Westcoast Connector Gas Transmission

Westcoast Connector Gas Transmission Project

Terrestrial Construction Environmental Management Plan
(KM -11.0 to KM 550.0)
Condition 35

Detailed Outline – Revision 1

December 2021

Prepared for:

Westcoast Connector Gas Transmission Ltd.

Prepared by:

Jacobs Consultancy Canada Inc.

Jacobs

Land Acknowledgement

We acknowledge that the Westcoast Connector Gas Transmission project (WCGT Project) area is in the Traditional and Ancestral Territory of many Indigenous Peoples, presently subject to the Nisga'a Treaty, Treaty 8, and vast areas of unceded Indigenous Traditional lands. These Indigenous groups include the Nisga'a Nation, Prophet River First Nation, Blueberry River First Nations, Doig River First Nation, Gitanyow Hereditary Chiefs, Gitxsan Hereditary Wilp, Halfway River First Nation, Kitselas First Nation, Kitsumkalum First Nation, Lake Babine Nation, Lax Kw'alaams First Nation, Wilp Luuxhon, Metlakatla First Nation, Saulteau First Nation, Takla Lake First Nation, Tsay Keh Dene First Nation, West Moberly First Nations, Nak'azdli First Nation, McLeod Lake Band, Gitxaala Nation, and the Métis Nation British Columbia

We acknowledge the many Indigenous Peoples who live on care for these lands and have for generations. We are grateful for the traditional Knowledge Keepers and Elders who are still with us today and those who have gone before us. We make this acknowledgement as an act of reconciliation and gratitude to those whose territory we reside on or are visiting.

Executive Summary

The Environmental Assessment Certificate (Certificate) (No. E14-05) granted for the Westcoast Connector Gas Transmission Project (WCGT Project) on November 25, 2014 is subject to 43 Conditions. The WCGT Project approved in the Certificate includes the potential to build two 48-inch diameter natural gas pipelines within the same right-of-way along with accompanying compressor stations that could potentially service multiple liquefied natural gas (LNG) terminal sites starting at Cypress in northeast BC and ending at Ridley Island on the north coast. The Certificate provides the flexibility to choose one of two routes to the Prince Rupert area - either through the Nass Valley (Nasoga Route) or north towards Kitsault (Kitsault Route).

WCGT Ltd. is actively developing the WCGT Project to build one express, single-purpose natural gas pipeline from a compressor station near Willow Flats in northeast BC to a delivery point at Wil Milit on the north coast to supply natural gas to potential LNG terminal sites (Project).

This Terrestrial Construction Environmental Management Plan (TCEMP or Plan) has been developed to meet the requirements of Certificate Condition 35 and includes all the terrestrial environmental protection measures to avoid or mitigate impacts during construction resulting from the Project.

The TCEMP includes all construction mitigation for the Project and should be read in conjunction with the Certificate condition plans, Environmental Alignment Sheets, Resource-Specific Mitigation Tables, Project commitments, and all applicable regulatory approvals and permits. The TCEMP provides Project-related environmental mitigation and commitments to be addressed for the Project, including pre-, during, and post-construction requirements, where they are set out in the Condition.

The Certificate condition plans developed for the Project include mitigation measures from this TCEMP, as well as additional information related to the specific topic of the condition plan. Personnel are encouraged to refer to the standalone Certificate Condition-specific condition plans for greater detail on those subjects.

Tables of Concordance

Table 0-1 describes how this TCEMP addresses the applicable Certificate Conditions.

Table 0-1. Concordance with Certificate Conditions 35, 36 Construction Environmental Management Plan

Certificate Condition[a]	Section
Condition 35 – Environmental Management	
The Holder must develop and implement an Environmental Management Plan (EMP) in accordance with Section 14 and Appendices 3-A and 3-B of the Application.[b]	Entire TCEMP
The Holder must develop the EMP in consultation with the Relevant Regulatory Authorities listed in Appendix A, Nisga'a Nation and Aboriginal Groups for the approval of EAO.	Entire TCEMP
The Holder must not commence Construction until the EMP has been approved. The EMP approved must be submitted to OGC prior to the Holder's planned date to commence Construction.	Entire TCEMP
The Holder must carry out a Post-Construction Monitoring Program in accordance with Section 14.2.1 of the Application, to monitor and report on the effectiveness of the mitigation set out in the EMP.	Section 20
Condition 36 – Environmental Inspection	
The Holder must retain environmental inspectors as described in Appendix 3-A (Section 3.1) and Appendix 3-B (Section 3.1) of the Application. The Holder must provide each such environmental inspector with the authority to require the Holder and its contractors to cease Construction activities immediately if such environmental inspector believes that such Construction activities are inconsistent with this EAC or applicable law.	Section 2.2

[a] "Aboriginal" was used at the time of the Certificate. The current preferred term is "Indigenous".

