

**Fish Habitat Design, Operation, Reclamation Requirements for  
Water Quality Zone Watercourses**

## **Fish Habitat Design, Operation, Reclamation Requirements for Water Quality Zone Watercourses**

Water quality zones are those areas within watercourses that are inaccessible to fish but provide water flow and contribute nutrients to downstream habitats. Water Quality zones are identified on an individual basis based on confirmed permanent barriers to fish passage. Permanent barriers include creeks that flow underground, waterfalls, and significant velocity barriers, but do not include temporary structures such as culverts, beaver dams or log jams.

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to E). The completed worksheets will be submitted as part of your project description to Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB).

***Do you propose to undertake placer mining activities in or near a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.***

**NO** – No further review pursuant to the *Fisheries Act* is required.

**YES** – Proceed to Step A, Identification of Project Location

### **A) Identification of Project Location**

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas involves completing the ***Project Location Worksheet*** (Appendix A).

**A1.** *On the **Project Location Worksheet** enter the stream name, the watershed name (as per **Yukon Placer Fish Habitat Suitability Maps**), identify the watershed sensitivity, and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as “prior development” a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.*

Once the sections noted above are complete in the ***Project Location Worksheet***, proceed to the next question.

***Do you propose to discharge effluent from your mine site?***

**NO** – Proceed to Step C, Riparian Zones.

**YES** - Proceed to Step B, Settling Pond Discharge.

## **B) Settling Pond Discharge (effluent concentration)**

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the *Guidebook of Mitigation Measures for Yukon Placer Mining*

Water quality objectives and sediment discharge standards for settling ponds in Water Quality Zones are specified in the *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat* for the specific watershed you propose to work in (general requirements summarized below). Please ensure to verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application. In Water Quality Zones the discharge standard is set to maintain acceptable water quality in downstream habitats of greater sensitivity. Standards are specific to each watershed and are therefore defined in each individual Watershed Authorization.

**B1. Record the Design Target, Action Level and Compliance Level on the *Project Location Worksheet* (Appendix A).**

Once the effluent discharge standards are recorded on the *Project Location Worksheet* proceed to the next question.

***Do you propose to build a Seasonal, Temporary or Permanent diversion channel?***

**NO** – Proceed to Step C, Riparian Zones.

**YES** – Proceed to Step D, Diversion Channels.

## **C) Riparian Zones**

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel. Riparian Zones are measured from the high water mark on each bank of the watercourse and follow the shape of the channel.

No setback is required in Water Quality Zones; however a berm that is sufficient to prevent surface runoff and associated sediment from entering the watercourse must be constructed between the mine site and the watercourse.

***Do you propose to conduct surface or subsurface works in the Riparian Zone?***

**NO** – Proceed to Step D, Diversion Channels.

**YES** – Proceed to next question.

***Do you propose to construct a new stream crossing (Ford)?***

**NO** – Proceed to next question.

**YES** – Review Step D, Watercourse Crossings, prior to proceeding to next question.

***Do you propose to clear surface vegetation only?***

**YES** – Proceed to Step C1, Surface Vegetation Clearing.

**NO** – The proposal includes both clearing of surface vegetation and subsurface works, proceed to Step C1, Surface Vegetation Clearing, followed by C2, Bank Modification.

### **C1. Surface Vegetation Clearing**

There are no restrictions on vegetation clearing in Water quality zones. Works or undertakings are authorized to occur up to the berm on the stream bank.

### **D) Diversion Channels**

Design and construction of a diversion channel is required if the proposal includes *Seasonal*, *Temporary* or *Permanent* relocation of a water course or channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective watershed *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat*. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the *Guidebook of Mitigation Measures for Yukon Placer Mining*.

### **D1. Original Channel and Site Parameters Worksheet**

*On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.*

*Note – The above worksheet must be completed prior to proceeding with the following steps.*

***Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).***

**YES** – Proceed to Step D2, Seasonal Diversion Channels.

**NO** – Proceed to next question.

**Do you propose a *Temporary* relocation of a channel?** (*A Temporary Channel is in place for a period of less than five years*).

**YES** – Proceed to Step D3, Temporary Diversion Channels.

**NO** – Proceed to next question.

**Do you propose a *Permanent* relocation of a channel?** (*A Permanent Channel is in place for a period of five years or more*).

