

Our Ref: 24001 OW Submission Kenneally Road

Monday, 20 May 2024

The Chief Executive Officer

Mareeba Shire Council

PO Box 154

MAREEBA QLD 4880

Attention: Carl Ewin

Dear Carl,

OPERATIONAL WORKS SUBMISSION**RAL 1 LOT INTO 3 (RAL23/0001)****9 KENNEALLY RD, MAREEBA (L1 RP725088)**

We refer to Mareeba Shire Council's (Council) Decision Notice RAL23/0001 (DN) dated 23 March 2023 for 9 Kenneally Road. Applin Consulting has been engaged to document the civil Operational Works (OW) plans associated with the reconfiguration and to submit and compile a response to Council's relevant civil conditions within the DN.

Attached for your information and action are the following:

- Compliance Assessment fees to be invoiced amounting to \$507.00 – (1.5% of construction estimate below)

Item	Rate	Amount
Survey setout	Item	\$1,500
Driveway		
Excavate	Item	\$5,000
Gravel	25m3@\$100	\$2,500
Seal	160m2@\$25	\$4,200
Water	42m@\$100	\$4,200
Kerb/Invert	120m@\$70	\$8,400
Rock protection	Item	\$2,500
Conduits	40m@\$100	\$4,000
Seed	Item	\$500
As Con	Item	\$1,000
TOTAL		\$33,800
Fee (1.5%)		\$507.00

- Civil Construction Drawings (1 x A3 PDF set: 24001-C001 (A) to C006 (A))
- DA Form 1
- OPW Checklist
- Certified Statement of Compliances
- Site SWMP

Also find below our responses to the relevant conditions, which are repeated below in the order in which it appeared in the DN for RAL23/0001.

3 General

3.4 The developer must relocate (in accordance with FNQROC standards) any services such as water, sewer, drainage, telecommunications and electricity that are not wholly located within the lots that are being created/serviced where required by the relevant authority unless approved by Council's delegated officer

Complied with.

Stage 1 works do not require any relocations.

3.7 All works must be designed, constructed and carried out in accordance with FNQROC Development Manual requirements and to the satisfaction of Council's delegated officer.

Complied with.

All proposed works are to FNQROC standards.

4 Infrastructure Services and Standards

4.1 Access

4.1.1 An access crossover must be upgraded/constructed to each lot (from the edge of the road to the property boundary) in accordance with FNQROC Development Manual Standards (as amended), to the satisfaction of Council's delegated officer.

Complied with. A standard FNQROC type access has been proposed.

4.1.2 A reinforced concrete/asphalt driveway shall be provided within access handle of proposed Lot 3. The driveway must:

- (i) have a minimum formation width of 3 metres;
- (ii) be constructed for the full length of the access handle and include an access crossover
- (iii) be formed with one-way cross fall to cater for stormwater drainage such that any stormwater runoff is contained within the access handle; and
- (iv) include service and utility conduits provided for the full length of the access handle.;

Complied. An asphalt/bitumen surface driveway was chosen over concrete to provide a more rural feel.

4.2 Stormwater Drainage

4.2.1 The applicant/developer must take all necessary steps to ensure a non- worsening effect on surrounding land as a consequence of the development and must take all reasonable and practical measures to ensure discharge occurs in compliance with the Queensland Urban Drainage Manual (QUDM) and the FNQROC Development Manual, to the satisfaction of Council's delegated officer.

Complied. The site drainage discharge point remains generally as is with minor modifications being made to divert the existing drainage path away from the downstream owner's property to ensure it is protected.

- 4.2.2 The applicant/developer must submit a Stormwater Management Plan and Report prepared and certified by a suitably qualified design engineer (RPEQ) that meets or exceeds the standards of design and construction set out in the Queensland Urban Drainage Manual (QUDM) and the FNQROC Development Manual, to the satisfaction of Council's delegated officer.

The Stormwater Management Plan must identify the necessary stormwater management measures for each stage of the development.

Any stormwater channels through private property must be registered, with the easement for drainage purposes in favour of the benefitted lot/s.

Complied. Refer submitted SWMP.

- 4.2.3 The applicant/developer must construct the stormwater drainage infrastructure in accordance with the approved Stormwater Management Plan and/or Stormwater Quality Management Plan and Report.

Complied.

- 4.2.4 All stormwater drainage must be discharged to an approved legal point of discharge.

Complied. The site drainage discharge point remains generally as is with minor modifications being made to divert the existing drainage path away from the downstream owner's property to ensure it is protected.

4.3 Water Supply

- 4.3.1 Where the existing reticulated water supply does not currently service the site or is not at an adequate capacity, the developer is required to extend or upgrade the reticulated water supply infrastructure to connect the site to Council's existing infrastructure at a point that has sufficient capacity to service the development in accordance with FNQROC Development Manual standards (as amended).

Noted. The water main has been extended to the frontage of proposed lot 2.

- 4.3.2 A water service connection must be provided to each proposed lot in accordance with FNQROC Development Manual standards (as amended) to the satisfaction of Council's delegated officer.

Noted. The watermain has been extended to allow this to occur.

4.4 On-Site Wastewater Management

At the time of construction of any future dwelling on proposed Lots 1 and/or 3, any associated on-site effluent disposal system must be constructed in compliance with the latest version On-

Site Domestic Wastewater Management Standard (ASNZ1547) to the satisfaction of the Council's delegated officer.

Noted

4.5 Electricity provision/supply

The applicant/developer must ensure that an appropriate level of electricity supply is provided to each allotment in accordance with FNQROC Development Manual standards (as amended) to the satisfaction of Council's delegated officer.

Written advice from an Electricity Service Provider is to be provided to Council indicating that an agreement has been made for the provision of power reticulation.

Noted. The works are being undertaken by Ergon.

4.6 Telecommunications

The applicant/developer must demonstrate that a connection to the national broadband network is available for each allotment, or alternatively, enter into an agreement with a telecommunication carrier to provide telecommunication services to each lot and arrange provision of necessary conduits and enveloping pipes.

Noted. The works are being undertaken by NBN.

We trust the above and attached is sufficient for Council's purposes and allows Council to finalise the Operational Works Approval for the civil plans submitted.

Please do not hesitate to contact the undersigned should you have any further questions in relation to this matter.

Yours faithfully
APPLIN CONSULTING

GREG APPLIN
B Eng (Civil) RPEQ 6073

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DA Form 1 – Development application details

Approved form (version 1.4 effective 15 December 2023) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) and parts 4 to 6 of *DA Form 2 – Building work details*.

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*. For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (individual or company full name)	D and K Graham
Contact name (only applicable for companies)	C/- Greg Applin – Applin Consulting
Postal address (P.O. Box or street address)	19 Mullins Street
Suburb	Whitfield
State	QLD
Postcode	4870
Country	Australia
Contact number	0414 768 109
Email address (non-mandatory)	greg@applinconsulting.com.au
Mobile number (non-mandatory)	0414 768 109
Fax number (non-mandatory)	n/a
Applicant's reference number(s) (if applicable)	n/a

2) Owner's consent	
2.1) Is written consent of the owner required for this development application?	
<input type="checkbox"/> Yes – the written consent of the owner(s) is attached to this development application	
<input checked="" type="checkbox"/> No – proceed to 3)	

PART 2 – LOCATION DETAILS

3) Location of the premises (complete 3.1) or 3.2), and 3.3) as applicable)

Note: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see [DA Forms Guide: Relevant plans](#).

3.1) Street address and lot on plan

- ☐ Street address **AND** lot on plan (all lots must be listed), **or**
☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises (appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).

a)	Unit No.	Street No.	Street Name and Type	Suburb
		9	Kenneally Road	Mareeba
	Postcode	Lot No.	Plan Type and Number (e.g. RP, SP)	Local Government Area(s)
	4880	1	RP725088	Mareeba Shire Council
b)	Unit No.	Street No.	Street Name and Type	Suburb
	Postcode	Lot No.	Plan Type and Number (e.g. RP, SP)	Local Government Area(s)

3.2) Coordinates of premises (appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)

Note: Place each set of coordinates in a separate row.

- ☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) (if applicable)
		<input type="checkbox"/> WGS84 <input type="checkbox"/> GDA94 <input type="checkbox"/> Other:	

- ☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) (if applicable)
		<input type="checkbox"/> 54 <input type="checkbox"/> 55 <input type="checkbox"/> 56	<input type="checkbox"/> WGS84 <input type="checkbox"/> GDA94 <input type="checkbox"/> Other:	

3.3) Additional premises

- ☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application
☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

- ☐ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:

- ☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:

Name of port authority for the lot:

- ☐ In a tidal area

Name of local government for the tidal area (if applicable):

Name of port authority for tidal area (if applicable):

- ☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*

Name of airport:

<input type="checkbox"/> Listed on the Environmental Management Register (EMR) under the <i>Environmental Protection Act 1994</i>
EMR site identification: <input type="text"/>
<input type="checkbox"/> Listed on the Contaminated Land Register (CLR) under the <i>Environmental Protection Act 1994</i>
CLR site identification: <input type="text"/>

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see [DA Forms Guide](#).

- ☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application
- ☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

- ☐ Material change of use ☐ Reconfiguring a lot ☒ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

- ☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

- ☒ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots):*

Operational work for a new driveway and services to create additional lot

e) Relevant plans

Note: *Relevant plans are required to be submitted for all aspects of this development application. For further information, see [DA Forms guide: Relevant plans](#).*

- ☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

- ☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

- ☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

- ☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots):*

e) Relevant plans

Note: *Relevant plans are required to be submitted for all aspects of this development application. For further information, see [DA Forms Guide: Relevant plans](#).*

- ☐ Relevant plans of the proposed development are attached to the development application

6.3) Additional aspects of development

- ☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
- ☒ Not required

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	<input type="checkbox"/> Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	<input type="checkbox"/> Yes – complete division 2
Operational work	<input checked="" type="checkbox"/> Yes – complete division 3
Building work	<input type="checkbox"/> Yes – complete <i>DA Form 2 – Building work details</i>

Division 1 – Material change of use

Note: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition (include each definition in a new row)	Number of dwelling units (if applicable)	Gross floor area (m ²) (if applicable)
8.2) Does the proposed use involve the use of existing buildings on the premises?			
<input type="checkbox"/> Yes			
<input type="checkbox"/> No			

Division 2 – Reconfiguring a lot

Note: This division is only required to be completed if any part of the development application involves reconfiguring a lot.

9.1) What is the total number of existing lots making up the premises?	
9.2) What is the nature of the lot reconfiguration? (tick all applicable boxes)	
<input type="checkbox"/> Subdivision (complete 10))	<input type="checkbox"/> Dividing land into parts by agreement (complete 11))
<input type="checkbox"/> Boundary realignment (complete 12))	<input type="checkbox"/> Creating or changing an easement giving access to a lot from a constructed road (complete 13))

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				
10.2) Will the subdivision be staged?				
<input type="checkbox"/> Yes – provide additional details below				
<input type="checkbox"/> No				
How many stages will the works include?				
What stage(s) will this development application apply to?				

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m ²)	Lot on plan description	Area (m ²)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? (attach schedule if there are more than two easements)				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? (e.g. pedestrian access)	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

Note: This division is only required to be completed if any part of the development application involves operational work.

14.1) What is the nature of the operational work?	
<input type="checkbox"/> Road work <input checked="" type="checkbox"/> Drainage work <input type="checkbox"/> Landscaping <input checked="" type="checkbox"/> Other – please specify:	<input type="checkbox"/> Stormwater <input checked="" type="checkbox"/> Earthworks <input type="checkbox"/> Signage <input checked="" type="checkbox"/> Water infrastructure <input type="checkbox"/> Sewage infrastructure <input type="checkbox"/> Clearing vegetation
Driveway	
14.2) Is the operational work necessary to facilitate the creation of new lots? (e.g. subdivision)	
<input checked="" type="checkbox"/> Yes – specify number of new lots:	
<input type="checkbox"/> No	
14.3) What is the monetary value of the proposed operational work? (include GST, materials and labour)	
\$33,800	

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application
16) Has the local government agreed to apply a superseded planning scheme for this development application?
<input type="checkbox"/> Yes – a copy of the decision notice is attached to this development application <input type="checkbox"/> The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached <input checked="" type="checkbox"/> No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?

Note: A development application will require referral if prescribed by the Planning Regulation 2017.

☒ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the Planning Act 2016:**

- ☐ Clearing native vegetation
- ☐ Contaminated land (*unexploded ordnance*)
- ☐ Environmentally relevant activities (ERA) (*only if the ERA has not been devolved to a local government*)
- ☐ Fisheries – aquaculture
- ☐ Fisheries – declared fish habitat area
- ☐ Fisheries – marine plants
- ☐ Fisheries – waterway barrier works
- ☐ Hazardous chemical facilities
- ☐ Heritage places – Queensland heritage place (*on or near a Queensland heritage place*)
- ☐ Infrastructure-related referrals – designated premises
- ☐ Infrastructure-related referrals – state transport infrastructure
- ☐ Infrastructure-related referrals – State transport corridor and future State transport corridor
- ☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
- ☐ Infrastructure-related referrals – near a state-controlled road intersection
- ☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
- ☐ Koala habitat in SEQ region – key resource areas
- ☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
- ☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
- ☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
- ☐ Ports – Brisbane core port land – hazardous chemical facility
- ☐ Ports – Brisbane core port land – taking or interfering with water
- ☐ Ports – Brisbane core port land – referable dams
- ☐ Ports – Brisbane core port land – fisheries
- ☐ Ports – Land within Port of Brisbane's port limits (*below high-water mark*)
- ☐ SEQ development area
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
- ☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use
- ☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity
- ☐ SEQ northern inter-urban break – community activity
- ☐ SEQ northern inter-urban break – indoor recreation
- ☐ SEQ northern inter-urban break – urban activity
- ☐ SEQ northern inter-urban break – combined use
- ☐ Tidal works or works in a coastal management district
- ☐ Reconfiguring a lot in a coastal management district or for a canal
- ☐ Erosion prone area in a coastal management district
- ☐ Urban design
- ☐ Water-related development – taking or interfering with water
- ☐ Water-related development – removing quarry material (*from a watercourse or lake*)
- ☐ Water-related development – referable dams
- ☐ Water-related development – levees (*category 3 levees only*)
- ☐ Wetland protection area

Matters requiring referral to the local government: <input type="checkbox"/> Airport land <input type="checkbox"/> Environmentally relevant activities (ERA) <i>(only if the ERA has been devolved to local government)</i> <input type="checkbox"/> Heritage places – Local heritage places
Matters requiring referral to the Chief Executive of the distribution entity or transmission entity: <input type="checkbox"/> Infrastructure-related referrals – Electricity infrastructure
Matters requiring referral to: <ul style="list-style-type: none"> • The Chief Executive of the holder of the licence, if not an individual • The holder of the licence, if the holder of the licence is an individual <input type="checkbox"/> Infrastructure-related referrals – Oil and gas infrastructure
Matters requiring referral to the Brisbane City Council: <input type="checkbox"/> Ports – Brisbane core port land
Matters requiring referral to the Minister responsible for administering the Transport Infrastructure Act 1994: <input type="checkbox"/> Ports – Brisbane core port land <i>(where inconsistent with the Brisbane port LUP for transport reasons)</i> <input type="checkbox"/> Ports – Strategic port land
Matters requiring referral to the relevant port operator , if applicant is not port operator: <input type="checkbox"/> Ports – Land within Port of Brisbane's port limits <i>(below high-water mark)</i>
Matters requiring referral to the Chief Executive of the relevant port authority: <input type="checkbox"/> Ports – Land within limits of another port <i>(below high-water mark)</i>
Matters requiring referral to the Gold Coast Waterways Authority: <input type="checkbox"/> Tidal works or work in a coastal management district <i>(in Gold Coast waters)</i>
Matters requiring referral to the Queensland Fire and Emergency Service: <input type="checkbox"/> Tidal works or work in a coastal management district <i>(involving a marina (more than six vessel berths))</i>

18) Has any referral agency provided a referral response for this development application?		
<input type="checkbox"/> Yes – referral response(s) received and listed below are attached to this development application <input checked="" type="checkbox"/> No		
Referral requirement	Referral agency	Date of referral response
Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application <i>(if applicable)</i> .		

