

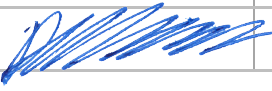
APPENDIX F - ENGINEERING INFRASTRUCTURE REPORT

Kehoe Myers Consulting Engineers

ENGINEERING INFRASTRUCTURE REPORT

104 CRONIN ROAD, HIGHFIELDS, QLD

Document Control Page					
Issue	Date	Status	Author	Review	Approver
1	31/03/2025	DRAFT	MDS	PJS	PJS
2	30/06/2026	For Approval	MDS/NJ	PJS	PJS

Certification						
Author/s:	Matthew Slager, Nathanael Jorgenson					
Approver:	Peter Sparksman	RPEQ:	Signature:		Date:	30/06/2026

DISCLAIMER

This report has been prepared by Kehoe Myers Consulting Engineers for the exclusive use of the client specified in this document. It is based on the scope of work agreed upon and is intended solely for the purposes outlined within. No warranties or guarantees, expressed or implied, are provided regarding the completeness, accuracy, or suitability of the information contained herein for any purpose other than that expressly stated.

Kehoe Myers accepts no liability for reliance on this report by any third party without Kehoe Myers's prior written consent. Any such unauthorized reliance shall be at the third party's sole risk. This report does not constitute legal, financial, or regulatory advice, and professional judgment should be exercised when interpreting its findings.

The recommendations and conclusions presented in this report are based on available information at the time of preparation. Changes in conditions, data, or other relevant factors may impact the validity of these findings. Kehoe Myers shall not be responsible for any loss or damage arising from the use of or reliance on this report beyond the limitations set out herein.

TABLE OF CONTENTS

1.	INTRODUCTION AND EXECUTIVE SUMMARY	5
1.1.	SITE LOCATION AND DESCRIPTION	6
1.2.	EXISTING SITE CONDITIONS	7
1.3.	PROPOSED DEVELOPMENT LAYOUT	8
2.	SITWORKS AND TRANSPORT	9
2.1.	EARTHWORKS	9
2.2.	ROADWORKS	10
2.2.1.	CRONIN ROAD INTERSECTION	10
2.2.2.	PEDESTRIAN FOOTPATH	11
2.3.	TRAFFIC IMPACT	11
2.4.	REFUSE COLLECTION	11
3.	STORMWATER MANAGEMENT PLAN	13
3.1.	STORMWATER QUANTITY MANAGEMENT	13
3.2.	STORMWATER QUALITY MANAGEMENT	13
4.	WASTEWATER	14
4.1.	EXISTING COUNCIL SEWER INFRASTRUCTURE	14
4.2.	INTERNAL WASTEWATER DEMAND	15
4.3.	PROPOSED INTERNAL SEWER INFRASTRUCTURE	15
4.4.	EXISTING EXTERNAL SEWER INFRASTRUCTURE	16
5.	WATER SUPPLY	19
5.1.	EXISTING COUNCIL WATER INFRASTRUCTURE	19
5.2.	INTERNAL WATER DEMAND	20
5.3.	PROPOSED INTERNAL WATER INFRASTRUCTURE	20
6.	ELECTRICAL, STREET LIGHTING AND COMMUNICATIONS	21
6.1.	EXISTING INFRASTRUCTURE	21
6.2.	PROPOSED DEVELOPMENT WORKS	21
7.	CONCLUSION	22
8.	REFERENCES	23
9.	APPENDICES	24

LIST OF FIGURES

FIGURE 1 SITE LOCALITY MAP (QUEENSLAND GLOBE 2025)	6
FIGURE 2 SITE AERIAL IMAGE AND CONTOURS (TR MAPS 2025)	7
FIGURE 3 PROPOSED LOT LAYOUT (KEHOE MYERS DRAWING: C2425076-PR01)	8
FIGURE 4 PRELIMINARY EARTHWORKS LAYOUT (KEHOE MYERS DRAWING: C2425076-PR03)	9
FIGURE 5 NEW INTERNAL 18.0M ROAD RESERVE TYPICAL CROSS-SECTION	10
FIGURE 6 NEW CUL-DE-SAC 17.0M ROAD RESERVE TYPICAL CROSS-SECTION	10
FIGURE 7 REFUSE VEHICLE SWEEP PATH THROUGH SUBDIVISION	11
FIGURE 8 TEMPORARY TURNAROUND SWEEP PATHS FOR B99 VEHICLE	12
FIGURE 9 EXISTING SEWER NETWORK (TR MAPS 2025)	14
FIGURE 10 EXISTING SEWER PUMP STATION NETWORK CATCHMENT (TR MAPS 2025)	16
FIGURE 11 KOALA HABITAT AREA (QLD GLOBE 2025)	17
FIGURE 12 DEVELOPABLE CONTRIBUTING CATCHMENT (TR MAPS 2025)	17
FIGURE 13 EXISTING WATER MAIN INFRASTRUCTURE (TR MAPS 2025)	19

LIST OF TABLES

TABLE 1 DEVELOPMENT SEWER LOADINGS	15
TABLE 2 ESTIMATED NUMBER OF CONTRIBUTING LOTS AT CRITICAL LINK	18
TABLE 3 DOWNSTREAM SEWER LOADINGS	18
TABLE 4 PIPE DETAILS AND FULL PIPE FLOW	18
TABLE 5 DEVELOPMENT WATER LOADINGS	20

LIST OF APPENDICES

APPENDIX A.	PROPOSED LOT LAYOUT (KEHOE MYERS DRAWING: C2425076-PR01)
APPENDIX B.	PROPOSED SERVICES LAYOUT (KEHOE MYERS DRAWING: C2425076-PR02)
APPENDIX C.	PROPOSED EARTHWORKS CUT/FILL LAYOUT (KEHOE MYERS DRAWING: C2425076-PR03)
APPENDIX D.	VEHICLE MANOEUVRING LAYOUTS (KEHOE MYERS DRAWING: C2425076-VM01)

1. INTRODUCTION AND EXECUTIVE SUMMARY

Kehoe Myers Consulting Engineers has been engaged by Tahmer Pty Ltd to prepare an Engineering Infrastructure Report as part of the planning documentation in support of the Development Application with the Toowoomba Regional Council (TRC) for the Reconfiguration of a Lot (RAL) Development Application (DA) at 104 Cronin Road, Highfields.

The proposed development consists of a residential subdivision on an existing rural residential allotment at 104 Cronin Road, Highfields. This proposed development will include the extensions and connections to the existing adjacent infrastructure.

This report seeks to address the on-site engineering issues associated with the proposed development works including:

- Existing services within the subject area;
- Siteworks and proposed earthworks;
- Site access;
- Stormwater quantity and quality management;
- Sewerage reticulation and requirements;
- Water reticulation and requirements;
- Electrical and telecommunication supply.

The report concludes that the development will be able to be connected to the local transport, stormwater, sewer, water reticulation and power/telecommunication networks with minimal impact on all existing services.

From the preliminary analysis of the site, it is seen that the development will require minor allotment earthworks to form the proposed roads. These earthworks are to be generally in accordance with expected development works and will be detailed as part of a future Operational Works application.

Stormwater quantity and quality have been addressed in the accompanying Stormwater Management Plan prepared by Kehoe Myers.

Finally, from the overall assessment of the Sewer, Water, Electrical and Telecommunication supply, it was seen that the development can be readily serviced by the existing adjacent infrastructure. Further details of these proposed connections are provided below and will be detailed in a future Operational Works application.

1.1. SITE LOCATION AND DESCRIPTION

The proposed development is located on a 41,030 m² site located at Cronin Road, Highfields. The real property description is Lot 109 on D349. A Locality Plan highlighting the proposed development site is shown below.

