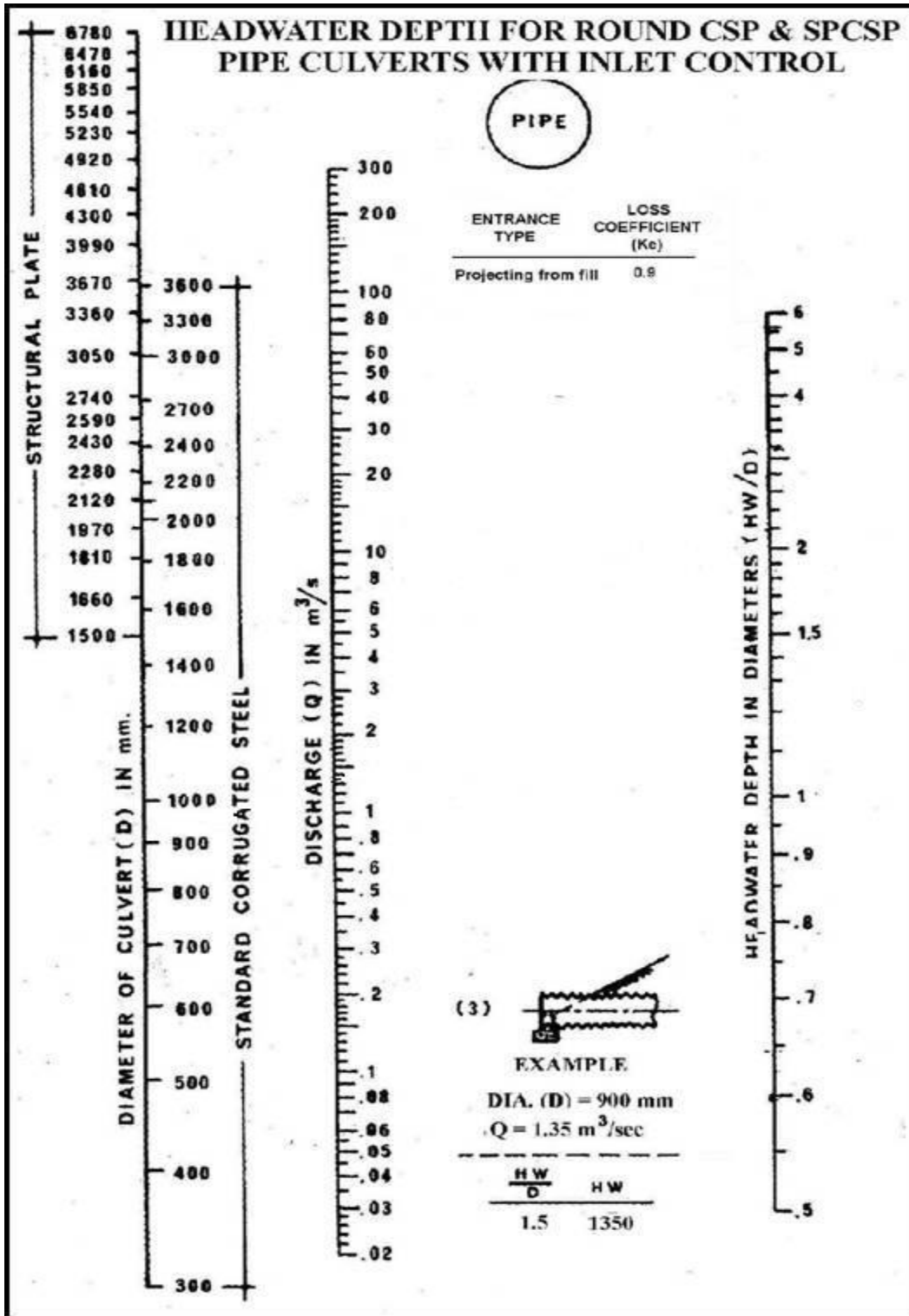


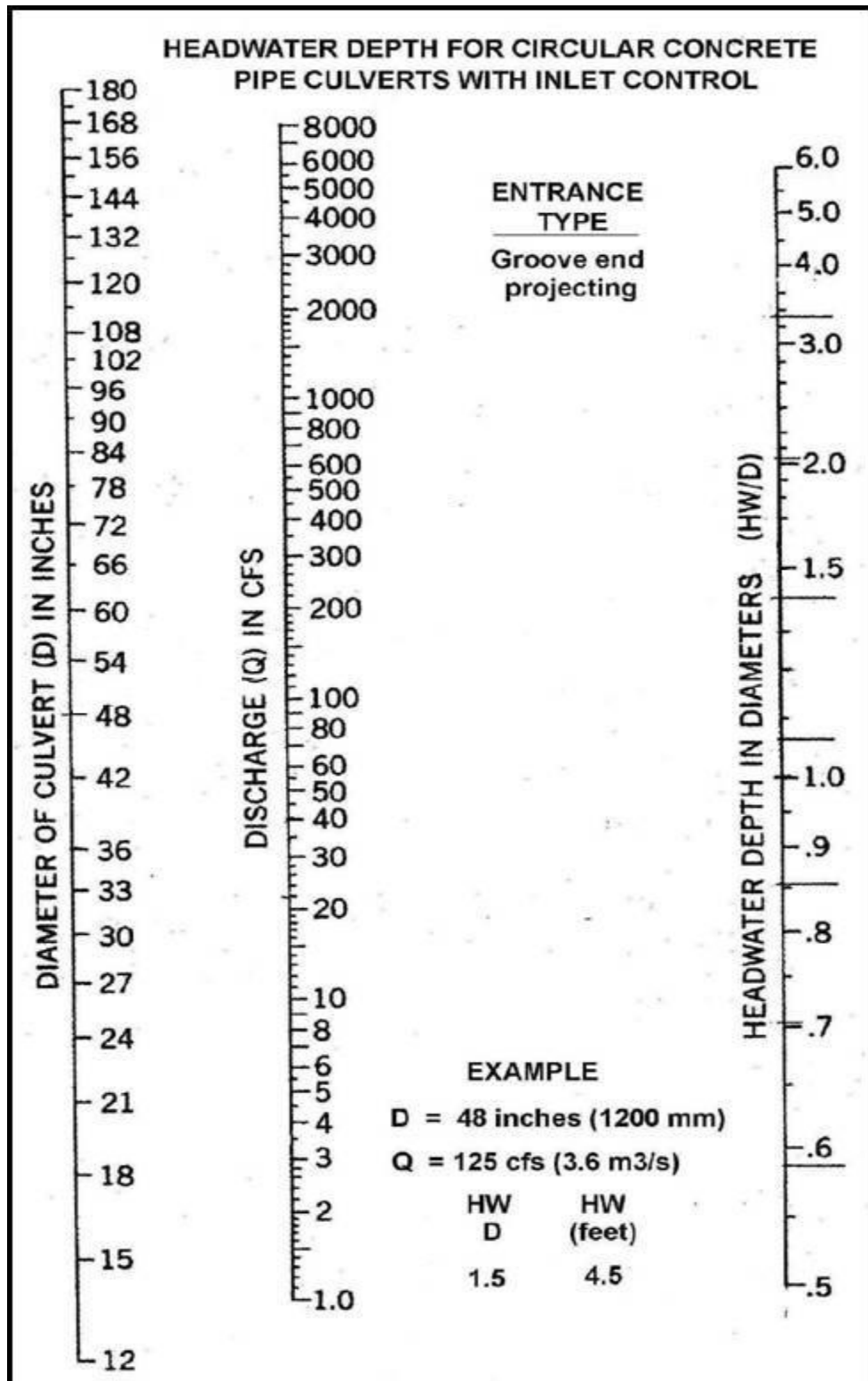
