Appendix A **Project Location Worksheet**

Applicant Name:				
Stream Name:		Watershed Name:		
Fish Habitat Suitability Classification(check appropriate box(s):	Operation Standard	☐ Water Quality Zone ☐ Low ☐ Lake Tributary ☐Moderate-Low ☐ Lake Tributary ☐Moderate-Moderate ☐ Lake Tributary	☐ Moderate-High ☐ High (Chinook Production) ☐ High (Areas of Special Consideration)	
	Restoration Standard	☐ Water Quality Zone ☐ Low ☐ Lake Tributary ☐Moderate-Low ☐ Lake Tributary ☐Moderate-Moderate ☐ Lake Tributary	☐ Moderate-High ☐ High (Chinook Production) ☐ High (Areas of Special Consideration)	
Watershed Sensitivity Classification:	☐ Category A	☐ Category B		
Prior Development Designation	☐ Yes ☐ No	Duration of proposed works:	(years)	
Discharge Standard (mg/L, ml/L):	Design: (mg/L, ml/L)	Action: (mg/L, ml/L)	Compliance: (mg/L, ml/L)	
Propose to Withdraw Water:	☐ Yes ☐ No			
All intakes will incorporate intake screens as per workbook:	☐ Yes ☐ No			
Propose to Use Existing Ford:	☐ Yes ☐ No			
Description of project location:				
Insert or attach map below showing proposed location of placer mine				

North Arrow

Appendix B **Riparian Zone / Bank Modification Design Worksheet**

Applicant Name:			
Stream Name:			
Riparian Zone			
Duration of Proposed Vegetation Clearing:	(years)	Total Length of Proposed Vegetation Clearing:	(m)
Habitat Suitability Type:		Width of proposed Works:	(m)
Designated Setback Distance:	(m)	Actual Setback Distance:	(m)
Bank Modification			
Duration of Proposed Bank Modification:	(years)	Total Length of Proposed Bank Modification:	(m)
Habitat Suitability Type:		Width of proposed Works:	(m)
Minimum Setback Distance:	(m)	Actual Setback Distance:	(m)

Do You Propose to Construct a New Ford: ☐ Yes ☐ No

Are Existing Fords Present: ☐ Yes ☐ No

Natural Channel Start

← Site Length (m) →

Natural Channel End

North Arrow

Diversion Channel

Flow Direction

Use the following symbols to indicate proposed works on map.

Riparian Clearing:	▓▓▓▓	Riparian Boundary:	- - - - - -
Bank Modification and Clearing:	**xxxxxxxx**	Stream Bank:	———
Previously Reclaimed Area:	‖ ‖ ‖ ‖	Undisturbed Vegetation:	▭
New Fords:	N	Existing Fords:	E

Required Reclamation Works (from workbook tables)

	Vegetation Clearing Requirement	Bank Modification Requirement
Grading:		
Surface:		
Vegetation:		

Appendix C **Original Channel and Site Parameters Worksheet**

Applicant Name:						**Guidebook Reference Section**
Channel Morphology:	Straight	☐	Meandering	☐	Braided ☐	**2.2.2**
Channel Floodplain Type:	None	☐	Narrow	☐	Wide ☐	**2.2.3**
Valley Length:	(metres)					**2.2.4**

Floodplain Width: **Note all measurements must be in metres.** **2.2.5**

Site	Width	
1		m
2		
3		
4		
5		
6		
Total of 1 to 6 above:		
Average width (total divided by 6):		

Change in Streambed Elevation:		m	**2.2.6**
Natural Channel Grade:		**%**	**2.2.7**
Flow Velocity Estimate:		Metres/second	**2.2.8**
Original Channel Length :		(metres)	**2.2.9**

Channel Width and Depth: **2.2.10**

Site	**Width**		**Site**	**Depth**	
1		(metres)	1		(metres)
2			2		
3			3		
4			4		
5			5		
6			6		
Total 1 to 6 Above:			Total 1 to 6 Above:		
Average (Total / 6)			Average (Total / 6)		

Channel Type (circle)	Dune-Ripple / Pool-Riffle / Plane-Bed / Step-pool / Cascade	**2.2.11**

Channel Bed Material: **2.2.12**

Record the most abundant size class		mm, in (circle)
Record the second most abundant size class		
Record the third most abundant size class		

Appendix D1

Severity of Effects Assessment for Seasonal Diversion Channel Worksheet

(Not applicable to High, Moderate-high and Moderate-moderate suitability habitat)

Applicant Name:	**Stream Name:**		
Design Component	**Range**	**Range Score**	**Project Score**
Channel gradient	**3.51% to 5.0%**	**3**	
	1.51% to 3.5%	**2**	
	0 to 1.5%	**1**	
Length of diversion channel	**1000 to 2000 metres**	**2**	
	<1000 metres	**1**	
Relative length of diversion channel	**Shorter than original**	**1**	
	Equal or Longer than original	**0**	
Permafrost in diversion channel	**Present**	**3**	
	Absent	**0**	
Primary material in diversion channel	**Silt / Sand**	**2**	
	Gravel / Cobble / Bedrock	**1**	
Location of diversion channel	**Perched (valley wall)**	**4**	
	Confined (valley floor)	**2**	
	Incised (valley floor)	**1**	
Project Score for Seasonal Diversion Channels			

