22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Our Ref: 251013

8th November 2024

Update 19 November 2024

Update 31 January 2025

Holmes Dyer Pty Ltd
Leve 3, Reid House, 15 Featherstone Place
Adelaide SA 5000

ATTENTION: S Holmes

Dear Stephen

SITE ANALYSIS REPORT FOR INFRASTRUCTURE REQUIREMENTS – BOYER PSP

I am writing to you about the findings to date for the provision of infrastructure services to the proposed subdivision based on the Plan 1792-002 R2>14.01.25 provided by Holmes Dyer. This working document shows approximately 362 lots. The essential services required include power supply from TasNetworks, sewer systems and water supply from TasWater and communications from NBN Co. Brighton Council have provided feedback on stormwater management including stormwater quantity and quality control. Consideration has been given to the provision of natural gas supply from TasGas. Additionally, to the infrastructure requirements, information from Tas Irrigation is included showing the approximate location of an irrigation supply pipeline. Keith Midson Traffic Engineer, has provided intersection treatments for entry points along Boyer Road.

The collection of background information on the services will inform the establishment of funding models.

TasNetworks - Power Supply

Contact Person – Gary Hancl – 0438 338 060 Alan Heald and Alex Izbecki

Initial contact was made via email to Clodagh Doyle on 24/9/24. Due to some internal staff movements, setting up an Early Engagement meeting proved difficult. On 31/10/24 a discussion finally took place with Gary Hancl – Team Leader. This was a good opportunity to explain the project context and that we are planning the future and not the developers of the project. He understands that we are looking for high level design of the system that will lead to high level costings enabling a model for funding to be established that links the power supply infrastructure to the future development. He has now organised an Early Engagement meeting for 10am on 12/11/24 with the right people within TasNetworks. Further reporting to follow.

Update 19/11/24

Early Engagement meeting was held on 12/11/24 with Gary Hancl, Angela Trewin and Chris Symons. The Network Planning Representative was not at the meeting but was contacted after the meeting. The positive outcomes were that TasNetworks do not have any issues in terms of supply to this location. The design may

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

include a looped supply especially if there is connectivity to Cobbs Hill Road. The internal requirements for supply are a 750kVa sub station per 100 lots. Preferable substation locations are central to the lots being supplied.

Update 10/1/24

After advice received from the Enquiry by Design Meeting from TasNetworks, the suggestion was to apply for a Feasibility Study. This occurred and on return to the office 6/1/25 and invitation for a new Early Engagement Meeting was received for 9/1/25 from different people in the Negotiated Connections Team, including Alan Heald and Katherine Johnstone. At the meeting Alex Izbecki was in attendance and understood that we are in a pre-planning and pre-subdivision phase.

The machinations of TasNetworks do not cater for pre-planning and they are used to dealing with subdivision developments with Planning Approval. They could do the feasibility study for a cost and would require a Staging Plan, which has now been produced.

Having said this they have indicated that they have an obligation to supply, that any costs associated with augmentation or upgrade requirements are bundled up into the developer costs that are normally associated with a subdivision. These developer costs include the HV lead in, sub-stations and underground reticulation. TasNetworks have indicated an indicative cost of $15 000 to $20 000 per lot.

Minutes of the meeting attached in Appendix D.

Funding of Infrastructure Decision 31/1/25

Based on advice from TasNetworks the design and supply of the power to the future subdivision site is achievable. Augmentation of HV supply is achievable and final design will be developed with a development plan as per TasNetworks practice. The costs associated to achieve the required HV supply and the breakdown to LV via substations will be distributed to the developer generally as per lot basis. No costs are to be included in a contribution's arrangement.

TasWater – Sewer Systems and Water Supply

Contact Person - Elio Ross – 0467 874 330 Update provided 22/11/24

Sewer System

In the first instance the advice from TasWater was to lodge a Service Enquiry. This was lodged with TasWater through their Portal on 16/10/24. To provide context to the servicing discussion we made calculations for Equivalent Tenements (ET's) for the sewer based on the three natural catchments within the development area. Each catchment has a low point adjacent to Boyer Road and will require a Sewer Pump Station. Pump Station 1 is located in 50 Boyer Road (Property ID: 7676361, Title Ref: 44724/8). Pump Station 2 is located in 170 Boyer Road (Property ID: 7676396, Title Ref: 44724/9) and Pump Station 3 is located furthest west in the property known as Boyer Road (Property ID: 1972194, Title Ref: 44724/2). The ET's for each catchment and Pump Station are listed in Table 1. A typical allowance for a 20% growth rate has also been included.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

The sewer pump stations have been sized at the highest level for environmental sensitivity based on their close proximity to the Derwent Estuary, meaning the storage time will be 8 hours (in accordance with *Taswater Supplement to WSA 04-2005 2.1 WSAA Sewage Pumping Code of Australia)* and hence the pump station size will be larger than a regular pump station with low environmental rating. The default environmental rating may be lowered subject to further risk assessments in consultation with Taswater, however due to the proximity to the Derwent Estuary, it is assumed that a high rating is appropriate and is likely to be required.

Consideration was given to a common rising main to allow each pump station to discharge into a common line before being discharged into a gravity manhole outside 24 Boyer Road. A professional discussion took place to investigate the possibility of achieving this outcome. After this discussion it was determined that it would not be possible to achieve this. There are two other possible ways to achieve the discharge requirements of the three pump stations. The first is to install an individual rising main to each sewer pump station. This means a common trench can be used from near Serenity Drive all the way to 24 Boyer Road. The other possible solution is to daisy chain the pump stations, that is one pumps to the other and then the next one. This means the pump stations would have to increase in size to accommodate the additional effluent discharged by the previous pump station and the inflow from the local catchment. A high-level cost analysis of these options will be carried out. In the first instance the multiple rising main option is likely to be the best option for cost but also for the fact that the stand-alone development can occur on the individual larger parcels. Please see new advice received about the pump stations and a common rising main.

The sewer pump station volumes for the multiple rising main option are shown in Table 1.

Table 1 – Sewage Pump Station Parameters – Current Plan > 362 lots

Pump Station ID	Developed Equivalent Tenements (ET's) (+20% Growth Rate)	Pump Station Volume	Pump Flow Rate
1 (50 Boyer Road)	134	20.1 m^3	10.62 L/s
2 (170 Boyer Road)	248	37.2 m^3	18.04 L/s
3 ('Boyer Road')	71	10.6 m^3	5.95 L/s

Preliminary comment from Taswater was received on 05/11/24 (included in Appendix B), with more detailed advice from Taswater's assets and modelling teams still to follow. Taswater's preliminary comment assumed connection to the existing Riverside Drive Sewage Pumping Station (ID: GRPSP12) which represents another option for connection location, however indicated that several upgrades to the existing piped network and sewage pumping station would likely be required in this instance and the Riverside Drive SPS will not be included.

Service Enquiry Update 22/11/24

After discussion with TasWater and receiving the written advice indications are that a common rising main linking all three pumpstations is a possibility. This may change the configuration of each of the pump stations and will be subject of future design. The already calculated total capacity requirements for all three pump stations are unlikely to change and hence these sizes can be used to calculate costs in relation to a contribution model.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

TasWater have also provided additional information about their downstream sewerage infrastructure. They are indicating that there is significant strain on the gravity system, the existing sewer pump stations and rising mains. One positive is that the Green Point Sewerage Treatment Plant has adequate capacity to cater for the development.
Gravity main upgrades are required between the receiving manhole and the Nielsen Parade SPS. Further to this gravity and rising main upgrades maybe required from the Nielsen Parade SPS to the Green Point STP.

The Sewer Pump Station at Nielsen Parade requires an upgrade in volume, at total of 52.6kL. Taswater water have nominated that 30.1kL are the responsibility of the development. Further to this pump upgrades will be required with additional flow rate. The additional flow rate will require a larger rising main. These works are shown on Plan 251013 C503, with alternatives for the possible rising main upgrades. TasWater Servicing Advice found in Appendix B.

Funding of Infrastructure 31/1/25 - Sewer

The upgrade to the existing Nielsen Parade Pump Station will have shared costs between TasWater and an infrastructure contribution for Boyer PSP. Taswater have been clear in regard to volume upgrades and pump upgrades and their portion of these costs. The final part of the puzzle is the final rising main size. The cost difference is minimal in the rising main pipe diameter as most of the cost is in trenching and backfilling. A BoQ has been produced to assist the Quantity Surveyor to establish the apportioned costs to the contributions plan.

Water Supply

The creation of a reticulated water supply network to service the development will require connection to the existing Taswater supply network. The closest connection location is at the intersection of Serenity Drive and Boyer Road to an existing DN100 PVC main. Preliminary comment from Taswater (included in Appendix B) has indicated that the existing DN100 main will be too small to service the development with a DN200 connection (or 2 x DN150) typically required for a development of this size. The existing Taswater network within a reasonable proximity to the site (developed areas to the east) consists entirely of DN100 or less sized mains, meaning no suitable connection is in close proximity to the site from this area.

The existing developed area to the east is supplied from the single Bridgewater Reservoir (ID: HOBWS017), which is located adjacent to Cobbs Hill Road to the north of the site. Taswater has advised that connection for the site will likely be required directly from the existing DN375 main (ID: A203814) at the reservoir. Connection at this location would mean the new water supply will be required to run through areas of 29 Cobbs Hill Road not previously included for development. Taswater has also advised that the creation of a new road reserve would be required to house the new DN200 main as new water mains cannot be located within private property. It is likely that the new mains servicing the site will also require connection back into the existing network at Serenity Drive to create a closed loop.

No other existing infrastructure suitable for direct connection is present within the surrounding areas. Several large bulk transfer mains are located further north of the site as well as a DN630 irrigation main that partially runs through 50 Boyer Road, however these are not suitable nor available for connection. This means that Taswater's initial comments on connection location nearby the reservoir are very likely to be the required solution for the site.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

In preliminary assessment of possible connections to Serenity Drive, an EPANET model has been undertaken which has been adjusted to include supply from the Bridgewater Reservoir. Preliminary results from the model show that adequate pressures and flows are expected to be available to all lots on the site inclusive of both residential and fire flows to the most hydraulically disadvantaged lot. A screenshot of the EPANET model is provided in Figure 1 below.

Service Enquiry Update 22/11/24

Water Infrastructure

Previous advice in regards to supply from the reservoir on Cobbs Hill Road still applies including the trunk supply at DN200 then spreading to DN100 throughout the subdivision. The new advice is that the capacity of the reservoir is not adequate to maintain existing servicing and supply the proposed subdivision. To this end TasWater will require additional capacity, either by rebuilding the existing reservoir with additional capacity or by building a second reservoir to give the additional capacity. If there is adequate land area a second reservoir is the likely outcome as this will limit supply disruption. We will discuss further with TasWater about the like volume requirement for additional storage.

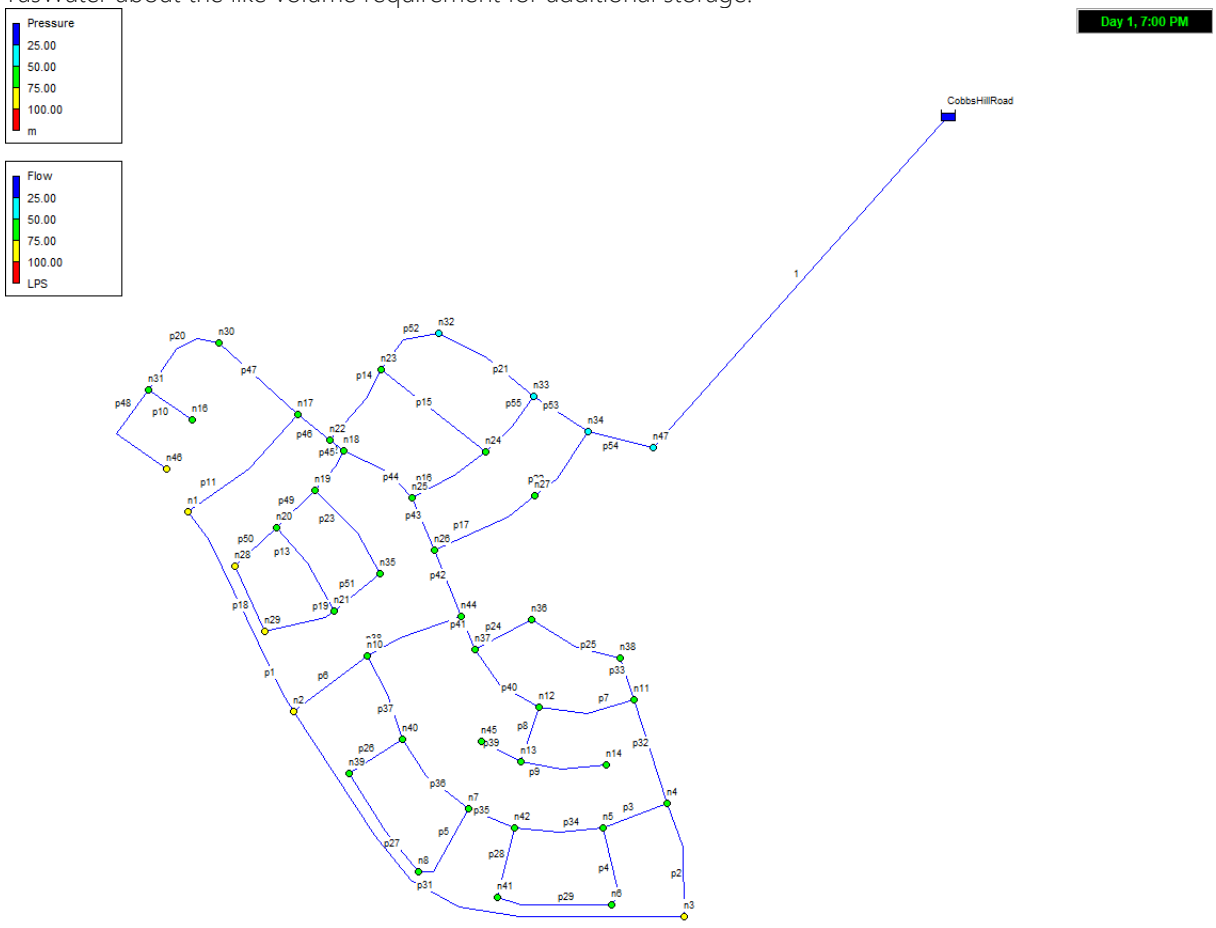


Figure 1 – EPANET Model (Cobbs Hill Road Connection)

This model provides DN 200 lead in from the reservoir spreading to a DN100 network within the subdivision.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Funding of Infrastructure 31/1/25 - Water

The requirement for additional reservoir storage at Cobbs Hill Road will fall under an infrastructure contribution model. Also included will be the DN200 connection from the Cobbs Hill Reservoir into the subdivision as it is required. Link water infrastructure that enables 50 Boyer Road, 170 Boyer Road and the third property on Boyer Road to be included in the infrastructure contribution model. A Bill of Quantities has been prepared for use by the Quantity Surveyor.

Council - Stormwater Discharges and Onsite Detention – Internal Roads

Contact Person – Leigh Wighton – 0418 569 044

A meeting with Brighton Council was undertaken on 05/11/24 which included discussion on stormwater quality and quantity management with the information provided below being in-line with these discussions and Council's direction/requirements.

The land has three overall catchments with each falling to Boyer Road as shown on the concept plans provided in Appendix A. Each catchment discharges via an existing pipe under Boyer Road. Catchment 1 (50 Boyer Road) has a twin DN375 discharging under Boyer Road into a table drain that runs towards the railway crossing point at Riverside Drive. Catchment 2 (170 Boyer Road) discharges via a DN900 under Boyer Road and then under the railway corridor and finally to the Derwent Estuary. Finally, Catchment 3 ('Boyer Road') has a DN1200 discharging under Boyer Road and then under the railway corridor to the Derwent Estuary. Photos of the existing pipes from the upstream side are provided in Appendix C.

The Catchments 2 & 3 have defined gullies, and because of the rural nature have farm dams capturing flows at various locations. While these dams provide online storage, this has been ignored for the overall catchment modelling. The catchment modelling was carried out using the software package DRAINS to determine the impact of increasing the impervious areas due to development. A screenshot of the DRAINS model is provided in Figure 2. The discharge parameters used consisted of maintaining the existing pipe sizes beneath Boyer Road to control flows up to the 1% AEP event including a climate change increase factor of 16.3%. The results of the modelling including likely detention sizes required, are shown in Table 2, noting that catchment 3 did not require any detention with the existing DN1200 pipe and roadside depression being adequate to build driving head and discharge of the post-development flows.

Table 2 – Stormwater Flows and Detention Requirements

Catchment ID	Existing Pipe Discharge Size	Peak 1% AEP Post-Developed Flow (Generated by Catchment)	Approximate Detention Volume Required	Peak 1% AEP Post-Developed Flow Through Culvert (With Detention)
1 (50 Boyer Road Discharge)	2 x DN375	1.04 m^3/s	1,300 m^3 (Approx. 1400m^2, 2m max. depth)	0.358 m^3/s
2 (170 Boyer Road Discharge)	DN900	3.57 m^3/s	2,360 m^3 (Approx. 2000m^2, 3m max. depth)	2.23 m^3/s

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

3 ('Boyer Road' Discharge)	DN1200	3.56 m^3/s	Nil (sufficient pipe capacity/inlet storage)	3.35 m^3/s

With the presence of an existing gully within Catchment 2, the topography is expected to lend itself to the creation of a suitable detention basin. The topography adjacent to the outlet for Catchment 1 is less well defined in regards to an existing low point/water course and would likely require additional earthworks to construct a suitable detention basin.

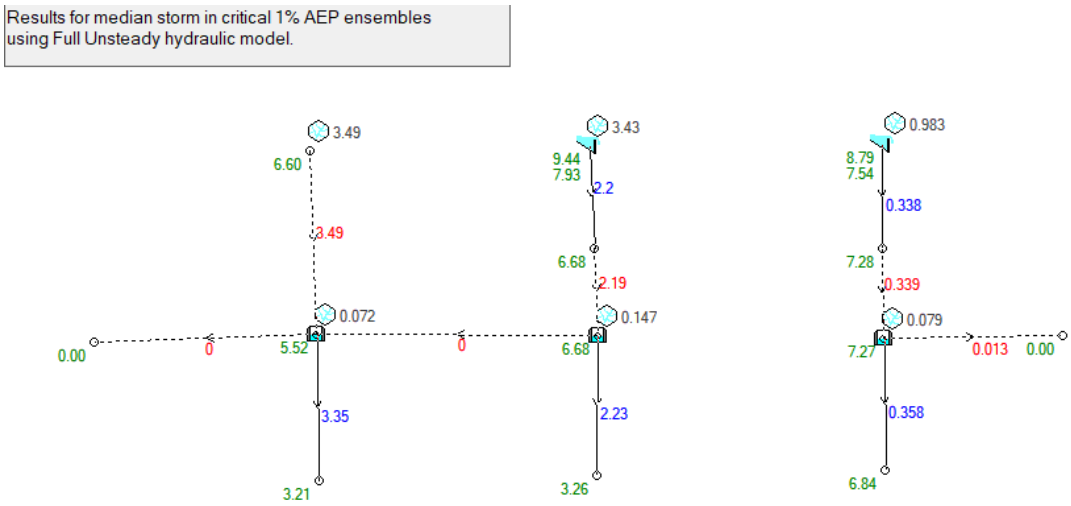


Figure 2 – DRAINS Model (1% AEP Event)

Funding of Infrastructure

It is likely that the detention basins would be included in a funding model as there based on their need to limit flows and prevent further pipe infrastructure upgrades. It would be fair for these to be aggregated as a whole of development requirement.

Stormwater Quality

Treatment of stormwater flows from developed areas is expected to be required in accordance with the pollutant reduction targets of 90% Gross Pollutants (GP), 80% Total Suspended Solids (TSS), 45% Total Phosphorus (TP) and 45% Total Nitrogen (TN) outlined in the *Tasmanian Stormwater Policy Guidance and Standards for Development* document.

Due to the significant portion of external undeveloped catchment flows and the nature of the development having the potential for staged or partial development of individual land parcels, it is expected to provide a better outcome to provide at source treatment/control. This would involve treatment at the localised discharges from the major developed areas before discharging into the existing gullys/watercourses, and/or

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

by providing treatment at the time of development on each individual lot. By allowing the large portion of external catchment flows to discharge directly to Boyer Road, bypassing treatment, more efficient removal of pollutants from developed areas can be carried out with less dilution of polluted flows. This may assist in lowering the total sizes of treatment infrastructure required. Potential locations for combined treatment systems are indicated on the concept plans provided in Appendix A, however may be located elsewhere depending on final outlet locations.

It is expected that with the inclusion of the open space/watercourse areas that sufficient space will be available for treatment devices to meet the required pollutant reduction targets at the outlets from individual developed areas. The configuration of treatment devices may include both the use of 'natural' WSUD solutions (e.g. sediment ponds, swales, bioretention) and proprietary treatment devices (e.g. gross pollutant traps, filtration systems) with further assessment required to determine treatment sizes dependant on selected methods.

Funding of Infrastructure

Local source control water quality devices to fall under local developer costs.

Internal Road Bridges

While the internal road network built to LGAT standards and requirements will be the developers cost, there are two bridges crossing the water ways, one in 170 Boyer Road and the other in western Boyer Road property. Thes have been considered for contribution funding but on the basis that they are not required to facilitate the development for all six properties have been excluded from contribution funding.

NBN

Contact Person – Peter Freshney – Kisstel – 0417 287 006 Daniel Costa – NBN Co. daniel.costa@nbnco.com.au

Communication services in the form of the NBN are located at the intersection of Boyer Road and Serenity Drive. Both 50 and 170 Boyer Road are connected by Fixed Wireless to the NBN network. Contact has been made with a local designer and installer to receive an appropriate contact with Development Planning at NBN for discussion. Peter has advised that Daniel Costa of NBN Co. is our contact. We will follow up with Daniel in due course.

Update 6/12/24

Met with Daniel Costa from NBN. He is confident that NBN will supply the future subdivision and lead in infrastructure will be provided as part of an overall development plan. Costs will be part of developer charges similar to TasNetworks. Typically costs are $1000 to $1500 per lot.

Funding of Infrastructure

NBN infrastructure to fall under local developer costs.

TasGas

TasGas have reticulation of Natural Gas on the eastern side of the Midland Highway in Bridgewater. The supply of Natural Gas is not considered to be an essential service but rather an optional service. Generally,

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

TasGas will make a commercial decision in terms of supplying an area based on the level of interest of future customers.

Funding of Infrastructure

As this is not an essential service this will not form any part of the funding agreement.

Department of State Growth – Entry Road Intersections

Advice has been received from Keith Midson concerning the treatment at the three entry road locations. A CHR(S) treatment is appropriate at all three locations. A CHR(S) treatment is approximately 160m long and involves introducing pavement widening, line marking and signage. A Bill of Quantities will be prepared for the Quantity Surveyor.

The construction of the CHR(S) intersections will facilitate development for the total land holding and the total cost for the three intersections will form part of the contributions plan.

Further to the intersections, a possible shared bike and pedestrian path from the Main Street to the entry point in 50 Boyer Road is being considered. Space and terrain may limit this proposal.

Funding of Infrastructure

The construction of three intersections to be included in a contributions plan and cost distributed on a per lot or developable land basis. A bike shared pathway would be included in a contributions scheme.

Tas Irrigation

Inquiries with Tas Irrigation have taken place after the LIST showed an irrigation pipeline located in the property. This is a DN630 irrigation line that runs from the north at Cobbs Hill Road into 25 Cobbs Hill Road and then into 50 Boyer Road before leaving the property crossing Boyer Road, under the rail corridor and into the Derwent Estuary crossing the river to Granton. The proposed layout keeps this irrigation infrastructure in proposed public land areas.

Conclusion

The Boyer Road development requires the provision of new services infrastructure to service approximately 360 residential lots. Early discussions with service authorities have been undertaken alongside preliminary concept design to determine the most likely and/or appropriate way forward for delivery of services.

Sewer infrastructure is expected to require the provision of three separate sewage pump stations at the low points of each catchment for pumping to existing gravity infrastructure outside 24 Boyer Road to the east. Upgrades to existing Nielsen Pde SPS will be required and include additional gravity and rising mains

Water supply will come from the Reservoir on Cobbs Hill Road. A minimum DN200 connection with a new main required to feed the development within a new road reserve or public reserve through the northern properties. To meet the supply needs a volume upgrade will be required to the reservoir.

To manage stormwater from both the site and existing catchments, stormwater detention is proposed within the two eastern-most catchments 1 & 2 with approximately 1,300m^3 and 2,360m^3 of detention volume expected to be required respectively. The western-most catchment 3 is not expected to require detention.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

All three catchments are to discharge through existing culverts beneath Boyer Road. Stormwater treatment is recommended to be provided at the source, either at the discharge from each developed area or on an individual lot basis to more effectively treat more highly polluted flows and minimise required infrastructure.

Power and communications supply is achievable with connection to existing infrastructure or augmented infrastructure and is not considered a risk to the development. TasNetworks will bundle supply and reticulation into a per lot charge passed onto the developer. NBN will take the same approach with guarantee to supply and cost recovery via a developer charge.

TasGas is considered an optional service with TasGas to determine if servicing the development is to be commercially viable.

The Traffic Engineer has provided intersection details and the cost of these will be determined and included in an overall contributions plan.

To assist the Quantity Surveyor a scope discussion is provided in Table format in Appendix E.

Yours Faithfully

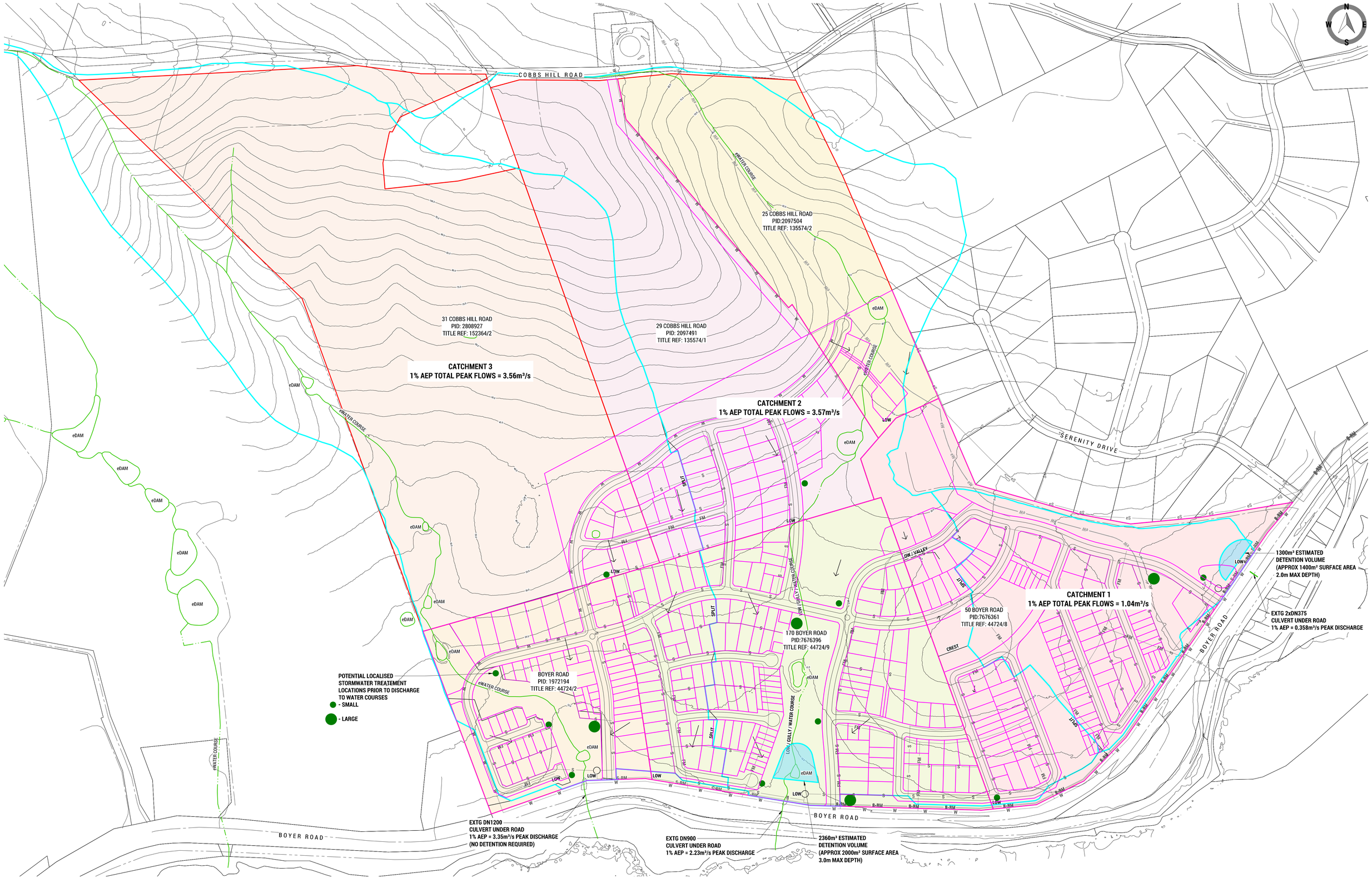
Rodney Jesson
Director
Civil and Infrastructure

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix A – Concept Site Services Plans



CONCEPT STORMWATER PLAN

SCALE 1:2500

REV:	DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	31-01-25
REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: -

ACRED. No: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER

PROJECT: BOYER ROAD PRECINCT

ADDRESS: 50 - 170 BOYER ROAD
BRIDGEWATER

TITLE: CONCEPT STORMWATER SERVICE PLAN

SCALE: 1:2500 SHEET SIZE: A1 DWGs IN SET: -

PROJECT No: 251013 DWG No: C501 REV: A

CONNECT TO DN375 BULK TRANSFER MAIN
ASSET ID: A203814
MIN DN200 CONNECTION REQUIRED (T.B.C)

BRIDGEWATER RESERVOIR
ASSET ID: SRR5TK07
RL: 85.0±

EXISTING RESERVOIR TO BE UPGRADED
TO GREATER CAPACITY

COBBS HILL ROAD

NEW 15m WIDE ROAD RESERVE
REQUIRED FOR WATER MAIN

25 COBBS HILL ROAD
PID:2097504
TITLE REF: 135574/2

DN630 PE TASMANIA IRRIGATION
WATER MAIN (SKETCHED LOCATION)

