Fish Passage Technical Working Group

Fish Passage Considerations Strategic Approach

Presentation - November 21, 2013

Agenda

- 10:00 Welcome and Introduction and purpose of the meeting.
-
- 10:10 Overview of the Fish Passage Program
-
- 10:20 Overview of the Strategic Approach
-
- 10:35 Fish Passage Field Assessment Procedure
-
- 10:50 Fish Passage Data System - PSCIS
- 11:05 Fish Passage Remediation Considerations – Overview
- 11:20 Opportunities for Collaboration
- 11:30 Questions.

Fish Passage in BC
Status, Issues and Solutions

Update and discussion:

Ian Miller, RPF

Why did the fish cross the road?

Difference Between

BC Fish Passage Program Overview

- Some attention-getting numbers
- Why should you care?
- Brief history of fish passage issue
- BC's strategic approach
- Fish Passage Technical Working Group
- Accomplishments
- Issues and next steps
- Final thoughts

Some attention-getting numbers

- 320,000 fish stream crossings in BC (approx)
- About 225,000 are closed-bottom culverts
- 135,000-200,000 likely impede fish passage
- Only about 15,000 culvert assessment done on fish streams
- Small sample: thousands of culverts to fix; thousands of kilometres of habitat to re-connect
- We've fixed 117 in the last 5 years…you do the math!!

Recent history

- Extensive MoE/DFO engagement over time
- Mid-1980's: Fish-Forestry Guidelines
- 1995: obligation to maintain passage in FPC
- 1995: funding under FRBC
- 2002: funding under FIA; obligation in FRPA
- 2007: FPTWG; target pre-1995 crossings
- 2009: Forest Practices Board report
- 2010: Land Based Investment program targets government priorities

Fish Passage Technical Working Group

- FLNRO, MoE, DFO, MoTI
- FLNRO districts and BCTS: field delivery agents
- Goals/Mandate:
    - Refine scope of problem
    - Implement strategic approach
    - Fix government priority crossings
    - Conduct training, extension
    - Provide guidance
    - Secure external funding sources

B.C.'s Strategic Approach

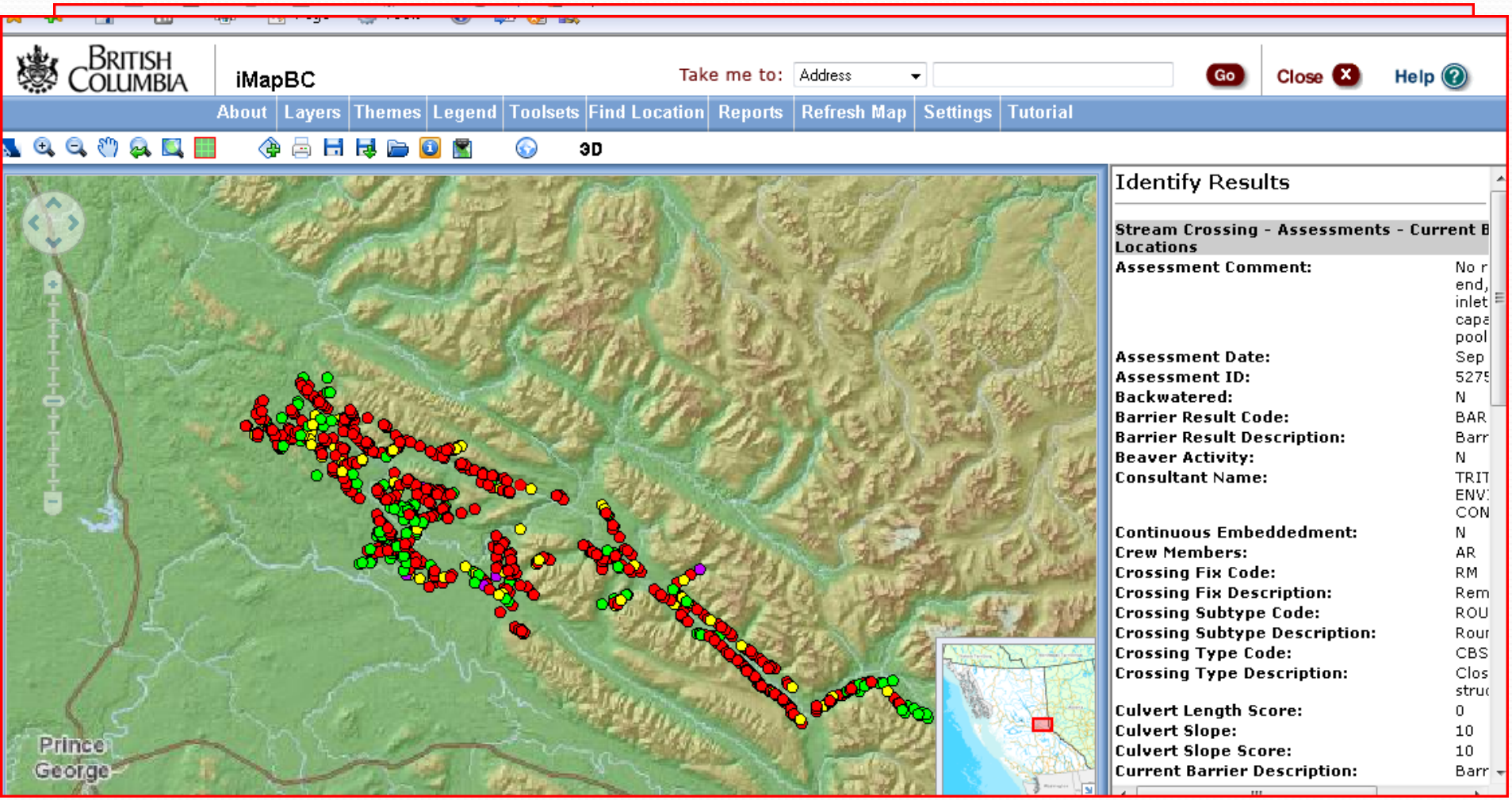
- Collaboration of forest industry, MoF, MoE, DFO:
  - Identify high-value watersheds
  - Apply standardized assessments to all crossings in those watersheds
  - Analyze data to find high-priority crossings to fix in the watershed
  - Monitor over time

OBJECTIVE

Watershed – Within high priority watersheds restore fish passage at the highest priority sites

Site - Restore fish passage by restoration of channel continuity through the crossing

IMAP BC


BRITISH COLUMBIA
iMapBC
Take me to:
Address
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Reports
Refresh Map
Settings
Tutorial
3D
Prince George
Identify Results
Stream Crossing - Assessments - Current B
Locations
Assessment Comment:
Assessment Date:
Assessment ID:
Backwatered:
Barrier Result Code:
Barrier Result Description:
Beaver Activity:
Consultant Name:
Continuous Embeddedment:
Crew Members:
Crossing Fix Code:
Crossing Fix Description:
Crossing Subtype Code:
Crossing Subtype Description:
Crossing Type Code:
Crossing Type Description:
Culvert Length Score:
Culvert Slope:
Culvert Slope Score:
Current Barrier Description:

Accomplishments

Year	Expenditure (millions)	Assessments (approx)	Remediations	Km habitat connected (approx)
2008/09	$6.1	4,683	44	158
2009/10	$3.6	4,594	34	184
2010/11	$2.4	8,171	17	305
2011/12	$1.0	1,987	2	25
2012/13	$2.4	4,500	18 (+11 more bought)	27
2013/14	$1.0	2-3,000	6	15
6 year TOTALS	**$16.5 million**	**26,000 (Note: 16,000 +/- in PSCIS)**	**121**	**714**
2014/15 planned	$2.0	2,500	10-12	20

Accomplishments (con't)

- Provincial Stream Crossing Information System (PSCIS database)
- 2012 revision to Fish-stream Crossing Guidebook
- On-line culvert assessment training course
- Partnership with BCTS and two districts (so far)
- Expanding FPTWG membership to represent NR Sector , plus Transportation and Infrastructure

Issues and next steps

- Expand collaboration, and leverage MoTI engagement to non-resource road agencies (i.e. BC Hydro, Local Gov.)
- Secure partnerships to pursue external funding and/or get better strategic alignment of existing funds
- Explore "non-crossing" works to benefit the fish resource value
- Seek more FLNRO op's staff and First Nations engagement

Last words

- Washington state has about 30,000 high-priority crossings with fish passage issues
- Comparable in many ways to BC
- Last year, they fixed over 1,000 crossings; and re-connected over nearly 1,500 km of habitat
- Over 10 years: 4,700 crossings fixed, and about 4,000 km of habitat re-connected
- BC fish deserve more!!

Assessing Fish Passage at Culverts Priorities & Assessment Methods

Presentation by
Richard Thompson
Ministry of Environment

Outline

- Objective
- Phase 1 – Watershed Selection
- Phase 1 - Day in field
- Assessment Method
- Data input.

Objective

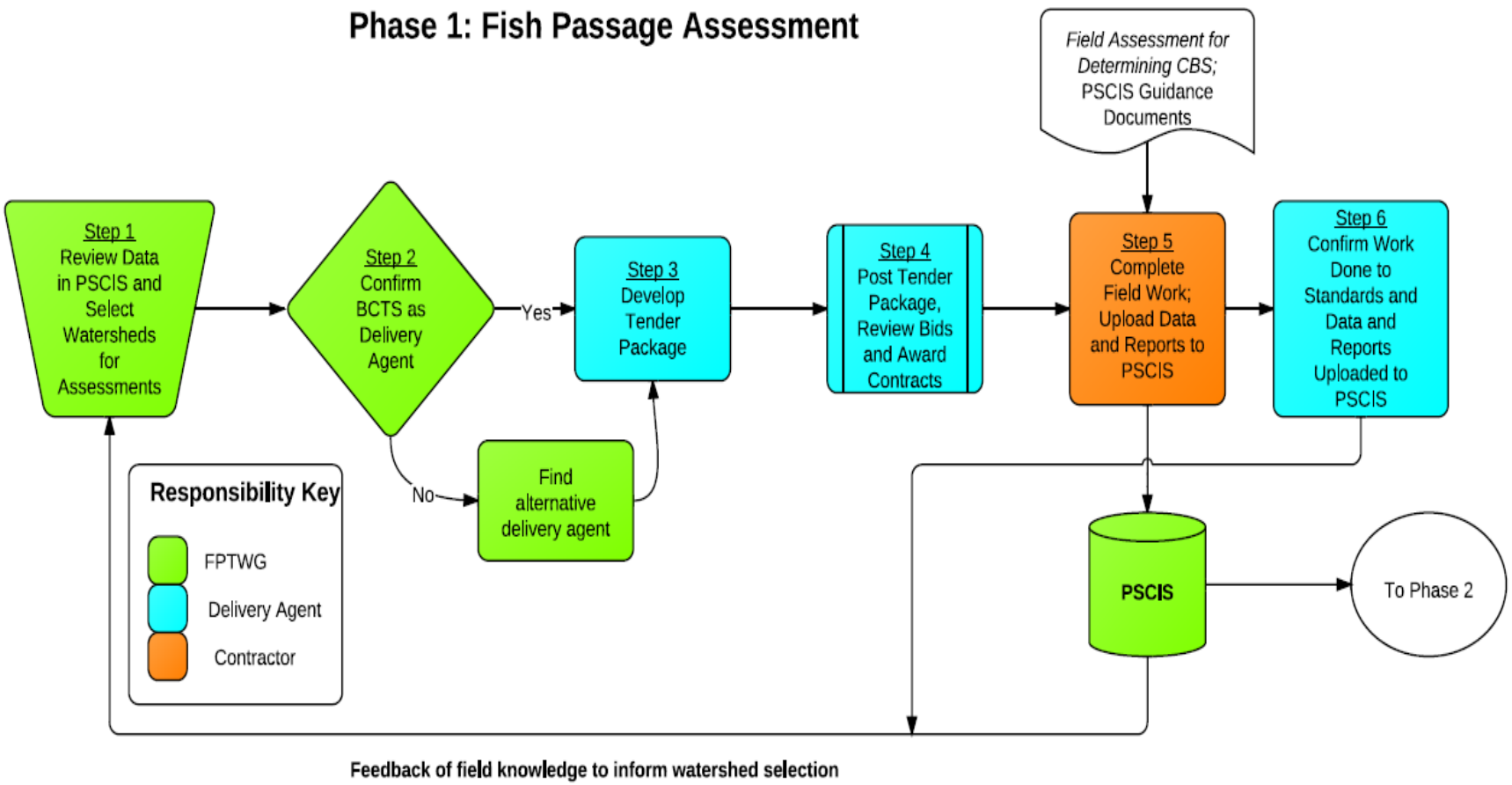
To complete a systematic assessment of all closed bottom structures on fish streams in priority watersheds and to identify the location and basic information of open bottom structures on fish streams. The assessment data for closed bottom structures on fish streams will allow the best decisions to be made regarding which closed bottom structures block fish passage and further to that, which closed bottom structures should be fixed first to achieve the greatest habitat gains given the limited resources available

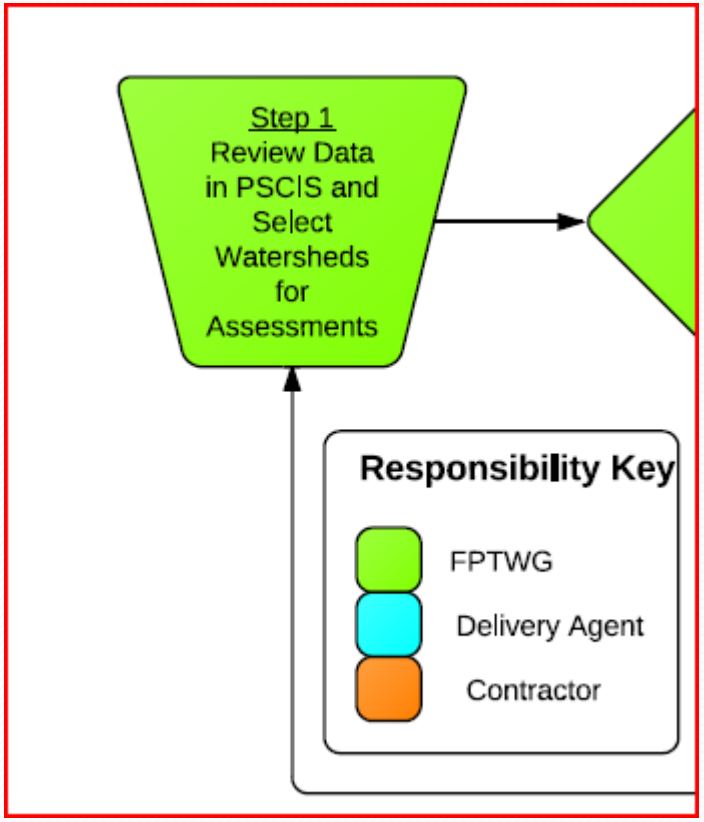
Scope of Work

In Scope

Full assessment to be completed for all closed bottom structures on a known or inferred fish stream.

