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Scenic Rim Flood Modelling

Warrill Creek Flood Modelling – Consolidated Final Report

Scenic Rim Regional Council

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Document control record

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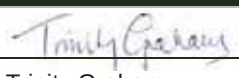
Author signature		Approver signature	
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1 Introduction

1.1 Study background

Scenic Rim Regional Council (SRRC) is seeking to gain a better understanding of the Region's Natural Hazard (Flood) characteristics. Aurecon has undertaken flood studies across the Scenic Rim Regional Council (SRRC) area for seven major waterway systems including Logan River, Albert River, Bremer River, Teviot Brook, Warrill Creek, Purga Creek and the Upper Coomera River. These studies involved the development of catchment wide models for each of the waterways, covering the majority of creeks and tributaries.

Aurecon were originally commissioned by SRRC to undertake flood modelling of each system to provide SRRC with flood extents, heights, velocities and hazard categories for the 1% AEP event. This modelling focussed on providing information to assist Council with strategic planning objectives.

Council recognised that whilst the 1% AEP event provided important information on large scale flooding across each catchment, understanding the behaviour of more frequent events was also important in particular when looking at risk to properties, access and egress routes during floods and for disaster management planning.

As such, Council commissioned Aurecon to update the flood models for each of its seven major catchments to include assessment of the 2%, 5% and 10% AEP flood events.

This report consolidates and presents the investigations completed for the Warrill Creek catchment.

1.2 Study area

Warrill Creek forms part of the Bremer River catchment located in the Brisbane River Basin. Warrill Creek extends north from the Queensland/New South Wales border ranges to its confluence with the Bremer River at Ipswich. Reynolds Creek is a major upper catchment tributary to Warrill Creek.
The area of interest for this flood study is the Warrill Creek catchment from Tarome (Warrill Creek) and Moogerah (Reynolds Creek) to Peak Crossing. This area of the catchment is predominantly rural.
The Scenic Rim Local Government boundary extends to Peak Crossing and defines the lower extent of this study.

1.3 Study objectives

SRRC initially requested a flood study that was compliant with the current State Planning Policy (and associated guidelines) and the relevant requirements of the Building Act 1975 (Act). The flood study is to provide Council with the ability to designate a flood hazard area under Section 13 of the Act.

The second stage objective was to provide information to assist with Council's disaster management planning and response functions. The following tasks were undertaken as part of this two-stage assessment:

- Hydrologic modelling of the catchment and calibration against selected historical events
- Hydraulic modelling of Warrill Creek and joint calibration with the hydrologic model
- Preparation of 1% AEP flood mapping presenting flood inundation extents, flood depths, flow velocities and hazard rating
- Identification of the minimum and maximum flood levels for each property inundated by the 1% AEP event
- Updated hydrologic and hydraulic modelling for the 10%, 5% and 2% AEP events
- Updated definition of minor, moderate and major flood events at each key stream gauge location to enable Council to inform BOM (and to update the current flood gauges)
- Review of the current flood gauge network to ascertain whether there are any further locations where flood gauges could/should be located
- Review of the correlation between gauge height, flooding event and scale of event, and
- Preparation of flood mapping for the additional events presenting flood inundation extents, flood depths, flow velocities and hazard ratings

The work undertaken to achieve the above objectives is documented in the following report.

The Scenic Rim Flood Hazard Management and Disaster Mitigation Assessment Project for the Warrill Creek catchment is a joint initiative of Scenic Rim Regional Council, the Queensland Government and the Australian Government.

2 Study Data

A number of datasets have been collated, reviewed and adopted for use in this project as described below.

2.1 Previous studies

The hydrologic URBS model for Warrill Creek was originally developed for the Wivenhoe and Somerset Dam Optimisation Study (WSDOS) (Seqwater, 2013) and recalibrated by Aurecon in 2015 as part the Brisbane River Catchment Flood Study (BRCFS) (Aurecon, 2015).

2.2 Survey Data

2.2.1 Aerial LiDAR Survey

SRRC's 2011 Aerial LiDAR Survey (ALS) data was utilised as the basis for topographic representation within the Warrill Creek catchment as per the 2015 study. ALS data typically produces levels within an accuracy of ±150 mm and a horizontal accuracy of ±300 mm.

As part of the Logan River Flood Study (Aurecon, 2014), the ALS data was verified against ground survey (2013) of Permanent Survey Marks (PSM). The ALS data was found to provide elevations within ±300 mm of the ground survey PSM. This is considered a reasonably accurate representation of the topography and confirmed that the LiDAR was suitable for use in the hydraulic model.

In 2017, Council also provided data generated by SEQ Catchments 2013 which provided refinement of the topographic data. However, it was found that this data only provided coverage in the upper reaches of the Warrill Creek catchment and as such it was not used for the additional flood modelling.

No bathymetric data was provided for this study and it was noted for the 1% AEP modelling that the river bed definition was limited by the presence standing water. Whilst this limitation was not considered significant for the 1% AEP event due to the high proportion of overbank flow in the major storm event, it was considered more significant for the analysis of minor to moderate storm events due to the higher proportion of flow conveyed within the banks.

2.2.2 Structure data

2.2.2.1 1% AEP event

Structure details for a number of bridges were provided by SRRC. The bridge information was limited with no As-Constructed details available. The following simplified assumptions have been made regarding bridge structures:

- It has been assumed that the bridge deck has the same level as the adjacent road level
- The thickness of the deck has been assumed to be 900 mm
- A blockage factor of 20% has been assumed to allow for pier losses

2.2.2.2 2%, 5% and 10% AEP events

To assist with providing information for emergency management response critical road crossings were identified within the Warrill Creek Catchment. This was carried out in consultation with Council. Detailed field survey was commissioned to obtain structure details for incorporation into the hydraulic model. In the Warrill Creek catchment, the following crossings were surveyed:

- Kalbar Connection Road
- Boonah-Fassifern Road
- Cunningham Highway
- Wholey Drive
- Fraserview Road

Using this field survey improvements were made to the bathymetric representation within the current model. This is discussed further in Section 5.2.3.2.

2.2.2.2.1 Other crossing data

Some structures in the Warrill Creek catchment were still under construction, therefore accurate survey could not be obtained. The following list of structures were modelled using design data provided by Council.

- Niebling Road
- Mutdapilly-Churchbank Weir Road

2.3 GIS data

The following GIS datasets were provided by SRRC which were utilised as per the 2016 study:

- Aerial imagery – High resolution 2013 aerial imagery
- GIS based hydraulic structures data. Details regarding refinements to the modelling of hydraulic structures is provided in Section 5.2.3.2.
- Updated DCDB (2017)

These datasets have been utilised for the generation of flood mapping and tabulated flood levels.

2.4 Report terminology

This report adopts the latest approach to design flood terminology as detailed in the updated *Australian Rainfall and Runoff – Book 1 Terminology* (AR&R, National Committee on Water Engineering, 2016). Therefore, all design events are discussed in terms of Annual Exceedance Probability (AEP) using percentage probability (eg 1% AEP design event).

Table 1, an extract of Figure 1.2.1 from Book 1 (AR&R, 2016), details the relationship between Annual Recurrence Interval (ARI) and AEP for a range of design events.

Table 1 Extract from Figure 1.2.1 AR&R adopted terminology

AEP (%)	AEP (1 in x)	Average recurrence interval (ARI)
10.00	10	9.49
5.00	20	20
2.00	50	50
1.00	100	100
0.50	200	200
0.20	500	500

As can be seen from Table 1, the difference between AEP and ARI is minimal for 10 year ARI event and above. This range of events reflects a focus on flooding therefore use of the AEP terminology has been adopted.

3 Models Development

3.1 Hydrologic Model

The Brisbane River Catchment Flood Study (BRCFS) URBS hydrologic model of the Warrill Creek catchment was considered suitable for use and adopted for this study. URBS is a runoff routing model and an industry standard tool commonly used for hydrologic studies.

3.1.1 Modelling extents

The WSDOS hydrologic model delineates the Warrill Creek catchment to Amberley and has previously been calibrated to a number of locations in the catchment. The extent of this current flood study is defined by the Scenic Rim Regional Council local government boundary as shown in Figure 1.

As the WSDOS URBS model was available and suitable for use, it was adopted for this study. However, the model calibration was reviewed using the joint hydrologic and hydraulic calibration process that was focused on historical event records at the stream gauges listed in Table 8.

3.2 Initial URBS model parameters

The URBS model parameters recommended in the WSDOS study (Seqwater, 2013) are detailed in Table 2. These parameters were adopted as a starting point and modified as part of the joint calibration process as described in Section 4.1. The final calibration parameters were then used to specify design event parameters for the 1% AEP event.

Table 2 WSDOS URBS model calibration parameters

Event	Calibration parameters				
	Initial Loss Rate (mm)	Continuing Loss Rate (mm/hr)	Alpha, a	Beta, b	m
1974	80	2.0	0.70	2.0	0.8
1991	50	5.5	0.90	2.3	0.8
2011	35	1.1	0.75	3.5	0.8

URBS uses five key parameters which can be varied to represent hydrological conditions:

- Alpha – channel and storage routing parameter typical range 0.03 to 0.20
- Beta – catchment routing parameter typical range 1 to 9
- m – catchment routing exponent typical range 0.6 to 1.0
- IL – Initial Loss (mm) typical range 0 to 100
- CL – Continuing Loss (mm/hr) typical range 0 to 5

The initial loss parameter is largely event specific relating to the antecedent conditions in the catchment, and as expected varies between calibration events. For each calibration run the dam's initial water level was sourced from Seqwater. The hydrologic model used a stage discharge curve to model the discharge from Moogerah dam.

Figure 1 Warrill Creek catchment

3.3 Hydraulic model

3.3.1 Software platform and modelling approach

A 2-dimensional (2D) hydraulic modelling approach was adopted for this study. The Warrill Creek hydraulic model has been developed to cover the entire floodplain and includes representation of the major hydraulic structures and topographic features that influence flood behaviour. Adoption of the 2D modelling software enabled floodplain and breakout flows to be accurately represented. Modelling has been undertaken using the TUFLOW software (version 2013-12-AC).

3.3.2 Modelling extents

The extent of the Warrill Creek system modelled and mapped matches the extents shown on the Queensland Reconstruction Authority (QRA) website as the 2010/11 Interim flood lines for the SRRC area. The model extends from Tarome (Warrill Creek) and Moogerah (Reynolds Creek) to Peak Crossing and includes an area of approximately 730 km^2.

3.3.3 Topography

The hydraulic model was based on topographic information sourced from the 2011 LiDAR survey provided by SRRC. The topography is represented in the hydraulic model using a 20 m grid size. This grid size allows sufficient detail for the channel and floodplain representation in the hydraulic model whilst allowing for reasonable model run times. The model topography is presented in Figure A-1, Appendix A.

3.3.4 Roughness values

Surface roughness values used in the hydraulic model are presented in Table 3 and Figure A-2, Appendix A, and were based on accepted industry values. Land use types were identified for areas using aerial photography provided.

Table 3 Adopted roughness/Manning's n values

Land use type	Manning's n
Low Density Residential	0.090
Dense Vegetation	0.090
Medium Vegetation	0.070
Low Vegetation	0.045
Agricultural areas	0.050
Road Reserve	0.020
River Corridor	0.040

3.3.5 Hydraulic structures

A number of hydraulic structures were included in the TUFLOW hydraulic model. Bridge details were obtained from SRRC data provided. Where no bridge data was available, structure details were assumed from topographic survey and aerial imagery. Details of the existing structures included are outlined in Table 4.

Table 4 Existing bridges

Name	Locality	Description	Bridge type	Bridge length (m)
Rasmussen Bridge	Aratula	Warrill Creek crossing at Frazerview Road	Concrete	27.8
Washpool Bridge	Aratula	Washpool Gully crossing at Tarome Road	Concrete	15.9
Purdons Bridge	Charlwood	Reynolds Creek crossing at Charlwood Road	Concrete	30.4
n/a	Fassifern	Warrill Creek crossing at Boonah Fassifern Road	n/a	n/a
n/a	Fassifern	Reynolds Creek crossing at Boonah Fassifern Road	n/a	n/a
n/a	Frazerview	Unnamed creek crossing at Frazerview Road	n/a	n/a
n/a	Frazerview	Warrill Creek crossing at Cunningham Highway	n/a	n/a
Fressers Bridge	Harrisville	Saltwater Creek crossing at Wilsons Plains Road	Timber	30.6
n/a	Harrisville	Warrill Creek crossing at Warrill View Peak Crossing Road	n/a	n/a
n/a	Harrisville	Saltwater Creek crossing at Wholey Drive	n/a	n/a
n/a	Kalbar	Saltwater Gully crossing at Kalbar Connection Road	n/a	n/a
n/a	Kalbar	Warrill Creek crossing at Kalbar Connection Road	n/a	n/a
Old Kalbar Road Bridge	Kalbar	Salwater Gully crossing at Old Kalbar Road	Concrete	4.5
Perrimans Bridge	Kalbar	Reynolds Creek crossing at Muller Road	Concrete	28.6
Politz Bridge	Kalbar	Salwater Gully crossing at Old Kalbar Road	Concrete	7.5
Kengoon Bridge	Kents Lagoon	Saltwater Creek crossing at Kengoon	Timber	23
n/a	Kents Lagoon	Saltwater Gully crossing at Kalbar Munbilla Road	n/a	n/a
Stokes Bridge	Kents Lagoon	Warrill Creek crossing at Kengoon Road	Timber	36.2
Dinner Camp Bridge	Milora	Dinner Camp Creek crossing at Munbilla Road	Concrete	15.4
n/a	Milora	Creek crossing at Munbilla Road	n/a	n/a
n/a	Milora	Creek crossing at Beckwith Road	n/a	n/a
n/a	Moogerah	Coulson Creek crossing at Lake Moogerah Road	n/a	n/a
n/a	Moogerah	Reynolds Creek crossing at Lake Moogerah Road	n/a	n/a
Morwincha Bridge	Morwincha	Reynolds Creek crossing at Morwincha Road	Timber	12.2

Name	Locality	Description	Bridge type	Bridge length (m)
n/a	Morwincha	Reynolds Creek crossing at Cunningham Highway	n/a	n/a
n/a	Mount Forbes	Mt Walker Creek crossing at Kruger Road	n/a	n/a
Churchbank Bridge	Mutdapilly	Warrill Creek crossing at Churchbank Weir Road	Timber	24.9
n/a	Mutdapilly	Mt Walker Creek crossing at Cunningham Highway	n/a	n/a
Walter Harsant Bridge	Radford	Warrill Creek crossing at Radford Road	Concrete	32
n/a	Tarome	Warrill Creek crossing 1 at Tarome Road	n/a	n/a
n/a	Tarome	Warrill Creek crossing 2 at Tarome Road	n/a	n/a
Chauvel Bridge	Warrill View	Warroolaba Creek crossing at Charles Chauvel Drive	Concrete	20
n/a	Warrill View	Warrill Creek crossing at Warrill View Peak Crossing Road	n/a	n/a

3.3.6 Moogerah Dam

Moogerah dam was included in the TUFLOW model. The spillway was represented using the rating curve provided by Seqwater. Initial water levels for Moogerah Dam were obtained from the gauge records for the calibration events. The dam was assumed to be full (ie at spillway level) for the 1% AEP design event. The dam initial water levels adopted for the calibration and design event scenarios are presented in Table 5.

Table 5 Moogerah Dam initial water levels

Flood Scenario	Moogerah Dam Initial Water Level (m AHD)
1974 Calibration	155.54
1991 Calibration	154.91
2011 Calibration	155.21
1% AEP Design Event	154.91

3.3.7 Boundary conditions

The URBS model outputs were applied as inflows into the TUFLOW model. Local inflows were applied throughout the model using TUFLOW's SA inflow. A normal depth boundary condition was applied at the downstream boundary. Since the downstream boundary is not a well-defined water level, a stage-discharge relationship was used in TUFLOW to define the boundary condition.

4 Calibration

4.1 Process of calibration

Three events were used in the model calibration process being 1974, 1991 and 2010/11.
Inflow hydrographs from the URBS model were incorporated into the TUFLOW hydraulic model at a number of locations within the study area. The hydraulic model was run and the resulting water levels and discharges compared to the available stream gauge data. An iterative joint calibration approach was then undertaken with both hydrologic and hydraulic model parameters adjusted to achieve the best match against the available recorded historical data.

4.2 Calibration targets

Ideally, the following tolerances are indicative of a good calibration:

Table 6 Calibration targets

Water level	Discharge
+/- 0.15m at stream gauges	+/- 10%

4.3 Calibration data

4.3.1 Stream gauge data

Calibration data for the 1974, 1991 and 2011 historical events was provided with the Seqwater WSDOS URBS model. This data consisted of recorded water levels at Moogerah Dam, Toohills Crossing, Junction Weir, Harrisville and Churchbank Weir stream gauges.

Historical stream gauge data was available at a number of gauges across the catchment and reported by either the Bureau of Meteorology (BoM), the Department of Natural resources and Mines (DNRM), or Seqwater. The complete available stream gauge information is listed in Table 7. The available gauge data was reviewed for the relevant calibration events (1974, 1991 and 2011) and the adopted gauges used in the model calibration are detailed in Table 8.

Table 7 Available stream gauge information

Gauge Location	Owner	Calibration Event		
		1974	1991	2011
Mutdapilly	DNRM	n/a	n/a	n/a
Churchbank Weir	Seqwater	n/a	n/a	✓
Harrisville	BoM	✓	✓	✓
Kalbar	BoM	n/a	n/a	✓
Junction Weir	Seqwater	n/a	n/a	✓
Aratula Weir	DNRM	n/a	n/a	n/a

Gauge Location	Owner	Calibration Event		
		1974	1991	2011
Toohills Crossing	Seqwater	n/a	n/a	✓
Moogerah Dam	Seqwater	✓	n/a	✓

Table 8 Stream gauges used for calibration

Station number	Station name	Period	Gauge zero
143105A/143988	Churchbank Weir	1953-2002 (DNRM) 1953-current (BoM)	38.704 SD 38.61 m AHD
143910/143812/143912	Harrisville	1956-current	45.688 m SD
143117	Kalbar Weir HW	1998-current	74.60 m AHD
143118A	Junction Weir	1997-current	0 m AHD
143116A	Toohills Crossing	1997-current	105.79 m AHD
143111A/143111	Moogerah Dam	2009-current (BoM) 1967-2002 (DNRM)	154.91 m AHD 100 m AHD

4.4 Calibration results

The following plots present the results from the joint calibration against the recorded gauge data. As there is only limited data available, the focus of the calibration exercise was to match peak water levels and to match the rising limb of the hydrograph as well as possible.

The stream gauges within the Warrill Creek catchment upstream of Amberley are not very well rated for large discharges. These values have to be reviewed with caution.

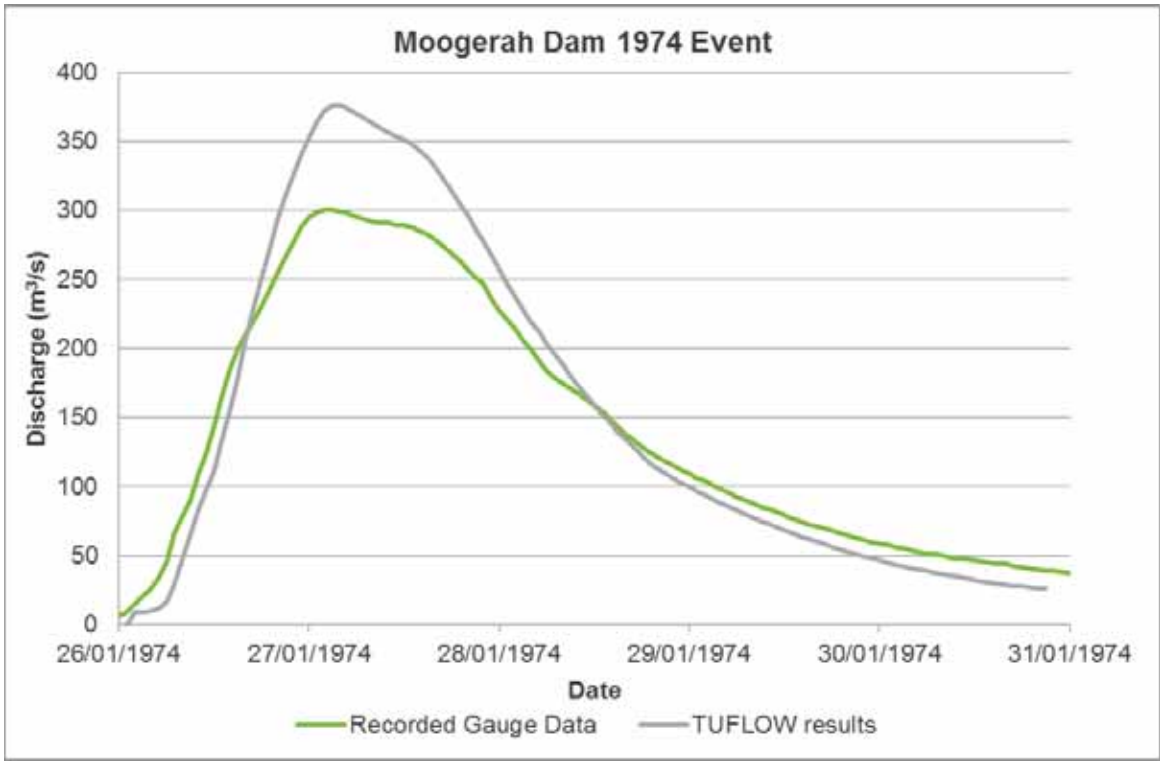


Figure 2 Moogerah Dam flow comparison 1974 event

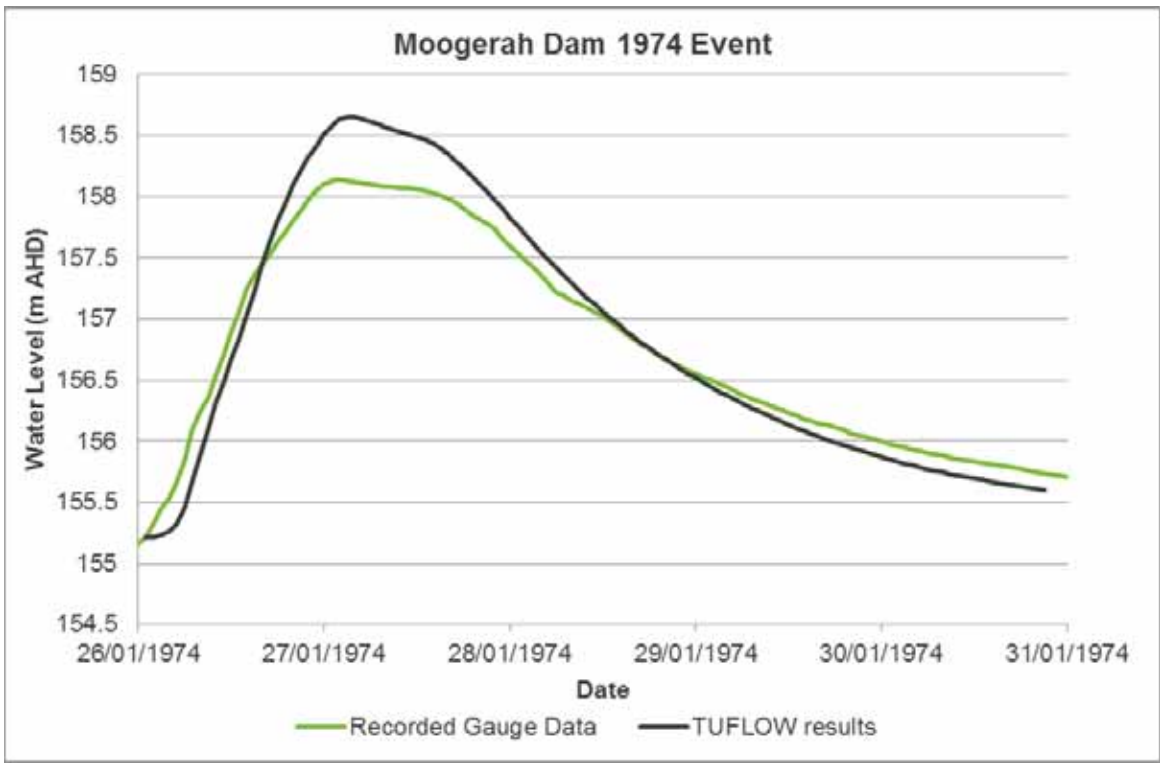


Figure 3 Moogerah Dam water level comparison 1974 event

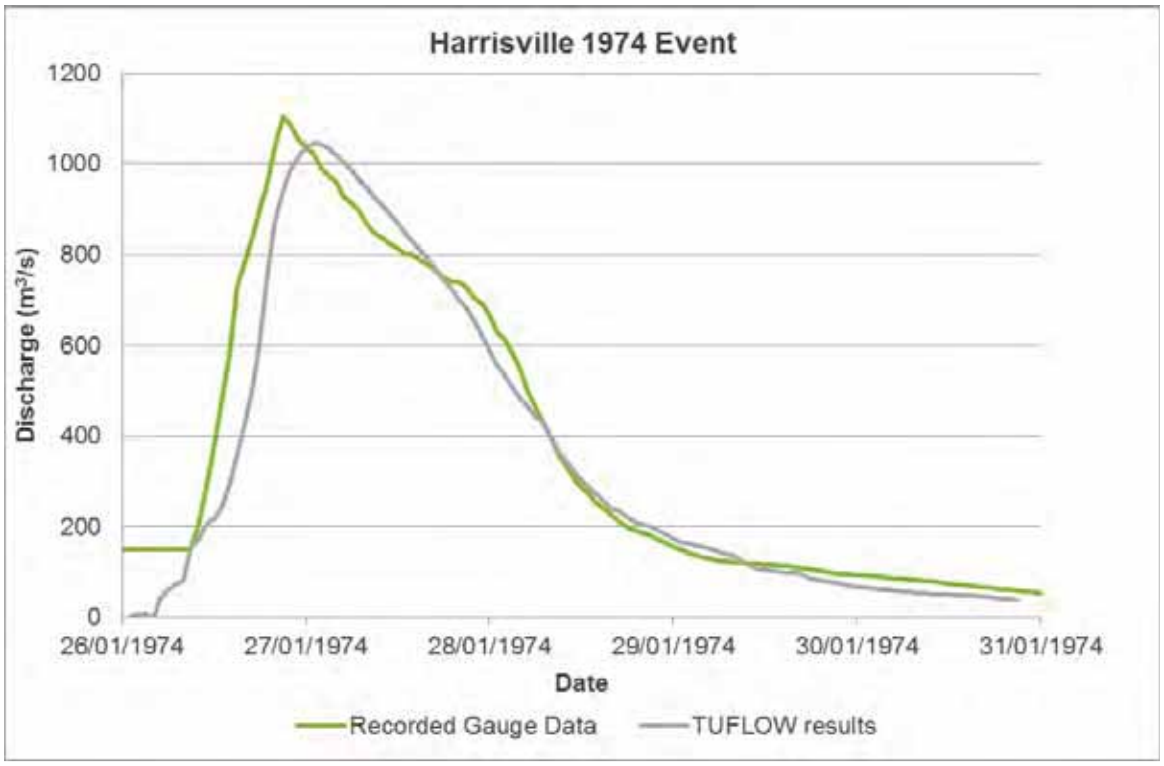


Figure 4 Harrisville flow comparison 1974 event

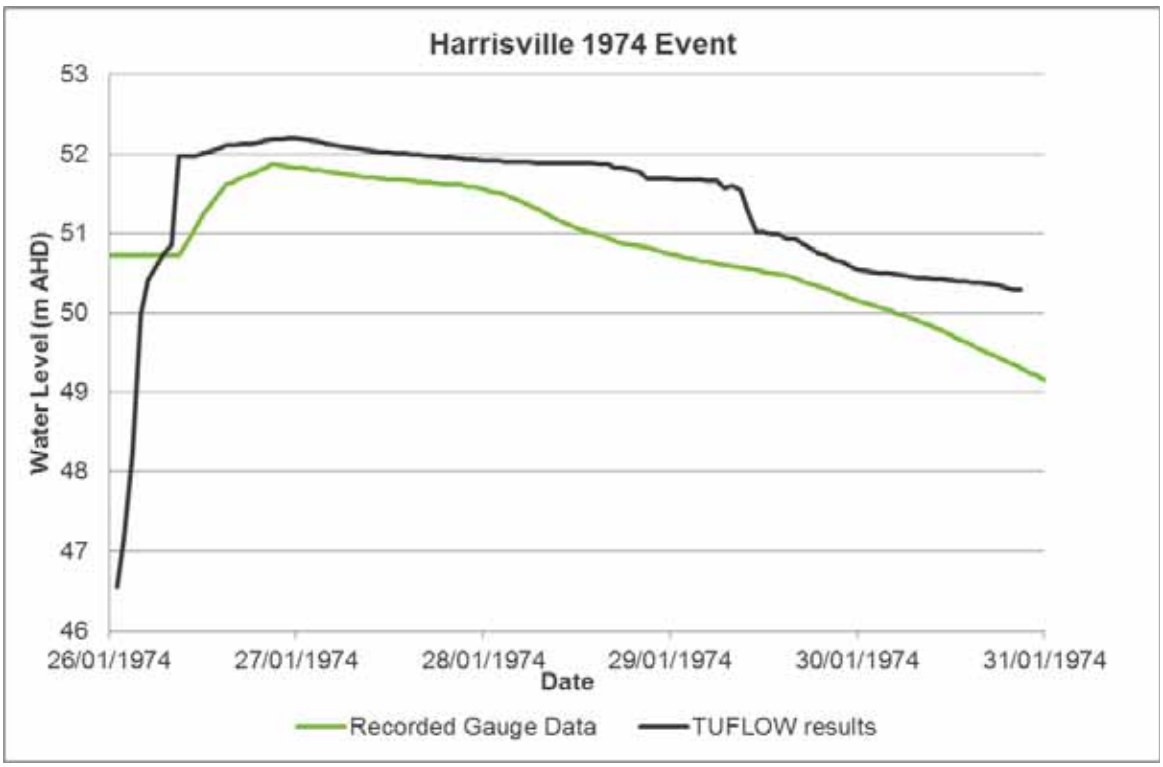


Figure 5 Harrisville water level comparison 1974 event

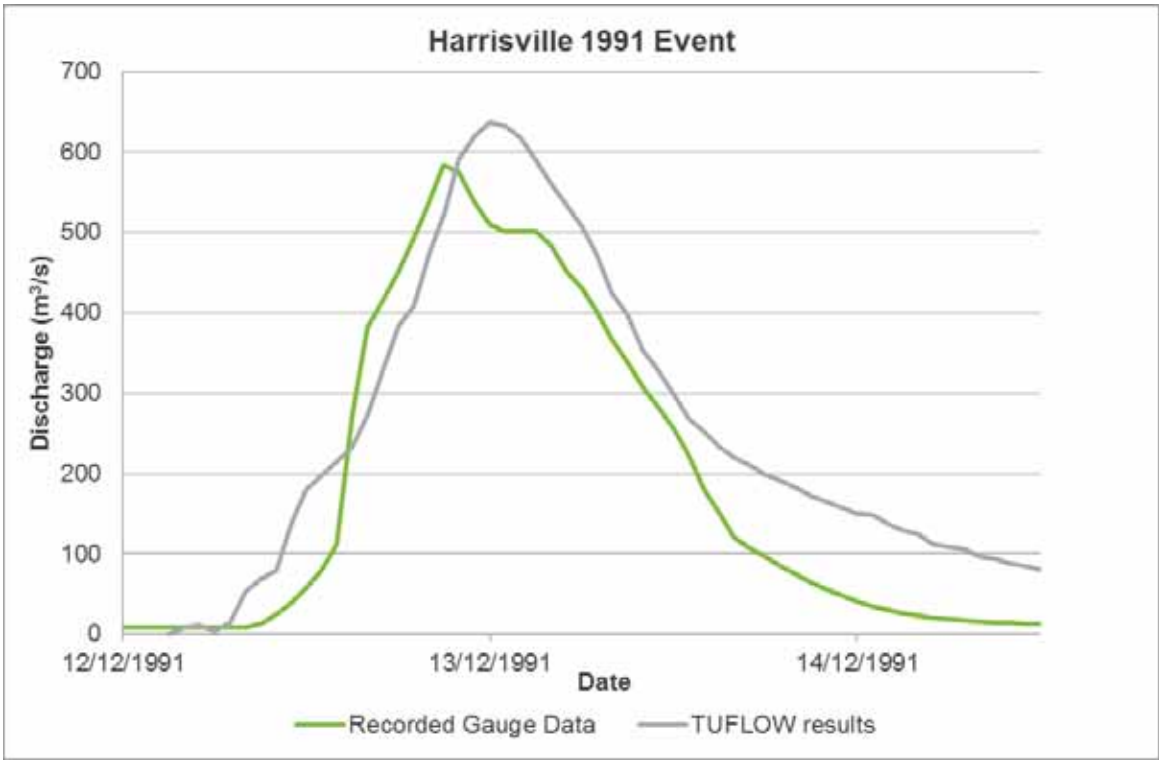


Figure 6 Harrisville flow comparison 1991 event

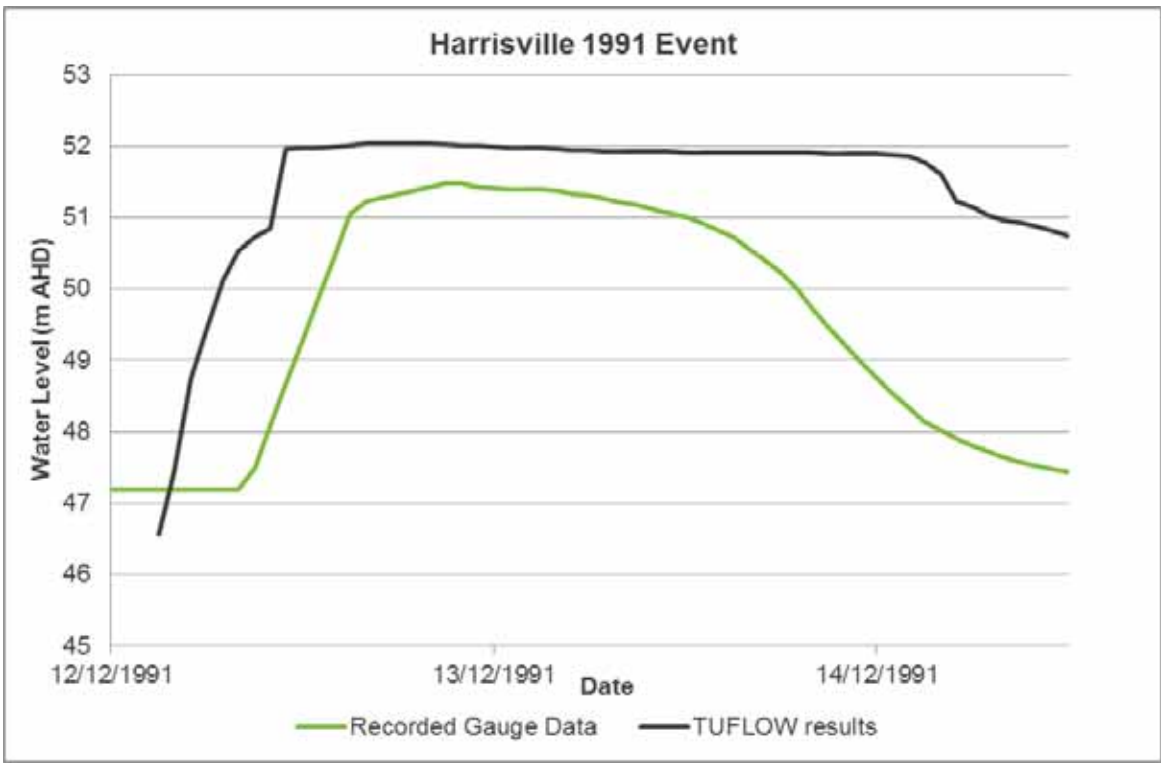


Figure 7 Harrisville water level comparison 1991 event

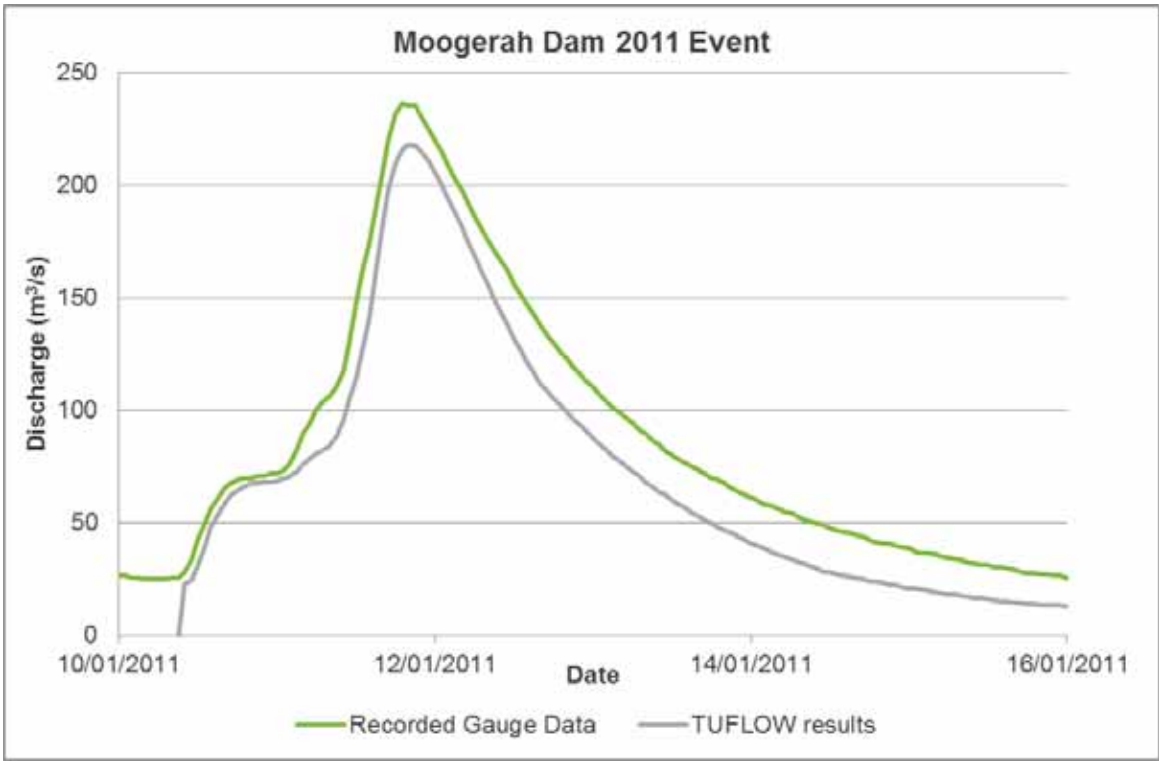


Figure 8 Moogerah Dam flow comparison 2011 event

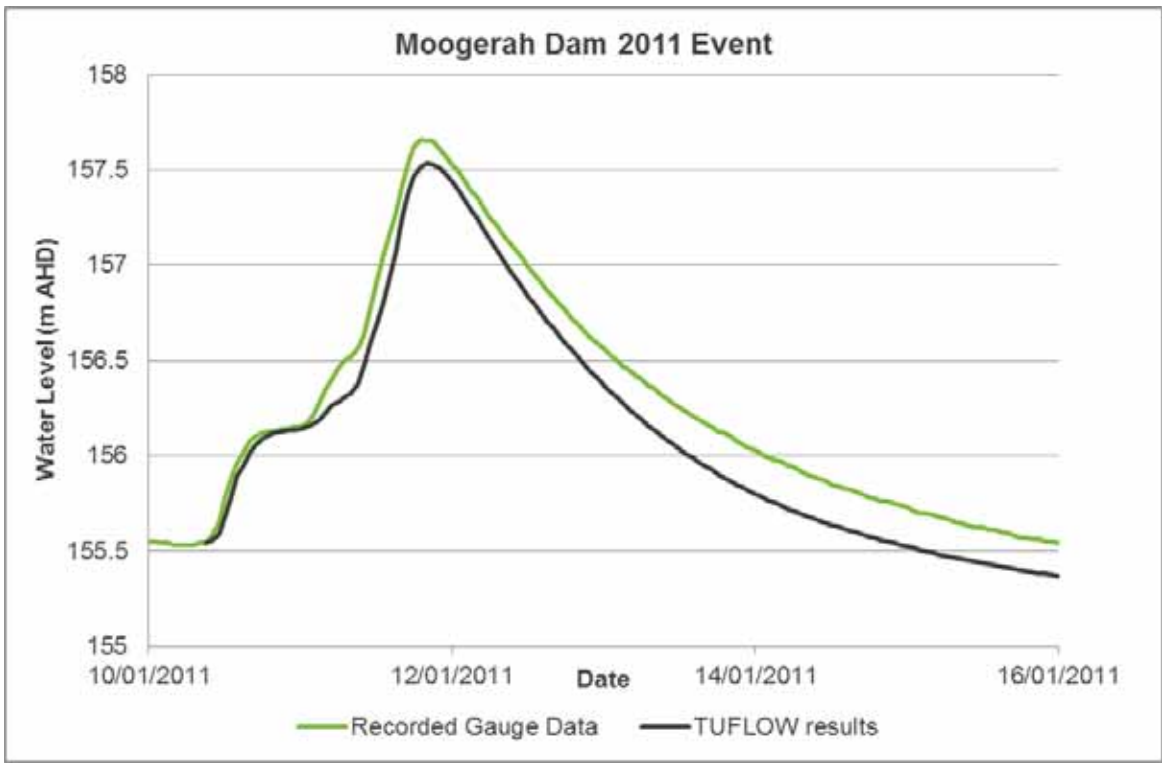


Figure 9 Moogerah Dam water level comparison 2011 event

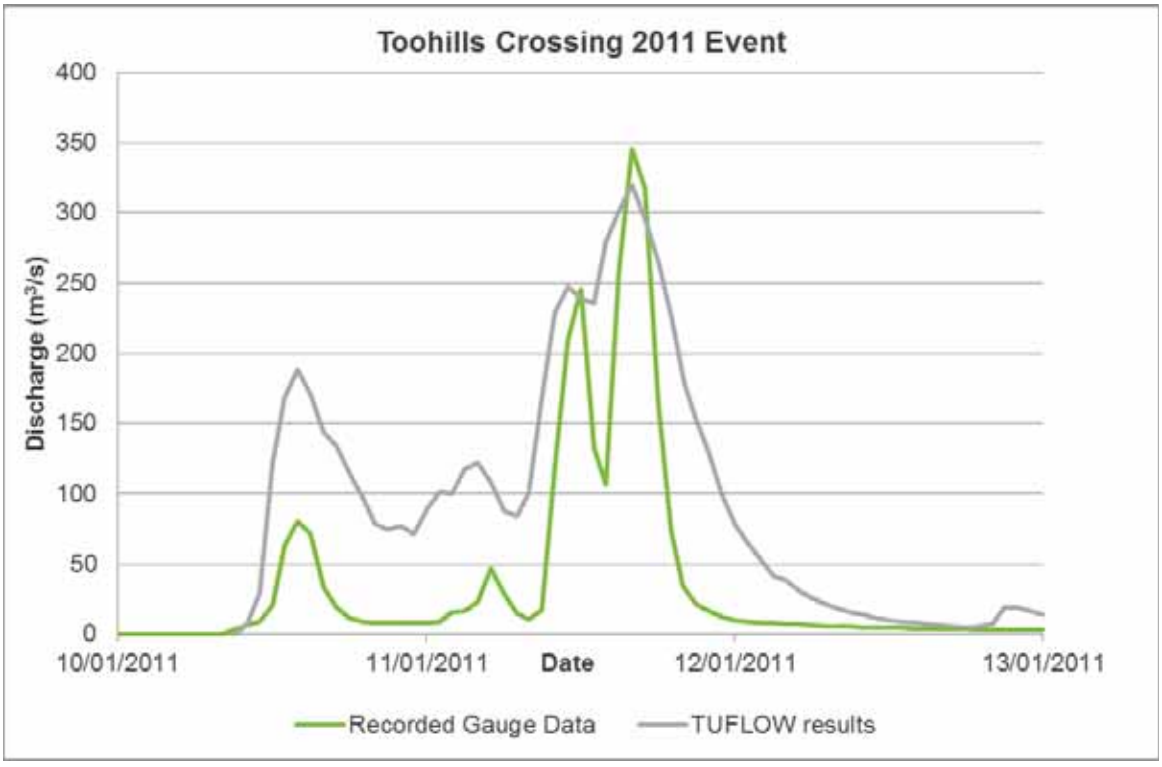


Figure 10 Toohills Crossing flow comparison 2011 event

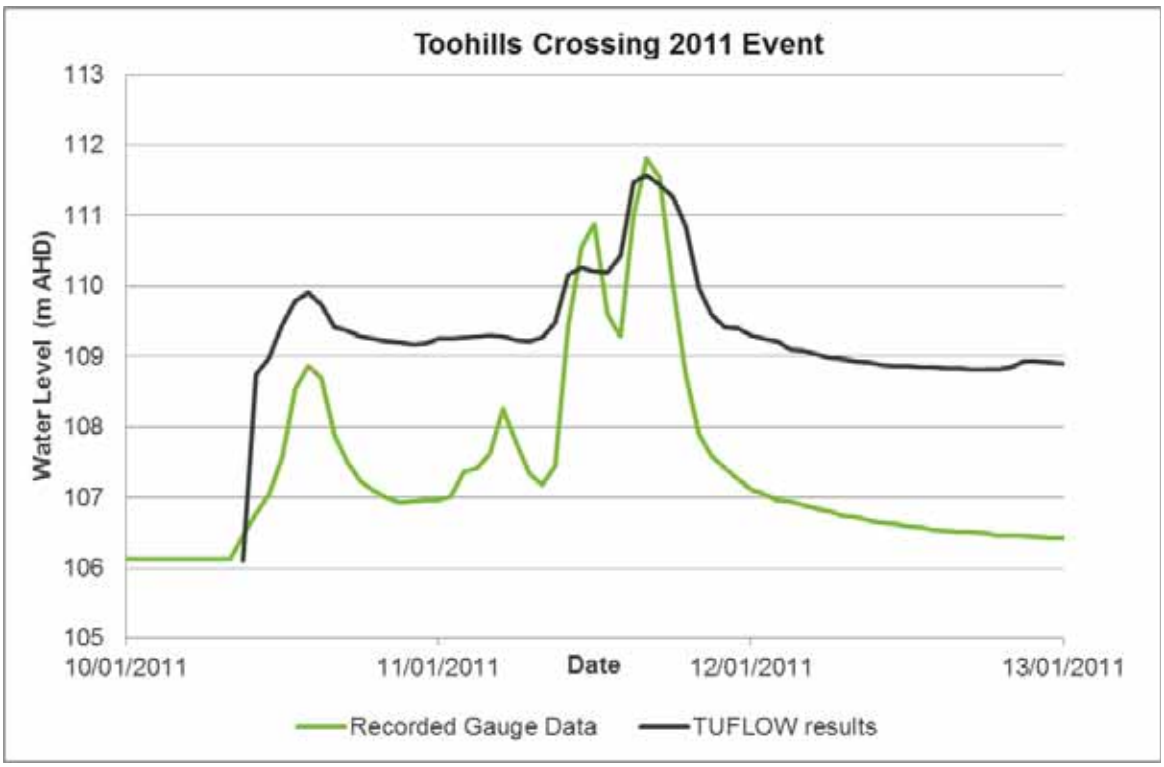


Figure 11 Toohills Crossing water level comparison 2011 event

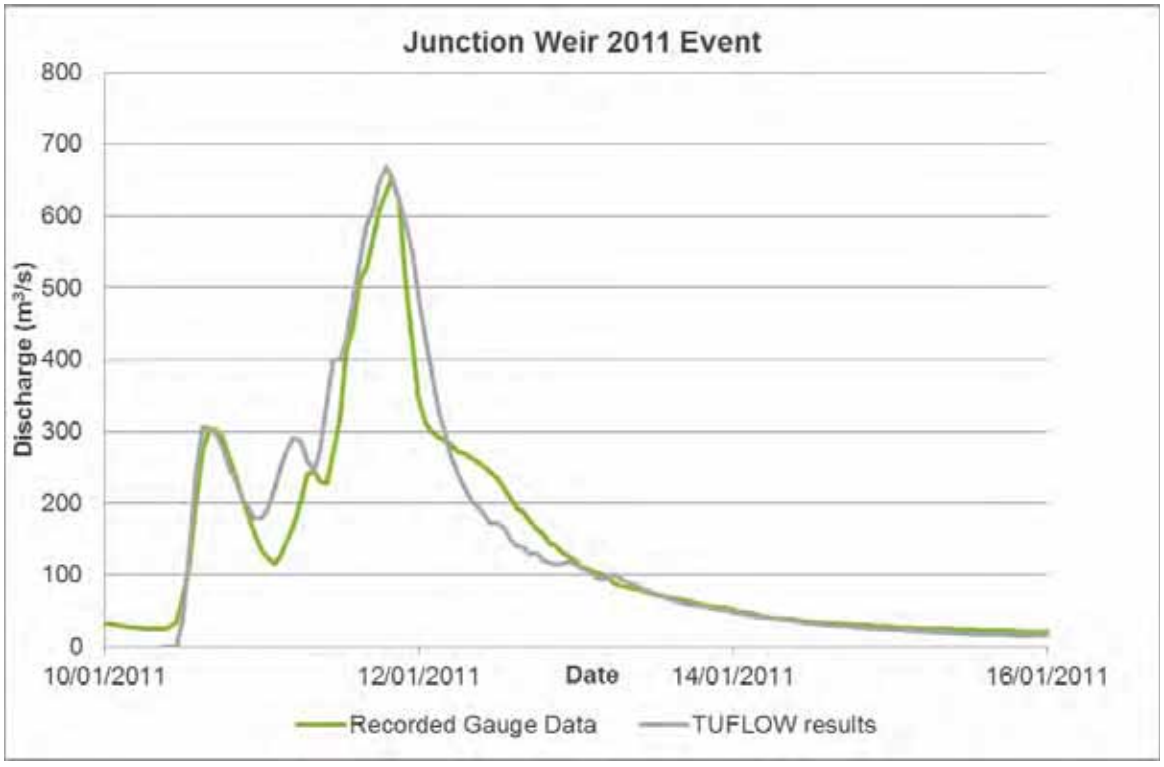


Figure 12 Junction Weir flow comparison 2011 event

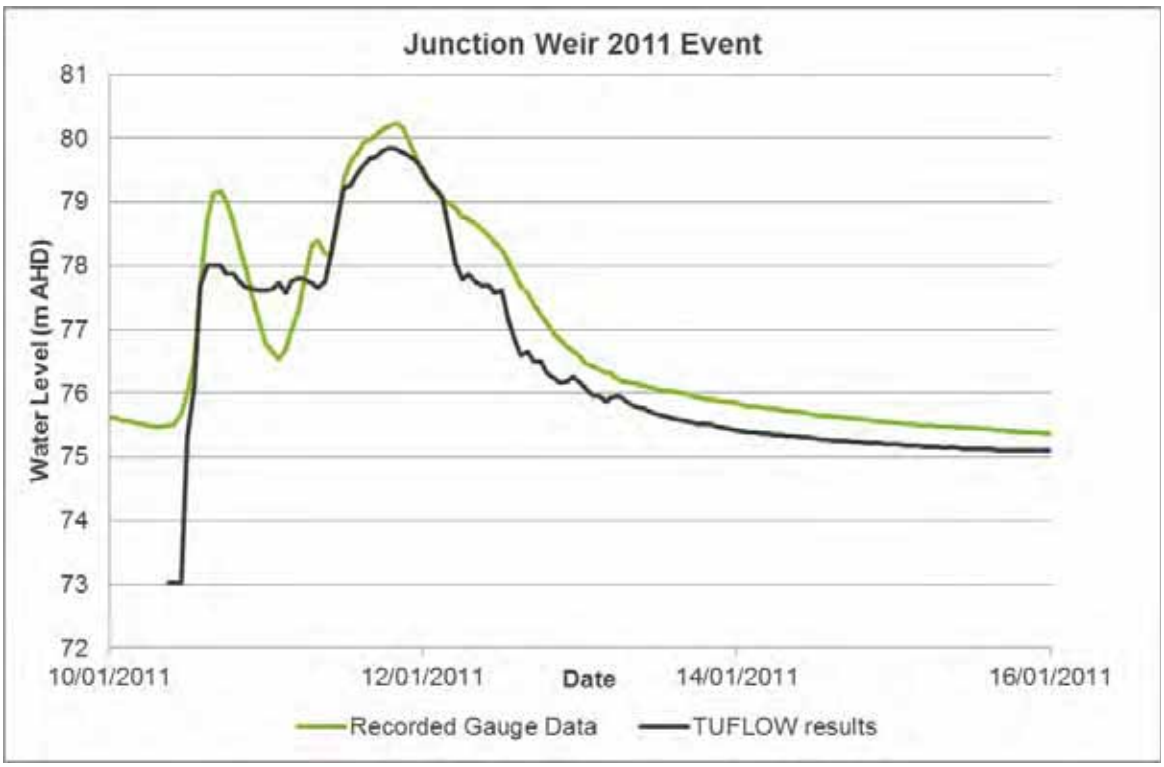


Figure 13 Junction Weir water level comparison 2011 event

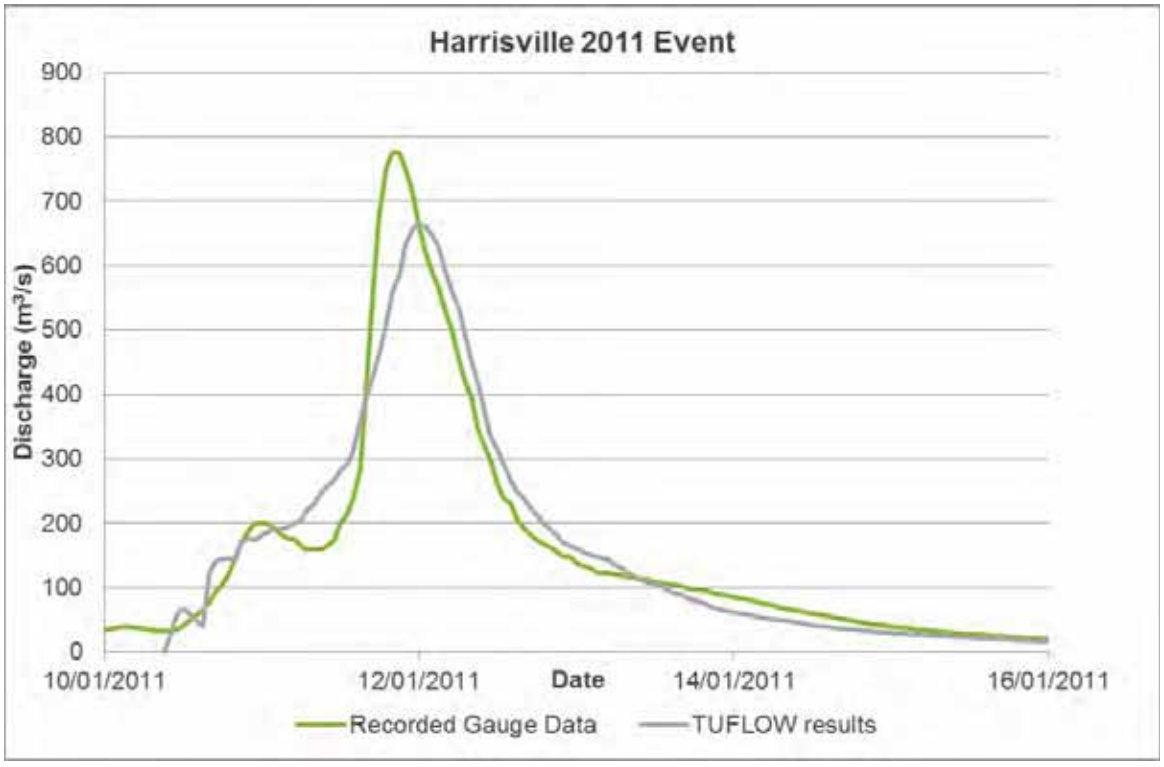


Figure 14 Harrisville flow comparison 2011 event

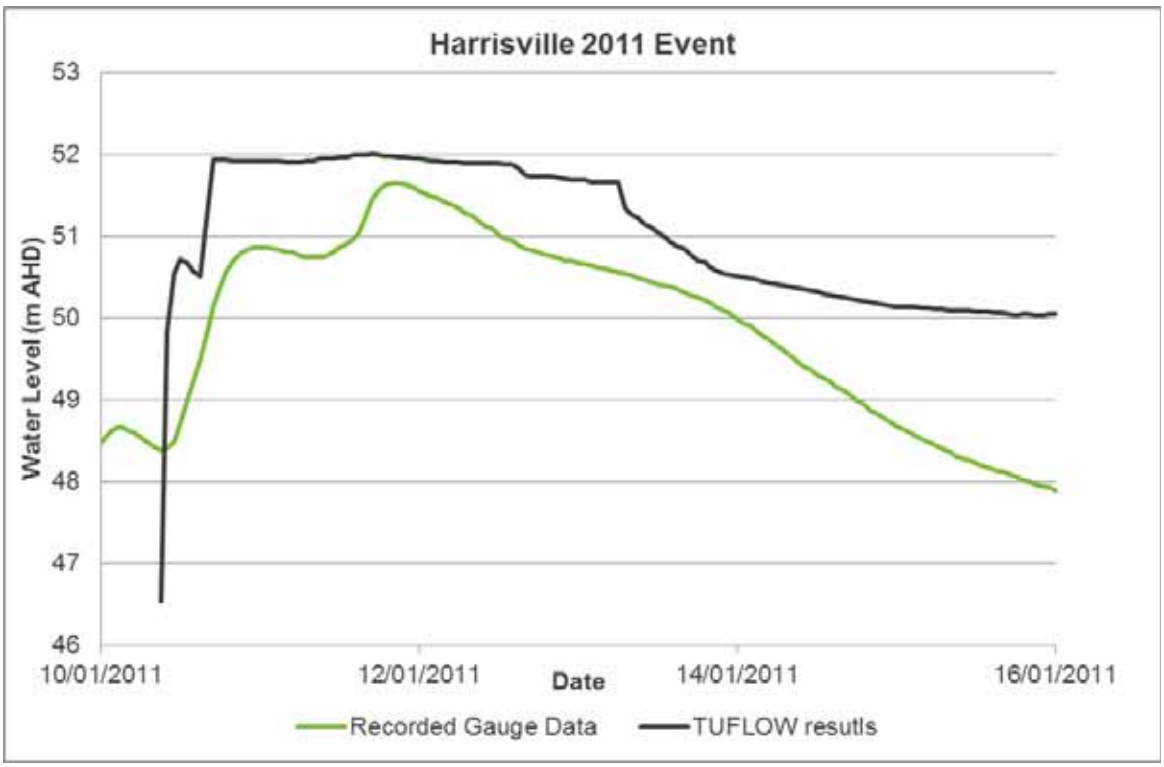


Figure 15 Harrisville water level comparison 2011 event

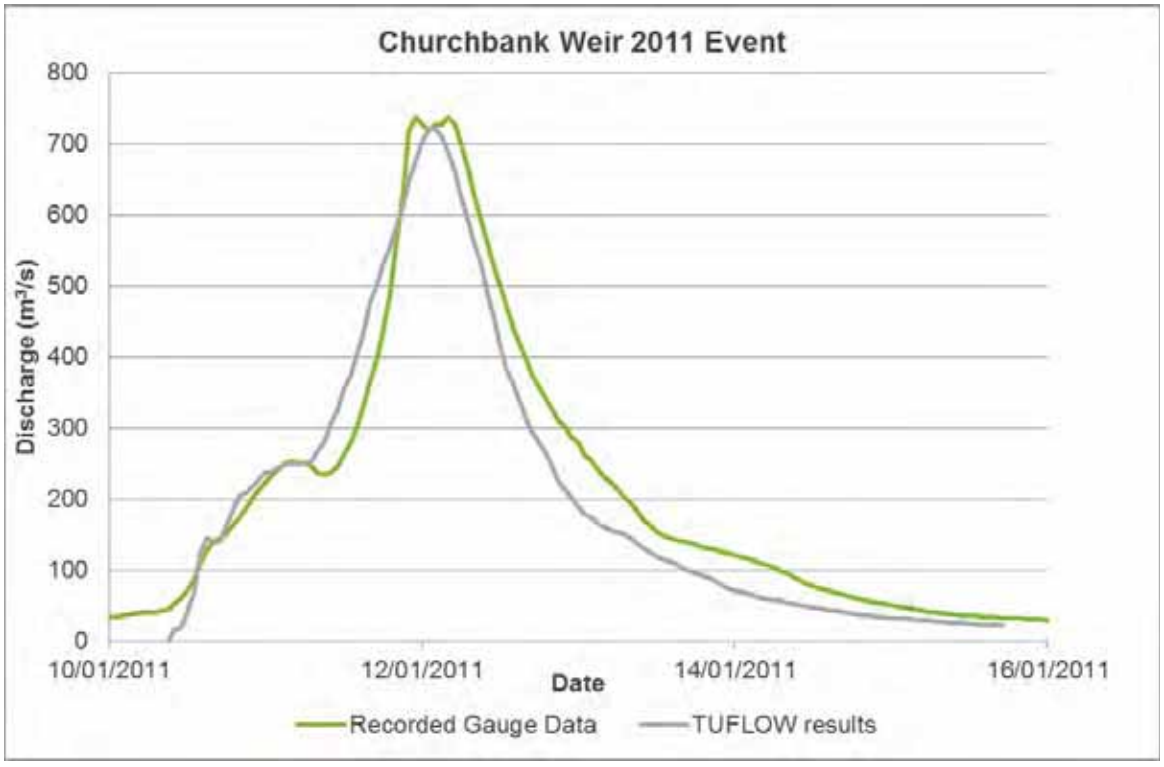


Figure 16 Churchbank Weir flow comparison 2011 event

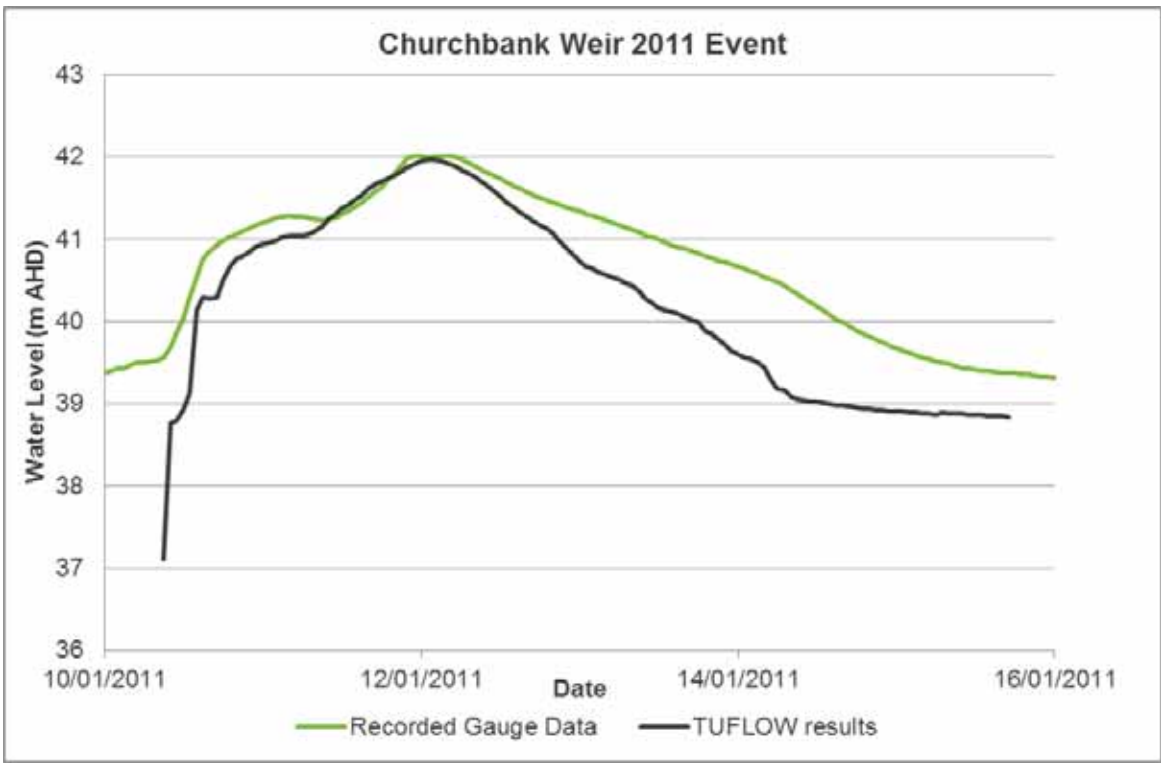


Figure 17 Churchbank Weir water level comparison 2011 event

The following tables present the calibration results achieved at each of the stream gauges for the 1974, 1991 and 2011 events.

Table 9 Observed vs modelled level and discharge at Moogerah Dam stream gauge

Result	1974 Event		2011 Event	
	Recorded	Modelled	Recorded	Modelled
Peak water level (m AHD)	158.14	158.65 (+0.51)	157.66	157.53 (-0.13)
Peak discharge (m^3/s)	300.6	376.08 (+25%)	236.48	217.86 (-9%)

Table 10 Observed vs modelled level and discharge at the Toohills Crossing stream gauge

Result	2011 Event	
	Recorded	Modelled
Peak water level (m AHD)	111.80	111.58 (-0.22)
Peak discharge (m^3/s)	345.65	319.87 (-8%)

Table 11 Observed vs modelled level and discharge at the Junction Weir stream gauge

Result	2011 Event	
	Recorded	Modelled
Peak water level (m AHD)	80.24	79.84 (-0.40)
Peak discharge (m^3/s)	653.48	668.14 (+2%)

Table 12 Observed vs modelled level and discharge at the Harrisville stream gauge

Result	1974 Event		1991 Event		2011 Event	
	Recorded	Modelled	Recorded	Modelled	Recorded	Modelled
Peak water level (m AHD)	52.34	52.19 (-0.15)	51.95	52.04 (+0.09)	52.12	52.0 (-0.12)
Peak discharge (m^3/s)	1102.51	1045.74 (-5%)	584.06	636.4 (+9%)	775.8	666.08 (-14%)

Table 13 Observed vs modelled level and discharge at the Churchbank Weir stream gauge

Result	2011 Event	
	Recorded	Modelled
Peak water level (m AHD)	42.01	41.97 (-0.04)
Peak discharge (m^3/s)	736.36	721.20 (-2%)

4.5 Gauge limitations

4.5.1 Harrisville gauge

The water level plots from the hydraulic modelling for the Harrisville gauge calibration exhibit a flat extended peak at approximately 52 m AHD which is consistent over the three calibration events. This is a result of the perched channel characteristic of Warrill Creek at this location. As a result, overflow from the channel spreads out onto the floodplain resulting in the flattened peaks presented in the water level plots.

The Harrisville gauge is located approximately 600 m upstream of the confluence with another large local creek. There also appears to be significant channel breakout and flow interchange between these creek systems around the Harrisville gauge. It is noted that this is not an ideal scenario for calibration purposes.

4.5.2 Kalbar Weir gauge

Historical stream gauge data was sourced for the Kalbar Weir gauge for the 2011 event. However, the data showed a uniform variation in river heights of approximately 3 m higher than the TUFLOW results. The TUFLOW results are consistent with the topography and top of bank at approximately 76.8 m AHD. Aurecon expects that this difference could be due to a gauge zero discrepancy in the data provided by BoM. As such, Kalbar Weir gauge was not reported in this assessment. Junction Weir is located just upstream of Kalbar and provides stream gauge calibration data for the same event. Junction Weir was used for calibration of the models.

4.6 Discussion

Overall, a reasonable calibration has been achieved based on the available information and suitability for the objectives of this study. The findings for each calibration event are described in the following sections.

4.6.1 1974 event

Whilst the modelled water levels are not within +/-0.15 m tolerance at Moogerah Dam, the shape and timing of the flood hydrograph matches the recorded data well. At Harrisville, taking into account the complex inter-channel flow characteristics, modelled levels are within the +/-0.15 m tolerance and the shape and timing of the flood hydrograph is reasonable.

4.6.2 1991 event

Only data for Harrisville is available for 1991. The shape of the discharge hydrograph matches the recorded data very well and the peak discharges are within the target tolerance.

The shape of the level hydrograph is not well replicated but the peak water level is within +/-0.15 m. The shape is difficult to match due to the complex inter-channel flows as detailed in Section 4.5.1.

4.6.3 2011 event

Modelled water levels are within the +/-0.15 m tolerance at Moogerah Dam, Harrisville and Churchbank Weir and outside the tolerance at Junction Weir and Toohills Crossing. The shape and timing of the flow hydrographs at Moogerah Dam, Junction Weir, Toohills Crossing and Churchbank match the recorded data well. At Harrisville, the shape of the level hydrograph is not well replicated but the peak water level is within +/-0.15 m. The shape is difficult to match due to the complex inter-channel flows as detailed in Section 4.5.1.

4.7 Adopted URBS model calibration parameters

As detailed above, a joint calibration exercise was undertaken and the following parameters were adopted for the URBS model for each historical event:

Table 14 URBS model calibration parameters

Event	Calibration parameters				
	IL (mm)	CL (mm/hr)	a	b	m
1974	90	1.2	0.70	2.0	0.8
1991	20	2.0	0.80	2.8	0.8
2011	5	0.3	0.30	2.0	0.8

The values of these parameters vary from those adopted in the WSDOS study for two key reasons:

- The current study has included the development of a hydraulic model which has enabled direct calibration against recorded flood levels rather than relying on the use of rating curves
- The current study is focused on the upper part of the Warrill Creek catchment (ie within SRRC boundaries) and therefore the best match against the gauges within these extents has been sought

4.8 Adopted roughness values

Aerial photography was used to define the land use within the study area and industry accepted values of Manning's 'n' roughness were applied. Calibration of the hydraulic model was then used to refine the values. The adopted roughness values are presented in Table 15.

Table 15 Post-calibration Manning's 'n' roughness values

Land use type	Manning's n
Low Density Residential	0.090
Dense Vegetation	0.090
Medium Vegetation	0.070
Low Vegetation	0.045
Agricultural areas	0.050
Road Reserve	0.020
River Corridor	0.040

5 Design Events

As the design event modelling was undertaken in two stages, the following section of the report covers the 1% AEP event first then the additional design events and refinements undertaken for those events.

5.1 1% AEP event

Model calibration parameters for each historical event were established through the joint calibration process. The parameters adopted for calibration and the results of the flood frequency analysis were used to formulate design event parameters for the 1% AEP. The adopted 1% AEP design event parameters are detailed in Table 16.

Table 16 1% AEP design event parameters

Design Event	Calibration parameters				
	Initial Loss Rate (mm)	Continuing Loss Rate (mm/hr)	Alpha, a	Beta, b	m
1% AEP	0	0.5	0.50	2.0	0.8

Using the calibrated hydrologic and hydraulic models, modelling of the 1% AEP event was undertaken. The 1987 rainfall (IFD) and temporal patterns were adopted from Australian Rainfall and Runoff (AR&R).

5.1.1 Flood frequency analysis

Flood frequency analysis (FFA) was proposed to provide further validation to the Warrill Creek flood modelling. Previous experience with the Warrill Creek catchment has shown a limited availability of historical records for development of an FFA. This was confirmed in the WSDOS study. Typically, the Amberley gauge would be used to prepare an FFA as this gauge provides the most comprehensive and best rated historical records for the catchment. However, as this study is limited to the extents of the SRRC boundary, the Amberley gauge was not used for calibration.

Historical annual peak gauge flows were sourced from DNRM for Kalbar (143102A) and Kalbar 2 (143102B). The data sets were combined to provide peak flow data for 53 years. A FFA was prepared for Kalbar and the predicted 1% AEP flow checked against the TUFLOW results. The FFA predicts a 1% AEP flow of 600 m^3/s (Figure 18) at Kalbar whilst the TUFLOW model predicts a peak flow of 413 m^3/s. The TUFLOW design event prediction is located on the lower 90% confidence limit of the FFA. This is consistent with findings on previous studies for this catchment ie the FFA tends to predict higher flows than the design IFD simulations.

The FFA is limited by the historical data available at the Kalbar gauges. Kalbar has measured gauging's up to 51 m^3/s whilst Kalbar 2 has measured gauging's up to 195 m^3/s. Considering the significant data limitations, a TUFLOW flow prediction within the 90% confidence limit can be considered a reasonable result.

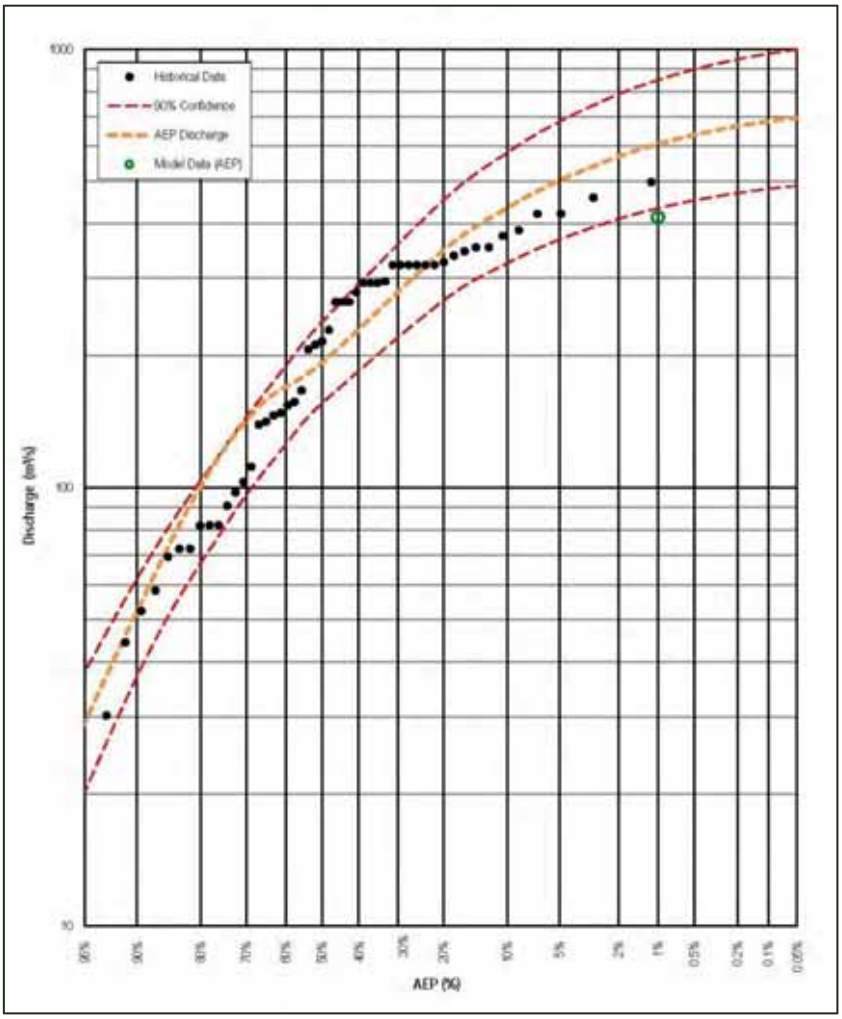


Figure 18 Flood frequency analysis at Kalbar Gauge

5.1.2 IFD sensitivity testing

Australian Rainfall and Runoff (AR&R) is currently undergoing a significant update. Revised Intensity-Frequency-Duration (IFD) curves have been derived and are currently available for sensitivity testing for new flood studies. Whilst they are not yet published for use on current flood studies, it is important to be aware of the potential changes and the implications for peak flood level estimation.

A sensitivity run was undertaken adopting the 2013 rainfall (IFD) data in the URBS hydrologic model. The results were assessed against the design event modelling prepared using the 1987 IFD.

The peak water surface levels across the catchment generally show an increase of less than 50 mm using the 2013 IFD data. At the downstream Churchbank gauge, a flow increase of less than 10% is predicted using the 2013 IFD data. These results are presented in Figure A7 (Appendix A).

The impacts of the 2013 IFD on flood levels and extents are considered minor but provide Council with an indication of potential changes that will arise as a result of the new IFD data. The formal adoption of the 2013 IFD dataset is yet to be confirmed by AR&R.

5.2 2%, 5% and 10% AEP events

5.2.1 Hydrology

Parameterisation of the URBS model for the 10%, 5% and 2% AEP events was based on the calibrated 1% AEP event hydrologic model. The event independent Alpha, Beta and m parameters were retained as per the calibrated 1% AEP event Warrill Creek URBS model.

Initial and continuing loss rates are typically adjusted across the range of design events to reflect the likelihood of lower levels of catchment saturation antecedent to more minor events. Loss parameters were defined for the lower events which were already defined in the existing study. Adopted URBS model parameters are shown in Table 17.

Table 17 Warrill Creek URBS model design event parameters

Design Event	Calibration parameters				
	Initial Loss Rate (mm)	Continuing Loss Rate (mm/hr)	Alpha,a	Beta,b	m
2% AEP	8	0.5	0.5	2	0.8
5% AEP	16	0.5	0.5	2	0.8
10% AEP	24	0.5	0.5	2	0.8

5.2.2 Hydraulics

The calibrated TUFLOW model developed to investigate the 1% AEP flooding behaviour within the Warrill Creek catchment was adopted to assess the additional smaller design events. The 1% AEP event model was developed using a 10 m grid resolution and was intended for investigation of the rare flooding events during which a significant proportion of flooding occurs as overland flow outside of defined watercourse banks. A number of model refinements have been undertaken to more accurately assess the smaller design events as detailed in the following sections.

5.2.3 Model refinements

5.2.3.1 Initial indicative low flow modelling

As an initial step, inflow hydrographs for the 1% AEP were scaled down to represent a minor/moderate storm scenario. The results from this simulation were used to inform and assess which hydraulic structures should be included in the hydraulic model refinement and to review locations where additional bathymetric data may be required. This simulation was only used to guide model development and the results of this simulation are not presented in this report.

5.2.3.2 Hydraulic structures

Improvements to the representation of hydraulic structures details and watercourse bathymetry has been achieved using new ground survey undertaken by Aurecon in February 2017. Locations for ground survey based on review of the initial modelling and discussions between Council and Aurecon. Waterway crossings were identified that were of significance in terms of understanding flooding impacts on access through the Warrill Creek catchment and the relative timing of road closures during flood events. The following aspects were considered in the selection of locations for survey and model refinement:

- Consequence of overtopping in terms of population affected by inundation and loss of access
- Likelihood of overtopping in minor/moderate storm events
- Degree of inundation in minor/moderate storm events

In light of the above, Table 18 details the Warrill Creek crossing locations selected for survey. These structures have been included in the refined hydraulic model.

Table 18 Surveyed Warrill Creek crossings

Locality	Description	Structure Type	Key structure dimensions (m)	Deck/Road Level (m AHD)
Kalbar	Warrill Creek Crossing at Kalbar Connection Road	Timber bridge	25.2m (l) x 7.3m (w)	76.2m AHD
Fassifern	Washpool Gully Crossing at Boonah Fassifern Road, parallel to Warrill Creek	Concrete box culverts	3 no. 3.5m (l) x 3.5m (w) RCBC Culverts	86.6m AHD
Warrill View	Warroolaba Creek Crossing at Cunningham Highway	Concrete bridge	48.3m (l) x 8.5m (w)	55.6m AHD
Harrisville	Normanby Gully Bridge at Normanby Gully Crossing at Wholey Drive	Concrete bridge	68.2m (l) x 7.9m (w)	49.1m AHD
Mutdapilly	Churchbank Bridge at Warrill Creek Crossing, Mutdapilly Churchbank Weir Road	Concrete bridge	80m (l) x 9.2m (w)	42.4m AHD
Aratula	Rasmussen Bridge at Warrill Creek Crossing, Fraserview Road	Concrete Bridge	28.6m (l) x 4.9m (w)	101.0m AHD
Tarome	Villis Bridge at Warrill Creek Crossing, Niebling Road	Concrete Bridge	18m (l) x 5.3m (w)	136.4m AHD

5.2.3.3 Bathymetry

Improvements to the hydraulic model bathymetry have been made in the vicinity of each of the surveyed waterway crossings and populated areas. In addition to the actual bridge and culvert structures, survey of the watercourse was undertaken both upstream and downstream at each location. This has enabled an improved representation of the conveyance area at each crossing structure and an improved delineation between in and out of bank flow conditions.

6 Modelling results

6.1 Climate change

There are several aspects of design flood estimation that are likely to be impacted by climate change. These include:

- Rainfall Intensity-Frequency-Duration (IFD) relationships
- Rainfall temporal patterns
- Continuous rainfall sequences
- Antecedent conditions and baseflow regimes
- Compound extremes (eg riverine flooding combined with storm surge inundation)

Typically, the approach to addressing climate change in flood studies is through consideration of sea-level rise (SLR) and/or increased rainfall intensities. SRRC is located in the upper reaches of the Bremer River drainage basin and therefore is unlikely to be influenced by sea-level rise. The effect of climate change on the Warrill Creek flood levels was therefore assessed for increased rainfall intensity predictions only.

The latest AR&R (2016) recommendations on climate change consider two Representative Concentration Pathways (RCPs) for greenhouse gas and aerosol concentrations driving climate change for the East Coast Cluster – RCP4.5 & RCP8.5. AR&R (2016) recommends using RCP4.5 as the minimum design basis but notes RCP8.5 should be considered where *'additional expense can be justified on socioeconomic and environmental grounds'*. This guideline recommends an increase in rainfall intensity of 12% for RCP4.5 and 22% for RCP8.5 to the 2090 planning horizon.

Table 19 Predicted increased rainfall intensity (AR&R, 2016)

Representative Concentration Pathway	Temperature increase (°C) at 2090 horizon	Increase in rainfall intensity (%)
4.5	2.25	12
8.5	4.10	22

For the 1% AEP event both Scenarios RCP4.5 and RCP8.5 were assessed and the results are presented on the figures in Appendix A. This includes afflux maps representing the difference in peak flood levels between the climate change and no-climate change scenarios.

SRRC have adopted the 1% AEP event with the RCP4.5 scenario for their Planning Scheme. This event has been used to set levels for development across the region.

For the 10% to 2% AEP events, the climate change investigation is based on RCP 4.5 only.

6.2 Mapping

The TUFLOW model results were analysed and a series of maps (Appendix A) were developed to present the results for each modelled return period. Four sets of maps were produced to display:

- Inundation extents with peak water surface levels – these maps present 1 m contours of the peak water surface levels
- Peak depths – these maps present peak depth contours in 0.5 m bands up to a depth of 5 m, with the lower band separated into two bands covering 0 to 0.3 m and 0.3 to 0.5 m
- Peak velocities – these maps present peak velocity contours in 0.5 m bands up to a velocity of 5 m/s
- Hazard maps – Guidelines for presentation of flood mapping are provided in the Australian Emergency Management Handbook Series (2013) produced by Emergency Management Australia (EMA). The guidelines include categorisation for flood hazard as shown below in Figure 19. The prepared hazard maps have used a simplified version of this classification, where only 3 levels are outlined (Low, Medium and High Hazard). Each of these simplified bands represent 2 bands within the EMA classification.

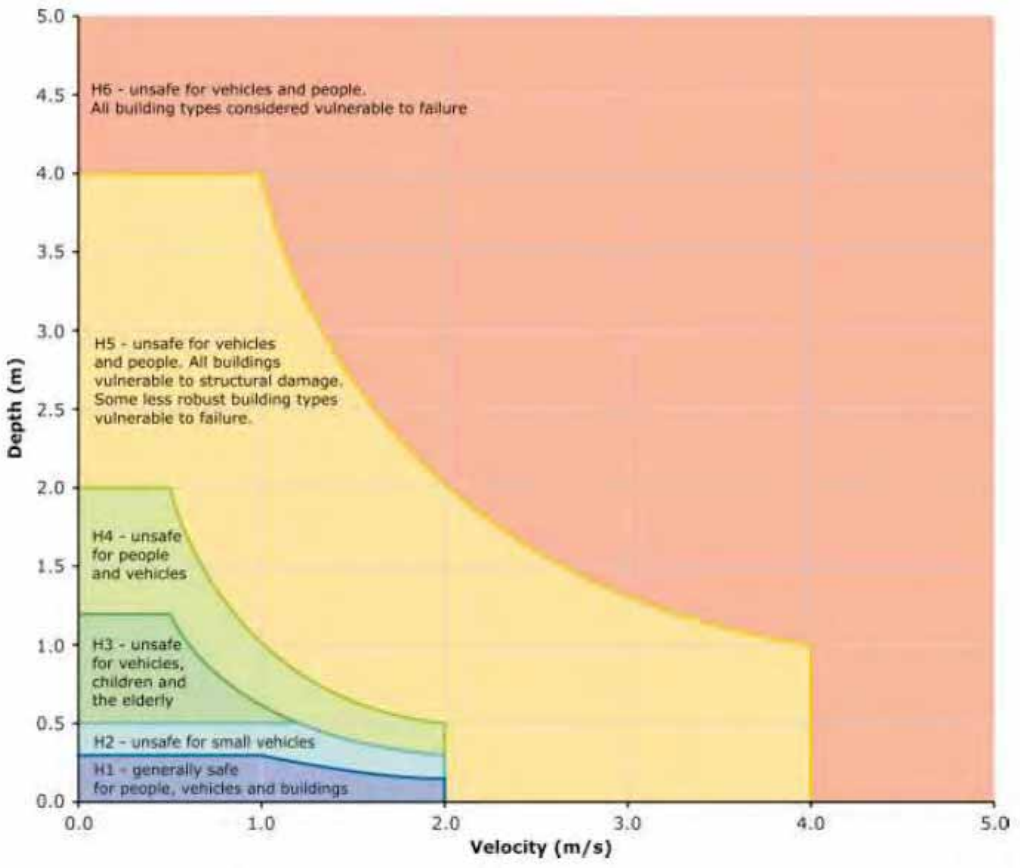


Figure 19 EMA revised flood hazard classification. ***Source: Australian Emergency Management Handbook Series (2013) - Technical flood risk management guideline: Flood hazard***

The flood maps accompanying this report provide a regional overview of the modelling results and are supplemented by GIS data to be supplied to SRRC which can be interrogated to provide further detail. A list of the figures and the full set of maps is presented in Appendix A.

6.3 Property flood levels

Peak water levels at properties affected by each of the design events were determined from the flood modelling results. The results are tabulated by property and will be provided to Council in spreadsheet format.

6.4 Design event discharges

Peak design event discharges are shown below in Table 20. The table shows the increase in peak discharge both with severity of the event and increasing distance travelled downstream through the catchment.

Table 20 Design event (AEP) peak discharges at key locations

Location	Peak Discharge (m^3/s)		
	10% AEP	5% AEP	2% AEP
Norman Gully Bridge, Wholey Drive	108	125	142
Warroolaba Creek Crossing, Cunningham Highway	142	172	219
Villis Bridge, Niebling Road	201	264	351
Rasmussen Bridge, Fraserview Road	260	349	461
Washpool Gully Crossing, Boonah-Fassifern Road	358	475	609
Warrill Creek Crossing, Kalbar Connection Road	532	672	887

6.5 Road closures

Management of flooding related road closure risk and timing is key to effective emergency planning and response functions. An understanding of the timing and location of road closures will enable emergency services to forewarn residents of impending loss of access prior to the arrival of the flood. Closure of key road crossings have been reviewed for the 10%, 5% and 2% AEP design events. Road closure risk findings are discussed further below.

6.5.1 Design event road closures

Closure of key road crossings has been reviewed for the 10%, 5%, 2% and 1% AEP design events. Figure F has been prepared and presents the estimated flooded width for each AEP for each key crossing within the Warrill Creek catchment. In addition, peak flood levels for each AEP have been presented for each stream gauge within the catchment. Historical flood levels at the stream gauge are also presented.

This mapping can be used in conjunction with predicted gauge levels that the BoM issue during events to give Council's response team an understanding of the likely crossings that will be inundated and to assist in guiding response measures.

6.6 Gauge rating review

A network of stream alert gauges is owned and operated by various agencies which are used to provide early warning of flooding and for flood forecasting operations by the Bureau of Meteorology (BoM). The stream alert gauges provide classifications for flood severity corresponding to various gauge depths. The descriptors for these classifications as provided by the BoM are as follows:

- **Minor Flooding:** This causes inconvenience such as closing of minor roads and the submergence of low level bridges and makes the removal of pumps located adjacent to the river necessary.
- **Moderate Flooding:** This causes the inundation of low lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by flood waters.
- **Major Flooding:** This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas, widespread flooding of farmland is likely.

It is understood that the gauge flood classification levels may not be reflective of the actual flood severity at some locations. A review the gauge level flood classifications has therefore been undertaken as detailed in the following sections.

6.6.1 Moogerah Dam Gauge

The Moogerah Dam gauge is located at the wall of Moogerah Dam. This gauge is located in a rural area and is primarily surrounded by dense vegetation. The current flood classification gauge levels for the Moogerah Dam gauge are shown in Table 21.

Table 21 Existing BoM flood classifications – Moogerah Dam Gauge Alert

Flood height (m)		
Minor	**Moderate**	**Major**
Moogerah Dam (Station #040135)		
1.0	2.0	3.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 22. Due to the location of this gauge, the analysis did not look purely at the flood extents but also took into consideration information provided in the *Moogerah Dam – Emergency Action Plan (SEQ Water).*

This review outlined the following important levels at the gauge.

- Spillway Crest Level – 154.91m AHD (Full Supply Level)
- Flood of Record – 158.14m AHD (January 2013)
- Main Dam Crest Level – 160.72m AHD

The information in this document outlines emergency actions to be taken at the dam by the Dam Supervisor and the frequency of surveillance required. The EAP also defines the Downstream Release Hazard categories which are summarised as follows:

- Stand-down: Lake level below FSL (EL154.91m AHD), no spillway overflow and no flood warning expected to be issued by BoM
- Alert: Lake Level above FSL (EL 154.91m AHD) and first spillway overflow occurring, BoM expected to issue a flood warning for SE-QLD
- Lean Forward: Lake Level reaches Flood of Record Level (EL 158.14m AHD) and flood overflow continuing
- Stand Up: Lake Level: Extreme Lake Level (EL159.50m AHD), dam crest overtopping is possible.

Review of this gauge indicates that levels in accordance with the action plan should be adopted as outlined in Table 22. The review indicates that the current flood classifications at the Moogerah Dam Gauge are inadequate.

Table 22 Moogerah Dam Gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
155.51	**0.5**	▪ This level is 0.5m above the full supply level of the Dam ▪ Reduced amenity to the camping and picnic area on the eastern side of the dam ▪ Overtopping of minor access roads/tracks being Wild Cattle Creek Road, Lake Moogerah Road, Grace Road and Mount Greville	Minor
156.91	**2.0**	▪ This level is 2.5m above full supply level ▪ Increased overtopping of minor access roads named above	Moderate

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
158.14	**3.23**	▪ This is the level of the January 2013 flood. This was a major flood and is recorded as the 'Flood of Record' at the gauge. ▪ Some rural properties upstream of the gauge are inundated	Major

6.6.2 Toohills Crossing Alert

The Toohills alert gauge is located on Warrill Creek in a rural area downstream of Toohill Road. There are currently no published flood classification levels for this gauge. The primary land use in the area is grazing with associated farm dwellings. The area is sparsely populated as is typical for rural grazing areas. Whilst gauge flood classifications were not available from the BoM for the Toohills Crossing gauge, a set of flood gauge level classifications are suggested below based on the BoM hazard rating.

Table 23 Toohills Crossing Alert gauge level analysis

Proposed Water level (m AHD)	Peak flood conditions description	Suggested flood classification
110.2	▪ Peak flood waters overtop the banks of Warrill Creek main channel downstream of the gauge ▪ Toohill Road is overtopped ▪ Frazerview Road is overtopped	Minor
111.4	▪ Toohill Road becomes further inundated ▪ Frazerview Road becomes more inundated ▪ Large areas of pasture land downstream of the gauge become inundated ▪ Habitable properties in the surrounding area have access cut	Moderate
111.9	▪ Tarome Road is overtopped and access is lost ▪ A large number of properties upstream of the gauge lose access ▪ Full inundation of the floodplain	Major

6.6.3 Kalbar Weir HW TM

The Kalbar Weir gauge is located 400m upstream of the Kalbar Connection Road Crossing of Warrill Creek. This gauge is located in a rural area and is surrounded primarily by pasture and grazing land. The current flood classification gauge levels for the Kalbar Weir Alert are shown in Table 24.

Table 24 Existing BoM flood classifications – Kalbar Weir HW TM

Flood height (m)		
Minor	**Moderate**	**Major**
Kalbar Weir HW TM (Station #540058)		
6.0	7.5	9.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 25 with amendments to the existing levels proposed. The review indicates that the current flood classifications at the Kalbar Weir gauge are not compatible with the adopted definitions and the flood behaviour observed in the hydraulic model simulations.

Table 25 Kalbar Gauge HW TM analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
79.4	**4.8**	▪ Peak flood waters overtop the banks of Warrill Creek main channel ▪ Pasture land is inundated upstream of the gauge directly adjacent to the main channel ▪ Minor access roads/tracks are overtopped ▪ Loss of access to several remote properties ▪ Kalbar Connection Road is overtopped and access is lost ▪ Muller Road is overtopped due to breakouts from the main channel. Access is lost.	Minor
80.0	**5.4**	▪ Most minor access roads/tracks in the surrounding area are overtopped ▪ Cunningham Highway is overtopped and access is lost ▪ This major access loss causes more remote properties to also lose access	Moderate
80.7	**6.1**	▪ Most minor access roads/tracks are overtopped ▪ Boonah-Fassifern Road is overtopped causing loss of access to a number of properties ▪ Widespread inundation of pasture land in the area surrounding the gauge	Major

6.6.4 Kalbar Gauge

The Kalbar gauge is located 1.2km downstream of the Kalbar Connection Road Crossing of Warrill Creek. Kalbar gauge is located in a rural area surrounded primarily by pasture and grazing land. There are several habitable buildings located within 1km of the gauge. The current flood classification gauge levels for the Kalbar gauge are shown in Table 26.

Table 26 Existing BoM flood classifications – Kalbar Gauge

Flood height (m)		
Minor	**Moderate**	**Major**
Kalbar (Station #040440)		
6.0	7.0	9.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 27. The review indicates that the current flood classifications at the Kalbar gauge are understated and should be adjusted as outlined in Table 27.

Table 27 Kalbar Gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
77.02	**10.3**	▪ Peak flood waters overtop the banks of Warrill Creek main channel upstream of the gauge ▪ Several minor access roads/tracks are overtopped and access is lost	Minor
77.42	**10.7**	▪ There is a breakout upstream of the gauge which connects with a tributary to the east. This causes isolation of a number of properties. ▪ More minor access roads/tracks are overtopped ▪ There is significant flooding of pasture lands downstream of the gauge	Moderate
77.52	**10.8**	▪ More minor /tracks are overtopped ▪ Widespread inundation upstream and downstream of the gauge ▪ Habitable properties become inundated	Major

Seqwater operated water resource assessment gauges are located at Moogerah Dam, Junction and Kalbar Weirs, and Churchbank Weirs. These are water level gauges and do not have flow gauging or flow ratings, although Seqwater has recently conducted an assessment (Seqwater, 2013) of the Junction and Kalbar Weirs. BoM flood warning gauges are located at Kalbar, Harrisville and Green's Road. These also do not have flow gauging or ratings.

The Junction Weir and three Kalbar gauging stations are all in close proximity within a 1.5 km reach of Warrill Creek in proximity to Kalbar Connection Road. An integrated review of applicable ratings was undertaken by Seqwater due to the proximity of the gauges. Contrasting the lack of available flow data, survey data was considered to be of sufficient quantity and quality to allow a hydraulic analysis to be performed. A HEC-RAS model was established extending from 280 m downstream of the BoM Kalbar gauge to 20 m upstream of the Junction Weir crest corresponding to the location of the Junction weir headwater gauge.

Details of the modelling is provided in "Brisbane Basin Flood Hydrology Models Appendix B.7 Hydraulic Analysis for Junction Weir and Kalbar Gauge Ratings for Warrill Creek Model' (Seqwater 2013).

The result of the Seqwater modelling was that the Junction Weir site was considered more reliable and Seqwater adopted this location to develop a rating curve and hence reference hydrologic model results against. Therefore, the behaviour at the Kalbar sites, although located within close proximity, are considered to be quite inconsistent as evidenced by the revised flood warning levels.
As a consequence, it is recommended that Council consider providing preference to the Kalbar Weir HW TM gauge as opposed to the more downstream Kalbar Gauge.

6.6.5 Harrisville gauge

The Harrisville stream gauge is at the Warrill View Peak Crossing Road crossing of Warrill Creek. This gauge is located in a rural area and the crossing is surrounded primarily by pasture and grazing land. The current flood classification gauge levels for the Harrisville stream gauge are shown in Table 28.

Table 28 Existing BoM flood classifications – Harrisville gauge

Flood height (m)		
Minor	**Moderate**	**Major**
Harrisville TM (Station #040735)		
3.0	4.0	5.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 29. The review indicates that the current flood classifications at the Harrisville gauge are inadequate.

Table 29 Harrisville gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
49.69	**4.0**	■ Peak flood waters overtop the banks of Warrill Creek main channel upstream of the gauge ■ Significant inundation on pasture land to the west of the gauge ■ Flood waters are starting to approach habitable properties ■ Please note that this gauge level is conservative. The level has been lowered to allow for increased warning time.	Minor
50.69	**5.0**	■ Several minor access roads/tracks are overtopped and access is lost including Charles Chauvel Drive and Warrill View Peak Crossing Road. ■ A small number of habitable properties become inundated ■ Increased inundation of pasture land surrounding gauge location	Moderate
51.69	**6.0**	■ Warrill View Peak Crossing Road is overtopped. A major access road is cut. ■ Wholey Drive is overtopped. A major access road is cut. ■ A large number of properties are isolated due to loss of access ■ Widespread inundation of pasture lands both upstream and downstream of gauge	Major

6.6.6 Churchbank Weir Alert

The Churchbank Weir Alert is located immediately upstream of the Mutdapilly Churchbank Weir Road crossing of Warrill Creek. Mutdapilly Churchbank Weir Road crossing is located within a rural area and is surrounded primarily by pasture and grazing land. The current flood classification gauge levels for the Churchbank Weir Alert are shown in Table 30.

Table 30 Existing BoM flood classifications – Churchbank Weir Alert

Flood height (m)		
Minor	**Moderate**	**Major**
Churchbank Weir Alert (Station #540316)		
1.0	2.0	3.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 31. The review indicates that the current flood classifications at the Churchbank Weir Alert are adequate.

Table 31 Churchbank Weir Alert analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Flood classification
39.62	**1.0**	▪ Peak flood waters overtop the banks of Warrill Creek main channel upstream of the gauge ▪ Peak Crossing Churchbank Weir Road is overtopped at the Warrill Creek crossing ▪ Minor access roads/tracks in the surrounding area are starting to overtop ▪ The pasture land upstream of the gauge is partially flooded directly adjacent to the river	Minor
40.62	**2.0**	▪ Peak flood waters overtop the banks of Warrill Creek main channel downstream of the gauge ▪ Peak Crossing Churchbank Weir Road becomes further inundated ▪ Mutdapilly Churchbank Weir Road is inundated at the Warrill Creek crossing ▪ More minor access roads/tracks in the surrounding area are overtopped ▪ There are large areas of pasture land inundated south of the gauge	Moderate
41.62	**3.0**	▪ Widespread inundation of the pasture land upstream of the gauge ▪ Widespread inundation of the pasture land downstream of the gauge ▪ No inundation of dwellings or habitable buildings	Major

6.6.7 Opportunities for additional alert gauges

Due to the relatively rural nature of the Warrill Creek catchment, low population and low risk of the access being lost along the major arterial connection, no specific additional alert gauging locations are recommended.

7 Conclusions

Scenic Rim Regional Council (SRRC) has undertaken work to gain a better understanding of the region's Natural Hazard (Flood) characteristics for a range of events from relatively frequent (10% AEP) to rare (1% AEP). This flood study has been undertaken for the Warrill Creek catchment within Council's boundaries to provide Council with detailed flood information across the catchment.

Hydrologic modelling has been carried out using the established BRCFS URBS model. Hydraulic modelling of the main floodplain areas has been carried out through the development of a 2D TUFLOW hydraulic model. Refinement of modelling parameters was carried out through a joint calibration of the hydrologic and hydraulic models. Calibration of the models was undertaken against stream gauge records for four historical flood events.

Design event modelling for the 1%, 2%, 5% and 10% AEP events was undertaken. Mapping of the modelling results has been prepared and includes flood inundation extents, peak water levels, depths, velocities and hazard zoning in accordance with current guidelines.

Two climate change scenarios were assessed for the 1% AEP flood event to the 2090 planning horizon. Allowances for climate change considered 12% and 22% increases in rainfall intensities as recommended in AR&R (2016).

The RCP 4.5 climate change scenario was assessed for the additional flood events to the 2090 planning horizon. Allowances for climate change for the 10%, 5% and 2% AEP events considered 12% increases in rainfall intensities as recommended in AR&R (2016).

For planning purposes a tabulation of peak water levels for each design event at properties within the catchment has been prepared. This information and the GIS mapping will be provided in digital format to Council.

8 Assumptions, limitations and recommendations

The following limitations relate to this study:

- Calibration
  - The calibration and verification exercise was undertaken for four events. Although the calibration was successful there were limitations due to the accuracy of the available information.
  - The hydrologic model assumes existing development conditions
  - The available calibration events for the hydraulic model was limited due to limited historic level data within the study area
- 1% AEP event
  - The hydraulic structures modelled in the 1% event are limited to the detail available at the time of analysis
  - The hydraulic modelling for the 1% AEP event adopted a 10 m grid hydraulic model. This model resolution may not be representative of features such as small local drainage channels.
- 2%, 5% and 10% AEP events
  - The hydraulic structures modelled are limited to the detail provided except where survey has been undertaken at agreed locations
  - The hydraulic modelling presented for these events adopted a 10 m grid hydraulic model. This model resolution may not be representative of features such as small local drainage channels.
- General
  - Hydraulic models are influenced by the boundary conditions. Areas of flooding in proximity of the downstream boundary condition should be investigated with caution. Note that the downstream boundary is outside of the Scenic Rim Regional Council boundary.
  - Information presented in this report is indicative only and may vary, depending upon the level of catchment and floodplain development. Filling of land or excavation and levelling may alter the ground levels locally at any time, whilst errors may occur from place to place in local ground elevation data from which the model has been developed.

