EXISTING INFRASTRUCTURE REPORT

PROPOSED SUBDIVISION BRUNKILL, MITCHELL, SILVERWOOD AND BIRCH ROADS WAGGA WAGGA

JUNE, 2020

PREPARED BY

LANCE RYAN CONSULTING ENGINEERS PTY LTD

JOB NO 18W039

LRCE

Lance Ryan Consulting Engineers

EXISTING INFRASTRUCTURE

Brunskill, Mitchell, Silverwood and Birch Road Wagga Wagga

CONTENTS

1. INTRODUCTION

Lance Ryan Consulting Engineers have been engaged by Lake Albert Heights Development to prepare a report to investigate the existing infrastructure along Brunskill, Mitchell, Silverwood and Birch Road Wagga Wagga to determine its adequacy to service a proposed subdivision in the land surrounded by the above roads.

Wagga Wagga City Council, Riverina Water, APA Gas, Essential Energy and Telstra / NBN have been approached for their input to advise on the existing infrastructure and what augmentation would be required to service the subdivision.

This report forms part of the submission process to gain approval to develop the subject land into lots with a minimum size of 1500sq.m to maximum of 5000sq.m. The existing area of the land bound by Brunskill, Mitchell, Silverwood and Birch Road is 45.1Ha

Appendix A shows the existing lot layout (drawing C01) of the proposed development area.

Refer to Appendix B for a preliminary concept plan (drawing C02) of the proposed subdivision. The concept plan is indicative only and is provided only to show a possible subdivision layout based on design principles set in the Roberts Day Urban Design Report.

2. STORMWATER AND SEWER

Wagga Wagga City council were approached for their input on the requirements for stormwater and sewer infrastructure to service the proposed development.

Stormwater

The roads surrounding the proposed development are rural roads with variable size table drains to nonexistent table drains. Refer Appendix C for existing stormwater infrastructure and flow routes (Drawing SW01).

The existing land bound by Brunskill, Mitchell, Silverwood and Birch Road is approximately 45.1Ha. The land generally falls towards the intersection of Brunskill and Birch Road with the eastern portion of the site falling towards Mitchell Road.

It is proposed that the new internal road networks will be constructed as rural residential roads consisting of table drains instead of kerb and guttering. The table drains can be constructed as a combination of vegetated swales and bioretention swales to ensure the principles of water sensitive urban design are implemented. Vegetated swales act as a primary treatment device and promote uniform flow and also the slowing of water velocity. Bioretention swales (or bioretention trenches) are similar to vegetated swales but include a subsurface filter. These systems provide a surface conveyance function as well as efficient treatment of stormwater through fine filtration, extended detention and some biological uptake.

Appendix D shows typical details for vegetated swales and bioretention swales.

The majority of the existing site falls naturally to the intersection of Brunskill Road and Birch Road. It is proposed that stormwater flows will be discharged primarily in the rural road table drains and also some rear of lot underground pipes where lots don't fall naturally towards the new roads. Discharge off the site is to be limited to pre-development flows and this can be achieved by a combination of the bioretention swales and a park / detention landscaped area adjacent to the proposed entry road off Birch Road. From the detention area stormwater will be carried by an underground pipe to the existing culvert and creek that crosses Brunskill Road approximately 350m west of the intersection of Brunskill and Birch Road. Refer Appendix C drawing SW02.

The eastern portion of the site has natural falls towards Mitchell Road. These lots can be constructed with their own detention systems to ensure flows off the site match existing conditions and don't overload the existing table drain in Mitchell Road. This can be achieved with above ground tanks for roof water and bunding to capture hardstand areas such as driveways.

There are no constraints to servicing the proposed development with stormwater and ensuring runoff flows are maintained or even less than pre development if required. The detention systems can be designed with an outlet structure that can limit flows to a variety of recurrence intervals such as 1 in 1, 10 and 100 year pre development flows. By retaining flows on site and only discharging the retained flows at a low rate such as a 1 in 1 year event this will minimize the effect of the development flows on the existing creek as the creek is subject to overland flow flooding. Careful design of the detention system can improve the existing flow conditions in the creek to alleviate the existing overland flooding.

The detention systems and outlet pipe to the existing culvert in Brunskill Road will be constructed during Stage 1 of the development. Construction of the development will begin in the north west corner of the site

near the intersection of Brunskill and Birch Road and proceed progressively in an eastern and southern direction moving upstream. This ensures the most downstream infrastructure is constructed first and is the logical staging of the development.

Sewer

The majority of existing dwellings in this development are currently on pressure sewer. Two dwellings are still utilizing on-site effluent systems. The current pressure system is only sized for the existing lots and has no additional capacity. Therefore the proposed development will need to be serviced by a new gravity system that will discharge to a pump station.

The existing gravity sewer infrastructure is located on the southern side of Brunskill Road approximately 50m east of the intersection of Brunskill Road and Forrest Street. The existing sewer pipe is a 225 diameter pipe that crosses Brunskill Road and then becomes a 300 diameter pipe. Correspondence with Council has confirmed that the existing infrastructure is capable of handling the additional effluent flows generated from the proposed development on the following condition. The sewer pump station will need to have the ability to store effluent and pump it into the existing infrastructure at OFF Peak times. This will ensure that the mains system is not overloaded. Once detailed design of the pump station begins Council should be able to provide timings for the peak times to allow programming of the pump station.

There are two options for the location of the sewer pump station.

Option 1

Locate the pump station in the north-west corner of the development. Sewer from the development will gravity feed to the pump station and then outflow via a rising main to the sewer manhole located near the intersection of Brunskill Road and Forrest Street. Refer Appendix E drawing SE01

Option 2

Locate the pump station in Brunskill Road approximately 300m west of the intersection of Brunskill Road and Birch Road. Sewer discharge from the proposed development will gravity feed to this pump station. The outflow from the pump station will be via a rising main to the sewer manhole located near the intersection of Brunskill Road and Forrest Street.

The advantage of locating the sewer pump in this location is it significantly increases the catchment area for potential sewer flows. Drawing SE02 in Appendix E shows the potential increase in the catchment area. If these areas are developed into smaller lots they have the potential to also join the sewer pump station. If this location was adopted the sewer pump station would be paid for via a contribution scheme based on Section 94 contributions.

The preferred option for the sewer pump station is Option 2. The total length of new sewer pipe work is the same for both options but option 1 allows for a greater catchment area to access the pump station. If Option 2 was adopted another sewer pump station would be required to service the additional catchment area shown on drawing SE02.

Appendix E includes email discussions with Council concerning the proposed sewer infrastructure.

Sewer infrastructure installation will begin with the construction of the sewer pump station and rising main during Stage 1 of the development. The gravity sewer mains that will service the development will then be installed starting at the sewer pump station and working upstream in an easterly and southerly direction.

As the gravity main moves past existing dwelling that are on the existing pressure system they will be taken off the pressure system and connected into the gravity sewer main. The ultimate aim is that all current dwellings on the pressure system will be disconnected from the pressure system and connected to the new gravity sewer main. The main benefit of this is that ongoing maintenance of the existing pressure system will be eliminated as the pressure system including pipes and pumps will become redundant.

3. ROADS

The existing surrounding road network is as follows.

- Mitchell Road – 7.0m sealed pavement with 1.8m sealed shoulders. 30m road reserve
- Brunskill Road – 6.2m sealed pavement with variable width unsealed shoulders. 30m road reserve
- Silverwood Road – 6.2m sealed pavement with variable width unsealed shoulders. 20m road reserve.
- Birch Road – 6.2 sealed pavement with variable width unsealed shoulders. 20m road reserve.

Wagga Wagga City Councils Engineering Guidelines for Subdivisions and developments recommends a minimum 6.5m carriageway with 2m shoulders for rural roads. As Brunskill, Birch and Silverwood Roads don't match these requirements upgrades to these roads will be required. Mitchell Road has recently undergone major upgrade works and this is reflected in the above pavement widths. Brunskill, Birch and Silverwood Roads have no major constraints that would affect the widening of these roads to meet current Wagga Wagga City guidelines.

The increase in traffic volumes and loads generated by the proposed development has not been calculated. This will require a report to be carried out by a qualified traffic consultant. The increase in traffic volumes on different sections of the surrounding road network will be largely dependent on the location of entry / exit roads from the development to the existing roads. Traffic numbers will dictate what intersection upgrades are required including lighting upgrades at the intersections.

Existing pavement compositions (pavement thickness) will also need to be investigated by a geotechnical engineer. The increased traffic volumes and loads may require the reconstruction of existing pavements. There are no constraints on carrying out reconstruction works with the major inconvenience being partial road closures during construction.

With development starting in the north west corner of the site adjacent to the intersection of Brunskill and Birch Roads to suit the staging of the stormwater and sewer infrastructure this intersection will be upgraded as part of the stage 1 construction works including upgrading of Birch Road to meet Council standards. As the development proceeds and additional traffic is placed on Brunskill and Silverwood Roads these roads will be upgraded to meet Council standards

4. WATER

Riverina Water has been approached to comment on the adequacy of the surrounding water infrastructure to handle the proposed development. Riverina Water are the authority responsible for the design and construction and maintenance of the existing water infrastructure.

Riverina Water supplied the following information and it can also be seen on the plans in Appendix F.

Existing water mains are located on the surrounding roads. The size of the mains are a follows.

- Brunskill Road – 150mm diameter AC Main.
- Mitchell Road – 150mm diameter AC main for the intersection with Brunskill and Cummins Road. 100mm diameter AC main from the intersection with Cummins to Silverwood Road.
- Silverwood Road – 100mm diameter AC main.
- Birch Road – 100mm diameter AC Main.

It is possible a 150mm diameter water main would be required to be extended to the proposed new entry / exit roads into the subdivision. If required the existing 100mm diameter mains can be upgraded to 150mm diameter and there are no major constraints to this being carried out if required by Riverina Water.