Basic location, structure type and photos to be gathered for all open bottom structures on fish streams.

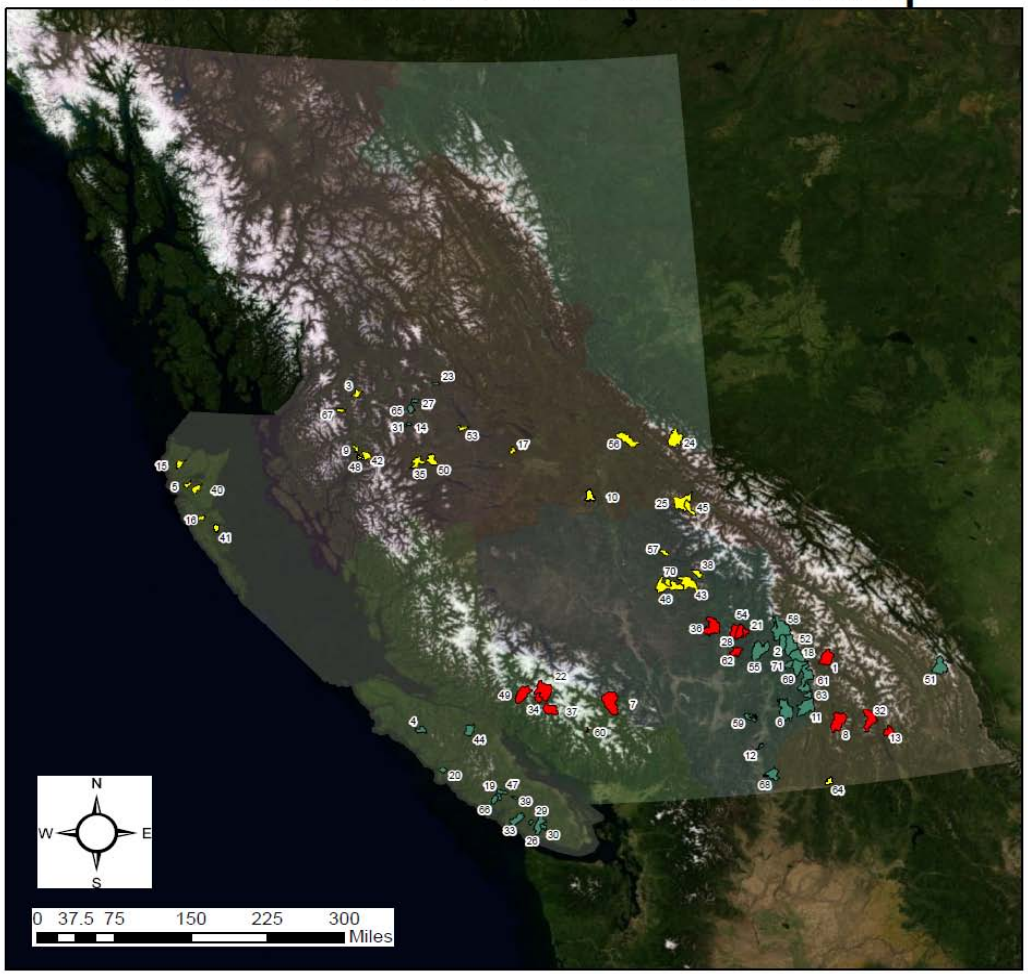

Phase 1: Fish Passage Assessment
Field Assessment for Determining CBS; PSCIS Guidance Documents
Step 1 Review Data in PSCIS and Select Watersheds for Assessments
Step 2 Confirm BCTS as Delivery Agent
Yes
No
Step 3 Develop Tender Package
Step 4 Post Tender Package, Review Bids and Award Contracts
Step 5 Complete Field Work; Upload Data and Reports to PSCIS
Step 6 Confirm Work Done to Standards and Data and Reports Uploaded to PSCIS
Find alternative delivery agent
Responsibility Key
FPTWG
Delivery Agent
Contractor
PSCIS
To Phase 2
Feedback of field knowledge to inform watershed selection



Inputs

- Fisheries Value – Relative Rank
- Species at Risk
- Fisheries Sensitive Watersheds
- Local Knowledge
- Knowledge of areas already assessed

Watersheds Location Map



Master_Watersheds

STATUS

- Candidate
- Designated
- Suspected

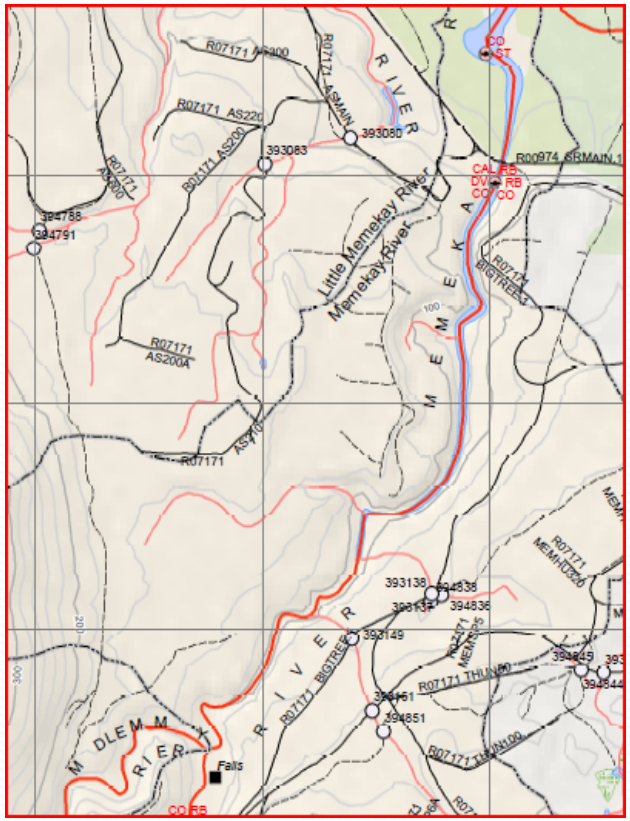
PCS_Albers
Projection: Albers

Watersheds Location

1, Akolkolex River
2, Anstey River
3, Anweiler River
4, Artlish River
5, Awun River
6, Bessette Creek
7, Birkenhead River
8, Caribou Creek
9, Cecil Creek
10, Chehischic Creek
11, Cherry Creek
12, Chute Creek
13, Crawford Creek
14, Cumming Creek
15, Davidson Creek
16, Deena Creek
17, Duncan Creek
18, Eagle Creek
19, Effingham River
20, Escalante River
21, Fennell Creek
22, Filer Creek
23, Five Mile Creek
24, Framstead Creek
25, Goat River
26, Gordon River
27, Gramaphone Creek
28, Harper Creek
29, Hatton Creek
30, Hemmingsen Creek
31, Jonas Creek
32, Kaslo River
33, Klanawa River
34, Klite River
35, Lamprey Creek
36, Lemieux Creek
37, Little Toba River
38, MacKay River
39, Macktush Creek
40, Mamin River
41, Mathers Creek
42, McKay Creek
43, McKinley Creek
44, Memekay River
45, Milk River
46, Moffat Creek
47, Nahmint River
48, Nalbeelah Creek
49, Orford River
50, Owen Creek
51, Palliser River
52, Perry River
53, Pierre Creek
54, Saskum
55, Scotch Creek
56, Seebach Creek
57, Seller Creek
58, Seymour River
59, Shorts Creek
60, Shovelnose Creek
61, Upper Shuswap River
62, Sinmax Creek
63, Sitkum Creek
64, Sutherland Creek
65, Toboggan Creek
66, Toquart River
67, Unnamed Tributary
68, Vaseux Creek
69, Wap Creek
70, Woodjam Creek
71, Yard Creek

A day in the field conducting assessments.

What do I need before I go in the field? Pre-Work Planning



What to do on field day?

Field Assessment for Determining Fish Passage Status Of Closed Bottom Structures

BC Ministry of Environment

4th Edition

August, 2011

http://www.for.gov.bc.ca/ftp/hcp/external/!publish/web/fia/Field-Assessment-for-Determining-Fish-Passage-Status-of-CBS.pdf

What are the most common issues resulting in changes in fishes ability to move up a stream channel?

Turbulence and increased velocity

No streambed substrate and low flow issues

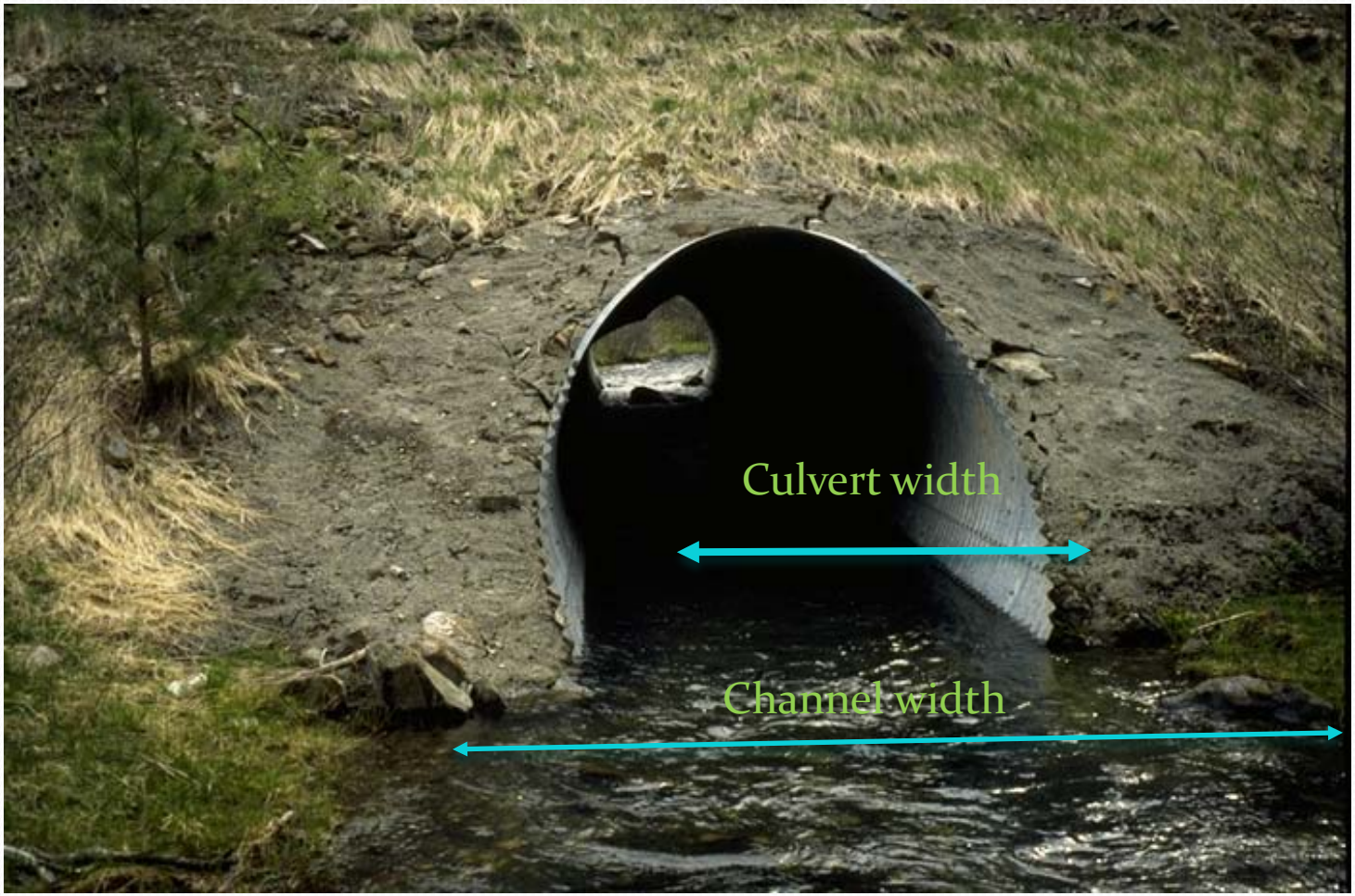
Perched culverts

Five Key indicators that go into our Surrogate determination

1. Embeddedness
2. Outlet Drop
3. Stream Width Ratio
4. Culvert Slope
5. Culvert Length

I can't reach

What is Stream Width Ratio?



