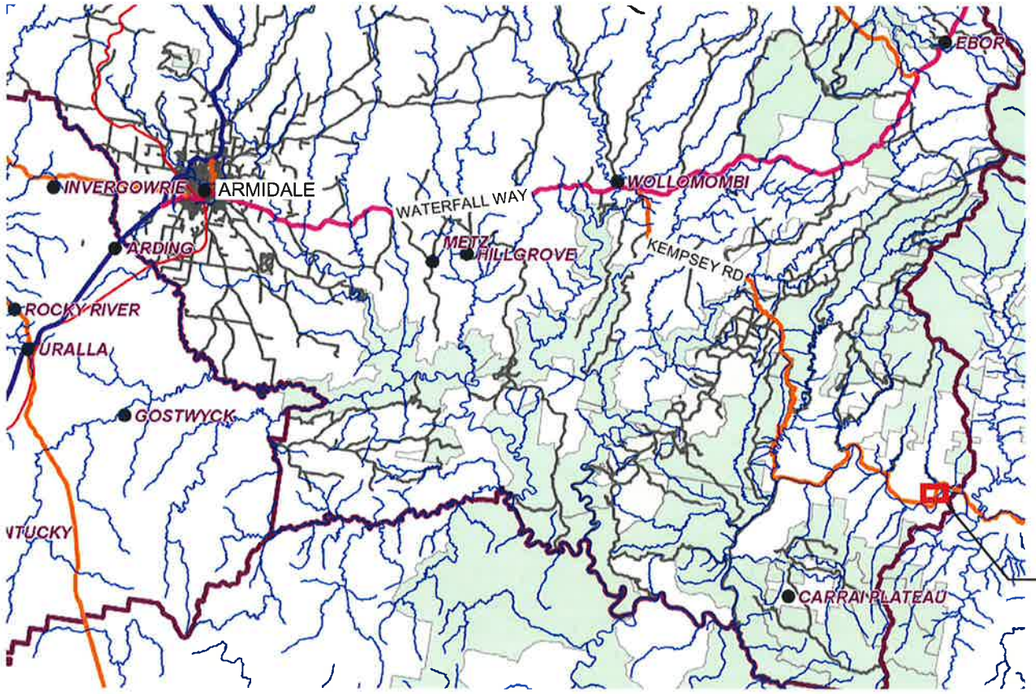
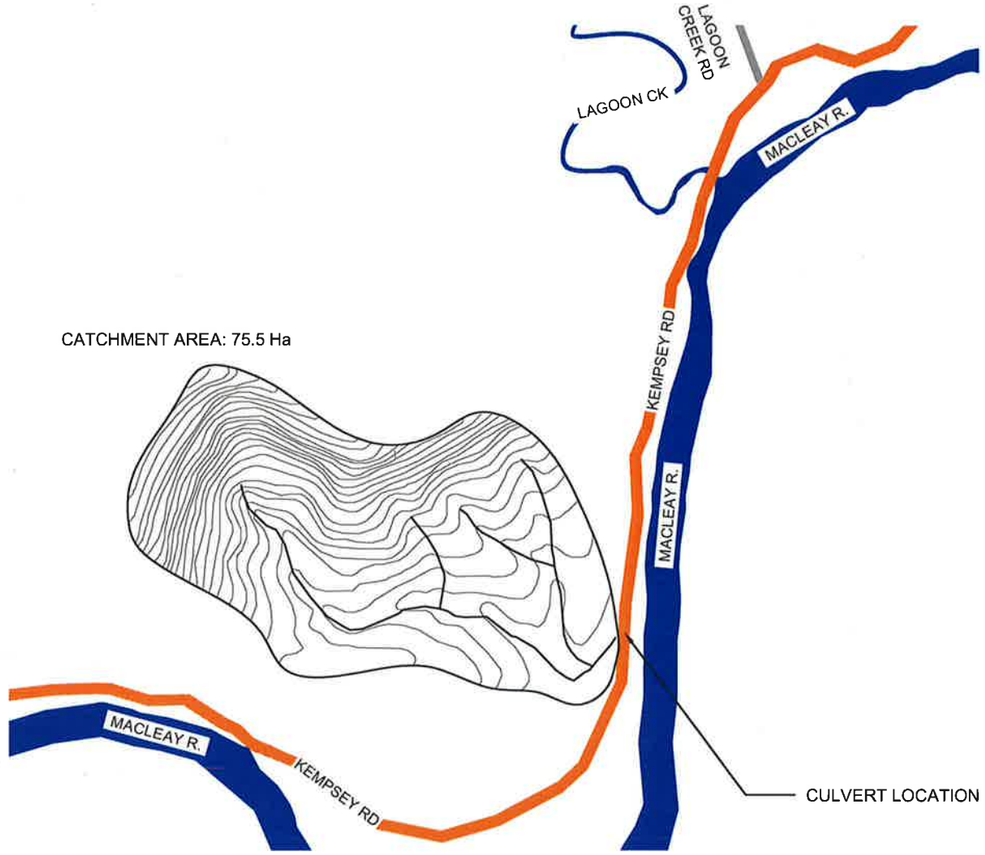
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT



SITE LOCATION



CATCHMENT

INDEX			
NO.	SHEET DESCRIPTION	NO.	SHEET DESCRIPTION
1	COVER PAGE AND INDEX	9	SAFETY BARRIER DETAILS AND TYPICAL SECTIONS
2	GENERAL NOTES	10	CULVERT LONGITUDINAL SECTION
3	GENERAL LAYOUT	11	SCOUR PROTECTION DETAILS
4	LONGITUDINAL SECTION	12	CULVERT OUTLET CHANNEL SH1
5	CROSS SECTIONS 1 (CH 10.000 - 40.000)	13	CULVERT OUTLET CHANNEL SH2
6	CROSS SECTIONS 2 (CH 50.000 - 80.000)	14	DTMR STANDARD DRAWING 1304 SH1
7	CROSS SECTIONS 3 (CH 90.612 - 120.000)	15	DTMR STANDARD DRAWING 1304 SH2
8	CROSS SECTIONS 4 (CH 130.000 - 160.000)		

AEP (%)	MAX CATCHMENT FLOW RATE (m^3/s)	MAX CULVERT FLOW RATE (m^3/s)	MAX CULVERT VELOCITY (m/s)
5	18.9	17.8	11.1
2	22.8	21.2	11.7
1	25.4	22.9	12.0

No.	Ammendment Description	Initials	Date

ARMIDALE Regional Council

REGIONAL GEOTECHNICAL SOLUTIONS

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
COVER SHEET

DRAWING No 314-027

APPROVED 29/10/24
COORDINATOR DESIGN AND RESOURCING — DATE

CADFILE:

AREA No: 318.dwg

AS SHEET SIZE A3

SHEET No. 1/15

ISSUE A

FILE No. ARC21/4742

GEOTECHNICAL ASSESSMENT REQUIREMENTS

1. THE BASE OF EXCAVATIONS SHALL BE BELOW THE LANDSLIDE SLIDE PLANE AND ALL UNSTABLE MATERIAL
2. BASE OF FOUNDATION EXCAVATIONS MUST BE ASSESSED BY A GEOTECHNICAL ENGINEER.
3. THE REQUIRED DEPTH OF EXCAVATION AND FOUNDATION MATERIAL MAY VARY
4. THE DESIGNER SHOULD BE CONTACTED IF THERE ARE ANY SIGNIFICANT VARIATIONS IN CONDITIONS ENCOUNTERED AND VARIATIONS TO THE DESIGN THAT MAY BE REQUIRED.
5. AT THE COMPLETION OF WORKS, THE CONTRACTOR SHALL PROVIDE CERTIFICATION OF THE COMPLETED WORKS AND WORK AS EXECUTED DRAWINGS SHOWING THE FINAL EXTENTS OF EXCAVATIONS, MATERIALS USED AND THEIR QUANTITIES.

DRAINAGE

6. ALL DRAINAGE WORKS IS TO COMPLY WITH RMS SPECIFICATION R11.
7. INLET AND OUTLET PROTECTION WORK TO COMPLY WITH RMS SPECIFICATION R55.
8. WHERE CONSTRUCTION IS HINDERED BY THE PRESENCE OF ROCK THE PRINCIPAL IS TO BE CONSULTED PRIOR TO ALTERING PIPE GRADES.
9. OPEN DRAINAGE LINES TO BE CONSTRUCTED WITH A MINIMUM 1% FALL.
10. PIPES INSTALLED TO HS2 SUPPORT CONDITIONS.
11. SCOUR PROTECTION MEASURES SHALL BE CONSTRUCTED AT THE DISCHARGE POINTS OF ALL SURFACE WATER CONTROL DEVISES. MEASURES CAN INCLUDE ROCK RIP RAP OR OTHER PROPRIETARY PRODUCTS SUCH AS CB STONEMAT OR SIMILAR.
12. SOIL SLOPES SHALL BE VEGETATED IMMEDIATELY FOLLOWING COMPLETION OF CONSTRUCTION TO PREVENT SCOUR AND EROSION. TEMPORARY MEASURES SUCH AS JUTE MAT, JUTE MESH, GRASSROOTS OR SIMILAR SHALL BE USED TO PROVIDE TEMPORARY PROTECTION WHILE VEGETATION ESTABLISHES.

GENERAL

13. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWINGS.
14. MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, TOGETHER WITH THE REQUIREMENTS OF ALL APPLICABLE CODES OF PRACTICE, AUSTRALIAN STANDARDS AND STATUTORY AUTHORITIES.
15. SITE SURVEY WILL BE SUPPLIED WITH STATIONS SET UP ON SITE. THE CONTRACTOR SHOULD CONFIRM THAT SUFFICIENT DATA IS SHOWN TO ENABLE CONSTRUCTION AND COMPLETION OF WORKS AS EXECUTED DRAWINGS.
16. HYDRAULIC DESIGN, AND DRAINAGE STRUCTURES DESIGNED BY ARMIDALE REGIONAL COUNCIL. REFER TO COUNCIL SHOULD ANY DISCREPANCIES BE FOUND.
17. ORIGIN OF CO-ORDINATES ARE LOCAL CO-ORDINATE SYSTEM.
18. PRIOR TO COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION SERVICES LOCATION SHALL BE UNDERTAKEN AND ANY RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR POSSIBLE RELOCATION OF UNDERGROUND SERVICES.
19. CULVERTS MAY BE INSTALLED WITH HDPE RATHER THAN RCP BUT WILL REQUIRE APPROVAL FROM THE SUPERINTENDENTS REPRESENTATIVE PRIOR TO INSTALLATION.

EARTHWORKS (Where Required)

20. EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH RMS SPECIFICATION R44.
21. EARTH WORKS MATERIAL REQUIREMENTS TO BE SPECIFIED AND APPROVED BY THE PROJECT MANAGER. PRIORITY IS TO BE PLACED UPON REUSING FILL MATERIAL FROM THE ROAD RESERVE.
22. WHERE 1:1 BATTERS ARE SPECIFIED THESE SHOULD BE FLATTENED ONSITE WHERE THE EXISTING SURFACE ALLOWS AND SUFFICIENT MATERIAL IS AVAILABLE.
23. ALL SOILS CONTAINING ORGANIC MATTER (E.G. ROOTS, GRASS ETC.) MUST BE STRIPPED AND MUST NOT BE REUSED AS FILL. SUCH MATERIAL CAN BE REUSED FOR TOPSOILING ONLY.
24. ANY MATERIAL REQUIRING OFFSITE DISPOSAL WILL REQUIRE WASTE CLASSIFICATION ASSESSMENT IN ACCORDANCE WITH DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE WASTE CLASSIFICATION GUIDELINES.
25. CUT / FILL BATTERS MUST NOT EXCEED 2H:1V (HORIZONTAL:VERTICAL), WITHOUT APPROVAL FROM THE NOMINATED GEOTECHNICAL ENGINEER.
26. EARTHWORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH AS3798-2007 GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENT.
27. FILL MATERIAL MUST COMPLY WITH THE SPECIFICATIONS IN THE DRAWINGS.
28. ALL OVERSIZED MATERIAL, MUST BE REMOVED FROM THE FILL.
29. FILL IS TO BE UNIFORMLY COMPACTED IN LOOSE LAYERS NO GREATER THAN 300 mm AND MUST ACHIEVE A MINIMUM OF 98% STANDARD COMPACTION OR AS OTHERWISE SPECIFIED IN THE DRAWINGS.
30. FILL PLACED ON SLOPES GREATER THAN 10H:1V SHALL BE BENCHED OR ROCKWALL INSTALLED AS PER SHEET 13.
31. CLAYS OF HIGH PLASTICITY OR HIGH IN-SITU MOISTURE CONTENT ARE NOT TO BE USED AS FILL.
32. IMPORTED FILL SHALL COMPRISE WELL GRADED GRANULAR MATERIAL WITH A PLASTICITY INDEX LESS THAN 15%, AND A CBR OF GREATER THAN 15% UNLESS OTHERWISE APPROVED BY THE NOMINATED GEOTECHNICAL ENGINEER OR DESIGNER.
33. FILL SHALL BE PLACED AND COMPACTED WITHIN 60% to 90% of OMC OR AS SPECIFIED ON THE DRAWINGS.
34. DENSITY TESTING SHALL BE UNDERTAKEN IN FILL AS SPECIFIED IN THE DRAWINGS BY A NATA ACCREDITED TESTING AUTHORITY. ANY MATERIAL THAT DOES NOT MEET THE MINIMUM DENSITY REQUIREMENTS SHALL BE REWORKED AND RETESTED.

PAVEMENTS

35. ALL ROAD WORKS TO COMPLY WITH RMS SEPCIFICATION R71OR IN ACCORDANCE WITH THE DESIGN OR AN APPROVED ALTERNATIVE DESIGN.
36. PAVEMENT MATERIAL REQUIREMENTS TO BE SPECIFIED AND APPROVED BY THE PROJECT MANAGER.
37. PAVEMENT TIE INS TO OCCUR OUTSIDE THE JOB EXTENTS. TIE IN TO BE PROVIDED OVER A MINIMUM OF 20 METRES TO ACHIEVE A SMOOTH TRANSITION.
38. WHERE NEW CONSTRUCTION JOINS ONTO EXISTING PAVEMENTS THE EXISTING PAVEMENT LAYERS SHOULD BE BENCHED TO AVOID A VERTICAL JOINT EXTENDING THROUGH THE PAVEMENTS AT THE INTERFACE.
39. PAVEMENT GRAVELS SHOULD BE PLACED AND MAINTAINED AT 60% TO 90% OF OPTIMUM MOISTURE CONTENT.
40. FINAL SEALING, THE BASE COURSE SHOULD BE ALLOWED TO DRY BACK TO NOT MORE THAN 60% OF OPTIMUM MOISTURE CONTENT PRIOR TO SEALING.
41. WHERE A TWO COAT SEAL IS ADOPTED, SEALING SHOULD BE AVOIDED DURING WINTER MONTHS OR AT TIMES WHEN PAVEMENT TEMPERATURES OF LESS THAN 15 DEGREES ARE LIKELY.
42. WHERE FINAL SEALING CANNOT BE UNDERTAKEN WITHIN A FEW DAYS OF COMPLETION OF THE BASE COURSE, A PRIMER SEAL SHOULD BE USED TO PROTECT THE PAVEMENT AND MAINTAIN EQUILIBRIUM MOISTURE CONTENT.