5. GAS

APA Gas has been approached to comment on the adequacy of the surrounding Gas infrastructure to handle the proposed development.

APA Gas provided the following options:-

If lots fronting onto Mitchell Road require gas reticulation a new 63mm diameter main will need to be installed. This main will extend south from Brunskill Road along Mitchell Road and then west along Silverwood Road to tie into the existing 63mm diameter main in Silverwood Road. In this instance there will be two feed into the proposed development. One from Birch Road and one from Mitchell Road via Silverwood Road. In this instance no augmentation of the existing network is necessary except for the new main.

Option two is if customers along Mitchell Road don't require gas. In which APA Gas would not require reticulation be laid along Mitchell Road and so the gas would be travelling along the 63mm diameter main in Birch Road. In this case APA Gas would require a duplicate 63mm diameter main in Birch Road south from Brunskill Road to the entry / exit road into the estate. Approximately 230m of 63mm diameter main. A capital evaluation of this main would be required at the time of requesting design information for this subdivision to see if any capital contributions are required to install the main.

For either option One or two there are no major constraints to prevent this work being out

Refer to Appendix G showing the existing gas infrastructure. The lines shown in BLUE are the existing gas infrastructure and the line shown in RED is the augmentation required if option two was adopted.

6. ELECTRICITY

Inland Power Solutions were engaged to laisse with Essential Energy to determine if any augmentation works are required in the surrounding electrical infrastructure to service the development.

The report prepared by Inland Power is attached in Appendix H.

There are no major constraints to providing electrical services for the proposed subdivision. The existing surrounding infrastructure is sufficient to enable the construction of new substations in the development to service the proposed new lots.

7. COMMUNICATION

Griffiths Contracting Services were engaged to laisse with the NBN to determine the suitability of existing surrounding infrastructure to service the development.

NBN have confirmed that the proposed development is within the fixed line footprint which is scheduled to be live in October 2019. NBN based their feedback on the preliminary concept plan (C02) in Appendix B. Based on this plan NBN confirmed this location would be accepted with no required backhaul contribution and subject only to the standard per lot deployment cost.

APPENDIX A

Existing Site Layout and Contours

Revision	Amendment or reason for issue	Issue date	Drawing completed by	Designed & dwg. checked by	Verified by X = Not verified	Issue authorised (*)
1	Issued for Information	18.03.2019	L.V.R.	L.V.R.	L.V.R.	

* Drawing Status
Warning: Unless there is an authorised Lance Ryan Consulting Engineers Pty. Ltd. signature at * , this drawing is not authorised for issue.

North

LRCE
Lance Ryan Consulting Engineers Pty Ltd
Consulting Engineers Planners & Managers
A.B.N. 53 831 529 091
52 Johnston Street, WAGGA WAGGA NSW 2650
P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Existing Lot Layout

Client: Lake Albert Heights Development

Scales: 1:2000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: C01

Sheet: 01 of 02

Revision: 1

A1 SHEET

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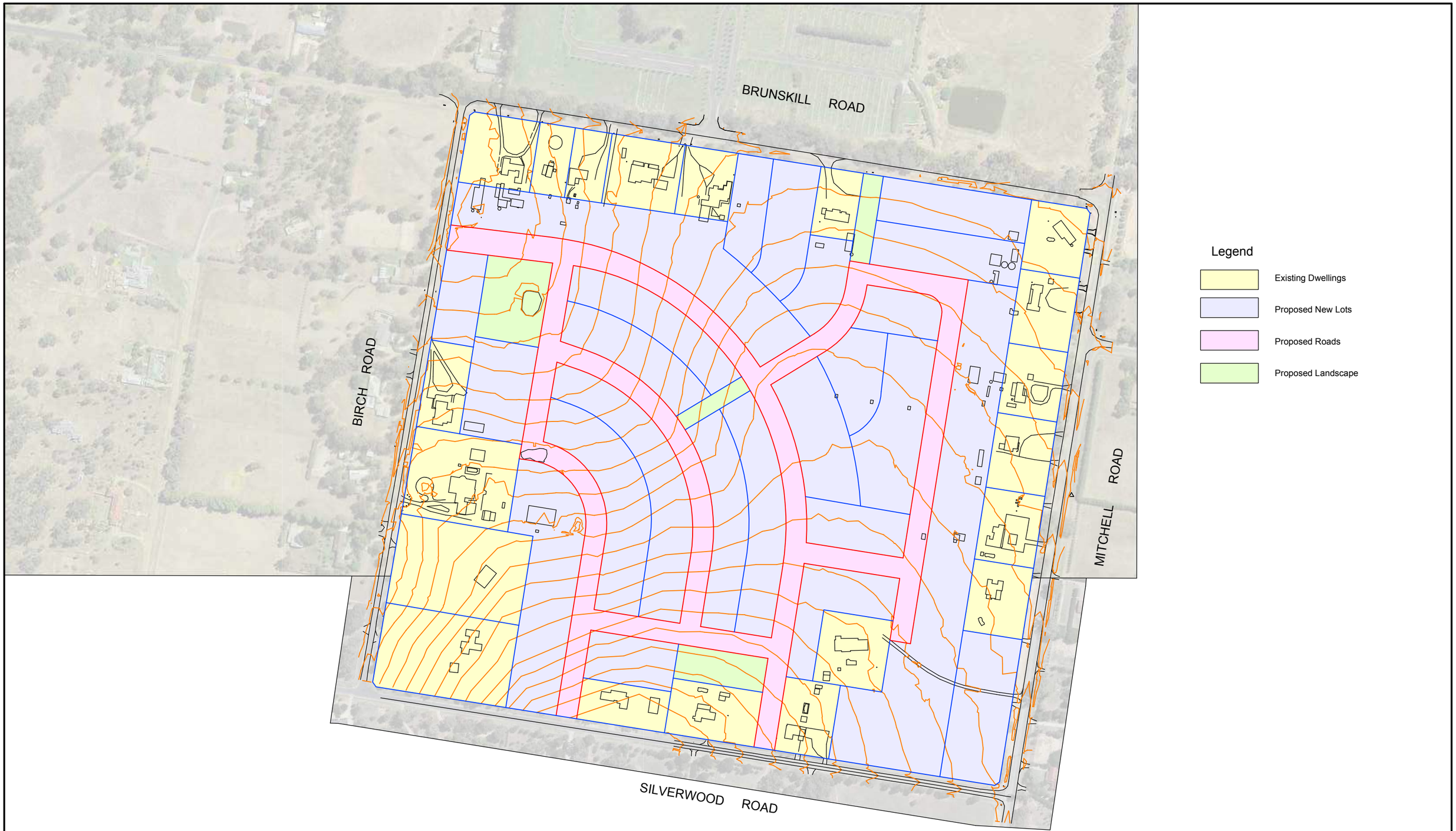
APPENDIX B

Preliminary Concept Layout Plan



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LRCE
Lance Ryan Consulting Engineers Pty Ltd
Consulting Engineers Planners & Managers
A.B.N. 53 831 529 091
52 Johnston Street, WAGGA WAGGA NSW 2650
P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Preliminary Concept Lot Layout

Client: Lake Albert Heights Development

Scales: 1:2000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: C02

Sheet: 02 of 02

Revision: 1

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APPENDIX C

Existing Stormwater Infrastructure and Flow Paths

Revision	Amendment or reason for issue	Issue date	Drawing completed by	Designed & dwg. checked by	Verified by X = Not verified	Issue authorised (*)
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LRCE
Lance Ryan Consulting Engineers Pty Ltd
Consulting Engineers Planners & Managers
A.B.N. 53 831 529 091
52 Johnston Street, WAGGA WAGGA NSW 2650
P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project
Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title
Existing Stormwater

Client
Lake Albert Heights Development

Scales
1:2000

Client Project No.