Barrier Determination

$$\frac{\text{Channel Width}}{\text{Culvert Diameter}}$$

Embedded (9)	value	OD (10)	value	SWR (11)	value	Slope (12)	value	Length (13)	value	Score
>30 cm. or > 20% of Diameter and continuous (Full)	0	< 15	0	< 1.0	0	< 1	0	< 15	0	
< 30 cm. or 20% of Diameter but continuous (Partial, contin.)	5	15 - 30	5	1.0 - 1.3	3	1 - 3	5	15 – 30	3	
No embeddment or discontinuous (None, discont)	10	> 30	10	> 1.3	6	> 3	10	> 30	6	

30

Barrier Determination

Cumulative Score	Result
0 - 14	passable
15 - 19	potential barrier
> 20	barrier

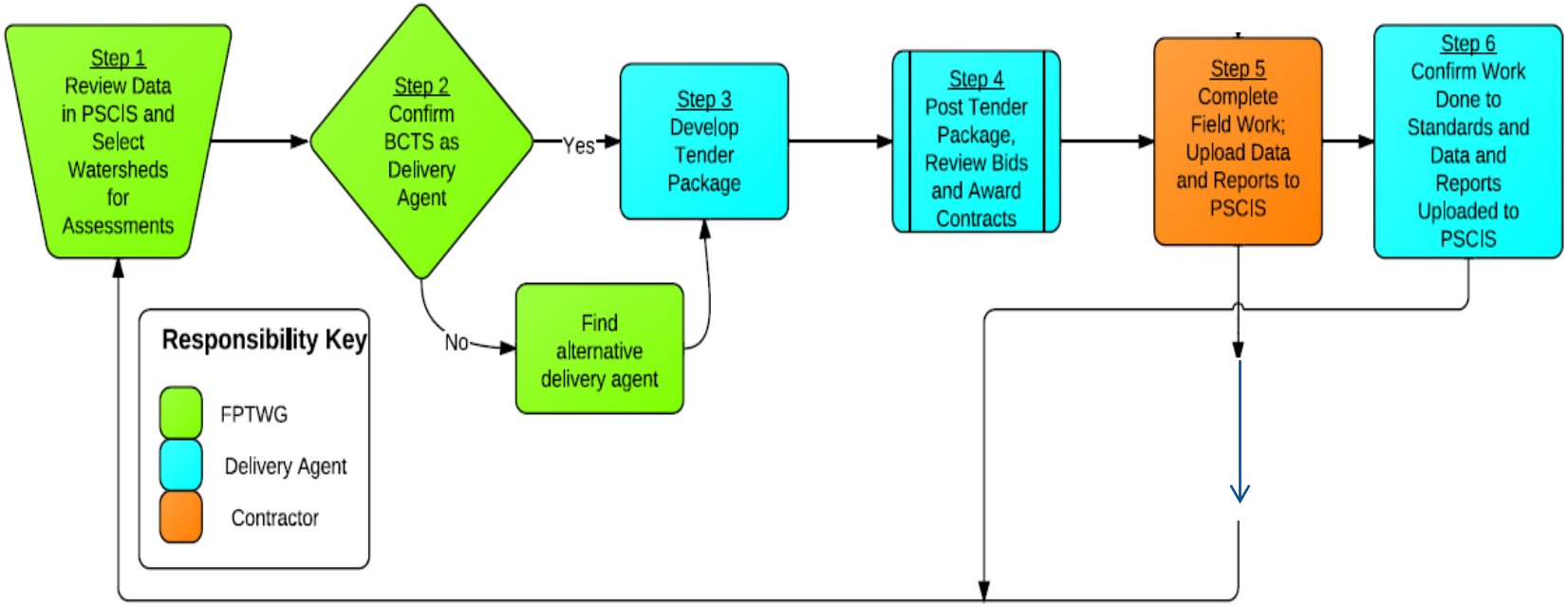
Provincial Stream Crossing Inventory System (PSCIS) and how it is used

Craig Mount
Aquatic Habitat Geomorphologist

Outline

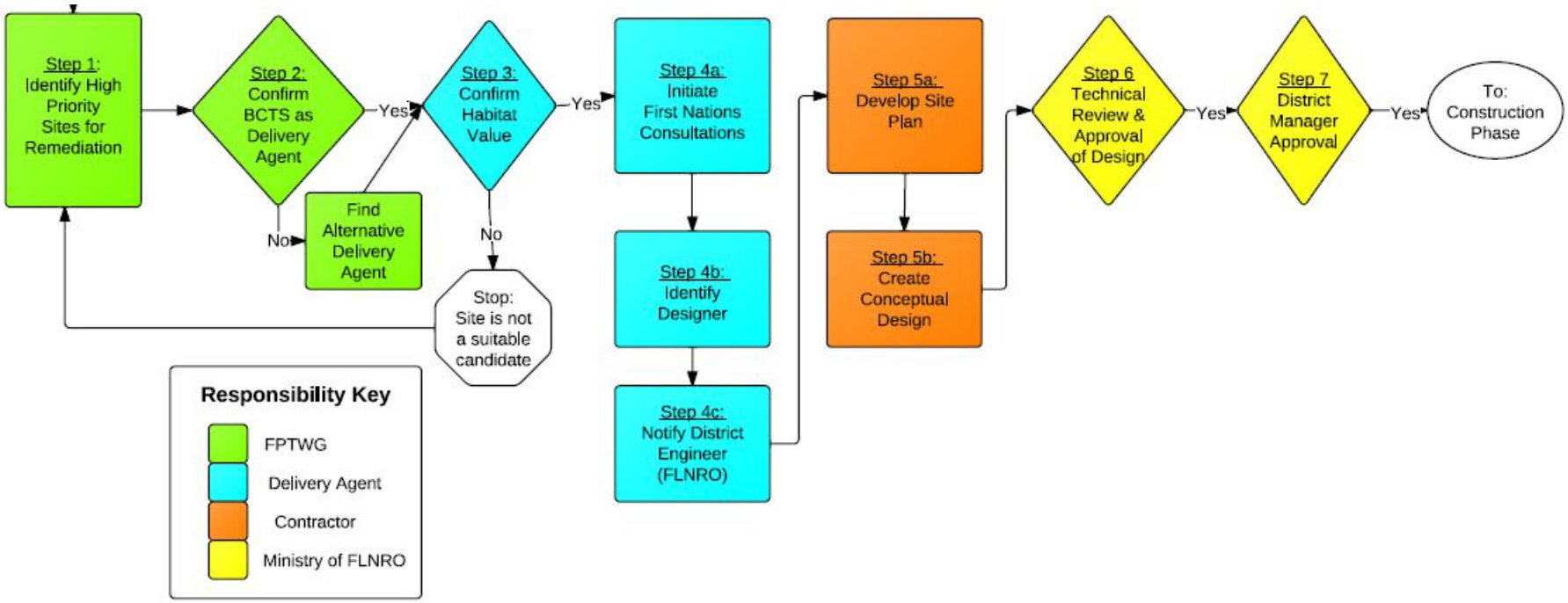
- PSCIS Data system
- Phases
  - Assessment;
  - Habitat Confirmation;
  - Remediation Design;
  - Remediation Result (As-Built)
- How the data is used
- Site Selection Process for Habitat Confirmation, Design, Remediation
- How the Data is accessed

