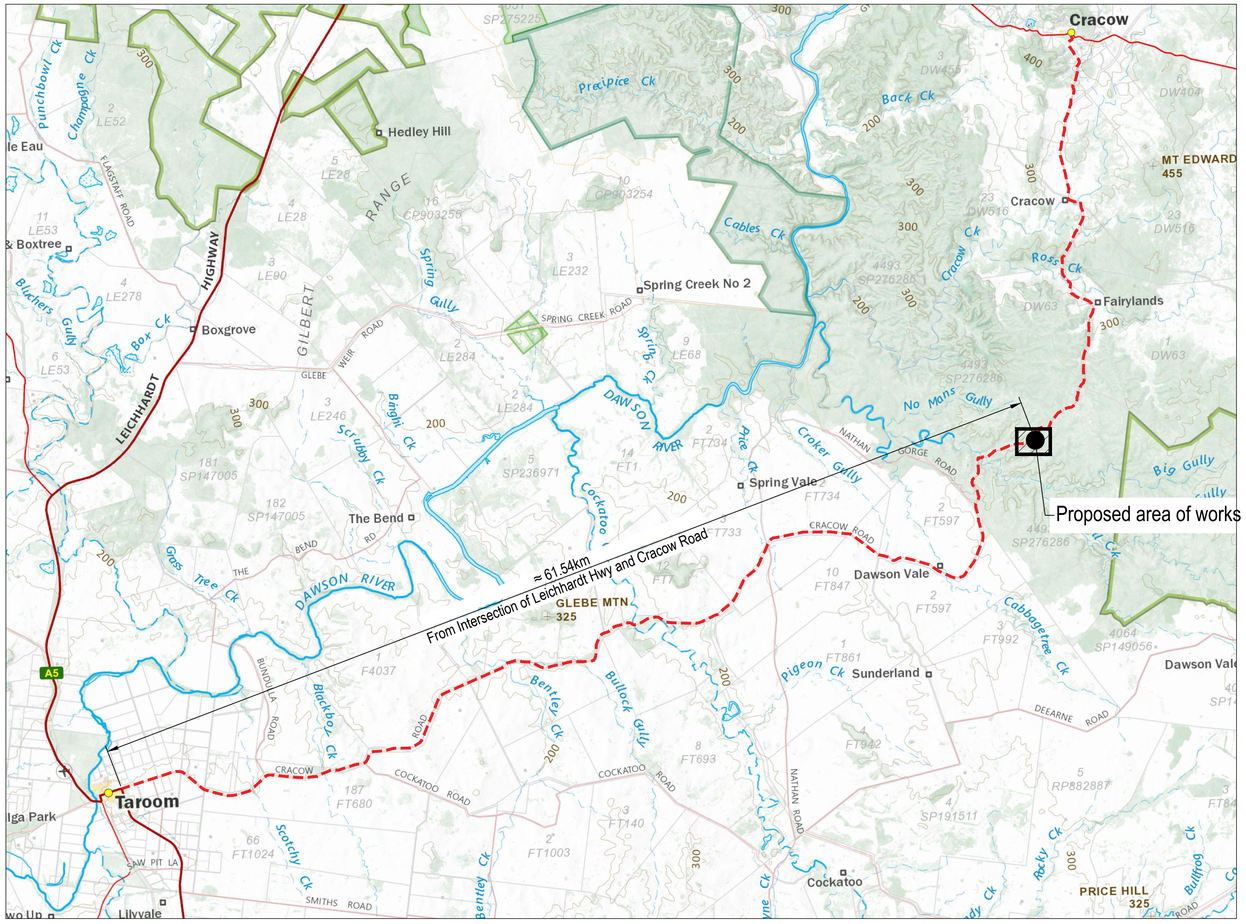
CRACOW ROAD, SITE 4 STABILISATION

ROAD UPGRADE



LOCALITY PLAN
(Not to scale)

Sheet List Table

Sheet Number	Date	Sheet Title
001	Sep-23	Project Cover Sheet
002	Sep-23	General Notes
300	Sep-23	Survey Control and Services Plans
400	Sep-23	Roadworks and Setout Plan Sheet 1
500	Sep-23	Pavement Plan
600	Sep-23	Longitudinal Section Sheet 1
700	Sep-23	Typical Cross Sections - Sheet 1

Sheet List Table

Sheet Number	Date	Sheet Title
800	Sep-23	Annotated Cross Sections Sheet 1
801	Sep-23	Annotated Cross Sections Sheet 2
802	Sep-23	Annotated Cross Sections Sheet 3
1200	Sep-23	Culvert Details
1600	Sep-23	Limit of Clearing Plan
1700	Sep-23	Temporary Erosion and Sediment Control Sheet 1
1701	Sep-23	Temporary Erosion and Sediment Control Sheet 2

STANDARD DRAWINGS:
ROADWORKS

Dwg.	Rev.	Description
CMDG-R-081	E	Sign Location and Installation Details
CMDG-R-094	B	Floodway - Bed Level Crossing

DEPARTMENT OF TRANSPORT AND MAIN ROADS - STANDARD DRAWINGS:
GENERAL EARTHWORKS AND PROPERTY ACCESS

1178	E	Diversion of Water from Roadway and Table Drains

DRAINAGE, RETAINING STRUCTURES AND PROTECTIVE TREATMENTS

1260	F	R C Box Culverts and Slab Link Box Culverts - Culverts Height = 375 TO 600
1359	E	Culverts - Installation, bedding and filling/backfilling against/ over culverts

XREFS :- X_CRC_BSC_TITLE.dwg

Last Modified :- Sep 29, 2023 - 9:12am

	Revisions/Descriptions	Drawn	Approved	Date
A	Issued for Construction			
20.01				

Scales

Dimensions shown in metres except where shown otherwise

crc quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
PROJECT COVER SHEET

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	001
Revision	A
Series No.	1 of 14

SAFETY IN DESIGN NOTES:

1. Potential safety hazards identified by the Designer have been assessed for this project in accordance with Safe Design of Structures - Code of Practices by Safe Work Australia, 2012. Refer to the ***Safety In Design Report*** for the potential safety hazards.
2. Disclaimer: It must be acknowledged that new and/or different risks may become apparent during each project phase.The designer has ensured, so far as reasonably practicable, that the structure/municipal work is designed to minimise risk to the health and safety of persons involved in construction or use related activities. Further, in Appendix A - Safety in Design Risk Register of the ***Safety In Design Report***, assumptions may have been made within the different project phases as to how the project and/or project elements will be constructed and maintained. This may differ from the end methods adopted.
3. Any person who undertakes alterations, variations or modifications to these design drawings, without consultation and approval from the original or subsequent designer, will assume the duties of a designer and will be held responsible for the safety in design for this project.
4. All works must comply with W.H. & S. Act, 2011.

GENERAL NOTES:

1. Works shall be undertaken generally in accordance with the relevant CMDG construction specifications except where specific DTMR specification requirements are detailed within these Project specific Drawings. The most current version shall be adopted, unless noted otherwise.
2. Works to be measured in accordance with project specific *Supplementary Specification for Measurement and Work Operations for Work Items.*
3. If any archaeological or cultural material is exposed on the work site all works shall cease. The D.E.H.P., Aboriginal Land Council and I.C.C. are to be notified.
4. All works are to comply with the requirements of the Environmental Protection Act, 1994.
5. Disposal/movement of material in areas of Red Imported Fire Ants are to comply with the D.A.F.F. regulations. Refer the Department's website: ***www.daff.qld.gov.au/fireants*** for the current information.
6. Prior to commencement of work a Risk Management Plan to minimise the chance of spreading Fire Ants is to be completed.
7. The positions shown on drawings for public utilities services are based on the B.Y.D.A. information supplied at time of design and are indicative only. Prior to construction the current Service Authority information is to be obtained from B.Y.D.A. (website: www.byda.com.au). The position and depth of each service is to be verified by the relevant Service Authority on site before the start of any construction.
8. Where these drawings make reference to the Administrator or Contract Administrator it shall mean the Superintendent managing the works.
9. Prior to commencement of work contact the Superintendent if any PSM's are in the vicinity of the work site.
10. Order of Precedence of Documents, Ambiguities or Discrepancies - The following order of precedence shall apply where there is any ambiguity, discrepancy or inconsistency between the design documents comprising the Contract, with the higher in the list having a higher priority:
    a. These Project Specific Drawings
    b. Technical Specifications
    c. Standard Drawings

    The several documents forming the Contract are to be taken as mutually explanatory of one another. If either party discovers any ambiguity or discrepancy in any document prepared for the purpose of executing the Work Under the Contract, that party shall notify the Superintendent in writing of the ambiguity or discrepancy as soon as possible,
11. The Scheme Drawings listed on the Project Cover Sheet are to be read as a whole and not in isolation. Any isolated drawing separated from the control set will be considered voided and is not to be used.
12. All drawings are to be read in conjunction with the project's specification and all relevant Standard Drawings.
13. All drawings are to be read in conjunction with the Abbreviation Table shown.
14. Materials and workmanship - Where materials, material components, workmanship and procedures are not specifically described by the Contract, they shall be in accordance with the relevant Australian Standard. Where no Australian Standard is available, other specifications shall be used in the following order of priority:
    a. manufacturer's recommendations, and
    b. accepted industry standards.

    At a minimum materials and workmanship shall be the best of their respective kinds and fit for the purpose for which they are intended.

    Any product trade names have been used to establish a quality requirement. Written approval to be obtained prior to using any substitutions.
15. Dimensions / Levels - All levels and setout points shall be confirmed on site by a registered surveyor prior to construction. The Contractor shall seek clarification from the Superintendent for any discrepancy prior to proceeding with works. Dimensions shall not be scaled from drawings.
16. Set Out of Individual Installations - The Contractor shall set out an installation as shown on the Drawings in sufficient detail to identify the location, length and levels of the proposed installation. Once the initial set out is complete the Superintendent will determine the design appropriateness of the set out with regard to the actual site conditions. The Superintendent may direct amendments to the set-out details. Payment for such amendments will be made at appropriate rates in the Schedule of Rates or, where such rates are not deemed by the Superintendent to be appropriate, as determined by the Superintendent. Installations to be set out in accordance with the above requirements include:
    a. drainage pipes, culverts, slabs and structures
    b. landscaping
    c. traffic control
17. Existing Services - Locate service prior to commencing works. Services are shown on these drawings for information only. No responsibility is taken for the accuracy or completeness of the information supplied. Take care to protect services from damage, and report any hits or damage to the service authority immediately.

EROSION AND SEDIMENT CONTROL NOTES:

1. During construction all necessary precautions shall be taken to control erosion and downstream sedimentation. Monitor the prevailing weather conditions and protect any downstream construction and gully inlets.
2. All sediment control devices, sediment fences, check dams, straw bales, stone traps and entry/exit sediment traps are to be in accordance with the E&SC plans within these project drawings or amended as required by the Contractor's suitably qualified professional.

EARTHWORK NOTES:

1. All unsuitable material is to be stripped prior to placement of structural fill.
2. All unsuitable material is to be removed in accordance with the specification or as directed by the Superintendent.
3. All contaminated soil to be removed in accordance with the specification or as directed by the Superintendent.
4. Earthwork quantities include existing road pavement excavated where applicable.
5. Earthwork quantities include unsuitable and or contaminated material except where noted otherwise.
6. Earthwork quantities in cut are bank (nett) volumes and in fill are compacted volumes.
7. Class A1 or B material to comply with the requirements of TMR MRTS04, and specific requirements within these project drawings.

