

SITE C CLEAN ENERGY PROJECT

**Component Application Package -
Reservoir Shoreline Fish Habitat
Enhancement
Site KM26**

For Canadian Navigable Waters Act

June 2, 2021

Submitted to:

Transport Canada
Suite 620 - 800 Burrard Street
Vancouver BC V6Z 2J8

Submitted by:

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Site C Clean Energy Project
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Vancouver BC V7X 1V5

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1 INTRODUCTION

The Canadian Navigable Waters Act (CNWA) came in to force on August 28, 2019. The CNWA includes a Schedule of navigable waters requiring regulatory approval for works that risk a substantial interference with navigation.

The Peace River is named in the schedule of navigable waters. Works required for construction and operation of the Site C Clean Energy Project (the Project) that occur in, on, over, under, through or across any navigable water, are subject to the requirements of the CNWA.

This application package provides an overview of reservoir shoreline fish habitat enhancement work, required as part of the Project's fish habitat offset, and is specific to enhancement work at site KM26 on the Peace River.

2 FISH HABITAT ENHANCEMENT AREAS

The Site C Environmental Impact Statement (EIS) identifies potential effects to fish habitat associated with the construction and operation of the Project that potentially reduce fish health and survival. To mitigate these effects, four sites will be enhanced to produce the following habitat within the future Site C reservoir:

- 21 ha of enhanced littoral zone¹ habitat at KM26
- 3.5 ha of shoal habitat for spawning at KM21
- 22 ha of shallow water littoral zone habitat at KM91, and
- 12 ha of shallow water littoral zone habitat at KM42

An overview map showing the habitat enhancement locations is included in Attachment A.

Fish habitat enhancement at these sites will be constructed in accordance with fish habitat offset requirements of Fisheries Act Authorization 15-HPAC-01160, issued for the Site C Clean Energy Project.

This document is specific to the development of enhanced littoral zone habitat at KM26. A separate application will be submitted for shoal habitat development at KM21.

Habitat enhancement at the KM42 and KM91 sites will involve excavation in order to provide continuously wetted shallow water littoral habitat for the full range of water levels in the Site C reservoir. Excavation at these two sites is not considered to interfere with navigation.

¹ The littoral zone is the shallow area along the reservoir shoreline between maximum normal reservoir level (MNRL) of 461.8 m and 6 m below MNRL, which supports higher aquatic production based on light penetration to bottom sediments supporting algal growth and growth of rooted aquatic plants (EIS, Vol. 2, App P, Part 3).

2.1 Location and Land Description

KM26 is located 7 km downstream of the Peace Canyon Dam, on a ~2.5km-long mid-channel island in the Peace River, opposite the municipality of Hudson's Hope, BC. The site is on Crown Land and within the following Occupant Licence to Cut (OLTC) area held by BC Hydro: OLTC#21; Licence # L51403.

The centrepoint coordinates and legal land description for KM21 is included in Table 1.

Table 1. Location and Legal Land Description for KM26 Fish Habitat Enhancement Site

Longitude	Latitude	Legal Land Description
55.996356	-121.974144	<ul style="list-style-type: none">• Theoretical Unsurveyed Crown Lands on Part of Island No.1 Section 18 Township 81 Range 25 West of The 6th Meridian Peace River District• Theoretical Unsurveyed Crown Lands in South East 1/4 of Section 13 Township 81 Range 26 West of The 6th Meridian Peace River District• Theoretical Unsurveyed Crown Lands on Part of Part of Island No.1 Section 12 Township 81 Range 26 West of The 6th Meridian Peace River District• Portions of the Peace River including the Crown Foreshore highwater mark South of the Peace River located within the Theoretical Unsurveyed Crown Lands on Part of Island No.1 Section 18 Township 81 Range 25 West of The 6th Meridian Peace River District, Theoretical Unsurveyed Crown Lands on Part of Part of Island No.1 Section 12 Township 81 Range 26 West of The 6th Meridian Peace River District and the Theoretical Unsurveyed Crown Lands in South East 1/4 of Section 13 Township 81 Range 26 West of The 6th Meridian Peace River District

2.2 Design of KM26 - Enhanced Littoral Zone Habitat

A map showing the location of KM26 is included in Attachment A. The project area, elevations and proposed works are shown on the attached Design Drawings included in Attachment B. Fish habitat design considerations are conceptual and subject to revision based on site conditions and final design review by Fisheries and Oceans Canada.