PART 6 – INFORMATION REQUEST

19) Information request under Part 3 of the DA Rules
<input checked="" type="checkbox"/> I agree to receive an information request if determined necessary for this development application <input type="checkbox"/> I do not agree to accept an information request for this development application
Note: By not agreeing to accept an information request I, the applicant, acknowledge:
<ul style="list-style-type: none"> • that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties • Part 3 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules.
Further advice about information requests is contained in the DA Forms Guide .

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? (e.g. a preliminary approval)

- ☒ Yes – provide details below or include details in a schedule to this development application
☐ No

List of approval/development application references	Reference number	Date	Assessment manager
<input type="checkbox"/> Approval <input checked="" type="checkbox"/> Development application	RAL23/0001	23 March 2023	Carl Ewin
<input type="checkbox"/> Approval <input type="checkbox"/> Development application			

21) Has the portable long service leave levy been paid? (only applicable to development applications involving building work or operational work)

- ☐ Yes – a copy of the receipted QLeave form is attached to this development application
☐ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid
☒ Not applicable (e.g. building and construction work is less than \$150,000 excluding GST)

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
\$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

- ☐ Yes – show cause or enforcement notice is attached
☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

- ☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below
☒ No

Note: Application for an environmental authority can be found by searching “ESR/2015/1791” as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

- ☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

- ☐ Yes – Form 69: Notification of a facility exceeding 10% of schedule 15 threshold is attached to this development application
☒ No

Note: See www.business.qld.gov.au for further information about hazardous chemical notifications.

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

Note: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.
2. See <https://www.qld.gov.au/environment/land/vegetation/applying> for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

Note: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

Note: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.des.qld.gov.au for further information.

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the Water Act 2000?**

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

Note: Contact the Department of Natural Resources, Mines and Energy at www.dnrme.qld.gov.au for further information.

DA templates are available from <https://planning.dsdmp.qld.gov.au/>. If the development application involves:

- Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1
- Taking or interfering with water in a watercourse, lake or spring: complete DA Form 1 Template 2
- Taking overland flow water: complete DA Form 1 Template 3.

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from <https://planning.dsdmp.qld.gov.au/>. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☐ Yes – an associated resource allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☒ No

Note: See guidance materials at www.daf.qld.gov.au for further information.

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000*?

- ☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development
☒ No

Note: Contact the Department of Natural Resources, Mines and Energy at www.dnrme.qld.gov.au and www.business.qld.gov.au for further information.

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995*?

- ☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development
☒ No

Note: Contact the Department of Environment and Science at www.des.qld.gov.au for further information.

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the *Water Supply Act*)?

- ☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the *Water Supply Act* is attached to this development application
☒ No

Note: See guidance materials at www.dnrme.qld.gov.au for further information.

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

- ☐ Yes – the following is included with this development application:
- ☐ Evidence the proposal meets the code for assessable development that is prescribed tidal work (*only required if application involves prescribed tidal work*)
 - ☐ A certificate of title
- ☒ No

Note: See guidance materials at www.des.qld.gov.au for further information.

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

- ☐ Yes – details of the heritage place are provided in the table below
☒ No

Note: See guidance materials at www.des.qld.gov.au for information requirements regarding development of Queensland heritage places.

Name of the heritage place:		Place ID:	
-----------------------------	--	-----------	--

Brothels

23.14) Does this development application involve a **material change of use for a brothel**?

- ☐ Yes – this development application demonstrates how the proposal meets the code for a development application for a brothel under Schedule 3 of the *Prostitution Regulation 2014*
☒ No

Decision under section 62 of the Transport Infrastructure Act 1994

23.15) Does this development application involve new or changed access to a state-controlled road?

- ☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)
☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.16) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

Note: See guidance materials at www.planning.dsdmip.qld.gov.au for further information.

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist

I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17

☒ Yes

Note: See the Planning Regulation 2017 for referral requirements

If building work is associated with the proposed development, Parts 4 to 6 of [DA Form 2 – Building work details](#) have been completed and attached to this development application

☐ Yes

☒ Not applicable

Supporting information addressing any applicable assessment benchmarks is with the development application

Note: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see [DA Forms Guide: Planning Report Template](#).

☒ Yes

Relevant plans of the development are attached to this development application

Note: Relevant plans are required to be submitted for all aspects of this development application. For further information, see [DA Forms Guide: Relevant plans](#).

☒ Yes

The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued (see 21)

☐ Yes

☒ Not applicable

25) Applicant declaration

☒ By making this development application, I declare that all information in this development application is true and correct

☐ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001*

Note: It is unlawful to intentionally provide false or misleading information.

Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website.

Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where:

- such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or
- required by other legislation (including the *Right to Information Act 2009*); or
- otherwise required by law.

This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002*.

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment			
<i>Note: For completion by assessment manager if applicable</i>			
Description of the work			
QLeave project number			
Amount paid (\$)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

Name of Council: Mareeba Shire Council

Development Name and Location: 9 Kenneally Road - Reconfiguration 1 Lot into 3 Subdivision

Planning Permit No/Council File No:RAL/ ..23...../ 0001.....

<u>DESIGN SUBMISSION</u>	<u>CHECK</u>	<u>COMMENT</u>
1. Completed 'Statement of Compliance' form. (FNQROC - AP1 – Appendix A)	Y	
2. IDAS Forms A ,E & IDAS Assessment Checklist (Available from www.ipa.qld.gov.au)	Y	IDAS Form 1 attached
3. Payment of Engineering Application Fees (Copy of receipt to be attached)	N	These will be paid upon receipt of Council's Tax Invoice as detailed in the covering letter
4. Copy of Decision Notice for Development Application Conditions, <u>inc. explanation of how each condition is to be addressed (Statement of Compliance)</u>	Y	
5. Engineering Design drawings - Complete sets (1 x A1 set, 2 x A3 sets and 1 x electronic copy on compact disc in 'PDF' format)	N	A set of drawings in PDF format are attached
6. One copy of Design and Standard Specifications (Unbound Copy Preferable)	N	As per FNQROC Development Manual as shown on the drawings
7. Written consent from adjoining property owners authorising any works on their property	N.A.	
8. Water reticulation network in electronic format (Engineer to confirm system requirements and compatibility with Cairns Water)	N.A.	
9. Landscape drawings - Complete set (1 x A1 set, 2 x A3 sets and 1 x electronic copy on compact disc in 'PDF' format). These must be accompanied by elements of the stormwater & street ltg. layout design, to avoid conflicts.	N/A	



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

<u>DESIGN SUBMISSION</u>	<u>CHECK</u>	<u>COMMENT</u>
10. Overall network drawings (for staged development) for:	Y	
• Water	Y	
• Stormwater	Y	
• Sewer	N/A	
• Pathways and roads	N/A	Domestic gravel driveway only
• Street Lighting	N/A	
• Electrical	N/A	Works will be D and C by Ergon
• Gas	N/A	
• Public Transport	N/A	
• Park Reserves	N/A	
• Drainage Reserves		
11. Pavement design criteria	N/A	
12. Geotechnical reports for proposed earthworks	N.A.	
13. Structural and geotechnical certificates for retaining walls etc.	N.A.	
14. Water supply/sewerage pump station design parameters	N.A.	
15. Stormwater drainage calculations	Y	
16. Erosion and Sediment Control Strategy (ESCS)	Y	
17. Declared Pest Management Plan (if applicable)	N.A.	
18. The approval of any other Authorities & concurrence agencies likely to be affected by the works.	N.A.	



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

19. Contact details of the Consulting Engineer who is submitting the Application:

Name of Engineer	Gregory M Applin	
Name of Company	Applin Consulting	
Telephone Number (s)	Office:	Mobile: 0414 768 109
Email address	greg@applinconsulting.com.au	
RPEQ No.	6073	

20. Date of submission of application / / 200

(For further information on all of the above refer to the FNQROC Development Manual Section AP1)

FNQROC DEVELOPMENT MANUAL

Council
(INSERT COUNCIL NAME)

STATEMENT OF COMPLIANCE OPERATIONAL WORKS DESIGN

This form duly completed and signed by an authorised agent of the Designer shall be submitted with the Operational Works Application for Council Approval.

Name of Development

Location of Development

Applicant

Designer

It is hereby certified that the Calculations, Drawings, Specifications and related documents submitted herewith have been prepared, checked and amended in accordance with the requirements of the FNQROC Development Manual and that the completed works comply with the requirements therein, **except** as noted below.

Compliance with the requirements of the Operational Works Design Guidelines	Non-Compliance refer to non-compliance report / drawing number
Plan Presentation	
Geotechnical requirements	
Geometric Road Design	
Pavements	
Structures / Bridges	
Subsurface Drainage	
Stormwater Drainage	
Site Re-grading	
Erosion Control and Stormwater Management	
Pest Plant Management	
Cycleway / Pathways	

Landscaping	
Water Source and Disinfection/Treatment Infrastructure (if applicable)	
Water Reticulation, Pump Stations and water storages	
Sewer Reticulation and Pump Stations	
Electrical Reticulation and Street Lighting	
Public Transport	
Associated Documentation/ Specification	
Priced Schedule of Quantities	
Referral Agency Conditions	
Supporting Information (AP1.08)	
Other	

Conscientiously believing the above statements to be true and correct, signed on behalf of:

Designer **RPEQ No**

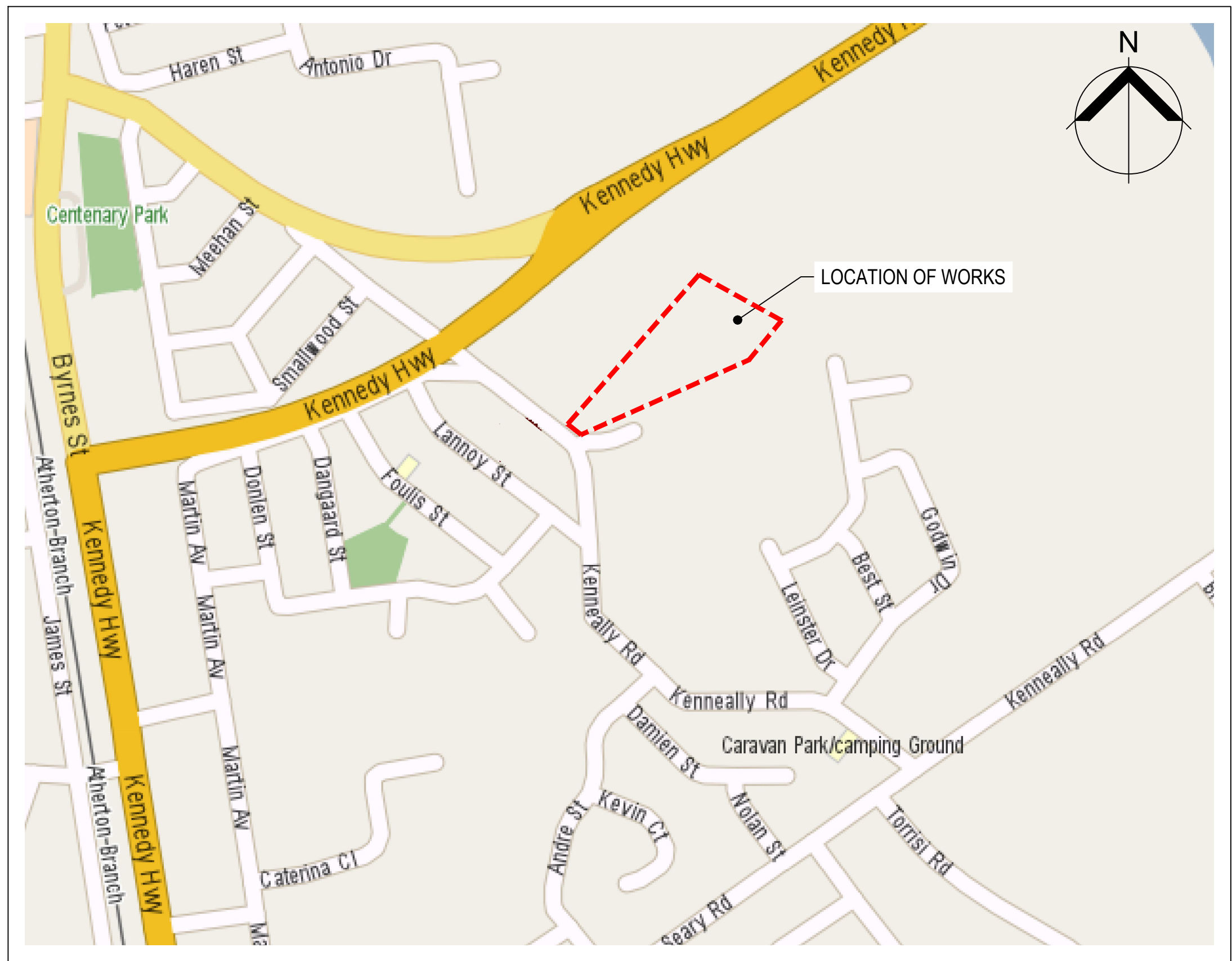
Name in Full

Signature **Date**

RESIDENTIAL SUBDIVISION

9 KENNEALLY ROAD (LOT 1 RP725088), MAREEBA

STAGE 1



LOCALITY PLAN
NOT TO SCALE

DRAWING LIST	
DRG No.	DRAWING TITLE
24001-C001	COVER SHEET, LOCALITY PLAN AND DRAWING INDEX
24001-C002	OVERALL SITE PLAN
24001-C003	PROPERTY ACCESS & DRAINAGE PLAN
24001-C004	SETOUT PLAN AND TYPE SECTIONS
24001-C005	LONGITUDINAL SECTIONS
24001-C006	WATER RETICULATION PLAN

