



November 2018

FORT MCMURRAY RIVER HAZARD STUDY

Ice Jam Flood Inundation Map Library

Submitted to:

Alberta Environment and Parks
11th Floor, Oxbridge Place
9820 - 106 Street NW
Edmonton, AB T5K 2J6

DRAFT

Report Number: 1662603_R0006_0

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Table of Contents

50-Year Ice Jam Flood Inundation Extent

100-Year Ice Jam Flood Inundation Extent

200-Year Ice Jam Flood Inundation Extent

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50-YEAR ICE JAM FLOOD INUNDATION EXTENT

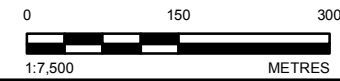
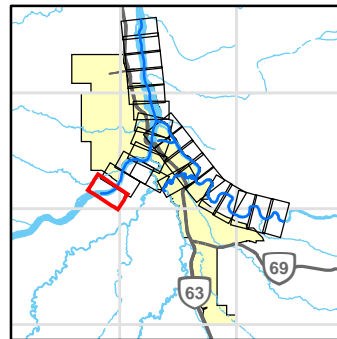
Sheets 1-23

DRAFT



LEGEND

CROSS SECTION	ICE JAM 50-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	50-YEAR FLOOD EXTENT
RS57085 RIVER STATION	50-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s
PRIMARY HIGHWAY	
FLOOD CONTROL STRUCTURE	
STUDY BOUNDARY	



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YYYY-MM-DD	2018-10-25
DESIGNED	S. ZARE
PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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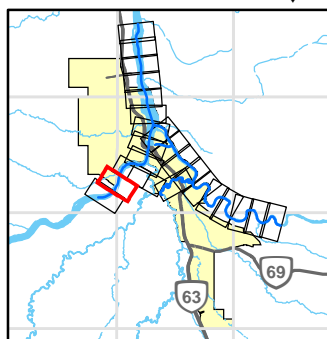
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 1 of 23



- LEGEND**
- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - ➔ FLOW DIRECTION
 - BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - FLOOD CONTROL STRUCTURE
 - STUDY BOUNDARY
 - ICE JAM 50-YEAR FLOOD INUNDATION EXTENT**
 - 50-YEAR FLOOD EXTENT
 - 50-YEAR FLOOD EXTENT (ISOLATED AREA)
 - 50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
 - DISCHARGE**
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m³/s



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Golder Associates
HATCH

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TITLE
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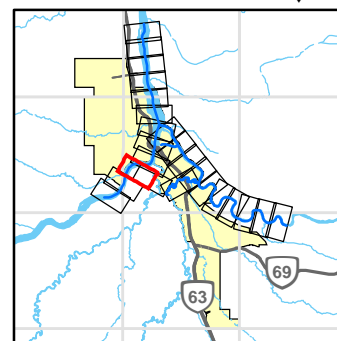
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 2 of 23

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LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s	



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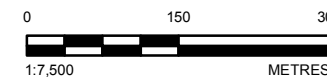
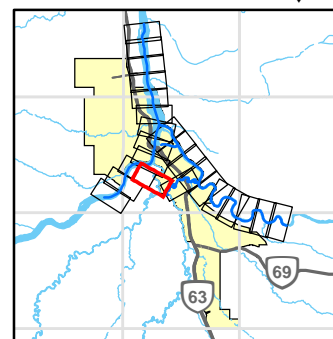
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CONSULTANT	Golder Associates HATCH
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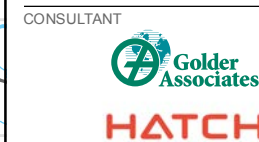
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TITLE		ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 3 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s	



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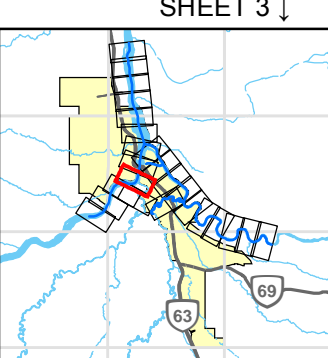
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FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 3a of 23



LEGEND	
CROSS SECTION	ICE JAM 50-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	50-YEAR FLOOD EXTENT
RS57085 RIVER STATION	50-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s
PRIMARY HIGHWAY	
FLOOD CONTROL STRUCTURE	
STUDY BOUNDARY	



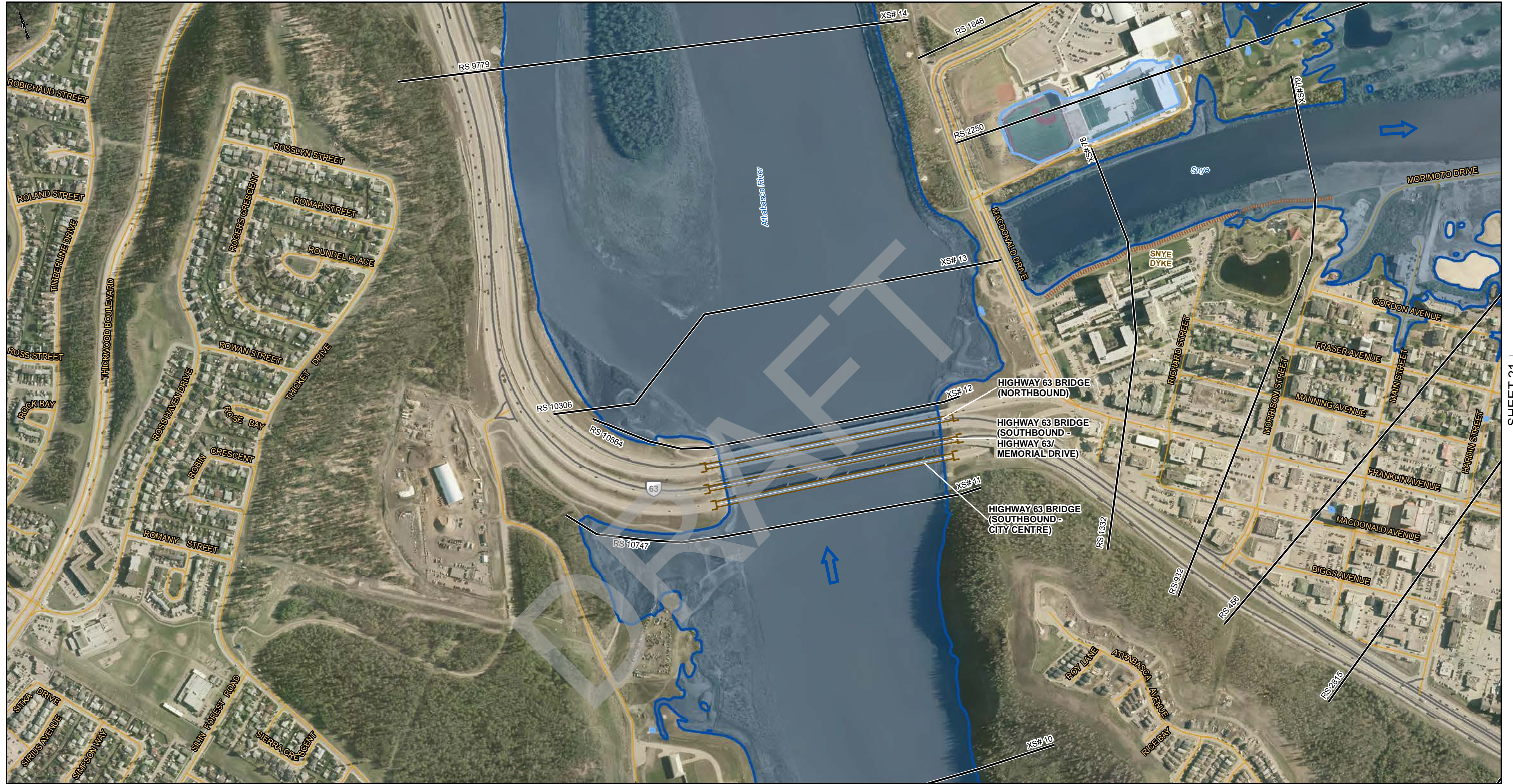
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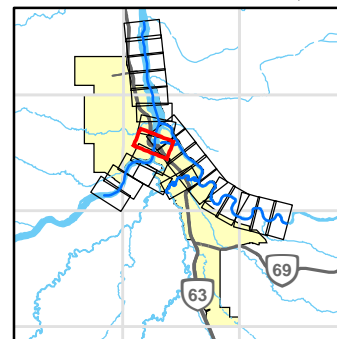


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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 4 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s	



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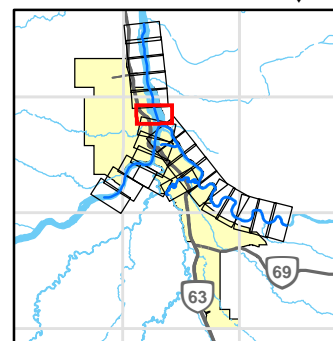
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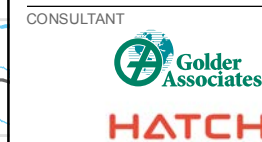
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1662603	6000	0	Sheet 5 of 23



LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➔	FLOW DIRECTION
⌈⌋	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
▬▬▬	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
■	50-YEAR FLOOD EXTENT
■	50-YEAR FLOOD EXTENT (ISOLATED AREA)
■	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1450 m ³ /s	



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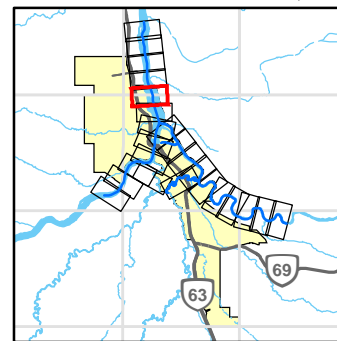
TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 7 of 23



LEGEND

- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - FLOW DIRECTION
 - BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - FLOOD CONTROL STRUCTURE
 - STUDY BOUNDARY
-
- ICE JAM 50-YEAR FLOOD INUNDATION EXTENT**
 - 50-YEAR FLOOD EXTENT
 - 50-YEAR FLOOD EXTENT (ISOLATED AREA)
 - 50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
-
- DISCHARGE**
 - ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1450 m³/s



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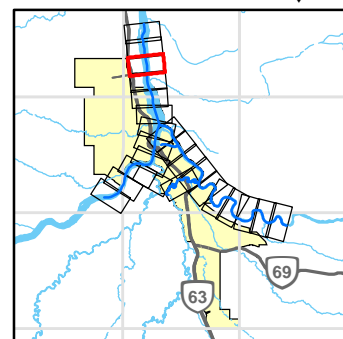
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PROJECT			
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TITLE			
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 8 of 23