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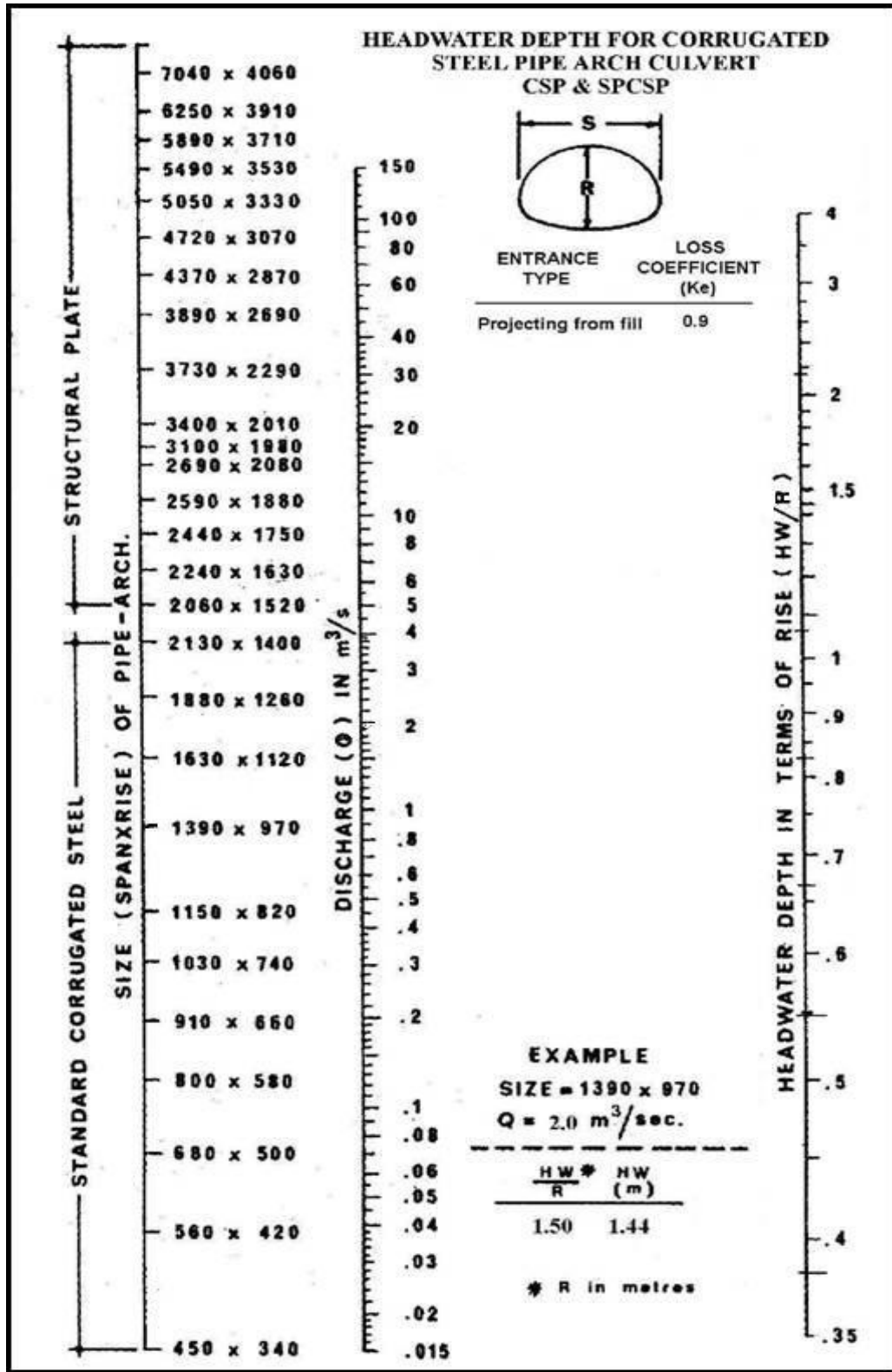
# APPENDIX A-1: CORRUGATED STEEL CIRCULAR PIPE