Refer to **FIGURE 1** below for site location with respect to adjoining roads and lots.



FIGURE 1 SITE LOCALITY MAP (QUEENSLAND GLOBE 2025)

1.2. EXISTING SITE CONDITIONS

From the available contour data of the subject, the site is currently seen to be a generally open and gently graded allotment. The current allotment is seen to feature an existing dwelling and multiple sheds, with extensive open grass areas and sparse vegetation. The site is seen to fall from North to South. The average gradient of the subject site is approximately 2%.

A current aerial image of the proposed development site is shown below in **FIGURE 2**.



FIGURE 2 SITE AERIAL IMAGE AND CONTOURS (TR MAPS 2025)

1.3. PROPOSED DEVELOPMENT LAYOUT

The proposed development layout has been developed in association with the Client. From this liaison, the proposed site layout was created, and a conceptual engineering design was undertaken to provide access and a services network for the proposed development.

A snapshot of the approved Site Layout of the development is shown below in **FIGURE 3** and a full plan of the proposed site is attached in **APPENDIX A**. Further to the development of the allotment layout, preliminary services were developed for the proposed site, and a concept services layout plan is attached in **APPENDIX B**.



FIGURE 3 PROPOSED LOT LAYOUT (KEHOE MYERS DRAWING: C2425076-PR01)

2. SITEWORKS AND TRANSPORT

2.1. EARTHWORKS

From a high-level overview of the site, it is assumed that the development will require earthworks to form the proposed roads, allotment pads and required services.

The earthworks for the planned roads and required infrastructure will follow the proposed allotment layout attached in **APPENDIX A** and the proposed services plan attached in **APPENDIX B**. The Southern portion of the site will be raised to direct site runoff from proposed lots onto the new road. The existing dwelling on site is also to remain untouched during these earthworks. These earthworks are to be generally in accordance with expected development works and will be detailed as part of a future application.

From a preliminary design of the proposed roads and allotment pads, a preliminary earthworks layout and quantities have been prepared. This preliminary layout is presented in **APPENDIX C** and below in **FIGURE 4**.

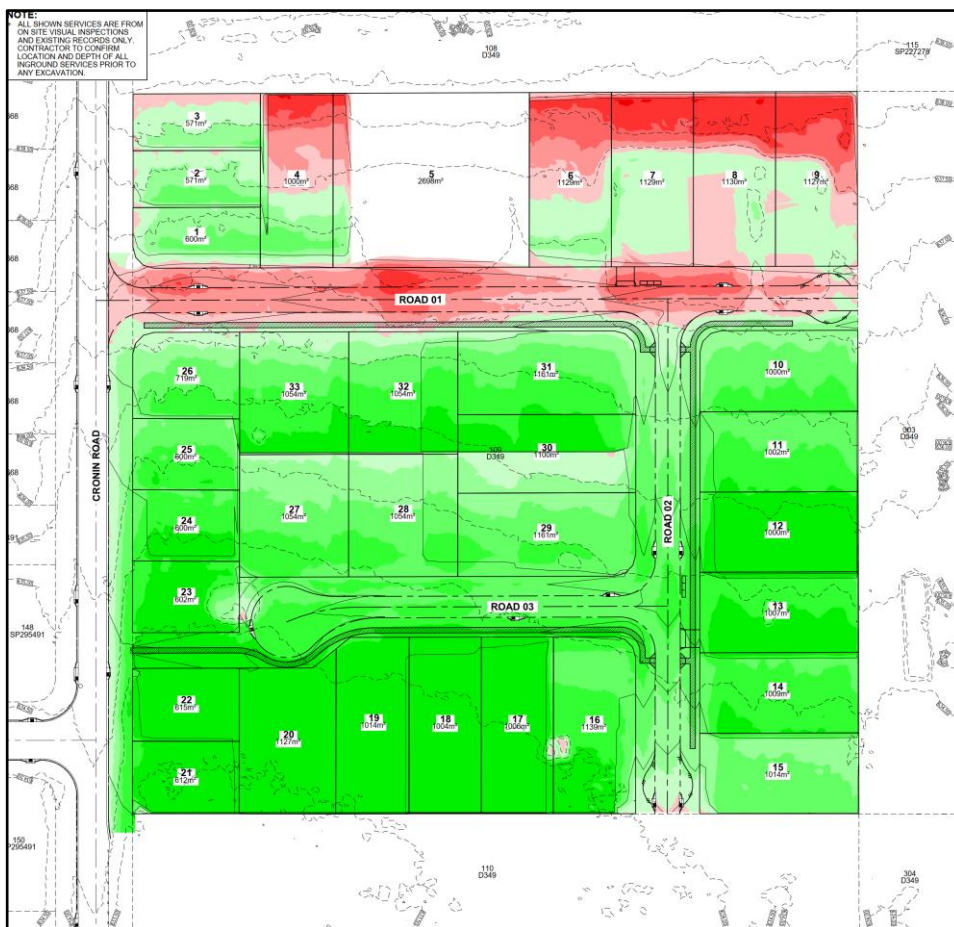


FIGURE 4 PRELIMINARY EARTHWORKS LAYOUT (KEHOE MYERS DRAWING: C2425076-PR03)

From this preliminary design, it is seen that the site will have a shortfall of material. The final volumes of material will be determined with the detailed design of the site. All further details of these proposed earthworks will be included as part of a future Operational Works application, but the detailed design will attempt to achieve as close to an earthworks cut to fill balance as possible.

2.2. ROADWORKS

To enable access to the created allotments, a new internal road will be created and connected to the greater road network. It is proposed that the internal street shall be a 7.0m roadway (measured between kerb inverts) paved with asphaltic concrete with layback kerb and channel on both sides, with an appropriate intersection treatment detail for connection to Cronin Road. For the cul-de-sac, it is proposed that it shall be a 6.0m roadway paved with asphaltic concrete with layback kerb and channel on both sides.

Internal roads will have a horizontal and vertical grading in accordance with the Toowoomba Regional Council Planning Scheme Policies and Austroads Guide to Road Design, Part 3: Geometric Design. All details of the further roadway design will be subject to a future Operational Works application.

The image, **FIGURE 5** Error! Reference source not found., below indicates a new typical 18.0m wide road reserve cross-section that is proposed for the internal road network. **FIGURE 6** below indicates a new typical 17.0m wide road reserve for the proposed cul-de-sac. A layout of the proposed road network is included in **APPENDIX A**.