Maximum permitted score for Seasonal diversion in Moderate-low suitability habitat: **11**
Maximum permitted score for Seasonal diversion in Freshwater Fisheries Production zones: **13**

Appendix D2

Severity of Effects Assessment for Temporary Diversion Channel Worksheet (Not applicable to High and Moderate-high suitability habitat)				
Applicant Name:		**Stream Name:**		
Design Component	**Range**		**Range Score**	**Project Score**
Channel gradient	**3.51% to 5.0%** (Not applicable to Moderate-moderate suitability habitat)		**3**	
	1.51% to 3.5%		**2**	
	0 to 1.5%		**1**	
	2000 to 5000 metres (Not applicable to Moderate-moderate suitability habitat)		**3**	
Length of diversion channel	**1000 to 2000 metres**	Moderate-moderate	**3**	
		Moderate-low	**2**	
		Freshwater Fisheries Production	**2**	
	500 to 1000 metres		**2**	
	<500 metres		**1**	
Relative length of diversion channel	**Shorter than original**		**1**	
	Equal or Longer than original		**0**	
Permafrost in diversion channel	**Present** (Not applicable to Moderate-moderate suitability habitat)		**2**	
	Absent		**0**	
Primary material in diversion channel	**Silt / Sand**		**2**	
	Gravel / Cobble / Bedrock		**1**	
	Perched (valley wall) (Not applicable to Moderate-moderate suitability habitat)		**4**	
Location of diversion channel	**Confined (valley floor)**		**2**	
	Incised (valley floor)		**1**	
Fish habitat features (rock islands / boulder groupings only)	**Moderate-moderate** (50% of total amount required for permanent channel)		**-1**	
	Moderate-low and Freshwater Fisheries Production zones (30% of total amount required for permanent channel)			
Project Score for Temporary Diversion Channels				

Maximum permitted score for Temporary diversion in Moderate-moderate suitability habitat: **7**
Maximum permitted score for Temporary diversion in Moderate-low suitability habitat: **10**
Maximum permitted score for Temporary diversion in Freshwater Fisheries Production zones: **12**

Appendix D3 Channel Design Flood Estimate Worksheet

(NOTE*: a separate Appendix D3 is required for each Habitat Suitability type*)

Applicant Name:

Guidebook Reference Section

Stream Name:

1. Required Flood Design Interval:										**2.3.3**
	Permanent Restoration Channel	:	Temporary Diversion	:	Seasonal Diversion	:				**2.3.4**
	(Refer to guidelines for applicable Habitat Suitability type and list it here:									
2. Calculated Severity of Effects Assessment Score for diversions:										
3. Upstream Drainage Area Calculation:										
	A. Topographic Map Scale (circle):	(1:50,000 or 1:250, 000)								
	B. Number of large (solid line) squares (1cm x 1cm):									
	C. Number of small (solid line) squares (0.5cm x 0.5cm):									
	D. Area within large (solid line) squares	=	Number of large squares	x	Area Factor					
		=		x	**1.5625**					
		=		Km^2						
	E. Area within small (dashed line) squares	=	Number of small squares	x	Area Factor					
		=		x	**0.0625**					
		=		Km^2						
			Area within small solid squares							
	F. Total drainage area	=	Area within large solid squares	+						
		=		+						
		=		km^2						
4. Determine Hydrologic Zone										
A. Upstream streambed elevation	=		ft / m (circle one)							**2.3.5**
	B. Downstream streambed elevation	=		ft / m (circle one)						
	C. Channel length between up and downstream elevations	=		(m)						
	D. Average upstream Channel Slope	=	Upstream elevation – Downstream elevation / Channel length						x 100%	
		=		–					x 100%	
		=		%						

	Mountain / Interior	Mountain (slope greater than or equal to 4.5%)
	(circle)	Interior (slope less than 4.5%)