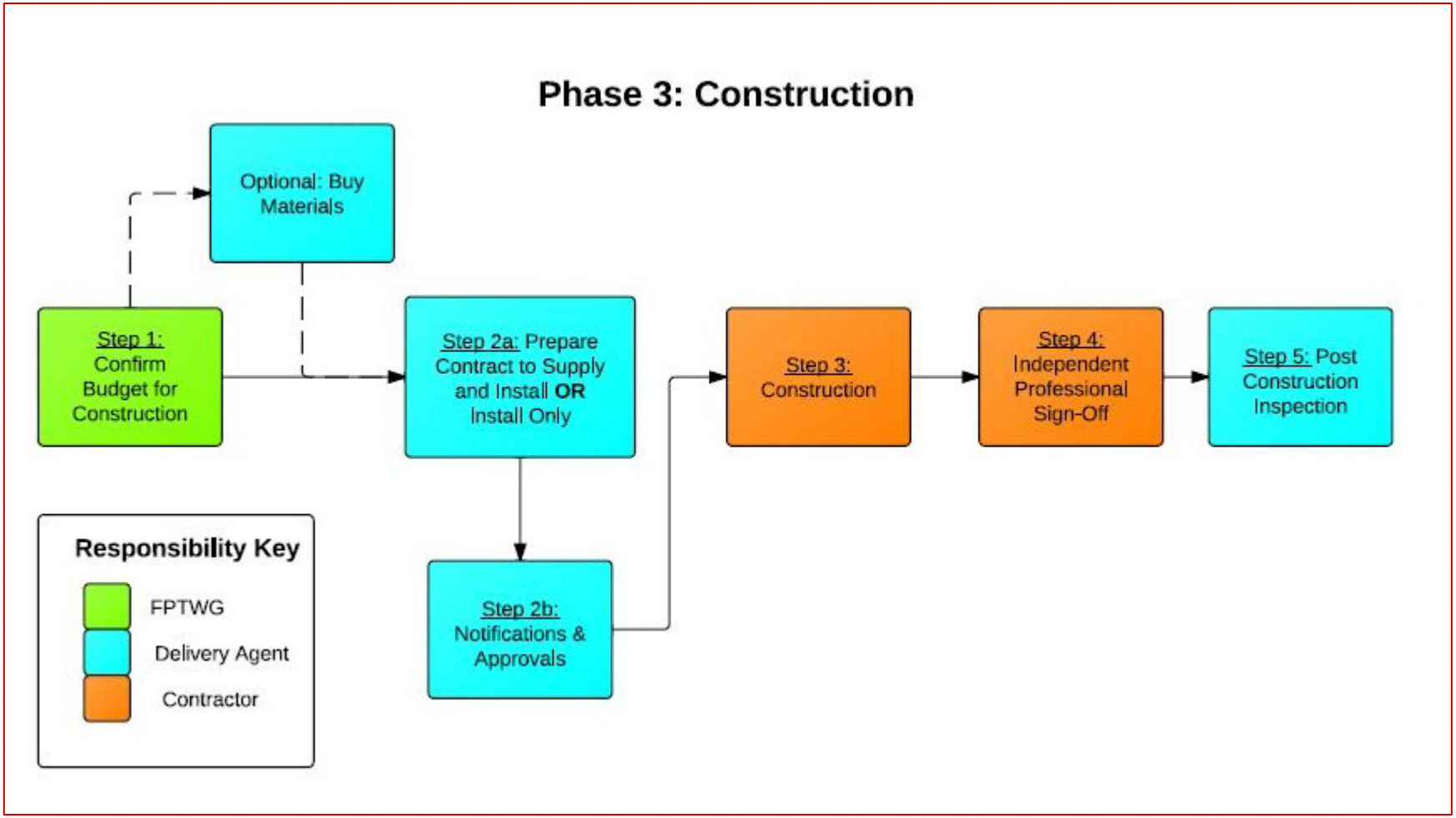
Phase 1: Fish Passage Assessment



Feedback of field knowledge to inform watershed selection

Phase 2: Remediation Design

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Optional: Buy Materials
Step 1: Confirm Budget for Construction
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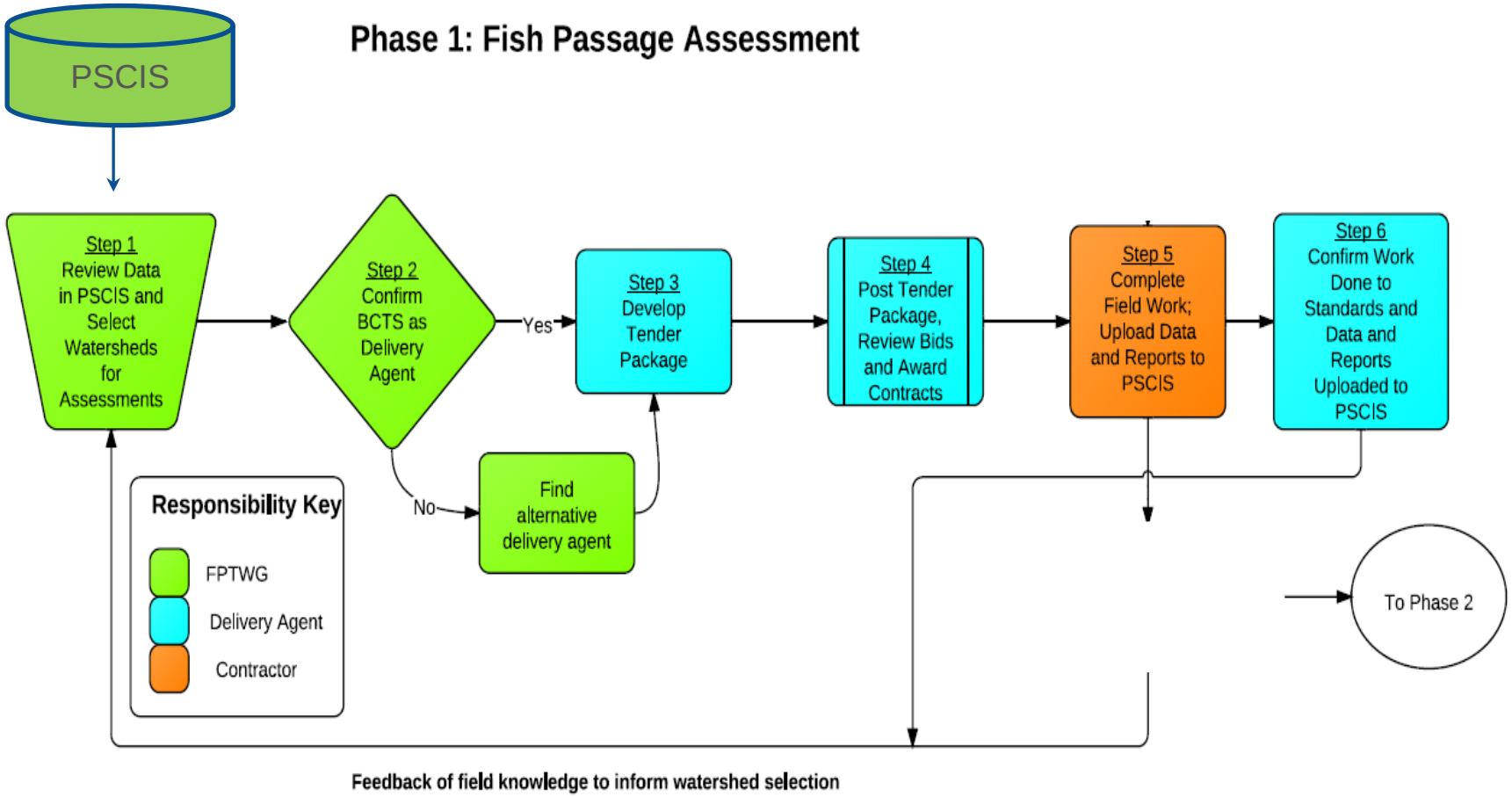
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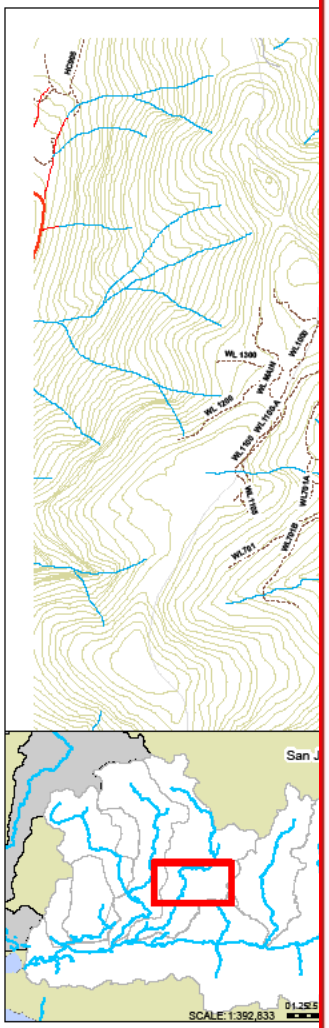

San Juan River Watershed: Fish Passage Assessments - January 2011

Funding Source: Land Based Investment Program
Project No. 4031504

Submitted To:
Dave Hamilton
Woodlands Supervisor
Strait of Georgia Business Area
BC Timber Sales
Ministry of Forests and Range
Phone: 250-286-9346
E-mail: dave.hamilton@gov.bc.ca

BCTS
BC Timber Sales
Strait of Georgia

COLLEGE OF APPLIED BIOLOGY
Michael Wright
R.P. Bio
#1744
CAB

Submitted By:
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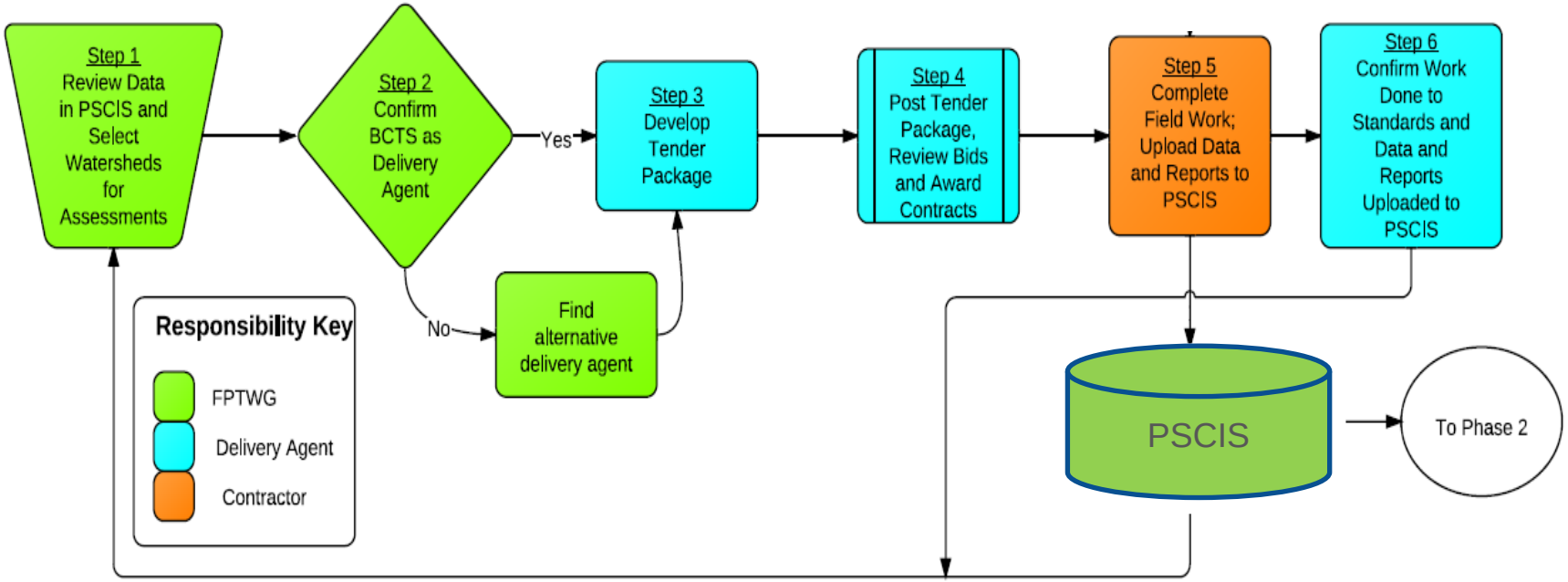
Fax: 250-591-1056
E-mail: mike.wright@mcwrightonline.com

M. C. Wright and Associates Ltd.
Biological Consultants

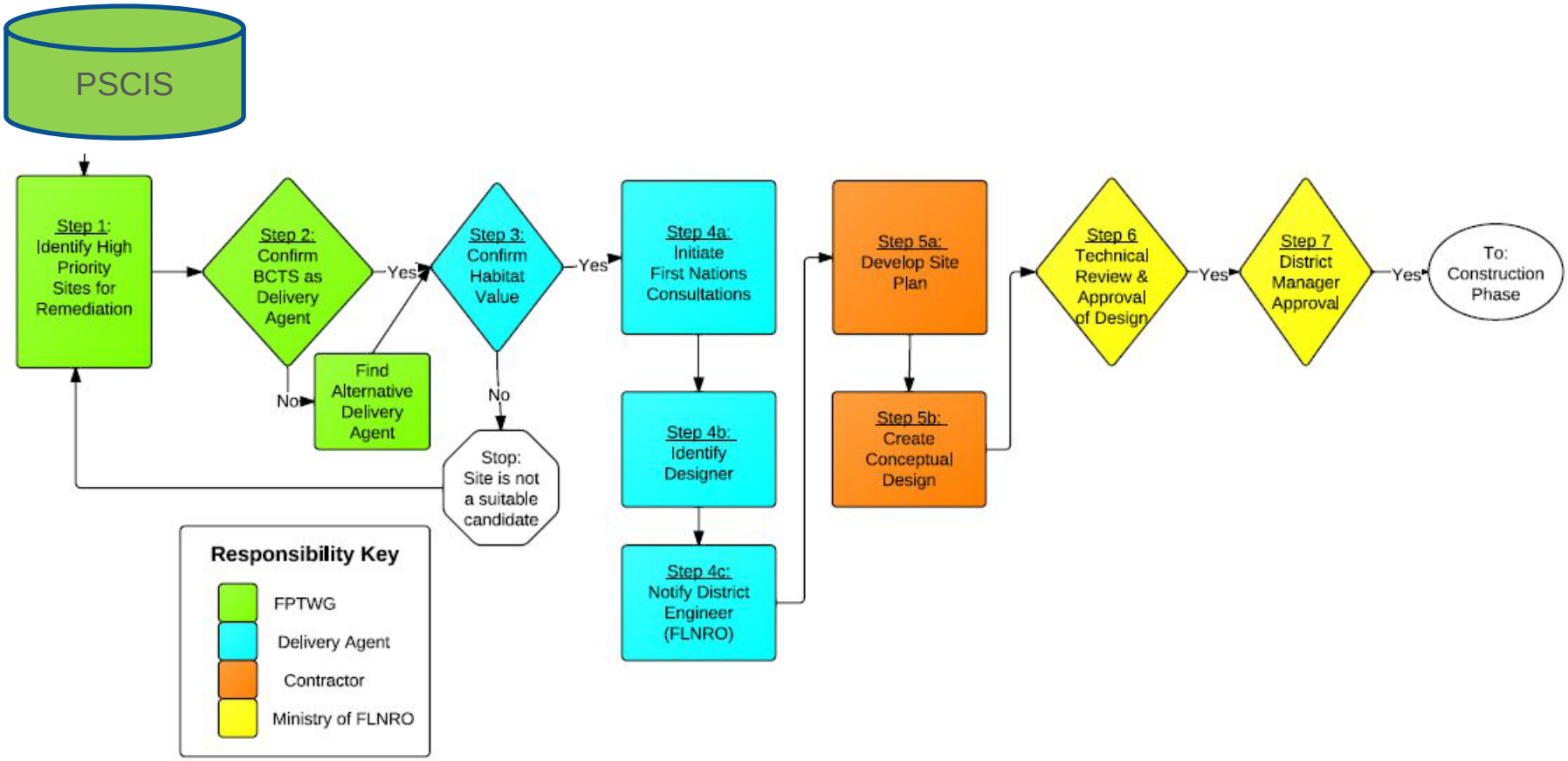
Citation: Musial, B., S. Hamilton and M. C. Wright. 2011. San Juan River Watershed: Fish Passage Assessments. FIA Project No. 4031504. Unpublished consultant's report prepared for BC Timber Sales Strait of Georgia Business Area

Phase 1: Fish Passage Assessment



Feedback of field knowledge to inform watershed selection

Phase 2: Habitat Confirmation and Remediation Design



Habitat Confirmation Phase

Amor De Cosmos
Habitat Confir

Prepar

Strait of Georgia

Prepar

Strategi
321-1180 In
Campbell Rive
Ph: (250)287-2246
www.s

Octobe

Written by:_____
Jacob Blanchard, RBTech
Strategic Forest Management Inc.