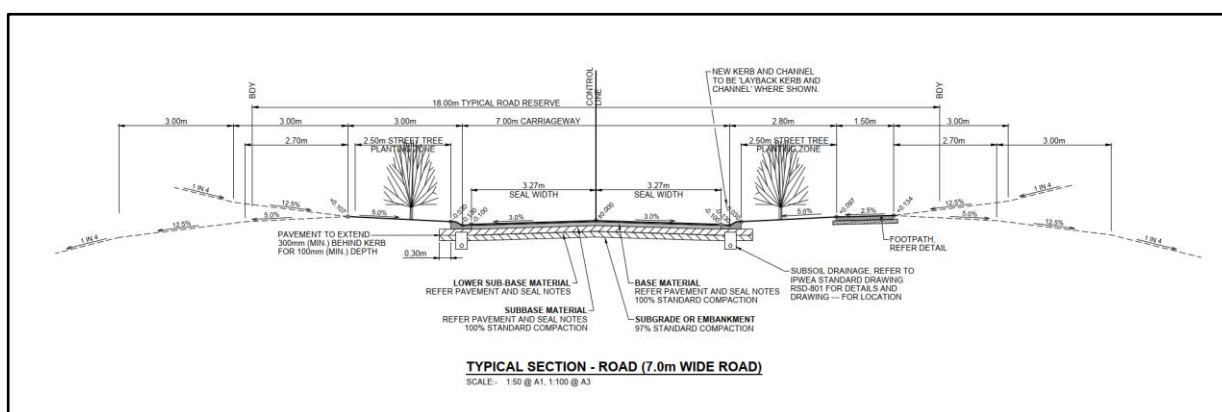


FIGURE 5 NEW INTERNAL 18.0M ROAD RESERVE TYPICAL CROSS-SECTION

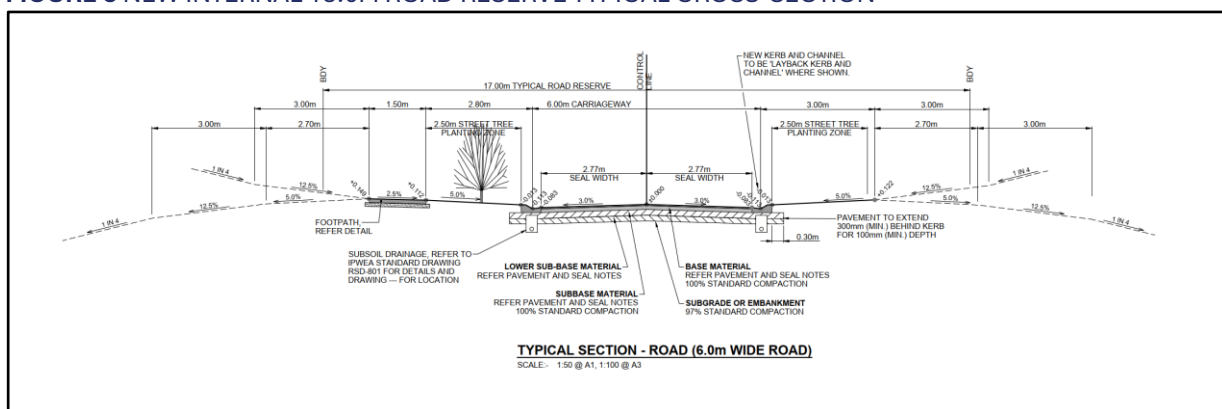


FIGURE 6 NEW CUL-DE-SAC 17.0M ROAD RESERVE TYPICAL CROSS-SECTION

2.2.1. CRONIN ROAD INTERSECTION

As detailed in **Section 2.2** above, the development proposes to create a new intersection with Cronin Road to provide direct pedestrian and vehicle access to the newly created allotments. This intersection has been designed to allow for safe access to the development while also complying with the on-site constraints and requirements.

From a preliminary roadway design, it was seen that the proposed intersection can be graded with no unusual or atypical features. In addition, the position of the intersection and existing gradients of Cronin Road allow the intersection to meet all sight distance requirements as detailed by the Austroads Guide to Road Design, Part 4a.

The further detailed design of the intersection will be in accordance with Toowoomba Regional Council Planning Scheme Policies and Austroads Guide to Road Design - Part 4a: Un-signalised and Signalised Intersections. All further details of the proposed intersection design will be provided as part of a future Operational Works application.

2.2.2. PEDESTRIAN FOOTPATH

The extent of the proposed new footpaths is shown on the Proposed Services Layout Plan attached in **APPENDIX B** of this report.

New 1.5m wide footpaths are proposed alongside the proposed roadways as part of the internal road network. This will provide pedestrian connectivity through the development.

A new 1.5m wide footpath with a dedicated 6.0m wide reserve is also proposed from the proposed cul-de-sac head to Cronin Road. This footpath connection will provide easier pedestrian access to Cronin Road for the portion of the development situated adjacent to the cul-de-sac.

2.3. TRAFFIC IMPACT

Cronin Road currently features a 9m sealed pavement with barrier kerb and channel on both sides for the full length of the development frontage. The pavement is seen to consist of 2x travel lanes and a 2m wide parking lane on the Western side. This street connects into the broader road network via an upgraded intersection with the New England Highway to the South and Barracks Road to the North.

The proposed development has a potential traffic yield of 297 daily trips (9 trips per dwelling in accordance with NSW RTA 'Guide to Traffic Generating Developments'). This generation is generally in accordance with the adjacent land use and 'Avenues' subdivision. The existing roads and intersections within proximity of the development have been designed for residential traffic use and the expected traffic generation of the area. From the above, the proposed development will generate negligible additional traffic load to the network and is generally in accordance with the roads' proposed use. It is therefore not expected that traffic generated by the proposed development will have any appreciable impact on the existing road network.

From this, it can be concluded that the traffic generated from the development is within the design traffic movements for the surrounding roads and intersections.

2.4. REFUSE COLLECTION

Due to the vehicle manoeuvring constraints for a refuse collection vehicle within the stub roads towards the south and east, a refuse collection arrangement was developed. For all lots fronting the internal road network, it is proposed that the refuse vehicle will enter the development and utilise the cul-de-sac to exit the development. Bin pads have been provided for Lots 7-9 and Lots 13-15 to avoid bin collection at the dead-end legs of Roads 01 and 02. **FIGURE 7** below and attached in **APPENDIX D** shows the desired route that the refuse vehicle will take to fully service the development.

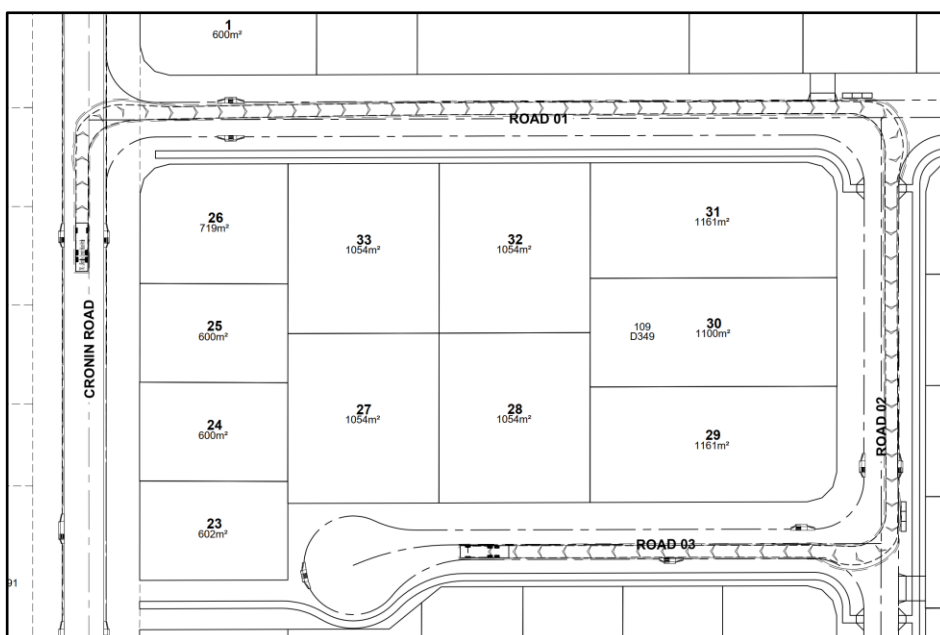


FIGURE 7 REFUSE VEHICLE SWEEP PATH THROUGH SUBDIVISION

Gravel temporary turnarounds have been provided at the dead-ends of Roads 01 and 02 to service light vehicles only. This will ensure that Lots 7-9 and Lots 13-15 will have adequate vehicular access. **FIGURE 8** below shows that these temporary turnarounds can accommodate a B99 vehicle. Details for these temporary turnarounds are shown on the Vehicle Manoeuvring Plan attached in **APPENDIX D** of this report