KM26 was selected as a site to enhance littoral zone habitat within the Site C reservoir to support increased secondary production and higher densities of juvenile fish. Habitat development at this site will be achieved through the placement of boulder clusters. Boulder clusters provide complexity and structural enhancement, supporting aquatic populations by providing physical refuge, nursery and rearing habitats.

Boulder clusters will be placed directly on the ground surface between elevation 456 m and 458 m. The upper limit considers navigational safety for watercraft while the lower limit corresponds with the estimated maximum light penetration depth associated with littoral zone habitat.

Boulders will be configured in a cluster arrangement, 1.5 to 2 m long and similarly wide (see Figure 1 for an example of boulder cluster configuration). The maximum height of the cluster is to be limited to 1.7 m, with the top of all structures below elevation 458 m. Boulders in each cluster are to be placed in loose, random arrangements that includes stacking boulders to allow spaces.

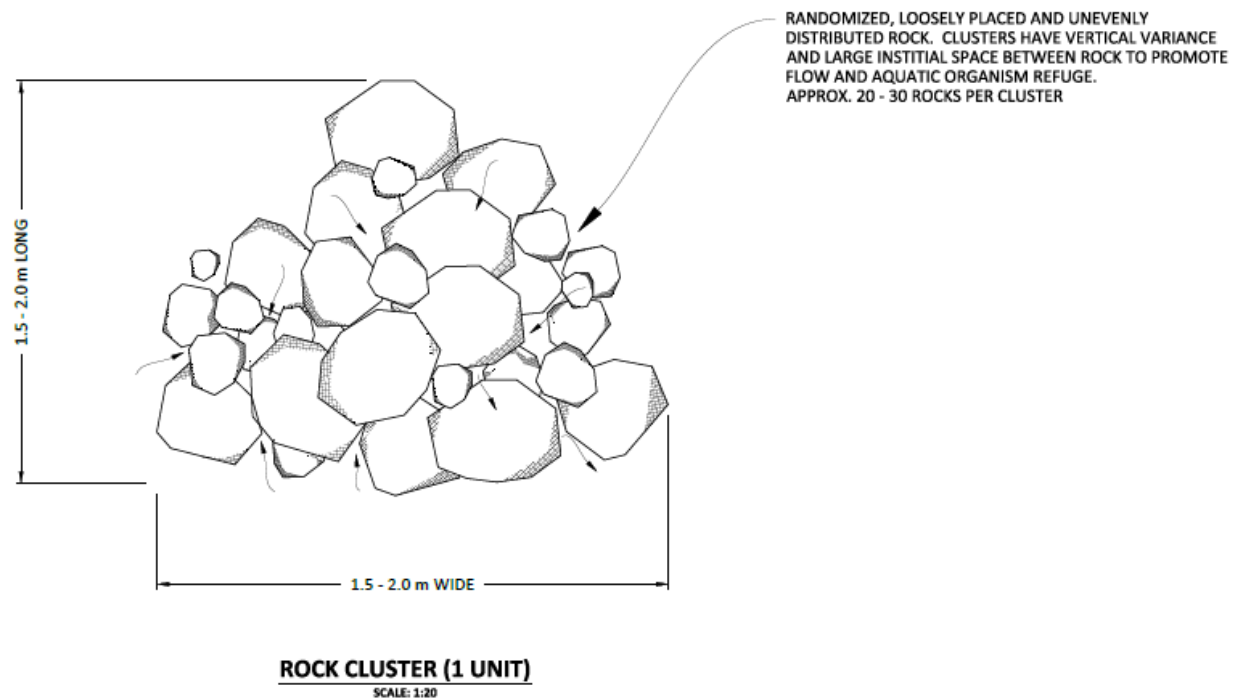


Figure 1. Example of Boulder Cluster

2.3 Construction Sequence and Schedule

Clearing of the mid-channel island is expected to be complete by October 2021, as part of the western reservoir clearing scope of work. Once the site is cleared and discharge releases from the upstream Peace Canyon Dam are low, off-road trucks will transport rock to the site via exiting access. Excavators will place rock in the required arrangements, directly on top of the existing surface.

Construction is anticipated to require 1 week to complete with favorable flow conditions.

