



Site Based Stormwater Management Plan 1 - 5 Railway St, Gulgong (Stage 1)

Prepared For
Mid-Western Regional Council

Project No.
TEL2021184

Issue A October 2021

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Reviewed By	Joe Bacha	Director	22 October 2021	Nil

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Disclaimer

The advice and information contained within this report relies on the quality of the records and other data provided by the Client and obtained from Council along with the time and budgetary constraints imposed.

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1 INTRODUCTION

Telford Consulting Pty Ltd have been commissioned to undertake a Site Based Stormwater Management Plan for the Proposed Subdivision at 1 - 5 Railway St, Gulgong (Stage 1).

The aim of this report is to:

1. Identify the proposed development details;
2. Describe the existing site topography and features;
3. Stormwater quantity management;
4. Stormwater quality management;
5. Assess erosion and sediment control;
6. Ensure the proposed development achieves the principle of "no worsening".

The limitations of this report are:

The concept plans provided are preliminary only and not for construction purpose.

2 STORMWATER QUANTITY/QUALITY MANAGEMENT PLAN

2.1 Site Details Summary

Table 2-1 provides a summary of development details for the subject site.

Table 2-1 – Site Details / Development Summary

Development Details	Comments
Applicant's Name	Mr. Roy Amery
Street Address	1 - 5 Railway St
Suburb	Gulgong (Stage 1)
State / Postcode	NSW / 2852
Local Authority	Mid-Western Regional Council
Zoning	R1 (General Residential)
Development Type	Subdivision
Number of Proposed Lots	5 (including 1 residue lot)
Site Area	4.19ha (total) 0.262ha (Stage 1)
Real Property Description	Lot 2 DP 613429
Stage	1 of 2

2.2 Location / Existing Development Details

The subject site is located at 1 - 5 Railway St, Gulgong (Stage 1) and has a total site area of approximately 4.19 ha. The total site area of stage 1 is approximately 0.262 ha.

This site is bounded by residential areas to the west and south, Railway street to the north, and Homer Street to the east.

See **Figure 2-1** below for a locality map of the site.



Figure 2-1 - Locality Map, Source: Google Map

2.3 Existing Topography and Drainage Patterns

The site falls from South to North with the lowest point occurring at the north eastern boundary of the site.

The lowest point is at RL 453.3m AHD while the highest point of the site is approximately at RL 460.5m at the most south western point.

The site falls towards the north at an average grade of approximately 3%.

2.4 External Catchment

Available Lidar data and specific survey demonstrates that the site is affected by local runoffs from an upstream catchment to the south. The catchment area is approximately 1.5ha (Refer to **Appendix B** for the stormwater catchment plan).

2.5 Proposed Subdivision Plan

The proposal is a 4 lot subdivision.

Refer to **Figure 2-2** below for the proposed subdivision plan.

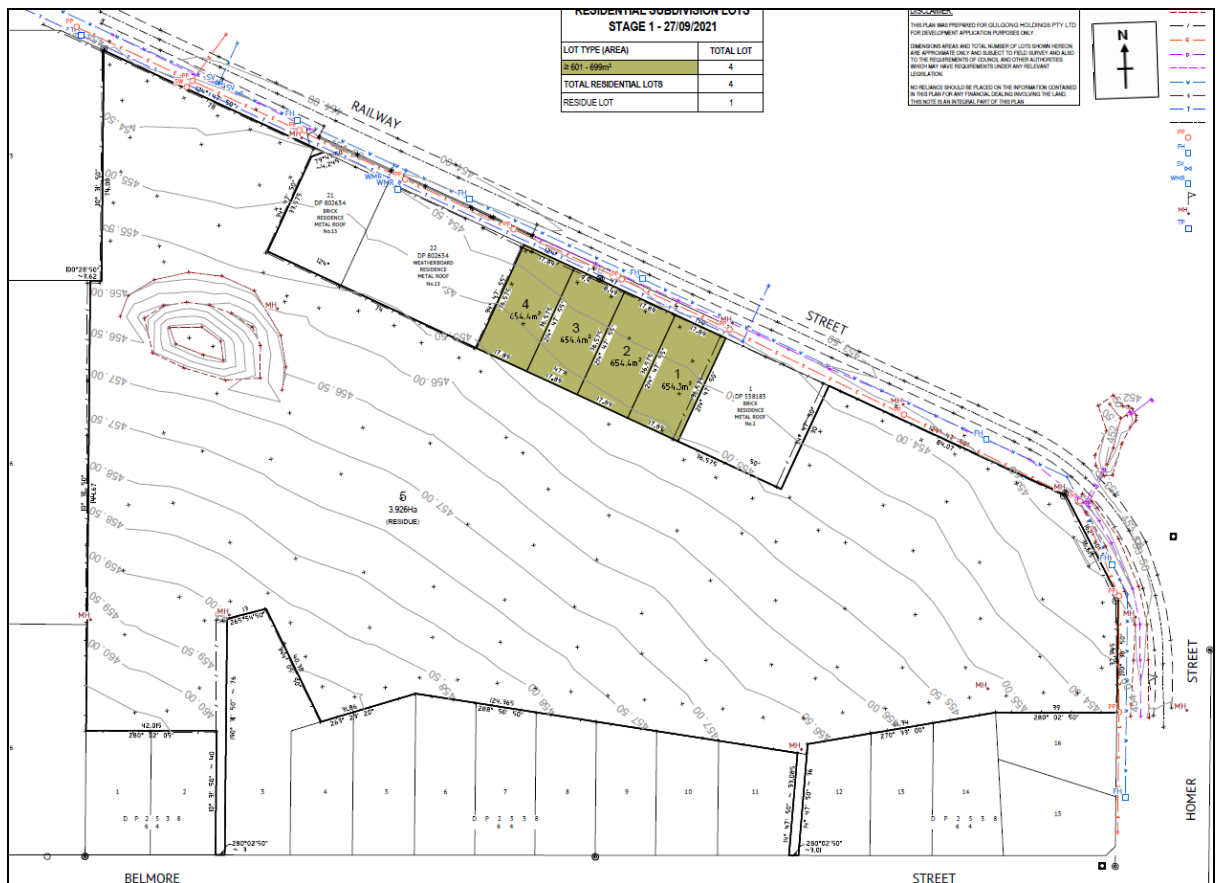


Figure 2-2 - Proposed Subdivision Plan

2.6 On-Site Detention

The proposed lots of Stage 1 (lots 1-4) slope towards Railway Street to the North. Due to the site's topography, it is impossible to drain Stage 1 to the regional OSD/WSUD systems proposed as part of Stage 2. The future Stage 2 basin's water levels are higher than Lots 1-4 and on this basis, the system would not function hydraulically. On this basis, it is recommended to design & install appropriate On-Site Detention (OSD) as part of future DA/CDC.

On-Site Detention facilities can be designed in the form of an underground Masonry/PVC tank with an outlet pipe connecting to the proposed site's K&G.

DRAINS ILSAX model was used for all storm events to analyze and determine the pre-development and post development stormwater runoff from the subject site. Note that the calculation below is typical for all proposed 4 lots.

The following table details the pre-development runoff from the pre-development Catchment towards the lawful point of discharge calculated using ILSAX DRAINS model.

Table 2-2 - Hydrologic Parameters – Pre-development

Parameters	Value
Catchment No	Pre dev
Area (ha)	0.0654
1 in 100 ARI Flow (m ³ /s)	0.023

The Post-development runoff towards the Outlet has been also calculated in DRAINS. Standard inlet times for the upstream section of catchments and pipe flow times are added to calculate the post-development times of concentration for the catchments.

Table 2-3 - Hydrologic Parameters – Post-development

Parameters	Value
Catchment No	Post Dev
Area (ha)	0.0654
1 in 100 ARI Flow (m ³ /s)	0.028

In reference to a preliminary assessment of the OSD requirements and assuming 70% of the proposed site will be impervious, a footprint has been estimated for the detention tank and the minimum required volume for the underground tank was calculated to be 7.3m³.

Table below summarises the peak discharge from the site in the pre-development and post-development scenario.

Table 2-4 - Summary of peak discharge

Outlet	Scenario	ARI Storm event				
		1 in 5	1 in 10	1 in 20	1 in 50	1 in 100
Lawful Point of discharge	Pre-dev	0.009	0.011	0.015	0.020	0.023
	Post-dev	0.009	0.010	0.013	0.014	0.017

The table indicates that with the proposed detention tank, the development will successfully attenuate all post-development peak discharges from the proposed development, for all investigated return periods.

Refer to **Appendix C** for the Drains Model Data.

2.7 External Catchment Discharge

As stated in **Section 2.4**, the proposed development has an external catchment to the south. These catchment flows will be captured by a 1.5m wide swale along the southern side of the proposed lots and directed towards the east.

Refer to **Appendix B** for Telford Civil Engineering Plans for the proposed swale.

3 EROSION AND SEDIMENT

3.1 Site Establishment

Prior to any earthworks associated with site commencement, on site erosion and siltation control measures are to be put in place in accordance with Council's guidelines and best management practices for erosion and sediment control and as described herein. These measures include:

1. The installation of a perimeter fence covered with shade cloth or solid A class hoarding, to the perimeter of the work site area;
2. The construction of a silt fence on the low side of all site areas that are disturbed;
3. All water leaving each site will be processed through a sediment control basin, where applicable;
4. Swales and hay bales are to be used to assist with sediment control for overland flow paths leading into sedimentation control basins;
5. The erosion and sediment control measures will be inspected at least once a week or after rainfall events to check their integrity.

3.2 Construction Phase

The following information is provided to identify controls and procedures, and who is responsible for them, which will be incorporated into the Erosion and Sediment Control Program:

3.2.1 Pre-Construction

1. A single stabilised entry/exit point is to be established (vehicle shake down device) for each stage of construction. This point should also include a vehicle shakedown device to mitigate the transportation of dust and dirt;
2. Sediment fences are to be placed along the low side of the site to slow flows, reduce scour and capture some sediment runoff;
3. Sediment fences are to be constructed at the base of fill embankments;
4. Divert up-slope water around the work site and appropriately stabilise any drainage channels;
5. Areas for plant and construction material storage are to be designated along with associated diversion drains and spillage holding ponds;
6. Diversion banks are to be created at the upstream boundary of construction activities to ensure upstream runoff is diverted around any areas to be exposed. Catch drains are to be created at the downstream boundary of construction activities;
7. Construction of temporary sediment basins, where required;
8. Site personnel are to be educated in the sediment and erosion control measures to be implemented on site.

3.2.2 During Construction

1. Progressive re-vegetation of filled areas and fill batters, if applicable;
2. Construction activities are to be confined to the necessary construction areas;
3. The provision of a construction exit to prevent the tracking of debris from tyres of vehicles onto public roads. Only one construction exit will be nominated to limit the movement of construction equipment;
4. The topsoil stockpile location will be nominated to coincide with areas previously disturbed. A sediment fence is to be constructed around the bottom of the stockpile to trap sediment. A diversion drain is to be installed upstream of the stockpile if required;
5. Roof downpipes should be installed as soon as practicable after the roof is laid;
6. Transport loads that are subject to loss through wind or spillage shall be covered or sealed to prevent entry of pollutants to the stormwater system;
7. Regular inspection and maintenance of silt fences, sediment basins and other erosion control measures. Following rainfall events greater than 50mm, inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged equipment should be undertaken immediately;

3.2.3 Post Construction

1. The Contractor/Developer will be responsible for the maintenance of erosion and sediment control devices from the possession of the site until the site is accepted, or until stabilisation has occurred, to the satisfaction of the superintendent and developer;
2. Key stormwater quality improvement devices requiring maintenance during the operational phase of the project following construction are the bio-retention areas and the gross pollutant traps. Maintenance requirements for these devices consist of regular storm event inspection to ensure:
 - a. Sufficient vegetation within bio-retention areas; and
 - b. Ensuring no erosion has occurred
3. Regular mowing/harvesting to ensure vegetation is maintained at acceptable levels,
4. Removal of litter within verges, swales and bio-retention areas,
5. Regular trash removal,
6. The Sediment and Erosion Control Management Plans should be provided to all people involved with the site, including sub-contractors, private certifiers, home owners and regulators.

4 CONCLUSION

This proposed Site Based Stormwater Management Plan has been prepared for the Proposed Subdivision at 1 - 5 Railway St, Gulgong (Stage 1), to manage future site based stormwater quantity requirements for the design storms up to and including the 1% AEP event.

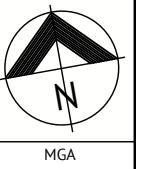
A detention tank for any future DA/CDC is required at each lot to ensure non-worsening of post-development discharge from the proposed development.

Runoff from external catchments will be conveyed safely by a 1.5m wide swale along the southern boundaries of the lots towards the east.

The conclusion of this site based stormwater management plan is that by implementing the proposed stormwater quantity management measures, the proposed development will ensure no worsening effects downstream of the proposed development and conforms to best engineering practices.

APPENDICES

Appendix A SUBDIVISION PLAN



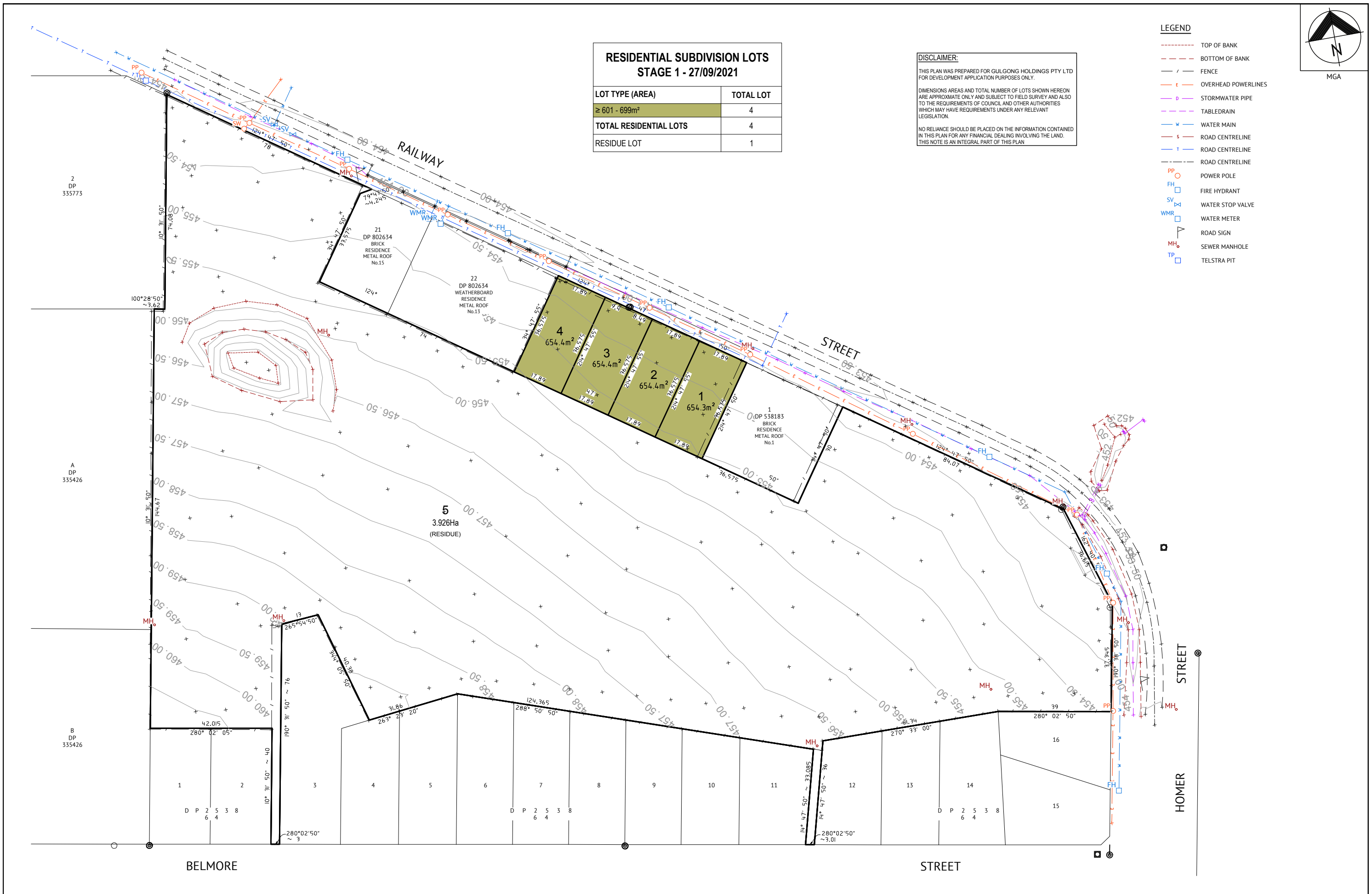
LEGEND

- TOP OF BANK
- BOTTOM OF BANK
- - - FENCE
- - - OVERHEAD POWERLINES
- - - STORMWATER PIPE
- - - TABLEDRAIN
- - - WATER MAIN
- - - ROAD CENTRELINE
- - - ROAD CENTRELINE
- - - ROAD CENTRELINE
- PP ○ POWER POLE
- FH □ FIRE HYDRANT
- SV □ WATER STOP VALVE
- WMR □ WATER METER
- △ ROAD SIGN
- MH ○ SEWER MANHOLE
- TP □ TELSTRA PIT

**RESIDENTIAL SUBDIVISION LOTS
STAGE 1 - 27/09/2021**

LOT TYPE (AREA)	TOTAL LOT
≥ 601 - 699m ²	4
TOTAL RESIDENTIAL LOTS	4
RESIDUE LOT	1

DISCLAIMER:
THIS PLAN WAS PREPARED FOR GULGONG HOLDINGS PTY LTD FOR DEVELOPMENT APPLICATION PURPOSES ONLY.
DIMENSIONS AREAS AND TOTAL NUMBER OF LOTS SHOWN HEREON ARE APPROXIMATE ONLY AND SUBJECT TO FIELD SURVEY AND ALSO TO THE REQUIREMENTS OF COUNCIL AND OTHER AUTHORITIES WHICH MAY HAVE REQUIREMENTS UNDER ANY RELEVANT LEGISLATION.
NO RELIANCE SHOULD BE PLACED ON THE INFORMATION CONTAINED IN THIS PLAN FOR ANY FINANCIAL DEALING INVOLVING THE LAND. THIS NOTE IS AN INTEGRAL PART OF THIS PLAN

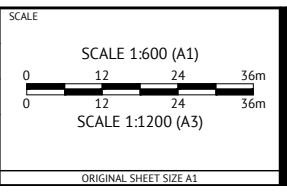


ISSUED FOR REVIEW

DATE	REV	DESCRIPTION	REVISIONS	REC	APP
27/09/21	B	ISSUED FOR REVIEW - TOTAL 4 RESIDENTIAL LOTS & RESIDUE LOT		PS	WRS
16/09/21	A	ISSUED FOR REVIEW - TOTAL 48 LOTS		PS	WRS

ORAN PARK OFFICE
SUITE 301, LEVEL 3 ORAN PARK PODIUM
351 ORAN PARK DRIVE
ORAN PARK, NSW 2570
PH: (02) 4632 6500
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DESIGNED
P. SITHIRAJVONGSA
CHECKED
W. SAUNDERS
PROJECT MANAGER
W. SAUNDERS
REGISTERED SURVEYOR



