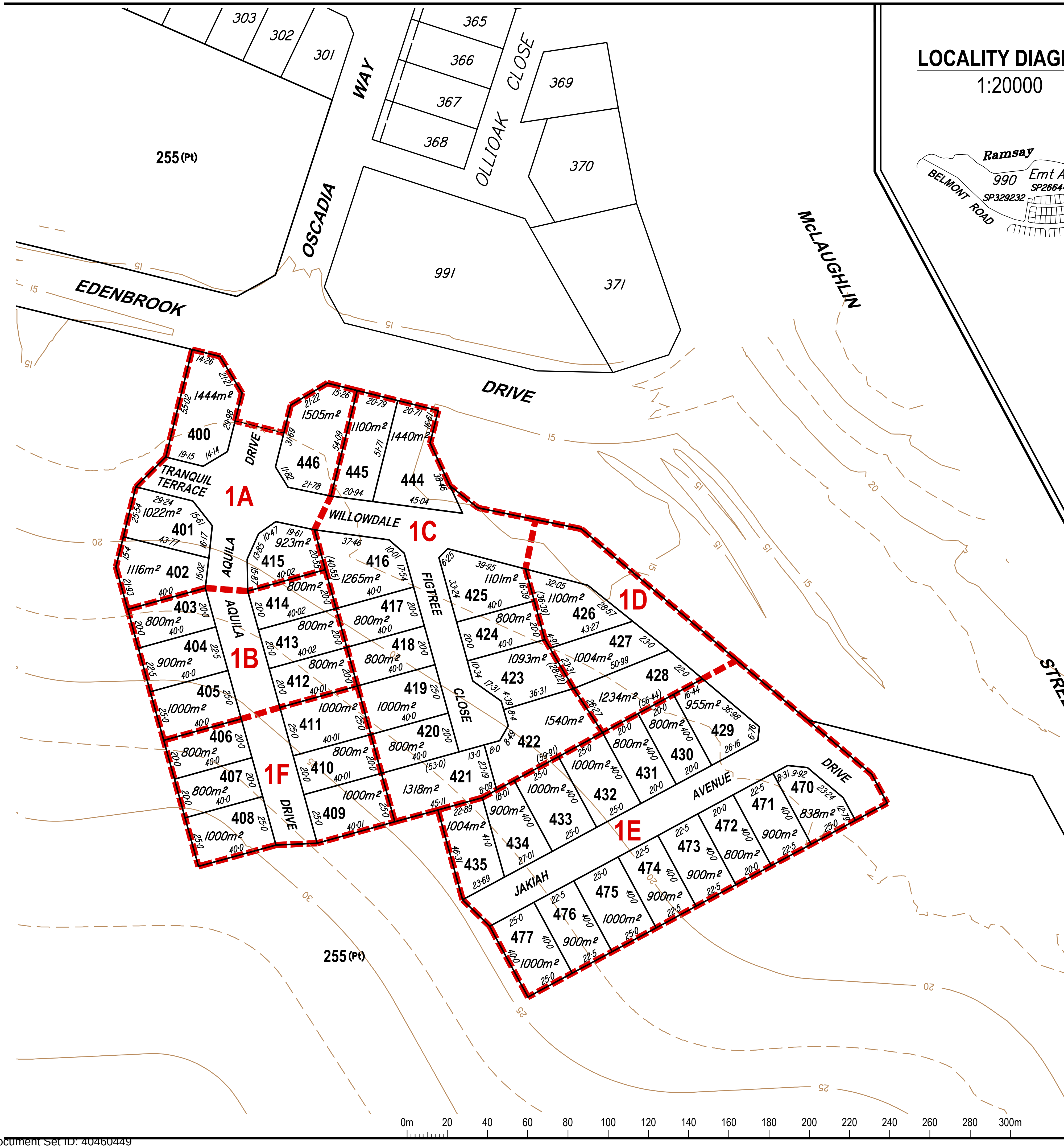
PRECINCT 2



LOCALITY DIAGRAM
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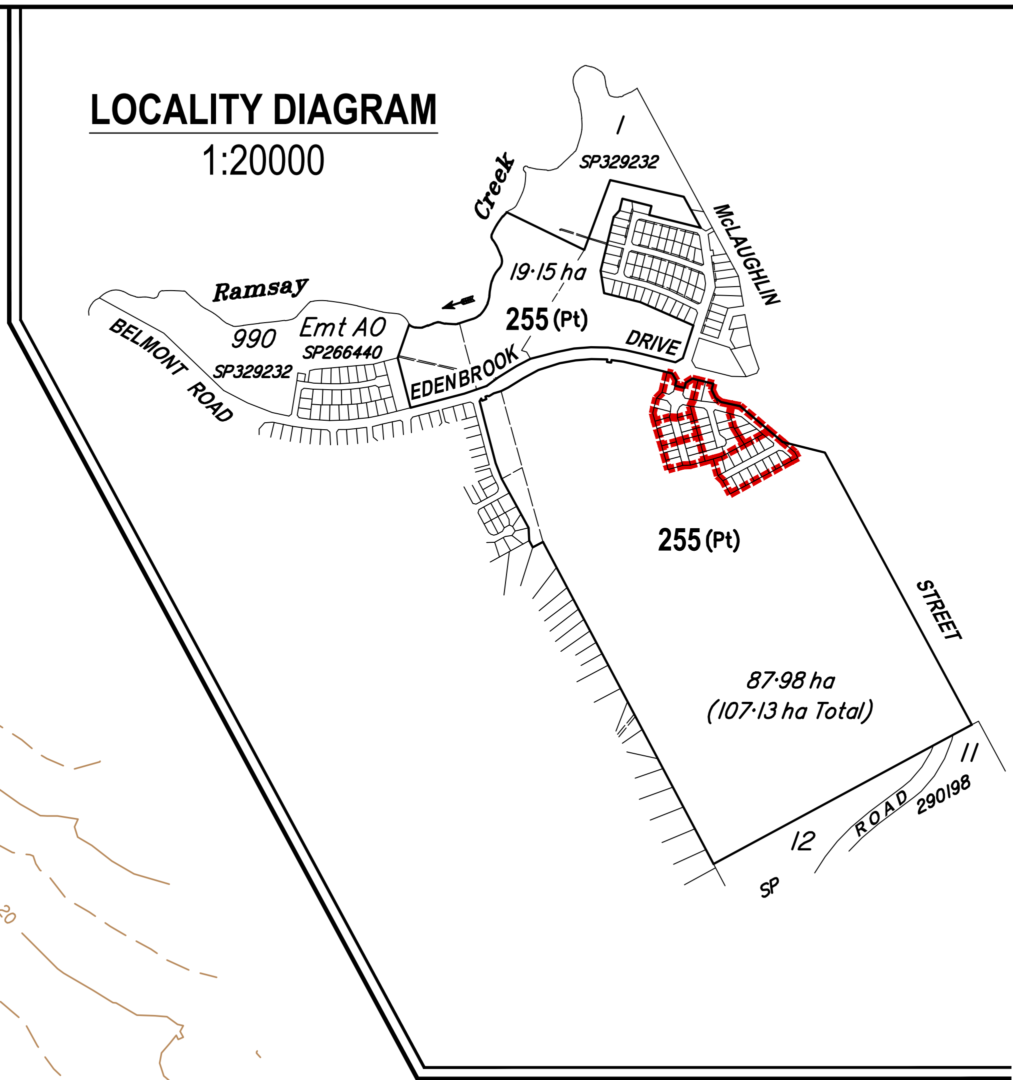

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

26 May 2023

DATE

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/69-2022

Dated: 7 July 2022

IMPORTANT NOTE

This plan was prepared to accompany an application to Rockhampton Regional Council and should not be used for any other purpose.

The dimensions and areas shown hereon are subject to field survey and also to the requirements of council and any other authority which may have requirements under any relevant legislation.

In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land.

This note is an integral part of this plan.

client
Edenbrook Land Pty Ltd
A.C.N. 112 588 182

project
Edenbrook Estate
Edenbrook Drive, Parkhurst

plan of
Reconfiguration Plan Stage 1
(47 Lots + Balance)

rpd
Lot 255 on SP339480

lga
Rockhampton Regional Council

issue	date	details	authorised
A	13-04-2023	Initial Issue	RJKF
-	-	-	-

created
capricornsurveygroupcq
SURVEYING & PLANNING SOLUTIONS
07 4927 5199 | reception@csgcq.com.au | 132 Victoria Parade, Rockhampton QLD 4700

scale: 1:2000 @ A3
datum: AHD 2.5m Contours
sheet no.: 1 of 1
cad file: 8066-11-ROL-A
plan no.: 8066-11-ROL
issue: A

ROCKHAMPTON REGIONAL COUNCIL

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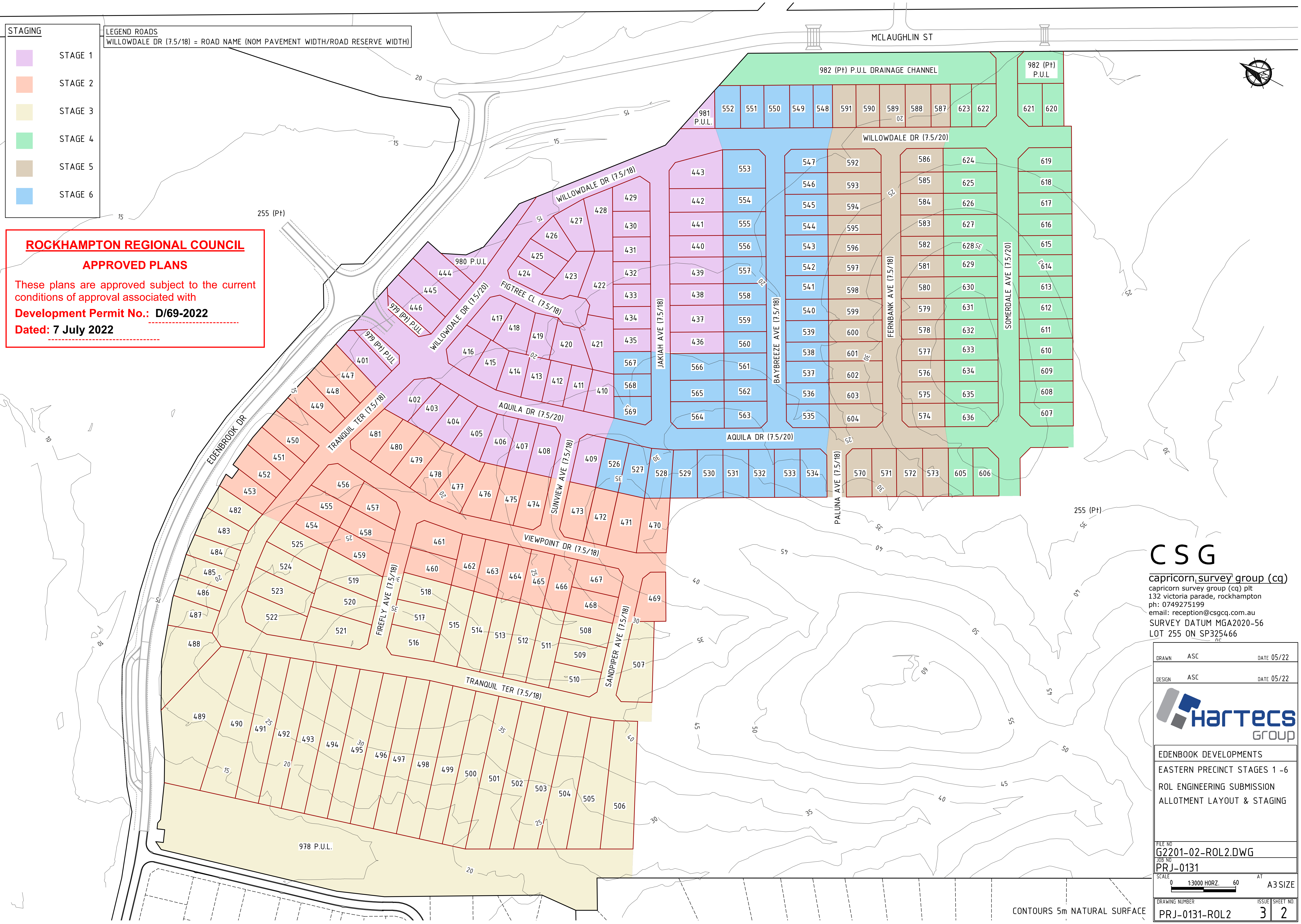

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC	DATE	05/22
DESIGN	ASC	DATE	05/22

HARTECS Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
ALLOTMENT LAYOUT & STAGING

FILE NO G2201-02-ROL2.DWG
JOB NO PRJ-0131
SCALE 1:3000 HORZ. AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL2 ISSUE 3 SHEET NO. 2

NOTES

FLOOD DEPTH RANGES AND INUNDATION EXTENTS HAVE BEEN PROVIDED FOR THE ULTIMATE CATCHMENT DEVELOPMENT CASE. THIS IS AN EXTENSION OF THE THE PREVIOUS APPROVED FLOOD STUDY & INUNDATION MAPPING DONE FOR THE DOWNSTREAM EDENBROOK DRIVE UPGRADE WORKS AND OSCADIA POCKET DEVELOPMENT. THE CATCHMENT MODEL IS THE SAME AND THE 2D SURFACE MODEL HAS BEEN UPDATED TO INCLUDE THE EASTERN PRECINCT DEVELOPMENT AND THE ASSOCIATED CHANNEL ALONG MCLAUGHLIN STREET.