3 CONSULTATION

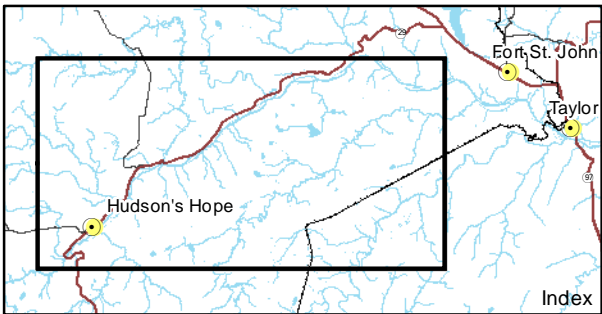
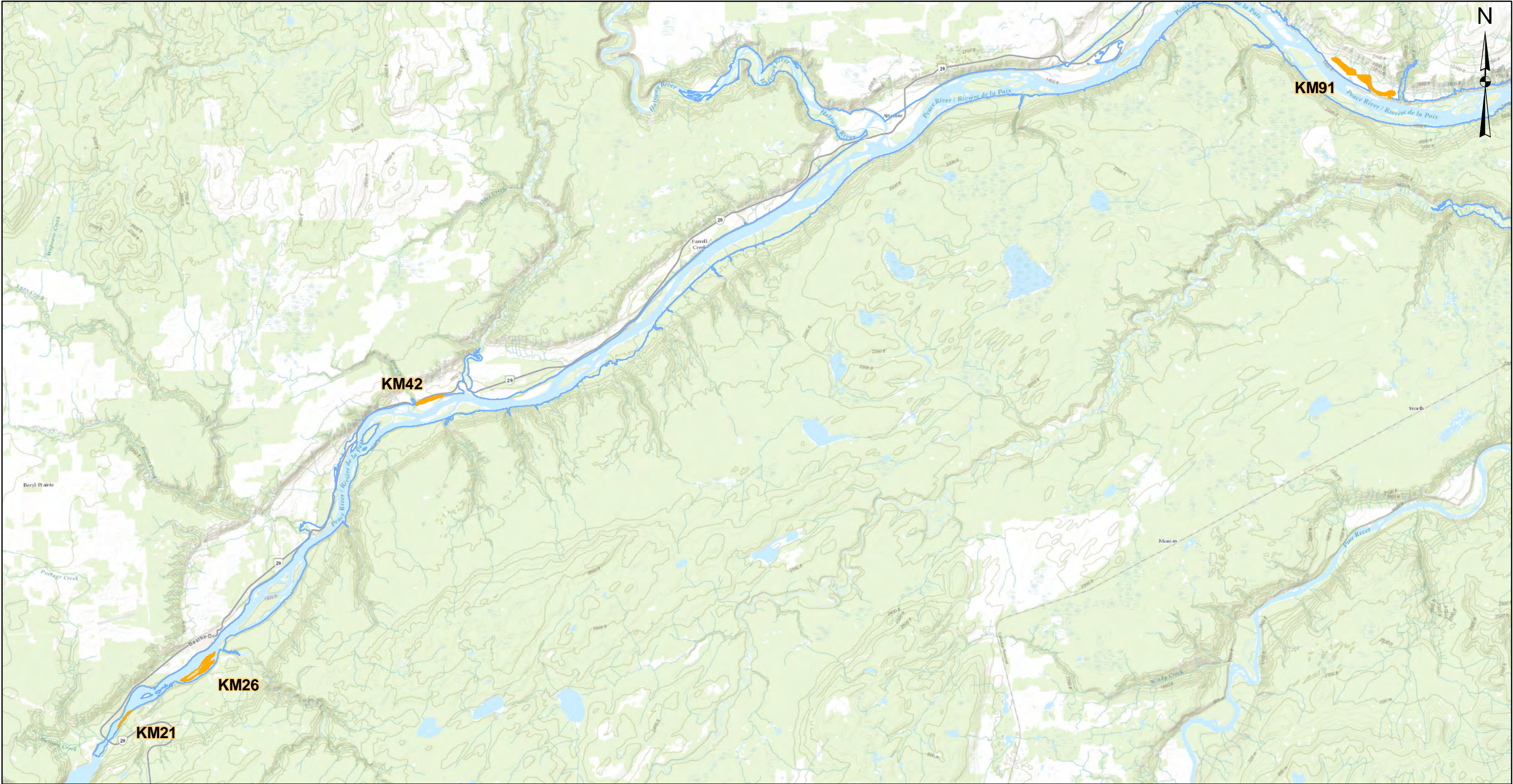
The reservoir shoreline fish habitat enhancement designs will be presented to local Aboriginal groups during the upcoming Site C Permitting Forum #19, planned for July 13, 2021.