CLIENT
GULGONG HOLDINGS PTY LTD

PROJECT
SUBDIVISION OF LOT 2 IN DP 613429

LOCATION
1 RAILWAY STREET, GULGONG

SHEET TITLE
PROPOSED SUBDIVISION PLAN - STAGE 1

JOB CODE
322037_02

SHEET NUMBER	REV
TP01	B

Appendix B CIVIL ENGINEERING PLANS

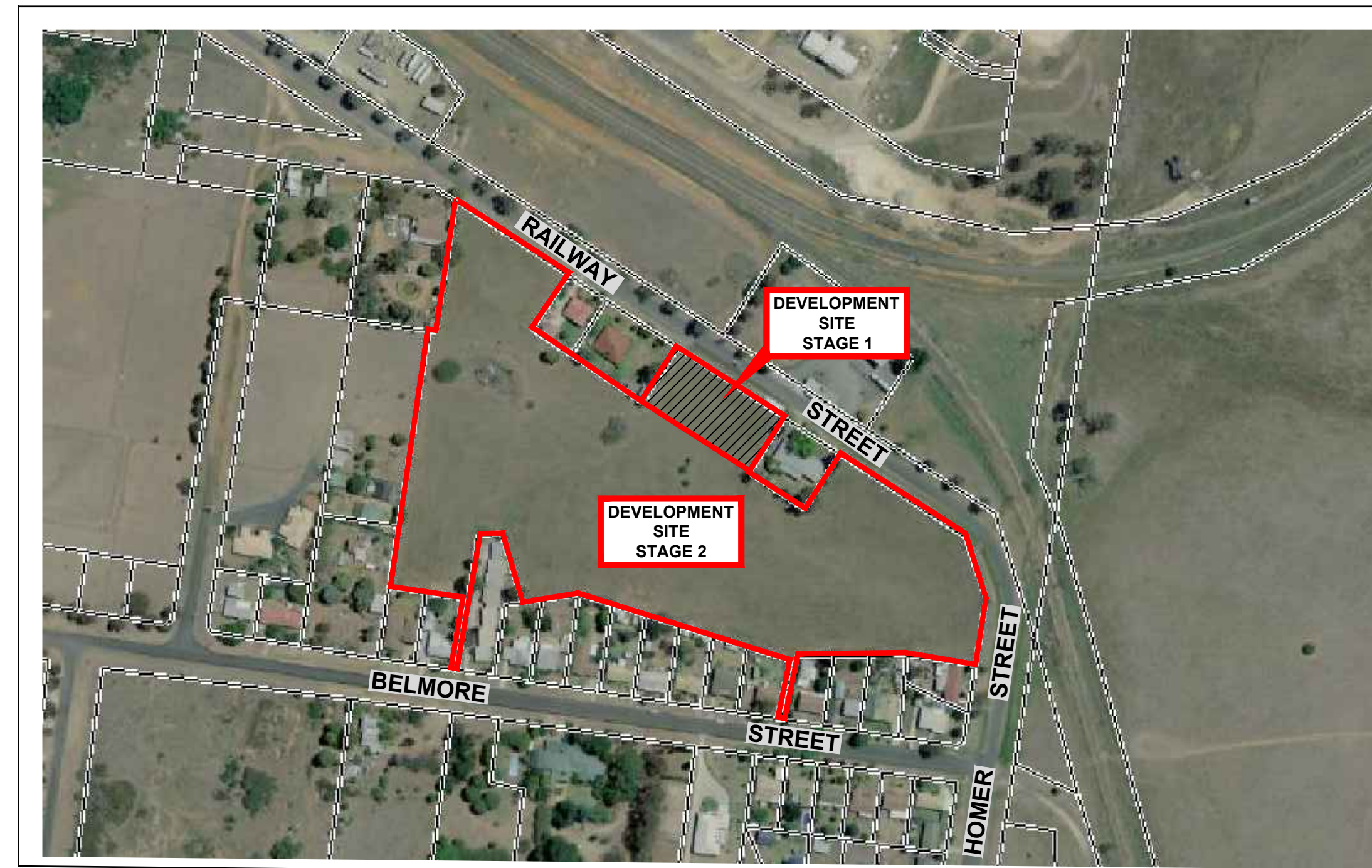
PROPOSED RESIDENTIAL SUBDIVISION

1 RAILWAY STREET, GULGONG - STAGE 1

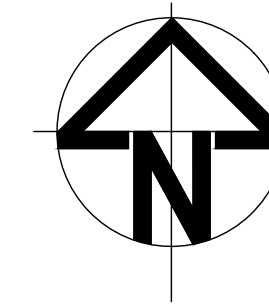
CIVIL ENGINEERING WORKS

FOR DEVELOPMENT APPLICATION

DRAWING SCHEDULE		
DRG No.	DESCRIPTION	REV.
GENERAL		
TEL2021184.CIV.DA.000	GENERAL NOTES, LOCALITY PLAN AND DRAWING SCHEDULE	A
TEL2021184.CIV.DA.001	EXISTING SERVICES AND DEMOLITION PLAN	A
EROSION AND SEDIMENT		
TEL2021184.CIV.DA.100	EROSION AND SEDIMENT CONTROL PLAN	A
TEL2021184.CIV.DA.102	EROSION AND SEDIMENT CONTROL DETAILS	A
ROADS		
TEL2021184.CIV.DA.300	ROADWORKS AND DRAINAGE LAYOUT PLAN	A
TEL2021184.CIV.DA.302	RAILWAY STREET - LONGITUDINAL SECTIONS AND TYPICAL CROSS SECTION	A
TEL2021184.CIV.DA.303	RAILWAY STREET - CROSS SECTIONS SHEET 1 OF 2	A
TEL2021184.CIV.DA.304	RAILWAY STREET - CROSS SECTIONS SHEET 2 OF 2	A
STORMWATER		
TEL2021184.CIV.DA.400	STORMWATER CATCHMENT PLAN	A



LOCALITY PLAN
N.T.S



COORDINATION NOTES

- REFER ELECTRICAL CONSULTANTS DRAWINGS FOR ELECTRICAL RETICULATION SETOUT.
- REFER LANDSCAPE ARCHITECTS DRAWINGS FOR SOIL STABILATION AND PLANTING DETAILS.
- REFER SERVICE AUTHORITY FOR LOCATION AND CONSTRUCTION REQUIREMENTS APPLICABLE TO EXISTING SERVICES.

GENERAL NOTES

- ALL WORK IS TO CONFORM TO THE CURRENT COUNCIL STANDARDS, DRAWINGS AND SPECIFICATIONS U.N.O.
- WHERE CONNECTION IS TO BE MADE TO EXISTING CONSTRUCTION THE CONTRACTOR SHALL CONFIRM THE LOCATION AND LEVEL OF THIS CONSTRUCTION PRIOR TO COMMENCING WORK ON ANY CRITICAL SECTION. THE SUPERINTENDENT MAY VARY LEVELS AND GRADIENTS OF NEW WORKS TO ACHIEVE A SATISFACTORY CONNECTION.
- LEVEL DATUM IS AHD.
- ALL DIMENSIONS ARE IN METRES U.N.O.
- PRIOR TO CONSTRUCTION THE CONTRACTOR WILL SATISFY HIMSELF OF THE CORRECT LOCATIONS OF ALL EXISTING SERVICES WHETHER INDICATED OR NOT ON THE PLANS. ANY DAMAGE TO EXISTING SERVICES IS TO BE RECTIFIED AT THE CONTRACTORS EXPENSE.
- PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY BENCH MARK LEVELS AND ADVISE THE SUPERINTENDENT OF ANY DISCREPANCIES.
- PRIOR TO CONSTRUCTION THE CONTRACTOR IS TO CONFIRM WITH THE SUPERINTENDENT THE FOLLOWING:
 - ALL INSPECTION HOLD POINTS, AND;
 - ALL COMPLIANCE TESTING REQUIREMENTS.
- ANY WORK ON EXISTING SERVICES THAT REQUIRE RELOCATION BY AUTHORITIES SHALL BE CARRIED OUT BY THE RELEVANT AUTHORITY, BUT WITHIN TERMS OF THE CONTRACT, AND SHALL BE CO-ORDINATED BY THE CONTRACTOR.
- AT COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL ARRANGE FOR AN INDEPENDENT LICENSED SURVEYOR TO CARRY OUT A "WORKS AS CONSTRUCTED" SURVEY IN ACCORDANCE WITH THE CURRENT COUNCIL STANDARDS AND SUBMIT THE DETAILS SHOWN ON A PLAN TO THE SUPERINTENDENT.
- ALL VERGES ARE TO BE FULLY TURFED WITH COUCH REFER TO LANDSCAPE ARCHITECTS PLANS FOR DETAILS.

EROSION AND SEDIMENT CONTROL NOTES

- EROSION & SEDIMENT CONTROL (ESC) NOTES ARE TO BE READ IN CONJUNCTION WITH THE GENERAL AND COORDINATION NOTES.
- ALL ESC MEASURES SHALL BE IN ACCORDANCE CURRENT COUNCIL STANDARDS, DRAWINGS AND SPECIFICATIONS U.N.O.
- CONSTRUCTION OF ALL SEDIMENT CONTROL MANAGEMENT DEVICES SHALL BE TO THE SATISFACTION OF THE SUPERINTENDENT. THE CONTRACTOR IS TO FOLLOW THE CONSTRUCTION PHASE AS OUTLINED:
 - CONSTRUCTION OF EROSION AND SEDIMENT DEVICES;
 - STRIPPING TOPSOIL;
 - BULK EARTHWORKS;
 - SERVICES, BUILDING, PAVEMENT AND ROAD CONSTRUCTION;
 - LANDSCAPED AREAS TO BE TOPSOILED, TURFED, MULCHED OR PLANTED.
- THE CONTRACTOR IS TO PROVIDE A CONSTRUCTION TRAFFIC SHAKEDOWN DEVICE AT ALL RELEVANT POINTS OF EXIT FROM THE SITE. THE CONTRACTOR SHALL CLEAN OUT AND MAINTAIN THE SHAKEDOWN DEVICE REGULARLY TO ENSURE EFFICIENT OPERATION.
- THE CONTRACTOR SHALL PROVIDE SILT FENCES IMMEDIATELY DOWNSTREAM OF ANY SOIL STOCKPILES.
- BOTH TEMPORARY AND PERMANENT ESC MEASURES SHALL BE MAINTAINED AT A SUITABLE LEVEL/CONDITION THROUGHOUT CONSTRUCTION TO THE SATISFACTION OF THE SUPERINTENDENT.
- ALL TEMPORARY ESC MEASURES SHALL BE MAINTAINED AND FULLY OPERATIONAL DURING THE CONSTRUCTION AND MAINTENANCE PERIOD, AND ARE TO BE REMOVED AFTER THE SATISFACTORY COMPLETION OF AN 'OFF MAINTENANCE' INSPECTION BY THE SUPERINTENDENT.
- ALL ESC MEASURES ARE TO BE INSPECTED AT LEAST DAILY, PRIOR TO EXPECTED RAINFALL AND AFTER RAINFALL. ANY DAMAGE OR EXCESS EROSION/SEDIMENT IS TO BE REPAIRED/MANAGED AS REQUIRED TO MAINTAIN CONTROL DEVICES.
- ALL ESC MEASURES MUST SUIT THE PREVAILING CLIMATE/WEATHER CONDITIONS AT THE TIME OF CONSTRUCTION.
- THE CONTRACTOR IS TO ENSURE THE SUPPRESSION OF DUST AT ALL TIMES DURING THE CONSTRUCTION AND MAINTENANCE PERIOD OF THE DEVELOPMENT. ENVIRONMENTAL HARM AND NUISANCE FROM DUST IS TO BE PREVENTED. ACCEPTABLE METHODS INCLUDE:
 - WATERING;
 - PROMOTING VEGETATION IN WIND EROSION PRONE AREAS;
 - CONSTRUCTING WIND BREAKS;
 - MULCHING.
- THE CONTRACTORS VEHICLES & PLANT SHALL NOT OPERATE OUTSIDE THE LIMITS OF THE IMMEDIATE CONSTRUCTION AREA AND ARE RESTRICTED FROM CROSSING OR DISTURBING AREAS NOT SUBJECT TO CONSTRUCTION.
- ANY WATER TRAPPED WITHIN THE TEMPORARY SEDIMENT BASIN IS TO BE REGULARLY TESTED DURING THE COURSE OF CONSTRUCTION. REFER WATER QUALITY MONITORING TABLE FOR DETAILS.
- ALL DISTURBED GROUND IS TO BE GRASS SEEDING TO PREVENT EROSION IF THE DISTURBED GROUND IS TO BE LEFT "OPEN" FOR A PERIOD OF GREATER THEN ONE (1) MONTH.
- REFER DRAWING AS TEL2021184.CIV.DA - 100 TO 101 FOR EROSION AND SEDIMENT CONTROL DETAILS.

DISCLAIMER

ALL INFRASTRUCTURE INFORMATION (MANS, SEWER, PIPES ETC.) IS DERIVED FROM DIAL BEFORE YOU DIG RECORDS. EVERY EFFORT WAS MADE TO ENSURE ACCURACY OF THESE RECORDS WHEN COMPILED.
NO WARRANTY IS GIVEN TO CURRENCY OF DEPTHS AND LEVELS DUE TO THE POSSIBILITY OF SUBSEQUENT ALTERATION OF LEVELS THROUGH FILLING OR EXCAVATION. USERS OF THE INFORMATION IN THIS DRAWING/DESIGN SHOULD TAKE ALL REASONABLE STEPS TO VERIFY THE RELEVANT INFORMATION BEFORE COMMENCING EXCAVATING OR CONSTRUCTION WORK.
TELFORD CIVIL DESIGN AND CONSTRUCTION EXCELLENCE TAKE NO RESPONSIBILITY FOR APPARENT ERRORS OR INACCURACIES IN THE INFORMATION PROVIDED.

IT IS THE CONTRACTOR RESPONSIBILITY TO CONTACT "DIAL BEFORE YOU DIG" FOR THE LOCATION OF EXISTING PUBLIC UTILITIES, PRIOR TO EXCAVATION.

DANGER :

LOCATION OF ALL EXISTING UNDERGROUND SERVICES SHOWN ARE APPROXIMATE AS TAKEN OFF DBYD INFO. EXTREME CAUTION TO BE EXERCISED WHEN WORKING IN THE VICINITY OF AND AROUND THESE SERVICES. PLEASE CALL THE RELEVANT AUTHORITIES TWO DAYS PRIOR TO CONSTRUCTION FOR A MORE EXACT LOCATION OF THE EXISTING SERVICES.

EARTHWORKS NOTES

- EARTHWORKS NOTES ARE TO BE READ IN CONJUNCTION WITH THE GENERAL AND COORDINATION NOTES.
- EARTHWORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH PROCEDURES SET DOWN IN AS3798 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'.
- BULK EARTHWORKS INCLUDING CLEARING, FILLING AND TESTING, ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT COUNCIL STANDARDS, DRAWINGS AND SPECIFICATIONS. COUNCIL STANDARDS SUPERSEDE ANY NOTES OR SPECIFICATIONS WRITTEN ON THE DESIGN DRAWINGS.
- BULK EARTHWORKS LEVELS SHALL BE DETERMINED RELATIVE TO THE FINISHED SURFACE LEVELS. REFER ARCHITECTURAL DRAWINGS FOR SLAB LEVELS, TO THE STRUCTURAL ENGINEERS DRAWINGS FOR BUILDING AND PATH SLAB THICKNESS AND TO THE CIVIL ENGINEERS DRAWINGS FOR EXTERNAL FINISHED SURFACE LEVELS AND EXTERNAL PAVEMENT THICKNESSES
- TOPSOIL SHALL BE STOCKPILED AS DIRECTED BY THE SUPERINTENDENT ON SITE.
- PRIOR TO PLACEMENT OF ANY FILLING ALL TOPSOIL AND ORGANIC MATERIAL IS TO BE REMOVED AND THE SUBGRADE SHALL BE UNIFORMLY COMPACTED TO THE MINIMUM DRY DENSITY RATIOS SHOWN IN NOTE 10. ANY SOFT SPOTS REVEALED BY COMPACTION SHALL BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND BACKFILLED WITH COMPACTED SELECT FILL.
- MOISTURE CONTENT OF COMPACTED FILL SHOULD BE MAINTAINED WITHIN 2% OF OPTIMUM MOISTURE CONTENT.
- FILL SHALL BE COMPACTED IN MAXIMUM 200mm THICK LAYERS (LOOSE THICKNESS) TO THE FOLLOWING MINIMUM DRY DENSITY RATIOS (STANDARD COMPACTION A.S.1289.5-1):
 - UPPER 0.3m OF PAVEMENT SUBGRADE = 100%;
 - UNDER BUILDINGS = 98%;
 - GENERAL FILL = 95%.
- ALL FILL MATERIAL PLACED ON THE SITE SHALL COMPRISE ONLY NATURAL EARTH AND ROCK, AND IS TO BE FREE OF CONTAMINANTS (AS DEFINED BY SECTION 11 OF THE ENVIRONMENTAL PROTECTION ACT 1994). NOXIOUS, HAZARDOUS, DELETERIOUS AND ORGANIC MATERIALS. NO DEMOLITION MATERIAL IS TO BE USED. SUITABLE FILL MATERIAL IS DEEMED TO COMPLY WITH THE REQUIREMENTS OF CLAUSE 4.3 OF AS3798, 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'.
- IMPORTED FILL SHALL COMPLY WITH THE FOLLOWING:
 - SOAKED CBR = MINIMUM OF 15%;
 - LIQUID LIMIT = 30% MAX;
 - PLASTICITY INDEX = 15% MAX;
 - MAXIMUM AGGREGATE SIZE = 75mm;
 - PASSING 0.075mm SIEVE = 30% MAX;
 - SHRINK/SWELL INDEX = 1.0% MAX.
- THE CONTRACTOR IS TO ENGAGE, AT THEIR EXPENSE, AN APPROVED NATA REGISTERED LABORATORY TO CARRY OUT SITE CONTROL TO 'LEVEL 1' STANDARD AS SET OUT IN APPENDIX B OF AS3798-2007 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS' AND PROVIDE A 'LEVEL 1' REPORT ON COMPLETION OF EARTHWORKS.

DRAINAGE NOTES

- DRAINAGE NOTES ARE TO BE READ IN CONJUNCTION WITH THE GENERAL AND COORDINATION NOTES.
- CONTRACTOR IS TO CHECK THAT THE PROPOSED PIPE WORKS DO NOT CLASH WITH EXISTING SERVICES PRIOR TO ANY TRENCH EXCAVATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CLASHES ARE FOUND FOR ADVICE ON ANY DESIGN REQUIREMENTS.
- STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE ASSESSMENT OF CONSTRUCTION LOADS AND PROVISION OF ANY TEMPORARY BRACING, PROPPING, ETC. REQUIRED DURING CONSTRUCTION. STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.
- ALL TRENCH EXCAVATIONS AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE WORKPLACE HEALTH AND SAFETY 1989 AS AMENDED AND THE MINE REGULATIONS ACT.
- ALL TRENCHES IN TRAFFICABLE AND NON TRAFFICABLE ZONES SHALL BE BACKFILLED TO DENSITY RATIOS, FREQUENCIES AND LAYER INTERVALS IN ACCORDANCE WITH THE CURRENT COUNCIL STANDARDS. ALL TEST RESULTS SHALL FORWARDED TO THE SUPERINTENDENT AS THEY BECOME AVAILABLE.
- ALL PRECAST CONCRETE PIPES ARE TO BE MANUFACTURED IN ACCORDANCE WITH AS 4058. STORMWATER PIPES SHALL BE TO FOLLOWING CLASSES U.N.O.
 - REINFORCED CONCRETE PIPES (RCP) = CLASS 2;
 - FIBRE REINFORCED PIPES (FRC) = CLASS 2;
 - uPVC = CLASS 'SEH'.
- ALL RCP PIPES SHALL HAVE THE FOLLOWING JOINTS U.N.O.
 - RCP <=600 DIA = RUBBER RING JOINTED (RRJ).
 - RCP >600 DIA = FLUSH JOINTED (FJ);
- ROOFWATER PIPES SHALL BE uPVC PIPES CLASS 'SH' U.N.O.
- REFER TO STORMWATER LONGITUDINAL SECTIONS FOR ALL STRUCTURE TYPES, SIZES, LEVELS AND GRATE TYPES. GRATES SHALL BE TRAFFICABLE CLASS 'D' U.N.O.
- MANHOLE AND FIELD INLET ACCESS SHALL BE INSTALLED AS DESCRIBED BELOW IN ACCORDANCE WITH AS1657:
 - GULLY/FIELD INLETS >1.35m DEPTH: STEP IRONS;
 - MANHOLES 0.850m-3.0m DEPTH: STEP IRONS;
 - MANHOLES >3.0m DEPTH: FIXED ACCESS LADDER.
- TEST CERTIFICATES AND MATERIAL CERTIFICATION DOCUMENTATION IS REQUIRED FOR ALL PIPES, FITTINGS, BOX CULVERTS AND OTHER PRECAST CONCRETE PRODUCTS.
- ALL STORMWATER SETOUT IS TO CENTRE OF STRUCTURE U.N.O.



Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

Certification By Dr. Michel Chayaas in affiliation with Joe Bacha (formerly Australian Consulting Engineers)

[Signature]

Client
MR. ROY AMERY

Council
MID-WESTERN REGIONAL COUNCIL

Surveyor

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Project

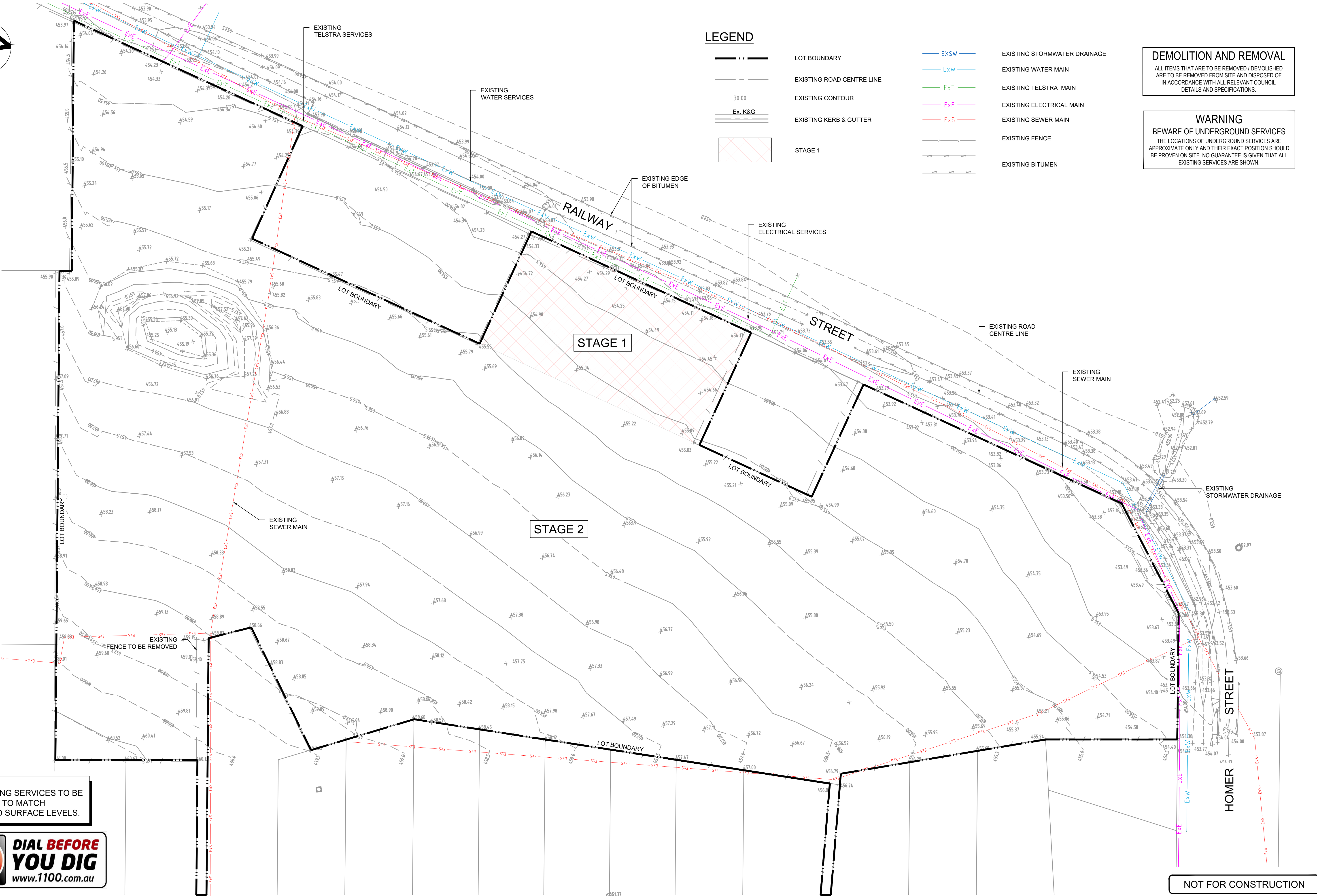
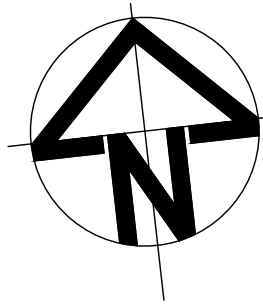
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

Drawing Title

GENERAL NOTES, LOCALITY PLAN AND DRAWING SCHEDULE

Scale N.T.S. | Project No. 2021184 | Dwg. No. 000 | Issue A

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LEGEND

- LOT BOUNDARY
- EXISTING ROAD CENTRE LINE
- EXISTING CONTOUR
- EXISTING KERB & GUTTER
- STAGE 1
- EXSW EXISTING STORMWATER DRAINAGE
- ExW EXISTING WATER MAIN
- ExT EXISTING TELSTRA MAIN
- ExE EXISTING ELECTRICAL MAIN
- ExS EXISTING SEWER MAIN
- EXISTING FENCE
- EXISTING BITUMEN

DEMOLITION AND REMOVAL
 ALL ITEMS THAT ARE TO BE REMOVED / DEMOLISHED ARE TO BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH ALL RELEVANT COUNCIL DETAILS AND SPECIFICATIONS.

WARNING
 BEWARE OF UNDERGROUND SERVICES
 THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

NOTE:
 ALL EXISTING SERVICES TO BE ADJUSTED TO MATCH PROPOSED SURFACE LEVELS.



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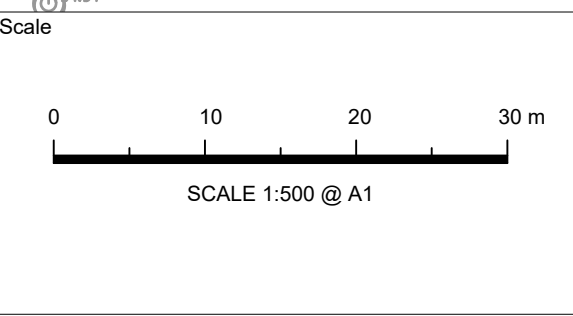
A ISSUE FOR DEVELOPMENT APPLICATION		22/10/2021	P.B.T.	J.A.B.
Issue	Description	Date	Design	Checked
1	From full size	10m		20m

Certification By Dr. Michel Chaaya
 in affiliation with Joe Bacha (formerly Australian Consulting Engineers)

Client
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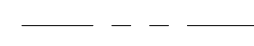

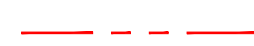
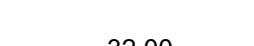


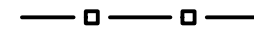
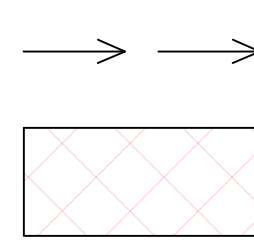


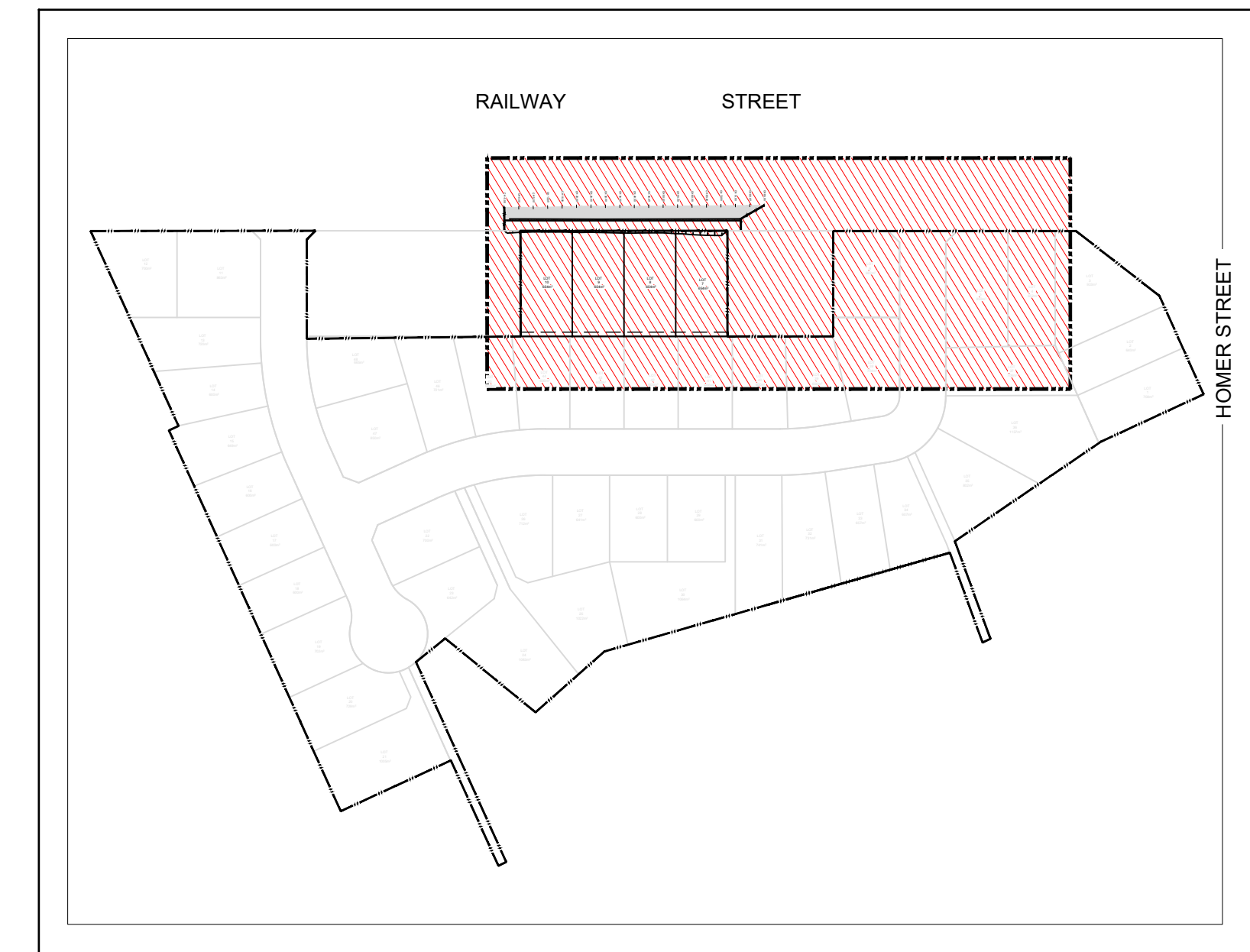
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Project
**1 RAILWAY STREET, GULGONG
 PROPOSED RESIDENTIAL SUBDIVISION
 CIVIL ENGINEERING PLANS
 DEVELOPMENT APPLICATION**

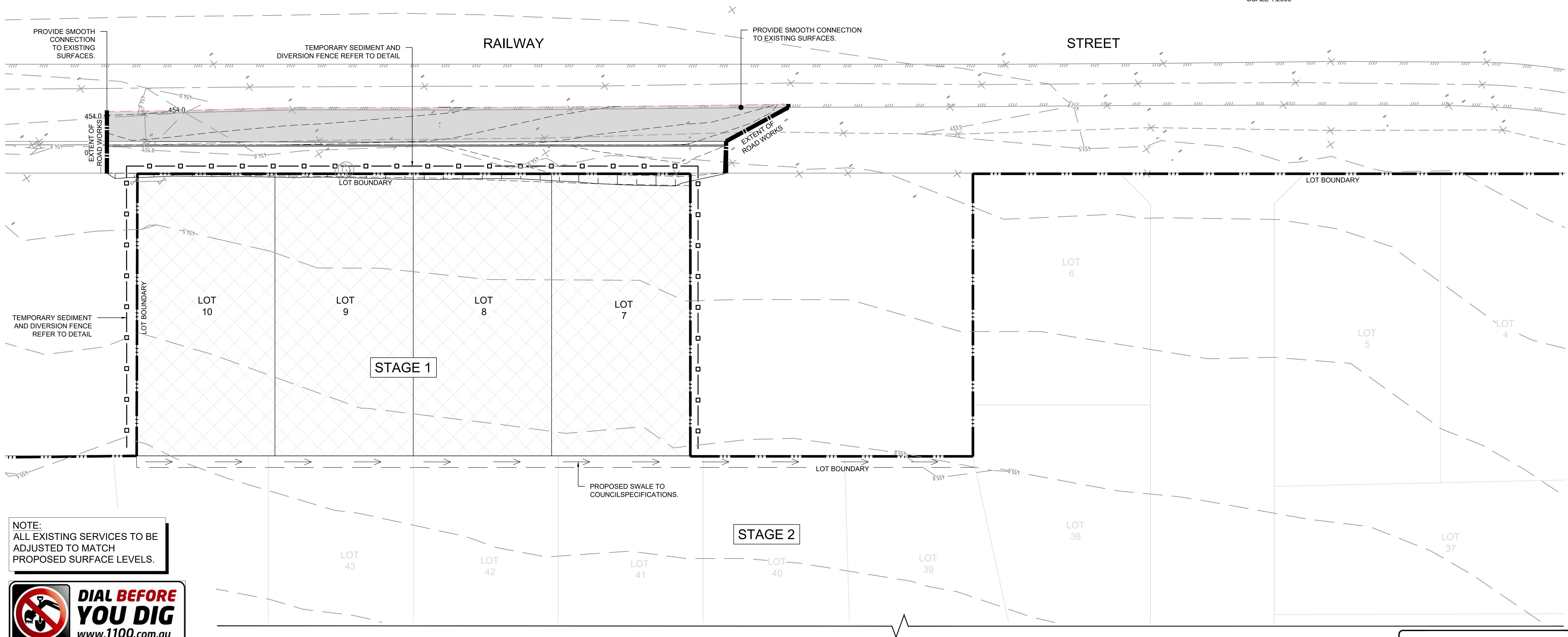
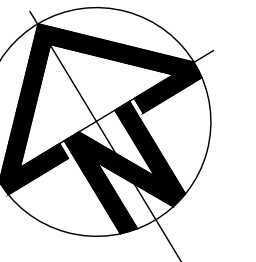
Drawing Title
**EXISTING SERVICES & DEMOLITION PLAN
 STAGE 1**
 Scale 1:500 A1 Project No. 2021184 Dwg. No. 001 Issue A

LEGEND

-  LOT BOUNDARY
-  PROPOSED INVERT OF KERB
-  PROPOSED LINE OF SAWCUT
-  PROPOSED CONTROL LINE
-  DESIGN CONTOURS
-  EXISTING CONTOUR
-  TEMPORARY SEDIMENT AND DIVERSION FENCE REFER TO DETAIL
-  PROPOSED SWALE
-  STAGE 1



KEY PLAN
SCALE 1:2000




NOTE:
ALL EXISTING SERVICES TO BE ADJUSTED TO MATCH PROPOSED SURFACE LEVELS.



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Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

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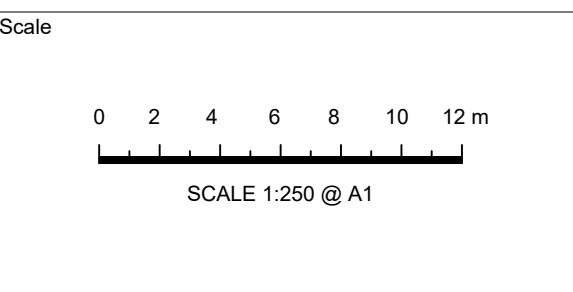
Client
MR. ROY AMERY

Council
MID-WESTERN REGIONAL COUNCIL

Surveyor



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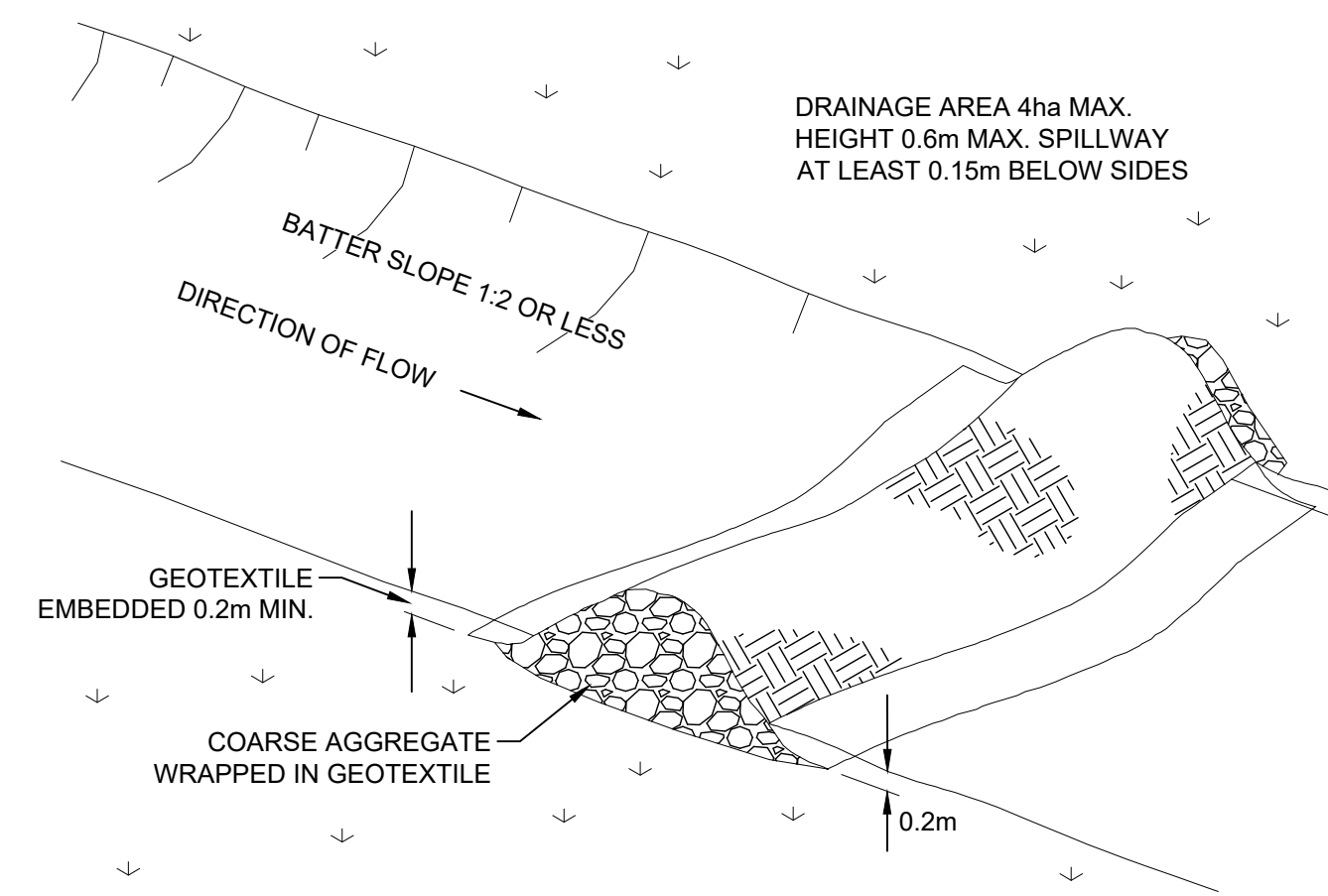
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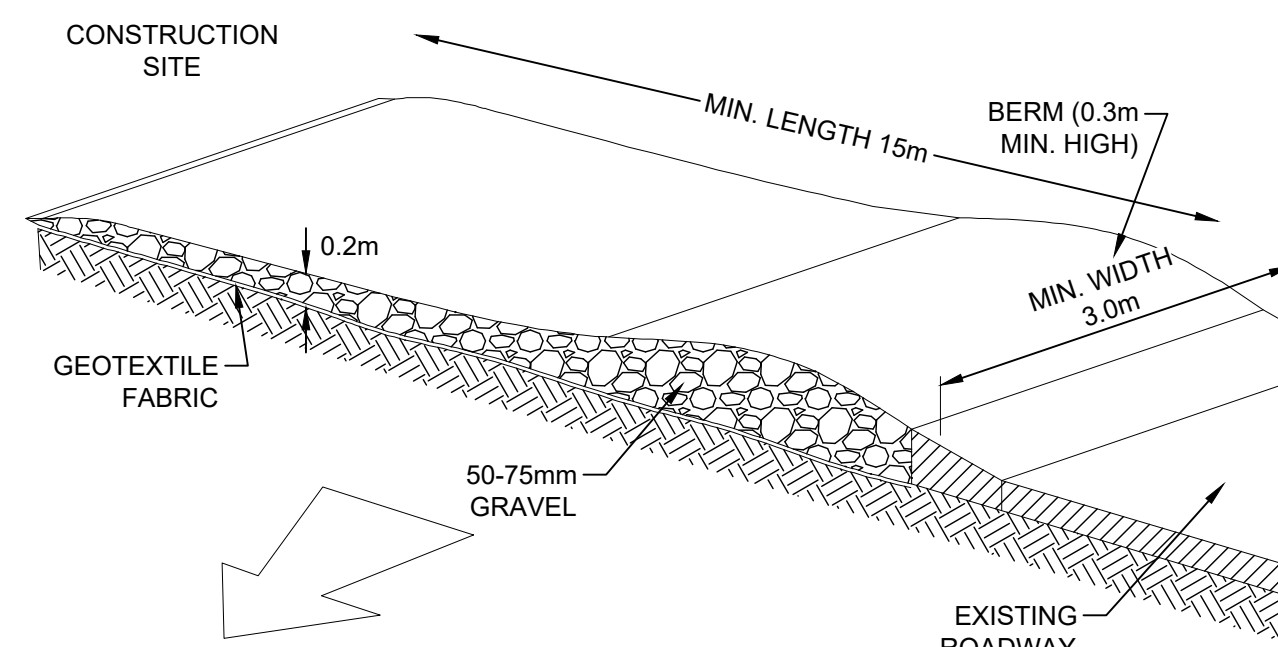
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**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

