#### GUIDELINES FOR STREAM CROSSINGS AND SEASONAL BRIDGE INSTALLATION AND REMOVAL: Fort St. John Division

#### Purpose:

The intent of this document is to provide operators with best management practices for various options pertaining to stream crossings, culvert installations and temporary bridge installation, for fish bearing and non-fish bearing streams. The supervisor or equipment operator will make the decision on what crossing method is appropriate based on the site specific conditions and timing, while keeping the main objectives in mind.

It is the proponent's responsibility to identify concerns regarding fish and fish habitat and refer these to the appropriate authority.

#### **Objectives:**

- Minimize impact to stream bank integrity by utilizing the least impact stream crossing structure, when feasible, and to implement bank stabilization countermeasures where necessary. This would include, riprap, straw matting, grass seeding, etc.
- Maintain fish passage.
- Minimize the risk of damage to fish and fish habitat.
- Maintain water quality by preventing the introduction of sediment and other deleterious material into the stream.

The following are suggested construction methods, winter and summer stream crossing planning matrix and other guidelines that are associated with stream crossings.

CLASS:	Seasonal
TYPE:	Single span, steel stringer
STREAM CLASS:	S2 to S6
	(see Summer and Winter Stream Crossing Approval Matrices)
ABUTMENTS:	Log (minimum diameter 300 mm) or
	timber (minimum 200 mm X 200 mm)

Where necessary, an area will be leveled-off on the stream bank to accommodate sills. Log cribbing may also be used to supplement abutments where leveling is required.

Abutment walls (where appropriate, lined with geotextile fabric) will be erected to prevent approach fills from sloughing into streams.

#### Bridge Installation:

(See diagram showing placement and removal.) The fording of the stream by heavy equipment to facilitate bridge placement will be minimized (generally, no more than two

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Seasonal winter bridges may be installed anytime after freeze-up, generally no earlier than October 15<sup>th</sup> in any year.

All seasonal summer bridges may be installed after the spring freshet. Fording of the stream by heavy equipment to facilitate bridge construction will be restricted to the timing window identified in this document for all streams S1 through S4 (inclusive) without prior approval by MOE. Fording of these streams outside the window will require notification to MOE.

#### Bridge Removal:

The fording of the stream by heavy equipment to facilitate bridge removal will be minimized (generally, no more than two crossings). Deactivation of approaches will involve re-contouring stream banks to their pre-construction condition (as appropriate) to prevent erosion and seeding with appropriate vegetation (any disturbed areas). All excavated material and debris from the site will be placed in a stable area above the normal high water mark and protected from erosion.

**Seasonal** <u>winter</u> bridges will be removed by the first day of spring freshet, usually no later than March 15<sup>th</sup> in any year. Extensions to this date may be approved by MOE upon application.

**Seasonal** <u>summer</u> bridges will be removed as soon as possible. Fording of the stream by heavy equipment to facilitate bridge removal will be restricted to the timing window identified in this document for all streams S1 through S4 (inclusive) without prior approval by MOE. If not threatened by higher flows, and if still required, seasonal bridges may stay in place for the winter. They will be removed by the first day of spring freshet, usually no later than March 15<sup>th</sup> in any year without consulting MOE. Extensions to this date may occur but will be dependent on site-specific conditions that may vary year to year.

#### General Seasonal Bridge Environmental Protection Measures:

- Seasonal winter bridges will clearly span the stream channel, or as otherwise approved by the appropriate authority.
- Seasonal summer bridges will clearly span the stream channel with provisions for somewhat higher than normal flows and debris.
- Bridge approaches will not enter the stream channel of the stream without approval from the appropriate authority. Monitoring of weather conditions and associated stream flows will be ongoing with provisions in place for timely removal of the bridge span, abutments (sills) and approach fills prior to high water stream flow events.
- Seasonal bridges will be adequately supported so that the stream banks are protected.

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- Any rock used as riprap will be clean (free of fines and dirt), durable, angular in shape and suitably graded and sized to resist movement by stream flows. Riprap placement will not adversely impact fish, fish habitat, or fish passage.
- Seasonal bridge construction and removal will be accomplished in a manner that does not cause stream bank erosion or contribute silt or dirt to the stream.