9 References

Aurecon 2015, Warrill Creek Flood Study – Final Report

BMT WBM, 2010, TUFLOW User Manual

Bureau of Meteorology, 2013, Intensity-Frequency-Duration data

Carroll, DG, 2009, URBS Manual – A Rainfall Runoff Routing Model for Flood Forecasting and Design

CSIRO, 2000, Floodplain Management in Australia: Best Practice Principles and Guidelines, SCARM Report

Emergency Management Australia, 2013, Managing the floodplain: a guide to best practice in flood risk management in Australia – Handbook 7

Institution of Engineers Australia, 1987, Australian Rainfall & Runoff: A guide to Flood Estimation

Institution of Engineers Australia, 2016, Australian Rainfall & Runoff: A guide to Flood Estimation

Queensland Government, 2015, Building Act 1975

Seqwater, 2013, Wivenhoe and Somerset Dam Optimisation Study

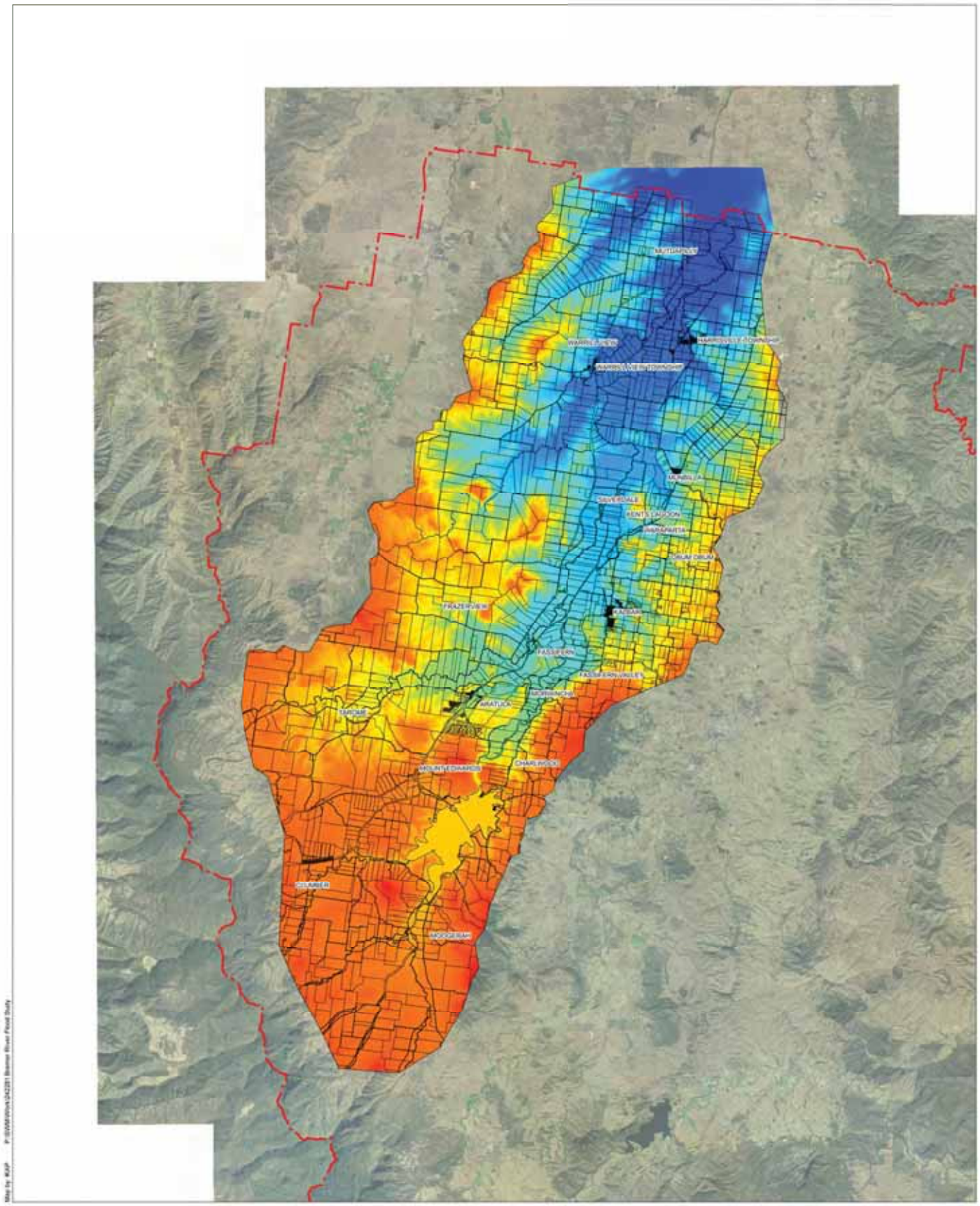
Seqwater. 2016, Moogerah Dam – Emergency Action Plan

Aurecon, 2015, Brisbane River Catchment Flood Study – Hydrology Phase Final Report

Appendices

Appendix A
Figures

Figure	Description
Figure A-1	Topography
Figure A-2	Roughness values
Figure B1	1% AEP Event – Inundation Extent Map
Figure B2	1% AEP Event – Peak Velocities Map
Figure B3	1% AEP Event – Peak Depth Map
Figure B4	1% AEP Event – Hazard Map
Figure B5-a	1% AEP Event – 4.5 Climate Change Scenario – Inundation Extent Map
Figure B5-b	1% AEP Event – 4.5 Climate Change Scenario – Afflux Map
Figure C1	2% AEP Event – Inundation Extent Map
Figure C2	2% AEP Event – Peak Velocities Map
Figure C3	2% AEP Event – Peak Depth Map
Figure C4	2% AEP Event – Hazard Map
Figure C5-a	2% AEP Event – 4.5 Climate Change Scenario – Inundation Extent Map
Figure C5-b	2% AEP Event – 4.5 Climate Change Scenario – Afflux Map
Figure D1	5% AEP Event – Inundation Extent Map
Figure D2	5% AEP Event – Peak Velocities Map
Figure D3	5% AEP Event – Peak Depth Map
Figure D4	5% AEP Event – Hazard Map
Figure D5-a	5% AEP Event – 4.5 Climate Change Scenario – Inundation Extent Map
Figure D5-b	5% AEP Event – 4.5 Climate Change Scenario – Afflux Map
Figure E1	10% AEP Event – Inundation Extent Map
Figure E2	10% AEP Event – Peak Velocities Map
Figure E3	10% AEP Event – Peak Depth Map
Figure E4	10% AEP Event – Hazard Map
Figure E5-a	10% AEP Event – 4.5 climate Change Scenario – Inundation Extent Map
Figure E5-b	10% AEP Event – 4.5 climate Change Scenario – Afflux Map
Figure F	Emergency Response Mapping



Legend

SRRC Boundary

Cadastral Boundary

Notes:

A3 scale 1:200,000

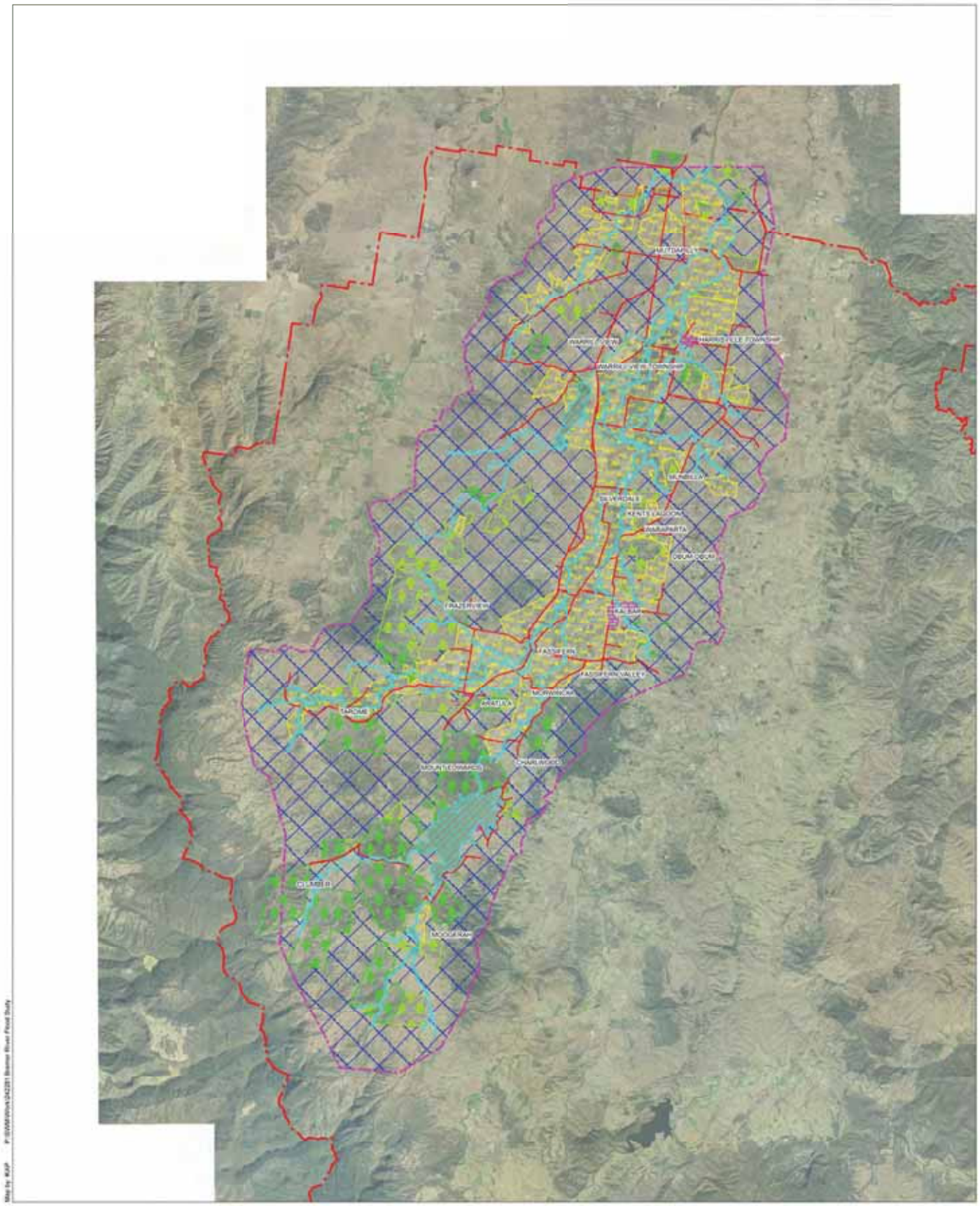
0 5,000 m 10,000 m

Date: 27/10/2014 Version: 2 Job No: 242281

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure A1**

Model Topography



A3 scale 1:200,000

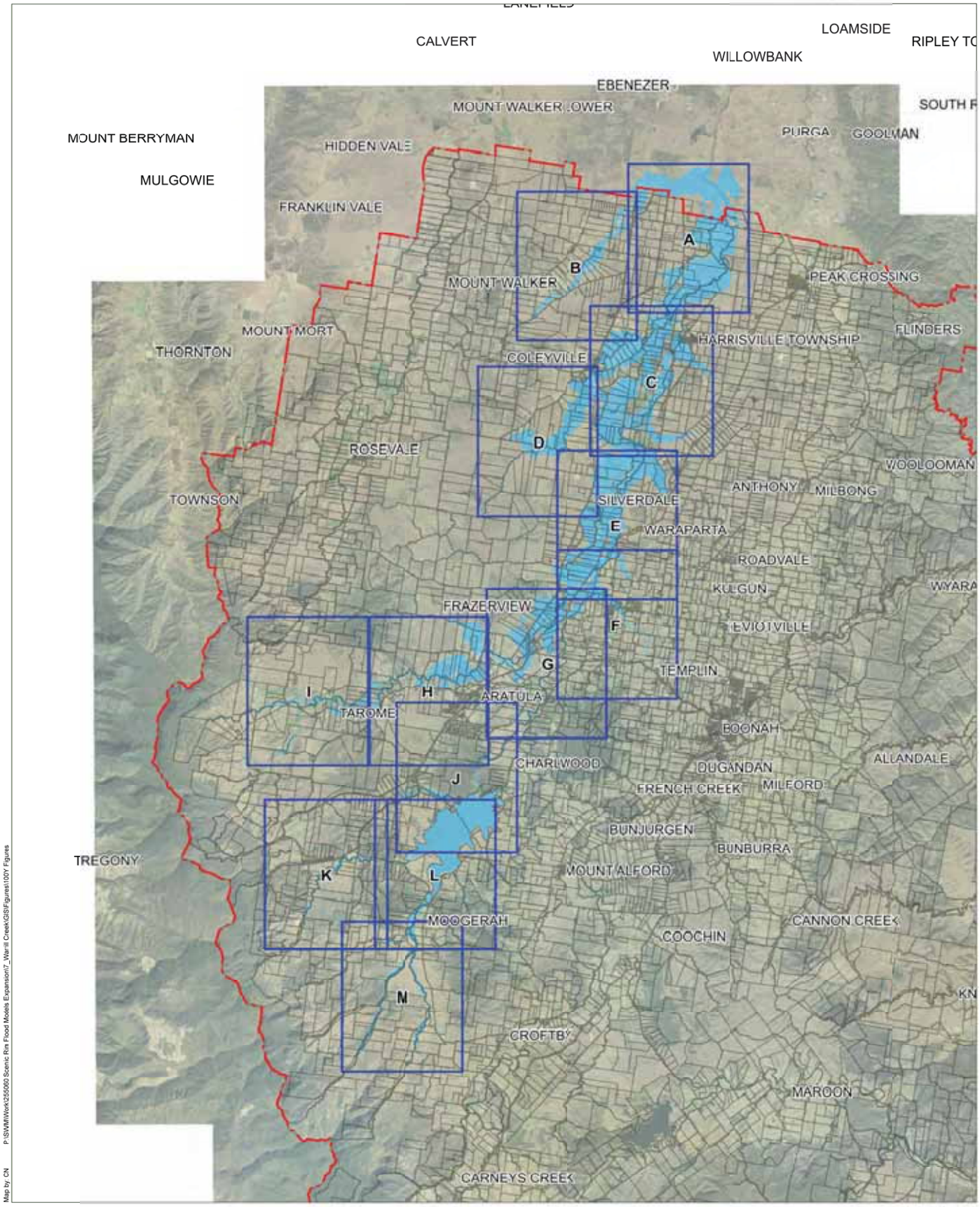
0 5,000 m 10,000 m

Date: 27/10/2014 Version: 2 Job No: 242281

Projection: MGA Zone 55

Warrill Creek Flood Study **Figure A2**

Roughness Values



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\100Y Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:200,000

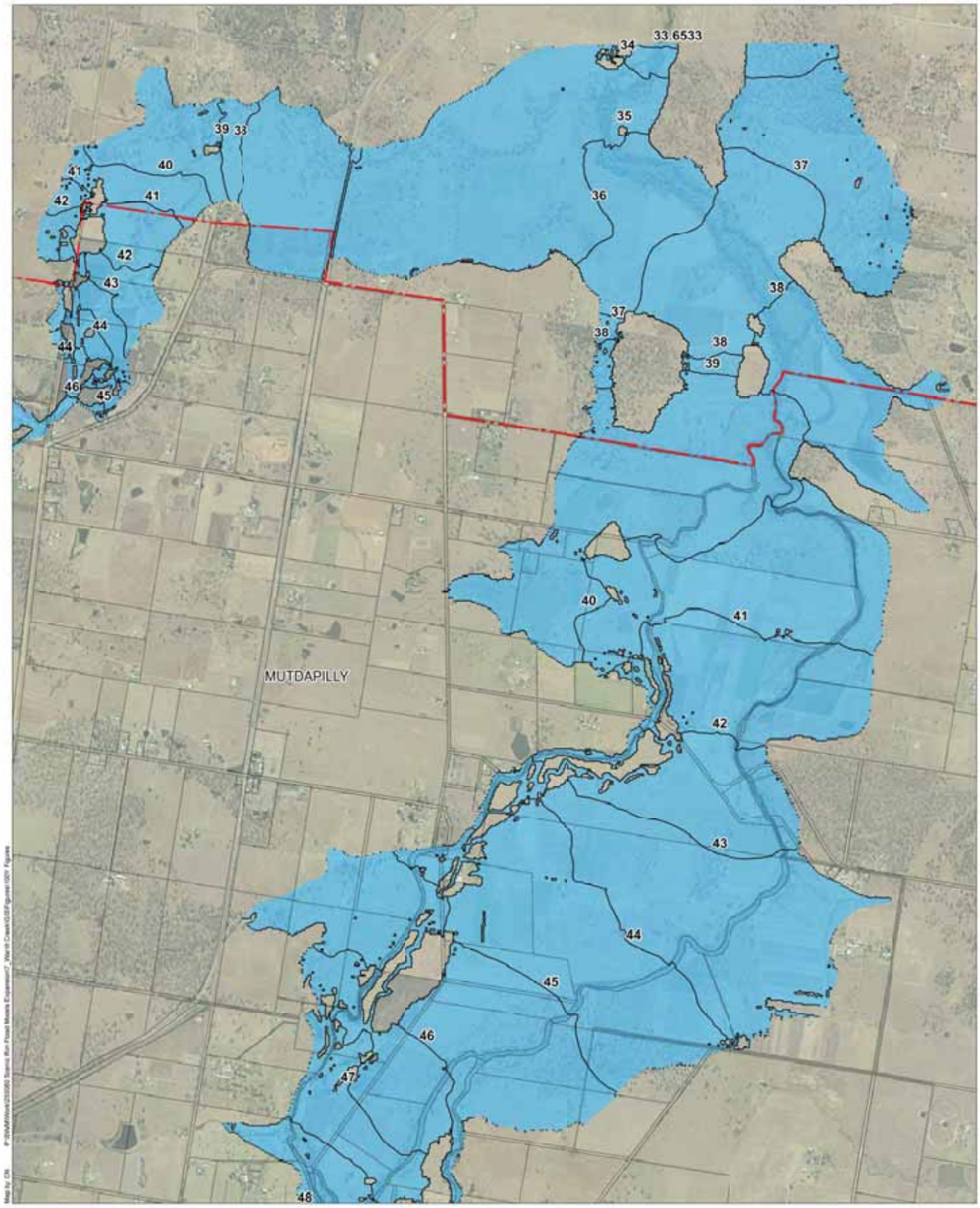
0 5,000 m 10,000 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1**

1% AEP Event - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

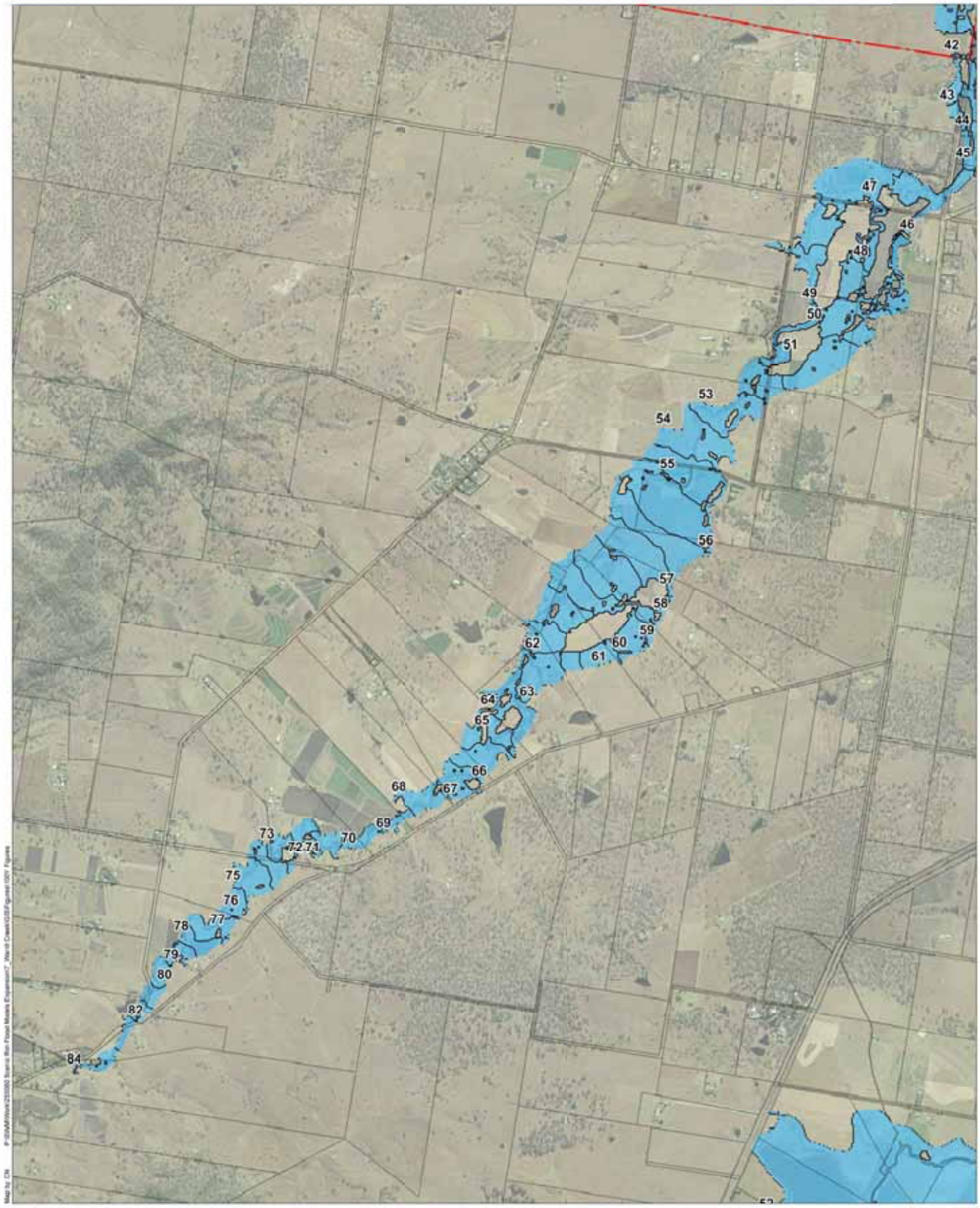
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-a**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

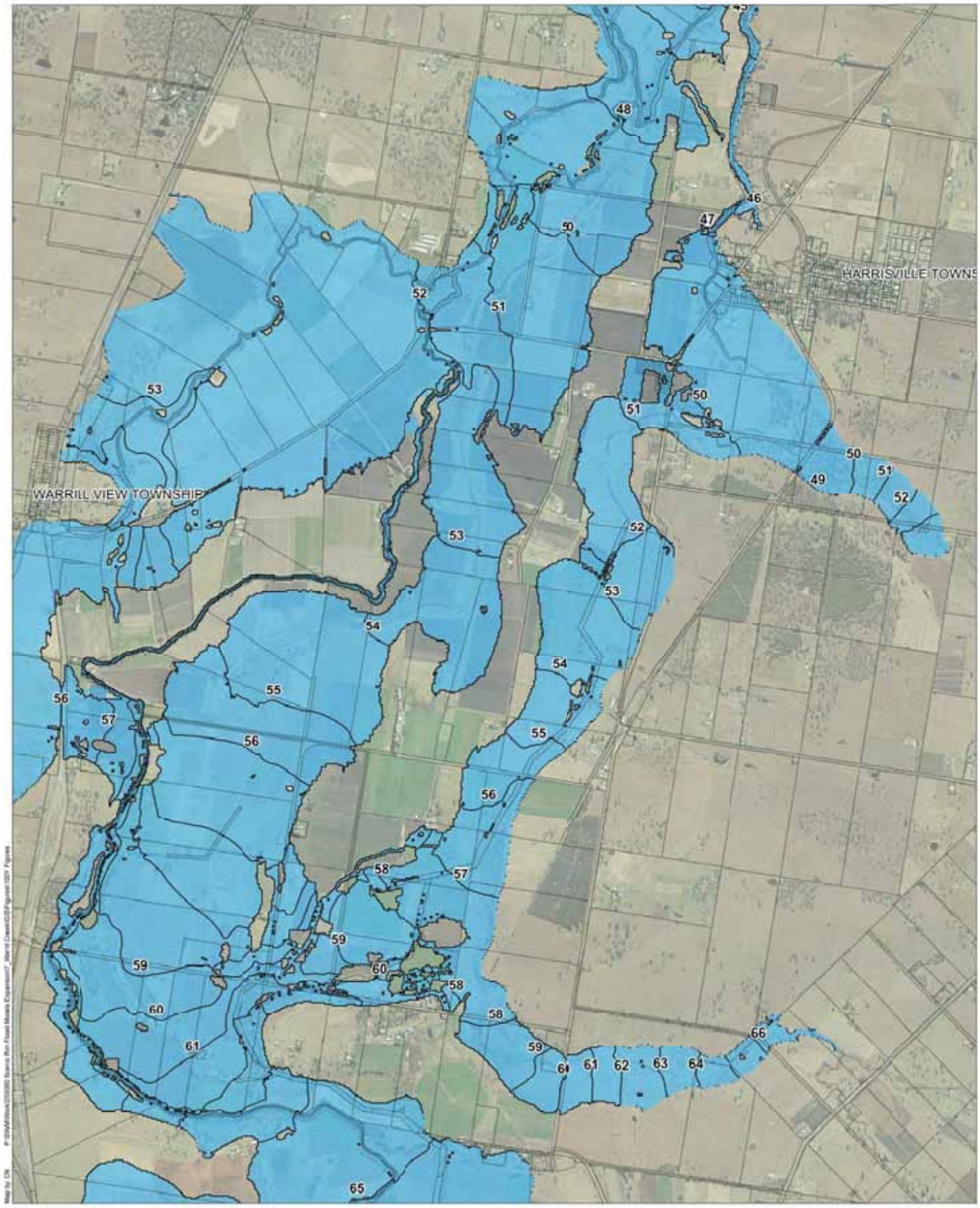
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-b**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

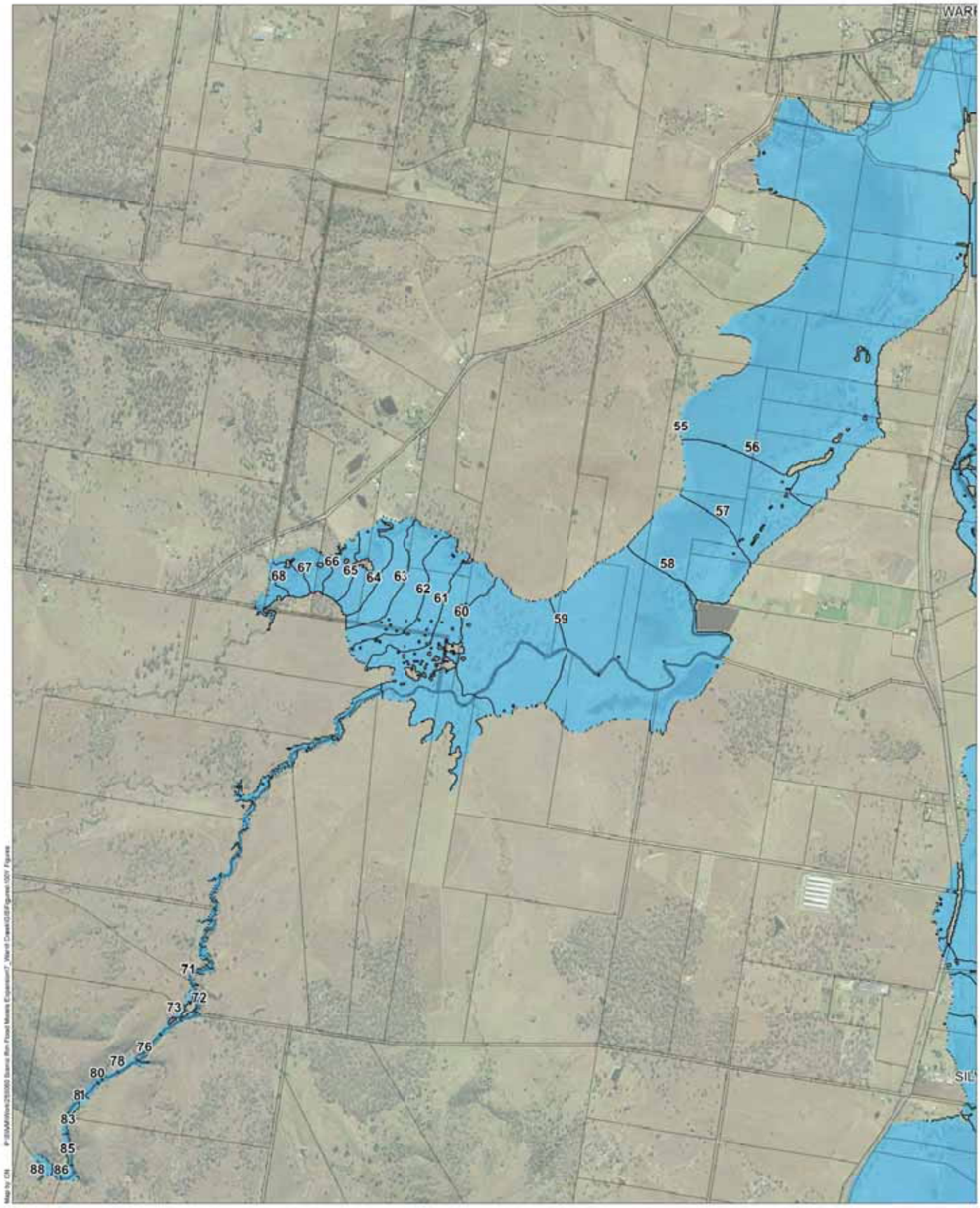
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-c**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

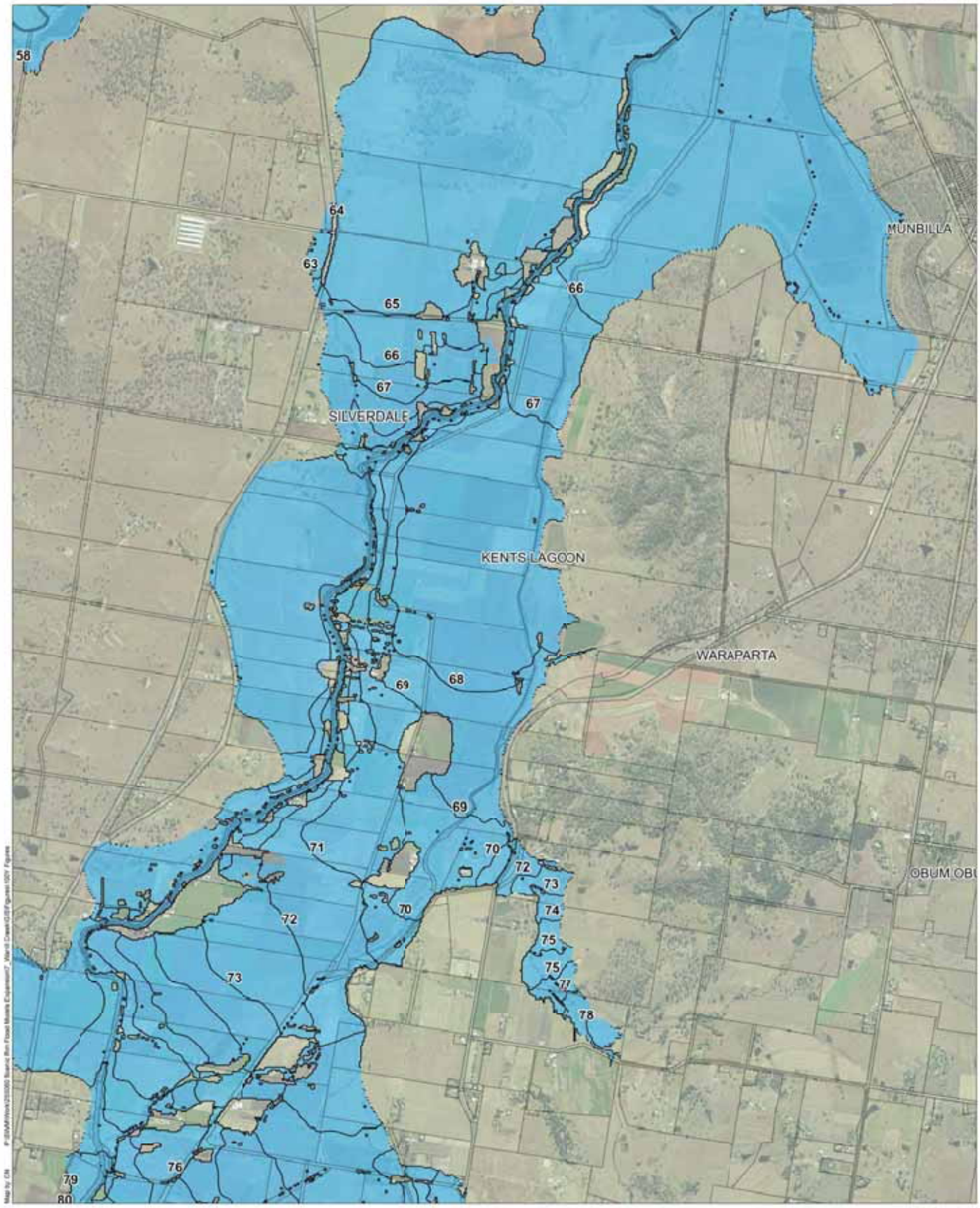
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-d**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

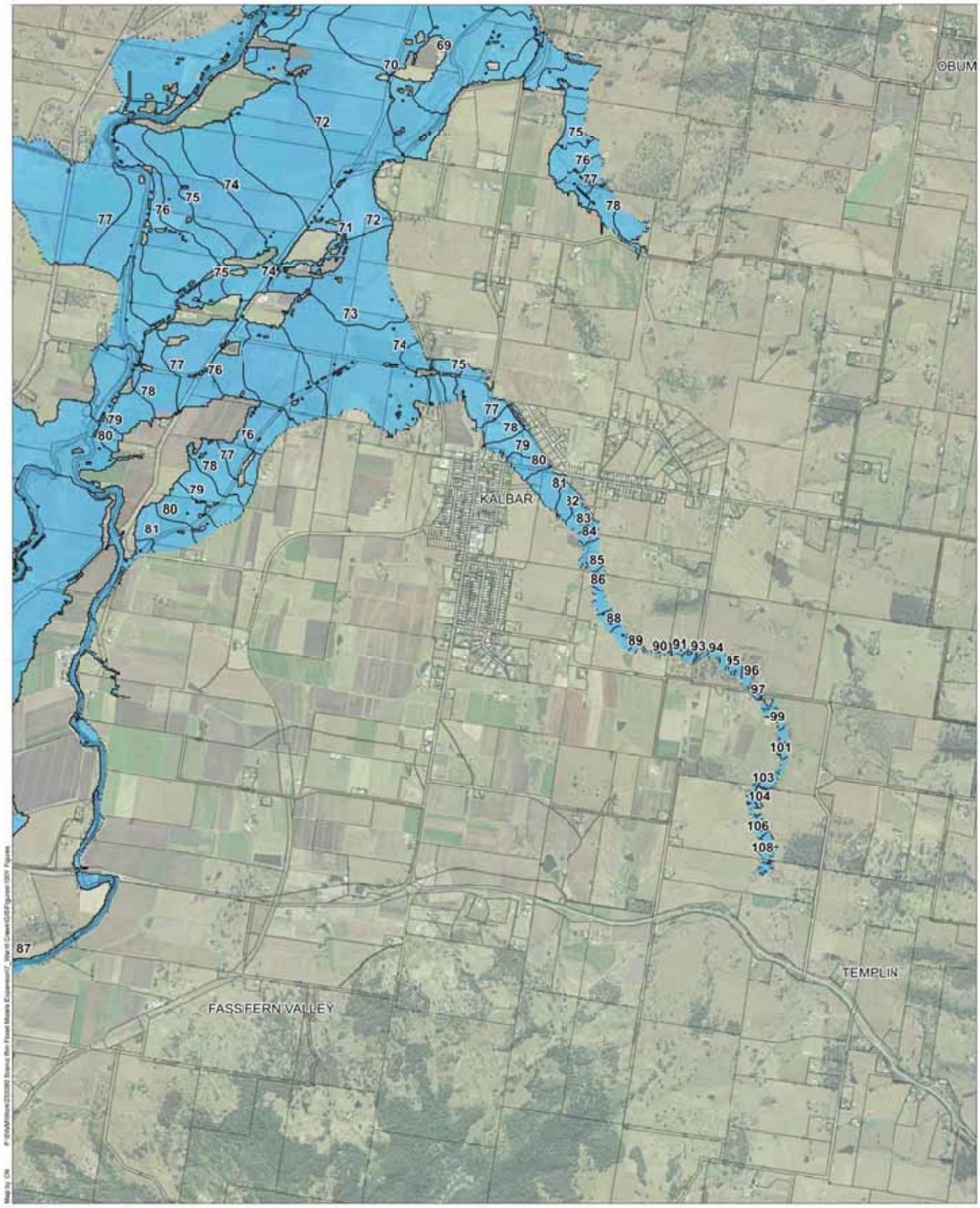
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B1-e

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

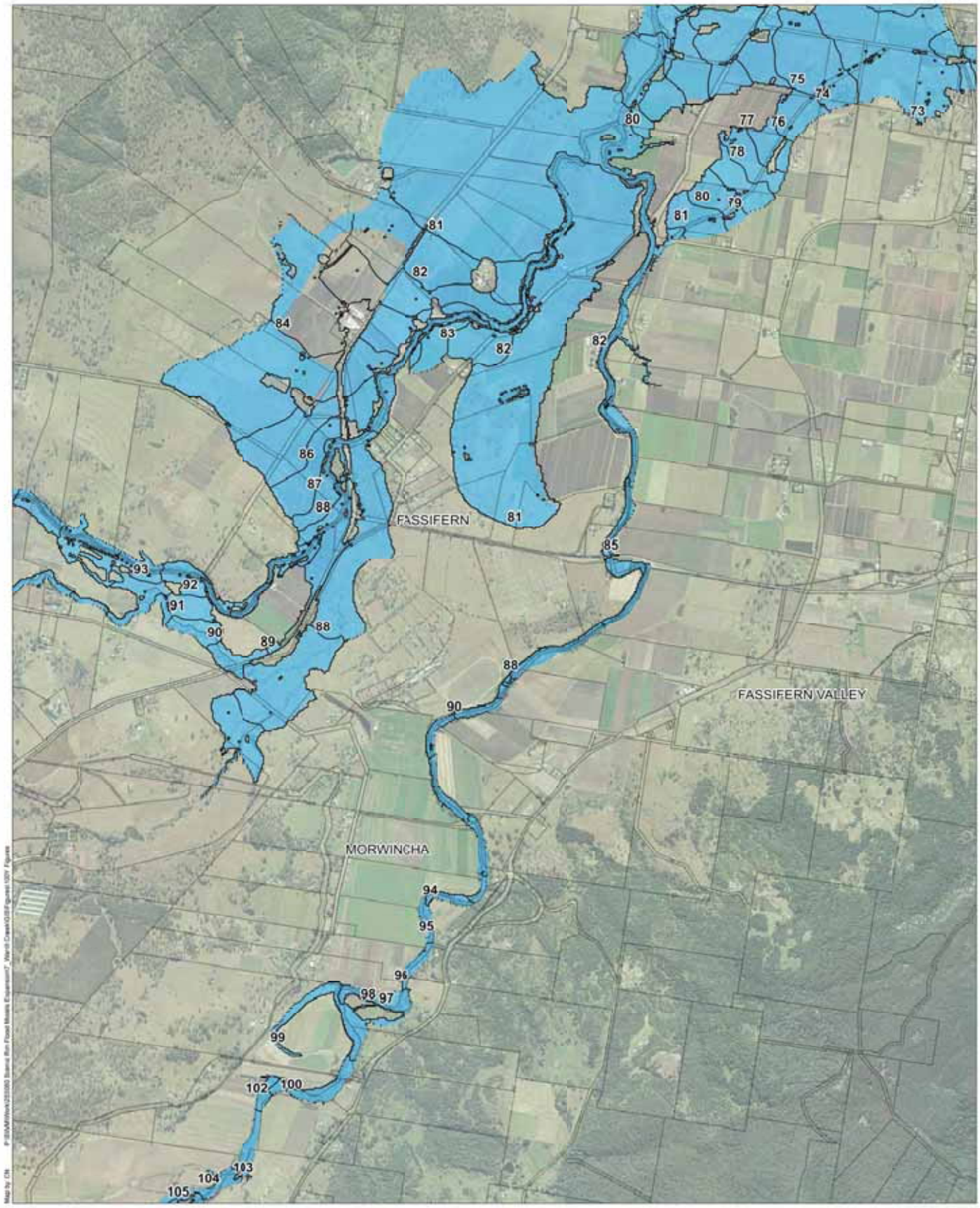
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B1-f

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

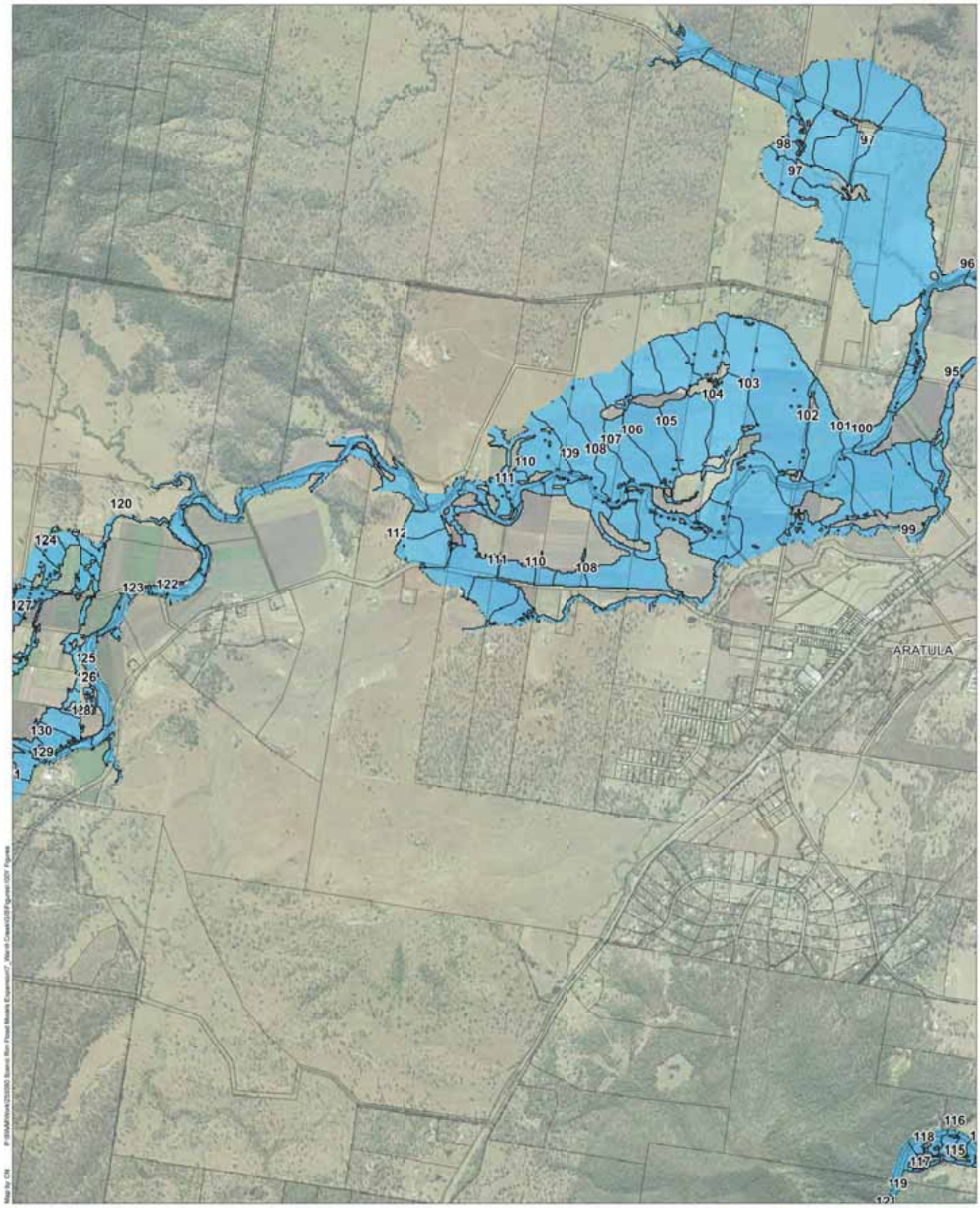
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-g**

1% AEP Event - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

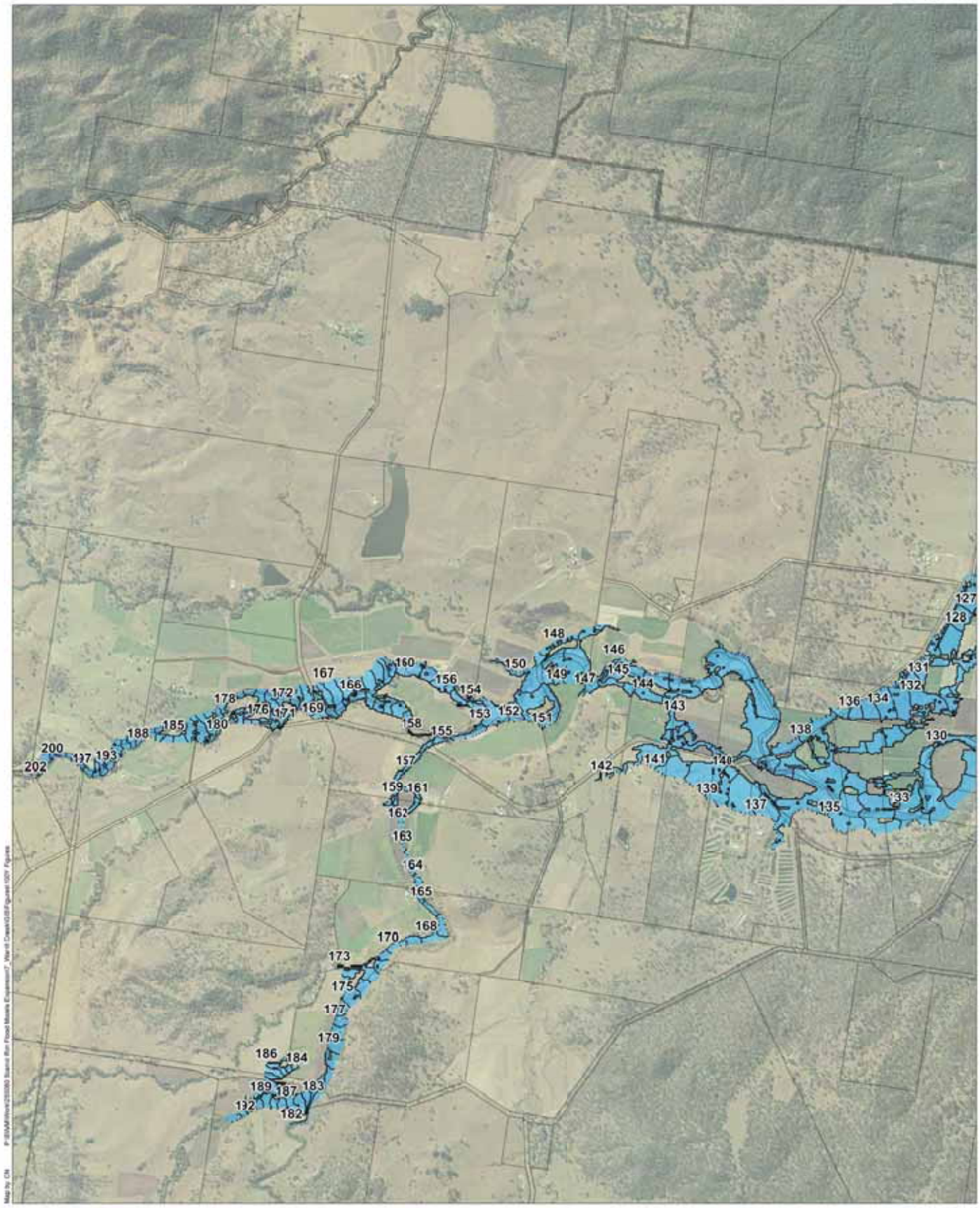
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-h**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

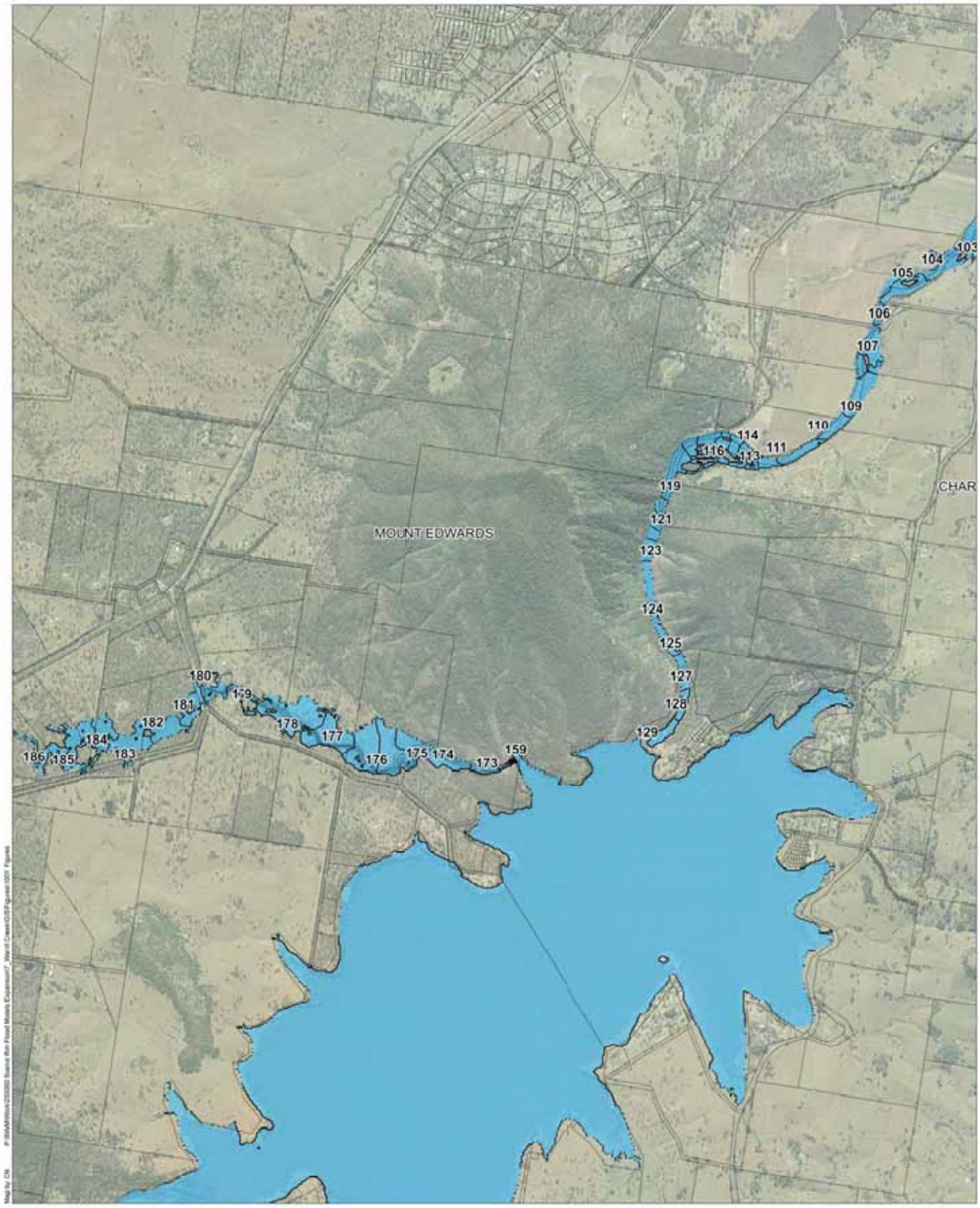
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-i**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

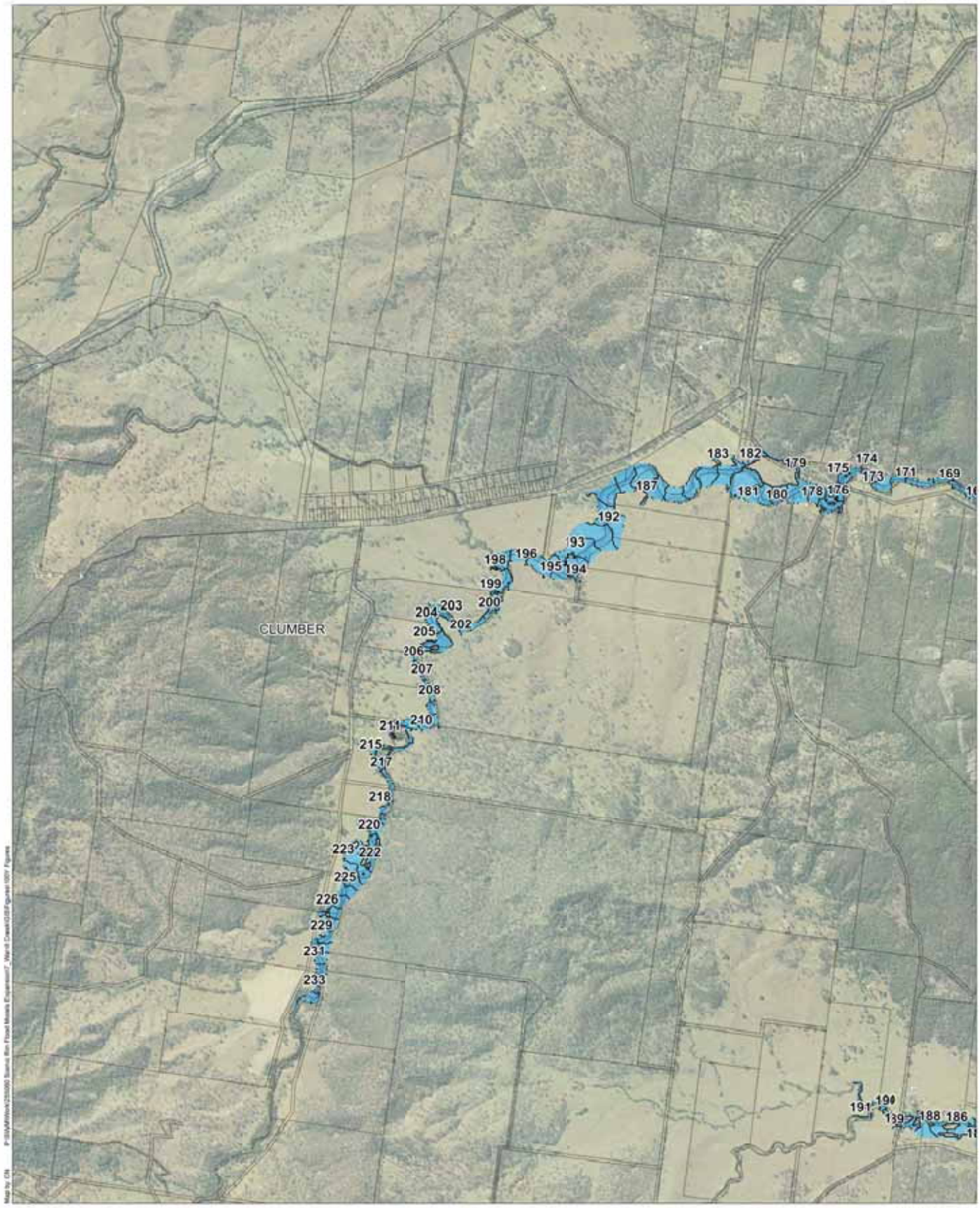
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-j**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

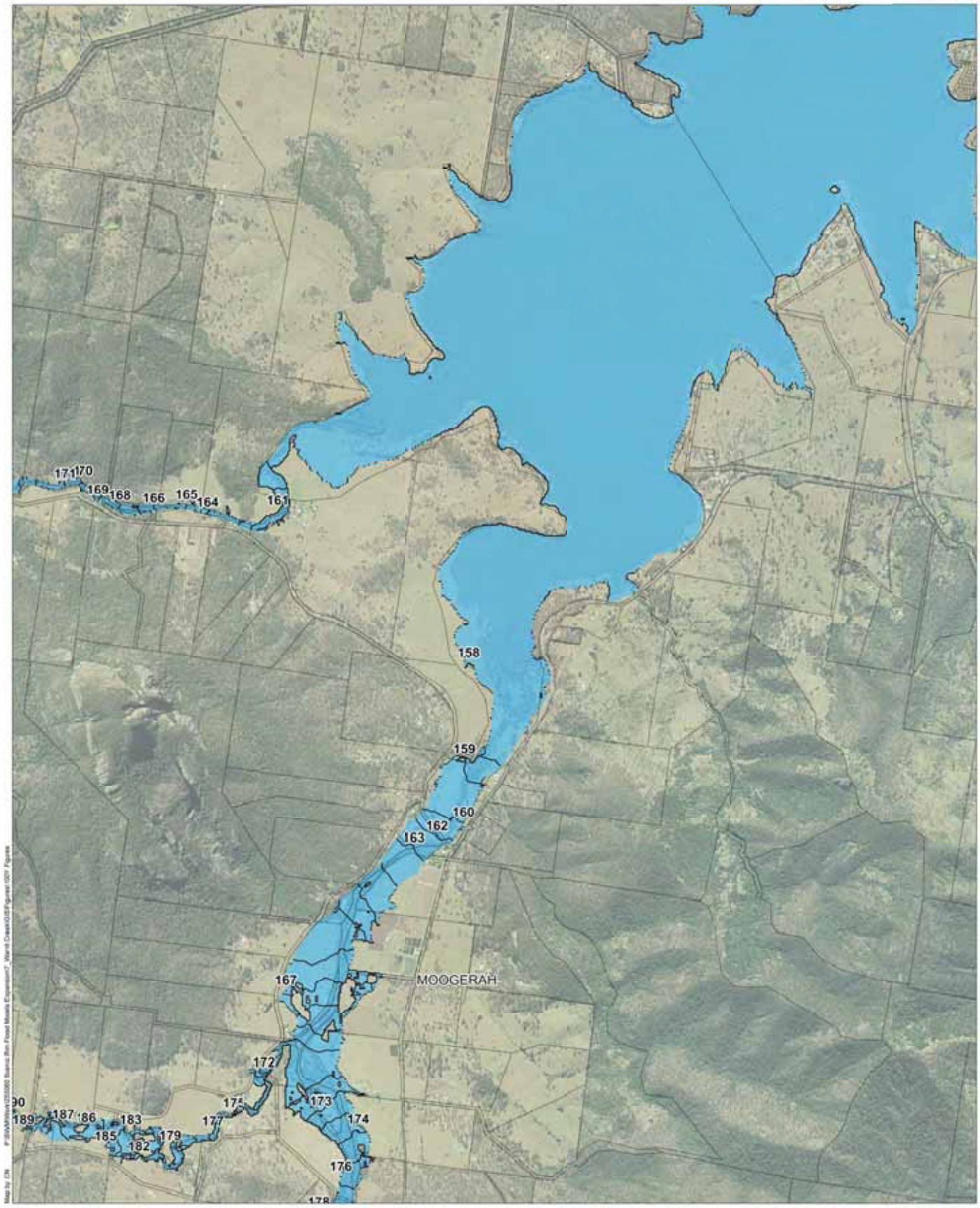
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-k**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

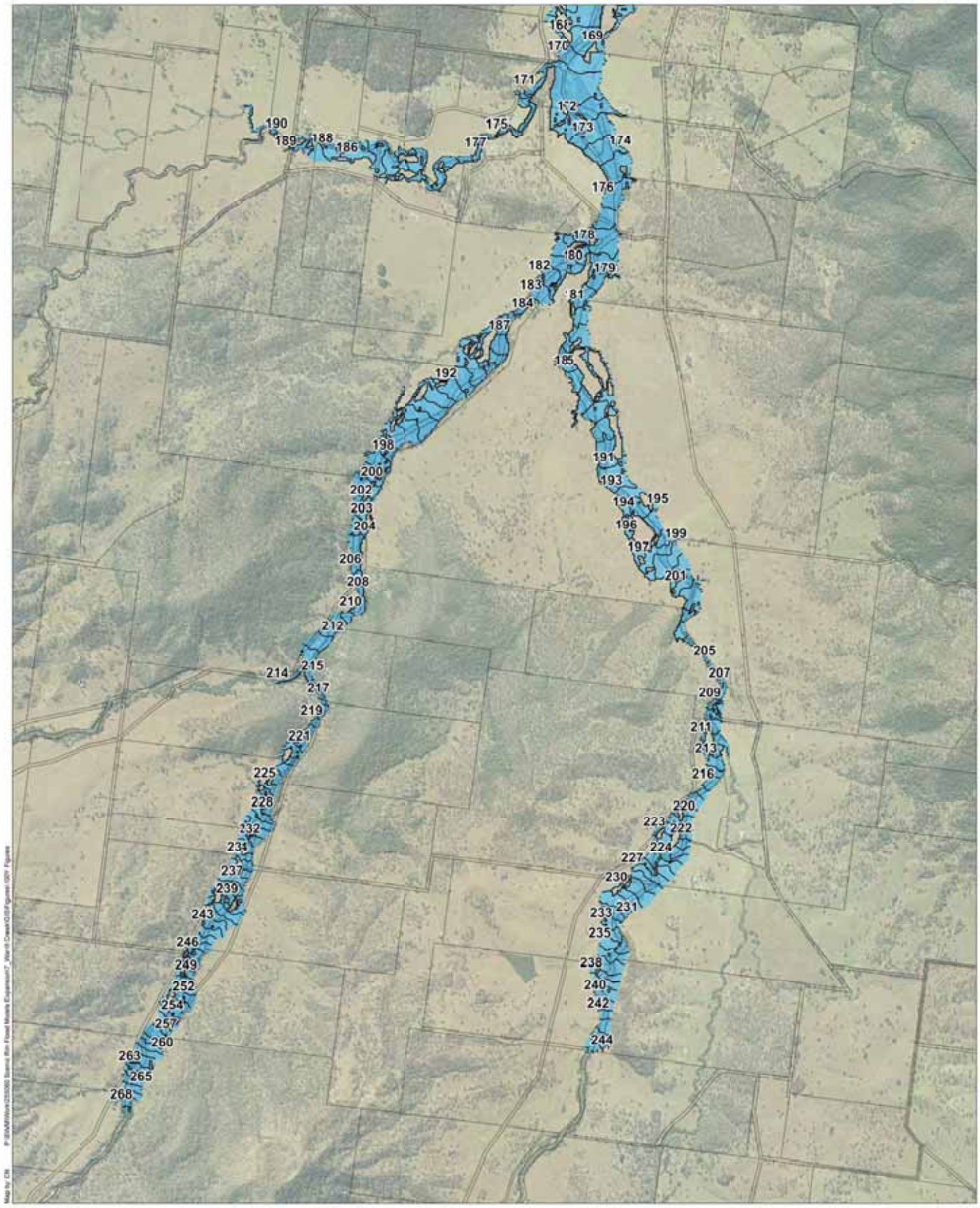
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B1-I**

1% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

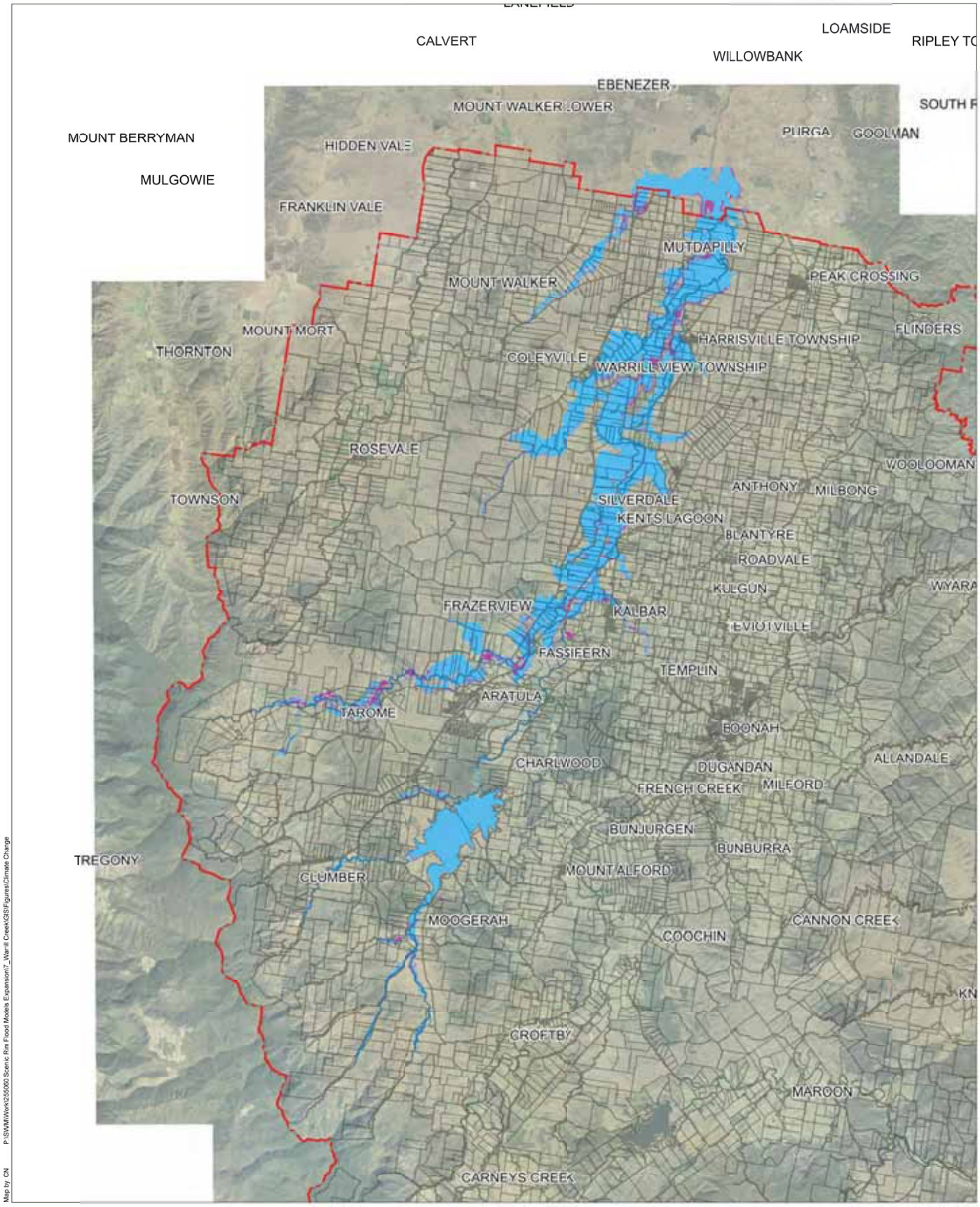
0 625 m 1,250 m

Date: 01/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

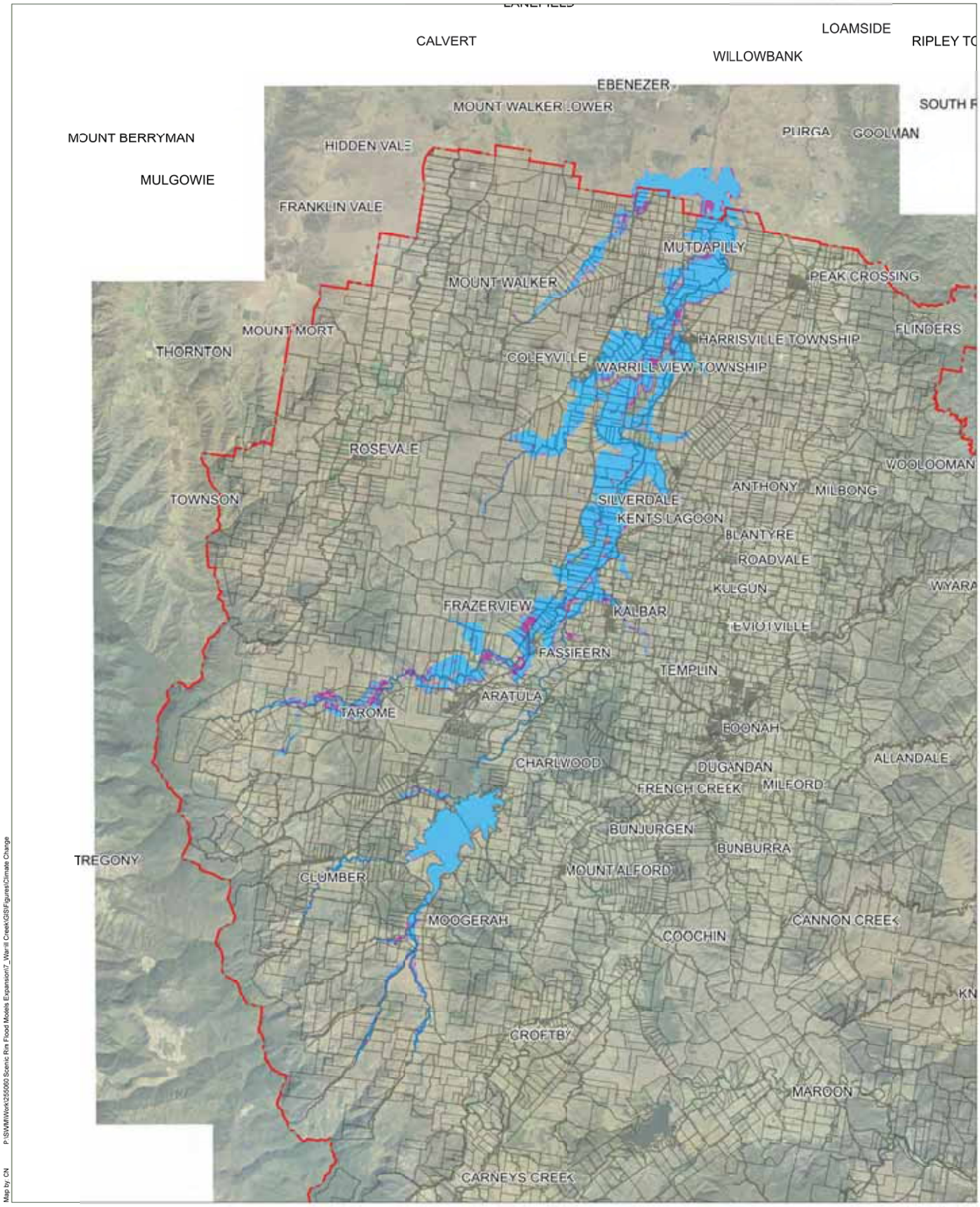
Warrill Creek Flood Study Figure B1-m

1% AEP Event - Inundation Extent



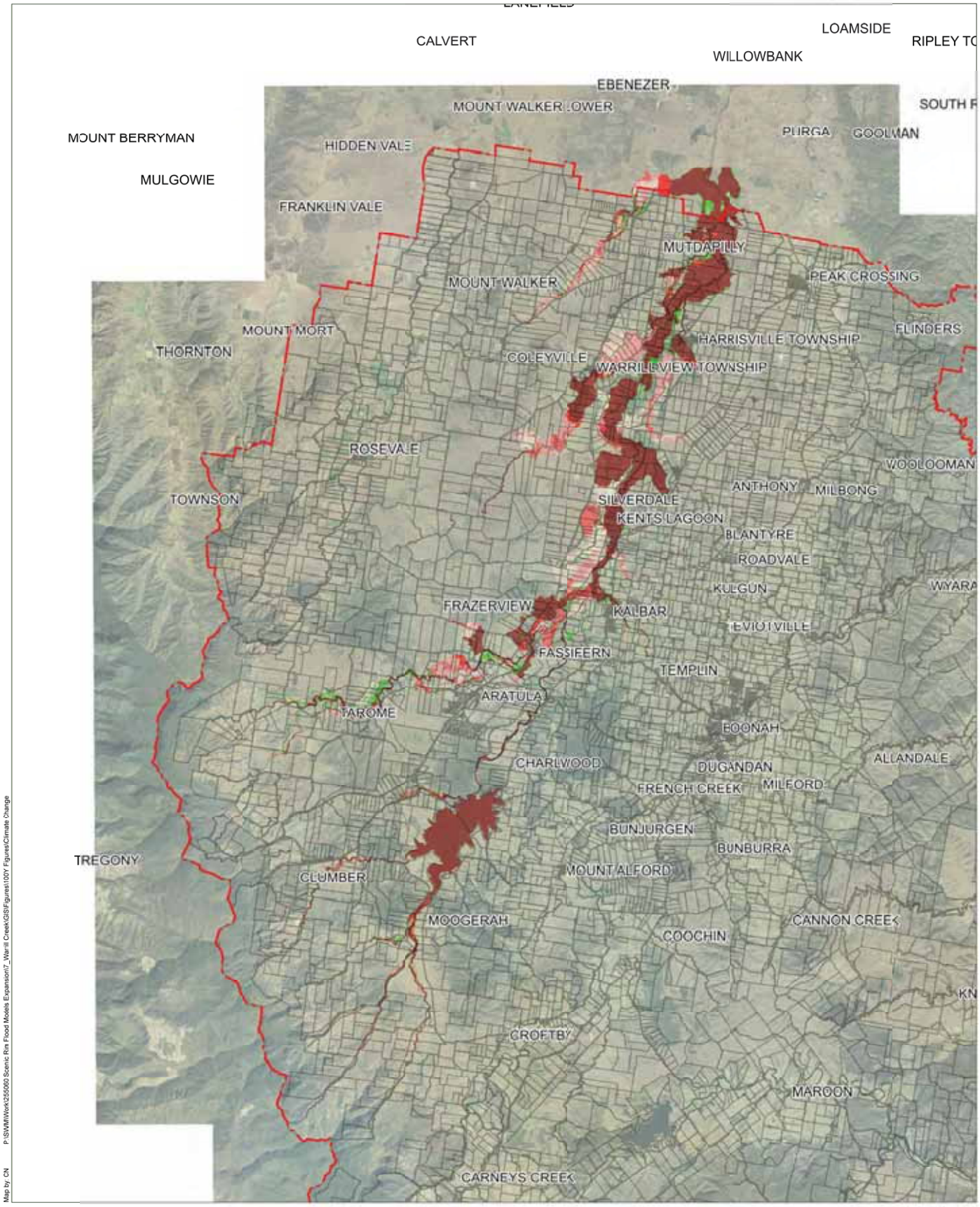
Warrill Creek Flood Study **Figure B2 - a**

Climate Change Scenario 4.5 - 1% AEP Event Inundation Extent



Warrill Creek Flood Study **Figure B2 - b**

Climate Change Scenario 8.5 - 1% AEP Event Inundation Extent



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\100Y Figures\Climate Change

Legend

- SRRC Boundary
- Cadastral Boundary

Afflux (m)

< -0.80	0.03 to 0.20
-0.80 to -0.60	0.20 to 0.40
-0.60 to -0.40	0.40 to 0.60
-0.40 to -0.20	0.60 to 0.80
-0.20 to -0.03	0.80 to 1.20
-0.03 to 0.03	> 1.20

Notes:

1:200,000

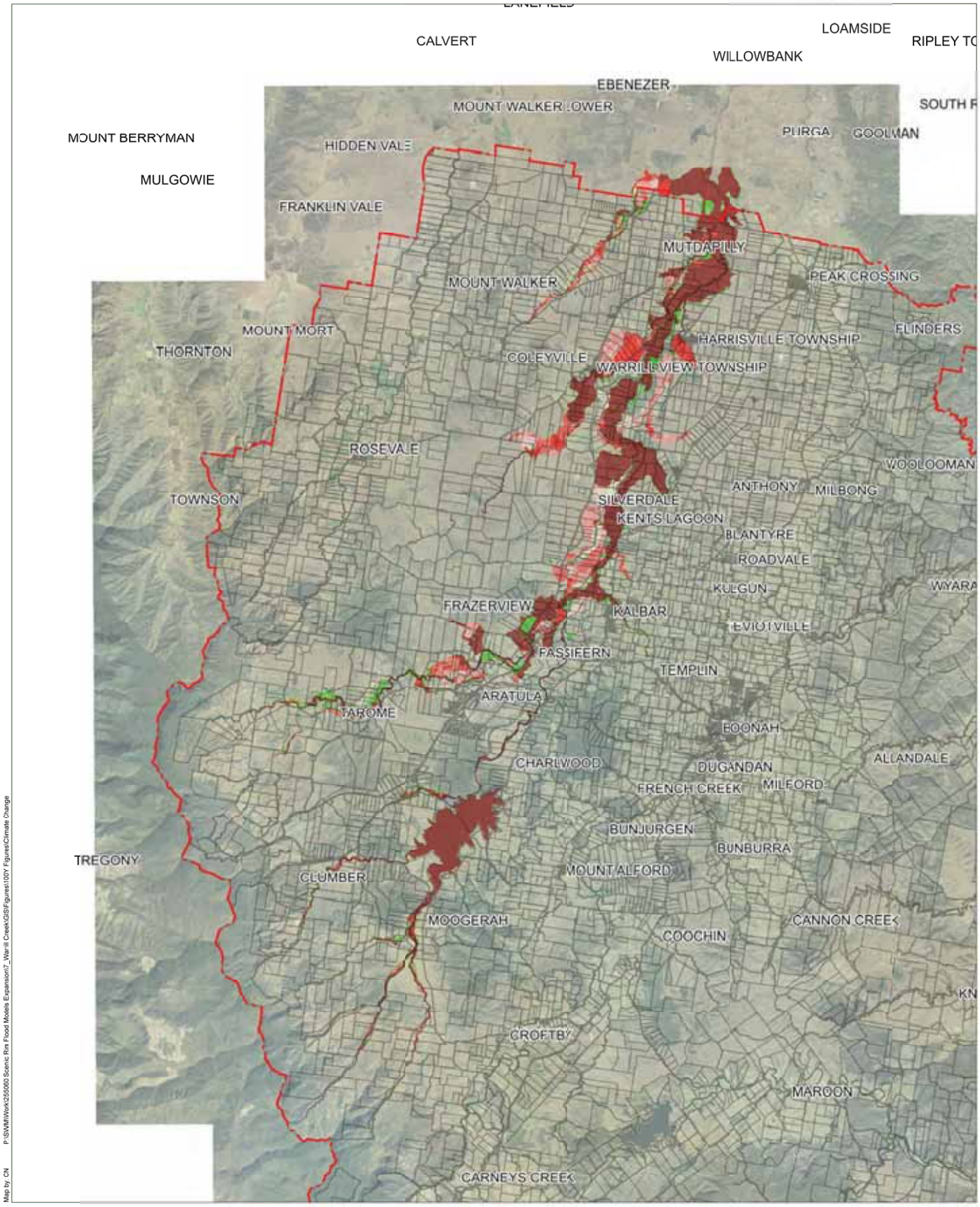
0 5,000 m 10,000 m

Date: 08/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B3-a**

Climate Change Scenario 4.5 - 1% AEP Event Afflux Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\100Y Figures\Climate Change

Legend

- SRRC Boundary
- Cadastral Boundary

Afflux (m)

< -0.80	0.03 to 0.20
-0.80 to -0.60	0.20 to 0.40
-0.60 to -0.40	0.40 to 0.60
-0.40 to -0.20	0.60 to 0.80
-0.20 to -0.03	0.80 to 1.20
-0.03 to 0.03	> 1.20

Notes:

1:200,000

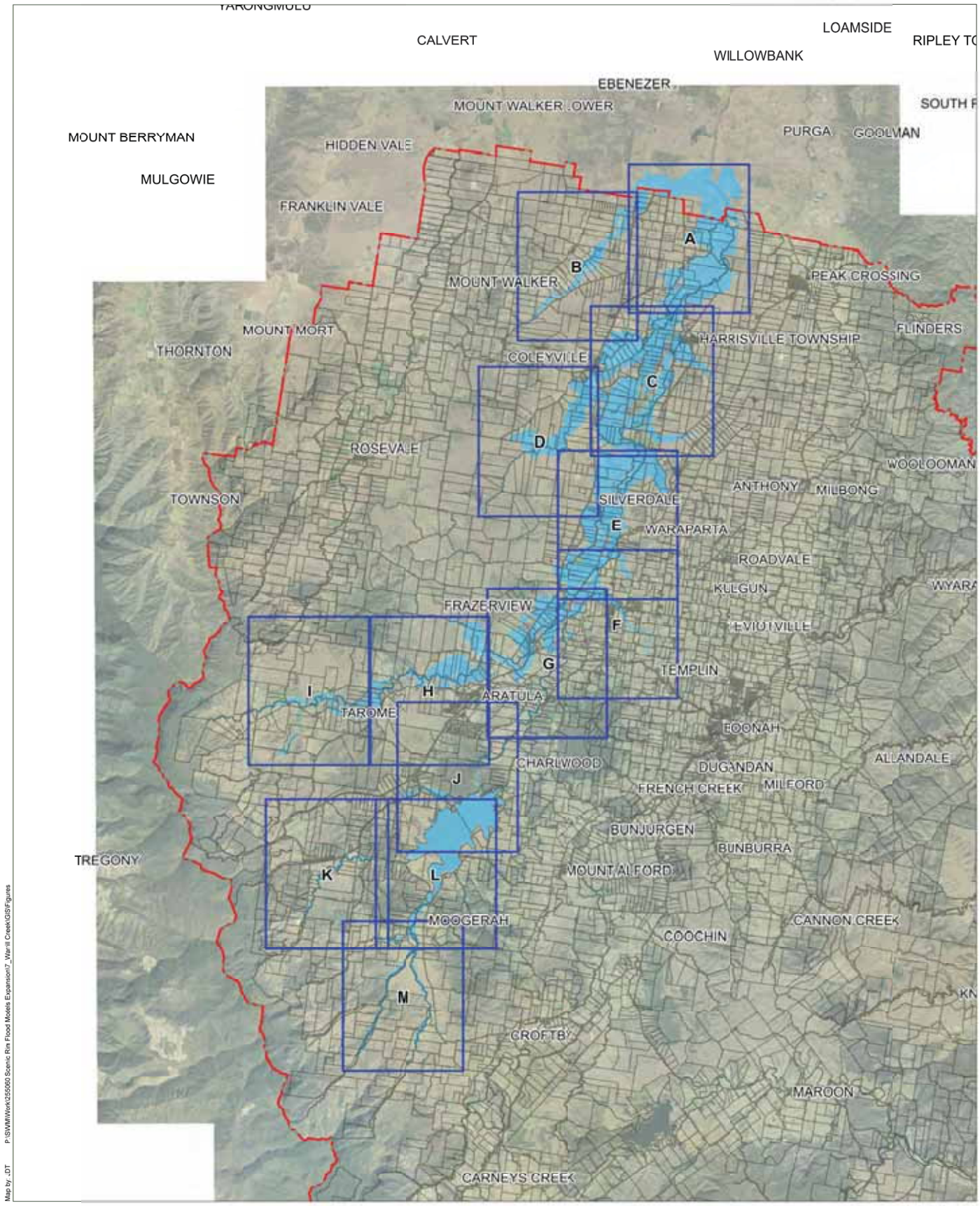
0 5,000 m 10,000 m

Date: 08/09/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B3-b**

Climate Change Scenario 8.5 - 1% AEP Event Afflux Map



Map by: JDT P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:200,000

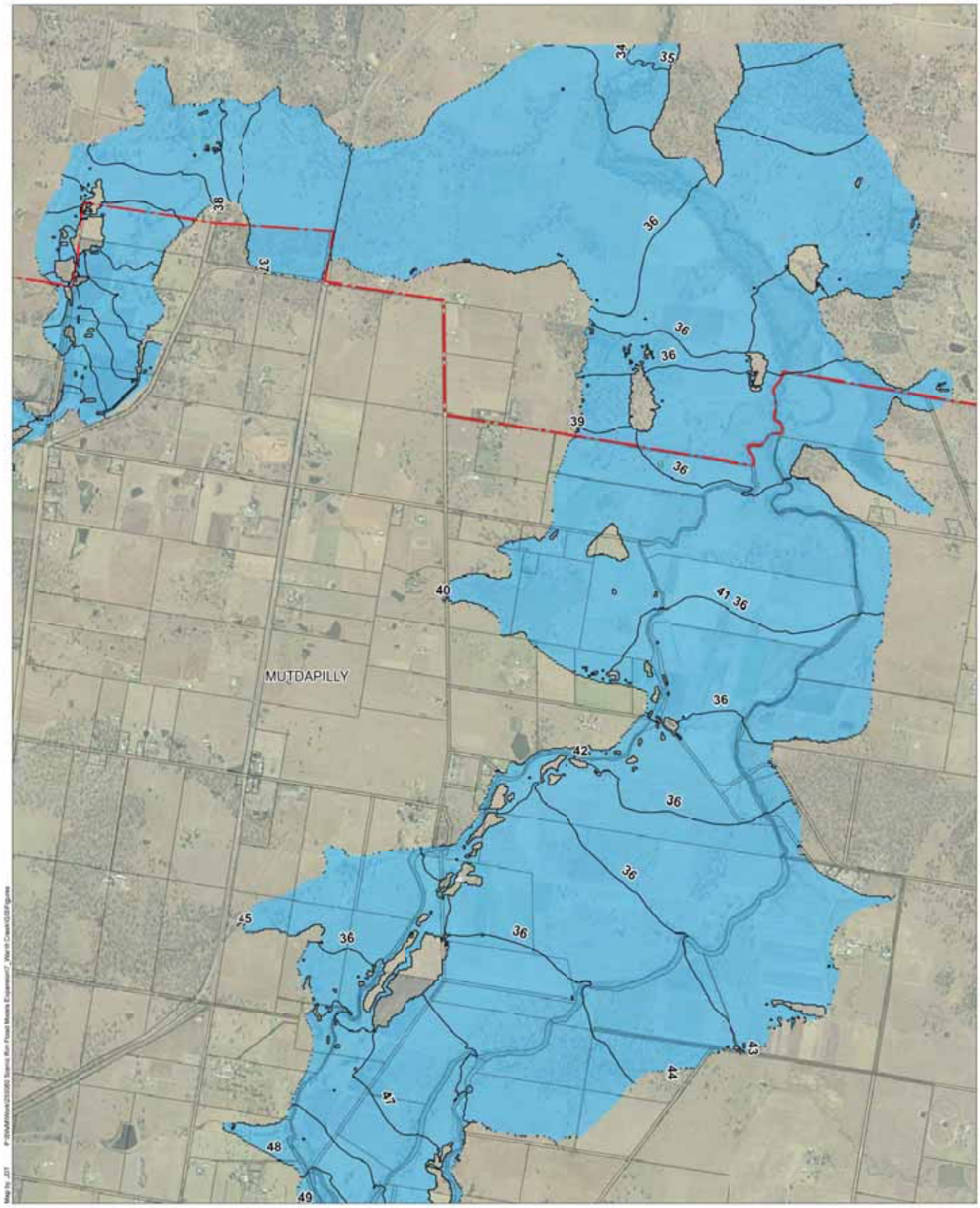
0 5,000 m 10,000 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

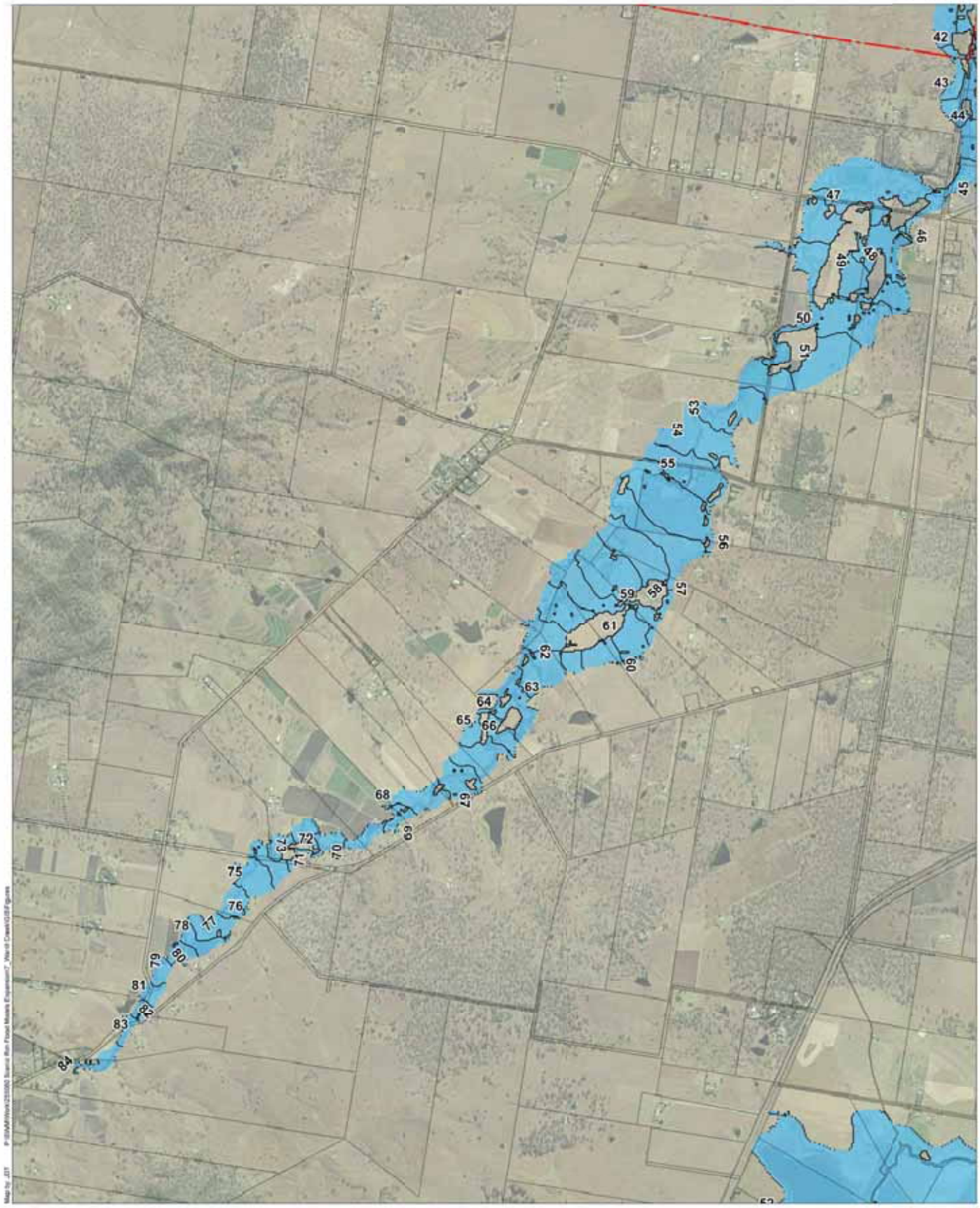
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-a**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

0 625 m 1,250 m

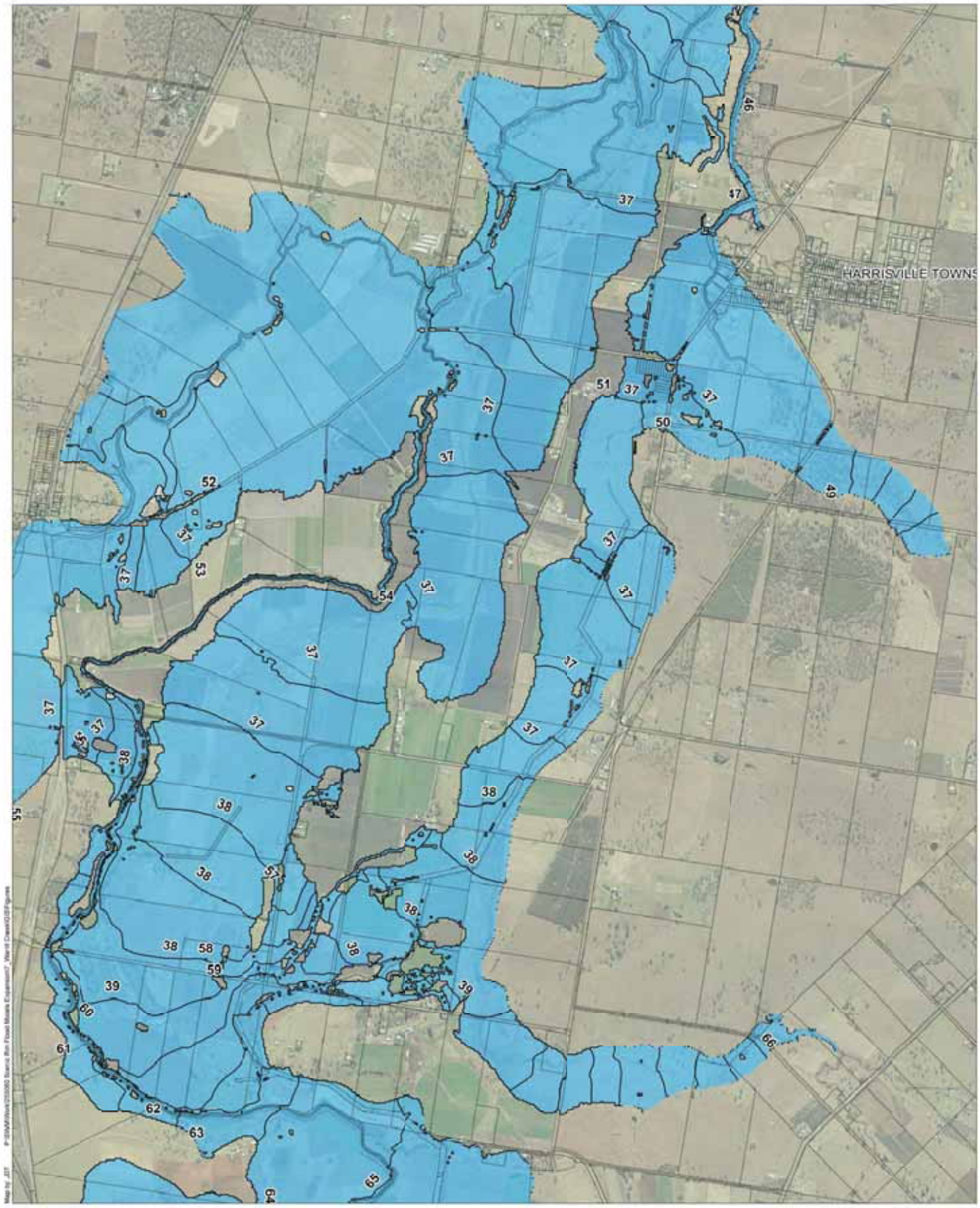
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-b**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

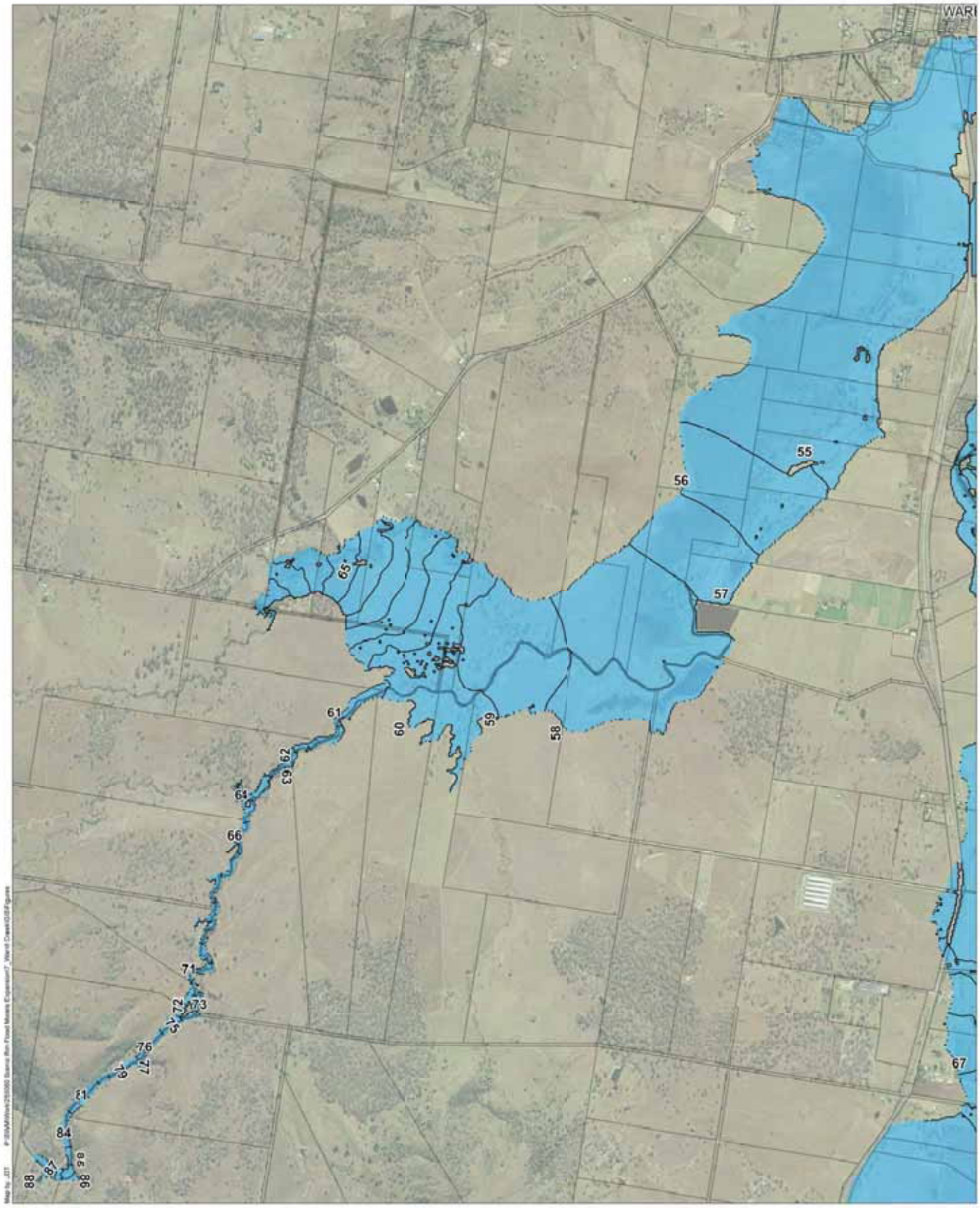
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-c**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

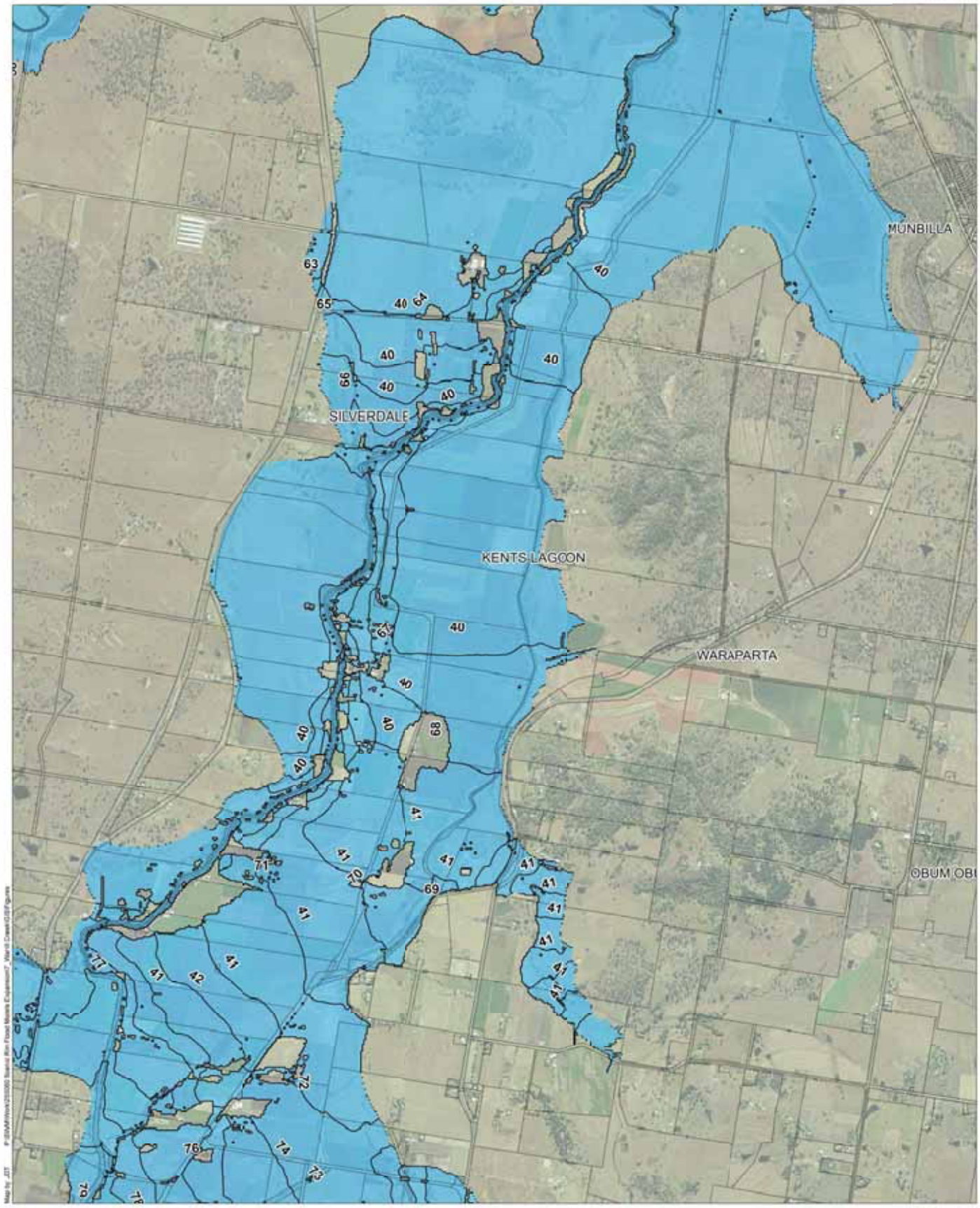
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-d**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

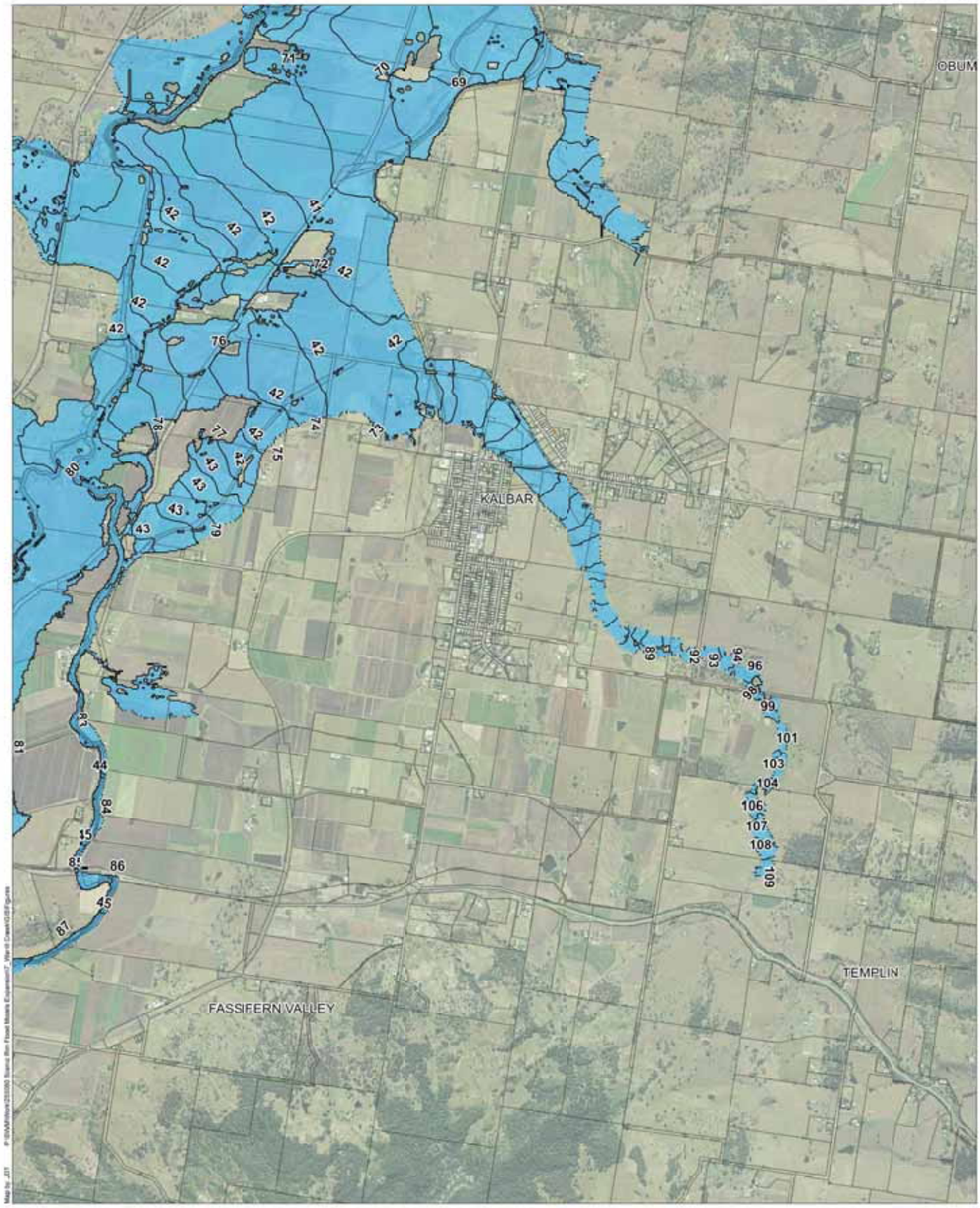
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-e**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

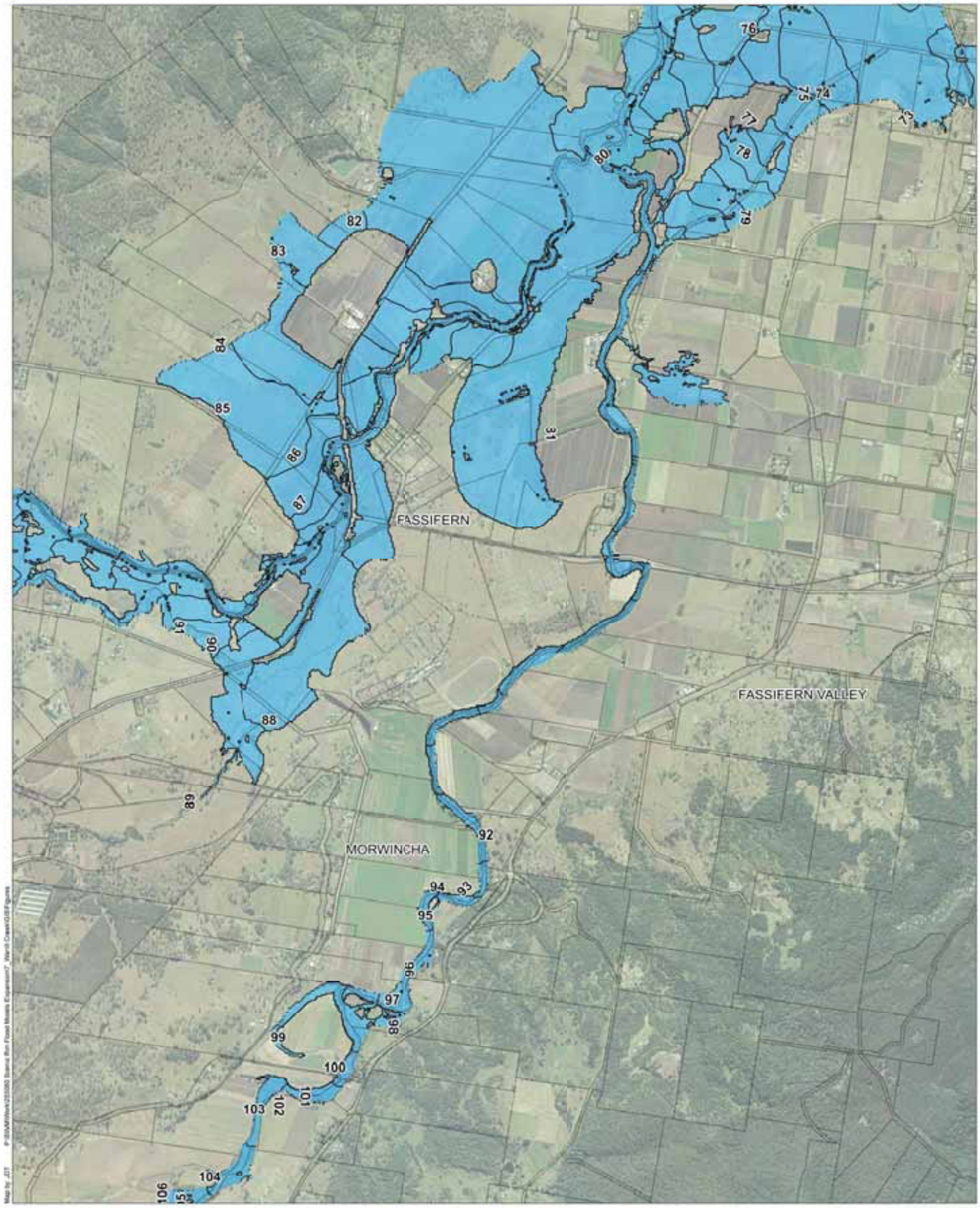
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-f**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

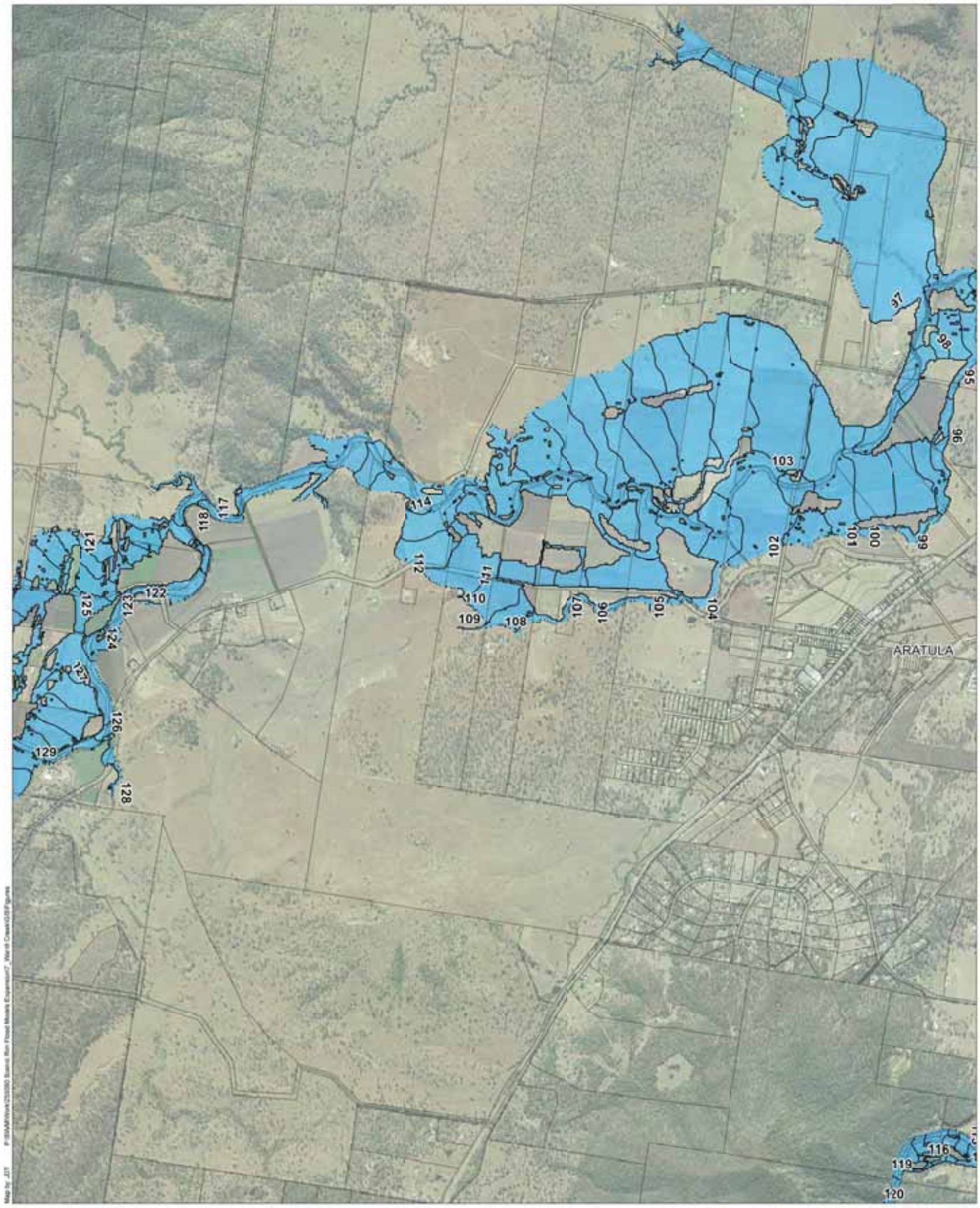
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-g**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

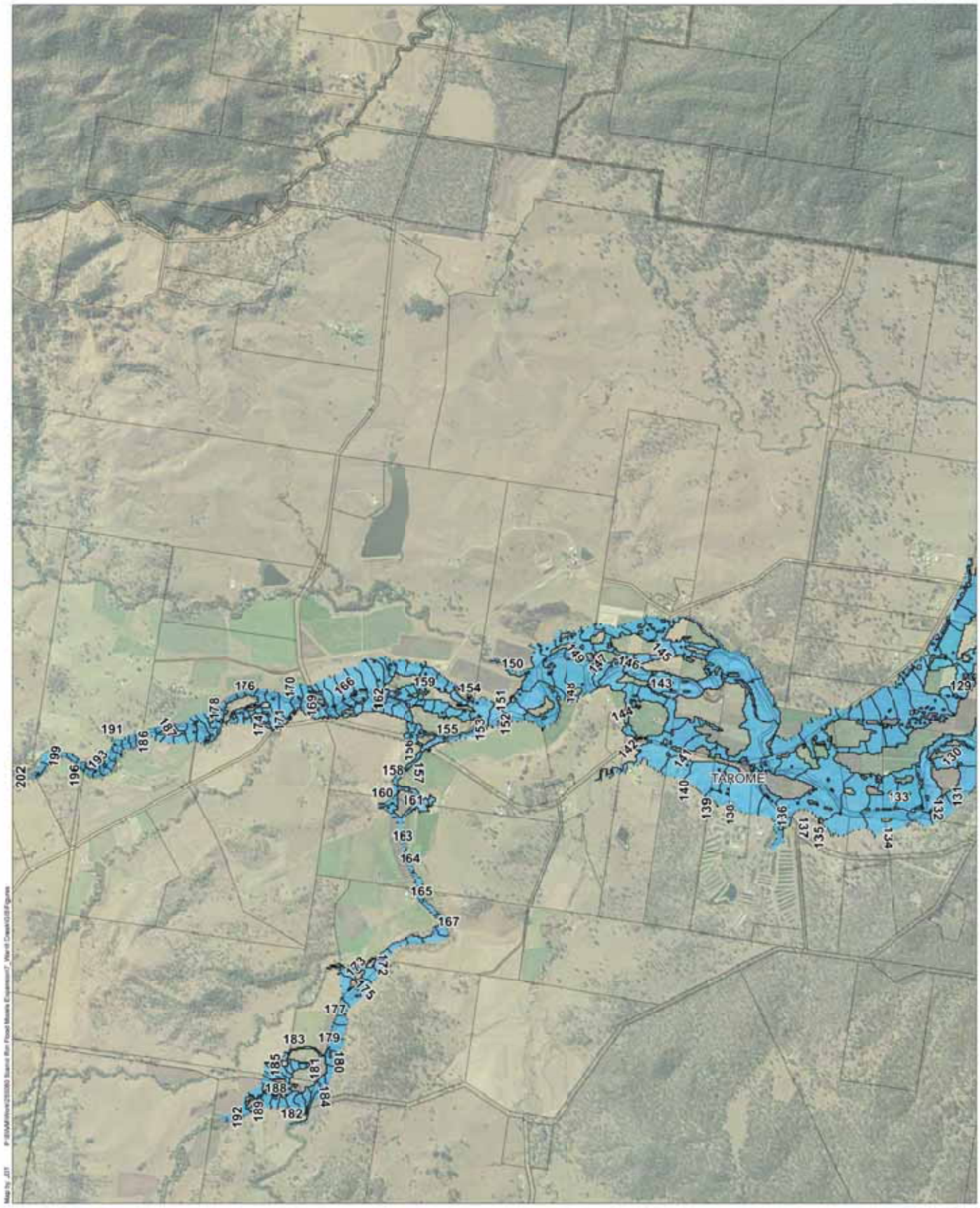
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B4-h

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

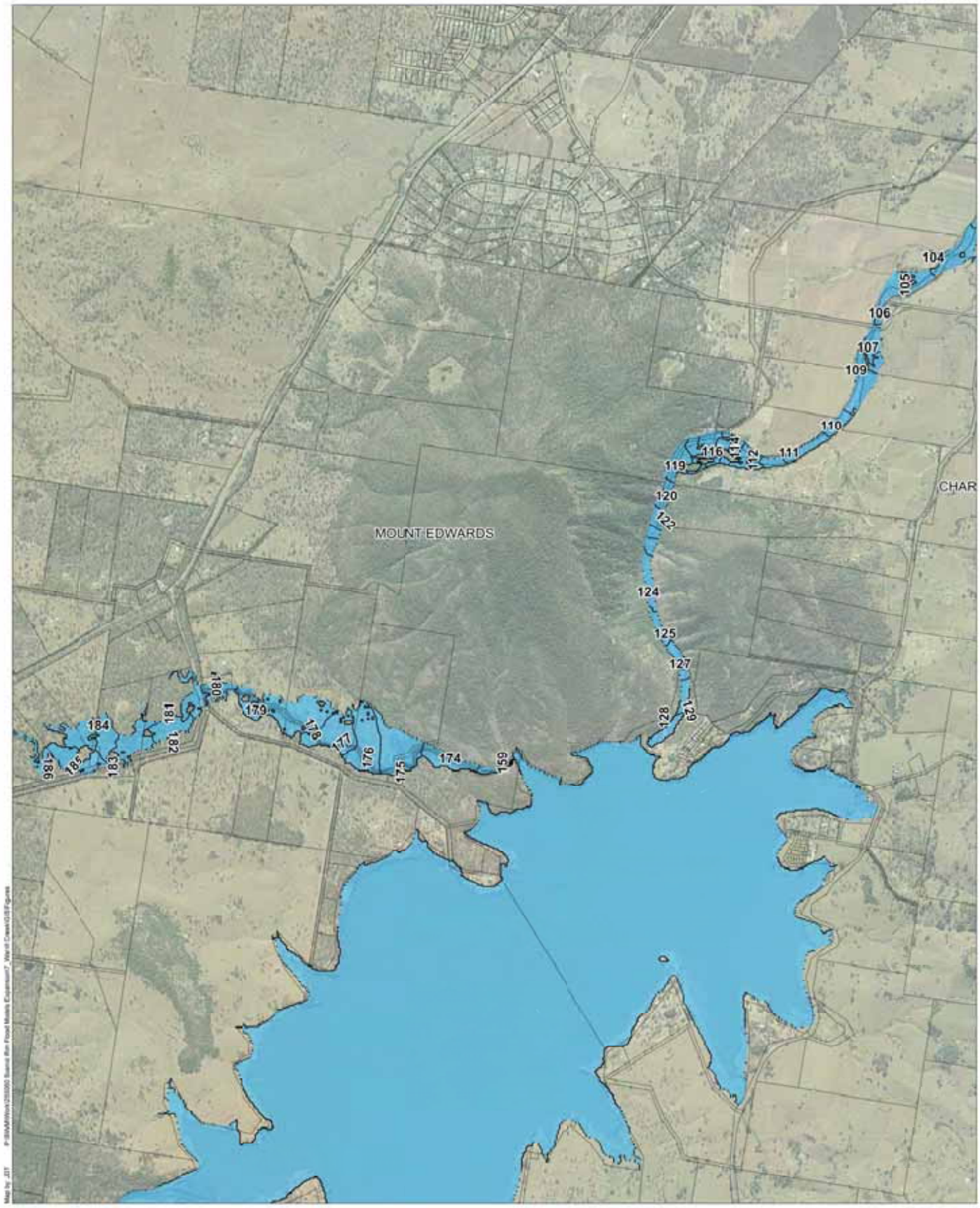
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-i**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