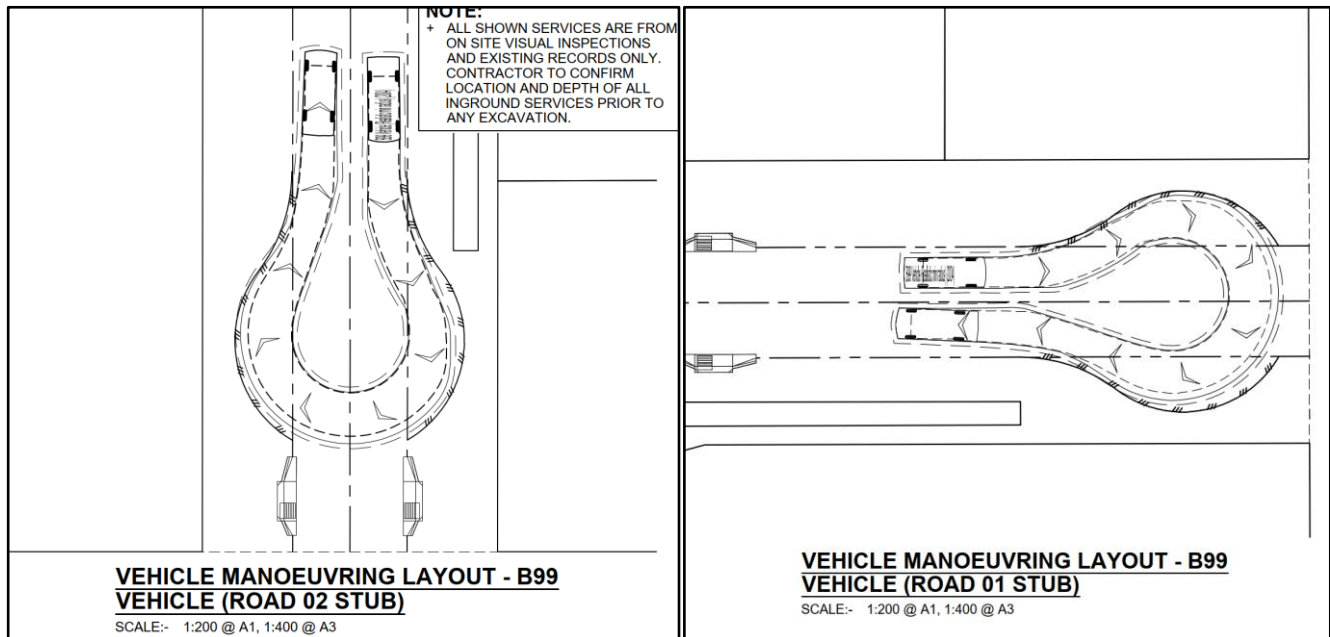


FIGURE 8 TEMPORARY TURNAROUND SWEEP PATHS FOR B99 VEHICLE

3. STORMWATER MANAGEMENT PLAN

3.1. STORMWATER QUANTITY MANAGEMENT

Stormwater Quantity Management for the proposed development has been addressed within the accompanying Stormwater Management Plan prepared by Kehoe Myers.

3.2. STORMWATER QUALITY MANAGEMENT

Stormwater Quality Management for the proposed development has been addressed within the accompanying Stormwater Management Plan prepared by Kehoe Myers.

4. WASTEWATER

4.1. EXISTING COUNCIL SEWER INFRASTRUCTURE

The sewerage from the proposed development shall be connected and discharged to an existing gravity sewer manhole in the South-Western corner of the development site. The manhole is ideally located at the lowest part of the development site and will allow the development to drain to a single connection point.

FIGURE 9 below indicates the existing sewer network adjoining the site from the council's *TR MAPS*.

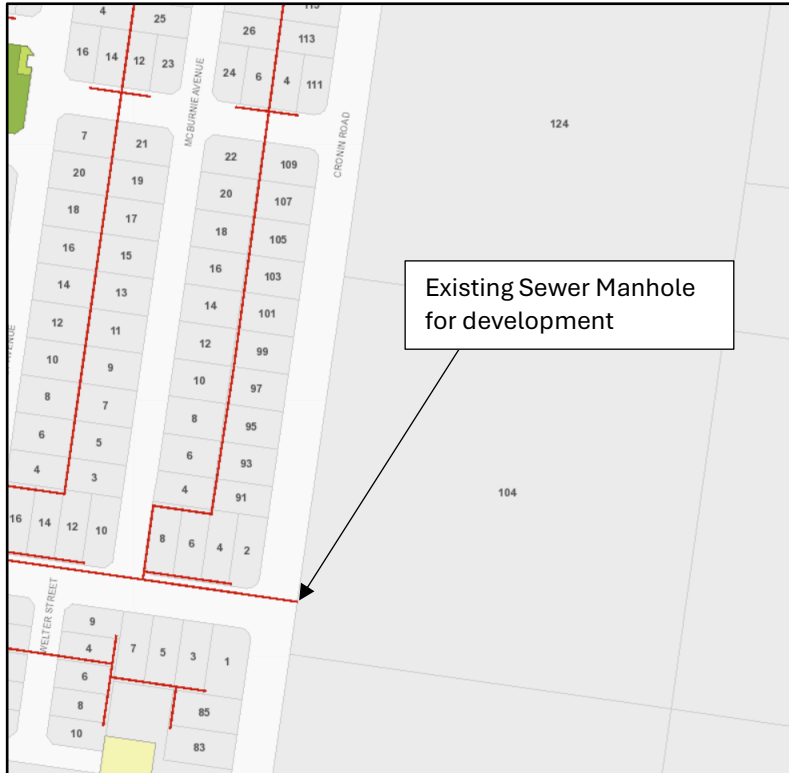


FIGURE 9 EXISTING SEWER NETWORK (TR MAPS 2025)

4.2. INTERNAL WASTEWATER DEMAND

From the proposed allotment layout, detailed above in **Section 1.3** the proposed development will provide 33 additional allotments or 33 additional Equivalent Tenements (ETs). By adopting the Toowoomba Regional Council's wastewater loadings as per SC6.3.3.7 TRC Addendum for Sewerage Code of Australia, WSA 02 – 2014 V3.1 an estimate of development sewer loading can be made. These adopted parameters include:

- 2.7 equivalent persons per tenement;
- 150 litres per person, per day;

Adopting these parameters, the average dry weather flow from this development will be approximately 13,365 litres per day or approximately 0.155 litres per second average flow rate of wastewater.

By then adopting the historical Queensland approach, the full sewer loadings can be calculated for the proposed development. These calculated Development Sewer Loadings are presented in **TABLE 1** below.

TABLE 1 DEVELOPMENT SEWER LOADINGS

DISCHARGE LOCATION	Cronin Road	
EQUIVALENT TENEMENTS (ET)	33	
EQUIVALENT PERSONS (EP) PER TENEMENT	2.70	
TOTAL EQUIVALENT PERSONS (EP)	89.1	
LOADING RATE (L/EP/DAY)	150	
SEWER DEMAND	(L/DAY)	(L/SEC)
AVERAGE DRY WEATHER FLOW (ADWF)	13,365.0	0.155
C1	7.356	
C2	2.933	
PEAK DRY WEATHER FLOW (PDWF)	39,204	0.454
PEAK WET WEATHER FLOW (PWWF)	98,314	1.138

4.3. PROPOSED INTERNAL SEWER INFRASTRUCTURE

The proposed development will be serviced by a new internal sewer network draining to the connection manhole in the South-Western corner of the development site. This proposed sewer network will be designed in accordance with the requirements of Toowoomba Regional Council's planning scheme and the Sewerage Code of Australia, WSA 02.

Details of the proposed sewer reticulation layout for the site are shown on the Proposed Services Layout Plan attached in **APPENDIX B** of this report. All further details of the proposed internal sewer network will be provided as a part of a future Operational Works application.

