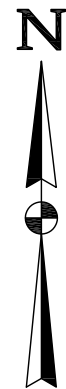
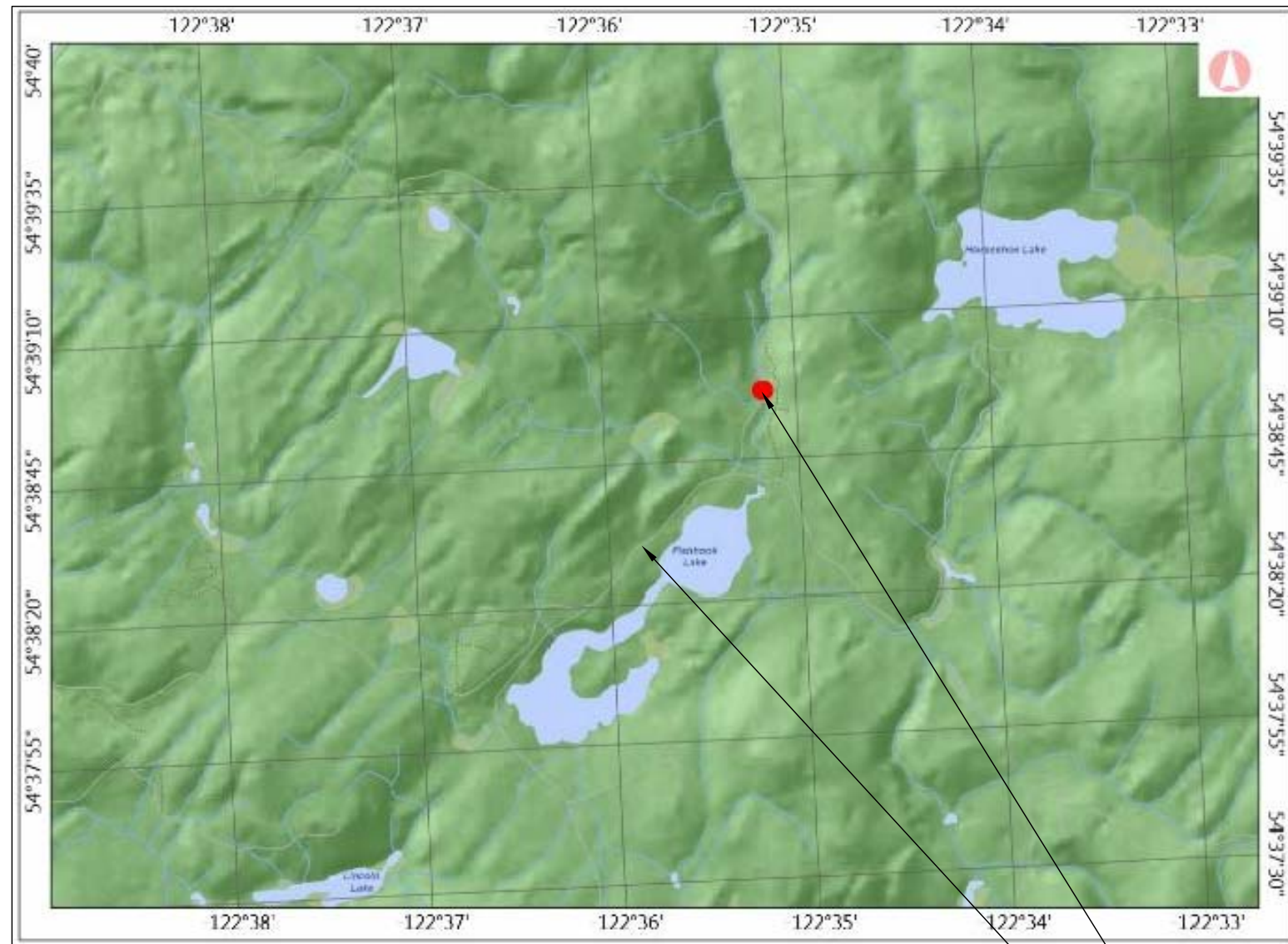




NOT TO SCALE

PROPOSED PERMANENT 15m DOUBLE LANE
CONCRETE SLAB GIRDER BRIDGE CROSSING
TACHEEDA CREEK AT 31+450 ON
CHUCHINKA-COLBOURNE FSR
MFLNRO SITE ID : G1-152
MFLNRO STRUCTURE ID : G1-152A



PREPARED FOR:

Ministry of
Forests, Lands and
Natural Resource Operations

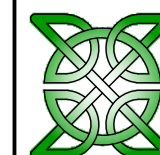
PREPARED ON:

June 27, 2016

BRIDGE SITE
54° 38' 57"N
122° 35' 10"W

CHUCHINKA-COLBOURNE FSR

Sheet Number	Sheet Name
1	Cover Sheet
2	Road and Crossing Plan Views
3	Road and Crossing Profile Views
4	Abutment Cross Sections
5	Notes
6	Site Photos



Celtic Engineering Ltd.