31 COBBS HILL ROAD
PID: 2808927
TITLE REF: 152364/2

29 COBBS HILL ROAD
PID: 2097491
TITLE REF: 135574/1

ET = 4
LOW

ALTERNATE - C

PROPOSED RIS
- BY PASS RIVE

SERENITY DRIVE

RIVERSIDE DRIVE
SEWAGE PUMPING STATION
ASSET ID: GRPSP12

PUMP STATION
ET'S (+20%) = 134
STORAGE (HIGH) = 20.13m³
PUMP = 10.62L/s

ET = 84
LOW

ET = 27
LOW

ET = 10

ET = 11
LOW

LOW / GULLY

LOW / VALLEY

50 BOYER ROAD
PID:7676361
TITLE REF: 44724/8

CREST

SPLIT

170 BOYER ROAD
PID:7676396
TITLE REF: 44724/9

BOYER ROAD
PID: 1972194
TITLE REF: 44724/2

PUMP STATION
ET'S (+20%) = 71
STORAGE = 10.6m³
PUMP = 5.95L/s

ET = 17
LOW

ET = 42

ET = 48

ET = 55

PUMP STATION
ET'S (+20%) = 248
STORAGE (HIGH) = 37.2m³
PUMP = 18.04L/s

ET = 52
LOW

ET = 28
LOW

BOYER ROAD

BOYER ROAD

CONCEPT SEWER + WATER SERVICE PLAN - SHEET 1
SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	31-01-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK
THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS PREPARED. © RARE INNOVATION PTY LTD. ABN 51 619 598 257

APPROVED: - ACRED. No: - DATE: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**

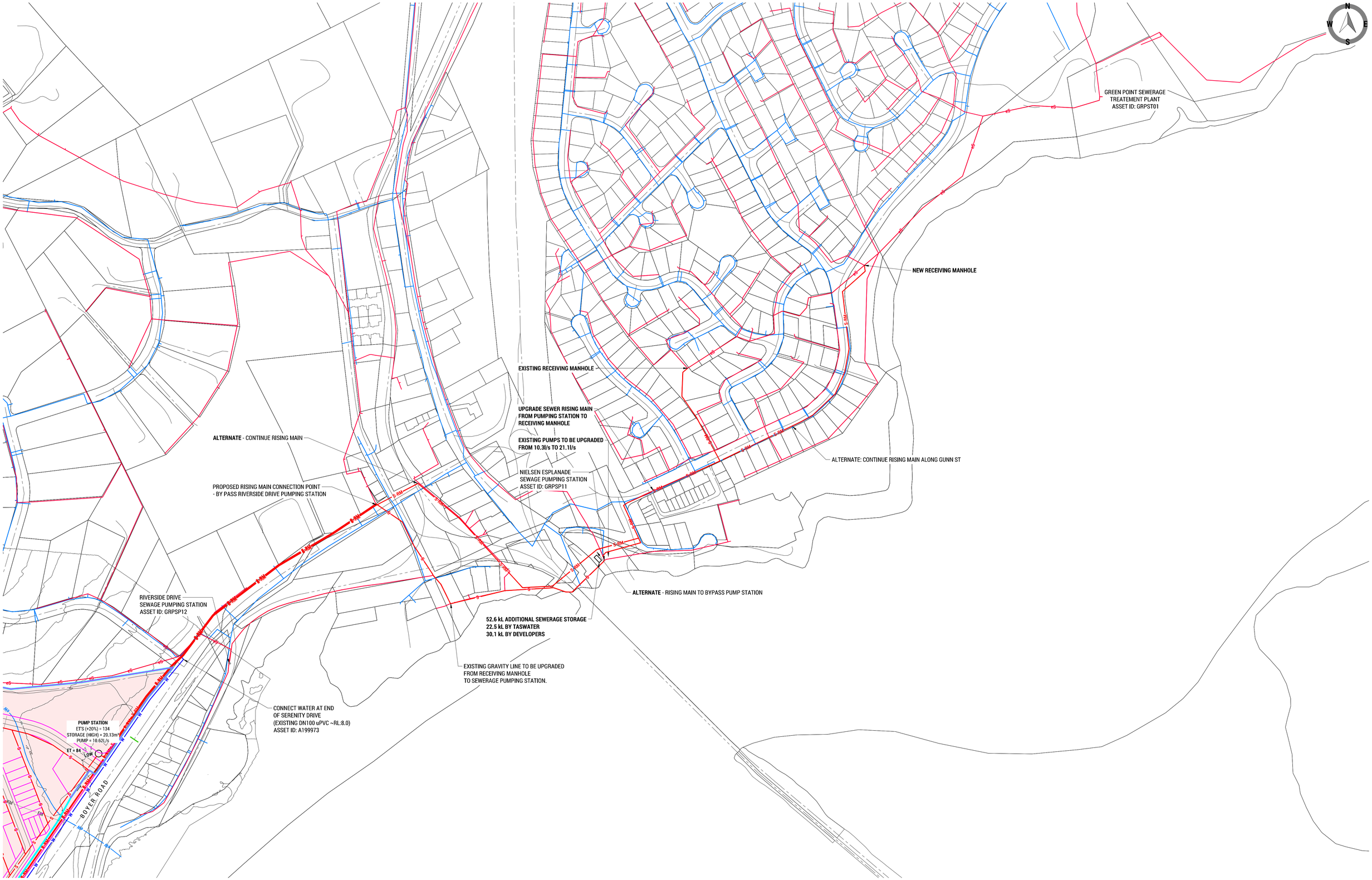
PROJECT: **BOYER ROAD PRECINCT**

ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

TITLE: **CONCEPT SEWER + WATER SERVICE PLAN - SHEET 1**

SCALE: **1:2500** SHEET SIZE: **A1** DWGs IN SET: -

PROJECT No: **251013** DWG No: **C502** REV: **A**



CONCEPT SEWER + WATER SERVICE PLAN - SHEET 2
SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	29-01-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: - ACRED. No: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**
PROJECT: **BOYER ROAD PRECINCT**
ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

TITLE: **CONCEPT SEWER + WATER SERVICE PLAN - SHEET 2**
SCALE: **1:2500** SHEET SIZE: **A1** DWGs IN SET: **-**
PROJECT No: **251013** DWG No: **C503** REV: **A**

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix B – Taswater Correspondence

Update 22/11/24 Attached

Water and Sewerage Servicing Advice

TasWater Reference No.	TWSI 2024/00697-BTN
Date of response	22/11/2024 19/11/2024 05/11/2024
TasWater Contact	Elio Ross
Phone No.	0467 874 330

Response issued to

Name	Rare Innovation Pty Ltd
Address	22-24 Paterson Street LAUNCESTON, TAS 7250
Contact details	approvals@rarein.com.au

Development details

Address	170 BOYER RD, BRIDGEWATER
Property ID (PID)	7676396
Description of development	Proposed Subdivision 250-300 Lot

Advice

Hi Paul,

Thanks for the call earlier regarding the proposed 300 lots subdivision at 170 BOYER RD, BRIDGEWATER.

Pending the official comments back for our assets and modelling teams, I have reviewed the documentation to provide some preliminary comments.

~~It's assumed that the sewer is to fall to Riverside Drive Sewage Pumping Station BRIDGEWATER, (id GRPSP12). Likely several upgrades would be required, depending on the proposed discharge location it looks as though pipes will need to be upsized as well as SPS and storage locations.~~ See updated advice below

Water, there were no concept plans provided with potential connection points nominated for the water network. Currently, the area is partly zoned in the Boyer Restricted Zone (BRW16), Pressure Head Level 161.7m, assuming this is because of its coming off the DN648 (id: A3352946) Bulk main and not suitable for a connection for this development.

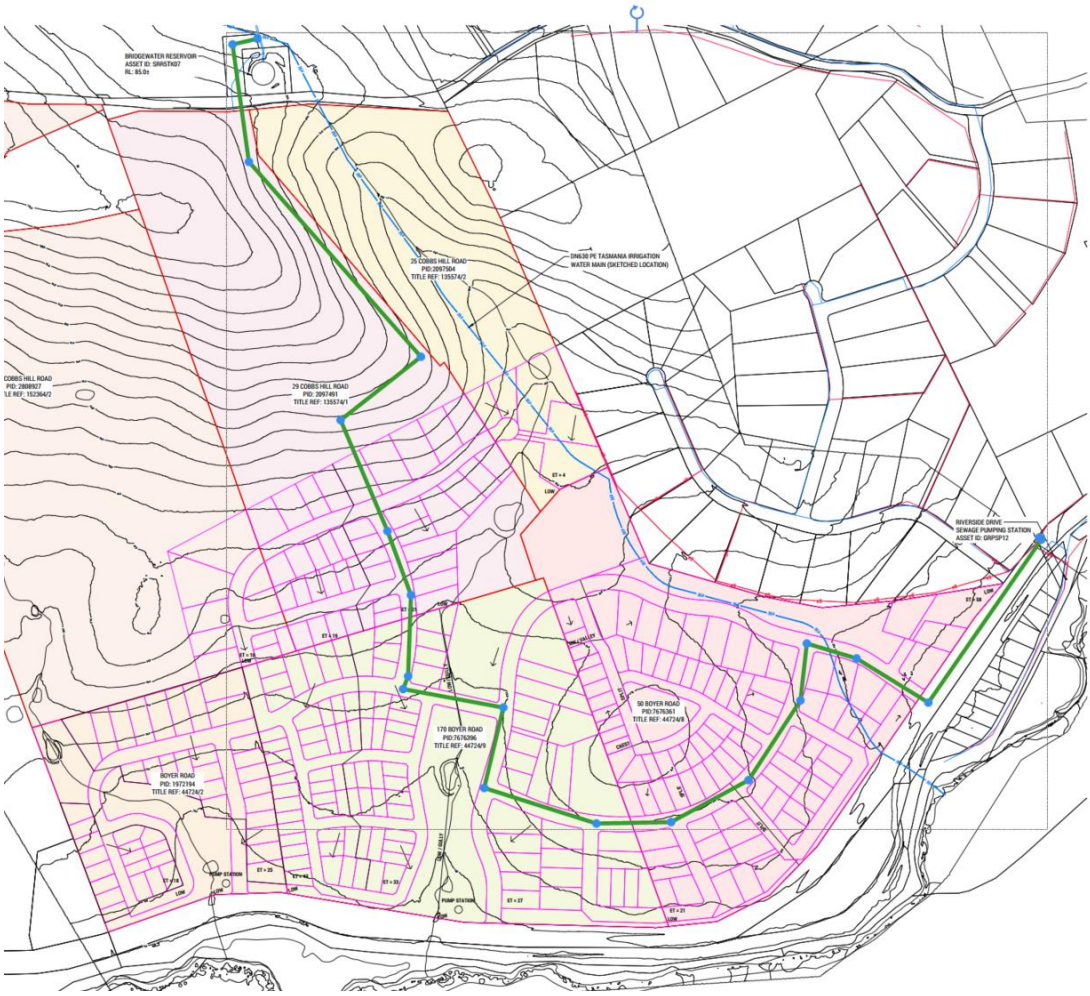
The other part of the development is located at 50 BOYER RD, which is zoned as Bridgewater Reservoir Zone (BRW1), with a head of 91m. This zone is more suitable for pressures given the approximate elevation of the lots range is 10m to 50m.

It is unclear where the proposed connections to the water network to feed the development will be located. The nearest location would be D100 (id A199973), which is too small to feed this development.

Typically, a single-direction feed would require a DN200 connection, or at least 2 x dn150 connections on a well-looped stable network.

Possibly a min DN200 connection to DN375 (id A203814) at the Bridgewater Reservoir, looped down to Serenity Drives DN100 would be the best approach.
Please note that the new water main cannot be in private property, the upper section of the loop will need to be located in a new roadway or council reserve.

I have sketched this below in green.



Please note that this is an early, provisional review of the area. More detailed modelling and asset reviews are being conducted, which will result in changes to the current assessment. This process will take additional time to complete.

Sewer Gravity:
Modelling analysis indicated that in the absence of the development, there is already a huge strain on the system with an abundance of excessively surcharging sewers and significant downstream capacity issues.
To accommodate this development all of the gravity mains between the discharge of the Riverside Drive SPS rising main to the Nielsen Parade SPS will need upsizing. TasWater may consider in a joint venture with the developer. However, this will require further investigations, consideration and approvals that will need to be confirmed.

The developer may also have to contribute to the upsizing of gravity mains between the discharge of the Nielsen Parade SPS rising main and the STP.
TasWater cannot accept the risks of allowing this development to connect without any infrastructure upgrades occurring.

SPS:

The development impacts two downstream SPS's GRPSP11 Nielsen Parade SPS and GRPSP12 Riverside Drive SPS.

GRPSP11 Nielsen Parade SPS

The downstream SPS "GRPSP11 Nielsen Parade SPS" currently has insufficient storage to support the proposed development. The total additional storage required at this site without the development is 22.5 kL. The total additional storage required at this site including the development is 52.6 kL. TasWater will hence be responsible for 22.5 kL and the developer responsible for 30.1 kL.

Pumps:

The pump station prior to the development fails to meet pump requirements by 10.3 l/s. With this development included, the pump station fails to meet pump requirements by 21.1 l/s.

Rising Main:

Following the required pump upgrade specified above, the rising main will need upsizing to accommodate the development.

GRPSP12 Riverside Drive SPS

The downstream SPS "GRPSP12 Riverside Drive SPS" currently has insufficient storage to support the proposed development. The total additional storage required at this site without the development is 0 kL. The total additional storage required at this site including the development is 25 kL. TasWater will hence be responsible for 0 kL and the developer responsible for 25 kL.

Pumps:

The pump station prior to the development meets pumping requirements. With this development included, the pump station fails to meet pump requirements by 0.8 l/s.

Rising Main:

Following the required pump upgrade specified above, the rising main will need upsizing to accommodate the development.

STP:

The Green Point STP has sufficient hydraulic and treatment capacity to accommodate the additional loading from the proposed development.

Water Modelling:

Modelling indicates there is capacity (in regards to available pressures) in the existing network at 170 Boyer Rd, Bridgewater (pipe A199973 and A203814) to supply this proposed development without impacting adversely on the existing infrastructure or customers. Total boundary heads (HGL), not pressures, at the proposed connection point(s) with the reservoir set to 1/3rd full are:

Location	H.G.L. Peak hour	H.G.L Peak day + 10 l/s fire flow
A199973 (Boyer Rd)	86	86
A203814 (Rev outlet)	87	87

These are heads within the Taswater network, so they do not account for losses in customer piping and fittings. This result is based on a sound but imperfect knowledge of conditions on the field and those who use this information should allow an appropriate margin of error in their design.

We noticed that the site falls within the Boyer Restricted Zone, and we agree that connecting to the A3352946 bulk main is not suitable for this development. Therefore, we proposed a DN200 loop: one connection from the reservoir outlet and another from 50 Boyer Rd (see image below).

The reservoir is already fully committed prior to adding this development. If this development proceeds, it will require upsizing storage (ie new reservoir) by the devloper prior to the completion of the subdivion.

TasWater confirms that you have made a pre-lodgement enquiry for the above proposal. TasWater's servicing advice in this response to the above proposal is based on the water and sewerage components of the proposal only. The other aspects of the proposal will be assessed by the relevant Planning Authority, or the Development Assessment Panel established under section 60G of the *Land Use Planning and Approvals Act* ("the Act") where the proposal is declared as a major project under 60C of the Act.

Despite anything else in the servicing advice TasWater reserves its rights regarding this proposal, when it is submitted for assessment as required by law under the Act.

Fees

This assessment is provided at no cost. For details on fees applicable for a formal assessment please see www.taswater.com.au

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix C – Culvert Photos

Catchment 1 (50 Boyer Road)

Catchment 2 (170 Boyer Road)

Catchment 3 ('Boyer Road')

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix D – TasNetworks Minutes

Early Engagement Meeting - Subdivisions

Case Reference No.	CN24-316681		
Case Manager	Alan Heald		
Date	10/01/2025	Site Address	170 Boyer Road BRIDGEWATER
Attendees	Chris Symons, Alex Izbicki, Katherine Johnston, Alan Heald. Rodney Jesson (RodneyJ@rarein.com.au)		
Apologies	Stephen Holmes (customer) admin@holmesdyer.com.au Kirsty Spilsbury (consultant) approvals@rarein.com.au		

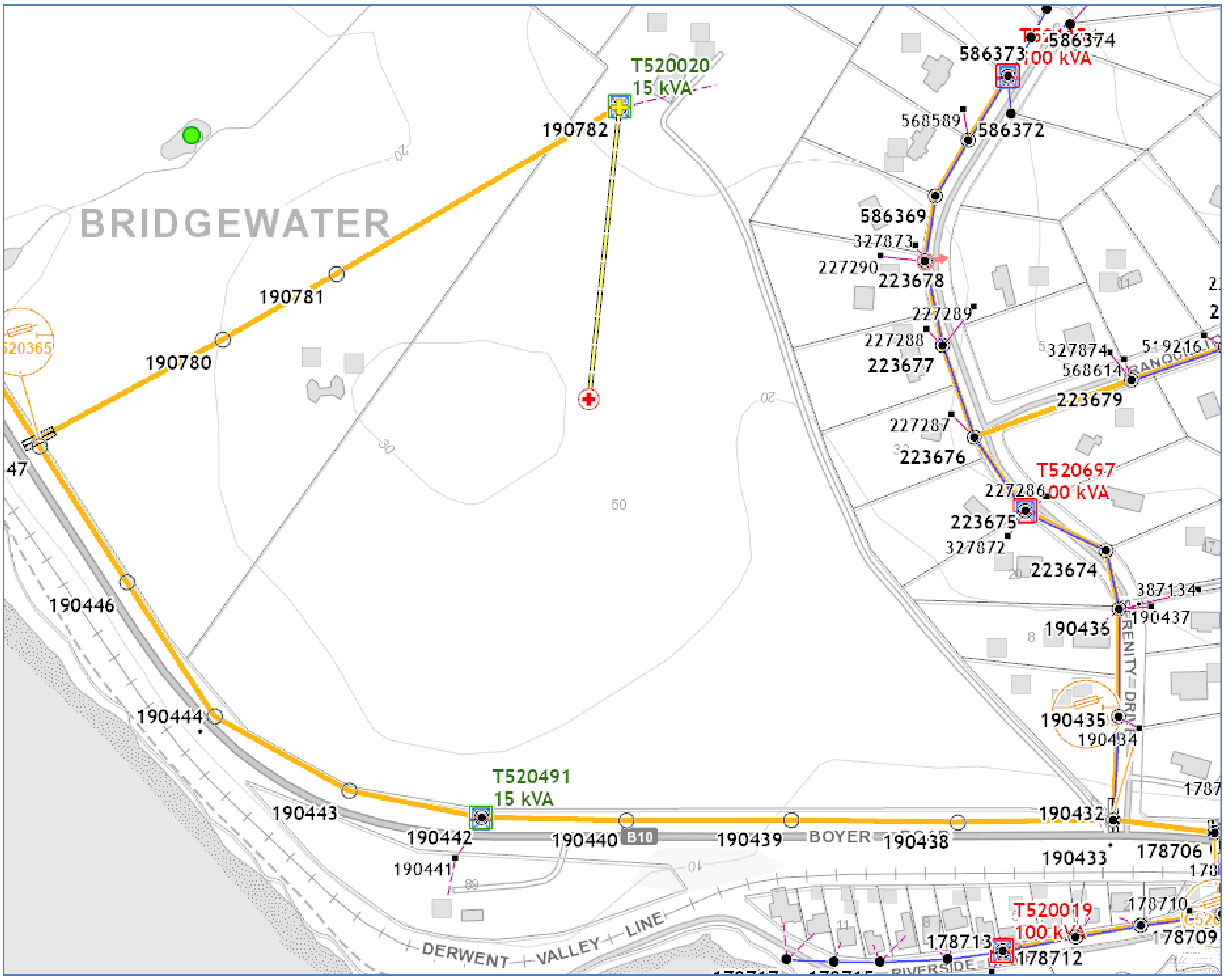
Agenda

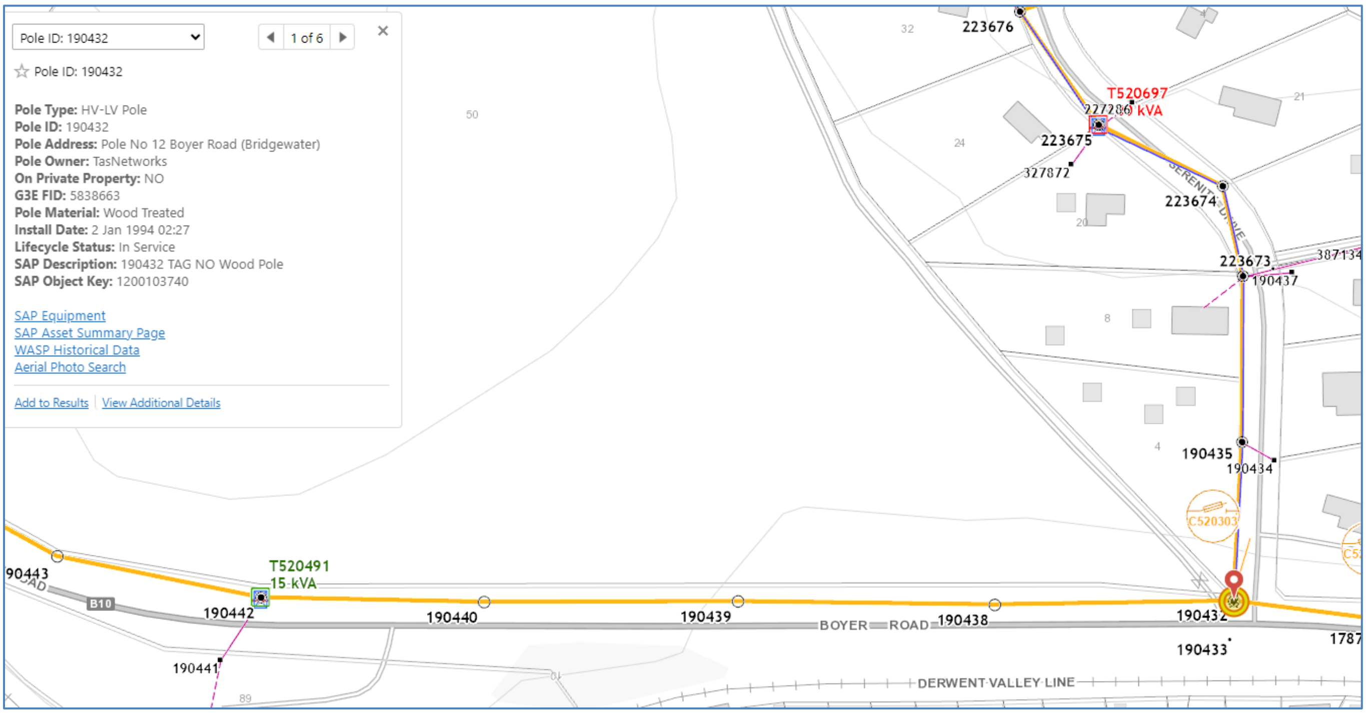
#	Items Discussed
1	Introductions
2	Developer to discuss overview of Development: • 250 lots / multi staged development. Rodney has advised this could be up to 400 lots • There are 6 parcels of land with 6 separate owners • Planning is being undertaken by the local council and Rodney is acting as a planning consultant. • Various stakeholders have attended a meeting to future plan and gain insight into the proposed development. Cost contribution is an important factor for the development planning. • The planning approvals and stages have not been finalised and are subject to feasibility studies. Rodney is requesting this from TasNetworks. For TasNetworks to provide this, a staged plan will need to be provided. What outcomes does Developer require from this meeting: Is a Planning Permit in-place? ☐ Yes or ☑ No Note: application will not be progressed to design without receipt of the planning permit. Have any aboriginal /Enviro studies been undertaken as part of the planning permit? ☐ Yes or ☑ No Reports to be provided if available Have CAD files been supplied? ☐ Yes or ☑ No Is this Development Staged? ☑ Yes or ☐ No

	If yes staged, please provide a staging plan and confirm sequences of construction so TasNetworks can design a development plan. What are the intentions for street lighting, council will need to provide advice on what they require (rural subdivision)?
3	Customer choice options (note TasNetworks due to administrative requirements may not support changes to an option part way through the application process). ☐ Accredited Electrical Designers (AED) & Accredited Electrical Constructors (AEC) ☐ TasNetworks as Designers & Accredited Electrical Constructors (AEC) ☐ TasNetworks as Designers & TasNetworks as Constructor
4	What are the Developer's program timings? Note: Timing of TasNetworks Services • Currently: ○ 14 weeks to design from start date. ○ 20 weeks construction min. 36 weeks construction min. if a substation is required. Due to construction scheduling and procurement of equipment the construction stage may take approximately 20 weeks (indicative estimates only) to complete. In some instances, these timeframes may be extended due to the supply of materials, weather, the work schedule of construction crews, or delays that are attributable to you or your external service provider. This can push up-to 24 weeks if a substation is involved. Do you require pre-purchase of substation if choosing TN to design/construct (18-20 weeks delivery time)? ☐ Yes or ☐ No
5	Network planning feedback: • A staging plan is required for an accurate feasibility study to strategically place substations and HV network and provide a clear feasibility plan. • The feeder that supplies development will need a network augmentation when development begins. The augmentation will be based on future needs. • Network Augmentation is triggered by the required needs as the development proceeds, this trigger will try to be picked up at Stage 1 but may not occur until Stage 7 depending on what other infrastructure requirements are within the network.

7	Design and Estimation Feedback: • Estimation of the cost per lot is a rough order of magnitude and can be subject to various factors that can alter this amount and should only be a guided estimation only. A figure of approximately $12,000.00 per lot was discussed however after receiving further technical advice at the conclusion of the meeting held, cost will be in the order of $15,000.00 to $20,000.00. • Cost separation between network augmentation and the new network within the development is preferred for cost allocation. Note: TasNetworks conducts audits to assess the general compliance of the proposed (AED) designs. Acceptance by TasNetworks does not relieve the AED of responsibility for suitability or correctness of the design. The audit will be undertaken within ten business days, unless otherwise agreed.
8	Construction Auditing Requirement for Accredited Electrical Constructors (AEC). • Open trench and cabling audit • Pre-commissioning and As-built audit Note: A TasNetworks Electrical Safety Specialist will complete the above staged audits, and non-compliance will be communicated to the Constructor and the Developer. The Developer is to ensure Constructor rectifies the identified non-conformance to ensure the construction schedule goes ahead as planned to mitigate any further delays. Note: regarding street and road names, can the developer please initiate this process early in the subdivision construction and provide to the AEC to ensure electrical labelling by the AEC is accurate at time of requesting the pre-commissioning and as-built audits Having labels fitted with roads 1,2 and 3 does not meet compliance and will not proceed to commissioning until such times as labelling is rectified.
9	Are there any known risks or issues associated to this development?

	Actions	**Due Date**
1	Civil Site Contact #	
2	Staging plan from developer for feasibility study	


BRIDGEWATER
T520020
15 kVA
190782
190781
190780
190446
190444
T520491
15 kVA
190443
190442
190441
190440
B10
190439
BOYER
190438
190432
190433
178706
DERWENT VALLEY LINE
T520019
100 kVA
178713
178712
178710
178709
586373
586374
586372
568589
586369
327873
227290
223678
227289
227288
223677
327874
519216
568614
223679
227287
223676
T520697
227286
223675
327872
223674
387134
190437
190436
190435
190434


Pole ID: 190432
1 of 6
Pole ID: 190432
Pole Type: HV-LV Pole
Pole ID: 190432
Pole Address: Pole No 12 Boyer Road (Bridgewater)
Pole Owner: TasNetworks
On Private Property: NO
G3E FID: 5838663
Pole Material: Wood Treated
Install Date: 2 Jan 1994 02:27
Lifecycle Status: In Service
SAP Description: 190432 TAG NO Wood Pole
SAP Object Key: 1200103740
SAP Equipment
SAP Asset Summary Page
WASP Historical Data
Aerial Photo Search
Add to Results
View Additional Details
223676
T520697
227286 kVA
223675
327872
223674
223673
387134
190437
190435
190434
C520303
T520491
15 kVA
190442
190441
190440
190439
BOYER ROAD
190438
190432
190433
DERWENT VALLEY LINE

rare.
22-24 Paterson Street
Launceston, TAS 7250
P. 6388 9200
rarein.com.au

Appendix E – Funding Scope Table

Authority	Infrastructure Element	Contribution Funding	Developer Cost
TasNetworks - Power			
	HV Augmentation and Site supply		Yes
	Internal Reticulation		Yes
Council - Stormwater			
	Detention Basins x 2 including Landscaping	Yes	
	Water Quality Devices – Source Control		Yes
	Local Stormwater Network		Yes
Council - Roads			
	Internal Road Network		Yes
	Internal Bridges x2		Yes
Council - Landscaping			
	Streetscape		Yes
	Parks and Waterways		Yes
	Walking Trails		Yes
	Playground	Yes	
Department of State Growth			
	Intersection Treatment	Yes	
	Shared Bike/Pedestrian Pathway	Yes	
TasWater - Water			
	New Reservoir Capacity Upgrade	Yes	
	DN200 and trunk watermain	Yes	
	Internal water reticulation		Yes
TasWater - Sewer			
	Sewer Pump Stations and Rising Main	Yes	
	Nielsen Pde Sewer Pump Station Upgrade	Yes (TW contribution)	
	Downstream gravity main upgrades	Yes	
	Internal reticulation network		Yes
NBN			
	Infrastructure supply		Yes
	Internal reticulation		Yes

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Our Ref: 251013

8th November 2024

Update 19 November 2024

Update 31 January 2025

Holmes Dyer Pty Ltd
Leve 3, Reid House, 15 Featherstone Place
Adelaide SA 5000

ATTENTION: S Holmes

Dear Stephen

SITE ANALYSIS REPORT FOR INFRASTRUCTURE REQUIREMENTS – BOYER PSP

I am writing to you about the findings to date for the provision of infrastructure services to the proposed subdivision based on the Plan 1792-002 R2>14.01.25 provided by Holmes Dyer. This working document shows approximately 362 lots. The essential services required include power supply from TasNetworks, sewer systems and water supply from TasWater and communications from NBN Co. Brighton Council have provided feedback on stormwater management including stormwater quantity and quality control. Consideration has been given to the provision of natural gas supply from TasGas. Additionally, to the infrastructure requirements, information from Tas Irrigation is included showing the approximate location of an irrigation supply pipeline. Keith Midson Traffic Engineer, has provided intersection treatments for entry points along Boyer Road.

The collection of background information on the services will inform the establishment of funding models.

TasNetworks - Power Supply

Contact Person – Gary Hancl – 0438 338 060 Alan Heald and Alex Izbecki

Initial contact was made via email to Clodagh Doyle on 24/9/24. Due to some internal staff movements, setting up an Early Engagement meeting proved difficult. On 31/10/24 a discussion finally took place with Gary Hancl – Team Leader. This was a good opportunity to explain the project context and that we are planning the future and not the developers of the project. He understands that we are looking for high level design of the system that will lead to high level costings enabling a model for funding to be established that links the power supply infrastructure to the future development. He has now organised an Early Engagement meeting for 10am on 12/11/24 with the right people within TasNetworks. Further reporting to follow.

Update 19/11/24

Early Engagement meeting was held on 12/11/24 with Gary Hancl, Angela Trewin and Chris Symons. The Network Planning Representative was not at the meeting but was contacted after the meeting. The positive outcomes were that TasNetworks do not have any issues in terms of supply to this location. The design may

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

include a looped supply especially if there is connectivity to Cobbs Hill Road. The internal requirements for supply are a 750kVa sub station per 100 lots. Preferable substation locations are central to the lots being supplied.