GABION / NO FINES CONCRETE BLOCK (NFC) SPECIFICATION

43. MACCAFERRI GABION PVC COATED DOUBLE TWIST BASKETS OR OTHER APPROVED GABION CAGE SHALL BE USED.
44. BASKETS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
45. GABION ROCK SHALL BE NOMINALLY 100MM IN SIZE WITH THE GENERAL CHARACTERISTICS AS PER THE ROCK FILL SPECIFICATION
46. THE RETAINING ELEMENTS (GABIONS, NFC BLOCKS, ROCK FILL ETC.) SHALL BE FOUNDED ON WEATHERED ROCK BELOW ANY POTENTIAL FAILURE PLANE. THE FOUNDATION SHALL BE ASSESS BY A GEOTECHNICAL ENGINEER.
47. WHERE FOUNDATION SURFACE IS IRREGULAR, CONCRETE LEVELING STRIPS CAN BE USED.
48. THE FOUNDATION SHALL BE GRADED OR A DRAINAGE PIPE INSTALLED TO ENSURE DRAINAGE FROM BEHIND THE WALL AND TO PREVENT PONDING.
49. GABIONS / NFC BLOCKS SHALL BE PLACED WITH A SLIGHT INCLINE INTO THE SLOPE FACE (NOM 1-5°).
50. GABIONS / NFC BLOCKS SHALL BE PLACED WITH A 0.5M OFFSET FROM ADJOINING ROWS AND THE ROW BELOW. UNLESS CLEARLY DETAILED OTHERWISE IN THESE DRAWINGS.
51. GABIONS / NFC BLOCKS NOT DIRECTLY PLACED OVER ANOTHER ROW OF GABIONS SHALL BE PLACED ON A PREPARED FOUNDATION CONSISTING OF ROCKFILL PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ROCK FILL CONSTRUCTION METHODOLOGY AND SEQUENCING
52. EXCAVATE AND REMOVE ALL EXISTING SITE DEBRIS AND UNSUITABLE MATERIAL FROM THE EMBANKMENT TOE AND FACE OF SLOPE. THESE MATERIALS COULD BE REUSED ON SITE FOR SLOPE REGRADING AND TOPSOILING. ANY MATERIAL REMOVED FROM THE SITE WOULD ALSO REQUIRE WASTE CLASSIFICATION ASSESSMENT IN ACCORDANCE WITH DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE WASTE CLASSIFICATION GUIDELINES.
53. PLACE A NON-WOVEN GEOFABRIC (SUCH AS BIDIM A49 OR SIMILAR) OVER THE BASE OF THE EXCAVATION AND SLOPE FACE BETWEEN THE GABION / NFC BLOCKS / ROCK FILL AND SUBGRADE;

ROCK FILL CONSTRUCTION

54. EXCAVATE AND REMOVE ALL UNSUITABLE MATERIAL FROM THE EMBANKMENT TOE AND SLOPE FACE
55. THE ROCKFILL FOUNDATION SHOULD COMPRISE STIFF / DENSE SOILS OR THE UNDERLYING WEATHERED ROCK. THE FOUNDATION MUST BE ASSESSED BY THE CONTRACTORS GEOTECHNICAL ENGINEER PRIOR TO PLACING ROCKFILL
56. EXCAVATE A 'KEY' INTO THE FOUNDATION TO PROVIDE TOE RESTRAINT AND TO INCREASE SLIDING RESISTANCE ALONG THE TOE
57. PLACE A NON-WOVEN GEOFABRIC (SUCH AS BIDUM A49 OR SIMILAR) OVER THE BASE OF THE EXCAVATION AND SLOPE BETWEEN THE ROCKFILL AND SLOPE FACE.
58. PLACE BOULDERS AND COBBLES SELECTIVELY IN A MANNER THAT ENSURES GOOD MECHANICAL INTERLOCK. ANY LARGE OPENINGS BETWEEN THE LARGER BOULDERS SHOULD BE IN-FILLED WITH SMALLER BOULDERS AND COBBLES.
59. EXCAVATE THE SLOPE PROGRESSIVELY AS THE ROCK IS PLACED, BENCHING IN LIFTS OF NO GREATER THAN 1.0M.
60. THE ROCK FILL SHOULD BE PLACED WITH A FACE ANGLE NO STEEPER THAN 35 TO 40°.

ROCK FILL SPECIFICATIONS

61. ROCK FILL SHOULD COMPRISE OF HARD, DURABLE, ANGULAR ROCK WITH THE FOLLOWING CHARACTERISTICS.
    a. HIGH SPECIFIC GRAVITY (MASS) OF GREATER THAN 2.4T/M3
    b. CHEMICALLY INERT
    c. WET STRENGTH >120 KN
    d. WET/DRY STRENGTH VARIATION <35%
    e. WATER ABSORPTION <1.5%
    f. SODIUM SULPHATE LOSS <6%
57. SITE WON MATERIAL CAN BE REUSED BUT SHOULD BE ASSESSED BY A GEOTECHNICAL ENGINEER FOR SUITABILITY.

EROSION AND SEDIMENT CONTROL (ERSED):

58. ERSED CONTROLS TO BE DESIGNED AND IMPLEMENTED IN ACCORDANCE WITH THE LAND COM BLUE BOOK (MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION) AND THE ENVIRONMENTAL MANAGEMENT PLAN.
59. ERSED CONTROLS TO BE MAINTAINED THROUGHOUT THE JOB AND REINSPECTED AND MAINTAINED AFTER EACH RAIN EVENT.
60. BATTERS AND EXPOSED SURFACES TO BE REVEGETATED. SPECIFIC GRASS MIX AND PLANTING REQUIREMENTS TO BE SPECIFIED BY THE ARMIDALE REGIONAL COUNCIL PROJECT TEAM.

SAFETY BARRIERS:

61. SAFETY BARRIERS TO BE CONSTRUCTED IN ACCORDANCE WITH RMS SPECIFICATION R132.

CONCRETE:

62. ALL CONCRETE WORKS MUST COMPLY WITH RMS SPEC R53 CONCRETE FOR GENERAL WORKS.
63. MINIMUM STRENGTH GRADE f'(c) = 32 MPa.
64. NOMINAL SLUMP 100 mm.
65. MINIMUM YIELD STRESS OF STEEL REINFORCING F'sy = 500 MPA.
66. ADJOINING SHEETS OF MESH MUST BE OVERLAPPED BY A MINIMUM OF TWO SQUARES.
67. STEEL REINFORCING BARS TO BE JOINED WITH MINIMUM LAP LENGTHS OF 32 TIMES THE BAR DIAMETER UNLESS OTHERWISE SPECIFIED.
68. CONCRETE REQUIREMENTS FOR HEADWALL CONSTRUCTION SHALL BE PROVIDED ON THE RMS STANDARD DRAWINGS. THESE CONSTRUCTION NOTES REFER TO GENERAL CONCRETE WORK FOR INLET PROTECTION AND GUARDRAIL FOOTINGS.
69. NEED FOR BLINDING LAYER AT HEADWALLS TO BE DETERMINED WITH THE SUPERINTENDENT AFTER EXCAVATION

No.	Ammendment Description	Initials	Date

REGIONAL GEOTECHNICAL SOLUTIONS

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE
KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT NOTES

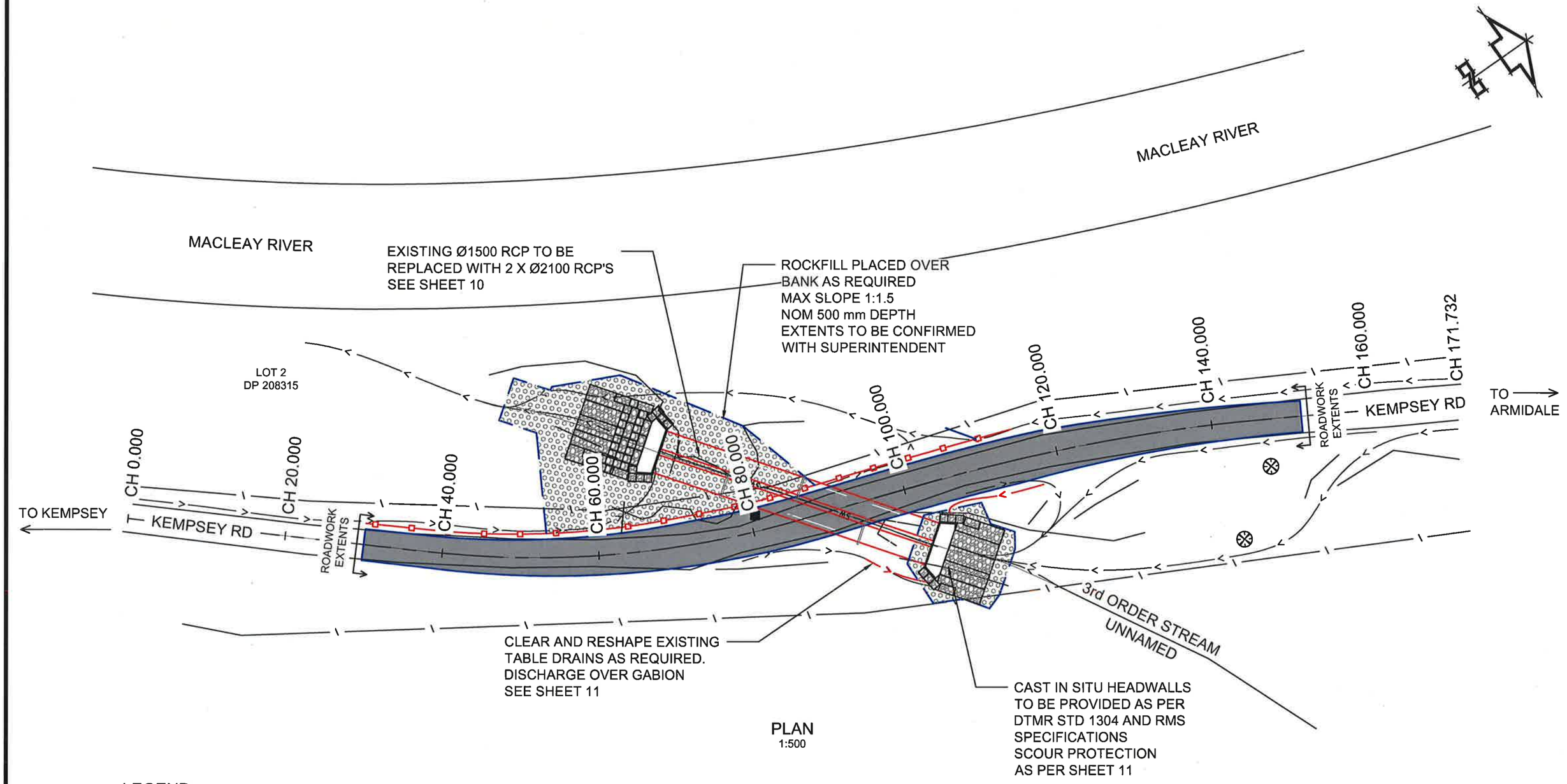
DRAWING No 314-027

APPROVED COORDINATOR DESIGN AND RESOURCING — DATE 29/10/21

CADFILE: 314-027.dwg
AREA No: 318.dwg

AS SHEET SIZE A3 | SHEET No. 2/15 | ISSUE A

FILE No. ARC21/4742



PLAN
1:500

LEGEND

- CENTER LINE
- 100mm OVERLAY
- ROCKFILL
- NEW GAURDRAIL
- EXISTING DRAINAGE
- FENCE

No.	Ammendment Description	Initials	Date

SCALES
0 5 10 15 20 25
SCALE 1:500 @ A3
Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

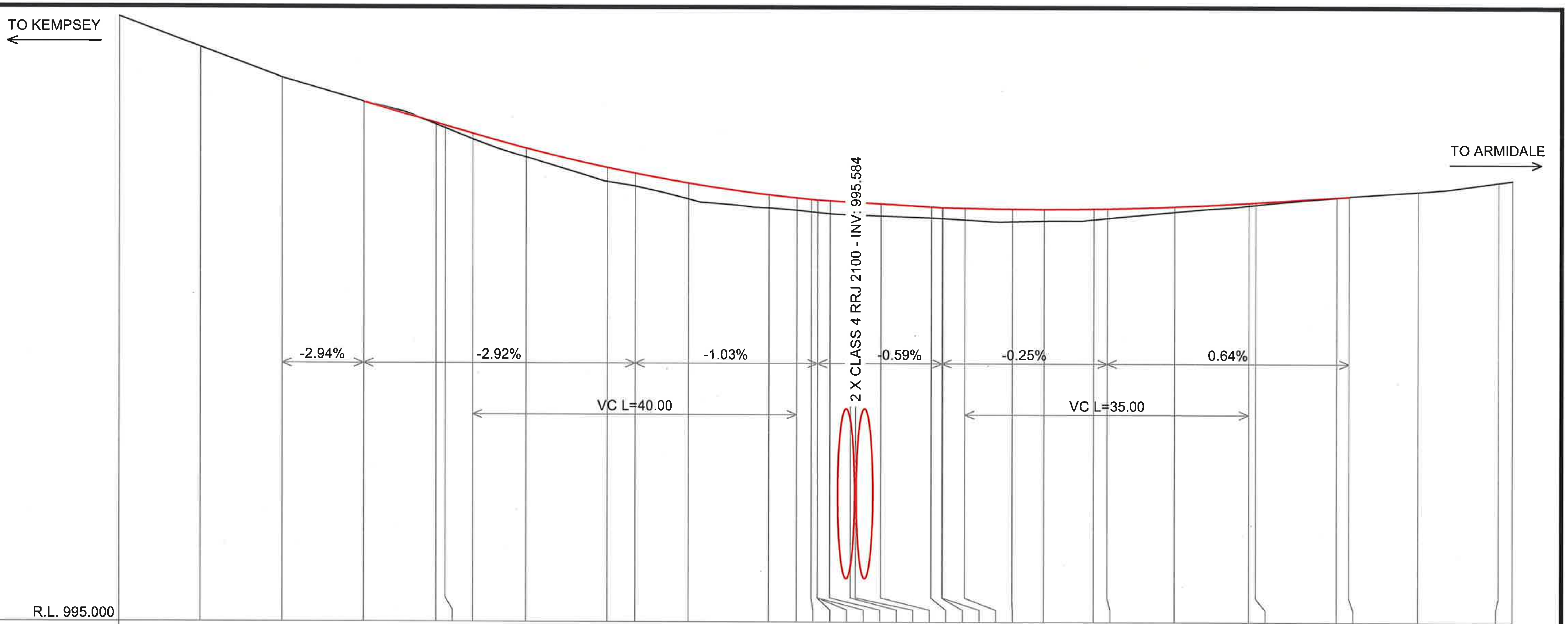
TITLE
KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT GENERAL LAYOUT