DESIGN & CONSTRUCTION

1715 Nicholson St. S., Prince George, BC, V2N 1V7
236-423-4464 (ph) info@celticengineering.ca

SHEET
1
OF 6

DWG #: 110-022-001-G1-152-001

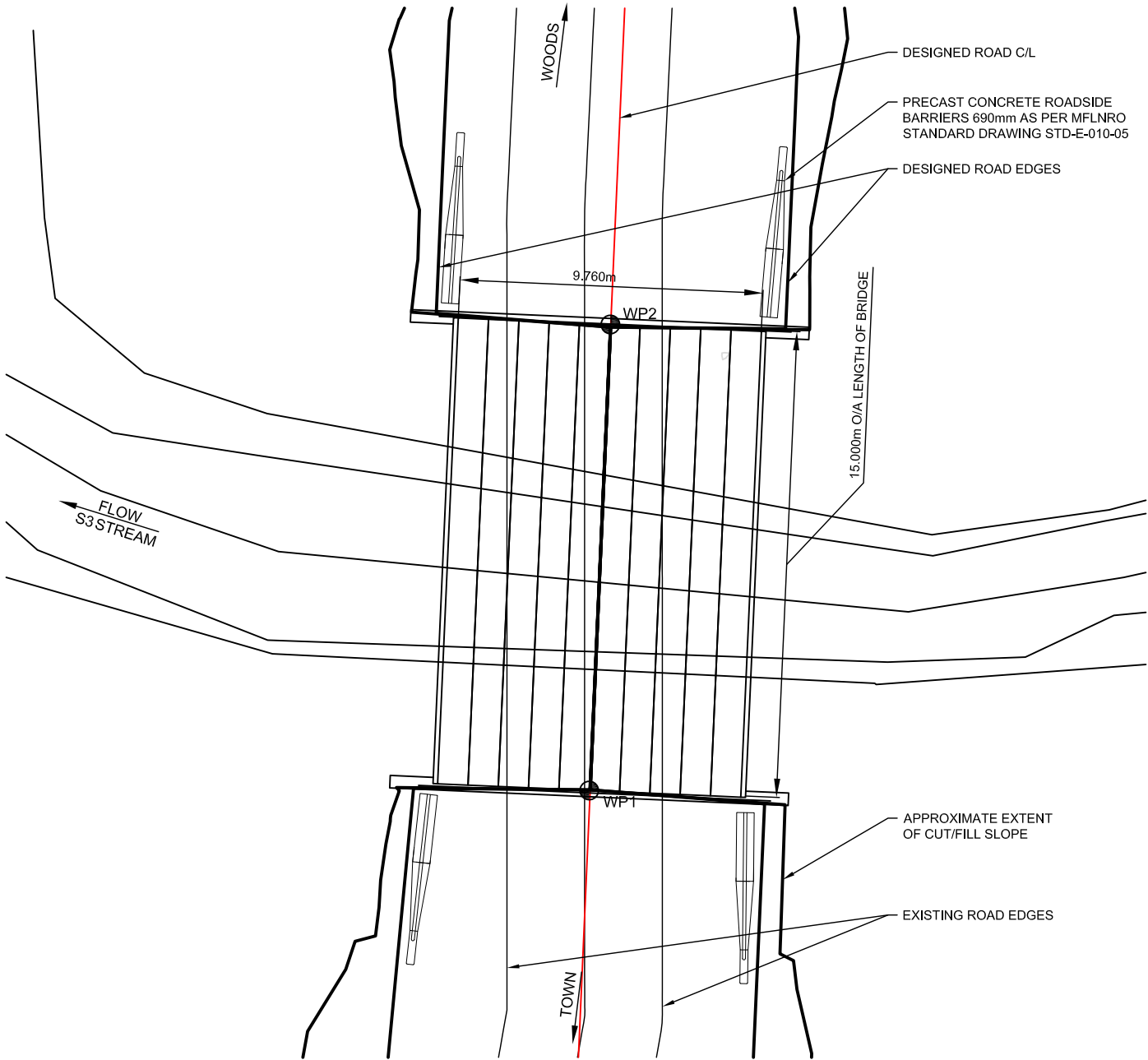
INTENDED TO BE PRINTED ON 11"X17" PAPER. ANY COPIES OF PDFS MAY NOT BE TO SCALE

CURRENT REVISION	0
REVISION DATE	N/A
REVISION DESC.	N/A

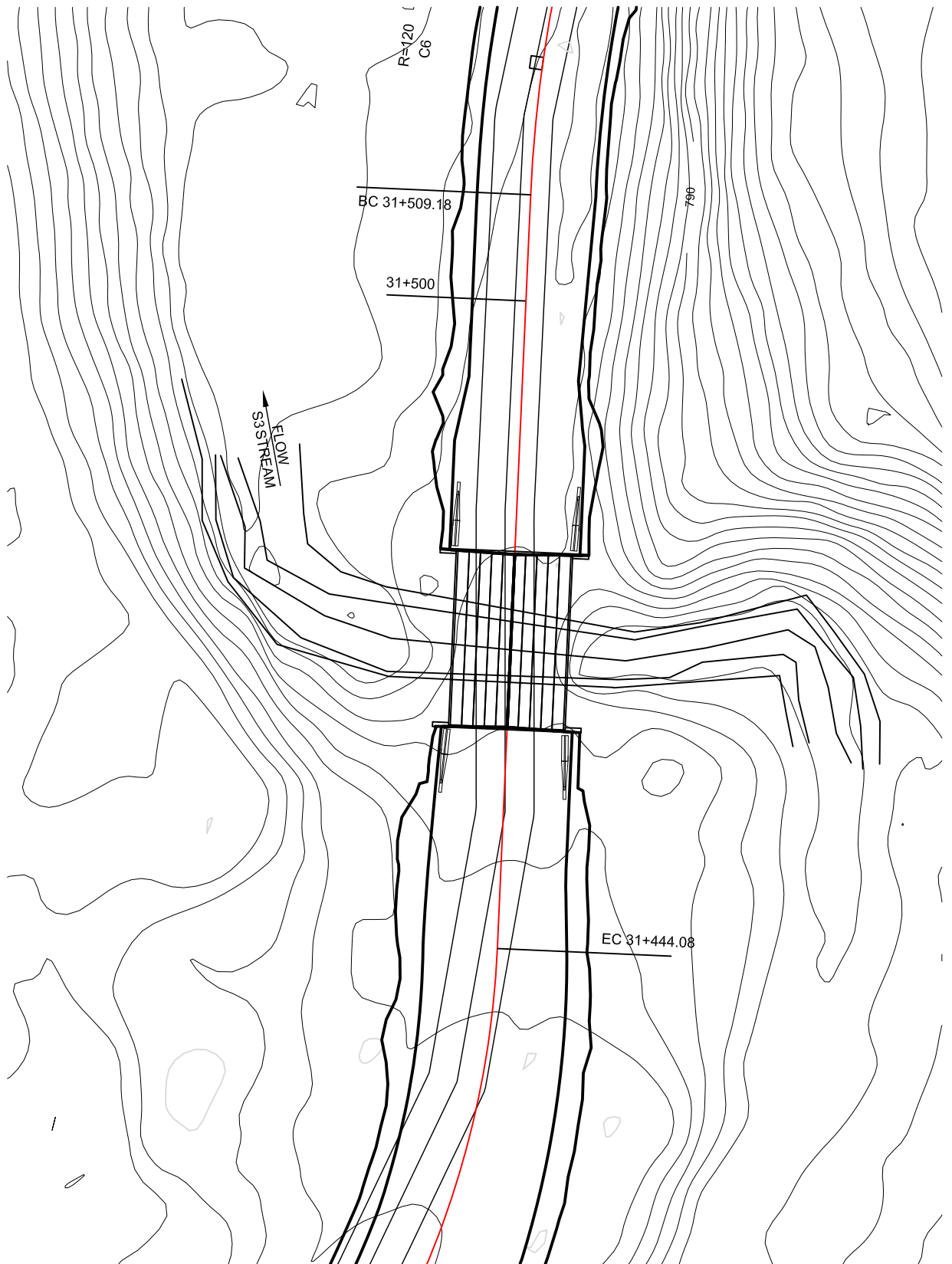
SITE INFORMATION	
Operating Area	PRINCE GEORGE
Road Shed	R0181434A TACHEEDA CREEK RD
Creek Name	UNKNOWN
Classification	S3
Tributary to	PARSNIP
Catchment Area	17.79 km ²
Est. Installation Date	2016
Temporary/Permanent	PERMANENT
Season of use	ALL

