



Sediment and Erosion Control Plan Appendix H

January 2019
Government of
Northwest Territories



PLAN MAINTENANCE AND CONTROL

INF and the Environmental Health and Safety Manager of the Contractor are responsible for the distribution, maintenance and updating of the Sediment and Erosion Control Plan (SECP).

This Sediment and Erosion Control Plan will be reviewed as needed, taking into account changes in the law, environmental factors, GNWT-INF and Contractor policies, and any other pertinent site-specific changes.

Changes in phone numbers, names of individuals, etc. that do not affect the intent of the plan are to be made on a regular basis. Plan updates will be issued as per the Sediment and Erosion Control Plan distribution list. The Sediment and Erosion Control Plan holder is responsible for adding new and/or removing obsolete pages upon receipt of updates.

Sediment and Erosion Control Plan Document History

Revision #	Section(s) Revised	Description of Revision	Prepared by	Issue Date

Additional copies of the Sediment and Erosion Control Plan can be obtained from the Environmental Health and Safety Manager of the Contractor and/or the GNWT representative responsible for the Project.



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Acronyms

DFO	Fisheries and Oceans Canada
GNWT-INF	Department of Infrastructure of the Government of the Northwest Territories
ENR	Environment and Natural Resources
GNWT	Government of the Northwest Territories
PDR	Project Description Report
SECP	Sediment and Erosion Control Plan
SLWB	Sahtu Land and Water Board



1 INTRODUCTION

This Sediment and Erosion Control Plan (SECP) has been developed for use by the Department of Infrastructure of the Government of the Northwest Territories (GNWT-INF) for the Geotechnical Investigations for the Great Bear River Bridge Project (the Project).

The purpose of the SECP is to provide guidance and mitigation to avoid or prevent erosion or sedimentation from activities related to the geotechnical and material source investigations (the Project). This SECP was developed in accordance with Fisheries and Oceans Canada (DFO) requirements and guidance, the Northern Land Use Guidelines and the GNWT- INF's Erosion and Sediment Control Manual. The goal of the SECP is to:

- Ensure components of our environment, including the air, water, land, vegetation, wildlife and fish, are not negatively affected by the Project;
- Ensure aesthetic and land use values remain intact; and
- Ensure the Project will comply with all applicable acts and regulations, as well as conditions outlined in the INF's land use permit.

The SECP will be revised as needed to reflect changes or site-specific conditions. Revisions will be submitted to the Sahtu Land and Water Board (SLWB).

1.1 ENVIRONMENTAL POLICY AND PROCEDURES

This SECP deals specifically with procedures and policies for the prevention, mitigation and monitoring of potential erosion of soil and deposition into water. It provides information on pre- operative measures, mitigations during operations, reclamation and monitoring.

1.2 LEGISLATION AND GUIDELINES

This plan been developed in consideration of the applicable legislation and guidelines, including:

- *Fisheries Act and Regulations*
- *Mackenzie Valley Resource Management Act and Regulations*
- *Northern Land Use Guidelines: Camp and Support Facilities* (Lands 2014a)
- *Northern Land Use Guidelines: Roads and Trails* (Lands 2014b)



1.3 PROJECT DETAILS

The Government of the Northwest Territories (GNWT) Department of Infrastructure is planning to construct a permanent bridge over the Great Bear River as a component of the Mackenzie Valley Winter Road.

Concurrent with the advancement of the design for the bridge, INF needs to determine sources of aggregate necessary for the construction of the bridge.

The purpose of the geotechnical investigation program is to gain access to the prospective aggregate sites in the winter to complete geotechnical site investigations using auger, core drills and an excavator. Some sites will be accessed during snow free conditions by helicopter to allow for drilling of boreholes. Boreholes will also be advanced on the roadway approaches to the bridge and at the location of the bridge abutments to test geotechnical properties. The boreholes and test pits will be logged, samples will be collected for laboratory analysis and a comprehensive report of the findings will be prepared. INF will be completing this work using the services of a contractor as well as their own staff.

A complete description of the Project is in the Project Description Report (PDR) along with maps.

1.4 PROJECT CONTACT

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1.5 DISTRIBUTION LIST

This plan and the most recent revisions will be distributed to:

1. Environmental Health and Safety Manager
2. Project Engineer
3. Public Relations
4. Contractor
5. Applicable INF Employees

Copies will also be provided to the following:



Regulatory Agency	Contact
Workers' Safety and Compensation Commission – 24 Hour Incident Reporting Line	1-800-661-0792
Department of Lands, GNWT (Inspector)	(867) 587-7206
Environment and Natural Resources, GNWT	(867) 392-6941
Sahtu Land and Water Board	(867) 598-2413
Fisheries and Oceans Canada	1-866-290-3731
Environment Canada	(780) 951-8600



2 PLANNING AND GENERAL MITIGATIONS

Erosion and sedimentation are naturally occurring processes of loosening and transporting soil through the action of wind, water, or ice, and the subsequent transport and deposition of sediment particles. Land use activities can result in increased erosion and sedimentation where soil surfaces are exposed to rainfall and runoff. If uncontrolled, these processes may result in adverse effects on the environment. The potential for erosion and sedimentation can be reduced through effective planning and application of general mitigation measures to the land use activity.

