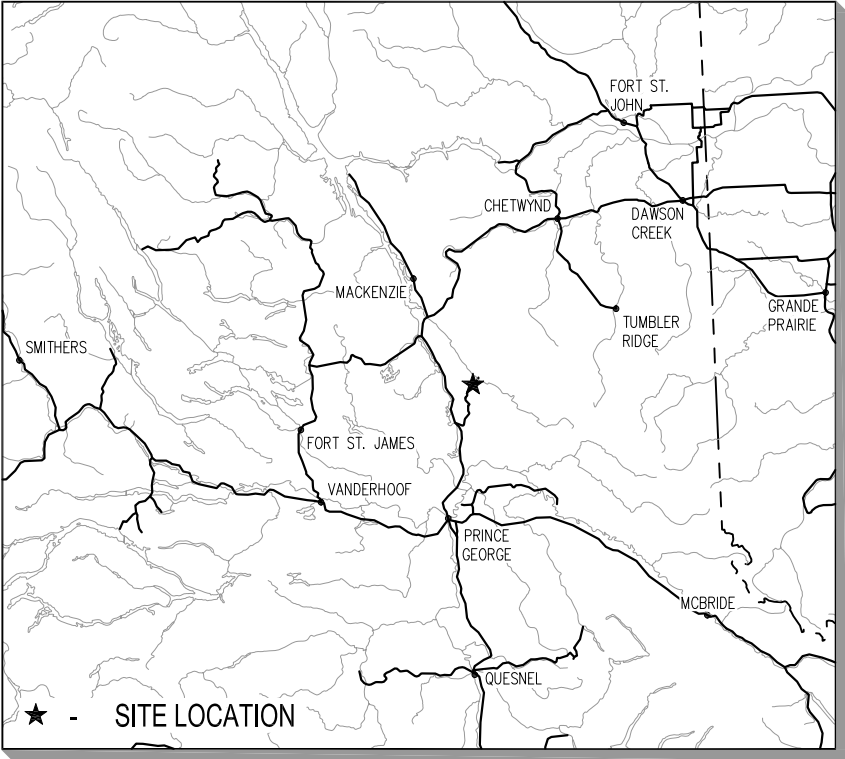




LOCATION MAP



Ministry of Forests, Lands and Natural Resource Operations

CONTRACT / FILE NO: 11250-85 / EN15DPG314

SITE SURVEY AND CONCEPTUAL DESIGN AT THREE SITES ON THE CHUCHINKA-COLBOURNE AND CHUCHINKA-HAMBONE FOREST SERVICE ROADS



SITE 2, G1-153
CHUCHINKA-COLBOURNE FSR, 40.0 km

DRAWING LIST		
DRAWING NUMBER	REVISION	DRAWING TITLE
G-200	0	GENERAL NOTES
C-201	0	EXISTING SITE PLAN
C-202	0	GENERAL ARRANGEMENT
C-203	0	RE-GRADING AND ABUTMENT DETAILS

1. DESIGN PARAMETERS

1. **DESIGN PARAMETERS:**

1.1. ALL LOADS ARE UNFACTORED UNLESS NOTED OTHERWISE.

1.2. CROSSING DESIGN LOAD:

DESIGN VEHICLE:

L-100 OFF-HIGHWAY (G.V.W. = 90,680 kg)

AXLE NUMBER
AXLE LOADS (kN)

SPACING (mm)

L-100 DESIGN TRUCK

AXLE NUMBER
AXLE LOADS (kN)

UNIFORMLY DISTRIBUTED
LOAD 25 kN/m

L-100 DESIGN LANE LOAD

NUMBER OF CYCLES: 500,000

DYNAMIC LOAD ALLOWANCE: 0.3

1.1. THE STREAM CROSSING WAS DESIGNED AS A PERMANENT STRUCTURE WITH A MINIMUM DESIGN LIFE OF 45 YEARS.

2. **GENERAL:**

2.1. REFERENCED CODES SHALL BE THE CURRENT EDITIONS UNLESS NOTED OTHERWISE.

2.2. THE DRAWINGS ARE FOR THE COMPLETED PROJECT. THE SUPPORT OF NEW AND EXISTING STRUCTURES DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR.

2.3. WHOLE NUMBERS INDICATE MILLIMETRES, DECIMAL NUMBERS INDICATE METRES.

2.4. DO NOT SCALE DRAWINGS.

2.5. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS IN THE FIELD. THE ENGINEER SHALL BE INFORMED OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL CONTROL THE PRODUCTION OF WORK ON SITE AND ELSEWHERE TO FULFILL THE INTENT OF THE DRAWINGS.

3. **ENVIRONMENTAL**

3.1. THE STREAM CROSSING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FISH STREAM CROSSING GUIDEBOOK BY THE MINISTRY OF FORESTS AND FISHERIES AND OCEANS CANADA PACIFIC REGION OPERATIONAL STATEMENT FOR CLEAR SPAN BRIDGES AS APPLICABLE.

3.2. EROSION CONTROL MEASURES SHALL BE TAKEN IN ACCORDANCE WITH FISHERIES AND OCEANS CANADA LAND DEVELOPMENT GUIDELINES FOR THE PROTECTION OF AQUATIC HABITAT.