REFERENCE TABLE			
Point	Easting (m)	Northing (m)	Elevation (m)
WP1	526693.935	6055817.608	783.734
WP2	526694.593	6055832.482	783.114

SURVEY CONTROL BASED ON GEODETIC DATUM
GATHERED FROM LIDAR INFORMAMTION.
WORKPOINTS ARE AT THE CENTER OF UNDERSIDE OF
GIRDER ENDS.



PLAN VIEW
SCALE 1:200



PLAN VIEW
SCALE 1:500

INTENDED TO BE PRINTED ON 11"X17" PAPER, ANY COPIES OF PDFS MAY NOT BE TO SCALE



Celtic Engineering Ltd.
DESIGN & CONSTRUCTION

1715 Nicholson St. S., Prince George, BC, V2N 1V7
236-423-4464 (ph) info@celticengineering.ca



Ministry of
Forests, Lands and
Natural Resource Operations

DRAFT

NOT FOR CONSTRUCTION

PROPOSED PERMANENT 15m DOUBLE LANE
CONCRETE SLAB GIRDER BRIDGE CROSSING
TACHEEDA CREEK AT 31+450 ON
CHUCHINKA-COLBOURNE FSR
MFLNRO SITE ID : G1-152
MFLNRO STRUCTURE ID : G1-152A

SHEET NAME:
ROAD AND CROSSING PLAN VIEWS

SCALE: As Indicated

DESIGN BY: EDWARD FOLK, P.Eng

DRAWN BY: TIMOTHY PETKAU

REVIEWED BY: DARYL TAYLOR, P.Eng, RPF

SITE SURVEY: CELTIC ENGINEERING

SURVEY CREW:

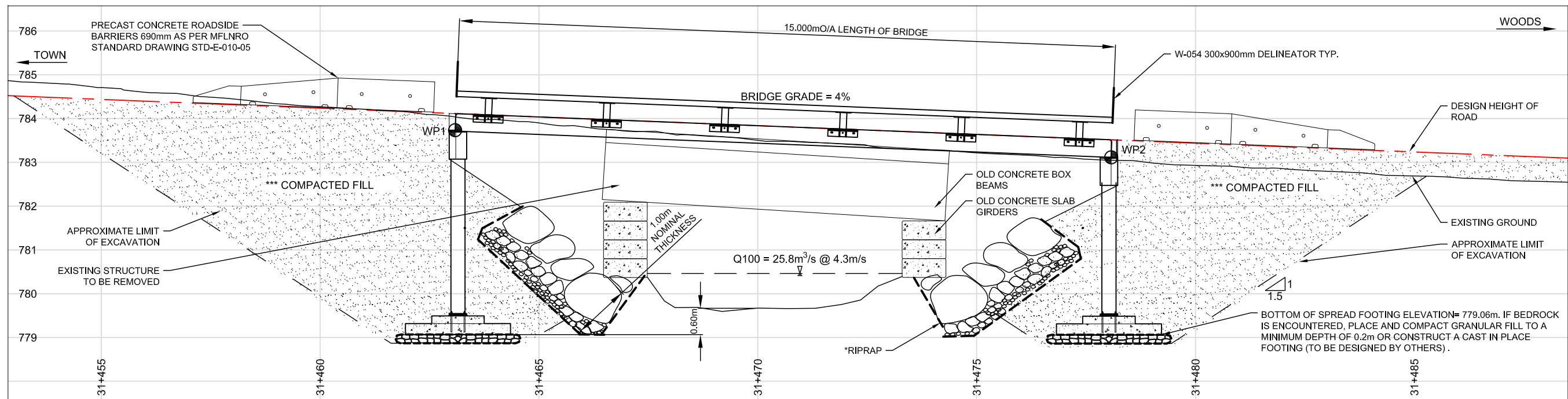
DATE: June 28, 2016

REVISION NUMBER:

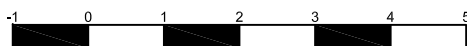
REVISION DATE:

DWG #:110-022-001-G1-152-002

SHEET
2
OF 6



PROFILE: CROSSING
SCALE 1:100



*RIPRAP
KEY *RIPRAP TO ELEVATION SHOWN. RIPRAP TO SERVE AS PROTECTION OF FOUNDATION FROM EROSION. ALL RIPRAP TO BE UNDERLAIN WITH NILEX 4551 OR APPROVED EQUIVALENT NON-WOVEN GEOTEXTILE. FOR APPROXIMATE RIPRAP SIZES USE GRADATION TABLE ON THIS SHEET.