## APPENDIX A-2: CONCRETE/PLASTIC CIRCULAR PIPE



# APPENDIX A-3: CORRUGATED STEEL PIPE ARCH



## APPENDIX B: CONVERSION TABLE

<b>Conventional Culvert Sizes</b>	
<u>Inches</u>	<u>Millimetres</u>
18	450
24	600
27	700
30	750
32	800
33	825
36	900
42	1000
48	1200
54	1400
60	1500
64	1600
66	1660
72	1800
78	1970
80	2000
84	2120
88	2200
90	2280
96	2430
102	2590
106	2700
108	2740
120	3050
118	3000
130	3300
142	3600

## APPENDIX C: END AREA REDUCTIONS – ROUND PIPES

End Area Reductions (based on 0.2D to a maximum of 0.45 m)					
Culvert diameter (D) (mm)	Radius (m)	Depth of material in pipe (m)	End area of culvert (m <sup>2</sup> )	Area occupied by material (m <sup>2</sup> )	End area remaining (m <sup>2</sup> )
450	0.225	0.090	0.159	0.023	0.136
600	0.300	0.120	0.283	0.040	0.242
700	0.350	0.140	0.385	0.055	0.330
750	0.375	0.150	0.442	0.063	0.379
800	0.400	0.160	0.502	0.071	0.431
825	0.413	0.165	0.534	0.076	0.458
900	0.450	0.180	0.636	0.091	0.545
1000	0.500	0.200	0.785	0.112	0.673
1200	0.600	0.240	1.130	0.161	0.969
1400	0.700	0.280	1.539	0.219	1.320
1500	0.750	0.300	1.766	0.252	1.515
1600	0.800	0.320	2.010	0.286	1.724
1660	0.830	0.332	2.163	0.308	1.855
1800	0.900	0.360	2.543	0.362	2.181
1970	0.985	0.394	3.047	0.434	2.613
2000	1.000	0.400	3.140	0.447	2.693
2120	1.060	0.424	3.528	0.503	3.026
2200	1.100	0.440	3.799	0.541	3.258
2280	1.140	0.450	4.081	0.570	3.510
2400	1.200	0.450	4.522	0.587	3.934
2430	1.215	0.450	4.635	0.591	4.044
2590	1.295	0.450	5.266	0.613	4.653
2700	1.350	0.450	5.723	0.627	5.095
2740	1.370	0.450	5.893	0.632	5.261
2895	1.448	0.450	6.579	0.652	5.927
3000	1.500	0.450	7.065	0.665	6.400
3050	1.525	0.450	7.302	0.671	6.632
3300	1.650	0.450	8.549	0.701	7.848
3600	1.800	0.450	10.174	0.734	9.439

## APPENDIX D: END AREA REDUCTIONS – ROUND PIPES WITH STREAM SIMULATION

End Area Reductions (based on 0.4D fill height)					
Culvert diameter (D) (mm)	Radius (m)	Depth of material in pipe (m)	End area of culvert (m <sup>2</sup> )	Area occupied by material (m <sup>2</sup> )	End area remaining (m <sup>2</sup> )
450	0.225	0.18	0.159	0.059	0.100
600	0.300	0.24	0.283	0.106	0.177
700	0.350	0.28	0.385	0.144	0.241
750	0.375	0.3	0.442	0.165	0.277
800	0.400	0.32	0.502	0.188	0.315
825	0.413	0.33	0.534	0.200	0.335
900	0.450	0.36	0.636	0.238	0.399
1000	0.500	0.4	0.785	0.293	0.492
1200	0.600	0.48	1.130	0.422	0.709
1400	0.700	0.56	1.539	0.575	0.964
1500	0.750	0.6	1.766	0.660	1.107
1600	0.800	0.64	2.010	0.751	1.260
1660	0.830	0.664	2.163	0.808	1.356
1800	0.900	0.72	2.543	0.951	1.594
1970	0.985	0.788	3.047	1.139	1.910
2000	1.000	0.8	3.140	1.173	1.968
2120	1.060	0.848	3.528	1.319	2.211
2200	1.100	0.88	3.799	1.420	2.381
2280	1.140	0.912	4.081	1.525	2.558
2400	1.200	0.96	4.522	1.690	2.834
2430	1.215	0.972	4.635	1.732	2.905
2590	1.295	1.036	5.266	1.968	3.301
2700	1.350	1.08	5.723	2.139	3.587
2740	1.370	1.096	5.893	2.203	3.694
2895	1.448	1.158	6.579	2.459	4.124
3000	1.500	1.2	7.065	2.640	4.428
3050	1.525	1.22	7.302	2.729	4.577
3300	1.650	1.32	8.549	3.195	5.358
3600	1.800	1.44	10.174	3.802	6.377

# APPENDIX E: WATERCOURSE ALTERATION CERTIFICATION DATA SHEET

## 1. General Information

Site coordinates: Lat. \_\_\_\_\_ Long. \_\_\_\_\_

Property is listed under my name (or my organization):  Yes  No

If no, I have attached a consent letter to my application:  Yes  No

Certified individual responsible for calculations: \_\_\_\_\_  
(for watercourse crossings + water withdrawals)

Certified individual responsible for onsite work: \_\_\_\_\_

OR

Recognized installer responsible for onsite work: \_\_\_\_\_

(if different than certified individual listed above)

Will the project result in a new footprint (beyond the toe of slope of an existing structure) greater than 100 m<sup>2</sup>?