A	ISSUED FOR APPROVAL	GB	GA	03/05/24
REV	DESCRIPTION	DRN	APP	DATE
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		G. APPLIN		6073

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M 0414 768 109 | E greg@applinconsulting.com.au

SCALES

CLIENT

D & K GRAHAM

DESIGNED
G. BROWNING

DRAWN
G. BROWNING

CHECKED
G. APPLIN

PROJECT
RESIDENTIAL SUBDIVISION
9 KENNEALLY RD (LOT 1 RP725088) - STAGE 1

TITLE
**COVER SHEET, LOCALITY PLAN AND
DRAWING INDEX**

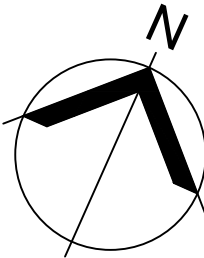
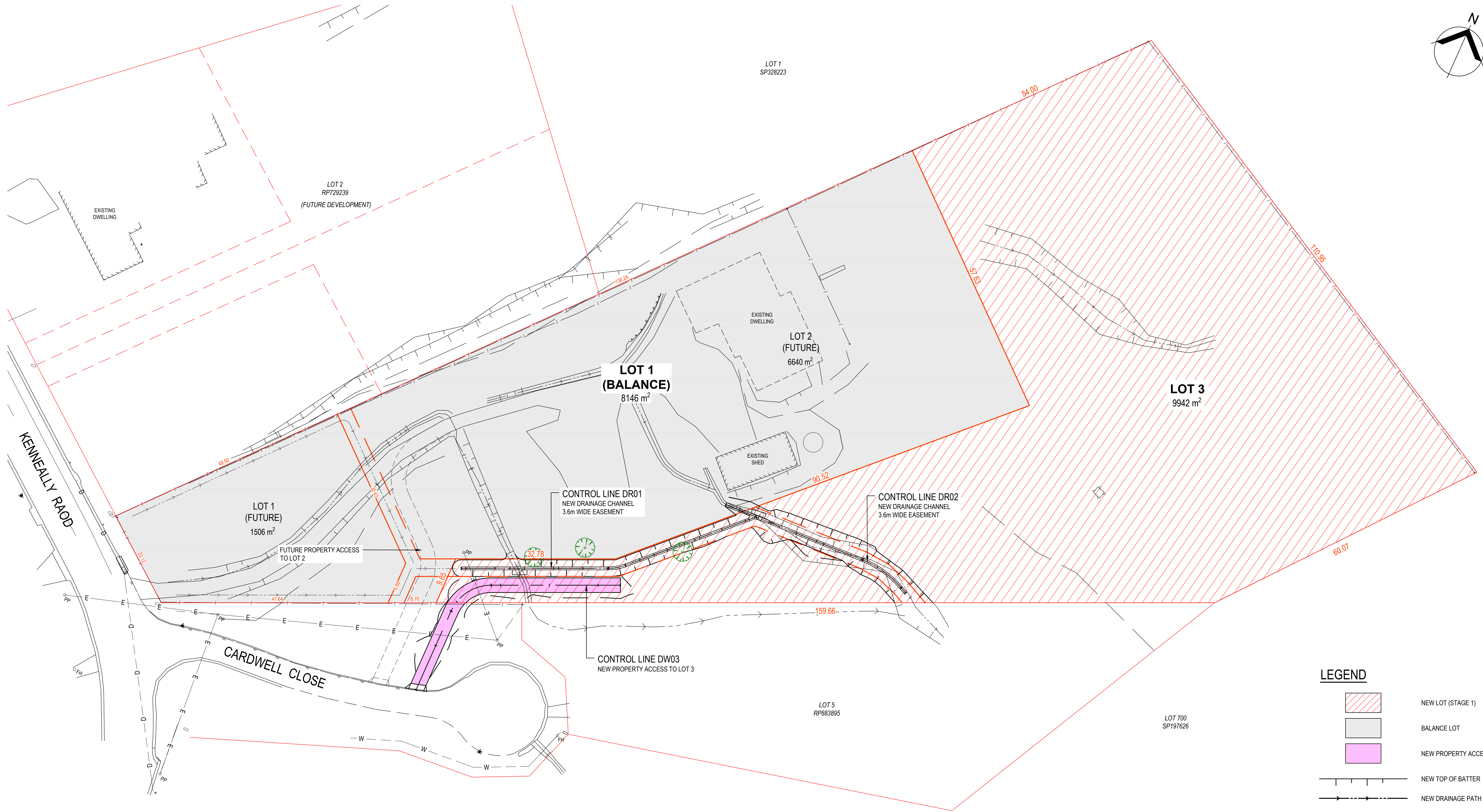
STATUS
FOR APPROVAL

SCALE (AT FULL SIZE)
-

SIZE
A1

DRAWING NUMBER
24001-C001

REVISION
A



LEGEND

- NEW LOT (STAGE 1)
- BALANCE LOT
- NEW PROPERTY ACCESS
- NEW TOP OF BATTER
- NEW DRAINAGE PATH
- EXISTING TOP OF BANK
- EXISTING DRAINAGE PATH
- EXISTING STRUCTURE

PLAN

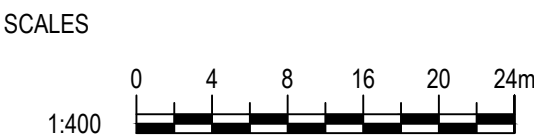
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		DRN	APP	DATE
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		G. APPLIN		6073

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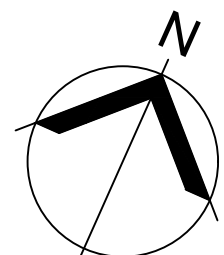
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PROJECT
RESIDENTIAL SUBDIVISION
9 KENEALLY RD (LOT 1 RP725088) - STAGE 1

TITLE
OVERALL SITE PLAN

STATUS FOR APPROVAL	
SCALE (AT FULL SIZE) 1:400	SIZE A1
DRAWING NUMBER 24001-C002	REVISION A



SURVEY CONTROL

- LEVEL DATUM: AHD (D)
ORIGIN OF LEVELS: PM 114590
MERIDIAN: MGA ZONE 55

GENERAL NOTES

- ## EROSION AND SEDIMENT CONTROL NOTES

- ## EARTHWORKS NOTES









- ## PROPERTY ACCESS NOTES

- ## CONCRETE NOTES

1. ALL CONCRETE WORKS (INCLUDING THE SUPPLY, PLACEMENT, COMPACTION, REINFORCEMENT AND FINISHING) SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT FNQROC DEVELOPMENT MANUAL SPECIFICATION - S7 'CONCRETE WORKS'.

PLAN

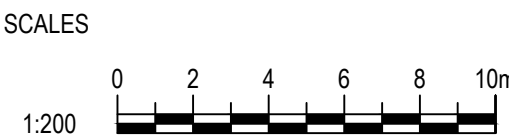
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	EXISTING ELECTRICITY (O)HEAD
	EXISTING POWER POLE
	EXISTING COMMS PIT
	EXISTING FIRE HYDRANT
	EXISTING SURVEY MARK
	EXISTING SURFACE CONTOURS (0.2m INTERVAL, INDEXED AT 1.0m)
	EXISTING SURFACE CONTOURS (0.2m INTERVAL, INDEXED AT 1.0m)
	SAND BAG CHECK DAM (ESC MEASURE - REFER NOTES)



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PROJECT
RESIDENTIAL SUBDIVISION

TITLE

**PROPERTY ACCESS AND DRAINAGE
PLAN**

STATUS

FOR APPROVAL

SCALE (AT FULL SIZE)
1:200

SIZE
A1

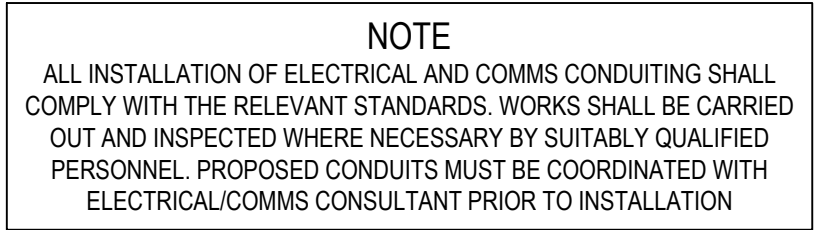
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24001-C003

REVISION

A



CONTROL LINE DR02 (DRAIN 02)								
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START	0.000	333163.533	8118351.560	409.014	87°59'47.78"	LINE		30.303
TC	30.303	333193.817	8118352.619	406.001	87°59'47.78"	ARC	20.000	9.768
CT	40.071	333203.278	8118350.610	405.119	115°58'49.84"	LINE		1.429
END	41.500	333204.562	8118349.985	404.990	115°58'49.84"			



SERVICES TRENCHING DETAIL
TYPE C
N.T.S.



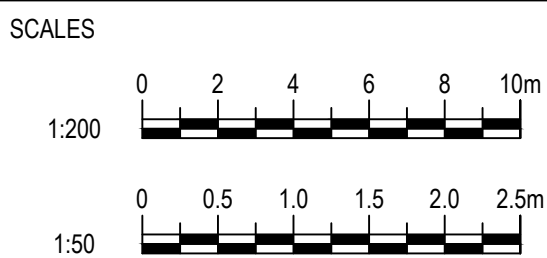
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CHECKED	G. APPLIN

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www.byda.com.au

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AS SHOWN	A1
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24001-C004	A