Figure 1: An area map showing the general location of
Creek waters

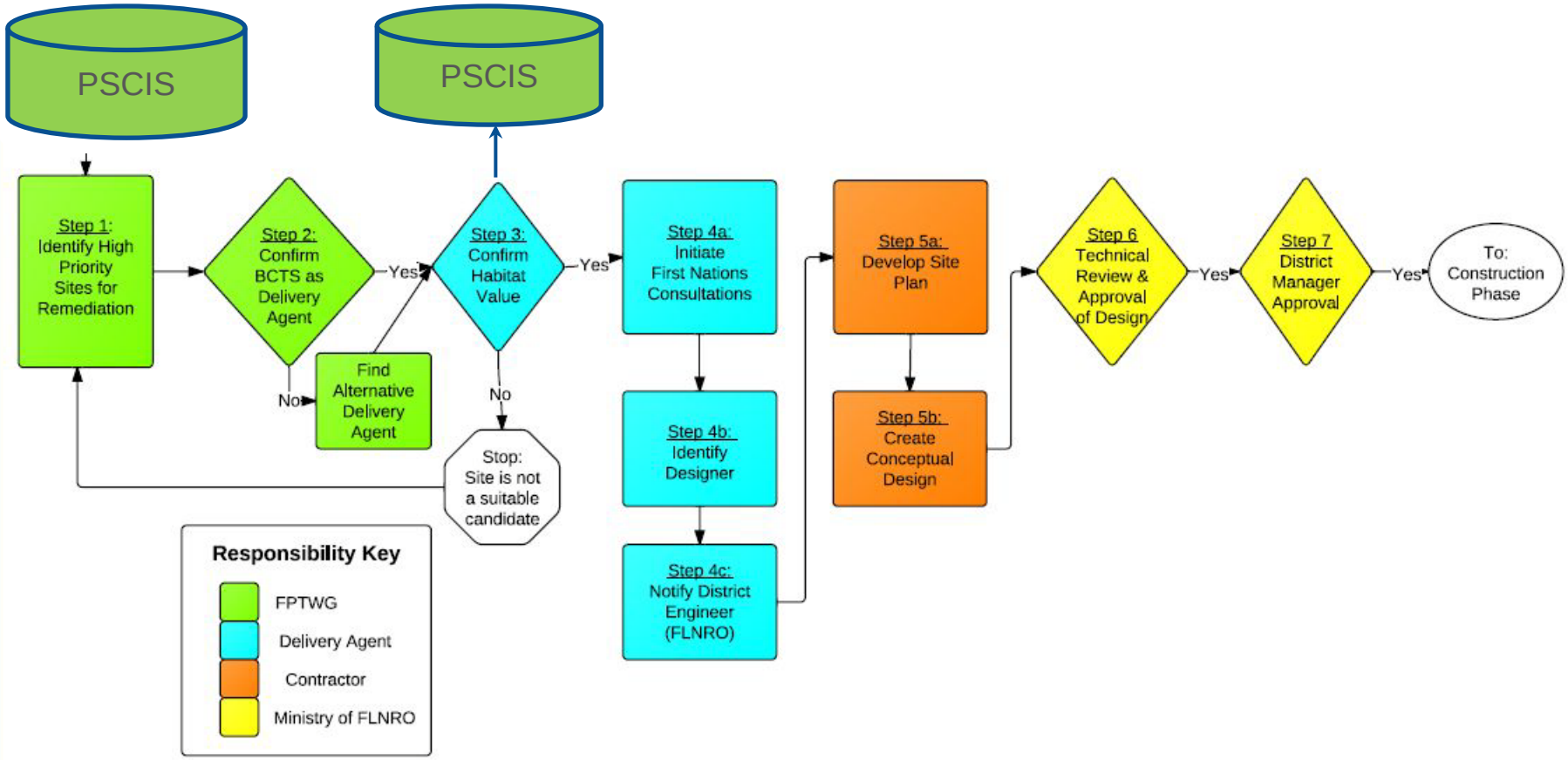
Photo 1, BBACC-12: Culvert outlets, the secondary culvert has a 57cm outlet drop. Red arrow indicating location of the primary culvert.

Photo 2, BBACC-12: Culvert inlets, the primary culvert is completely buried.

Photo 3, BBACC-12: Immediately upstream of the crossing there is a small wetland which appears to have resulted from past beaver activity.

DRAFT

Phase 2: Habitat Confirmation and Remediation Design

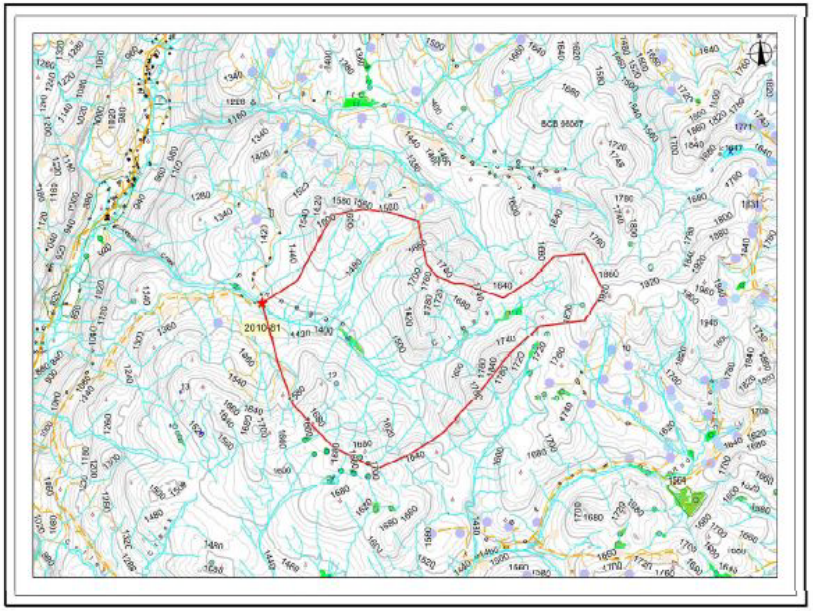


Design Phase

Replacement Crossing - 5.18m x 2.69m x 26.0m Pipe Arch
L100 - Hayes 8 - Red-Finnegan - 9+533 - Princeton Area

FIA Project SOTSA228158011 / UTM Zone 10U 693,502 / 5,496,781 - MFR Site ID# K998 - FSR Project # 8614.02

Site Hayes 8	Use Weyerhaeuser Red Book at all times
Safety	Road name is Finnegan FSR. Channel frequency is 153.02 MHz, comply with Rules of the Road in Weyerhaeuser Red Book. Report all near misses and incidents within 24 hours. Call 911 –Princeton. Princeton Hospital (250) 295-6911 This site is more than 20 minutes surface travel time to Princeton hospital. Comply with Forest Safety Accord, Weyerhaeuser High Risk Areas, In the clear – Working Around Active Equipment, and PPE Policies.
EMS	No fueling within 30m of riparian area. Remove all operational waste including culverts, dunnage, lunch materials, all metal and other manufactured products. Leave the site completely clean. Return used culverts to Weyerhaeuser culvert yard (Princeton or Okanagan Falls) and dispose of all other operational waste in an approved sanitary landfill.
Wildfire	Immediately report all fires to 1-800-663-5555 Once reported above, notify Weyerhaeuser 250-295-3281 or 250-497-8211. Use Moosecamp weather station to determine Fire Danger Class and appropriate work restrictions. Manipulating rip rap, welding and cutting generate sparks and heat. Determine if fire watch is required.
Spill Response	Step 1. Ensure safety and take charge Step 2. Stop the source (upright, turn-off, plug leak, de-energize.) Step 3. Contain - Use spill kit, contain with soil berms, barricades. Keep away from watercourses Step 4. Report to Weyco within 24 hours Step 5. Clean-up Step6. Dispose following Weyco supervisor instructions.



Limited subsurface investigation has been conducted on site. If upon excavation, subsurface conditions vary from those assumed: the foundation design may need to be amended.
A detailed geotechnical investigation has not been conducted. Please contact Caliber Bridge & Design Ltd. If geotechnical data and recommendations are available for this crossing or if the owner wishes to expand the engineering services to incorporate this additional work.

Any changes to this document indicated as a Revision supersede previous versions of the entire document.

Dec 20, 2012

PAPER SIZE 11X17 TABLOID

Drawing Index
Page 2: Site Plan
Page 3: Site Plan Profiles & Photos
Page 4: General Arrangement Plan
Page 5: General Arrangement Profiles

Prepared for:
Dave Hamilton, RFT

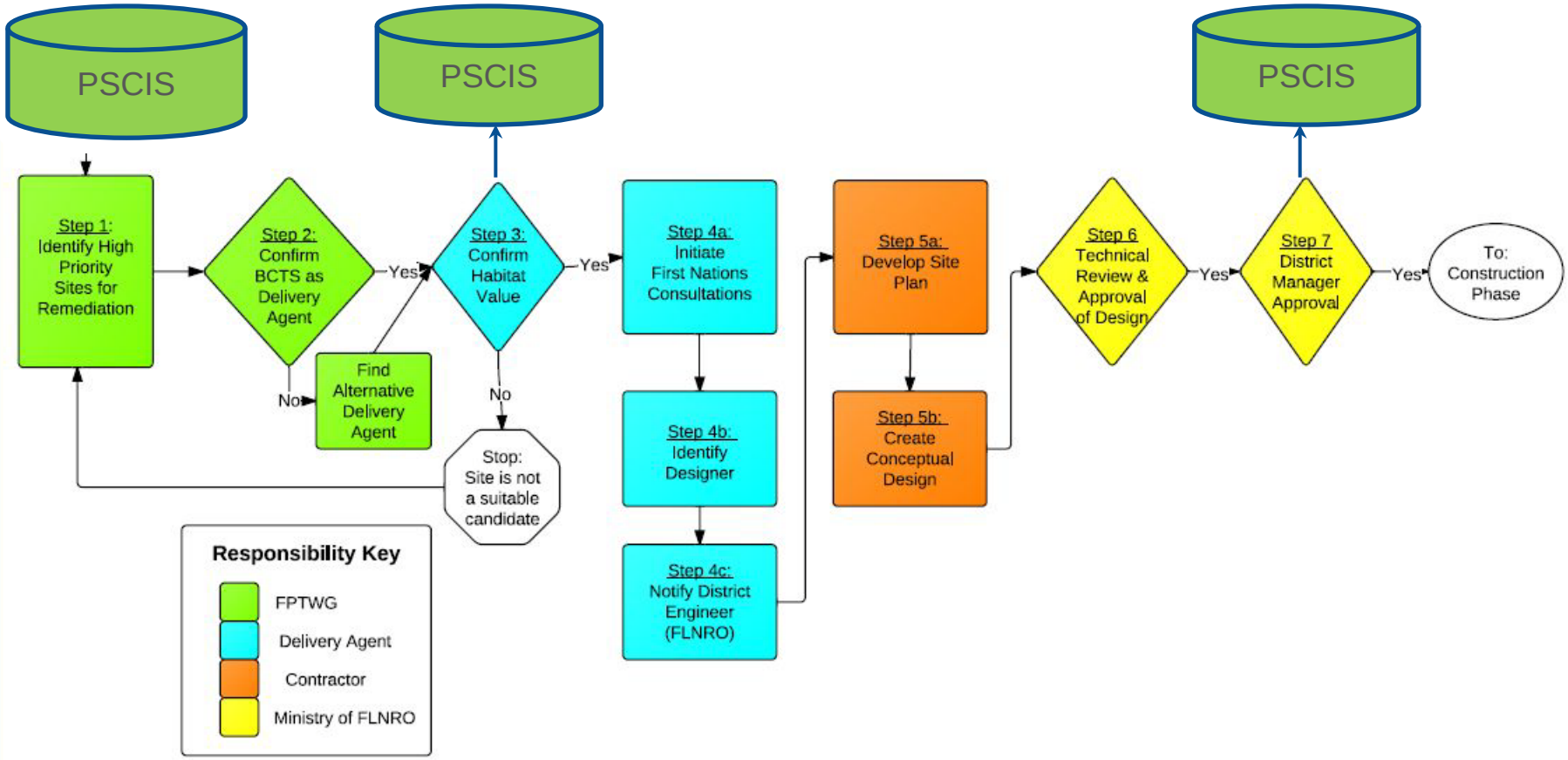
BCTS
BC Timber Sales
Strait of Georgia

CALIBER BRIDGE & DESIGN LTD
250.287.2216

DRAWINGS PRINTED IN PDF FORMAT CAN NOT BE GUARANTEED TO SCALE
2012-A91_R2.DWG

SITE COORDINATES:	NORTHING: 5496781 UTM Zone 10 EASTING: 693502
DATE: 20DEC12	
PAGE: 1 OF 5	
REVISION: 2	

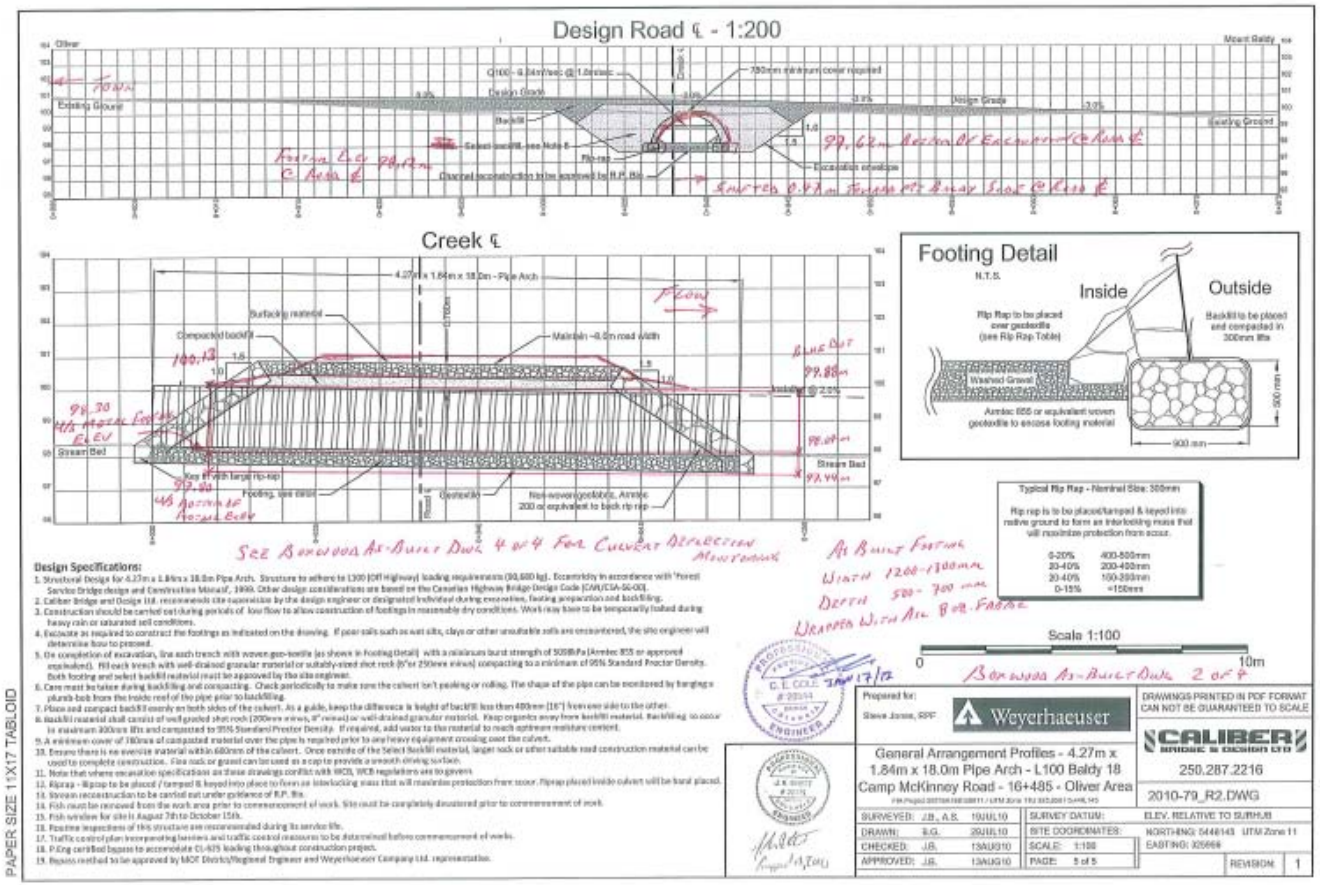
Phase 2: Habitat Confirmation and Remediation Design

