

SITUATION

In 2010 it was discovered that the 30 inch mainline in the main (north) channel of the Cottonwood River had approximately 150 mm of cover for approximately 35 m.

Pending the design and implementation of a long term solution, SET placed 15 Armourflex mats over the line to reduce the potential of full exposure and undermining of the lines in March 2011.

The temporary revetment failed during the 2011 freshet due to undercutting and outflanking of the Armourflex mats.

LONG TERM SOLUTION

The following potential long term solutions have been reviewed by SET:

Solution Option	Discussion	Feasible
Do nothing	The river can expose and undermine the pipe over its critical span. Not code compliant for DoC.	No
Make Temporary Matting permanent	The river can outflank/undermine the temporary protection as evidenced by 2011 freshet failure of matting. Not code compliant for DoC.	No
Lower Pipe by cutting slack	Many issues associated with this design but the main issue is that the entire pipe would have to be exposed at once across the river; therefore, no isolation possible -not acceptable based on today's environmental standards.	No
Conduct HDD	AMEC Earth & Environmental assessed drill logs and cross sections provided by SET and indicated that there was a low probability of success due to a thick non-cemented granular deposit that could collapse. <i>(AMEC HDD report available)</i>	No
Build Aerial Crossing	Based on drilling results good pier foundation conditions. Would require at least on pier in active river channel. Facility is now above ground and more vulnerable to third party interactions and would require maintenance.	Yes, but not in time for 2012 freshet
Conduct Pipe Replacement	Given that the channel has a large gravel bar in the centre it would be possible to install pipeline with the river isolated during the install in either the north or south channel.	Yes

Based on the information provided above and required project timelines, SET has chosen to implement the “Conduct Pipe Replacement Option”.

DETAILED PIPE REPLACEMENT METHODOLOGY

The Pipe Replacement can generally be divided into 4 phases:

1. Preconstruction Site Preparation,
2. In Stream Works,
3. Pipeline Work and Tie- ins, and
4. Site Rehab and Compensation works

The general construction process would be:

1. Preconstruction Site Preparation

- a. Clear vegetation from new RoW and temporary workspace on north and south sides of the river channel,
- b. Haul to site new 30 inch pipe and prepare for installation,
- c. Excavate “Out of Stream” pipe trenches and tie in points on north and south sides and tie-in points on either side of crossing (Fig 3. Plate 2), and
- d. Excavate abandoned south channel to allow for diversion (Fig 3. Plate 2).

2. In stream Works

- a. Install Aquadams to direct river into South Channel,
- b. Excavate North Excavation “In Stream” (Fig. 3, Plate 3). During excavation channel gravels would be separated off,
- c. Remove any recoverable armourflex mats downstream of 30 inch mainline and remove swamp weights/river weights from 30 inch mainline,
- d. Install casing pipe in excavation and weight down with swamp type weights,
- e. Backfill over casing pipe excavations including channel gravels (Fig 3. Plate 4),
- f. Divert river back into north channel, and
- g. Excavate South Excavation “In Stream” (Fig 3. Plate 5).

3. Pipeline Work and Tie-Ins

- a. Pull pipe through carrier pipe and through southern excavations,
- b. Install river or swamp weights on section of pipe not in casing pipe,
- c. Backfill excavations except for tie-in areas,
- d. Tie in pipelines
- e. Back fill tie in points
- f. Replace and repair rip-rap on southern side of river channel

4. Site Rehab and Compensation Works

- a. Regrade, reseed and replant site
- b. Conduct off site DFO compensation works