4.4. EXISTING EXTERNAL SEWER INFRASTRUCTURE

Further analysis of the downstream network has been undertaken to check the critical sewer pipe section capacity. The downstream network is shown below in **FIGURE 10**.

From this analysis, the North-flowing 375mm link at Barracks Road within the easement over Lot 1 RP141348 was identified as the critical link for analysis. This is because the sewer upstream of this link was seen to be appropriately sized for the expected development works, and this section of trunk sewer will have the greatest number of allotments contributing to its loading. All links upstream of this point will then have less and less loading until reaching the subject development site.

For the sewerage catchment of this link, the lots to the North of Barracks Road have been excluded from the analysis. These lots are unable to contribute future development flows to the pump station. Lots to the North of Barracks Road and fronting Wirraglen Road fall away from the existing gravity sewer line to the pump station and therefore will not be able to connect to the network. Lots to the North of Barracks Road and fronting Cabarlah Park Road are considered undevelopable as they are restricted by the Koala Habitat Area under mapped State Government overlays (**FIGURE 11**).



FIGURE 10 EXISTING SEWER PUMP STATION NETWORK CATCHMENT (TR MAPS 2025)



FIGURE 11 KOALA HABITAT AREA (QLD GLOBE 2025)



FIGURE 12 DEVELOPABLE CONTRIBUTING CATCHMENT (TR MAPS 2025)

For the analysis of the downstream critical sewer network link, a catchment was identified as shown in **FIGURE 12**. An assumption was made regarding the density of future developments within the catchment to the critical link.

The density of the master plan of 'The Avenues' development was calculated as approximately 11.5 dwellings per hectare. The master plan for the nearby 'Akora' development at Reis Road was calculated to have a density of approximately 8.9 dwellings per hectare. Based on these surrounding developments, an average development density of 10.2 dwellings per hectare was adopted for the remaining undeveloped land zoned as low-medium residential.

Excluding Lot 16 AG340 and Lot 17 D349, which would need to cross the branch of Klein Creek to reach the pump station, the estimated number of lots contributing to the critical link is determined and presented in **TABLE 2** below.

TABLE 2 ESTIMATED NUMBER OF CONTRIBUTING LOTS AT CRITICAL LINK

DEVELOPMENT	AREA (HA)	DENSITY (DWELLINGS/HA)	ESTIMATED LOTS (ET)
THE AVENUES	45.6569	11.5	525
AKORA	24.9530	8.9	222
UNDEVELOPED LAND	36.5168	10.2	372
TOTAL			1120

By then, adopting the historical Queensland approach, the full sewer loadings to the critical link can be calculated. These calculated sewer loadings are presented in **TABLE 3** below.

TABLE 3 DOWNSTREAM SEWER LOADINGS

DISCHARGE LOCATION	Existing 375mm link	
EQUIVALENT TENEMENTS (ET)	1120	
EQUIVALENT PERSONS (EP) PER TENEMENT	2.40	
TOTAL EQUIVALENT PERSONS (EP)	2688.0	
LOADING RATE (L/EP/DAY)	150	
SEWER DEMAND	(L/DAY)	(L/SEC)
AVERAGE DRY WEATHER FLOW (ADWF)	403,200	4.667
C1	4.284	
C2	2.051	
PEAK DRY WEATHER FLOW (PDWF)	827,043	9.572
PEAK WET WEATHER FLOW (PWWF)	2,016,000	23.333

From these loadings, the full pipe flows were calculated as per **TABLE 4** below.

TABLE 4 PIPE DETAILS AND FULL PIPE FLOW

FULL PIPE FLOWS			
Diameter (m)	Grade (m/m)	Velocity (m/s)	Flow (L/s)
0.375	0.01	1.896	216

As can be seen from **TABLE 4** above, the existing DN375 sewer line is flowing well under 50% capacity, accounting for the full development of nearby adjacent subdivisions and the development of upstream lots, which may contribute loading to the critical link in future. It is therefore shown that the existing network has ample capacity to service the development of the subject site.

5. WATER SUPPLY

5.1. EXISTING COUNCIL WATER INFRASTRUCTURE

Currently, there is no Council water infrastructure within the proposed development site. It is proposed that a connection is made to the 150mm uPVC main within Cronin Road, indicated on the preliminary services layout in **APPENDIX B**. From TR Maps, the existing water mains were installed post-2009, and therefore, it is assumed they are on the current standard alignment with the required cover. **FIGURE 13** below indicates the existing water network adjacent to the site.



FIGURE 13 EXISTING WATER MAIN INFRASTRUCTURE (TR MAPS 2025)

5.2. INTERNAL WATER DEMAND

From the proposed allotment layout, detailed above in **Section 1.3** the proposed development will provide 33 additional allotments of a minimum size of 571m² or 33 additional Equivalent Tenements (ETs). By adopting the Toowoomba Regional Council's water loadings as per SC6.3.2.7 TRC Addendum for Water Code of Australia, WSA 03 – 2011 V3.1 an estimate of development water loading can be made. These adopted parameters include:

- 2.7 equivalent persons per tenement;
- 200 litres per person, per day;
- MDMM = 1.5 AD;
- PD = 2.25 AD;
- PH = 4.5 AD;
- NRW = 34.5 L/EP/d;

Adopting these parameters, the full water loading can be calculated for the proposed development. These calculated development loadings are presented in **TABLE 5** below.

TABLE 5 DEVELOPMENT WATER LOADINGS

EQUIVALENT TENEMENTS (ET)	33	
EQUIVALENT PERSONS (EP) PER TENEMENT	2.70	
TOTAL EQUIVALENT PERSONS (EP)	89.1	
LOADING RATE (L/EP/DAY)	200.00	
NON-REVENUE WATER (L/DAY)	3,073.95	
DEMAND	(L/DAY)	(L/SEC)
AVERAGE DAY DEMAND (AD)	17,820.0	0.206
MEAN DAY MAXIMUM MONTH (MDMM)	26,730.0	0.309
PEAK DAY DEMAND (PD)	40,095.0	0.464
PEAK HOUR DEMAND (PH)	(L/HR)	(L/SEC)
	3,341.5	0.928

As the above development loadings are typical of a residential subdivision and connection to this area is provisioned, it has been assumed that no further analysis of the adjacent network is required.

5.3. PROPOSED INTERNAL WATER INFRASTRUCTURE

The proposed development will be serviced by a new internal water network connecting to the existing service points, as detailed in **Section 5.2** above. This proposed water network will be designed in accordance with the requirements of Toowoomba Regional Council's planning scheme and the Water Code of Australia, WSA 03.

The proposed water main will be installed from the connection in Cronin Road. The internal connection link will be ø150mm to match the connecting main's diameter. Fire hydrants will be provided internally so that each allotment is within 40m of a fire hydrant, in accordance with Council's and QFD hydrant coverage requirements.

Details of the proposed water reticulation layout for the site are shown on the Proposed Services Layout Plan attached in **APPENDIX B** of this report. All further details of the proposed internal water network will be provided as part of a future Operational Works application.

6. ELECTRICAL, STREET LIGHTING AND COMMUNICATIONS

6.1. EXISTING INFRASTRUCTURE

From a 'Dial Before You Dig' search of the proposed development site, it was seen that above-ground electrical services exist in Cronin Road adjacent to the development site.

Telstra and NBN Co have also identified existing pit and pipe networks within Cronin Road.

6.2. PROPOSED DEVELOPMENT WORKS

Reticulated underground electricity services will be provided to each allotment in accordance with the requirements of Ergon Energy. Connections will be made to the existing Ergon cables located within the surrounding streets.