4. **FILL:**

4.1. FILL SHALL BE GRANULAR MATERIAL OR APPROVED NATIVE SOIL FREE OF ORGANIC MATERIAL, FOREIGN MATTER AND ROCKS LARGER THAN 75 mm EXCEPT AS NOTED IN SECTION 4.2. NATIVE MATERIAL IS NOT ACCEPTABLE IF IT IS IMPRACTICABLE TO CONTROL THE WATER CONTENT OR COMPACT TO THE SPECIFIED DENSITY.

4.2. ROAD BASE COURSE FILL SHALL BE GRANULAR MATERIAL WITH A MAXIMUM FINES CONTENT OF 15 %

4.3. FILL SHALL BE COMPACTED TO THE FOLLOWING STANDARD PROCTOR MAXIMUM DRY DENSITIES IN LAYERS NOT EXCEEDING 300 mm:

BRIDGE END FILL:	100 %
ROAD BASE COURSE:	100 %
ROAD EMBANKMENTS:	95 %

5. **RIPRAP**

5.1. RIPRAP SHALL BE ANGULAR, HARD, DURABLE QUARRY STONE, FREE FROM SEAMS, CRACKS OR OTHER STRUCTURAL DEFECTS, WITH A SPECIFIC GRAVITY OF NOT LESS THAN 2.65.

5.2. THE MAXIMUM DIMENSION OF THE RIPRAP SHALL NOT EXCEED 2.5 TIMES ITS MINIMUM DIMENSION.

5.3. RIPRAP SHALL BE PLACED ON NON-WOVEN GEOTEXTILE.

6. **GEOSYNTHETICS**

6.1. NON-WOVEN GEOTEXTILES SHALL COMPLY WITH THE FOLLOWING UNLESS NOTED OTHERWISE:

GRAB TENSILE STRENGTH (ASTM D4595):	890 N
CBR PUNCTURE STRENGTH (ASTM D6241):	2,200 N

6.2. WOVEN GEOTEXTILES SHALL COMPLY WITH THE FOLLOWING UNLESS NOTED OTHERWISE:

MIN WIDE-WIDTH TENSILE STRENGTH (ASTM D4595):	30 kN/m
---	---------

7. **SHALLOW FOUNDATIONS:**

7.1. ASSUMED SOIL BEARING CAPACITY: 200 kPa

7.2. THE SOIL BEARING CAPACITY SHALL BE VERIFIED IN THE FIELD. THE ENGINEER SHALL BE NOTIFIED IF THE ACTUAL SOIL BEARING CAPACITY IS SUSPECTED TO BE LESS THAN THE VALUE SPECIFIED ABOVE.

7.3. FOOTINGS SHALL BEAR ON APPROVED NATIVE, UNDISTURBED SOIL OR ROCK, FREE OF ORGANIC MATERIAL, OR ON COMPACTED GRANULAR FILL.