Yes  No

## 2. Type of Work

Also see the corresponding section indicated in ( )

- Bank stabilization (biotechnical/rip-rap) ([Section 1](#))
- Beaver dam management and removal
- Bridge (permanent) – new/replacement of a single span ([Section 2](#))
- Bridge – maintenance
- Bridge removal
- Culvert – new/replacement ([Section 3](#))
- Culvert – extending an existing ([Section 4](#))
- Culvert maintenance
- Culvert removal
- Temporary bridge
- Timber harvesting ([Section 5](#))
- Removal of non-merchantable woody vegetation ([Section 6](#))
- Water withdrawal ([Section 7](#))



## Section 1: Bank stabilization (biotechnical/rip-rap)

### Check one:

- Biotechnical
- Rip-rap/armor stone

Height of product to be placed on the bank: \_\_\_\_\_

Length of product to be placed on the bank: \_\_\_\_\_

The following information is required for review:

- Scaled drawings (plan and cross-section) that clearly show all dimensions of the project (size of rock to be used, bank length of project, bank height of project, proposed slope of the bank, location of rock toe)
- Photos of the bank where the erosion protection products are to be placed (clearly labelled: looking upstream, looking downstream, looking directly forward)
- If vegetation is to be removed along or on top of the bank to facilitate the placement of rock and/or machinery access, a revegetation plan must be prepared and submitted

## Section 2: Bridge (permanent) – new/replacement of a single span

Upstream drainage area (km<sup>2</sup>): \_\_\_\_\_

Design flow (m/sec): \_\_\_\_\_

Waterway opening (m<sup>2</sup>): \_\_\_\_\_  
(end area)

## Section 3: Culvert – new/replacement

Bankfull width of channel (m): \_\_\_\_\_

Upstream drainage area (km<sup>2</sup>): \_\_\_\_\_

Design flow (m/sec): \_\_\_\_\_

Headwater depth/diameter ratio: \_\_\_\_\_

Diameter (mm): \_\_\_\_\_

Span (m): \_\_\_\_\_

(for open-bottom culvert)