MODELLING

1D/2D HYDRAULIC MODELING AS PER CURRENT AR&R 2019; AR&R RAINFALL 2016 IFD DATA & TEMPORAL PATTERNS; XPSTORM COMPUTER PACKAGE

- LAURENSON ROUTING METHOD.
- PREDOMINANT LAND USAGE RESIDENTIAL.
- LOSS MODELS - UNIFORM LOSS & SEPARATE IMPERVIOUS AND PERVIOUS AREAS. PERVIOUS AREAS INITIAL LOSS 0mm, CONTINUING LOSS 2.5mm/hr; IMPERVIOUS AREA INITIAL & CONTINUING LOSS 0mm.

FOR THE NOMINATED AEP A RANGE OF STORM DURATIONS HAVE BEEN SELECTED FOR ANALYSIS, EACH STORM COMPRISING AN ASSEMBLE OF 10 DIFFERENT PATTERNS. THE PEAK FLOW FOR EACH ENSEMBLE HAVE BEEN STATISTICALLY ANALYSED AND THE WORST CASE PEAK MEDIAN FLOW HAS BEEN ADOPTED AS THE DESIGN STORM/FLOW.

ROCKHAMPTON REGIONAL COUNCIL

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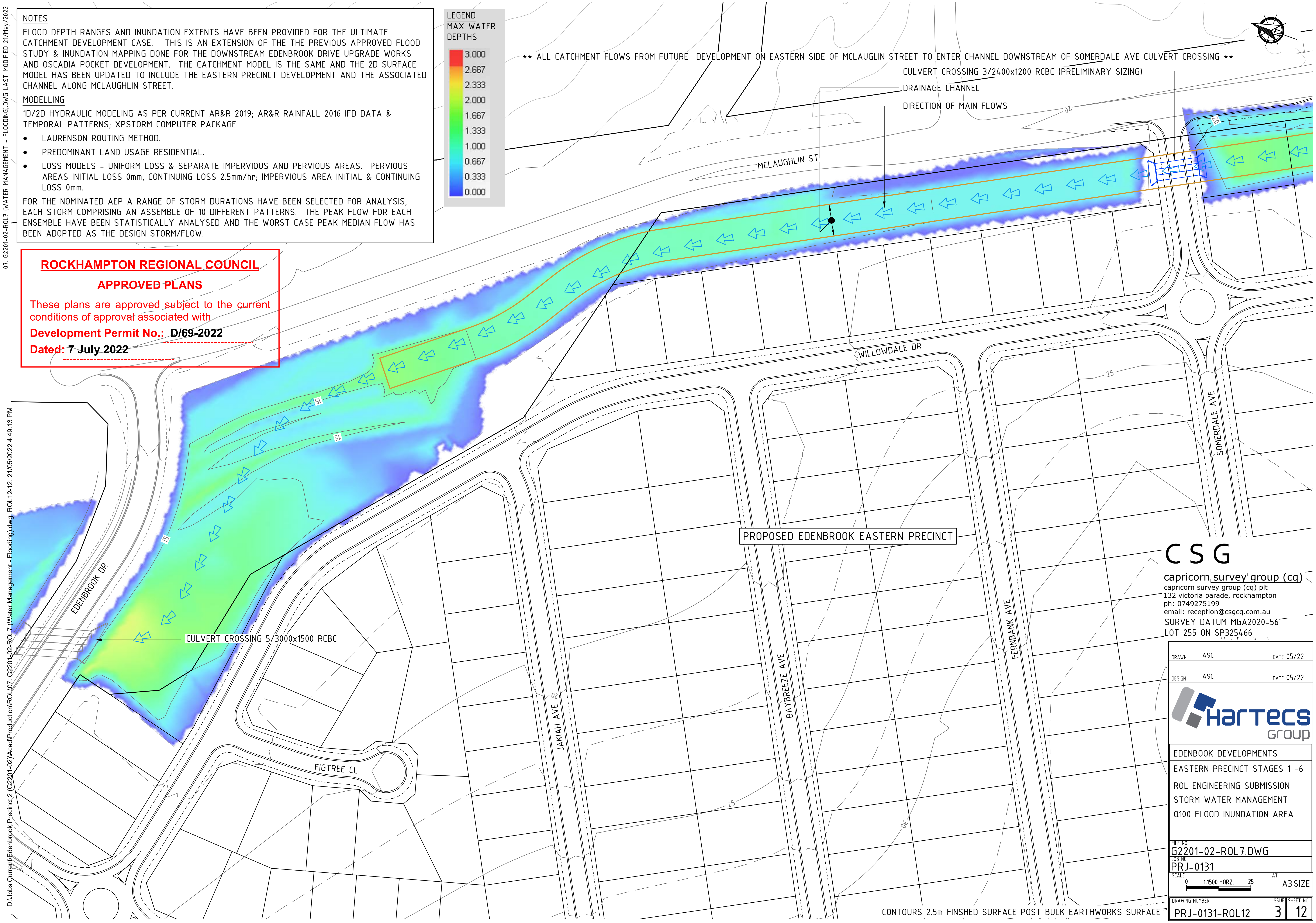

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN ASC	DATE 05/22
DESIGN ASC	DATE 05/22

HARTECS Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
STORM WATER MANAGEMENT
Q100 FLOOD INUNDATION AREA

FILE NO G2201-02-ROL7.DWG
JOB NO PRJ-0131
SCALE 1:1500 HORZ. AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL12 | ISSUE 3 | SHEET NO. 12

07. G2201-02-ROL7 (WATER MANAGEMENT - FLOODING).DWG LAST MODIFIED 21/May/2022

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ROCKHAMPTON REGIONAL COUNCIL

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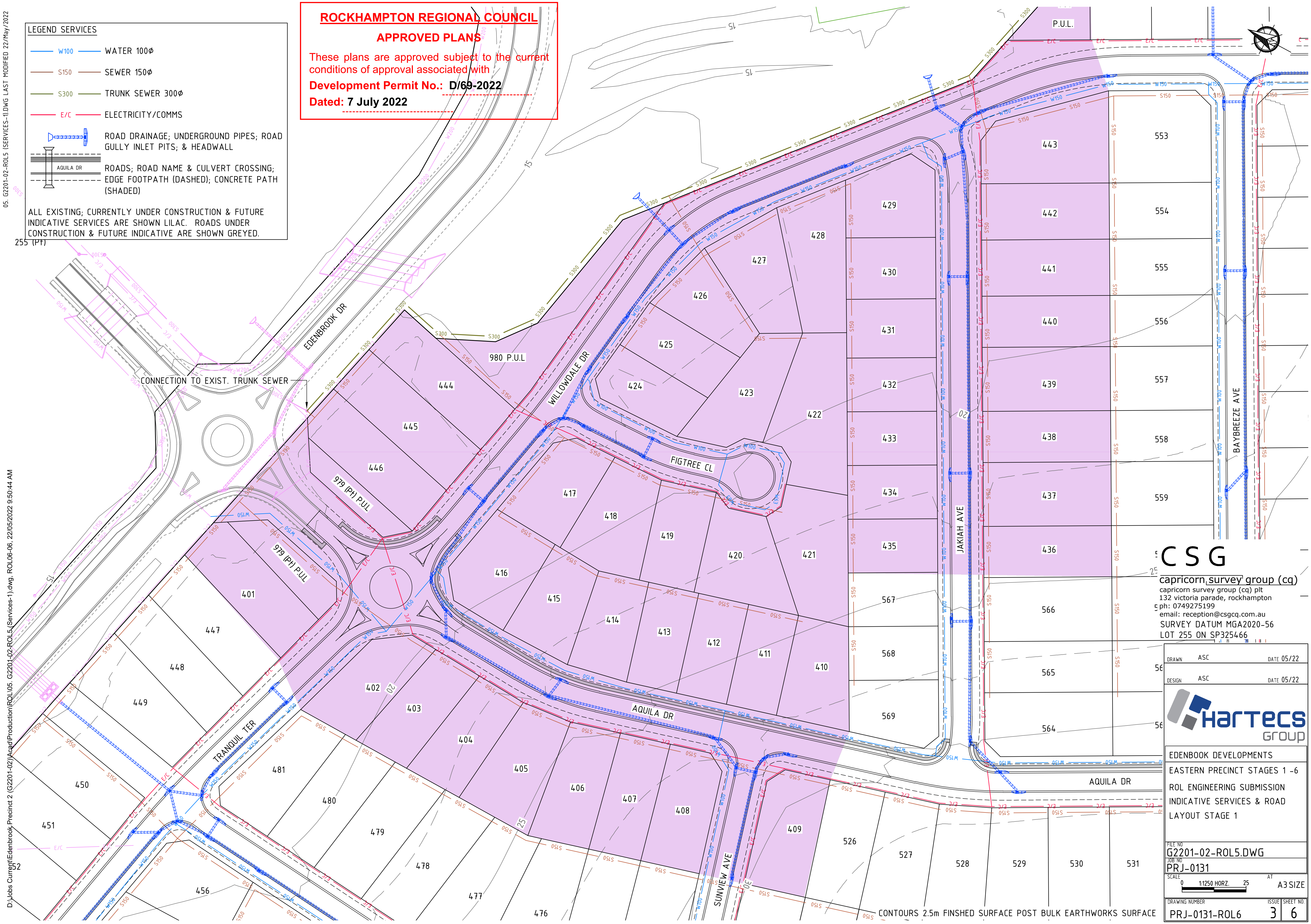
Dated: 7 July 2022

LEGEND SERVICES

- W100 — WATER 100ø
- S150 — SEWER 150ø
- S300 — TRUNK SEWER 300ø
- E/C — ELECTRICITY/COMMS
- ROAD DRAINAGE; UNDERGROUND PIPES; ROAD GULLY INLET PITS; & HEADWALL
- AQUILA DR — ROADS; ROAD NAME & CULVERT CROSSING; EDGE FOOTPATH (DASHED); CONCRETE PATH (SHADED)

ALL EXISTING; CURRENTLY UNDER CONSTRUCTION & FUTURE INDICATIVE SERVICES ARE SHOWN LILAC. ROADS UNDER CONSTRUCTION & FUTURE INDICATIVE ARE SHOWN GREYED.