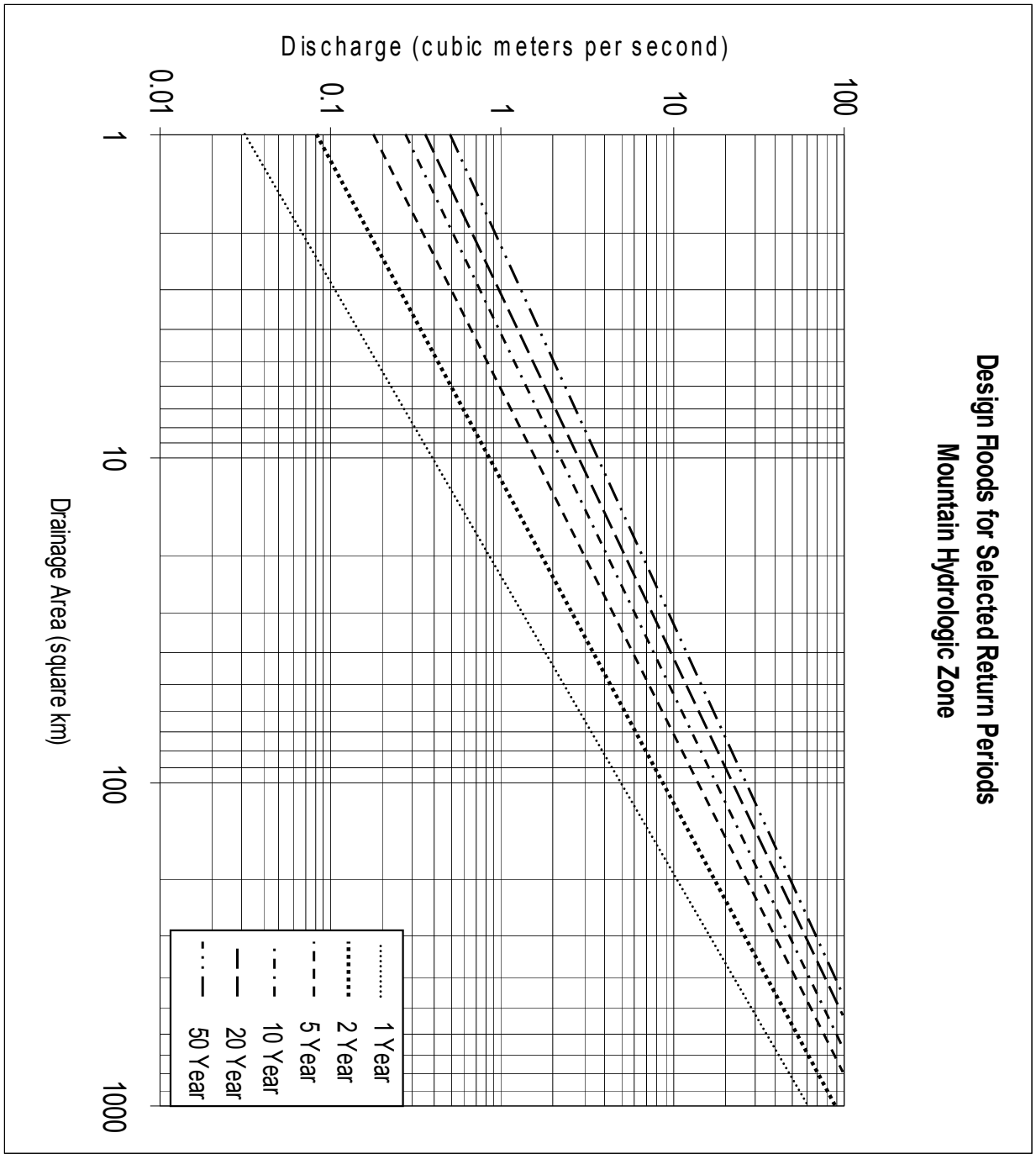
Appendix D3 (continued) **Applicant Name:**
Stream Name:

5. Design Flood Estimate:

A. Use the information from above (Steps 1 to 4) combined with the following graphs to determine the discharge (m^3 / sec) required for your proposed diversion channel.

A1. If the proposed site is located in the Mountain Hydrologic Zone use the following graph.