LINEMARKING NOTES:

1. All linemarking, signs and traffic devices shall comply with the M.U.T.C.D. - current edition.
2. Ensure that signage has clear sight distance, otherwise adjust location accordingly.
3. Superseded linemarking and signage to be removed.

SERVICE ADJUSTMENT NOTES:

1. Service Authority infrastructure adjustments are to be performed by contractors approved by the relevant service authority.

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XREFS :- X_CRC_BSC_TITLE.dwg

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A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Dimensions shown in metres except where shown otherwise

crc quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

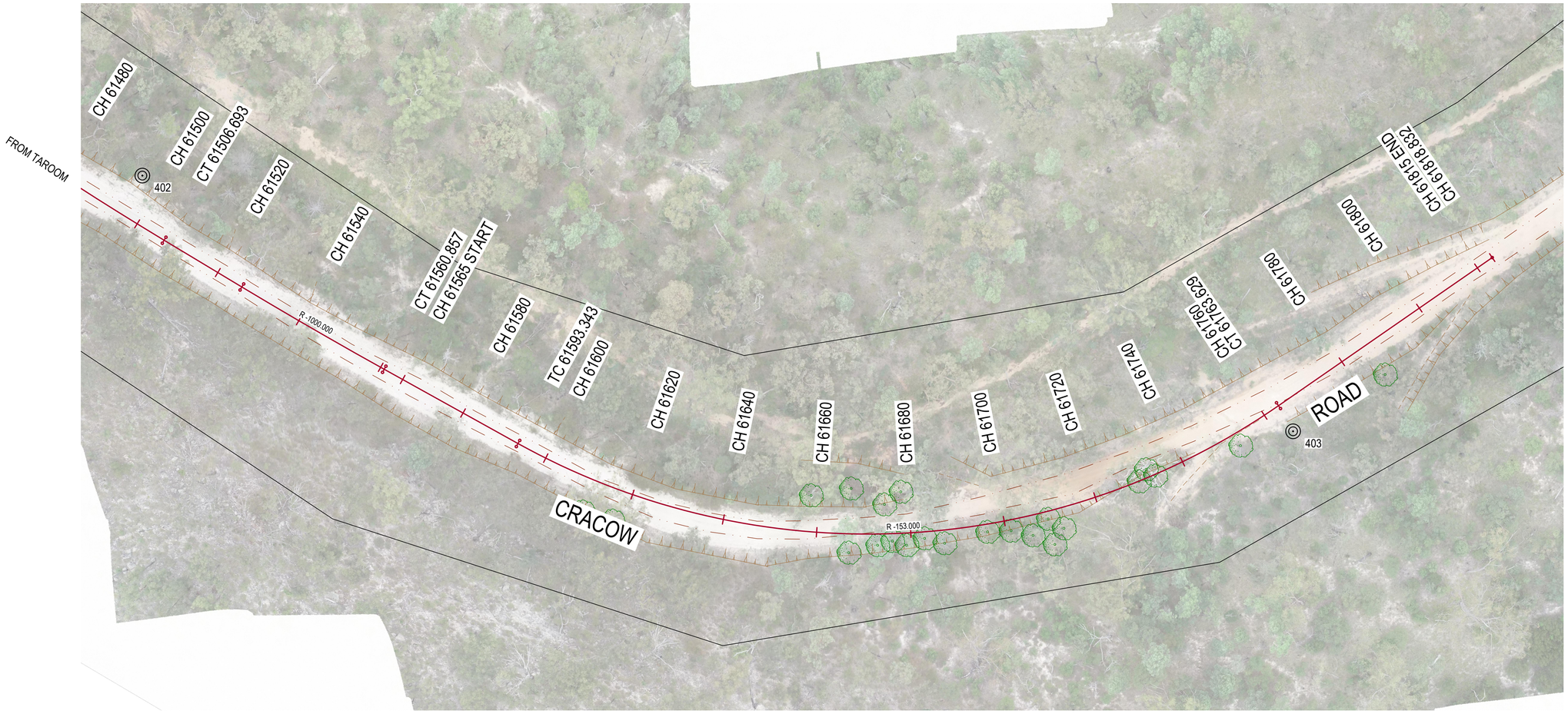
Client: Banana SHIRE SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
GENERAL NOTES

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	002
Revision	A
Series No.	2 of 14



PLAN
Scale: 1:500

LEGEND

403 ◎ - Survey Mark and Label

ENGINEERING SURVEY CONTROL

STATION	EASTING	NORTHING	LEVEL	REMARKS
402	226387.927	7178525.927	292.834	PBMK
403	226625.912	7178603.271	293.807	PBMK

PERMANENT SURVEY MARKS

PSM	EASTING	NORTHING	LEVEL	LOCATION
PM153059	223551.089	7174809.863	307.496	PPMK

WARNING!

BEWARE OF UNDERGROUND SERVICES
The location of underground services has been compiled from engineering survey and interpolated from Dial Before You Dig as provided by the Service Authorities. No responsibility is taken for the accuracy of the interpolated information supplied. Ensure all services are accurately located prior to commencement of work.

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales
Scale A 0 5 10 15 20 25 1:500
Dimensions shown in metres except where shown otherwise

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245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
SURVEY CONTROL AND SERVICES PLAN

Drawn: B Doherty
Designed: B Doherty

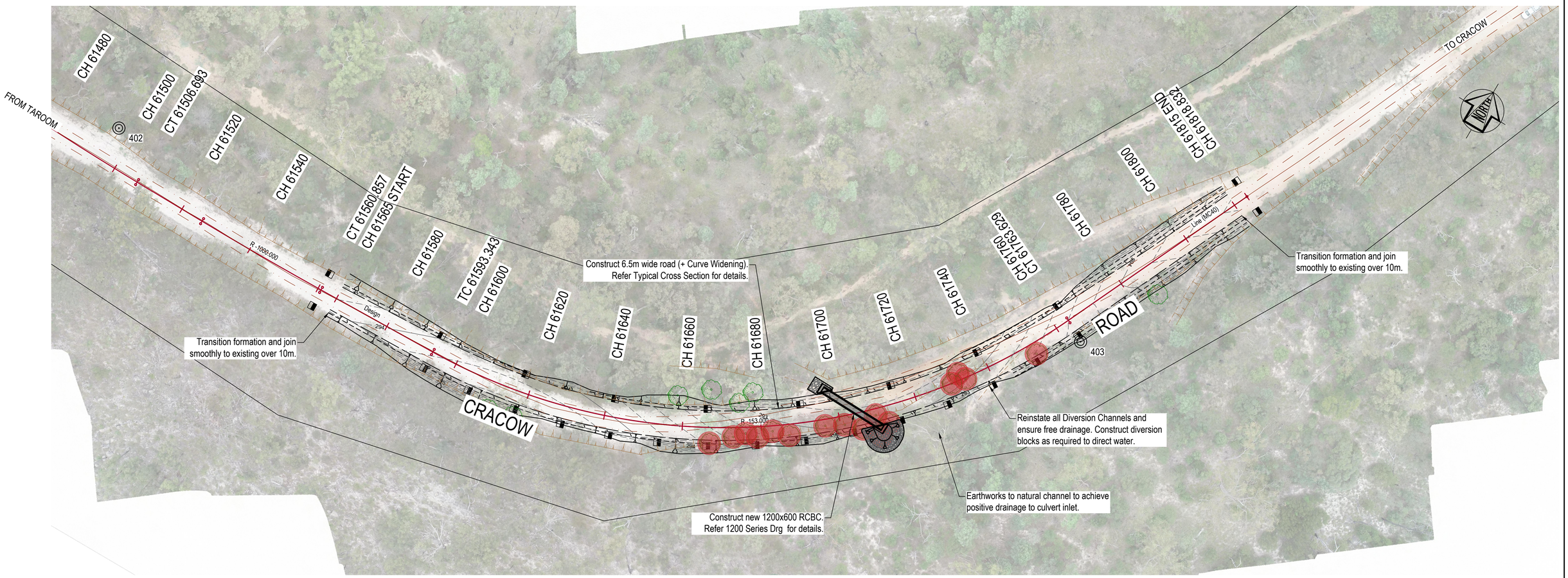
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	300
Revision	A
Series No.	3 of 14

XREFS :- X_CRC_BSC_TITLE.dwg ; X_IMAGE.dwg ; X_SURVEY.dwg ; X_CONTROL.dwg

Last Modified :- Sep 29, 2023 - 9:13am



PLAN
Scale 1:500

DESIGN LINE SETOUT (MC40)

POINT	CHAINAGE	EASTING	NORTHING	LEVEL	BEARING	RAD/SPIRAL	A.LENGTH	D.ANGLE
TC	61525.951	226418.139	7178516.292	293.379	90°30'00.00"			
IP 4	61543.404	226435.594	7178516.140	293.506		R = -1000.000	34.907	2°00'00.00"
CT	61560.857	226453.043	7178516.597	293.733	88°30'00.00"			
TC	61593.343	226485.518	7178517.447	294.156	88°30'00.00"			
IP 5	61678.486	226580.661	7178519.939	293.146		R = -153.000	170.285	63°46'07.90"
CT	61763.629	226620.479	7178606.386	293.602	24°43'52.10"			
IP 6	61818.832	226643.574	7178656.526	294.733	24°43'52.10"			

LEGEND

Red
- Flexible Guidepost
White

- Tree to be removed

403 - Survey Mark and Label

WARNING!

BEWARE OF UNDERGROUND SERVICES

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XREFS :- X_CRC_BSC_TITLE.dwg ; X_SURVEY.dwg ; X_CONTROL.dwg ; X_DESIGN.dwg ; X_HATCH.dwg ; X_IMAGE.dwg ; X_GUIDEPOSTS.dwg ; X_DESIGNTADPOLES.dwg ; X_CONTOURS.dwg ; X_CULVERT PLAN.dwg

Last Modified :- Sep 29, 2023 - 9:13am

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 5 10 15 20 25 1:500

Dimensions shown in metres except where shown otherwise

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245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
ROADWORKS AND SETOUT PLAN

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	400
Revision	A
Series No.	4 of 14

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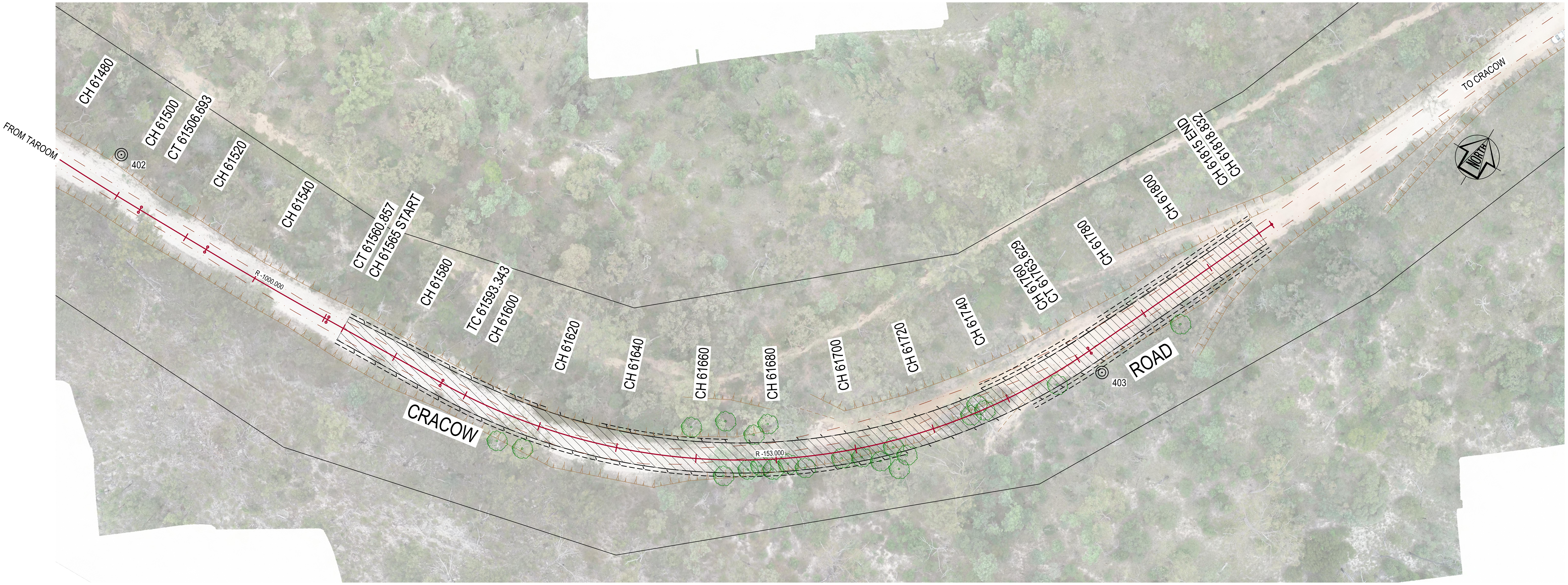

PLAN

Scale 1:500

LEGEND

▨ New pavement to be constructed. Refer Pavement Type 1 Details.