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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

DRAWN	ASC — DATE 05/22
DESIGN	ASC — DATE 05/22

HARTECS GROUP

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
INDICATIVE SERVICES & ROAD LAYOUT STAGE 1

FILE NO G2201-02-ROL5.DWG
JOB NO PRJ-0131
SCALE 1:1250 HORZ. AT A3 SIZE
DRAWING NUMBER PRJ-0131-ROL6 — ISSUE 3 — SHEET NO. 6

05. G2201-02-ROL5 (SERVICES-1).DWG LAST MODIFIED 22/May/2022

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08. G2201-02-ROL8 (WATER MANAGEMENT - QUALITY).DWG LAST MODIFIED 21/May/2022

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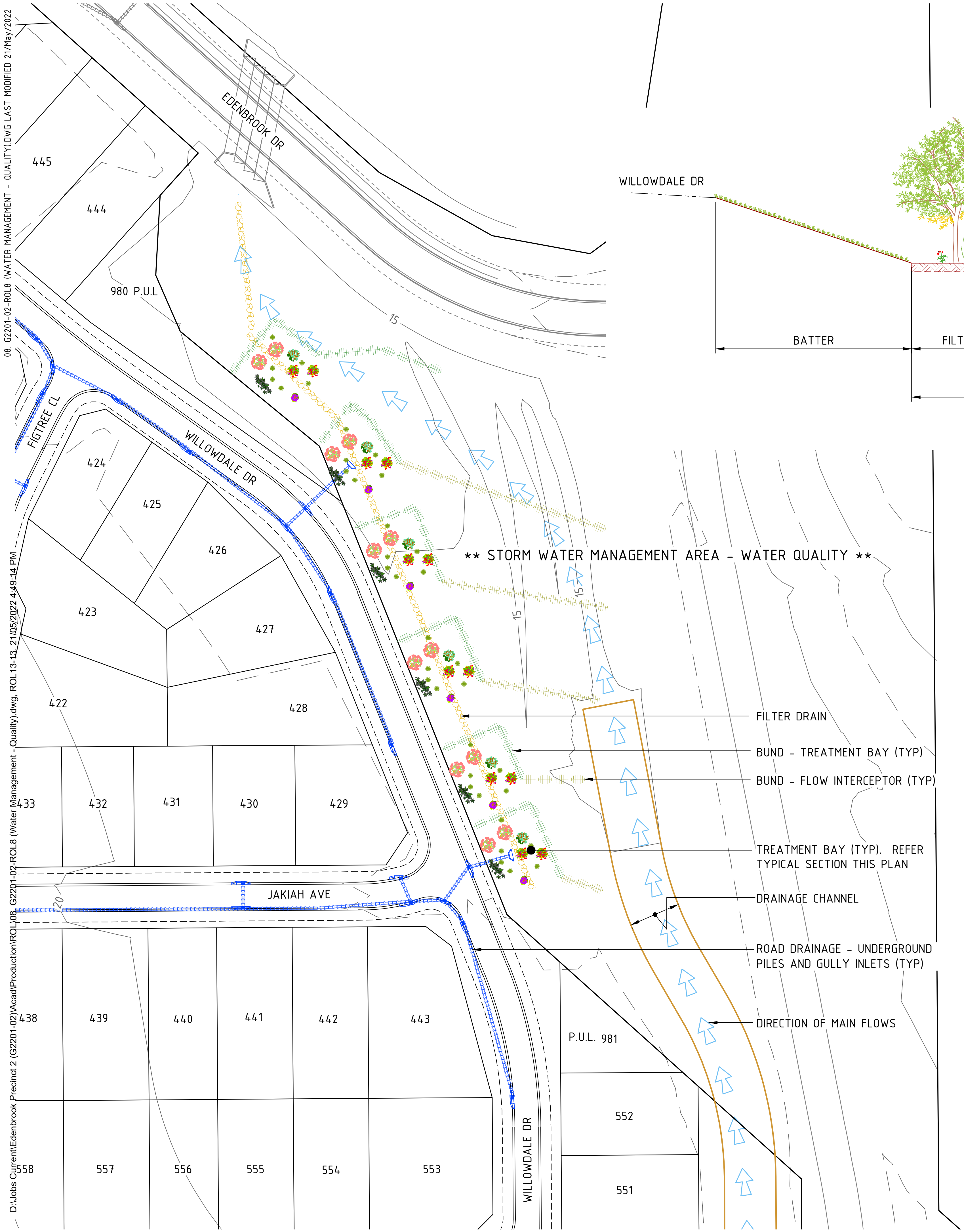

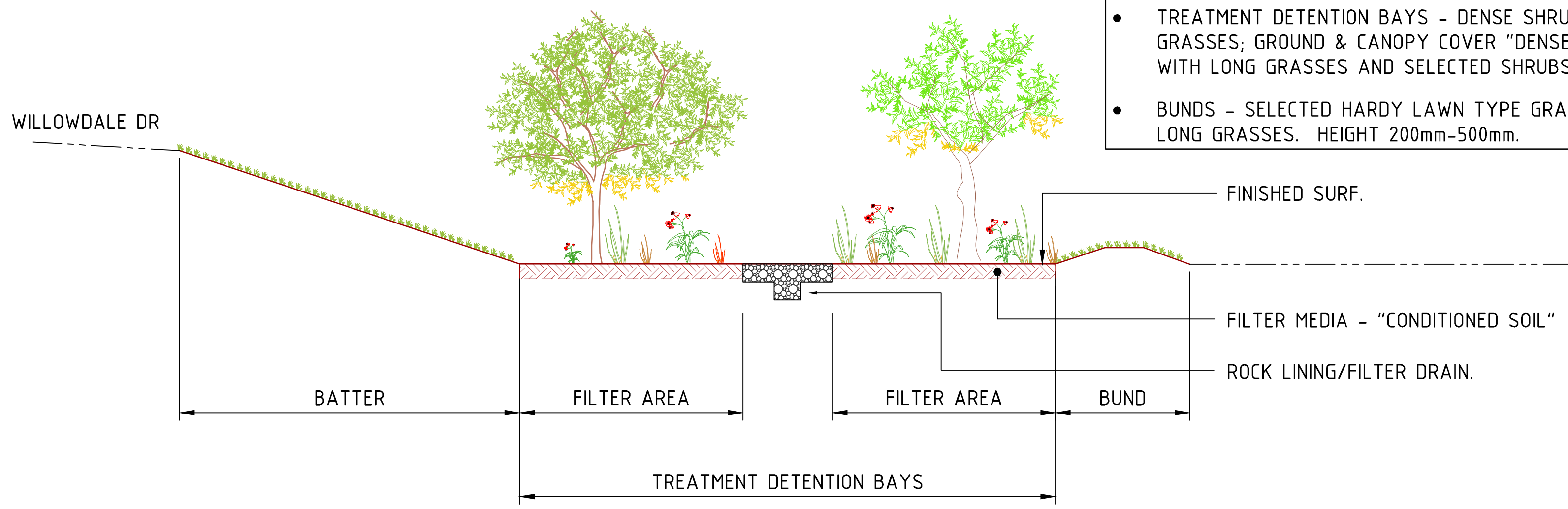

TREATMENT BAY TYPICAL SECTION
NTS

PROPOSED STORM WATER TREATMENT METHODOLOGY SAME AS ADOPTED FOR PREVIOUS EDENBROOK STAGES 8 & 10 - "STREET TREE" CONCEPT WITH CONCENTRATED END OF LINE TREATMENT AREA

- BATTERS - GROUND COVER COMPRISING MIXTURE OF NATURAL GRASSES.
- TREATMENT DETENTION BAYS - DENSE SHRUBS; HIGH UPTAKE TREES; LONG GRASSES; GROUND & CANOPY COVER "DENSE"; ROCK CENTRAL DRAINAGE STRIP WITH LONG GRASSES AND SELECTED SHRUBS. DEPTH 200mm-500m.
- BUNDS - SELECTED HARDY LAWN TYPE GRASS; LOW LEVEL CREEPING SHRUBS; LONG GRASSES. HEIGHT 200mm-500mm.

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SURVEY DATUM MGA2020-56
LOT 255 ON SP325466

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/69-2022

Dated: 7 July 2022

CONTOURS 2.5m FINSHED SURFACE POST BULK EARTHWORKS SURFACE

DRAWN ASC	DATE 05/22
DESIGN ASC	DATE 05/22

Hartecs Group

EDENBOOK DEVELOPMENTS
EASTERN PRECINCT STAGES 1 -6
ROL ENGINEERING SUBMISSION
STORM WATER MANAGEMENT
QUALITY (INDICATIVE)

FILE NO G2201-02-ROL8.DWG
JOB NO PRJ-0131
SCALE 0 1:1250 HORZ. 25 AT A3 SIZE

DRAWING NUMBER	ISSUE	SHEET NO.
PRJ-0131-ROL13	3	13

Douglas Partners

Geotechnics / Environment / Groundwater

Report on
Geotechnical Stability Assessment

Proposed Subdivision
Edenbrook Estate (Precinct 2)
Edenbrook Drive, Parkhurst

Prepared for
Hartecs Group Pty Ltd

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/69-2022

Dated: 7 July 2022

Project 213255.00
May 2022

Integrated Practical Solutions

Douglas Partners
Geotechnics | Environment | Groundwater

Document History

Document details

Project No.	213255.00	Document No.	R.001.RevA
Document title	Report on Geotechnical Stability Assessment Proposed Subdivision		
Site address	Edenbrook Estate (Precinct 2), Edenbrook Drive, Parkhurst		
Report prepared for	Hartecs Group Pty Ltd		
File name	213255.00.R.001.RevA		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Michael-Davies-Hill	Brett Egen (RPEQ8597)	19 April 2022
Revision A	Michael-Davies-Hill	Brett Egen (RPEQ8597)	9 May 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	-	dtoon@hartecs.com.au
Revision A	1	-	dtoon@hartecs.com.au

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		
Reviewer	[signature]	9 May 2022

bsi. ISO 9001 Quality Management
FS 604853

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Table of Contents

Report on Geotechnical Stability Assessment
Proposed Subdivision
Edenbrook Estate (Precinct 2), Edenbrook Drive, Parkhurst

1. Introduction

This report presents the results of a geotechnical stability assessment undertaken by Douglas Partners Pty Ltd (DP) for Precinct 2 as part of the Edenbrook Estate development on Edenbrook Drive, Parkhurst.

The geotechnical assessment was undertaken at the request of Hartecs Group Pty Ltd on behalf of Edenbrook Developments in accordance with DP's proposal 213255.00.P.001 dated 17 February 2022.

The aim of the assessment was to assess the stability of the proposed development in accordance with the requirements of the Rockhampton Regional Council's (RCC) steep land overlay code. The assessment comprised the review of regional geology, previous investigation results, historical aerial photographs, and available online mapping; followed by a site walk-over inspection by a senior geotechnical engineer, stability assessment and reporting.

This report must be read in conjunction with the notes entitled *"About This Report"* in Appendix A along with any other attached explanatory notes and should be kept in its entirety without separation of individual pages or sections.

2. Site Description and Proposed Development

The development site is described as Lot 255 on SP325466, which encompasses both the northern and southern sides of Edenbrook Drive, Parkhurst (refer to Figure 1).

It is understood that the proposed residential development will comprise approximately 500 to 600 residential lots ranging in size. Supporting infrastructure will include subdivisional roads, water, sewerage and stormwater.

It is further understood that the proposed earthworks for a portion of the overall site will consist of bulk excavations up to approximately 7 m in height along the ridgeline and spurs, and filling up to approximately 9 m in the low lying re-entrants between the spurs (refer to Figure 2); generally creating relatively flat and level building platforms, some locally increasing up to approximately 15%. It is anticipated that similar earthworks will be required for the remainder of the site.

Figure 1: Site Location.

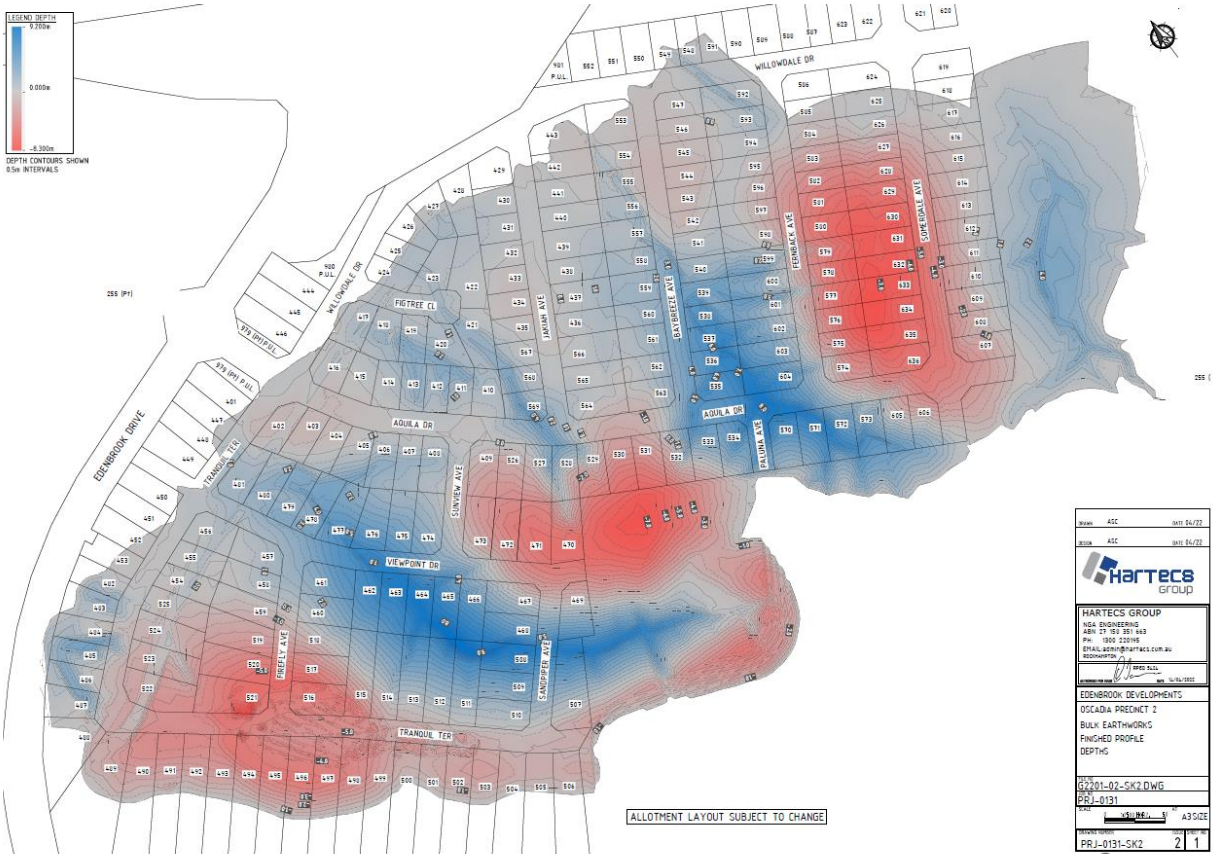


Figure 2: Proposed earthworks for a proportion of the overall site.