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LEGEND	
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	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
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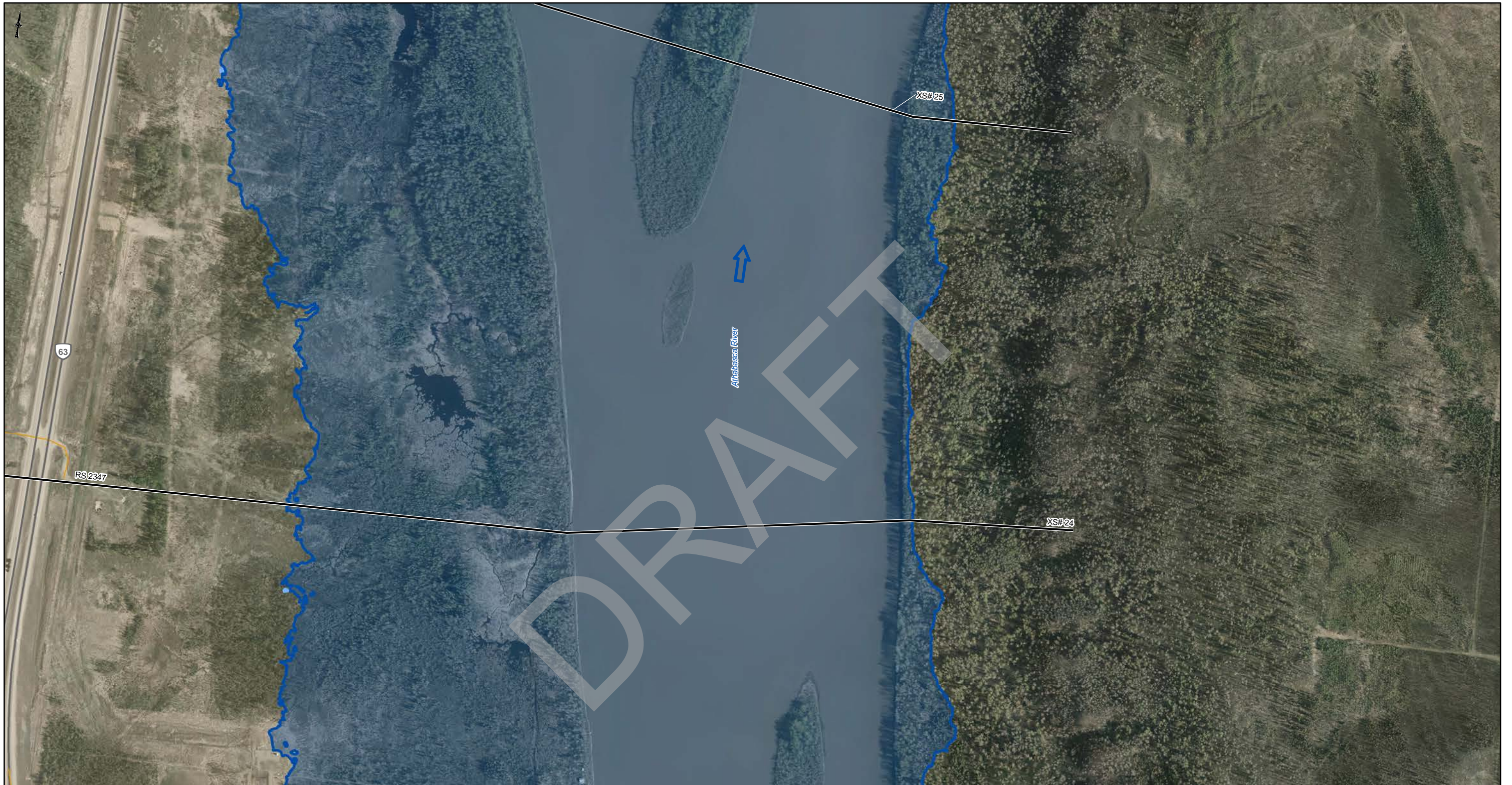
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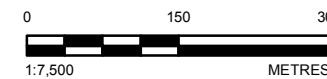
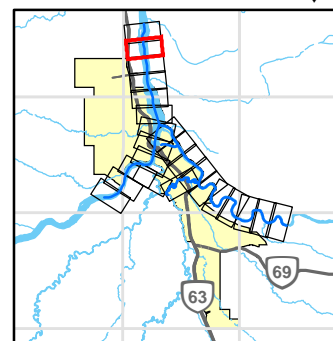
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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 10 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
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DISCHARGE	
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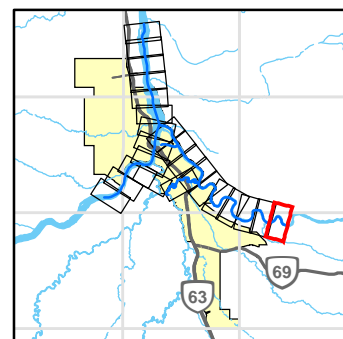
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 11 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 385 m ³ /s	



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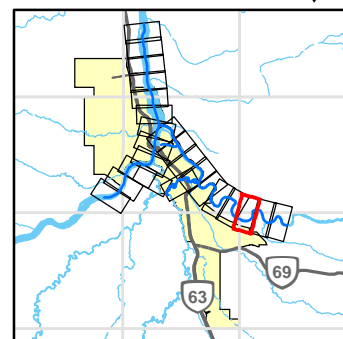
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TITLE ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 13 of 23



- LEGEND**
- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - ➡ FLOW DIRECTION
 - BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - FLOOD CONTROL STRUCTURE
 - STUDY BOUNDARY
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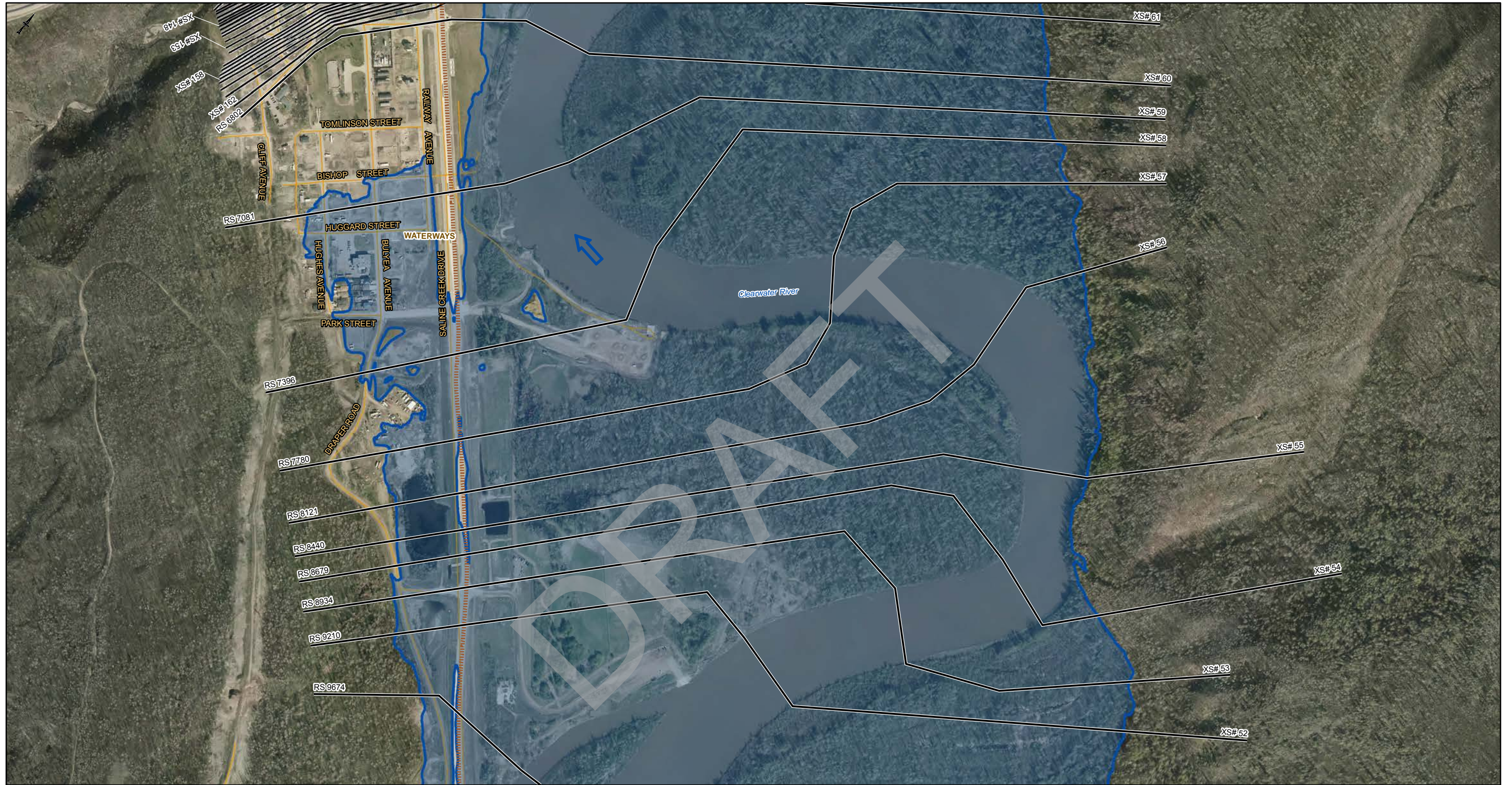
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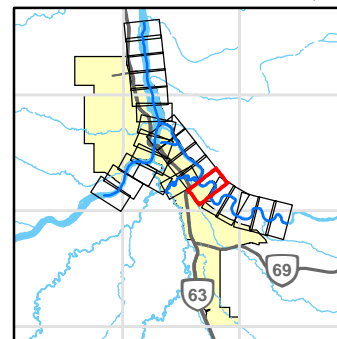
PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 15 of 23

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LEGEND	
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➔	FLOW DIRECTION
⌈⌋	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
⌈⌋	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
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■	50-YEAR FLOOD EXTENT
■	50-YEAR FLOOD EXTENT (ISOLATED AREA)
■	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 385 m ³ /s	