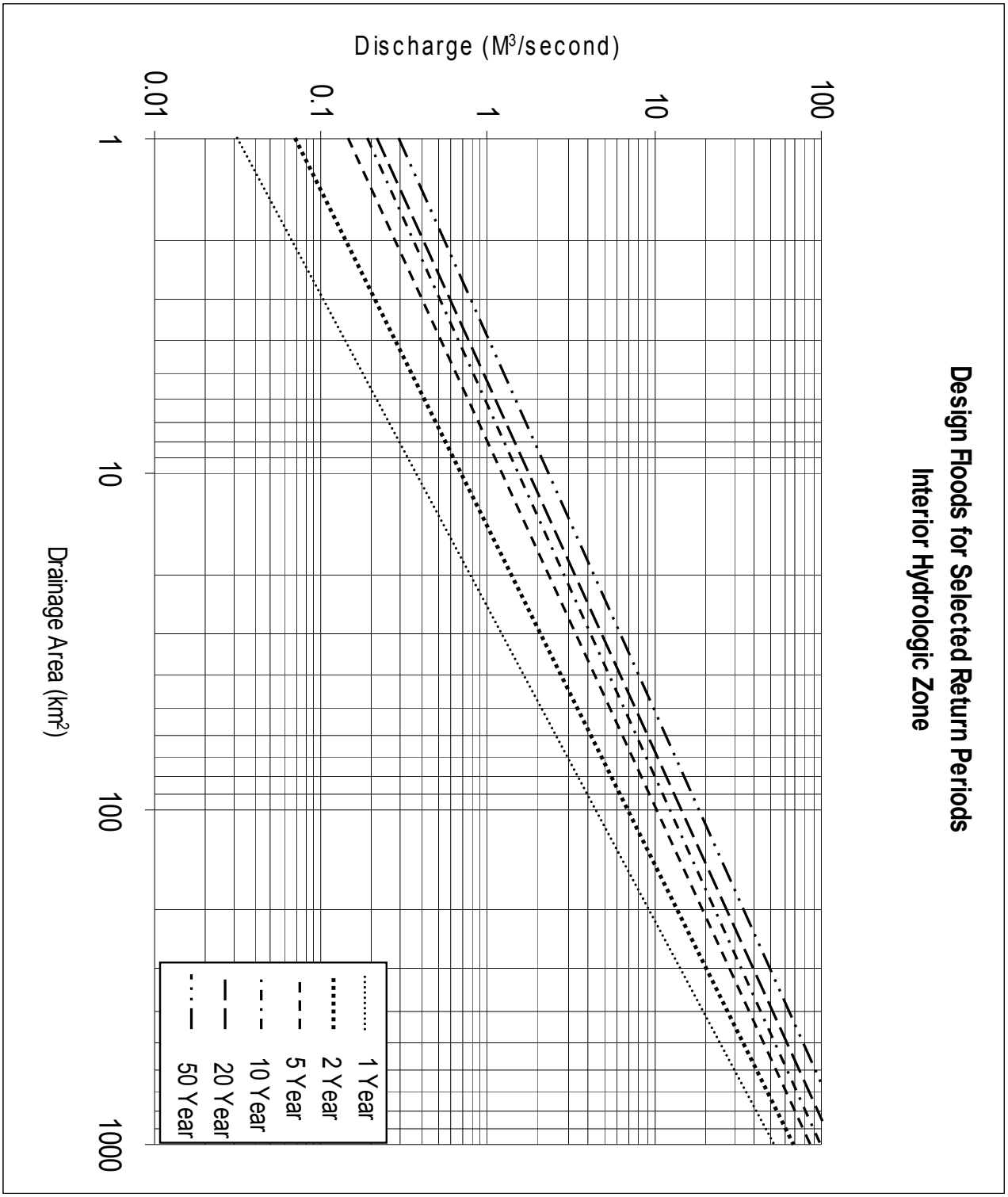
Enter the chart on the horizontal axis (Drainage Area). Draw a vertical straight line up through the appropriate return interval line on the graph. Draw a horizontal straight line to the left axis (left side of chart) from the intersection point with the vertical line. Read the Discharge on the left axis.



A2. Record the Required Diversion Channel Design Discharge : _____ m^3 / sec

Appendix D3 (continued) **Applicant Name:**
Stream Name:

B1. If the proposed site is located in the Interior Hydrologic Zone use the following graph.



B2. Record the Required Diversion Channel Design Discharge: _____ m^3 / sec

Appendix E1 **Channel Replication Worksheet**

Applicant Name:

Guidebook Reference Section

Stream Name:

A. Required Diversion Channel Width:

Diversion Channel Width = Average Original channel width (m) x 1.2

= _____ metres

Diversion Channel Depth = Average original channel depth (m) x 1.5

= _____ metres

2.3.7

B. Original Channel Grade: _____ %

C. Proposed Channel Length: _____ metres

D. Is the diversion channel length less than the natural channel length?

☐ If Yes drop structures are required

☐ If No drop structures are not required

E. Required Number of Drop Structures

$$\text{Diversion Channel Bed Elevation Change} = \text{Proposed Channel Length} \times \frac{\text{Channel Grade}}{100}$$

$$= \_\_\_\_ \times \frac{\_\_\_\_}{100}$$

= _____ metres

F. Total Height of Drop Structures required:

$$= \text{Natural channel bed elevation change} - \text{Diversion channel bed elevation change}$$

$$= \_\_\_\_ - \_\_\_\_$$

= _____ metres

G. Number of Drop Structures Required:

Proposed Individual Drop Structure Height = _____ metres

$$\text{Number of Drop Structures Required} = \frac{\text{Total Height of Drop Structures}}{\text{Individual Drop Structure Height}}$$

$$= \frac{\quad}{\quad}$$

= _____ metres

Appendix E2 **Floodplain Design Worksheet**

Applicant Name:			**Guidebook Reference Section**
Stream Name:			
A. Floodplain Width:			**2.3.8**
Originally a Non-floodplain System	= Average original channel width	x 3.0	
	=	x 3.0	
	=	metres	
Originally a Narrow or Wide Floodplain System	= Average original channel width	x 6.0	
	=	x 6.0	
	=	metres	
B. Restoration Channel Width	= Average Original channel width	x 1.2	
	=	x 1.2	
	=	metres	
C. Restoration Channel Depth	= Average original channel depth	x 1.2	
	=	x 1.2	
	=	metres	
D. Restoration Channel Length:	= Original channel length		
	=	metres	

Appendix E3 **Regime Channel Worksheet**

(Use Design Charts 1-4)

Applicant Name: **Guidebook Reference Section**

Stream Name:

A. Bed Material: Sand / Gravel / Small Cobbles / Large Cobbles / Rocks / Boulders (circle) **2.3.9**

B. Diversion Channel Discharge (m^3/sec): _____ (from section 5 Design Flood Estimate Worksheet)

C. Diversion Channel Width:

C1. Use Design Chart 1 based on Discharge and bed Material: _____ metres

D. Diversion Channel Depth:

D1. Use Design Chart 2 based on Discharge and Bed Material: _____ metres

D2. Add additional freeboard based on the following table:

Diversion Channel Width	Freeboard
< 5 metres	Add 0.5 metres
5 – 10 metres	Add1.0 metre
> 10 metres	Add 1.5 metres

D3. Total Channel Depth

Channel Depth	+	Freeboard
	+	
	=	metres

C. Channel Grade:

C1. Use Design Chart 3 based on Discharge and Bed Material: _____ %

D. Velocity of Flow:

D1. Use Design Chart 4 based on Discharge and Bed Material: _____ m /sec

E. Required Channel Length:

$$\text{Required Length (m)} = \frac{\text{Change in natural channel bed elevation}}{\text{Required Channel Grade (\%)}} \times 100\%$$

$$= \frac{\quad}{\quad} \times 100\%$$

$$= \quad \text{metres}$$

F. Proposed Diversion Channel Length = _____ metres

G. Diversion Channel Bed Elevation Change:

$$\text{Diversion Channel Bed Elevation Change} = \frac{\text{Required Channel Grade (\%)}}{100} \times \text{Diversion channel length (m)}$$

$$= \frac{\quad}{100} \times \quad$$

$$= \quad \text{metres}$$

Appendix E3 (continued) **Applicant Name:**
Stream Name:

H. Total Height Drop Structures Required:

Total Height Drop Structures = Natural channel bed elevation change - Diversion channel bed elevation change

[ ] - [ ]

= [ ] metres

I. Number of Drop Structures Required:

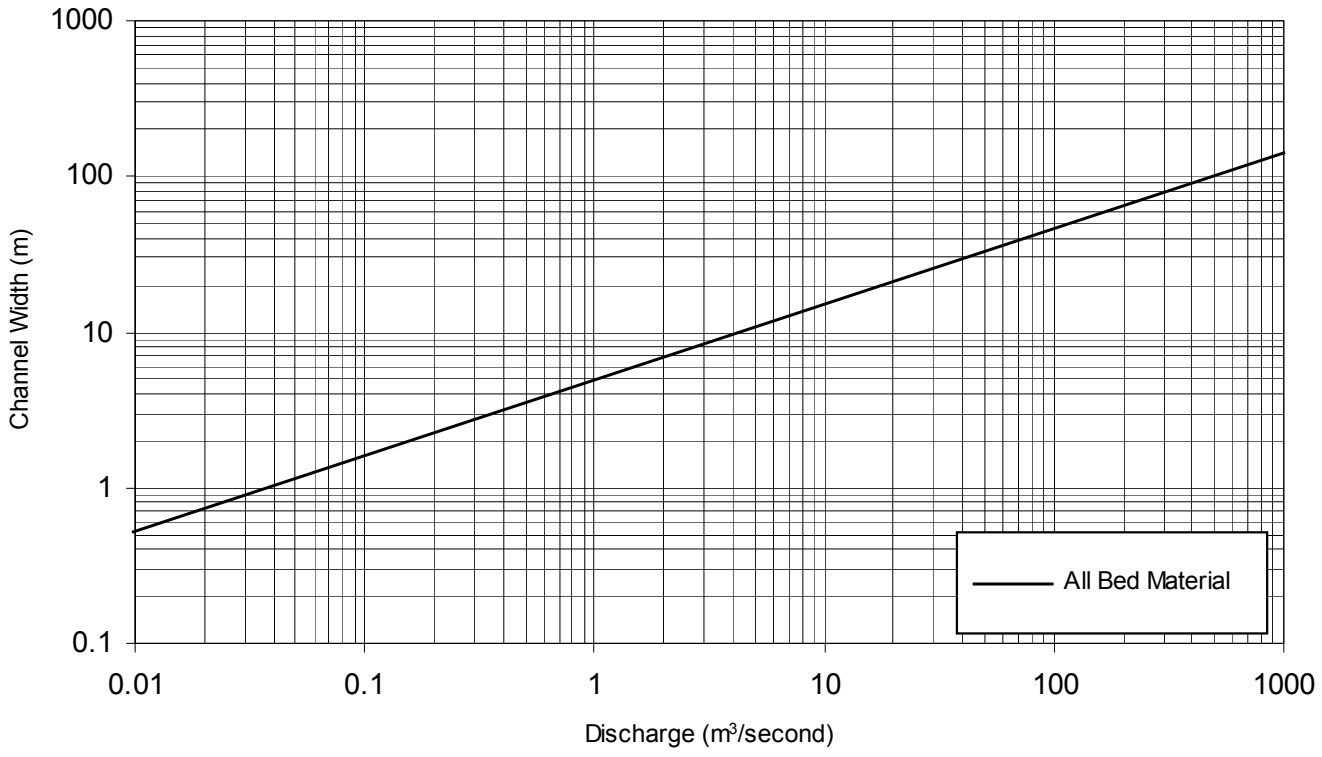
Individual Drop Structure Height = [ ] metres