DRAWING No 314-027
CADFILE: 314-027.dwg
AREA No: 318.dwg

APPROVED 28/10/21
COORDINATOR DESIGN AND RESOURCING — DATE

AS SHEET SIZE	SHEET No.	ISSUE
A3	3/15	A

FILE No. ARC21/4742



HORIZONTAL GEOMETRY

0 — L=39 B=186°12'35" — 39 — L=47 R=120 — 85 — L=16 B=164°02'11" — 101 — L=44 R=228 — 146 — L=26 B=175°01'07" — 172

CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT/FILL
0.000	1002.48		
10.000	1002.10		
20.000	1001.72		
30.000	1001.43	1001.429	+0.000
38.870	1001.15	1001.170	+0.025
40.000	1001.10	1001.137	+0.038
43.414	1000.96	1001.037	+0.074
50.000	1000.74	1000.854	+0.113
60.000	1000.44	1000.617	+0.177
63.414	1000.38	1000.547	+0.163
70.000	1000.23	1000.427	+0.201
80.000	1000.12	1000.284	+0.167
83.414	1000.09	1000.246	+0.157
85.228	1000.07	1000.228	+0.157
85.959	1000.06	1000.220	+0.157
85.984	1000.06	1000.220	+0.157
85.997	1000.06	1000.220	+0.157
87.468	1000.05	1000.211	+0.164
90.000	1000.03	1000.196	+0.161
90.612	1000.03	1000.192	+0.159
93.755	1000.02	1000.174	+0.153
100.000	1000.00	1000.137	+0.140
101.345	999.99	1000.129	+0.137
101.445	999.99	1000.129	+0.138
104.165	999.97	1000.122	+0.148
110.000	999.95	1000.112	+0.159
113.907	999.96	1000.110	+0.149
120.000	999.98	1000.115	+0.136
121.665	999.99	1000.118	+0.123
130.000	1000.07	1000.143	+0.070
139.165	1000.15	1000.191	+0.037
140.000	1000.16	1000.196	+0.033
150.000	1000.25	1000.260	+0.005
151.523	1000.27	1000.269	+0.000
160.000	1000.33		
170.000	1000.44		
171.732	1000.47		

SCALES: H - 1:500 V - 1:50

KEMPSEY ROAD CENTRELINE LONGITUDINAL SECTION

No.	Ammendment Description	Initials	Date

SCALES

SCALE 1:500 @ A3

SCALE 1:50 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE

KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT LONGITUDINAL SECTION

DRAWING No 314-027

CADFILE: 314-027.dwg

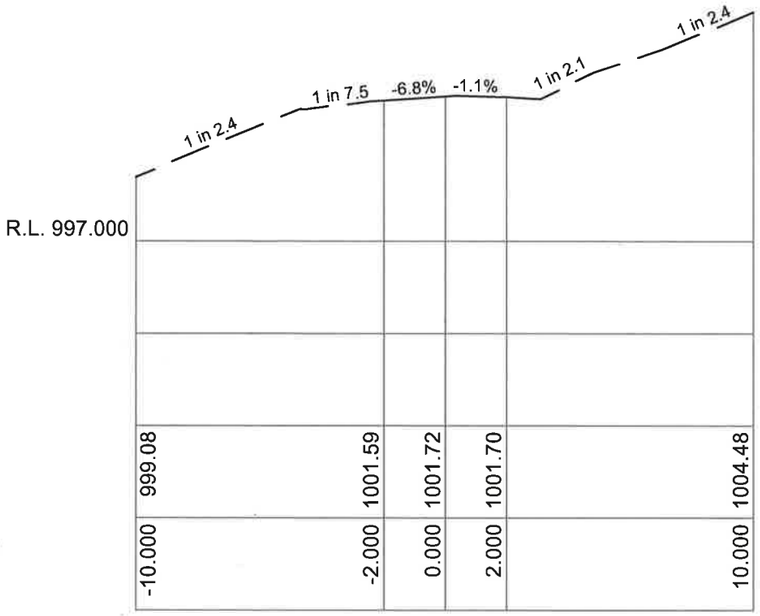
AREA No: 318.dwg

APPROVED COORDINATOR DESIGN AND RESOURCING

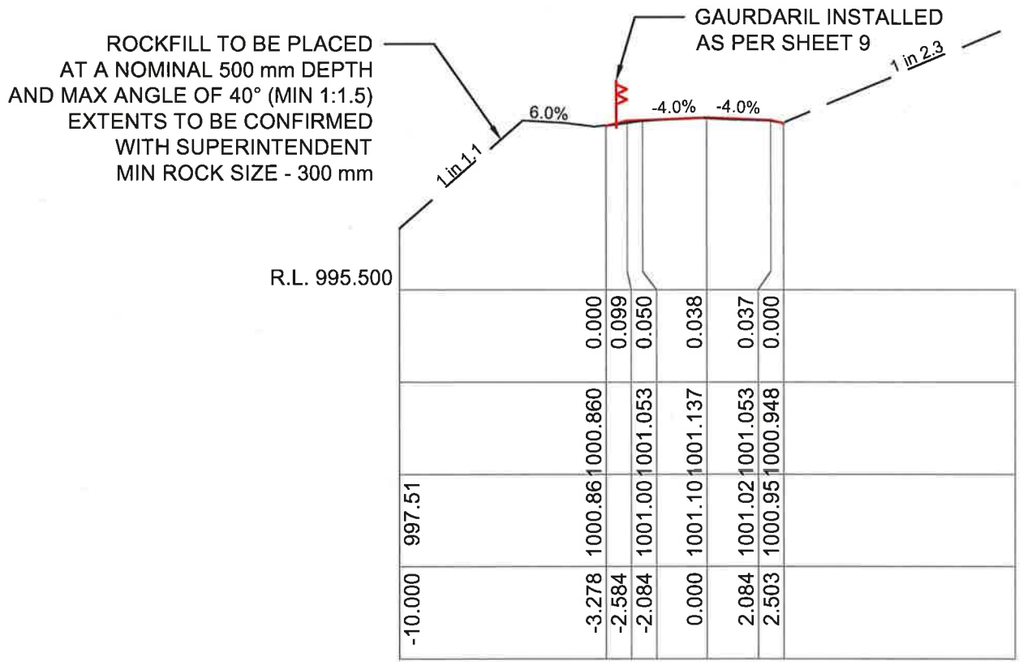
DATE 29/10/21

AS SHEET SIZE A3 | SHEET No. 4/15 | ISSUE A

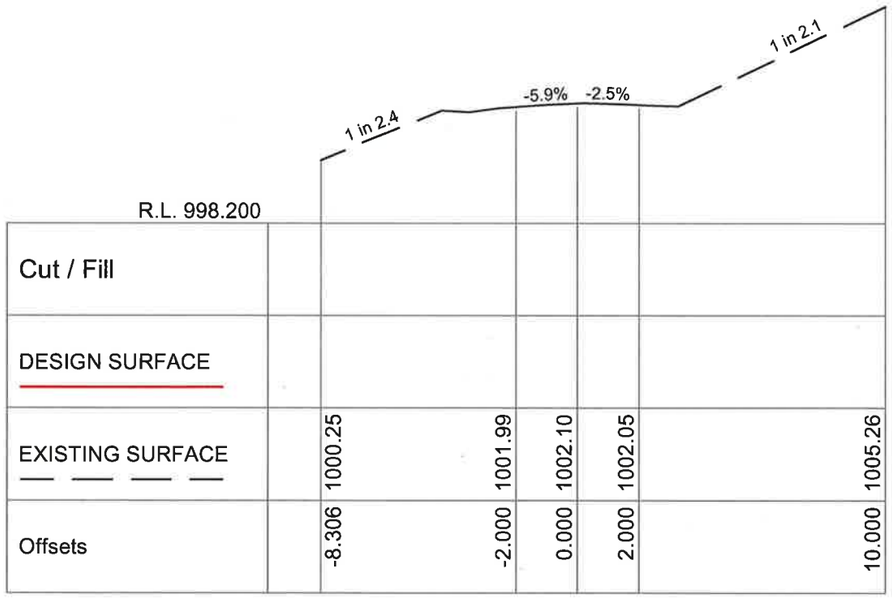
FILE No. ARC21/4742



Ch 20.000

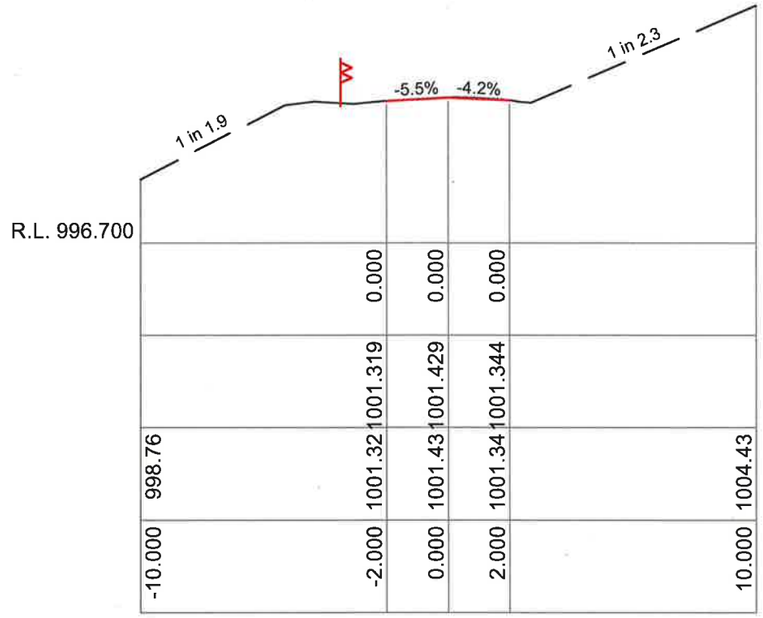


Ch 40.000



SCALES: H - 1:200 V - 1:200

Ch 10.000



Ch 30.000

No.	Ammendment Description	Initials	Date

SCALES
0 2 4 6 8 10
SCALE 1:200 @ A3
Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
CROSS SECTIONS CH10 - 38.646

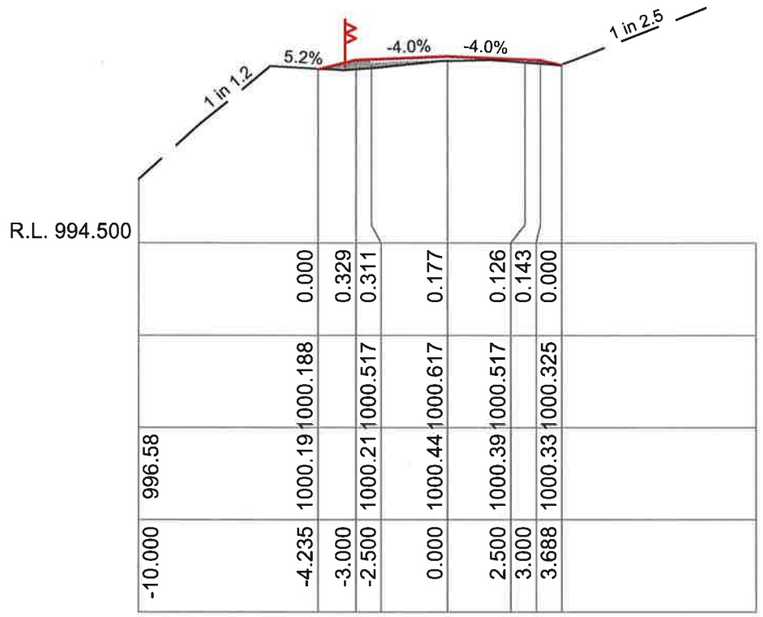
DRAWING No 314-027
CADFILE: 314-027.dwg
AREA No: 318.dwg

APPROVED
COORDINATOR DESIGN AND RESOURCING
29/10/21
DATE

AS SHEET SIZE	SHEET No.	ISSUE
A3	5/15	A

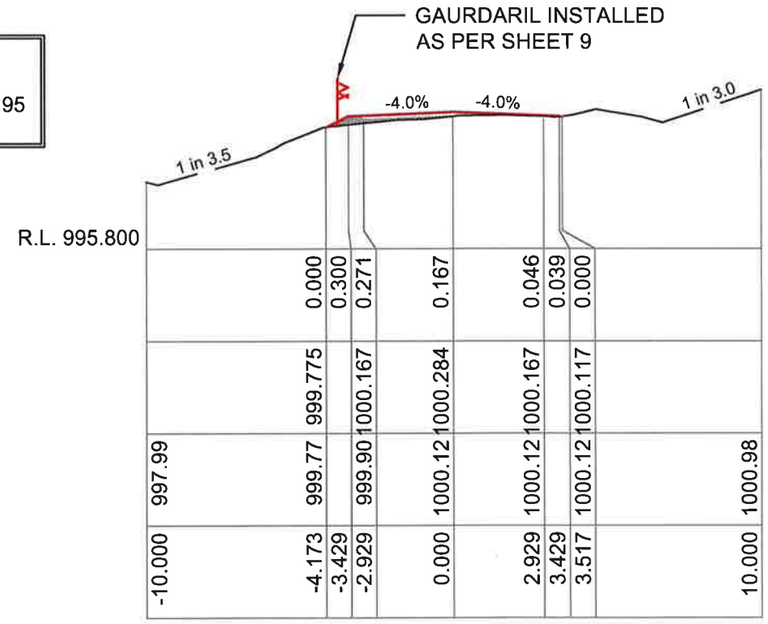
FILE No. ARC21/4742

NOTE CULVERT TO BE INSTALLED UNDER ROAD BETWEEN CHAINAGES ~85 AND 95 SEE SHEET 10 FOR DETAILS



		0.000	0.329	0.311	0.177	0.126	0.143	0.000	
		1000.188		1000.517	1000.617	1000.517		1000.325	
	996.58	1000.19		1000.21	1000.44	1000.39		1000.33	
-10.000		-4.235	-3.000	-2.500	0.000	2.500	3.000	3.688	

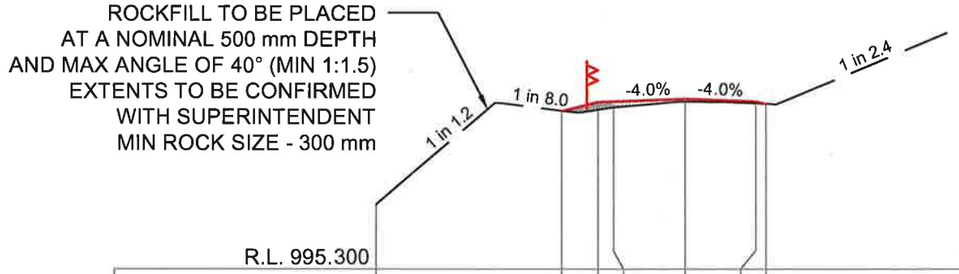
Ch 60.000



		0.000	0.300	0.271	0.167	0.046	0.039	0.000	
		999.775		1000.167	1000.284	1000.167		1000.117	
	997.99	999.77		999.90	1000.12	1000.12		1000.12	1000.98
-10.000		-4.173	-3.429	-2.929	0.000	2.929	3.429	3.517	10.000