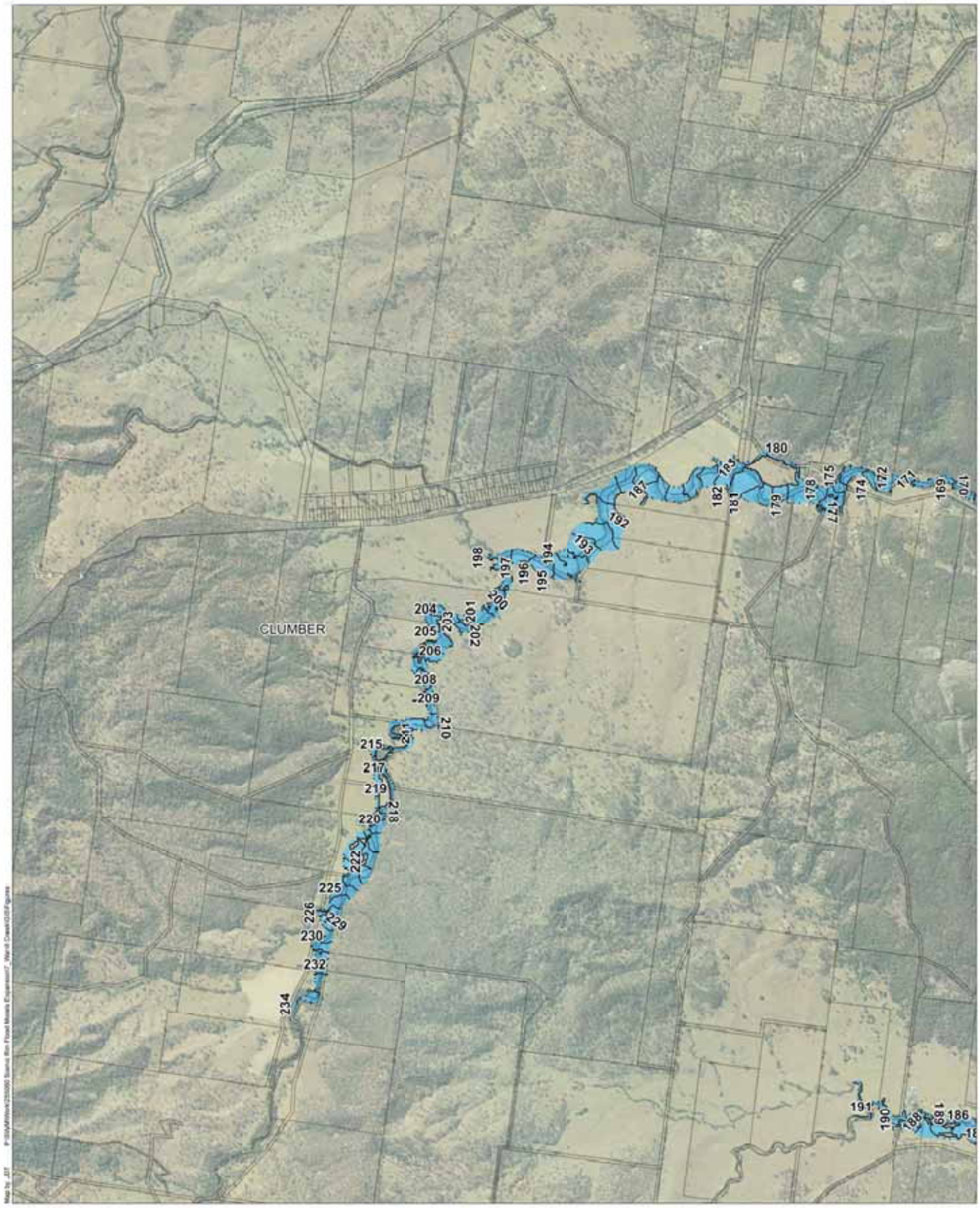
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-j**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

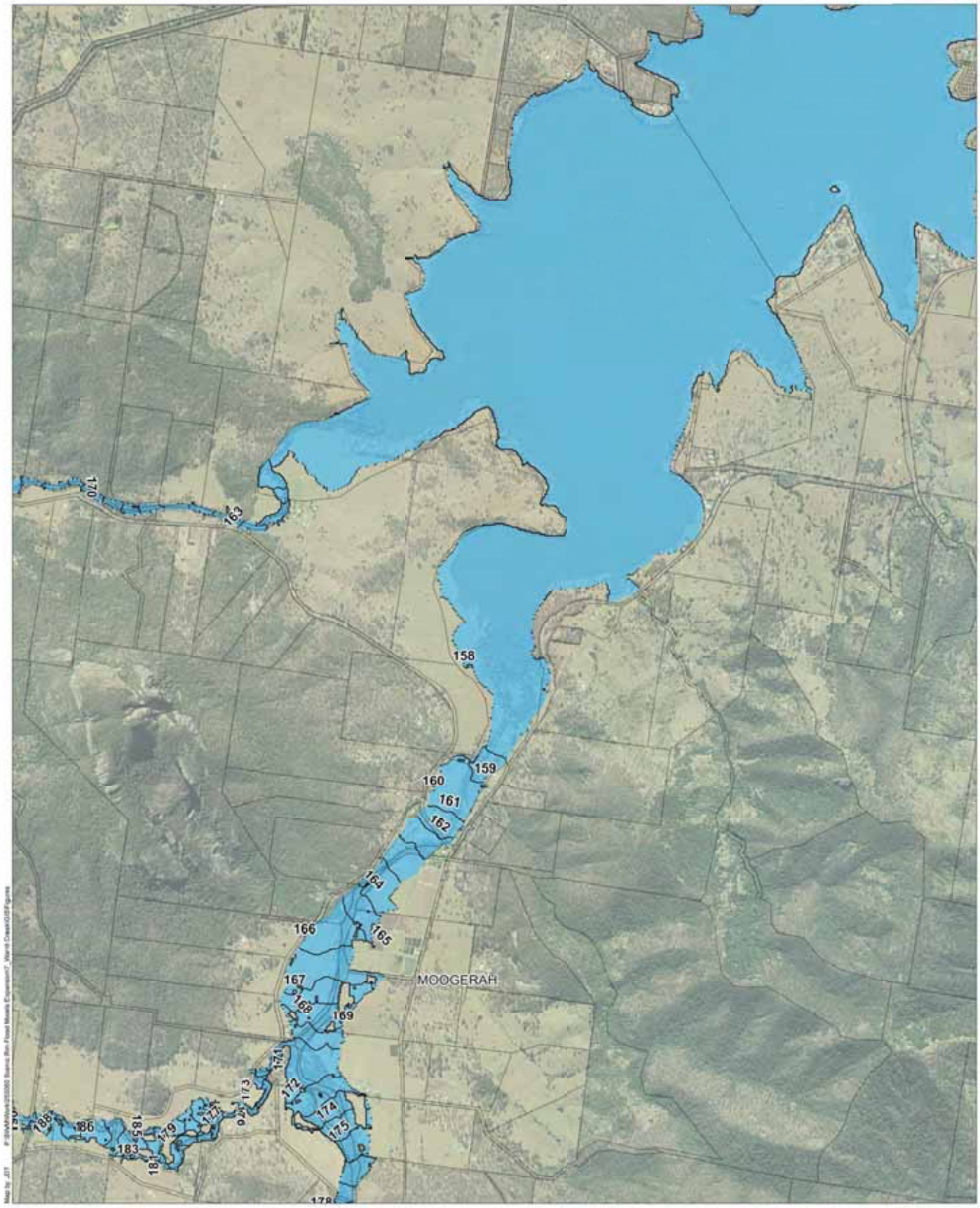
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B4-k

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

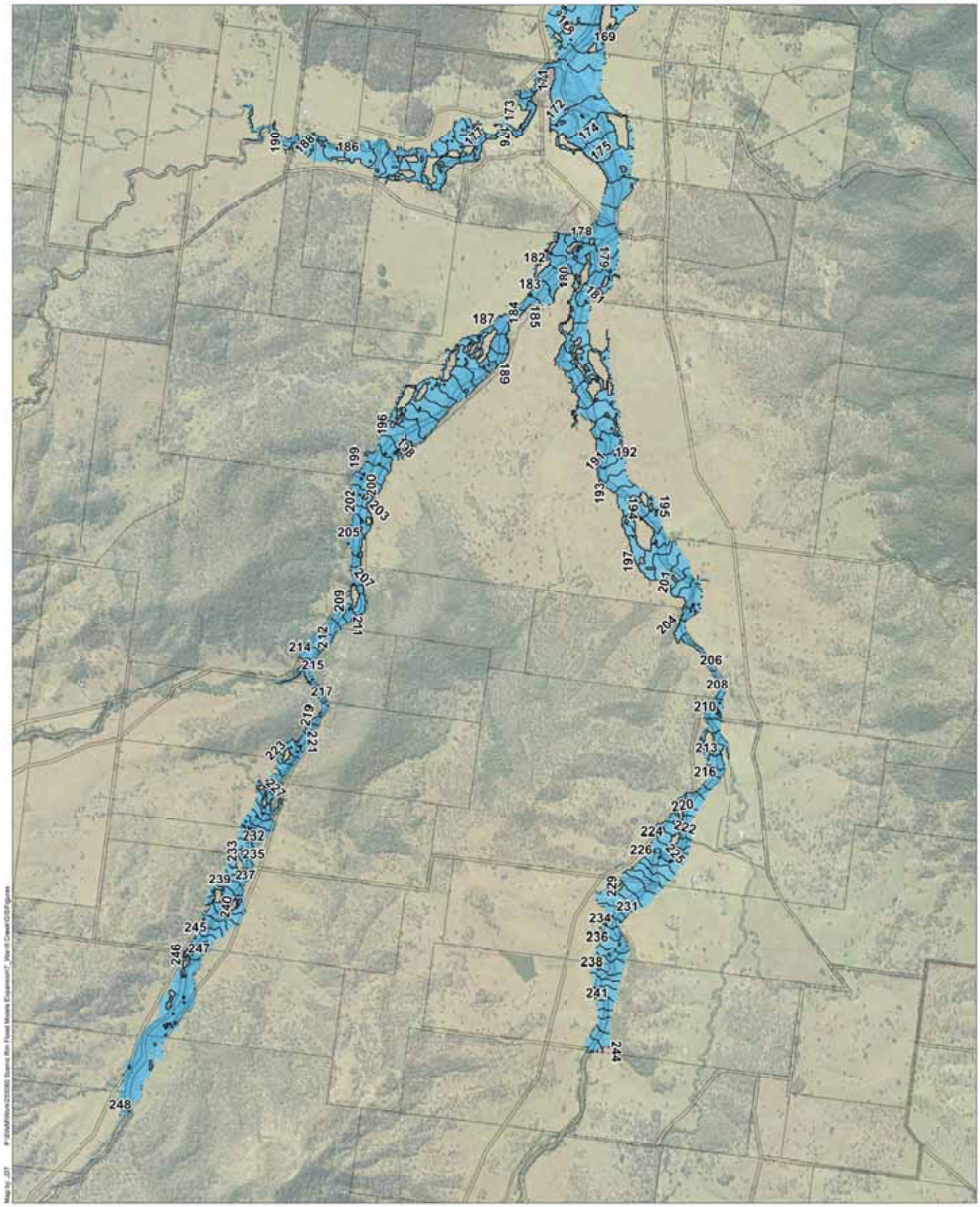
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-I**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

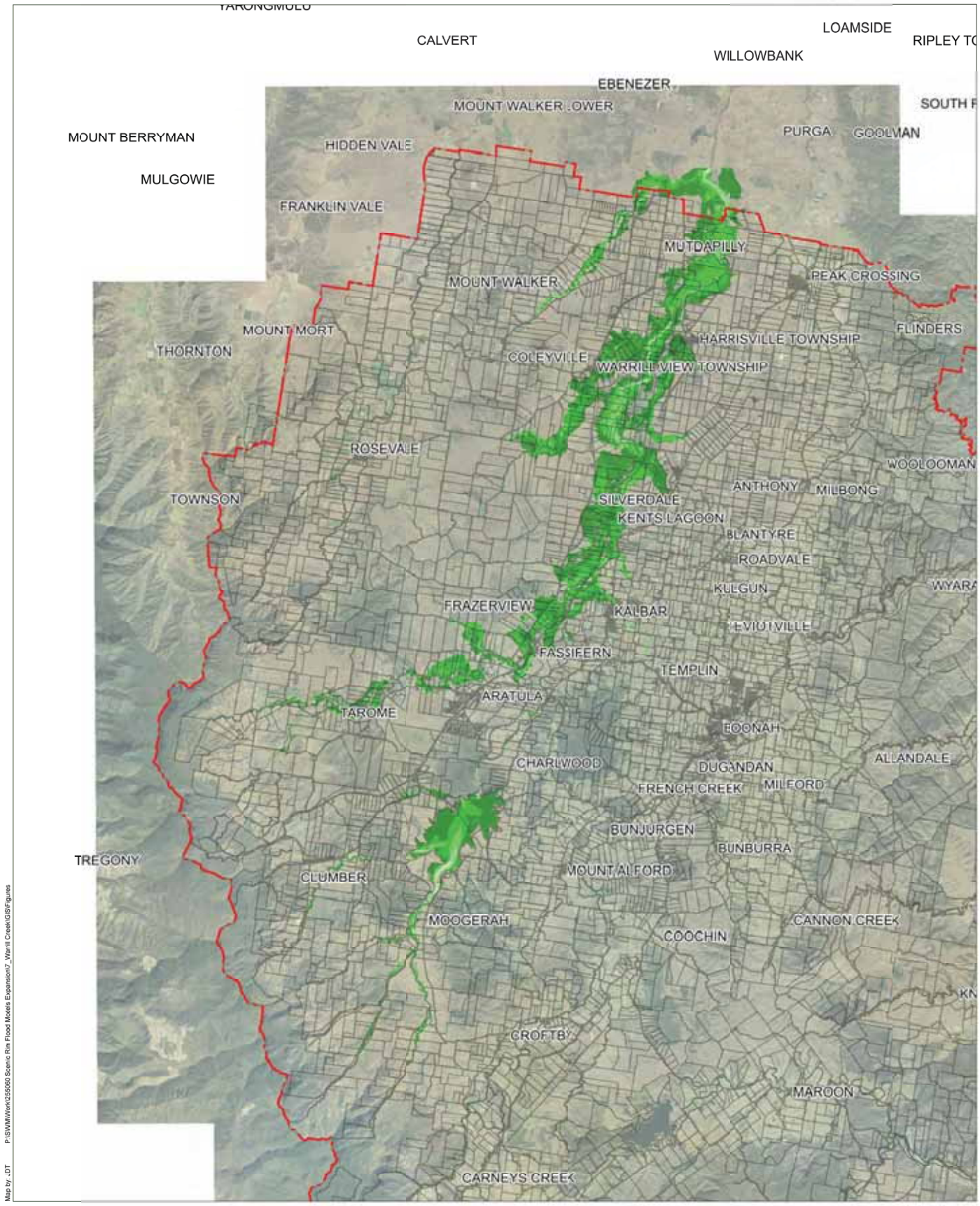
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B4-m**

1% AEP Event Climate Change Scenario 4.5 - Inundation Extent



Map by: JDT P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

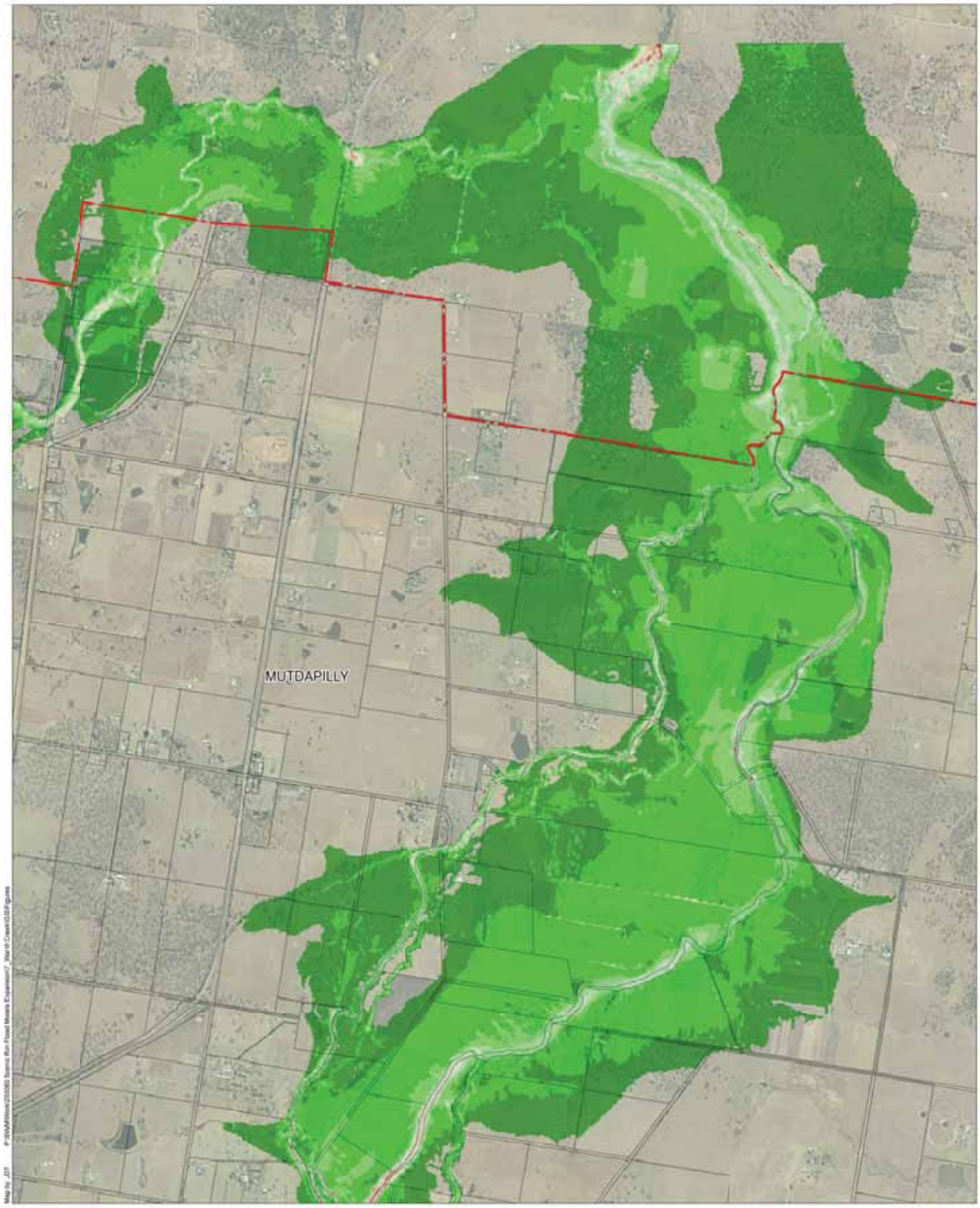
0 5,000 m 10,000 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

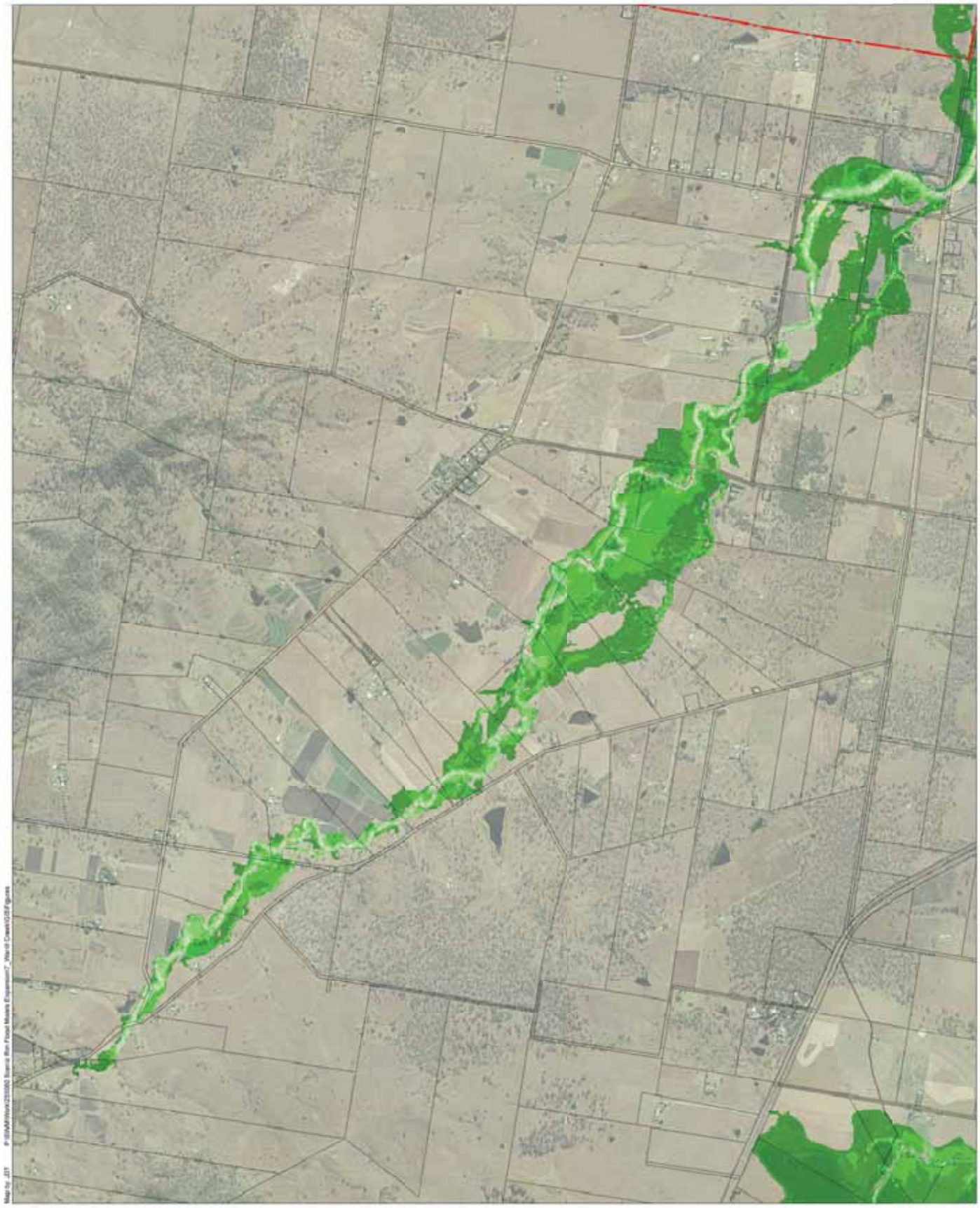
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-a**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

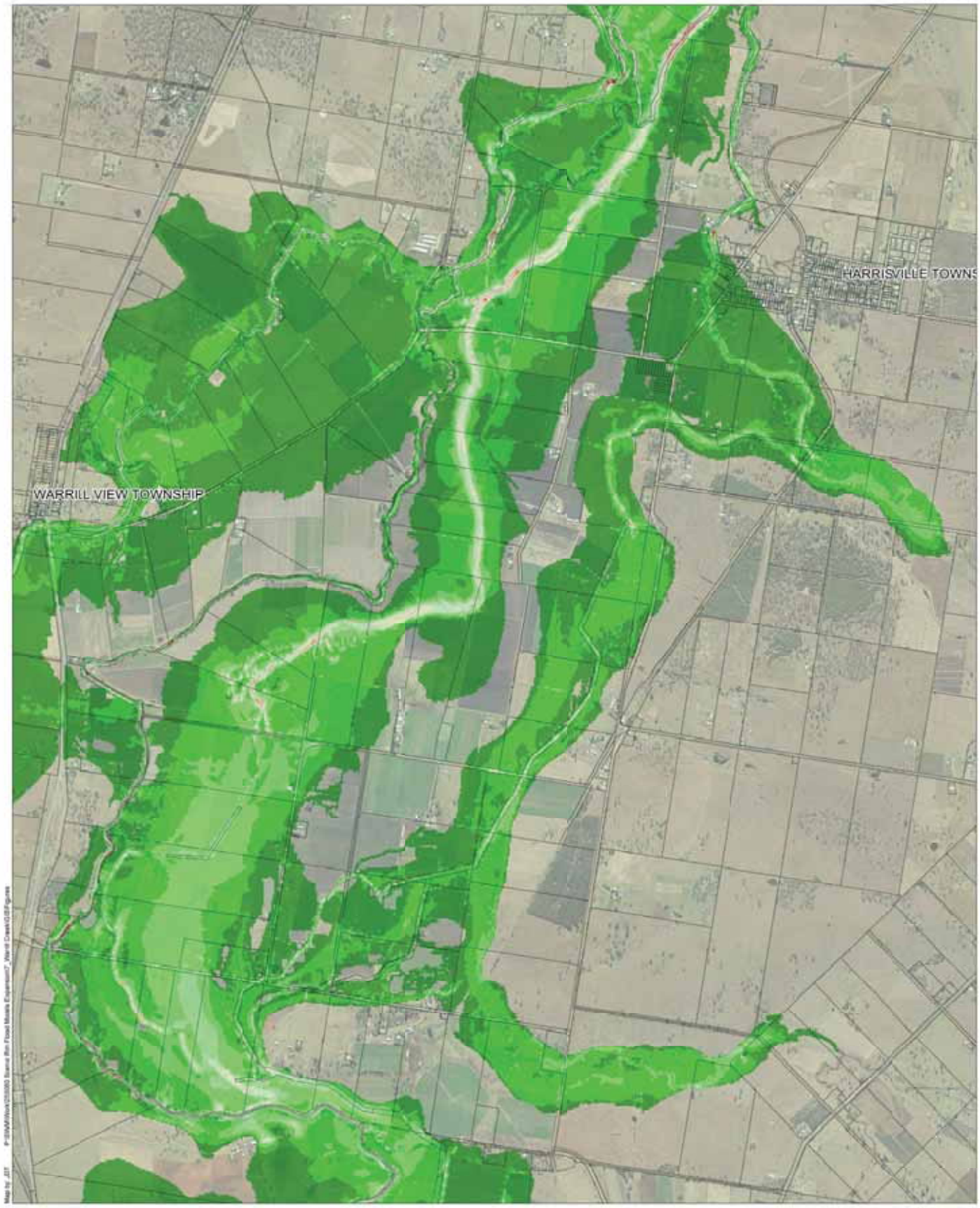
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-b**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

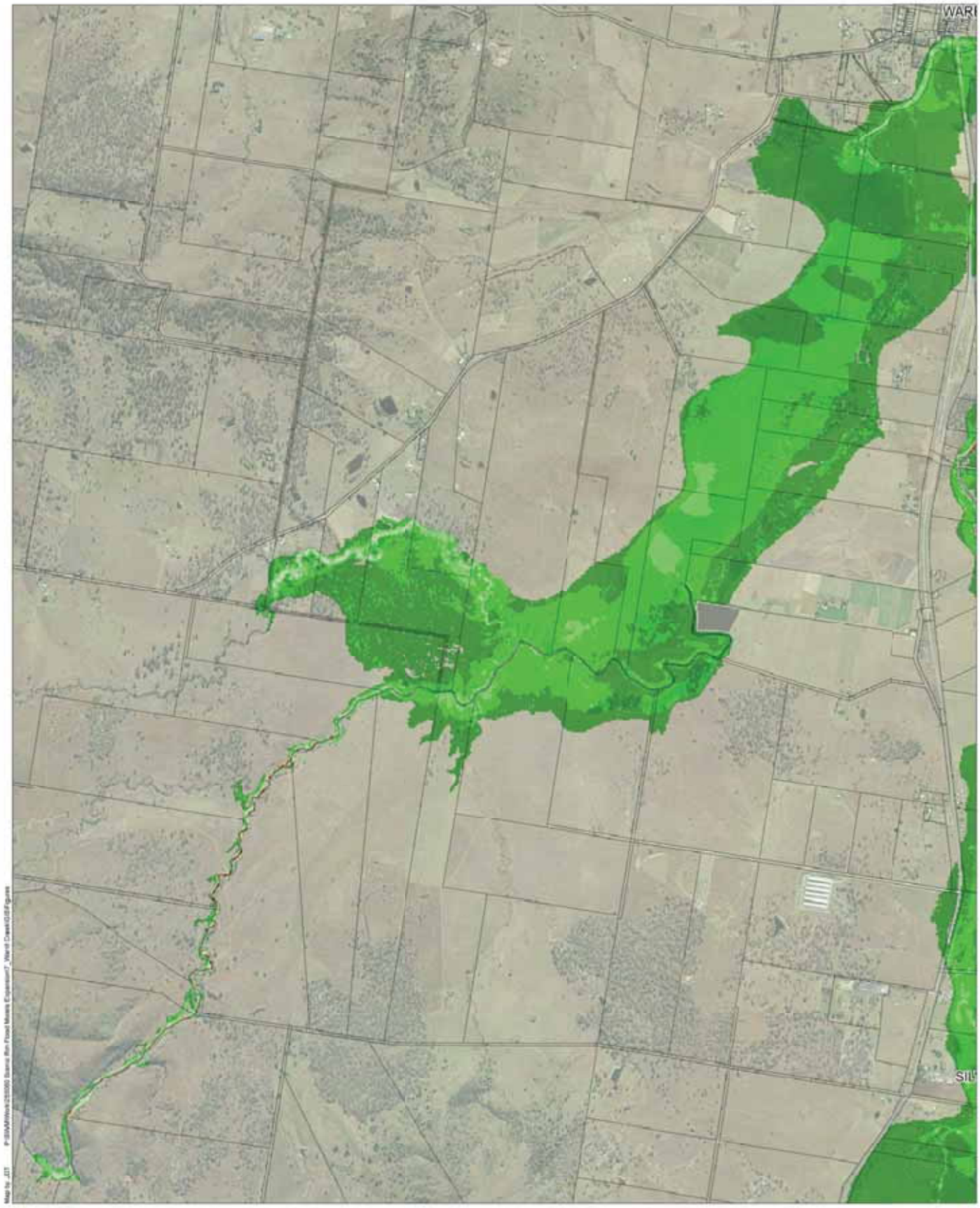
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-c**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

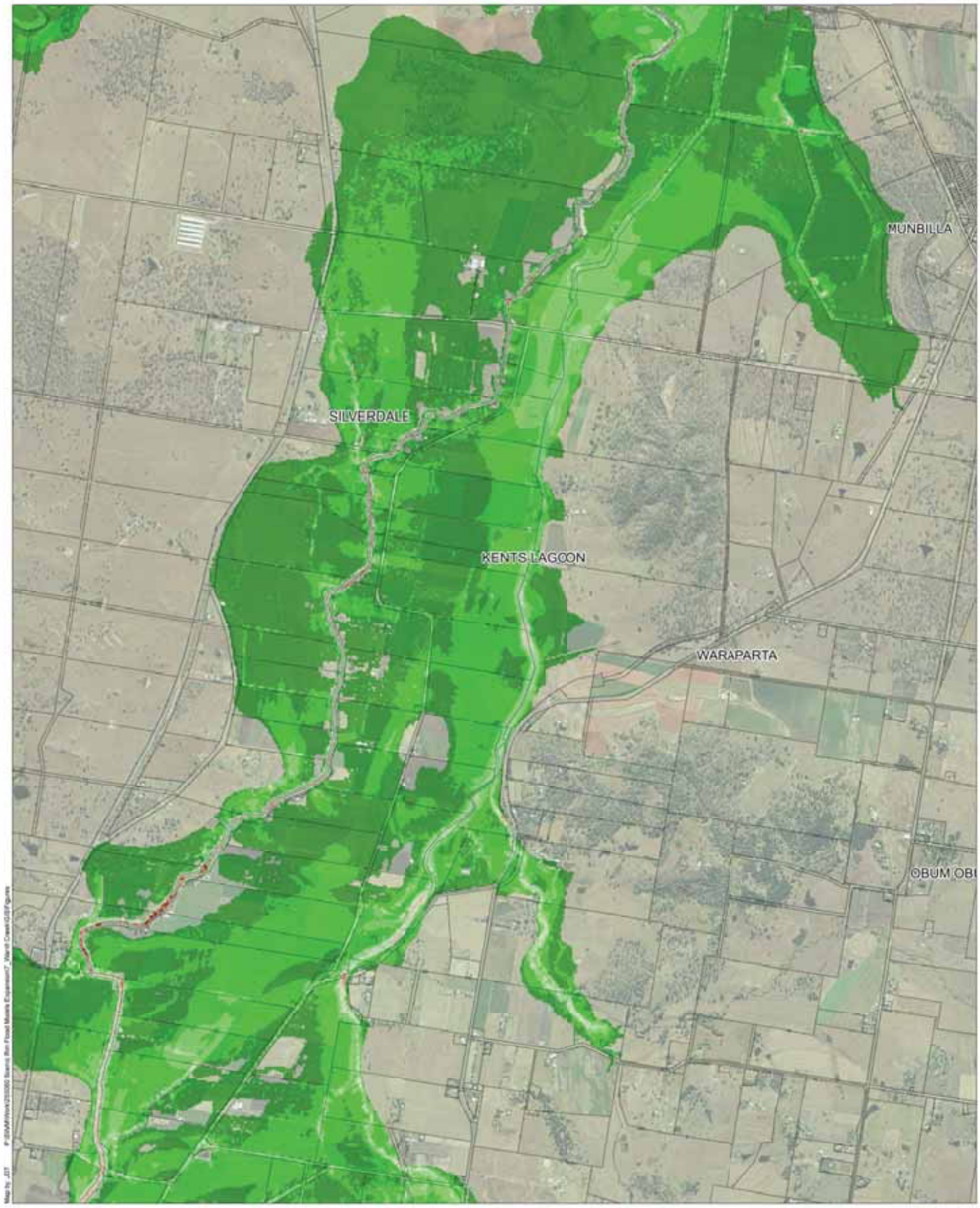
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-d**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

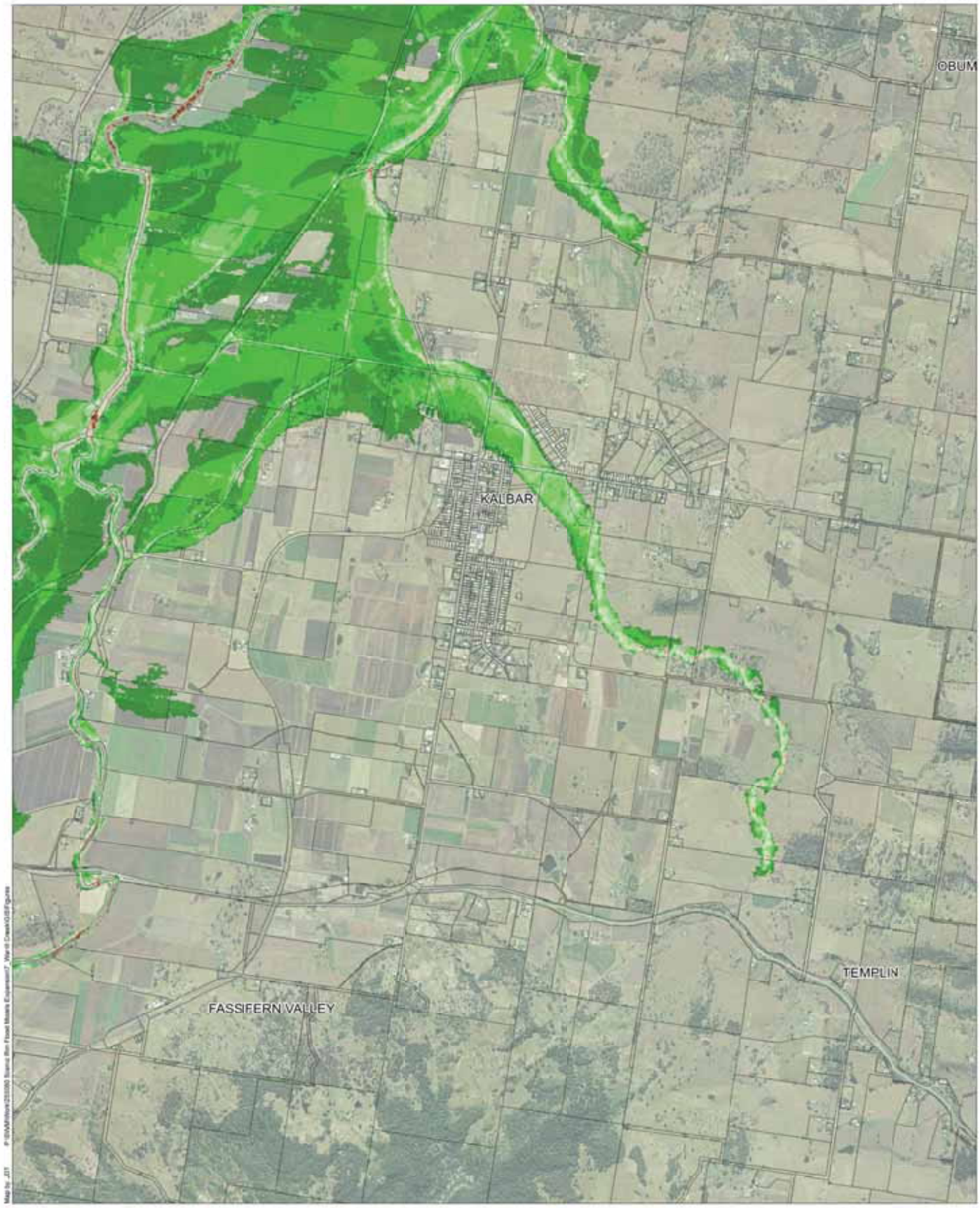
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-e**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

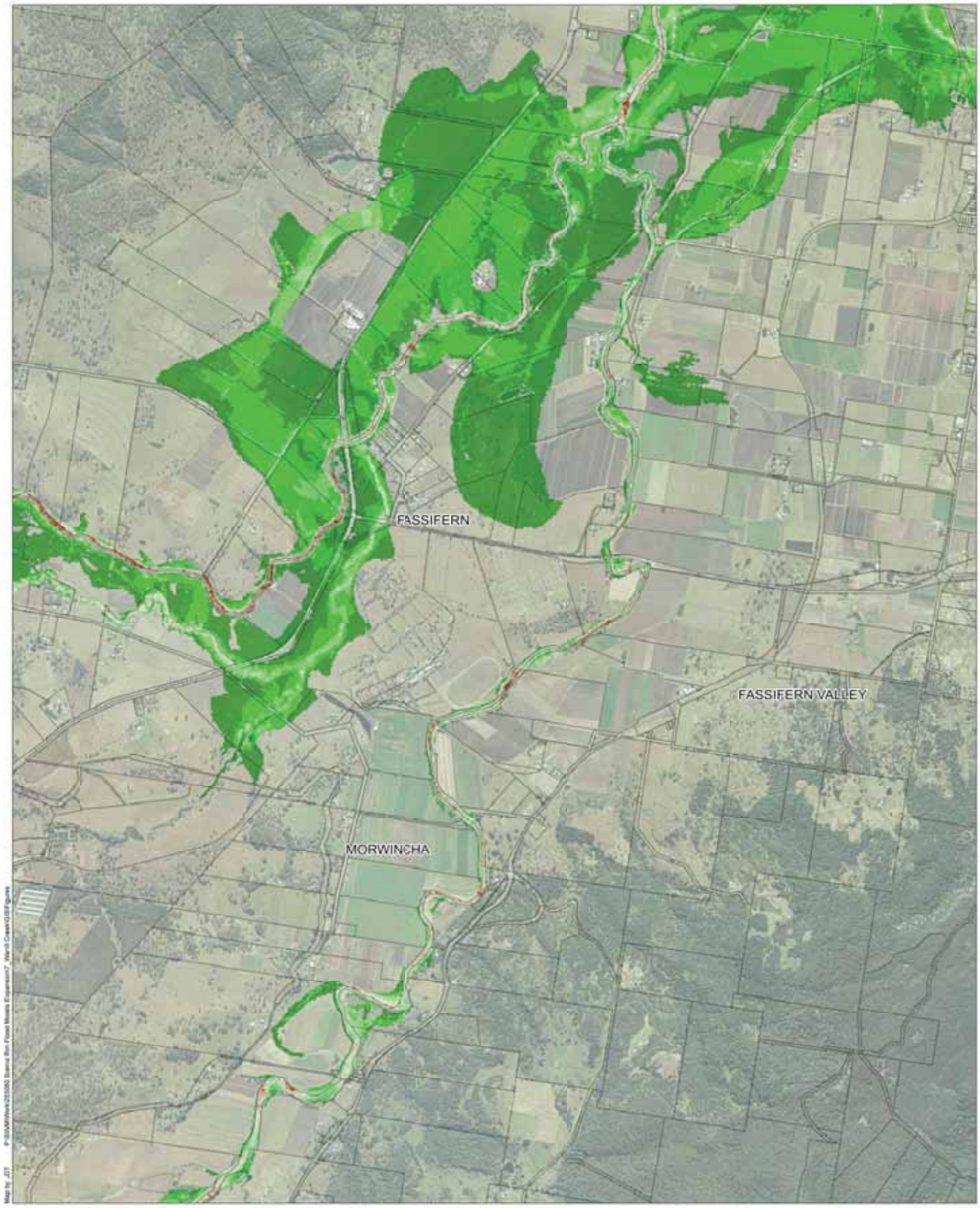
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-f**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

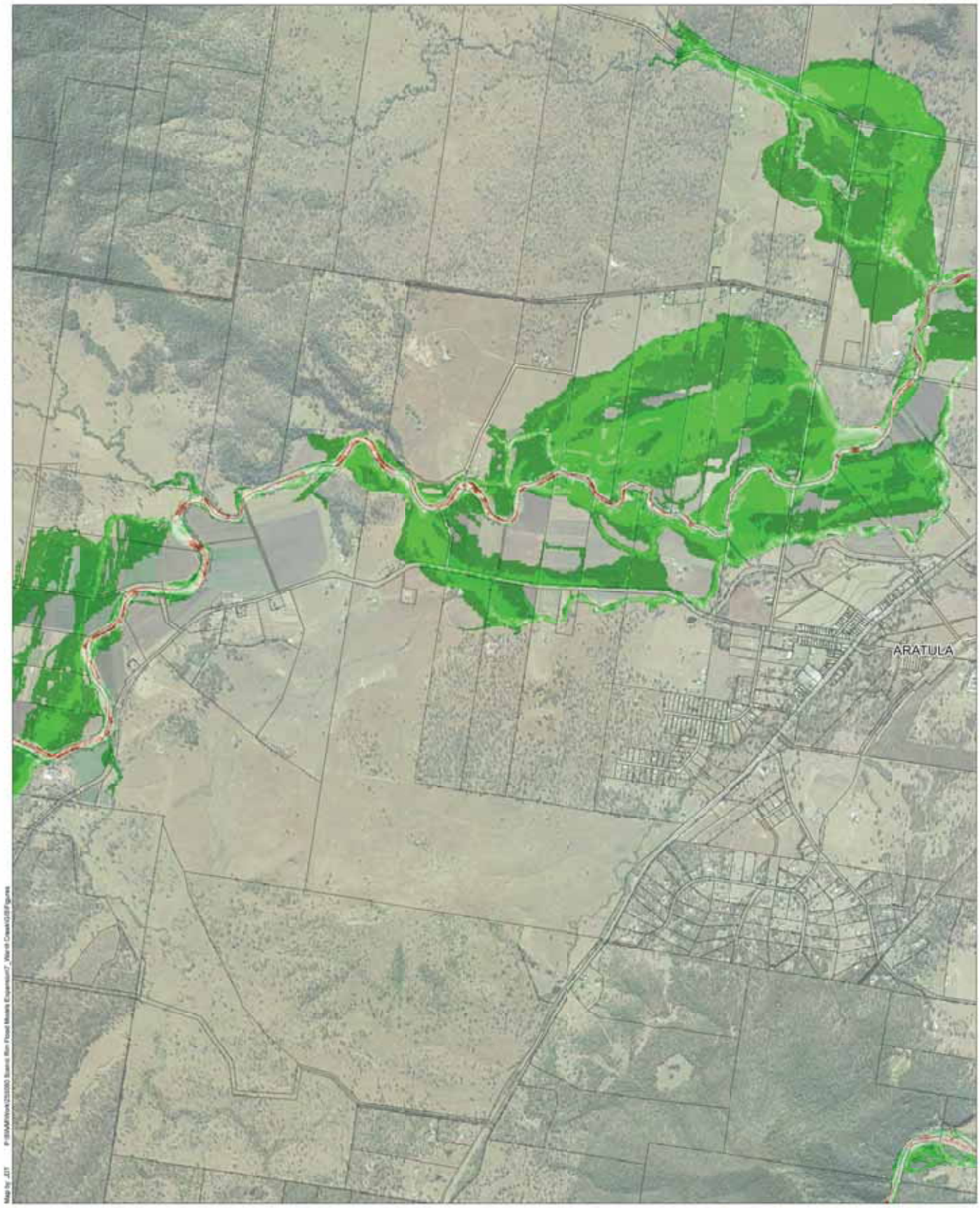
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-g**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

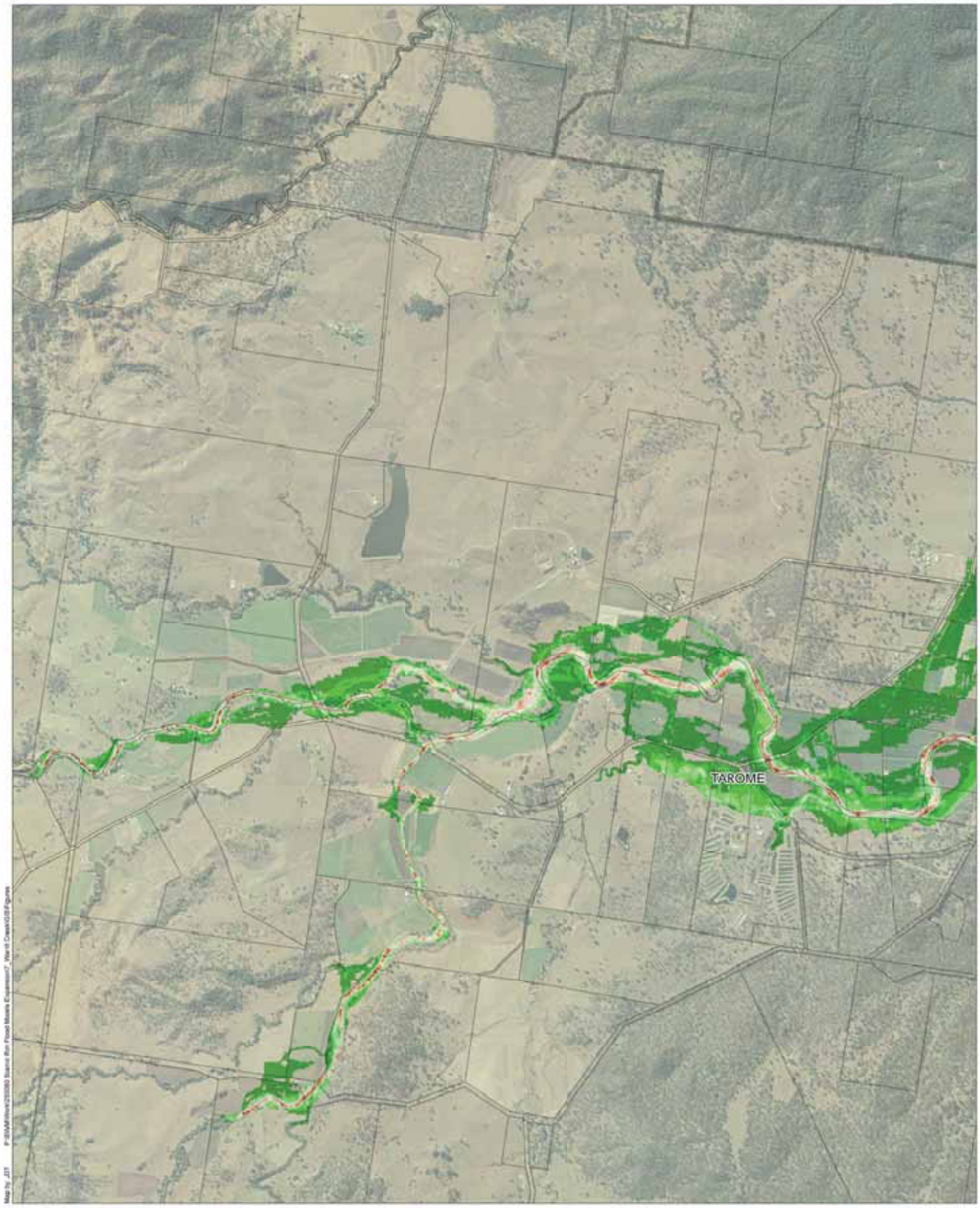
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-h**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

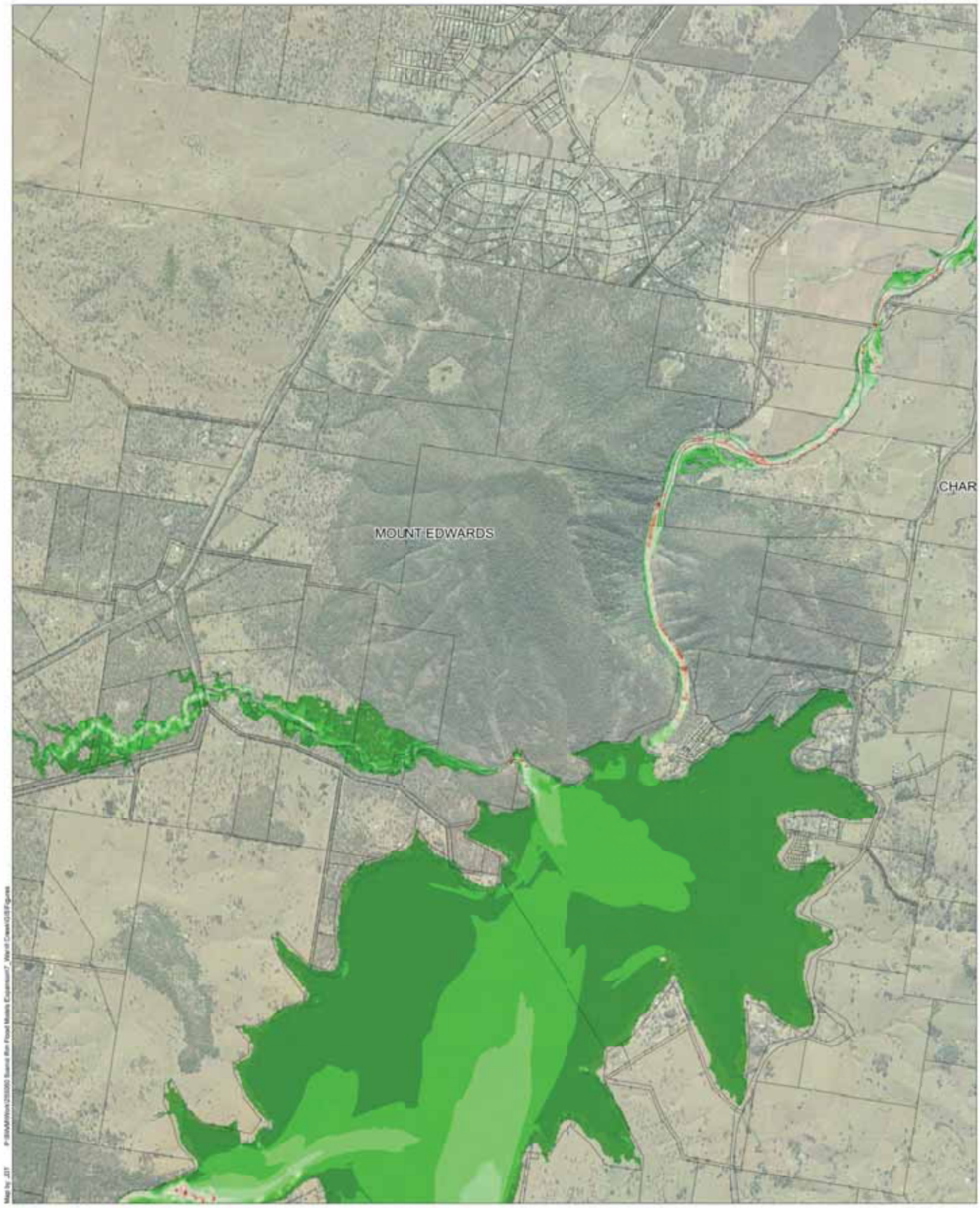
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-i**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

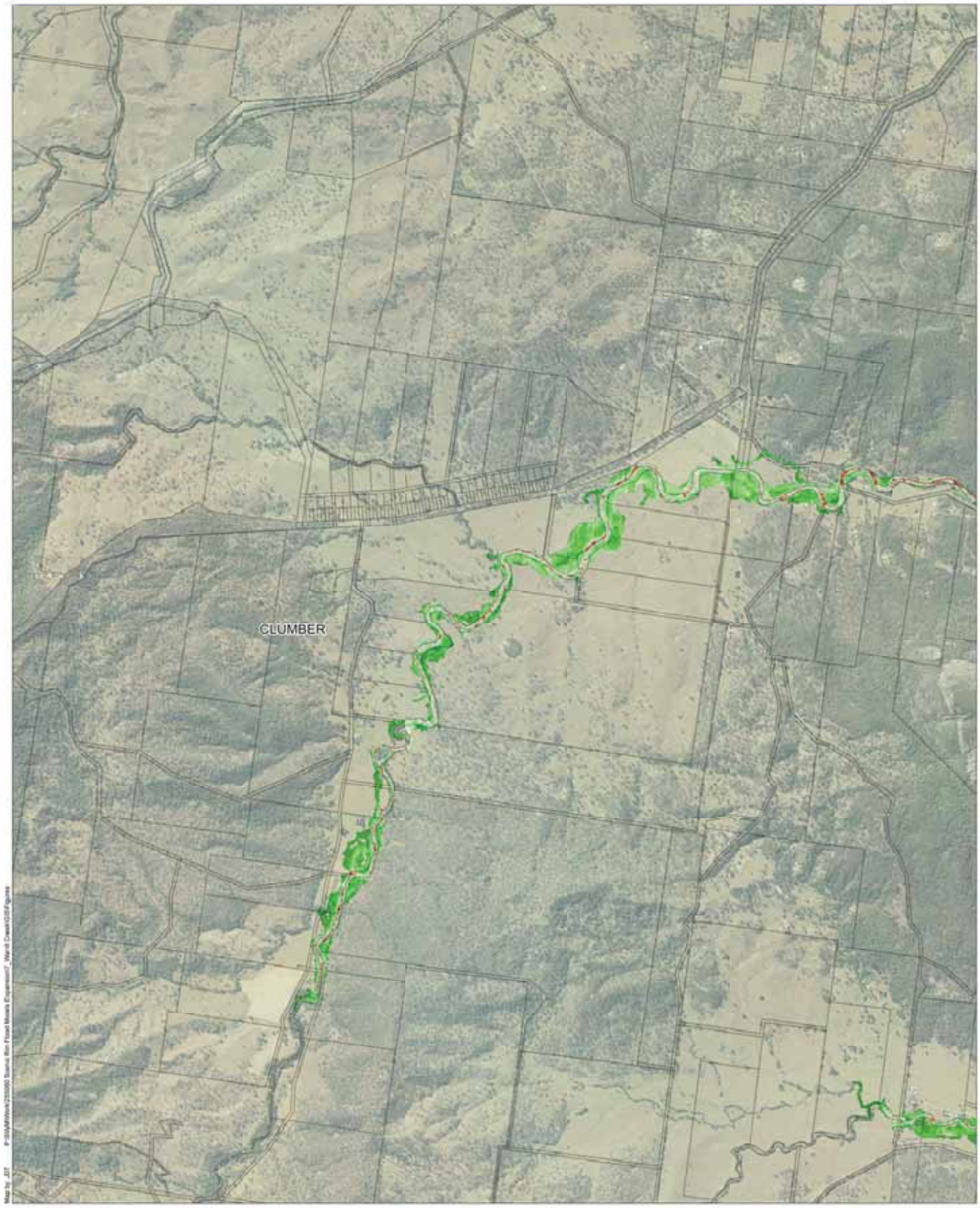
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-j**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

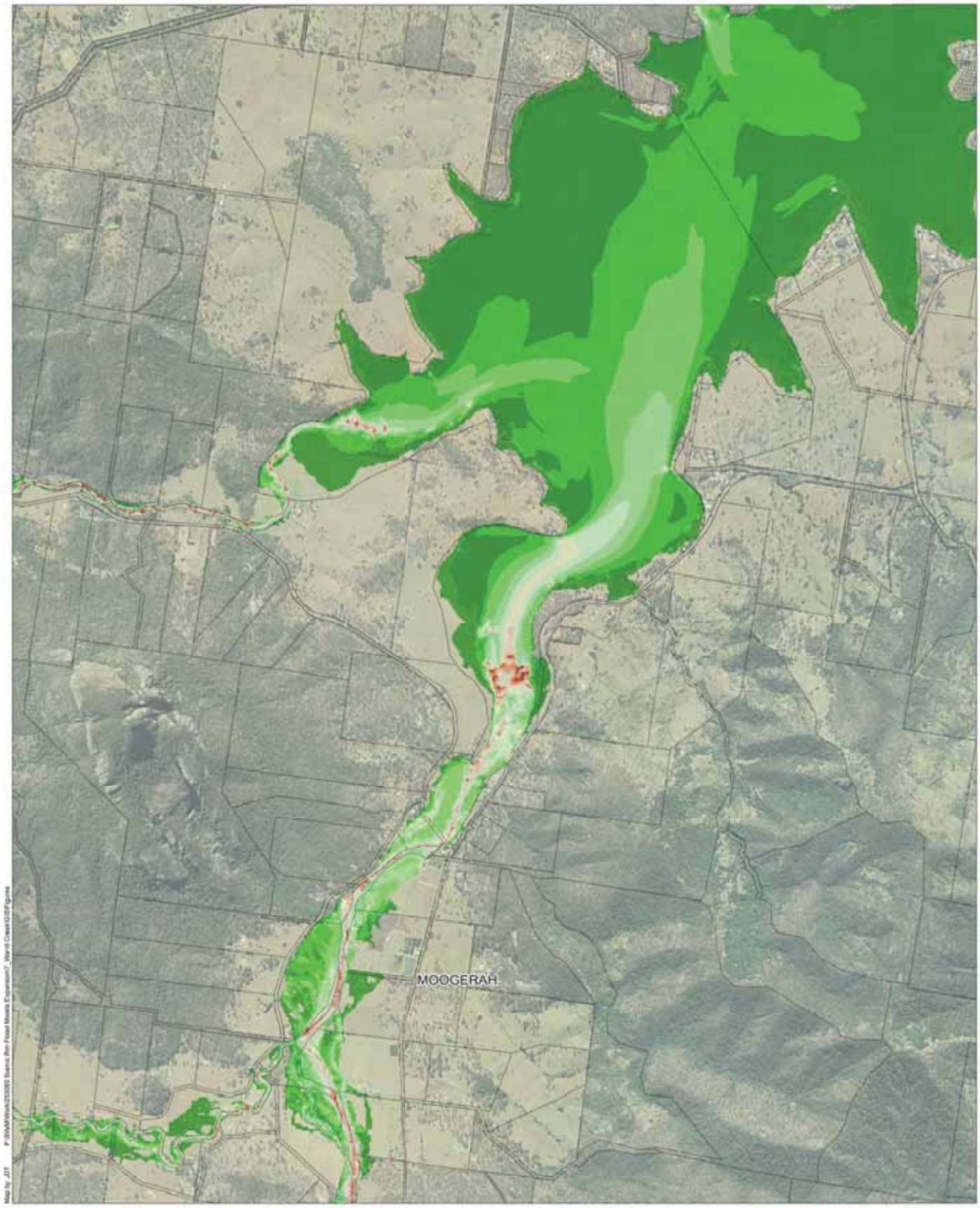
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-k**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

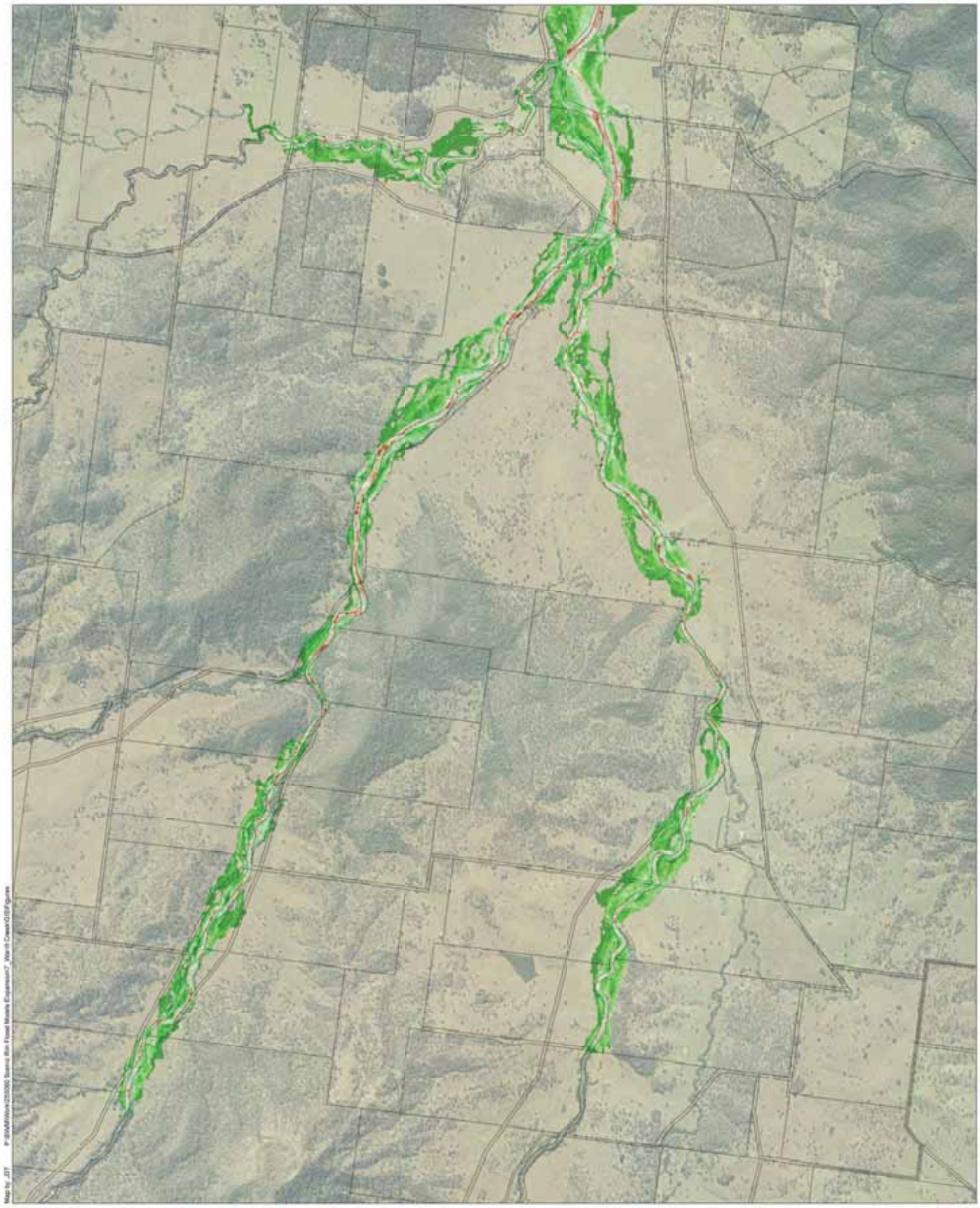
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B5-I

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

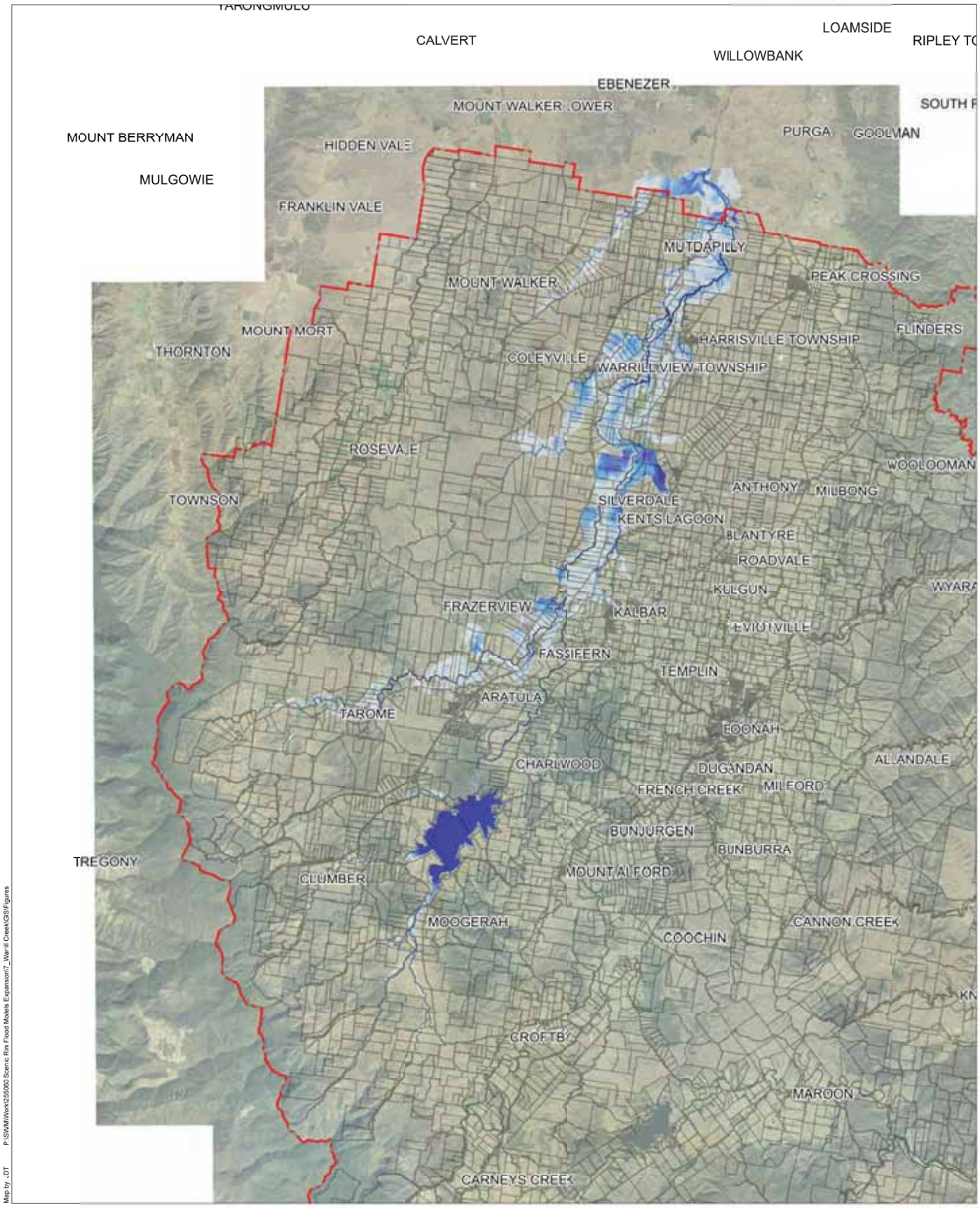
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B5-m**

1% AEP Event Climate Change Scenario 4.5 - Peak Velocities



Map by: JDT P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

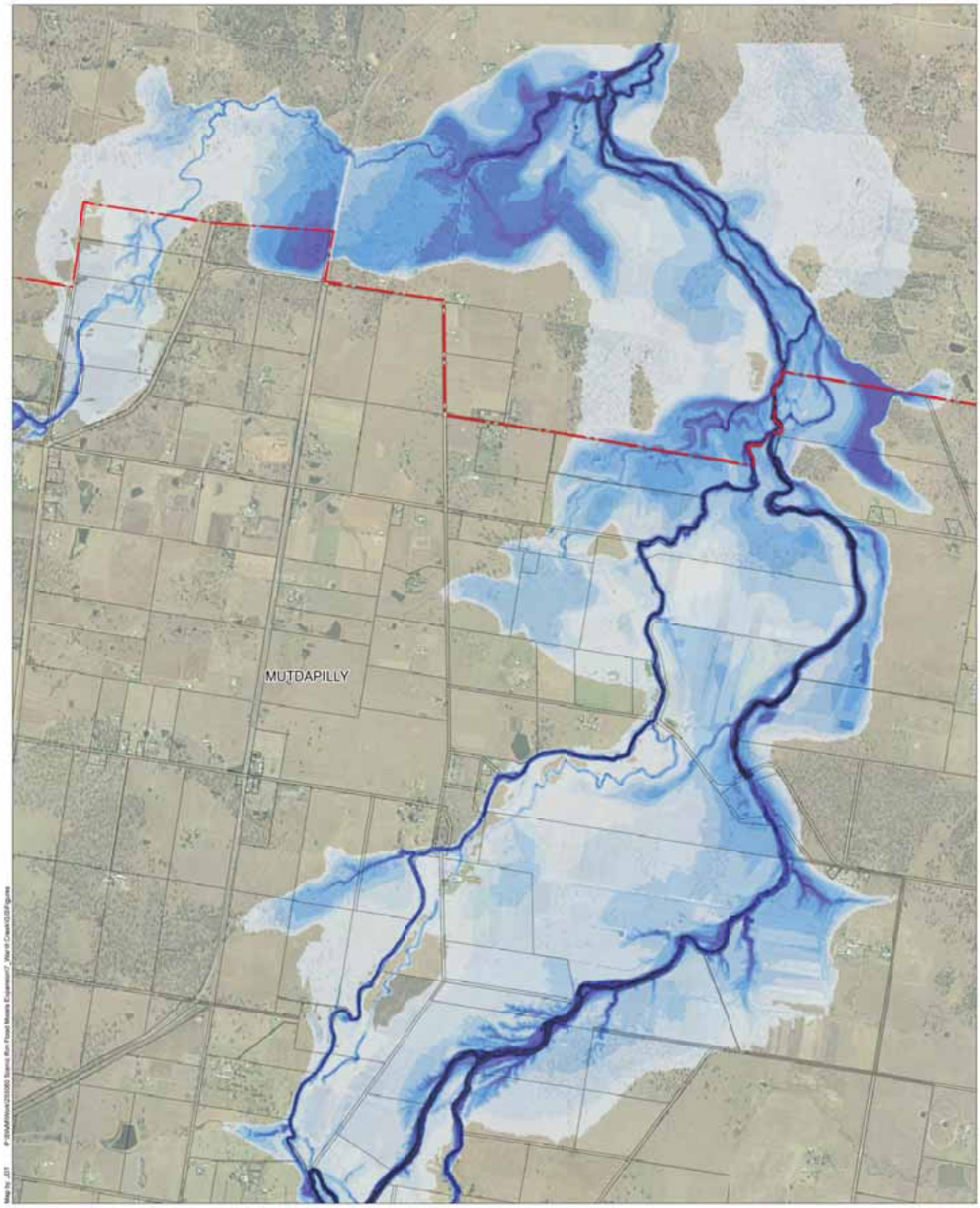
0 5,000 m 10,000 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

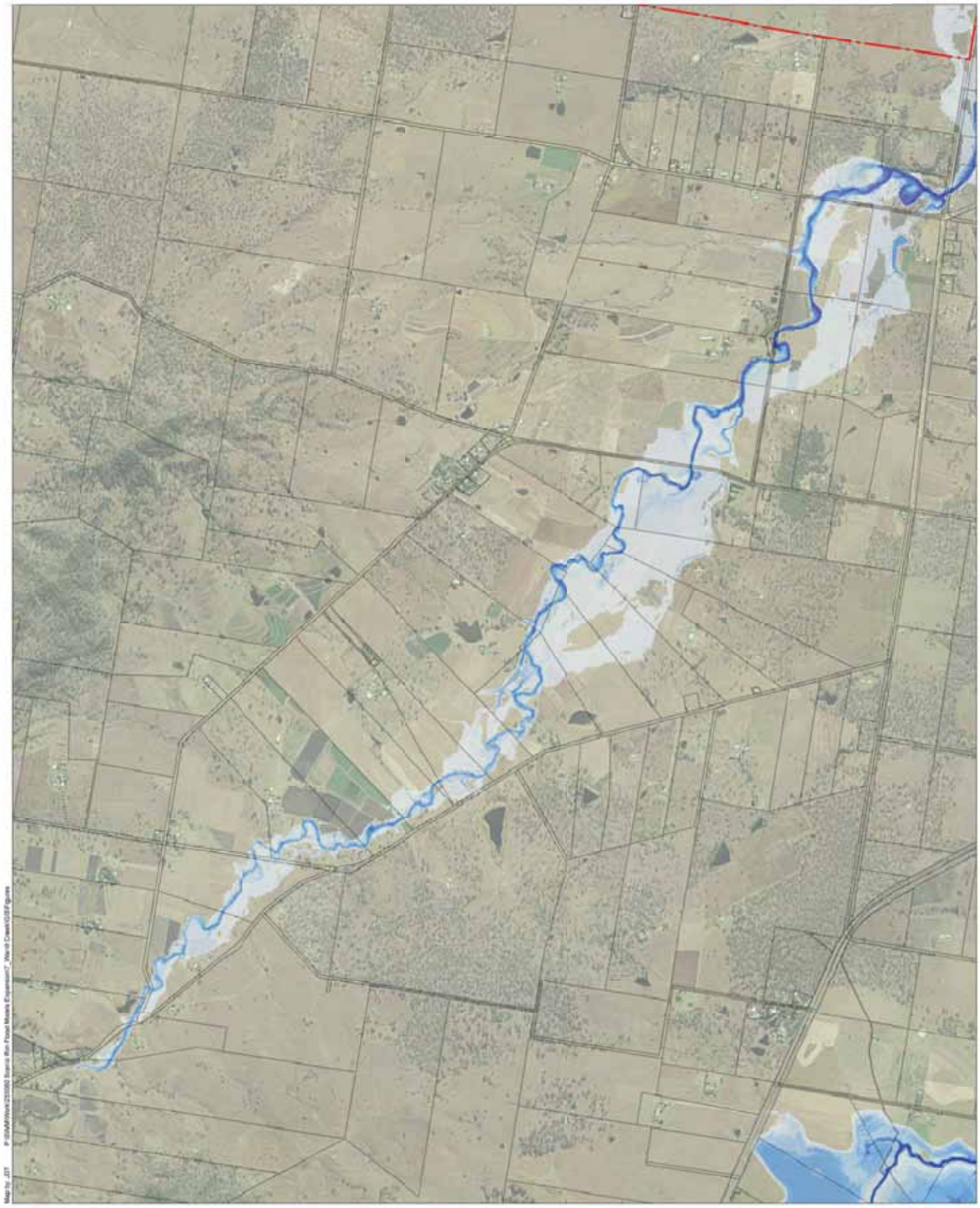
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-a**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

0 625 m 1,250 m

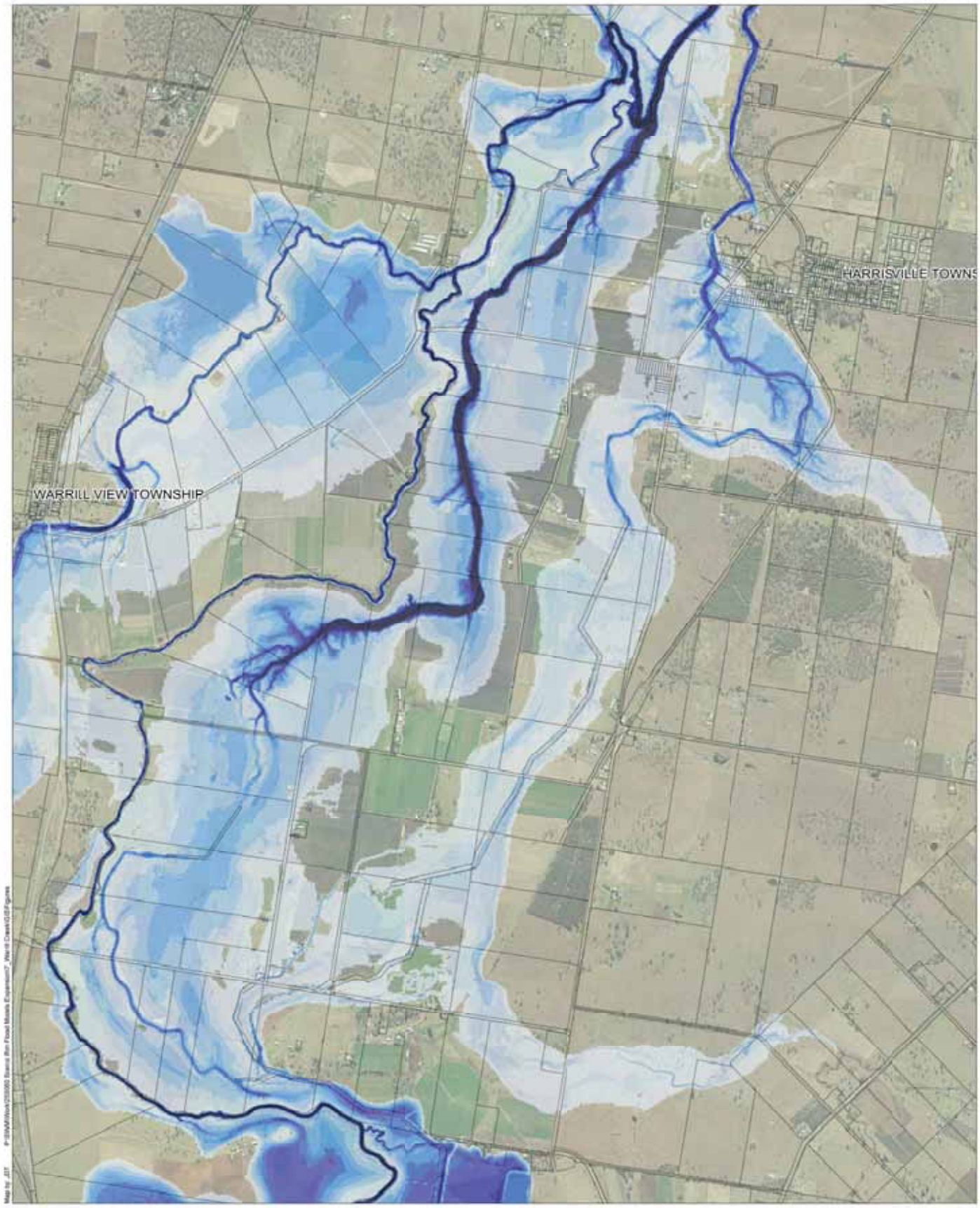
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-b**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

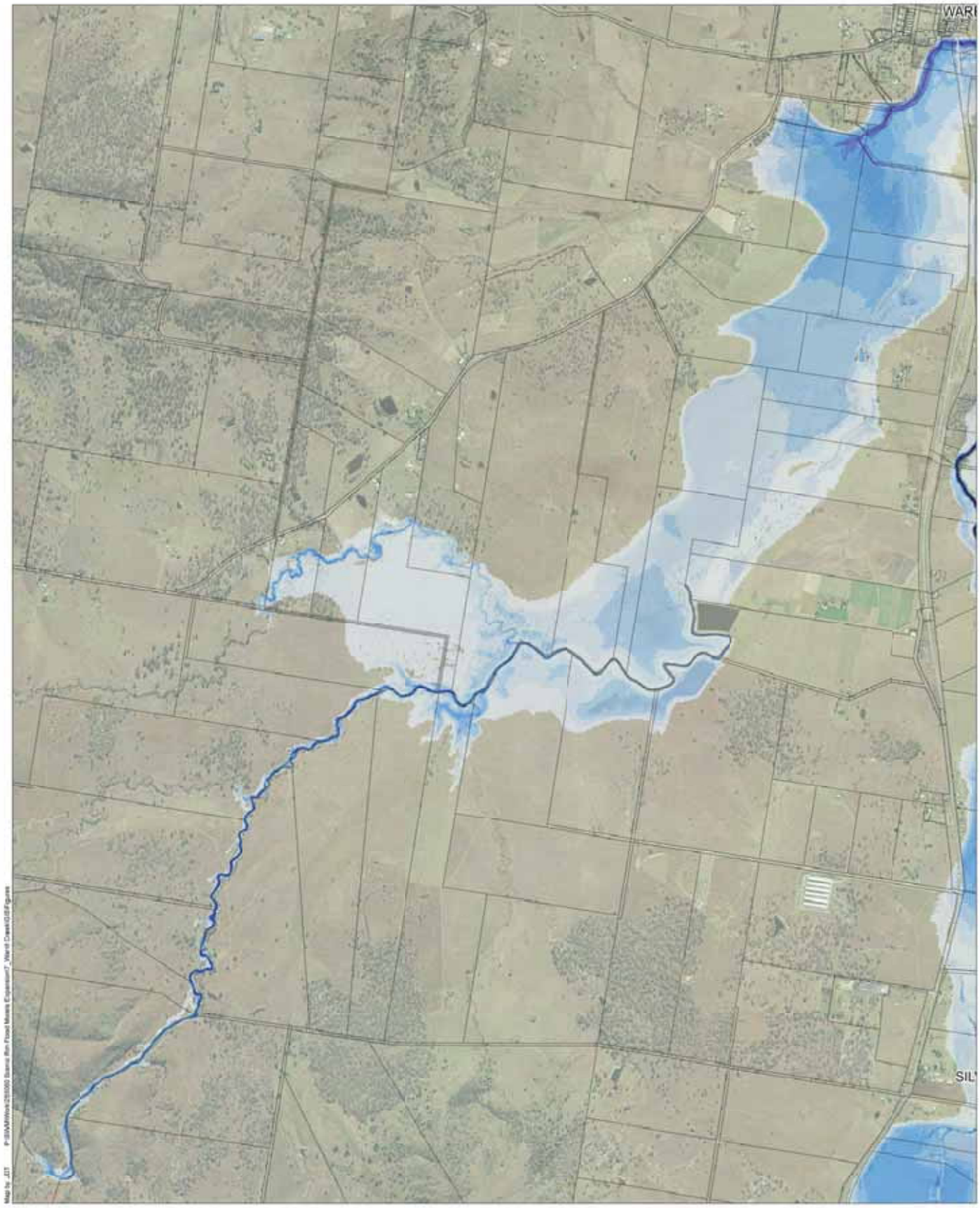
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-c**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

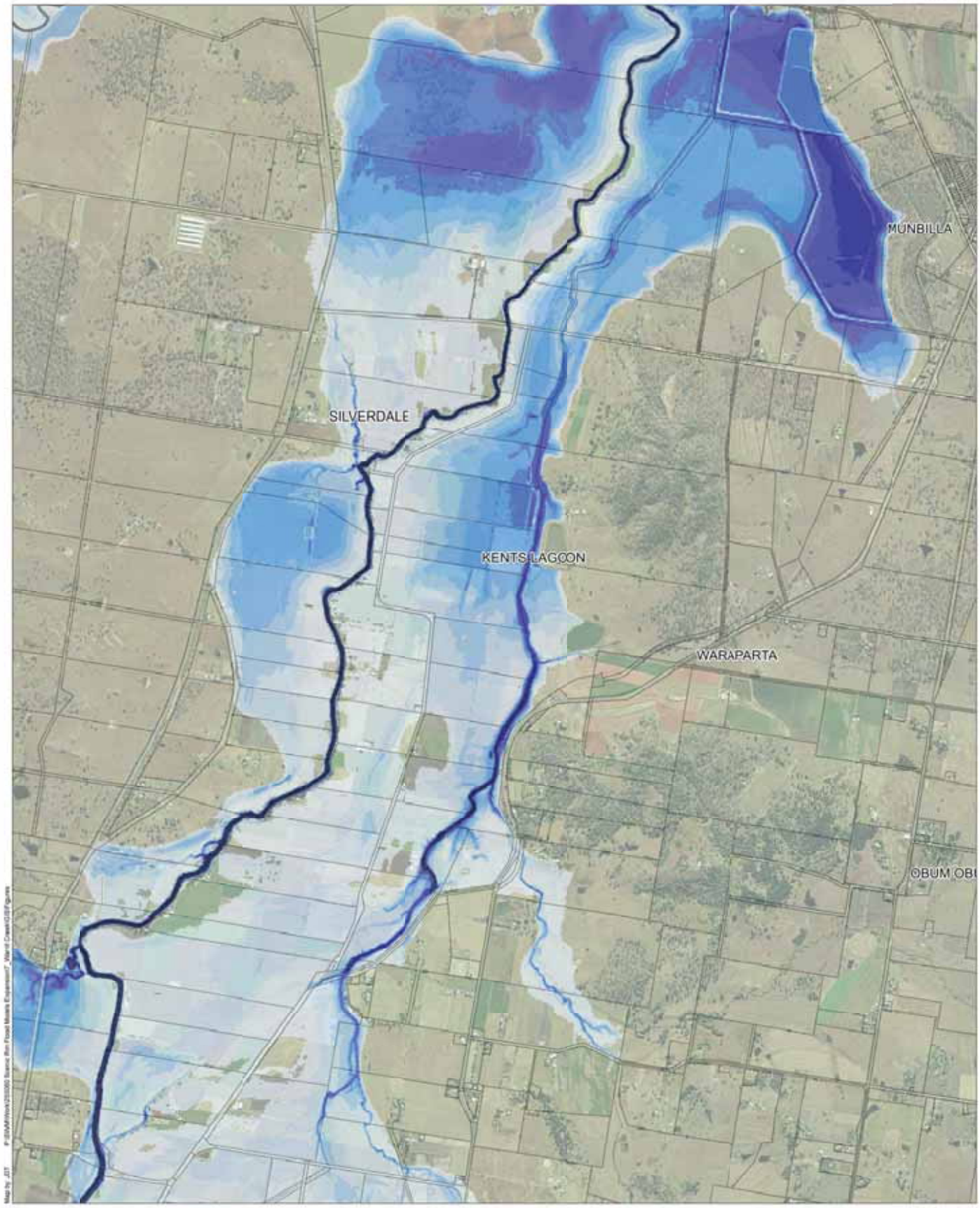
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-d**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

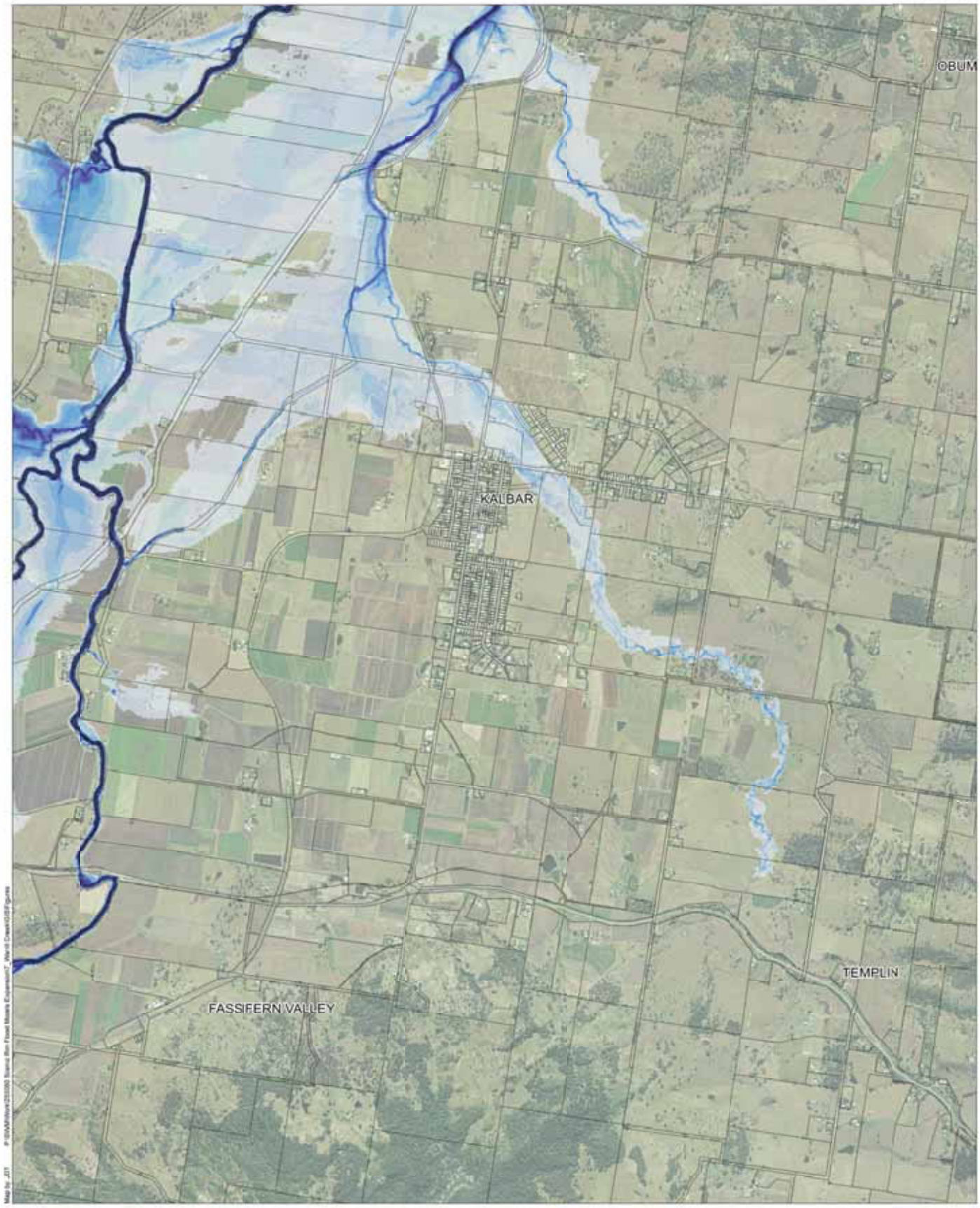
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-e**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

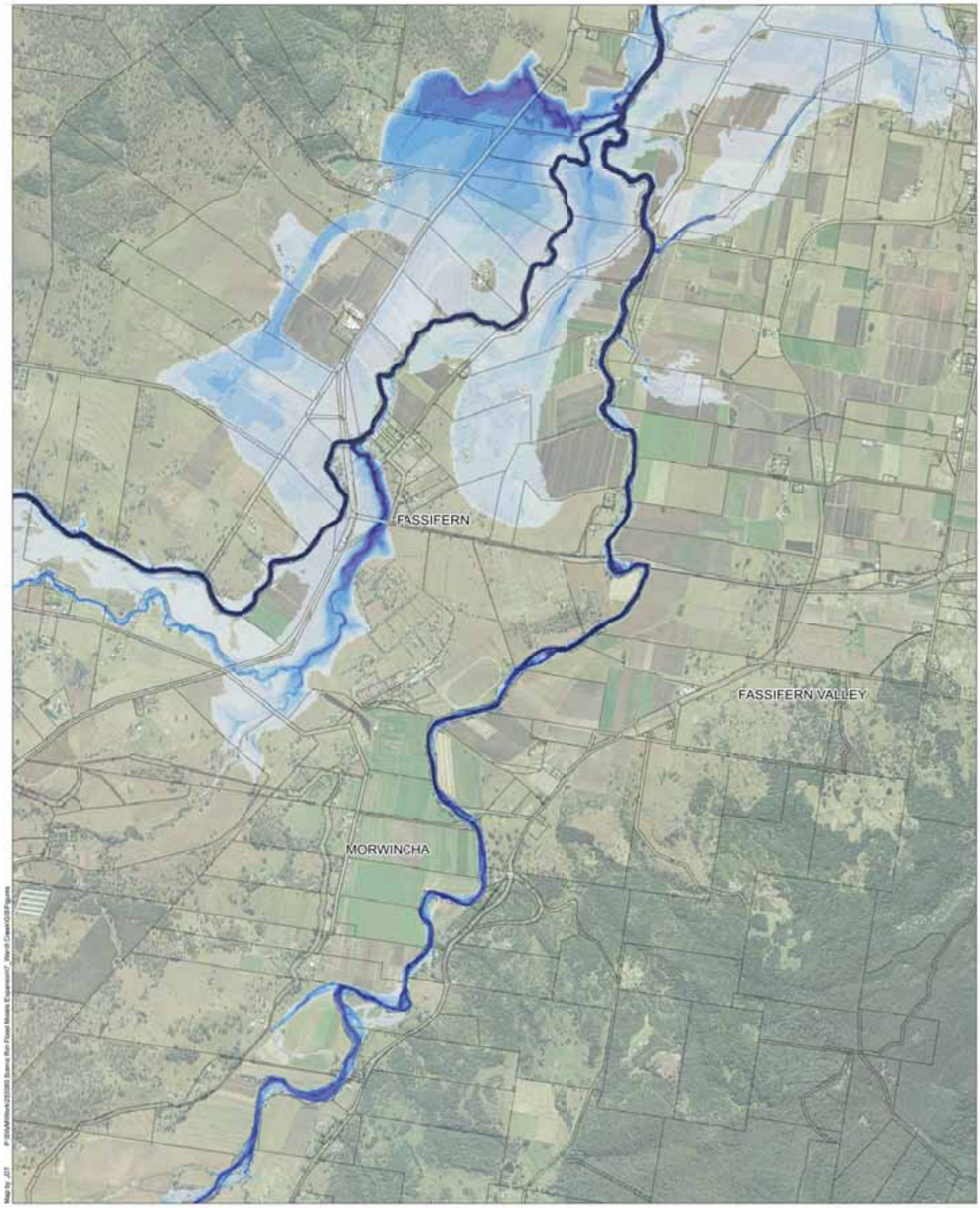
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-f**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

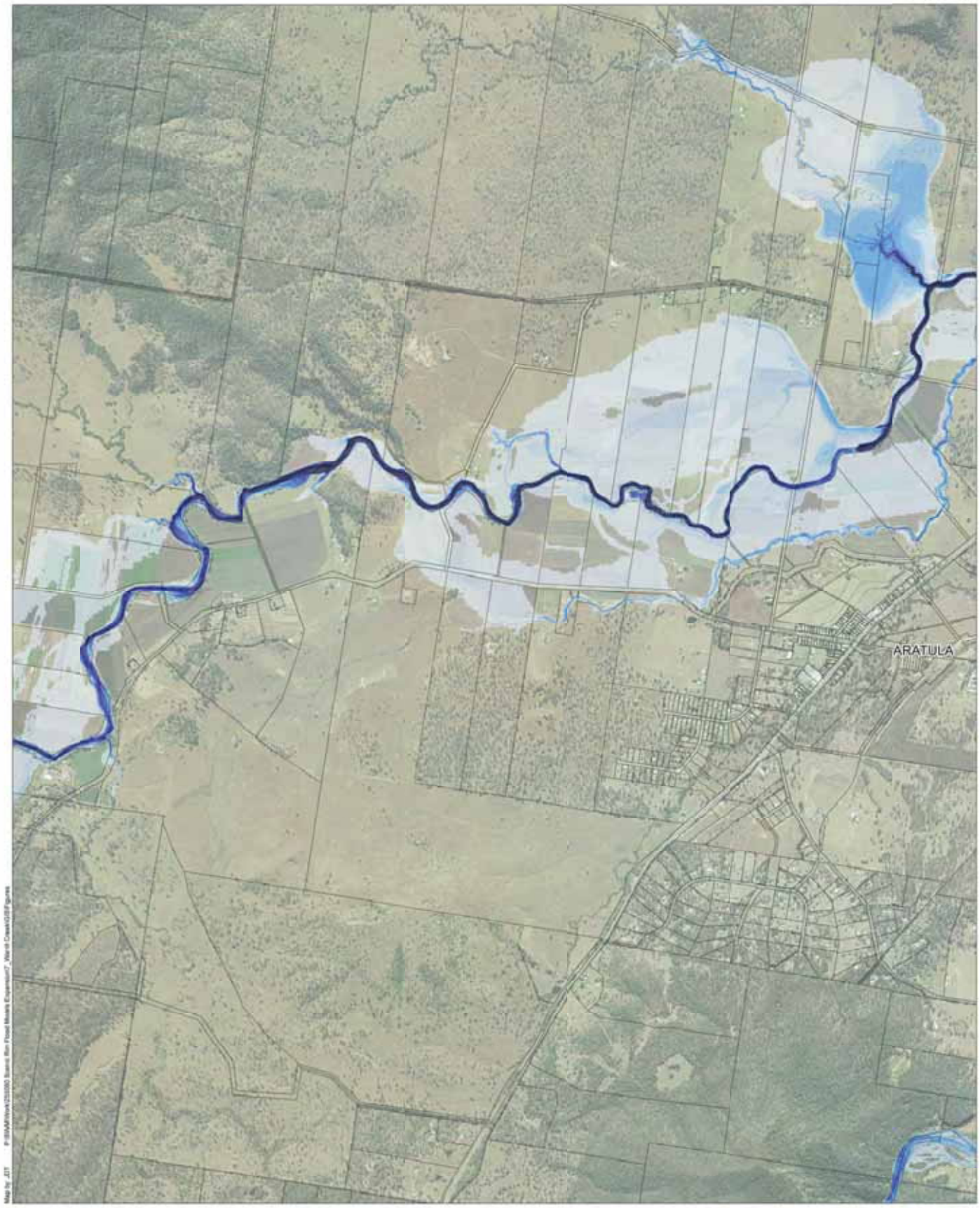
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-g**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

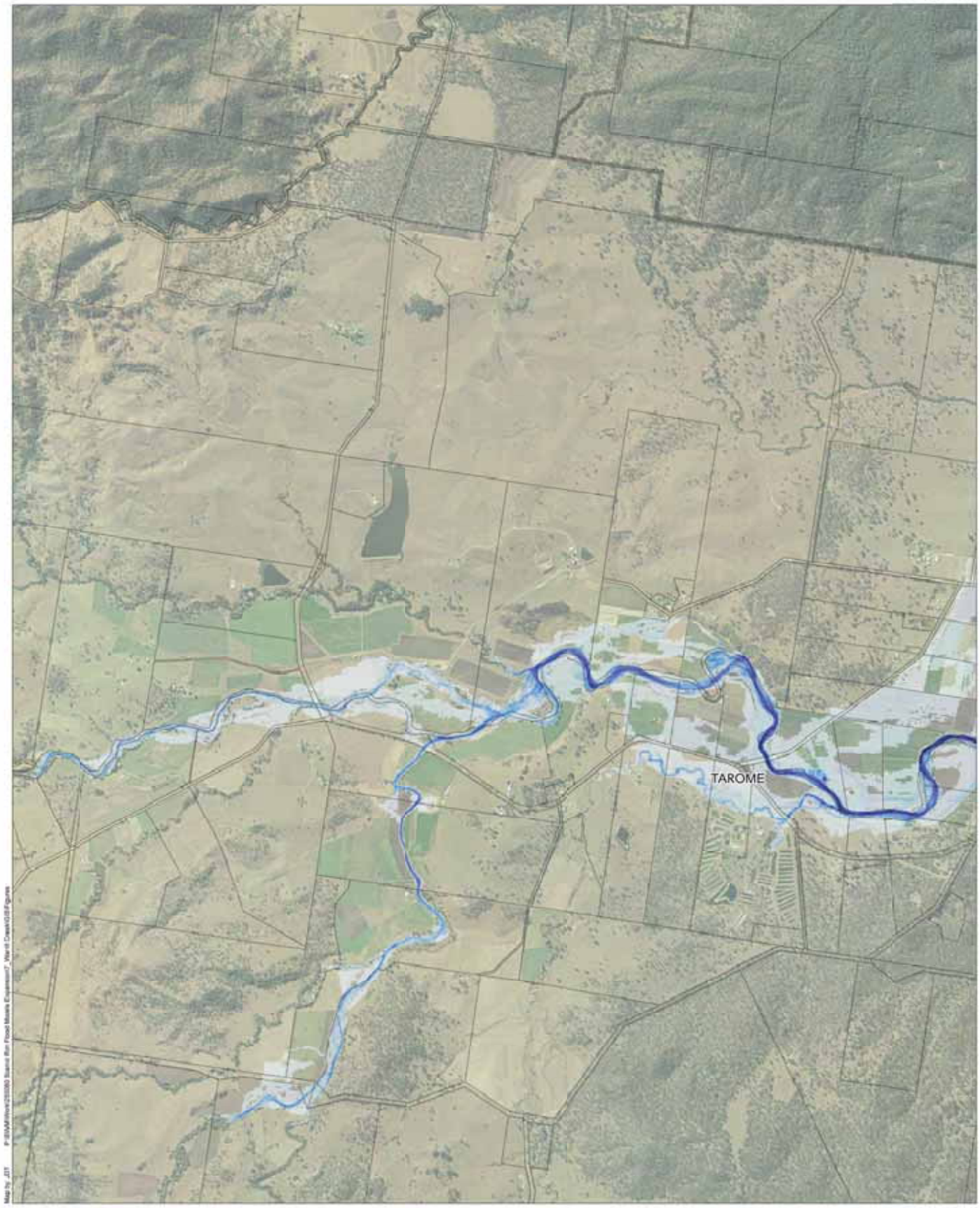
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-h**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

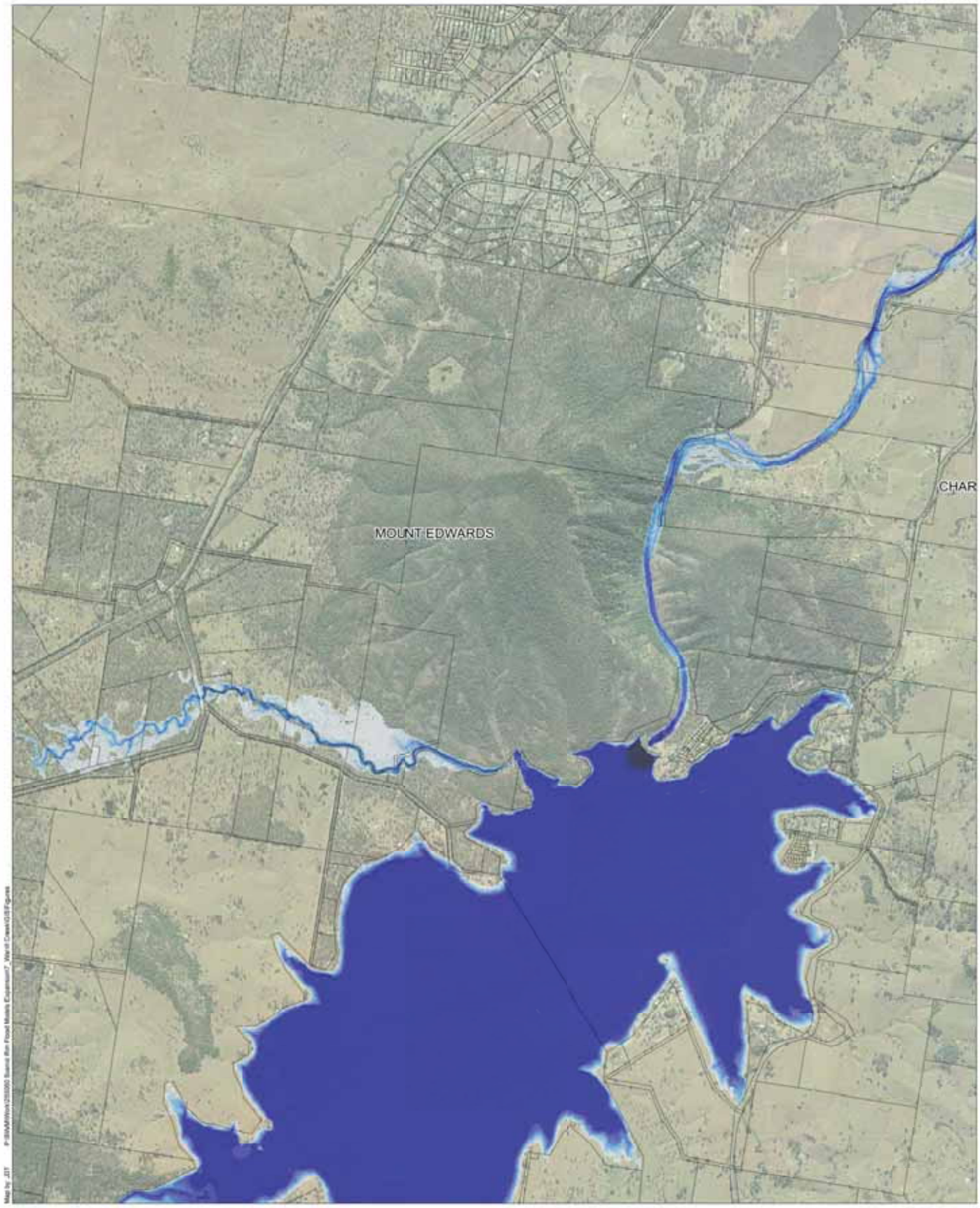
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-i**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

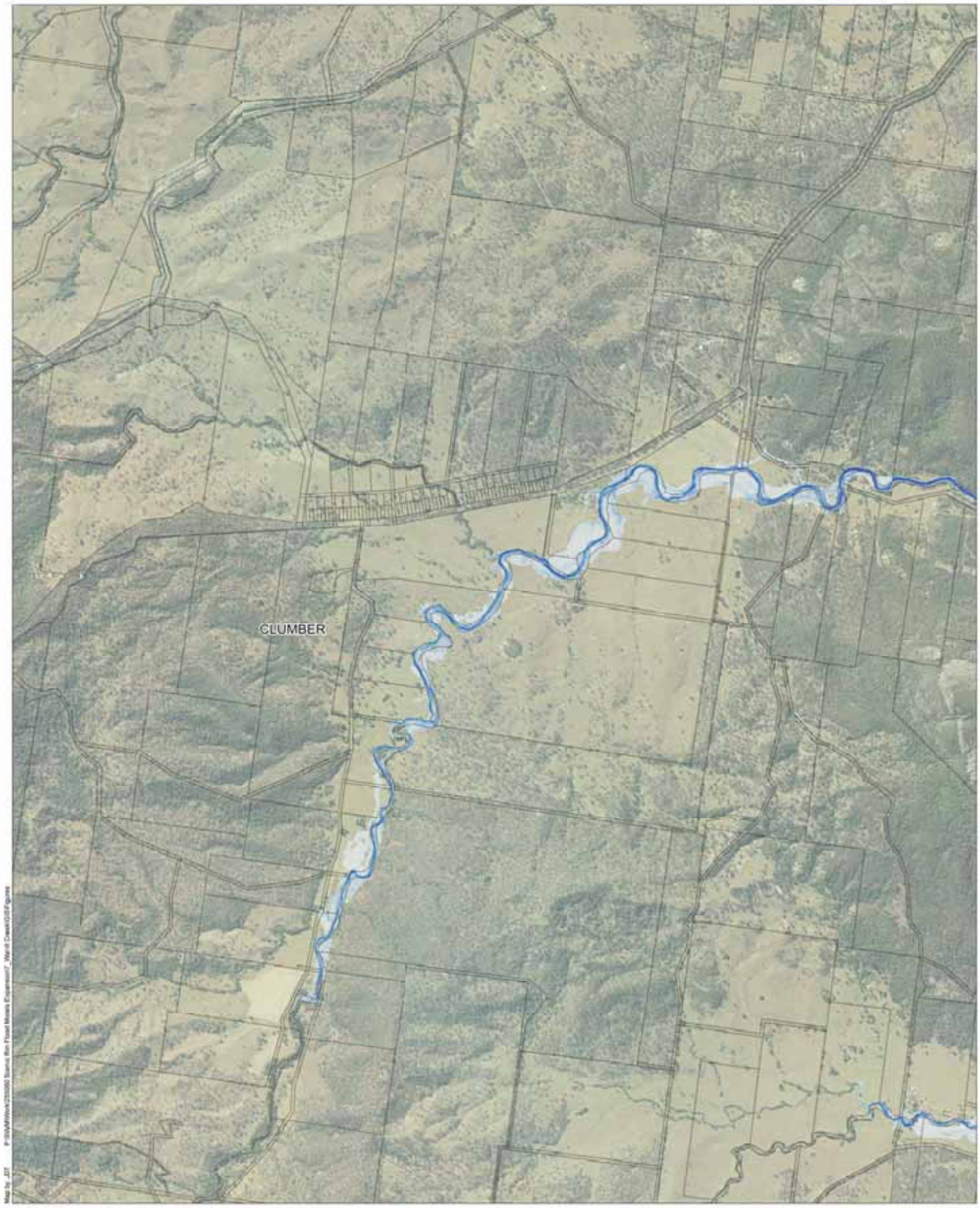
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-j**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

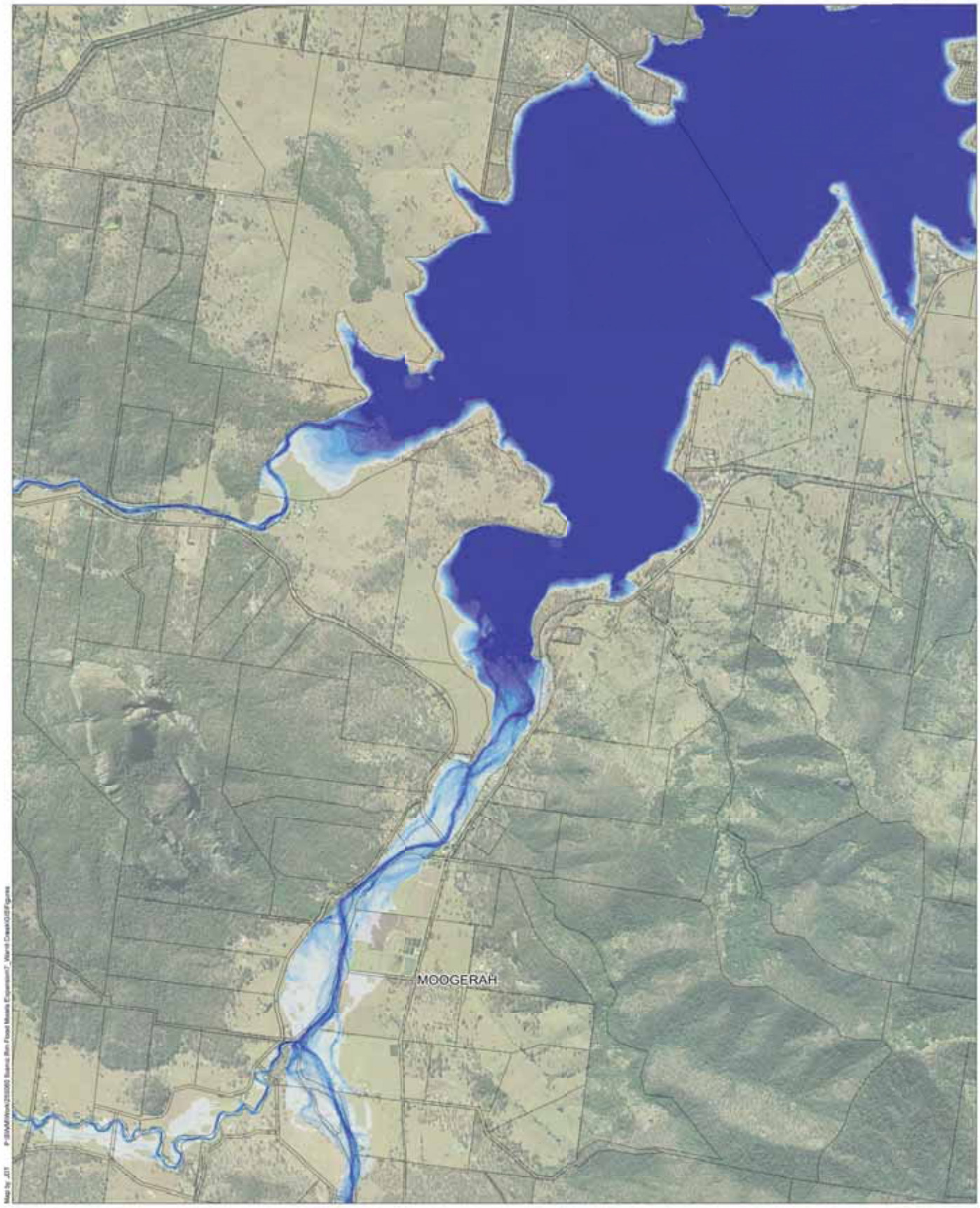
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-k**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

