



Oscar Creek Bridge Relocation Project

Erosion and Sedimentation Control Plan v.1.1

November 2024



Plan Maintenance and Control

Plan Document History

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Abbreviations

>	more than
ATV	all-terrain vehicle
BMP	best management practice
CCME	Canadian Council of Ministers of the Environment
cm	centimetre
DFO	Fisheries and Oceans Canada
ESCP	Erosion and Sedimentation Control Plan
GNWT	Government of the Northwest Territories
INF	Department of Infrastructure, Government of the Northwest Territories
km	kilometre
km/h	kilometre per hour
m	metre
MVWR	Mackenzie Valley Winter Road
NTU	Nephelometric Turbidity Unit
the Project	Oscar Creek Relocation Project
ROW	right-of-way

1 Introduction

1.1 Purpose

This Erosion and Sedimentation Control Plan (ESCP) describes the mitigation measures to reduce erosion and sedimentation effects from activities related to the Oscar Creek Bridge Relocation Project (the Project) by the Government of the Northwest Territories (GNWT) Department of Infrastructure (INF). It includes measures for protecting permafrost.

The Project is in the Sahtu Region of the Northwest Territories. The Project includes the relocation of the Oscar Creek Bridge located at KM1054.4 of the Mackenzie Valley Winter Road (MVWR) to a location 2.9 kilometres (km) to the east (upstream), and re-alignment of the MVWR from approximately KM1051 to KM1056 to connect with the new bridge location. The re-alignment requires construction of additional watercourse crossings of the North and South tributaries of Oscar Creek. (Figure 1-1).

The ESCP was developed in accordance with applicable guidelines and best practices in Northwest Territories, Fisheries and Oceans Canada Letter of Advice for the Project, and is one of several plans developed for the Project. This ESCP is a requirement of, and is complementary to, terms and conditions contained in Land Use Permit S24E-006 and Water Licence S24L8-003 issued to the GNWT-INF.

The ESCP will be reviewed annually during the Project to capture lessons learned from the previous year's construction and monitoring activities. Once constructed, the Project will become part of the GNWT's operational highway network, specifically the Mackenzie Valley Winter Road (MVWR) – Norman Wells to Fort Good Hope section.

1.2 Project Overview

The Project includes the following activities to which this plan applies:

- Mobilizing and demobilizing construction equipment to and from work sites
- Site preparation:
 - Tree clearing and grubbing along a new MVWR alignment right-of-way (ROW)
 - Tree clearing and ice pad preparation at camp location and workspaces and laydowns
 - Construction of a winter road along the new ROW
- Disassembly and relocation of existing Oscar Creek bridge structure to the new location
- Installation of pile foundations at new Oscar Creek bridge location
- Rehabilitation of the old bridge location, including removing material, cutting piles, removing/cutting bin walls and seeding/planting.
- Construction of a bridge crossing at the North Tributary and large diameter culvert crossing at the South Tributary
 - Construction of new piled abutments for the Oscar Creek bridge at its new location
 - Launching superstructure onto abutments
 - Apron and rip rap installation
 - Excavation of watercourse base for culvert installation
 - Placement and backfill of culverts
 - Beaver dam and/or beaver lodge removal
- Construction of bridge approaches:
 - Sub-excavation to meet design grade
 - Placing geotextile
 - Hauling, placing and compacting granular fill
- Construction of temporary crossings and ice platform
 - Construction of a snow/ice crossings and reinforcement of ice to create an ice platform
- Borrow source operations:
 - Clearing and stripping
 - Excavation
 - Blasting (potential)
 - Sorting and stockpiling

- Camp accommodations and associated facilities
 - Camp operations
 - Waste management and water use

1.3 Relevant Guidance

This ESCP has been developed in consideration of applicable legislation, guidelines, and best practices as they may apply to the project activities, including:

- The Fisheries and Oceans Canada's (DFO's) codes of practice (DFO 2022) and interim codes of practice (DFO 2019), including:
 - Code of practice: Culvert maintenance
 - Code of practice: Clear span bridges
 - Code of practice: Ice bridges and snow fills
 - Code of practice: Temporary fords
 - Code of practice: Beaver dam breaching and removal
 - Interim code of practice: Temporary cofferdams and diversion channels
- DFO's Measures to protect fish and fish habitat, including:
 - Measures to maintain riparian vegetation
 - Ensuring proper sediment control
 - Avoiding work in water where possible
- DFO Letter of Advice 23-HCAA-01660, Appendix A
- Northern Land Use Guidelines: Camp and Support Facilities (GNWT 2015a)
- Northern Land Use Guidelines: Pits and Quarries (GNWT 2015b)
- Northern Land Use Guidelines: Roads and Trails (GNWT 2015c)
- Erosion and Sediment Control Manual (GNWT 2013)
- Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions (TAC 2010)