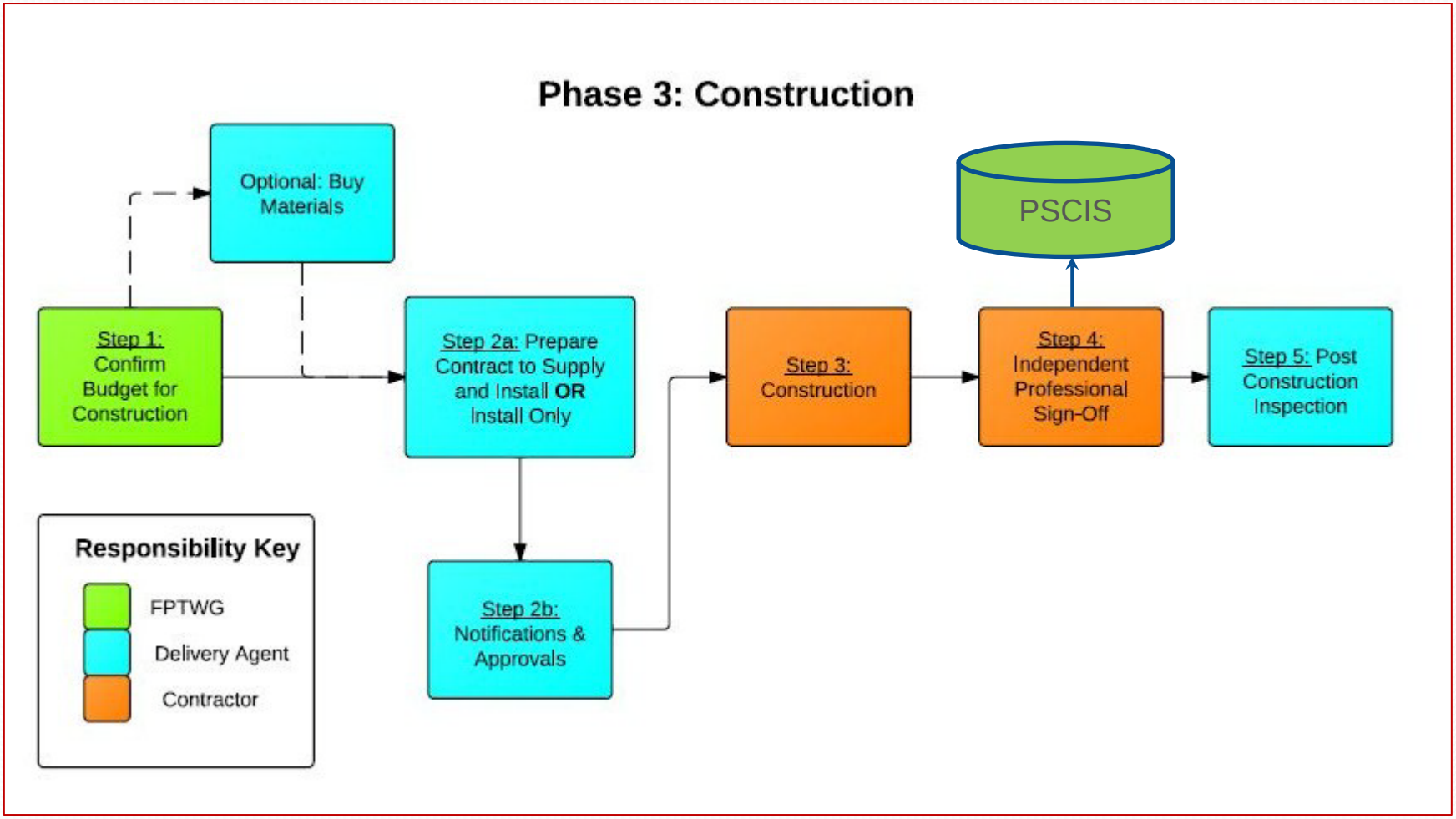


Construction Phase

As-Constructed Photos

Record (As-Built) Drawings

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Responsibility Key
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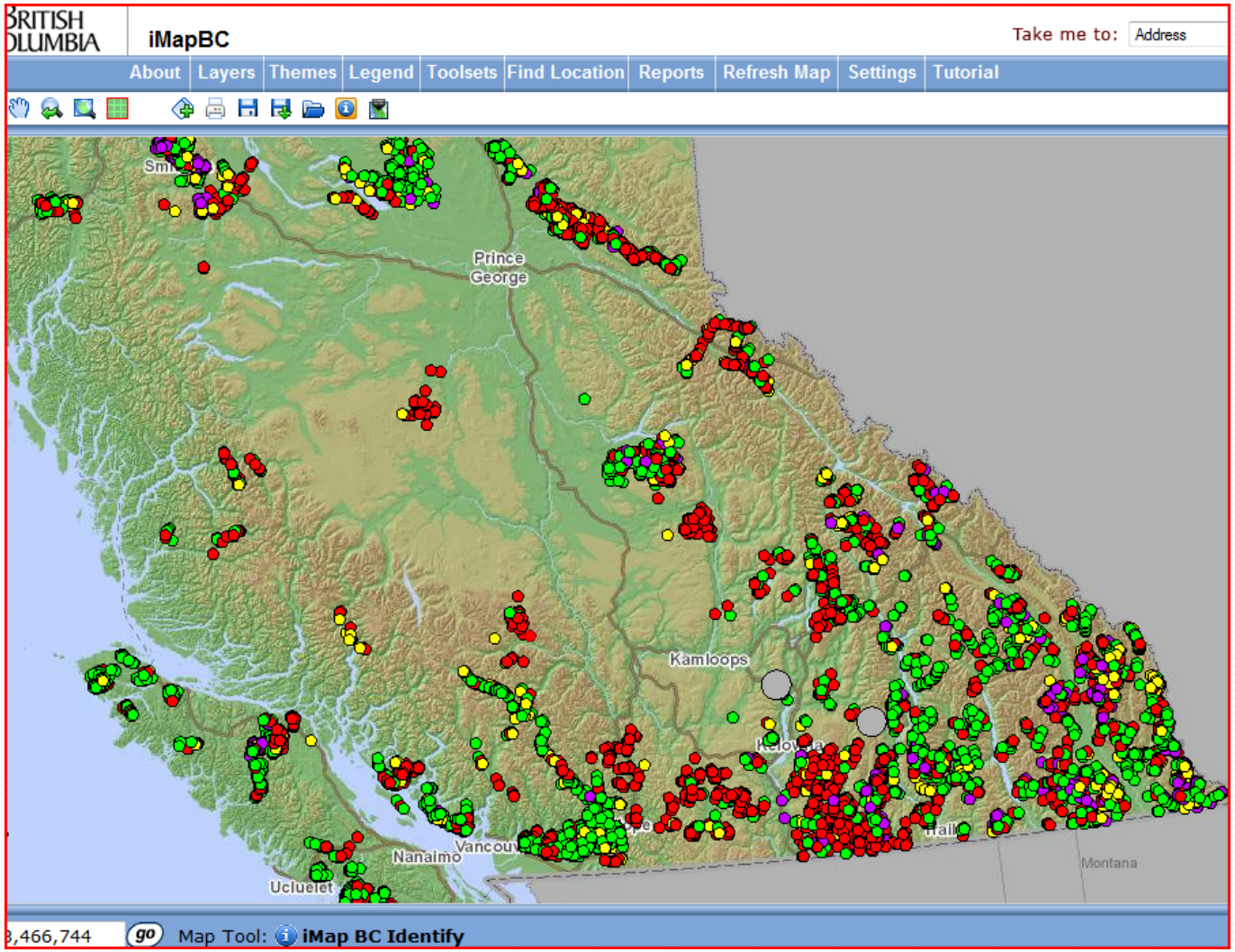
Where do I find all this Data??

- LRDW
- iMap
- EcoCat

IMAP BC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iMapBC
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Address
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Layers
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Legend
Toolsets
Find Location
Reports
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Tutorial
Prince George
Kamloops
Nanaimo
Ucluelet
Montana
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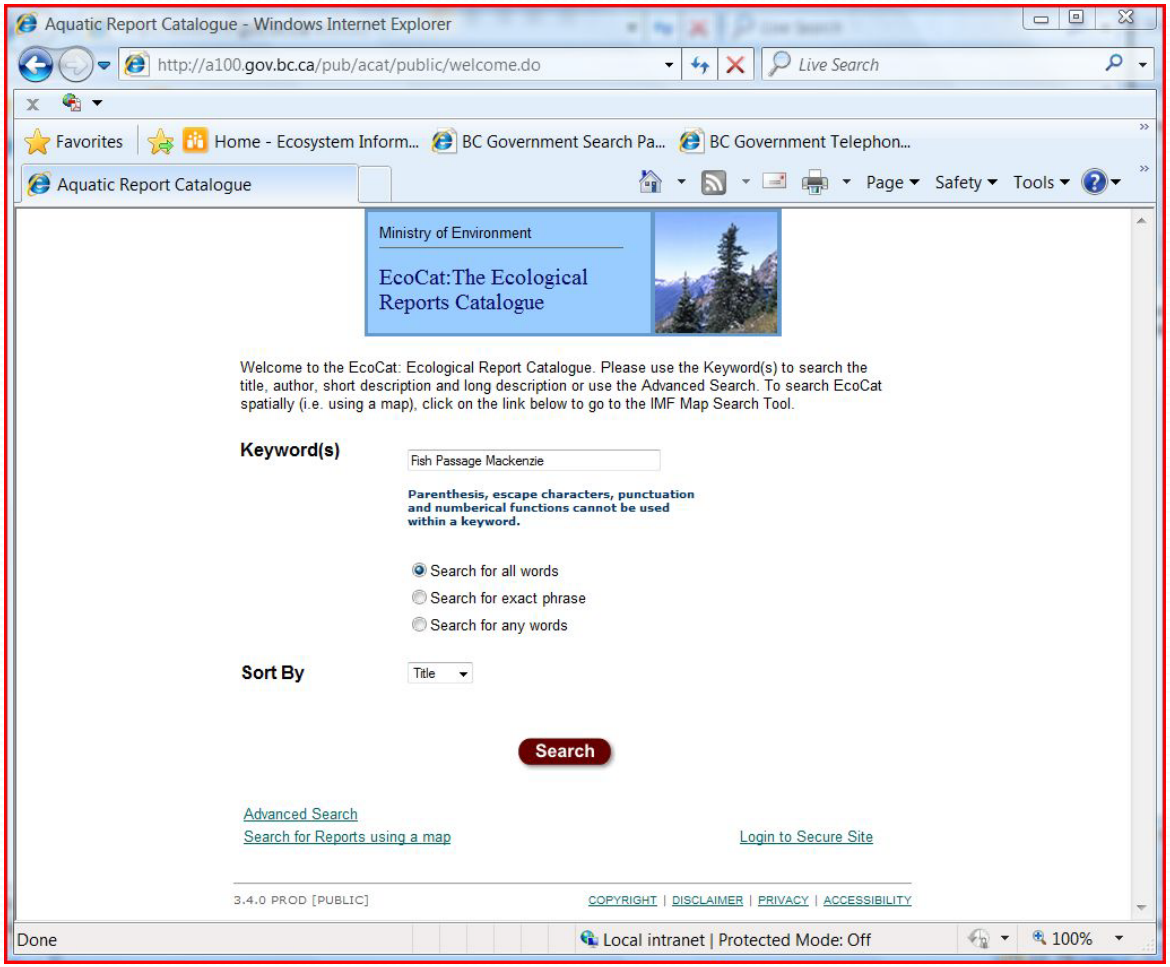
Map Tool:
iMap BC Identify