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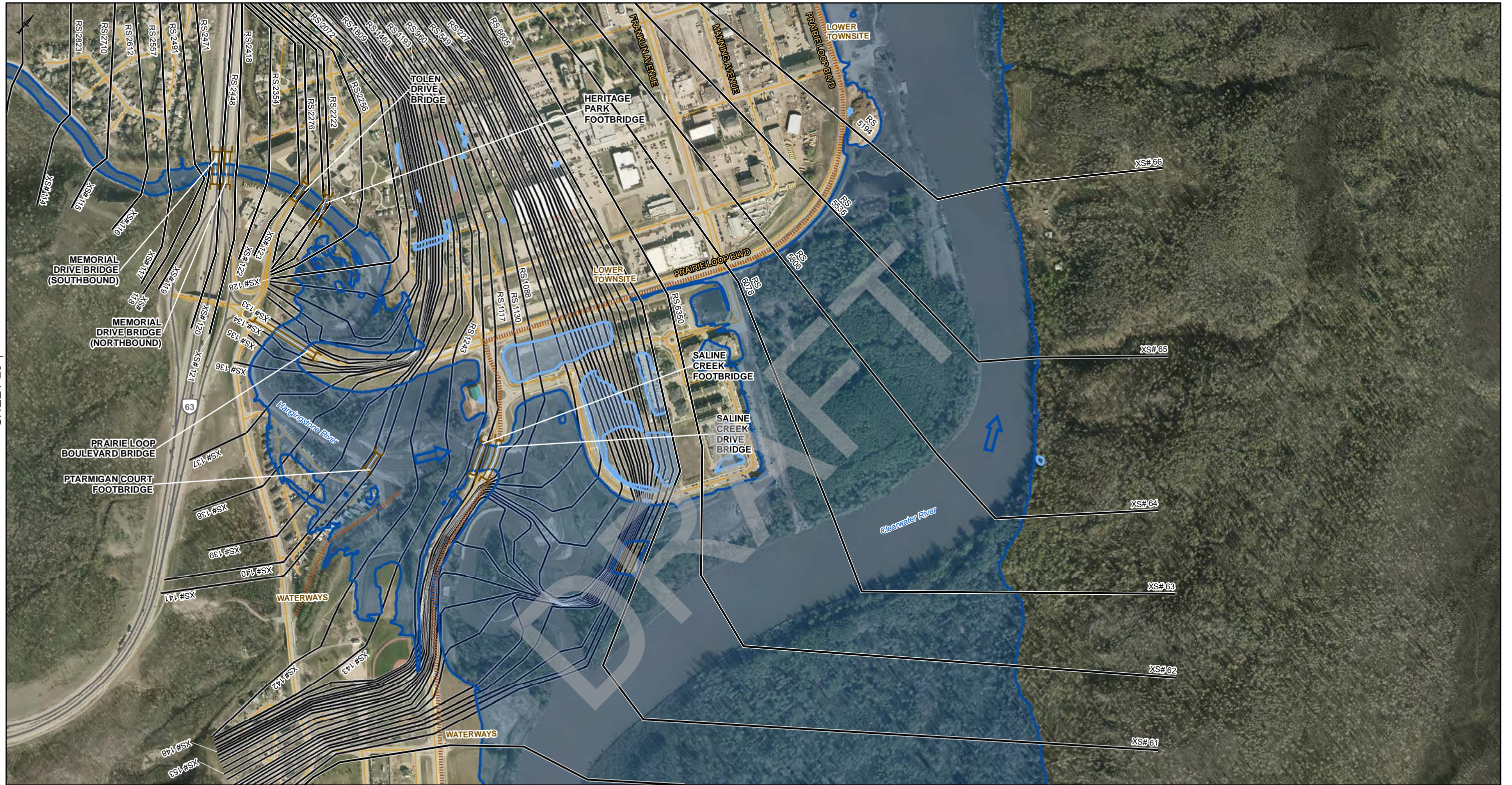
YYYY-MM-DD	2018-10-25
DESIGNED	S. ZARE
PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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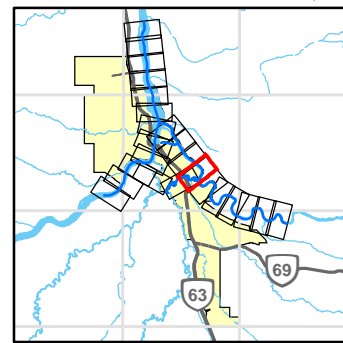
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 18 of 23



LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➔	FLOW DIRECTION
⌈	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
▬▬▬	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
■	50-YEAR FLOOD EXTENT
■	50-YEAR FLOOD EXTENT (ISOLATED AREA)
■	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 385 m ³ /s	
HANGINGSTONE RIVER = 162 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 859 m ³ /s	



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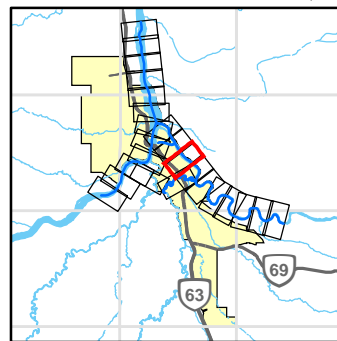
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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 19 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 421 m ³ /s	



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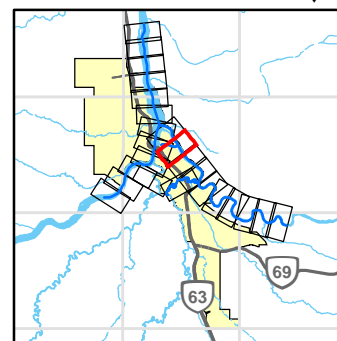
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FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

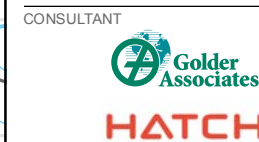
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 20 of 23



	CROSS SECTION		ICE JAM 50-YEAR FLOOD INUNDATION EXTENT
	CROSS SECTION NUMBER		50-YEAR FLOOD EXTENT
	RIVER STATION		50-YEAR FLOOD EXTENT (ISOLATED AREA)
	FLOW DIRECTION		50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	BRIDGE		DISCHARGE
	LOCAL ROAD		CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 421 m³/s
	PRIMARY HIGHWAY		
	FLOOD CONTROL STRUCTURE		
	STUDY BOUNDARY		



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CONSULTANT	Golder Associates HATCH
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PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT

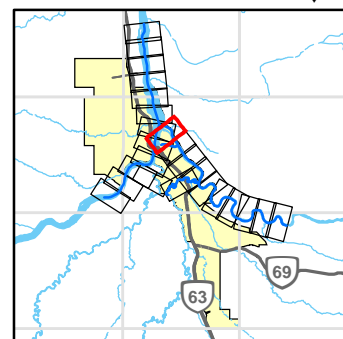
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 21 of 23



SHEET 5 ↑

SHEET 21 ↓

CROSS SECTION	ICE JAM 50-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	50-YEAR FLOOD EXTENT
RS57085 RIVER STATION	50-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1350 m ³ /s
PRIMARY HIGHWAY	CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 421 m ³ /s
FLOOD CONTROL STRUCTURE	ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1450 m ³ /s
STUDY BOUNDARY	



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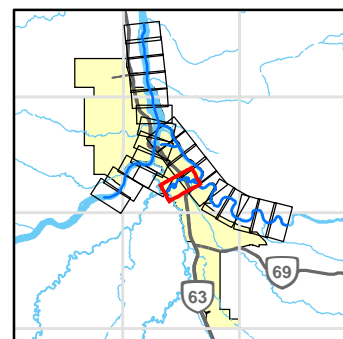
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PROJECT FORT McMURRAY RIVER HAZARD STUDY	
TITLE ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO. 1662603	CONTROL 6000
REV. 0	FIGURE Sheet 22 of 23



SHEET 19 ↓

LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 50-YEAR FLOOD INUNDATION EXTENT	
	50-YEAR FLOOD EXTENT
	50-YEAR FLOOD EXTENT (ISOLATED AREA)
	50-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 385 m ³ /s	
HANGINGSTONE RIVER = 36 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 421 m ³ /s	



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APPROVED	J. GROENEVELD

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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 50-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 23 of 23



100-YEAR ICE JAM FLOOD INUNDATION EXTENT

Sheets 1-23

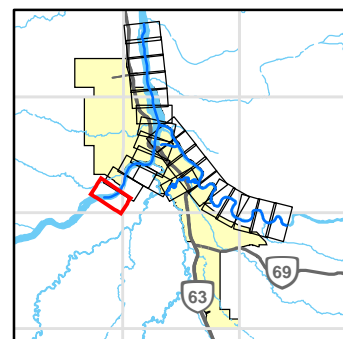
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LEGEND

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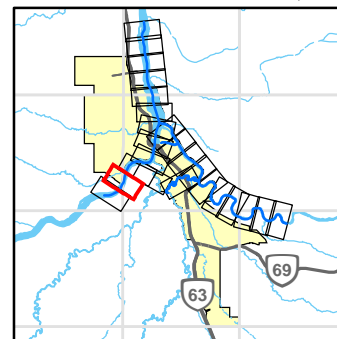
	YYYY-MM-DD 2018-10-25 DESIGNED S. ZARE PREPARED P. THIEDE REVIEWED S. ZARE APPROVED J. GROENEVELD
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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 1 of 23

28mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



- LEGEND**
- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - ➔ FLOW DIRECTION
 - BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - FLOOD CONTROL STRUCTURE
 - STUDY BOUNDARY
- ICE JAM 100-YEAR FLOOD INUNDATION EXTENT**
- 100-YEAR FLOOD EXTENT
 - 100-YEAR FLOOD EXTENT (ISOLATED AREA)
 - 100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
- DISCHARGE**
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1600 m³/s



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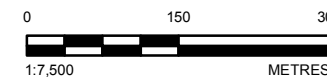
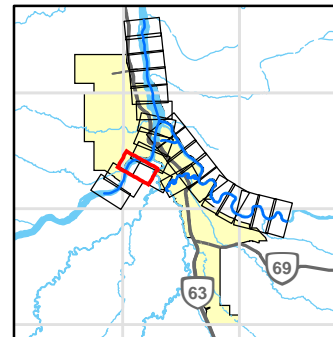
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 2 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1600 m ³ /s	



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APPROVED	J. GROENEVELD

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PROJECT
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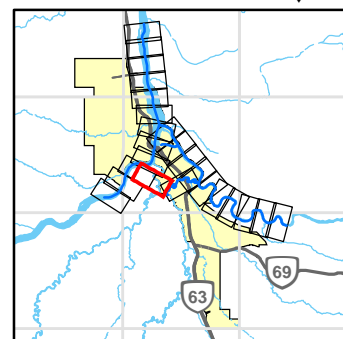
TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 3 of 23



SHEET 3 ↑

LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1600 m ³ /s	



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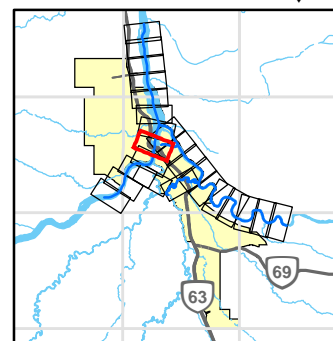
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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 3a of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
	ICE JAM 100-YEAR FLOOD INUNDATION EXTENT
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	DISCHARGE ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1600 m ³ /s