PAVEMENT TYPE 1 DETAILS

▨ New pavement to be constructed

150mm Stabilised Base, Full Width,

Imported Unsealed Pavement Material **

Insitu stabilised, GB binder (Cement/Fly Ash)
Target UCS value 1 - 2 MPa at 7 Days. Contractor to undertake additive testing to confirm percentage of stablising agent by mass. A nominal 3% by mass used for estimating purposes only.

Design Subgrade CBR 11 (soaked)

150mm Total thickness

All works to be carried out in accordance with the relevant CMDG Construction Specifications.

PAVEMENT DESIGN
(Lower Order Roads Design Guide)

Design Period:	20 Years
Design Traffic:	5.1 x 10^4 DESA
Design Subgrade CBR:	11 (Soaked)

**
UNSEALED PAVEMENT SPECIFICATION
(Lower Order Roads Design Guide)

Imported Unsealed Pavement Material to satisfy the following specifications

Grading Coefficient (Gc):	16 - 34
Shrinkage Product (Sp):	100 - 240
WPI:	< 1200
PI:	$\geq$ 7%
Passing 0.075mm Sieve:	$\geq$ 15%

WARNING!

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XREFS :- X_CRC_BSC_TITLE.dwg ; X_CONTROL.dwg ; X_DESIGN.dwg ; X_HATCH.dwg ; X_IMAGE.dwg ; X_SURVEY.dwg ; X_DESIGNTADPOLES.dwg

Last Modified :- Sep 29, 2023 - 9:13am

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 5 10 15 20 25 1:500

Dimensions shown in metres except where shown otherwise

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245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client

Banana SHIRE
SHIRE OF OPPORTUNITY

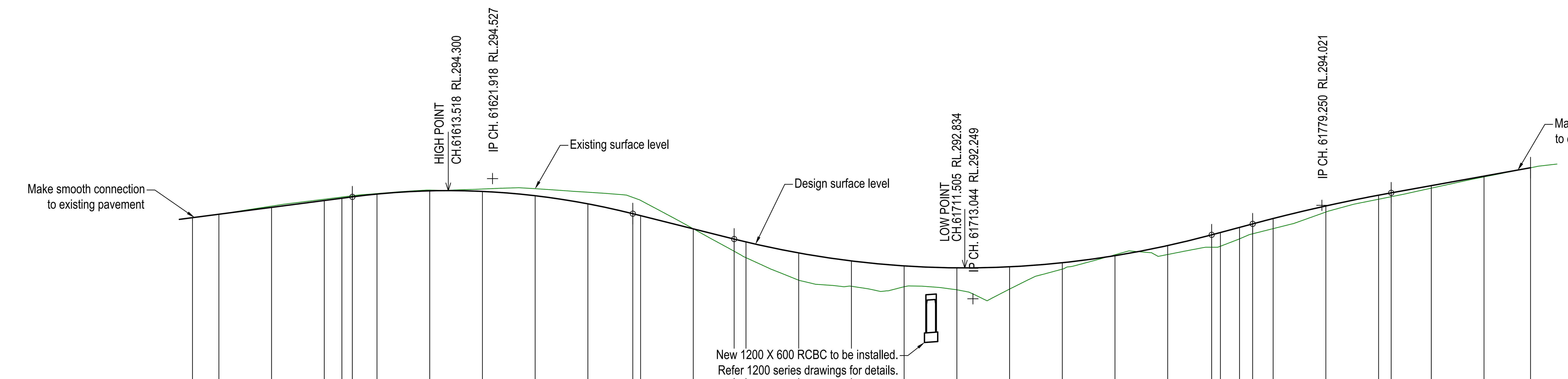
Title
CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
PAVEMENT PLAN

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose	[illegible]	24087	

Job No.	CRC00288
Drawing No.	500
Revision	A
Series No.	5 of 14



Horizontal Curve Data: R-153m

Vertical Curve Length (m) / Vertical Curve Radius (m): 53.2 VC, R = 1400; 90.579 VC, R = 1750; 26.279 VC, R = 3000

Vertical Geometry Grade (%) / Vertical Grade Length (m): 1.3 %, 90.36; -2.5 %, 91.126; 2.676 %, 66.206; 1.8 %, 39.581

DATUM R.L.288.000

DESIGN CHAINAGE	CUT / FILL DEPTHS	DESIGN LINE LEVELS	EXISTING SURFACE LEVELS
61565.000	-0	293.787	293.787
61570.000	-0.001	293.852	293.853
61580.000	-0.024	293.982	294.006
61590.000	-0.024	294.112	294.136
61593.343	-0.022	294.156	294.177
61595.318	-0.02	294.181	294.201
61600.000	-0.01	294.234	294.244
61610.000	-0.014	294.295	294.310
61620.000	-0.046	294.285	294.330
61630.000	-0.134	294.203	294.336
61640.000	-0.221	294.049	294.270
61648.518	-0.309	293.862	294.171
61650.000	-0.289	293.825	294.114
61660.000	-0.002	293.575	293.577
61667.755	0.231	293.381	293.150
61670.000	0.298	293.326	293.029
61680.000	0.518	293.118	292.600
61690.000	0.48	292.966	292.487
61700.000	0.395	292.872	292.477
61710.000	0.415	292.835	292.420
61720.000	0.422	292.855	292.433
61730.000	0.121	292.932	292.811
61740.000	-0.017	293.066	293.083
61750.000	0.169	293.258	293.089
61758.334	0.233	293.461	293.228
61760.000	0.26	293.505	293.245
61763.629	0.217	293.602	293.385
61766.111	0.188	293.669	293.481
61770.000	0.191	293.770	293.579
61780.000	0.115	294.008	293.893
61790.000	0.077	294.213	294.136
61792.390	0.073	294.257	294.184
61800.000	0.048	294.394	294.346
61810.000	0.015	294.574	294.559
61818.832	-0	294.733	294.733

SUPER ELEVATION: RHS 4%; LHS -4%; LHS and RHS -4%

61565.3 61751.6 61771.6 61791.6 61815.0

LONGITUDINAL SECTION

Horizontal Scale A
Vertical Scale B

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales
Scale A 0 5 10 15 20 25 1:500
Scale B 0 0.5 1.0 1.5 2.0 2.5 1:50
Dimensions shown in metres except where shown otherwise

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245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
LONGITUDINAL SECTION

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose	[signature]	24087	

Job No.	CRC00288
Drawing No.	600
Revision	A
Series No.	6 of 14

WARNING!

BEWARE OF UNDERGROUND SERVICES

The location of underground services has been compiled from engineering survey and interpolated from Dial Before You Dig as provided by the Service Authorities. No responsibility is taken for the accuracy of the interpolated information supplied. Ensure all services are accurately located prior to commencement of work.

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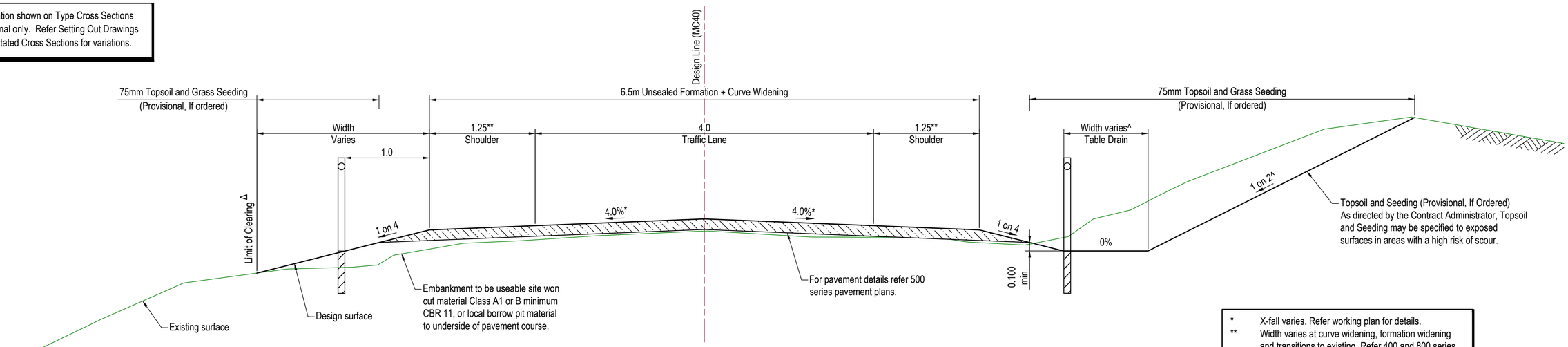
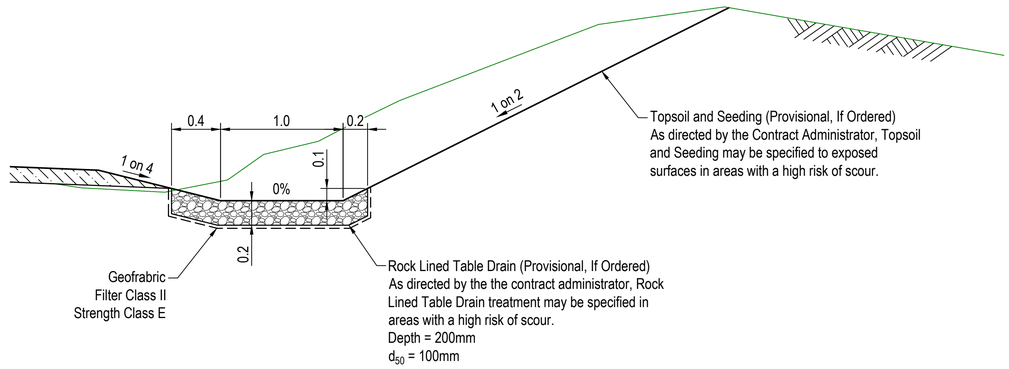
Information shown on Type Cross Sections is nominal only. Refer Setting Out Drawings & Annotated Cross Sections for variations.