Ch 80.000

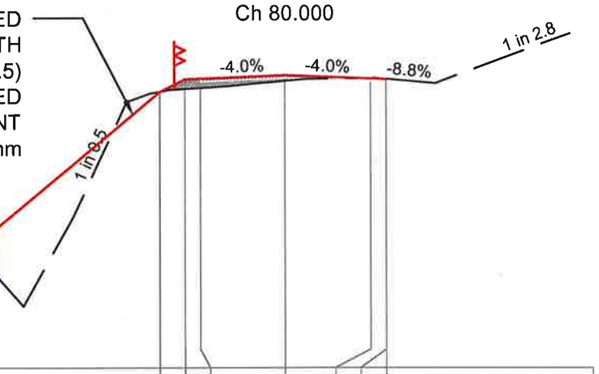
ROCKFILL TO BE PLACED AT A NOMINAL 500 mm DEPTH AND MAX ANGLE OF 40° (MIN 1:1.5) EXTENTS TO BE CONFIRMED WITH SUPERINTENDENT MIN ROCK SIZE - 300 mm



Cut / Fill		0.000	0.260	0.204	0.114	0.070	0.000		
DESIGN SURFACE		1000.450		1000.763	1000.854	1000.763	1000.681		
EXISTING SURFACE	997.40	1000.45		1000.56	1000.74	1000.69	1000.68		
Offsets	-10.000	-3.963	-2.793	-2.293	0.000	2.293	2.620		

SCALES: H - 1:200 V - 1:200

Ch 50.000



		0.000	0.326	0.315	0.201	-0.009	-0.001	0.000	
		999.878		1000.316	1000.427	1000.316		1000.297	
	993.32	999.88		1000.00	1000.23	1000.33		1000.30	
-10.000		-4.102	-3.267	-2.767	0.000	2.767	3.267	3.269	

Ch 70.000

No.	Ammendment Description	Initials	Date

SCALES

0 2 4 6 8 10

SCALE 1:200 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE

KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT CROSS SECTIONS CH50 - 80

DRAWING No 314-027

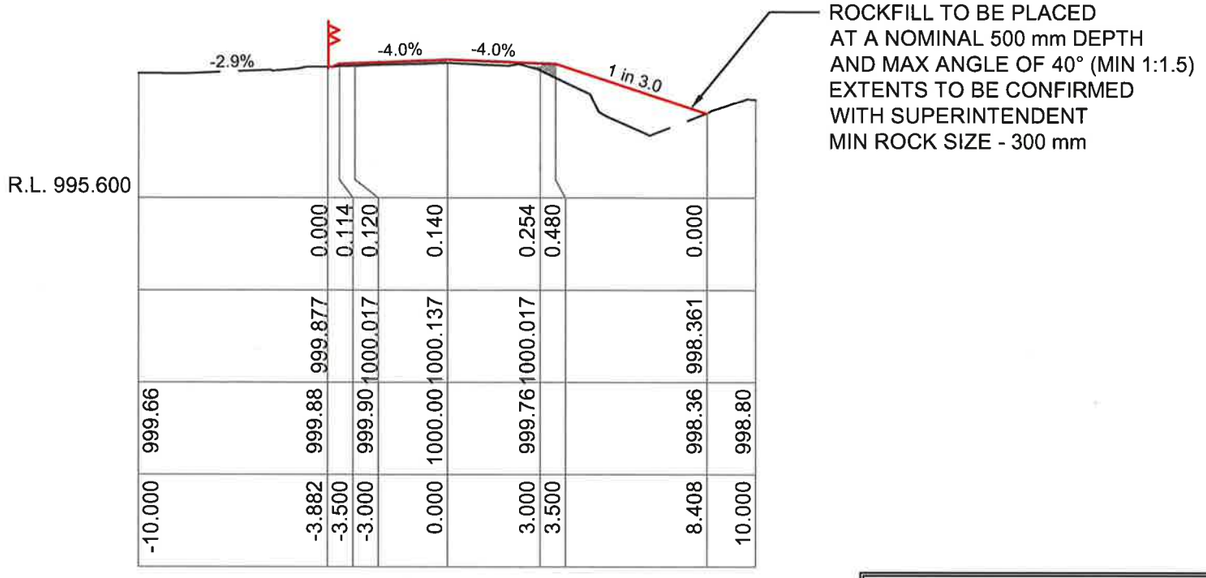
CADFILE: 314-027.dwg

AREA No: 318.dwg

APPROVED COORDINATOR DESIGN AND RESOURCING — DATE 29/10/21

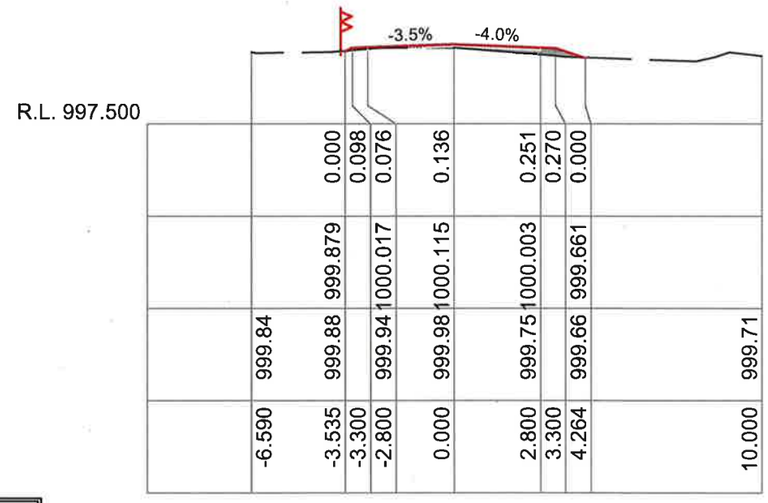
AS SHEET SIZE	SHEET No.	ISSUE
A3	6/15	A

FILE No. ARC21/4742

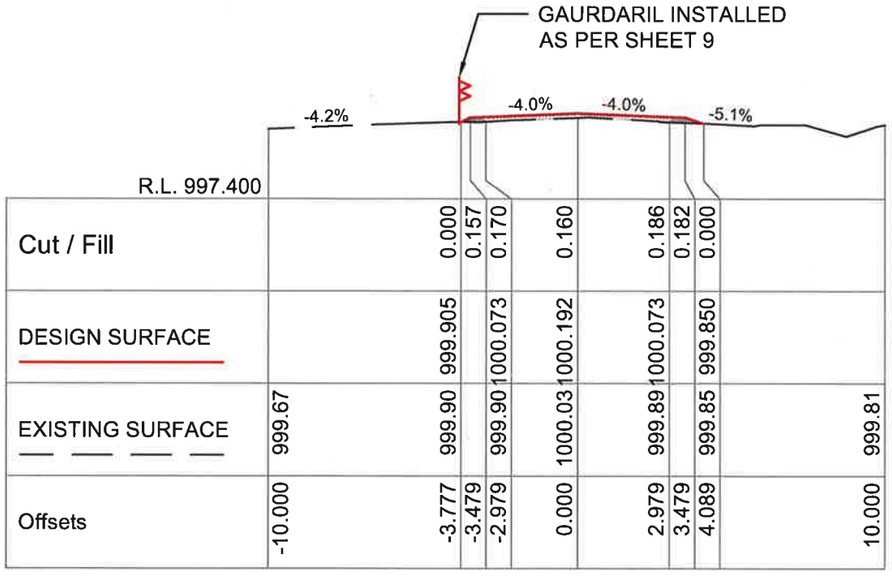


Ch 100.000

NOTE CULVERT TO BE
INSTALLED UNDER ROAD
BETWEEN CHAINAGES ~85 AND 95
SEE SHEET 10 FOR DETAILS

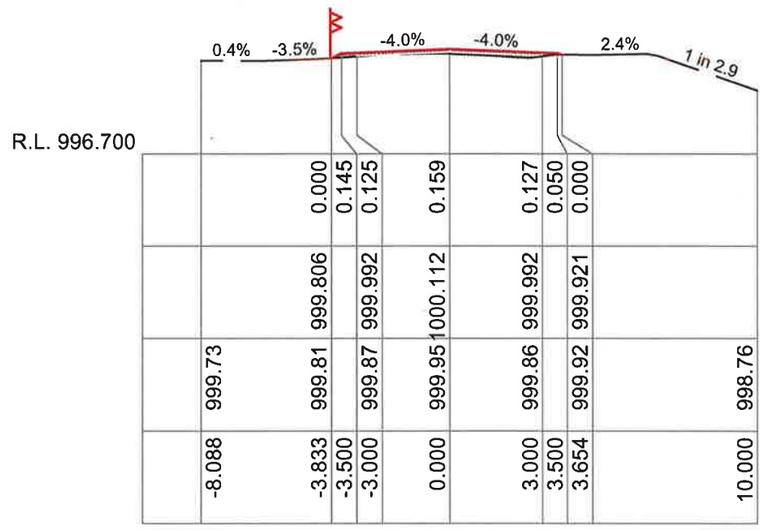


Ch 120.000



SCALES: H - 1:200 V - 1:200

Ch 90.612



Ch 110.000

No.	Ammendment Description	Initials	Date

SCALES
0 2 4 6 8 10
SCALE 1:200 @ A3
Co-ordinate System: LOCAL
Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

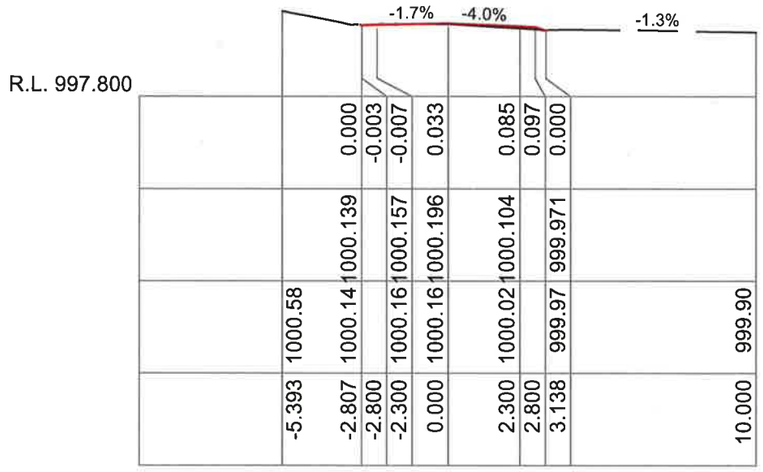
TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
CROSS SECTIONS CH90.612 - 120

DRAWING No 314-027
CADFILE: 314-027.dwg
AREA No: 318.dwg

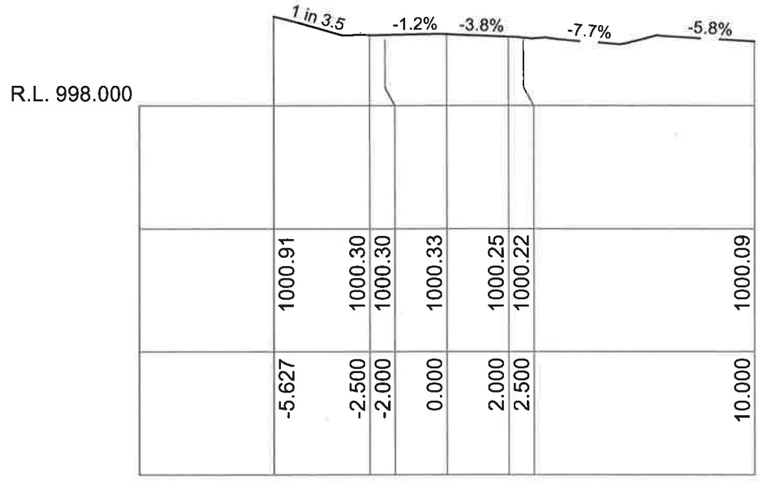
APPROVED 28/10/21
COORDINATOR DESIGN AND RESOURCING ..... DATE

AS SHEET SIZE	SHEET No.	ISSUE
A3	7/15	A

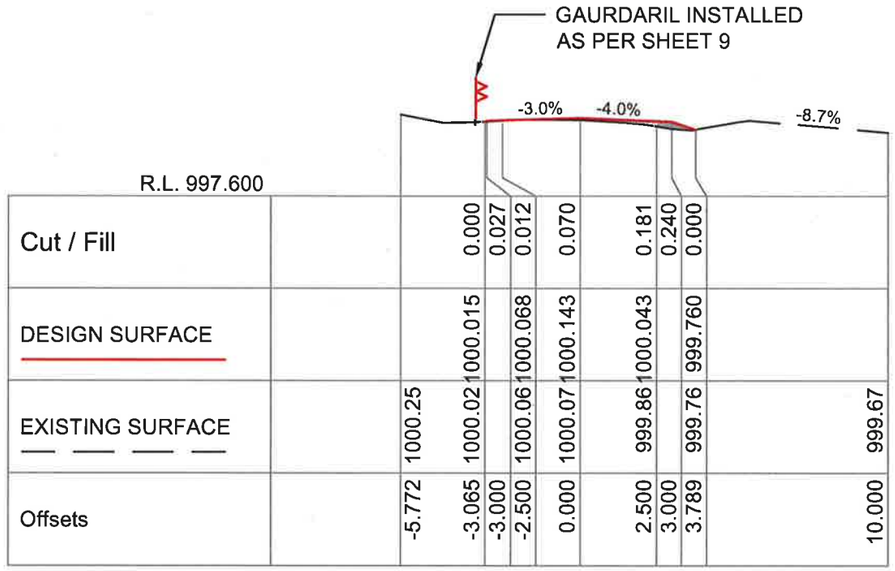
FILE No. ARC21/4742



Ch 140.000



Ch 160.000



SCALES: H - 1:200 V - 1:200

Ch 130.000

Ch 151.523

No.	Ammendment Description	Initials	Date

SCALES

0 2 4 6 8 10

SCALE 1:200 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE

KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT CROSS SECTIONS CH130 - 140