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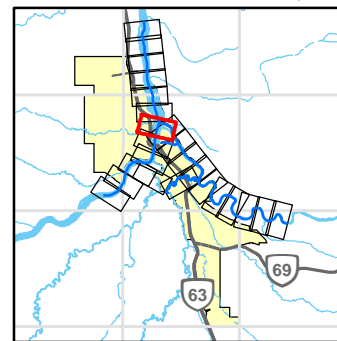
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 5 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1700 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m ³ /s	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1700 m ³ /s	



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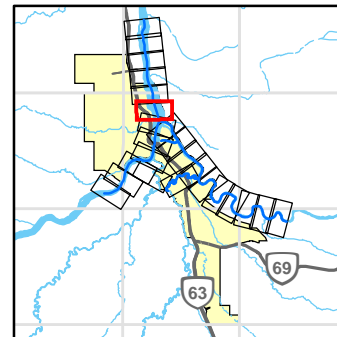
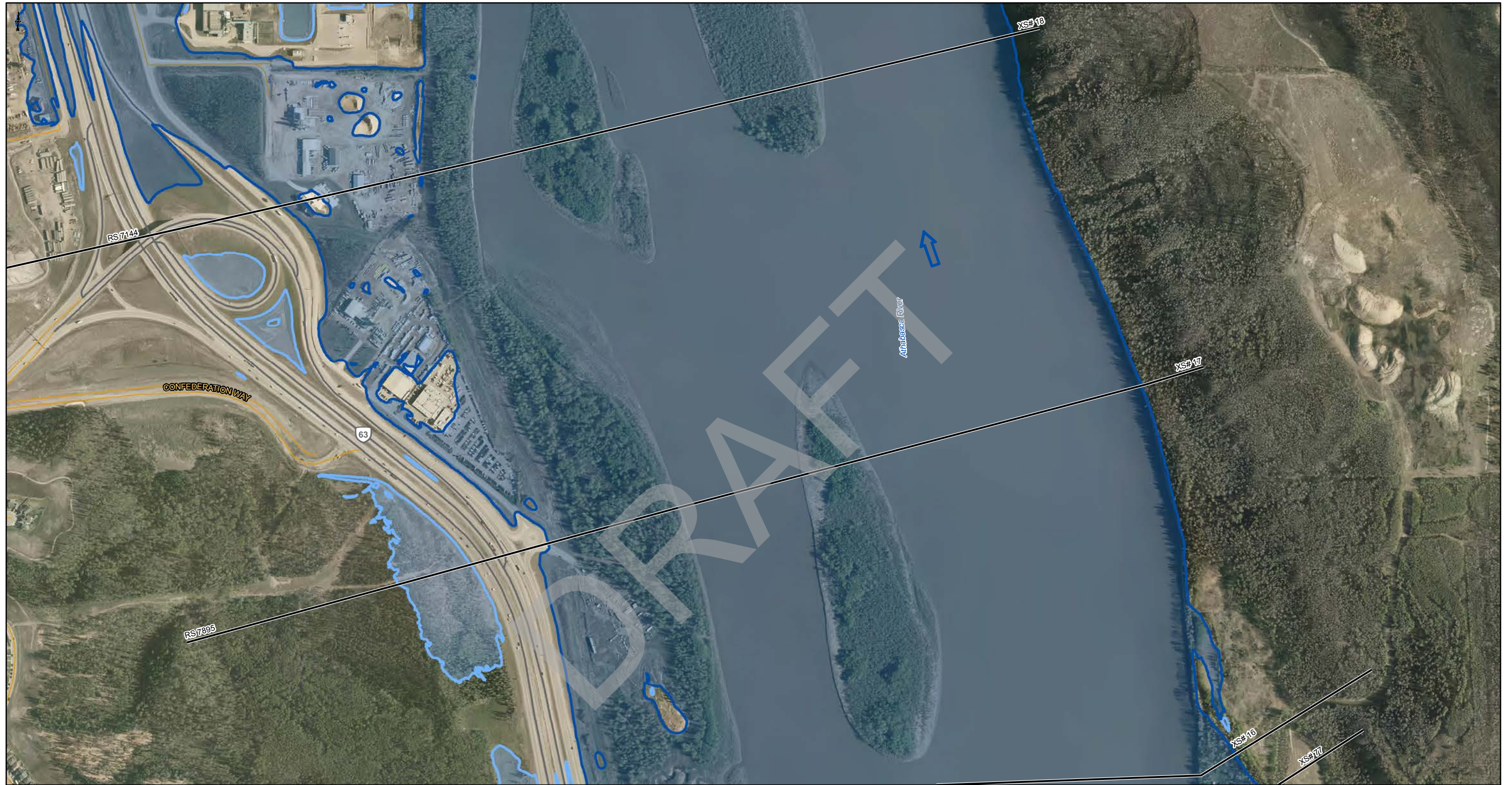
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PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 6 of 23



LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➔	FLOW DIRECTION
⌈⌋	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
▬▬▬	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
■	100-YEAR FLOOD EXTENT
■	100-YEAR FLOOD EXTENT (ISOLATED AREA)
■	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1700 m³/s	



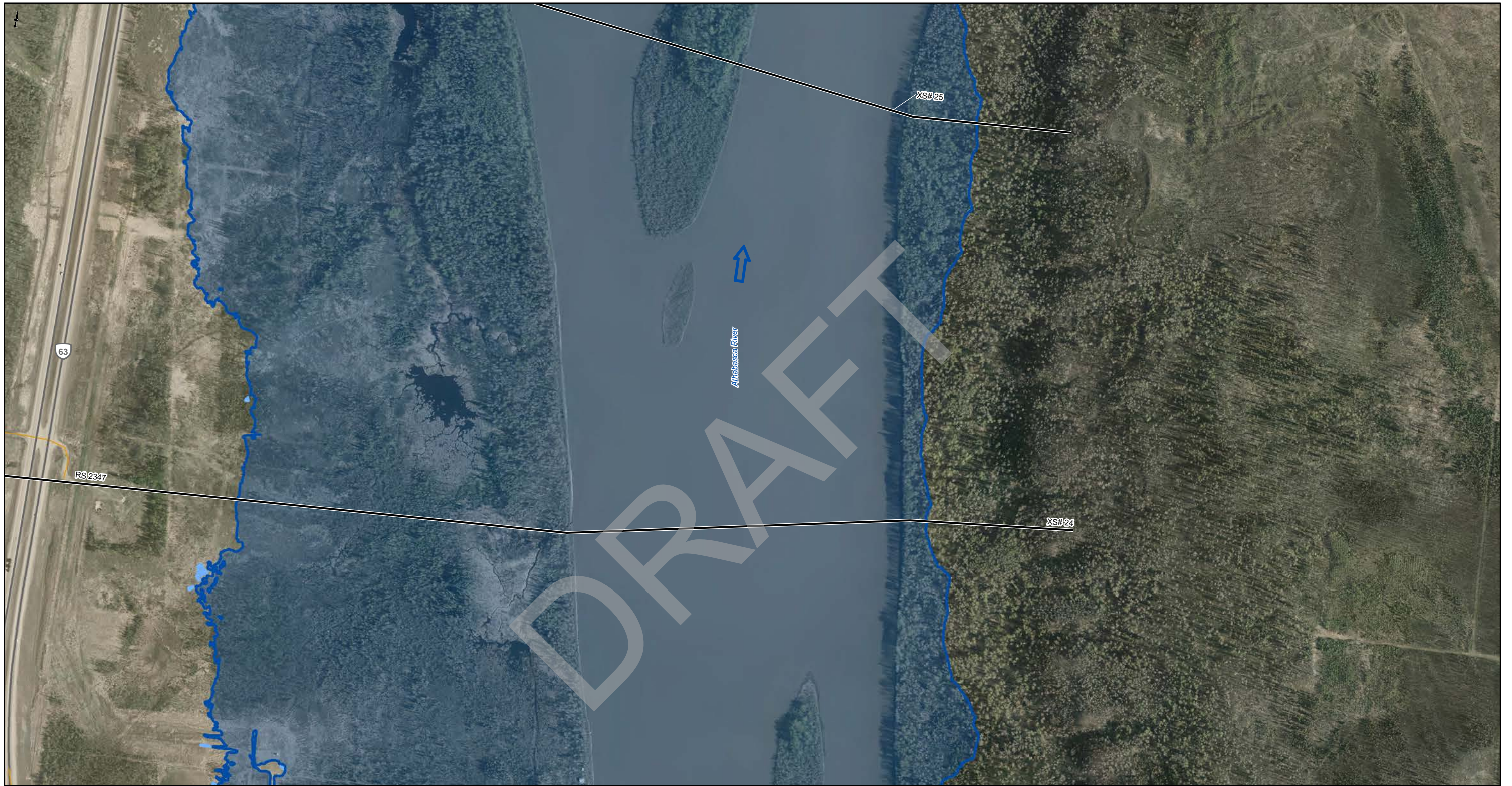
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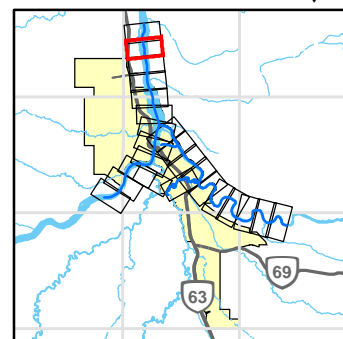
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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

PROJECT FORT McMURRAY RIVER HAZARD STUDY	
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO. 1662603	CONTROL 6000
REV. 0	FIGURE Sheet 7 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1700 m ³ /s	