[b] Section 14, Appendix 3-A and Appendix 3-B of the Application are as follows: Section 14 – Construction and Operational Environmental Management Plans and Follow-up Programs; Appendix 3-A – Preliminary Terrestrial Environmental Management Plan; and Appendix 3-B – Preliminary Marine Environmental Management Plan.

Notes:

BC EAO = British Columbia Environmental Assessment Office
BC MFLNRORD = British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC OGC = British Columbia Oil and Gas Commission

Table 0-2 provides a comparison of information previously provided in the Preliminary Terrestrial Environmental Management Plan (Appendix 3-A of the Application) against the current presentation of information in this TCEMP.

Table 0-2. Terrestrial Environmental Management Plan Comparison

Preliminary Terrestrial Environmental Management Plan Section	Location in TCEMP
1.0 Introduction	Section 1
2.0 Environmental Scope of Work	Section 1
3.0 Pre-Construction Activities	Section 3
4.0 Project Construction	Sections 4 to 15
5.0 Contingency Plans	Appendix D
6.0 Management Plans	Appendix E
7.0 Details	Appendix F
8.0 References	Section 21
Appendix A – Contacts	Appendix A
Appendix B – Onsite Checklists for Pipeline and Vehicle Crossings of Watercourses and Wetlands	Appendix B
Appendix C – Approval/Permits Potentially Required for Pipeline Development	Appendix C
Appendix D – Soils Resource-Specific Mitigation	Appendix G, Appendix H
Appendix E – Fish and Fish Habitat Resource-Specific Mitigation	Appendix G, Appendix H
Appendix F – Vegetation Resource-Specific Mitigation	Appendix G, Appendix H
Appendix G – Wetlands Resource-Specific Mitigation	Appendix G, Appendix H
Appendix H – Wildlife and Wildlife Habitat Resource-Specific Mitigation	Appendix G, Appendix H
Appendix I – Heritage Resource-Specific Mitigation	Appendix G, Appendix H
Appendix J – TLU Resource-Specific Mitigation	Appendix G, Appendix H
Appendix K – Excerpts from BC MOE Standards and Best Practices for Instream Works	No longer included
Appendix L – *Oil and Gas Road Regulation*	No longer included

Definitions of Terms

Note to Reviewers – this list will be fully developed in future editions of this TCEMP.

Terms	Definition
Term	Definition
Term	Definition
Term	Definition

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Appendices

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Acronyms and Abbreviations

Note to Reviewers – this list will be fully developed in future editions of this TCEMP.

BC	British Columbia
BC EAO	British Columbia Environmental Assessment Office
Certificate	Environmental Assessment Certificate
CPC	Certified Pipeline Corridor
EAS	Environmental Alignment Sheet
ESIS	Environmental Site Information Sheet
km	kilometre(s)
LNG	liquified natural gas
OGMA	old growth management area
PCM	Post-Construction Monitoring
Project	one express, single-purpose natural gas pipeline from a compressor station near Willow Flats in northeast British Columbia to a delivery point at Wil Milit on the north coast to supply natural gas to potential liquified natural gas terminal sites
RRA	Relevant Regulatory Authority
TCEMP or the Plan	Terrestrial Construction Environmental Management Plan
WCGT Ltd.	Westcoast Connector Gas Transmission Ltd.
WCGT Project	Westcoast Connector Gas Transmission Project

1. WCGT Project and Environmental Management Plan Overview

The British Columbia (BC) Environmental Assessment Office (BC EAO) issued an Environmental Assessment Certificate (Certificate) to Westcoast Connector Gas Transmission Ltd. (WCGT Ltd.) for the Westcoast Connector Gas Transmission Project (WCGT Project) on November 25, 2014, and later granted a 5-year extension to the Certificate on April 25, 2019. The Certificate expires on November 25, 2024. The Certificate granted for the WCGT Project is subject to 43 Conditions. The purpose of the Terrestrial Construction Environmental Management Plan (TCEMP or the Plan) is to address the requirements of Certificate Condition 35.

WCGT Ltd. is engaging with Indigenous groups and relevant regulatory authorities (RRAs) in the development of this detailed outline to support the full build-out of the Plan. Through engagement, WCGT Ltd. is seeking collaboration in the development of the Plan and any information that can be shared to strengthen the Plan and the commitment to fulfilling Condition 35.

WCGT Ltd. acknowledges the inherent connection Indigenous Peoples have with the land and that while the Plan will satisfy the regulatory requirement, the Plan is also intended to minimize impacts by incorporating Indigenous Knowledge and ensuring concerns are addressed during development.