8. STRUCTURAL STEEL:
- 8.1. THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO CSA-S6 AND ALL SUPPLEMENTS TO DATE.
- 8.2. STRUCTURAL STEEL SHALL CONFORM TO MINISTRY OF FORESTS' STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
- 8.3. WELDING SHALL CONFORM TO CSA-W59, AND BE CARRIED OUT BY COMPANIES CERTIFIED IN ACCORDANCE WITH CSA-W47.1. WELDERS AND WELDING OPERATORS SHALL BE QUALIFIED BY THE CMB.
- 8.4. WELDS SHALL BE CONTINUOUS AND GROUND SMOOTH UNLESS NOTED OTHERWISE. BLEMISHES, WELD SPATTER AND SHOP MARKS SHALL BE REMOVED.
- 8.5. FIELD WELDING IS NOT PERMITTED UNLESS SPECIFIED OR AUTHORIZED BY THE ENGINEER.
- 8.6. THE CONTRACTOR SHALL BE RESPONSIBLE AND PAY FOR FOLLOWING NON-DESTRUCTIVE TESTING (NDT) OF WELDS. NDT SHALL CONFORM TO CSA-W59. THE TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER.
- | | |
|----------------------------|-------------------------------|
| BUTT WELDS | 100 % RADIOLOGY OR ULTRASONIC |
| FLANGE TO WEB FILLET WELDS | 100 % MAGNETIC PARTICLE |
| ALL OTHER WELDS | 100 % VISUAL INSPECTION |
9. CONCRETE
- 9.1. CONCRETE SHALL CONFORM TO AND BE PLACED IN ACCORDANCE WITH CSA-A23.1.
- 9.2. PRECAST CONCRETE SHALL CONFORM TO AND BE PLACED IN ACCORDANCE WITH CSA-A23.4.
- 9.3. REFER TO TABLE ON THIS DRAWING FOR CONCRETE SPECIFICATIONS. MIX DESIGNS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST ONE WEEK PRIOR TO BATCHING.
- 9.4. CONCRETE QUALITY SHALL BE TESTED IN ACCORDANCE WITH CSA-A23.2. CONCRETE TESTING SHALL BE CARRIED OUT BY A THIRD PARTY TESTING AGENCY CERTIFIED IN ACCORDANCE WITH CSA-A283. A MINIMUM OF THREE CYLINDERS SHALL BE TAKEN FOR STRENGTH TESTING. TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER.
- 9.5. FORMWORK SHALL BE LEFT IN PLACE UNTIL THE CONCRETE HAS ATTAINED SUFFICIENT STRENGTH TO CARRY ITS OWN WEIGHT AND ALL IMPOSED LOADS. CONTACT THE ENGINEER FOR RECOMMENDED STRIPPING TIMES.
- 9.6. REFER TO STRUCTURAL DRAWINGS FOR HOLES, INSERTS, ETC TO BE CAST INTO THE CONCRETE.
10. REINFORCEMENT:
- 10.1. REINFORCEMENT, HARDWARE AND EMBEDDED ITEMS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH CSA-A23.1.
- 10.2. REINFORCING STEEL SHALL CONFORM TO CSA-G30.18 GRADE 400 UNLESS NOTED OTHERWISE.
- 10.3. WELDING OF REINFORCING STEEL IS NOT PERMITTED UNLESS SPECIFIED OR AUTHORIZED BY THE ENGINEER. REINFORCING STEEL TO BE WELDED SHALL CONFORM TO CSA-G30.18 GRADE 400W UNLESS NOTED OTHERWISE. WELDING OF REINFORCING BARS SHALL CONFORM TO AND BE CARRIED OUT BY COMPANIES CERTIFIED IN ACCORDANCE WITH CSA-W186.
- 10.4. REFER TO TABLES ON THIS DRAWING FOR LAP, HOOK AND DEVELOPMENT LENGTHS FOR REINFORCING BARS.
- 10.5. REINFORCEMENT SPICES IN SLABS AND WALLS SHALL BE STAGGERED WITH AN OFFSET EQUAL TO OR GREATER THAN THE REQUIRED LAP LENGTH.
- 10.6. REINFORCEMENT, HARDWARE AND EMBEDDED ITEMS SHALL BE SECURED AND SUPPORTED TO ENSURE PROPER CONCRETE COVER AND SPACING WITHIN ALLOWABLE TOLERANCES BEFORE AND DURING PLACING OF CONCRETE. WIRE NOT LESS THAN 1.5 mm DIAMETER SHALL BE USED TO SECURE REINFORCEMENT. BAR SUPPORTS SHALL BE MADE OF PRECAST CONCRETE OR PLASTIC.
- 10.7. CONCRETE SHALL NOT BE POURED UNTIL THE ENGINEER, OR HIS/HER REPRESENTATIVE, HAS INSPECTED THE REINFORCING STEEL AND POUR CONDITIONS.
11. BEARING PADS
- 11.1. ELASTOMERIC BEARING PADS SHALL CONSIST OF VIRGIN NATURAL POLYISOPRENE OR VIRGIN POLYCHLOROPRENE.
- 11.2. ELASTOMERIC BEARING PADS SHALL HAVE A HARDNESS OF 55' ± 5' SHORE A TO ASTM D2240, AND COMPLY WITH THE REQUIREMENTS OF TABLE 11.5 OF CSA-S6.
12. FASTENERS
- 12.1. FASTENERS SHALL CONFORM TO FOLLOWING UNLESS NOTED OTHERWISE:
- | | |
|----------------------------|--------------------|
| STRUCTURAL BOLTS | ASTM A325 TYPE 3 |
| ANCHOR RODS | ASTM A193 GRADE B7 |
| WOOD BOLTS & THREADED RODS | ASTM A307 |
| LAG SCREWS | ASME B18.2.1 |
- 12.2. ALL FASTENERS EXCEPT FOR STRUCTURAL BOLTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.

CONCRETE SPECIFICATIONS TABLE					
CONCRETE ELEMENT	EXPOSURE CLASS	28-DAY COMPRESSIVE STRENGTH	MAX AGGREGATE SIZE	AIR CONTENT	MAX W/C RATIO
ALL CONCRETE	C-1	35 MPa	20 mm	5-8%	0.40

LAP, HOOK, AND DEVELOPMENT LENGTHS TABLE					
LAP LENGTH				HOOK LENGTH	
TENSION			COMPRESSION		TENSION
VERTICAL BARS (2)		HORIZONTAL BARS (2)		HORIZONTAL & VERTICAL BARS	HORIZONTAL & VERTICAL BARS
≤ 20M	≥ 25M	≤ 20M	≥ 25M	ALL DIAMETERS	ALL DIAMETERS
32d	40d	41d	51d	29d	17d
≥ 300 mm					≥ 150 mm

- (1) LAP AND HOOK LENGTHS APPLY TO NORMAL DENSITY CONCRETE WITH COMPRESSIVE STRENGTH OF 35 MPa AND UNCOATED BARS WITH YIELD STRENGTH OF 400 MPa.
- (2) LAP LENGTHS FOR VERTICAL BARS ALSO APPLY TO HORIZONTAL BARS WITH NO MORE THAN 300 mm OF FRESH CONCRETE CAST BELOW THE SPLICE.
- (3) DIVIDE LAP LENGTHS BY 1.3 TO DETERMINE DEVELOPMENT LENGTHS. DEVELOPMENT LENGTHS SHALL NOT BE LESS THAN 300 mm IN TENSION AND 200 mm IN COMPRESSION.

