 Class 1 Granular Fill is used for:
 - .1 cover and regrading requirements.
 - .2 Construction of containment berms.
 - .3 Gradations to be within the following limits when tested to ASTM C136 and ASTM C117, sieve sizes to CAN/CGSB-8.2:

Sieve Designation	% Passing by Weight
(millimeters)	
100	100
75	80-100
50	60 to 100
19	30 to 50
5	10 to 30
0.08	0 to 5

.6 Class 2 Granular Fill:

.1 Class 2 Granular Fill consists of granular pit-run material, with a maximum particle size of 80 mm, and no more than 10% passing an 80 μm sieve, from identified borrow sources and is generally used for:

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- .1 regrading low areas as indicated;
- .2 backfill for impacted soil excavations;
- .3 general site grading requirements.
- .2 Class 2 Granular Fill may be designated by Departmental Representative as a suitable alternative for other material classes.
- .3 Materials classified as unsuitable will include:
 - .1 Soils with moisture content exceeding optimum moisture by 2% or more.
 - .2 Soils containing organic material, snow, ice or other deleterious material.

.7 Class 3 - Sand:

.1 Sand consists of screened granular material, with maximum particle size 12 mm and no more than 5% passing a 80 μm sieve, from identified borrow sources and is generally used for a protection layer next to synthetic liners as indicated on the drawings.

.8 Class 4- Riprap Slope Protection:

- .1 Riprap slope protection consists of screened coarse well graded gravel and cobbles with maximum particle size 100 mm and no more than 10% passing a 25 mm sieve, from identified borrow sources and is generally used for erosion protection on steeper slopes as indicated.
- .2 Gradations to be within the following limits when tested to ASTM C136 and ASTM C117, sieve sizes to CAN/CGSB-8.2:

Sieve Designation (millimetres)	% Passing by Weight
100	100
75	50-100
50	0 to 50
19	0 to 10

.9 Class 5: Rockfill / drain rock:

- .1 Non-impacting waste rock with porosity of 0.45-0.50;
- .2 Representative particle diameter of approximately d50 = 200 mm;
- .3 Particle size distribution to be confirmed by non-Darcy permeability testing on-site by Departmental Representative
- .10 Refer to Section 31 22 13 Grading and Earthworks Construction for placement, moisture conditioning and compaction of granular fill.
- .11 Vegetation Support Layer:
 - .1 Vegetation Support Layer consists of native till materials, placed in an uncompacted state, with a saturated hydraulic conductivity ranging from 10⁻³ to 10⁻⁴ cm/sec and is generally used to support vegetative growth as part of waste rock cover.
- .12 Unsuitable materials to use as aggregate will include:
 - .1 Soils with moisture content exceeding optimum moisture by 5% or more.
 - .2 Soils containing organic material, snow, ice, or other deleterious material.
- .13 Screening may be required to meet the Class 1 and Class 2 Granular Fill requirements. Field testing data is provided in Appendix B.

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PART 3 - EXECUTION

3.1 DEVELOPMENT OF AGGREGATE SOURCE

- .1 Prior to excavating materials for aggregate production, remove any debris (known or unknown) from area, as described in Section 02 41 23 Debris and Miscellaneous Removals.
- Delineate with the Departmental Representative the limits of borrow sources and have the topography surveyed by a licensed surveyor to confirm the site grades at the beginning of the aggregate recovery program.
- .3 Any significant deposits of organic material, as determined by Departmental Representative, are to be avoided and left undisturbed during development of an aggregate source, or stripped and stockpiled for replacement to restored borrow area.
- .4 Strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious material.
- .5 Implement erosion control measures as required to minimize impacts on the local environment and comply with the conditions outlined in Section 01 35 43 Environmental Procedures.
- When excavation is complete, dress sides of excavations to achieve gentle slopes, maximum of 3H:1V, which fit local topography and provide swales or ditches if required to prevent surface standing water.
- .7 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .8 Trim, backblade and restore burrow areas to a condition acceptable to Departmental Representative.

3.2 PROCESSING

- .1 Process aggregate uniformly using methods that prevent contamination and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements. Use methods and equipment accepted by Departmental Representative. Blending to decrease percentage of flat and elongated particles is permitted.
- .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .4 Moisten aggregate as required to achieve the specified density and/or degree of saturation.
- .5 Dry aggregate as required to place and compact according to this Specification.
- .6 Do not use frozen aggregate in any areas that require compaction.

3.3 HANDLING

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.4 STOCKPILING

- .1 If required, stockpile aggregates on site in locations specified by the Departmental Representative.
- .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

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.5 Separate different aggregate stockpiles far enough apart to prevent intermixing.

- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .7 Transport granular fill from borrow areas to the work areas via existing access routes where available. Maintain and provide for dust control on the access route between the borrow area and the work area.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile in uniform layers of one (1) metre maximum thickness.
- .9 Do not cone piles or spill material over edges of piles (2 m maximum height and flatten top).
- .10 Complete each layer over the entire stockpile area before beginning next layer.
- .11 During winter operations (snowy conditions), prevent ice and snow from becoming mixed into stockpile.

3.5 EXCAVATING

- .1 Obtain aggregates from potential borrow areas as indicated.
- .2 Ensure drainage of all excavated areas and maintain crowns and cross slopes to provide surface drainage.
- .3 Notify Departmental Representative whenever unsuitable materials are encountered.
- Transport granular fill from borrow areas to the work areas via existing access routes where available. Maintain and provide for dust control on the access route between the borrow area and the work area.

3.6 RECLAMATION OF AGGREGATE SOURCE AND STOCKPILE CLEANUP

- .1 Final grading of borrow area upon completion to be tidy, in a well-drained condition, free of standing water to the satisfaction of Departmental Representative.
- .2 Upon completion of final grading, leave all slopes in a stable condition, no steeper than 3H:1V, and spread all stripped topsoil or organics. Trim and backblade to a condition acceptable to Departmental Representative. The final grading should mimic the natural topography.
- .3 Leave temporary aggregate stockpiles in tidy, well drained condition, free of standing surface water.
- .4 Upon completion of Work, unused aggregates to be left in stable condition, with slopes mimicking natural topography. The final condition must meet the satisfaction of Departmental Representative.
- .5 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of AHJ.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

- .1 This Section specifies the definition and execution of clearing and grubbing of the following:
 - .1 The area surrounding the Landfarm at Camlaren.
 - .2 The areas surrounding the Portal Seep Water Management System and the WRSCA at Kidney Pond.
 - .3 All other areas requiring clearing or grubbing to perform the Work.

1.2 RELATED SECTIONS

- .1 Section 01 35 43 Environmental Procedures.
- .2 Section 31 23 33.01 Excavation, Trenching and Backfilling.

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .3 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and disposing of all fallen timber and surface debris.
- .4 Grubbing consists of excavation and disposal of stumps and roots to not less than a specified depth

1.4 QUALITY CONTROL

- .1 Perform construction occupational health and safety in accordance with Section 01 35 32 Site Specific Health and Safety Plan.
- .2 Safety Requirements: worker protection.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees and root systems of trees which are to remain.
 - .1 Repair any damaged items to approval of Departmental Representative.
 - .2 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

1.6 MEASUREMENT AND PAYMENT

- .1 Include all direct costs for Clearing and Grubbing, as needed to perform the Work, as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as indicated above, work under this section will not be measured. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart

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PART 2 - PRODUCTS

2.1 MATERIALS

.1 Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Inspect site and verify with Departmental Representative, items designated to remain.
- .2 Locate and protect temporary utility lines. Preserve in operating condition active utilities traversing site.
 - .1 Notify Departmental Representative immediately of damage to utilities, or when unknown existing utilities are encountered.

3.2 CLEARING

- .1 Clear as indicated by Departmental Representative, by cutting at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.
- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.3 ISOLATED TREES

- .1 Cut off isolated trees as indicated by Departmental Representative at height of not more than 300 mm above ground surface.
- .2 Grub out isolated tree stumps.
- .3 Prune individual trees as indicated.
- .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
- .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.
- .6 Paint cuts more than 3 cm in diameter with approved tree wood paint.

3.4 UNDERBRUSH CLEARING

.1 Clear underbrush from areas as indicated.

3.5 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent ground surface.

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3.6 REMOVAL AND DISPOSAL

.1 Cleared and grubbed materials and chip or mulch material shall be burned on-site in accordance with Section 02 41 16 – Structure Demolition.

3.7 FINISHED SURFACE

.1 Leave ground surface in condition suitable for immediate grading operations, and stripping of topsoil to approval of Departmental Representative.

3.8 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies earthwork associated with:
 - .1 General site grading and maintenance of designated areas including Camp Areas and Temporary Staging Areas at the respective sites.
 - .2 Upgrading existing access roads and constructing new access roads as required.
 - .3 Upgrading the Tailings Containment Area (TCA) at Camlaren to the Tailings and Soil Containment Area (TSCA) and constructing a cover system.
 - .4 Constructing the Waste Rock and Soil Containment Area (WRSCA) at Kidney Pond.
 - .5 Constructing the Portal Seep Water Management System (PSWMS) at Kidney Pond.
 - .6 Constructing the Camlaren Landfarm.
 - .7 Capping the Tailings Impoundment Area at Burnt Island.
 - .8 Borrow sources.
 - .9 Regrading of areas and depressions created by the removal of debris and impacted soil and tailings, and impacting waste rock requiring remediation.
 - .10 Reshaping of areas created by the removal of abandoned infrastructure, including sumps, and abandoned site buildings to match the surrounding topography.
- .2 Individual Drawings should be referred to for a description of the designated area(s), design grades, contours, elevations or cover soil thickness.

1.2 RELATED SECTIONS

- .1 Section 31 05 16 Aggregate Materials.
- .2 Section 31 23 33.01 Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ³).
- .2 Mine Environment Neutral Drainage (MEND) Report 1.20.1, 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND website at http://mend-nedem.org/wp-content/uploads/1.20.1_PredictionManual.pdf

1.4 DEFINITIONS

- .1 Constructing: The supply and placement of granular fill in designated areas to construct soil berms, cover and intermediate fill layers for on-site containment areas (i.e. TSCA and WRSCA), soil berms and liner bedding materials for an on-site Landfarm facility, and requirements for upgrading existing and constructing new site access roads.
- Reshaping: The levelling and grading, to a maximum depth of 600 mm, including the movement of boulders, in designated areas to blend in with the natural terrain and provide positive drainage.

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Reshaping does not require the supply and placement of additional granular fill. Excavation of the terrain to a depth greater than 600 mm during reshaping operations is to be considered as unclassified excavation.

- .3 Regrading: The supply and placement of granular fill in designated areas to blend in with the natural terrain, to provide positive drainage, and to place additional granular fill materials at the drainage channel crossings.
- .4 Scarifying: The disturbance or loosening of a soil to a minimum depth of 300 mm to allow for compaction or aeration.
- .5 Berm: Granular fill of type indicated on the Drawings, placed above the original ground and built-up to a design elevation.
- .6 Granular Fill Class 1, Class 2, Class 3, Class 4 (Rip Rap), Sand Bedding, and Vegetation Support Layer: Material as specified in Section 31 05 16 Aggregate Materials.
- .7 General Fill: Granular fill used for regarding low areas and to backfill contaminated excavations.
- .8 Intermediate Cover: Granular Fill, as designated by the Departmental Representative, used to cover each waste layer and fill void spaces within the landfilled waste.
- .9 Rockfill/Drain Rock: Coarse aggregate drainage material, as defined in Section 31 05 16 Aggregate Materials, for construction of the PSWMS.
- .10 Impacting Waste Rock Requiring Remediation is waste rock that has the potential for metal leaching (ML) and/or acid rock drainage (ARD) to impact the surrounding environment.
- .11 Waste Material: Excavated material unsuitable for use in work or surplus to requirements.
- .12 Coarse Waste Rock: Waste rock with coarse gradation requirements as determined by Departmental Representative to be used in stability zone of WRSCA.
- .13 Fine Waste Rock/Material; Waste rock and/or random waste/material with fine gradation requirements as determined by Departmental Representative, to be used in internal zone of WRSCA.
- .14 Borrow Material: Material obtained from approved areas and required for construction, re-grading and backfilling requirements.
- .15 Unclassified Excavations: Excavation of materials of whatever nature encountered in the work to a depth greater than 600 mm.
- .16 Truck Box: The capacity of the granular fill hauling vehicle that will be measured to the closest 0.1 cubic metre. The vehicle, once measured, will not be changed without consent of the Departmental Representative. The box is to be levelled by the Contractor, using a strike-off method prior to measurement. No heaping or mounding of the truck box is allowed. The following bulking factors will be applied to truck box measurements.
 - .1 Granular materials: 15%.
 - .2 Debris: 50%.
- .17 Zone Types for berm construction at the WSCRA and TSCA
 - .1 Zone A: Foundation of the berm; fine rockfill/gravel (i.e. Class 1 material)
 - .2 Zone B: Erosion Protection cover (i.e. Class 1 material)

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- .3 Zone C: Sand – Bedding (i.e. Class 3 material)
- .4 Zone D: Sand - Cover (i.e. Class 3 material)
- .18 Maximum Dry Density: Determine by the Standard Proctor Method in accordance with ASTM D698.
- .19 Corrected Maximum Dry Density: Applicable if more than 30% of the material is retained on the ASTM 19 sieve. It is defined as:
 - .1 D =D1 x D2 (F1)(D2)+(F2)(D1)
 - .2 Where:

D = corrected maximum dry density kg/m³

F1 = fraction (decimal) of total field sample passing ASTM 19.0 mm sieve

F2 = fraction (decimal) of total field sample retained on ASTM

19.0 mm sieve (equal to 1.00 – F1)

D1 = maximum dry density (kg/m³ of material passing ASTM 19.0 mm sieve determined in accordance with Method C of ASTM D698 or latest edition thereof.

D2 = bulk density, kg/m³ of material retained on ASTM 19.0 mm sieve, equal to 1,000 G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127-84, or latest edition thereof.

EXISTING SITE CONDITIONS 1.5

- Suspend grading operation whenever climatic conditions are unsatisfactory for grading Work to .1 conform with this Specification.
- .2 Do not operate equipment in work areas until the material has dried sufficiently to prevent excessive rutting.
- .3 Areas to be graded are to be free from debris and excessive snow, ice or standing water prior to grading work.
- Contractor is advised that soft ground conditions may be at the site during periods of maximum thaw .4 of the permafrost. Schedule and carry out work to minimize disturbance to permafrost soils.
- .5 Contractor is advised that existing access roads to be used during construction activities may require repair, upgrading, and general maintenance.

PROTECTION 1.6

- .1 Maintain access roads to prevent accumulation of construction related debris on roads.
- .2 Protect archaeological sites from construction and construction traffic.
- .3 Unanticipated archaeological resources may be encountered during construction; suspend all activities in that area and notify Departmental Representative immediately.
- .4 Protect and do not disturb nesting sites, fish spawning beds and wildlife breeding grounds during construction.
- .5 Protect all monitoring wells, ground temperature cables (thermistors) and survey monuments, if any. Repair or replace, at no cost to the Departmental Representative, any monitoring wells or survey monuments damaged by Contractor's operations.

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.6 Environmental protection measures are to be in accordance with the requirements specified in Section 01 35 45 - Environmental Procedures. Follow the approved Erosion, Sediment and Drainage Control Plan submitted in accordance with Section 01 35 43 – Environmental Procedures.

1.7 SITE ACCESS UPGRADE PLAN

- .1 Submit the Site Access Upgrade Plan to Departmental Representation prior to mobilization, in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Site Access Upgrade Plan to include, but not be limited to, the following:
 - Blasting or scaling requirements (if any) .1
 - .2 Drainage improvements.
 - .3 Road sections and camp areas to be built up, as required.
 - .4 Estimated quantity of granular material required and borrow sources proposed for use.
 - .5 Passing, pull-out or turn around locations.
 - .6 Safety measures to be put in place in narrow or steep road sections, as required.

1.8 TSCA, WRSCA, LANDFARM AND PSWMS DESIGN

.1 **TSCA**

- .1 Examine Drawings C-CAM-06 to C-CAM-14 for conceptual designs and location details.
- Submit a TSCA Construction Plan to Departmental Representative a minimum of 45 days .2 prior to construction, in accordance with Section 01 33 00 – Submittal Procedures.
- .3 The TSCA Construction Plan to include at a minimum:
 - .1 Confirm the existing survey.
 - .2 Identify areas where embankment toe drain will be required.
 - .3 Identify areas with different type of design.
 - .4 Identify areas where rock excavation will be required, if any
 - .5 Confirm construction volumes
 - .6 Provide preliminary details for the placement, including sequencing, of impacted soil and waste rock

.2 **WRSCA**

- Examine Drawings C-KID-08 to C-KID-15 for conceptual designs and location details. .1
- .2 Submit a WRSCA Construction Plan to Departmental Representative a minimum of 45 days prior to construction, in accordance with Section 01 33 00 – Submittal Procedures.
- .3 The WRCA Construction Plan to include at a minimum:
 - .1 Confirm the existing survey.
 - .2 Identify areas where rock excavation will be required, if any
 - .3 Confirm construction volumes
 - Provide preliminary details for the placement, including sequencing, of impacted soil .4 and waste rock

.3 Landfarm

Examine Drawings C-CAM-14 and C-CAM-15 for conceptual Landfarm design and Landfarm .1 location.

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- Submit a Landfarm Construction Plan to Departmental Representative a minimum of 45 days .2 prior to construction, in accordance with Section 01 33 00 - Submittal Procedures.
- .3 The Landfarm Construction Plan to include at a minimum:
 - .1 Contractor's proposed location for the Landfarm.
 - .2 Survey of proposed Landfarm location including original ground elevation and proposed base elevation.
 - .3 Areas requiring cut and/or fill and volume of material required/generated. Indicate borrow source if volume of fill material is greater than volume of cut material.
- Kidney Pond Portal Seep Water Management System (PSWMS) .4
 - Examine Drawings C-KID-08, C-KID-09 to C-KID-11 and C-KID-16 for conceptual designs and location details.
 - .2 Submit a PSWMS Construction Plan to Departmental Representative a minimum of 45 days prior to construction, in accordance with Section 01 33 00 – Submittal Procedures.
 - The PSWMS Construction Plan to include at a minimum: .3
 - .1 Confirm the existing survey.
 - .2 Identify areas where rock excavation will be required, if any
 - .3 Confirm construction volumes
 - .4 Outline sequencing of construction

1.9 MEASUREMENT FOR PAYMENT

- .1 For items to be measured for payment by survey, survey the area to receive granular fill either by cross section or by grid, following removal/stripping (if required) of surface material. Survey significant breaks in the original ground surface grade, incorporating at minimum the cross section locations indicated on the Drawings. The maximum distance between cross sections or grid points is to not exceed 10 metres unless otherwise indicated by Departmental Representative. Survey measurements are to be to the nearest 0.01 metre. Following placement of granular fill material, Contractor is to resurvey the cross sections or grid points. The volume measurement of granular material for payment will be determined by digital terrain model or average end area method, as Departmental Representative deems appropriate for the survey information provided. Preference is to be for quantity determination by digital terrain model
- .2 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground (for berm, bedding and cover construction) at the WRSCA will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid under Item 31 22 13-1 - (WRSCA Berm/Bedding/Cover Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the WRSCA, including coarse waste rock, and potential reorganization of the waste rock in this area as specified on Drawings C-KID-08 to C-KID-16 with the exception of any intermediate fill (fine waste rock) requirements between waste layers if required (refer to Section 31 22 13 Item 1.9.7).
- .3 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground (for berm, bedding and cover construction) at the TSCA will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid under Item 31 22 13-2 - (TSCA Berm/Cover Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the TSCA and potential reorganization of the waste rock in this area, as specified on Drawings C-CAM-06 to C-CAM-14 with the exception of any intermediate fill requirements between waste layers if required (refer to Section 31 22 13 Item 1.9.7)

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- .4 The supply, placement, moisture conditioning, and compaction of all granular fill material above existing ground (for berm and bedding construction) at the Landfarm will be measured for payment by the cubic metre as determined by the average end area method or digital terrain analysis, and will be paid under Item 31 22 13-3 (Landfarm Berm/Bedding Construction) of the Basis of Payment Schedule. This includes all above ground fill placement requirements for the Landfarm as specified on Drawing C-CAM-15.
- The excavation and granular backfill of the perimeter diversion ditch of the WRSCA and TSCA will be measured for payment based on the volume (m³) of material removed as measured by survey and paid under Item 31 22 13-4 (WRSCA Perimeter Diversion Ditch) and 33 22 13-5 (TSCA Perimeter Diversion Ditch) of the Basis of Payment Schedule, based on 620 m³ and 800 m³ excavation for the WRSCA and TSCA, respectively. For excavation greater than this volume, as directed by the Departmental Representative, the Unit Cost for perimeter diversion ditch excavation will be multiplied by a factor dependent on the volume of excavation. The multiplication factor will be negotiated with the Departmental Representative.
- .6 The scope of work for Payment Items 31 22 13-6 (Trench Excavation for LLDPE Liner Installation WRSCA), 31 22 13-7 (Trench Excavation for Liner Installation TSCA), 31 22 13-8 (Trench Excavation for Liner Installation Landfarm) shall include:
 - .1 Excavation of anchor trench and installing and anchoring the geotextile (if required) and geomembrane below ground surface to the depth of excavation as indicated on the Drawings, or as directed by the Departmental Representative.
 - Disposal of the excavated material in a location as directed by the Departmental Representative.
 - .3 Supply, placement, and compaction of granular fill to the specified depth as indicated on the Drawings.
 - .4 No extra payment will be made for soil excavated from beyond the specified limits of the trench excavation, unless such removal has been specifically directed by the Departmental Representative.
- .7 Metals and/or Co-mingled impacted soil shall be used as intermediate fill (fine waste rock) in the WRSCA and TSCA as directed by the Departmental Representative where available. If additional intermediate fill is required (i.e. insufficient volume and/or quality of Metals and/or Co-mingled impacted soil) then Class 2 Granular Fill shall be used as directed by Departmental Representative and will be paid under Item 31 22 13-9 (Intermediate Fill WRSCA) and 31 22 13-10 (Intermediate Fill TSCA) of the Basis of Payment Schedule. The processing, loading, hauling, placement and compaction of intermediate granular fill for the WRSCA and TSCA will be measured for payment by truck box as described in Article 1.2 Definitions of this Section. The capacity of the truck box will not be changed without consent of the Departmental Representative. The Departmental Representative may, at their own discretion, determine the granular material volume without enforcing the strike-off method. Truck boxes are to be thoroughly cleaned when unloading.
- .8 The excavation of organic materials for the PSWMS will be measured for payment based on the volume (m³) of material removed as measured by survey and paid under Item 31 22 13-11 (Organic Material Removal for PSWMS Installation) found in the Basis of Payment Schedule Contingency Items table, and is based on 800 m³ excavation. This item (PSWMS) is contingent on the data to be collected in the summer of 2016. For excavation greater than this volume, as directed by the Departmental Representative, the Unit Cost for organic materials excavation will be multiplied by a factor dependent on the volume of excavation. The multiplication factor will be negotiated with the Departmental Representative.

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- .9 Rockfill and soil cover placement at the PSWMS will be measured for payment based on volume (m3) of material as determined by area and average thickness or digital terrain analysis, and will be paid under Item 31 22 13-12 (PSWMS Drain Rock Placement) and 31 22 13-13 (PSWMS Soil Cover Placement) found in the Basis of Payment Schedule - Contingency Items table.. This item (PSWMS) is contingent on the data to be collected in the summer of 2016. The processing, loading, hauling, placement and compaction of drain rock and soil cover will be included within this item.
- .10 The construction of the perimeter berm for the PSWMS will be measured for payment based on the volume (m³) of material by the end area method, and paid under Item 31 22 13-14 (Perimeter Berm Construction for PSWMS Installation), found in the Basis of Payment Schedule - Contingency Items table, and is based on 400 m³ of fill for the PSWMS berm. This item (PSWMS) is contingent on the data to be collected in the summer of 2016. For fill placement greater than this volume, as directed by the Departmental Representative, the Unit Cost for perimeter berm construction will be multiplied by a factor dependent on the volume of fill. The multiplication factor will be negotiated with the Departmental Representative.
- .11 No measurement for payment will be made for:
 - Excavation, and stripping and replacement of organic material beyond specified limits; .1
 - .2 Preparation of borrow sources;
 - .3 Excavations to investigate borrow sources:
 - .4 Surplus material;
 - .5 Waste and reject material;
 - .6 Placement of granular fill beyond the limits and depths specified, unless specifically authorized by Departmental Representative.
- .12 The following work items will be incidental to the work described in this Section, and will not be measured separately:
 - Stripping, stockpiling and replacement or placement of organic material from borrow areas .1 as directed by Departmental Representative, and where required from construction areas upon where granular material is to be placed.
 - .2 Construction of access roads and upgrading the infrastructure to facilitate site remediation activities as required for construction including placement of granular materials and installation of culverts.
 - Disposal of waste material from the borrow areas. .3
 - .4 Removal of surficial boulders over 300 mm in diameter from construction areas.
 - Excavating, separating, processing, screening, and stockpiling of borrow materials. .5
 - .6 Grading of borrow areas to approximate the before-construction condition upon completion.
 - .7 Loading, hauling and haul road construction, maintenance and rehabilitation.
 - 8. Water for moisture conditioning, compaction, and dust control should such be used as per water permit requirements.
 - .9 All construction surveying, including layout of facilities, slope staking, and supply and installation of witness grade stakes to monitor the depth of granular material placement
 - .10 Surveying and calculation of granular material quantities for progress payment purposes.
 - Reshaping of areas with ponded water (standing water covering over five (5) square metres .11 and more than 0.2 metres deep) and rutting (ruts more than 0.1 metres deep) caused by contractor's construction activities

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- Reshaping and regarding of borrow areas and Contractor's laydown areas including the .12 supply, placement and compaction of granular material.
- Removal and disposal or burial of abandoned utility lines exposed by Contractor during the .13 excavation or granular materials.
- .14 Draining of wet areas prior to regrading operations.
- .15 Work undertaken to drain borrow areas prior to excavation.
- .13 The placement in layers and compaction of contaminated soils and non-hazardous waste into the on-site landfarm or containment areas will be measured separately under one of the following sections:
 - .1 Section 02 41 16 – Structure Demolition
 - Section 02 41 16 Debris Removal .2
 - .3 Section 02 55 13 - Contaminated Soil
 - .4 Section 02 61 00 - Soil Remediation
- .14 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- Fill materials in accordance with Section 31 05 16 Aggregate Materials and Section 31 23 33.01 -.1 Excavating, Trenching and Backfilling.
- .2 Fill materials require the approval of Departmental Representative.
- .3 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Departmental Representative.
- .4 Fill materials shall be pit-run or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material, snow, ice and other deleterious materials.
- .5 There is a requirement to selectively acquire, blend and/or screen granular materials to satisfy gradation specifications as indicated in Section 31 05 17 - Aggregate Materials.

LINER MATERIALS 2.2

- .1 Geotextile in accordance with Section 31 32 19.01 – Geotextile.
- .2 Geomembrane in accordance with Section 31 32 19.02 – Geomembranes.

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PART 3 - EXECUTION

3.1 SITE PREPARATION

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.1 Unless specifically indicated or directed by Departmental Representative, do not remove existing topsoil or organic materials from construction areas. Remove exposed surface boulders over 300 mm in diameter that are located in areas to receive granular fill. Dispose of boulders by placing on embankment side slopes.

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.2 Borrow Excavation:

- .1 Obtain from potential borrow areas as indicated, or provide from own sources, all required granular fill material.
- .2 The existing operational pads and roadways at the site are not to be used as granular material borrow sources unless specifically authorized by Departmental Representative.
- .3 Advise Departmental Representative of selected borrow areas seven days in advance of excavation operations for appropriate testing to be completed.
- .4 Notify Departmental Representative whenever unsuitable materials are encountered in borrow areas.
- .5 Borrow material cannot be obtained from existing granular pads beneath facilities to be demolished, unless authorized in writing by Departmental Representative.
- Stripping, stockpiling and replacement or placement to a new location of organic material and stripping and disposal of waste material found when excavating existing granular material to be as directed by Departmental Representative.
- .7 Upon completion of final grading, leave all slopes in a stable condition and spread all stripped organics.
- .8 Final grading of borrow area upon completion to be tidy, in a well-drained condition, free of standing water to the satisfaction of the Departmental Representative.
- .9 Transport aggregate from borrow areas to the Work areas via existing access routes where available. Maintain and provide for dust control on the access route between the borrow area and the Work areas.

3.2 TSCA, WRSCA, LANDFARM AND PSWMS CONSTRUCTION

.1 TSCA

- .1 Examine C-CAM-06 to C-CAM-14 for conceptual TSCA designs, TSCA Location, and Contractor's approved Construction Plan.
- .2 Set grades and lay out work in detail from control points in areas of granular fill placement.
- .3 Verify the original ground topography by survey.
- .4 Level and maintain the TSCA base elevation by cut and fill as required.
- Prepare foundation around the perimeter as indicated on the Drawing C-CAM-08 by removing all organic and deleterious material, remove all loose native soil material. Compact the subgrade using a 10 tonne smooth drum vibrating roller compactor. Make a minimum 3 passes.
- .6 Haul granular fill material from borrow areas to designated TSCA area.
- .7 Place granular fill material to the lines and dimensions indicated on the Drawings and to the grades and elevations indicated in the Contractor's approved TSCA Construction Plan, or agreed to with Departmental Representative.
- .8 Do not place fill material which is frozen or place fill material on frozen surfaces.
- .9 Do not place granular fill on snow or surface ice.
- .10 Maintain natural drainage patterns, unless otherwise directed.

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- .11 Construct perimeter berms to design elevations (Class 1 Granular Fill), while leaving access corridor.
- Do not dump fill material over the side slopes of berms. .12
- .13 Place Class1 material in berm areas (i.e. Zone A as per drawings) in 0.3 m lifts. Compact to the maximum reasonable achievable compactness using a 10 tonne smooth steel drum vibrating roller compactor with a minimum 3 passes.
- After berms are constructed, place waste in 0.3 metre lifts separated by 0.15 metre .14 intermediate cover (Metals and Co-mingled impacted soils and, if necessary, Class 2 Granular Fill); place lifts to design height. Each lift shall be compacted using a 10 tonne smooth steel drum vibrating roller compactor with a minimum 3 passes.
- .15 Maintain a crowned surface during construction to ensure ready runoff of surface water. Do not place material in free standing water. Drain low areas before placing material.
- Moisture condition granular fill as required to meet compaction requirements. Provide a .16 water truck capable of efficiently placing water on granular fill. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .17 Prior to placing geotextile in TSCA, place uniform lift of granular fill material Class 3 (sand bedding - Zone C as shown on the Drawings), not exceeding 300 mm in loose thickness or 200 mm after compaction, and compact to 95 percent of Maximum Dry Density in accordance with ASTM D698. Compaction shall be performed using a 10 tonne smooth steel drum vibrating roller compactor with a minimum 3 passes.
- After geomembrane/geotextile installation, secure the geotextile by placing a uniform lifts of .18 granular fill material Class 3 (i.e. sand cover - Zone D on Drawing C-CAM-10) as shown on the Drawings using a light tire construction equipment type bobcat under 1 tonne or equivalent. Do not drive directly on the liner. The granular fill material shall be spread, not exceeding 300 mm in loose thickness or 200 mm after compaction, and compacted to 90 percent of Maximum Dry Density in accordance with ASTM D698. Compact backfill in such a manner as to not damage the geotextile/liner system. Compaction should be performed using a light smooth steel drum compaction roller under 2 tonnes.
- .19 Compact Class 1 material Zone B on the drawings (final cover) using a light smooth steel drum compaction roller under 2 tonnes.
- .20 If granular fill has dried out prematurely due to weather condition, scarify surface, adjust moisture condition and re-compact at Departmental Representative's discretion. No extra payment will be made for extra costs incurred as a result of any extra work.
- .21 Compaction equipment must be capable of obtaining required densities uniformly in materials on the project. Hand equipment must be available for compaction in areas where large equipment cannot access and around instrumentation.
- .22 Install groundwater monitoring wells and thermistors at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 - Instrumentation prior to placement of any waste or contaminated soil in the TSCA
- Impacting waste rock requiring remediation. Metals and Co-mingled Impacted Soil shall be .23 placed in the TSCA in sequence outlined in the TSCA Construction Plan.
- .24 Placement of Non-Hazardous Waste in the TSCA
 - Place Non-Hazardous Wastes in the designated area(s) in uniform, horizontal lifts .1 between and against the berm. The thickness of each waste lift is to be such that there are minimal voids within the waste. The maximum thickness of each waste lift shall not exceed 0.5 metre.
 - .2 Compact waste during placement with a double steel drum compactor or approved alternative during placing and spreading of the waste material. The equipment must be capable of crushing demolition debris.

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- .3 For placement in TSCA, cut all demolition debris as required:
 - .1 To minimize displacement and lifting of landfilled materials resulting from landfill compaction operations;
 - .2 To satisfy the overall landfill dimension requirements as indicated on the Drawings;
 - .3 Large equipment/vehicles shall be cut to length and reduced in volume at the recommendation and discretion of the on-site Departmental Representative.
- .4 Cut structural steel material into separate members prior to placement in TSCA. Place large materials including structural steel members on the base of the landfill preferably, so that the materials lay on a compacted, flat surface. Cut hollow components or objects, such as tanks as required allowing for nesting of materials. As a minimum, hollow components are to be cut in half parallel to the lengthwise axis. Within the landfill, support the underside of nested materials with intermediate cover or other debris material to minimize displacement and lifting of materials.
- .5 Crush, cut or shred barrels to be landfilled on site to reduce the total original barrel volume by minimum of 75 percent.
- .25 Construction of the cover for the TSCA.
 - .1 Haul granular fill material from Landfarm and/or borrow areas to designated TSCA
 - .2 Place granular fill material to the lines and dimensions indicated on the Drawings and to the grades and elevations indicated in the Contractor's approved TSCA Construction Plan, or agreed to with Departmental Representative.
 - .3 Do not place fill material which is frozen or place fill material on frozen surfaces.
 - .4 Do not place granular fill on snow or surface ice.
 - .5 Maintain natural drainage patterns, unless otherwise directed.
 - Moisture condition granular fill as required to meet compaction requirements.

 Provide a water truck capable of efficiently placing water on granular fill. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .7 Provide material placement and compaction in the same manner as described above.

.2 WRSCA

- .1 Examine Drawings C-KID-08 to C-KID-16 for conceptual WRSCA designs, WRSCA Location, and Contractor's approved Construction Plan.
- .2 Set grades and lay out work in detail from control points in areas of granular fill placement. Verify the original ground topography by survey.
- .3 Level and maintain the WRSCA base elevation by cut and fill as required.
- .4 Prepare foundation around the perimeter as indicated on Drawing C-KID-10 by removing all organic and deleterious material, remove all loose native soil material. Compact the subgrade using a 10 tonne smooth drum vibrating roller compactor. Make a minimum 3 passes.
- .5 Placement of Non-Hazardous Waste and impacting waste rock requiring remediation in the WRSCA.
 - .1 Place all coarse waste rock material along the perimeter of the WRSCA facility within the foundation preparation zone as indicated on the drawings. Place all fine waste material inside the perimeter or by filling voids in the coarse material.

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- .2 Place Non-Hazardous Wastes in the designated area(s) in uniform, horizontal lifts of maximum thickness 0.5 metre by keeping minimum voids within the waste.
- .3 Compact each waste lift during placement with a 10 tonne smooth drum vibrating roller compactor using minimum 3 passes. The equipment must be capable of crushing demolition debris.
- .4 For placement in WRSCA cut all demolition debris as required:
 - .1 To minimize displacement and lifting of landfilled materials resulting from landfill compaction operations;
 - .2 To satisfy the overall landfill dimension requirements as indicated on the Drawings;
 - .3 Large equipment/vehicles shall be cut to length and reduced in volume at the recommendation and discretion of the on-site Departmental Representative.
- .5 Cut structural steel material into separate members prior to placement in containment areas. Place large materials including structural steel members on the base of the landfill preferably, so that the materials lay on a compacted, flat surface. Cut hollow components or objects, such as tanks as required allowing for nesting of materials. As a minimum, hollow components are to be cut in half parallel to the lengthwise axis. Within the landfill, support the underside of nested materials with intermediate cover or other debris material to minimize displacement and lifting of materials.
- .6 Crush, cut or shred barrels to be landfilled on site to reduce the total original barrel volume by minimum of 75 percent.
- .6 Impacting waste rock requiring remediation, Metals and Co-mingled Impacted Soil shall be placed in the WRSCA in sequence outlined in the WRSCA Construction Plan.
- .7 Construction of the cover for the WRSCA.
 - .1 Haul granular fill material from borrow areas to designated WRSCA area.
 - .2 Place granular fill material to the lines and dimensions indicated on the Drawings and to the grades and elevations indicated in the Contractor's approved WRSCA Construction Plan, or agreed to with Departmental Representative.
 - .3 Do not place fill material which is frozen or place fill material on frozen surfaces.
 - .4 Do not place granular fill on snow or surface ice.
 - .5 Maintain natural drainage patterns, unless otherwise directed.
 - Moisture condition granular fill as required to meet compaction requirements.

 Provide a water truck capable of efficiently placing water on granular fill. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .7 Provide material placement and compaction in the same manner as described above for the TSCA.

.3 Landfarm

- .1 Examine C-CAM-14 and C-CAM-15 for conceptual Landfarm design, potential location, and Contractor's approved Landfarm Construction Plan.
- .2 Set grades and lay out work in detail from control points in areas of granular fill placement. Verify the original ground topography by survey.
- .3 Remove cobbles, boulders, and sharp objects within the Landfarm footprint.
- .4 Install groundwater monitoring wells at the locations as indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 Instrumentation prior to placement of any contaminated soil in the Landfarm. Place

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granular fill material to the lines and dimensions indicated on the Drawings and to the grades and elevations indicated in the Contractor's approved Landfarm Construction Plan, or agreed to with Departmental Representative.

- .5 Haul granular fill material from borrow areas to designated Landfarm area.
- Do not place fill material which is frozen or place fill material on frozen surfaces. Do not place .6 granular fill on snow or surface ice.
- Maintain natural drainage patterns, unless otherwise directed, and fill depressions to .7 avoid any ponding of water adjacent to embankments.
- Maintain a crowned surface during construction to provide ready runoff of surface water. 8. Do not place material in free standing water. Drain low areas, before placing material.
- .9 Do not dump granular fill material over the side slopes of berms.
- .10 Place and compact granular fill material in horizontal or near horizontal lifts.
- .11 Cease construction at any sign of movement or bulging in the embankments to allow assessment by Departmental Representative.
- .12 Moisture condition granular fill as required to meet compaction requirements. Provide a water truck capable of efficiently placing water on granular fill. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- Compact Granular Fill material to a minimum of 95 percent of Maximum Dry Density in .13 accordance with ASTM D698 or as determined from a Control Strip Density. The method for determining the maximum dry density will be established by Departmental Representative.
- Compaction equipment must be capable of obtaining required densities uniformly in .14 materials on project. Hand equipment must be available for compaction in areas where large equipment cannot access. Tracked or tired equipment may be substituted for dedicated compaction equipment, provided it can demonstrate satisfactory compactive effort.
- .15 Where indicated on the Drawing, excavate a key trench for placement of granular fill.
- Prior to placing geotextile, place minimum 150 mm thickness of bedding Sand. .16
- Construct Landfarm perimeter berms using Class 1 Granular Fill and compact fill material to .17 at least 95% of standard maximum dry density in accordance with ASTM D698.
- Construct berms sloped at 2H:1V (interior)/2.5H:1V (exterior) with minimum 1.0 m crest and .18 an access ramp on top of berm and liner with 10H:1V slope.
- .19 Place geotextiles in accordance with Section 31 32 19.01 – Geotextiles.
- .20 Place geomembrane in accordance with Section 31 32 19.02 - Geomembranes and follow up geotextiles.
- .21 Prevent damage to the liner during granular fill placement. The following are provided as guidelines for equipment traffic.

Backfill Thickness over Liner	Allowable Ground Pressures/
	Placement Equipment
No Backfill	Foot Traffic or ATV only
150 mm or less	Hand Placement
200 mm to 300 mm	28.7 kPa to 29.0 kPa (D3-D4 Cat Track
	Loaders B Low Ground Pressure)
Greater than 300 mm	29.0 kPa to 59.9 kPa (D4 to D6 Style CAT)
600 mm	72.8 kPa to 109 kPa (D7 to D9 Style CAT)
900 mm	Loaded Scrapers, Motor Graders
900 to 1,200 mm	Loaded Tandem Axle Trucks

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Install two sumps within the low corners of the Landfarm with a 1 to 2% slope downward to the sumps as per Drawings C-CAM-14 and C-CAM-15 and Contractor's approved Landfarm Construction Plan.

- .1 Sumps must be sized appropriately for the size of the Landfarm area.
- .2 Equipment designed for liquid removal must be sized and managed appropriately so to not overflow the sumps.
- .23 Place 300 mm minimum thickness of Sand above the top layer of geotextile. All sand is to be placed in an unfrozen state. Fill material to be free from debris, snow and ice. Do not place granular fill if the outside air temperature is below 0° C, unless otherwise directed by Departmental Representative.
- .24 Place 500 mm maximum thickness of hydrocarbon contaminated soil in lifts not exceeding 250 mm in loose thickness.

.4 Control Strip Density:

- .1 A Control Strip is a lift of granular material placed over a minimum 300 square metres area that requires regrading.
- .2 To determine the Control Density, moisture and density readings are to be taken by Departmental Representative during the compaction process until a maximum dry density is attained.
- .3 The density and moisture content of the Control Strip are to be measured by Departmental Representative after each pass of the compaction equipment to determine the type of equipment and number of passes required to obtain the specified density.
- .4 A new Control Strip will be required if, as established by Departmental Representative, the material type, moisture content, or subgrade of the area to be regraded is significantly different than that of the Control Strip.
- .5 Proof roll areas compacted in accordance with the Control Strip Density upon completion of grading and compaction or as requested by Departmental Representative.
- .6 Use a fully loaded haul truck for the proof rolling operation. The speed of the vehicle is not to exceed 4 km per hour during proof rolling. Departmental Representative may authorize the use of alternative proof rolling equipment.
- .7 Make sufficient passes with the proof rolling equipment to subject every point on the surface to three separate passes of a loaded tire.
- .8 Where proof rolling reveals areas of defective granular fill, remove and recompact the granular fill, and modify the compaction process, as required.
- .9 The Control Strip Density method for compaction is not intended to relax the specified compaction requirements, but to reduce compaction testing requirements.

.5 Kidney Pond PSWMS

- .1 Examine C-KID-08, C-KID-09 to C-KID-11 and C-KID-16 for conceptual PSWMS designs, PSWMS location, and Contractor's approved Construction Plan.
- .2 Set grades and lay out work in detail from control points in areas of rockfill and soil cover placement. Verify the original ground topography by survey.
- .3 Place granular fill material to the lines and dimensions indicated on the Drawings and to the grades and elevations indicated in the Contractor's approved PSWMS Construction Plan, or as agreed to with the Departmental Representative.
- .4 Prepare foundation within footprint of PSWMS rockfill drain and perimeter berm as indicated on Drawings C-KID-08, C-KID-09 to C-KID-11 and C-KID-16 by removing all organic and deleterious material.
- .5 Coordinate installation of PSWMS thermal control systems with grading work.

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- .6 Construct perimeter berms using Class 1 Granular Fill and compact fill material to at least 95% of standard maximum dry density in accordance with ASTM D698.
- .7 Construct berms sloped at 2H:1V (interior) / 2H:1V (exterior) with minimum 1.0 m crest.
- .8 Place geomembrane on inside face of perimeter berm in accordance with Section 31 32 19.02 – Geomembranes.
- .9 Place rockfill / drain rock to design thickness and grade and per the extent indicated on the Drawings within the perimeter berm, against the weir box drain wall and against the western slope.
- .10 Place geotextiles on berm and on rockfill / drain rock layer in accordance with Section 31 32 19.01 Geotextiles
- .11 Place soil cover, consisting of Class 1 Granular Fill, to design thickness and grade and compact fill material to 95% of standard maximum dry density in accordance with ASTM D698.
- .12 Install thermos-siphon thermal control measures at locations and per details indicated on the Drawings, or as directed by the Departmental Representative.
- .13 Install groundwater monitoring wells at the locations indicated on the Drawings or as directed by the Departmental Representative, in accordance with Section 02 51 00 Instrumentation following placement of the soil cover.

3.3 UPGRADING EXISTING ROADS AND CONSTRUCTING NEW ROADS

- .1 Improve stability of the existing roads for equipment access, as required. The overview drawings show existing access trails at the sites.
- .2 Strip topsoil in areas where new access roads are required to be constructed.
- .3 Haul granular fill material from borrow areas to designated areas.
- .4 Do not place fill material which is frozen.
- .5 Maintain natural drainage patterns, unless otherwise directed, and fill depressions to avoid any ponding of water adjacent to embankments.
- All granular fill is to be placed in an unfrozen state. Fill material to be free from debris, snow and ice. Do not place granular fill if the outside air temperature is below 0°C, unless otherwise directed by Departmental Representative.
- .7 Maintain a crowned surface during construction to ensure ready runoff of surface water. Do not place material in free standing water. Drain low areas before placing material.
- .8 Place Class 1 Granular Fill generally consisting of well-graded sand and gravel and free from rocks larger than 300 mm, waste or other deleterious material.
- .9 If granular fill has dried out prematurely due to weather conditions, scarify surface, adjust moisture condition and recompact at Departmental Representative's discretion. No extra payment will be made for extra costs incurred as a result of any extra work.

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- .10 Where the alignment of new access road or upgrading of an existing trail crosses a natural drainage channel or watercourse that is flowing with water or intermittently flows with water, then the Contractor may be required to install a culvert (or equivalent) to permit water flow under the road to maintain natural drainage patterns until such time that the access road is no longer required.
- .11 The Contractor is required to submit a Drainage and Sediment Control Plan prior to commencing work as described in Section 01 35 43 Environmental Procedures.
- .12 Compaction equipment must be capable of obtaining the required densities uniformly in materials on the project. Hand equipment must be available for compaction in areas where large equipment cannot access and around instrumentation.

3.4 REGRADING

- .1 Supply, place, blade and trim designated Granular Fill material to elevation, grades, and crosssection dimensions indicated on Drawings or as directed by Departmental Representative.
- .2 Supply and install witness grade stakes in areas to be regraded to monitor the depth of granular material. The grade stakes are to be placed on a grid spacing accepted by Departmental Representative for each specific regrade area. Immediately replace all grade stakes that are damaged or displaced by Contractor operations.
- .3 Place granular backfill material in uniform layers not exceeding 250 mm compacted thickness up to 0.3 meters above original grade to account for settlement, prevent ponding and blend into the surrounding terrain. Compact each layer to 95% Standard Proctor maximum dry density (ASTM D698) before placing succeeding layer. Class 1 granular fill is to be used on surfaces where there is potential for erosion. Have Departmental Representative approve amount and areas for Class 1 granular fill
- .4 Compact and moisture condition Granular Fill material as necessary to obtain specified density in accordance to Clause 1.4 of this Section

3.5 RESHAPING

- .1 Obtain authorization from Departmental Representative prior to beginning reshaping operations.
- .2 Blade and trim material to elevation, grades, and cross-section dimensions indicated or directed by Departmental Representative.
- .3 Make use of material within the area designated for reshaping to provide a surface that is smooth and compact with firm slopes.
- .4 Remove or cover debris exposed during reshaping with a minimum depth of Granular Fill as directed by Departmental Representative.
- .5 Grade excavation side-slopes from culvert removal at 10H:1V, or as directed by Departmental Representative, to provide a stable channel for drainage and to allow for vehicle passage.
- .6 Blend the final reshaped surface with the natural terrain and provide positive drainage.

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3.6 TESTING

.1 Inspection and testing of soil compaction will be carried out by Departmental Representative.

3.7 SURPLUS MATERIAL

.1 Surplus material and material unsuitable for filling or grading will be distributed in the borrow area to match the natural terrain as directed by Departmental Representative.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

.1 This Section specifies the definition, design, responsibilities, operation, maintenance, removal, and execution of dewatering of the following:

DEWATERING

- .1 Goodrock North Shaft and South Pit The South Pit will be dewatered to allow for the placement of the mine opening seal in accordance with the Section 01 81 00 Mine Opening Seal.
- .2 Storm North and South Mine Shafts The shafts will be dewatered to allow for the placement of the mine opening seal in accordance with the Section 01 81 00 Mine Opening Seal.
- .3 Treacy East Trench The East Trench will be dewatered to allow for the placement of the mine opening seal in accordance with the Section 01 81 00 Mine Opening Seal.
- .4 Other Mine Openings any other Mine Openings specified for Backfill or Seals not otherwise listed in this Section that due to conditions at the time of work require dewatering.
- .5 All other areas requiring dewatering to perform the Work, including impacted soil excavations, if applicable.

1.2 DESCRIPTION OF SITES REQUIRING DEWATERING AND OF WATER DISPOSAL AREA

Location	Feature	Backfill Area (m²)	Backfill Depth (m)	Disposal Option
Goodrock	North Shaft	12	3	minimum of 30 m from surface water bodies and in accordance with Land
	South Pit	18	3	
Storm	North Mine Shaft	15	3	
	South Mine Shaft	9	5	
Treacy	East Trench	40	3	

1.3 REFERENCES

.1 Stantec. 2016. Gordon Lake Remedial Action Plan.

1.4 PERFORMANCE REQUIREMENTS

- Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control water flow at the mine openings described in Section 1.1.1 and in any other areas requiring dewatering to proceed on dry, stable surfaces.
 - .1 Perform dewatering in accordance with the requirements of the Water License.

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.2 Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades is prevented.

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- .3 Minimize suspended solids during dewatering activities.
- .4 Prevent surface water from entering mine openings and excavations by construction of the diversion ditch prior to dewatering, grading, berms, or other means.
- .5 Remove dewatering system when no longer needed.

1.5 SUBMITTALS

- .1 Submit Dewatering Plan as part of the Construction Plan one (1) week prior to commencing Work:
 - Drawings and complete design data showing methods and equipment proposed to utilize in dewatering, including relief of hydrostatic head, use of temporary facilities to dispose of water, and in maintaining excavations in a dewatered and in a hydrostatically relieved condition.

1.6 QUALITY CONTROL

- .1 Contractor will have the sole responsibility to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
- .2 Employ an independent qualified Professional Engineer with experience in similar dewatering problems to review and approve the Contractor's proposed method of dewatering and to inspect the Contractor's operations, at least once, and provide a report to the Departmental Representative.
- .3 Contractor will have the responsibility of all dewatering operations, which will be adequate to assure the integrity of the finished project.
- .4 The responsibility for conducting the dewatering operation in a manner which will protect adjacent facilities, to remain, rests solely with the Contractor. The cost of repairing damage to adjacent facilities, to remain, will be the responsibility of the Contractor.

1.7 MEASUREMENT AND PAYMENT

- .1 Include all direct costs for the dewatering for Goodrock North Shaft and South Pit, Storm North and South Mine Shaft, and Treacy East Trench and all other areas, as needed to perform the Work, as lump sum under Lump Sum Amount (LSA) in the Basis of Payment Schedule.
- .2 Except as indicated above, work under this section will not be measured. Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart

PART 2 - PRODUCTS

2.1 <u>EQUIPMENT</u>

.1 Before operations begin, have available on the site sufficient pumping equipment and/or other machinery to assure that the operation of the dewatering system can be maintained.

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PART 3 - EXECUTION

3.1 METHODS

- .1 Accomplish dewatering by such method(s) as the Contractor may elect.
- .2 Dispose of water so as not to cause injury to public or private property or to cause a nuisance or menace to the public and in accordance with the requirements of regulatory agencies.

DEWATERING

- .3 Disposal of shaft and trench water will be discharged overland a minimum of 30 m from surface water bodies.
 - .1 Contact water removed from impacted soil excavations shall be tested and treated in accordance with Section 01 35 15 Special Project Procedures for Contaminated Sites.
- .4 Do not incorporate permanent piping systems in the dewatering system.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies the excavating, trenching and backfilling that is required for earthworks associated with:
 - .1 Upgrading existing roads and constructing new access roads as required.
 - .2 Borrow sources.
 - .3 Regrading of areas and depressions created by the removal of debris and impacted soil, tailings, and waste rock.
 - .4 Backfill the East and West Trench at Treacy and Mine Openings as specified in Section 01 81 00.
 - .5 Excavation works for perimeter ditch construction at the Tailings and Soil Containment Area (TSCA) and Waste Rock and Soil Containment Area (WRSCA).
 - .6 Excavation works for Kidney Pond Portal Seep Water Management System (PSWMS).

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 35 32 Site Specific Health and Safety Plan
- .3 Section 01 45 00 Quality Control.
- .4 Section 02 61 00 Hydrocarbon Soil Treatment.
- .5 Section 31 05 16 Aggregate Materials.
- .6 Section 31 22 15 Grading and Earthworks Construction.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D 422-63(2002), Standard Test Method for Particle-Size Analysis of Soils.
 - .3 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³) (600 kN-m/m ³).

1.4 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized.
 - .1 Rock excavation: solid material in excess of 1.00 m ³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Topsoil: native surficial material suitable for reuse for landscaping purposes as approved by Departmental Representative.

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- .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .6 Maximum Dry Density: Determine by the Standard Proctor Method in accordance with ASTM D698.
- .7 Corrected Maximum Dry Density: Applicable if more than 30% of the material is retained on the ASTM 19 sieve. It is defined as:
 - .1 D = $\frac{D1 \times D2}{(F1)(D2)+(F2)(D1)}$
 - .2 Where:

D = corrected maximum dry density kg/m3

F1 = fraction (decimal) of total field sample passing ASTM 19.0 mm sieve

F2 = fraction (decimal) of total field sample retained on ASTM

19.0 mm sieve (equal to 1.00 – F1)

D1 = maximum dry density (kg/m3 of material passing ASTM 19.0 mm sieve determined in accordance with Method C of ASTM D698 or latest edition thereof.

D2 = bulk density, kg/m3 of material retained on ASTM 19.0 mm sieve, equal to 1,000 G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127-84, or latest edition thereof.

1.5 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 Quality Control:
 - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
 - .2 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
 - .3 Submit to Departmental Representative written notice when bottom of excavation is reached.
 - .4 Submit to Departmental Representative testing/inspection results, as required, and report as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this Section prior to start of Work.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Contractor will provide samples and sieve analysis for borrow materials two (2) weeks prior to use. Borrow materials to be accepted by Departmental Representative prior to use by the Contractor.

1.6 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

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- .2 Do not use soil material until written report of soil test results are approved by Departmental Representative.
- .3 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 32 Site Specific Health and Safety Plan.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert petroleum hydrocarbon-impacted soils to Camlaren Landfarm for treatment in accordance with 02 61 00 Hydrocarbon Soil Treatment.
- .2 Divert metals impacted soils and tailings to on-site Containment Areas (i.e. the Waste Rock and Soil Containment Area (WRSCA) or the Tailings and Soil Containment Area (TSCA), site dependent) for disposal in accordance with Section 02 55 13 Contaminated Soil.
- .3 Divert co-mingled impacted soils (i.e. petroleum hydrocarbon and metals impacted soils) to on-site Containment Areas (WRSCA or TSCA site dependent) for disposal in accordance with Section 02 55 13 Contaminated Soil.
- .4 Divert potentially acid-generating (PAG) rock to the WRSCA or TSCA (site dependant) for disposal in accordance with Section 02 55 13 Contaminated Soil.

1.8 EXISTING CONDITIONS

- .1 Examine Remedial Action Plan (Stantec, 2016) and Drawings.
- .2 Existing buildings and surface features:
 - 1 Conduct, with Departmental Representative, condition survey of the natural ecosystem which may be affected by Work.
 - .2 As much as possible, protect the natural ecosystem from damage while Work is in progress. In the event of damage, immediately make repair as directed by Departmental Representative.

1.9 MEASUREMENT FOR PAYMENT

- .1 Location and development of borrow sources including stripping, processing, handling, stockpiling, transport, replacement of organics, and any necessary restoration will be incidental to the work of Section 31 22 13 Grading, and will not be measured separately.
- .2 Payment for the excavation of contaminated soil will be based on cubic metres of contaminated soil excavated and incorporated into the work as determined by survey. Payment includes excavating, loading, hauling to treatment area, and stockpiling material and is included in the payment under Items 02 55 13-1-1 to 02 55 13-1-5 (PHC-impacted soil), 02 55 13-2-1 to 02 55 13-2-7 (metals-impacted soils); 02 55 13-3-1 to 02 55 13-3-4 (co-mingled impacted soils); 02 55 13-4-1 to 02 55 13-4-2 (Impacted tailings); and 02 55 13-5-1 to 02 55 13-5-6 (Impacting Waste Rock Requiring Remediation), as indicated in the Basis of Payment Schedule. Payment will be based on initial and final cross sections as follows:
 - .1 Initial survey of the ground profile prior to excavating the areas of environmental concern.
 - .2 Final survey of the ground profile upon completion of excavating the areas of environmental concern.

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- .3 Payment for the backfilling of the contaminated soil excavations will be based on cubic metres as determined by survey. Payment includes loading, hauling, backfilling, compacting and reshaping the areas to conform to existing conditions and is included in the payment under Items 02 55 13-1-1 to 02 55 13-1-5 (PHC-impacted soils), 02 55 13-2-1 to 02 55 13-2-7 (metals-impacted soils), 02 55 13-1 to 02 55 13-3-4 (co-mingled impacted soils), 02 55 13-4-1 to 02 55 13-4-2 (Impacted tailings) and 02 55 13-5-1 to 02 55 13-5-1-6 (Impacting Waste Rock Requiring Remediation), as indicated in the Basis of Payment Schedule. Payment will be based on initial and final cross sections as follows:
 - .1 Initial survey of the ground profile prior to excavating the areas of environmental concern.
 - .2 Final survey of the ground profile upon completion of excavating the areas of environmental concern.
- .4 Payment for the backfilling of trenches and mine openings will be paid under Section 01 81 00 Mine Opening Seal.
- 1.5 The excavation of soil and sediment at the PSWMS for the flow monitoring station will be measured for payment by the cubic metre of excavated material as determined from survey method identified in Section 31 22 13 Grading and Earthworks Construction. Excavated soil and sediment at the PSWMS will be paid under Item 31 23 33.01-1 found in the Basis of Payment Schedule—Contingency Items table.. This item (PSWMS) is contingent on the data to be collected in the summer of 2016.
- .6 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 and Type 2 materials: properties in accordance with Section 31 05 16 Aggregate Materials
- .2 Environmental Protection Supplies as per Section 01 35 43 Environmental Procedures.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and approved Sediment and Erosion Control Plan, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Remove all brush, weeds, grasses and accumulated debris from the site.

3.3 PREPARATION/PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing tundra from damage.
- .4 Environmental protection measures are to be in accordance with the Environmental Protection Plan and as specified in Section 01 35 43 Environmental Procedures.
- .5 Install temporary erosion, sediment and drainage controls prior to construction and excavation activities.
- .6 Suspend operations whenever climatic conditions are unsatisfactory for excavation or grading to conform with this specification.
- .7 Some areas designed for clean-up under this contract involve soils and hazardous materials which contain inorganic elements, and other contaminants which are considered hazardous to human health.
- .8 A listing of the waste materials that may exist within the existing Work areas is included in Appendix A of the specification and on Drawings.
- .9 When working with inorganic elements and other contaminants, workers are to wear protective clothing and equipment acceptable to Labour Canada or Territorial Labour Department suitable for exposure in the work area. Follow National Institute for Occupational Safety and Health (NIOSH) guidelines in providing protection for on-site personnel including contract employees and subcontractor, Departmental Representative and Departmental Representative's Authorized Personnel. Comply with all applicable regulation as indicated in Section 02 82 00.01 Asbestos Abatement Minimum Precautions, Section 02 83 10 Lead-Based Paint Abatement Minimum Precautions, and Section 02 81 01 Hazardous Materials.
- .10 Unless otherwise specified, carry out excavation work in accordance with Section 01 35 32 Site Specific Health and Safety Plan.

3.4 STOCKPILING

- .1 Stockpile excavated materials in areas designated by Departmental Representative.
- .2 Cover impacted materials from precipitation to reduce leachate pending transportation to Landfarm area.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

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ual to the denth of the

.4 Place stockpile of excavated materials at a distance from the excavation equal to the depth of the excavation. Stockpile height not to exceed 2 metres.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Dewater excavations/mine openings in accordance with Section 31 23 15 Dewatering.
- .3 Provide for Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, and well points.
- .4 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .5 Protect open excavations against flooding and damage due to surface run-off.
- .6 Dispose of water in accordance with Section 01 35 43 Environmental Procedures to approved collection runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.
- .7 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.6 EXCAVATION

- .1 Contractor to initiate and complete topographic survey in advance of excavation operations for initial cross section to be taken.
- .2 Remove concrete, above-ground tanks, demolished foundations and rubble, and other obstructions encountered during excavation in accordance with Section 02 41 16 Structure Demolition.
- .3 Prior to excavation, remove all surface snow/ice and direct surface water run-off around the excavation.
- .4 Excavate to lines, grades, elevations and dimensions as indicated and as directed by Departmental Representative.
- .5 When excavating in the vicinity of a drainage course or a body of water, erect silt fences, floating silt curtains and/or containment berms to prevent the release of sediment or deleterious material into the water.
- .6 Collect melt water/groundwater/leachate at the low point of the excavation and provide for settling of sediments and testing of water prior to discharge to the environment. Carry out testing of melt water/groundwater. Release of water is to conform to the wastewater discharge criteria described in Section 01 35 43 Environmental Procedures. Submit results of testing to Departmental Representative.
- .7 Use a VOC instrument to continuously measure the concentrations of VOC during excavation operations within impacted areas. When the concentrations of VOC exceed 20% LEL, temporarily halt work until ventilation (natural or induced) reduces the concentration levels to a safe working level.

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- .8 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 metres of trench in advance of installation operations and do not leave open more than 15 metres at end of day's operation.
- .9 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.
- .10 Restrict vehicle operations directly adjacent to open trenches.
- .11 Dispose of surplus and unsuitable excavated non-hazardous materials in approved location on site landfill location as directed by Departmental Representative.
- .12 Do not obstruct flow of surface drainage or natural watercourses.
- .13 Notify Departmental Representative when bottom of excavation is reached.
- .14 Obtain Departmental Representative approval of completed excavation.
- .15 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .16 Do not damage permafrost during excavation.
- .17 Correct unauthorized over-excavation as follows:
 - .1 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.
- .18 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- .19 Install geotextiles and geomembranes in accordance with Section 31 32 19.01 Geotextiles and Section 31 32 19.02 Geomembranes.

3.7 BACKFILLING

- .1 Impacted Soil Excavations:
 - .1 Do not proceed with backfilling operations until completion of following:
 - .1 Survey of the ground profile upon completion of the final excavation limits and Departmental Representative has inspected and approved final excavation limits.
 - .2 The confirmatory soil results indicate that soils along the final excavation limits meet the applicable guidelines and confirmed by Departmental Representative.
 - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
 - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .4 Place backfill material in uniform layers not exceeding 250 mm compacted thickness up to 0.3 metres above original grade to account for settlement, prevent ponding and blend into the surrounding terrain. Compact each layer before placing succeeding layer.
- .2 Trenches and mine openings

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- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Survey of the ground profile prior to backfill and Departmental Representative has inspected and approved limits.
 - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground
 - .3 Trenches requiring backfill shall be filled to surrounding grade level.
 - .4 The Goodrock South Pit shall be backfilled with impacting waste rock to the water table, and granular fill material to the surface.
 - The Shaft and Deep Trench at Murray Lake and the North and South Shafts at Storm Property shall be backfilled with impacting waste rock to the level of the water table or apparent water table if not currently filled and granular fill material to the surface.

3.8 DITCH CONSTRUCTION

- .1 Excavate to lines, grades, elevations and dimensions as indicated on DrawingsC-CAM-11 and C-KID-12.
 - .1 When excavating in the vicinity of a drainage course or a body of water, erect silt fences, floating silt curtains and/or containment berms to prevent the release of sediment or deleterious material into the water
 - .2 Excavation in rock may involve mucking and removal of weathered bedrock using heavy construction equipment, where possible. In the event of the hard rock, ditch profile may be adjusted such as to maintain a positive drainage.

3.9 RESTORATION

- .1 Clean and reinstate, including revegetation, areas affected by Work as directed by Departmental Representative and in accordance with the Land Use Permit and Quarry Permit.
- .2 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

.1 This Section specifies the requirements for the supply and installation of non-woven geotextiles for:

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- .1 The Landfarm in conjunction with the installation of the geomembrane liners as indicated on Drawing C-CAM-15.
- .2 The Tailings and Soil Containment Area (TSCA) in conjunction with installation of the geomembrane liners as indicated on Drawings C-CAM-10 and C-CAM-11.
- .3 The Waste Rock and Soil Containment Area (WRSCA) in conjunction with installation of the geomembrane liners as indicated on Drawings C-KID-11 to C-KID-12.
- .4 The Portal Seep Water Management System (PSWMS) in conjunction with installation of the geomembrane liners as indicated on Drawings C-KID-11.

1.2 RELATED SECTIONS

- .1 Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.
- .2 Section 01 33 00 Submittal Procedures.
- .3 Section 31 22 15 Grading and Earthworks Construction.
- .4 Section 31 23 33.01 Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - 1 ASTM D 4491-(99a), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D 4595-(09) Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D 4716-(08), Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 ASTM D 4751-(04), Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-(2004) Textile Test Methods Bursting Strength Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-(M85), Methods of Testing Geosynthetics Mass per Unit Area.
 - .2 No.3-(M85), Methods of Testing Geosynthetics Thickness of Geotextiles.
 - .3 No.6.1-(93), Methods of Testing Geotextiles and Geomembranes Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3-(92), Methods of Testing Geotextiles and Geomembranes Grab Tensile Test for Geotextiles.
 - No. 10-(94), Methods of Testing Geosynthetics Geotextiles Filtration Opening Size.

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1.4 SUBMITTALS

- .1 Obtain written acceptance from Departmental Representative for geotextile before the installation of the material in Work.
- .2 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
- .3 Product Data:
 - .1 Submit manufacturer's instruction, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations. Submit four (4) weeks prior to commencing Work.
 - .2 Provide a written warranty from the manufacturer against defects or deficiencies in the quality of the geotextile material supplied. Submit two (2) weeks prior to commencing Work.
 - .3 Provide to the Departmental Representative, prior to shipment of the material to site, a signed manufacturer's certification that the material to be shipped to the site has test values for each property listed in Clauses 2.1.1.1 to 2.1.1.6 of this section, that meet or exceed the property values specified for that material.
 - .4 These certificates shall be signed by the Manufacturer's Product Manager or Quality Control Manager.
- .4 Samples:
 - .1 Submit the following samples four (4) weeks prior to beginning Work:
 - .1 Minimum length of 2 m of roll width geotextile.
 - .2 Methods of joining minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.
- .5 Testing and Evaluation Reports:
 - .1 Submit three (3) copies of mill test data and certificate at least four (4) weeks prior to start of Work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle material in accordance with Section 01 61 00 Common Product Requirements.
 - .1 Provide the geotextile in rolls wrapped with protective covering to protect the fabric from mud, dirt, dust, and debris. The fabric shall be free of defects or flaws which significantly affect its physical properties. Label each roll of fabric in the shipment with a number or symbol to identify that production run.
- .2 Contractor to supply and deliver all geotextile to the site in sufficient quantities to cover area designated in the Contract Documents and as requested by Departmental Representative.
- .3 Storage and Handling Requirements:
 - .1 Store materials in clean, dry and well-ventilated location and in accordance with manufacturer's recommendations.
 - .2 Store and protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
 - .3 Replace defective or damaged materials with new.