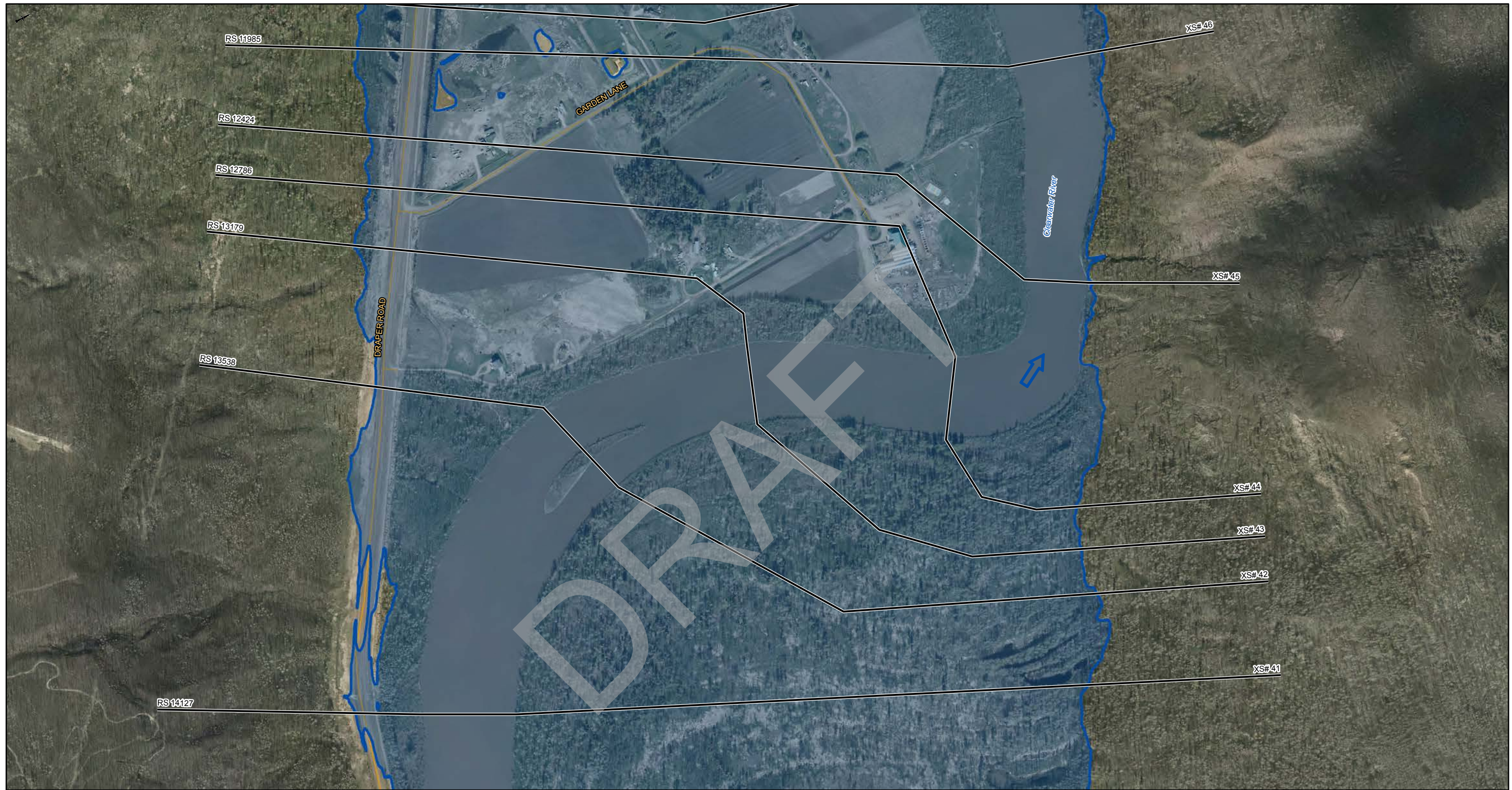
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CONSULTANT

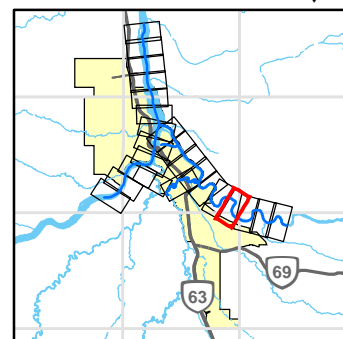
YYYY-MM-DD	2018-10-25
DESIGNED	S. ZARE
PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 11 of 23

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LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 436 m ³ /s	



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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 16 of 23

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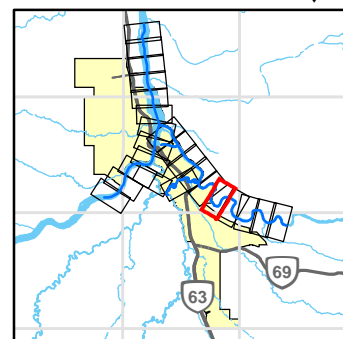
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LEGEND

—	CROSS SECTION		ICE JAM 100-YEAR FLOOD INUNDATION EXTENT
XS#110	CROSS SECTION NUMBER		100-YEAR FLOOD EXTENT
RS57085	RIVER STATION		100-YEAR FLOOD EXTENT (ISOLATED AREA)
	FLOW DIRECTION		100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	BRIDGE		
	LOCAL ROAD		
	PRIMARY HIGHWAY		
	FLOOD CONTROL STRUCTURE		
	STUDY BOUNDARY		

DISCHARGE
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 436 m³/s



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APPROVED	J. GROENEVELD

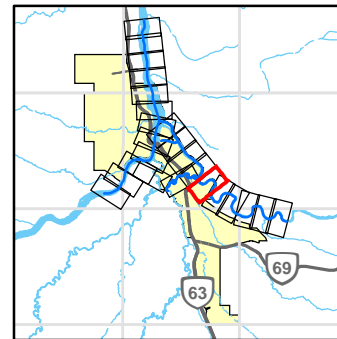
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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 17 of 23



LEGEND

CROSS SECTION	ICE JAM 100-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	100-YEAR FLOOD EXTENT
RS57085 RIVER STATION	100-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 436 m ³ /s
PRIMARY HIGHWAY	
FLOOD CONTROL STRUCTURE	
STUDY BOUNDARY	



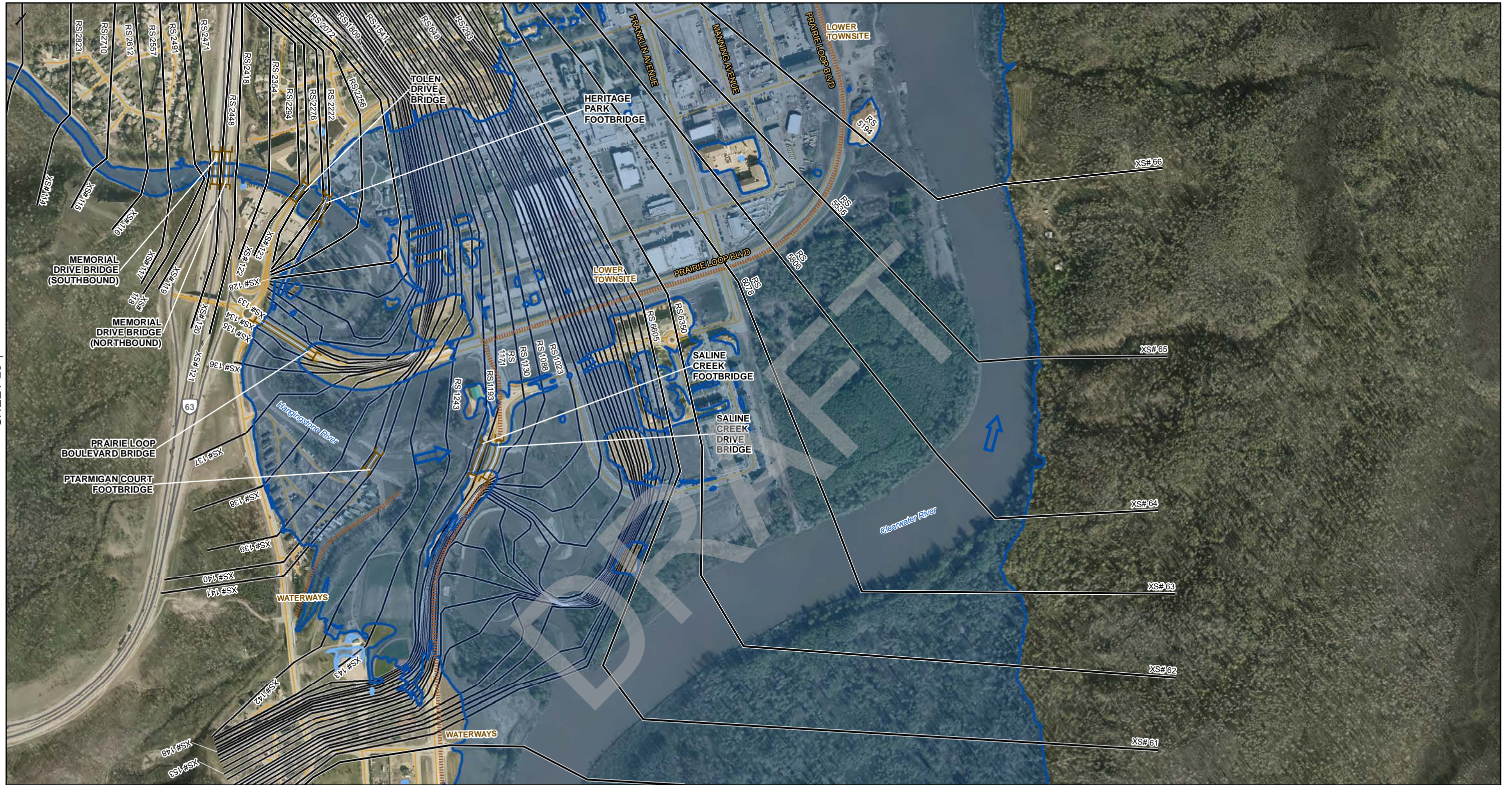
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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

PROJECT FORT McMURRAY RIVER HAZARD STUDY	
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO. 1662603	CONTROL 6000
REV. 0	FIGURE Sheet 18 of 23



LEGEND

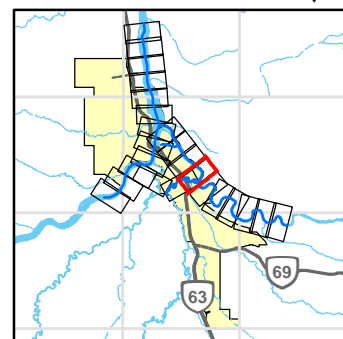
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- XS#110 CROSS SECTION NUMBER
- RS57085 RIVER STATION
- ➡ FLOW DIRECTION
- ⌈⌋ BRIDGE
- LOCAL ROAD
- PRIMARY HIGHWAY
- ▬ FLOOD CONTROL STRUCTURE
- STUDY BOUNDARY

ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

- 100-YEAR FLOOD EXTENT
- 100-YEAR FLOOD EXTENT (ISOLATED AREA)
- 100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)

DISCHARGE

- CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 436 m³/s
- HANGINGSTONE RIVER = 44 m³/s
- CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m³/s



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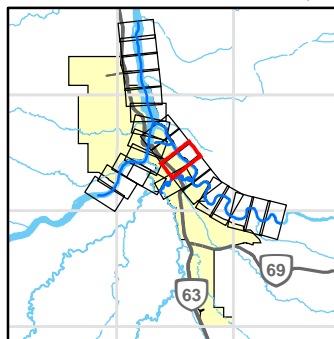
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 19 of 23



- LEGEND**
- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - ➡ FLOW DIRECTION
 - ⌈⌋ BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - ▬ FLOOD CONTROL STRUCTURE
 - ▬ STUDY BOUNDARY
- ICE JAM 100-YEAR FLOOD INUNDATION EXTENT**
- 100-YEAR FLOOD EXTENT
 - 100-YEAR FLOOD EXTENT (ISOLATED AREA)
 - 100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
- DISCHARGE**
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m³/s