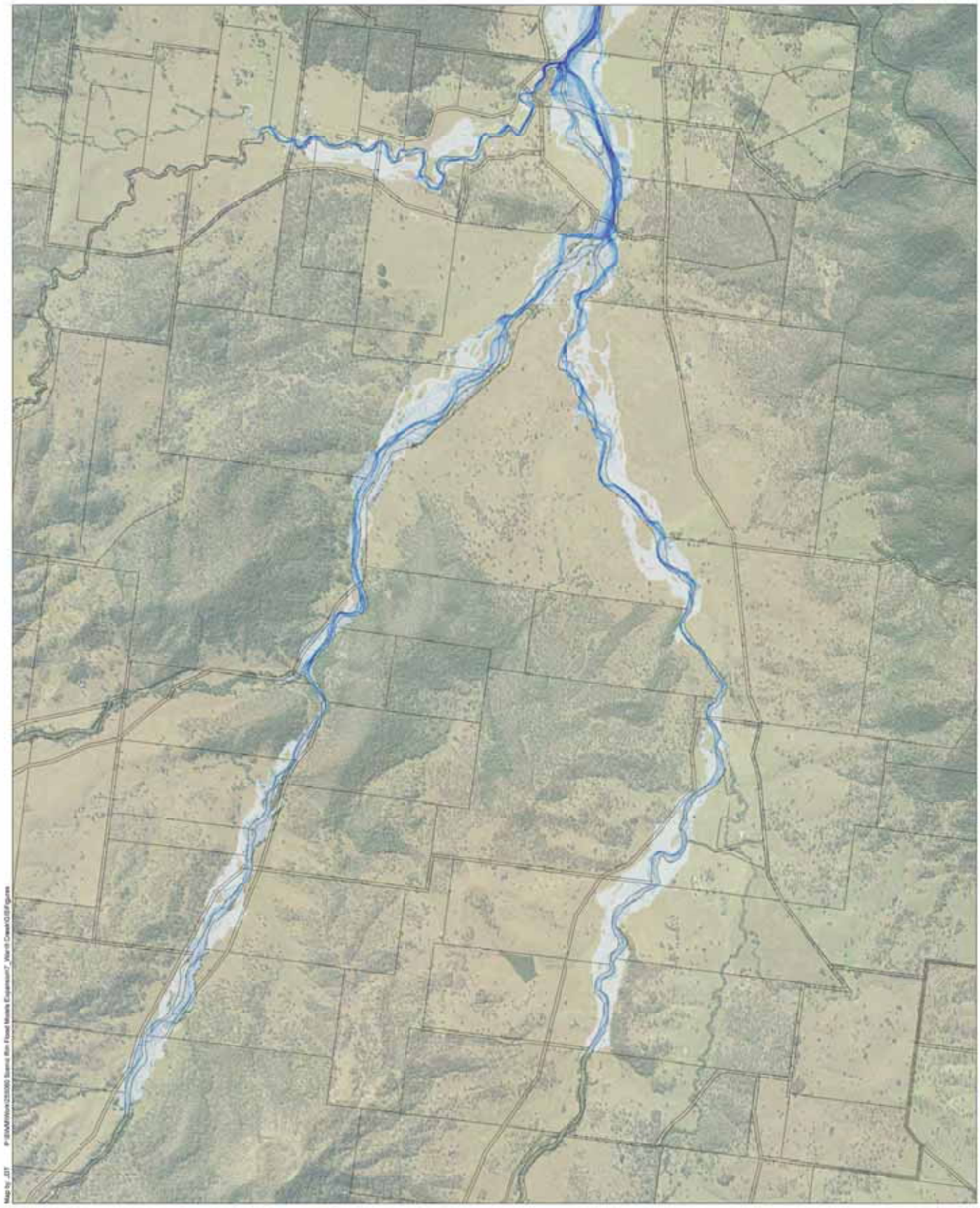
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-I**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

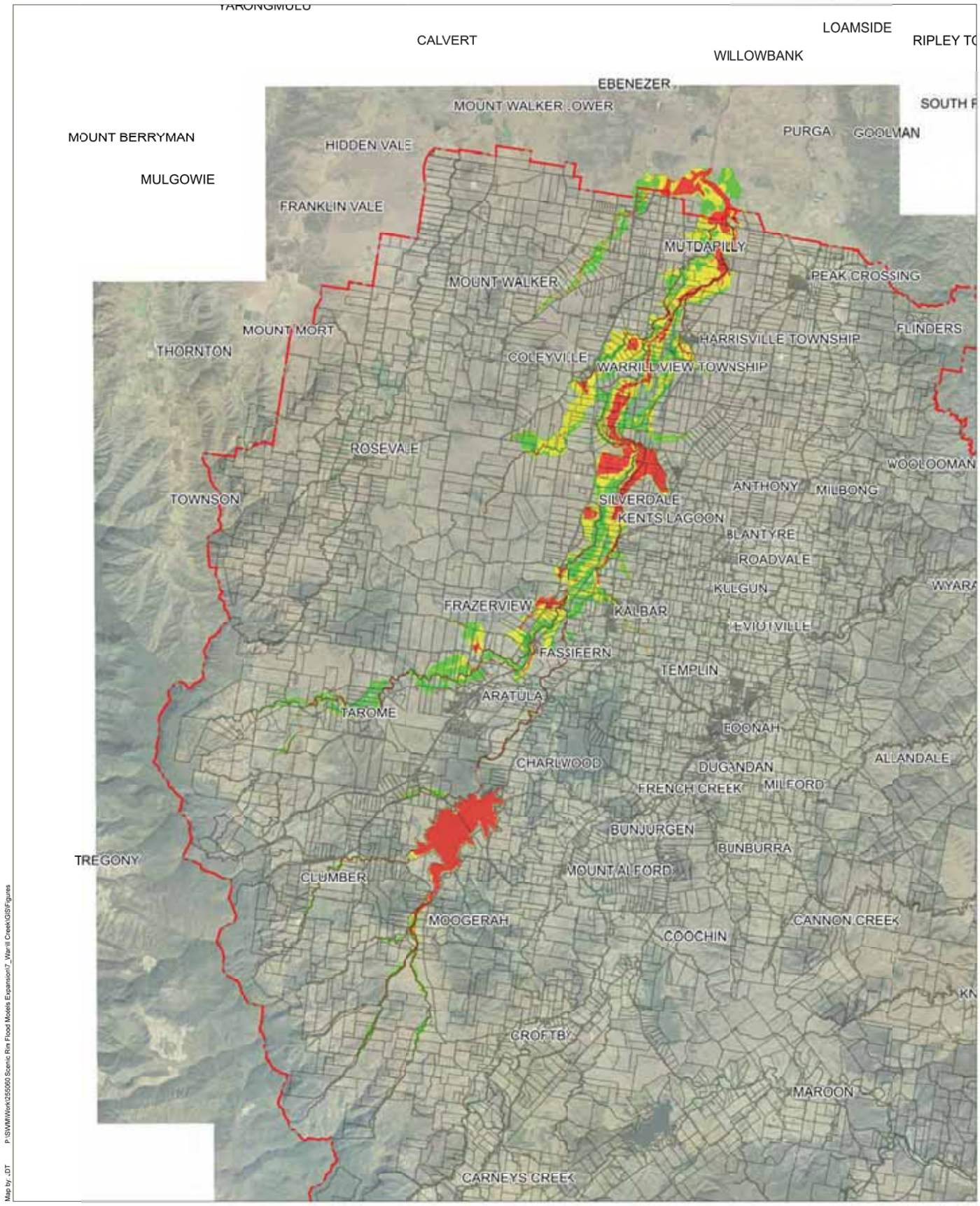
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B6-m**

1% AEP Event Climate Change Scenario 4.5 - Peak Depth Map



Map by: JDT P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

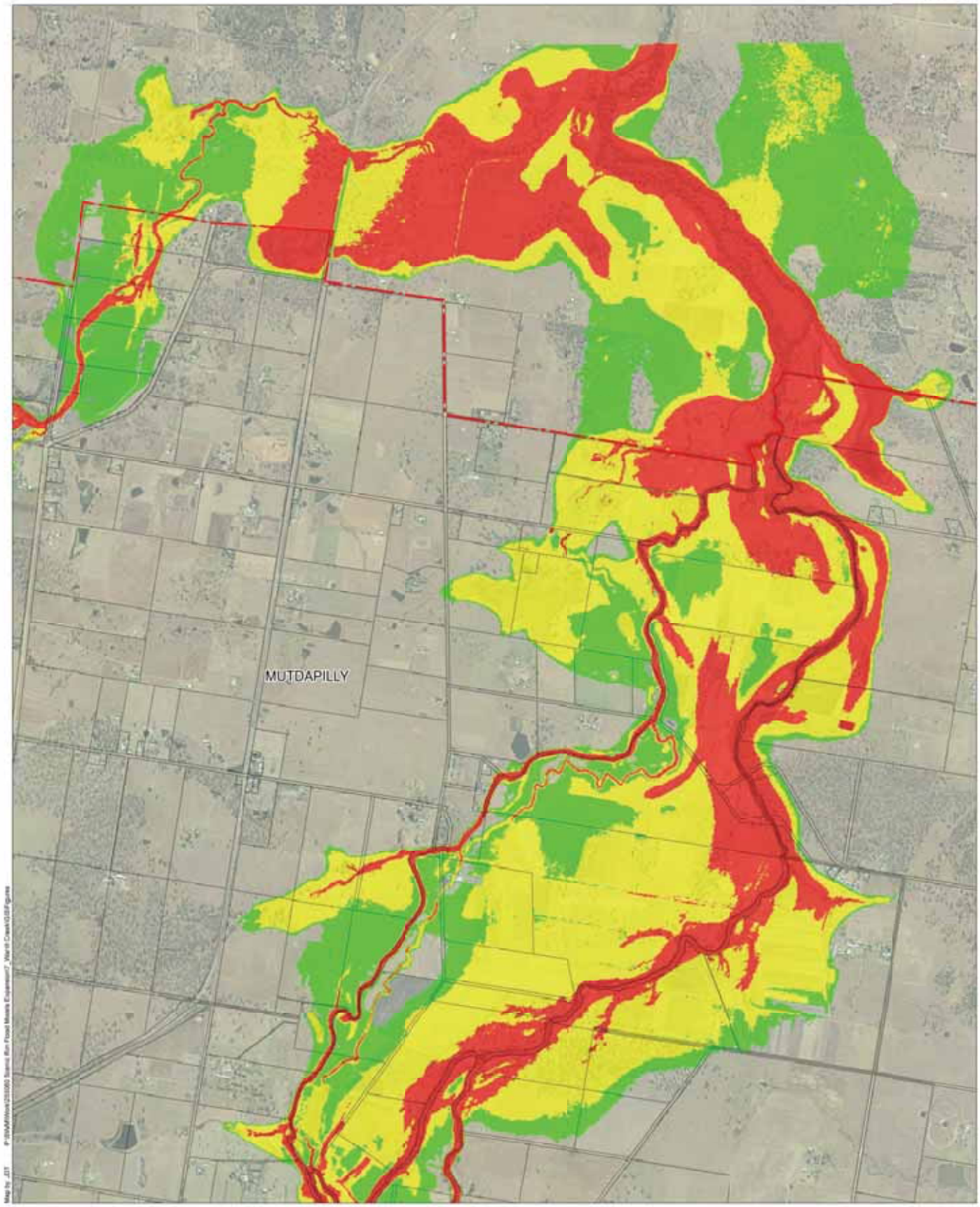
Notes:

1:200,000
0 5,000 m 10,000 m

Date: 10/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

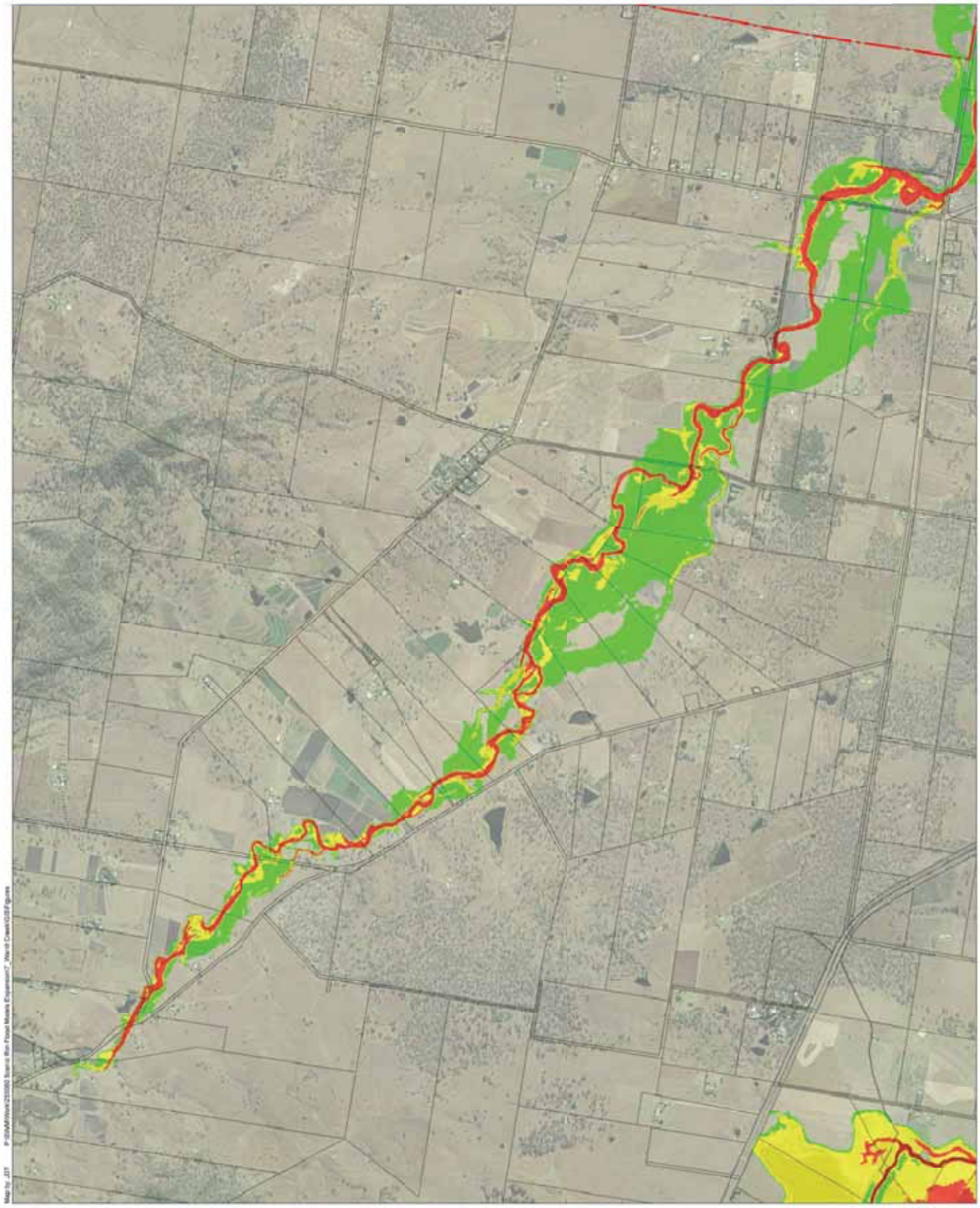
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-a

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

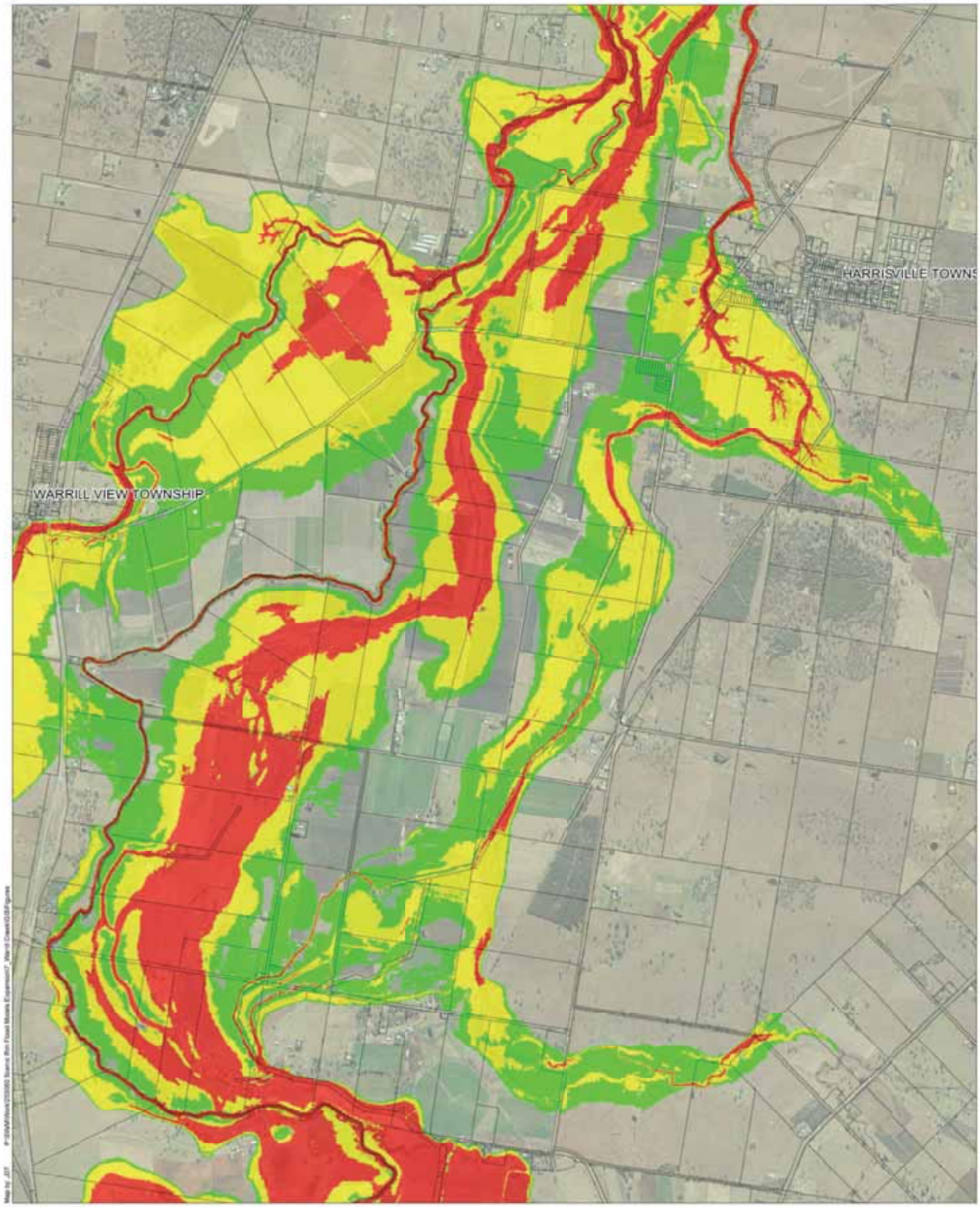
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-b

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

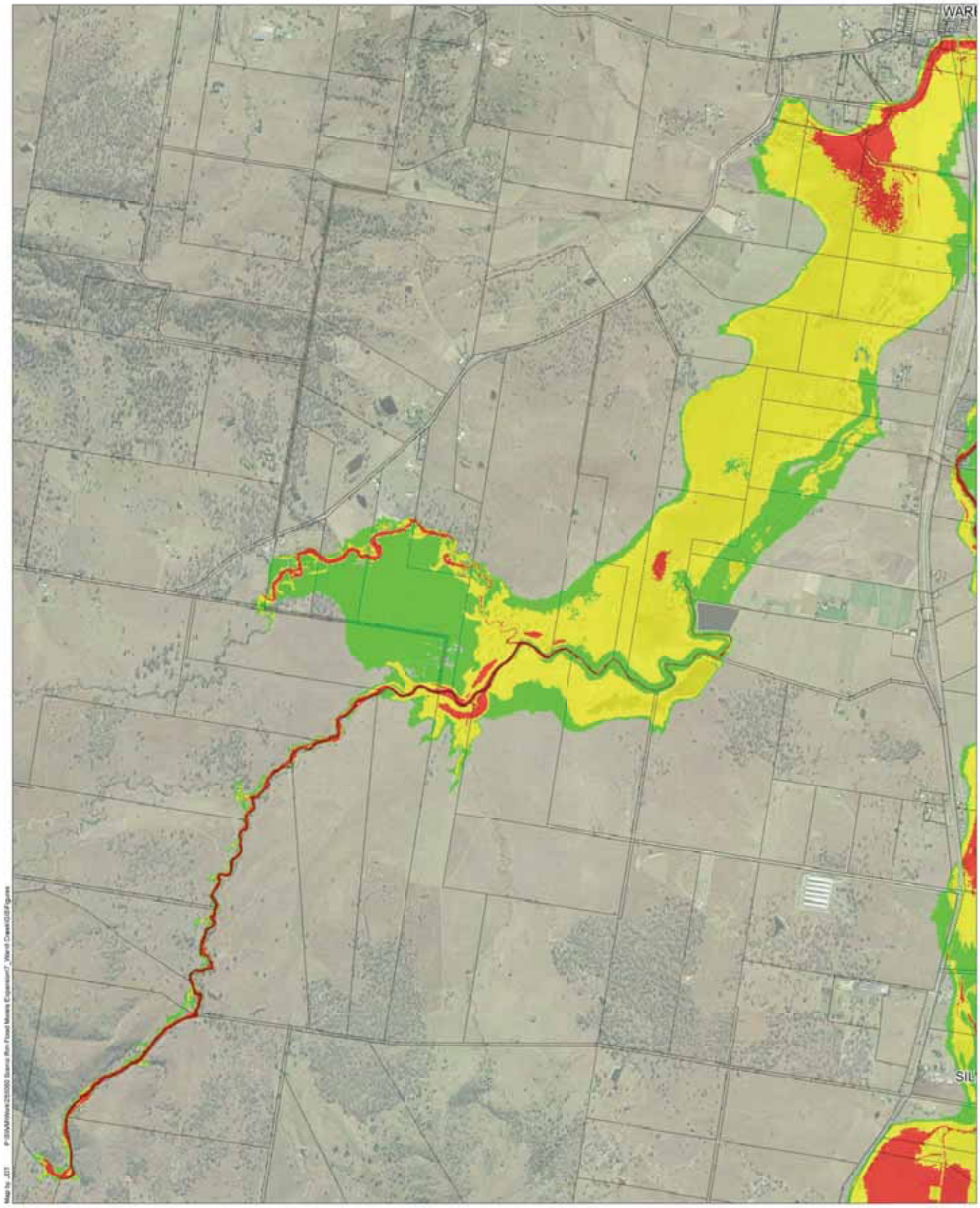
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-c**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

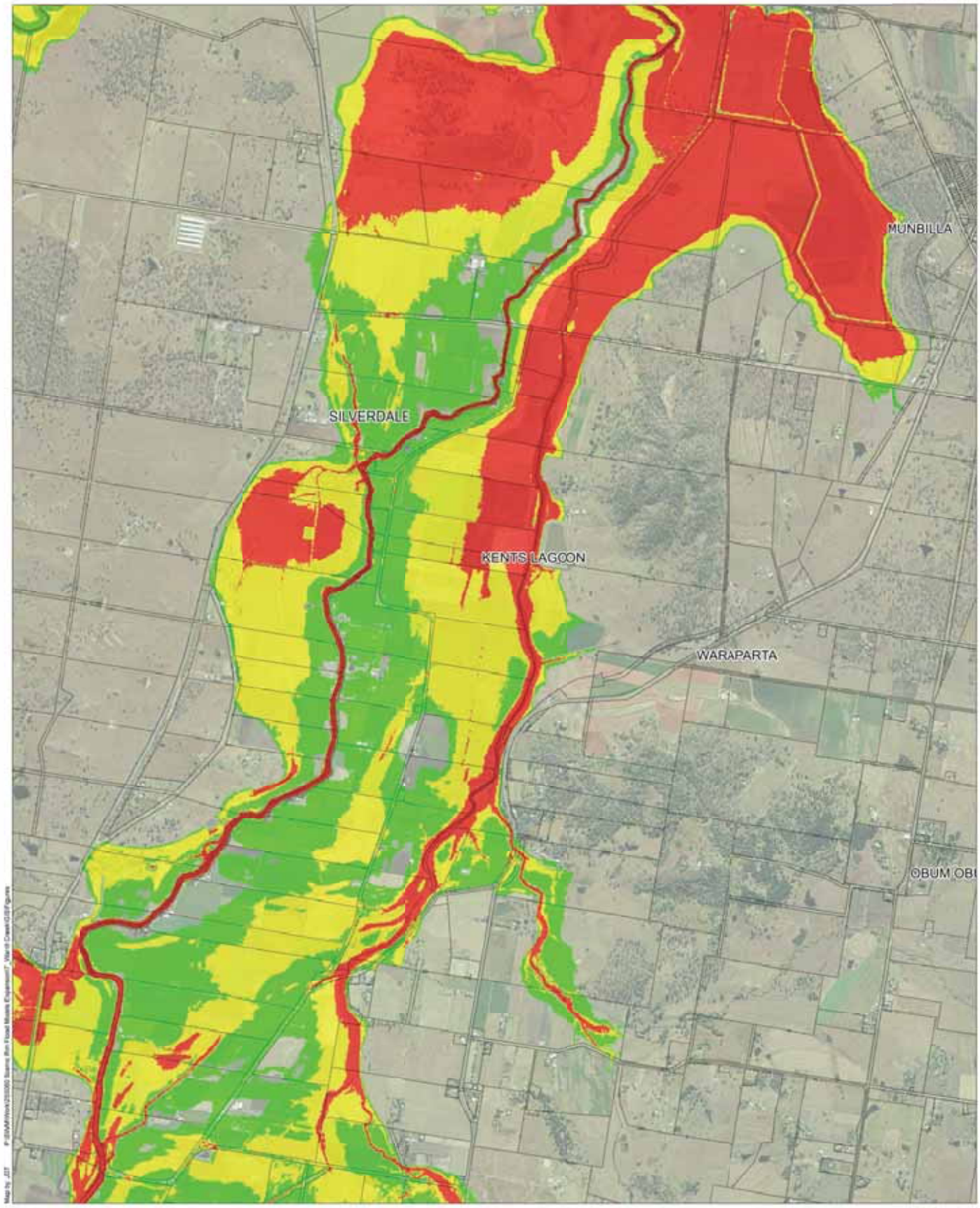
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-d**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

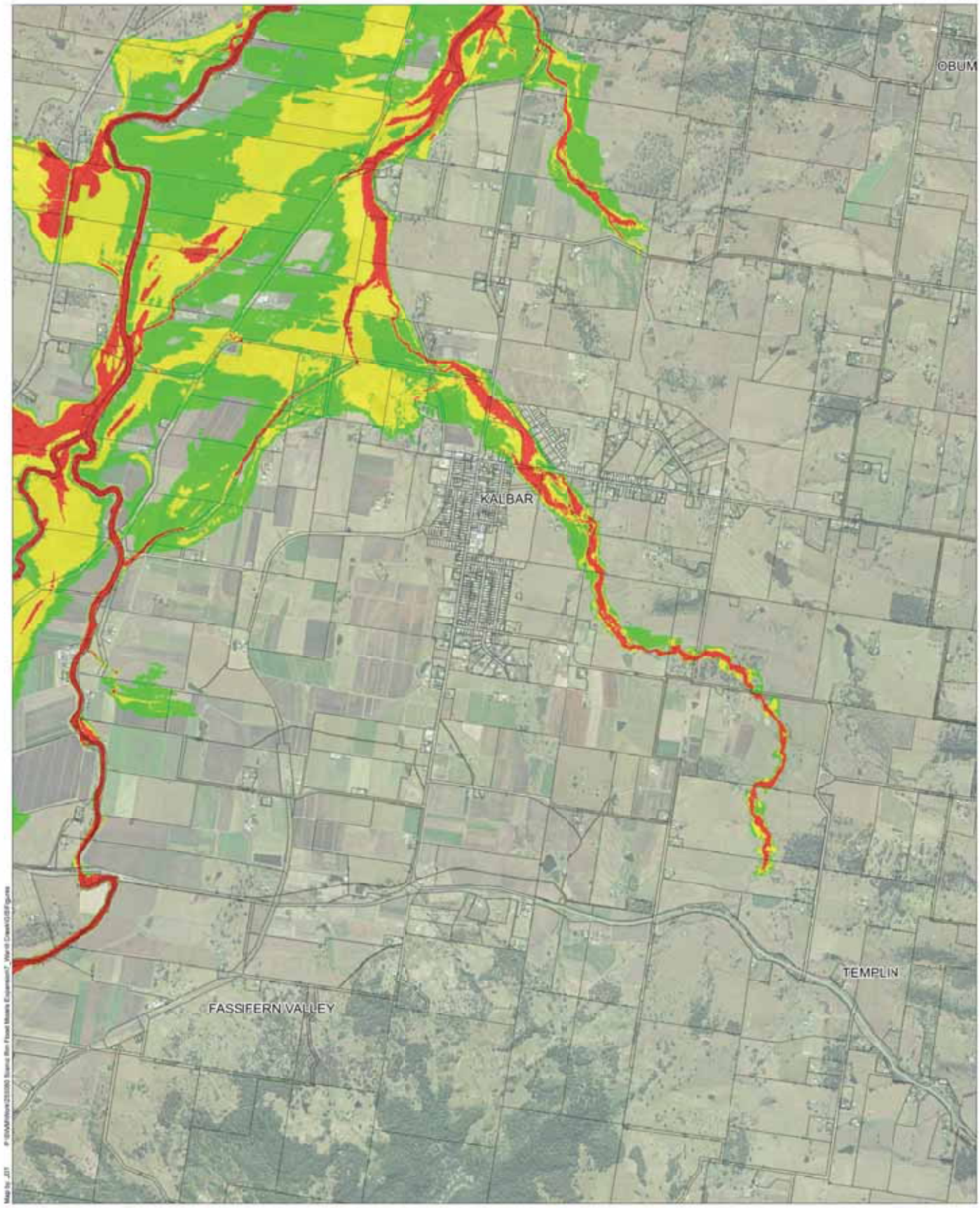
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-e

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

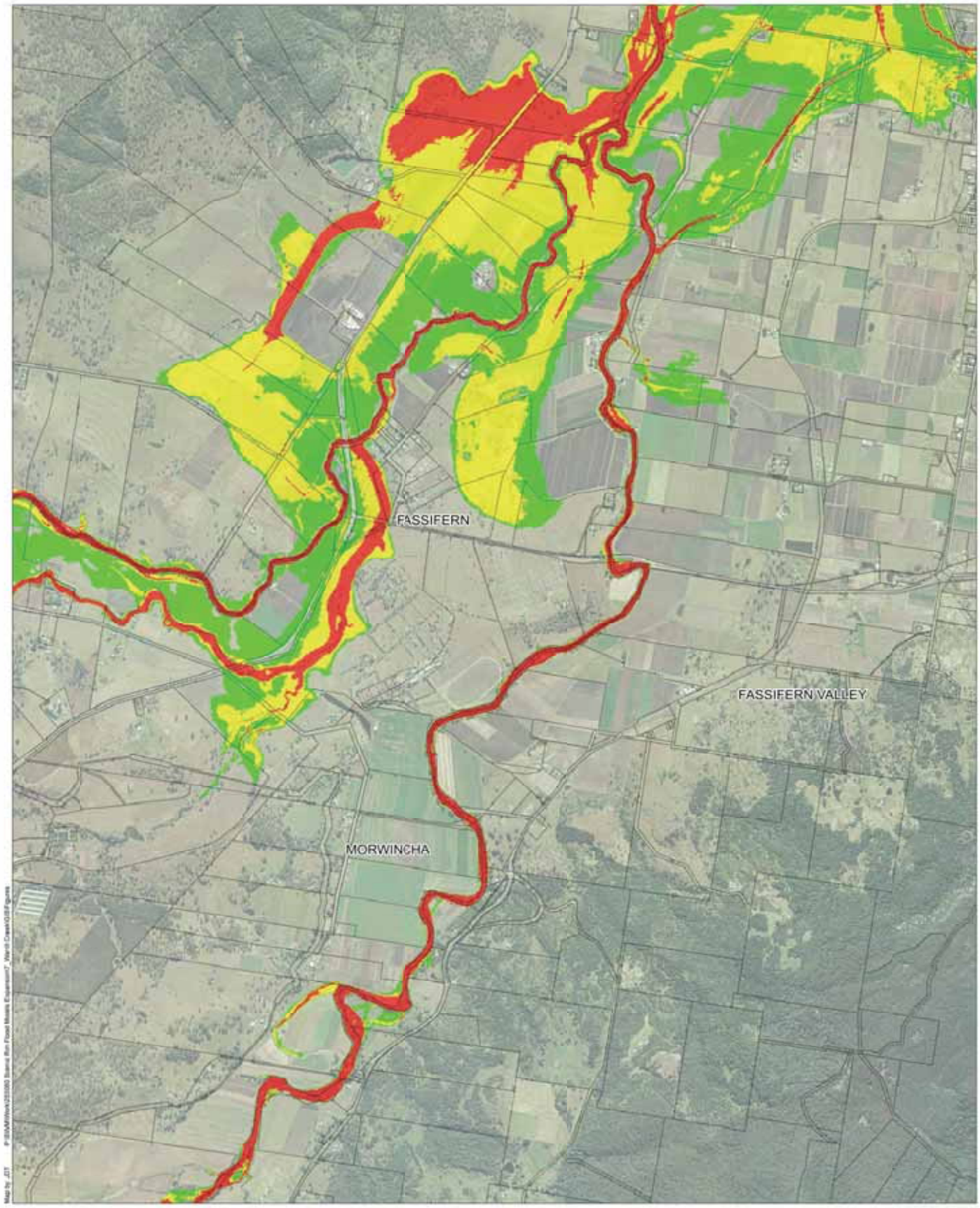
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-f**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

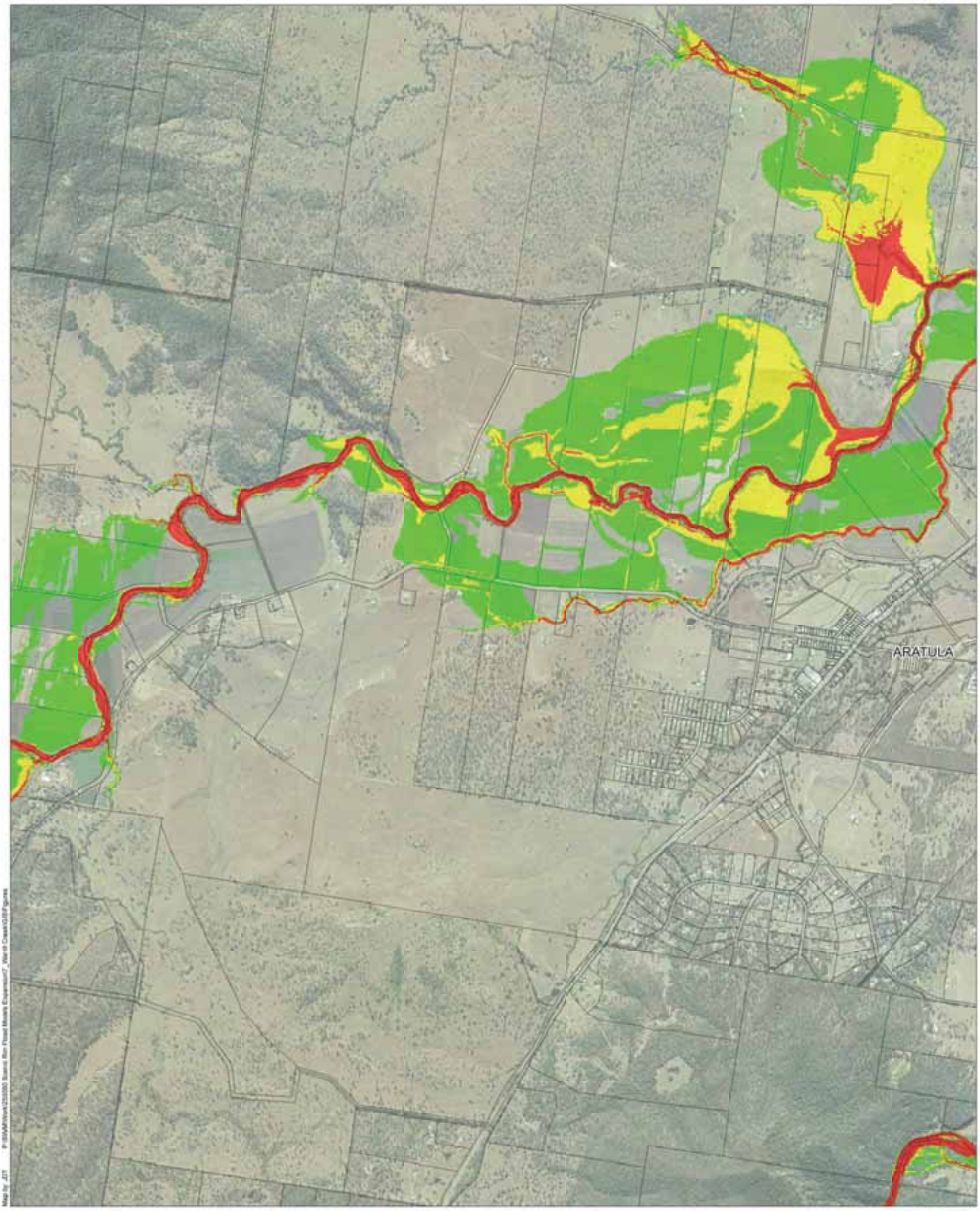
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-g

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

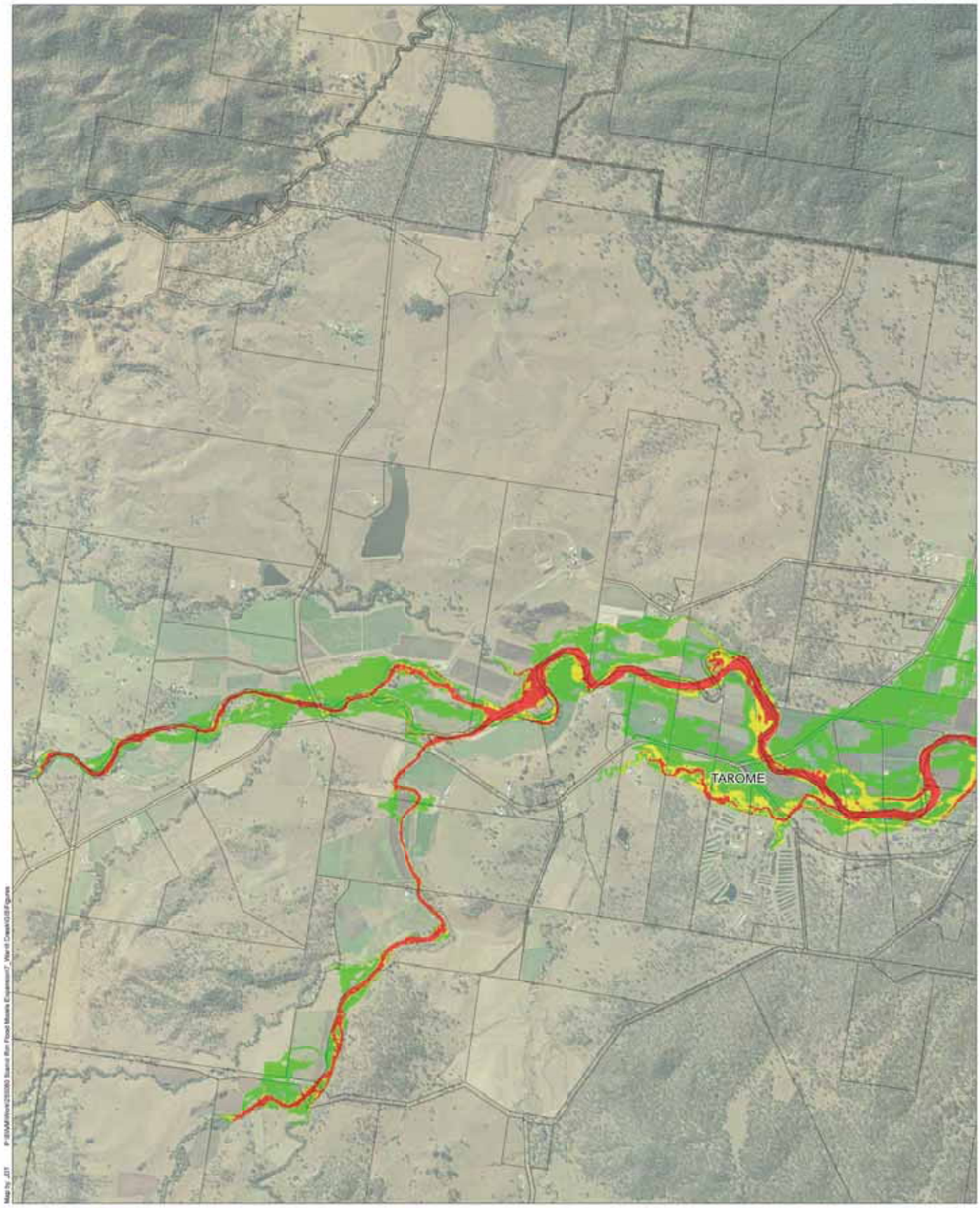
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-h

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

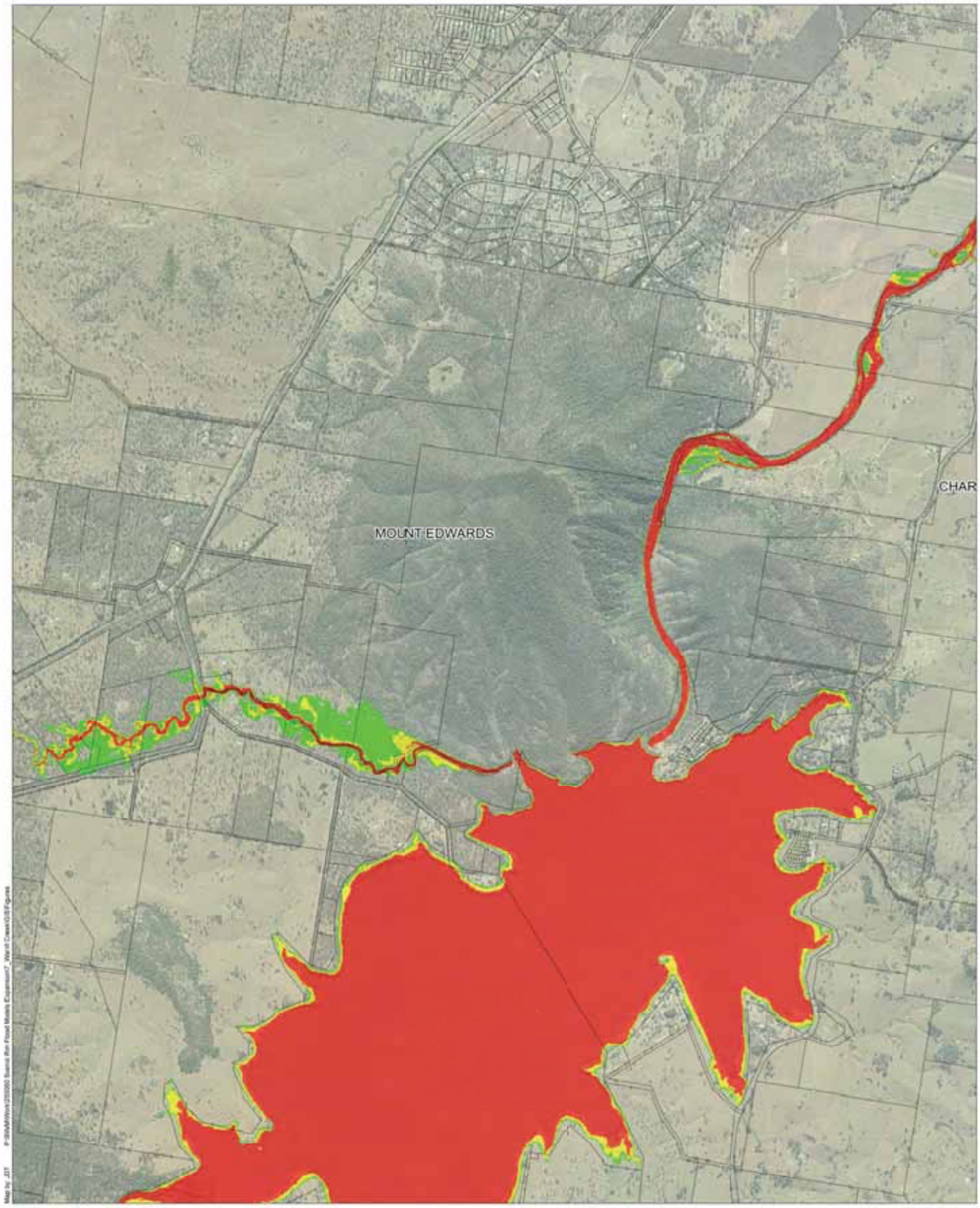
Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-i**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

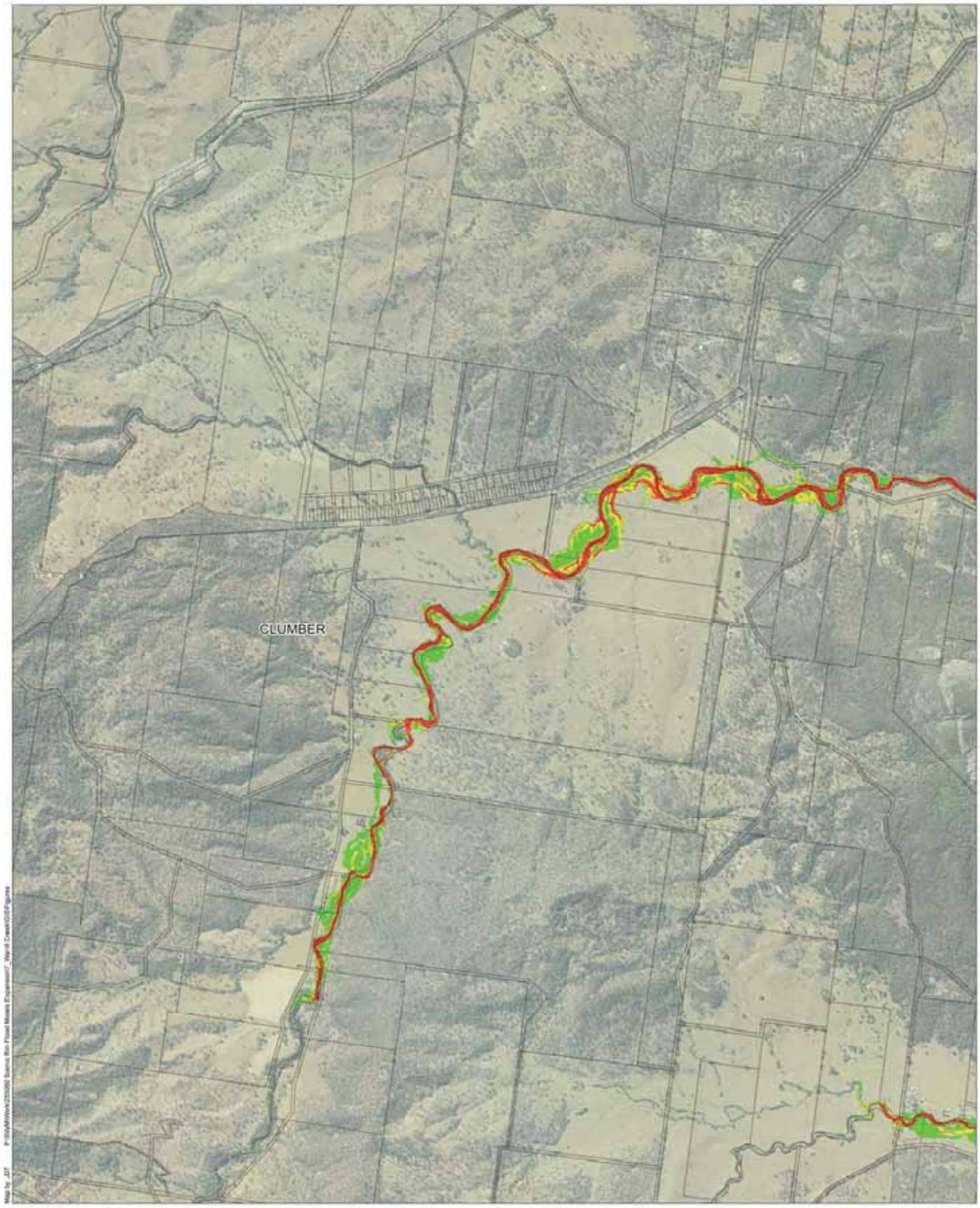
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure B7-j

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

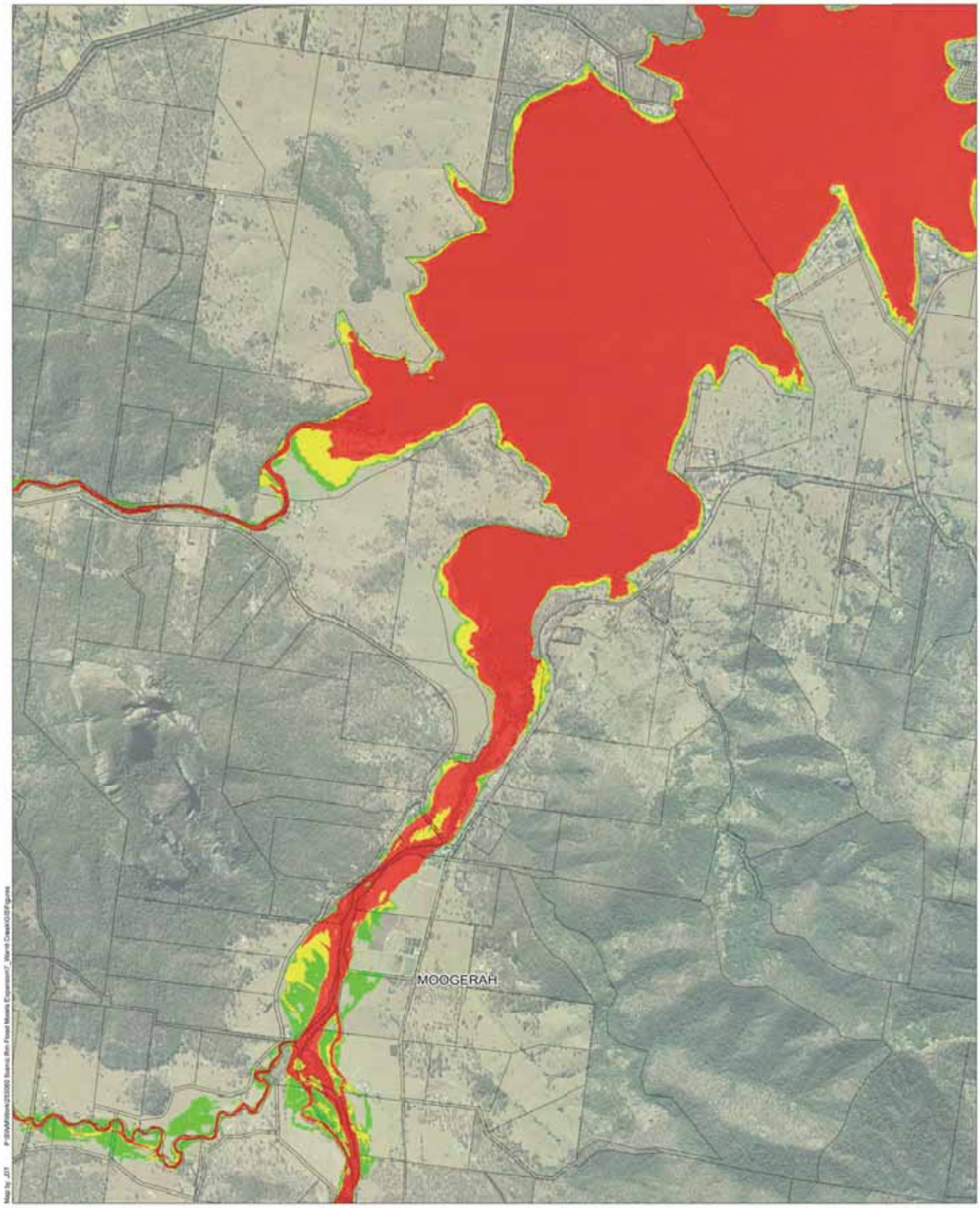
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-k**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

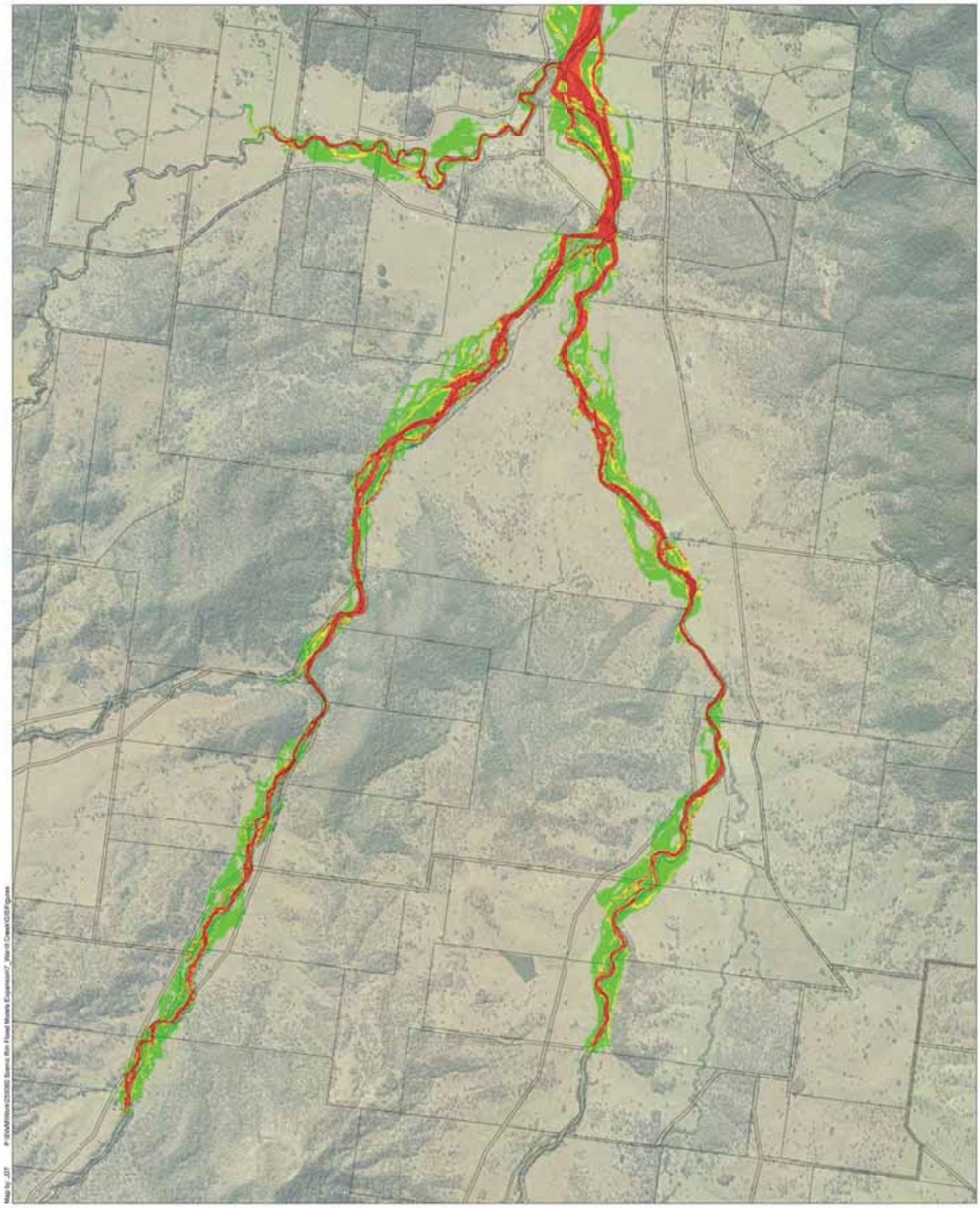
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-I**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

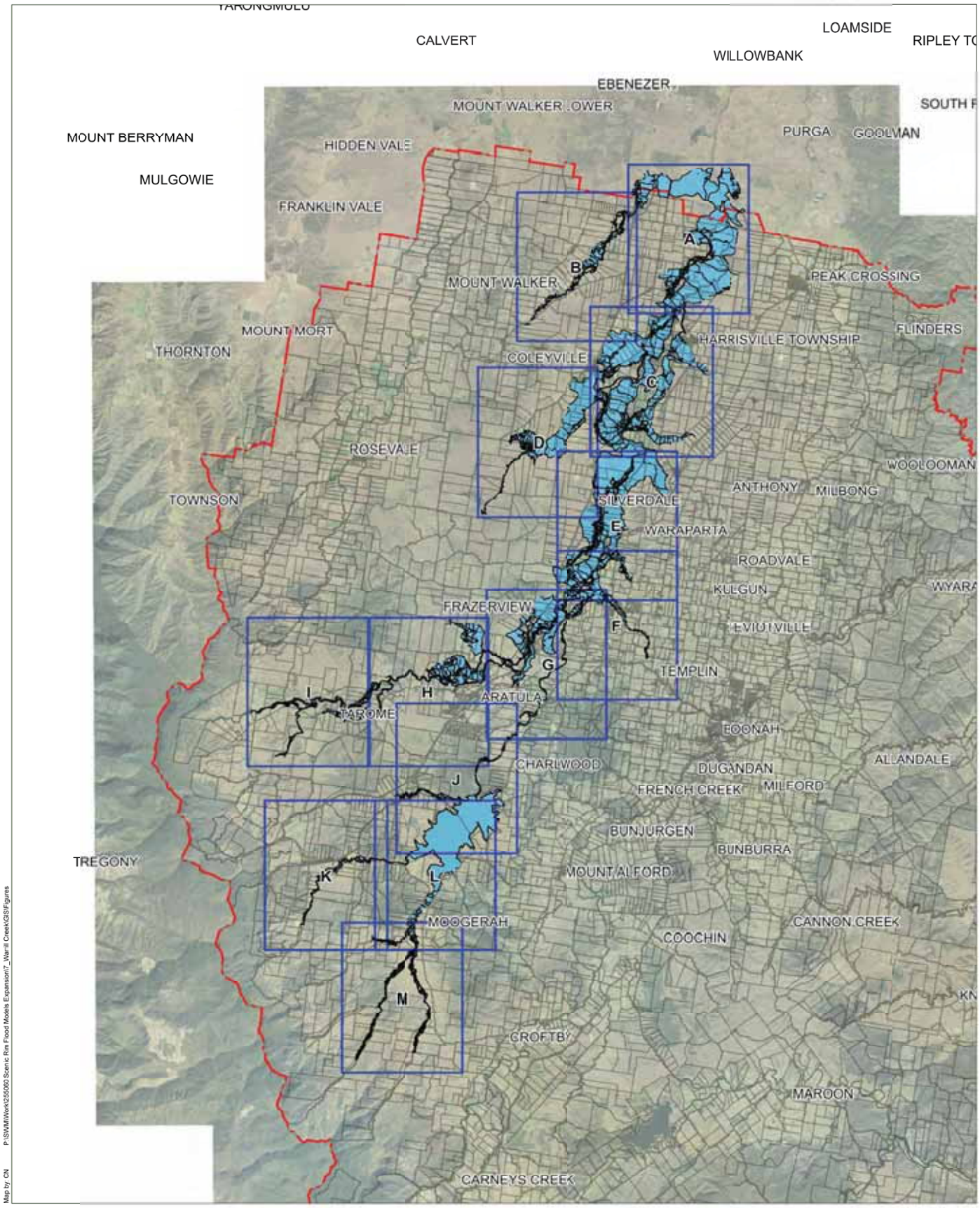
0 625 m 1,250 m

Date: 10/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure B7-m**

1% AEP Event Climate Change Scenario 4.5 - Peak Hazard Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:200,000

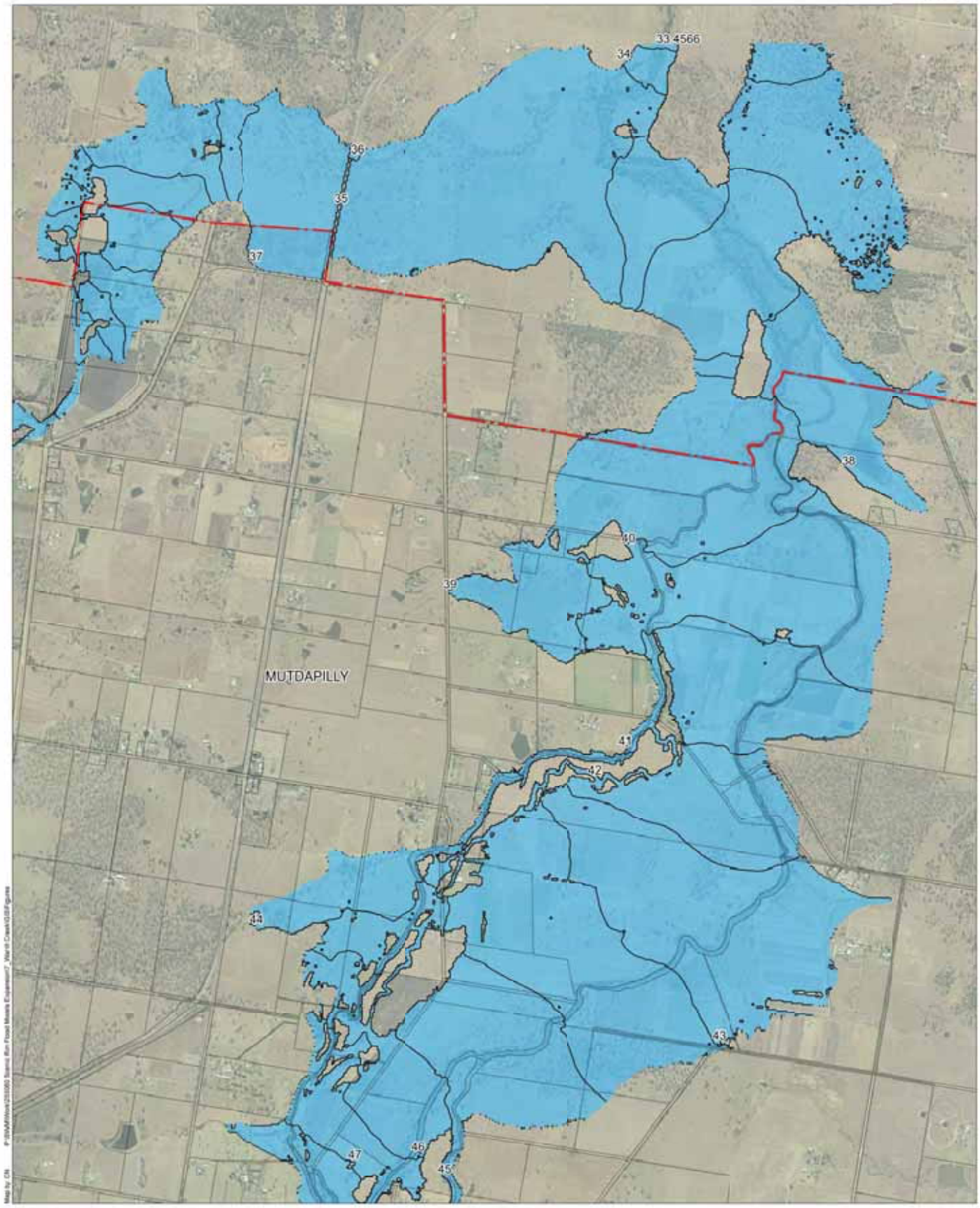
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1**

2% AEP Event - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

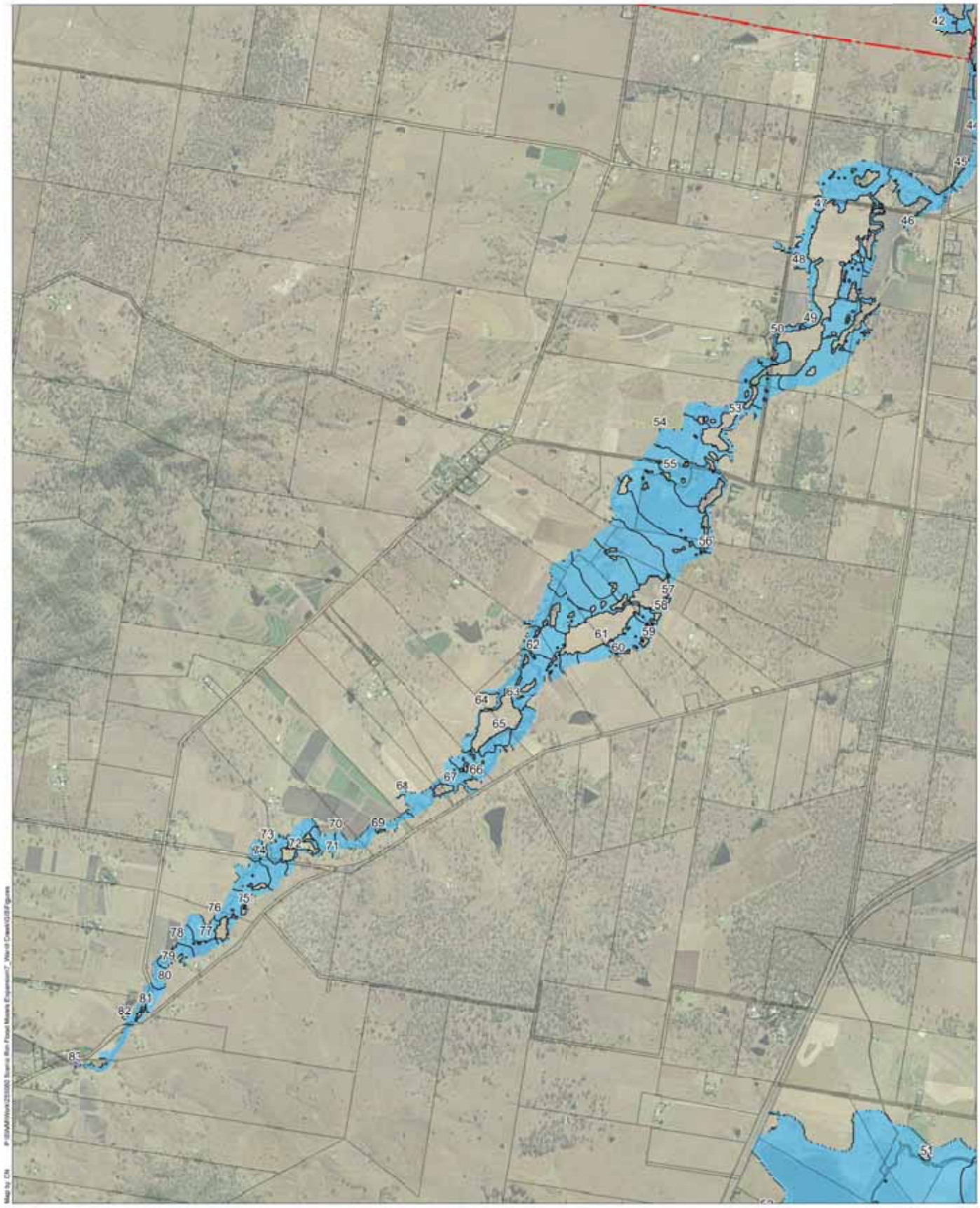
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-a**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

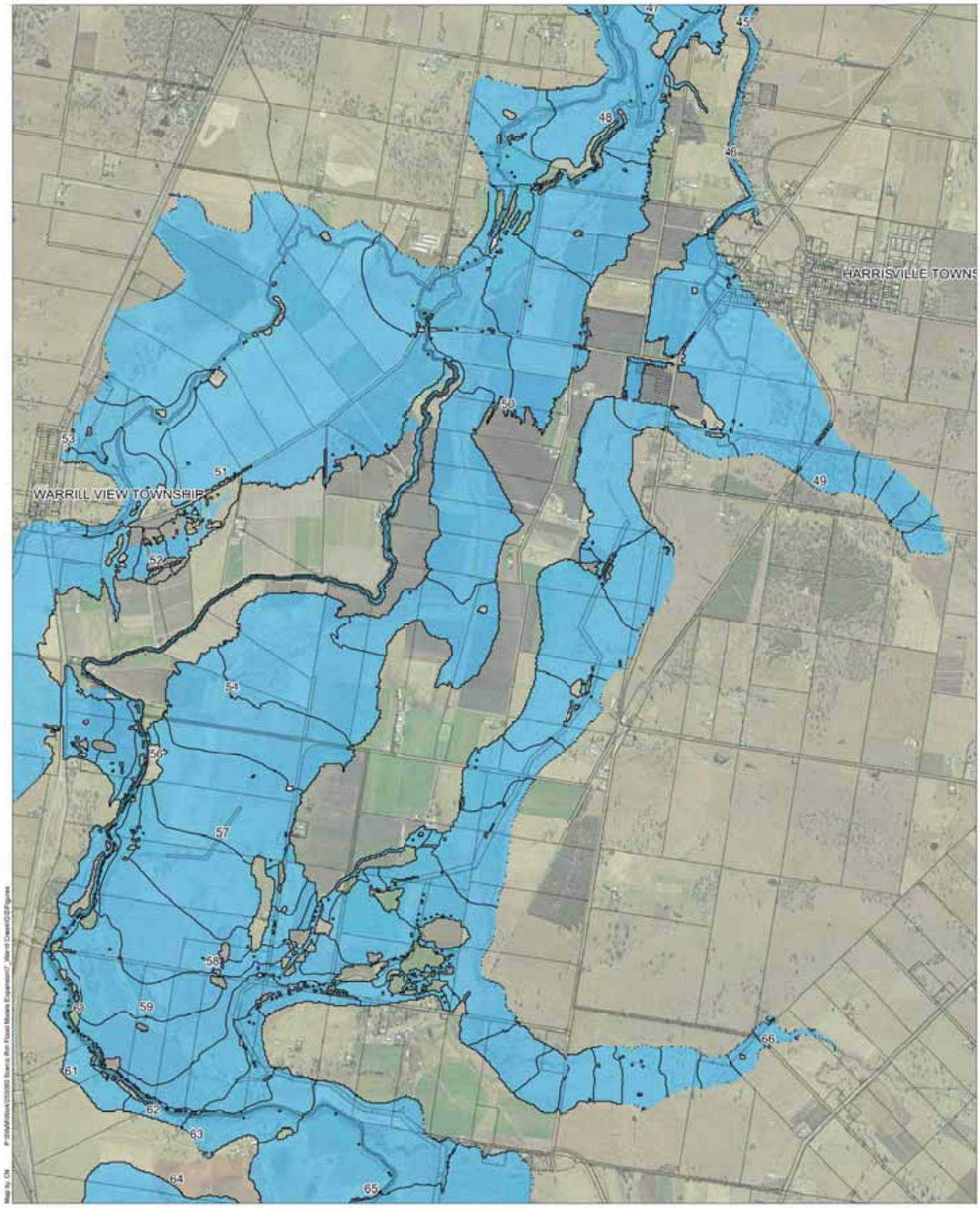
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-b**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

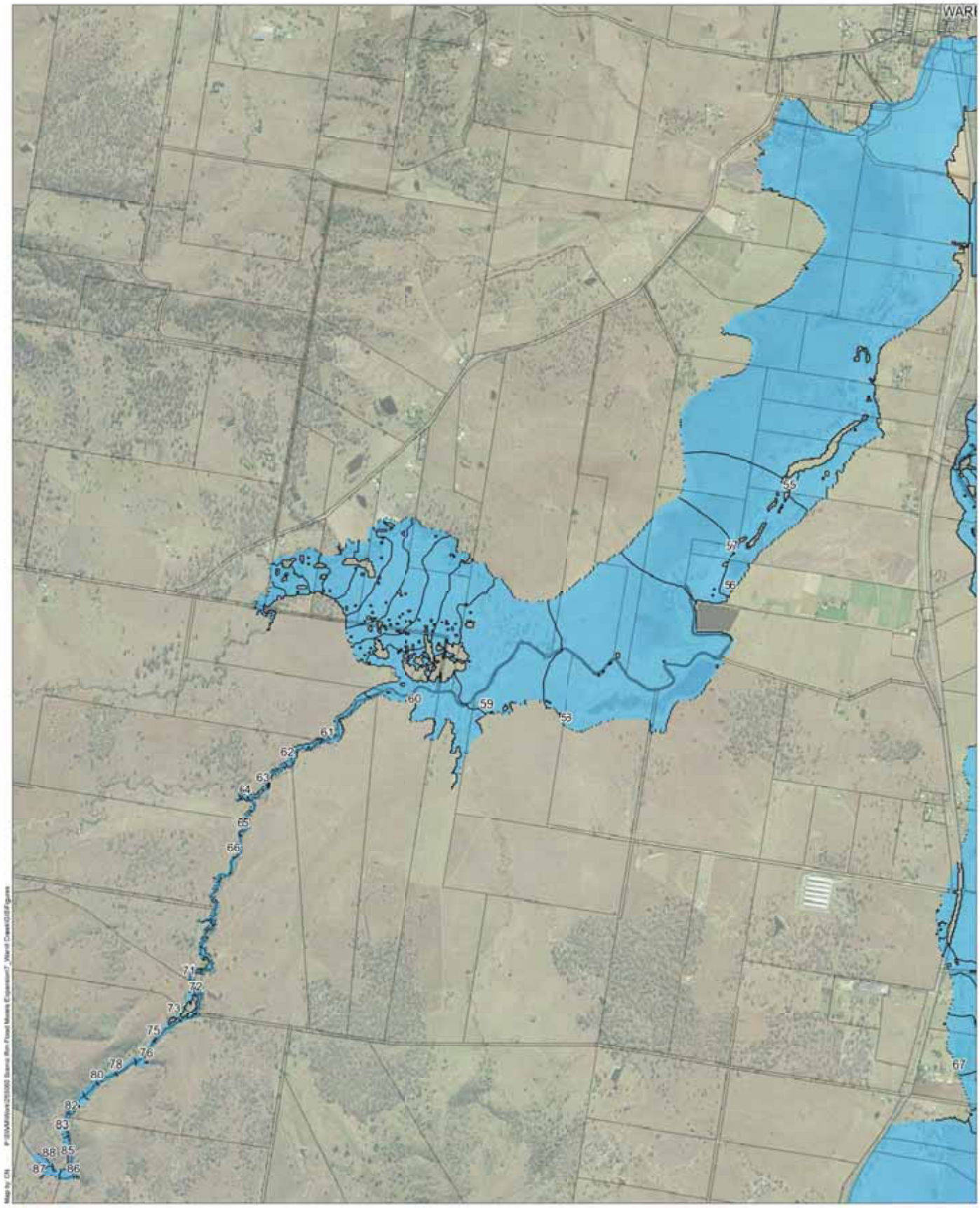
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-c**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

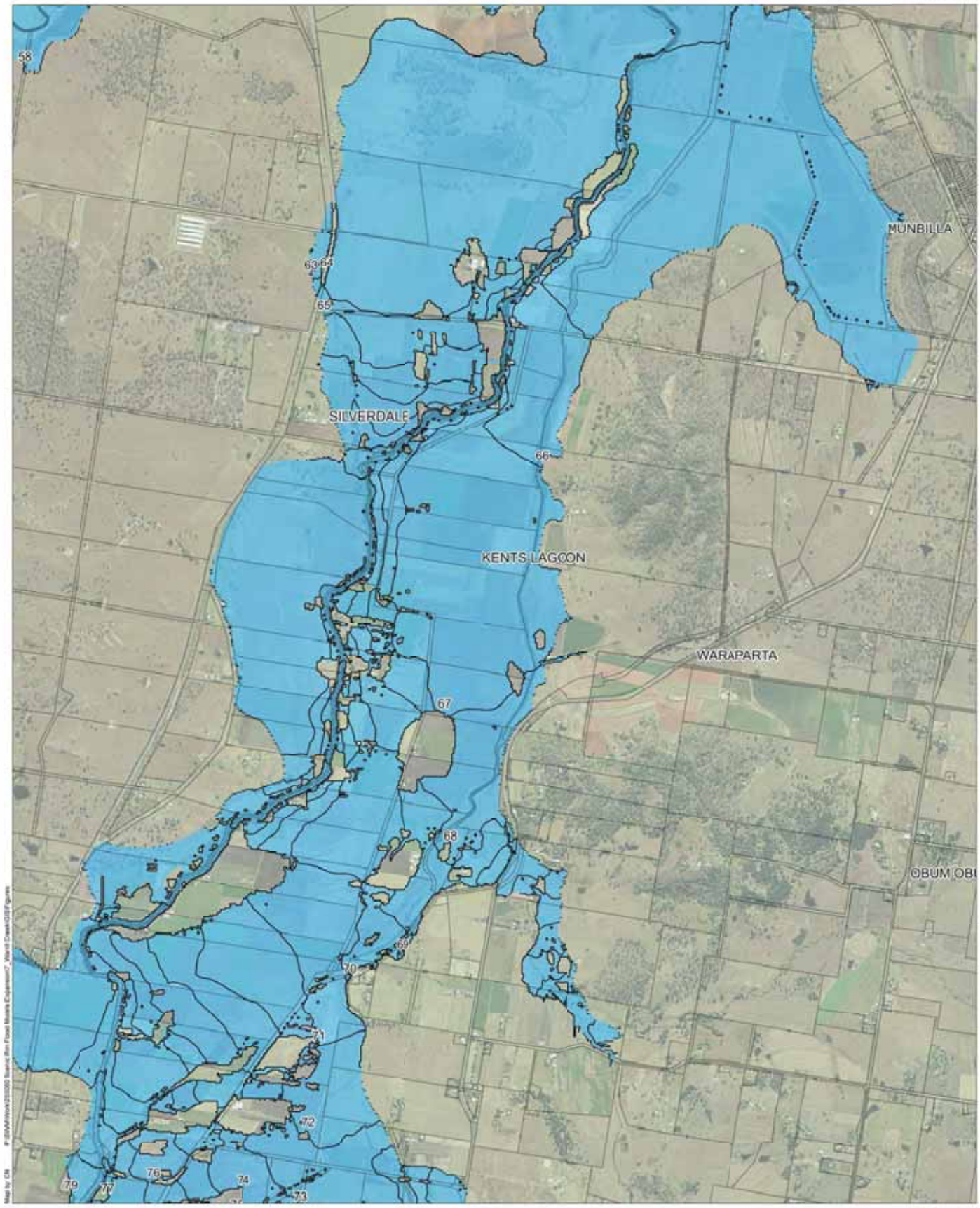
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-d**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

0 625 m 1,250 m

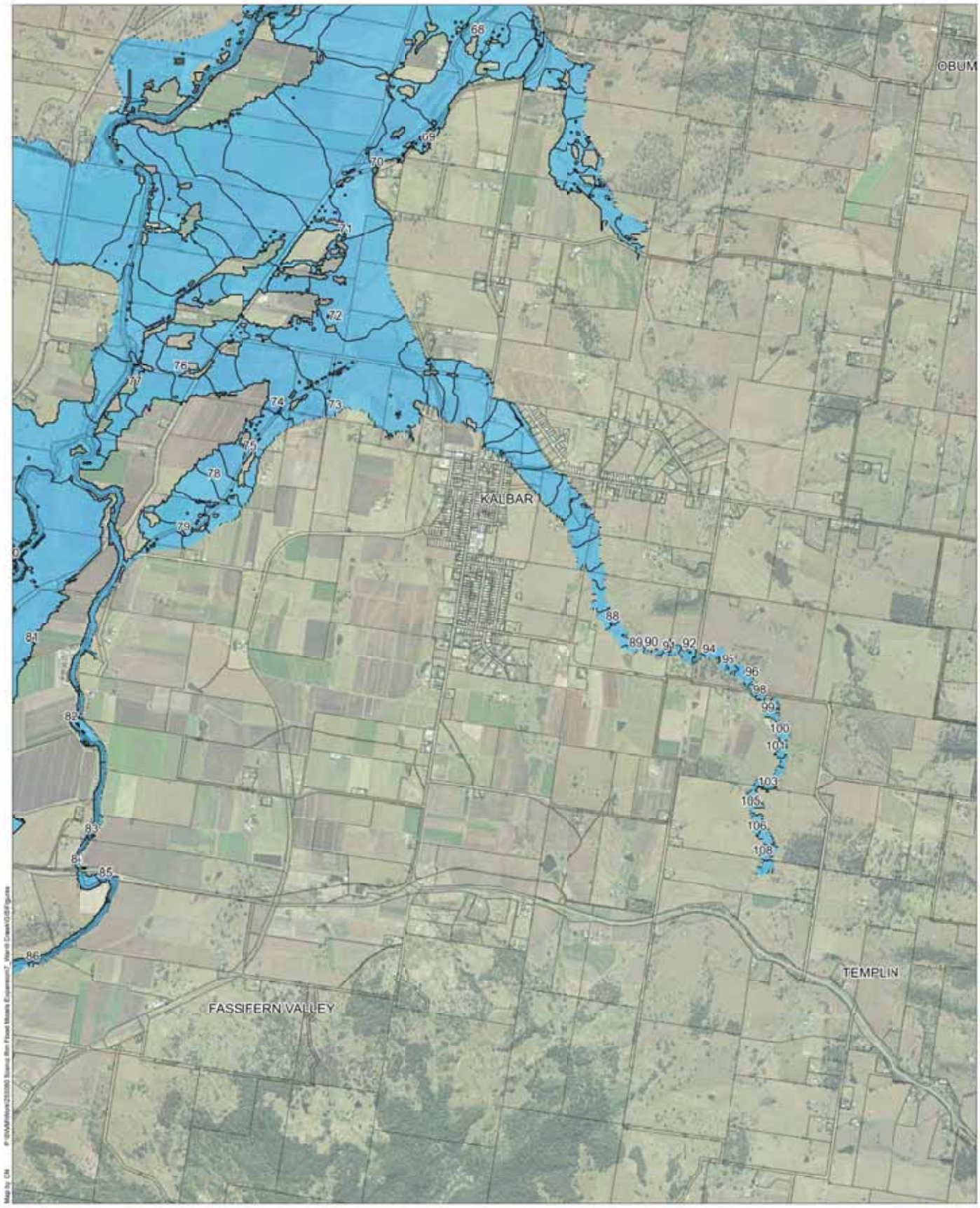
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-e**

2% AEP Event - Inundation Extent

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

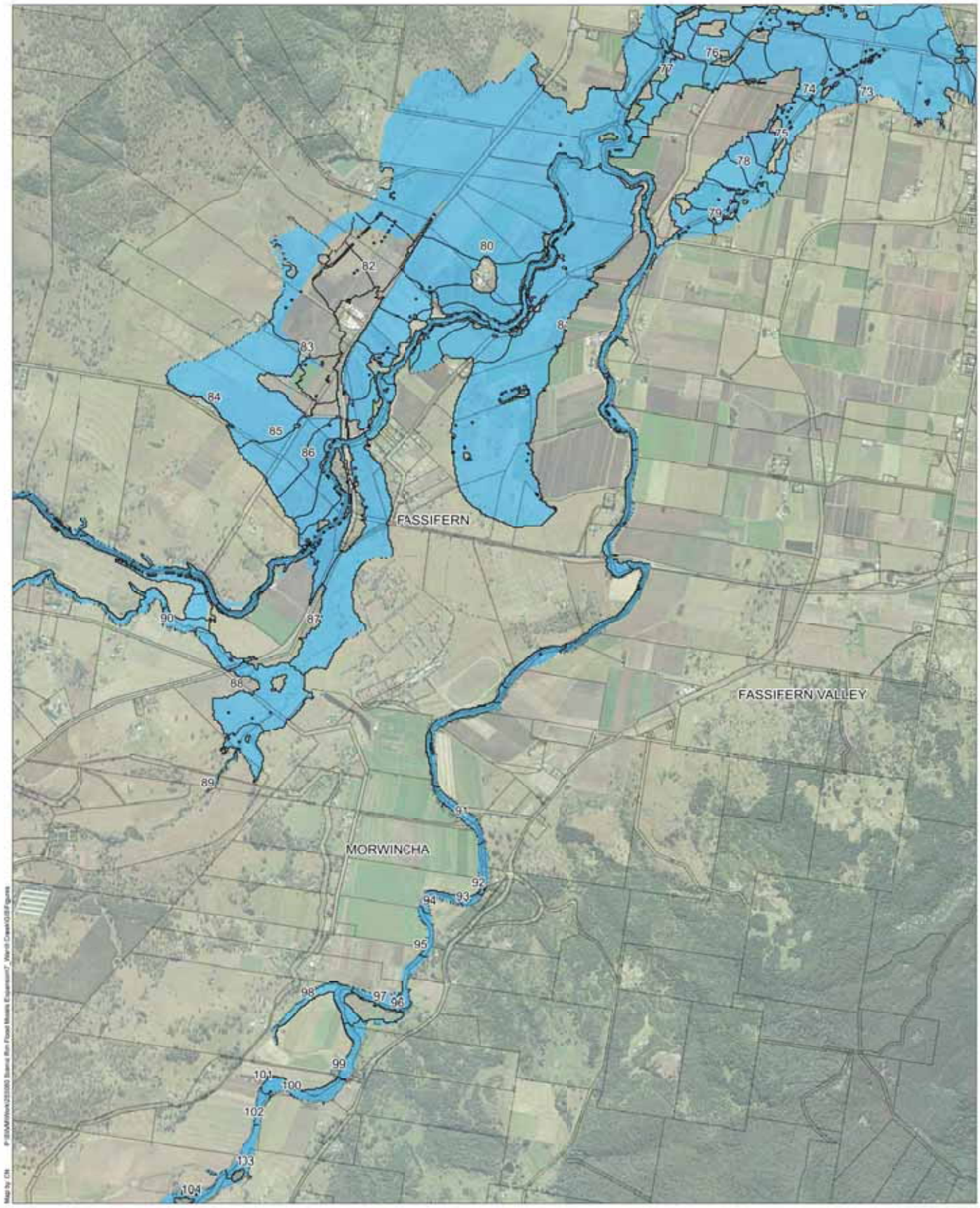
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-f

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

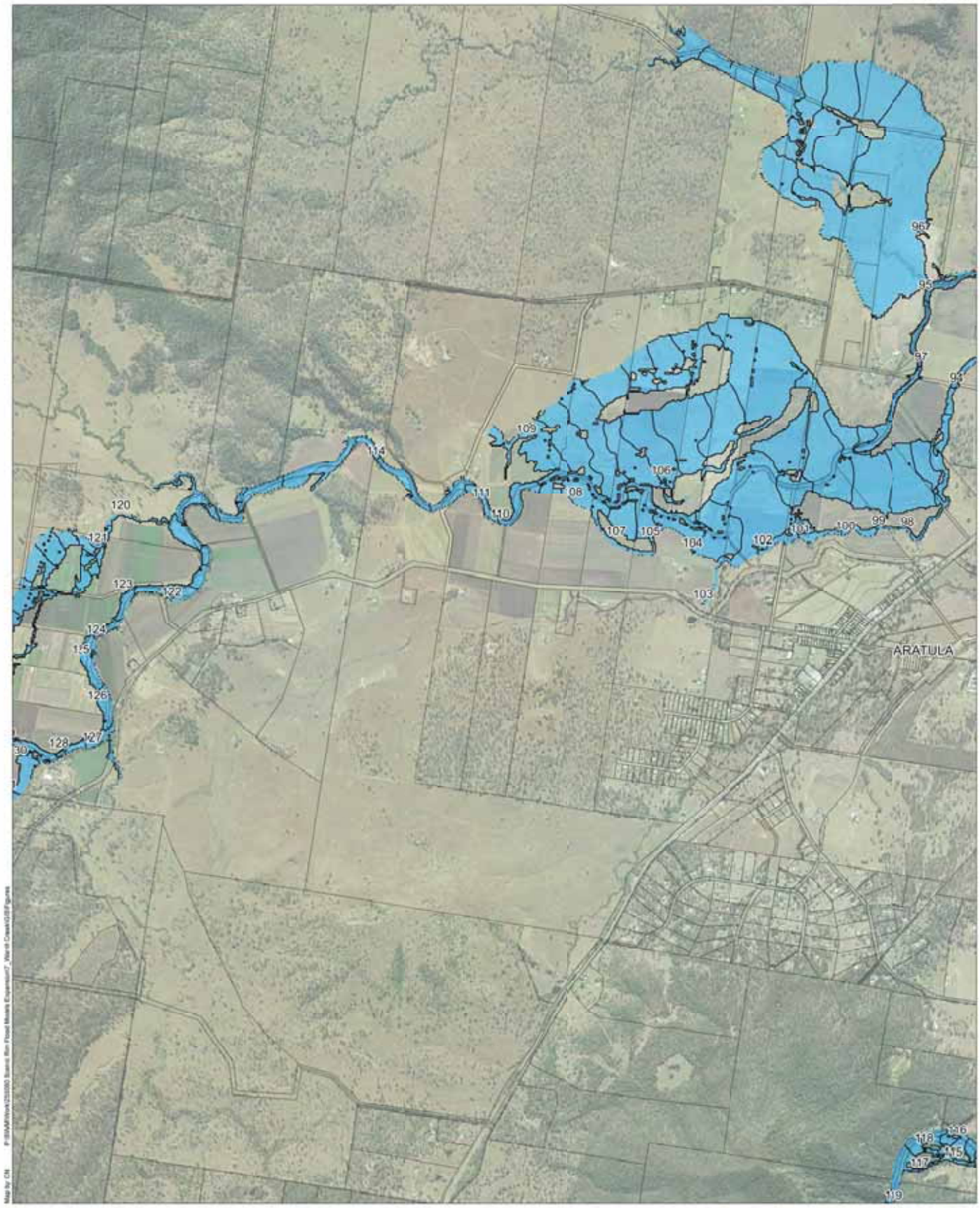
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-g

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

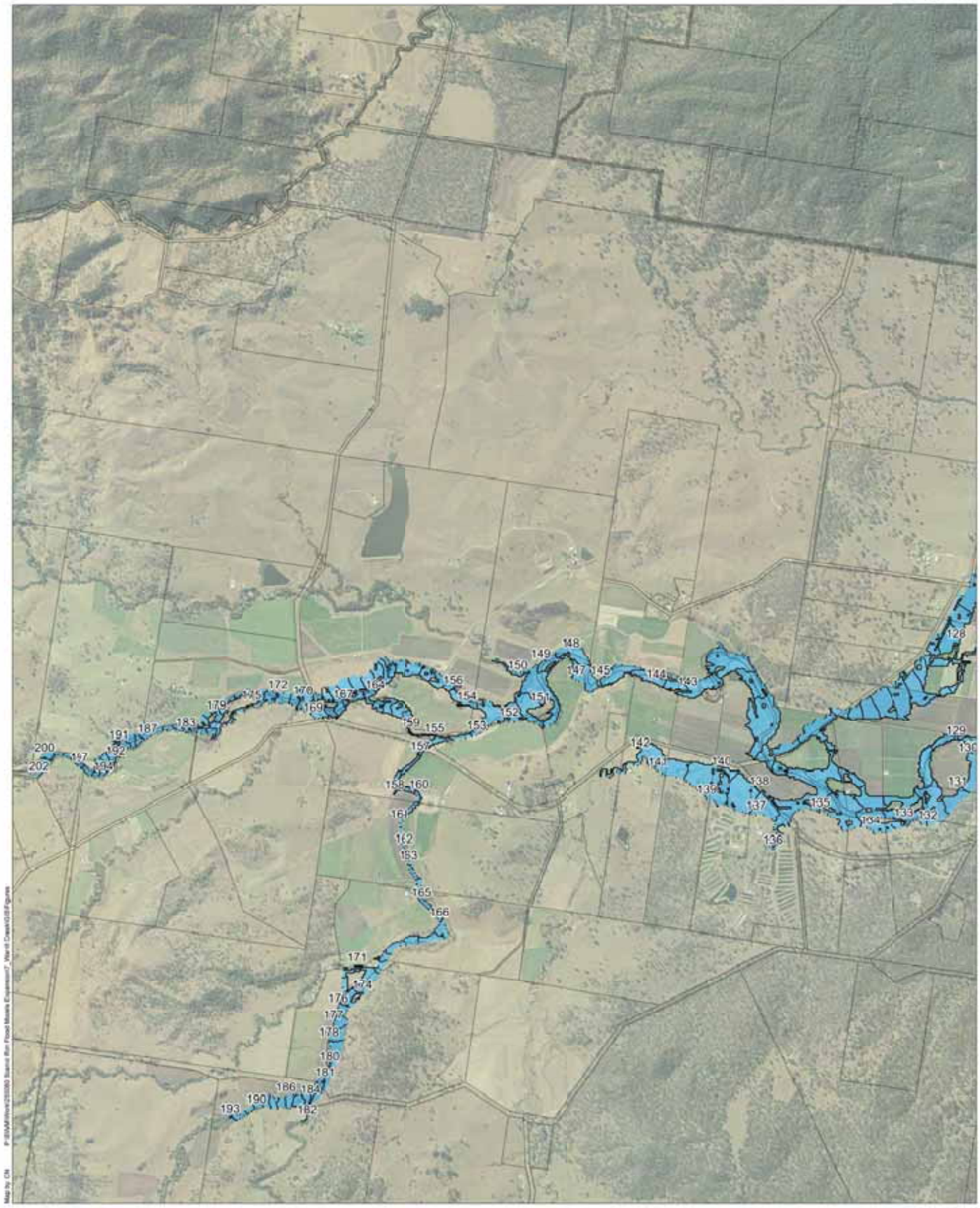
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-h**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

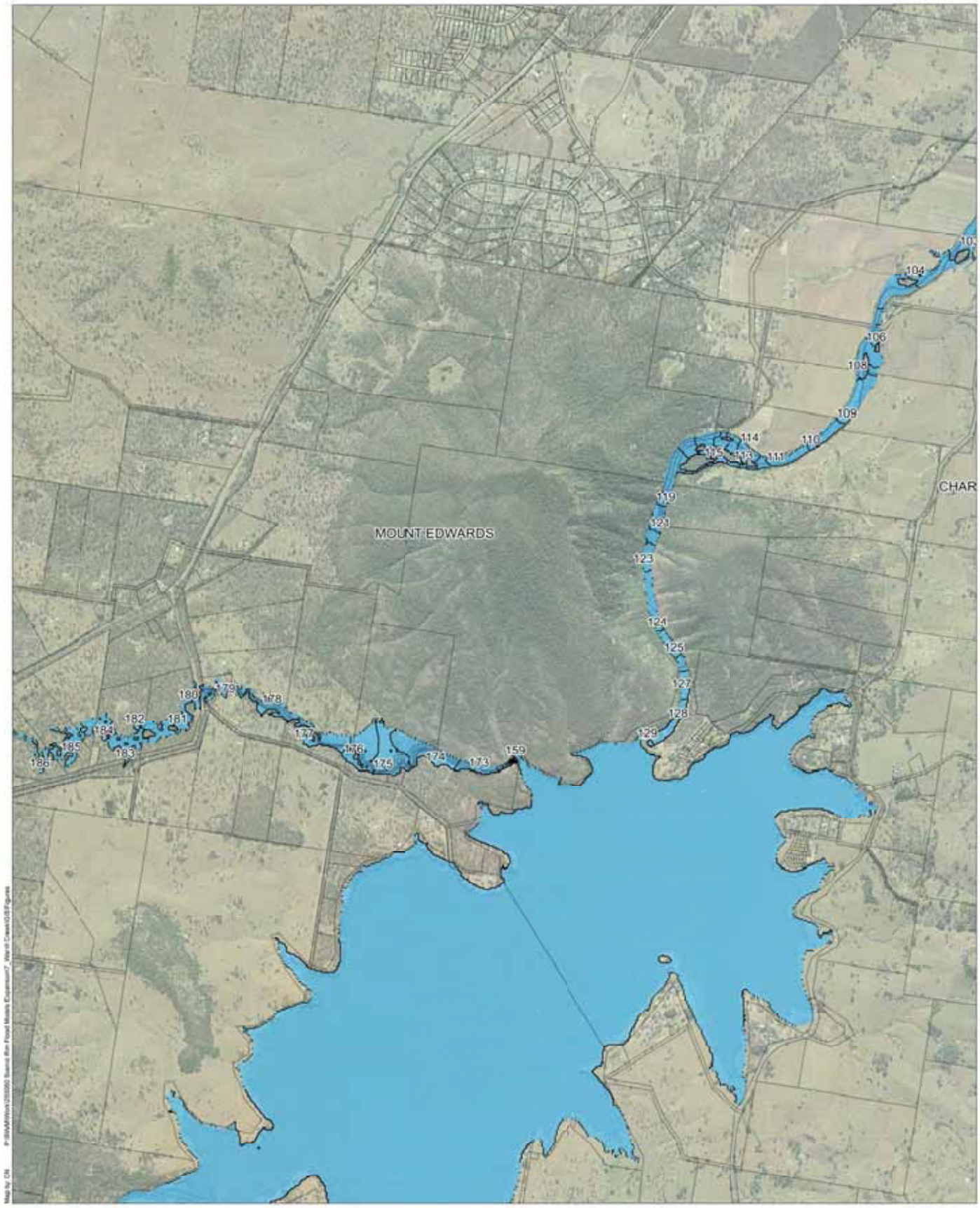
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-i

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

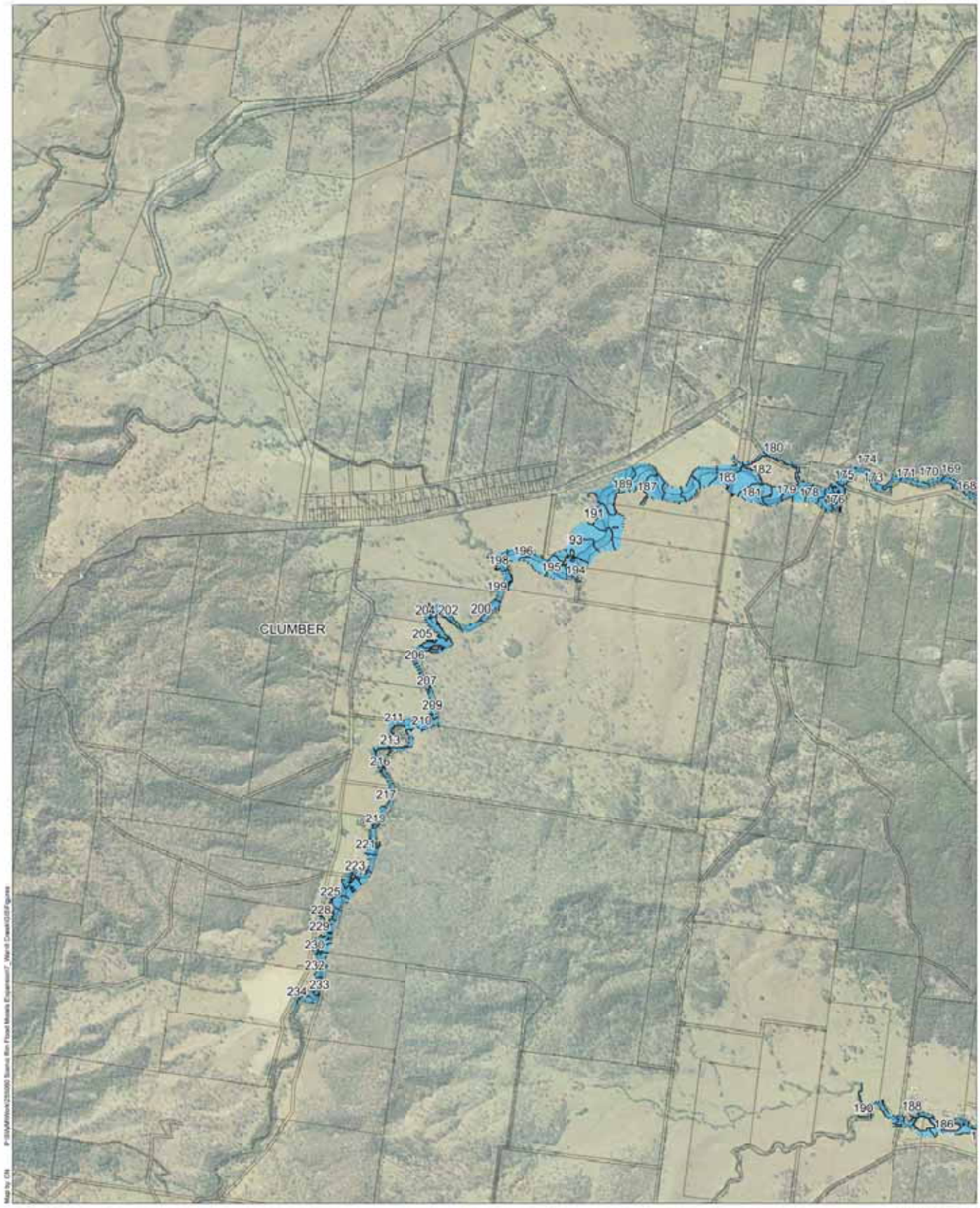
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-j

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

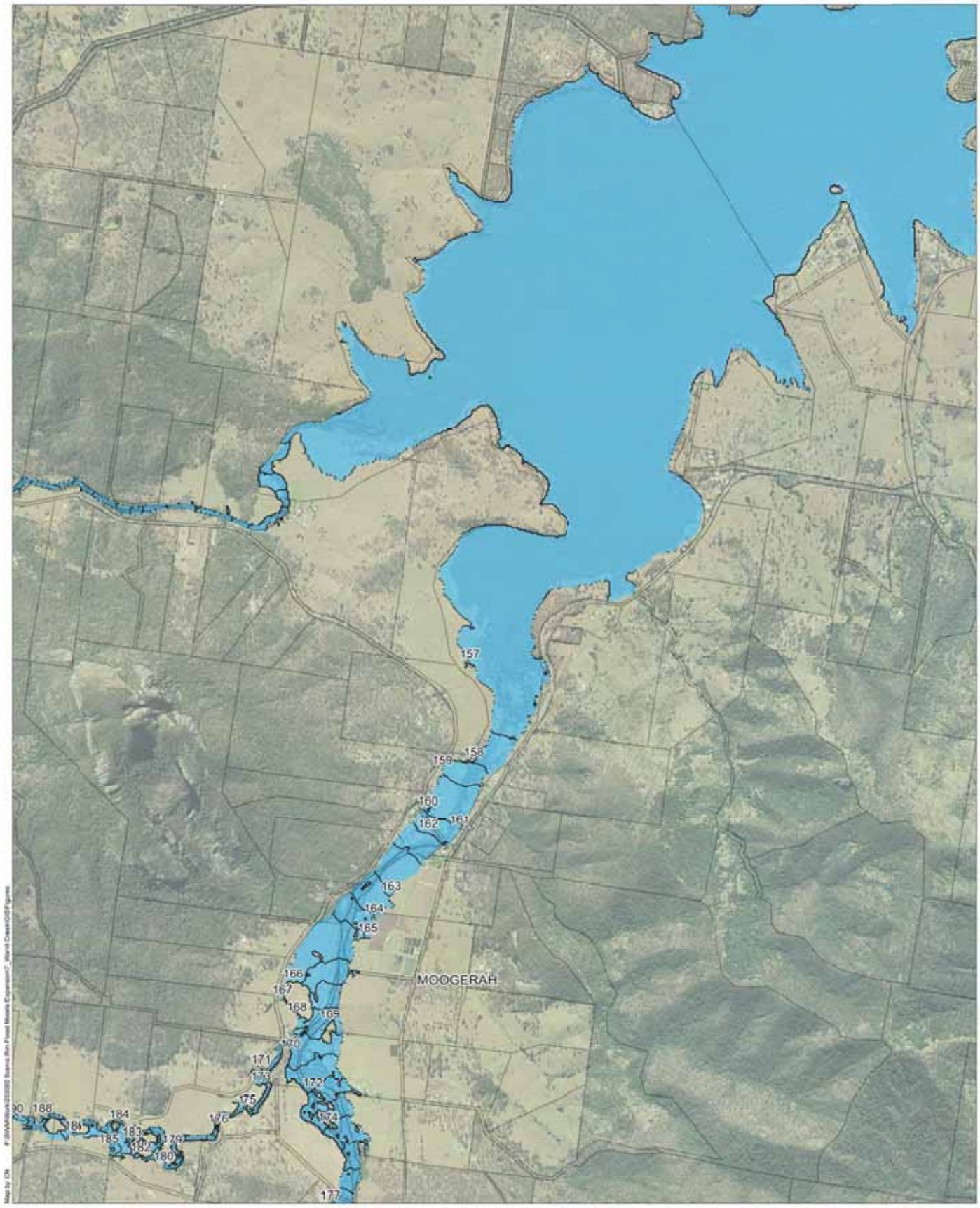
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-k

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

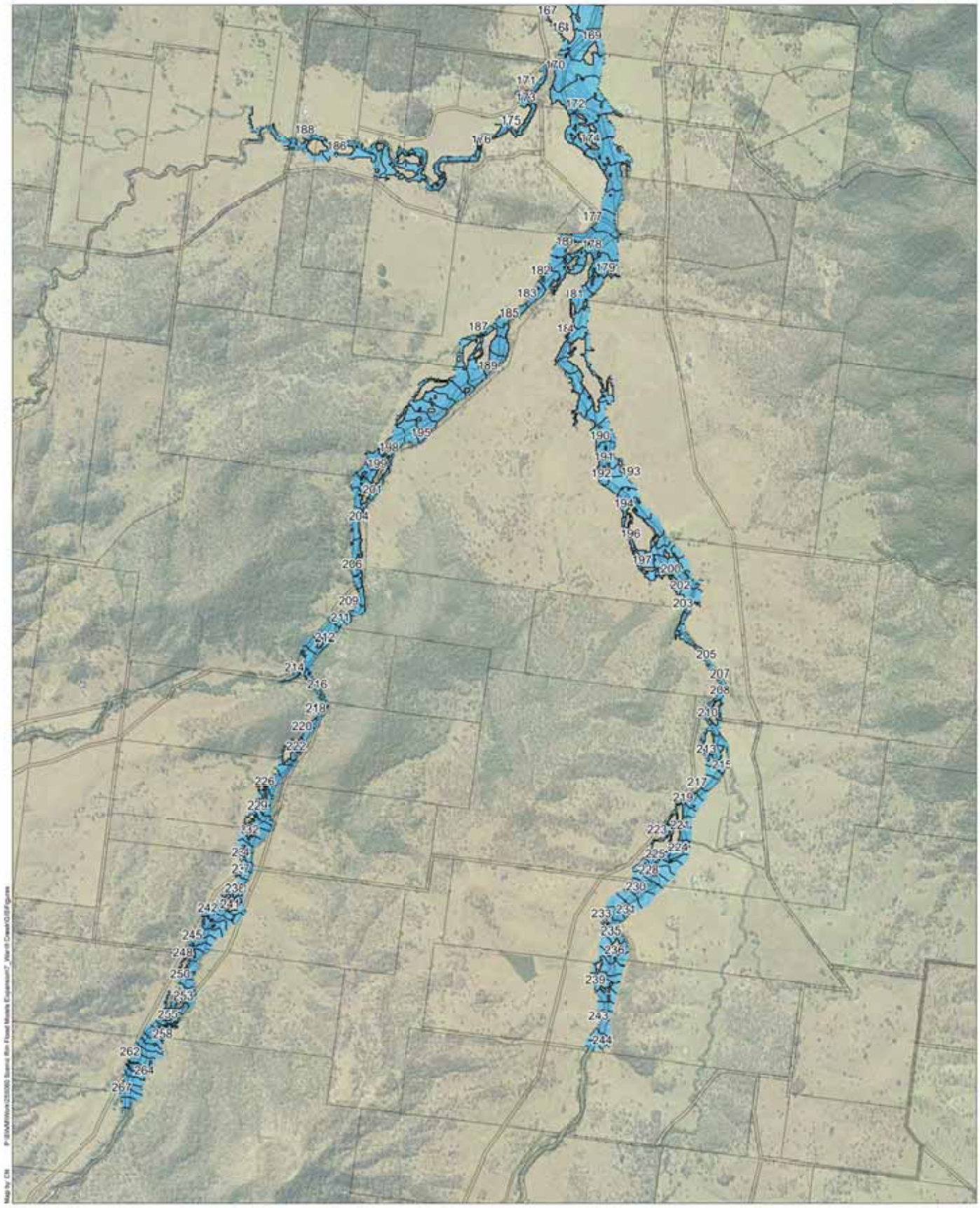
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C1-I**

2% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

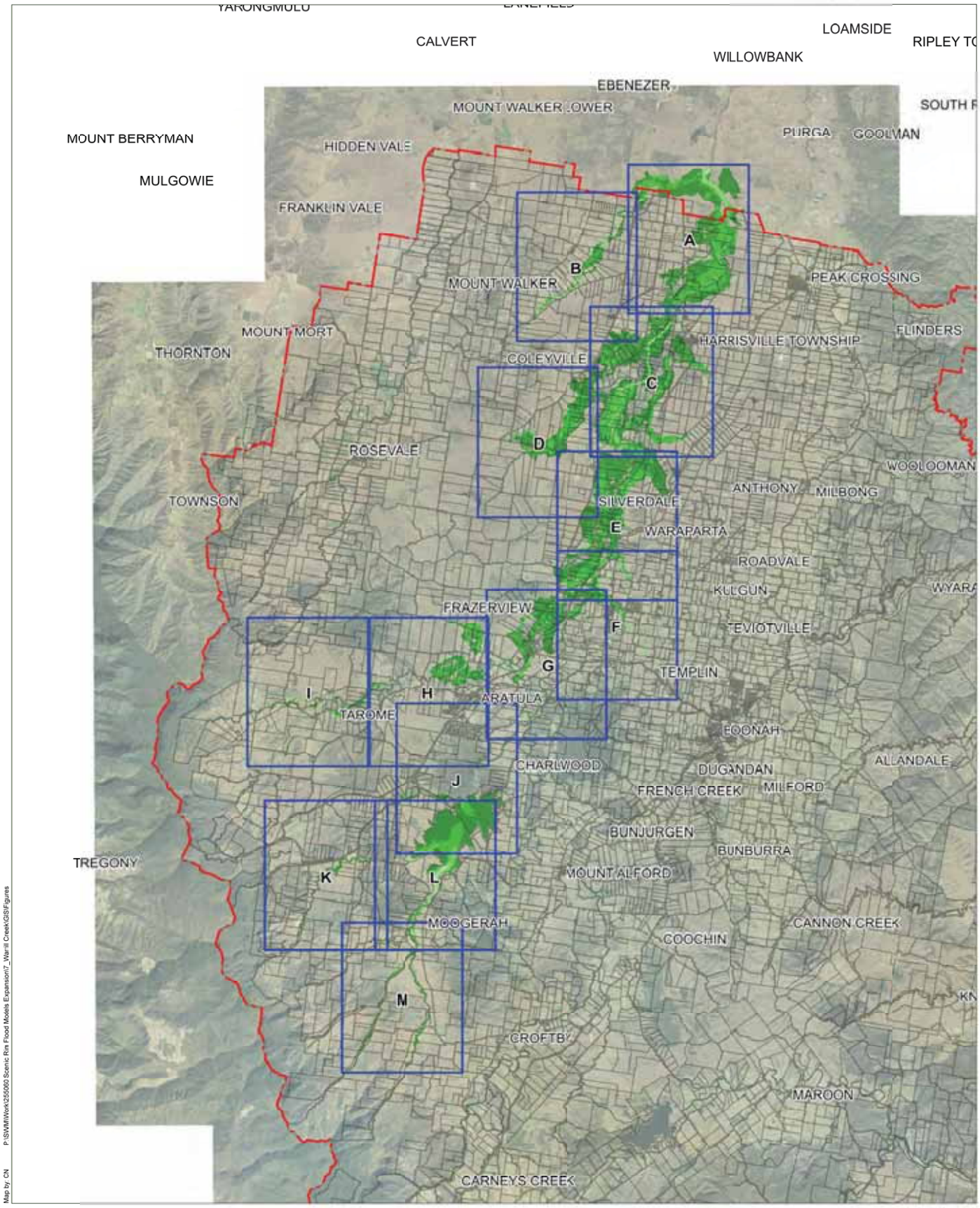
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C1-m