**NO** – Proceed to next question.

**YES** – Proceed to Step D4, Permanent Diversion Channels.

## ***D2. Seasonal Diversion Channels***

Seasonal diversion channels are defined as a constructed channel that will convey stream flow for no more than one operating season. This diversion channel type may not be used to convey stream flow between late fall and the following spring of any given year. Refer to the channel design considerations in the guidebook for more information on seasonal diversion channels. You will need to complete and submit the ***Channel Design Flood Estimate Worksheet*** (Appendix D3) and the ***Channel Design Method Worksheet*** (Appendix E) for your Seasonal Diversion Channel to YESAB and the YWB.

***Note – Riparian Zone provisions do not apply to Seasonal Diversion Channels.***

***Note – Flood design interval for Seasonal Diversion Channels in Water Quality Zones is 1:1.***

**D2a.** *On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).*

***Seasonal Diversion Channels must be less than 2000 metres in length.***

**D2b.** *On the Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.*

***Note – The Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.***

### ***D2c. Selecting a Channel Design Method***

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

<b>Design Method</b>	<b>Parameter</b>	<b>Condition</b>
<b><i>Channel Replication</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
<i>Notes</i>	<i>Optional when channel gradient is &lt; 2%</i>	
<b><i>Floodplain Design</i></b>	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
<i>Notes</i>	<i>Can be used in areas with no floodplain when relocation site has space to support floodplain</i>	
<b><i>Regime Channel</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
<i>Notes</i>	<i>Use when site data is insufficient to use other methods</i>	

**Select a Channel Design Method based on the criteria listed in the table above.**

**In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected (Channel Replication Worksheet (Appendix E1), Floodplain Design Worksheet (Appendix E2) or Regime Channel Worksheet (Appendix E3)). Do not proceed until you have selected a Channel Design Method.**

**Note – The Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.**

**D2d.** On the **Channel Design Method Worksheet** you have selected, enter the information required and complete the design calculations. Refer to the guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed **Channel Design Method Worksheet** with your submission to the YESAB and the YWB.

**Note – A plan for a Seasonal Diversion Channel must be accompanied by plans for a Temporary and / or Permanent Diversion Channel (See sections D3 and / or D4).**

Once the **Channel Design Method Worksheet** is completed, proceed to Step D3, Temporary Diversion Channels or D4, Permanent Diversion Channels.

### **D3. Temporary Diversion Channels**

Temporary diversion channels are defined as a constructed channel that will convey stream flow for a period of one to five years. Refer to the channel design considerations in the guidebook for more information on temporary diversion channels. You will need to complete and submit the **Channel Design Flood Estimate Worksheet** (Appendix D3) and the **Channel Design Method Worksheet** (Appendix E) for your Temporary Diversion Channel to YESAB and the YWB.

**Note – The Riparian Zone provisions do not apply to Temporary Diversion Channels.**

**Note – Flood design interval for Temporary Diversion Channels in Water Quality is 1:2.**

**D3a.** On the **Channel Design Flood Estimate Worksheet** (Appendix D3), enter the flood design interval (line 1).

**D3b.** On the **Channel Design Flood Estimate Worksheet** (Appendix D3), enter the information required and complete the calculations. Refer to the guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Design Flood Estimate Worksheet with your submission to the YESAB or YWB.

### **D3c. Selecting a Channel Design Method**

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

<b>Design Method</b>	<b>Parameter</b>	<b>Condition</b>
<b><i>Channel Replication</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	<i>Notes</i>	<i>Optional when channel gradient is &lt; 2%</i>
<b><i>Floodplain Design</i></b>	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	<i>Notes</i>	<i>Can be used in areas with no floodplain when relocation site has space to support floodplain</i>
<b><i>Regime Channel</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	<i>Notes</i>	<i>Use when site data is insufficient to use other methods</i>

**Select a Channel Design Method based on the criteria listed in the table above.**

***In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected (Channel Replication Worksheet (Appendix E1), Floodplain Design Worksheet (Appendix E2) or Regime Channel Worksheet (Appendix E3)). Do not proceed until you have selected a Channel Design Method.***

***Note – The Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.***

**D3d.** On the ***Channel Design Method Worksheet*** you have selected, ***enter the information required and complete the design calculations. Refer to the guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process.***

Please ensure to include the completed **Channel Design Method Worksheet** with your submission to the YESAB and the YWB.

#### ***D4. Permanent Diversion Channels***

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. All permanent diversion channels must include provisions for construction of fish habitat features. Refer to the channel design considerations in the guidebook for more information on permanent diversion channels. You will need to complete and submit the **Channel Design Flood Estimate Worksheet** (Appendix D3) and the **Channel Design Method Worksheet** (Appendix E) for your Permanent Diversion Channel to YESAB and the YWB.