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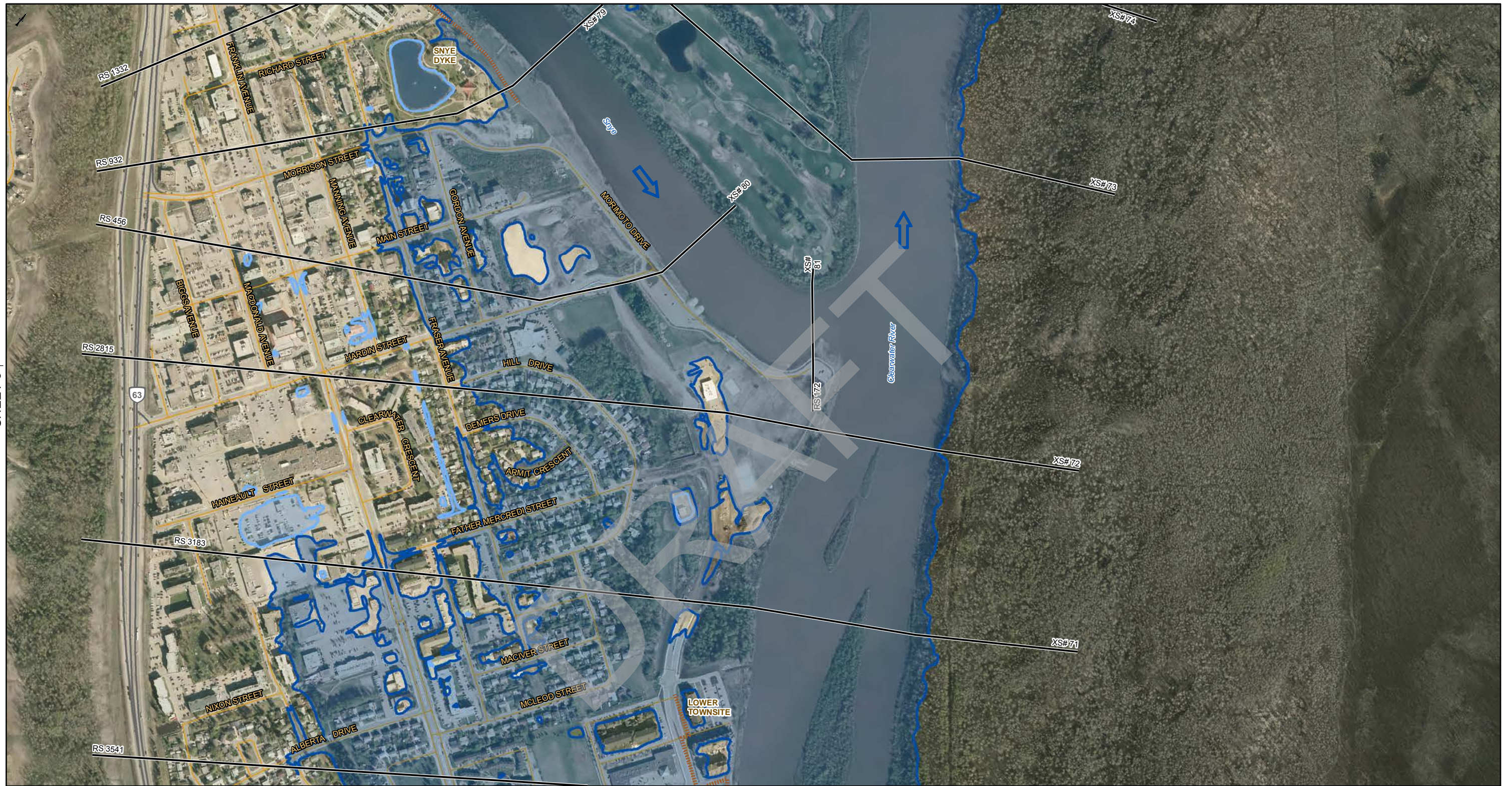
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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

PROJECT
FORT McMURRAY RIVER HAZARD STUDY

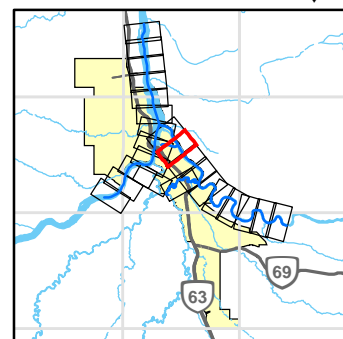
TITLE
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 20 of 23

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LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
	ICE JAM 100-YEAR FLOOD INUNDATION EXTENT
	100-YEAR FLOOD EXTENT
	100-YEAR FLOOD EXTENT (ISOLATED AREA)
	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	DISCHARGE
	CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m³/s



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PROJECT	
FORT McMURRAY RIVER HAZARD STUDY	
TITLE	
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO.	CONTROL
1662603	6000
REV.	FIGURE
0	Sheet 21 of 23

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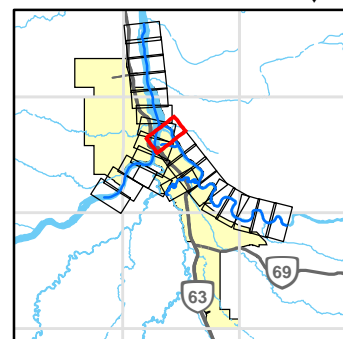
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SHEET 5 ↑

SHEET 21 ↓

LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➔	FLOW DIRECTION
⌈⌋	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
▬▬▬	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
ICE JAM 100-YEAR FLOOD INUNDATION EXTENT	
■	100-YEAR FLOOD EXTENT
■	100-YEAR FLOOD EXTENT (ISOLATED AREA)
■	100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1600 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m ³ /s	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1700 m ³ /s	



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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 22 of 23



SHEET 19 ↓

LEGEND

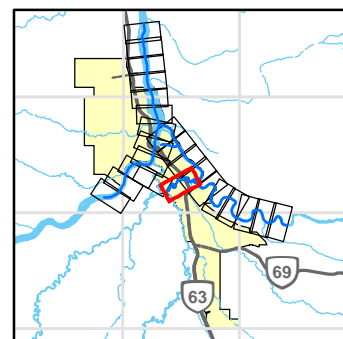
- CROSS SECTION
- XS#110 CROSS SECTION NUMBER
- RS57085 RIVER STATION
- ➔ FLOW DIRECTION
- BRIDGE
- LOCAL ROAD
- PRIMARY HIGHWAY
- FLOOD CONTROL STRUCTURE
- STUDY BOUNDARY

ICE JAM 100-YEAR FLOOD INUNDATION EXTENT

- 100-YEAR FLOOD EXTENT
- 100-YEAR FLOOD EXTENT (ISOLATED AREA)
- 100-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)

DISCHARGE

CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 436 m³/s
 HANGINGSTONE RIVER = 44 m³/s
 CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 480 m³/s



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PROJECT FORT McMURRAY RIVER HAZARD STUDY		
TITLE ICE JAM 100-YEAR FLOOD INUNDATION EXTENT		
PROJECT NO. 1662603	CONTROL 6000	REV. 0
FIGURE Sheet 23 of 23		



200-YEAR ICE JAM FLOOD INUNDATION EXTENT

Sheets 1-23

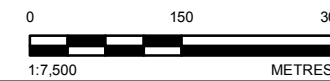
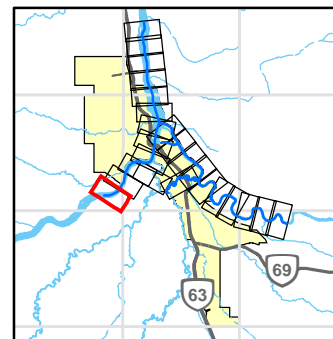
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LEGEND

—	CROSS SECTION		ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
XS#110	CROSS SECTION NUMBER		200-YEAR FLOOD EXTENT
RS57085	RIVER STATION		200-YEAR FLOOD EXTENT (ISOLATED AREA)
	FLOW DIRECTION		200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	BRIDGE		
	LOCAL ROAD		
	PRIMARY HIGHWAY		
	FLOOD CONTROL STRUCTURE		
	STUDY BOUNDARY		

DISCHARGE
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1875 m³/s



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PROJECT
FORT McMURRAY RIVER HAZARD STUDY

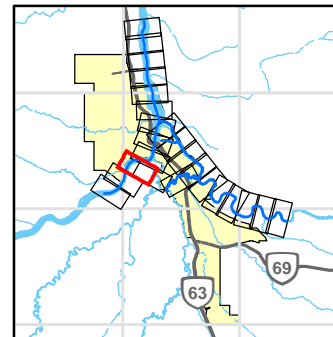
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ICE JAM 200-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 1 of 23

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LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1875 m ³ /s	



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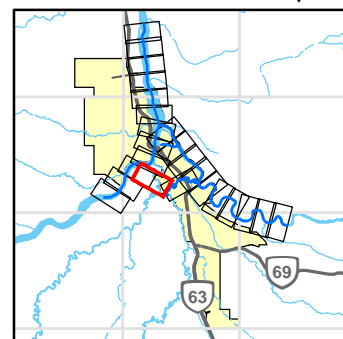
PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 3 of 23



SHEET 3 ↑

SHEET 2 ↓

LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1875 m ³ /s	



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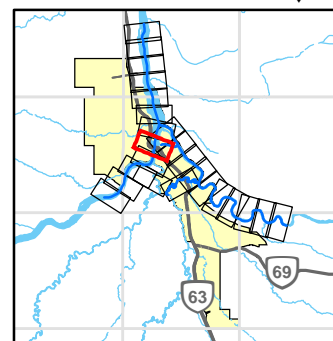
CONSULTANT

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DATUM: NAD 83 CSRS PROJECTION: 3TM 111			
PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 3a of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
	DISCHARGE
	ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1875 m ³ /s



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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

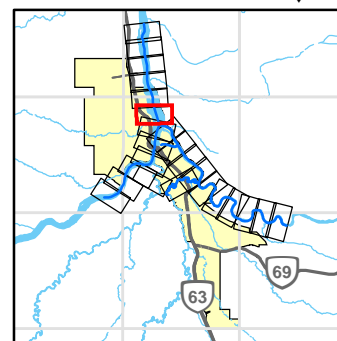
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TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO. 1662603	CONTROL 6000
REV. 0	FIGURE Sheet 5 of 23

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LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➔	FLOW DIRECTION
⌈⌋	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
▬▬▬	FLOOD CONTROL STRUCTURE
■	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
■	200-YEAR FLOOD EXTENT
■	200-YEAR FLOOD EXTENT (ISOLATED AREA)
■	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m ³ /s	