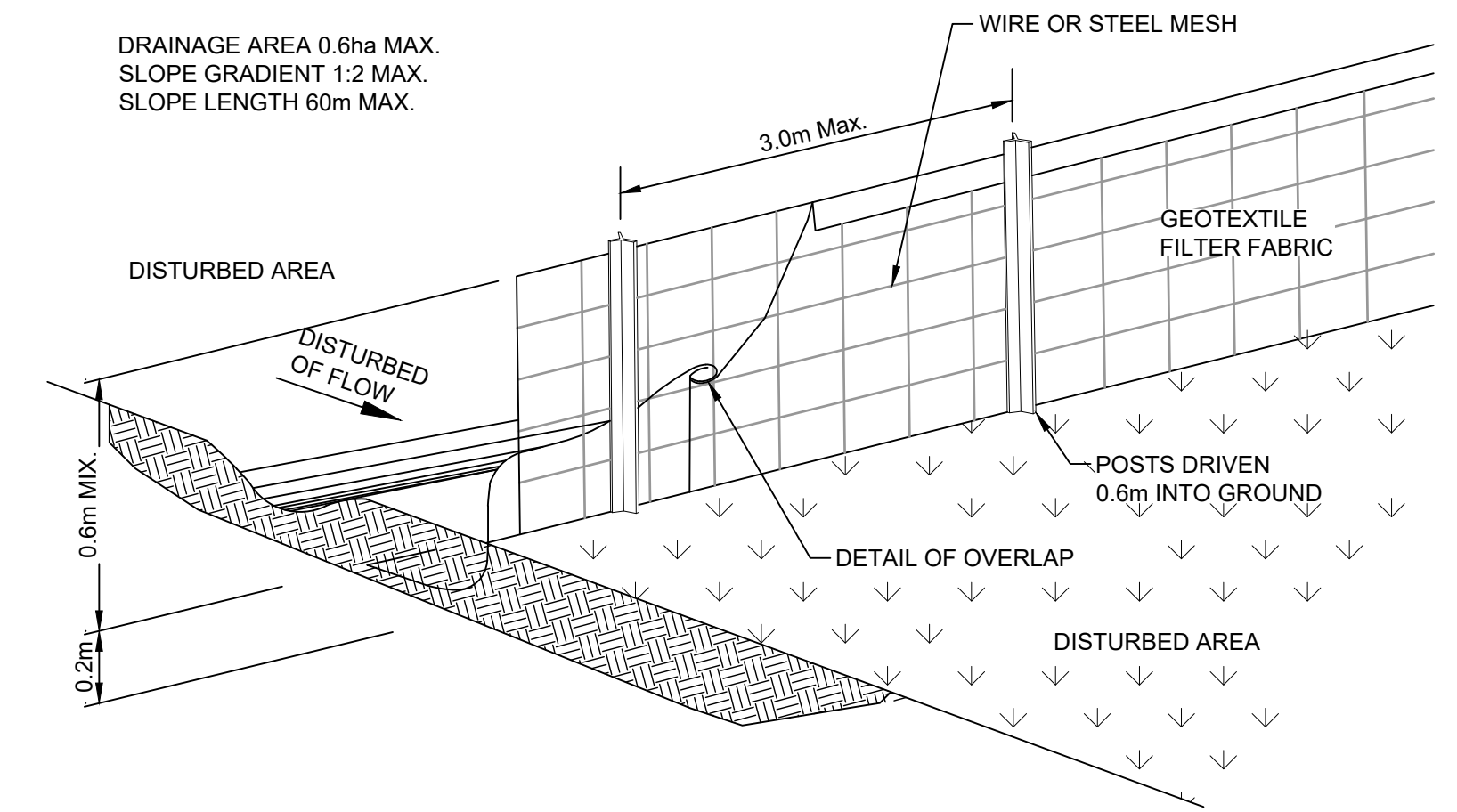
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Scale	A1 AS SHOWN	Project No. 2021184	Dwg. No. 100
Issue	A		



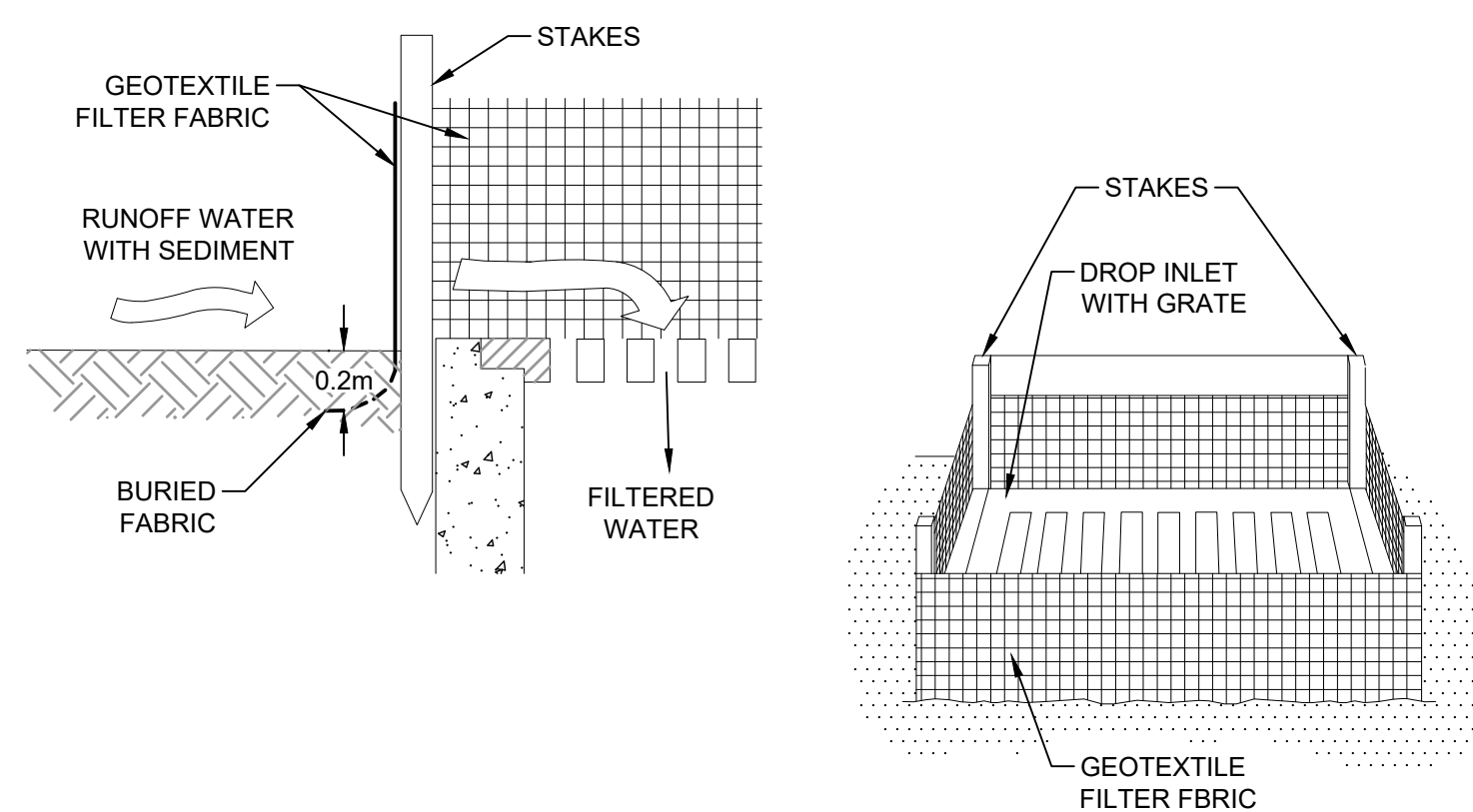
ROCK CHECK DAM
SCALE N.T.S



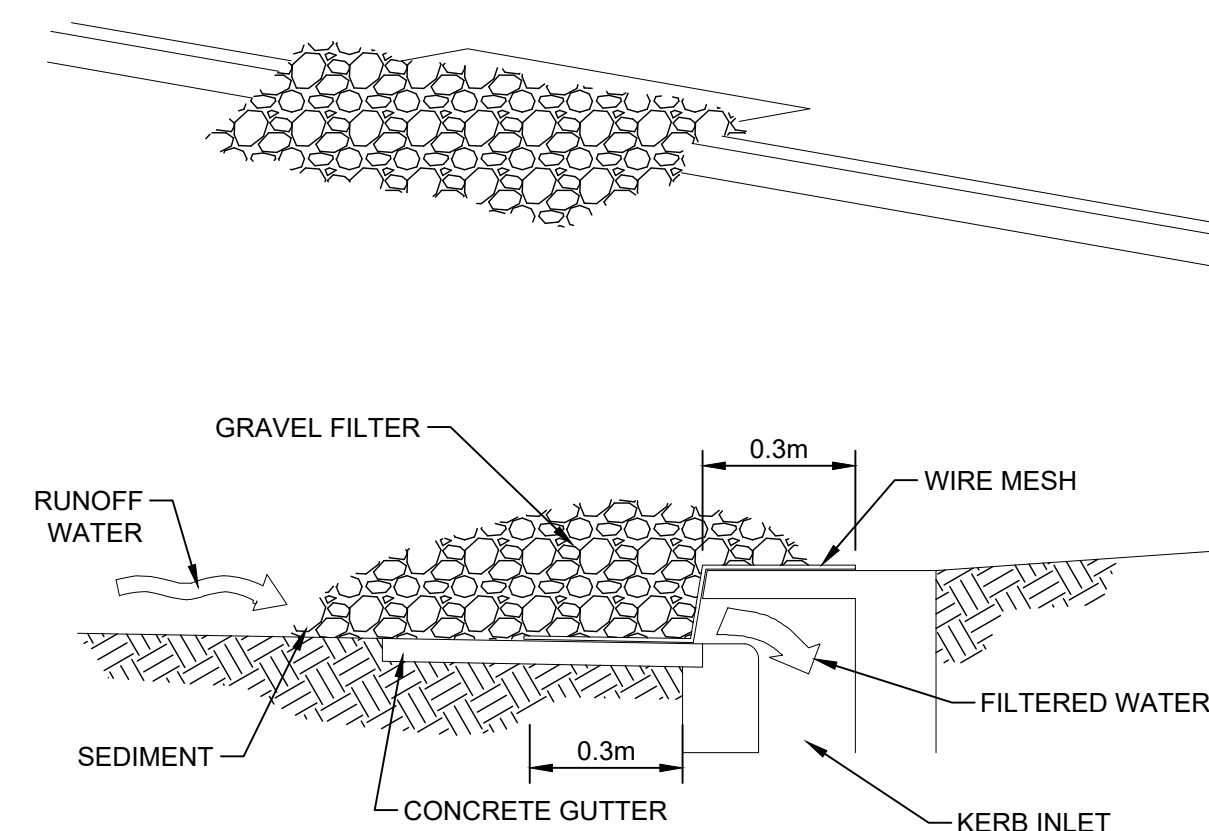
TEMPORARY CONSTRUCTION EXIT
SCALE N.T.S



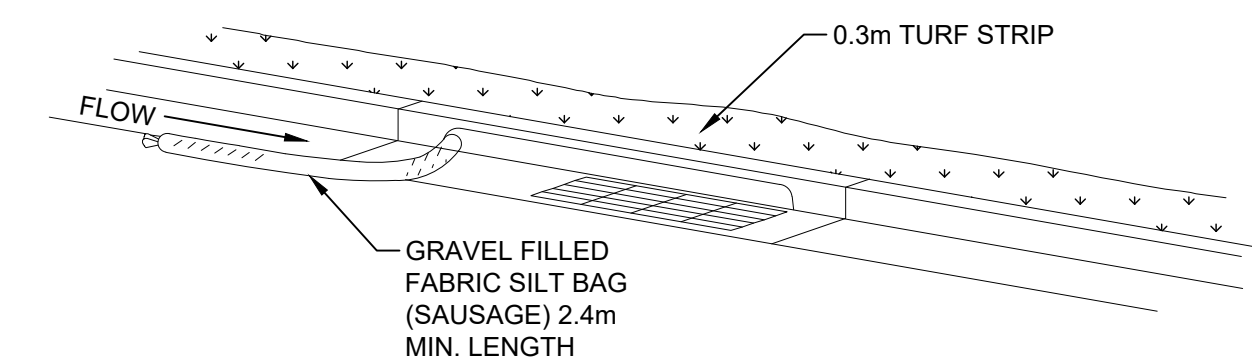
SEDIMENT FENCE
SCALE N.T.S



**GEOTEXTILE FILTER FABRIC
DROP INLET SEDIMENT TRAP**
SCALE N.T.S



GRAVEL KERB INLET SEDIMENT TRAP
SCALE N.T.S



KERB INLET SEDIMENT TRAP
SCALE N.T.S

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Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

Certification By Dr. Michel Chaaya
in affiliation with Joe Bacha (formerly
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Client
MR. ROY AMERY

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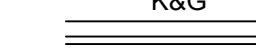


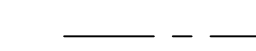
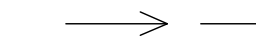

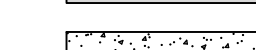
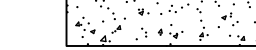







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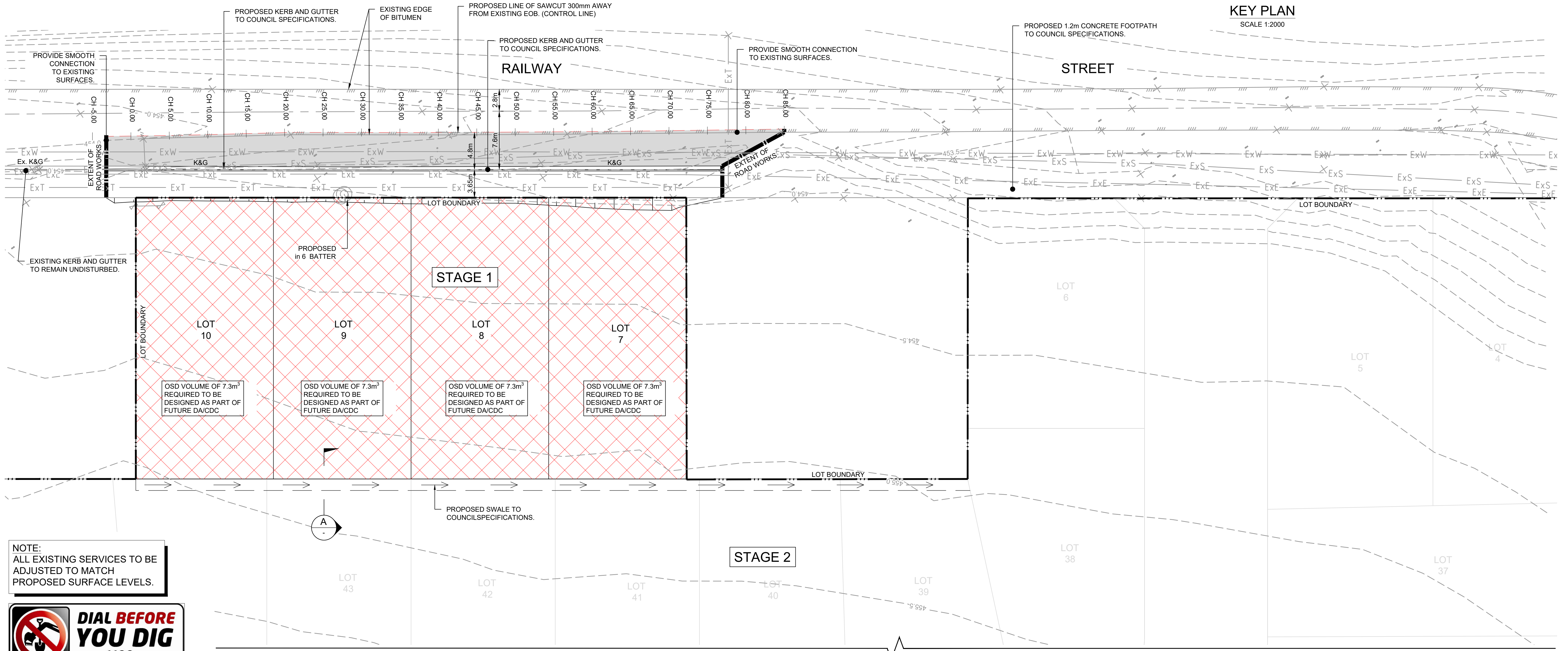
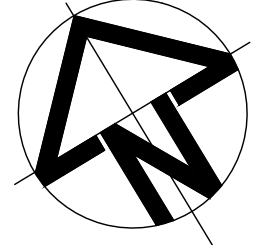
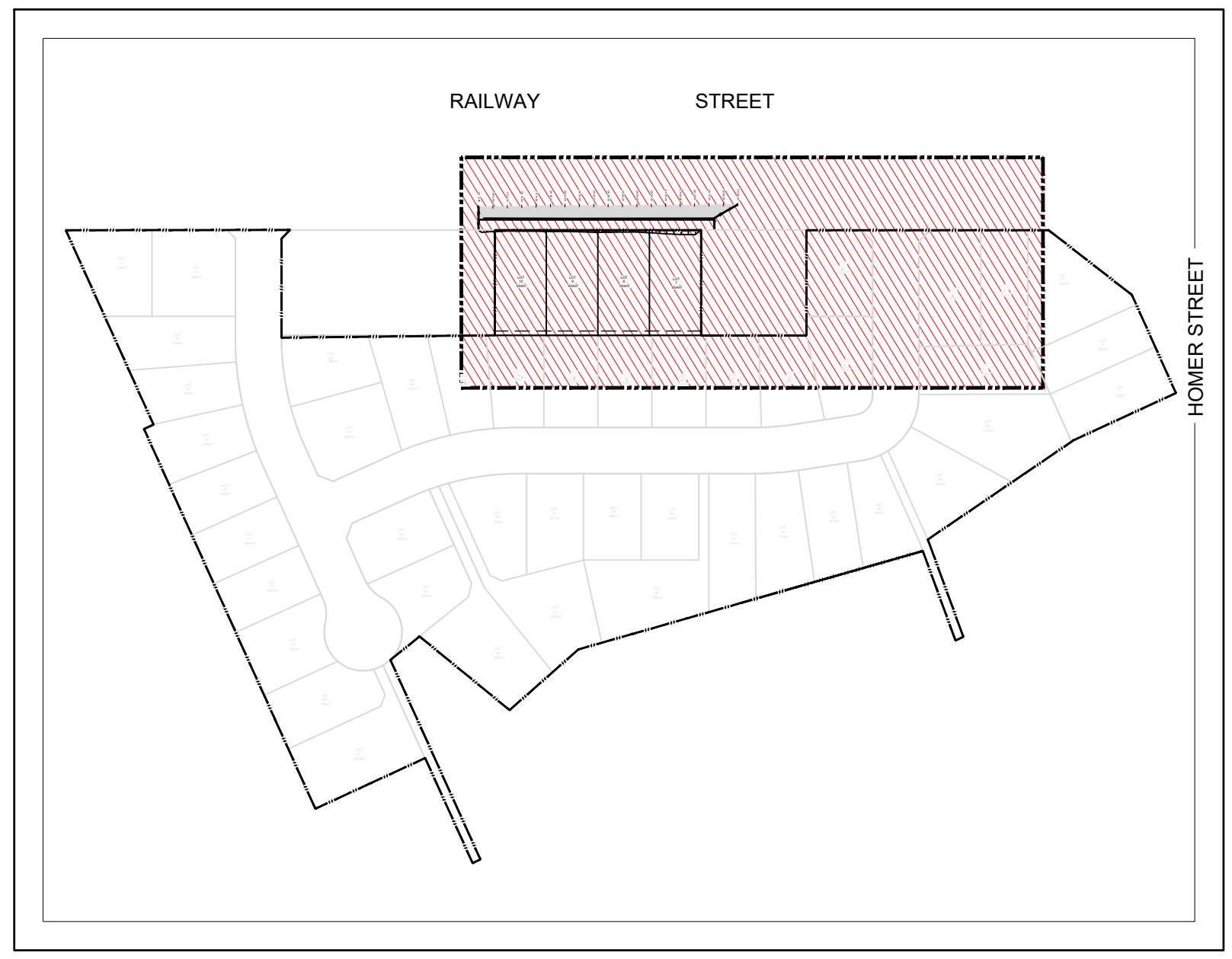
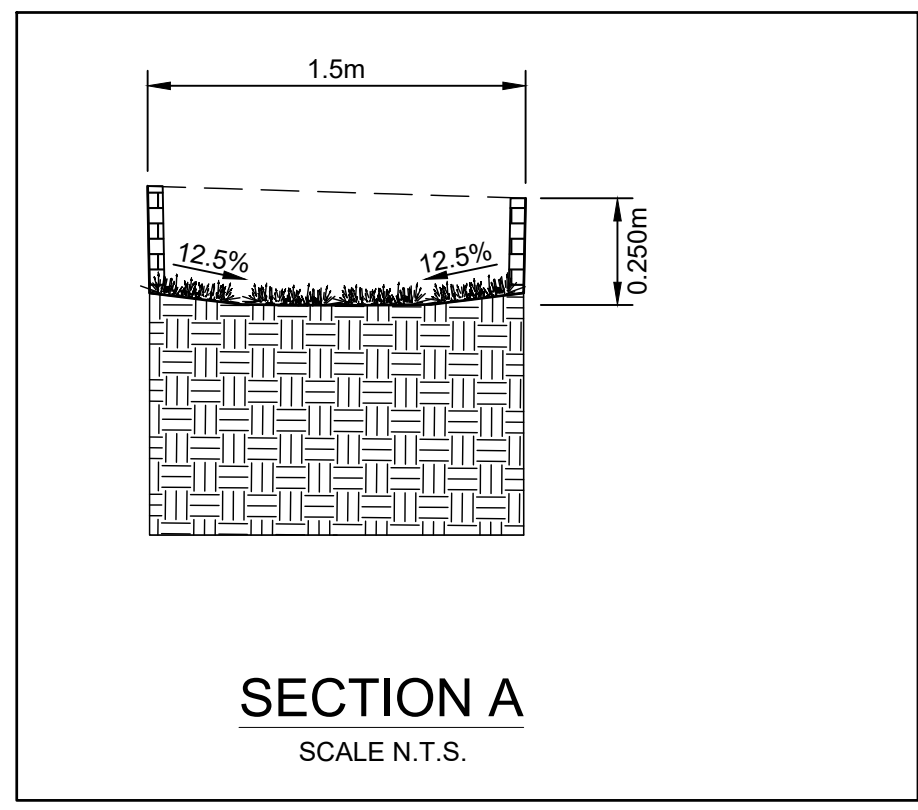
Project
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

Drawing Title
**EROSION AND SEDIMENT
CONTROL DETAILS**

Scale	A1	Project No.	Dwg. No.	Issue
N.T.S.		2021184	102	A

LEGEND

-  LOT BOUNDARY
-  K&G
-  PROPOSED LINE OF SAWCUT (CONTROL LINE)
-  FINISHED CONTOURS
-  PROPOSED ROAD CENTERLINE
-  PROPOSED SWALE
-  PROPOSED ROAD PAVEMENT
-  PROPOSED CONCRETE FOOTPATH
-  STAGE 1
-  EXISTING ROAD CENTRE LINE
-  Ex. K&G
-  EXISTING WATER MAIN
-  EXISTING TELSTRA MAIN
-  EXISTING ELECTRICAL MAIN
-  EXISTING SEWER MAIN
-  EXISTING EDGE OF BITUMEN



NOTE:
ALL EXISTING SERVICES TO BE ADJUSTED TO MATCH PROPOSED SURFACE LEVELS.



