



NOT TO SCALE



PROPOSED PERMANENT GRS WALL AT
33+348 - 33+454 ON
CHUCHINKA-COLBOURNE FSR

BRIDGE SITE
54° 39' 55.8" N
122° 35' 18.4" W

CHUCHINKA-COLBOURNE FSR

PREPARED FOR:



Ministry of
Forests, Lands and
Natural Resource Operations

PREPARED ON:
July 15, 2016

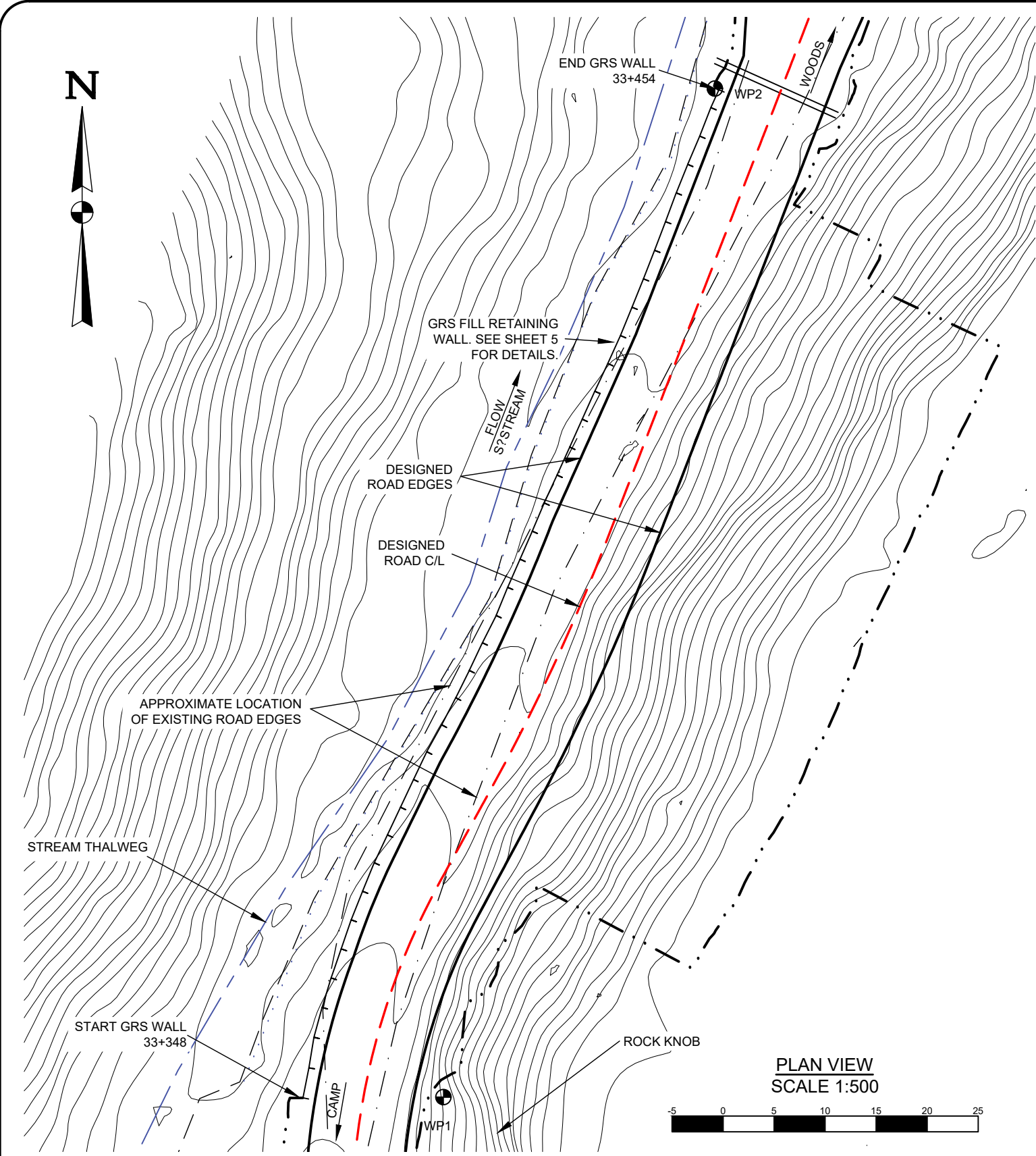
Sheet Number	Sheet Name
1	Cover Sheet
2	GRS Wall Plan View
3	Road Profile and Section
4	Cross Sections
5	GRS Wall Details and Notes