Architect / Project Manager
Salvestro Planning

Project Number
18W039

Dwg. No.
SW01

Sheet
01 of 02

Revision
1

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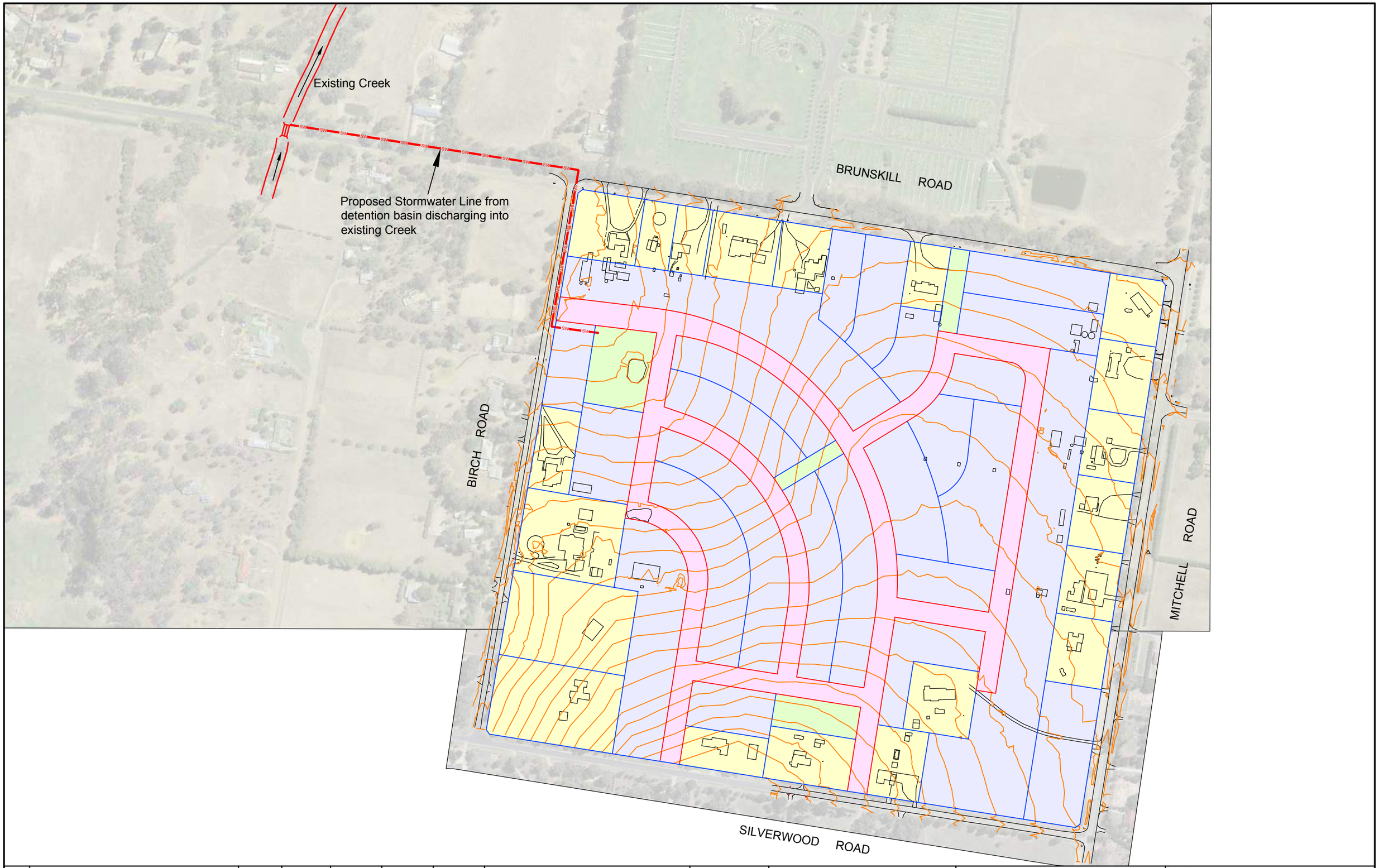

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A.B.N. 53 831 529 091
52 Johnston Street, WAGGA WAGGA NSW 2650
P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Proposed Stormwater Concept Lot Layout

Client: Lake Albert Heights Development

Scales: 1:2000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: SW02

Sheet: 02 of 02

Revision: 1

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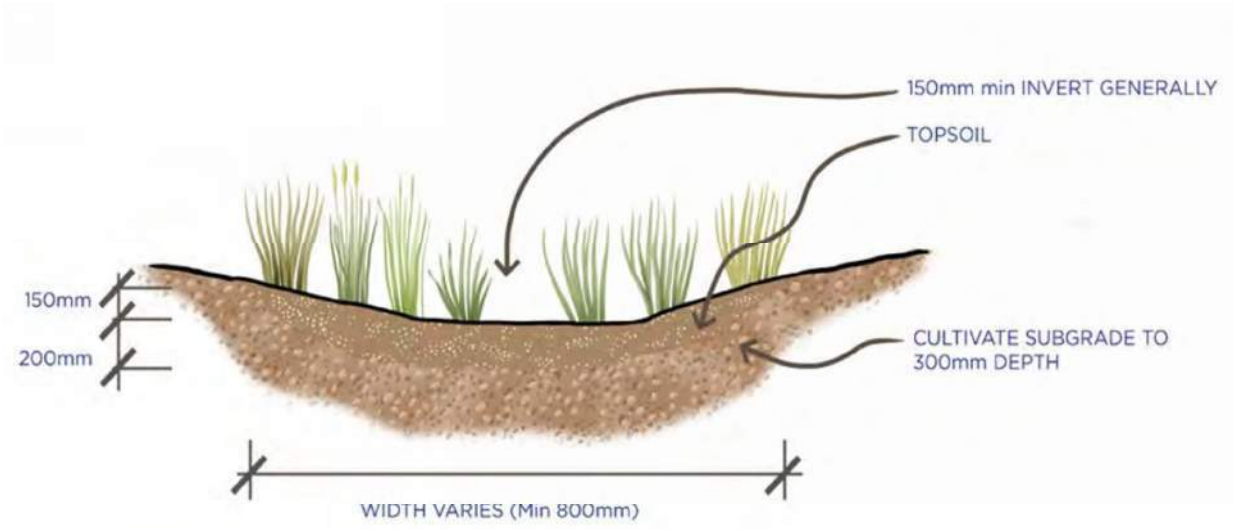
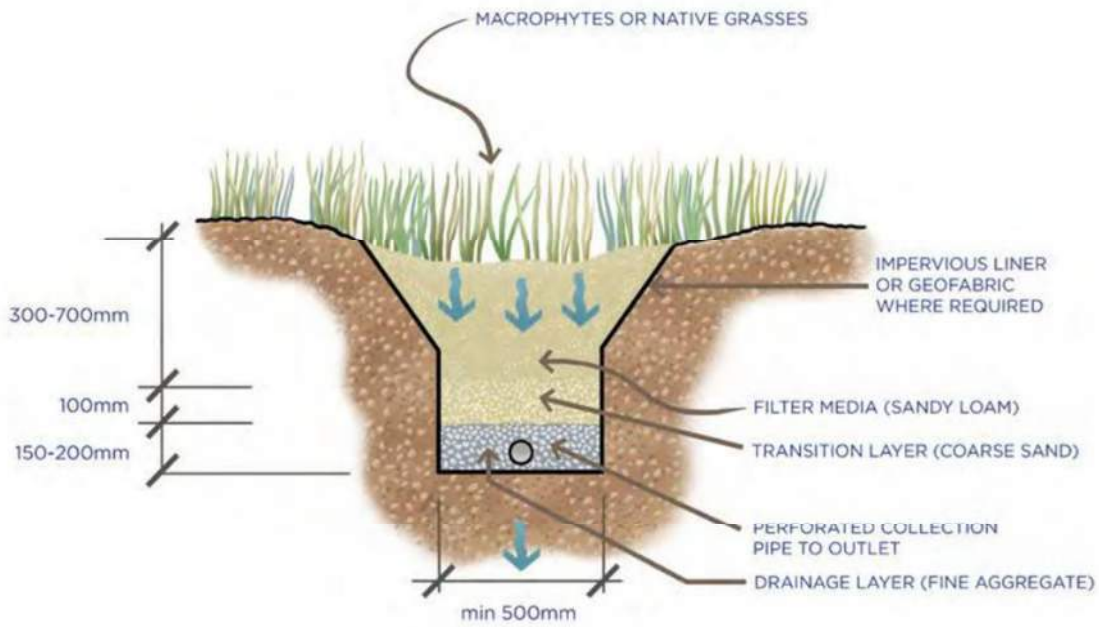
A1 SHEET

APPENDIX D

Typical Vegetated Swale and Bioretention Swale



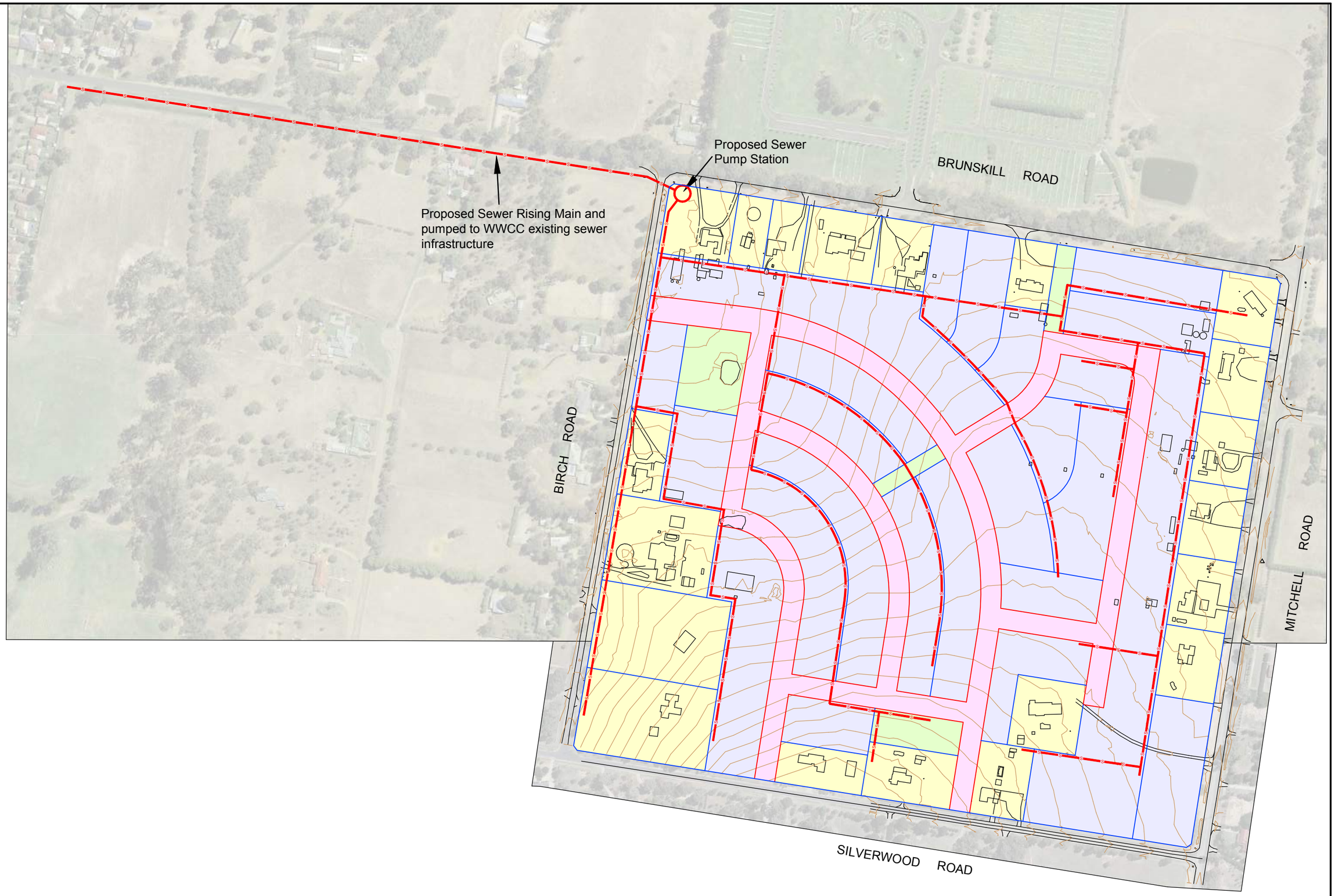
VEGETATED SWALE



BIORETENTION SWALE

APPENDIX E

Proposed Sewer for Concept Layout and Alternate Location of Sewer Station to Maximise the Sewer Catchment Area