1.1 WCGT Project Description

The WCGT Project approved in the Certificate includes the potential to build two 48-inch diameter natural gas pipelines within the same right-of-way along with accompanying compressor stations that could potentially service multiple liquefied natural gas (LNG) terminal sites starting at Cypress in northeast BC and ending at Ridley Island on the north coast. The Certificate provided the flexibility to choose one of two routes to the Prince Rupert area either through the Nass Valley (Nasoga Route) or north towards Kitsault (Kitsault Route).

WCGT Ltd. is actively developing the WCGT Project to build one express, single-purpose natural gas pipeline from a compressor station near Willow Flats in northeast BC to a delivery point at Wil Milit on the north coast to supply natural gas to potential LNG terminal sites (Project).

The new compressor station at Willow Flats will have the potential to connect to Enbridge Inc.'s Westcoast Energy Inc. pipeline system near Compressor Station 2 or TC Energy's NGTL system, eliminating the need for the pipeline corridor from Cypress to Willow Flats and the compressor station at Cypress. WCGT Ltd. will apply to the BC EAO to amend its Certificate to:

1) approximately 100 kilometres (km) of the Certified Pipeline Corridor (CPC) from Cypress to Willow Flats and
2) Change the location of the compressor station from Cypress to Willow Flats.

If WCGT Ltd. proceeds with construction of a second pipeline, it would also start near Willow Flats and would not use the corridor from Cypress to Willow Flats.

The new delivery point for the pipeline will be near Wil Milit. WCGT Ltd. will apply to the BC EAO to amend its Certificate to make routing changes along its approved Nasoga Route to end the first pipeline at Wil

Milit. WCGT Ltd. will retain the option to expand the WCGT Project to the currently approved delivery point at Ridley Island at a later date.

WCGT Ltd. is developing condition plans for the Project with Indigenous groups, RRAs, and stakeholders for submission to the BC EAO in accordance with its Certificate. The condition plans will address potential impacts from the Project, which includes the first pipeline from Willow Flats to Wil Milit, one compressor station at Willow Flats and the necessary meter stations. WCGT Ltd. does not have plans to build the second pipeline at this time; however, should it decide to construct a second pipeline, increase capacity by adding compressor stations or extend the first pipeline to Ridley Island, WCGT Ltd. will submit revised or new condition plans to the BC EAO in accordance with Condition 1 of its Certificate.

1.1.1 Westcoast Connector Gas Transmission Project Interactions

The TCEMP is intended to include all measures with Project interactions during Construction. The biophysical features along the Project have been extensively studied. WCGT Ltd. will commission any additional required biophysical studies along the proposed pipeline route and associated infrastructure sites prior to construction, as necessary. Information from these studies has been and will be used to further refine and optimize environmental management of the WCGT Project.

Key environmental concerns associated with the Project include:

- atmospheric environment - greenhouse gas emissions;
- the monitoring of freshwater water quality;
- areas with metal leaching and/or acid rock drainage concerns;
- wetlands encountered by the Project;
- access management;
- areas with merchantable timber and old growth management areas (OGMAs);
- grizzly bear, caribou, moose, and other wildlife and wildlife habitat;
- areas that support plant communities at risk and weed infestations;
- identified items of cultural interests;
- implementation of restoration along the Project;
- sensitive areas such as the Mugaha Marsh and Nisga'a Lava Bed Memorial Park;
- maintaining visual quality of the landscape; and
- effects from social and economic perspective.

1.2 Terrestrial Construction Environmental Management Plan Purpose and Overview

The purpose of the TCEMP is to satisfy the applicable Certificate Conditions, specifically Condition 35. The overall desired outcomes of the TCEMP include the following:

- Outline environmental protection measures related to Project activities and provide WCGT Project personnel and contractors with guidelines for carrying out construction activities in such a way as to avoid or reduce environmental effects of the Project.

- Use by environmental representatives on the Project to ensure measures to reduce risks on the environment are being implemented.
- Use as a foundation for the specific environmental protection instructions contained in Project contract documents, where compliance will be a contractual obligation for Contractor(s).
- Use as an educational tool, for orientation and training of Project personnel and Contractor(s).

1.2.1 Organization of the Terrestrial Construction Environmental Management Plan

The TCEMP is written in construction specification format and should be read in conjunction with the Environmental Alignment Sheet Package and Construction Line List (Section 1.2). The scope of this TCEMP is as follows.