1.4 Previous Experience

The GNWT’s Erosion and Sediment Control Manual (GNWT 2013) provides a comprehensive compilation of guidelines and standard procedures for selecting, designing, and implementing erosion and sedimentation control measures for transportation infrastructure projects in the Northwest Territories. The GNWT-INF has applied its experience implementing erosion and sedimentation control measures for the following projects:

- Prohibition Creek Access Road
- Tłıchǵ All Season Road
- Ongoing operations of the MVWR
- Ongoing operations of the NWT Highways System

1.5 Roles and Responsibilities

The Contractor is responsible for implementing the ESCP. Roles and responsibilities are outlined in Table 1-1.

Table 1-1 Roles and Responsibilities

Entity	Responsibility
Contractor	<ul style="list-style-type: none"> • Implement this ESCP under the direction of the Contractor Supervisor • Make personnel, equipment, and materials available, as required • Take appropriate response measures • Continue implementing the ESCP until responsibility is transferred under the authority of the GNWT-INF
Contractor Supervisor	<ul style="list-style-type: none"> • Supervise the contractor team • Verify that this ESCP is available on site at all times • Verify that personnel are trained and competent in the ESCP’s application • Verify that the measures in the ESCP are adequately applied • Conduct regular worksite inspections • Coordinate additional equipment and/or workforce (if necessary) • Liaise with GNWT Inspector(s) and Engineer
Contractor Project Manager	<ul style="list-style-type: none"> • Maintain records of construction, mitigation, and inspection activities • Report to GNWT-INF • Oversee completion of the Project • Support the Contractor Supervisor as required

Entity	Responsibility
Government of the Northwest Territories Department of Infrastructure (INF)	<ul style="list-style-type: none">• Comply with all permits and licences• Develop press releases and liaise with media directly (if required)• Liaise with Indigenous Governments, landowner, other affected parties, and the public (as required)• Confirm all reports are completed, as required by Authorizations
Engineer and/or GNWT's Designated Representative	<ul style="list-style-type: none">• Support the Contractor and GNWT by providing technical guidance on the implementation of this ESCP• Make recommendations for modification to mitigation measures based on site reviews• Verify that the ESCP is being followed

1.6 Training

The GNWT-INF, its contractors, and other authorized personnel working for, or on behalf of the GNWT-INF, will be trained and competent in the purpose and methods included in this plan.

2 Potential Effects and Mitigation Measures

Mitigation measures aim to prevent erosion and reduce the effects of sedimentation. Erosion is the wearing away of soil or rock by water, wind, or ice, whereas sedimentation is the deposition of this eroded material into water. Erosion control aims to prevent material from being eroded, and sedimentation control aims to limit the transport and deposition of this eroded material, thereby reducing effects on the environment. See Table 2-1 to Table 2-7 for activities that may lead to erosion and sedimentation and their specific mitigation measures.

2.1 Best Management Practices

The GNWT Erosion and Sediment Control Manual (GNWT, 2013) is to be used for further guidance on selecting, installing, and monitoring the best method/installation for sedimentation control. Appendix C of the GNWT Erosion and Sediment Control Manual includes 30 best management practices (BMPs) for erosion and sediment control.

In all cases:

- Mitigation BMPs must not contravene permit conditions or other regulatory requirements, such as DFO codes of practice.
- Installations, as indicated in design drawings and specifications, take precedence over BMPs unless otherwise approved by the Engineer based on observed site conditions (see Section 3 of this plan).
- The location of mitigation installations is to be recorded to facilitate inspection.

2.2 Mitigation Measures to be Applied

Table 2-1 to Table 2-7 identify measures required to be implemented to mitigate the potential effects of erosion and sedimentation that may be caused by each general project activity of the Project.