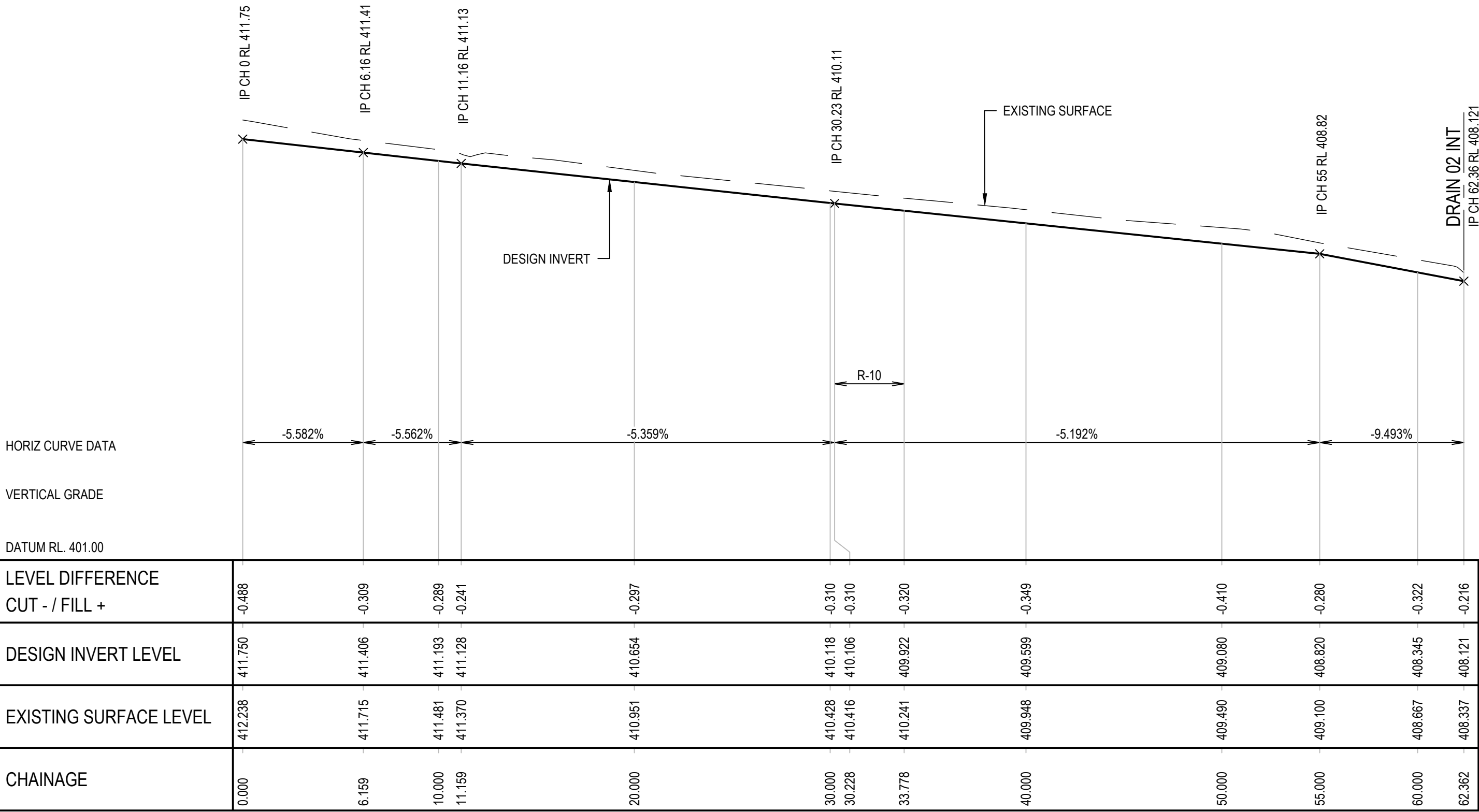
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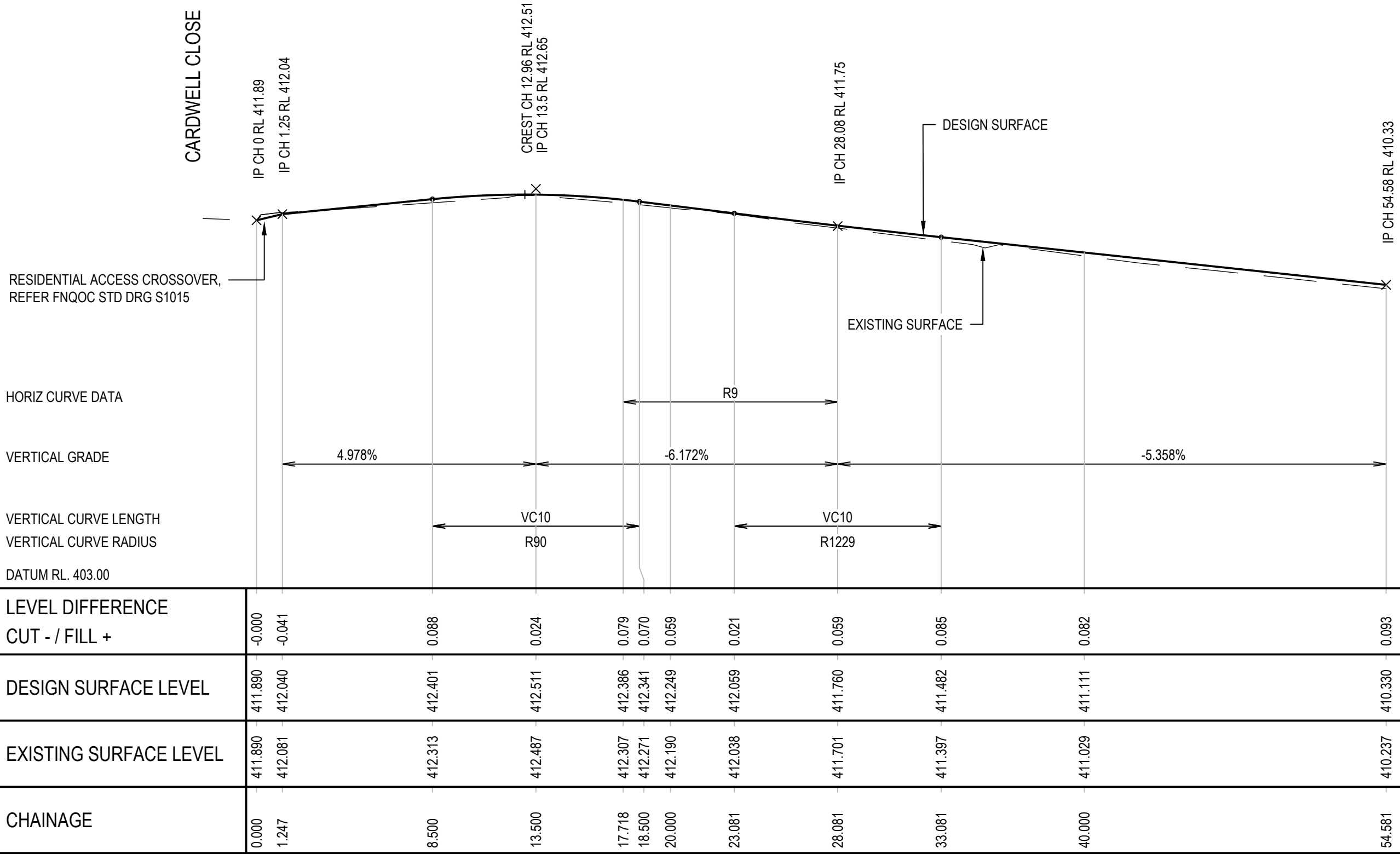
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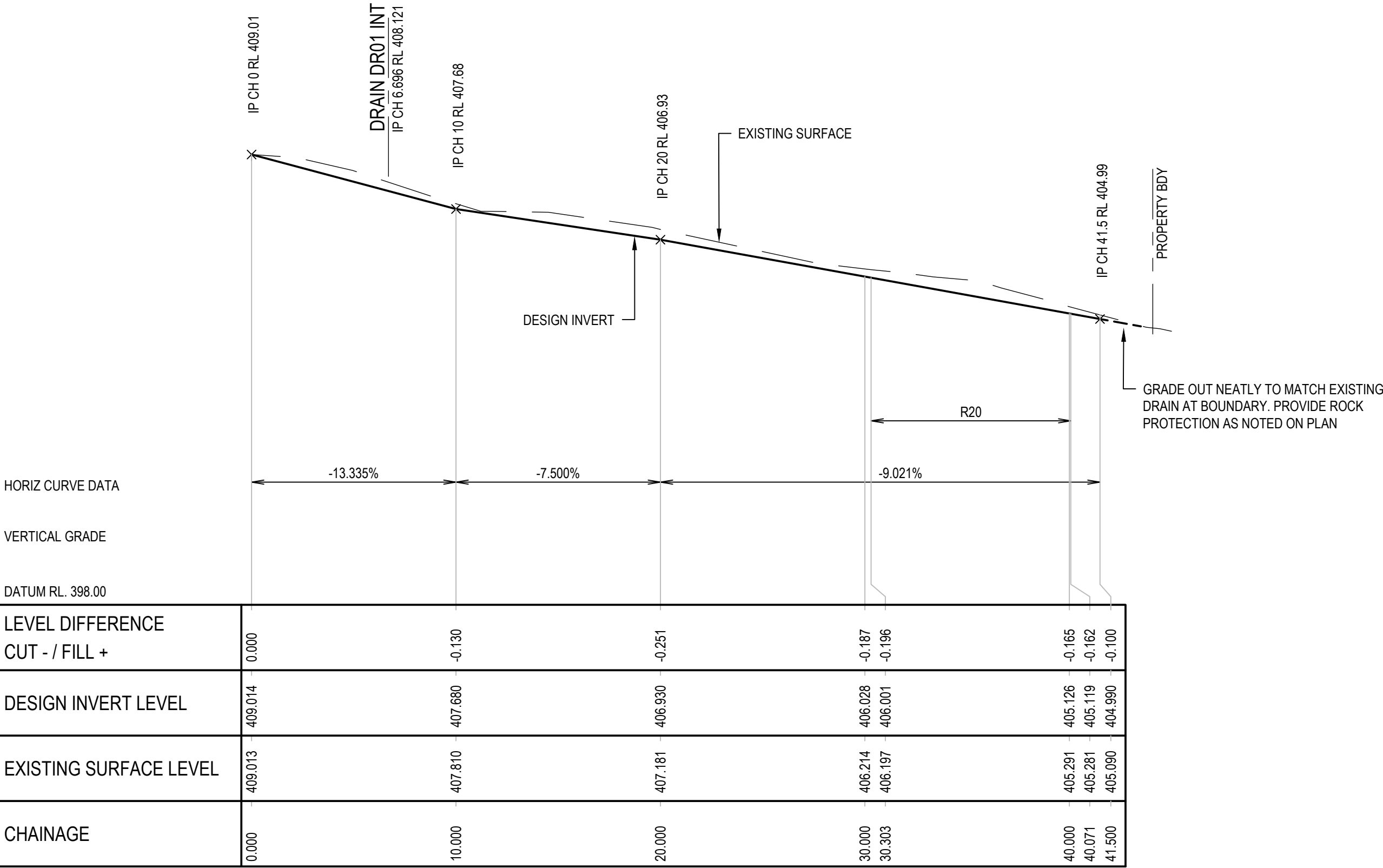
LONGITUDINAL SECTION - DRAIN DR01

HORZ 1:200 / VERT 1:100



LONGITUDINAL SECTION - ACCESS DW03

HORZ 1:200 / VERT 1:100



LONGITUDINAL SECTION - DRAIN DR02

HORZ 1:200 / VERT 1:100

NOTES

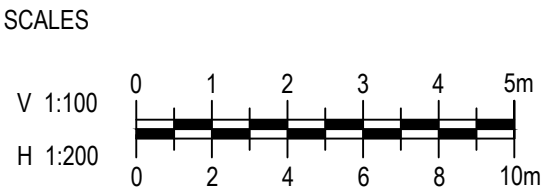
- REFER DRG 24001-C003 FOR NOTES.
- REFER DRG DRG 24001-C004 FOR SETOUT AND TYPE SECTIONS.



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		G. APPLIN		6073

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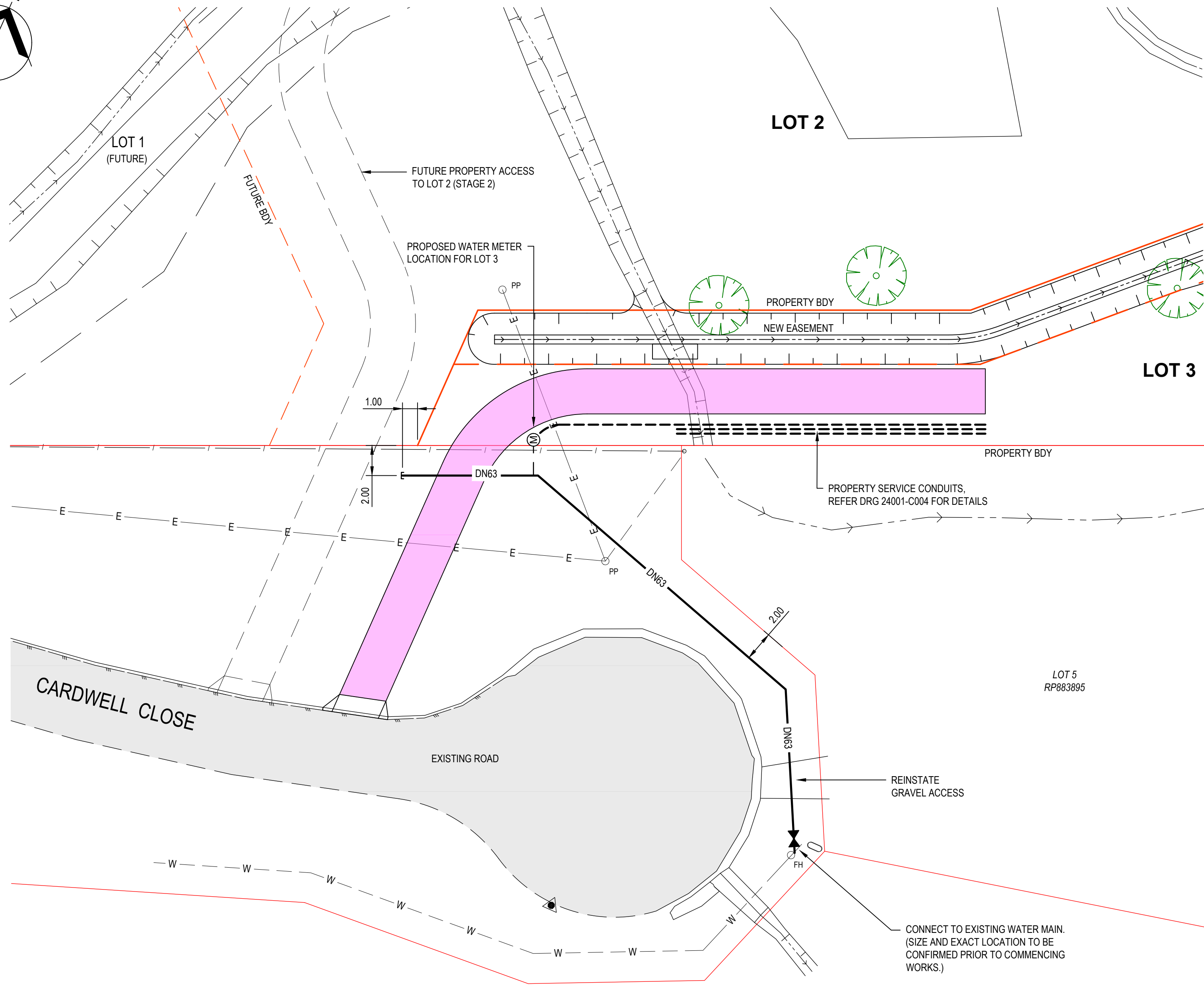
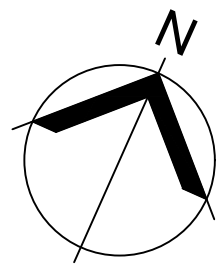
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CHECKED	G. APPLIN	

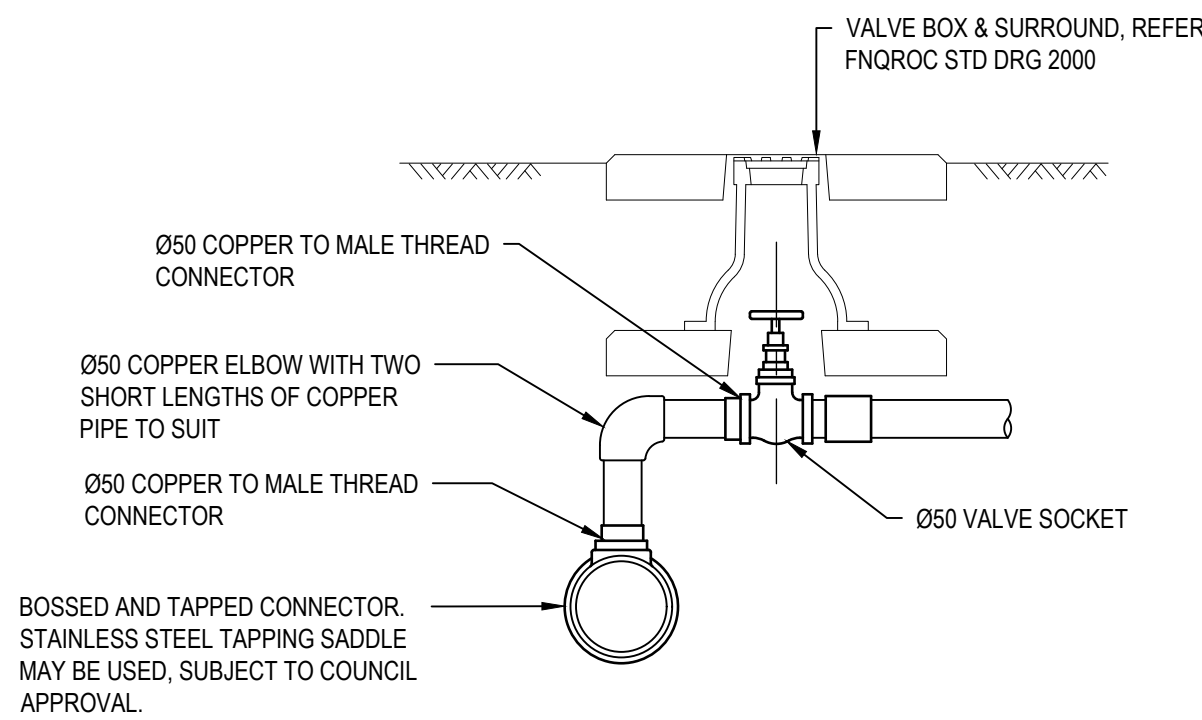
PROJECT	
RESIDENTIAL SUBDIVISION	
9 KENNEALLY RD (LOT 1 RP725088) - STAGE 1	
TITLE	
LONGITUDINAL SECTIONS	

STATUS	
FOR APPROVAL	
SCALE (AT FULL SIZE)	SIZE
1:200H / 1:100V	A1
DRAWING NUMBER	REVISION
24001-C005	A



PLAN
SCALE 1:200

NOTE
THE CONTRACTOR MUST CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS. THE EXACT LOCATION AND SIZE OF THE EXISTING WATER MAIN SHALL BE CONFIRMED PRIOR TO COMMENCING WORKS.