DRAWING No 314-027

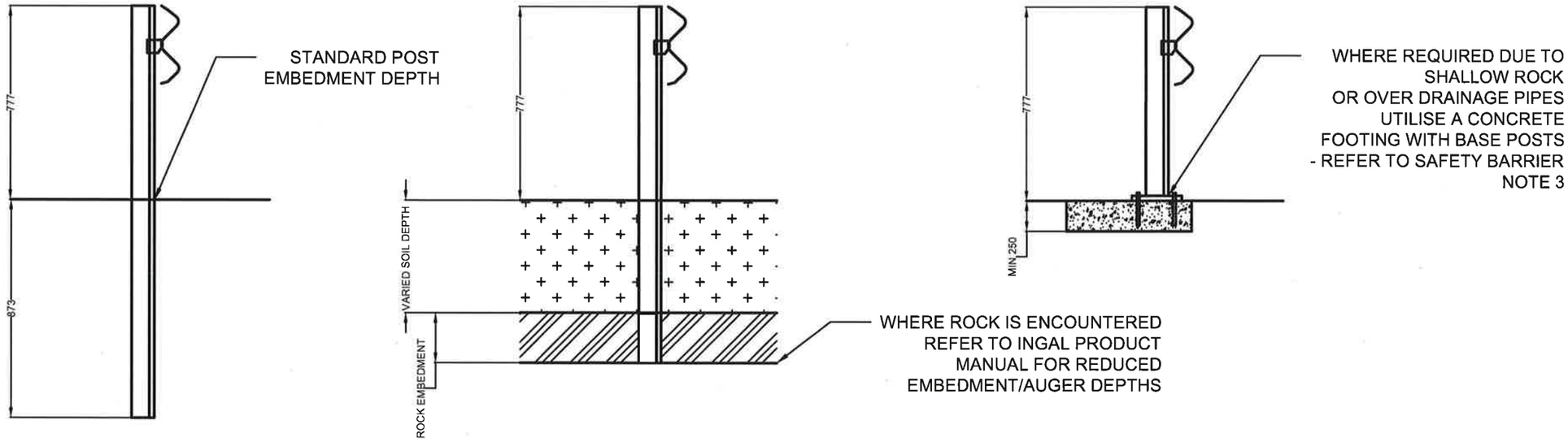
CADFILE: 314-027.dwg

AREA No: 318.dwg

APPROVED ..... COORDINATOR DESIGN AND RESOURCING ..... 29/10/21 DATE

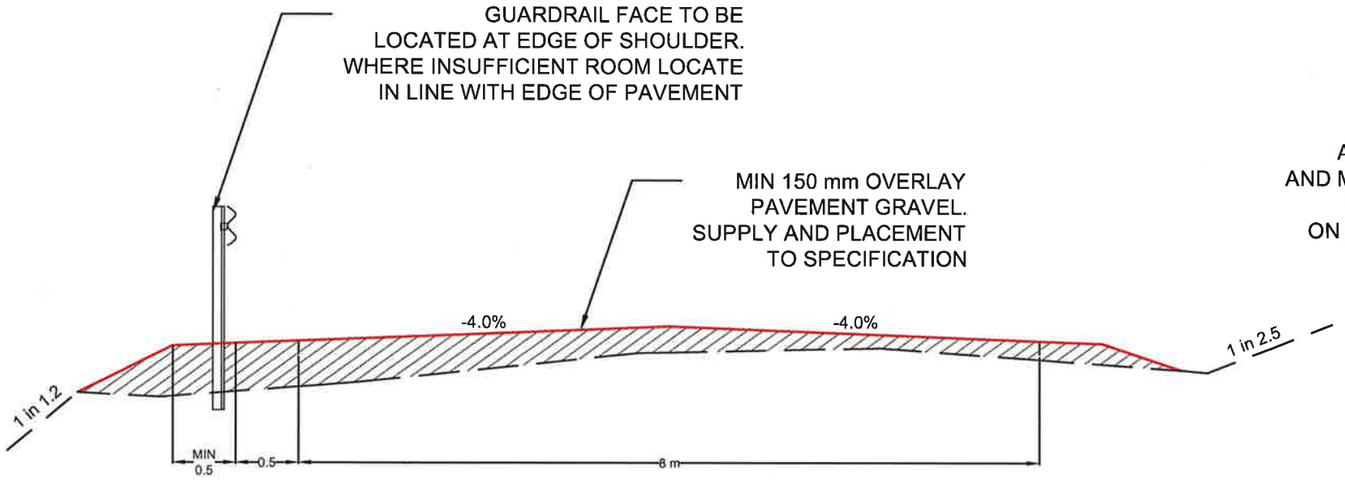
AS SHEET SIZE	SHEET No.	ISSUE
A3	8/15	A

FILE No. ARC21/4742



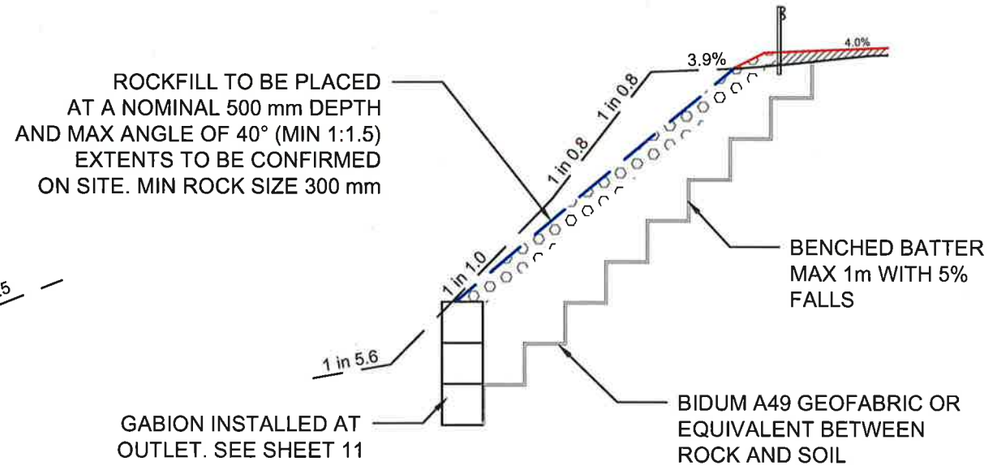
SAFETY BARRIER DETAILS

SCALE 1:20



TYPICAL ROAD CROSS SECTION

SCALE 1:50



TYPICAL LEFT BATTER SECTION

SCALE 1:150

No.	Ammendment Description	Initials	Date

SCALES
0 0.2 0.4 0.6 0.8 1
SCALE 1:20 @ A3
0 0.5 1 1.5 2 2.5
SCALE 1:50 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

REGIONAL GEOTECHNICAL SOLUTIONS
ARMIDALE Regional Council

SURV	J.SPENCE
DRWN	S.TUCKER
DES	S.TUCKER
CHKD	M.WILSON

TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
GAURDRAIL DETAILS
AND TYPICAL SECTIONS

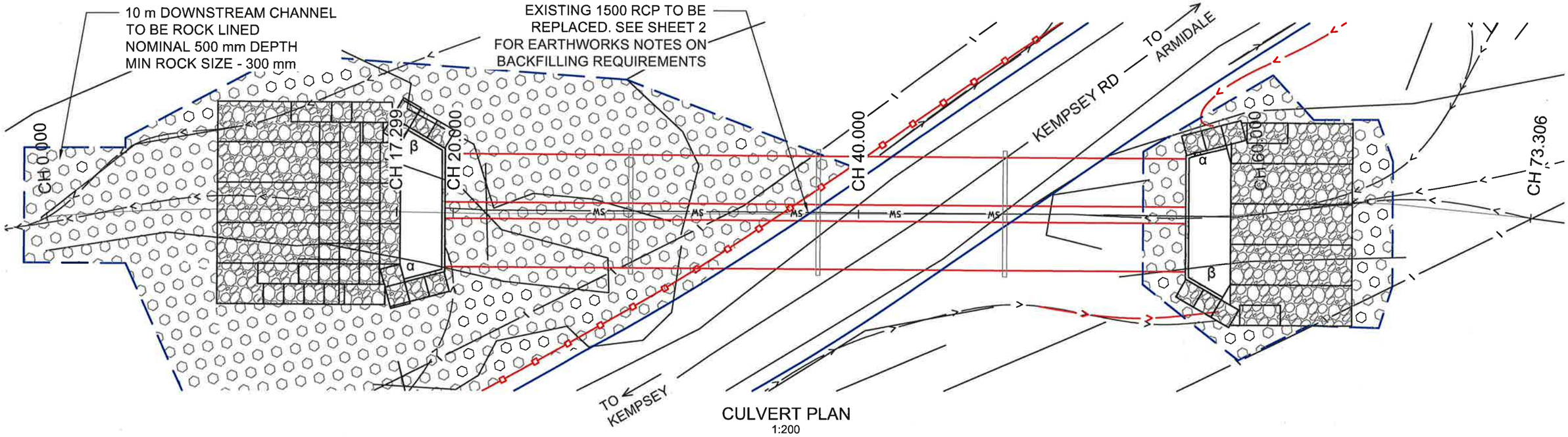
DRAWING No 314-027

APPROVED COORDINATOR DESIGN AND RESOURCING — DATE 29/10/21

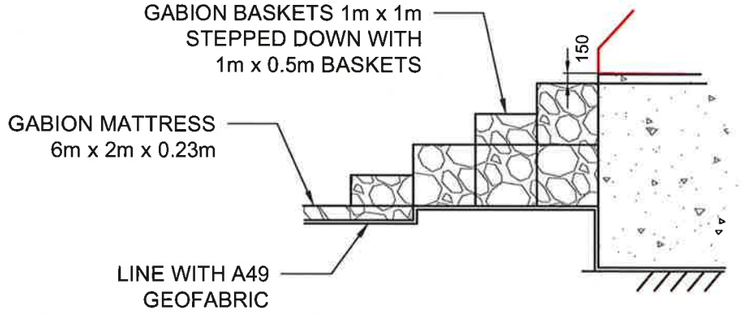
CADFILE: 314-027.dwg
AREA No: 318.dwg

AS SHEET SIZE	SHEET No.	ISSUE
A3	9/15	A

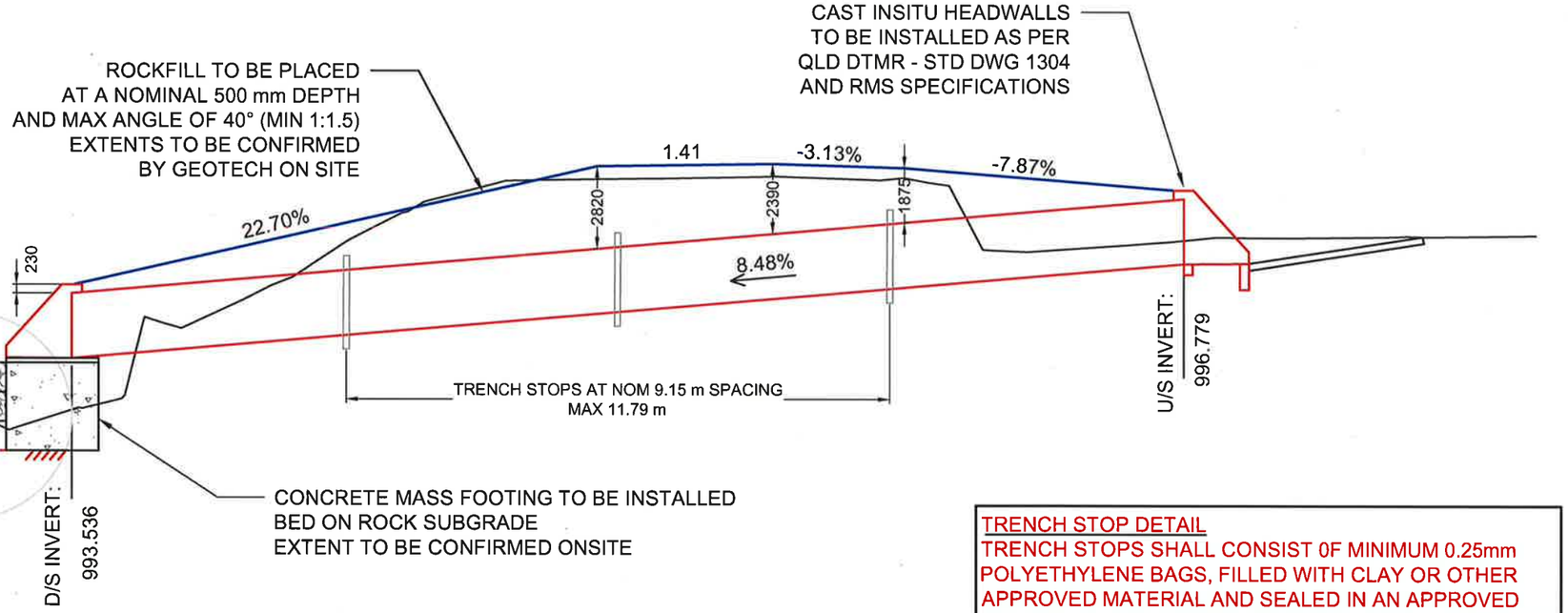
FILE No. ARC21/4742



CULVERT PLAN
1:200



DETAIL A
1:100



CULVERT LONGITUDINAL SECTION
1:200

SKEW ANGLE	WINGWALL ANGLE		WINGWALL LENGTH	
	α	β	W1	W2
45°	15°	30°	1.945	1.945

TRENCH STOP DETAIL

TRENCH STOPS SHALL CONSIST 0F MINIMUM 0.25mm POLYETHYLENE BAGS, FILLED WITH CLAY OR OTHER APPROVED MATERIAL AND SEALED IN AN APPROVED MANNER. PLACE AROUND PIPE, FULL WIDTH OF TRENCH AND 300mm ABOVE THE PIPE (AT THE SOCKET SIDE OF THE JOINTS WHERE THEY COINCIDE). TRENCH STOPS SHALL BE RECESSED 100mm INTO SIDES AND BOTTOM. REFER ARC STANDARD DRAWING 010-039 FOR DETAILS.