Number Required = Total Height of Drop Structures (m) / Individual Drop Structure Height (m)

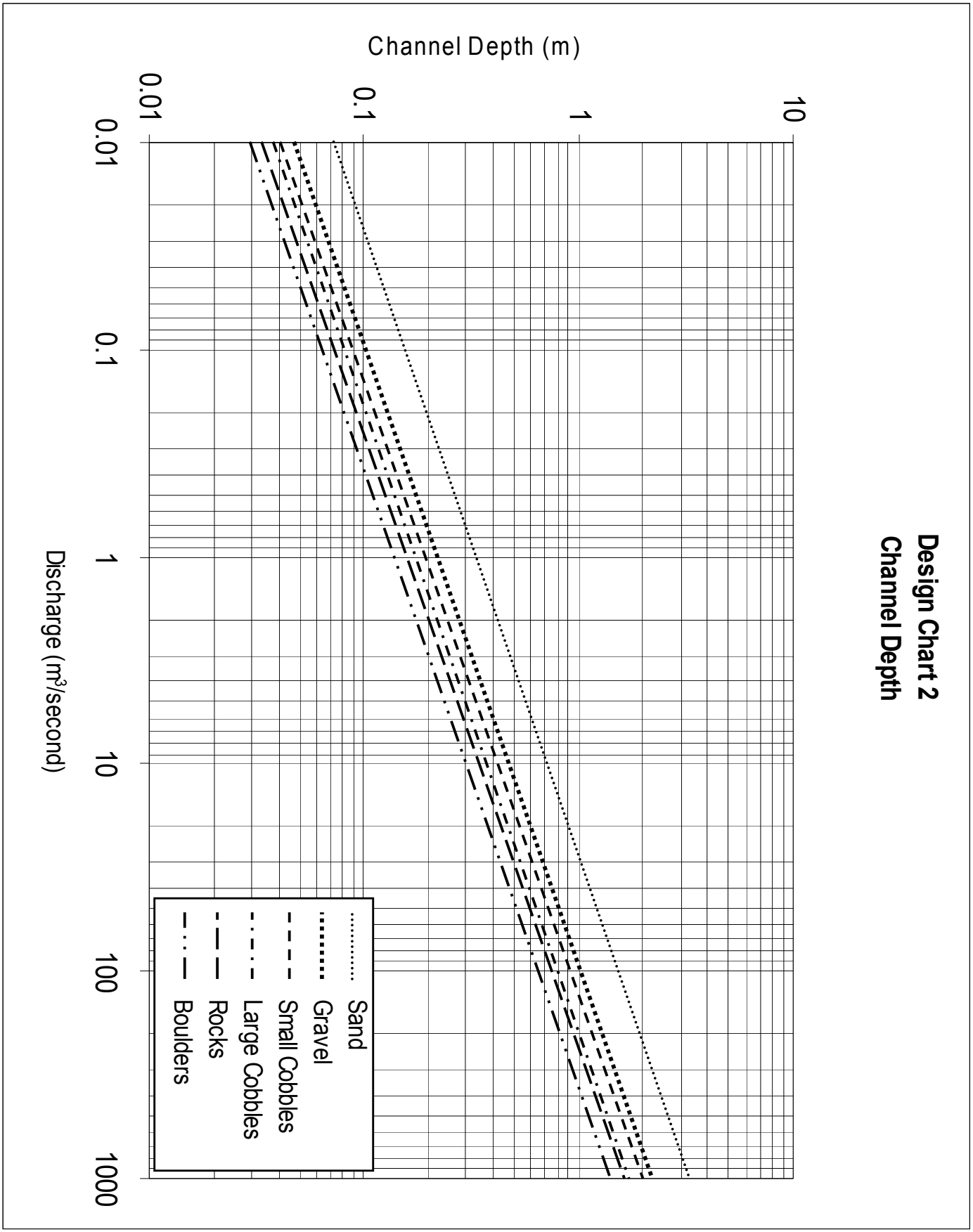
= [ ] (m) / [ ] (m)