DN63 MAIN CONNECTION
NTS

LEGEND

- EXISTING ROADWAY
- NEW PROPERTY ACCESS
- DN63 PE100 MAIN PN16
- NEW VALVE
- NEW ENDCAP
- EXISTING WATER MAIN
- EXISTING FIRE HYDRANT
- EXISTING ROAD EDGE
- EXISTING ELECTRICITY (O/HEAD)
- EXISTING POWER POLE
- EXISTING COMMS PIT

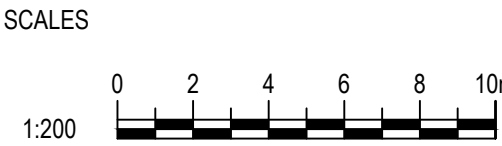
NOTES

- ALL WATER RETICULATION WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT FNQROC DEVELOPMENT MANUAL SPECIFICATION - S5 'WATER RETICULATION'.
- FOR MAIN TRENCHING AND BEDDING DETAILS REFER FNQROC STD DRAWING S2016. ENSURE COVER TO WATER MAINS IS 900mm MINIMUM UNDER ROADWAYS AND 600mm MINIMUM ELSEWHERE.
- ALL VALVES SHALL BE INSTALLED IN ACCORDANCE WITH MAREEBA SHIRE COUNCIL STD DRG S2000.
- WHERE NON-METALIC PIPES ARE LAID, A CONTINUOUS STEEL WIRE, 1.6mm MIN DIAMETER SHALL BE LAID IMMEDIATELY ABOVE THE FILL SAND TO ASSIST IN FUTURE LOCATION. THE WIRE SHALL BE WRAPPED ONCE AROUND ALL HYDRANTS AND VALVES.
- COUNCIL MUST BE CONTACTED TO PERFORM ANY DIRECT CONNECTION OR ALTERATION TO LIVE WATER MAINS. THE CONTRACTOR SHALL LODGE WITH COUNCIL THE APPROPRIATE APPLICATION FORMS AND FEES FOR THESE WORKS TO BE COMPLETED. IT MAY BE POSSIBLE FOR SOME WORKS TO BE PERFORMED BY THE CONTRACTOR UNDER SPECIAL CIRCUMSTANCES AND SUBJECT TO APPROPRIATE CONDITIONS AGREED TO WITH COUNCIL.
- ROAD MARKERS SHALL BE PROVIDED TO ALL VALVES AS PER MAREEBA SHIRE COUNCIL STD DRG S2000.
- THE MINIMUM TEST PRESSURE FOR ALL PIPES SHALL BE 1250KPa. THE CONTRACTOR SHALL GIVE COUNCIL'S WATER OFFICER 24 HOURS MINIMUM NOTICE PRIOR TO TESTING.



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PROJECT
RESIDENTIAL SUBDIVISION
9 KENNEALLY RD (LOT 1 RP725088) - STAGE 1

TITLE
WATER RETICULATION PLAN

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9 KENNEALLY ROAD
MAREEBA QLD 4880

STORMWATER MANAGEMENT
PLAN AND REPORT

CLIENT	D & K GRAHAM
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8 MAY 2024

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APPENDIX A CATCHMENT CALCULATIONS

APPENDIX B OPEN DRIAN CALCULATIONS

1 Introduction

1.1 Project Description and Background

Applin Consulting has been commissioned by D & K Graham to undertake a stormwater management plan and report in support of the application for an Operational Works Permit for Reconfiguring a Lot – Subdivision (1 Lots into 3 Lots in (2) stages) at 9 Kenneally Road, Mareeba.

Mareeba Shire Council has conditioned the stormwater drainage associated with the reconfiguration must take all necessary steps to ensure a non-worsening effect on the surrounding land in compliance with the Queensland Urban Drainage Manual (QUDM) and the FNQROC development manual.

The footprint of the development has no impact on the external upstream catchment; therefore, it has been proposed to upgrade the stormwater drainage of the lot only as shown in Figure 1 below:



Figure 1. Kenneally Road Development Site

2 Stormwater Drainage and Management

2.1 Catchments

2.1.1 External Catchments

The external catchments are to the North and West of the development site and have been analysed further to determine if any flows from these catchments contribute to the site flows.

2.1.1.1 North External Catchment

The North external catchment was approximated using QGlobe and is shown in Figure 2 below.



Figure 2: North External Catchment

The Caravan Park accommodation buildings along the southwestern boundary have a raised floor level such that the service road acts as the overland flow path for the site directing all site flows towards the northeast boundary of the property, shown in Figure 3.

The stormwater flows from the caravan park have no impact on the development site therefore this site is not included in the external catchment flowing into the site.

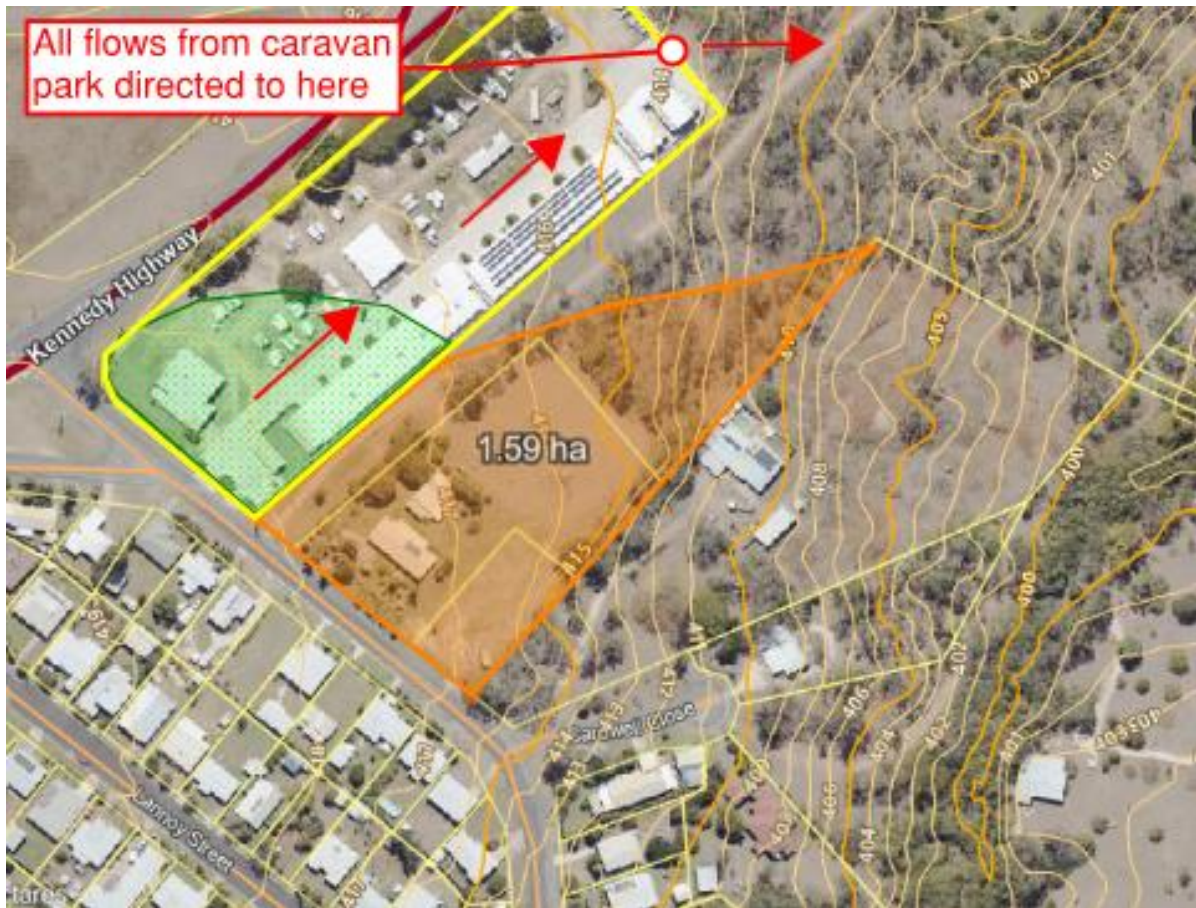


Figure 3: Revised North External Catchment

2.1.1.2 West External Catchment

The West external catchment was approximated using QGlobe and is shown in Figure 4 below.



Figure 4: West External Catchment

Q100 flows for the West external catchment have been calculated in Table 1 below and the capacity of Kenneally Road has been checked to determine if the west external catchment bypasses the site.

Table 1: Q100 Flows West External Catchment

CATCHMENT	AREA (APPROX.)	O/L FLOW LENGTH	O/L FLOW SLOPE %	T'C (FIG 4.4 - QUDM)	C 100 I 100	Q 100
1 (W)	2.57Ha	460 m	2%	8 min	0.96 245 mm/hr	1.7 m ³ /s

The Kenneally Road capacity is calculated below to determine if these flows bypass the site via Kenneally Road.

2.1.1.3 Kenneally Road Capacity Check

Kenneally Road has a 10m wide pavement with a longitudinal slope of around 2% along the section of Kenneally Road which continues past the site. Assuming a depth of flow 0.2m (50mm above the top of kerb), as shown in Figure 5 below the half road capacity is 1.56 m³/s and a full road capacity of 3.12 m³/s.

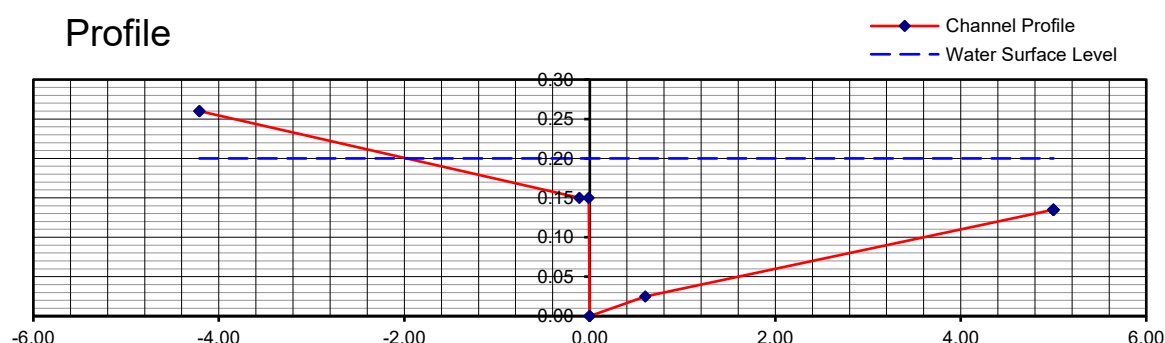


Figure 5: Kenneally Road Profile

The calculated Q100 flow for the West catchment is 1.7 m³/s, therefore Kenneally Road cuts off all the West external flow from the development site.

2.1.2 Revised External Catchment Impacting the Development Site

Revision of the north external catchment, shown below in Figure 6, indicates the sub catchments which are contributing to that part of the development site where the new drainage works, which protect the neighbouring downstream property, are proposed.

Although there is an application to develop the site directly north of the development and direct part of this catchment to Kenneally Road, these works have not been undertaken, therefore the external catchment contributing to the site has been taken to be that shown in Figure 7.

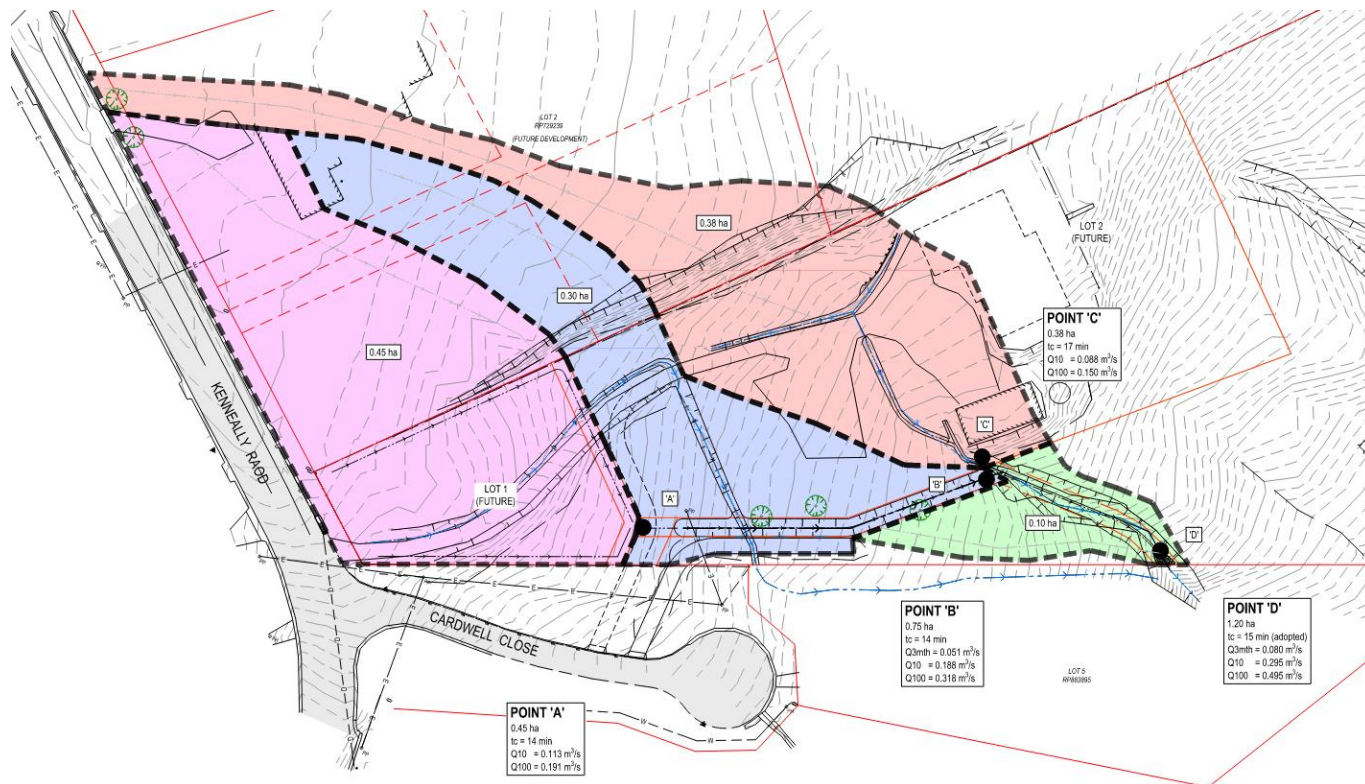


Figure 6: Development Catchment Area

Calculated flows for the revised external catchments impacting the development site as summarised in Table 2 below with the calculations appended in Appendix A.