REFERENCE DRAWINGS			
DWG No.	REV	PROJECT No.	PRODUCED BY

DRAWING REVISIONS					

0	15.03.09	KN	SF	DS	CONCEPT
REV	DATE	DRW	DES	APP	REVISION

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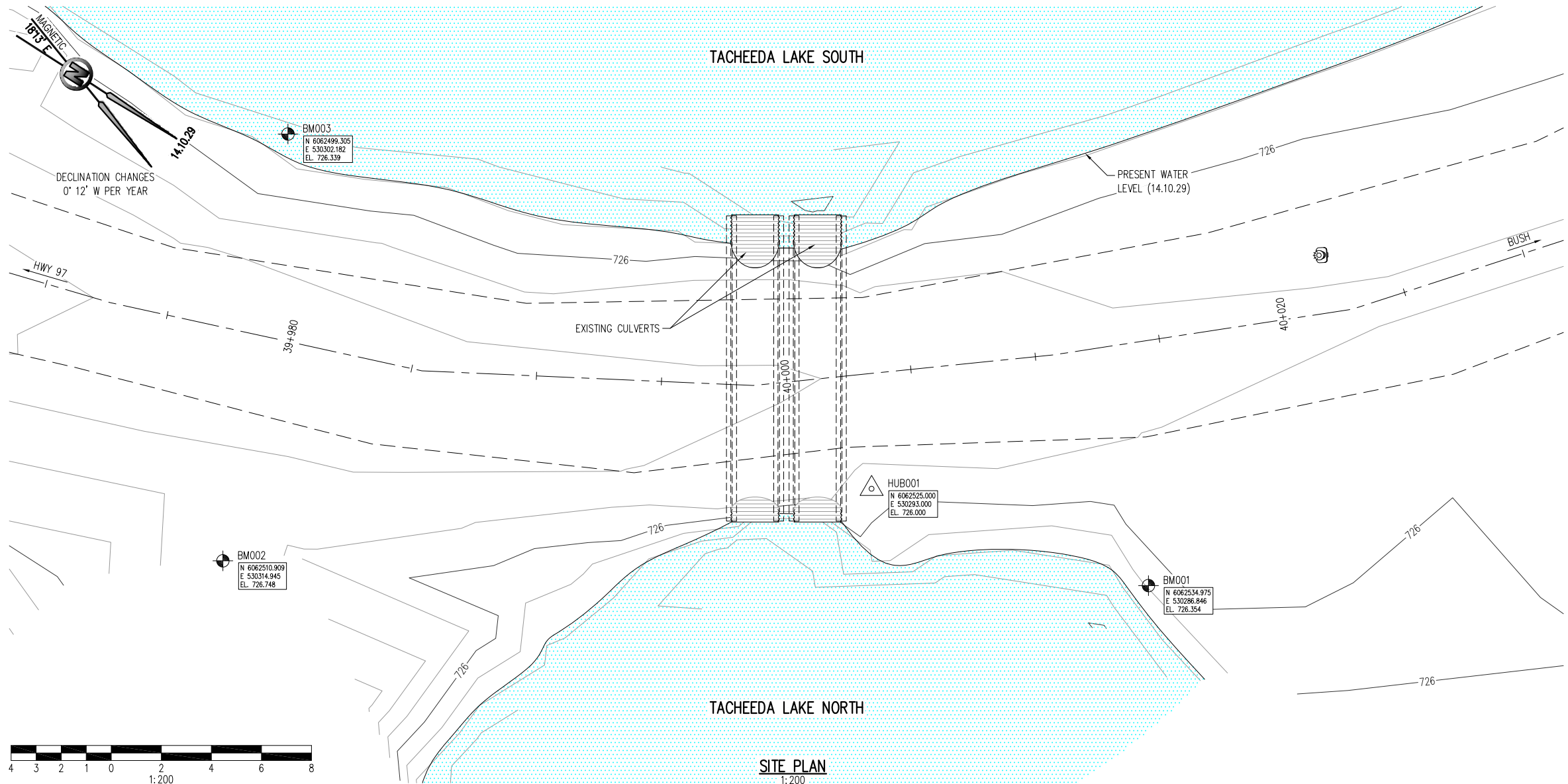
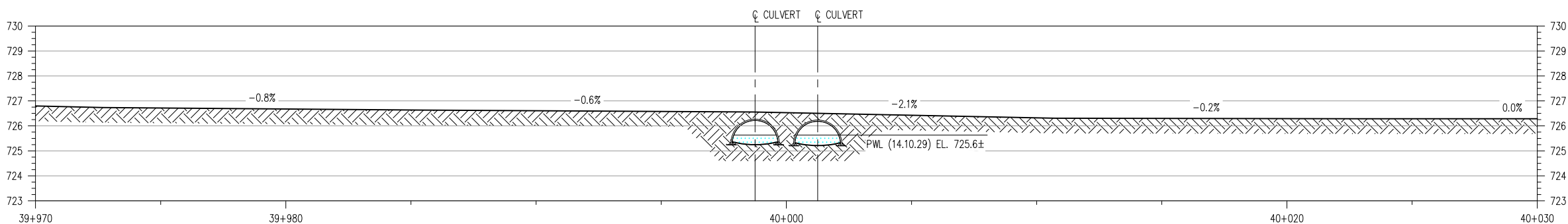
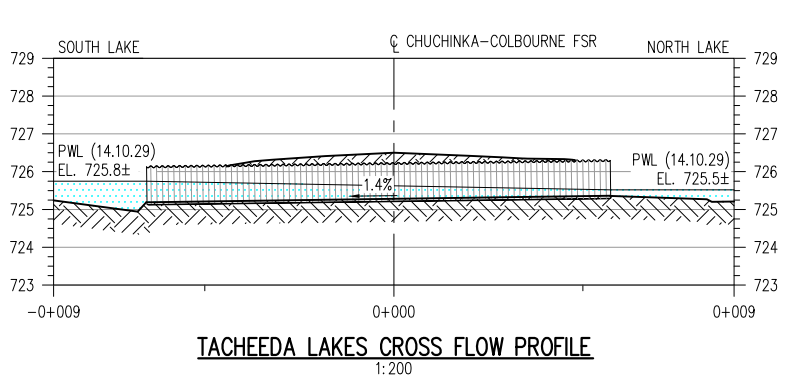
PROJECT INFORMATION