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1.6 MEASUREMENT FOR PAYMENT PROCEDURES

.1 The unit of measurement for the installation of Non-Woven Geotextile to the lines and dimensions indicated on the Drawings and including all labour, materials, tools, supervision, and on-site transport will be measured for payment by the square metre of non-woven geotextile installed. No extra payment shall be made for material overlap requirements or for patches over damaged material. The installation of Non-Woven Geotextile will be paid under Items 31 32 19.01-1,31 32 19.01-2 and 31 32 19.01-3 for the WRSCA, TSCA and Landfarm, respectively, found in the Basis of Payment Schedule.

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- .2 The installation of the Non-Woven Geotextile will be paid under Item 31 32 19.01-4 for the PSWMS, found in the Basis of Payment Schedule Contingency Items table. This item (PSWMS) is contingent on the data to be collected in the summer of 2016. Excavating and backfilling necessary to install and anchor the geotextile beneath the original ground surface will be measured for payment as indicated in Section 31 22 13 Grading and Earthworks Construction.
- .3 Unused geotextile remains the property of the Department Representative until completion of the project. The Contractor will transport and dispose of unused geotextile off-site upon completion of the project.
- .4 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 Construction Progress Schedules Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Geotextile fabric shall consist of polymeric filament or yarns such as polypropylene, polyethylene, polyester, or other polymers excluding polyamides, formed into a stable network such that the filaments or yarns retain their relative position to each other. The geotextile shall be inert to commonly encountered chemicals, resistant to ultraviolet light and heat exposure, and shall be indestructible by micro-organisms and insects. The minimum average roll value (weakest principal direction) for strength properties of any individual roll tested from the manufacturing lot or lots of a particular shipment shall be in excess of the minimum average roll value (weakest principal direction) stipulated below.
 - .1 Grab Tensile Strength (ASTM D4632): 911 N.
 - .2 Elongation at Failure (ASTM D4632): 50 %.
 - .3 Trapezoidal Tear Strength (ASTM D4533): 356 N.
 - .4 Apparent Opening Size (ASTM D4751) 180 μm
 - .5 Puncture (ASTM D6241): 2220 N.
 - .6 Weight Typical (ASTM D5261): 270 g/m²
- .2 Seams: overlapped in accordance with manufacturer's recommendations.
- .3 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.
- .4 Materials not meeting these specifications will not be accepted without prior authorization by the Departmental Representative.

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.5 Geomembrane as per Section 31 32 19.02.

2.2 CONFORMANCE TESTING

.1 Conformance testing of the geotextile is not required; verification of the manufacturing quality control documentation for the production run, as per Clause 1.4.3 of this Section, will be sufficient for determination of material conformance

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

All materials, procedures, operations, and methods shall be in strict conformance with the Drawings and Specifications and shall be subjected to strict quality assurance monitoring as detailed herein. The installed systems shall conform to the Drawings and Specifications, except as otherwise authorized in writing by the Departmental Representative.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.3 INSTALLATION

- .1 Ensure that the surface underlying the geotextile is graded smooth and is free from angular rocks, debris and protrusions.
- .2 Do not begin installation of geotextile until the base has been approved by the Departmental Representative.
- .3 For sand bedding preparation refer to Section 31 22 13 Grading and Earthworks Construction.
- .4 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .5 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .6 Overlap each successive strip of geotextile 600 mm over previously laid strip. Do not use securing pins when placing geotextile material over geomembrane liner.
- .7 Employ sufficient temporary anchorage to hold geotextile in place during placement, and during placement of other elements of the liner system until backfilled.
- .8 Heat track of glue geotextile overlaps prior to placing granular fill cover to prevent lifting or separation of overlap.

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- .9 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .10 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .11 After installation, cover with overlying layer within 4 hours of placement.
- .12 For soil cover specifications including placement and compaction refer to Section 31 22 13 Grading and Earthworks Construction.

3.4 CLEANING

.1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.5 ANCHORAGE

- .1 Anchor the geotextile at the perimeter of the landfarm/TSCA and/or WRSCA as indicated on the Drawings. Temporary anchorage can be provided by sandbags.
- .2 Place the geotextile into the key trench extending down the inside face and across the bottom of the trench.
- .3 Place the geotextile into this trench extending down the inside face and across the bottom of the trench.
- .4 Secure the geotextile by placement of sand cover layer as per Section 31 22 13 Grading and Earthworks Construction.

3.6 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile, unless for compaction purposes as described above.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This Section specifies the requirements for the supply and installation of the following:
 - .1 LDPE textured Geomembranes at the Waste Rock and Soil Containment Area (WRSCA),
 Tailings and Soil Containment Area (TSCA) and the Portal Seep Water Management System
 (PSWMS).

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- .2 20 mil LDPE Geomembrane at the Camlaren Landfarm.
- .3 Geomembrane at the Temporary Storage Areas at each Site.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 31 22 13 Grading and Earthworks Construction.
- .3 Section 31 23 33.01 Excavating, Trenching and Backfilling.
- .4 Section 31 32 19.01 Geotextiles.

1.3 REFERENCES

- .1 All references to this Specifications, Standards, or Methods shall be understood to refer to the latest adopted revision, including all amendments.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D 413-98(2002)e1, Standard Test Methods for Rubber Property-Adhesion to Flexible Substrate.
 - .2 ASTM D 638-02a, Standard Test Method for Tensile Properties of Plastics.
 - .3 ASTM D 746-98e1, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
 - .4 ASTM D 792-00, Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - .5 ASTM D 1004-94a(2003), Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
 - .6 ASTM D 1204-02, Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
 - .7 ASTM D 1238-01e1, Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
 - .8 ASTM D 1593-99, Standard Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting.
 - .9 ASTM D 1603-01, Standard Test Method for Carbon Black in Olefin Plastics.
 - .10 ASTM D 1693-01, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
 - .11 ASTM D 882-02, Standard Test Methods for Tensile Properties of Thin Plastic Sheeting.

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.12 ASTM D 1203-94(1999)e1, Standard Test Methods for Volatile Loss from Plastics Using Activated Carbon Methods.

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.13 ASTM D 1790-02, Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact.

1.4 SUBMITTALS

- .1 Obtain written acceptance from Departmental Representative for geomembrane before installation of material.
- .2 Submit in accordance with Section 01 33 00 Submittal Procedures.

.3 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for geomembranes and include product characteristics, performance criteria, physical size, finish and limitations. Submit four (4) weeks prior to commencing Work.

.4 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer licensed in Northwest Territories, Canada. Submit four (4) weeks prior to commencing Work.
- .2 Submit shop drawings and indicate installation layout, dimensions and details, including fabricated and field seams, anchor trenches and protrusion details.

.5 Samples:

- .1 Submit to Departmental Representative following samples at least four (4) weeks prior to beginning Work.
- .2 Minimum 2 m length of standard width membrane.
- .3 Minimum of 1 m seam with at least 300 mm of membrane on both sides of seam.

.6 Certificates:

- .1 Submit three (3) copies of manufacturer's mill test data four (4) weeks minimum before beginning Work.
- .2 Submit certificates, including test results two (2) weeks before delivery to job site.

1.5 QUALITY ASSURANCE

- .1 Test quality of resin and membrane to ensure consistency of raw material and geomembrane quality in accordance with manufacturer's recommendations.
- .2 Test seams in strength and peel at beginning of each seaming period, and at least once every 4 h if welding operation is interrupted, for each seaming apparatus and seamer used that day. Also test at least two samples from each panel, with samples taken from extra material, such that panel is not damaged and blanket geometry is not altered.
- .3 If seam test specimen fails in seam, repeat on new specimen. If new specimen fails in seam, material will not be used for seaming until deficiencies are corrected and two consecutive successful test seams are achieved.
- .4 Test seams by non-destructive methods over their full length, using vacuum test unit, air pressure test or thermo-fusion methods as specified in the ASTM test methods.

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.5 Provide test results to Departmental Representative for each shift's production, including documentation of non-destructive testing and repairs at the end of each shift.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 Common Product Requirements.
- .2 Contractor to supply and deliver all geomembrane to the site in sufficient quantities to cover the area designated in the Contract Documents and as requested by Departmental Representative.

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- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .4 During delivery and storage, protect geo-membranes from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .5 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated areas.
 - .2 Replace defective or damaged materials with new.

1.7 MEASUREMENT FOR PAYMENT

- .1 The installation of Geomembrane liner to the lines and dimensions indicated, including all labour, materials, tools and supervision, will be measured for payment by the square metre of Geomembrane Installed and will be paid under Items 31 32 19.02-1, 31 32 19.02-2 and 31 32 19.02-3 for the WRSCA, TSCA and Landfarm, respectively, found in the Basis of Payment Schedule. No extra payment shall be made for material overlay requirements or for patches over damaged or failed material.
- The installation of Geomembrane liner to the lines and dimensions indicated, including all labour, materials, tools and supervision, will be measured for payment by the square metre of Geomembrane Installed and will be paid under Items 31 32 19.02-4 for the PSWMS found in the Basis of Payment Schedule Contingency Items table. No extra payment shall be made for material overlay requirements or for patches over damaged or failed material. This item (PSWMS) is contingent on the data to be collected in the summer of 2016.
- .3 The following activities are considered incidental to the work identified by Items 31 32 19.02-1 in the Basis of Payment Schedule and will not be measured separately:
 - .1 The installation of Geomembrane liner at Temporary Storage Areas including all labour, materials, tools and supervision.
- .4 Excavating and backfilling necessary to install the Geomembrane Liner will be measured for payment as indicated in Section 31 22 13 Grading and Earthworks Construction.
- .5 Unused geomembrane remains the property of the Departmental Representative until the completion of the project. Store geomembrane in accordance with Clause 2.3 of this section. The Contractor will transport and dispose of unused geomembrane off-site upon completion of the project.
- .6 Except as indicated above, work under this section will not be measured. Include all costs in the Lump Sum Amount (LSA). Indicate cost of the work of this section as a separate line item in the

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Contract Work Breakdown Structure (CWBS) specified in Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 LDPE Geomembrane:

The physical properties of the smooth or textured (both sides) LDPE Geomembrane shall be in accordance with ASTM D1248 where applicable. The material shall have the minimum properties specified as follows:

Thickness – Typical (ASTM D5994)	As per drawings
Tensile Strength – Stress at Break (ASTM D638–)	44.0 N/mm
Elongation at Break (ASTM D638)	1000 %
Trapezoidal Tear Resistance (ASTM D751)	480 N
Puncture Resistance (ASTM D4833)	400 N
Carbon Black Content (ASTM D1603; D4218)	2-3%
Axi-Symmetric Strain (ASTM D 5617)	80%
UV Resistance (ASTM D 4329)	90%
Low Temperature Impact Resistance (ASTM D1790)	<-70 °C
Coefficient of Thermal Expansion (ASTM D696)	1.4x10-4 m/m/ C
Methane Permeability (ASTM D1434)	2.11x10-4 m3/m2/day

- .2 The LDPE geomembrane shall be formulated from resin incorporating a flexible modified, and consisting of approximately 98% polyethylene, 2.0% carbon black, and trace amounts of antioxidants and heat stabilizers.
- .3 In the slope areas, the LDPE geomembrane shall incorporate a co-extruded textured surface on both sides to increase the friction between the liner and the material on which it is placed. In most of other flat areas or with gentle slopes up to 5%, smooth geomembrane shall be used.
- .4 The LDPE geomembrane shall be capable of being heat sealed or solvent welded for making field splices, seams, and repairs.
- .5 Seams: welded in accordance with manufacturer's recommendations. The minimum strength of heat bonded seam shall be 15.7 N/mm (ASTM D6392).

.2 Geotextiles

- .1 Non-woven geotextiles in accordance with Section 31 32 19.01 Geotextiles.
- .3 Epoxy resin: FlexSet or equivalent.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions:
 - .1 Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geomembrane installation in accordance with manufacturer's written instructions.

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- .2 Visually inspect substrate in presence of Departmental Representative.
- .3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

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3.2 PREPARATION

- .1 Prepare sand bedding granular fill base layer in accordance with section 31 22 13 Grading and Earthworks Construction.
- .2 Geotextile fabric shall be installed in accordance with Section 31 32 19.01 Geotextiles prior to geomembrane installation.
- .3 A certificate of subgrade acceptance will be prepared by the geomembrane installation contractor prior to membrane installation.

3.3 INSTALLATION

- .1 Maintain area of installation free of water, deleterious material, and snow accumulations.
- .2 Prepare excessively soft supporting material as directed by Departmental Representative.
- .3 Do not proceed with panel placement and seaming when ambient temperatures are below minus 5 degrees C or above 40 degrees C, during precipitation, or in presence of excessive moisture (e.g. fog, dew).
- .4 Installation of the membrane in winds above 20 km/hr can proceed only if the installer can demonstrate that the liner will not be at risk of damage.
- .5 Do not install in any weather conditions that may be detrimental to the function of the membrane.
- .6 Ensure all personnel working on the geomembrane do not use damaging footwear.
- .7 Place and seam panels in accordance with manufacturer's recommendations on graded surface in orientation and locations indicated. Minimize wrinkles, avoid scratches and crimps to geomembranes and avoid damage to supporting material.
- .8 Protect installed membrane from displacement, damage or deterioration before, during and after placement of material layers.
- .9 Replace damaged, torn or permanently twisted panels to approval of Departmental Representative. Remove rejected damaged panels from site.
- .10 Keep field seaming to minimum. Locate field seams up and down slopes, with no horizontal field seam less than 1.5 m beyond toe of slope.
- .11 Keep seam area clean and free of moisture, dust, dirt, debris and foreign material.
- .12 Make field seam samples in accordance with requirements described in PART 2 on fragment pieces of geo-membrane and test to verify that seaming conditions are adequate.

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.13 Test field seams as seaming work progresses by non-destructive methods over their full length.

Repair seams which do not pass non-destructive test. Reconstruct seam between failed location and any passed test location, until non-destructive testing is successful.

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3.4 ANCHORAGE

- .1 Anchor the geomembrane at the perimeter of the containment areas/landfarm as indicated on the Drawings.
- .2 If a key trench is used for anchorage, place the geomembrane into the trench extending down the inside face and across the bottom of the trench. The anchor trench should be excavated to the intact/non-weathered bedrock surface.
- .3 The bedrock surface should be smoothed with the slush grout. Use a grout for low temperatures. Perform grout work at the time when the weather forecast is at least 2 °C for a minimum 12 hr. Check the manufacture specifications regarding the working temperatures and select the appropriate grout for the anticipated temperature conditions. The work plan should include the type of grout and specifications for the approval by the Departmental Representative. Provide sufficient cure time in accordance with the manufacture specifications before proceeding to the next step.
- .4 Place the geomembrane into this trench extending down the inside face and across the smoothed bedrock at the trench bottom.
- .5 Seal the geomembrane to smoothed bedrock using the epoxy resin FlexSet or equivalent.
- .6 Provide backfill fill material as shown on the Drawings, compacting to 90 percent of Maximum Dry Density in accordance with ASTM D698. Compact backfill in such a manner as to not damage the geomembrane/liner system.

3.5 SECTION REPAIR

- .1 Inspect seams and non-seam areas for holes, tears, or other defects.
- .2 Repair minor tears and pinholes by patching until non-destructive testing is successful.
- .3 Patches to be round or oval in shape, made of same geomembrane material, and extend minimum of 75 mm beyond edge of defect.
- .4 All repairs to be visually inspected.
- .5 Keep records of all repairs and the results of inspections.

3.6 PROTECTION

- .1 Protect panels from damage.
- .2 Handle carefully to avoid damaging the geomembrane.
- .3 Do not permit vehicular traffic directly on membrane.

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APPENDIX FLYSHEET

APPENDIX A - Hazardous and Non-Hazardous Waste Inventory

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m³)	Adjusted Backfill Volume (m³)	Disposal Location
1.1.1	Burnt Island	Co-Mingled Impacted Soil	BUR_SO_07	Old Mill Area	129	0.3	32.2	32.2	TSCA
1.3.2	Burnt Island	PHC Impacted Soil	BUR_SO_01	Shaft Area	53	0.6	36.1	36.1	LF
1.3.3	Burnt Island	PHC Impacted Soil	BUR_SO_02	Shaft Area	40	0.4	20.5	20.5	LF
1.3.4	Burnt Island	PHC Impacted Soil	BUR_SO_03	Waste Rock Area	33	0.6	19.7	19.7	LF
1.3.5	Burnt Island	PHC Impacted Soil	BUR_SO_04	Waste Rock Area	59	0.6	35.7	35.7	LF
1.3.6	Burnt Island	PHC Impacted Soil	BUR_SO_05	Waste Rock Area	124	1.1	130.5	130.5	LF
1.3.7	Burnt Island	PHC Impacted Soil	BUR_SO_06	Waste Rock Area	19	0.3	5.8	5.8	LF
1.4.8	Burnt Island	Mine Openings	Portal	Portal Area			0.0	585.9	n/a
1.4.9	Burnt Island	Mine Openings	Mine Shaft	Shaft Area			0.0	475.2	n/a
1.5.10	Burnt Island	Underground Workings	Underground Workings	Shaft Area			0.0		n/a
1.6.11	Burnt Island	Trenches	Trenches	Old Mill Area			0.0	0.0	n/a
1.7.12	Burnt Island	Abandoned Infrastructure	Core Rack	Shaft Area	1	1.0	0.3		TSCA
1.7.13	Burnt Island	Abandoned Infrastructure	Dock	Old Cabin Area	120	0.2	1.2		TSCA
1.7.14	Burnt Island	Abandoned Infrastructure	Drill Rig	Shaft Area	3	12.0	9.0		TSCA
1.7.15	Burnt Island	Abandoned Infrastructure	South Sump	Old Cabin Area	1	1.0	1.0		TSCA
1.7.16	Burnt Island	Abandoned Infrastructure	Camp Comfort Stove	Old Sawmill	1	1.0	0.0		n/a
1.8.17	Burnt Island	Abandoned Site Buildings	Former Cabins	Knutsen Camp Area			1.2		TSCA
1.8.18	Burnt Island	Abandoned Site Buildings	Headframe	Shaft Area	60	0.2	0.6		TSCA
1.8.19	Burnt Island	Abandoned Site Buildings	Old Mill Building	Old Mill Area	140	0.2	2.8		TSCA
1.9.20	Burnt Island	Waste Rock	BUR_WR_01	Old Mill Area	95	0.5	0.0		n/a
1.10.21	Burnt Island	Tailings	Tailings	Tailings Area	1366	1.5	0.0	751.3	n/a
1.11.22	Burnt Island	Hazardous Waste	Asbestos	Brake pad on drill rig (Shaft	1	1.0	1.0		Off-site
1.12.23	Burnt Island	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Area) Throughout (Old Cabin Area, Tin Can Dump, Collapsed Tent Frame, etc.)			3.0		TSCA
1.12.24	Burnt Island	Non-Hazardous Waste	Wood	Throughout (Old Cabin Area, Portal Wood Barrier, etc.)			4.1		TSCA
1.13.25	Burnt Island	Sediment	Impacted Sediment	Knutsen Camp Area			0.0		n/a

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m³)	Adjusted Backfill Volume (m³)	Disposal Location
2.1.1	Camlaren	Co-Mingled Impacted Soil	CAM_SO_09	Mine Area (South)	316	1.2	254.6	191.0	TSCA
2.2.2	Camlaren	Metals Impacted Soil	CAM_HS_01	North Cabin (Near Potential Burned Battery Area)	9	0.5	9.0	9.0	TSCA
2.2.3	Camlaren	Metals Impacted Soil	CAM_SO_02	Mine Area (South)	49	0.7	32.0	32.0	TSCA
2.2.4	Camlaren	Metals Impacted Soil	CAM_SO_04	Mine Area (South)	1024	0.2	216.8	238.4	TSCA
2.2.5	Camlaren	Metals Impacted Soil	CAM_SO_06	Mine Area (South)	800	0.5	251.9	188.9	TSCA
2.2.6	Camlaren	Metals Impacted Soil	CAM_SO_07	Mine Area (South)	713	1.2	574.2	631.6	TSCA
2.2.7	Camlaren	Metals Impacted Soil	CAM_SO_08	Mine Area (South)	9922	1.1	7431.7	3715.9	TSCA
2.2.8	Camlaren	Metals Impacted Soil	CAM_SO_10	Mine Area (South)	362	0.5	114.1	85.6	TSCA
2.2.9	Camlaren	Metals Impacted Soil	CAM_SO_11	Mine Area (South)	371	0.3	77.9	58.4	TSCA
2.2.10	Camlaren	Metals Impacted Soil	CAM_SO_12	Mine Area (South)	1323	0.8	694.7	625.2	TSCA
2.2.11	Camlaren	Metals Impacted Soil	CAM_SO_15	Mine Area (North)	621	0.6	372.6	372.6	TSCA
2.2.12	Camlaren	Metals Impacted Soil	CAM_SO_17	Mine Area (North)	94	0.2	20.9	20.9	TSCA
2.2.13	Camlaren	Metals Impacted Soil	CAM_SO_18	Mine Area (North)	1311	0.5	1041.9	1041.9	TSCA
2.2.14	Camlaren	Metals Impacted Soil	CAM_SO_20	Mine Area (North)	79	0.3	41.5	45.6	TSCA
2.2.15	Camlaren	Metals Impacted Soil	CAM_SO_21	North Cabin	46	0.4	0.0		n/a
2.2.16	Camlaren	Metals Impacted Soil	CAM_SO_22	North Cabin	29	0.3	0.0		n/a
2.2.17	Camlaren	Metals Impacted Soil	CAM_SO_23	Zenith Island	1332	0.5	399.6	299.7	TSCA
2.2.18	Camlaren	Metals Impacted Soil	CAM_SO_24	Zenith Island	36	0.5	35.5	35.5	TSCA
2.3.19	Camlaren	PHC Impacted Soil	CAM_SO_01	Mine Area (South)	473	0.8	378.1	378.1	LF
2.3.20	Camlaren	PHC Impacted Soil	CAM_SO_03	Mine Area (South)	103	0.4	41.0	30.8	LF
2.3.21	Camlaren	PHC Impacted Soil	CAM_SO_05	Mine Area (South)	59	0.2	8.2	12.9	LF
2.3.22	Camlaren	PHC Impacted Soil	CAM_SO_13	Mine Area (South)	240	0.2	48.0	52.8	LF
2.3.23	Camlaren	PHC Impacted Soil	CAM_SO_14	Mine Area (North)	208	0.8	174.9	174.9	LF
2.3.24	Camlaren	PHC Impacted Soil	CAM_SO_16	Mine Area (North)	256	0.5	120.3	120.3	LF
2.3.25	Camlaren	PHC Impacted Soil	CAM_SO_19	Mine Area (North)	384	0.2	70.7	77.8	LF

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m³)	Adjusted Backfill Volume (m³)	Disposal Location
2.4.26	Camlaren	Mine Openings	Crown Pillar Opening	South Muir Island . Open to the small bay where concrete structure and mined out crown pillar are located.			0.0	0.0	n/a
2.4.27	Camlaren	Mine Openings	Mine Shaft Cap	South Muir Island. Located west of the concrete mill pad.			0.0	0.0	n/a
2.4.28	Camlaren	Mine Openings	Potential Hollow Area	South Muir Island. Located northwest of the concrete mill pad.			0.0	75.0	n/a
2.4.29	Camlaren	Mine Openings	Shaft	Zenith Island. Located in the central area of the site.			0.0	135.0	n/a
2.4.30	Camlaren	Mine Openings	Vent Raise	South Muir Island. Located south of the concrete mill pad.			0.0	0.0	n/a
2.5.31	Camlaren	Underground Workings	Underground Workings	Muir Island Mine Area (South)			0.0		n/a
2.6.32	Camlaren	Trenches	Trenches	Zenith Island. Three small shallow trenches south east of the shaft at Zenith Island.			0.0	0.0	n/a
2.7.33	Camlaren	Abandoned Infrastructure	Concrete Divide	South Muir Island			0.0		n/a
2.7.34	Camlaren	Abandoned Infrastructure	Docks	South Muir Island	60	0.2	0.6		TSCA
2.7.35	Camlaren	Abandoned Infrastructure	Hoist Pad	South Muir Island	50	0.3	15.0		TSCA
2.7.36	Camlaren	Abandoned Infrastructure	Mill Pad	South Muir Island	225	0.3	67.5		TSCA
2.7.37	Camlaren	Abandoned Infrastructure	Wooden Culvert	West Muir Island. On road running between dock and tailinas pond	2	0.1	0.0		TSCA
2.8.38	Camlaren	Abandoned Site Buildings	Cabins	North Cabin Area, Muir Island	140	0.2	2.8		TSCA
2.8.39	Camlaren	Abandoned Site Buildings	Stone Oven	North Cabin	9	1.5	0.0		n/a
2.8.40	Camlaren	Abandoned Site Buildings	Partially Collapsed Buildings (structure, outhouse, cabin)	Mine Area (North)	100	0.1	10.0		TSCA
2.8.41	Camlaren	Abandoned Site Buildings	Old Chimney	Mine Area (South)	2	5.0	0.0		n/a
2.9.39	Camlaren	Waste Rock	CAM_WR_02B	Zenith Island- Waste Rock (associated with shaft area)	9	1.0	9.0	394.9	TSCA
2.9.43	Camlaren	Waste Rock	CAM_WR_02A	Zenith Island- Waste Rock (associated with shaft area)	736	1.0	294.4	147.2	TSCA
2.9.44	Camlaren	Waste Rock	CAM_WR_01A	South Muir Island			4093.2		TSCA
2.9.45	Camlaren	Waste Rock	CAM_WR_03	Zenith Island- Waste Rock (associated with trenches to the south)	40	0.5	20.0		TSCA
2.9.46	Camlaren	Waste Rock	CAM_WR_01B	South Muir Island			0.0		TSCA
2.10.47	Camlaren	Tailings	CAM_TL_01	South Muir Island. Within tailings dyke.	15012	3.0	0.0		TSCA

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m ³)	Adjusted Backfill Volume (m³)	Disposal Location
2.11.48	Camlaren	Hazardous Waste	Burned Battery Area	South Muir Island and North Cabin)	2	1.0	2.0		Off-site
2.12.49	Camlaren	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Throughout the Site (Zenith Island and Muir Island)			42.5		TSCA
2.12.50	Camlaren	Non-Hazardous Waste	Wood	Throughout the Site (Zenith Island and Muir Island)			1.5		TSCA
2.13.51	Camlaren	Sediment	Impacted Sediment	Muir island			0.0		n/a
2.14.52	Camlaren	Impacted Water	Impacted Water	Main Camp			0.0		n/a
3.2.1	Goodrock	Metals Impacted Soil	GOO_HS_01	Mill Area	54	0.5	13.5	0.0	TSCA
3.4.2	Goodrock	Mine Openings	North Mine Shaft	Mill Area			0.0	43.2	n/a
3.4.3	Goodrock	Mine Openings	South Pit	Mill Area			0.0	81.0	n/a
3.6.4	Goodrock	Trenches	Trenches	Camp Area			0.0	0.0	n/a
3.6.5	Goodrock	Trenches	Large Trench Area	Mill Area			0.0	0.0	n/a
3.7.6	Goodrock	Abandoned Infrastructure	Private Dock	Camp Area	10	0.2	0.0		n/a
3.7.7	Goodrock	Abandoned Infrastructure		450 m northwest of the mill and 450 m south of the camp		0.2	0.3		TSCA
3.8.8	Goodrock		Private Cabin #1 and #2	·	200	0.2	0.0		n/a
3.8.9	Goodrock		Private Incinerator	Camp Area	1	2.0	0.0		n/a
	Goodrock	Abandoned Site Buildings		Camp Area	133	0.2	2.7		TSCA
3.8.11	Goodrock		Mill Slab	Mill Area	1	1.0	1.0		n/a
3.9.10	Goodrock	Waste Rock	GOO_WR_02	Mill Area (waste rock associated with trenches)			0.0		n/a
3.9.11	Goodrock	Waste Rock	GOO_WR_01	Camp Area (waste rock associated with trenches)	70	0.9	0.0		n/a
3.11.14	Goodrock	Hazardous Waste	Battery Remnants	Camp Area	1	1.0	1.0		Off-site
3.12.15	Goodrock	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Camp Area/Mill Area			5.0		TSCA
3.12.16	Goodrock	Non-Hazardous Waste	Wood	Camp Area/Mill Area			2.8		TSCA
3.13.17	Goodrock	Sediment	Impacted Sediment	Wetland			0.0		n/a
3.14.18	Goodrock	Impacted Water	Metal Impacted Water	North Shaft and South Pit			0.0	10045	n/a
4.1.1	Kidney Pond	Co-Mingled Impacted Soil	KID_SO_07	Portal Area	988	1.1	1086.8	1086.8	WRSCA
4.1.2	Kidney Pond	Co-Mingled Impacted Soil	KID_SO_11	Portal Area	1301	0.3	669.7	669.7	WRSCA
4.1.3	Kidney Pond	Co-Mingled Impacted Soil	KID_SO_13	Portal Area	83	0.4	29.1	29.1	WRSCA
4.2.4	Kidney Pond	Metals Impacted Soil	KID_SO_05	Exploration Camp	51	0.2	13.9	13.9	WRSCA

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m³)	Adjusted Backfill Volume (m³)	Disposal Location
4.2.5	Kidney Pond	Metals Impacted Soil	KID_SO_06	Exploration Camp	34	0.2	6.6	6.6	WRSCA
4.2.6	Kidney Pond	Metals Impacted Soil	KID_SO_08	Portal Area	209	0.2	60.4	60.4	WRSCA
4.2.7	Kidney Pond	Metals Impacted Soil	KID_SO_12	Kidney Pond Area	171	0.2	34.1	34.1	WRSCA
4.2.8	Kidney Pond	Metals Impacted Soil	KID_HS_01	1983 Camp Area	15	0.5	15.0	15.0	WRSCA
4.3.9	Kidney Pond	PHC Impacted Soil	KID_SO_01	1983 Camp	112	0.3	33.7	33.7	LF
4.3.10	Kidney Pond	PHC Impacted Soil	KID_SO_02	1983 Camp	67	0.3	18.9	18.9	LF
4.3.11	Kidney Pond	PHC Impacted Soil	KID_SO_03	1983 Camp	94	0.3	31.1	31.1	LF
4.3.12	Kidney Pond	PHC Impacted Soil	KID_SO_04	1983 Camp	183	0.4	93.5	93.5	LF
4.3.13	Kidney Pond	PHC Impacted Soil	KID_SO_09	Portal Area	70	0.2	14.1	14.1	LF
4.3.14	Kidney Pond	PHC Impacted Soil	KID_SO_10	Portal Area	266	0.8	207.3	207.3	LF
4.4.15	Kidney Pond	Mine Openings	Portal	AEC 17			0.0	270.0	n/a
4.5.16	Kidney Pond	Underground Workings	Underground Workings	Shaft Area			0.0		n/a
4.6.17	Kidney Pond	Trenches	Trenches	Exploration Camp (AEC 13), Portal Area (northwest and southeast), Kidney Pond Area (AEC 27)			0.0	0.0	n/a
4.7.18	Kidney Pond	Abandoned Infrastructure	Core Racks	Portal Area/Kidney Pond Area	1	1.0	0.3		WRSCA
4.7.19	Kidney Pond	Abandoned Infrastructure	Docks	1983 Camp and Kidney Pond Area (Sentinel Lake- northeast of Kidney Pond)	30	0.2	0.3		WRSCA
4.8.20	Kidney Pond	Abandoned Site Buildings	Former Buildings (cabin, shack, remnants)	1939 Camp	50	0.4	2.0		WRSCA
4.9.21	Kidney Pond	Waste Rock	KID_WR_03	Portal Area Trenches	25	1.0	0.0		n/a
4.9.22	Kidney Pond	Waste Rock	KID_WR_04	Exploration Camp Trenches	25	1.0	0.0		n/a
4.9.23	Kidney Pond	Waste Rock	KID_WR_01	Waste Rock Area			12596.0	0.0	WRSCA
4.9.24	Kidney Pond	Waste Rock	KID_WR_02	Kidney Pond Area Trenches	175	1.0	175.0	0.0	WRSCA

ID#	Site Name	Hazard Całegory	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m ³)	Adjusted Backfill Volume (m³)	Disposal Location
4.11.25	Kidney Pond	Hazardous Waste	Batteries	1983 Camp and Portal Area	1	1.0	1.0		Off-site
4.12.26	Kidney Pond	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Throughout site			8.8		WRSCA
4.12.27	Kidney Pond	Non-Hazardous Waste	Wood	Throughout site			3.3		WRSCA
4.13.28	Kidney Pond	Sediment	Impacted Sediment	Various			0.0		n/a
4.14.29	Kidney Pond	Impacted Water	Metal and Hydrocarbon Impacted Water	Kidney Pond Area			0.0		n/a
4.15.30	Kidney Pond	Unfired Explosives	Blasting Caps	Exploration Camp/Kidney Portal Area			5.0		n/a
5.2.1	Murray Lake	Metals Impacted Soil	MUR_SO_01	1938/2008 Camp	9	0.5	4.5	0.0	TSCA
5.2.2	Murray Lake	Metals Impacted Soil	MUR_SO_02	Trench Area	433	0.4	0.0		n/a
5.2.3	Murray Lake	Metals Impacted Soil	MUR_SO_03	Trench Area	664	0.3	0.0		n/a
5.2.4	Murray Lake	Metals Impacted Soil	MUR_SO_04	Trench Area	625	0.3	0.0		n/a
5.2.5	Murray Lake	Metals Impacted Soil	MUR_SO_05	Trench Area	1250	0.4	0.0		n/a
5.4.6	Murray Lake	Mine Openings	Main Shaft	Trench Area			0.0	22.5	n/a
5.4.7	Murray Lake	Mine Openings	Deep Trench/Shaft	Trench Area			0.0	252.0	n/a
			_						
5.6.8 5.7.9	Murray Lake Murray Lake	Trenches Abandoned Infrastructure	Trenches Sumps	Trench Area 1938/2008 Camp	1	1.0	0.0	0.0	n/a TSCA
5.9.9	Murray Lake	Waste Rock	MUR_WR_01	Trench Area -Main Shaft Area	2970	0.1	0.0		n/a
5.9.10	Murray Lake	Waste Rock	MUR_WR_02	Throughout Trench Area (waste rock associated with trenches)	500	0.6	0.0		n/a
5.12.12	Murray Lake	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Throughout			0.8		TSCA
5.12.13	Murray Lake	Non-Hazardous Waste	Wood	Throughout			0.2		TSCA
5.14.14	Murray Lake	Impacted Water	Metal Impacted Water	Trench Area			0.0		n/a
6.2.1	Storm Property	Metals Impacted Soil	STO_HS_01	Camp Area	4	0.5	4.0	0.0	TSCA
6.2.2	Storm Property	Metals Impacted Soil	STO_SO_01	Shaft Area	331	0.2	0.0		n/a
6.2.3	Storm Property	Metals Impacted Soil	STO_SO_02	Shaft Area	117	0.4	0.0		n/a

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m ³)	Adjusted Backfill Volume (m³)	Disposal Location
6.2.4	Storm Property	Metals Impacted Soil	STO_SO_03	Shaft Area	703	0.2	0.0		n/a
6.4.5	Storm Property	Mine Openings	South Mine Shaft	Shaft Area			0.0	67.5	n/a
6.4.6	Storm Property	Mine Openings	North Mine Shaft	Shaft Area			0.0	67.5	n/a
6.6.7	Storm Property	Trenches	Trench	Camp Area and Shaft Area			0.0	0.0	n/a
6.9.8	Storm Property	Waste Rock	STO_WR_01	Shaft Area	80	1.0	0.0	0.0	n/a
6.9.9	Storm Property	Waste Rock	STO_WR_02	Shaft Area (waste rock associated with trenches)	30	1.0	0.0		n/a
6.11.10	Storm Property	Hazardous Waste	Battery Remnants	Camp Area	1	1.0	1.0		Off-site
6.12.11	Storm Property	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Throughout			2.5		TSCA
6.12.12	Storm Property	Non-Hazardous Waste	Wood	Throughout			0.6		TSCA
6.13.13	Storm Property	Sediment	Impacted Sediment	Camp Area			0.0		n/a
7.2.1	Treacy	Metals Impacted Soil	TRE_SO_01	Mill Area	1738	0.4	199.7	149.7	WRSCA
7.2.2	Treacy	Metals Impacted Soil	TRE_SO_03	Camp Area	31	0.2	6.1	4.6	WRSCA
7.3.3	Treacy	PHC Impacted Soil	TRE_SO_02	Mill Area	37	0.5	18.7	14.0	LF
7.6.4	Treacy	Trenches	East Trench	Mill Area			0.0	198.0	n/a
7.6.5	Treacy	Trenches	Other Trenches	Mill area			0.0		n/a
7.6.6	Treacy	Trenches	West Trench	Mill area			0.0	22.0	n/a
7.8.7	Treacy	Abandoned Site Buildings	Mill Remains	Mill area	25	0.5	1.3		WRSCA
7.9.8	Treacy	Waste Rock	TRE_WR_01	Mill Area	127	1.3	115.6	0.0	WRSCA
7.10.9	Treacy	Tailings	TRE_TL_01	Mill Area	7	1.5	13.1	13.1	WRSCA
7.11.10	Treacy	Hazardous Waste	Painted Wood Debris	Mill Area			0.1		Off-site
7.12.11	Treacy	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Mill Area / Camp Area			4.8		WRSCA
7.12.12	Treacy	Non-Hazardous Waste	Wood	Mill Area / Camp Area			1.8		WRSCA
7 12 12	Tredcy	Sediment	Impacted Sadiment	Traccy			0.0		n/a
7.13.13	Treacy	Sediment	Impacted Sediment	Treacy			U.U		n/a

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m ³)	Adjusted Backfill Volume (m³)	Disposal Location
7.14.14	Treacy	Impacted Water	Metal Impacted Water	Camp Area			0.0		n/a
8.4.1	Try Me	Mine Openings	Shaft	Main Camp			0.0	30.0	n/a
8.6.2	Try Me	Trenches	Trenches	Main Camp			0.0	0.0	n/a
8.7.3	Try Me	Abandoned Infrastructure	Core Racks	Main Camp	1	1.0	0.3		TSCA
8.7.4	Try Me	Abandoned Infrastructure	Dock	Main Camp	30	0.2	0.3		TSCA
8.8.5	Try Me	Abandoned Site Buildings	Cabin and Other Wooden Structures	Main Camp	85	0.1	0.9		TSCA
8.11.6	Try Me	Hazardous Waste	Battery	Western Camp	1	1.0	1.0		Off-site
8.12.7	Try Me	Non-Hazardous Waste	Other (Metal, Misc. Debris)	Western Camp and Main Camp (incuding Rail Spur)		1.0	5.5		TSCA
8.12.8	Try Me	Non-Hazardous Waste	Wood	Western Camp and Main Camp			0.8		TSCA
8.13.9	Try Me	Sediment	Impacted Sediment	Main Camp			0.0		n/a
8.14.10	Try Me	Impacted Water	Metal Impacted Water	Main Camp			0.0		n/a
9.1.1	West Bay	Co-Mingled Impacted Soil	WES_SO_03	South Area	45	0.3	17.1	17.1	WRSCA
9.2.2	West Bay	Metals Impacted Soil	WES_SO_06	South Area	76	0.4	15.2	15.2	WRSCA
9.2.3	West Bay	Metals Impacted Soil	WES_SO_02	South Area	984	0.4	431.7	431.7	WRSCA
9.2.4	West Bay	Metals Impacted Soil	WES_SO_04	South Area	211	0.4	74.0	74.0	WRSCA
9.2.5	West Bay	Metals Impacted Soil	WES_SO_08	South Area	204	0.3	56.6	56.6	WRSCA
9.3.6	West Bay	PHC Impacted Soil	WES_SO_01	North Area	93	0.2	0.0	0.0	n/a
9.3.7	West Bay	PHC Impacted Soil	WES_SO_05	South Area	131	0.4	33.5	67.1	LF
9.3.8	West Bay	PHC Impacted Soil	WES_SO_07	South Area	286	0.4	67.2	134.5	LF
9.4.9	West Bay	Mine Openings	Open Pit	South Area			0.0	0.0	n/a
9.7.10	West Bay	Abandoned Infrastructure	Core Racks	South Area	1	1.0	0.3		WRSCA

ID#	Site Name	Hazard Category	Hazard Name	Hazard Location	Remediation Area (m²)	Remediation Depth (m)	Adjusted Remediation Volume with Uncertainty - Max (m³)	Adjusted Backfill Volume (m³)	Disposal Location
9.7.11	West Bay	Abandoned Infrastructure	Docks	South Area	30	0.2	0.3		WRSCA
9.8.12	West Bay	Abandoned Site Buildings	Structure Remains	South Area - Camp Area	70	0.3	2.1		WRSCA
9.9.13	West Bay	Waste Rock	WES_WR_01	South Area (East Waste Rock Pile)			0.0		n/a
9.9.14	West Bay	Waste Rock	WES_WR_02	South Area (West Waste Rock Pile)			0.0		n/a
9.10.15	West Bay	Tailings	WES_TL_01	South Area	849	0.3	318.4	159.2	WRSCA
9.11.16	West Bay	Hazardous Waste	Battery	South Area	1	1.0	1.0		Off-site
9.12.17	West Bay	Non-Hazardous Waste	Other (Metal, Misc. Debris)	South Area			2.5		WRSCA
9.12.18	West Bay	Non-Hazardous Waste	Wood	South Area			0.3		WRSCA
9.13.19	West Bay	Sediment	Impacted Sediment	Main Site			0.0		n/a
9.14.20	West Bay	Impacted Water	Metal Impacted Water	South Area			0.0		n/a

Public Works and Government Services Canada Project No. R.057573 Environmental Site Remediation Gordon Lake Group Sites, NT

ISSUED FOR TENDER
APPENDIX B
Page 1 of 1

APPENDIX FLYSHEET

APPENDIX B – Geotechnical Information



Stantec Consulting Ltd. 102-40 Highfield Park Drive, Dartmouth NS B3A 0A3

July 29, 2016 File: 121414290

Attention: Matthew McElwaine, P.Eng.

Public Works and Government Services Canada PWGSC - Northern Contaminated Sites ATB Place, North Tower 5th Floor, 10025 Jasper Avenue Edmonton AB. T5J 1S6

Dear Mr. McElwaine,

Reference: Gordon Lake Group Borrow Source Assessment Amendment

Stantec was engaged by Public Works and Government Services Canada (PWGSC) with Indigenous and Northern Affairs Canada (INAC) as the end client, to complete a borrow source assessment to support remediation planning for the closure of nine abandoned mine and advanced exploration sites on and/or near Gordon Lake located in the Northwest Territories (NT), as reported in "Gordon Lake Mine Sites Gap Assessment – Borrow Source" prepared for PWGSC and INAC by Stantec Consulting Ltd., dated March 16, 2016 (the Report). Since this assessment was completed, additional work has been conducted which has affected the conclusions of this report including:

- Completion of an archaeology assessment
- Finalization of the remedial design

The purpose of this letter is to update the applicable figures and communicate this updated information to potential bidders.

The Report indicated potential borrow sources without tabulation of specific material quality required to support the remediation (as the design was not yet completed), or identification of archaeology sensitivities (as the archaeology work was completed concurrently). Now that these components have been merged with the results of the borrow source assessment, the areas available for potential use have been decreased due to areas of archaeological significance, known quality, and known requirements based on the current design.

The revised figures are attached to this letter. The quality of material present within each area has not changed and the volumes estimated are expected to represent sufficient quantities to support remediation based on the current design. These areas have been reviewed by staff from the Prince of Wales Northern Heritage Centre who agree that these areas have been sufficiently assessed for archaeology. As such, recommendations for additional archaeology work in the borrow source assessment report are outdated.



July 29, 2016 Matthew McElwaine, P.Eng. Page 2 of 2

Reference: Gordon Lake Group Borrow Source Assessment Amendment

We trust this information is sufficient at this time. Attached are the revised figures and the original borrow source assessment report. The limitations section in the original report (attached) applies to this letter as well.

Regards,

STANTEC CONSULTING LTD.

Digitally signed by Michael Doucet
Date: 2016.07.29 11:28:15
-03'00'

Michael Doucet, B.Sc.

Environmental Project Manager

Phone: (902) 468-7777

Michael.Doucet@stantec.com

Attachments:

Figure G -1 – Potential Borrow Source GD-11

Figure G -2 – Potential Borrow Source GD-18

Figure G -3 – Potential Borrow Source GD-28

Figure G -4 – Potential Borrow Source GD-37

Figure G -5 – Potential Borrow Source GD-45

Figure G -6 – Potential Borrow Source GD-65

Gordon Lake Mine Sites Gap Assessment – Borrow Source report, dated March 16, 2016

c. Alison Heslep, Sam Kennedy (INAC), David Wilson (Stantec)





Legend

Borrow Source Test Pit Location

------ Archaeology Assessment Track

Potential Borrow Source

/// Assessed Portion of Borrow Source



NAD 1983 UTM Zone 12N

June 20 121413573-1

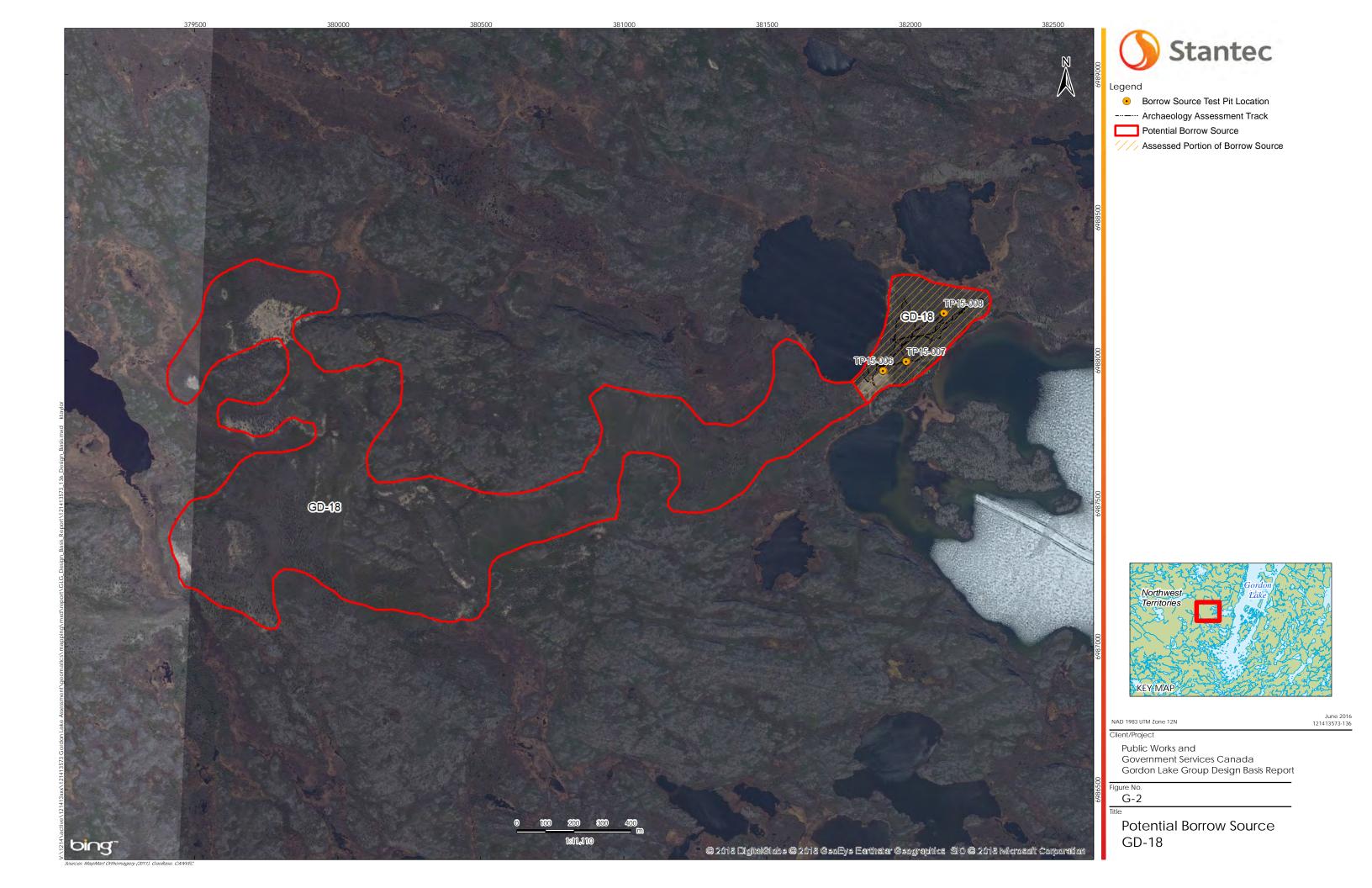
Client/Project

Public Works and Government Services Canada Gordon Lake Group Design Basis Report

Figure No. **G-1**

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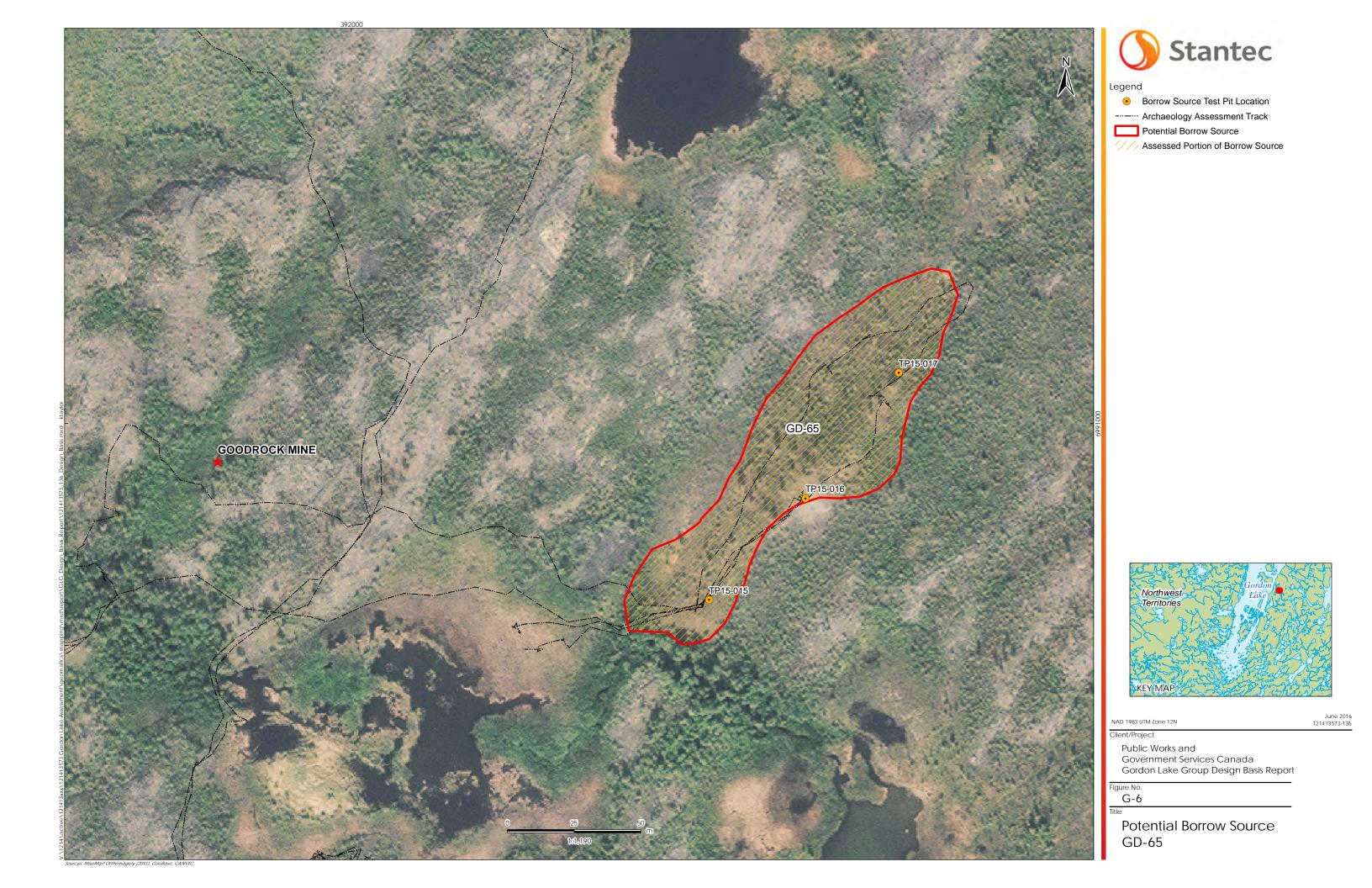
Potential Borrow Source GD-11











Gordon Lake Mine Sites Gap Assessment - Borrow Source



Prepared for:
Public Works and Government
Services Canada and Indigenous
and Northern Affairs Canada

Prepared by: Stantec Consulting Ltd.

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Appendix A Grain Size Analysis Results from Potential Borrow Source Sample and Test Pit Logs



Glossary

Esker A ridge of material, mainly consisting of sands and gravel,

deposited by sub-glacial or en-glacial meltwater in retreating

glaciers and ice sheets.

Glaciofluvial material Material deposited by meltwater from retreating glaciers and

ice sheets.

Till Material deposited directly by glaciers and ice sheets.



1.0 INTRODUCTION

Indigenous and Northern Affairs Canada (INAC) has responsibility, through the Contaminated Sites Program (CSP), to manage a number of contaminated properties that are no longer maintained by the original occupant. The Gordon Lake Mine Sites in the Northwest Territories (NWT) is one such example. INAC has retained Public Works and Government Services Canada (PWGSC) – Northern Contaminated Sites Group to assist in coordinating the program on its behalf. PWGSC engaged Stantec Consulting Ltd. (Stantec) to complete the scope of work through the existing "As and When Requested" Contract (EW699-121587-001) for Environmental Services within the Western Region. Terms of Reference (TOR) for this work were provided in June and September 2014.

Gordon Lake is located northeast of Yellowknife and includes nine former mine sites that have been investigated to varying degrees. The nine sites are:

- Camlaren Mine
- Burnt Island
- Goodrock Mine
- Kidney Pond
- Murray Lake
- Storm Property
- Treacy Mine
- Try Me
- West Bay

The INAC CSP and PWGSC Northern Contaminated Sites Group intend to eventually carry out the remediation of the sites and therefore requested that an inventory of available aggregate sources be carried out.

In general quality aggregate deposits are sparse in the Gordon Lake area¹. The landscape is dominated by undulating bedrock outcrops, and thick quaternary deposits; high potential for development of high quality gravel borrow sites are rare. In 2014 Stantec undertook a reconnaissance borrow source assessment program in the Gordon Lake area². Soft copy digital air photo interpretation was used to identify a total of 57 granular deposits (GD) within the search area (a 10 km buffer applied to all nine mine sites). The assessment included a field reconnaissance, to evaluate the quality, quantity, and extent of the available material in the granular deposits; however no samples were taken at this time.

¹ Northwest Territories Granular Resource Directory. Department of Public Works and Services, Department of Municipal and Community Affairs, Department of Transportation, NWT Housing Corporation. March 2009. Available online at: http://www.pws.gov.nt.ca/pdf/GRD/GNWT%20GRD%20Web%20March%202009.pdf
² Stantec Consulting Ltd. 2015. Gordon Lake Mines Borrow Assessment.



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1.1 SCOPE OF WORK

The objective of the 2015 program was a detailed assessment of the material texture and suitability of high potential borrow sites. The program consisted of four stages:

- Selection of granular deposits for inclusion in the sampling program
- Field investigations, involving test pitting and sampling of the selected granular deposits
- Laboratory testing of the potential borrow source samples to determine the grain size and gradation of the material
- Quality classification and volume estimates of the sampled borrow source material

The following sections summarize the methodology and results of the sampling program.

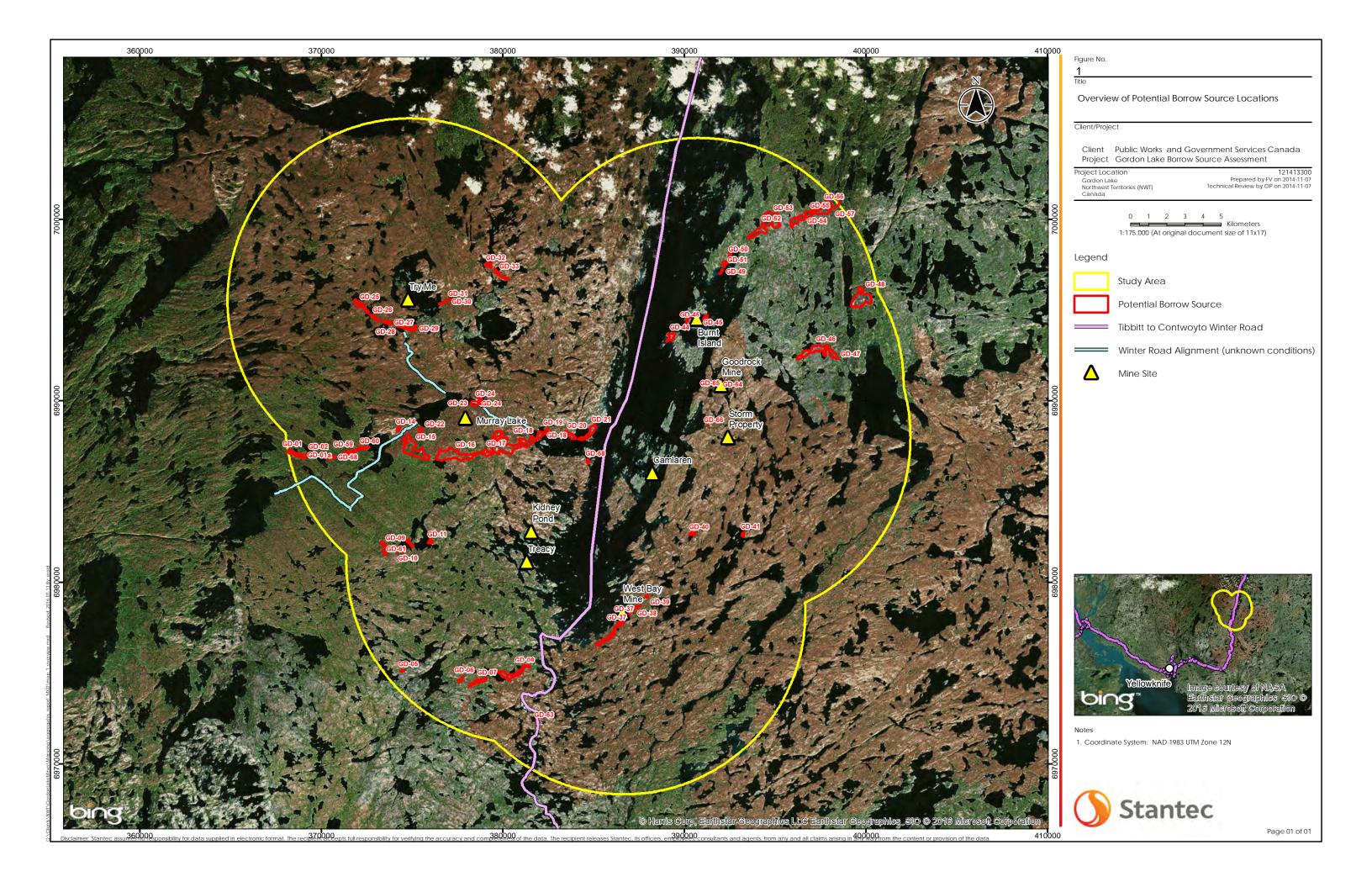
2.0 METHODOLOGY

2.1 SITE SELECTION

Sites were selected based on several factors including, texture and volume of available material, site location, ground access, material hauling distances, and presence of, or proximity to existing ice roads. Although 57 granular deposits were identified in the mapping phase of the borrow source program (Figure 1), many of the deposits were deemed unsuitable for use as borrow source material during the reconnaissance field investigations because they consisted of mostly sandy material, with low gravel content (<20%). Six preferred gravel deposits were identified as having good potential for borrow source site development and were selected for the 2015 sampling program.

- 1. GD-18 Existing borrow source located at West Bay
- 2. GD-45 Burnt Island
- 3. GD-37 West Bay mine site
- 4. GD-64 Goodrock mine site
- 5. GD-28 Try me mine site
- 6. GD-11 West of Kidney Point and Treacy mine sites





2.2 FIELD METHODS

At each of the selected deposits test pit locations were determined in the field, using a sampling grid of approximately 50 to 100 m as a general guide. These were located in the location where a potential gravel pit would most likely be opened (i.e. close to existing ice roads, mine sites or at the back of existing gravel pits). Three test pits were dug by hand at each of the selected granular deposits, spaced between 50 and 200 meters apart.

Test pits were dug to a minimum depth of 1 meter, and a sample of the material was collected from the bottom of each pit. Additional samples were taken when variability existed within the pit (i.e. bedding). The samples were bagged and placed in a moisture tight container for transportation to the lab. The depth of most test pits varied between 100 cm and 150 cm. Although this is considerably shallower than a gravel pit, which is likely to be at least a few meters deep, a 100-150 cm test pit provides a representative sample of the material in the deposit.

Each of the test pits was logged describing changes in the material texture and grain size with depth. Recording of the texture and grain size of the material followed the Unified Soil Classification System (USCS). Notes on the terrain conditions, surface expressions, drainage conditions and material texture (i.e., average grain size) were recorded at each test pit site. Geographic locations of each test pit were taken using a Garmin 60[®] GPS unit. Digital photos of the test pits and the excavated materials were also taken.

2.3 LABORATORY ANALYSIS

Samples were sent to the Stantec Materials Testing Lab in Edmonton, a facility which is accredited under the Canadian Council of Independent Laboratories (CCIL) aggregate laboratory certification program. Grain size analysis by sieve testing was completed on each sample to determine the gradation of the material at each potential borrow source. The test was performed using standard testing methods for sieve analysis of fine and coarse aggregates³. Results of the grain size analysis are presented in Appendix A.

2.4 QUALITY CLASSIFICATION AND VOLUME ESTIMATES

The borrow source material was Classified using the Indian and Northern Affairs Canada (INAC) "Quality Classification of Granular Materials" 4. This is a 4 class system, presented in Table 1, which is used to describe the quality of materials for use as granular resources.

http://www.pws.gov.nt.ca/pdf/GRD/GNWT%20GRD%20Web%20March%202009.pdf



2

³ ASTM C136 and C117

⁴ Table 1: Northwest Territories Granular Resource Directory. Department of Public Works and Services, Department of Municipal and Community Affairs, Department of Transportation, NWT Housing Corporation. March 2009. Available online at:

Table 1 Material Quality Classification

Classification	Quality	Material	Typical Use
Type 1	Excellent	Well graded sands and gravel with less than 5% fines	Surfacing materialsConcrete aggregate
Type 2	Good	Well graded sand and gravels with fines	Granular bases and sub-baseStructure supporting fill
Type 3	Fair	Poorly graded sands and gravels with fines	General fill for roads, foundation pads and staging areas
Type 4	Poor	Poorly graded sands and gravels with high percentage of fines (silt)	Non-structural fill such as berms and covering material

Volume estimates for granular material can be proven, probable or prospective. Proven estimates are supported by extensive ground-truth information such as boreholes, exposed stratigraphy, and sampling. Probable estimates are inferred from a combination of indirect and direct evidence, such as air photo interpretation, terrain analysis and limited sampling. Prospective estimates are based only on limited direct evidence such as air photo interpretation and satellite imaging, without ground trothing or sampling.

In this report prospective volumes of the overall quantity of material available at each granular deposit were estimated based on air photo interpretation and terrain analysis. These are reported as range of maximum and minimum volumes estimating using the maximum and minimum depths of the deposit.

Probable volumes of the type and quality of material present at each deposit were estimated based on the test pits completed at each potential borrow source, and subsurface materials below the depth of the test pits were not considered. Volume estimates were determined by multiplying the average thickness of each material Type encountered in the test pits, by the total area of the granular deposit. In the case of large granular deposits, where the entire area was not investigated in the field, only the area of the deposit where test pitting was conducted was used in the probable volume estimates.

This method assumes that the conditions encountered in the test pits are representative of the overall source. As these deposits are placed under relatively well understood conditions, this gives a representative sample of the materials in the granular deposit. However subsurface conditions are likely to vary both laterally and with depth. Therefore variability in the volume and type of material in the granular deposits should be anticipated.



3.0 RESULTS

An overview of the physiography and Quaternary deposits present within the search area, and a complete inventory of all granular deposits was presented in the Gordon Lake Mines Borrow Assessment Report⁵. This report will only present results from the 2015 sampling program. Full grain size analysis results are presented in Appendix A1 and test pit logs are presented in Appendix A2.

3.1 POTENTIAL BORROW SOURCE GD-18

Landform: Esker - Glaciofluvial material

Site description: The esker is located on the west side of Gordon Lake, just north of

the West Bay area of Gordon Lake, and is part of a large esker complex (Figure 2). A full description of the esker complex can be found in section 3.2.3 of the Gordon Lake Mines Borrow Assessment

Report (Stantec 2015). An existing gravel pit is located at the

eastern end of the esker (Figure 3).

Access: The site is accessible via the Tibbitt to Contwoyto Winter Road; with

good access to the pit via an existing access trail. The pit is

located approximately 4 km southeast from Murray Lake mine site

and 6.5 km from the Camlaren mine site.

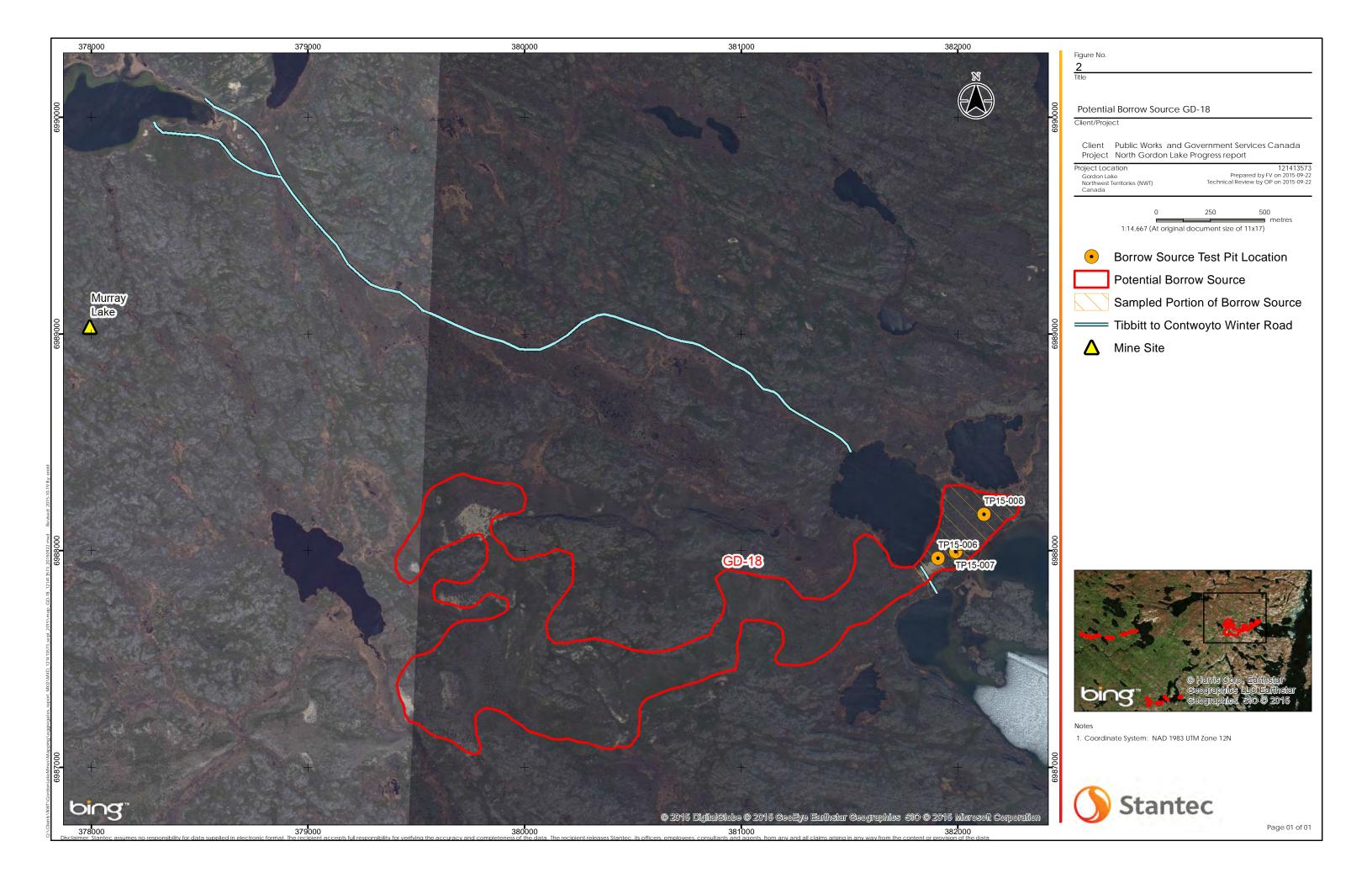
Reasons for Selection: This site was chosen for several reasons, but mainly the presence of

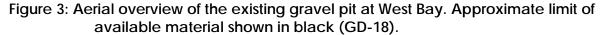
the existing gravel pit. Use of an existing disturbed site will limit new disturbances in the area. There are also existing winter access roads, so no additional road construction is required. In addition the esker is in a fairly central location to all of the mine sites.