Table 2: External Catchment Q100 Flows

CATCHMENT	AREA (HA)	O/L FLOW LENGTH	O/L FLOW SLOPE %	T'C (FIG 4.4 -QUDM)	C 100 I 100 (MM/HR)	Q 100 (M3/S)
1	0.45	80 m	2.25%	14 min	0.82 187	0.191
2	0.75	75 m	2.00%	14 min	0.82 187	0.318
3	0.38	150 m	2.50%	17 min	0.82 187	0.150
4	0.10	75 m	2.00%	15 min	0.82 187	0.495

2.2 Existing Site

2.2.1 Existing Site Drainage

The site is currently a small rural property with extensive works undertaken to formally drain the site to suit the house, driveways, large shed and lay down areas.

The result of these existing formalised drainage lines is to discharge the front portion of the site at 2 locations whilst the back section of the site remains as natural ground with this area simply sheet flowing across the paddock.

The first existing discharge point is nearby the downstream property owners residence, and although we have been advised anecdotally that the downstream property has no drainage issues, this existing location is not a suitable point of discharge and it is proposed to move this discharge location away from the residence as part of the development application.

Refer Figure 7 below for an aerial view of the existing site with the formalised drainage lines shown.

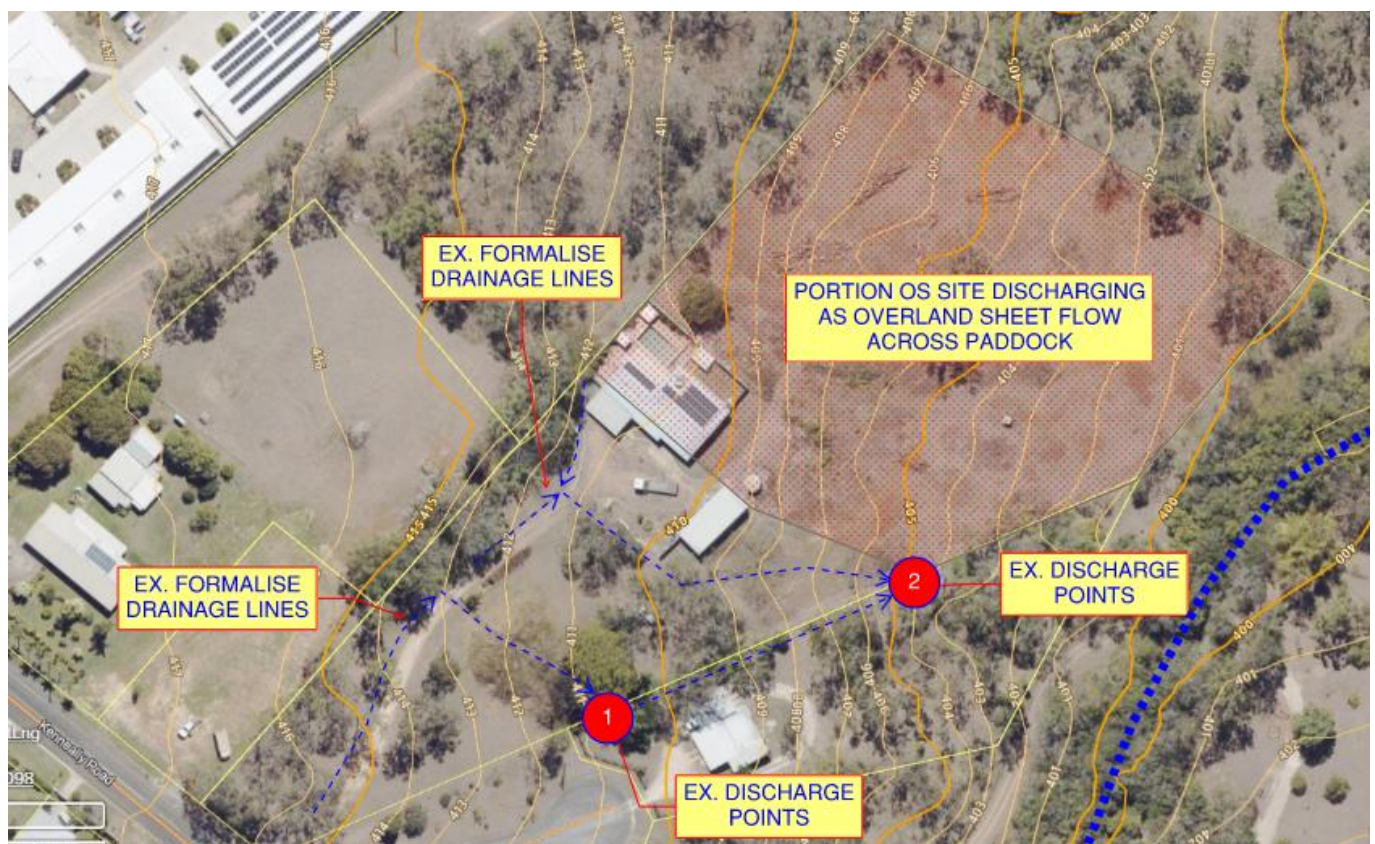


Figure 7: Existing Site Stormwater Drainage

2.2.2 Site Photos

Refer to the figures below for the existing formalised drainage channels used for stormwater drainage of the existing site.



Figure 8: Existing Stormwater Drainage Concrete/Rock Channel



Figure 9: Existing Stormwater Drainage Channel



Figure 10: Existing Open Rock lined Channel.

2.3 Proposed Site Drainage

The proposed site drainage has been developed to protect the downstream residence whilst complying with FNQROC and QUDM for flow capture.

Engineering plan 24001-C003 proposes to capture the existing formalised drainage line and divert it to a more suitable point of discharge clear of the downstream neighbouring residence as shown in Figure 11 below.

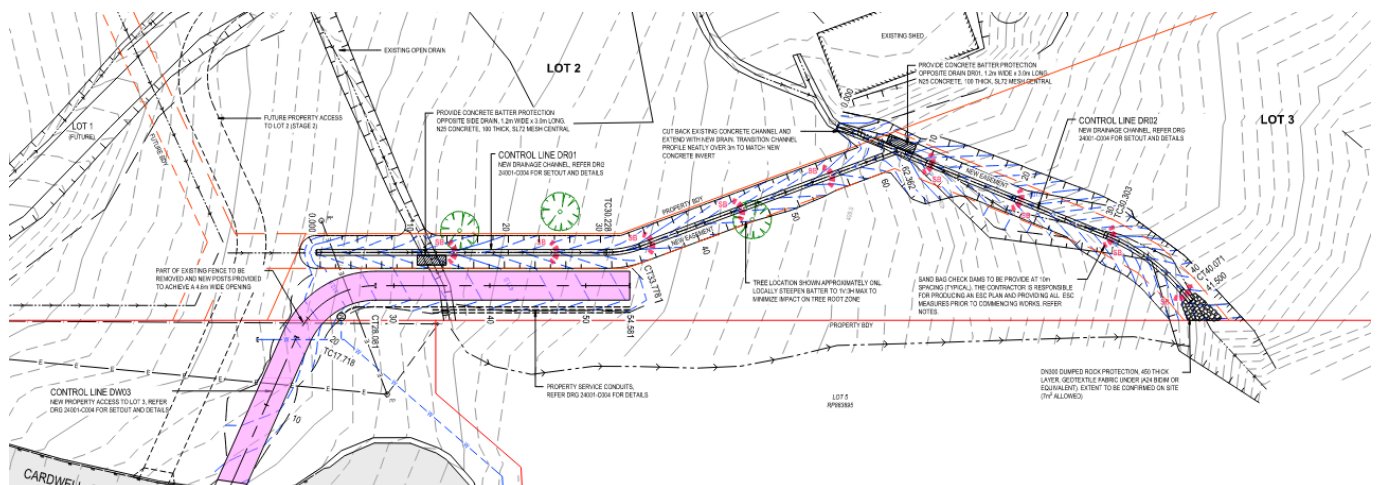


Figure 11: Drainage Plan Kenneally Road Development

DRAIN01 is proposed to be placed on the high side of the proposed new lot 2 driveway to intersect and convey the upstream flows away from the downstream property to the existing discharge point 2 as shown in Figure 7.

It should be noted that discharge point 2 is currently the same point where all upstream site flows converge before traversing the downstream property, therefore this still remains as the same legal point of discharge.

Table 3 below is a summary of the Q100 flows through the proposed swale drains. This table looks at the minimum and maximum slopes of the proposed swale drains to ensure the Q100 flows are contained.

Table 3: Channels Flows

CHANNEL	Q 100 (M3/S)	DEPTH OF FLOW (MM)	SLOPE (%)	CALCULATED DESIGN FLOW (M3/S)	VELOCITY	NOTES
DRAIN01 min	0.318	150	5.2%	0.318	2.94 m/s	DRAIN IS ADEQUATE
DRAIN01 max	0.318	135	9.5%	0.327	3.83 m/s	DRAIN IS ADEQUATE
DRAIN02 min	0.495	170	7.5%	0.495	3.67 m/s	DRAIN IS ADEQUATE
DRAIN02 max	0.495	150	13.3%	0.507	4.70 m/s	DRAIN IS ADEQUATE

See Appendix B for detailed channel flow calculations and Figure 12 below shows the proposed cross sections.

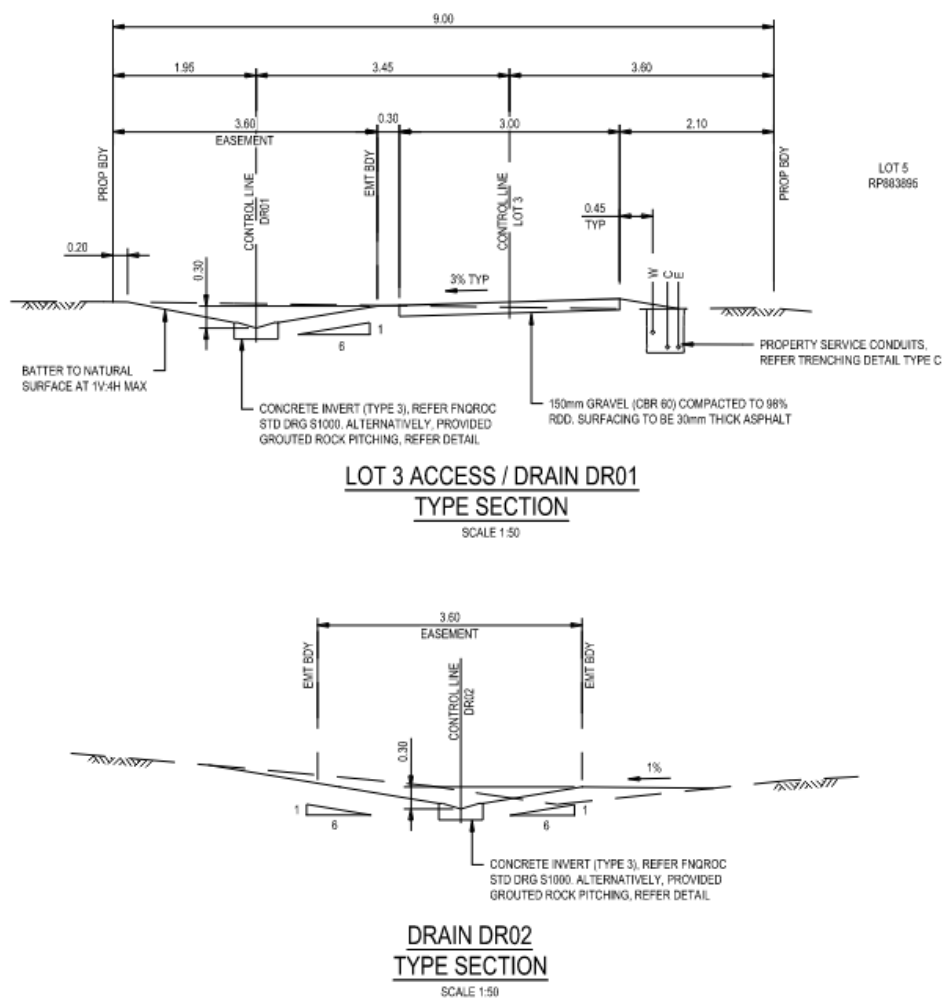


Figure 12: Drain Detail

2.4 Pre and Post Development Q₁₀₀ Flows

The pre and post development flows remain, more or less, the same, only a diversion of the drainage paths has been proposed to protect the downstream neighbouring residence by diverting the existing discharge point away from the house.

No adverse impact will occur upstream or downstream of the proposed drainage network.

The site discharge outlet location post development is to the same discharge point pre development, which is the legal point of discharge.

3 Conclusion and Recommendations

The upstream external catchments of the caravan park and Kenneally Road do not contribute any flows to the development site.

The proposed site drainage is designed for Q100 flows as per FNQROC and QDUM and directs flows away from the downstream property to the existing legal point of discharge.