Update 10/1/24

After advice received from the Enquiry by Design Meeting from TasNetworks, the suggestion was to apply for a Feasibility Study. This occurred and on return to the office 6/1/25 and invitation for a new Early Engagement Meeting was received for 9/1/25 from different people in the Negotiated Connections Team, including Alan Heald and Katherine Johnstone. At the meeting Alex Izbecki was in attendance and understood that we are in a pre-planning and pre-subdivision phase.

The machinations of TasNetworks do not cater for pre-planning and they are used to dealing with subdivision developments with Planning Approval. They could do the feasibility study for a cost and would require a Staging Plan, which has now been produced.

Having said this they have indicated that they have an obligation to supply, that any costs associated with augmentation or upgrade requirements are bundled up into the developer costs that are normally associated with a subdivision. These developer costs include the HV lead in, sub-stations and underground reticulation. TasNetworks have indicated an indicative cost of $15 000 to $20 000 per lot.

Minutes of the meeting attached in Appendix D.

Funding of Infrastructure Decision 31/1/25

Based on advice from TasNetworks the design and supply of the power to the future subdivision site is achievable. Augmentation of HV supply is achievable and final design will be developed with a development plan as per TasNetworks practice. The costs associated to achieve the required HV supply and the breakdown to LV via substations will be distributed to the developer generally as per lot basis. No costs are to be included in a contribution's arrangement.

TasWater – Sewer Systems and Water Supply

Contact Person - Elio Ross – 0467 874 330 Update provided 22/11/24

Sewer System

In the first instance the advice from TasWater was to lodge a Service Enquiry. This was lodged with TasWater through their Portal on 16/10/24. To provide context to the servicing discussion we made calculations for Equivalent Tenements (ET's) for the sewer based on the three natural catchments within the development area. Each catchment has a low point adjacent to Boyer Road and will require a Sewer Pump Station. Pump Station 1 is located in 50 Boyer Road (Property ID: 7676361, Title Ref: 44724/8). Pump Station 2 is located in 170 Boyer Road (Property ID: 7676396, Title Ref: 44724/9) and Pump Station 3 is located furthest west in the property known as Boyer Road (Property ID: 1972194, Title Ref: 44724/2). The ET's for each catchment and Pump Station are listed in Table 1. A typical allowance for a 20% growth rate has also been included.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

The sewer pump stations have been sized at the highest level for environmental sensitivity based on their close proximity to the Derwent Estuary, meaning the storage time will be 8 hours (in accordance with *Taswater Supplement to WSA 04-2005 2.1 WSAA Sewage Pumping Code of Australia)* and hence the pump station size will be larger than a regular pump station with low environmental rating. The default environmental rating may be lowered subject to further risk assessments in consultation with Taswater, however due to the proximity to the Derwent Estuary, it is assumed that a high rating is appropriate and is likely to be required.

Consideration was given to a common rising main to allow each pump station to discharge into a common line before being discharged into a gravity manhole outside 24 Boyer Road. A professional discussion took place to investigate the possibility of achieving this outcome. After this discussion it was determined that it would not be possible to achieve this. There are two other possible ways to achieve the discharge requirements of the three pump stations. The first is to install an individual rising main to each sewer pump station. This means a common trench can be used from near Serenity Drive all the way to 24 Boyer Road. The other possible solution is to daisy chain the pump stations, that is one pumps to the other and then the next one. This means the pump stations would have to increase in size to accommodate the additional effluent discharged by the previous pump station and the inflow from the local catchment. A high-level cost analysis of these options will be carried out. In the first instance the multiple rising main option is likely to be the best option for cost but also for the fact that the stand-alone development can occur on the individual larger parcels. Please see new advice received about the pump stations and a common rising main.

The sewer pump station volumes for the multiple rising main option are shown in Table 1.

Table 1 – Sewage Pump Station Parameters – Current Plan > 362 lots

Pump Station ID	Developed Equivalent Tenements (ET's) (+20% Growth Rate)	Pump Station Volume	Pump Flow Rate
1 (50 Boyer Road)	134	20.1 m^3	10.62 L/s
2 (170 Boyer Road)	248	37.2 m^3	18.04 L/s
3 ('Boyer Road')	71	10.6 m^3	5.95 L/s

Preliminary comment from Taswater was received on 05/11/24 (included in Appendix B), with more detailed advice from Taswater's assets and modelling teams still to follow. Taswater's preliminary comment assumed connection to the existing Riverside Drive Sewage Pumping Station (ID: GRPSP12) which represents another option for connection location, however indicated that several upgrades to the existing piped network and sewage pumping station would likely be required in this instance and the Riverside Drive SPS will not be included.

Service Enquiry Update 22/11/24

After discussion with TasWater and receiving the written advice indications are that a common rising main linking all three pumpstations is a possibility. This may change the configuration of each of the pump stations and will be subject of future design. The already calculated total capacity requirements for all three pump stations are unlikely to change and hence these sizes can be used to calculate costs in relation to a contribution model.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

TasWater have also provided additional information about their downstream sewerage infrastructure. They are indicating that there is significant strain on the gravity system, the existing sewer pump stations and rising mains. One positive is that the Green Point Sewerage Treatment Plant has adequate capacity to cater for the development.
Gravity main upgrades are required between the receiving manhole and the Nielsen Parade SPS. Further to this gravity and rising main upgrades maybe required from the Nielsen Parade SPS to the Green Point STP.

The Sewer Pump Station at Nielsen Parade requires an upgrade in volume, at total of 52.6kL. Taswater water have nominated that 30.1kL are the responsibility of the development. Further to this pump upgrades will be required with additional flow rate. The additional flow rate will require a larger rising main. These works are shown on Plan 251013 C503, with alternatives for the possible rising main upgrades. TasWater Servicing Advice found in Appendix B.

Funding of Infrastructure 31/1/25 - Sewer

The upgrade to the existing Nielsen Parade Pump Station will have shared costs between TasWater and an infrastructure contribution for Boyer PSP. Taswater have been clear in regard to volume upgrades and pump upgrades and their portion of these costs. The final part of the puzzle is the final rising main size. The cost difference is minimal in the rising main pipe diameter as most of the cost is in trenching and backfilling. A BoQ has been produced to assist the Quantity Surveyor to establish the apportioned costs to the contributions plan.

Water Supply

The creation of a reticulated water supply network to service the development will require connection to the existing Taswater supply network. The closest connection location is at the intersection of Serenity Drive and Boyer Road to an existing DN100 PVC main. Preliminary comment from Taswater (included in Appendix B) has indicated that the existing DN100 main will be too small to service the development with a DN200 connection (or 2 x DN150) typically required for a development of this size. The existing Taswater network within a reasonable proximity to the site (developed areas to the east) consists entirely of DN100 or less sized mains, meaning no suitable connection is in close proximity to the site from this area.

The existing developed area to the east is supplied from the single Bridgewater Reservoir (ID: HOBWS017), which is located adjacent to Cobbs Hill Road to the north of the site. Taswater has advised that connection for the site will likely be required directly from the existing DN375 main (ID: A203814) at the reservoir. Connection at this location would mean the new water supply will be required to run through areas of 29 Cobbs Hill Road not previously included for development. Taswater has also advised that the creation of a new road reserve would be required to house the new DN200 main as new water mains cannot be located within private property. It is likely that the new mains servicing the site will also require connection back into the existing network at Serenity Drive to create a closed loop.

No other existing infrastructure suitable for direct connection is present within the surrounding areas. Several large bulk transfer mains are located further north of the site as well as a DN630 irrigation main that partially runs through 50 Boyer Road, however these are not suitable nor available for connection. This means that Taswater's initial comments on connection location nearby the reservoir are very likely to be the required solution for the site.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

In preliminary assessment of possible connections to Serenity Drive, an EPANET model has been undertaken which has been adjusted to include supply from the Bridgewater Reservoir. Preliminary results from the model show that adequate pressures and flows are expected to be available to all lots on the site inclusive of both residential and fire flows to the most hydraulically disadvantaged lot. A screenshot of the EPANET model is provided in Figure 1 below.

Service Enquiry Update 22/11/24

Water Infrastructure

Previous advice in regards to supply from the reservoir on Cobbs Hill Road still applies including the trunk supply at DN200 then spreading to DN100 throughout the subdivision. The new advice is that the capacity of the reservoir is not adequate to maintain existing servicing and supply the proposed subdivision. To this end TasWater will require additional capacity, either by rebuilding the existing reservoir with additional capacity or by building a second reservoir to give the additional capacity. If there is adequate land area a second reservoir is the likely outcome as this will limit supply disruption. We will discuss further with TasWater about the like volume requirement for additional storage.

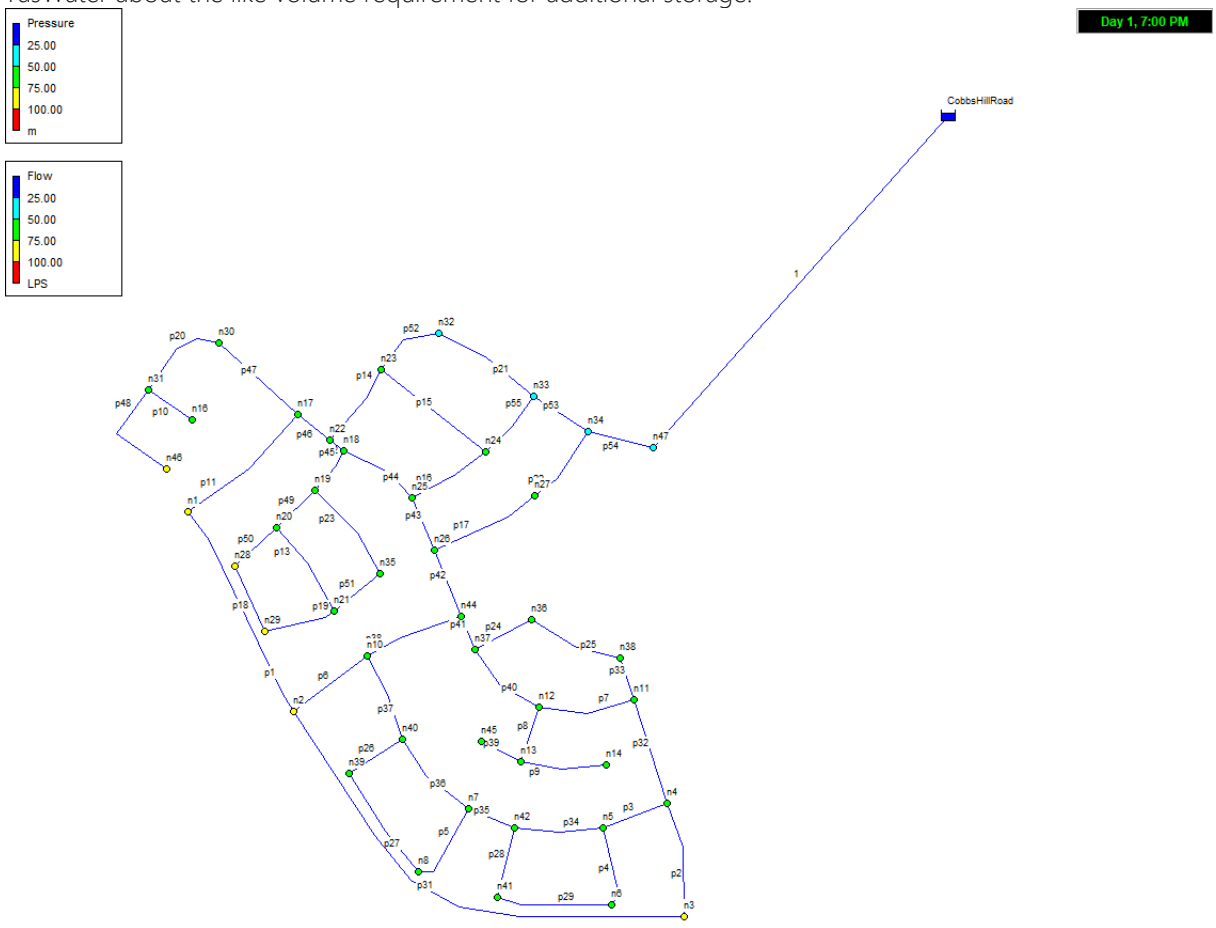


Figure 1 – EPANET Model (Cobbs Hill Road Connection)

This model provides DN 200 lead in from the reservoir spreading to a DN100 network within the subdivision.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Funding of Infrastructure 31/1/25 - Water

The requirement for additional reservoir storage at Cobbs Hill Road will fall under an infrastructure contribution model. Also included will be the DN200 connection from the Cobbs Hill Reservoir into the subdivision as it is required. Link water infrastructure that enables 50 Boyer Road, 170 Boyer Road and the third property on Boyer Road to be included in the infrastructure contribution model. A Bill of Quantities has been prepared for use by the Quantity Surveyor.

Council - Stormwater Discharges and Onsite Detention – Internal Roads

Contact Person – Leigh Wighton – 0418 569 044

A meeting with Brighton Council was undertaken on 05/11/24 which included discussion on stormwater quality and quantity management with the information provided below being in-line with these discussions and Council's direction/requirements.

The land has three overall catchments with each falling to Boyer Road as shown on the concept plans provided in Appendix A. Each catchment discharges via an existing pipe under Boyer Road. Catchment 1 (50 Boyer Road) has a twin DN375 discharging under Boyer Road into a table drain that runs towards the railway crossing point at Riverside Drive. Catchment 2 (170 Boyer Road) discharges via a DN900 under Boyer Road and then under the railway corridor and finally to the Derwent Estuary. Finally, Catchment 3 ('Boyer Road') has a DN1200 discharging under Boyer Road and then under the railway corridor to the Derwent Estuary. Photos of the existing pipes from the upstream side are provided in Appendix C.

The Catchments 2 & 3 have defined gullies, and because of the rural nature have farm dams capturing flows at various locations. While these dams provide online storage, this has been ignored for the overall catchment modelling. The catchment modelling was carried out using the software package DRAINS to determine the impact of increasing the impervious areas due to development. A screenshot of the DRAINS model is provided in Figure 2. The discharge parameters used consisted of maintaining the existing pipe sizes beneath Boyer Road to control flows up to the 1% AEP event including a climate change increase factor of 16.3%. The results of the modelling including likely detention sizes required, are shown in Table 2, noting that catchment 3 did not require any detention with the existing DN1200 pipe and roadside depression being adequate to build driving head and discharge of the post-development flows.

Table 2 – Stormwater Flows and Detention Requirements

Catchment ID	Existing Pipe Discharge Size	Peak 1% AEP Post-Developed Flow (Generated by Catchment)	Approximate Detention Volume Required	Peak 1% AEP Post-Developed Flow Through Culvert (With Detention)
1 (50 Boyer Road Discharge)	2 x DN375	1.04 m^3/s	1,300 m^3 (Approx. 1400m^2, 2m max. depth)	0.358 m^3/s
2 (170 Boyer Road Discharge)	DN900	3.57 m^3/s	2,360 m^3 (Approx. 2000m^2, 3m max. depth)	2.23 m^3/s

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

3 ('Boyer Road' Discharge)	DN1200	3.56 m^3/s	Nil (sufficient pipe capacity/inlet storage)	3.35 m^3/s

With the presence of an existing gully within Catchment 2, the topography is expected to lend itself to the creation of a suitable detention basin. The topography adjacent to the outlet for Catchment 1 is less well defined in regards to an existing low point/water course and would likely require additional earthworks to construct a suitable detention basin.

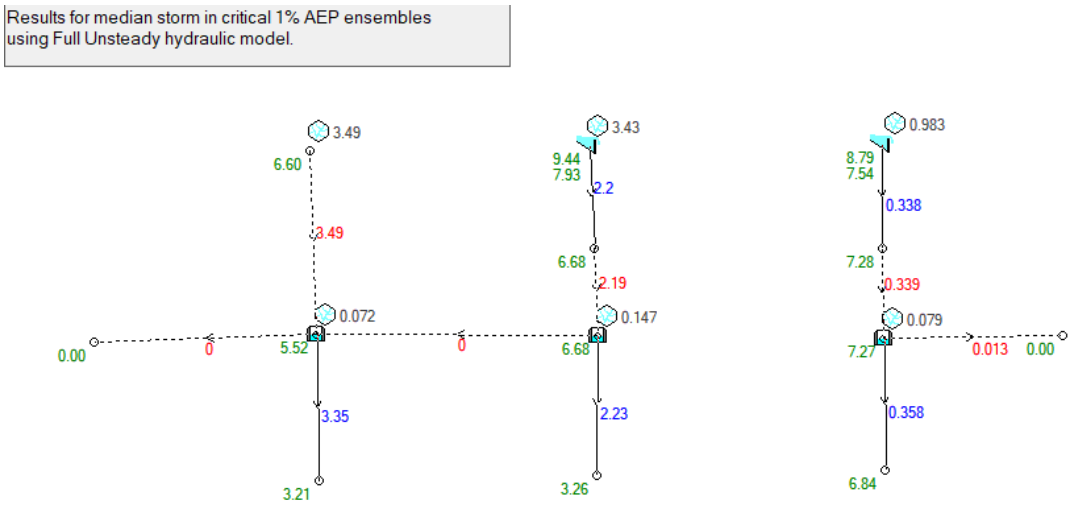


Figure 2 – DRAINS Model (1% AEP Event)

Funding of Infrastructure

It is likely that the detention basins would be included in a funding model as there based on their need to limit flows and prevent further pipe infrastructure upgrades. It would be fair for these to be aggregated as a whole of development requirement.

Stormwater Quality

Treatment of stormwater flows from developed areas is expected to be required in accordance with the pollutant reduction targets of 90% Gross Pollutants (GP), 80% Total Suspended Solids (TSS), 45% Total Phosphorus (TP) and 45% Total Nitrogen (TN) outlined in the *Tasmanian Stormwater Policy Guidance and Standards for Development* document.

Due to the significant portion of external undeveloped catchment flows and the nature of the development having the potential for staged or partial development of individual land parcels, it is expected to provide a better outcome to provide at source treatment/control. This would involve treatment at the localised discharges from the major developed areas before discharging into the existing gullys/watercourses, and/or

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

by providing treatment at the time of development on each individual lot. By allowing the large portion of external catchment flows to discharge directly to Boyer Road, bypassing treatment, more efficient removal of pollutants from developed areas can be carried out with less dilution of polluted flows. This may assist in lowering the total sizes of treatment infrastructure required. Potential locations for combined treatment systems are indicated on the concept plans provided in Appendix A, however may be located elsewhere depending on final outlet locations.

It is expected that with the inclusion of the open space/watercourse areas that sufficient space will be available for treatment devices to meet the required pollutant reduction targets at the outlets from individual developed areas. The configuration of treatment devices may include both the use of 'natural' WSUD solutions (e.g. sediment ponds, swales, bioretention) and proprietary treatment devices (e.g. gross pollutant traps, filtration systems) with further assessment required to determine treatment sizes dependant on selected methods.

Funding of Infrastructure

Local source control water quality devices to fall under local developer costs.

Internal Road Bridges

While the internal road network built to LGAT standards and requirements will be the developers cost, there are two bridges crossing the water ways, one in 170 Boyer Road and the other in western Boyer Road property. Thes have been considered for contribution funding but on the basis that they are not required to facilitate the development for all six properties have been excluded from contribution funding.

NBN

Contact Person – Peter Freshney – Kisstel – 0417 287 006 Daniel Costa – NBN Co. daniel.costa@nbnco.com.au

Communication services in the form of the NBN are located at the intersection of Boyer Road and Serenity Drive. Both 50 and 170 Boyer Road are connected by Fixed Wireless to the NBN network. Contact has been made with a local designer and installer to receive an appropriate contact with Development Planning at NBN for discussion. Peter has advised that Daniel Costa of NBN Co. is our contact. We will follow up with Daniel in due course.

Update 6/12/24

Met with Daniel Costa from NBN. He is confident that NBN will supply the future subdivision and lead in infrastructure will be provided as part of an overall development plan. Costs will be part of developer charges similar to TasNetworks. Typically costs are $1000 to $1500 per lot.

Funding of Infrastructure

NBN infrastructure to fall under local developer costs.

TasGas

TasGas have reticulation of Natural Gas on the eastern side of the Midland Highway in Bridgewater. The supply of Natural Gas is not considered to be an essential service but rather an optional service. Generally,

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

TasGas will make a commercial decision in terms of supplying an area based on the level of interest of future customers.

Funding of Infrastructure

As this is not an essential service this will not form any part of the funding agreement.

Department of State Growth – Entry Road Intersections

Advice has been received from Keith Midson concerning the treatment at the three entry road locations. A CHR(S) treatment is appropriate at all three locations. A CHR(S) treatment is approximately 160m long and involves introducing pavement widening, line marking and signage. A Bill of Quantities will be prepared for the Quantity Surveyor.

The construction of the CHR(S) intersections will facilitate development for the total land holding and the total cost for the three intersections will form part of the contributions plan.

Further to the intersections, a possible shared bike and pedestrian path from the Main Street to the entry point in 50 Boyer Road is being considered. Space and terrain may limit this proposal.

Funding of Infrastructure

The construction of three intersections to be included in a contributions plan and cost distributed on a per lot or developable land basis. A bike shared pathway would be included in a contributions scheme.

Tas Irrigation

Inquiries with Tas Irrigation have taken place after the LIST showed an irrigation pipeline located in the property. This is a DN630 irrigation line that runs from the north at Cobbs Hill Road into 25 Cobbs Hill Road and then into 50 Boyer Road before leaving the property crossing Boyer Road, under the rail corridor and into the Derwent Estuary crossing the river to Granton. The proposed layout keeps this irrigation infrastructure in proposed public land areas.

Conclusion

The Boyer Road development requires the provision of new services infrastructure to service approximately 360 residential lots. Early discussions with service authorities have been undertaken alongside preliminary concept design to determine the most likely and/or appropriate way forward for delivery of services.

Sewer infrastructure is expected to require the provision of three separate sewage pump stations at the low points of each catchment for pumping to existing gravity infrastructure outside 24 Boyer Road to the east. Upgrades to existing Nielsen Pde SPS will be required and include additional gravity and rising mains

Water supply will come from the Reservoir on Cobbs Hill Road. A minimum DN200 connection with a new main required to feed the development within a new road reserve or public reserve through the northern properties. To meet the supply needs a volume upgrade will be required to the reservoir.

To manage stormwater from both the site and existing catchments, stormwater detention is proposed within the two eastern-most catchments 1 & 2 with approximately 1,300m^3 and 2,360m^3 of detention volume expected to be required respectively. The western-most catchment 3 is not expected to require detention.

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

All three catchments are to discharge through existing culverts beneath Boyer Road. Stormwater treatment is recommended to be provided at the source, either at the discharge from each developed area or on an individual lot basis to more effectively treat more highly polluted flows and minimise required infrastructure.

Power and communications supply is achievable with connection to existing infrastructure or augmented infrastructure and is not considered a risk to the development. TasNetworks will bundle supply and reticulation into a per lot charge passed onto the developer. NBN will take the same approach with guarantee to supply and cost recovery via a developer charge.

TasGas is considered an optional service with TasGas to determine if servicing the development is to be commercially viable.

The Traffic Engineer has provided intersection details and the cost of these will be determined and included in an overall contributions plan.

To assist the Quantity Surveyor a scope discussion is provided in Table format in Appendix E.

Yours Faithfully

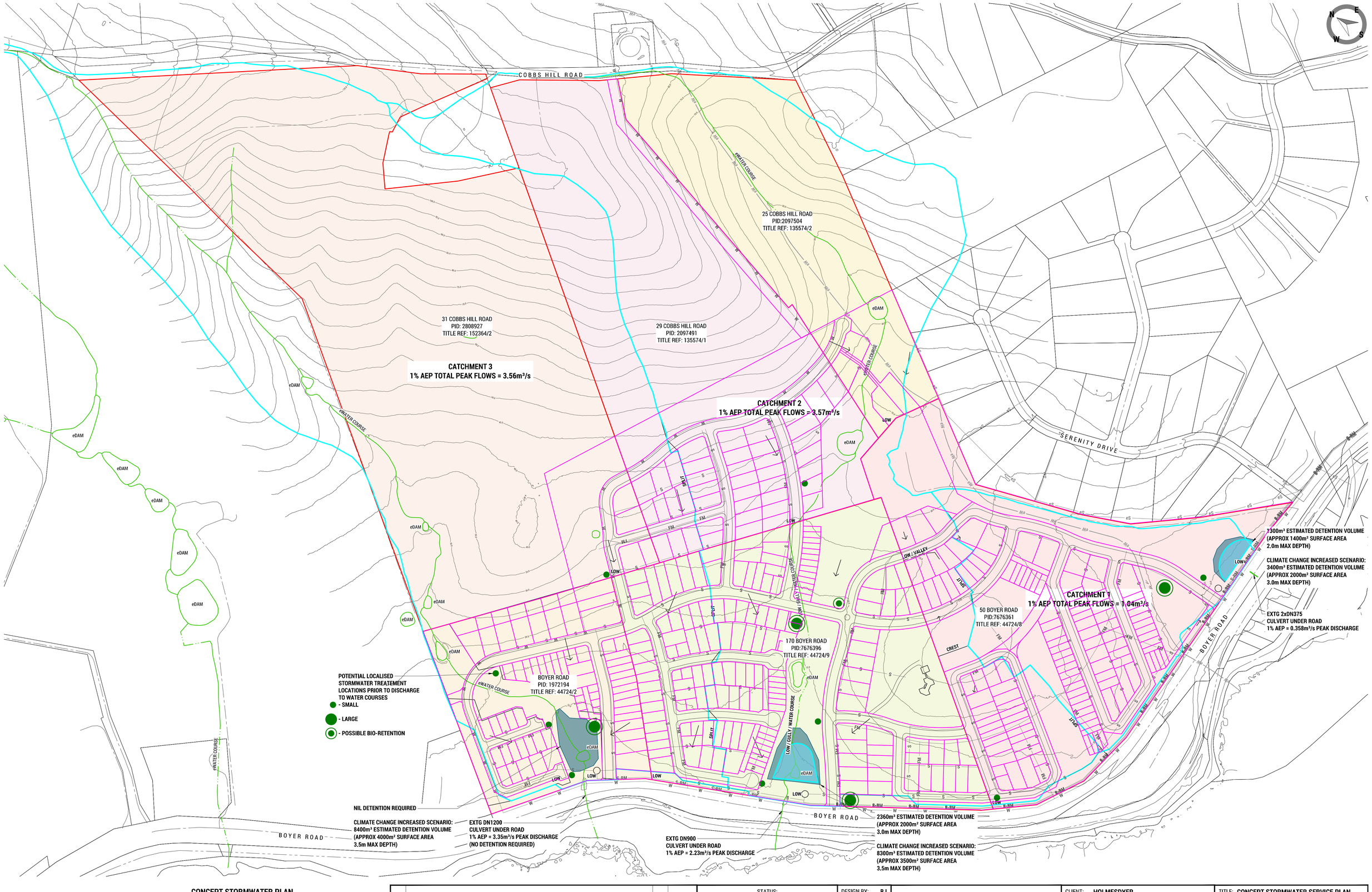
Rodney Jesson
Director
Civil and Infrastructure

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix A – Concept Site Services Plans



CONCEPT STORMWATER PLAN

SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
APPROVED:	-
ACRED. No:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER

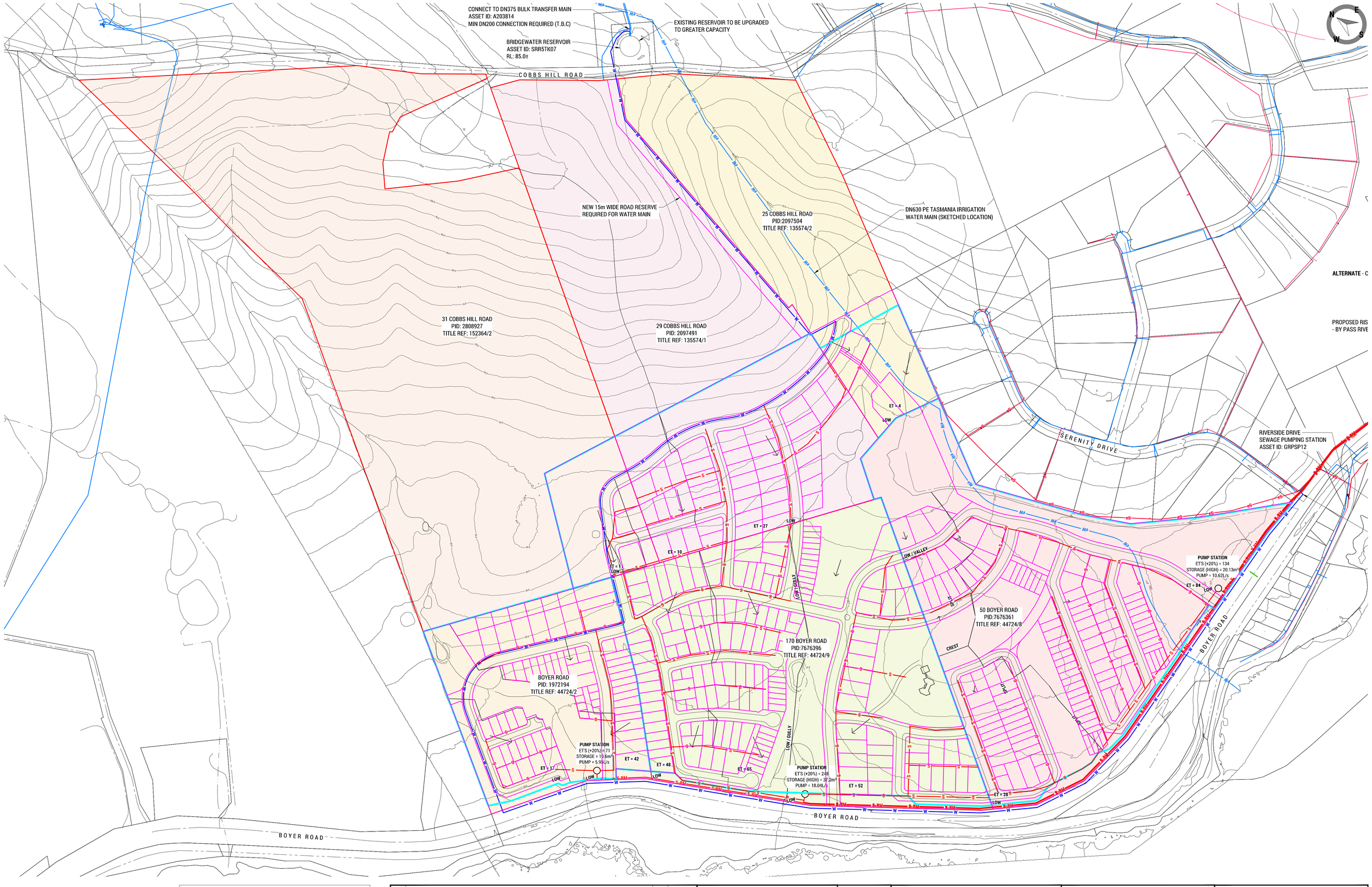
PROJECT: BOYER ROAD PRECINCT

ADDRESS: 50 - 170 BOYER ROAD
BRIDGEWATER

TITLE: CONCEPT STORMWATER SERVICE PLAN

SCALE: 1:2500 SHEET SIZE: A1 DWGs IN SET: -

PROJECT No: 251013 DWG No: C501 REV: A



CONCEPT SEWER + WATER SERVICE PLAN - SHEET 1

SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS:
PRELIMINARY / INFORMATION