Overall Volume Estimate: 212,000 – 636,000 m³ remaining behind the existing pit

⁵ Stantec Consulting Ltd. 2015. Gordon Lake Mines Borrow Assessment.









3.1.1 Volume and Quality of Potential Borrow Source Material at GD-18

Sampling of potential borrow Source GD-18 was undertaken on the back wall of the existing pit and further north east on the untouched portion of the deposit. It is assumed that this would be the portion of the material used if the pit was extended. Test pit locations are shown on Figure 2. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 2. Quality Classifications for material encountered in the test pits are displayed in table 3 and volume estimates of each Type of material present in the untouched portion of the esker, behind the existing pit, are presented in Table 4.

Table 2 Summary of Grain size Analysis Results from Potential Borrow Source GD-18

Took Dik		Sample	Grain	Size An	alysis	
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description
TP15-006	GD18_BS_2015_001A	0.2	60.5	34.3	5.2	Poorly graded gravel with silt and/or clay and sand
TP15-006	GD18_BS_2015_001B	0.4	1.4	96.5	2.1	Poorly graded sand
TP15-006	GD18_BS_2015_001C	1.0	0.0	95.4	4.6	Poorly graded sand
TP15-007	GD18_BS_2015_002A	0.2	56.3	35.5	8.2	Well graded gravel with silt and/or clay and sand
TP15-007	GD18_BS_2015_002B	1.4	0.1	75.6	24.3	Silty and/or clayey sand
TP15-008	GD18_BS_2015_003	1.0	36.7	59.2	4.1	Poorly graded sand with gravel

Table 3 Material Quality Classification for Potential Borrow Source GD-18

Test Pit No.	Material Layer Thickness (m)										
	Type 1 - Excellent			Туре	Type 2 - Good			e 3 - Fa	Type 4 - Poor		
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both		
TP15-006	-	-	-	-	-	-	0.2	0.9	-	-	
TP15-007	-	-	-	0.2	-	-	-	-	-	1.2	
TP15-008	-	-	-	-	-	0.3	-	-	0.6	-	

Table 4 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-18

Estimated Material Volume (m³)										
Type 1 - Excellent	ellent Type 2 - Good Type 3 - Fair Type 4 - Poor TOTAL									
-	53,007	108,224	127,217	267,245						

The sides of the existing pit show several meters of gravel, however at the back of the existing pit, at TP15-006, only a thin (20 cm) layer of gravel is present. It is assumed that the layer thins in a north eastern direction. The gravel layer consists of poorly graded gravel with fines and sand, and overlies a thicker layer of poorly graded sand. All of the material found in TP15-006 is type 3, fair borrow source material.



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100 m to the north east, at TP15-007, a similar gravel layer of 20cm was encountered overlying fine-grained silty sand material. The gravel layer consists of well graded gravel with fines and sand. This was classed as type 2, good borrow source material. The material underlying the gravel layer is very fine-grained and is of poor quality for use as borrow source material.

Towards the north eastern end of the esker at TP15-008, the material was more coarse grained, and the majority of the pit consisted of poorly graded sand with gravel, classed as type 3, fair borrow source material.

TP15-006

TP15-007

TP15-008

Figure 4: Test pits dug at GD-18 showing variability of sub-surface materials

3.2 POTENTIAL BORROW SOURCE GD-45

Landform: Esker – Glaciofluvial material

Site description: The deposit covers the southern portion of Burnt Island, with the

mine site located just along the northern limit of the deposit (Figure 5 and 6). A small existing borrow pit (less than 25 m^2 in size) is

located along the southeast side of the island, just next to the old

dock (Figure 7).

Access and Proximity

to Mine sites: The Burnt Island mine site is located less than 200 m from the

northern edge of the deposit.

Reason for selection: The location of the deposit close to the water's edge means the

borrow source could be easily accessed without building on-land trails. There is also an existing disturbance at this site, which limits the number of new disturbances in the area. Its proximity to Burnt Island means it could be useful as a local source. Archeological concerns that limited the sampling, however, may also restrict

access to the site as a borrow source.

Overall Volume Estimate: 522,000 – 870,000 m³ in the north east portion surveyed

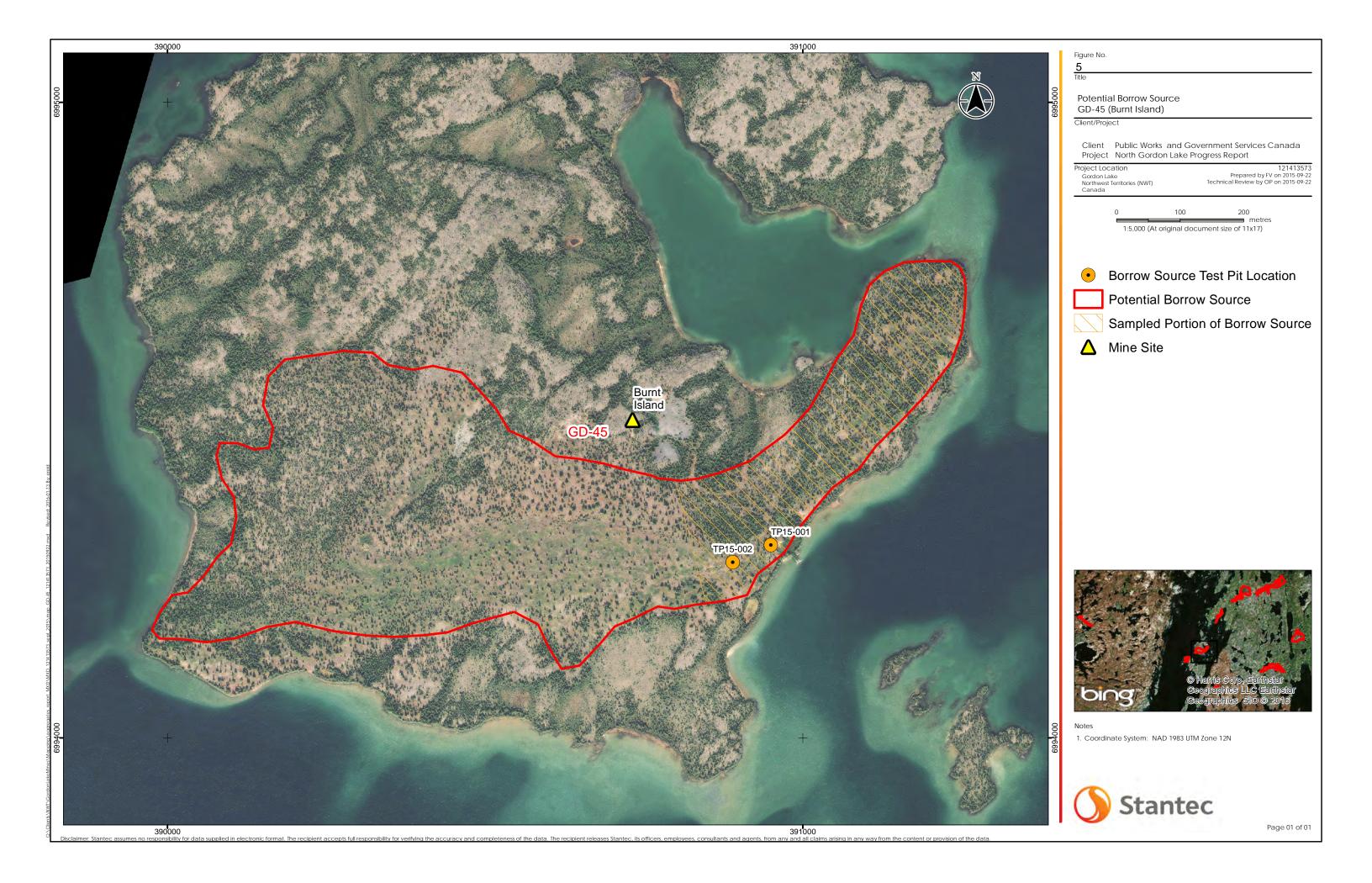


Figure 6: Aerial view of the southeast portion of Burnt Island looking northeast (approximate limits of the deposit in white).



Figure 7: Small man-made exposure located on the southeast portion of the island.





121413573 - Appendix J

3.2.1 Volume and Quality of Potential Borrow Source Material at GD-45

Sampling of potential borrow source GD-45 was limited due to archeological concerns. Sampling was undertaken on the back wall of the existing disturbance and in further to the south west of the deposit. Test pit locations are shown on Figure 5. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 5. Quality Classifications for material encountered in the test pits are displayed in table 6 and volume estimates of each Type of material present in the portion of the esker surveyed, are presented in Table 7.

Table 5 Summary of Grain size Analysis Results from Potential Borrow Source GD-45

	. 50		Grain	Size An	alysis		
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description	
TP15-001	GD45_BS_2015_001	1.3	21.3	76.9	1.8	Poorly graded sand with gravel	
TP15-002	GD45_BS_2015_002	0.9	43.0	54.2	2.8	Well graded sand with gravel	

Table 6 Material Quality Classification for Potential Borrow Source GD-45

Test Pit No.		Material Layer Thickness (m)										
	Type 1 - Excellent			Туре	e 2 - Good Typ			e 3 - Fa	ir	Type 4 - Poor		
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both			
TP15-001	-	-	-	-	-	-	-	0.8	0.5	-		
TP15-002	-	-	0.4	-	-	0.3	-	-	0.3	-		

Table 7 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-45

Estimated Material Volume (m³)										
Type 1 - Excellent Type 2 - Good Type 3 - Fair Type 4 - Poor TOTAL										
34,857	26,143	104, 572	-	165,572						

Sampling was limited at GD-45 and variability within the deposit may not be adequately accounted. Nevertheless, the materials encountered in the test pits appear to be very coarse grained (Figure 8) and the exposed face near the dock (TP15-001) shows that there is approximately 6 meters of sands and gravel. However the gravel is poorly graded and consists of a high concentration of cobbles. This material is classed as type 3, fair borrow source material.

TP15-002 also consists of coarse grained material, but contains fewer cobbles. A 40cm layer of well graded gravel was encountered at TP15-002 that is classed, type 1, excellent for use as



borrow source material. GD-45 could potentially yield over 30,000 cubic meters of type 1 borrow source material.

Figure 8: Test pits dug at GD-45



3.3 POTENTIAL BORROW SOURCE GD-37

Landform: Esker – Glaciofluvial material

Site description: This is a 2.5 km esker located south of the West Bay min site.

Access and

Proximity to Mine Sites: a

The esker is located only 250 m east of the Gordon Lake shoreline and only 100 m east of the waste rock piles from the West Bay mine site (Figure 9). Old access trails associated with the mine leads to a small pit on the west side of the esker (Figure 10; GD-37, TP15-005).

The distance between the Tibbitt to Contwoyto Winter Road and

the site is approximately 2 km.

Reason for Selection: This site was primarily chosen for its proximity to the West Bay mine

site. There is also abundant material available and it is close to the

Winter Road for access.

Overall Volume Estimate: 138,000 – 207,000 m³ in the north eastern portion sampled



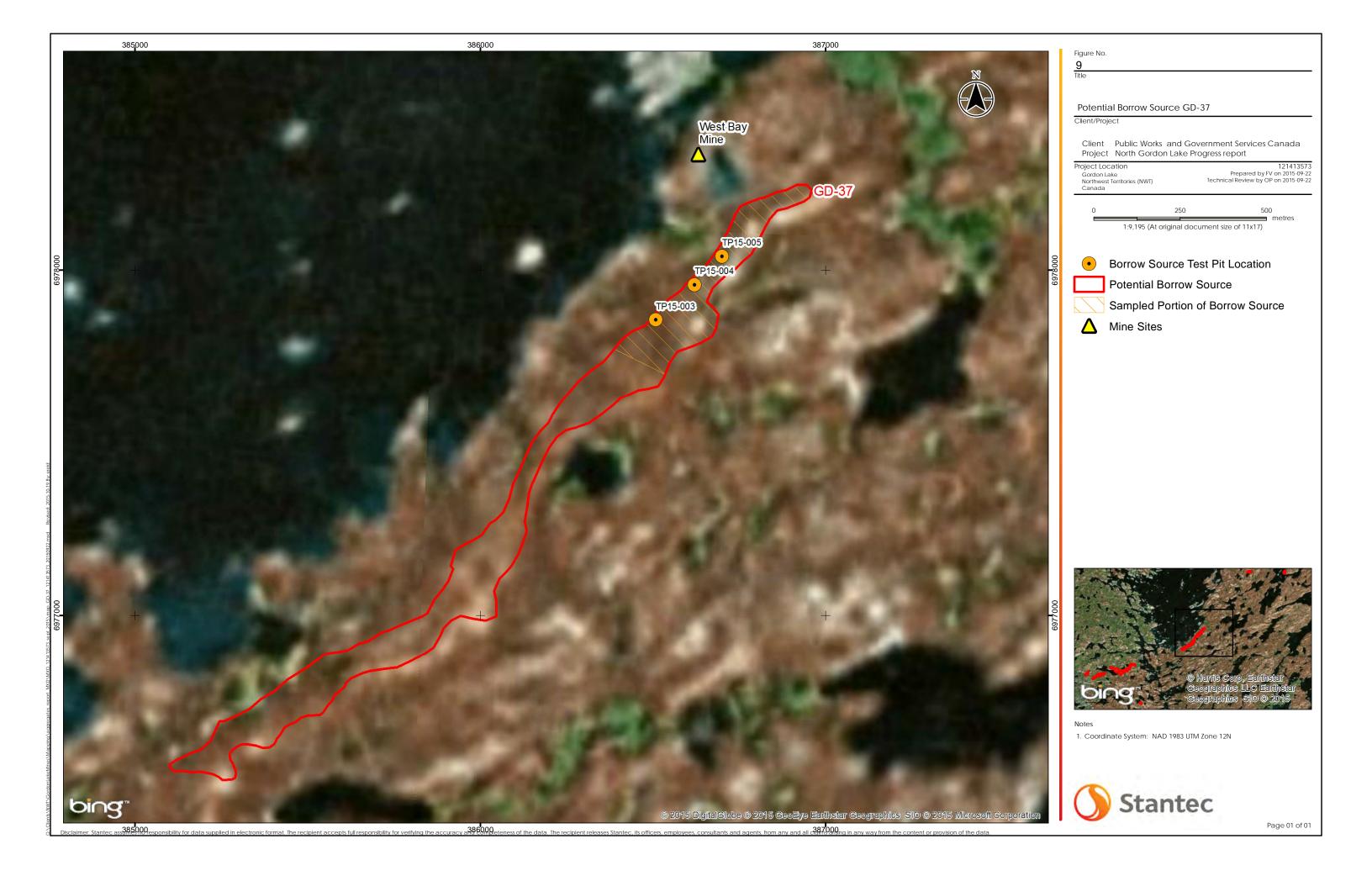




Figure 10: Aerial view (satellite imagery) of the esker (GD-37) alongside the West Bay mine site

3.3.1.1 Volume and Quality of Potential Borrow Source Material at GD-37

Sampling was undertaken along the esker ridge, with test pits spaces approximately 100 m apart. Test pit locations are shown on Figure 9. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 8. Quality Classifications for material encountered in the test pits are displayed in Table 9 and volume estimates of each Type of material present in the portion of the esker investigated in the field are presented in Table 10.



Table 8 Summary of Grain size Analysis Results from Potential Borrow Source GD-37

		Sample	Grain	Size An	alysis	
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description
TP15-003	GD37_BS_2015_001A	0.4	7.0	88.1	4.9	Poorly graded sand
TP15-003	GD37_BS_2015_001B	1.0	1.8	95.5	2.7	Poorly graded sand
TP15-004	GD37_BS_2015_002B	1.1	23.9	74.4	1.7	Poorly graded sand with gravel
TP15-005	GD37_BS_2015_003B	1.0	1.1	97.7	1.2	Poorly graded sand

Table 9 Material Quality Classification for Potential Borrow Source GD-37

Test Pit No.		Material Layer Thickness (m)										
	Type 1 - Excellent			Type 2 - Good			Type 3 - Fair			Type 4 - Poor		
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both			
TP15-003	-	-	-	-	-	-	-	1.1	-	-		
TP15-004		-	-	-	-	-	-	0.4	0.7	-		
TP15-005	-	-	1	-	-		1	0.6	0.6	-		

Table 10 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-37

Estimated Material Volume (m³)										
Type 1 - Excellent	Type 1 - Excellent Type 2 - Good Type 3 - Fair Type 4 - Poor TOTAL									
-	-	93,083	-	93,083						

In general the material at GD-37 is very sandy and consists mainly of poorly graded sand with limited gravel (Figure 11). Where gravel was encountered course fragment percentages were generally less than 10%. At TP15-003 consisted purely of sand with no coarse fragments. There was some bedding of fine sand and silt and coarser sand. At TP15-004 the pit consisted mostly of sand with some gravel found at the base of the pit. TP15-005 again, consisted mostly of sand with the occasional layer with low gravel content. All of the materials found in this esker were type 3, fair borrow source material.





Figure 11: Test Pits dug at GD-37 showing typical consistency of material encountered

3.4 POTENTIAL BORROW SOURCE GD-65

Landform: Small localized glaciofluvial deposit

Site description: GD-65 is a small, 0.6 ha deposit on the east side of Gordon Lake

(Figure 12 and 13). Bedrock was observed in the field at the north

eastern end of the deposit.

Access and

Proximity to mine sites:

The deposit is located on the east side of Gordon Lake, less than 200 m from the Goodrock mine site. However this site is not

very accessible, several hundred meters of new access roads

would be required.

Reason for Selection: GD-65 was selected because of its proximity to the Goodrock

mine site. It is located less than 4 km from both the Burnt Island

mine site and the Storm Property.

Overall Volume Estimate: 12,000 – 36,000 m³



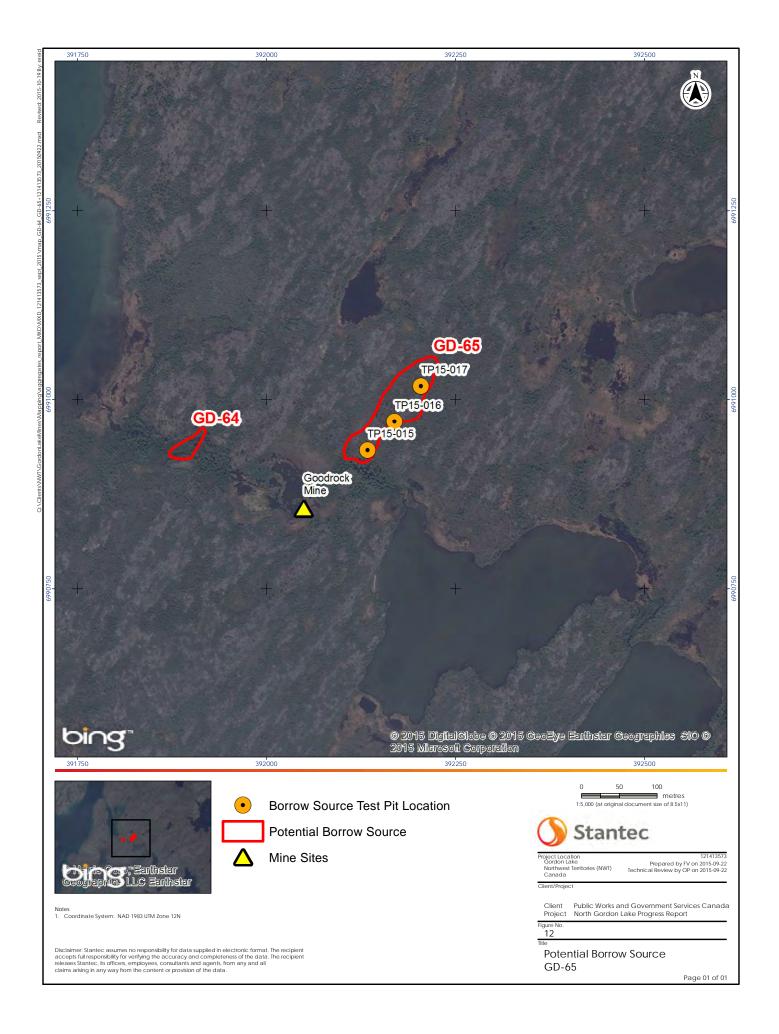




Figure 13: Aerial view of a small esker at GD-65 (approximate limits in white).

3.4.1.1 Volume and Quality of Potential Borrow Source Material at GD-65

Sampling was undertaken along the esker ridge, with test pits spaces approximately 50 m apart. Test pit locations are shown on Figure 12. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 11. Quality Classifications for material encountered in the test pits is displayed in table 12 and volume estimates of each type of material present in the esker, are presented in Table 13.

Table 11 Summary of Grain size Analysis Results from Potential Borrow Source GD-65

Took Dik		Sample	Grain	ı Size An	alysis		
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description	
TP15-015	GD65_BS_2015_001	1.1	67.4	27.4	5.2	Well graded gravel with silt and/or clay and sand	
TP15-016	GD65_BS_2015_002	1.1	0.4	87.4	12.2	Silty and/or clayey sand	
TP15-017	GD65_BS_2015_003	1.0	44.9	43.7	11.4	Well graded gravel with silt and/or clay and sand	



Table 12 Material Quality Classification for Potential Borrow Source GD-65

Test Pit No.		Material Layer Thickness (m)										
	Type 1 - Excellent			Type 2 - Good			Тур	e 3 - Fa	ir	Type 4 - Poor		
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both			
TP15-015	-	-	-	-	-	0.8	-	-	0.3	-		
TP15-016		-	-	-	-	-	-	-	0.3	0.8		
TP15-017	-	-	-	0.1	-	0.4	-	-	-	0.4		

Table 13 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-65

Estimated Material Volume (m³)										
Type 1 - Excellent Type 2 - Good Type 3 - Fair Type 4 - Poor TOTAL										
-	4,256 1,824 3,648 9,728									

Although GD-65 is a relatively small deposit, it contains some good quality sand and gravel, with over 4,000m³ of type 2 found in the small deposit. Well grade gravel was found at test pits at either end of the deposit (TP15-015 and 017), however material encountered at TP15-016 was fine-grained and of poor quality for use as borrow source material (Figure 14). In addition bedrock was encountered at the north east end of the deposit, so the thickness of material is expected to vary.





Figure 14: Photos of test pits dug at GD-65 showing the typical material encountered

3.5 POTENTIAL BORROW SOURCE GD-28

Landform: Esker – Glaciofluvial material

Site description: GD-28 is a long narrow esker which forms part of a larger esker

complex located south-southwest of the Try Me mine site (Figure 15). The esker is about 50 m wide and is about 700 m in length, but is fairly low lying with material depths of only 3-4 m (Figure 16).

Access and

Proximity to mine sites:

GD-28 is located on the west side of Gordon Lake, 1.5 km south of the Try Me mine site. An old winter road alignment connects the Tibbitt to Contwoyto Winter Road to the proposed site and

further north to the Try Me mine site.

Reason for Selection: This site was chosen for its proximity and easy access to Try Me

mine site, where there is limited granular deposits. It also has easy

access with no requirement for additional access trails.

Overall Volume Estimate: 98,000 – 196,000 m³







Figure 16: Aerial overview of the esker at GD-28 looking northwest (approximate limits in black).

3.5.1 Volume and Quality of Potential Borrow Source Material at GD-28

Sampling was undertaken along the esker ridge, with test pits spaced approximately 100 m apart. Test pit locations are shown on Figure 15. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 14. Quality Classifications for material encountered in the test pits is displayed in Table 15 and volume estimates of each type of material present in the portion of the esker surveyed are presented in Table 16.

Table 14 Summary of Grain size Analysis Results from Potential Borrow Source GD-28

Toot Dit		Sample	Grain	Size An	alysis	
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description
TP15-012	GD28_BS_2015_001A	0.4	59.3	37.5	3.2	Well graded sand with gravel
TP15-012	GD28_BS_2015_001B	1.0	16.3	80.3	3.4	Poorly graded sand with gravel
TP15-013	GD28_BS_2015_002	1.3	3.7	85.5	10.8	Poorly graded sand with silt and/or clay
TP15-014	GD28_BS_2015_003	1.2	3.7	94.4	1.9	Poorly graded sand



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Table 15 Material Quality Classification for Potential Borrow Source GD-28

Test Pit No.				Ma	aterial L	ayer Th	ickness (ı	m)		
	Туре	1 - Exce	llent	Туре	2 - Go	od	Тур	e 3 - Fa	ir	Type 4 - Poor
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both	
TP15-012	-	-	0.4	-	0.2	-	-	-	0.5	-
TP15-013		-	-	-	-	-	-	1.1	0.1	
TP15-014	-	-	-	-	-		-	1.0	0.1	

Table 16 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-28

	Estimate	d Material Volume (m	³)	
Type 1 - Excellent	Type 2 - Good	Type 3 - Fair	Type 4 - Poor	TOTAL
19,698	9,849	88,642	-	118,189

Like many of the deposits in this area, the sub surface materials in GD-28 were highly variable, but were typically quite sandy (Figure 17). At TP15-012 sandy material overlies a layer of well graded sand with gravel. This layer contains type 1, excellent borrow source material. The sandy layer in TP15-012 is also well graded and consists of type 2, good borrow source material. However the other test pits encountered more sandy material and the majority of material in the esker seems to be type 3, fair borrow source material.





Figure 17: Photos of test pits dug at GD-28 showing typical material encountered

3.6 POTENTIAL BORROW SOURCE GD-11

Landform: Mix of till and glaciofluvial material

Site description: GD-11 is a small (3.8 ha) deposit which is composed of a mixture of

till and glaciofluvial material (Figure 18 and 19).

Access and

Proximity to mine sites: Pond and Treacy mine sites. The distance between the Tibbitt to

Contwoyto Winter Road and the site is approximately 9 km, from

The deposit is located approximately 5.8 km west from the Kidney

which approximately 1.5 km would be over land.

Reason for Selection: This site was selected because the reconnaissance field

investigations suggested that there was a higher volume of coarse-grained material at this deposit, which is in relatively short

supply in the Gordon Lake area.

Overall Volume Estimate: 76,000 – 190,000 m³



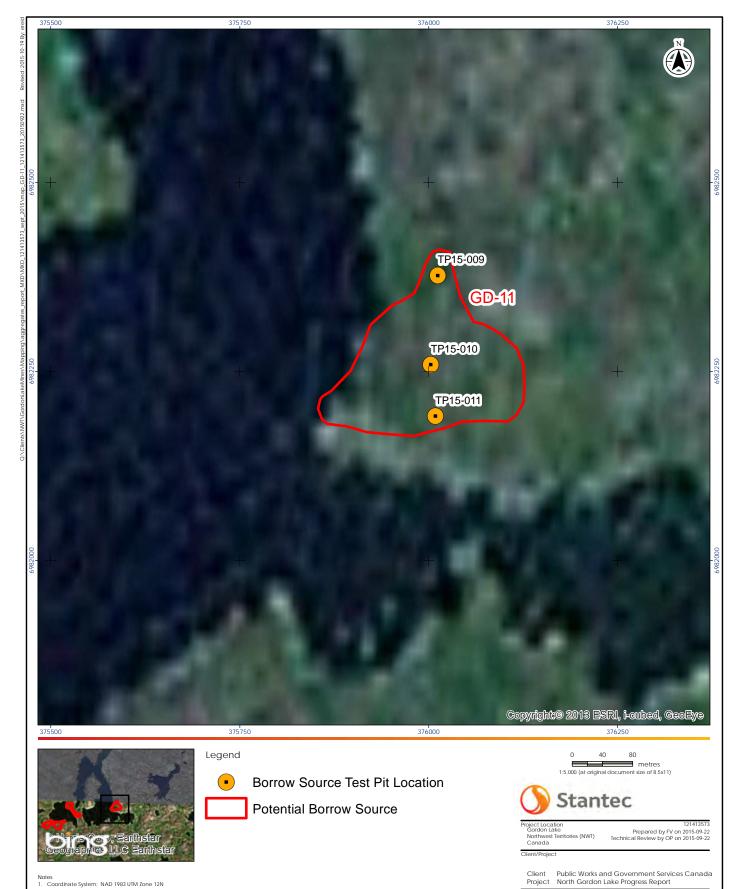


Figure No.

GD-11

Potential Borrow Source

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Notes
1. Coordinate System: NAD 1983 UTM Zone 12N

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Figure 19: Northeast facing overview of the GD-11 deposit (approximate limits in black).

3.6.1 Volume and Quality of Potential Borrow Source Material at GD-11

Sampling was undertaken along the deposit, with test pits spaced approximately 100 m apart. Test pit locations are shown on Figure 18. The full grain size analysis results for the samples are presented in Appendix A and a summary of these results is shown in Table 17. Quality Classifications for material encountered in the test pits are displayed in Table 18 and volume estimates of each Type of material present in the deposit are presented in Table 19.

Table 17 Summary of Grain size Analysis Results from Potential Borrow Source GD-11

Took Dik		Sample	Grair	Size An	alysis	
Test Pit No.	Sample No.	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	Description
TP15-009	GD11_BS_2015_001	1.0	39.0	59.6	1.4	Poorly graded sand with gravel
TP15-010	GD11_BS_2015_002	1.0	64.2	34.3	1.5	Well graded gravel with sand
TP15-011	GD11_BS_2015_003	1.0	33.5	58.7	7.8	Poorly graded sand with silt and/or clay and gravel



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Table 18 Material Quality Classification for Potential Borrow Source GD-11

Test Pit No.				Ma	aterial L	ayer Th	ickness (m)		
	Туре	1 - Exce	llent	Туре	2 - Go	od	Тур	e 3 - Fa	ir	Type 4 - Poor
	Gravel	Sand	Both	Gravel	Sand	Both	Gravel	Sand	Both	
TP15-009	-	-	-	-	-		0.7	0.2	0.1	-
TP15-010		0.2	0.8	-	-	-	-	-		
TP15-011	-	0.1	0.4		-		-	0.2	0.2	

Table 19 Probable Material Volume Estimates by Material Type for Potential Borrow Source GD-11

	Estimate	d Material Volume (m	3)	
Type 1 - Excellent	Type 2 - Good	Type 3 - Fair	Type 4 - Poor	TOTAL
51,106	-	35,963	-	87,069

Material at GD-11 was typically quite coarse grained (Figure 20). Type 1 material was encountered in both TP15-010 and 011, where material typically consisted of well graded sands and gravel. Estimated volumes of type 1 material are relatively high; with a potential yield of over 50,000 cubic meters of type 1 borrow source material. A 70 cm layer of gravel was also encountered in TP15-009. This gravel was poorly graded with fines.





Figure 20: Photos of test pits and typical sub surface materials at GD-11.

4.0 SUMMARY AND CONCLUSIONS

Quality borrow source material is sparse in the Gordon lake area. Although 57 granular deposits were identified during the mapping phase of the project, many of these were found to contain mainly fine-grained sand and silts with no coarse fragments, and are therefore of little use as borrow source material.

The 2015 borrow source program aimed to sample selected granular deposits that showed high potential for borrow source site development, in terms of both location (accessibility and proximity to the mine sites) and quality of granular material. The following section will discuss and compare the potential of each granular deposit for development as a borrow source site.

Overall, the material encountered in the granular deposits was found to be highly variable with bedding present in most test pits. Some of the deposits (GD-37 and GD-28) were found to contain mainly sandy material, with few coarse fragments. The material encountered in test pits at GD-37 consisted mainly of poorly graded sand, which is likely of limited use as borrow source material, even with its close proximity to the West Bay mine site. Although the material at GD-28 was also mostly sandy, where was some well-graded sand and gravel present, which could



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potentially yield over 19,000 cubic meters of type 1, excellent borrow source material. Although this is a relatively small volume, with the close proximity of GD-28 to the Try Me mine site, it could be useful as a local source for remediation at Try Me. There are also no archeological concerns with the use of GD-28 as a borrow source.

Coarse-grained material was most abundant at sites GD-11, GD-45 and GD-65. Material at GD-65 was quite variable, and although some type 2 borrow source material was encountered, there was also some type 4, poor borrow source material. GD-65 is a very small deposit and is likely only of use for remediation at the nearby Goodrock mine site. The archeological potential of this site was found to be low during the archeological assessment (Points West 2015).

GD-45 appears to be an abundant source of coarse-grained material, however sampling was limited due to archeological concerns and it is likely that this would also limit borrow source site development. However there is potential for limited use of material at the existing excavation for local remediation efforts at Burnt Island mine site. This excavation should not extend more than 10 meters back from the existing exposure, as recommended in the archeological assessment (Points West 2015).

GD-11 appears to be the best source of coarse-grained material of the sampled granular deposits. The material in the test pits were consistently coarse grained, with some well-graded material. Volume estimates for this site suggest that there could be over 50,000 cubic meters of type 1, excellent borrow source material available in the deposit. In addition, there are no archeological concerns with the use of this borrow source (Points West 2015). However the location of GD-11 is not optimal, as it is located over 9 km from the Tibbitt to Contwoyto Winter Road. Development of this site would require new access trails, of which 1.5 km would be onland.

In terms of location, GD-18 would be ideal for borrow source site development. It is centrally located among the nine mine sites and is easily accessible by the Tibbitt to Contwoyto Winter Road. The site is already disturbed, as it has been previously used as a borrow source; use of this site would limit new disturbances in the area. However materials in the portion of the esker behind the existing pit were highly variable and the gravel layer that was previously being excavated appears to thin in a northeastern direction. It is possible that this is the reason the pit is not currently used. On the other hand, more coarse-grained material (poorly graded gravel) was encountered at the far end of the pit (TP15-008). So there may still be some potential for gravel extraction at the north eastern end of the esker. Based on the materials encountered in the test pits, there is likely more than 53,000 cubic meters of type 2, good borrow source material in the portion of the esker behind the existing pit. No archeological remains were found during the archeology assessment of the sampled section of the borrow source, however the assessment reported that more good potential ground exists within the sampled area, and recommends an additional archeological review of the proposed disturbance when this has been determined (Points West 2015).



GORDON LAKE MINE SITES GAP ASSESSMENT - BORROW SOURCE

Overall GD-11 and GD-18 would appear to have the best potential for borrow source site development. More detailed assessments of the volume of available aggregate material is recommended at these sites, as well as detailed assessment of the various economic and environmental factors related to the development and operation of new borrow sources, including transportation routes to the mines sites..

5.0 LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report.

This report provides an inventory of unconsolidated surface materials and landforms that could be used as borrow sources to support the remediation of a series of mine sites in the Gordon Lake area of the Northwest Territories (NWT). This report has been prepared for the use of the client identified herein and any reliance on this report by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. This report should not be construed as legal advice. The conclusions are based on a combination of aerial photograph interpretation and limited field observations at some specific site locations. The site conditions encountered by Stantec at the specific test pits locations may vary in space and not being representative of the full landforms and surface material deposits. Variation in material textures are common and may vary among sampling locations.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.



APPENDIX A Grain Size Analysis Results from Potential Borrow Source Sample and Test Pit Logs





ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

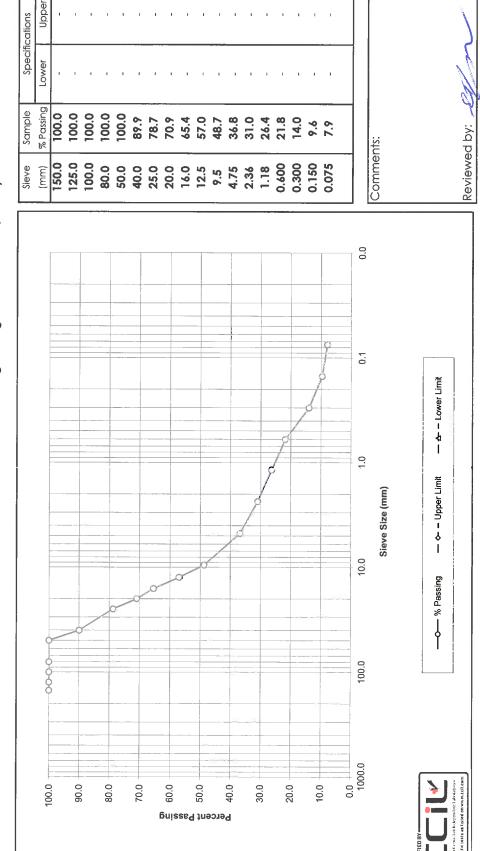
Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 15K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002A **GD65** ST SAMPLE #: TESTED BY: SOURCE:

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Well graded gravel with silt and/or clay and sand



Reporting of those test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or writhout the knowledge of Stantec.



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

Edmonton, Alberta Canada T5H 2X5 Edmonton, Alberta Canada 15K 2L6

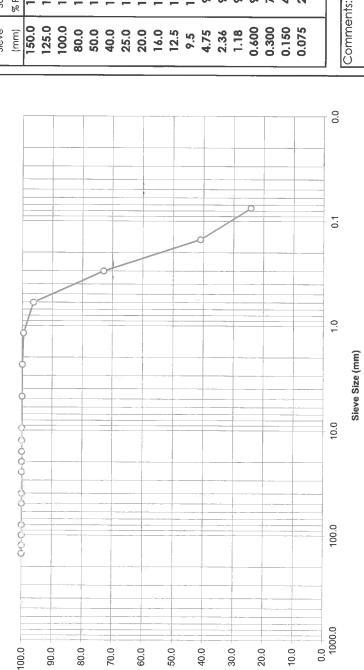
Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002B SOURCE: TESTED BY: SAMPLE #:

GD18 ST

DATE RECEIVED: September 4, 2015
DATE TESTED: September 15, 2015
SAMPLE DESCRIPTION: Silty and/or clayey sand DATE RECEIVED: DATE TESTED:

Specifications	Upper	ı	1	,	1	ı	,	'	,	,	,	'	1	•	ı	ı	,	1	1
Specifi	Lower	,	,	,	1	1	1	1	1	•	ı	1	,	,	,	,	,		ı
Sample	% Passing	0.0	0.	0.	0.	0.	0.	0	0.	0	0	0	٥	۰.	15	~	۰	0	w
San	% Pa	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.5	96.2	72.9	41.0	24.3
Sieve San		150.0 100	125.0 100	100.0 100	80.0 100	50.0 100	40.0 100	25.0 100	20.0 100	16.0 100	12.5 100	9.5 100	4.75 99.	2.36 99.	1.18 99.	0.600 96.2	0.300 72.9	0.150 41.0	0.075 24



Percent Passing



Roporting of these lest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec is not responsible, nor can be held liable,

Reviewed by:



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6 Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001C GD18 ST SAMPLE #: TESTED BY: SOURCE:

DATE RECEIVED: September 4, 2015
DATE TESTED: September 15, 2015
SAMPLE DESCRIPTION: Poorly graded sand

	jer																		
Specifications	Upper	_				'	'		'	'			'		' 	,	'	'	
Specif	Lower	1	,	,	,	1	,	1	1		ı	1	1	,	1	1	1	,	,
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.9	91.4	51.3	13.7	4.6
Sieve	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	009'0	0.300	0.150	0.075

100.0 100.0	0.00 0.0		0.00 100.0								_									Comments:	
10.0 1.0 Sieve Size (mm) % Passing Upper Limit Lower Limit	000	125	100	80.	50.	40.	25.	20.	16.	12.	9.6	4.7	2.3	-1.	09.0	0.30	0.15	0.075	0:0		
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																			100.0		%

Reporting of these fest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 75K 2L6 Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001 GD45 S SAMPLE #: TESTED BY: SOURCE:

100.0

90.0

80.0

70.0

60.0

50.0

Percent Passing

40.0

30.0

SAMPLE DESCRIPTION: Poorly graded sand with gravel September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

		ıts:	Comments:	10.0 1.0 0.1 0.0 Sieve Size (mm)
i				9
,	ı	9.	0.075	3
,	,	5.2	0.150	
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,		9.59	2.36	
'	,	78.7	4.75	
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1	1	90.4	12.5	
(,	92.2	16.0	
1	,	93.3	20.0	
,	•	0.96	25.0	
•		0.96	40.0	
•	,	100.0	50.0	
'	,	100.0	80.0	
1	,	100.0	100.0	
1	ı	100.0	125.0	
,		100.0	150.0	4
Upper	Lower	% Passing	(mm)	
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	S. S
Comments:	Reviewed by:

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- 4 - Lower Limit

- ◆ - Upper Limit

100.0

1000.0

10.0

20.0



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

10575 106 ST 10160 - 112 ST

LABORATORY

OFFICE

Edmonton, Alberta Canada T5H 2X5 Edmonton, Alberta Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002 GD45 ST SAMPLE #: TESTED BY: SOURCE:

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Well graded sand with gravel

Upper

Lower

% Passing Sample

100.0 100.0 100.0 100.0 100.0 95.6

Specifications

100.0

89.9

87.7

93.1

82.9 77.0 57.0 36.8 23.5 16.0

8.1 3.7

is:

Reporting of these test results constitutes a tosting service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the dient stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

-- &- -- Lower Limit

— ⇔ – Upper Limit

-o- % Passing

Reviewed by: 221



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 15K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001A GD37 ST SOURCE: TESTED BY: SAMPLE #:

September 15, 2015 SAMPLE DESCRIPTION: Poorly graded sand September 4, 2015 DATE RECEIVED: DATE TESTED:

Sieve Sample (mm) % Possing 150.0 100.0 100.0 100.0 100.0 100.0 50.0 100.0 25.0 100.0 25.0 100.0 12.5 99.4 9.5 98.8 4.75 99.4 9.5 98.8 4.75 99.4 9.5 98.8 6.300 10.6 0.300 16.5 0.500 10.5 0.500 0.150 8.5 0.0075 4.9	Specifications	Lower Upper		,	1		1	1	1	1	,	1	1	•		1	1	•	1	
Sieve (mm) 150.0 125.0 125.0 100.0 80.0 50.0 40.0 25.0 25.0 25.0 26.0 14.75 4.75 4.75 2.36 1.18 0.600 0.300 0.150 0.075	Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.66	99.4	98.8	93.0	79.3	59.2	39.8	16.5		4.9
L	é	nm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075

5 1557 0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.66	99.4	98.8	93.0	79.3	59.2	39.8	16.5	8.5	4.9		nts:		: 2 7
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ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada T5H 2X5 Edmonton, Alberta Canada T5K 2L6

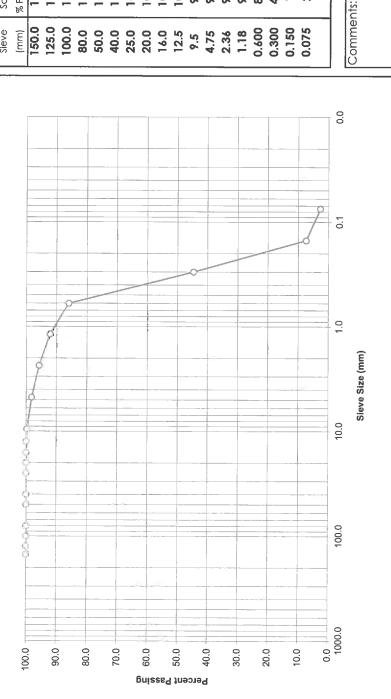
Tel: (780) 917-7463

Tel: (780) 917-7000

BS-2015-001B GD37 ST SAMPLE #: TESTED BY: SOURCE:

DATE TESTED: September 15, 2015 SAMPLE DESCRIPTION: Poorly graded sand September 4, 2015 DATE RECEIVED:

Specifications	Upper		'		,			1	'		1	'	•		,	1		•	,
Spec	Lower	١,	1		,	1	,	1	ı	1	1	1		•	1	,	1	ı	,
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	98.2	95.7	92.1	85.9	44.7	7.4	2.7
Sieve	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075





— ♣ – Lower Limit

- ← - Upper Limit

-o- % Passing

Reviewed by:



Grain Size Analysis ASTM C136, ASTM C117

Project Name: Gordon Lake Group Mine Si Project No: 121413573 Client: Public Works & Government

LABORATORY OFFICE

Edmonton, Alberta Canada 15H 2X5 10575 106 ST Edmonton, Alberta Canada T5K 2L6 10160 - 112 ST

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002B GD37 ST SAMPLE #: TESTED BY: SOURCE:

SAMPLE DESCRIPTION: Poorly graded sand with gravel September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

Upper Specifications Lower % Passing Sample 100.0 100.0 100.0 100.0 86.5 83.6 79.9 91.1 91.1 84.1 81.7 76.1 73.4 70.1 56.1 6.5 2.0 0.0

	—————————————————————————————————————	<u>}</u>
	Sieve Size (mm)	
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		0.0
0.150 2.		10.0
		0.00
		000
		30.0
4.75		40.0
9.5		
12.5		20.0
16.0		
20.0		0.09
25.0		
40.0		70.0
20.0		
80.0		80.0
100.0	8)
125.0		0.06
150.0		0.000
(mm) % Pas		

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Reviewed by:



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-003B GD37 ST SAMPLE #: TESTED BY: SOURCE:

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand

Upper

Lower

Specifications

	L L																			4	
)	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.66	9.66	99.3	98.9	97.9	90.3	44.2	9.5	2.4	1.2		nts:
	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075		Comments:
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- 4- - Lower Limit

- ~ - Upper Limit

Reviewed by: AM



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

Edmonton, Alberta Canada 15H 2X5 10575 106 ST Edmonton, Alberta Canada T5K 2L6 10160 - 112 ST

LABORATORY

OFFICE

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001A GD18 ST SAMPLE #: SOURCE:

TESTED BY:

100.0

90.0

80.0

70.0

60.0

50.0

Percent Passing

40.0

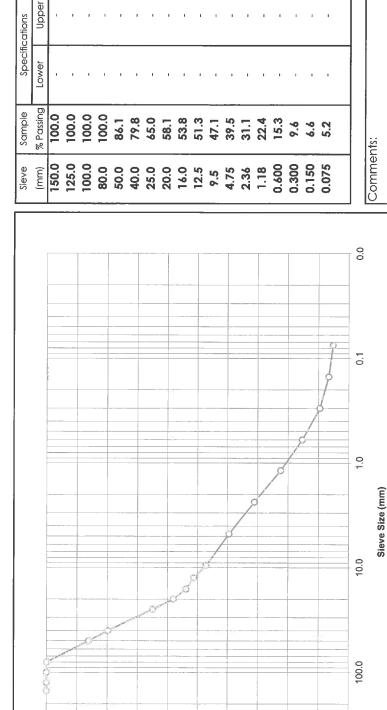
30.0

20.0

10.0

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded gravel with silt and/or clay and sand



Reporting of those lest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the cole use of the client stipulated above. Stantoc is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantoc.

- & - Lower Limit

- ~ - Upper Limit

-O- % Passing

1000.0



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 15K 2L6 Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001B **GD18** ST SAMPLE #: TESTED BY: SOURCE:

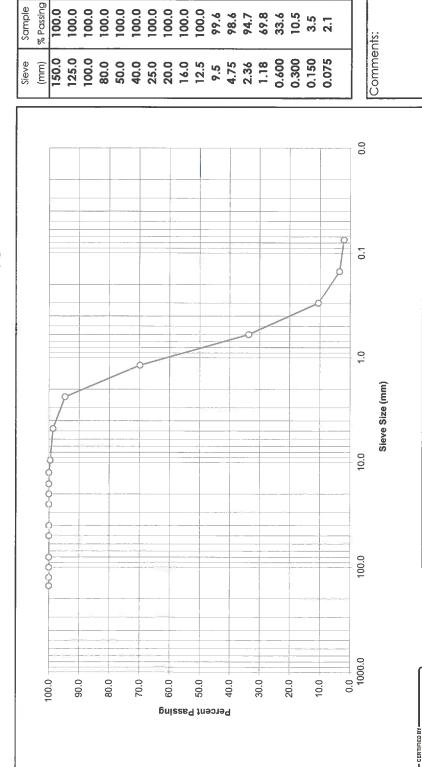
September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand

Upper

Lower

Specifications



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the tast results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stanfac is not responsible, nor can be held liable for the use of this report by any other party, with or writhout the knowledge of Stanfac.

— ♣ – Lower Limit

— ◆ – Upper Limit

—O— % Passing



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST Edmonton, Alberta 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002C GD18 ST SOURCE: TESTED BY: SAMPLE #:

DATE RECEIVED: September 4, 2015

DATE TESTED: September 15, 2015

SAMPLE DESCRIPTION: Well graded gravel with silt and/or clay and sand

Upper

Specifications

	7 50 50 50 50	Reviewed by:	Concentration of the desirement of the desiremen
			CERTIFIED BY
	nts:	Comments:	1000.0 1000 1.0 0.1 0.0 0.0 Sieve Size (mm)
:	;		0.0
, ,	8.2	0.075	0001
ı	13.4	0.500	
	22.7	0.600	
,	29.8	1.18	30.0
1	36.1	2.36	
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1	58.4	9.5	erce.
,	63.7	12.5	0.00 and 1.00 and 1.0
1	69.2	16.0	SSEC
,	73.9	20.0	0.09 ems
ı	82.0	25.0	
1	92.9	40.0	70.0
1	100.0	50.0	
1	100.0	80.0	80.0
1	100.0	100.0	
1	100.0	125.0	
	100.0	150.0	
Lower	% Passing	(mm)	1000
Specifi	Sample	Sieve	

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

Edmonton, Alberta Canada T5H 2X5 10575 106 ST Edmonton, Alberta Canada 15K 2L6 10160 - 112 ST

LABORATORY

OFFICE

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-003 GD18 ST SOURCE: TESTED BY: SAMPLE #:

100.0

90.0

80.0

70.0

0.09

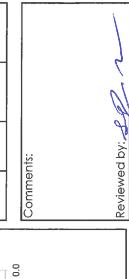
50.0

Percent Passing

40.0

SAMPLE DESCRIPTION: Poorly graded sand with gravel **September 15, 2015** September 4, 2015 DATE RECEIVED: DATE TESTED:

Specifications	Upper	,			1	1	,	1	1		-1	,	1	1	,	1		1	,
Specifi	Lower		ı	ı	i	i	,	,	1	ı			,	,	1	,	1		1
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	8.96	92.8	89.8	85.3	79.5	63.3	49.7	36.7	20.9	9.7	5.6	4.1
Sieve	(mm)	150.0	125.0	100.0	80.0	20.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	009.0	0.300	0.150	0.075
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				0							Т								



0.1

1.0

10.0

100.0

1000.0

10.0

30.0

20.0

Sieve Size (mm)

- 4- Lower Limit — ◆ – Upper Limit —— % Passing Reporting of these test results constitutes a testing service only. Engineening interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantoc is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantoc.



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

Edmonton, Alberta 10575 106 ST Edmonton, Alberta 10160 - 112 ST

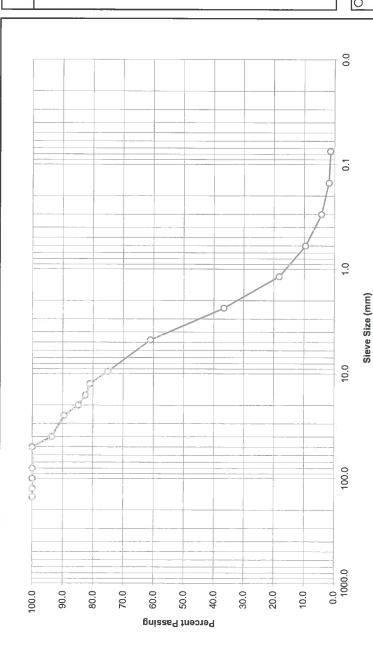
Canada 15H 2X5 Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001 GD11 ST SAMPLE #: TESTED BY: SOURCE:

September 4, 2015 September 15, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand with gravel



Specifications	ower Upper	1		1	,		-	1			,		1	,	,	,		1	-
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	93.6	89.5	84.9	82.4	81.0	75.0	61.0	36.6	18.2	9.5	4.3	1.9	1.4
Sieve	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stanter is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

◆ - Lower Limit

— ← — Upper Limit



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 15K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002 GD11 ST SAMPLE #: TESTED BY: SOURCE:

1000.0

90.0

80.0

70.0

60.0

50.0

Percent Passing

40.0

30.0

September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Well graded gravel with sand September 15, 2015

		ıts:	Comments:
ı	'	5:	0.075
,	,	.	0.150
	ı	2.3	0.300
1	1	4.2	0.600
'	ı	8.2	1.18
'	1	17.8	2.36
1	1	35.8	4.75
1	,	59.9	9.5
'	1	68.5	12.5
ı	,	76.3	16.0
ı	1	82.2	20.0
ı	,	89.9	25.0
•	,	100.0	40.0
1	,	100.0	50.0
1	1	100.0	80.0
1		100.0	100.0
1	,	100.0	125.0
ľ	,	100.0	150.0
Upper	Lower	% Passing	(mm)
2	specifications	samble	Sieve

		Reviewed by: & The
		<u> </u>
	— ♣ – Lower Limit	
	—── % Passing — ← – Upper Limit — 在 – Lower Limit	
	—O— % Passing	
		u.
•	perskent Laborateuro	sted on www.ccil.cam

100.0

1000.0

10.0

20.0

Reporting of those test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or writhout the knowledge of Stantec.



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-003 GD11 SAMPLE #: TESTED BY: SOURCE:

ST

100.0

90.0

80.0

70.0

0.09

50.0

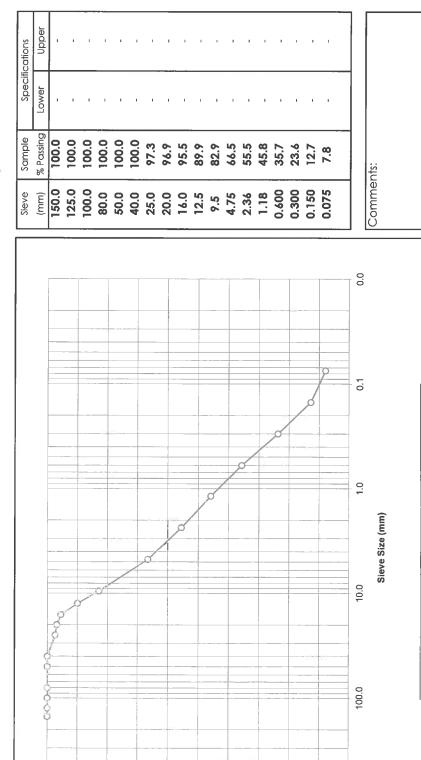
Percent Passing

40.0

30.0

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand with silt and/or clay and gravel





Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stanted is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stanted.

- 4 - Lower Limit

─ ◆ - Upper Limit

1000.0

0.0

20.0

10.01



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

Edmonton, Alberta Canada 15H 2X5 10575 106 ST Edmonton, Alberta Canada 15K 2L6 10160 - 112 ST

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001A GD28 ST SAMPLE #: TESTED BY: SOURCE

100.0

0.06

80.0

70.0

0.09

50.0

Percent Passing

40.0

SAMPLE DESCRIPTION: Well graded gravel with sand September 15, 2015 DATE TESTED:

September 4, 2015

DATE RECEIVED:

_																				_		
Specifications	Upper		1	1				,	ı	,				,	,	,	,	ı	,			
Specific	Lower	,	,	,				,		1	1			1	,		1	1	,			
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	88.3	79.3	72.8	65.0	56.7	40.7	30.6	21.9	13.4	0.9	4.0	3.2			ıts:
Sieve	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075			Comments:
																					0.0	
																				9	0.1	
												-							j	7		
									3 0 0							70	/	Ø			1.0	
									3					/	8							Sieve Size (mm)
							0	٥		0											10.0	Sie
	5			0				******									W)					
	7		- 1		- 1		- 1															



Reporting of these lest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be hald liable, for the use of this report by any other party, with or without the knowledge of Stantec.

- & - Lower Limit

- ↑ - Upper Limit

100.0

1000.0

20.0

30.0

10.0



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada 15K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-001B GD28 SAMPLE #: TESTED BY: SOURCE:

ST

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand with gravel

Upper

Lower

% Passing

Sample

100.0

100.0 100.0 100.0 96.3 95.3

94.2 92.3 90.7 83.7 74.7

45.2 65.1

12.1

100.0

100.0

Specifications

000

Reviewed by: mments:

Reporting of these lest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the cole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

- 4 - Lower Limit

— ◆ – Upper Limit

-O- % Passing



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST Edmonton, Alberta 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Canada 75K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002 GD28 ST SAMPLE #: TESTED BY: SOURCE:

100.0

90.0

80.0

70.0

60.0

40.0

50.0

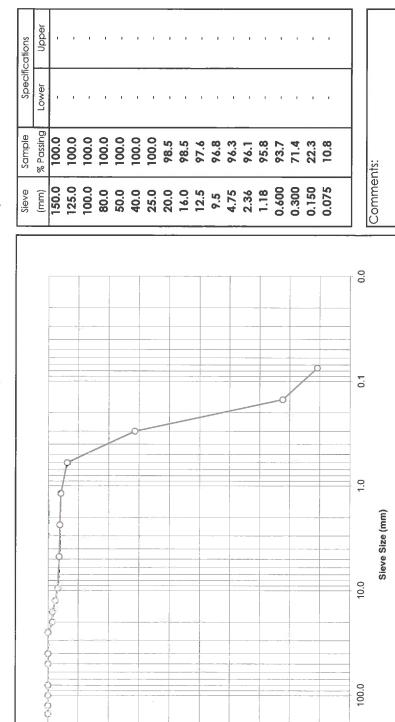
Percent Passing

30.0

20.0

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand with silt and/or clay





1000.0

10.0

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ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000 Upper

BS-2015-003 GD28 SAMPLE #: TESTED BY: SOURCE:

ST

100.0

90.0

80.0

70.0

60.0

50.0

Percent Passing

40.0

30.0

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Poorly graded sand

				Sieve Size (mm)	
		-	(100.0 1.0 0.1 0.0	
				3	
' 	,	1.9	0.075		
,	,	3.00 0.00	0.150		
f	,	13.7	0.300		
,	1	48.0	0.600		
'	ı	83.3	1.18		1
1	,	93.2	2.36		
,	1	96.3	4.75		
ı	,	98.5	9.5		
1	,	99.3	12.5		
1	,	100.0	16.0		
,	,	100.0	20.0		
,	,	100.0	25.0		
'	'	100.0	40.0		
'	'	100.0	50.0		
'	,	100.0	80.0		
'	ı	100.0	100.0		
ı	'	100.0	125.0		
		100.0	150.0		
Upper	Lower	% Passing	(mm)		
Specifications	Spec	Sample	Sieve		



1000.0

10.0

20.0

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ASTM C136, ASTM C117

Client: Public Works & Government Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY 10575 106 ST 10160 - 112 ST OFFICE

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6

Tel: (780) 917-7463

Tel: (780) 917-7000

BS-2015-001 GD65 ST SAMPLE #: TESTED BY: SOURCE:

September 15, 2015 **September 4, 2015** DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Well graded gravel with silt and/or clay and sand

Upper

Specifications

g		1	'	1	1		1	'		'	'	'	'	'	'	'	'	1		
% Passing	100.0	100.0	100.0	100.0	100.0	100.0	84.6	78.2	69.5	62.7	51.6	32.6	22.3	13.3	8.6	7.3	6.4	5.2		nte.
(mm)	150.0	125.0	100.0	80.0	20.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075		Commonter
																			0:0	
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																		9	0.1	
								-										1		
																		Î		
			-														1	2	1.0	
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			2										مر	/						
	-))		0									10.0	
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Š			-			+	_	+		-										
Ć Ć)																		100.0	
							-											_		
100 0)	0.09		80.0		70.0		0.09		50.0		40.0	(30.0	0	70.0	10.0	9 (1000.0	

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- & - Lower Limit

— ◆ – Upper Limit



ASTM C136, ASTM C117

Client: Public Works & Government Project Name: Gordon Lake Group Mine Si Project No: 121413573

LABORATORY OFFICE

10575 106 ST 10160 - 112 ST

Edmonton, Alberta Canada 15H 2X5 Edmonton, Alberta Canada T5K 2L6 Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-002B GD65 ST SOURCE: TESTED BY: SAMPLE #:

100.0

0.06

80.0

70.0

0.09

50.0

Percent Passing

40.0

30.0

20.0

September 4, 2015 September 15, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Silty and/or clayey sand

Specifications	Upper	1	1	1		,	•	1	1	1	1	1	,	ı	1	1	ı	ı	1		
Specifi	Lower		ı	1	1		,	1	1	ı	1	1	ı	,	,	,		,	1		
Sample	% Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.66	99.2	98.5	97.1	50.1	16.9	12.2		nts:
Sieve	(mm)	150.0	125.0	100.0	80.0	50.0	40.0	25.0	20.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075		Comments:
										=										0.0	
											-0-							7		0.1	
		9																		1.0	(mm)
																				10.0	Sieve Size (mm)
) 																		100.0	

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the exe of this report by any other party, with or without the knowledge of Stantec.