No.	Ammendment Description	Initials	Date

SCALES
0 2 4 6 8 10
SCALE 1:200 @ A3
Co-ordinate System: LOCAL
Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

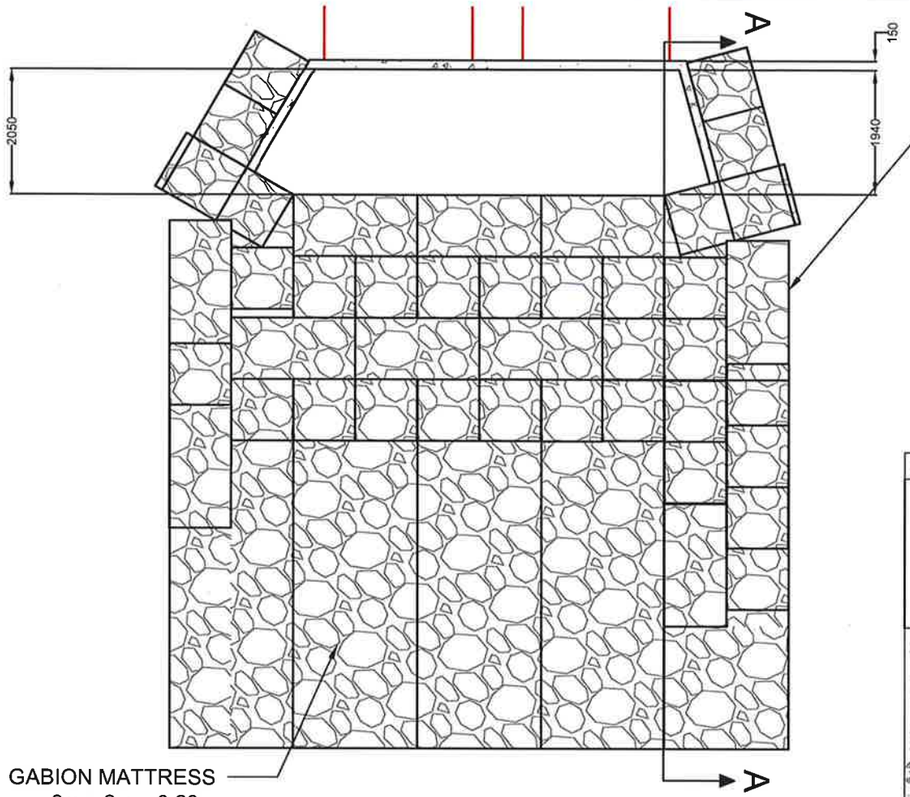
TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
CULVERT LONGITUDINAL SECTION

DRAWING No 314-027
CADFILE: 314-027.dwg
AREA No: 318.dwg

APPROVED
COORDINATOR DESIGN AND RESOURCING
29/04/21
DATE

AS SHEET SIZE	SHEET No.	ISSUE
A3	10/15	A

FILE No. ARC21/4742

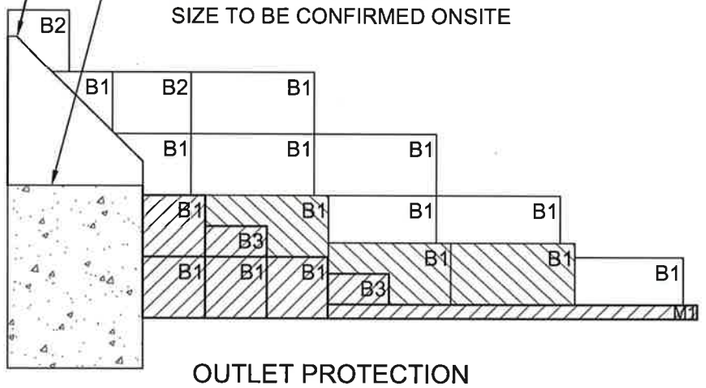


OUTLET PROTECTION
PLAN
1:100

GABION BASKETS 2m x 1m
STEPPED DOWN WITH
1m x 0.5m BASKETS AND TIED IN
TO SURROUNDINGS AS REQUIRED

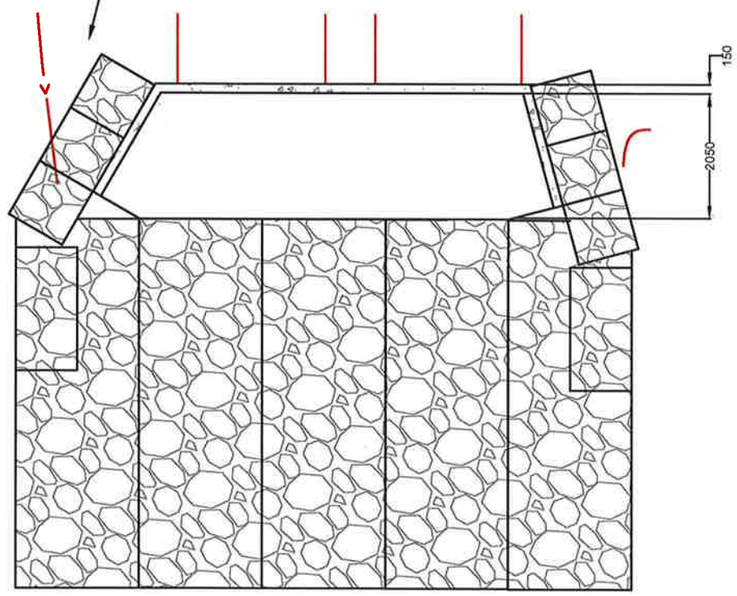
CAST IN SITU HEADWALLS TO BE
PROVIDED AS PER DTMR STD 1304
AND RMS SPECIFICATIONS

CONCRETE MASS FOOTING TO BE INSTALLED
BED ON ROCK SUBGRADE
SIZE TO BE CONFIRMED ONSITE

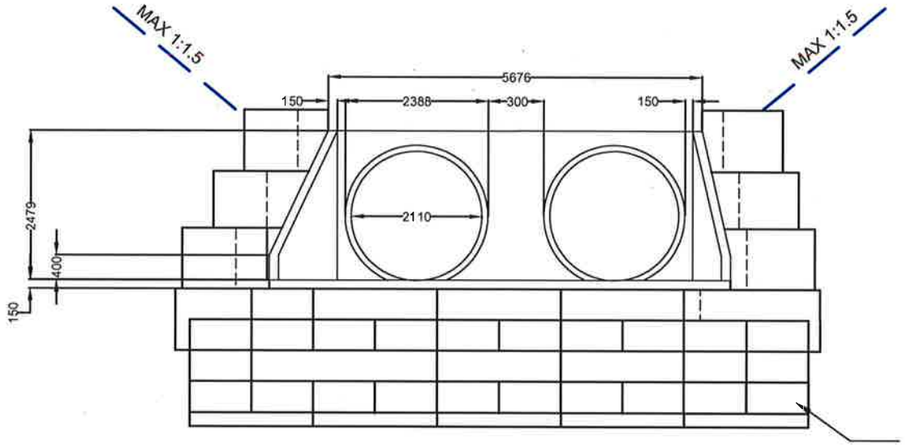


OUTLET PROTECTION
SECTION AA
1:100

SCOUR ROCK TO BE PLACED AS SITE
REQUIRES. EXTENTS TO BE
CONFIRMED WITH SUPERINTENDENT



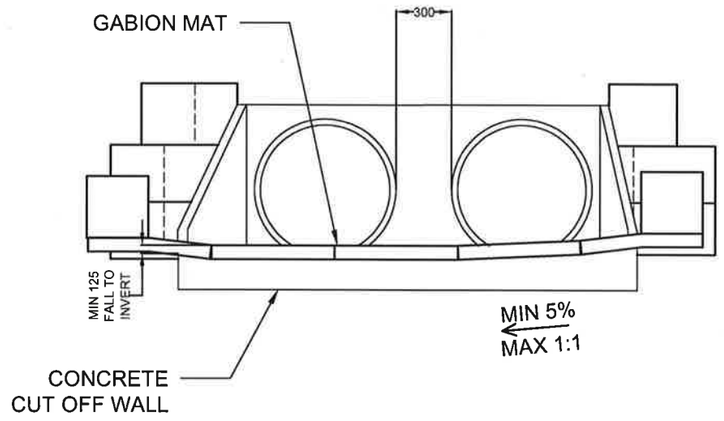
INLET PROTECTION
PLAN
1:100



OUTLET PROTECTION
ELEVATION
1:100

GABION SCHEDULE		
ITEM	SPECIFICATION	No.
B1	2.0 X 1.0 X 1.0 BASKET	36
B2	1.0 X 1.0 X 1.0 BASKET	6
B3	1.0 X 1.0 X 0.5 BASKET	19
M1	6.0 X 2.0 X 0.23 MAT	10

GABION BASKETS 2m x 1m
STEPPED DOWN WITH
1m x 0.5m BASKETS AND TIED IN
TO SURROUNDINGS AS REQUIRED



INLET PROTECTION
ELEVATION
1:100

No.	Ammendment Description	Initials	Date

SCALES
0 1 2 3 4 5
SCALE 1:100 @ A3
Co-ordinate System: LOCAL
Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE
KEMPSEY ROAD - CORN PATCH
CULVERT REPLACEMENT
HEADWALL AND
SCOUR PROTECTION DETAILS