**MINISTRY OF FORESTS, LANDS
AND NATURAL
RESOURCE OPERATIONS**
**11250-85 / EN15PGN314 - THREE
CONCEPTUAL DESIGNS CHUCHINKA-
COLBOURNE AND CHUCHINKA-HAMBONE**
SITE 2, G1-153
CHUCHINKA-COLBOURNE FSR, 40,0 km
GENERAL NOTES

PROJECT No.	DRAWING No.	REV
208-66	G-200	0

CONCEPT

DISCARD ALL PREVIOUS REVISIONS LAST UPDATED: 09.03.15 FILE NAME: 208-66 2 SP.dwg



- HYDROLOGY AND SITE DATA**
- SITE DATA:
 - SITE SURVEY BY: TDB CONSULTANTS INC.
 - PERFORMED ON: 14.10.29
 - LOCATION: 40 km ON THE CHUCHINKA-COLBOURNE FSR, CROSSING TACHEEDA LAKE, APPROXIMATELY 140 km NORTH OF PRINCE GEORGE
 - UTM: 10 U 0530293 6062525
 - LAT/LONG: 54°42'33"N/122°31'47"W
 - NO GEOTECHNICAL INVESTIGATION WAS PERFORMED TO DATE.
 - HYDROLOGY:
 - CATCHMENT AREA: 8700 ha
 - PRESENT WATER VELOCITY: 0.3 m/s
 - EXISTING CULVERT OBVERT EL: 726.1 m
 - HIGH WATER LEVEL EL: 726.3 m
 - RIPARIAN CLASSIFICATION: LAKE
 - IN STREAM MATERIAL:
 - CLAY: 0 %
 - SILT: 0 %
 - SAND: 30 %
 - GRAVEL: 30 %
 - COBBLE: 30 %
 - BOULDER: 10 %
 - STREAM BANK MATERIAL:
 - CLAY: 0 %
 - SILT: 0 %
 - SAND: 30 %
 - GRAVEL: 30 %
 - COBBLE: 30 %
 - BOULDER: 10 %
 - HIGH CHAINAGE FOOTINGS MATERIAL:
 - CLAY: 0 %
 - SILT: 0 %
 - SAND: 30 %
 - GRAVEL: 30 %
 - COBBLE: 30 %
 - BOULDER: 10 %
 - LOW CHAINAGE FOOTINGS MATERIAL:
 - CLAY: 0 %
 - SILT: 0 %
 - SAND: 30 %
 - GRAVEL: 30 %
 - COBBLE: 30 %
 - BOULDER: 10 %
 - SITE CHARACTERISTICS:
 - BEDROCK: DEEP
 - STREAM PROFILE: UNIFORM
 - STREAM X-SEC: FLAT
 - STREAM PLAN: STRAIGHT
 - CHANNEL CHARACTERISTICS:
 - SCoured SIDE CHANNELS: NO
 - EPHEMERAL FLOOD CHANNELS: NO
 - VEGETATED OLD CHANNELS: NO
 - UNDERCUT BANKS: NO
 - ERODING BANKS: NO
 - DEBRIS MOVEMENT POTENTIAL:
 - FINES = TWIGS, NEEDLES, LEAVES: NO
 - SMALL = < 3 cm x 1 m: NO
 - LARGE = > 10 cm x 3 m: NO
 - IN STREAM DEBRIS:
 - LARGE ANCHORED DEBRIS: NO
 - LARGE MOVING DEBRIS: NO
 - SUSPENDED WINDFALL: NO
 - IN STREAM WINDFALL: NO
 - BEAVER DAM UPSTREAM: NO

DRAWING NOTES

- SEE DRAWING G-200 FOR GENERAL NOTES
- S# DENOTES DEFAULT STREAM CLASSIFICATIONS BASED SOLELY ON BANKFUL FIELD MEASUREMENTS TAKEN AT TIME OF THE FIELD SURVEY.