- Section 2 of the TCEMP provides an overview of WCGT Ltd.'s approach to ensuring environmental compliance and discusses the roles and responsibilities of personnel proposed to fulfill the commitments and regulatory requirements of the Project.
- Section 3 of the TCEMP provides an overview of the activities that should occur prior to construction, such as permitting, preparatory activities and scheduling considerations.
- Sections 4 through 13 of the TCEMP define the mitigation measures appropriate for various phases of pipeline construction for the Project, as well as whether they are to be implemented by the Contractor or by WCGT Ltd.
- Sections 14 and 15 of the TCEMP define the mitigation measures appropriate for construction of permanent and temporary facility sites associated with the Project.
- Section 16 of the TCEMP outlines the Post-Construction Monitoring (PCM) Program to be implemented in years 1, 3 and 5 following clean-up and reclamation of the Project footprint.
- Appendices to the TCEMP include the following:
  - Appendix A - Contacts
  - Appendix B - Onsite Checklists for Pipeline and Vehicle Crossings of Watercourses and Wetlands
  - Appendix C - Approvals/Permits Required for Pipeline Development
  - Appendix D - Contingency Plans
  - Appendix E - Management Plans
  - Appendix F - Typical Details
  - Appendix G - Environmental Alignment Sheet (EAS) Packages
  - Appendix H - Environmental Site Information Sheets (ESIS)

1.2.2 Methodology

The mitigation measures provided in this TCEMP are based on:

- commitments made in the application to regulatory agencies, Indigenous groups, and the public;
- the results of environmental and cultural resources field studies;
- input from Indigenous groups, stakeholders, and RRAs gathered during the engagement process;
- industry standards and best management documents;
- a review of the results of environmental as-builts, Post-Construction Environmental Monitoring and restoration assessment programs for other pipeline projects located in BC;
- WCGT Ltd. corporate standards and procedures; and

- professional experience of the WCGT Project team members.

1.2.3 Environmental Alignment Sheets and Construction Line List

The EAS Package (Appendix G), a companion document to the TCEMP, identifies site-specific issues on the pipeline construction footprint and briefly notes the corresponding mitigation measures to be considered at those locations during construction. The EAS Package refers the reader to this TCEMP for a full discussion of the mitigation measures considered.

The construction line list is a document that outlines landowner-specific or tenure holder-specific measures to be implemented during construction of a pipeline and should be consulted in consideration of the TCEMP.

1.2.4 Environmental Site Information Sheets

The ESIS (Appendix H), an additional companion document to the TCEMP, identify site-specific issues at infrastructure and cleared sites (i.e., compressor stations, temporary access roads, temporary camp sites, ancillary sites, borrow pits) and briefly note the corresponding mitigation measures to be considered at those locations during construction. The ESIS refer the reader to this TCEMP for a full discussion of the mitigation measures considered.

1.2.5 Certificate Condition-Specific Condition plans

As outlined in Section 1, the Certificate issued for the WCGT Project included numerous Conditions requiring development of resource-specific condition plans independent of this TCEMP, outlined as follows. Condition plans in bold font are embedded in Appendix E of this TCEMP while remaining plans will be provided to appropriate construction personnel under a separate cover.

- Condition 4: Greenhouse Gas Emissions Management Plan
- Condition 10: Freshwater Water Quality Monitoring Plan
- Condition 11: Metal Leaching/Acid Rock Drainage Management Plan
- Condition 12: Wetland Management Plan
- Condition 13: Grizzly Bear Mitigation and Monitoring Plan
- Condition 15: Human-Wildlife Conflict Plan
- Condition 16: Caribou Mitigation and Monitoring Plan
- Condition 18: Moose Monitoring Plan
- Condition 19: Wildlife and Wildlife Habitat Management Plan
- Condition 22: Access Management Plan
- Condition 25: Restoration Plan
- Condition 28: Visual Quality Management Plan
- Condition 29: Old Growth Area Incursion Plans and Replacement or Recruitment Plans
- Condition 30: Timber Salvage Strategy
- Condition 33: Social and Economic Effects Management Plan
- Condition 43: Nisga'a Watercourse Restoration Plan (note, this plan is only required if the pipeline route is determined to overlap existing habitat restoration or compensation sites within Nisga'a Lands.

1.3 Implementation Schedule

This TCEMP will be submitted and approved before the commencement of construction. The Plan will be implemented throughout construction under the supervision of WCGT Ltd., and as described throughout the TCEMP.

WCGT Ltd. will monitor mitigation effectiveness during the construction period and implement a PCM Program (Section 16) in the first, third, and fifth years following the first full growing season after completion of final clean-up. Routine operational monitoring will occur over the life of the WCGT Project.

1.4 Future Updates to Terrestrial Construction Environmental Management Plan

Revisions to the TCEMP could occur as a result of:

- engagement programs with Indigenous groups;
- additional information becoming available;
- changes to WCGT Project planning (e.g., engineering changes);
- commitments made during the regulatory review process;
- regulatory permits and authorization Conditions; and
- addressing unforeseen resource-specific conditions that may arise during construction.

WCGT Ltd. will not notify Indigenous groups, RRAs, and stakeholders when minor revisions are made to the TCEMP (i.e., small changes that would not affect the scope and objectives of the TCEMP). Indigenous groups, RRAs, and stakeholders will be provided an opportunity to review and provide comment on material revisions to the TCEMP (i.e., changes to mitigation). A Document History table listing version, date, and distribution will be provided in this document.