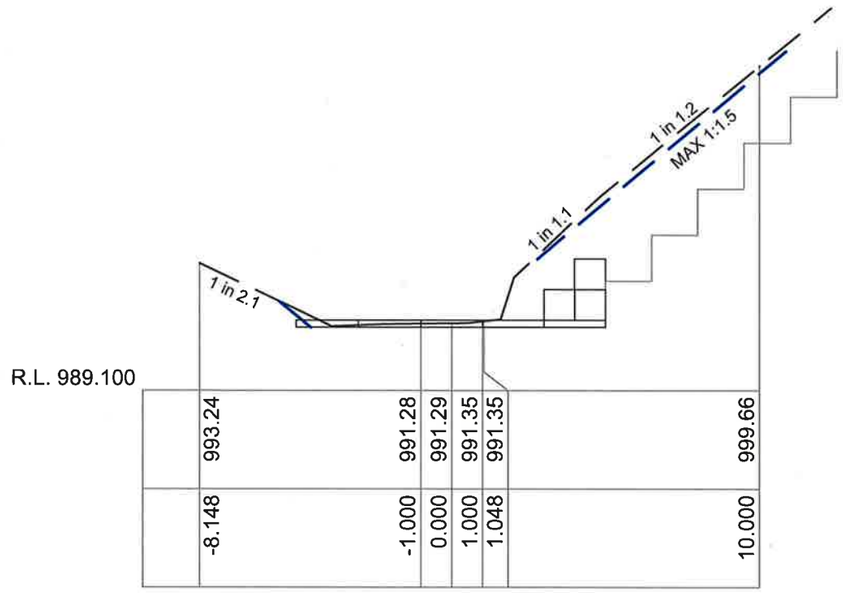
DRAWING No 314-027

APPROVED COORDINATOR DESIGN AND RESOURCING 27/10/21 DATE

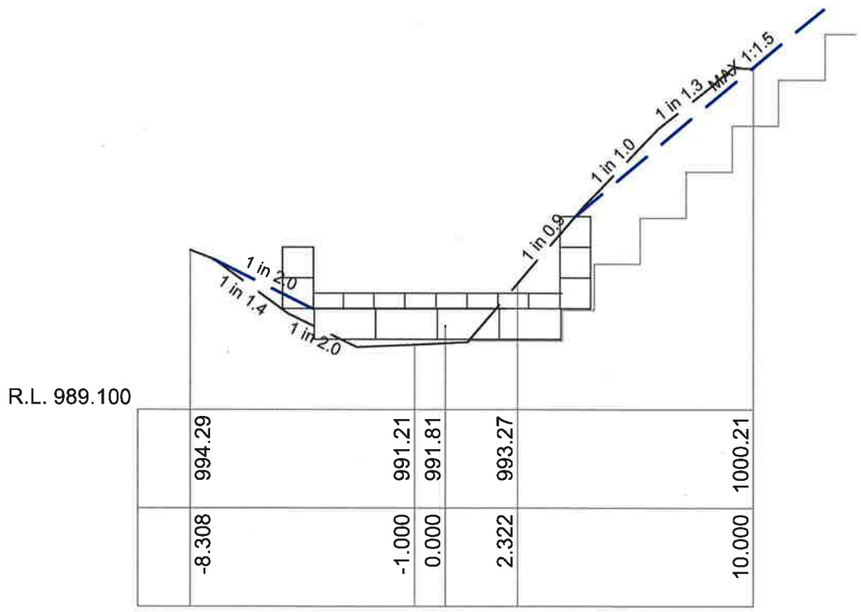
CADFILE:
AREA No: 318.dwg

AS SHEET SIZE A3
SHEET No. 11/15
ISSUE A

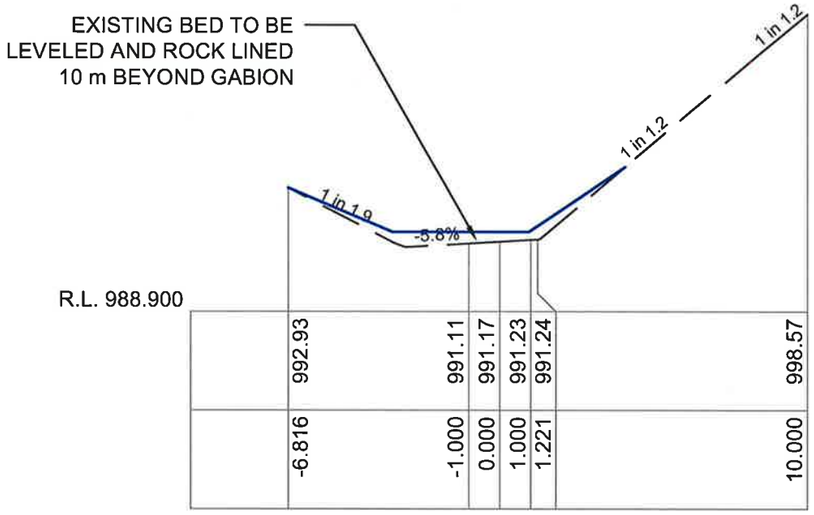
FILE No. ARC21/4742



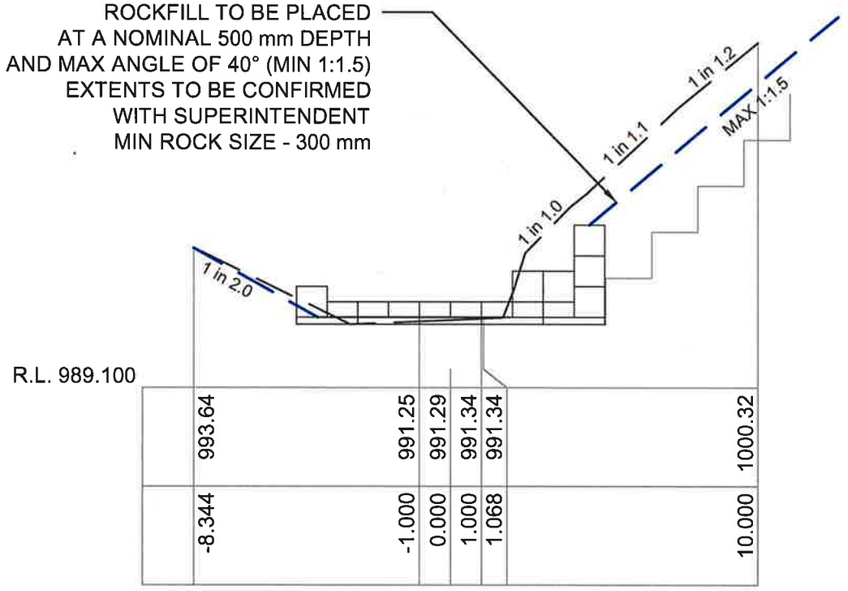
Ch 10.228



Ch 15.229



Ch 4.226



Ch 13.299

No.	Ammendment Description	Initials	Date

SCALES

0 2 4 6 8 10

SCALE 1:200 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE

KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT CULVERT OUTLET CHANNEL

DRAWING No 314-027

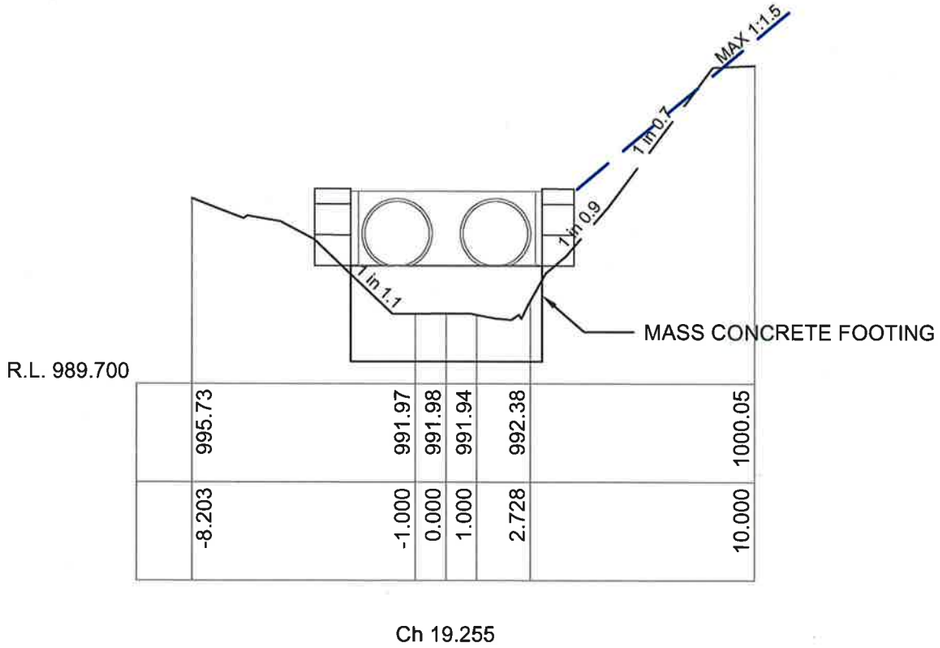
CADFILE: 314-027.dwg

AREA No: 318.dwg

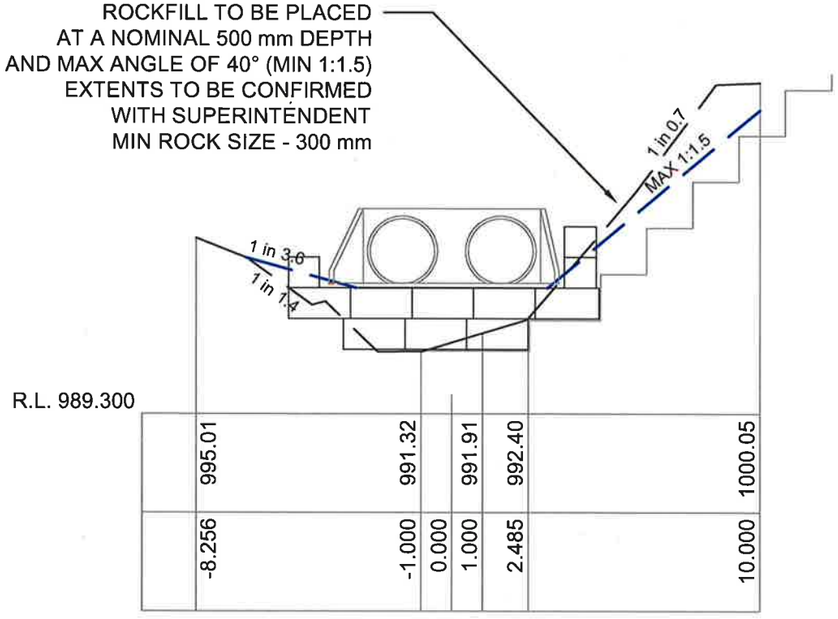
APPROVED COORDINATOR DESIGN AND RESOURCING — DATE 29/04/21

AS SHEET SIZE	SHEET No.	ISSUE
A3	12/15	A

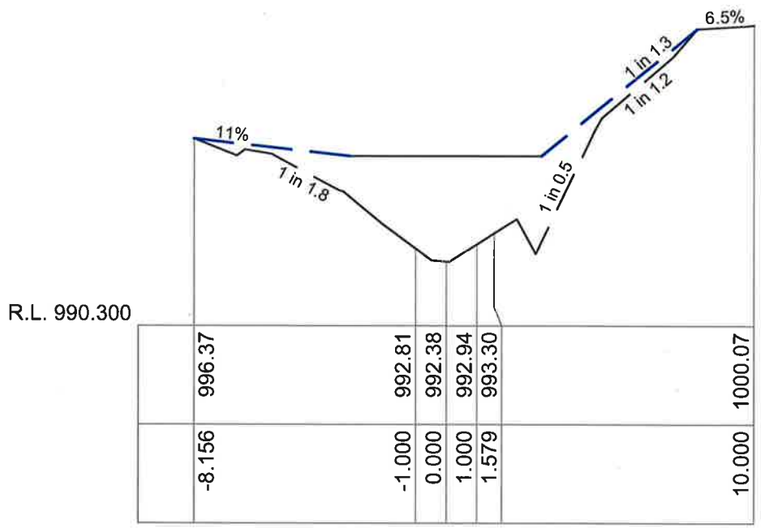
FILE No. ARC21/4742



Ch 19.255



Ch 17.229



Ch 21.069

No.	Ammendment Description	Initials	Date

SCALES

0 2 4 6 8 10

SCALE 1:200 @ A3

Co-ordinate System: LOCAL | Height Datum: LOCAL

ARMIDALE Regional Council

SURV J.SPENCE
DRWN S.TUCKER
DES S.TUCKER
CHKD M.WILSON

TITLE

KEMPSEY ROAD - CORN PATCH CULVERT REPLACEMENT CULVERT OUTLET CHANNEL

DRAWING No 314-027

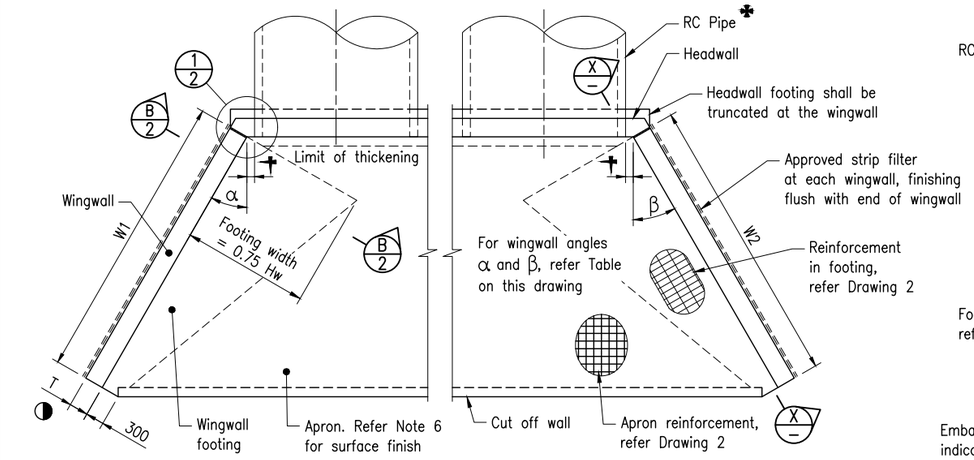
CADFILE: 314-027.dwg

AREA No: 318.dwg

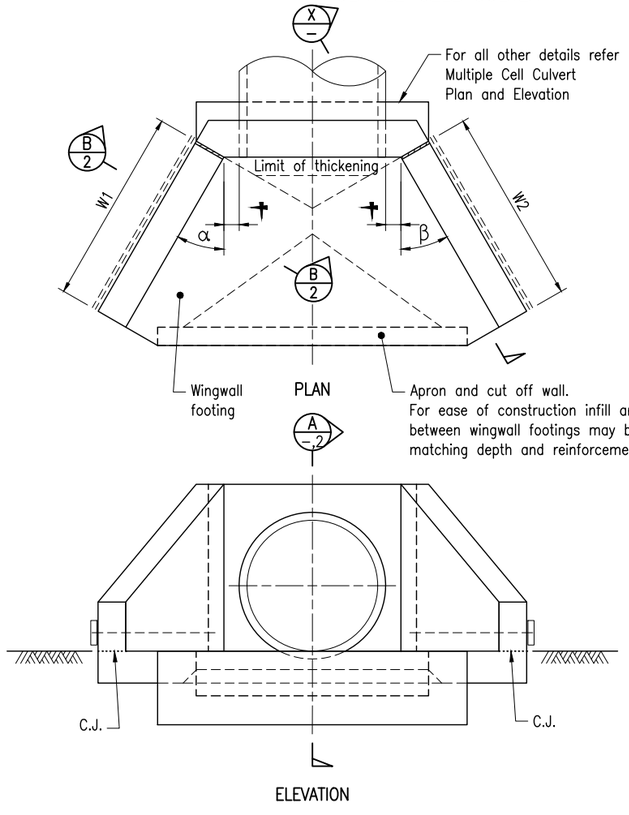
APPROVED COORDINATOR DESIGN AND RESOURCING — DATE 29/10/21

AS SHEET SIZE	SHEET No.	ISSUE
A3	13/15	A

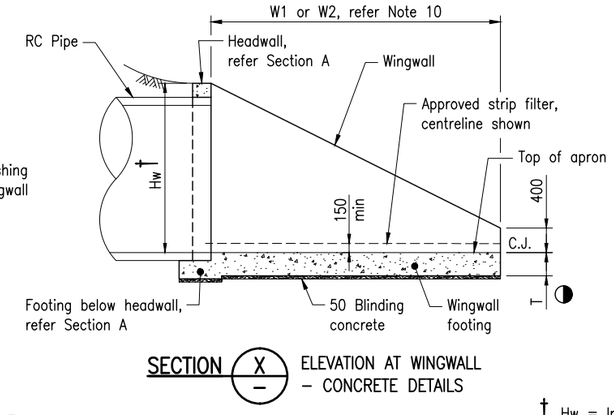
FILE No. ARC21/4742



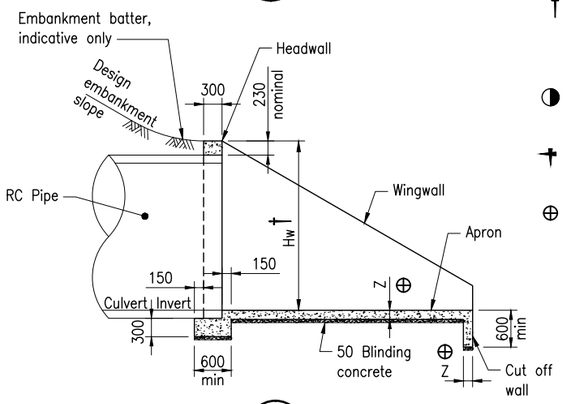
MULTIPLE CELL CULVERT



SINGLE CELL CULVERT



SECTION X – ELEVATION AT WINGWALL – CONCRETE DETAILS



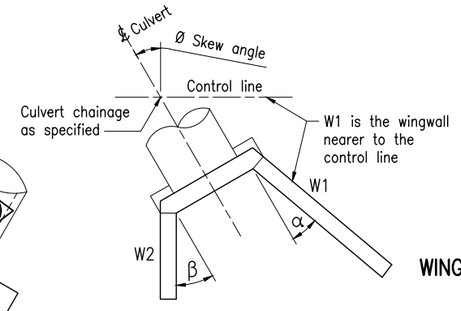
SECTION A – HEADWALL AND APRON – CONCRETE DETAILS

† Hw = Internal pipe diameter (d) + pipe thickness (t) + 230 min. Refer table on Drawing 2

◑ T is a constant thickness for wingwalls and footings. Refer table on Drawing 2

✝ Exposure classification B2 = 100
Exposure classification C1 and C2 = 125

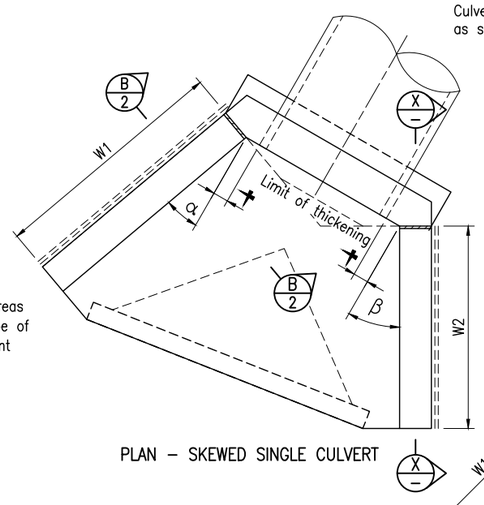
⊕ Z is a constant thickness for aprons and cut off walls. Refer table on Drawing 2



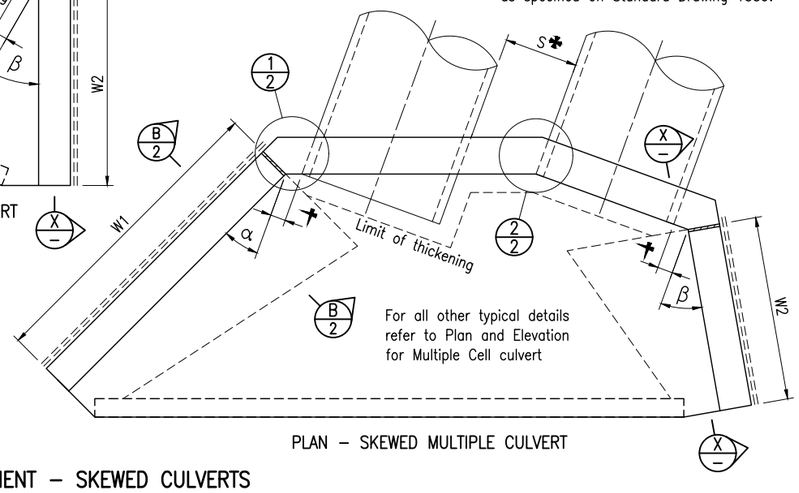
Skew angle Ø	Wingwall angle	
	α	β
0 – 10	30	30
11 – 20	25	30
21 – 30	20	30
31 – 45	15	30

WINGWALL ANGLES

✤ Spacing for multiple pipes "S" is as specified on Standard Drawing 1359.



PLAN – SKEWED SINGLE CULVERT



PLAN – SKEWED MULTIPLE CULVERT

GENERAL ARRANGEMENT – SKEWED CULVERTS

The purpose of this Standard Drawing is to provide typical standard details that shall be used within the limitations specified in the drawing and in accordance with the following:

1. The adaptability of the standard details shall be assessed by the project designer in respect of specific project geometric, appropriate foundation and scour conditions.
2. If the insitu bearing capacity is inadequate, insitu ground improvement may be explored subject to review and acceptance by E&T Structures and Geotechnical sections.
3. When there is uncertainty regarding the application of the standard details on this drawing for a specific project, advice shall be sought from E&T Structures.
4. The details specific to the project shall be shown on the project specific drawings.

