Appendix E

Site Based Stormwater Management Plan (Quantity)

ARCADIS Design & Consultancy for natural and built assets

4499 – 4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Site Based Stormwater Management Plan (Quantity)

15 AUGUST 2023

Incorporating Hyder

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CHARTER HALL PRIME INDUSTRIAL FUND 4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Site Based Stormwater Management Plan (Quantity)

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Report No	EAG001-30109334-AAR	
Date	15/08/2023	
Revision Text	9	

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REVISIONS

Revision	Date	Description	Prepared by	Approved by
01	30/09/2022	DRAFT Issue	TF	DC
02	14/10/2022	Issue for Approval	TF	DC
03	06/02/2023	Response to RFI	TF	DC
04	22/02/2023	Amended Southern Basin Outlet	EP	DC
05	23/06/2023	Response to Peer Review Comments	TF/DC	DC
06	04/07/2023	Table 5-9 Updated	TF	DC
07	06/07/2023	Weir Width Updated and Inundation Curve Added	TF	DC
08	03/08/2023	Overall Site Layout Updated	TF	DC
09	15/08/2023	ROL Update	TF	DC

CONTENTS

APPENDICES

1 EXECUTIVE SUMMARY

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Site Based Stormwater Management Plan (Quantity) (SBSMPQ) for the proposed industrial development, situated at 4499-4651 Mount Lindesay Highway, North Maclean. The site is located in the Greater Flagstone Priority Development Area located within the Logan City Council local government area. On 21 September 2021, the Minister for Economic Development Queensland (EDQ) granted approval for a PDA development application over the site for a Development Permit for Reconfiguring a Lot – 1 into 4 lots, plus roads and open space. The proposed development seeks approval to amend this PDA development approval for a Development Permit for the reconfiguring a lot - one (1) lot into eleven (11) lots and new roads, consisting of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation.

This report demonstrates the proposed development will be constructed and operated in accordance with the requirements of Council, the South-East Queensland State Planning Policy (SPP), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM) Economic Development Queensland (EDQ) PDA guidelines and the Environmental Protection (Water) Policy (2009). This report also demonstrates the proposed amendment will not result in substantially different development to the existing approval.

The primary objective of this SBSMPQ is to ensure that:

1. Suitable measures are incorporated into the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to stormwater runoff peak flow rates.

This report therefore includes hydraulic and hydrological modelling which demonstrate, that due to change in stormwater catchment parameters, there is an increase in peak flow rate during the post development scenario. Subsequently, three regional detention structures have been proposed and designed in conjunction with numerous on-site detention systems for Lots 2 - 5 such that flow rates discharged from the development site are no greater than the corresponding catchment existing peak flow rates at the proposed points of interest, from 50% to 1% Average Exceedance Probability (AEP) storm events.

The impact of the proposed development against the existing condition at the areas immediately downstream and upstream of the site have been assessed using TUFLOW. The assessment considers the changes and if they would cause corresponding changes to the existing flood behaviour and thereby would cause any actionable nuisance.

In assessing the area constraints and the flood characteristics surrounding the site, Arcadis assigned a 2m grid size to the TUFLOW model, with resulting increased accuracy of the results in flood sensitive areas compared to larger grid sizes. Results from the model were assessed for peak water surface level afflux between the existing and developed scenarios.

This report presents the methodology and results of a flood modelling assessment which has included the analysis of the impacts of the proposed development in comparison to the existing scenario. In particular, this assessment has focused on the impact immediately upstream and downstream of the site where complex flood behaviour, with flows currently draining through private properties, is present.

Results indicate that the proposed development will generally improve flood conditions downstream of the site by applying the reduction of site stormwater discharge via the proposed detention systems and augmenting the proposed earthworks to allow adequate flood storage and conveyance through the site.

Note: The proposed operational stormwater quality treatment train is detailed in the Site Based Stormwater Quality Management Plan (SBSQMP) (EAG003-30109334-AAR-01).

1.1 Revision 03

Revision 03 of this report was prepared in response to the Information Request received from EDQ via email on 22 November 2022, related to the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space. Specifically includes changes to the Western Swale configuration to reduce clearing impacts within the 25m buffer.

1.2 Revision 05

Revision 05 of this report has been prepared in response to the comments received from Water Tech following their peer review of this report, as well as the Further Clarification Request received from EDQ on 31 March 2023 related to the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space.

1.3 Revision 08

The Overall Site Layout in Appendix A has been updated for Revision 08 of this report. The Overall Site Layout has been updated to reflect the adjustment to the northern site boundary which has been realigned to reflect the minimum 11m clear zone required by Council for safety purposes pertaining to the proposed upgrade of Crowson Lane. This has adjusted the size of Lots 1 and 4.

The above change results in a minor reallocation of land from the allotment catchments to the Crowson Lane catchments. No changes have been made to the modelling undertaken as part of this report as the change is considered negligible in relation to the catchment as a whole and the modelling undertaken is more conservative.

Revision 08 of this report was submitted to EDQ as part of the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space.

1.4 Revision 09

Revision 09 of this report has been prepared to support the amended ROL application, increasing the number of proposed allotments from four (4) to eleven (11) and new roads, consisting of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation. The proposed amendments to the existing ROL development approval do not result in substantially different development from either a stormwater management or a flooding perspective. No changes were made to the DRAINS or TUFLOW models as a result of this amendment.

2 INTRODUCTION

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Site Based Stormwater Management Plan (Quantity) (SBSMPQ) for the proposed industrial development, situated at 4499 - 4651 Mount Lindesay Highway, North Maclean. The site is situated within the Greater Flagstone Priority Development Area (PDA) located within the Logan City Council (LCC) local government area.

On 21 September 2021, the Minister for Economic Development Queensland (EDQ) granted approval for a PDA development application over the site for a Development Permit for Reconfiguring a Lot – 1 into 4 lots, plus roads and open space. The proposed development seeks approval to amend this PDA development approval for a Development Permit for the reconfiguring a lot - one (1) lot into eleven (11) lots and new roads, consisting of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation. The proposed amended ROL layout is shown in Figure 2-1, below.

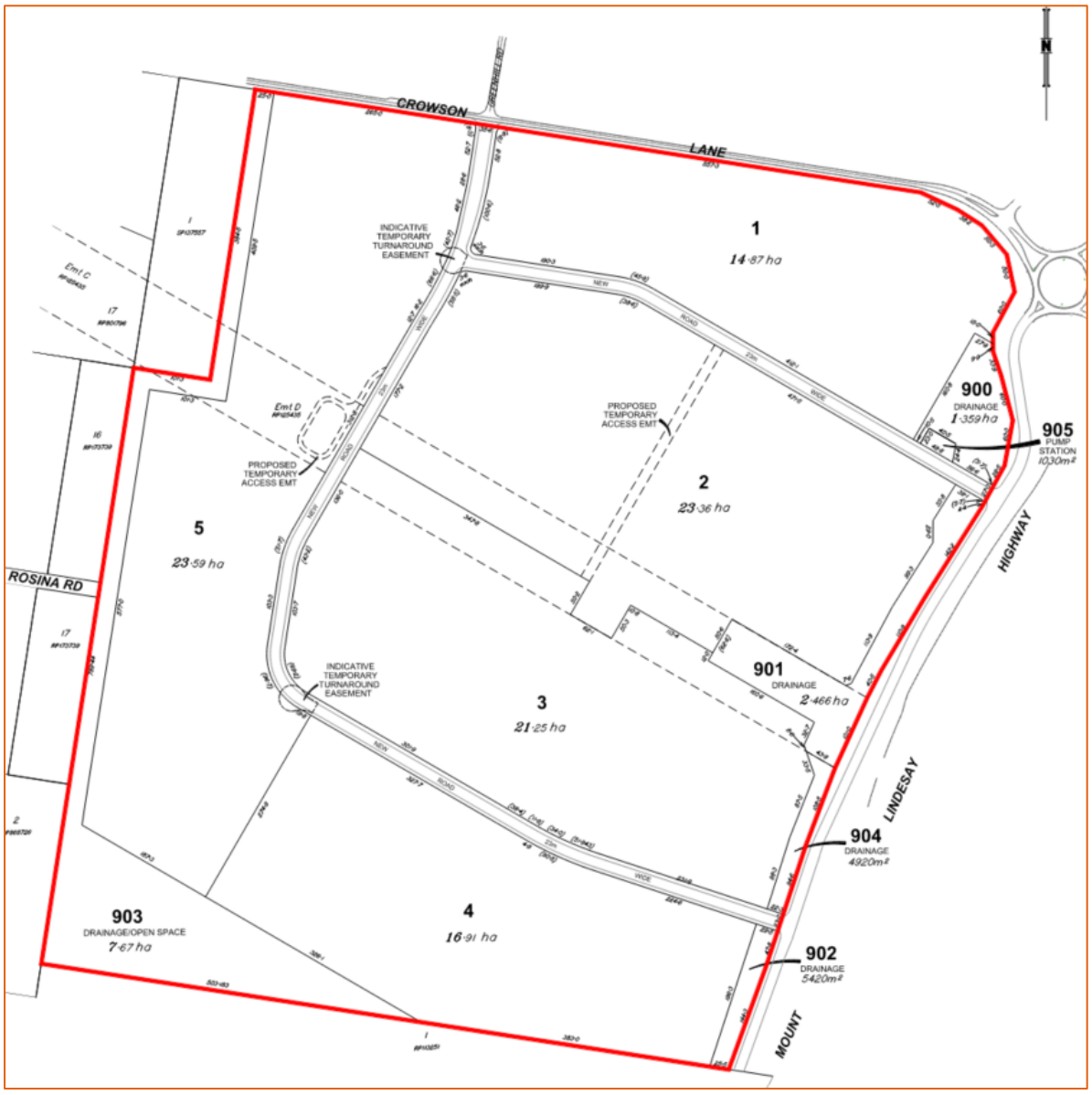


Figure 2-1 – Proposed Amended ROL Layout (Source: Wolters, August 2023)

The following report demonstrates the proposed development will be constructed and operated in accordance with the Queensland State Planning Policy (SPP 2017), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM), Economic Development Queensland (EDQ) PDA guidelines and the Environmental Protection (Water) Policy (2009) with respect to the attenuation of stormwater runoff. This report also demonstrates the proposed amendment will not result in substantially different development to the existing approval.

3 SITE CHARACTERISTICS

3.1 Site Description

The subject site is located within Logan, South-East Queensland, Australia on the following lot:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

The site in generally bounded by the following co-ordinates (GDA94 / MGA zone 56)

- South-West: 500708, 6928700
- North-East: 501974, 6929628

The proposed area for the development is approximately 117.9ha.

3.2 Existing Land Usage

The site is predominantly vegetated with cleared areas relating to the existing residential dwelling and associated land use and High Voltage Electrical Power transmission lines and towers.

The site currently has direct property frontage to Mount Lindesay Highway to the east, predominantly trees and vegetation to the south and rural residential developments to the north and west. A MEDQ Approved context plan published 10 September 2021 includes the subject site. The site is approved for specific land use "*Industry and Business Zone*" with overlay for indicative future bio-diversity corridor. An existing high voltage easement running through the site from the south into the existing rural residential dwelling to the north. A further high voltage (275kV) easement runs through the site within the cleared area.

A site locality plan is provided in Figure 3-1 below:

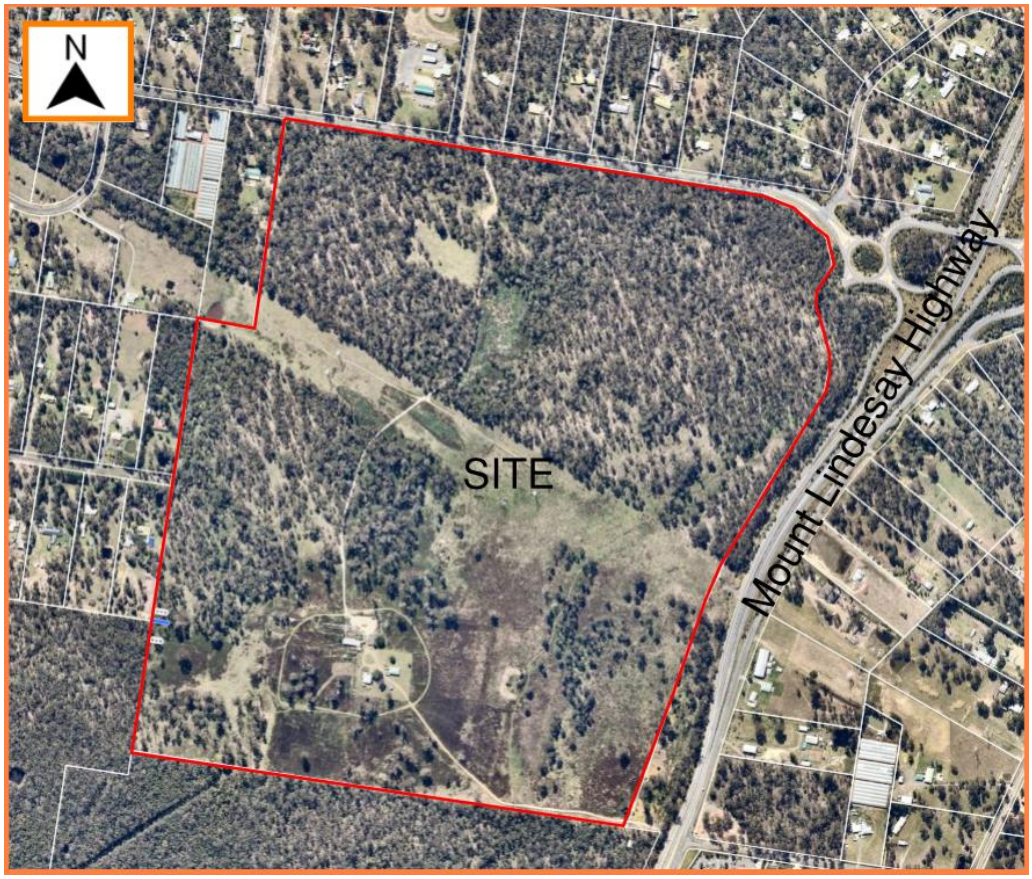


Figure 3-1- Development Locality Plan (Source: NearMap, June 2022)

3.3 Existing Topography and Site Drainage

In its current state, a ridge traverses the development site from the north-western corner to the southern site boundary, with further undulations dividing the site into three sub-catchments, as shown in Figure 3-2. The northern catchment slopes east at an average of 2% from RL44.0 to a culvert with a minimum invert level of RL20.90 which allows flows to pass beneath Mount Lindesay Highway to the opposite side. From here, water is ultimately discharged east of Mount Lindesay Highway towards the Logan River located approximately 1.1km east of the site.

The western portion of the site slopes south from RL44.0 to RL26.5 at an average grade of 1.6%. An overland flow path commences in this portion of the site, exiting the site across the southern boundary before re-entering the site in the east through the third catchment area. The overland flow path flows north-east to the abovementioned culverts. The third catchment area site also slopes to this culvert at an average grade of 1.2%.

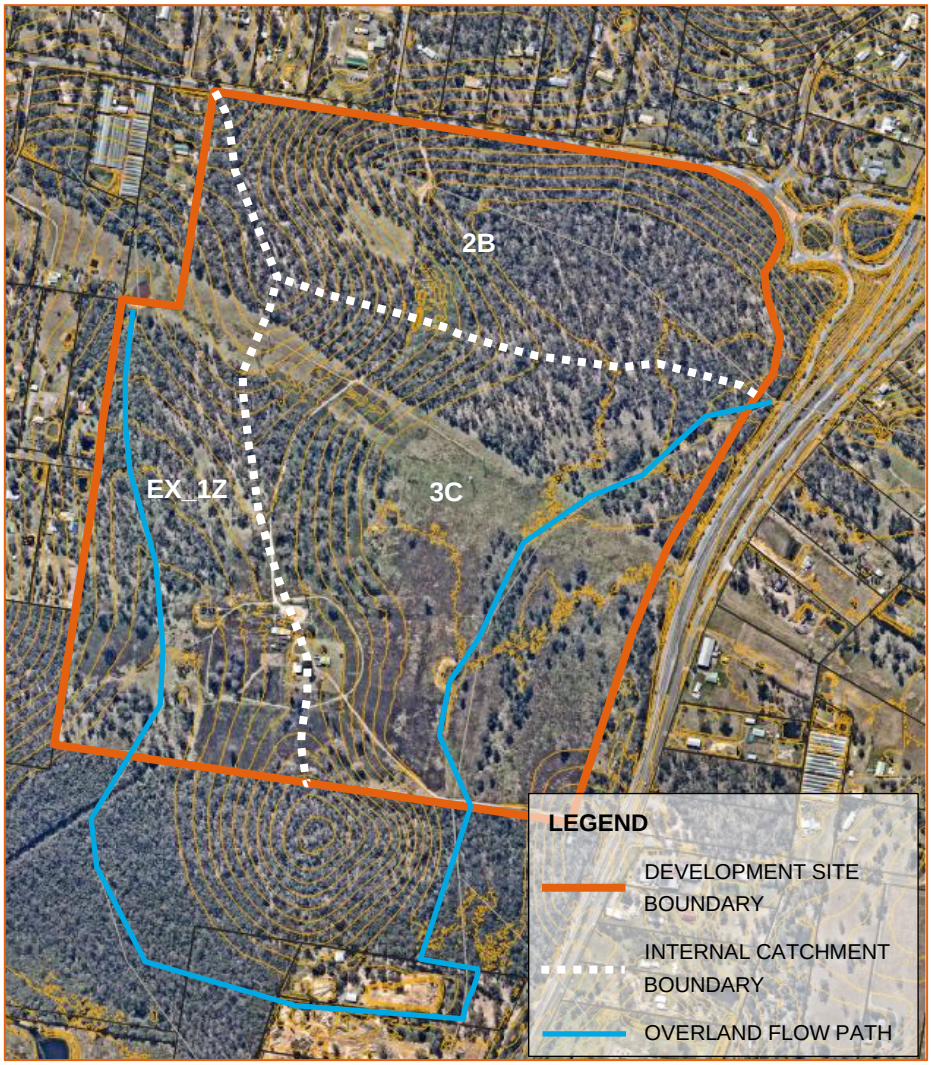


Figure 3-2- Internal Catchment Plan (Source: NearMap, June 2022)

Stormwater runoff from upstream external catchments enter the site from the north, south and west. The extent of the external catchments is shown in Figure 3-3.

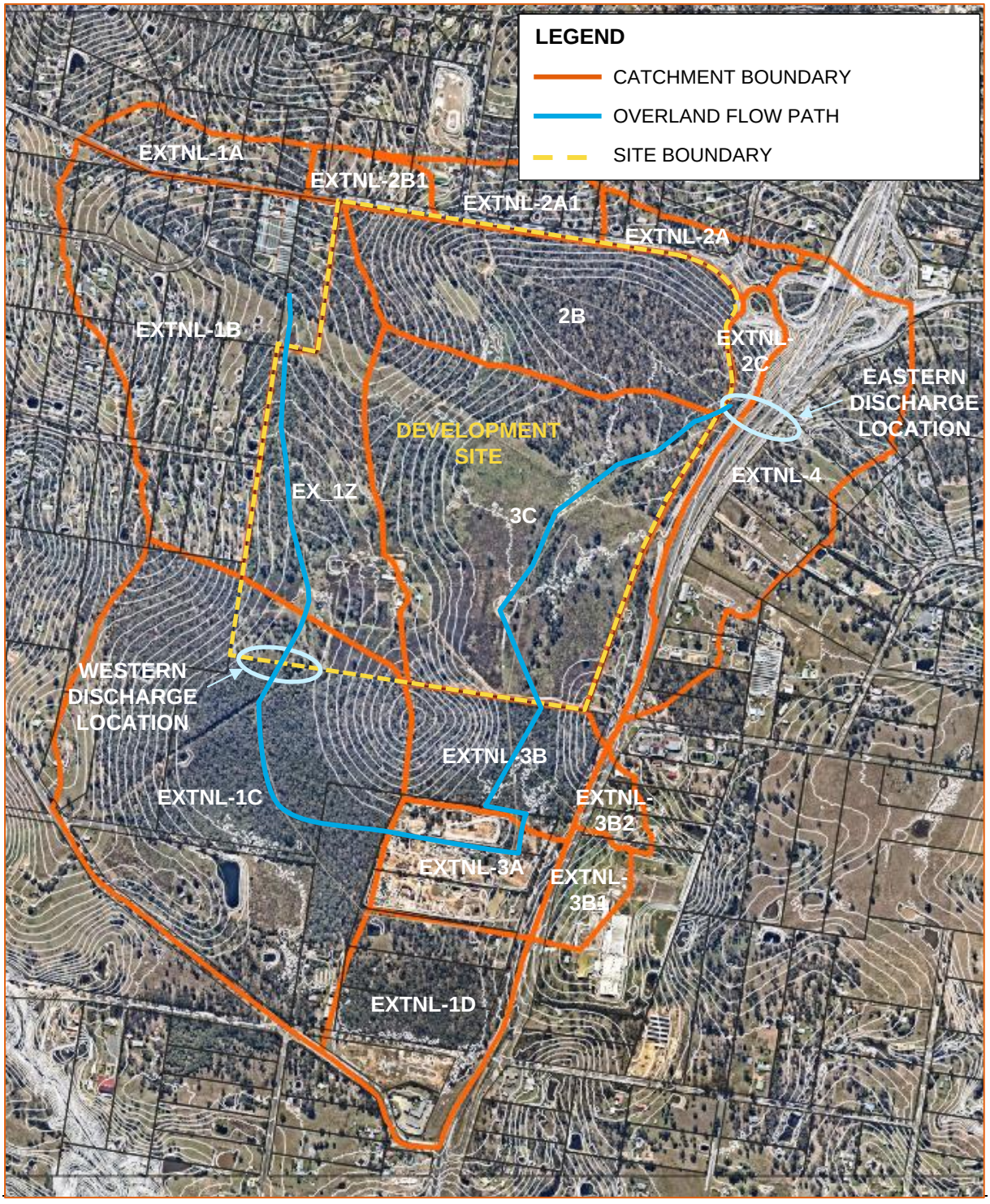


Figure 3-3: Existing Catchment Plan

3.4 Existing Approval

It is understood that the existing EDQ approval (DEV 2018/961) over the site is for a reconfiguring a lot – 1 lot into 4 lots, plus roads and open space. As part of this approval key services to support the development were identified with associated works including:

- Construction of a service road along the western side of the Mount Lindesay Highway accessed via the existing Crowson Lane / Mount Lindesay Highway off ramp roundabout;

- Construction of a trunk rising sewer main running through the existing electrical main of the proposed development, ending at Greenbank Road.
- Connection to existing potable water mains along Crowson Lane and the Mount Lindesay Highway
- Proposed stormwater infrastructure;
- Construction of internal roads; and
- Proposed connection to existing underground electrical and telecommunication services along Crowson Lane and the Mount Lindesay Highway.

Further details on the works associated with the adjacent property approval can be found within the relevant Decision Notice attached within Appendix C. The approved EDQ Structure Plan is shown below in Figure 3-4 below.

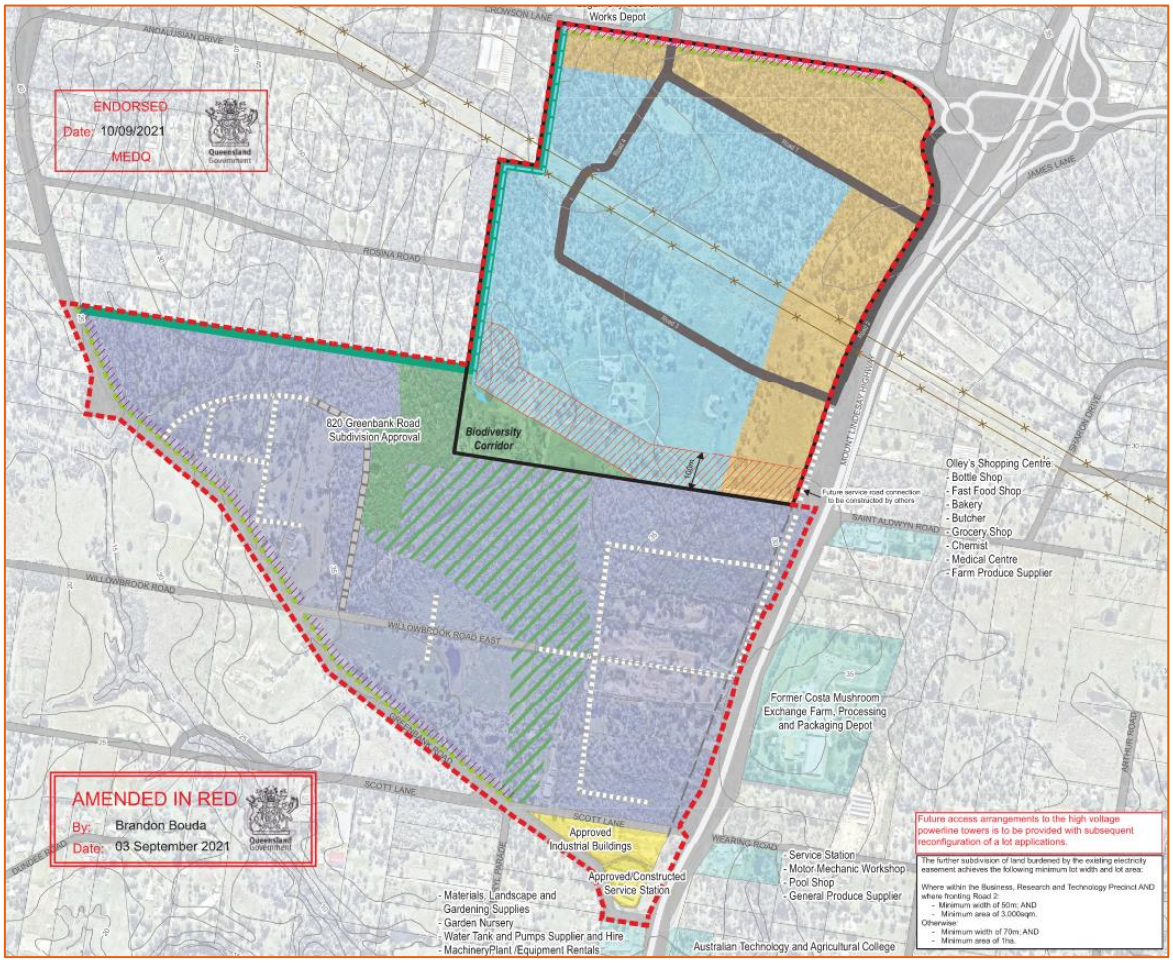


Figure 3-4- North Maclean Enterprise Context Plan (Source: Reel Planning, September 2021)

3.5 Geotechnical Investigation

A geotechnical investigation was completed separately by Protest Engineering in October 2021. Borehole testing revealed the ground profile generally comprises of silty sand (Emerson Class 6) up to 0.6m depth, overlaying silty/sandy clay up to 4m depth followed by low to high strength sandstone. Groundwater was not encountered during the investigation; however, Protest Engineering noted that groundwater levels can be seasonal and fluctuate during and after heavy rainfall events. Refer to Protest Engineering Report PTP/07651-0001-Rev3 for further details.

3.6 Flooding

A review of LCC's Flood Hazard Tigger Overlay Map (OM-05) revealed that the site is identified as a Flooding and inundation area with a large portion of the site being prone to flooding. Figure 3-5 below shows LCC's Flood Hazard Overlay for the site. Detailed flood modelling has been undertaken to ensure modifications to the overland flow path does not have adverse impacts on properties upstream or downstream of the development site. The overland flow path has also been modified to include adequate storage of flows from the eastern developed catchment to ensure flows discharged from the development site do not exceed pre-development flows.

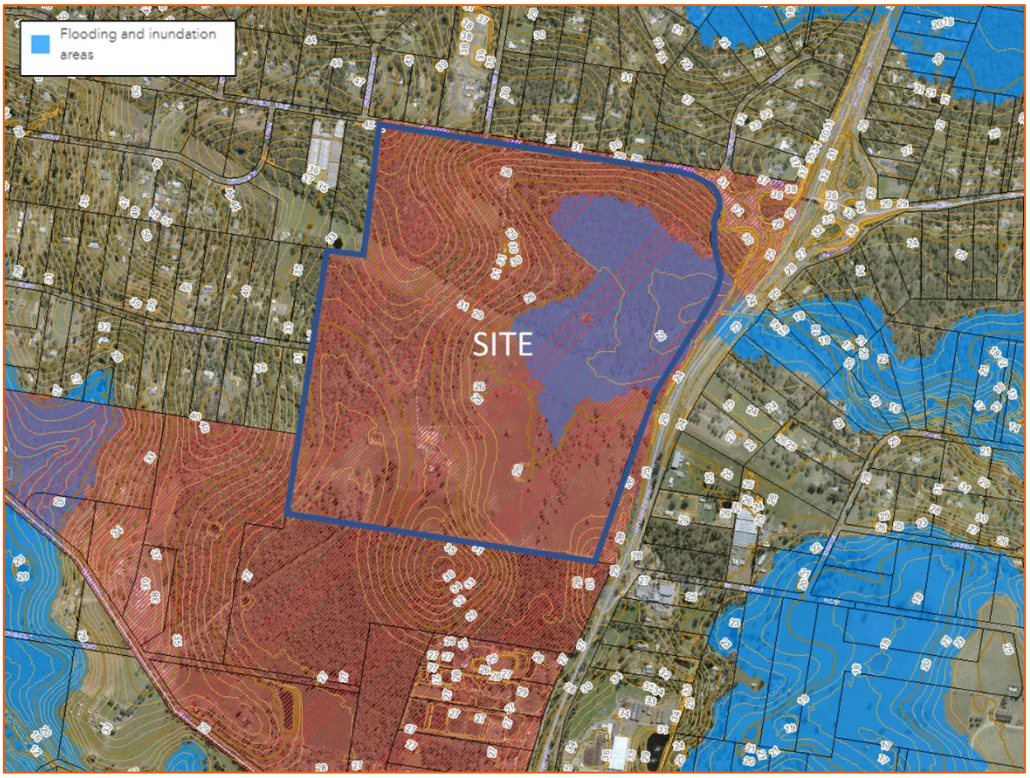


Figure 3-5- Flood Hazard Overlay (Source: Logan City Council, June 2022)

3.7 Existing and Planned Stormwater Infrastructure

Limited stormwater drainage infrastructure is present within the vicinity of the development site. A set of culverts is situated near the eastern property boundary discharging stormwater under the Mount Lindsay Highway and ultimately towards the Logan River located approximately 1.1km east of the site. The culverts comprise two 1.75m high, 2.1m wide reinforced concrete box culverts at RL21.09m AHD, between which sit two 1.75m high, 2.1m wide reinforced concrete box culverts at RL20.90m AHD

Smaller culverts are present within Crowson Lane, directing stormwater runoff from the northern upstream catchments beneath the road and discharging into the subject site. The pipes vary in size from approximately 375mm dia to 4 x 675mm dia.

Crowson Lane and the adjacent streets are to be upgraded by Logan City Council in the near future. The proposed stormwater drainage upgrades are shown in Figure 3-6 below and in Appendix B.

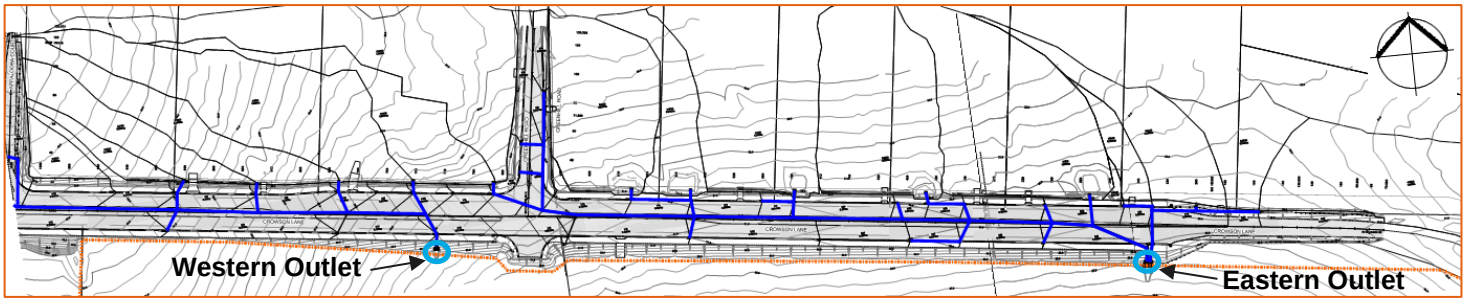


Figure 3-6- Proposed Crowson Lane Stormwater Drainage Upgrade (Source: Logan City Council, August 2022)

Following the proposed stormwater drainage upgrades, the Crowson Lane piped network will discharge flows into the development site at two locations, circled in the figure above. The western discharge pipe is 1050mm dia. The eastern outlet consists of two pipes – a 1350mm dia pipe and a 900mm dia pipe.

The proposed internal drainage network has been designed to convey the developed flows associated with Crowson Lane upgrade through the site to the legal point of discharge.

4 DISCHARGE LOCATIONS

4.1 Pre-Developed Discharge Characteristics

As previously outlined in this report, the site in its pre-developed state consists of multiple catchments, discharging via concentrated flows into either local flood plain area to the south (Catchment EX_1Z) (referred to as “Southern Discharge Location” in Figure 3-3) and/or ultimately to the highway infrastructure to the east (Catchments 2B and 3C) (referred to as “Eastern Discharge Location” in Figure 3-3).

4.2 Proposed Discharge Characteristics and Objectives

The proposed development will retain the existing discharge locations, as marked on Figure 3-3 and Figure 5-1. To comply with the requirements of Council, the Queensland State Planning Policy (SPP 2017), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM) and the Environmental Protection (Water) Policy (2009), the following primary objectives are to be achieved:

- Suitable measures are incorporated into the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to stormwater runoff peak flow rates; and
- waterway flow management measures are implemented to ensure no adverse stability impacts to downstream receiving unlined waterways;

All standard Average Exceedance Probability (AEP) design events attenuation is proposed for the 4499 - 4651 Mount Lindesay Highway, North Maclean development. The site assessment will demonstrate compliance with LCC Policy by discharging pre-detained 50%, 20%, 10%, 2% and 1% AEP flows to the points of interest.

The proposed amendments to the existing ROL development approval do not result in substantially different development from either a stormwater management or a flooding perspective. The proposed discharge locations and objectives remain unchanged.

5 HYDROLOGICAL ASSESSMENT

The hydrological assessment presented in this report has been undertaken in accordance with the methodology documented in the Australian Rainfall & Runoff 2019. This methodology replaces the Average Variability Method (AVM) temporal patterns of ARR1987 with a fundamentally changed ensemble approach (i.e. 10 temporal distributions per storm duration). This methodology also uses the updated design rainfall inputs sourced from the AR&R (2019) data hub.

5.1 Temporal Patterns

Rainfall Intensities Frequency Duration data were obtained from The Bureau of Meteorology (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016). The Latitude and Longitude of used for the site is summarised in Table 5-1 below.

Table 5-1 Site Latitude & Longitude

Parameter	Value
Latitude	-27.761
Longitude	153.013

5.2 Preburst Data

Preburst depths and ratios were obtained from the Australian Rainfall and Runoff Data Hub for the coordinates shown in the table above. The preburst depths are listed in Table 5-2.

Table 5-2 Preburst Depths (mm)

Duration (hour)	% AEP					
	50	20	10	5	2	1
1	0.3	2.9	4.6	6.2	7.1	7.8
1.5	0.1	2.0	3.2	4.5	11.9	17.4
2	0	3.6	6.1	8.4	15.5	20.8
3	0.4	5.1	8.2	11.2	22.7	31.4
6	0.1	7.8	12.8	17.7	30.6	40.3
12	1.8	9.1	14.0	18.7	31.4	40.9
18	0.5	8.5	13.9	19.0	28.3	35.2
24	0.7	5.7	9.0	12.2	22.9	31.0
36	0.2	2.8	4.6	6.3	12.7	17.5
48	0	1.6	2.7	3.7	12.0	18.2
72	0	0	0	0	1.8	3.1

5.3 Catchment Analysis

As previously discussed, the development site drains to two points of interest (Western Discharge Location and Eastern Discharge Location). The development site has been assessed under the following two scenarios:

- **Pre-development Scenario** – Site and external catchment in their current state. The pre development scenario also includes the proposed upgrades to Crowson Lane and Eastern Trunk service road. As all the catchments modelled in this scenario have a rural/rural residential land use, the RAFTS method has been adopted as the most appropriate method to model the catchments.
- **Mitigated Scenario** – The proposed industrial development (divided into the catchments shown in Figure 5-1) with the calculated detention infrastructure in place and no changes to the external catchment areas. The RAFTS method has continued to be used to model the external catchments in the mitigated scenario. The ILSAX method has been used to model the industrialised internal catchments.

The scenarios listed above have been modelled in TUFLOW to assess the impact on the properties upstream and downstream of the site boundaries beyond identified points of interest. The catchments were first modelled in DRAINS with the hydrographs exported and imported into TUFLOW. This methodology ensures that peak flow concentrations from the catchments are assessed and mitigated appropriately.

Please note that the proposed amendments to the existing ROL development approval do not result in substantially different development from either a stormwater management or a flooding perspective. No changes were made to the proposed catchments, nor the DRAINS or TUFLOW models as a result of this amendment.

Table 5-3 and Table 5-4, below, list the loss parameters adopted in DRAINS for the RAFTS and ILSAX models. The pervious initial and continuing losses were sourced from the AR&R Data Hub.

Table 5-3 RAFTS Initial and Continuing Losses

Parameter	Initial Loss (mm)	Continuing Loss (mm/h)
Impervious Area	1	0
Pervious Area	26	1.9

Table 5-4 ILSAX Depression Storage

Parameter	Depression Storage (mm)
Impervious Area	1
Pervious Area	5

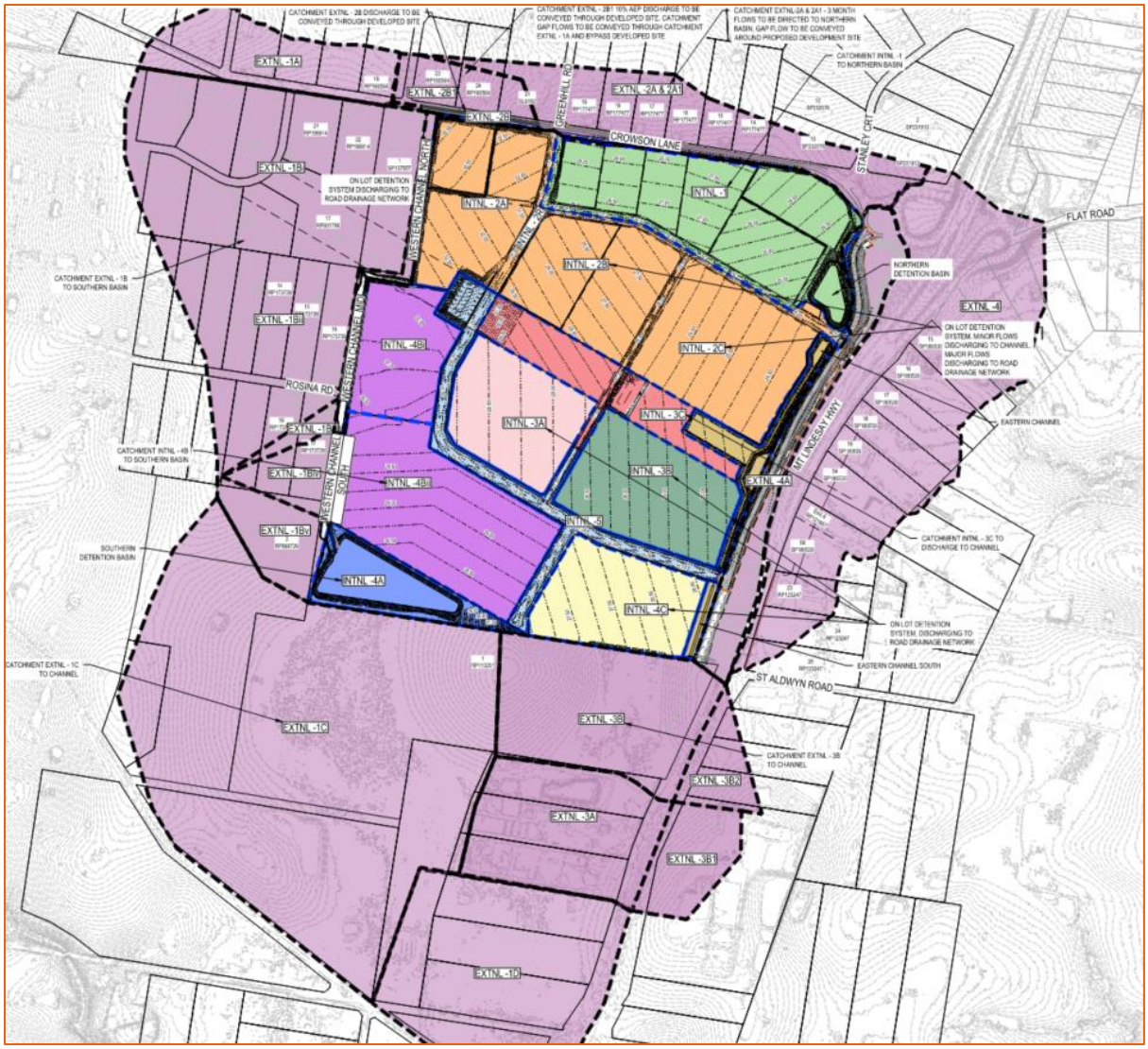


Figure 5-1: Developed Catchment Plan

Tables 5-5 and 5-6, below, summarise the catchment parameters used to assess the pre and post development flows.