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P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Proposed Sewer Option 1

Client: Lake Albert Heights Development

Scales: 1:2000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: SE01

Sheet: 01 Of 02

Revision: 1

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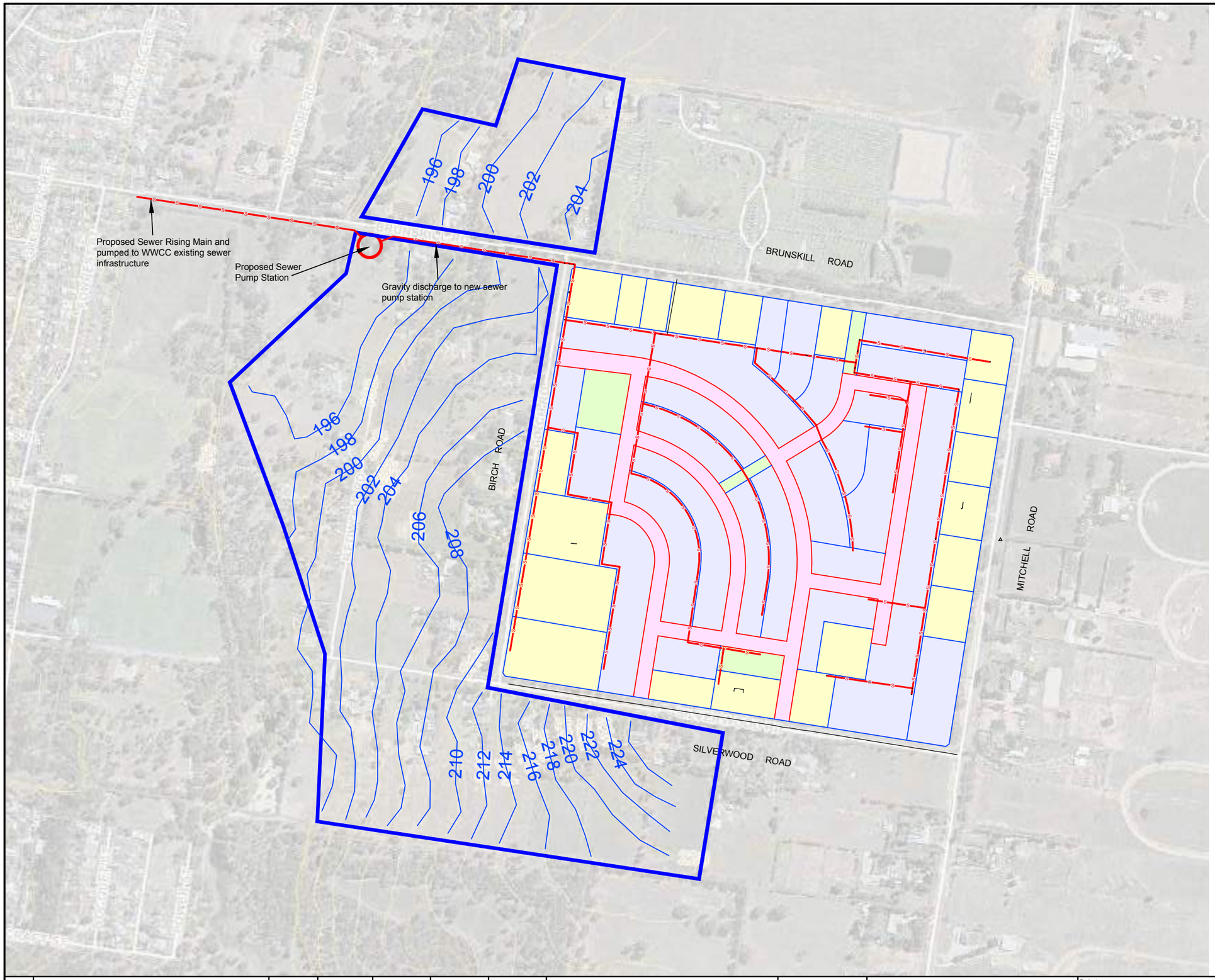

Legend

Additional sewer catchment area by moving the Sewer Pump Station from the North West corner of the proposed development to approximately 300m west of the intersection of Brunskill Road and Birch Road

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A.B.N. 53 831 529 091
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P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Proposed Sewer Pump Station
Option 2 - Maximum Catchment

Client: Lake Albert Heights Development

Scales: 1:3000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: SE02

Sheet: 02 Of 02

Revision: 1

0 100mm 200mm 300mm

A1 SHEET

Gmail **Lance Ryan <lancevryan@gmail.com>**

Proposed subdivision of Mitchell, Brunskill, Silverwood and Birch Road

Lance Ryan <lancevryan@gmail.com> 29 January 2019 at 12:04
To: "Seghers, Keith" <Seghers.Keith@wagga.nsw.gov.au>

Keith,
I have been engaged by the land owners to assist with the process of getting approvals to subdivide the subject land into lots with a minimum area of 1500sq.m

Garry Salvestro of Salvestro Planning is the project manager and he is the consultant running the process to get the appropriate planning approvals for the proposed subdivision.

I have attached a letter and plan to to explain the information we are after. Basically I would like to discuss the augmentation of the surrounding stormwater, sewer and the roads that will be required in order to service the proposed development.

I suggest a meeting at Council to discuss the requirements.

Can you call me with a time for the meeting. I would suggest yourself and Ron Cheney attend the meeting.

Lance Ryan Consulting Engineers Pty Ltd
52 Johnson Street
Po Box 7
Wagga Wagga NSW 2650
P 69 211 877
M 0429 037 595

2 attachments

Layout Plan.pdf
1160K

Letter.pdf
79K

Gmail **Lance Ryan <lancevryan@gmail.com>**

Proposed subdivision of Mitchell, Brunskill, Silverwood and Birch Road

Lance Ryan <lancevryan@gmail.com> 29 January 2019 at 13:40
To: "Cheney, Ron" <Cheney.Ron@wagga.nsw.gov.au>

Further to our phone conservation please see attached documents relating to preliminary planning for a proposed subdivision bounded by Mitchell, Brunskill, Birch and Silverwood Road. I am looking for advice on how to sewer this proposed subdivision. The low point of the subdivision is at the corner of Brunskill and Birch. We would have a sewer pump station here and I would like to now where we can discharge the pump station to and if the existing infrastructure is capable of handling the additional flows generated by the proposed subdivision.

Lance Ryan Consulting Engineers Pty Ltd
52 Johnson Street
Po Box 7
Wagga Wagga NSW 2650
P 69 211 877
M 0429 037 595

[Quoted text hidden]

2 attachments

Layout Plan.pdf
1160K

Letter.pdf
79K

Gmail

Lance Ryan <lancevryan@gmail.com>

Proposed subdivision of Mitchell, Brunskill, Silverwood and Birch Road

Seghers, Keith <Seghers.Keith@wagga.nsw.gov.au> 5 February 2019 at 09:28
To: Lance Ryan <lancevryan@gmail.com>
Cc: "Cheney, Ron" <Cheney.Ron@wagga.nsw.gov.au>, "Ross, Peter" <Ross.Peter@wagga.nsw.gov.au>, "Golden, Crystal" <Golden.Crystal@wagga.nsw.gov.au>, "Stander, Adriaan" <Stander.Adriaan@wagga.nsw.gov.au>

Hi Lance,

We have discussed the servicing requirements internally and have the following comments:

SEWER

- The area is currently on pressure sewer. This is only sized for the existing lots and has no additional capacity. Further subdivision would require the development to be serviced by a gravity sewer system discharging to a Sewer Pump Station. Construction of a sewer rising main would be required to a point where it can connect into Council's existing system.

STORMWATER

- The development would need to manage stormwater through a pipe and pit network discharging into a detention basin within the development to restrict post developed flows. The discharge from the detention basin would need to be piped to the culvert in Brunskill Rd to the west at the creek line. A stormwater study would need to be carried out to determine the impact of the development on stormwater flow in the creek as it is subject to overland flow flooding. This may require the basin to have some retention in order to reduce the volume of runoff discharging into the creek. A gross Pollutant Trap would be required at the detention basin.

ROADS

- Further investigation required. Traffic generation numbers may require upgrade of existing pavements. Small lots fronting existing roads may require kerb and gutter. Traffic numbers will dictate what intersection upgrades are required. Lighting upgrades at new intersections.