DO NOT SCALE - IF IN DOUBT, ASK

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
APPROVED:	-
ACRED. No:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**

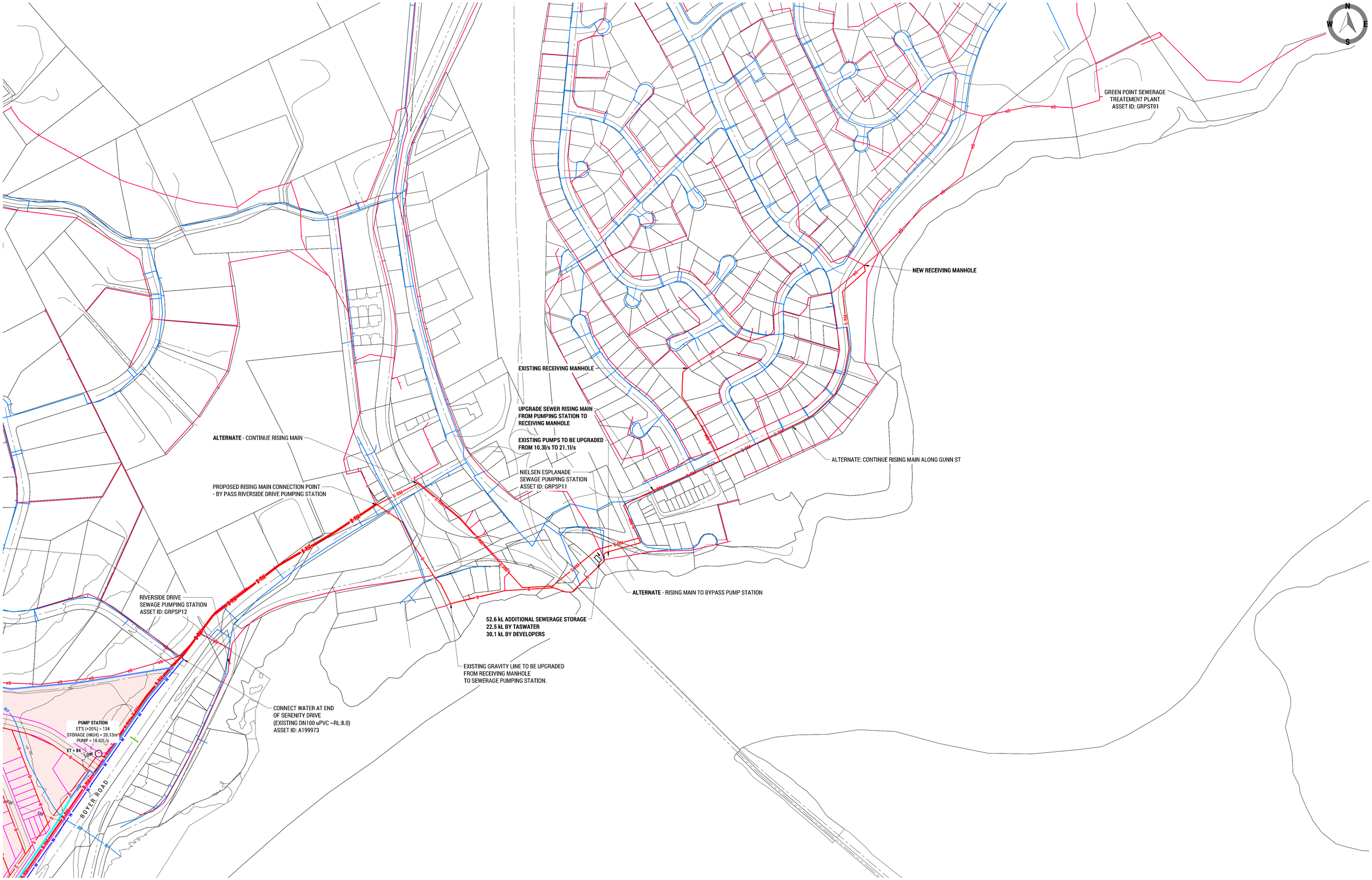
PROJECT: **BOYER ROAD PRECINCT**

ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

TITLE: **CONCEPT SEWER + WATER SERVICE PLAN - SHEET 1**

SCALE: **1:2500** SHEET SIZE: **A1** DWGs IN SET: **-**

PROJECT No: **251013** DWG No: **C502** REV: **A**



CONCEPT SEWER + WATER SERVICE PLAN - SHEET 2
SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	29-01-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: - ACRED. No: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**
PROJECT: **BOYER ROAD PRECINCT**
ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

TITLE: **CONCEPT SEWER + WATER SERVICE PLAN - SHEET 2**
SCALE: **1:2500** SHEET SIZE: **A1** DWGs IN SET: **-**
PROJECT No: **251013** DWG No: **C503** REV: **A**

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix B – Taswater Correspondence

Update 22/11/24 Attached

Water and Sewerage Servicing Advice

TasWater Reference No.	TWSI 2024/00697-BTN
Date of response	22/11/2024 19/11/2024 05/11/2024
TasWater Contact	Elio Ross
Phone No.	0467 874 330

Response issued to

Name	Rare Innovation Pty Ltd
Address	22-24 Paterson Street LAUNCESTON, TAS 7250
Contact details	approvals@rarein.com.au

Development details

Address	170 BOYER RD, BRIDGEWATER
Property ID (PID)	7676396
Description of development	Proposed Subdivision 250-300 Lot

Advice

Hi Paul,

Thanks for the call earlier regarding the proposed 300 lots subdivision at 170 BOYER RD, BRIDGEWATER.

Pending the official comments back for our assets and modelling teams, I have reviewed the documentation to provide some preliminary comments.

~~It's assumed that the sewer is to fall to Riverside Drive Sewage Pumping Station BRIDGEWATER, (id GRPSP12). Likely several upgrades would be required, depending on the proposed discharge location it looks as though pipes will need to be upsized as well as SPS and storage locations.~~ See updated advice below

Water, there were no concept plans provided with potential connection points nominated for the water network. Currently, the area is partly zoned in the Boyer Restricted Zone (BRW16), Pressure Head Level 161.7m, assuming this is because of its coming off the DN648 (id: A3352946) Bulk main and not suitable for a connection for this development.

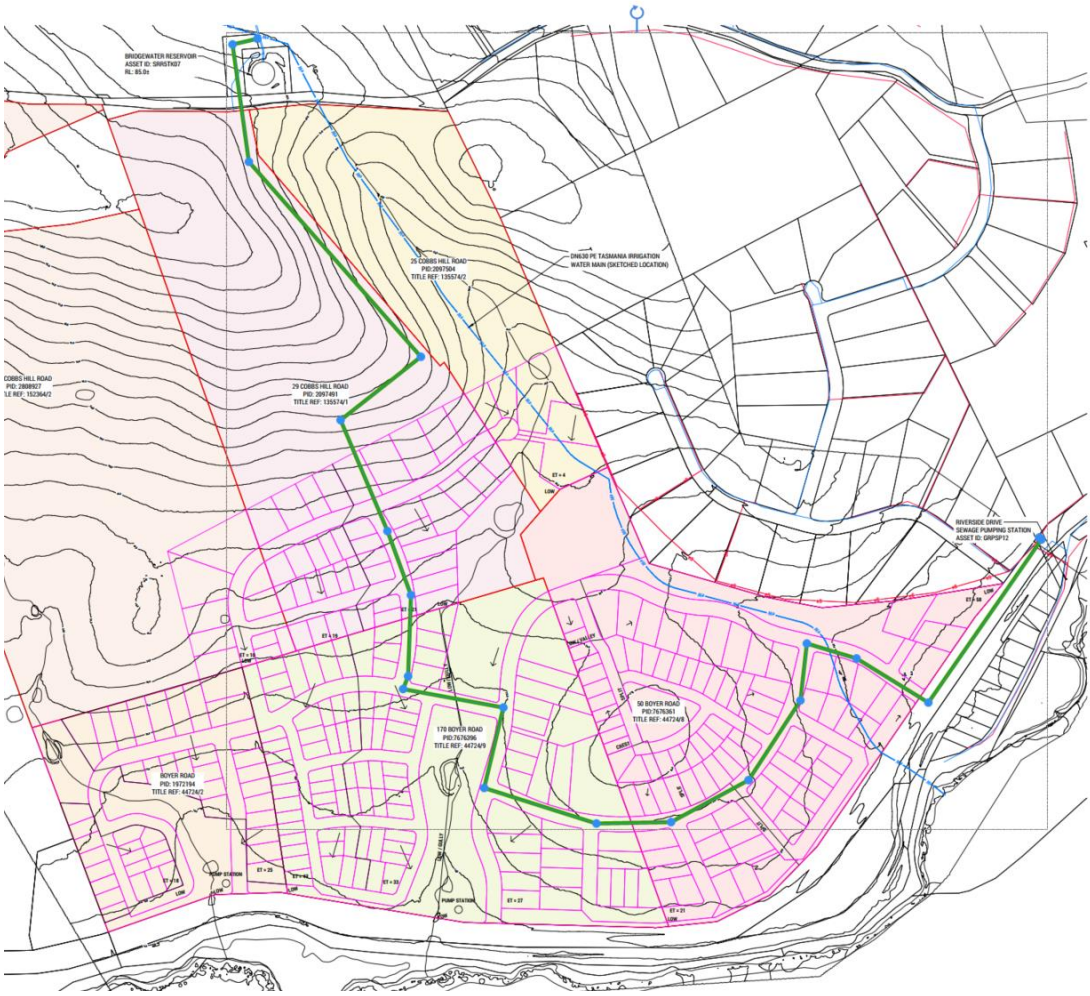
The other part of the development is located at 50 BOYER RD, which is zoned as Bridgewater Reservoir Zone (BRW1), with a head of 91m. This zone is more suitable for pressures given the approximate elevation of the lots range is 10m to 50m.

It is unclear where the proposed connections to the water network to feed the development will be located. The nearest location would be D100 (id A199973), which is too small to feed this development.

Typically, a single-direction feed would require a DN200 connection, or at least 2 x dn150 connections on a well-looped stable network.

Possibly a min DN200 connection to DN375 (id A203814) at the Bridgewater Reservoir, looped down to Serenity Drives DN100 would be the best approach.
Please note that the new water main cannot be in private property, the upper section of the loop will need to be located in a new roadway or council reserve.

I have sketched this below in green.



Please note that this is an early, provisional review of the area. More detailed modelling and asset reviews are being conducted, which will result in changes to the current assessment. This process will take additional time to complete.

Sewer Gravity:
Modelling analysis indicated that in the absence of the development, there is already a huge strain on the system with an abundance of excessively surcharging sewers and significant downstream capacity issues.
To accommodate this development all of the gravity mains between the discharge of the Riverside Drive SPS rising main to the Nielsen Parade SPS will need upsizing. TasWater may consider in a joint venture with the developer. However, this will require further investigations, consideration and approvals that will need to be confirmed.

The developer may also have to contribute to the upsizing of gravity mains between the discharge of the Nielsen Parade SPS rising main and the STP.
TasWater cannot accept the risks of allowing this development to connect without any infrastructure upgrades occurring.

SPS:

The development impacts two downstream SPS's GRPSP11 Nielsen Parade SPS and GRPSP12 Riverside Drive SPS.

GRPSP11 Nielsen Parade SPS

The downstream SPS "GRPSP11 Nielsen Parade SPS" currently has insufficient storage to support the proposed development. The total additional storage required at this site without the development is 22.5 kL. The total additional storage required at this site including the development is 52.6 kL. TasWater will hence be responsible for 22.5 kL and the developer responsible for 30.1 kL.

Pumps:

The pump station prior to the development fails to meet pump requirements by 10.3 l/s. With this development included, the pump station fails to meet pump requirements by 21.1 l/s.

Rising Main:

Following the required pump upgrade specified above, the rising main will need upsizing to accommodate the development.

GRPSP12 Riverside Drive SPS

The downstream SPS "GRPSP12 Riverside Drive SPS" currently has insufficient storage to support the proposed development. The total additional storage required at this site without the development is 0 kL. The total additional storage required at this site including the development is 25 kL. TasWater will hence be responsible for 0 kL and the developer responsible for 25 kL.

Pumps:

The pump station prior to the development meets pumping requirements. With this development included, the pump station fails to meet pump requirements by 0.8 l/s.

Rising Main:

Following the required pump upgrade specified above, the rising main will need upsizing to accommodate the development.

STP:

The Green Point STP has sufficient hydraulic and treatment capacity to accommodate the additional loading from the proposed development.

Water Modelling:

Modelling indicates there is capacity (in regards to available pressures) in the existing network at 170 Boyer Rd, Bridgewater (pipe A199973 and A203814) to supply this proposed development without impacting adversely on the existing infrastructure or customers. Total boundary heads (HGL), not pressures, at the proposed connection point(s) with the reservoir set to 1/3rd full are:

Location	H.G.L. Peak hour	H.G.L Peak day + 10 l/s fire flow
A199973 (Boyer Rd)	86	86
A203814 (Rev outlet)	87	87

These are heads within the Taswater network, so they do not account for losses in customer piping and fittings. This result is based on a sound but imperfect knowledge of conditions on the field and those who use this information should allow an appropriate margin of error in their design.

We noticed that the site falls within the Boyer Restricted Zone, and we agree that connecting to the A3352946 bulk main is not suitable for this development. Therefore, we proposed a DN200 loop: one connection from the reservoir outlet and another from 50 Boyer Rd (see image below).

The reservoir is already fully committed prior to adding this development. If this development proceeds, it will require upsizing storage (ie new reservoir) by the devloper prior to the completion of the subdivion.

TasWater confirms that you have made a pre-lodgement enquiry for the above proposal. TasWater's servicing advice in this response to the above proposal is based on the water and sewerage components of the proposal only. The other aspects of the proposal will be assessed by the relevant Planning Authority, or the Development Assessment Panel established under section 60G of the *Land Use Planning and Approvals Act* ("the Act") where the proposal is declared as a major project under 60C of the Act.

Despite anything else in the servicing advice TasWater reserves its rights regarding this proposal, when it is submitted for assessment as required by law under the Act.

Fees

This assessment is provided at no cost. For details on fees applicable for a formal assessment please see www.taswater.com.au

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix C – Culvert Photos

Catchment 1 (50 Boyer Road)

Catchment 2 (170 Boyer Road)

Catchment 3 ('Boyer Road')

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Appendix D – TasNetworks Minutes

Early Engagement Meeting - Subdivisions

Case Reference No.	CN24-316681		
Case Manager	Alan Heald		
Date	10/01/2025	Site Address	170 Boyer Road BRIDGEWATER
Attendees	Chris Symons, Alex Izbicki, Katherine Johnston, Alan Heald. Rodney Jesson (RodneyJ@rarein.com.au)		
Apologies	Stephen Holmes (customer) admin@holmesdyer.com.au Kirsty Spilsbury (consultant) approvals@rarein.com.au		

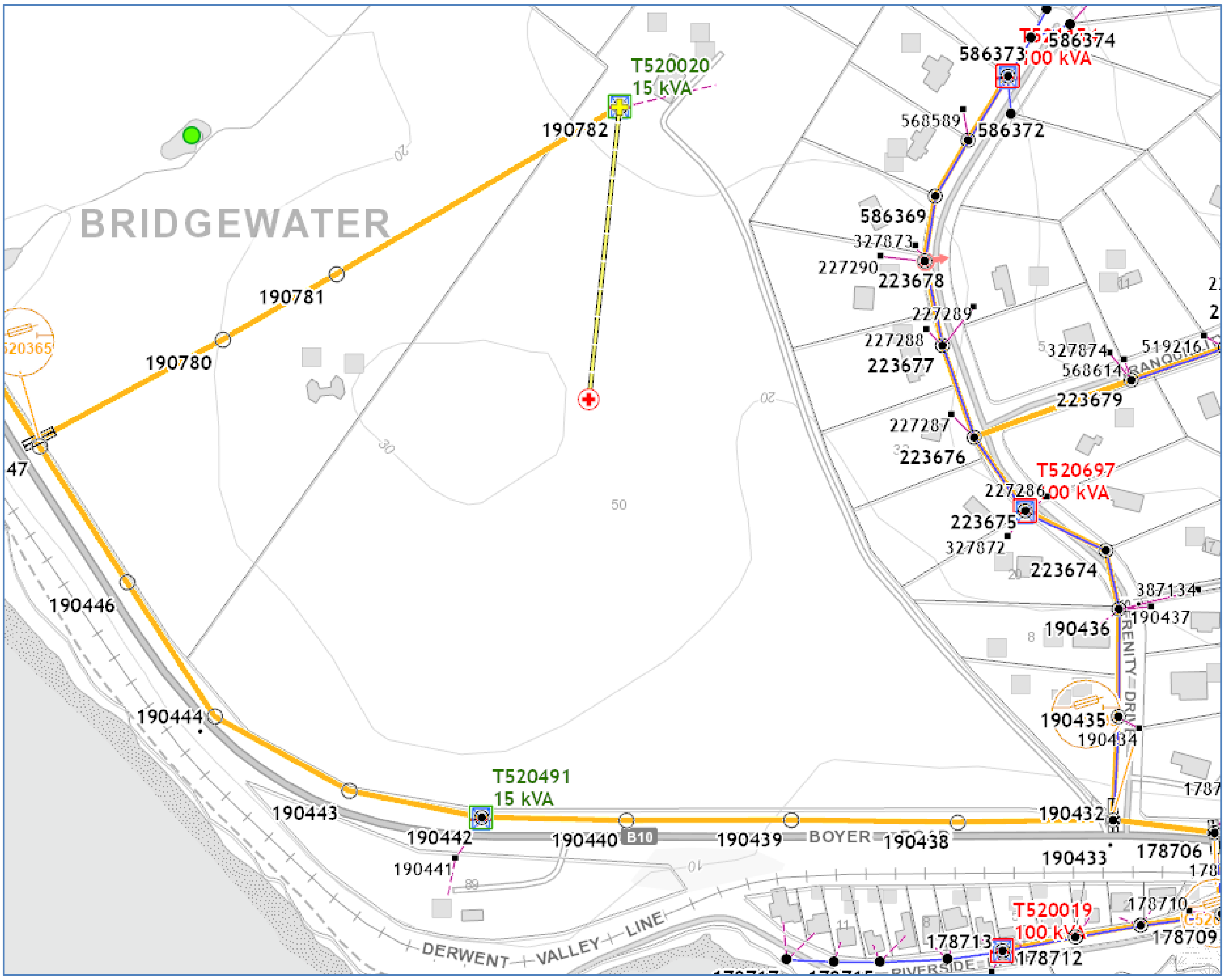
Agenda

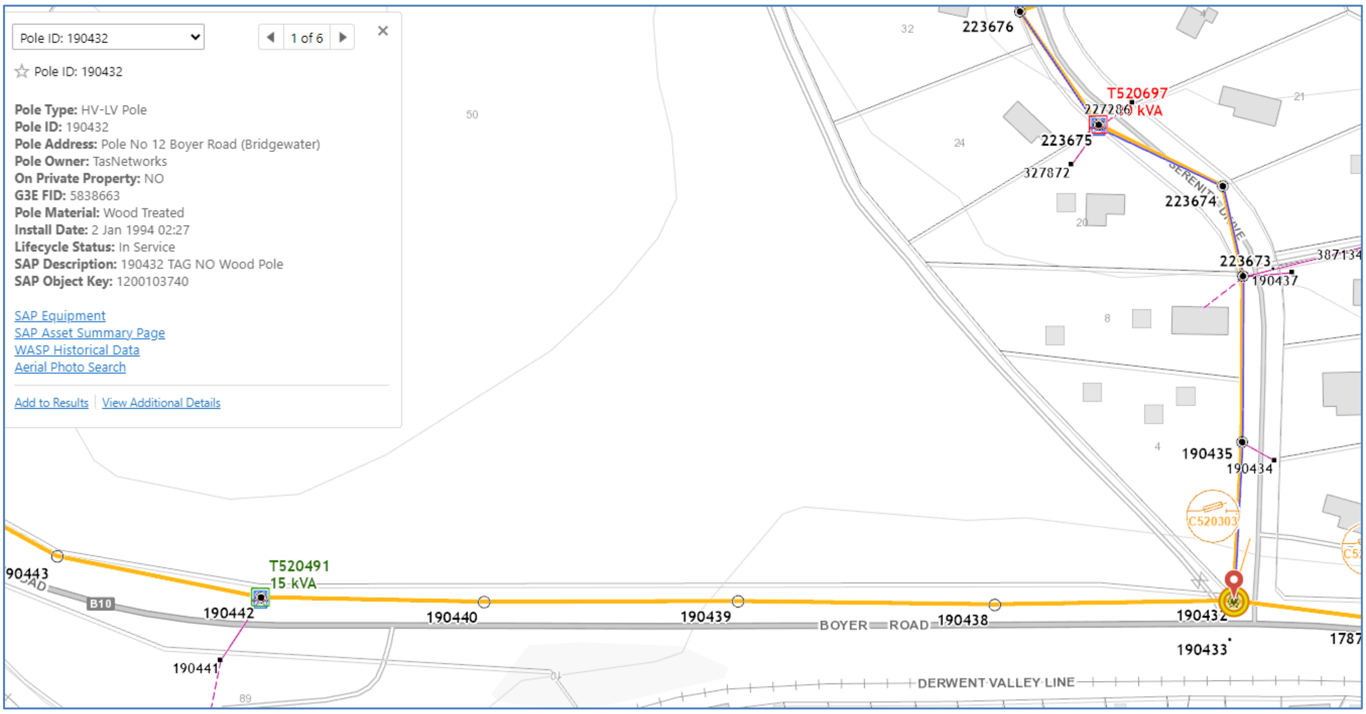
#	Items Discussed
1	Introductions
2	Developer to discuss overview of Development: • 250 lots / multi staged development. Rodney has advised this could be up to 400 lots • There are 6 parcels of land with 6 separate owners • Planning is being undertaken by the local council and Rodney is acting as a planning consultant. • Various stakeholders have attended a meeting to future plan and gain insight into the proposed development. Cost contribution is an important factor for the development planning. • The planning approvals and stages have not been finalised and are subject to feasibility studies. Rodney is requesting this from TasNetworks. For TasNetworks to provide this, a staged plan will need to be provided. What outcomes does Developer require from this meeting: Is a Planning Permit in-place? ☐ Yes or ☑ No Note: application will not be progressed to design without receipt of the planning permit. Have any aboriginal /Enviro studies been undertaken as part of the planning permit? ☐ Yes or ☑ No Reports to be provided if available Have CAD files been supplied? ☐ Yes or ☑ No Is this Development Staged? ☑ Yes or ☐ No

	If yes staged, please provide a staging plan and confirm sequences of construction so TasNetworks can design a development plan. What are the intentions for street lighting, council will need to provide advice on what they require (rural subdivision)?
3	Customer choice options (note TasNetworks due to administrative requirements may not support changes to an option part way through the application process). ☐ Accredited Electrical Designers (AED) & Accredited Electrical Constructors (AEC) ☐ TasNetworks as Designers & Accredited Electrical Constructors (AEC) ☐ TasNetworks as Designers & TasNetworks as Constructor
4	What are the Developer's program timings? Note: Timing of TasNetworks Services • Currently: ○ 14 weeks to design from start date. ○ 20 weeks construction min. 36 weeks construction min. if a substation is required. Due to construction scheduling and procurement of equipment the construction stage may take approximately 20 weeks (indicative estimates only) to complete. In some instances, these timeframes may be extended due to the supply of materials, weather, the work schedule of construction crews, or delays that are attributable to you or your external service provider. This can push up-to 24 weeks if a substation is involved. Do you require pre-purchase of substation if choosing TN to design/construct (18-20 weeks delivery time)? ☐ Yes or ☐ No
5	Network planning feedback: • A staging plan is required for an accurate feasibility study to strategically place substations and HV network and provide a clear feasibility plan. • The feeder that supplies development will need a network augmentation when development begins. The augmentation will be based on future needs. • Network Augmentation is triggered by the required needs as the development proceeds, this trigger will try to be picked up at Stage 1 but may not occur until Stage 7 depending on what other infrastructure requirements are within the network.

7	Design and Estimation Feedback: • Estimation of the cost per lot is a rough order of magnitude and can be subject to various factors that can alter this amount and should only be a guided estimation only. A figure of approximately $12,000.00 per lot was discussed however after receiving further technical advice at the conclusion of the meeting held, cost will be in the order of $15,000.00 to $20,000.00. • Cost separation between network augmentation and the new network within the development is preferred for cost allocation. Note: TasNetworks conducts audits to assess the general compliance of the proposed (AED) designs. Acceptance by TasNetworks does not relieve the AED of responsibility for suitability or correctness of the design. The audit will be undertaken within ten business days, unless otherwise agreed.
8	Construction Auditing Requirement for Accredited Electrical Constructors (AEC). • Open trench and cabling audit • Pre-commissioning and As-built audit Note: A TasNetworks Electrical Safety Specialist will complete the above staged audits, and non-compliance will be communicated to the Constructor and the Developer. The Developer is to ensure Constructor rectifies the identified non-conformance to ensure the construction schedule goes ahead as planned to mitigate any further delays. Note: regarding street and road names, can the developer please initiate this process early in the subdivision construction and provide to the AEC to ensure electrical labelling by the AEC is accurate at time of requesting the pre-commissioning and as-built audits Having labels fitted with roads 1,2 and 3 does not meet compliance and will not proceed to commissioning until such times as labelling is rectified.
9	Are there any known risks or issues associated to this development?

	Actions	**Due Date**
1	Civil Site Contact #	
2	Staging plan from developer for feasibility study	

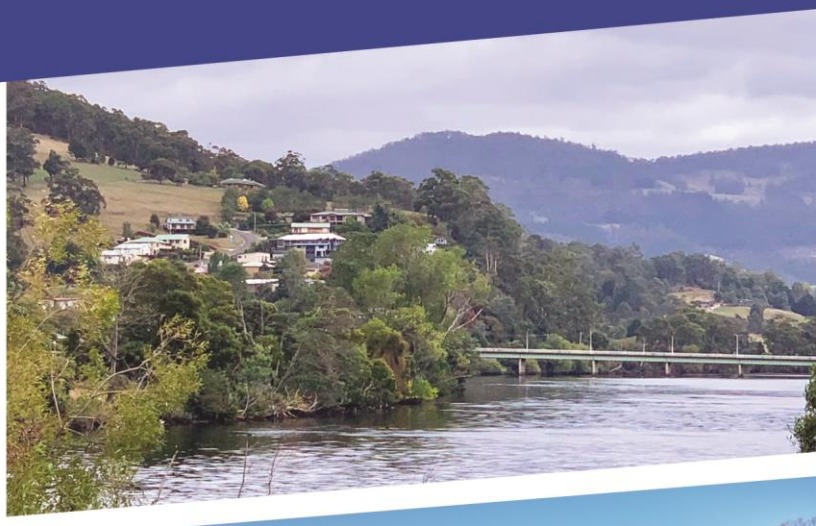

BRIDGEWATER
T520020
15 kVA
190782
190781
190780
190446
190444
190443
190442
190441
T520491
15 kVA
190440
B10
190439
BOYER
190438
190432
190433
178706
DERWENT VALLEY LINE
T520019
100 kVA
178713
178712
178710
178709
586373
586374
586372
568589
586369
327873
227290
223678
227289
227288
223677
327874
568614
519216
223679
227287
223676
T520697
227286
223675
327872
223674
387134
190437
190436
190435
190434
SERENITY DRIVE
50

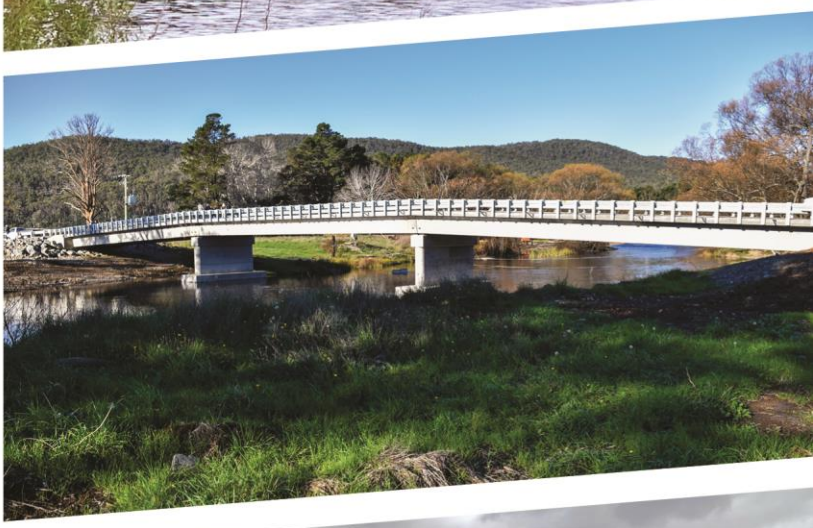

Pole ID: 190432
1 of 6
Pole ID: 190432
Pole Type: HV-LV Pole
Pole ID: 190432
Pole Address: Pole No 12 Boyer Road (Bridgewater)
Pole Owner: TasNetworks
On Private Property: NO
G3E FID: 5838663
Pole Material: Wood Treated
Install Date: 2 Jan 1994 02:27
Lifecycle Status: In Service
SAP Description: 190432 TAG NO Wood Pole
SAP Object Key: 1200103740
SAP Equipment
SAP Asset Summary Page
WASP Historical Data
Aerial Photo Search
Add to Results
View Additional Details
223676
T520697
227286 kVA
223675
327872
223674
223673
387134
190437
190435
190434
C520303
T520491
15 kVA
190442
190440
190439
BOYER ROAD
190438
190432
190433
190441
DERWENT VALLEY LINE

rare.
22-24 Paterson Street
Launceston, TAS 7250
P. 6388 9200
rarein.com.au

Appendix E – Funding Scope Table

Authority	Infrastructure Element	Contribution Funding	Developer Cost
TasNetworks - Power			
	HV Augmentation and Site supply		Yes
	Internal Reticulation		Yes
Council - Stormwater			
	Detention Basins x 2 including Landscaping	Yes	
	Water Quality Devices – Source Control		Yes
	Local Stormwater Network		Yes
Council - Roads			
	Internal Road Network		Yes
	Internal Bridges x2		Yes
Council - Landscaping			
	Streetscape		Yes
	Parks and Waterways		Yes
	Walking Trails		Yes
	Playground	Yes	
Department of State Growth			
	Intersection Treatment	Yes	
	Shared Bike/Pedestrian Pathway	Yes	
TasWater - Water			
	New Reservoir Capacity Upgrade	Yes	
	DN200 and trunk watermain	Yes	
	Internal water reticulation		Yes
TasWater - Sewer			
	Sewer Pump Stations and Rising Main	Yes	
	Nielsen Pde Sewer Pump Station Upgrade	Yes (TW contribution)	
	Downstream gravity main upgrades	Yes	
	Internal reticulation network		Yes
NBN			
	Infrastructure supply		Yes
	Internal reticulation		Yes





Stormwater Analysis Report

Holmes Dyer Pty Ltd
Boyer PSP
Boyer Road, Bridgewater

Prepared for:	Holmes Dyer Pty Ltd
Project No:	251013
Document No:	251013-RPT-001
Issue No:	01
Revision No:	B

22-24 Paterson Street
Launceston, TAS 7250

PO Box 1898,
Launceston, TAS 7250

P. 6388 9200

E. action@rarein.com.au

rarein.com.au

rare.