EcoCat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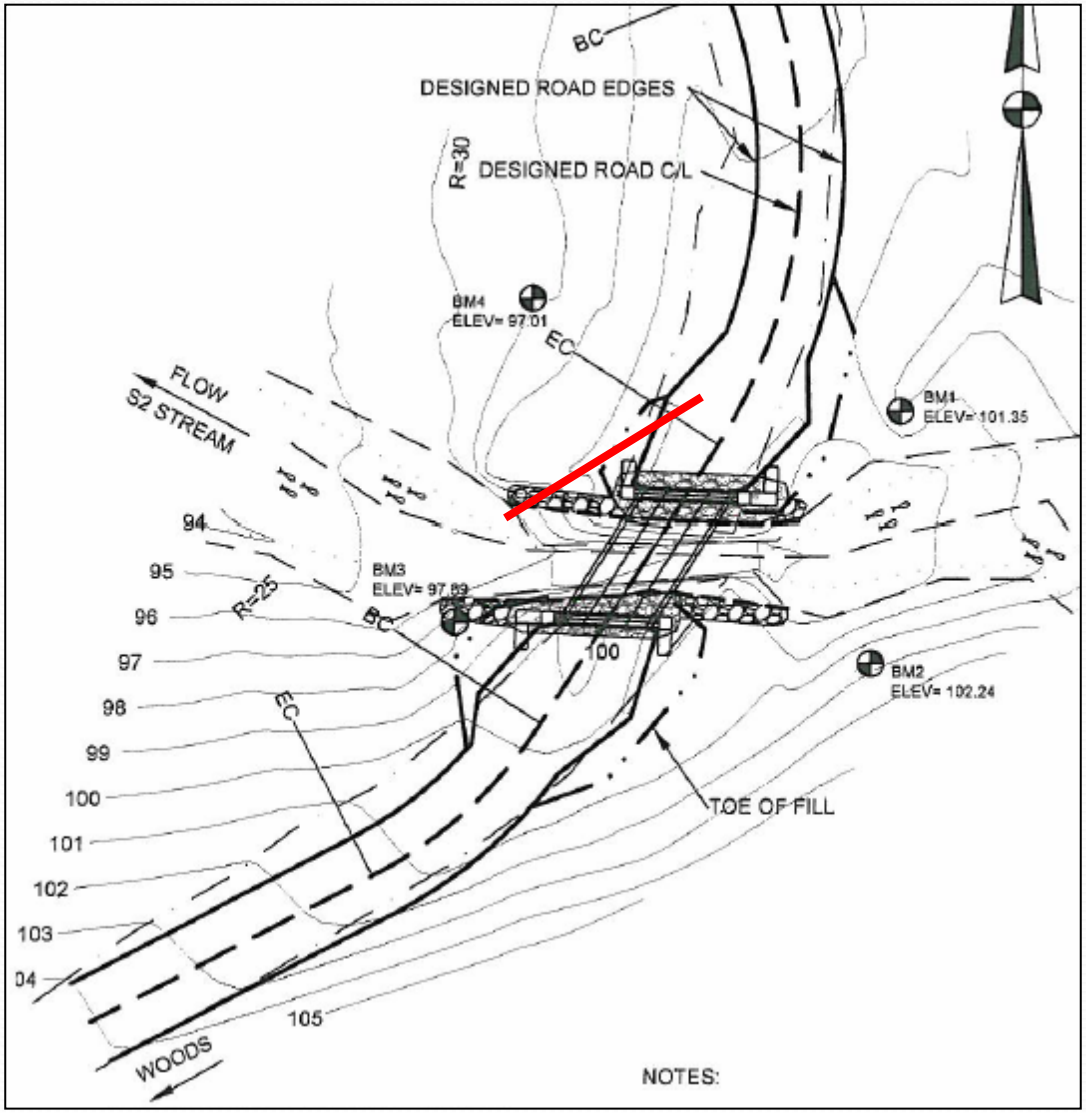
Live Search
Favorites
Home - Ecosystem Inform...
BC Government Search Pa...
BC Government Telephon...
Aquatic Report Catalogue
Page
Safety
Tools
Ministry of Environment
EcoCat:The Ecological Reports Catalogue
Welcome to the EcoCat: Ecological Report Catalogue. Please use the Keyword(s) to search the title, author, short description and long description or use the Advanced Search. To search EcoCat spatially (i.e. using a map), click on the link below to go to the IMF Map Search Tool.
Keyword(s)
Fish Passage Mackenzie
Parenthesis, escape characters, punctuation and numberical functions cannot be used within a keyword.
Search for all words
Search for exact phrase
Search for any words
Sort By
Title
Search
Advanced Search
Search for Reports using a map
Login to Secure Site
3.4.0 PROD [PUBLIC]
COPYRIGHT | DISCLAIMER | PRIVACY | ACCESSIBILITY
Done
Local intranet | Protected Mode: Off
100%

- **What have we learned?**
  - Dave Hamilton, Brian Chow, Richard Thompson
-
- FPTWG Field Reviews
  - Squamish - July 2011
  - Haida Gwaii – Nov 2011
  - Vancouver Island/Sunshine Coast – August/October 2012
  - Southern interior – Sept 2013

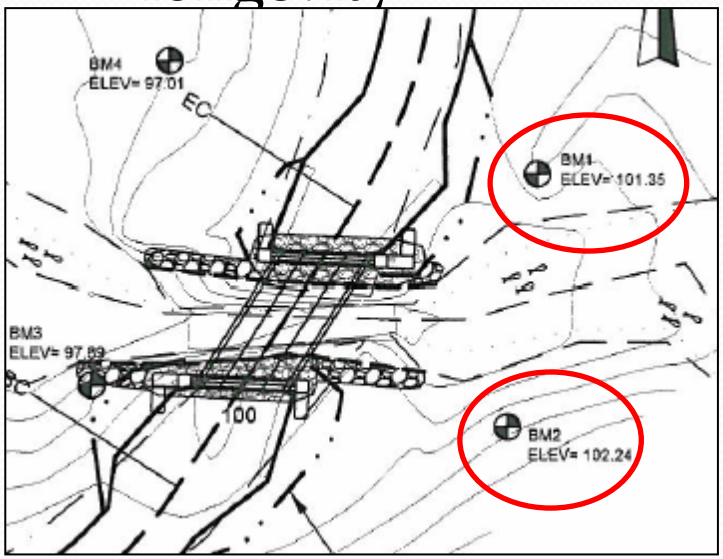
- Observations :
  - Habitat marginal or non-existent

- Observations:
  - Sites may be ok but downstream/upstream problems precluding proceeding (eg. water falls or other culvert obstructions)

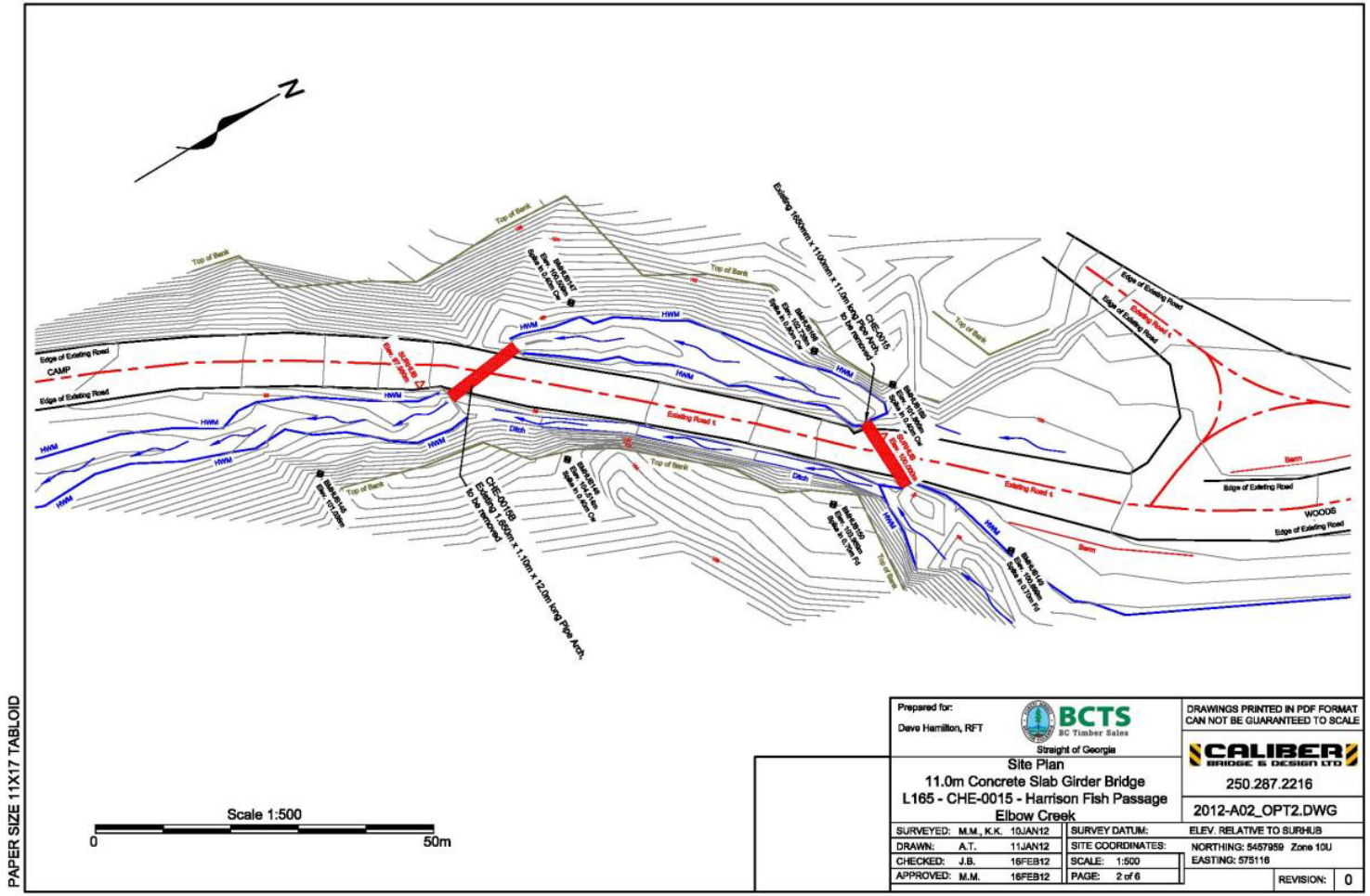
- Observations:
  - Designs that could not be built



- Observations:
  - Field referencing problems – identification and longevity



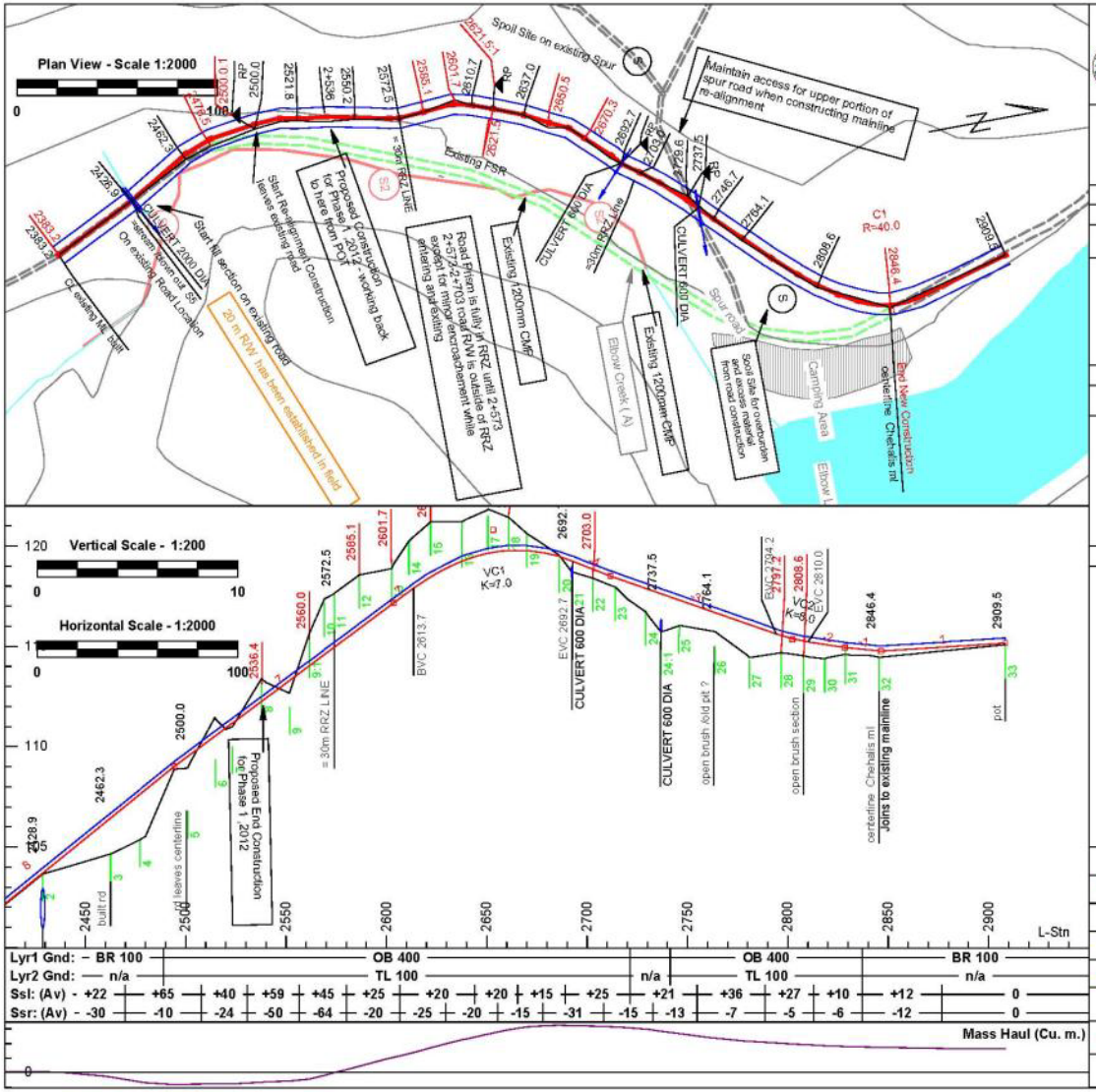
- Observations:
- Lack of consideration for alignment efficiencies - Chehalis
- Chehalis FSR