Regards,

Keith

Keith Seghers
Development & Subdivisions Engineer Coordinator

1300 292 442
d +61 2 6926 9542 | **e** seghers.keith@wagga.nsw.gov.au
Wagga Wagga City Council · 243 Baylis Street (PO Box 20) · Wagga Wagga NSW 2650

From: Lance Ryan <lancevryan@gmail.com>
Sent: Tuesday, 29 January 2019 12:04 PM
To: Seghers, Keith <Seghers.Keith@wagga.nsw.gov.au>
Subject: Proposed subdivision of Mitchell, Brunskill, Silverwood and Birch Road

Keith,

[Quoted text hidden]

Gmail

Lance Ryan <lancevryan@gmail.com>

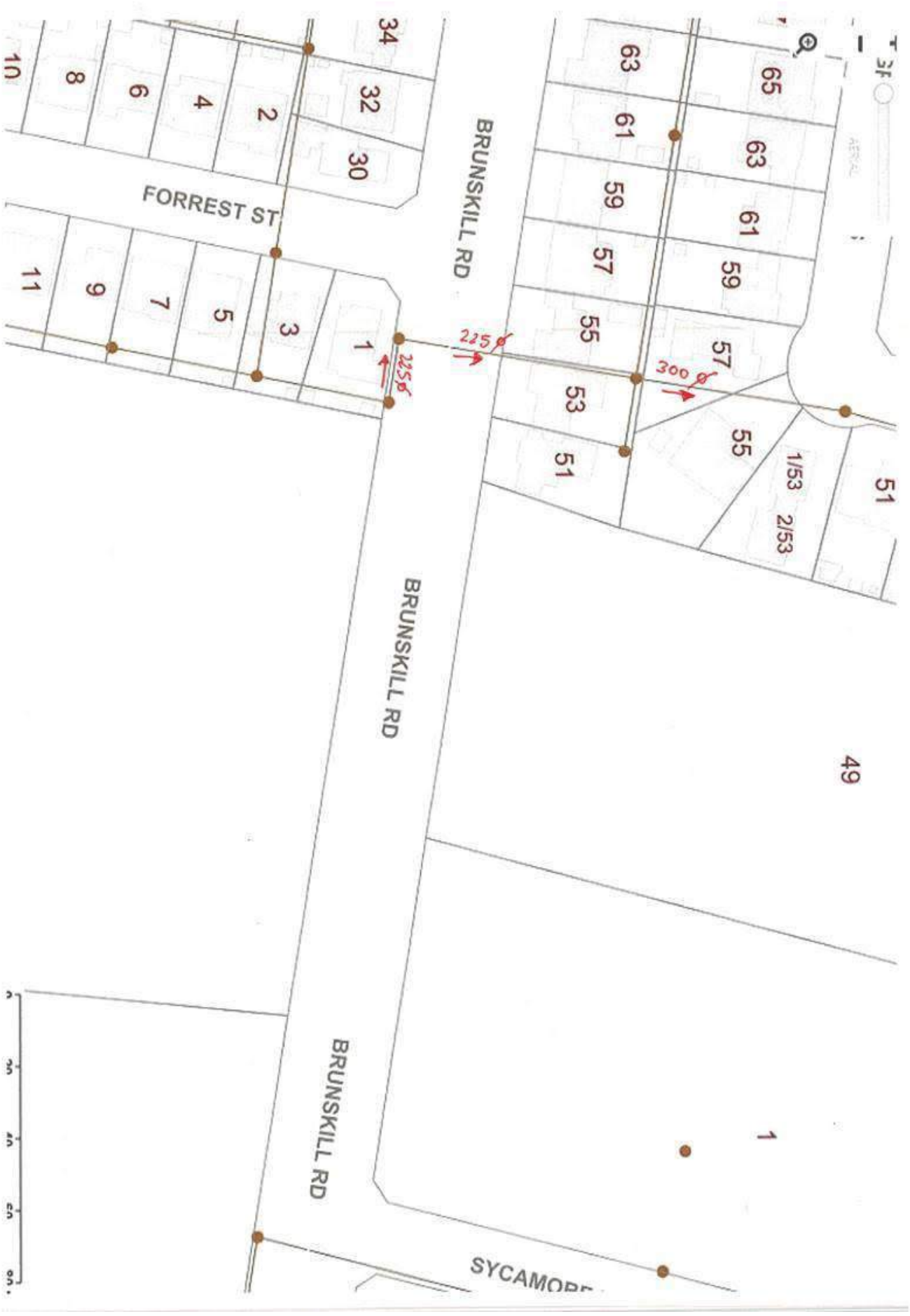
Mitchell Road Brunskill Road Subdivision

Seghers, Keith <Seghers.Keith@wagga.nsw.gov.au> 10 October 2019 at 08:49
To: Lance Ryan <lancevryan@gmail.com>
Cc: "Stander, Adriaan" <stander.adriaan@wagga.nsw.gov.au>, "Cheney, Ron" <Cheney.Ron@wagga.nsw.gov.au>, "Ross, Peter" <Ross.Peter@wagga.nsw.gov.au>

Hi Lance,

Please see the diagram below showing confirmation of the sewer main diameters. After discussing internally, it has been concluded that these will be able to cater for the proposed subdivision development based on the following requirement:

- The sewer pumpstation that is constructed for the subdivision will need to have the ability to store effluent and pump it into the mains system at OFF PEAK times. This ensure that the mains system is not overloaded. Once detailed design of the pump station begins Council should be able to provide timings for the peak times to allow programming of the pump station.



Regards,

Keith

Keith Seghers
Development & Subdivisions Engineer Coordinator

1300 292 442
d +61 2 6926 9542 **| e** seghers.keith@wagga.nsw.gov.au
Wagga Wagga City Council · 243 Baylis Street (PO Box 20) · Wagga Wagga NSW 2650

We celebrate diversity and inclusion, and promote equity and respect

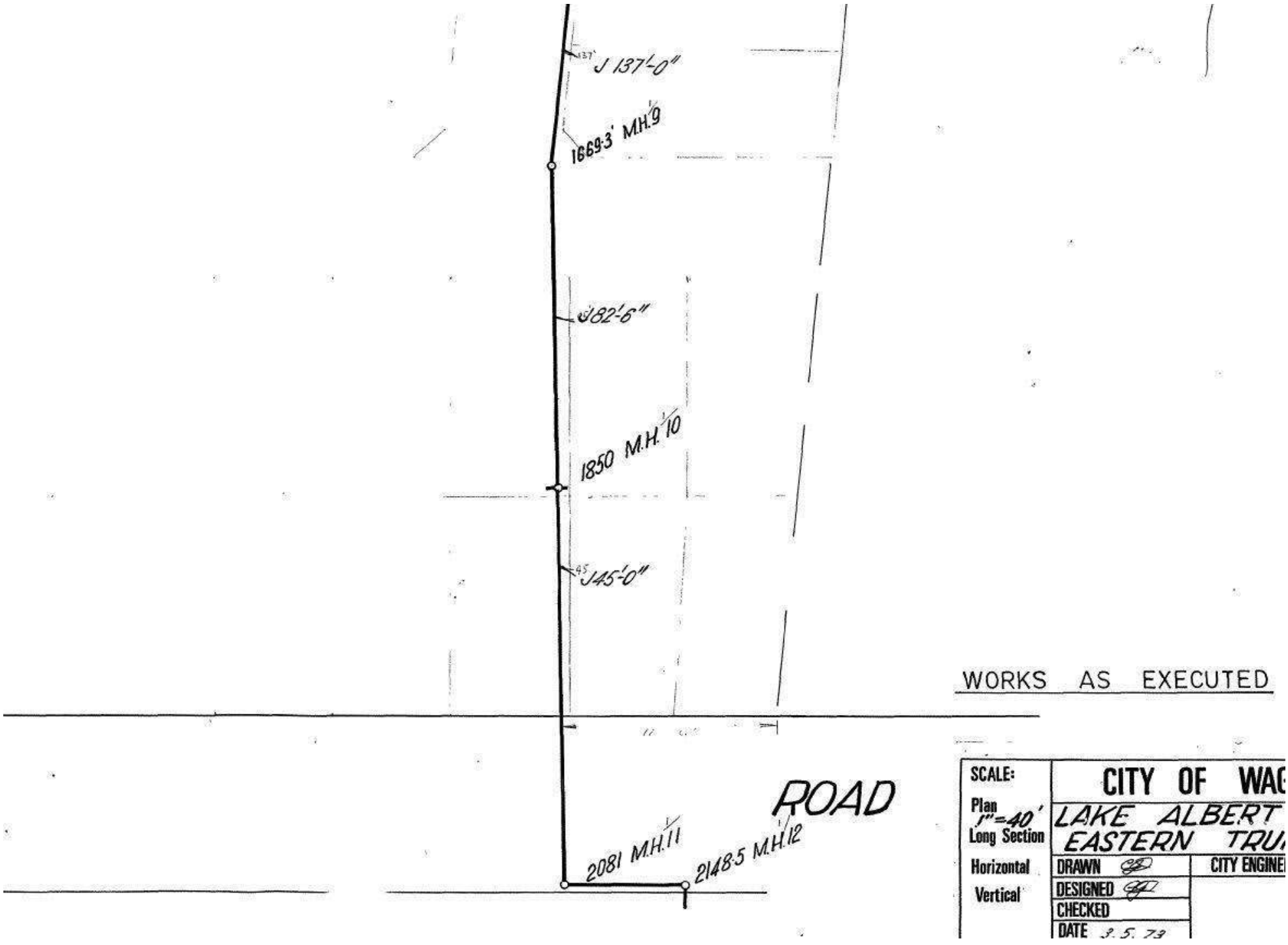
From: Seghers, Keith
Sent: Monday, 19 August 2019 4:27 PM
To: 'Lance Ryan' <lancevryan@gmail.com>
Cc: Wrobel, Zibby <Wrobel.Zibby@wagga.nsw.gov.au>; Stander, Adriaan <Stander.Adriaan@wagga.nsw.gov.au>; Cheney, Ron <Cheney.Ron@wagga.nsw.gov.au>
Subject: RE: Mitchell Road Brunskill Road Subdivision