DOCUMENT CONTROL

Project	Holmes Dyer – Boyer PSP – Boyer Road, Bridgewater
Report Title	Stormwater Analysis Report
Project No	251013
Document ID	251013-RPT-001
File Path	R:\Projects\2025\251000 Civil\251013-Boyer Road Precicnt0Civil Services\4 Internal\STW Report
Client	Holmes Dyer Ptd Ltd

Record of Report					
Issue	**Reason**	**Revision**	**Date**	**Prepared By**	**Approved By**
01	Client Issue	B	14/03/2025	JS	RJ

Distribution of Report			
Company	**Name & Address**	**Contact**	**Copies**
Holmes Dyer Pty Ltd	Holmes Dyer Ptd Ltd Level 3, Reid House 15 Featherstone Place, Adelaide SA 5000	E: stephen@holmesdyer.com.au Ph: 08 7231 1889	1 (elec)

Contents

1. INTRODUCTION

Rare Innovation Pty Ltd (Rare) have been engaged to undertake investigation into the provision of infrastructure services to the proposed subdivision based on the Plan 1792-002>14.01.25 provided by Holmes Dyer. This working document shows approximately 362 lots for the potential future subdivision. This report focuses on the stormwater related aspects of the development including existing and proposed infrastructure, stormwater quantity management and stormwater quality treatment. The objective of this report is to inform early engineering design, planning and future requirements for the potential subdivision.

2. EXISTING SITE

2.1. Location & Property Details

The proposed development is located across six existing land titles in Bridgewater, Tasmania:

- 50 Boyer Road, Property ID: 7676361, Title Reference: 44724/8
- 170 Boyer Road, Property ID: 7676396, Title Reference: 44724/9
- 182 Boyer Road, Property ID: 1972194, Title Reference: 44724/2
- 25 Cobbs Hill Road, Property ID: 2097504, Title Reference: 135574/2
- 29 Cobbs Hill Road, Property ID: 2097491, Title Reference: 135574/1
- 31 Cobbs Hill Road, Property ID: 2808927, Title Reference: 152364/2

The site is zoned as Future Urban across the extent of the proposed subdivision area. The northern portions of the Cobbs Hill Road properties remain zoned as Landscape Conservation, however are outside the extend of the proposed subdivision areas. The site is bounded by Boyer Road to the south, Cobbs Hill Road to the north, existing Rural Living zoned residential developments to the east and existing rural/agricultural properties to the west.

2.2. Land Description

The development site currently contains multiple rural residential properties across the six existing titles with accesses onto Boyer Road and Cobbs Hill Road. The areas designated for future development as part of this subdivision (as shown in Figure 1) generally consist of cleared rural farmland. Areas to the north of the subdivision area and partly within the north-western corner of the subdivision area generally consist of existing native bushland.

The existing topography varies across the whole development site but typically falls towards the south-west and Boyer Road with undulating falls from the north-westerly to the south-easterly direction forming three distinct minor valleys with several existing drainage dams present. Falls typically range from 5-10% towards the south-west across the lower half of the existing six titles where the subdivision is predominantly located. Falls are typically higher in the range of 10-25% within the upper existing bushland areas.

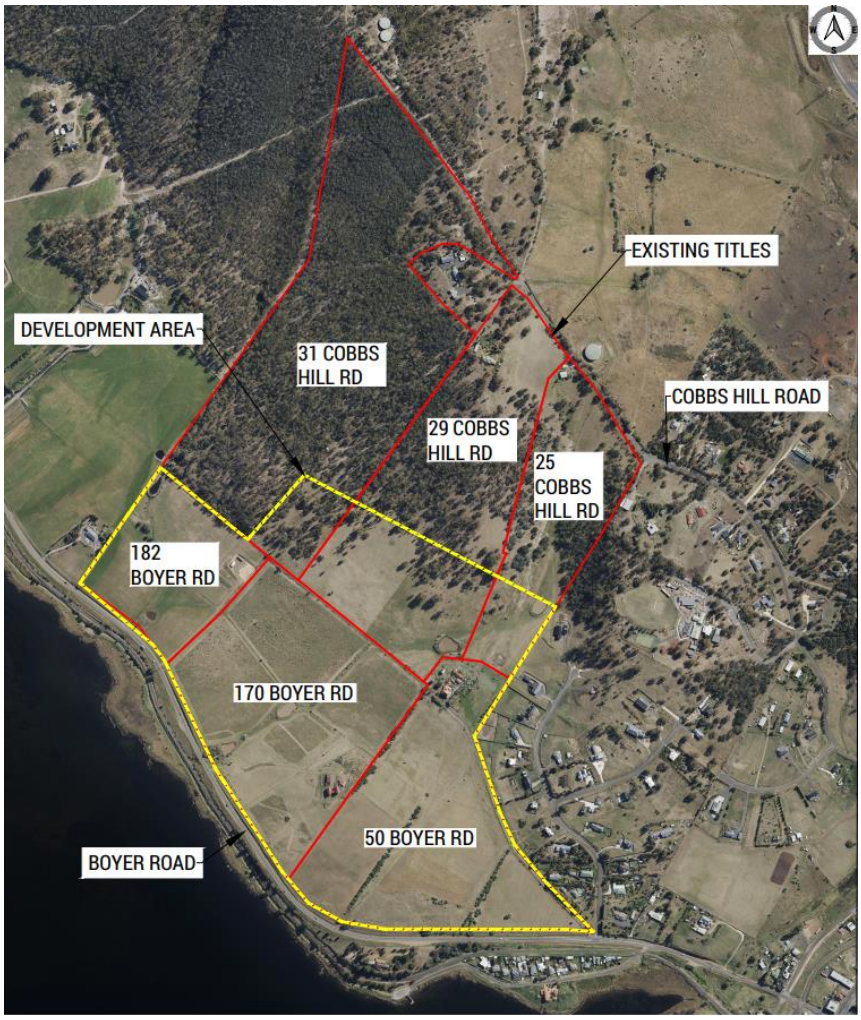


Figure 1 – Existing Site/Development Area

2.3. Existing Stormwater System & Catchments

Due to the nature of the existing land being largely rural/agricultural with existing bushland, the drainage across the site consists predominantly of naturally formed topographical drainage lines along minor valleys and gullies through the various properties towards the south-west and Boyer Road. Three distinct drainage paths are present which ultimately reach Boyer Road at the eastern end of no. 50 Boyer Road (Catchment 1, [east]), approximately in the centre of no. 170 Boyer Road (Catchment 2 [central]) and in the centre of no. 182 Boyer Road (Catchment 3 [west]). Multiple man-made farm dams are present within the central and western catchments. Appendix A provides an overview of the catchments and flows for the site which are discussed in further sections of this report. The catchments shown are the combined existing and developed catchments as they are expected to be altered in the developed areas of the site, although only marginally.

The outflow from each existing catchment discharges under Boyer Road through existing concrete culverts, which subsequently flow through the adjacent rail line and into the Derwent River. The western catchment contains a single DN1200 culvert in an existing gully, the central catchment contains a single DN900 culvert also located in an existing gully, and the eastern catchment contains a twin DN375 culvert located in a shallower open drain adjacent to the road. Photos of the existing culverts are provided in Appendix B.

3. PROPOSAL

3.1. Proposed Development

The proposed development is for the creation of a new subdivision area consisting of 362 lots and associated road and services infrastructure. The development is to feature three new road accesses from Boyer Road and proposes to retain the existing natural drainage corridors for use in stormwater management for the site. Figure 2 shows the master plan for the proposed extent of development and general lot layout.

Figure 2 – Development Master Plan (Source: Holmes Dyer)

3.2. Stormwater Objective

The overall objective for stormwater management across the development is to ensure that stormwater flows through the development area and as generated by the development are sufficiently managed with no/minimal impact to the existing environment. Stormwater quantity and quality modelling has been undertaken and is discussed further in the relevant sections of this report addressing the increased flows and pollutants likely to be generated by the proposed development and how they may be managed. This report provides high-level desktop assessments to inform the future design of the subdivision.

The intent for stormwater infrastructure for the site is to utilise the existing infrastructure wherever possible to meet the above objectives and determine any new required infrastructure or modification that may be required.

3.3. Stormwater Quantity Analysis

Modelling of the proposed development/existing site catchments has been undertaken using the Watercom DRAINS software package. Model input data has been obtained from the AR&R Data Hub for the development location utilising an initial loss/continuing loss model in accordance with AR&R guidelines. The following key model input parameters were used:

- Impervious Area Initial Loss: 1.0mm
- Impervious Area Continuing Loss: 0mm/hr
- Pervious Area Initial Loss: 26.0mm
- Pervious Area Continuing Loss: 4.3mm/hr
- Climate Change loading factor of 16.3% rainfall intensity increase adopted.

The modelling that has been undertaken has utilised the existing culverts beneath Boyer Road effectively as the limiting discharge for each catchment. The intent is to ensure that if fully utilised, that the existing culverts do not overtop the road in storm events up to the 1% AEP (1 in 100 year) frequency. Any stormwater detention infrastructure that may be required to meet this objective has also been modelled with results from each of the three catchments provided in Table 1 below. A screenshot of the DRAINS model is also shown in Figure 3.

Additional consideration of recent climate change factor increases and worst-case scenarios for limiting flows to pre-development levels are also discussed further in Section 3.4.

Table 1 – Stormwater Flows and Detention Requirements

Catchment ID	Existing Pipe Discharge Size	Peak 1% AEP Post-Developed Flow (Generated by Catchment)	Approximate Detention Volume Required	Peak 1% AEP Post-Developed Flow Through Culvert (With Detention)
1 (50 Boyer Road Discharge) (East)	2 x DN375	1.04 m^3/s	1,300 m^3 (Approx. 1400m^2, 2m max. depth)	0.358 m^3/s
2 (170 Boyer Road Discharge) (Central)	DN900	3.57 m^3/s	2,360 m^3 (Approx. 2000m^2, 3m max. depth)	2.23 m^3/s
3 (182 Boyer Road Discharge) (West)	DN1200	3.56 m^3/s	Nil (sufficient pipe capacity/inlet storage)	3.35 m^3/s

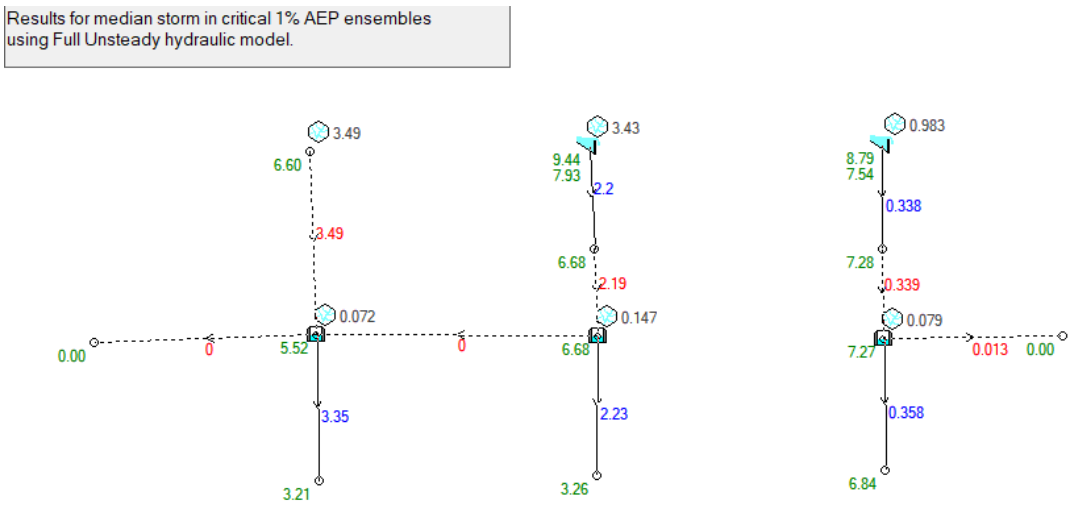


Figure 3 – DRAINS Model (1% AEP event)

The results shown in Table 1 for the 'Peak 1% AEP Post-Developed Flow (Generated by Catchment)', indicate the total flow that is expected to be generated by each catchment including the proposed developed areas and existing upstream properties/bushland areas. These flows were modelled as entering each respective culvert and detention storages were applied if required to ensure that the flows would not overtop Boyer Road. The existing gully depressions around the western and central culverts assist in allowing water to pond at the culvert inlet and build driving head in large flows, however the eastern-most culvert is situated in a shallower drain and does not allow for much ponding around the inlet in it's current state. It is expected that some minor works may be required around this culvert inlet to improve inlet capture efficiency.

From the modelling undertaken and as summarised in Table 1, Catchments 1 and 2 (east and central) will require detention storages to limit flows and allow discharge without overtopping through the existing culverts. A detention storage volume of approximately 1,300m^3 is expected to be required for Catchment 1 and 2,360m^3 for Catchment 2. With these detention storages in place the 'Peak 1% AEP Post-Developed Flow Through Culvert (With Detention)' is shown to be reduced, with these flows able to be adequately drained by the existing culverts. Modelling has indicated that the culvert for Catchment 3 is able to adequately discharge the 1% AEP developed flows without requiring additional detention storages.

The above detention storages were modelled utilising the existing valley depressions/topography to form an above ground basin. The detention basins may alter in size, shape and/or configuration when undertaken during more detailed design and as such the final flows discharged may change. However, with the detention basins modelled, this indicates that basins of sufficient size to achieve the required flow reductions are achievable. It is noted that the topography of Catchment 2 lends itself to the creation of a suitable detention basin, however Catchment 1 has a less defined depression/drainage route and will likely require additional earthworks.

The current basins have been modelled with a single control outlet only to ensure maximum flows for the 1% AEP event (climate change inclusive) are controlled. Additional multi-stage outlet control can be implemented during detailed design if required to control more frequent rainfall events.

It is expected that the approach of utilising the existing culverts and constructing detention basins within the site will be the most efficient approach to managing stormwater from the development rather than upgrading the existing culverts to allow for the full development's flows. Upgrades to the existing culverts would require significant works beneath Boyer Road (being a State Road owned by Department of State Growth) as well as additional upgrade works further downstream until reaching the Derwent River including potential upgrades being required to any drainage culverts beneath the adjacent rail line.

3.4. Stormwater Quantity Analysis – Climate Change Increases & Further Discharge Limiting

Further considerations for increased climate change loading and limiting of discharges to pre-development levels has also been assessed to provide guidance on the likely required detention infrastructure required in such scenarios.

Previous modelling as described in Section 3.3 used the capacity of the existing culverts beneath Boyer Road as the limiting factor for site discharges. It is noted that there may be further limiting factors downstream of these culvert locations (e.g. additional culverts or drainage infrastructure through the rail corridor) and so it may be appropriate to restrict flows further to pre-development levels should this be the case. As such, the stormwater runoff quantities generated by the site during a 1% AEP event (current condition, no climate change loading) have also been assessed and are presented in Table 2.

Recent revisions to AR&R have adjusted the climate change factors to be dependant on the storm durations being assessed, typically with increases to climate change loading multipliers across the board compared to previous values and in particular for short duration storms (increases of up to 77% to base rainfall intensities for SSP5-8.5 2090). Additional modelling has been undertaken in accordance with AR&R guidance from Watercom for modelling in DRAINS software. The following key model input parameters include adjustment factors also now provided as part of the revised AR&R data.

- Impervious Area Initial Loss: 1.0mm
- Impervious Area Continuing Loss: 0mm/hr
- Pervious Area Initial Loss: 30.42mm
- Pervious Area Continuing Loss: 5.977mm/hr
- Rainfall intensity data adjusted based on SSP5-8.5 Pathway (2090)

Both the adjusted climate change factors and the pre-development flows (as limits to site discharges) have been used to determine the required stormwater detention infrastructure in such a case, with summaries of flows provided in Table 2.

Table 2 – Pre-Development & Post-Development Flows (new climate change factors included)

Catchment ID	1% AEP Pre-Development Flow	Peak 1% AEP Post-Developed Flow	Peak 1% AEP Post-Developed Flow (with Detention)	Approximate Detention Volume Required
1 (50 Boyer Road Discharge) (East)	0.692 m^3/s	2.14 m^3/s	0.343 m^3/s	3,400 m^3 (Approx. 2000m^2, 3m max. depth)
2 (170 Boyer Road Discharge) (Central)	2.51 m^3/s	7.07 m^3/s	2.44 m^3/s	8,300 m^3 (Approx. 3,500m^2, 5m max. depth)
3 (182 Boyer Road Discharge) (West)	2.46 m^3/s	6.72 m^3/s	2.47 m^3/s	8,400 m^3 (Approx. 4,000m^2, 3.5m max. depth)

The increase in stormwater runoff generated by each catchment is shown to be significant in comparison the those shown in Table 1 using the previous climate change factors with increases of 88-102%.

Catchment 1 (East) is likely to be able to accommodate the increased detention basin size required. It is noted that the capacity of the existing twin culvert in this location is actually less than the peak pre-development 1% AEP flow and so the capacity of the culvert remains the limiting factor for discharge in this location. It is expected that the increased basin size noted in Table 2 will be able to limit flows to the lesser culvert capacity (and thus the pre-development flow also).

Catchment 2 (Central) is likely to be able to accommodate the increased detention basin size required in the same location as noted in Appendix A, however the shape and configuration of this basin is likely to be more constrained by the width of the open space area available. It is likely that a basin of this size will be approaching the limits of what is able to fit within this area, with the possibility of additional earthworks required to chase the basin out further uphill. There is also the possibility of splitting the detention into two separate basins with a second located further uphill, possibly at the location of one of the existing farm dams if required. It is noted than the pre-development flow for this catchment is approximately equal to the existing culvert capacity.

Catchment 3 (West) will require detention to accommodate this scenario where previously none was required for the scenario described in Section 3.3. The basin would likely be constructed in a similar position to the other two catchments at the low point of the open space area where the lowest existing farm dam is currently located. However, it is likely to encounter space constraints if constructing a single full size basin to the size noted in Table 2. Such a basin will be achievable and will meet the required targets, however will likely occupy the entire lower portion of the open space area up to approximately the 10m contour line. This is expected to impact on the space available for localised treatment locations. It is recommended that if this climate change/discharge scenario is adopted that the detention be split across two separate basins with one located in the same position as shown in Appendix A and another positioned uphill at the location of the existing farm dam in the northern corner of the developed area. The sizing of these basins to meet the pre-development discharge requirement will be approximately 7,000m^3 (3,700m^2, 3.5m max. depth) for the lower basin and approximately 2,000m^3 (1,900m^2, 3m max. depth) for the upper basin, providing some reduction in size of the lower basin from a single basin configuration.

By considering only the increase in climate change factors and continuing to utilise the maximum capacity of the existing culverts beneath Boyer Road, some reduction in the size of the western basin can be achieved due to spare culvert capacity available above pre-development levels. It is noted that the pre-development flows are approximately equal to the culvert capacity for the central catchment and are higher than the culvert capacity for the eastern catchment, so no further reductions to detention can be made in this scenario for these catchments. The resulting basin size that would be required for the western catchment in this scenario is approximately 5,100m^3 (3,300m^2, 2.65m max. depth) and is likely to be achievable within the lowest portion of the open space area.

3.5. Stormwater Retention

With the creation of multiple detention basins, there is the potential for allowing for a permanent retention storage in each to create a permanent water body to improve natural values and/or for water re-use. The creation of retention volumes within each basin will require additional earthworks to increase the size of the basin, allowing for a permanent storage volume as well as sufficient additional capacity to allow for temporary detention in large rainfall events.

The size of the permanent storage area will be largely determined based on nominated landscape design, cost constraints and physical area limitations, however to ensure the retention storage is able to retain a permanent water body it is necessary to conduct a water balance check to ensure that evapotranspiration (ET) losses do not outweigh yearly rainfall inflows.

A maximum retention surface area has been estimated by modelling using MUSICX software using a 10-year representative period of rainfall data. Net yearly inflow to the smallest catchment (eastern catchment) is approximately 32.5 ML/year.

The maximum retention pond surface area resulting in ET losses greater than the above net inflow is approximately 41,000m^2.

With the areas available in the open space locations for the proposed development and considering existing topography, it is not expected that maximum sized ponds in excess of 2,000-3,000m^2 will be achievable. It is thus also expected that any permanent retention ponds are able to maintain yearly storage.

Due to no detention basin being required for the western catchment, it is expected that construction of a permanent retention pond would be achievable in this area.

Due to the size of detention basin for the central catchment (approximately 2000m^2) requiring use of a large portion of the available open space area, it is not expected that this basin will also be able to be utilised as a permanent retention pond with limited additional space available. To provide a permanent retention pond, a second separate pond may be located further upstream of the detention basin.

It is possible that the detention basin for the eastern catchment may be increased in size to accommodate some permanent retention with sufficient open space available. However, the topography in this area does not feature a prominent low valley/drainage channel and more significant earthworks than the other two catchments would likely be required to cut and retain a pond/basin of sufficient size.

Re-use of water stored in permanent retention ponds is achievable, however is expected to be mostly dependent on available space and budget for construction of suitably sized storages to meet any re-use

volumes required. Catchment inflows are expected to be sufficiently high to assist in servicing any intended re-use, however will be dependent on the storage volumes constructed and frequency of draw-down from the storages.

3.6. Stormwater Quality Analysis

Treatment of stormwater flows is expected to be required in accordance with the pollutant reduction targets of 90% Gross Pollutants (GP), 80% Total Suspended Solids (TSS), 45% Total Phosphorus (TP) and 45% Total Nitrogen (TN) outlined in the *Tasmanian Stormwater Policy Guidance and Standards for Development* document.

The required treatment may be achieved in a number of ways by using proprietary treatment devices and/or natural treatment systems in multiple configurations. These include a combination of the below main configurations:

- Primary treatment in-line with catchment drainage courses, utilising sedimentation ponds or extended period detention.
- Localised treatment from individual development areas.
- Treatment provided on an individual lot basis.

With the site proposing to maintain the existing drainage routes for each catchment through the developed areas, an option for treatment may include utilising retention ponds, possibly in combination with the detention storages to achieve some of this treatment requirement. However, due to the large portion of external natural catchment flows that will continue to flow through the drainage course, this is not expected to be the most efficient treatment method. Treatment systems typically provide their most effective treatment when pollution concentrations in the inflows are high. Pollutant loading from non-developed areas such as rural catchments or native bushlands are typically low, whereas pollutant loading in runoff from developed urban catchments is typically higher. By attempting to treat both the existing natural catchment as well as the developed catchment, pollutant loadings will be diluted, resulting in less efficient treatment. Due to the larger flows from the combined catchment, the treatment systems would also likely be required to be larger in size to cope with the increased diluted flows. Additional tertiary treatment systems to remove finer particles and reduce Nitrogen levels would likely also be required. As such, this method of providing primary treatment within the drainage course is not recommended.

Alternative options which would provide a more efficient treatment system include at source treatment or localised treatment from each developed area. Individual areas of development will require localised discharges into the central drainage routes depending on site topography and available grades. Treatment may be provided at each discharge point into the drainage courses which will provide more efficient treatment of inflows having a higher pollutant concentration. This may be in the form of proprietary treatment devices at the outflow or in combination with natural solutions such as bioretention if available space allows. Additional treatment devices could also be incorporated into the streetscape such as biofiltration pits to assist as at-source control. Appendix A indicates several areas where localised treatment systems from development areas may be best suited. The use of bio-retention as a treatment option requires both sufficient area and low enough grades to efficiently construct a level treatment system. Appendix A also highlights the nominated treatment areas where it is likely that bio-retention may be more suitable, with urban catchment areas of sufficient size to warrant the additional maintenance from

construction of such bio-retention. These may however be dependant on impact from the chosen detention basin sizes/configurations also.

Treatment may also be provided on an individual lot basis by requiring the owner/developer of each future lot to provide treatment systems to meet the required pollutant reduction targets for their individual development. This ensures that a significant portion of the overall developed catchment is treated at the required level prior to discharge into the public system. However, this may place an unnecessary burden on individual residential owners/builders with upfront and maintenance costs that may be more effectively used to provide combined treatments at the point of discharge, resulting in an overall lesser sized system.

It is recommended that a combination of localised treatment to treat flows from sections of development areas be provided along with treatment on an individual lot basis for any larger individual lot developments (e.g. unit developments resulting in higher impervious surfaces and pollutant loads than a typical residential lot). The proposed development has been modelled using MUSICX software to analyse if this treatment method is achievable with the model configurations and results shown in Figures 4-6 and Tables 3-9 below.

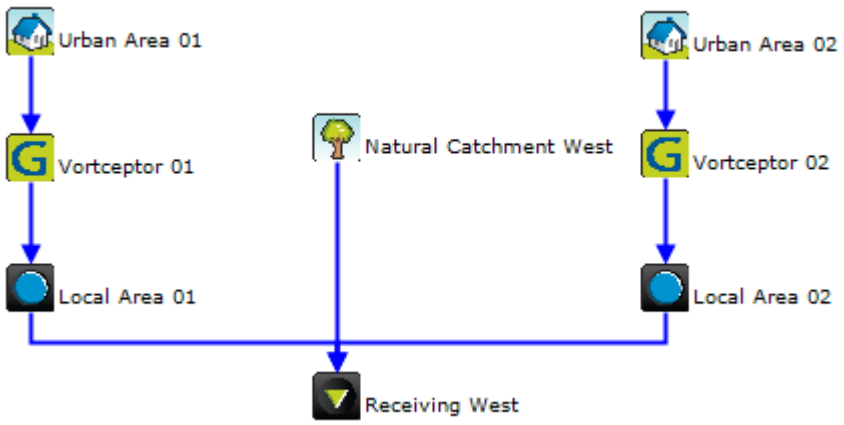


Figure 4 – MUSICX Model – West Catchment

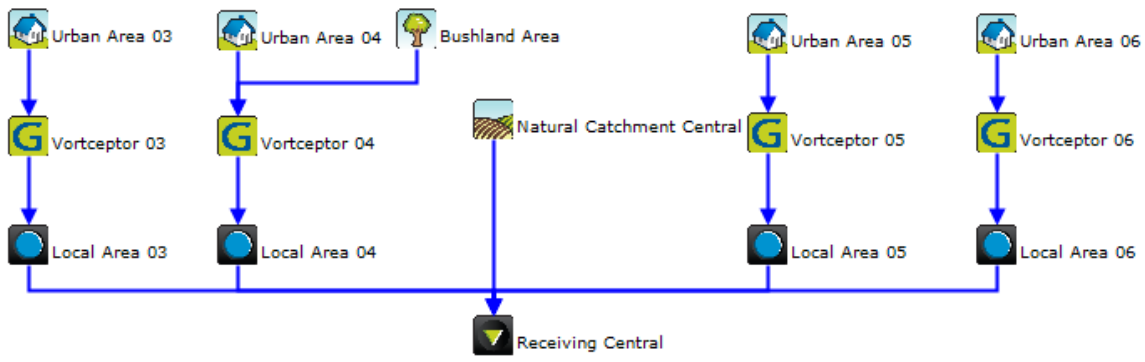


Figure 5 – MUSICX Model – Central Catchment

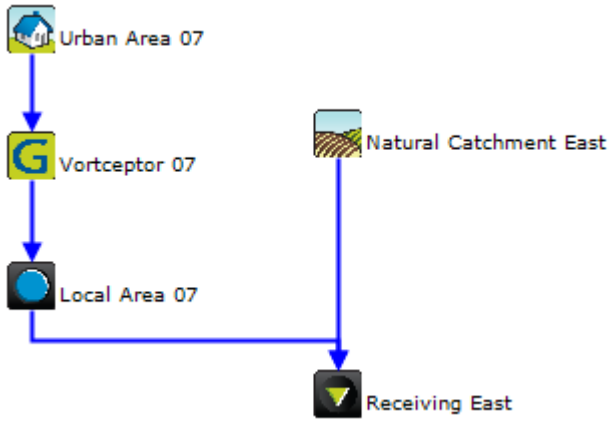


Figure 6 – MUSICX Model – East Catchment

Table 3 – MUSICX Model Results – West Catchment – Urban Area 01

(1) West Catchment : Treatment Train Effectiveness : Local Area 01

	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.392	5.392	0
Total Suspended Solids (kg/yr)	1071	82.55	92.29
Total Phosphorus (kg/yr)	2.224	0.3269	85.3
Total Nitrogen (kg/yr)	15.51	7.967	48.64
Gross Pollutants (kg/yr)	187.1	0.4618	99.75

Table 4 – MUSICX Model Results – West Catchment – Urban Area 02

(1) West Catchment : Treatment Train Effectiveness : Local Area 02

	Sources	Residual Load	% Reduction
Flow (ML/yr)	41.89	41.89	0
Total Suspended Solids (kg/yr)	8419	1065	87.35
Total Phosphorus (kg/yr)	17.22	3.313	80.77
Total Nitrogen (kg/yr)	119.7	64.6	46.01
Gross Pollutants (kg/yr)	1453	59.71	95.89

Table 5 – MUSICX Model Results – Central Catchment – Urban Area 03

(2) Central Catchment : Treatment Train Effectiveness : Local Area 03

	Sources	Residual Load	% Reduction
Flow (ML/yr)	10.28	10.28	0
Total Suspended Solids (kg/yr)	2022	171.6	91.52
Total Phosphorus (kg/yr)	4.259	0.6671	84.34
Total Nitrogen (kg/yr)	29.6	15.34	48.17
Gross Pollutants (kg/yr)	356.7	3.56	99

Table 6 – MUSICX Model Results – Central Catchment – Urban Area 04

(2) Central Catchment : Treatment Train Effectiveness : Local Area 04

	Sources	Residual Load	% Reduction
Flow (ML/yr)	31.97	31.97	0
Total Suspended Solids (kg/yr)	5090	615.2	87.91
Total Phosphorus (kg/yr)	9.929	1.819	81.68
Total Nitrogen (kg/yr)	73.54	39.33	46.51
Gross Pollutants (kg/yr)	787.3	16.24	97.94

Table 7 – MUSICX Model Results – Central Catchment – Urban Area 05

(2) Central Catchment : Treatment Train Effectiveness : Local Area 05

	Sources	Residual Load	% Reduction
Flow (ML/yr)	35.69	35.69	0
Total Suspended Solids (kg/yr)	7174	834.3	88.37
Total Phosphorus (kg/yr)	14.64	2.676	81.72
Total Nitrogen (kg/yr)	102	54.22	46.85
Gross Pollutants (kg/yr)	1238	37.26	96.99

Table 8 – MUSICX Model Results – Central Catchment – Urban Area 06

(2) Central Catchment : Treatment Train Effectiveness : Local Area 06

	Sources	Residual Load	% Reduction
Flow (ML/yr)	10.67	10.67	0
Total Suspended Solids (kg/yr)	2137	190.7	91.08
Total Phosphorus (kg/yr)	4.335	0.6703	84.54
Total Nitrogen (kg/yr)	30.39	15.72	48.26
Gross Pollutants (kg/yr)	370	3.971	98.93

Table 9 – MUSICX Model Results – East Catchment – Urban Area 07

Latest Run : Treatment Train Effectiveness : Local Area 07

	Sources	Residual Load	% Reduction
Flow (ML/yr)	27.38	27.38	0
Total Suspended Solids (kg/yr)	5442	525.8	90.34
Total Phosphorus (kg/yr)	11.1	1.835	83.48
Total Nitrogen (kg/yr)	78.22	41.08	47.48
Gross Pollutants (kg/yr)	950.1	17.88	98.12

The purpose of this modelling is to determine if a reasonable method of stormwater treatment is achievable for the development. Treatment of the final subdivision design may take many forms, with many options available for both proprietary and natural treatment systems. Modelling has been undertaken using a single proprietary hydrodynamic separator GPT (Atlan Vortceptor – offline configuration) at multiple assumed localised urban catchment outlets as a basic design solution.