2% AEP Event - Inundation Extent



Map by: CN P:\SWMWork\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

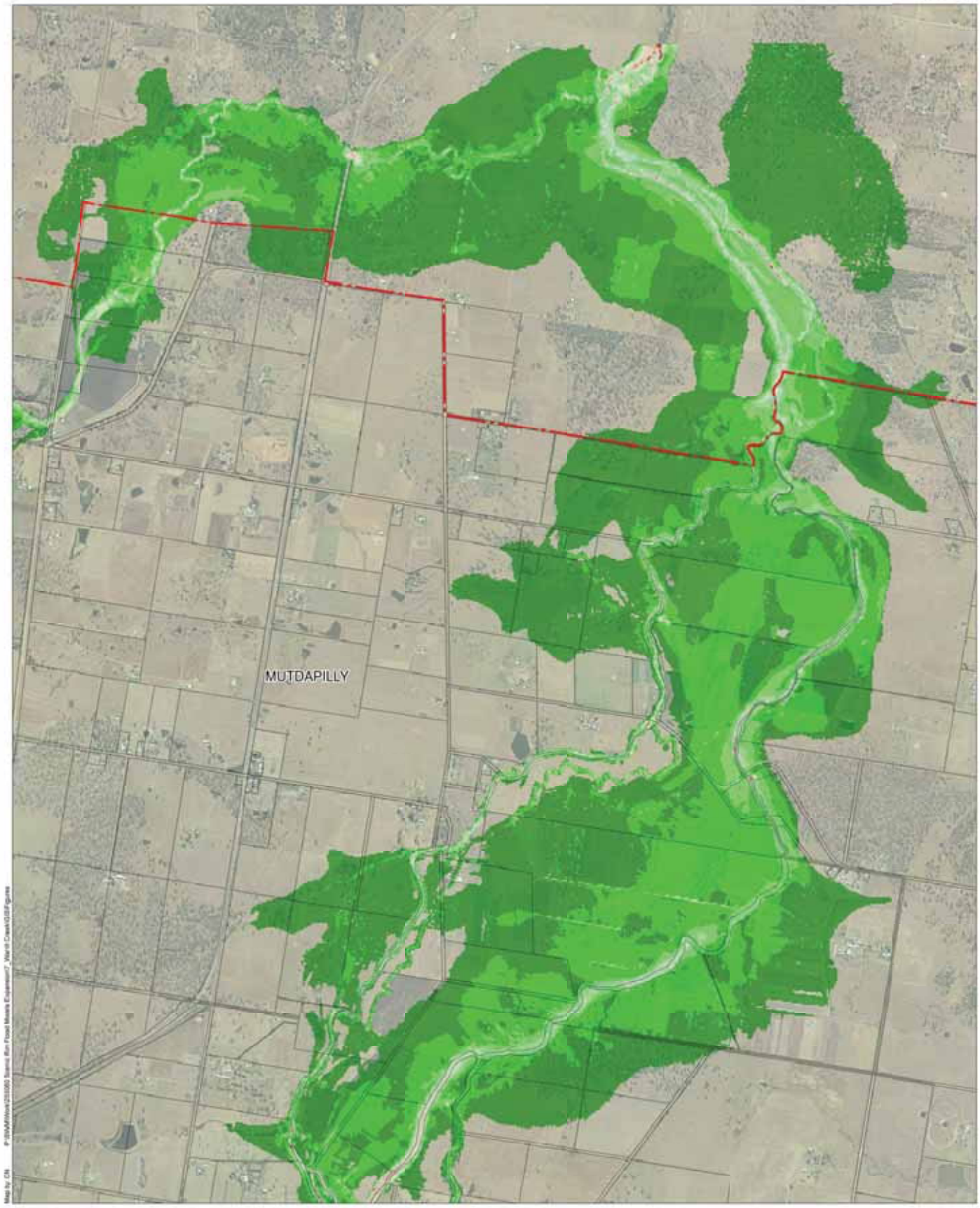
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

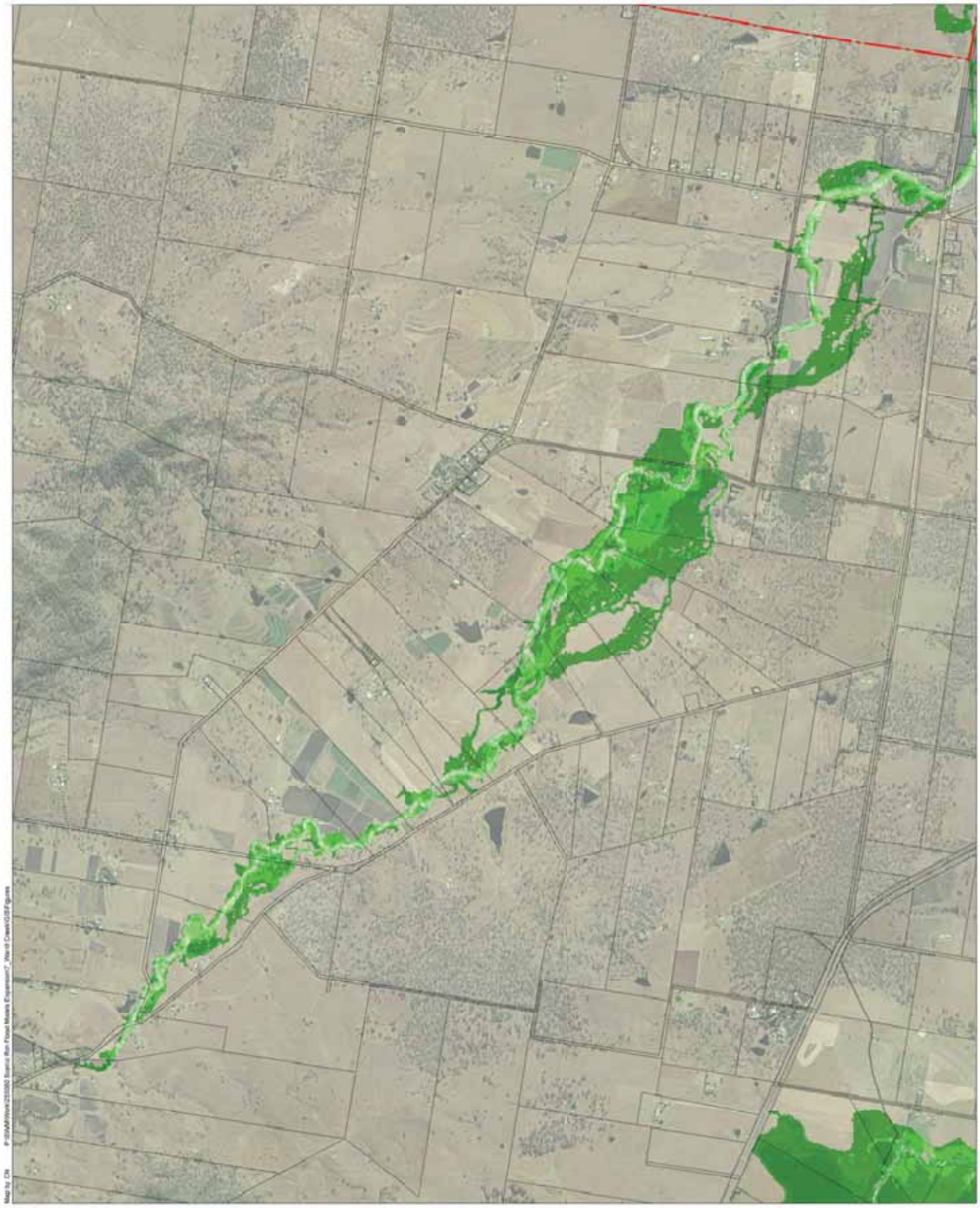
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-a**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

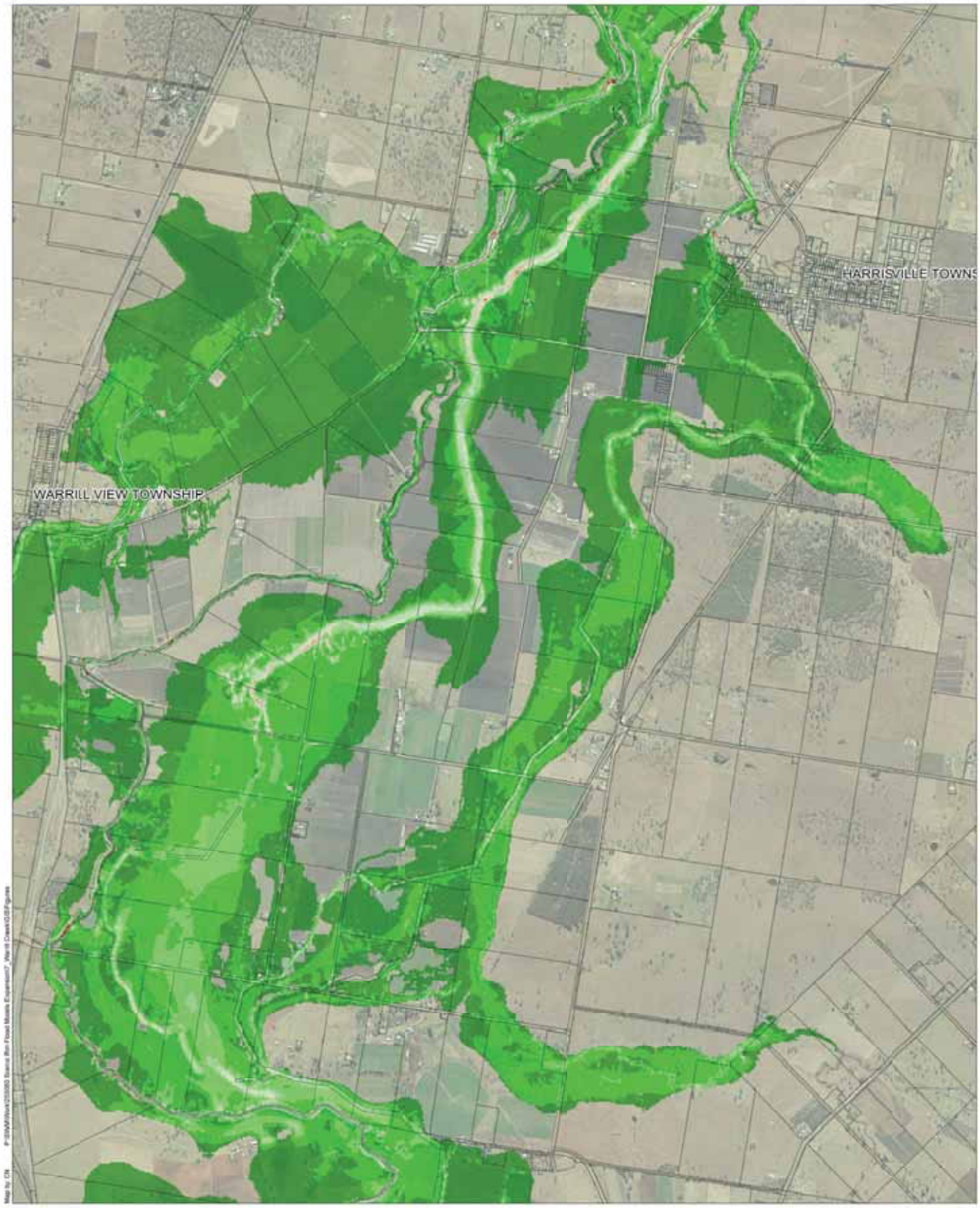
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-b**

2% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

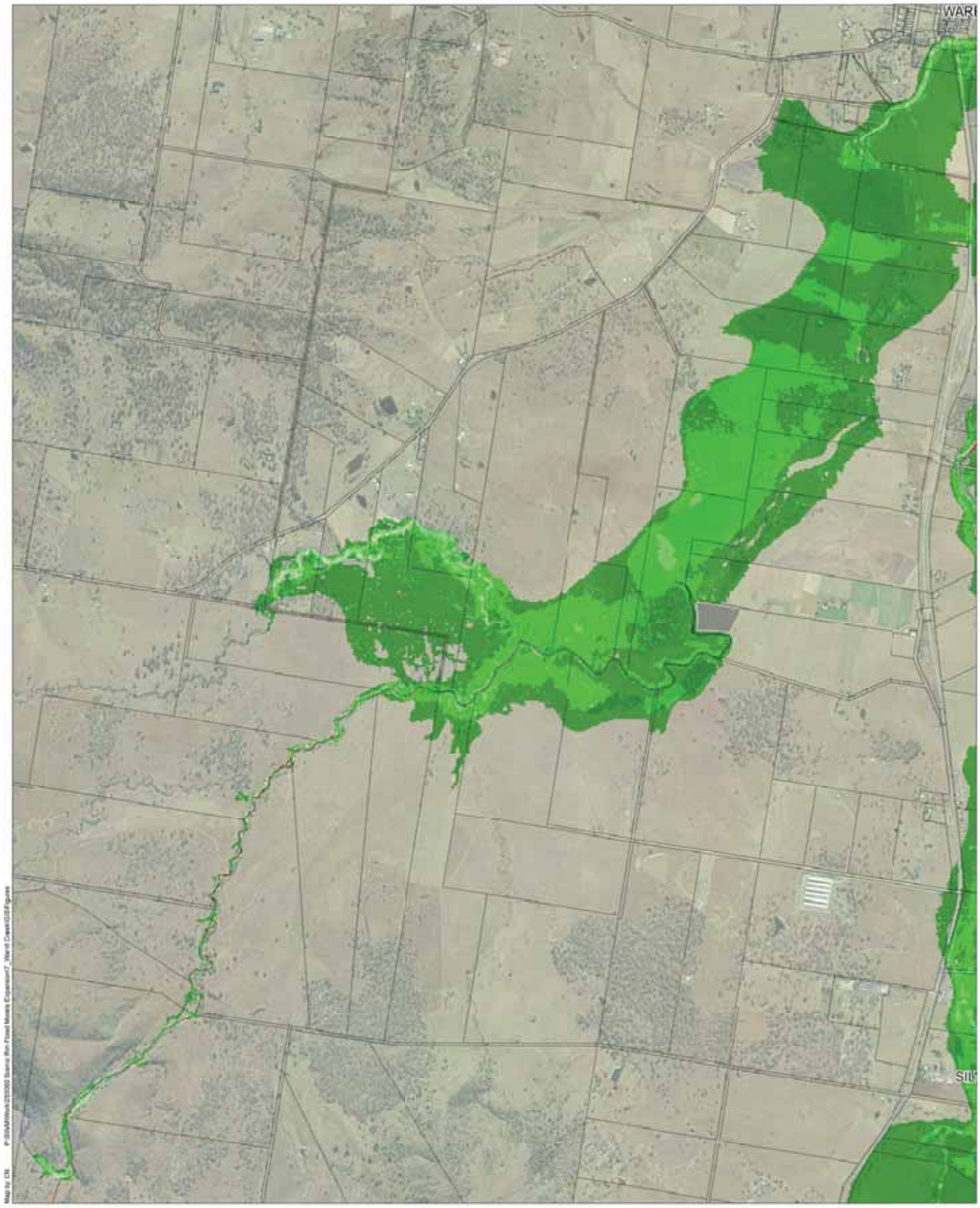
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-c**

2% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

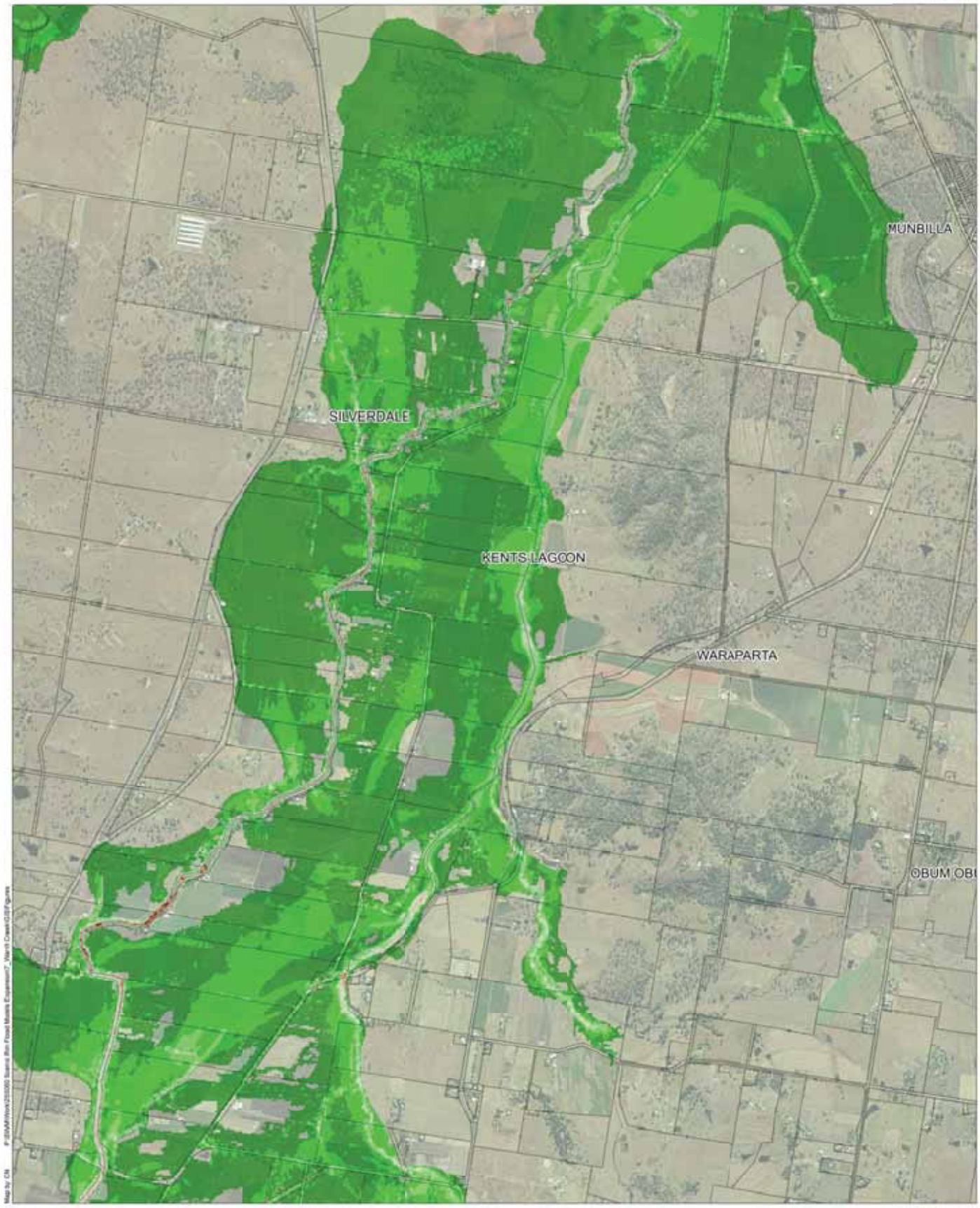
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-d**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

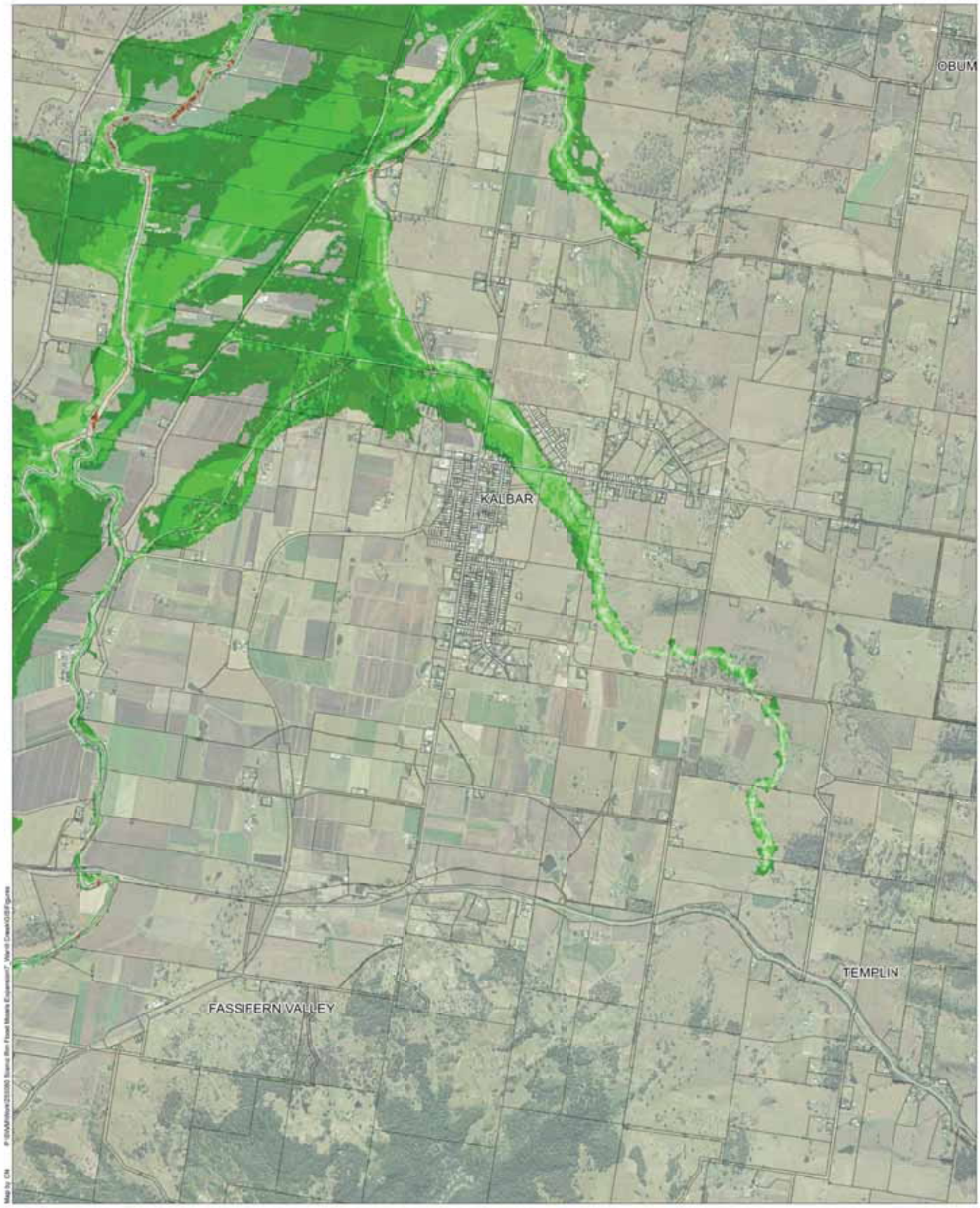
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-e**

2% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

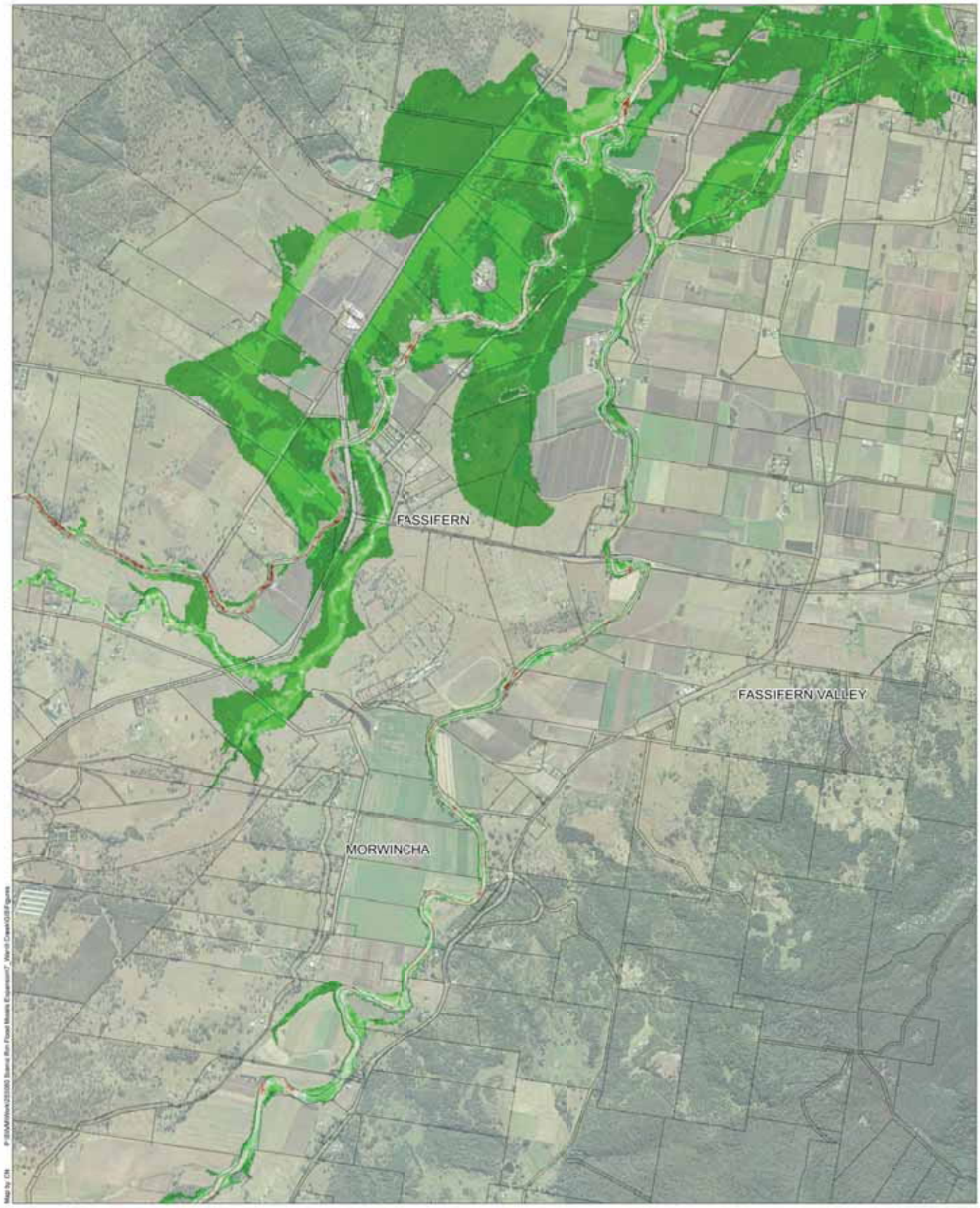
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C2-f

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

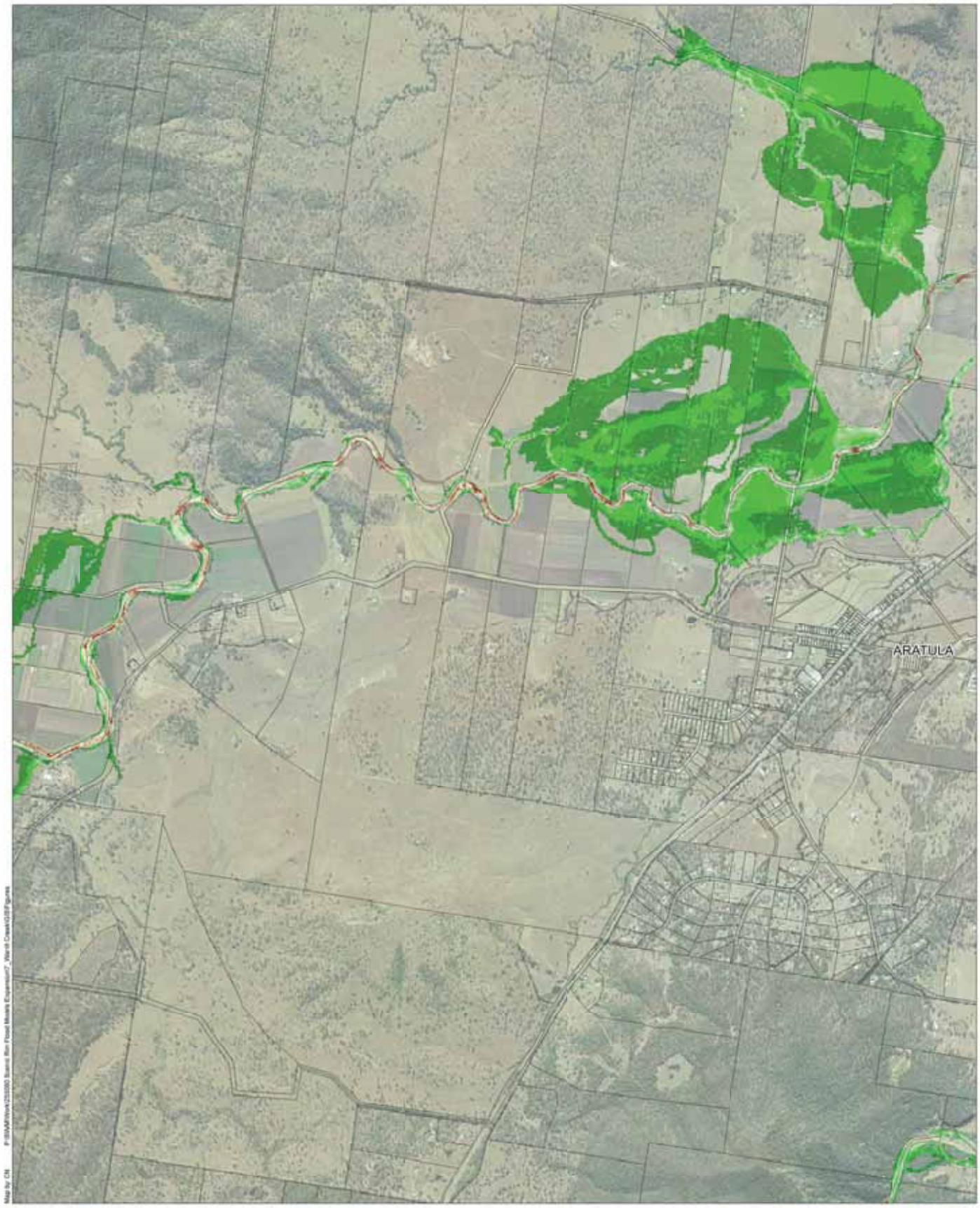
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-g**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

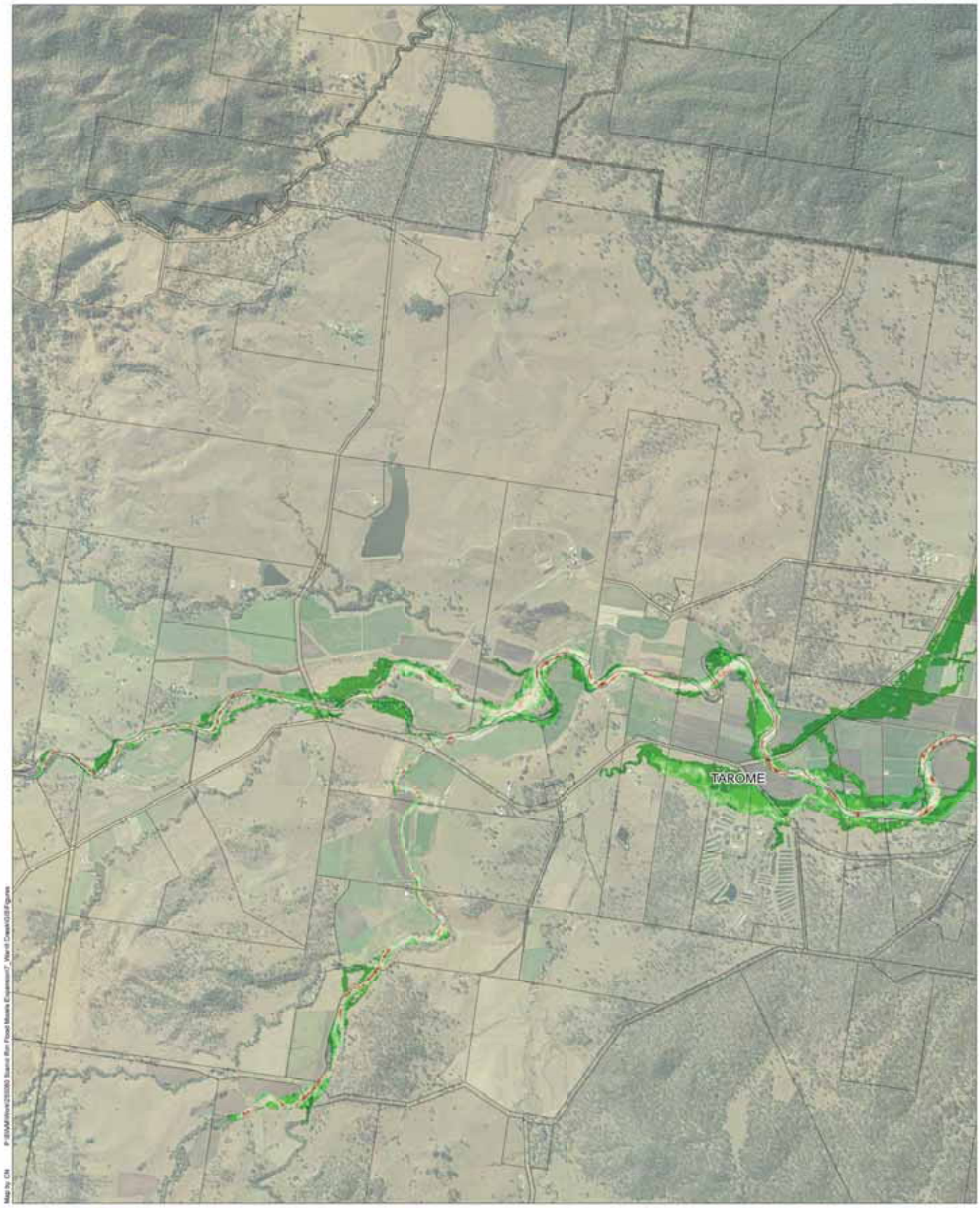
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-h**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

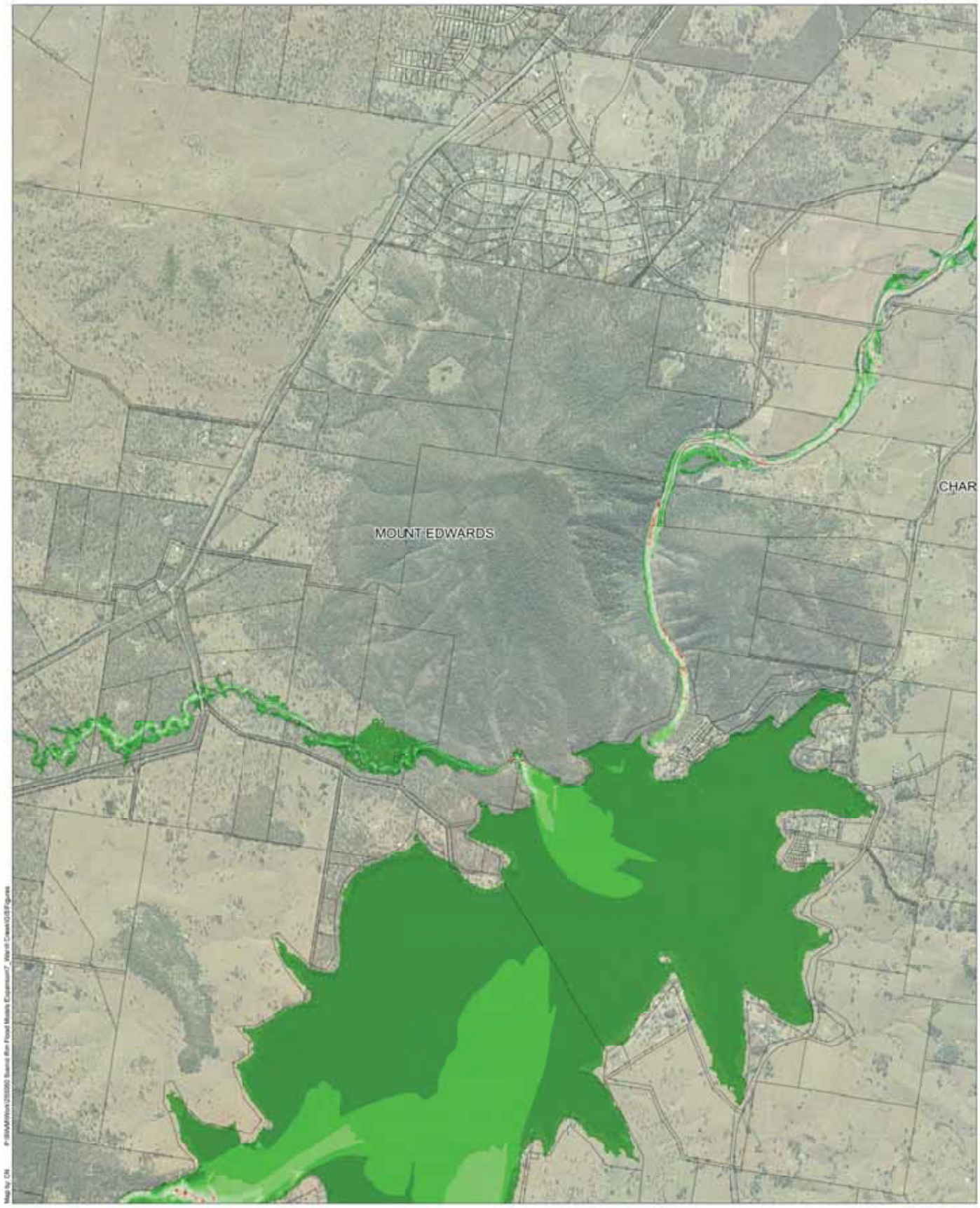
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-i**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

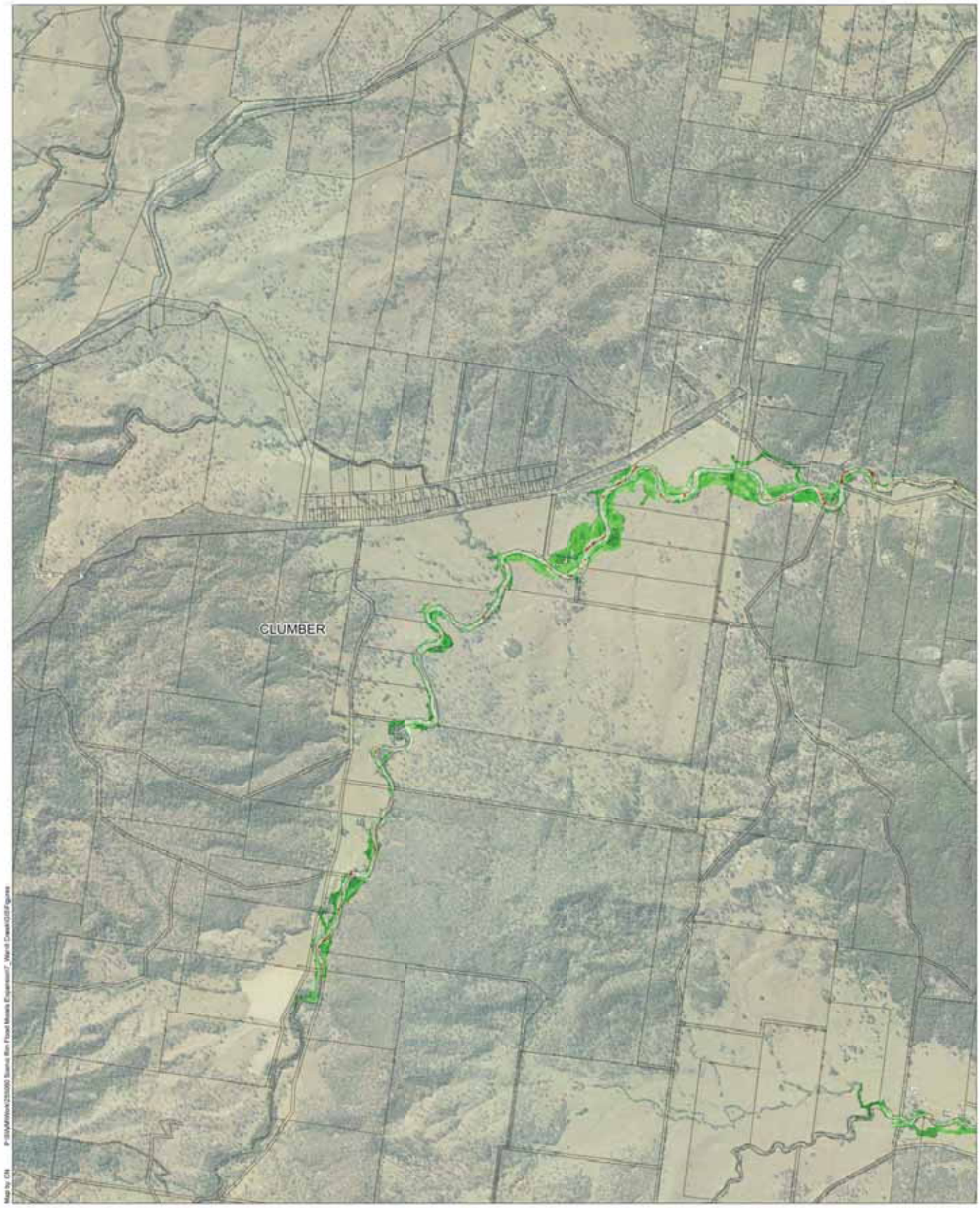
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-j**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

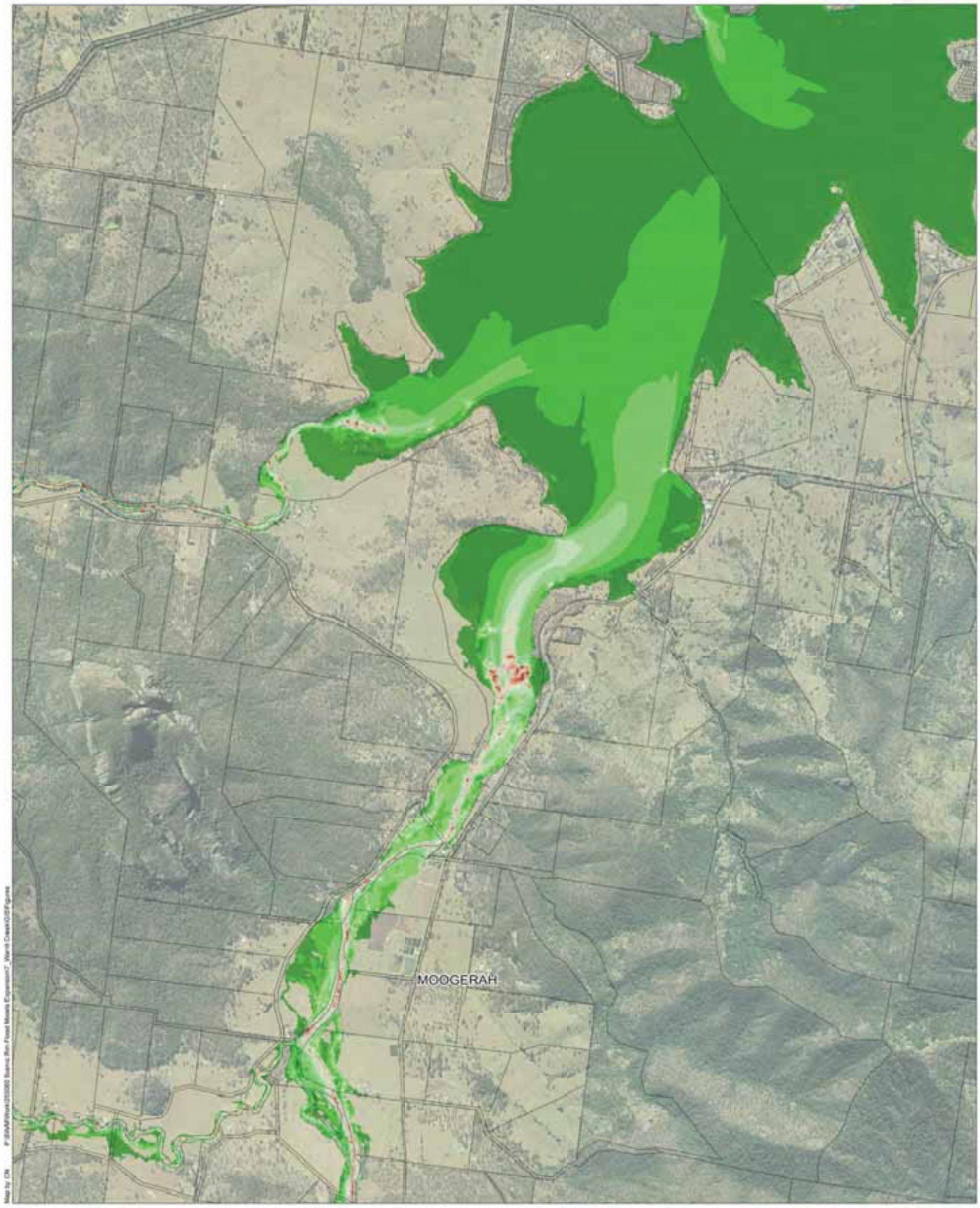
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-k**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

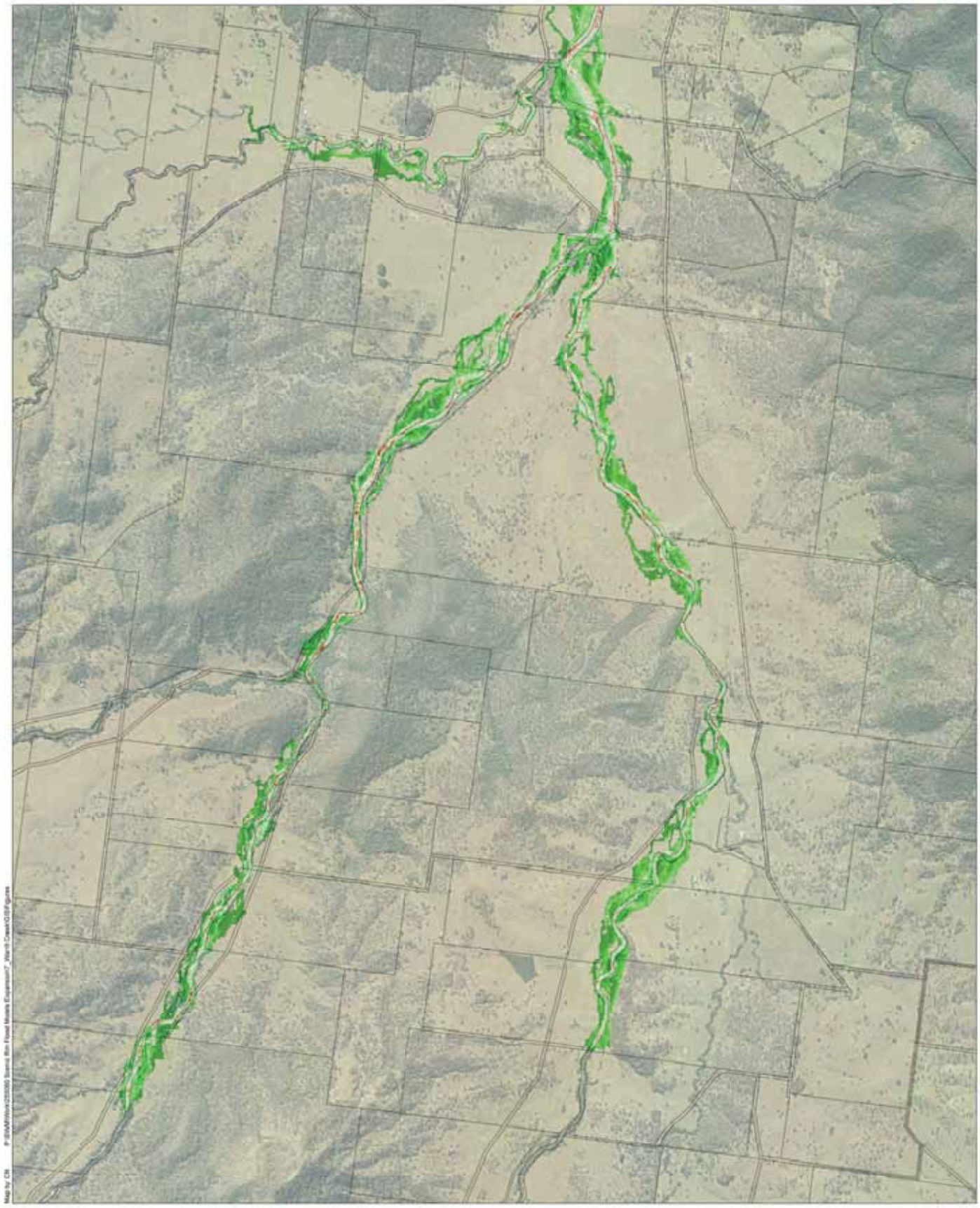
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-I**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

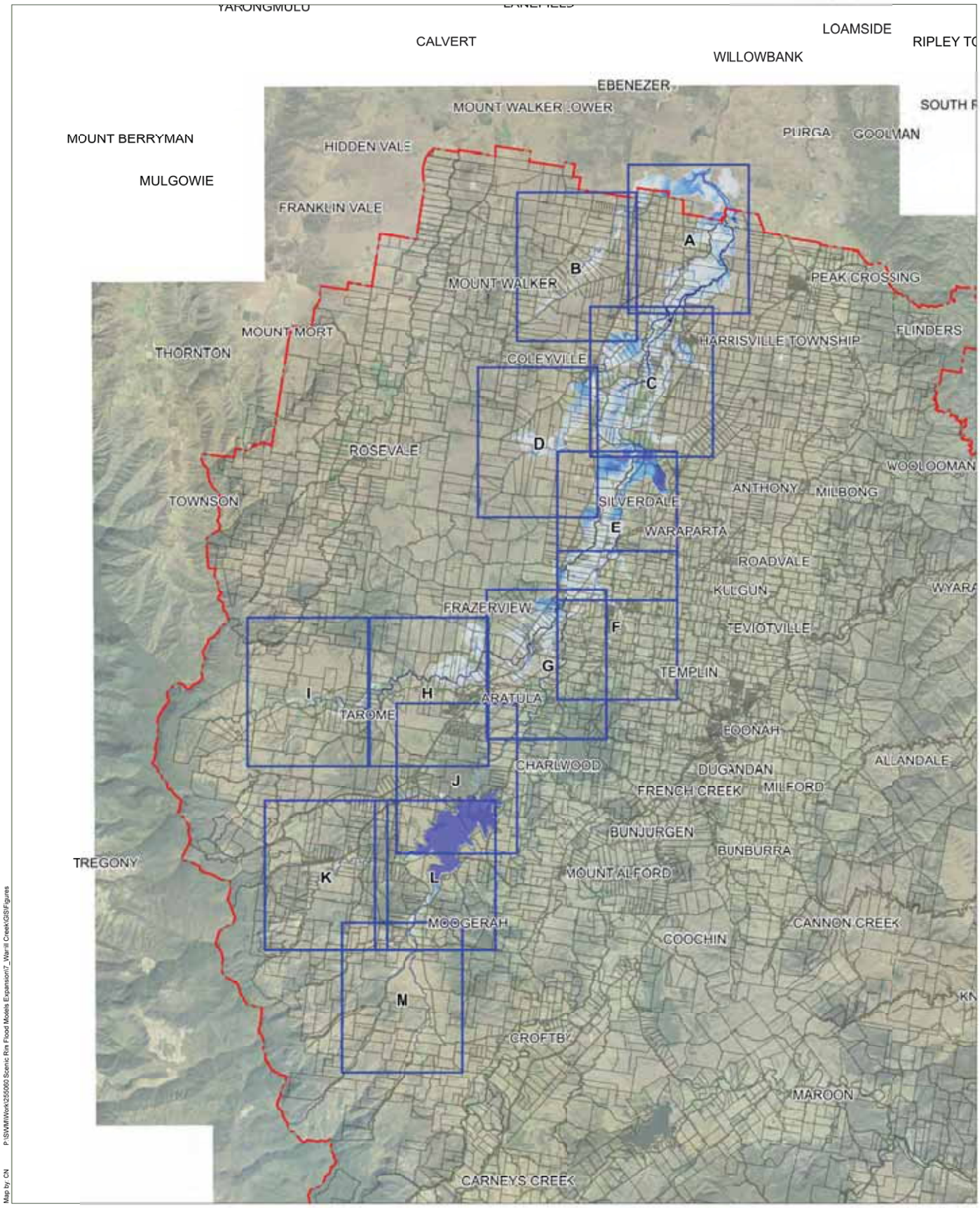
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C2-m**

2% AEP Event - Peak Velocities



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

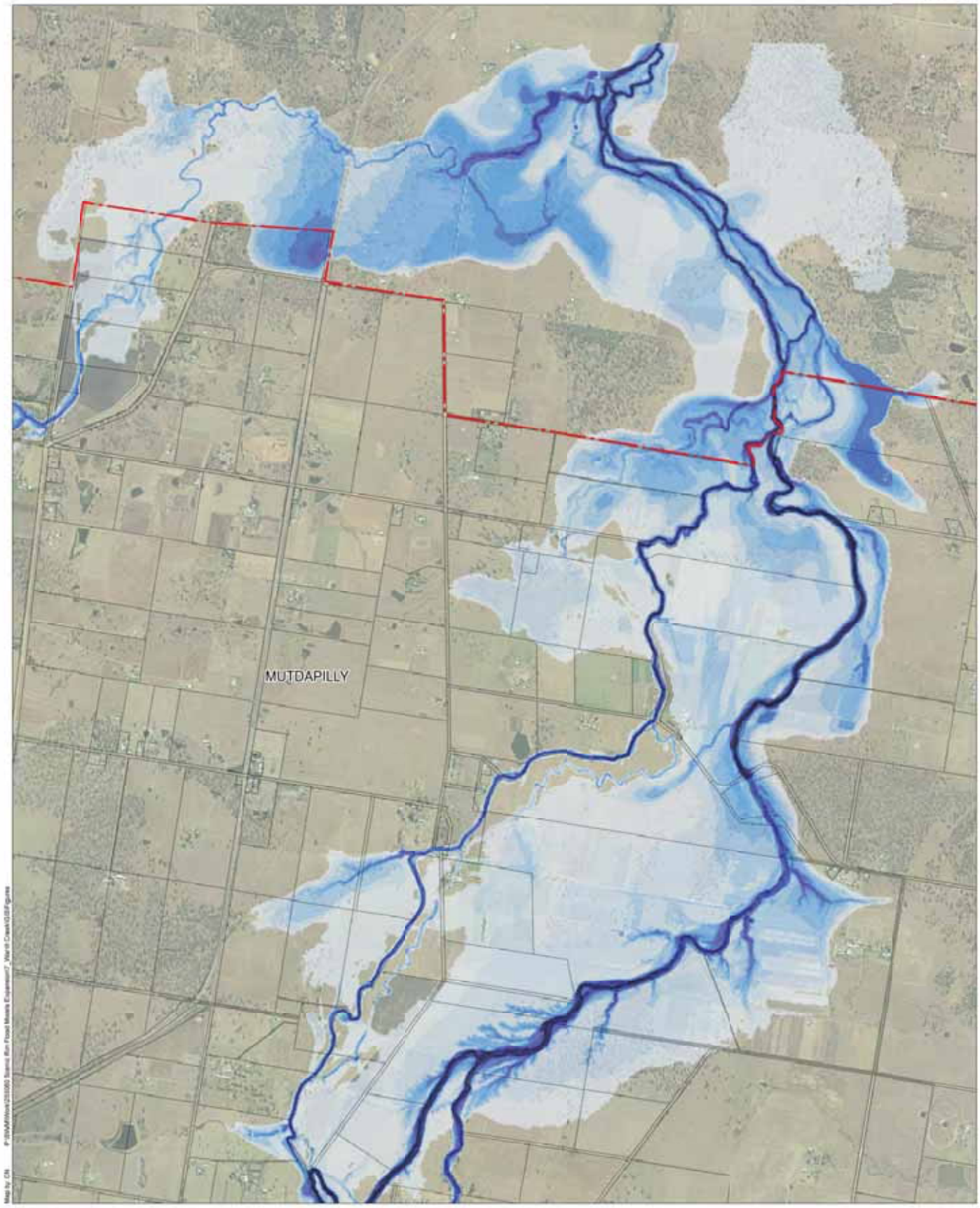
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

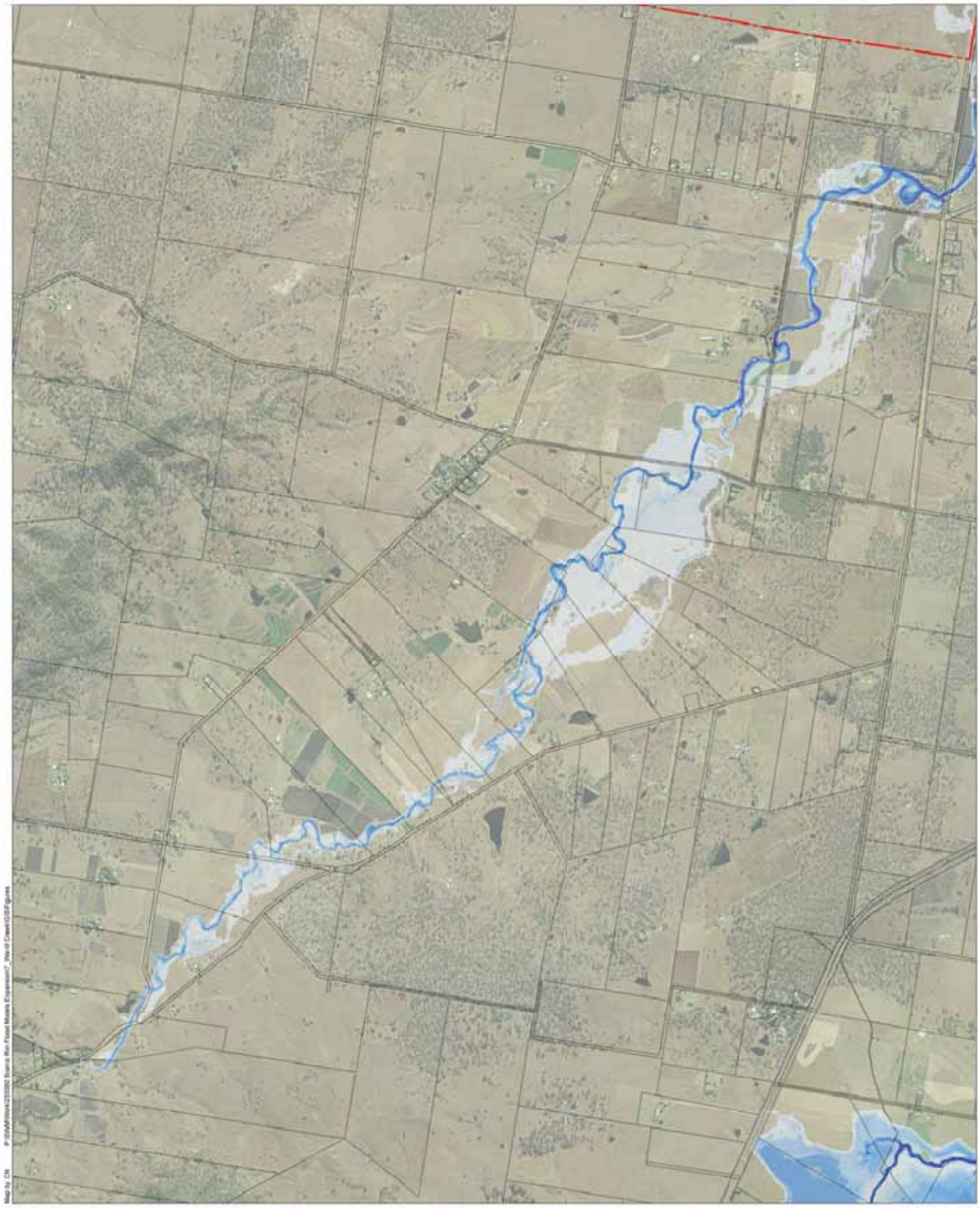
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C3-a

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

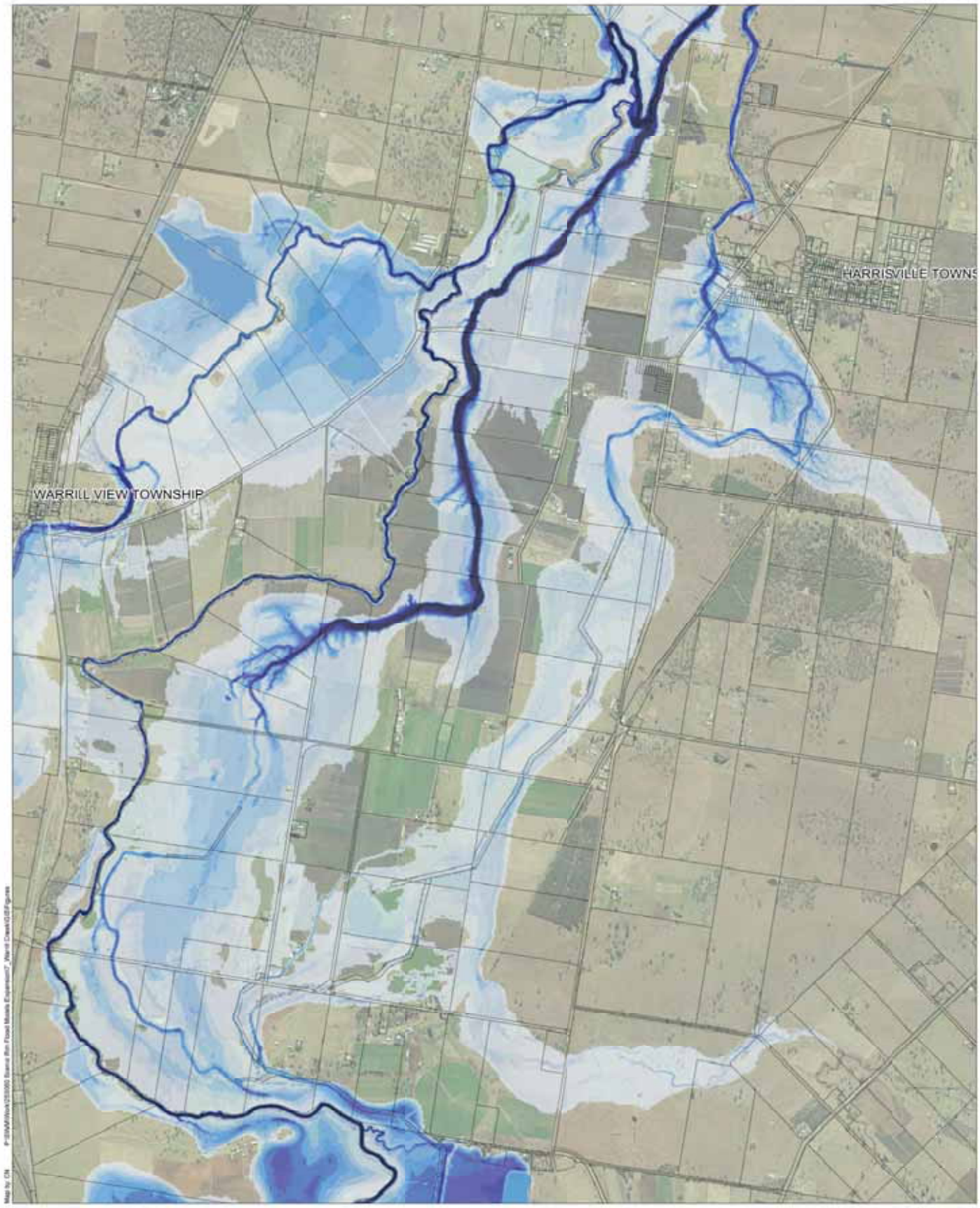
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-b**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

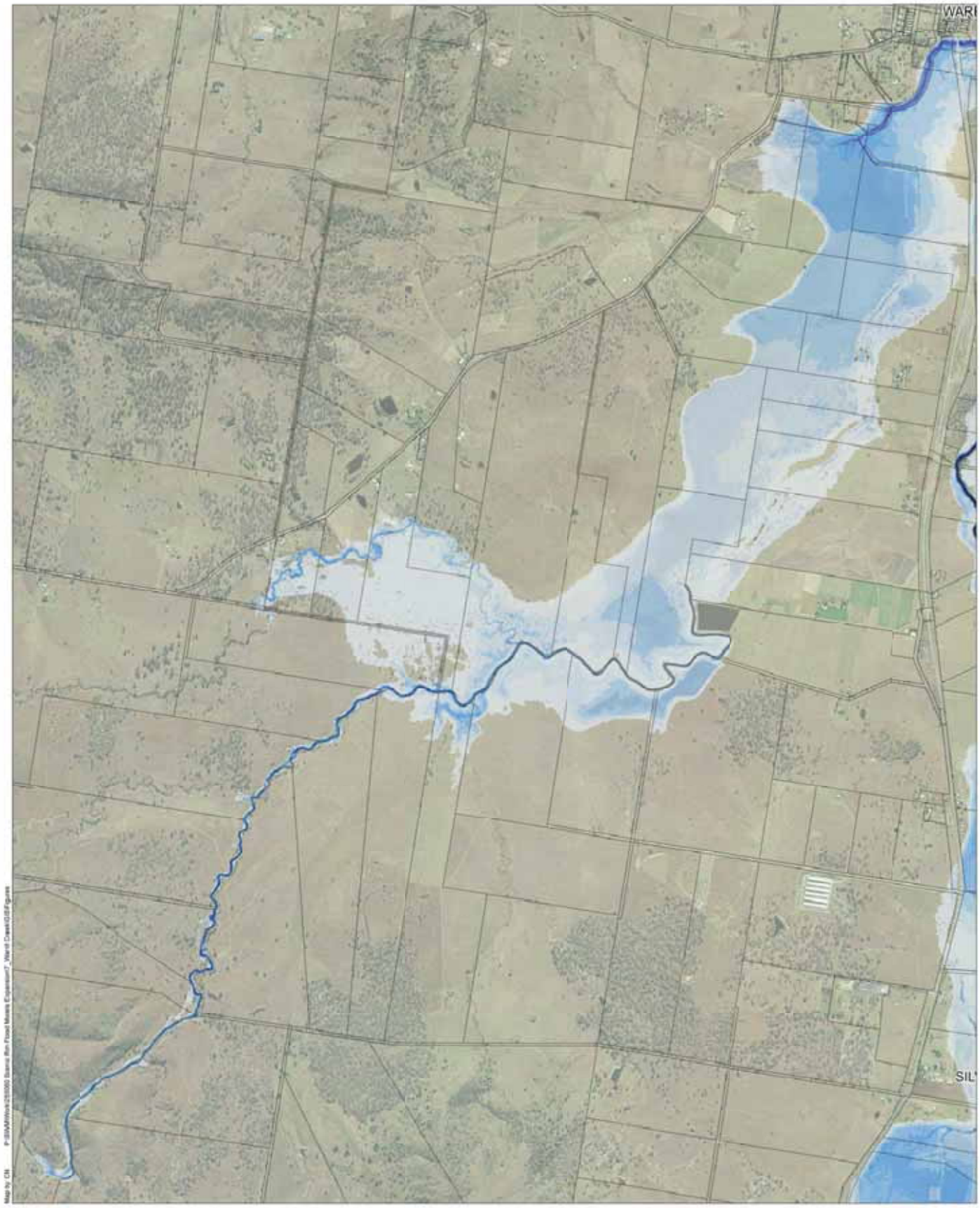
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-c**

2% AEP Event - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

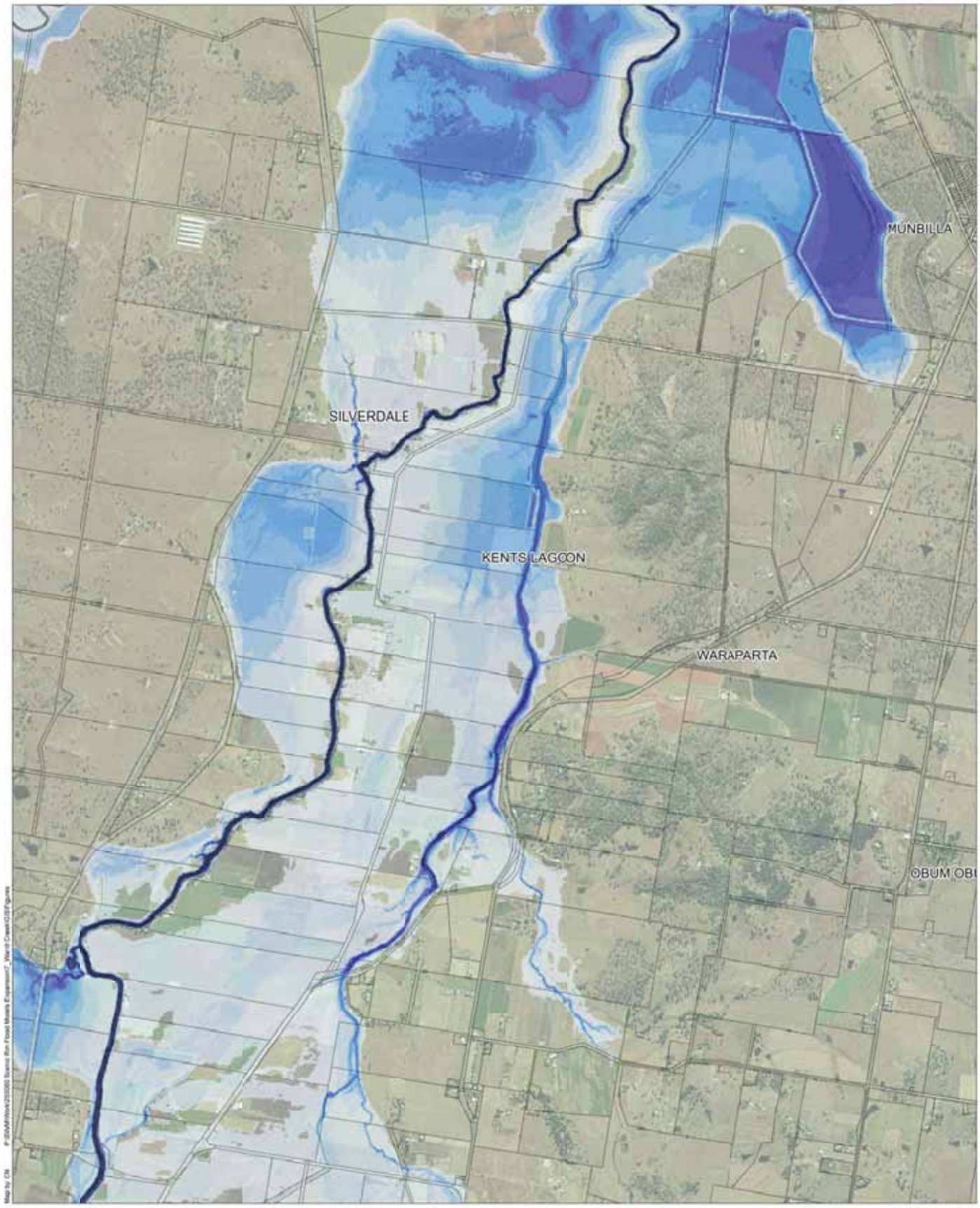
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-d**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

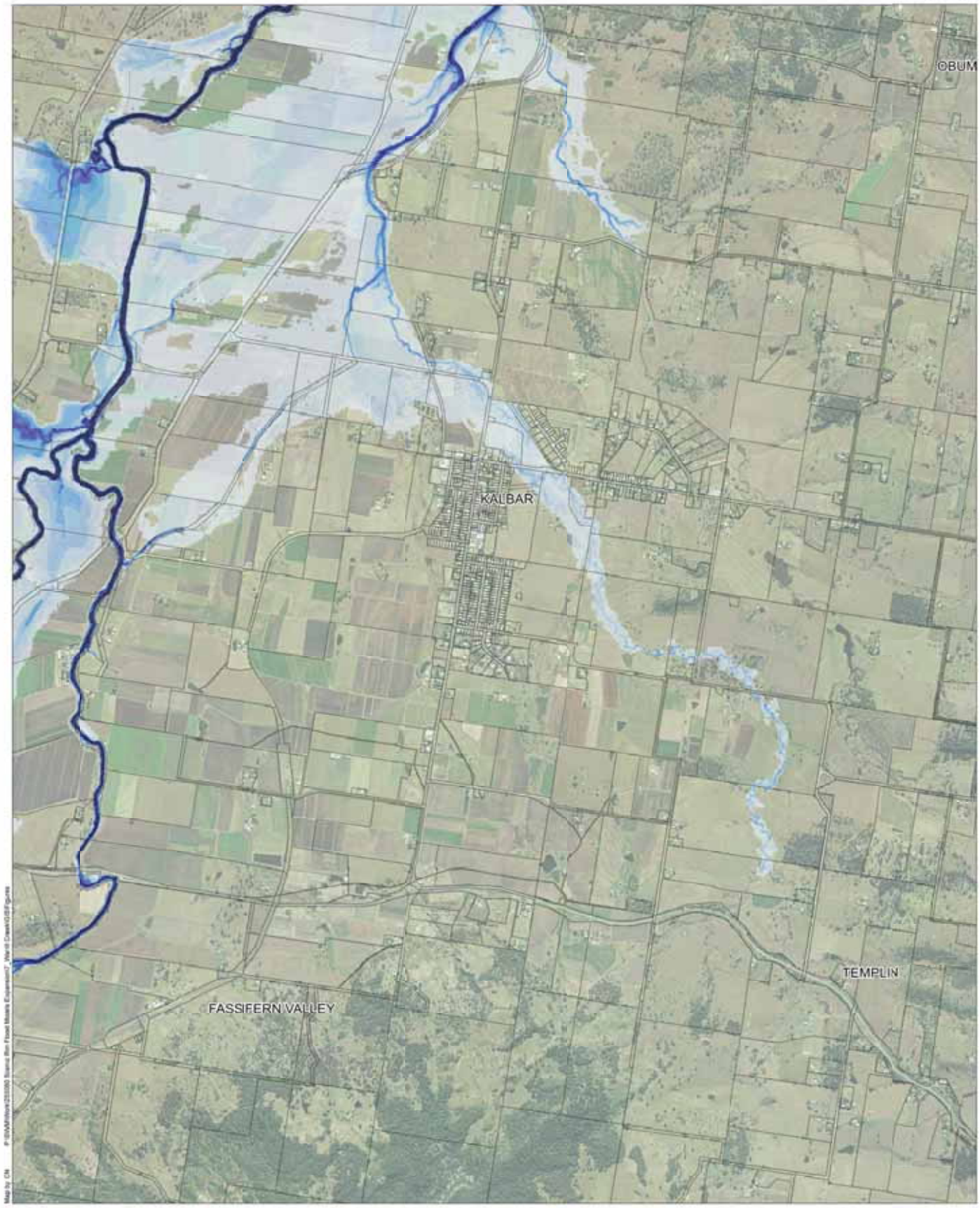
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-e**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

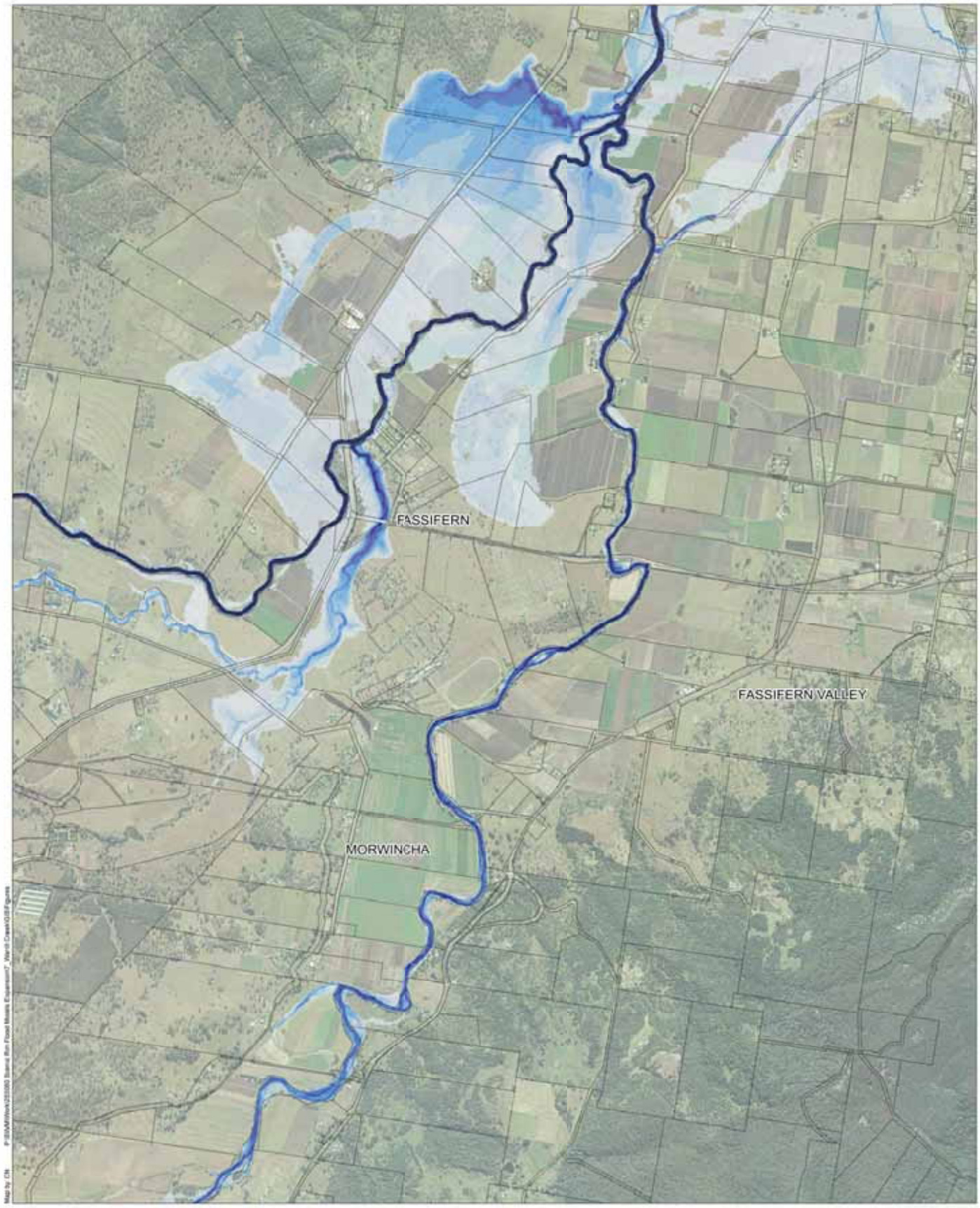
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-f**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

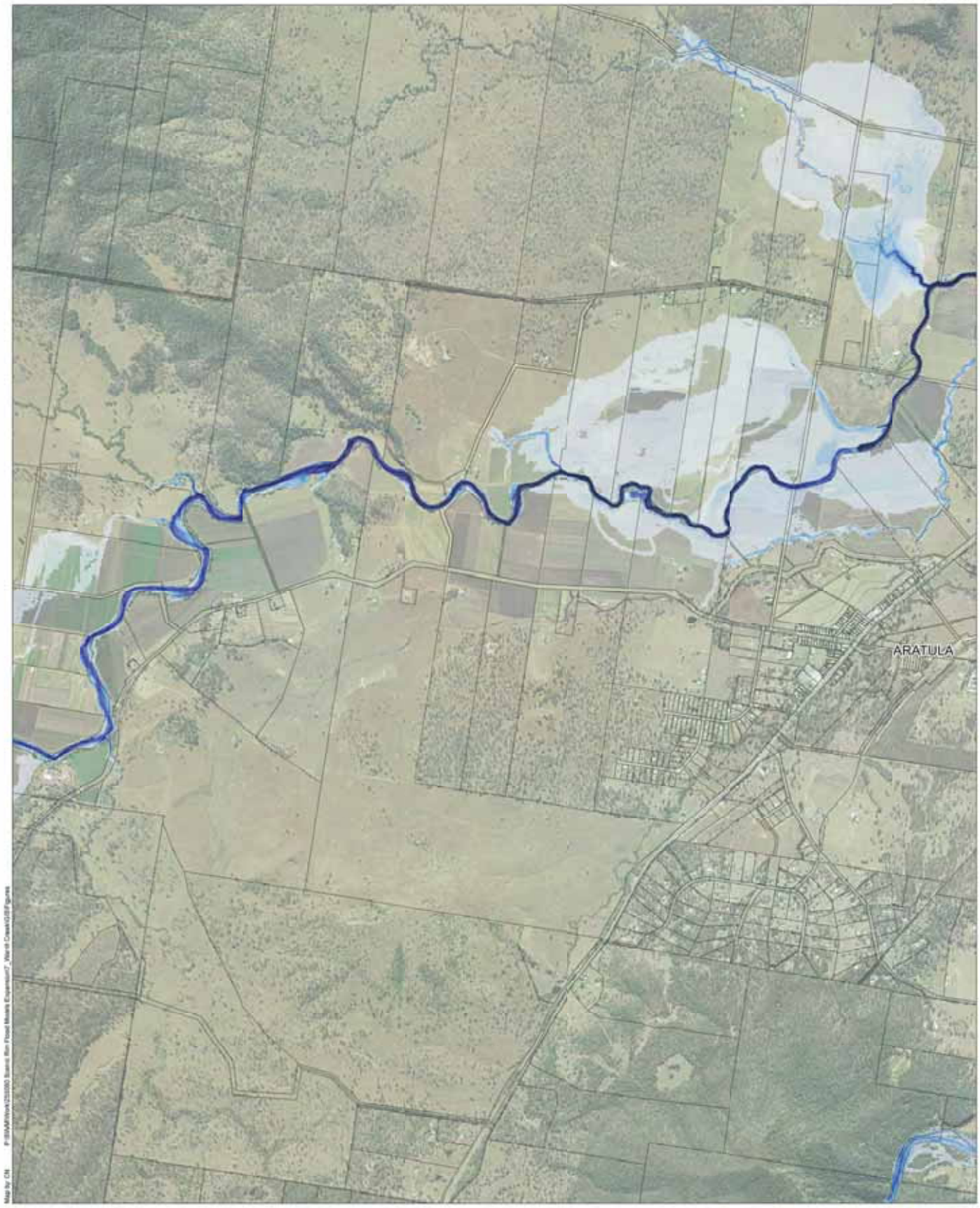
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-g**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

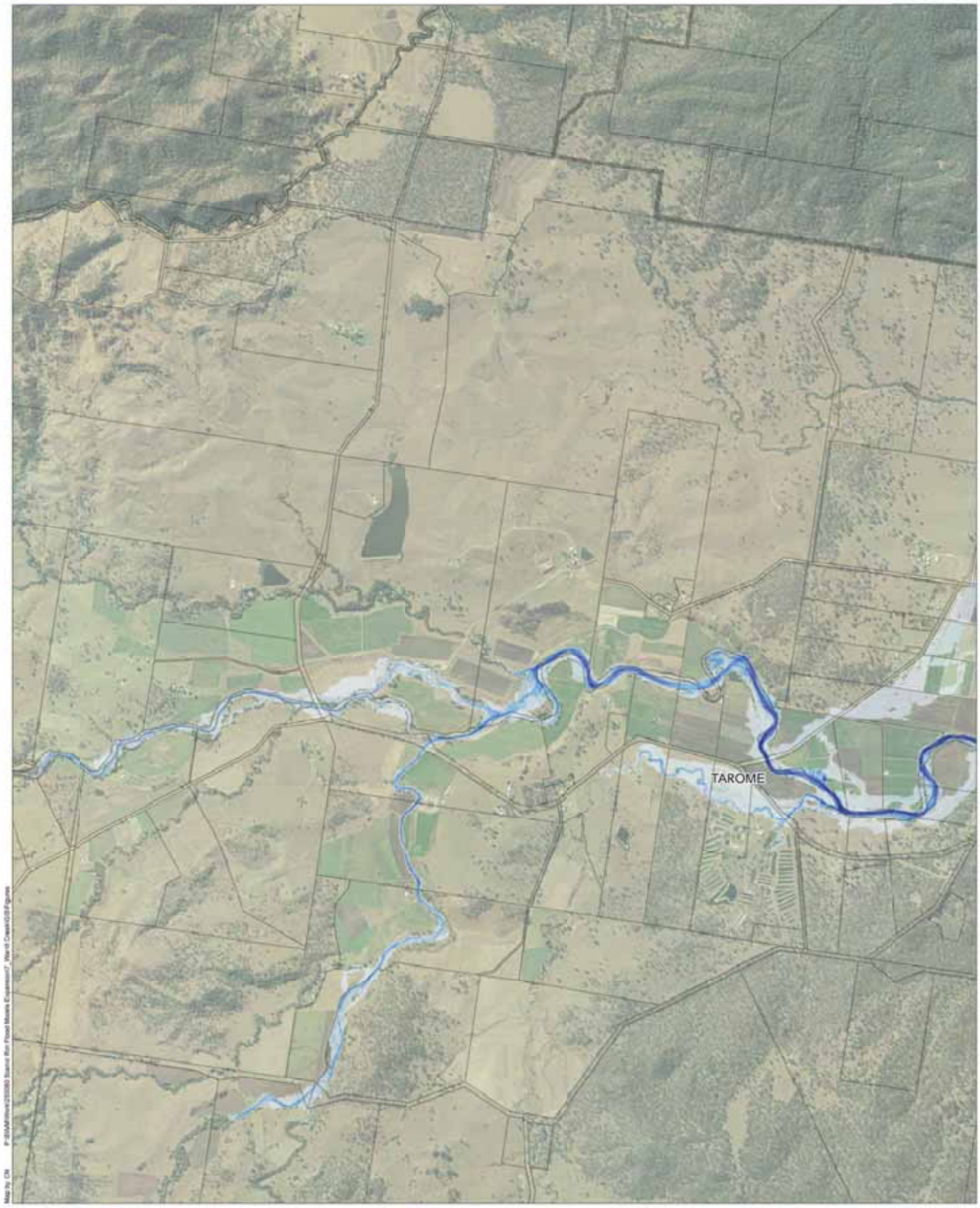
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-h**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

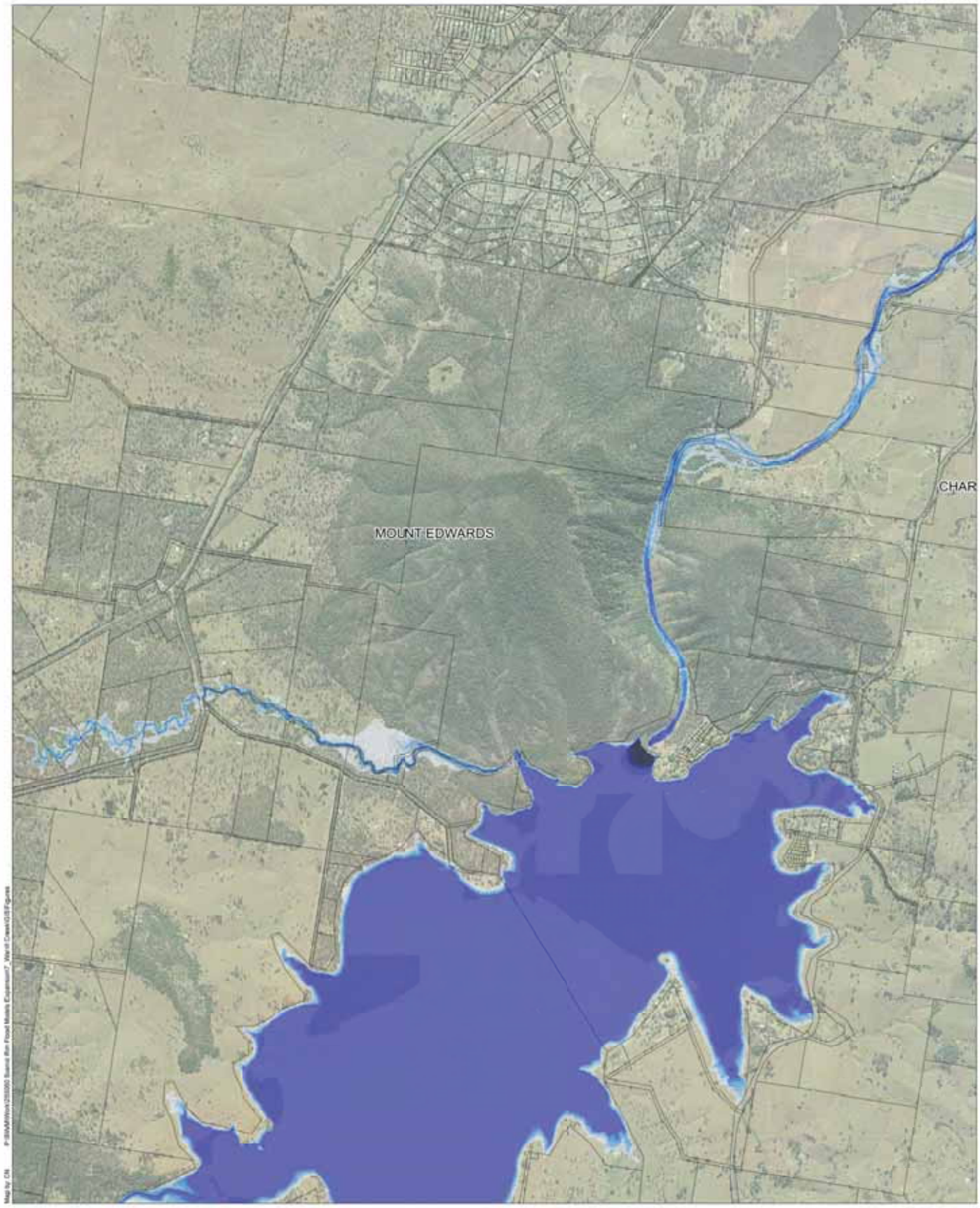
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-i**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

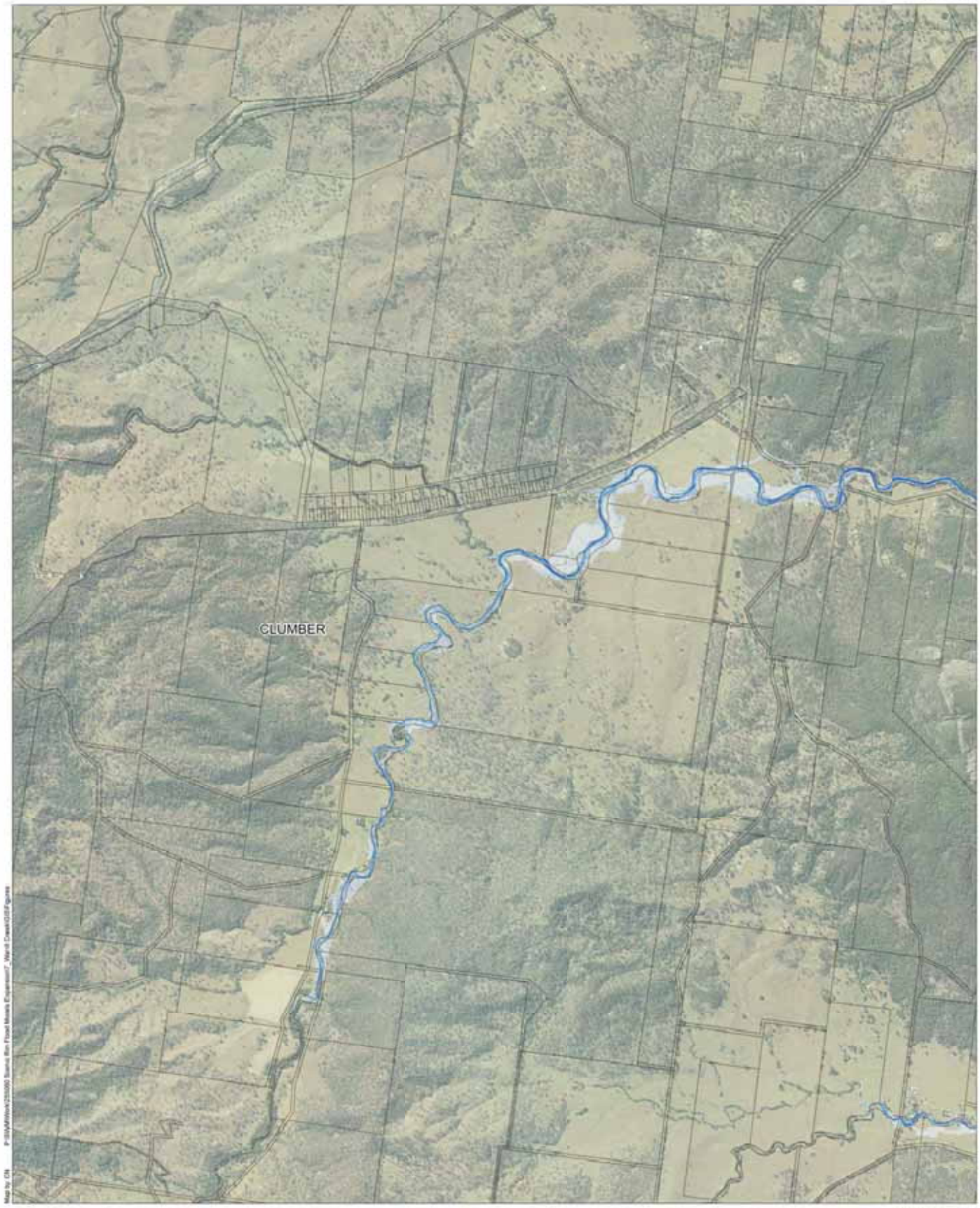
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-j**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

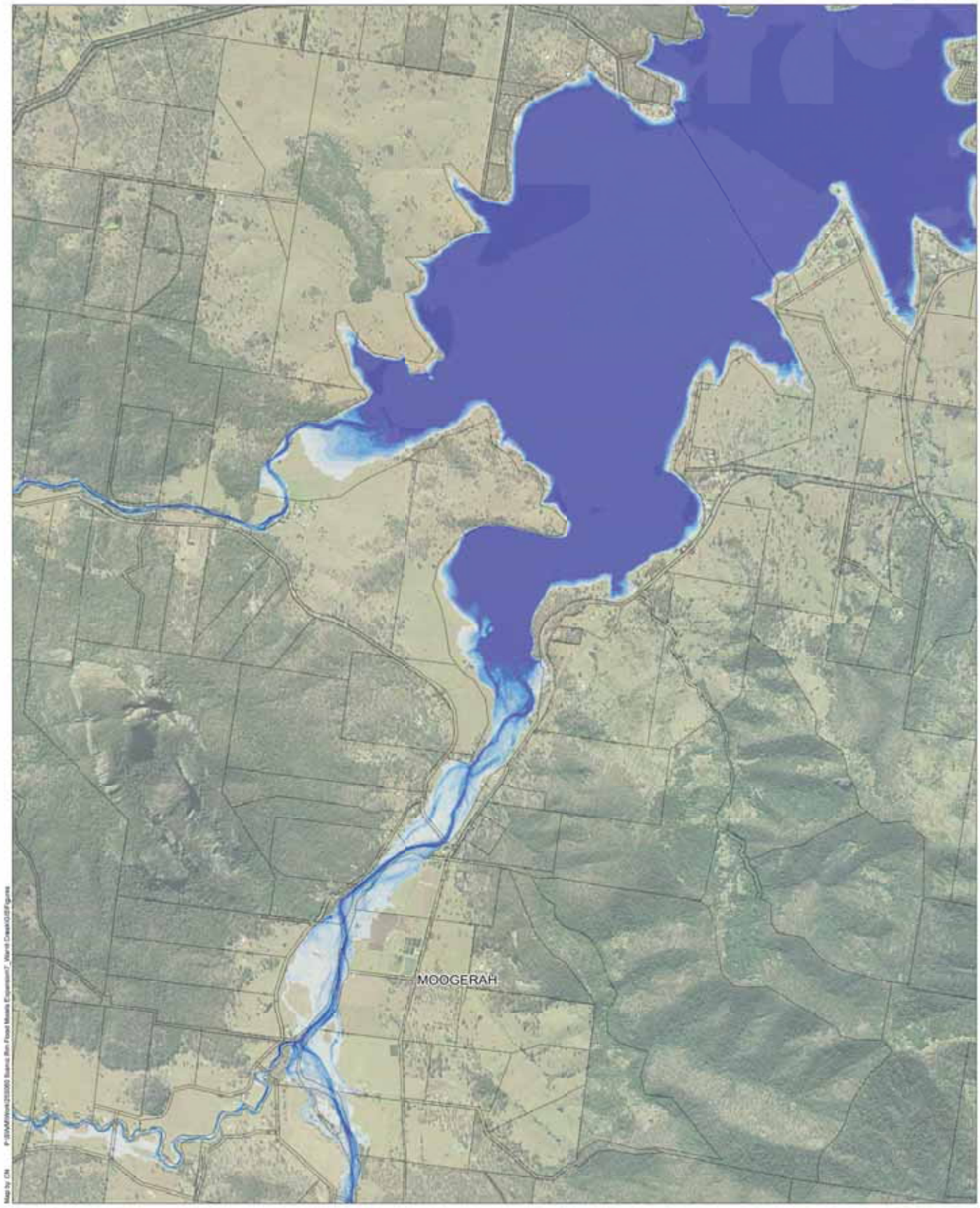
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-k**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

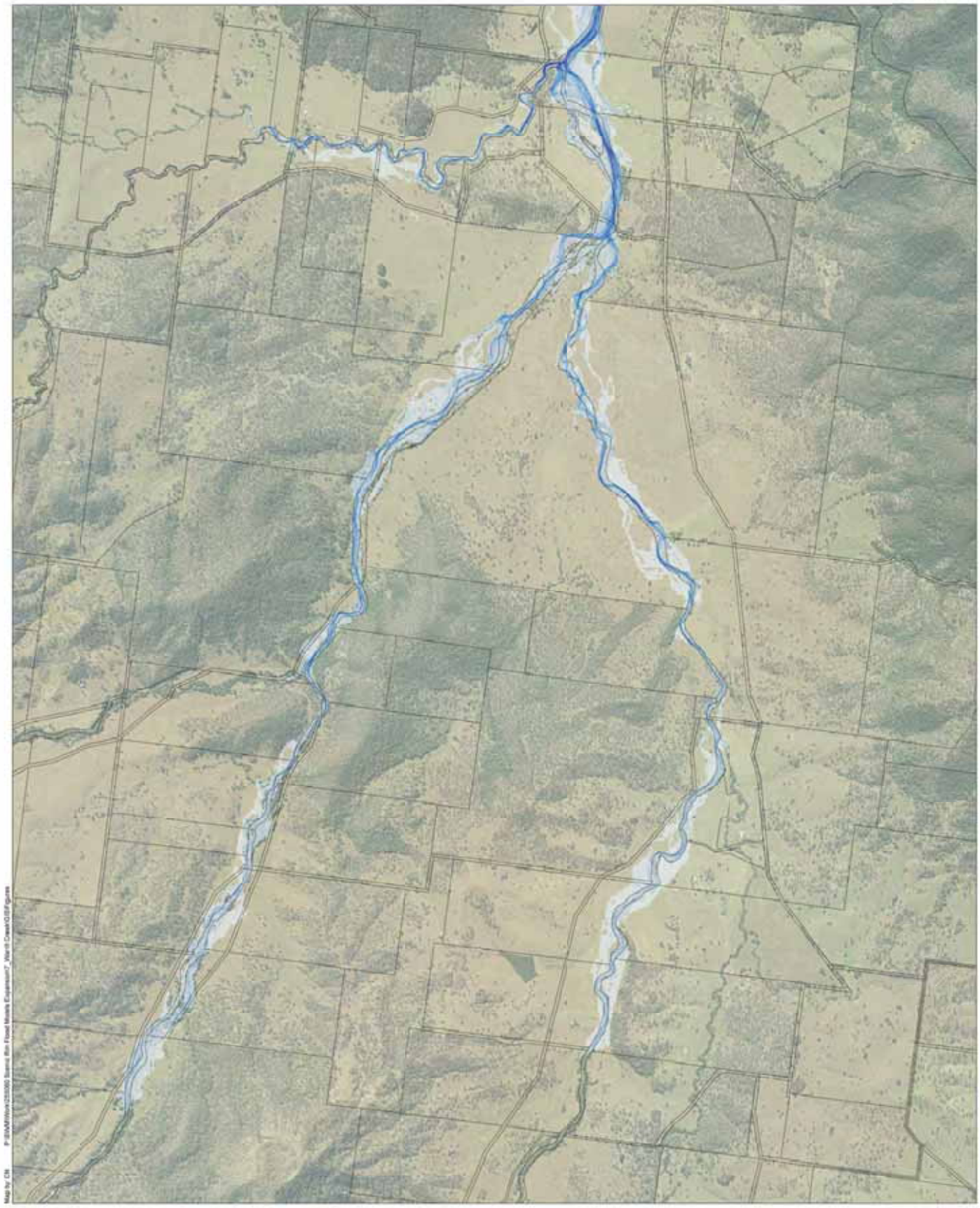
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-I**

2% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

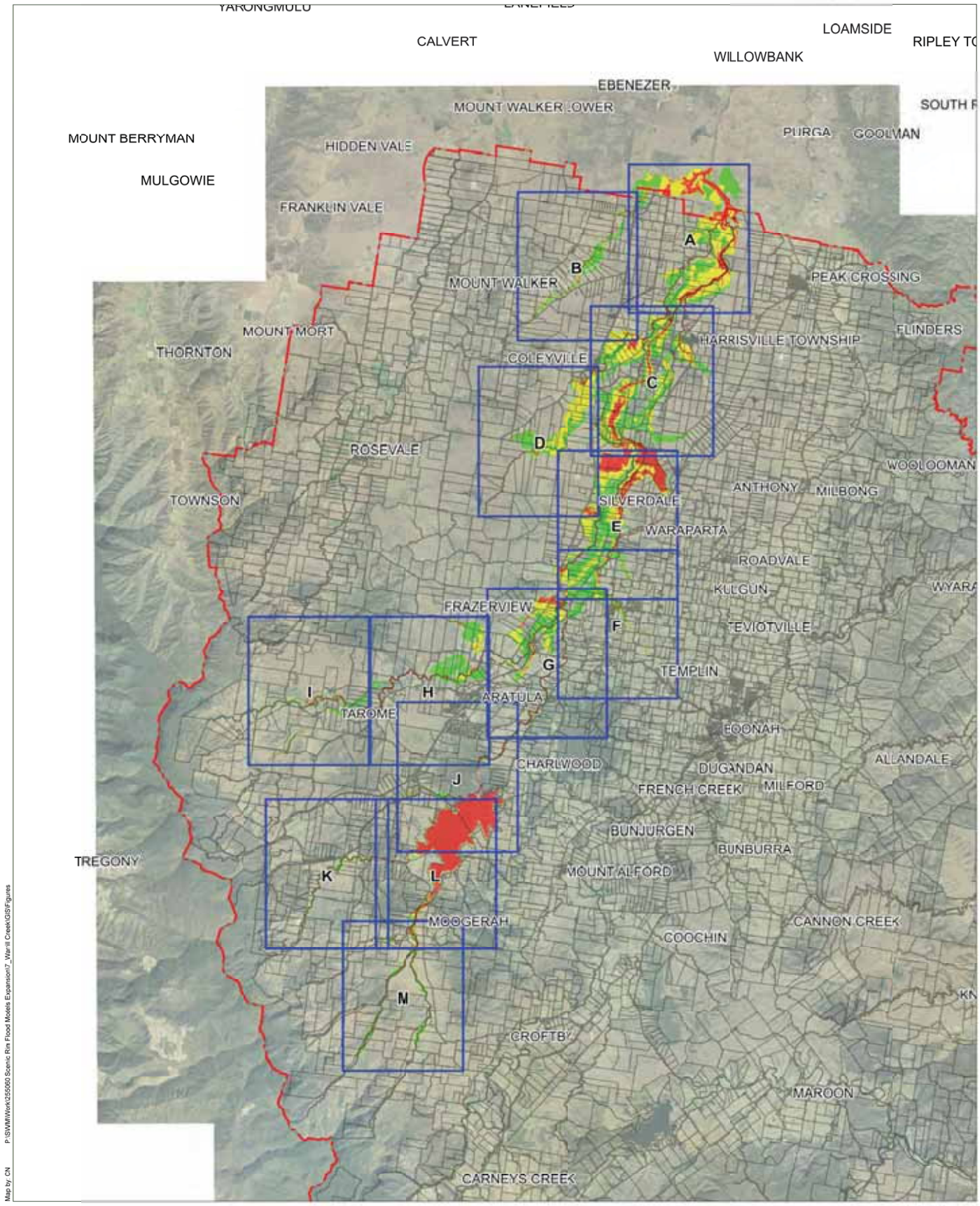
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C3-m**

2% AEP Event - Peak Depth Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

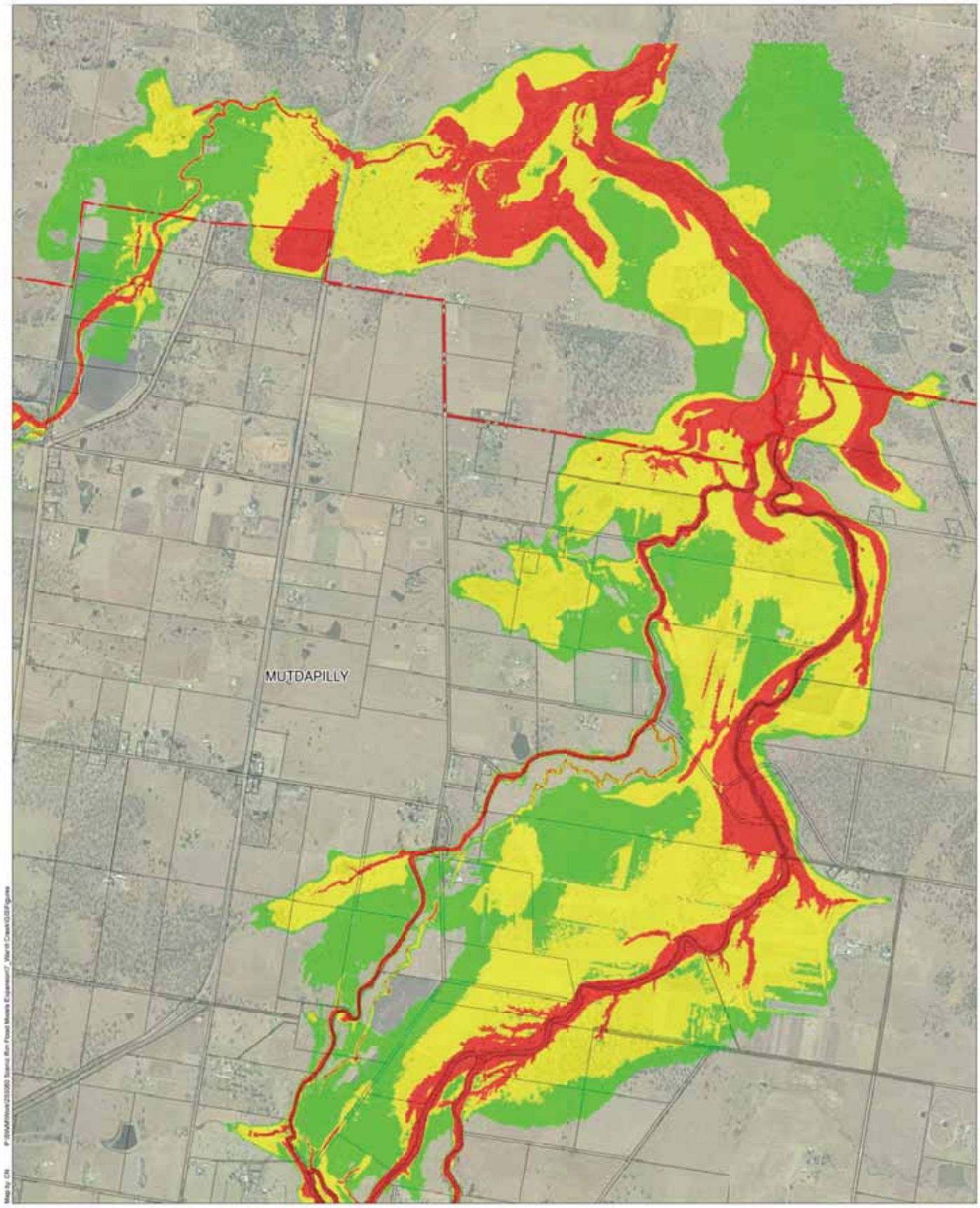
1:200,000
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4**

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

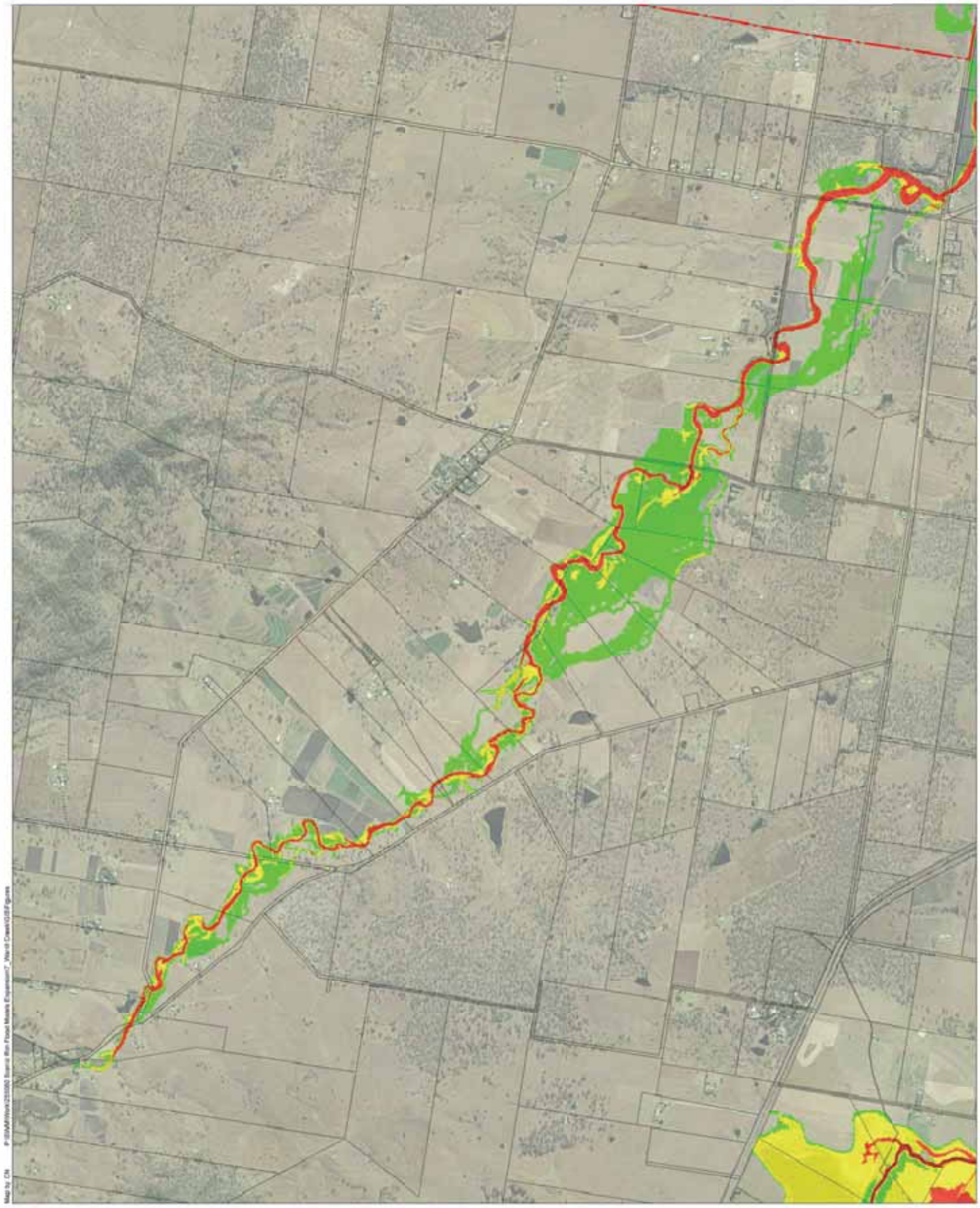
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-a**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