- 4- - Lower Limit

- ◆ - Upper Limit

-O- % Passing

Sieve Size (mm)

1000.0

10.0



ASTM C136, ASTM C117

Client: Public Works & Government

Project Name: Gordon Lake Group Mine Si Project No: 121413573

Edmonton, Alberta LABORATORY 10575 106 ST Edmonton, Alberta 10160 - 112 ST OFFICE

Canada 15H 2X5

Canada 15K 2L6

Tel: (780) 917-7463 Tel: (780) 917-7000

> BS-2015-003 GD65 SAMPLE #: TESTED BY: SOURCE:

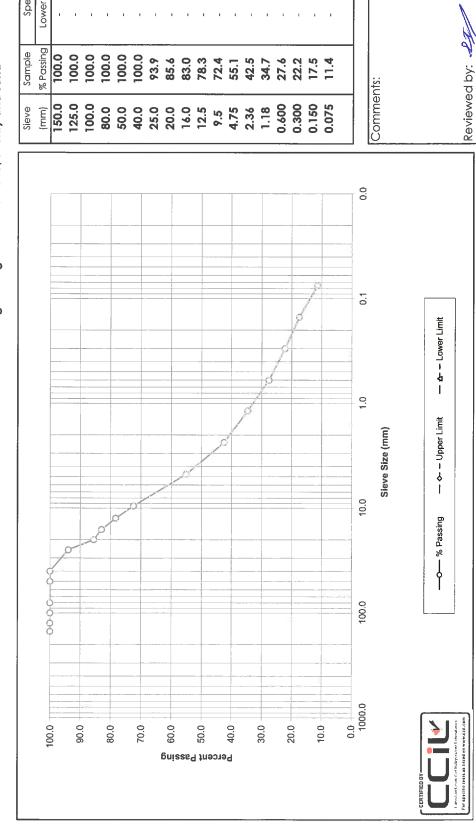
ST

September 15, 2015 September 4, 2015 DATE RECEIVED: DATE TESTED:

SAMPLE DESCRIPTION: Weil graded gravel with silt and/or clay and sand

Upper

Specifications



Reporting of these lest results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

			TEST P	T	RF	ECO	RD							TP	15-0	01
	LIEN		Public Works & Government Services									JECT			4135	73
	ROJE OCA	ECT TION									DAT	UM VATIO		N/A N/A		_
Е	XCA	VAT	ION DATE Aug. 12, 2015 CONTRACTOR N/A					F	EXCAV	ATION	METH	IOD _	Hand/	Shove	1	
		ı		S	AMP	LES			ar Vane	(kPa) eter (kPa)				r Vane (kPa)	
(m)	YPE	SYMBOL			l E	RE (%)	△ P00		0kPa) A Di)kPa		50kPa)kPa	Œ
DEPTH (m)	SOIL TYPE	SOIL SY	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	₩ _P	W		loisture C					1	DEPTH
0	TP					-8	1	0						70 8	0 90	0
	I I I		ORGANICS SAND - with gravel, poorly graded													-
	SP		S. I. 13 William g. W. V., pooling g. ward													-
-	SP		SAND - bedded - alternating beds of coarse and medium sand													_
			SAND - poorly graded, coarse, some cobbles													_ 2
	SP															-
1 -																_
	SP		SAND - Poorly graded, with gravel - Grain size test at 1.30 m: gravel=21.3%,													4
-			sand=76.9%, fines=1.8% - End of test pit TP15-001 at 1.30 m													-
	-		-UTM Zone 12: (N: 6994303; E 390950)													_
	<u> </u> 															- 6
2 -																-
	-															-
_	 															8
																-
3 -																
-	Piez	zomet			e R	ogged by	oy: O.P.		1::::) S	ta	nt	ec		10
	Bac	kfill [Type: Bentonite Sloughed Drift Cuttings	Janu	D	ate: Oct.	20, 201	5								

			TEST PIT	<u> </u>	RF	CO	RD							TP:	15-00	02
PI	LIEN ROJI DCA	ECT	Gordon Lake Group Mine Site								DAT	JECT N UM _ /ATION	1	_121 N/A N/A	4135′	73
E	KCA	VAT	ION DATE Aug. 12, 2015 CONTRACTOR N/A					F	EXCAVA	ATION I	METH	OD <u>H</u>	and/S	Shove	1	
(7		S	AMP				ar Vane (enetromet	,		emoulded sturbed T		,	kPa)	
DEPTH (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION	Ч	BER	12 RE (%)			0kPa	100	kPa	1501	кРа	200	0kPa	DEPTH (ft)
DEP	SOIL	SOIL S		IYPE	NUMBER	MOISTURE CONTENT (%)	W _P	W -⊖				& Atterbe tion Test,				DEP
0	TP		ORGANICS				1	0	20 3	0 40	5	0 60	7	0 8	0 90	0
-	SP	001	SAND - medium, poorly graded with gravel													-
=	GW		GRAVEL AND SAND - well graded - some cobbles													-
-	SP		SAND - coarse poorly graded with gravel													
_		>	SAND - well graded with gravel					- 3 - 3 - 3 -								_ 2
-	SW	, , ,		GS	1		-									_
-		, 0.	- Grain size test at 0.90 m: gravel=43.0%, sand=54.2%, fines=2.8%													-
1 -			- End of test pit TP15-002 at 0.90 m													
_			-UTM Zone 12: (N: 6994276; E: 390890)													4
-																
_												-2-4-1-2-1				
_																_
-																- 6
2 -																-
-																-
-																-
_																8
_																-
_																-
3 -																-
-	San	nple T	Ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuous C	Core	. —	ogged by					\	.	.4			10
		zomet kfill			K	ate: Oct.			(5	tar	IT	eC		

			TEST PIT	<u> </u>	RF	CO	RD							TP:	15-0	03
PI LO		ECT TION	Public Works & Government Services Gordon Lake Group Mine Site								DAT ELEV	VATION		N/A N/A	4135	73
E	XCA	VAI	ON DATE Aug. 14, 2013 CONTRACTOR IVA		AMP				ar Vane (emoulded				_ T
m)	긢	BOL		O/				ket Pe	ar vane (netromet 0kPa	. ,	X Dis		orvane	e (kPa)	okPa	l (i
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	IYPE	NUMBER	MOISTURE CONTENT (%)	W _P		$W_{ m L}$ — Mc	oisture Co	ontent &	& Atterbe	rg Lim	its	7KI a	DEPTH (ft)
0	SW	». ; ^{~.} «	SAND - with organics				1	0	20 3	0 40	5	0 60	7	0 8	0 90	0
-	SW	2. 0	SAND - trace gravel													
=		, 0 0	SAND - poorly graded, medium to coarse, some													
-	SP		Grain size test at 0.45 m: gravel=7.0%,	GS	1											-
_			sand=88.1%, fines=4.9% SAND - poorly graded													- 2
-	SP															-
-							-:::::: -:::::::::::::::::::::::::::::									-
1 -			- Grain size test at 1.05 m: gravel=1.8%, \sand=95.5%, fines=2.7%	GS	2											-
-			- End of test pit TP15-003 at 1.06 m													- 4
=			-UTM Zone 12: (N: 6977857; E: 386508)													-
_																
-																-
-																-
=																- 6
2 -	-															-
-																-
=	:															-
_								-3-0-6-1								8
-																-
-																-
=																
3 -	San	nole T	'ype: GS - Grab Sample SS - Split Spoon		ı	ogged by	ED									10
	Piez	zomet	ST - Shelby Tube PT - Piston Tube CC - Continuous C		R	eviewed 1	oy: O.P.		(S	tar	nto	ec		
	Bac	ktill '	Type: Bentonne Sloughed Drin Cuttings San		D	ate: Oct.	20, 2015	5								1

			TEST P	T	RF	ECO	RD							TP	15-0	04
C	LIEN	IT _	Public Works & Government Services								PRO	JECT	No.		14135	73
	ROJI										DAT			N/A		
		TION VATI	GONDATE Aug. 14, 2015 CONTRACTOR N/A								ELEV METH			N/A /Shove	 el	
					AMP				ar Vane					ar Vane		
_	Ш	JO.			AIVII			ket Pe	netrome	eter (kPa)	X Di	sturbe	d Torva	ne (kPa)	,	
DEPTH (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION	Й	3ER	15 KR		50	0kPa	100	kPa	1;	50kPa	20	00kPa	TH (ft)
DEP	SOIL	SOIL S	00.2 22001 iii 11.01.1	TYPE	NUMBER	MOISTURE CONTENT (%)	W _P ⊢	W		loisture C tandard F						DEPTH (
0	TP	71.17	ORGANICS - with sand				1	0	20	30 4	0 5	0	60	70 8	30 9	0
-	SP		SAND - some organics, loose, poorly graded													-
-		•	SAND - poorly graded, loose													
-	-															-
-	G.D.															
_	SP															- - 2
-																
-			SAND - poorly graded with gravel													-
-	SP		SAND - poorly graded with graver													
1 -	Sr		- Grain size test at 1.10 m: gravel=23.9%,	GS	1											-
-			\sand=74.4\%, fines=1.7\%	1												
-			- End of test pit TP15-004 at 1.10 m													- 4
-			-UTM Zone 12: (N: 6977959; E: 386620)													
_																-
-																
-																
-																6
-																
2 -																-
-																
-																-
-																8
-																
-																
-																_
-																
3 -																-
	San	nple T	Sype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuou	s Cor	.a —	ogged by		_	-1		\	1-			•	10
	Piez Bac	zomet kfill	er Dantonito D Cloughod Drill Cuttings			eviewed ate: Oct.				U	y 5	τα	nt	ec		

			TEST P	IT	RF	ECO	RD							TP	15-0	05
C	LIEN	IT _	Public Works & Government Services								PRO	JECT	No.	_12	14135	73
	ROJE		Gordon Lake Group Mine Site								DAT			N/A		
		TION	Gordon Lake, Northwest Territories ON DATE Aug. 14, 2015 CONTRACTOR N/A								ELEV			N/A I/Shov	el	
E.	ACA	VAI	ONDATE Mag. 14, 2013 CONTRACTOR 11/11					Е	ACA V.	ATION	MEIL		Tranc	I/ SHOV	<u> </u>	
		٦		S	AMP				ar Vane netrome	(kPa) ter (kPa)				ear Vane ane (kPa		
(m)	γPE	SYMBOL			<u>بي</u>	RE (%))kPa		kPa		50kPa		00kPa	(<u>#</u>)
DEPTH (m)	SOIL TYPE	L SY	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	W_{P}	W	$W_{ m L}$		I		ı		'	DEPTH (ft)
	Š	SOIL			≥	8 ENS	-	0		oisture C tandard f						□
0		117.				0	10) :	20 :	30 4	0 5	0	60	70	80 9	0
-	TP	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	ORGANICS - with sand SAND - poorly graded													-
-	SP		SAND - poorly graded SAND - poorly graded with gravel													-
-	SP		Silvid poorly graded with graver													
-			SAND - poorly graded													
-			1 7 6													 - 2
-																
-	SP															-
			- Grain size test at 1.00 m: gravel=1.1%,	GS	1											
1 -			sand=97.7%, fines=1.2%													_
-			- End of test pit TP15-005 at 1.20 m													4
-	•		-UTM Zone 12: (N: 6978041; E: 386699)													
_			-01W Zone 12. (N. 0978041, E. 380099)													-
-																
-																_
-																- 6
2 -																-
-																_
-																_
-							-0-4-1-0-4								.	8
-																
-																_
-																
3 -					<u></u>											10
	San	nple T	Ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuou	s Cor	.a 🗀	ogged by					۱ د	+-				10
	Piez Bac	zomet kfill				eviewed ate: Oct.		;		V	y 3	Ld	ınt	ec		

			TEST PI	T	RF	ECO	RD									TP	15-()06
C	LIEN	Т_	Public Works & Government Services									PRO	JEC1	Г			1413	
	ROJE		*									2.11		_		J/A_		
			Gordon Lake, Northwest Territories ON DATE Aug. 14, 2015 CONTRACTOR N/A													V/A		
E	XCA	VAI	ONDATE Aug. 14, 2013 CONTRACTOR IN/A					I	EXC	AVA	HON	MEIL	IOD	_11a	IIU/ K)110 V		
		7		S	AMP		☐ Insi					□ Re X Di				Vane (kPa)		
E) H	IYPE	SYMBOL	acu pecapipetau	111	ER	JRE (%)		5	0kPa		100	kPa	1	150kl	Pa	20	00kPa	H (#)
DEPTH (m)	SOIL TYPE	SOIL S	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	W _P ⊢	W	$W_{\rm L}$	Moi	sture C	Content	& Atte	erberç	g Limi	ts		DEPTH (ft)
•		Š				≥Õ	1	0	• 20	Sta 30		Penetra	tion T	Γest, b	lows/		30	90
0	TP	1/ xi /	ORGANICS - with sand	V														
_	~~	10 O	GRAVEL - poorly graded with sand and fines	GS	1													
-	GP		- Grain size test at 0.20 m: gravel=60.5%, sand=34.3%, fines=5.2%				-											
-	SP		SAND - poorly graded, some gravel	GS	2													
-			- Grain size test at 0.45 m: gravel=1.4%, \sand=96.5%, fines=2.1%															
-			SAND - poorly graded															2
-																		-
_	SP			GS	3		-:::::											
1 -			- Grain size test at 1.00 m: gravel=0.0%, sand=95.4%, fines=4.6%	Nos	3													-
-			30.173, 11.00															
=			- End of test pit TP15-006 at 1.20 m															- 4
-			-UTM Zone 12: (N: 6987966; E: 381907)															
_							-3-4-3-3-											<u> </u>
-																		
-																		
-																		6
2 -																		
-																		-
-																		-
=																		
_																	10000	8
-																		
-																		. -
-																		
3 -																		-
-	San	ıple T	ype: GS - Grab Sample SS - Split Spoon		I	ogged by	E.R.		:1::	انن			1:::	:1:	:::1		<u> </u>	10
		zomet	ST - Shelby Tube PT - Piston Tube CC - Continuous		1 1	eviewed	oy: O.P.			(S	ta	an	te	9 C		
			er Γype: Bentonite Sloughed Drill Cuttings	Sand	Г	ate: Oct.	20, 201	5		•								

CLIEM PROJIL LOCA EXCA	ECT TION		λ									PRO DAT		Γ Να _		_12 V/A	1413	3573
LOCA EXCA	NOIT.	Gordon Lake, Northwest Territories	\									DAT	UM	_		N/A		
	SYMBOL	ION DATE Aug. 14, 2015 CONTRACTOR N/A	_									ELE	VATI	ION		N/A		
DEPTH (m) SOIL TYPE	SOIL SYMBOL		S					_ E	XCA	VAT	TON	METH	HOD	_Ha	nd/S	Shov	el	
DEPTH (m) SOIL TYPE	SOIL SYMB(AMP					ar Van netron			□ Re X Di				Vane (kPa)		
DEPT SOIL	SOIL S	SOIL DESCRIPTION	ш	ZER.	URE T (%)				kPa			kPa		150k			00kPa	DEPTH (ft)
_ -	0	GOIL BEGOIN HOW	TYPE	NUMBER	MOISTURE CONTENT (%)	W _P	• W	<i>V</i>				content						DEP.
0	\				-8		10		20	Stan 30	dard I	Penetra 0 5	ition I	60	olows 7		80	90 0
- 11		ORGANICS - with sand, some gravel GRAVEL - well graded with fines and sand	GS	1														
Gw	001	- Grain size test at 0.20 m: gravel=56.3%, \sand=35.5%, fines=8.2%	,															
SM		SAND- silty, poorly graded																
		SAND - silty and/or clayey	_										1.0.0.1	-2-1-1				2
1 - SM																		
-			GS	2														4
_	<u>. </u>	- Grain size test at 1.40 m: gravel=0.1%, \sand=75.6%, fines=24.3% - End of test pit TP15-007 at 1.40 m		2														
-		-UTM Zone 12: (N: 6987997; E: 381988)																
1																		6
2 -																		
-																		
-																		8
1																		
1																		
3 - Sar	nple T	Sype: GS - Grab Sample SS - Split Spoon		L	ogged by	: Е	R.				~		Liii					10
Pie	zomet	ST - Shelby Tube PT - Piston Tube CC - Continuo		R	eviewed	by: O.				(S	ta	ar	te	ec		

			TEST PIT	<u> </u>	RF	CCO	RD							TP	15-00	08
PI	LIEN ROJI DCA	ECT	Gordon Lake Group Mine Site								DAT	JECT N UM VATION		_121 N/A_ N/A_	4135′	73
E	XCA	VAT.	ON DATE Aug. 14, 2015 CONTRACTOR N/A					1	EXCAV	ATION :	METH	IOD _H	[and/	Shove	1	
)L	_	SA	MP				ear Vane enetrome	(kPa) ter (kPa)		emoulded sturbed		,	kPa)	
DEPTH (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION	<u>н</u>	BER	rure NT (%)		5	0kPa	100	kPa	150	kPa	20	0kPa	DEPTH (ft)
DEP	SOIL	SOIL 9	SOIL DESCRIPTION	-	NUMBER	MOISTURE CONTENT (%)	W _P	W	• St	oisture C tandard F	Penetra	tion Test	, blows	s/0.3m		
0	TP		ORGANICS - with sand and silt, trace gravel				1	0	20 3	30 40	0 5	60 60) 7	70 8	0 90	0
-	SM	, 0	SAND - silty, trace gravel SAND AND GRAVEL													-
-	SW	. 0.00														_
-			SAND - poorly graded with gravel													-
-	SP															- 2
-				GS	1		-									
1 -			- Grain size test at 1.00 m: gravel=36.7%, \sand=59.2%, fines=4.1% - End of test pit TP15-008 at 1.00 m													-
-			-UTM Zone 12: (N: 6988167; E: 382119)													- 4
-																
-																-
-																-
	-															- 6
2 -																-
-																-
-																8
-																-
-											100 M					-
3 -																10
			ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuous C		_	ogged by eviewed l)	taı	าt	P C		10
		zomet kfill	er Fype: Bentonite Sloughed Drill Cuttings Sar	nd	\vdash	ate: Oct.					,	tai	10	-		

			TEST PI	T	RI	ECO	RD							TP	15-0	09
C	LIEN	IT _	Public Works & Government Services								PRO	JECT			4135	73
	ROJE		Gordon Lake Group Mine Site Gordon Lake, Northwest Territories								DAT			N/A_		
		TION VATI	ION DATE Aug. 15, 2015 CONTRACTOR N/A									VATIO IOD _		N/A Shove	1	
				S	SAMP	I FS	□Insit	u Shea	ar Vane	(kPa)	□ Re	emould	ed Shea	r Vane (kPa)	
Ē	Щ	30L						ket Pei	netrome	ter (kPa)	X Di	sturbed	d Torvar	e (kPa)	•	(ft)
DEPTH (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	TO PR	***)kPa	100)kPa	13	50kPa	20	0kPa	ОЕРТН (1
DEF	SOII	SOIL		≱	N N N	MOISTURE CONTENT (%)	₩ _P	W		oisture C						
0		\.,				ŏ	10)		30 4					0 9	0
-	TP	×1.1/2	ORGANICS - with sand SAND - coarse, trace gravel													-
-	SP															
-	GW		GRAVEL - with sand													
-			GRAVEL AND SAND - some cobbles													-
-	GW	601														2
-	SP	; ; ; ; ;	SAND - poorly graded with gravel	GS	S 1		-::::::::::::::::::::::::::::::::::::::									-
1 -	SF		- Grain size test at 1.00 m: gravel=39.0%, sand=59.6%, fines=1.4%	/\												_
-			- End of test pit TP15-009 at 1.00 m													4
-			-UTM Zone 12: (N: 6982377; E: 376012)													-
-								- 3 - 5 - 5 - 5								
-																-
-																6
2 -																-
-																-
-																8
-																_
-																-
3 -																10
	San	nple T	Sype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuous	s Cor	. <u>.</u> –	ogged by					۱ د	4-				10
	Piezometer Backfill Type: Bentonite Sloughed Drill Cuttings Sand Date: Oct. 20, 2015								y 3	ld	nt	ьC				

			TEST PI	T	RF	ECO	RD							TP	15-0	10
C	LIEN	Т _									PRO	JECT			4135	73
	ROJE	ECT TION	Gordon Lake Group Mine Site Gordon Lake, Northwest Territories								DAT ELEV			N/A N/A		
			ION DATE Aug. 15, 2015 CONTRACTOR N/A												el	_
				S	AMP	LES	☐ Insit	u Shea	ar Vane	(kPa)	■ Re	emoulo	led Shea	ar Vane ((kPa)	
Œ.	Ш	SYMBOL			~	ш%	△ Pock		netromet kPa	ter (kPa)	X Di kPa		d Torvai 50 <u>k</u> Pa		0kPa	(#)
DEPTH (m)	SOIL TYPE	SYN	SOIL DESCRIPTION	TYPE	NUMBER	STUR ENT (W _P	W	$W_{\rm L}$	100			70111 11		 	ОЕРТН (
DE	SO	SOIL		Ĺ) N	MOISTURE CONTENT (%)	<u> </u>	Ö	⊢ Mo	oisture C andard F						
0	TP	7/.1/Z	ong Angga ida d			0	10) 2	20 3	80 4	0 5	0	60	70 8	30 90	0
		2.00	ORGANICS - with sand SAND - well graded, some gravel													-
	SW	, ,	- mostly cobbles													-
-			GRAVEL AND SAND - coarse sand													-
	GW	00														F
-																_ 2
		2.0	GRAVEL - well graded with sand (coarse)													- 2
	SW	, , ,														
		, 0.	- Grain size test at 1.00 m: gravel=64.2%,	GS	1											-
1 -		, °.4	\sand=34.3%, fines=1.5%													
			- end of test pit TP15-010 at 1.00 m													<u> </u>
-			-UTM Zone 12: (N: 6982259; E: 376003)													4
-																-
-							-5-4-1-5-4									-
																-
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2 -																-
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_																- 8
																-
																-
•	1															-
3 -	San	nple T	Sype: GS - Grab Sample SS - Split Spoon		L	ogged by	: E.R		1::::					1::::		10
	Piez	zomet	ST - Shelby Tube PT - Piston Tube CC - Continuou		e R	eviewed					S	ta	nt	ec		
	Bac	kfill [Type: Bentonite Sloughed Drill Cuttings	sanu	D	ate: Oct.	20, 2015									

			TEST P	T	RF	ECO	RD									TP	P 15-	-01	1
C	LIEN	Т_										PRO	JEC	Г Ис			1413	357	'3
	ROJE											DAT		-		N/A N/A			_
		TION VAT	ON DATE Aug. 15, 2015 CONTRACTOR N/A									ELE METH					el		_
				S	AMP	LES	□Ins	itu Shea	ar Van	e (kPa	1)	□ R	emou	lded \$	Shea	· Vane	(kPa)		
(m)	TYPE	SYMBOL			~	щ [°]	△ Po	cket Pei 50	netrom)ķPa		kPa) 100]			ed To 150k) 00kPa	a	(#
DEРТН (m)			SOIL DESCRIPTION	TYPE	NUMBER	STUR ENT (W _P	W	$W_{ m L}$								7		DEPTH (
DE	SOIL	SOIL		<u> </u>	Ž	MOISTURE CONTENT (%)	Ĺ	-	–			ontent Penetra							DE
0	TP	71.1 ⁷ ,	ORGANICS - with sand			0	: : : :	10 2	20	30	40) 5	50	60	7	0	80	90	0
	SW	2. 6. 4	SAND - and fines, some gravel																-
-	SW	2.00	SAND - well graded, with gravel																-
-		2 0	SAND AND GRAVEL																-
_	SW	, , , ,																	-
-		, , ,																	- 2
-	-	2 0	SAND - poorly graded with fines and gravel																-
1 -	SP		- Grain size test at 1.00 m: gravel=33.5%,	GS	1														_
	-		\sand=58.7%, fines=7.8% - End of test pit TP15-011 at 1.00 m																-
-	•		-UTM Zone 12: (N: 6982191; E: 376009)																- 4
-																			-
_								-3-2-2-3											-
-	-																		-
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2 -	 																		-
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-	.																		- - 8
-	†																		-
-																			-
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3 -	_																	Щ	10
			ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuou		e R	ogged by eviewed					9) (+:	an	1	ec	,		
		zomet kfill		Sand	\vdash	ate: Oct.				V	J	,		41			į.		

			TEST P	IT	RI	ECO	RD							TP	15-0	12
C	LIEN	Т _	Public Works & Government Services								PRO	JECT			4135	73
	ROJE	ECT TION									DAT ELEV			N/A N/A		
			ION DATE Aug. 15, 2015 CONTRACTOR N/A												el	_
				S	AMP	LES	☐ Insi	tu Shea	ar Vane	(kPa)	■ Re	emould	led Shea	ar Vane (kPa)	
Ê	<u>ا</u> ا	BOL				∭ ©		ket Pe		ter (kPa)		sturbe		ne (kPa)	0kPa	(ft)
DEРТН (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	TUR S) TN	W			100	кга	1.	окга	20	- Kra	DEPTH (
DEF	SOI	SOIL		}	N N	MOISTURE CONTENT (%)	W _P	W		oisture C						🗒
0						ŏ	1	0		30 4					0 90	0
	SP		SAND - no rootmat; surface disturbed													-
		2.0	SAND - well graded with gravel	<u> </u>			-: : : : : :									-
-	SW	, , , ,	- Grain size test at 0.40 m: gravel=59.3%, sand=37.5%, fines=3.2%	GS	1											
-		, , ,														_ 2
-	-		SAND - poorly graded with gravel (some cobbles)													_
	SP															-
1 -			- Grain size test at 1.10 m: gravel=16.3%,	GS	2											-
-			\sand=80.3\%, fines=3.4\%	1												F
-			- End of test pit TP15-012 at 1.10 m													- 4
	† 		-UTM Zone 12: (N: 6994100; E: 374311)													
-																
-																-
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2 -																-
	•															
-																8
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-																-
-																-
3 -		1.7			1									1:::::		10
			ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuou		e R	ogged by eviewed) <	ta	nt	ec		
	Piezometer Backfill Type: Bentonite Sloughed Drill Cuttings Sand Reviewed by: O.P. Date: Oct. 20, 2015									,	Lu					

			TEST PI	T	RE	CO	RD									ТP	15-0	<u></u> በ1	3
C	LIEN	Т_										PRO)JEC	T No			1413 1413		
P	ROJI	ECT	Gordon Lake Group Mine Site									DAT	TUM			V/A			_
			Gordon Lake, Northwest Territories ON DATE Aug. 15, 2015 CONTRACTOR N/A													V/A Shov			_
I.	Г	VAI	ONDATE TIME. 10, 2012 CONTRACTOR THE																_
Ē	 Ш	OL		- 5	AMP		☐ Insi				er (kPa) X D	isturb	ed To	orvane	Vane (kPa)			_
DЕРТН (m)	ΙΥΡ	SYMBOL	SOIL DESCRIPTION	Ш	3ER	URE IT (%			50kF	Pa	100	0kPa		150k	Pa	20	00kPa		DEPTH (ft)
DEPI	SOIL TYPE	SOIL S	SOIL BESONI HON	TYPE	NUMBER	MOISTURE CONTENT (%)	₩ _P	W	- W		oisture (Content	& Att	terber	g Lim	its			DEP
		Ñ			_	ΣŌ	1	.0	• 20			Penetra	ation [*] 50	Test, I	olows 7		80	90	
0	TP	2.00	ORGANICS - with sand														Ť T	Ĩ	0
	SW	, 0	SAND - some gravel																-
-			SAND - poorly graded with fines																-
-																			-
-																			-
-																			- 2
-	SP																		-
-																			-
1 -																			-
1																			-
-				GS	1														- - 4
-			- Grain size test at 1.30 m: gravel=3.7%, \sand=85.5%, fines=10.8%																-
-			- End of test pit TP15-013 at 1.30 m																-
-			-UTM Zone 12: (N: 6994211; E: 374119)															-	-
																			-
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3 -		1 7						L										Щ	10
			Type: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube CC - Continuous		e R	ogged by eviewed					1) 5	:	an	114	ec			
	Bac	zomet kfill	Fype: Bentonite Sloughed Drill Cuttings	Sand	-	ate: Oct.						, –	(~ '		-			

	TEST PIT RECORD TP15-014														<u>-</u>						
C	CLIENT Public Works & Government Services														PROJECT No. 121413573						
	ROJI		*													N/A			_		
LOCATION Gordon Lake, Northwest Territories ELEVATION N/A EXCAVATION DATE Aug. 15, 2015 CONTRACTOR N/A EXCAVATION METHOD Hand/Shovel															_						
					AMP		☐ Insi									· Vane					
_	Ш	JO.	SOIL DESCRIPTION		Π			ket P	enet	trome	ter (kPa	a) 🗶 D	isturb	ed To	orvane	(kPa)					
DEPTH (m)	SOIL TYPE	SYMBOL		TYPE	3ER	URE VT (%			50kl	Pa	10	00kPa		150k	Pa 200kPa				DEPTH (ft)		
DEP.	SOIL	SOIL S			NUMBER	MOISTURE CONTENT (%)	W _P W ⊢ ⊖		и —-		oisture	Content	ontent & Atterberg L			Limits			DEP.		
		S				≥ 0	1	.0	20			Penetra	ation ⁻ 50	Test, I	blows 7		30	90			
0	TP SW	2/1/4	ORGANICS - with sand															T.	0		
	SP		\(\sum_{\text{SAND}}\) - with fines and gravel \(\sum_{\text{SAND}}\) - some silt, trace gravel																		
-			SAND - poorly graded																=		
-																		-			
-																					
																	\		- 2		
-	SP																				
-																		-			
1 -																			•		
				GS	1																
-		• •	- Grain size test at 1.20 m: gravel=3.7%, \sand=94.4%, fines=1.9%		1														- 4		
-			- End of test pit TP15-014 at 1.20 m															-			
-			-UTM Zone 12: (N: 6994141; E: 374188)																		
_							-5-6-8-6				<u> </u>								-		
-																			- 6		
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2 -																					
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3 -																					
•	San	nple T	ype: GS - Grab Sample SS - Split Spoon		L	ogged by	E.R.		:1		~	\ -	1 : : :	: : <u> </u>			1:::	4	10		
	Piez	zomet	ST - Shelby Tube PT - Piston Tube CC - Continuou er Bentonite Sloughed Drill Cuttings		K	eviewed					U) S	ta	ar	t	ec					
	l pac	kfill [rype. 💳 wu - wu		D	ate: Oct.	20, 201	3													

TEST PIT RECORD													TP15-015								
C	LIEN	Т_	Public Works & Government Services		PROJECT No121413573																
PROJECT Gordon Lake Group Mine Site LOCATION Gordon Lake, Northwest Territories														N/A							
			ON DATE Aug. 15, 2015 CONTRACTOR N/A								ELEV METH			N/A /Shove	 el						
		,,,,,																			
<u></u>		OL OL		3	AMP				ar Vane netrome	(кРа) ter (kРа)		sturbe	d Torvai	ar Vane (ne (kPa)	(кРа)						
DEРТН (m)	ΥP	SYMBOL	SOIL DESCRIPTION	Щ	ZER.	U.RE 17 (%		50)kPa	100	kPa	1:	50kPa	a 200kPa		DEPTH (ft)					
DEP.	SOIL TYPE	SOIL S	GOIL BESCHI HON	TYPE	NUMBER	MOISTURE CONTENT (%)	₩ _P —	W		oisture C						DEP'					
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Public Works and Government Services Canada Project No. R.057573 Environmental Site Remediation Gordon Lake Group Sites, NT

ISSUED FOR TENDER
APPENDIX C
Page 1 of 1

APPENDIX FLYSHEET

APPENDIX C - AANDC Winter Road Rules

A FIELD GUIDE TO ICE CONSTRUCTION SAFETY









A FIELD GUIDE TO ICE CONSTRUCTION SAFETY

This document is produced by the Department of Transportation of the Government of the Northwest Territories.

It is published in booklet form to provide a convenient and easy to carry reference for Department of Transportation staff and contractors involved in the construction and maintenance of winter roads, ice roads and ice bridges. It outlines work practices and procedures which are intended to increase the safety of those working or travelling on ice or under winter conditions. It is intended to be read in conjunction with the department's Highway Maintenance Manual that amplifies the details on the procedures.

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1.0 INTRODUCTION

Working on and around ice is inherently dangerous. Ice conditions, whether on a lake, slow moving river, creek or fast moving river, can be unpredictable and must be respected at all times. Workers and especially supervisors must be vigilant and extremely aware of the situation, the need for care and attention, and the critical need to fully communicate all plans, procedures, conditions and regulations.

The Department of Transportation's highest priority is safety. Consequently, the department is committed to:

- Encouraging the joint efforts of management and the employees to establish and maintain safe and healthy working conditions for all employees;
- · Providing employees with safe and proper equipment and materials;
- Providing training in safe work practices; and
- Encouraging employee participation in the development and support of safety programs.

Employees, in turn, have a responsibility to perform their work in a safe and responsible manner, to follow guidelines established to ensure their safety, to advise their supervisor of unsafe practices or conditions and to promote safety amongst their co-workers.

It is impossible to anticipate all situations that may arise in the field or all of the factors that might affect one's response. This information should be treated as guidelines rather than strict rules and regulations. Common sense and good judgment are most important. The department has introduced the "VITAL" logo to assist all those who work on or around ice to take that extra time to ensure they are fully prepared for the work

All GNWT and contractors' employees involved in ice/winter road construction will be given a copy of "A Field Guide to Ice Construction Safety". Read this guide and if you require clarification or have any questions, talk to your supervisor immediately or at any of the regular safety meetings.

SAFETY IS EVERYONE'S RESPONSIBILITY.

2.0 GUIDELINES FOR WORKING IN A COLD ENVIRONMENT

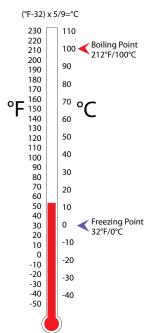
2.1 INTRODUCTION

These guidelines provide information for working in a "cold environment". They apply when working out of doors or when travelling on winter roads, when handling extremely cold materials and when involved in an accident or stranded in a vehicle. The intent is to prevent injuries caused by severe cold, particularly frostbite and hypothermia.

2.2 HAZARDS OF EXPOSURE TO COLD WEATHER

Frostbite is the freezing of body tissue resulting from exposure to the cold. Hypothermia is a lowering of the core body temperature as a result of prolonged exposure to cold temperature. Both conditions are extremely serious.

The following factors contribute to cold injury:



Air Temperature – As temperatures drop, the risk of injury increases.

0°C to -20°C: In this temperature range, the risk of frostbite or hypothermia exists but can be avoided. Work can continue as long as the individual is wearing proper clothing, is in good health and the equipment used is in proper working order.

- -20°C to -45°C: In this temperature range, outdoor travel can be dangerous and equipment failure is serious.
- -45°C and Below: This temperature range is a serious threat to personal health and safety. Normally, all outdoor work will cease. In the event of an emergency such as natural disasters, rescue operations and situations that threaten public safety, work must proceed with extreme caution.

Windchill — Air temperature is not the only measure of how cold it is. Wind velocity combines with air temperature to create a windchill that magnifies the cooling effect on exposed human skin. For example, a calm-air temperature of -20° Celsius poses little danger, but the same temperature in a 50-kilometre per hour wind will chill as quickly as a calm air temperature of -30° Celsius. Wind, therefore, adds to the effect of low temperature and causes the body to cool more rapidly or hastens the freezing of tissue. Figure 1 shows the relationship between air temperature and wind chill. These equivalent chill temperatures are applicable if your clothes and skin are dry. When you are wet, cold injury can result at much warmer temperatures.

FIGURE 1
Wind Chill Calculation Chart

	Air Temperature (°C)												
		5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
	5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
	10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
	15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
	20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
	25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-68
Speed (kph)	30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-70
) pea	35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-72
Spe	40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-73
Wind	45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-74
-	50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-75
	55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-76
	60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-77
	65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
	70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80

Frostbite Guide

Low risk of frostbite for most people

Increasing risk of frostbite for most people in 10 to 30 minutes of exposure

High risk for most people in 5 to 10 minutes of exposure

High risk for most people in 2 to 5 minutes of exposure

High risk for most people in 2 mnutes of exposure or less

2.0 GUIDELINES FOR WORKING IN A COLD ENVIRONMENT

Wind speed doesn't only occur when it's windy. Driving in an open vehicle will mechanically generate brisk air movement similar to high wind speeds.

The following is a useful guide to guess the wind speed:

- 10 kph Wind felt on face; leaves rustle; moves a light flag.
- 20 kph Leaves and small twigs constantly moving; fully extends a light flag.
- 30 kph Raises dust, leaves and loose paper; large flags flap; small tree branches move.
- 40 kph Small trees begin to sway; blowing and drifting snow.
- 50 kph Larger tree branches moving; whistling heard in power lines; large flags waving wildly.
- 60 kph Whole trees moving; resistance felt in walking.

(Environment Canada)

Factors affecting individuals' ability to tolerate cold:

- Physical Condition Individuals vary greatly in their ability to tolerate cold. For example, an individual who is short and stout is less susceptible to the effects of cold than one who is tall and slim. Fatigue can also render an individual vulnerable to cold.
- Physical Activity Physical activity will generate body heat and counteract the
 effects of cold temperatures. On the other hand, workers who are sedentary or
 who do light work may not produce adequate heat to maintain body temperature.
- Adequate Protective Clothing This is the most important factor in preventing cold injuries. Warm head cover and face protection is essential. Hands and feet must be kept dry.
- Use of Tobacco and Drugs Nicotine in any form decreases blood flow while alcohol and some drugs stop the liver from releasing fuel that muscles need to make heat. In addition, alcohol increases blood circulation to the skin and the body becomes cold faster. The use of alcohol, tobacco and drugs greatly increases the risk of cold injury.

2.3 Prevention of Injury

Prevention of cold injuries is largely a matter of common sense. By recognizing the dangers, planning effectively to reduce them, paying attention to the work at hand and staying calm if a problem occurs, most injuries can be avoided.

Food, Rest and General Health — Overall physical well-being is an important factor in the prevention of cold injury. When you are exhausted, hungry, ill or injured, your chances of frostbite or hypothermia are increased. Learn to recognize your physical limits and don't exceed them. When doing physical work ensure that you are well rested before heading out onto the job and pace yourself to avoid exhaustion and perspiration.

Eat plenty of the right sorts of food for producing body heat. Most important are fats, followed by carbohydrates, with protein being the least important.

The following list indicates the composition of various foods:

Bacon Fp Chicken Pf Macaroni Cp

Ham FP

Beans (dried) CPf Chocolate FC Meats (average fat content) Pf

Soups (dried, thick) C

Beef (chipped) Pf Eggs (whole) Pf Milk (whole) PFc

Biscuits (Pilot) Cp Fish PF Milk (non-fat, dried) Pc

Bread (white) Cp Fish (in oil) FP Nuts FPc
Butter F Flour (white) Cp Dried meat FP
Dates Cp Fruits Cp Potatoes (dried) C

Cereal (oatmeal) Cp Honey C

Cereal (oatmeal) Cp Jams and Jellies C

Cheese FP

Candies (hard) C

(F)ats (C)arbohydrates (P)roteins

Lowercase letters indicate a minor component of the food item.

2.0 GUIDELINES FOR WORKING IN A COLD ENVIRONMENT

Personal Clothing – Workers are responsible for providing or obtaining and carrying cold weather clothing and footwear that is appropriate for the outdoor temperature range and type of activity, including sunglasses, when travelling and working in cold temperatures and isolated areas. It is important to consider what weather conditions **might** be encountered rather than what they currently are. Plan for the worst case. In cold windy weather, protect your face, head and neck. Enormous amounts of body heat can be lost from these areas even when other parts of the body are adequately clothed.

Avoid tight fitting clothing, which might restrict circulation, particularly on the hands and feet. Wear multiple layers of light, loose-fitting clothes. Air between the layers provides warmth. Outer wear should be water-resistant.

Avoid sweating. Sweat dampened clothes lose their insulating value. The following sequence is a guide when removing clothing to avoid sweating:

- Remove gloves/mitts, unless protection from cold materials, snow and ice is needed.
- Remove headgear and neck wrapping.
- Open jackets at the waist and sleeves.
- Remove outer layers of clothing.

Replace clothing in the reverse sequence as soon as work is done. Don't wait until you start feeling cold.

Don't use old matted boot insoles that have lost their insulating ability. Keep your hands and feet dry by changing socks and/or liners that have become wet from perspiration or water.

Communications – Working alone must be avoided when cold weather is potentially a danger. However, this is not always possible on winter road construction (which is over land). In this case, a "buddy" system must be used. This means that a person working on a winter road must be able to contact another person by radio or telephone on an open channel at all times. Reporting schedules are shown in Figure 2. Workers who work on an ice crossing or on lake ice are never to work alone. Supervisors are to clearly lay out the communications plan prior to starting work so everyone is clear on the work and what happens during an emergency.

FIGURE 2
Warm-up and Reporting Schedule for Outdoor Activities

Windchill (°C)		
(Refer to Figure 1)	Outside Worker	Equipment Operator
-15 to -30	Warm-up breaks every hour.	Where warm shelter is provided by heated cab, breaks are every 2 hours, otherwise, same as outside worker.
	Persons working should be contacted every hour by visit or radio communication.	Same as outside worker.
-30 to -45	Warm-up breaks every ½ hour.	Where warm shelter is provided by heated cab, breaks are every 2 hours, otherwise, same as outside worker.
	Persons working should be contacted every ½ hour by visit or radio communication.	Same as outside worker.
	NON-EMERGENCY WORK SHOULD CEASE. Where work must proceed, warm-up breaks should be taken every ½ hour.	NON-EMERGENCY WORK SHOULD CEASE. Where work must proceed and where warm shelter is provided by heated cab, breaks are every hour, otherwise, same as outside worker.
Greater than -45	NON-EMERGENCY WORK SHOULD CEASE. Where work must proceed, persons working alone should be contacted every 1/2 hour by visit or radio communication.	NON-EMERGENCY WORK SHOULD CEASE. Where work must proceed, same as outside worker.

Important: This is a guide only. Common sense should over-ride the strict application of this table.

2.0 GUIDELINES FOR WORKING IN A COLD ENVIRONMENT

Warm-up Breaks — Figure 2 shows warm-up break schedules for outdoor work in cold conditions. It assumes that under normal warm weather working conditions, breaks are scheduled at two-hour intervals. The schedule provides for additional breaks as the wind velocity at the work site increases and/or the temperature decreases. If effective protection from the wind can be achieved by shields or screens or by modifying or relocating work, then temperature alone can be considered. Where the work itself generates wind (i.e. driving or riding on an unshielded vehicle), this should be taken into account.

The tolerance of individuals to cold varies widely. In all cases, common sense should be taken into consideration to determine individual limitations.

Awareness – A major defence against serous cold injury is awareness of the danger. When working with others watch for potential danger or signs of injury. In turn, make sure that your co-workers are looking out for you. Periodic checks of face and ears can identify a potential frostbite problem before it becomes serious. Look for disorientation or clumsiness in yourself or others, which could be a sign of hypothermia.

Equipment – Equipment is prone to mechanical breakdown during cold temperatures. In extreme weather conditions such a breakdown can be life threatening. It is, therefore, prudent to take care to ensure that equipment is in good working order. As the temperature decreases, more stringent standards of safety will apply:

- Air Temperatures from 0°C to -20°C: To avoid accidents and breakdowns, all
 equipment must be checked at the start of each working day and every eight
 hours thereafter.
- Air Temperatures from -20°C to -45°C: All equipment must be checked at the start of each working day and every four hours thereafter.
- Air Temperatures -45°C and Below: Normally, all outdoor work will cease.
 In the event of an emergency such as natural disasters, rescue operations and situations that threaten public safety, work must proceed with extreme caution.
 Equipment checks must be carried out hourly.

Use caution when handling gasoline. With a freezing point of -56°C (-70°F) and a high evaporation rate, contact with the skin can be very dangerous. Similarly, caution should be exercised when handling metal objects. Always wear gloves or mitts rather than touch the object directly.

Emergency Kit – All vehicles should be outfitted with emergency gear as a precaution against vehicle breakdown or sudden changes in weather or road conditions. Drivers should routinely check to see that their vehicles are equipped with:

- Reflectors or flares
- Shovel
- Hatchet, axe or saw
- Tow strap or rope
- Basic tool kit
- Jumper cables
- Flashlight, candle
- First aid kit
- Personal survival kit
- Food (rations)

- Maps
- Mirror
- Newspaper
- Toilet paper, paper towels
- · Small metal can, jug
- Matches (strike anywhere)
- Knife
- Rope, wire
- Sleeping bag or blankets

2.4 First Aid Treatment

It is important to recognize the early symptoms of cold injury. As the body cools, discomfort is first felt at the extremities such as fingers and toes. Shivering follows this discomfort. This is a warning that the body must be warmed, either in a warm shelter or, in some circumstances, by more vigorous activity. The activity should not be so great as to cause sweating. If the warning is ignored then the result can be serious injury such as frostbite or hypothermia.

Hypothermia – Hypothermia is a condition that results from the cooling of the body at a rate that exceeds the body's ability to generate warmth. This can occur slowly, as in the case of a person who has put in a full day of work under cold conditions and is in need of food and rest to allow the body to restore normal body core temperature. It can also occur quickly, as in the case of a person who has fallen through ice into frigid water.

Typical signs and symptoms include:

- · Increasing slowness of physical and mental response;
- Stumbling, cramps and shivering;
- Slurring of speech:
- Impaired vision;
- Unreasonable behaviour or irritability; and
- Increased pulse and respiration as long as the body can still respond by shivering.

2.0 GUIDELINES FOR WORKING IN A COLD ENVIRONMENT

As the body's normal heat regulating processes are overcome, the body core temperature will drop. At a body core temperature of 35°C (95°F) body functions become depressed, and below 30°C (86°F) the body functions are critically reduced.

The first step in treatment is to remove the victim from the cold by providing shelter, removing any wet clothes and wrapping the victim in a blanket or sleeping bag. Hot liquids can be administered if the victim is awake. Avoid cigarettes and alcohol **completely**, which will only worsen the condition.

Placing the victim in a sleeping bag may not be enough since the victim's body is not generating sufficient heat on its own. An external heat source such as a fire or body heat from others may be required. Care must be taken not to provide too much heat too quickly since this may result in the sudden dilation of surface blood vessels, which will rob the essential internal organs of blood and may trigger a fatal collapse of essential organ(s) functions.

Frostbite – A condition in which skin tissue, exposed to extreme cold, freezes. Hands and feet are most susceptible because of their distance from the body core and the tendency of protective clothing to be compressed or restrict blood circulation. Ears, nose and cheeks are also highly susceptible because they are frequently left unprotected.

Frost nip is the only type of frostbite that can be effectively treated in the field. If sudden blanching of the skin is noticed promptly, it can usually be treated effectively by firm steady pressure of a warm hand (no rubbing!) or by blowing warm breath on the spot until it returns to normal colour or, in the case of fingers, by holding them under a warm armpit or against the skin in the crook of the neck. In the case of toes it is necessary to remove footgear and re-warm them by applying heat at or near body temperature. Placing the frozen toes against the bare stomach of a companion is an effective means of re-warming.

Superficial frostbite involves only the skin or tissue immediately beneath it. The area appears white or waxy. After re-warming, the area will first become numb, mottled blue or purple and then swell, sting and burn. In more severe cases blisters will occur beneath the outer layer of skin in 24 to 36 hours.

Deep frostbite is more serious, extending into deeper tissue. It is usually accompanied by huge blisters, which may take from three days to a week to develop. General swelling of the area will occur and may last for a month or more. In both cases, blisters will dry up, blacken and slough off, leaving a thin layer of new skin that is red in colour and extremely sensitive to cold. In some cases the sensitivity is permanent. If not treated properly, major tissue damage may occur which may be aggravated by infection.

In all cases of true frostbite every effort should be made to remove the injured person to a hospital where re-warming of the injured area can take place under controlled conditions. Inadequate re-warming followed by re-freezing can result in considerable damage to the affected area. If it is not possible to speedily evacuate the injured person to an hospital, then it is generally preferable to leave the injured part frozen until hospital conditions can be achieved and maintained. Under no conditions should an injured person with re-warmed feet be permitted to walk since this will result in serious tissue damage. In fact, less damage will be done walking on frozen feet than by walking on thawed feet.

If the casualty is unable to reach a hospital and a doctor is not available, it may be advisable to consider re-warming. This should only be attempted in a warm, secure location such as a maintenance camp. The frozen part can be thawed by immersing it in the largest possible vessel of water, warmed to a temperature between 10°C and 15°C (50°F and 59°F), which is then warmed by 5°C (9°F) every five minutes to a maximum of 40°C (104°F). The temperature is critical and great care must be taken to ensure that the water never exceeds this range. The vessel should be large enough to allow water to be added without having to pour it directly on the injured part and to ensure that the part itself does not cool the water. Following re-warming the injured part must be protected from further injury either from exposure to cold or from rubbing or rough treatment.

If pain becomes a problem then acetaminophen such as Tylenol in normal doses can be administered to the injured person. Other painkillers should be avoided in order to ensure that the healing process is not adversely affected.

Clean the injured part thoroughly as soon as re-warming has been completed, using a mild, non-alcoholic antiseptic or very mild soap — administered with thoroughly boiled and cooled water. Don't rub or scrub, rather dab off dirt gently with sterile absorbent cotton, facial tissue or the softest available cloth (also boiled). Be sure not to use antiseptics involving alcohol, as they may be very painful but are also liable to do further damage to delicate tissues.

Ultimate success in the treatment of frostbite largely depends on two factors: First, the exercise of extreme care during and after re-warming so that the delicate injured part is not further damage in any way; and, second, the prevention of infection, which becomes the paramount issue from the time of re-warming to the conclusion of treatment.

3.0 ICE CAPACITY AND TESTING

3.1 Introduction

Construction of ice bridges and ice roads has unique safety hazards because of the ever-present danger of an ice failure. To reduce this risk for those working on the road as well as for the travelling public, strict attention must be paid to testing of the ice to ensure that it is capable of supporting the loads to which it is subjected. The following section provides guidelines for testing of ice thickness and for determining the capacity of the ice to carry loads.

3.2 Safety Procedures

Each year before the winter or ice road construction season begins, your supervisor must organize a meeting with all ice/winter road construction employees to review and discuss safety procedures for ice road construction contained in this guide.

The GNWT supervisor must attend the contractor's information meeting to ensure that an appropriate review is done.

The GNWT supervisor or contractor's supervisor must have regular safety meetings with all respective ice/winter road employees during the construction phase. Minutes of the meeting must be produced and a copy provided to the GNWT Regional Superintendent within five working days following the meeting.

All ice/winter road workers are responsible for understanding and following the guidelines contained in this guide. The GNWT supervisor shall ensure that GNWT employees follow the procedures and practices of this guide through periodic work site inspections.

The GNWT supervisor shall ensure that contractors follow the guidelines contained in this guide through periodic inspections and the review of the contractor's minutes of safety meetings.

3.3 Ice Testing

The work crew supervisor is responsible for supervising/measuring the ice thickness.

Test crewmembers must wear an approved flotation suit, as described in Section 4.5 of this guide, when measuring initial ice thicknesses and until the ice thickness is more than 18 centimetres thick throughout the entire work area.

Do not work alone when taking initial ice thickness measurements or during the ice/winter road construction stages. Always use the "buddy system".

The lead tester must wear a safety harness, as described in Section 4.5 of this guide, attached to a ten (10) millimetre thick polypropylene rescue rope approximately 30 metres long that is held by trailing crewmembers.

Workers on foot are not to proceed onto ice that is less than 10 centimetres thick for any reason. Snowmobiles must have a minimum of 15 centimetres of ice and cars or light trucks less than 1,600 kilograms in weight must have at least 20 centimetres of ice before proceeding. The use of extremely light tracked or even floating vehicles are highly recommended for use in the early stages of ice road construction. Vehicles such as the "Badger" have a low bearing pressure, protect the operator from the elements and will float if ice breaks under them. All efforts to add safety and security should be pursued by the supervisor.

An ice chisel or needle bar may be used to test ice up to 30 centimetres thick. An auger should be used for ice more than 30 centimetres thick. Ice thickness must be tested before any workers or vehicles are allowed on the surface. If ice thickness is less than 10 centimetres test crewmembers should vacate the area immediately.

Measurements should be taken using an ice thickness measuring stick, which has a foot to hook onto the underside of the ice. This eliminates visibility problems caused by poor light or loose ice obstructing the view of the hole.

The GNWT supervisor or contractor's supervisor shall ensure that the gross vehicle weights of all vehicles used for working on ice are posted in clear view on both the outside and inside of the vehicle for the operator's reference. Workers must be aware of the weight of the equipment they are using and shall not proceed if the ice is not thick enough to support the operator and equipment, including all attachments and extra gear.

If, during testing, the measured ice thickness is less than that required to support the worker(s) and the equipment being used, back off slowly and suspend further testing. Report to the work crew supervisor.

3.0 ICE CAPACITY AND TESTING

The boundaries of the corridor where ice bearing capacity has been established, as provided in this guide, shall be clearly marked, and all workers shall ensure that working equipment stays within that corridor. Examples of types of markers include trees, poles, cones or any item that clearly delineates the boundaries. No one is to proceed beyond the boundary without the proper safety precautions.

During shift changes, workers shall report ice conditions noted during their shift to the work crew supervisor and to the crew coming on shift. The use of a thickness diagram regularly updated is recommended.

The contractor's supervisor or workers shall report any hazardous situation immediately to the GNWT supervisor for proper assessment.

The GNWT supervisor shall perform a risk assessment on any hazardous situation reported by employees or the contractor to ensure that safe working conditions are maintained.

If an area of thin ice is found but conditions are still safe, drill additional holes to determine the extent of the weak area. The thinnest ice measurement will govern the allowable loading. For example, if nine test holes read 25 centimetres and one reads 12 centimetres, the critical ice thickness will be 12 centimetres. Subsequent testing will start at the 12 centimetre test hole location.

Flooding or spray ice can increase ice thickness. Alternatively, construction activities can be postponed until the ice thickens naturally.

In general, the most frequent and intensive testing will take place early in the construction season. As ice thickness increases and crews become more confident that all thin areas have been identified, testing may be reduced. Typically, the frequency and distribution of test holes is as described in Figure 3.

FIGURE 3
Test Hole Spacing of Ice Roads and Bridges

	Preconstruction	Construction	Operation and Maintenanace		
	Initial test run	From start of construction until road is opened to traffic	This may overlap with construction activities at lower load levels		
Rivers (crossing with a flowing current)	30 metres between test holes along centre line	30 metres between test holes along alternate edges	30 metres between test holes along alternate edges If SIR is used, test holes are only required for calibration and for mapping of thin areas	Look for thin areas caused by river current	
Lakes	If within 250 metres of shore: 30 metres between test holes along centre line	If within 250 metres of shore: 30 metres between test holes along alternate edges	250 metres between test holes along alternate edges	Beware of shallow or shoal areas that could affect the ice strength due to the underwater wave caused by vehicles passing over the ice	
	If more than 250 metres from shore: 250 metres between test holes along centre line	If more than 250 metres from shore: 250 metres between test holes along alternate edges	If SIR is used, test holes are only required for calibration and for mapping of thin areas		
Slow moving rivers (Mackenzie Delta)	If within 250 metres of shore: 30 metres between test holes along centre line If more than 250 metres of shore: 250 metres between test holes along centre line	If within 250 metres of shore: 30 metres between test holes along centre line If more than 250 metres of shore: 250 metres between test holes along centre line	250 metres between test holes along alternate edges	If SIR is used, test holes are only required for calibration and for mapping of thin areas	
	Frequency – repeat as required until sufficient ice has formed to allow the start of construction	Frequency – continue testing in areas where construction is underway	Frequency – test entire route prior to raising load limits of spot test known thin areas as directed by the work supervisor		

Note: The above table indicates normal test frequency and hole spacing. Good judgement based on field experience must be used when varying from this table. In thin areas the suggested spacing must be reduced to determine their extent and severity.

3.0 ICE CAPACITY AND TESTING

If available, Subsurface Interface Radar (SIR) may be used in conjunction with test holes. This is particularly useful in identifying air bubbles, cracks and other anomalies that might be missed by the test holes. The SIR unit must be calibrated to ensure its accuracy at the start of each day, after four hours of use and whenever erratic or questionable readings are obtained.

SIR tapes are to be annotated as they are produced, indicating location and type of anomalies as well as significant thickness readings. The notes are to be initialled by the operator and submitted to the GNWT supervisor no later than the following day. These tapes will be retained until the end of the ice/winter road season.

All distances, test hole locations and SIR results must be recorded in the "Ice Thickness" log book (bound book). The records will be filed as part of the permanent record and will be made available to senior department officials. It is very important that the log book is filled out accurately and in a professional manner. In addition to the distances and thicknesses, the following information must also be recorded:

- Date of test:
- Time of start and finish;
- Names of testing crew;
- Air temperature during testing;
- The presence of wide, wet cracks and other significant cracking;
- Details of load reductions and/or traffic detours;
- Location, i.e. Peel, Mackenzie at Arctic Red, Tsiighetchic Branch at Mackenzie,
 Liard River, Mackenzie River at Fort Providence, Aklavik, Tuktoyaktuk, etc.; and
- Printed name and signature.

3.4 Ice Capacity

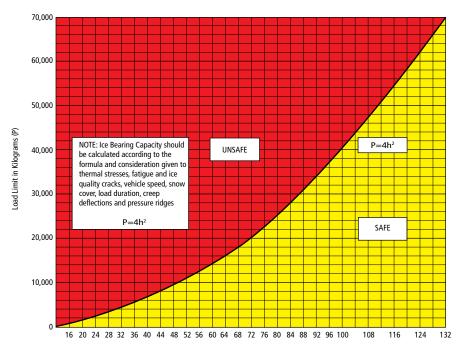
The ability of ice to support a load is dependent on a number of factors, including ice thickness, the pressure of the water below the ice as deflection develops, the way the ice formed initially, snow cover, vehicle speed and the kinds of load placed on the ice cover. The strength is different for sea and freshwater ice and is affected by the presence of cracks and sudden or extreme temperature changes. It should also be remembered that ice thickness can vary considerably from place to place and until a margin of safety is achieved, extreme caution must be exercised. Although ice can be described as BLUE, WHITE, GREY, fresh water or salt water, this guide will treat all ice the same when applying the bearing capacity formula and the safety precautions required.

Figure 4 is a graphical representation of the Gold's Formula, which is used as a guide for establishing the thickness of ice necessary to support a given load. The Gold's Formula provides an estimate of the load limit for a particular thickness of ice, below which the failure of an ice sheet is unlikely. It is not an infallible measure of the bearing capacity of an ice sheet and must be combined with field observations of other factors affecting ice strength when actual load limits are determined.

Only the formula that is found in this guide shall be used to determine ice-bearing capacity. No other formula, graphs or charts shall be used.

FIGURE 4

Ice Bearing Capacity Chart



Effective Ice Thickness in Centimetres (h)

3.0 ICE CAPACITY AND TESTING

Figure 5

Ice Bearing Capacity Chart

Golds Formula (Capacity = 4 x h²) (Height in centimetres – Capacity in kilograms)

cm (h)	Capacity	cm (h)	Capacity	cm (h)	Capacity	cm (h)	Capacity
2.5	25	37.5	5625	75	22500	112.5	50625
3.5	49	40	6400	77.5	24025	115	52900
5.0	100	42.5	7225	80	25600	120	57600
7.5	225	45	8100	82.5	27225	125	62500
10	400	47.5	9025	85	28900	130	67600
12.5	625	50	10000	87.5	30625	135	72900
15	900	52.5	11025	90	32400	140	78400
17.5	1225	55	12100	92.5	34225	145	84100
20	1600	57.5	13225	95	36100	150	90000
22.5	2025	60	14400	97.5	38025	155	96100
25	2500	62.5	15625	100	40000	160	102400
27.5	3025	65	16900	102.5	42025	165	108900
30	3600	67.5	18225	105	44100	170	115600
32.5	4225	70	19600	107.5	46225	175	122500
35	4900	72.5	21025	110	48400	180	129600

Every condition will be different - in the next few pages a number of observations will be made to assist the supervisor to make informed judgements when determining the ice bearing capacity. The presence of cracks, climatic conditions, load spacing, vehicle speeds, recent damage and presence of shoals could all affect the ultimate bearing capacity of the ice in question.

Sudden and Extreme Temperature Changes – A temperature drop of more than 20° Celsius over a 24 hour period will produce severe thermal stressing and cracking of the ice. If this occurs the road should be checked for cracks which may compromise the load capacity.

The Presence of Cracks – Any ice cover will have cracks caused by thermal contraction or movements in the ice cover. Except during spring thaw or in areas subject to fatigue, cracks do not necessarily indicate a loss in the load-bearing capacity of the ice.

Where there is an indication that a wet crack penetrates right through the ice cover, a reduction in the allowable load limit is advisable. Once a wet crack refreezes, the new ice is as strong as the original. A healed wet crack should be tested with an ice chisel, auger or a chain saw to gauge the depth of healing.

Where a dry crack over 10 centimetres wide is observed, a reduction in the maximum load limit should be considered. The decision to reduce the load limit will be based on the frequency, width, depth and intersection of the cracks (see Figure 6). Dry cracks can be repaired by filling them with water or slush.

FIGURE 6

Modification of the Ice Loading and Remedial Action for Various Types of Cracks

Type of Crack	Modification of Ice Loads	Remedial Action
Hairline Cracks	None	None
Refrozen Cracks	None	None
Non-intersecting and Intersecting Dry Cracks Non-intersecting Wet Cracks	Weight reduction to 90% of allowable should be considered based on frequency, width and intersection of cracks. Weight reduction to 75% of allowable should be considered	Fill cracks, and/or Detour around affected area, and/or
	based on frequency, width and intersection of cracks.	Spray/flood affected area, and/or Abandon existing alignment.
Intersecting Wet Cracks	Weight reduction to 50 % of allowable should be considered based on frequency, width and intersection of cracks.	

3.0 ICE CAPACITY AND TESTING

As a result of normal thermal contraction, cracks sometimes form in the middle of a road perpendicular or parallel to the direction of travel. If they remain dry they do not seriously reduce the bearing capacity of the ice. Cracks at the sides of the road and running parallel to the direction of travel indicate over-stressing (perhaps by the weight of snow deposits from clearing operations) or possible fatigue from excessive traffic. If such cracks develop, particularly if they are wet, traffic should be diverted away from the crack and, in more extreme cases, road use should be suspended until the cracks have healed.

Fluctuating water levels may produce cracks near and generally parallel to the shoreline, which can create hanging ice or pressure ridges. These cracks are often accompanied by a difference in the levels of the floating and the grounded ice. If these cracks are wet, loads should be reduced accordingly. With extreme differences in the level, bridging repair or flooding may be necessary.

Moving Loads — Deflection of ice by a moving vehicle creates stresses, which fatigue the ice when frequently repeated and in extreme cases may result in a sudden failure. The speed of the vehicle is a key factor. An empty truck travelling between 25 and 35 kilometres per hour will often cause more audible cracking in the ice cover than a fully loaded truck travelling at 10 kilometres per hour or less. Restricting the speed of heavy trucks may be necessary to protect the integrity of the ice and load capacity.

Moving loads deflect the ice sheet and create a wave in the water beneath the ice. The speed of the wave is dependent on the depth of the water, underwater obstacles such as rock outcroppings, the thickness of the ice cover and the strength of the ice. The greatest deflection and the most severe stresses occur when the vehicle on top of the ice and the wave below it are travelling at the same speed.

The moving deflection effect is critical when the water depth is less than 50 times the thickness of the ice. The critical velocity increases with water depth. Consequently, over very deep water, the deflection wave travels through the ice at a much higher velocity than a vehicle would normally achieve. Although the speed of a vehicle is not significant over deep water it becomes critical near the shore.

When a vehicle is travelling parallel to a shoreline, resonant waves reflect back through the ice. The wave pattern is critical when the vehicle weight is close to the load-bearing limit of the ice. Reflected waves are greatest when a vehicle approaches a shoreline at a right angle. If possible, roads and vehicles should meet the shoreline at a 45° angle. It is important that drivers obey the posted speed limit at all times and especially when a road meets the shoreline at a 90° angle and when a vehicle's weight is close to a maximum load limit for the ice.

Multiple Loads – Two or more moving vehicles increase deflection and stress as they approach or travel close together. Therefore, drivers should decrease speed when approaching another vehicle and should not follow other vehicles too closely. Heavy and/or tracked equipment such as a tracked dozer can also cause vibrations in the ice that add to the deflection effect.

Frequently Repeated Loads – Frequently repeated loadings will cause rutting, holes, and dry and wet cracks to form in the ice. The weakened condition of the ice may be a reason to reduce the allowable load limit. If cracks or potholes appear in the ice, the travel route may be detoured, loads reduced, the area flooded or the road closed temporarily to allow for the recovery of the damaged areas.

Long-term Loads — Long-term loads are those imposed by vehicles parked for more than a few minutes. Over a period of time the ice begins to show signs of plastic or creep failure. This mechanism for failure is significantly different, therefore, the standard load calculations do not apply. Parking of vehicles or equipment on ice that is at or near its load limits must be avoided. Also, avoid parking vehicles close together or near the edges of the ice road/bridge corridor where the snow banks are located as this area is much weaker due to the insulation provided by the snow and the constant weight applied by the snow banks.

4.0 WORKER SAFETY

4.1 Introduction

Working on ice is inherently dangerous. Failure can occur so quickly that rescue can be very difficult, dangerous or even impossible. It is, therefore, imperative that all workers are aware of the potential danger and take the necessary steps to protect themselves and others. Workers should observe all Occupational Health and Safety Regulations as well as other standards, procedures and practices relating to their work.

4.2 Ice Conditions

- Seek approval from the work crew supervisor before going on any winter road or ice road
- Every effort must be taken to know and understand the local conditions.
- Every operator must be aware of the required ice thickness for his/her vehicle.
- The ice must be a minimum of 15 centimetres thick before a snowmobile or 20 centimetres thick before a car or light truck may travel on the ice.

4.3 Weather Conditions

- Evaluate weather and ice conditions prior to venturing onto the winter road and follow Chapter 2 Guidelines for Working in a Cold Environment. Dress and be prepared for the worse case scenario. You can always take a layer off.
- Cancel or postpone travel on a winter road if the weather is unsuitable or if deterioration of the ice is apparent.

4.4 Procedures

- On winter road construction (over land), a "buddy" system can be used. This
 means that a person working on winter roads will be able to contact another
 person by radio or telephone on an open channel at all times. Wherever possible,
 workers should not be left to work alone. Workers on ice are not allowed to work
 alone.
- If machine operators are working alone, they will radio the work crew supervisor
 at the beginning of each shift and give their location and direction of travel.
 During the shift, they are required to call in as shown in the guidelines presented
 in Figure 2.
- Observe and report hazardous conditions.

4.5 Protective Clothing and Safety Equipment

- A lifeline (i.e. 10 millimetre thick polypropylene rope) must be used by workers who are doing the initial testing of an area or suspect that they may be near the load limits given the equipment they are using (i.e. snowmobile or pickup with trailer mounted auger). The lifeline should be at least 30 metres in length and should be held by another worker rather than attached to a piece of equipment. The line must be inspected for damage before and after each use. The lead worker during testing must wear a CSA approved harness to which the lifeline is secured.
- All GNWT Department of Transportation workers on the ice during initial ice road
 construction must wear a Canadian Coast Guard (CCG) approved flotation suit.
 The department has specified the Mustang Survival, Anti-Exposure Coverall and
 Worksuit model MS2176 and Mustang Survival Coverall model MS-185 as an
 acceptable flotation suit for their workers. All contractors and/or other workers
 on the ice during initial ice road construction are strongly encouraged to adopt
 the same Canadian Coast Guard (CCG) approved flotation suits as the GNWT
 Department of Transportation.
- All workers on the ice during the initial ice road construction shall also carry a set
 of ice rescue picks on them while on the ice.
- Inspect all personal safety equipment daily.
- If operating a vehicle, obtain an emergency kit as described in Section 2.3 of
 this guide. Store it securely in the vehicle to protect it from damage, theft and
 direct sunlight. If items from the kit are used, they should be replaced or the kit
 exchanged for a fully serviced one at the end of the shift.
- Fire extinguishers, first aid kits and warning devices such as flares, reflectors and flags are mandatory on all vehicles used on winter road construction and maintenance.
- Wear warm clothing and footwear appropriate for the conditions encountered or anticipated.

4.0 WORKER SAFETY

4.6 Vehicles and Equipment

- Each piece of equipment will be weighed and the minimum ice thickness necessary to support it will be calculated according to the formula presented on the Ice Bearing Capacity chart (Figure 4) in Section 3.4 of this guide. In communities without access to a weigh scale, equipment will be weighed with portable scales. If neither permanent nor portable scales are available, weight information given by the manufacturer can be obtained from the Central Repair Facility in Hay River. The gross vehicle weight (GVW) of all motor vehicles used for working on ice will be posted in clear view on the outside and inside of the vehicle for the operator's reference. Workers must be aware of the operating weight of the equipment they are using and shall not proceed if the ice is not thick enough to support the weight of the equipment and operator plus any additional gear or attachments.
- Equipment operators will decide whether the doors and/or hatches on equipment
 working on ice will be removed or lashed open during the construction phase.
 Wherever practical, canopies will be removed and panic bars or hatches will
 be installed on equipment doors so that operators can quickly exit in case of
 breakthrough. At the first sign of breakthrough the operator is to abandon the
 vehicle immediately.
- Use of seat belts is optional when travelling on ice during the construction phase.
- Tools, equipment and materials must be stowed neatly in the vehicle.
- Visibility from the vehicle should be unobstructed (i.e. clean windshield).
- No equipment will be used on winter roads if it is not in proper running order.
- Vehicles operating close to the load-bearing capacity of the ice during construction must not exceed 20 kilometres per hour.
- If required, materials and equipment will be repaired, replaced or modified. This may include the installation of snowploughs and wings.
- Operators will be responsible for the care of their equipment and for reporting any equipment problem to their work crew supervisor. The work crew supervisor will arrange for repairs.
- An operational check of all equipment will be done and proper training for all personnel carried out.

4.7 Summary of the Key Dos and Don'ts:

Do:

- Ensure sufficient ice capacity for the heaviest unit to be used on the delineated ice road corridor.
- Open up and clear a specific section to full width in one shift to avoid the refreezing of windrowed snow. (Compacted snow and disturbed snow freezes very hard and requires increased effort to move again.)
- Keep the windrow height low (i.e. less than one metre) and spread out to reduce the overloading of the ice by the windrow and its ability to catch a lot of drifted snow.
- Plow snow berms off the main ice road to catch drifting snow in areas where
 drifting is a problem. (Remember the snow catchment area behind a berm is
 approximately 30 times as long as the height of the berm so get them back far
 enough from the main road.)
- To promote rapid ice growth, remove all loose or fresh snow that insulates the ice sheet or compact the snow to remove air and insulating value from the snow cover
- If flooding, use multiple "lifts" of water that will freeze solidly in 12 to 24 hours. (This reduces "shell" ice from forming.) Keep traffic off flooded areas.

Don't:

- Do not park heavy equipment on the ice or near the snowbanks overnight or for extended periods the ice will "creep" and failure can occur.
- Do not make multiple passes over the same area of ice within a short period of time (i.e. one hour). This can cause ice fatigue and ice failure.
- Avoid opening new road when temperatures are very cold (-40). This causes
 extreme internal stress in the ice sheet. (Ice needs some time to normalize the
 internal stress.) This is not that critical if there is a lot of over capacity with the ice
 thickness.
- Avoid loading the ice to its limits when temperatures are very cold or when there has been a sudden decline in air temperature.

4.0 WORKER SAFETY

The Department of Transportation has introduced the VITAL program to act as a safety message for all personnel who work on or are responsible for working on and around ice road and ice bridge construction.

VITAL stands for:

V	VEHICLE	All operators and supervisors must be aware of the vehicle weight, ice required to support it, the characteristics and capabilities of the vehicle, ensuring it is in good repair and the most effective escape plan.
ı	ICE	Everyone working on or near the ice needs to know the ice thickness, the bearing capacity, the conditions and any special observations or notes. An ICE LOG is to be kept.
T	TASK	All workers are to know exactly what is expected of them while they are working or operating equipment on the ice.
A	ASSEMBLE the proper equipment	Everyone working on or near ice is to have the proper personal protective gear and tools to accomplish their task. Radios, ice chisels/augers, ice profilers, vehicles, ropes, floater suits, etc. are to be in good working order and tested prior to deploying on the task. If in doubt, ask.
L	LEARN	Successfully working on ice takes experience, knowledge, training and skill. Learn the techniques and procedures and keep you and your team alive.

5.0 PUBLIC SAFETY

5.1 Introduction

All GNWT Department of Transportation employees involved in ice road construction, in addition to their regular duties, are responsible for monitoring road conditions. If an employee sees a situation that is a danger to the public, they have the authority and responsibility to take immediate action to correct the problem. For example, if wet cracks and overflow conditions are observed at a stream crossing, an employee has the authority to detour traffic or temporarily close the road.

Winter roads in the north are somewhat unique in that even minor accidents or delays have the potential to create a life-threatening situation. Anything, therefore, that interferes with the steady flow of traffic is a public safety concern.

5.2 Construction Techniques

Hazards created by drifting snow can be reduced by blading out snow guards approximately 30 metres from each side of the road surface. The guards will trap blowing snow before it reaches the road surface. This will keep the road open longer during drifting conditions and also reduce maintenance costs. Care must be taken to ensure that the ice beyond the edge of the cleared road surface is sufficient to support the equipment being used.

When constructing the road, a narrow lane may be initially compacted to allow the movement of equipment to locations within the limits of the project. Wherever possible, however, the full width of the road should be cleared in order to reduce the possibility of thermal cracks and the development of pressure ridges.

5.3 Road Inspections

While all personnel have a responsibility to identify potential hazards, this is a major part of the activities of supervisors, foreman and superintendents. Regular road patrols are carried out during both the construction and maintenance phases of the winter road season. Once identified, problems must be either corrected or isolated from the traffic. The travelling public must also be promptly advised of changes to road conditions that might affect their ability to complete a trip.

When conducting road inspections:

Look for snow drifting, overflow, wet or dry cracks and icing. If a hazard is
discovered, place warning devices such as flags, delineators or flares. If possible,
remedial action should begin at once. Warning signs must be set if the repair will
take some time to complete.