From the results shown in Tables 3-9, each urban catchment area can be seen to achieve the required pollutant reduction targets of 90% Gross Pollutants (GP), 80% Total Suspended Solids (TSS), 45% Total Phosphorus (TP) and 45% Total Nitrogen (TN).

4. SUMMARY

The Boyer Road development will require the provision of additional stormwater infrastructure to ensure that any increases to flow quantities and pollutant loads are adequately managed and that impacts to the receiving environment are mitigated.

Expected stormwater runoff for the proposed development has been modelled using DRAINS software. It is proposed to utilise the existing stormwater culverts beneath Boyer Road as the limiting factor for stormwater quantity. To ensure that the capacity of the existing culverts for the 1% AEP storm event (16.3% climate change loading inclusive) is not exceeded, stormwater detention infrastructure will be required for two of the three catchments across the site (central and eastern catchments) with approximate volumes of 2,360m^3 and 1,300m^3 required respectively. The western culvert has been assessed to provide sufficient capacity for the developed flows and will not require stormwater detention.

Recent increases to climate change loading factors as well as limiting flows to pre-development levels has also been considered to provide advice on increased infrastructure requirements for this worst-case condition.

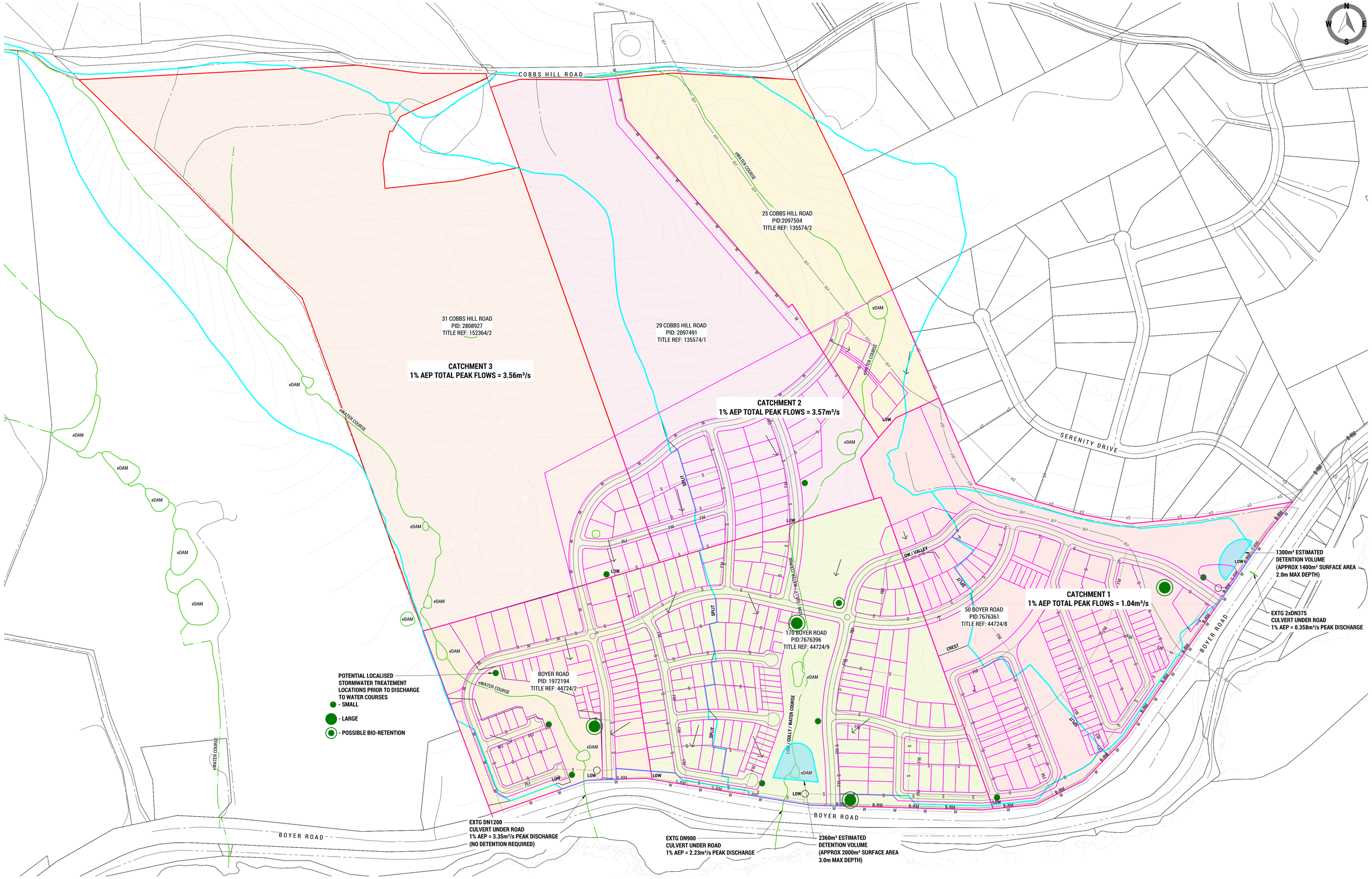
Stormwater treatment has been modelled using MUSICX software to determine if a basic treatment train option can achieve the required pollutant reduction targets for the development. The most appropriate and efficient method for treatment is expected to be by utilising treatment structures (proprietary or natural) at several localised discharges from areas of the urban development prior to discharge into the existing water courses flowing through the site. This allows natural flows from the upper catchment to continue to flow through the site unchanged, whilst the new urban areas are treated more effectively at higher pollutant concentrations. Results from modelling have indicated that treatment using the above method is achievable.

Permanent stormwater retention is also expected to be achievable from a water balance perspective, however will be largely dependent on available space and cost constraints.

Yours Faithfully

Rodney Jesson
Director
Civil and Infrastructure

5. APPENDIX A – CONCEPT STORMWATER SERVICE PLAN



CONCEPT STORMWATER PLAN

SCALE 1:2500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
B	INFORMATION PURPOSES	JWS	14-03-25
A	INFORMATION PURPOSES	PVD	31-01-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: - ACRED. No: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
DATE:	-

rare.
22-24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER

PROJECT: BOYER ROAD PRECINCT

ADDRESS: 50 - 170 BOYER ROAD
BRIDGEWATER

TITLE: CONCEPT STORMWATER SERVICE PLAN

SCALE: 1:2500 SHEET SIZE: A1 DWGs IN SET: -

PROJECT No: 251013 DWG No: C501 REV: B

6. APPENDIX B – CULVERT PHOTOS

Eastern Catchment 1 (50 Boyer Road)

Central Catchment 2 (170 Boyer Road)

Western Catchment 3 (182 Boyer Road)

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

Our Ref: 251013

4th June 2025

Holmes Dyer
Level 3, Reid House, 15 Featherstone Place
Adelaide SA 5000

ATTENTION: N TAYLOR

Dear Nitsan,

This letter is provided as confirmation that the roads as detailed in the provided concept documentation (specifically Rare concept plans *251013-C – Road 25-05-21*) comply with the relevant standards as listed below and with the following additional notes:

- *Tasmanian Municipal Standard Drawings - v3 December 2020* ('LGAT Standard Drawings')
- *Tasmanian Subdivision Guidelines – October 2013*
- *Austroads Guide to Road Design Part 3: Geometric Design Edition 3.4*
- *AS 2890.5 Parking Facilities, Part 5: On-Street Parking*
- *AS/NZS 2890.1 Parking Facilities, Part 1: Off-Street Car Parking*

The Tasmanian Subdivision Guidelines and the LGAT Standard Drawings have predominantly informed the concept designs. The main point of note in relation to compliance with these standards/guidelines is with vertical grading due to the existing site grades being moderate to steep in some areas. The concept drawings noted above provide preliminary longitudinal sections for the proposed roads. The Tasmanian Subdivision Guidelines Clause 5.8, 11.4.1 (ii) & (iii) specify that the longitudinal road (and kerb) gradient shall be between 0.5% to 14%, except that in special circumstances the council may permit a grade of 20% for short lengths of road up to 70m. As shown in the above noted drawings, all grades are able to be designed within this range, except for Road 8 for which grades may exceed 14% (up to 16.19%) between chainages 230m – 289.575m (60m approx.). However this still complies with the above condition allowing for approval of such grades below 20% for lengths ≤70m by Council, for which it is potentially warranted in this case due to existing grades.

Further refinement of road levels can be undertaken to increase earthworks cut/fill to minimise these grades if required, at the expense of additional cost of construction. Further refinement of road reserve cross section geometry may also be undertaken to optimise the location/offset of footpaths closer to kerbs in places where reduction of cut/fill earthworks may be warranted (e.g. limit batter encroachment into lots by moving footpath hard against back of kerb to reduce overall road footprint).

22-24 Paterson Street
Launceston, TAS 7250

P. 6388 9200

rarein.com.au

The current typical cross section designs specify nature strip batter transitions to allow for driveways to be constructed with appropriate grade changes in accordance with the LGAT Standard Drawings and AS/NZS 2890.1.

If you require anything further please contact us.

Yours faithfully,

Rodney Jesson

Director - Civil

CONCEPT ROAD CHAINAGE PLAN
SCALE 1:2000

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
APPROVED:	-
ACRED. No:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**

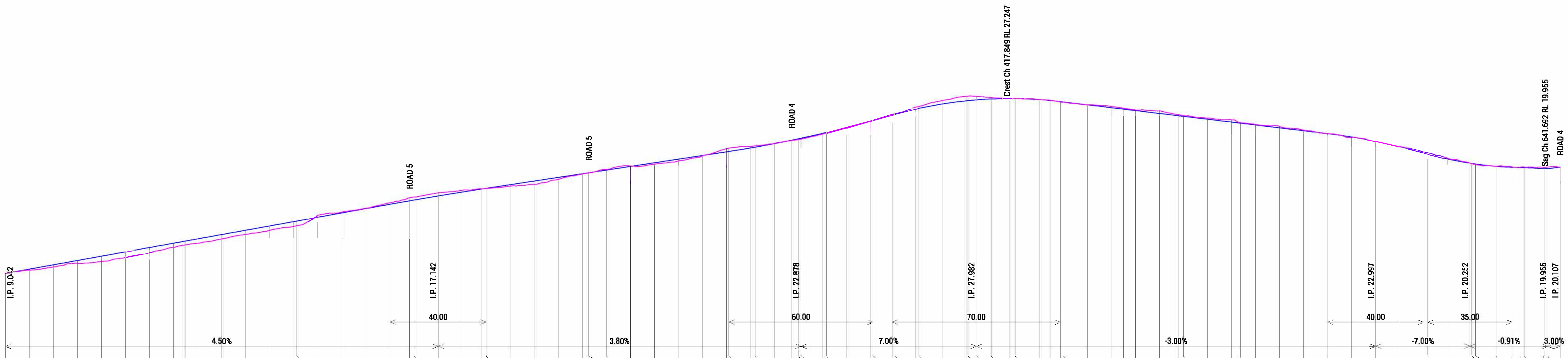
PROJECT: **BOYER ROAD PRECINCT**

ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

TITLE: **CIVIL WORKS PLAN**

SCALE: **1:2000** SHEET SIZE: **A1** DWGs IN SET: **-**

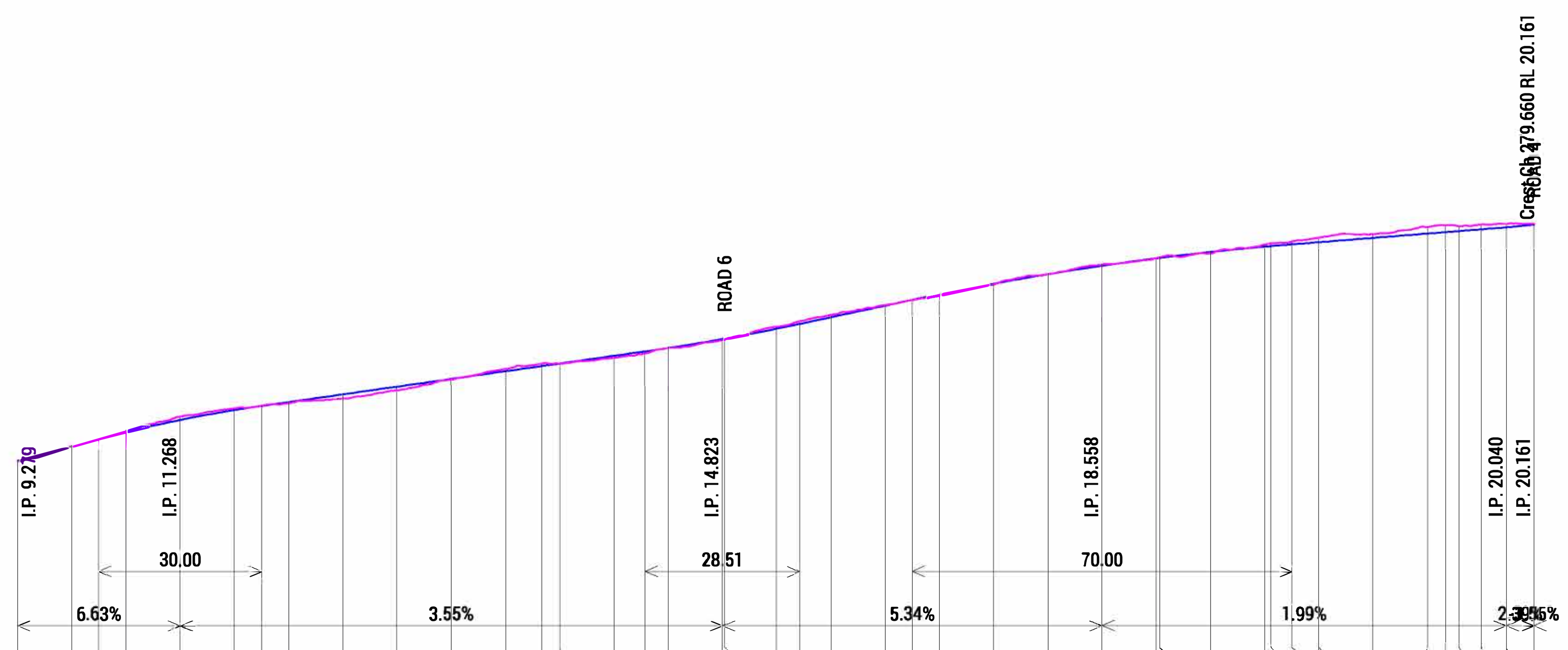
PROJECT No: **251013** DWG No: **C400** REV: **A**



Chainage	Existing Levels	Design Levels	Cut Fill
0.000	9.042	9.042	+0.000
10.000	9.397	9.492	+0.095
20.000	9.717	9.942	+0.225
30.000	10.107	10.392	+0.285
40.000	10.292	10.842	+0.550
50.000	10.734	11.292	+0.558
60.000	11.226	11.742	+0.516
70.000	11.757	12.192	+0.435
74.701	12.008	12.404	+0.396
80.000	12.173	12.642	+0.469
90.000	12.626	13.092	+0.466
100.000	13.120	13.542	+0.422
110.000	13.530	13.992	+0.462
120.000	13.938	14.442	+0.504
121.170	14.015	14.495	+0.480
130.000	15.081	14.892	-0.189
140.000	15.437	15.342	-0.095
150.000	15.836	15.792	-0.044
160.000	16.407	16.242	-0.165
168.101	16.908	16.601	-0.307
170.000	17.007	16.684	-0.323
180.000	17.432	17.107	-0.325
190.000	17.703	17.514	-0.189
197.917	17.864	17.823	-0.041
200.000	17.890	17.902	+0.012
210.000	18.136	18.282	+0.146
220.000	18.322	18.662	+0.340
230.000	18.833	19.042	+0.209
240.000	19.399	19.422	+0.023
242.615	19.506	19.522	+0.016
242.663	19.507	19.524	+0.017
250.000	19.874	19.802	-0.072
260.000	20.230	20.182	-0.048
270.000	20.425	20.562	+0.137
280.000	20.750	20.942	+0.192
290.000	21.285	21.322	+0.037
300.000	22.027	21.702	-0.325
300.937	22.083	21.738	-0.345
310.000	22.260	22.104	-0.156
311.881	22.328	22.186	-0.142
320.000	22.587	22.559	-0.028
327.101	22.878	22.915	+0.037
330.000	22.986	23.068	+0.082
330.937	23.029	23.118	+0.089
340.000	23.557	23.629	+0.072
341.542	23.656	23.721	+0.065
350.000	24.206	24.244	+0.038
360.000	24.944	24.913	-0.031
360.937	25.018	24.978	-0.040
368.849	25.631	25.532	-0.099
370.000	25.699	25.611	-0.088
378.546	26.340	26.143	-0.197
380.000	26.417	26.224	-0.193
390.000	27.060	26.693	-0.367
400.000	27.498	27.019	-0.479
400.355	27.498	27.028	-0.470
403.849	27.482	27.107	-0.375
410.000	27.354	27.203	-0.151
417.849	27.256	27.247	-0.009
420.000	27.247	27.244	-0.003
430.000	27.141	27.141	+0.000
434.551	27.073	27.048	-0.025
438.849	26.901	26.932	+0.031
440.000	26.866	26.897	+0.031
450.000	26.603	26.597	-0.006
460.000	26.423	26.297	-0.126
465.028	26.235	26.146	-0.089
470.000	26.063	25.997	-0.066
480.000	25.962	25.697	-0.265
487.803	25.581	25.463	-0.118
490.000	25.466	25.397	-0.069
500.000	25.212	25.097	-0.115
510.000	25.032	24.797	-0.235
513.712	24.739	24.686	-0.053
520.000	24.552	24.497	-0.055
530.000	24.347	24.197	-0.150
540.000	23.962	23.897	-0.065
546.360	23.691	23.707	+0.016
550.000	23.581	23.597	+0.016
560.000	23.176	23.247	+0.071
570.000	22.801	22.797	-0.004
580.000	22.253	22.247	-0.006
590.000	21.728	21.597	-0.131
591.712	21.637	21.477	-0.160
600.000	21.029	20.957	-0.072
609.212	20.523	20.519	-0.004
610.000	20.472	20.488	+0.016
611.487	20.382	20.433	+0.051
620.000	20.202	20.193	-0.009
626.712	20.132	20.092	-0.040
630.000	20.110	20.062	-0.048
631.693	20.125	20.047	-0.078
640.000	20.076	19.971	-0.105
641.693	20.112	19.955	-0.157
646.743	20.122	20.107	-0.015

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 1



Chainage	Existing Levels	Design Levels	Cut Fill
0.000	9.238	9.279	+0.041
10.000	9.943	9.942	-0.001
15.000	10.292	10.274	-0.018
20.000	10.648	10.592	-0.056
30.000	11.312	11.153	-0.159
40.000	11.693	11.611	-0.082
45.000	11.812	11.801	-0.011
50.000	11.921	11.979	+0.058
60.000	12.142	12.334	+0.192
70.000	12.525	12.690	+0.165
80.000	13.015	13.045	+0.030
90.000	13.501	13.401	-0.100
96.692	13.747	13.639	-0.108
100.000	13.749	13.756	+0.007
110.000	14.012	14.112	+0.100
115.744	14.219	14.316	+0.097
120.000	14.474	14.473	-0.001
130.000	14.834	14.886	+0.052
130.367	14.870	14.903	+0.033
140.000	15.454	15.362	-0.092
144.256	15.707	15.584	-0.123
150.000	15.997	15.890	-0.107
160.000	16.450	16.424	-0.026
165.000	16.685	16.691	+0.006
170.000	16.907	16.951	+0.044
180.000	17.401	17.437	+0.036
190.000	17.884	17.875	-0.009
200.000	18.320	18.265	-0.055
210.000	18.613	18.608	-0.005
210.588	18.655	18.626	-0.029
220.000	18.824	18.902	+0.078
230.000	19.239	19.148	-0.091
231.160	19.304	19.174	-0.130
235.000	19.381	19.254	-0.127
240.000	19.561	19.353	-0.208
250.000	19.717	19.552	-0.165
260.000	20.053	19.750	-0.303
263.352	20.150	19.817	-0.333
265.856	20.092	19.867	-0.225
270.000	20.171	19.949	-0.222
274.592	20.192	20.040	-0.152
279.660	20.202	20.161	-0.041

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 2

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

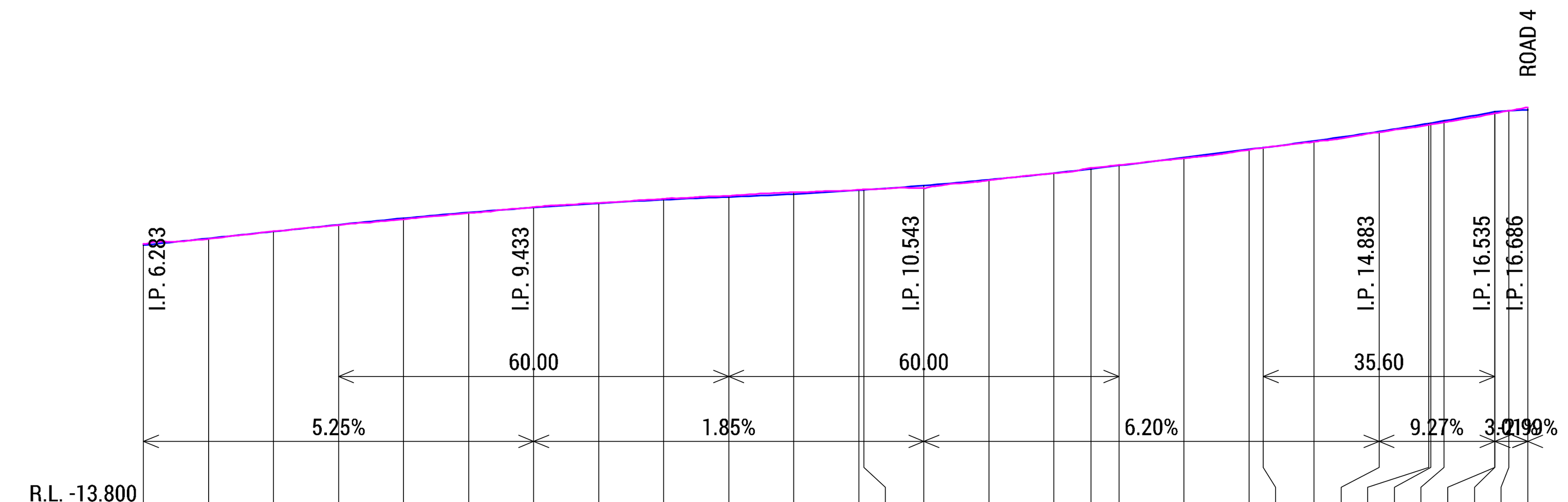
APPROVED: - ACRED. No: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -
DATE: -

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
ROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

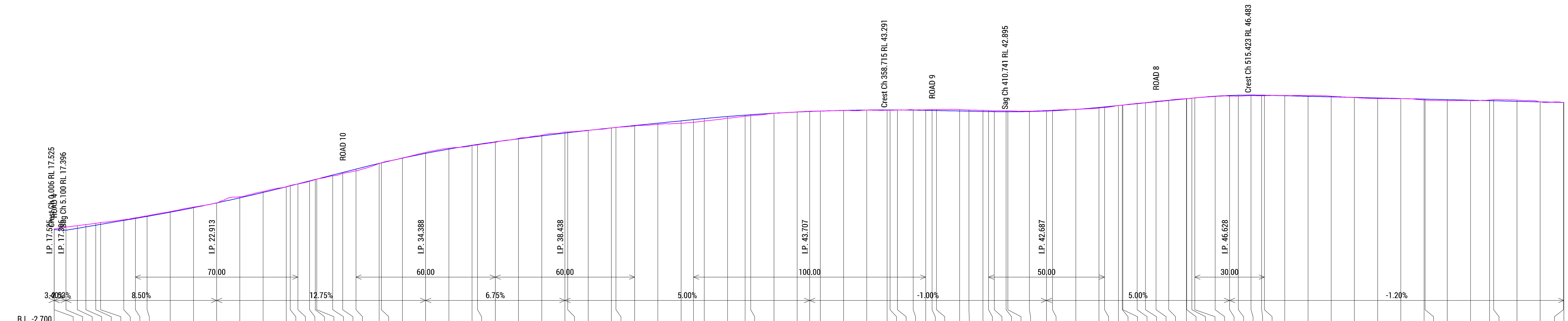
TITLE: LONG SECTION - ROAD 1 & ROAD 2
SCALE: AS NOTED SHEET SIZE: A1 DWGs IN SET: -
PROJECT No: 251013 DWG No: C411 REV: A



Chainage	Existing Levels	Design Levels	Cut/Fill
0.000	6.379	6.283	-0.096
10.000	6.759	6.808	+0.049
20.000	7.357	7.333	-0.024
30.000	7.829	7.858	+0.029
40.000	8.272	8.355	+0.083
50.000	8.755	8.795	+0.040
60.000	9.216	9.178	-0.038
70.000	9.531	9.505	-0.026
80.000	9.841	9.775	-0.066
90.000	10.082	9.988	-0.094
100.000	10.355	10.210	-0.145
110.000	10.540	10.503	-0.037
110.793	10.566	10.530	-0.036
120.000	10.658	10.870	+0.212
130.000	11.267	11.308	+0.041
140.000	11.802	11.820	+0.018
145.688	12.215	12.143	-0.072
150.000	12.443	12.403	-0.040
160.000	12.952	13.023	+0.071
170.000	13.606	13.643	+0.037
172.199	13.766	13.780	+0.014
180.000	14.230	14.290	+0.060
190.000	14.946	15.020	+0.074
197.661	15.532	15.637	+0.105
197.977	15.557	15.664	+0.107
200.000	15.713	15.836	+0.123
207.801	16.409	16.533	+0.124
207.820	16.410	16.534	+0.124
210.000	16.625	16.600	-0.025
212.870	16.876	16.686	-0.190

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:500

ROAD 3



Chainage	Existing Levels	Design Levels	Cut/Fill
0.000	17.687	17.525	-0.162
0.006	17.687	17.525	-0.162
5.101	18.087	17.396	-0.691
10.000	18.378	17.813	-0.565
13.666	18.614	18.124	-0.490
17.928	18.887	18.487	-0.400
20.000	19.057	18.663	-0.394
30.000	19.654	19.513	-0.141
35.000	20.081	19.938	-0.143
40.000	20.488	20.370	-0.118
50.000	21.410	21.281	-0.129
60.000	22.377	22.253	-0.124
70.000	23.252	23.285	+0.033
80.000	24.606	24.378	-0.228
90.000	25.724	25.531	-0.193
100.000	26.781	26.746	-0.035
101.676	27.021	26.955	-0.066
105.000	27.349	27.375	+0.026
110.000	27.938	28.013	+0.075
112.452	28.283	28.326	+0.043
113.091	28.381	28.407	+0.026
120.000	29.104	29.288	+0.184
124.312	29.653	29.838	+0.185
130.000	30.167	30.563	+0.396
140.000	31.751	31.788	+0.037
140.906	31.918	31.894	-0.024
150.000	32.952	32.913	-0.039
160.000	34.153	33.938	-0.215
170.000	35.056	34.863	-0.193
180.000	35.619	35.688	+0.069
182.345	35.775	35.867	+0.092
190.000	36.341	36.413	+0.072
200.000	37.171	37.074	-0.097
210.000	37.841	37.705	-0.136
220.000	38.530	38.307	-0.223
221.216	38.558	38.378	-0.180
230.000	38.916	38.880	-0.036
240.000	39.423	39.424	+0.001
241.970	39.511	39.527	+0.016
250.000	39.836	39.938	+0.102
260.000	40.158	40.438	+0.280
270.000	40.424	40.938	+0.514
275.382	40.639	41.207	+0.568
280.000	40.905	41.432	+0.527
290.000	41.507	41.874	+0.367
297.615	41.939	42.171	+0.232
300.000	42.040	42.256	+0.216
310.000	42.584	42.579	-0.005
320.000	42.864	42.841	-0.023
325.382	43.014	42.957	-0.057
330.000	43.050	43.043	-0.007
340.000	43.166	43.185	+0.019
350.000	43.251	43.268	+0.017
358.715	43.214	43.291	+0.077
360.000	43.215	43.290	+0.075
363.165	43.265	43.285	+0.020
370.000	43.323	43.252	-0.071
375.382	43.305	43.207	-0.098
378.096	43.369	43.180	-0.189
380.000	43.387	43.161	-0.226
390.000	43.362	43.061	-0.301
393.954	43.275	43.021	-0.254
400.000	43.218	42.961	-0.257
402.407	43.167	42.937	-0.230
404.892	43.096	42.916	-0.180
410.000	43.106	42.896	-0.210
410.741	43.094	42.895	-0.199
420.000	43.024	42.947	-0.077
427.407	43.167	43.062	-0.105
430.000	43.228	43.118	-0.110
440.000	43.382	43.409	+0.027
450.000	43.687	43.820	+0.133
452.407	43.793	43.937	+0.144
458.372	44.226	44.235	+0.009
460.000	44.324	44.317	-0.007
460.246	44.338	44.329	-0.009
466.451	44.701	44.639	-0.062
470.000	44.852	44.817	-0.035
474.558	45.131	45.044	-0.087
480.000	45.383	45.317	-0.066
487.658	45.718	45.699	-0.019
487.800	45.722	45.707	-0.015
490.000	45.807	45.817	+0.010
491.230	45.857	45.878	+0.021
500.000	46.185	46.237	+0.052
506.230	46.279	46.396	+0.117
510.000	46.260	46.452	+0.192
515.423	46.367	46.483	+0.116
520.000	46.333	46.461	+0.128
521.230	46.341	46.448	+0.107
530.000	46.400	46.343	-0.057
540.000	46.352	46.223	-0.129
550.000	46.248	46.103	-0.145
560.000	45.952	45.983	+0.031
570.000	45.736	45.863	+0.127
580.000	45.734	45.743	+0.009
590.000	45.415	45.623	+0.208
590.428	45.400	45.618	+0.218
600.000	45.281	45.503	+0.222
610.000	45.301	45.383	+0.082
618.190	45.426	45.285	-0.141
620.000	45.505	45.263	-0.242
630.000	45.409	45.143	-0.266
640.000	45.010	45.023	+0.013
650.000	44.885	44.903	+0.018
650.233	44.869	44.900	+0.031