**Note – Flood design interval for Permanent Diversion Channels in Water quality Habitat is 1:5.**

**D4a.** On the **Channel Design Flood Estimate Worksheet** (Appendix D3), enter the flood design interval (line 1).

**D4b.** On the **Design Flood Estimate Worksheet** (Appendix D3), enter the information required and complete the calculations. Refer to the guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed **Design Flood Estimate Worksheet** with your submission to the YESAB and the YWB.

**Note – The Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.**

#### ***D4c. Selecting a Channel Design Method***

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

<b>Design Method</b>	<b>Parameter</b>	<b>Condition</b>
<b><i>Channel Replication</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	<i>Notes</i>	<i>Optional when channel gradient is &lt; 2%</i>
<b><i>Floodplain Design</i></b>	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	<i>Notes</i>	<i>Can be used in areas with no floodplain when relocation site has space to support floodplain</i>
<b><i>Regime Channel</i></b>	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	<i>Notes</i>	<i>Use when site data is insufficient to use other methods</i>

**Select a Channel Design Method based on the criteria listed in the table above.**

**In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected (Channel Replication Worksheet (Appendix E1), Floodplain Design Worksheet (Appendix E2) or Regime Channel Worksheet (Appendix E3)). Do not proceed until you have selected a Channel Design Method.**

**Note – The Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.**

**D4c.** On the **Channel Design Method Worksheet** you have selected, enter the information required and complete the design calculations. Refer to the guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed **Channel Design Method Worksheet** with your submission to the YESAB and the YWB.

The following tables identify design restrictions for Permanent Diversion Channels which must be incorporated to be in compliance with the respective watershed *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat*.

### Design Restrictions for Permanent Diversion Channels

Design Component (Permanent Diversion)	Criteria
Overall length of diversion channel	< 5000 m
Conveyance (flood design) capacity	1:5
Channel design	As per channel design worksheets
Fish Habitat Features	None Required

**Note – in the next step you will need to refer to the *Original Channel and Site Parameters Worksheet (Appendix C)* in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types see the *Guidebook of Mitigation Measures for Yukon Placer Mining*.**

### Construction and Reclamation Requirements for Permanent Diversion Channels

**Pool-riffle / Dune-riffle and Plane-bed channel type.**

Reclamation Feature	Spacing Requirements (multiply the number in this column by the width of the channel in metres)
Top Soil Spreading	Continuous (both banks)
Rip-rap	Based on channel design method

**Step-pool and Cascade Channel type**

Reclamation Feature	Spacing Requirements (multiply the number in this column by the width of the channel in metres)
Top Soil Spreading	Continuous (both banks)
Rip-rap	Based on channel design method

**D4d.** Use the information provided to complete the *Fish Habitat Feature Worksheet* (Appendix F) to identify the type, spacing and relative location of reclamation features. Draw a diagram of the diversion channel (include north arrow, flow direction and reclaimed Riparian Zone) (use symbols identified on worksheet to compose your diagram).

**Note – If you propose to construct a crossing (new Ford) be sure to identify the location of the ford on the *Fish Habitat Feature Worksheet* (see section E2).**

Once the *Fish Habitat Feature Worksheet* is completed, proceed to the next question.

***Do you propose to use an Existing Ford?***

**NO** – Proceed to next question.

**YES** – Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

***Do you propose to construct a New Ford?***

**NO** – Proceed to Step F, Water Acquisition.

**YES** – Proceed to Step E, Watercourse Crossings.

### **E. Watercourse Crossings (Fords)**

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (*Fords*) have been “improved” or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

#### ***E1. Use of Existing Ford***

Use of existing Fords may be used in Water Quality Zones. Refer to the *Guidebook of Mitigation Measures for Yukon Placer Mining* for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

***NOTE – Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).***

Refer to the *Guidebook of Mitigation Measures for Yukon Placer Mining* for additional information on fords. The following measures should be adhered to when utilizing existing fords.

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

## ***E2. Construction of New Fords***

The construction of new Fords is authorized in Water Quality Zones.

The location of new Fords must be identified when proposed for original channels, Temporary Channels (with Fish Habitat Features), and Permanent Diversion Channels. The new ford proposed must achieve the design, construction and reclamation requirements identified in the table below to be in compliance with the respective watershed *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat*.