- Chehalis FSR remediation

- Fish passage was not the only
- issue with these culverts

Chehalis FSR remediation



Chinook Business Area - Chilliwack District
Chehalis
Road: Chehalis FSR
2+429-2+846 km Re_Alignment

BCTS

Date August 3,2012
Infinity-Pacific Stewardship Group
Tel: (604)870-1191, Email:rheise@infinity-pacific.com
Designer: RH

Declination: 16.5E degrees

Drainage Structures

Index	P-Stn m.	L-Stn m.	Cul DIA mm.	Cul Len m.	Cul Skew deg.	Cul Cmt
2	2428.9	2428.9	2000	14.0	90	
21	2692.7	2692.4	600	12.0	90	
	2737.5	2736.9	600	18.0	45	

Reference Points

Index	P-Stn m.	L-Stn m.	RS1 Az deg.	RS1 HD m.	RS1 Cmt
5	2500.0	2501.0	221.0	13.3	RP
15	2621.5	2622.0	283.0	12.0	RP
21	2692.7	2692.4	325.0	13.5	RP
24:1	2737.4	2736.7	312.0	13.4	RP

Horizontal & Vertical Curves

Curve Table

	C1
Angle	42.4
Tangent	15.5
Arc. Len.	29.6
Radius	40.0

P-Stn m.	L-Stn m.	K
2613.2	2613.7	-7.0
2693.0	2692.7	
2794.8	2794.2	8.0
2810.9	2810.0	

Plan

Plan L-line Location	Plan Culverts
Plan P-line Location	Plan Side Shots
Plan Road Edges	Reference Points
Plan Clearing Limits	

Profile

Profile Subgrade	Profile Finished Grade
Profile P-Line Topography	Profile Culverts

- Observations:
  - Culverts with exposed baffles, high in the profiles
  - Lack of embedment for closed bottom culverts

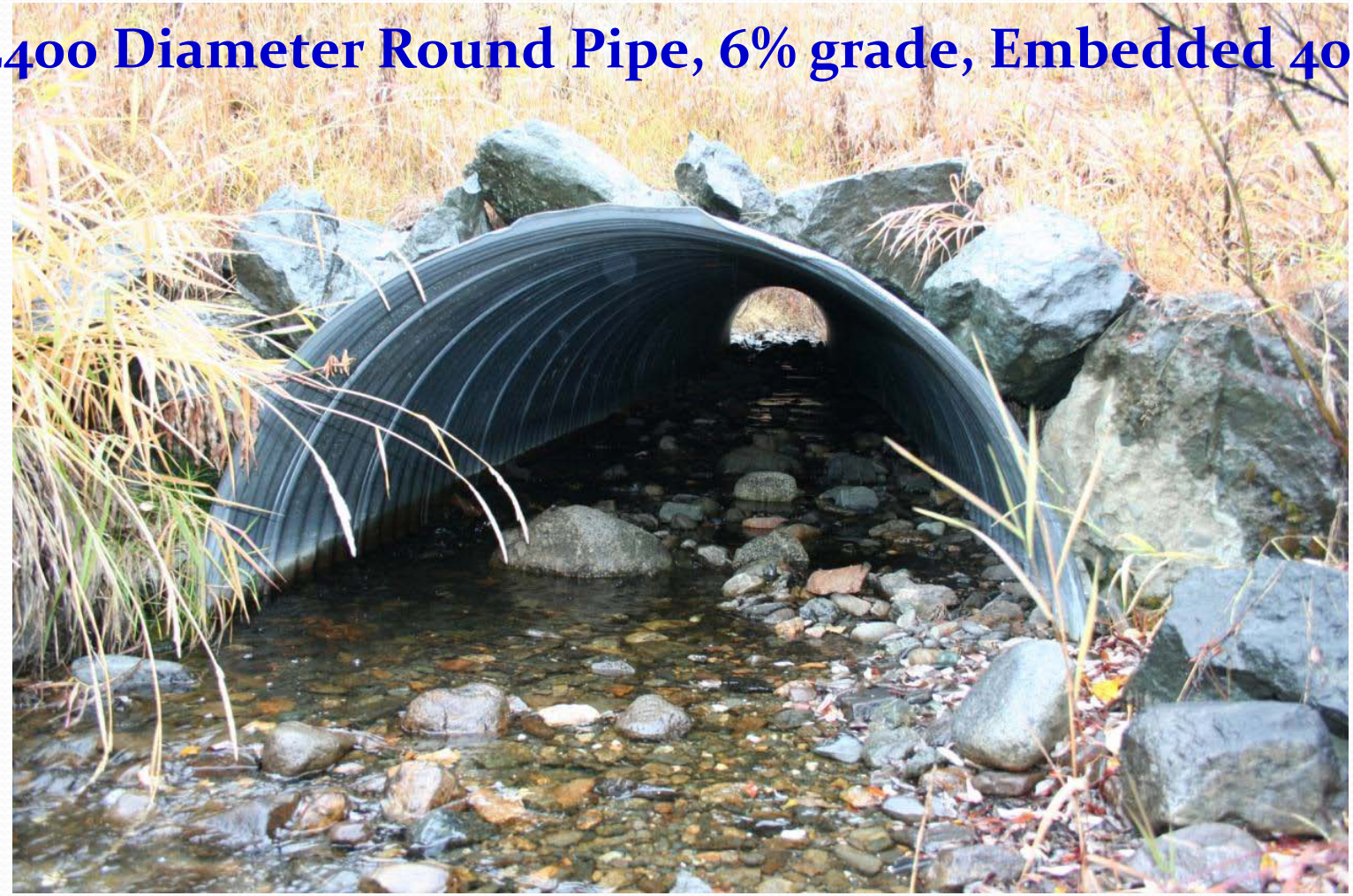
- Observations:

- Observations:
  - Streambeds not resembling “natural” characteristics

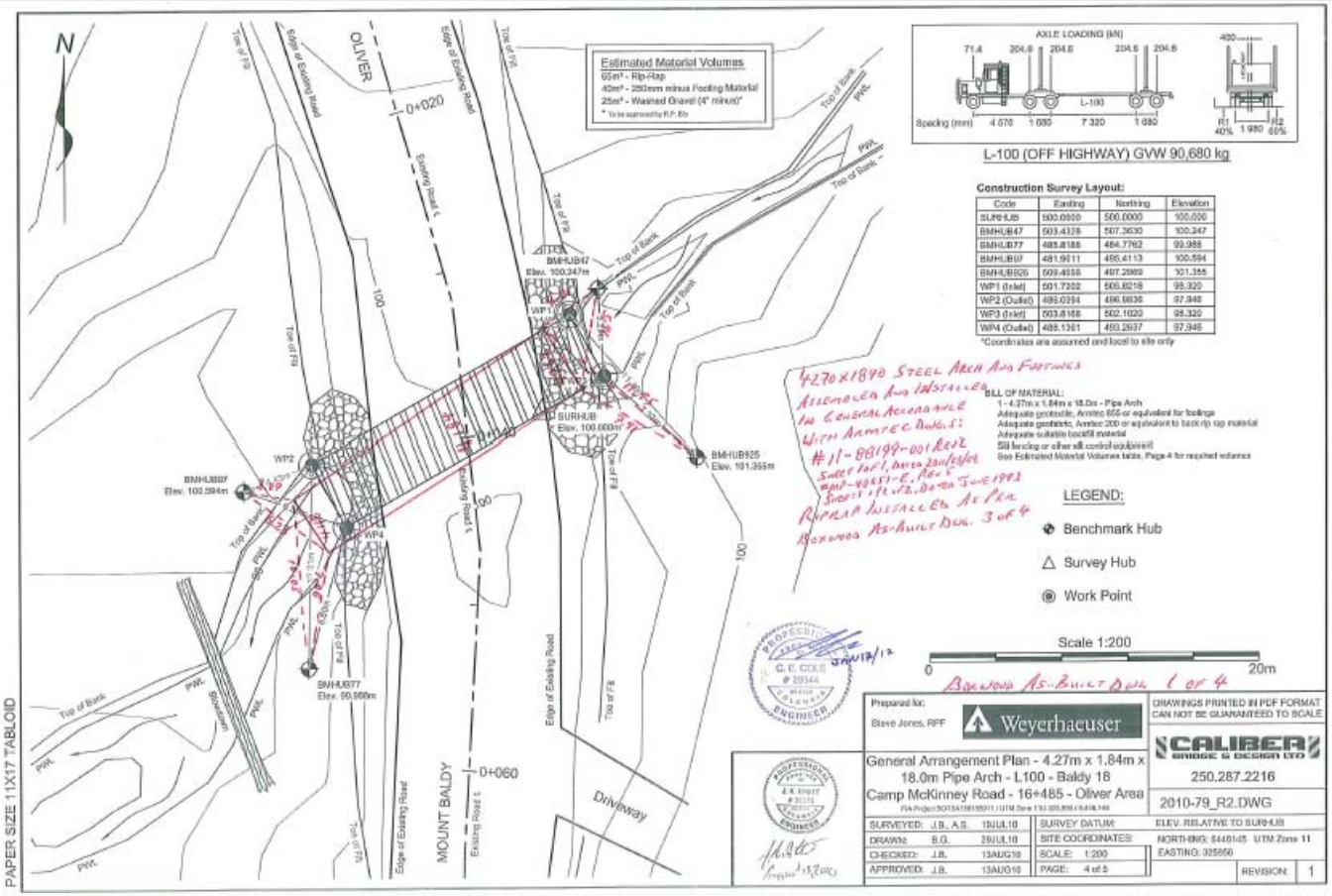
- Observations:

GOOD EXAMPLE

2400 Diameter Round Pipe, 6% grade, Embedded 40%



- Observations:
  - As-built/record drawings
    - Need to reflect actual dimensions/elevations



- Observations:
  - Conformance to ministry standards
    - Structural grout
      - Curing
      - sampling

- Observations:
  - Conformance to ministry standards
    - CWB for structural welding

- **Fish Passage Program Engineering Standards**
- Revised to be clearer and capture some specific modifications for this program including:
  - Require long profiles as a general requirement unless waived by a specialist
    - Determine natural stream grades, outside influence of existing crossing(s) in order to utilize in establishing foundation elevations and grades
  - Baffles or weirs will require specific approvals from the Fish Passage Technical Working group
  - In process of developing standard general arrangement designs for guidelines for drawings
  - Adhere to ministry standards for bridges and major culverts (grout sampling, CWB, etc)

- **Overview of Remediation Project Implementation for fish passage projects**

- Early engagement of District and Regional Engineering Staff.
- District Staff help identify stakeholders (Especially First Nations)

- **Overview of Remediation Project Implementation for fish passage projects**

- Engage Coordinating Registered professional
  - to ensure engineering standards are met during construction
  - To sign off structure
- Engage a contract / environmental monitor
  - For complex projects
  - And/or pre tender to ensure environmental conditions are included
- Continued communication for project success
  - MFLNRO staff
  - affected stakeholders

Opportunities for Collaboration

- Recent success in partnering with Pacific Salmon Foundation for DFO funding (RFCCP); more in 14/15?
- Supporting two applications under development for BC Hydro funding in 14/15 (FWCP)
- Technical guidance documents (e.g. DFO, MoTI, BCH, OGC)
- Actively seeking to develop strategic linkages (partnerships?) with UBCM and/or individual municipalities, transmission companies and railroads.

Acknowledgements

Fish Passage Technical Working Group

- Peter Tschaplinski MoE
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- Ian Miller FLNRO
- Brian Chow FLNRO
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- Gord MacKinnon
- George Robison
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- Leslie Mckinley
- Jeff Guerin DFO
- Howard DeBeck
- Dan Buri
- Knut Herzog
- Troy Larden

- Ministry of Environment
- Ministry of Forests, Lands and Natural Resource Operations.
- Department of Fisheries
- and Oceans
- Council of Forest Industries
- Ministry of Transportation and Infrastructure
- B.C. Hydro
- Pacific Salmon Foundation
- Oil and Gas Commission

Thanks!!

- QUESTIONS?

- Please visit our website at: http://www.for.gov.bc.ca/Hfp/fish/fishpassage.html