Table 5-5 – Pre-development Catchment Parameters

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
EXTNL-1A	7.224	1	2.65	0.050
EXTNL-1Bi	23.636	10	2.49	0.050
EXTNL-1Bii	16.974	5	4.19	0.050
EXTNL-1Biii	0.9034	5	4.22	0.050
EXTNL-1Biv	3.3656	5	4.44	0.050
EXTNL-1C	74.256	0.5	1.26	0.100
EXTNL-1D	19.78	10	0.26	0.055
EX_1Z	25.142	0.5	0.98	0.055
EXTNL-2A	5.218	2	2.01	0.045
EXTNL-2A1	7.434	2	2.01	0.055
2B	32.26	0	2.05	0.060
EXTNL-2B1	4.077	2	3.71	0.045
EXTNL-2C	8.764	10	3.55	0.050
EXTNL-3A	12.15	0	1.64	0.055
EXTNL-3B	14.09	0	2.91	0.100
EXTNL-3B1	4.83	25	2.17	0.035
EXTNL-3B2	2.81	5	1.56	0.040
3C	55.53	1	1.62	0.050
EXTNL-4	34.632	25	3.76	0.040

Table 5-6 – Post-development Catchment Parameters

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
EXTNL-1A	7.224	1	2.65	0.050
EXTNL-1Bi	23.636	10	2.48	0.050
EXTNL-1Bii	16.974	5	4.19	0.050
EXTNL-1Biii	0.9034	5	4.22	0.050
EXTNL-1Biv	3.3656	5	4.44	0.050
EXTNL-1Bv	4.2025	5	4.02	0.050
EXTNL-1C	64.974	0.5	1.26	0.100
EXTNL-1D	19.780	10	0.26	0.055
EXTNL-2A	5.218	2	2.01	0.045
EXTNL-2A1	7.434	2	2.01	0.055
EXTNL-2B1	2.0703	2	3.71	0.045
EXTNL-1C (Crowson Lane)	2.007	90	3.14	0.015
EXTNL-2C	8.764	10	3.55	0.050
EXTNL-3B	12.15	0	1.64	0.055
EXTNL-3A	14.09	0.001	2.91	0.100
EXTNL-3B1	4.83	25	2.17	0.035
EXTNL-3B2	2.81	5	1.56	0.040
EXTNL-4	34.632	25	3.76	0.040

Catchment	Area (ha)	Impervious (%)	Impervious Time of Concentration (minutes)	Pervious Time of Concentration (minutes)
INTNL-1	17.052	85	15	15
INTNL-2A	8.918	90	10	10
INTNL-2B	8.821	90	10	10
INTNL-2C	10.478	90	10	10
INTNL-2R	3.472	75	20	20
INTNL-3A	7.740	90	10	10
INTNL-3B	9.165	90	10	10

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
INTNL-3C	6.271	90	17	17
INTNL-4Bi	6.5529	75	15	24
INTNL-4Bii	13.9671	75	15	24
INTNL-4C	7.916	90	10	10
INTNL-5	5.958	75	20	20
INTNL-4A	5.529	0	1	0.035
Channel South	0.5458	0	0.5	0.035
Channel North	2.9041	0	0.5	0.035

5.4 Model Verification

Catchment EXTNL-1B was selected for a comparative exercise to validate the adoption of the RAFTS hydrological models for the rural/rural residential catchments. Catchment EXTNL-1B has been adopted as it does not contain large depression/storage areas which would distort the results. In addition to the RAFTS method, Catchment EXTNL-1B has been modelled using the Rational Method, ILSAX, Initial and Continuing Loss hydrological models.

A time of concentration of 31.7 minutes was applied to pervious and impervious portions of the catchment, alike, as the impervious areas traverse large tracks of pervious area before reaching the edge of the catchment boundary.

A 15mm grass depression storage was adopted for the ILSAX model. This is larger than the value listed in Table 5-4 as Catchment EXTNL-1B has a rural residential landuse and is predominantly pervious with an uneven surface.

Refer to Table 5-7, below for the results.

Table 5-7 Catchment EXTNL-1B 1% AEP Hydrological Model Verification

Hydrological Model	1% AEP Flow (m^3/s)
RAFTS	9.95
ILSAX	11.8
Initial and Continuing Loss	13.7
Rational Method	11.2

As can be seen in Table 5-7, the RAFTS model produced the lowest 1% AEP flow and as such is considered the most conservative hydrological model with respect to detention volume calculations and is therefore appropriate for modelling the rural/rural residential catchments.

5.5 Drainage Strategy

As discussed in Section 4 of this report, the development site drains to two discharge locations (refer to Figure 3-3 and Figure 5-1). The proposed development will result in the redefinition of the catchment boundaries and characteristics draining to each discharge location, and as such, detention structures are required to attenuate flows to pre-development flow rates.

A regional detention basin is proposed to be constructed in the south-west corner of the development site to attenuate flows from Catchment INTNL-4B for all storm events, up to and including the 1% AEP storm event. Flows from external catchments EXTNL-1A, EXTNL-2B and EXTNL-1B are also conveyed through this detention basin. This detention basin was previously documented in Arcadis report *'4499-4651 Mount Lindesay Highway, North Maclean SBSMP (Southern Catchment Discharge Area)*' (11-0001-30101970-AAR-04); however, owing to changes to the contributing catchment, and proposed preservation measures to the southern wetland areas this basin has been remodelled.

A second regional detention basin is proposed to be constructed in the north-eastern corner of the site to attenuate flows from Catchment INTNL-1. As such, the minor flows from the road network will by-pass the Northern Detention Basin.

A third regional detention system is proposed in the form of the conveyance channel situated along the eastern site boundary. The channel conveys flows from Catchments INTNL-3A, INTNL-3B, INTNL-3C, INTNL-4C, INTNL-5 and external catchments EXTNL-1C (including flows discharged from the southern detention basin), EXTNL-1D, EXTNL-3A, EXTNL-3B, EXTNL-3B1 and EXTNL-3B2. A weir is proposed to be constructed in the northern portion of the channel (upstream of the culverts situated beneath the Mount Lindesay Highway) to control the flows discharged to the existing eastern discharge location.

Catchments INTNL-2A – INTNL3B and INTNL-4C are to provide on-site allotment detention. For the purpose of sizing the three regional detention systems, an estimate of the detention volumes for the INTNL-2A – INTNL3B and INTNL-4C on-site detention systems has been calculated using the DRAINS software and is documented as part of this report; however, this is to be confirmed through a site specific SBSMP created for each individual lot. An allowance has been made for a portion of Lots 2, 3 and 4 to bypass the on-site allotment detention, discharging undetained to the drainage infrastructure in the road corridor. As such Catchments INTNL-2R and INTNL-5 extend slightly beyond the road corridor, and catchments INTNL-2B, INTNL-3A, INTNL-3B and INTNL-4C do not encompass the full allotment extends.

Note that internal catchment INTNL-3C does not require lot scale detention and is included in the regional mitigation system.

The proposed detention systems work in union to ensure the flows discharged from the development site do not cause adverse impacts upstream or downstream of the development site, for all storm events, up to and including the 1% AEP storm event.

Owing to the extensive external catchments conveyed through the regional detention systems, the complexity of the outlet structures, obstructions and drowned orifices, DRAINS was not considered the most appropriate software to model the regional detention systems. As such, the regional detention systems have been modelled in TUFLOW with input from DRAINS for the discharge flows from the allotment detention systems proposed for Catchments INTNL-2A – INTNL3B and INTNL-4C.

5.6 Detention Sizing

5.6.1 Allotment Detention

5.6.1.1 Methodology

The allotment detention systems proposed for Catchments INTNL-2A – INTNL3B and INTNL-4C were sized using DRAINS. The DRAINS models utilise a combination of the RAFTS and ILSAX methods to more accurately represent the different land use types. ILSAX was used to model the developed catchments with RAFTS used to model the relatively undeveloped existing and external catchments. The rainfall hydrographs generated for each catchment were exported from DRAINS and imported into the TUFLOW model.

The critical storm events were determined via an investigation of storm durations ranging from 10mins to 1080mins. The models were then used to route post-developed runoff from the eastern catchment through the proposed detention structure to determine the most efficient onsite detention system to comply with aforementioned objective.

Each catchment was modelled using a split catchment approach, with the first sub-catchment representing impervious areas and the second pervious. This allows for an accurate representation of Manning's roughness coefficients and applicable loss parameters.

5.6.1.2 Allotment Detention System Design Sizing

As stated in section 5.3, Catchments INTNL-2A – INTNL-3B and INTNL-4C are to provide individual on-site detention. Site specific SBSMPs will be required for each individual lot to determine the detention volumes and configurations required; however, for the purposes of sizing the northern and southern detention basins and the detentions storage in the conveyance channel, the detention volumes has been estimated and modelled in DRAINS. The discharge from each allotment detention system was extracted from DRAINS and imported into TUFLOW.

Table 5-8 provides a summary of the design parameters adopted for each individual allotment detention system. The allotment detention system design parameters were determined by modelling the pre and post development areas specific to Catchments INTNL-2A – INTNL-3B and INTNL-4C in DRAINS and ensuring the detention systems are adequately sized such that the post development flows do not exceed the pre-development flows.

Table 5-8 Allotment Detention System Design Parameters

Catchments	Internal Base Area	Maximum Water Depth	Detention Storage Volume	Control Outlets
INTNL-2A	2,400 m^2	2.06m (RL32.06m AHD)	4,951m^3	• 525mm dia outlet @ RL30m AHD (base level); • 1.3m wide weir @ RL31.5m AHD
INTNL-2B	2,900 m^2	2.00m (RL28.00m AHD)	5,812m^3	• 900mm dia outlet @ RL26m AHD (base level); • 0.7m wide weir @RL27.5m AHD
INTNL-2C	4,370 m^2	1.94m (RL27.94m AHD)	8,478m^3	• 900mm dia outlet @ RL26m AHD (base level); • 0.5m wide weir @RL27.8m AHD
INTNL-3A	4,800 m^2	0.86m (RL28.86m AHD)	4,132m^3	• 2x525mm dia outlet @ RL28m AHD (base level); • 4m wide weir @RL28.65m AHD
INTNL-3B	5,110 m^2	1.67m (RL25.67m AHD)	8,627m^3	• 375mm dia outlet @ RL24m AHD (base level); • 4m wide weir @RL25.5m AHD
INTNL-4C	1,800 m^2	1.86m (RL26.36m AHD)	3,495m^3	• 2x375mm dia outlet @ RL24.5m AHD (base level); • 4m wide weir @RL26m AHD

The peak water level estimated for each system is provided in Figure 5-2 below.

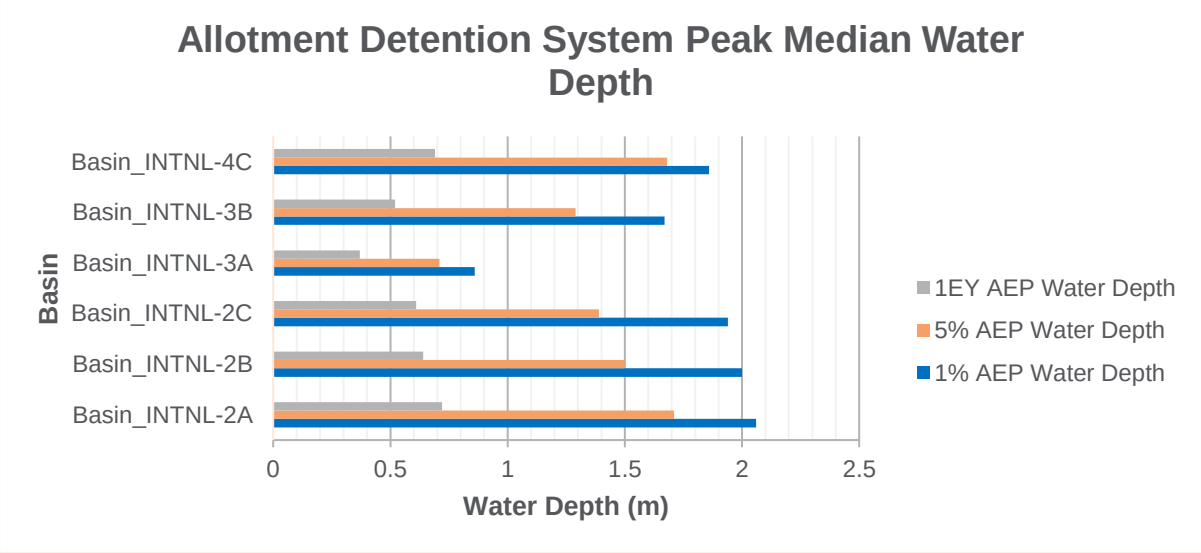


Figure 5-2: Allotment Detention System Peak Median Water Level

We note that should the individual lots adopt a different basin configuration other than what is specified in Table 5-8, the proposed basins shall be designed to ensure no increase in discharge rates up to the 540min duration for all the design events to ensure no impacts downstream. …

5.6.2 Southern Detention Basin

Table 5-9 presents the parameters for the proposed southern on-site detention basin, as modelled in TUFLOW, which attenuates flows from Catchment INTNL-4B for all storm events, up to and including the 1% AEP storm event, prior to release to the southern discharge location. External catchments EXTNL-1A and EXTNL-1B are also conveyed through this basin.

This basin was previously documented in Arcadis report *'4499-4651 Mount Lindesay Highway, North Maclean SBSMP (Southern Catchment Discharge Area)'* (11-0001-30101970-AAR-04); however, owing to changes to the contributing catchment, this basin has been remodelled as part of this report, resulting in a larger and higher weir. This adjustment to the outlet configuration ensures that the flows discharged from the basin continue to be restricted to pre-development flows.

Reference should be made to Engineering Drawings in Appendix B for a conceptual illustration of how the detention basin will operate.

Table 5-9 Southern Detention System Design Parameters

Contributing Catchments	Internal Base Area	Maximum Water Depth	Detention Storage Volume	Control Outlets
EXTNL-1A, EXTNL-1B & INTNL-4B	17,174 m^2	1.45 m (RL28.06m AHD)	42,277m^3	• 3 x 900mm dia pipe low flow outlets @ RL26.61m AHD (base level) • 64m wide weir @ RL28.0m AHD

5.6.3 Northern Detention Basin

The northern on-site detention basin is situated in the north-east corner of the proposed development and attenuates flows from INTNL-1 and the major flows from the northern portion of the internal road network, prior to discharge to the northernmost portion of the eastern conveyance channel. Bio-retention filter media is proposed to be included in the base of this basin to achieve the water quality objectives for Lot 1. The detention volume modelled was above the extended detention required for water quality (0.3 m).

Reference should be made to Figure 5-1 for the catchment plan and the Engineering Drawings in Appendix B for a conceptual illustration of how the detention basin will operate. Table 5-10 provides a summary of the design parameters adopted for the northern detention basin in TUFLOW.

Table 5-10 Northern Detention System Design Parameters (Depths and Areas include extended detention for water quality)

Contributing Catchments	Internal Base Area	Maximum Water Depth (including extended detention depth)	Detention Storage Volume	Control Outlets
INTNL-1	4811 m^2	1.88m (RL24.42m AHD)	4,442m^3	• 2 x 300mm dia low flow pipe outlets @ RL22.54m AHD; • 2 x 900x450 RCBC @ RL23.40m AHD

5.6.4 Conveyance Channel

A conveyance channel is proposed to be constructed along the eastern site boundary to convey flows from the following catchments to the eastern discharge location, being the four 1.75m high, 2.1m wide reinforced concrete box culverts which convey flows beneath Mount Lindesay Highway to the receiving waterway:

- INTNL-2A – INTNL-3C
- INTNL-4C
- INTNL-5
- EXTNL-1C (including flows discharged from the Southern Detention Basin)
- EXTNL-1D
- EXTNL-3A
- EXTNL-3B
- EXTNL-3B1
- EXTNL-3B2

A series of weirs are proposed to be constructed across the conveyance channel, upstream of the receiving stormwater drainage culverts, to control the flows released to the eastern discharge location, thus converting the conveyance channel into a combined conveyance and detention structure. This configuration was represented in the TUFLOW model to ensure flows are safely conveyed through the site and no adverse impacts occur upstream or downstream of the site.

Reference should be made to Figure 5-1 for the catchment plan and to the Engineering Drawings in Appendix B for catchment plans, channel dimensions, outlet details and a conceptual illustration of how the detention structure will operate.

6 HYDRAULIC ASSESSMENT

6.1 Methodology

The hydraulic assessment has been undertaken to evaluate how the proposed on-site detention basin and proposed development pad will manage flows being conveyed through the overland flow path.

The hydraulic assessment of the proposed overland flow path required a detailed understanding of the hydraulic and hydrological characteristics under a series of storm events.

To assess the complex flood behaviour around the site a TUFLOW two-dimensional flood model has been identified as the preferred method to accurately determine any impacts caused by the proposed development.

The hydraulic and hydrological impact assessment undertaken via a two-dimensional model presents more accurate results through utilising a grid to represent the catchment topography and complex existing flow distribution. The results are particularly relevant around the inflow and outflow locations of the site, determining peak flow rates, the extent of flood inundation as well as flow distribution.

6.2 Objectives

The primary objective of this assessment is to ensure the proposed stormwater management will not significantly change the flood behaviour against the existing condition at the areas immediately downstream and upstream of the site. The assessment considers the changes and if they would cause any actionable nuisance.

6.3 Model Set Up and Adopted Data

A TUFLOW 2D flood model has been created to assess any changes in flood behaviour caused by the proposed development as well as the conveyance of external flows through the site and flood impacts upstream and downstream of the site. The following sections provide discussion on the adopted inputs into the TUFLOW model.

6.3.1 Hydrology

Due to intrinsic complexity of 2D modelling and particularly modelling time, a DRAINS rainfall runoff model was used to determine the hydrograph for each Annual Exceedance Probability (AEP) event: 50%, 20%, 10%, 5%, 2% and 1% AEP. The results for this model were then used to give an indication of which duration would be critical at the assessment point (i.e. northern site boundary) however, the routing of flows through the catchment and determination of median temporal pattern has been undertaken in TUFLOW.

6.3.1.1 Determination of Critical Durations and Median Temporal Pattern

TUFLOW was run initially for the storm durations ranging from 60 minutes to 540 minutes using all 10 temporal patterns based on the results of the DRAINS modelling. Although the critical durations throughout the model were found to vary, at the downstream portion of the model, the critical durations would vary from 90min to 540min in the existing and developed case. As such, the model was then run for all these durations to determine potential impacts.

Once the critical durations were selected, the simulation output was processed as follows:

- For each storm duration, the median flood grid was extracted from the 10 temporal pattern flood grids using the TUFLOW utility asc_to_asc.exe, -statMedian switch.
- The median flood grids for each of the simulated durations were combined to form the maximum median flood grid for each AEP (max max).

6.3.1.2 Modelling Results

Modelling results have been assessed to compare the peak flow rates downstream of Mount Lindesay Highway and at the outlet of the Southern Detention Basin in the Existing Model Scenario and Developed Model Scenario, shown in Table 6-1.

Table 6-1 Peak Flow Rates Downstream

Scenario	Peak Flow Rate for Annual Exceedance Probability (m^3/s)					
	50%	20%	10%	5%	2%	1%
Downstream of Mount Lindesay Highway						
Existing	2.9	6.24	8.26	10.5	13.07	16.15 (16.16)
Developed	2.5	5.2	7.33	9.65	12.63	16.12 (15.57)
Difference	-0.4	-1.04	-0.93	-0.85	-0.44	-0.03
Outlet of Southern Detention Basin						
Existing	2.87	3.54	3.74	4.54	8.13	8.84 (9.41)
Developed	1.58	2.71	2.85	3.55	3.83	4.49 (6.68)
Difference	-1.29	-0.83	-0.89	-0.99	-4.3	-4.35

*Flow presented in this table are peak median values 'Rank 6"
1% AEP Mean flows provided in ( )

Table 6-2 Critical Temporal Pattern

AEP	Scenario	Duration	Selected Temporal Pattern(s)
50%	Existing	540 min	TP06
	Developed	540 min	TP05
20%	Existing	540 min	TP05
	Developed	540 min	TP06
10%	Existing	180 min	TP08
	Developed	360 min	TP02
5%	Existing	180 min	TP08
	Developed	360 min	TP04
2%	Existing	270 min	TP09
	Developed	180 min	TP20
1%	Existing	90 min	TP03
	Developed	120 min	TP02

6.3.2 Boundary Conditions

The downstream boundary condition has been set approximately 1150m downstream of the Mount Lindesay Highway drainage crossing (west to east). This set up has allowed the system to be generally free discharging with the main hydraulic control being the culvert crossing beneath Mount Lindesay Highway. It is noted however that an existing access road adjacent to the site boundary acts like a 'weir' in the existing and developed case allowing additional ponding within the site.

Due to recent updates to the Logan River flood model, Arcadis has conducted a sensitivity assessment based on water level information extracted from this model and applied at the boundary. Further discussion is provided in section 6.5.4 below.

6.3.3 Grid Size

A 2m grid has been adopted in the model to accurately represent the hydraulic features of the existing and proposed overland flow path.

To accurately depict the proposed western channel, the QUADTREE option in TUFLOW has been employed. This function has reduced the grid to 0.5m around the channel, ensuring the accurate representation of channel dimensions. To maintain consistency in the final comparison, the same approach was applied to the modelling of the existing condition.

6.3.4 Manning's Values

The Manning's values adopted as part of this assessment are provided in Table 6-3.

Table 6-3 Manning's Values

Land use	Manning's n
Medium Scrub	0.055 – 0.06
Dense Vegetation	0.1
Scattered Scrub	0.05
Open Ground (sparce grass)	0.027
Road	0.018
Swales	0.06 / 0.02

6.3.5 Existing Downstream Drainage Infrastructure

Mount Lindesay Highway drainage crossing (west to east)– 4 x 1.8 m high x 2.1m wide box culverts.

6.3.6 Planned Upstream Drainage Infrastructure

As discussed in section 3.5, Logan City Council will soon be upgrading the stormwater drainage infrastructure in Crowson Lane. As such the following planned and/or existing drainage infrastructure has been modelled in TUFLOW:

Mount Lindesay Highway drainage crossing (east to west)– 900mm dia RCP.

Crowson Lane West (north to south) – 1050mm dia RCP.

Crowson Lane East (north to south) – 1350mm dia RCP

Crowson Lane East (north to south) – 900mm dia RCP

6.3.7 Existing Model Scenario

The existing terrain has been represented based on LiDAR information for the area. Aerial photos as well as site visits have been used to determine the existing condition roughness.

6.3.8 Developed Model Scenario

The TUFLOW model has been modified to include the proposed industrial development including the proposed overland flow path.

6.4 Assumptions and Limitations

6.4.1 Key Limitations

6.4.1.1 LiDAR Ground Survey

The model topography has been based on LiDAR survey information (2018) provided in digital format with a 1m grid resolution. It is recommended this report be reviewed and amended as required in conjunction with the detailed design once detailed survey of the site and its boundaries is obtained.

6.4.1.2 Climate Change

Climate change has not been considered in this assessment.

6.4.1.3 Sensitivity

No sensitivity assessment for roughness has been considered in this assessment.

6.4.2 Key Assumptions

6.4.2.1 Proposed Development

This report has made assumptions on finished surface levels and roughness values of particular land use areas to show that a potential solution is available for the proposed development. In the event that the development proposal changes in any form or further applications are lodged with Council or EDQ, this report **must** be updated to reflect the changes made to the hydraulic conveyance capacity of the development site.

6.5 Model Results

The primary assessment of flood impacts has been undertaken using a comparison of the peak water surface levels resulting from the proposed development stormwater management and earthworks against the existing scenario terrain, under a variety of flood events. Appendix D of this report shows existing and developed scenario peak water depth ranges along with peak water surface level changes for a range of flood events (50%, 20%, 10%, 5%, 2% and 1% AEP). Additionally, the results section includes peak velocity maps for the existing and proposed scenarios.

6.5.1 Flood Depths

The project site hydraulic properties have been designed with the aim of minimising changes in flood behaviour both upstream and downstream of the site. Maximum depths in the existing case 1% AEP storm event are seen to reach approximately 1.1m adjacent to Mount Lindesay Highway.

Immediately downstream of the site flood depth in the 1% AEP reaches approximately 2.4m in both existing and developed cases. The proposed earthworks changes, creates and overland flow channel crossing the site from south to north. Depth within this channel is approximately 2.9m in the 1% AEP within the bounds of the site.

Figure 6-1 and Figure 6-2, below, provide the 1% AEP peak flood depths for both existing and developed cases respectively.

Figure 6-1 - Existing Peak Water Depth - 1% AEP

Figure 6-2 - Developed Peak Water Depth - 1% AEP

Table 6-4 1% AEP Channel Water Level

MD01		MD04	
Chainage	1% AEP Water Level	Chainage	1% AEP Water Level
0	24.84	0	25.62
100	24.82	40	25.62
200	24.58	80	25.62
300	24.51	120	25.62
400	24.51	180	25.62
500	24.51	-	-
600	24.51	-	-

6.5.2 Peak Water Surface Level Change

Modelling results show that generally, the existing flood behaviour outside of the site is maintained as per the existing condition. Changes in the water surface levels are generally positive with a reduction in levels in the proposed case scenario. Increase in water surface levels are contained to the site boundary, where earthworks are proposed.

Modelling results for all storm events up to the 1% AEP have been included in Appendix D.

Figure 6-3 - Developed Peak Water Surface Level Change - 50% AEP

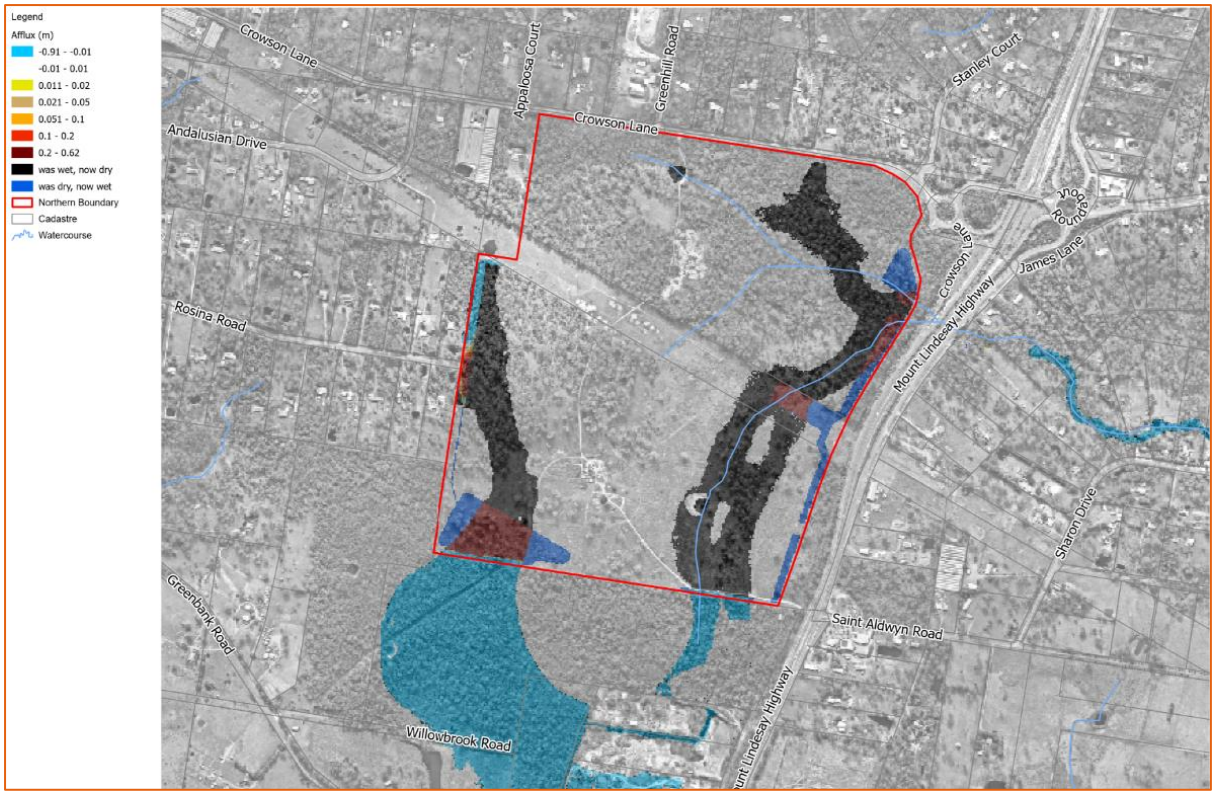


Figure 6-4 - Developed Peak Water Surface Level Change - 1% AEP

6.5.3 Peak Velocities

Modelling results are presented in Appendix D to show the peak velocities reached within the assessment area. Figure 6-5 and Figure 6-6, below, show an extract of the 1% AEP flood event peak velocity, with the results indicating that velocities are generally below 1m/s and unchanged upstream and downstream of the site. Within the proposed overland flow channel created by the earthworks, velocities are higher than existing case reaching 1.5m/s. At these locations the necessary scour protection will be provided.

Figure 6-5 - Existing Peak Water Velocity - 1% AEP

Figure 6-6 - Developed Peak Water Velocity - 1% AEP

No significant change in flow velocity is observed outside of the site. Modelling results are presented in Appendix D showing change in velocity for all events up to the 1% AEP.

Figure 6-7 – Change in Flow Velocity - 1% AEP

6.5.4 Blockage Sensitivity

A sensitivity assessment for pipe blockage has been conducted, modelling two scenarios: a 20% pipe blockage and a 50% pipe blockage. The results presented in Appendix D indicate that in the 20% blockage scenario, the flow is generally contained within the channel. In the 50% blockage scenario, minor spillage is observed at the downstream end of the eastern and western channels. However, it is worth noting that water levels are still below the finished floor level and the proposed sewer pump station.

Figure 6-8 demonstrates that the peak water level in the Southern Detention Basin increases slightly under the blocked scenario and the inundation time increases from approximately 6.5 hours to 9.5 hours during the 1% AEP event.

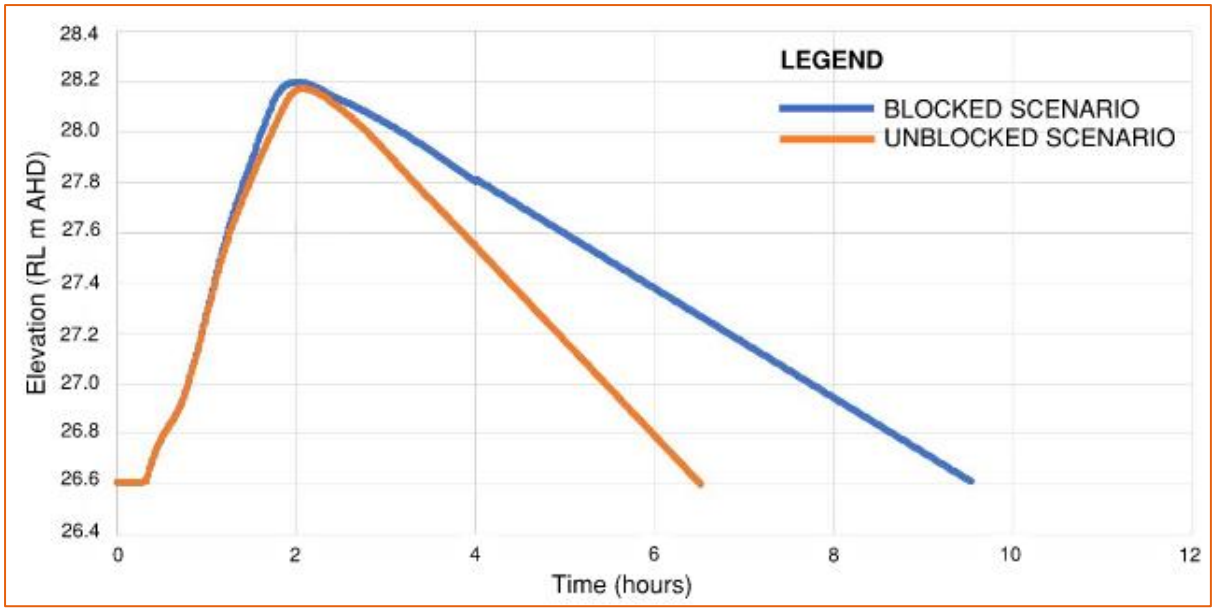


Figure 6-8 – Southern Basin Inundation Curves - 1% AEP

6.5.5 Regional Flood Sensitivity

A regional sensitivity has been undertaken based on the recently updated Logan River Flood Model. To undertake this assessment Arcadis has purchased the TUFLOW model and accompanying report. Based on this information Arcadis has determined that the peak water level for the site area occurs in the 72hr event.

Water levels for this event was then extracted and applied to the site-specific flood model as a boundary condition. Whilst the results indicated a higher water level downstream of the site, flood levels were generally below the peak water level for the site (540min). It is also noted that results indicated that the peak for the river occurs approximately 20hrs past the site peak which validates the assessment with a lower boundary.

Figure 6-9 - 1% AEP 72hr Regional Flood Depth and Extents

6.6 Objective Discussion

The above hydraulic investigation has demonstrated that suitable measures can be included in the design of the proposed development, to ensure that there is no increase in peak 1% AEP discharge being directed off-site to existing downstream infrastructure and no actionable nuisance caused to neighbouring properties as a result of the development.

6.7 Drainage System Safety

Urban drainage systems can present a risk to community during storms and times of flood. The consequences of interaction with the proposed drainage system and treatment areas can lead to physical harm and trauma. Notwithstanding the safety risks associated with the proposed stormwater structures can be managed though design and management techniques. In this instance it is considered necessary to develop risk assessment profile and implement where required appropriate design and management techniques. Refer to supplied Bulk Earthworks Engineering Plans for associated risk analysis and proposed management actions.

7 CONCLUSION

This SBSMPQ has been prepared to provide a design proposal and guide to the stormwater quantity management techniques and strategies for the site.

The primary objective of this SBSMPQ has been to ensure that:

1. **Suitable measures are incorporated in the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to peak discharging stormwater flow rates.**

This report has presented the methodology and results of a flood modelling assessment which has included the analysis of the impacts of the proposed development in comparison to the existing scenario. In particular this assessment has concentrated to the impact immediately upstream and downstream of the site where complex flood behaviour exists.

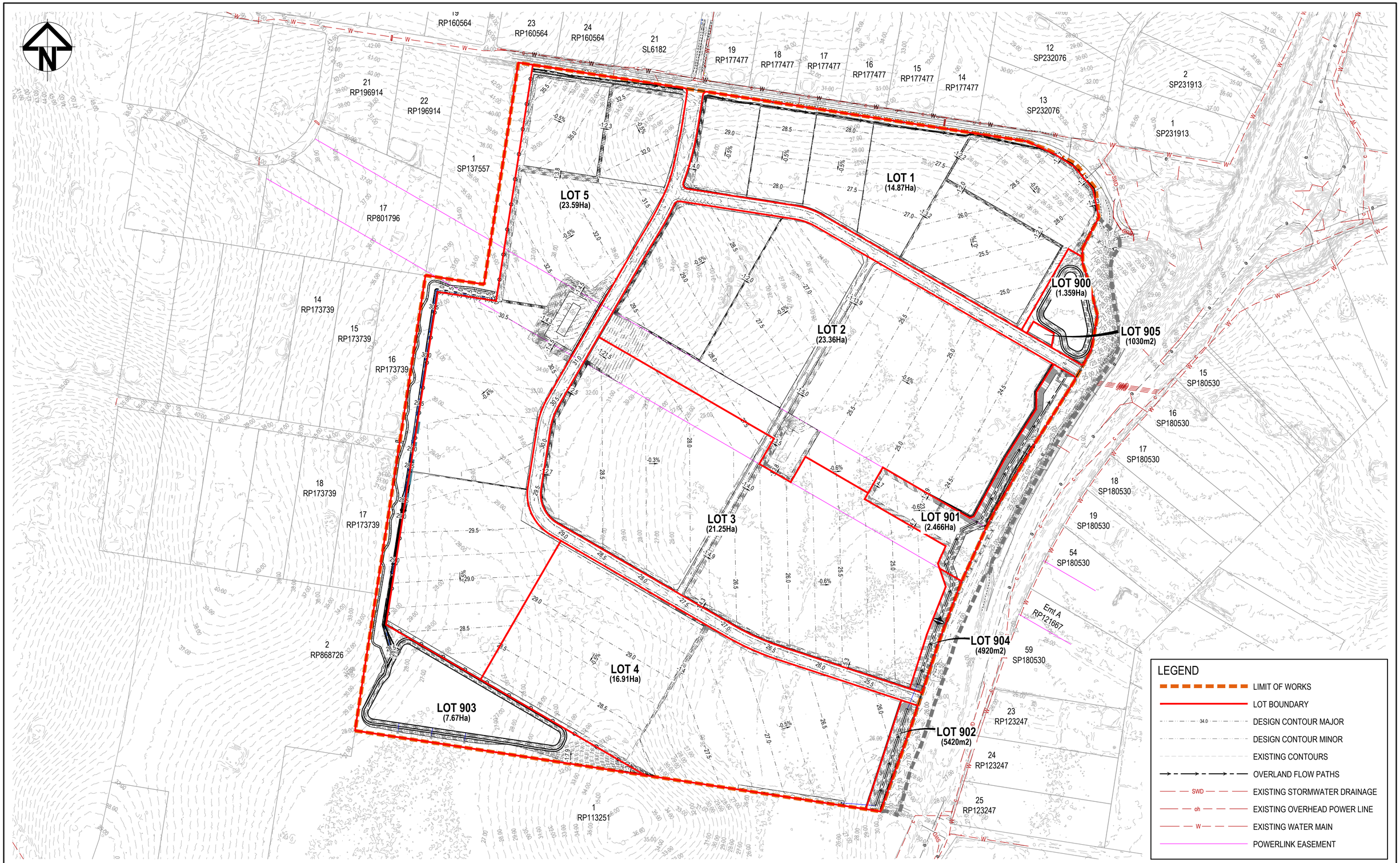
To undertake the assessment of the hydraulic conveyance changes as a result of the proposed development, Arcadis has created a TUFLOW model using results documented in the 4499 - 4651 Mount Lindesay Highway, North Maclean Site Based Stormwater Management Plan Report, EAG001-30139050-AAR-01. The assumptions and limitations associated with the modelling exercises undertaken are highlighted in this report and the subsequent results are summarised as follows.

Results indicate that the proposed development will generally improve flood conditions downstream of the site by applying the reduction of site stormwater discharge via the proposed detention systems.

Note: The proposed operational stormwater quality treatment train is detailed in the Site Based Stormwater Quality Management Plan (SBSQMP) (EAG003-30109334-AAR-01).