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Golder Associates
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DESIGNED	S. ZARE
PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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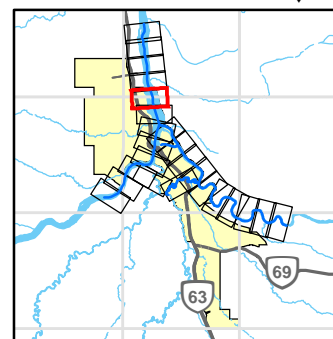
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 7 of 23



CROSS SECTION	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	200-YEAR FLOOD EXTENT
RS57085 RIVER STATION	200-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m ³ /s
LOCAL ROAD	
PRIMARY HIGHWAY	
FLOOD CONTROL STRUCTURE	
STUDY BOUNDARY	



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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 8 of 23

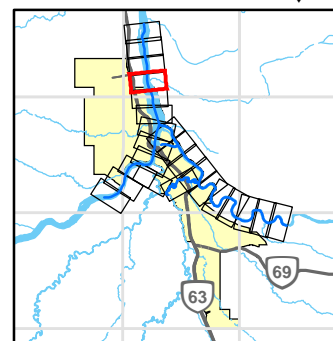
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



LEGEND

- CROSS SECTION
 - XS#110 CROSS SECTION NUMBER
 - RS57085 RIVER STATION
 - ➡ FLOW DIRECTION
 - BRIDGE
 - LOCAL ROAD
 - PRIMARY HIGHWAY
 - FLOOD CONTROL STRUCTURE
 - STUDY BOUNDARY
-
- ICE JAM 200-YEAR FLOOD INUNDATION EXTENT**
 - 200-YEAR FLOOD EXTENT
 - 200-YEAR FLOOD EXTENT (ISOLATED AREA)
 - 200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
-
- DISCHARGE**
 - ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m³/s



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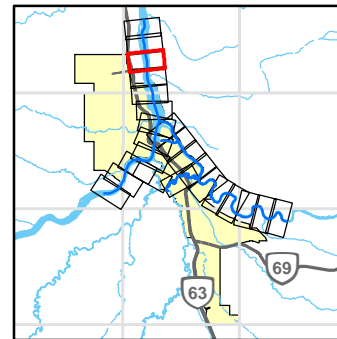
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HATCH

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CONSULTANT	Golder Associates HATCH
DATE	2018-10-25
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PREPARED	P. THIEDE
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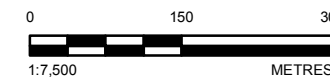
PROJECT FORT McMURRAY RIVER HAZARD STUDY	
TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
PROJECT NO. 1662603	CONTROL 6000
REV. 0	FIGURE Sheet 9 of 23

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LEGEND

CROSS SECTION	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	200-YEAR FLOOD EXTENT
RS57085 RIVER STATION	200-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m ³ /s
PRIMARY HIGHWAY	
FLOOD CONTROL STRUCTURE	
STUDY BOUNDARY	



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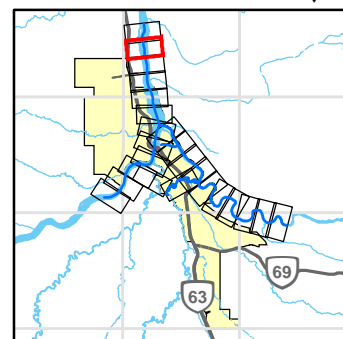
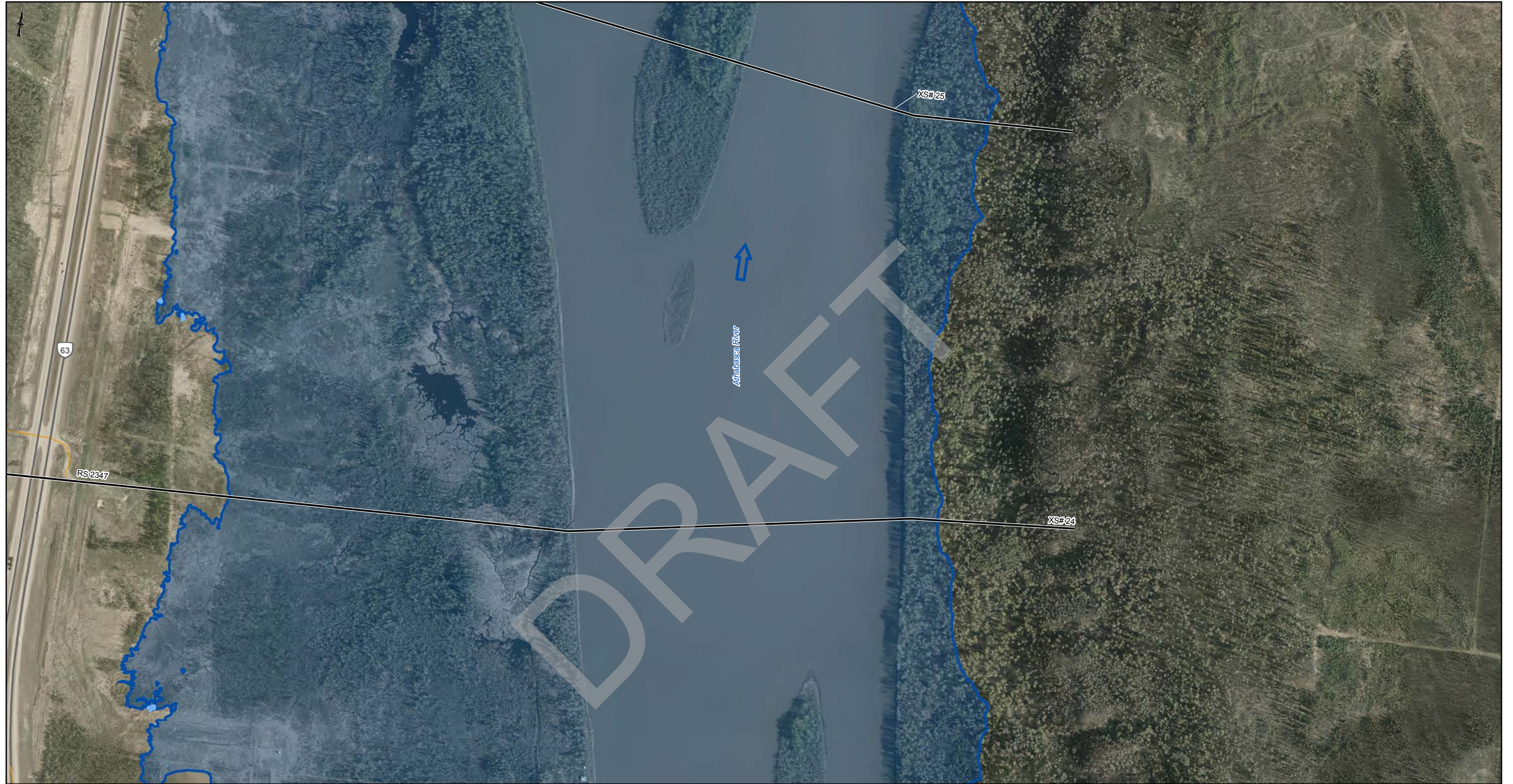
YYYY-MM-DD	2018-10-25
DESIGNED	S. ZARE
PREPARED	P. THIEDE
REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 10 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m ³ /s	



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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

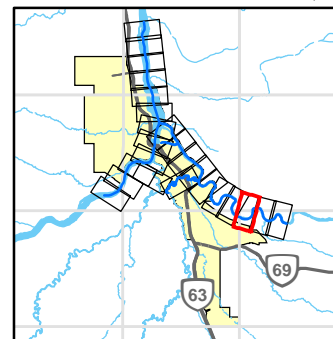
PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO. 1662603	CONTROL 6000	REV. 0	FIGURE Sheet 11 of 23

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LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
➡	FLOW DIRECTION
—+—	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
—+—+—	FLOOD CONTROL STRUCTURE
—+—+—	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
■	200-YEAR FLOOD EXTENT
■	200-YEAR FLOOD EXTENT (ISOLATED AREA)
■	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 488 m ³ /s	



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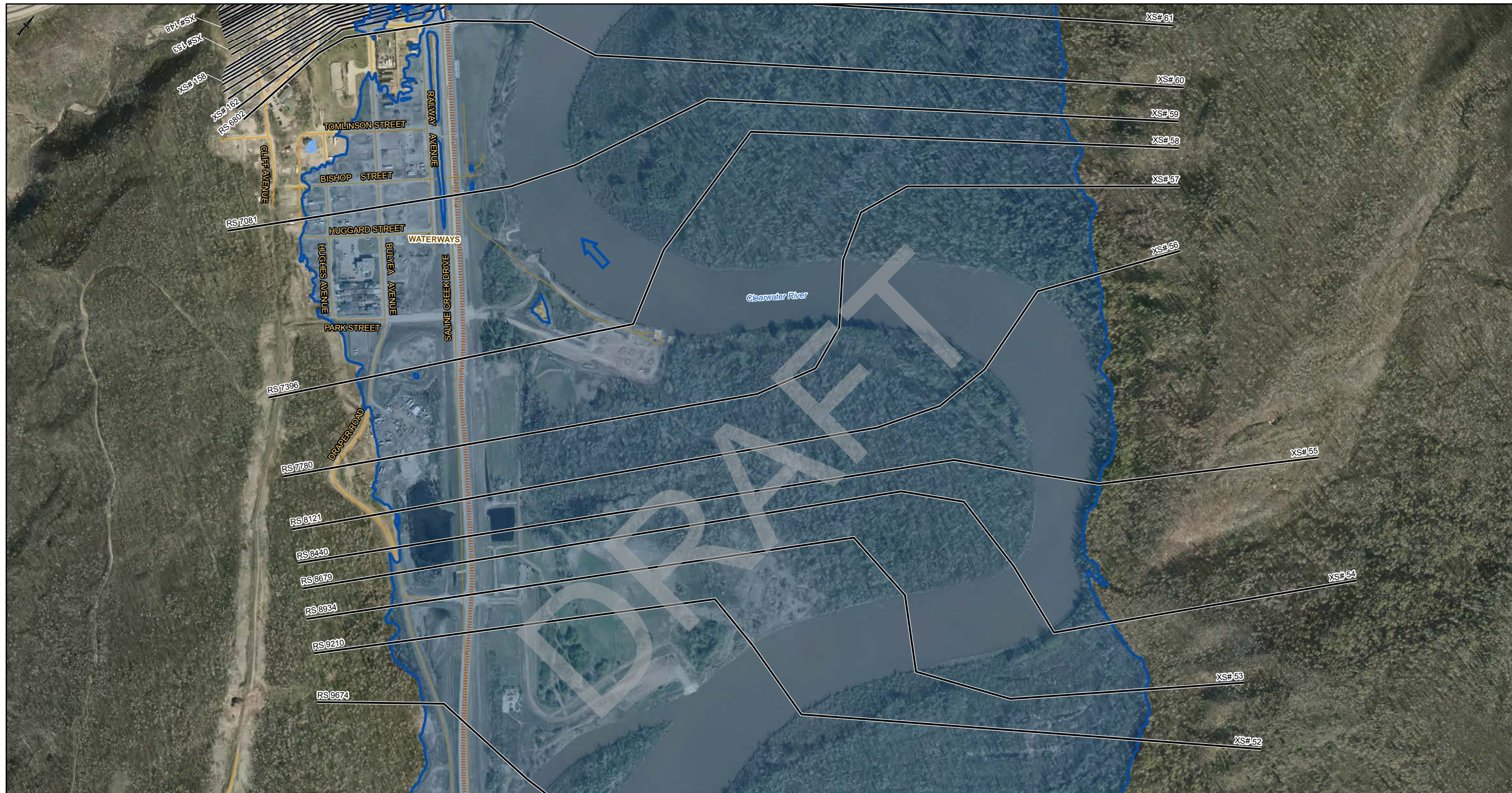
Alberta Government	
YYYY-MM-DD	2018-10-25
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REVIEWED	S. ZARE
APPROVED	J. GROENEVELD