Figure 1: Site Location approximately 20 km north of Quesnel BC

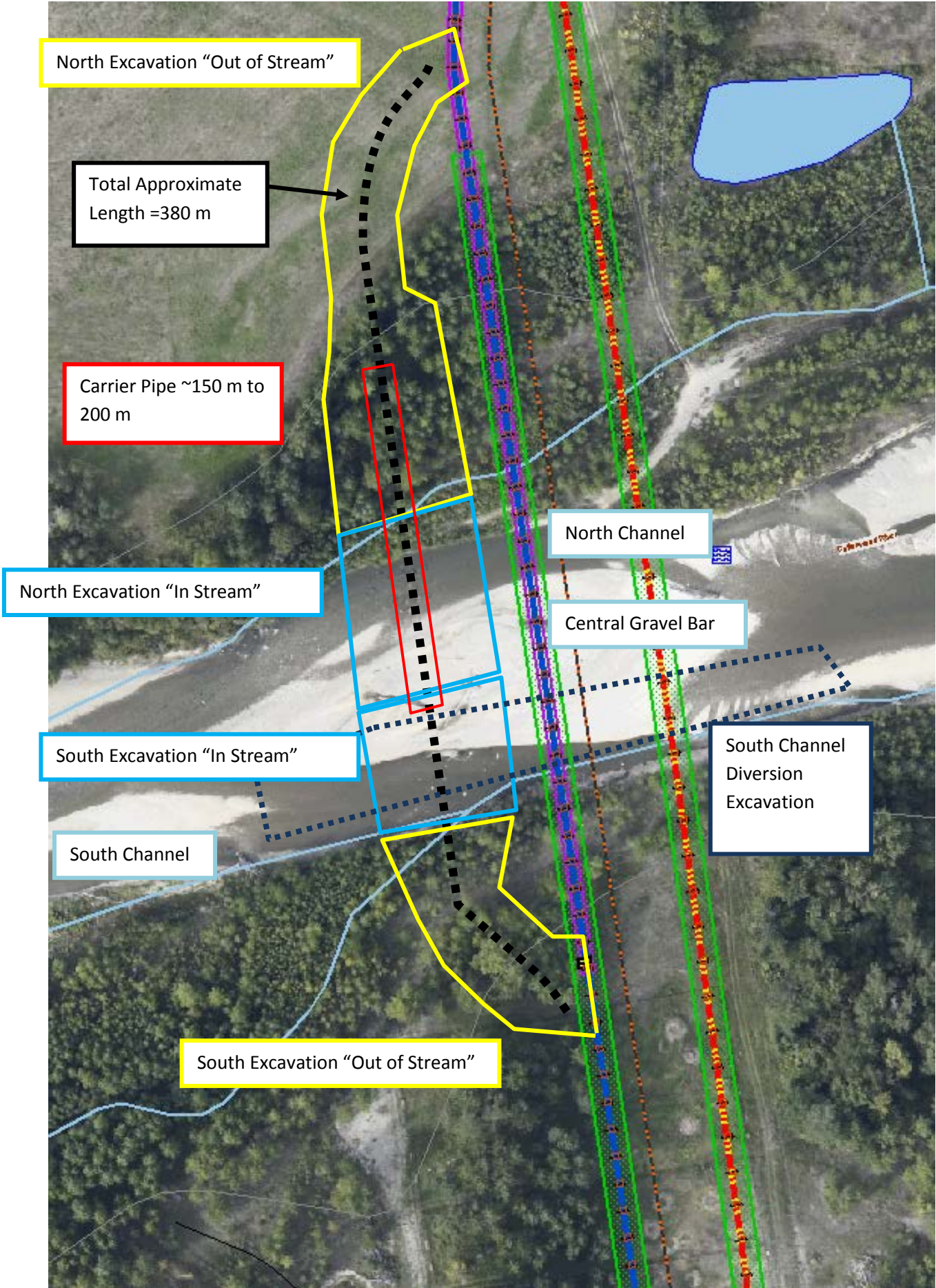
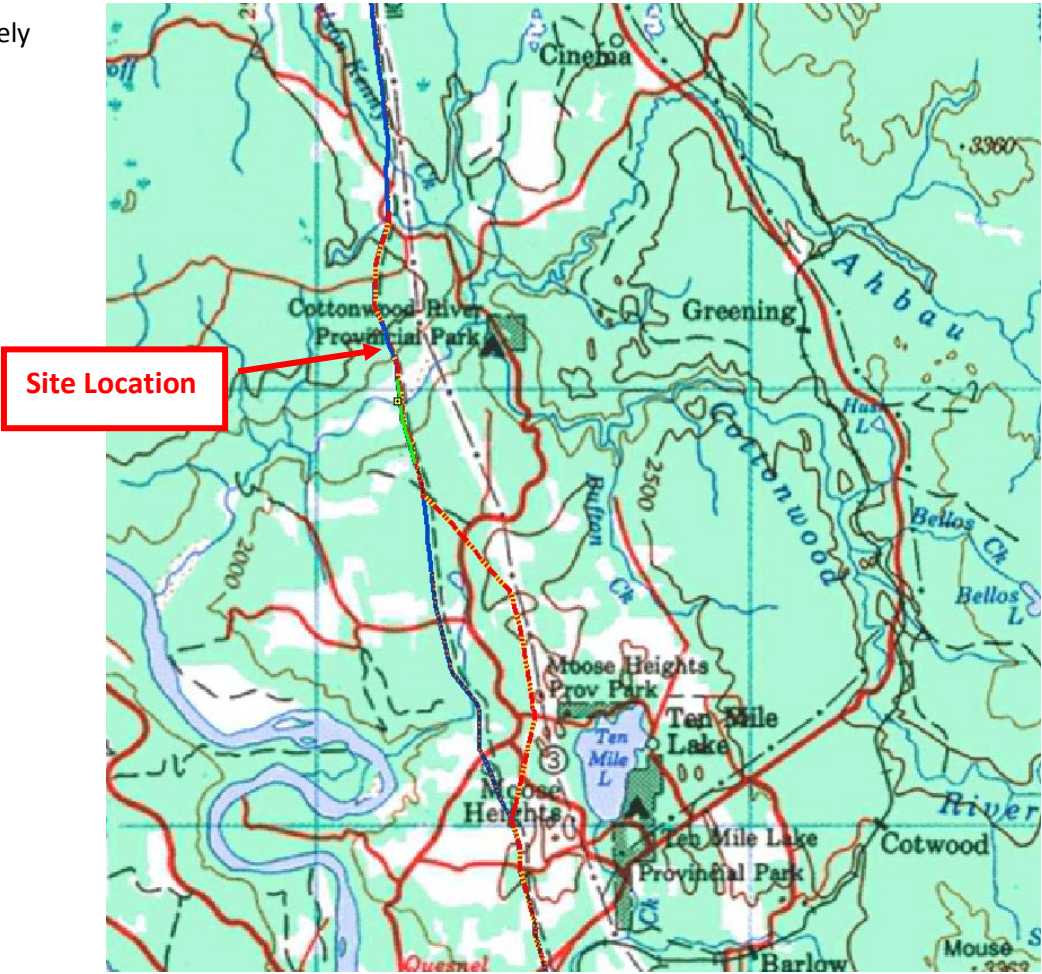


Figure 2: Proposed Construction Layout –Plan View