APPENDIX A

Functional Layout Plan



Issue	Description	DR	CH	VE	Date
05	OVERALL LAYOUT CHANGES	GP	GP	BK	15.08.2023
04	OVERALL LAYOUT CHANGES	GP	GP	BK	8.08.2023
03	DESIGN UPDATES ALONG 11m RESUMPTION BDY	GP	GP	BK	2.08.2023
02	DESIGN UPDATES	JG	EP	GE	13.02.2023
01	ORIGINAL ISSUE	EP	EP	GE	29.09.2022

Scales

0 30 60 120 180 240 300m

1 : 3000

100mm on Original

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Architect

-

Client

Charter Hall

Status

CONCEPT DESIGN ONLY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	G.PUMNUT	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	MGA
Verified	B.KITSON		

Project

4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Title

OVERALL SITE LAYOUT

ARCADIS

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Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30109334	AAP	WS00OP	CV	SKT	018	05

Date Plotted: 15 Aug 2023 - 08:45AM File Name: C:\Users\gp117798\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS00OP-CV-SKT-018-Lot Layout.dwg V1

APPENDIX B

Engineering Drawings and Site Topography

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
2 NO. 0.9m x 0.45 RCBC
USIL = 23.400
DSIL = 22.500
LENGTH = 60.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
2 NO. 300mm DIA PIPE CLASS 4
USIL = 22.540
DSIL = 21.550
LENGTH = 60.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
1 NO. 375mm DIA PIPE CLASS 4
USIL = 21.56
DSIL = 21.55
LENGTH = 5.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING FOR EACH SCREEN SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
1 NO. 300mm DIA PIPE CLASS 4
USIL = 22.656
DSIL = 22.639
LENGTH = 5.0m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

1 NO. 1050mm DIA PIPE CLASS 4
USIL = 28.00
DSIL = 27.55
LENGTH = 70m

2 NO. 750mm DIA PIPE CLASS 4
USIL = 27.52
DSIL = 27.46
LENGTH = 5m

1 NO. 3.6 x 1.2 RCBC
USIL = 27.56
DSIL = 26.6
LENGTH = 280m

DETENTION BASIN TO BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED SITE BASED STORMWATER MANAGEMENT PLAN (SOUTHERN CATCHMENT) REF. 11-0001-30101970 (DAWE REF. EPBC 2013/6941)

BASIN
RL=26.607

2 NO. 2.1m x 1.2m RCBC,
USIL = 24.50
DSIL = 24.25
LENGTH = 56.5m.
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

3 NO. 900mm DIA PIPES CLASS 4
USIL = 26.607
DSIL = 26.48
LENGTH = 14.3m

05 WEIR WIDTH = 64m AT RL28.0m AHD

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

BASIN
RL=22.539

1 NO. 375mm DIA PIPE CLASS 4
USIL = 23.236
DSIL = 23.199
LENGTH = 10.5m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

1 NO. 2.2m x 0.9m RCBC
USIL = 23.64
DSIL = 23.62
LENGTH = 43.0m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

FUTURE INTERNAL ROAD DRAINAGE CONNECTION TO EXISTING HIGHWAY CULVERTS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE EXTENSION OF EXISTING HIGHWAY CULVERTS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE GABION WALL TO BE CONSTRUCTED WITH ADJOINING SERVICE ROAD WORKS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE GABION WALL TO BE CONSTRUCTED WITH ADJOINING SERVICE ROAD WORKS. DETAILS INCLUDED TO SERVICE ROAD DESIGN PACKAGE AND SUBJECT TO DTMR APPROVAL

PROPOSED BUND

PROPOSED BUND

LEGEND

- EXISTING SURFACE CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- PROPOSED STORMWATER DRAINAGE
- PROPOSED STORMWATER HEADWALL
- EXISTING STORMWATER DRAINAGE
- EXISTING WATER RETICULATION
- EXISTING COMMUNICATIONS
- EXISTING OVERHEAD ELECTRICAL
- EXISTING UNDERGROUND ELECTRICAL
- POWERLINK EASEMENT
- EXISTING FENCE
- TOP OF BANK
- TOE OF BANK
- FAUNA EXCLUSION FENCE
- PROPOSED SLEEPER RETAINING WALL
- PROPOSED BLOCKWORK RETAINING WALL
- PROPOSED A-GRADE SANDSTONE BOULDER RETAINING WALL
- FUTURE GABION WALL

Issue	Description	DR	CH	VE	Date
05	WEIR WIDTH ADDED	A.O.	T.F.	B.K.	06.07.23
04	DESIGN UPDATES	A.O.	T.F.	G.E.	20.06.23
03	DESIGN UPDATES	A.O.	E.P.	G.E.	21.02.23
02	DESIGN UPDATES	J.G.	E.P.	G.E.	08.02.23
01	ORIGINAL ISSUE	J.G.	E.P.	G.E.	24.10.22

100mm on Original

Scales
0 50 100 150 200m
1 : 2000

Surveyor
WOLTER consulting group
Planning Urban Design Landscape Environment Surveying

Architect
-

Client
Charter Hall

Status
CONCEPTUAL DESIGN ONLY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	A.OSORIO	Original Size	A1
Designed	S.SEM	Height Datum	AHD
Project Manager	B.KITSON	Grid	LOCAL
Verified	G. ELLIS	R.P.E.Q. No: 17942 Date	

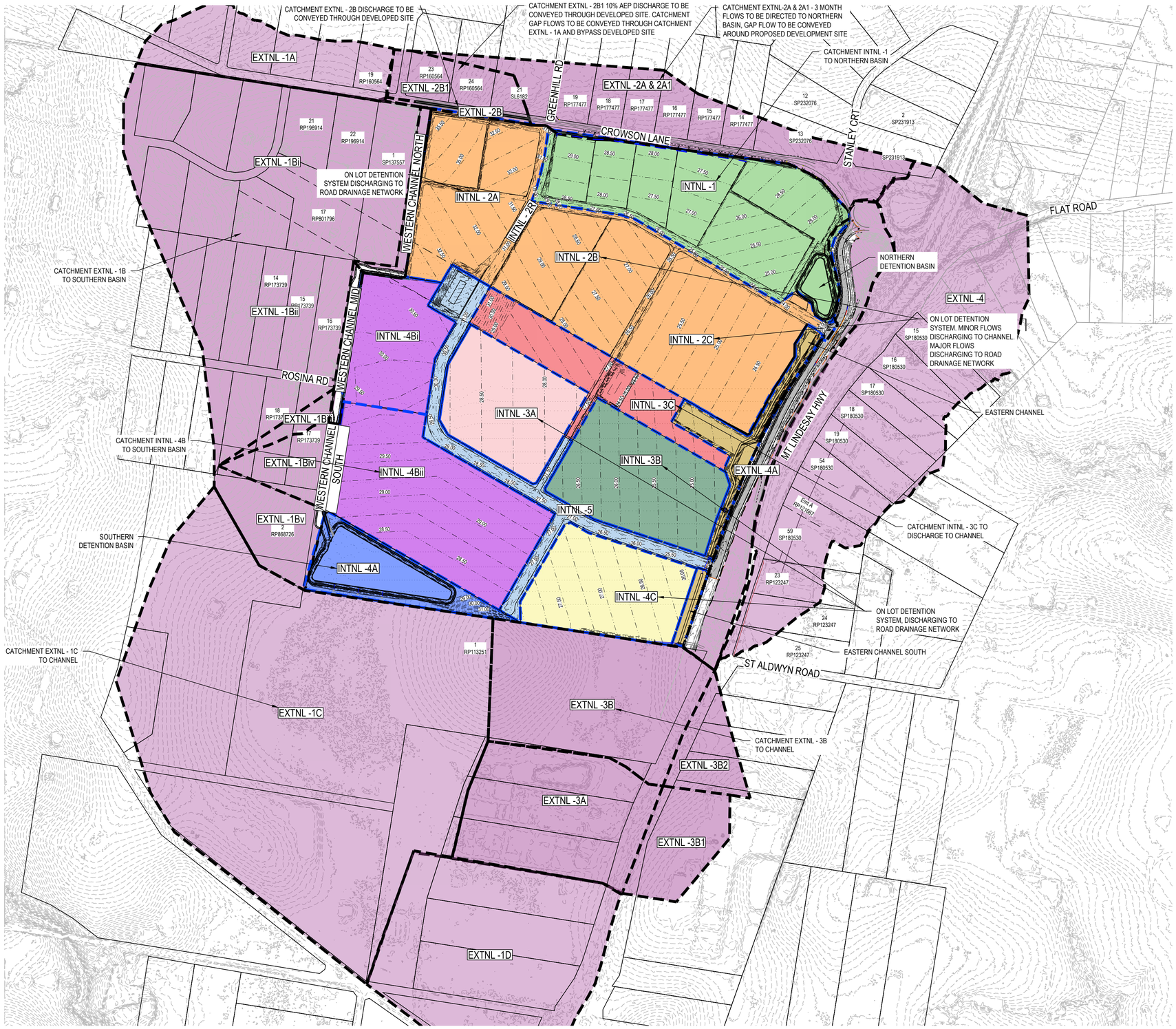
Project
4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Title
CHANNEL SKETCH PLAN

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30109334	AAP	WS00OP	CV	SKT	011	05

Date Plotted: 6 Jul 2023 - 03:39PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS00OP-CV-SKT-011-ChannelSketch.dwg V1



LEGEND

- EXISTING SURFACE CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- EXTERNAL STORMWATER CATCHMENT
- POST DEVELOPMENT STORMWATER CATCHMENT

CATCHMENT AREAS

LABEL	AREA (Ha)
EXTNL - 1A	7.224
EXTNL - 1Bi	23.636
EXTNL - 1Bii	16.974
EXTNL - 1Biii	0.903
EXTNL - 1Biv	3.366
EXTNL - 1Bv	4.203
WESTERN CHANNEL NORTH	1.244
WESTERN CHANNEL MID	0.960
WESTERN CHANNEL SOUTH	0.517
EXTNL - 1C	64.974
EXTNL - 1D	19.78
EXTNL - 2A & 2A1	12.652
EXTNL - 2B1	2.070
EXTNL - 3A	12.150
EXTNL - 3B	14.090
EXTNL - 3B1	4.830
EXTNL - 3B2	2.810
EXTNL - 4	34.632
EXTNL - 4A	8.764
INTNL - 1	17.052
INTNL - 2A	8.918
INTNL - 2B	8.821
INTNL - 2C	10.479
INTNL - 2R	3.472
INTNL - 3A	7.740
INTNL - 3B	9.165
INTNL - 3C	6.271
INTNL - 4A	5.529
INTNL - 4Bi	6.553
INTNL - 4Bii	13.967
INTNL - 4C	7.916
INTNL - 5	5.958
EASTERN CHANNEL	2.904
EASTERN CHANNEL SOUTH	0.546

Issue	Description	DR	CH	VE	Date
02	RFI RESPONSE	T.F.	D.C.	G.E.	20.06.23
01	FOR APPROVAL	J.G.	E.P.	G.E.	24.01.23

Scales

0 50 100 200 300 400 500m

1 : 5000

100mm on Original

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Architect: -

Client: Charter Hall

Status: CONCEPT DESIGN ONLY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	L. STAUNTON	Original Size	A1
Designed	L. STAUNTON	Height Datum	AHD
Project Manager	T. FANNING	Grid	LOCAL
Verified	G. ELLIS	R.P.E.Q. No: 17942 Date	

Project: 4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Title: POST-DEVELOPMENT CATCHMENT PLAN

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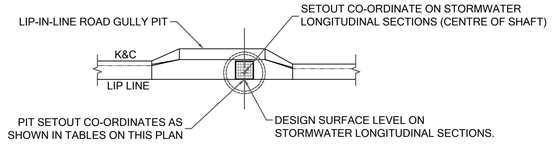
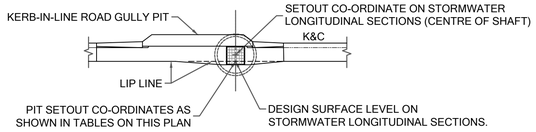
Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30109334 -	AAP	- WS00OP -	CV -	SKT -	024A -	02

Date Plotted: 22 Jun 2023 - 04:45PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindsay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS00OP-CV-SKT-024-SWDReportCatchments.dwg V1



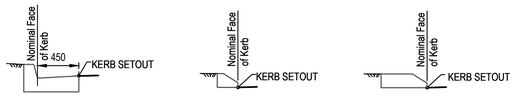
LIP IN LINE GULLY PIT SETOUT DETAIL

Not to Scale



KERB IN LINE GULLY PIT SETOUT DETAIL

Not to Scale



450mm TYPE B1 KERB AND CHANNEL | TYPE SM4 MOUNTABLE KERB | TYPE SM5 MOUNTABLE KERB

KERB SETOUT DETAIL

N.T.S.

LEGEND

- EXISTING TREE TO REMAIN
- ENVIRONMENTALLY / CULTURALLY SIGNIFICANT TREE
- EXIST. ELECTRICAL OVERHEAD
- EXIST. ELECTRICAL UNDERGROUND
- EXIST. UNDERGROUND GAS
- EXIST. TELECOMMUNICATIONS OVERHEAD
- EXIST. TELECOMMUNICATIONS UNDERGROUND
- EXIST. SEWER LINE
- EXIST. WATER MAIN
- EXIST. STORMWATER PIPE (RCP 375Ø)
- EXIST. INVERT
- EXIST. TOP OF BANK
- EXIST. BOTTOM OF BANK
- EXIST. POWER / PROPERTY / LIGHT / STAY POLE
- EXIST. TELECOMMUNICATIONS PIT
- EXIST. PROPERTY BOUNDARY
- EXIST. KERB & CHANNEL – BARRIER TYPE (B1)
- EXIST. KERB – SEMI MOUNTABLE TYPE (SM5)
- EXIST. EDGE OF BITUMEN
- EXIST. FENCE TO REMAIN
- PROPOSED ELECTRICAL OVERHEAD
- PROPOSED ELECTRICAL UNDERGROUND
- PROPOSED UNDERGROUND GAS
- PROPOSED TELECOMMUNICATIONS OVERHEAD
- PROPOSED TELECOMMUNICATIONS UNDERGROUND
- PROPOSED SEWER LINE
- PROPOSED WATER MAIN
- PROPOSED STORMWATER PIPE (375mm)
- PROPOSED INVERT
- PROPOSED TELECOMMUNICATIONS PIT
- PROPOSED PROPERTY / POWER / LIGHT POLE
- PROPOSED ELECTRICAL PITS / PILLAR
- PROPOSED PROPERTY BOUNDARY / RESUMPTION
- PROPOSED DRAINAGE EASEMENT BOUNDARY
- PROPOSED KERB & CHANNEL – BARRIER TYPE (B1)
- PROPOSED KERB – SEMI MOUNTABLE TYPE (SM4)
- PROPOSED KERB – SEMI MOUNTABLE TYPE (SM5)
- PROPOSED EDGE OF BITUMEN
- PROPOSED BOUNDARY FENCE LINE
- PROPOSED GUARDRAIL
- PROPOSED PEDESTRIAN FENCE
- PROPOSED TYPE 1 FAUNA FENCE
- PROPOSED TYPE 2 FAUNA FENCE
- PROPOSED RETAINING WALL
- PROPOSED SUBSOIL DRAIN

CROSS DRAINAGE SETOUT TABLE

ITEM I.D	INLET			OUTLET			PIPE DETAILS				SCOUR PROTECTION	
	EASTING	NORTHING	I.L	EASTING	NORTHING	I.L	PIPE TYPE	PIPE SIZE (mm)	No. of CELLS	PIPE LENGTH (m)	INLET	OUTLET
CC09	499617.826	6929993.19	44.342	499593.899	6929988.566	43.33	RCP CL3	375	2	24.37	YES	YES
DC01	499424.366	6930385.895	52.293	499428.587	6930378.473	52.25	RCP CL3	375	1	8.54	YES	YES
DC04	499588.685	6930106.889	46.771	499593.423	6930095.651	46.61	RCP CL3	375	1	12.2	YES	YES
DC05	499617.719	6930010.003	44.778	499618.511	6930000.276	44.726	RCP CL3	450	1	9.76	YES	YES
DC06	499397.92	6930430.81	52.815	499393.379	6930438.041	52.77	RCP CL3	375	1	8.54	YES	YES
DC07	499394.117	6930468.096	52.97	499398.009	6930461.898	52.93	RCP CL3	375	1	7.32	YES	YES
DC08	499589.246	6929942.696	41.835	499588.322	6929935.44	41.72	RCP CL3	450	1	7.31	YES	YES
DC09	498596.573	6929056.011	27.541	498598.643	6929063.032	27.516	RCP CL3	375	1	7.32	YES	YES
DC10	498612.043	6929043.699	27.647	498614.478	6929050.601	27.605	RCP CL3	375	1	7.32	YES	YES
DC11	500111.525	6930131.905	48.075	500117.242	6930129.776	48.054	RCP CL3	450	1	6.1	YES	YES
DC12	498726.144	6929504.568	23.298	498728.019	6929512.896	23.206	RCP CL3	450	1	8.54	YES	YES
DC13	498722.343	6930248.904	30.832	498719.759	6930255.745	30.67	RCP CL3	450	1	7.31	YES	YES
DC14	498718.386	6930259.685	30.208	498714.804	6930270.059	30.05	RCP CL3	450	1	10.97	YES	YES
DC15	498673.369	6930406.825	28.808	498674.944	6930399.678	28.771	RCP CL3	450	1	7.32	YES	YES
DC16	499464.006	6930362.793	51.669	499468.297	6930356.865	51.595	RCP CL3	375	1	7.32	YES	YES
DC17	501600.736	6929778.919	29.916	501606.664	6929778.002	29.86	RCBC	600x300	1	6.00	YES	YES

WARNING!

BEWARE OF UNDERGROUND SERVICES. THE LOCATIONS OF UNDERGROUND SERVICES HAS BEEN INTERPOLATED FROM EASIMAP DATA OR KNOWN POSITIONS OF VALVES, MANHOLES ETC. OR INFORMATION SUPPLIED BY SERVICE AUTHORITIES. NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THE INTERPOLATED INFORMATION SUPPLIED. ENSURE ALL SERVICES ARE ACCURATELY LOCATED PRIOR TO COMMENCEMENT OF WORK.

NOTES

1. REFER TO DRAWING SET "G" FOR GENERAL NOTES.
2. REFER TO DRAWING SET "D" FOR ROAD LAYOUT PLANS.
3. REFER TO DRAWING SET "CL" FOR CONTROL LINE SETOUT PLANS.
4. REFER TO DRAWING SET "LM" FOR LINEMARKING & SIGNAGE PLANS.
5. REFER TO DRAWING SET "E" FOR SERVICES PLANS.
6. REFER TO DRAWING SET "EW" FOR EARTHWORKS PLANS.
7. REFER TO DRAWING SET "GR" FOR GUARDRAILS, RETAINING WALLS AND FENCING NOTES, PLANS AND DETAILS.
8. REFER TO DRAWING SET "DD" FOR CROSS CULVERT DETAILS.
9. REFER TO DRAWING SET "DS" FOR STORMWATER PIPE CLASSES, INVERT LEVELS AND MANHOLE SIZES.
10. REFER TO SHEETS 31&32 FOR STORMWATER GULLY PIT SETOUT TABLES.
11. CONTOURS SHOWN ON THE PLAN ARE FINISHED SURFACE CONTOURS.
12. ROCK SCOUR PROTECTION DEPTH & SIZE AS PER TABLE THIS SHEET, WITH BIDIM A34 GEOFABRIC 50 MATERIAL OR APPROVED ALTERNATIVE U.N.O.
13. EXISTING SWALE DRAINS BEYOND THE LIMITS OF CONSTRUCTION ARE TO REMAIN UNDISTURBED DURING CONSTRUCTION. IF DISTURBED, DRAINS ARE TO BE REINSTATED TO PREVIOUS CONDITION, AS PER IPWEA STD. DWG. RS-056. REFER TO "TYPICAL DRIVEWAY SECTION – ROAD IN CUT" AND "TYPICAL DRIVEWAY SECTION – ROAD IN FILL".
14. ALL REINFORCED CONCRETE PIPE (RCP) CULVERTS ARE TO BE MINIMUM CLASS 3 U.N.O.
15. ALL INSTALLATION, BEDDING AND BACKFILLING OF PROPOSED STORMWATER PIPES, REFER IPWEA STD DWG DS-030.
16. ALL ROAD CROSSING CULVERTS WITH PRECAST HEADWALLS ARE TO BE FITTED WITH CAST INSITU HEADWALL EXTENSIONS AND CUTOFF WALLS IN ACCORDANCE WITH MAIN ROADS STANDARD DRAWING 1243.
17. DESIGN BASED ON MANUFACTURER HUMES. ALTERNATE SHOULD BE CHECKED AGAINST THIS DESIGN.
18. SUBSOIL DRAINS TO BE CONSTRUCTED IN ACCORDANCE WITH IPWEA STD. DWG. RS-140, RS-142.

Δ NOTE: Setout of box culvert structures is based on "ROCLA" products. Adjustments to setout points to be made by contractor if selected product dimensions vary.

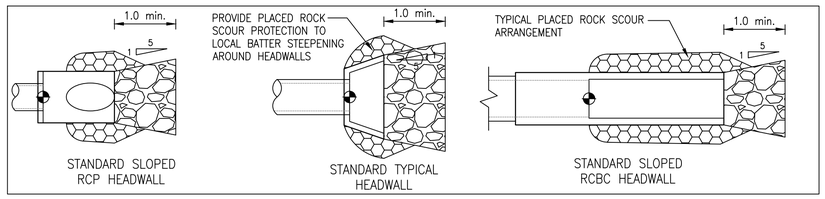
Δ MAJOR CULVERT SETOUT TABLE

POINT No.	EASTING	NORTHING	HEIGHT	COMMENT
4B1	498819.626	6929691.556	19.060	CC04 BASE
4B2	498818.218	6929677.564	19.029	CC04 BASE
4B3	498816.472	6929674.609	19.029	CC04 BASE
4B4	498766.732	6929703.990	19.318	CC04 BASE
4B5	498768.141	6929717.985	19.348	CC04 BASE
4B6	498769.885	6929720.938	19.348	CC04 BASE
4H1	498763.633	6929728.448	19.348	CC04 HW
4H2	498768.564	6929706.895	23.300	CC04 HW
4H3	498761.257	6929704.082	19.317	CC04 HW
4H4	498822.724	6929667.099	19.029	CC04 HW
4H5	498817.793	6929688.651	23.044	CC04 HW
4H6	498820.658	6929693.501	19.061	CC04 HW
4H7	498825.331	6929693.455	19.061	CC04 HW
5B1	498811.958	6929652.750	21.915	CC05 BASE
5B2	498766.843	6929658.812	22.206	CC05 BASE
5B3	498762.230	6929624.480	22.206	CC05 BASE
5B4	498807.345	6929618.419	21.915	CC05 BASE
5H1	498811.615	6929615.170	21.890	CC05 HW
5H2	498816.935	6929654.756	21.890	CC05 HW
5H3	498762.574	6929662.061	22.230	CC05 HW
5H4	498757.254	6929622.474	22.230	CC05 HW
6B1	498803.742	6929595.439	22.947	CC06 BASE
6B2	498797.009	6929559.291	22.947	CC06 BASE
6B3	498752.477	6929567.807	23.258	CC06 BASE
6B4	498759.210	6929603.955	23.258	CC06 BASE
6H1	498806.286	6929596.285	22.949	CC06 HW
6H2	498799.084	6929557.546	22.949	CC06 HW
6H3	498749.941	6929566.959	23.260	CC06 HW
6H4	498757.142	6929605.698	23.260	CC06 HW
1H1	499137.054	6930113.714	35.365	CC01 HW
1H2	499131.492	6930112.208	35.365	CC01 HW
1H3	499118.637	6930159.657	35.780	CC01 HW
1H4	499124.199	6930161.163	35.780	CC01 HW
1B1	499134.333	6930116.966	35.364	CC01 BASE
1B2	499132.200	6930116.388	35.364	CC01 BASE
1B3	499121.311	6930156.579	35.781	CC01 BASE
1B4	499123.444	6930157.157	35.781	CC01 BASE
3B1	498658.195	6930343.912	25.765	CC03 BASE
3B2	498657.084	6930348.705	25.765	CC03 BASE
3B3	498690.565	6930356.466	26.302	CC03 BASE
3B4	498691.676	6930351.673	26.302	CC03 BASE
3H1	498695.615	6930360.554	26.300	CC03 HW
3H2	498698.010	6930350.223	26.300	CC03 HW
3H3	498653.418	6930339.887	25.507	CC03 HW
3H4	498651.023	6930350.218	25.507	CC03 HW
8B1	498647.604	6929115.133	26.268	CC08 BASE
8B2	498646.074	6929110.795	26.268	CC08 BASE
8B3	498611.803	6929122.884	26.628	CC08 BASE
8B4	498613.334	6929127.222	26.628	CC08 BASE
8H1	498648.590	6929115.525	26.269	CC08 HW
8H2	498646.594	6929109.866	26.269	CC08 HW
8H3	498610.816	6929122.489	26.631	CC08 HW
8H4	498612.812	6929128.148	26.631	CC08 HW

SURFACES LEGEND

- PAVEMENT CONSTRUCTION – ASPHALTIC CONCRETE
- DRIVEWAYS – REFER TO DRAWING SET "DW" FOR DRIVEWAY PAVEMENT DETAILS
- CONCRETE FOOTPATH / SHARED PATH
- CONCRETE CAPPING – 100mm tk. 25MPa SL62 MESH
- MEDIAN LANDSCAPING – REFER TO LANDSCAPING PLANS (BY OTHERS)

PAVEMENT NOTES:
1. REFER TO DRAWING SET "R" FOR ROAD PAVEMENT DETAILS.
2. REFER TO DRAWING SET "DW" FOR DRIVEWAY PAVEMENT DETAILS



STANDARD SLOPED RCP HEADWALL | STANDARD TYPICAL HEADWALL | STANDARD SLOPED RCBC HEADWALL

SINGLE CULVERT TYPICAL SETOUT POINT DETAIL

ROCK SCOUR PROTECTION

LOCATION	D_{50} ROCK SIZE (mm)	DEPTH (mm)	Approx. Vol (m^3)
Outlet 1/03	300	600	9.4
Outlet 1/17	200	400	1.7
Outlet 1/25	200	400	2.3
Outlet 1/32	200	400	0.7
Outlet 1/36	200	400	0.6
Outlet 1/39	200	400	1.4
CC01 inlet	200	400	7.6
CC01 outlet	200	400	26.4
CC03 inlet	300	600	35.1
CC03 outlet	300	600	34.9

ROCK SCOUR PROTECTION

LOCATION	D_{50} ROCK SIZE (mm)	DEPTH (mm)	Approx. Vol (m^3)
CC04 inlet	400	800	403.3
CC04 outlet	400	800	700.9
CC05 inlet	200	400	55.2
CC05 outlet	200	400	55.2
CC06 inlet	200	400	33.3
CC06 outlet	200	400	21.9
Outlet 1/121	300	600	53.0
CC08 inlet	200	400	7.1
CC08 outlet	200	400	7.1
all driveway culverts (in/outlet)	100	200	1.0 (each culvert)

PRELIMINARY
NOT FOR CONSTRUCTION

AMENDMENTS	BY	CHKD	APP'D	DATE

WESTERA PARTNERS
STRUCTURAL+CIVIL+ENVIRONMENTAL ENGINEERS
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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
REFER TO DRAWING SET "CL" FOR DETAILS				

BAR SCALES (A1 UNREDUCED)

NOT TO SCALE

CITY OF LOGAN

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	B19175	
COMP. REF.	SWDLAY.dwg	
SURVEYOR	T.J.K.	26.08.20
SURVEY REF.	CD45	
DESIGNED	R.vdB	10.05.21
CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION
DRAINAGE NOTES AND LEGEND, CROSS DRAINAGE SETOUT TABLE SHEET 1 OF 1

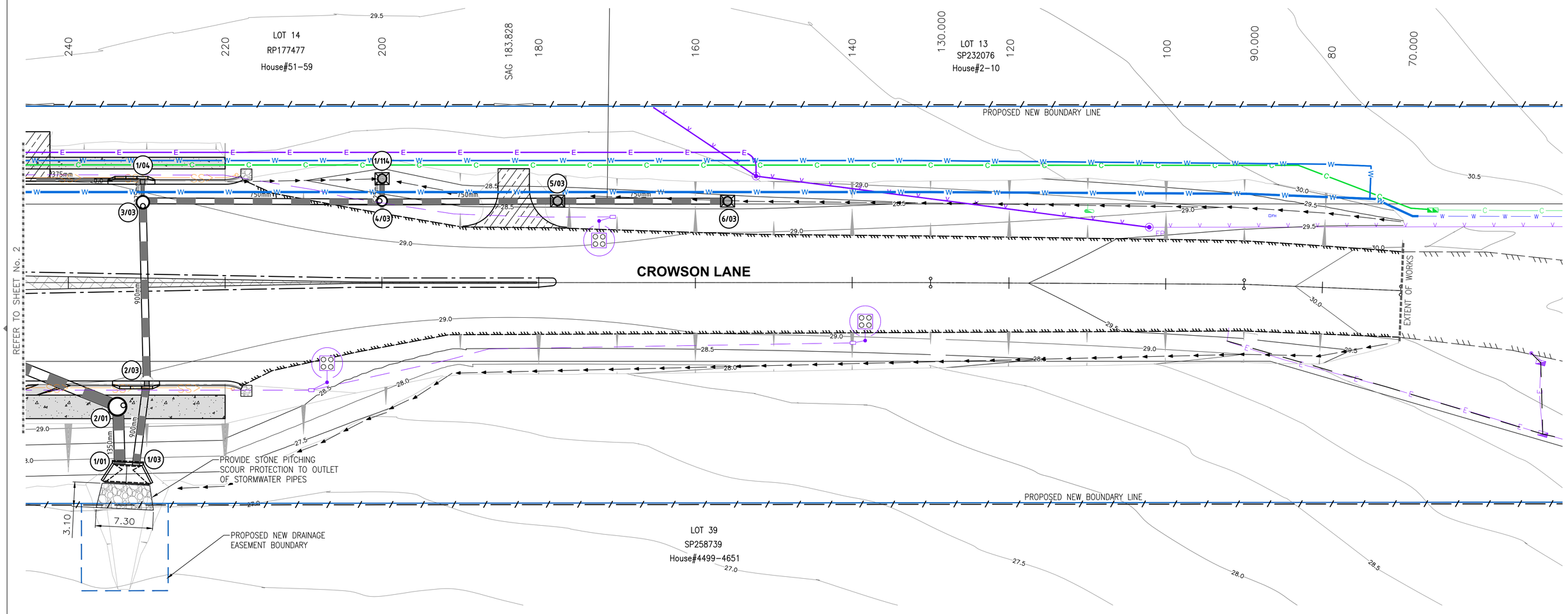
APPROVED
DESIGN ENGINEER DATE

SHEET 1 OF 1

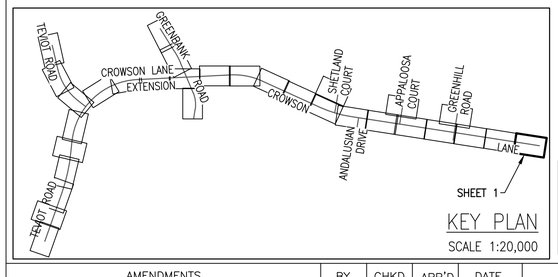
DRAWING NUMBER
1 | B19175-DR00 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1



PLAN 1
SCALE 1:250



KEY PLAN
SCALE 1:20,000

PRELIMINARY
NOT FOR CONSTRUCTION

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

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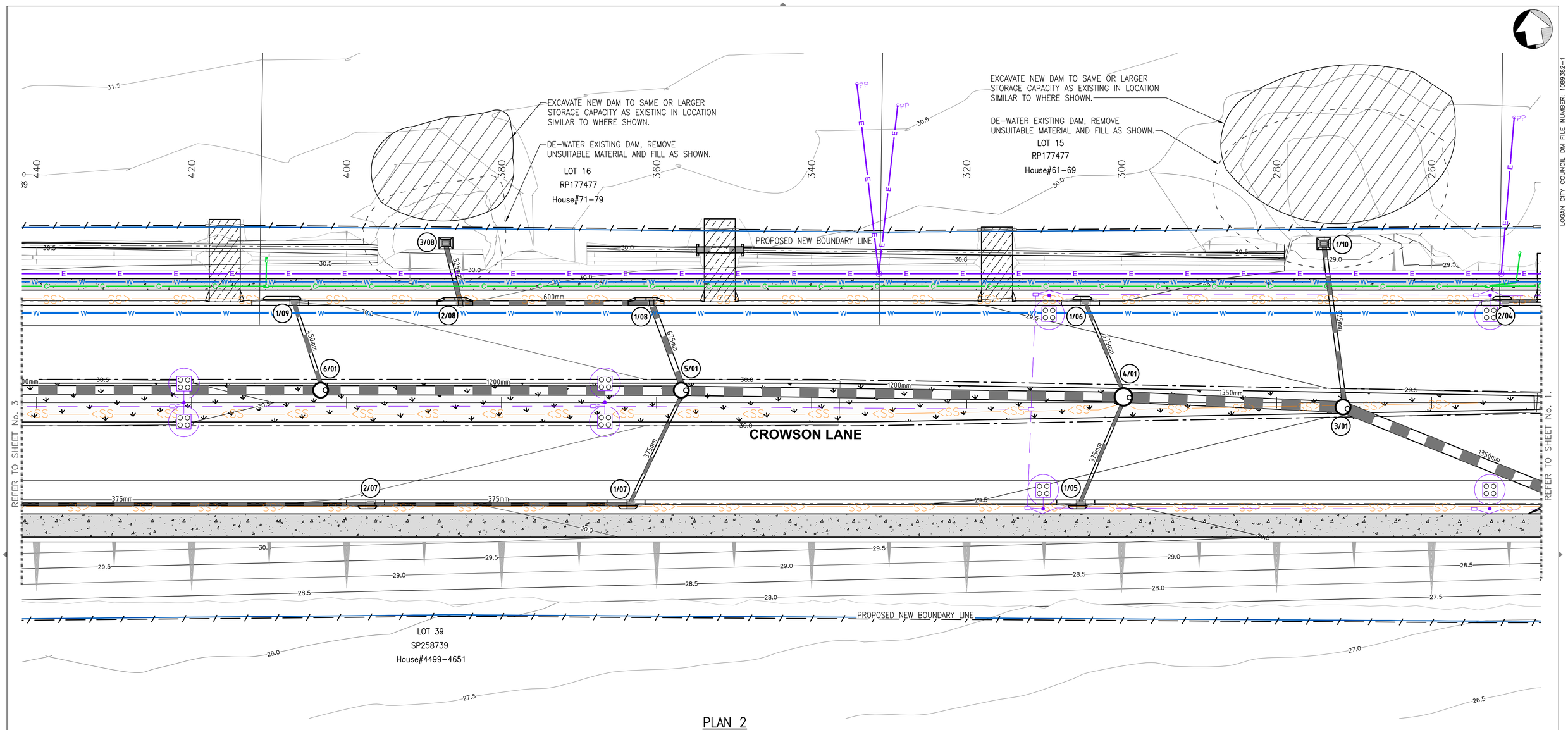
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 1 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 1 OF 33

DRAWING NUMBER
1 | B19175-DR01 | –

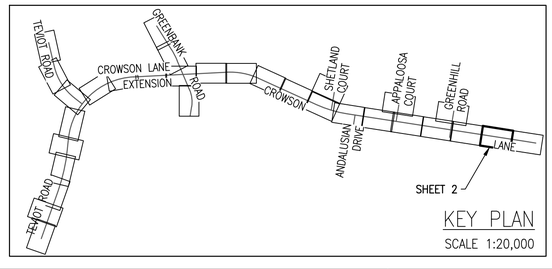


PLAN 2

SCALE 1:250

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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0 5 10 15 20m
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 2 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 2 OF 33

DRAWING NUMBER
1 | B19175-DR02 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

DE-WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

LOT 19
RP177477
House#101-109

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

LOT 18
RP177477
House#91-99

DE-WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

LOT 17
RP177477
House#81-89

DE-WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

PROPOSED NEW BOUNDARY LINE

CROWSON LANE

PROPOSED NEW BOUNDARY LINE

LOT 39
SP258739
House#4499-4651

REFER TO SHEET No. 5

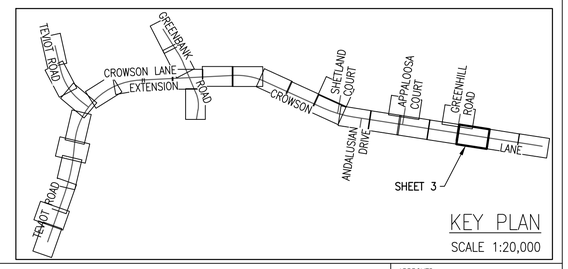
REFER TO SHEET No. 2.

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

PLAN 3
SCALE 1:250

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION

REFER TO DRAWING SET "CL" FOR DETAILS

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

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CHECKED	S.T.	02.09.22

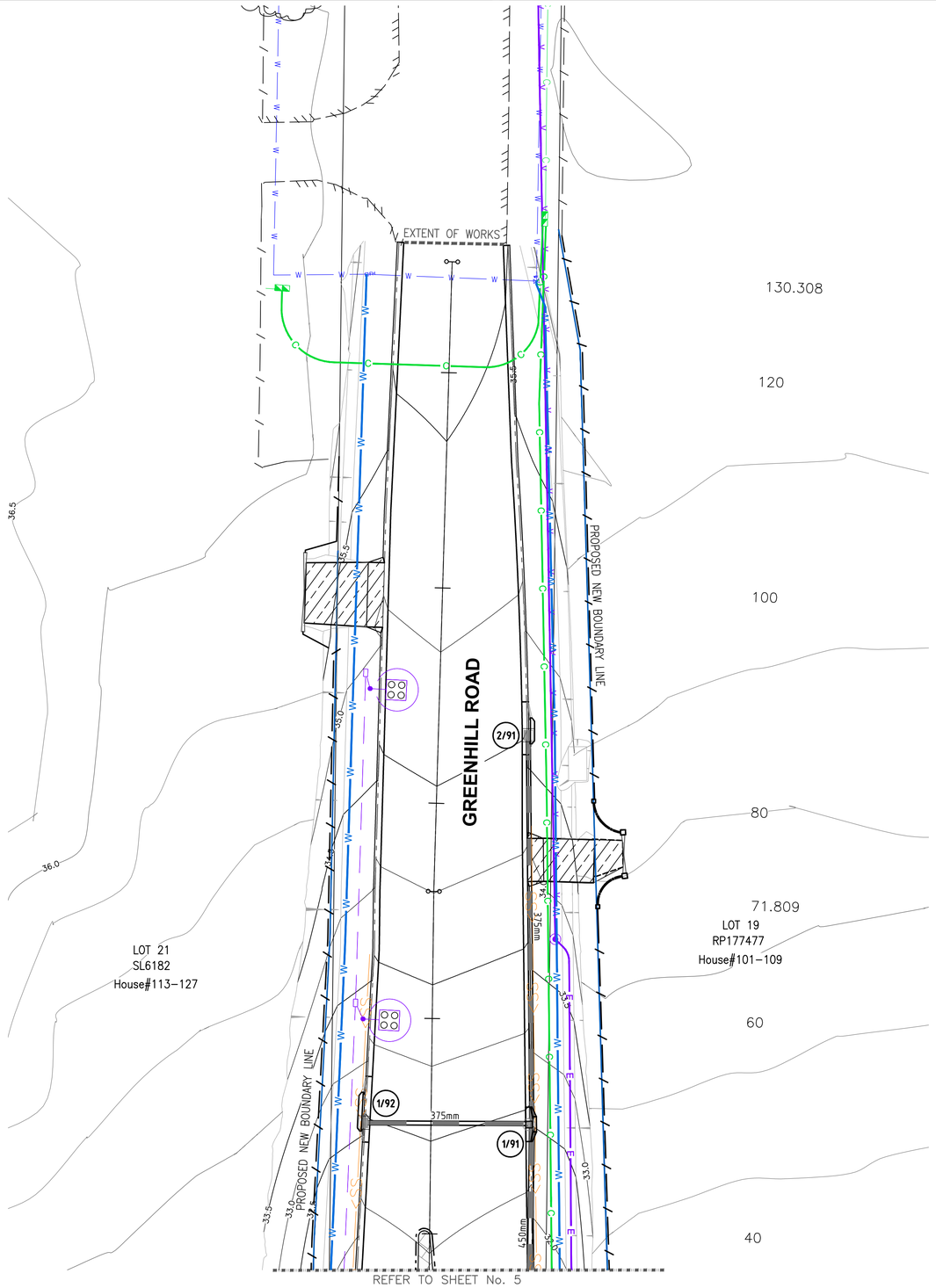
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 3 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 3 OF 33

DRAWING NUMBER
1 | B19175-DR03 | -

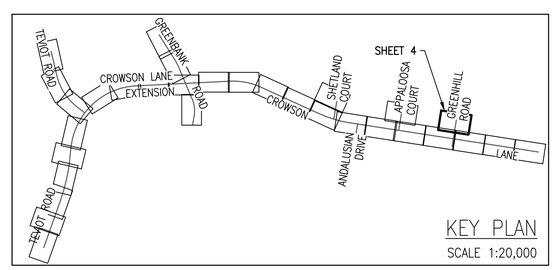


PLAN 4

SCALE 1:250

NOTE:
REFER TO DRAWING B19175–DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN

SCALE 1:20,000

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

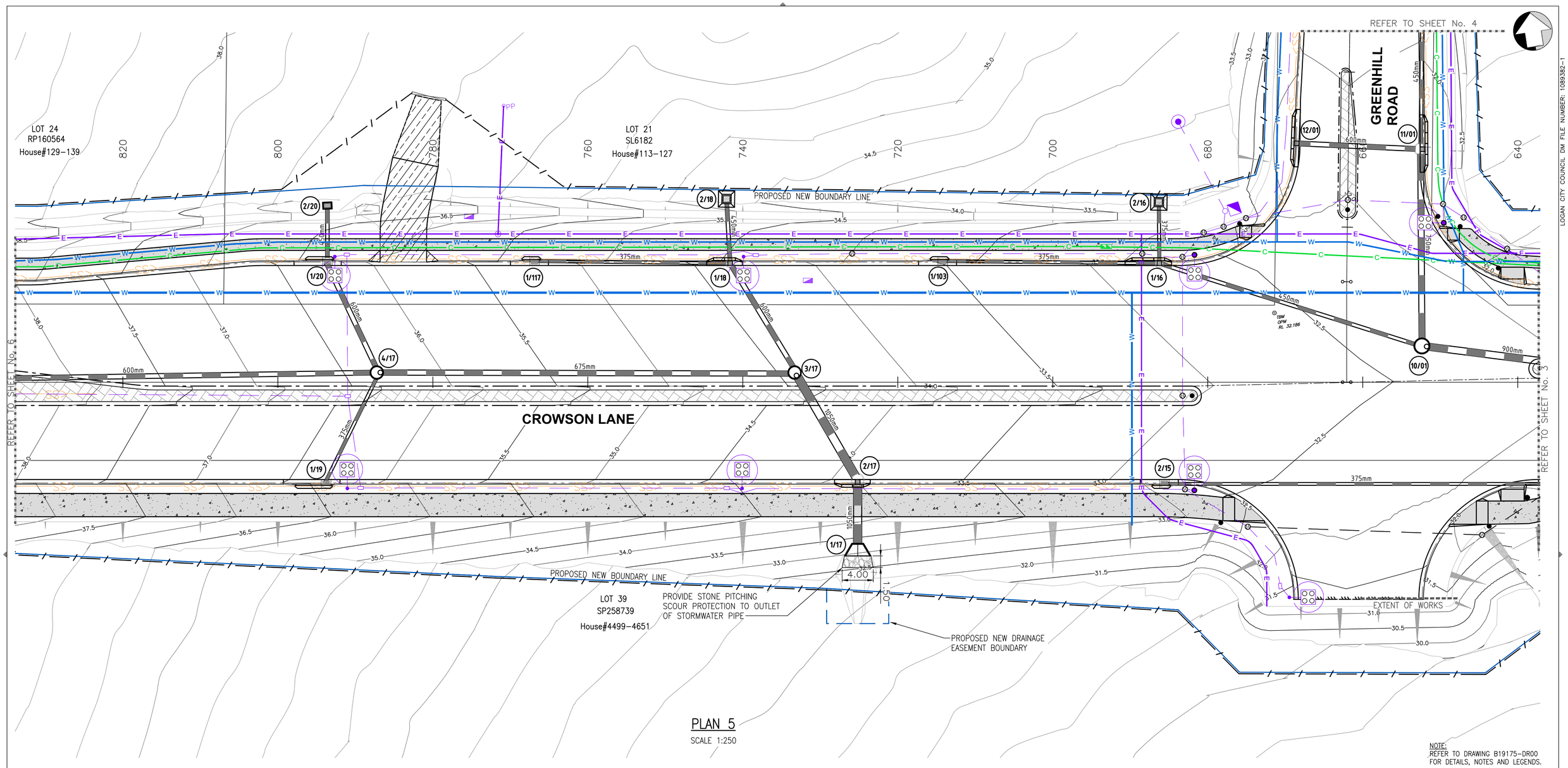
ROAD DRAINAGE LAYOUT SHEET 4 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 4 OF 33