3. Published Data

3.1 Regional Geology

Reference to the Geological Survey of Queensland's 1:100,000 scale Rockhampton Region geological map indicates the site is located in an area underlain by the Early Carboniferous aged Rockhampton Group described as typically comprising *"mudstone, siltstone, oolitic sandstone, and conglomerate, oolitic and crinoidal limestone"* with local folds dipping moderately to steeply to the east.

3.2 Topography

Reference to RCC's online contour mapping, the site is dominated by two prominent topographical features of high relief with a saddle connecting the two along the western part of the site. An elongated spur runs off to the north, with a number of smaller moderately sloping (between 10º and 15º) spurs running off to the north-east, to the east and to the south. A knoll is located atop of a spur towards the eastern part of the site. Steep (between 15º and 20º) re-entrants are located between the spurs. The site is also dominated by a second feature of high relief along the southern boundary of the site. As the site extends to the north-east, it generally flattens out.

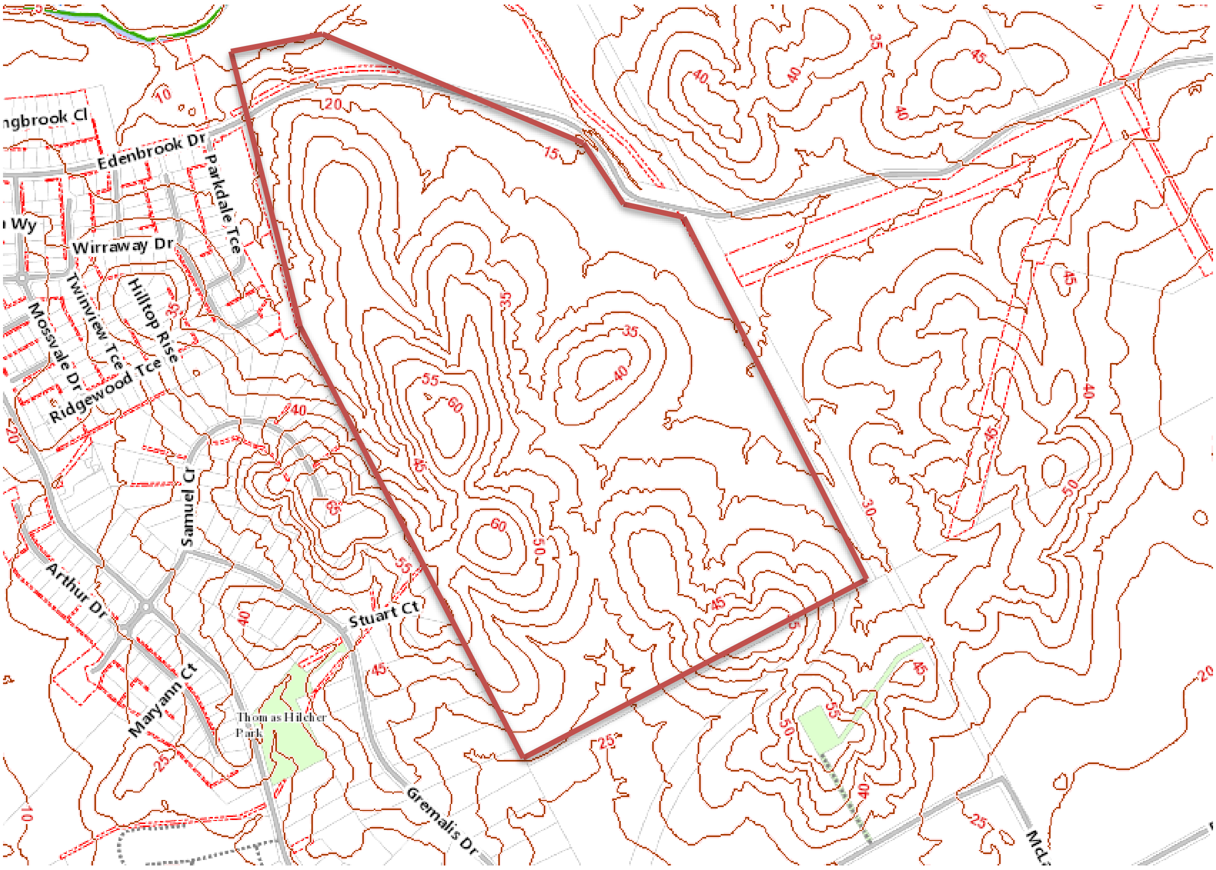


Figure 3: RRC Contour Mapping.

3.3 Steep Land

RCC's Steep Land Overlay identifies land with a slope of 15% or greater as being land potentially susceptible to landslide. Reference to the steep land overlay map (Figure 4), typically the moderately sloping side slopes of the spurs, and steeply sloping re-entrants are identified as steep land.

It should be noted that the steep land overlay map is a broad scale indication of the potential landslide susceptibility based on topography alone, and does not consider other factors such as regional geology or evidence of past instability.

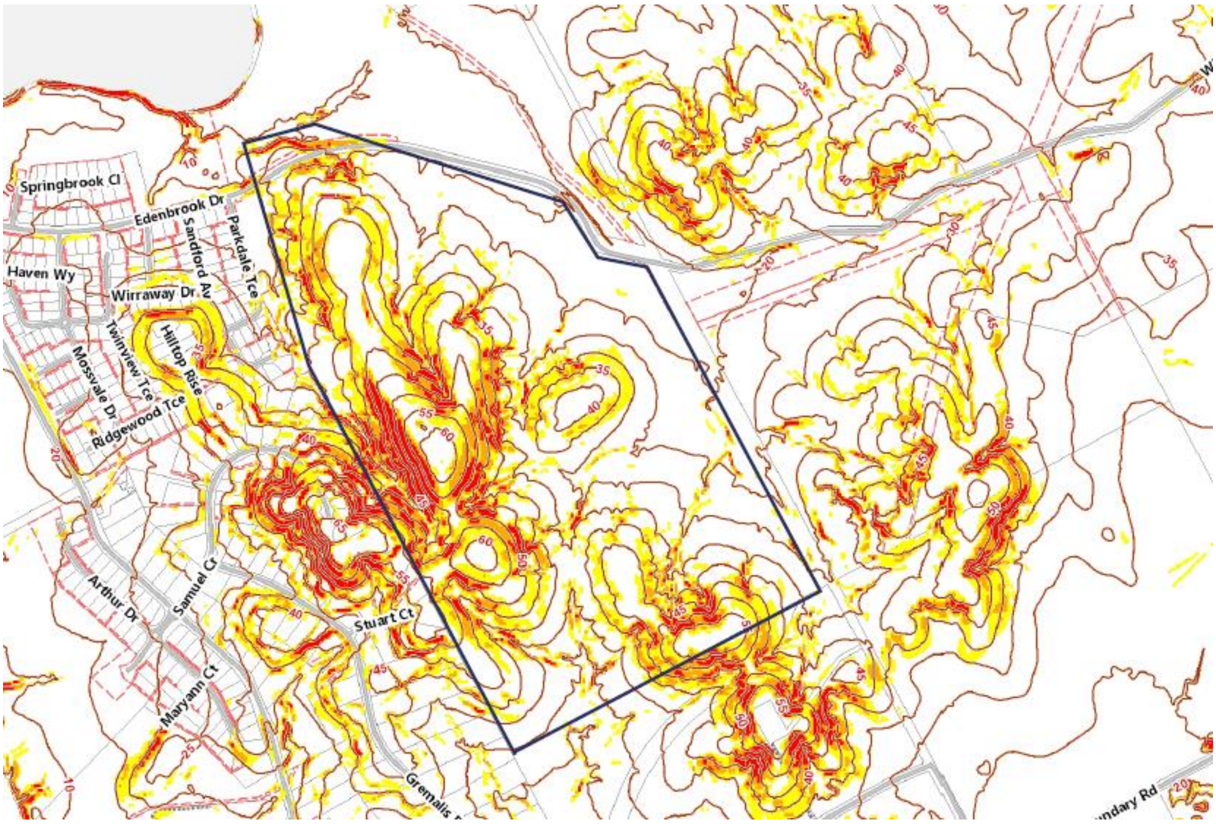


Figure 4: RRC Steep Land Overlay.

3.4 Previous Investigations

The drill logs from previous drilling carried out by CQ Drilling and Blasting Pty Ltd were provided by the client. The previous bores were typically drilled across the western part of the site. The drilling conditions are generally described as being "soft" to between 0.5 m and 2.0 m depth. The "soft" conditions are inferred to be typical of residual soils overlying extremely weathered material, with conditions becoming harder with depth and penetration into less weathered and subsequently stronger rock.

3.5 Aerial Photographs

Aerial photographs from 1956 to present were reviewed to assess for evidence of significant past instability.

The photos indicate no significant evidence of instability or changes in topography on the site.

4. Field Work

The field work was carried out on 16 March 2022 and comprised a walk-over inspection by a senior geotechnical engineer from DP in order to make an appraisal of the general condition of the site in regard to topography, drainage, vegetation cover, geology, erosion and slope stability.

During the site walk-over, topographical features specific to the site were noted, and ground slopes were measured using a hand-held inclinometer.

The exposed conditions on site generally indicate shallow residual soils overlying weathered siltstone, which is consistent with the above described geology and previous borehole drilling by others.

No obvious or significant scarps, naturally hummocky or visibly disturbed ground surface, or tension cracks were observed; which would usually indicate the presence of local or global instability. Any large trees on the slopes were also generally straight.

No signs of groundwater seepage (ie. surface 'springs') were observed at the time of inspection. Surface water from the slopes appear to be naturally diverted towards the re-entrants and typically drain to the north-east or south-west. Localised scour and erosion was noted in a drainage gully located in the south-western corner of the site.

5. Comments

5.1 Slope Stability Risk Assessment

The terminology of the Australian Geomechanics Society (AGS) Practice Note Guidelines for Landslide Risk Management 2007 has been used in the descriptions of hazards and the qualitative assessment of likelihood, consequence and risk of slope instability. Terminology and risk matrix tables from the AGS Practice Note Guidelines are included in Appendix B.

A qualitative assessment of the likelihood, consequence and risk has been carried out for the site, based on the results of the site walk-over and experience in similar projects, provided that development of the site is carried out in accordance with good engineering practice for hillside developments and the recommendations within this report.

Table 1: Slope Instability Risk Assessment to Property

Hazard	Likelihood	Consequence to Property	Risk to Property	Comments
Shallow failure in proposed fill or unsupported cuts	"Unlikely"	"Minor to Medium"	"Low"	The proposed fill is retained by engineered designed retaining walls, with long batters no steeper than 2H:1V
Shallow rotational or translational slide in residual soils	"Unlikely"	"Minor to Medium"	"Low"	The likelihood of a shallow failure through the residual soils is considered unlikely due to the overall strength of these materials and no evidence of previous movement.
Deep rotational failure in residual soils or weathered bedrock	"Rare"	"Major"	"Low	The base geology is generally not adversely bedded or otherwise structured to be prone to deep instability.

Based on the results of the slope stability assessment, considering the geology of the site, relatively shallow depth to rock and the lack of evidence of any previous landslips, the risk to property and to properties adjacent to the site is considered to be "low". The AGS Guidelines suggest that a low level of risk is "usually acceptable" by regulators.

5.2 Geotechnical Constraints

The potential impacts on slope stability for the proposed development have been assessed, and the measures recommended below in particular with reference to the AGS guidelines on hillside constructions have been designed to mitigate those impacts.

5.2.1 Earthworks

Suitable unsurcharged temporary and permanent dry cut and fill batter slopes up to 3 m in height are presented in Table 2. Advice should be sought from DP for batter slopes greater than 3 m in height. Where groundwater seepage is encountered, batter slopes will need to be considerably flatter.