* X-fall varies. Refer working plan for details.
** Width varies at curve widening, formation widening and transitions to existing. Refer 400 and 800 series drawings for details.
Δ Refer 1600 series plans for Limit of Clearing details.
^ Interfacing cut slope and table drain width vary 0-1m

TYPICAL CROSS SECTION A

Ch. START - END (MC40)
(Excluding Floodway)
Not To Scale



ROCK LINED TABLE DRAIN

Not to Scale

XREFS :- X_CRC_BSC_TITLE.dwg

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A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

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crc quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

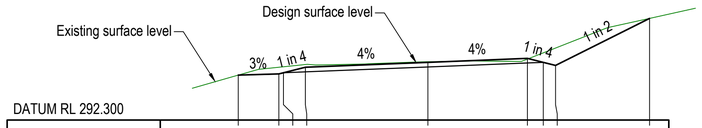
Client: Banana SHIRE SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
TYPICAL CROSS SECTIONS

Drawn: B Doherty
Designed: B Doherty

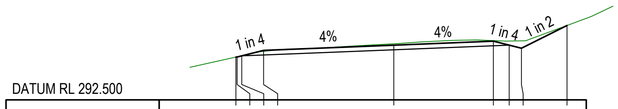
ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	700
Revision	A
Series No.	7 of 14



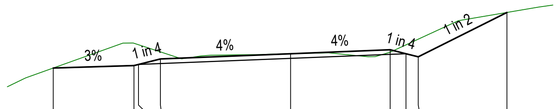
DATUM RL 292.300							
DESIGN LEVEL	293.765	293.805	293.843	294.021	294.181	294.311	294.182	294.082	295.617
EXISTING LEVEL	293.765	294.022	294.038	294.111	294.201	294.290	294.493	294.649	295.617
OFFSET	-6.191	-4.864	-4.714	-3.999	0.000	3.250	3.768	4.168	7.238

CH. 61595.318



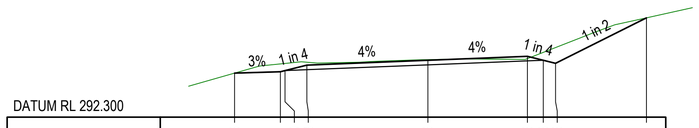
DATUM RL 292.500							
DESIGN LEVEL	293.897	293.898	293.936	294.115	294.285	294.415	294.285	294.185	294.928
EXISTING LEVEL	293.897	293.906	293.940	294.083	294.330	294.434	294.420	294.426	294.928
OFFSET	-5.156	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	5.654

CH. 61620.000



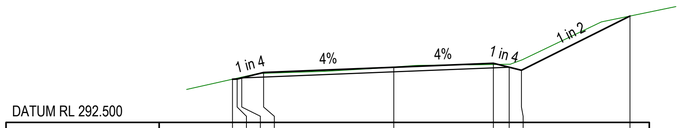
DATUM RL 291.400							
DESIGN LEVEL	293.110	293.189	293.226	293.405	293.575	293.705	293.576	293.476	294.923
EXISTING LEVEL	293.110	293.918	293.869	293.636	293.577	293.627	293.866	294.050	294.923
OFFSET	-7.748	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	7.063

CH. 61660.000



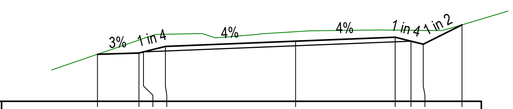
DATUM RL 292.300							
DESIGN LEVEL	293.736	293.781	293.819	293.998	294.156	294.286	294.156	294.056	295.541
EXISTING LEVEL	293.736	294.037	294.052	294.092	294.177	294.211	294.414	294.570	295.541
OFFSET	-6.311	-4.815	-4.665	-3.950	0.000	3.250	3.768	4.168	7.137

CH. 61593.343



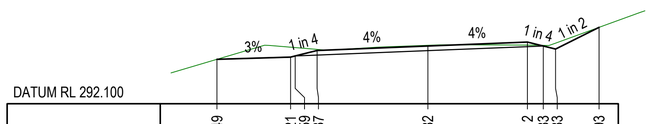
DATUM RL 292.500							
DESIGN LEVEL	293.909	293.913	293.951	294.130	294.300	294.430	294.300	294.200	295.971
EXISTING LEVEL	293.909	293.943	293.976	294.102	294.306	294.390	294.398	294.534	295.971
OFFSET	-5.267	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	7.710

CH. 61613.518



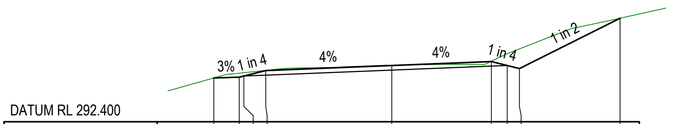
DATUM RL 291.900							
DESIGN LEVEL	293.435	293.476	293.513	293.692	293.862	293.992	293.863	293.763	294.396
EXISTING LEVEL	293.435	293.900	293.951	294.090	294.171	294.223	294.218	294.214	294.396
OFFSET	-6.469	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	5.434

CH. 61648.518



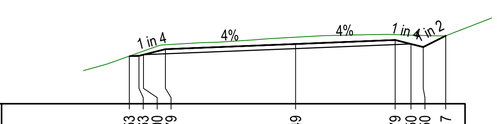
DATUM RL 292.100							
DESIGN LEVEL	293.549	293.621	293.659	293.837	293.982	294.112	293.983	293.883	294.593
EXISTING LEVEL	293.549	293.944	293.932	293.872	294.006	294.012	294.005	294.077	294.593
OFFSET	-6.887	-4.481	-4.331	-3.617	0.000	3.250	3.768	4.168	5.588

CH. 61580.000



DATUM RL 292.400							
DESIGN LEVEL	293.829	293.853	293.891	294.070	294.234	294.364	294.235	294.135	295.777
EXISTING LEVEL	293.829	293.983	293.999	294.076	294.244	294.373	294.620	294.777	295.777
OFFSET	-5.811	-4.981	-4.831	-4.117	0.000	3.250	3.768	4.168	7.452

CH. 61600.000



DATUM RL 292.100							
DESIGN LEVEL	293.653	293.663	293.700	293.879	294.049	294.179	294.050	293.950	294.317
EXISTING LEVEL	293.653	293.765	293.818	294.023	294.270	294.355	294.339	294.327	294.317
OFFSET	-5.430	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	4.902

CH. 61640.000

WARNING!

BEWARE OF UNDERGROUND SERVICES

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CROSS SECTIONS

Scale A

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 1.0 2.0 3.0 4.0 5.0 1:100

Dimensions shown in metres except where shown otherwise

crc quality people client focused solution driven

245 Mary Street, GYMPIE, QLD, 4570

ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
ANNOTATED CROSS SECTIONS SHEET 1

Drawn: B Doherty

Designed: B Doherty

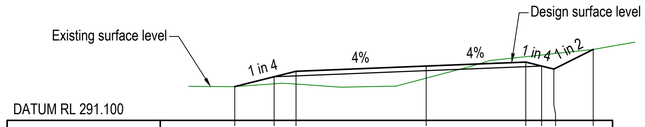
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	800
Revision	A
Series No.	8 of 14

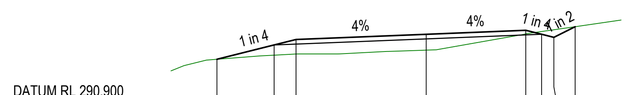
XREFS :- X_CRC_BSC_TITLE.dwg : X_MC40_XSECT_01.dwg

Last Modified :- Sep 29, 2023 - 9:13am



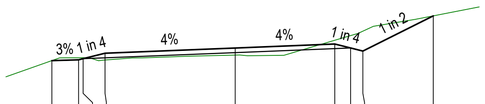
DATUM RL 291.100							
DESIGN LEVEL	292.202	292.523	292.702	292.872	293.002	293.873	293.773	293.415
EXISTING LEVEL	292.202	292.293	292.284	292.477	293.178	293.234	293.277	293.415
OFFSET	-6.250	-4.965	-4.250	0.000	3.250	3.768	4.168	5.453

CH. 61700.000



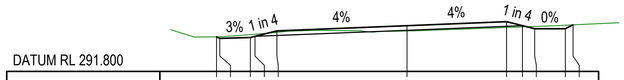
DATUM RL 290.900							
DESIGN LEVEL	292.302	292.769	292.948	293.118	293.248	293.118	293.018	293.366
EXISTING LEVEL	292.302	292.436	292.473	292.600	293.132	293.208	293.266	293.366
OFFSET	-6.833	-4.965	-4.250	0.000	3.250	3.768	4.168	4.863

CH. 61680.000



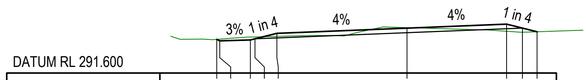
DATUM RL 291.400							
DESIGN LEVEL	292.969	292.995	293.032	293.211	293.381	293.511	293.382	293.282	294.431
EXISTING LEVEL	292.969	293.063	293.064	292.989	293.150	293.634	293.786	293.931	294.431
OFFSET	-5.987	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	6.467

CH. 61667.755



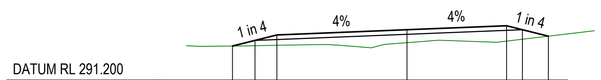
DATUM RL 291.800							
DESIGN LEVEL	292.929	292.877	292.907	292.945	293.124	293.294	293.424	293.294	293.194	293.194	293.320
EXISTING LEVEL	292.929	292.934	293.002	293.014	293.076	293.120	293.234	293.253	293.267	293.308	293.320
OFFSET	-6.219	-6.115	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.168	5.168	5.419

CH. 61751.600



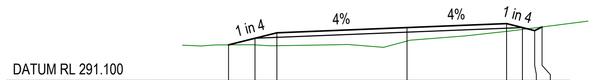
DATUM RL 291.600							
DESIGN LEVEL	292.699	292.650	292.680	292.718	292.896	293.066	293.196	293.067	292.948
EXISTING LEVEL	292.699	292.707	292.775	292.778	292.797	293.083	292.964	292.931	292.948
OFFSET	-6.213	-6.115	-5.115	-4.965	-4.250	0.000	3.250	3.768	4.245

CH. 61740.000



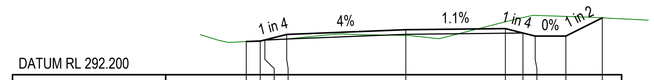
DATUM RL 291.200							
DESIGN LEVEL	292.323	292.506	292.685	292.855	292.985	292.855	292.644
EXISTING LEVEL	292.323	292.333	292.347	292.433	292.483	292.544	292.644
OFFSET	-5.699	-4.965	-4.250	0.000	3.250	3.768	4.613

CH. 61720.000



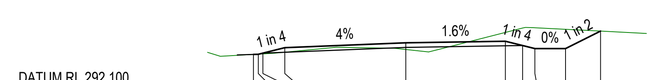
DATUM RL 291.100							
DESIGN LEVEL	292.269	292.486	292.664	292.834	292.964	292.835	292.735	292.855
EXISTING LEVEL	292.269	292.269	292.243	292.394	292.710	292.774	292.825	292.855
OFFSET	-5.829	-4.965	-4.250	0.000	3.250	3.768	4.168	4.408