DRAWING NUMBER

1	B19175–DR04	–

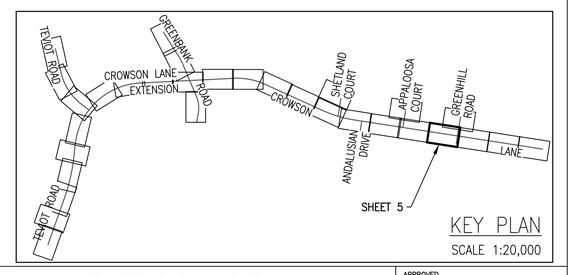


PLAN 5

SCALE 1:250

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
REFER TO DRAWING SET "CL" FOR DETAILS				

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

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DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 5 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 5 OF 33

DRAWING NUMBER
1 | B19175-DR05 | -

REFER TO SHEET No. 7

REFER TO SHEET No. 8

REFER TO SHEET No. 5

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

APPALOOSA COURT

CROWSON LANE

PROPOSED NEW BOUNDARY LINE

LOT 23
RP160564
House#1-23

LOT 24
RP160564
House#129-139

LOT 1
SP137557
House#142-152

LOT 39
SP258739
House#4499-4651

1/24 2/24 1/115 2/21 2/23 1/23 1/21 7/17 8/17 6/17 5/17 1/22

450mm 375mm 525mm

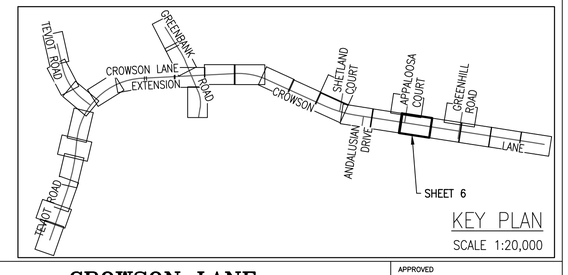
0.000

PLAN 6

SCALE 1:250

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

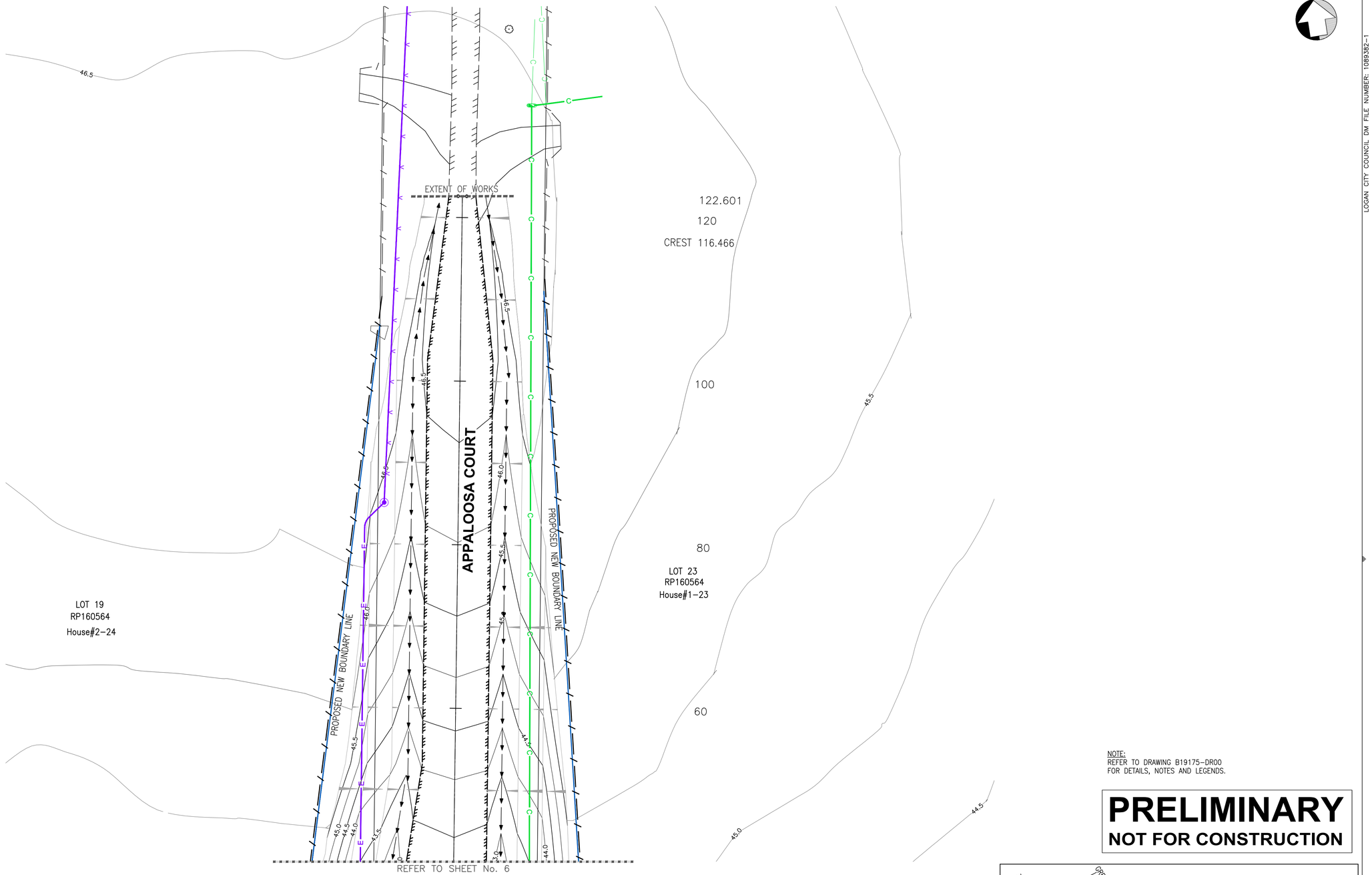
ROAD DRAINAGE LAYOUT
SHEET 6 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 6 OF 33

DRAWING NUMBER

1	B19175-DR06	-

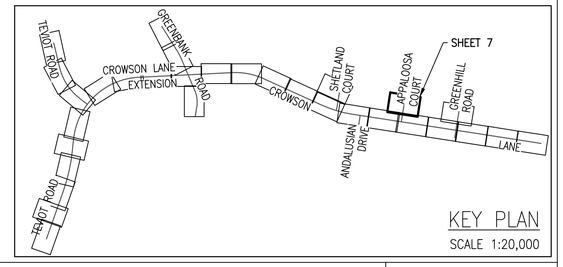


PLAN 7

SCALE 1:250

NOTE:
REFER TO DRAWING B19175–DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN

SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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0 5 10 15 20m
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

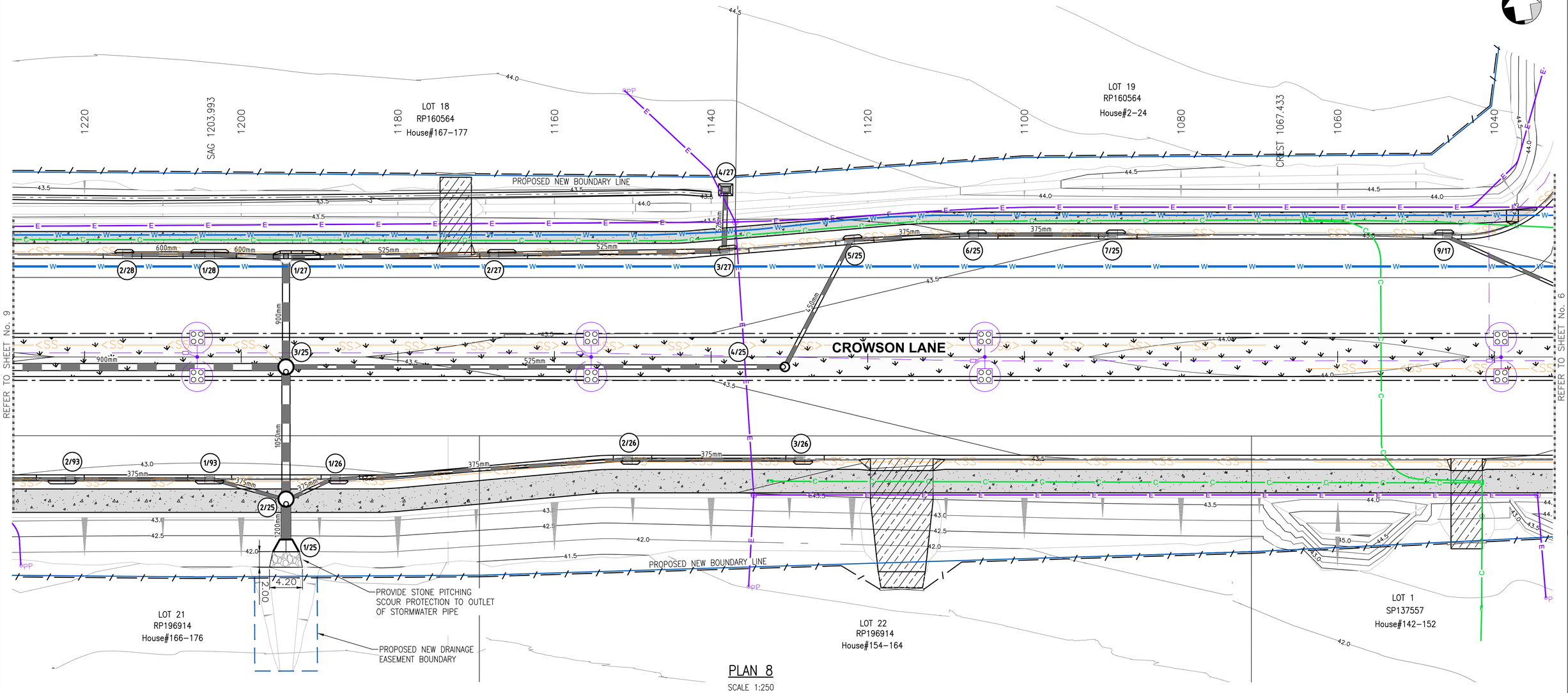
ROAD DRAINAGE LAYOUT
SHEET 7 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 7 OF 33

DRAWING NUMBER
1 | B19175–DR07 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

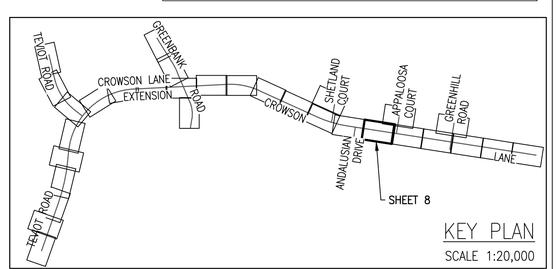


PLAN 8

SCALE 1:250

NOTE:
REFER TO DRAWING B19175–DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN

SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 8 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 8 OF 33

DRAWING NUMBER

1	B19175–DR08	–

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

DE-WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

LOT 16
RP160564
House#1-23

LOT 17
RP160564
House#179-189

PROPOSED NEW BOUNDARY LINE

CROWSON LANE

REFER TO SHEET No. 10

REFER TO SHEET No. 8

PROVIDE STONE PITCHING SCOUR PROTECTION TO OUTLET OF STORMWATER PIPE

PROPOSED NEW DRAINAGE EASEMENT BOUNDARY

LOT 1
SP185436
House#190-202

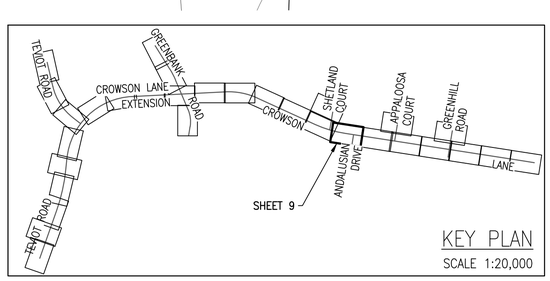
LOT 13
SP185436
House#180-188

LOT 21
RP196914
House#166-176

ANDALUSIAN DRIVE

EXTENT OF WORKS

PLAN 9
SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
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PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 9 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 9 OF 33

DRAWING NUMBER
1 | B19175-DR09 | -

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

REFER TO SHEET No. 11

REFER TO SHEET No. 12

REFER TO SHEET No. 9

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

SHETLAND COURT

CROWSON LANE

LOT 12
RP160564
House#2–24

LOT 16
RP160564
House#1–23

LOT 28
RP160564
House#204–248

LOT 12
RP801796
House#47–55

LOT 1
SP185436
House#190–202

PROPOSED NEW BOUNDARY LINE

CMA
10.5
MH

R180.000

R750.000

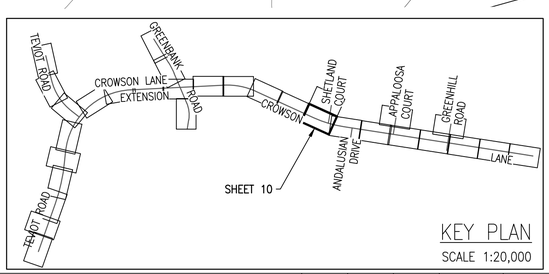
23.780

0.420

0.000

PLAN 10

SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
REFER TO DRAWING SET "CL" FOR DETAILS				

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
infradelivery@logan.qld.gov.au

PROJECT NO.	B19175	
COMP. REF.	SWDLAY.dwg	
SURVEYOR	T.J.K.	26.08.20
SURVEY REF.	CD45	
DESIGNED	R.vdB	10.05.21
CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

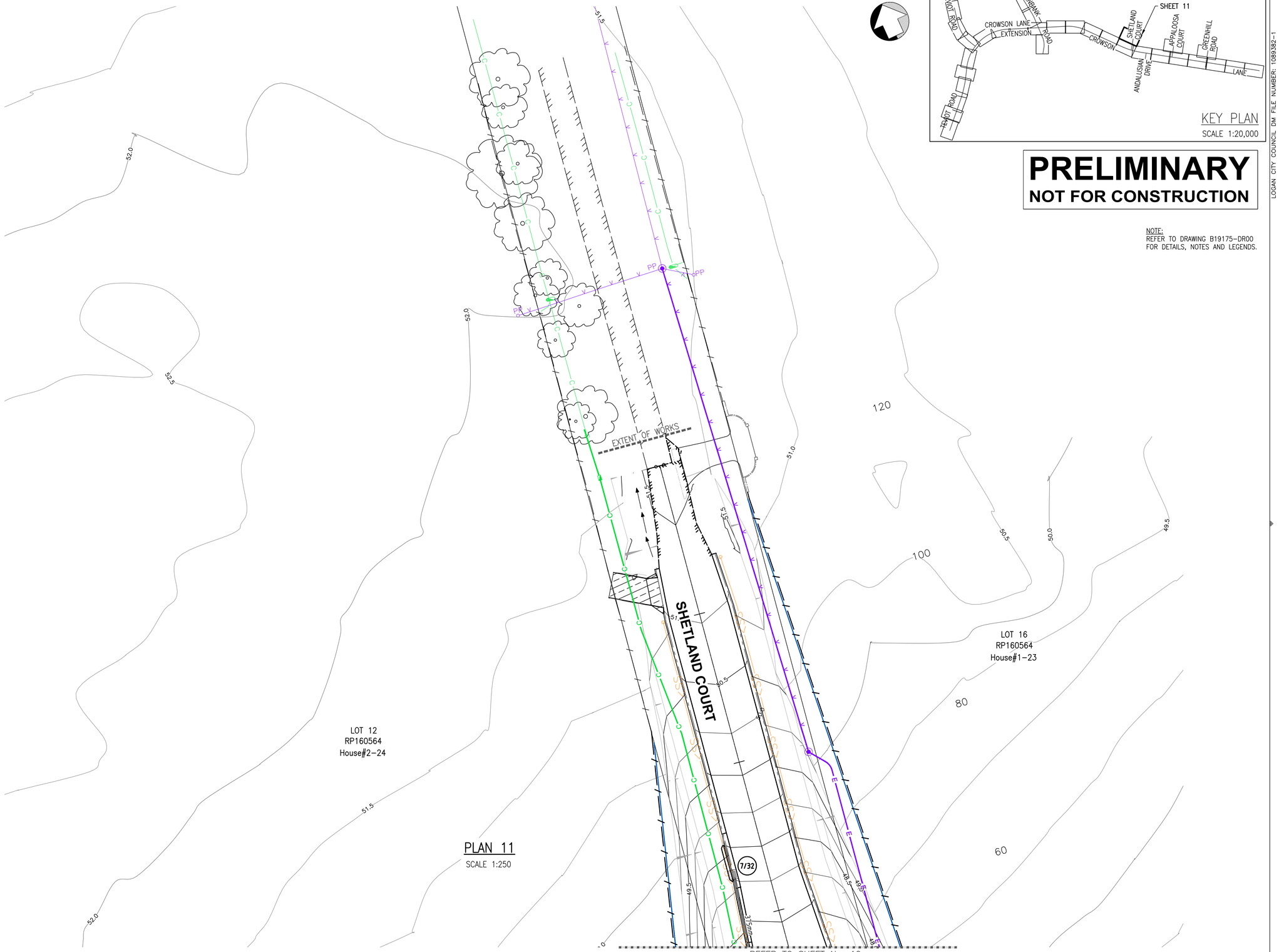
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

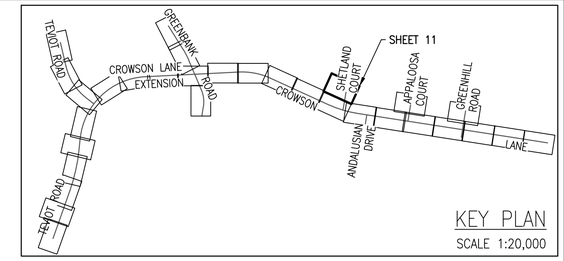
ROAD DRAINAGE LAYOUT SHEET 10 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 10 OF 33

DRAWING NUMBER
1 | B19175-DR10 | –





PRELIMINARY
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LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

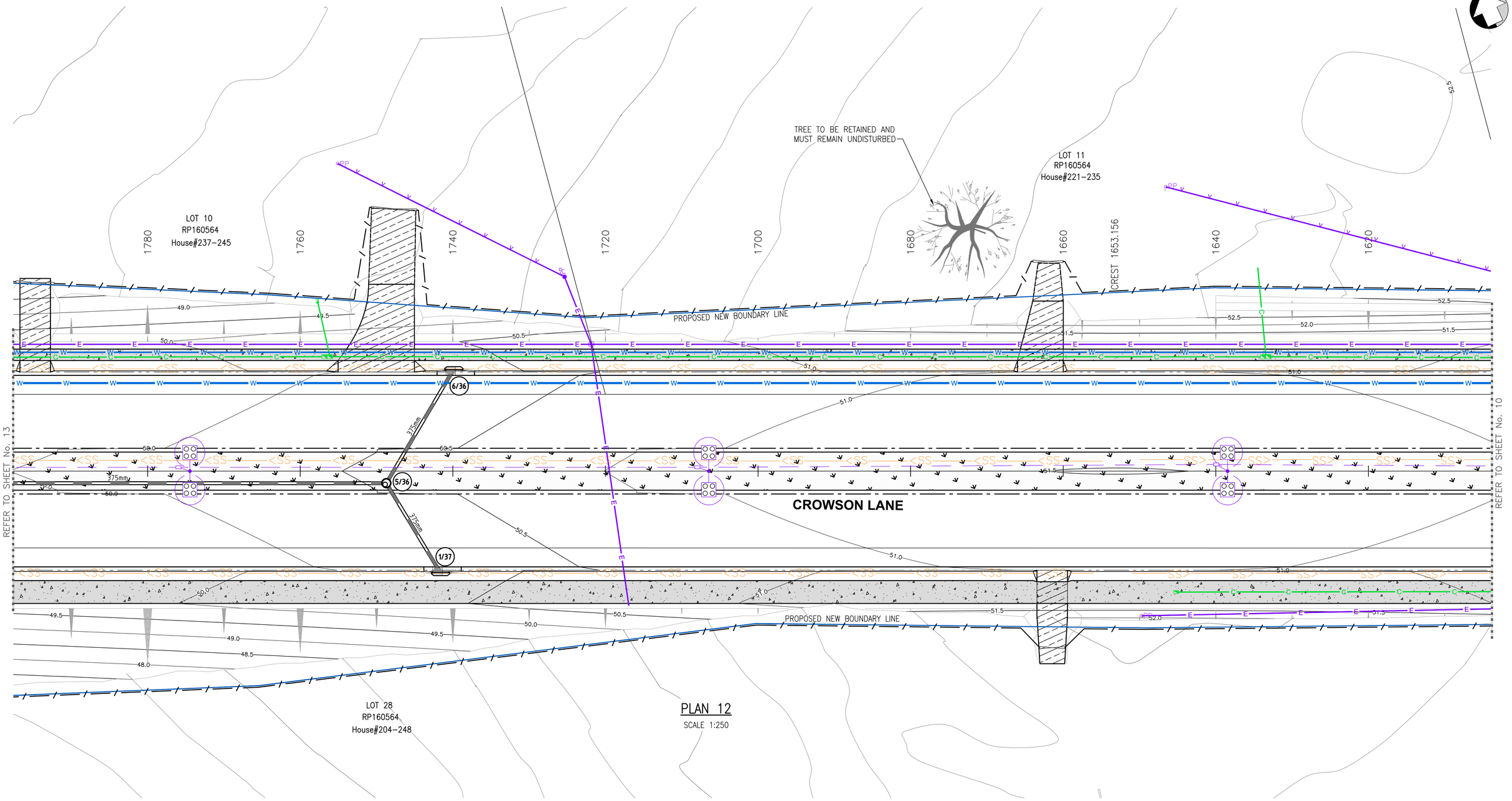
ROAD DRAINAGE LAYOUT SHEET 11 OF 31

APPROVED
DESIGN ENGINEER DATE

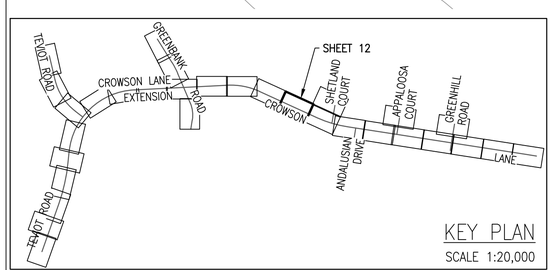
SHEET 11 OF 33

DRAWING NUMBER
1 | B19175-DR11 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1



PLAN 12
SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
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PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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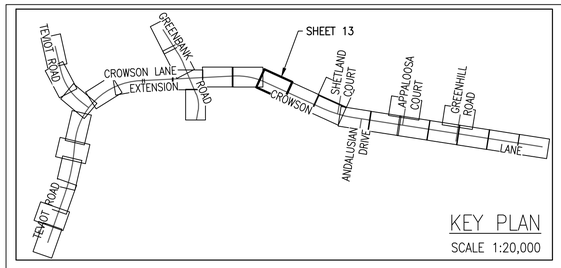
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 12 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 12 OF 33

DRAWING NUMBER
1 | B19175-DR12 | –



KEY PLAN
SCALE 1:20,000

PRELIMINARY
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NOTE:
REFER TO DRAWING B19175-DR00
FOR DETAILS, NOTES AND LEGENDS.

REFER TO SHEET No. 14

REFER TO SHEET No. 12

LOGAN CITY COUNCIL DM FILE NUMBER: 10893382-1

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

LOT 7
RP160563
House#267-283

DE-WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

LOT 8
RP160563
House#257-265

LOT 9
RP160563
House#247-255

DRIVEWAY CULVERT 11 (DC11)

PROPOSED NEW BOUNDARY LINE

CROWSON LANE

PROPOSED NEW BOUNDARY LINE

LOT 27
RP160563
House#250-268

PROVIDE STONE PITCHING SCOUR PROTECTION TO OUTLET OF STORMWATER PIPES

EXISTING DRAINAGE EASEMENT BOUNDARY

LOT 27
RP160563
House#250-268

LOT 28
RP160564
House#204-248

PLAN 13
SCALE 1:250

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 13 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 13 OF 33

DRAWING NUMBER
1 | B19175-DR13 | –

LOT 6
RP160563
House#285–293

LOT 7
RP160563
House#267–283

PROPOSED NEW BOUNDARY LINE

CROWSON LANE

REFER TO SHEET No. 15

REFER TO SHEET No. 13

PROPOSED NEW BOUNDARY LINE

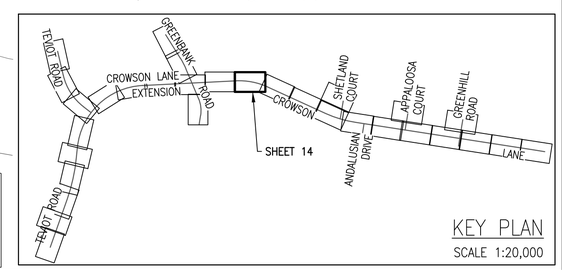
LOT 25
RP160563
House#566–580

LOT 1
RP108335
House#270–292

PLAN 14
SCALE 1:250

NOTE:
REFER TO DRAWING B19175-DR00 FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 14 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 14 OF 33

DRAWING NUMBER
1 | B19175-DR14 | –

LOT 3
RP160563
House#315–323

LOT 4
RP160563
House#305–313

LOT 5
RP160563
House#295–303

LOT 25
RP160563
House#566–580

PROPOSED NEW BOUNDARY LINE

PROPOSED NEW BOUNDARY LINE

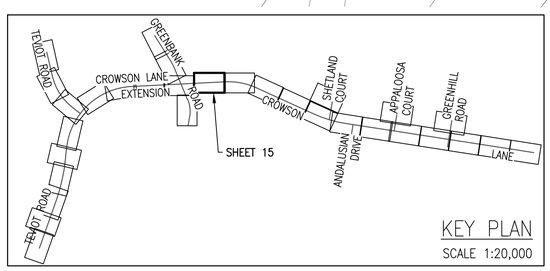
CROWSON LANE

PROVIDE STONE PITCHING
SCOUR PROTECTION TO OUTLET
OF STORMWATER PIPES

REFER TO SHEET No. 16

REFER TO SHEET No. 14

PLAN 15
SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
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PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 15 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 15 OF 33

DRAWING NUMBER
1 | B19175–DR15 | –

REFER TO SHEET No. 18

REFER TO SHEET No. 20

REFER TO SHEET No. 15

REFER TO SHEET No. 17

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

LOT 9
RP105545
House#555-567

LOT 2
RP160563
House#325-333

LOT 3
RP160563
House#315-323

LOT 10
RP105545
House#569-581

LOT 25
RP160563
House#566-580

PROPOSED NEW BOUNDARY LINE

POWERLINK EASEMENT BDY

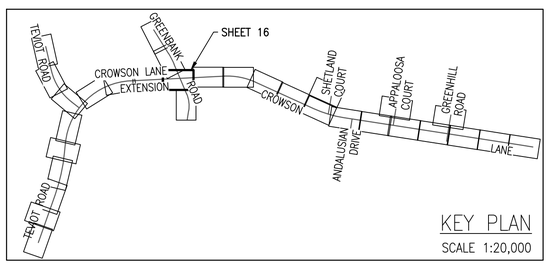
CROWSON LANE EXTENSION

CROWSON LANE

GREENBANK ROAD

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

DRIVEWAY CULVERT 04 (DC04)



KEY PLAN
SCALE 1:20,000

NOTE:
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PLAN 16
SCALE 1:250

AMENDMENTS	BY	CHKD	APP'D	DATE

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0 5 10 15 20m
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 16 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 16 OF 33

DRAWING NUMBER
1 | B19175-DR16 | –

LOT 12
RP105545
House#597–609

LOT 2
RP206779
House#595

LOT 1
RP206779
House#583–593

LOT 10
RP105545
House#569–581

LOT 25
RP160563
House#566–580

LOT 9
RP196914
House#582–600

DRIVEWAY CULVERT 08 (DC08)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

PROVIDE STONE PITCHING SCOUR PROTECTION TO OUTLET OF STORMWATER PIPE

PROPOSED NEW BOUNDARY LINE

EXTENT OF WORKS

GREENBANK ROAD

MATCH NEATLY INTO EXISTING ROAD PAVEMENT

CROSS CULVERT 09 (CC09)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

DRIVEWAY CULVERT 05 (DC05)

R200.000

375mm

1/125 2/125 3/125 4/125 1/126

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

REFER TO SHEET No. 16

NOTE:
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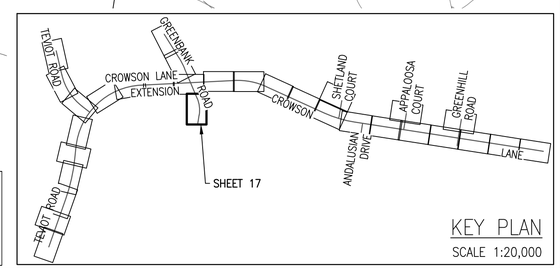

KEY PLAN
SCALE 1:20,000

PLAN 17
SCALE 1:250

PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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BAR SCALES (A1 UNREDUCED)
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 17 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 17 OF 33

DRAWING NUMBER
1 | B19175–DR17 | –

LOT 2
RP160563
House#325–333

LOT 18
RP109794
House#533–553

LOT 9
RP105545
House#555–567

POWERLINK EASEMENT BDY

PROPOSED NEW BOUNDARY LINE

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

DRIVEWAY CULVERT 16 (DC16)

GREENBANK ROAD

R=500.000

REFER TO SHEET No. 19

REFER TO SHEET No. 16

PLAN 18

SCALE 1:250

NOTE:
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PRELIMINARY
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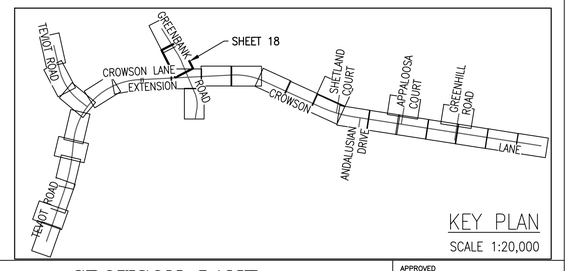

KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 18 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 18 OF 33

DRAWING NUMBER
1 | B19175–DR18 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

GREENBANK ROAD

EXTENT OF WORKS

LOT 1
RP160563
House#522–538

LOT 17
RP109794
House#527–531

LOT 18
RP109794
House#533–553

DRIVEWAY CULVERT 16 (DC16)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

DRIVEWAY CULVERT 07 (DC07)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

DRIVEWAY CULVERT 06 (DC06)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

DRIVEWAY CULVERT 01 (DC01)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPE

MATCH NEATLY INTO EXISTING ROAD PAVEMENT

POWERLINK EASEMENT BDY

REFER TO SHEET No. 18

PLAN 19
SCALE 1:250

NOTE:
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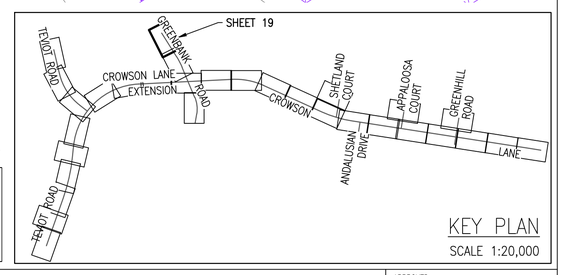

KEY PLAN
SCALE 1:20,000

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BAR SCALES (A1 UNREDUCED)
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SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	B19175	
COMP. REF.	SWDLAY.dwg	
SURVEYOR	T.J.K.	26.08.20
SURVEY REF.	CD45	
DESIGNED	R.vdB	10.05.21
CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 19 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 19 OF 33

DRAWING NUMBER
1 | B19175-DR19 | –

LOT 9
RP105545
House#555–567

PROPOSED NEW BOUNDARY LINE

CROWSON LANE EXTENSION

LOT 10
RP105545
House#569–581

PROPOSED NEW BOUNDARY LINE

REFER TO SHEET No. 21

REFER TO SHEET No. 16

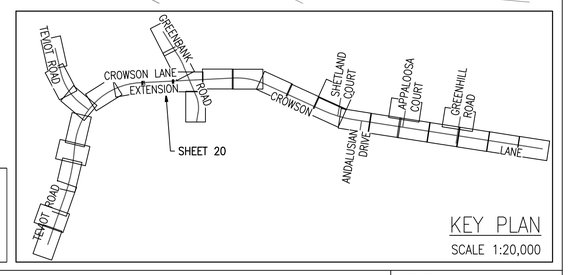
LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

PLAN 20

SCALE 1:250

NOTE:
REFER TO DRAWING B19175–DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
REFER TO DRAWING SET "CL" FOR DETAILS				

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

CITY ADMINISTRATION CENTRE
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD
UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 20 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 20 OF 33

DRAWING NUMBER
1 | B19175–DR20 | –

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

LOT 2
RP105545
House#282–294

PROPOSED NEW BOUNDARY LINE

CROSS CULVERT 01 (CC01)

7.55

2.70

12.40

SAG 2849.210

EXCAVATE NEW DAM TO SAME OR LARGER STORAGE CAPACITY AS EXISTING IN LOCATION SIMILAR TO WHERE SHOWN.

DE–WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

LOT 9
RP105545
House#555–567

PROPOSED NEW BOUNDARY LINE

CROWSON LANE EXTENSION

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

DE–WATER EXISTING DAM, REMOVE UNSUITABLE MATERIAL AND FILL AS SHOWN.

LOT 3
RP105545
House#296–308

LOT 10
RP105545
House#569–581

PROPOSED NEW BOUNDARY LINE

REFER TO SHEET No. 22

REFER TO SHEET No. 20

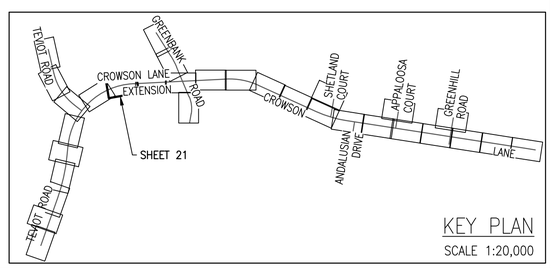
LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

PLAN 21

SCALE 1:250

NOTE:
REFER TO DRAWING B19175–DR00
FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 21 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 21 OF 33

DRAWING NUMBER
1 | B19175–DR21 | –

LOT 3
RP105545
House#296–308

LOT 2
RP105545
House#282–294

PROPOSED NEW BOUNDARY LINE

CROWSON LANE EXTENSION

PROPOSED NEW BOUNDARY LINE

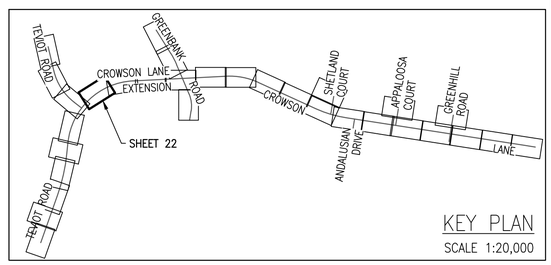
LOT 3
RP105545
House#296–308

LOT 4
RP105545
House#310–322

PLAN 22
SCALE 1:250

REFER TO SHEET No. 23

REFER TO SHEET No. 21



KEY PLAN
SCALE 1:20,000

NOTE:
REFER TO DRAWING B19175–DR00
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PRELIMINARY
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LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

AMENDMENTS	BY	CHKD	APP'D	DATE

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 22 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 22 OF 33

DRAWING NUMBER
1 | B19175–DR22 | –

REFER TO SHEET No. 22

REFER TO SHEET No. 24

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

LOT 3
RP105545
House#296–308

PROPOSED NEW BOUNDARY LINE

CROWSON LANE EXTENSION

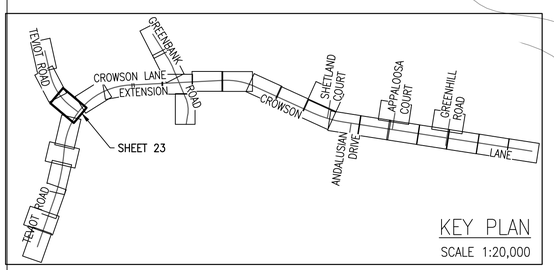
TEVIOT ROAD

LOT 4
RP105545
House#310–322

PROPOSED NEW BOUNDARY LINE

REFER TO SHEET No. 26

PLAN 23
SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
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PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD
UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 23 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 23 OF 33

DRAWING NUMBER
1 | B19175-DR23 | –

LOT 2
RP105545
House#282–294

NEW RETAINING WALL. REFER TO "GR" SET FOR DETAILS.

PROPOSED NEW BOUNDARY LINE

REFER TO SHEET No. 25

REFER TO SHEET No. 23

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382–1

TEVIOT ROAD

GRACELANDS DRIVE

LOT 32
SP128051
House#1–11

LOT 50
SP128051
House#2–8

EXTENT OF WORKS

PLAN 24
SCALE 1:250

SHEET 24

CROWSON LANE EXTENSION

CREEKBANK ROAD

CROWSON

SHETLAND COURT

ANDALUSIAN DRIVE

APPALOOSA COURT

GREENHILL ROAD

LANE

KEY PLAN
SCALE 1:20,000

NOTE:
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FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
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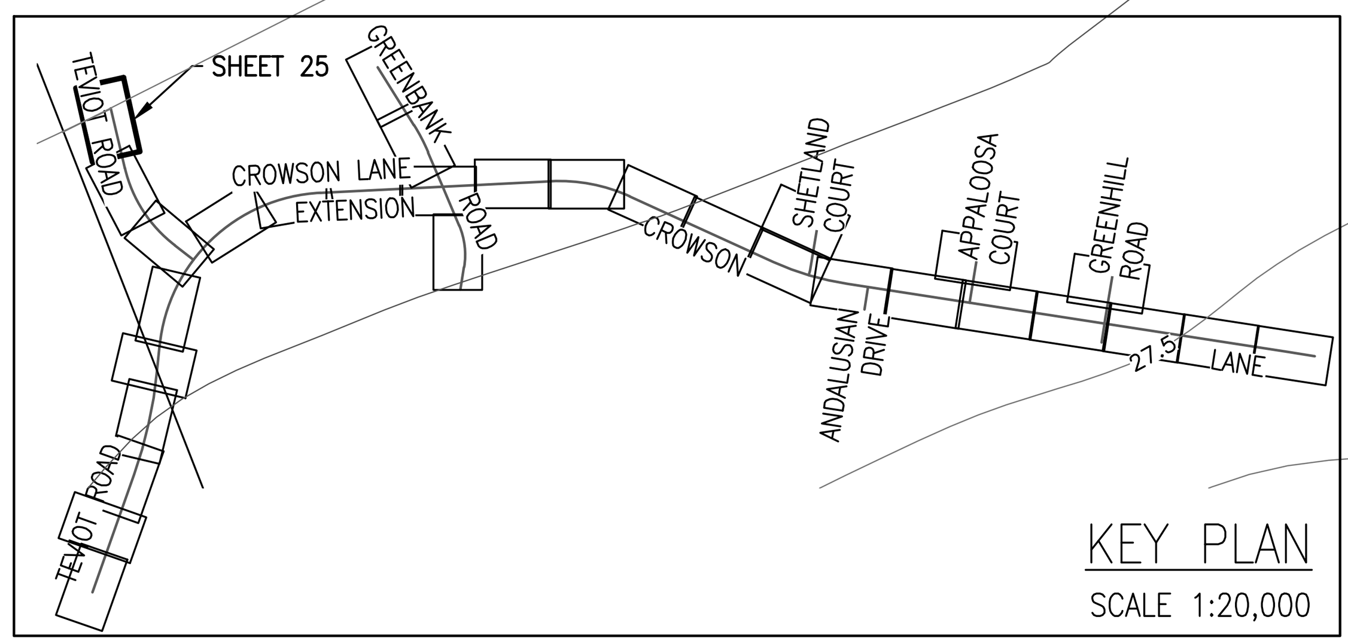
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 24 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 24 OF 33

DRAWING NUMBER
1 | B19175–DR24 | –



NOTE:
REFER TO DRAWING B19175-DR00 FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 25 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 25 OF 33

DRAWING NUMBER
1 B19175-DR25 –

LOT 50
SP128051
House#2–8

LOT 6
RP105545
House#338–348

LOT 5
RP105545
House#324–336

TEVIOT ROAD

PROPOSED NEW BOUNDARY LINE

REFER TO SHEET No. 27

REFER TO SHEET No. 23

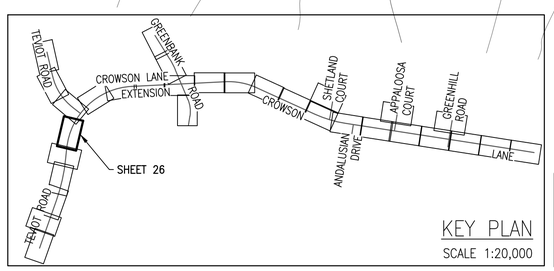
6/63 7/63 8/63 9/63 10/63 11/63 1/69 1/67

600mm 525mm 450mm

3400 3380 3360 3340 3320 3300 3280 3260

EP PP

PLAN 26
SCALE 1:250



KEY PLAN
SCALE 1:20,000

NOTE:
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PRELIMINARY
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AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 26 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 26 OF 33
DRAWING NUMBER
1 | B19175–DR26 | –

LOGAN CITY COUNCIL DM FILE NUMBER: 10893382–1

REFER TO SHEET No. 26

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

PROPOSED NEW BOUNDARY LINE

LOT 6
RP105545
House#338-348

CROSS CULVERT 04 (CC04)

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

LOT 7
RP105545
House#350-362

LOT 46
SP128051
House#26

PROPOSED NEW BOUNDARY LINE

TEVIOT ROAD

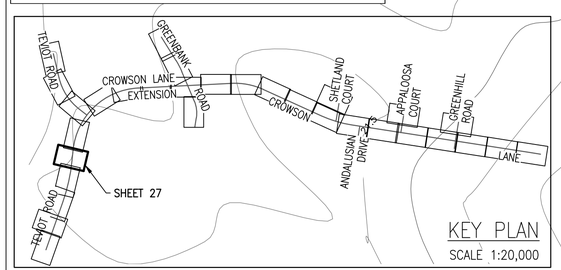
CROSS CULVERT 05 (CC05)

PROPOSED NEW DRAINAGE EASEMENT BOUNDARY

REFER TO SHEET No. 28

NOTE:
REFER TO DRAWING B19175-DR00 FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION



KEY PLAN
SCALE 1:20,000

PLAN 27
SCALE 1:250

AMENDMENTS	BY	CHKD	APP'D	DATE

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SURVEY CONTROL POINTS

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CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 27 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 27 OF 33

DRAWING NUMBER
1 | B19175-DR27 | –

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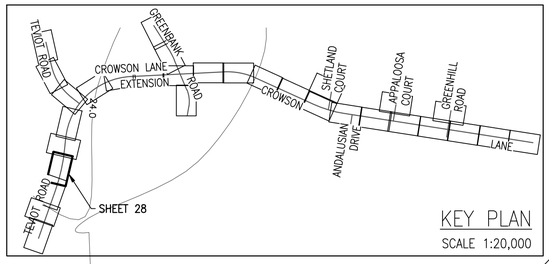

KEY PLAN
SCALE 1:20,000

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

PROVIDE STONE PITCHING SCOUR PROTECTION TO OUTLET OF STORMWATER PIPES

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER CULVERTS

CROSS CULVERT 06 (CC06)

CROSS CULVERT 05 (CC05)

DRIVEWAY CULVERT 12 (DC12)

PROPOSED NEW BOUNDARY LINE

LOT 1
RP147592
House#1-7

TEVIOT ROAD

TREE TO BE RETAINED AND MUST REMAIN UNDISTURBED

LOT 8
RP105545
House#364-376

LOT 7
RP105545
House#350-362

PROPOSED NEW DRAINAGE EASEMENT BOUNDARY

REFER TO SHEET No. 29

REFER TO SHEET No. 27

PLAN 28
SCALE 1:250

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

AMENDMENTS	BY	CHKD	APP'D	DATE

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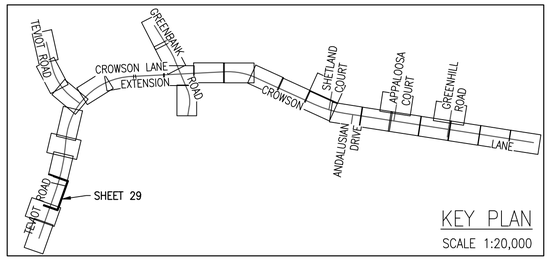
CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 28 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 28 OF 33

DRAWING NUMBER
1 | B19175-DR28 | -



KEY PLAN
SCALE 1:20,000

PRELIMINARY
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NOTE:
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LOT 1
RP147592
House#1-7

REFER LCC FOR ADVICE REGARDING CULTURAL HERITAGE.