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:500

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: - ACRED. No: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -
DATE: -

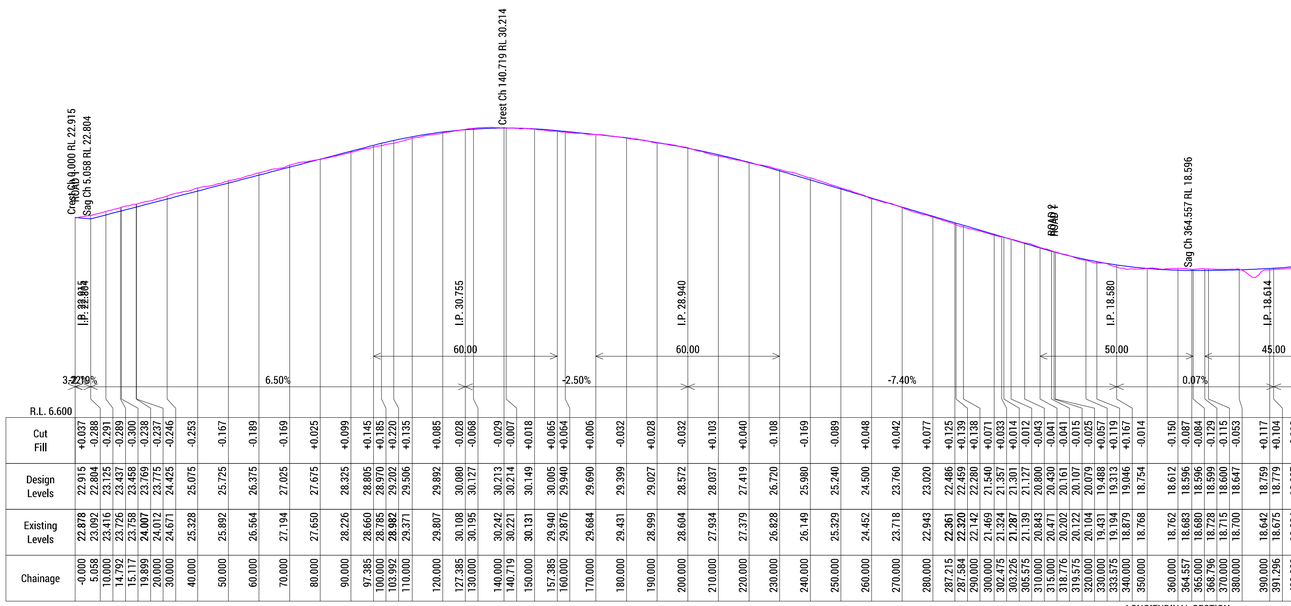
rare.
22-24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
PROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

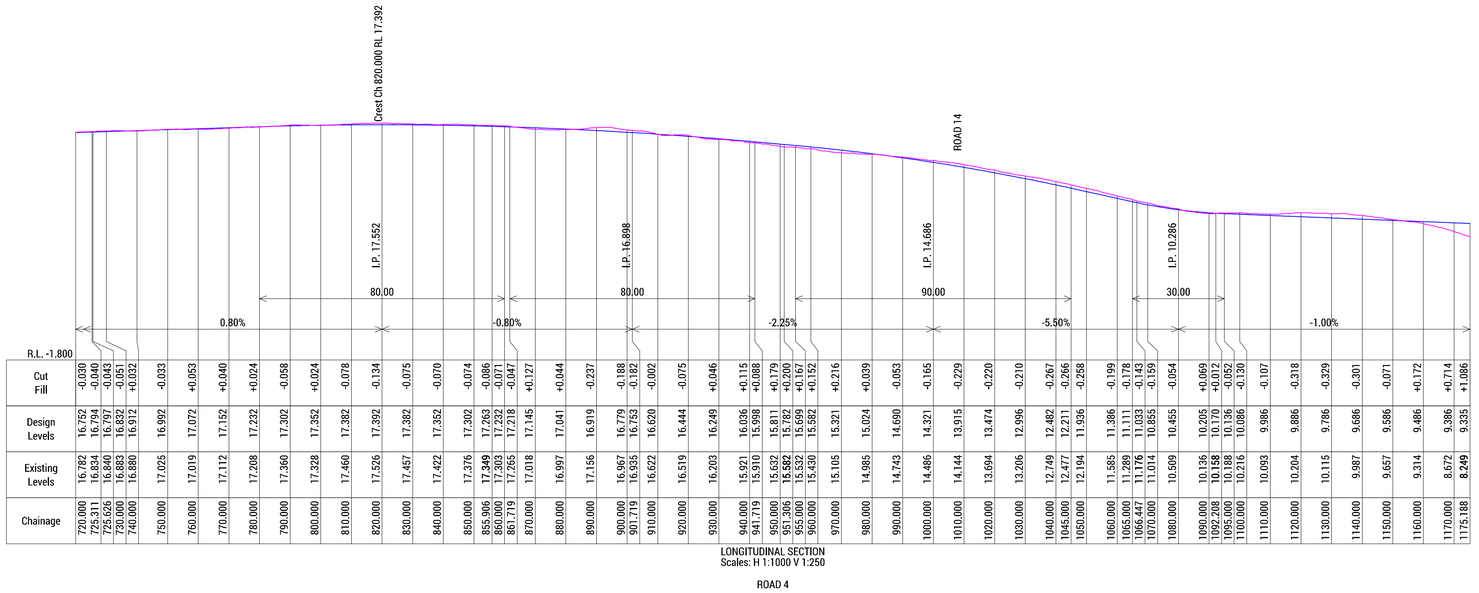
TITLE: LONG SECTION - ROAD 3 & 15

SCALE: AS NOTED SHEET SIZE: A1 DWGs IN SET: -

PROJECT No: 251013 DWG No: C412 REV: A



Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	22.878	22.915	+0.037
5.058	23.092	22.804	-0.288
10.000	23.416	23.125	-0.291
14.792	23.726	23.437	-0.289
15.117	23.758	23.458	-0.300
19.899	24.007	23.769	-0.238
20.000	24.012	23.775	-0.237
30.000	24.671	24.425	-0.246
40.000	25.328	25.075	-0.253
50.000	25.892	25.725	-0.167
60.000	26.564	26.375	-0.189
70.000	27.194	27.025	-0.169
80.000	27.650	27.675	+0.025
90.000	28.226	28.325	+0.099
97.385	28.660	28.805	+0.145
100.000	28.785	29.010	+0.225
103.992	28.982	29.202	+0.220
110.000	29.371	29.506	+0.135
120.000	29.807	29.892	+0.085
127.385	30.108	30.080	-0.028
130.000	30.195	30.127	-0.068
140.000	30.242	30.213	-0.029
140.719	30.221	30.214	-0.007
150.000	30.131	30.149	+0.018
157.385	29.940	30.005	+0.065
160.000	29.876	29.940	+0.064
170.000	29.684	29.690	+0.006
180.000	29.431	29.399	-0.032
190.000	28.999	29.027	+0.028
200.000	28.604	28.572	-0.032
210.000	27.934	28.037	+0.103
220.000	27.379	27.419	+0.040
230.000	26.828	26.720	-0.108
240.000	26.149	25.980	-0.169
250.000	25.329	25.240	-0.089
260.000	24.452	24.500	+0.048
270.000	23.718	23.760	+0.042
280.000	22.943	23.020	+0.077
287.215	22.361	22.486	+0.125
287.584	22.320	22.459	+0.139
290.000	22.142	22.280	+0.138
300.000	21.469	21.540	+0.071
302.475	21.324	21.357	+0.033
303.226	21.287	21.301	+0.014
305.575	21.139	21.127	-0.012
310.000	20.843	20.800	-0.043
315.000	20.493	20.452	-0.041
318.776	20.202	20.161	-0.041
319.575	20.122	20.107	-0.015
320.000	20.104	20.079	-0.025
330.000	19.431	19.488	+0.057
333.575	19.194	19.313	+0.119
340.000	18.879	19.046	+0.167
350.000	18.768	18.754	-0.014
360.000	18.762	18.612	-0.150
364.557	18.683	18.596	-0.087
365.000	18.680	18.596	-0.084
368.796	18.728	18.599	-0.129
370.000	18.715	18.600	-0.115
380.000	18.700	18.647	-0.053
390.000	18.642	18.759	+0.117
391.296	18.675	18.779	+0.104
400.000	18.824	18.937	+0.113
410.000	19.143	19.180	+0.037
413.094	19.278	19.268	-0.010
413.796	19.316	19.289	-0.027
420.000	19.459	19.475	+0.016
430.000	19.853	19.775	-0.078
440.000	20.161	20.075	-0.086
450.000	20.437	20.375	-0.062
460.000	20.772	20.675	-0.097
470.000	21.029	20.975	-0.054
472.506	20.965	21.050	+0.085
480.000	21.244	21.275	+0.031
490.000	21.576	21.575	-0.001
498.476	21.869	21.859	-0.010
499.575	21.896	21.886	-0.010
500.000	21.896	21.875	-0.021
510.000	22.094	22.114	+0.020
520.000	22.200	22.243	+0.043
526.749	22.254	22.268	+0.014
530.000	22.254	22.268	+0.014
534.476	22.242	22.235	-0.007
540.000	22.246	22.172	-0.074
550.000	22.034	21.971	-0.063
560.000	21.728	21.660	-0.068
564.083	21.625	21.502	-0.123
569.476	21.344	21.264	-0.080
570.000	21.308	21.240	-0.068
570.420	21.289	21.220	-0.069
580.000	20.856	20.770	-0.088
590.000	20.421	20.300	-0.121
600.000	19.857	19.830	-0.027
610.000	19.289	19.360	+0.071
611.076	19.242	19.309	+0.067
620.000	18.848	18.890	+0.042
626.989	18.671	18.561	-0.110
630.000	18.585	18.420	-0.166
630.419	18.580	18.400	-0.180
640.000	18.291	17.979	-0.312
650.000	17.799	17.602	-0.197
660.000	17.506	17.289	-0.217
670.000	16.839	17.041	+0.202
673.419	16.989	16.970	-0.019
680.000	16.921	16.856	-0.065
681.511	16.902	16.833	-0.069
690.000	16.842	16.735	-0.107
695.216	16.819	16.697	-0.122
700.000	16.781	16.678	-0.103
703.910	16.779	16.673	-0.106
710.000	16.871	16.685	-0.186
710.418	16.876	16.686	-0.190
716.419	16.864	16.723	-0.141
720.000	16.782	16.752	-0.030



Chainage	Existing Levels	Design Levels	Cut Fill
720.000	16.782	16.752	-0.030
725.311	16.834	16.794	-0.040
725.626	16.840	16.797	-0.043
730.000	16.883	16.832	-0.051
740.000	16.880	16.912	+0.032
750.000	17.025	16.992	-0.033
760.000	17.019	17.072	+0.053
770.000	17.112	17.152	+0.040
780.000	17.208	17.232	+0.024
790.000	17.360	17.302	-0.058
800.000	17.328	17.352	+0.024
810.000	17.460	17.382	-0.078
820.000	17.526	17.392	-0.134
830.000	17.457	17.382	-0.075
840.000	17.422	17.352	-0.070
850.000	17.376	17.302	-0.074
855.906	17.349	17.263	-0.086
860.000	17.303	17.232	-0.071
861.719	17.265	17.218	-0.047
870.000	17.018	17.145	+0.127
880.000	16.997	17.041	+0.044
890.000	17.156	16.919	-0.237
900.000	16.967	16.779	-0.188
901.719	16.935	16.753	-0.182
910.000	16.622	16.620	-0.002
920.000	16.519	16.444	-0.075
930.000	16.203	16.249	+0.046
940.000	15.921	16.036	+0.115
941.719	15.910	15.998	+0.088
950.000	15.632	15.811	+0.179
951.296	15.582	15.782	+0.200
955.000	15.522	15.689	+0.167
960.000	15.430	15.582	+0.152
970.000	15.105	15.321	+0.216
980.000	14.985	15.024	+0.039
990.000	14.743	14.690	-0.053
1000.000	14.486	14.321	-0.165
1010.000	14.144	13.915	-0.229
1020.000	13.694	13.474	-0.220
1030.000	13.206	12.996	-0.210
1040.000	12.749	12.482	-0.267
1045.000	12.477	12.211	-0.266
1050.000	12.194	11.936	-0.258
1060.000	11.585	11.386	-0.199
1065.000	11.289	11.111	-0.178
1066.447	11.176	11.033	-0.143
1070.000	11.014	10.855	-0.159
1080.000	10.509	10.455	-0.054
1090.000	10.136	10.205	+0.069
1092.208	10.158	10.170	+0.012
1095.000	10.188	10.136	-0.052
1100.000	10.216	10.086	-0.130
1110.000	10.093	9.986	-0.107
1120.000	10.204	9.886	-0.318
1130.000	10.115	9.786	-0.329
1140.000	9.987	9.686	-0.301
1150.000	9.657	9.586	-0.071
1160.000	9.314	9.486	+0.172
1170.000	8.672	9.386	+0.714
1175.188	8.249	9.335	+1.086

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

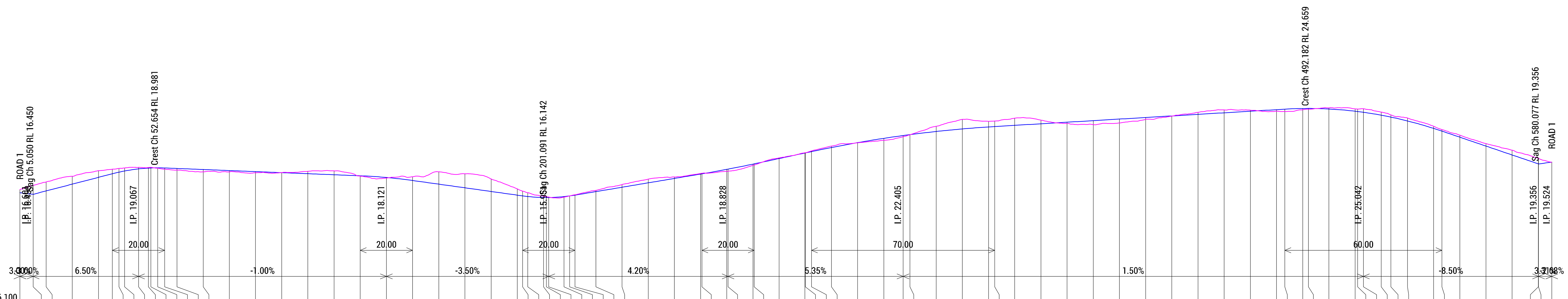
APPROVED: - ACRED. No: - DATE: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
PROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

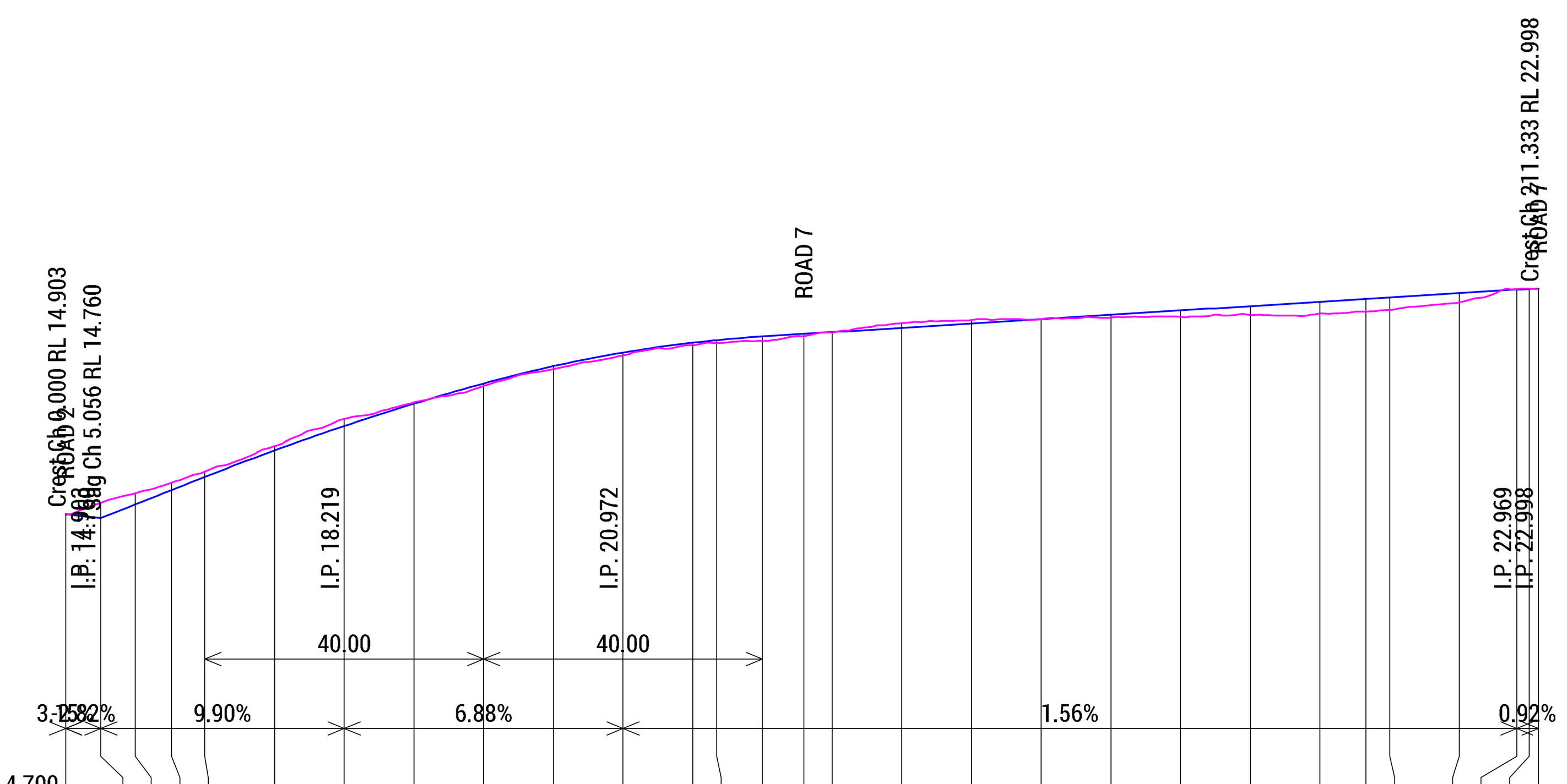
TITLE: LONG SECTION - ROAD 4
SCALE: AS NOTED SHEET SIZE: A1 DWGs IN SET: -
PROJECT No: 251013 DWG No: C413 REV: A



Chainage	Existing Levels	Design Levels	Cut / Fill
-0.000	16.908	16.601	-0.307
5.050	17.312	16.450	-0.862
10.000	17.634	16.772	-0.862
20.000	18.176	17.422	-0.754
30.000	18.709	18.072	-0.637
35.320	18.850	18.417	-0.433
37.862	18.925	18.570	-0.355
40.000	18.969	18.681	-0.288
45.320	19.027	18.880	-0.147
49.108	19.009	18.957	-0.052
50.000	19.029	18.968	-0.061
52.654	18.947	18.981	+0.034
55.320	18.853	18.967	+0.114
60.000	18.765	18.921	+0.156
70.000	18.608	18.821	+0.213
80.000	18.581	18.721	+0.140
90.000	18.513	18.621	+0.108
100.000	18.530	18.521	-0.009
110.000	18.643	18.421	-0.222
120.000	18.691	18.321	-0.370
130.000	18.185	18.221	+0.036
140.000	18.006	18.058	+0.052
150.000	18.133	17.771	-0.362
160.000	18.605	17.421	-1.184
170.000	18.416	17.071	-1.345
180.000	17.922	16.721	-1.201
190.000	16.968	16.371	-0.597
192.000	16.755	16.301	-0.454
193.997	16.601	16.238	-0.363
200.000	16.274	16.144	-0.130
201.091	16.229	16.142	-0.087
202.000	16.185	16.143	-0.042
207.859	16.178	16.230	+0.052
210.000	16.300	16.294	-0.006
212.000	16.406	16.371	-0.035
220.000	16.827	16.707	-0.120
230.000	17.383	17.127	-0.256
240.000	17.901	17.547	-0.354
250.000	18.104	17.967	-0.137
260.000	18.445	18.387	-0.058
260.503	18.465	18.408	-0.057
270.000	18.646	18.833	+0.187
270.503	18.658	18.856	+0.198
280.000	19.211	19.336	+0.125
280.503	19.249	19.363	+0.114
290.000	19.928	19.871	-0.057
299.828	20.420	20.397	-0.023
300.000	20.427	20.406	-0.021
302.359	20.597	20.532	-0.065
310.000	21.057	20.925	-0.132
320.000	21.370	21.390	+0.020
330.000	21.612	21.801	+0.189
337.359	21.956	22.068	+0.112
340.000	22.146	22.156	+0.010
350.000	22.954	22.457	-0.497
360.000	23.615	22.702	-0.913
370.000	23.434	22.893	-0.541
372.359	23.458	22.930	-0.528
380.000	23.727	23.044	-0.683
390.000	23.543	23.194	-0.349
400.000	23.225	23.344	+0.119
410.000	23.110	23.494	+0.384
420.000	23.272	23.644	+0.372
430.000	23.617	23.794	+0.177
440.000	23.924	23.944	+0.020
450.000	24.290	24.094	-0.196
460.000	24.519	24.244	-0.275
470.000	24.496	24.394	-0.102
480.000	24.401	24.544	+0.143
483.182	24.370	24.592	+0.222
490.000	24.532	24.655	+0.123
492.182	24.591	24.659	+0.068
500.000	24.713	24.608	-0.105
510.000	24.620	24.395	-0.225
510.994	24.602	24.364	-0.238
513.182	24.631	24.292	-0.339
520.000	24.312	24.015	-0.297
523.681	24.042	23.833	-0.209
530.000	23.745	23.468	-0.277
540.000	22.959	22.754	-0.205
543.182	22.639	22.492	-0.147
550.000	22.108	21.912	-0.196
560.000	21.293	21.062	-0.231
570.000	20.668	20.212	-0.456
580.000	19.890	19.362	-0.528
580.077	19.882	19.356	-0.526
585.143	19.507	19.524	+0.017

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 5



Chainage	Existing Levels	Design Levels	Cut / Fill
-0.000	14.870	14.903	+0.033
5.056	15.306	14.760	-0.546
10.000	15.655	15.249	-0.406
15.204	16.027	15.764	-0.263
20.000	16.428	16.239	-0.189
30.000	17.348	17.191	-0.157
40.000	18.321	18.068	-0.253
50.000	18.915	18.869	-0.046
60.000	19.503	19.595	+0.092
70.000	20.106	20.217	+0.111
80.000	20.607	20.705	+0.098
90.000	20.972	21.061	+0.089
93.440	21.047	21.152	+0.105
100.000	21.124	21.283	+0.159
105.936	21.288	21.376	+0.088
110.000	21.432	21.439	+0.007
120.000	21.756	21.595	-0.161
130.000	21.871	21.750	-0.121
140.000	21.909	21.906	-0.003
150.000	21.962	22.062	+0.100
160.000	21.986	22.218	+0.232
170.000	22.050	22.373	+0.323
180.000	22.108	22.529	+0.421
186.619	22.174	22.632	+0.458
190.000	22.241	22.685	+0.444
200.000	22.510	22.841	+0.331
208.242	22.987	22.969	-0.018
210.000	22.999	22.985	-0.014
211.334	22.989	22.998	+0.009

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 6

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

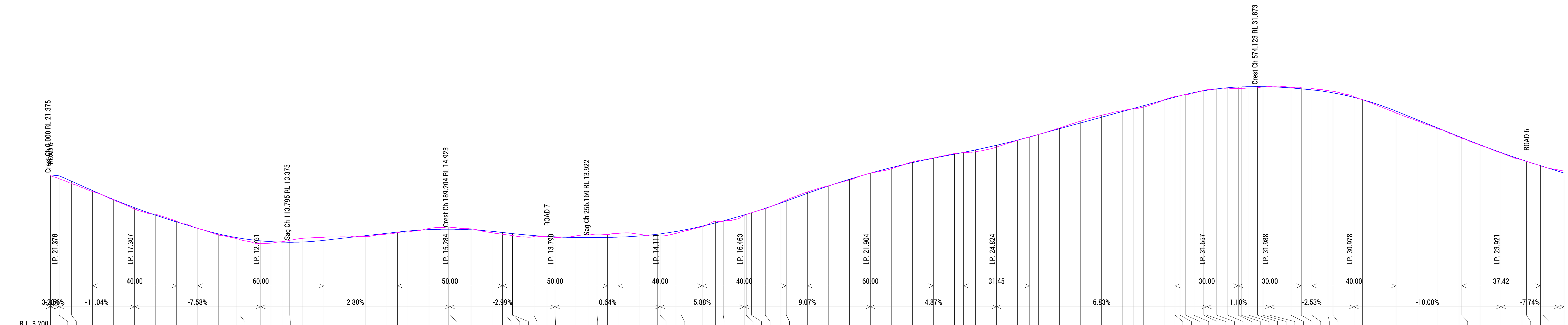
APPROVED: - ACRED. No: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -
DATE: -

rare.
22-24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
PROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

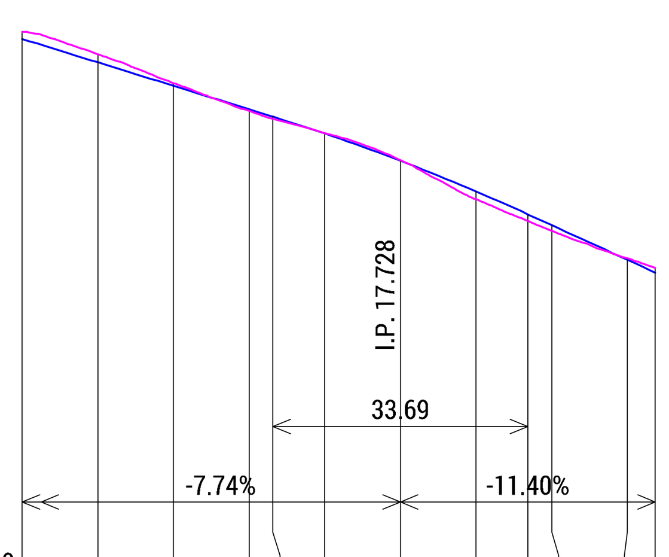
TITLE: LONG SECTION - ROAD 5 & ROAD 6
SCALE: AS NOTED SHEET SIZE: A1 DWGs IN SET: -
PROJECT No: 251013 DWG No: C414 REV: A



Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	21.288	21.375	+0.087
4.111	20.923	21.270	+0.347
10.000	20.376	20.620	+0.244
20.000	19.415	19.516	+0.101
30.000	18.435	18.455	+0.020
40.000	17.294	17.481	+0.187
50.000	16.717	16.593	-0.124
60.000	15.880	15.792	-0.088
70.000	15.019	15.034	+0.015
80.000	14.247	14.363	+0.116
88.338	13.808	13.935	+0.127
90.000	13.698	13.864	+0.166
100.000	13.242	13.539	+0.297
104.832	13.273	13.444	+0.171
110.000	13.439	13.387	-0.052
113.795	13.605	13.375	-0.230
120.000	13.844	13.408	-0.436
130.000	13.964	13.602	-0.362
140.000	14.015	13.882	-0.133
150.000	14.059	14.163	+0.104
160.000	14.360	14.443	+0.083
165.000	14.528	14.583	+0.055
170.000	14.602	14.709	+0.107
180.000	15.011	14.874	-0.137
189.204	15.179	14.923	-0.256
190.000	15.160	14.922	-0.238
200.000	14.964	14.855	-0.109
210.000	14.511	14.672	+0.161
215.000	14.327	14.537	+0.210
216.563	14.266	14.491	+0.225
219.762	14.167	14.403	+0.236
220.000	14.159	14.397	+0.238
230.000	14.072	14.171	+0.099
236.127	14.032	14.068	+0.036
240.000	13.948	14.017	+0.069
250.000	14.137	13.936	-0.201
256.169	14.260	13.922	-0.338
260.000	14.336	13.927	-0.409
265.000	14.297	13.950	-0.347
270.000	14.429	13.982	-0.447
280.000	14.334	14.112	-0.222
288.666	14.113	14.330	+0.217
290.000	14.114	14.373	+0.259
297.563	14.430	14.657	+0.227
300.000	14.601	14.764	+0.163
310.000	15.218	15.287	+0.069
316.304	15.888	15.673	-0.215
320.000	15.869	15.915	+0.046
330.000	16.568	16.622	+0.054
330.969	16.665	16.695	+0.030
333.440	16.878	16.884	+0.006
340.000	17.362	17.410	+0.048
347.442	18.107	18.047	-0.060
350.000	18.397	18.277	-0.120
360.000	19.344	19.183	-0.161
370.000	20.085	20.055	-0.030
380.000	20.769	20.857	+0.088
390.000	21.595	21.589	-0.006
400.000	22.113	22.251	+0.138
410.000	22.928	22.842	-0.086
420.000	23.396	23.364	-0.032
430.000	23.915	23.851	-0.064
434.273	24.018	24.059	+0.041
440.000	24.136	24.348	+0.212
450.000	24.687	24.901	+0.214
460.000	25.486	25.518	+0.032
465.727	25.862	25.899	+0.037
470.000	26.185	26.191	+0.006
480.000	26.962	26.874	-0.088
490.000	27.776	27.557	-0.219
500.000	28.477	28.241	-0.236
510.000	29.030	28.924	-0.106
515.267	29.239	29.284	+0.045
520.000	29.437	29.607	+0.170
530.000	30.337	30.290	-0.047
534.496	30.667	30.598	-0.069
535.000	30.696	30.632	-0.064
537.258	30.797	30.782	-0.015
540.000	30.923	30.950	+0.027
543.896	31.114	31.164	+0.050
548.542	31.439	31.382	-0.057
550.000	31.498	31.442	-0.056
554.692	31.575	31.607	+0.032
560.000	31.602	31.743	+0.141
565.000	31.644	31.823	+0.179
566.393	31.650	31.837	+0.187
570.000	31.711	31.863	+0.152
574.123	31.731	31.873	+0.142
576.766	31.821	31.869	+0.048
580.000	31.898	31.852	-0.046
590.000	31.788	31.720	-0.068
595.000	31.743	31.609	-0.134
600.000	31.650	31.483	-0.167
607.633	31.403	31.235	-0.168
610.000	31.328	31.136	-0.192
620.000	30.674	30.600	-0.074
624.137	30.311	30.323	+0.012
630.000	29.749	29.875	+0.126
640.000	28.737	28.962	+0.225
650.000	27.829	27.954	+0.125
660.000	26.856	26.946	+0.090
670.000	25.896	25.938	+0.042
671.292	25.719	25.807	+0.088
680.000	24.918	24.953	+0.035
690.000	24.009	24.031	+0.022
700.000	23.151	23.171	+0.020
702.109	22.989	22.998	+0.009
708.708	22.451	22.473	+0.022
710.000	22.339	22.373	+0.034
720.000	21.835	21.599	-0.236