Table 2: Batter Slopes (unsurcharged, up to 3 m in height)

Material	Safe Batter Slope (H:V)	
	Short Term	Long Term
Controlled fill*, residual soils	1:1	2:1
Weathered rock	1:1	1.5:1

Notes: * Depends on fill material type and level of compaction. Assumes clayey material compacted under 'Level 1' inspection and testing to minimum dry density ratio of 95% for Standard compaction.

Temporary excavations up to 1.5 m in depth may remain near vertical for short periods of time, provided that they remain dry at the time of construction and provided there are no loads, services, structures or traffic located within a distance from the crest equal to the batter height.

The above batter slopes are suggested with respect to slope stability only and do not allow for lateral stress relaxation which may result in movement of nearby in-ground services or shallow footings. If such services or footings are settlement sensitive, then the excavation may have to be positively supported.

Slopes may need to be flattened to 4H:1V or less, in order to allow vehicle access for maintenance of the slopes. It is recommended that all batters incorporate crest and toe drainage. The batters should also be covered with topsoil and vegetation (or similar) to provide long term erosion protection.

Long term cuts in very low strength (or stronger) rock is dependent upon the joint orientation within the rock mass. The above batter slopes are contingent upon geotechnical inspections during construction to verify that no adverse jointing and/or defects are present in the batter face. Steeper batters may be possible with the inclusion of passive nails/dowels, anchors and surface protection, but would be subject to detailed stability assessment.

It is recommended that where fill is to be placed over sloping ground, the slope should be benched to allow for the fill to be 'keyed' into the existing slope. These procedures will provide for greater stability of the fill and allow for adequate compaction to be achieved throughout the full depth of the fill. Filled batters should also be overfilled and then cut back to the required design batter angle in order to maximise compaction of the material in the batter faces.

Approved bulk fill should be placed in layers not exceeding 0.3 m 'loose' thickness, with each layer compacted to a minimum dry density ratio of 95% relative to Standard compaction. Where fill has a significant clay content, moisture content within the fill should be maintained within 2% of OMC during and after compaction. The upper 0.3 m of pavement subgrade and unbound pavement gravels should be compacted to a minimum dry density ratio of 100% relative to Standard compaction and to within the same moisture content range as given above.

Care should be taken not to use over-wet clayey soils as this can lead to problems associated with trafficability and workability. Clayey soils should also not be over-compacted (ie. not more than 102% Standard) or placed too dry of OMC, as this can lead to future swelling and softening with changes to moisture content or inundation from water.

Field density testing should be carried out to confirm the standard of compaction has been achieved and the placement moisture content. The frequency of testing should be carried out in accordance with AS 3798 (2007) and distributed reasonably evenly throughout the full depth and area of filling.

Level 1 inspection and testing of filling must be undertaken where the fill is to support buildings or pavements. It is also recommended that Level 1 inspection and testing be adopted for all trench backfill greater than 1.5 m deep in areas to support buildings or pavements as settlement of deep trench backfill can have significant impact on these works.

5.2.2 Retaining Walls

The design of flexible and rigid retaining walls could be undertaken using a triangular pressure distribution and the earth pressure parameters given in Table 3. Flexible walls are those which are free to rotate or tilt (such as cantilevered walls) and should be designed using an active (Ka) earth pressure coefficient. Rigid walls are those which are restrained against rotation or tilt (ie. single anchored/propped walls) and should be designed using the at-rest earth pressure (Ko).

Passive resistance (Kp) at the toe of the wall should be ignored in the zone where future disturbance (eg. services trenches) could occur.

Table 3: Earth Pressure Coefficients (non-sloping crest backfill)

Material	Unit Weight (kN/m^3)	Friction Angle (degrees)	Active Ka	At Rest Ko	Passive Kp
Controlled fill*, residual clay soils	19	26	0.40	0.55	2.5
Weathered rock	21	36	0.25	0.40	3.6

Notes: * Depends on fill material type and level of compaction. Assumes clayey material compacted under 'Level 1' inspection and testing.

Allowance should be made for hydrostatic pressure build-up behind the retaining wall. It is recommended that all retaining walls be drained for full height in order to minimise hydrostatic pressure build-up behind the wall. Additional guidelines on wall drainage are provided in Appendix G of AS 4678 (2002).

Allowance for surcharge loads and sloping crest should also be made as appropriate. The effect of surcharge should be included by multiplying the vertical pressure developed by the surcharge by the appropriate lateral earth pressure coefficient as given in Table 3.

Preference should be given to adopting thin soil layers and using small hand-controlled compaction equipment during backfilling against retaining walls. This is in order to limit the stress applied to the walls during construction. Should heavy compaction be required, then wall stresses will be well in excess of Ko and temporary propping should be used.

Clayey backfill should not be placed too dry of optimum moisture content, as this can lead to increased future swelling with changes to moisture content or inundation from water creating additional load on the back of the wall.

It is recommended that factors of safety of 2 against overturning and sliding stability and 1.5 for global stability, be adopted in the design of all retaining walls.

For limit state design methods, the ultimate parameters provided above in Table 3 will need to be factored in accordance with AS 4678. Guidance on the selection of material strength partial factors is provided in Section 5.2 of AS 4678 and is dependent upon the nature and state of the insitu soils.

5.2.3 Footing Design

Provided that earthworks is carried out in accordance with the recommendations in this report, it is considered that high level pad and/or strip footings founded in either controlled fill, competent residual soils or weathered rock may be adopted. Where the change in depth of fill is significant across a building platform (especially where there is cut to fill), the potential for differential movements should be noted, and if these are significant then piers through the fill and founding into natural should be adopted.

Slabs supported on high level footings should be stiffened to suit the expected ground surface movements due to potential soil reactivity. This should be confirmed following future site investigations on individual lots as required for building design.

'Pole' type houses are generally preferred on moderate to steeply sloping lots (if any), unless the buildings are benched into the hillslope.

Embedment required for retaining wall footings will be dependent on global stability checks as part of the retaining wall design.

All footing excavations should be inspected and tested by an experienced geotechnical to confirm bearing pressures prior to casting of concrete.

The above footing recommendations are considered to be the minimum requirements from a slope stability viewpoint and final footing design details will be dependent upon the extent of earthworks, proposed development loads and what is considered acceptable in terms of settlement and cost.

5.2.4 Drainage

For subdivisional works, all stormwater collected on site should be prevented from discharging directly onto the slope or from ponding on the proposed building envelopes. All stormwater and surface water is to be directed via an approved stormwater containment system in a controlled manner to appropriate discharge points.

6. References

AGS. (2007). *Practice Note Guidelines for Landslide Risk Management.* Australian Geomechnics, Volume 42, No 1: Australian Geomechanics Society, Landslide Taskforce, Landslide Practice Note Working Group.

AS 3798. (2007). *Guidelines on Earthworks for Commercial and Residential Developments.* Standards Australia.

AS 4678. (2002). *Earth-retaining structures.* Standards Australia.

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for Precinct 2 as part of the Edenbrook Estate, Edenbrook Drive, Parkhurst in accordance with DP's proposal 213255.00.P.001 dated 17 February 2022. This report is provided for the exclusive use of Hartecs Group Pty Ltd and Edenbrook Developments for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

DP's advice is based upon the conditions encountered during previous investigations and observed during the site walk-over. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

AGS Guidelines

APPENDIX C: – QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY (CONTINUED)

QUALITATIVE RISK ANALYSIS MATRIX – LEVEL OF RISK TO PROPERTY

LIKELIHOOD		CONSEQUENCES TO PROPERTY (With Indicative Approximate Cost of Damage)				
	Indicative Value of Approximate Annual Probability	1: CATASTROPHIC 200%	2: MAJOR 60%	3: MEDIUM 20%	4: MINOR 5%	5: INSIGNIFICANT 0.5%
A – ALMOST CERTAIN	10^{-1}	VH	VH	VH	H	M or **L** (5)
B - LIKELY	10^{-2}	VH	VH	H	M	**L**
C - POSSIBLE	10^{-3}	VH	H	M	M	**VL**
D - UNLIKELY	10^{-4}	H	M	**L**	**L**	**VL**
E - RARE	10^{-5}	M	**L**	**L**	**VL**	**VL**
F - BARELY CREDIBLE	10^{-6}	**L**	**VL**	**VL**	**VL**	**VL**

Notes: (5) For Cell A5, may be subdivided such that a consequence of less than 0.1% is Low Risk.

(6) When considering a risk assessment it must be clearly stated whether it is for existing conditions or with risk control measures which may not be implemented at the current time.

RISK LEVEL IMPLICATIONS

Risk Level		Example Implications (7)
VH	VERY HIGH RISK	Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work likely to cost more than value of the property.
H	HIGH RISK	Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property.
M	MODERATE RISK	May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as practicable.
L	LOW RISK	Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required.
VL	VERY LOW RISK	Acceptable. Manage by normal slope maintenance procedures.

Note: (7) The implications for a particular situation are to be determined by all parties to the risk assessment and may depend on the nature of the property at risk; these are only given as a general guide.

APPENDIX C: LANDSLIDE RISK ASSESSMENT

QUALITATIVE TERMINOLOGY FOR USE IN ASSESSING RISK TO PROPERTY

QUALITATIVE MEASURES OF LIKELIHOOD

Approximate Annual Probability		Implied Indicative Landslide Recurrence Interval		Description	Descriptor	Level
Indicative Value	**Notional Boundary**					
10^{-1}	5×10^{-2}	10 years	20 years	The event is expected to occur over the design life.	ALMOST CERTAIN	A
10^{-2}	5×10^{-3}	100 years	200 years	The event will probably occur under adverse conditions over the design life.	LIKELY	B
10^{-3}	5×10^{-4}	1000 years	2000 years	The event could occur under adverse conditions over the design life.	POSSIBLE	C
10^{-4}	5×10^{-5}	10,000 years	20,000 years	The event might occur under very adverse circumstances over the design life.	UNLIKELY	D
10^{-5}	5×10^{-6}	100,000 years	200,000 years	The event is conceivable but only under exceptional circumstances over the design life.	RARE	E
10^{-6}		1,000,000 years		The event is inconceivable or fanciful over the design life.	BARELY CREDIBLE	F

Note: (1) The table should be used from left to right; use Approximate Annual Probability or Description to assign Descriptor, not *vice versa*.

QUALITATIVE MEASURES OF CONSEQUENCES TO PROPERTY

Approximate Cost of Damage		Description	Descriptor	Level
Indicative Value	**Notional Boundary**			
200%	100%	Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage.	CATASTROPHIC	1
60%	40%	Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage.	MAJOR	2
20%	10%	Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage.	MEDIUM	3
5%	1%	Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works.	MINOR	4
0.5%		Little damage. (Note for high probability event (Almost Certain), this category may be subdivided at a notional boundary of 0.1%. See Risk Matrix.)	INSIGNIFICANT	5

Notes: (2) The Approximate Cost of Damage is expressed as a percentage of market value, being the cost of the improved value of the unaffected property which includes the land plus the unaffected structures.

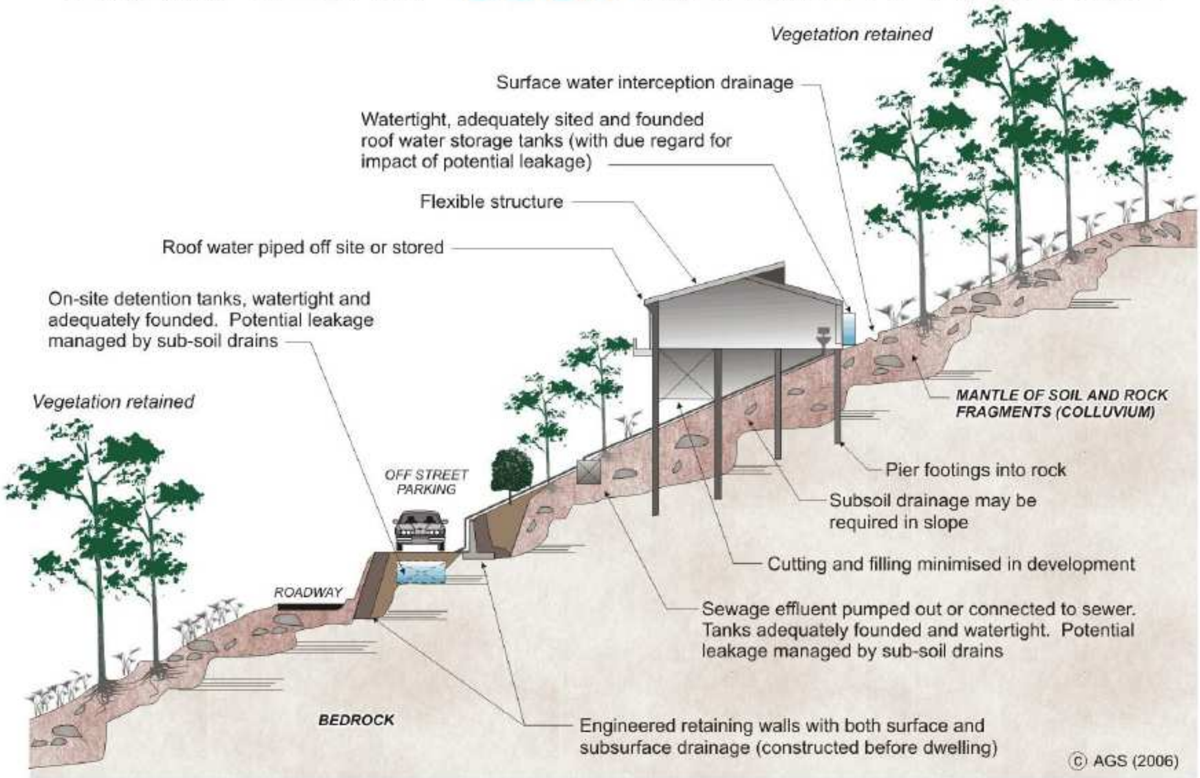
(3) The Approximate Cost is to be an estimate of the direct cost of the damage, such as the cost of reinstatement of the damaged portion of the property (land plus structures), stabilisation works required to render the site to tolerable risk level for the landslide which has occurred and professional design fees, and consequential costs such as legal fees, temporary accommodation. It does not include additional stabilisation works to address other landslides which may affect the property.