= [ ] Number

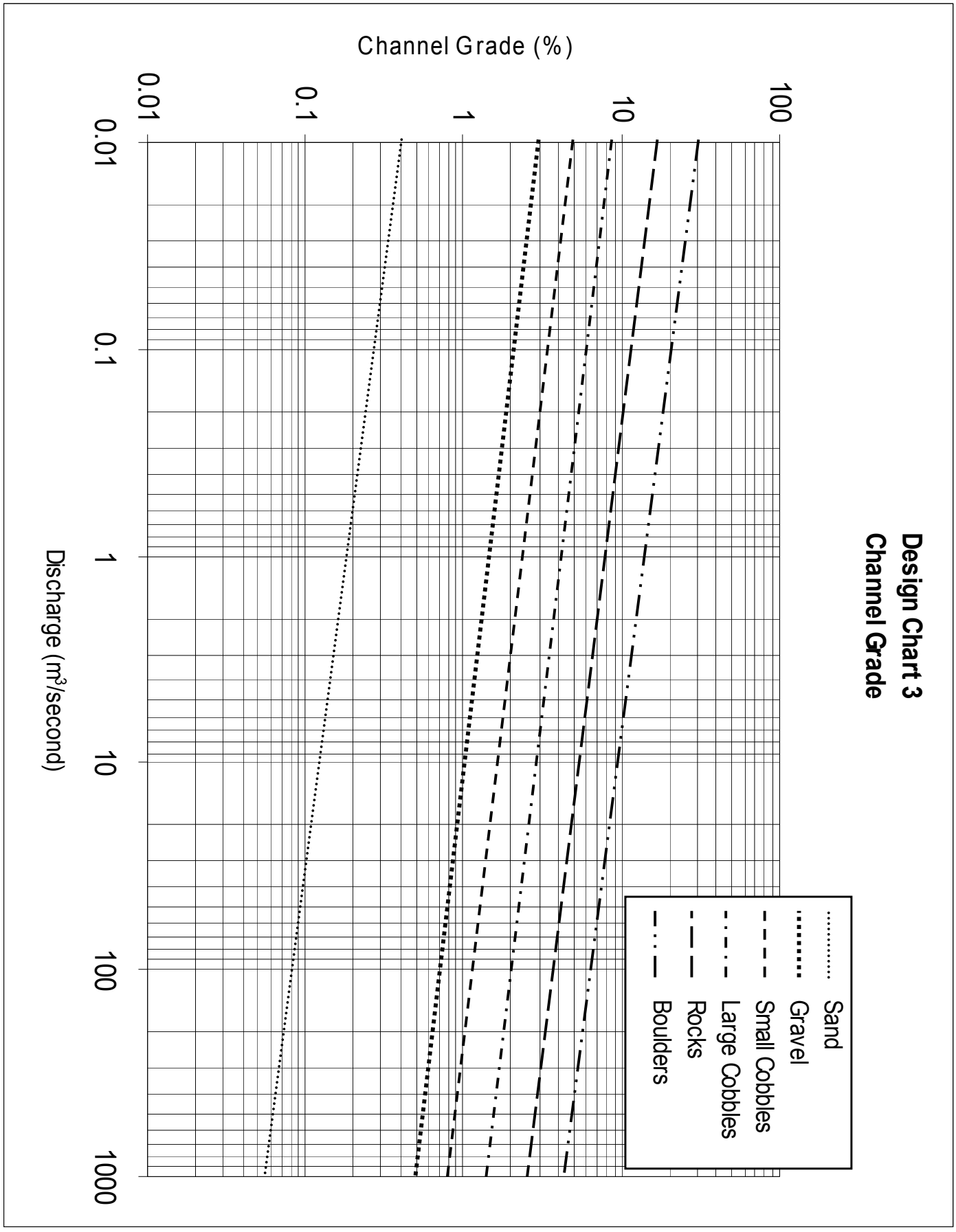
Design Chart 1
Channel Width



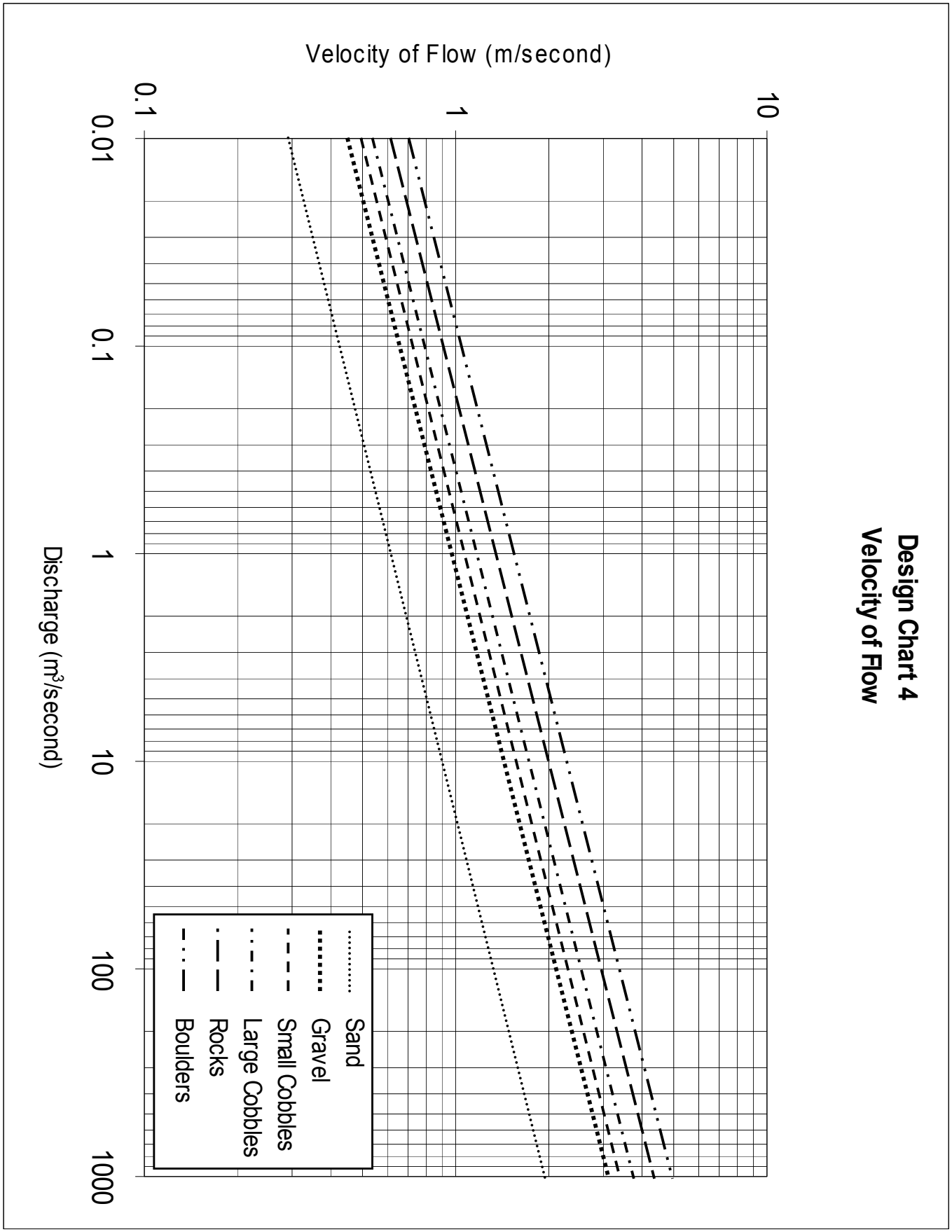
Appendix E3 (continued) **Applicant Name:**
Stream Name:



Appendix E3 (continued) **Applicant Name:**
Stream Name:



Appendix E3 (continued) **Applicant Name:**
Stream Name:



Appendix F **Fish Habitat Feature Design Worksheet**

(Temporary or Permanent Restoration Channel)

Applicant Name:

Stream Name:

Use the template below to draw a schematic of the proposed fish habitat features that will be constructed

Natural Channel Start		**North Arrow**
↑ Site Length (m) ↓		Diversion Channel
Natural Channel End		**Flow Direction**

Use the following symbols to indicate habitat feature locations.

Stream Bank	———	Anchored or buried tree	—<
Topsoil	- - - -	Willow staking	vv
Rock Island / Boulder Group		Transplant	
Ford		Drop Structure	**xxxx**

Fish Habitat Feature Description	**Spacing Requirement** (*X channel width*)	**Spacing Proposed (m)** (*Channel Width x Spacing Requirement*)

Appendix G1

Severity of Effects Assessment for In-stream Works Worksheet			
Applicant Name:			
Stream Name:			
Design Component	**Range**	**Risk Score**	**Project Score**
Channel Width Construction	**>30% channel constriction** (Not applicable for Moderate-high suitability habitat)	**3**	
	5% - 30% of the channel	**2**	
	< 5%	**1**	
Above and Below the Structure – Difference in Water Surface Level	**>2.0 m** (Not applicable for Moderate-high suitability habitat)	**3**	
	0.3 – 2.0 m	**2**	
	< 0.3 m	**1**	
Material Type	**Fine (silt-sand)** (Not applicable for Moderate-high, Moderate-moderate, or Moderate-low suitability habitat)	**3**	
	Compactable (fine gravel and sand)	**2**	
	Metal/ riprap/ structure	**1**	
Construction Method	**Non-compaction/ dumped** **Moderately compacted/ placement** **Compacted shallow lift (or rip-rap, gabions, or boulders)**	**3** **2** **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**	
PROJECT SCORE FOR IN-STREAM WORKS			

Note – some ranges are not permissible in specific habitat suitability classes.

Note – in-stream settling ponds must be constructed from compactable material that is placed and compacted in shallow lifts.

Maximum permitted score for in-stream works in Moderate-high suitability habitat:	**12**
Maximum permitted score for in-stream works in Moderate-moderate suitability habitat:	**12**
Maximum permitted score for in-stream works in Moderate-low suitability habitat:	**14**
Maximum permitted score for in-stream works in Freshwater Fisheries Production zones:	**16**
Maximum permitted score for in-stream works in Water Quality zones:	**17**

Appendix G2 **In-stream Works Worksheet**

Applicant Name:	**Stream Name:**

Do you Propose: Excavation of Dugout ☐ Stream Channel As Conduit ☐ Wing Dam ☐

In-stream Dam ☐ In-stream Settling ☐ In-stream Reservoir ☐

Description of the proposed in-stream works.

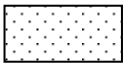
Calculated total score from Severity of Effects Assessment table :

Maximum permitted score for in-stream works :

Use the template below to draw a schematic of the proposed in-stream works.

	North Arrow
↓ Site Length (m) ↑	
	Flow Direction

Use the following symbols to indicate feature locations.

Stream Bank	——	In-stream Dam	
In-stream Settling Area		Point of Discharge	X
Dugout		Wing Dam