Attachment A

Overview Map for Reservoir Shoreline Fish Habitat Enhancement Sites

Map of Reservoir Shoreline Fish Habitat Enhancement at KM26

Path: X:\GIS\Projects\Permitting\Federal_Permits\NavProd\CNWA_ResShorelineContouring_KM21_KM26_1016_N11_01130-1.mxd



Map Notes:
1. Datum: NAD83
2. Projection: UTM Zone 10N
3. Basemap: ESRI

- Legend**
- Reservoir Fish Habitat Enhancement Sites
 - Reservoir Full Supply Level (461.8m)

1:160,000 0 8 km

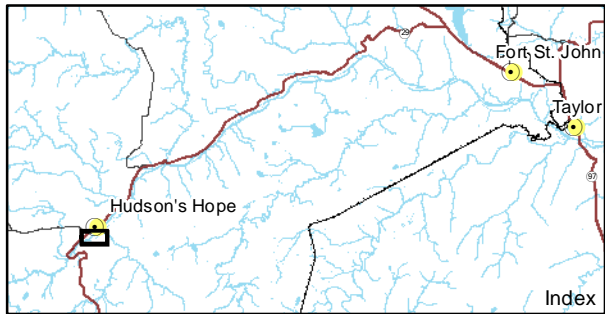


**CNWA Application for Approval
Reservoir Fish Habitat Enhancement Sites
Overview**

Date	Jun 2, 2021	DWG NO	1016-N11-01130-1	R 0
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Construction of the Site C Clean Energy Project is subject to required regulatory and permitting approvals.

Path: X:\GIS\Projects\Permitting\Federal_Permitting\NavPro\CNWA_ResShorelineContouring_KM21_KM26_1016_N11_01130-3.mxd



Map Notes:
1. Datum: NAD83
2. Projection: UTM Zone 10N
3. Orthophotos created from LIDAR
taken on September 21st - October 1st, 2019

Legend

- Reservoir Fish Habitat Enhancement Sites
- Reservoir Full Supply Level (461.8m)

1:10,000 0 500 m



CNWA Application for Approval
Reservoir Fish Habitat Enhancement
Site KM26

Date	May 31, 2021	DWG NO	1016-N11-01130-3	R 0
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Construction of the Site C Clean Energy Project is subject to required regulatory and permitting approvals.

Attachment B

Design Drawings for Reservoir Shoreline Fish Habitat Enhancement at KM26

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SHEET 103

SHEET 102

PEACE RY

NOTE:

1. IMAGERY SITE DETAIL: NHC 10 cm DRONE ORTHO, 2020.
2. IMAGERY OUTSIDE OF SITE DETAIL: WORLD IMAGERY
3. EXISTING GROUND SURVEY BY NHC, 2020 - DRONE PHOTOGRAMMETRY.
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
5. ALL ELEVATIONS ARE ORTHOMETRIC WITH VERTICAL DATUM CGVD28.



nbc northwest
hydraulic
consultants

BChydro 

PEACE RIVER CONTOURING PROJECT

SHALLOW WATER HABITAT COMPLEXING: KM26
ISSUED FOR TENDER

DRAWING LAYOUT PLAN

[illegible]

NOT TO BE REPRODUCED WITHOUT THE PERMISSION OF BC HYDRO



PEACE

EQUIPMENT FORD



HIGHWAY 29

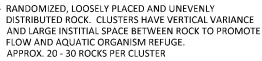
ACCESS ROAD

HIGHWAY 29

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<p>PEACE RIVER CONTOURING PROJECT</p> <p>SHALLOW WATER HABITAT COMPLEXING: KM26</p> <p>ISSUED FOR TENDER</p> <p>SITE ACCESS PLAN</p>						
DWG NO	101	<table border="1"> <tr> <td>SIZE</td> <td>A0</td> <td>R</td> <td>0</td> </tr> </table>	SIZE	A0	R	0
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AARON BLEZY
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