5.0 PUBLIC SAFETY

- Check for missing or damaged traffic signs and make immediate repairs or replacements.
- Check for and remove debris or dead animals from the roadway.
- Report the unauthorized erection of signs or the construction of accesses to the Regional Highway Superintendent.
- Help stranded motorists.
- Report abandoned vehicles to the RCMP or the Traffic Enforcement Officer.
- Check for and report spills of oil or dangerous goods.
- Inspections should be done once a week on snow roads, twice a week on ice roads and daily on ice bridges.

5.4 Highway Patrols

Traffic Enforcement Officers are responsible for ensuring that vehicles comply with the Motor Vehicles Act and its regulations. Inspections of transport trucks are especially important when the load limits on the ice roads are not yet up to those set for the all-weather highway system. A truck that is legally loaded for the primary highway system may exceed the load limit for an ice road or crossing and cause an ice failure

If construction/maintenance personnel believe that trucks are operating in excess of an ice crossing load limit, they should notify Department of Transportation personnel of the need for spot inspections. The Officer assigned to enforcement duty on a winter road will be equipped with portable scales to weigh the truck traffic.

5.5 Signs and Barricades

Winter road traffic signs are used to declare the road open or closed, to direct traffic to destinations along the road, to post load limits and to warn motorists of potential hazards. The standards of signing are somewhat different from those on permanent all-weather roads because conditions on seasonal roads are more subject to change. Traffic signs must be adjusted to meet these changing road conditions.

During Construction – While the winter road is under construction and not yet open to the public, barricades and signs will be posted at the entrance to the winter road stating that it is closed. Regular checks and patrols will be conducted to ensure that all barricades are in place at all times. If barricades have been moved or vandalized, the RCMP having jurisdiction in the area should be notified.

At the end of the season the signs and barricades should be reinstalled and the closure monitored and enforced.

Entry Signs – Signs must be posted at each major river crossing and at the entrance to all winter roads on the NWT Highway System, which clearly indicates whether the road or crossing is open or closed, the maximum allowable weight and the phone number to call for road information.

At the entrance to the winter roads, signs must also be posted that advise motorists to carry chains and survival gear and indicate that there are no services available. On the Mackenzie Delta ice roads, in the Inuvik/Tuktoyaktuk area, additional signs will be posted to caution motorists to remember that they are driving on ice.

At the entrance to the major ice bridges, motorists will be advised to maintain a distance of 400 metres from other vehicles and a maximum speed of 20 kilometres per hour.

Roadway Markers – Markers such as flagging and trees will be installed to delineate the edge of the roadway. Additional traffic control devices such as drums and barricades can be used to direct the flow of traffic.

Regulatory and Advisory Signs – Speed limit signs should be posted as required, taking into account the type of road surface. For example, the upper limit for the Tuktoyaktuk/Aklavik/Inuvik ice road is 70 kilometres per hour because the surface is entirely of ice.

Signs should also be posted to indicate the distance from the next community. These signs and the speed limit signs should be posted at 50 kilometre intervals, near communities and at intersecting roads.

Standard warning signs should be posted where required. For example:

- WA-1 90° Curve (left or right)
- WA-8 Checkerboard (left, right or both directions)
- WD-A43 Diversion
- WD-A44 Detour
- WD-103 Detour Next kilometres
- WD-106 One Lane Traffic

On short detours, traffic cones or drums may be sufficient.

Barricade lights may be installed in an emergency to attract attention to a sign message or to identify a particular hazard or obstruction. Lighting devices should be positioned so as not to blind traffic with their glare. Flashing devices do not provide good illumination and should not be used by themselves to channel traffic.

5.0 PUBLIC SAFETY

5.6 Temporary Road Closure

Section 23 of the Public Highways Act authorizes the closure of portions of a highway for the purpose of construction or maintenance. The department routinely closes sections of highway if snowstorms or drifting snow reduce visibility to the extent that travel is hazardous.

When a road is closed, proper signs must be installed to inform the public. The same standards apply to temporary and permanent road closures. In addition, it is important to notify the local radio stations so that public service announcements advising of the closure can be made.

5.7 Public Information and Communications

The department makes regular public announcements on current road conditions through public service announcements on local radio stations, messages on a toll-free telephone line, on the GNWT web site and communication with major transportation companies. Any changes in road conditions must be promptly communicated to the department's Regional Superintendent and/or Highway Superintendent to ensure that information provided to the public is up to date and accurate.

6.0 ACCIDENT RESPONSE

6.1 Introduction

In spite of taking all reasonable safety precautions, accidents can happen. Whether such accidents involve the public or government employees or private contractors, it is likely that those involved with highway construction and maintenance will be among the first on site and will be required to respond.

Similarly, regardless of who is involved in the accident or its severity, it is important to report it to the correct individuals so that follow-up action can be taken and so that information and statistics are available to those with responsibility for establishing design/construction standards and operational guidelines. It is thorough this process that ongoing problems are identified and corrected.

6.2 Initial Response

In the event of an accident:

- The first priority after aiding the accident victim(s) is to secure the site to ensure that no one, including yourself, is in danger from further accidents. For example, in the case of an ice failure, warning signs, flares or barriers must be used to warn others away from the failure (hole). In an area where visibility is poor and traffic is likely, warnings must again be provided to ensure that approaching vehicles do not endanger the people and equipment that are providing assistance at the accident scene.
- In the case of an ice failure, approach with extreme caution. No attempt at rescue must be made if it puts the rescuer at risk.

THINK BEFORE YOU ACT.

- Determine if anyone is in immediate danger. A rescue effort may be required if a
 person is trapped in a vehicle and the vehicle is in an unstable position. Similarly,
 an injured person may be in need of immediate medical attention. Deal with life
 threatening situations or injuries immediately.
- At the first opportunity, radio/telephone (Sat phone) for assistance. Provide the following information:
 - i. Location:
 - ii. Brief description of the accident;
 - iii. Description of injuries;
 - iv. Assistance required such as air evacuation, ambulance, road closure, additional personnel or equipment;
 - v. Request that the RCMP be notified; and
 - vi. Request that the Regional Superintendent and/or District Highway Superintendent be notified.

6.0 ACCIDENT RESPONSE

- Stabilize casualties, being sure to provide as much warmth and shelter as possible.
- Maintain security of the site and stability of victim(s) until assistance arrives, or transport victim(s) to the nearest facility where medical assistance or transportation is available.

Important – There is always a danger in moving an accident victim. This danger must be weighed against the danger associated with the delay in receiving professional medical treatment and the lack of adequate warmth and shelter. Whenever possible use your radio or telephone (Sat phone) to seek professional medical advice before making the decision to move the casualty.

6.3 Follow-up and Reporting

In the event of death, serious injury or major equipment loss:

- Prevent the destruction or removal of evidence at the accident scene if possible.
 The site should remain secured until the Regional or Area Superintendent of Transportation or the Director, Highways and Marine Division, authorizes restoration of the site and recovery of the equipment.
- If there are witnesses to the accident, they should be interviewed while events are still fresh in their minds. Written statements should be obtained.
- Try to establish the cause of the accident.
- Take photos and make a sketch, complete with measurements of the accident site.
- Within 24 hours, report the accident to Workers' Compensation Board (WCB) and provide a written accident report to the Regional Superintendent, which includes:
 - i. Date and time of accident;
 - ii. Persons involved;
 - iii. Vehicles or equipment involved;
 - iv. Description of accident;
 - v. Weather conditions at the time of the accident;
 - vi. Road conditions at the time of the accident: and
 - vii. Action taken.

Note: WCB also requires an accident report within 72 hours (three days).

In the event of minor injury or equipment damage:

- Minor injuries to department employees are to be reported to the appropriate Administrative Officer within 24 hours. The injured person and their supervisor are responsible for filing reports with the WCB within 72 hours (three days).
- Minor government or contracted equipment accidents are to be reported to the Central Repair Facility in Hay River within 24 hours.

6.4. Other Reporting Responsibilities

It is the responsibility of the GNWT Department of Transportation Regional Superintendent to immediately report accidents involving death and serious injury to:

- Assistant Deputy Minister or the Deputy Minister, Department of Transportation ((867) 920-3460)
- Supervisor WCB Prevention Services within 24 hours, Workers' Compensation Board (1-800-661-0792)
- Manager, Insurance and Risk Management, Department of Finance ((867) 873-7307)
- Manager Public Affairs and Communications, Department of Transportation ((867) 873-7712)
- Workplace Safety Program Coordinator, Department of Transportation ((867) 920-8809)
- Director, Highways and Marine Division ((867) 873-7800) or Assistant Director, Highway Operations ((867) 874-5021), Department of Transportation

APPENDIX - A

Safety Act

The Northwest Territories Safety Act and Regulations are the legal requirements for governing safe work sites in the Northwest Territories. The following sections of the NWT Safety Regulations are especially relevant to the construction and maintenance of winter roads. (The reader should refer to the regulations for updates or changes.)

Section 3 – "Subject to Section 4, every employer shall:

- a) Initiate an accident prevention program and direct effective ways and means
 of preventing work injuries, including the promotion of relations between
 management and the employees that will encourage attitudes and desires
 favourable to an accident-free operation;
- b) Encourage the participation of his employees in the implementation of accident prevention measures;
- c) Organize accident prevention committees;
- d) Maintain a record of accidents and injuries, including the causes of the accidents and the action taken to prevent similar incidents;
- e) Conduct regular inspections of all structures and places of employment and review work practices at intervals that will ensure that safe working conditions are maintained;
- f) Correct any condition that constitutes a hazard to workers and ensure that no person other than those workers necessary to correct the condition could be exposed to the hazard;
- g) Maintain records and statistics, including inspections and accident investigations sufficient to indicate the effectiveness of the accident prevention program; and
- h) Initiate the prompt investigation of every accident to determine the action necessary to prevent a recurrence."
- **Section 4** "An accident prevention program shall be initiated and maintained by every employer with 10 or more workers in any one area or settlement."
- **Section 9** "An employer shall ensure the adequate instruction of each worker in the safe performance of his duties."
- **Section 10** "A supervisor is responsible for the proper instruction of workers under his direction and control, and for ensuring that their work is performed without undue risk."

Section 51 - "(1) Where a worker is exposed to the risk of drowning he shall wear a device having a buoyant effect sufficient to maintain his head above water without any effort on his part.

(2) The devise referred to in subsection (1) shall not be dependent upon manual manipulation to produce the buoyant effect and shall be acceptable the Chief Safety Officer."

Section 57 - "(1) Every worker shall wear a lanyard, life-line and safety-belt or body-harness where that worker is working:

- a) at an elevation 3 metres or more above grade or floor level;
- b) over a pit, a shaft, or operating machinery; or
- c) where a fall could result in drowning, and where it is impractical to provide adequate work platforms or guarding.
- (2) An employer shall provide a separate lanyard, life-lie and safety-belt or body-harness to each worker to whom the conditions specified in subsection (1) apply..."

Section 211 – "(2) A safe means of access shall be provided to the operating platforms, cabs and bodies of mobile equipment."

Section 215 – "(3) Notwithstanding subsections (1) and (2), mobile equipment listed in Section 210 may be exempted from the requirements of these regulation in respect of ROPS (rollover protective structure) where it can be shown to the satisfaction of the Chief Safety Officer where the vehicle will be used under circumstances where no rollover hazard will exist."

APPENDIX - B

Emergency Preparedness

Emergencies, incidents and injuries can occur at any time and without warning. Being prepared to handle emergencies is an individual as well as an organizational responsibility. Supervisors are responsible to ensure that assessment of emergency preparedness of the workplace is carried out and that employees are aware of safety procedures and emergency protocols. Rehearsals and "walk through" exercises are recommended to ensure everyone knows their task during an emergency. When the real thing happens — it happens fast, without warning and usually at the worse possible time.

The first priority of employees involved in any emergency situation is the safety and welfare of themselves, their co-workers and the public. Emergency response services are generally obtained through the "local emergency service". It is critical that during an emergency, the lines of communication be kept clear. Other unnecessary communications must be avoided. Once the first priority has been looked after, secondary priorities include the protection of property and the environment, preservation of evidence and the identity of witnesses/participants. Employees involved in or witnessing an emergency incident should report the event to their supervisor/manager. They should refrain from discussing the incident with persons other than their supervisor, manager, Department OHS, Risk Management and Emergency Services Personnel (fire, ambulance, police, etc.). All other requests for information should be referred to the department's Manager of Public Affairs and Communications or departmental spokesperson.

QUICK REFERENCE CHARTS

Wind Chill Calculation Chart

	Air Temperature (° C)												
		5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
Wind Speed (kph)	5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
	10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
	15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
	20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
	25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-68
	30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-70
	35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-72
	40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-73
	45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-74
	50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-75
	55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-76
	60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-77
	65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
	70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80

Ice Bearing Capacity Chart Golds Formula (Capacity = $4 \times h^2$) (Height in centimetres – Capacity in kilograms)

cm (h)	Capacity	cm (h)	Capacity	cm (h)	Capacity	cm (h)	Capacity
2.5	25	37.5	5625	75	22500	112.5	50625
3.5	49	40	6400	77.5	24025	115	52900
5.0	100	42.5	7225	80	25600	120	57600
7.5	225	45	8100	82.5	27225	125	62500
10	400	47.5	9025	85	28900	130	67600
12.5	625	50	10000	87.5	30625	135	72900
15	900	52.5	11025	90	32400	140	78400
17.5	1225	55	12100	92.5	34225	145	84100
20	1600	57.5	13225	95	36100	150	90000
22.5	2025	60	14400	97.5	38025	155	96100
25	2500	62.5	15625	100	40000	160	102400
27.5	3025	65	16900	102.5	42025	165	108900
30	3600	67.5	18225	105	44100	170	115600
32.5	4225	70	19600	107.5	46225	175	122500
35	4900	72.5	21025	110	48400	180	129600

Public Works and Government Services Canada Project No. R.057573 Environmental Site Remediation Gordon Lake Group Sites, NT

ISSUED FOR TENDER APPENDIX D Page 1 of 1

APPENDIX FLYSHEET

APPENDIX D – Photographs



Photo 1: Overview of the Waste Rock Area (AEC 8 and 9) at Burnt Island.



Photo 2: Overview of the Shaft Area at Burnt Island.





Photo 3: Overview of the Portal at Burnt Island.



Photo 4: Overview of the Mill Area at Burnt Island.



Photo 5: Mine Shaft in AEC 1 at Burnt Island.



Photo 6: Headframe in AEC 1 at Burnt Island.





Photo 7: Soil sample BUR_01_SO_2015_007 located adjacent to old drill rig in impacted area located northwest of the shaft in AEC 1.



Photo 8: Soil sample BUR_01_SO_2015_003 collected from the area southeast of the shaft.





Photo 9: Waste rock pad in the AEC 9 at Burnt Island.



Photo 10: Soil sample $BUR_08_SO_2015_005$ and 007 located in AEC 8.



Photo 11: Soil sample location BUR_08_SO_2015_002 located in AEC 8.



Photo 12: Soil sample BUR_09_SO_2015_002 at Burnt Island.



Photo 13: Soil sample BUR_11_SO_2015-003 within the Old Mill Area (AEC 11).



Photo 14: Mill Building at in the Old Mill Area at Burnt Island.





Photo 15: Former borrow source location at Burnt Island.



Photo 16: Asbestos containing break pad located in the Mill Building at Burnt Island



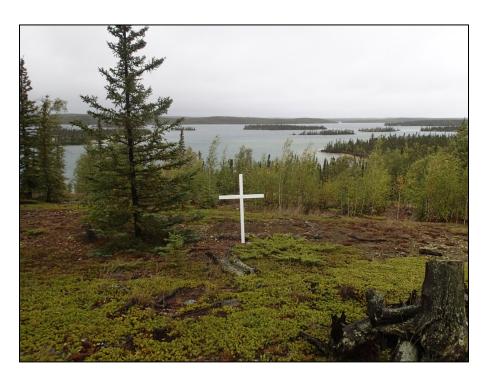


Photo 17: Burial location on Burnt Island.



Photo 18: Tailings Impoundment at Burnt Island.



Photo 19: One of the old cabins in the Knutsen Camp area at the Burnt Island mine site.



Photo 20: Access trail between the Shaft Area and the Tailings Area.



Photo 21: Metal debris identified on edge of waste rock in AEC 9.

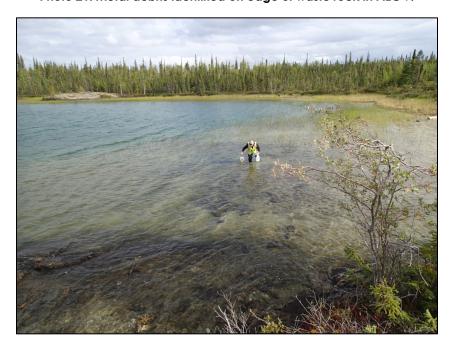


Photo 22: Hyalella sampling location in AEC 11 in the Mill Area at Burnt Island.



Photo 1: Overview of the Tailings Containment Area at Camlaren.



Photo 2: South Muir Island at Camlaren.



Photo 3: Overview of the concrete berm on the south portion of Muir Island.



Photo 4: Soil sample CAM_1_SO_2015_002 collected from AEC 1.



Photo 5: Soil sample CAM_2_SO_2015_001 collected from AEC 2 at Camlaren.



Photo 6: Soil sample CAM_3_SO_2015_006 located at Camlaren.



Photo 7: Hand augering within the tailings containment area (AEC 6) at Camlaren.



Photo 8: Fireplace located in AEC 7 at Camlaren.



Photo 9: Soil sample CAM_8_SO_2015_011 located in AEC 8 at Camlaren.



Photo 10: Typical scattered debris on-site.





Photo 11: One of the abandoned site buildings on-site. Log cabin at the North Cabin Area.



Photo 12: Vent Raise located on the southern portion of AEC 1.





Photo 13: Concrete structure (in deteriorating condition) on the southern portion of Muir Island.



Photo 14: Dock located on the west side of Muir Island.





Photo 15: Mill Pad at Camlaren



Photo 16: Electromagnetic survey being completed in AEC 1 at Camlaren.



Photo 17: Hoist Pad at Camlaren.



Photo 18: Waste rock piles at Zenith Island.



Photo 19: Partially buried metal debris located in AEC 8B.



Photo 20: Hyalella sampling location, north of the Tailings Containment Area.





Photo 21: Remnants of former dock and potential barge landing location, facing northeast towards southwest end of Muir Island.



Photo 21: Partially buried debris located in AEC 9.





Photo 1: North shaft mine opening in AEC 10 in the Mill Area at Goodrock Mine.



Photo 2: Background soil sample location at Goodrock.





Photo 3: The south shaft in AEC 10 in the Mill Area at Goodrock Mine.



Photo 4: Trench located north of AEC 1 at the Camp Area at Goodrock Mine. Note the presence of waste rock adjacent to the trench.





Photo 5: Remains of a building at AEC 3 in the Camp Area at Goodrock.



Photo 6: Remains of a building south of AEC1 at the Goodrock mine site.





Photo 7: Tin can dump at AEC 3 at the Camp Area at Goodrock Mine.





Photo 1: Overview of the eastern portion of the Portal Area at Kidney Pond.



Photo 2: Soil sampling within AEC 5 at the 1983 Camp at Kidney Pond.





Photo 3: Dock at the 1983 Camp at Kidney Pond.



Photo 4: Scattered debris located on the shoreline of Gordon Lake near the 1939 Exploration Camp.





Photo 5: Remains of a building structure at the 1939 Camp.



Photo 6: Portal located in the Portal Area at Kidney Pond.





Photo 7: Surface soil sample location within AEC 17.



Photo 8: Overview of AEC 16 at Kidney Pond.





Photo 9: Trench located north of Kidney Pond (north of AEC 27).



Photo 10: Surface water located in AEC 16.





Photo 11: Overview of Kidney Pond.



Photo 12: Rock sample location from AEC 17 (KID_17_RO_2015_004).





Photo 13: Trench located west of the Portal at Kidney Pond.



Photo 14: Waste Rock located in AEC 17 at Kidney Pond.



Gap Assessment Report Kidney Pond Mine Site (SM 474)



Photo 15: Battery located in AEC 17 at Kidney Pond.



Photo 16: Waste rock sample location at AEC 17 (KID_17_SO_2015_003).





Photo 1: Overview of the 1938 Camp Area.



Photo 2: Charred building remains in the 1938 Camp Area.





Photo 3: Soil sample MUR_1_SO_2015_001 at the 1938 Camp Area.



Photo 4: Overview of the trench area looking north towards Murray Lake.



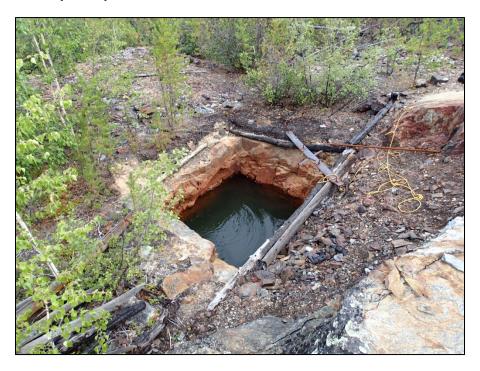


Photo 5: Prospect shaft located between AEC 4 and AEC 6 at the Murray Lake mine site.



Photo 6: Soil sample MUR_6_SO_2015_002 from AEC 6 in the Trench Area.





Photo 7: Water filled potential prospect shaft at AEC 3 at Murray Lake mine site.



Photo 8: Trench in AEC 6





Photo 9: Exploration trenches in the northern portion of AEC 3 facing north.



Photo 10: Debris scattered throughout the site.



Gap Assessment Report Storm Property Mine Site (SM 471)



Photo 1: Overview of the Storm Property site.



Photo 2: South mine shaft at Storm Property.



Gap Assessment Report Storm Property Mine Site (SM 471)



Photo 3: Soil sampling in AEC 1 at Storm Property.

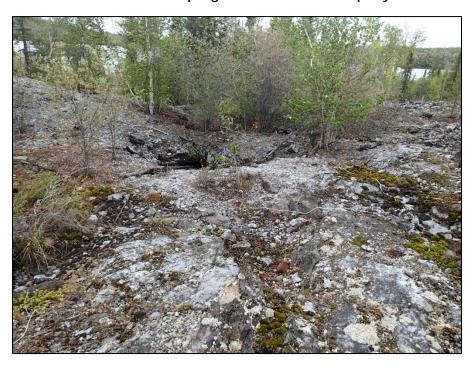


Photo 4: Overview of the shaft looking southwest.



Gap Assessment Report Storm Property Mine Site (SM 471)



Photo 5: Background soil sample location. Note presence of veining on bedrock.



Photo 6: Thin veining on bedrock at background sample location.



Gap Assessment Report Survey Photo Log



Photo 1: Placed survey control points



Photo 2: Found survey control points.





Photo 3: RTK Base Station – North Gordon Lake (GPS Coordinate: Lat: 63.089964, Long: -113.135749)





Photo 1: Overview of Treacy mine site looking northwest.



Photo 2: East trench located in AEC 5 at the Treacy mine site.





Photo 3: Red painted wood located in the east trench at Treacy.



Photo 4: Red painted wood located in AEC 3 at Treacy.





Photo 5: West trench located in AEC 5 at the Treacy mine site. Note the presence of mill sediments at the base of the excavation.



Photo 6: Rock sample collection site in the west trench in AEC 5 at Treacy.





Photo 7: Other trench located in AEC 5 at the Treacy mine site.



Photo 8: Former Mill Building at the Treacy mine site.





Photo 9: Soil sample located in AEC 6 at Treacy.



Photo 10: Wooden sluice present at the Treacy mine site.





Photo 11: Wooden sluice present at the Treacy mine site.



Photo 12: Scattered debris in the Mill Area at Treacy mine site.





Photo 13: Waste rock / ore piles present in the Mill Area at Treacy mine site.



Photo 14: Tin can dump at the Camp area near AEC 1 at the Treacy mine site.





Photo 15: Former building footprint in AEC 1 at the Treacy mine site.





Photo 1: Aerial overview of the rail spur at Try Me.



Photo 2: Prospect shaft located in APEC 1 at Try Me mine site.





Photo 3: Rail spur located adjacent to the prospect shaft in APEC 1 at the Main Camp Area.



Photo 4: Rock sample location at Trenches located in AEC 1 at Try Me.





Photo 5: Cabin located at the Try Me mine site.



Photo 6: Scattered debris located at the Western Camp area of the Try Me mine site.





Photo 7: Typical trench located at the Try Me mine site located in APEC 3 within the Main Camp area of the Site.





Photo 1: Overview of the waste rock piles at West Bay note the winter access route.



Photo 2: Overview of the pit located at West Bay.



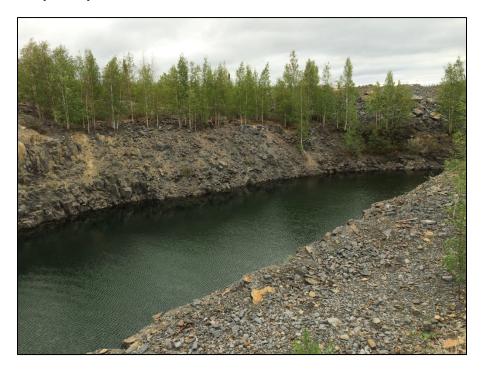


Photo 3: Open pit located in AEC 1 at the West Bay mine site; looking east.



Photo 4: Open pit located in AEC 1; looking south.





Photo 5: Overview of the tent frames and core racks at West Bay.



Photo 6: Tent frame and core racks located at the West Bay mine site.



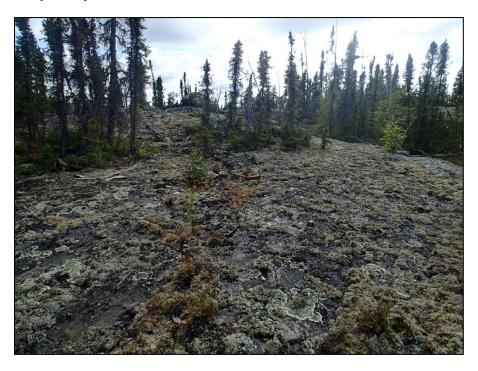


Photo 7: Overview of AEC 1 at West Bay.



Photo 8: Remains of the rail spur line at the West Bay mine site.





Photo 9: Scrap metal at the West Bay mine site.



Photo 10: Rail cart remains at the West Bay mine site.





Photo 11: Soil sample collected near the scattered debris at the Assay Lab area in AEC 12.



Photo 12: Remains of the battery located in AEC 11 at the West Bay mine site.





Photo 13: Typical waste rock area located in AEC 2&3 located at West Bay.



Photo 14: Waste rock pile (West) located in AEC 1 at the West Bay mine site.





Photo 15: Groundwater monitoring well in AEC 8 at West Bay.





Photo 16: Remains of the fence surrounding the open pit at West Bay mine site.



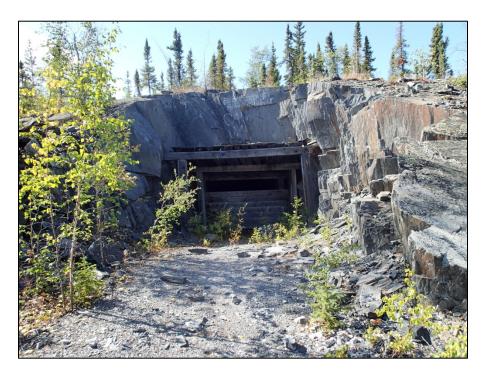


Photo A-1: Portal located at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.0632527, Long: -113.161516



Photo A-2: Mine Opening sign at the Portal at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.06324166, Long: -113.16161944





Photo A-3: Typical trench located north of AEC 8 and 9 (Stantec 2015 field program).

GPS Coordinate - Lat: 63.06423889, Long: -113.1617222



Photo A-4: Mine Shaft at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.0634777, Long: -113.164055





Photo A-5: Headframe at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.0635222, Long: -113.1640083



Photo A-6: Core rack at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.06339166, Long: -113.1636111





Photo A-7: Mill Building at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.06357, Long: -113.164444



Photo A-8: One of the old cabins in the AEC 14 at the Burnt Island mine site (Stantec 2015 field program).

GPS Coordinate - Lat: 63.062736, Long: -113.15898



Site Wide Hazard Assessment Burnt Island Mine Site (SM 220)



Photo A-9: Old dock at Knutsen camp (Source: SLR Consulting (Canada) Ltd. 2013. Phase 3 Environmental Site Assessment, Burnt Island, Gordon Lake, Northwest Territories).

GPS Coordinate - Lat: 63.0615619, Long: -113.1568111



Photo A-10: Structure remains in AEC 14 at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.062736, Long: -113.15898



Site Wide Hazard Assessment Burnt Island Mine Site (SM 220)



Photo A-11: Scattered debris at AEC 15 (Source: SLR Consulting (Canada) Ltd. 2013. Phase 3 Environmental Site Assessment, Burnt Island, Gordon Lake, Northwest Territories).

GPS Coordinate - Lat: 63.062736, Long: -113.15898



Photo A-12: Waste rock in the Waste Rock Area located in AEC 9 (Stantec 2015 field program).

GPS Coordinate - Lat: 63.063383, Long: -113.161068



Photo A-13: Tailings Area at Burnt Island (Stantec 2015 field program). GPS Coordinate - Lat: 63.0628777, Long: -113.1675305



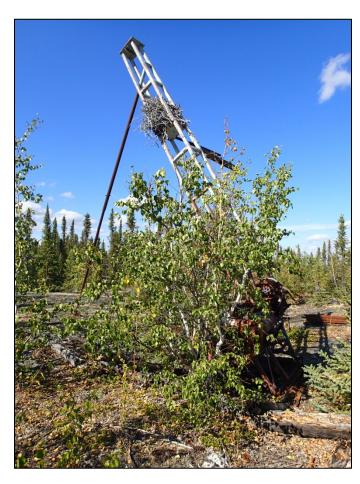


Photo A-14: Drill Equipment at Burnt Island (Stantec 2015 field program).

GPS Coordinate - Lat: 63.06355556, Long: -113.16443611



Site Wide Hazard Assessment Burnt Island Mine Site (SM 220)



Photo A-15: Burnt Island – Contaminated Site Sign. Located at the trailhead at the dock area at the Knutsen Camp Area.

GPS Coordinate - Lat: 63.06156388, Long: -113.15763880



Photo A-16: Burnt Island – Mine Opening Sign at the Portal. GPS Coordinate - Lat: 63.06324166, Long: -113.16161944





Photo A-17: Burnt Island – Mine Opening Sign at the Mine Shaft. GPS Coordinate - Lat: 63.06356111, Long: -113.16412500





Photo B-1: Tailings contained at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9874055, Long: -113.2045972



Photo B-2: Western boundary of the Tailings at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9874055, Long: -113.2045972



Photo B-3: Slope of Tailings containment at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9874055, Long: -113.2045972



Photo B-4: Typical scattered debris on-site (Stantec 2015 field program).

No GPS coordinate as this is located in several areas.



Site Wide Hazard Assessment Camlaren Mine Site (SM 205)



Photo B-5: One of the abandoned site buildings on-site. Log cabin at the North Cabin Area (Stantec 2015 field program).

GPS Coordinate - Lat: 62.996174, Long: -113.1945383



Photo B-6: Vent Raise located on the southern portion of AEC 1. (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98544444, Long: -113.2055944



Photo B-7: Concrete retaining wall on the southern portion of Muir Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98498611, Long: -113.2057083

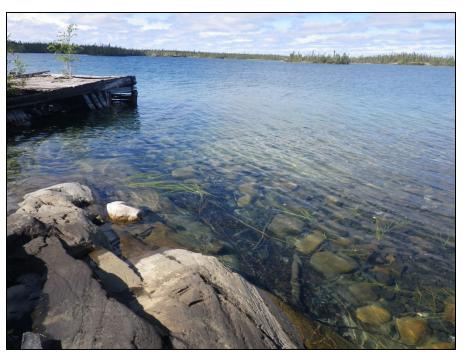


Photo B-8: Dock located on the west side of Muir Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.985807, Long: -113.206813



Photo B-9: Dock located on the southwest side of Muir Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98564720, Long: -113.2066416



Photo B-10: Mill Pad at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98573333, Long: -113.2056861





Photo B-11: Hoist Pad at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98616111, Long: -113.20556111



Photo B-12: Wooden culvert location (Source: SLR Consulting (Canada) Ltd. 2013. Phase III Environmental Site Assessment – Camlaren Mine, Gordon Lake, Northwest Territories).

GPS Coordinate - Lat: 62.98723, Long: -113.206245538615





Photo B-13: Photo of the Mine Shaft Cap with the Mill Slab in the foreground (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98592778, Long: -113.2058055



Photo B-14: Hollow sounding area northwest of the mill slab (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9864, Long: -113.20580277



Photo B-15: Stope Breakthrough / Crown Pillar at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.985338888, Long: -113.20571944



Photo B-16: One of the utility culverts at Camlaren.

No GPS coordinate as areas of buried debris is located in several areas at Camlaren.



Photo B-17: Shaft at Zenith Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9815555, Long: -113.2341417



Photo B-18: Collapsed headframe at Zenith Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.981605, Long: -113.2341194



Photo B-19: Trenches at Zenith Island (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9812305, Long: -113.2342361



Photo B-20: Old chimney present at Camlaren (Stantec 2015 field program).

GPS Coordinate - Lat: 62.9869742, Long: -113.2068852





Photo B-21: Area with burned battery (Source: WESA. 2010. Phase II Environmental Site Assessment, SM 205 – Camlaren).

GPS Coordinate: Lat: 62.98539722, Long: -113.20399167



Photo B-22: Waste rock in AEC 1 with mill pad in the foreground (Stantec 2015 field program).

GPS Coordinate - Lat: 62.98573333, Long: -113.2056861



Site Wide Hazard Assessment Camlaren Mine Site (SM 205)



Photo B-23: Waste rock piles at Zenith Island. (Stantec 2015 field program). No GPS coordinate as areas of waste rock are located in several areas at Camlaren.



Photo B-24: Partially buried debris located in AEC 9. (Stantec 2015 field program). No GPS coordinate as areas of buried debris is located in several areas at Camlaren.



Site Wide Hazard Assessment Camlaren Mine Site (SM 205)



Photo B-25: Camlaren – Contaminated Site Sign. Located adjacent to the old dock on the southwest side of Muir Island (common landing area for boats and aircraft).

GPS Coordinate - Lat: 62.98564720, Long: -113.2066416



Photo B-26: Camlaren – Mine Opening Sign at Crown Pillar Breakthrough. Located on the slope above the breakthrough.

GPS Coordinate - Lat: 62.98520277, Long: -113.2059444



Photo B-27: Camlaren – Mine Opening Sign at the mine shaft at Zenith Island. GPS Coordinate - Lat: 62.98160550, Long: -113.23411944





Photo C-1: North shaft mine opening in AEC 10 in the Mill Area at Goodrock Mine (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.0309333 Long: -113.1333166



Photo C-2: The south shaft in AEC 10 in the Mill Area at Goodrock Mine (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.03058055, Long: -113.1335277



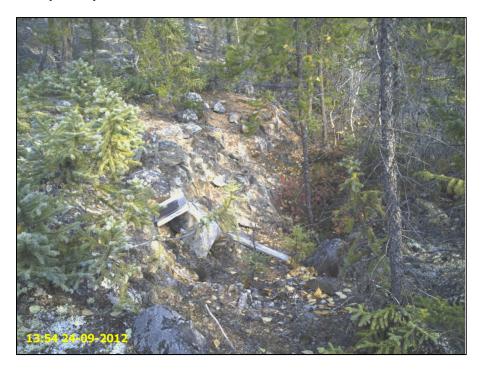


Photo C-3: Trench located between the north and south shafts in AEC 10 at Goodrock (Source: SLR Consulting Ltd. 2013. Phase 3 Environmental Site Assessment, Goodrock Mine, Northwest Territories.) Between GPS coordinates outlined in Photo C-1 and 2.



Photo C-4: Trench located north of AEC 1 at the Camp Area at Goodrock Mine. Note the presence of waste rock adjacent to the trench (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.03565833, Long: -113.1389055





Photo C-5: Remains of a building at AEC 3 in the Camp Area at Goodrock (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.036316666, Long: -113.1383277



Photo C-6: Remains of a building south of AEC1 at the Goodrock mine site (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.03529722, Long: -113.13963611





Photo C-7: Tin can dump at AEC 3 at the Camp Area at Goodrock Mine. GPS Coordinate: Lat: 63.036316666, Long: -113.1383277



Photo C-8: Mill slab located in AEC 8 (Source: WESA, 2010. Phase II Environmental Site Assessment, SM 466, Goodrock Mine, Northwest Territories).



GPS coordinate - Lat: 63.0311834, Long: -113.1349466



Photo C-9: Wharf timber location located 450 m northwest of the Mill Area (Source: WESA, 2010. Phase II Environmental Site Assessment, SM 466, Goodrock Mine, Northwest Territories).

GPS coordinate - Lat: 63.03259722, Long: -113.14172222



Photo C-10: Goodrock – Mine Opening at the North Mine Shaft GPS coordinate - Lat: 63.0310000, Long: -113.1331389





Photo C-1110: Goodrock – Mine Opening North Mine Shaft. GPS coordinate - Lat: 63.0310000, Long: -113.1331389





Photo D-1: Portal located in AEC 17 at Kidney Pond. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 62.95541111, Long: -113.3358611111



Photo D-2: Trench located in AEC 13 at the Exploration Camp at Kidney Pond (Source: SLR Consulting Ltd. 2013. Phase 3 Environmental Site Assessment, Kidney Pond, Northwest Territories).

GPS Coordinate – Lat: 62.9516, Long: -113.317522





Photo D-3: Blasting caps within waste rock / ore on the eastern part of the waste rock / ore pad in AEC 17. (Source: SLR Consulting Ltd. 2013. Phase 3 Environmental Site Assessment, Kidney Pond, Northwest Territories). GPS Coordinate – Lat: 63.00713611, Long: -113.407141666



Photo D-4: Trench located north of Kidney Pond (north of AEC 27). (Stantec 2015 Field Program)

No GPS Coordinate





Photo D-5: Trench north of Kidney Pond (north of AEC 27). (Stantec 2015 Field Program)
No GPS Coordinate



Photo D-6: Core racks present in AEC 17. (Stantec 2015 Field Program)
Various GPS Coordinates





Photo D-7: Scattered debris located on the shoreline of Gordon Lake near the 1939 Exploration Camp. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666



Photo D-8: Remains of a building structure at the 1939 Camp. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666





Photo D-9: Dock at the 1983 Camp at Kidney Pond. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666



Photo D-10: Trench located west of the Portal at Kidney Pond. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666





Photo D-11: Waste Rock located in AEC 17 at Kidney Pond. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666



Photo D-12: Battery located in AEC 17 at Kidney Pond. (Stantec 2015 Field Program)

GPS Coordinate – Lat: 63.00713611, Long: -113.407141666





Photo D-13: Kidney Pond – Contaminated Site Sign. Located at the dock area at the 1983 Camp.

GPS Coordinate – Lat: 62.95417000, Long: -113.3484500



Photo D-14: Kidney Pond - Mine Opening Sign at the Portal. GPS Coordinate – Lat: 62.95538330, Long: -113.3359027



Site Wide Hazard Assessment Murray Lake Mine Site (SM 490)

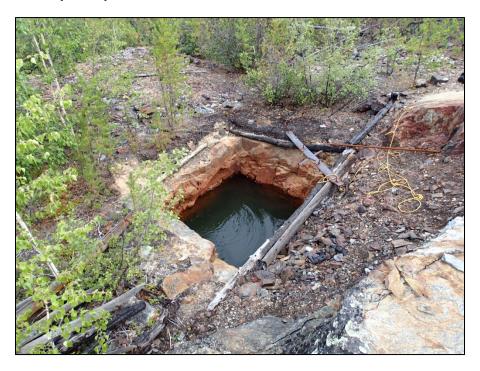


Photo E-1: Prospect shaft located between AEC 4 and AEC 6 at the Murray Lake mine site (Stantec 2015 Field Program). GPS Coordinate – Lat: 63.00713611, Long: -113.407141666



Photo E-2: Water filled Deep Trench/Shaft at AEC 3 at Murray Lake mine site (Stantec 2015 Field Program). GPS Coordinate – Lat: 63.00930555, Long: -113.4125833



Site Wide Hazard Assessment Murray Lake Mine Site (SM 490)



Photo E-3: Trench in AEC 6 (Stantec 2015 Field Program).

AEC 6 features four trenches in total. GPS Coordinate of the area: Lat: 63.0074, Long: -119.409



Photo E-4: Exploration trenches in the northern portion of AEC 3 facing north (Stantec 2015 Field Program). GPS Coordinate: Lat: 63.00714, Long: -119.40717



Site Wide Hazard Assessment Murray Lake Mine Site (SM 490)



Photo E-5: Strip pile from AEC 4 (Source: Columbia Environmental. 2013. Phase III Environmental Site Assessment, Murray Lake, Northwest Territories). GPS Coordinate: Lat: 63.00714, Long: -119.40717



Photo E-6: Typical trenches encountered in AEC 8, facing east (Source: Columbia Environmental. 2013. Phase III Environmental Site Assessment, Murray Lake, Northwest Territories). Fifteen trenches observed in this AEC. Central GPS coordinate: Lat: 63.011, Long: -119.415



Site Wide Hazard Assessment Murray Lake Mine Site (SM 490)



Photo E-7: Debris scattered throughout the site (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.01846, Long: -119.40550



Photo E-8: Murray Lake – Mine Opening Sign at the Shaft (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.00712500, Long: -113.4072472



Site Wide Hazard Assessment Murray Lake Mine Site (SM 490)



Photo E-99: Murray Lake – Mine Opening Sign at the Deep Trench/Shaft (Stantec 2015 Field Program).

GPS Coordinate: Lat: 63.00719444, Long: -113.4070690





Photo F-1: South mine shaft at Storm Property.

GPS Coordinate – Lat: 63.00573611, Long: -113.12479444



Photo F-2: North mine shaft at the Storm Property (Source: WESA Inc. 2010. Phase II Environmental Site Assessment, SM 471 – Storm Property).

GPS Coordinate – Lat: 63.005997, Long: -113.124228





Photo F-3: Trenches at Storm Property (Source: WESA Inc. 2010. Phase II Environmental Site Assessment, SM 471 – Storm Property).

GPS Coordinate – Lat: 63.00577222, Long: -113.12496944



Photo F-4: Battery located at the camp area at Storm Property (Source: WESA Inc. 2010. Phase II Environmental Site Assessment, SM 471 – Storm Property).

GPS Coordinate – Lat: 63.01181667, Long: -113.15111389





Photo F-5: Scattered scrap metal located at the Camp Area at Storm Property (Source: WESA Inc. 2010. Phase II Environmental Site Assessment, SM 471 – Storm Property).

GPS Coordinate – Lat: 63.01185000, Long: -113.15039722



Photo F-6: Empty drum located at the Camp Area at Storm Property (Source: WESA Inc. 2010.

Phase II Environmental Site Assessment, SM 471 – Storm Property).

GPS Coordinate – Lat: 63.01175556, Long: -113.15058889



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Photo F-7: Storm Property – Mine Opening Sign at the south mine shaft GPS Coordinate – Lat: 63.00573610, Long: -113.1247944





Photo G-1: East trench located in AEC 5 at the Treacy mine site. GPS Coordinate – Lat: 62.941061111, Long: -113.33727777



Photo G-2: West trench located in AEC 5 at the Treacy mine site. Note the presence of mill sediments at the base of the excavation.

GPS Coordinate – Lat: 62.941102777, Long: -113.3376055





Photo G-3: Other trench located in AEC 5 at the Treacy mine site. GPS Coordinate – Lat: 62.94098888, Long: -113.337538888



Photo G-4: Former Mill Building at the Treacy mine site.GPS Coordinate – Lat: 62.941061111, Long: -113.33745555





Photo G-5: Wooden sluice present at the Treacy mine site. GPS Coordinate – Lat: 62.9410361, Long: -113.3375028



Photo G-6: Wooden sleuce present at the Treacy mine site. GPS Coordinate – Lat: 62.9410361, Long: -113.3375028





Photo G-7: Scattered debris in the Mill Area at Treacy mine site. GPS Coordinate – Lat: 62.94125, Long: -113.337433



Photo G-8: Waste rock / ore piles present in the Mill Area at Treacy mine site.

GPS Coordinate – Lat: 62.94108056, Long: -113.337186111





Photo G-9: Tin can dump at the Camp area near AEC 1 at the Treacy mine site.

GPS Coordinate – Lat: 62.94023889, Long: -113.33844722



Photo G-10: Former building footprint in AEC 1 at the Treacy mine site. GPS Coordinate – Lat: 62.94021944, Long: -113.33863889





Photo G-11: Red painted wood with lead content located in the east trench at Treacy. GPS Coordinate – Lat: 62.94108889, Long: -113.33736667





Photo H-1: Prospect shaft located in APEC 1 at Try Me mine site. GPS Coordinate – Lat: 63.067713888, Long: -113.478458



Photo H-2: Rail spur located adjacent to the prospect shaft in APEC 1 at the Main Camp Area. GPS Coordinate – Lat: 63.06768611, Long: -113.47863333





Photo H-3: Remains of the core rack located in the Main Camp Area (Source: Columbia Environmental Consulting Ltd. 2013. Final Phase I/II Environmental Site Assessment Try Me Property (SM488) Northwest Territories). GPS Coordinate – Lat: 63.06809444, Long: -113.47765833



Photo H-4: Wooden debris located in the Main Camp Area at Try Me (Source: Columbia Environmental Consulting Ltd. 2013. Final Phase I/II Environmental Site Assessment Try Me Property (SM488) Northwest Territories). GPS Coordinate – Lat: 63.06809444, Long: -113.47765833





Photo H-5: Cabin located at the Try Me mine site. GPS Coordinate – Lat: 63.06741389, Long: -113.47862778



Photo H-6: Scattered debris located at the Western Camp area of the Try Me mine site. GPS Coordinate – Lat: 63.069243, Long: -113.48828391





Photo H-7: Former dock location (APEC 2) located in the Main Camp area. Mac Lake in background. Timbers and nailed wood observed within the lake. (Source: Columbia Environmental Consulting Ltd. 2013. Final Phase I/II Environmental Site Assessment Try Me Property (SM488) Northwest Territories). GPS Coordinate – Lat: 63.06926389, Long: -113.47836111



Photo H-8: Typical trench rock located near the trenches in the Main Camp Area (Source: Columbia Environmental Consulting Ltd. 2013. Final Phase I/II Environmental Site Assessment Try



Me Property (SM488) Northwest Territories). GPS Coordinate – Lat: 63.06800556, Long: - 113.47870278

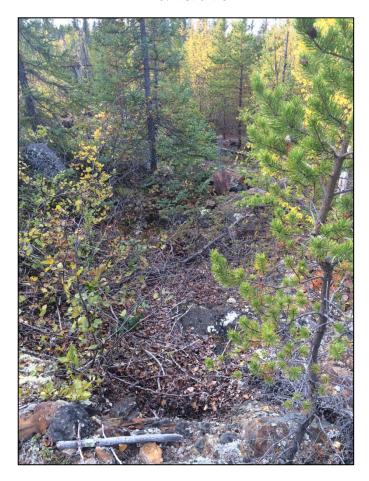


Photo H-9: Typical trench located at the Try Me mine site located in APEC 3 within the Main Camp area of the Site.

GPS Coordinate – Lat: 63.06800556, Long: -113.47870278





Photo I-1: Open pit located in AEC 1 at the West Bay mine site; looking east. GPS Coordinate – Lat: 62.917588888, Long: -113.231713888



Photo I-2: Open pit located in AEC 1; looking south. GPS Coordinate – Lat: 62.917588888, Long: -113.231713888





Photo I-3: Tent frame and core racks located at the West Bay mine site. GPS Coordinate – Lat: 62.91669722, Long: -113.2345777



Photo I-4: Remains of the rail spur line at the West Bay mine site. GPS Coordinate – Lat: 62.91754444, Long: -113.23219167





Photo I-5: Scrap metal at the West Bay mine site. GPS Coordinate – Lat: 62.916393, Long: -113.23343124



Photo I-6: Rail cart remains at the West Bay mine site. GPS Coordinate – Lat: 62.91754444, Long: -113.23219167





Photo I-7: Scattered debris at the Assay Lab area in AEC 12. (Source: EBA Engineering Consultants Ltd. 2009. Phase II Environmental Site Assessment for West Bay/ Blackridge Mine, SM 302, Northwest Territories). GPS Coordinate – Lat: 62.91664444, Long: -113.23229444



Photo I-8: Remains of the battery located in AEC 11 at the West Bay mine site. GPS Coordinate – Lat: 62.916774, Long: -113.233686973024





Photo I-9: Typical waste rock area located in AEC 2&3 located at West Bay.

No GPS Coordinate (Waste Rock covers large area)



Photo I-10: Waste rock pile (West) located in AEC 1 at the West Bay mine site.

GPS Coordinate – Lat: 62.91653889, Long: -113.23158611





Photo I-11: Tailings in AEC 2&3 at the West Bay mine site (Source: EBA Engineering Consultants Ltd. 2009. Phase II Environmental Site Assessment for West Bay / Blackridge Mine, SM 302, Northwest Territories). GPS Coordinate – Lat: 62.91755833, Long: -113.23215833





Photo I-12: Remains of the fence surrounding the open pit at West Bay mine site. GPS Coordinate – Lat: 62.917588888, Long: -113.231713888

Public Works and Government Services Canada Project No. R.057573 Environmental Site Remediation Gordon Lake Group Sites, NT

ISSUED FOR TENDER
APPENDIX E
Page 1 of 1

APPENDIX FLYSHEET

APPENDIX E – INAC Tracking Forms

Quai	rterly Report Template Overview and Navigation
This Quarterly Report Template is made up of description is provided next to each button.	of the following tabs. You can click on the buttons below to navigate to the various tabs. A brief
Instructions	This tab provides a set of instructions for completing this template
Worksheet 1 - Emp & Training	This tab is used to track the socio-economic make-up of all personnel involved with this project - both your employees and those of your subcontractors. Employee gender, status as well as total hours worked and hours of training received are to be tracked in this sheet. This data is used to determine whether departmental employment targets are being met, not to validate contract specific AOC targets.
Worksheet 2 - Suppliers	This tab is used to compile data related to the project-related goods and services you have provided to the project, and to report on the socio-economic makeup of your organization, and that of your sub-contractors. This data is used to determine whether departmental contractual targets are being met, not to validate contract specific AOC targets.
Worksheet 3 - EHS and Events	This tab is used to compile data related to Environment, Health & Safety, as well as community consultations, media events and other engagements which you or your subcontractors have conducted.
Worksheet 1 - Example	Examples of completed worksheets are provided in these tabs for your reference.
Worksheet 2 - Example	
Worksheet 3 - Example	
Glossary	This tab provides definitions of key terms used in this template for your reference.

Quarterly Report Template Instructions								
General:								
Please complete and submit this Quarterly Repo	rt in accordance with the schedule below:							
Report	Months Included	Due Date						
Q1 Report	April, May, June							
Q2 Report	July August, September							
Q3 Report	October, November, December							
Q4 Report	January, February, March							
Please note that "Supplie	r" refers to the "Main Contractor" for the purposes of completing the attached wo	rksheets.						

Purpose: The purpose of this section is to compile data on all supplier employees and sub-contracted employees working on the project. The Contaminated Sites Program has set employment targets in its commitment to bring economic benefit to the North through the delivery of it's contaminated sites projects.

The data reported is used to determine whether the Northern Contaminated Sites Program is meeting its employment commitments under:

- 1. 2015-2020 Northern Affairs Organization Performance Measurement Strategy Required by Treasury Board Secretariat's Policy on Transfer Payments and Policy on Evaluation.
- 2. Departmental Performance Report (DPR) the DPR is a report on the Plans and Priorities for the fiscal year as set by the Department, which includes the Northern Affairs Organization

Please note that this data is NOT being used to validate your AOC targets as part of your contract(s) relating to the project. Validation relating to your AOC targets is done by the Project Manager (PM) or the Departmental Representative (DR).

Instructions

<u>General:</u>

- Data is to be completed for all main contractor employees including any/all sub-contracted employees working on the project.
- The same file/worksheets will be used by each main contractor for all four quarters, completing only the applicable quarter each time.
- Worksheets are only required for main contractors. It is expected that sub-contractor information is collected and presented in the main contractor worksheets. Do not re-arrange the order of the employees. It is important to keep all of the employees in the same order during reporting for all quarters such that it can be transferred effectively to the INAC quarterly report.
- New employees should be added to the bottom of the list, if they are required, for the subsequent quarter and highlighted in green.
- Do not delete employees from the list even if they no longer work on the project or are not required for a subsequent quarter.

Supplier Name:

The Supplier Name is the name of the Main Contractor

AOC Employment Target:

Please enter the employment target (%) as identified in the original contract. If there is no AOC Employment target, please enter "NA".

Relationship to Supplier:

f an employee works directly for the main contractor ENTER "Supplier Internal Resource". For employees who work for subcontractors please enter name of the subcontractor.

Employee ID: This does not need to be the Employee name, it is a unique identifier as determined by the Supplier. Once set, it must remain the same from Q1 to Q4 or the specific employee it was assigned. Two employees may not have the same Employee ID.

Total Hours Worked:

Employee Category:
Only one box shall be checked with an "x" for each employee. Employees that have an AOC designation are condsidered to be Northern Aboriginal, though are racked seperately so that we can determine the benefit that the AOC Targets bring to Indigenous people in the North

Please enter the hours worked by an employee for the respective reporting Quarter. This is not a running total. If no hours were worked by the employees, please enter zero. Do not leave blank and do not delete the employee

For the various training categories please enter the number of hours spent on training for that specific quarter for each employee. This is not a running total. If no hours vere spent in training by the employee, please enter zero.

Worksheet 2 - Suppliers

Purpose: The purpose of this section is to compile data related to the project related goods and services provided by the suppliers and their subcontractors. The Contaminated Sites Program has set contract targets in its commitment to bring economic benefit to the North through the delivery of it's contaminated sites projects.

The data reported is used to determine whether the Northern Contaminated Sites Program is meeting its contracting commitments under:

1. 2015-2020 Northern Affairs Organization Performance Measurement Strategy - Required by Treasury Board Secretariat's Policy on Transfer Payments and Policy n Evaluation

Instructions:

Data is to be provided for any goods and services provided by the main contractor, and their subcontractors, related to the project. This includes main contractor actor fees. Main supplier/contractor fees are to be listed as a "Supplier Internal Cost" and subcontractor fees are to be included in the total recorded for the individual subcontractor.

- •Worksheets are only required for main contractors. Subcontractor information must be collected and presented in the main contractor v
- The same file/worksheet will be used by each main contractor for all four quarters, completing only the applicable quarter each time.
- Do not rearrange the order of the internal resources and subcontractors. It is important to keep all of the resources and subcontractors in the same order during reporting, for all quarters, such that it can be transferred effectively to the INAC quarterly report.
- New main contractor resources and subcontractor resources should be added to the bottom of the list, if they are required, for a subsequent quarter and highlighted in green.
- Do not delete Supplier internal costs/subcontractors from the list, as identified in column C of the worksheet, even if they are no longer required for a subsequent quarter

Supplier Name:

The Supplier Name is the name of the Main Contractor.

AOC Financial Target:

Please enter the Financial target (%) as identified in the original contract. If there is no AOC Financial target, please enter "NA".

Supplier Categorization:

- Supplier Name Name of the prime supplier/contractor who provided the goods or services. Contractor fees must be included here as a "Internal Supplier Cost". You nay chose to list it seperately from other "Internal Supplier Cost" line items, or combine them.
- If the goods and services are provided directly by the main contractor ENTER "Supplier Internal Costs".
- If the goods and services are provided by the Subcontractor ENTER the subcontractors name
- Essentially, at the end of Q4 all costs that were billed should equal what is entered in this spreadsheet

Supplier Category:

Applicable to how the main contractor identifies themselves - only one box should be checked with an "x" per supplier/contractor. This is also applicable for the subcontractor

Supplier Utilization:

Used this Quarter - If project related goods or services was used in a particular quarter, for which is being reported, put an "x" in this column. Will assume if left blank, that it was not used for that particular quarter. It is necessary to put an "x" if a cost is indicated for the quarter, or the costs will not tabulate Value (\$):

n each Quarter where project related goods or services have been supplied by an main supplier/contractor or subcontractor, place the total value of the goods and/or services provided during the quarter. This is not a running total.

•Do not include GST in the Value costs.

•It is necessary to put an "x" if a cost is indicated for the quarter, or the costs will not tabulate

Worksheet 3 - EHS & Events

Purpose: To compile data related to Environmental Health and Safety, as well as statistics such as numbers of community consultations, engagements and media events.

nstructions

Enter your company name in the Supplier area. Enter statistics as required. You are expected to roll up your subcontractor EHS/Event data and combine with your companys' data into your report

	eet 1 - Em	ploy	ment a																
Supplier Na	ame			AO	Employm	ent Targe	t (%)												
	Emplo	ovee	Categor	ization							Emplo	vment ar	d Trainir	g Hours	for Quar	ter ⁴			
														Training					
Relationship to Supplier:					Total Hours Worked by Employee for Current Quarter	EHS Awareness				EHS Health and Safety				EHS	Environmental	Бr			
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	oyee	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Total Hours W Employee for C	Policy & Proc	HAZWOPR	WHMIS	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)
							 										t		
							-										 		
																	<u> </u>		

- 1) For supplier internal resources, please enter "Supplier Internal Resource". For subcontrator's resources, please enter the relevant subcontractor's name.
- 2) Please enter a unique identifier (employee initials, employee ID etc.) for each employee. Please do not remove an employee if they do not work in subsequent quarters.
- 3) Please enter an "x" into the most appropriate employment category. *Only **one** category allowed per employee.*
- 4) Please enter total employment hours and training hours in increments no smaller than 15 minutes.

	eet 1 - Em	pioy	inent a																
Supplier Na	ame			AO	Employm	ent Targe	t (%)												
	Emplo	oyee	Categor	ization							Employ	yment an	d Trainir	g Hours	for Quar	ter ⁴			
		ĺ												Training					
Employee Category ³					orked by Current Quarter	EHS Awareness				EHS Health and Safety				EHS	Environmental	Ви			
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	oyee	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Total Hours Worked by Employee for Current Qu	Policy & Proc	HAZWOPR	SIWHM	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)
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- 1) For supplier internal resources, please enter "Supplier Internal Resource". For subcontrator's resources,
- 2) Please enter a unique identifier (employee initials, employee ID etc.) for each employee. Please do not n
- 3) Please enter an "x" into the most appropriate employment category. *Only **one** category allowed per employment category.
- 4) Please enter total employment hours and training hours in increments no smaller than 15 minutes.

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Supplier Na	ame			AO	Employm	ent Targe	t (%)												
	Emplo	oyee	Categor	ization							Employ	yment an	d Trainir	g Hours	for Quar	ter ⁴			
		ĺ												Training					
Employee Category ³					orked by Current Quarter	EHS Awareness				EHS Health and Safety				EHS	Environmental	Ви			
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	oyee	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Total Hours Worked by Employee for Current Qu	Policy & Proc	HAZWOPR	SIWHM	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)
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		-																	

- 1) For supplier internal resources, please enter "Supplier Internal Resource". For subcontrator's resources,
- 2) Please enter a unique identifier (employee initials, employee ID etc.) for each employee. Please do not n
- 3) Please enter an "x" into the most appropriate employment category. *Only **one** category allowed per employment category.
- 4) Please enter total employment hours and training hours in increments no smaller than 15 minutes.

	eet 1 - Em	pioy	inent a																
Supplier Na	ame			AO	Employm	ent Targe	t (%)												
	Emplo	oyee	Categor	ization							Employ	yment an	d Trainir	g Hours	for Quar	ter ⁴			
		ĺ												Training					
Employee Category ³					orked by Current Quarter	EHS Awareness				EHS Health and Safety				EHS	Environmental	Ви			
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	oyee	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Total Hours Worked by Employee for Current Qu	Policy & Proc	HAZWOPR	SIWHM	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)
										·								·	·
		-																	

- 1) For supplier internal resources, please enter "Supplier Internal Resource". For subcontrator's resources,
- 2) Please enter a unique identifier (employee initials, employee ID etc.) for each employee. Please do not n
- 3) Please enter an "x" into the most appropriate employment category. *Only **one** category allowed per employment category.
- 4) Please enter total employment hours and training hours in increments no smaller than 15 minutes.

Supplier Name	AOC Employment Target (%)

	Supplier I	Supplier Utilization					
			Supplier Category ²			Quar	ter: 1
Please specify "Supplier Internal Costs" or indicate the	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non-	Northern,	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)
Subcontractor Name if applicable ¹	Aportginal	Aboriginal	Aboriginal	Aboriginal	Consideration	Quarter	Value (\$)
				·			

- 1) For supplier internal costs, please enter "Supplier Internal Costs". For costs relating to a supplier's subcontractor, please enter the relevant subcontractor's name.
- 2) Ensure that internal fees are listed. For the prime supplier/contractor, list fees either as a "Supplier Internal Cost". Subcontractor fees should be incorporated and reported as a total for the respective supplier/contractor.
- 2) Please enter an "x" into the most appropriate category. *Only **one** category allowed per employee.*
- 3) Please enter an "x" if the supplier / subcontractor was utilized in the current quarter.

Supplier Name	AOC Employment Target (%)

	Supplier	Supplier Utilization					
		pplier Categoriz	Supplier Category			Quar	ter: 2
Please specify "Supplier Internal Costs" or indicate the Subcontractor Name if applicable ¹	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)
Cubcontractor Name ii applicable	Aboriginal	Aboriginal	Aboriginal	Aboriginal	Oonsideration	Quarter	Value (ψ)

- 1) For supplier internal costs, please enter "Supplier Internal Costs". For costs relating to a supplier's subcontractor, please enter the relevant
- 2) Ensure that internal fees are listed. For the prime supplier/contractor, list fees either as a "Supplier Internal Cost". Subcontractor fees she as a total for the respective supplier/contractor.
- 2) Please enter an "x" into the most appropriate category. *Only **one** category allowed per employee.*
- 3) Please enter an "x" if the supplier / subcontractor was utilized in the current quarter.

Supplier Name	AOC Employment Target (%)

Southern, Non- Aboriginal	Southern, Aboriginal	Supplier Category ² Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Supplier L Quart Used in this Quarter ³	
Southern, Non- Aboriginal	Southern,	Northern, Non-	Northern,	Opportunity	Used in this	
1						
	·					

- 1) For supplier internal costs, please enter "Supplier Internal Costs". For costs relating to a supplier's subcontractor, please enter the relevant
- 2) Ensure that internal fees are listed. For the prime supplier/contractor, list fees either as a "Supplier Internal Cost". Subcontractor fees she as a total for the respective supplier/contractor.
- 2) Please enter an "x" into the most appropriate category. *Only **one** category allowed per employee.*
- 3) Please enter an "x" if the supplier / subcontractor was utilized in the current quarter.

Supplier Name	AOC Employment Target (%)

	Su	pplier Categoriz	ation			Supplier	Utilization
	Supplier Category ²				Quarter: 4		
Please specify "Supplier Internal Costs" or indicate the	Southern, Non-	Southern,	Northern, Non-	Northern,	Aboriginal Opportunity Consideration	Used in this Quarter ³	
Subcontractor Name if applicable ¹	Aboriginal	Aboriginal	Aboriginal	Aboriginal	Consideration	Quarter	Value (\$)

- 1) For supplier internal costs, please enter "Supplier Internal Costs". For costs relating to a supplier's subcontractor, please enter the relevant
- 2) Ensure that internal fees are listed. For the prime supplier/contractor, list fees either as a "Supplier Internal Cost". Subcontractor fees she as a total for the respective supplier/contractor.
- 2) Please enter an "x" into the most appropriate category. *Only **one** category allowed per employee.*
- 3) Please enter an "x" if the supplier / subcontractor was utilized in the current quarter.