Table 2-1 Mitigation Measures for Equipment Mobilization to and from Work Sites

Activity: Equipment Mobilization to and from Work Sites	
Potential Effect	Mitigation Measures
Vehicle use causes ponding and rutting	<ul style="list-style-type: none"> • Travel of vehicles will be confined to existing roads and winter roads as much as possible to avoid disturbing vegetated areas. • Off-road travel will be limited to frozen conditions (approximately December 15 to April 1), where possible. • Off-road travel on highly saturated soil will be avoided, where possible. • A minimum of 10 centimetres (cm) of packed snow will be maintained on all off-road travel surfaces.
Vehicle travel causes erosion of stream banks	<ul style="list-style-type: none"> • Equipment will be operated in a manner that limits disturbance to lake, river, or stream banks. • Travel on steep slopes will be avoided, where possible.

Table 2-2 Mitigation Measures for Site Preparation

Activity: Site Preparation (Clearing of Workspaces and Right-of-Way and Construction of a Winter Road)	
Potential Effect	Mitigation Measures
Vegetation clearing from the ROW exposes soil to erosion	<ul style="list-style-type: none"> • Clearing will be completed when the ground is frozen. • Clearing will not be conducted during high rainfall or runoff events. • Removal of vegetation will be limited to the width of the ROW. • Where possible, windrowed material will be mulched and spread over cleared areas within the ROW. • Organic material and topsoil will be retained.
Clearing of vegetation in riparian areas exposes soil to erosion	<ul style="list-style-type: none"> • Riparian vegetation will be maintained whenever possible. • Where vegetation must be cut but is not removed, the cut will be made > 10 cm above the ground to retain the root structure. Stumps that remain must be less than 30 cm above the ground. • Erosion and sedimentation control measures will be maintained until disturbed areas are revegetated or until such areas have been permanently stabilized by other effective measures. • Clearing will be completed by hand, where required, to prevent damage to the ground such as rutting, compaction and erosion.

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 Potential Effects and Mitigation Measures

Activity: Site Preparation (Clearing of Workspaces and Right-of-Way and Construction of a Winter Road)	
Potential Effect	Mitigation Measures
Equipment use causes ponding and rutting	<ul style="list-style-type: none"> • Clearing will be completed by hand, where required, to prevent damage to the ground. • Clearing will not be conducted during high rainfall or runoff events. • Construction activities will be conducted during dry or frozen conditions, or use rig mats to reduce soil compaction, rutting, and erosion.
Erosion causes sediment to enter watercourse	<ul style="list-style-type: none"> • Travel of vehicles will be confined to existing roads and trails as much as possible to avoid disturbing vegetated areas. • Travel on steep slopes will be avoided, where possible. • Erosion and sedimentation control measures (per GNWT, 2013) will be in place prior to construction activities and before the spring melt/freshet. • Silt fencing will be used downgradient of the works where required. • Pondered water will be directed away from watercourses.
Excess sediment enters watercourse	<ul style="list-style-type: none"> • Install effective erosion and sediment control measures (such as silt fencing) before starting work to prevent sediment from entering the waterbody • Regularly inspect and maintain erosion and sediment control measures • Repair erosion and sediment control measures and structures if damage occurs • Remove non-biodegradable erosion and sediment control materials once the site is stabilized
Vehicle use on winter travel lane causes erosion or rutting	<ul style="list-style-type: none"> • A winter travel lane will be constructed in previously cleared areas only. • Construction of a winter travel lane will occur during frozen conditions. • A minimum of 10 cm of packed snow will be maintained on all off-road travel surfaces. • Use of the winter travel lane will cease by April 1 or as directed by the Inspector or specified in the land use permit.
Temporary crossings release sediment into water degrading water quality	<ul style="list-style-type: none"> • Temporary crossings will be constructed perpendicular to the watercourse. • Temporary crossings will be constructed of clean snow fill. • Temporary ice bridges or snow fills will be constructed in accordance with the Code of practice: Ice bridges and snow fills (DFO 2022). • Snow fill crossings will be v-notched prior to the spring melt/freshet before April 1 each year. • Logs or woody debris will be removed from the watercourse and banks. • Temporary bridges, if required, will not be placed below the ordinary high water mark. • No fording of watercourses is permitted, except to install a temporary work bridge.