Areas subject to investigation should be evaluated prior to commencement of the land use activity. This will involve review of maps, air photos, reports and site visits to identify areas of the site which may be susceptible to erosion (e.g. slopes, ice-rich soils), location of water bodies and drainage channels and presence of downstream sensitive environments. Areas with higher potential for erosion and sedimentation should be avoided whenever possible. Areas with higher potential for erosion that must be used should be identified and mitigative measures identified to limit erosion and sedimentation. Land use activity within 100 m of the ordinary high-water mark of a watercourse should be avoided when possible. Additionally, planning of the land use activity should try to minimize the amount of land used during the land use activity to further reduce the potential for erosion.

Activities should occur during periods with reduced potential for erosion and sedimentation. Snow cover can eliminate the interaction between equipment and soils with the exception of the locations where test pit excavations and boreholes are advanced. A minimum snow thickness of 10 cm should be maintained in all land use areas during winter. If an area is subject to repeated activity, the depth of snow cover can be increased and/or strengthened with the addition of water to develop a frozen work surface. Winter crossings of watercourses should be constructed perpendicular to the watercourse and follow gentle slopes. Snow fill or ice crossings should be removed or notched upon conclusion of the land use activity. Activity should be avoided during spring or following precipitation when soils can be saturated and more susceptible to erosion. Only vehicles exerting low ground pressures should be used when a prepared snow cover is not present. Overland travel should be suspended if it results in the creation of ruts in the terrain.

When clearing trees for access, care should be taken to leave the surface vegetation cover and root mat intact to protect the underlying soil. During winter the surface vegetation cover and root mat can be protected by using a dozer equipped with mushroom shoes and clearing sensitive areas (e.g., riparian zones and steep slopes) by hand. During summer, tree clearing should be done by hand only.

For land use areas likely to experience erosion, install erosion and sediment control measures prior to commencing activity and monitor and repair during activity as necessary. Have sufficient erosion and sediment control equipment and materials available for use during land use activity.



3 PROJECT ACTIVITIES, POTENTIAL EFFECTS AND MITIGATIONS

The Project involves the excavation of test pits and advancement of boreholes to collect data on the geotechnical properties of the underlying materials. Access to investigation sites will be winter road and trail during winter and by helicopter to the sites during summer. During summer, drilling rig access to borehole location within the sites will either be by helicopter or overland using a tracked drill rig. Table 1 outlines activities with potential for erosion and/or erosion and sedimentation, the potential environmental effects and proposed measures to mitigate the effects.

Table 1: Project Activities, Potential Effects, and Proposed Mitigation Measures

Activity	Potential effect	Mitigation Measures
Clearing of trees (for access trails, helicopter landings and test pit and drilling locations)	Removal of surface vegetation and root mat can expose soil, which can erode, potentially resulting in terrain damage, permafrost degradation and sedimentation of watercourses.	<ul style="list-style-type: none"> • Minimize the amount of clearing required through planning and use of existing cleared areas. • Equipment used for clearing of trees during winter should be equipped with mushroom shoes to avoid direct contact with the surface vegetation and root mat. • Summer clearing and clearing of sensitive areas in winter should be done by hand. • Upon conclusion of work, inspect cleared areas for soil exposure and evidence of potential soil erosion and sedimentation. • As necessary, install and regularly maintain all active sediment and erosion control measures.
Preparation and maintenance of access trails	Removal of surface vegetation and root mat can expose soil, which can erode, potentially resulting in terrain damage, permafrost degradation and sedimentation of watercourses. Snow fills and ice crossings can restrict freshet flows leading to bank erosion and sedimentation of watercourses	<ul style="list-style-type: none"> • A minimum of 10 cm of snow should be maintained in all winter work areas. The surface can be further prepared through the use of water. • Remove or notch snow fills or built-up ice crossings at watercourse crossings to allow for unrestricted flow during freshet. • If activity exposes soil during winter operations, install effective erosion and sediment control measures before snow melt. • During summer use equipment which exerts a low ground pressure to avoid breaking through surface vegetation and root mat. • Suspend overland vehicle travel during periods when soils are saturated, or rutting occurs. • If shoreline or banks are destabilized, re-stabilize them immediately to prevent erosion and/or sedimentation. • Upon conclusion of work, inspect work areas for soil exposure and evidence of potential soil erosion and sedimentation.