Worksheet 3 - EHS and Events

O
Supplier Name

Categories		Metrics	Quarter: 1	
EHS Performance				
Incidents, Inspections and Aud	lits			
Safety Incidents	Major Incident	# of incidents		
	Moderate Incident	# of incidents		
	Minor Incident	# of incidents		
	Near misses	# of near misses		
Environmental Incidents	Environmental Incidents	# of incidents		
		Spill Volume (L)		
Inspections / Audits	Inspections/Audits (external)	# performed		
		# non-compliances		
	Inspections/Audits (internal)	# performed		
		# non-compliances		
Other Corrective Actions	New procedures	# procedures		
	Other initiatives	# initiatives		
Consultations, Engageme	nts and Media Events			
Events	Consultations	# consultations		
		# persons		
	Community Engagements	# community engagements		
		# persons		
	Media Events	# media events		

O
Supplier Name

Ca	ategories	Metrics	Quarter: 2
EHS Performance			
Incidents, Inspections and Aud	lits		
Safety Incidents	Major Incident	# of incidents	
-	Moderate Incident	# of incidents	
	Minor Incident	# of incidents	
	Near misses	# of near misses	
Environmental Incidents	Environmental Incidents	# of incidents	
		Spill Volume (L)	
Inspections / Audits	Inspections/Audits (external)	# performed	
		# non-compliances	
	Inspections/Audits (internal)	# performed	
		# non-compliances	
Other Corrective Actions	New procedures	# procedures	
	Other initiatives	# initiatives	
Consultations, Engageme	ents and Media Events		
Events	Consultations	# consultations	
		# persons	
	Community Engagements	# community engagements	
		# persons	
	Media Events	# media events	

O
Supplier Name

Ca	ategories	Metrics	Quarter: 3
EHS Performance			
Incidents, Inspections and Aud	lits		
Safety Incidents	Major Incident	# of incidents	
	Moderate Incident	# of incidents	
	Minor Incident	# of incidents	
	Near misses	# of near misses	
Environmental Incidents	Environmental Incidents	# of incidents	
		Spill Volume (L)	
Inspections / Audits	Inspections/Audits (external)	# performed	
		# non-compliances	
	Inspections/Audits (internal)	# performed	
		# non-compliances	
Other Corrective Actions	New procedures	# procedures	
	Other initiatives	# initiatives	
Consultations, Engageme	ents and Media Events		
Events	Consultations	# consultations	
		# persons	
	Community Engagements	# community engagements	
		# persons	
	Media Events	# media events	

O
Supplier Name

Ca	ategories	Metrics	Quarter: 4
EHS Performance			
Incidents, Inspections and Aud	lits		
Safety Incidents	Major Incident	# of incidents	
,	Moderate Incident	# of incidents	
	Minor Incident	# of incidents	
	Near misses	# of near misses	
Environmental Incidents	Environmental Incidents	# of incidents	
		Spill Volume (L)	
nspections / Audits	Inspections/Audits (external)	# performed	
		# non-compliances	
	Inspections/Audits (internal)	# performed	
		# non-compliances	
Other Corrective Actions	New procedures	# procedures	
	Other initiatives	# initiatives	
Consultations, Engageme	ents and Media Events		
Events	Consultations	# consultations	
		# persons	
	Community Engagements	# community engagements	
		# persons	
	Media Events	# media events	

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

NOME CONCIDE OF	orioti dottori		2070						
	Emplo	yee	Categor	ization					
		Employee Category ³						orked by current Quarter	EHS Awareness
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹		Employee Gender	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Total Hours Worked by Employee for Current Quarter	Policy & Proc
Supplier Internal Resource	Emp 1	М				\		147.00	
Supplier Internal Resource	Emp 2	F				/ x \		171.00	
Supplier Internal Resource	Emp 3	M						39.00	
Supplier Internal Resource	Emp 4	F) (/ x\		77.00	
_ ' '	Emp 5	М				X		55.00	
	Emp 6	F			X			222.00	
	Emp 7	М				Х		258.00	
Supplier Internal Resource	Emp 8	F					Х	70.00	
Expert Abatement Inc	EA Emp 1	М			X			198.00	
Expert Abatement Inc	EA Emp 2	F			X			155.00	
Expert Abatement Inc	EA Emp 3	М			X			151.00	
Expert Abatement Inc	EA Emp 4	F			X			154.00	
Northern Excavation	NE Emp 1	М			X			52.00	
Northern Excavation	NE Emp 2	F			X			203.00	
Northern Excavation	NE Emp 3	M			Х			33.00	
PM Project Management	PM Emp 1	F		Х				26.00	
PM Project Management	PM Emp 2	M		х				48.00	8.00

	Employment and Training Hours for Quarter 1										
	Training										
hind ess									EHS	б	
_	Policy & Proc	HAZWOPR	WHMIS	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)
147.00	1.00	9.00	10.00	5.00	9.00		2.00	4.00	8.00	6.00	4.00
171.00	3.00	6.00	5.00	7.00	5.00		8.00	4.00	4.00	2.00	2.00
39.00	6.00	7.00	2.00	1.00	1 -	8.00	3.00	6.00	1.00	10.00	2.00
77.00	6.00	2,00	3.00	7.00	8.00	9.00	5.00	4.00	8.00	1.00	-
55.00	4.00	3.00	1.00	1.00	6.00	9.00	-	1.00	5.00	4.00	10.00
222.00	3.00	10.00	6.00	9.00	2.00	3.00	7.00	2.00	10.00	9.00	3.00
258.00	10.00	5.00	8.00	5.00	3.00	4.00	7.00	5.00	10.00	8.00	4.00
70.00	-	6.00	8.00	-	10.00	8.00	9.00	5.00	10.00	2.00	1.00
198.00	3.00	1.00	10.00		3.00	10.00	7.00	9.00	2.00	7.00	7.00
155.00	10.00	6.00	1.00	6.00	2.00	9.00	1.00	-	6.00	4.00	8.00
151.00	2.00	8.00	1.00	8.00	6.00	8.00	5.00	4.00	1.00	-	9.00
154.00	2.00	6.00	3.00	1.00	6.00	1.00	9.00	9.00	7.00	4.00	2.00
52.00	2.00	- 10.00	6.00	8.00	2.00	2.00	-	6.00	6.00	6.00	6.00
203.00	2.00	10.00	3.00	10.00	10.00	-	7.00	-	6.00	7.00	10.00
33.00	7.00	5.00	8.00	3.00	5.00	2.00	2.00	10.00	3.00	2.00	9.00
26.00	3.00	3.00	3.00	3.00	2.00	4.00	3.00	-	1.00	1.00	2.00
48.00	8.00	7.00	2.00	10.00	9.00	10.00	3.00	10.00	5.00	3.00	1.00

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

	Emplo	yee	Categor	ization			
		der		Empl	oyee Cate	gory ³	
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	Employee Gender	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration
Supplier Internal Resource	Emp 1	М				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
Supplier Internal Resource	Emp 2	F				/ x \	
Supplier Internal Resource	Emp 3	М					
Supplier Internal Resource	Emp 4	F) (/ x\	
Supplier Internal Resource	Emp 5	М				Х	
Supplier Internal Resource	Emp 6	F			Х		
Supplier Internal Resource	Emp 7	М				Х	
Supplier Internal Resource	Emp 8	F					X
Expert Abatement Inc	EA Emp 1	М			X		
Expert Abatement Inc	EA Emp 2	F			X		
Expert Abatement Inc	EA Emp 3	М			Х		
Expert Abatement Inc	EA Emp 4	F			X		
Northern Excavation	NE Emp 1	М			X		
Northern Excavation	NE Emp 2	F			X		
Northern Excavation	NE Emp 3	М			Х		
PM Project Management	PM Emp 1	F		Х			
PM Project Management	PM Emp 2	M		Х			

	Employment and Training Hours for Quarter 2											
	Training											
Total Hours Worked by Employee for Current Quarter	EHS Awareness	EHS Health and Safety EHS ENVironmental										
Total Hours Worked by Employee for Current C	Policy & Proc	HAZWOPR	WHMIS	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)	
56.00	9.00	6.00	6.00	1.00	5.00	2.00	6.00	9.00	4.00	9.00	4.00	
101.00	6.00	-	7.00	4.00	6.00	-	2.00	8.00	1.00	4.00	8.00	
134.00	4.00	6.00	6.00	3.00	2.00	5.00	3.00	2.00	1.00	10.00	7.00	
157.00	10.00	9.00	8.00	2.00	3.00	10.00	3.00	1.00	1.00	10.00	3.00	
85.00	8.00	7.00	2.00	8.00	10.00	6.00	7.00	10.00	7.00	1.00	10.00	
92.00	5.00	4.00	4.00	4.00	-	8.00	10.00	10.00	7.00	8.00	2.00	
239.00	5.00	5.00	-	2.00	3.00	1.00	-	10.00	8.00	9.00	8.00	
87.00	6.00	4.00	9.00	1.00	9.00	1.00	9.00	9.00	-	7.00	5.00	
226.00	7.00	1.00	2.00	4.00	7.00	2.00	10.00	4.00	6.00	4.00	7.00	
243.00	1.00	1.00	8.00	5.00	8.00	7.00	-	9.00	9.00	3.00	3.00	
185.00	7.00	5.00	3.00	10.00	7.00	1.00	3.00	2.00	10.00	1.00	-	
80.00	7.00	1.00	-	6.00	8.00	4.00	4.00	9.00	7.00	4.00	1.00	
163.00	3.00	8.00	3.00	7.00	5.00	6.00	4.00	10.00	4.00	1.00	5.00	
259.00	2.00	9.00	8.00	3.00	5.00	8.00	-	8.00	4.00	8.00	1.00	
217.00	8.00	3.00	6.00	2.00	9.00	9.00	10.00	9.00	4.00	6.00	4.00	
62.00	9.00	7.00	1.00	9.00	3.00	1.00	8.00	9.00	6.00	1.00	9.00	
291.00	-	9.00	-	2.00	4.00	1.00	10.00	7.00	1.00	7.00	9.00	

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

	Emplo	yee	Categor	ization					
		der	Employee Category ³						
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	Employee Gender	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration		
Supplier Internal Resource	Emp 1	М				\ \ ^x /			
Supplier Internal Resource	Emp 2	F				/ x \			
Supplier Internal Resource	Emp 3	M							
Supplier Internal Resource	Emp 4	F				x\			
Supplier Internal Resource	Emp 5	Μ				Х			
Supplier Internal Resource	Emp 6	F			Х				
Supplier Internal Resource	Emp 7	М				Х			
Supplier Internal Resource	Emp 8	F					X		
Expert Abatement Inc	EA Emp 1	М			X				
Expert Abatement Inc	EA Emp 2	F			X				
Expert Abatement Inc	EA Emp 3	М			Х				
Expert Abatement Inc	EA Emp 4	F			Х				
Northern Excavation	NE Emp 1	М			Х				
Northern Excavation	NE Emp 2	F			X				
Northern Excavation	NE Emp 3	М			Х				
PM Project Management	PM Emp 1	F		Х					
PM Project Management	PM Emp 2	M		Х					

	Employment and Training Hours for Quarter 3											
	Training											
Total Hours Worked by Employee for Current Quarter	EHS Awareness				EHS Health and Safety				EHS.	Environmental	б	
	Policy & Proc	HAZWOPR	WHMIS	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)	
229.00	9.00	2.00	8.00	3.00		-	9.00	7.00	6.00	9.00	9.00	
274.00	3.00	2.00	-	8.00	7.00	9.00	2.00	3.00	7.00	9.00	8.00	
14.00	9.00	4.00	7.00	-	5.00	5.00	5.00	7.00	9.00	1.00	5.00	
111.00	1.00	2.00	10.00	9.00	6.00	9.00	1.00	-	5.00	6.00	2.00	
39.00	9.00	-	6.00	-	7.00	10.00	3.00	4.00	1.00	9.00	2.00	
68.00	9.00	6.00	2.00	9.00	5.00	4.00	9.00	6.00	-	5.00	6.00	
226.00	-	-	9.00	8.00	4.00	-	3.00	9.00	10.00	-	2.00	
88.00	1.00	-	7.00	10.00	3.00	3.00	-	9.00	1.00	1.00	9.00	
88.00	9.00	10.00	6.00	6.00	3.00	8.00	2.00	2.00	3.00	8.00	7.00	
45.00	1.00	9.00	9.00	7.00	5.00	9.00	7.00	3.00	5.00	2.00	10.00	
42.00	1.00	4.00	8.00	10.00	7.00	2.00	9.00	8.00	6.00	3.00	9.00	
74.00	8.00	5.00	9.00	4.00	3.00	3.00	5.00	-	5.00	9.00	4.00	
218.00	10.00	_	1.00	-	2.00	4.00	9.00	-	9.00	7.00	9.00	
99.00	2.00	9.00	4.00	7.00	-	1.00	7.00	6.00	9.00	1.00	5.00	
173.00	8.00	5.00	5.00	1.00	8.00	5.00	4.00	2.00	9.00	4.00	5.00	
236.00	-	6.00	5.00	6.00	-	5.00	10.00	1.00	-	6.00	1.00	
51.00	1.00	1.00	5.00	4.00	-	3.00	10.00	9.00	9.00	1.00	4.00	

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

	Emplo	yee	Categor	ization					
		der	Employee Category ³						
Relationship to Supplier: Please specify "Supplier Internal Resource" or indicate the Subcontractor Name if applicable ¹	Employee ID	Employee Gender	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	× Northern, Aboriginal	Aboriginal Opportunity Consideration		
Supplier Internal Resource	Emp 1	М				\ \v_x /			
Supplier Internal Resource	Emp 2	F				/ x \			
Supplier Internal Resource	Emp 3	М							
Supplier Internal Resource	Emp 4	F				x\			
Supplier Internal Resource	Emp 5	М				Х			
Supplier Internal Resource	Emp 6	F			Х				
Supplier Internal Resource	Emp 7	М				Х			
Supplier Internal Resource	Emp 8	F					X		
Expert Abatement Inc	EA Emp 1	M			Х				
Expert Abatement Inc	EA Emp 2	F			X				
Expert Abatement Inc	EA Emp 3	М			х				
Expert Abatement Inc	EA Emp 4	F			Х				
Northern Excavation	NE Emp 1	М			Х				
Northern Excavation	NE Emp 2	F			Х				
Northern Excavation	NE Emp 3	М			Х				
PM Project Management	PM Emp 1	F		Х					
PM Project Management	PM Emp 2	M		Х					

Employment and Training Hours for Quarter 4												
						Training						
Total Hours Worked by Employee for Current Quarter	EHS Awareness				EHS Health and Safety				EHS	Environmental	б	
Total Hours Worked by Employee for Current C	Policy & Proc	HAZWOPR	SIWHM	First Aid	Wildlife safety	Water safety	Fire response	Other	Spills response	Other	General Training (Non-EHS)	
174.00	-	3.00	7.00	3.00	1.00	-	10.00	2.00	9.00	2.00	9.00	
44.00	10.00	2.00	2.00	-	3.00	2.00	10.00	4.00	6.00	2.00	-	
122.00	7.00	10.00	4.00	4.00	10.00	4.00	2.00	8.00	5.00	7.00	10.00	
159.00	2.00	3.00	2.00	4.00	7.00	3.00	•	3.00	•	4.00	6.00	
31.00	6.00	-	3.00	9.00	4.00	7.00	2.00		9.00	-	2.00	
129.00	7.00	9.00	5.00	1.00	4.00	7.00	1.00	4.00	1.00	5.00	7.00	
50.00	10.00	-	-	10.00	10.00	5.00	-		3.00	1.00	7.00	
41.00	6.00	2.00	-	5.00	4.00	-	2.00	1.00	10.00	6.00	5.00	
168.00	9.00	9.00	8.00	2.00	-	-	8.00	1.00	3.00	4.00	9.00	
173.00	10.00	4.00	6.00	7.00	10.00	3.00	1.00	5.00	7.00	-	7.00	
157.00	-	2.00	9.00	4.00	5.00	10.00	4.00	8.00	10.00	10.00	-	
190.00	9.00	8.00	7.00	10.00	6.00	5.00	10.00	7.00	6.00	10.00	10.00	
273.00	-	8.00	5.00	7.00	4.00	2.00	7.00	6.00	-	5.00	6.00	
88.00	-	3.00	6.00	10.00	9.00	-	5.00	-	8.00	3.00	3.00	
22.00	10.00	9.00	9.00	4.00	7.00	5.00	10.00	-	3.00	10.00	9.00	
284.00	8.00	-	4.00	3.00	6.00	1.00	6.00	9.00	5.00	4.00	4.00	
286.00	2.00	2.00	1.00	2.00	4.00	-	5.00	2.00	9.00	5.00	3.00	

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

	ACIVIL Genera	ai Constituction		370	1				
	Su	pplier Categoriza	ation			Supplier	Utilization		
			Supplier Category	2		Quarter: 1			
Please specify "Supplier Internal Costs" or indicate the Subcontractor Name if applicable ¹	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)		
Supplier Internal Costs		_		X		X	\$ 1,735		
Expert Abatement Inc			X			X	\$ 17,122		
Northern Excavation			X			X	\$ 19,559		
PM Project Management	х					x	\$ 12,175		
-									

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

	ACIVIL GENERA	ar 00110tt 00tt011		3 / 0	1			
	Su	pplier Categoriza	ation			Supplier	Utilization	
			Supplier Category	2		Quarter: 2		
Please specify "Supplier Internal Costs" or indicate the Subcontractor Name if applicable ¹	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)	
Supplier Internal Costs				X		Х	\$ 45,321	
Expert Abatement Inc			X			Х	\$ 4,226	
Northern Excavation			X			Х	\$ 18,458	
PM Project Management	Х					Х	\$ 17,733	
-								
-								
-								
				ı	l		1	

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

Please specify "Supplier Internal	Sup	oplier Categoriza				Supplier l	Jtilization
Please specify "Supplier Internal							
Please specify "Supplier Internal			Supplier Category	2		Quarter: 3	
Costs" or indicate the Subcontractor Name if applicable ¹	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)
Supplier Internal Costs				X		X	\$ 16,788
Expert Abatement Inc			X				
Northern Excavation			X				
PM Project Management	Х						
	/						
	\longrightarrow $/$ \wedge						
			·				
			<u>'</u>				

Supplier Name	AOC Employment Target (%)
ACME General Construction	25%

			<u> </u>		·		
	Sup	oplier Categoriza	ation			Supplier	Utilization
	Supplier Category ²			Quarter: 4			
Please specify "Supplier Internal Costs" or indicate the Subcontractor Name if applicable ¹	Southern, Non- Aboriginal	Southern, Aboriginal	Northern, Non- Aboriginal	Northern, Aboriginal	Aboriginal Opportunity Consideration	Used in this Quarter ³	Value (\$)
Supplier Internal Costs				X		X	\$ 8,413
Expert Abatement Inc			X			Х	\$ 15,958
Northern Excavation			X			Х	\$ 11,251
PM Project Management	X					Х	\$ 11,123
)						

Supplier Name
ACME General Construction

Cate	egories	Metrics	Quarter: 1
EHS Performance			
Incidents, Inspections and Audits	3		
Safety Incidents	Major Incident	# of incidents	0
	Moderate Incident	# of incidents	0
	Minor Incident	# of incidents	0
	Near misses	# of near misses	0
Environmental Incidents	Environmental Incidents	# of incidents	
	M/M	Spilf Volume (L)	355
Inspections / Audits	Inspections/Audits (external)	# performed	1
/		# non-compliances	2
	Inspections/Audits (internal)	# performed	2
		#non-compliances	0
Other Corrective Actions	New procedures	# procedures	0
	Other initiatives	# initiatives	1
Consultations, Engagement	s and Media Events		
Events	Consultations	# consultations	1
		# persons	25
	Community Engagements	# community engagements	0
	,	# persons	0
	Media Events	# media events	1

Supplier Name
ACME General Construction

Cat	egories	Metrics	Quarter: 2
EHS Performance			
Incidents, Inspections and Audit	s		
Safety Incidents	Major Incident	# of incidents	1
	Moderate Incident	# of incidents	1
	Minor Incident	# of incidents	2
	Near misses	# of near misses	1
Environmental Incidents	Énvironmental Incidents	# of incidents	0
	M/ V)	Spill Volume (L)	0
Inspections / Audits	Inspections/Audits (external)	# performed	0
		# non-compliances	0
	Inspections/Audits (internal)	# performed	0
		#non-compliances	0
Other Corrective Actions	New procedures	# procedures	0
	Other initiatives	# initiatives	0
Consultations, Engagemen	ts and Media Events		
Events	Consultations	# consultations	2
		# persons	10
	Community Engagements	# community engagements	1
		# persons	60
	Media Events	# media events	0

Supplier Name
ACME General Construction

Cate	egories	Metrics	Quarter: 3
EHS Performance			
Incidents, Inspections and Audits	1		
Safety Incidents	Major Incident	# of incidents	0
	Moderate Incident	# of incidents	0
	Minor Incident	# of incidents	0
	Near misses	# of near misses	0
Environmental Incidents	Environmental Incidents	# of incidents	0
	M/ W)	Spill Volume (L)	0
Inspections / Audits	Inspections/Audits (external)	# performed	0
		# non-compliances	0
	Inspections/Audits (internal)	# performed	0
		# non-compliances	0
Other Corrective Actions	New procedures	# procedures	0
	Other initiatives	# initiatives	0
Consultations, Engagement	s and Media Events		
Events	Consultations	# consultations	0
		# persons	0
	Community Engagements	# community engagements	0
		# persons	0
	Media Events	# media events	0

Supplier Name
ACME General Construction

Cate	egories	Metrics	Quarter: 4
EHS Performance	_		
Incidents, Inspections and Audits	3		
Safety Incidents	Major Incident	# of incidents	1
	Moderate Incident	# of incidents	0
	Minor Incident	# of incidents	0
	Near misses	# of near misses	0
Environmental Incidents	Environmental Incidents	# of incidents	0
	M/M	Spill Volume (L)	0
Inspections / Audits	Inspections/Audits (external)	# performed	0
		# non-compliances	0
	Inspections/Audits (internal)	# performed	2
		# non-compliances	0
Other Corrective Actions	New procedures	# procedures	1
	Other initiatives	# initiatives	1
Consultations, Engagement	s and Media Events		
Events	Consultations	# consultations	0
		# persons	0
	Community Engagements	# community engagements	3
		# persons	75
	Media Events	# media events	0

	Glossary
Term: Aboriginal Employee	Section 35 of the Constitution Act recognizes three groups of Aboriginal people (Indians, Métis and Inuit) as descendants of the original inhabitants of North America. For the purposes of the socio-economic employment and training data, the Aboriginal Employee categories include First Nation, Inuit and/or Métis individuals who are working, either on-site or off-site, performing services related to the project for a contractor, subcontractor or supplier who has a contract with INAC or PWGSC to do work
Aboriginal Opportunities Consideration (AOC)	related to the project. Aboriginal employees of INAC or PWGSC are not included in this category. Point-rated evaluation criteria used within a competitive solicitation process which evaluate Bidders on the basis of the type and extent of commitments made to maximizing participation from the Indigenous population within the affected land claim area.
Aboriginal Supplier	Bidders are required to submit an AOC proposal demonstrating their proposed approach to implementing this component. Upon Award, the successful Bidder's proposed AOC target become a firm commitment under the contract. As defined by the Procurement Strategy for Aboriginal Business, an enterprise that is: a sole proprietorship, limited company, co operative, or not-for-profit organization in which Aboriginal persons have majority ownership and control (meaning at least 51 percent), and in which, in the case of a business enterprise with six or more full time employees, at least 33 percent of the full-time employees are Aboriginal persons; or, a joint venture or consortium in which an Aboriginal business or Aboriginal business or Aboriginal business as defined above have at least 51 percent ownership and control.
Awareness – EHS Policy and	Ideneral training, provided to individuals working on the project site, related to the Environmental Health and Safety (EHS)
Procedures Training Community Engagement	policies and procedures that apply to the site. Includes events that involve the community that are not considered formal Consultations to fulfill Duty to Consult requirements. Examples of engagement activities include meetings, workshops, discussion groups, formal dialogue, sharing knowledge, site tours, and other activities where input is sought related to the project.
Consultation	Formal Consultations that fulfill the Duty to Consult requirements related to the potential or established Aboriginal or Treaty rights recognized and affirmed in section 35 of the Constitution Act, 1982. The specific requirements for formal Consultation are outlined in the Government of Canada document: Aboriginal Consultation and Accommodation Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (March 2011). Please see:
Corrective Action	http://www.aadnc-aandc.gc.ca/eng/1100100014664/1100100014675 A corrective action within the project, on-site, which is implemented to improve operations, reduce risk to health and safety and/or the environment. Generally, this new procedure would be a direct result of an incident, inspection and/or audit.
Environmental Incident	A release or spill that is reportable as stipulated in federal or territorial legislation or in a license or permit applicable to the project. Resources to determine whether a spill or release needs to be reported can be found through the following resources:
	Yukon – Schedule A of the Spill Regulations of the Environment Act. Please see: http://www.env.gov.yk.ca/environment-you/spills.php
	Northwest Territories – Schedule B of the Spill Contingency Planning and Reporting Regulations. See:
	http://www.enr.gov.nt.ca/sites/default/files/reports/guide to spill contingency planning and reporting.pdf
	Nunavut - Schedule B of Consolidation of Spill Contingency Planning and Reporting Regulations. http://www.gov.nu.ca/sites/default/files/gnjustice2/justicedocuments/Consolidated%20Law/Original/ENVIRONMENTAL%20PRO TECTION%20ACT/633404216382987500-243762148-Req558.pdf
	• Federal - Canadian Environmental Protection Act (CEPA, 1999). For releases: Sections 95, 169, 179 and 212. For environmental emergencies: Section 201. Fisheries Act. "If there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under this Act, or if there is a serious and imminent danger of such an occurrence, and detriment to fish habitat or fish or to the use by humans of fish results or may reasonably be expected to result from the occurrence, then every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations if the person at any material time."
	CEPA and Fisheries Act reporting requirements and contact information:
First Aid Training	https://www.ec.gc.ca/ee-ue/default.asp?lanq=En&n=EED2E58C-1 Emergency First Aid, Wilderness First Aid, Cardiopulmonary Resuscitation (CPR) Level C training provided to individuals working on the project site.
HAZWOPER Training	Occupational Safety and Health Administration (OSHA, USA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training provided to individuals working on the project site.
Inspections/Audits (external)	An environmental, health and safety site inspection or audit performed by a third party expert: •A representative of an authority that has jurisdiction over the site, excluding INAC; •A consultant retained by INAC; •A representative from the project management body, excluding INAC (e.g. Territory, or Third Party Site Operator, Owner or
Inspections/Audits (internal) Major Incident	Lessee). An environmental, health and safety site inspection or audit performed by INAC staff. An incident resulting from activities performed at the project site that results in a severe and irreversible disability, impairment,
Media Events	injury, illness or fatality to an individual or individuals. Any radio, television, social media, Internet or newspaper reports and/or media tours that cover the project.
Minor Incident	An incident resulting from activities performed at the project site that results in injury or illness that inconveniences an individual
Moderate Incident	or individuals. An incident resulting from activities performed at the project site that results in a reversible disability, impairment, injury or
Near Misses	iillness that temporarily alters the lives of an individual or individuals. An incident resulting from activities performed at the project site, which did not result in any disability, impairment, injury, illness or fatality, but had the potential to do so.
New Procedure	A new procedure within the project, on-site, which is implemented to improve operations, reduce risk to health and safety and/or
Northern Employee	the environment. Generally, this new procedure would be a direct result of an incident, inspection and/or audit. A person with permanent residence of greater than six months in any of the three territories. Does not include employees of INAC or PWGSC.
Northern Supplier	A company with a head office, or other regional office, in any of the three territories.
Quarter	Q1 = April to June (inclusive), Q2 = July to September (inclusive), Q3 = October to December (inclusive), Q4 = January to March (inclusive)
WHMIS Training	Workplace Hazardous Materials Information System (WHMIS) training provided to individuals working on the project site.

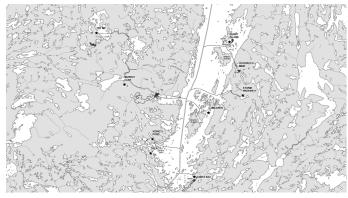
Public Works and Government Services Canada Project No. R.057573 Environmental Site Remediation Gordon Lake Group Sites, NT

ISSUED FOR TENDER
APPENDIX F
Page 1 of 1

APPENDIX FLYSHEET

APPENDIX F - PWGSC AOC Benefit Tracking







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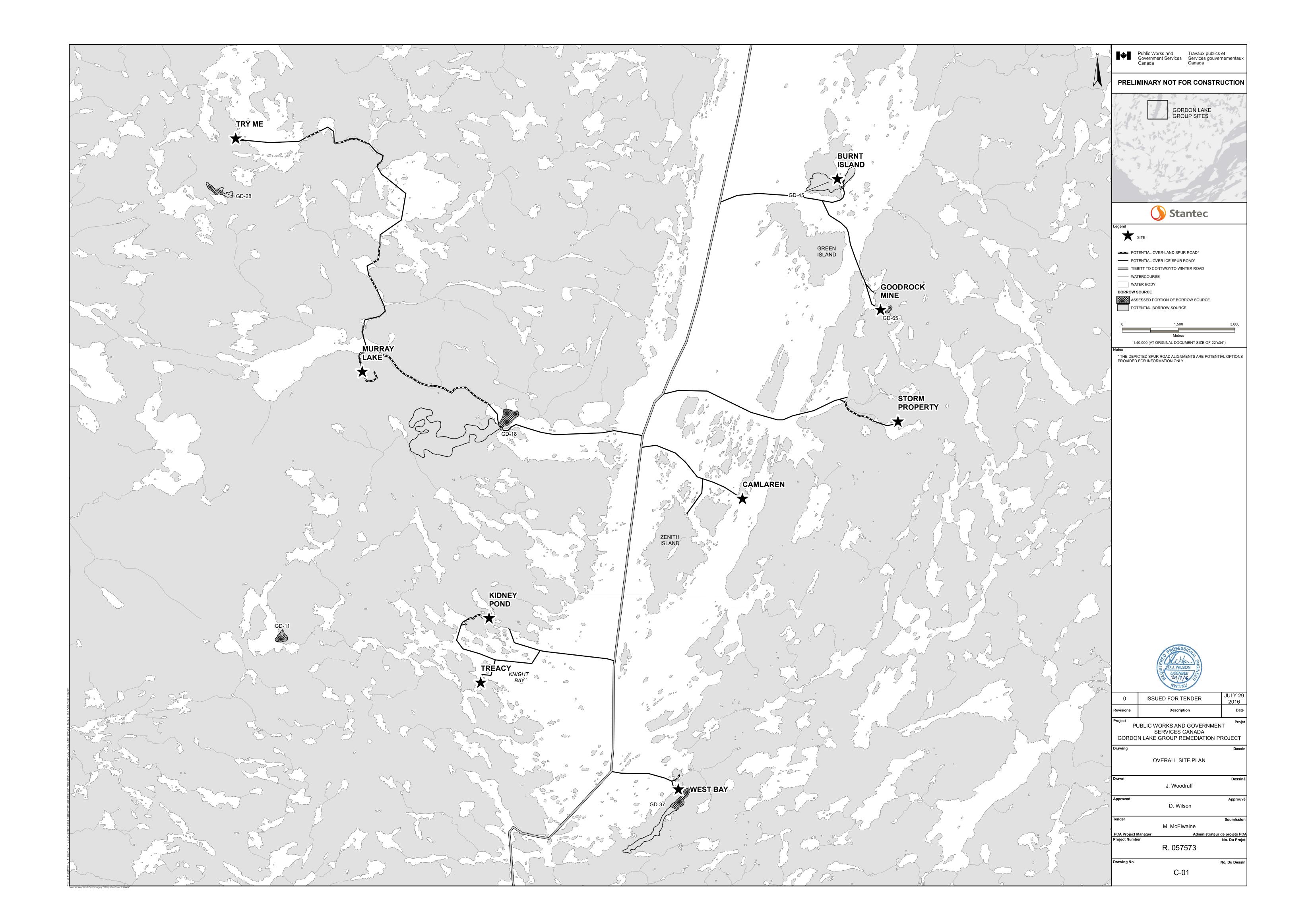
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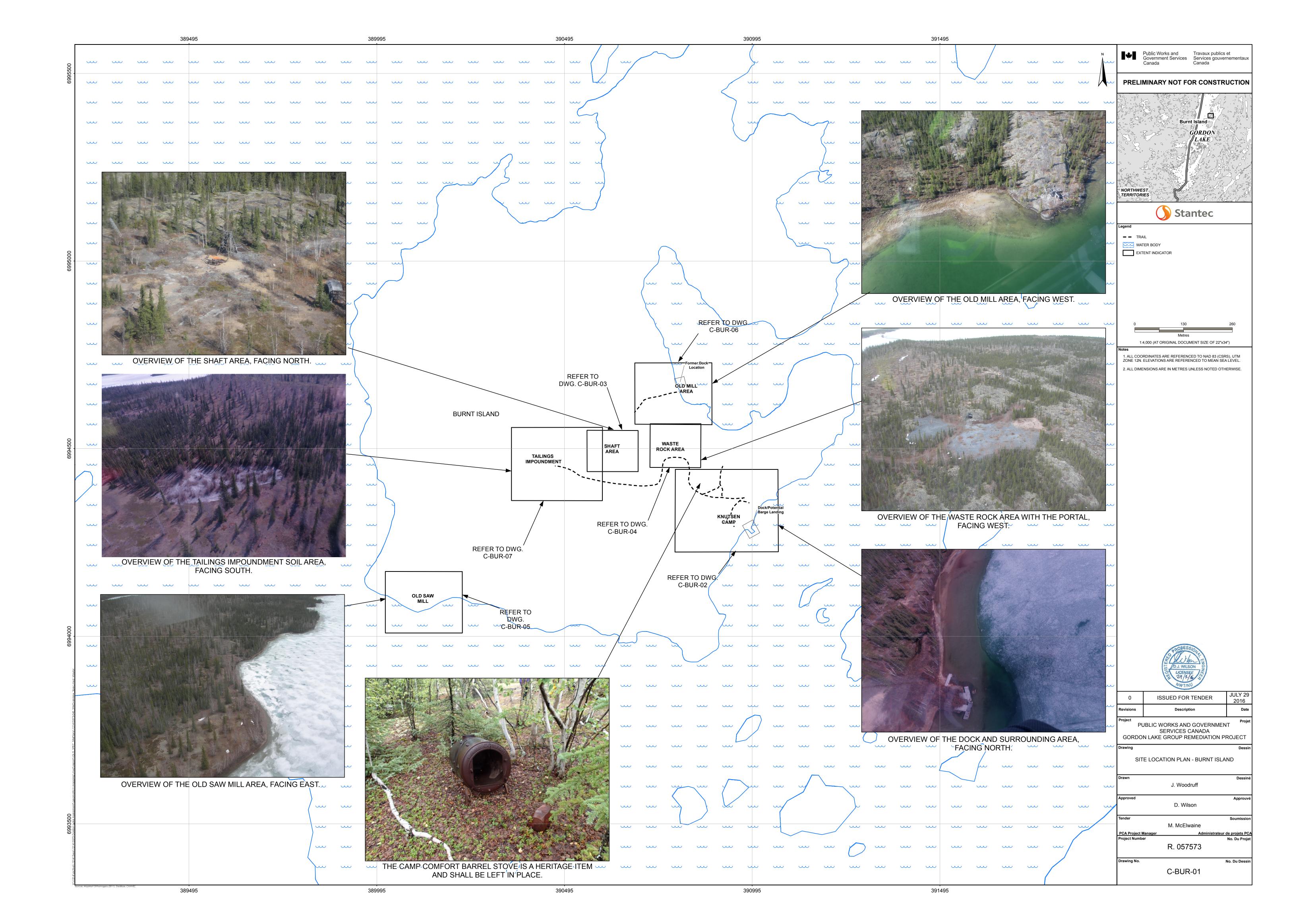
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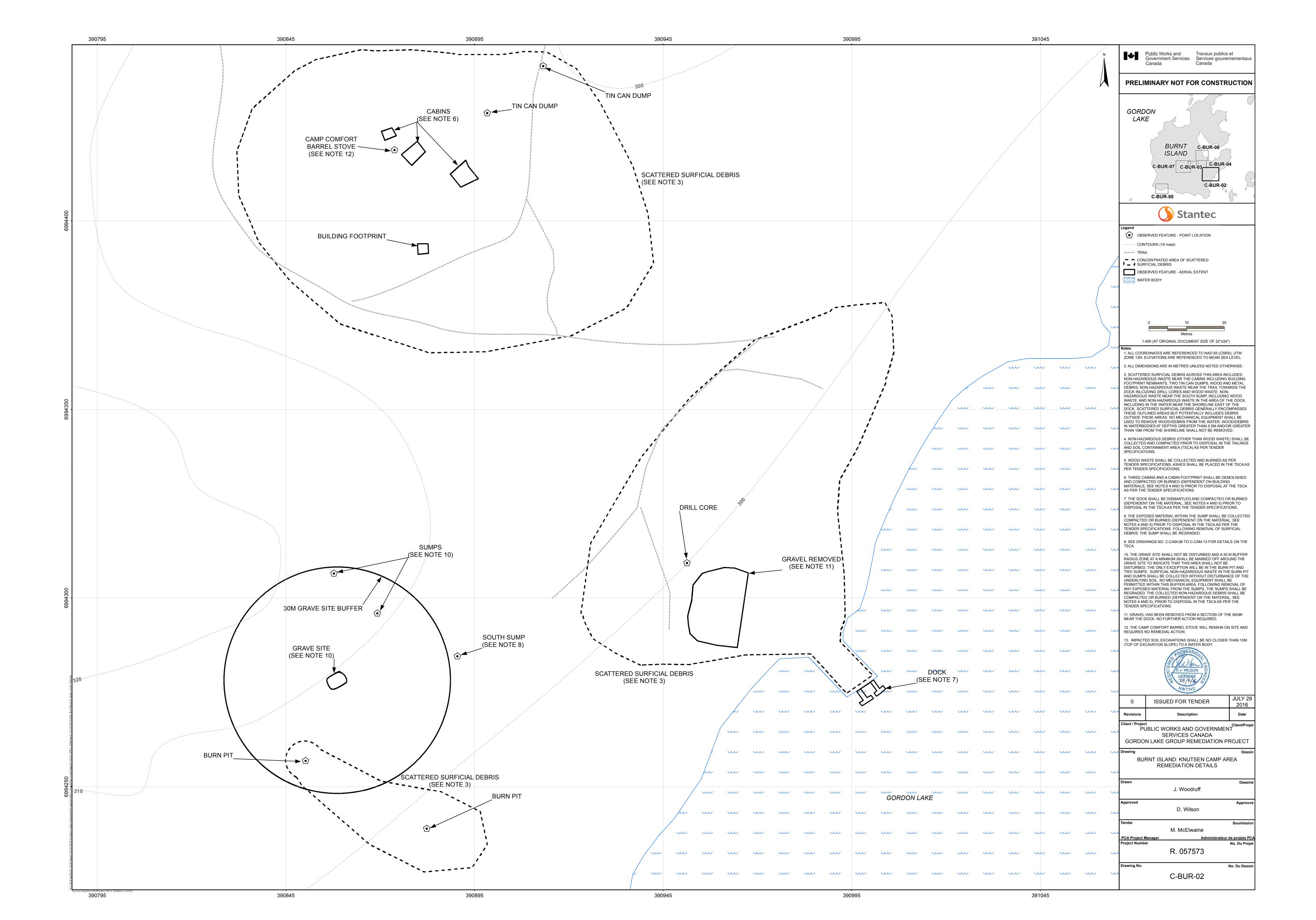
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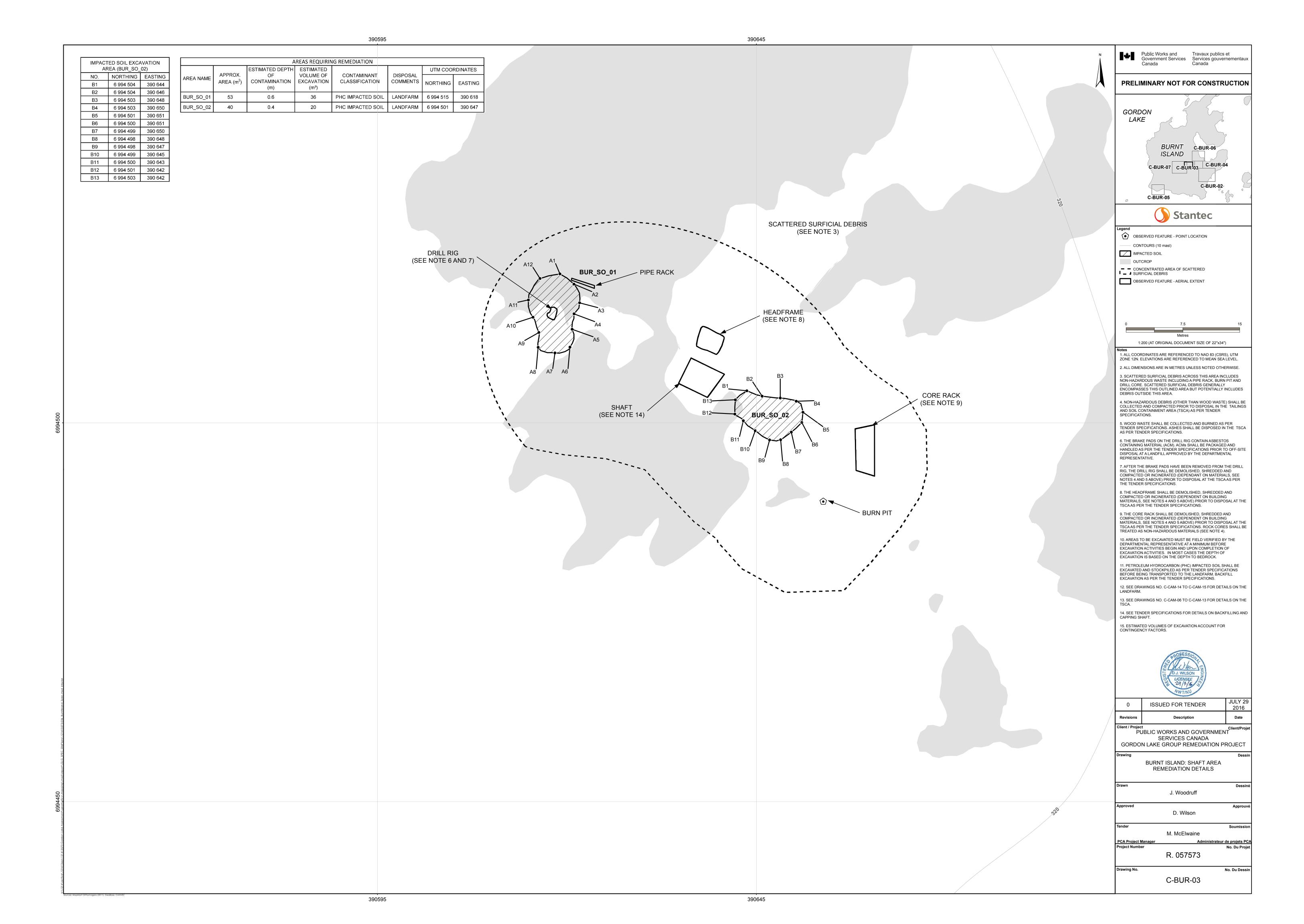
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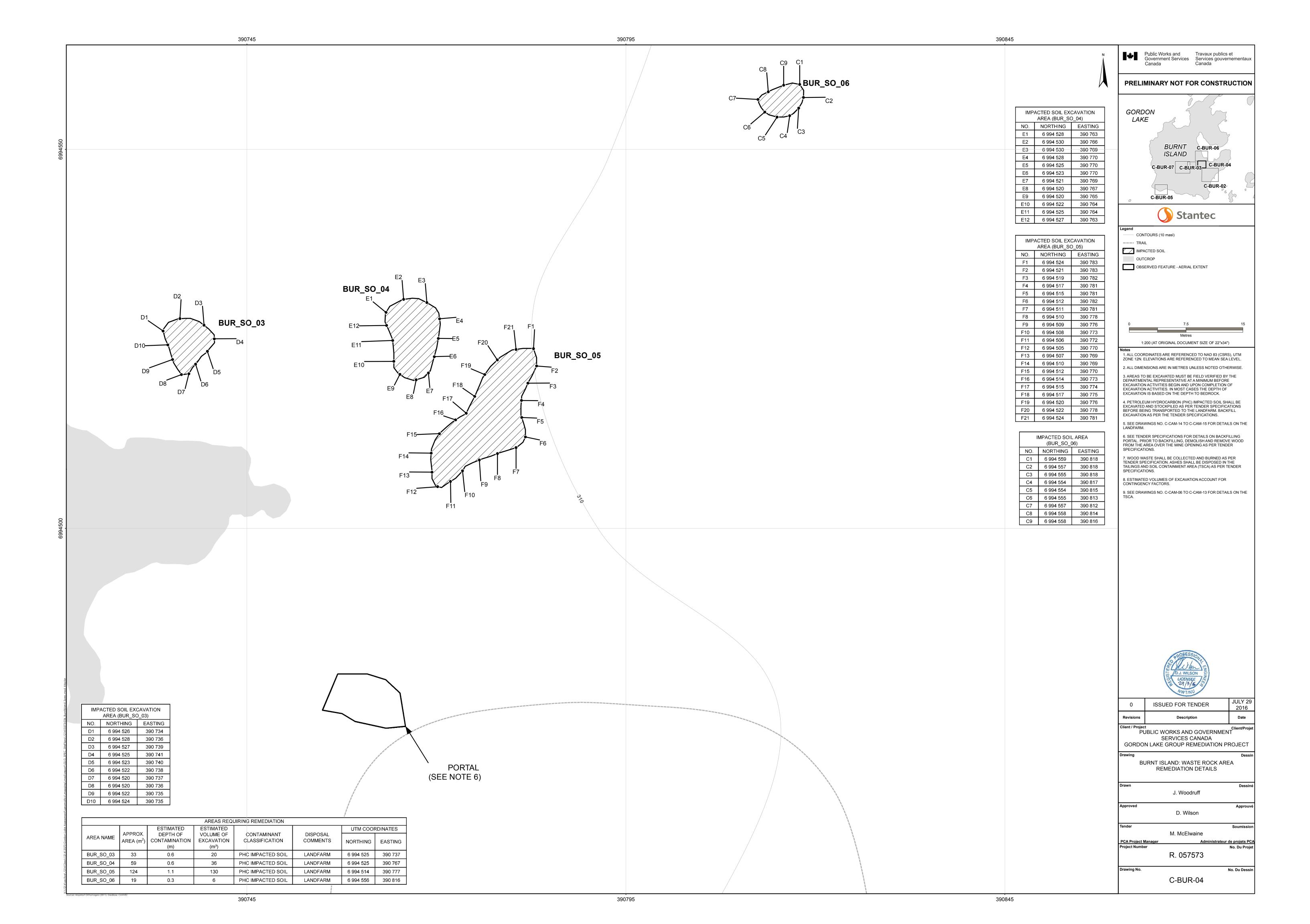
Pomodial Dra	nwinge
Remedial Dra C-01	Overall Site Plan
C-BUR-01	Site Location Plan - Burnt Island
C-BUR-02	Burnt Island - Knutsen Camp Area Remediation Details
C-BUR-03	Burnt Island - Shaft Area Remediation Details
C-BUR-04	Burnt Island - Waste Rock Area Remediation Details
C-BUR-05	Burnt Island - Old Saw Mill Remediation Details
C-BUR-06	Burnt Island - Old Mill Area Remediation Details
C-BUR-07	Burnt Island – Tailings Impoundment Area Remediation Details
C-CAM-01	Site Location Plan - Camlaren
C-CAM-02	Camlaren - Mine Area North Remediation Details
C-CAM-03	Camlaren - Mine Area South Remediation Details
C-CAM-04	Camlaren - North Cabin Remediation Details
C-CAM-05	Camlaren - Zenith Island Remediation Details
Design Drawi	ings
C-CAM-06	Camlaren - Tailings and Soil Containment Area Current Conditions
C-CAM-07	Camlaren - Tailings and Soil Containment Area Post Construction
C-CAM-08	Camlaren - Tailings and Soil Containment Area Foundation Preparation
C-CAM-09	Camlaren - Tailings and Soil Containment Area Embankment Profile
C-CAM-10	Camlaren - Tailings and Soil Containment Area Embankment Sections
C-CAM-11	
	Camlaren - Tailings and Soil Containment Area Ditch Sections and Details
C-CAM-12	Camlaren - Tailings and Soil Containment Area Ditch Perimeter Ditch Profiles
C-CAM-13	Camlaren - Tailings and Soil Containment Area Instrumentation
C-CAM-14	Camlaren - Landfarm Design Hydrocarbon Impacted Soil Treatment Cell
C-CAM-15	Camlaren - Landfarm Design Instrumentation
D	
Remedial Dra	
C-GOO-01	Site Location Plan - Goodrock
C-GOO-02	Goodrock Mine - Camp Area Remediation Details
C-GOO-03	Goodrock Mine - Mill Area Remediation Details
C-KID-01	Site Location Plan - Kidney Pond
C-KID-02	Kidney Pond - 1983 Camp Remediation Details
C-KID-03	Kidney Pond - Exploration Camp Remediation Details
C-KID-04	Kidney Pond - 1939 Camp Remediation Details
C-KID-05	Kidney Pond - Southeast Portal Area Remediation Details
C-KID-06	Kidney Pond - Portal Area Remediation Details
C-KID-07	Kidney Pond - Kidney Pond Area Remediation Details
	•
Design Drawi	ings
C-KID-08	Kidney Pond - Waste Rock and Soil Containment Area Current Conditions
C-KID-09	Kidney Pond - Waste Rock and Soil Containment Area Prepared Grade/Foundation Preparation
C-KID-10	Kidney Pond - Waste Rock and Soil Containment Area Post Construction
C-KID-11	Kidney Pond - Waste Rock and Soil Containment Area Overall Sections
C-KID-12	Kidney Pond - Waste Rock and Soil Containment Area Ditch Sections and Details
C-KID-13	Kidney Pond - Waste Rock and Soil Containment Area Excavation Sections
C-KID-13	Kidney Pond - Waste Rock and Soil Containment Area Perimeter Ditch Profiles
C-KID-14 C-KID-15	Kidney Pond - Waste Rock and Soil Containment Area Instrumentation
C-KID-16	Kidney Pond - Waste Rock and Soil Containment Area Portal Seep Water Management System
Remedial Dra	awings
C-MUR-01	Site Location Plan - Murray Lake
C-MUR-02	Murray Lake - 1938/2008 Camp Remediation Details
C-MUR-03	Murray Lake - Trench Area Remediation Details
C-STO-01	Site Location Plan - Storm Property
C-STO-02	Storm - Shaft Area Remediation Details
C-STO-03	Storm - Camp Area Remediation Details
C-TRE-01	Site Location Plan - Treacy Mine
C-TRE-02	Treacy Mine - Mill Area Remediation Details
C-TRE-03	Treacy Mine - Camp Area Remediation Details
C-TRY-01	Site Location Plan - Try Me
C-TRY-02	Try Me - Main Camp Remediation Details
C-TRY-03	Try Me - Western Camp Remediation Details
C-WES-01	Site Location Plan - West Bay
C-WES-01 C-WES-02	West Bay - South Area Remediation Details
0-WL3-UZ	West Day - Coulit Alea Nettieulalion Delaiis