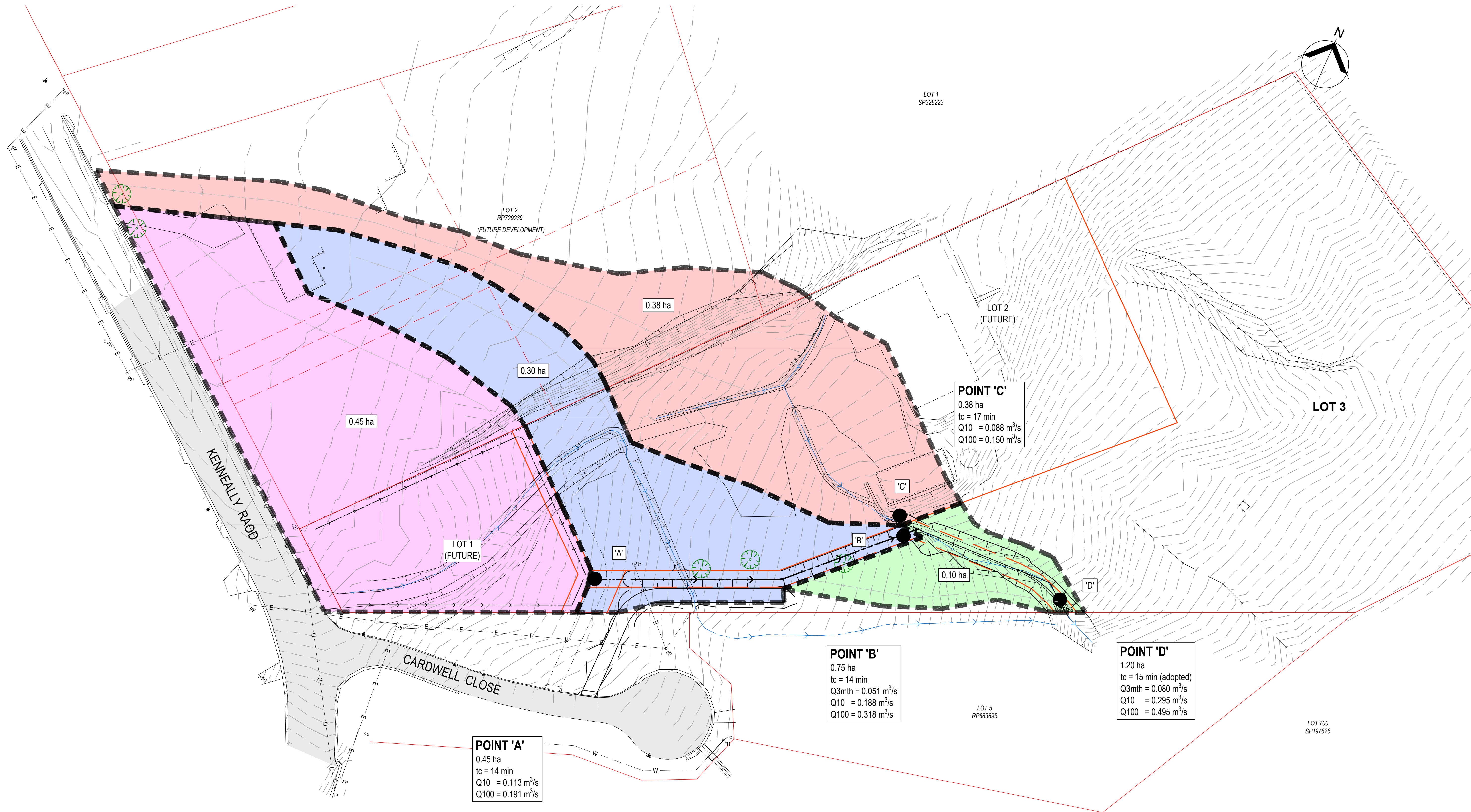
The proposed drainage has no impact on upstream or downstream properties.

The works proposed will alleviate existing drainage flows into the downstream neighbour's property.

The recommendations of the report are:

- Drainage easement to be created over stormwater drainage as per the submitted civil engineering plans.
- New drainage channel to DRAIN 01/DRAIN 02 section detail or alternative.

APPENDIX A



Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Project Name:	Kenneally Rd Subdivision
Project Number:	24001
Designer:	GARY BROWNING
Date:	

Catchment Details:

Catchment Number:	POINT 'A'		
Catchment Area	=	A	= 0.450 ha
Length of Stream	=	L	= km
Stream Slope	=	Se	= %

Time of Concentration:

Friends Equation tc	=	13.7	min
Overland sheet flow path Length	=	80.0	m
Horton's Roughness Factor	=	0.035	
Surface Slope	=	2.25	%

Additional Channel flow	=	0.2	min	0	min	0	min	0	min	0	min	0	min
Channel Length	=	35	m		m		m		m		m		m
Channel Slope	=	3.50	%		%		%		%		%		%
Channel Vel. (assumed)	=	3.00	m/s		m/s		m/s		m/s		m/s		m/s

Calculated Time of Concentration	=	t_c	=	13.9	mins
Adopted Time of Concentration	=	t_c	=	14.0	mins

Runoff Coefficient:

Fraction Impervious	=	f_i	=	0.3	Table 4.5.3 QUDM
1 hr rainfall Intensity for 10yr ARI	=	i_{10}	=	63.5	
10 yr Discharge Coefficient	=	C_{10}	=	0.68	

Coefficient of Runoff	=	C _y	=	63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
				0.54	0.58	0.65	0.68	0.71	0.78	0.82

Rainfall Intensity:

Intensity for Catchment tc (mm/hr)	=	t_{Ly}	75.40	85.20	114.00	133.00	150.00	172.00	187.00
------------------------------------	---	----------	-------	-------	--------	--------	--------	--------	--------

Runoff Calculation:

The Rational Method formula is:

$$Q_y = (C_y \cdot I_y \cdot A)/360$$

				63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Runoff Coefficient	=	C _y	=	0.54	0.58	0.65	0.68	0.71	0.78	0.8160
Intesity for tc hours and y years	=	I _y	=	75.40	85.20	114.00	133.00	150.00	172.00	187.00
Catchment Area	=	A	=	0.450 ha						
				63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Calculated Peak Flow Rate	=	Q _y	=	0.051 m ³ /s	0.062 m ³ /s	0.092 m ³ /s	0.113 m ³ /s	0.134 m ³ /s	0.168 m ³ /s	0.191 m ³ /s

Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Project Name:	Kenneally Rd Subdivision
Project Number:	24001
Designer:	GARY BROWNING
Date:	

Catchment Details:

Catchment Number:	POINT 'B'		
Catchment Area	=	A	= 0.750 ha
Length of Stream	=	L	= km
Stream Slope	=	Se	= %

Time of Concentration:

Friends Equation tc	=	13.7	min						
Overland sheet flow path Length	=	75.0	m						
Horton's Roughness Factor	=	0.035							
Surface Slope	=	2.00	%						
Additional Channel flow	=	0.7	min	0	min	0	min	0	min
Channel Length	=	110	m						
Channel Slope	=	3.75	%						
Channel Vel. (assumed)	=	2.50	m/s						
Calculated Time of Concentration	=	tc	= 14.5 mins						
Adopted Time of Concentration	=	tc	= 14.0 mins						

Runoff Coefficient:

Fraction Impervious	=	f _i	= 0.3	
1 hr rainfall Intensity for 10yr ARI	=	¹ I ₁₀	= 63.5	
10 yr Discharge Coefficient	=	C ₁₀	= 0.68	Table 4.5.3 QUDM

			63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Coefficient of Runoff	=	C _y	= 0.54	0.58	0.65	0.68	0.71	0.78	0.82

Rainfall Intensity:

			63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Intensity for Catchment tc (mm/hr)	=	^t I _y	75.40	85.20	114.00	133.00	150.00	172.00	187.00

Runoff Calculation:

The Rational Method formula is:

$$Q_y = (C_y \cdot {}^tI_y \cdot A)/360$$

			63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Runoff Coefficient	=	C _y	= 0.54	0.58	0.65	0.68	0.71	0.78	0.8160
Intesity for tc hours and y years	=	^t I _y	= 75.40	85.20	114.00	133.00	150.00	172.00	187.00
Catchment Area	=	A	= 0.750 ha						
			63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Calculated Peak Flow Rate	=	Q _y	= 0.085 m ³ /s	0.103 m ³ /s	0.153 m ³ /s	0.188 m ³ /s	0.223 m ³ /s	0.280 m ³ /s	0.318 m ³ /s

Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Project Name:	Kenneally Rd Subdivision
Project Number:	24001
Designer:	GARY BROWNING
Date:	

Catchment Details:

Catchment Number:	POINT 'C'		
Catchment Area	=	A	= 0.380 ha
Length of Stream	=	L	= km
Stream Slope	=	Se	= %

Time of Concentration:

Friends Equation tc	=	16.5	min
Overland sheet flow path Length	=	150.0	m
Horton's Roughness Factor	=	0.035	
Surface Slope	=	2.50	%

Additional Channel flow	=	0.2	min	0	min	0	min	0	min	0	min	0	min
Channel Length	=	40	m		m		m		m		m		m
Channel Slope	=	5.00	%		%		%		%		%		%
Channel Vel. (assumed)	=	3.00	m/s		m/s		m/s		m/s		m/s		m/s

Calculated Time of Concentration	=	t_c	=	16.8	mins
Adopted Time of Concentration	=	t_c	=	17.0	mins

Runoff Coefficient:

Fraction Impervious	=	f_i	=	0.3	Table 4.5.3 QUDM
1 hr rainfall Intensity for 10yr ARI	=	i_{10}	=	63.5	
10 yr Discharge Coefficient	=	C_{10}	=	0.68	

Coefficient of Runoff	=	C _y	=	63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
				0.54	0.58	0.65	0.68	0.71	0.78	0.82

Rainfall Intensity:

Rainfall Intensity:		63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Intensity for Catchment tc (mm/hr)	= t_{I_y}	70.00	79.00	106.00	123.00	139.00	159.00	174.00

Runoff Calculation:

The Rational Method formula is:

$$Q_y = (C_y \cdot I_y \cdot A)/360$$

Runoff Coefficient	=	C _y	=	63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Intesity for tc hours and y years	=	I _y	=	70.00	79.00	106.00	123.00	139.00	159.00	174.00
Catchment Area	=	A	=	0.380 ha						
Calculated Peak Flow Rate	=	Q _y	=	0.040 m ³ /s	0.048 m ³ /s	0.072 m ³ /s	0.088 m ³ /s	0.105 m ³ /s	0.131 m ³ /s	0.150 m ³ /s

Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Project Name:	Kenneally Rd Subdivision
Project Number:	24001
Designer:	GARY BROWNING
Date:	

Catchment Details:

Catchment Number:	POINT 'D'			
Catchment Area	=	A	=	1.200 ha
Length of Stream	=	L	=	km
Stream Slope	=	S _e	=	%

Time of Concentration:

Friends Equation tc	=	13.7	min
Overland sheet flow path Length	=	75.0	m
Horton's Roughness Factor	=	0.035	
Surface Slope	=	2.00	%

Additional Channel flow	=	0.8	min	0	min	0	min	0	min	0	min	0	min
Channel Length	=	140	m		m		m		m		m		m
Channel Slope	=	5.00	%		%		%		%		%		%
Channel Vel. (assumed)	=	3.00	m/s		m/s		m/s		m/s		m/s		m/s

Calculated Time of Concentration	=	t_c	=	14.5	mins
Adopted Time of Concentration	=	t_c	=	15.0	mins

Runoff Coefficient:

Fraction Impervious	=	f_i	=	0.3	Table 4.5.3 QUDM
1 hr rainfall Intensity for 10yr ARI	=	i_{10}	=	63.5	
10 yr Discharge Coefficient	=	C_{10}	=	0.68	

Coefficient of Runoff	=	C _y	=	63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
				0.54	0.58	0.65	0.68	0.71	0.78	0.82

Rainfall Intensity:

Intensity for Catchment tc (mm/hr)	=	t_y	73.50	83.00	111.00	130.00	146.00	167.00	182.00
------------------------------------	---	-------	-------	-------	--------	--------	--------	--------	--------

Runoff Calculation:

The Rational Method formula is:

$$Q_y = (C_y \cdot I_y \cdot A)/360$$

				63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Runoff Coefficient	=	C _y	=	0.54	0.58	0.65	0.68	0.71	0.78	0.8160
Intesity for tc hours and y years	=	I _y	=	73.50	83.00	111.00	130.00	146.00	167.00	182.00
Catchment Area	=	A	=	1.200 ha						
				63.2% (1yr)	50% (1.44yr)	20% (4.48 yr)	10% (10 yr)	5% (20 yr)	2% (50 yr)	1% (100 yr)
Calculated Peak Flow Rate	=	Q _y	=	0.133 m³/s	0.160 m³/s	0.239 m³/s	0.295 m³/s	0.347 m³/s	0.435 m³/s	0.495 m³/s

APPENDIX B

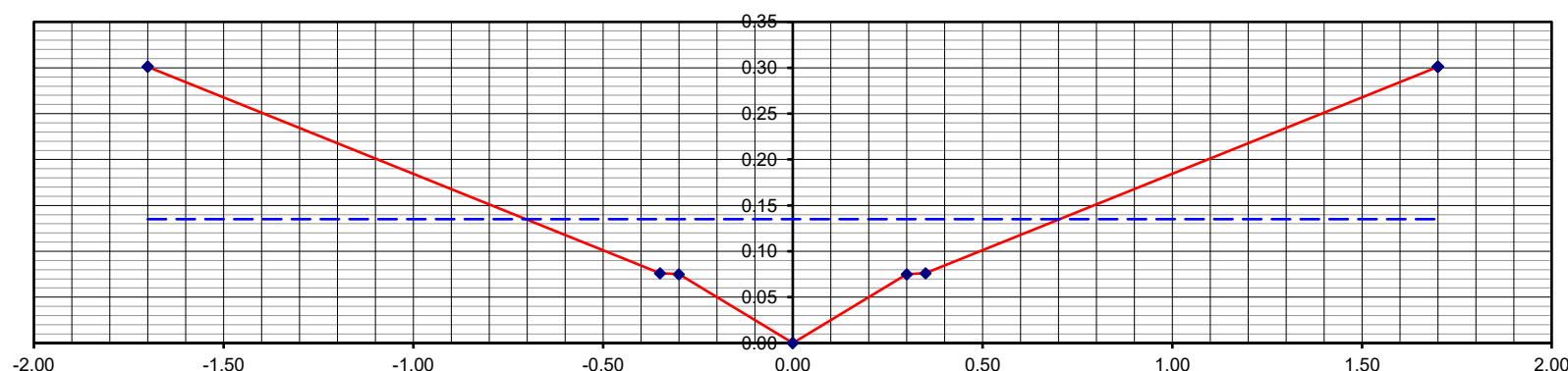
Channel Flow (Irregular shape)