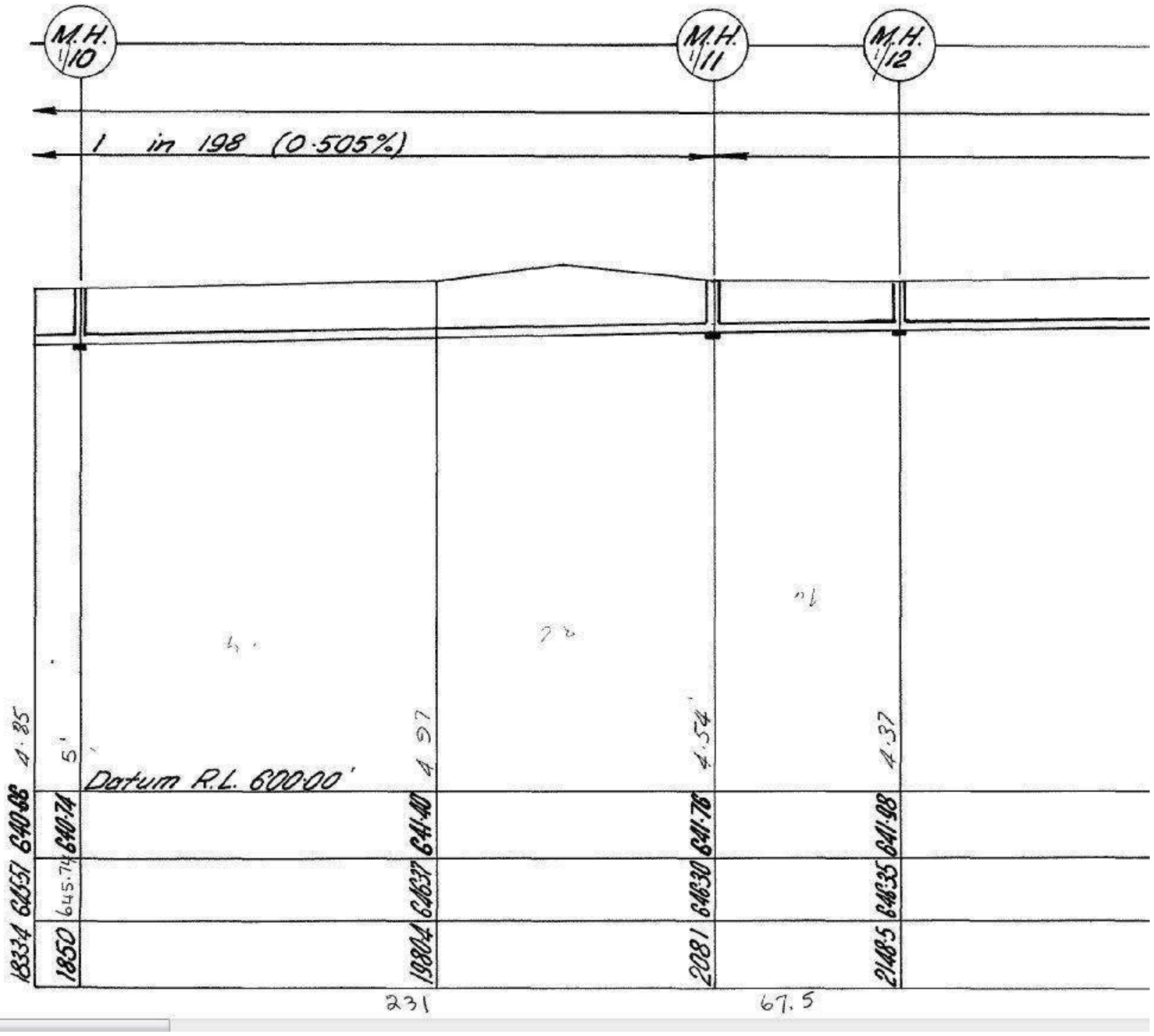
Hi Lance,

In response to your email.

The map below shows the gravity sewer mains categorised by Loading expressed as a percentage of capacity. At the proposed connection point the orange coloured main is indicating that reach of line is at 75 – 100% capacity. This would indicate there is little additional capacity at this location. The WAE plans (below) indicate this is a 225 mm dia pipe laid at 0.5 %. The Gravity Sewer Grading Table indicates that this main has a MAXIMUM capacity of 422 tenements.

For all future emails regarding subdivision rezonings please include Adriaan Stander in the email correspondence. I will see when I can get the relevant people together for a meeting and I will send you a meeting request, I'll aim for later in the week or early next week.


J 137'-0"
1669·3' M.H.9
J82'-6"
1850 M.H.10
J45'-0"
WORKS AS EXECUTED
ROAD
2081 M.H.11
2148·5 M.H.12
SCALE:
Plan
1"=40'
Long Section
Horizontal
Vertical
CITY OF WAC
LAKE ALBERT
EASTERN TRU
DRAWN
DESIGNED
CHECKED
DATE
CITY ENGINE



Regards,

Keith

Keith Seghers
Development & Subdivisions Engineer Coordinator

1300 292 442
d +61 2 6926 9542 | **e** seghers.keith@wagga.nsw.gov.au
Wagga Wagga City Council · 243 Baylis Street (PO Box 20) · Wagga Wagga NSW 2650

From: Lance Ryan <lancevryan@gmail.com>
Sent: Monday, 19 August 2019 8:07 AM
To: Seghers, Keith <Seghers.Keith@wagga.nsw.gov.au>
Subject: Mitchell Road Brunskill Road Subdivision

Keith,

[Quoted text hidden]

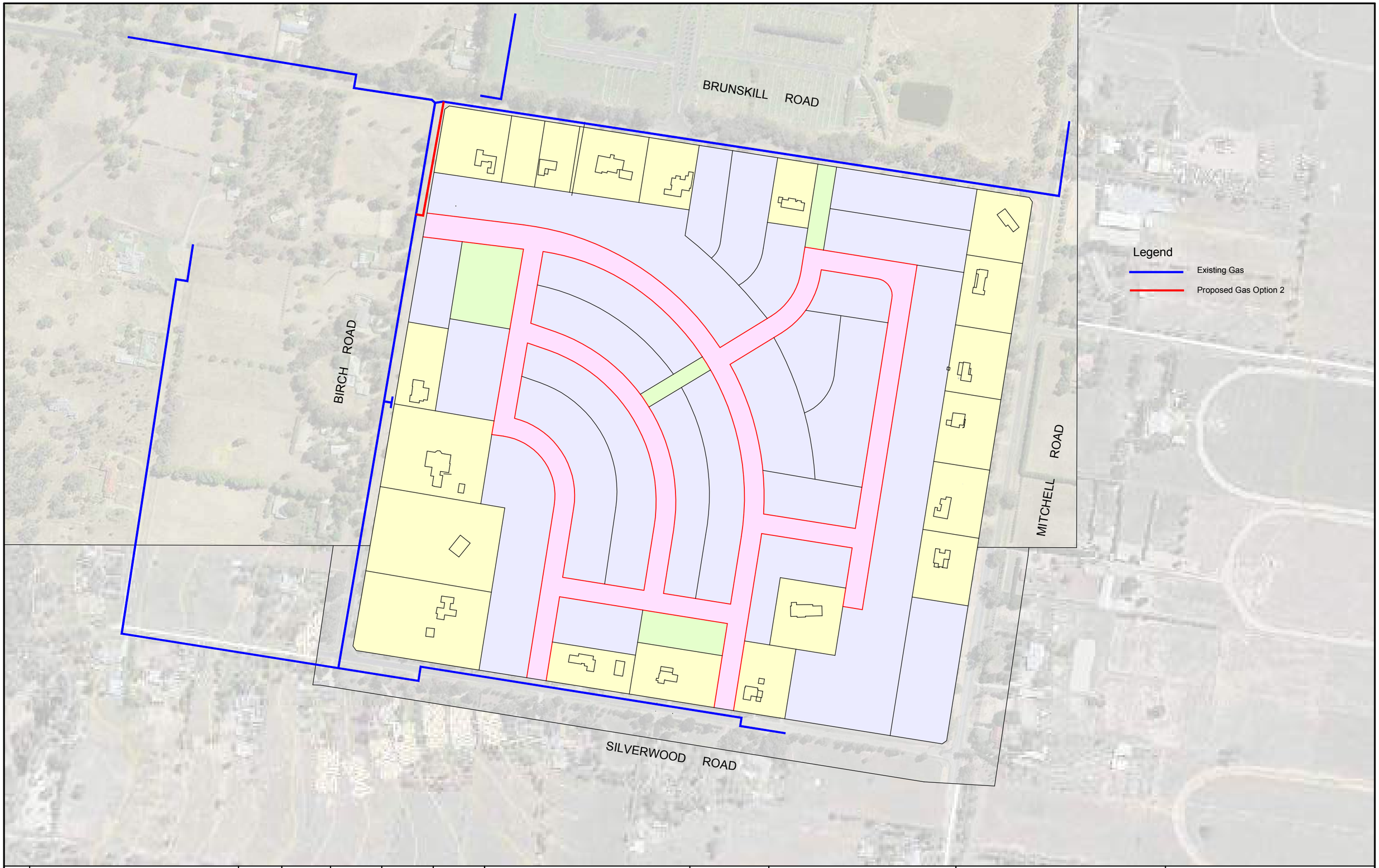
[Quoted text hidden]

APPPENDIX F

Existing Water Infrastructure

APPENDIX G

Existing Gas Infrastructure



Revision	Amendment or reason for issue	Issue date	Drawing completed by	Designed & dwg. checked by	Verified by X = Not verified	Issue authorised (*)
1	Issued for Information	19.06.2020	L.V.R.	L.V.R.	L.V.R.	

* Drawing Status
Warning: Unless there is an authorised Lance Ryan Consulting Engineers Pty. Ltd. signature at * , this drawing is not authorised for issue.