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A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.
Issue	Description	Date	Design	Checked

Certification By Dr. Michel Chaaya
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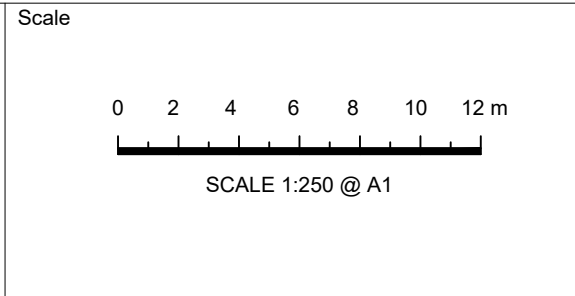


Client
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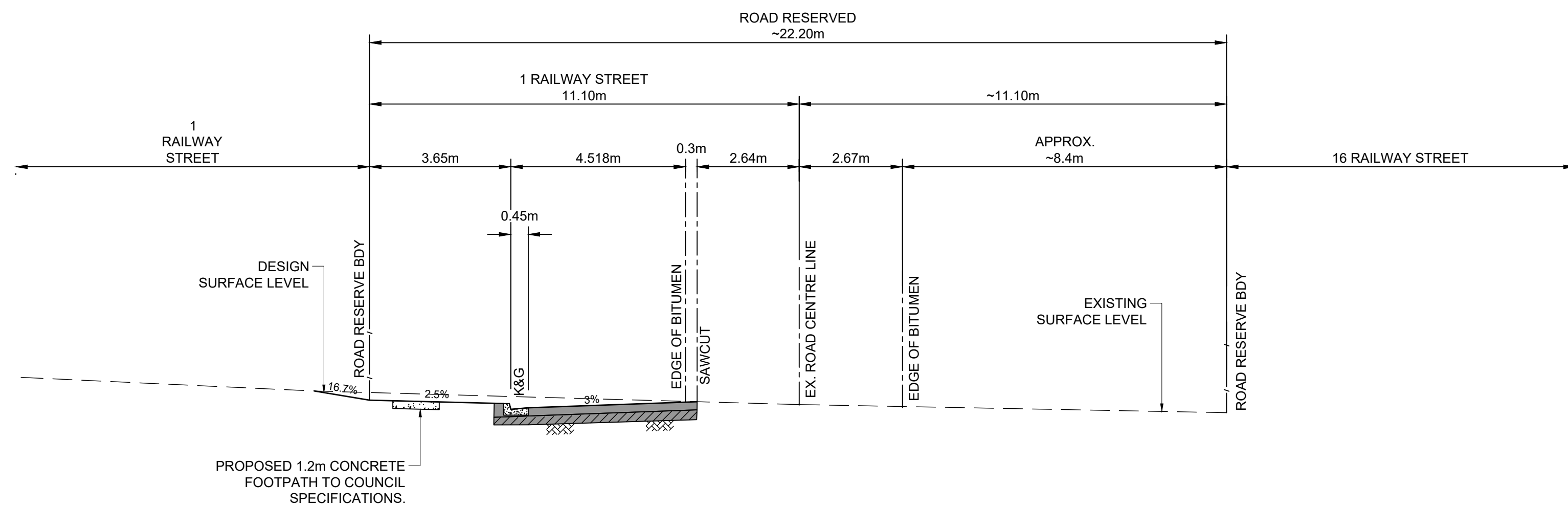
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Project
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

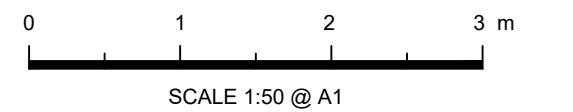
Drawing Title ROADWORKS AND DRAINAGE LAYOUT PLAN			
Scale AS SHOWN	Project No. 2021184	Dwg. No. 300	Issue A



CROSS SECTION (RAILWAY STREET)
SCALE 1:50

CHAINAGE	EXISTING ROAD LEVEL	PROPOSED ROAD LEVEL	VERTICAL GRADE (%)
-5	454.02	454.022	-0.2%
0	454.01	454.012	-0.19%
1.87	454.009	454.009	-0.27%
5	454	454.003	-0.19%
10	453.99	453.989	-0.1%
15	453.98	453.98	-0.16%
20	453.97	453.97	-0.26%
20.8	453.97	453.969	-0.35%
25	453.96	453.962	-0.64%
30	453.95	453.95	-0.38%
35	453.94	453.937	-0.5%
40	453.92	453.924	-0.32%
41.4	453.92	453.919	-0.54%
45	453.9	453.896	-0.59%
50	453.86	453.863	
55	453.83	453.831	
56.77	453.82	453.825	
60	453.81	453.809	
65	453.79	453.792	
70	453.78	453.776	
75	453.76	453.76	
80	453.74	453.744	
84.58	453.73	453.729	
85	453.73	453.727	

RAILWAY STREET - LONGITUDINAL SECTION (CONTROL LINE SAWCUT)
SCALE (H) 1:500
(V) 1:100



SCALE 1:50 @ A1
NOT FOR CONSTRUCTION

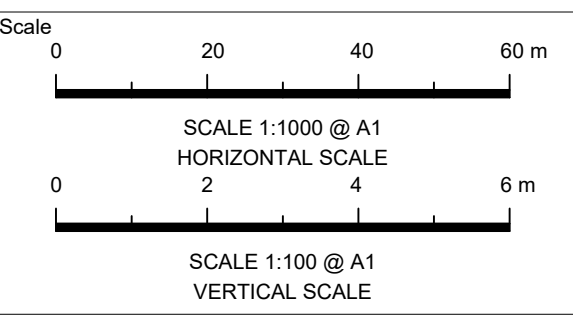
Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

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Surveyor

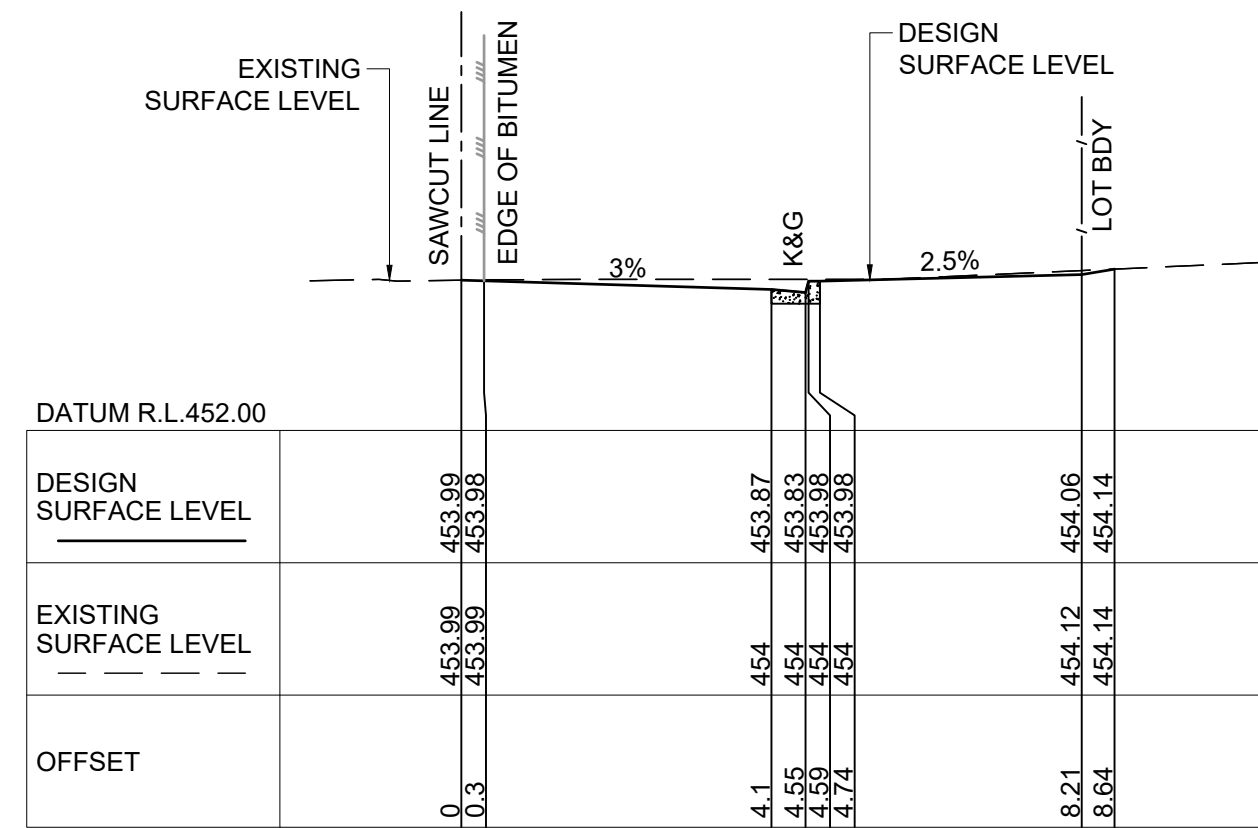
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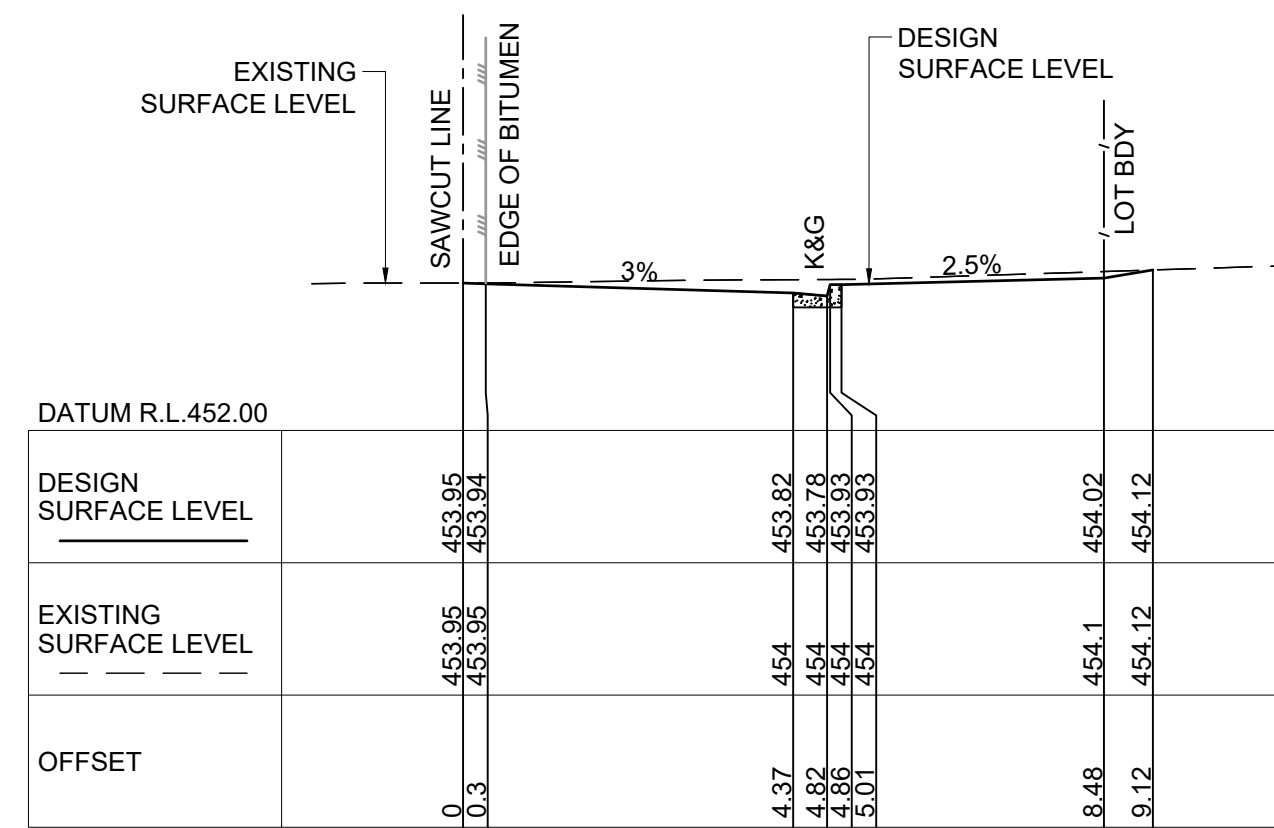
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Project
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

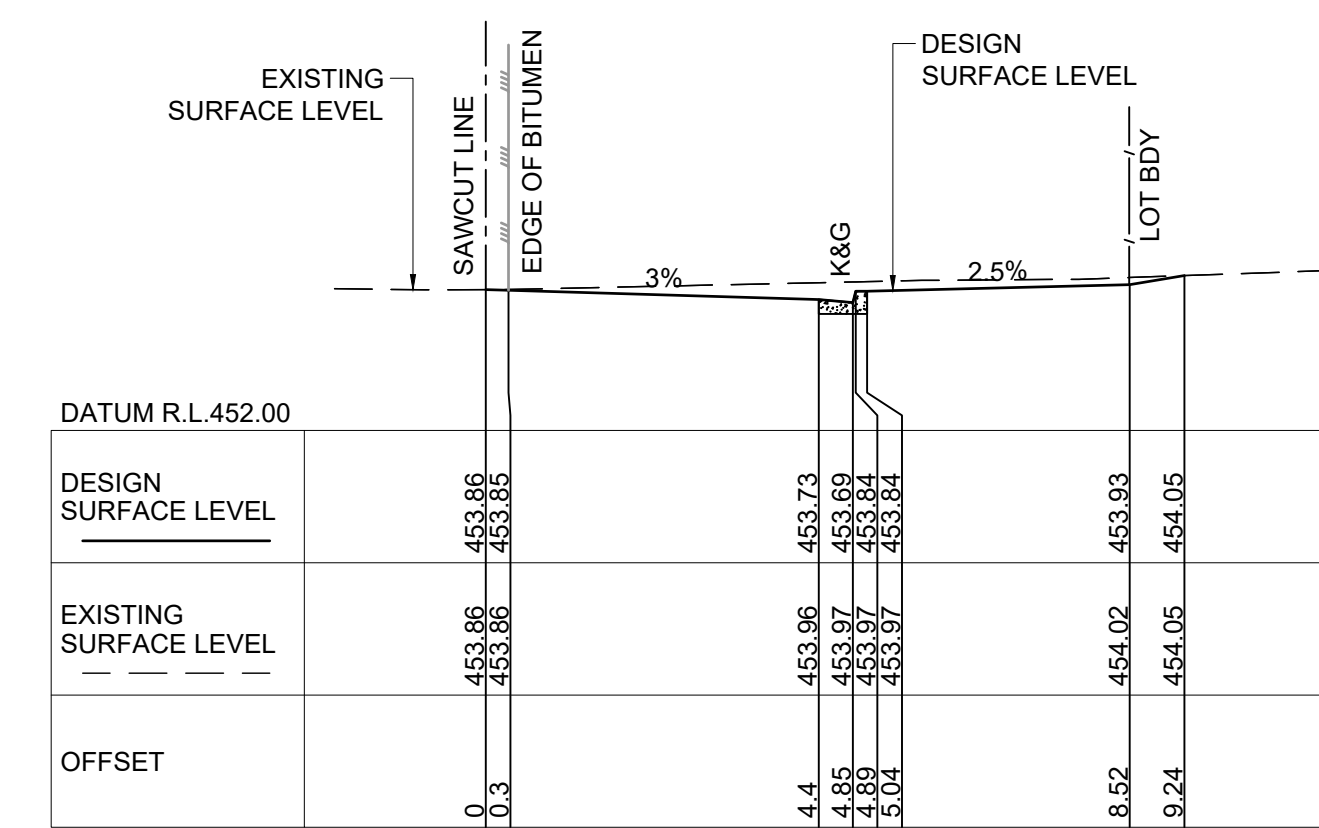
Drawing Title	RAILWAY STREET LONGITUDINAL SECTION AND TYPICAL CROSS SECTION		
Scale	A1 AS SHOWN	Project No. 2021184	Dwg. No. 302
Issue	A		