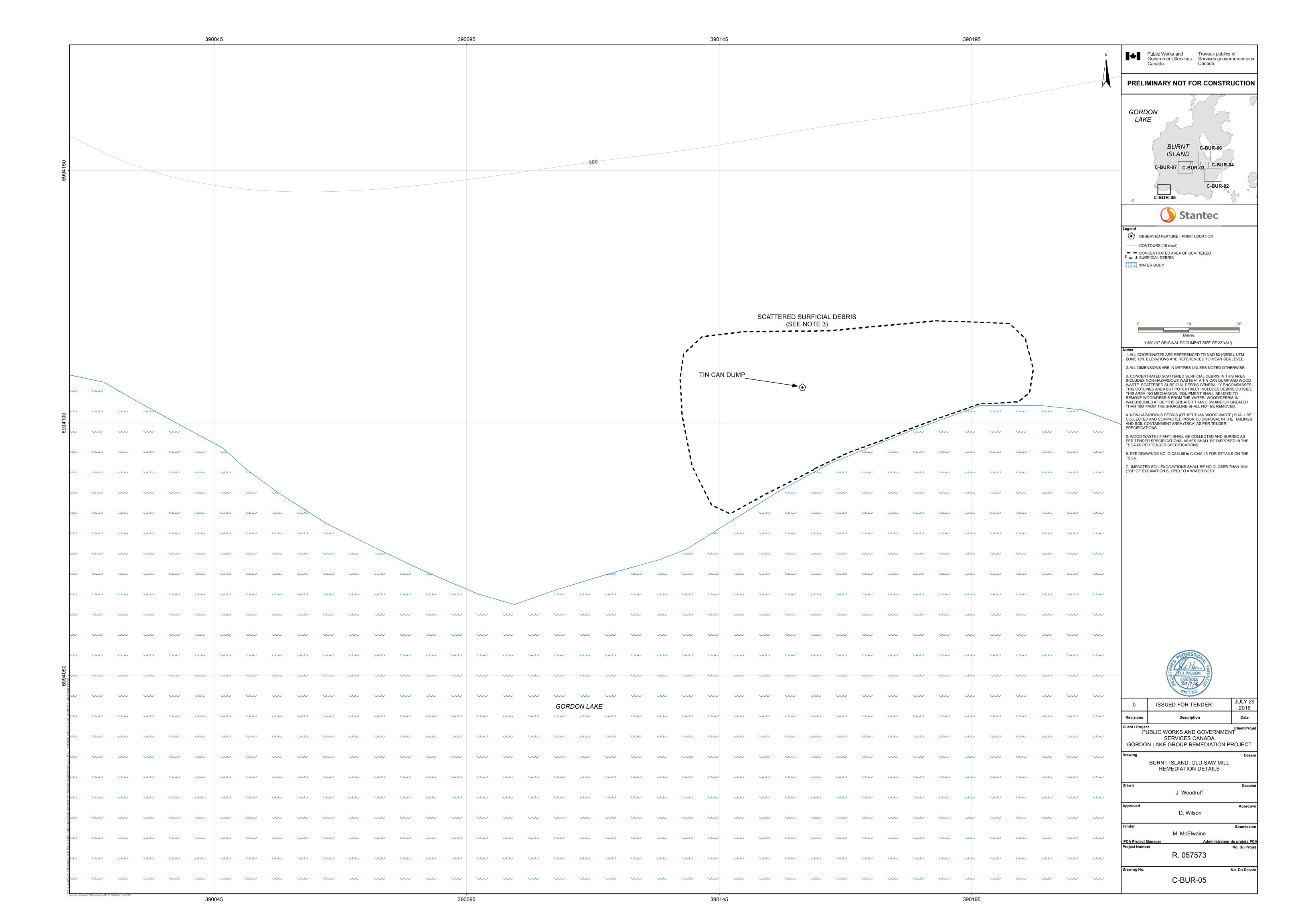


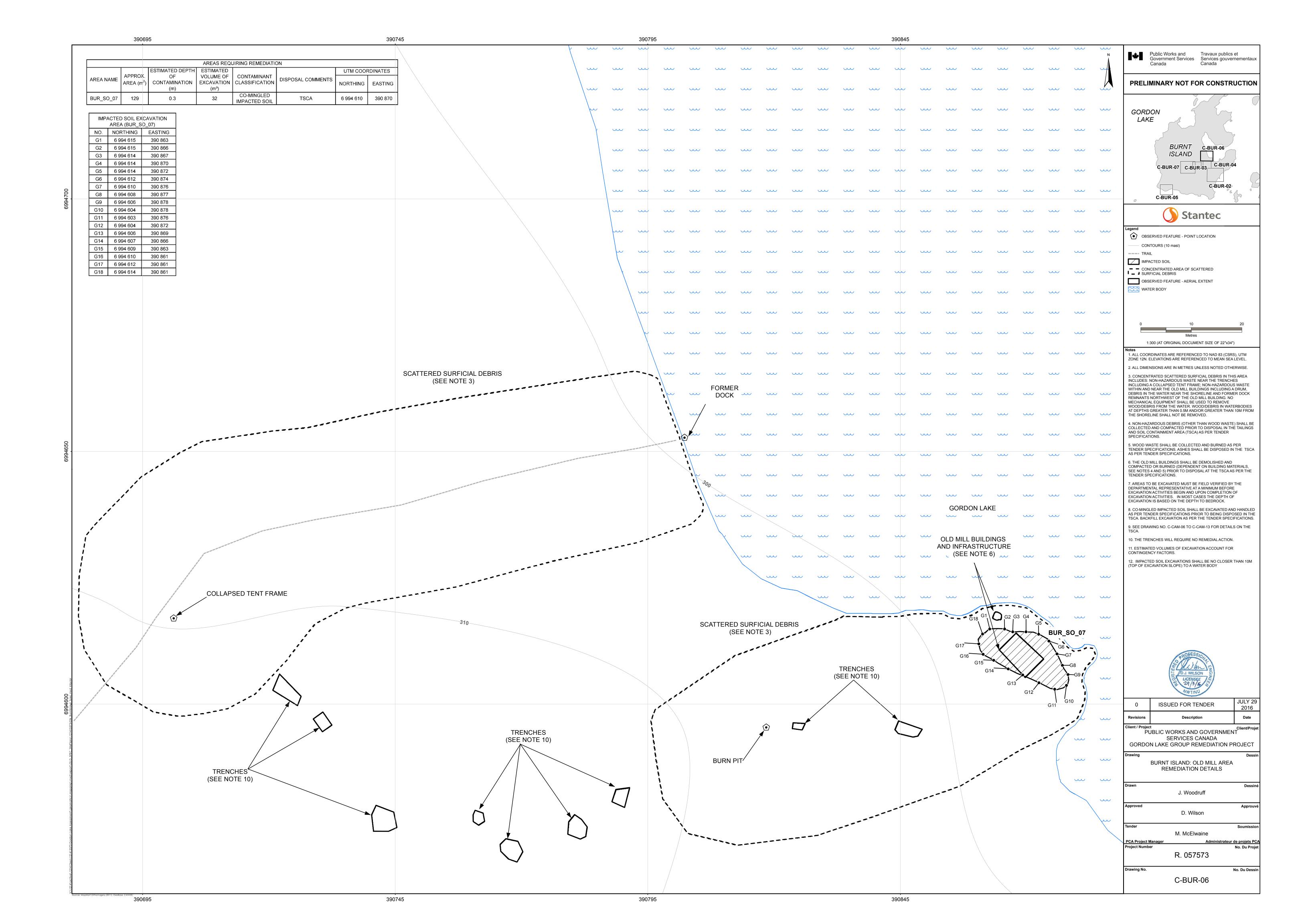


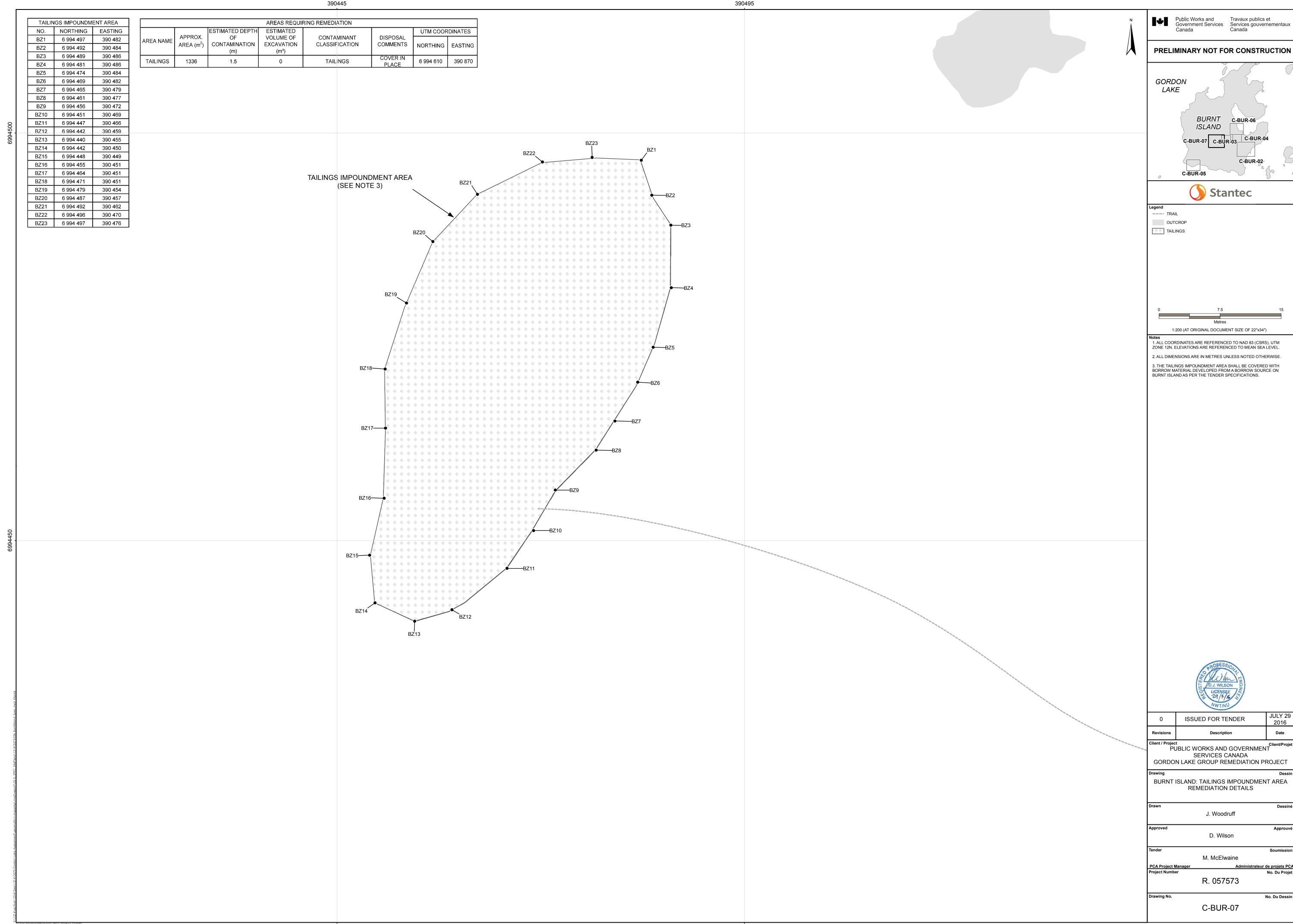


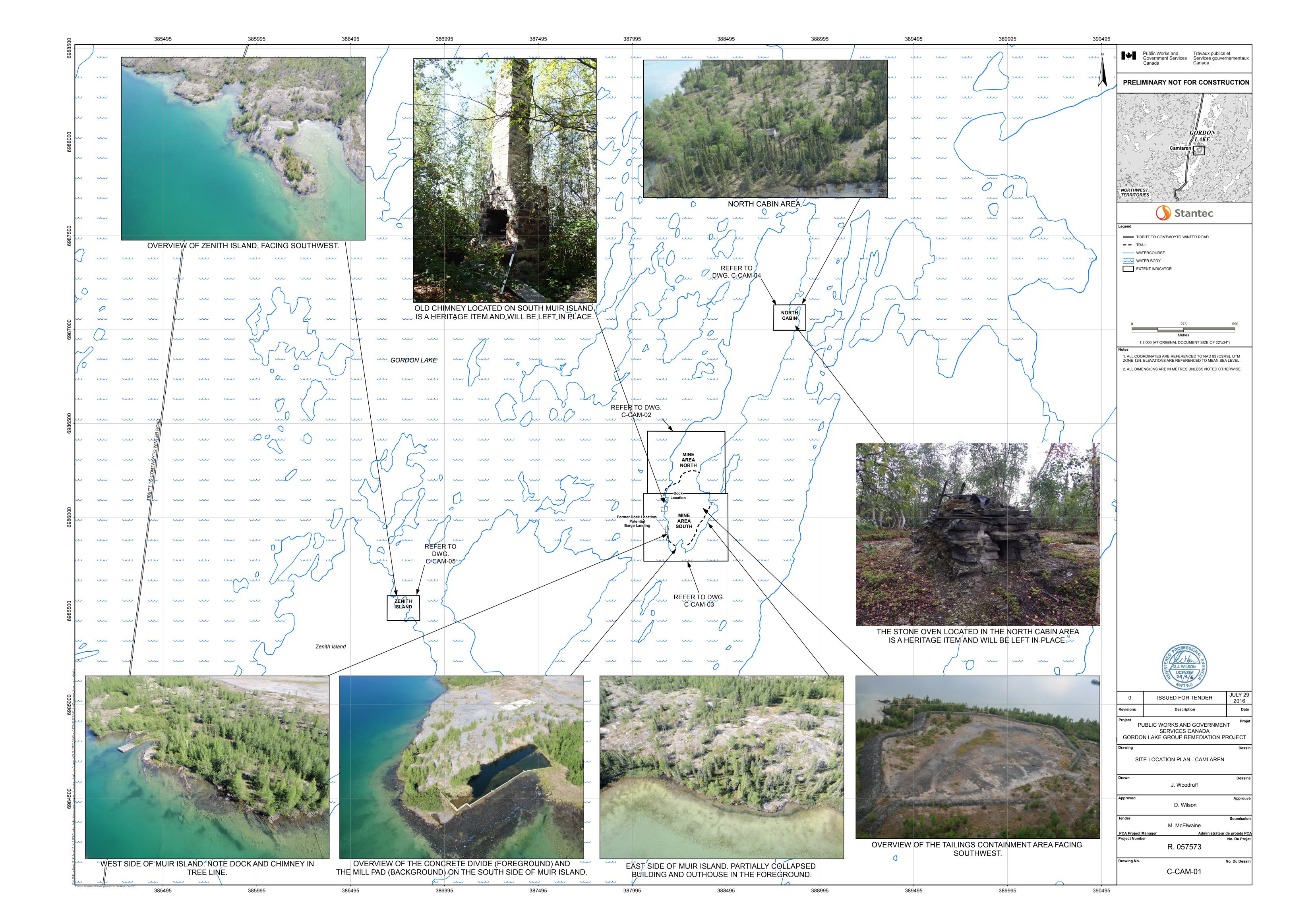


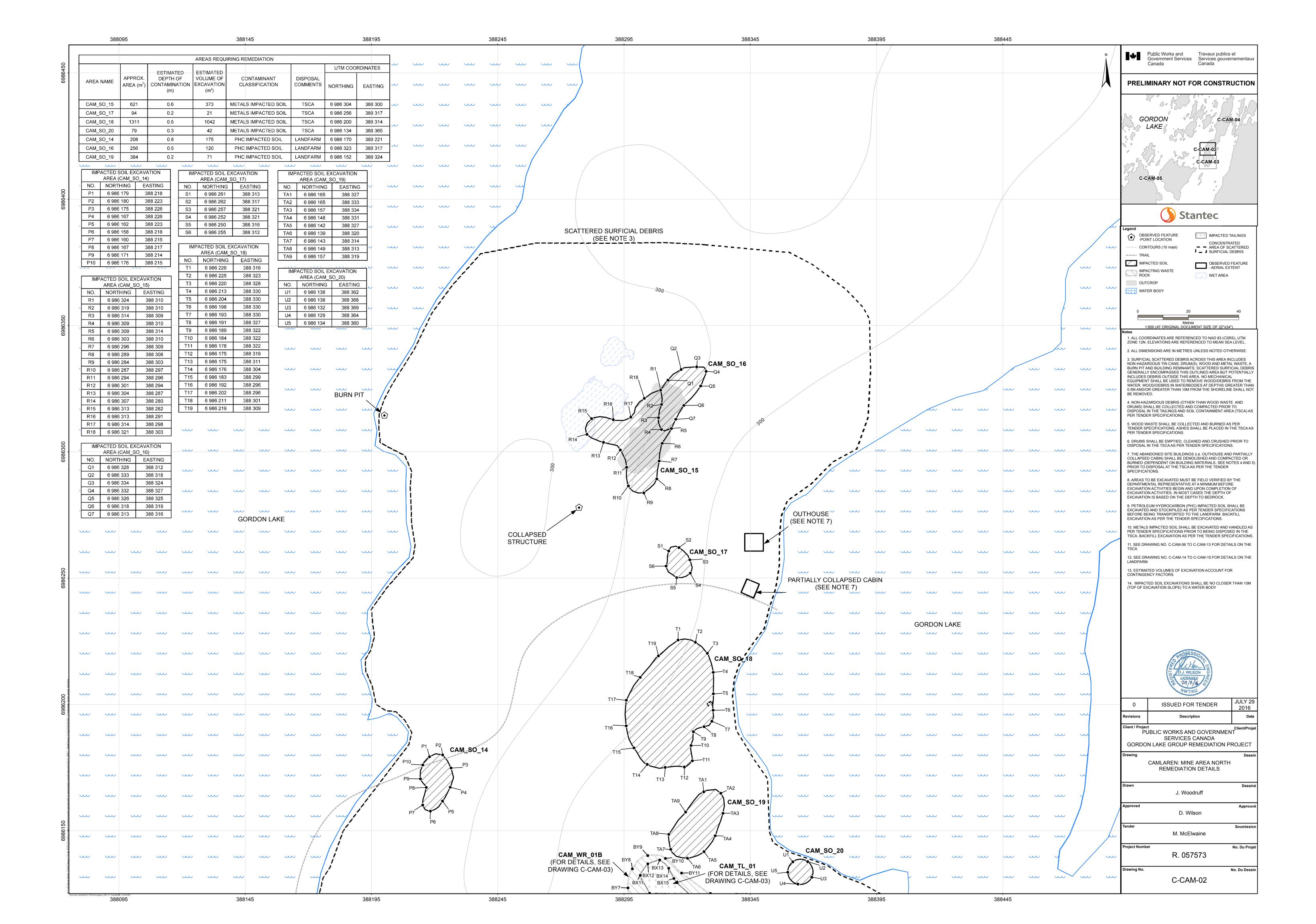


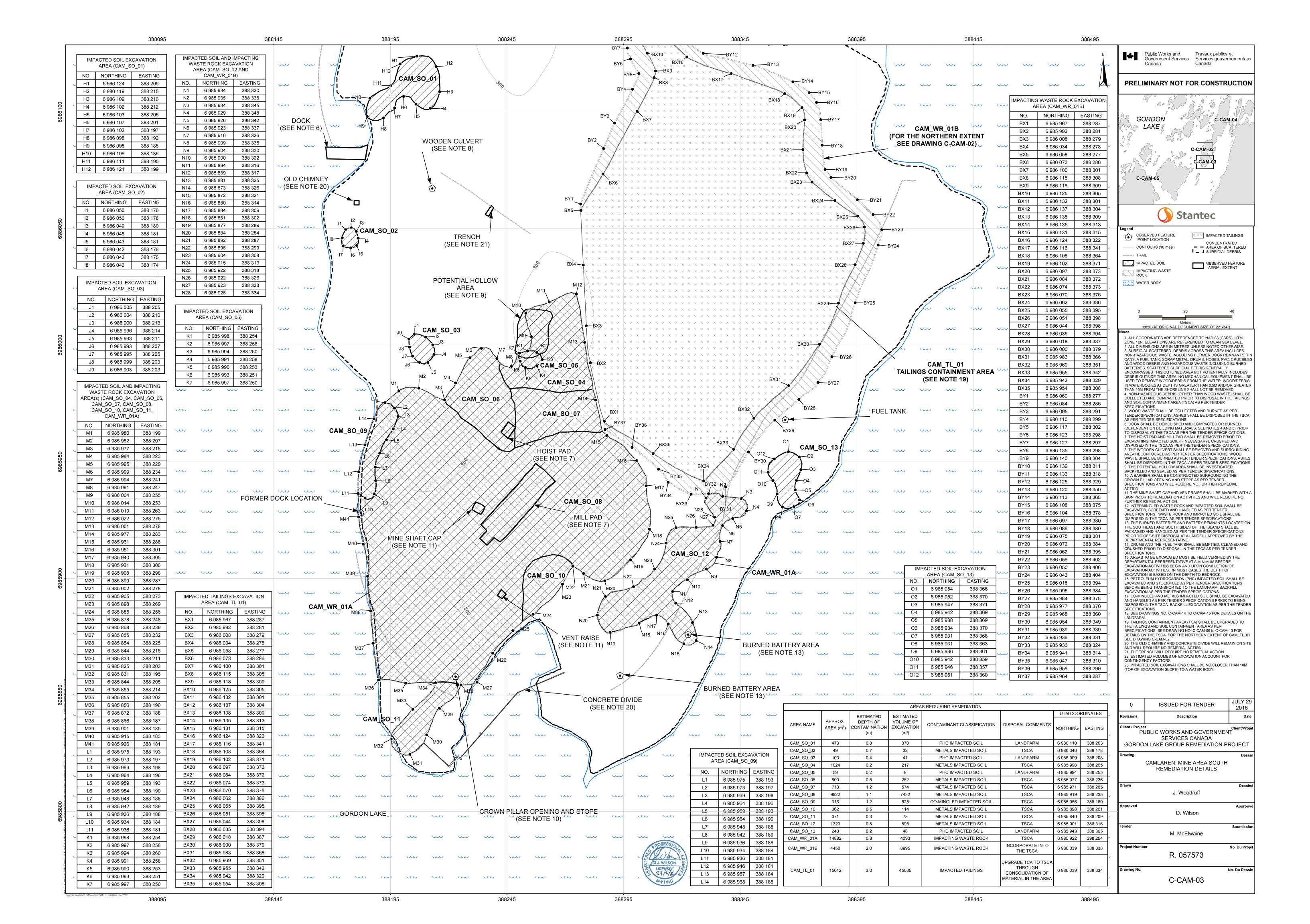


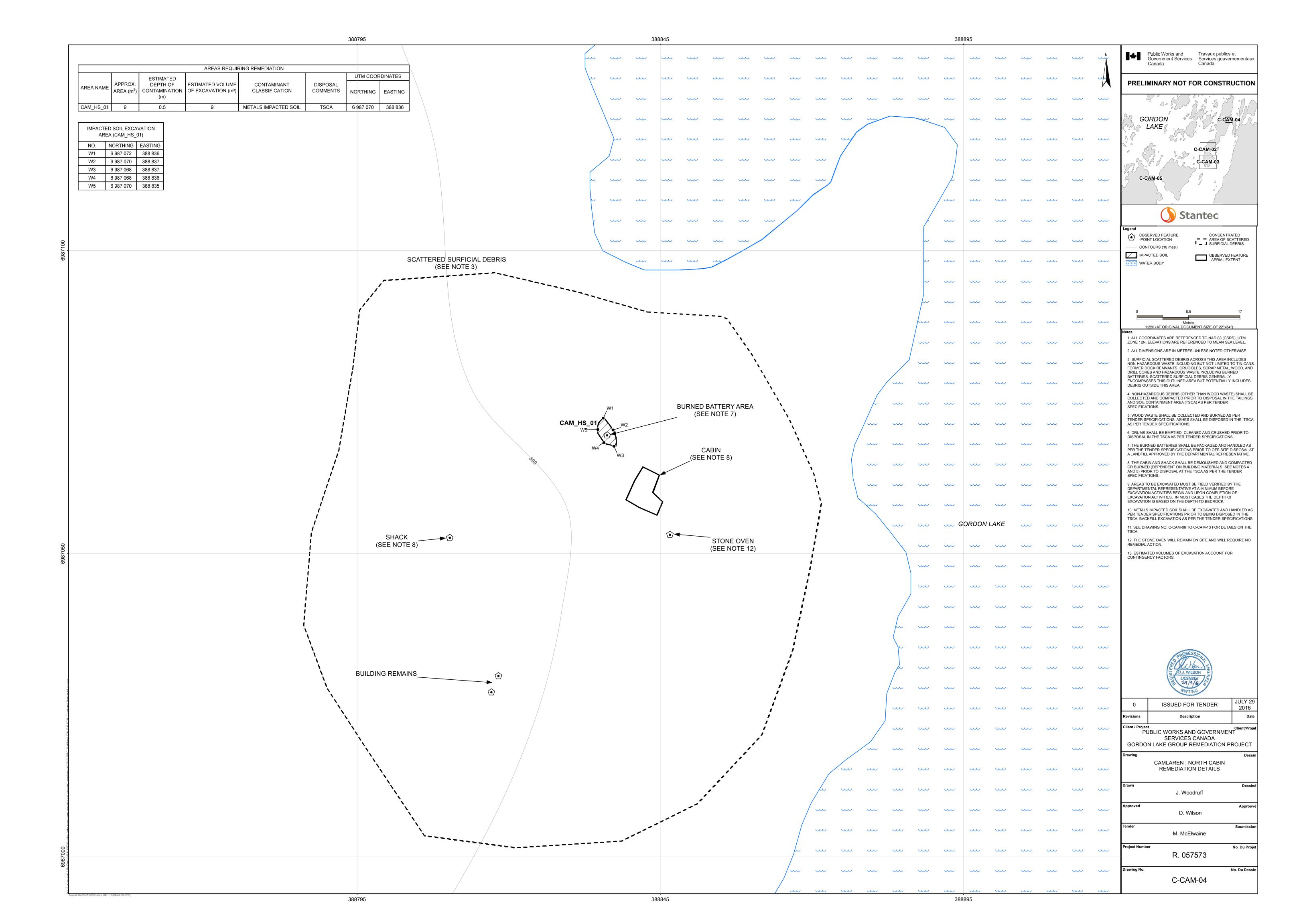












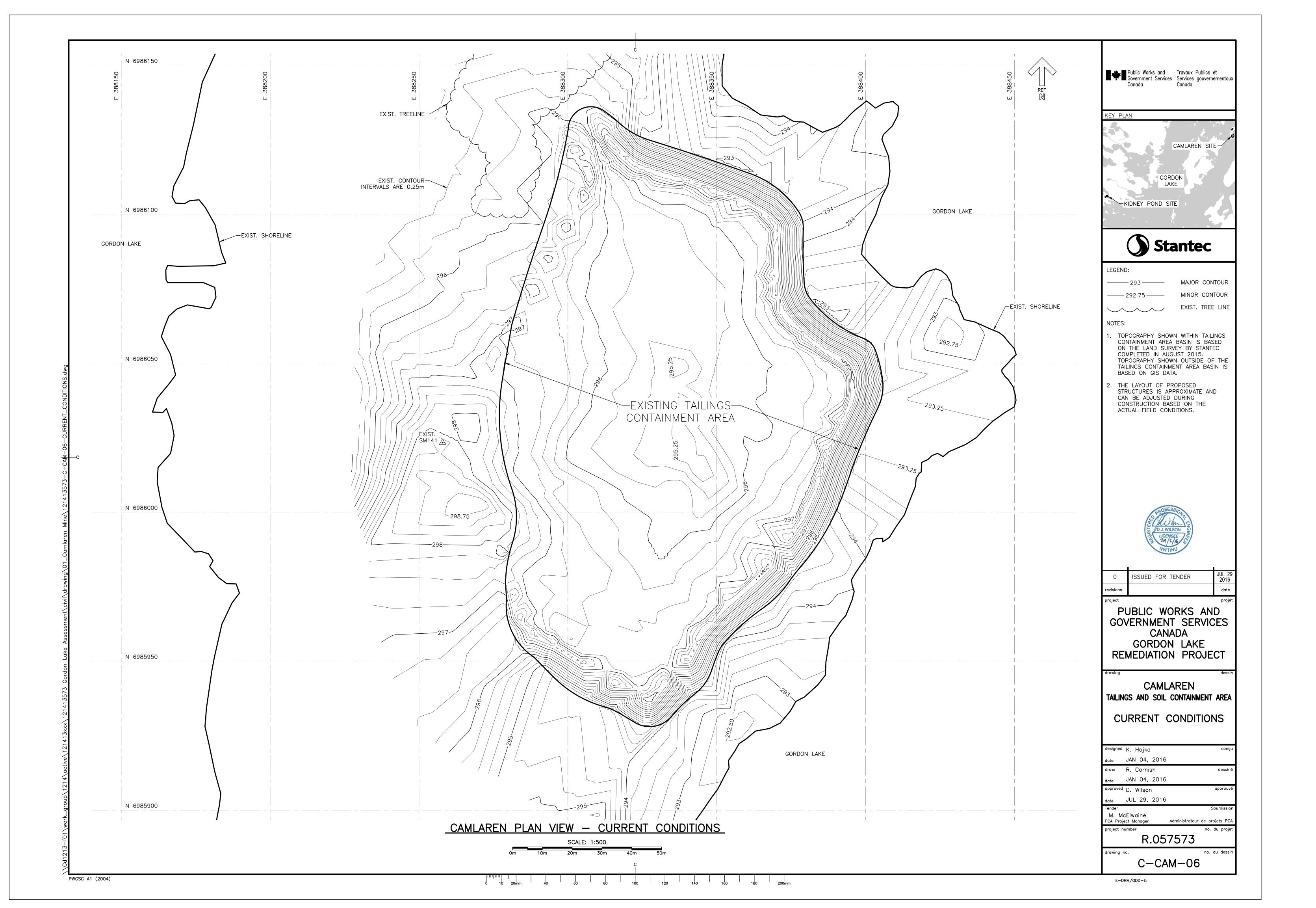
386695 386745 386795 386845 Public Works and Travaux publics et Government Services Services gouvernementaux AREAS REQUIRING REMEDIATION UTM COORDINATES **ESTIMATED** ESTIMATED DEPTH OF CONTAMINANT DISPOSAL AREA NAME **VOLUME OF** PRELIMINARY NOT FOR CONSTRUCTION COMMENTS NORTHING EASTING CONTAMINATION CLASSIFICATION AREA (m²) EXCAVATION (m³) METALS IMPACTED SOIL 0.5 TSCA 6 985 520 386 780 CAM_SO_23 1332 METALS IMPACTED SOIL CAM_SO_24 36 0.5 36 TSCA 6 985 461 386 786 C-CAM-04 LAKE CAM_WR_02A 736 1.0 294 IMPACTING WASTE ROCK TSCA 6 985 515 386 782 1.0 CAM WR 02B IMPACTING WASTE ROCK 6 985 512 386 802 C-CAM-02 0.5 IMPACTING WASTE ROCK TSCA 6 985 476 386 782 CAM_WR_03 40 C-CAM-03 SCATTERED SURFICIAL DEBRIS IMPACTING WASTE ROCK IMPACTING WASTE ROCK IMPACTED SOIL EXCAVATION (SEE NOTE 3) EXCAVATION AREA (CAM_WR_02A) EXCAVATION AREA (CAM_WR_02B AREA (CAM SO 23) NO. NORTHING EASTING NO. NORTHING | EASTING NO. | NORTHING | EASTING 386 778 6 985 543 BJ1 6 985 526 386 770 BL1 6 985 513 386 801 6 985 544 Y2 386 782 BJ2 6 985 525 386 772 BL2 | 6 985 514 | 386 803 **Stantec** Y3 6 985 543 386 786 BJ3 6 985 527 386 774 BL3 6 985 513 386 804 386 789 6 985 542 BJ4 6 985 529 386 776 BL4 6 985 512 386 803 OBSERVED FEATURE -POINT LOCATION CONCENTRATED Y5 6 985 537 386 793 BJ5 6 985 532 386 778 BL5 6 985 511 386 801 - AREA OF SCATTERED SURFICIAL DEBRIS 6 985 534 386 796 BJ6 6 985 534 386 781 6 985 512 IMPACTED SOIL BL6 386 800 6 985 529 386 797 BJ7 6 985 534 386 784 IMPACTING WASTE OBSERVED FEATURE
- AERIAL EXTENT ≟ ROCK 6 985 524 386 798 BJ8 6 985 533 386 785 OUTCROP 6 985 520 386 797 BJ9 6 985 533 | 386 787 WATER BODY 6 985 517 386 795 BJ10 6 985 536 386 789 Y3 6 985 512 386 793 BJ11 6 985 539 386 790 Y12 6 985 511 386 797 386 790 BJ12 6 985 541 386 801 Y13 6 985 502 BJ13 6 985 541 386 790 Y14 6 985 498 386 800 BJ14 6 985 538 386 791 386 798 Y15 | 6 985 497 BJ15 6 985 535 386 795 **COLLAPSED HEADFRAME** 6 985 496 386 794 LALL COORDINATES ARE REFERENCED TO NAD 83 (CSRS). UTM BJ16 6 985 531 386 797 ZONE 12N. ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL. 6 985 496 386 788 BJ17 6 985 528 386 796 2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. 386 784 6 985 497 BJ18 6 985 525 386 794 3. SURFICIAL SCATTERED DEBRIS ACROSS THIS AREA INCLUDES NON-HAZARDOUS WASTE INCLUDING BUT NOT LIMITED TO A 386 783 6 985 499 BJ19 6 985 522 | 386 791 COLLAPSED HEADFRAME, TIN CANS, SCRAP METAL, WOOD, AND DRILL RODS. SCATTERED SURFICIAL DEBRIS GENERALLY Y20 6 985 504 386 784 BJ20 6 985 519 386 788 ENCOMPASSES THIS OUTLINED AREA BUT POTENTIALLY INCLUDES DEBRIS OUTSIDE THIS AREA. NO MECHANICAL EQUIPMENT SHALL BI Y21 6 985 509 386 783 BJ21 USED TO REMOVE WOOD/DEBRIS FROM THE WATER. WOOD/DEBRIS 6 985 517 386 786 IN WATERBODIES AT DEPTHS GREATER THAN 0.5M AND/OR GREATER Y22 6 985 511 386 783 BJ22 6 985 515 386 786 THAN 10M FROM THE SHORELINE SHALL NOT BE REMOVED. Y23 386 781 6 985 509 4. NON-HAZARDOUS DEBRIS (OTHER THAN WOOD WASTE) SHALL BE BJ23 6 985 513 386 783 COLLECTED AND COMPACTED PRIOR TO DISPOSAL IN THE TAILINGS AND SOIL CONTAINMENT AREA (TSCA) AS PER TENDER Y24 6 985 506 386 779 BJ24 6 985 508 386 779 SPECIFICATIONS. Y25 6 985 504 386 777 BJ25 6 985 506 386 778 5. WOOD WASTE SHALL BE COLLECTED AND BURNED AS PER TENDER SPECIFICATIONS. ASHES SHALL BE DISPOSED IN THE TSCA 386 773 Y26 6 985 503 BJ26 6 985 504 386 776 AS PER TENDER SPECIFICATIONS. Y27 6 985 502 386 770 BJ27 6 985 505 386 774 3. THE SHAFT SHALL BE BACKFILLED AND CAPPED WITH AN ENGINEERED CAP AS PER THE TENDER SPECIFICATIONS. Y28 6 985 502 386 765 BJ28 6 985 508 386 769 6 985 503 386 762 DEPARTMENTAL REPRESENTATIVE AT A MINIMUM BEFORE 6 985 512 386 765 EXCAVATION ACTIVITIES BEGIN AND UPON COMPLETION OF Y30 6 985 507 386 762 EXCAVATION ACTIVITIES. IN MOST CASES THE DEPTH OF BJ30 6 985 514 386 763 CAM WR 02B BL2 EXCAVATION IS BASED ON THE DEPTH TO BEDROCK. Y31 6 985 509 386 765 6 985 516 386 765 EXCAVATED, SCREENED AND HANDLED AS PER TENDER 6 985 511 386 764 BJ32 6 985 516 386 762 SPECIFICATIONS PRIOR TO BEING DISPOSED IN THE TSCA. BACKFILL EXCAVATION AS PER THE TENDER SPECIFICATIONS. Y33 6 985 514 386 761 BJ33 6 985 516 386 758 9. METALS IMPACTED SOIL SHALL BE EXCAVATED AND HANDLED AS Y34 6 985 517 386 756 PER TENDER SPECIFICATIONS PRIOR TO BEING DISPOSED IN THE 6 985 518 386 756 TSCA. BACKFILL EXCAVATION AS PER THE TENDER SPECIFICATION Y35 6 985 522 386 755 BJ35 6 985 519 386 755 10. SEE DRAWING NO. C-CAM-06 TO C-CAM-13 FOR DETAILS ON THE Y36 6 985 526 386 758 BJ36 6 985 521 386 756 11. THE TRENCHES WILL REQUIRE NO REMEDIAL ACTION. 6 985 527 386 761 BJ37 6 985 528 386 761 SCATTERED WASTE ROCK PILES NEAR THE TRENCHES SHALL BE EXCAVATED. SCREENED AND HANDLED AS PER TENDER Y38 6 985 527 386 765 BJ38 6 985 528 386 762 SPECIFICATIONS PRIOR TO BEING DISPOSED IN THE TSCA. 6 985 528 386 770 BJ39 6 985 528 386 765 12. ESTIMATED VOLUMES OF EXCAVATION ACCOUNT FOR 6 985 534 Y40 386 773 Y27 6 985 510 386 787 Y28 13. IMPACTED SOIL EXCAVATIONS SHOULD BE NO CLOSER THAN 10M (TOP OF EXCAVATION SLOPE) TO A WATER BODY. Y41 6 985 539 386 775 BK2 6 985 511 386 791 BK3 6 985 512 386 795 SHAFT 6 985 510 386 797 BK4 IMPACTED SOIL EXCAVATION (SEE NOTE 6) AREA (CAM_SO_24) BK5 6 985 509 386 795 BK6 6 985 508 386 792 NO. NORTHING **EASTING** BK7 6 985 465 386 789 6 985 508 386 789 BK8 6 985 509 386 786 386 786 6 985 466 BK9 386 782 6 985 511 386 797 6 985 463 BM1 6 985 502 386 800 Z4 6 985 460 386 781 TRENCH BM2 6 985 458 386 782 6 985 501 386 801 (SEE NOTE 11) 6 985 461 386 785 BM3 6 985 500 386 801 6 985 463 386 788 BM4 6 985 499 386 799 BM5 6 985 498 386 797 BM6 6 985 499 386 796 CAM WR 03 JULY 29 SCATTERED IMPACTING WASTE ROCK BM7 6 985 500 | 386 797 ISSUED FOR TENDER 2016 (SEE NOTE 11) BM8 6 985 501 386 795 BM9 6 985 503 386 794 **TRENCHES** PUBLIC WORKS AND GOVERNMENT 6 985 502 386 795 (SEE NOTE 1 SERVICES CANADA BM11 6 985 501 386 798 GORDON LAKE GROUP REMEDIATION PROJECT CAM_SO_24 CAMLAREN: ZENITH ISLAND REMEDIATION DETAILS J. Woodruff Approuv D. Wilson Soumissi M. McElwaine No. Du Projet R. 057573 No. Du Dessin \sim C-CAM-05

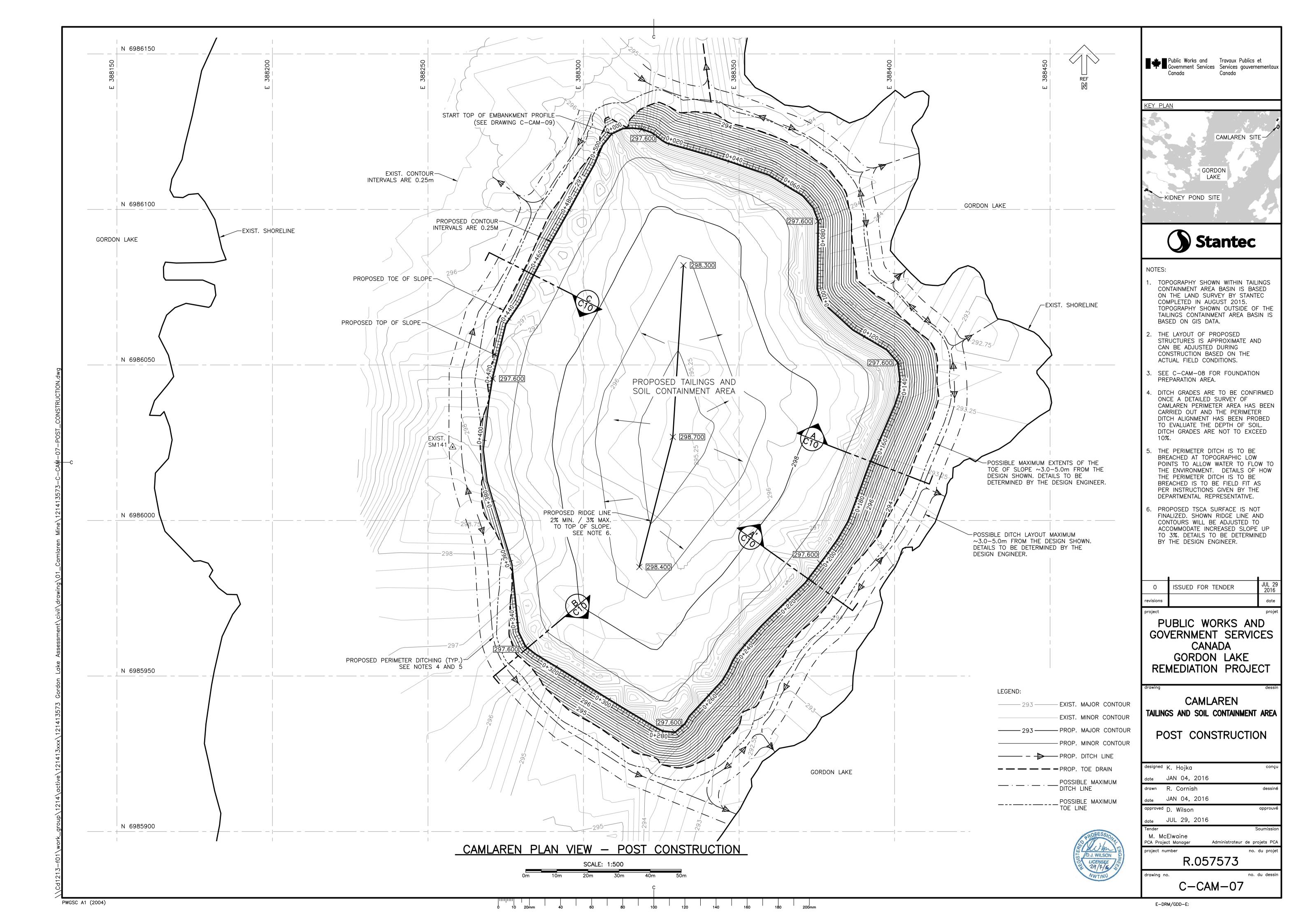
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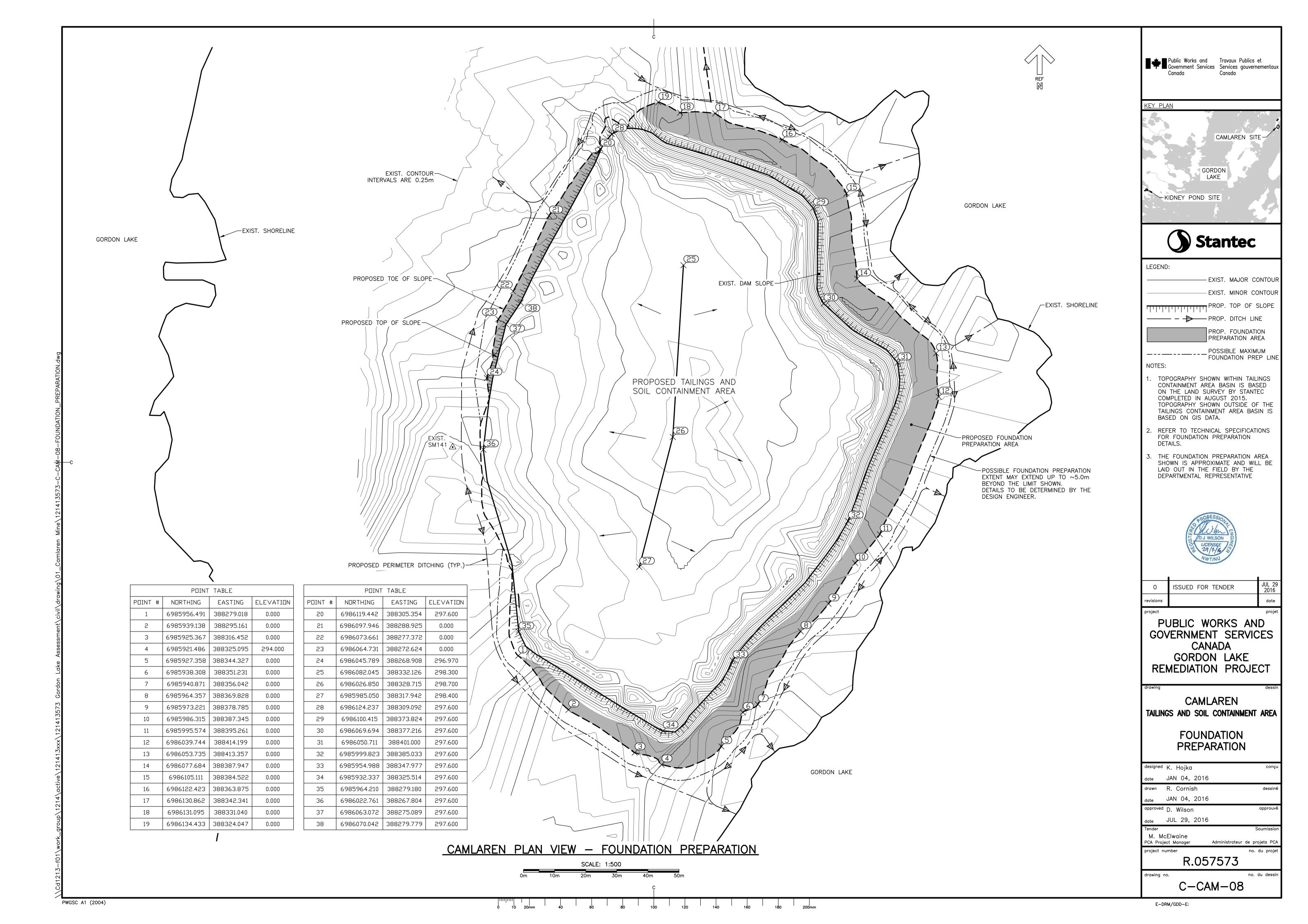
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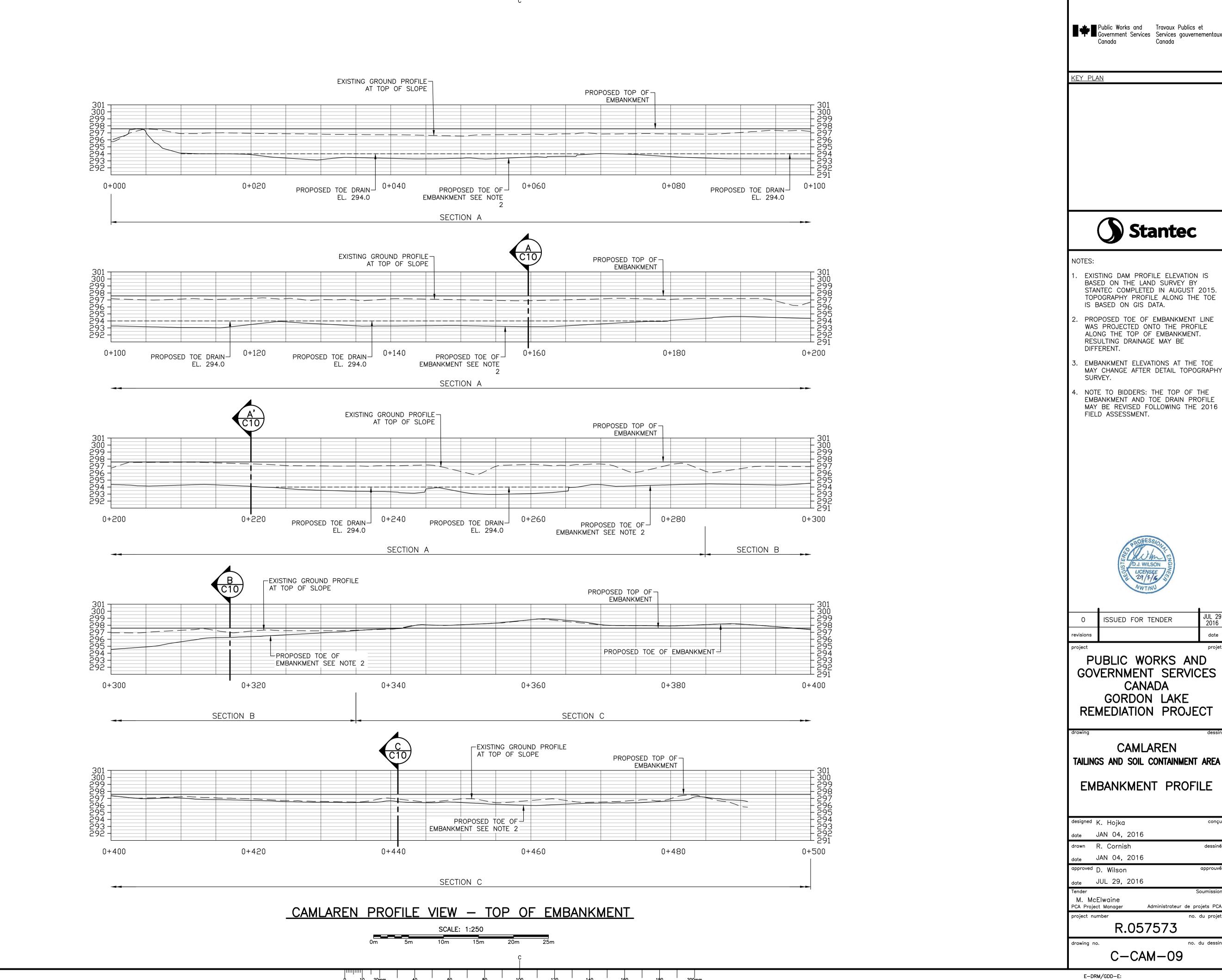
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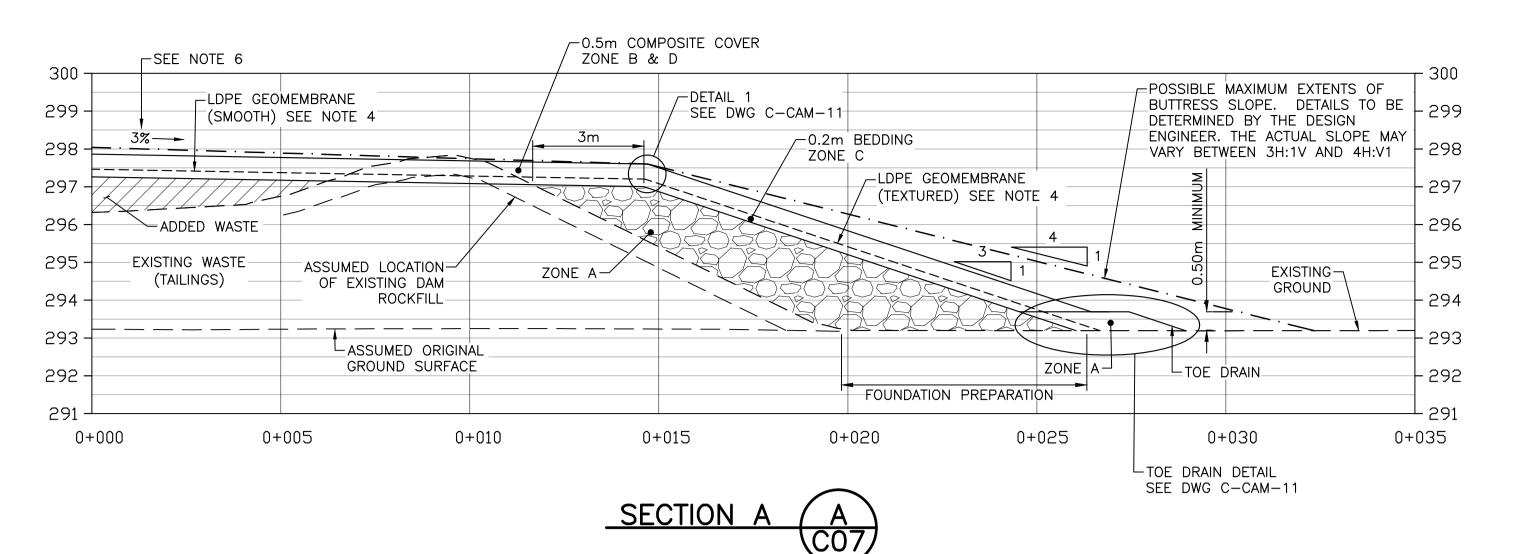


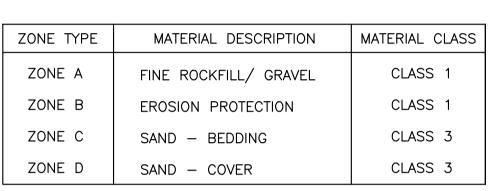






PWGSC A1 (2004)







Public Works and Travaux Publics et
Government Services Services gouvernementaux

Canada

KEY PLAN

NOTES

- THE SUBSURFACE CONDITIONS SHOWN ON THIS DRAWING ARE ASSUMED AND ARE BASED ON THE LIMITED SURVEY AND FIELD INVESTIGATION DATA. THE ACTUAL SUBSURFACE CONDITIONS MAY VARY FROM THOSE SHOWN.
- 2. SOME DESIGN CHANGES MAY BE REQUIRED IF ACTUAL SUBSURFACE CONDITIONS VARY SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWING. ANY DESIGN CHANGES SHOULD BE APPROVED BY THE DESIGN ENGINEER.
- 3. REFER TO TECHNICAL SPECIFICATIONS
 FOR SPECIFICATIONS REGARDING
 EXCAVATION, FOUNDATION
 PREPARATION, FILL PLACEMENT,
 GEOTEXTILE AND GEOMEMBRANE
 INSTALLATION.
- 4. TEXTURED LDPE GEOMEMBRANE TO BE INSTALLED ON THE SLOPE PORTION OF THE EMBANKMENT. SMOOTH LDPE GEOMEMBRANE TO BE INSTALLED ON THE TOP FLAT PORTION OF THE EMBANKMENT.
- 5. LDPE GEOMEMBRANE TO BE PLACED BETWEEN LAYERS OF GEOTEXTILE, SEE DWG. C-CAM-11.
- 6. PROPOSED TSCA SURFACE IS NOT FINALIZED. SHOWN RIDGE LINE AND CONTOURS WILL BE ADJUSTED TO ACCOMMODATE INCREASED SLOPE UP TO 3%. DETAILS TO BE DETERMINED BY THE DESIGN ENGINEER.

0	ISSUED FOR TENDER	JUL 29 2016
revisions		date
project		projet

PUBLIC WORKS AND
GOVERNMENT SERVICES
CANADA
GORDON LAKE
REMEDIATION PROJECT

CAMLAREN

TAILINGS AND SOIL CONTAINMENT AREA

EMBANKMENT SECTIONS

designed	K. Hojka	cc
date	JAN 04, 2016	
drawn	R. Cornish	des
date	JAN 04, 2016	
approved	D. Wilson	appro
date	JUL 29, 2016	
Tender		Soumis

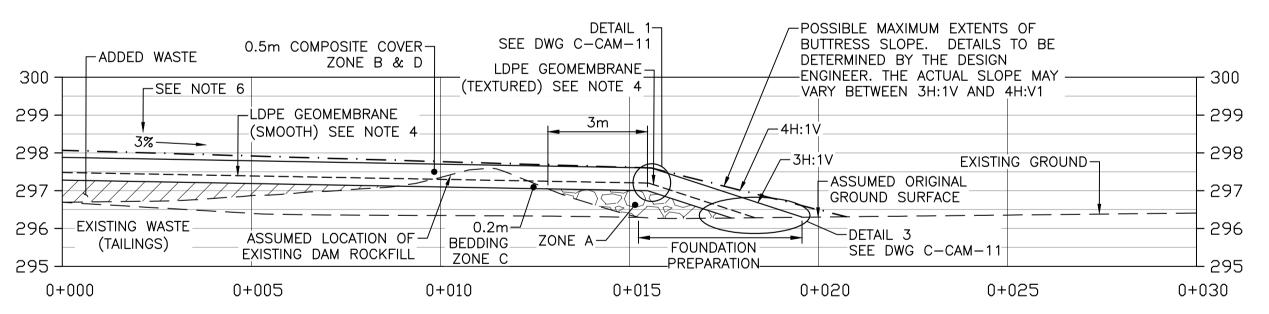
M. McElwaine
PCA Project Manager
Administrateur de projets PCA
project number
no. du projet
R.057573

c-CAM-10

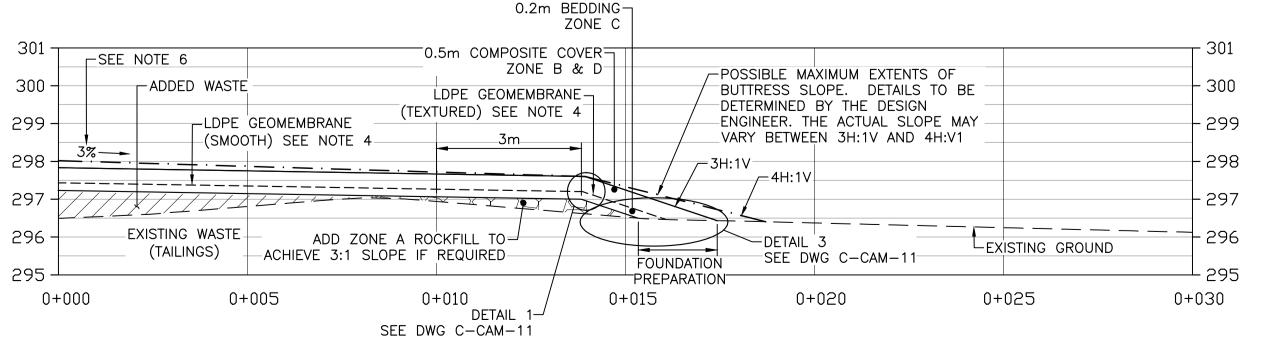
-ZONE B & D SEE NOTE 6-=POSSIBLE MAXIMUM EXTENTS OF BUTTRESS SLOPE. DETAILS TO BE | 299 ←0.2m BEDDING _LDPE GEOMEMBRANE 299 ZONE C (SMOOTH) SEE NOTE 4 DETERMINED BY THE DESIGN ENGINEER. THE ACTUAL SLOPE MAY _LDPE GEOMEMBRANE · — · — · - · · · + VARY BETWEEN 3H:1V AND 4H:V1 (TEXTURED) SEE NOTE 4 - 297 -ADDED WASTE -DETAIL 2 - 296 SEE DWG C-CAM-11 EXISTING WASTE (TAILINGS) ZONE A-295 - 295 294 LASSUMED ORIGINAL GROUND SURFACE -EXISTING GROUND FOUNDATION 293 PREPARATION 0+000 0+005 0+010 0+015 0+020 0+025 0+030 0+035

-0.5m COMPOSITE COVER





SECTION B B CO7



SECTION C C CO7

D.J. WILSON GOVERNOON OF THE PROPERTY OF THE P

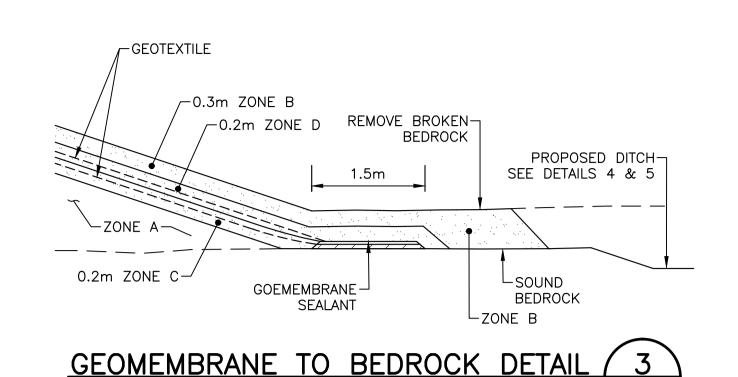
SCALE: 1:100 HORIZ.

SCALE: 1:100 VERT.

0 10 20mm 40 60 80 100 120 140 160

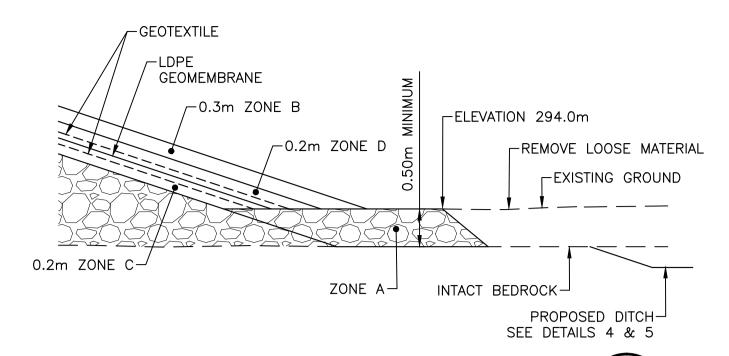
PWGSC A1 (2004)

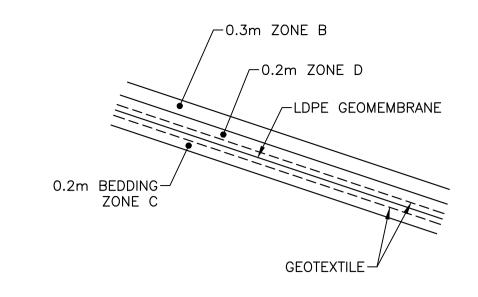
E-DRM/GDD-E:



SCALE : N.T.S.

(SEE NOTE 7)

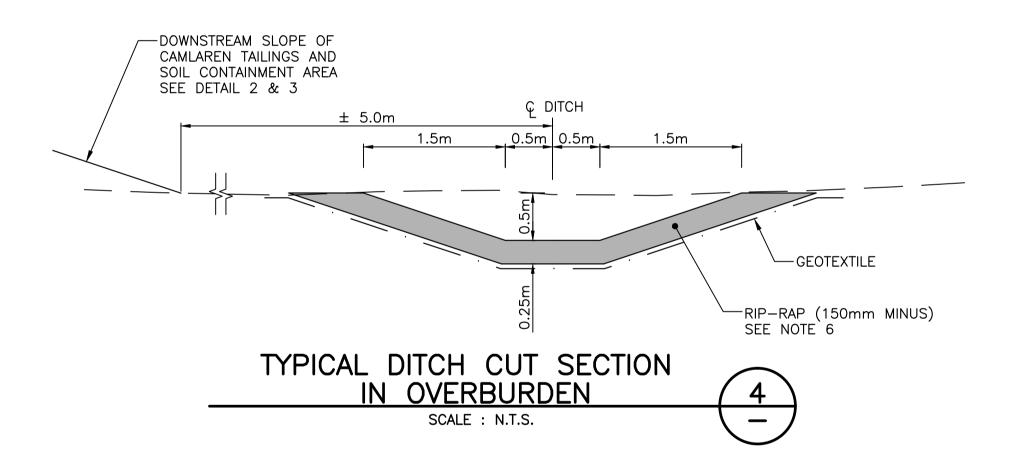


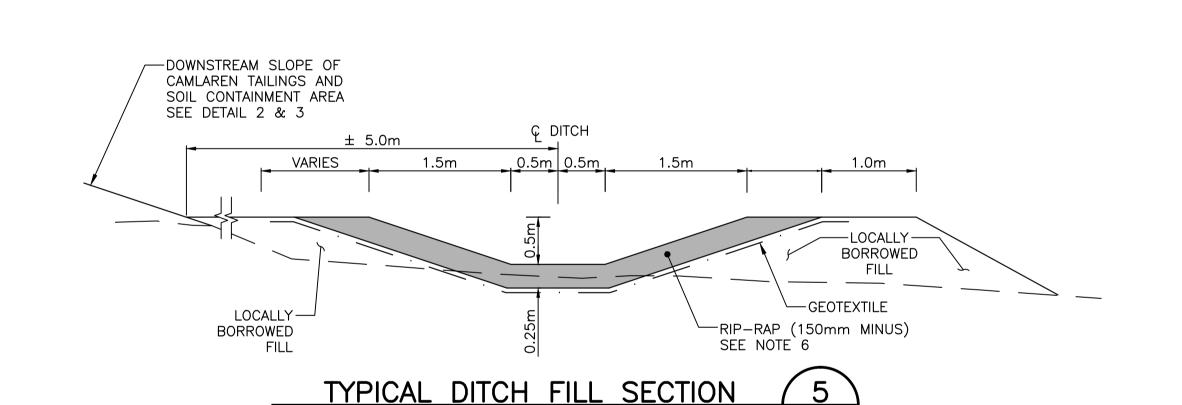


TOE DRAIN DETAIL (SEE NOTE 7) SCALE : N.T.S.

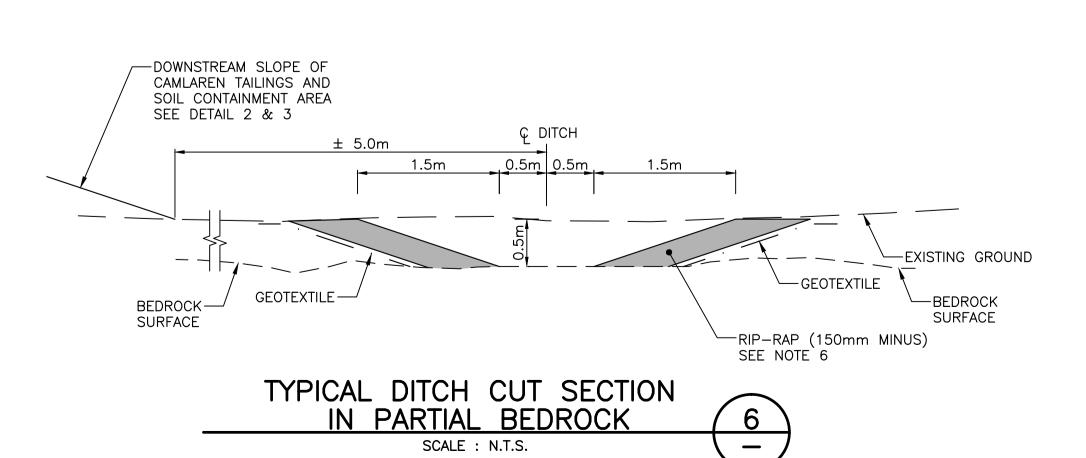
SLOPE DETAIL (SEE NOTE 7) SCALE: N.T.S.

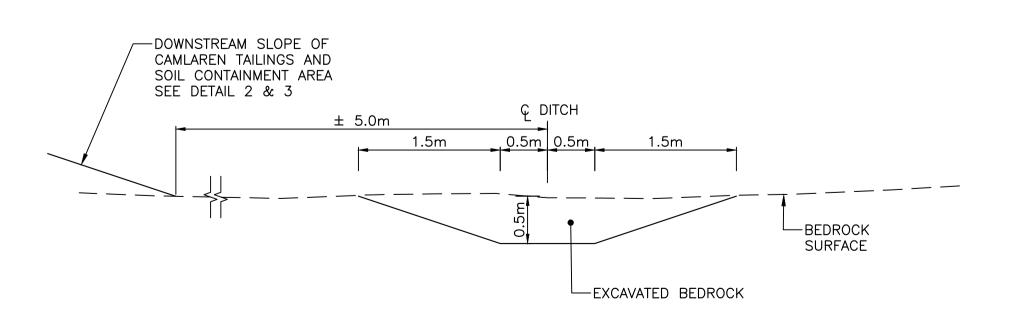
ZONE TYPE	MATERIAL DESCRIPTION	MATERIAL CLASS
ZONE A	FINE ROCKFILL/ GRAVEL	CLASS 1
ZONE B	EROSION PROTECTION	CLASS 1
ZONE C	SAND — BEDDING	CLASS 3
ZONE D	SAND - COVER	CLASS 3
		1





SCALE : N.T.S.





TYPICAL DITCH CUT SECTION IN BEDROCK SCALE : N.T.S.



Public Works and Travaux Publics et
Government Services Services gouvernementaux

KEY PLAN

Stantec

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- 4. TEXTURED LDPE GEOMEMBRANE TO BE INSTALLED ON THE SLOPE PORTION OF THE EMBANKMENT. SMOOTH LDPE GEOMEMBRANE TO BE INSTALLED ON THE TOP FLAT PORTION OF THE EMBANKMENT.
- 5. LDPE GEOMEMBRANE TO BE PLACED BETWEEN LAYERS OF GEOTEXTILE.
- 6. USE THE LARGEST STONE AVAILABLE AT THE SITE. REFER TO THE DESIGN REPORT AND SPECIFICATIONS.
- 7. DETAILS TO BE REVISED FOLLOWING 2016 FIELD INVESTIGATION.

ISSUED FOR TENDER

PUBLIC WORKS AND **GOVERNMENT SERVICES** CANADA GORDON LAKE REMEDIATION PROJECT

CAMLAREN TAILINGS AND SOIL CONTAINMENT AREA

> DITCH SECTIONS AND DETAILS

^{designed} K. Hojka date JAN 04, 2016 drawn R. Cornish date JAN 04, 2016 approved D. Wilson JUL 29, 2016 M. McElwaine

project number R.057573

Administrateur de projets PC/

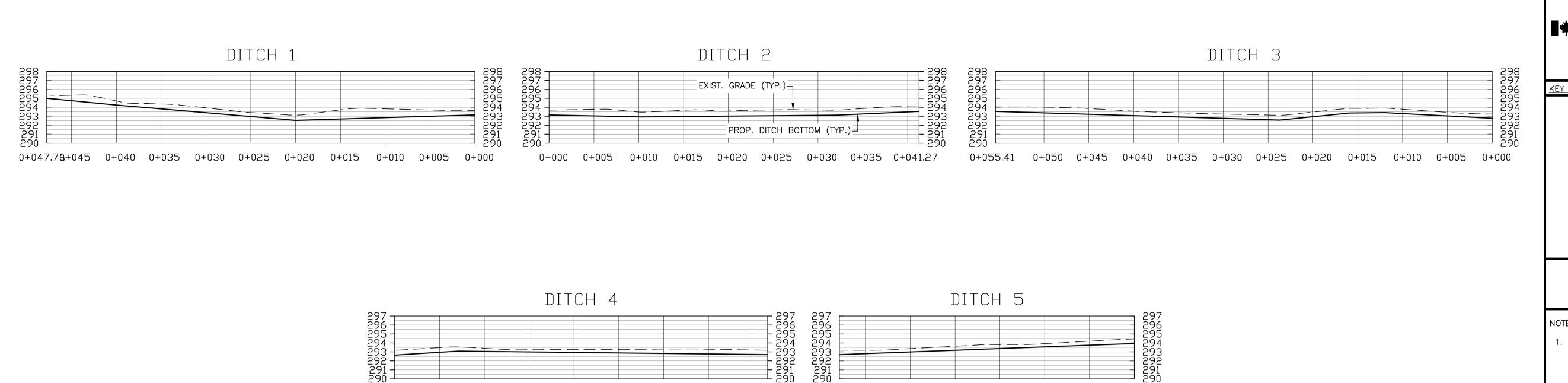
drawing no.

C-CAM-11

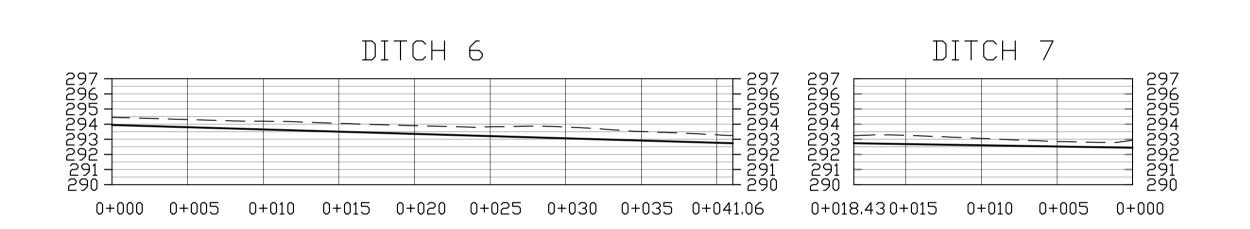
PWGSC A1 (2004)

E-DRM/GDD-E:

PCA Project Manager



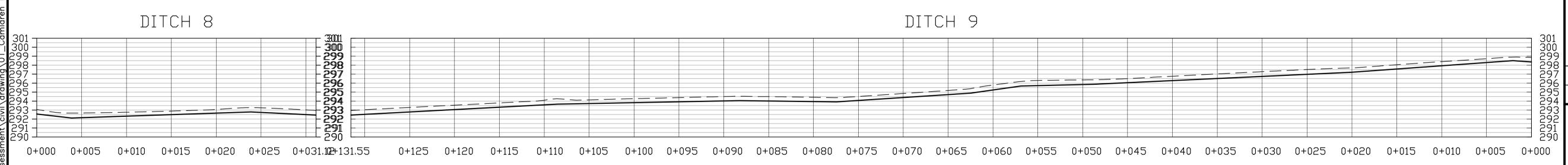
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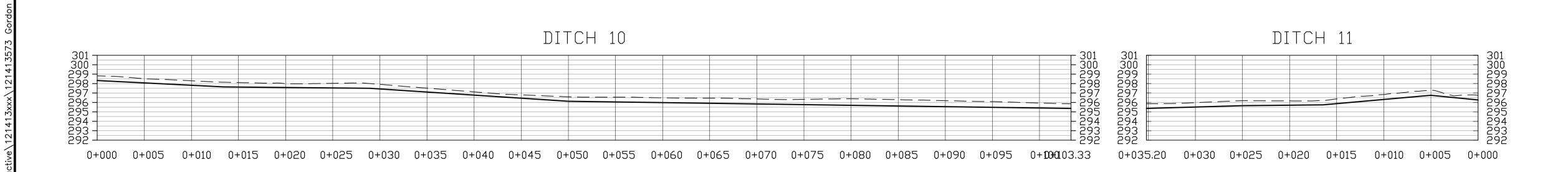


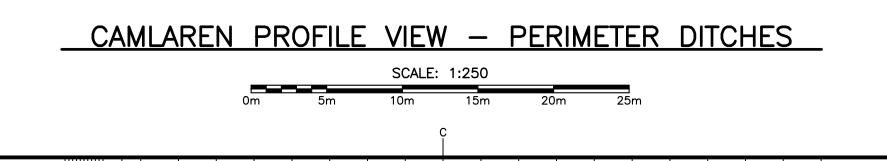
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0+000 0+005 0+010 0+015 0+020 0+025 0+030 0+035

PWGSC A1 (2004)







Public Works and Travaux Publics et
Government Services Services gouvernementaux

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- 4. SURFACE BEDROCK CONDITIONS ARE LIKELY PRESENT AT HIGHER ELEVATIONS ABOVE 294.00m. TO BE VERIFIED DURING 2016 FIELD ASSESSMENT.
- 5. NOTE TO BIDDERS: DITCH PROFILES MAY BE REVISED ONCE THE DITCH ALIGNMENT IS FINALIZED FOLLOWING THE 2016 FIELD ASSESSMENT.



ISSUED FOR TENDER

PUBLIC WORKS AND **GOVERNMENT SERVICES** CANADA GORDON LAKE REMEDIATION PROJECT

CAMLAREN

TAILINGS AND SOIL CONTAINMENT AREA

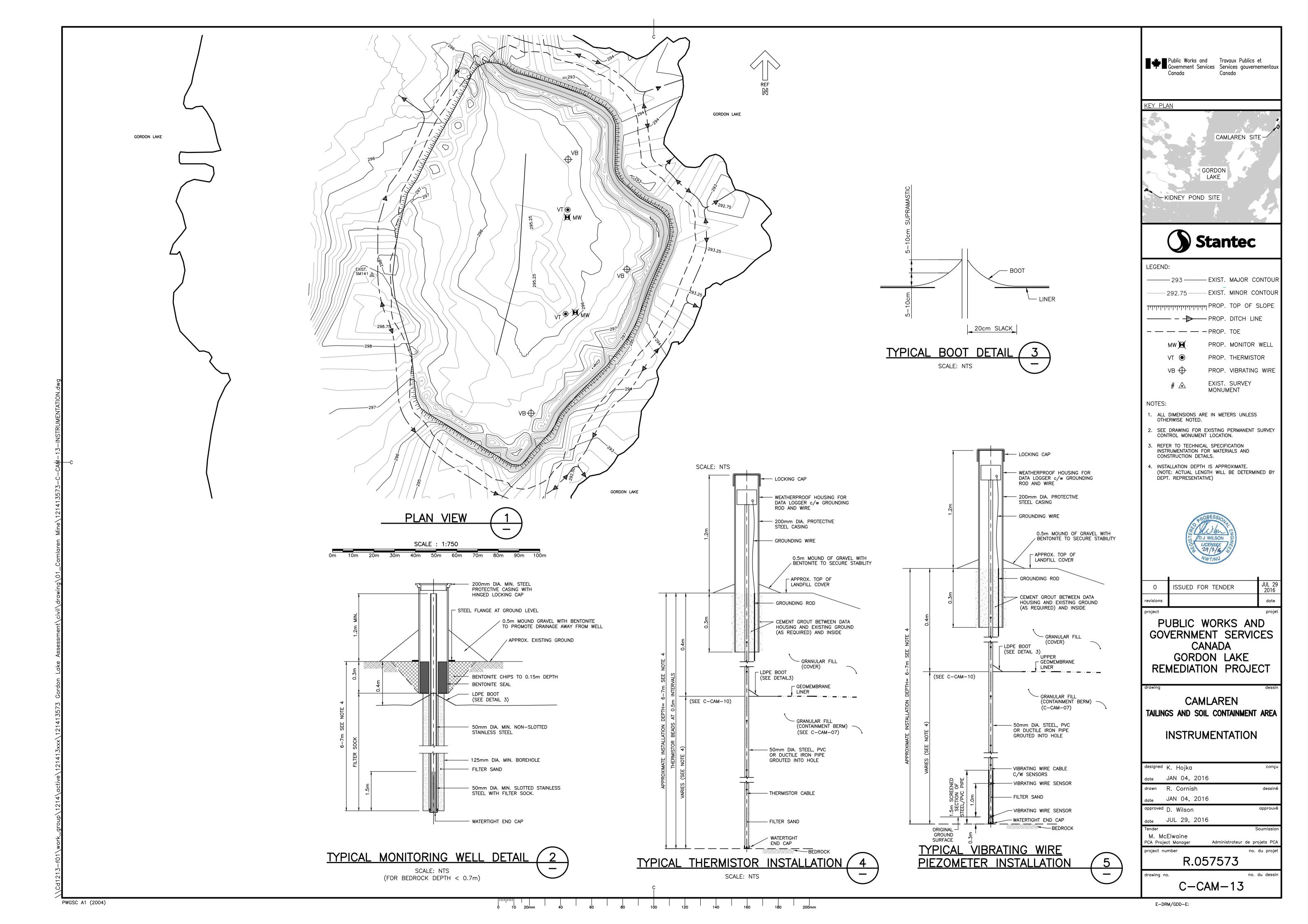
PERIMETER DITCH **PROFILES**

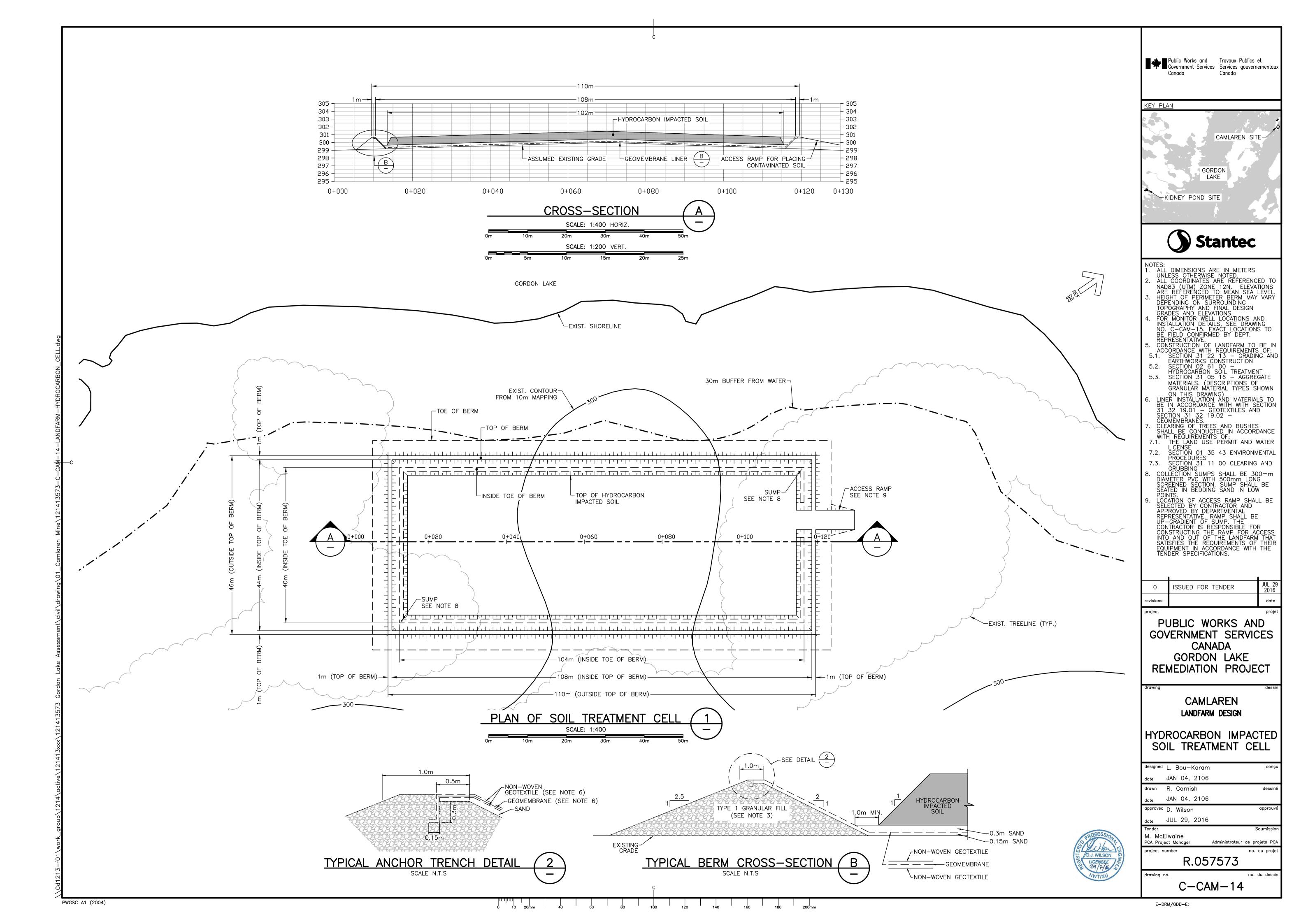
^{designed} K. Hojka date JAN 04, 2016 drawn R. Cornish date JAN 04, 2016 approved D. Wilson JUL 29, 2016 M. McElwaine PCA Project Manager Administrateur de projets PC/