Table 2-3 Mitigation Measures for Bridge and Bridge Approach Construction

Activity: Road and Bridge Construction / Bridge Removal	
Potential Effect	Mitigation Measures
<p>Slope cutting causes permafrost degradation and ponding</p> <p>Excavation releases sediment into watercourses</p>	<ul style="list-style-type: none"> • Cutting of the subgrade at the North Tributary crossing is to be conducted according to design. Some thaw and settling of the ground surface is expected. • Where cutting of the subgrade at the North Tributary is required per design, erosion and sedimentation control measures will be implemented (per GNWT, 2013). • Direct ponded water away from watercourses. • Sub-excavation will cease during high rainfall or runoff events. • Implement erosion monitoring and address issues promptly per GNWT (2013)
<p>Removal of approach fill and bin walls at old bridge location releases sediment into water degrading water quality</p>	<ul style="list-style-type: none"> • Erosion and sedimentation control measures will be implemented (per GNWT, 2013). • Sediment control measures will be in place prior to construction activities and before the spring melt/freshet, as applicable. • Excavation will cease during high rainfall or runoff events • Implement erosion monitoring and address issues promptly per GNWT (2013) • Seeding and planting will be completed in the frost-free season following site rehabilitation, in accordance with the specifications.
<p>The use of machinery in or near water causes sediment to enter watercourses</p>	<ul style="list-style-type: none"> • Machinery on-site will be in a clean condition. • Machinery will not be left in the watercourse. • Washing, refueling, and servicing machinery and storage of fuel and other materials for machinery will be conducted at least 100 metres (m) from the high water mark and in a manner to prevent any deleterious substances from entering the water. • All-terrain vehicles (ATVs) and mobile equipment will avoid steep banks at crossings. • Erosion and sedimentation control measures will be implemented (per GNWT, 2013). • The spill contingency plan for the Project will be followed to prevent and reduce the effect of a spill entering a watercourse.
<p>Excavation of bed and bank material releases sediment into water degrading water quality</p>	<ul style="list-style-type: none"> • Sediment control measures will be in place prior to construction activities and before the spring melt/freshet, as applicable. • Culvert design will include requirements for bedding materials and geotextile to protect surrounding permafrost from thaw. Rip rap will be incorporated into culvert design to avoid erosion around each culvert. • Grading of stream banks at approaches shall be limited where possible.

Activity: Road and Bridge Construction / Bridge Removal	
Potential Effect	Mitigation Measures
Excavation of bed and bank material releases sediment into water degrading water quality (cont'd)	<ul style="list-style-type: none"> • Excavated spoil material will be disposed of at least 30 m from the watercourse. • Material stockpiles will be kept a minimum of 30 m from a watercourse or waterbody with the appropriate erosion control mitigation measures in place (per GNWT, 2013) to prevent sediment from entering a watercourse or waterbody. • In-stream construction will be conducted in the dry, using isolation techniques. • Temporary isolation for the placement of rip rap and removal of culverts will follow the interim standard: in-water site isolation (DFO 2023). • Conduct in-water undertakings and activities during periods of low water levels or frozen conditions • Limit impacts on riparian vegetation to those approved for the work, undertaking or activity <ul style="list-style-type: none"> – Limit access to banks or areas adjacent to waterbodies – Construct access points and approaches perpendicular to the watercourse or waterbody – Re-vegetate the disturbed area with native species suitable for the site • Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the waterbody) to its initial state, or as design specifies.
Placement of material in and near water degrades water quality	<ul style="list-style-type: none"> • Riprap will be free of silt and other debris. • Material with acid rock drainage and/or metal leaching potential will not be used. • Avoid introducing sediments (e. g., silts, clays and sand) in the water.
Snow clearing causes sediment to enter watercourses	<ul style="list-style-type: none"> • Direct cleared snow away from watercourses and drainages • Implement runoff control to avoid entry to waterbodies, including: <ul style="list-style-type: none"> – Divert water from entering watercourse – Control flow velocity
Breaching or removal of beaver dams causes erosion and degrades water quality	<ul style="list-style-type: none"> • Beaver dam removal will be done in accordance with the code of practice: Beaver dam breaching and removal (DFO, 2022) and conditions of a GNWT General Wildlife Permit. • Riparian vegetation will be maintained whenever possible. • Access will be along existing trails and perpendicular to the watercourse, where possible. • Erosion and sedimentation control measures will be maintained until disturbed areas are revegetated or until such areas have been permanently stabilized by other effective measures.