# Stream Crossing Planning and Methodology:

- Notification of the proposed location and construction of a bridge or major culvert will be by way of forest development plans, forest operation schedule, site level plan, road authorization, and/or specific notifications to MOE.
- Participants will plan and construct stream crossings using the Summer and Winter Stream Crossing Planning Matrices (attached.) as a guide. Stream crossings qualified by a "maybe" will be applied where site conditions permit and where the stated objectives can be met. Alternate proposals and/or measures proposed by Participants will be considered where specifically proposed.
- Solution Minimum culvert (CMP or steel pipe) diameters installed will be 400 mm.
- Where other appropriate alternatives exist (e.g. as per the Summer and Winter Stream Crossing Planning Matrices), culverts will not be installed in streams classed S1 through S3, inclusive.
- Instream work required to install bridges or culverts on S1 through S4 streams will be restricted to the *Least Risk Instream Work Windows* for resident fish species in streams (as identified by MOE) as outlined in the *Riparian Management Area Guide Book.* Alternate proposals and/or measures proposed by participants will be considered where specifically proposed.
- Aspen and cottonwood will not be used in the construction of any fills in or adjacent to streams that will be in place during unfrozen conditions. These species contain a leachate that may be toxic to aquatic life.
- Snowfills shall be constructed of clean snow only. Placements of clean logs or temporary steel pipes to facilitate movement of water under the snowfill will be considered appropriate (refer to *Winter Stream Crossing Planning Matrix*). Where a large number of logs are required in the construction of the crossing it is recommended that the logs be banded to facilitate removal. Snowfills (including any pipe or logs and unintentional dirt deposited from logging traffic) will be removed with an excavator during post-logging road deactivation, placed above the high water mark of the stream and protected from erosion.
- Le bridges may be constructed (see Winter Stream Crossing Approval Matrix) on major rivers and streams with appropriate depth and winter flows. Ice bridges will not interfere with or impede winter flows in any stream or river. Ice bridges will be maintained and monitored throughout their use.
- Clean, limbed and topped coniferous logs with the root boles removed may be used to reinforce ice bridges.

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# Timing Windows:

Instream work can result in harmful effects to fish and fish habitat, including the harmful alteration or destruction of spawning habitat, introduction of sediment and the destruction of fish eggs and juveniles prior to emergence from gravel. Therefore, such work must be undertaken during times or periods when such harmful effects will be minimized. Timing windows may be better referred to as windows of least risk regarding fish and fish habitat. Instream timing windows (windows of least risk) for the Fort St. John TSA are as follows:

Fish Affected	Approved InStream Time Window
Both spring and fall spawners	July 15 - August 15
Fall spawners (bull trout, kokanee and mountain whitefish)	June 15 - August 15
Spring spawners (rainbow trout, arctic grayling)	July 15 - March 31
Anadromous salmon	DFO has site-specific time windows if needed

- If fish species information for a particular stream is not available, the instream timing window for both spring and fall spawners will be used.
- Stream inventory data for fish presence/absence are critical to establishing the widest possible timing windows.
- These timing windows must be applied to all construction in fish streams, as well as tributaries that have a high risk of depositing sediment into fish streams.

### Variances to Timing Windows:

- Where a proponent wishes to conduct in-stream work outside the approved timing window, a variance must be requested from the MOE in writing. Requests will be evaluated on a case by case basis.
- Notwithstanding the above, if any one of the following conditions is met, then the timing window extends from January 1 through December 31 of any given year.
  - 1. On fish streams, the stream channel is dry and the construction, modification or deactivation activity will not result in the introduction of sediment into fish habitat.
  - 2. Winter crossings of fish streams located on cutblocks where appropriate winter crossings methods are identified in a Forest Practices Code approved plan (i.e. SLP, FDP,FOS, SFMP).
  - 3. On fish streams, the structure does not encroach below the high water mark, no work is proposed within the stream channel and the risk of sediment delivery to the stream is low.
- Any request for variance must be submitted, in writing, to MOE.
- Any approval for a variance from the timing windows and measures outlined in this document must be kept on site.

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Stream Class	S1	S2	<b>S</b> 3	S4	S5 no fish	S6 no fish
Width	> 20 m	> 5-20 m	1.5 – 5 m	< 1.5 m	> 3 m	< 3 m
Temporary bridge (no instream work)	Yes	Yes	Yes	Yes	Yes	Yes
Temporary bridge (with instream work)	Yes (*1*)	Yes (*2*)	Yes (*2*)	Yes (*2*)	Yes (*3*)	Yes
Seasonal (*4*) bridge (no instream work)	No	Maybe (*1)	Yes	Yes	Yes	Yes
Seasonal (*4*) bridge (with instream work)	No	Maybe (*2*)	Yes (*2)	Yes (*2*)	Yes (*3*)	Yes (*3*)
Engineering culvert with earthfill	n/a	No	Maybe (*2)	Maybe (*2*)	Yes (*3*)	Yes (*3*)
Culverts less than 2,000 mm	n/a	n/a	n/a	Yes (*3*)	Yes	Yes
Ford	No	No	Yes (*5)	Yes (*6*)	Yes (*6*)	Yes (*6*)

### SUMMER STREAM CROSSING PLANNING MATRIX

\*I\* Site specific approval required from the appropriate authority.

\*2\* Site specific approval required from the appropriate authority. Instream work may be restricted to specific time period. (Refer to timing windows identified in this document.)

\*3\* Instream work may be restricted to specific time period. (Refer to Timing Windows identified in this document).