2. Environmental Compliance

Note to Reviewers - For this Detailed Outline of the TCEMP, all tables and mitigation measures have been left blank throughout the document. The intent is to provide an overview of what would be included in future editions of the TCEMP and open the document to discussion.

The environmental compliance and inspection program will assist to ensure Project commitments are adhered to and the results of inspection work will be used to evaluate the effectiveness of the mitigation and restoration measures.

2.1 Roles and Responsibilities

Table 2-1 provides a summary of the roles and responsibilities for this TCEMP.

Table 2-1. Summary of Roles and Responsibilities for the TCEMP

Role	Responsibilities

2.2 Notification and Reporting Protocol

(This section will discuss notifications and reporting requirements related to environmental compliance)

2.3 Decision-Making Criteria

When deciding which protection measure(s) and/or procedures to implement during construction of the Project, criteria that WCGT Ltd. will consider includes

- baseline conditions documented within the environmental assessment, or supplementary studies;
- site conditions at the time of construction (e.g., slope gradient and aspect, soil moisture, soil texture, frozen/non-frozen surface);
- current and forecasted weather conditions (e.g., wind, precipitation forecast, air temperature);
- equipment and/or material availability at the time of construction;
- Contractor experience with employing specific construction techniques; and
- inspection staff experience with implementing applicable protection measures and/or procedures.

In the event an unforeseen environmental issue arises during construction for which no, or ineffective, mitigation measures have been described in this TCEMP, WCGT Ltd. and their inspection personnel will formulate alternative mitigation measures.

2.4 Environmental Training

Project personnel, including visitors to the construction right-of-way, will receive the appropriate level of environmental training before they can access any development site associated with the Project.

Multiple environmental training sessions may be conducted for the Project to address construction over several different seasons (i.e., non-frozen and frozen conditions) and years.

3. Pre-construction Activities

3.1 Permits, Licences, and Approvals

WCGT Ltd. will ensure all applicable permits, approvals, licences, and so forth will be acquired prior to construction or site-specific activity, as appropriate. A list of permits and approvals required for the Project is provided in Appendix C.

3.2 Construction Preparation

The following construction preparation measures are the responsibility of WCGT Ltd. and the Contractor, and are to be implemented prior to construction or, where noted, prior to commencement of applicable local construction activities.

Activity/Concern	Mitigation Measures

3.3 Activity Scheduling

To reduce effects of the Project, timing of pre-construction and construction activities will be scheduled to avoid important wildlife and fish timing constraints, and construction will be conducted at times where potential effects are reduced, where feasible. Exceptions will carefully be planned and communicated, and necessary approvals and permits will be obtained.

The following measures are the responsibility of WCGT Ltd. and the Contractor and are intended to guide construction of the Project in respect of applicable regulatory timing restrictions and considerations for the public.

Activity/Concern	Scheduling Requirements

4. Notification of Concerned Parties

The following sections outline general and specific notifications that are required prior to and during construction. WCGT Ltd. will obtain applicable permits, approvals, licences, and/or authorizations prior to the commencement of construction activities covered by these documents (subsection 3.1). WCGT Ltd. will follow notification requirements identified in these documents. Also see Appendix A for additional persons who may require notification.

Company Measures

The following notifications are the responsibility of WCGT Ltd.

Contacts	Measures

Contractor Measures

The following notifications are the responsibility of the Contractor.

Contacts	Measures

5. General Environmental Management Measures

General environmental mitigation measures are provided in this subsection. These are followed by detailed mitigation measures for each phase of pipeline construction during frozen and non-frozen soil conditions (Sections 6 to 13).

Within this document, topsoil is defined as:

- the layer of soil that is tilled or cultivated, or the A horizon on agricultural developed lands (including improved hay and pasture lands); or
- in forested areas, the upper surface material consisting of approximately 50 percent organic matter (duff layer) and 50 percent mineral soil, or approximately the upper 15 to 20 centimetres (i.e., strippings).

Company Measures

The following measures are the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The Contractor shall be responsible for the implementation of the following measures.

Activity/Concern	Mitigation Measures

6. Survey, Access and Clearing

Goal

Identify the Project footprint and approved workspace and other localized features (e.g., wetlands, watercourses, archaeological sites, cultural sites). Clearing will follow in these surveyed boundaries.

Company Measures

The following measures are the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

7. Topsoil Salvage and Grading

Goal

To avoid or reduce adverse effects on soil productivity, surface drainage patterns, land use, watercourses, wetlands, and wildlife habitat.

Company Measures

The following measures are to be implemented by WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

8. Stringing, Welding, Trenching, and Lowering-In

Goal

To reduce ground disturbance, soil compaction, interference with other land uses, disruption of surface and subsurface drainage and movements of wildlife, as well as facilitate the successful restoration of the construction right-of-way.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

9. Backfilling

Goal

To control subsurface drainage prior to backfilling and to backfill the trench to restore pre-construction grades during backfill operations in a manner that facilitates restoration and restoration of surface drainage.