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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

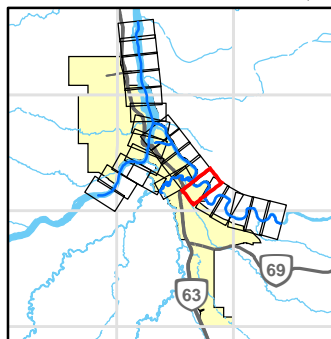
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 15 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 488 m ³ /s	



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APPROVED	J. GROENEVELD

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DATUM: NAD 83 CSRS PROJECTION: 3TM 111

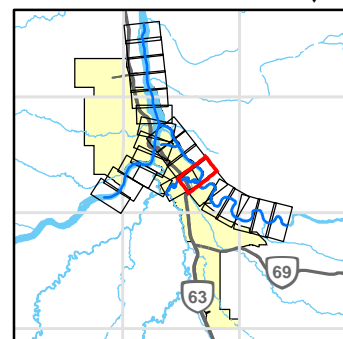
PROJECT
FORT McMURRAY RIVER HAZARD STUDY

TITLE
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT

PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 18 of 23



LEGEND	
	CROSS SECTION
	CROSS SECTION NUMBER
	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 488 m ³ /s	
HANGINGSTONE RIVER = 50 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 538 m ³ /s	

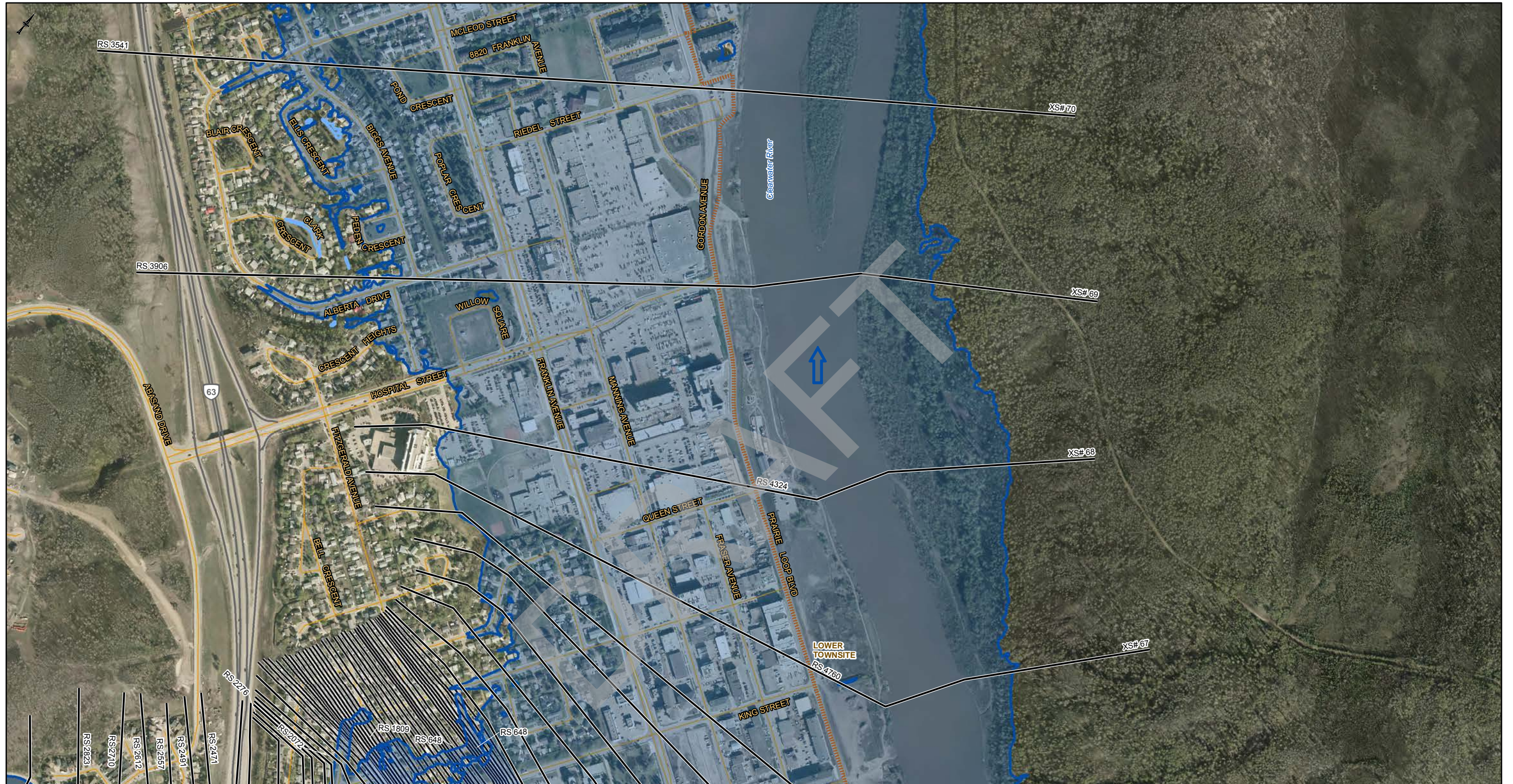


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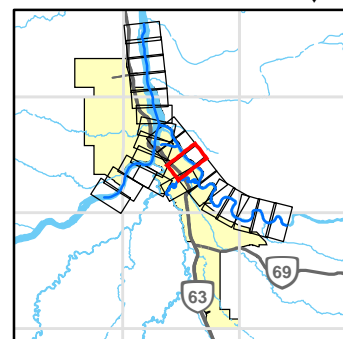
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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 19 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 538 m ³ /s	



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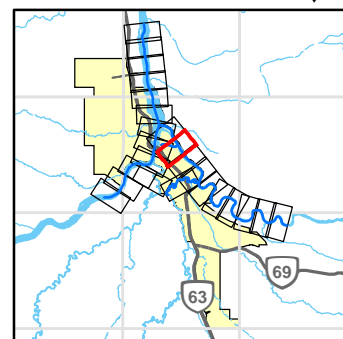
CONSULTANT

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PROJECT FORT McMURRAY RIVER HAZARD STUDY			
TITLE ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 20 of 23



LEGEND	
	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
	FLOW DIRECTION
	BRIDGE
	LOCAL ROAD
	PRIMARY HIGHWAY
	FLOOD CONTROL STRUCTURE
	STUDY BOUNDARY
	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
	200-YEAR FLOOD EXTENT
	200-YEAR FLOOD EXTENT (ISOLATED AREA)
	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 538 m³/s	



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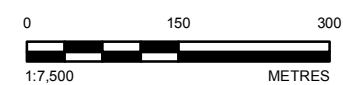
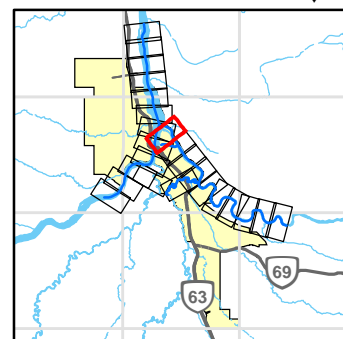
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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 21 of 23



CROSS SECTION	ICE JAM 200-YEAR FLOOD INUNDATION EXTENT
XS#110 CROSS SECTION NUMBER	200-YEAR FLOOD EXTENT
RS57085 RIVER STATION	200-YEAR FLOOD EXTENT (ISOLATED AREA)
FLOW DIRECTION	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
BRIDGE	DISCHARGE
LOCAL ROAD	ATHABASCA RIVER ABOVE CLEARWATER RIVER CONFLUENCE = 1875 m ³ /s
PRIMARY HIGHWAY	CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 538 m ³ /s
FLOOD CONTROL STRUCTURE	ATHABASCA RIVER BELOW CLEARWATER RIVER CONFLUENCE = 1975 m ³ /s
STUDY BOUNDARY	



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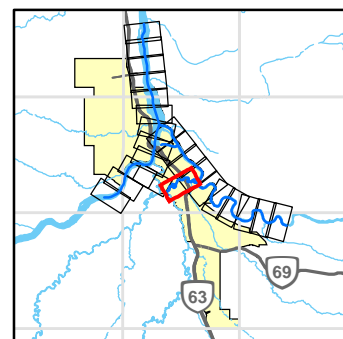
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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 22 of 23



SHEET 19 ↓

LEGEND	
—	CROSS SECTION
XS#110	CROSS SECTION NUMBER
RS57085	RIVER STATION
→	FLOW DIRECTION
—+—	BRIDGE
—	LOCAL ROAD
—	PRIMARY HIGHWAY
—+—+—	FLOOD CONTROL STRUCTURE
—+—+—	STUDY BOUNDARY
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT	
■	200-YEAR FLOOD EXTENT
■	200-YEAR FLOOD EXTENT (ISOLATED AREA)
■	200-YEAR FLOOD EXTENT (FLOOD CONTROL STRUCTURE FAILURE)
DISCHARGE	
CLEARWATER RIVER ABOVE HANGINGSTONE RIVER CONFLUENCE = 488 m ³ /s	
HANGINGSTONE RIVER = 50 m ³ /s	
CLEARWATER RIVER BELOW HANGINGSTONE RIVER CONFLUENCE = 538 m ³ /s	



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HATCH

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PROJECT			
FORT McMURRAY RIVER HAZARD STUDY			
TITLE			
ICE JAM 200-YEAR FLOOD INUNDATION EXTENT			
PROJECT NO.	CONTROL	REV.	FIGURE
1662603	6000	0	Sheet 23 of 23