CH. 61711.505



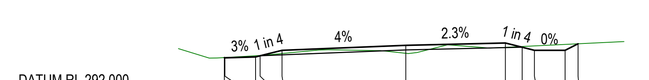
DATUM RL 292.200							
DESIGN LEVEL	293.283	293.297	293.335	293.513	293.669	293.705	293.561	293.461	294.056
EXISTING LEVEL	293.283	293.310	293.319	293.368	293.481	293.926	294.067	294.137	294.103	294.056
OFFSET	-5.210	-4.753	-4.603	-3.888	0.000	3.250	3.825	4.225	5.225	6.415

CH. 61766.111



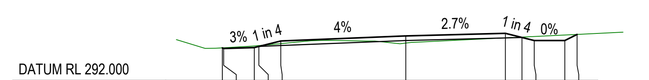
DATUM RL 292.100							
DESIGN LEVEL	293.224	293.228	293.266	293.444	293.602	293.654	293.514	293.414	293.985
EXISTING LEVEL	293.224	293.233	293.241	293.296	293.385	293.941	294.085	294.095	294.043	293.985
OFFSET	-4.974	-4.815	-4.665	-3.950	0.000	3.250	3.814	4.214	5.214	6.357

CH. 61763.629



DATUM RL 292.000							
DESIGN LEVEL	293.107	293.098	293.128	293.165	293.344	293.505	293.581	293.444	293.344	293.556
EXISTING LEVEL	293.107	293.108	293.165	293.174	293.238	293.245	293.441	293.467	293.487	293.535	293.556
OFFSET	-5.924	-5.906	-4.906	-4.756	-4.041	0.000	3.250	3.799	4.199	5.199	5.624

CH. 61760.000



DATUM RL 292.000							
DESIGN LEVEL	293.073	293.051	293.081	293.119	293.298	293.461	293.547	293.412	293.312	293.512
EXISTING LEVEL	293.073	293.075	293.133	293.145	293.210	293.228	293.398	293.424	293.444	293.492	293.512
OFFSET	-5.990	-5.947	-4.947	-4.797	-4.082	0.000	3.250	3.793	4.193	5.193	5.592

CH. 61758.334

WARNING!

BEWARE OF UNDERGROUND SERVICES

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CROSS SECTIONS

Scale A

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 1.0 2.0 3.0 4.0 5.0 1:100

Dimensions shown in metres except where shown otherwise

crc quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
ANNOTATED CROSS SECTIONS SHEET 2

Drawn: B Doherty
Designed: B Doherty

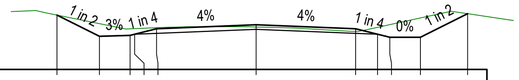
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	801
Revision	A
Series No.	9 of 14

XREFS :- X_CRC_BSC_TITLE.dwg :X_MC40_XSECT_02.dwg

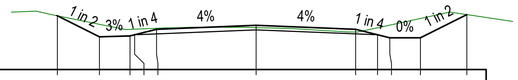
Last Modified :- Sep 29, 2023 - 9:14am



DATUM RL 292.800

DESIGN LEVEL	294.574	293.881	293.911	293.948	294.127	294.257	294.127	293.948	293.848	293.848	294.619
EXISTING LEVEL	294.574	294.294	294.125	294.131	294.162	294.184	294.040	294.174	294.261	294.479	294.619
OFFSET	-6.501	-5.115	-4.115	-3.965	-3.250	0.000	3.250	3.965	4.365	5.365	6.906

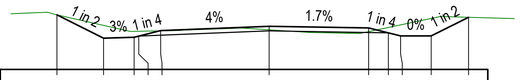
CH. 61792.390



DATUM RL 292.800

DESIGN LEVEL	294.553	293.866	293.896	293.934	294.113	294.243	294.113	293.934	293.834	293.834	294.592
EXISTING LEVEL	294.553	294.276	294.109	294.116	294.146	294.168	294.022	294.161	294.248	294.466	294.592
OFFSET	-6.490	-5.116	-4.116	-3.966	-3.251	0.000	3.250	3.965	4.365	5.365	6.880

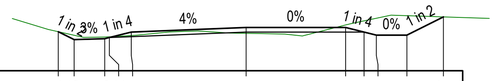
CH. 61791.600



DATUM RL 292.600

DESIGN LEVEL	294.382	293.621	293.651	293.688	293.867	294.008	293.954	293.793	293.693	293.693	294.302
EXISTING LEVEL	294.382	294.038	293.843	293.846	293.860	293.893	293.833	293.969	294.053	294.264	294.302
OFFSET	-6.927	-5.406	-4.406	-4.256	-3.541	0.000	3.250	3.893	4.293	5.293	6.511

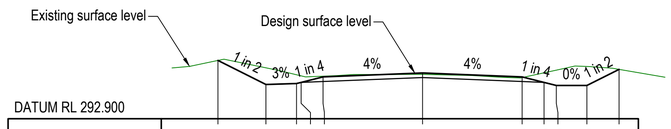
CH. 61780.000



DATUM RL 292.400

DESIGN LEVEL	293.674	293.415	293.445	293.482	293.661	293.811	293.811	293.661	293.561	293.561	294.157
EXISTING LEVEL	293.674	293.557	293.500	293.507	293.549	293.619	293.893	294.026	294.111	294.196	294.157
OFFSET	-6.135	-5.616	-4.616	-4.466	-3.751	0.000	3.250	3.850	4.250	5.250	6.441

CH. 61771.600



DATUM RL 292.900

DESIGN LEVEL	294.801	294.018	294.048	294.085	294.264	294.394	294.264	294.085	293.985	293.985	294.511
EXISTING LEVEL	294.801	294.562	294.334	294.298	294.288	294.346	294.242	294.398	294.486	294.605	294.511
OFFSET	-6.682	-5.115	-4.115	-3.965	-3.250	0.000	3.250	3.965	4.365	5.365	6.416

CH. 61800.000

WARNING!

BEWARE OF UNDERGROUND SERVICES

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CROSS SECTIONS

Scale A

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 1.0 2.0 3.0 4.0 5.0 1:100

Dimensions shown in metres except where shown otherwise

crc
quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
ANNOTATED CROSS SECTIONS SHEET 3

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	802
Revision	A
Series No.	10 of 14

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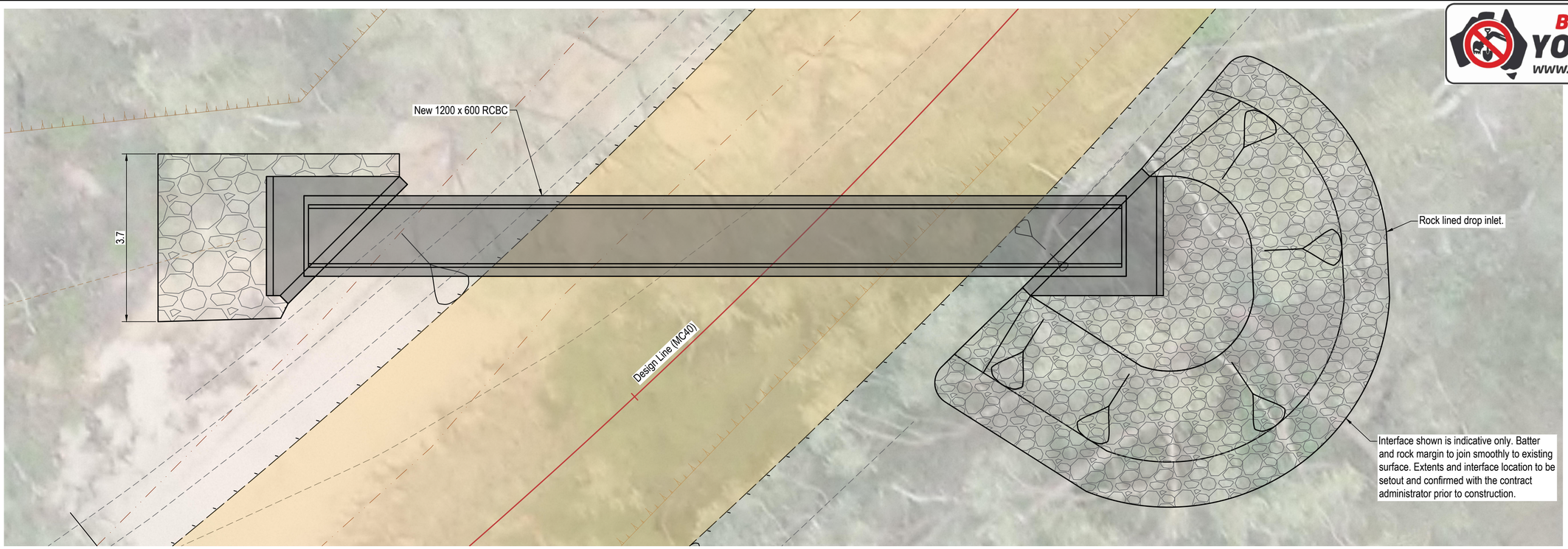
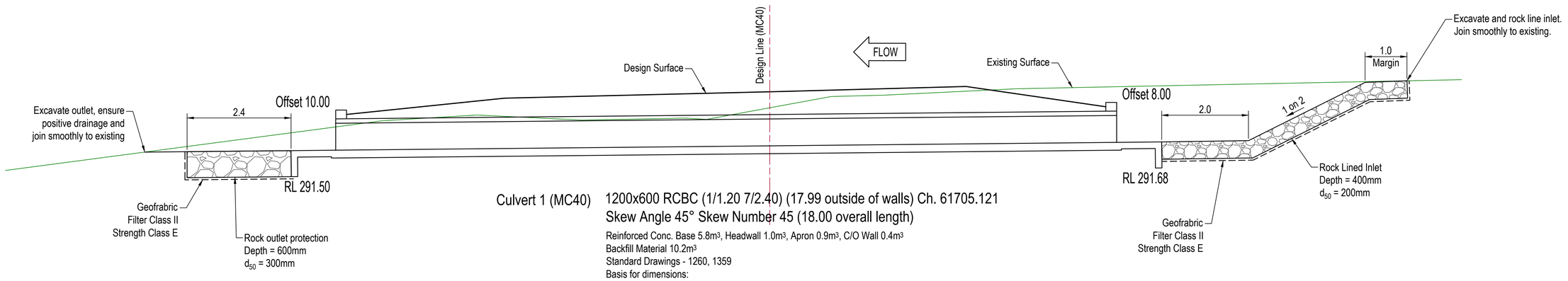
Last Modified :- Sep 29, 2023 - 9:14am



PLAN



Culvert 1 (MC40) 1200x600 RCBC (1/1.20 7/2.40) (17.99 outside of walls) Ch. 61705.121
Skew Angle 45° Skew Number 45 (18.00 overall length)

Reinforced Conc. Base 5.8m³, Headwall 1.0m³, Apron 0.9m³, C/O Wall 0.4m³
Backfill Material 10.2m³
Standard Drawings - 1260, 1359
Basis for dimensions:
External Box Wd. 1384mm, Internal Ht. 610mm, Deck Thick. 102mm
Leg Thick. 79mm, Headwall Ht. 200mm, Base Thick. 180mm
Exposure Classification: B2

WARNING!