Company Measures

The following measures are the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

10. Hydrostatic Testing

Goal

To withdraw and release hydrostatic test water in accordance with applicable regulations and to control erosion and prevent the contamination of surface waters during dewatering activities.

Company Measures

The following measures will be the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

11. Watercourse Crossings

The goal of this section is to reduce the risk of siltation, protect fish habitat, maintain stream flow and prevent water pollution/contamination during construction of watercourse, lake and drainage crossings and to restore disturbed watercourse bed and banks to as close to their pre-construction configuration as practical.

11.1 General Watercourse Crossing Measures

Company Measures

The following measures will be the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

11.2 Vehicle/Equipment Crossings of Watercourses

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

11.3 Pipeline Installation at Watercourse Crossings

Contractor Measures

The following activity-specific mitigation measures for construction of pipeline crossings of watercourses may be implemented by the Contractor.

Activity/Concern	Mitigation Measures

12. Wetland Crossings

Goal

To reduce the risk of sedimentation in wetlands, protect wetland habitat, maintain wetland hydrological, habitat and biogeochemical function and prevent water pollution/contamination during construction of wetland crossings.

12.1 General Wetland Crossing Measures

Company Measures

The following measures will be the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

12.2 Vehicle/Equipment Crossings of Wetlands

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

12.3 Pipeline Installation at Wetland Crossings

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

13. Clean-Up and Restoration

13.1 Clean-Up

This section details the standard environmental protection measures for both rough and final clean-up. Rough clean-up is the last phase of Construction where soil moving is done prior to final clean-up. Final clean-up includes the return of salvaged topsoil, prior to restoration.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

13.2 Restoration

The goal of the restoration program is to restore soil capability and disturbed surfaces as well as control erosion to as close a pre-disturbance conditions as practical. Appendix E provides the Restoration Plan for the WCGT Project.

14. Permanent Facilities and Infrastructure

The following potential mitigation measures may be implemented, as appropriate, by WCGT Ltd., its Contractor, and/or subcontractors during the construction and operations phases of permanent facilities and infrastructure required by the Project (i.e., compressor stations, meter stations).

14.1 General Measures

Goal

To ensure that the permanent facilities are constructed in a manner that reduces adverse effects on soil capability, surface drainage patterns, timber, land use, watercourses, wetlands and wildlife habitat during facility construction.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

14.2 Air Testing

Goal

To conduct air testing in a safe and responsible manner.

Contractor Measures

The following measures are to be implemented by the Contractor.

Activity/Concern	Mitigation Measures

15. Temporary Lands and Infrastructure

15.1 Access Roads

The following potential mitigation measures may be implemented, as appropriate, by WCGT Ltd, its Contractor, and/or subcontractors on all access roads during the construction and operation phases of the Project. This includes temporary access roads and shoo-flies to access the construction right-of-way, ancillary sites, borrow sites, stockpile sites, and construction camps. Use of access roads during construction will be managed by the Access Management Plan in Appendix E. ESIS for access roads are provided in Appendix H.

The objective of these mitigation measures is to ensure that new temporary access roads and upgrades to existing roads and trails for use during pipeline construction are selected, designed, constructed, used and, where warranted, reclaimed in a manner that reduces or avoids adverse environmental effects.

Company Measures

WCGT Ltd. will implement the following activity-specific mitigation measures.

Activity/Concern	Mitigation Measures

Contractor Measures

The following activity-specific mitigation measures may be implemented by the Contractor.

Activity/Concern	Mitigation Measures

15.2 Temporary Work Camps

The Project will use temporary camps at various locations during construction. Camps will typically consist of staff accommodations, dining facilities, appropriate emergency medical facilities, electrical power generation, fuel storage and facilities for sewage gathering or treatment, and waste incineration and management facilities. ESIS for temporary camps are provided in Appendix H.

The mitigation measures provided below are applicable to all work areas throughout the construction and operations phases of the temporary work camps.

Goal

To ensure that potential adverse environmental effects associated with development, operation, and restoration of work camps for the Project are reduced or avoided.

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

15.3 Ancillary Sites

The following measures will be implemented by the Contractor during construction of ancillary sites for the Project. Ancillary sites include communications tower sites, mainline block valve sites, and helicopter pads. Some of these sites will be permanent to provide continued access during operation. ESIS for ancillary sites are provided in Appendix H.

The objective of the following mitigation measures is to ensure that temporary ancillary sites needed during construction and permanent ancillary sites to support operation of the Project are designed, built, used and, where warranted, restored in a manner that reduces or avoids adverse environmental effects.