PROPOSED NEW BOUNDARY LINE

SAG 3841.154
CREST 3735.806
3779.554

TEVIOT ROAD

LOT 2
RP851321
House#2

REFER TO SHEET No. 30

REFER TO SHEET No. 28

PLAN 29
SCALE 1:250

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

AMENDMENTS	BY	CHKD	APP'D	DATE

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CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT SHEET 29 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 29 OF 33

DRAWING NUMBER
1 | B19175-DR29 | -

PRELIMINARY
NOT FOR CONSTRUCTION

AMENDMENTS	BY	CHKD	APP'D	DATE

WESTERA PARTNERS
STRUCTURAL+CIVIL+ENVIRONMENTAL ENGINEERS
www.westerapartners.com.au | ABN 52 097 417 975

SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION

REFER TO DRAWING SET "CL" FOR DETAILS

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	B19175	
COMP. REF.	SWDLAY.dwg	
SURVEYOR	T.J.K.	26.08.20
SURVEY REF.	CD45	
DESIGNED	R.vdB	10.05.21
CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE
MT LINDESAY HWAY TO TEVIOT RD
UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 30 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 30 OF 33
DRAWING NUMBER
1 B19175-DR30 –

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

LOGAN CITY COUNCIL DM FILE NUMBER: 1089382-1

LOT 59
RP147592
House#585

LOT 60
RP147592
House#571–577

LOT 61
RP147592
House#563–569

4178.503

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

DRIVEWAY CULVERT 09 (DC09)

CROSS CULVERT 08 (CC08)

11.55

2.70

375mm

14/12

13/12

12/12

TEVIOT ROAD

LIMIT OF WORKS

DRIVEWAY CULVERT 10 (DC10)

2x RCP 450ø

EXISTING 2x 450ø RCP TO REMAIN

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER PIPES

3.60

2.70

7.10

8.50

PROVIDE STONE PITCHING SCOUR PROTECTION TO INLET AND OUTLET OF STORMWATER CULVERT

LOT 8
RP217053
House#438

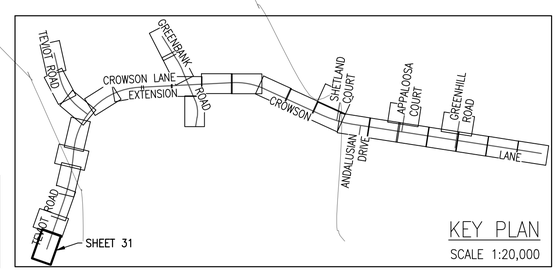
LOT 9
RP217053
House#430

LOT 1
RP129000
House#402–426

NOTE:
REFER TO DRAWING B19175–DR00 FOR DETAILS, NOTES AND LEGENDS.

PRELIMINARY
NOT FOR CONSTRUCTION

PLAN 31
SCALE 1:250



KEY PLAN
SCALE 1:20,000

REFER TO SHEET No. 30

AMENDMENTS	BY	CHKD	APP'D	DATE

WESTERA PARTNERS
STRUCTURAL+CIVIL+ENVIRONMENTAL ENGINEERS
www.westerapartners.com.au | ABN 52 097 417 975

SURVEY CONTROL POINTS

PT	EASTING	NORTHING	RL	DESCRIPTION
REFER TO DRAWING SET "CL" FOR DETAILS				

BAR SCALES (A1 UNREDUCED)
0 5 10 15 20m
SCALE IN METRES (1:250 BEFORE REDUCTION)

CITY OF LOGAN

CITY ADMINISTRATION CENTRE
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PROJECT NO.	B19175	
COMP. REF.	SWDLAY.dwg	
SURVEYOR	T.J.K.	26.08.20
SURVEY REF.	CD45	
DESIGNED	R.vdB	10.05.21
CHECKED	S.T.	10.05.21
DRAWN	MJP	02.09.22
CHECKED	S.T.	02.09.22

CROWSON LANE MT LINDESAY HWAY TO TEVIOT RD UPGRADE & EXTENSION

ROAD DRAINAGE LAYOUT
SHEET 31 OF 31

APPROVED
DESIGN ENGINEER DATE

SHEET 31 OF 33

DRAWING NUMBER
1 | B19175–DR31 | –

APPENDIX C

Existing Decision Notice Approval

Queensland Government

Department of
State Development, Infrastructure, Local Government and Planning

Our ref: DEV2018/961

10 September 2021

Wearco Pty Ltd
C/- Reel Planning Pty Ltd
Att: Ms Amy Adamson
PO Box 2088
MILTON QLD 4064

Email: amy@reelplanning.com

Dear Amy

S89(1)(a) Approval of PDA development application
PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space at 4499-4651 Mount Lindesay Highway, North Maclean described as Lot 39 on RP253739

On 10 September 2021, pursuant to s.85(4)(b) of the *Economic Development Act 2012,* the Minister for Economic Development Queensland (MEDQ) decided to grant **all** of the PDA development application applied for, in accordance with the attached PDA decision notice.

The PDA decision notice and approved plans / documents can also be viewed in the MEDQ Development Approvals Register via the Department website at www.dsdilgp.qld.gov.au/pda-da-applications.

If you require any further information, please contact Mr Brandon Bouda, Manager, Development Assessment, in Economic Development Queensland, by telephone on (07) 3452 7422 or at brandon.bouda@dsdilgp.qld.gov.au, who will be pleased to assist.

Yours sincerely

Jeanine Stone
Director
Development Assessment
Economic Development Queensland

Economic Development Queensland
GPO Box 2202
Brisbane Queensland 4001 Australia
Website www.edq.qld.gov.au
ABN 76 590 288 697

PDA Decision Notice

Site information		
Name of priority development area (PDA)	Greater Flagstone	
Site address	4499 – 4651 Mount Lindesay Highway, North Maclean	
Lot on plan description	Lot number	Plan description
	39	SP258739

PDA development application details	
DEV reference number	DEV2018/961
'Properly made' date	19 October 2018
Type of application	☒ PDA development application for: ☐ Material change of use ☐ Preliminary approval ☐ Development permit ☒ Reconfiguring a lot ☐ Preliminary approval ☒ Development permit ☐ Operational work ☐ Preliminary approval ☐ Development permit ☐ Application to change PDA development approval ☐ Application to extend currency period
Proposed development	1 into 4 lots, with road, open space and a context plan

PDA development approval details	
Decision of the MEDQ	The MEDQ has decided to grant **all** of the PDA development approval applied for, **subject to** PDA development conditions forming part of this decision notice. The approval is for: • 1 into 4 lots, with road, open space and a context plan
Decision date	10 September 2021
Currency period	6 years from the date of the decision

Economic Development Queensland
GPO Box 2202
Brisbane Queensland 4001 Australia
Website www.edq.qld.gov.au
ABN 76 590 288 697

Approved plans and documents			
The plans and documents approved by the MEDQ and referred to in the PDA development conditions for the PDA development approval are detailed below.			
Approved plans and documents		**Number**	**Date**
1.	Proposed Development Layout Plan	TIEL2020159.CIV.DA 010, Issue H	07/07/21 (as amended in red dated 08/09/2021)
2.	Staging Plan	TIELK202159.CIV.DA, Dwg No. 16, Issue C	07/07/2021 (as amended in red date 03/09/2021)
3.	Concept Earthworks Layout Plan	TIEL202159.CIV.DA, Dwg No. 015, Issue G	07/07/21
4.	Concept Water Reticulation Layout Plan	TIEL202159.CIV.DA, Dwg No. 014, Issue G	07/07/21
5.	Concept Sewer Reticulation Layout Plan	TIEL202159.CIV.DA, Dwg No. 012, Issue G	07/07/21 (as amended in red dated 03/09/2021)
6.	Concept Stormwater Drainage Layout Plan	TIEL202159.CIV.DA, Dwg No. 013, Issue H	07/07/21
7.	Concept Catchment Layout Plan	TIEL202159.CIV.DA, Dwg No. 008, Issue I	07/07/21
8.	Swale Cross Section	TIEL202159.CIV.DA.DWG No 019, Issue C	07/07/21
9.	Swale Longitudinal Section	TIEL202159.CIV.DA, Dwg No 018, Issue B	07/07/21
10.	Traffic Impact Assessment	16378, Version 3	01/03/19
11.	Bushfire Management Plan	Report 16014, Final V3	13 July 2018
12.	Addendum to the bushfire management plan for the proposed development at 4499-4651 Mount Lindsay Highway, North Maclean		18 February 2019
13.	North Maclean Enterprise Precinct (4499-4651 Mount Lindesay Highway, North Maclean) – Progression of Ecological Issues		31 March 2017

Supporting Plans and Documents

To remove any doubt, the following documents are not approved documents for the purposes of this PDA development approval, but rather are supporting documents.

	Supporting plans, reports and specifications	**Number** *(if applicable)*	**Date** *(if applicable)*
Endorsed Context Plan			
1.	North Maclean Enterprise Context Plan Land Use and Road Network		12/07/2021 (as amended in red dated 03/09/2021)
2.	North Maclean Enterprise Context Plan Land Use and Road Network (Wider Locality)		12/07/2021
3.	North Maclean Enterprise Context Plan Ultimate Water and Sewer Network		12/07/2021
4.	North Maclean Enterprise Context Plan Ultimate Stormwater Network		12/07/2021 (as amended in red dated 03/09/2021)
Supporting Plans, Reports and Specifications			
5.	Site Based Stormwater Management Plan	TEL202159, Issue A	08 July 2021
6.	Engineering Services Report	TEL202159, Issue A	06/07/21.

PDA development conditions

PREAMBLE AND ABBREVIATIONS

PREAMBLE

For the purpose of interpreting this PDA Development Approval, including the PDA Development Conditions, the following applies:

Compliance assessment

Where a condition of this approval requires Compliance Assessment, Compliance Assessment is required in accordance with the following:

a) The applicant must:

   i) pay to MEDQ at the time of submission the relevant fee for Compliance Assessment, including any third party peer review costs which will be charged on a 100% cost recovery basis. The Compliance Assessment fees are set out in EDQ Development Assessment Fees and Charges Schedule[1] (as amended from time to time).
   ii) submit to EDQ DA a duly completed Compliance Assessment form[2].

   iii) submit to EDQ DA the documentation as required under the relevant condition.

b) Where EDQ is satisfied the documentation submitted for Compliance Assessment meets the requirements of the relevant condition (or element of the condition), EDQ will endorse the documentation and advise by written notice.

[1] The EDQ Development Assessment Fees and Charges Schedule is available at EDQ's website.

[2] The Compliance Assessment form is available at EDQ's website. It sets out how to submit documentation for Compliance Assessment and how to pay Compliance Assessment fees.

c) Compliance Assessment and endorsement can be repeated where a different design or solution, to that already endorsed, is sought.

d) The process and timeframes that apply to Compliance Assessment are as follows:

i) applicant submits items required under a) above to EDQ DA for Compliance Assessment.

ii) **within 30 business days** – EDQ assesses the documentation and:
1. if satisfied, endorses the documentation; or
2. if not satisfied, notifies the applicant accordingly.

iii) if the applicant is notified under ii.2. above, revised documentation must be submitted **within 30 business days** from the date of notification.

iv) **within 30 business days** – EDQ assesses the revised documentation and:
1. if satisfied, endorses the revised documentation; or
2. if not satisfied, notifies the applicant accordingly.

v) where EDQ notifies the applicant as stated under iv.2. above, repeat steps iii. and iv. above. If either party is not satisfied by the outcome of this process, that party can elect to enter into a mediation process with an independent mediator agreed to by both parties.

Despite note v. above, the condition (or element of the condition) is determined to have been met only when EDQ endorses relevant documentation.

SUBMITTING DOCUMENTATION TO EDQ:

Where a condition of this approval requires documentation to be submitted to either EDQ DA or EDQ TS, submit the documentation to:

a) EDQ DA at: pdadevelopmentassessment@dsdmip.qld.gov.au.

b) EDQ TS at: EDQ_PrePostConstruction@dsdmip.qld.gov.au.

ABBREVIATIONS

For the purposes of interpreting the PDA Development Conditions, the following is a list of abbreviations utilised:

1. **AILA** means a Landscape Architect registered Australian Institute Landscape Architect.

2. **Certification Procedures Manual** means the document titled *Certification Procedures Manual*, prepared by the Department of Infrastructure, Local Government and Planning, dated 16 October 2017 (as amended from time to time).

3. **Contributed Asset** means an asset constructed under a PDA development approval or Infrastructure Agreement that will become the responsibility of an External Authority. For the purposes of operational works for a Contributed Asset, the following definitions apply:
   a. **External Authority** means a public-sector entity other than the MEDQ;
   b. **Parkland** means carrying out operational work related to the provision of parkland infrastructure;

c. **Roadworks** means carrying out any operational work within existing or proposed road(s), to a depth of 1.5m measured from the top of kerb, and includes Streetscape Works;
d. **Sewer Works** means carrying out any operational work related to the provision of wastewater infrastructure;
e. **Streetscape Works** means carrying out any operational work within the verge of a road, including footpath surface treatments, street furniture, street lighting and landscaping;
f. **Stormwater Works** means carrying out any operational work related to the provision of stormwater infrastructure; and
g. **Water Works** means carrying out any operational work related to the provision of water infrastructure.

4. **Council** means Logan City Council.

5. **DSDILGP** means The Department of State Development, Infrastructure, Local Government and Planning

6. **EDQ** means Economic Development Queensland

7. **EDQ DA** means Economic Development Queensland's – Development Assessment team.

8. **EDQ TS** means Economic Development Queensland's – Technical Services team.

9. **IFF** means Infrastructure Funding Framework.

10. **MEDQ** means The Minister of Economic Development Queensland.

11. **PDA** means Priority Development Area.

12. **RPEQ** means Registered Professional Engineer of Queensland

No.	Condition	Timing
General		
1.	**Carry out the approved development** Carry out the approved development generally in accordance with the approved plans and documents; and any other documentation endorsed via Compliance Assessment as required by these conditions.	Prior to survey plan endorsement for the relevant stage
2.	**Street naming** Submit to EDQ DA a schedule of street names approved by Council.	Prior to survey plan endorsement for the relevant stage
Construction		
3.	**Hours of work - construction** Unless otherwise endorsed, via Compliance Assessment for out of hours work, construction hours for the approved development are limited to Monday to Saturday between 6:30am to 6:30pm, excluding public holidays.	During construction unless otherwise endorsed

4.	**Out of hours work - Compliance Assessment** Where out of hours work is proposed, submit to EDQ DA, for Compliance Assessment, an out of hours work request. The out of hours work request must include a duly completed out of hours work request form[3].	Minimum of 10 business days prior to proposed out of hours work commencement date
5.	**Certification of Operational Work** Carry out all Operational Work under this approval in accordance with the *Certification Procedures Manual.*	At all times
6.	**Construction management plan** a) Submit to EDQ TS a site-based Construction Management Plan (CMP), prepared by the principal site contractor and reviewed by a suitably qualified and experienced person responsible for overseeing the site works, to manage construction impacts, including: i) noise and dust in accordance with the EP Act; ii) stormwater flows around and through the site without increasing the concentration of total suspended solids or Prescribed Water Contaminants (as defined in the EP Act), causing erosion, creating any ponding and causing any actionable nuisance to upstream and downstream properties; iii) contaminated land, where required under a site suitability statement prepared in accordance with section 389 of the EP Act; iv) complaints procedures; v) site management: 1. for the provision of safe and functional alternative pedestrian routes, past, through or around the site; 2. to mitigate impacts to public sector entity assets, including street trees, on or external to the site; 3. for safe and functional temporary vehicular access points and frequency of use; 4. for the safe and functional loading and unloading of materials including the location of any remote loading sites; 5. for the location of materials, structures, plant and equipment; 6. of waste generated by construction activities; 7. detailing how materials are to be loaded/unloaded; 8. of proposed external hoardings and gantries (with clearances to street furniture and other public sector entity assets); 9. of employee and visitor parking areas; 10. of anticipated staging and programming; 11. for the provision of safe and functional emergency exit routes; and 12. any out of hours work as endorsed via Compliance Assessment. b) A copy of the CMP submitted under part a) of this condition must be current and available on site.	a) Prior to commencing work for the relevant stage b) During construction

[3] The out of hours work request form is available at EDQ's website.

	c) Carry out all construction work generally in accordance with the CMP submitted under part a) of this condition.	c) During construction
7.	**Erosion and sediment management** a) Submit to EDQ TS an Erosion and Sediment Control Plan (ESCP), certified by a RPEQ or an accredited professional in erosion and sediment control, and prepared generally in accordance with the following: i) construction phase stormwater management design objectives of the *State Planning Policy 2017* (Appendix 2 Table A); ii) *Healthy Land and Water Technical Note: Complying with the SPP – Sediment Management on Construction Sites*. b) Implement the certified ESCP submitted under part a) of this condition.	a) Prior to commencing work for the relevant stage b) During construction
8.	**Dispersive soil management** a) Submit to EDQ TS a Dispersive Soil Management Plan, prepared by a soil science/soil chemistry specialist that details for the design, construction, and operational phases of the development including: i. the suite of methods required to identify and address potential issues associated with the exposure and re-use of dispersive soils, ii. details of the areas where dispersive soils will be disturbed and treated/rehabilitated. b) Implement and monitor the actions identified in the Dispersive Soil Management Plan as required under part a) of this condition.	a) Prior to commencing site works b) At all times during construction
9.	**Traffic Management Plan** a) Submit to EDQ TS a Traffic Management Plan (TMP), certified by a person holding a current Traffic Management Design qualification. The TMP must include the following: i) provision for the safe and functional management of traffic around and through the site during and outside of construction work hours; ii) provision for the safe and functional management of pedestrian traffic, including alternative pedestrian routes past, through or around the site; iii) provision of parking for workers and materials delivery; iv) risk identification, assessment and identification of mitigation measures; v) ongoing monitoring, management review and certified updates (as required); and vi) traffic control plans and/or traffic control diagrams, prepared in accordance with *Austroads Guide to Temporary Traffic Management*, for any temporary part or full road closures. b) Carry out all construction work generally in accordance with the certified TMP submitted under part a) of this condition, which is to be current and available on site.	a) Prior to commencing work for the relevant stage b) During construction

	***Advice Note**: Operational traffic changes, such as temporary and permanent lane modifications, relaxation of clearway zone hours or footpath closures may require authorisation from Council or DTMR as road manager. It is recommended that applicants engage directly with the applicable road manager.*	
10.	**Public infrastructure (damage, repairs and relocation)** a) Repair any damage to existing public infrastructure caused by works carried out in association with the approved development. b) Where existing public infrastructure require repair or relocation, due to the approved development and/or works associated with the approved development, repair and/or relocate the public infrastructure at no cost to others and in accordance with statutory requirements and adopted design standards. ***Advice Note**: It is recommended applicants record their own dated photographic evidence of the condition of relevant existing public infrastructure both before and after works carried out in association with the approved development.*	a) Prior to survey plan endorsement for the relevant stage b) Prior to survey plan endorsement for the relevant stage
Earthworks and retaining walls		
11.	**Compliance Assessment - Earthworks** a) Submit to EDQ DA for Compliance Assessment detailed earthworks plans, certified by a RPEQ, and designed generally in accordance with: i) Australian Standard AS3798 – 2007 Guidelines on Earthworks for Commercial and Residential Developments and ii) the approved Concept Earthworks Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 015, Issue G, Prepared by Telford Civil, dated 07/07/21. The certified earthworks plans are to: i) include a geotechnical soils assessment of the site; ii) accord with the Erosion and Sediment Control Plan, as required by condition 7 – Erosion and sediment management; iii) accord with the Dispersive Soil Management Plan, as required by condition 8 – Dispersive soil management; iv) include the location and finished surface levels of any cut and/or fill; v) provide details of any areas where surplus soils are to be stockpiled; vi) detail protection measures to: 1. ensure adjoining properties and roads are not impacted by ponding or nuisance stormwater resulting from earthworks associated with the approved development; 2. preserve all drainage structures from structural loading impacts resulting from earthworks associated with the approved development.	a) Prior to commencing earthworks for the relevant stage

	b) Carry out earthworks generally in accordance with the certified plans endorsed by EDQ through part a) of this condition. c) Submit to EDQ TS RPEQ certification that: i) all earthworks have been carried out generally in accordance with the certified plans submitted under part a) of this condition; and ii) any unsuitable material encountered has been treated or replaced with suitable material.	b) Prior to survey plan endorsement for the relevant stage c) Prior to survey plan endorsement for the relevant stage
12.	**Retaining walls (excluding the western boundary retaining wall)** a) Submit to EDQ TS detailed engineering plans, certified by a RPEQ, of all retaining walls 1m or greater in height. Retaining walls must be: i) certified to achieve a minimum 50 year design life; ii) designed generally in accordance with *AS4678 – Earth Retaining Structures* and relevant material standards (e.g. *AS3600 – Concrete Structures*); b) Construct retaining walls generally in accordance with the certified plans required under part a) of this condition. c) Submit to EDQ TS certification from an RPEQ that all retaining wall works 1.0m or greater in height have been constructed generally in accordance with the certified plans submitted under part a) of this condition.	a) Prior to commencing earthworks for the relevant stage b) Prior to survey plan endorsement for the relevant stage c) Prior to survey plan endorsement for the relevant stage
13.	**Compliance Assessment – Western boundary retaining wall** a) Submit to EDQ DA for Compliance Assessment preliminary engineering plans, certified by a RPEQ, of the proposed western boundary retaining wall adjoining the swale. The retaining wall must be: i) fully contained, including footings, within the private lots; ii) designed based on a professional geotechnical advice; iii) take into consideration scour and flood impacts from the adjoining swale; and iv) appropriately fenced (fauna exclusion). b) Submit to EDQ TS detailed engineering plans, certified by a RPEQ, of the proposed retaining wall along the western swale, generally in accordance with the endorsed plans required under part a) of this condition. The retaining wall must be: i) certified to achieve a minimum 100 year design life; ii) designed generally in accordance with *AS4678 – Earth Retaining Structures* and relevant material standards (e.g. *AS3600 – Concrete Structures*); c) Construct retaining walls generally in accordance with the certified plans required under part b) of this condition.	a) Prior to commencing earthworks for Stage 2 b) Prior to survey plan endorsement for Stage 2 c) Prior to survey plan endorsement for Stage 2

	d) Submit to EDQ TS: i) 'as-constructed' plans, certified by a RPEQ, demonstrating that the retaining wall has been constructed generally in accordance with the certified plans submitted under part a) of this condition. ii) A survey plan identifying the location of wall and footings to the property boundary.	d) Prior to survey plan endorsement for Stage 2
Roadworks, urban servicing and stormwater management		
14.	**Compliance Assessment - Road 1, Road 3 and Road 4**	
	a) Submit to EDQ DA for Compliance Assessment functional layout plans, certified by a RPEQ, for Road 1, Road 3 and Road 4 generally in accordance with: i) PDA Guideline No. 13 Engineering standards; and ii) Proposed Development Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 010, Issue H, prepared by Telford Civil and dated 07/07/21 iii) Industrial Connector Street Cross-Section as identified in the Engineering Services Report prepared by Telford Civil and dated 06/07/21. The roads are to be designed to allow for the use of heavy vehicles (B-doubles).	a) Prior to commencing site works
	b) Submit to EDQ TS detailed engineering plans, certified by a RPEQ, for roadworks for Road 1, Road 3 and Road 4, including parking bays, traffic devices and footpaths generally in accordance with: i) PDA Guideline No. 13 Engineering standards; and ii) functional layout plans endorsed under part a) of this condition.	b) Prior to commencing roadworks for the relevant stage
	c) Construct roadworks generally in accordance with the certified plans submitted under part b) of this condition.	c) Prior to survey plan endorsement for the relevant stage
	d) Submit to EDQ TS: i) certification from a RPEQ that all roadworks have been constructed generally in accordance with the certified plans submitted under part a) of this condition; and ii) all documentation as required by the *Certification Procedures Manual*. iii) as-constructed drawings, asset register and test results, certified by a RPEQ, in a format acceptable to the end asset owners for all roadworks constructed under this condition.	d) Prior to survey plan endorsement for the relevant stage
15.	**Compliance assessment – Crowson Lane and Greenhill Road intersection interim layout** Unless ultimate intersection works are already delivered by Council as part of the Crowson Lane augmentation project:	
	a) Submit to EDQ DA for Compliance Assessment engineering design and construction drawings, certified by a RPEQ, for the auxiliary left-turn treatment and channelised right turn lane	a) Prior to commencing intersection works

	treatment at the Crowson Lane/Greenhill Road intersection, generally in accordance with the following plans/documents: i. PDA Guideline No. 13 Engineering standards; and ii. Traffic Impact Assessment, Report No. 16378, Version 3 prepared by Rytenskild Traffic Engineering and dated 1 March 2019. b) Construct the works generally in accordance with the endorsed plans submitted under part a) of this condition. c) Submit to EDQ TS: i) certification from a RPEQ that the intersection works have been constructed generally in accordance with the certified plans submitted under part b) of this condition; and ii) all documentation as required by the Certification Procedures Manual. iii) as-constructed drawings, asset register and test results, certified by a RPEQ, in a format acceptable to the end asset owners for all roadworks constructed under this condition.	b) Prior to survey plan endorsement for the first stage c) Prior to survey plan endorsement for the first stage
16.	**Mount Lindesay Highway Service Road (Road 2)** a) Submit to EDQ TS, approval from the Department of Transport and Main Roads for the Mount Lindesay Highway service lane, identified as Road 2 on Proposed Development Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 010, Issue H, prepared by Telford Civil and dated 07/07/21 The service lane is to be designed to allow for the use of heavy vehicles (B-doubles). b) Construct the extent of Road 2 as shown on Proposed Development Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 010, Issue H, prepared by Telford Civil and dated 07/07/21 from the intersection with Road 1 to the Crowson Lane Interchange with the first stage of development in accordance with the approval from DTMR as required under part a) c) Construct the extent of Road 2 as shown on Proposed Development Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 010, Issue H, prepared by Telford Civil and dated 07/07/21 from the intersection with Road 3 to the intersection of Road 1 with the second stage of development in accordance with the approval from DTMR as required under part a). d) Submit to EDQ TS, certification from a RPEQ that all roadworks have been constructed generally in accordance part a) of this condition. ***Advice Note****: Construction of this service lane in accordance with the Industrial Connector cross-section or as alternatively agreed to by EDQ and meets EDQ's minimum requirements for offsetable infrastructure, can be considered offsetable.*	a) Prior to commencing works for Stage 1 b) As indicated c) As indicated d) Prior to survey plan endorsement for the relevant stage

17.	**Street lighting** Comply with either parts a) and c) or parts b) and c) of this condition.	
	a) Design and install a Rate 2 street lighting system, certified by a RPEQ, to all roads, including footpaths/bikeways within road reserves. The design of the street lighting system must: i) meet the relevant standards of Energex; ii) be endorsed by Energex as 'Rate 2 Public Lighting'; iii) be endorsed by Council as the Energex 'billable customer'; iv) be generally in accordance with *Australian Standards AS1158 – 'Lighting for Roads and Public Spaces*.	a) Prior to survey plan endorsement for the relevant stage
	b) Design and install a Rate 3 street lighting system, certified by a suitably qualified and experienced RPEQ, to all roads, including footpaths/bikeways within road reserves. The design of the street lighting system must: i) be in accordance with *Australian Standards AS1158 – 'Lighting for Roads and Public Spaces'* ii) meet the requirements of AS3000 – '*SAA Wiring Rules'.* iii) meet the requirements of Energex for unmetered supply iv) be endorsed by the relevant ownership authority.	b) Prior to survey plan endorsement for the relevant stage
	c) Submit to EDQ TS 'as-constructed' plans and test documentation, certified by a RPEQ, in a format acceptable to Council.	c) Prior to survey plan endorsement for the relevant stage
18.	**Compliance Assessment - Water reticulation**	
	a) Submit to EDQ DA for Compliance Assessment a detailed water network plan, supported by hydraulic analysis, certified by RPEQ. The water network plan shall be prepared in accordance with: i) *SEQ Water Supply and Sewerage Design and Construction Code*; and ii) Concept Water Reticulation Layout Plan, Plan no. TIEL202159.CIV.DA, Dwg No 014, Issue G, prepared by Telford Civil and dated 07/07/21.	a) Prior to commencing works for Stage 1
	b) Submit to EDQ TS detailed water reticulation design plans, certified by a RPEQ. The certified water reticulation design plans must be designed generally in accordance with: i) *SEQ Water Supply and Sewerage Design and Construction Code*; and ii) the endorsed water network analysis required under part a) of this condition.	b) Prior commencing water reticulation work for the relevant stage
	c) Construct water reticulation works generally in accordance with the certified plans submitted under part a) of this condition.	c) Prior to survey plan endorsement for the relevant stage

	d) Submit to EDQ TS 'as constructed' plans, certified by a RPEQ, of all water reticulation infrastructure constructed in accordance with this condition, including an asset register, pressure and bacterial test results in accordance with: i) SEQ Water Supply and Sewerage Design and Construction Code - Asset Information.	d) Prior to survey plan endorsement for the relevant stage
19.	**Compliance Assessment – Internal Sewer reticulation**	
	a) Submit to EDQ DA for Compliance Assessment a detailed internal sewerage network plan, supported by hydraulic analysis, certified by RPEQ. The internal sewer network plan shall be prepared in accordance with: i) *SEQ Water Supply and Sewerage Design and Construction Code*; and ii) Concept Sewer Reticulation Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No 012, Issue G, prepared by Telford Civil and dated 07/07/21. The sewerage network plan shall include the extension of the internal sewer reticulation to the southern boundary to service the external catchment falling to the site.	a) Prior to commencing works for the relevant stage
	b) Submit to EDQ TS detailed sewer reticulation design plans, certified by a RPEQ. The certified sewer reticulation design plans must be designed generally in accordance with: i) *SEQ Water Supply and Sewerage Design and Construction Code;* and ii) the endorsed sewer network plan required under part a) of this condition	b) Prior to commencing works for the relevant stage
	c) Construct the internal sewer reticulation works generally in accordance with the certified plans submitted under part b) of this condition.	c) Prior to survey plan endorsement for the relevant stage
	d) Submit to EDQ TS 'as constructed' plans, certified by an RPEQ, of all internal sewer reticulation infrastructure constructed in accordance with this condition, including an asset register, pressure and CCTV results in accordance with: *i) SEQ Water Supply and Sewerage Design and Construction Code - Asset Information.* **Advice Note:** *The Sub-Regional sewerage pump station NM1 and external sewer rising main will be constructed and put in operation by Council.*	d) Prior to survey plan endorsement for the relevant stage
20.	**Temporary sewage tankering of wastewater** Unless the Sub-Regional sewerage pump station NM1 and external rising main is completed and in operation by Council:	
	a) Enter into a tankering agreement with Council for the collection and disposal of wastewater for any lots created; and	a) Prior to survey plan endorsement for the first stage
	b) Maintain the tankering agreement required by part a) of this condition until Sub-Regional sewerage pump station NM1 is commissioned.	b) As indicated

21.	**Compliance Assessment – Updated Site Based Stormwater Management Plan** Submit to EDQ DA for Compliance Assessment an updated Site Base Stormwater Management Plan (SBSMP), certified by a RPEQ, for the management of stormwater within the site to ensure non-worsening to downstream properties, including Mt Lindesay Highway, generally in accordance with *PDA Guideline No. 13 Engineering standards, Stormwater Quantity and Stormwater Quality*. The updated SBSMP shall include the following: i) Confirmation that the subject site is not impacted by flooding. This confirmation is to be provided through the undertaking of a site based flood model. If impacted by flood, provide further details on the Q100 line and the type of inundation – conveyance and/or storage Or Demonstrate that the updated current solution identified in the SBSMP ensures that there is no worsening at lawful point of discharge based on Council's nominated 1% AEP flood level at Mt Lindesay Highway. ii) he on-site detention/bio-retention basins form part of the overall solution. Provide an engineering and legal strategy/mechanism (e.g. Easement) to ensure that these devices can continue to perform as designed into the future. iii) Demonstrate that the design of the road stormwater system will convey runoff from the road reserve and the pre-developed lots to the proposed detention / bio-retention basin. iv) Demonstrate that the configuration, sizing and operation of the proposed detention / bio-retention basin system will accommodate runoff from the road stormwater system as per part (iii) above and result in no net worsening downstream of the site. v) Conveyance of existing external flows to the existing lawful point of discharge, ensuring no-net worsening downstream of the site.	Prior to commencing works
22.	**Stormwater Conveyance System** a) Submit to EDQ TS detailed engineering drawings and hydraulic calculations, certified by a RPEQ, for the stormwater conveyance system designed generally in accordance with: i) *PDA Guideline No. 13 Engineering standards* – Stormwater quantity; and ii) Updated Site Based Stormwater Management Plan, required by Condition 21 of this approval. b) Construct stormwater network generally in accordance with the certified plans submitted under part a) of this condition.	a) Prior to commencing works for the relevant stage b) Prior to survey plan endorsement for the relevant stage

	c) Submit to EDQ TS "as constructed" plans, certified by a RPEQ including an asset register in a format acceptable to Council.	c) Prior to survey plan endorsement for the relevant stage
23.	**Compliance Assessment - Stormwater detention/bio-retention basin** a) Submit to EDQ DA for Compliance Assessment detailed engineering drawings and hydraulic calculations, certified by a RPEQ, for the proposed detention/bio-retention basin designed generally in accordance with: i) PDA Guideline No. 13 Engineering standards – Stormwater Quantity and Stormwater Quality; and ii) Updated Site Based Stormwater Management Plan, required by Condition 21 of this approval. b) Construct the basin generally in accordance with the endorsed plans required under part a) of this condition. c) Submit to EDQ TS "as constructed" plans, certified by a RPEQ including an asset register in a format acceptable to Council. **Advice Note:** *The proposed industrial allotments will have lot-based on-site stormwater detention and water quality treatment measures in the post-development phase. These treatment devices will be installed by the future lot owner with their size and location being allocated to suit the end use. Maintenance of these devices will be the responsibility of the future lot owners.*	a) Prior to commencing works b) Prior to survey plan endorsement for the first stage c) Prior to survey plan endorsement for the first stage
24.	**Compliance Assessment – Swale** a) Submit to EDQ DA for Compliance Assessment detailed engineering drawings and hydraulic calculations, certified by a RPEQ, for the stormwater swale on the western boundary of the land designed generally in accordance with: i) PDA Guideline No. 13 Engineering standards – Stormwater quantity and: ii) Concept Catchment Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 008 Issue I, Prepared by Telford Civil and dated 07/07/2021 iii) Swale Longitudinal Section, Plan No. TIEL202159.CIV.DA, Dwg No 018 Issue B, Prepared by Telford Civil and dated 07/07/2021 iv) Swale Cross Sections, Plan No. TIEL202159.CIV.DA, Dwg No 019 Issue C, Prepared by Telford Civil and dated 07/07/2021 The detailed design shall ensure that the swale: i) has adequate capacity to convey overland flow up to including the 1 in 100year event with appropriate freeboard ii) is free flowing with no ponding iii) is provided with an adjacent track to allow future maintenance iv) maintain a depth*velocity product not exceeding 0.6 up to including 1 in 100year event unless agreed in writing by Council	a) Prior to commencing works

	v) is appropriately fenced (fauna exclusion) along the eastern side of the swale. b) Construct the swale generally in accordance with the endorsed plans required under part a) of this condition. c) Submit to EDQ TS swale "as constructed" plans, certified by a RPEQ including an asset register in a format acceptable to Council.	 b) Prior to survey plan endorsement for Stage 2 c) Prior to survey plan endorsement for Stage 2
25.	**Electricity** a) Submit to EDQ TS a Certificate of Electricity Supply from ENERGEX for the provision of electricity supply to the approved development. b) Connect the approved development in accordance with the Certificate of Electricity Supply submitted under part a) of this condition.	 a) Prior to survey plan endorsement for the relevant stage b) Prior to survey plan endorsement for the relevant stage
26.	**Telecommunications** a) Submit to EDQ TS documentation from an authorised telecommunication service provider confirming that an agreement has been entered into for the provision of underground telecommunication services to the approved development. b) Connect the approved development in accordance with the documentation submitted under part a) of this condition.	 a) Prior to survey plan endorsement for the relevant stage b) Prior to survey plan endorsement for the relevant stage
27.	**Broadband** a) Submit to EDQ TS written agreement, from an authorised telecommunications service provider, confirming that fibre-ready pit and pipe infrastructure designed to service the approved development can accommodate services compliant with *Industry Guideline G645:2017 Fibre-Ready Pit and Pipe Specification for Real Estate Development Projects*. b) Construct the fibre-ready pit and pipe infrastructure specified in the agreement submitted under part a) of this condition.	 a) Prior to survey plan endorsement for the relevant stage b) Prior to survey plan endorsement for the relevant stage
28.	**Gas** a) Submit to EDQ TS, documentation from an authorised gas service provider, confirming that an agreement has been entered into for the provision of underground gas services to the proposed development. b) Connect the development to underground gas services in accordance with the agreement mentioned in part a) of this condition.	 a) Prior to survey plan endorsement for the relevant stage b) Prior to survey plan endorsement for the relevant stage