LEGEND

STREAM FLOW DIRECTION

SURVEY HUB

BENCHMARK

PHOTO ORIGIN

ALIGNMENT & EXISTING

ROAD EDGE EXISTING

DITCH EXISTING

REFERENCE DRAWINGS

DWG No.	REV	PROJECT No.	PRODUCED BY

DRAWING REVISIONS

REV	DATE	DRW	DES	APP	REVISION
0	15.03.09	KN	SF	DS	CONCEPT

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CLIENT

BRITISH COLUMBIA

PROJECT INFORMATION

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

11250-85 / EN15PGN314 - THREE CONCEPTUAL DESIGNS CHUCHINKA-COLBOURNE AND CHUCHINKA-HAMBONE

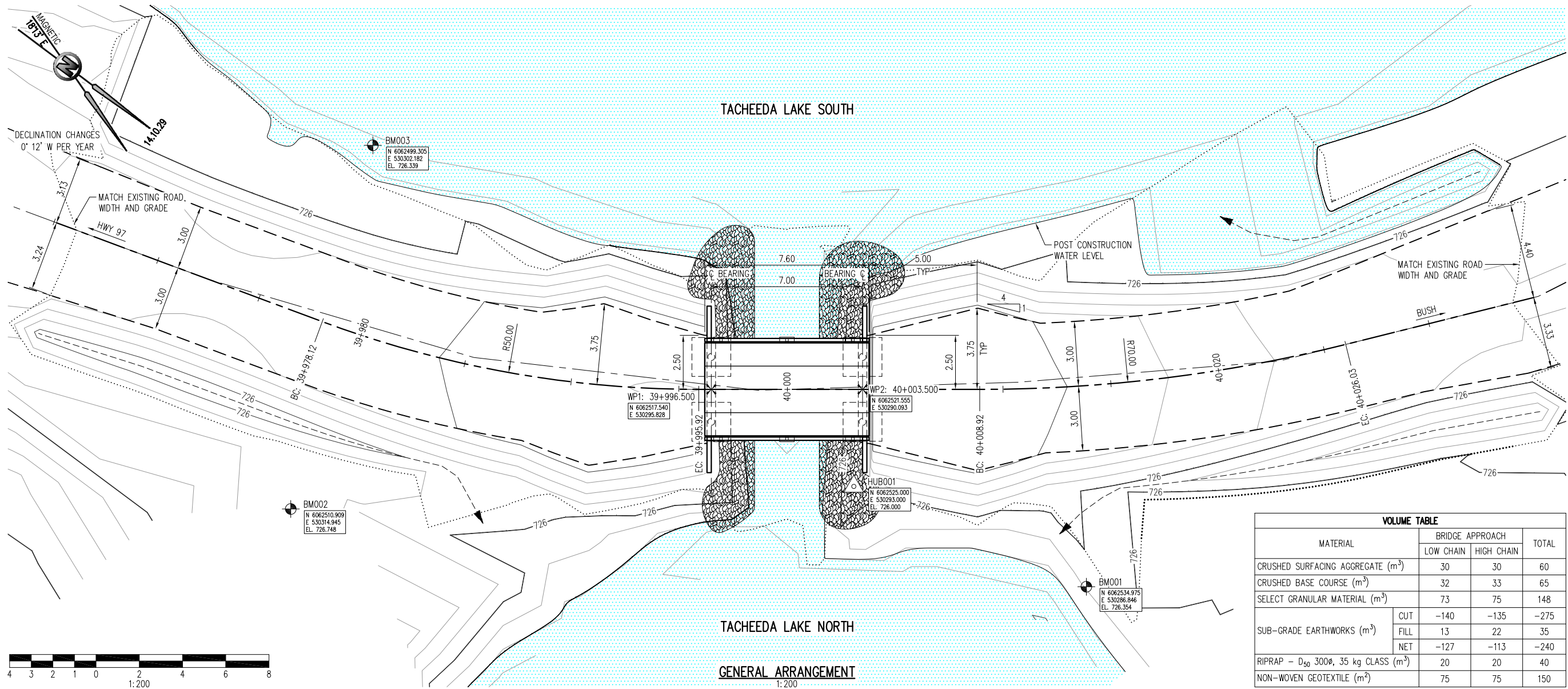
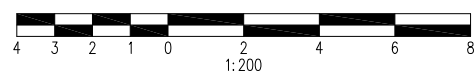
SITE 2, G1-153
CHUCHINKA-COLBOURNE FSR, 40.0 km EXISTING SITE PLAN

PROJECT No.	DRAWING No.	REV
208-66	C-201	0

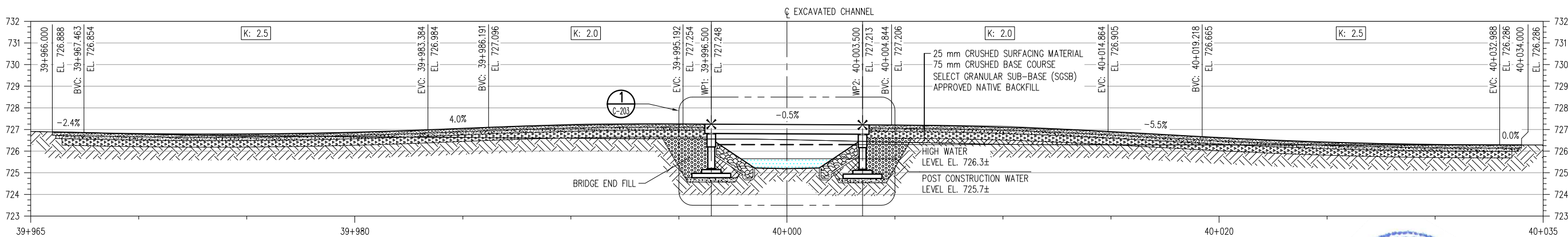
PROFESSIONAL
D. J. SCOUTEN
ENGINEER

9 March 2019

CONCEPT



VOLUME TABLE			
MATERIAL	BRIDGE APPROACH		TOTAL
	LOW CHAIN	HIGH CHAIN	
CRUSHED SURFACING AGGREGATE (m³)	30	30	60
CRUSHED BASE COURSE (m³)	32	33	65
SELECT GRANULAR MATERIAL (m³)	73	75	148
SUB-GRADE EARTHWORKS (m³)	CUT	-140	-135
	FILL	13	22
	NET	-127	-113
RIPRAP - D ₅₀ 300#, 35 kg CLASS (m³)	20	20	40
NON-WOVEN GEOTEXTILE (m²)	75	75	150