Celtic Engineering Ltd.
DESIGN & CONSTRUCTION
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NORTHERN OPERATIONS

SHEET
1
OF 5

DWG #: 110-022-COLBOURNE 33 300-454	CURRENT REVISION	-
INTENDED TO BE PRINTED ON 11"X17" PAPER. ANY COPIES OF PDFS MAY NOT BE TO SCALE	REVISION DATE	-
	REVISION DESC.	-



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 ARE ANTICIPATED TO BE **LOOSE TO COMPACT SANDY GRAVELS AND FRACTURED ROCK.

2 - HYDROLOGY AND HYDRAULIC ASSESSMENT

HYDRAULIC ANALYSIS BASED ON CURRENT CHANNEL. CONDITIONS COULD VARY OVER TIME

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 GRS WALL.

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.

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
- LAYOUT RIPRAP PLACEMENT
- GRS WALL FILL MATERIAL AND COMPACTION TECHNIQUE
- OTHER SITE INSPECTIONS AT THE DISCRETION OF THE PROFESSIONAL

5 - MATERIALS

FORM BACKFILL MATERIAL SHALL CONSIST OF COMPACTIBLE GRANULAR SOIL OR BROKEN ROCK. SEE CONSTRUCTION NOTES ON SHEET 5.

7 - SAFETY

WHERE EXCAVATION SPECIFICATIONS ON THESE DRAWINGS CONFLICT WITH WORKSAFEBC REGULATIONS, WORKSAFEBC REGULATIONS ARE TO GOVERN

8 - ENVIRONMENT

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

THE DATA WAS COLLECTED WITH AN RTK GPS UNIT WITH ACCURACY OF 8.5cm HORIZONTALLY AND VERTICALLY. THE ORTHOMETRIC HEIGHT WAS DETERMINED USING CGVD28 (HTv2.0).

SURVEY CONTROL BASED ON COORDINATES ESTABLISHED USING RTK. WORKPOINTS ARE LOCATED AT EACH END OF GRS WALL.

REFERENCE TABLE			
Point	Easting (m)	Northing (m)	Elevation (m)
BM1			
BM2			
BM3			
BM4			
WP1			
WP2			

ORTHOMETRIC HEIGHT = 783.949m

UTM ZONE 10 (6055817.588m N; 526697.944m E)

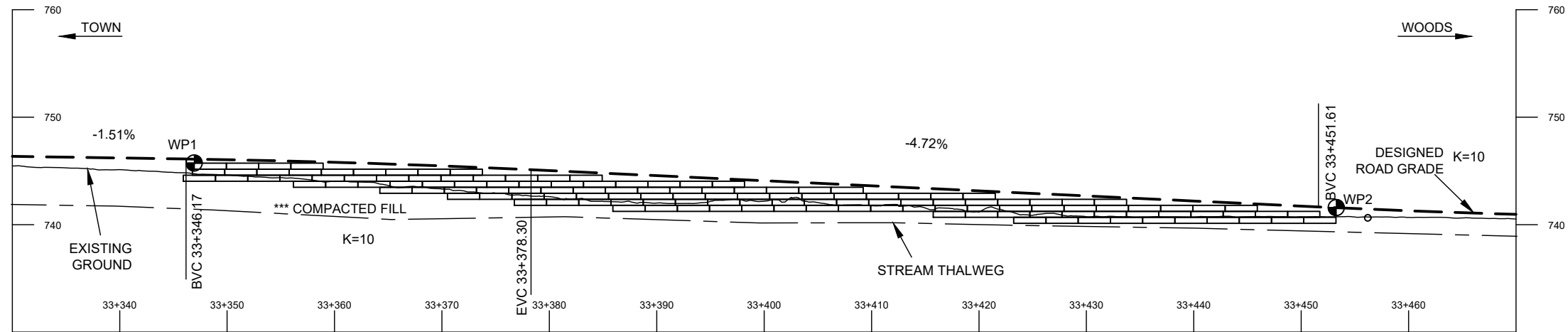
SCALE FACTOR 0.99960874 (POINT)
0.99948770 (COMBINED)

WP	OC	HD
1	BM1	
	BM2	
	BM3	
	BM4	
2	BM1	
	BM2	
	BM3	
	BM4	

*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 400m³ OF
RIPRAP REQUIRED.