\*4\* Clear span, no approaches within the stream channel, monitored/removed at high flows.

\*5\* Light (LGP, pickup or less) traffic only; site specific notification required.

\*6\* Refer to MLWAP authorization letters for details.

Note: Instream work does not include fords.

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Stream Class	S1	S2	S3	S4	S5 –	S6 –
					no fish	no fish
Width	> 20 m	> 5-20 m	1.5 – 5 m	< 1.5 m	> 3 m	< 3 m
Temporary or seasonal	Yes	Yes	Yes	Yes	Yes	Yes
clear span bridge						
(no instream work)						
Seasonal bridge	Yes	Yes (*4*)	Yes (*4*)	n/a	Yes	n/a
(with instream work)	(*4*)				(*4*)	
Seasonal bridge (with	Yes	Yes	Yes	Yes	Yes	Yes
instream work, and snow	(*4*)					
fill or ice approaches)						
Ice bridge – heavy loads	Yes	Yes (*1*)	No	No	n/a	n/a
Ice bridge – light loads	Yes	Yes	Maybe	n/a	Yes	n/a
(*2*)			(*4*)			
Snowfill – artificial or	n/a	No	Yes	Yes	Yes	Yes
natural, with pipe or log						
bundles (*3*)						
Snowfill – artificial or	n/a	No	Yes	Yes	Yes	Yes
natural (no flow, dry or						
frozen solid)						
Temporary pipe/culvert	n/a	No	No	Yes	Yes	Yes
with earthfill					(*4*)	
*I* If depth $> 1$ metro, width $> 15$ metro, and winter mean daily flows $> 0.5 \text{ m}^{3/222}$						

### WINTER STREAM CROSSING PLANNING MATRIX

\*I\* If depth > 1 metre, width > 15 metre and winter mean daily flows >  $0.5 \text{ m}^3$ /sec

\*2\* Weight restriction. (1 ton or less). For heavier loads, special approval is required from the participants engineering supervisor.

\*3\* If stream flow.

\*4\* Not first option.

Note: Instream work does not include fording for construction purposes.

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# Installation & Removal Guidelines for In-Block Equipment Crossings on Streams

### General:

- Equipment crossing locations must be approved by a participants supervisor before construction.
- During summer activities or unfrozen ground conditions, measures must be taken to protect the approaches to the crossing. Coniferous logs can be used as a mat to protect the ground adjacent to the crossing.
- Where possible, clean, non-merchantable wood should be used for constructing crossings and approaches (dry trees or undersize). Deciduous trees can be used under frozen conditions only.
- Where possible rub trees (stubbed) should be created on each side of the approach to the crossing. This will help minimize the amount of debris carried to the crossing and help minimize the width of the crossing.
- Care must be taken during installation and removal to maintain the natural stream banks and vegetation.
- Where snow fills are used as a temporary crossing structure, they must be installed at least one day prior to skidding across them to allow the snow sufficient time to set up.
- Crossing structures must be monitored by the logging contractor during use to ensure the objectives are being met (i.e. stream banks are not being damaged, sediment and other deleterious material is not being introduced to the creek).

### Suggested methods of construction:

- 1. Temporary Bridge Spans streams bank to bank. Construction materials can include coniferous logs/timbers/steel.
- Culvert with Log Fill Permits free flow of water, logs fill and/or bridge the channel (depending on log orientation) to protect stream bank stability. Deciduous logs may be used during frozen conditions only.
- 3. Log Fill Permits water flow, logs fill and/or bridge the channel (depending on log orientation) to protect stream bank stability. Where a large number of logs are required in construction of the crossing it is recommended that the logs be banded to facilitate removal. Deciduous logs may be used during frozen conditions only.
- 4. Clean snow/ice fill Snow and/or ice fill channel protecting stream bank stability.

### **Removal Guidelines:**

1. Prior to spring freshet materials used for the crossing structure and approaches must be removed in a manner that protects the stream channel and banks. Crossing materials will be removed from site, skidded to slash piles or left as coarse woody debris, if appropriate.

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2. Any logging debris (including limbs) must be removed from the channel and crossing site, and placed a minimum of 5 metres from the channel or 5 metres above the high water mark whichever distance is greater. Care must be taken to minimize disturbance to the natural stream channel.

Stream Class	S3	S4	S5 – no fish	S6 – no fish	
Width	1.5 – 5 m	< 1.5 m	> 3 m	< 3 m	
Temporary bridge (without instream work)	Yes	Yes	Yes	Yes	
Culvert with log fill	No	Maybe (*1*)	Yes	Yes	
Snowfill, artificial or natural/log fill	Yes	Yes	Yes	Yes	
Clean artificial or natural snow/ice fill	Yes	Yes	Yes	Yes	
*I* Specific approval requ	ired.				
*2* Frozen conditions only					

# **IN-BLOCK EQUIPMENT CROSSING PLANNING MATRIX**