Street Lighting will be provided in accordance with the requirements of the TRC Planning Scheme, AS/NZS 1158 Lighting for Roads and Public Spaces and AS4282 Control of the obtrusive effects of outdoor lighting.

Reticulated telecommunication services will be provided to each allotment in accordance with the requirements of NBN Co/Telstra. Connections will be made to the existing telecommunication services that exist within the adjoining streets.

A plan of the proposed services to each allotment and their connections to existing assets is attached in **APPENDIX B**. All further detail regarding electrical, street lighting & telecommunications will be subject to a further detailed design by an electrical engineer.

7. CONCLUSION

As detailed in the sections above and accompanying Stormwater Management Plan, it has been determined that the proposed development works will provide adequate Access, Stormwater, Sewer, Water Reticulation, and Power/Telecommunications services to the subdivisional land development.

The current site conditions have been assessed, and it is seen that only general site works will be required to construct the proposed subdivision, including earthworks to construct roads and drainage.

To service the new allotments, it is proposed that a new intersection be created with Cronin Road and connected to an internal crescent road. The expected traffic loadings generated by the development are within the expected use of the surrounding road network.

Stormwater Quantity and Quality Management have been addressed for the proposed development within the accompanying Stormwater Management Plan prepared by Kehoe Myers.

From **Section 4 & 5** above, it was concluded that the proposed development can be connected to the existing sewer and water networks in the adjacent streets. From a preliminary analysis of the existing sewer network, it was determined that the proposed development will have a negligible impact on the existing system, and no further analysis would be required. All further details of the proposed internal water and wastewater networks will be provided as part of a future application.

Finally, from the overall assessment of the electrical and telecommunication supply, it was seen that the development can be serviced by existing adjacent electrical and telecommunications networks. All further details regarding electrical, street lighting & telecommunications will be subject to a further detailed design by an electrical engineer.

Hence, as summarised above, the proposed development can be serviced by all applicable infrastructure services by utilising existing services and the creation of new connecting and complementary assets.

8. REFERENCES

Text References

Toowoomba Regional Council, Toowoomba Regional Planning Scheme

<https://www.tr.qld.gov.au/planning-building/planning-scheme-strategies-tools/planning-scheme-new/13289-access-the-toowoomba-regional-planning-scheme-9>

Queensland Government 2017, State Planning Policy, July 2017, Department of Infrastructure, Local Government Planning, Brisbane, Australia

Department of Energy and Water Supply (DEWS), “Planning Guidelines for Water Supply and Sewerage – April 2010

Austroads Ltd 2020, Guide to Traffic Management Part 12: Traffic Impacts of Developments

Institute of Public Works Engineering Australasia, Queensland 2017, Queensland Urban Drainage Manual –Fourth Edition, 2016, Institute of Public Works Engineering Australasia, Queensland

Water by Design 2010, MUSIC Modelling Guidelines, SEQ Healthy Waterways Partnership, Brisbane Qld, ISBN 978-0-9806278-4-8

Software Used

12d Model

9. APPENDICES

APPENDIX A. PROPOSED LOT LAYOUT (*KEHOE MYERS* DRAWING: C2425076-PR01)



PRELIMINARY LOT LAYOUT
SCALE:- 1:500 @ A1, 1:1000 @ A3

NOTE:
+ ALL SHOWN SERVICES ARE FROM ON SITE VISUAL INSPECTIONS AND EXISTING RECORDS ONLY. CONTRACTOR TO CONFIRM LOCATION AND DEPTH OF ALL INGROUND SERVICES PRIOR TO ANY EXCAVATION.

DATUM
PSM
SURVEYOR_INFORMATION

DRAWING ISSUE

ISSUE	DATE	DETAILS	INITIAL
P1	24.06.26	FOR INFORMATION	
P2	01.07.26	FOR INFORMATION	

05m10m15m20m25m

SCALE 1:500 @ A1
SCALE 1:1,000 @ A3

PRELIMINARY
NOT FOR CONSTRUCTION
DATE 01.07.26 08:49 AM

PRINT IN COLOUR

Kehoe Myers

CONSULTING ENGINEERSKEHOEMYERS.COM.AUPH +617 4632 8100

CIVIL | STRUCTURAL | HYDRAULIC

CLIENT
TAHMER PTY LTD

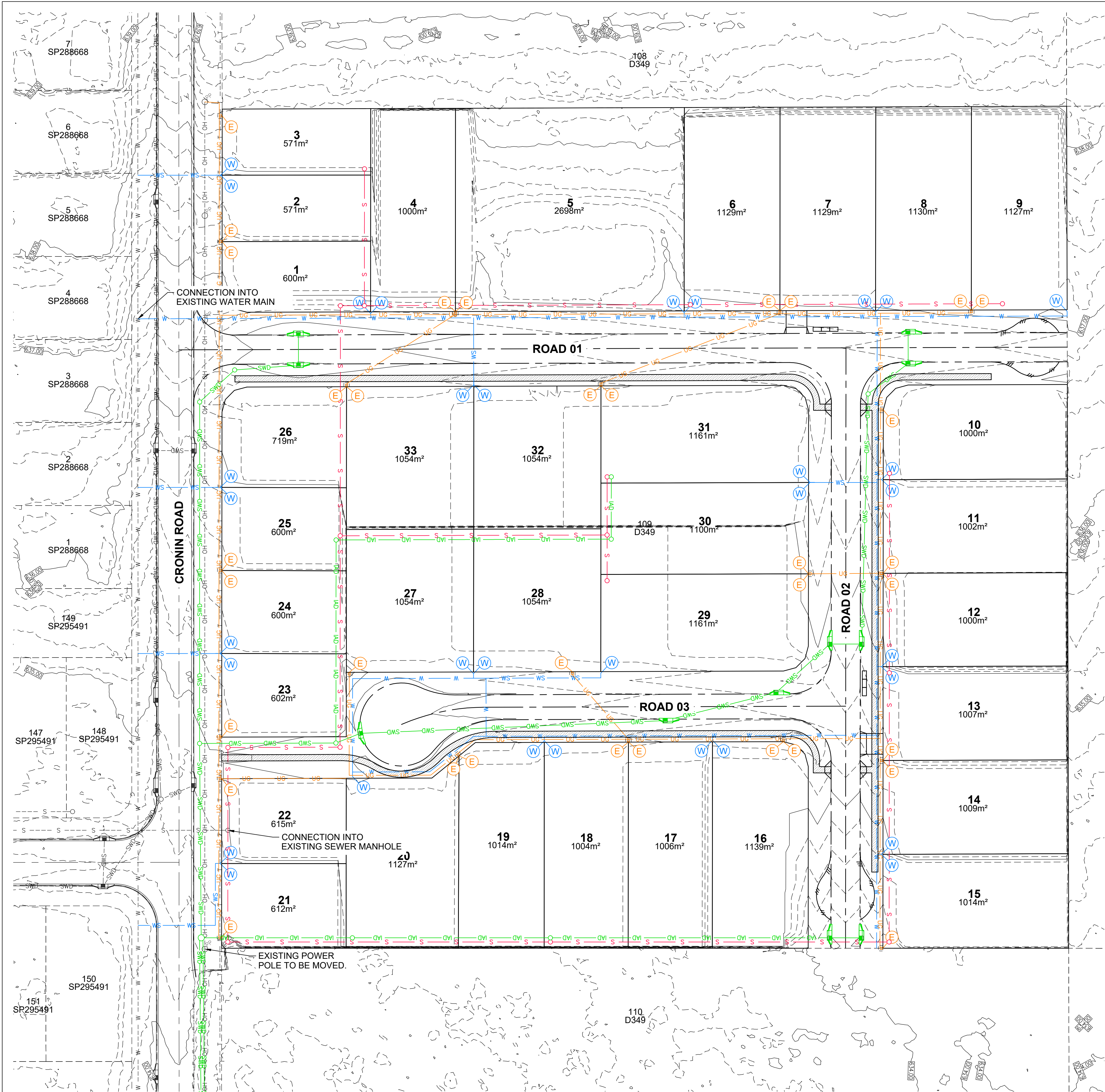
PROJECT
CRONIN ROAD HIGHFIELDS -
SUBDIVISION

DRAWING TITLE
PRELIMINARY LOT LAYOUT

DESIGN	MDS	ORIGINAL SIZE	A1
DRAWN	NJ	PROJECT NUMBER	C2425076
CHECKED	FJS	DRAWING NUMBER	PR01
APPROVED		ISSUE	P2
DATE			

APPENDIX B.