(4) The table should be used from left to right; use Approximate Cost of Damage or Description to assign Descriptor, not vice versa

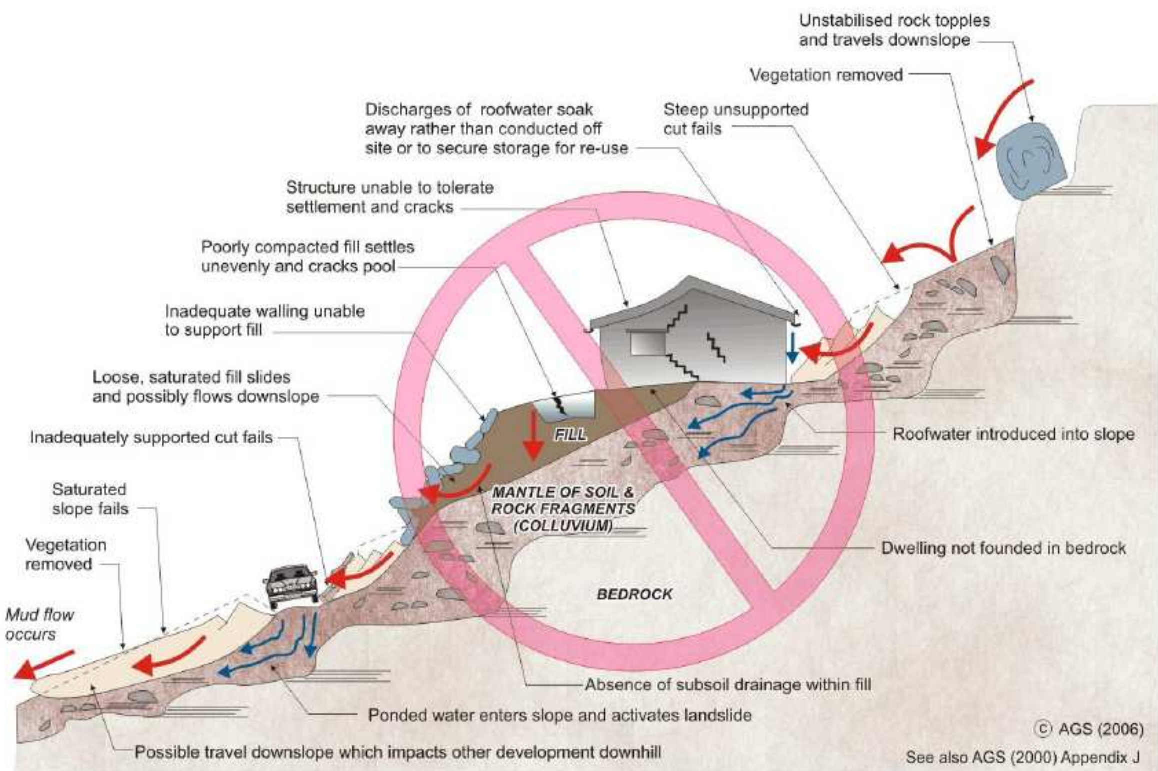
APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

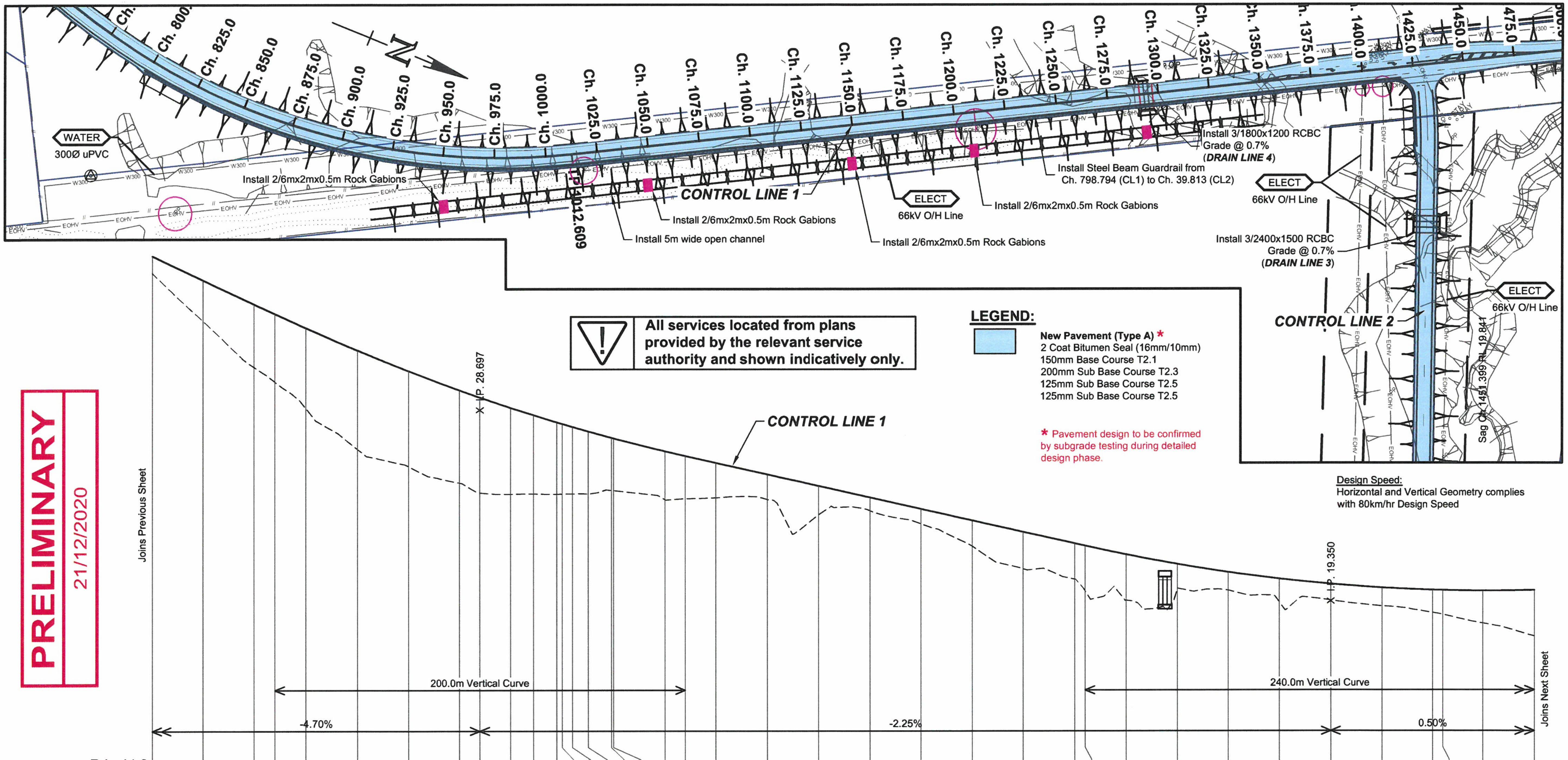
	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	

EXAMPLES OF GOOD HILLSIDE PRACTICE



EXAMPLES OF POOR HILLSIDE PRACTICE





PRELIMINARY
21/12/2020

CHAINAGE	CUT / FILL	DESIGN SURFACE	EXISTING SURFACE
800.000	+0.830	36.217	35.387
825.000	+1.986	35.042	33.056
850.000	+3.074	33.867	30.793
860.000	+3.324	33.397	30.073
875.000	+3.929	32.706	28.777
900.000	+4.834	31.615	26.781
925.000	+4.668	30.600	25.932
950.000	+4.534	29.662	25.128
960.000	+4.662	29.309	24.647
975.000	+4.216	28.801	24.585
985.971	+3.850	28.447	24.597
997.371	+3.512	28.095	24.583
1000.000	+3.425	28.016	24.591
1004.971	+3.269	27.869	24.600
1012.609	+3.053	27.649	24.596
1023.971	+2.571	27.335	24.764
1025.000	+2.555	27.308	24.753
1050.000	+2.363	26.676	24.313
1060.000	+2.086	26.445	24.359
1075.000	+1.705	26.107	24.402
1100.000	+1.228	25.544	24.316
1125.000	+1.418	24.981	23.563
1150.000	+0.650	24.418	23.768
1175.000	+0.728	23.854	23.126
1200.000	+1.260	23.291	22.031
1225.000	+1.803	22.728	20.925
1250.000	+1.746	22.165	20.419
1255.000	+2.214	22.053	19.839
1275.000	+2.247	21.625	19.378
1300.000	+1.225	21.155	19.930
1325.000	+0.887	20.757	19.870
1350.000	+1.132	20.431	19.299
1375.000	+0.797	20.176	19.379
1400.000	+0.897	19.992	19.095
1425.000	+1.107	19.881	18.774
1430.003	+1.186	19.867	18.681
1450.000	+1.588	19.841	18.253
1475.000	+1.440	19.065	17.625

HORIZONTAL GEOMETRY: 470.234m -R330.0m; 515.158m STRAIGHT

Surveyed: NS	Date: SEPT '20		
Ref Mark: PSM 207582	R.L. 18.946		
Datum: Horiz. GDA 2020 Vert. AHD			
Zone: 56	Survey Book: NS06		
XREF: 2020-229-00.dwg			
Aux Plans:			

SCALES: 0 20 40m Plan & Horiz. 1:2000; 0 2 4m Vertical 1:200; FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL________
RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 3 OF 4