Length (m): \_\_\_\_\_

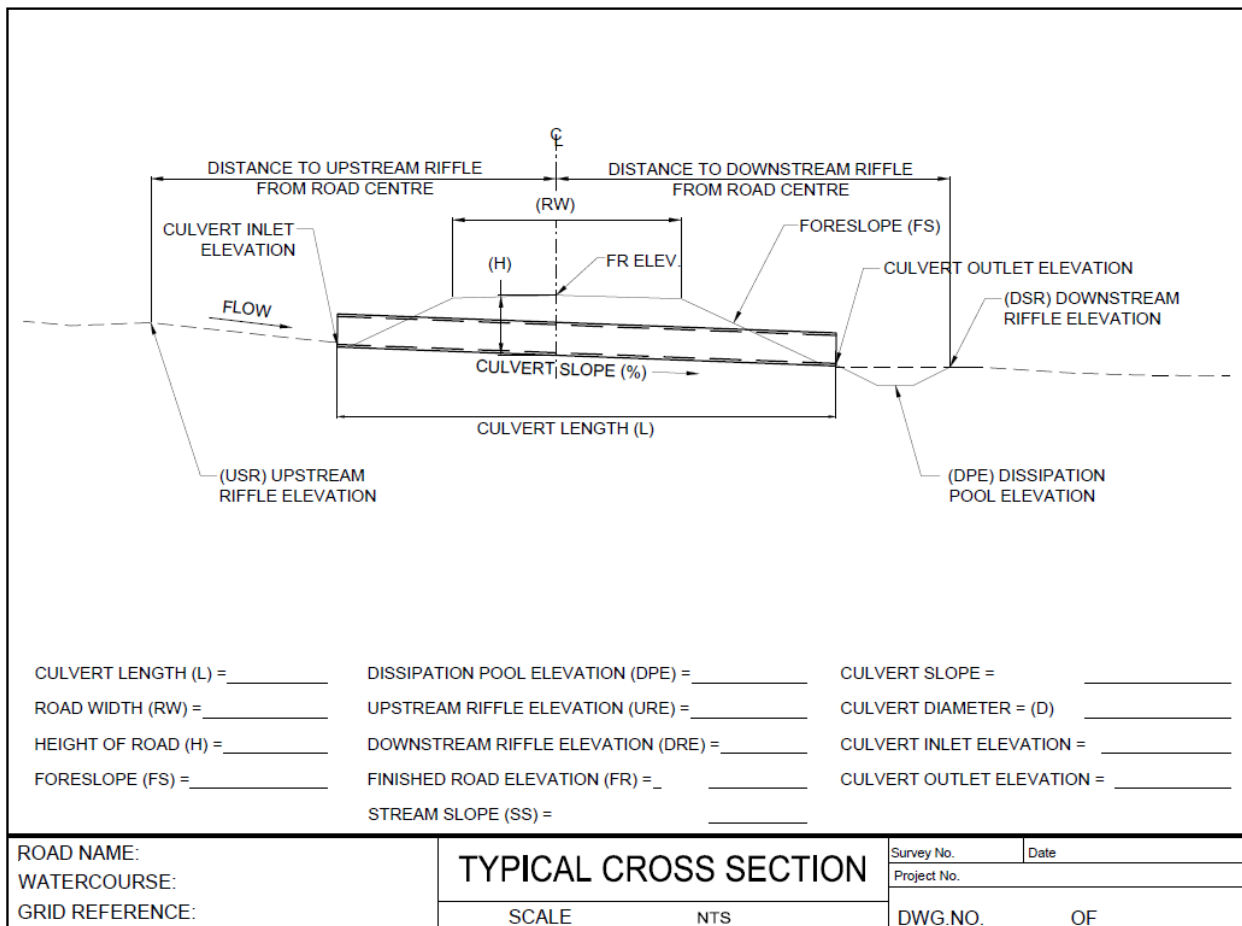
Pipe material: \_\_\_\_\_

**Check one:**

- Open-bottom culvert
- Closed-bottom culvert watercourse slope 0.5% or less (requires cross-section drawing clearly showing slope of watercourse and details of proposed culvert)
- Closed-bottom culvert watercourse slope 0.5% to 5.0%\*
- Twin-pipes\*
- Stream simulation culvert\*

\*The following information is required for review:

- Clearly labelled upstream and downstream photos of the crossing site; typical habitat photos upstream and downstream of the crossing site
- Plan and profile (cross-section) drawings. Should also show the stream survey including slope, downstream, and upstream control riffle elevation (thalweg)
- For culverts with baffles: baffle height, notch width, notch depth, drop between baffles
- Energy dissipation pool width, length, depth
- Rock size and mix for stream bed
- For project where water control measures are anticipated to be in place for more than 3 weeks: a water control plan including how long expected to be in place and details on how fish passage is to be provided



**Section 4: Culvert – extending an existing**

Original pipe length (m): \_\_\_\_\_

Final pipe length (m): \_\_\_\_\_

Total footprint of culvert and altered streambed (including energy dissipation pool – if included in the design) (m<sup>2</sup>): \_\_\_\_\_

**Section 5: Timber harvesting**

PID(s) where harvesting is to take place: \_\_\_\_\_

**Section 6: Removal of non-merchantable woody vegetation**

PID(s) where harvesting is to take place: \_\_\_\_\_

A fully dimensioned sketch showing the scope and location of the proposed vegetation removal must be included for review.

**Section 7: Water withdrawal**

Upstream drainage area (km<sup>2</sup>): \_\_\_\_\_

Maximum pumping rate (litres/minute): \_\_\_\_\_

## APPENDIX F: WETLAND IDENTIFICATION DATA SHEET

**Note:** This data sheet must be filled out by someone qualified, meaning a person having a combination of training in wetland identification and delineation based on the North-Central and Northeast Regional Supplement of the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987) or an equivalent pending review from the Source and Surface Water Management Branch and; education and/or demonstrated experience in wetland hydrology, soils, botany and/or related sciences.