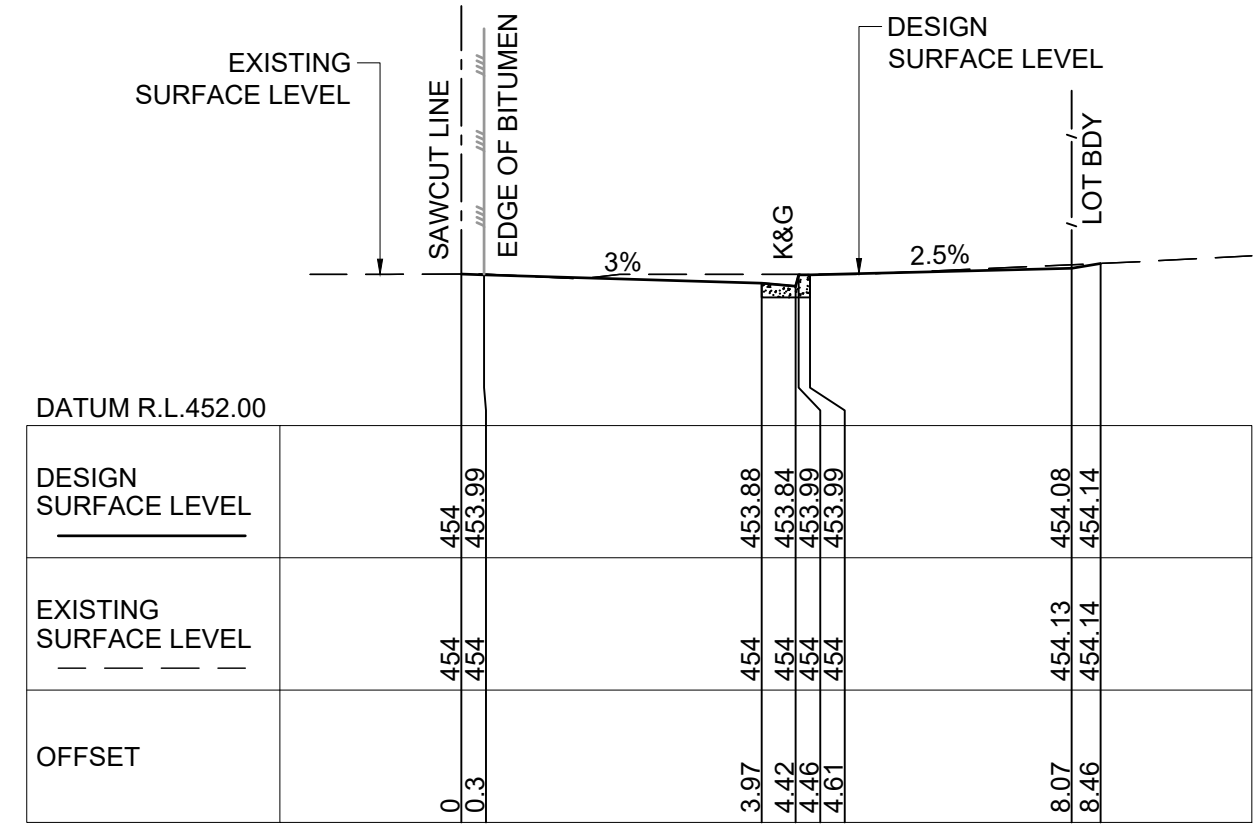
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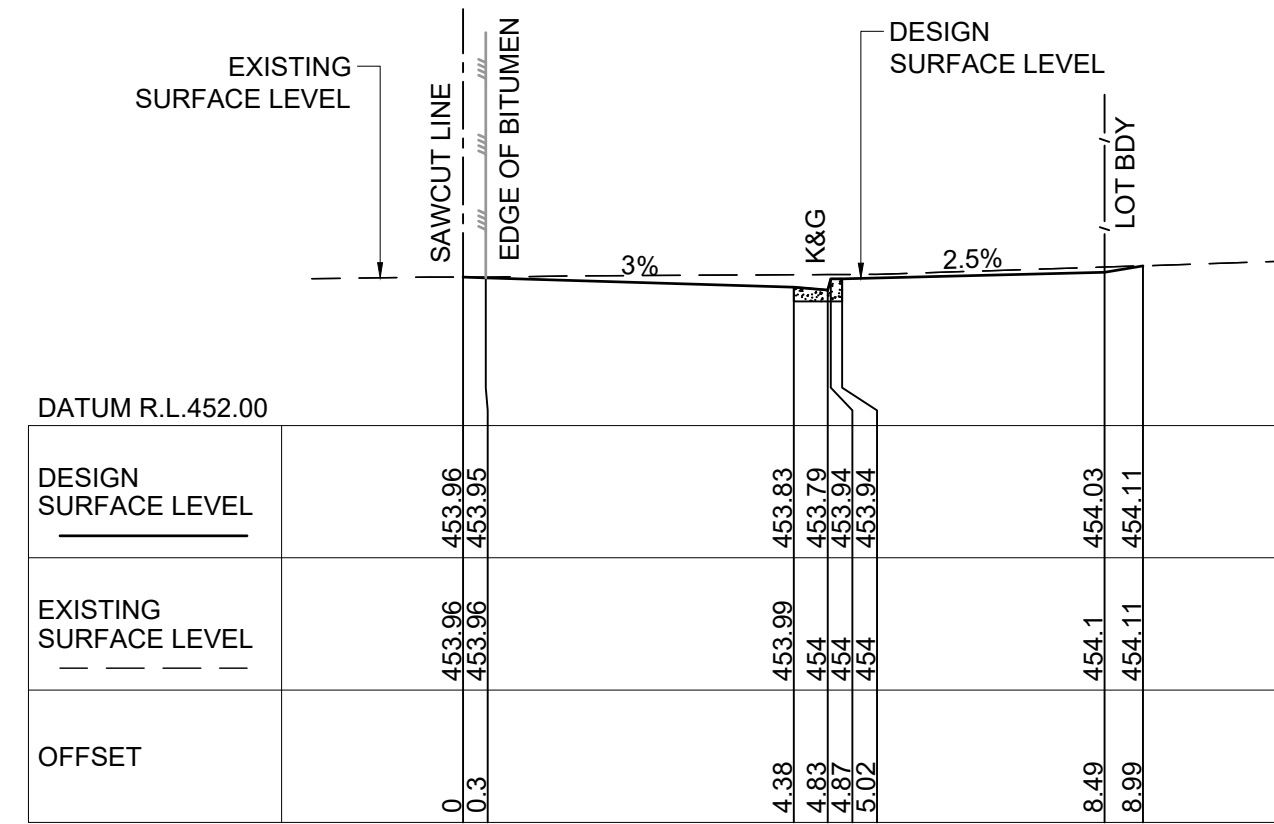
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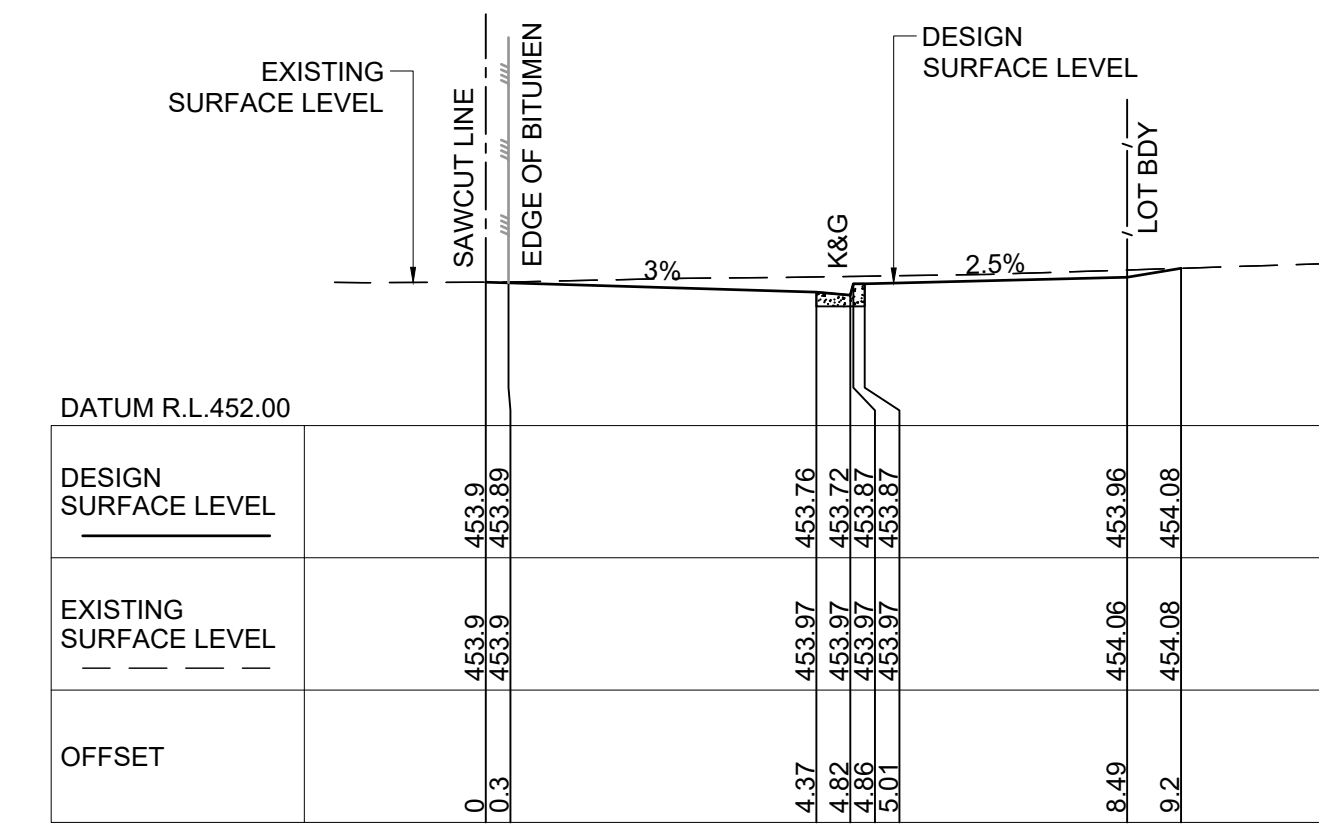
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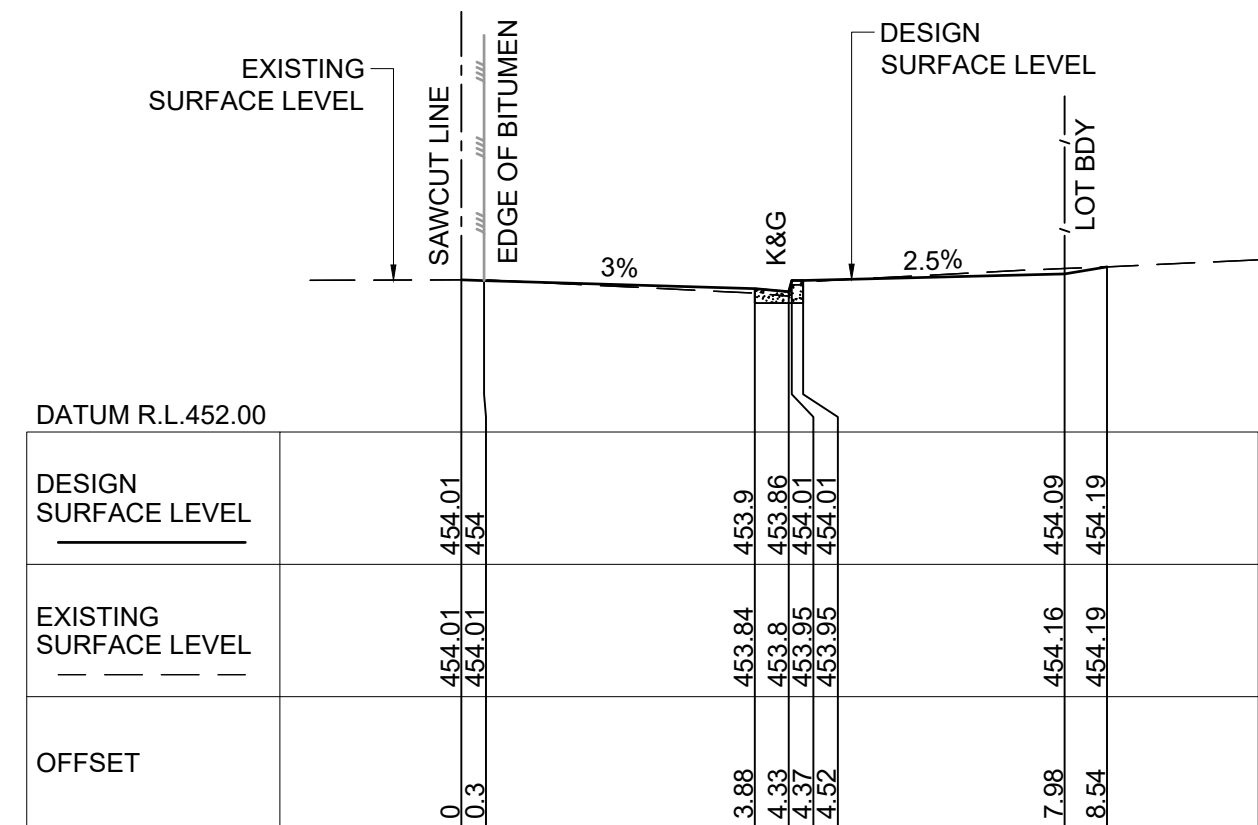
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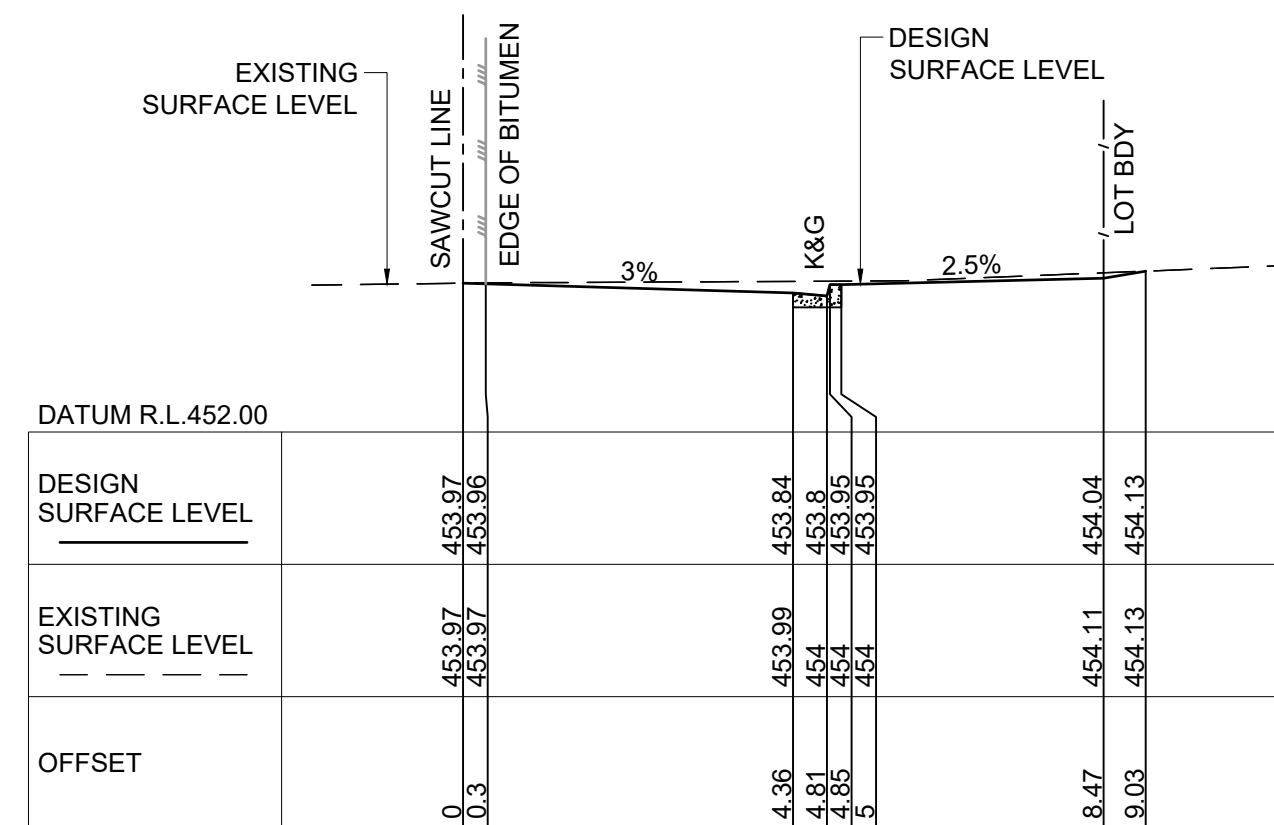
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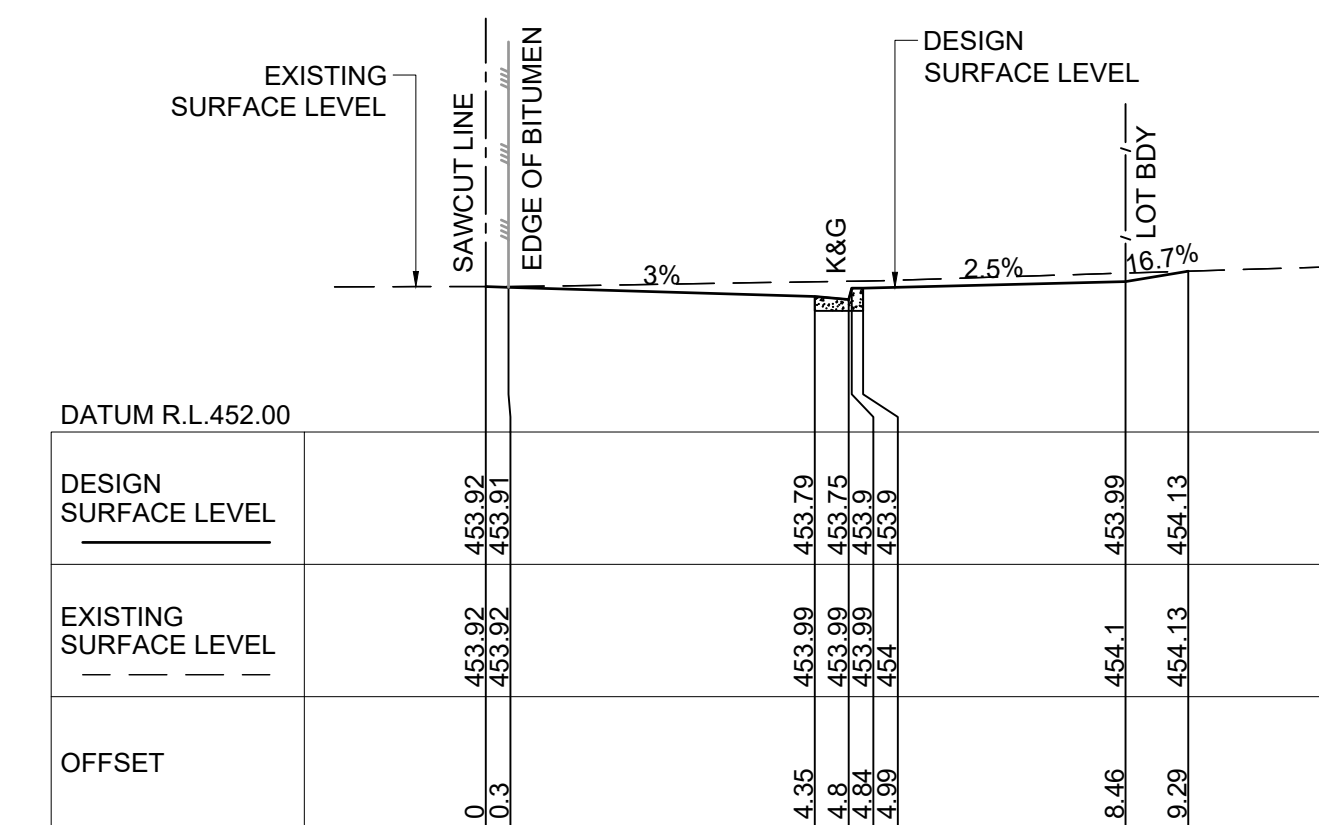
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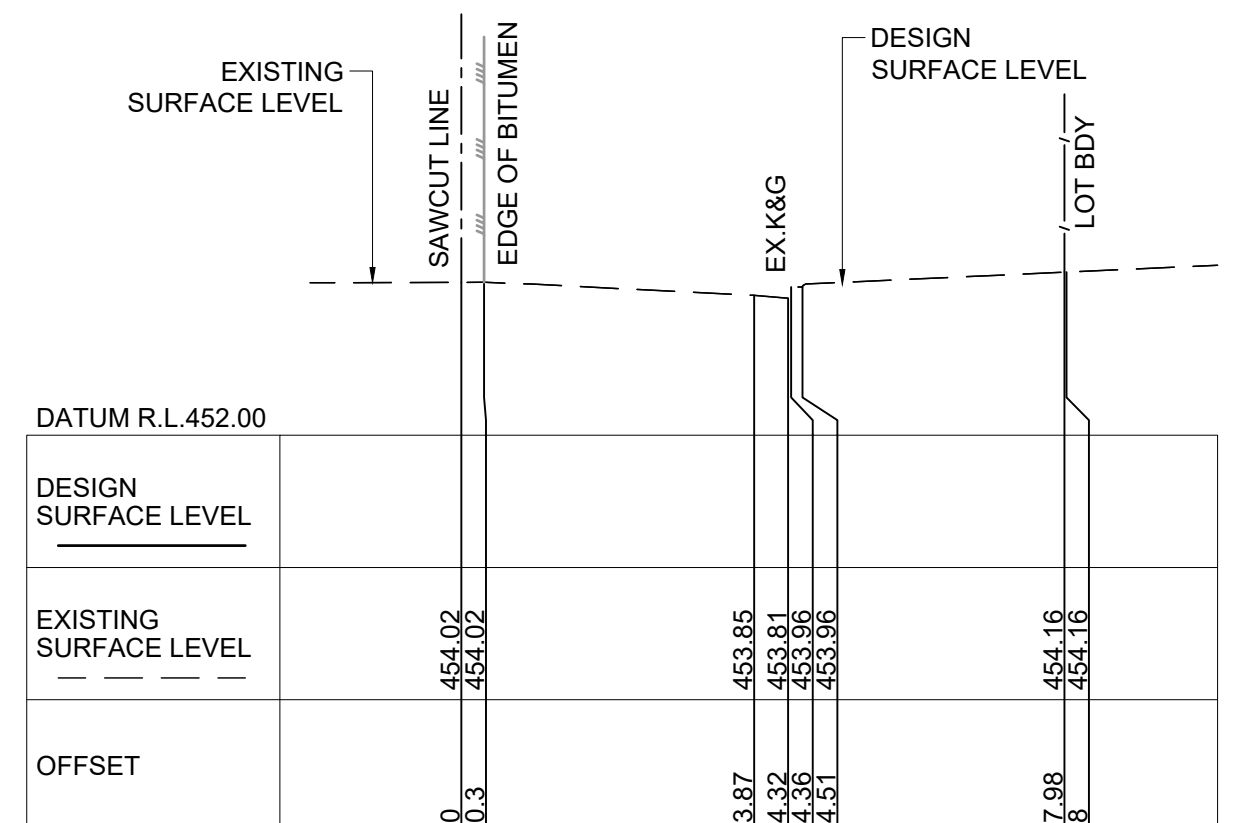
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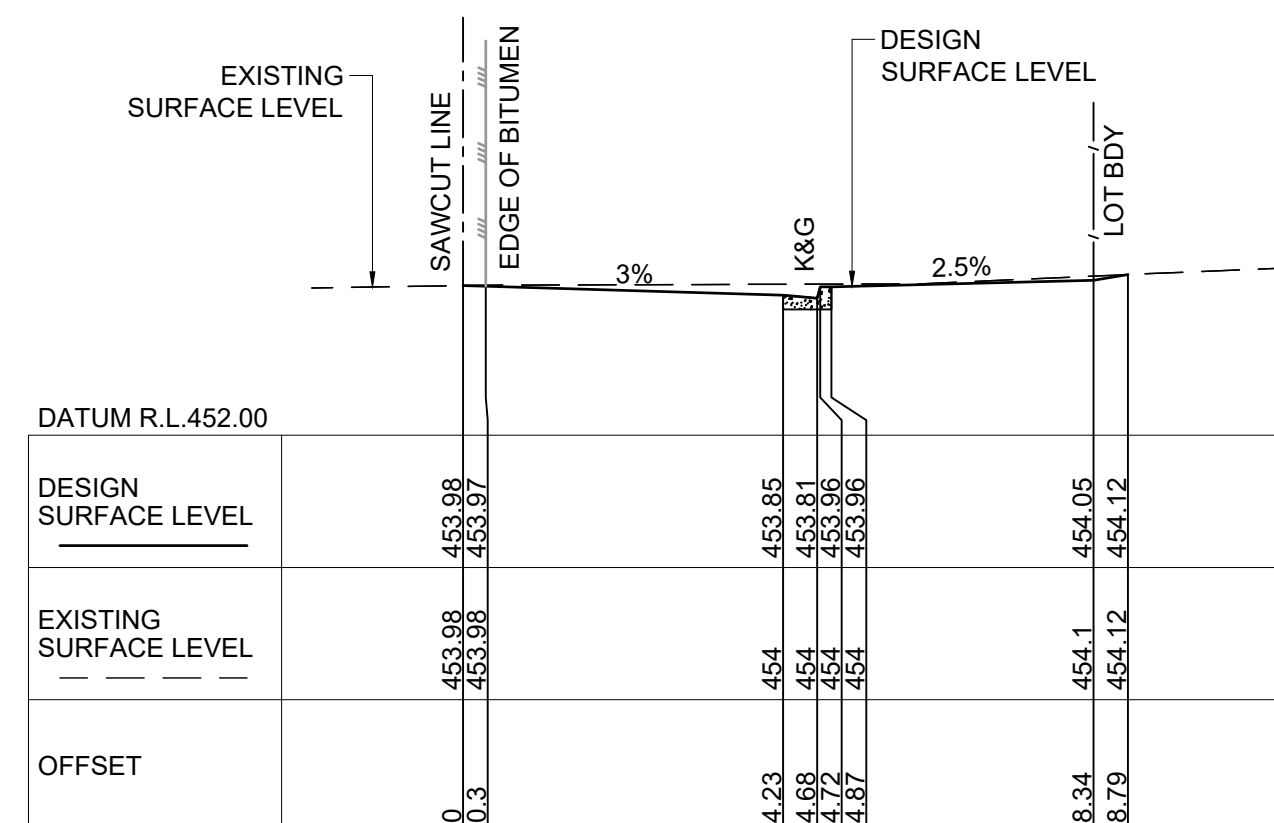
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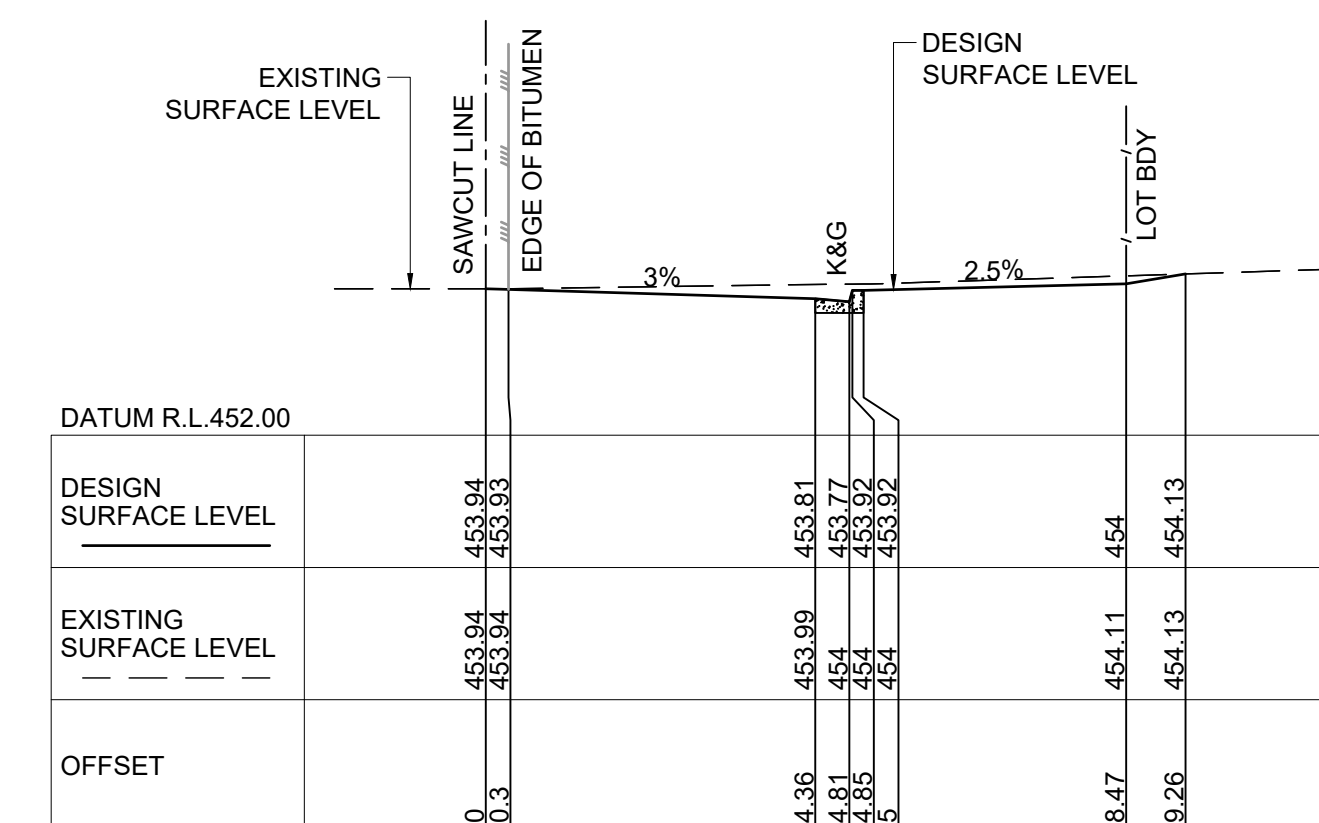
CH. 40.00