Activity: Road and Bridge Construction / Bridge Removal	
Potential Effect	Mitigation Measures
Breaching or removal of beaver dams causes erosion and degrades water quality (cont'd)	<ul style="list-style-type: none"> • When dewatering beaver impoundments: <ul style="list-style-type: none"> – Remove the dam gradually, beginning with a small breach, and work in stages to control flows, prevent sediment from being released downstream, and prevent fish stranding – Verify that the width of the breach opening of the beaver dam does not exceed the width of the original stream channel • As the water levels drop in the upstream pond, increase the size of the opening to drain the pond to the desired water level
In-water activities impact fish and fish habitat	<ul style="list-style-type: none"> • Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults. • Screen intake pipes to prevent entrainment or impingement of fish <ul style="list-style-type: none"> – Use the code of practice for water intake screens (DFO 2020).

Table 2-4 Mitigation Measures for Temporary Crossings and Ice Platform

Activity: Construction of Temporary Watercourse Crossings and Ice Platform	
Potential Effect	Mitigation Measures
Temporary crossings and fords release sediment into water degrading water quality	<ul style="list-style-type: none"> • Temporary crossings will be constructed perpendicular to the watercourse. • Temporary crossings will be constructed of clean snow fill. • Snow fill crossings will be v-notched prior to the spring melt/freshet before April 1 each year. • Logs or woody debris will be removed from the watercourse and banks. • Temporary bridges, if required, will not be placed below the ordinary high water mark. • Temporary ice bridges or snow fills will be constructed in accordance with the Code of practice: Ice bridges and snow fills (DFO 2022). • No fording of watercourses is permitted, except to install a temporary work bridge. <ul style="list-style-type: none"> – Plan in-water works to respect fish timing windows – Use methods to reduce soil compaction and erosion of banks – Conduct fords during periods of low flow – Do not skid or drag material across the ford

Table 2-5 Mitigation Measures for Borrow Source Development

Activity: Quarry Operations	
Potential Effect	Mitigation Measures
Excavated material, debris and dust enter water degrading water quality	<ul style="list-style-type: none"> • Borrow source operations will be located a minimum of 100 m from the ordinary high water mark of any waterbody. • Blast mats will be used when blasting (if used). • Blast rock will not enter a waterbody or watercourse. • Runoff water will be directed into vegetated areas away from natural drainages. • Positive drainage will be maintained within the pit floor. • Haul trucks will be limited to speeds of 50 km/h on project roads
The use of machinery in or near water degrades water quality	<ul style="list-style-type: none"> • Machinery on-site will be in a clean condition and maintained free of fluid leaks, invasive species, and noxious weeds. • Machinery will not be left in the watercourse. • Washing, refueling, and servicing machinery and storage of fuel and other materials for machinery will be conducted a minimum of 100 m from the high water mark of waterbodies and in a manner to prevent any deleterious substances from entering the water. • ATVs and mobile equipment will avoid steep banks at crossings. • Erosion control measures will be implemented.
Sediment enters watercourse or waterbody degrading water quality	<ul style="list-style-type: none"> • Material stockpiles will be kept a minimum of 30 m from a watercourse or waterbody with the appropriate erosion control mitigation in place (per GNWT, 2013) to prevent sediment from entering a watercourse or waterbody.
Potential permafrost thaw resulting from excavations	<ul style="list-style-type: none"> • If ice-rich permafrost is identified during borrow source activities, suitable measures will be taken to protect permafrost and ground ice encountered during material extraction activities, as per the Project Quarry Development Plan. • Cover any permafrost soils or materials that are susceptible to physical erosion so that there is no unintended permafrost degradation • Excavations and developed borrow sources will be visually monitored throughout the summer and fall to verify that there is no physical erosion resulting from the degradation of permafrost.