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

15.4 Borrow Sites

Borrow material may be required for facility site pads, infrastructure (construction camps, stockpile sites, helicopter pads, and access roads), the pipeline right-of-way including bedding material in the trench, pipe padding, imported backfill, right-of-way preparation, and shoo-fly access protection.

Borrow sources selected for development may change as the Project evolves due to:

- a change in demand quantities and locations where borrow material is required;

- insufficient quantity or quality of proposed borrow source material once explored prior to development; or
- environmental, ownership, and permitting concerns may arise over specific borrow sources.

The environmental mitigation measures provided are applicable to all work areas throughout the development, operation and, when warranted, restoration of borrow sites. WCGT Ltd. will follow applicable regulatory management plans provided for the use of granular materials current at the time of construction.

Goal

To ensure that potential adverse environmental effects associated with borrow site development, operation and, when warranted, restoration of borrow sites for the Project are reduced or avoided.

Company Measures

The following measures will be the responsibility of WCGT Ltd.

Activity/Concern	Mitigation Measures

Contractor Measures

The following measures will be implemented by the Contractor.

Activity/Concern	Mitigation Measures

16. Post-Construction Monitoring Program

Note to reviewers: The PCM Program will be developed as the TCEMP is developed, however, the intent of the PCM plan is outlined below.

The PCM Program will be developed and include an assessment of: soil capability; terrain integrity; the success of revegetation (or recolonization); weed management; and erosion and sediment control efforts on the Project footprint. Methods for monitoring the status of environmental effects of the Project will be based on the principle that the success of land restoration is measured against the adjacent representative site conditions while taking into consideration the natural variation and the status of restoration at the time of the assessment.

The purpose of the PCM Program will be to:

- evaluate the effectiveness of environmental protection and enhancement measures;
- document the recovery of areas disturbed by Project construction;
- identify new environmental issues that may have arisen following the restoration phase of the Project;
- track and address commitments made to landowners and land users; and
- recommend, coordinate, and implement any corrective measures that are warranted as well as additional measures to address outstanding or new environmental issues.

17. References

17.1 Personal Communications

17.2 Literature Cited

Appendix A
Contacts

Appendix A. Contacts

Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Environment Supervisor)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Senior Analyst – Environment)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Lead Field Engineer)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Construction Manager)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Engineering Manager)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Assistant Construction Manager)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Safety Manager)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Manager – Public Affairs and Communications)

Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Senior Advisor – Indigenous Affairs)
Name Role WCGT Ltd. Address Phone: Email:	(WCGT Ltd. Area Operations Manager, XXXXX Area)
Name Role Jacobs Address Phone: Email:	(WCGT Ltd. Environmental Consultant for TCEMP)

Appendix B
Onsite Checklists for Pipeline and Vehicle Crossings of Watercourses and Wetlands

WCGT Ltd. intends this appendix to contain the Watercourse and Wetland Crossing Checklists

Appendix C
Approvals/Permits Required for Pipeline Development

Table C1. Approval/Permits Required for Pipeline Development

Jurisdiction	Regulator	Regulation	Permit Name
Indigenous groups	Nisga'a Lisms Government	*Nisga'a Lisms Land Act*	▪ Licence of Occupation ▪ Investigative Permits
Federal	Fisheries and Oceans Canada	*Fisheries Act*	▪ Request for Review and *Fisheries Act* Authorization ▪ Scientific Licence (Fish Salvage)
	Environment and Climate Change Canada	*Species at Risk Act*	▪ Permits Authorization an Activity Affecting Listed Wildlife Species
	Transport Canada	*Canadian Navigable Waters Act (CNWA)*	▪ Notice of Works to the Minister under *CNWA* (Major and Minor Works in scheduled and/or non-scheduled waters) ▪ Application for Approval (only for substantial interference)
Provincial	BC Parks	*Protected Areas of BC Act*	▪ Park Boundary Amendment
		Parks Act	▪ Park Use Permit
	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC MFLNRORD)	*Wildlife Act*	▪ General Wildlife Permit (Amphibian Salvage) ▪ Exemption from General Wildlife Measures ▪ Fish Management Process
		Heritage Conservation Act	▪ Fossil Management Process
		Dike Maintenance Act	▪ *Dike Maintenance Act* Approval
	BC Oil and Gas Commission (BC OGC)	*Oil and Gas Activities Act*	▪ Pipeline and Facility PermitsBC OGC Road and Associated Oil and Gas Activities ▪ Changes In and About a Stream Authorization ▪ Short-term Use of Water Permit
		Land Act	▪ Investigative Use Permits ▪ Temporary Workspace on Crown Lands ▪ Aggregate Operations and Burrow Pit Permit, Temporary Permit and Investigative Permit
		Waste Management Act	▪ Waste Discharge Authorization - Effluent ▪ Waste Discharge Permit - Air
	BC OGC and BC MFLNRORD	*Oil and Gas Activities Act; Heritage Conservation Act*	▪ Archaeological Information Form
Municipal	District of McKenzie	Local Bylaws	▪ Development permits ▪ Temporary Use Permits

Appendix D
Contingency Plans

WCGT Ltd. intends the following Contingency Plans to be included in this TCEMP.