North

LRCE
Lance Ryan Consulting Engineers Pty Ltd
Consulting Engineers Planners & Managers
A.B.N. 53 831 529 091
52 Johnston Street, WAGGA WAGGA NSW 2650
P.O. Box 7, WAGGA WAGGA NSW 2650
Ph: 02 6921 1877
Mob: 0429 037 595
Fax: 02 6921 7415
Email: lancevryan@gmail.com

Project: Proposed Subdivision Development
Brunskill, Mitchell, Silverwood and Birch Road
Wagga Wagga

Drawing Title: Existing Gas Infrastructure

Client: Lake Albert Heights Development

Scales: 1:2000

Client Project No.:

Architect / Project Manager: Salvestro Planning

Project Number: 18W039

Dwg. No.: G01

Sheet: 01 or 01

Revision: 1

0 100mm 200mm 300mm

A1 SHEET

APPENDIX H

Electricity Infrastructure

Inland Power Solutions
ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
Tel. 02 6925 0041
info@inlandpowersolutions.com.au

Mitchell Road Subdivision Master Plan Report

Prepared for

Lance Ryan Consulting Engineers Pty Ltd

By Shaun Bennett
Inland Power Solutions

15th October 2019

Document ID:		**Document Title:**	Mitchell Road Master Plan
Original release date:	15/10/2019	**Originally released by:**	Shaun Bennett
Current version:	1.1	**Document owner:**	Shaun Bennett
Date of last update:	15/10/2019	**Page:**	1 of 6
Comments:			

Inland Power Solutions
ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
Tel. 02 6925 0041
info@inlandpowersolutions.com.au

Table of Contents

Inland Power Solutions
ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
Tel. 02 6925 0041
info@inlandpowersolutions.com.au

Mitchell Road Subdivision Master Plan General Information

Substation Sizing:

Essential Energy has listed the After Diversity Maximum Demand (ADMD) as:

- For Lots with reticulated gas - 4kva per lot
- For Lots without reticulated gas - 6kva per lot

ADMD:

Essential Energy have listed the preferred substation size as being 315kva. Therefore:

- For Lots with reticulated gas - 4kva per lot, a maximum of 78 connections per substation are available so to supply the 234 lots a minimum of 3 substations would be required.
- For Lots without reticulated gas - 6kva per lot, a maximum of 52 connections per substation are available so to supply the 234 lots a minimum of 5 substations would be required.

LV Drop:

Essential Energy standard substations for an Urban Residential Subdivision have 6 x 3ph Fuse carriers so a maximum of 6 circuits originate from a substation. The cable used as the backbone low voltage conductor is a 240mm² XLPE-PVC cable with a rating of 400Amps per phase when buried direct in soil at 25°C. Essential Energy do not load cables beyond 75% in design so this cable is able to be loaded to a maximum of 300 Amps per phase.

Therefore:

- For Lots with reticulated gas - 4kva per lot, a maximum of 8 connections per phase is permitted on each circuit. This has a current rating of 286.7A. This is 24 connections per circuit (over 3 phases). Due to voltage drop requirements and cable lengths, it is not possible to load all circuits with 24 connections. The substation can supply of up to 144 Connected lots (this is then restricted to 78 connections as per the ADMD).
- For Lots without reticulated gas - 6kva per lot, a maximum of 4 connections per phase is permitted on each circuit. This has a current rating of 260.87A. This is 12 connections per circuit (over 3 phases). Due to voltage drop requirements and cable lengths, it is not possible to load all circuits with 12 connections. The substation can supply of up to 72 Connected lots (this is then restricted to 52 connections as per the ADMD).

Recommendation:

To allow for voltage drop and potential pump sites on basins/sewer systems and the overall layout of the subdivision, it is recommended a minimum of **6 x 315kVA** padmount substations be allowed for in this development. This will have 4 x Pad Mount substations internally and 2 to supply the external lots

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ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
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info@inlandpowersolutions.com.au

This additional allocation of 1 substation is to allow for the long distances to the end of the cul-de-sacs from potential substation locations. See concept plan for potential substation locations. Note that there have been no calculations completed to confirm these locations and they are located centrally to loads and distribution of circuits.

It would also be recommended that existing and future pole mounted substations be utilised on the overhead network surrounding the subdivision to reconnect existing properties that are to be retained.

Inland Power Solutions
ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
Tel. 02 6925 0041
info@inlandpowersolutions.com.au

Mitchell Road Subdivision Master Plan General Information

Lighting Detail:

Essential Energy has multiple standard luminaires for new Urban Residential Subdivisions. The most commonly installed at this time is the 17W "Street LED" and is installed on a 7.5m P-Category Column.

AS1158 has various categories of lighting for road ways and public spaces, for this report, Category P4 has been used as it is a commonly used standard for Subdivisions.

Cat P4 has the following Illuminance Criteria:

Average Illuminance (Eav) >= 0.85 lx

Minimum Illuminance (Eph) >= 0.14 lx

Illuminance Uniformity (Up) <= 10

The Maximum Spacings for a 17W "Street LED" on a 7.5m P Category Column are as follows:

Road Reserve Width	Maximum Spacing
16.0m	76.1m
16.5m	76.1m
17.0m	76.0m
17.5m	75.9m
18.0m	75.8m
18.5m	75.7m
19.0m	75.6m
19.5m	75.5m
20.0m	74.7m
20.5m	73.6m
21.0m	72.5m
21.5m	71.4m
22.0m	70.3m
22.5m	69.3m
23.0m	68.4m

Essential Energy standards state:
Columns are to be erected in line with the property boundaries or in line with the middle of the lot. For lots less than 15m wide, the columns will only be permitted in line with the boundary.

Inland Power Solutions
ABN 15 603 034 297
13 Cheshire St
Wagga Wagga
Tel. 02 6925 0041
info@inlandpowersolutions.com.au

Mitchell Road Subdivision Master Plan General Information

Site Capacity:

The Essential Energy Design Information Pack has stated the following criteria is required for this development:

1. Your connection point will be at poles CE281147 and CE116259 (see photos attached). Construct an overhead to underground high voltage termination, install a new 11kV 3-phase high voltage loop-in loop-out network with reference to the connection points, install multiple 315kVA padmount substations within the development and construct low voltage underground reticulations supplying the 234 lot subdivision.
    a. CE281147 is currently Timber pole located within lot 1 DP258992. The pole is of suitable size to permit the UGOH connection. This pole has a Standard Delta Pin assembly. As the pole is located within private land, an easement would be required to be obtained over the underground powerline that would be installed to service this new development.
    b. CE116259 is a Steel pole with a HV Standard Delta Pin assembly and a LV Termination assembly. The LV Termination assembly would be removed and the LV would be supplied underground from the new Transformer. This Pole would be required to be replaced as there is no current standard for a UGOH Termination on a Steel Pole.
2. No network augmentation is required at this stage and is subject to application from future proponents. It must be noted, that assessment of the network's capacity is based on its current state and capacity will not be reserved for any customer. As such the ability of the upstream network to support the 234-lot subdivision at any point in the future will need to be reassessed at the time of application. If at the time of application, it is found that upstream augmentation is required then this will be at the customers expense.
3. ADMD is 4kVA/lot (w/ reticulated gas) or 6kVA/lot (No reticulated gas) shall be used for voltage drop analysis.
4. Street lighting along the proposed public road within the subdivision must be provided by the developer in accordance with Wagga Wagga City Council requirements.
5. All works are to comply with Essential Energy Overhead/Underground Design & Construction Manual, NSW Service and Installation Rules, AS/NZS 7000 and AS/NZS 3000.
6. Created easements are to be shown with dimension for relevant underground route in compliance to CEOP8046 requirements.
    a. Easements for underground high and low voltage are generally not permitted through private property and all new infrastructure is to be supplied from the road reserve.
7. Development Application/Notice of Determination shall be provided with the design submission when a decision is made.

REVISED DESIGN INFORMATION PACKAGE
FOR Project: 118749 Subdivision - Mitchell Road Wagga Wagga - Masterplan - Lance Ryan Consulting Engineers

Design Information Issue Date: 26/09/2019.

Delta Star Designs Pty Ltd
PO Box 1274
WAGGA WAGGA NSW 2650

Introduction

Thank you for your application requesting electrical reticulation design information for the proposed supply to **Lot 202, DP 48278**

Project Address: Mitchell Road Wagga Wagga NSW 2650

Customer Name: Lance Ryan Consulting Engineers

General

1. The project number **118749** has been established and shall be used for all future reference and payment transactions.

2. The content of this Design Information Package has been compiled on the basis of certain conditions and restrictions. The designer shall incorporate these requirements within the electrical reticulation design prepared for presentation to Essential Energy.

3. The Design Information Package will be valid for a period of 180 days from the above date. If an updated package is required, please send an email request to contestableworks@essentialenergy.com.au and quote the project number.

4. Essential Energy is providing this information in good faith, to assist you to complete designs for certification. Essential Energy cannot and does not warrant the accuracy or completeness of the information and does not accept any liability for inaccuracies or lack of information. It is the responsibility of the applicant or Accredited Service Provider to independently confirm the accuracy or otherwise, of any information.

Connection Point & Specific Design Information

The regulatory category for the project is: **UG Urban Residential Subdivisions**

The nominated connection point on the network will be at Asset No: **CE281147 and CE116259.**

Connection Point Voltage: **11,000 Volts 3Ø**

Connection Contract

A Development Application has not been submitted. This Design Information Package is based on the information supplied with the request.

A Development Application/Notice of Determination must be in place into prior to submitting a design package for certification. If the information supplied with the application does not match the information supplied with the request for design information, Essential Energy may require the Design Information Package to be reissued and additional charges may apply.