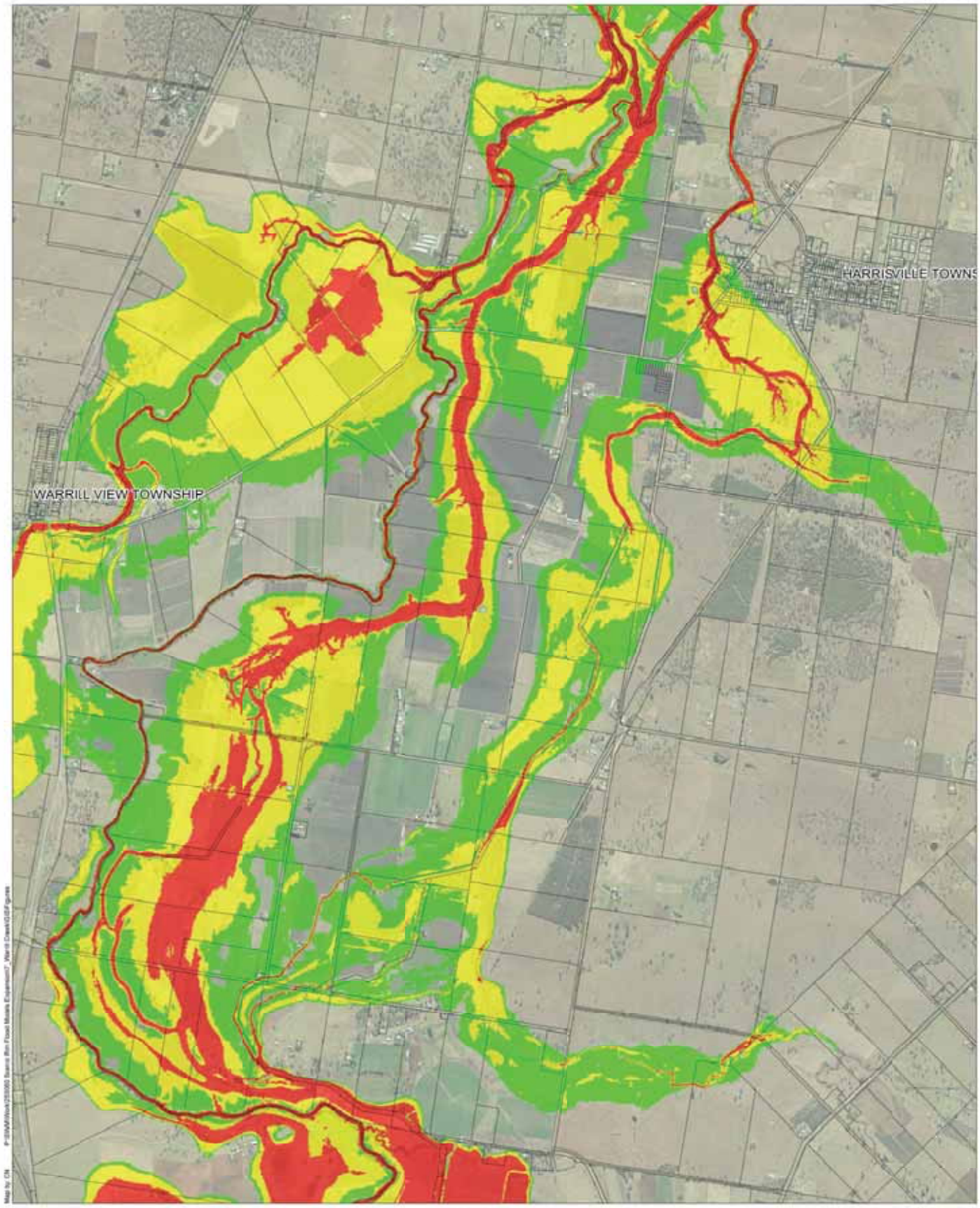
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-b**

2% AEP Event - Peak Hazard Map

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

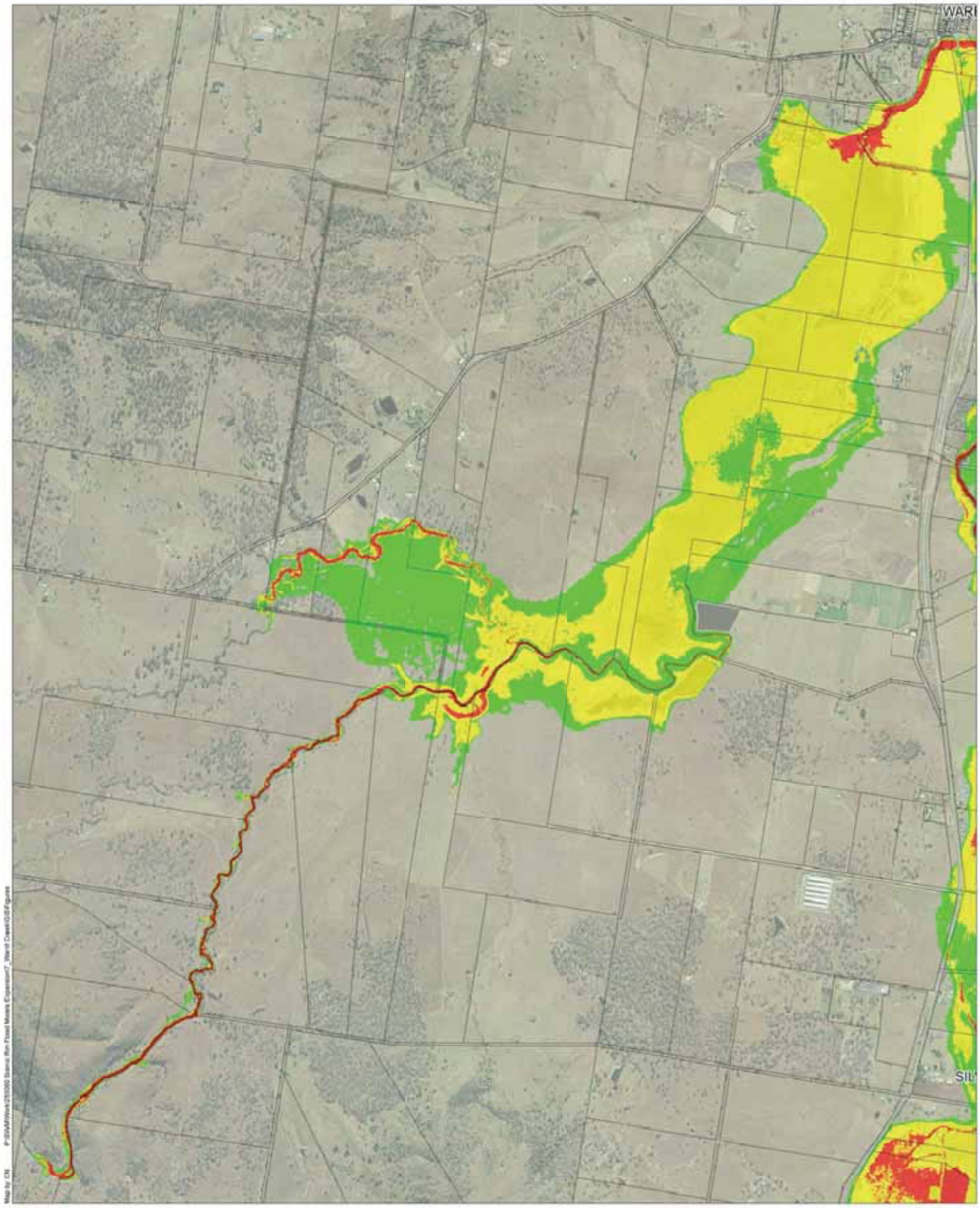
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-c**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

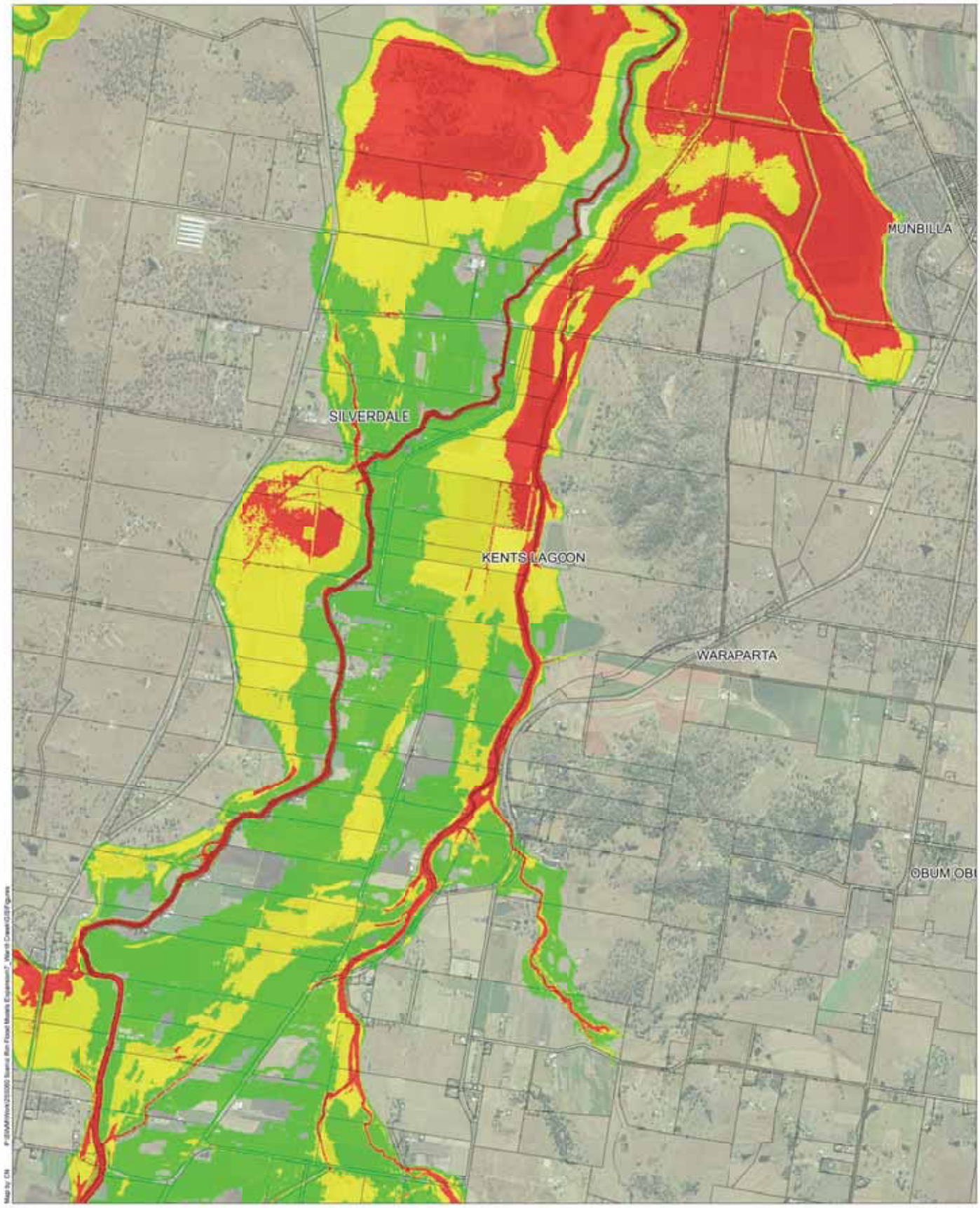
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-d**

2% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

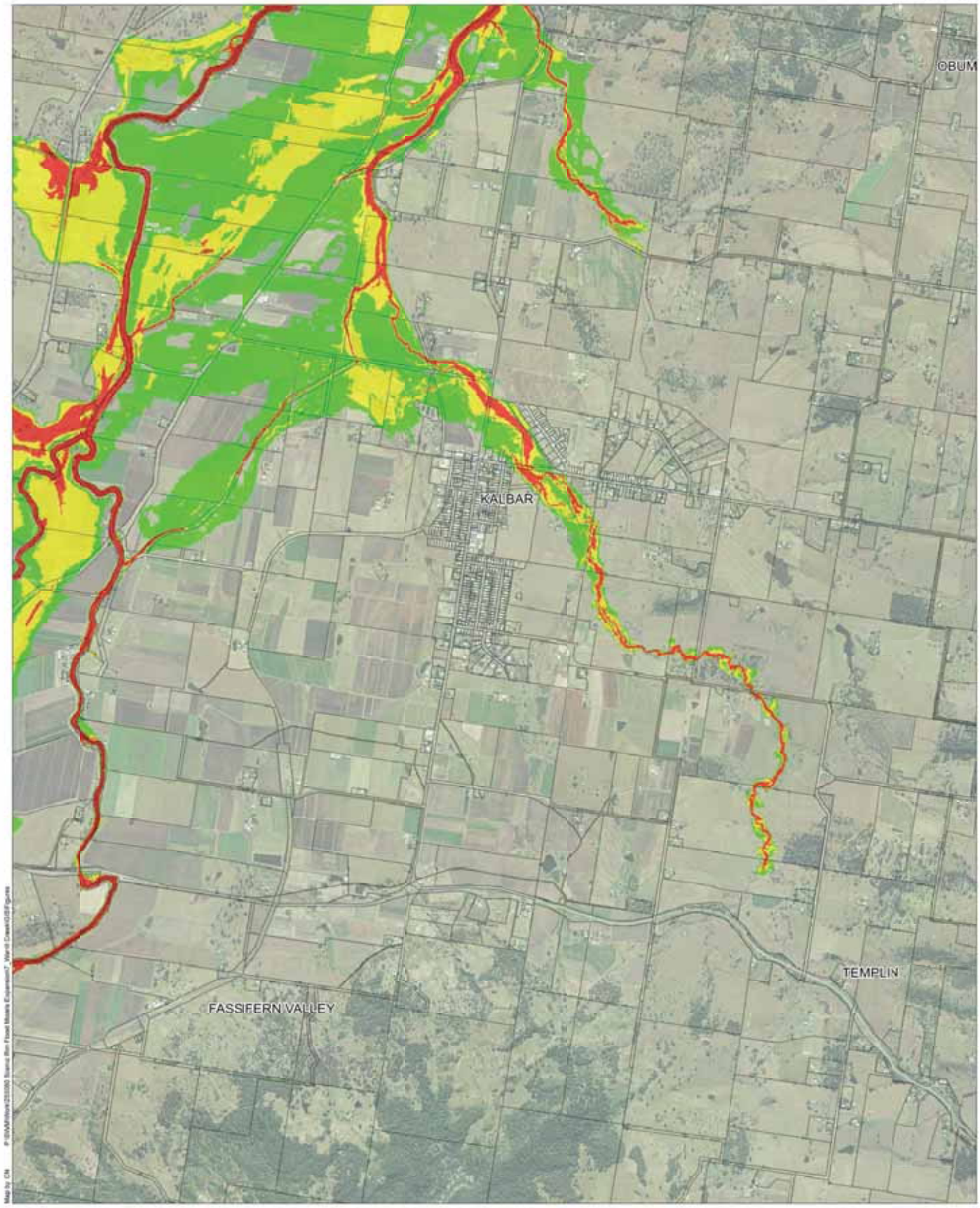
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C4-e

2% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

0 625 m 1,250 m

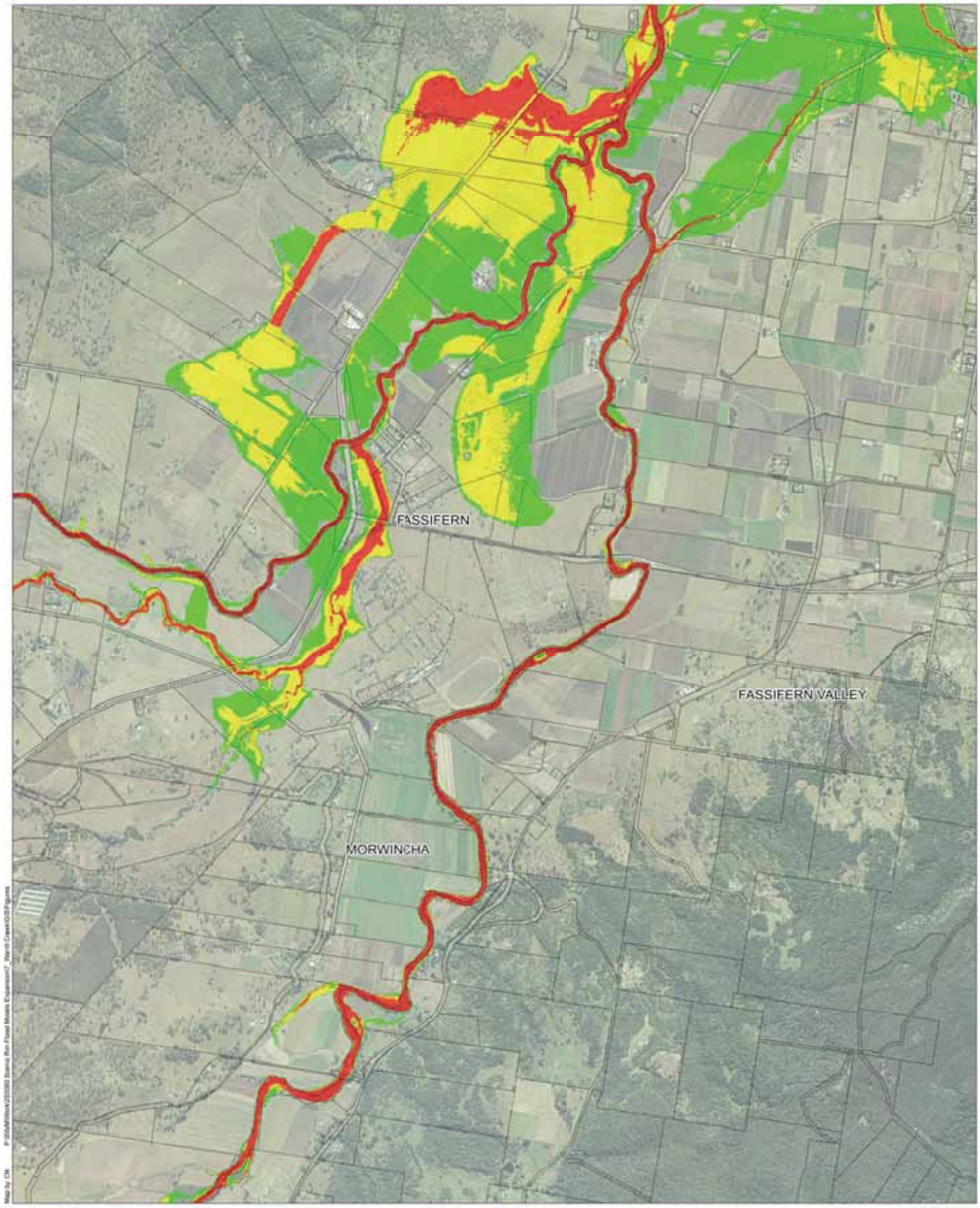
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C4-f

2% AEP Event - Peak Hazard Map

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

0 625 m 1,250 m

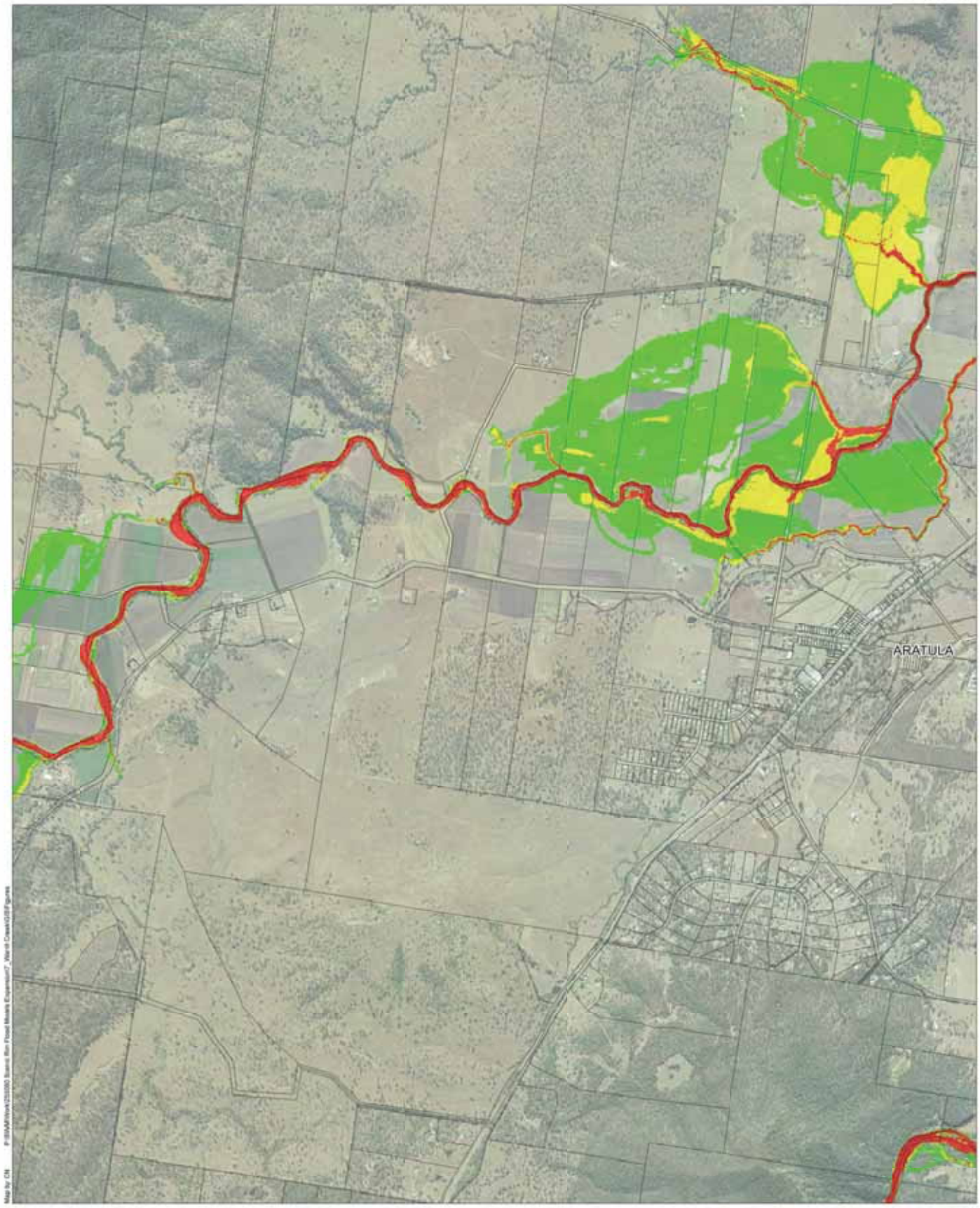
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure C4-g

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

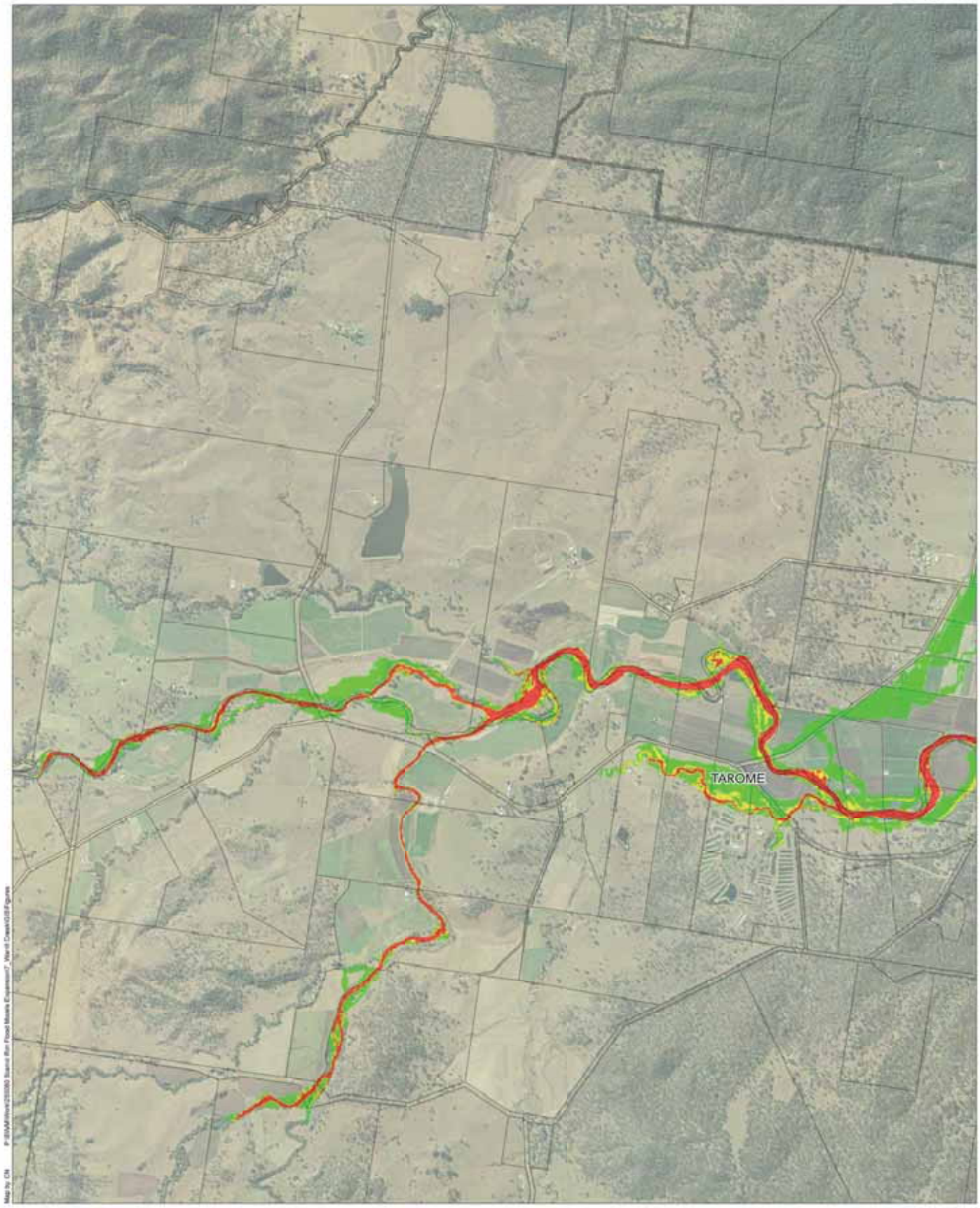
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-h**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

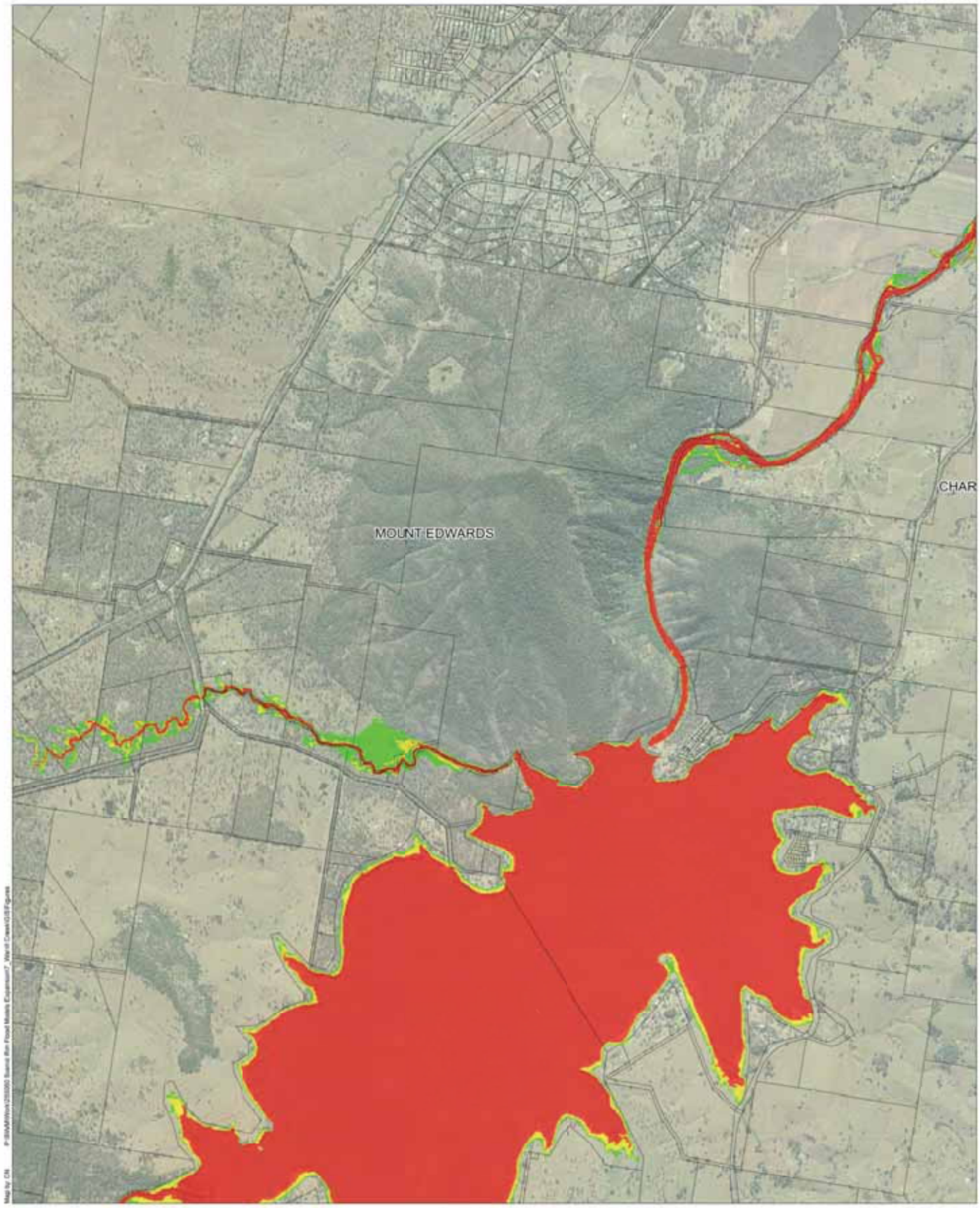
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-i**

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

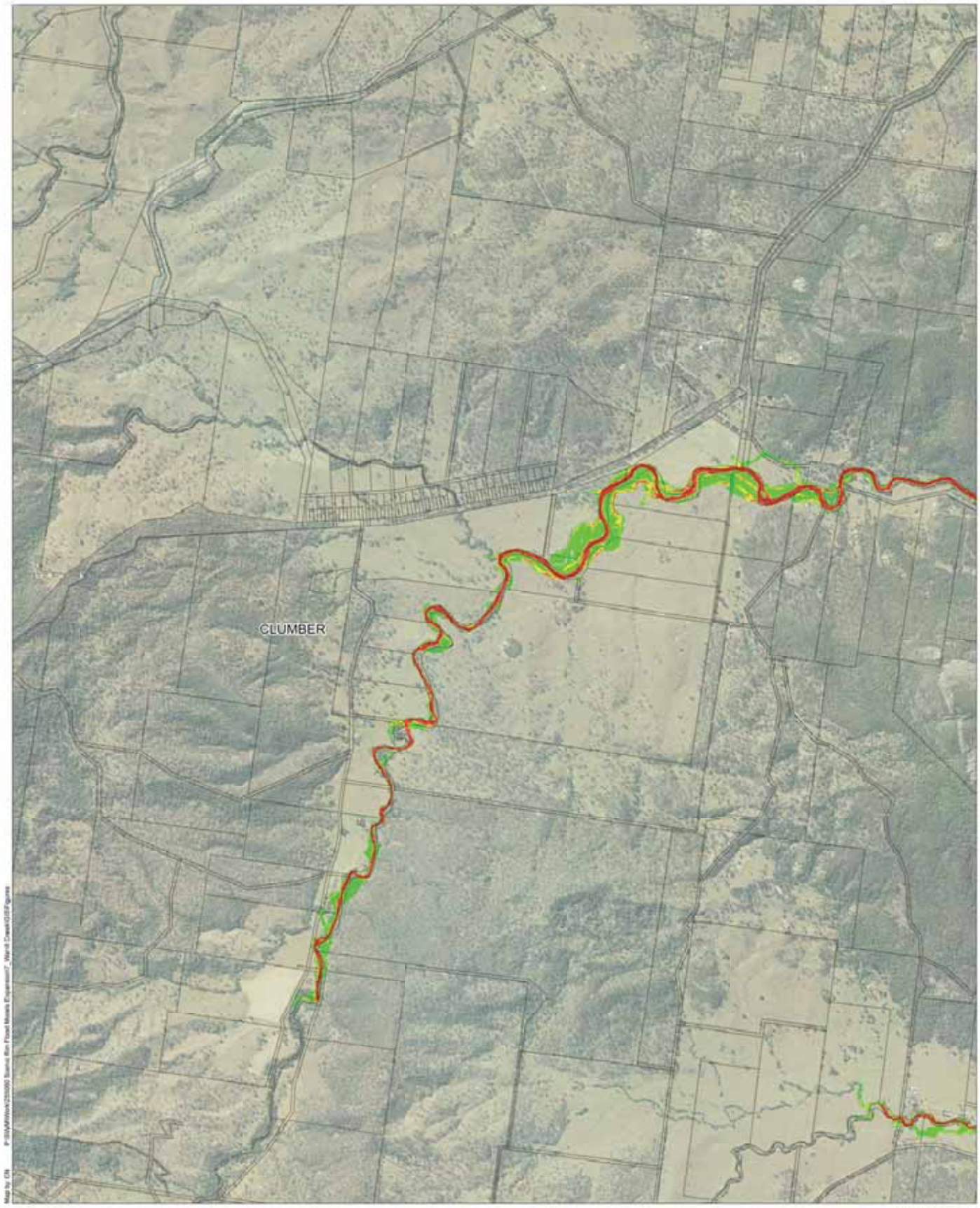
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-j**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

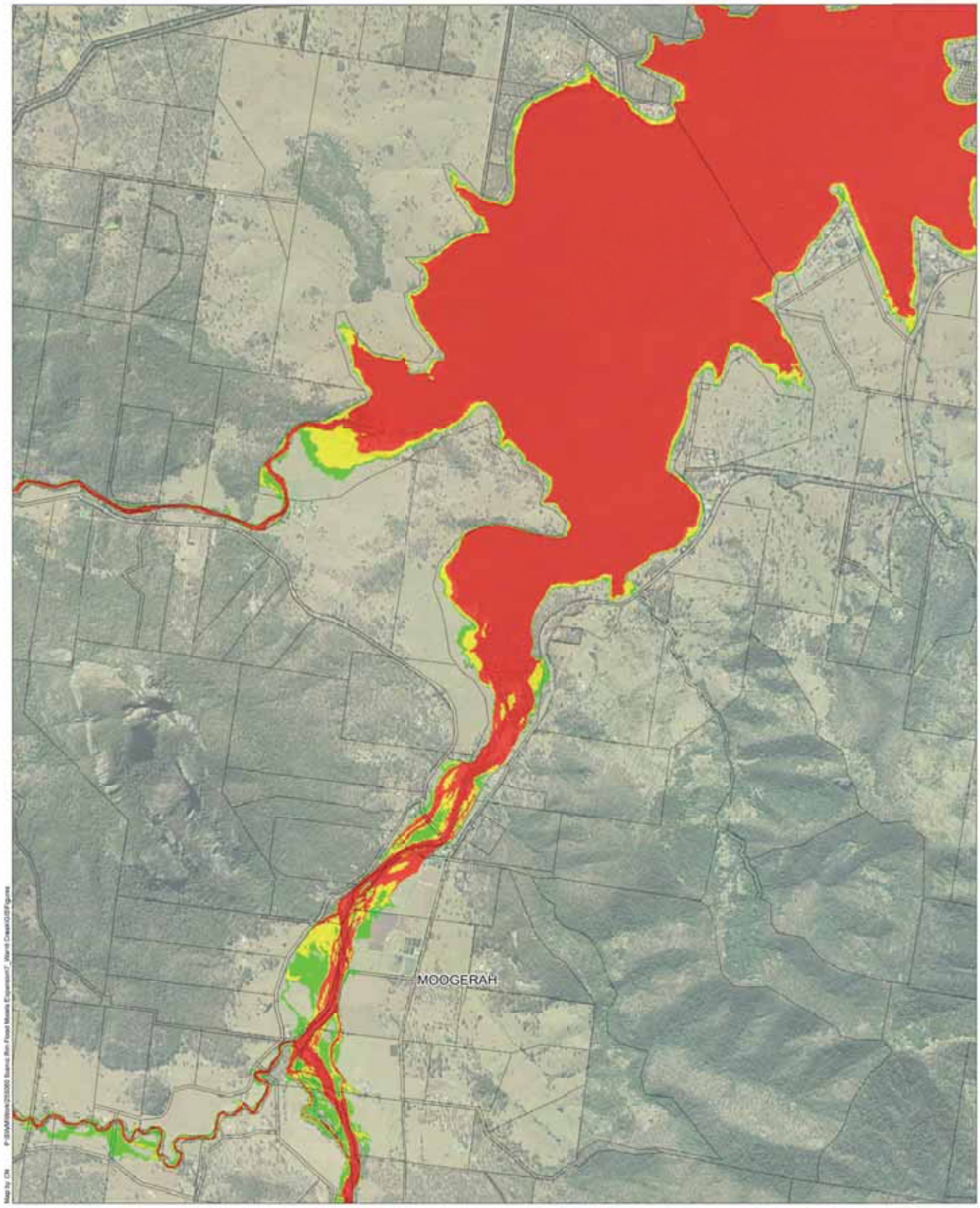
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-k**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

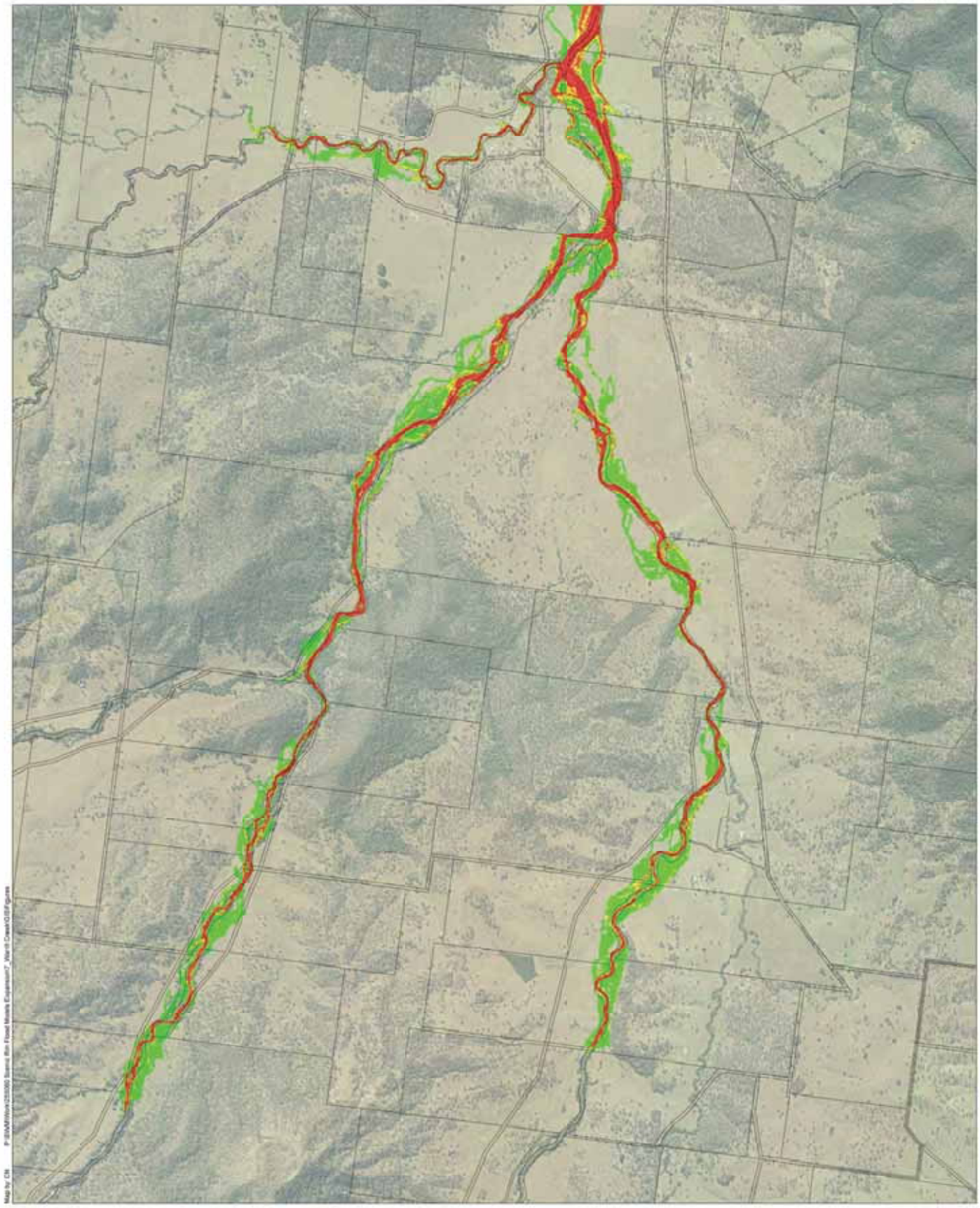
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-I**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

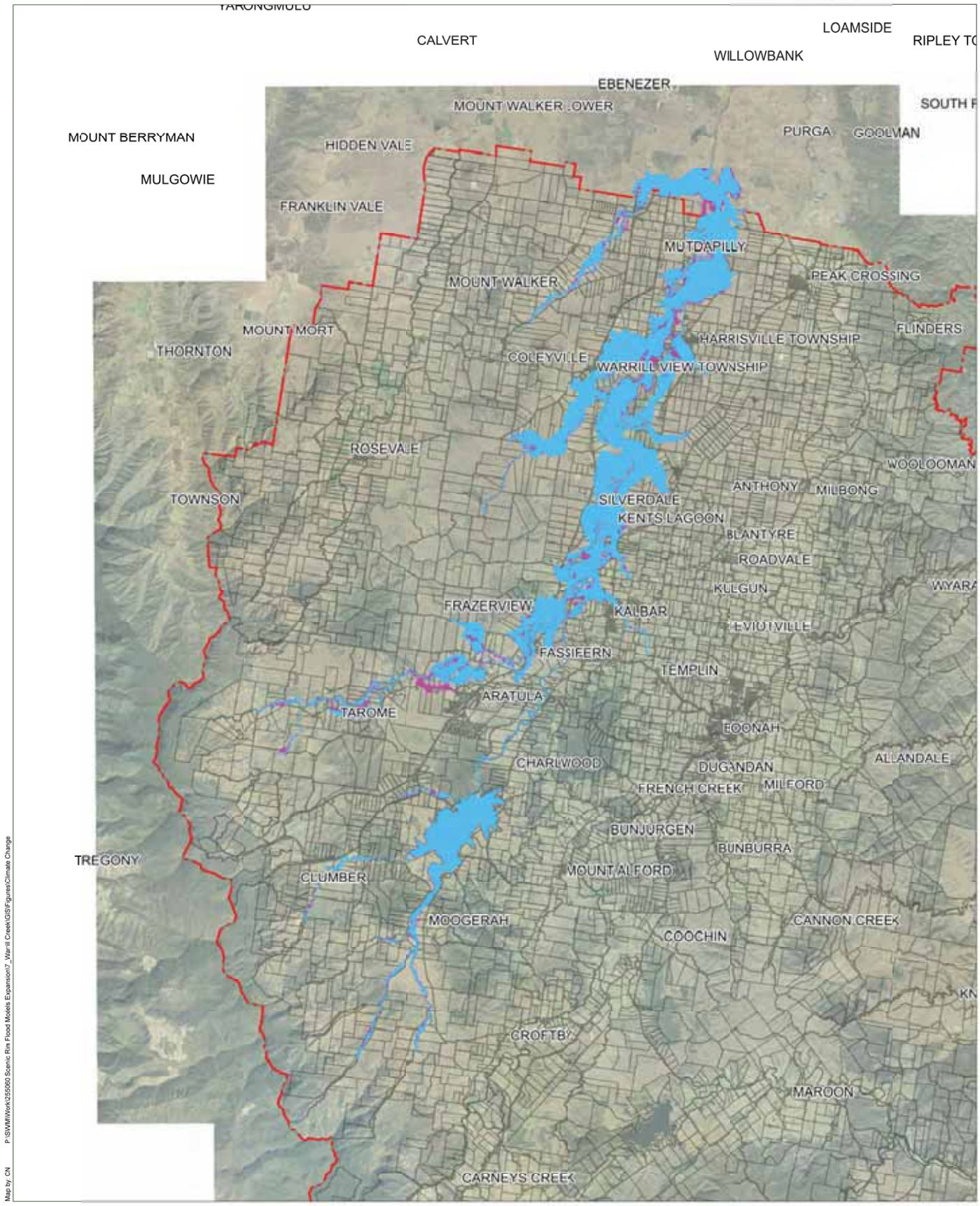
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C4-m**

2% AEP Event - Peak Hazard Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\Climate Change

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Inundation Extent Climate Change

Notes:

1:200,000

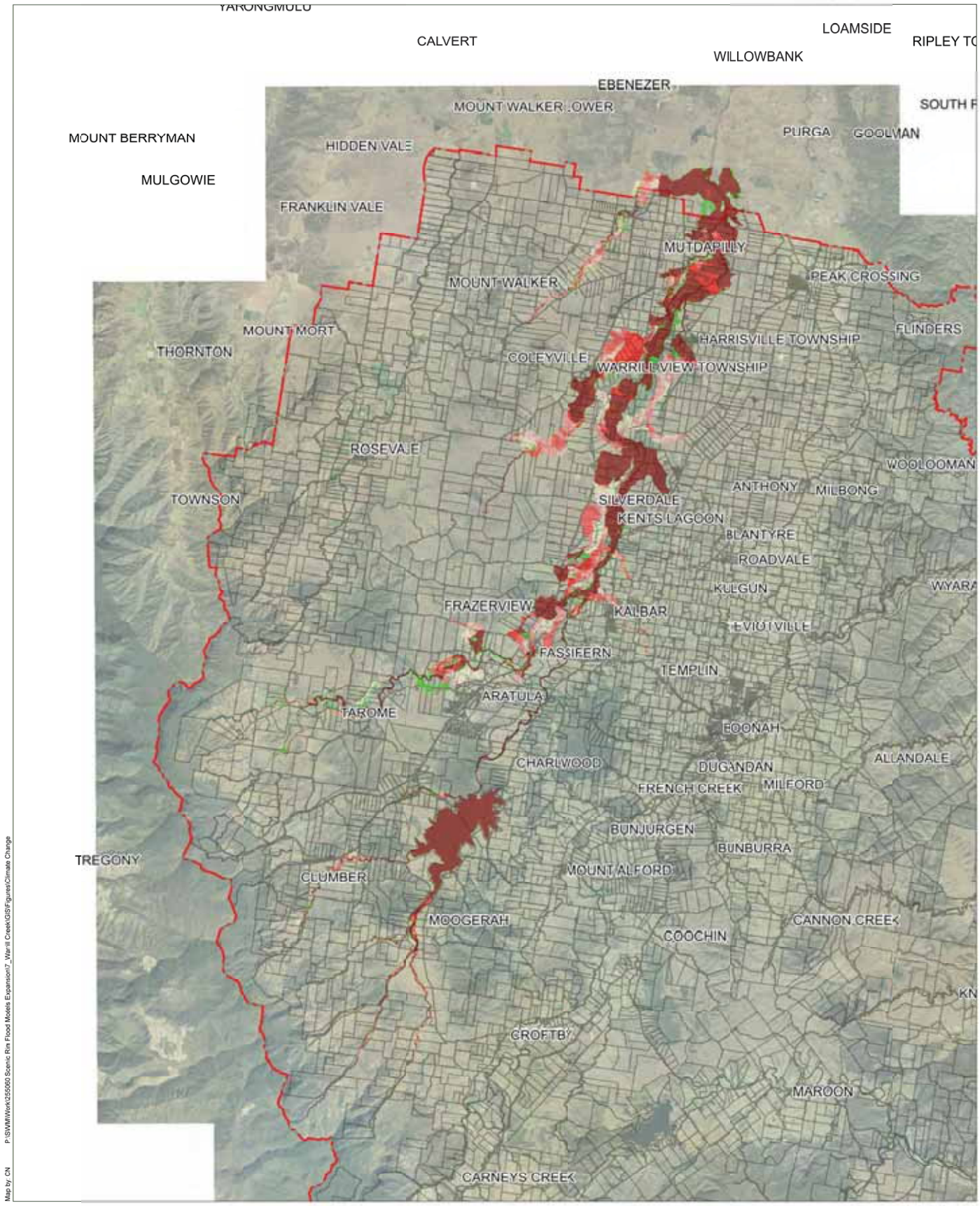
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C5 - a**

Climate Change Scenario 4.5 - 2% AEP Event Inundation Extent



Map by: CN P:\SWMWork\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\Climate Change

Legend

SRRC Boundary

Cadastral Boundary

Afflux (m)

< -0.80	0.03 to 0.20
-0.80 to -0.60	0.20 to 0.40
-0.60 to -0.40	0.40 to 0.60
-0.40 to -0.20	0.60 to 0.80
-0.20 to -0.03	0.80 to 1.20
-0.03 to 0.03	> 1.20

Was Dry Now Wet

Was Wet Now Dry

Notes:

1:200,000

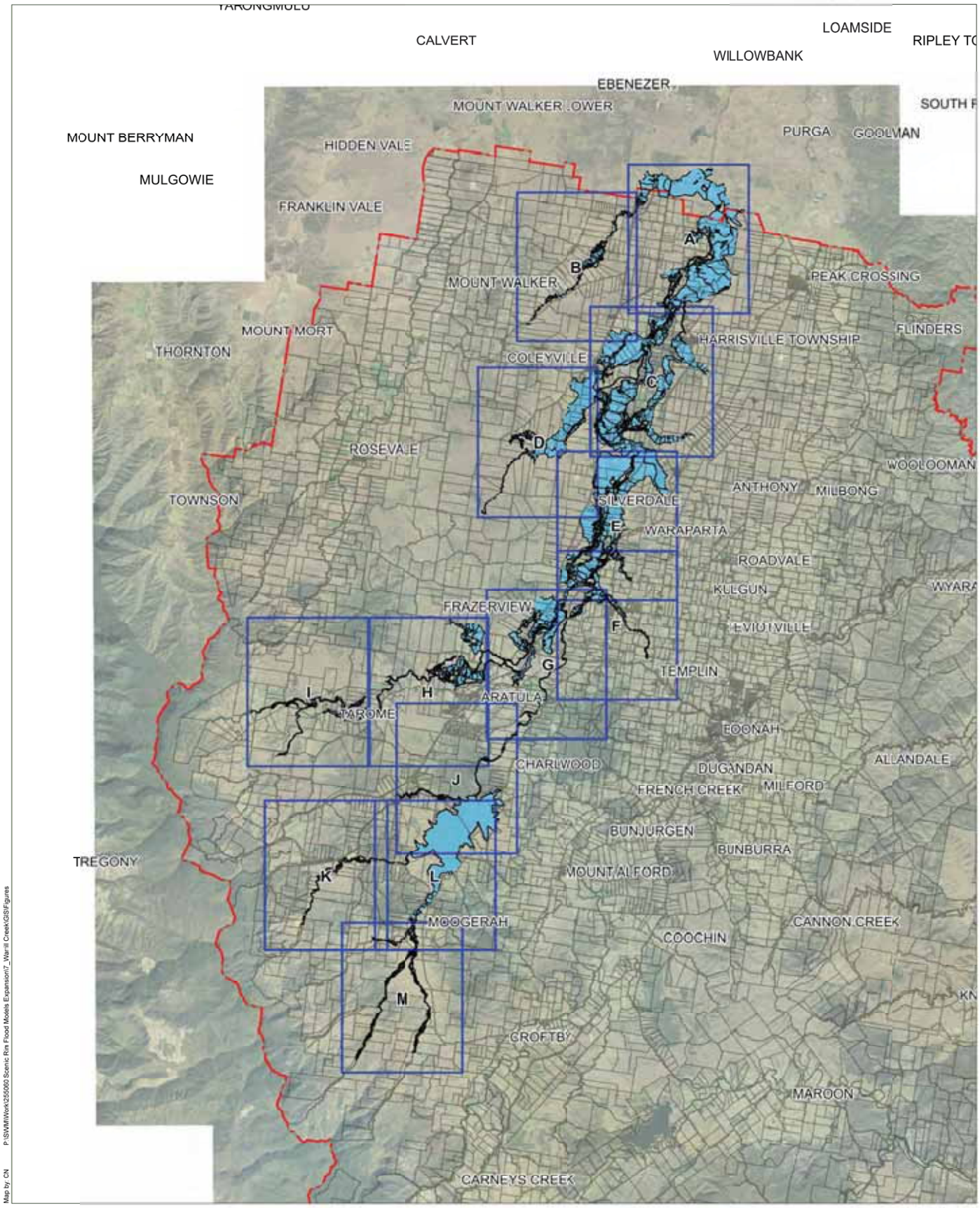
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure C5 - b**

Climate Change Scenario 4.5 - 2% AEP Event Afflux Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

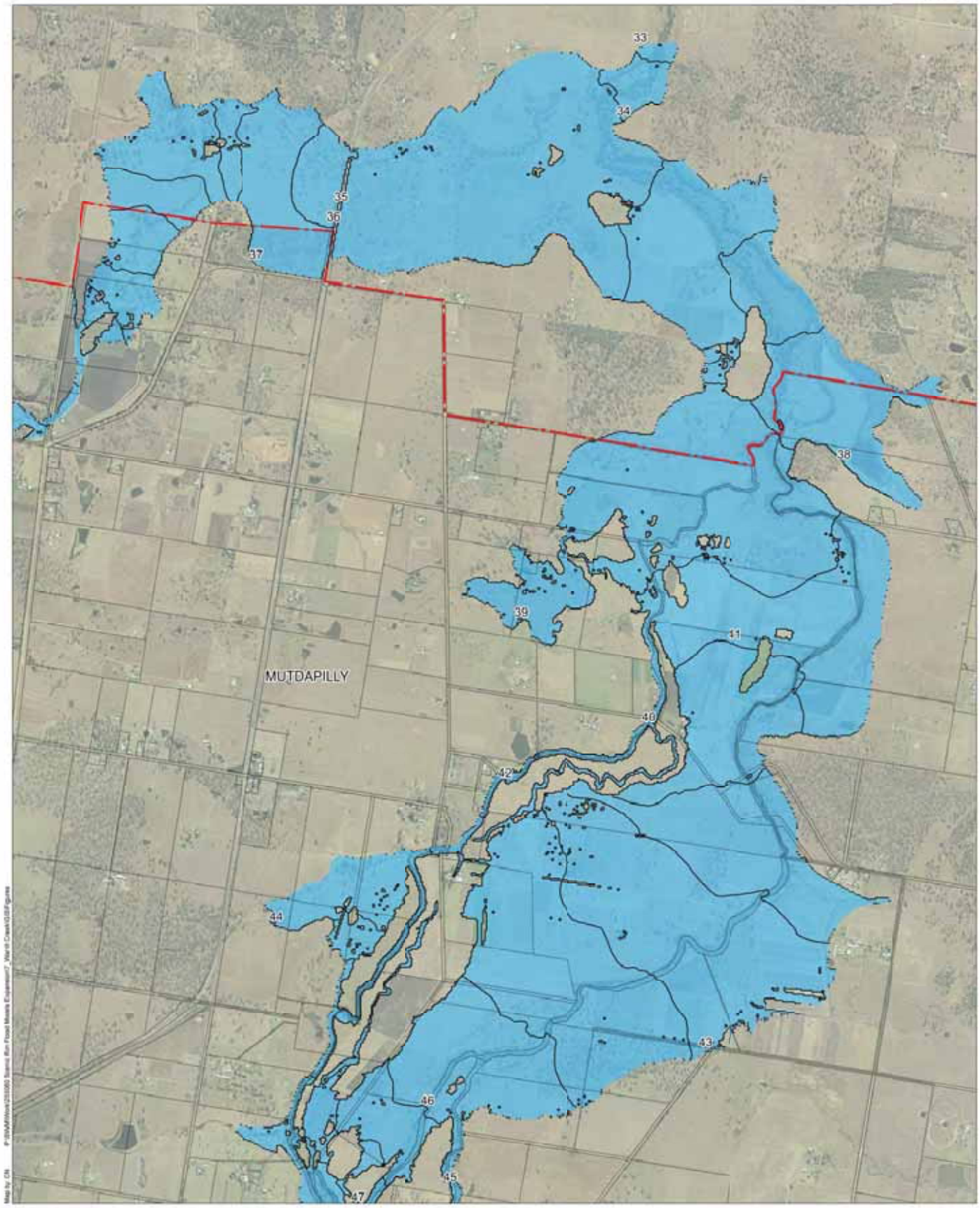
Notes:

1:200,000
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

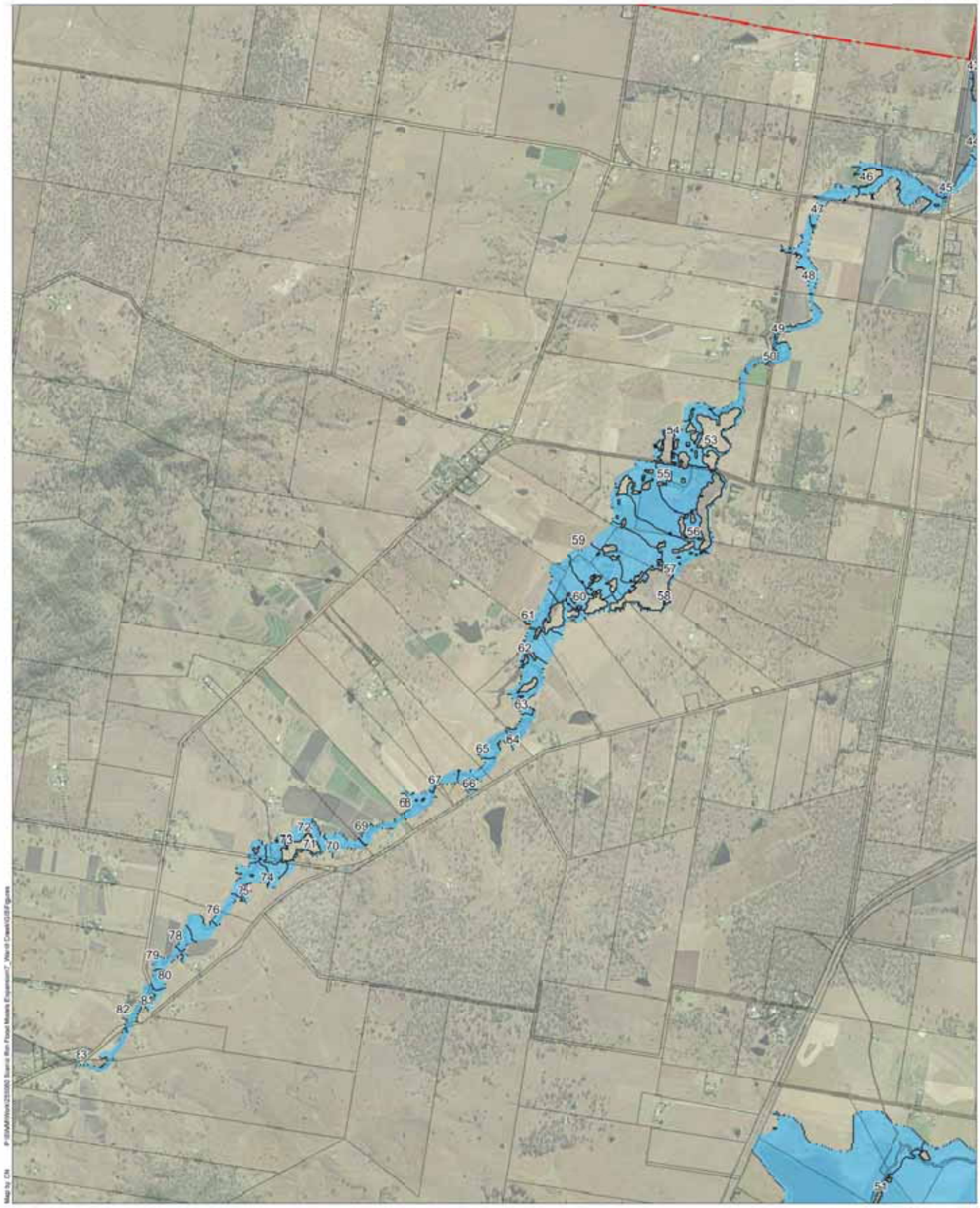
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-a**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

0 625 m 1,250 m

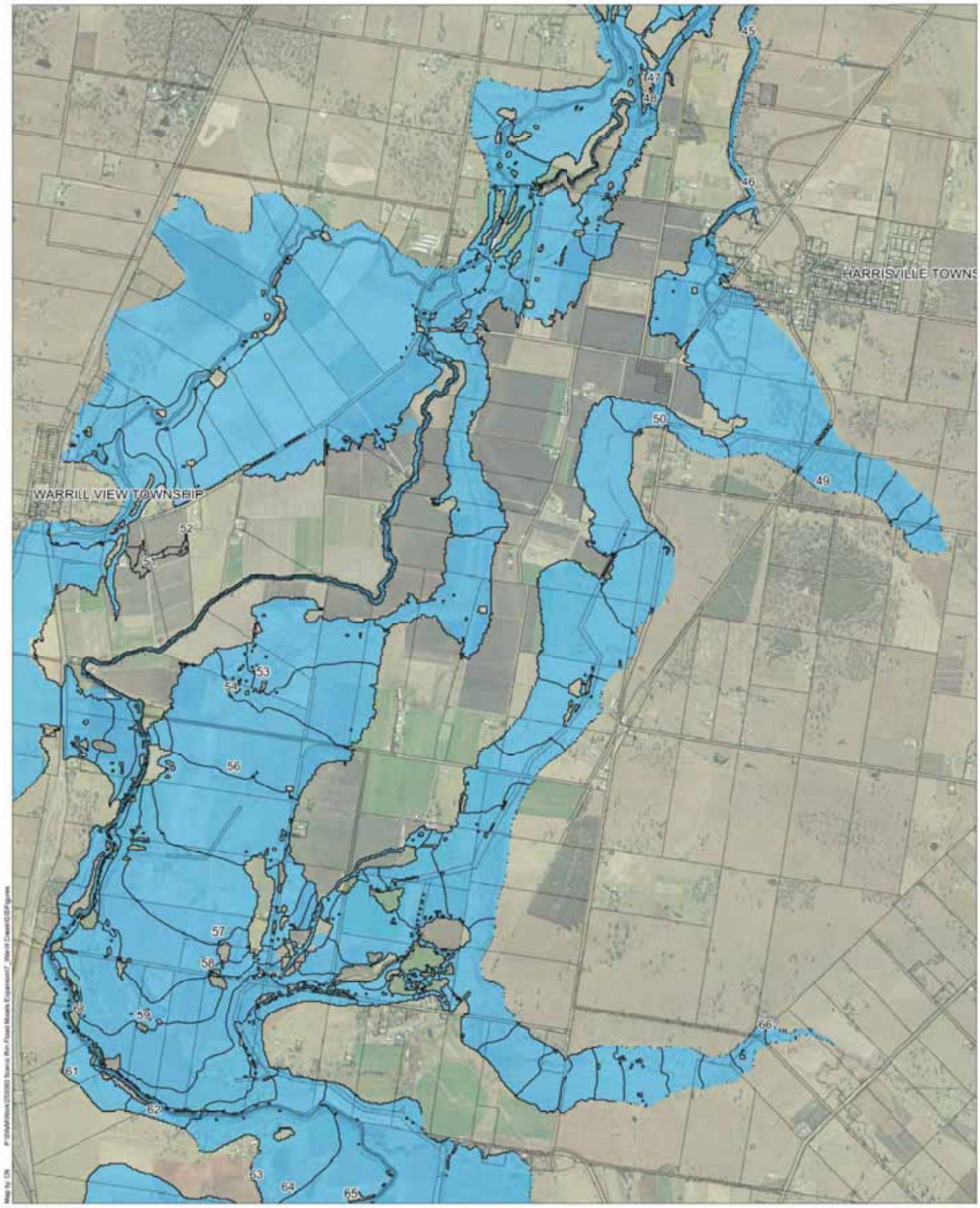
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-b**

5% AEP Event - Inundation Extent

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

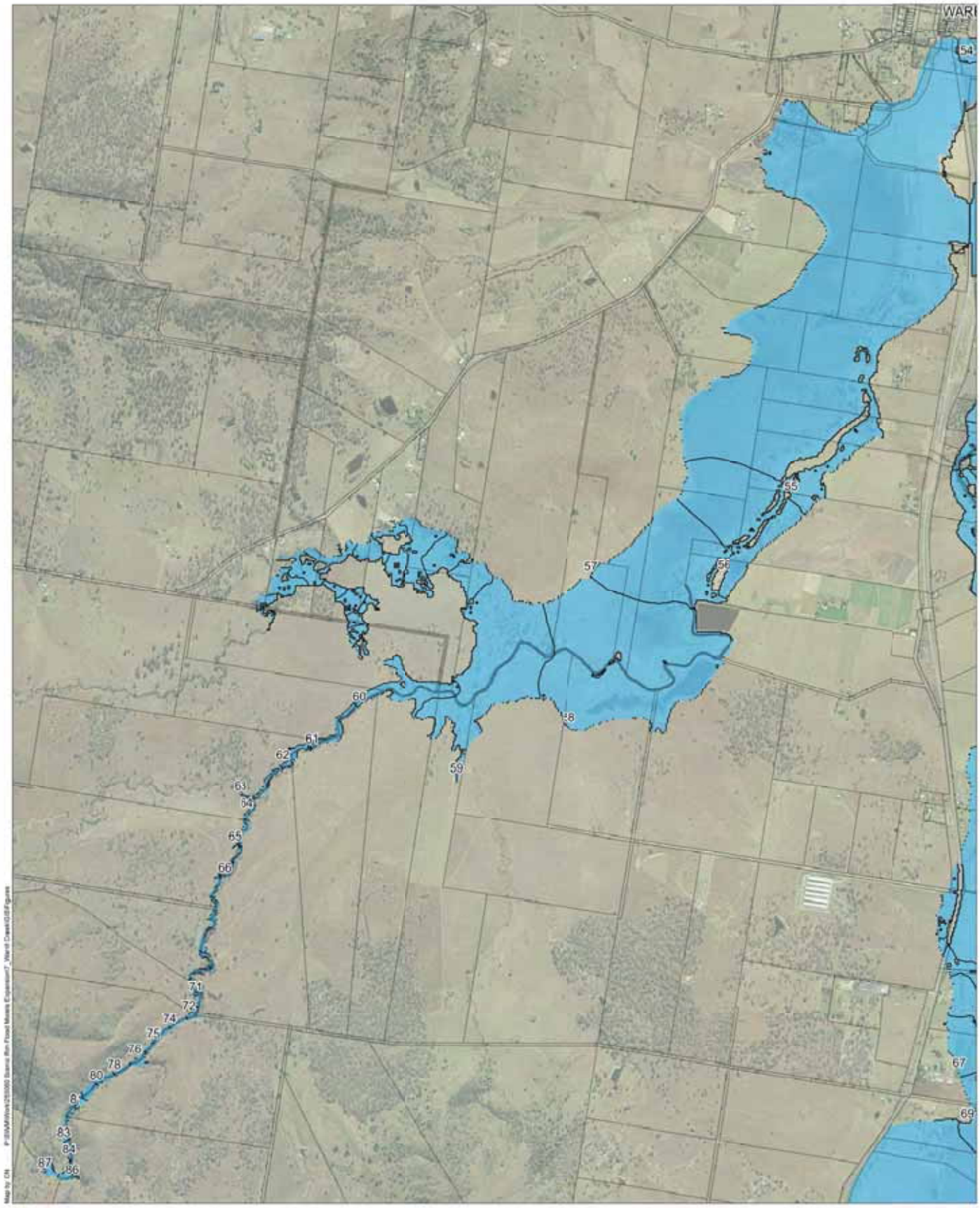
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-c**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

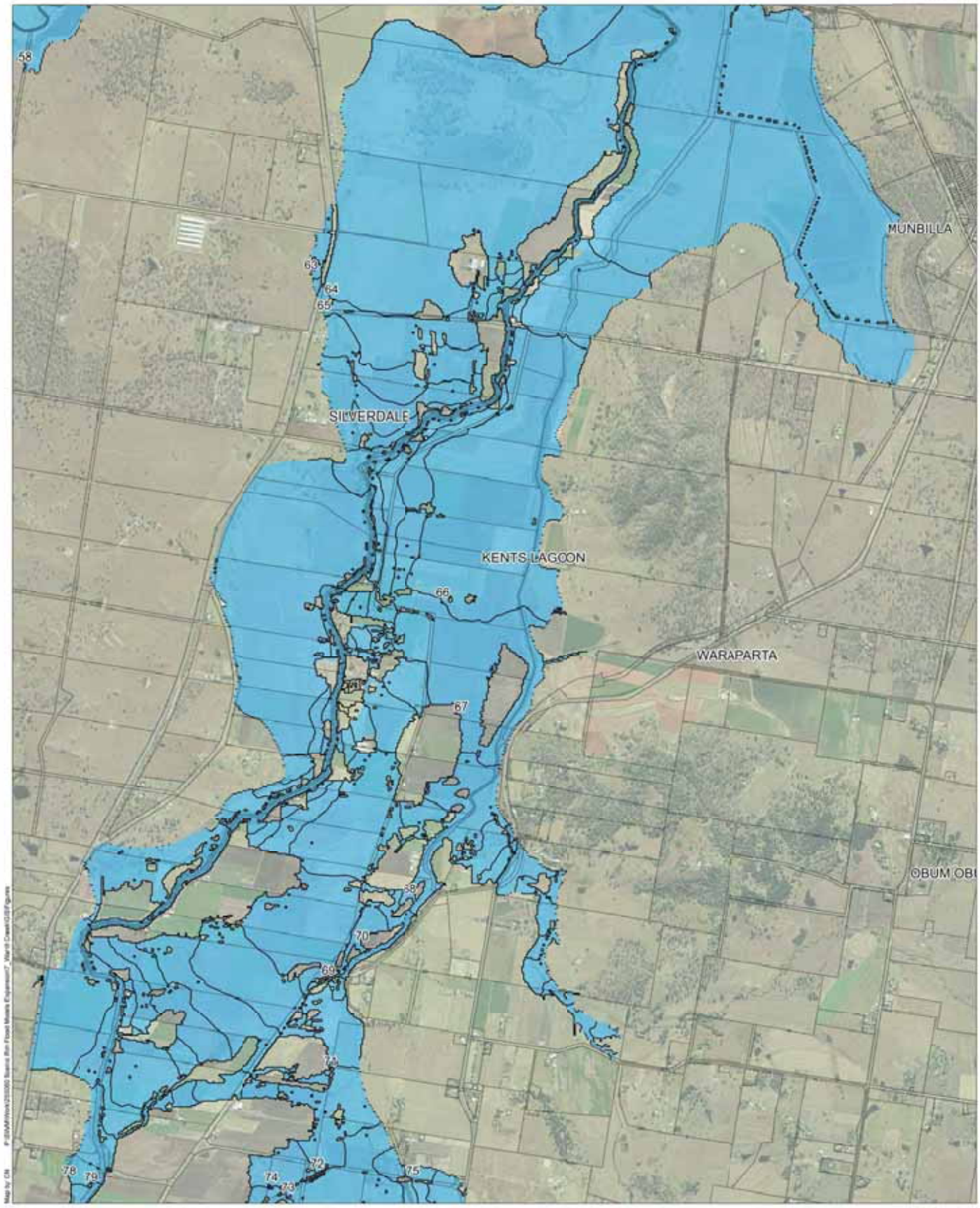
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-d**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

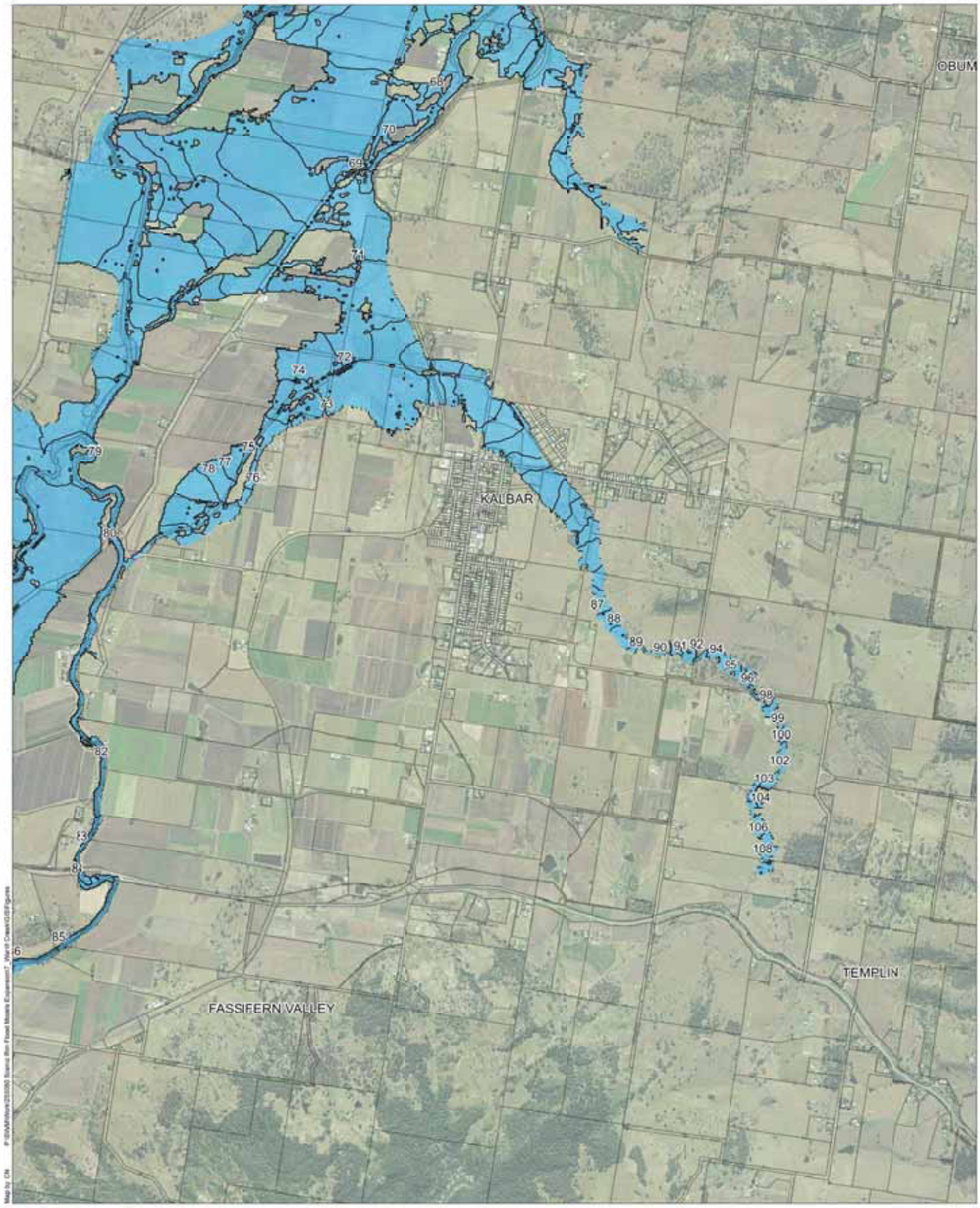
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-e**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

0 625 m 1,250 m

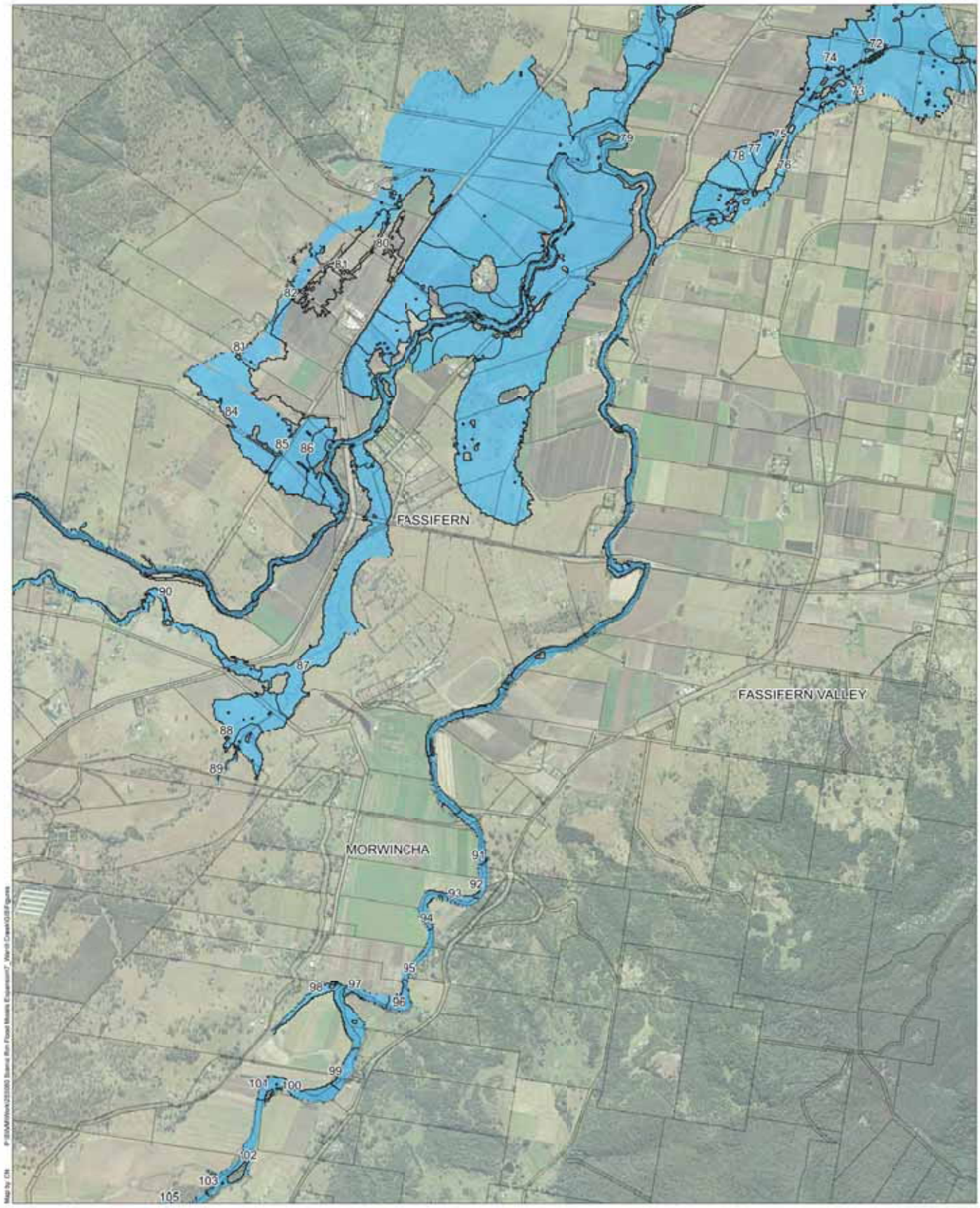
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-f**

5% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

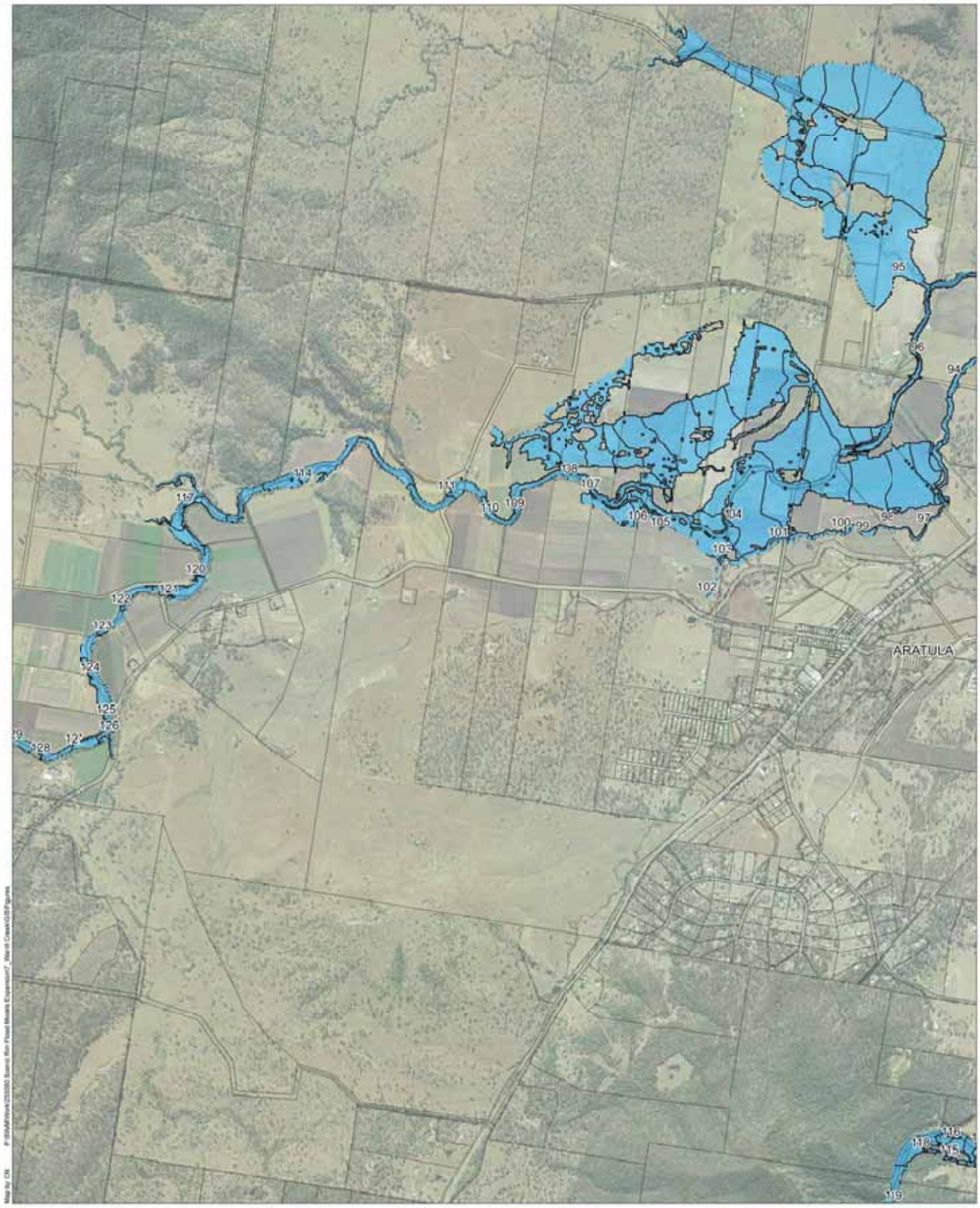
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-g**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

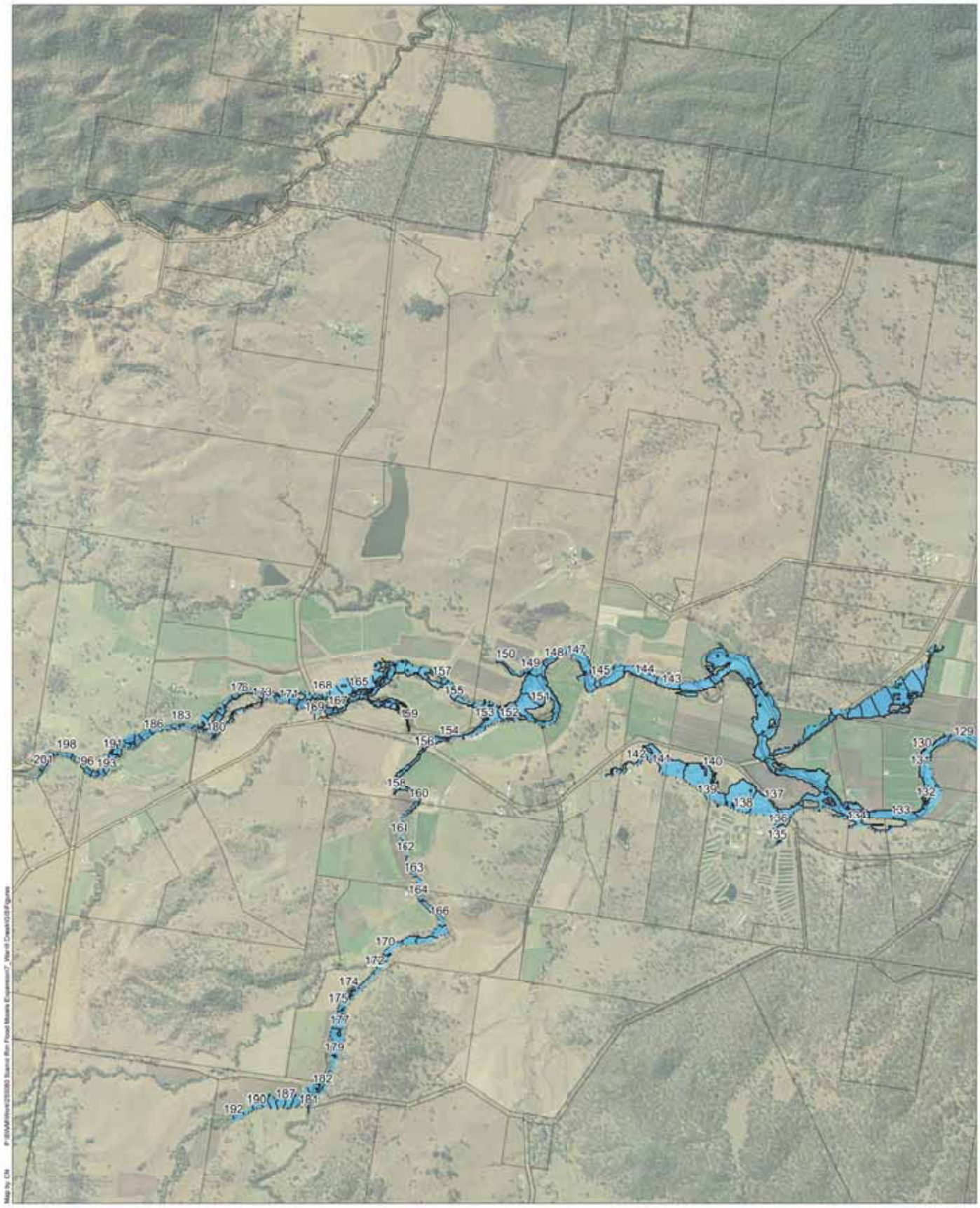
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

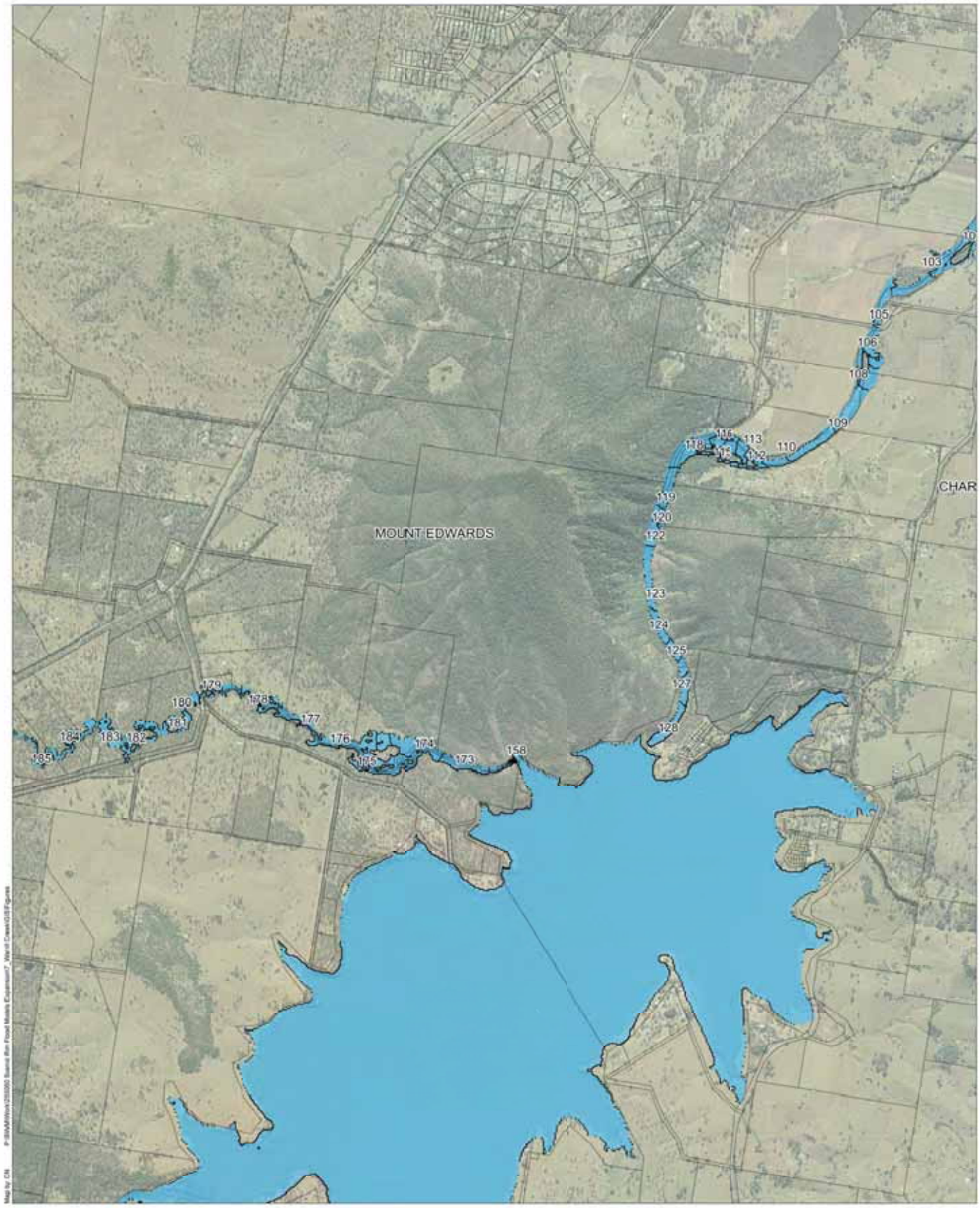
Warrill Creek Flood Study **Figure D1-h**

5% AEP Event - Inundation Extent



Warrill Creek Flood Study Figure D1-i

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

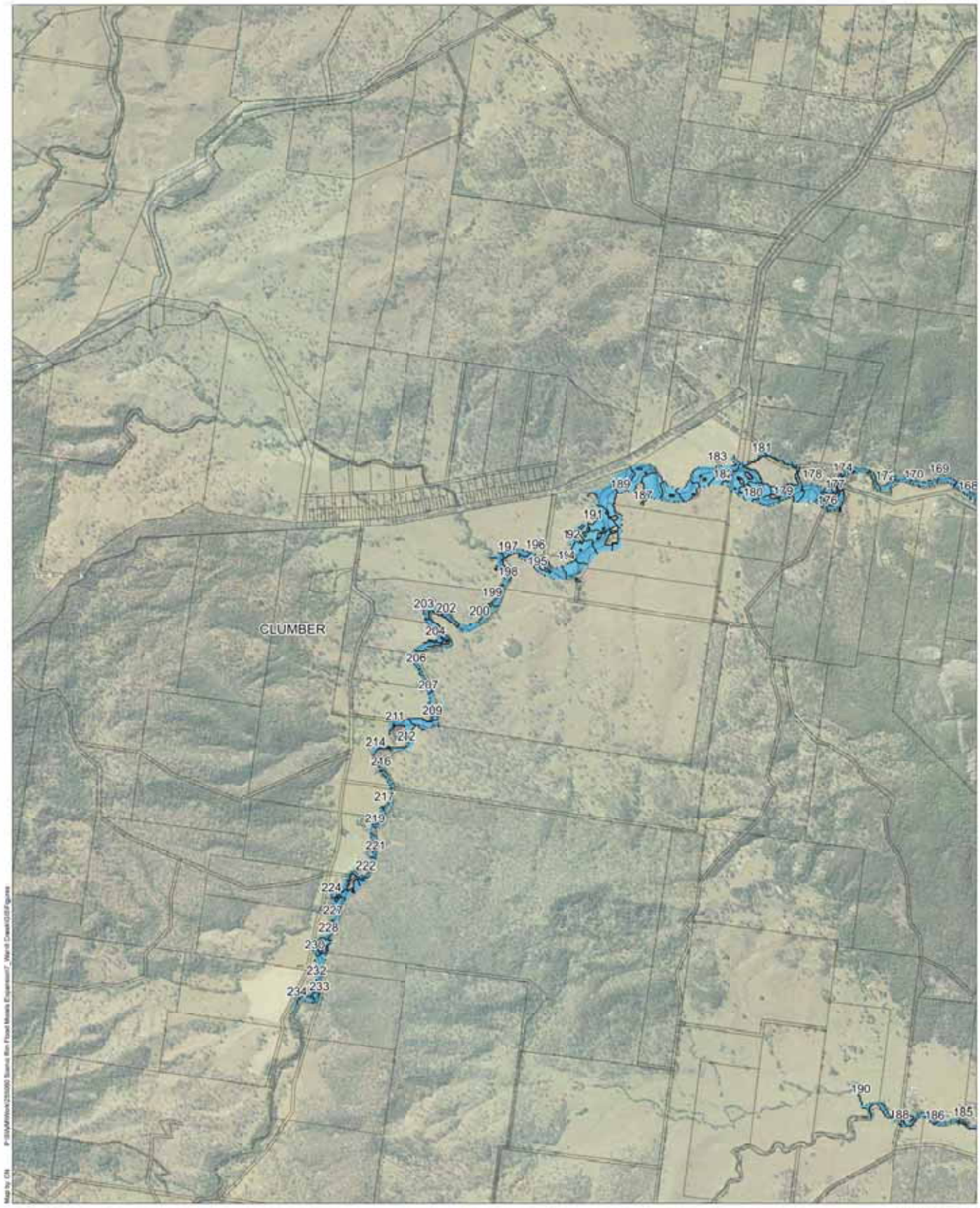
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-j**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

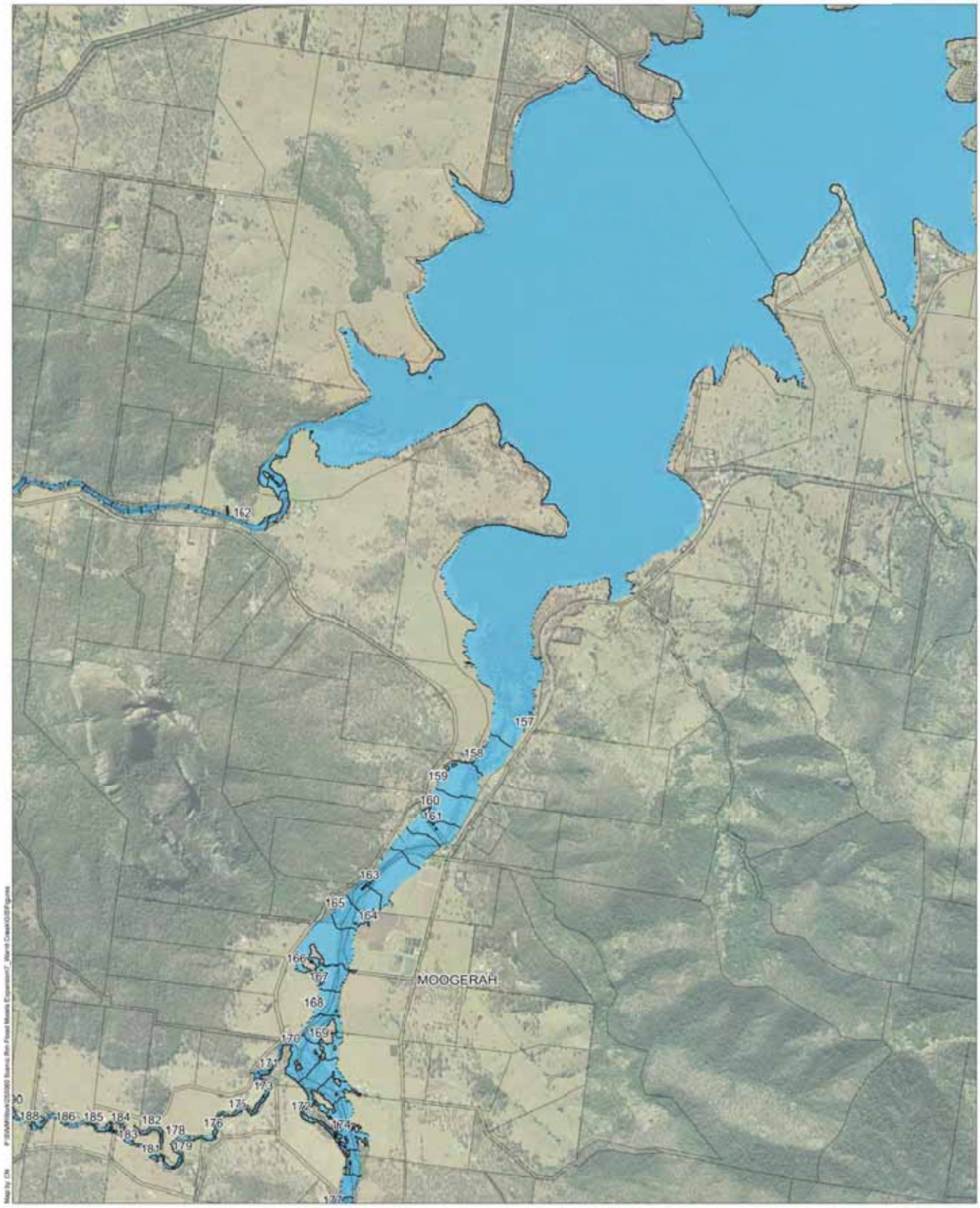
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-k**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

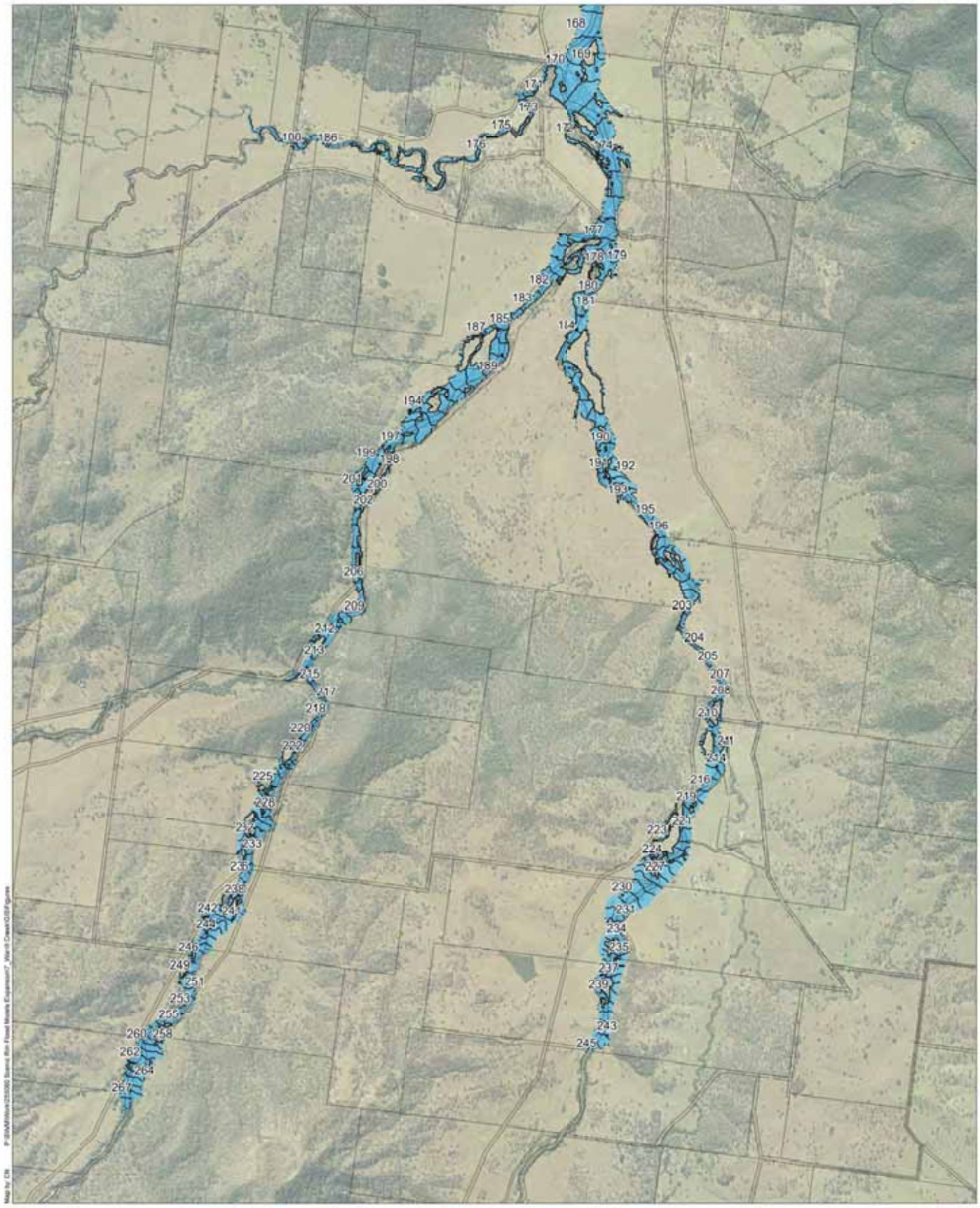
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D1-I**

5% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

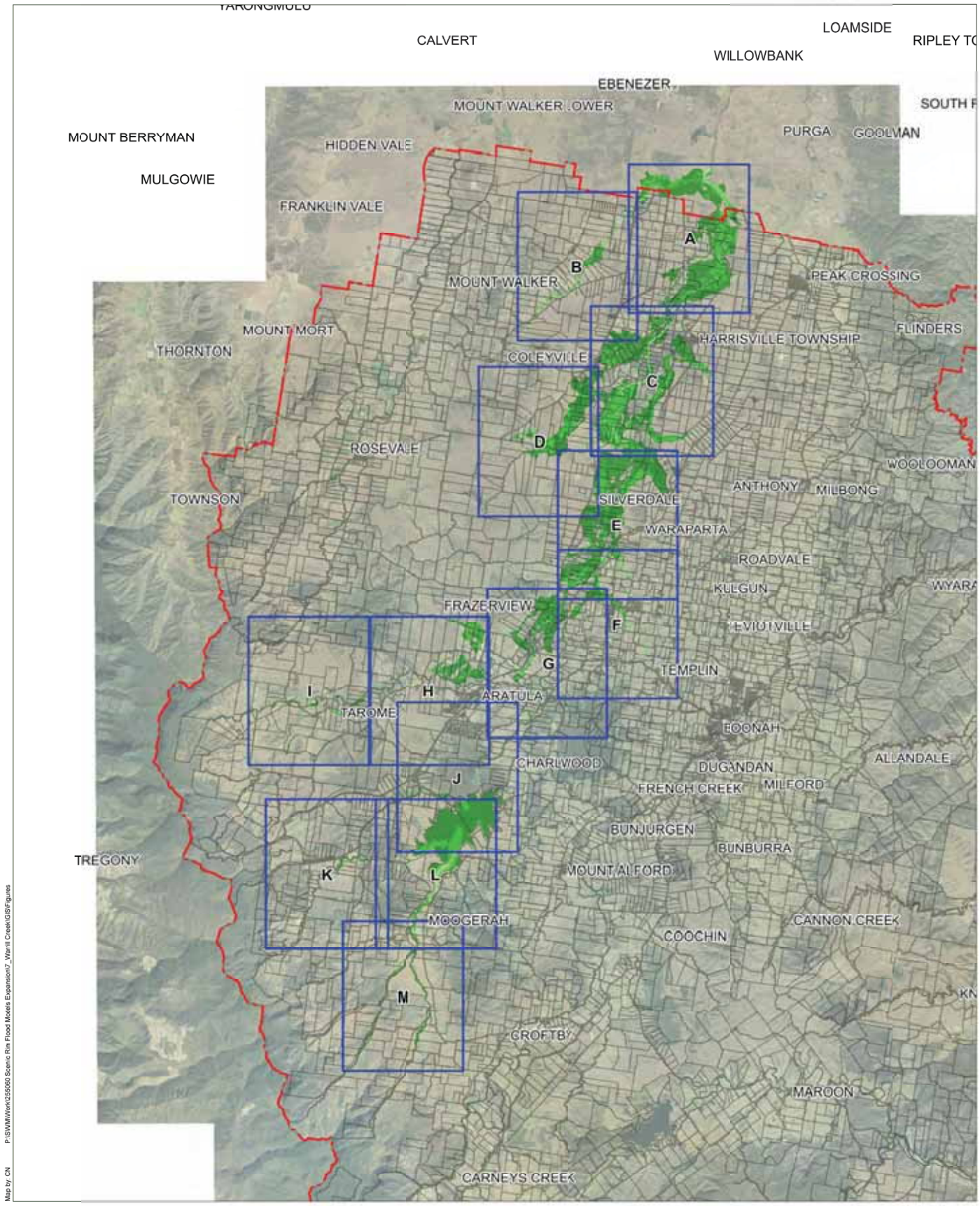
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure D1-m

5% AEP Event - Inundation Extent



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

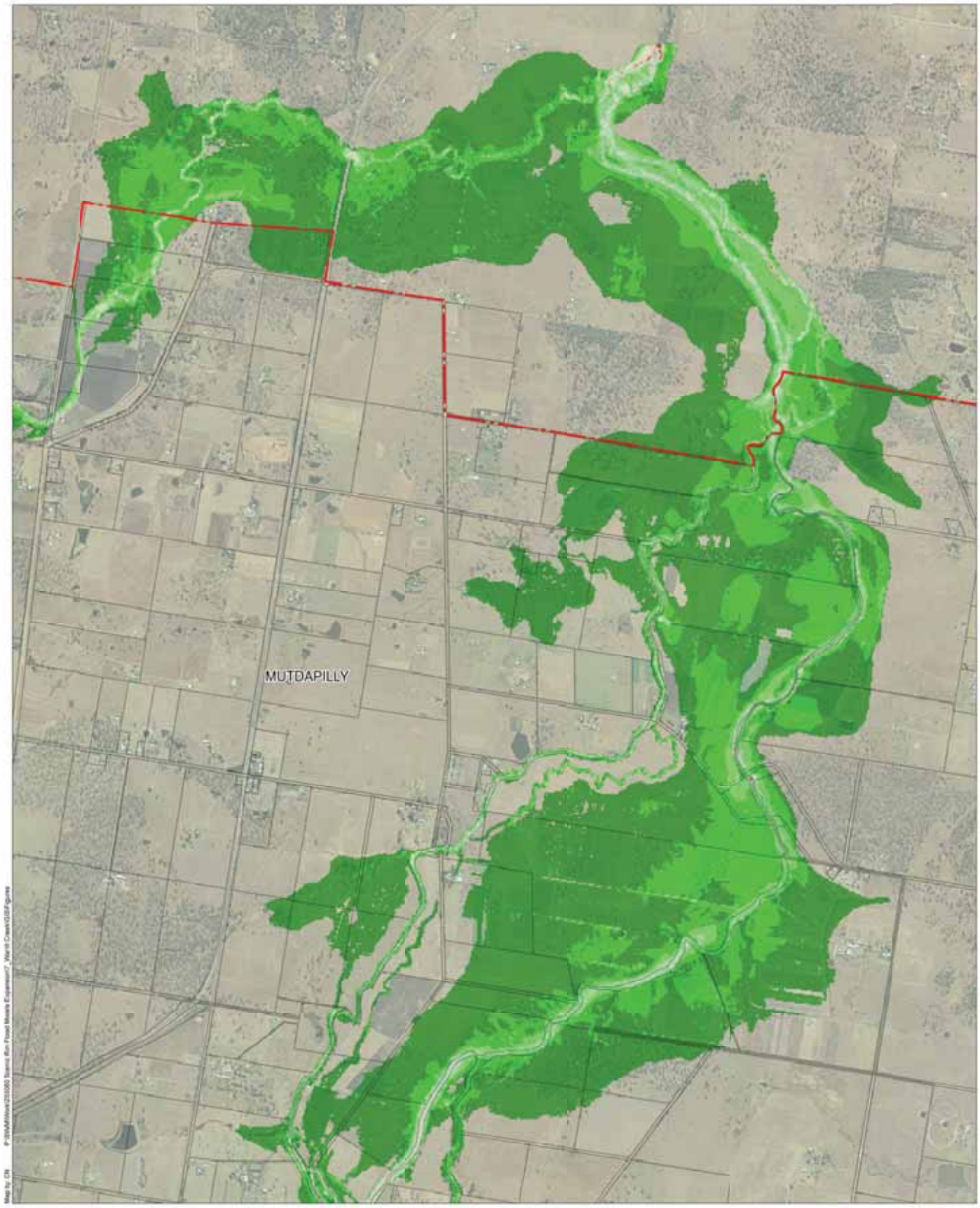
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

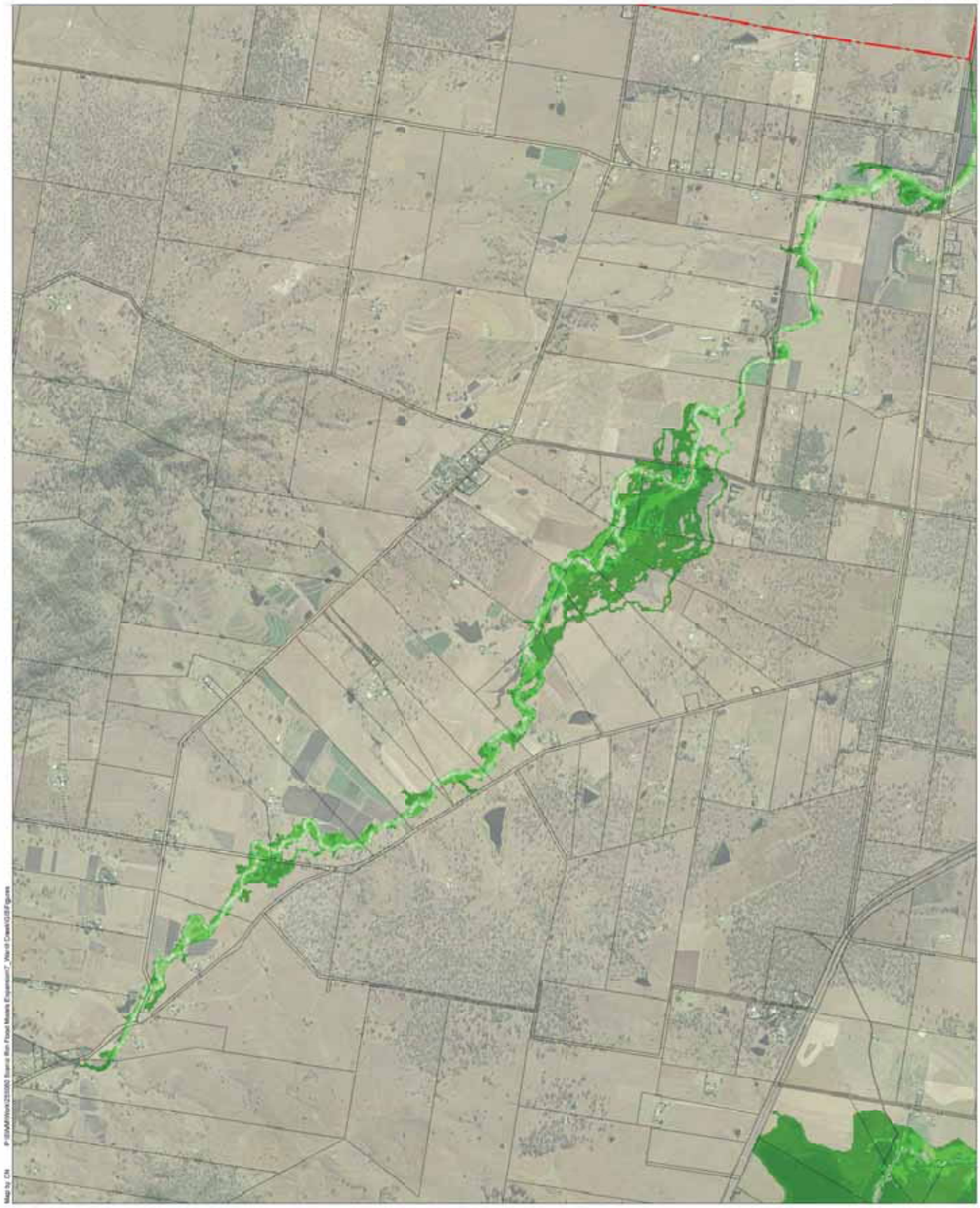
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-a**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