<b>DELG Wetland Identification Data Sheet</b>	
Project/Site:	
Site Visit Date:	
Investigator(s):	
PID:	GPS Coordinate:
Wetland Type (circle or highlight):	
Forested	Riparian Shrub
Fen/Bog	Marsh
Aquatic Bed	
Wetland Hydrology and Connectivity:	
Dominant Wetland Vegetation (3 species minimum):	
Dominant Upland Vegetation:	
Wetland Soil Description:	
Upland Soil Description:	
Additional Information (include photos and wetland limit on aerial imagery and/or site plans):	

## APPENDIX G: WATERCOURSE IDENTIFICATION DATA SHEET

Site Visit Date: \_\_\_\_\_

Carried out by: \_\_\_\_\_

PID: \_\_\_\_\_

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

Station #	Transect Distance (m)	Bank Width (cm)	Meets Definition? *>0.5 m/ rock, soil substrate/defined channel
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
<b>Average width</b>			

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Requirements

- A minimum of five width measurements must be taken upstream at representative areas of the natural stream, from the top of both stream banks. Dependant on length of stream these can be taken at 5-metre increments of greater or less depending on site specific information.
- If not possible, then measurements should be taken immediately after the crossing site downstream at representative areas.

## APPENDIX H: DIRECTORY

### NEW BRUNSWICK DEPARTMENT OF ENVIRONMENT AND LOCAL GOVERNMENT (DELG)

#### CENTRAL OFFICE

<b>Fredericton</b>	Marysville Place 20 McGloin St. Fredericton, NB, E3A 5T8	Phone (506) 457-4850 Email <a href="mailto:wawa@gnb.ca">wawa@gnb.ca</a>
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#### REGIONAL OFFICES

<b>Bathurst</b>	Regional Operations & Compliance 159 Main St., Suite 202 Bathurst, NB E2A 1A6	Phone (506) 547-2092 Fax (506) 547-7655
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<b>Fredericton</b>	Regional Operations & Compliance 20 McGloin St. Fredericton, NB E3A 5T8	Phone (506) 444-5149 Fax (506) 453-2893
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<b>Miramichi</b>	Regional Operations & Compliance 316 Dalton Avenue Miramichi, NB E1V 3N9	Phone (506) 778-6032 Fax (506) 778-6796
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<b>Moncton</b>	Regional Operations & Compliance 355 Dieppe Blvd Moncton, NB E1A 8L5	Phone (506) 856-2374 Fax (506) 856-2370
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<b>Saint John</b>	Regional Operations & Compliance 8 Castle Street Saint John, NB E2L 3B8	Phone (506) 658-2558 Fax (506) 658-3046
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<b>Grand Falls</b>	Regional Operations & Compliance 65 Broadway Blvd Grand Falls, NB E3Z 2J6	Phone (506) 473-7744 Fax (506) 475-2510
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#### ENVIRONMENT EMERGENCY

##### National Environmental Emergencies Center

1-800-565-1633 (24 hours/day)

# NEW BRUNSWICK DEPARTMENT OF NATURAL RESOURCES AND ENERGY DEVELOPMENT (DNRED)

## CENTRAL OFFICE

<b>Fredericton</b>	New Brunswick Department of Natural Resources and Energy Development (1350 Regent Street, E3C 2G6) P.O. Box 6000 Fredericton, NB E3B 5H1	Phone (506) 453-3826 Fax (506) 444-4367
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## REGIONAL OFFICES

<b>Bathurst (Region 1)</b>	New Brunswick Department of Natural Resources and Energy Development 2570 Route 180 South Tetagouche, NB E2A 7B8	Phone (506) 547-2080 Fax (506) 547-2068
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<b>Miramichi (Region 2)</b>	New Brunswick Department of Natural Resources and Energy Development 80 Pleasant Street Miramichi, NB E1V 1X7	Phone (506) 627-4049 Fax (506) 627-4224
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<b>Fredericton (Region 3)</b>	New Brunswick Department of Natural Resources and Energy Development Fredericton HQ – Ancillary Building 1350 Regent Street Fredericton, NB E3C 2G6	Phone (506) 444-4888 Fax (506) 453-5237
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<b>Edmundston (Region 4)</b>	New Brunswick Department of Natural Resources and Energy Development 25 Guy Street Edmundston, NB E3V 3K5	Phone (506) 735-2040 Fax (506) 735-2042
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## **FISHERIES AND OCEANS CANADA (DFO)**

<b>Gulf Region</b>	Fish and Fish Habitat Protection Program Fisheries and Oceans Canada 343 University Avenue Moncton, NB E1C 9B6	Phone (506) 851-6082 Email <a href="mailto:xglf-habitat2@dfo-mpo.gc.ca">xglf-habitat2@dfo-mpo.gc.ca</a>
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