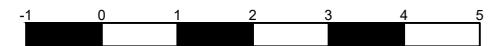


SITE INFORMATION	
Operating Area	CHUCHINKA
Road Shed	
Creek Name	TACHEEDA
Classification	S3
Tributary to	TACHEEDA LAKES
Catchment Area	17.8km²
Est. Installation Date	
Est. Removal Date	PERMANENT
Season of use	ALL SEASON
Field Info. Gathering Method	RTK GRS & TOTAL STATION
Field Info. Provided By	CELTIC ENGINEERING

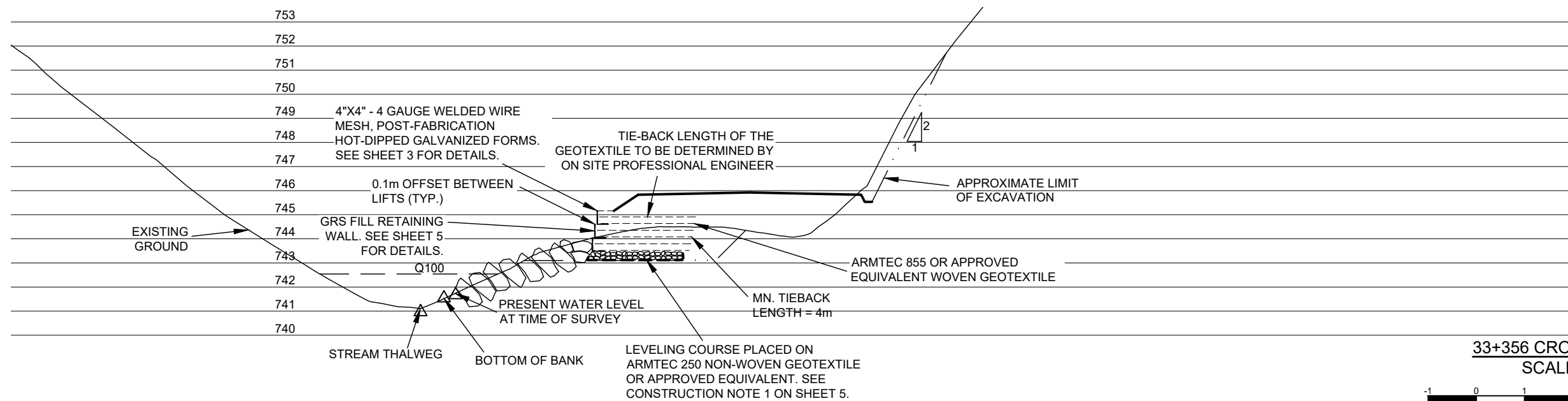
**SOIL DENSITY	
VERY LOOSE	EASILY EXCAVATED WITH A SPADE
LOOSE	SOME RESISTANCE TO SPADE
COMPACT	CONSIDERABLE RESISTANCE TO SPADE
DENSE	REQUIRES PICK FOR EXCAVATION
VERY DENSE	HIGH RESISTANCE TO PICK

MATERIAL LIST	
1	ROLL ARMTEC 855 WOVEN GEOTEXTILE OR EQUIVALENT
1	ROLL ARMEC 250 NON-WOVEN GEOTEXTILE OR EQUIVALENT
	CUT MATERIAL INCLUDES ROAD APPROACHES
	FILL MATERIAL INCLUDES ROAD APPROACHES
400m³	CLASS 250 RIP RAP

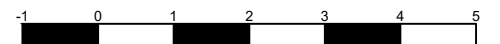
PROFILE: CROSSING
SCALE 1:100



***COMPACTED FILL
GRANULAR FILL TO BE
COMPACTED TO AT LEAST 95%
OF THE STANDARD PROCTOR
MAXIMUM DRY DENSITY.



33+356 CROSS SECTION
SCALE 1:100



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SURVEY CREW:

DESIGN BY: EDWARD FOLK, P.Eng

DATE: July 15, 2016

DRAWN BY: TIMOTHY PETKAU

REVISION NUMBER:

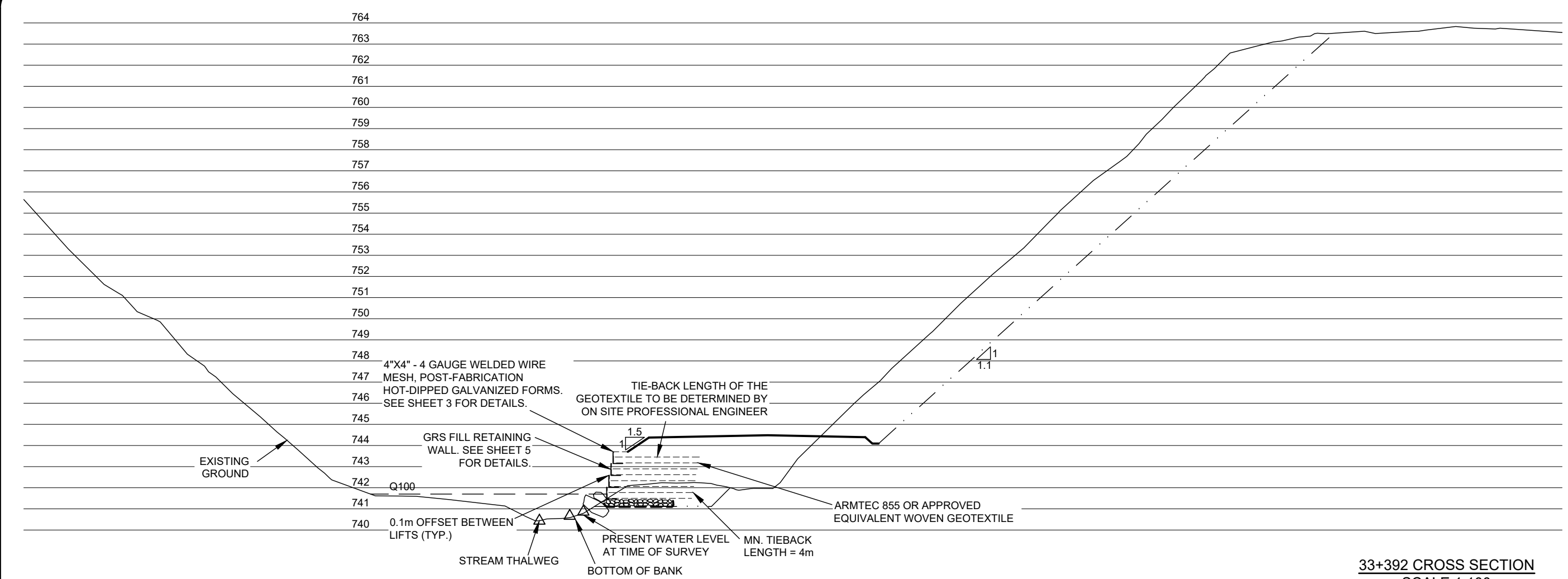
REVIEWED BY: DARYL TAYLOR, P.Eng

REVISION DATE:

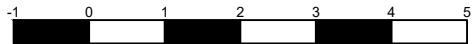
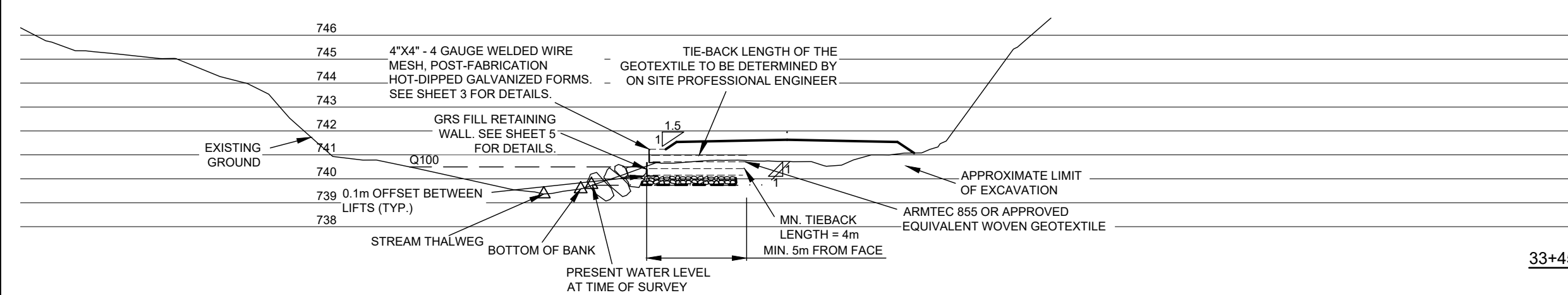
SITE SURVEY:

DWG #: 110-022-COLBOURNE 33 300-454

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OF 5



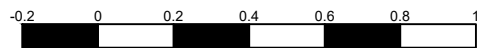
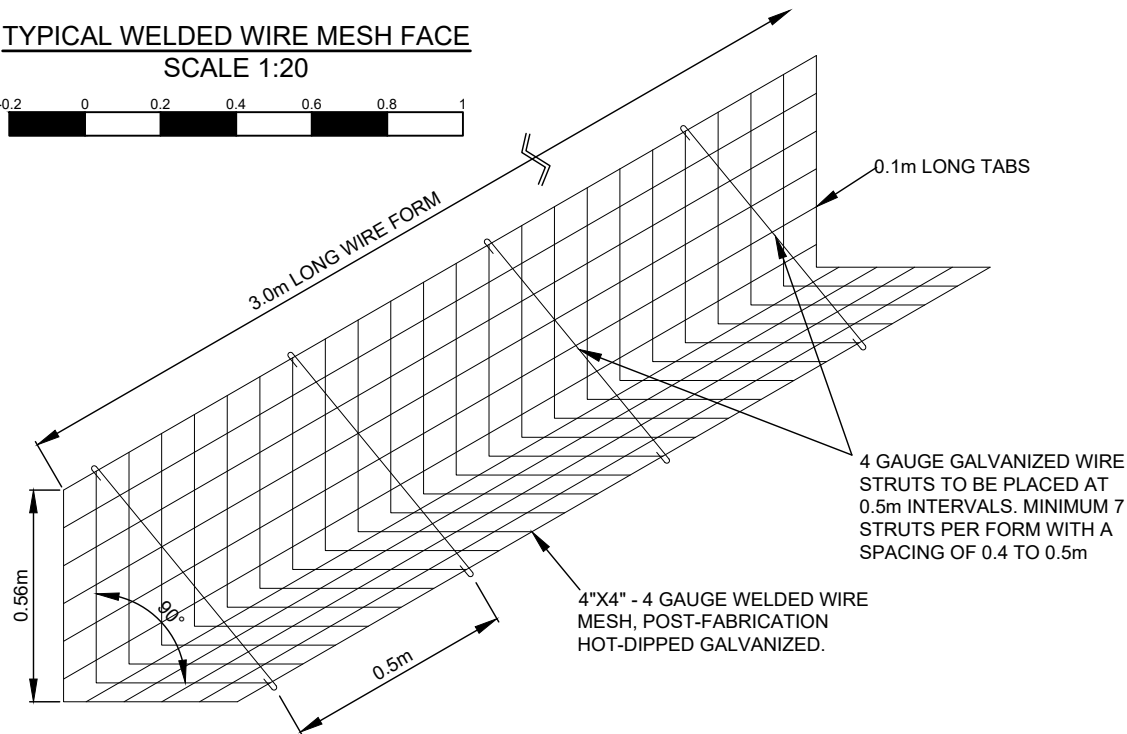
33+392 CROSS SECTION
SCALE 1:100



33+452 CROSS SECTION
SCALE 1:100

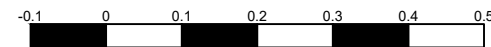


TYPICAL WELDED WIRE MESH FACE
SCALE 1:20



TWIST UNDER
TWIST OVER

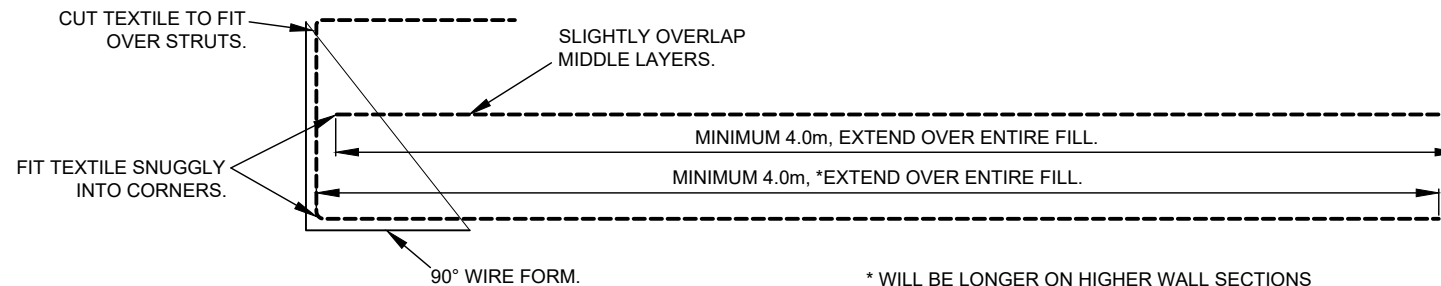
TYPICAL WIRE FRAME CONNECTION DETAIL
SCALE 1:10