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NOTES:

- Consideration for overtopping, destructive and nuisance flows - 2% AEP
- Culvert design immunity - 5% AEP

DRAINAGE SCHEDULE

Culvert						Base Slab / Footing				Headwall		Apron				Cutoff Wall			Wingwall 1					Wingwall 2					Blinding	Excavation (m³)		Backfill			Filters	
Alignment	Chainage (m)	Skew No.	ID	Structure	Exp Class	Concrete (m³)	Rebar (kg)	Fabric (m²)	Fabric Type	Concrete (m³)	Rebar (kg)	Concrete (m³)	Rebar (kg)	Fabric (m²)	Fabric Type	Concrete (m³)	Fabric (m²)	Fabric Type	Length (m)	Concrete (m³)	Rebar (kg)	Fabric (m²)	Fabric Type	Length (m)	Concrete (m³)	Rebar (kg)	Fabric (m²)	Fabric Type	Concrete (m³)	Culvert	Inlet / Outlet	Overlay (m³)	Fill (m³)	Foundation (m³)	Block Count	Strip Count
MC40	61705.121	45.0	CULVERT 1	1200x600 RCBC (1/1.20 7/2.40)	B2	5.8	167.3	30.1	RL1218	1.0	23.5	0.9	86.1			0.4													1.9	42.0			10.2		2	
				Total Fabric (Area / Type)		30.1 / RL1218																															

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 0.5 1.0 1.5 2.0 2.5 1:50

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crc
quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
CULVERT DETAILS

Drawn: B Doherty
Designed: B Doherty

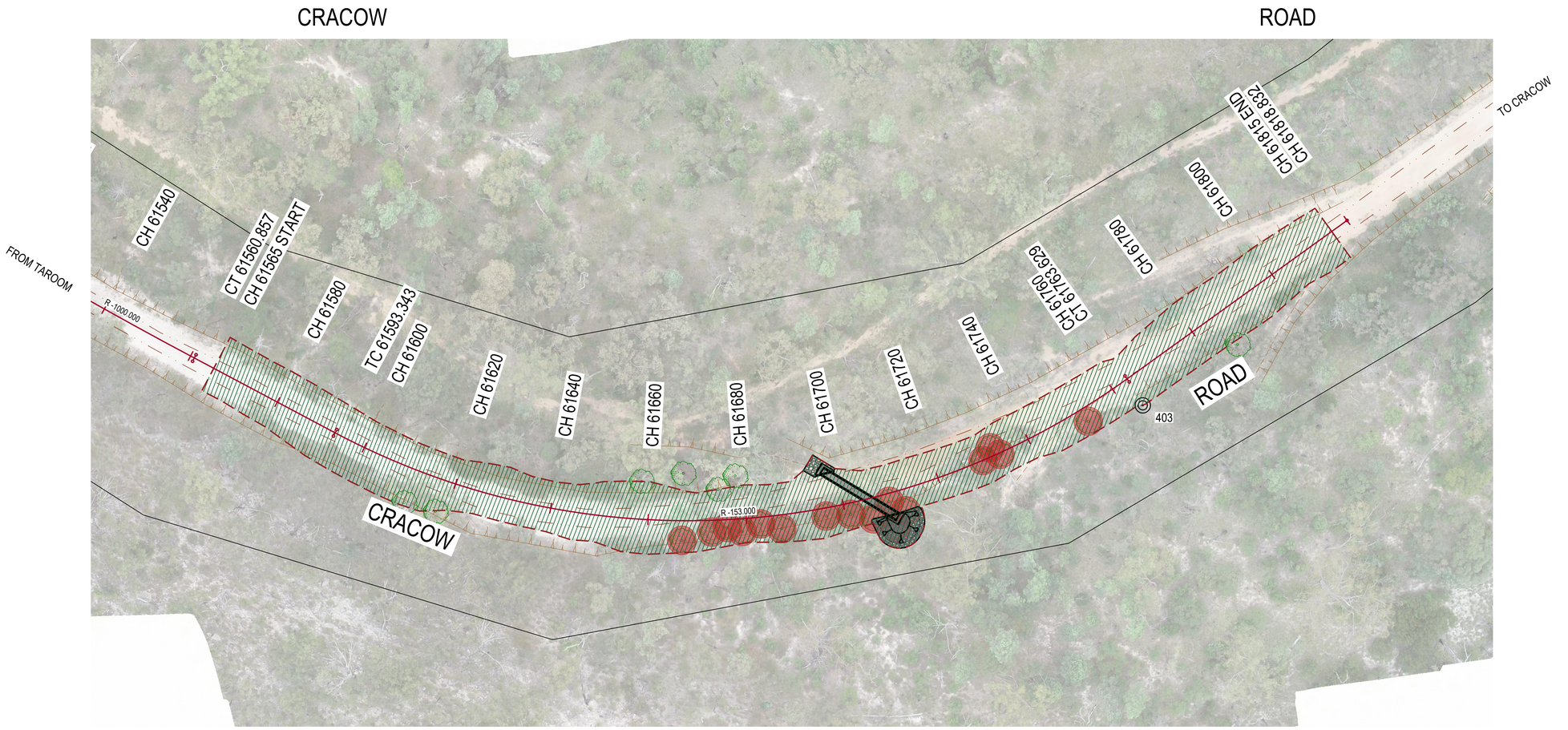
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	1200
Revision	A
Series No.	11 of 14

XREFS :- X_CRC_BSC_TITLE.dwg ; X_SURVEY.dwg ; X_CONTOURS.dwg ; X_CONTROL.dwg ; X_CULVERT PLAN.dwg ; X_DESIGN.dwg ; X_DESIGN_ADPOLES.dwg ; X_GUIDEPOSTS.dwg ; X_HATCH.dwg ; X_IMAGE.dwg

Last Modified :- Sep 29, 2023 - 9:14am



PLAN
Scale 1:500

DESIGN LINE MC40

CHAINAGE	OFFSET LHS	OFFSET RHS
61570	6.973	5.115
61580	6.887	5.588
61590	6.491	6.963
61600	5.811	7.452
61610	5.324	7.832
61620	5.156	5.654
61630	6.354	4.800
61640	5.430	4.902
61650	6.934	5.513
61660	7.748	7.063
61670	5.642	6.358
61680	6.833	4.863
61690	6.465	5.772

DESIGN LINE MC40

CHAINAGE	OFFSET LHS	OFFSET RHS
61700	6.250	5.453
61710	5.812	4.578
61720	5.699	4.613
61730	5.325	4.930
61740	6.213	4.245
61750	6.227	5.410
61760	5.924	5.624
61770	5.993	6.435
61780	6.927	6.511
61790	6.556	6.801
61800	6.682	6.416
61810	6.198	6.582

LEGEND

- Tree to be removed
- Limit of clearing
403 - Survey Mark and Label

XREFS :- X_CRC_BSC_TITLE.dwg ; X_SURVEY.dwg ; X_CONTROL.dwg ; X_DESIGN.dwg ; X_HATCH.dwg ; X_IMAGE.dwg ; X_IMAGE.dwg

Last Modified :- Sep 29, 2023 - 9:14am

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20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales
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ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

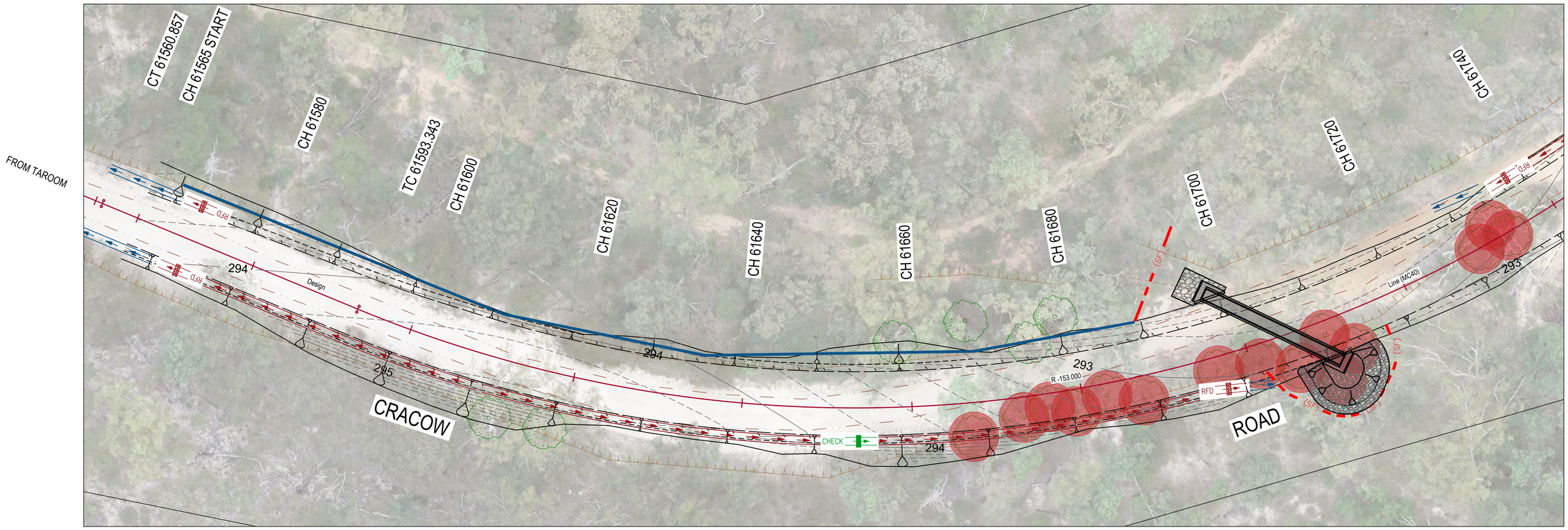
Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
LIMIT OF CLEARING PLAN

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	T Penrose		24087	

Job No.	CRC00288
Drawing No.	1600
Revision	A
Series No.	12 of 14



PLAN
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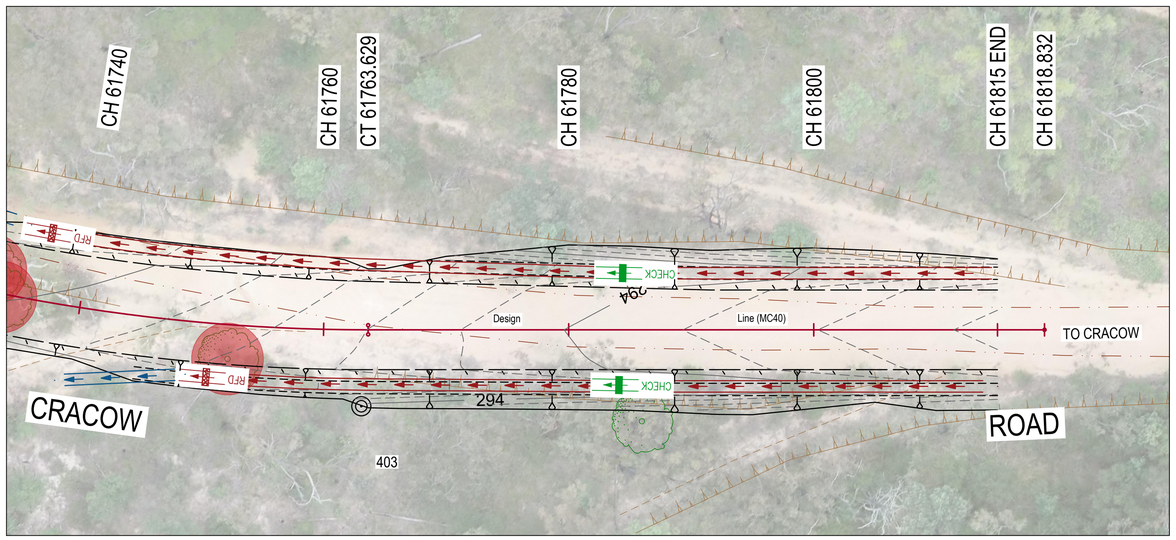