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

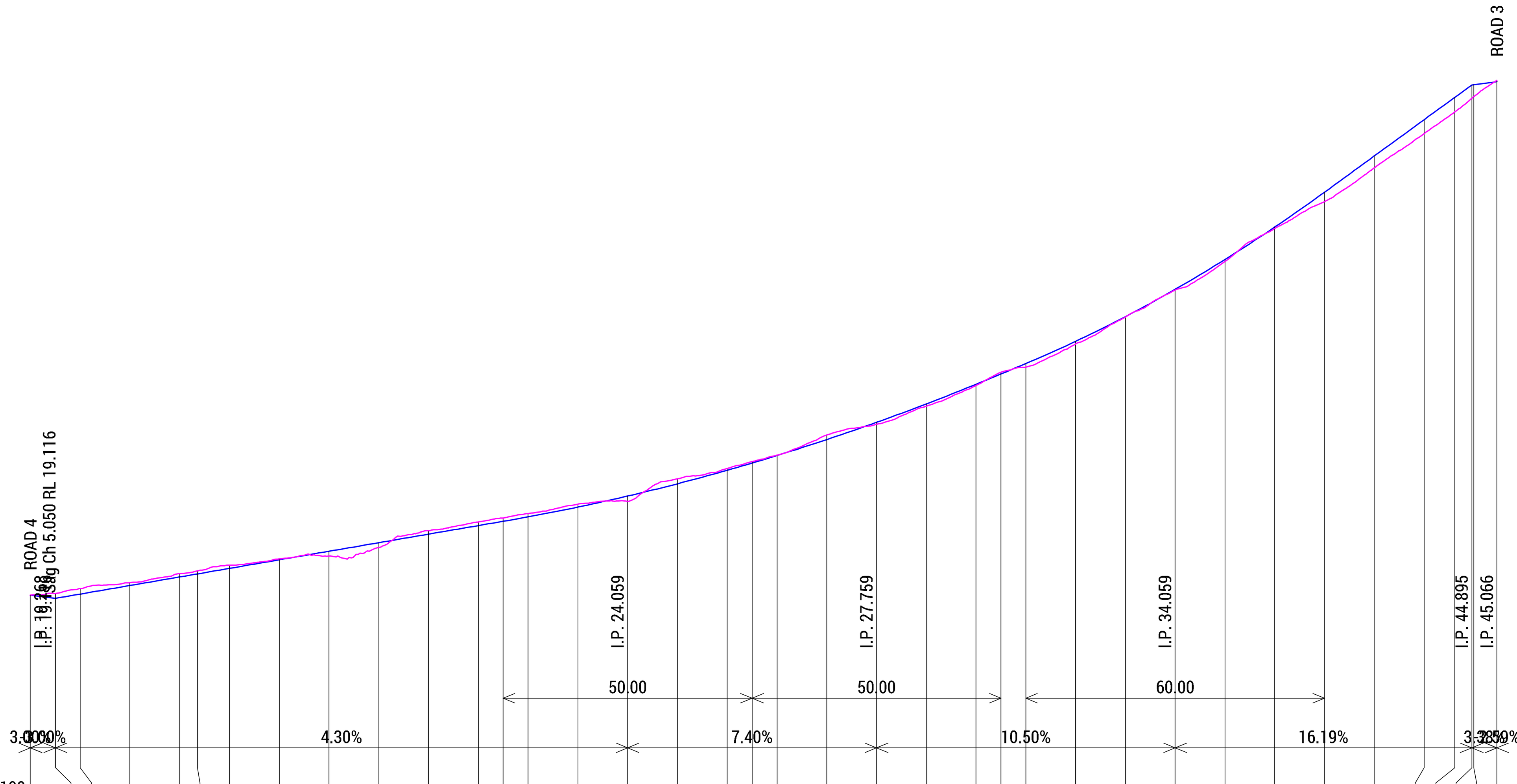
ROAD 7



Chainage	Existing Levels	Design Levels	Cut Fill
720.000	21.835	21.599	-0.236
730.000	21.084	20.825	-0.259
740.000	20.141	20.050	-0.091
750.000	19.231	19.276	+0.045
753.154	18.963	19.032	+0.069
760.000	18.482	18.477	-0.005
770.000	17.594	17.574	-0.020
780.000	16.304	16.562	+0.258
786.846	15.586	15.807	+0.221
790.000	15.263	15.447	+0.184
800.000	14.356	14.307	-0.049
803.692	14.032	13.886	-0.146

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

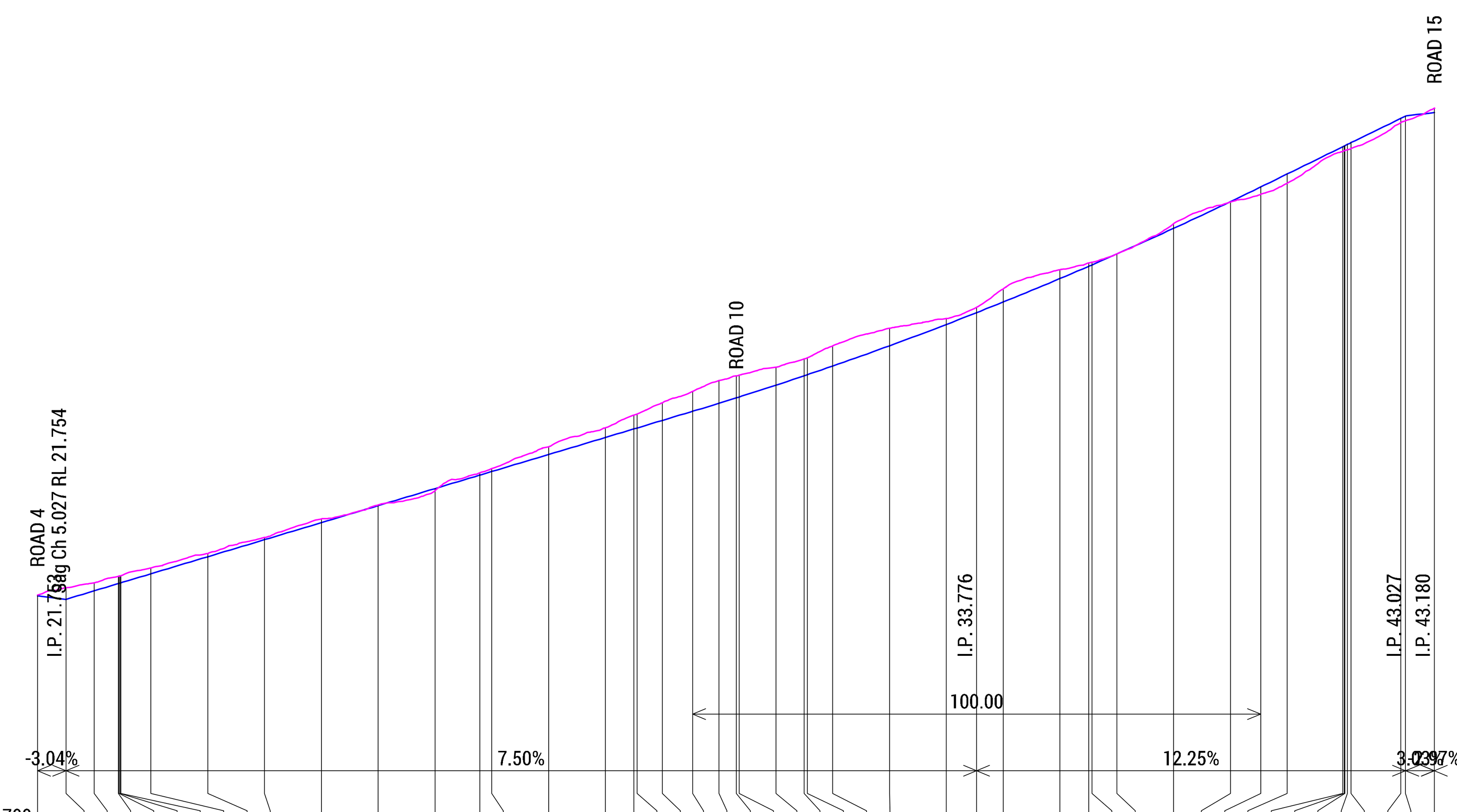
ROAD 7



Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	19.278	19.268	-0.010
5.050	19.360	19.116	-0.244
10.000	19.604	19.329	-0.275
20.000	19.906	19.759	-0.147
30.000	20.352	20.189	-0.163
33.562	20.494	20.342	-0.152
40.000	20.786	20.619	-0.167
50.000	21.096	21.049	-0.047
60.000	21.240	21.479	+0.239
70.000	21.669	21.909	+0.240
80.000	22.514	22.339	-0.175
90.000	22.951	22.769	-0.182
95.000	23.150	22.984	-0.166
100.000	23.373	23.207	-0.166
110.000	23.846	23.699	-0.147
120.000	23.992	24.253	+0.261
130.000	25.117	24.869	-0.248
140.000	25.634	25.547	-0.087
145.000	25.985	25.909	-0.076
150.000	26.309	26.287	-0.022
160.000	27.324	27.089	-0.235
170.000	27.859	27.953	+0.094
180.000	28.762	28.879	+0.117
190.000	29.811	29.867	+0.056
195.000	30.471	30.384	-0.087
200.000	30.733	30.909	+0.176
210.000	31.889	32.023	+0.134
220.000	33.240	33.265	+0.025
230.000	34.597	34.636	+0.039
240.000	36.039	36.134	+0.095
250.000	37.687	37.761	+0.074
260.000	39.046	39.516	+0.470
270.000	40.734	41.335	+0.601
280.000	42.453	43.153	+0.700
286.185	43.546	44.279	+0.733
289.575	44.230	44.895	+0.665
290.000	44.319	44.909	+0.590
294.642	45.131	45.066	-0.065

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 8



Chainage	Existing Levels	Design Levels	Cut Fill
0.000	21.933	21.907	-0.026
5.027	22.258	21.754	-0.504
10.000	22.479	22.126	-0.353
14.247	22.767	22.445	-0.322
14.394	22.776	22.456	-0.320
14.560	22.786	22.468	-0.318
14.673	22.792	22.477	-0.315
20.000	23.135	22.876	-0.259
30.000	23.770	23.626	-0.144
40.000	24.472	24.376	-0.096
50.000	25.291	25.126	-0.165
60.000	25.909	25.876	-0.033
70.000	26.530	26.626	+0.096
77.878	27.319	27.217	-0.102
80.000	27.505	27.376	-0.129
90.000	28.466	28.126	-0.340
100.000	29.306	28.876	-0.430
104.981	29.858	29.250	-0.608
105.559	29.913	29.293	-0.620
110.000	30.406	29.626	-0.780
115.330	30.900	30.026	-0.874
120.000	31.377	30.382	-0.995
123.008	31.588	30.616	-0.972
123.561	31.619	30.660	-0.959
130.000	31.966	31.178	-0.788
134.986	32.329	31.592	-0.737
135.549	32.378	31.640	-0.738
140.000	32.908	32.021	-0.887
150.000	33.679	32.912	-0.767
160.000	34.111	33.850	-0.261
165.330	34.610	34.370	-0.240
170.000	35.419	34.836	-0.583
180.000	36.263	35.870	-0.393
185.055	36.553	36.410	-0.143
185.612	36.589	36.471	-0.118
190.000	36.953	36.951	-0.002
200.000	38.281	38.079	-0.202
210.000	39.238	39.255	+0.017
215.330	39.581	39.901	+0.320
220.000	40.071	40.473	+0.402
229.792	41.470	41.673	+0.203
230.000	41.491	41.698	+0.207
230.149	41.507	41.717	+0.210
230.621	41.545	41.774	+0.229
231.267	41.589	41.853	+0.264
240.000	42.732	42.923	+0.191
240.848	42.821	43.027	+0.206
245.900	43.369	43.180	-0.189

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 9

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS:
PRELIMINARY / INFORMATION

DO NOT SCALE - IF IN DOUBT, ASK

THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS PREPARED.

APPROVED: - | ACRED. No: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -
DATE: -

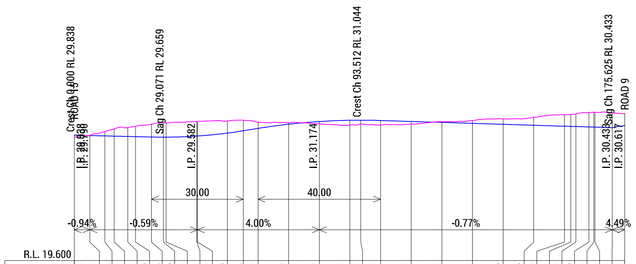
rare.
22-24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
PROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

TITLE: LONG SECTION - ROAD 7 - ROAD 9

SCALE: AS NOTED | SHEET SIZE: A1 | DWGs IN SET: -

PROJECT No: 251013 | DWG No: C415 | REV: A

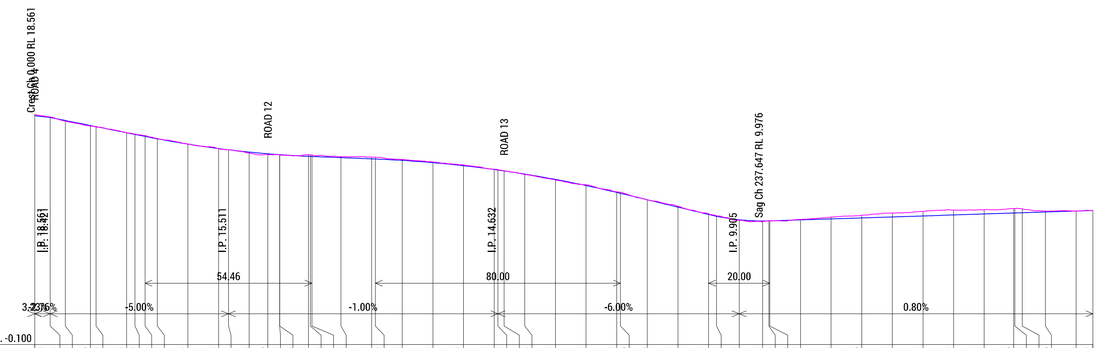


R.L. 19.600

Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	29.653	29.838	+0.185
5.115	29.807	29.790	-0.017
10.000	30.123	29.761	-0.362
12.998	30.334	29.743	-0.591
17.489	30.435	29.716	-0.719
20.000	30.548	29.702	-0.846
25.208	30.713	29.671	-1.042
29.071	30.855	29.659	-1.196
30.000	30.825	29.660	-1.165
40.000	30.944	29.751	-1.193
49.088	30.948	29.754	-1.194
50.000	30.981	29.995	-0.986
55.208	31.034	30.182	-0.852
60.000	30.883	30.374	-0.509
70.000	30.824	30.714	-0.110
80.000	30.746	30.935	+0.189
90.000	30.640	31.037	+0.397
93.512	30.741	31.044	+0.303
100.000	30.642	31.019	+0.377
110.000	30.734	30.941	+0.207
120.000	30.931	30.864	-0.067
130.000	31.021	30.787	-0.234
140.000	31.155	30.709	-0.445
150.000	31.298	30.632	-0.666
160.000	31.479	30.554	-0.925
162.144	31.554	30.528	-1.026
168.010	31.668	30.492	-1.176
169.616	31.685	30.480	-1.205
170.000	31.685	30.477	-1.208
175.626	31.637	30.433	-1.204
179.709	31.588	30.617	-0.971

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 10

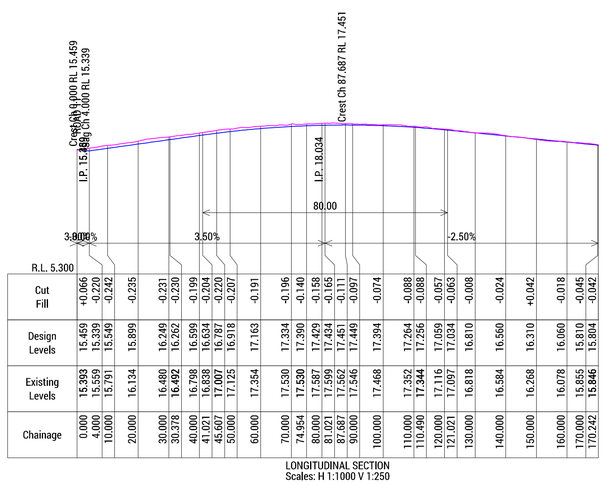


R.L. -0.100

Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	18.671	18.561	-0.110
5.055	18.460	18.421	-0.039
10.000	18.113	18.174	+0.061
18.180	17.719	17.765	+0.046
20.000	17.644	17.674	+0.030
30.000	17.182	17.174	-0.009
32.727	17.068	17.038	-0.030
36.026	16.927	16.873	-0.054
40.000	16.701	16.680	-0.021
50.000	16.261	16.246	-0.015
60.000	15.851	15.885	+0.034
63.257	15.783	15.784	+0.001
70.000	15.516	15.598	+0.082
76.116	15.393	15.459	+0.066
79.439	15.362	15.384	+0.022
80.000	15.362	15.384	+0.022
89.376	15.379	15.251	-0.128
90.000	15.366	15.244	-0.122
90.488	15.356	15.239	-0.117
100.000	15.225	15.144	-0.081
110.000	15.185	15.044	-0.141
111.232	15.182	15.032	-0.150
120.000	14.988	14.920	-0.068
130.000	14.792	14.734	-0.058
140.000	14.544	14.485	-0.059
150.000	14.195	14.174	-0.021
151.232	14.159	14.132	-0.027
153.248	14.073	14.060	-0.013
160.000	13.767	13.801	+0.034
170.000	13.321	13.365	+0.044
180.000	12.934	12.866	-0.068
190.000	12.355	12.305	-0.050
191.232	12.318	12.232	-0.086
200.000	11.707	11.705	-0.002
210.000	11.176	11.105	-0.071
220.000	10.566	10.505	-0.061
222.604	10.402	10.361	-0.041
230.000	10.030	10.075	+0.045
237.647	9.922	9.976	+0.054
239.673	9.979	9.983	+0.004
240.000	9.983	9.985	+0.002
250.000	10.104	10.065	-0.039
260.000	10.287	10.145	-0.142
270.000	10.441	10.225	-0.216
280.000	10.623	10.305	-0.318
290.000	10.756	10.385	-0.371
300.000	10.860	10.465	-0.395
310.000	10.896	10.545	-0.351
319.645	10.989	10.623	-0.366
320.000	10.996	10.625	-0.371
322.407	10.958	10.645	-0.313
330.000	10.781	10.705	-0.076
340.000	10.783	10.785	+0.002
345.463	10.829	10.829	+0.000

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 11

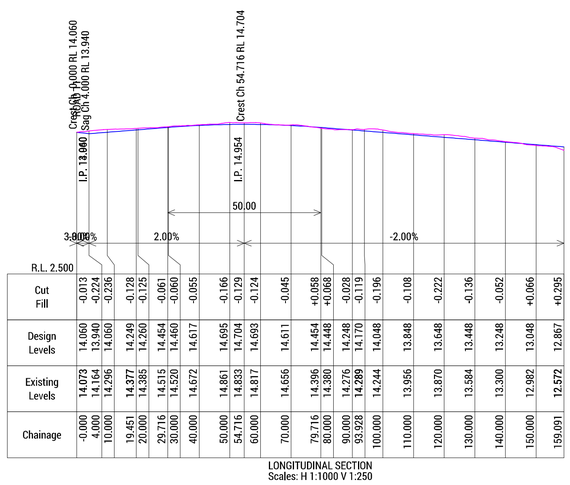


R.L. 5.300

Chainage	Existing Levels	Design Levels	Cut Fill
0.000	15.393	15.459	+0.066
4.000	15.569	15.339	-0.230
10.000	15.791	15.549	-0.242
20.000	16.134	15.899	-0.235
30.000	16.480	16.249	-0.231
30.378	16.492	16.262	-0.230
40.000	16.798	16.599	-0.199
41.021	16.838	16.634	-0.204
45.607	17.007	16.787	-0.220
50.000	17.125	16.918	-0.207
60.000	17.354	17.163	-0.191
70.000	17.530	17.334	-0.196
74.954	17.530	17.390	-0.140
80.000	17.587	17.429	-0.158
81.021	17.599	17.434	-0.165
87.687	17.562	17.451	-0.111
90.000	17.546	17.449	-0.097
100.000	17.468	17.394	-0.074
110.000	17.352	17.264	-0.088
110.490	17.344	17.256	-0.088
120.000	17.116	17.059	-0.057
121.021	17.097	17.034	-0.063
130.000	16.818	16.810	-0.008
140.000	16.584	16.560	-0.024
150.000	16.268	16.310	+0.042
160.000	16.078	16.060	-0.018
170.000	15.855	15.810	-0.045
170.242	15.846	15.804	-0.042

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 12

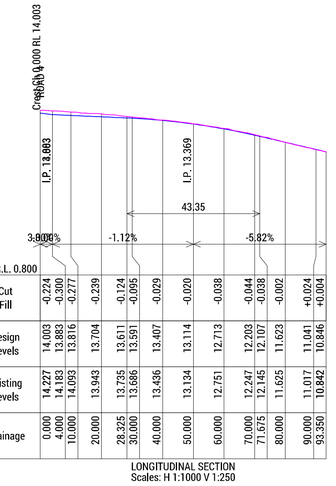


R.L. 2.500

Chainage	Existing Levels	Design Levels	Cut Fill
-0.000	14.073	14.060	-0.013
4.000	14.164	13.940	-0.224
10.000	14.296	14.060	-0.236
19.451	14.377	14.249	-0.128
20.000	14.385	14.260	-0.125
29.716	14.515	14.454	-0.061
30.000	14.520	14.460	-0.060
40.000	14.672	14.617	-0.055
50.000	14.861	14.695	-0.166
54.716	14.833	14.704	-0.129
60.000	14.817	14.693	-0.124
70.000	14.656	14.611	-0.045
79.716	14.396	14.454	+0.058
80.000	14.380	14.448	+0.068
90.000	14.276	14.248	-0.028
93.928	14.289	14.170	-0.119
100.000	14.244	14.048	-0.196
110.000	13.956	13.848	-0.108
120.000	13.870	13.648	-0.222
130.000	13.584	13.448	-0.136
140.000	13.300	13.248	-0.052
150.000	12.982	13.048	+0.066
159.091	12.572	12.867	+0.295

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 13



R.L. 0.800

Chainage	Existing Levels	Design Levels	Cut Fill
0.000	14.227	14.003	-0.224
4.000	14.183	13.883	-0.300
10.000	14.093	13.816	-0.277
20.000	13.943	13.704	-0.239
28.325	13.735	13.611	-0.124
30.000	13.686	13.591	-0.095
40.000	13.436	13.407	-0.029
50.000	13.134	13.114	-0.020
60.000	12.751	12.713	-0.038
70.000	12.247	12.203	-0.044
71.675	12.145	12.107	-0.038
80.000	11.625	11.623	-0.002
90.000	11.017	11.041	+0.024
93.350	10.842	10.846	+0.004

LONGITUDINAL SECTION
Scales: H 1:1000 V 1:250

ROAD 14

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS:
PRELIMINARY / INFORMATION

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: -
ACRED. No: -

DESIGN BY:	RJ
DESIGN CHK:	JS
DRAWN BY:	PVD
DRAFT CHK:	-
DATE:	-

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: **HOLMESDYER**

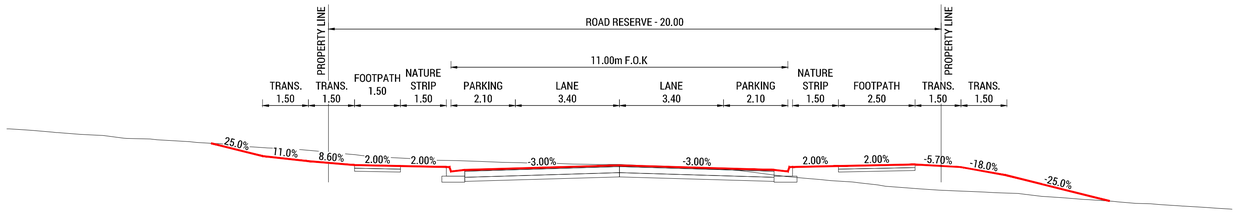
PROJECT: **BOYER ROAD PRECINCT**

ADDRESS: **50 - 170 BOYER ROAD BRIDGEWATER**

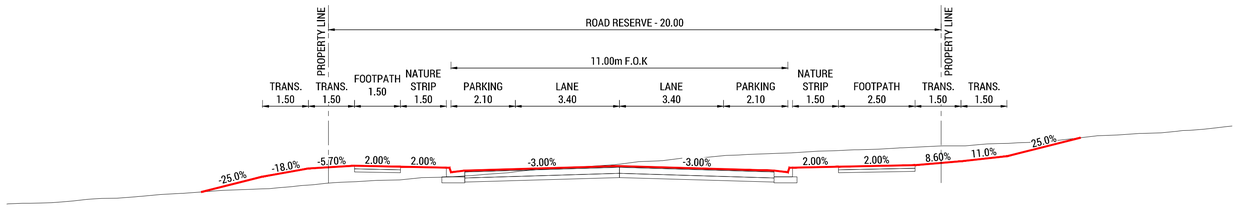
TITLE: **LONG SECTION - ROAD 10 - ROAD 14**

SCALE: **AS NOTED** SHEET SIZE: **A1** DWGs IN SET: -

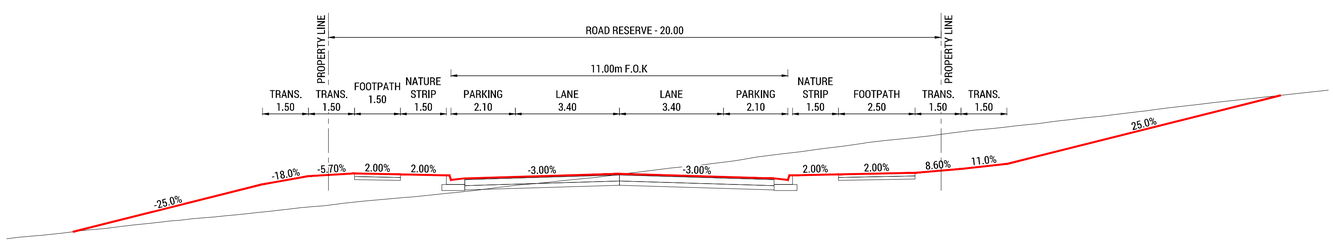
PROJECT No: **251013** DWG No: **C416** REV: **A**



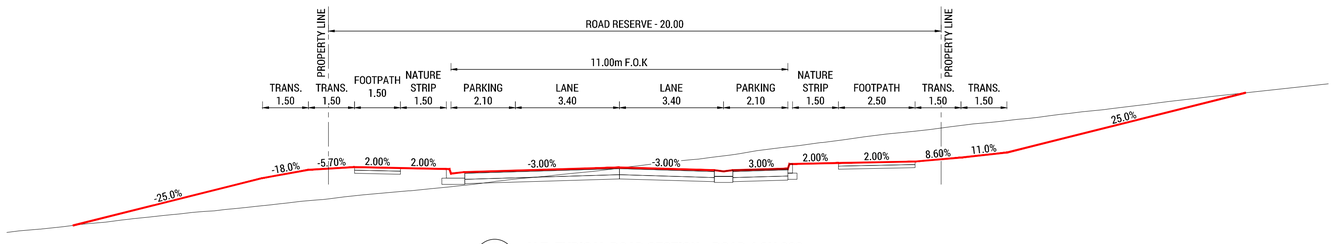
01 TYPICAL ROAD SECTION - ROAD 4 CH 140
SCALE 1:100



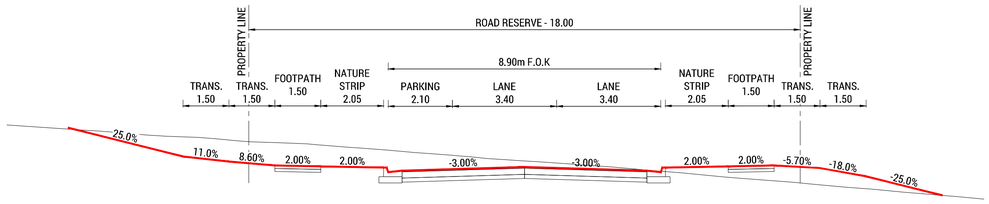
02 TYPICAL ROAD SECTION - ROAD 4 CH 550
SCALE 1:100



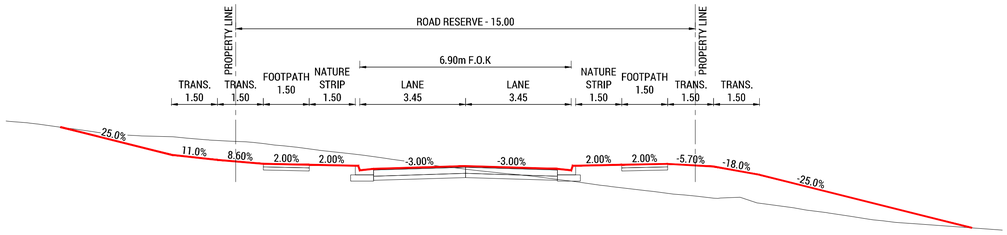
03 TYPICAL ROAD SECTION - ROAD 4 CH 800
SCALE 1:100



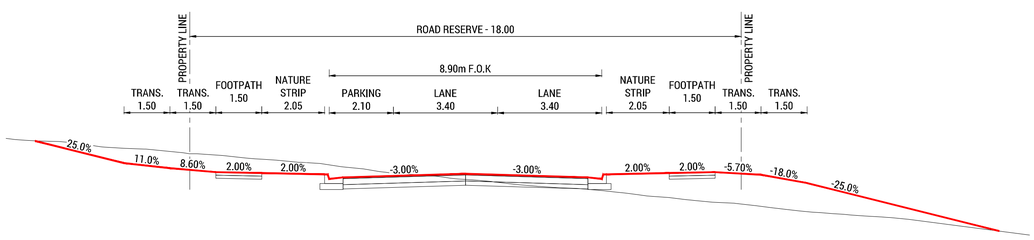
03a ALT. TYPICAL ROAD SECTION - ROAD 4 CH 800
SCALE 1:100



04 TYPICAL ROAD SECTION - ROAD 5 CH 450
SCALE 1:100



05 TYPICAL ROAD SECTION - ROAD 7 CH 150
SCALE 1:100



06 TYPICAL ROAD SECTION - ROAD 10 CH 150
SCALE 1:100

REV:	ISSUED FOR / DESCRIPTION:	BY:	DATE:
A	INFORMATION PURPOSES	PVD	21-05-25

STATUS: **PRELIMINARY / INFORMATION**

DO NOT SCALE - IF IN DOUBT, ASK

APPROVED: -
ACRED. No: -

DESIGN BY: RJ
DESIGN CHK: JS
DRAWN BY: PVD
DRAFT CHK: -
DATE: -

rare.
22–24 Paterson Street
Launceston TAS 7250
rarein.com.au
P. 03 6388 9200

CLIENT: HOLMESDYER
PROJECT: BOYER ROAD PRECINCT
ADDRESS: 50 - 170 BOYER ROAD BRIDGEWATER

TITLE: TYPICAL ROAD CROSS SECTIONS
SCALE: 1:100 SHEET SIZE: A1 DWGs IN SET: -
PROJECT No: 251013 DWG No: C421 REV: A