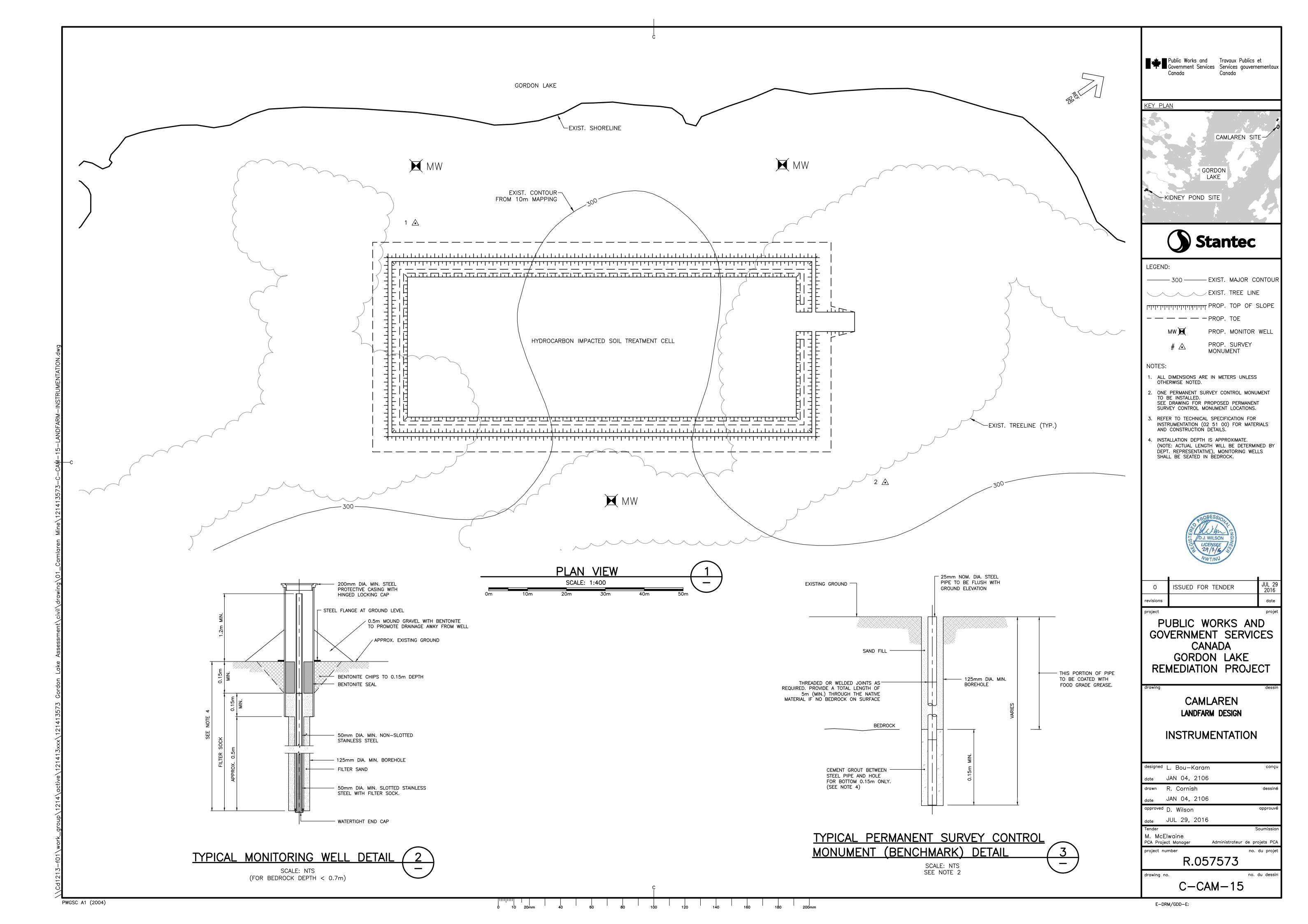
R.057573

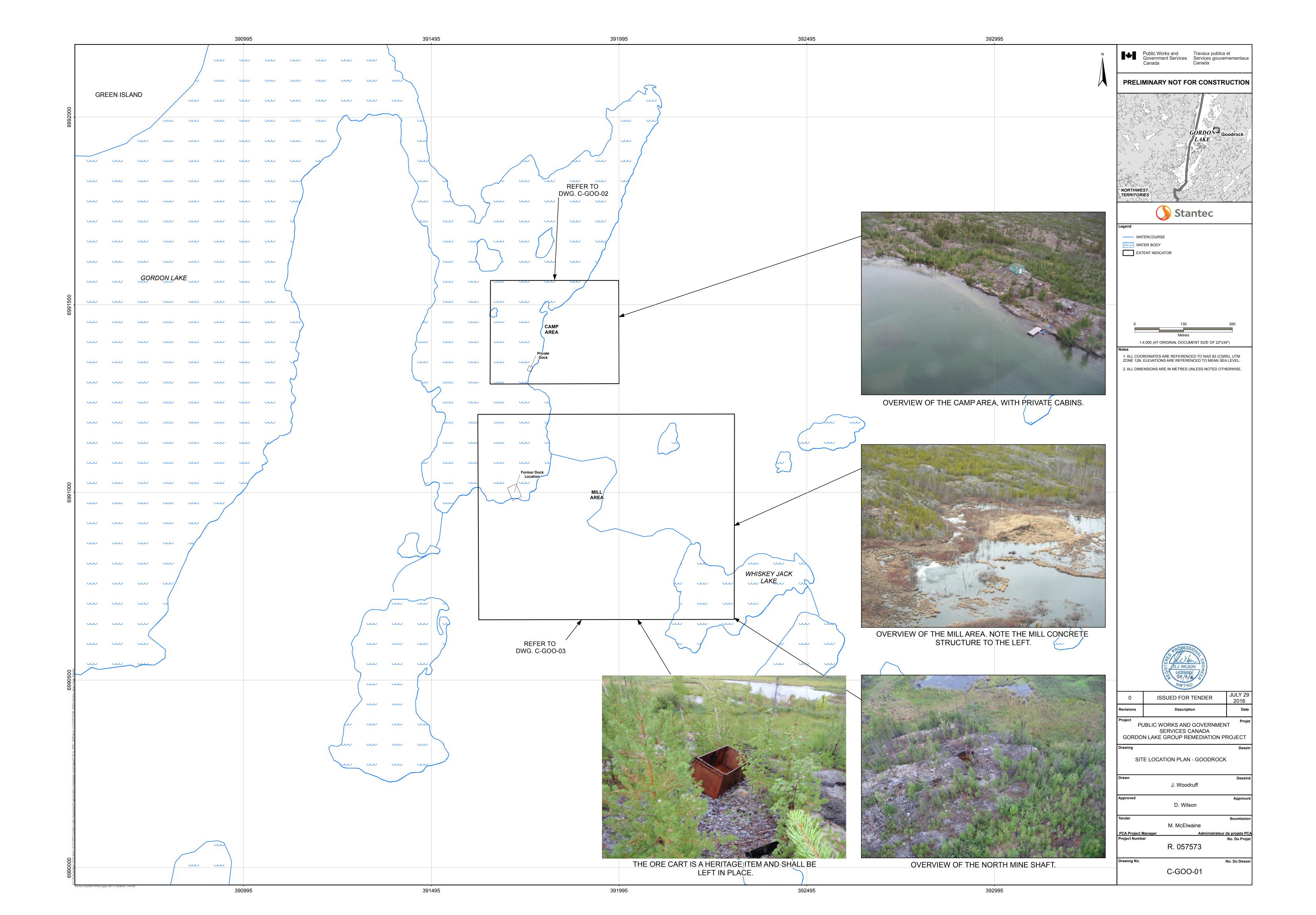
C-CAM-12

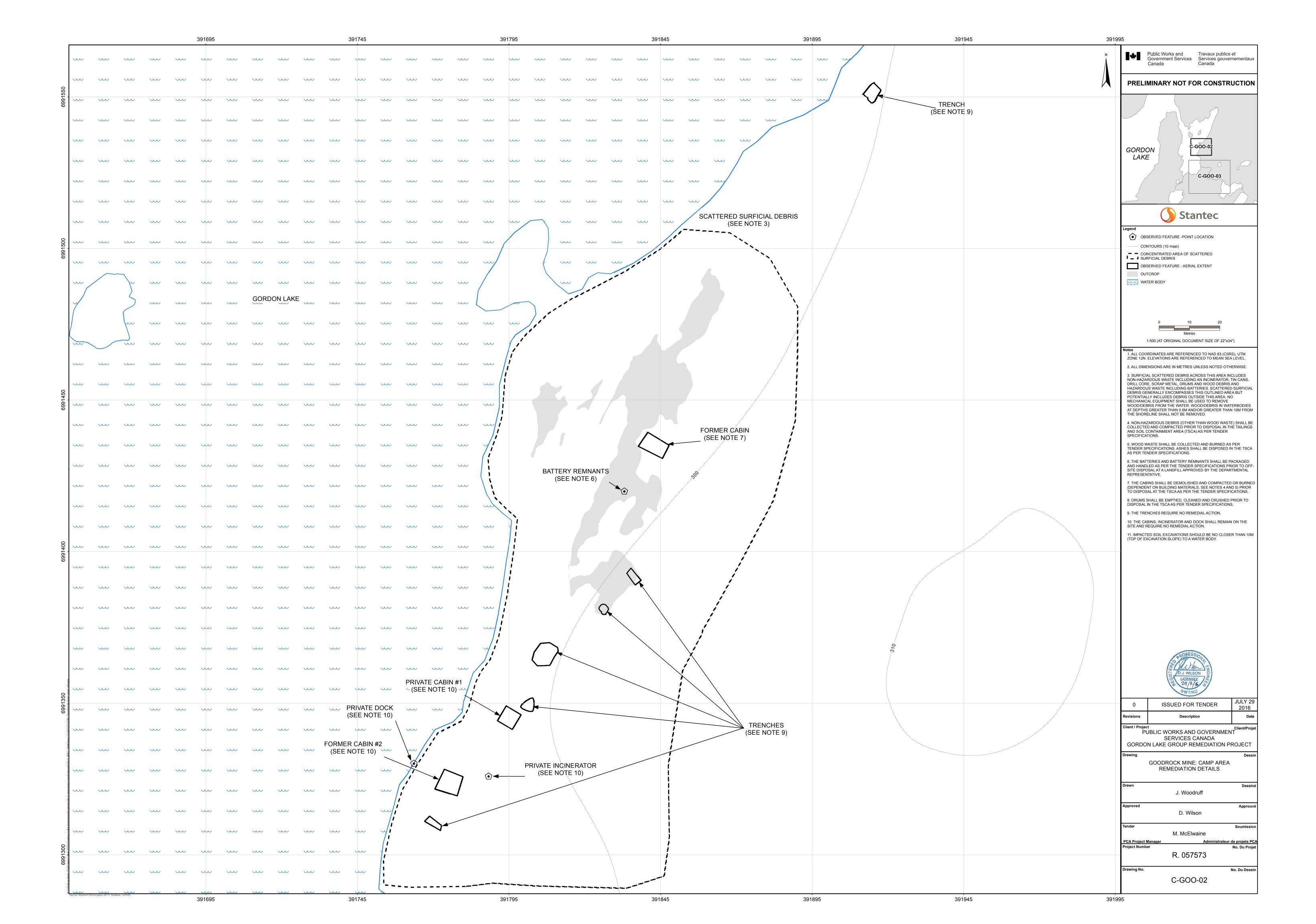
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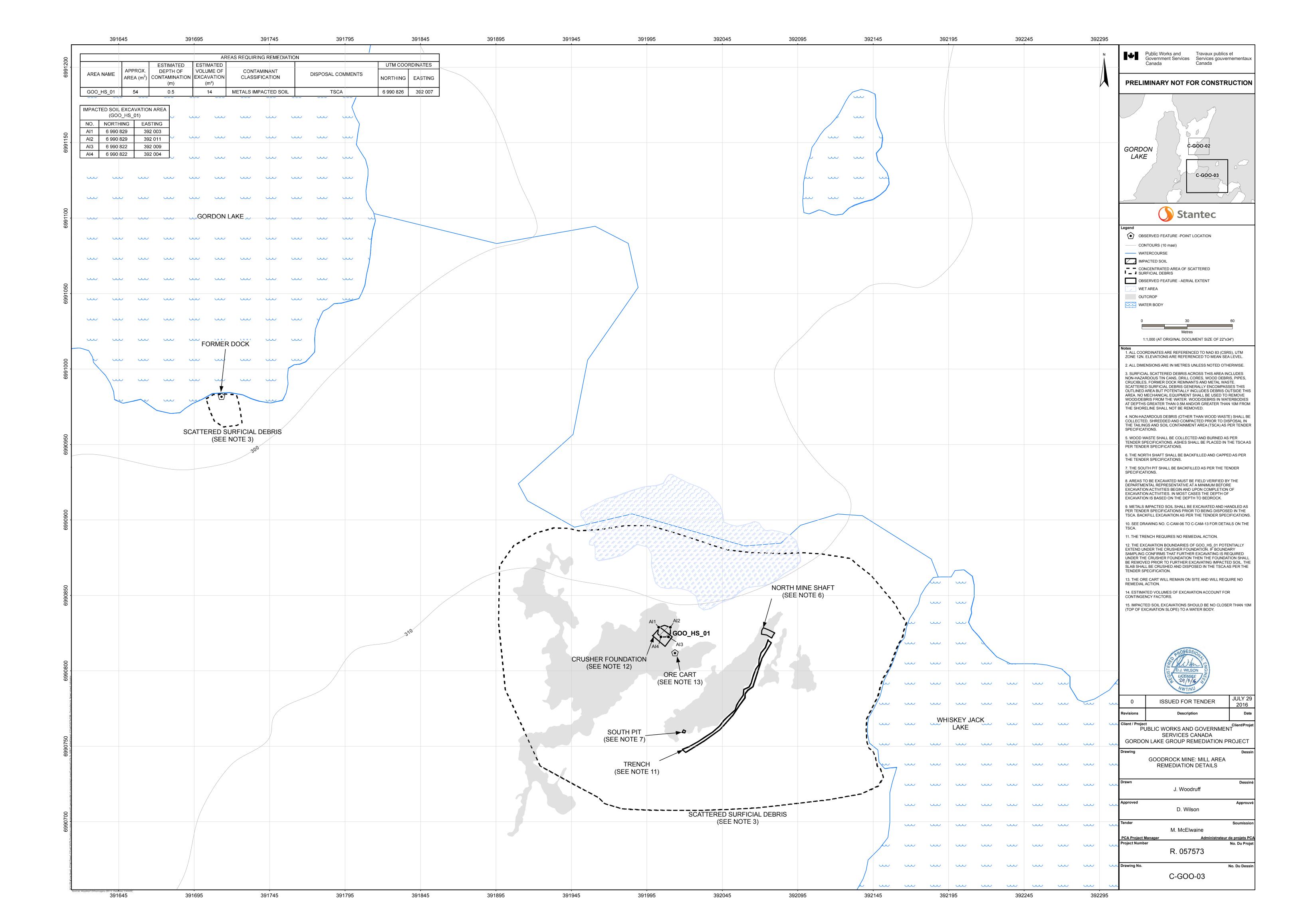


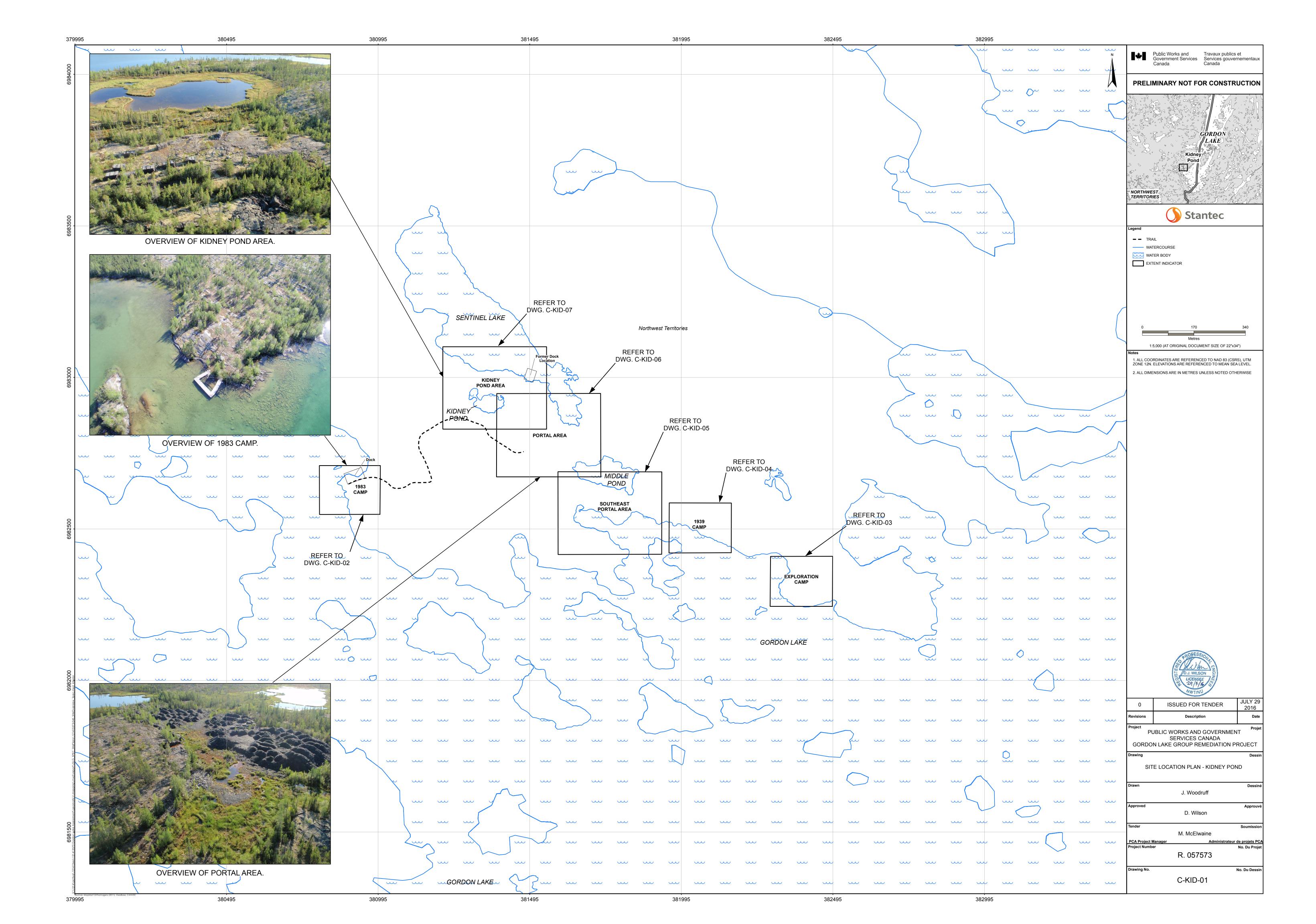


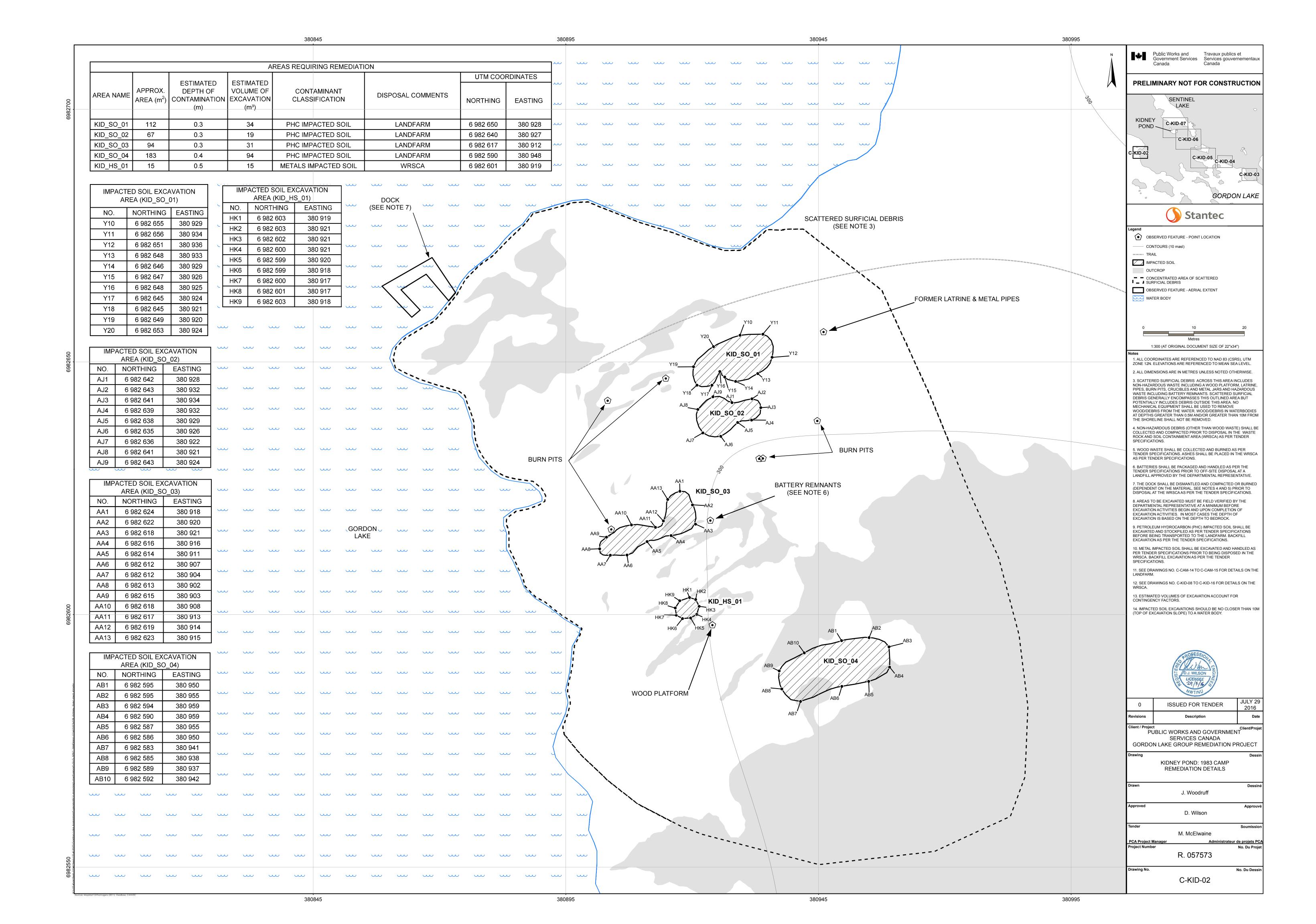


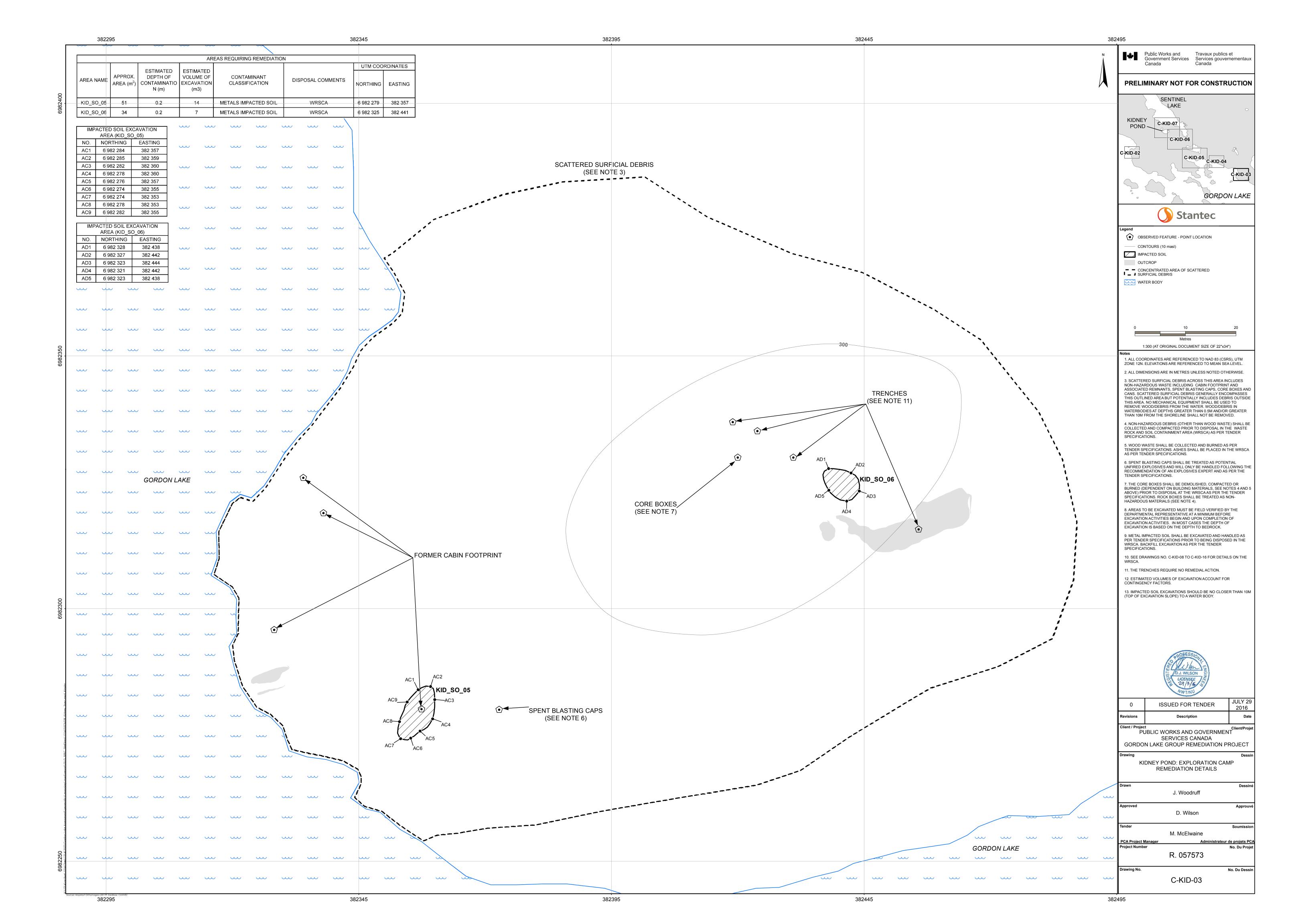


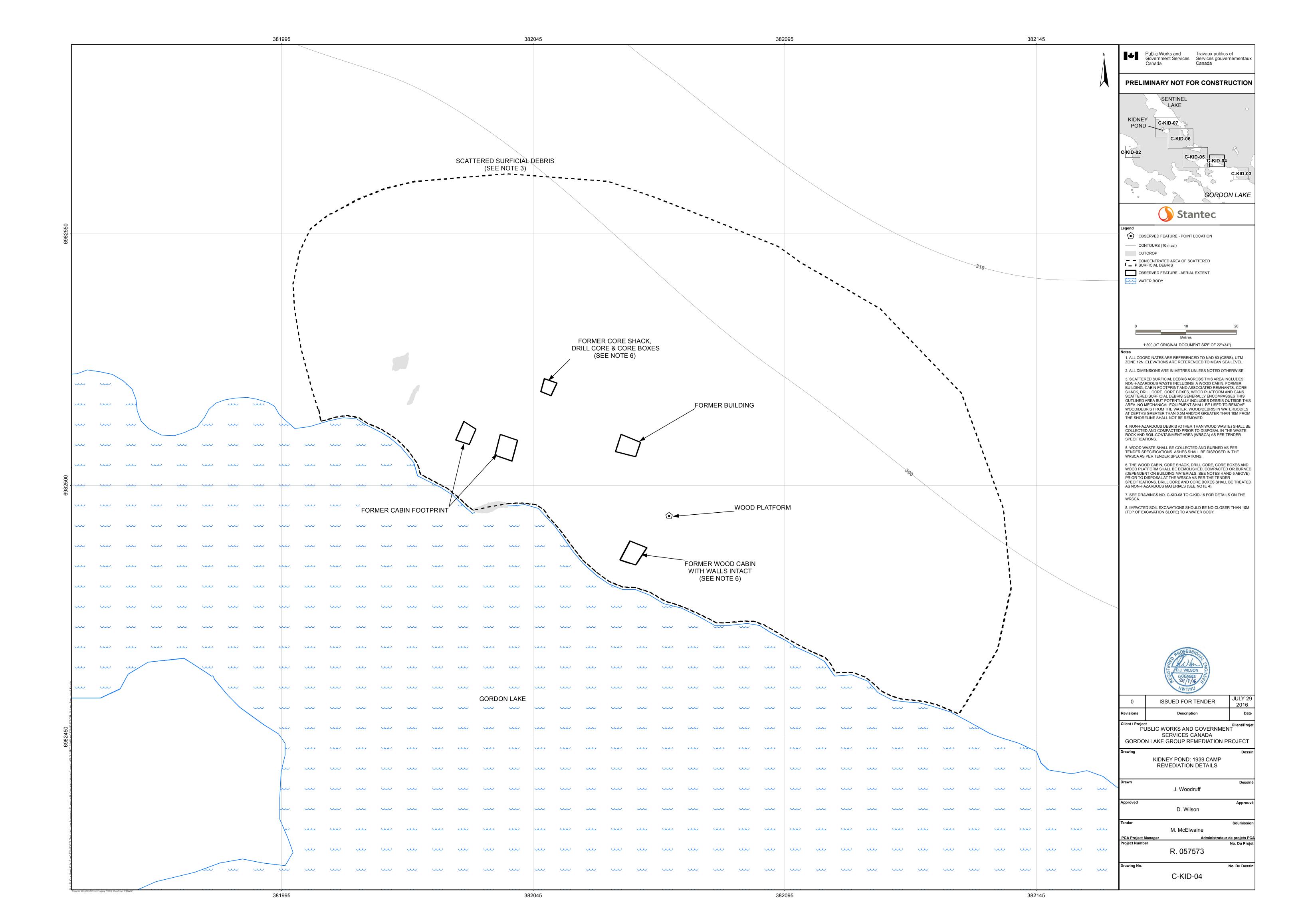


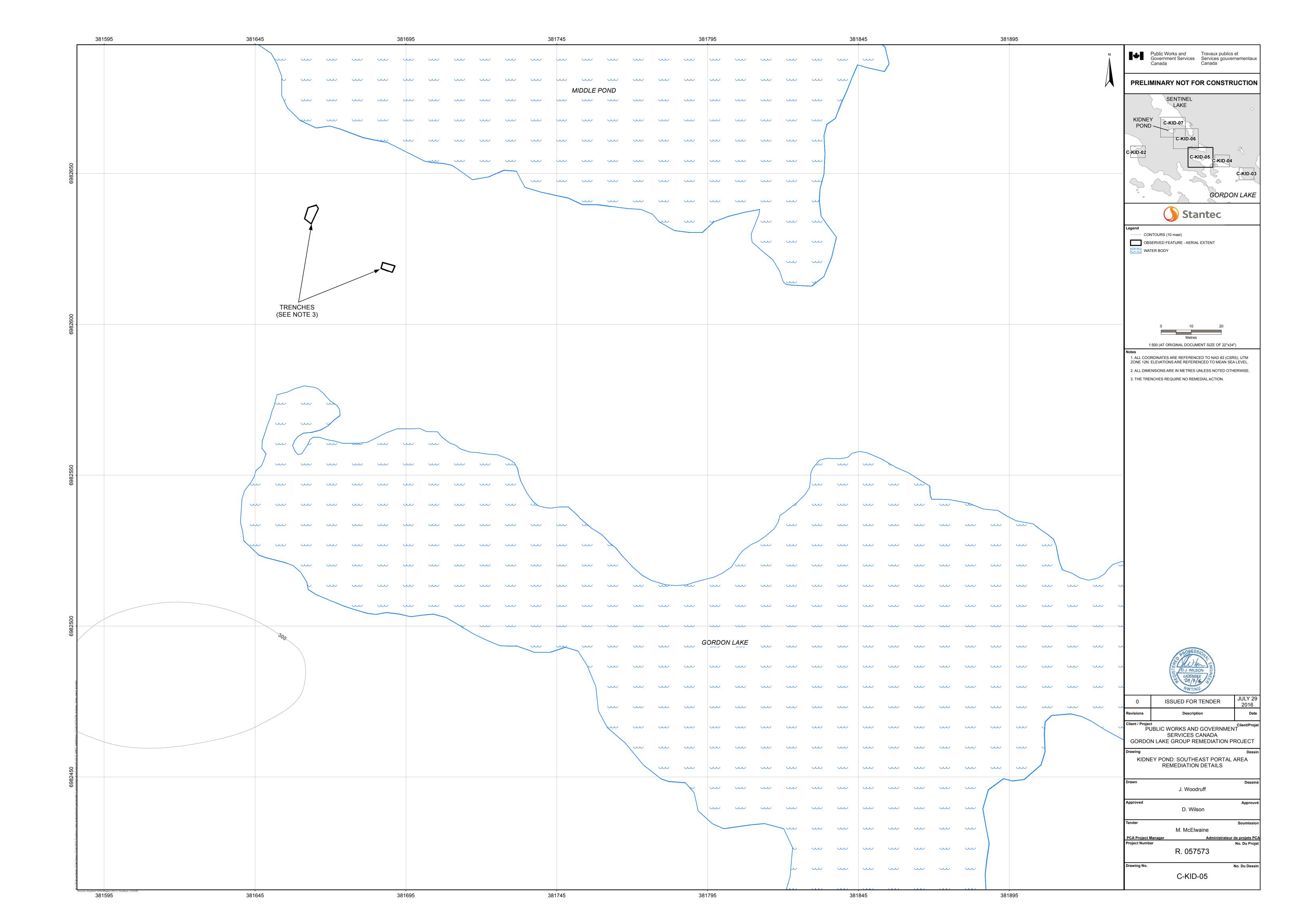


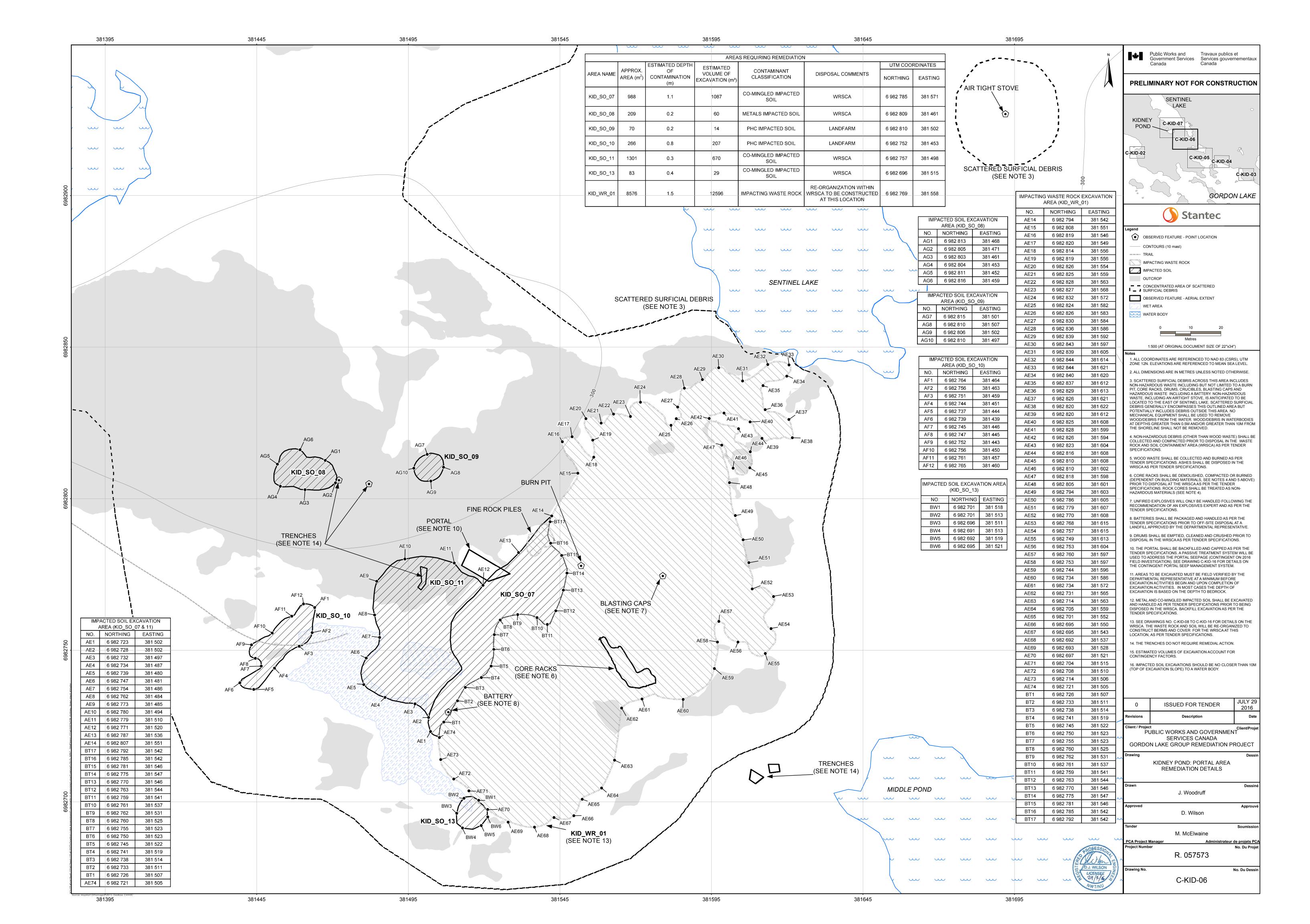


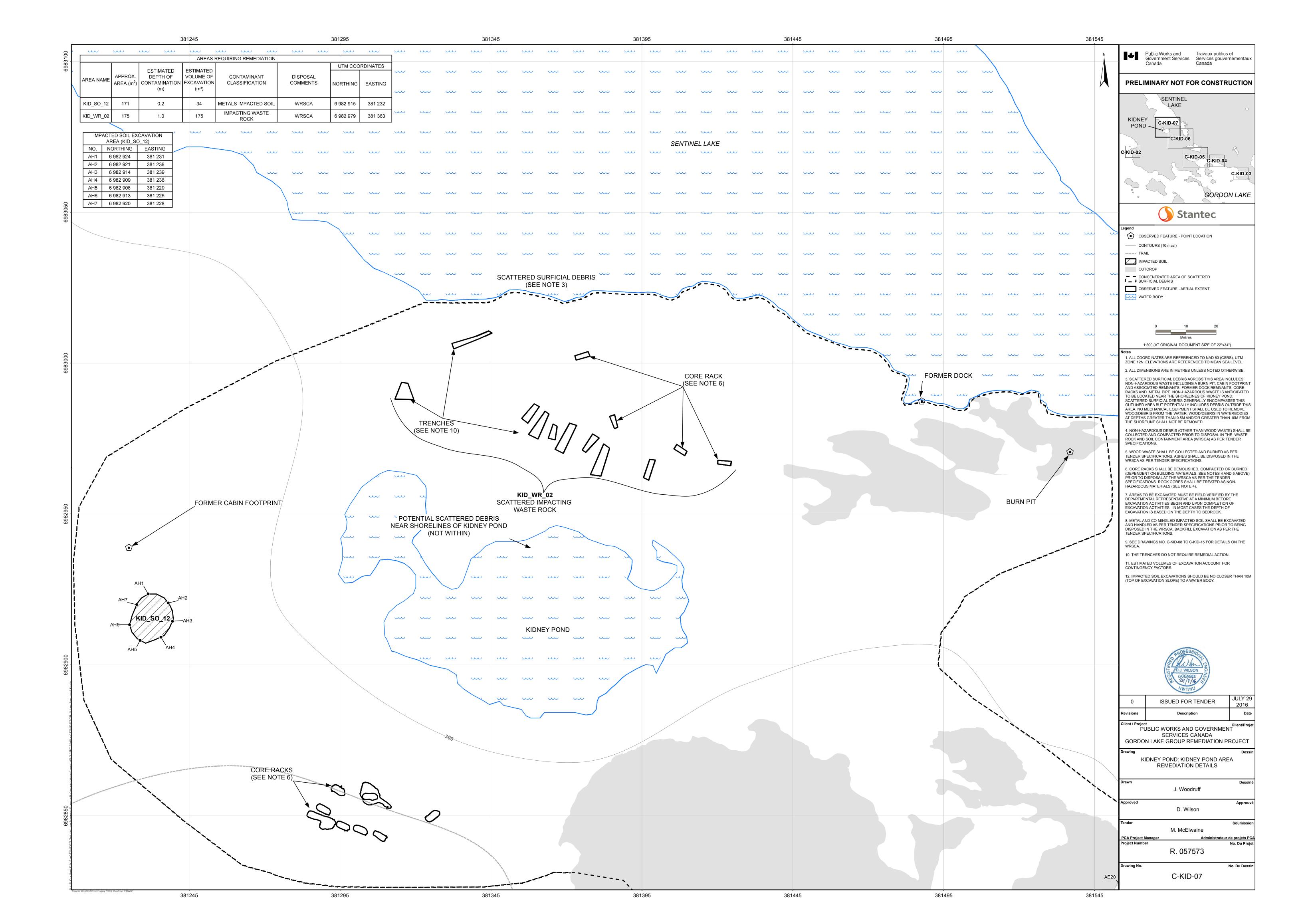




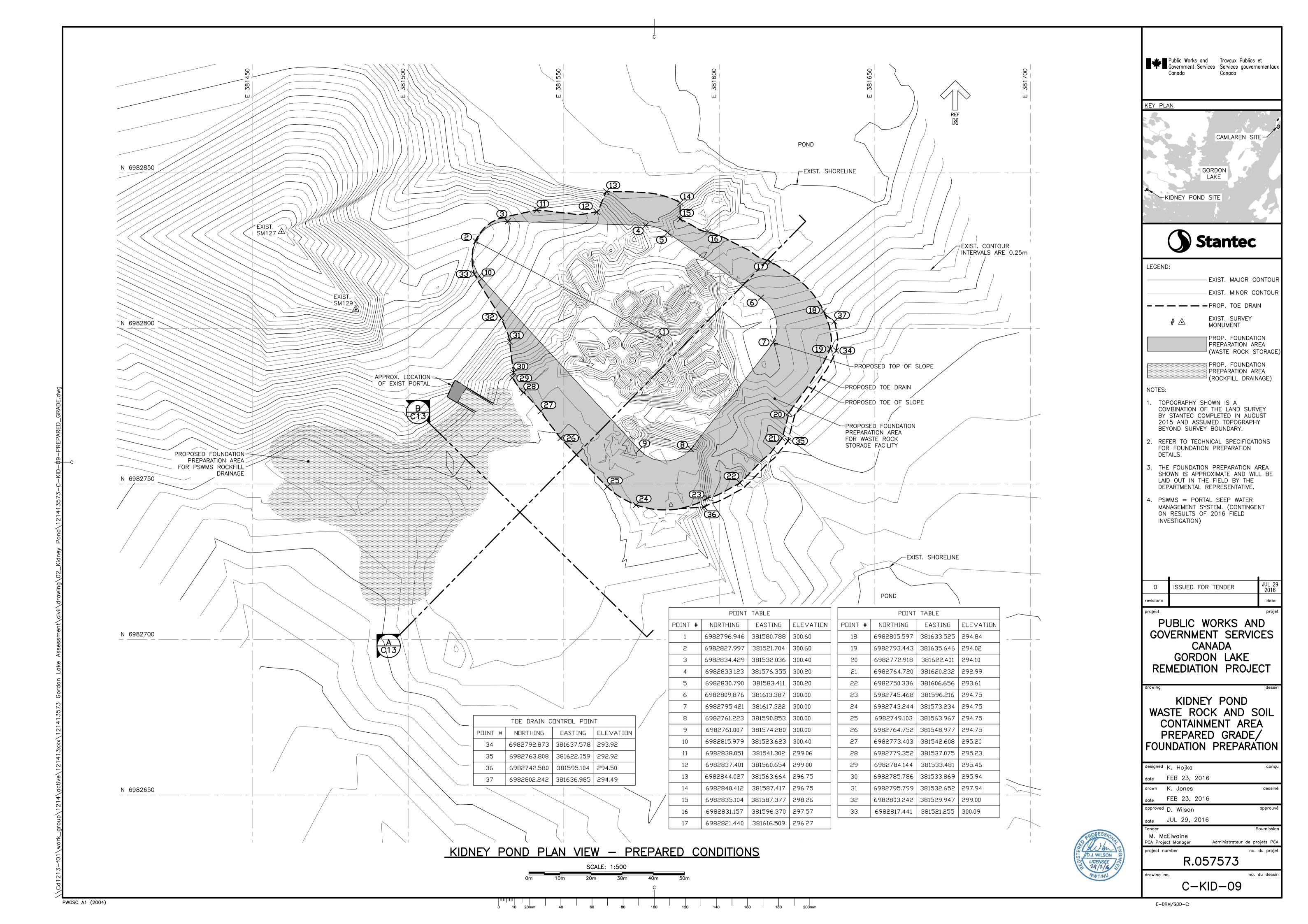


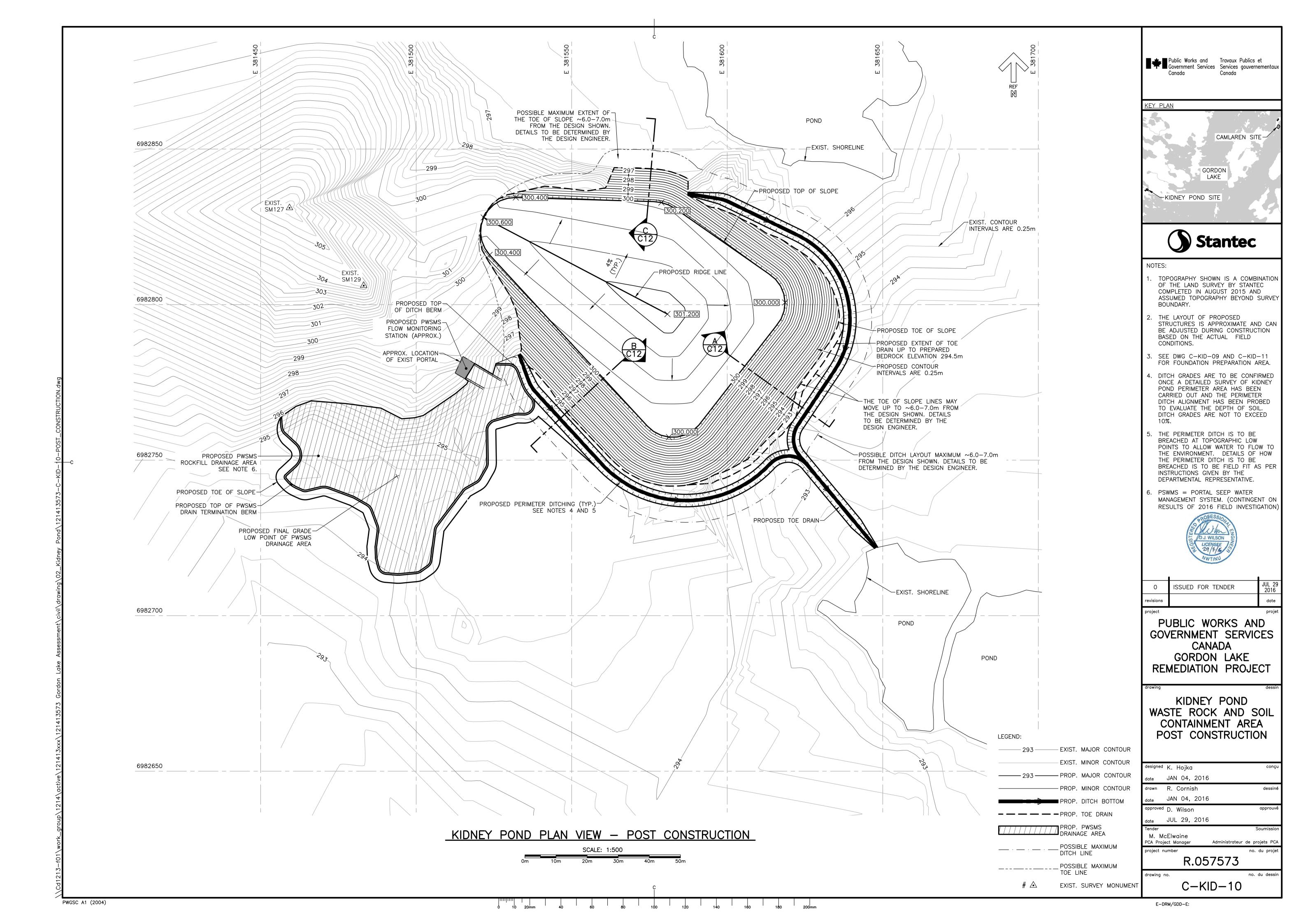


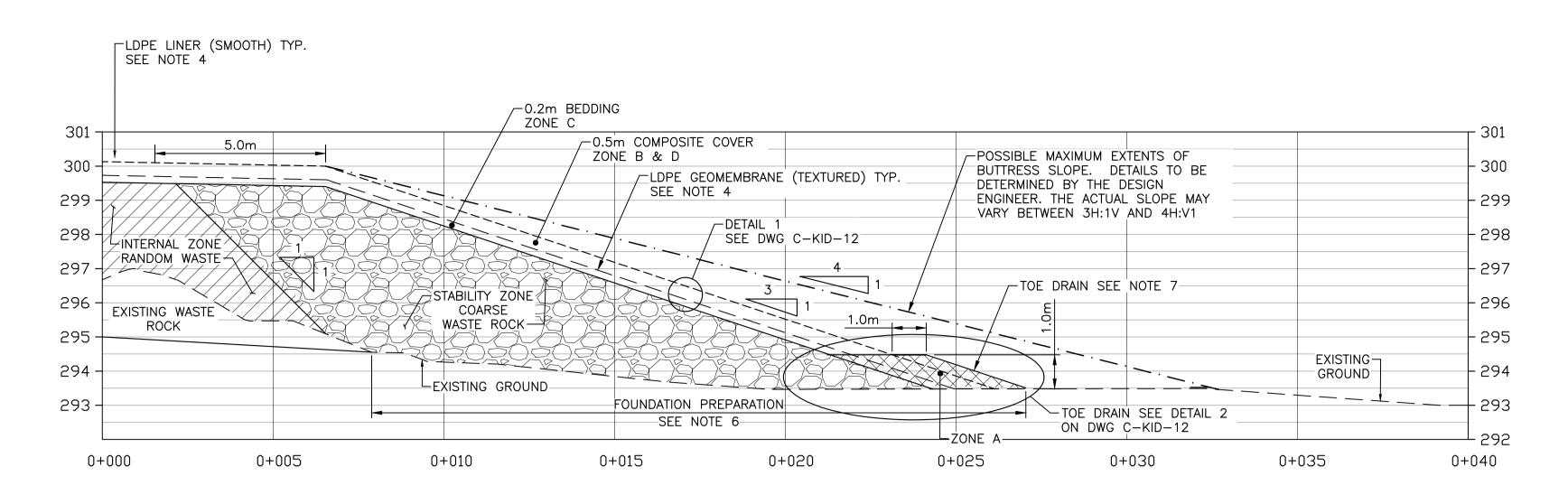




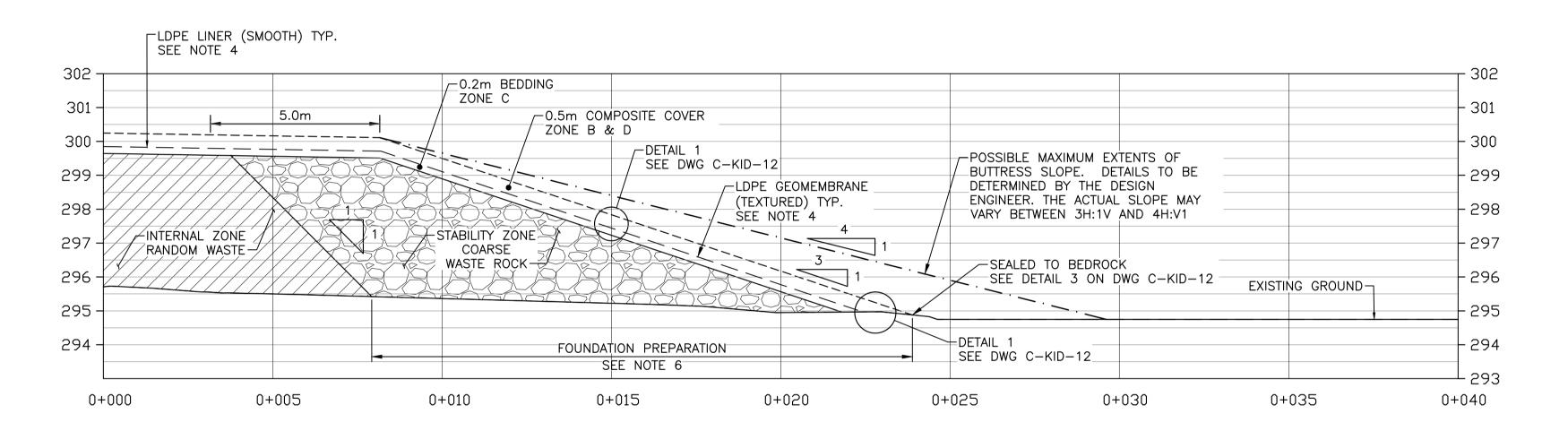


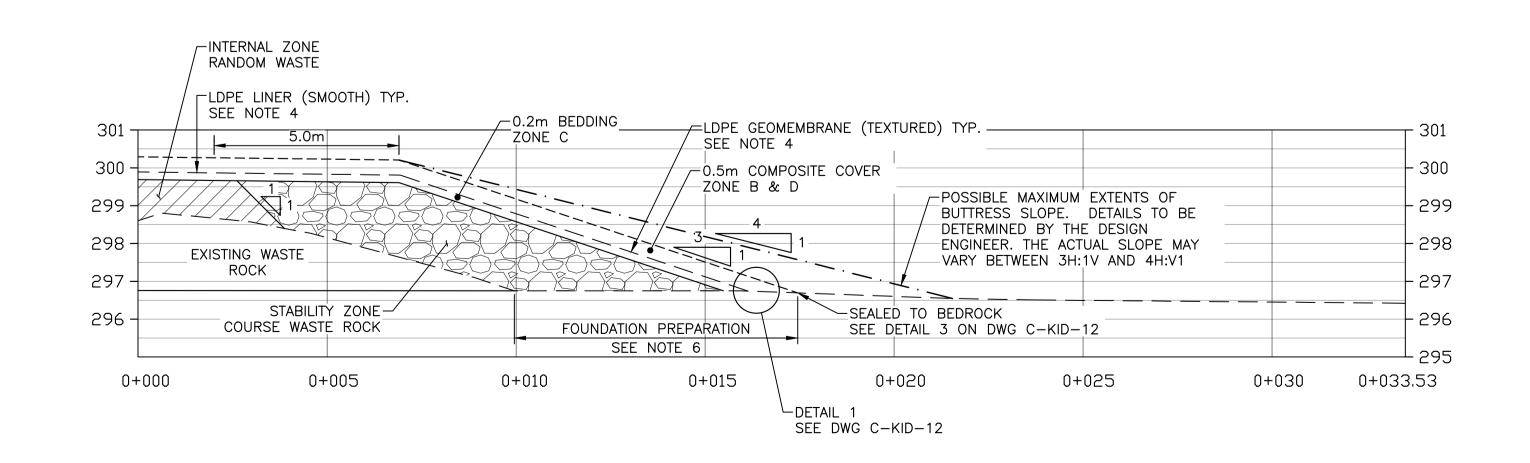












SECTION C

ZONE TYPE	MATERIAL DESCRIPTION	MATERIAL CLASS
ZONE A	FINE ROCKFILL/ GRAVEL	CLASS 1
ZONE B	EROSION PROTECTION	CLASS 1
ZONE C	SAND — BEDDING	CLASS 3
ZONE D	SAND - COVER	CLASS 3
ZONE E	RIPRAP	CLASS 4
ZONE F	ROCKFILL	CLASS 5

SCALE: 1:100 HORIZ. SCALE: 1:100 VERT.



Public Works and Travaux Publics et

Government Services Services gouvernementaux Canada

KEY PLAN



NOTES:

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- 4. TEXTURED LDPE GEOMEMBRANE TO BE INSTALLED ON THE SLOPE PORTION OF THE WRSCA. SMOOTH LDPE GEOMEMBRANE TO BE INSTALLED ON THE TOP FLAT PORTION OF THE WRSCA.
- LDPE GEOMEMBRANE TO BE PLACED BETWEEN LAYERS OF GEOTEXTILE, SEE DWG. C-KID-12.
- 6. REMOVE ALL LOOSE MATERIAL WITHIN FOUNDATION PREPARATION ZONE, SEE TECHNICAL SPECIFICATIONS.
- 7. TOE DRAIN WILL BE INSTALLED ON THE PREPARED FOUNDATION UP TO THE GRADE OF 294.5m.

revisions	date
Tevisions	date

PUBLIC WORKS AND **GOVERNMENT SERVICES** CANADA GORDON LAKE REMEDIATION PROJECT

KIDNEY POND WASTE ROCK AND SOIL CONTAINMENT AREA OVERALL SECTIONS

designed	K. Hojka	conçu
date	JAN 04, 2016	
drawn	R. Cornish	dessiné
date	JAN 04, 2016	
approved	D. Wilson	approuvé
date	JUL 29, 2016	
Tender		Soumission
	cElwaine ect Manager	Administrateur de projets PCA

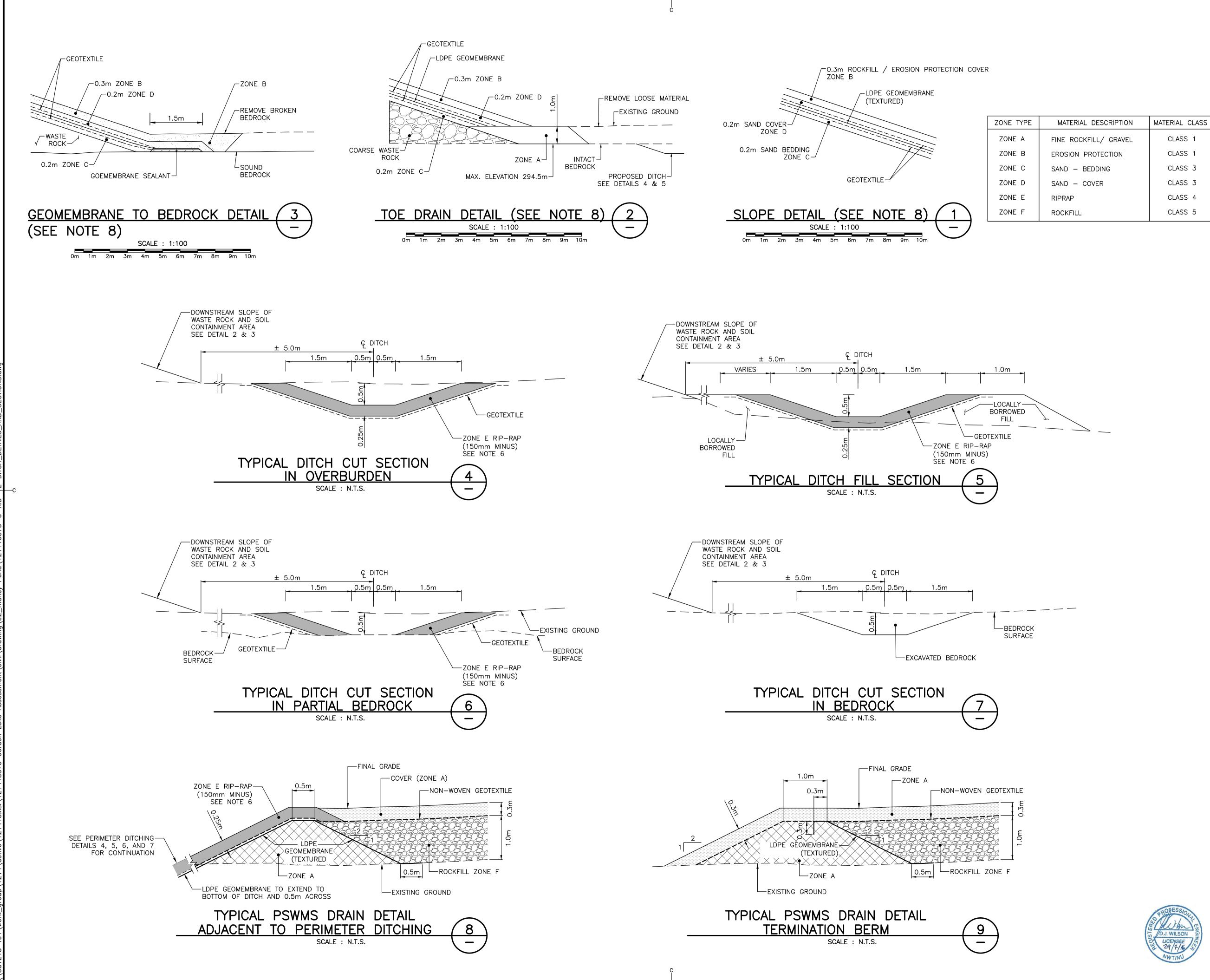
project number no. du projet R.057573

drawing no.

C-KID-11

PWGSC A1 (2004)

E-DRM/GDD-E:



PWGSC A1 (2004)

Public Works and Travaux Publics et
Government Services Services gouvernementaux
Canada

KEY PLAN

Stantec

NOTES:

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 FOR SPECIFICATIONS REGARDING
 EXCAVATION, FOUNDATION
 PREPARATION, WASTE/WASTE ROCK
 PLACEMENT, FILL PLACEMENT,
 GEOTEXTILE AND GEOMEMBRANE
 INSTALLATION.
- 4. TEXTURED LDPE GEOMEMBRANE TO BE INSTALLED ON THE SLOPE PORTION OF THE DAM. SMOOTH LDPE GEOMEMBRANE TO BE INSTALLED ON THE TOP FLAT PORTION OF THE DAM.
- LDPE GEOMEMBRANE TO BE PLACED BETWEEN LAYERS OF GEOTEXTILE.
- USE THE LARGEST STONE AVAILABLE AT THE SITE. REFER TO THE DESIGN REPORT AND TECHNICAL SPECIFICATIONS.
- 7. PSWMS = PORTAL SEEP WATER
 MANAGEMENT SYSTEM. (CONTINGENT
 ON RESULTS OF 2016 FIELD
 ASSESSMENT)
- 8. DETAILS TO BE REVISED FOLLOWING 2016 FIELD ASSESSMENT.

0	ISSUED FOR TENDER	JUL 29 2016
revisions		date

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA GORDON LAKE REMEDIATION PROJECT

KIDNEY POND
WASTE ROCK AND SOIL
CONTAINMENT AREA
DITCH SECTIONS

AND DETAILS

designed	K. Hojka	conçu
date	JAN 04, 2016	
drawn	R. Cornish	dessiné
date	JAN 04, 2016	
approved	D. Wilson	approuvé
date	JUL 29, 2016	

PCA Project Manager

Administrateur de projets PCA

project number

no. du projet

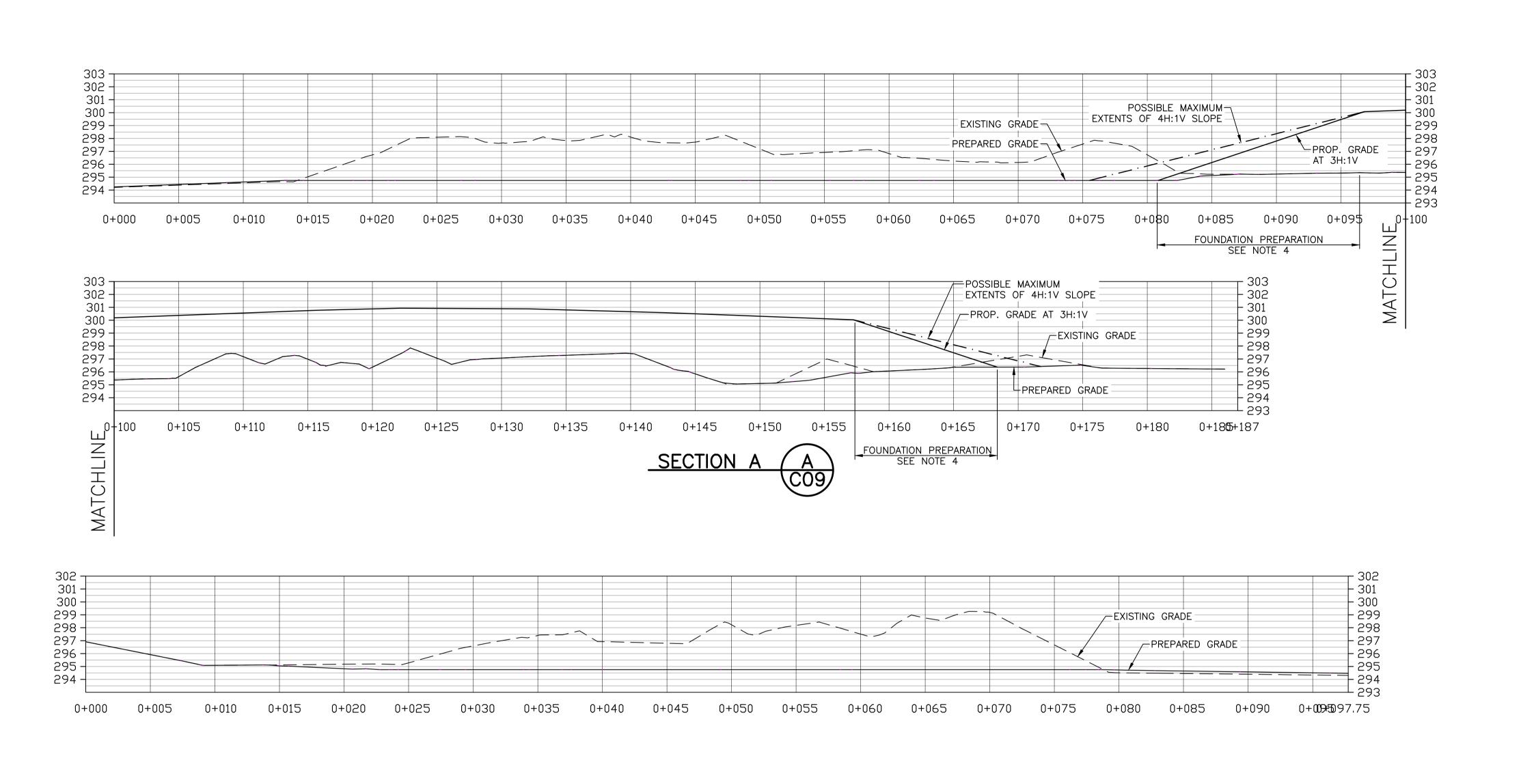
R.057573

drawing no.

E-DRM/GDD-E:

M. McElwaine

80 100 120 140 160 180 200mm



ISSUED FOR TENDER PUBLIC WORKS AND

Public Works and Travaux Publics et
Government Services Services gouvernementaux

Canada

Stantec

1. THE SUBSURFACE CONDITIONS SHOWN

ON THIS DRAWING ARE ASSUMED AND

ARE BASED ON THE LIMITED SURVEY

AND FIELD INVESTIGATION DATA. THE

VARY FROM THOSE SHOWN.

2. SOME DESIGN CHANGES MAY BE

DESIGN CHANGES SHOULD BE

EXCAVATION, FOUNDATION PREPARATION, FILL PLACEMENT, GEOTEXTILE AND GEOMEMBRANE

INSTALLATION.

REQUIRED IF ACTUAL SUBSURFACE CONDITIONS VARY SIGNIFICANTLY FROM

THOSE SHOWN ON THE DRAWING. ANY

APPROVED BY THE DESIGN ENGINEER.

REFER TO TECHNICAL SPECIFICATIONS FOR SPECIFICATIONS REGARDING

4. REMOVE ALL LOOSE MATERIAL WITHIN THE FOUNDATION PREPARATION ZONE,

SEE TECHNICAL SPECIFICATIONS.

5. NOTE TO BIDDERS: DITCH PROFILES

THE 2016 FIELD ASSESSMENT.

MAY BE REVISED ONCE THE DITCH ALIGNMENT IS FINALIZED FOLLOWING

ACTUAL SUBSURFACE CONDITIONS MAY

Canada

<u>KEY PLAN</u>

NOTES:

GOVERNMENT SERVICES CANADA GORDON LAKE REMEDIATION PROJECT

KIDNEY POND WASTE ROCK AND SOIL CONTAINMENT AREA **EXCAVATION SECTIONS**

^{designed} K. Hojka date FEB 23, 2016 drawn K. Jones date FEB 23, 2016 ^{approved} D. Wilson _{date} JUL 29, 2016

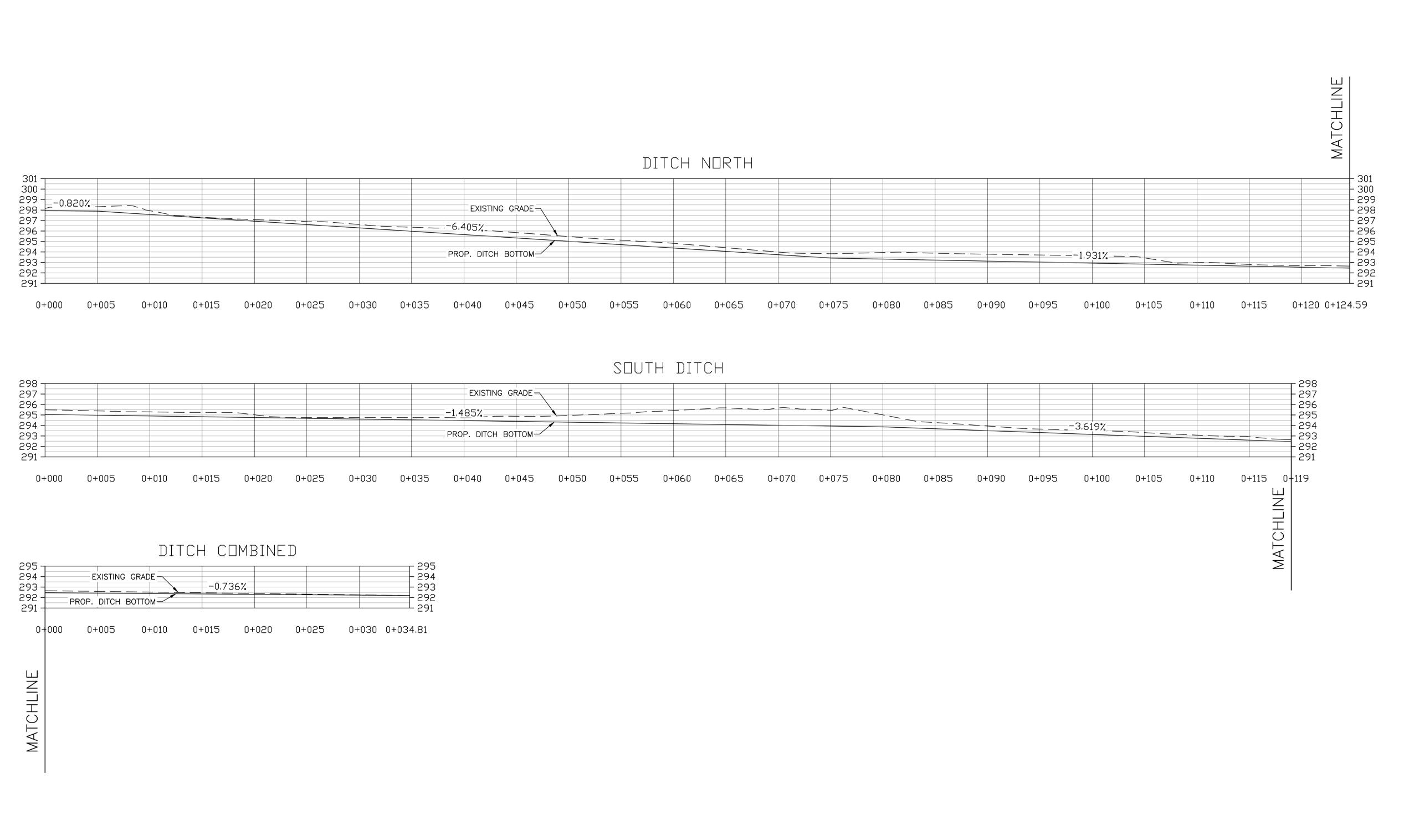
M. McElwaine PCA Project Manager Administrateur de projets PCA R.057573

drawing no. C-KID-13

SCALE: 1:200 HORIZ. SCALE: 1:200 VERT.

PWGSC A1 (2004)

E-DRM/GDD-E:



Public Works and Travaux Publics et
Government Services Services gouvernementaux Canada

<u>KEY PLAN</u>



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ISSUED FOR TENDER

PUBLIC WORKS AND **GOVERNMENT SERVICES** CANADA GORDON LAKE REMEDIATION PROJECT

KIDNEY POND WASTE ROCK AND SOIL CONTAINMENT AREA PERIMETER DITCH **PROFILES**

^{designed} K. Hojka date JAN 04, 2016 drawn R. Cornish date JAN 04, 2016 approved D. Wilson _{date} JUL 29, 2016 M. McElwaine Administrateur de projets PCA PCA Project Manager R.057573

C-KID-14

PWGSC A1 (2004)

KIDNEY POND PROFILE VIEW — PERIMETER DITCHES

SCALE: 1:200