Table 1: Project Activities, Potential Effects, and Proposed Mitigation Measures

Activity	Potential effect	Mitigation Measures
Excavation and backfilling of test pits	<p>Exposed soils are subject to erosion through overland drainage.</p> <p>Slumping test pits can fill with water, which may result in erosion and/or permafrost degradation.</p>	<ul style="list-style-type: none"> • As necessary, install and regularly maintain all active sediment and erosion control measures. • Avoid advancing test pits on steep slopes and in overland drainage channels. • Conduct test pitting during winter conditions to minimize interaction with soil and vegetation. • Stockpile excavated soils immediately adjacent to test pit to enable backfilling with minimal equipment movement • Upon completion of test pit, immediately backfill test pit with excavated material. Compact material and mound material above surrounding grade to allow for slumping during the melt period and to promote positive drainage away from the test pit. • If test pit is on a slope or within a drainage channel, install sediment control measures down slope to prevent potential eroded material from reaching a watercourse. • Upon conclusion of work, inspect work areas for soil exposure and evidence of potential soil erosion and sedimentation. • As necessary, install and regularly maintain all active sediment and erosion control measures.
Drilling of boreholes	<p>Exposed soils are subject to erosion through overland drainage.</p>	<ul style="list-style-type: none"> • Minimize area of soil to be exposed to allow access to for advancement of borehole. • Stockpile soils from borehole immediately adjacent to test pit to enable backfilling with minimal equipment movement. • Direct non- hazardous drill water to low areas and use low velocities and/or diffuser to reduce erosion potential. • Upon completion of borehole, immediately backfill with excavated material. Compact material and mound material above surrounding grade to allow for slumping during the melt period and to promote positive drainage away from the test pit. • Upon conclusion of work, inspect work areas for soil exposure and evidence of potential soil erosion and sedimentation. • As necessary, install and regularly maintain all active sediment and erosion control measures.
Operation of Camps	<p>Transportation, placement and operation of camps can expose soils which may be eroded and result in sedimentation.</p>	<ul style="list-style-type: none"> • Place camps on level ground and at least 100 m from watercourses, in locations approved by the Land Use Inspector. • Overland transportation of camps should only occur



Table 1: Project Activities, Potential Effects, and Proposed Mitigation Measures

Activity	Potential effect	Mitigation Measures
		<p>when a 10 cm snow cover is in place.</p> <ul style="list-style-type: none"> • Locate high traffic areas on stable soils. If necessary, place mats or barriers on vegetation surface to distribute weight of traffic over a larger surface area to prevent rutting. • If draining fluids into sumps, use low velocities and/or a diffuser to prevent soil erosion. • Upon conclusion of work, inspect camp areas for soil exposure and evidence of potential soil erosion and sedimentation. • As necessary, install and regularly maintain all active sediment and erosion control measures.



4 MONITORING

4.1 Operations Period

During the land use activity, the Supervisor shall routinely monitor all active and completed work areas for erosion. Areas of exposed soil should be contoured to prevent positive drainage around or away from the exposure. If necessary, apply erosion control measures such as erosion control matting, rip rap, straw and/or seeding to promote revegetation. As necessary install sediment control measures between exposed areas and water courses to trap eroded materials before entering watercourses. These sediment control measures could include silt fences, ditch blocks and cleared vegetation. Prior to leaving the site, inspect all erosion and sediment control measures and repair and replace as necessary.

4.2 Post Operations

Land use activity areas should be inspected once snow free to identify evidence of erosion and sedimentation and the effectiveness of installed sediment and erosion control measures. As necessary install or repair erosion and sediment control measures.

Land use activity areas should be inspected again following the summer investigation program. As necessary, install or repair erosion and sediment control measures.

After the spring freshet in 2020, inspect the land use areas and repair, replace or remove erosion and sediment control measures. If necessary, conduct remedial measures to prevent further erosion and sedimentation from occurring. Continue monitoring until stable conditions have been achieved. Remove erosion and sediment control materials as practical.



5 REPORTING

The GNWT will report annually during the period of the permit on the status of Project caused erosion and sedimentation, measures taken to mitigate the effects and planned monitoring and reclamation.



6 REFERENCES

Department of Lands (Lands). 2014a. Northern Land Use Guidelines: Camp and Support Facilities. GNWT. Yellowknife, NT. Retrieved January 2018 from: http://www.lands.gov.nt.ca/sites/default/files/nlug_-_camps.pdf.

Department of Lands (Lands). 2014b. Northern Land Use Guidelines: Roads and Trails. GNWT. Yellowknife, NT. Retrieved January 2018 from: http://www.lands.gov.nt.ca/sites/default/files/nlug_-_roads_and_trails.pdf.

Appendix H

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