PROPOSED SERVICES LAYOUT (*KEHOE MYERS* DRAWING: C2425076-PR02)



NOTE:
+ ALL SHOWN SERVICES ARE FROM ON SITE VISUAL INSPECTIONS AND EXISTING RECORDS ONLY. CONTRACTOR TO CONFIRM LOCATION AND DEPTH OF ALL INGROUND SERVICES PRIOR TO ANY EXCAVATION.

COPYRIGHT
Kehoe Myers Consulting Engineers Pty. Ltd. Reserve the right to the design and documentation of the work contained on this drawing. This work is covered by Copyright and cannot be reproduced or copied in any form without the written permission of Kehoe Myers Consulting Engineers Pty. Ltd. Any license, expressed or implied, to the use of this document is restricted to the terms of agreement between the client and consulting engineer for professional services.

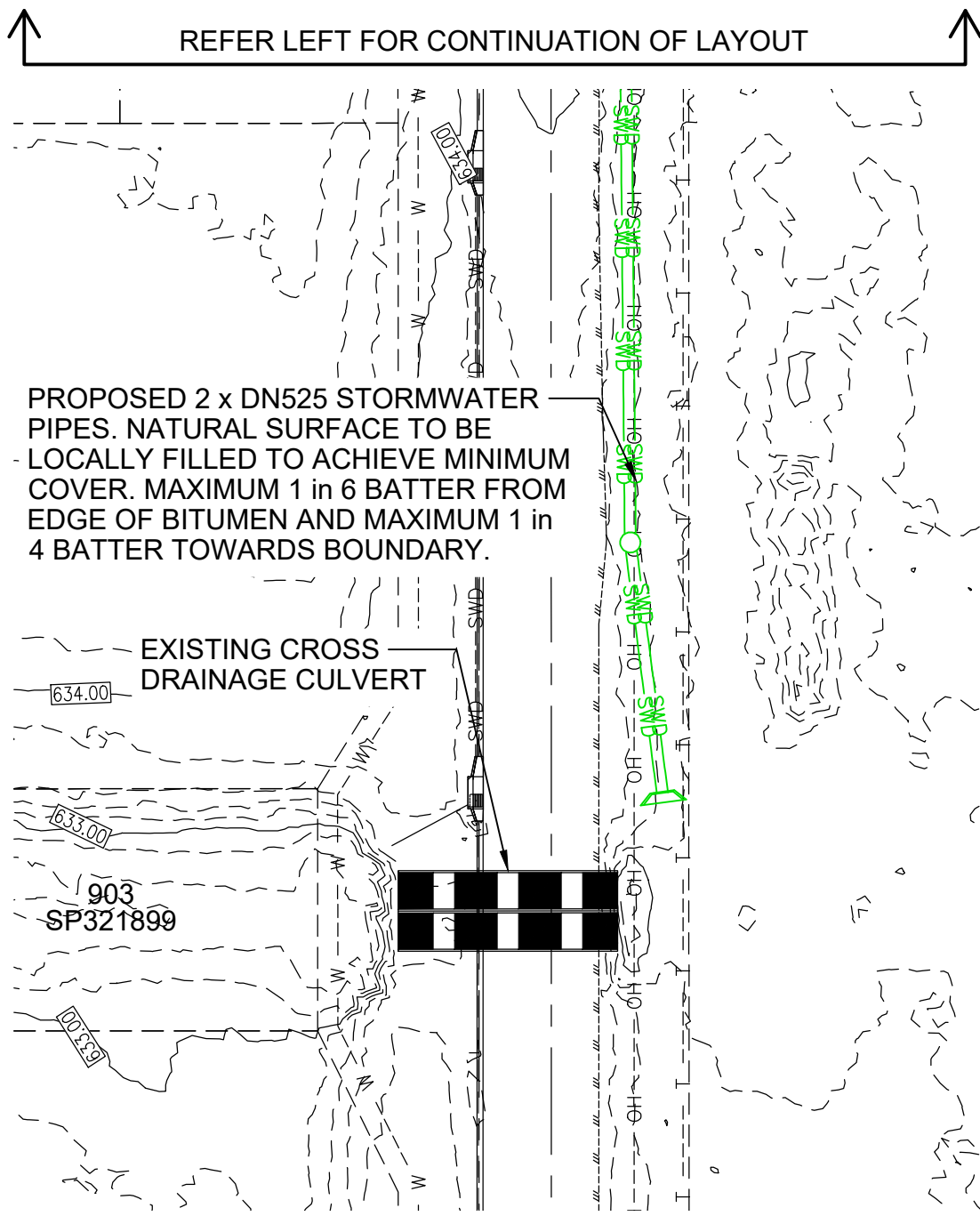
DATUM
PSM
SURVEYOR_INFORMATION

DRAWING ISSUE

ISSUE	DATE	DETAILS	INITIAL
P1	01.07.26	FOR INFORMATION	

0 5m 10m 15m 20m 25m

SCALE 1:500 @ A1
SCALE 1:1,000 @ A3



PRELIMINARY
NOT FOR CONSTRUCTION
DATE 01.07.26 08:53 AM

PRINT IN COLOUR

Kehoe Myers

CONSULTING ENGINEERS

KEHOEMYERS.COM.AU
PH +617 4632 8100

SERVICES LEGEND	
PROPOSED WORKS	
	PROPOSED LAYBACK KERB AND CHANNEL.
	PROPOSED STORMWATER DRAINAGE PIPE, MANHOLE, GULLY AND HEADWALL
	PROPOSED INTERALLOTMENT DRAINAGE PIPE AND MANHOLE
	PROPOSED SEWER MAIN AND MANHOLE
	PROPOSED WATER MAIN
	PROPOSED WATER METER AND SERVICE (BY OTHERS)
	PROPOSED UNDERGROUND ELECTRICAL LINE
	PROPOSED ELECTRICAL PILLAR BOX
	MAJOR DESIGN SURFACE CONTOUR (1.0m INTERVALS)
	MINOR EXISTING SURFACE CONTOUR (0.2m INTERVALS)
EXISTING WORKS	
	EXISTING BITUMEN EDGE
	EXISTING KERB AND CHANNEL.
	EXISTING STORMWATER DRAINAGE PIPE
	EXISTING OPEN DRAIN AND DIRECTION
	EXISTING SEWER MAIN AND MANHOLE
	EXISTING WATER MAIN
	EXISTING OVERHEAD ELECTRICAL LINES AND POWER POLES
	EXISTING TELECOMMUNICATION LINES