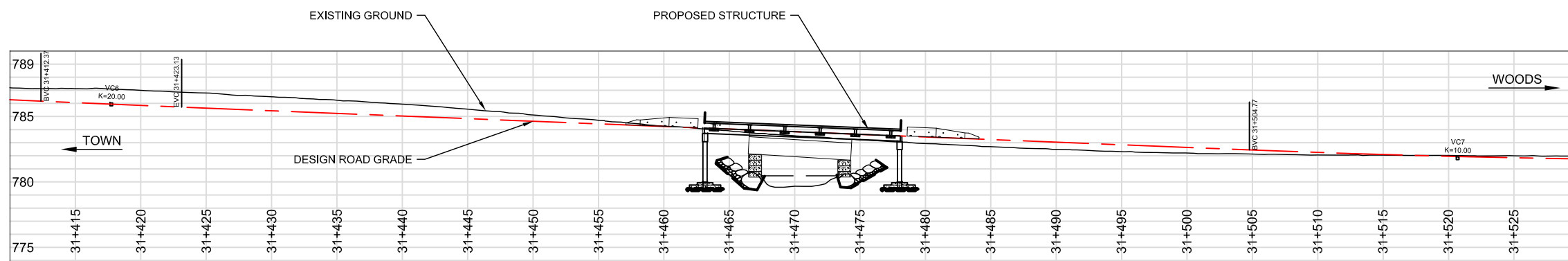
PLACE RIPRAP ON STRIPPED OR EXCAVATED GROUND DIRECTLY IN FRONT OF THE PROPOSED SPREAD FOOTINGS. PLACE ROCK ON GEOTEXTILE ON MINERAL SOIL. EXPECT UNDERLYING SOIL TO BE *COMPACT SANDY SILT. IF UPON EXCAVATION SOILS ARE FOUND TO BE FULLY SATURATED AND SOFT, IMPORTED ROCK FILL MAY BE REQUIRED. RIPRAP IS TO BE CAREFULLY PLACED (NOT DUMPED) TO CREATE AN INTERLOCKING SURFACE.

***COMPACTED FILL
IS A WELL DRAINED GRANULAR MATERIAL, TO BE PLACED IN LIFTS OF A MXIMUM 0.3m (MEASURED LOOSE). WATER MAY NEED TO BE ADDED (PRIOR TO COMPACTION AND DURING THE SPREADING OF THE LIFTS) TO THE MATERIAL TO ACHIEVE THE REQUIRED COMPACTION, MULTIPLE PASSES WITH A 1000lb VIBRATING COMPACTOR TO 95% STANDARD OF THE MODIFIED DRY DENSITY (SPMDD)

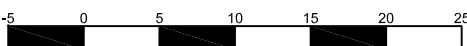
*RIPRAP: CLEAN ANGULAR ROCK

CLASS 250kg RIPRAP
ROCK GRADATION
PERCENT SMALLER THAN GIVEN
ROCK MASS kg(mm)
15% 25(260)
50% 250(565)
85% 750(815)
NOMINAL THICKNESS OF RIPRAP
1000mm

ALL ROCK TO BE PLACED TO MAXIMIZE INTERLOCKING BETWEEN PIECES. ALL ROCK TO BE UNDERLAIN WITH ARMTEC 250 OR APPROVED EQUIVALENT NON-WOVEN GEOTEXTILE. APPROXIMATELY ??m³ OF RIPRAP REQUIRED.



ROAD PROFILE VIEW
SCALE 1:400



INTENDED TO BE PRINTED ON 11"X17" PAPER, ANY COPIES OF PDFS MAY NOT BE TO SCALE



Celtic Engineering Ltd.
DESIGN & CONSTRUCTION

1715 Nicholson St. S., Prince George, BC, V2N 1V7
236-423-4464 (ph) info@celticengineering.ca



Ministry of
Forests, Lands and
Natural Resource Operations

DRAFT

NOT FOR CONSTRUCTION

PROPOSED PERMANENT 15m DOUBLE LANE
CONCRETE SLAB GIRDER BRIDGE CROSSING
TACHEEDA CREEK AT 31+450 ON
CHUCHINKA-COLBOURNE FSR
MFLNRO SITE ID : G1-152
MFLNRO STRUCTURE ID : G1-152A

SHEET NAME:
ROAD AND CROSSING PROFILES

SCALE: As Indicated

DESIGN BY: EDWARD FOLK, P.Eng

DRAWN BY: TIMOTHY PETKAU

REVIEWED BY: DARYL TAYLOR, P.Eng, RPF

SITE SURVEY: CELTIC ENGINEERING

SURVEY CREW:

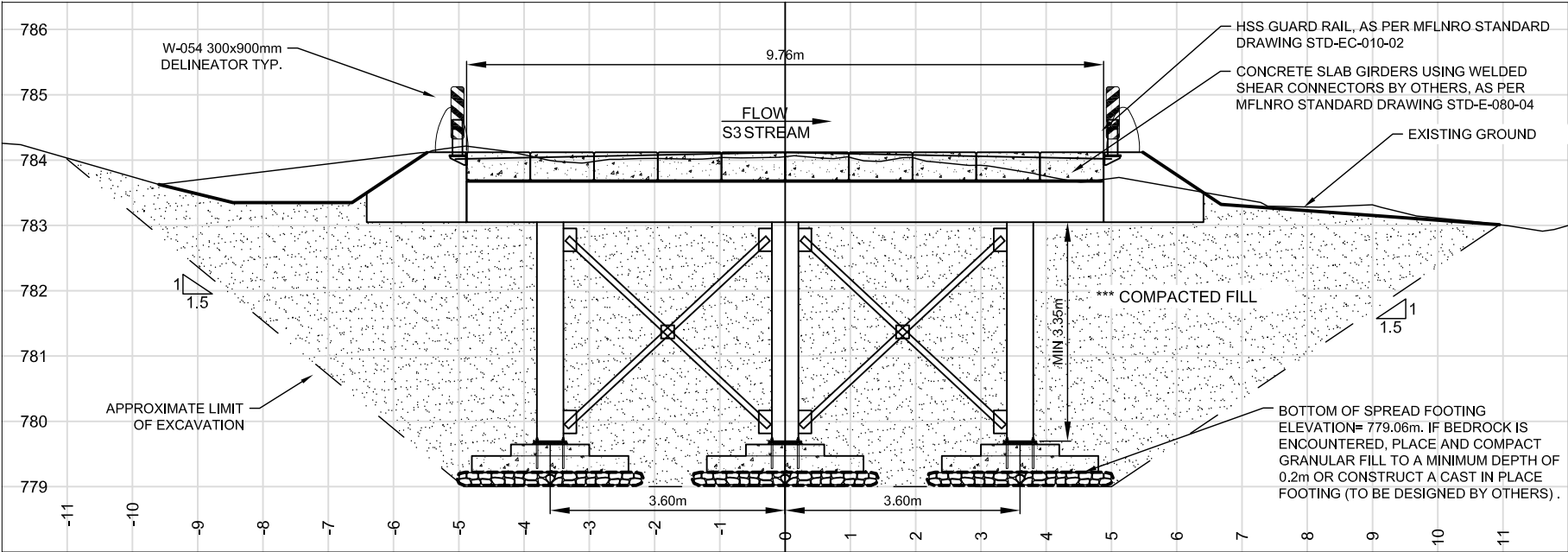
DATE: June 28, 2016

REVISION NUMBER:

REVISION DATE:

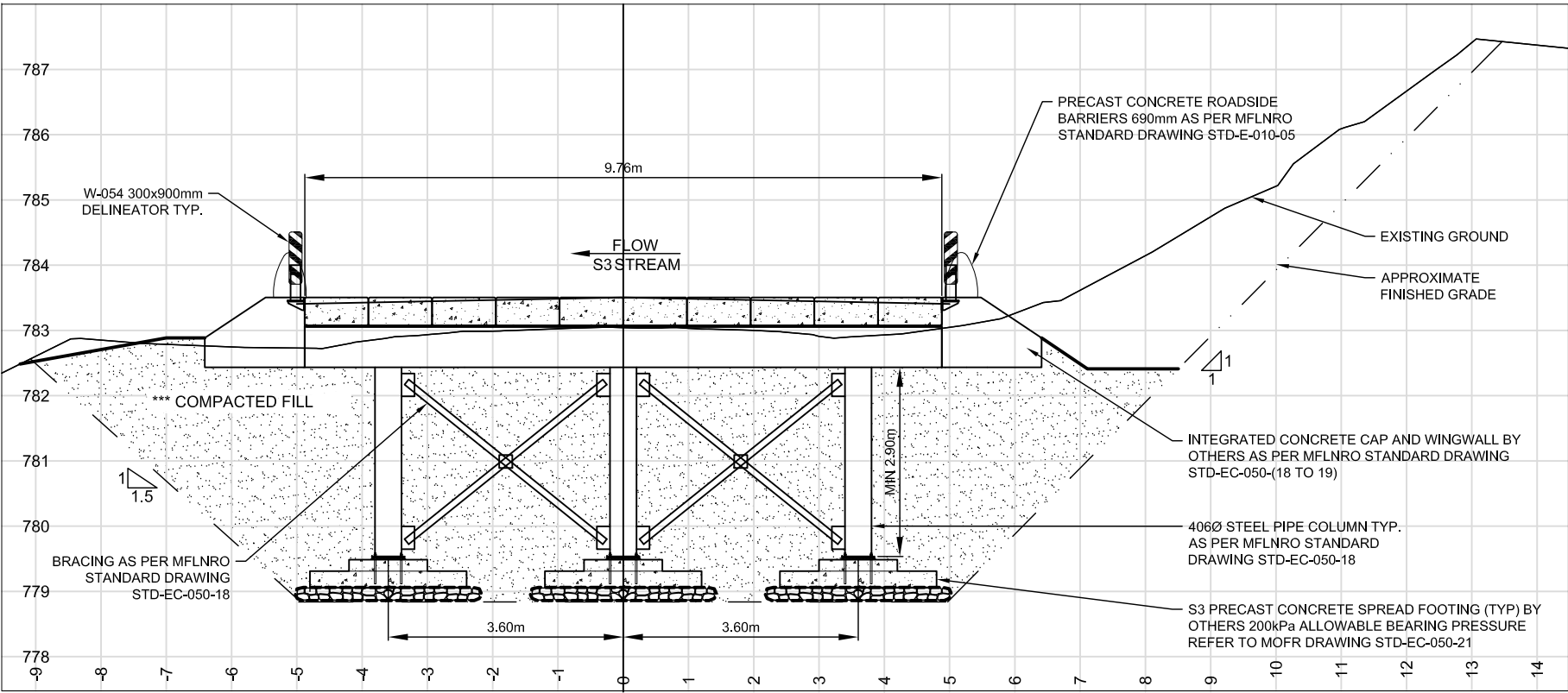
DWG #:10-022-001-G1-152-003

SHEET
3
OF 6



TOWN ABUTMENT CROSS SECTION
SCALE 1:100

***COMPACTED FILL
IS A WELL DRAINED GRANULAR MATERIAL, TO BE PLACED IN LIFTS OF A MXIMUM 0.3m (MEASURED LOOSE). WATER MAY NEED TO BE ADDED (PRIOR TO COMPACTION AND DURING THE SPREADING OF THE LIFTS) TO THE MATERIAL TO ACHIEVE THE REQUIRED COMPACTION. MULTIPLE PASSES WITH A 1000lb VIBRATING COMPACTOR TO 95% STANDARD OF THE MODIFIED DRY DENSITY (SPMDD)



WOODS ABUTMENT CROSS SECTION
SCALE 1:100

- ENVIRONMENTAL NOTES:
1. WORK TO PROCEED IN ACCORDANCE WITH DFO AND BCMOE CONDITIONS NOTED AT THE WEB SITE: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html> THE BCMOE REGIONAL TERMS AND REGIONAL PERIODS OF LEAST RISK TO RESIDENT FISH SPECIES AND FISH REMOVAL/RELOCATION FOR IN-STREAM WORK ALSO APPLY IF THE STREAM HAS FISH PRESENT OR IS CLASSIFIED AS S1 THROUGH S4.
 2. A SEDIMENT MANAGEMENT PLAN WITH SPECIFIC MITIGATION MEASURES TO MINIMIZE SILTATION MUST BE ON SITE. MACHINE CROSSINGS MUST BE LIMITED TO 2 UNLESS OTHERWISE INCREASED OR DECREASED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP).
 3. ALTERATION TO STREAM BANKS AND IN-STREAM WORK (NONE EXPECTED) SHOULD BE SUPERVISED BY AN ENVIRONMENTAL MONITOR.
 4. REMOVE THE MINIMUM AMOUNT OF RIPARIAN VEGETATION NECESSARY TO INSTALL A SAFE STRUCTURE. VEGETATE DISTURBED SLOPES AS SOON AS POSSIBLE.
 5. MACHINERY IS TO BE CLEAN AND LEAK FREE WHILE ON SITE. PETROLEUM PRODUCTS MUST BE CAREFULLY MONITORED WITH NO FUELING WITHIN THE RIPARIAN MANAGEMENT AREA.
 6. DIRECT SURFACE WATER AWAY FROM WORK SITE DURING CONSTRUCTION. ENSURE DITCH WATER AND SURFACE RUNOFF FROM THE ROAD DOES NOT FLOW DIRECTLY INTO THE STREAM. INSTALL CROSS DRAIN CULVERTS ON THE APPROACHES AND CONSTRUCT SUMPS AS REQUIRED.

1 - GEOTECHNICAL

FOUNDATION DESIGN REFERENCES THE CANADIAN ENGINEERING FOUNDATION MANUAL. SUBSURFACE INFORMATION HAS BEEN INFERRED FROM SITE OBSERVATIONS OF ROAD CUTS AND ALONG STREAMBANKS AND FROM SHALLOW HAND DUG TEST PITS. NO DETAILED SUBSURFACE INVESTIGATION WAS PERFORMED (LARGE MACHINE DUG TEST PITS OR BORE HOLES). FIELD CONDITIONS MAY VARY FROM THOSE INFERRED. IF, UPON EXCAVATION, FIELD CONDITIONS VARY FROM THOSE INFERRED, THEN CHANGES TO THE FOUNDATION DESIGN OR INSTALLATION MAY BE REQUIRED. SOILS WERE NOTED TO BE LOOSE TO COMPACT SILTY GRAVELS AND FRACTURED ROCK.

2 - HYDROLOGY AND HYDRAULIC ASSESSMENT

HYDRAULIC ANALYSIS BASED ON CURRENT CHANNEL. CONDITIONS COULD VARY OVER TIME
FREE BOARD HEIGHT REQUIREMENT SHOWN REFERS TO UPSTREAM UNDERSIDE OF THE GIRDER OF BRIDGE

THE EXTENT OF THE RIPRAP IS BASED ON AVAILABLE INFORMATION. THE EXTENTS SHOULD BE ADJUSTED IN THE FIELD TO ENSURE ADEQUATE SCOUR PROTECTION IS PROVIDED TO THE BRIDGE SUBSTRUCTURE AND ABUTMENTS.

PEAK FLOW FOR DESIGN PURPOSES WAS DETERMINED BASED ON REVIEW OF CHANNEL CHARACTERISTICS, PREVIOUS HIGH FLOW EVIDENCE, AND REVIEW OF THE RESULTS OF APPLYING SEVERAL PEAK FLOW EMPIRICAL MODELS. THESE EMPIRICAL MODELS EMPLOY ESTIMATES OF TIME OF CONCENTRATION, HYDROMETRIC STATISTICS, WATERSHED CHARACTERISTICS, AND OTHER RELEVANT INFORMATION TO DETERMINE PEAK FLOW. Q100=25.8m³/s @ 4.3m/s

3 - BRIDGE DESIGN

CONFORM TO CAN/CSA-S6-36 (MODIFIED) AND THE MINISTRY OF FORESTS AND RANGE, "FOREST SERVICE BRIDGE DESIGN AND CONSTRUCTION MANUAL" 1999.

ALL BRIDGE COMPONENTS SHALL CONFORM TO THE MINISTRY OF FORESTS AND RANGE STANDARD DRAWINGS UNLESS APPROVED BY OWNER.