PLAN
Scale 1:250

LEGEND

- Diversion Bank
- (SF) Silt Fence
- Geo Log
- Dirty Water Flow
- Clean Water Flow
- CHECK Rock Check Dam
- RFD End of line rock check dam (to act as rock filter dam)
- Existing Trees

A	Issued for Construction			
20.01	Revisions/Descriptions	Drawn	Approved	Date

Scales

Scale A 0 2 4 6 8 10 12 1:250

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quality people client focused solution driven
245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
TEMPORARY EROSION AND SEDIMENT CONTROL SHEET 1

Drawn: B Doherty
Designed: B Doherty

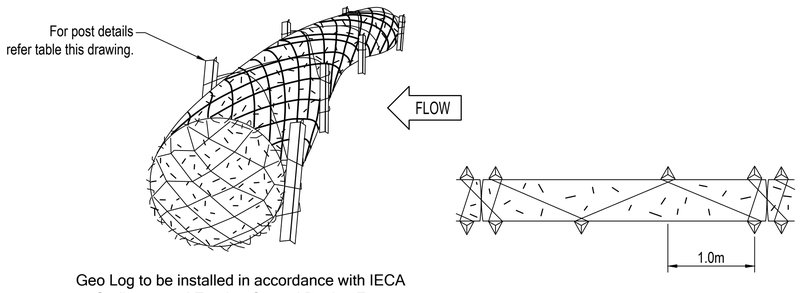
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	P Meredith		15268	

Job No.	CRC00288
Drawing No.	1700
Revision	A
Series No.	13 of 14

XREFS :- X_CRC_BSC_TITLE.dwg ; X_DESIGN.dwg ; X_SURVEY.dwg ; X_CONTROL.dwg ; X_CONTOURS.dwg ; X_ENS.dwg ; X_IMAGE.dwg ; X_HATCH.dwg ; X_DESIGNTADPOLES.dwg ; X_CULVERT PLAN.dwg

Last Modified :- Sep 29, 2023 - 9:14am



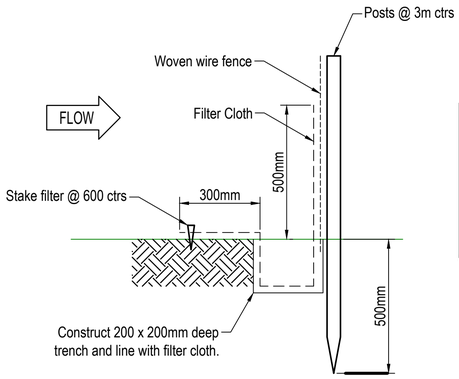
Geo Log to be installed in accordance with IECA Sediment and Erosion Control Design Fact Sheets - Instream Practices

GEO-LOG STAKING METHOD

N.T.S

MATERIALS

MATERIAL	TYPE
Posts (either)	1.5kg/m (min) Steel Star Picket or 1500mm^2 (min) Hardwood or 2500mm^2 (min) Softwood
Fence	Woven wire 14 guarge 150mm max aperture
Filter Cloth	Filter as specified (terram 100, polyfelt ts500, Bidim u24 or equivalent)
Prefabricated Unit	Geofab, envirofence or approved equivalent



Erection Notes

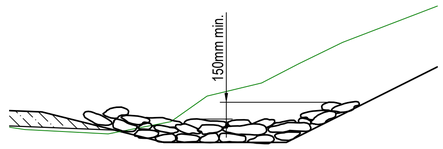
Woven fence to be fastened securely to fence posts with wire ties or staples. Filter cloth to be fastened securely to woven wire fence with teis speaced every 600mm at top of mid section. When two sections of filter cloth adjoin each other they shall be overlapped by 150mm and folded and material removeed when bulging of fence occurs.

SILT FENCE

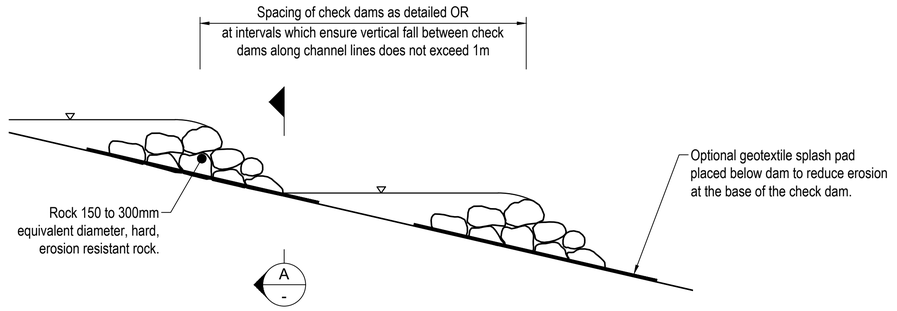
N.T.S

LEGEND

- Diversion Bank
- (SF) Silt Fence
- Geo Log
- Dirty Water Flow
- Clean Water Flow
- CHECK Rock Check Dam
- RFD End of line rock check dam (to act as rock filter dam)
- Existing Trees



SECTION A -

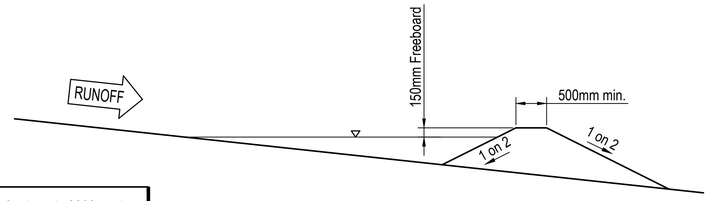


ROCK CHECK DAM

N.T.S

Notes

1. Design and construction of all sediment management devices is the contractors responsibility and shall be completed and effective prior to:
   (i) Stripping of topsoil and grass.
   (ii) Bulk earthworks to the site.
   (iii) Service installations.
2. All sediment management devices are to remain in place until notice from the Contract Administrator
3. Both temporary and permanent sediment management devices shall be maintained at a suitable level/condition throughout construction. Sediment fences are to be cleaned out when capacity is reduced by 30%.
4. If erosion and sediment control devices have been found to be deficient or failed in service, due to unforeseen circumstances, corrective action is to be undertaken immediately which may include amendments/additions to the original approved erosion control plans. such additions or amendments are to be approved by the Contract Administrator.
5. All erosion and sediment control devices are to be inspected at least weekly, before and after rainfall events. Any damage or excess erosion/sediment is to be repaired/managed as required to maintain control devices.
6. Devices shown on the drawings shall not necessarily be limited to the locations shown. Additional devices may be required as directed by Contract Administrator.
7. Rock check dams to be installed per detail this drawing in drainage channels with slopes greater than 2%. Spacing of check dams to be at every 1.0m vertical drop in drainage channel.
8. Contract Administrator to order installation of topsoil and grass seeding to disturbed areas.
9. The contractor shall ensure all turfed and/or seeded areas are regularly watered to ensure vegetation is maintained until there is 80% coverage.
10. Stockpiles shall be protected from erosion and sediment loss by:
    - The installation of diversion works on the upstream side.
    - The use of silt fences or other approved controls on the downstream side.
    - Compaction.
    - Re-vegetation if left exposed for longer than 30 days



A minimum freeboard of 300mm is recommended for non-vegetated earth embankments.

DIVERSION BANK

N.T.S

	Revisions/Descriptions	Drawn	Approved	Date
A	Issued for Construction			
20.01				

Scales

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245 Mary Street, GYMPIE, QLD, 4570
ABN 73 617 924 437 Ph: 0477 322 555

Client: Banana SHIRE — SHIRE OF OPPORTUNITY

Title: CRACOW ROAD UPGRADE (Ch. 61565m - 61815m)
SITE 4 - STABILISATION
TEMPORARY EROSION AND SEDIMENT CONTROL SHEET 2

Drawn: B Doherty
Designed: B Doherty

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE
Civil	P Meredith		15268	

Job No.	CRC00288
Drawing No.	1701
Revision	A
Series No.	14 of 14

XREFS :- X_CRC_BSC_TITLE.dwg

Last Modified :- Sep 29, 2023 - 9:14am

Cracow Road – Site 4

Stabilised Section 2 Ch. 61570 - 61815m

Safety in Design

Client: Banana Shire Council

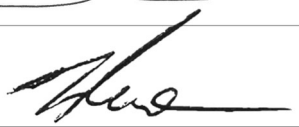
28/09/2023

Document Control

Document History

Date	Version	Name	Position	Action (Review/endorse/approve)
12/07/2023	0.1	Bryan Doherty	Senior Designer (Civil)	Draft for internal review
18/08/2023	0.2	Luke Marshall	Principal Designer (Civil)	Update for 100% Design Review
28/09/2023	1.0	Bryan Doherty	Senior Designer (Civil)	Final

Certification

Date	Name	Position	Signature
28/09/2023	B. Doherty	Senior Designer	
28/09/2023	T. Penrose	RPEQ	

Contents

1. Purpose of this Document

The purpose of this document is to identify and control project specific risks, where possible, in the civil design phase to ensure the safety of constructors, maintenance providers and end users. All risks identified as part of the design are documented in this report and provided for appropriate risk management in future phases. Risks unable to be closed out in the design phase are be documented in the report and communicated to the Client, for action in the construction and or later phases. This document has been produced to provide support to the design undertaken for Cracow Road, Stabilised Section 2 (Site 4, Ch. 61570 – 61815m).

2. Project Scope and Objectives

Scope of works for this project include,

- Pavement widening, overlay and stabilization.
- Geometric improvements.
- New Culvert and associated Protective Treatments
- Road edge guideposts.
- Clearing

3. Safe Design

Safe design begins from the outset or planning phase of a project and is further refined in the concept and development phases. Safe design covers the:

- Design of a project or a component of a project and its intended purpose or future use
- Materials being used
- Possible methods of construction, maintenance, and operation of the product, and
- Legislation, codes of practice and standards that need to be complied with.

Safe design is a collaborative effort between all parties involved throughout the lifecycle of the project and where possible should eliminate or minimize the risk of project lifecycle occupational health and safety hazards as early as practical. It also encompasses the management and documentation of remaining risks so all parties involved can understand and be aware of all risks identified in the design phase of the project lifecycle.

Safe design consists of a balance between cost, functionality, and aesthetics; without compromise to the health and safety of those who will construct, use, and maintain the product and community expectations. While not all risks can be eliminated or it be cost effective to remove all risks, Safe Design principles in the planning phase should aim to:

- Prevent injury and disease
- Improve useability of products, systems, and facilities
- Improve productivity in all phases
- Reduce operation costs
- Better predict and manage production and operational costs over the lifecycle of a product
- Comply with legislation, and
- Incorporate innovative design which fosters safer design practices and demands new thinking.

4. Duty of Care/Disclaimer

This document is not intended to be a standalone document, it should be read in conjunction with the *Work Health and Safety Act 2011* and the *Work Health and Safety Regulation 2011*. The Act and Regulation applies to all phases of a project lifecycle from concept, through design, construction, maintenance, and decommissioning and provides that all risks to health and safety be eliminated, so far as is practical or minimised so far as is reasonably practical where they cannot be eliminated. To properly manage exposure to a risk, a person must:

- Identify hazards
- Assess risks that may result because of the hazards
- Identify appropriate control measures to eliminate of minimise the level of risk
- Implement control measures, and
- Monitor and review the effectiveness of control measures.