CH. -5.00 - EXTENT OF WORKS



CH. 15.00



CH. 35.00

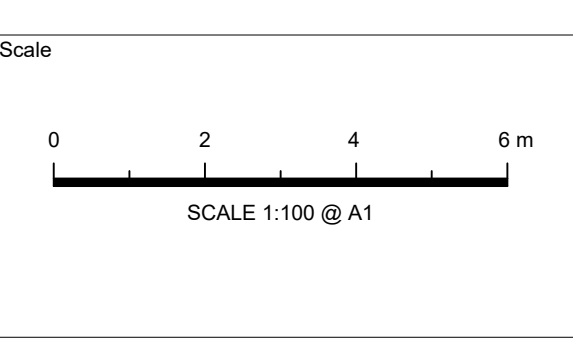
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Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

Certification By Dr. Michel Chaaya in affiliation with Joe Bacha (formerly Australian Consulting Engineers):

Client: MR. ROY AMERY

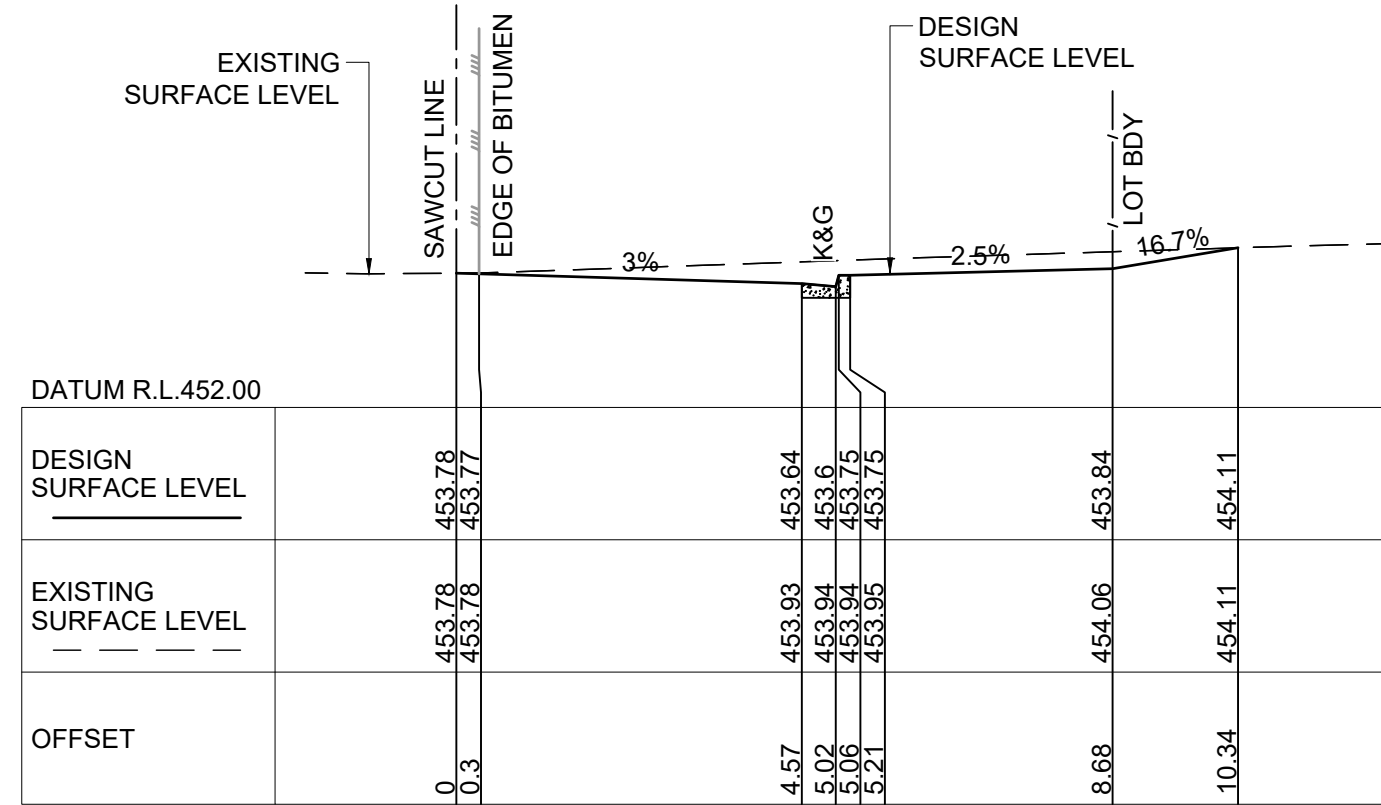
Surveyor: DUBBO OFFICE, 1ST FLOOR, 62 WINGEWARRA STREET, DUBBO, NSW 2830. PH: (02) 6887 4500. WEB: www.premise.com.au



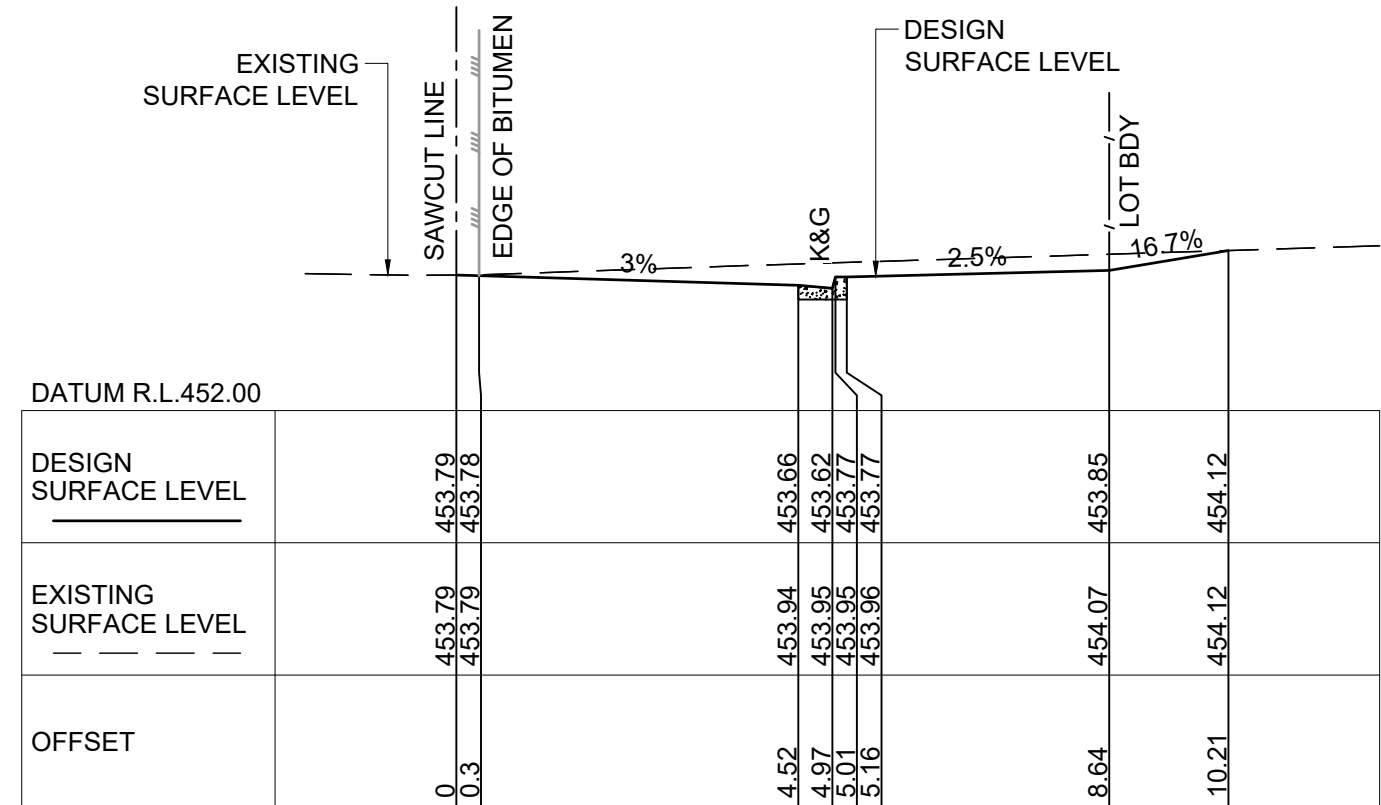
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Project: 1 RAILWAY STREET, GULGONG PROPOSED RESIDENTIAL SUBDIVISION CIVIL ENGINEERING PLANS DEVELOPMENT APPLICATION

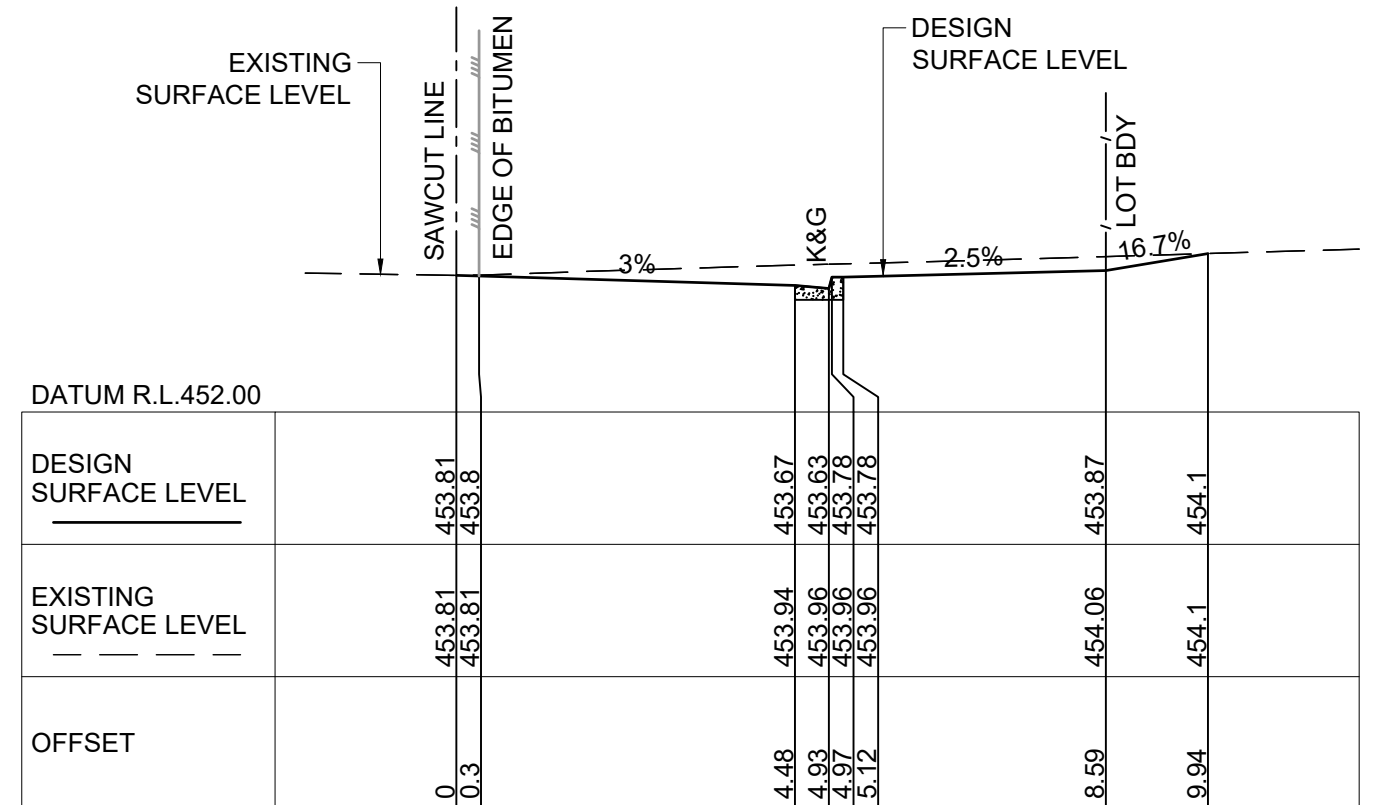
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Scale	A1	Project No.	2021184
Dwg. No.	303	Issue	A