Existing Asset Details

The existing High Voltage Conductor is: **19/3.75 AAAC**
The existing Low Voltage Conductor is: **7/4.50 AAAC**

New Asset Details:

The Minimum size for the New HV conductor / cable required: **11kV 240mm 3 Core AL XLPE**
The Minimum size for the New LV conductor / cable required: **LV 240mm 4 Core AL XLPE**

The New Substation size required is: **315 kVA 3Ø**

- New Substation HV Fuses are: **31.5 Amp (Padmount)**
- New Substation LV Fuses are**: 400 Amp (Padmount)**

Refer to CEOS5099 **–** Distribution: Transformer Fusing

To request Asset Numbers please email Contestable Works stating the number and type required.

Primary Tap setting

Primary Tap setting for this transformer is to be included on the drawing for certification.

The primary tap setting for this transformer: 11,000V **–** 100%

Earth Fault Protection Settings for Neutron Earthing Analysis

Site Asset Number: SUB 71-3305 | SUB 71-3428
Phase to Earth fault level at site (Amps): 1020 | 1282
X/R ratio at site: 2.78 | 3.35
Number of interconnected Substations: 0 | 0
Estimated number of connections per substation: <10 | 1
SEF Active: Y
Upstream protective device: HV substation fuses

Project Specific Comments:

Your application to provide electrical supply to Mitchell Road 151-lot subdivision has been approved.

Your connection points will be at poles CE281147 and CE116259. Construct an overhead to underground high voltage termination, install a new 11kV 3-phase high voltage loop-in loop-out network with reference to the connection points leaving the proposed development connected via the 2 adjacent 11kV feeders present **–** KOO3B6 Lake Albert & KOO3B3 Vincent Rd., install multiple 315kVA padmount substations within the development and construct low voltage underground reticulations supplying the 234-lot subdivision.

No network augmentation is required at this stage and is subject to application from future proponents. It must be noted, that assessment of the network's capacity is based on its current state and capacity will not be reserved for any customer. As such the ability of the upstream network to support the 234-lot subdivision at any point in the future will need to be reassessed at the time of application. If at the time of application it is found that upstream augmentation is required then this will be at the customers expense.

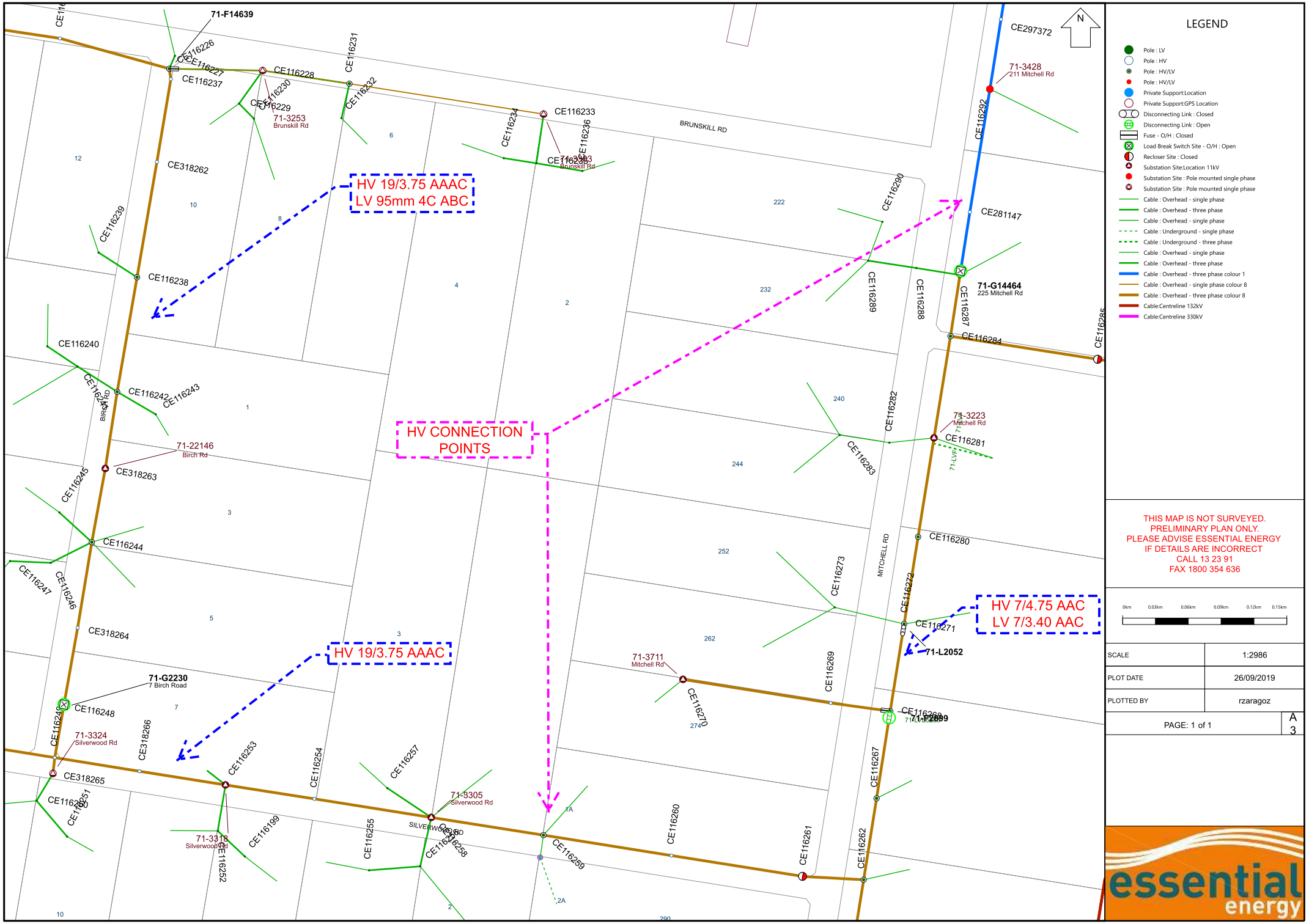
ADMD is 4kVA/lot (w/ reticulated gas) or 6kVA/lot (No reticulated gas) shall be used for voltage drop analysis.

Street lighting along the proposed public road within the subdivision must be provided by the developer in accordance with Wagga Wagga City Council requirements.

All works are to comply with Essential Energy Overhead/Underground Design & Construction Manual, NSW Service and Installation Rules, AS/NZS 7000 and AS/NZS 3000.

Created easements are to be shown with dimension for relevant underground route in compliance to CEOP8046 requirements.

Development Application/Notice of Determination shall be provided with the design submission when a decision is made.



LEGEND

- Pole : LV
- Pole : HV
- Pole : HV/LV
- Pole : HV/LV
- Private Support:Location
- Private Support:GPS Location
- Disconnecting Link : Closed
- Disconnecting Link : Open
- Fuse - O/H : Closed
- Load Break Switch Site - O/H : Open
- Recloser Site : Closed
- Substation Site:Location 11kV
- Substation Site : Pole mounted single phase
- Substation Site : Pole mounted single phase
- Cable : Overhead - single phase
- Cable : Overhead - three phase
- Cable : Overhead - single phase
- Cable : Underground - single phase
- Cable : Underground - three phase
- Cable : Overhead - single phase
- Cable : Overhead - three phase
- Cable : Overhead - three phase colour 1
- Cable : Overhead - single phase colour 8
- Cable : Overhead - three phase colour 8
- Cable:Centreline 132kV
- Cable:Centreline 330kV

THIS MAP IS NOT SURVEYED.
PRELIMINARY PLAN ONLY.
PLEASE ADVISE ESSENTIAL ENERGY
IF DETAILS ARE INCORRECT
CALL 13 23 91
FAX 1800 354 636

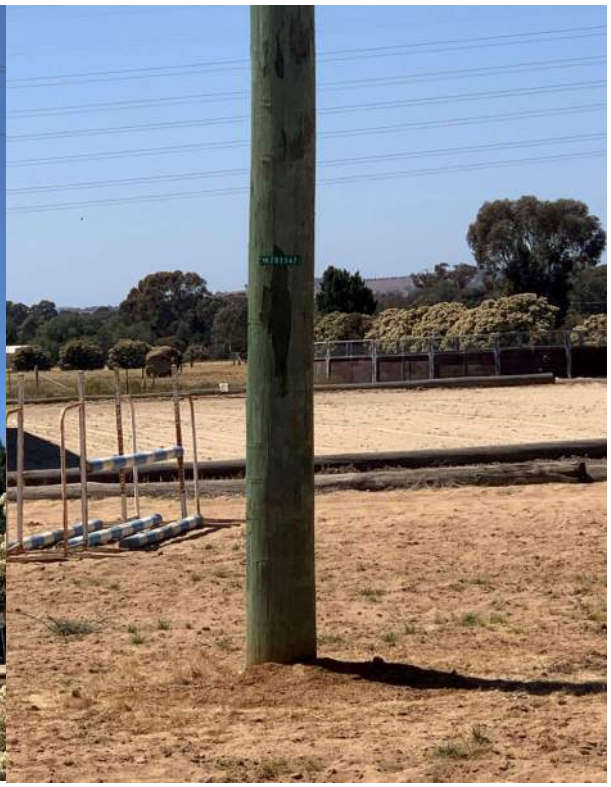
0km 0.03km 0.06km 0.09km 0.12km 0.15km

SCALE	1:2986
PLOT DATE	26/09/2019
PLOTTED BY	rzaragoz
PAGE: 1 of 1	A3

essential energy


Mitchell Road 11kv Network
Legend
11kv Overhead
Substation
71-1121
Brunskill Rd
71-3253
71-3303
71-2960
71-3428
71-4879
Cummins Rd
71-3223
71-22146
Birch Rd
Redwood Rd
71-4878
71-3711
Mitchell Rd
71-3323
71-3324
71-3318
71-3305
Silverwood Rd
71-2583
400 m
N
Google Earth
Imagery © Department Finance, Services and Innovation 2016

CE281147



CE116259