PRELIMINARY SERVICES LAYOUT
SCALE:- 1:500 @ A1, 1:1000 @ A3

CLIENT
TAHMER PTY LTD

PROJECT
CRONIN ROAD HIGHFIELDS - SUBDIVISION

DRAWING TITLE
PRELIMINARY SERVICES LAYOUT

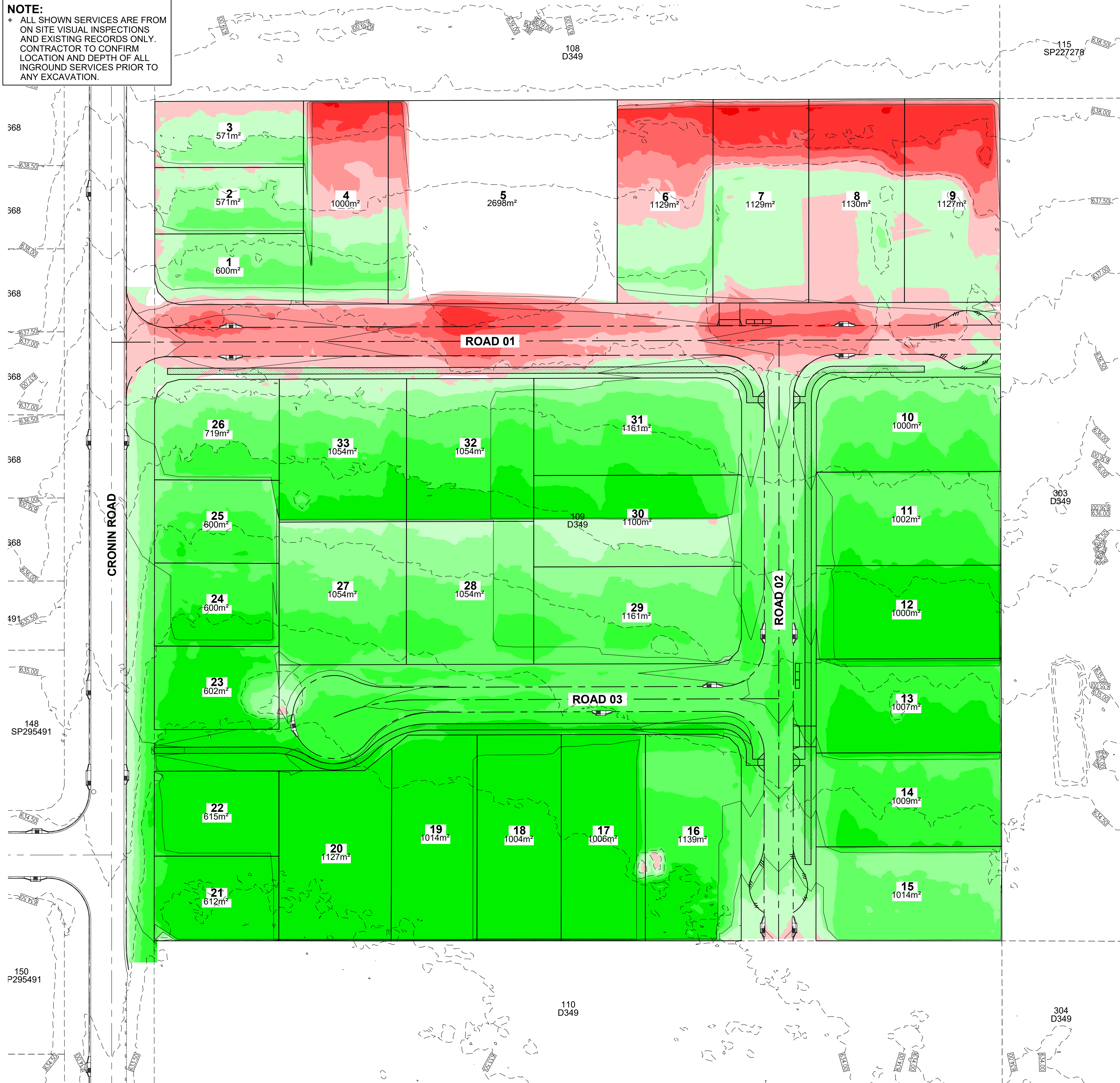
DESIGN	MDP	ORIGINAL SIZE	A1
DRAWN	MDP	PROJECT NUMBER	C2425076
CHECKED	FJB	DRAWING NUMBER	PR02
APPROVED		ISSUE	P1

DATE

APPENDIX C.

PROPOSED EARTHWORKS CUT/FILL LAYOUT (*KEHOE MYERS* DRAWING: C2425076-PR03)

NOTE:
+ ALL SHOWN SERVICES ARE FROM ON SITE VISUAL INSPECTIONS AND EXISTING RECORDS ONLY. CONTRACTOR TO CONFIRM LOCATION AND DEPTH OF ALL INGROUND SERVICES PRIOR TO ANY EXCAVATION.



SURFACE ANALYSIS DEPTH RANGES

Colour	Minimum Depth (m)	Maximum Depth (m)	2D Area (m ²)	Volume (m ³)
	-5.00	-1.00	19.2	0.3
	-1.00	-0.75	888.3	92.0
	-0.75	-0.50	1236.9	374.6
	-0.50	-0.25	2051.4	770.7
	-0.25	0.00	2660.4	1338.7
	0.00	0.25	4757.6	7675.8
	0.25	0.50	4786.4	6510.4
	0.50	0.75	7597.5	5020.6
	0.75	1.00	6866.4	3038.4
	1.00	5.00	9085.3	3657.5

PRELIMINARY QUANTITIES

CUT	(m ³)	2,576
FILL	(m ³)	25,903
BALANCE	(m ³)	23,327 (FILL REQUIRED)

NOTE:

1. THESE QUANTITIES ARE APPROXIMATE AND FOR GENERAL INFORMATION ONLY. THE CONTRACTOR IS RESPONSIBLE TO VERIFY ALL QUANTITIES.
2. QUANTITIES ARE DIRECT FROM 12d EARTHWORKS MODEL. NO BULKING FACTORS HAVE BEEN TAKEN INTO ACCOUNT.
3. CONTRACTOR SHALL INSTALL ADEQUATE EROSION AND SEDIMENT CONTROL MEASURES WHERE NECESSARY.
4. PRELIMINARY QUANTITIES DO NOT INCLUDE TRENCH SPOIL OR BOXING VOLUMES. CONTRACTOR IS TO ALLOW FOR ADEQUATE PROVISIONS FOR EXCESS SPOIL

COPYRIGHT

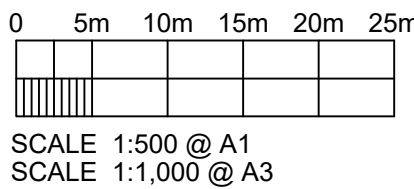
Kehoe Myers Consulting Engineers Pty. Ltd. Reserve the right to the design and documentation of the work contained on this drawing. This work is covered by Copyright and cannot be reproduced or copied in any form without the written permission of Kehoe Myers Consulting Engineers Pty. Ltd. Any license, expressed or implied, to the use of this document is restricted to the terms of agreement between the client and consulting engineer for professional services.



DATUM
PSM
SURVEYOR_INFORMATION

DRAWING ISSUE

ISSUE	DATE	DETAILS	INITIAL
P1	01.07.26	FOR INFORMATION	



PRELIMINARY

NOT FOR CONSTRUCTION

DATE 01.07.26 08:54 AM

PRINT IN COLOUR



CIVIL | STRUCTURAL | HYDRAULIC

CLIENT
TAHMER PTY LTD

PROJECT
CRONIN ROAD HIGHFIELDS -
SUBDIVISION

DRAWING TITLE

PRELIMINARY EARTHWORKS
LAYOUT

DESIGN	<i>MDS</i>	ORIGINAL SIZE	A1
DRAWN	<i>MDS</i>	PROJECT NUMBER	C2425076
CHECKED	<i>FJS</i>		
APPROVED		DRAWING NUMBER	PR03
DATE		ISSUE	P1

APPENDIX D.

VEHICLE MANOEUVRING LAYOUTS (*KEHOE MYERS DRAWING: C2425076-VM01*)