Table 2-6 Mitigation Measures for Temporary Workspaces and Laydowns

Activity: Temporary Workspaces and Laydowns	
Potential Effect	Mitigation Measures
Erosion of soil from temporary workspaces or laydowns causes changes to water quality	<ul style="list-style-type: none"> • Equipment laydown and staging areas will be located at least 100 m from the ordinary high water mark of any waterbody. • Clearing will be completed when the ground is frozen. • Organic material and topsoil will be retained. • Site drainage will be directed away from natural drainages. • Where possible, a buffer strip of undisturbed vegetation of at least 30 m wide will be maintained between cleared areas and public roads.
Vegetation clearing exposes sediment to erosion	<ul style="list-style-type: none"> • Where possible, windrowed material will be mulched and spread over cleared areas within the footprint.
The use of machinery in or near water degrades water quality	<ul style="list-style-type: none"> • Machinery on-site will be in a clean condition and maintained free of fluid leaks, invasive species, and noxious weeds. • Work in the active stream channel will be avoided. • Washing, refueling, and servicing machinery and storage of fuel and other materials for machinery will be conducted a minimum of 100 m away from the high water mark of waterbodies and in a manner to prevent any deleterious substances from entering the water. • ATVs and mobile equipment will avoid steep banks at crossings. • Silt fencing will be installed where required to control possible sediment releases. • The spill contingency plan for the Project will be followed to prevent and reduce the effect of a spill entering a watercourse.

Table 2-7 Mitigation Measures for Camps and Associated Facilities

Activity: Construction and Operation of Camps and Associated Facilities	
Potential Effect	Mitigation Measures
Erosion of soil from camp pad locations causes changes to water quality	<ul style="list-style-type: none"> • Camps will be located at least 100 m from the ordinary high water mark of any waterbody. • Clearing will be completed when the ground is frozen. • Organic material and topsoil will be retained. • Site drainage will be directed away from natural drainages. • Where possible, a buffer strip of undisturbed vegetation of at least 30 m wide will be maintained between cleared areas and public roads.
Snow clearing causes sediment to enter watercourses	<ul style="list-style-type: none"> • Direct cleared snow away from watercourses and drainages
Camp buildings cause permafrost degradation	<ul style="list-style-type: none"> • Avoid locating camps on areas of ice-rich ground • Elevate camp buildings and tanks, where needed, to protect permafrost • Accumulated snow drifts may be plowed or flattened to reduce the potential long-term effects on permafrost. • The camp will be removed at the end of each winter season unless site conditions are determined by the Inspector to be suitable for storage over summer.

3 Monitoring, Inspection and Response

3.1 Monitoring During Bridge and Culvert Installation

Monitoring of water quality is required during bridge and culvert installation when:

- Water is present in the watercourse, and
- Work is taking place, or installations are present within the watercourse

Water quality monitoring is used to verify that mitigation measures are working as intended, and to identify if corrective actions are needed.

Turbidity monitoring is a method of sediment monitoring to be conducted only during the removal of sediment control structures, when pulses of sediment release are most likely to occur.

Visual monitoring is to be used at other times to monitor performance of sediment control measures. If sediment is seen to be released while sediment control is in place, work is to be halted until sediment mitigation is corrected.

During winter construction, smaller watercourses are expected to be frozen to the bottom with no flowing water and therefore no water quality monitoring is required.

3.1.1 Turbidity Monitoring Method

Turbidity monitoring includes the establishment of four transects: one at 25 m upstream of the construction site (baseline), and three transects downstream (50 m, 100 m, 200 m). An additional transect at 300 m would be established if turbidity levels are not decreasing by the 200 m transect. At each transect turbidity will be measured at three stations; 25%, 50% and 75% of the channel width. Three measurements using a turbidity meter will be taken at each station at approximately 30% water depth to avoid potential floating material (e.g., organic material) on the surface of the water affecting the turbidity measurement. The three measurements are to be averaged to provide a turbidity level for each station. Turbidity monitoring would occur once every hour during placement and removal of sedimentation control mitigation measures to confirm no residual effects. If a turbidity exceedance is observed, additional sampling will be done within the plume until downstream turbidity has returned to acceptable background levels for two consecutive sampling events. (upstream transect). When working within site isolation, turbidity monitoring would occur once every 3 hours. Monitoring requirements for culvert installation are summarized in Table 3-1.

Table 3-1 Monitoring During Bridge or Culvert Installation

Watercourse Location KM			
Watercourse Location UTM			
Monitoring Location	Measurement Location	Parameters to be Monitored	Frequency
25 m upstream of installation; 50 m, 100 m, and 200 m downstream of installation; 300 m downstream if needed ¹	25%, 50%, and 75% of channel width and at 30% water depth at each monitoring location	Turbidity ² , reported as average of the three measurements at each monitoring location	Once every hour during placement and removal of sedimentation control mitigation measures to confirm no residual effects. Once every 3 hours when working within site isolation.
Notes:			
¹ An additional transect at 300 m would be established if turbidity levels are not decreasing by the 200 m transect.			
² Measured as Nephelometric Turbidity Units (NTU).			