To comply with the above, assumptions are made during the assessment as to what construction and maintenance practices may be adopted which may differ from actual methods adopted by those undertaking the works. Use of this document does not remove any obligation of any party involved, either during or after this document is published. A duty of care applies to all parties during subsequent phases and it is incumbent on those involved to further assess risks and hazards include:

- the client
- project managers
- constructor
- maintenance personnel
- users
- visitors
- demolishers, and
- disposers.

Further Safety advice, hazard identification, risk assessment or control measures may indicate other risks associated with the project that have not been identified in the document. Reference is made to the principle of what is considered 'reasonably practical' regarding the extent of Safe Design achievable by the designers.

Use of this document does not remove the obligation of the client, constructor end user or other parties during the lifecycle of the project.

Any party who has read this document and disagrees with the assessment or requires clarification of an item should contact the Project Designer at their earliest opportunity.

5. Risk Management

Table 1 – Methods of controlling risk in order of preference

Method	
Elimination	Remove the risk by modifying the design
Substitution	Remove or reduce the risk by modifying the design
Isolation	Physically separate the hazard
Engineered Control	Using *Design Safety* measure to reduce risks
Administration	Using formal process to reduce the risk
PPE	Ensure appropriate Personal Protective Equipment is used or worn.

The Risk Assessment Matrix is intended to assist our designers in:

- Fulfilling their obligations under the Work Health and Safety Act 2011.
- Achieving safe, economical and efficient constructions for our clients.
- Consulting and communicating with all parties involved in a project (designers, client, end-users, constructors etc.) to establish the hazards and risks identified during the design phase associated with the construction, operation, maintenance and decommissioning of a project.
- Consulting and communicating with all parties involved in a project on the controls that have or are required to mitigate these risks. This is not an exhaustive list and all parties should therefore undertake a thorough review of this document to satisfy themselves that it accurately reflects the intended purpose.
- Consulting and communicating to all parties the controls adopted to mitigate these risks and any residual risks that are considered present during construction, operation, maintenance and decommission that may need continual monitoring to achieve a safe working environment.

6. Appendix A – Safe Design Risk Register

Safety in Design Register

Cracow Road, Site 4, Stabilised Section 2, Road Upgrade

Hazards							Controls				Action		
				Raw Risk (no controls)				Residual Risk					
				Likelihood	Consequence			Likelihood	Consequence				
No.	Project Phase	Risk Description	Consequence Description	1. Very Unlikely 2. Unlikely 3. Possible 4. Likely 5. Almost Certain	A. Minor B. Major C. Severe D. Critical E. Catastrophic	Risk Rating	Mitigation Strategy / Control Measures	1. Very Unlikely 2. Unlikely 3. Possible 4. Likely 5. Almost Certain	A. Minor B. Major C. Severe D. Critical E. Catastrophic	Risk Rating	Responsibility	By When	Comments / Notes
1	Pre-Design	Insufficient/inaccurate data collection. (e.g. GIS, Traffic Data, LIDAR, Aerial photography)	Risk results in inadequate or substandard design that could lead to potential safety risk to travelling public, Constructors and maintenance workers.	4	D	Significant	Project is adequately scoped, discussed and documented during pre-detailed design phases to ensure data collection is appropriate. Detailed survey has been supplied for this project	1	C	Low	Designer/ Principal	Detailed Design	Residual risk with Principal
2	Pre-Design	Poor Scoping/Client brief on project requirements.	Risk results in inadequate design that could lead to potential safety risk. EDD, design exceptions, funding constraints.	4	D	Significant	Risks identified and accepted by Client. Mitigating treatments incorporated into design to the available funding.	2	B	Negligible	Designer/ Principal	Detailed Design	Residual risk with Principal Client decisions recorded within Design Decision Register.
1	Design	Errors and omissions in design.	Errors/omissions in design resulting in inadequate or substandard design that could lead to potential safety risk to travelling public. Constructor, maintenance – workers	3	E	Extreme	Design has been carried out in accordance with quality management procedures to avoid potential for errors in design. Design has been carried out in accordance with Australian Standards and quality management procedures in line with scope and deliverables to avoid potential for errors in design.	1	D	Moderate	Designer/ Principal	Detailed Design	Residual risk with Principal
2	Design	Design methodology poorly considers construction practices leading to potential safety risks for both construction workplace and the travelling public.	E.g. Traffic management, working near overhead power lines, lifting, trenching, site access, materials storage and handling (Asbetos identified within site), working close to travelling public due to corridor restrictions.	4	E	Extreme	Design incorporates learnings from previous projects and include recommendations from industry experts on appropriate site treatments in the design.	2	C	Low	Designer/ Principal	Detailed Design	Residual Risk transferred to Contractor.
3	Design	Project exceeds budget	Identified saftety issues will not be addressed leading to an unsafe environment for the travelling public.	3	D	Significant	BSC to prepare contingency plans to reduce project cost to within budget constraints.	2	D	Moderate	BSC	Detailed Design	Residual risk with Principal
4	Design	Hazards in designated clear zones and road corridor.	Poor Scoping of project requirements resulting in inadequate design that could lead to potential safety risk to travelling public, constructor, maintenance. Impact of errant vehicle resulting in injury or death.	3	E	Extreme	Risks identified and accepted by BSC. Mitigating treatments have been incorporated into the design. Hazard Treatment Evaluation undertaken in accordance with Austroads and the information available at the time of detailed design.	2	D	Moderate	Designer/ Principal	Detailed Design	Residual risk with Principal
5	Design	Inadequate treatment of private entrance or turnout design.	This could lead to potential safety risk to travelling public. SISD, ASD, angles, vertical clearance, appropriate layout, design vehicle.	3	D	Significant	Private entrances and turnouts to be designed in accordance with BSC standard drawing and incorporating validated road function, traffic volumes and usage. Key stakeholder consultation, EDD/Design Exceptions.	1	D	Moderate	Designer/ Principal	Detailed Design	Residual Risk with Principal
6	Design	Services not identified during design.	This could lead to the potential safety risk of constructors and/or closure of key services to the general public.	4	D	Significant	• Contact DBYD and other relevant authorities to identify existing services (DBYD received 17/02/23). • Designers have noted known services on drawings. • Carry out field inspection to confirm and identify any potential service related issues e.g. potholing and locating activities. • Locating activities have been carried out during the design phase with no PUP infrastructure located on site. • Contractor to complete service locations to confirm the preconstruction investigations	2	D	Moderate	Designer/ Principal	Detailed Design	Residual Risk with Principal and Contractor
1	Construction	Drainage during construction	Poor drainage during construction affecting pavements/traffic/etc	3	B	Low	Maintain flow paths during construction where practical. Make pumping equipment available if required.	2	A	Negligible	Contractor	Construction	Residual risk with Principal and contractor
2	Construction	Exposure to asbestos	Existing abandoned conduits/pits/culverts may be present which could be exposed during construction.	2	D	Moderate	Details of existing services/culverts where known have been provided. Contractor to undertake appropriate intestigations as required.	1	D	Moderate	Contractor	Construction	Residual risk with Principal and Contractor It is unknown if any asbestos infrastructure is located within the project limit.
3	Construction	Deep excavation of trenches	Trench collapse injuries	2	E	Significant	Depth of culverts to be minimised where possible. Contractor to employ appropriate temporary work measures.	1	E	Moderate	Contractor	Construction	Residual risk with Principal and contractor
4	Construction	Design changes made by Contractor or Administrator following design completion	Design changes do not meet safety requirements.	3	C	Moderate	Contractor / Administrator to advise the Designer or any proposed design changes. Follow RFI process.	1	C	Low	BSC	Construction	Residual risk with Principal and contractor
5	Construction	Working in vicinity of High Voltage Ergon power lines, both overhead and underground.	Death or serious injury	2	E	Significant	Contractor to identify all services and have construction procedures for working near HV services.	1	E	Moderate	Contractor	Construction	Constructors shall conduct their own DBYD and verify all utilities on site prior to commencing any roadworks.
6	Construction	The risk of traffic not being managed adequately.	Traffic chaos, delays and accidents caused by lack of controls.	2	E	Significant	Designer has nominated traffic volumes in design documentation. It is noted that the traffic volumes are low. Contractor to engage a suitably qualified traffic manager to implement traffic management controls considering road function; traffic volumes; constructability and road users.	1	E	Moderate	Contractor	Construction	Residual Risk with Principal and Contractor
7	Construction	Working on top of high and steep embankments	Injury due to personnel fall or overturning construction plant	3	E	Extreme	Consider construction methodology prior to implemenation.	2	D	Moderate	Contractor	Construction	Residual risk with Principal and contractor
8	Construction	Lighting levels during construction.	Inadequate lighting of conflict points during construction resulting in confusion/collisions	2	B	Negligible	Temporary standalone LED lighting, if required.	1	B	Negligible	BSC	Construction	Residual risk with Principal and contractor
9	Construction	Disruption / damage to existing services	Constructors may damage existing services during construction. Service may/may not have been shown on design plans.	3	D	Significant	Constructors to conduct dial before you dig and no work shall be carried out over utility or within 3m of services without prior notification to the appropriate service authorities. Contractor to complete service locations to verify existing infrastructure. Appropriate demarcations and planning by contractor to highlight any locations where work activities are undertaking in the vicinity of existing services.	2	D	Moderate	Contractor	Construction	Constructors shall conduct their own DBYD and verify all utilities on site prior to commencing any roadworks or excavations.
10	Construction	Unexpected weather events resulting in potential injury to construction personnel and/or travelling public	Sudden weather events resulting in the need to evacuate the site.	4	D	Significant	Constructor to consider location, likely duration and characteristics of project to determine likelihood of event and consider project specific mitigation strategies via risk management.	3	D	Significant	Contractor	Construction	Residual Risk with Principal and Contractor
11	Construction	Unearthing unexpected soil types e.g. acid sulphate soil, sodic soils or contaminated soil from rail reserves. resulting in potential safety risk to construction personnel and general public.	This results in potential safety risk to construction personnel and general public.	3	D	Significant	• Design to consider location and likelihood of encountering specific soil type. • Site inspection and/or geotechnical investigation to confirm presence of soils requiring specific treatment. • Include comments in "notes to contract administrators" advising of potential for presence of hazardous materials. • Experienced construction staff that can recognise potential hazards	3	C	Moderate	Contractor	Construction	Residual Risk with Principal and Contractor
12	Construction	Incorrect or unsuitable surface treatment either temporary or permanent resulting in potential safety risk to the travelling public. e.g. line marking removal, appropriate seal design	This results in potential safety risk to construction personnel and general public.	3	D	Significant	Constructor to consider road function, traffic volumes, location and seasonal conditions to propose suitable surface treatment.	2	E	Significant	Contractor	Construction	Residual Risk with Principal and Contractor
1	Maintenance	Final product leads to potential safety issues with maintenance activities.	Personel cannot undertake maintainance activities safely due to the proposed design.	3	C	Moderate	Design to consider maintenance requirements including provision of safe environment to facilitate maintenance activities including safe ingress and egress and clear work area. E.g. batter slopes, under bridge inspections, gardens in medium strips, allowance for access tracks etc.	1	E	Moderate	BSC	Ongoing	Residual risk with Principal
2	Maintenance	Inadequate as constructed information.	Existing conditions not accurately reflected.	4	E	Extreme	Adequate handover to maintenance provider.	1	D	Moderate	BSC	Ongoing	Residual risk with Principal
1	Finalisation	Not applying all the appropriate standards.	This could result in an unsafe design.	3	D	Significant	Carry out appropriate design reviews and RPEQ approvals	1	D	Moderate	Designer	Ongoing	Residual risk with Principal