### **Design and Construction Restrictions and Reclamation Requirements for New Fords**

<b>Design Component (Construction of new Ford)</b>	<b>Requirement</b>
Approach angle	90° to bank
Maximum width of approach zone clearing (surface)	No Restrictions
Minimum watercourse distance between Ford sites	No Restrictions
Site Selection (Watercourse)	Shallow Water Depth
Site Selection (Approach / Bank Composition)	Gravel / Cobble
Construction	Equipment to Work from Bank
Maximum width of bank grading (subsurface)	No Restrictions
Approach surface ground coverage	Gravel / Cobble
Construction timing	Low Water Period
Reclamation	Full Topsoil Coverage

**Note – The above design considerations are not required for Construction of Fords in Seasonal or Temporary Diversion Channels.**

***E2a.*** If the construction of a new ford is proposed for an original channel or previously restored channel, identify the location of the new ford(s) on the ***Riparian Zone / Bank Modification Worksheet*** (see step C, *Riparian Zones and Appendix B*).

***E2b.*** If the construction of a new ford is proposed for a Permanent Diversion Channel, identify the location on the ***Riparian Zone / Bank Modification Worksheet***. Proceed to the next question. ***Do you propose to withdraw water from a Water Quality Zone?***

**NO** – Proceed to Step G, In-stream Works.

**YES** – Proceed to Step F, Water Acquisition.

## **F. Water Acquisition**

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective watershed *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat*.

### **F1. Water Intake Screens**

Intake pipes do **not** require screens.

## **G. In-stream Works**

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

*Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.*

**NO** – Review complete – proceed with submission of all completed worksheets along with your project description to YESAB and your application for water use license to YWB.