CHUCHINKA-COLBOURNE FSR PROPOSED ALIGNMENT PROFILE
1:200



CONCEPT

DRAWING NOTES

1. SEE DRAWING G-200 FOR GENERAL NOTES
2. SEE DRAWING C-203 FOR RE-GRADING AND ABUTMENT DETAILS

LEGEND

STREAM FLOW DIRECTION

SURVEY HUB

BENCHMARK

WORK POINT

ALIGNMENT & EXISTING

ALIGNMENT & PROPOSED

ROAD EDGE EXISTING

ROAD EDGE PROPOSED

DITCH EXISTING

DITCH PROPOSED

CUT/FILL SLOPE DAYLIGHT

REFERENCE DRAWINGS

DWG No.	REV	PROJECT No.	PRODUCED BY

DRAWING REVISIONS

REV	DATE	DRW	DES	APP	REVISION
0	15.03.09	KN	SF	DS	CONCEPT

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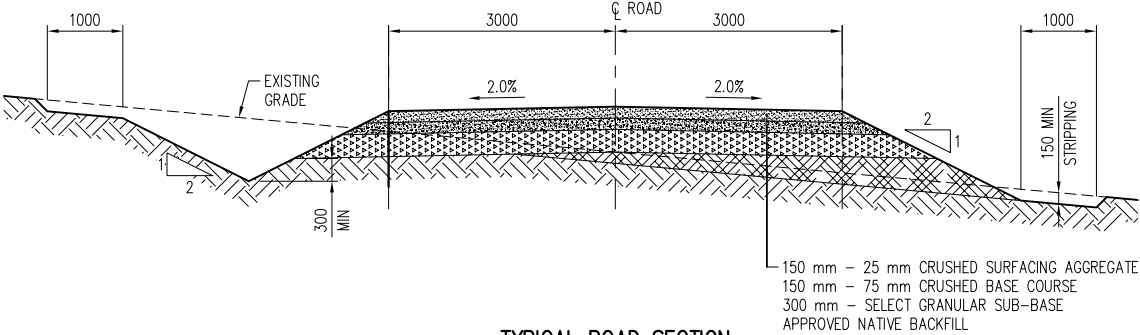
PROJECT INFORMATION

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
11250-85 / EN15PGN314 - THREE CONCEPTUAL DESIGNS CHUCHINKA-COLBOURNE AND CHUCHINKA-HAMBONE
SITE 2, G1-153
CHUCHINKA-COLBOURNE FSR, 40.0 km
GENERAL ARRANGEMENT

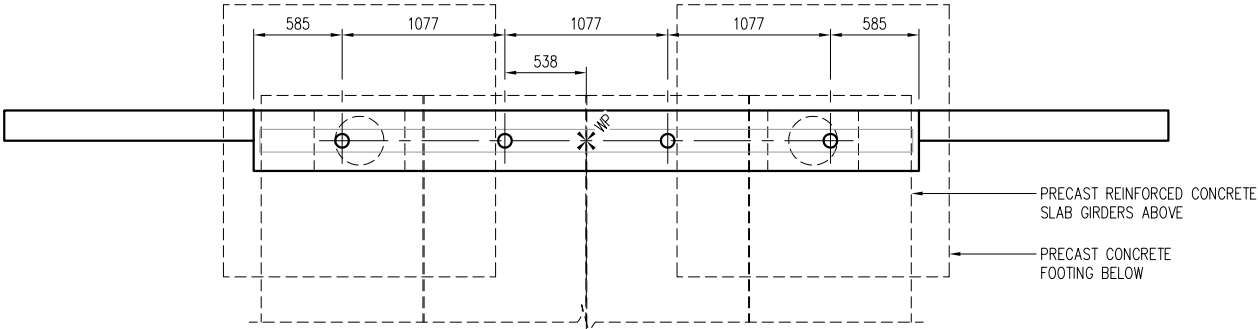
PROJECT No.	DRAWING No.	REV
208-66	C-202	0