3.1.2 Turbidity Criteria and Response

Per Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Total Particulate Matter (CCME, 2002), **if downstream turbidity levels exceed eight (8) Nephelometric Turbidity Units (NTUs) above baseline levels, removal of the sediment control barriers will cease** and additional site-specific mitigation measures will be employed to allow the continuation of the removal of the sediment control structures.

3.2 Inspection

Daily

Work areas are to be inspected daily during construction to:

- Observe the effectiveness of erosion and sedimentation control measures
- Identify damage or degradation of erosion and sedimentation control measures
- Observe for scouring at new bridge or culvert installations
- Observe excavations throughout summer and fall for signs of degradation of permafrost

Prior to Freshet

Work areas are to be inspected prior to the onset of spring melt (freshet) to:

- Verify that erosion and sedimentation control measures are in place
- Confirm that snow crossings are v-notched
- Confirm that drainage culverts and drainage pathways are not blocked

3.3 Response

The response is to be based on the outcome of inspections conducted on the effectiveness and condition of erosion and sedimentation control measures. Responses may include:

- Repair or replace damaged installations
- Add or substitute measures, as approved by the Inspector or Engineer, to improve effectiveness

3.4 Documentation

All monitoring data, inspections and responses are to be documented by the contractor supervisor and submitted to the GNWT-INF.

4 References

CCME. 2002. Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Total Particulate Matter

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Appendix A – DFO Letter of Advice



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ontario and Prairie Region
Fish and Fish Habitat Protection Program
867 Lakeshore Rd.
Burlington, ON
L7S 1A1

Région de l'Ontario et des Prairies
Programme de protection du poisson et de son habitat
867 chemin Lakeshore
Burlington, ON
L7S 1A1

October 16, 2023

Our file *Notre référence*
23-HCAA-01660

Patricia Coyne
Government of Northwest Territories
Department of Infrastructure
4922 48 Street, Yellowknife,
NWT, X1A 2L9

Subject: [Culvert and Bridge Installation, Oscar Creek, Norman Wells] (23-HCAA-01660) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Dear Patricia Coyne:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on August 8, 2023. We understand that you propose to:

- Oscar Creek: Remove and relocate existing 67m long steel girder bridge several hundred meters upstream on Oscar Creek; and place new abutments above the Highwater Mark under frozen conditions; and
- Oscar South: Installation of new 3m x 31.5m SPCSP. Embed culvert approx. 0.5m into streambed and install new riprap at the inlet and outlet; and
- Oscar North: Installation of new 24m span steel girder bridge. All works above HWM except for new riprap placement which will extend below the HWM into the channel bed; and
- Work in isolation of flow or under frozen to the bottom conditions to avoid sedimentation of the watercourse;

We understand the following aquatic species listed under the *Species at Risk Act* may use the area in the vicinity of where your proposal is to be located:

- Bull Trout listed as Special Concern

Our review considered the following information:

- Request for Review form and associated documents.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*;
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*; and

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Plan in-water works, undertakings and activities to respect [timing windows](#) to protect fish, including their eggs, juveniles, spawning adults
- Install a temporary ice bridge or snow fill using the mitigations listed in the [Code of practice: Ice bridges and snow fills \(dfo-mpo.gc.ca\)](#)
- Conduct in-water undertakings and activities during periods of low water levels or frozen conditions
- Screen intake pipes to prevent entrainment or impingement of fish;
 - Use the [code of practice](#) for water intake screens
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity;
 - Limit access to banks or areas adjacent to waterbodies
 - Construct access points and approaches perpendicular to the watercourse or waterbody
 - Re-vegetate the disturbed area with native species suitable for the site
- Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the waterbody) to its initial state;
- Avoid introducing sediments (e.g., silts, clays and sand) in the water
- Develop and implement an erosion and sediment control plan to avoid or minimize the introduction of sediment into any waterbody during all phases of the work, undertaking or activity; and
 - Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse
 - Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action
- Develop and implement a response plan to avoid a spill of deleterious substances.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal will not require an authorization under the *Fisheries Act*, or the *Species at Risk Act*.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, or the *Species at Risk Act*.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to (<http://www.dfo-mpo.gc.ca/pnw-ppe/CONTACT-eng.html>).

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Lucas Coletti at our Burlington office at 905-317-1541 or by email at Lucas.Coletti@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,



Lucas Coletti
Biologist, Triage and Planning