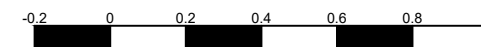
ADJACENT FORMS TO BE OVERLAPPED BY 0.1m OR ONE FULL SQUARE. TWIST 0.1m LONG WIRE TABS AROUND ADJACENT FORMS. USE ALL TABS ON THE FACE AND AT LEAST ONE ON THE BOTTOM.

CONSTRUCTION NOTES FOR GRS AND WELDED WIRE FORM FACE:

1. BOTTOM ROWS OF WIRE FORMS MUST BE PLACED DIRECTLY ON NATIVE MINERAL SOIL, BEDROCK OR COMPACTED GRANULAR / BROKEN ROCK FILL LAYER AT OR BELOW THE ELEVATIONS SHOWN IN THE DESIGN AND AS PER THE ON-SITE DIRECTION OF THE DESIGN ENGINEER. FORMS ARE FOR FILL RETAINMENT ONLY. FOR PROPER GEOTEXTILE PLACEMENT A MINIMUM 3.0m WIDE FLAT AREA BEHIND THE FORMS MUST BE EXCAVATED WHERE PRACTICABLE. IF BEDROCK PREVENTS EXCAVATION, USE A MINIMUM OF 1.0m WIDE BENCH TO START THE GRS ON.
2. FORMS ARE 3m LONG AND CAN BE CUT TO SHORTER LENGTHS TO FORM AROUND CORNERS. ADJACENT FORMS MUST BE BOUND TOGETHER BY "TWISTING" THE 0.1m LONG WIRE TABS AROUND THE NEXT FORM TO AT LEAST 360°. ALL TABS ON THE FACE AND A MINIMUM OF ONE TAB ON THE BOTTOM MUST BE USED (SEE DETAIL ABOVE) TO BIND FORMS.
3. PLACE ARMTEC 855 (OR APPROVED EQUIVALENT) WOVEN GEOTEXTILE OVER FORMS WITH A MINIMUM 3.0m LONG TAIL EXTENDING BEHIND THE FACE. THE REMAINING GEOTEXTILE IS TO BE DRAPED OVER THE FACE OF THE FORMS. WHILE ENSURING THE GEOTEXTILE IS FIT TIGHTLY TO THE INSIDE OF THE FORM, THE STRUTS MUST BE ATTACHED TO THE FORMS THROUGH THE GEOTEXTILE AT A SPACING OF 0.4 TO 0.5m.
4. BACKFILL THE FORMS WITH COMPACTIBLE GRANULAR SOIL OR BROKEN ROCK FILL TO A LOOSE DEPTH OF ABOUT 0.35m AND COMPACT TO AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY. USE A VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 12,000 lbs OF CENTRIFUGAL FORCE. USE A JUMPING JACK COMPACTOR WITH A MINIMUM IMPACT FORCE OF 23 psi TO COMPACT THE SOIL BETWEEN THE STRUTS. A SECOND PLATE COMPACTOR OR LARGER COMPACTOR IS SUGGESTED FOR THE PURPOSE OF INCREASED PRODUCTIVITY.
5. PLACE THE SECOND LAYER OF GEOTEXTILE OVER THE COMPACTED LIFT AND CUT SLITS IN THE FABRIC (PERPENDICULAR TO THE WALL FACE) WHERE THE STRUTS INTERFERE SO THE GEOTEXTILE MAY BE PLACED TIGHT AGAINST THE WIRE FACE.
6. PLACE AND COMPACT GRANULAR FILL TO THE TOP OF THE WELDED WIRE FORM AS PER STEP 4.



TYPICAL GEOTEXTILE PLACEMENT DETAIL
SCALE 1:20



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