LOADING: BCFS L-100(90,680 KG G.V.W.) ECCENTRICITY IN ACCORDANCE WITH S6-06.

FATIGUE: DESIGN TO BE COMPLETED IN ACCORDANCE WITH CAN/CSA-S6-06 - 500,000 CYCLES.

GUARD RAIL - HSS GUARDRAILS AS PER MFLNRO STANDARD DRAWING STD-EC-020-05.

FOR THE PURPOSES OF THIS DESIGN THE TERM PERMANENT AS IT REFERS TO DURATION OF THIS INSTALLATION MEANS FORTY-FIVE (45) YEARS OR LESS. DURATION WILL BE DETERMINED IN THE END BY ROUTINE INSPECTIONS.

SUPERSTRUCTURE SUPPLIED BY OTHERS. CONFIRM ALL DIMENSIONS PRIOR TO FIELD LAYOUT. IF SUPERSTRUCTURE USED PREVIOUSLY AT ANOTHER LOCATION IT MUST BE INSPECTED BY A QUALIFIED REGISTERED PROFESSIONAL PRIOR TO USE AT THIS SITE.

CHECK REQUIRED BEARING TO BEARING DISTANCE AND DEPTH OF ACTUAL STRUCTURE PRIOR TO INSTALLATION OF THE FOUNDATION.

4 - CONSTRUCTION NOTES

THE PROFESSIONAL OF RECORD OR THEIR DESIGNATE IS REQUIRED TO INSPECT / CARRY OUT THE FOLLOWING ACTIVITIES PRIOR TO PROVIDING SUBSTANTIAL CONFORMANCE DOCUMENTATION:
-INSPECT FOUNDATION SOILS FOLLOWING EXCAVATION
-INSPECT LAYOUT AND LOCATION OF FOOTINGS
-LAYOUT RIPRAP PLACEMENT
-BACKFILL MATERIAL AND TECHNIQUE
-OTHER SITE INSPECTIONS AT THE DISCRETION OF THE PROFESSIONAL

NOTE THAT WHERE EXCAVATION SPECIFICATIONS ON THESE DRAWINGS CONFLICT WITH WORKSAFEBC REGULATIONS WORKSAFEBC REGULATIONS ARE TO GOVERN.

5 - MATERIALS

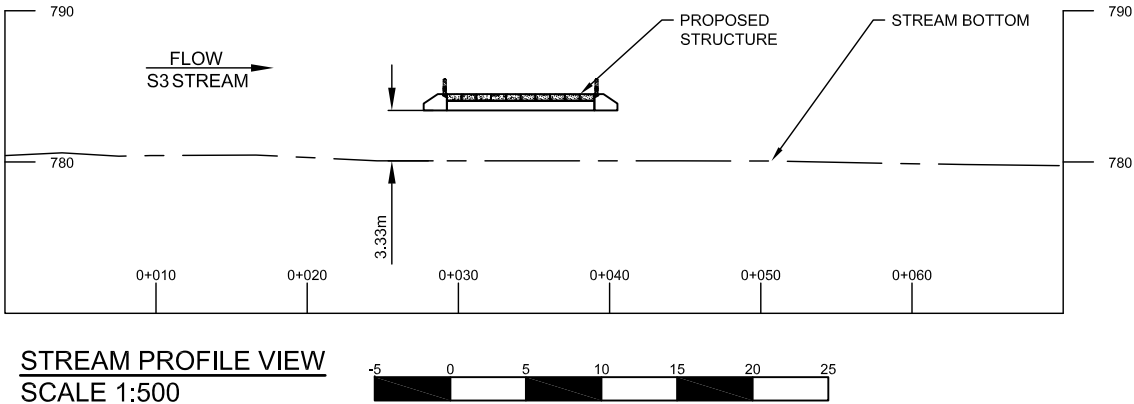
ENDFILL MATERIAL - ENDFILL SHALL CONSIST OF WELL GRADED, SELECT, GRANULAR MATERIAL (<75MM), PLACED IN LIFTS OF 300mm MAXIMUM (MEASURED LOOSE), WATER MAY NEED TO BE ADDED (PRIOR TO COMPACTION AND DURING THE SPREADING OF LIFTS) TO THE MATERIAL TO ACHIEVE THE REQUIRED COMPACTION. MULTIPLE PASSES WITH A 1000-LB VIBRATING COMPACTOR, COMPACTED TO 95% STANDARD PROCTOR OF THE MODIFIED DRY DENSITY (SPMDD).

6 - ABUTMENTS

ENSURE ALL WORKS COMPLY WITH MINISTRY OF FORESTS AND RANGE STANDARDS

7 - SAFTEY

WHERE EXCAVATION SPECIFICATIONS ON THESE DRAWINGS CONFLICT WITH WORKSAFEBC REGULATIONS, WORKSAFEBC REGULATIONS ARE TO GOVERN
AVERAGE STREAM GRADIENT = 1%



8 - ENVIRONMENT

ALTERATION TO STREAM BANKS AND IN-STREAM WORK MUST BE SUPERVISED BY QUALIFIED PERSON. SEDIMENT MANAGEMENT TO REDUCE SILTATION IS REQUIRED. IN-STREAM MACHINE CROSSINGS ARE NOT PERMITTED WITHOUT PROPER APPROVAL.

REMOVE THE MINIMUM AMOUNT OF RIPARIAN VEGETATION NECESSARY TO INSTALL A SAFE STRUCTURE. DIRECT SURFACE WATER AWAY FROM WORK SITE. ENSURE MACHINERY IN CLEAN PRIOR TO ENTERING WATERCOURSE. SILT FENCING, GEOTECTILE CLOTH FABRIC AND A ROLL OF PLASTIC SHOULD BE ON SITE. STOP WORK DURING EXTREME ADVERSE WEATHER CONDITIONS. SEED AND STRAW DISTURBED SLOPES AS SOON AS POSSIBLE.