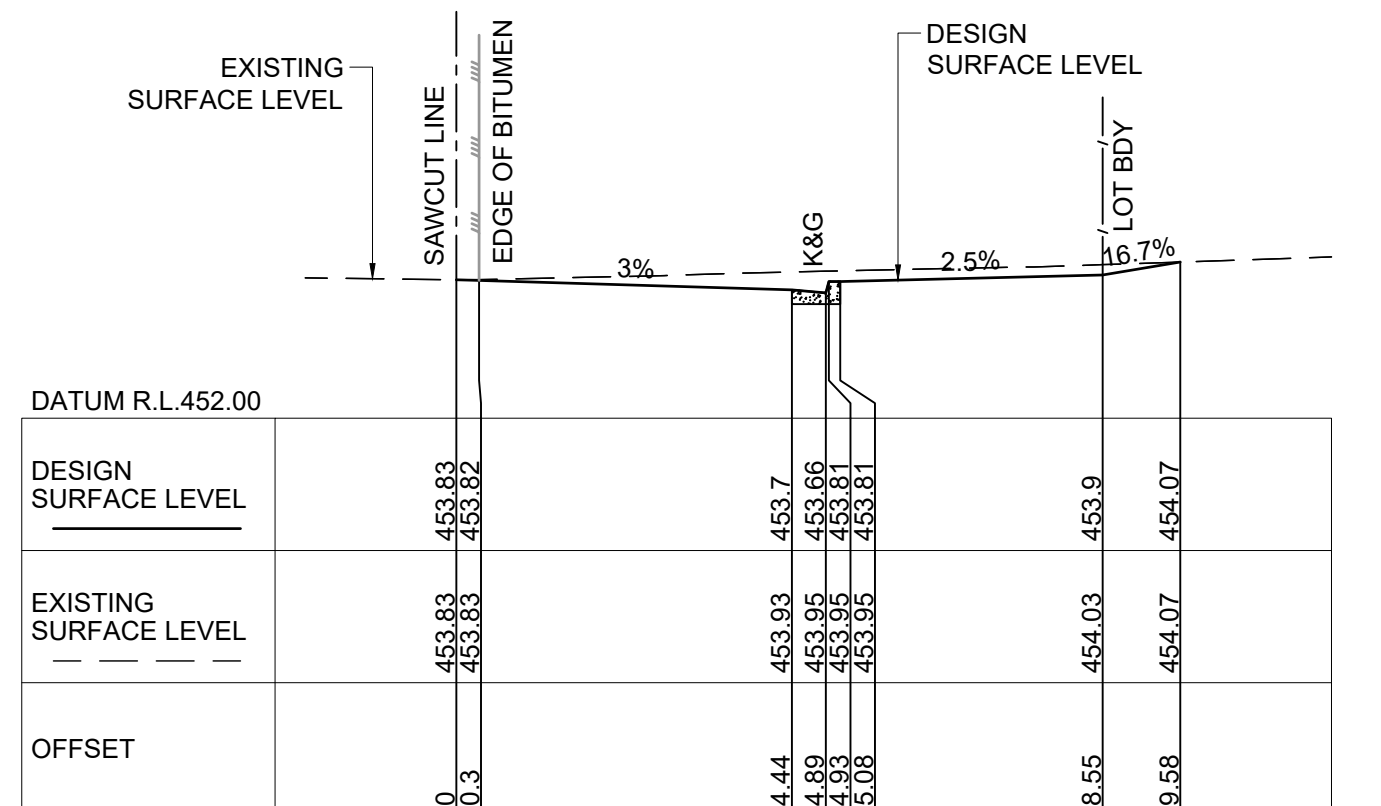
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CH. 65.00



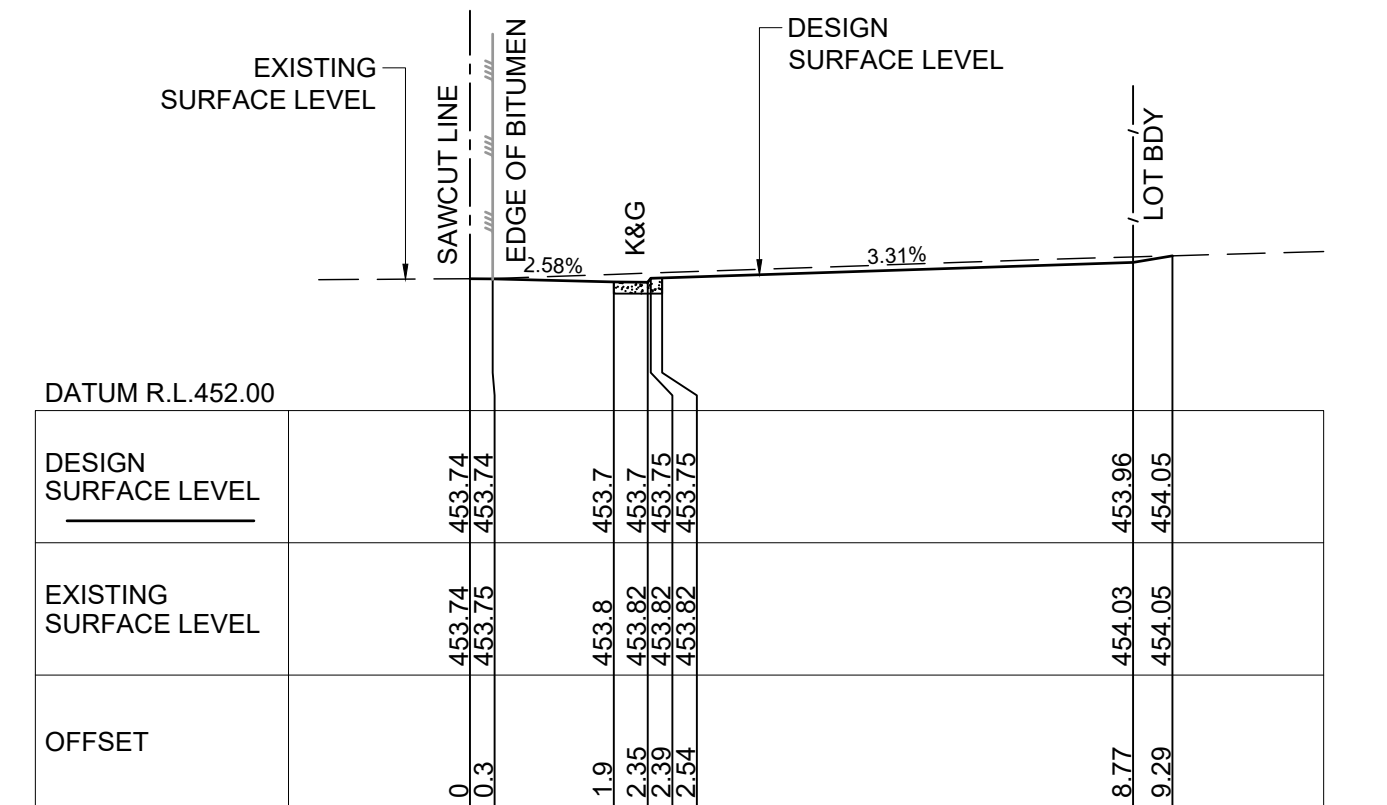
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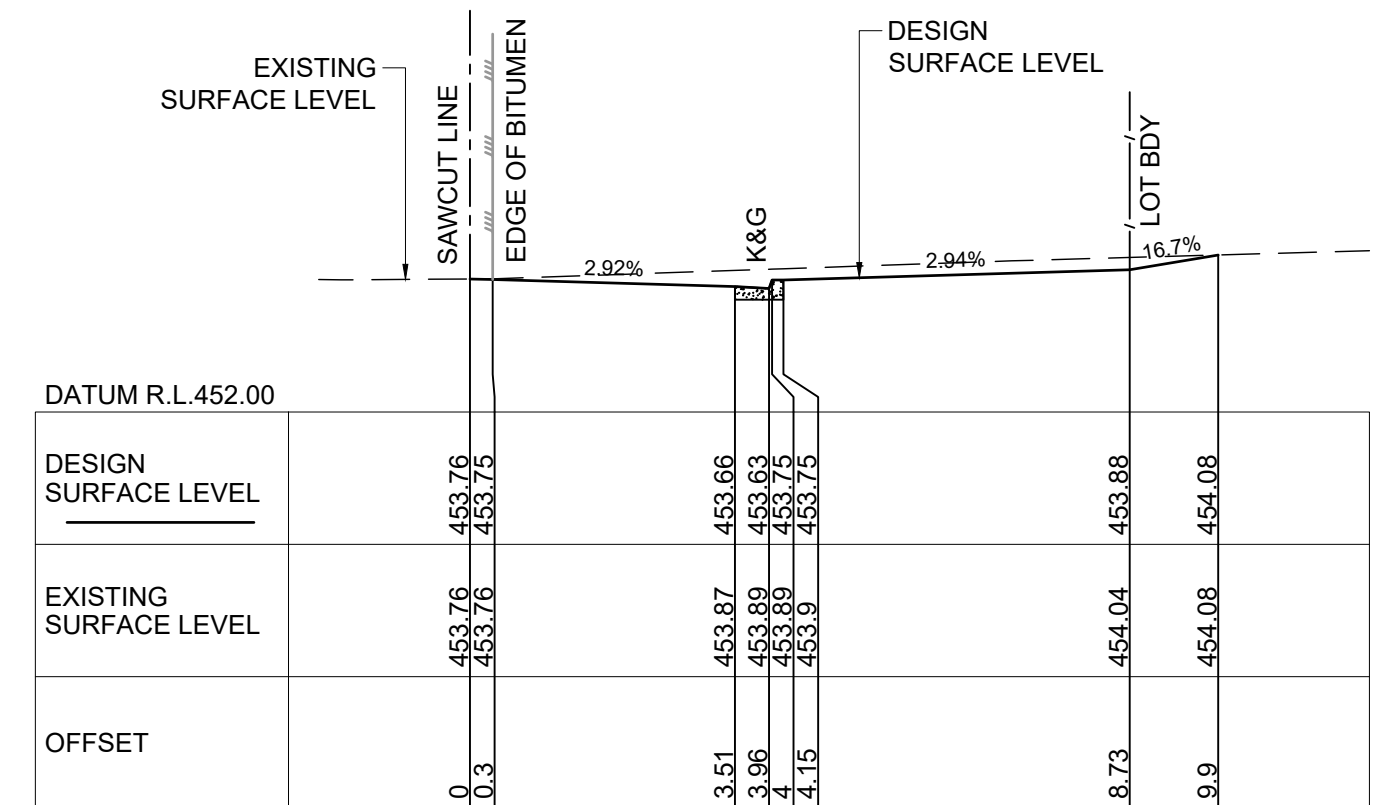
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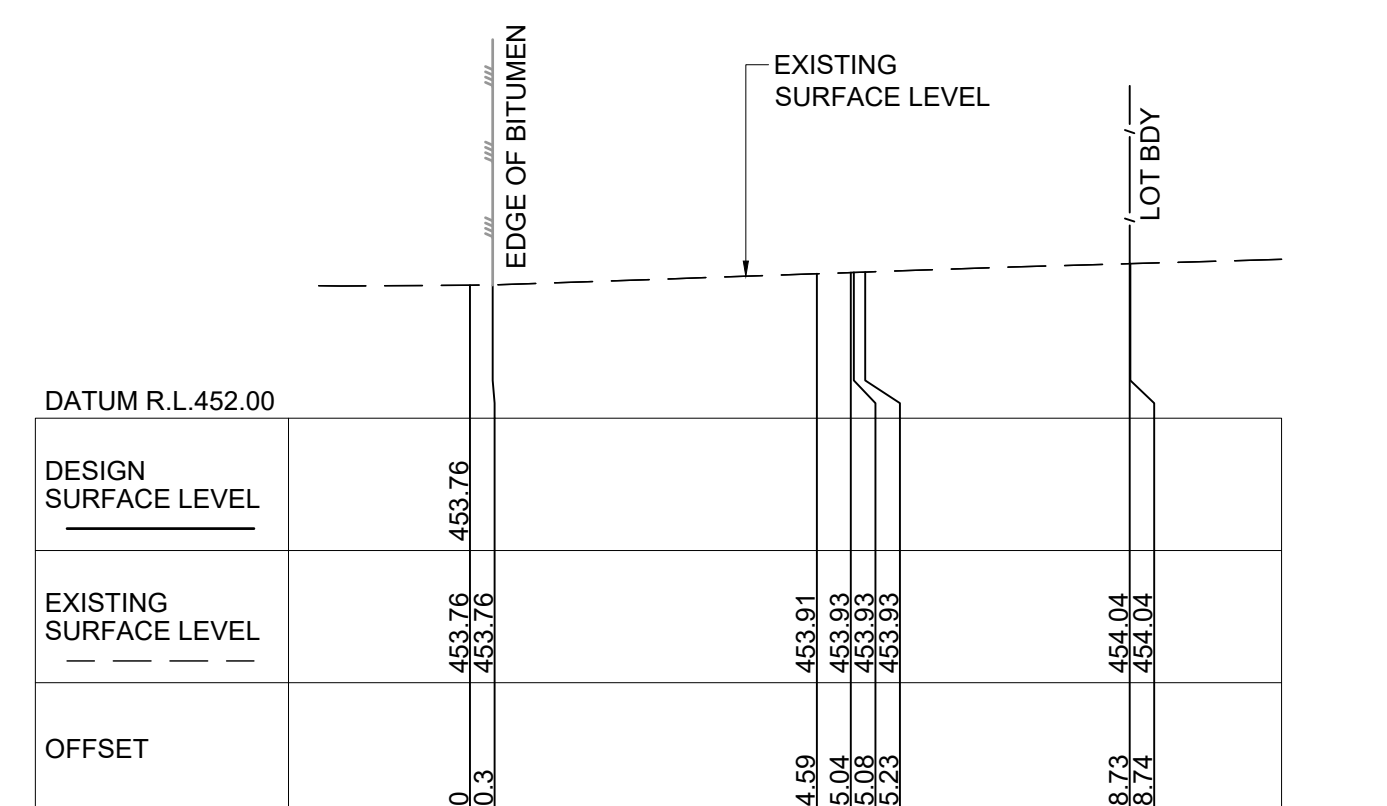
CH. 85.00 - EXTENT OF WORKS



CH. 80.00



CH. 75.00



CH. 75.00

NOT FOR CONSTRUCTION

A		ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.
Issue	Description	Date	Design	Checked	

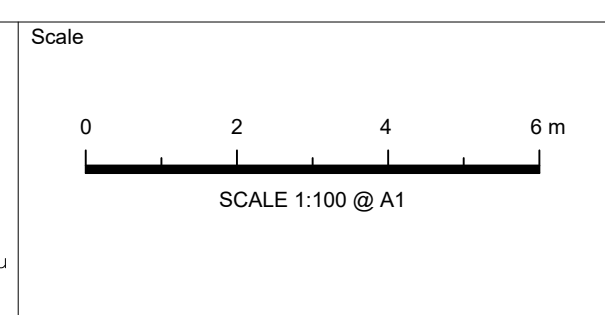
Certification By Dr. Michel Chaaya
in affiliation with Joe Bacha (formerly
Australian Consulting Engineers):

Client
MR. ROY AMERY

Council
MID-WESTERN REGIONAL COUNCIL

Surveyor

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DUBBO, NSW 2830
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
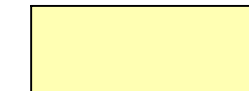




Level 4, 470 Church Street, Parramatta NSW 2150
Email: info@telfordcivil.com.au
PHONE: 02 7809 4931
PO BOX 3579 Parramatta 2124

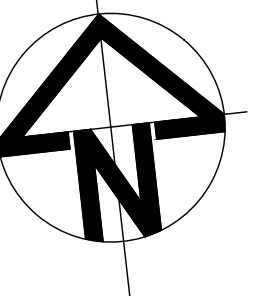
Project
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

Drawing Title
**RAILWAY STREET
CROSS SECTIONS
SHEET 2 OF 2**

Scale 1:100
Project No. 2021184
Dwg. No. 304
Issue A

LEGEND

-  LOT BOUNDARY
-  FINISH CONTOURS
-  EXISTING CONTOURS
-  PROPOSED SWALE
-  PROPOSED EASEMENT
-  CATCHMENT NUMBER
-  CATCHMENT 1
-  CATCHMENT 2
-  STAGE 1
-  PROPOSED STORMWATER PIT
-  PROPOSED STORMWATER PIPE




NOTE:
ALL EXISTING SERVICES TO BE ADJUSTED TO MATCH PROPOSED SURFACE LEVELS.



NOT FOR CONSTRUCTION

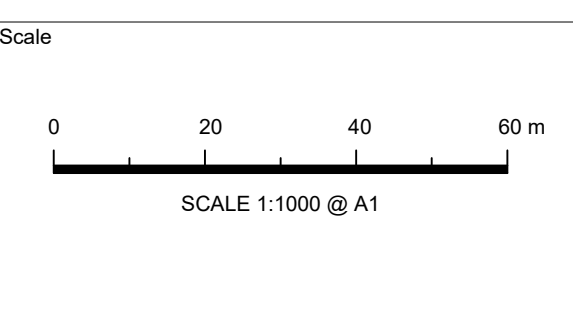
Issue	Description	Date	Design	Checked
A	ISSUE FOR DEVELOPMENT APPLICATION	22/10/2021	P.B.T.	J.A.B.

Certification By Dr. Michel Chaaya in affiliation with Joe Bacha (formerly Australian Consulting Engineers):


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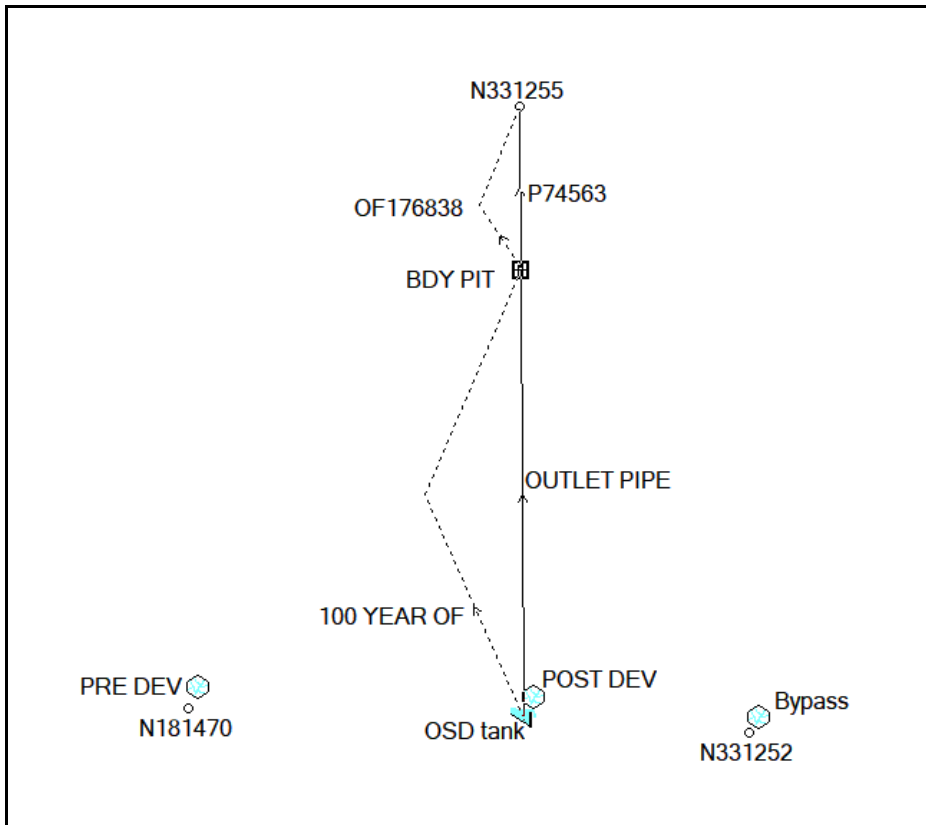
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PO BOX 3579 Parramatta 2124
Email : info@telfordcivil.com.au
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Project
**1 RAILWAY STREET, GULGONG
PROPOSED RESIDENTIAL SUBDIVISION
CIVIL ENGINEERING PLANS
DEVELOPMENT APPLICATION**

Drawing Title	STORMWATER CATCHMENT PLAN		
Scale	A1	Project No.	Dwg. No.
1:1000		2021184	400
Issue	A		

Appendix C DRAINS MODEL DATA

Drains Model Layout



PRE DEV N181470

×

Sub-Catchment Data

Sub-catchment name Sub-catchment area (ha)

Hydrological Model

Default model
 You specify

Use

abbreviated data
 more detailed data

	Paved	Supplementary	Grassed
Percentage of area	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Time of concentration (mins)	<input type="text" value="5"/>	<input type="text" value="0"/>	<input type="text" value="7"/>

Notes

Sub-Catchment Data

Sub-catchment name: POST DEV Sub-catchment area (ha): 0.0405

Hydrological Model

Use

- abbreviated data
- more detailed data

Default model
 You specify

	Paved	Supplementary	Grassed
Percentage of area	70	0	30
Time of concentration (mins)	5	0	7

Notes

OK
 Cancel
 Customise Storms
 Help

Sub-Catchment Data

Sub-catchment name: Bypass Sub-catchment area (ha): 0.0249

Hydrological Model

Use

- abbreviated data
- more detailed data

Default model
 You specify

	Paved	Supplementary	Grassed
Percentage of area	70	0	30
Time of concentration (mins)	5	0	7

Notes

OK
 Cancel
 Customise Storms
 Help

Bypass
 1331252