Landscape and environment		
29.	**Streetscape works – Compliance Assessment** a) Submit to EDQ DA, for Compliance Assessment, detailed streetscape works drawings, certified by an AILA, for proposed streetscape works of Roads 1, 3 and 4, including a schedule of proposed standard and non-standard Contributed Assets to be transferred to Council. The certified drawings are to include, where relevant: 1. location and type of street lighting in accordance with AS1158 –*'Lighting for Roads and Public Spaces';* 2. footpath treatments; 3. location and specifications of streetscape furniture; 4. location and size of stormwater treatment devices; and 5. street trees and plants, including species, size and location generally in accordance with Council's adopted planting schedules and guidelines. b) Construct streetscape works generally in accordance with the streetscape plans endorsed under part a) of this condition. c) Submit to EDQ TS 'as constructed' plans, certified by an AILA, and asset register in a format acceptable to Council.	a) Prior to commencing streetscape work for the relevant stage b) Prior to survey plan endorsement for the relevant stage c) Prior to survey plan endorsement for the relevant stage
30.	**Vegetation Clearing** a) Submit to EDQ TS a vegetation clearing plan prepared by an ecologist for each stage that excludes the 25m buffer corridor and lot identified for open space. b) Undertake vegetation clearing generally in accordance with the plan submitted under part a) of this condition. The clearing is to be undertaken with the stage to be developed. c) Vegetation clearing is to be supervised by an Ecologist. d) Submit to EDQ TS written certification from an Ecologist that vegetation clearing has been carried out generally in accordance with part b) of this condition.	a) Prior to commencement of clearing for relevant stage b) At all times c) At all times d) Within 3 months of completion of clearing of the relevant stage
31.	**Fauna Spotter** a) A licensed Wildlife Spotter/Catcher under the N*ature Conservation Act 1992* is to undertake a survey of the site to identify any fauna or habitat features (e.g. nests, tree hollows) and certify that any necessary fauna protection measures or relocation procedures have been implemented. b) A licensed Wildlife Spotter/Catcher must be present during the vegetation clearing.	a) Prior to commencement of vegetation clearing for the relevant stage b) At all times during vegetation clearing

	c) Submit to EDQ TS certification from the licensed Wildlife Spotter/Catcher that vegetation clearing and fauna protection measures was carried out generally in accordance with the conditions of approval. **Advice Note:** *Where an Environmental Protection and Biodiversity Conservation Act 1999 (EPBC) approval has been granted and includes fauna spotter requirements, the fauna spotter requirements under this condition will not be applicable for the same matters under the EPBC approval*.	c) Within 3 months of the completion of vegetation clearing of the relevant stage
32.	**Vegetation – Compensatory Planting**	
	a) Submit to EDQ TS a planting plan certified by an ecologist showing the extent of compensatory planting to be undertaken in lot identified as 'Open Space' on Proposed Development Layout Plan, Plan No. TIEL2020159.CIV.DA, Dwg 10, Issue H dated 07/07/2021, excluding the minimum 25m buffer on the western boundary, including, type and extent of planting, as set out in the EDQ Guideline 17: Remnant Vegetation and Koala Habitat Obligations in Greater Flagstone and Yarrabilba PDAs dated May 2015.	a) Prior to commencement of vegetation clearing for the relevant stage
	b) Undertake compensatory planting in accordance with a) of this condition.	b) Within 3 months of commencement of vegetation clearing
	c) Once compensatory planting has been undertaken, submit to EDQ TS confirmation from a qualified arborist (AQF Level 5) or ecologist that the compensatory planting has been undertaken in accordance with b) of this condition.	c) Within 12 months of commencement of vegetation clearing of the relevant stage
33.	**Bushfire management**	
	a) Carry out bushfire management works in accordance with: (i) Section 6 of the approved Bushfire Management Plan, Report 16014, Final V3, dated 13 July 2018 (ii) Addendum to the Bushfire Management Plan for the proposed development at 4499-4651 Mount Lindsay Highway, North Maclean dated 18 February 2021.	a) Prior to survey plan endorsement for the relevant stage
	b) Submit to EDQ TS verification from a suitably qualified professional that the works required for bushfire management and mitigation within the relevant stages have been carried out generally in accordance with the relevant approved plans and documents. **Advice Note**: *If the adjoining landowner obtains approval for vegetation clearing that reduces bushfire impact, then this can be articulated though an updated context plan supported by a new bushfire advice.*	b) Prior to survey plan endorsement for the relevant stage

Surveying, land transfers and easements		
34.	**Land transfers - contaminated land** Submit to EDQ TS a copy of a site suitability statement, as required under the EP Act, confirming that all land conditioned to be transferred to a trustee is suitable for the intended purpose(s). The site suitability statement must be prepared by a suitably qualified person and be certified by an approved auditor in accordance with the EP Act. *NOTES:* *For the purpose of this condition a suitably qualified person is defined in the EP Act.* *A list of approved auditors can be found at the following website:* https://www.qld.gov.au/environment/pollution/management/contaminated-land/auditor-engagement.	Prior to survey plan endorsement for the relevant stage
35.	**Land transfers – drainage and offset area** Transfer, in fee simple, to Council as trustee, the Lot identified as Open Space as shown on the approved plans for drainage and offset open space purposes.	At registration of survey plan for Stage 2
36.	**Land transfers – Sewerage pump station** a) Submit to EDQ TS, confirmation from Council on the size and location of the Sewer pump station site. b) Transfer in fee simple, to Council as trustee, land for the proposed sub-regional pump station generally in accordance as shown on: i) Concept Sewer Reticulation Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 012, Issue G, prepared by Teleford Civil and dated 07/07/21. The land metes and bounds must be to the satisfaction of the Chief Executive Officer of the authority. ***Advice Note**: This land forms part of the sub-regional sewer infrastructure to be delivered by Council. Offsets for the land may be available.*	a) Prior to survey plan endorsement of the first stage b) At registration of survey plan for the first stage
37.	**Rising main easement** Provide a 6m wide easement, in favour of and at no cost to the Council, along the southern boundary for the proposed sub-regional sewerage rising main generally in accordance as shown on: i) Concept Sewer Reticulation Layout Plan, Plan No. TIEL202159.CIV.DA, Dwg No. 012, Issue G, prepared by Teleford Civil and dated 07/07/21. The terms of public utility easements are to be to the satisfaction of the Chief Executive Officer of the authority which is to accept and maintain the Contributed Assets. ***Advice Note:** If an alternative route for the rising main is pursued, the easement can be cancelled at the agreement of Council.*	At registration of survey plan for the first stage

38.	**Easements over infrastructure** Provide public utility easements, in favour of and at no cost to the grantee, over infrastructure located in land (other than road) for Contributed Assets. . The terms of public utility easements are to be to the satisfaction of the Chief Executive Officer of the authority which is to accept and maintain the Contributed Assets.	At registration of survey plan for the relevant stage

STANDARD ADVICE

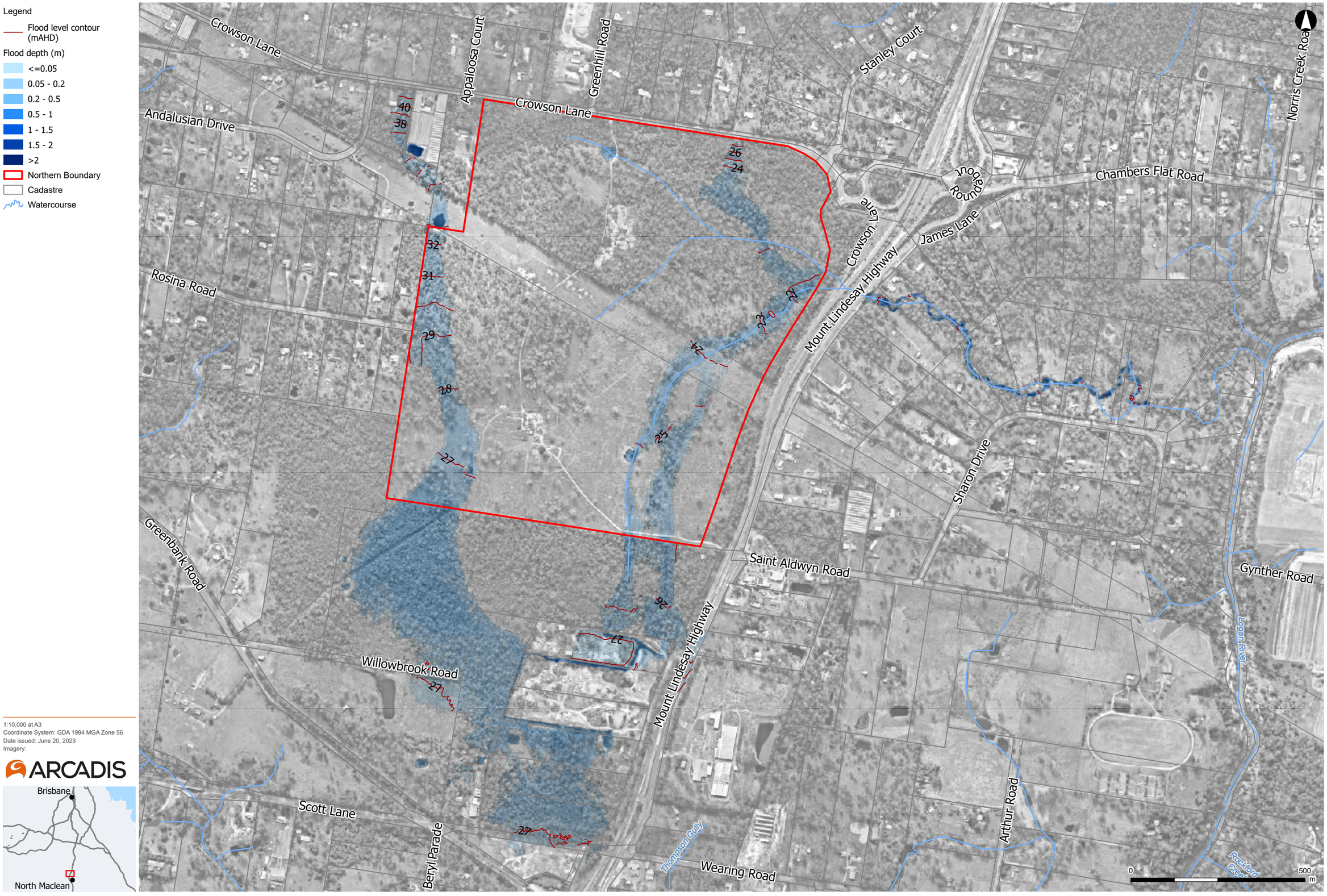
Please note that to lawfully undertake development, it may be necessary to obtain approvals other than this PDA development approval. For advice on other approvals that may be necessary in relation to your proposal, it is recommended that you seek professional advice.

**** End of Package ****

APPENDIX D

TUFLOW Mapping

Figure E-1 - Flood Depths - Existing Case 2 year ARI - 50% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

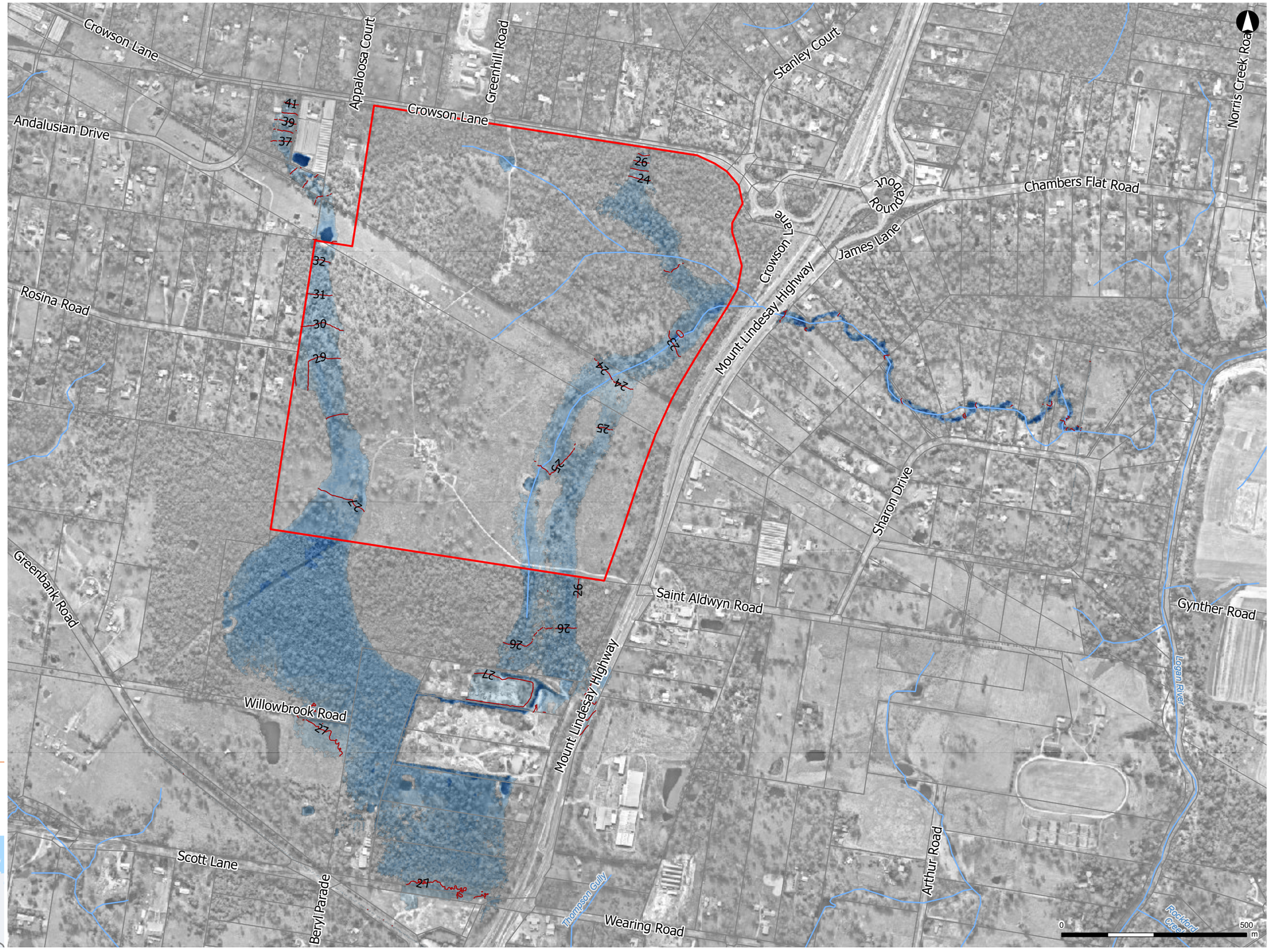
Figure E-2 - Flood Depths - Existing Case 5 year ARI - 20% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

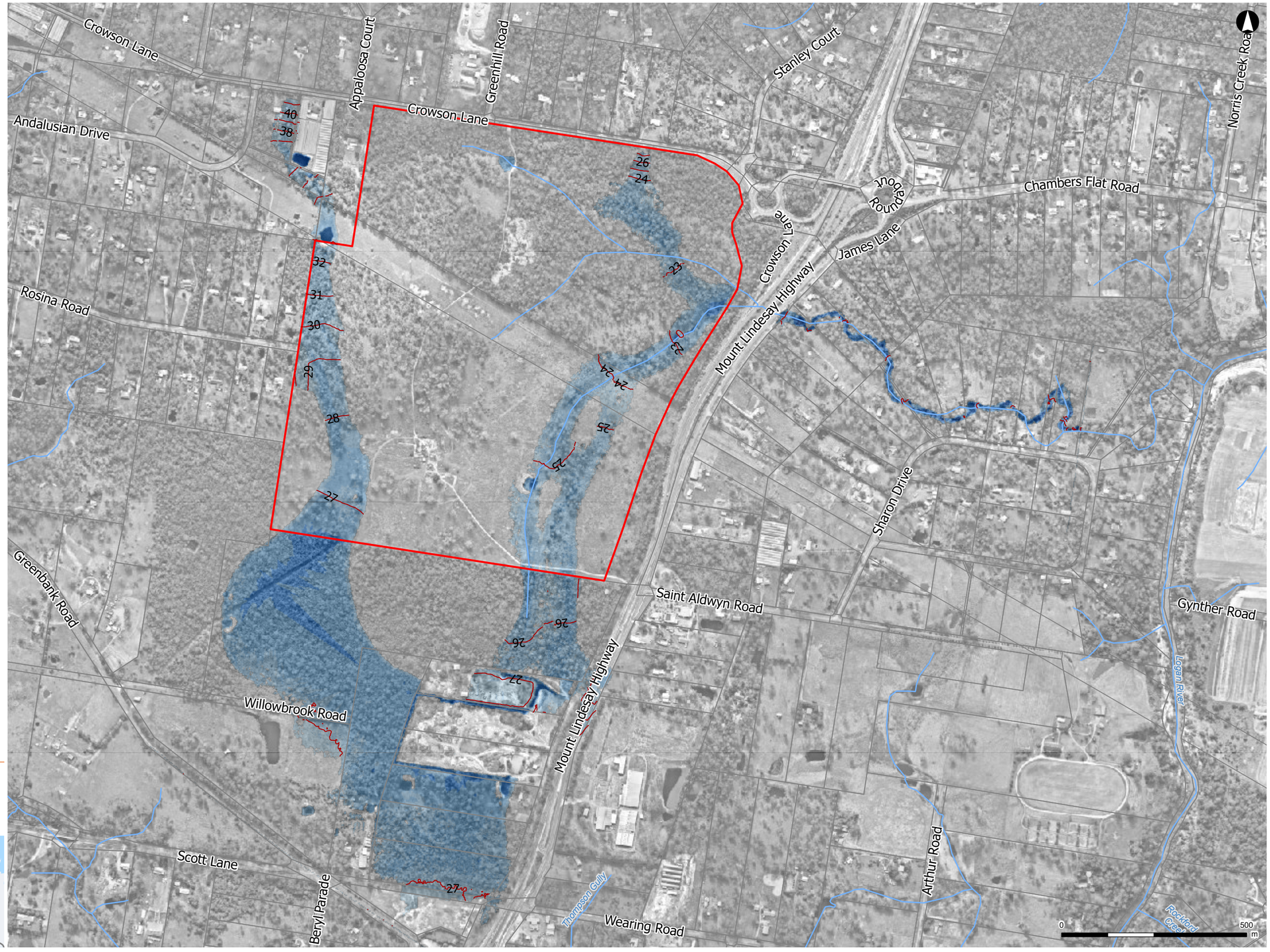
Figure E-3 - Flood Depths - Existing Case 10 year ARI - 10% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

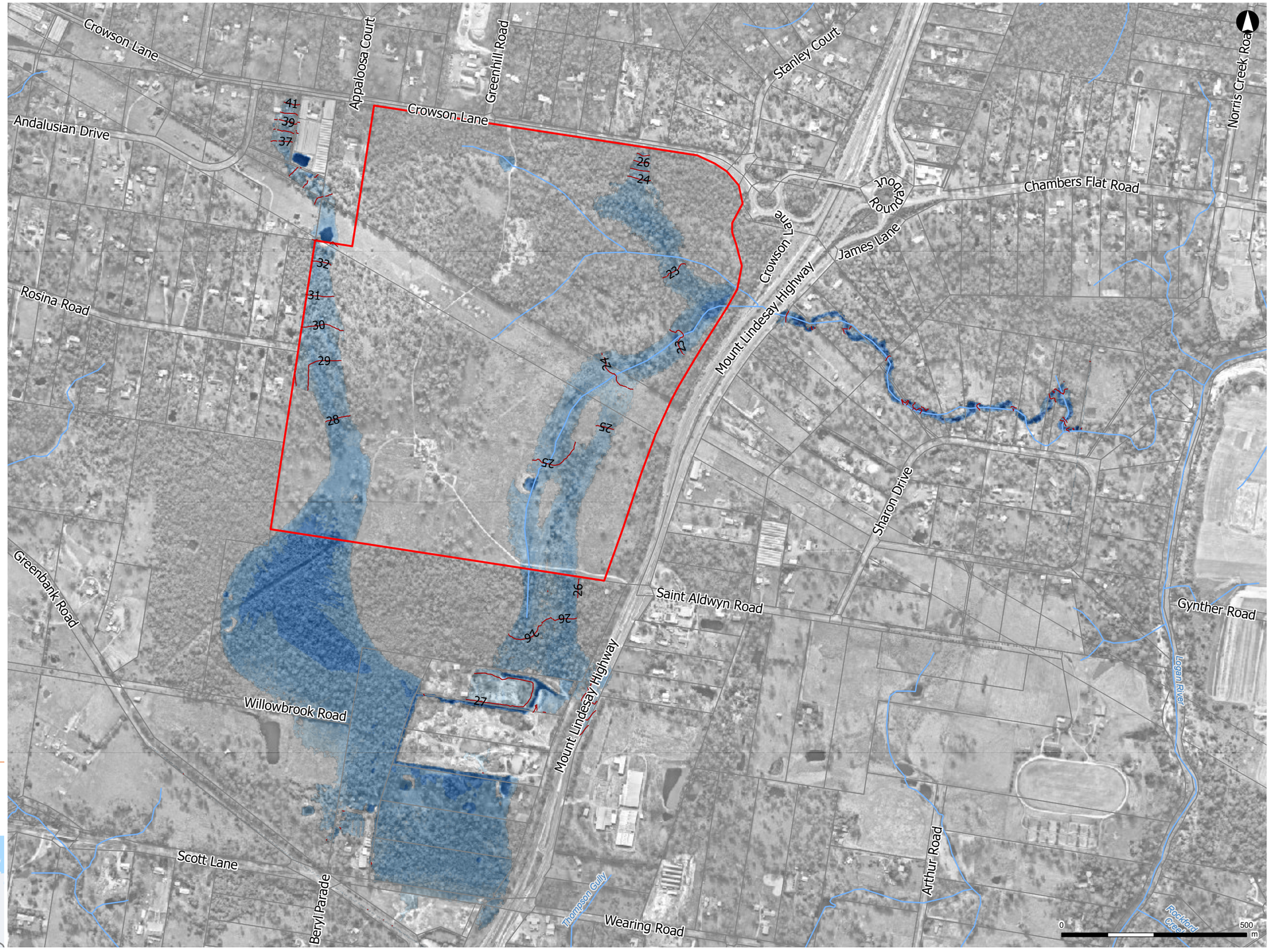
Figure E-4 - Flood Depths - Existing Case 20 year ARI - 5% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

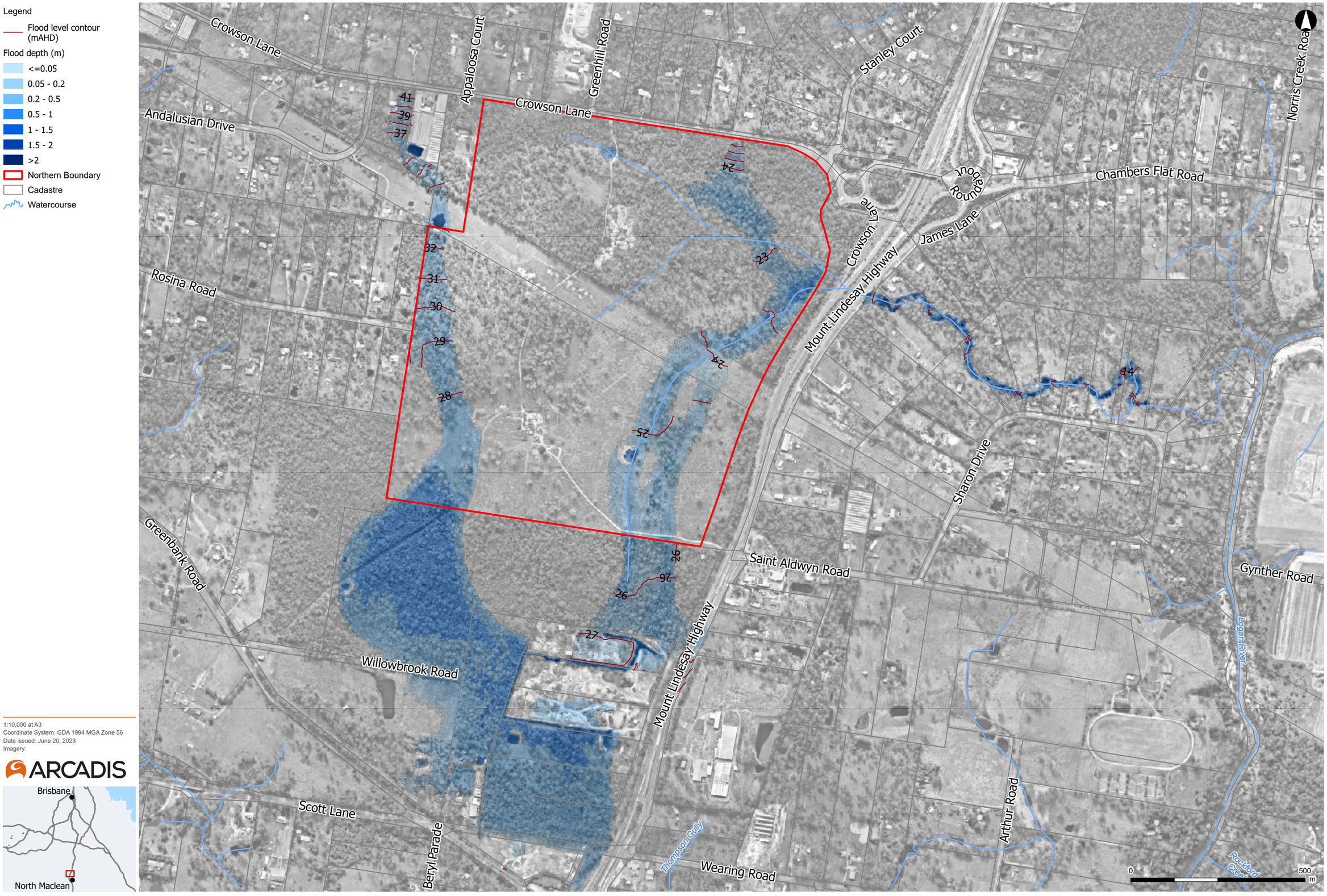
- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

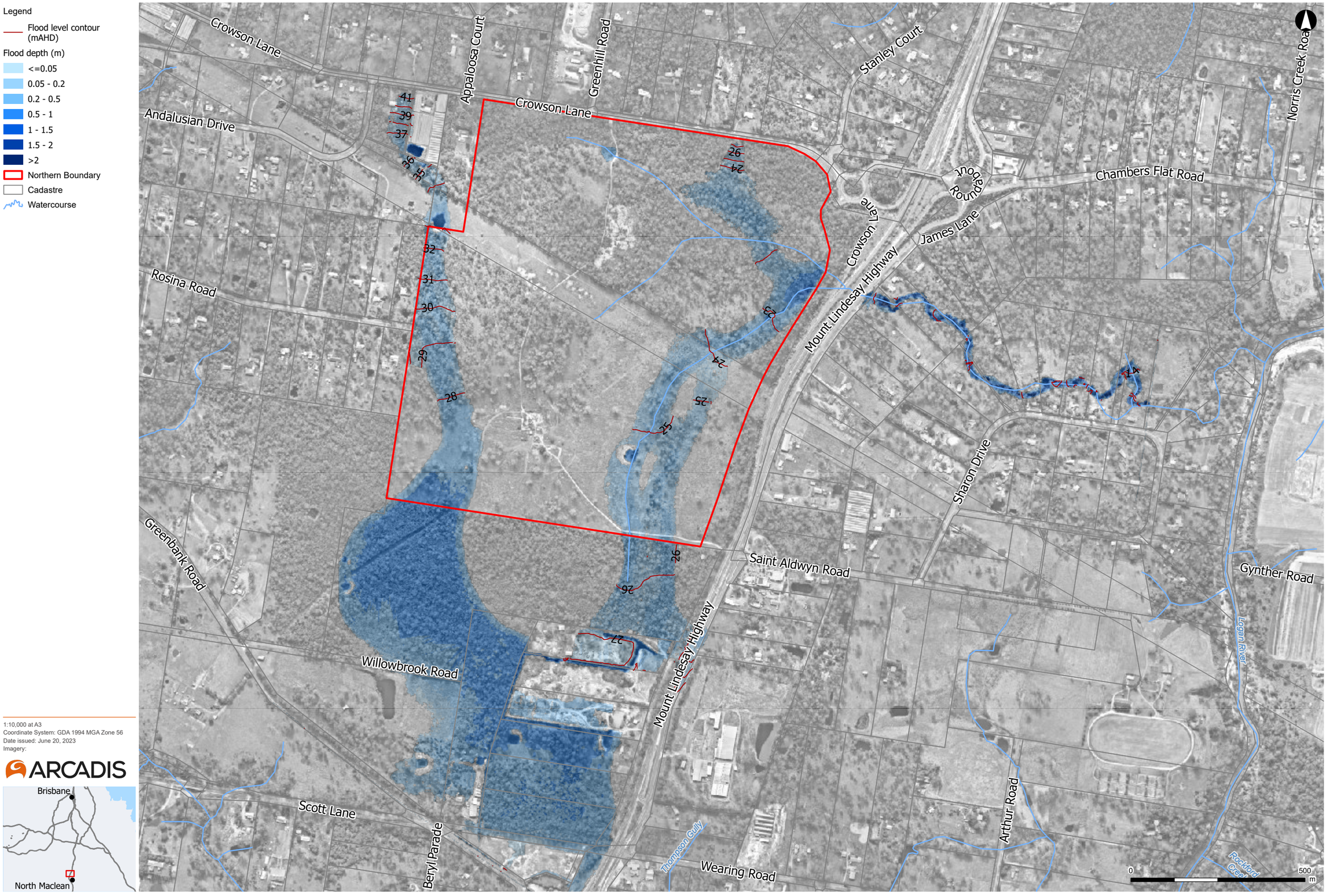
Figure E-5 - Flood Depths - Existing Case 50 year ARI - 2% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure E-6 - Flood Depths - Existing Case 100 year ARI - 1% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure E-7- FlowVelocity - Existing Case - 50% AEP

Figure E-8 - FlowVelocity - Existing Case - 20% AEP

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure E-9 - FlowVelocity - Existing Case - 10% AEP

Figure E-10 - FlowVelocity - Existing Case - 5% AEP

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

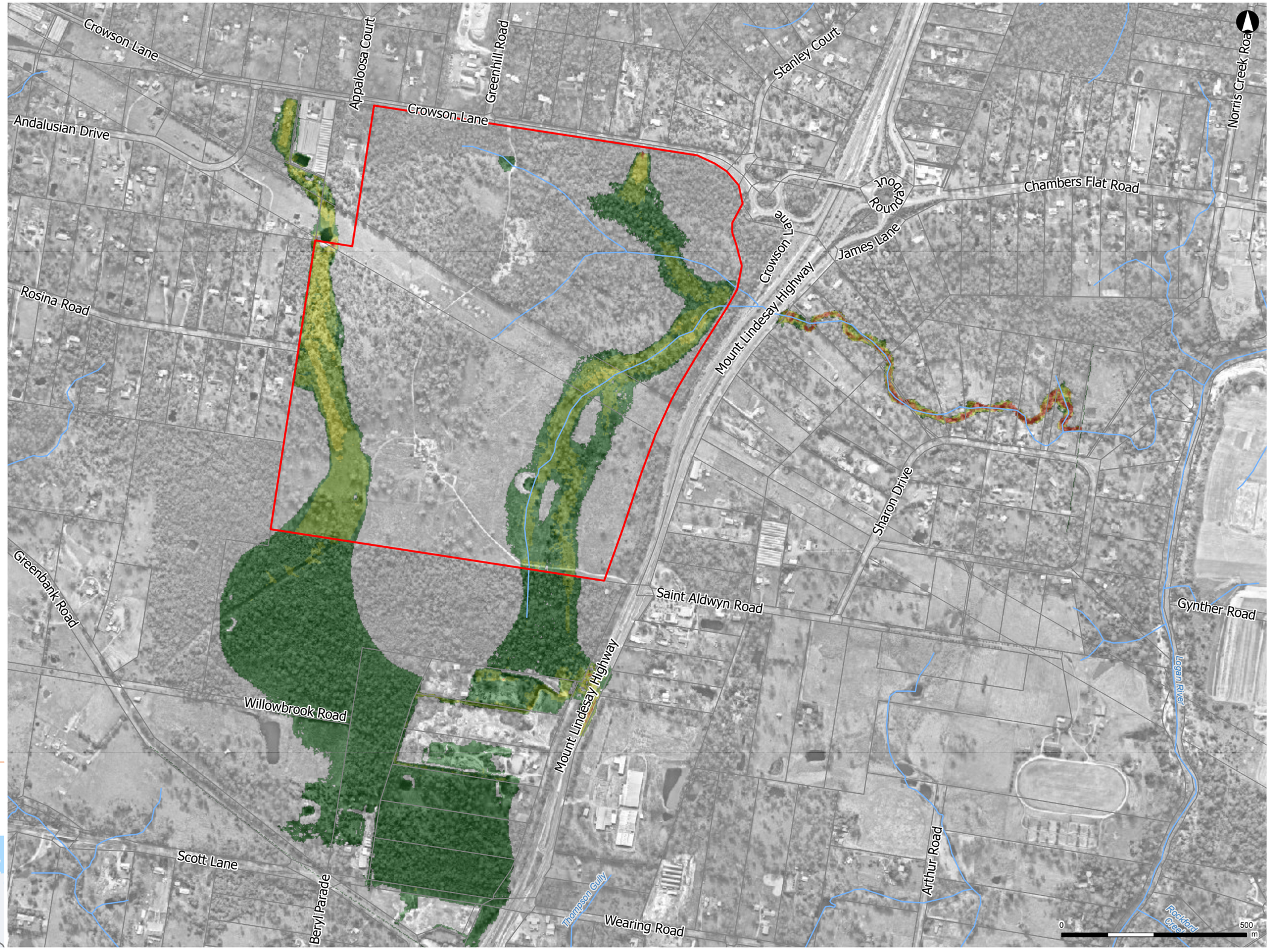
ARCADIS

Figure E-11 - FlowVelocity - Existing Case - 2% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

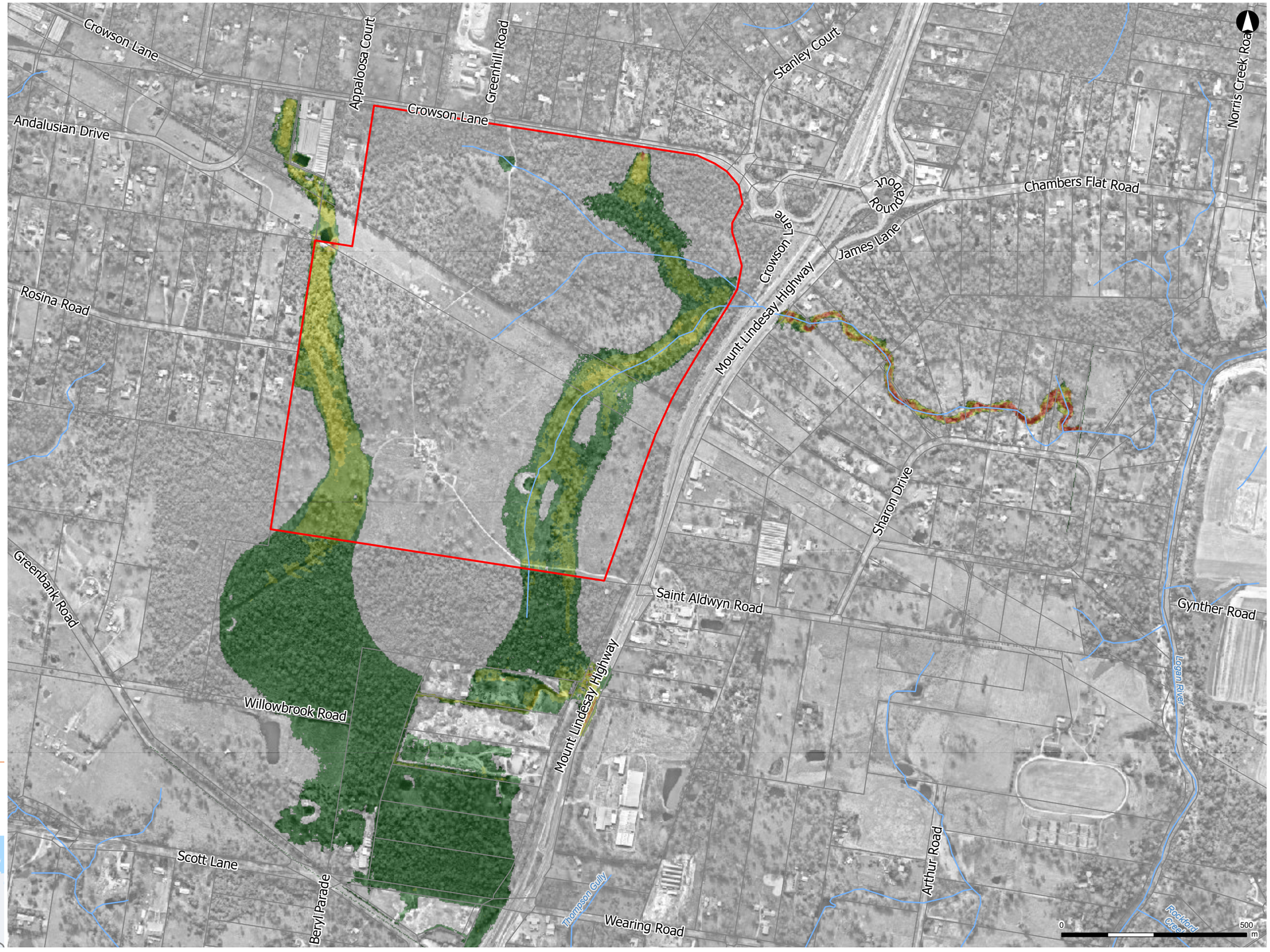
ARCADIS

Figure E-12 - FlowVelocity - Existing Case - 1% AEP

Legend

Flow velocity (m/s)

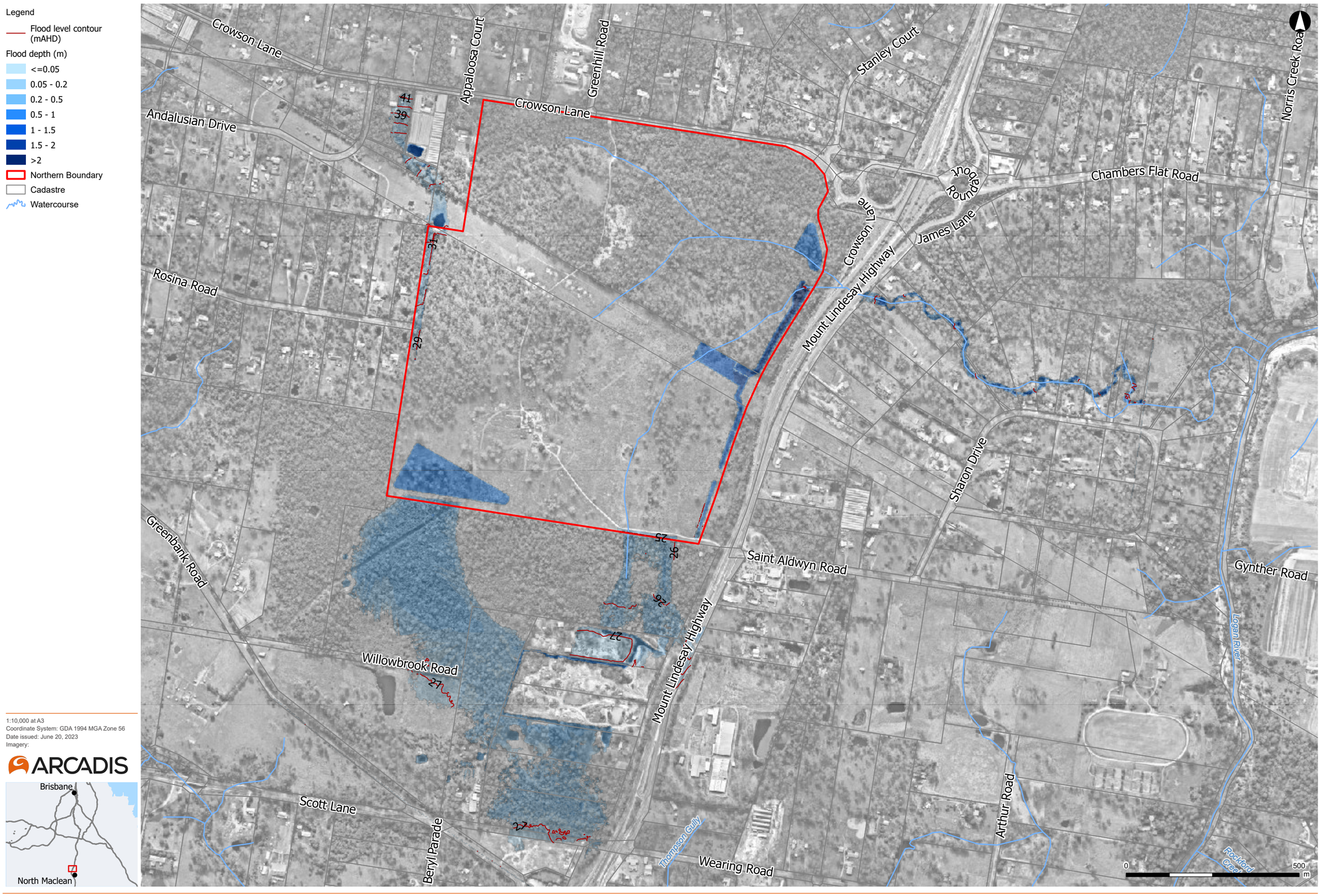
- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