NOTES:

1. PIPE CULVERT END STRUCTURES shall be in accordance with MRTS03.
   The purpose of this drawing is to provide typical details for wingwalls, headwall and apron for culverts with pipe diameter 750 to 2400.
   Refer Standard Drawing 1305 for typical details of headwall and apron for culverts with pipe diameter 375 to 675.
   Refer Standard Drawing 1359 for details of culvert installation and earthworks.
   This standard drawing does not provide details of fish passage requirements. Where project specific environmental assessment determines that waterway barrier works are required, additional details shall be developed and included in the project drawings.
2. Maximum design pressure (E_d) under the culvert apron is 75 kPa.
3. PIPE DIAMETERS greater than 2400 require a special design.
4. Where CULVERT APRONS are longer than 20m, the project specific design shall be developed with a transverse contraction joint, with direction of flow, at every 20m length. Typical contraction joint details provided in this standard drawing are to be used.
5. WINGWALLS for skewed culverts with angle greater than 45 require a special design.
6. CONCRETE shall be in accordance with MRTS70.
   Design life 100 years.
   Exposure classification and cover to reinforcement shall be in accordance with AS 5100. Minimum concrete strength and cover to reinforcement shall be as shown in table below.

Exposure classification	minimum B2	C1	C2
Minimum concrete strength	S40/20	S50/20	S55/20
Minimum Cover UNO	60	70	80

   Blinding concrete N20/20.
   Surface roughening of the aprons shall be broom finish using a broom not less than 400 wide to achieve an average texture depth of 0.8. The direction of brushing shall be perpendicular to the direction of flow.
7. REINFORCING STEEL shall be read in conjunction with Standard Drawings 1043 and 1044, and shall be in accordance with MRTS71 and AS/NZS 4671.
   Deformed bars Grade D500N. Round bars Grade R250N. Mesh Grade D500L.
   Reinforcement shall be hot dip galvanised to AS/NZS 4680 where shown.
8. TACK WELDING to reinforcement for location purposes to AS/NZS 1554.3.
   Welding consumables to be controlled hydrogen type: G49X to AS/NZS ISO 14341–B or T49X to AS/NZS ISO 17632–B.
9. WINGWALL DRAINAGE shall be provided behind wingwalls to prevent hydrostatic pressure being applied to the wingwall. A strip filter shall be used at each wingwall to drain out at the low end of the wingwall as shown.
10. PROJECT–SPECIFIC INFORMATION to be shown on the drawings:
    Exposure classification; Culvert chainage; Skew angle; Apron setout and extents; Headwall and wingwall extents (W1, W2, α, β); Requirements for fish passage.
11. DIMENSIONS are in millimetres.

ASSOCIATED DEPARTMENTAL DOCUMENTS:

Design Criteria for Bridges and Other Structures; Road Drainage Manual (RDM)

REFERENCED DOCUMENTS:

Departmental Standard Drawings:

1043 Reinforcing Steel – Standard Bar Shapes
1044 Reinforcing Steel – Lap Lengths
1305 Pipe Culverts – Headwall and Apron for Pipe Diameter 375 to 675
1359 Culverts – Installation, Bedding and Filling/Backfilling Against/Over Culverts

Departmental Specifications:

MRTS03 Drainage, Retaining Structures and Protective Treatments
MRTS70 Concrete; MRTS71 Reinforcing Steel

Department of Transport and Main Roads

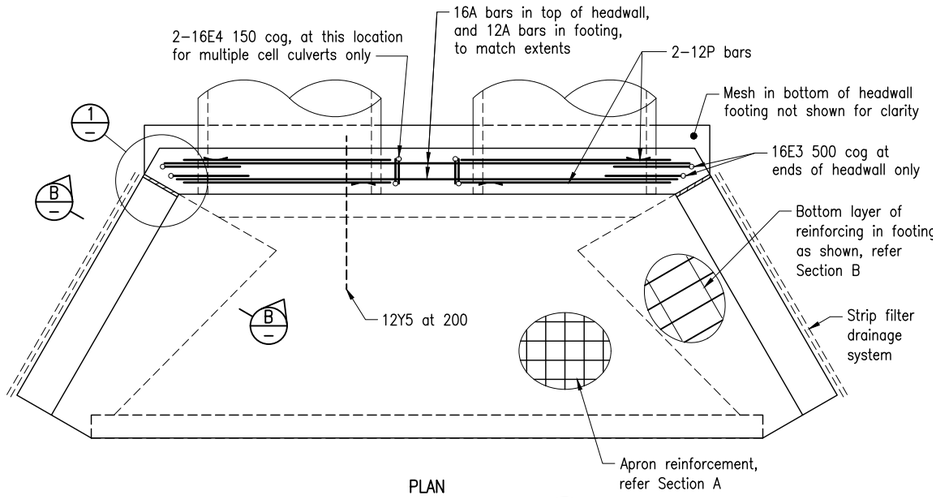
PIPE CULVERTS

WINGWALLS, HEADWALL AND APRON FOR PIPE DIAMETER 750 TO 2400
DRAWING 1 OF 2

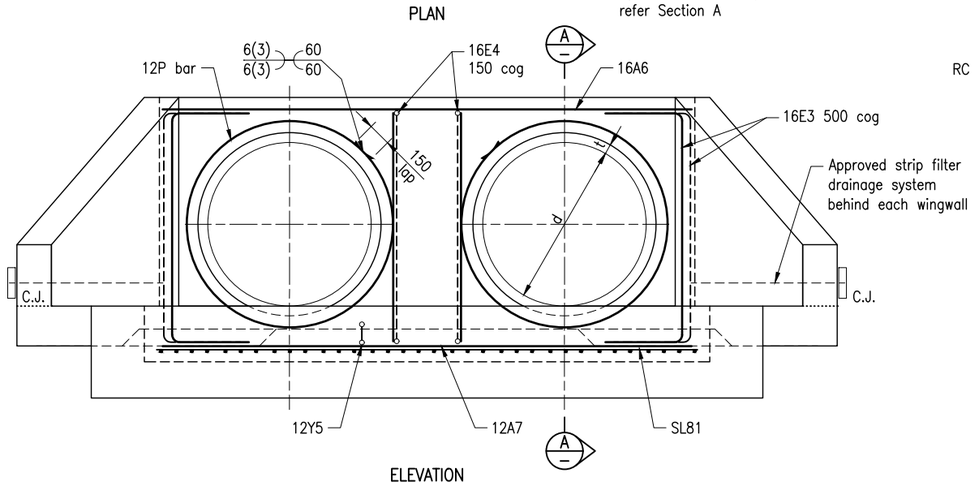
A3
Not to Scale

Standard Drawing No
1304
Date 7/2021

J K L M N O

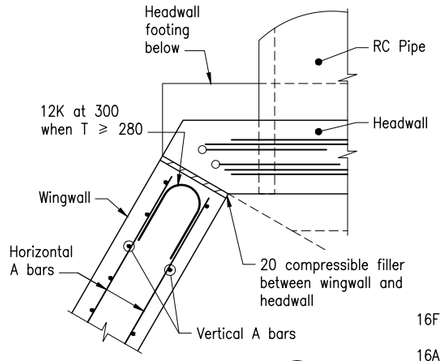


PLAN

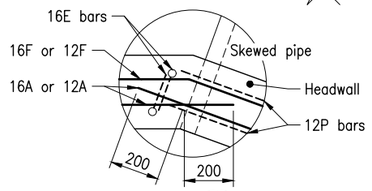


ELEVATION

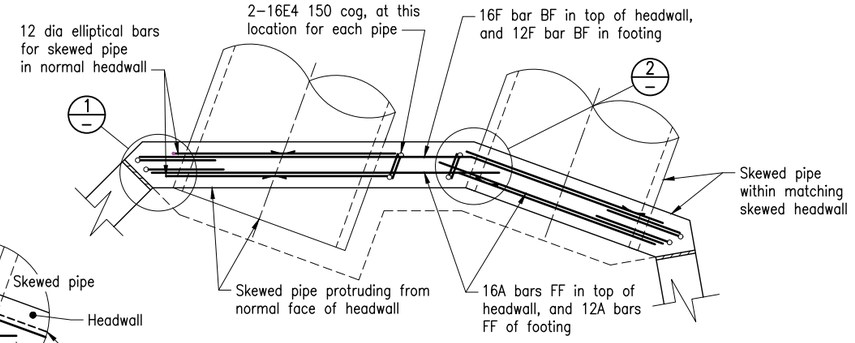
HEADWALL REINFORCEMENT – SQUARE CULVERT



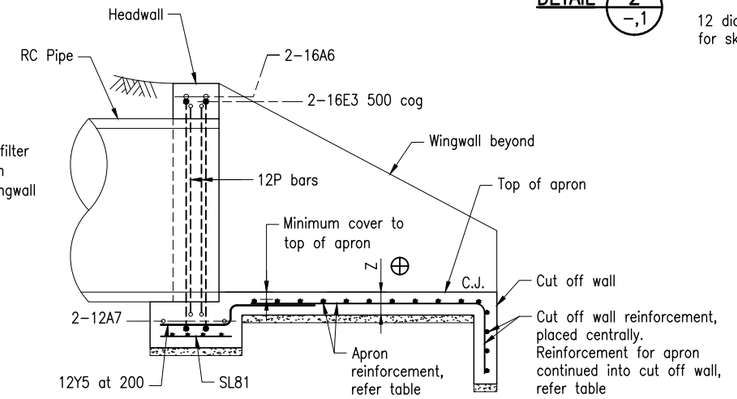
DETAIL 1 –,1



DETAIL 2 –,1



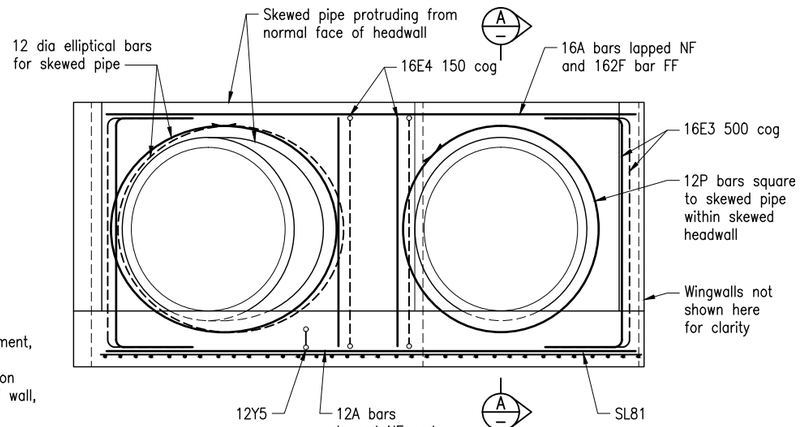
PART PLAN



HEADWALL REINFORCEMENT

APRON AND CUT OFF WALL REINFORCEMENT

SECTION A –,1



PART ELEVATION

HEADWALL REINFORCEMENT – SKEWED MULTIPLE CULVERT

WINGWALL DIMENSIONS AND MINIMUM REINFORCEMENT REQUIREMENTS

up to Hw †	T ◑ for Exposure classification			Vertical A bars BF		Vertical A bars FF		Horizontal A bars FF and BF						D1 bars	
	B2	C1	C2	Dia	Spacing	Dia	Spacing	B2		C1		C2		Dia	Dim A ◆
								Dia	Spacing	Dia	Spacing	Dia	Spacing		
1000	220	240	260	12	150	12	300	12	150	12	125	12	100	12	500
1500	220	240	260						150		125				
2000	260	270	280						125		100				
2500	330	340	350						100	16	150	16	125		
3000	380	390	400	16				16	150		125			16	700

† where Hw = Internal pipe diameter d + pipe thickness t + headwall thickness nominal 230 above pipes

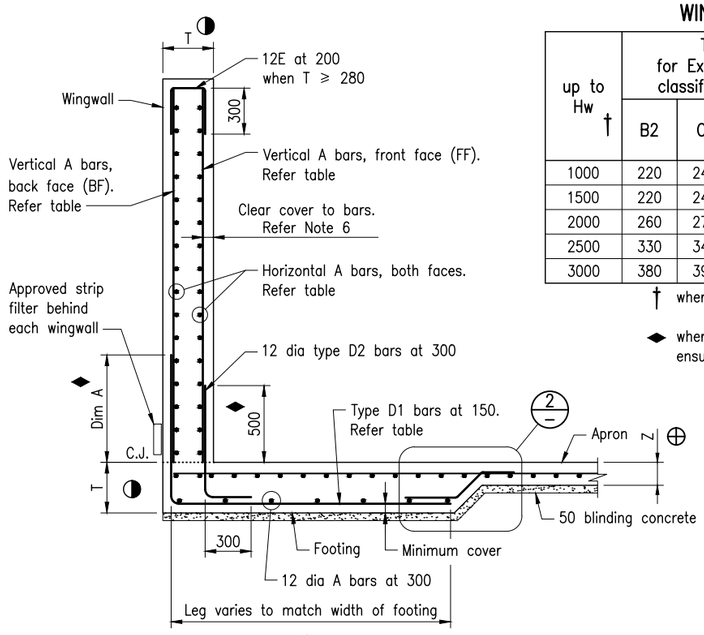
◆ where type D1 and D2 bars exceed the wall height, curtail the bars to match the wall height, ensuring cover requirements are met

APRON AND CUT OFF WALL THICKNESSES AND MINIMUM REINFORCEMENT REQUIREMENTS

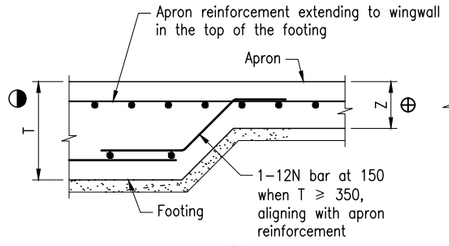
Exposure classification	Apron and Cut off wall #	
	Thickness Z ⊕	Reinforcement
B2	150	N12 at 150 both ways
C1	175	N12 at 150 both ways
C2	190	N12 at 125 both ways

⊕ where Z is a constant thickness for aprons and cut off walls.

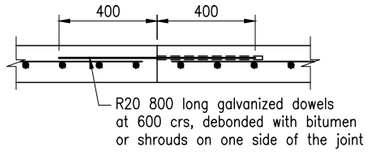
\# Apron minimum reinforcement for shrinkage and temperature effects is designed considering the full restraint condition to AS 5100. For the slab on ground condition, only the top half of the apron thickness is considered for calculation of this reinforcement.



SECTION B –,1 WINGWALL AND FOOTING REINFORCEMENT DETAILS

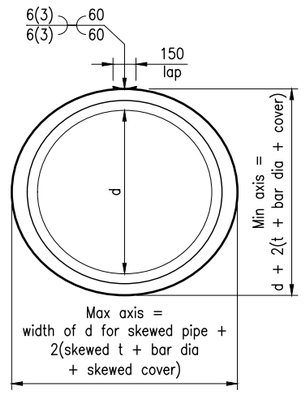


DETAIL 2 –



TYPICAL DOWELLED CONTRACTION JOINT

Installed with direction of flow, for aprons larger than 20m. Refer Note 4 on Drawing 1



12 DIA ELLIPTICAL BAR DETAIL

Department of Transport and Main Roads

PIPE CULVERTS

WINGWALLS, HEADWALL AND APRON FOR PIPE DIAMETER 750 TO 2400 DRAWING 2 OF 2

A3

Not to Scale

Standard Drawing No 1304

Date 7/2021

J K L M N 0