Dwg No. 2020-229-05
Sheet No. 5 of 42
Job No: C.1077722.
A

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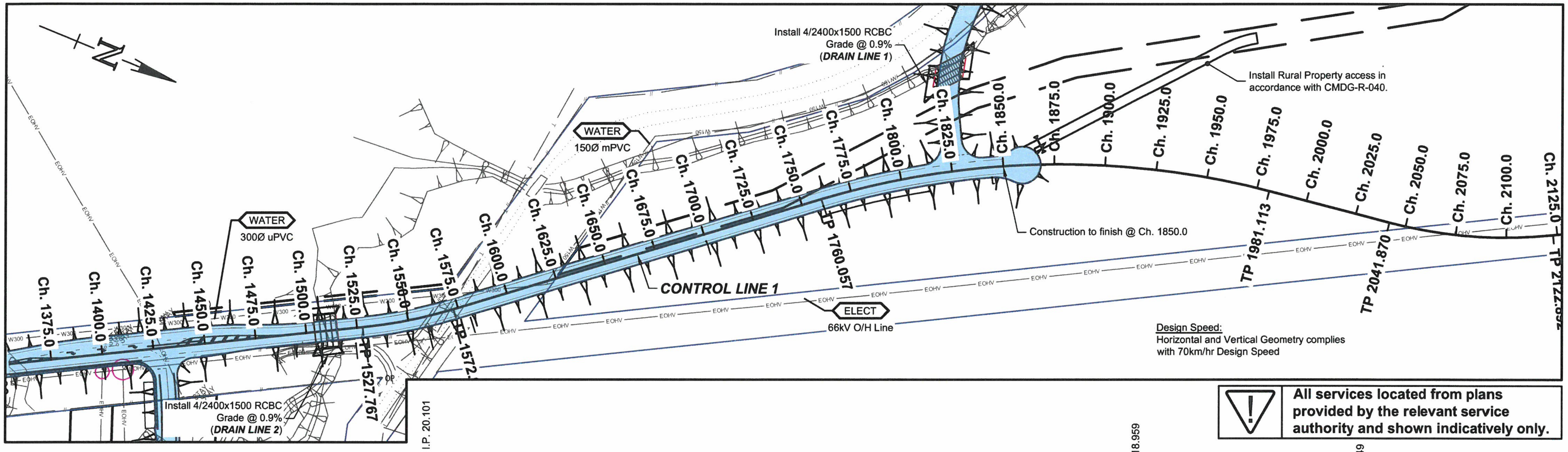
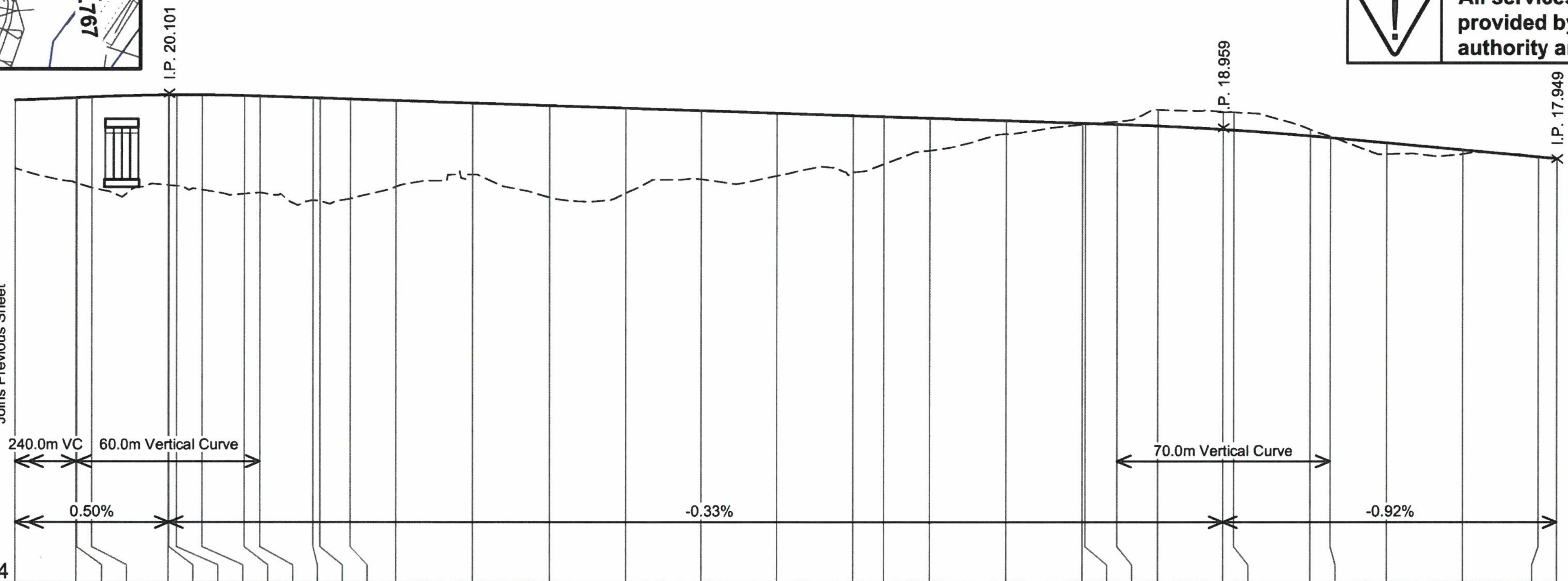


All services located from plans provided by the relevant service authority and shown indicatively only.

LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



R.L. 4

CUT / FILL	+2.248	+2.800	+2.809	+2.982	+2.959	+2.961	+2.987	+3.115	+3.224	+3.166	+3.368	+3.380
DESIGN SURFACE	19.873	19.950	19.951	19.973	20.039	20.039	20.041	20.040	20.018	20.002	19.945	19.937
EXISTING SURFACE	17.625	17.150	17.142	16.991	17.080	17.078	17.054	16.925	16.794	16.836	16.577	16.557
CHAINAGE	1475.000	1495.000	1495.236	1500.000	1525.000	1525.236	1527.767	1536.152	1550.000	1555.236	1572.657	1575.000

CUT / FILL	+3.272	+2.828	+2.351	+3.016	+2.796	+2.252	+2.063	+1.863	+1.552	+1.065	+0.443	+0.052
DESIGN SURFACE	19.904	19.854	19.772	19.689	19.607	19.524	19.442	19.359	19.326	19.277	19.194	19.112
EXISTING SURFACE	16.632	17.026	17.421	16.673	16.811	17.272	17.379	17.496	17.774	18.212	18.751	19.060
CHAINAGE	1584.881	1600.000	1625.000	1650.000	1675.000	1700.000	1725.000	1750.000	1760.057	1775.000	1800.000	1825.000

CUT / FILL	+0.041	-0.092	-0.532	-0.583	-0.585	-0.209	-0.043	+0.368	+0.136	-0.012	+0.000
DESIGN SURFACE	19.109	19.074	19.022	18.907	18.884	18.694	18.636	18.465	18.235	18.005	17.949
EXISTING SURFACE	19.068	19.166	19.554	19.490	19.469	18.903	18.679	18.097	18.099	18.017	17.949
CHAINAGE	1825.868	1836.475	1850.000	1871.475	1875.000	1900.000	1906.475	1925.000	1950.000	1975.000	1981.113

HORIZONTAL GEOMETRY	515.158m STRAIGHT	44.890m -R240.0m	187.400m STRAIGHT	221.055m R405.0m

PRELIMINARY
21/12/2020

Surveyed: NS	Date: SEPT '20		
Ref Mark: PSM 207582	R.L. 18.946		
Datum: Horiz. GDA 2020	Vert. AHD		
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Rockhampton Regional Council

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RPEQ No________ DATE________
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 1 - SHEET 4 OF 4

Dwg No. 2020-229-06
Sheet No. 6 of 42
Job No: C.1077722.
A

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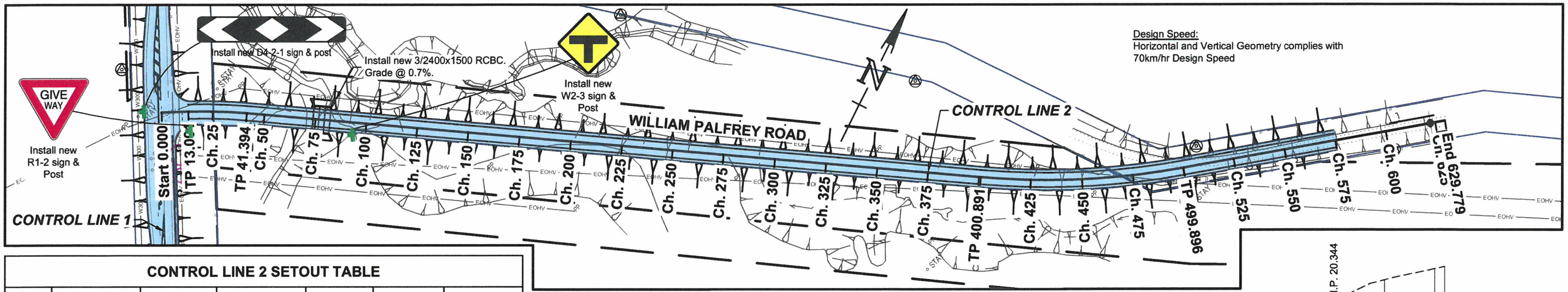


Design Speed:
Horizontal and Vertical Geometry complies with 70km/hr Design Speed

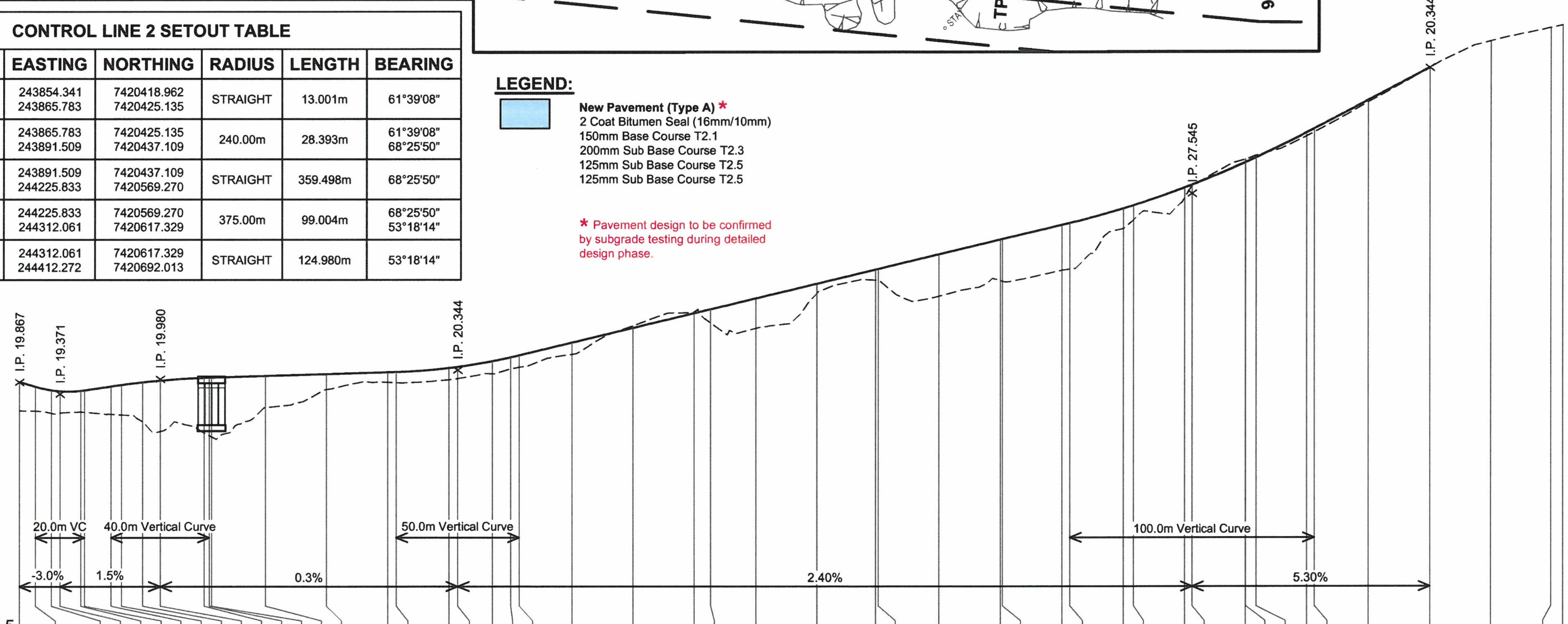
CONTROL LINE 2 SETOUT TABLE

	CHAINAGE	EASTING	NORTHING	RADIUS	LENGTH	BEARING
START END	0.000 13.001	243854.341 243865.783	7420418.962 7420425.135	STRAIGHT	13.001m	61°39'08"
TP TP	13.001 41.394	243865.783 243891.509	7420425.135 7420437.109	240.00m	28.393m	61°39'08" 68°25'50"
START END	41.394 400.891	243891.509 244225.833	7420437.109 7420569.270	STRAIGHT	359.498m	68°25'50"
TP TP	400.891 499.896	244225.833 244312.061	7420569.270 7420617.329	375.00m	99.004m	68°25'50" 53°18'14"
START END	499.896 624.875	244312.061 244412.272	7420617.329 7420692.013	STRAIGHT	124.980m	53°18'14"

LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



R.L. 9.5

CHAINAGE	CUT / FILL	DESIGN SURFACE	EXISTING SURFACE
0.000	+1.186	19.867	18.681
6.533	+0.995	19.671	18.676
13.001	+0.941	19.524	18.583
16.533	+0.891	19.484	18.593
25.000	+0.863	19.501	18.638
26.533	+0.894	19.521	18.627
37.083	+1.139	19.680	18.541
41.394	+1.226	19.741	18.515
50.000	+1.614	19.848	18.234
57.083	+2.078	19.920	17.842
75.000	+2.253	20.033	17.780
77.083	+2.378	20.040	17.662
78.015	+2.426	20.042	17.616
100.000	+1.309	20.108	18.799
125.000	+0.629	20.183	19.554
150.000	+0.409	20.258	19.849
153.462	+0.438	20.269	19.831
175.000	+0.480	20.431	19.951
178.462	+0.478	20.475	19.997
192.614	+0.518	20.708	20.190
200.000	+0.469	20.864	20.395
203.462	+0.485	20.944	20.459
225.000	+0.477	21.462	20.985
250.000	-0.090	22.063	22.153
275.000	-0.043	22.663	22.706
281.614	+0.548	22.822	22.274
300.000	+1.221	23.264	22.043
325.000	+0.391	23.865	23.474
348.872	+0.428	24.439	24.011
350.000	+0.465	24.466	24.001
375.000	+1.713	25.067	23.354
400.000	+1.674	25.667	23.993
400.891	+1.722	25.689	23.967
425.000	+1.856	26.268	24.412
428.122	+1.885	26.343	24.458
450.000	+0.825	26.938	26.113
454.028	+0.594	27.063	26.469
475.000	+0.425	27.788	27.363
478.122	+0.061	27.907	27.846
499.896	-0.129	28.814	28.943
500.000	-0.127	28.819	28.946
504.337	-0.087	29.016	29.103
525.000	+0.142	30.030	29.888
528.122	+0.144	30.195	30.051
550.000	+0.080	31.354	31.274
575.000	-0.006	32.679	32.685
600.000	-	-	33.764
625.000	-	-	34.307
629.779	-	-	34.411

HORIZONTAL GEOMETRY				
13.001m STRAIGHT	28.393m R240.0m	359.498m STRAIGHT	99.004m -R375.0m	129.883m STRAIGHT

PRELIMINARY 21/12/2020

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Surveyed: NS	Date: SEPT '20
Ref Mark: PSM 207582	R.L. 18.946
Datum: Horiz. GDA 2020 Vert. AHD	
Zone: 56	Survey Book: NS06
XREF: 2020-229-00.dwg	
Aux Plans:	

SCALES: 0 20 40m 1:2000 Plan & Horiz. — 0 2 4m 1:200 Vertical — FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
Checked		
Examined		
Recomm.		