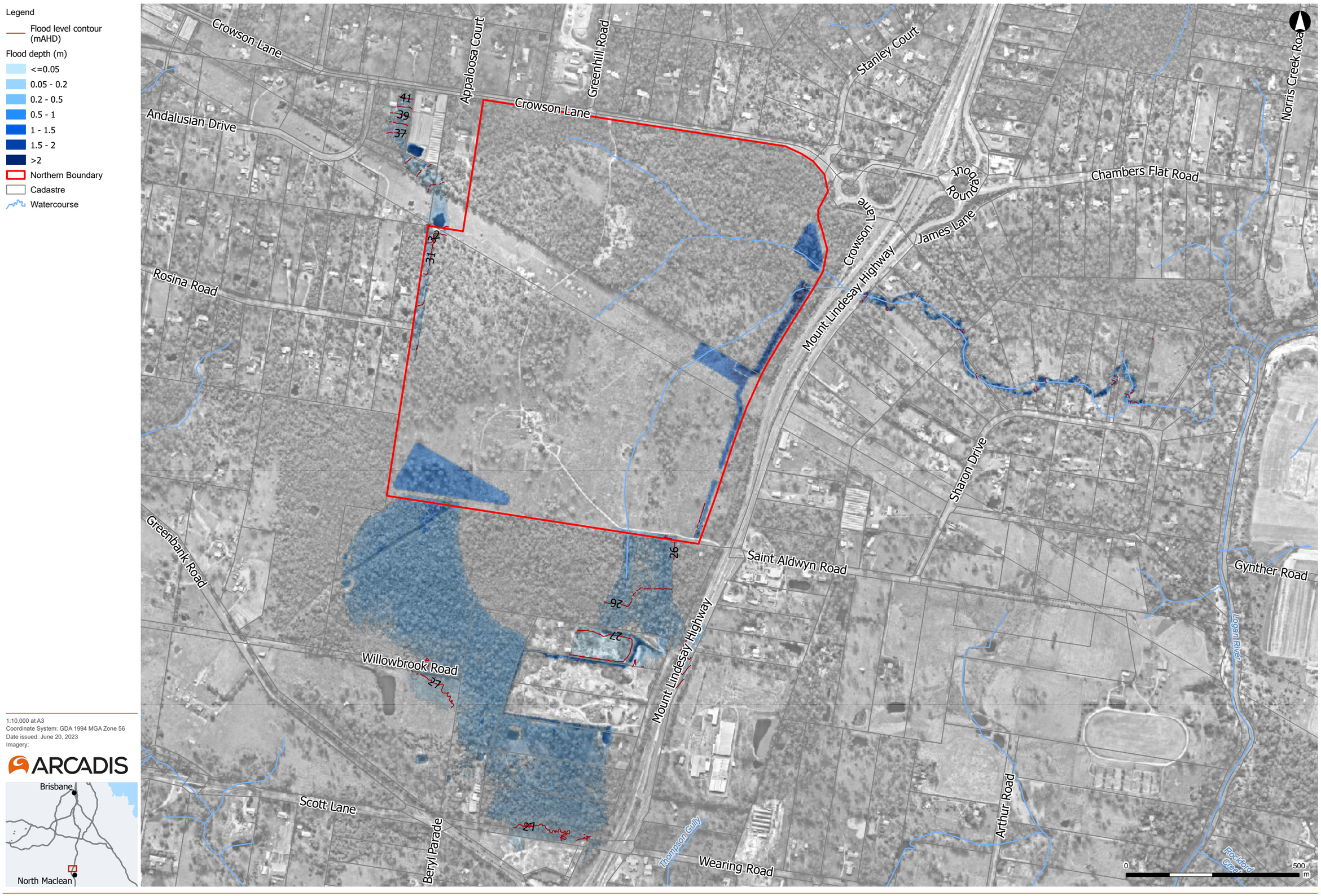
Figure D-1 - Flood Depths - Design Case - 50% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-2 - Flood Depths - Design Case - 20% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

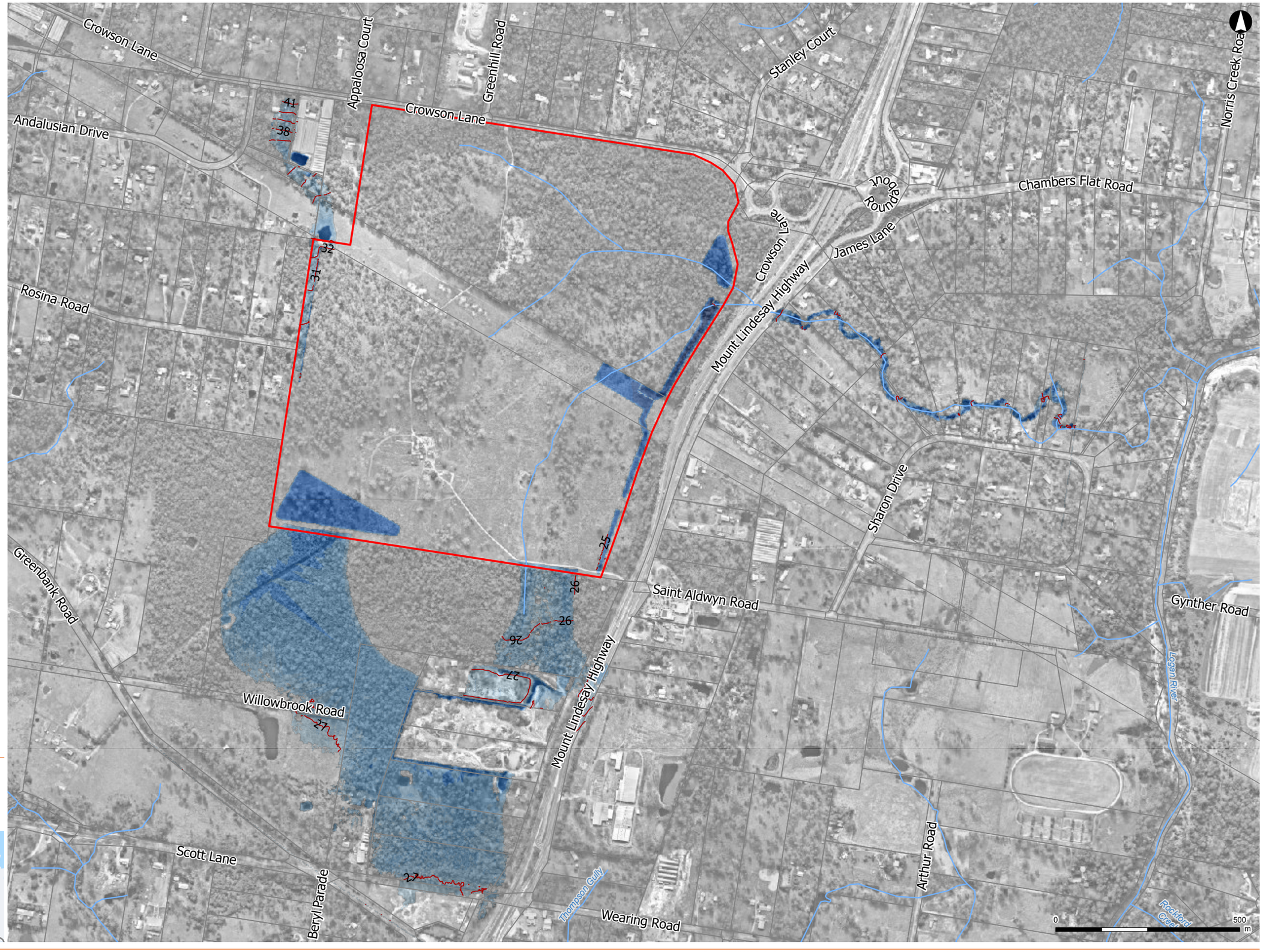
Figure D-3 - Flood Depths - Design Case - 10% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

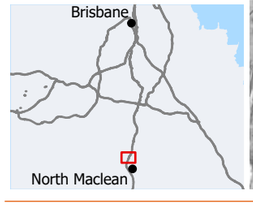


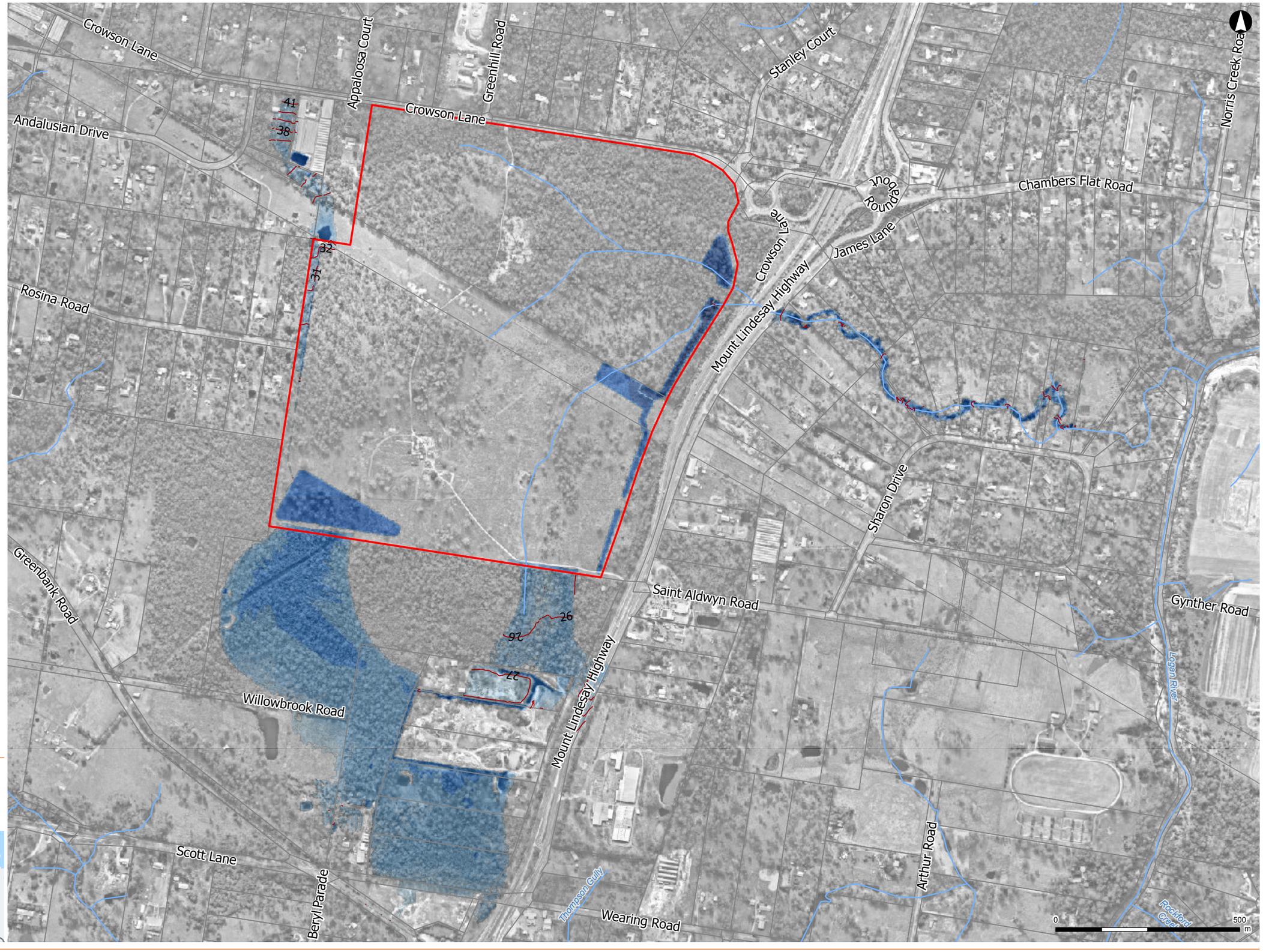
Figure D-4 - Flood Depths - Design Case - 5% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

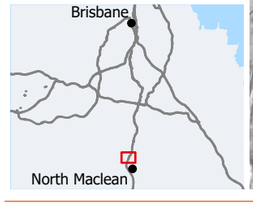
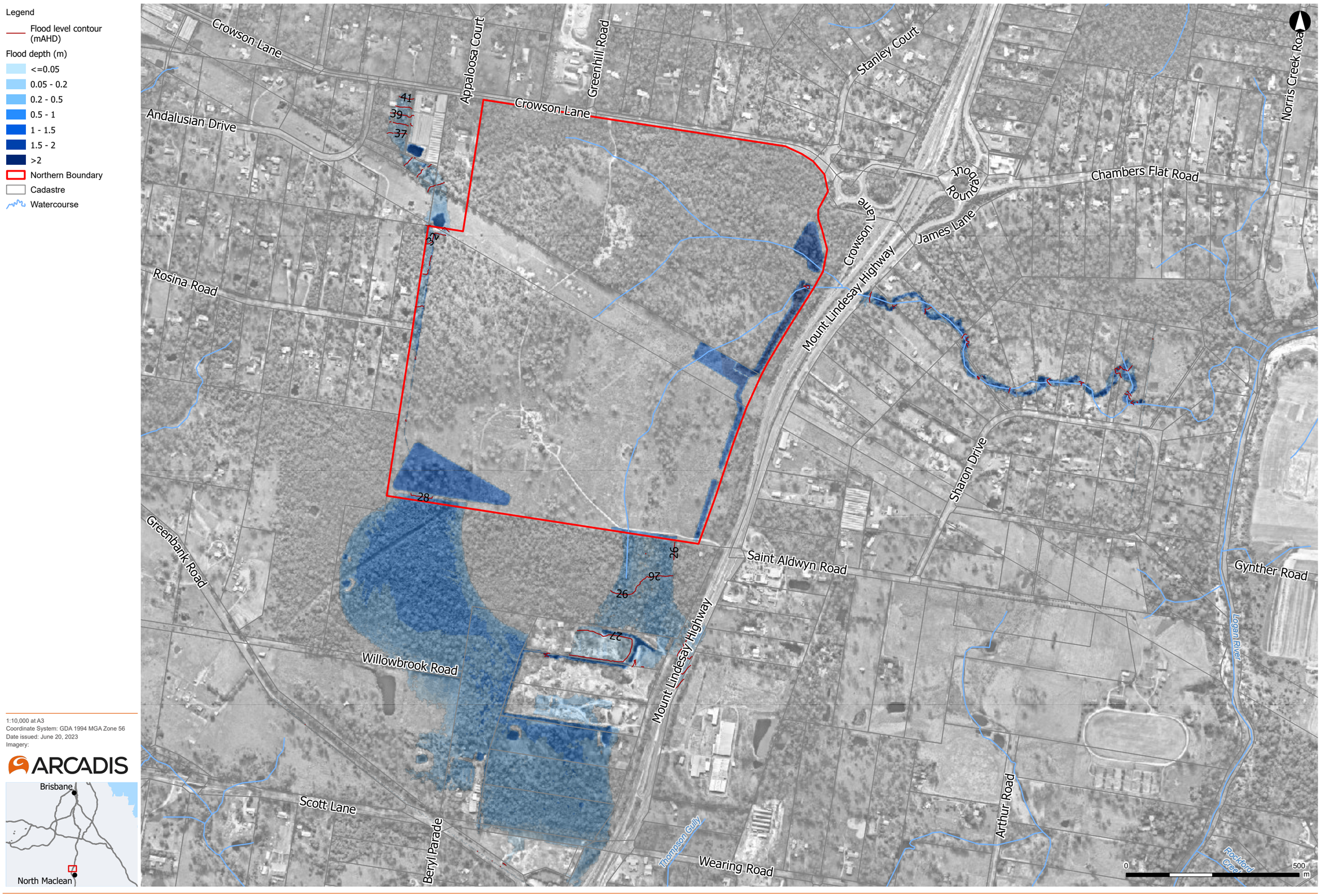


Figure D-5 - Flood Depths - Design Case - 2% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

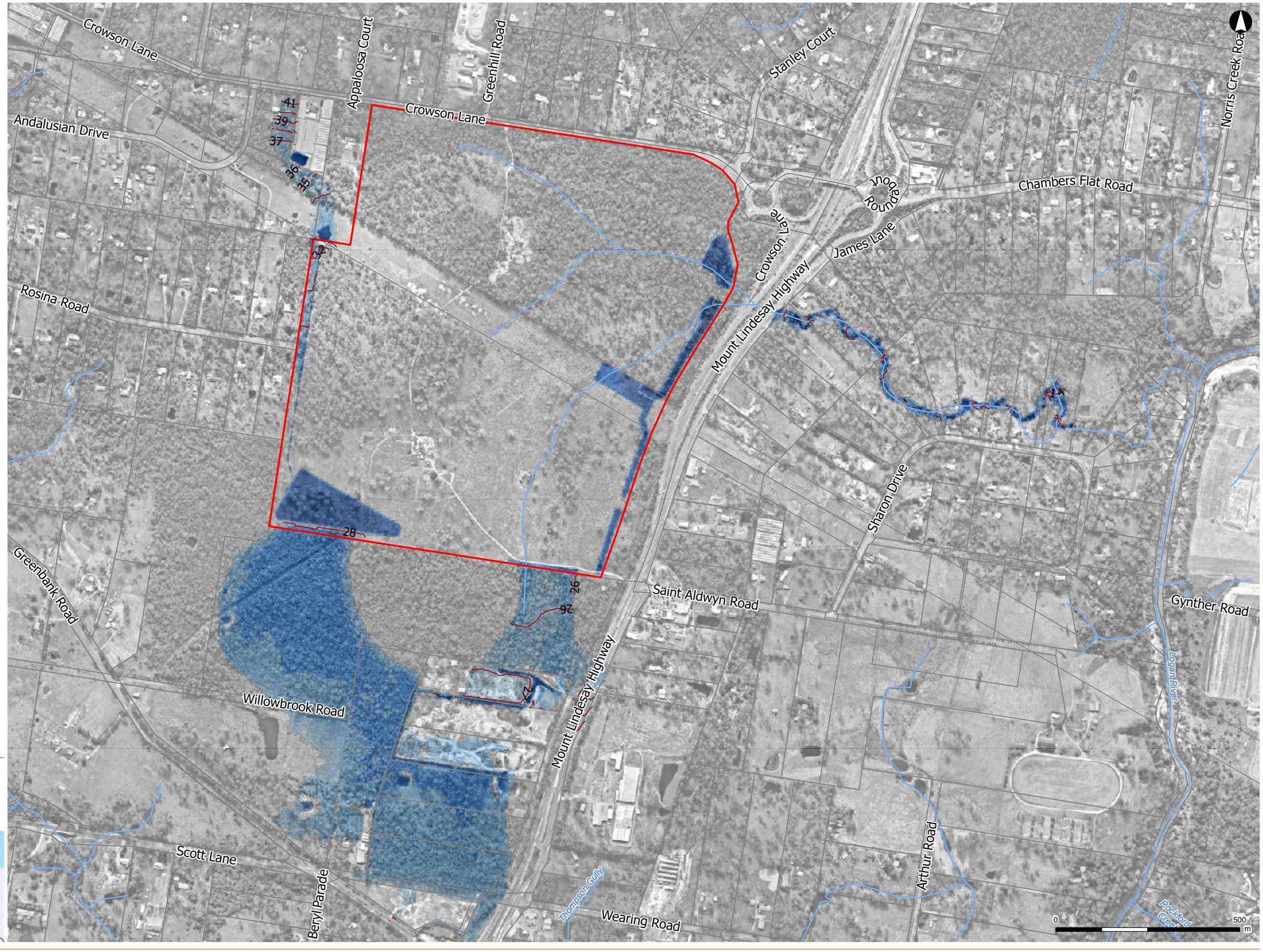
Figure D-6 - Flood Depths - Design Case - 1% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

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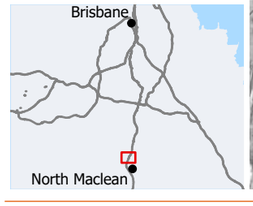


Figure D-7 - Flow Velocity - Design Case - 50% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

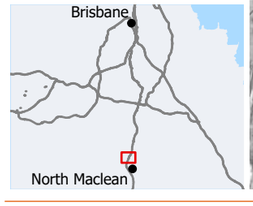
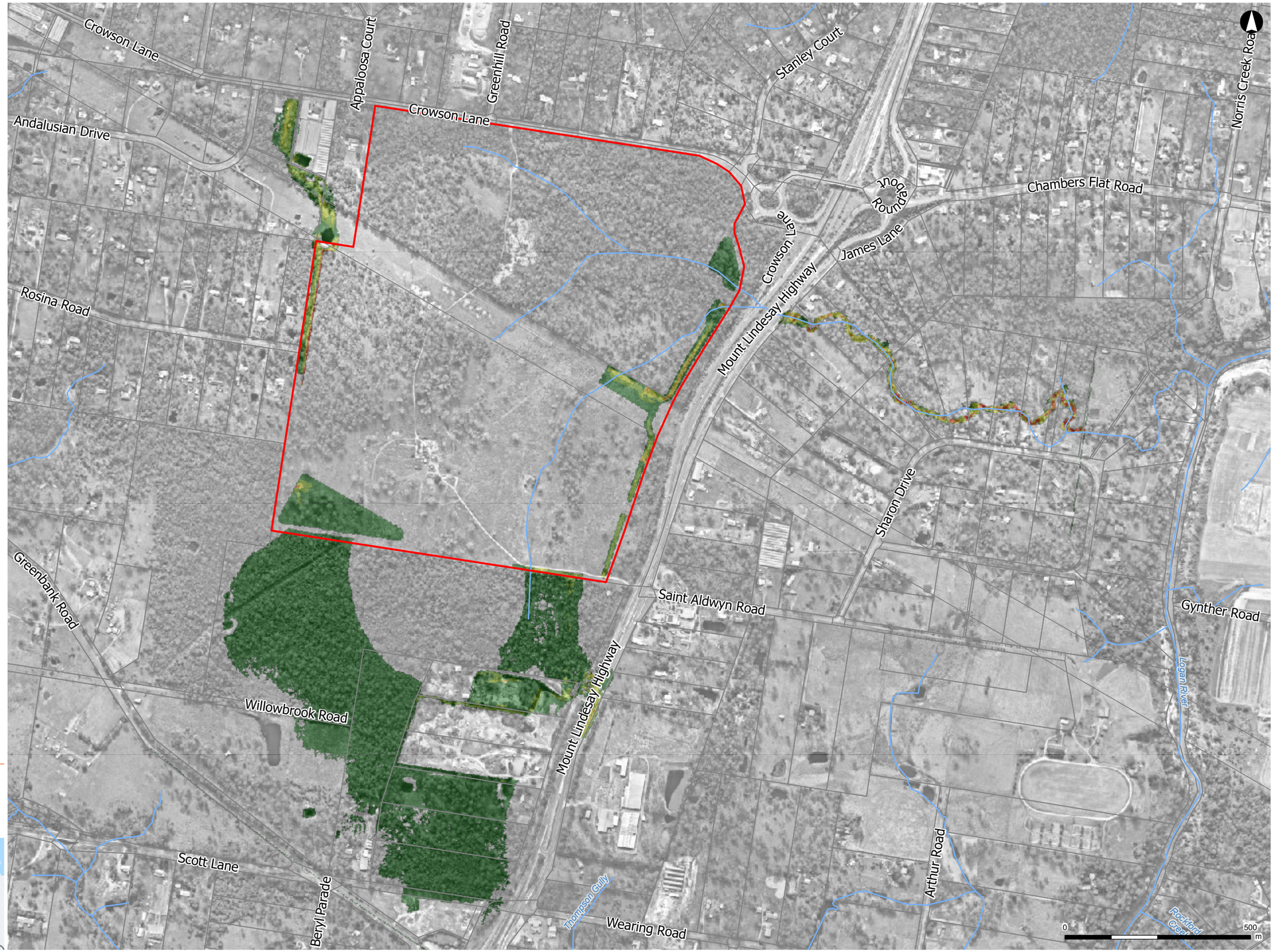


Figure D-8 - Flow Velocity - Design Case - 20% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-9 - Flow Velocity - Design Case - 10% AEP

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

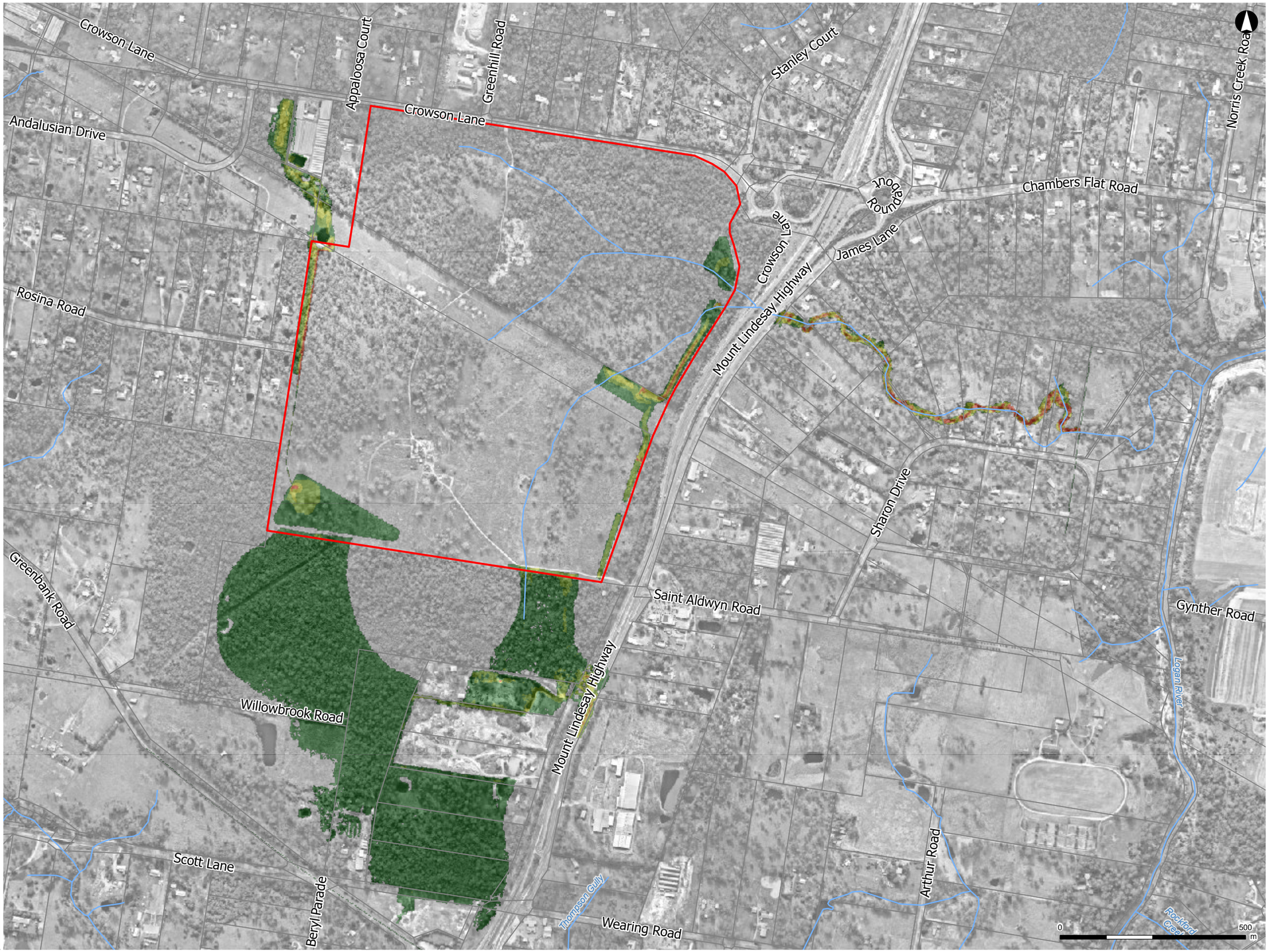
ARCADIS

Figure D-10 - Flow Velocity - Design Case - 5% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

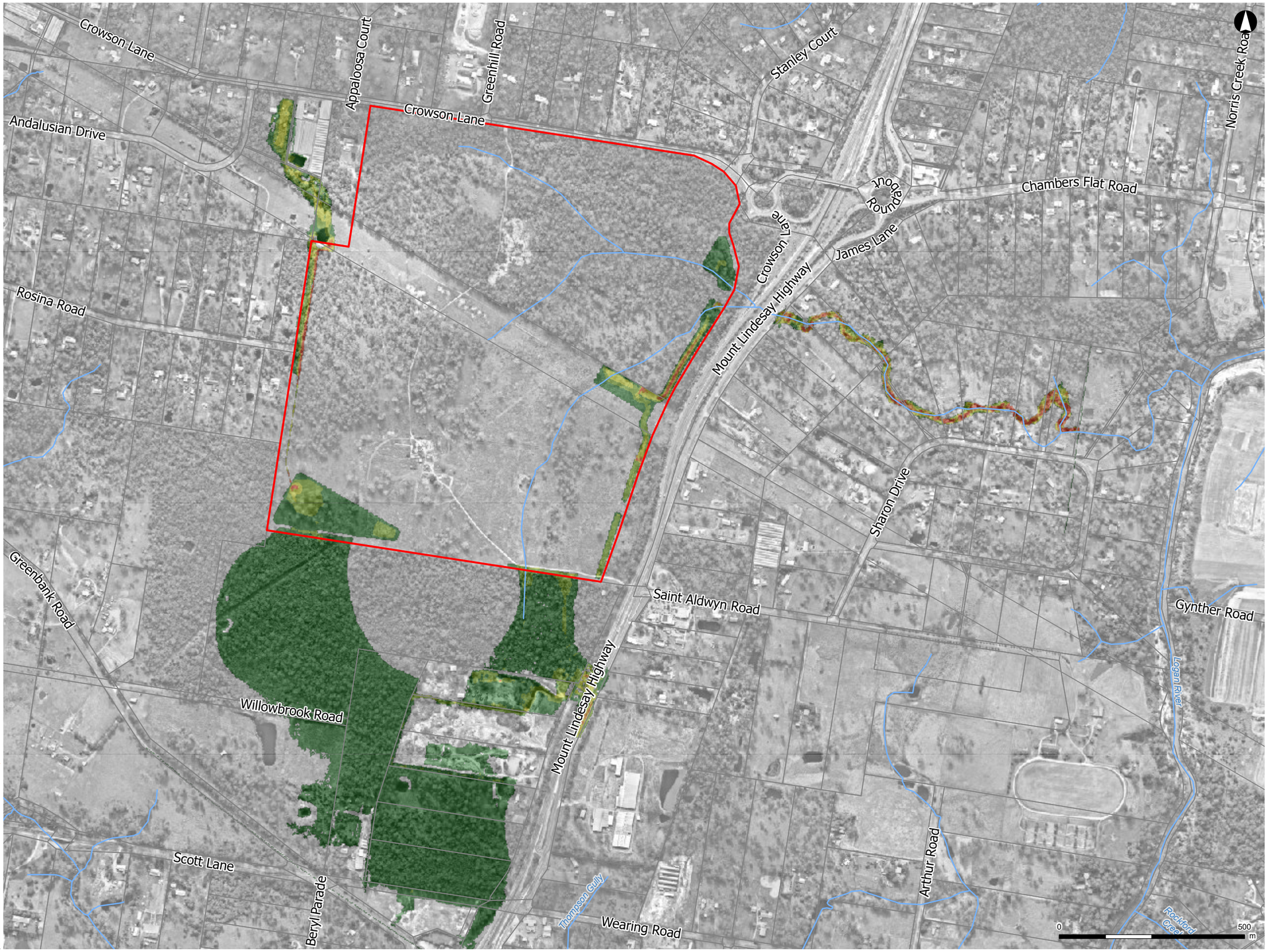
ARCADIS

Figure D-11 - Flow Velocity - Design Case - 2% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

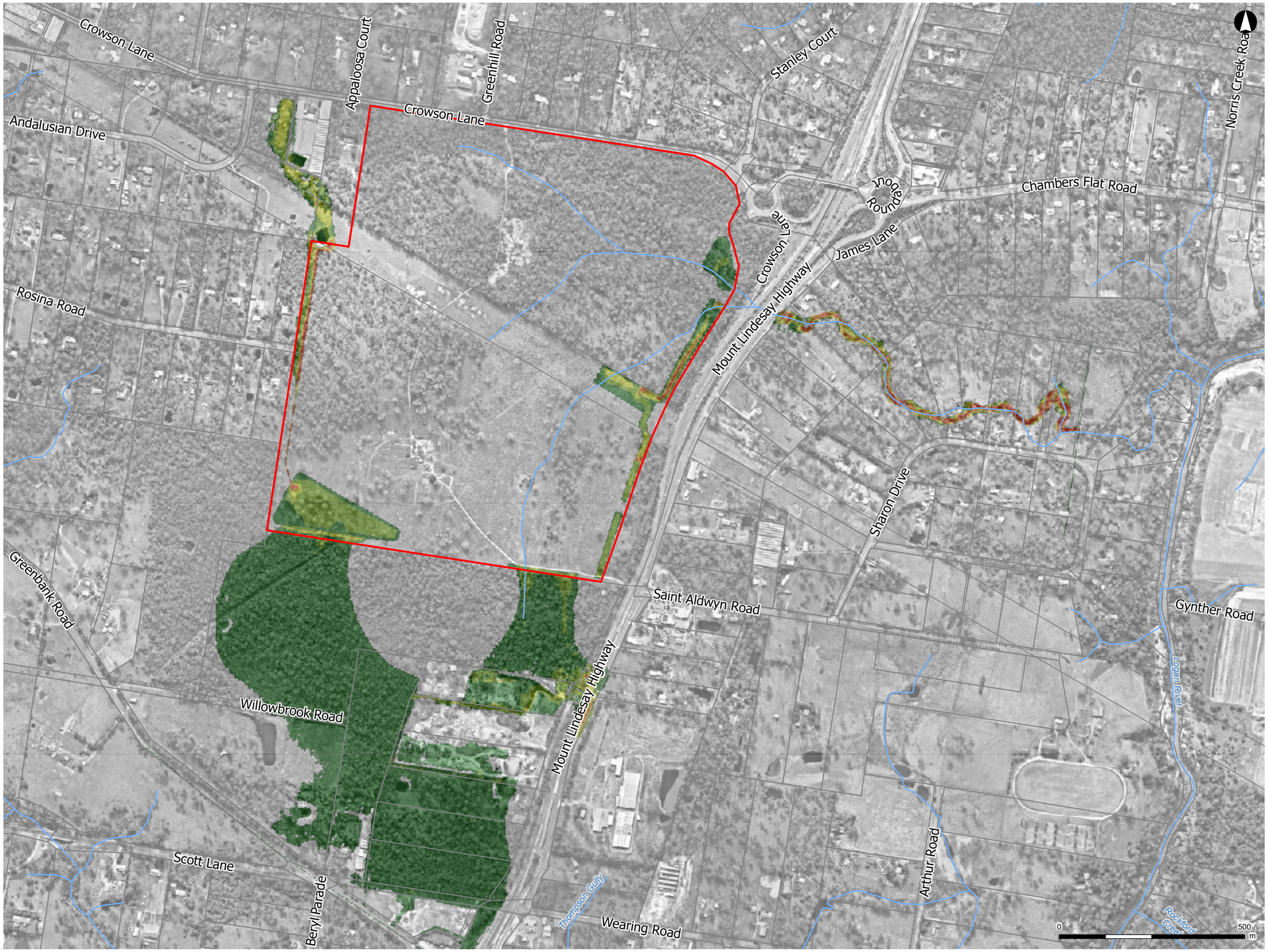
ARCADIS

Figure D-12 - Flow Velocity - Design Case - 1% AEP

Legend

Flow velocity (m/s)

- 0 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.2
- 1.2 - 1.5
- >1.5
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

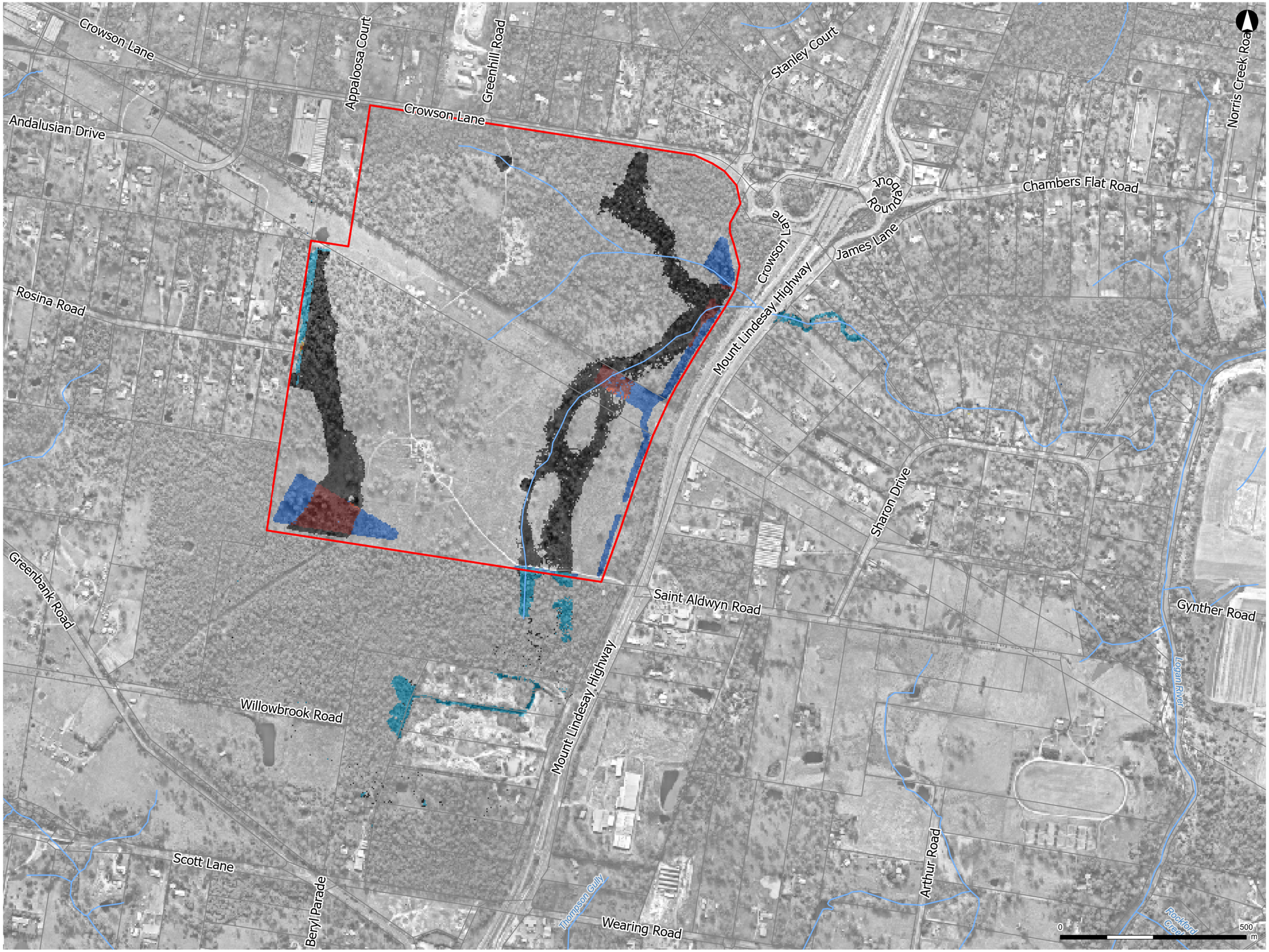
ARCADIS

Figure D-13 - Flood Level Afflux - 50% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

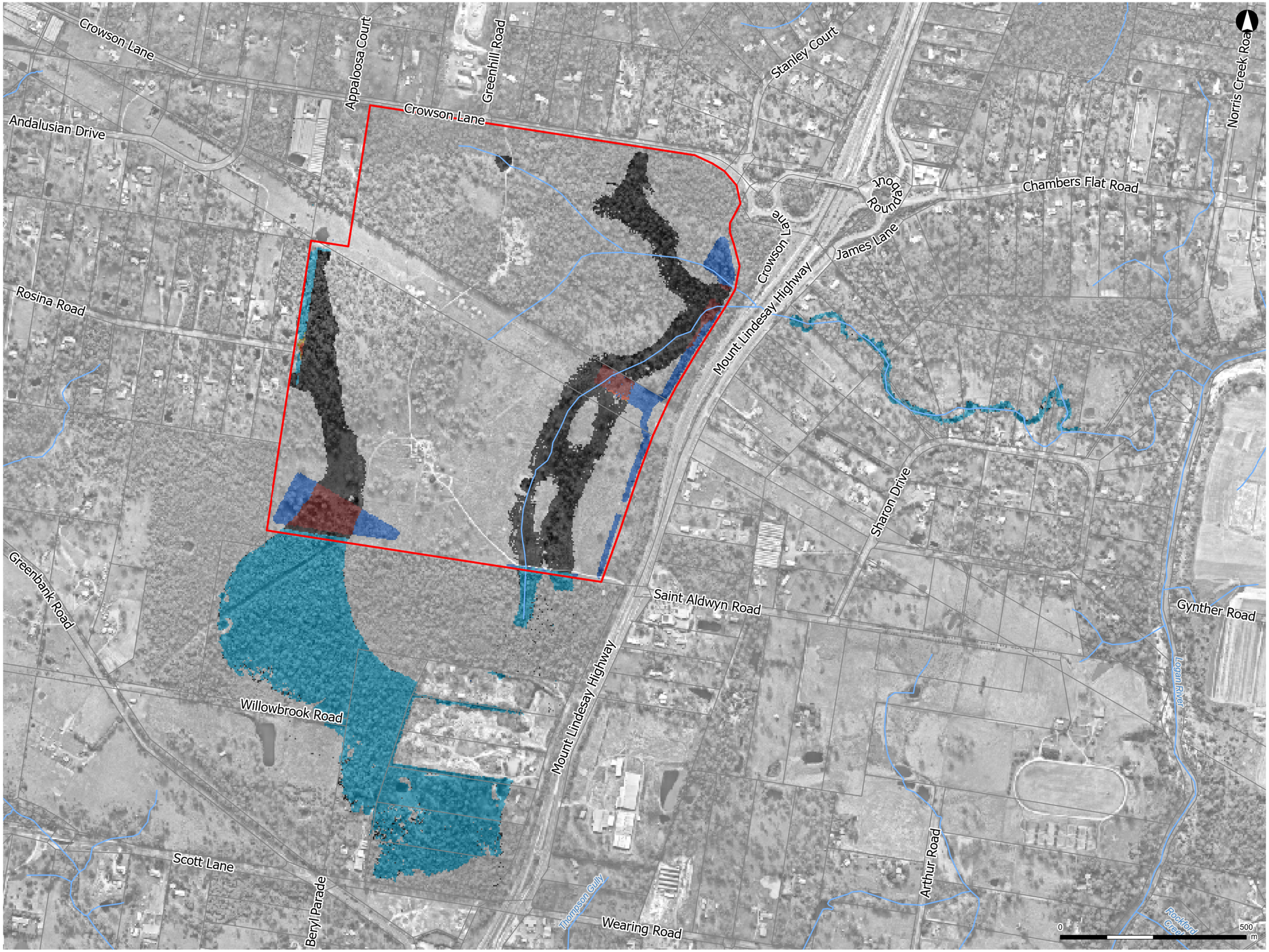
ARCADIS

Figure D-14 - Flood Level Afflux - 20% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-15 - Flood Level Afflux - 10% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-16 - Flood Level Afflux - 5% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