1) Adverse Weather Contingency Plan
2) Contaminated Soils Contingency Plan
3) Drilling Mud and Inadvertent Release Contingency Plan
4) Fire Contingency Plan
5) Fish Species of Concern Contingency Plan
6) Flood and Excessive Flow Contingency Plan
7) Heritage Resource Discovery Contingency Plan
8) Hydrovac Slurry Contingency Plan
9) Plant of Concern Contingency Plan
10) Siltation of Watercourses Contingency Plan
11) Soil Erosion Contingency Plan
12) Soil Handling Contingency Plan
13) Soil/Sod Pulverization Contingency Plan
14) Spill Contingency Plan
15) Traditional Land Use Sites Discovery Contingency Plan
16) Wet/Thawed Soils Contingency Plan
17) Wildlife Encounter Contingency Plan

Appendix E
Management Plans

WCGT Ltd. intends the following Management Plans to be included in this TCEMP.

1) Access Management Plan (per Condition 22)
2) Air Quality Management Plan
3) Erosion and Sediment Control Plan
4) Freshwater Water Quality Monitoring Plan (per Condition 10)
5) Integrity Management Plan
6) Invasive Plant Species Management Plan
7) Metal Leaching/Acid Rock Drainage Management Plan (per Condition 11)
8) Rare Plant and Ecological Communities Management Plan
9) Restoration Plan (per Condition 25)
10) Soil Handling Management Plan
11) Traffic Management Plan
12) Waste Management Plan

Appendix F
Typical Details

WCGT Ltd. intends the following typical details (i.e., construction drawings) to be included in this TCEMP.

1) Weed Clean-off Stations
2) Narrow Down Fencing
3) Live Plant Salvage and Transplant
4) Timber Salvage Deck
5) Topsoil Salvage – Blade Width
6) Topsoil Salvage – Full Right-of-Way
7) Topsoil Salvage
8) Topsoil Salvage – No Strip - Peatlands
9) Strippings Salvage
10) Material Handling at Rail Bores
11) Material Handling at Road Bores
12) Silt Fence Installation
13) Sidehill Grading
14) Cross Ditches and Diversion Berms
15) Trench Breaker / Ditch Plugs
16) Trench Breaker – Watercourse/Wetland
17) Wetland – Stub Berms
18) Subdrain
19) Bar Ditch Ramp Installation
20) Swamp Mat Ford
21) Streambank Protection – Riprap Armour
22) Streambank Protection – Cribwalls
23) Vehicle Crossing – Typical Ford
24) Vehicle Crossing Typical Ice Bridge
25) Vehicle Crossing – Typical Log Fill
26) Vehicle Crossing – Typical Ramp and Culvert
27) Vehicle Crossing – Typical Temporary Bridge
28) Watercourse Crossing – Directional Drill
29) Watercourse Crossing - Microtunnel
30) Watercourse Crossing – Open Cut Crossing
31) Watercourse Crossing – Isolated Open Cut Crossing – Bore or Punch
32) Watercourse Crossing – Isolated Open Cut Crossing – Dam and Pump
33) Watercourse Crossing – Isolated Open Cut Crossing – High Volume Pump
34) Watercourse Crossing – Isolated Open Cut Crossing – Flume
35) Wetland Crossing – General
36) Wetland Crossing – Open Cut Method for Open Water Wetlands
37) Wetland Crossing – Open Cut Method for Peatlands
38) Wetland Crossing – Open Cut Method with Push-Pull

Appendix G
Environmental Alignment Sheet Packages

This appendix will house the Environmental Alignment Sheet (EAS) Packages for each construction section or spread, which will be developed as field data are available. Each EAS Package will include three components:

1) A series of environmental notes pertaining to the entire Project
2) Resource-Specific Mitigation Tables (RSMTs) which detail the site-specific mitigation for each environmental, heritage, cultural, or social feature identified on the Project footprint
3) EAS which provide a visual representation of the pipeline construction right-of-way, the environmental, heritage, culture, and social features in relation to the Project footprint, and site-specific mitigation measures to be implemented

Appendix H
Environmental Site Information Sheets

This appendix will house the Environmental Site Information Sheets (ESIS) for each off right-of-way construction site, which will be developed as field data are available. Each ESIS will include two components:

1) Resource-Specific Mitigation Tables which detail the site-specific mitigation for each environmental, heritage, cultural or social feature identified on the Project footprint
2) A photo image which provides a visual representation of the off right-of-way construction site, and the environmental, heritage, culture, and social features in relation to the Project footprint