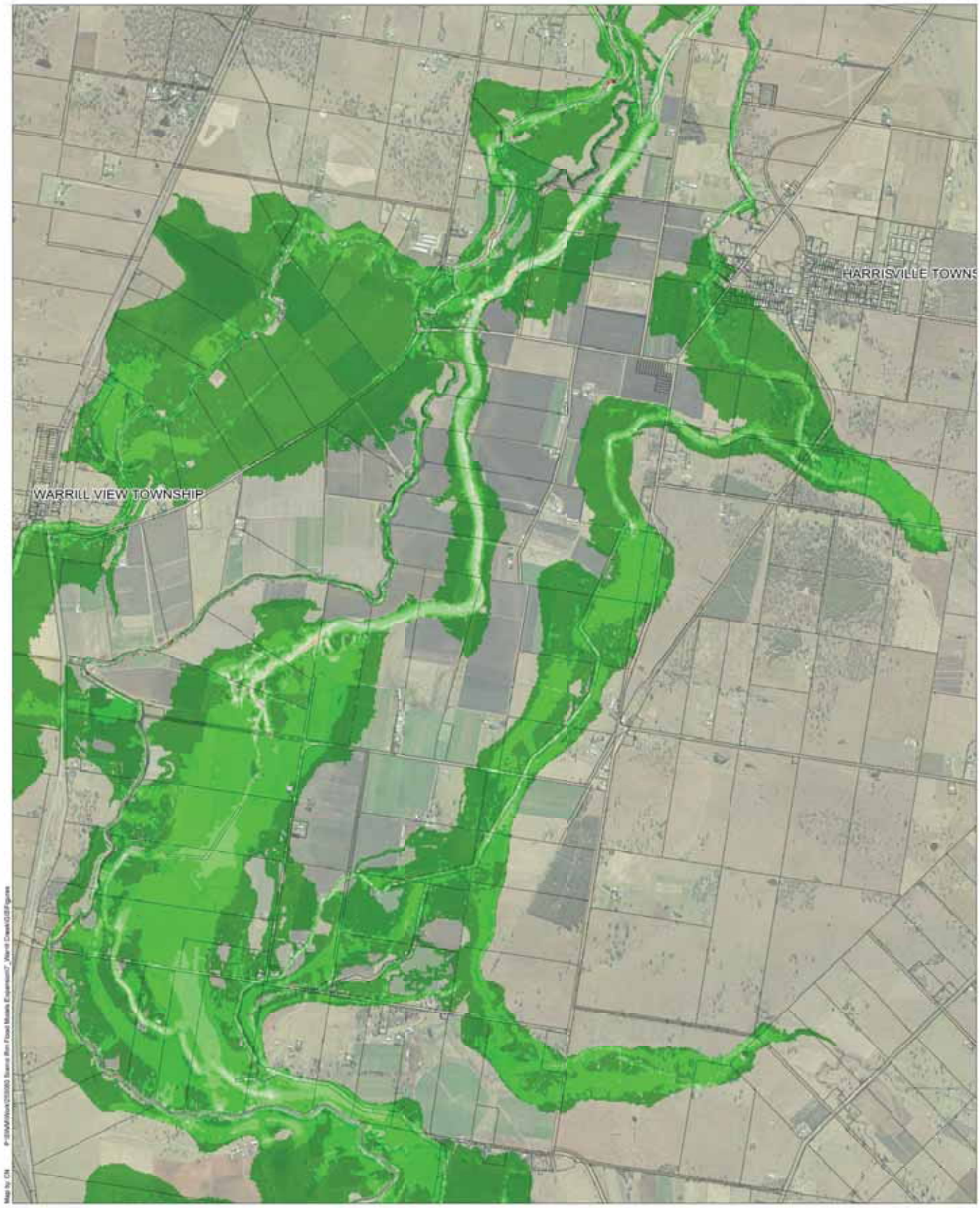
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-b**

5% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

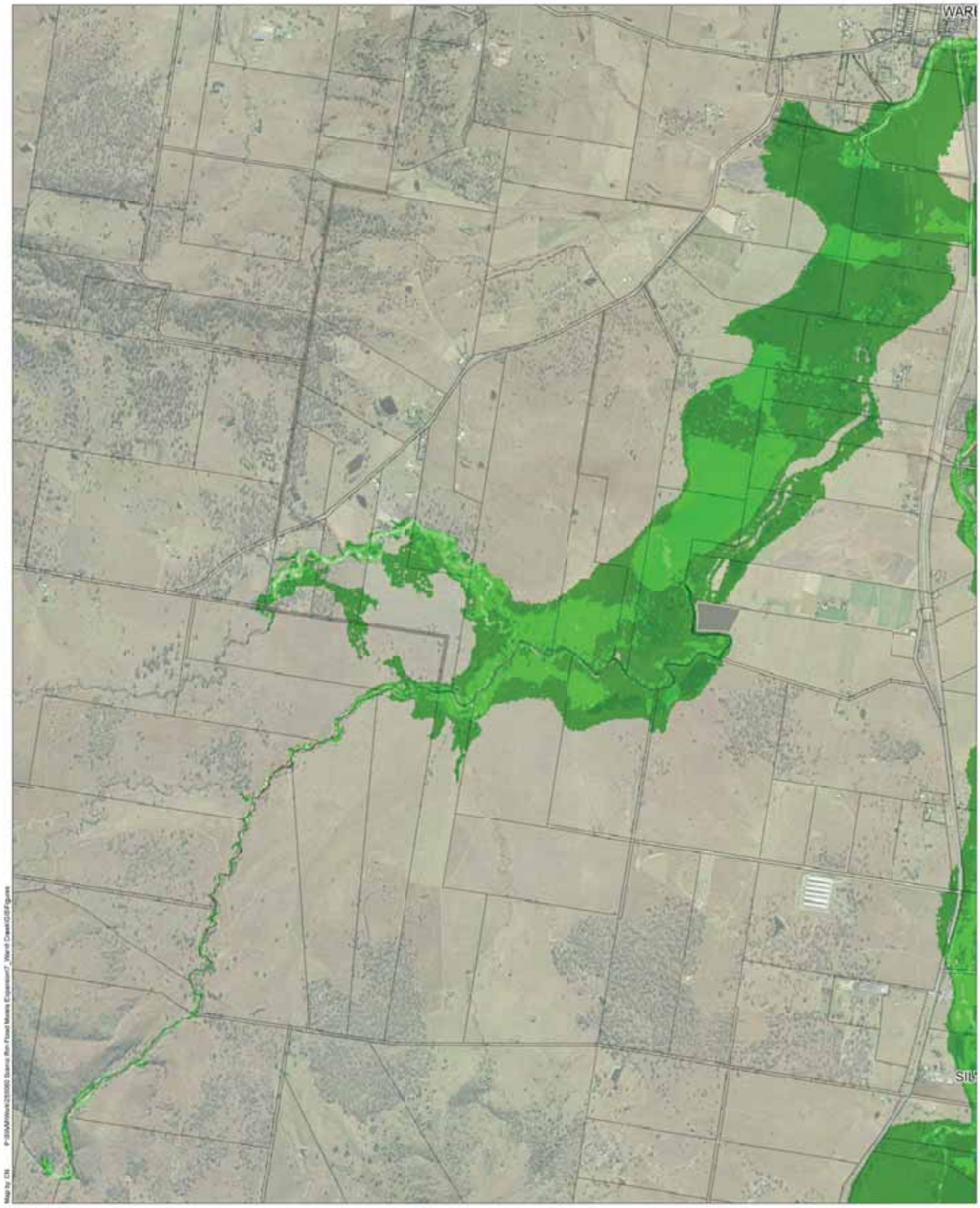
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-c**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

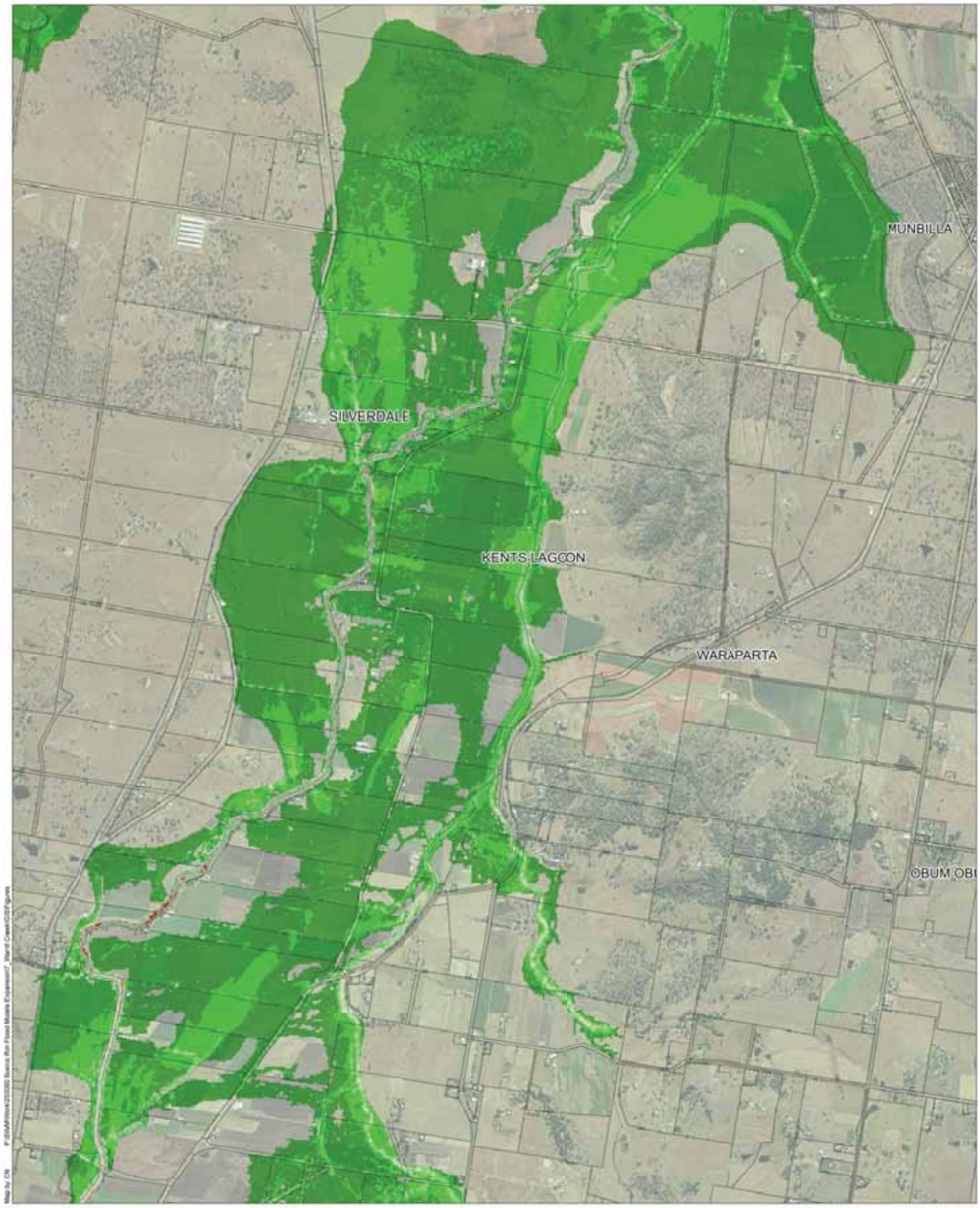
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-d**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

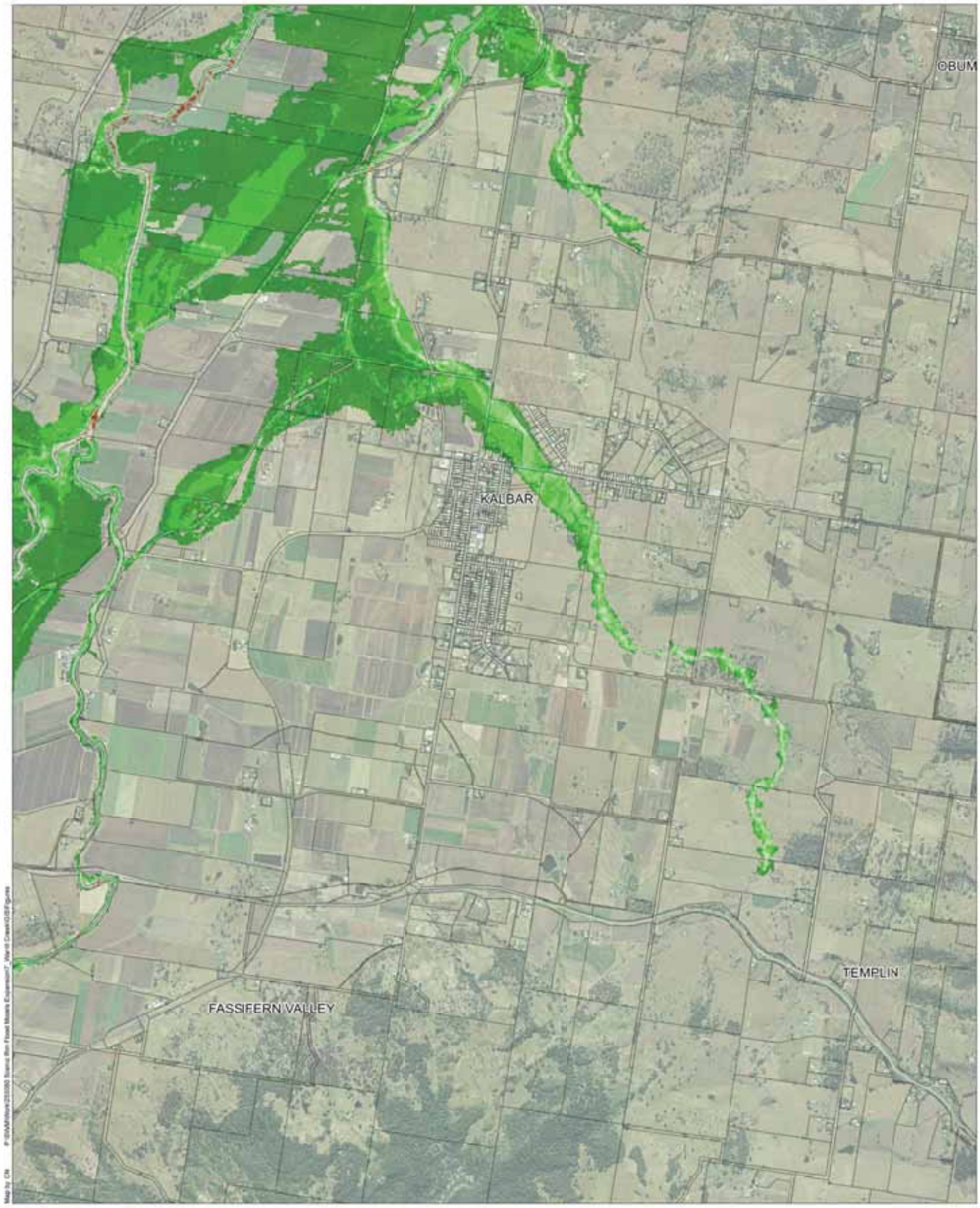
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-e**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

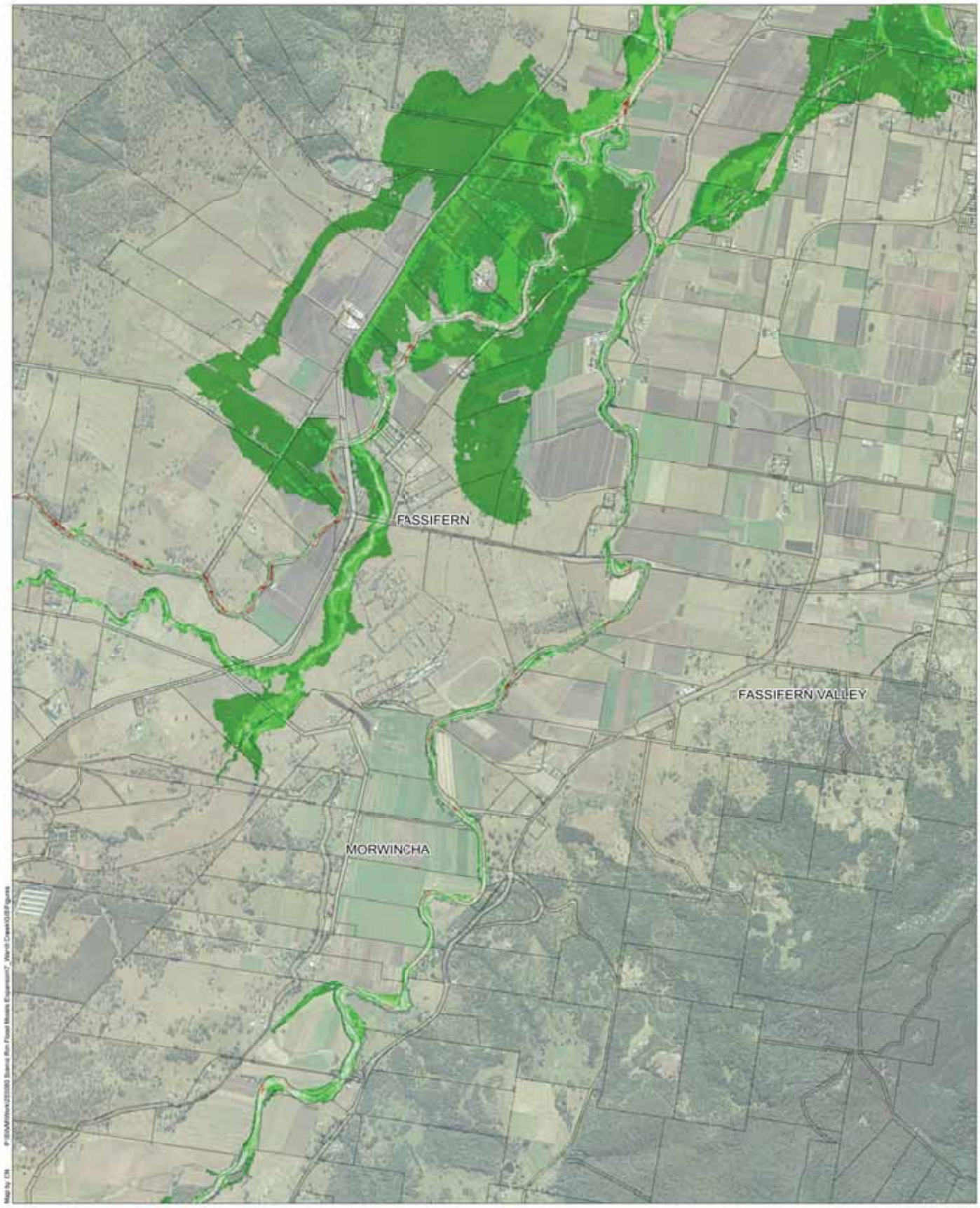
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-f**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

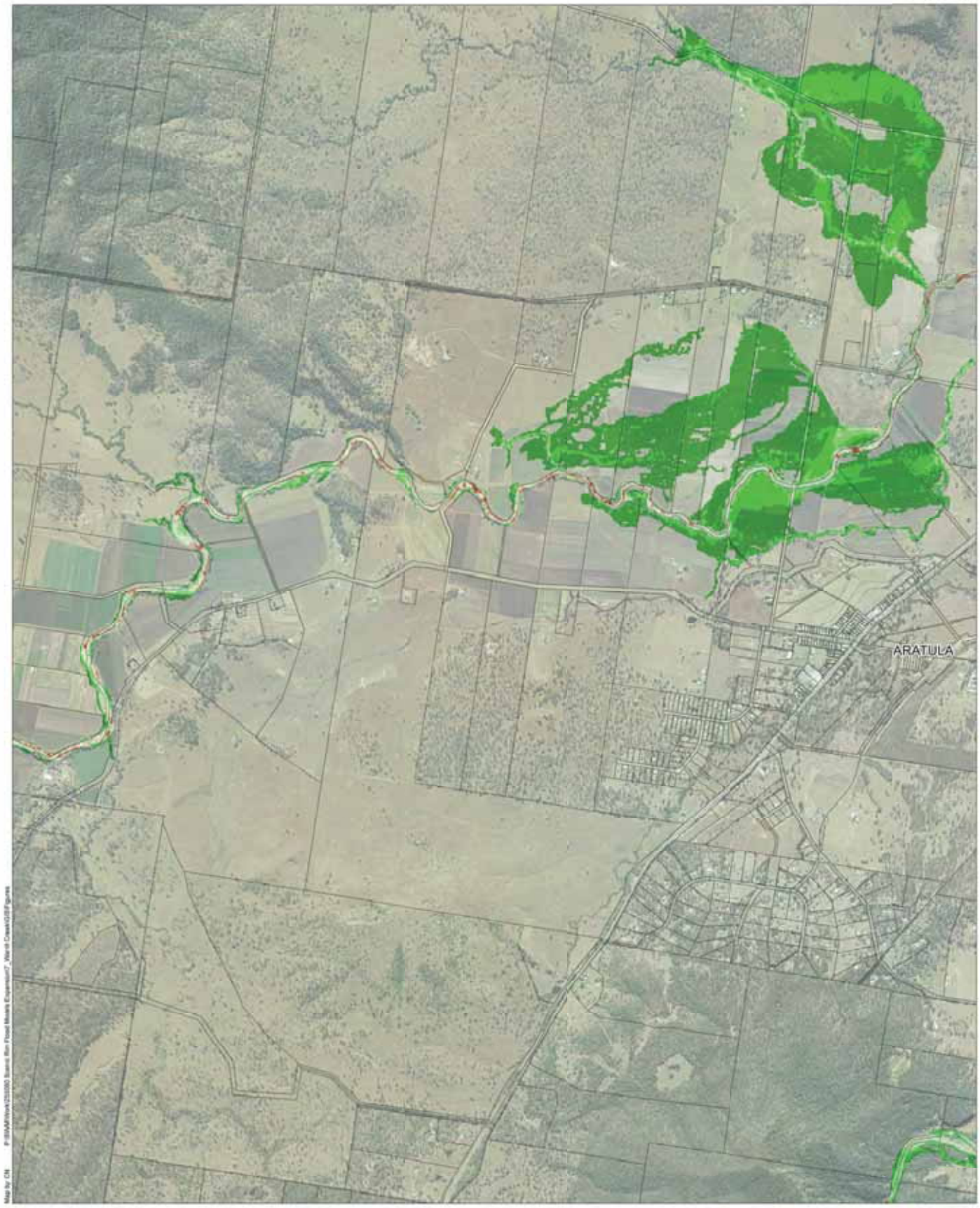
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-g**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

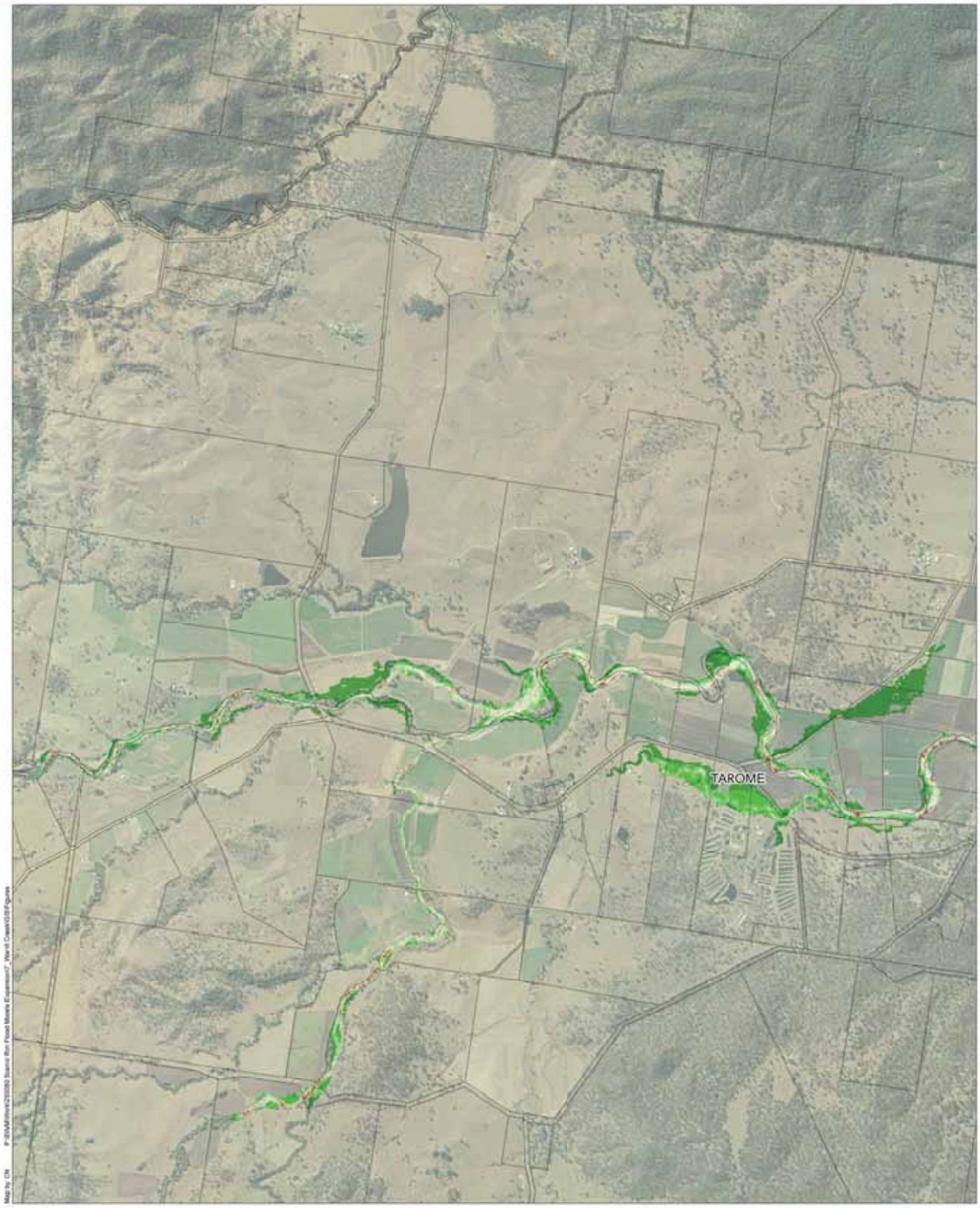
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-h**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

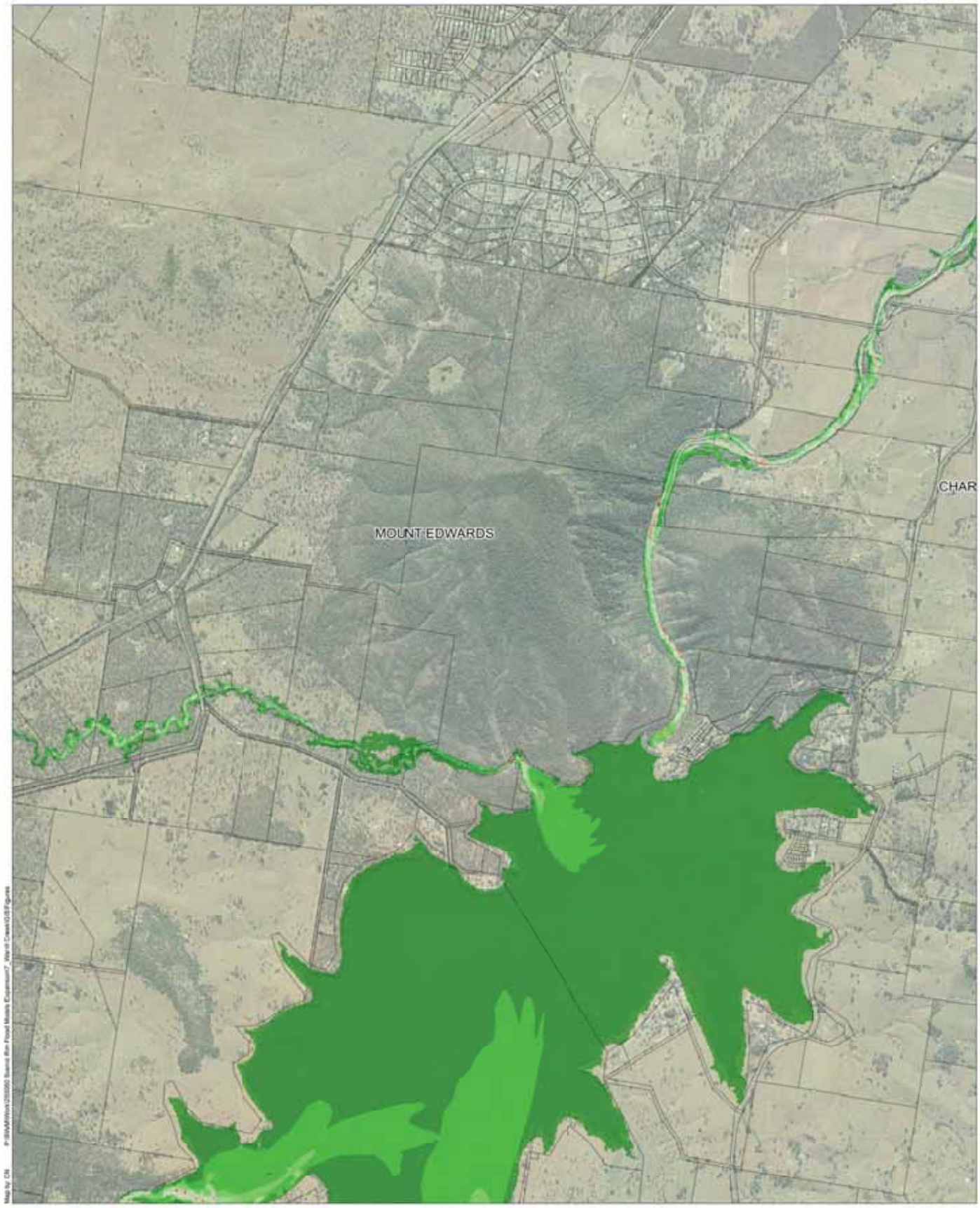
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-i**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

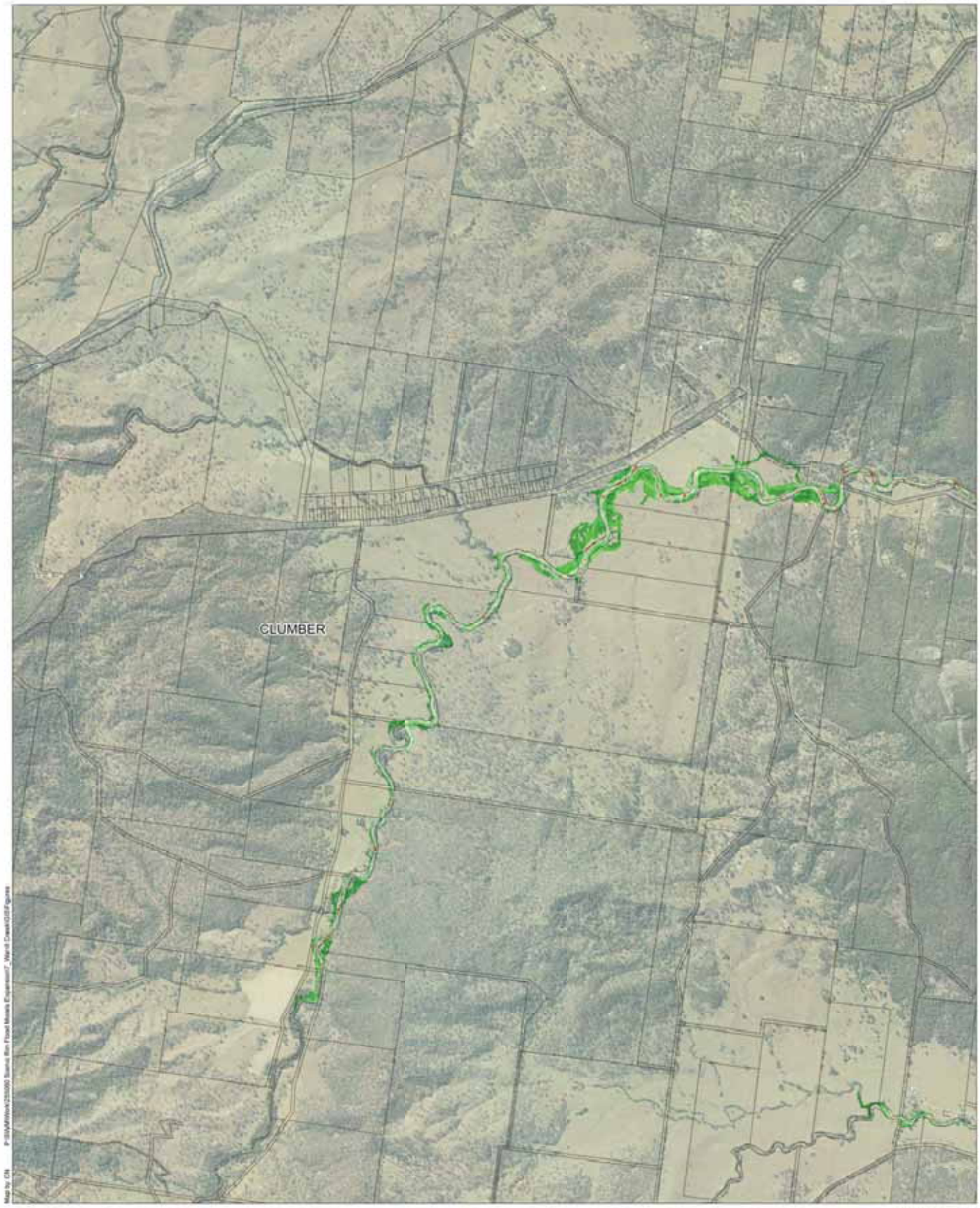
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-j**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

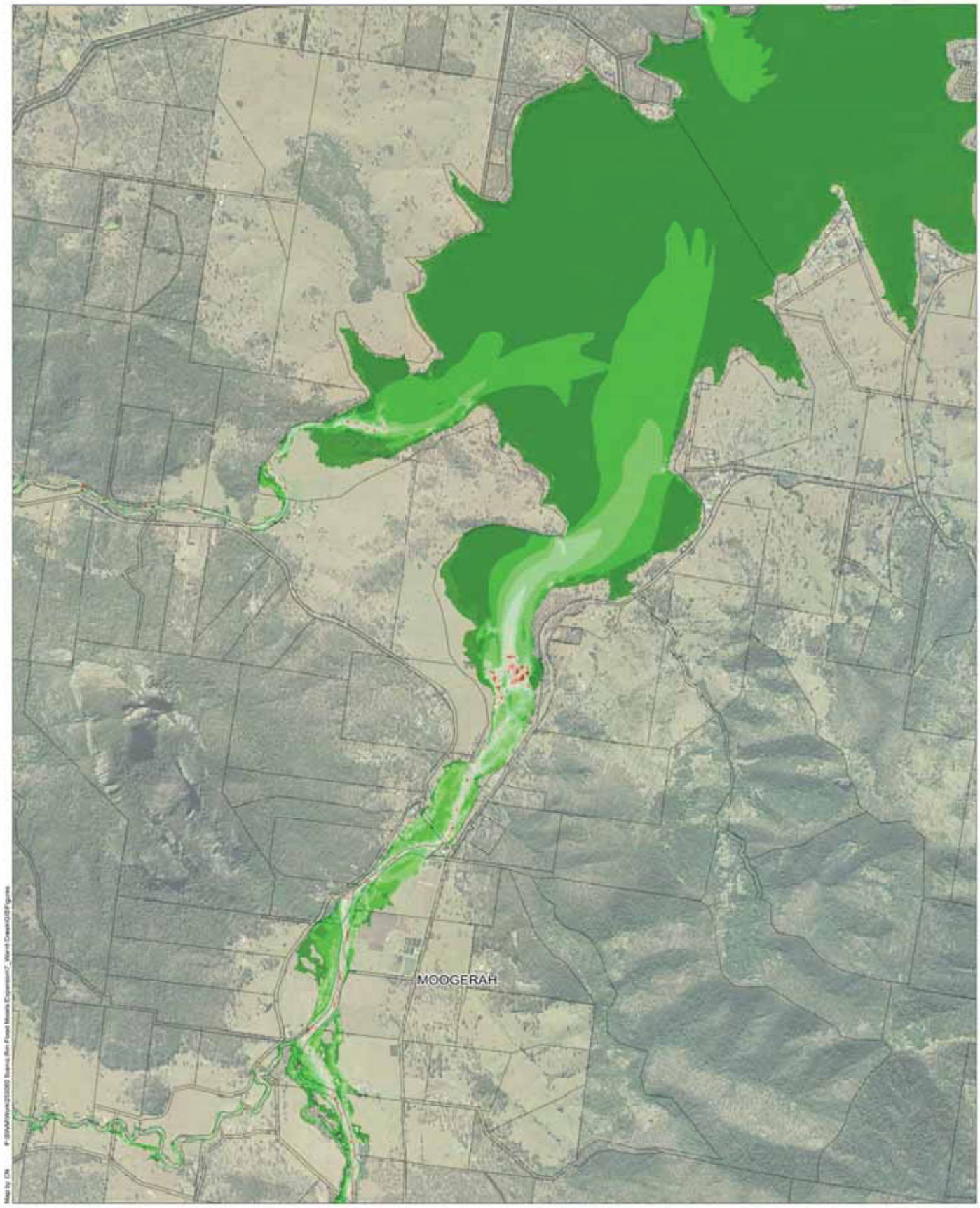
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-k**

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

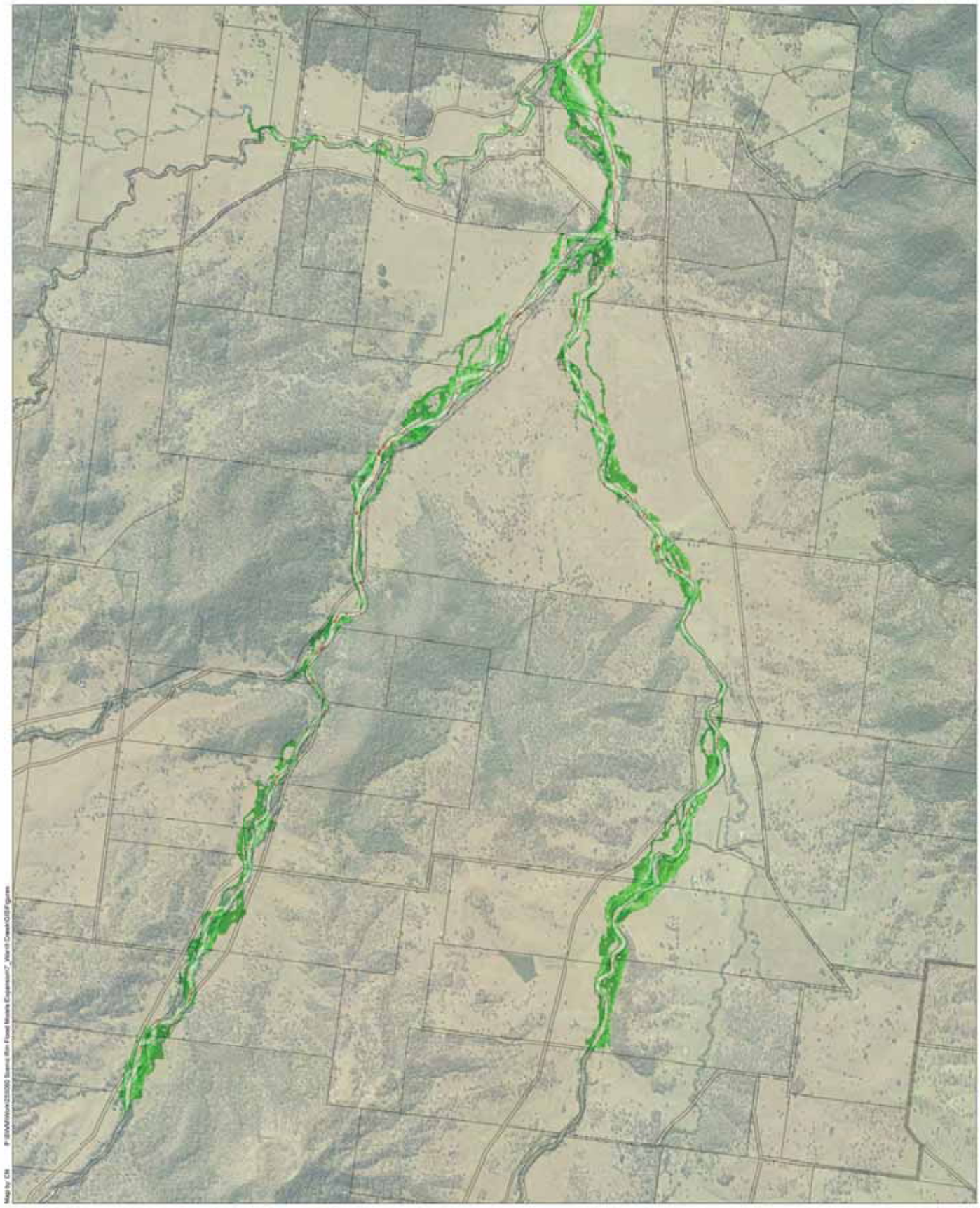
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure D2-I

5% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

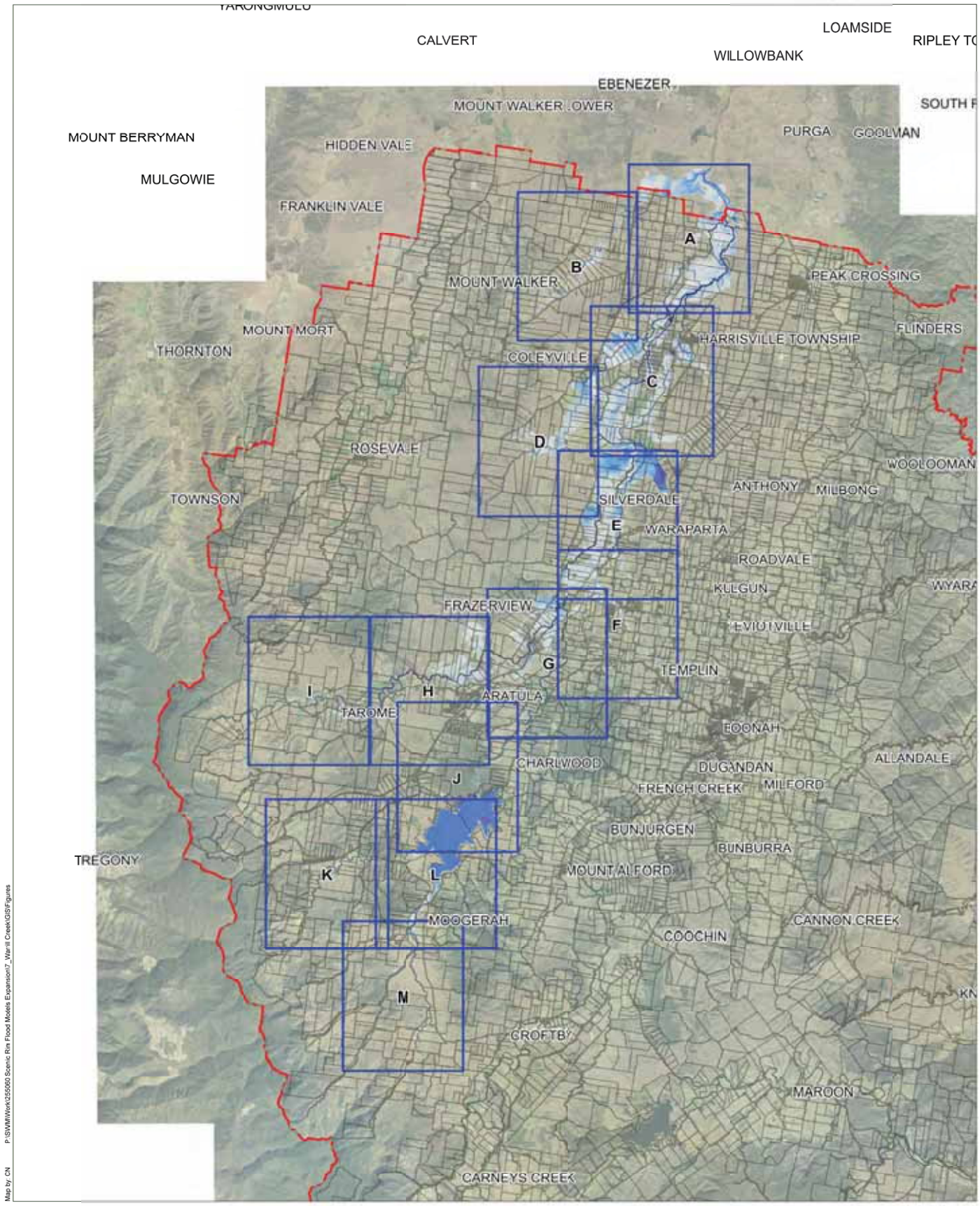
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D2-m**

5% AEP Event - Peak Velocities



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

0 5,000 m 10,000 m

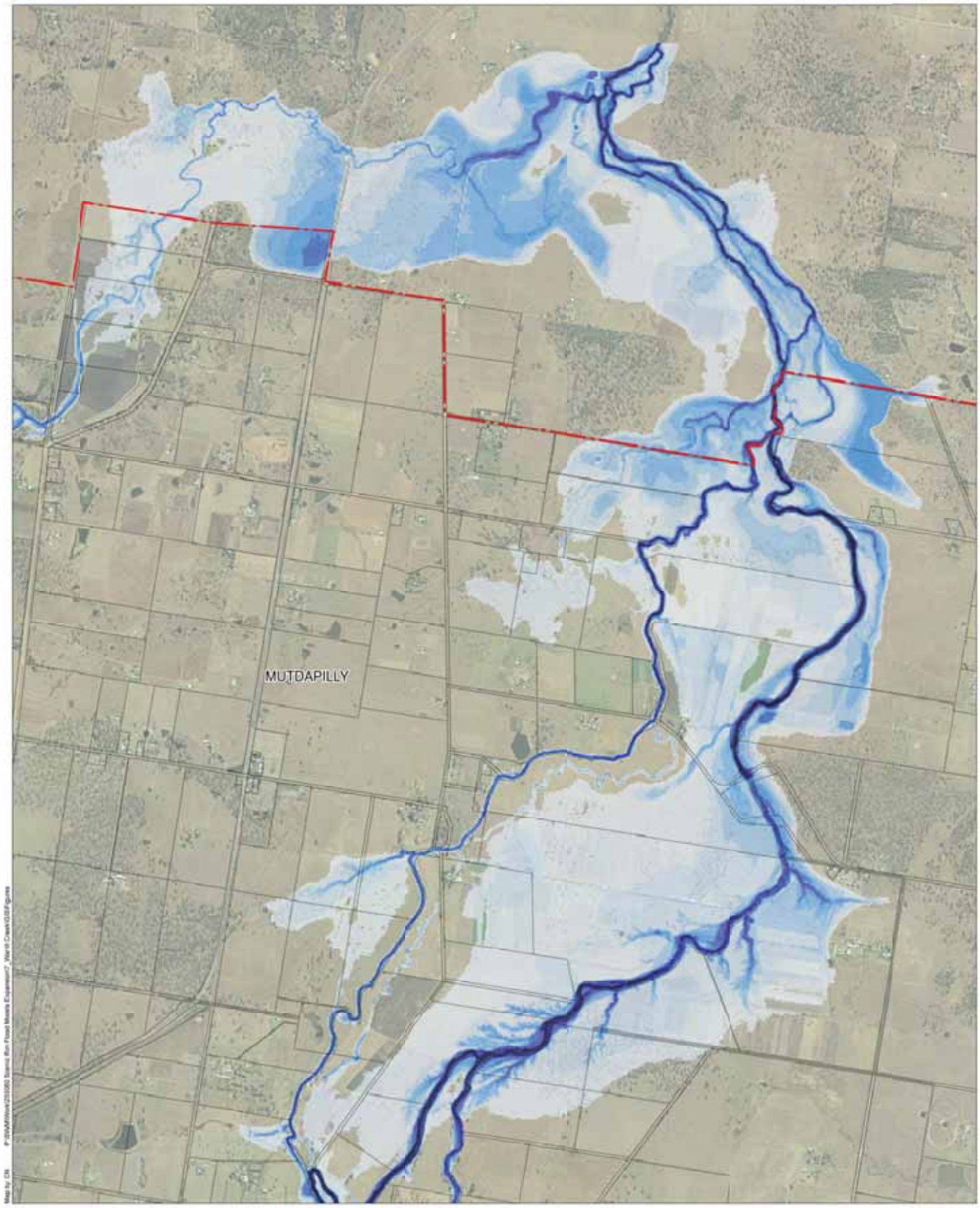
Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3**

5% AEP Event - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

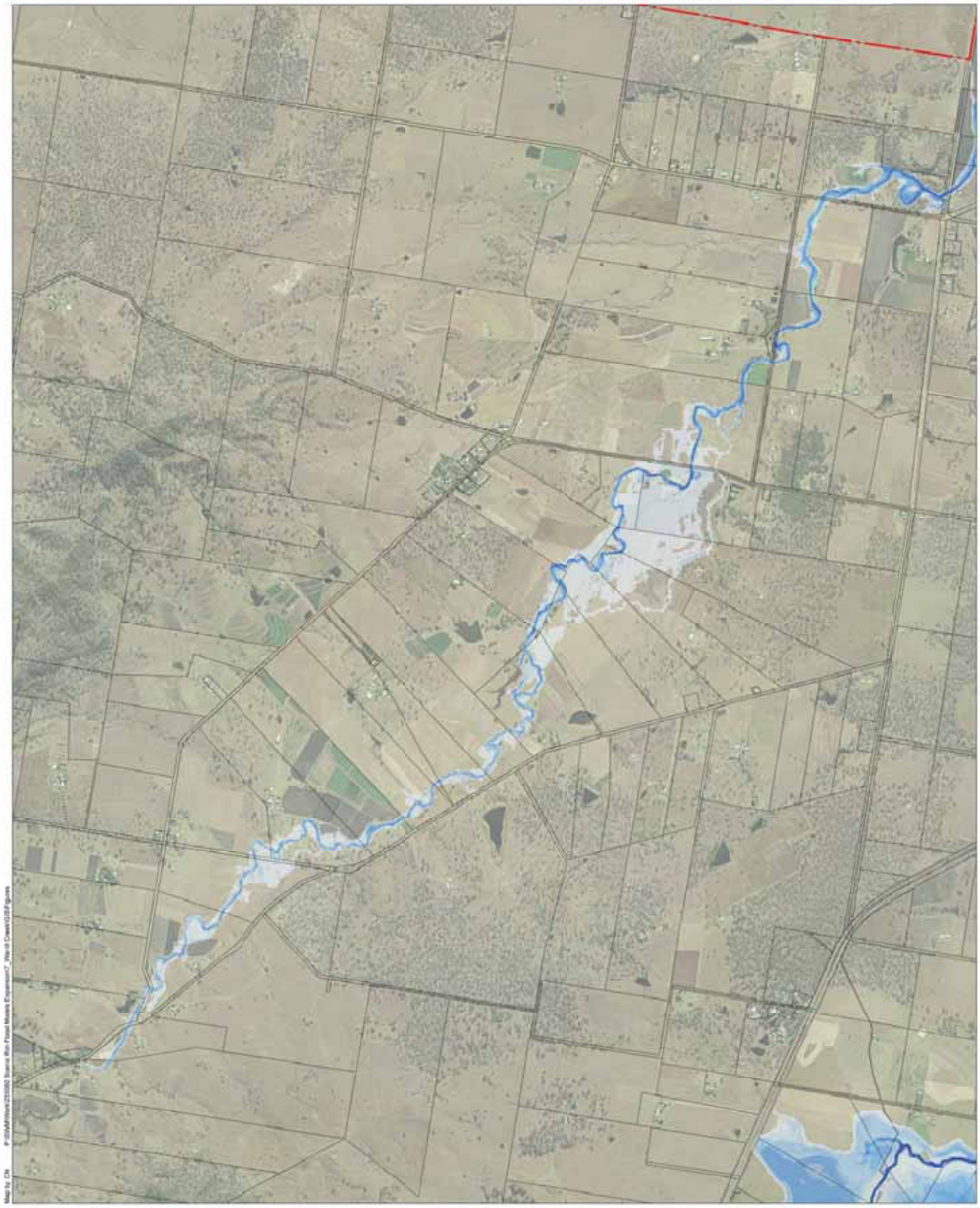
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-a**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

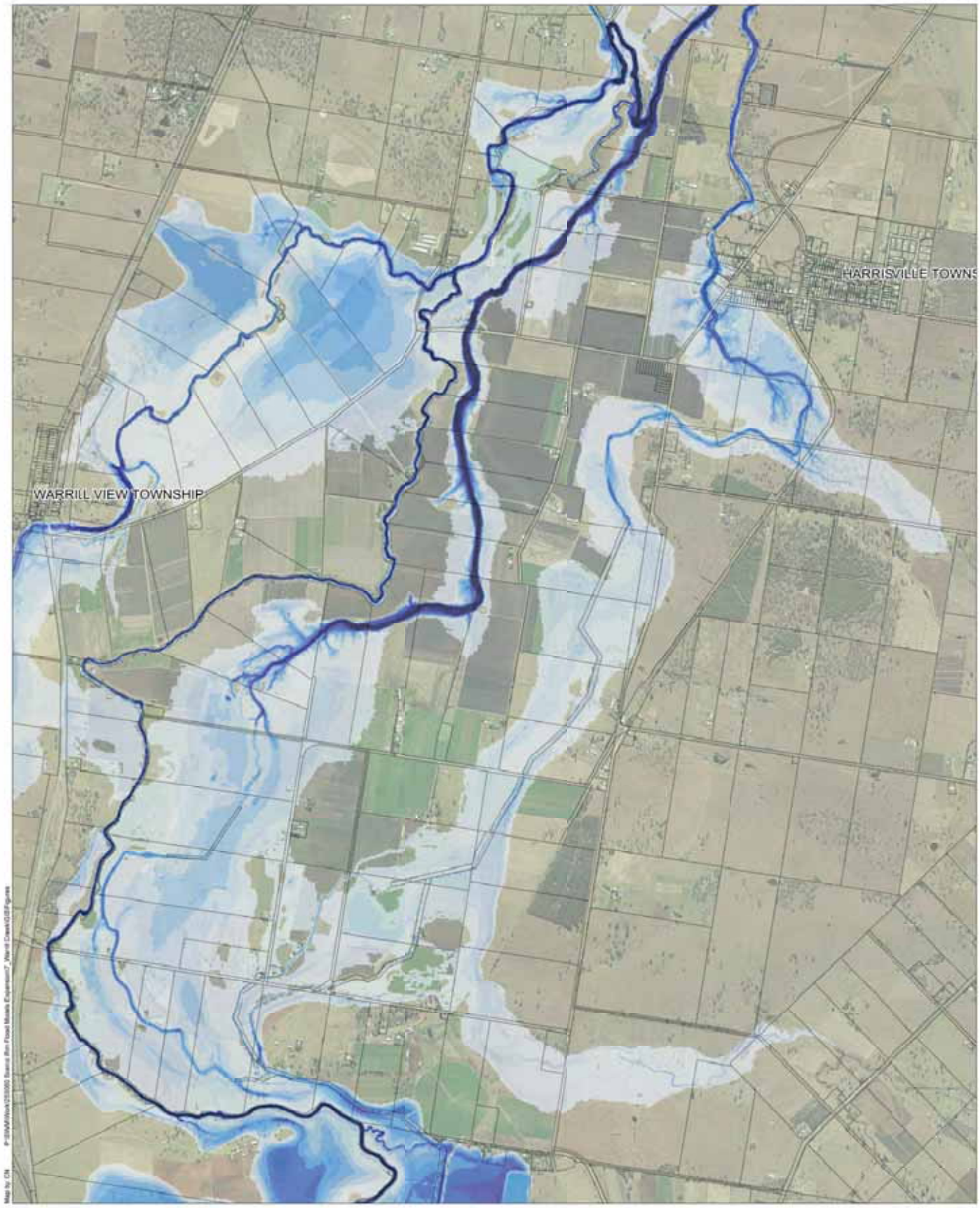
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-b**

5% AEP Event - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

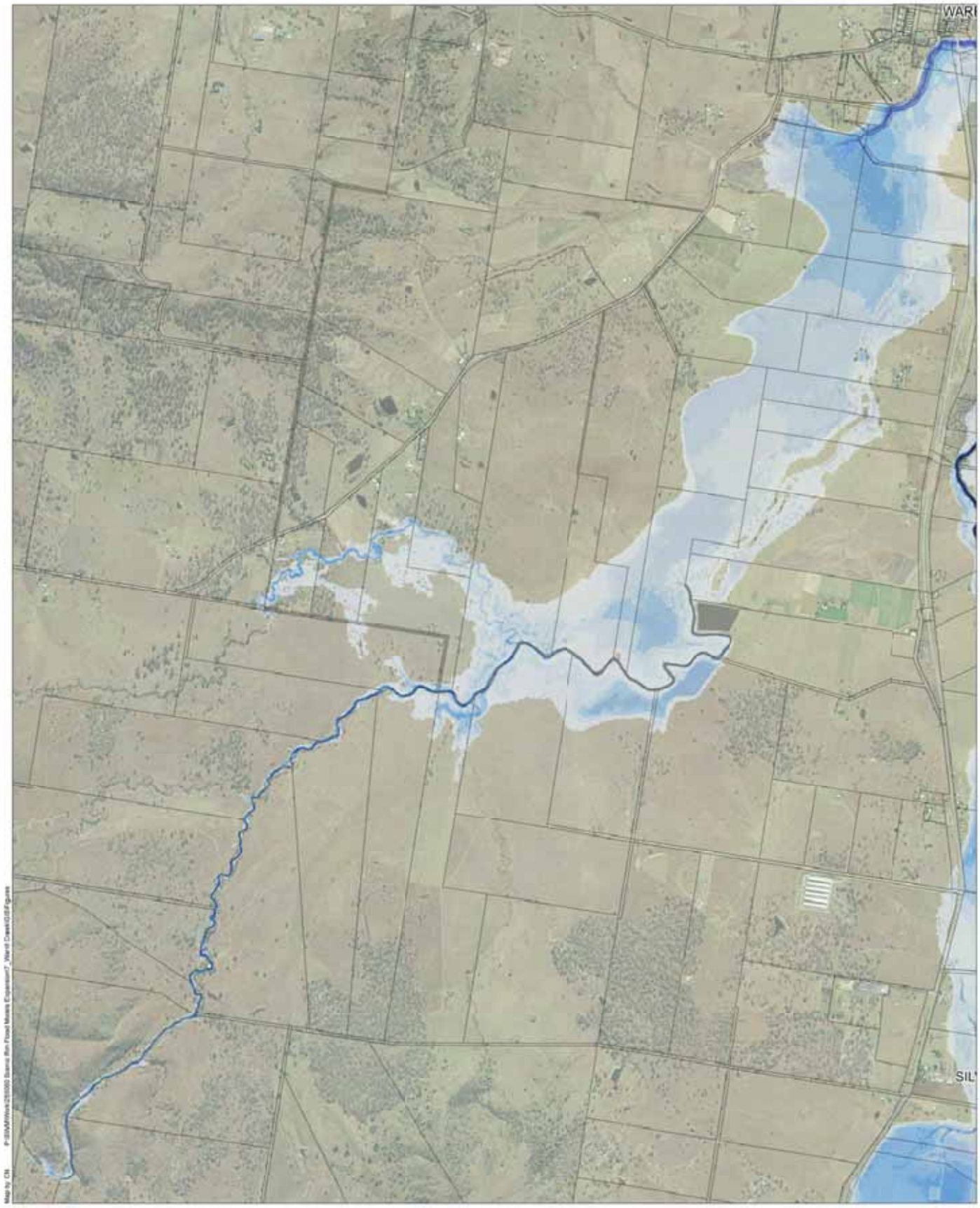
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-c**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

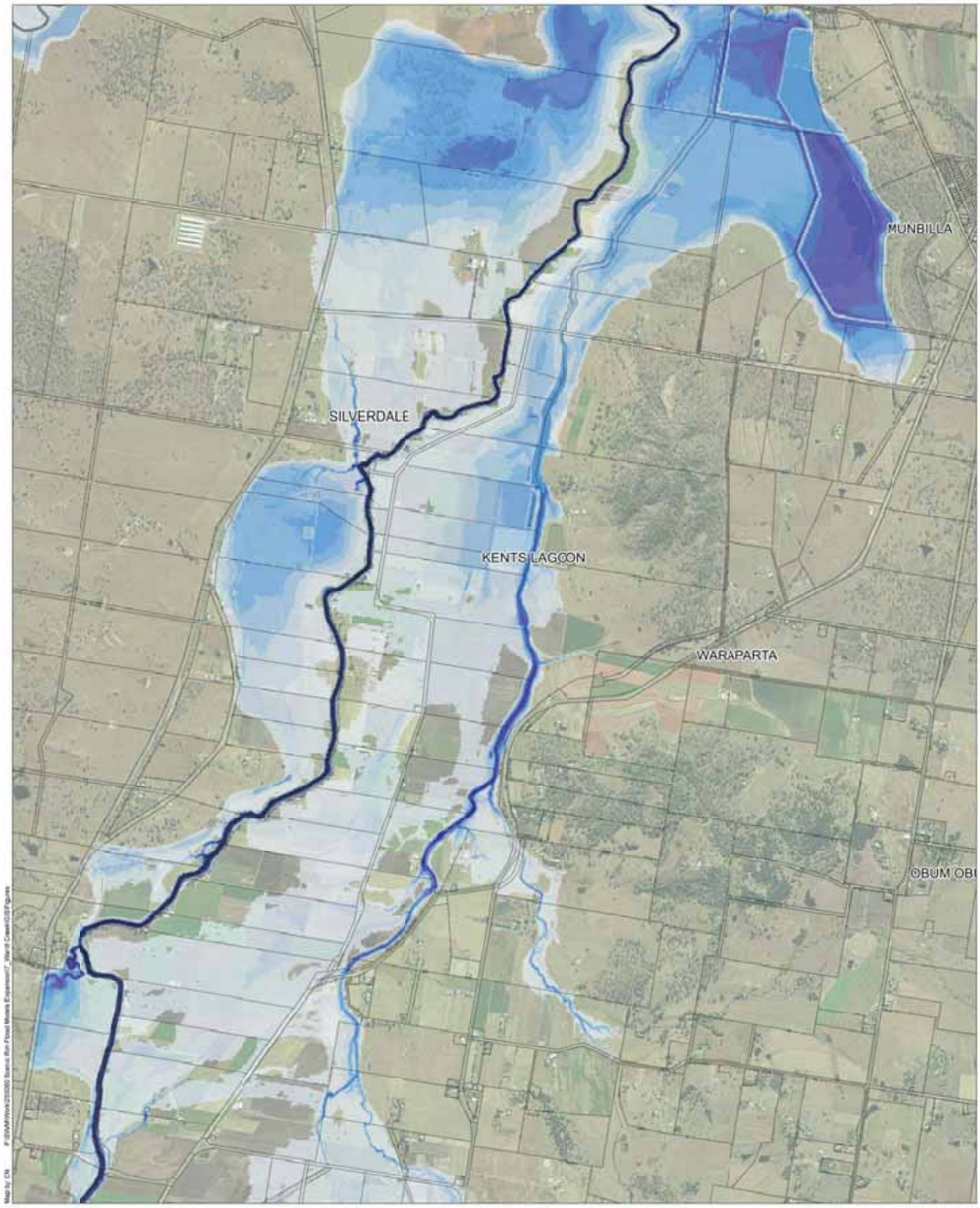
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-d**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

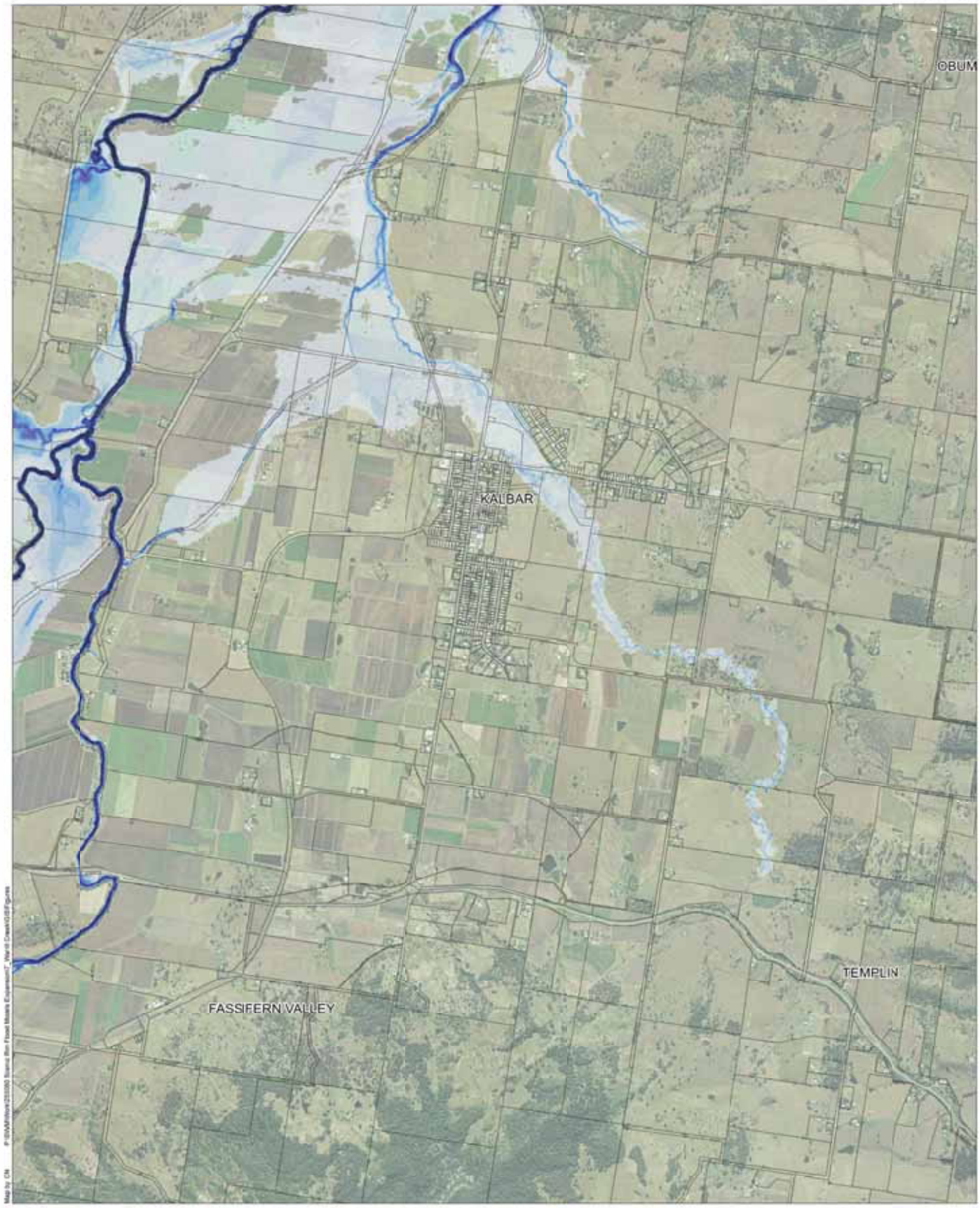
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-e**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

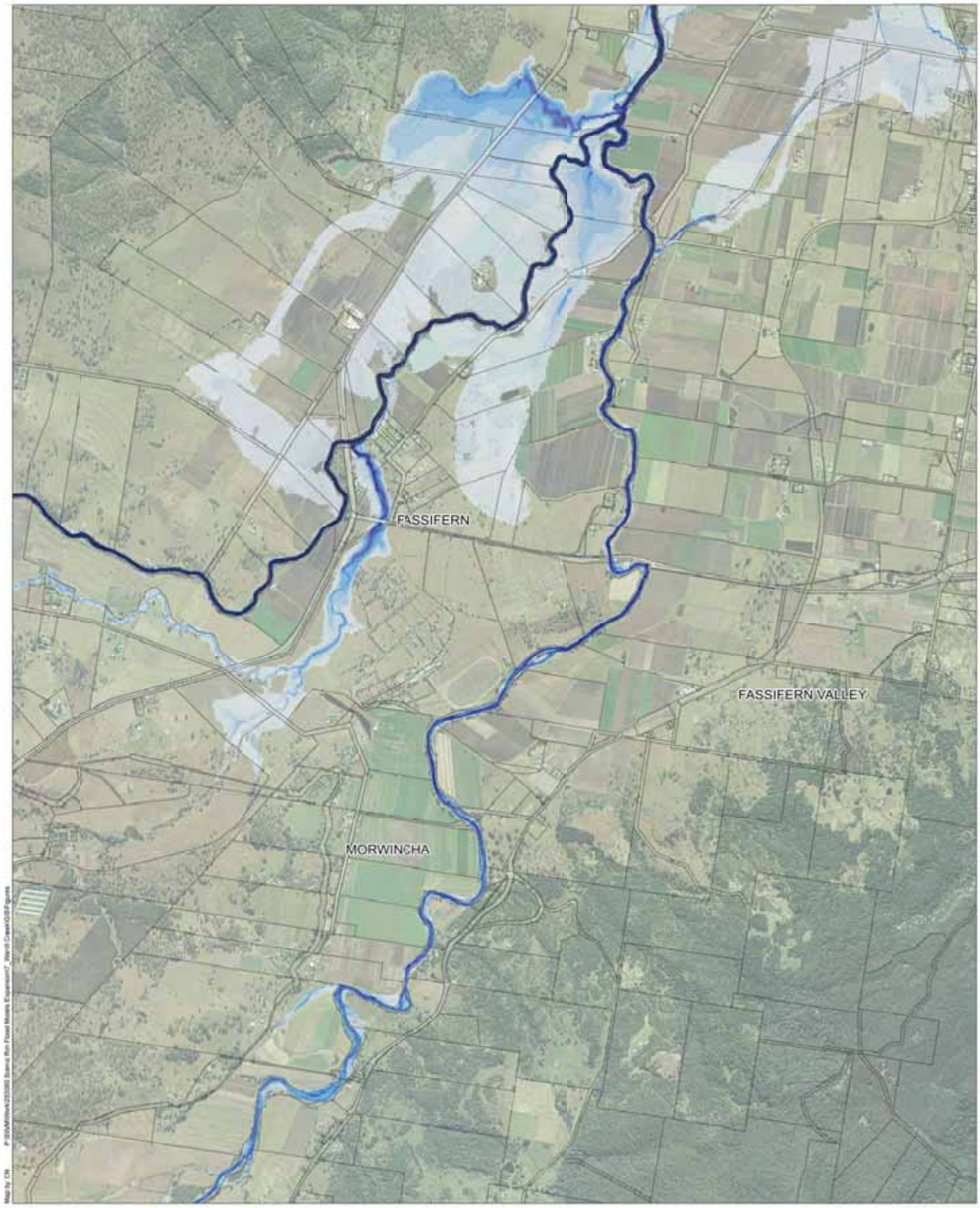
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-f**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

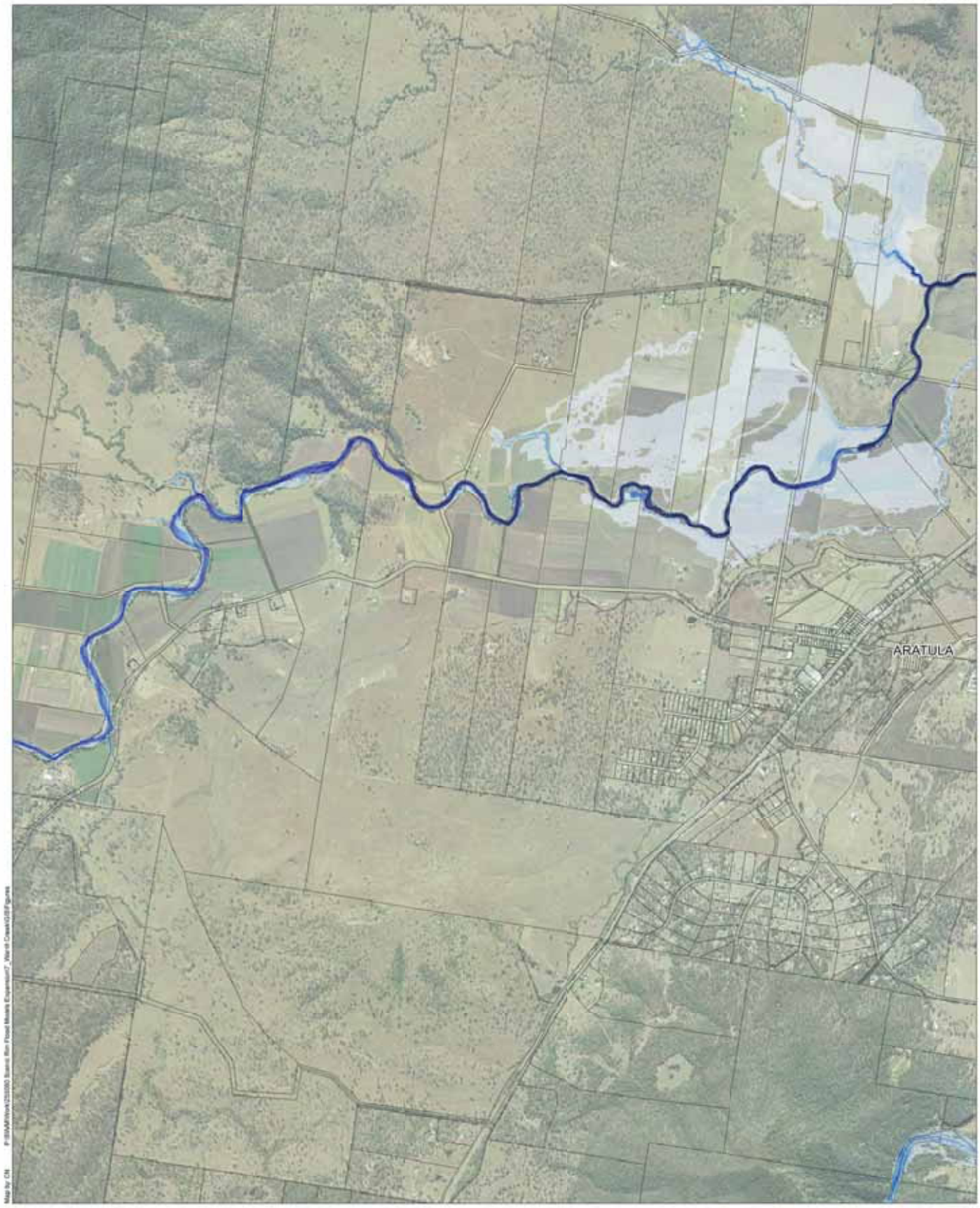
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-g**

5% AEP Event - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

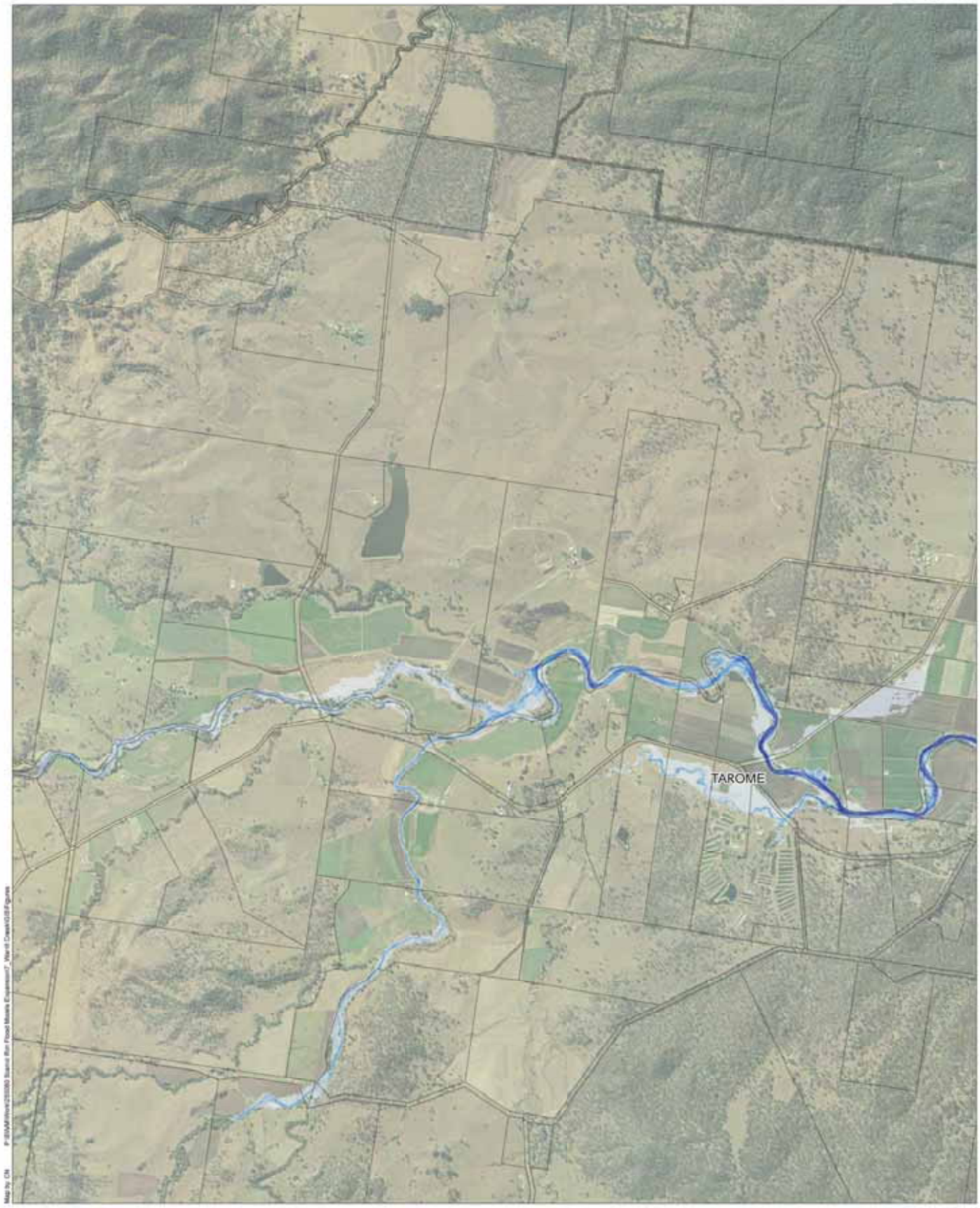
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-h**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

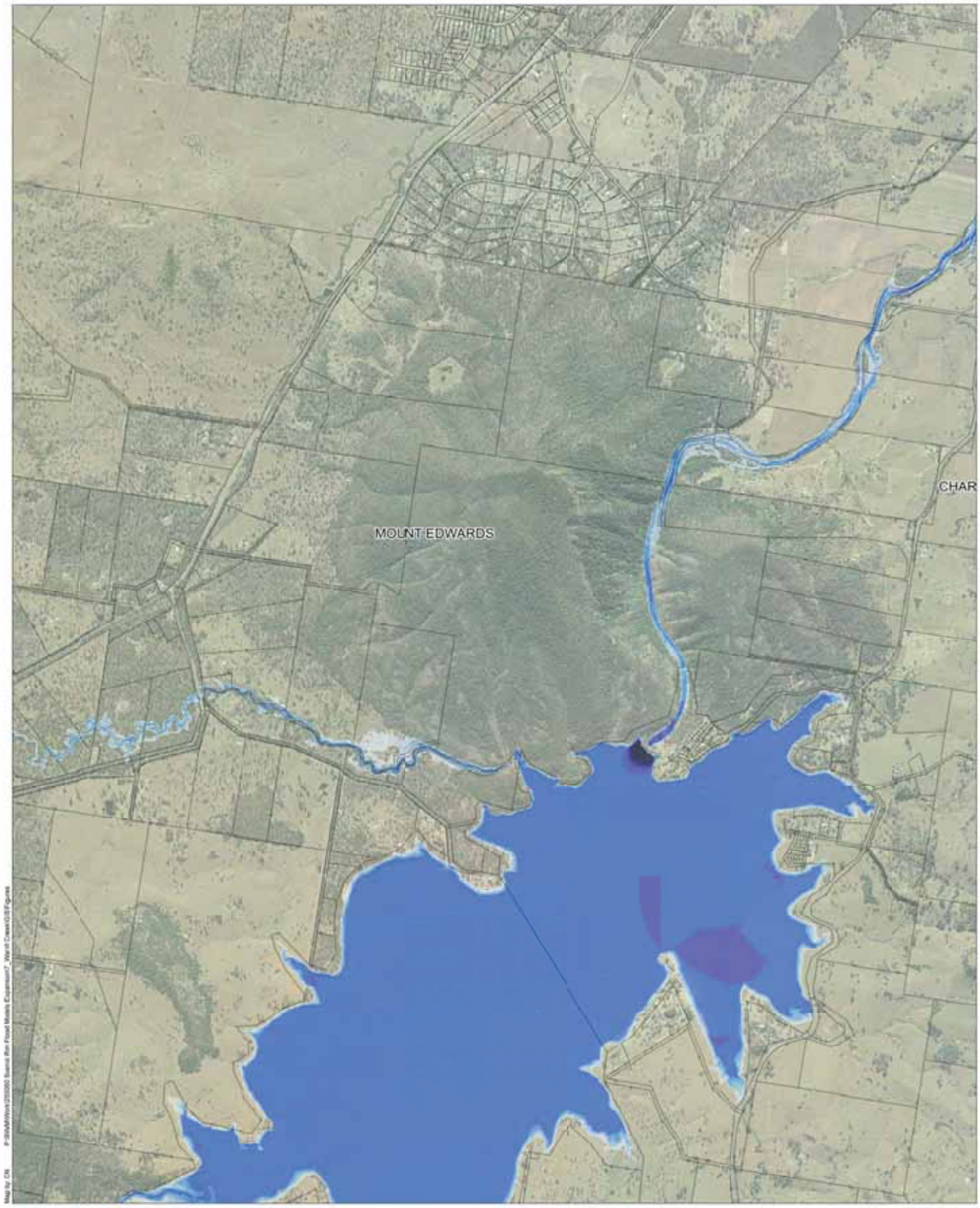
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-i**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

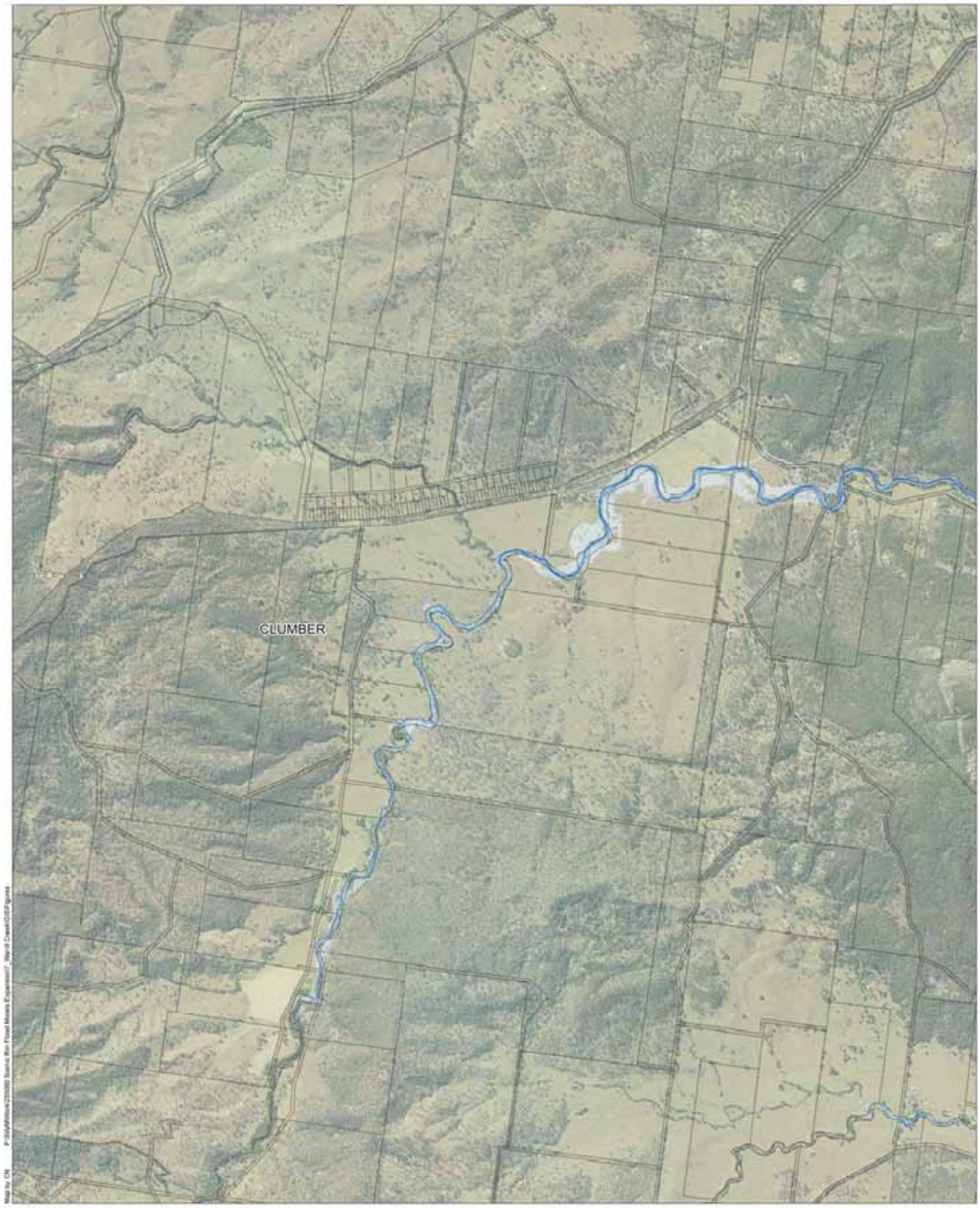
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-j**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

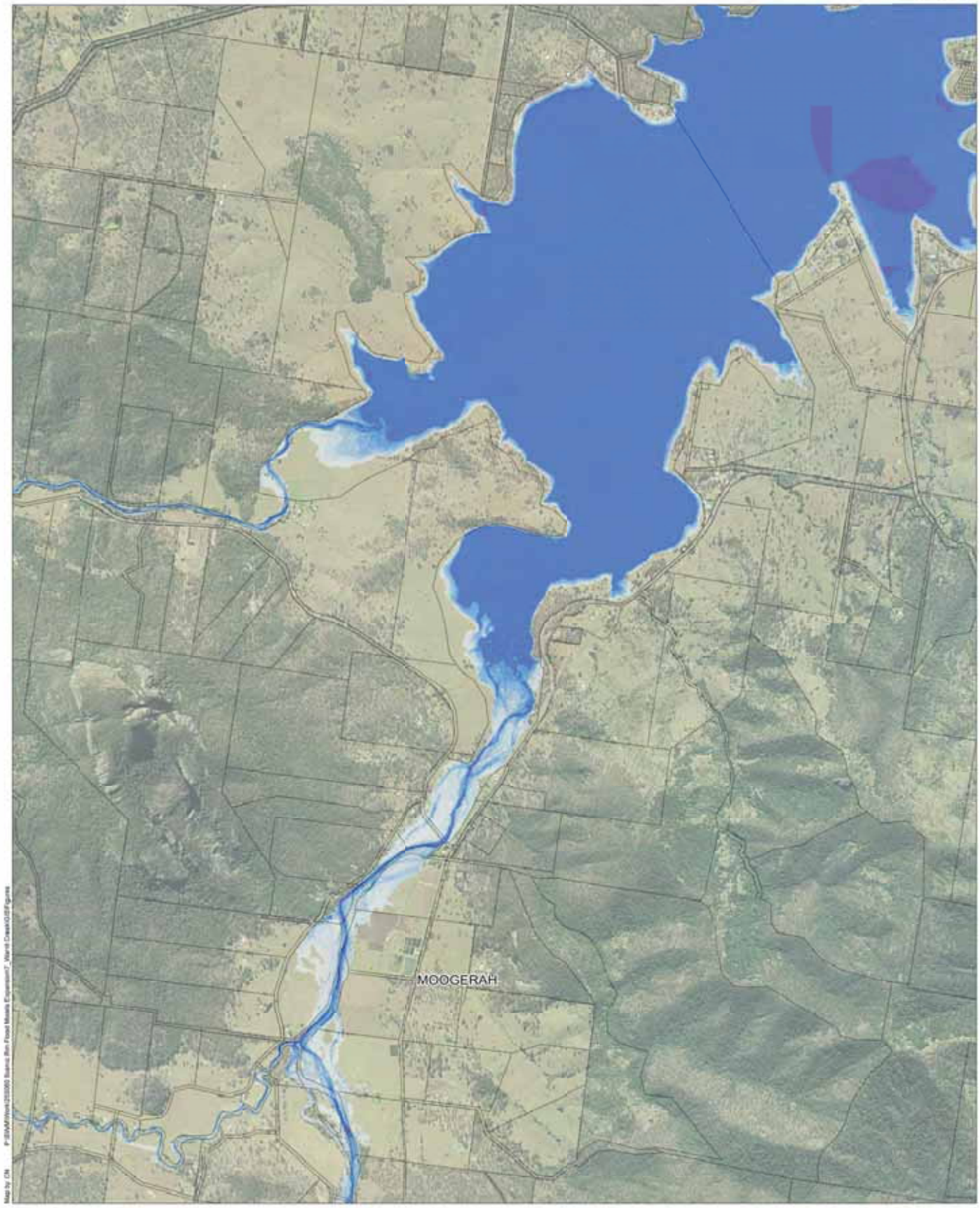
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-k**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

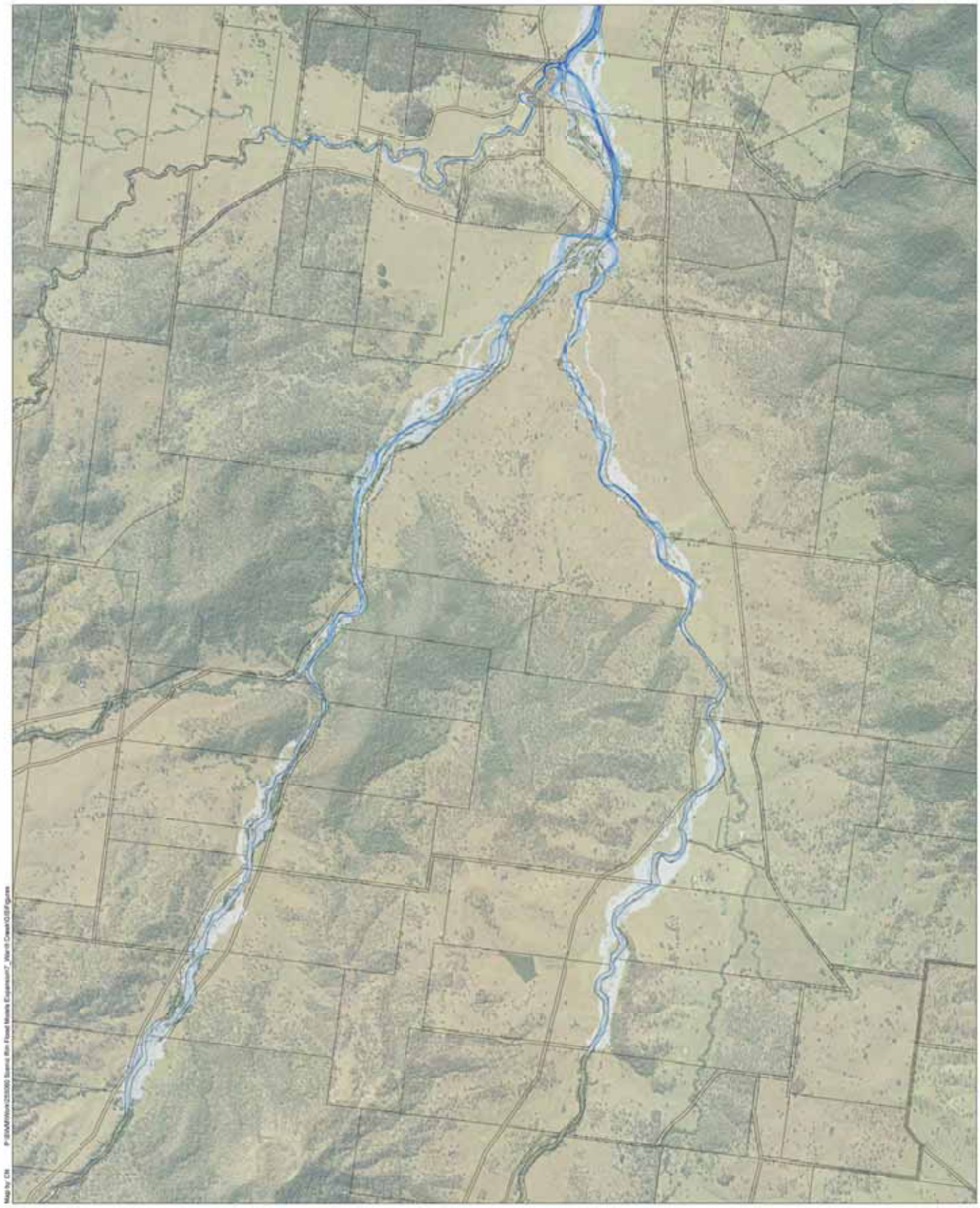
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-I**

5% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

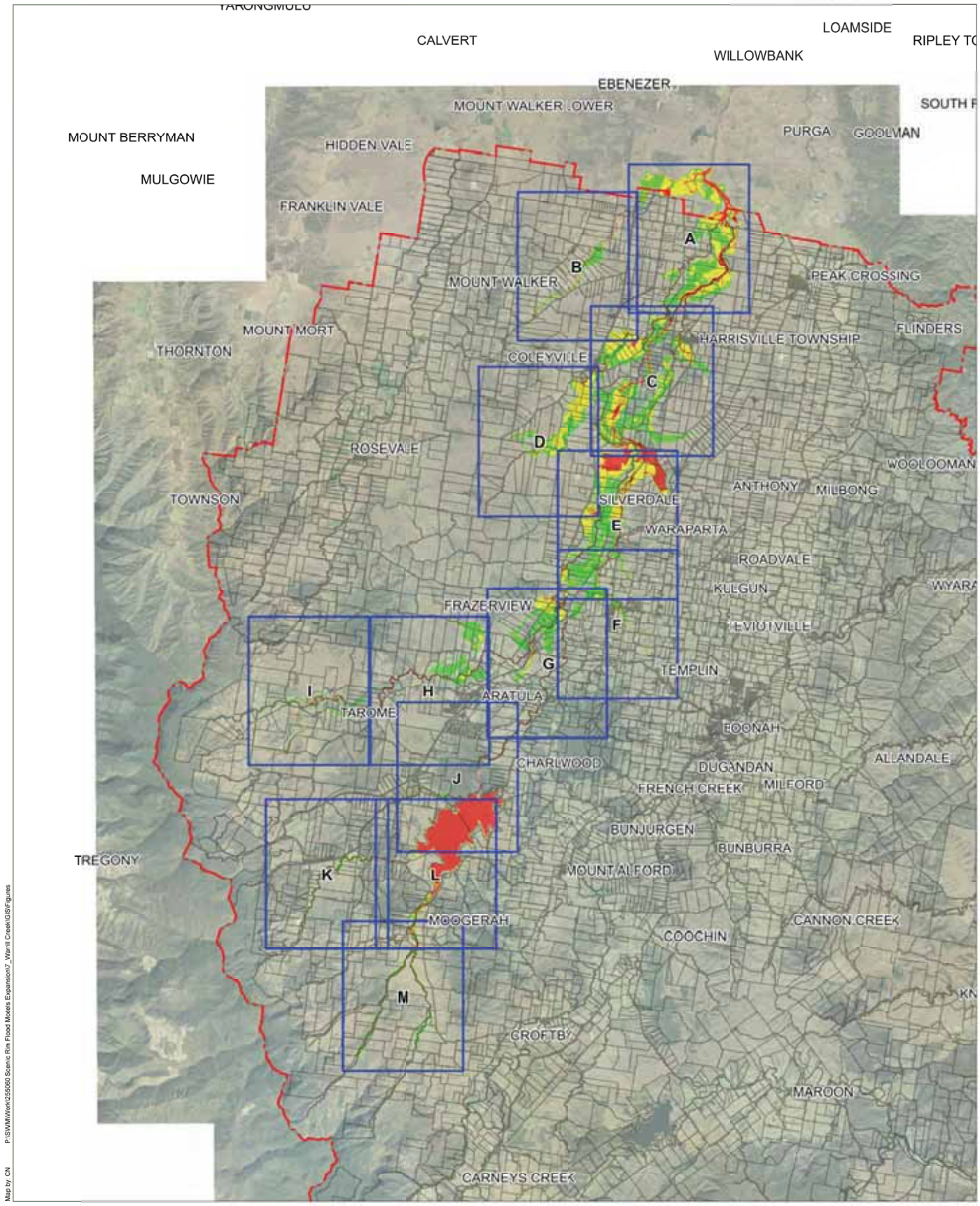
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D3-m**

5% AEP Event - Peak Depth Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

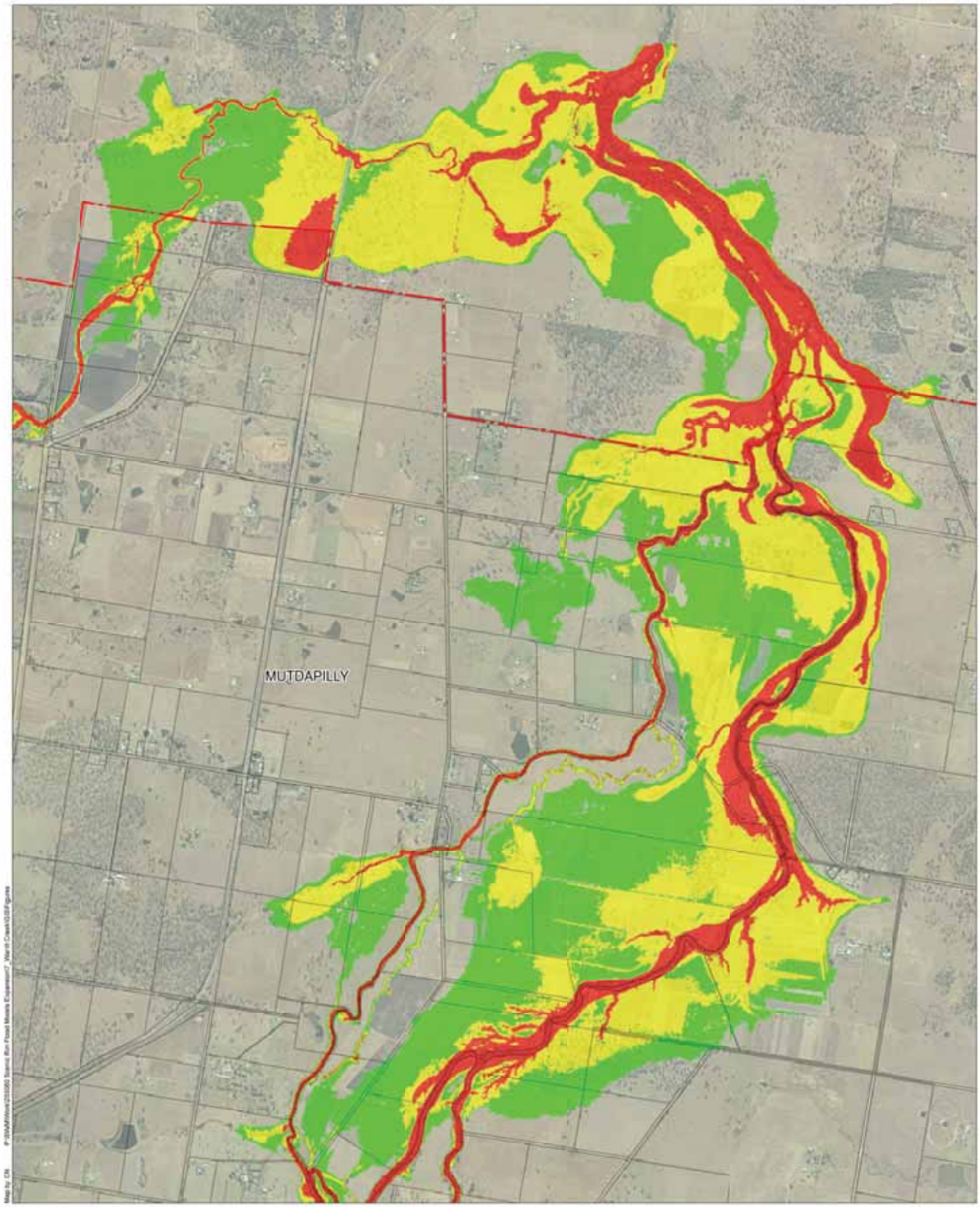
Notes:

1:200,000
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

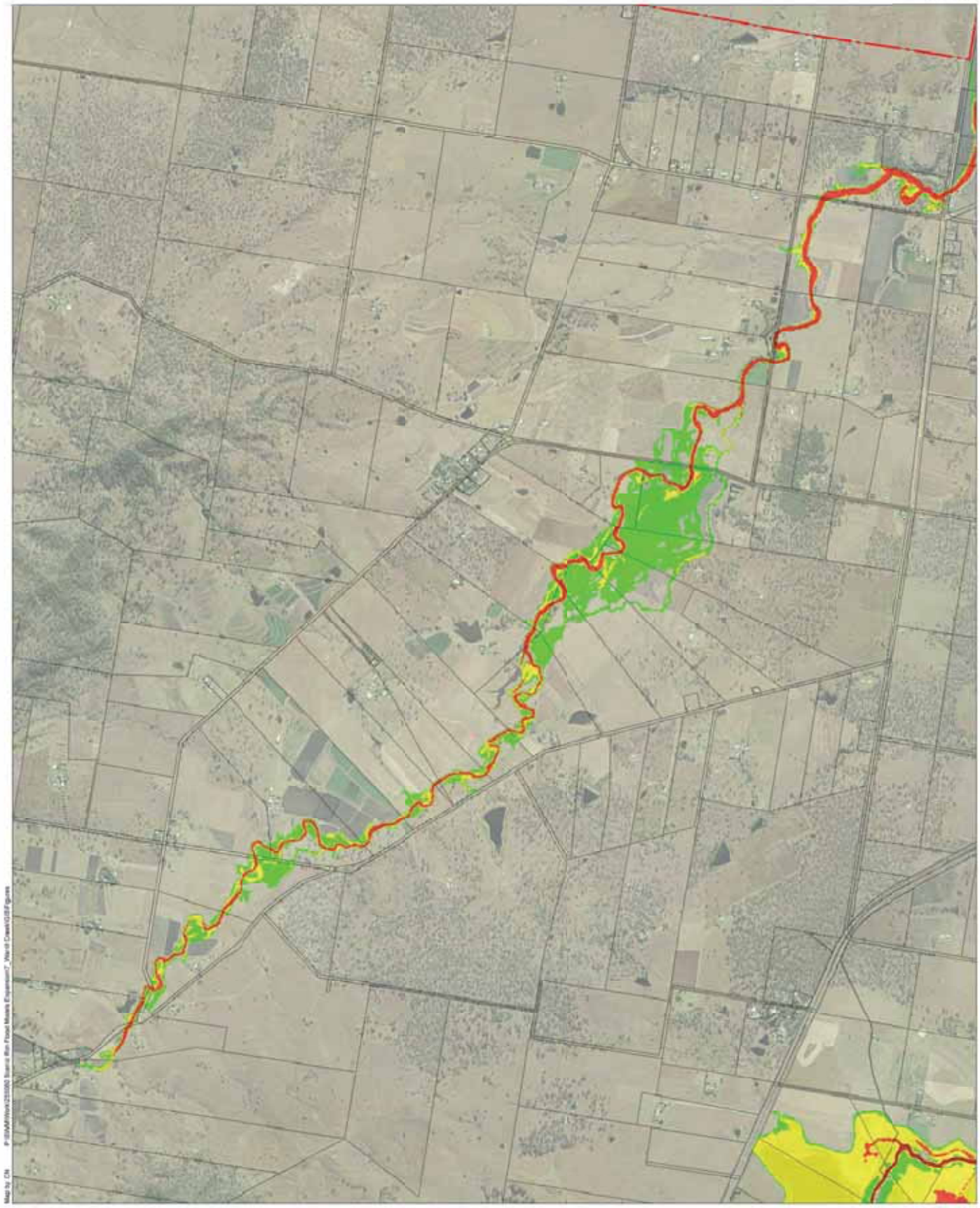
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-a**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

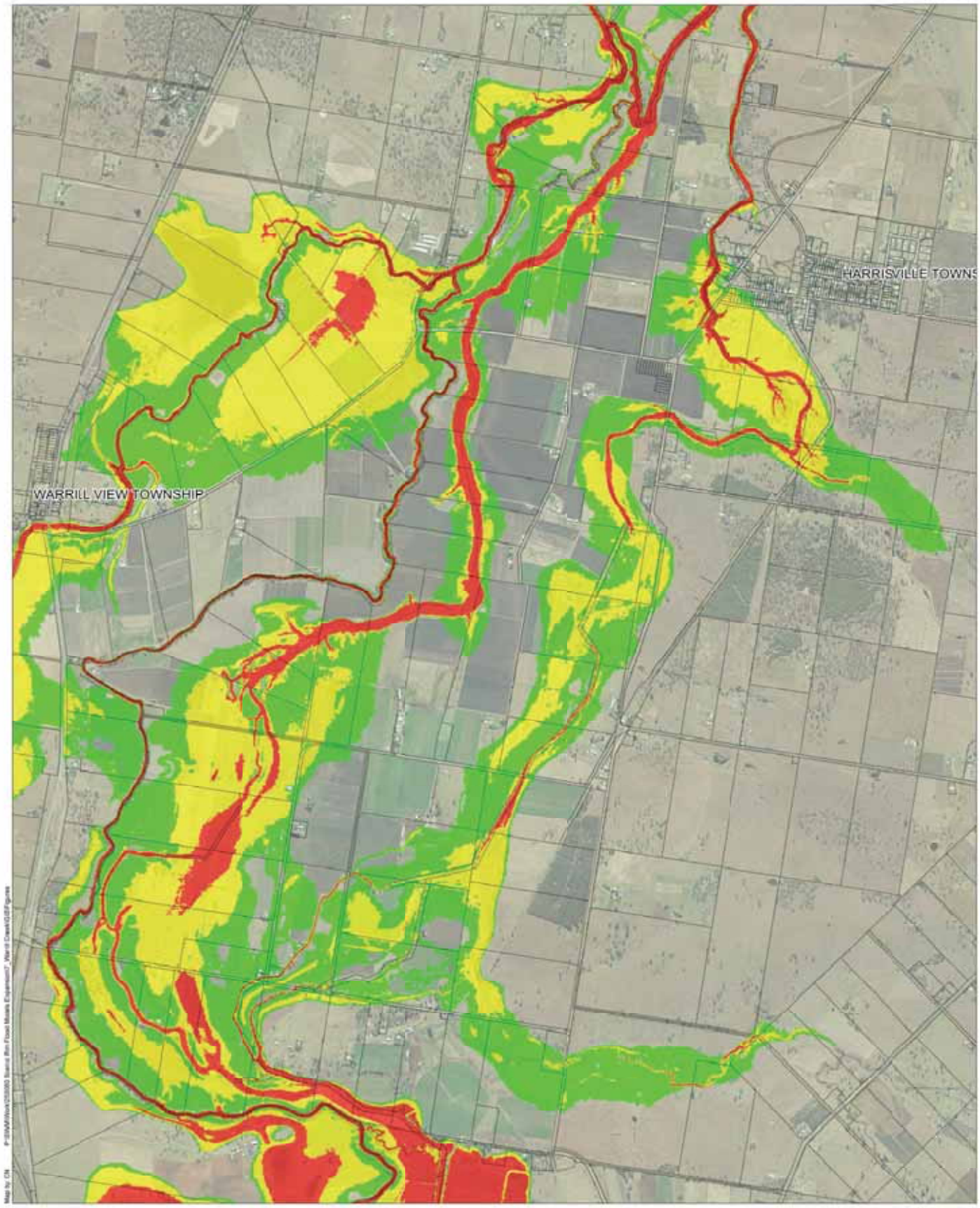
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-b**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

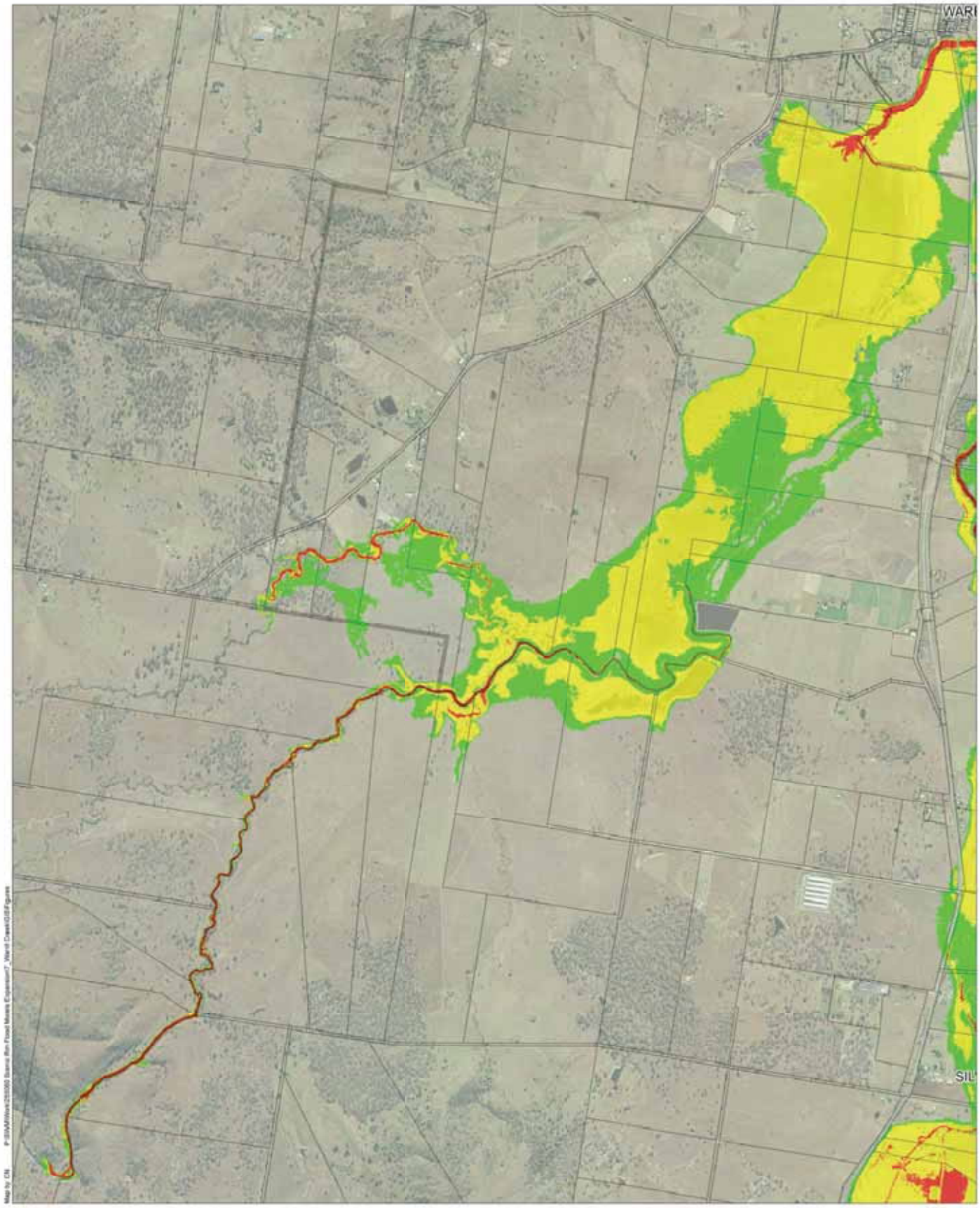
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-c**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