Location Kenneally Rd, Mareeba
DRAIN01 ALONG LOT 2/3- Type 3 Concrete Invert (9.5% max grade)

Project No. 24001
Calc's By
Checked By

Profile

Channel Profile
Water Surface Level



Depth of flow (m)	0.135
Slope (m/m)	0.0950
I.L.	0.000
A	0.085
P	1.436
R	0.059
WSE	0.135

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} xP	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	1.350	0.225	0.035	0.010	0.000	0.059	0.354	0.359	0.029	0.009	0.002	0.001	0
	0.050	0.001	0.013	0.003	0.059	0.060	0.050	0.050	0.059	0.011	0.000	0.000	0
Centre	0.300	0.075	0.013	0.029	0.060	0.135	0.300	0.309	0.095	0.144	0.000	0.006	0
	0.000	0.000	0.013	0.000	0.135	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.000	0.000	0.013	0.000	0.135	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.300	0.075	0.013	0.029	0.060	0.135	0.300	0.309	0.095	0.144	0.000	0.006	0
	0.050	0.001	0.013	0.003	0.059	0.060	0.050	0.050	0.059	0.011	0.000	0.000	0
	1.350	0.225	0.035	0.010	0.000	0.059	0.354	0.359	0.029	0.009	0.002	0.001	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.09						0.327	0.01	0.02	1

Calculated Design Flows	
Q100	0.318 m ³ /s
Q10	0.188 m ³ /s
Q3 month	0.051 m ³ /s
	m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	3.83 m/s
Minimum	0.30 m
20% channel depth	0.03 m
V ² /2g	0.75 m

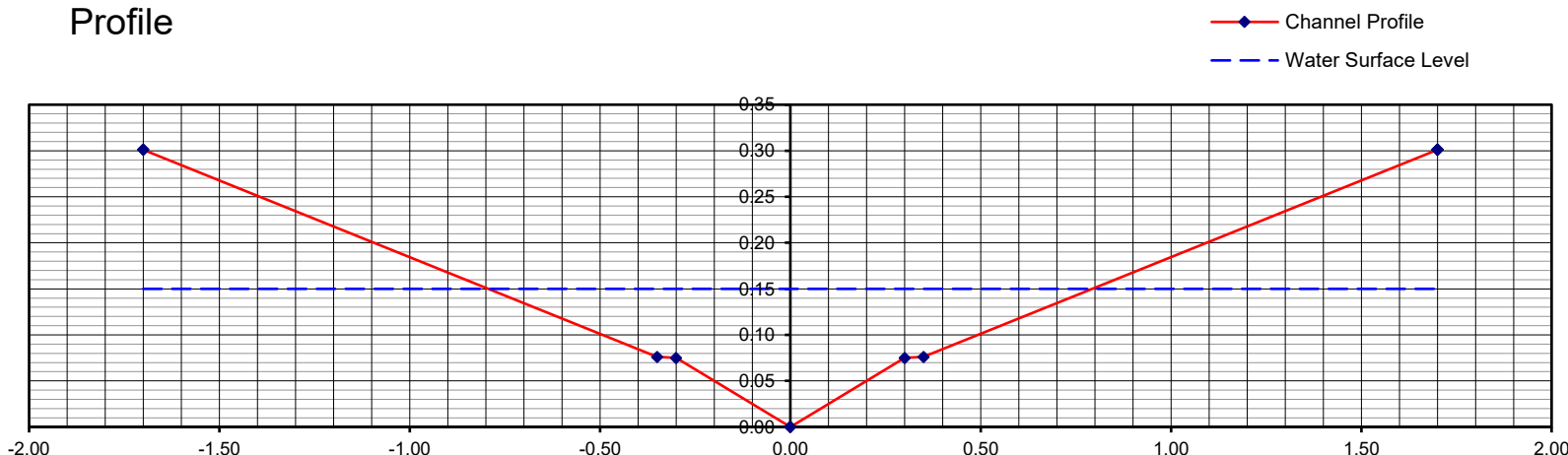
Comments	
100 ARI	Q=0.318m ³ /s D=0.135m V=3.83m/s
10 ARI	Q=0.188m ³ /s D=0.110m V=3.50m/s
3mth ARI	Q=0.051m ³ /s D=0.075m V=2.60m/s

Channel Flow (Irregular shape)

Location Kenneally Rd, Mareeba
DRAIN01 ALONG LOT 2/3- Type 3 Concrete Invert (5.2% min grade)

Project No. 24001
Calc's By
Checked By

Profile



Depth of flow (m)	0.150
Slope (m/m)	0.0520
I.L.	0.000
A	0.108
P	1.619
R	0.067
WSE	0.150

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} xP	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	1.350	0.225	0.035	0.016	0.000	0.074	0.444	0.450	0.036	0.012	0.003	0.002	0
	0.050	0.001	0.013	0.004	0.074	0.075	0.050	0.050	0.074	0.012	0.000	0.001	0
Centre	0.300	0.075	0.013	0.034	0.075	0.150	0.300	0.309	0.109	0.135	0.000	0.008	1
	0.000	0.000	0.013	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.000	0.000	0.013	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.300	0.075	0.013	0.034	0.075	0.150	0.300	0.309	0.109	0.135	0.000	0.008	1
	0.050	0.001	0.013	0.004	0.074	0.075	0.050	0.050	0.074	0.012	0.000	0.001	0
	1.350	0.225	0.035	0.016	0.000	0.074	0.444	0.450	0.036	0.012	0.003	0.002	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.11						0.317	0.01	0.02	1

Calculated Design Flows	
Q100	0.318 m ³ /s
Q10	0.188 m ³ /s
Q3 month	0.051 m ³ /s
	m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	2.94 m/s
Minimum	0.30 m
20% channel depth	0.03 m
V ² /2g	0.44 m

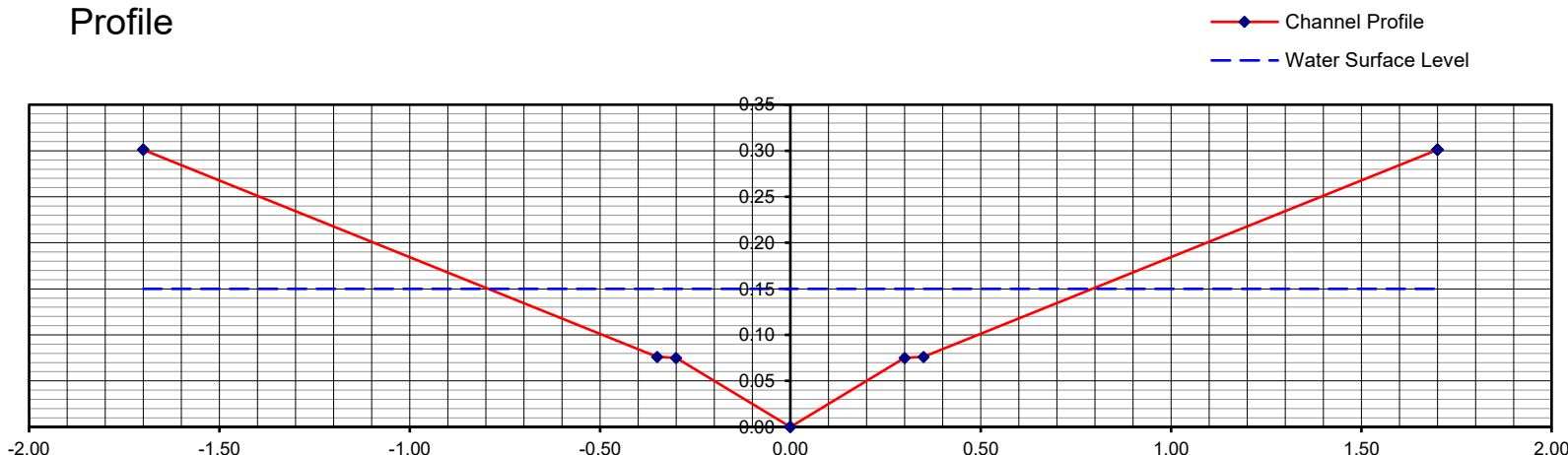
Comments	
100 ARI	Q=0.318m ³ /s D=0.150m V=2.94m/s
10 ARI	Q=0.188m ³ /s D=0.125m V=2.75m/s
3mth ARI	Q=0.051m ³ /s D=0.080m V=2.06m/s

Channel Flow (Irregular shape)

Location Kenneally Rd, Mareeba
DRAIN02 THROUGH LOT 2/3- Type 3 Concrete Invert (13% max grade)

Project No. 24001
Calc's By
Checked By

Profile



Depth of flow (m)	0.150
Slope (m/m)	0.1330
I.L.	0.000
A	0.108
P	1.619
R	0.067
WSE	0.150

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} xP	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	1.350	0.225	0.035	0.016	0.000	0.074	0.444	0.450	0.036	0.019	0.003	0.002	0
	0.050	0.001	0.013	0.004	0.074	0.075	0.050	0.050	0.074	0.018	0.000	0.001	0
Centre	0.300	0.075	0.013	0.034	0.075	0.150	0.300	0.309	0.109	0.216	0.000	0.008	1
	0.000	0.000	0.013	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.000	0.000	0.013	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.300	0.075	0.013	0.034	0.075	0.150	0.300	0.309	0.109	0.216	0.000	0.008	1
	0.050	0.001	0.013	0.004	0.074	0.075	0.050	0.050	0.074	0.018	0.000	0.001	0
	1.350	0.225	0.035	0.016	0.000	0.074	0.444	0.450	0.036	0.019	0.003	0.002	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.11						0.507	0.01	0.02	1

Calculated Design Flows	
Q100	0.495 m ³ /s
Q10	0.295 m ³ /s
Q3 month	0.080 m ³ /s
	m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	4.70 m/s
Minimum	0.30 m
20% channel depth	0.03 m
V ² /2g	1.13 m

Comments	
100 ARI	Q=0.495m3/s D=0.150m V=4.70m/s
10 ARI	Q=0.295m3/s D=0.125m V=4.39m/s
3mth ARI	Q=0.080m3/s D=0.080m V=3.29m/s

Channel Flow (Irregular shape)

Location

Kenneally Rd, Mareeba
DRAIN02 THROUGH LOT 2/3- Type 3 Concrete Invert (7.5% min grade)

Project No.

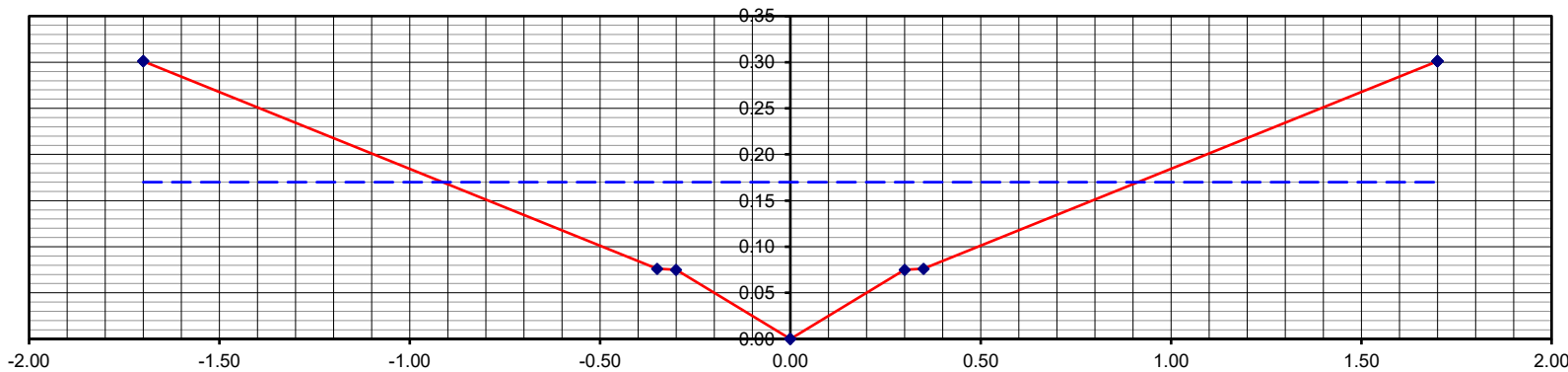
24001

Calc's By

Checked By

Profile

Channel Profile
Water Surface Level



Depth of flow (m)	0.170
Slope (m/m)	0.0750
I.L.	0.000
A	0.142
P	1.862
R	0.076
WSE	0.170

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} xP	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	1.350	0.225	0.035	0.027	0.000	0.094	0.564	0.572	0.046	0.027	0.004	0.003	0
	0.050	0.001	0.013	0.005	0.094	0.095	0.050	0.050	0.094	0.021	0.000	0.001	0
Centre	0.300	0.075	0.013	0.040	0.095	0.170	0.300	0.309	0.129	0.213	0.000	0.010	1
	0.000	0.000	0.013	0.000	0.170	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.000	0.000	0.013	0.000	0.170	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0
	0.300	0.075	0.013	0.040	0.095	0.170	0.300	0.309	0.129	0.213	0.000	0.010	1
	0.050	0.001	0.013	0.005	0.094	0.095	0.050	0.050	0.094	0.021	0.000	0.001	0
	1.350	0.225	0.035	0.027	0.000	0.094	0.564	0.572	0.046	0.027	0.004	0.003	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
				0.14						0.521	0.01	0.03	2

Calculated Design Flows	
Q100	0.495 m ³ /s
Q10	0.295 m ³ /s
Q3 month	0.080 m ³ /s
	m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	3.67 m/s
Minimum	0.30 m
20% channel depth	0.03 m
V ² /2g	0.69 m

Comments

100 ARI Q=0.495m³/s D=0.170m V=3.67m/s
10 ARI Q=0.295m³/s D=0.140m V=3.45m/s
3mth ARI Q=0.080m³/s D=0.090m V=2.73m/s