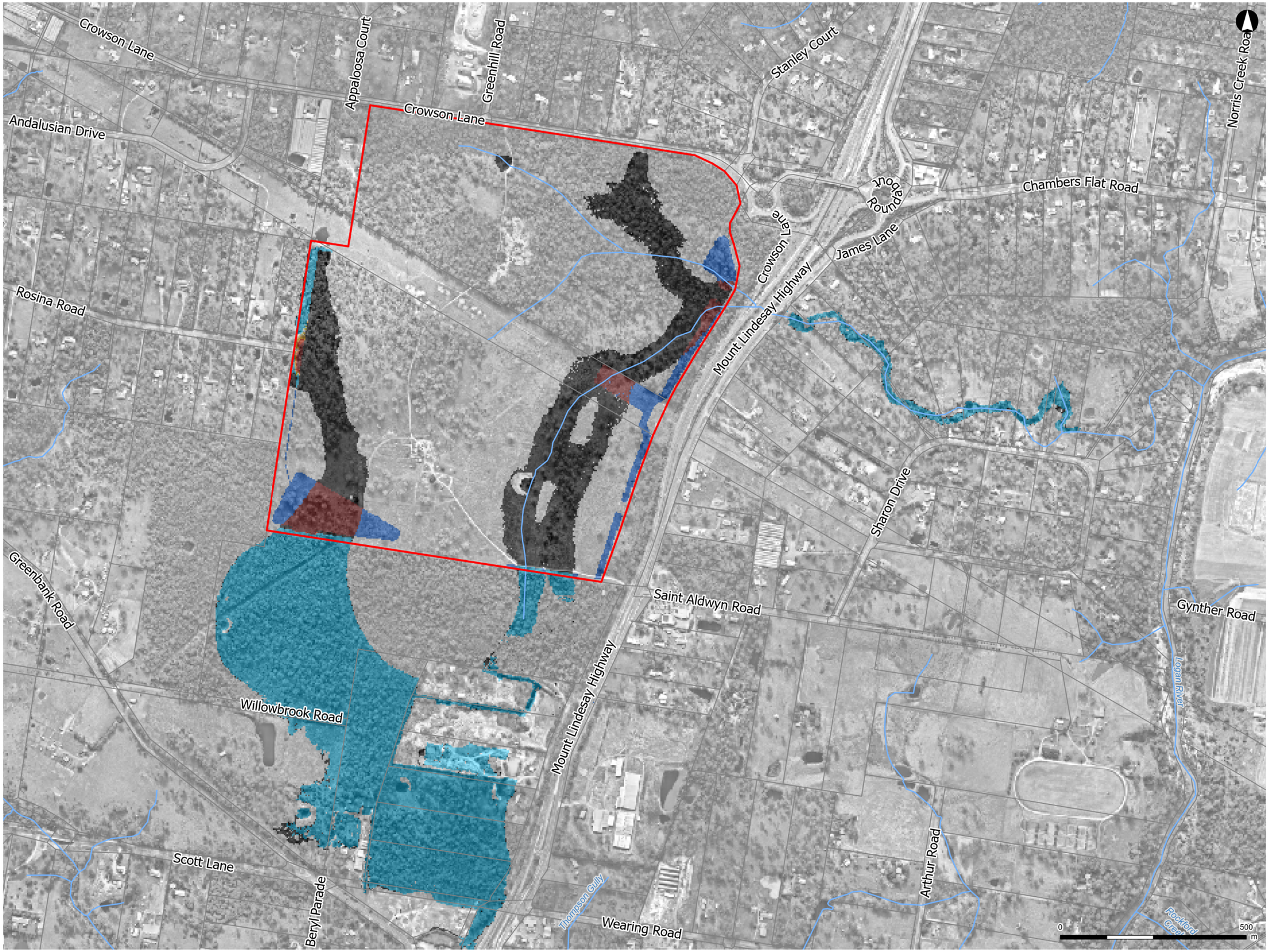
ARCADIS

Figure D-17 - Flood Level Afflux - 2% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

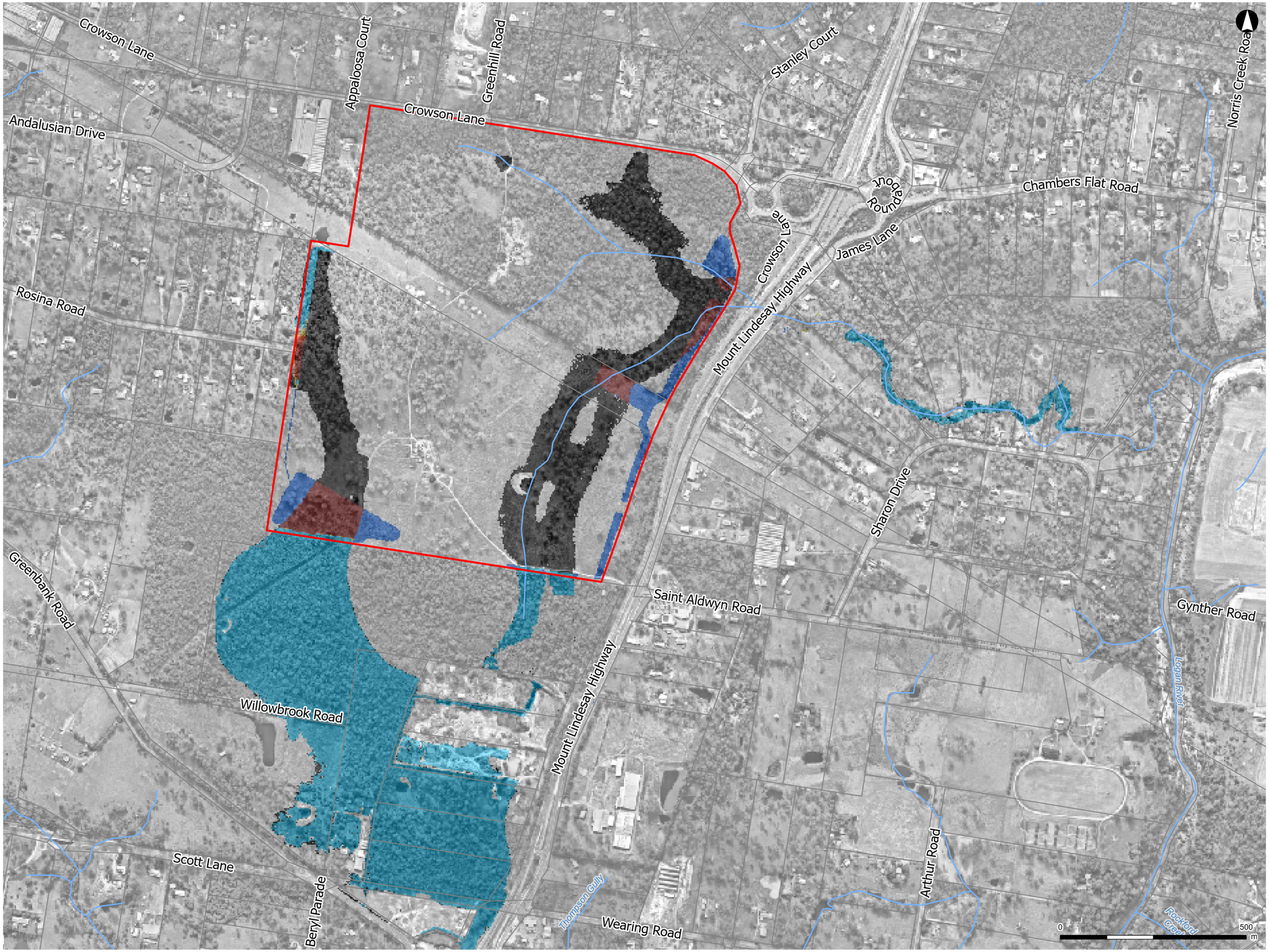
ARCADIS

Figure D-18 - Flood Level Afflux - 1% AEP

Legend

Afflux (m)

- -0.91 - -0.01
- -0.01 - 0.01
- 0.011 - 0.02
- 0.021 - 0.05
- 0.051 - 0.1
- 0.1 - 0.2
- 0.2 - 0.62
- was wet, now dry
- was dry, now wet
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

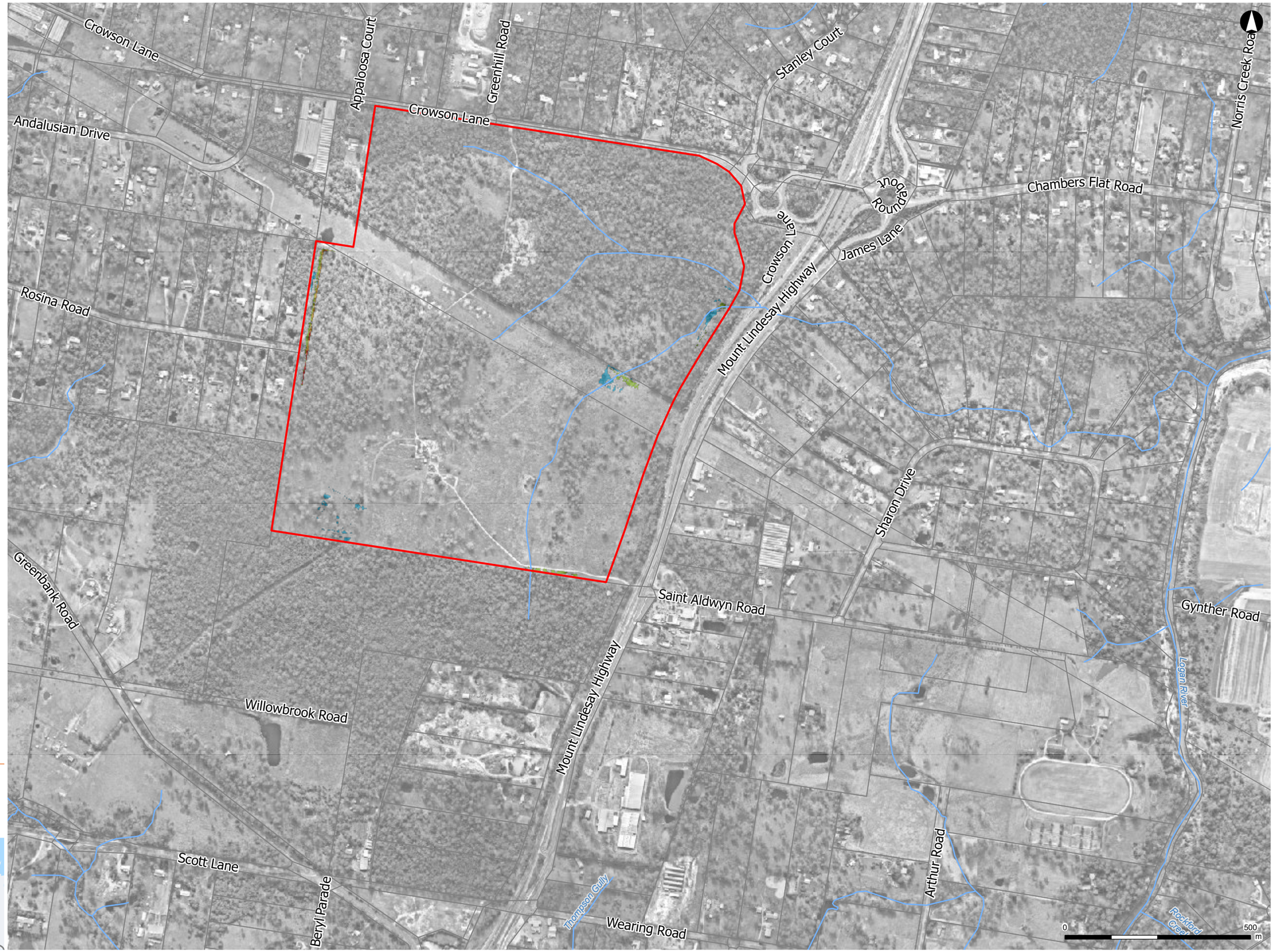
ARCADIS

Figure D-19 - Velocity Change - 50% AEP

Legend

Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

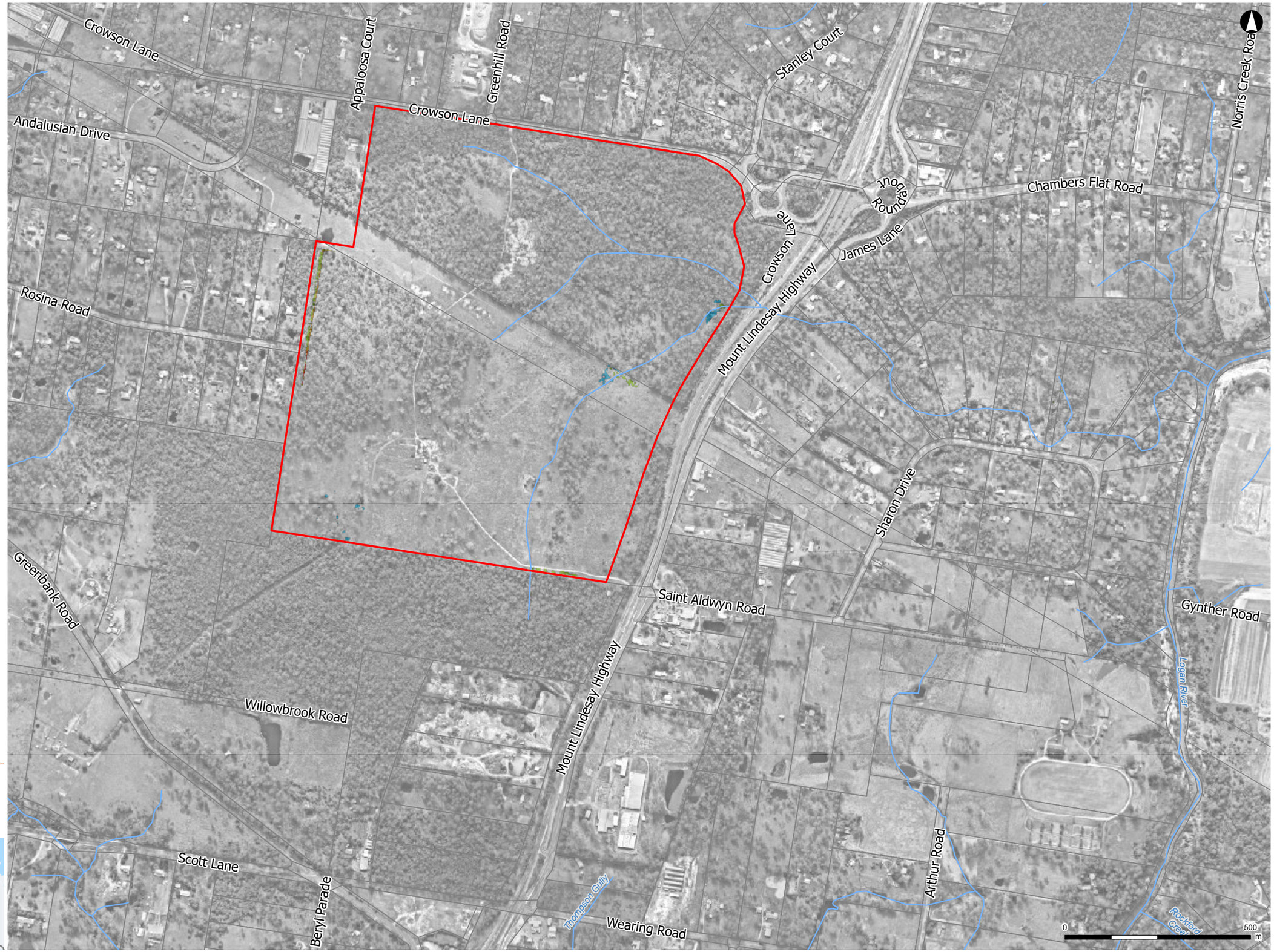
ARCADIS

Figure D-20 - Velocity Change - 20% AEP

Legend

Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-21 - Velocity Change - 10% AEP

Legend

Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse

Crowson Lane
Appaloosa Court
Greenhill Road
Stanley Court
Norris Creek Road
Andalusian Drive
Crowson Lane
Chambers Flat Road
Roundabout
Crowson Lane
James Lane
Mount Lindesay Highway
Rosina Road
Sharon Drive
Greenbank Road
Saint Aldwyn Road
Gynther Road
Willowbrook Road
Mount Lindesay Highway
Logan River
Scott Lane
Beryl Parade
Thompson Gully
Wearing Road
Arthur Road
Rockford Creek
0
500
m

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-22 - Velocity Change - 5% AEP

Legend

Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

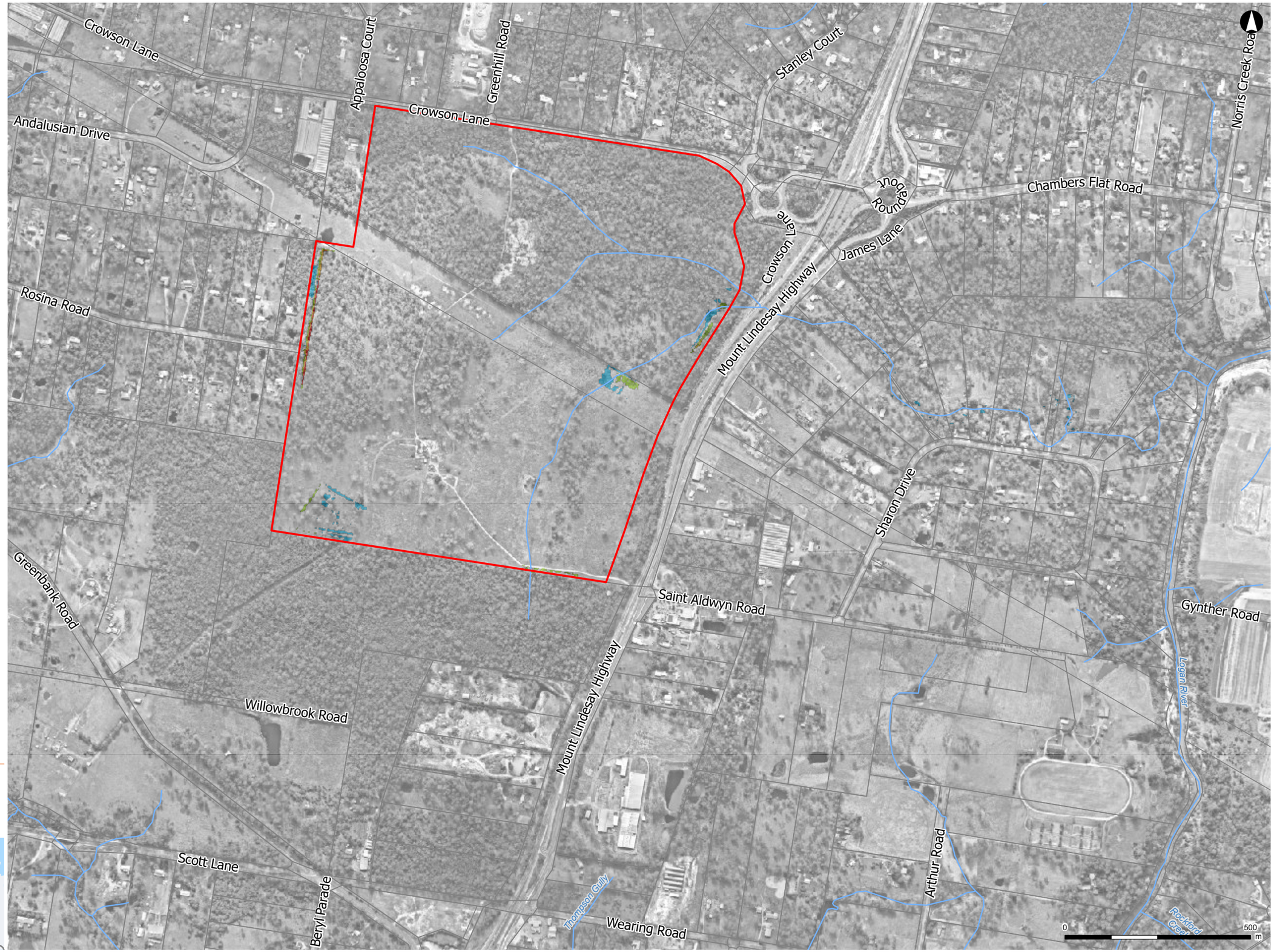
ARCADIS

Figure D-23 - Velocity Change - 2% AEP

Legend

Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure D-24 - Velocity Change - 1% AEP

Legend

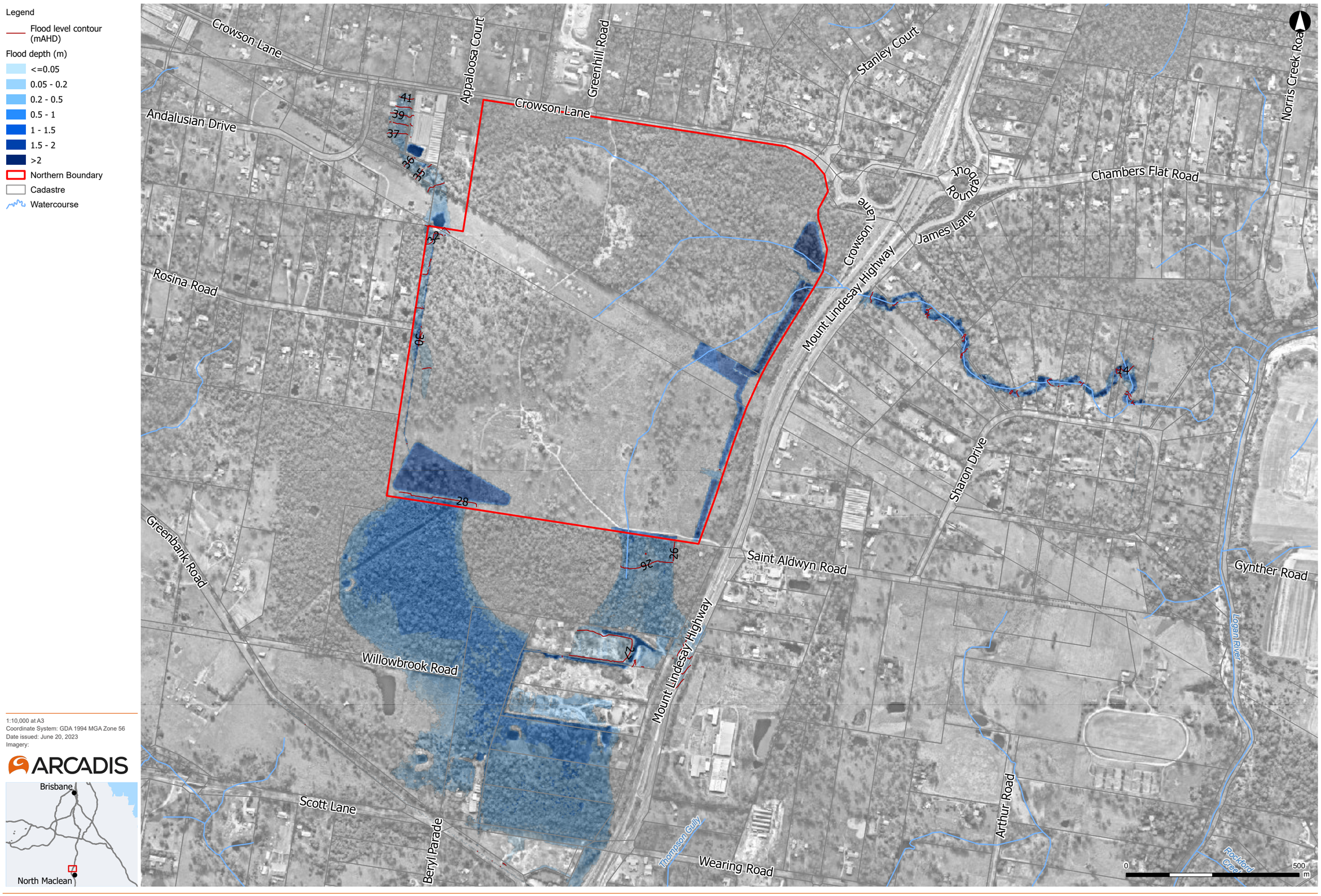
Velocity Change (m/s)

- -0.91 - -0.21
- -0.21 - 0.2
- 0.21 - 0.5
- 0.51 - 1
- 1.1 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse

1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

Figure S-1 - Flood Depths - Sensitivity BLK 20% - 1% AEP



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

ARCADIS

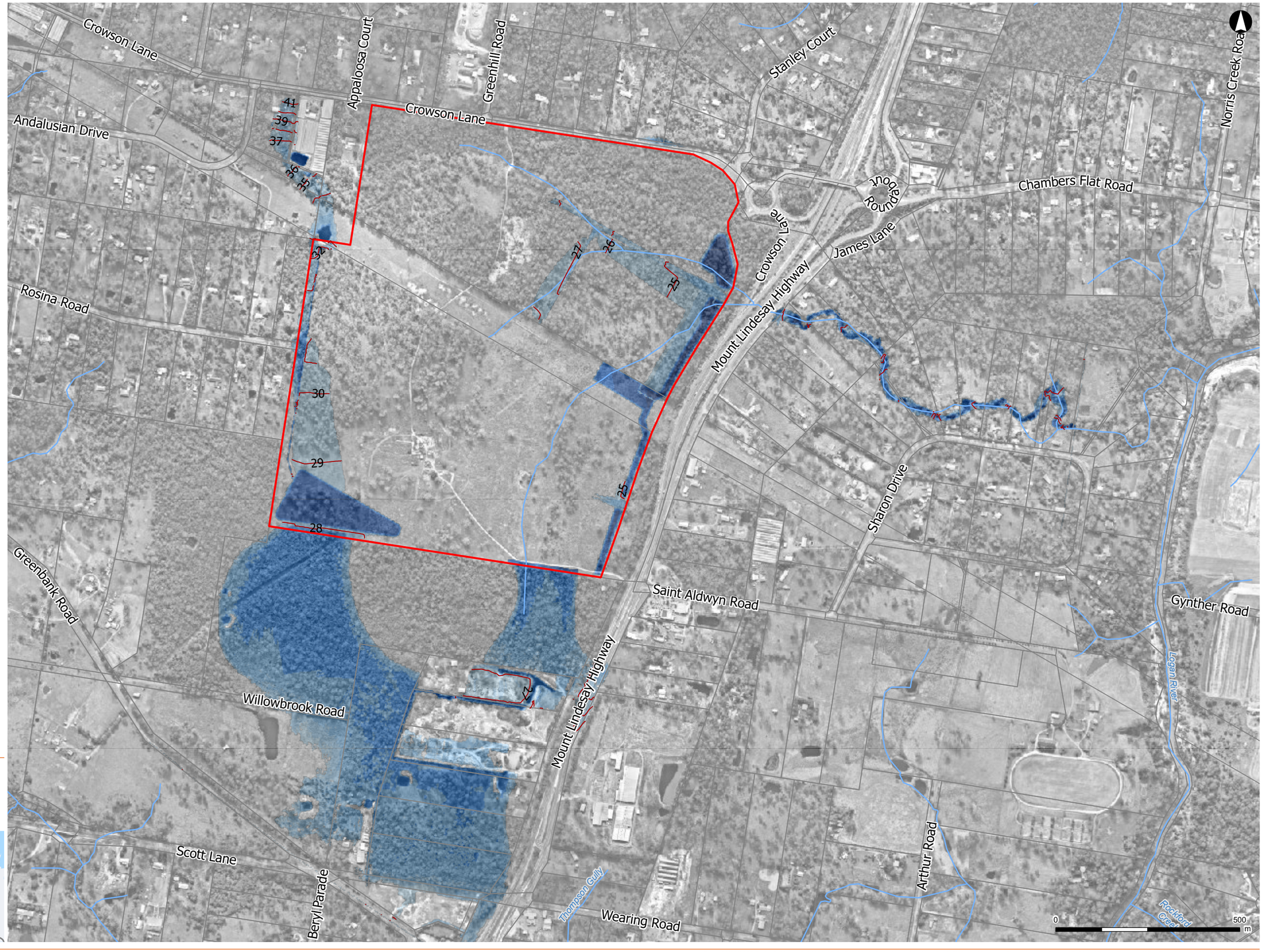
Figure S-2 - Flood Depths - Sensitivity BLK 50%- 1% AEP

Legend

- Flood level contour (mAHD)

Flood depth (m)

- <=0.05
- 0.05 - 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- >2
- Northern Boundary
- Cadastre
- Watercourse



1:10,000 at A3
Coordinate System: GDA 1994 MGA Zone 56
Date issued: June 20, 2023
Imagery:

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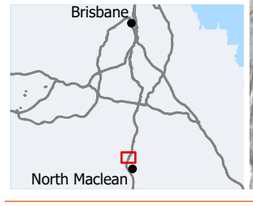

APPENDIX E

Stormwater Drainage Safety Audit

MEMO

ARCADIS Design & Consultancy for natural and built assets

Date 22/06/2023
To Gary Ellis – Technical Director
From Thea Fanning – Civil Engineer
Copy to
Subject North Maclean – Stormwater Drainage Infrastructure (structures/conduits) Safety Audit

INTRODUCTION

This Technical Memo assesses the proposed stormwater overland conveyance and attenuation drainage infrastructure, specifically associated structures (hydraulic hazards) proposed as part of the Flagstone Industrial Subdivision at North Maclean and provides recommendations on any safety mitigation measures for the proposed stormwater drainage network structures.

This assessment excludes other stormwater drainage structures associated with road system design and minor and major flows which are to be designed in accordance with QUDM with road gully pit inlets to include standard pin-lock inlet grates to deter entry or interference.

This analysis has been prepared in accordance with the Queensland Urban Drainage Manual (QUDM) section 12. The table below provides the Contact Classification as per QUDM Table 12.3.1 for the stormwater conveyance system as presented in Appendix A – Channel Sketch Plan.

Table 1 – Contact Classification for Stormwater Drainage Infrastructure

Stormwater Drainage Infrastructure	Contact Classification
Northern combined bioretention and detention basin - Outlets	Class C1
Southern detention basin - Outlets	Class C2
Western diversion channel - Box culvert	Class C1
Eastern conveyance channel – Cross-drainage Culverts	Class C1
Eastern Channel – Service Road Culvert	Class C1
Service Road Outlet/Existing Highway culvert Inlet	Class D

QUDM Table 12.3.1 defines Class C1 as follows:

More than 100 metres from a school, park, childcare centre, or existing or future urban residential area. Access to the inlet or upstream channel is unrestricted and/or there is reasonable risk of a person being swept towards the inlet during a storm or flood.

QUDM Table 12.3.1 defines Class C2 as follows:

As above except access to potentially dangerous waters or inlets is unlikely and/or severely restricted.

QUDM Table 12.3.1 defines Class D as follows:

Within an area surrounded by heavily trafficked arterial roads, childproof fencing, or is otherwise considered inaccessible (legally or illegally) to the general public.

Arcadis considers the classifications listed in Table 1, above, are appropriate given the proposed development land use is industrial, the Mount Lindesay Highway forms the eastern site boundary and the remaining adjacent land is either heavily vegetated buffer/bio-diversity corridor or comprises a low density rural residential land use. Class C2 has been applied to the southern detention basin given the remote location adjoining the bio-diversity corridor.

Table 2, below, assesses each of the stormwater drainage elements against the assessment criteria recommended by QUDM Table 12.3.2.

Table 2 – Stormwater Drainage Infrastructure Risk Ranking

Stormwater Drainage Infrastructure	Potential Safety Risk (QUDM Table 12.3.2)					Cumulative Consequence Score
	Conduit Flowing Full	Length	Velocity (m/s)	Flow Conditions Within a Conduit	Flow Conditions at the Outlet of a Conduit	
Northern basin – outlets (single inlet structure)						
0.3m RCP (x2)	High (6)	Medium (3)	2.62	High (6)	High (6)	21
0.9m x 0.45m RCBC	High (6)	Medium (3)	3.94	High (6)	High (6)	21
Southern detention basin – Multiple outlets	High (6)	Low (1)	2.80	High (6)	Low (1)	14
0.9m RCP (x3)						
Western Swale - Box culvert (2.4m x 1.2m RCBC)	Medium (3)	High (6)	3.26	High (6)	Low (1)	16
Eastern conveyance channel (Multiple conduits)						
2.2m x 0.9m RCBC	Low (1)	Medium (3)	2.72	High (6)	Low (1)	11
375mm RCP (x2)	High (6)	Low (1)	0.46	Low (1)	Medium (3)	11
300mm RCP	High (6)	Low (1)	0.25	Low (1)	Medium (3)	11
Eastern Channel – Service Road Culvert						
2.1m x 1.2m RCBC (x2)	Low (1)	Medium (3)	1.05	High (6)	Low (1)	11
Service Road Outlet/Existing Highway culvert Inlet	Low (1)	High (6)		Medium (3)	Low (1)	11

The Risk Ranking Matrix included in Table 12.3.6 of QUDM has been replicated in Table 3.

Table 3 – Risk Ranking Matrix

Contact Class	Cumulative Consequence Score				
	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24
	Risk Ranking				
A1	13	7	4	2	1
A2, B1	16	12	8	5	3
B2, C1	18	14	11	9	6
C2, D	20	19	17	15	10

The below table provides a summary of each stormwater drainage element, the risk ranking and mitigation case, in conjunction with the proposed risk mitigation measure(s). The mitigation case was determined from QUDM Table 12.3.7.

Notably, a ranking of “1” represents the highest risk. A ranking of ‘20’ represents the lowest risk.

Table 4 – Cumulative Consequence Score

Stormwater Drainage Infrastructure	Contact Classification	Cumulative Consequence Score	Risk Ranking	Mitigation Option Case	Proposed Risk Mitigation Measure(s)
Northern basin – outlets (single inlet structure)	C1	21	6	Case 4	Liberal placement of Warning signs to be erected around perimeter of basin with water depth measuring stick. Single inlet screen applied to upstream end of stormwater inlets with openings exceeding 300mm diameter. Detailed design to maintain maximum 1200mm depth for 5% AEP design storm event. Basin batters which are steeper than 1 in 6 are to include high density plantings to assist individual egressing basin (note wet turf can be slippery under foot where steeper than 1 in 6). No batter slope to exceed 1 in 4.
Southern detention basin – outlets 0.9m RCP (x3)	C2	14	17	Case 7	Liberal placement of Warning signs to be erected along with water depth measuring stick. Basin batters and floor to include high density plantings to discourage person/child wishing to enter during storm events. Plantings / trees provide assistance for egress on batter slopes. Provide property boundary fence for adjoining development lots to discourage a person/child wishing to enter swale area during storm events. Detailed design to maintain maximum 1200mm depth for 5% AEP design storm event with maximum 1 in 4 batters.

Stormwater Drainage Infrastructure	Contact Classification	Cumulative Consequence Score	Risk Ranking	Mitigation Option Case	Proposed Risk Mitigation Measure(s)
Box culverts beneath western diversion swale (2.4m x 1.2m RCBC)	C1	16	9	Case 4	Inlet screen applied to upstream end of culvert designed in accordance with QUDM. Additionally, provision of fauna exclusion fencing (and acoustic barrier) which interfaces with development lots will discourage a person/child wishing to enter swale area during storm events from the development area.
Eastern flood conveyance channel – cross drainage culverts (multiple conduits: 2.2m x 0.9m RCBC, 375mm RCP (x2) 300mm RCP	C1	11 11 11	11 11 11	Case 4 Case 4 Case 4	Inlet screens applied to upstream end of stormwater inlets with openings exceeding 300mm diameter. Designed in accordance with QUDM. Provide liberal warning signage along channel. Maximum batter slope (conveyance) to be 1 in 4. Tree planting to be provided to provide egress assistance. Provide barrier fencing to culvert headwall (DS and US) and associated batter (fall hazard and discourage access to slip risk batter). Provide high density plantings to these batters – outside conveyance areas.
Eastern Channel – Service Road Culvert 2.1m x 1.2m RCBC (x2)	C1	11	11	Case 4	Inlet screen applied to upstream end of culvert configuration, designed in accordance with QUDM.
Service Road Outlet/Existing Highway culvert Inlet	D	11	17	Case 7	In conjunction with existing fauna exclusion fencing located along highway, provide exclusion fence to new headwall and immediate surrounds. In conjunction provide high density planting for disturbed areas (including batter) to screen and discourage person/child wishing to enter during storm events.

MEMO

ARCADIS Design & Consultancy for natural and built assets

This Stormwater Drainage Safety Audit has provided a risk assessment of the stormwater conveyance drainage elements (Structures/Conduits) and proposed mitigation measures to be implemented for the detailed design of the Industrial Subdivision proposed to be constructed at 4499 – 4651 Mount Lindesay Highway, North Maclean.

Kind regards,

Thea

Civil Engineer

I concur with this assessment and recommended mitigation measures.

Gary Ellis

Technical Director - RPEQ

APPENDIX A

Channel Sketch Plan

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
2 NO. 0.9m x 0.45 RCBC
USIL = 23.400
DSIL = 22.500
LENGTH = 60.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
2 NO. 300mm DIA PIPE CLASS 4
USIL = 22.540
DSIL = 21.550
LENGTH = 60.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
1 NO. 375mm DIA PIPE CLASS 4
USIL = 21.56
DSIL = 21.55
LENGTH = 5.0m
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING FOR EACH SCREEN SHALL BE LESS THAN 125mm).

1 NO. 1050mm DIA PIPE CLASS 4
USIL = 28.00
DSIL = 27.55
LENGTH = 70m

2 NO. 750mm DIA PIPE CLASS 4
USIL = 27.52
DSIL = 27.46
LENGTH = 5m

1 NO. 3.6 x 1.2 RCBC
USIL = 27.56
DSIL = 26.6
LENGTH = 280m

DETENTION BASIN TO BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED SITE BASED STORMWATER MANAGEMENT PLAN (SOUTHERN CATCHMENT) REF. 11-0001-30101970 (DAWE REF. EPBC 2013/6941)

BASIN
RL=26.607

3 NO. 900mm DIA PIPES CLASS 4
USIL = 26.607
DSIL = 26.48
LENGTH = 14.3m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

2 NO. 2.1m x 1.2m RCBC,
USIL = 24.50
DSIL = 24.25
LENGTH = 56.5m.
INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

FUTURE STORMWATER PIPE TO BE CONSTRUCTED:
1 NO. 300mm DIA PIPE CLASS 4
USIL = 22.656
DSIL = 22.639
LENGTH = 5.0m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREENS TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLETS IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACINGS FOR EACH SCREEN SHALL BE LESS THAN 125mm).

1 NO. 375mm DIA PIPE CLASS 4
USIL = 23.236
DSIL = 23.199
LENGTH = 10.5m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

1 NO. 2.2m x 0.9m RCBC
USIL = 23.64
DSIL = 23.62
LENGTH = 43.0m

INLET AND OUTLET PRECAST HEADWALLS (INCLUDING WINGWALLS AND APRON) TO BE IN ACCORDANCE WITH TMR STANDARD DRAWING 1243.
RCBC CAST IN SITU BASE SLAB IN ACCORDANCE WITH TMR STANDARD DRAWING 1250.
INLET SCREEN TO BE INSTALLED ON UPSTREAM END OF PIPE OUTLET IN ACCORDANCE WITH QUDM CLAUSE 12.5.5 (BAR SPACING SHALL BE LESS THAN 125mm).

FUTURE INTERNAL ROAD DRAINAGE CONNECTION TO EXISTING HIGHWAY CULVERTS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE EXTENSION OF EXISTING HIGHWAY CULVERTS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE GABION WALL TO BE CONSTRUCTED WITH ADJOINING SERVICE ROAD WORKS. DETAILS TO BE INCLUDED IN SERVICE ROAD DESIGN PACKAGE WHICH IS SUBJECT TO DTMR APPROVAL

FUTURE GABION WALL TO BE CONSTRUCTED WITH ADJOINING SERVICE ROAD WORKS. DETAILS INCLUDED TO SERVICE ROAD DESIGN PACKAGE AND SUBJECT TO DTMR APPROVAL

PROPOSED BUND

PROPOSED BUND

LEGEND

- EXISTING SURFACE CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- PROPOSED STORMWATER DRAINAGE
- PROPOSED STORMWATER HEADWALL
- EXISTING STORMWATER DRAINAGE
- EXISTING WATER RETICULATION
- EXISTING COMMUNICATIONS
- EXISTING OVERHEAD ELECTRICAL
- EXISTING UNDERGROUND ELECTRICAL
- POWERLINK EASEMENT
- EXISTING FENCE
- TOP OF BANK
- TOE OF BANK
- FAUNA EXCLUSION FENCE
- PROPOSED SLEEPER RETAINING WALL
- PROPOSED BLOCKWORK RETAINING WALL
- PROPOSED A-GRADE SANDSTONE BOULDER RETAINING WALL
- FUTURE GABION WALL

Issue	Description	DR	CH	VE	Date
04	DESIGN UPDATES	A.O.	T.F.	G.E.	20.06.23
03	DESIGN UPDATES	A.O.	E.P.	G.E.	21.02.23
02	DESIGN UPDATES	J.G.	E.P.	G.E.	08.02.23
01	ORIGINAL ISSUE	J.G.	E.P.	G.E.	24.10.22

Scales
0 50 100 150 200m
1 : 2000

Surveyor
WOLTER consulting group
Planning Urban Design Landscape Environment Surveying

Architect
-

Client
Charter Hall

Status
CONCEPTUAL DESIGN ONLY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	A.OSORIO	Original Size	A1
Designed	S.SEM	Height Datum	AHD
Project Manager	B.KITSON	Grid	LOCAL
Verified	G. ELLIS	R.P.E.Q. No: 17942 Date	

Project
4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Title
CHANNEL SKETCH PLAN

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Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30109334	- AAP -	WS00OP -	CV -	SKT -	011 -	04

100mm on Original

Date Plotted: 21 Jun 2023 - 08:11AM File Name: C:\Users\ao67297\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Package-00_Civil_CV\Drawings\30109334-AAP-WS00OP-CV-SKT-011-ChannelSketch.dwg V1