ENSURE DITCH WATER AND SURFACE RUNOFF FROM THE ROAD DOES NOT FLOW DIRECTLY INTO STREAM. CONSTRUCT SUMPS AS REQUIRED. EXACT LOCATIONS ARE TO BE FIELD DETERMINED UPON CONSTRUCTION.

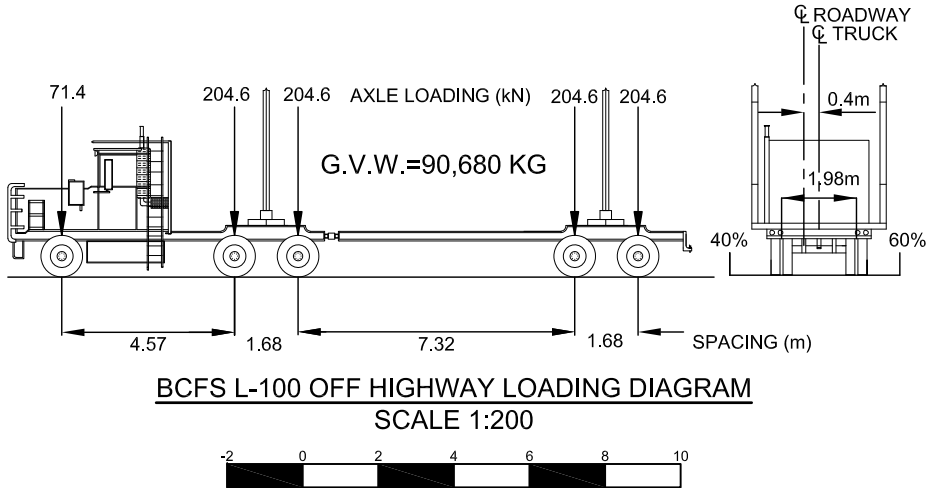
ON SITE PRESCRIPTIONS MAY HAVE TO BE MODIFIED TO ACCOMMODATE ACTUAL ROAD VERTICAL/HORIZONTAL ALIGNMENT, SLOPE ANGLES ON FILL AND CUT SLOPES, MATERIAL COMPOSITION AND WEATHER.

9 - SITE CONDITIONS

DUE TO THE NATURE OF THE SITE, CONDITIONS MAY VARY FROM THE FIELD INFORMATION GATHERED DURING SUMMER CONDITION. CONDITIONS COULD VARY.

PARTIAL MATERIALS LIST	
1	ROLL NON-WOVEN GEOTEXTILE: NILEX 4551 OR EQUIVALENT
	ROLL OF GEOGRID : ARMTEC 7XT OR EQUIVALENT OR ((designer to choose one)) ROLL OF WOVEN GEOTEXTILE: ARMTEC 855 OR EQUIVALENT
?m³	LEVELING COURSE (SANDY GRAVEL OR 19mm CLEAR CRUSH) - COMPACTED TO 95% SPMDD. ENSURE THERE IS NO ORGANIC MATERIAL UNDER THE FOOTINGS.
6	PRECAST S3 SPREAD FOOTINGS
2	CONCRETE BALLAST WALL
4	SETS OF CONCRETE NO-POST APPROACH BARRIERS: 690-CRB-H, CTB-1E, CBN-H
4	W-054 SERIES DELINEATORS (2 LEFT, 2 RIGHT)
2	W-051 SERIES NARROW STRUCTURE SIGNS
2	POSTS FOR NARROW STRUCTURE SIGNS: 0.2m X 4.0m LENGTH LOG POSTS OR 0.1m X 0.1m X 3.0m LENGTH TREATED TIMBERS
1	BAG ROADSIDE GRASS SEED MIX

**SOIL DENSITY	
VERY LOOSE	EASILY EXCAVATED WITH A SPADE
LOOSE	SOME RESISTANCE TO SPADE
COMPACT	CONSIDERABLE RESISTANCE TO SPADE
DENSE	REQUIRES PICK FOR EXCAVATION
VERY DENSE	HIGH RESISTANCE TO PICK



INTENDED TO BE PRINTED ON 11"X17" PAPER, ANY COPIES OF PDFS MAY NOT BE TO SCALE



Celtic Engineering Ltd.
DESIGN & CONSTRUCTION

1715 Nicholson St. S., Prince George, BC, V2N 1V7
236-423-4464 (ph) info@celticengineering.ca



Ministry of
Forests, Lands and
Natural Resource Operations

DRAFT
NOT FOR CONSTRUCTION

PROPOSED PERMANENT 15m DOUBLE LANE
CONCRETE SLAB GIRDER BRIDGE CROSSING
TACHEEDA CREEK AT 31+450 ON
CHUCHINKA-COLBOURNE FSR
MFLNRO SITE ID : G1-152
MFLNRO STRUCTURE ID : G1-152A

SHEET NAME:
NOTES

SCALE: As Indicated

DESIGN BY: EDWARD FOLK, P.Eng

DRAWN BY: TIMOTHY PETKAU

REVIEWED BY: DARYL TAYLOR, P.Eng, RPF

SITE SURVEY: CELTIC ENGINEERING

SURVEY CREW:

DATE: June 28, 2016

REVISION NUMBER:

REVISION DATE:

DWG #:10-022-001-G1-152-005

SHEET
5
OF 6



PHOTO #1 - VIEW OF TOWN APPROACH



PHOTO #2 - VIEW OF WOODS APPROACH



PHOTO #3 - VIEW OF STRUCTURE AND ABUTMENT



PHOTO #4 - VIEW DOWNSTREAM OF CROSSING



PHOTO #5 - VIEW TOWARDS DOWNSTREAM



PHOTO #6 - VIEW TOWARDS UPSTREAM