**YES** – Proceed to Step G1, Severity of Effects Assessment.

### **G1 - Severity of Effects Assessment and Risk Management Decisions for In-stream Works**

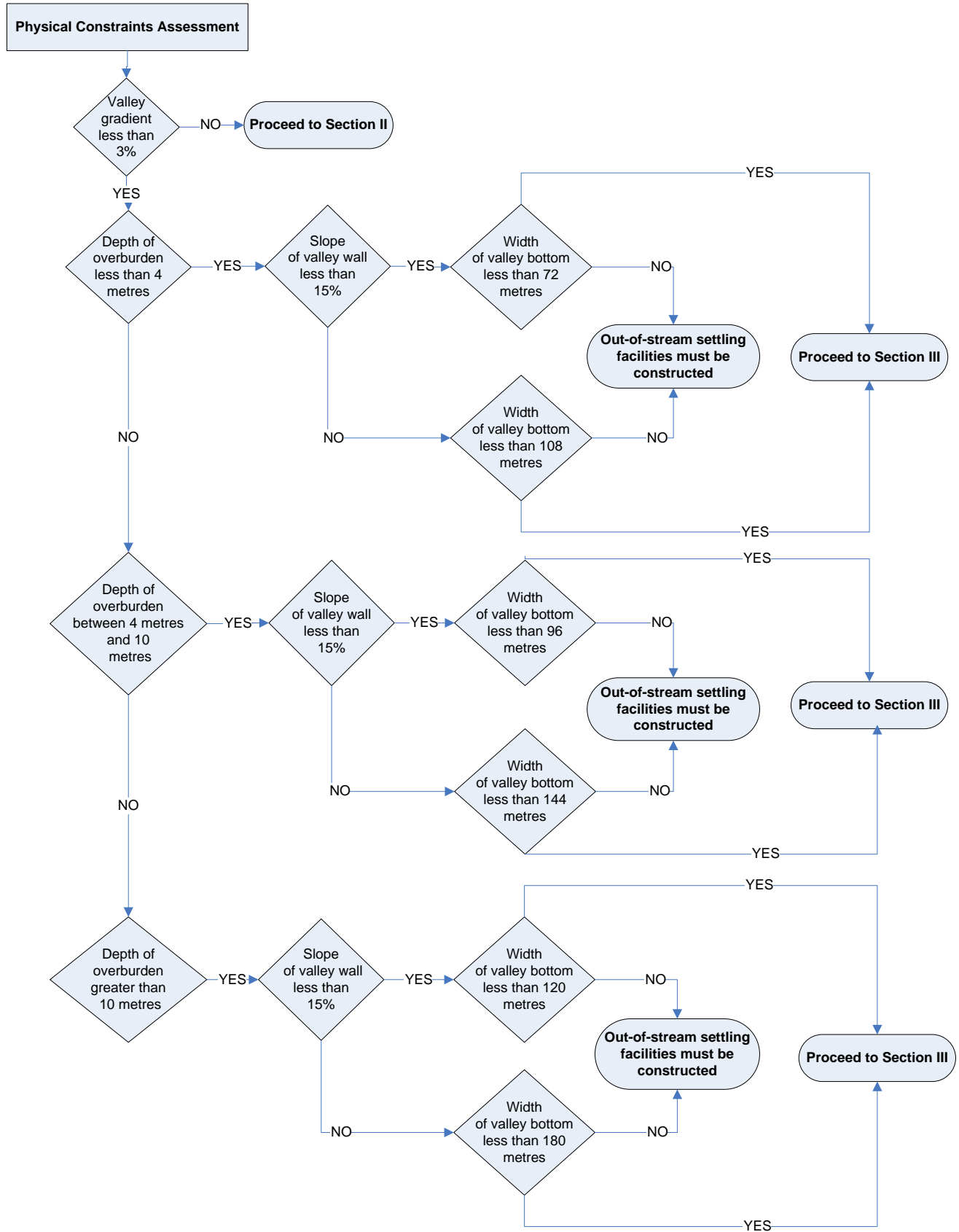
#### **Water Quality Zones**

In-stream settling facilities and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds are authorized under the auspices of a watershed-based authorization in Water Quality Zones under certain conditions. In order to determine whether your site qualifies, please complete the worksheet found in Section I. In-stream reservoirs constructed with cross-channel dams are authorized under watershed-based authorizations in Low Habitat Suitability.

#### **Section I**

Use the following flowchart to evaluate whether your site is suitable for construction of in-stream settling facilities or the use of a stream channel as a conduit. **Please note that authorization to construct in-stream settling facilities or to use a stream channel as a conduit is conditional and that these works may not be permitted.** Depending upon the scale of operation or size of earth-moving equipment out-of-stream settling facilities may be required in proximity to working areas.

## Worksheet for Instream Settling Ponds and Use of Stream Channel as Conduit



## **Section II**

The valley bottom you intend to mine is not ideal for the construction of settling ponds, due to its steep gradient. Use of the stream channel as a conduit for transporting process water to the nearest suitable site for out-of-stream settling ponds may be permitted.

**Do you have the right to construct settling facilities on placer claims immediately below your working area where the valley gradient is less than or equal to 3%, and the habitat classification remains either a Water Quality Zone, Low Habitat Suitability or Moderate-low?**

**YES** - Use the flowchart above to evaluate whether your site is suitable for construction of out-of-stream settling facilities.

**NO** – Prior to proceeding with this proposal you must apply to Fisheries and Oceans Canada for a site-specific review of your project.

## **Section III**

The valley bottom you intend to mine can not accommodate an out-of-stream settling facility, due to its narrow width. If you have the right to construct out-of stream settling facilities on placer claims immediately below your working area, and the habitat classification remains either a Water Quality Zone, Low Habitat Suitability or Moderate-low, use of the stream as a conduit for transporting process water to this downstream location may be permitted. If not, construction of in-stream settling ponds may be permitted. The following conditions apply to construction of these in-stream works:

- Construction and maintenance of a pre-settling pond is mandatory;
- If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel. More information on fish salvage requirements is available from Fisheries and Oceans Canada;
- Only compactable material (fine gravel and sand) may be used as core material in dam construction, while coarse material should be used on the surfaces to prevent erosion;
- Material must be placed in shallow (< 0.3 metre) lifts and compacted when dams are constructed;
- Sluicing must be terminated if stream flows increase to bank-full width in response to rainfall events;
- Settling ponds must be mechanically cleaned and equipped with well-armoured spillways in order to maintain stability during spring freshet; or
- A stable bypass channel must be constructed to protect the settling pond cells from high flows during spring freshet; and

- Stream channel restoration must commence once these in-stream works are no longer required for current mining activities.

The following table is to be used to evaluate the risk of proposed in-stream works in Water Quality zones. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective watershed *Authorization for Placer Mining Works or Undertakings Affecting Fish Habitat*.

**Please note that in-stream settling ponds must be constructed from compactable material that is placed and compacted in shallow lifts.**

<b>Design Component</b>	<b>Range</b>	<b>Risk Score</b>
Channel Width Construction	> 30% channel constriction	3
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface	> 2.0 m	3
	0.3 – 2.0 m	2
	< 0.3 m	1
Material Type	Fine (silt-sand)	3
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Non-compaction/ dumped	3
	Moderately compacted/ placement	2
	Compacted shallow lift	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
<b>MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS</b>		<b>17</b>

**G1.** Calculate your total score and maximum permitted score on *Severity of Effects Assessment for In-stream Works Worksheet* (Appendix G1), and record details of proposed in-stream works on the *In-stream Works Worksheet* (Appendix G2). Proceed with submission of proposal.