FILE NAME: 208-66_Z_Grdg
LAST UPDATED: 08.03.15
DISCARD ALL PREVIOUS REVISIONS

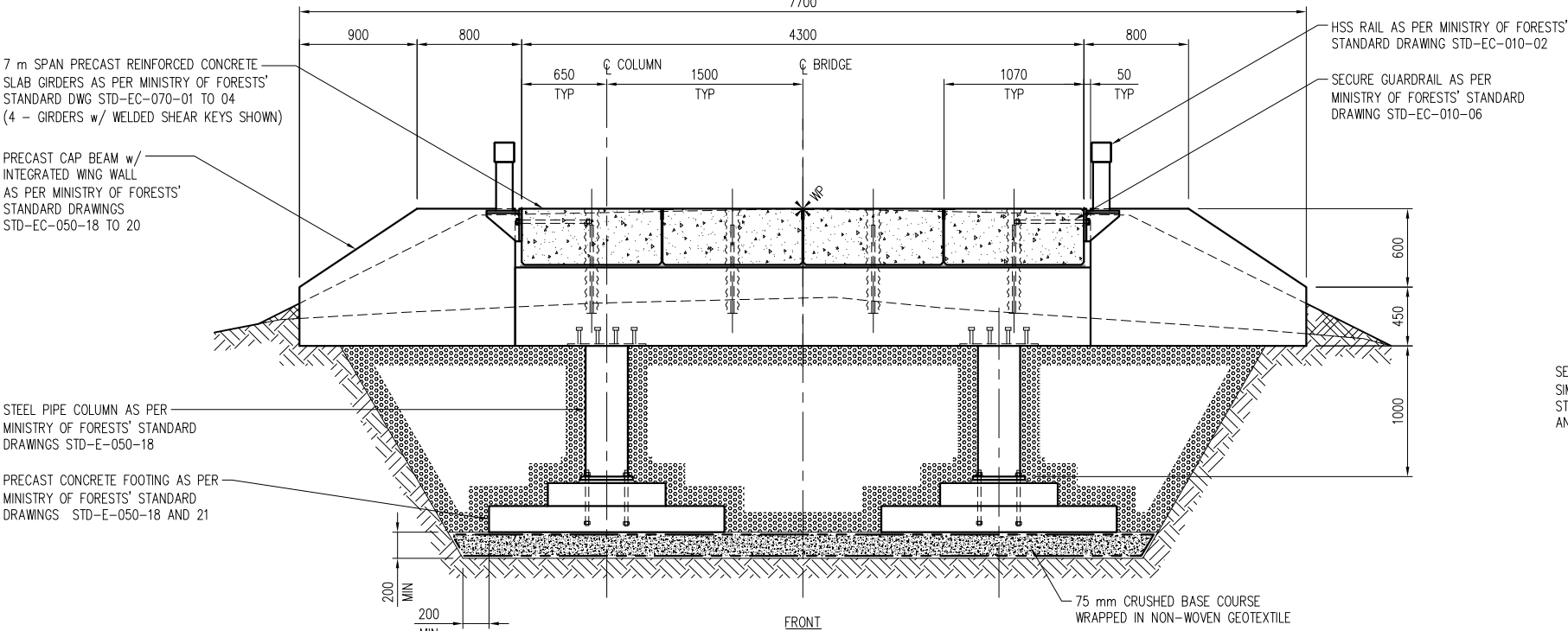
ROAD SECTION BASED ON:
BC SUPPLEMENT TO TAC GEOMETRIC DESIGN 2007 EDITION,
FIGURE 510.0 CROSS SECTION FOR LOW-VOLUME ROADS,
TWO-LANE TWO-WAY LVR - GRAVEL SURFACE



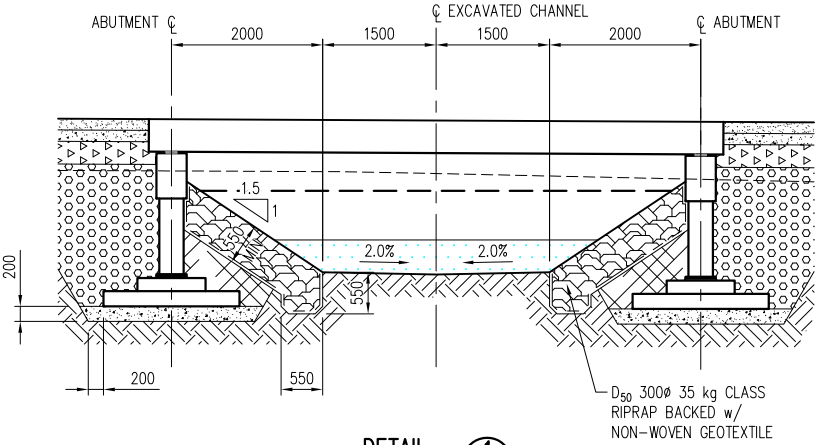
TYPICAL ROAD SECTION
1:100



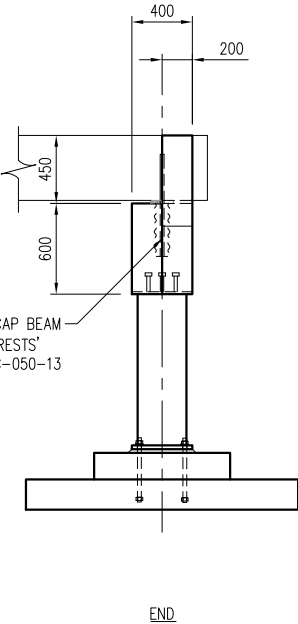
TOP



TYPICAL ABUTMENT DETAIL
1:50



DETAIL 1
1:100



END

CONCEPT

DRAWING NOTES

1. SEE DRAWING G-200 FOR GENERAL NOTES

REFERENCE DRAWINGS

DWG No.	REV	PROJECT No.	PRODUCED BY
FIG 510.0	0	-	MOTI
STD-EC-010-02	0	-	MFLNRO
STD-EC-010-06	0	-	MFLNRO
STD-EC-050-13	0	-	MFLNRO
STD-EC-050-18	0	-	MFLNRO
STD-EC-050-19	0	-	MFLNRO
STD-EC-050-20	0	-	MFLNRO
STD-EC-050-21	0	-	MFLNRO
STD-EC-070-01	0	-	MFLNRO
STD-EC-070-02	0	-	MFLNRO
STD-EC-070-03	0	-	MFLNRO
STD-EC-070-04	0	-	MFLNRO

DRAWING REVISIONS

REV	DATE	DRW	DES	APP	REVISION
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CONCEPTUAL DESIGNS CHUCHINKA-
COLBOURNE AND CHUCHINKA-HAMBONE**
SITE 2, G1-153
CHUCHINKA-COLBOURNE FSR, 40.0 km
RE-GRADING AND ABUTMENT DETAILS

PROJECT No.	DRAWING No.	REV
208-66	C-203	0