APPROVAL ____________
RPEQ No ________ DATE ________
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 2

Dwg No. 2020-229-07
Sheet No. 7 of 42
Job No: C.1077722.
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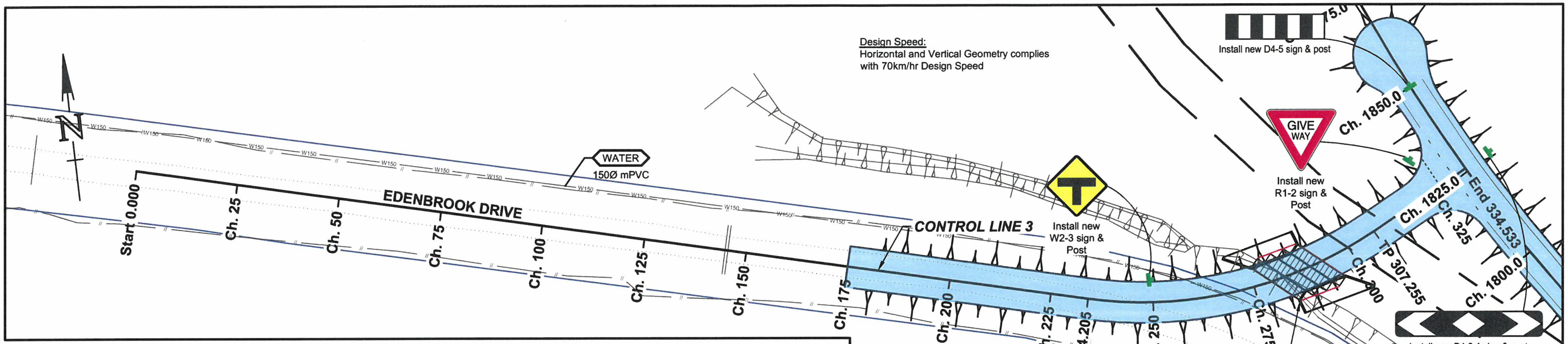


PRELIMINARY

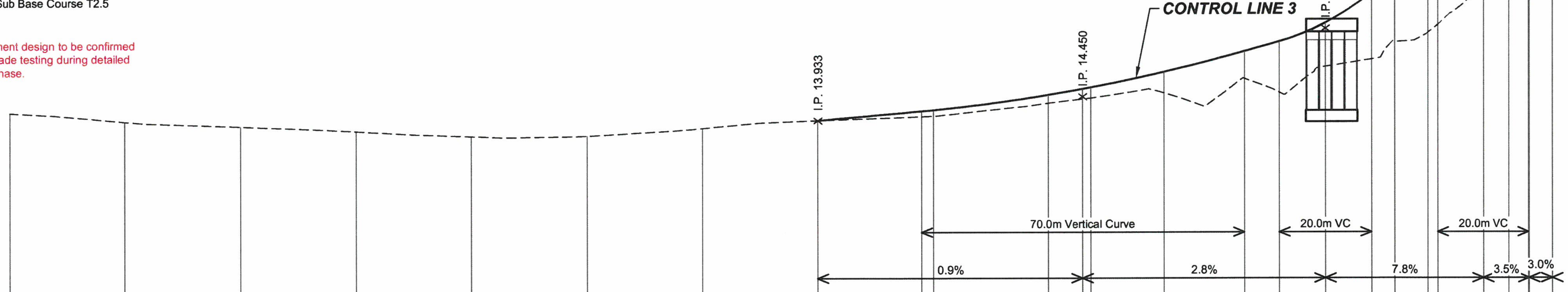
21/12/2020

CONTROL LINE 3 SETOUT TABLE						
	CHAINAGE	EASTING	NORTHING	RADIUS	LENGTH	BEARING
START END	0.000 234.205	243305.676 243532.674	7420778.745 7420721.089	STRAIGHT	234.205m	104°15'05"
TP TP	234.205 307.255	243532.674 243603.626	7420721.089 7420729.394	100.00m	73.050m	104°15'05" 62°23'49"
START END	307.255 334.533	243603.626 243627.799	7420729.394 7420742.033	STRAIGHT	27.278m	62°23'49"

LEGEND:

New Pavement (Type A) *
2 Coat Bitumen Seal (16mm/10mm)
150mm Base Course T2.1
200mm Sub Base Course T2.3
125mm Sub Base Course T2.5
125mm Sub Base Course T2.5

* Pavement design to be confirmed by subgrade testing during detailed design phase.



R.L. 9.5

CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT / FILL
0.000	14.118		
25.000	13.926		
50.000	13.817		
75.000	13.708		
100.000	13.598		
125.000	13.605		
150.000	13.767		
175.000	13.933	13.933	+0.000
197.427	14.015	14.135	+0.120
200.000	14.026	14.159	+0.133
225.000	14.307	14.486	+0.179
232.427	14.395	14.616	+0.221
234.205	14.416	14.649	+0.233
250.000	14.526	14.983	+0.457
267.427	14.837	15.430	+0.593
275.000	14.537	15.642	+1.105
285.000	15.096	16.047	+0.951
295.000	15.256	16.702	+1.446
300.000	15.641	17.092	+1.451
307.255	15.834	17.658	+1.824
309.385	16.004	17.824	+1.820
319.385	16.944	18.496	+1.552
325.000	17.611	18.780	+1.169
329.385	18.248	18.954	+0.706
329.530	18.271	18.959	+0.688
334.533	19.068	19.109	+0.041

HORIZONTAL GEOMETRY			
	234.205m STRAIGHT	73.050m R100.0m	27.278m STRAIGHT

Surveyed: NS	Date: SEPT '20	Ref Mark: PSM 207582	R.L. 18.946
Datum: Horiz. GDA 2020, Vert. AHD		Zone: 56	Survey Book: NS06
XREF: 2020-229-00.dwg		Aux Plans:	

SCALES: 0 10 20m 1:1000 Plan & Horiz.; 0 1.0 2.0m 1:100 Vertical; FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
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RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.

BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
WORKING PLAN - CONTROL LINE 3

Dwg No. 2020-229-08
Sheet No. 8 of 42
Job No: C.1077722.
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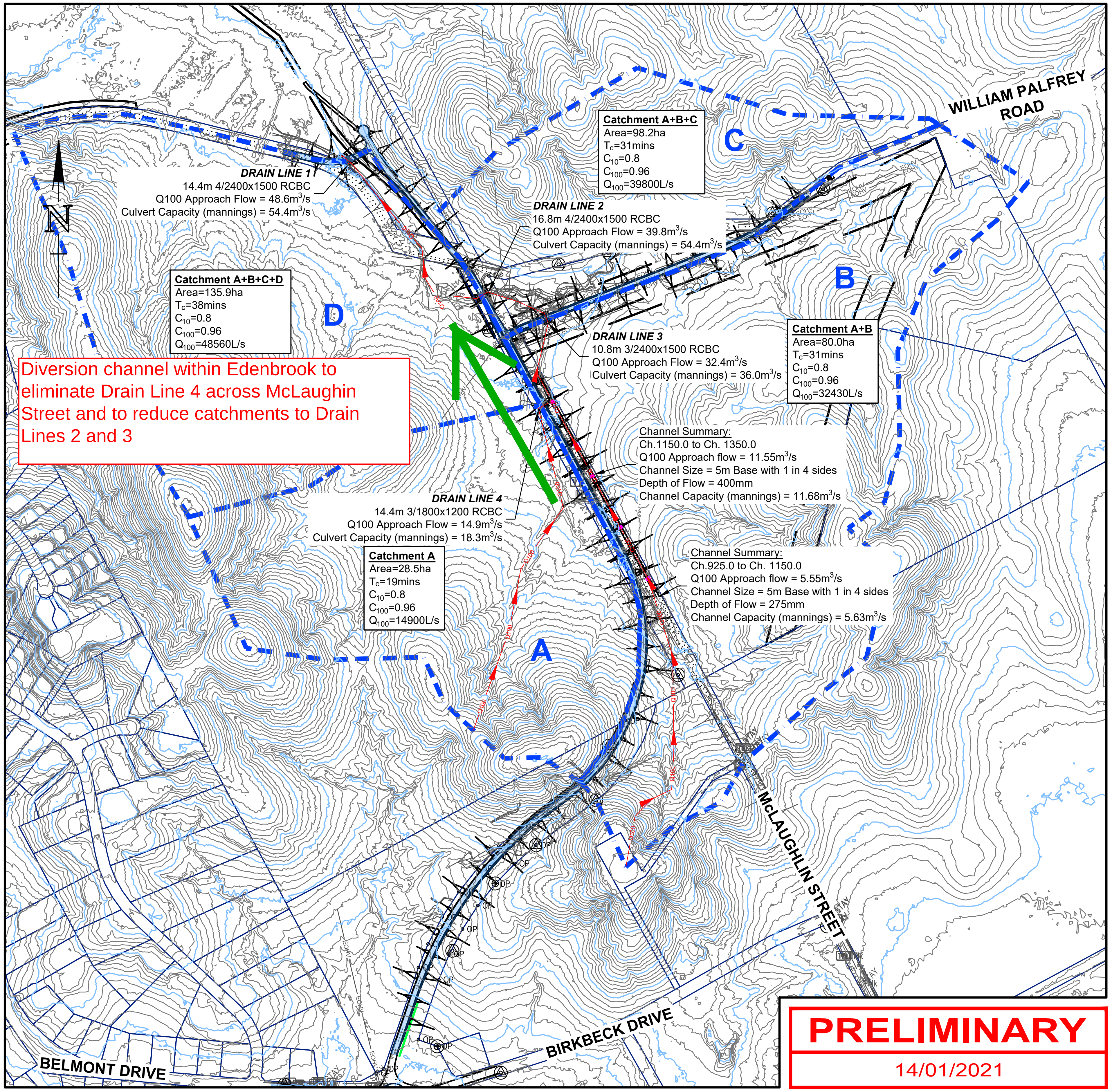
LEGEND:

Catchment Boundary



PRELIMINARY
14/01/2021

Surveyed: NS	Date: SEPT '20			
Ref Mark: PSM 207582	R.L. 18.946			
Datum: Horiz. GDA 2020 Vert. AHD				
Zone: 56	Survey Book:NS06			
XREF: 2020-229-00.dwg				
Aux Plans:				

SCALES: 0 75 150m Plan 1:7500 — FULL SIZE A3

	AMENDMENTS DESCRIPTION	DRAWN	APPR'D	DATE
A	Original Issue	ARM		

Rockhampton Regional Council

Designed	ARM	OCT '20
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Examined		
Recomm.		

APPROVAL__________
RPEQ No______ DATE______
MANAGER INFRASTRUCTURE PLANNING

ALEXANDRA STREET EXT.
BELMONT DR TO EDENBROOK DR (PARKHURST)
ROADWORKS CONSTRUCTION
DRAINAGE CATCHMENT PLAN

Dwg No. 2020-229-09
Sheet No. 9 of 42
Job No: C.1077722.
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