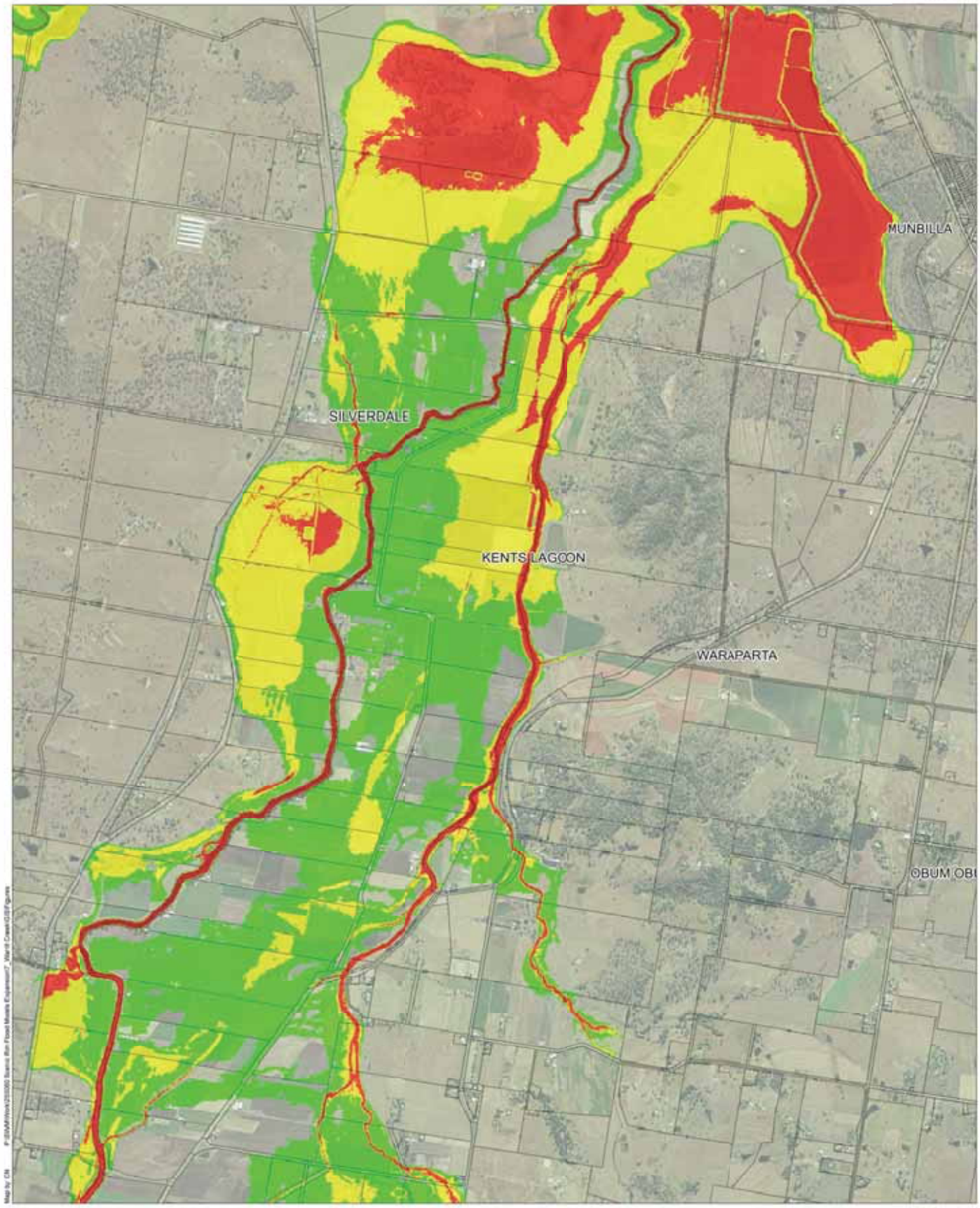
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-d**

5% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

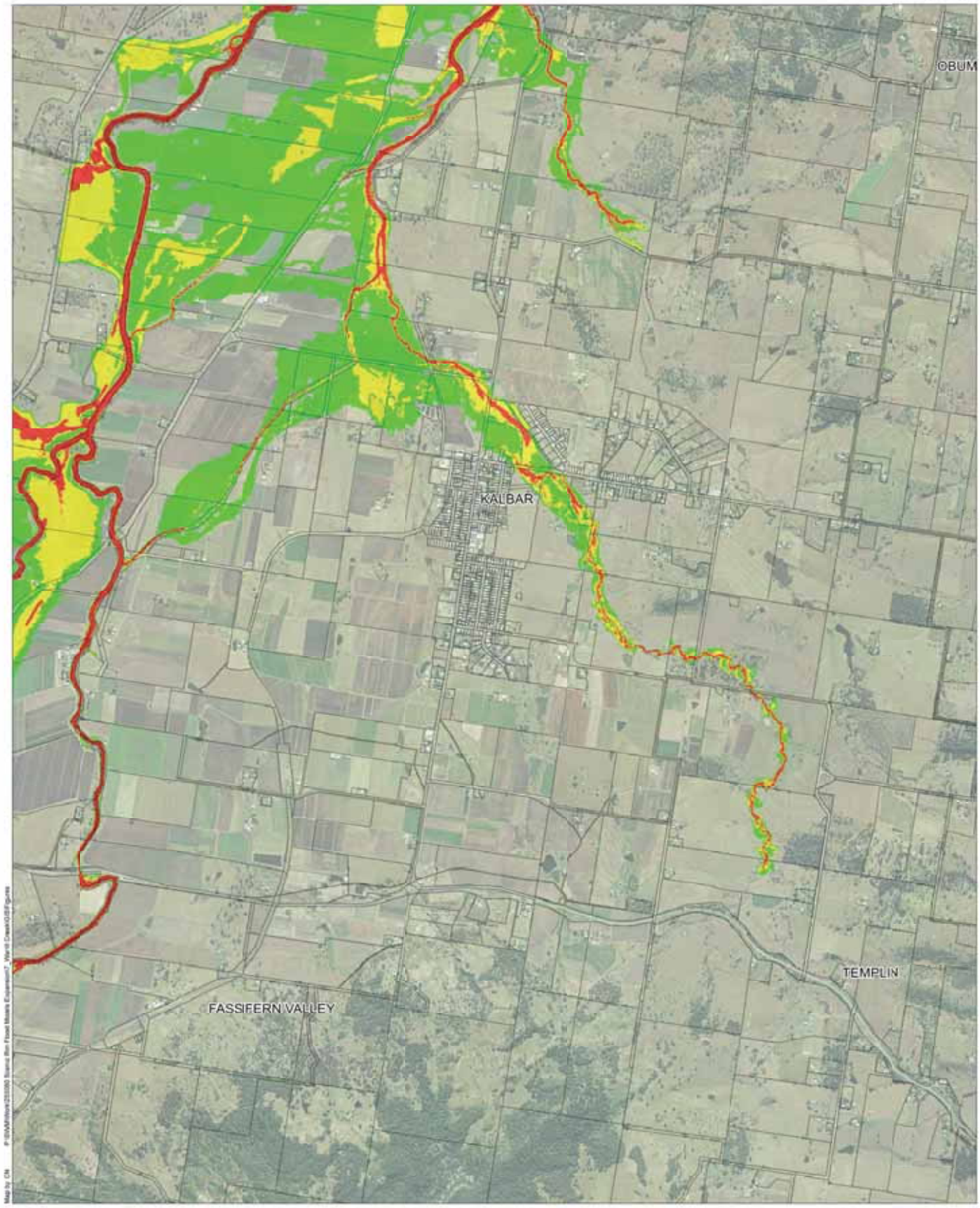
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-e**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

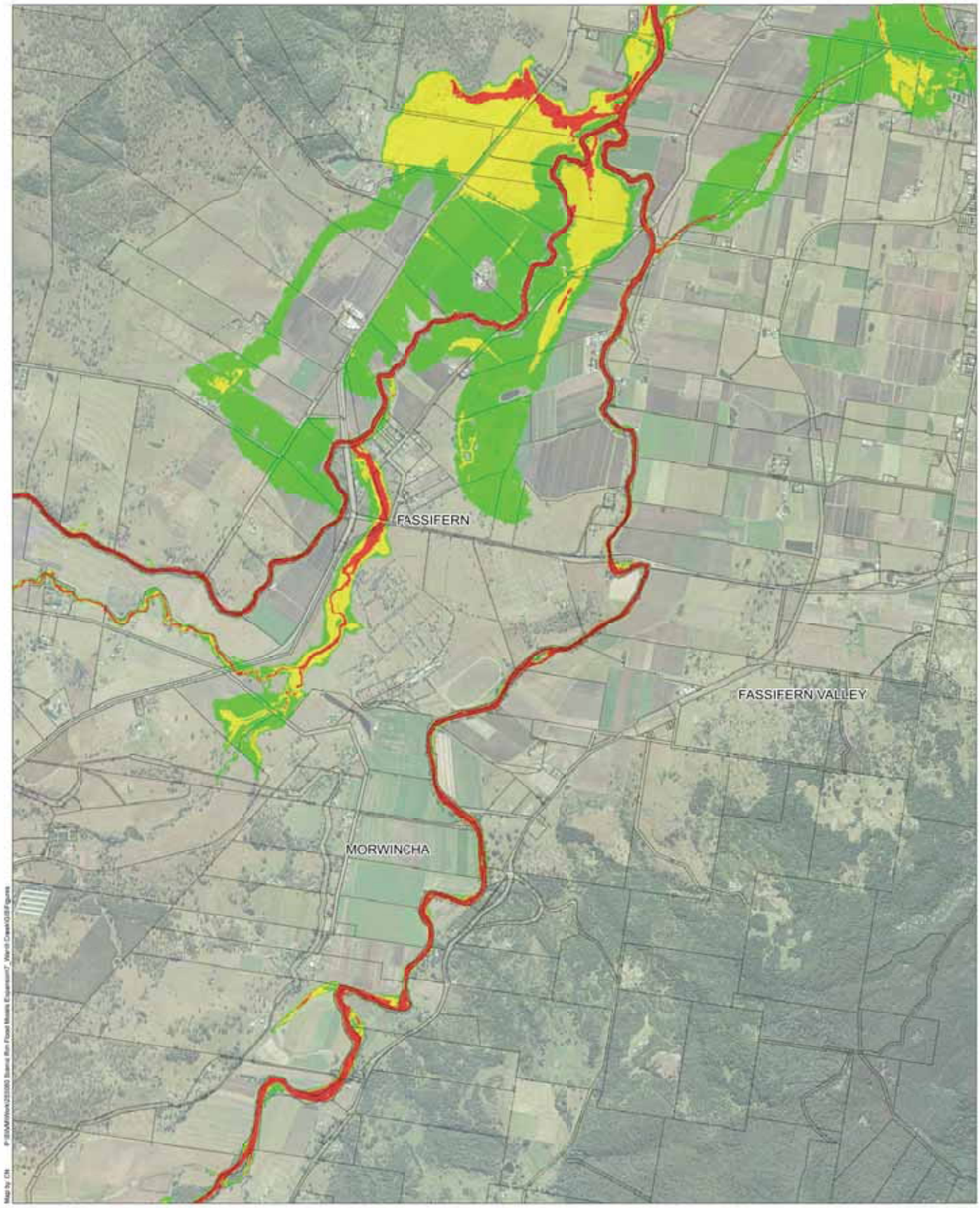
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-f**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

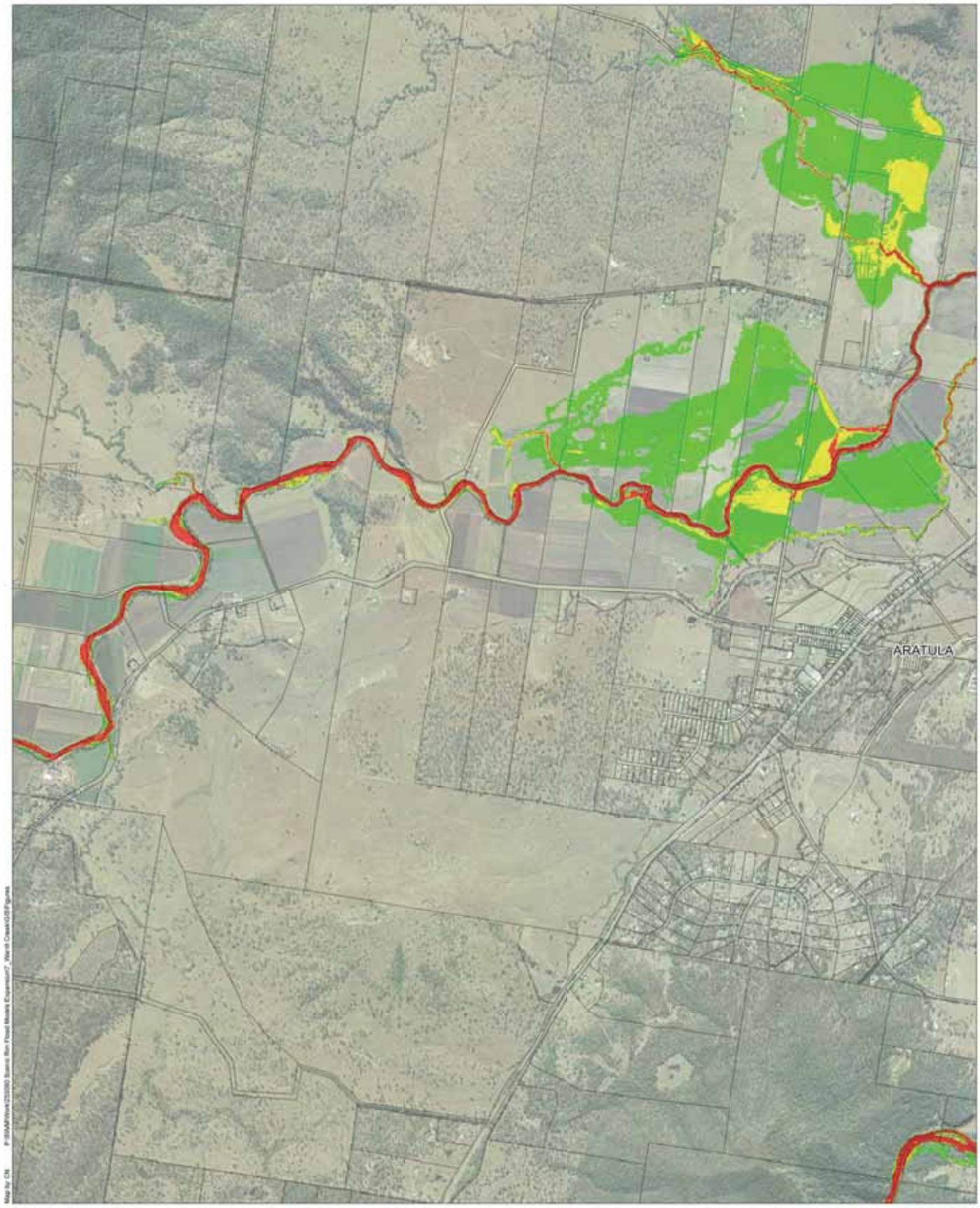
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure D4-g

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

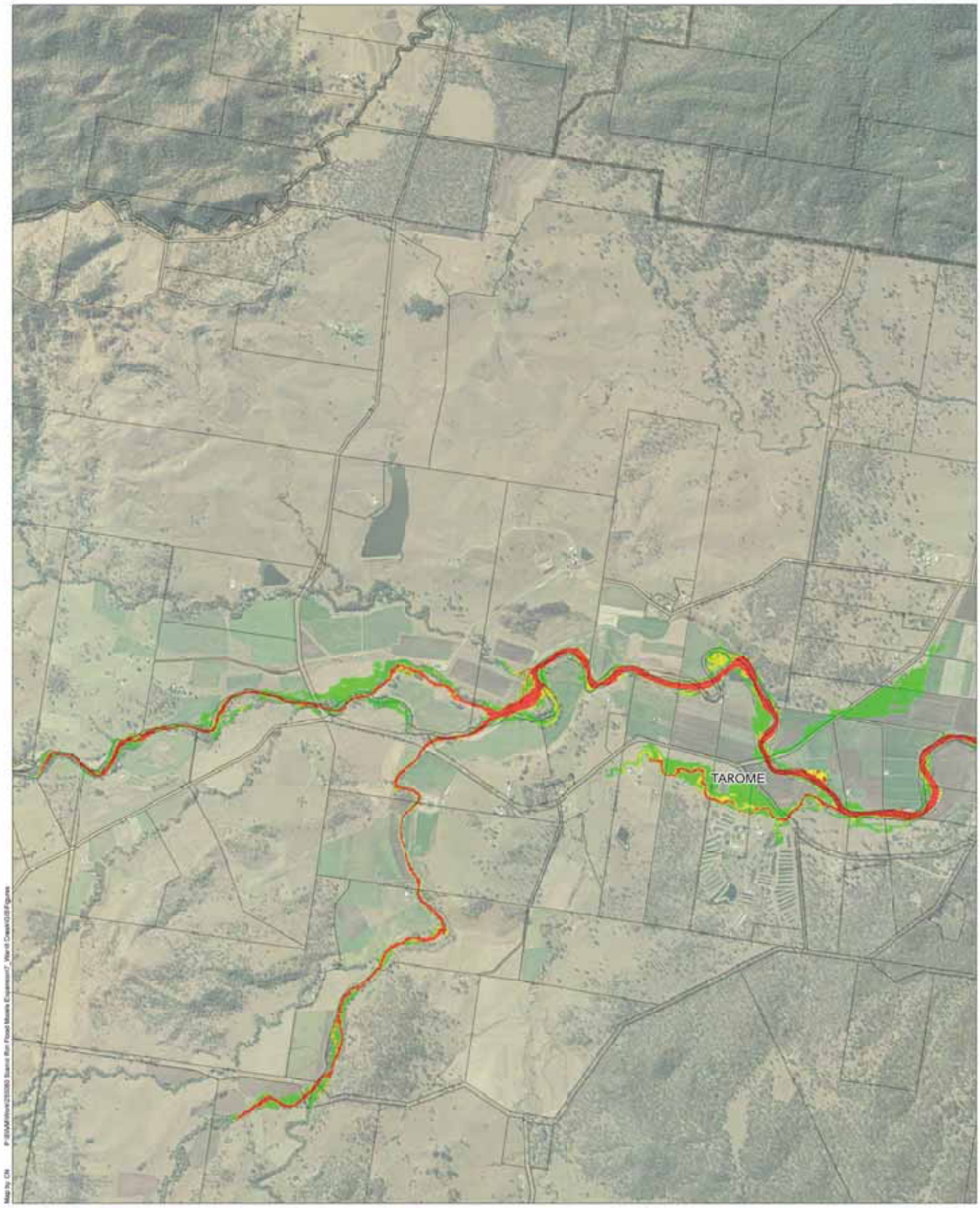
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-h**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

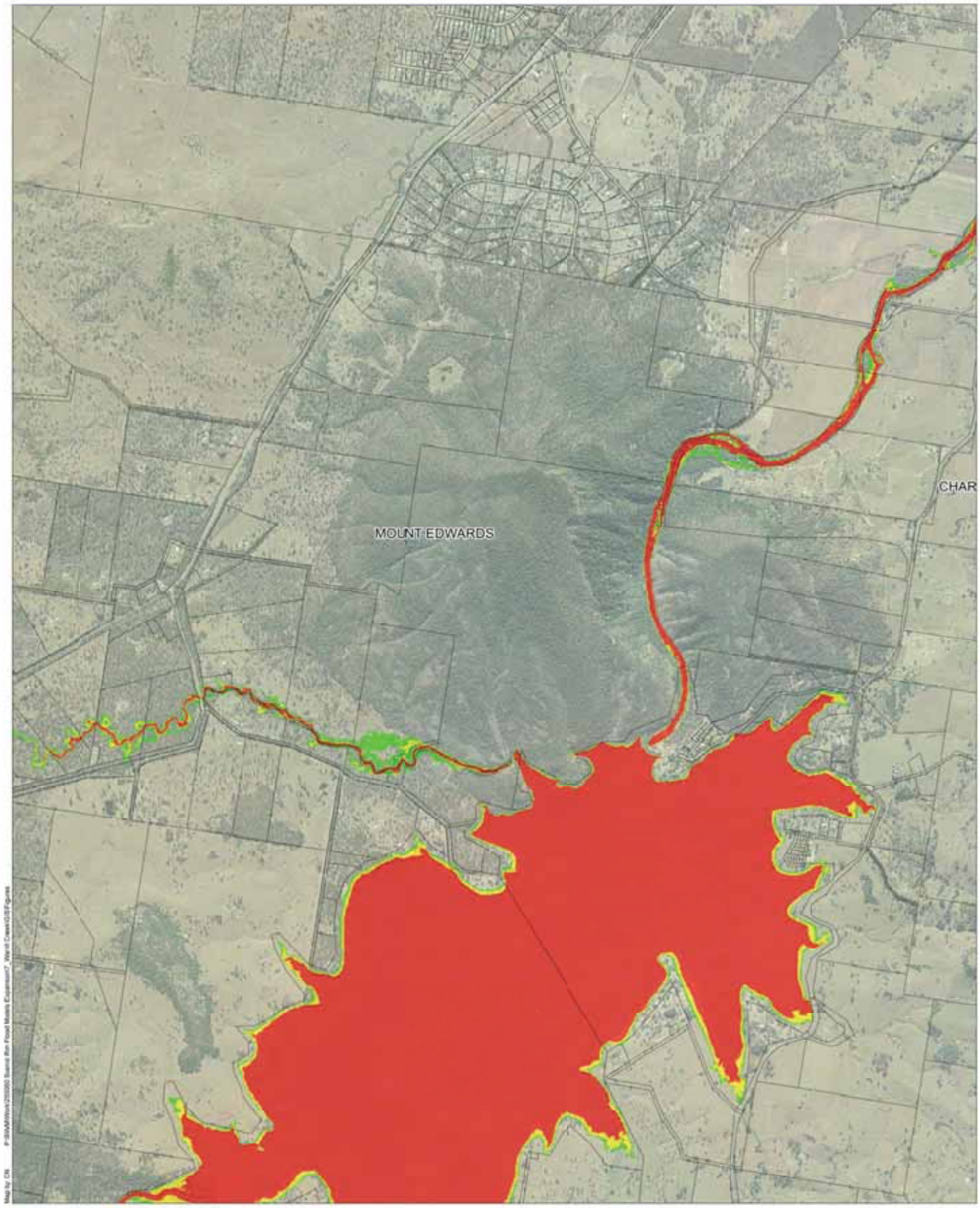
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-i**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

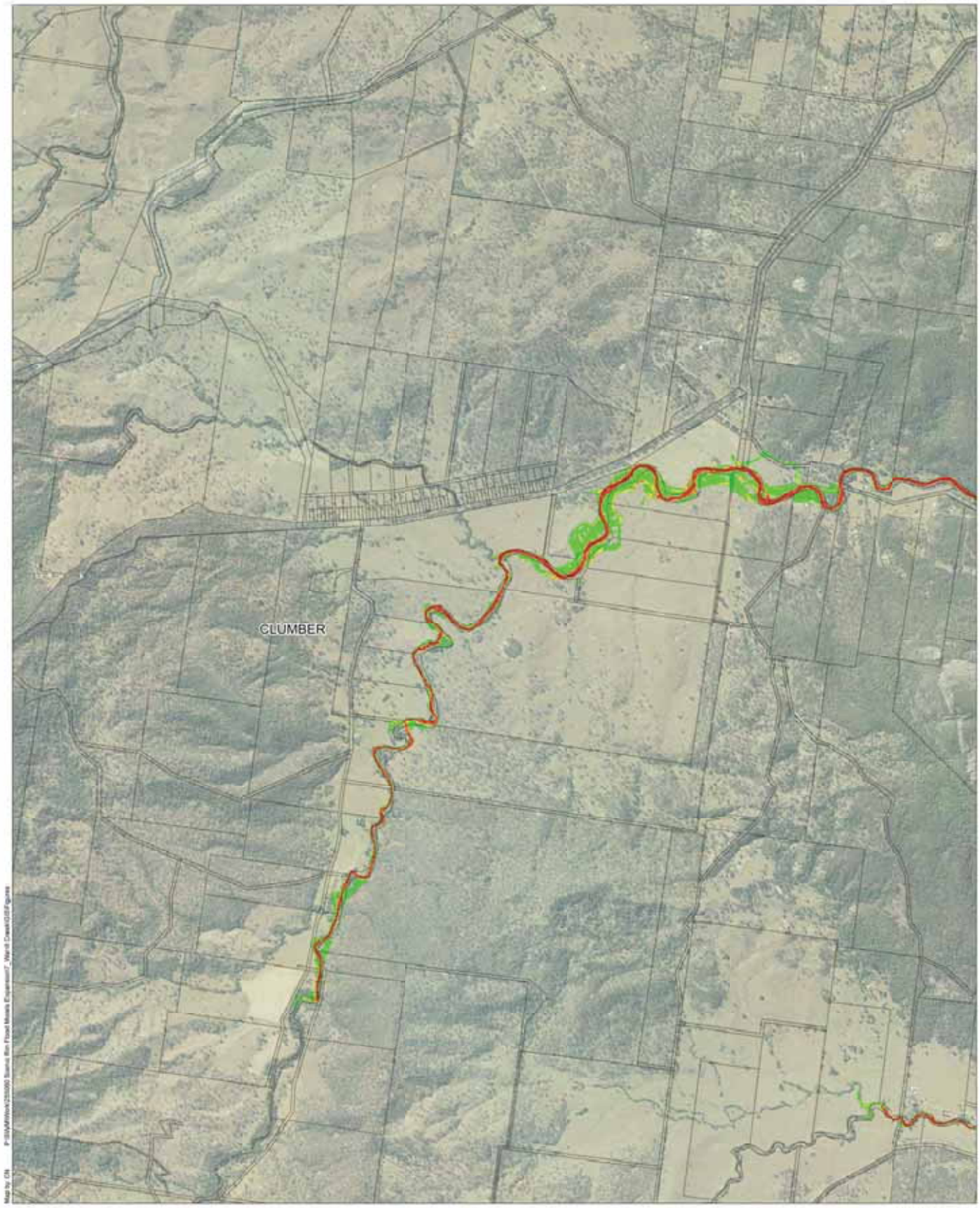
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-j**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

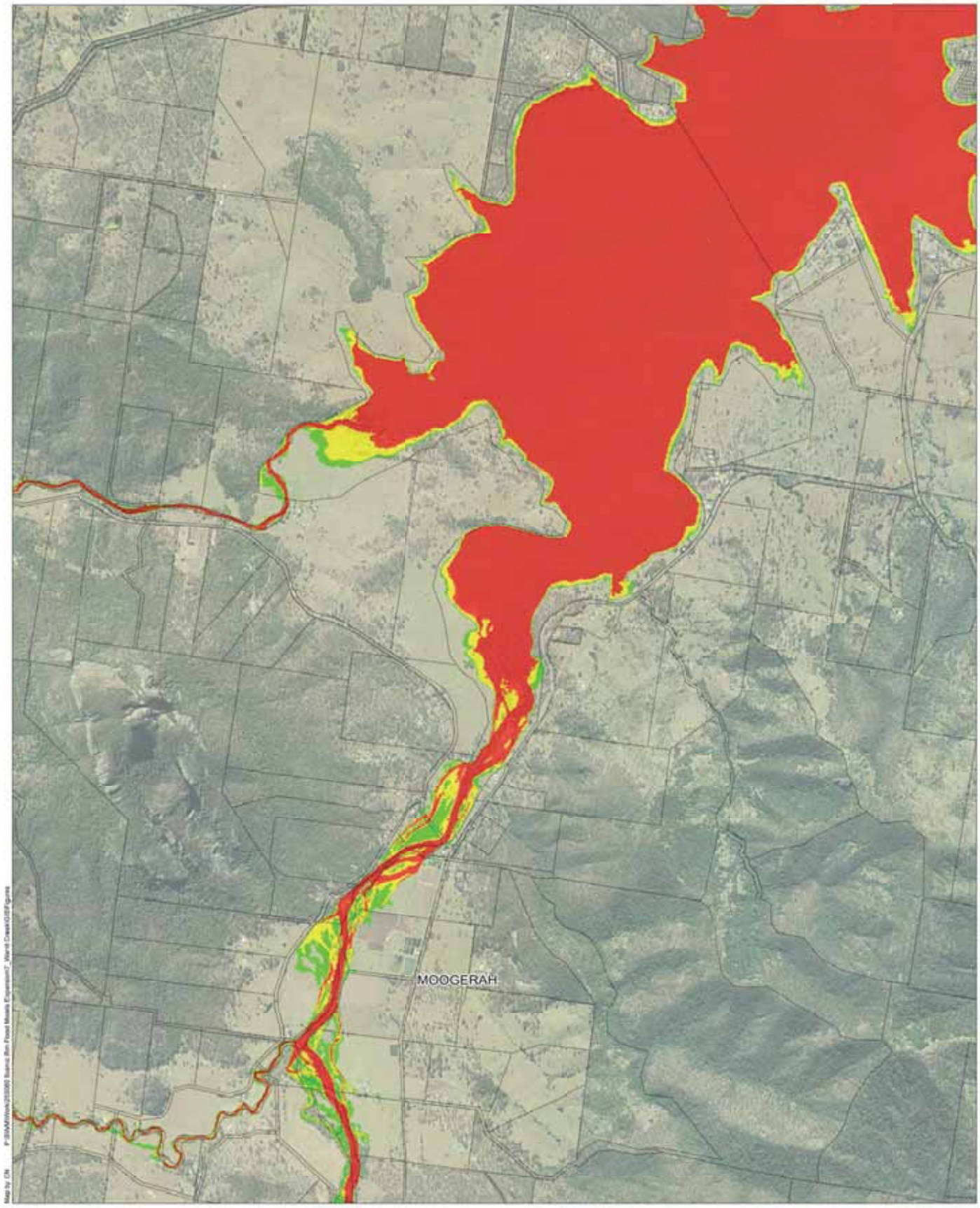
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-k**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

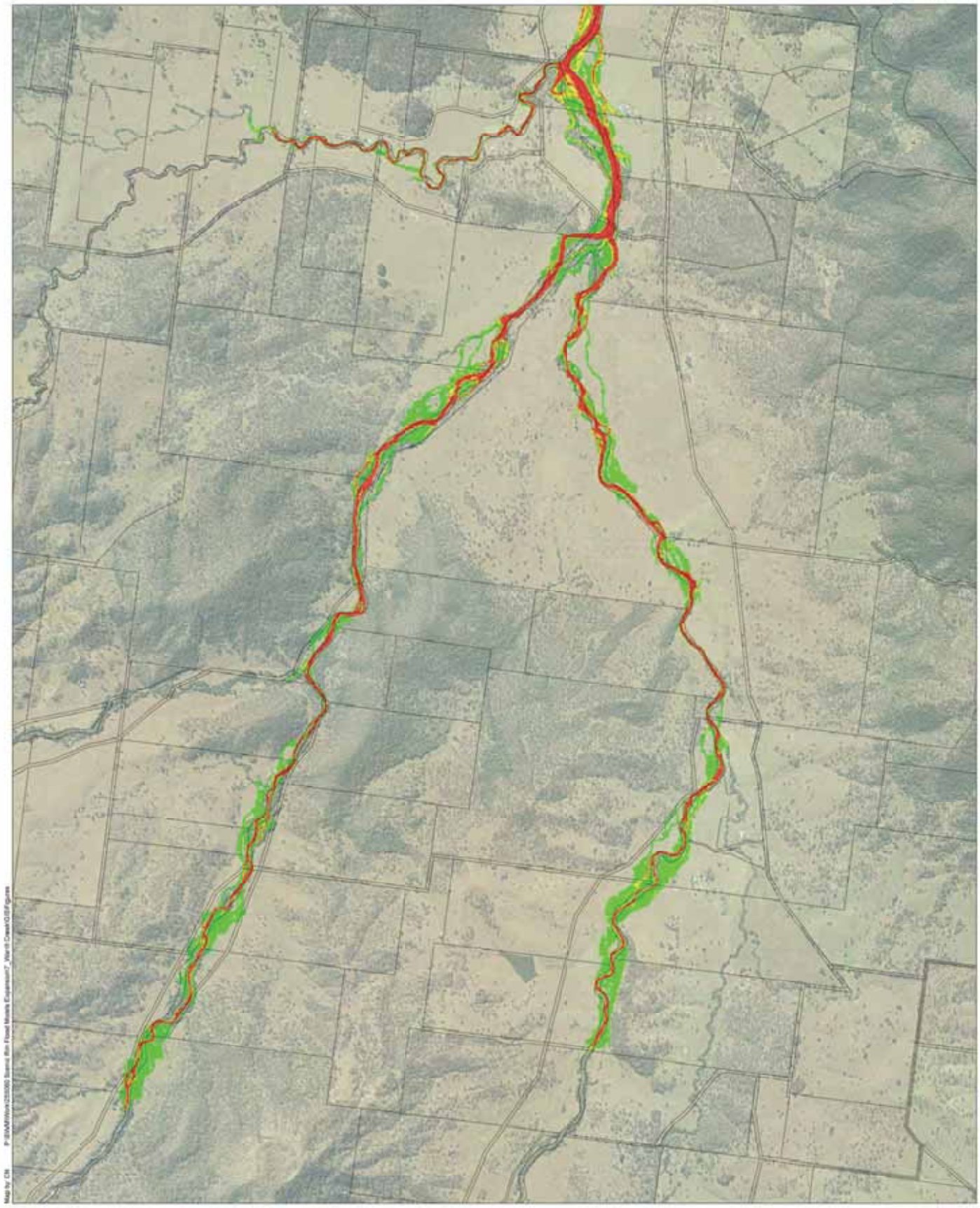
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-I**

5% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

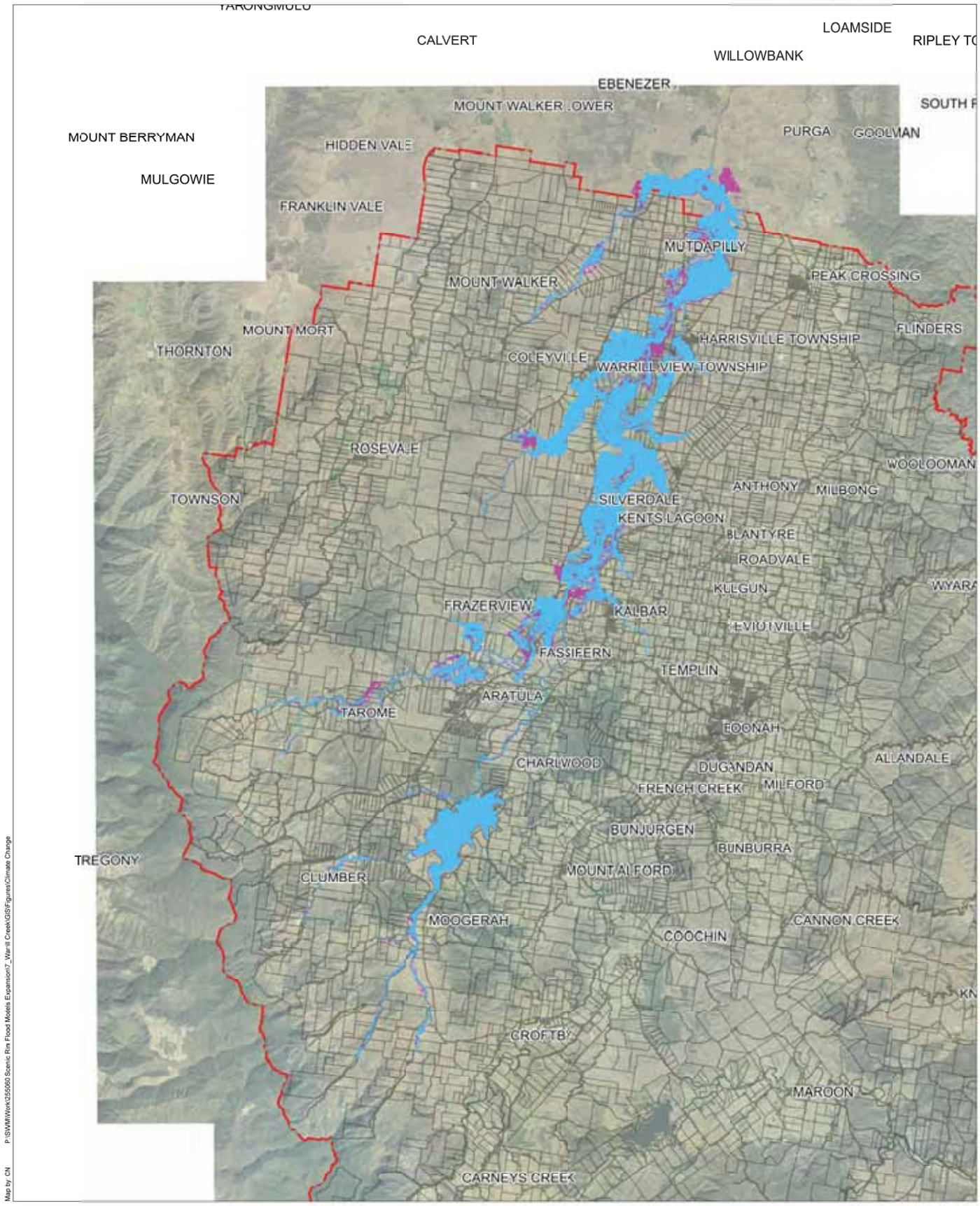
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D4-m**

5% AEP Event - Peak Hazard Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\Climate Change

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Climate Change Inundation Extent

Notes:

1:200,000

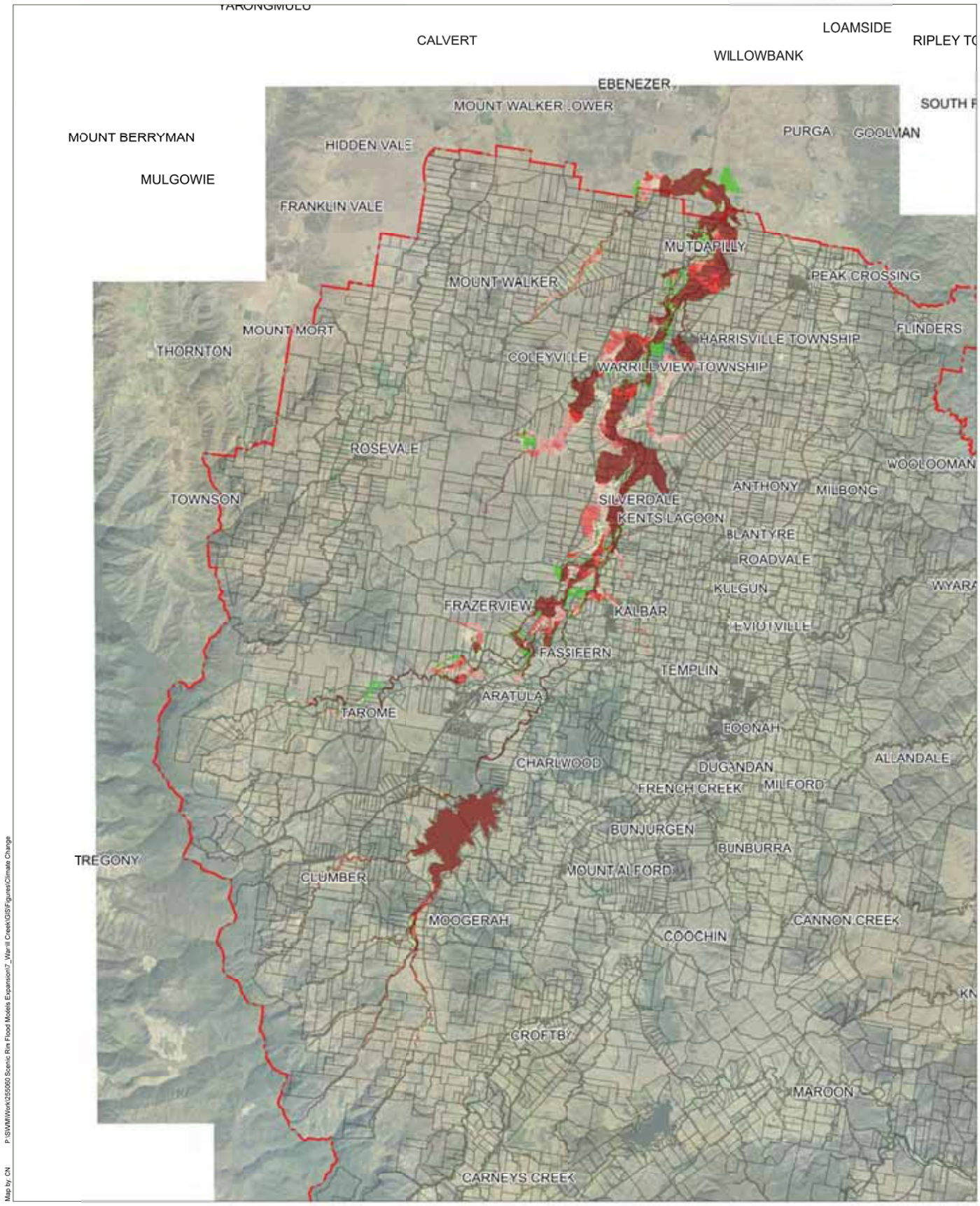
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D5 - a**

Climate Change Scenario 4.5 - 5% AEP Event Inundation Extent



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\Climate Change

Legend

SRRC Boundary

Cadastral Boundary

Afflux (m)

< -0.80	0.03 to 0.20
-0.80 to -0.60	0.20 to 0.40
-0.60 to -0.40	0.40 to 0.60
-0.40 to -0.20	0.60 to 0.80
-0.20 to -0.03	0.80 to 1.20
-0.03 to 0.03	> 1.20

Was Dry Now Wet

Was Wet Now Dry

Notes:

1:200,000

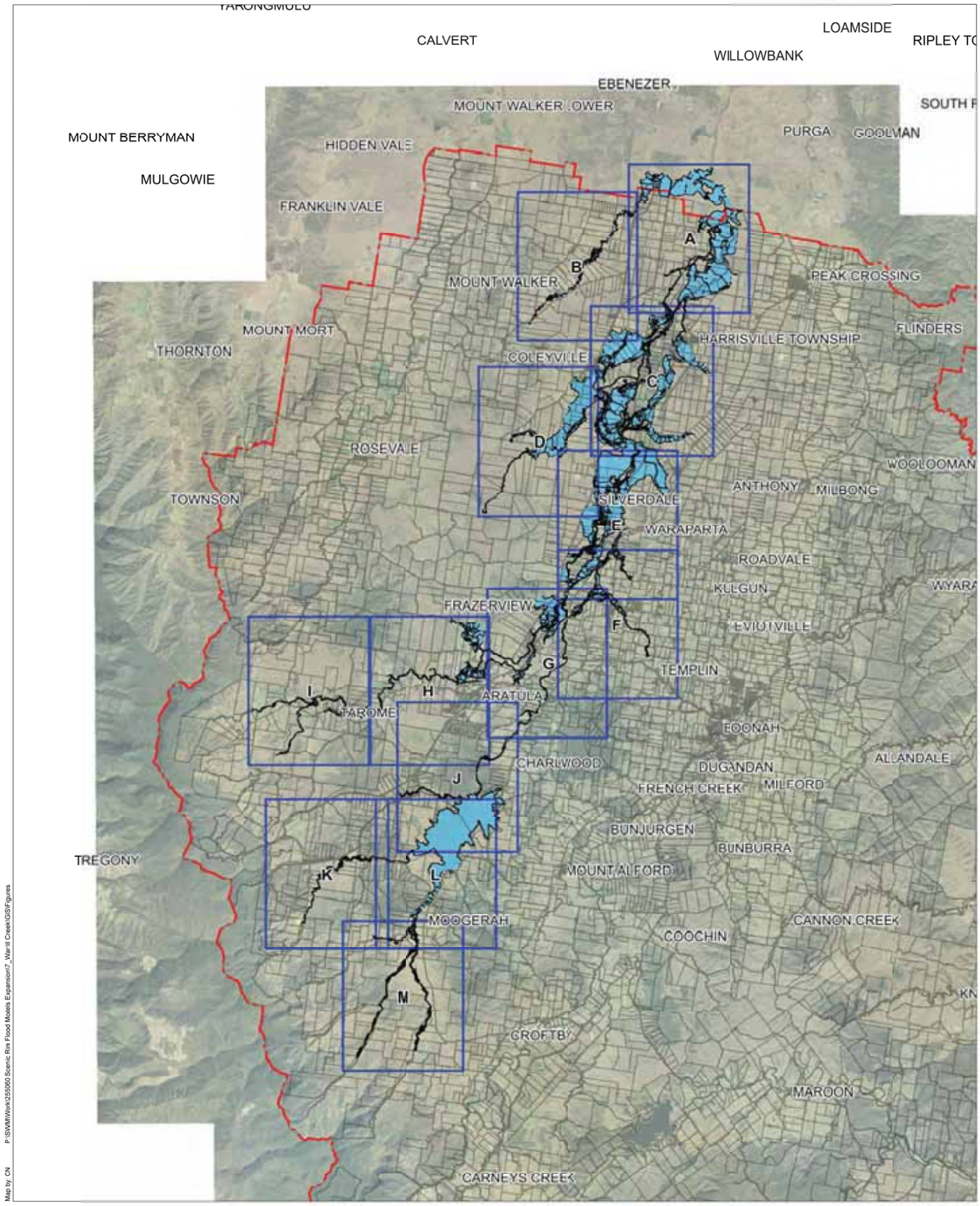
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure D5 - b**

Climate Change Scenario 4.5 - 5% AEP Event Afflux Map



Map by: CN P:\SWMWork\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

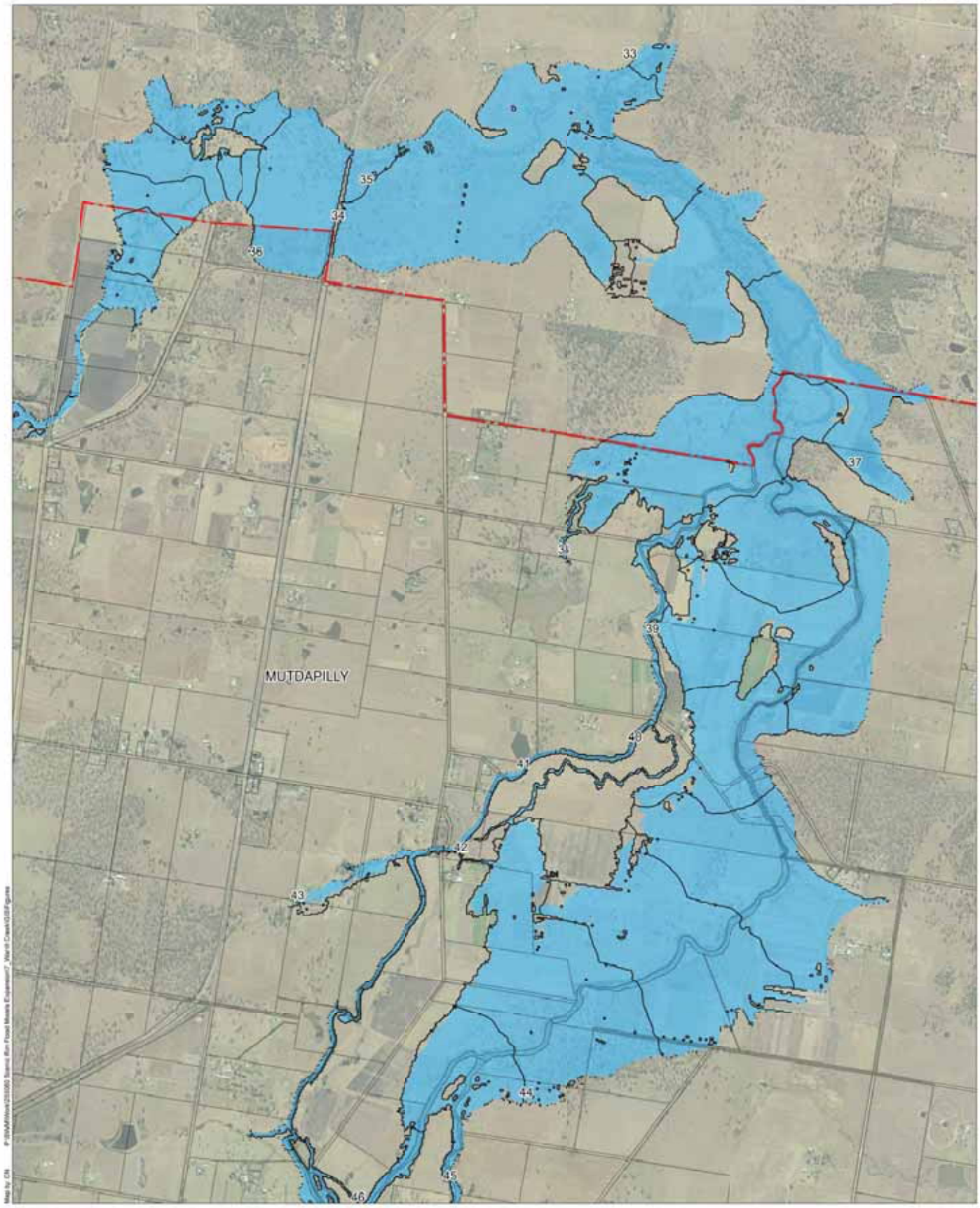
Notes:

1:200,000
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

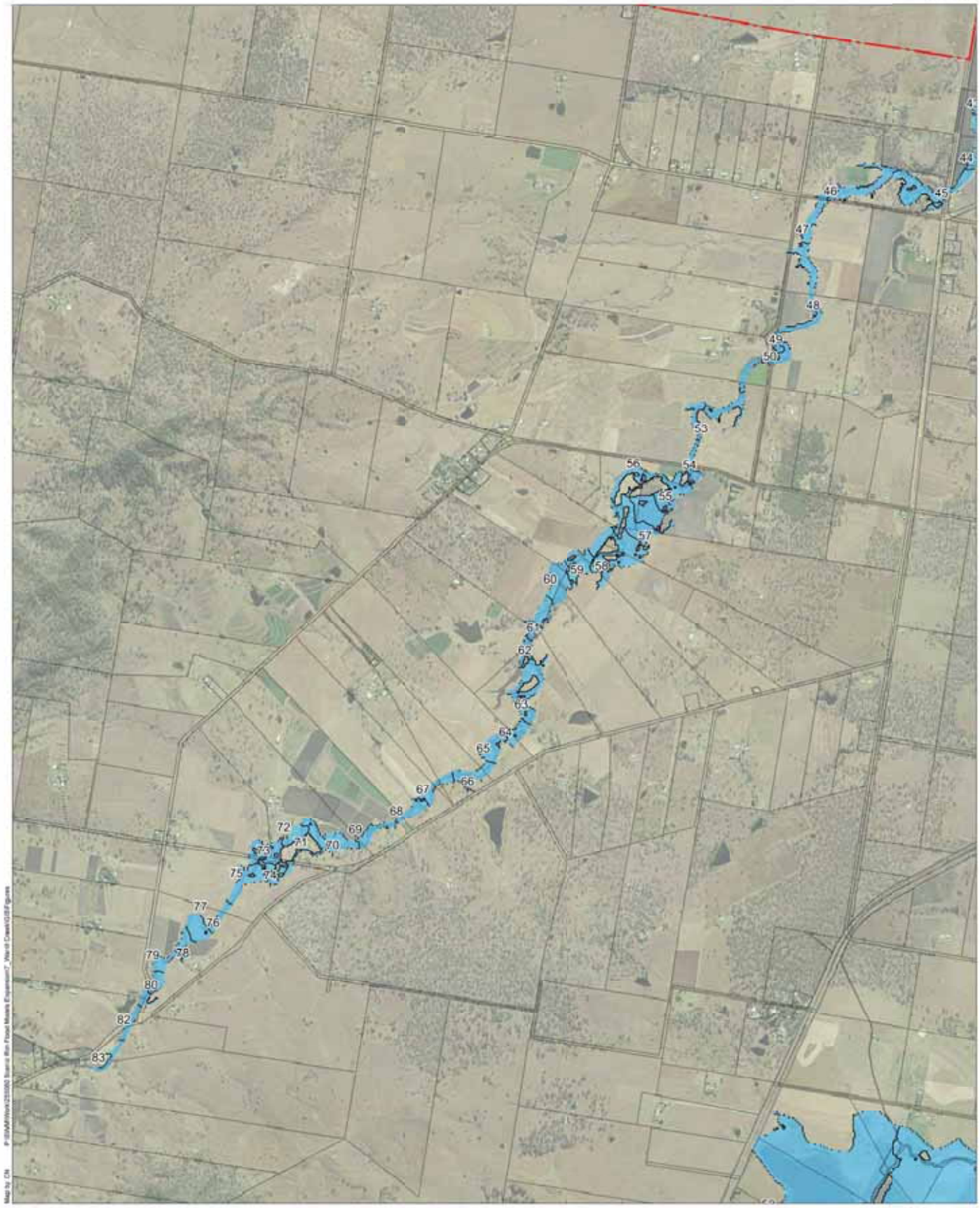
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E1-a

10% AEP Event - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

0 625 m 1,250 m

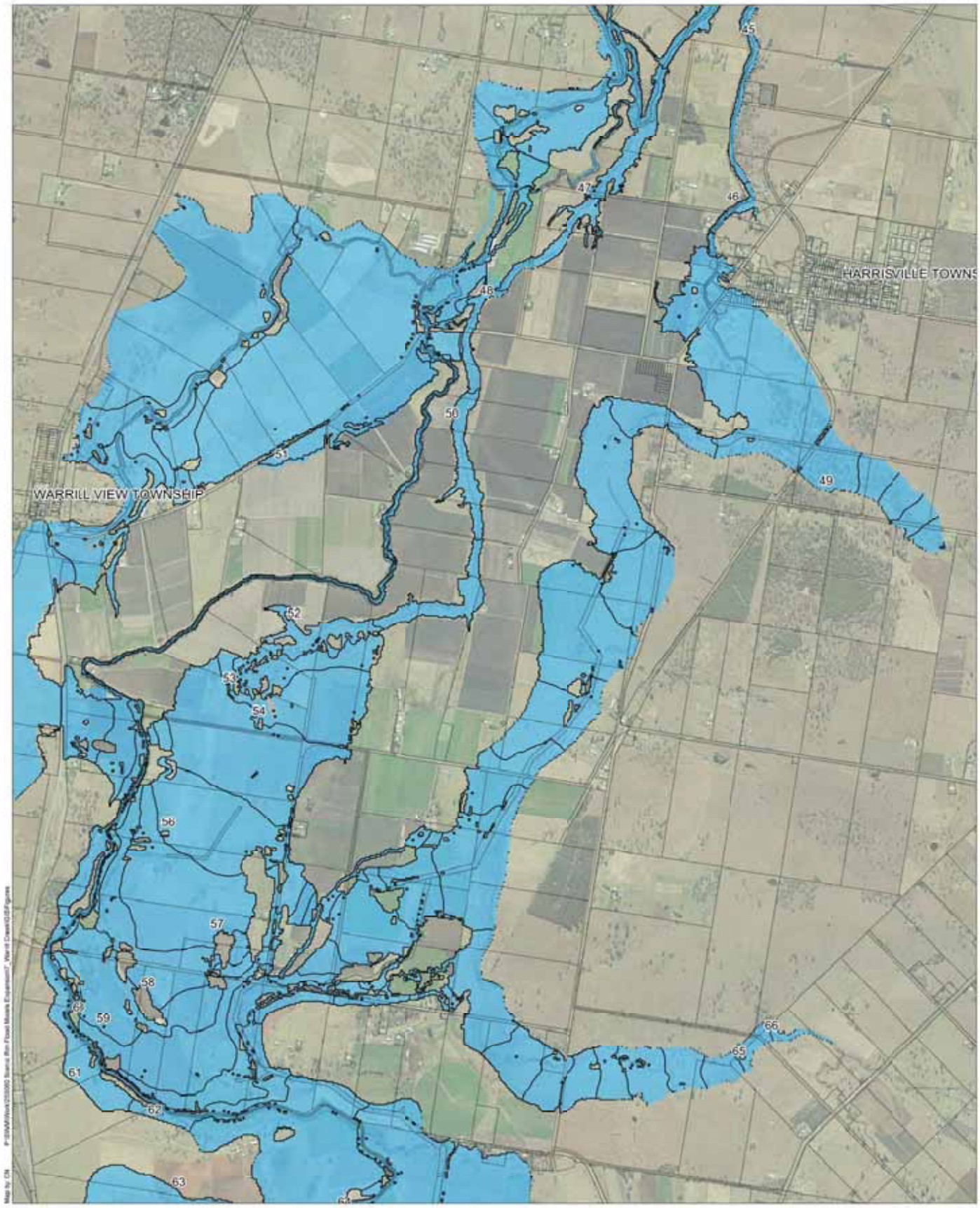
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-b**

10% AEP Event - Inundation Extent

aurecon



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

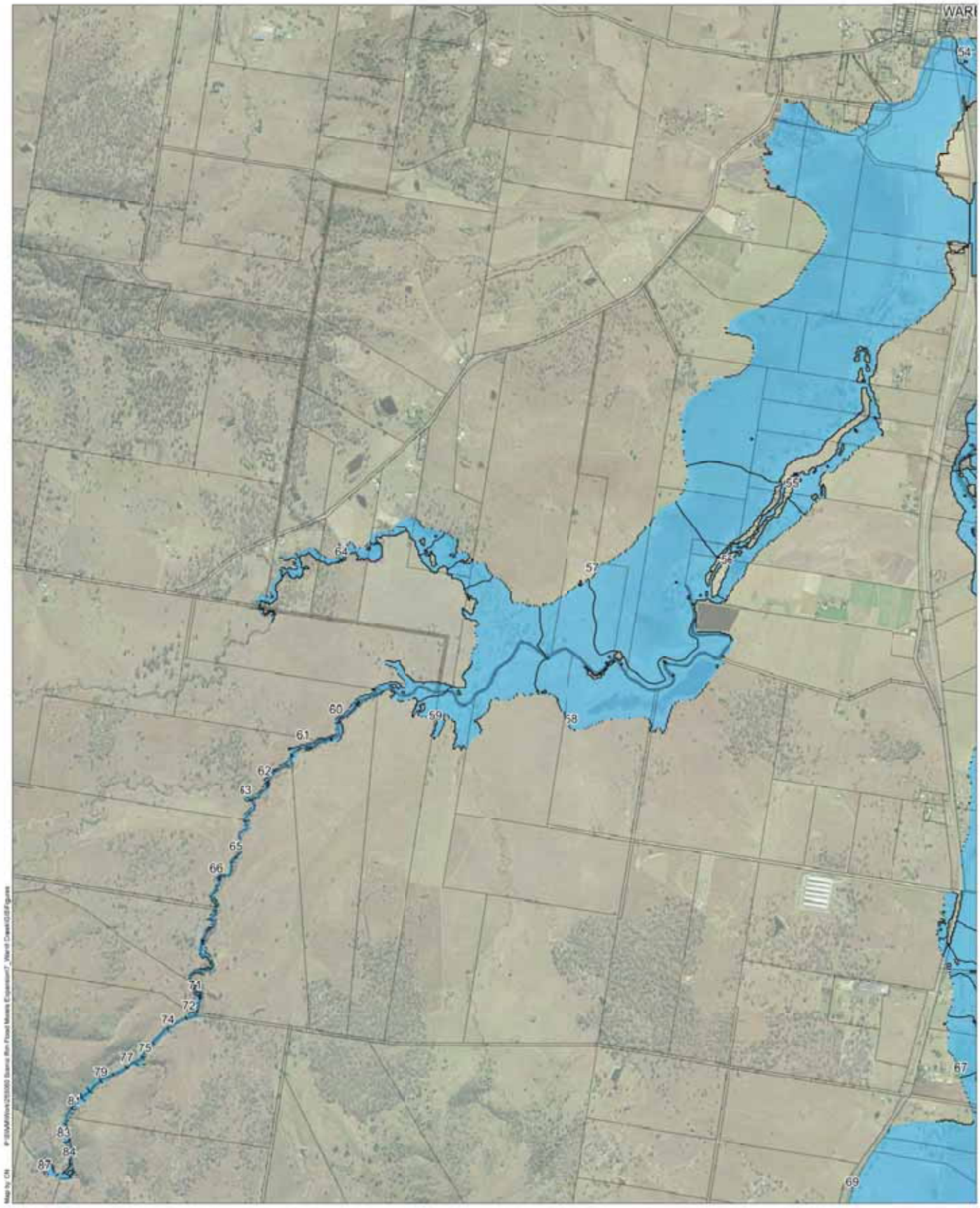
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-c**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

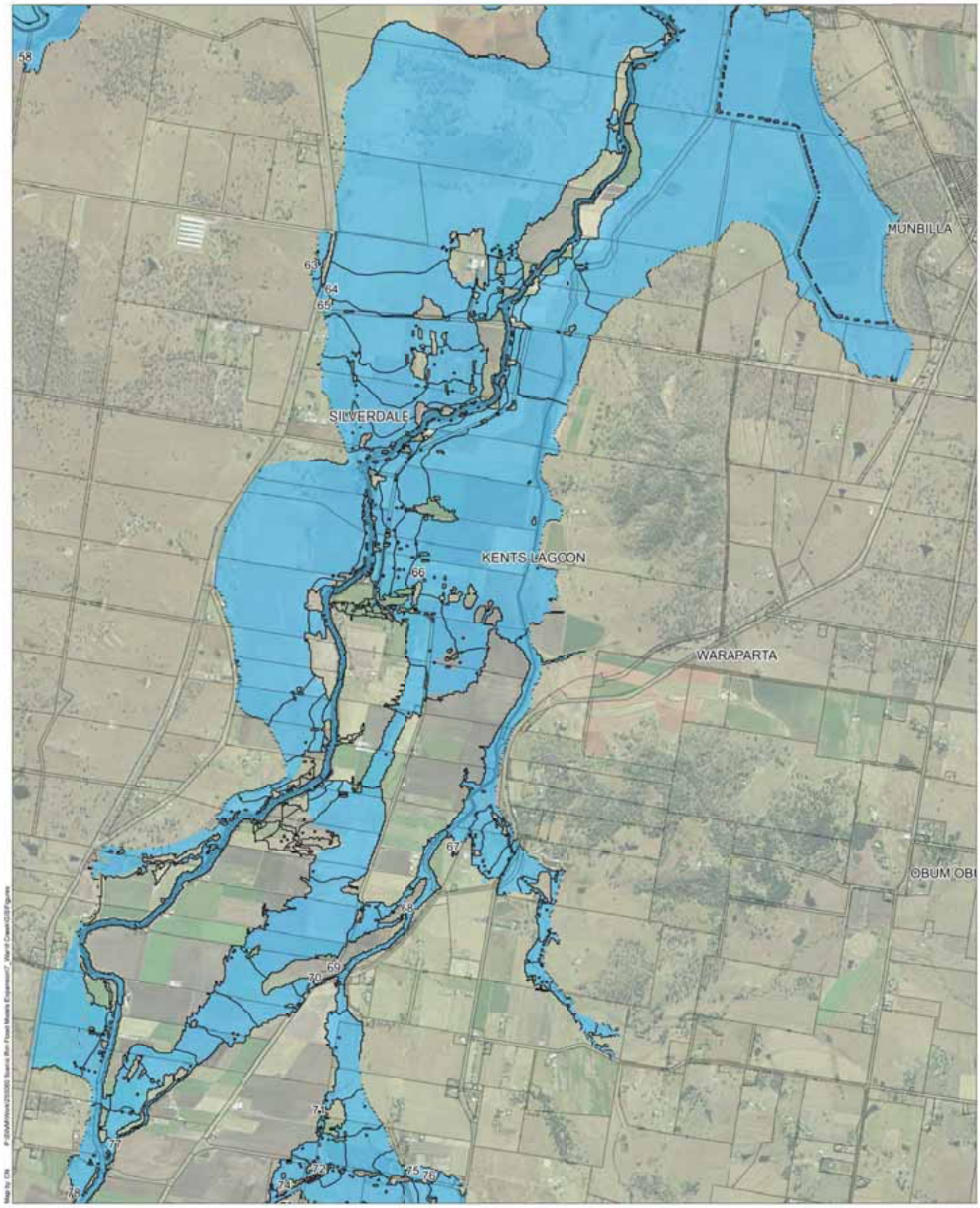
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-d**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

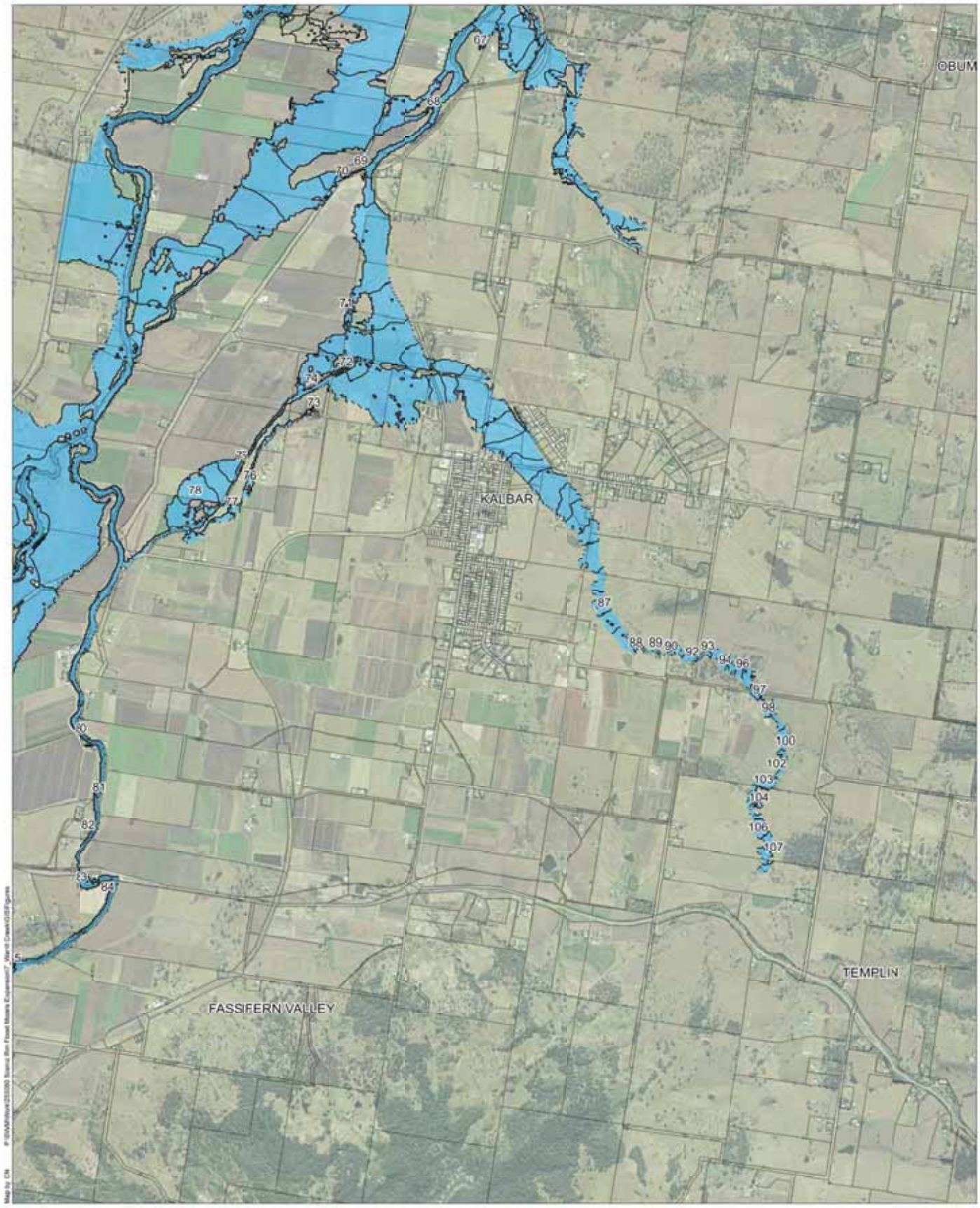
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-e**

10% AEP Event - Inundation Extent



Legend

- SRRC
- Cadastral
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

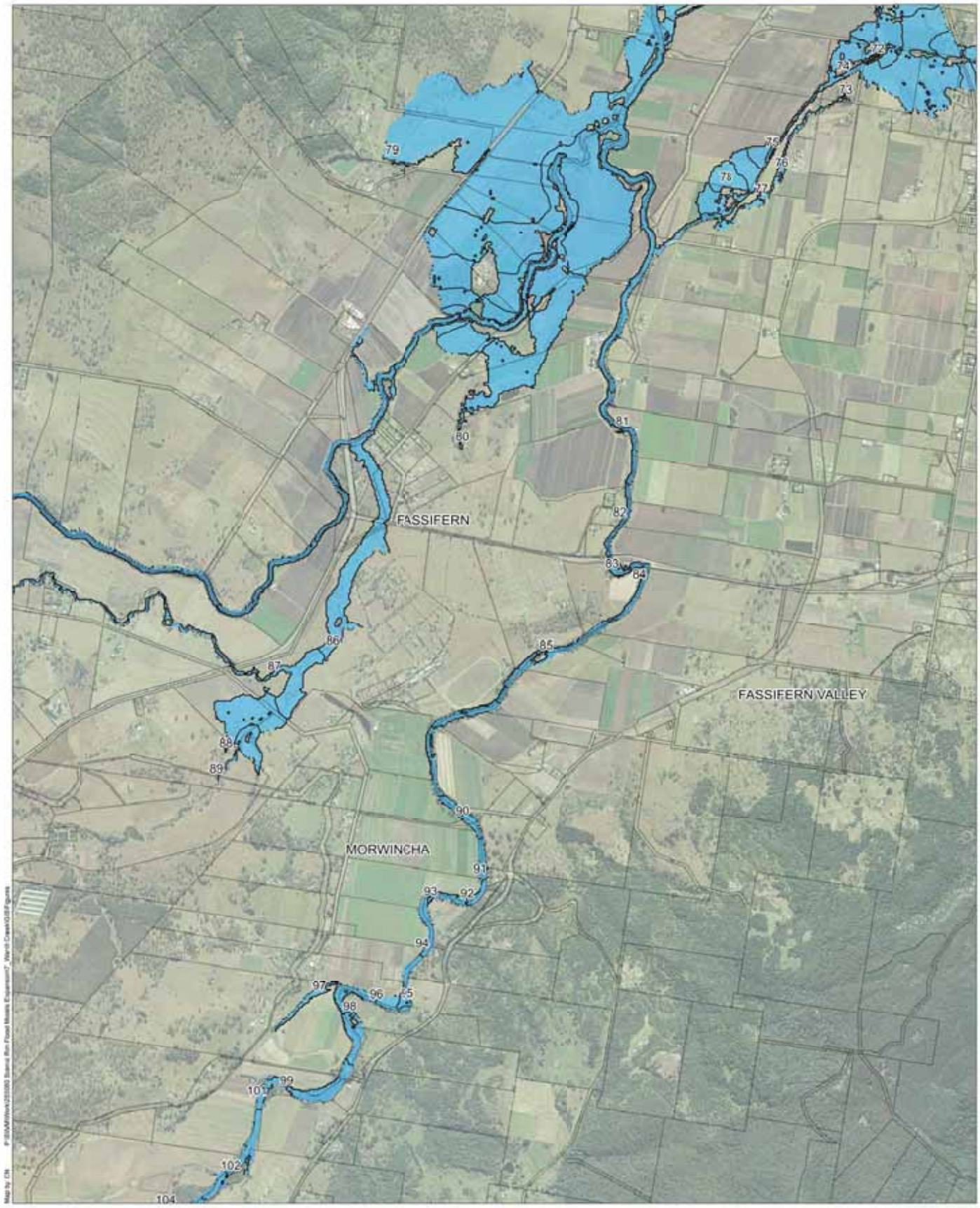
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E1-f

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

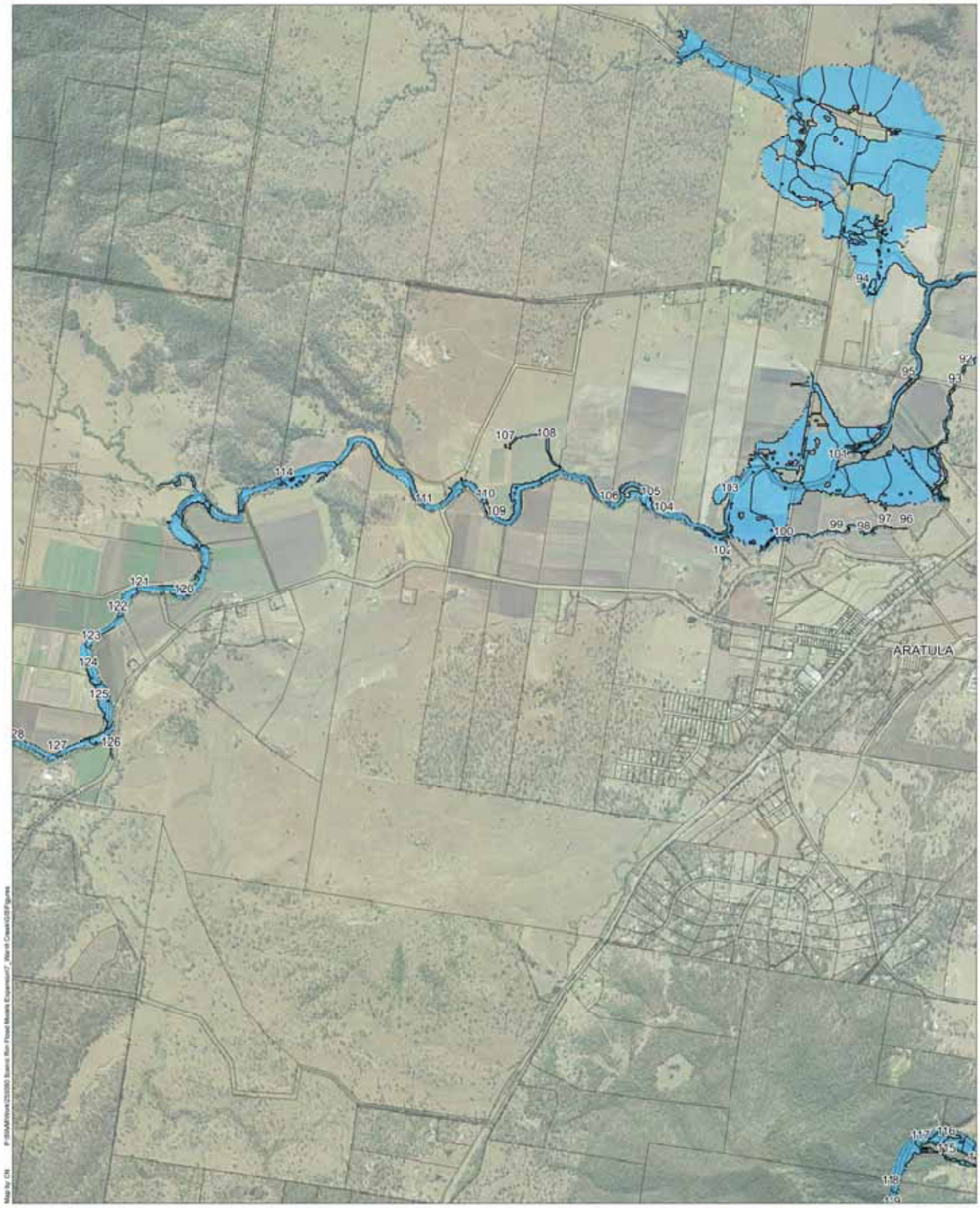
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-g**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

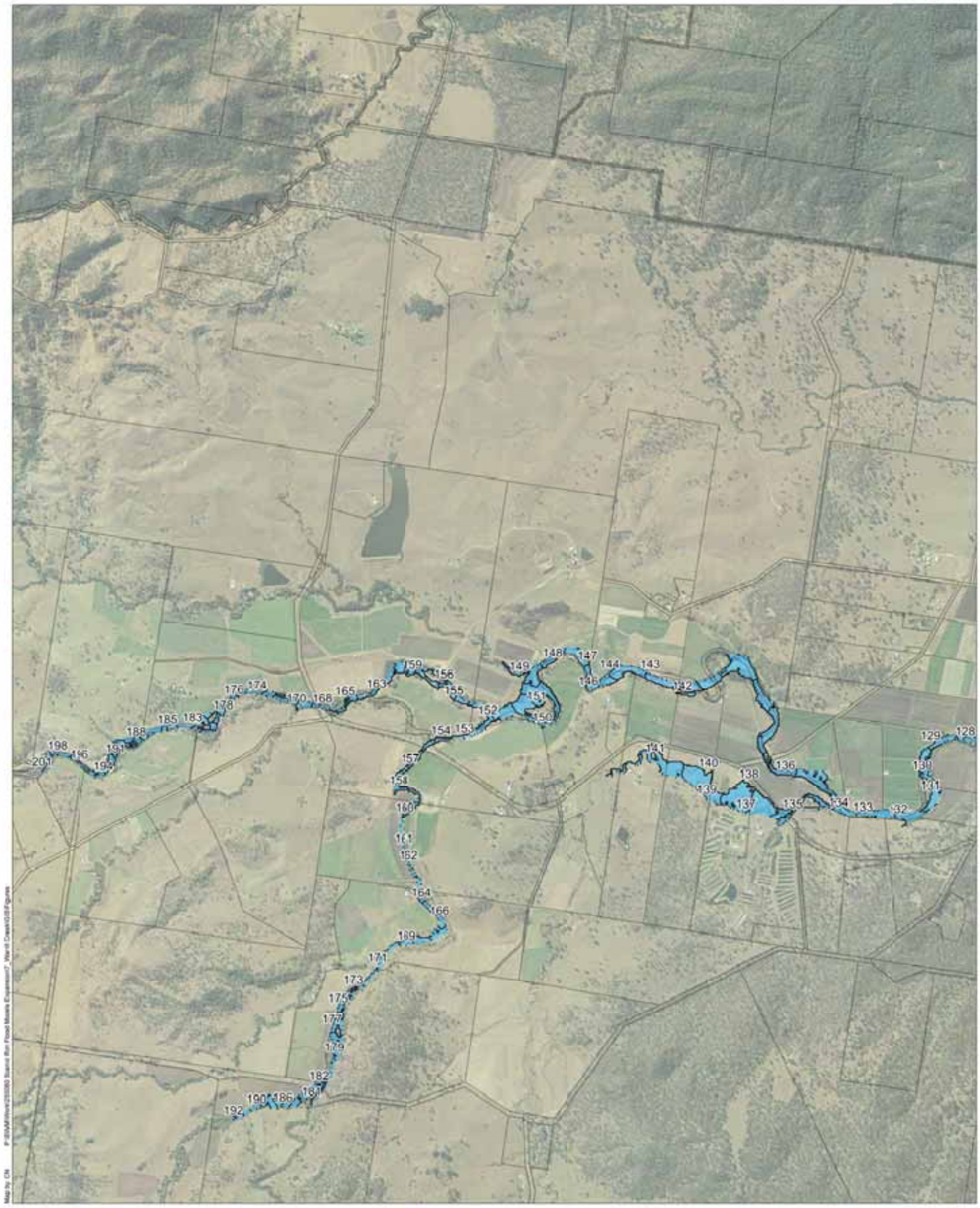
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-h**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

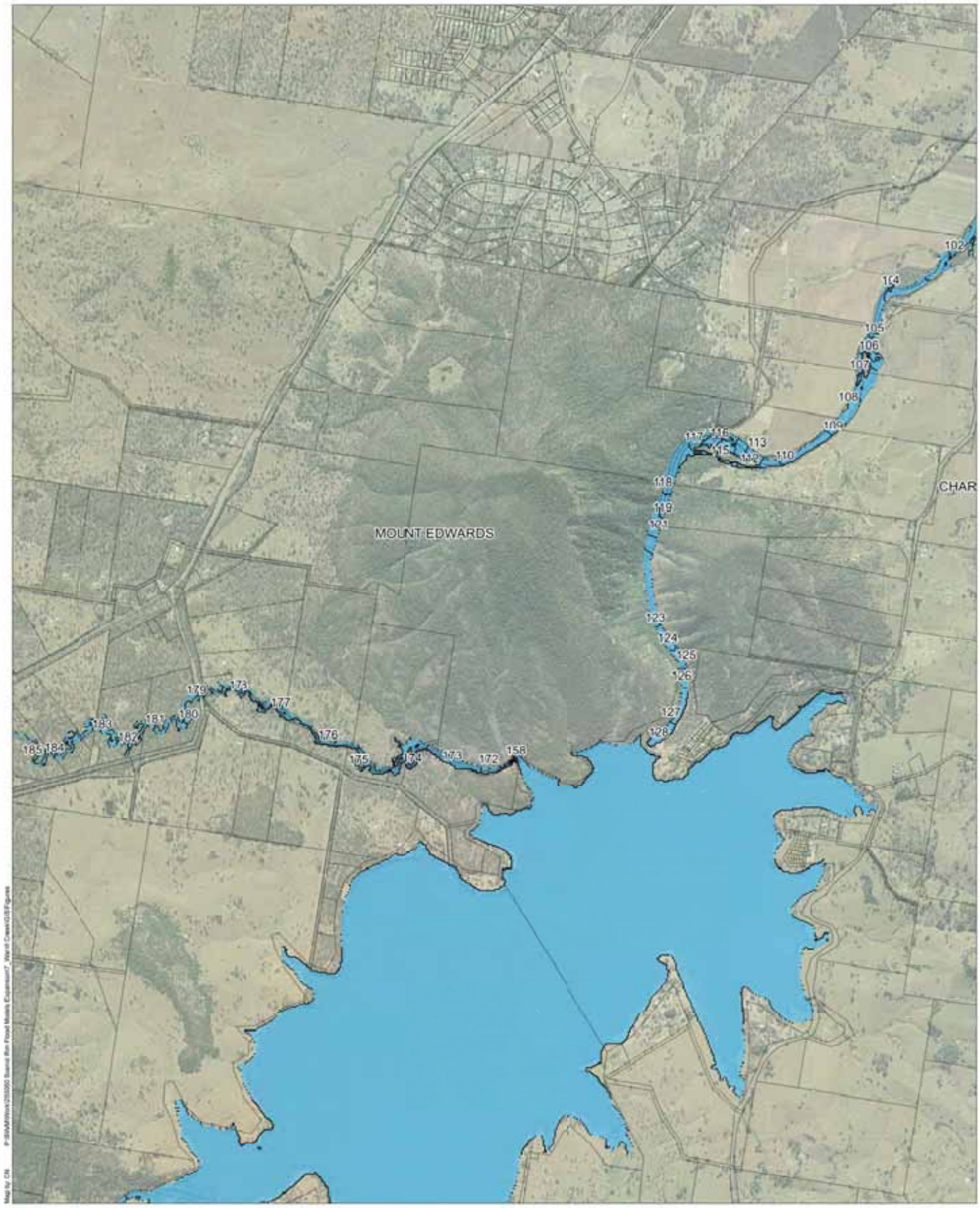
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-i**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

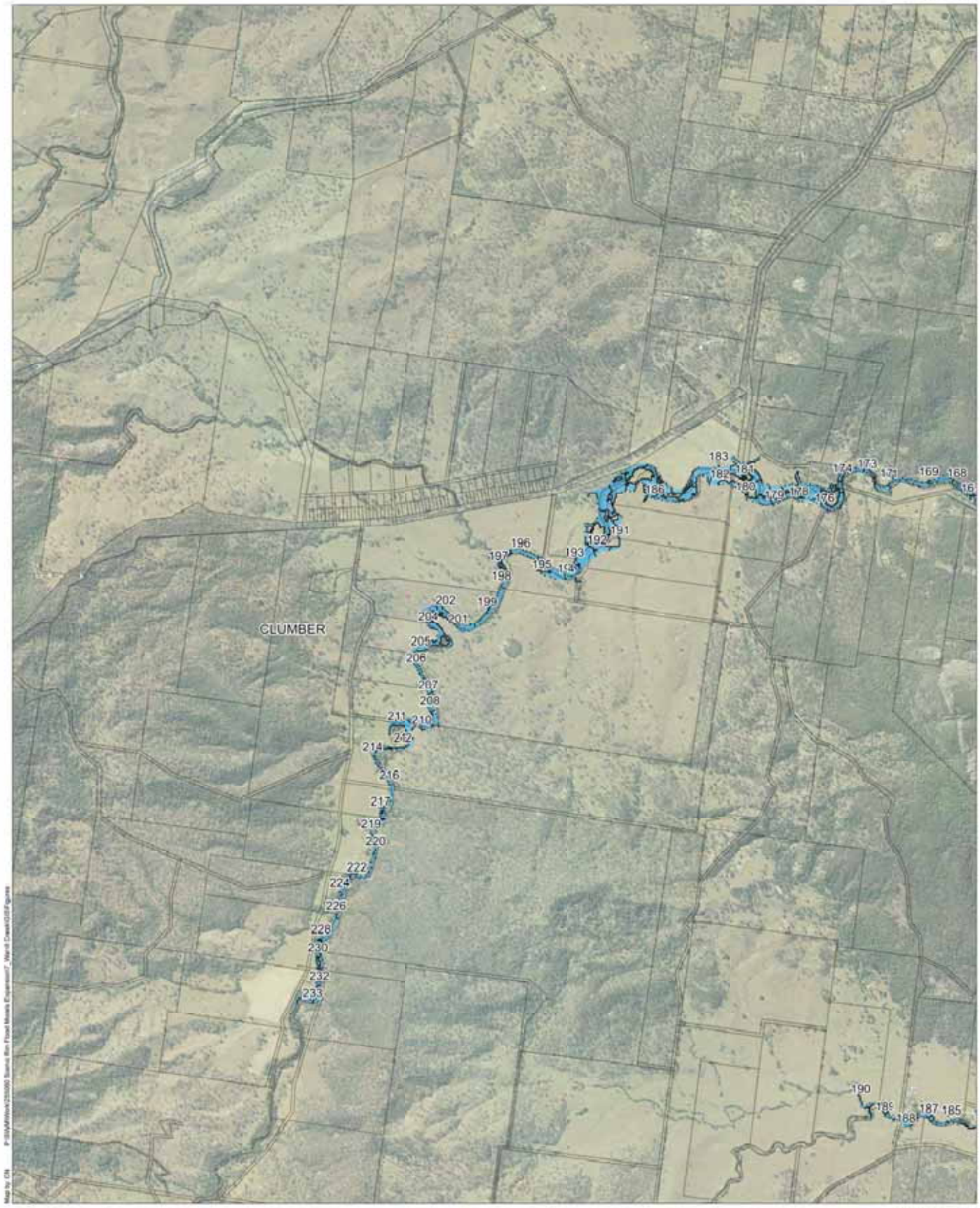
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-j**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

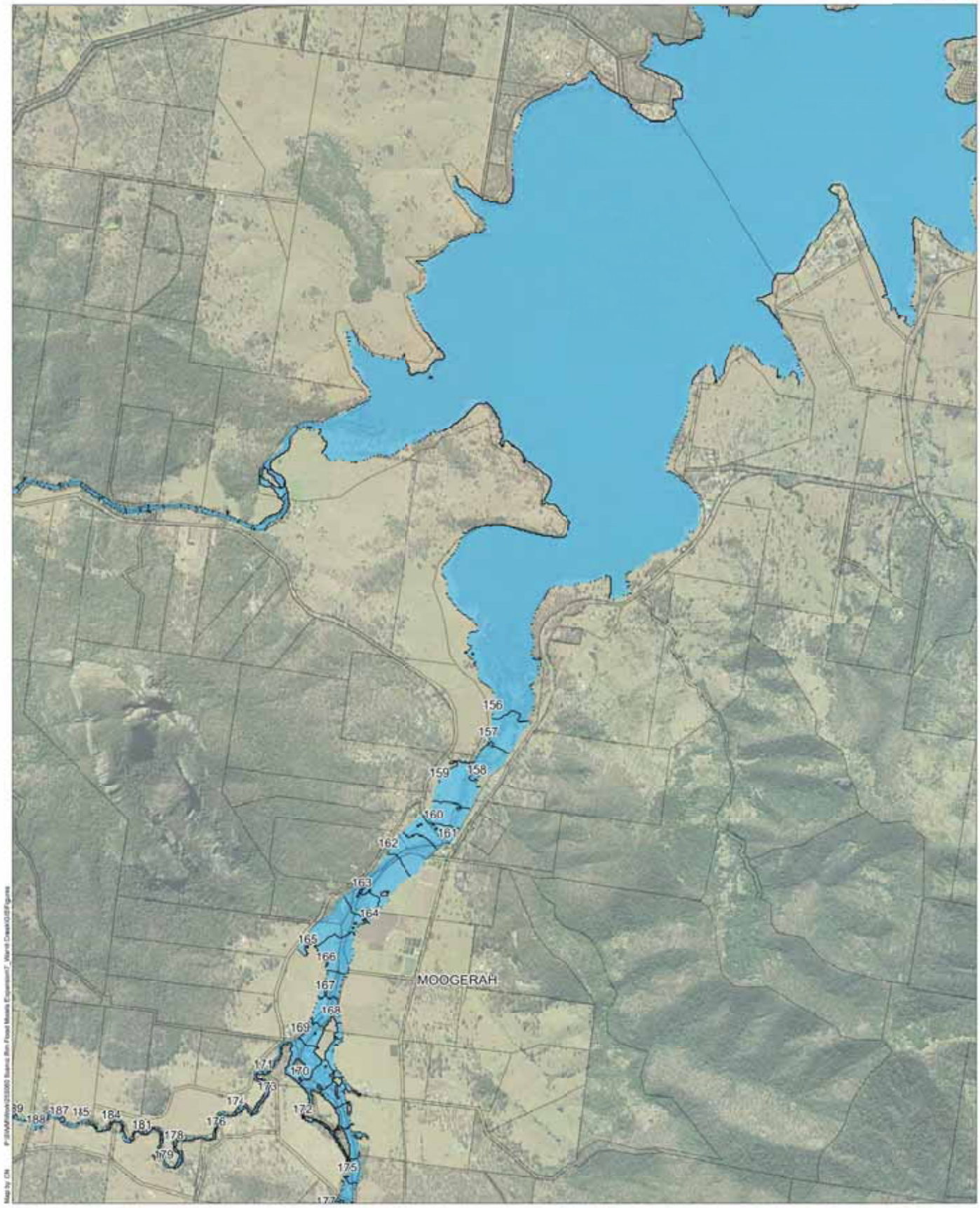
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E1-k**

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

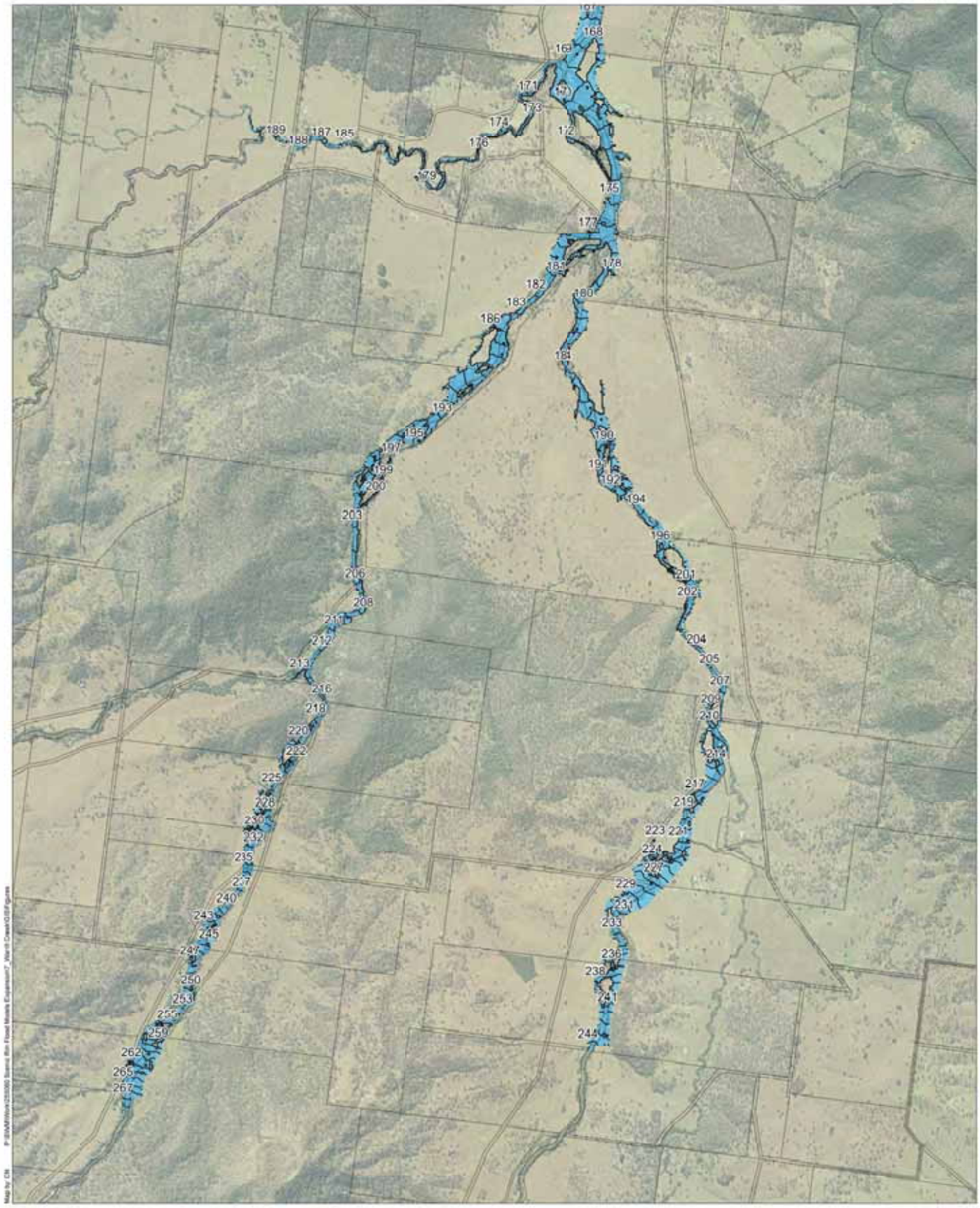
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E1-I

10% AEP Event - Inundation Extent



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Peak Water level Contour (mAHD)

Notes:

1:25,000

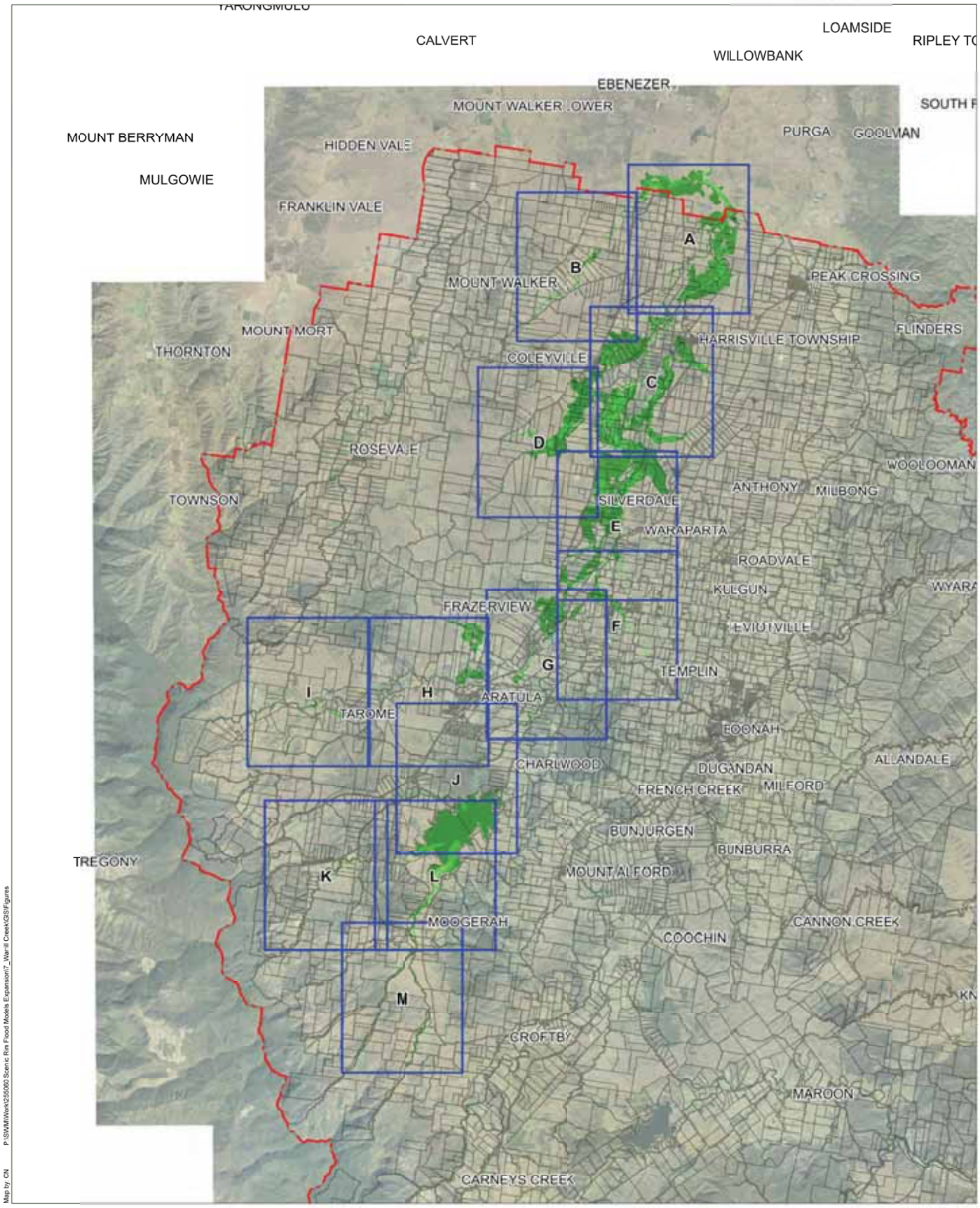
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E1-m

10% AEP Event - Inundation Extent



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

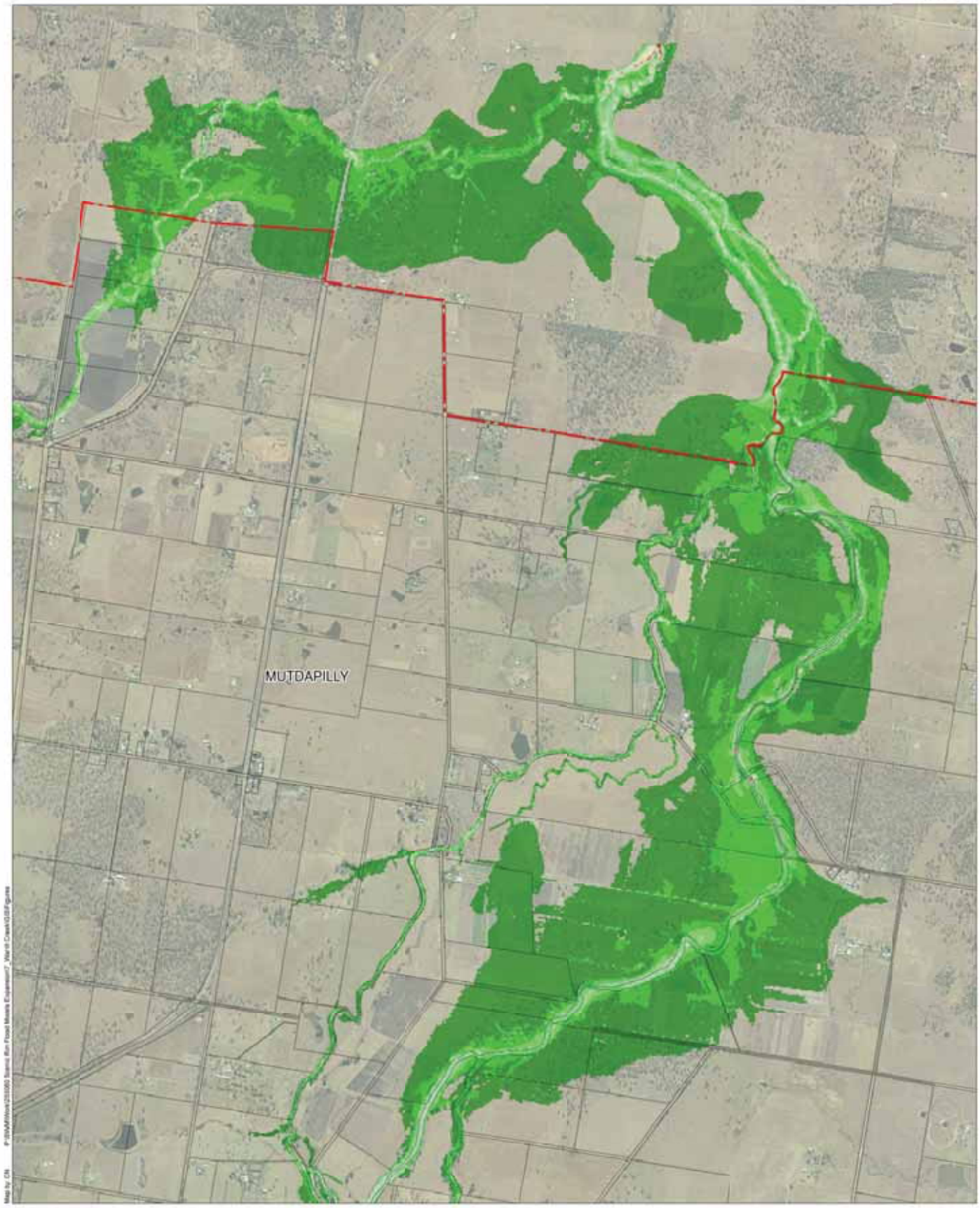
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

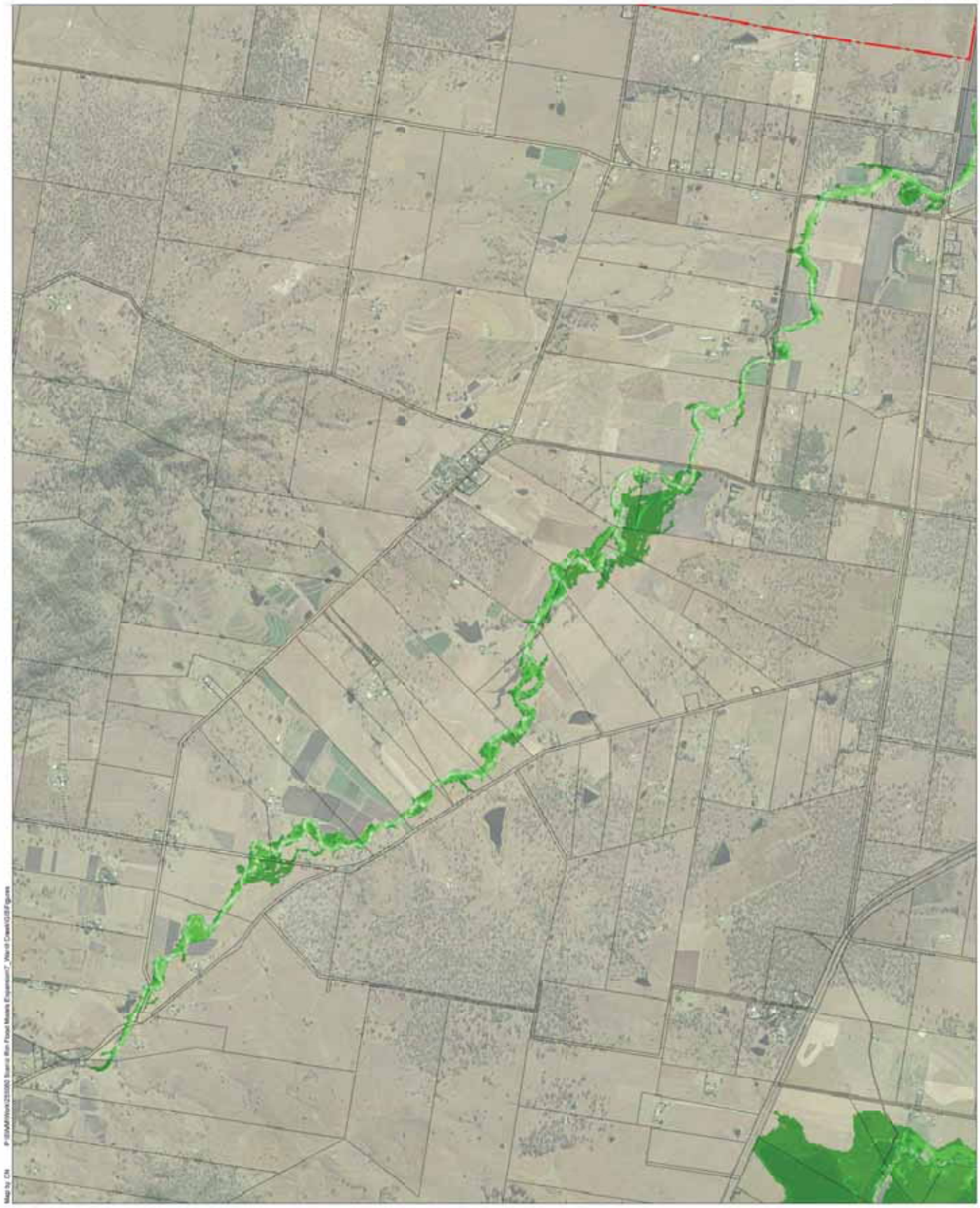
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-a**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

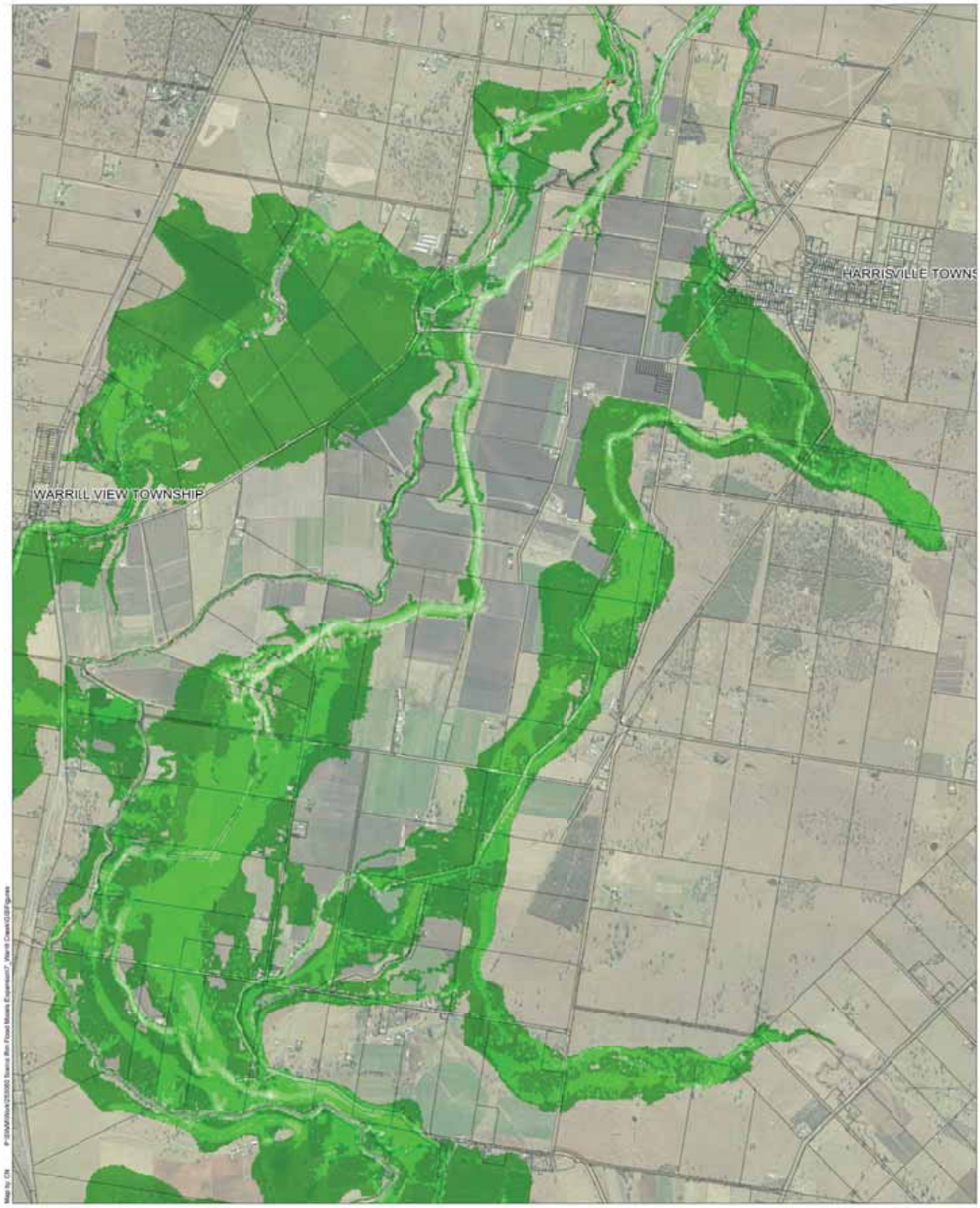
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-b**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

0 625 m 1,250 m

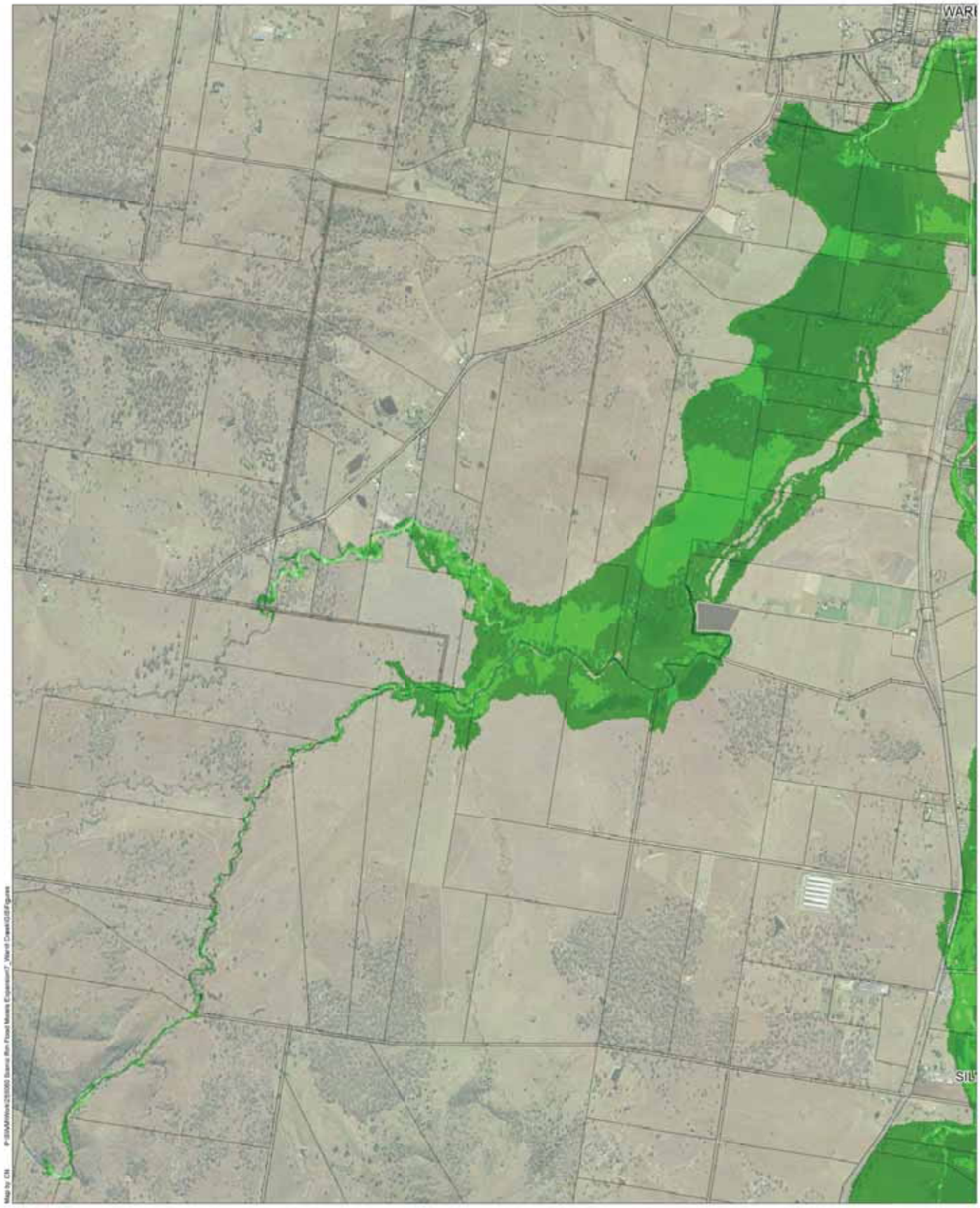
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-c**

10% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

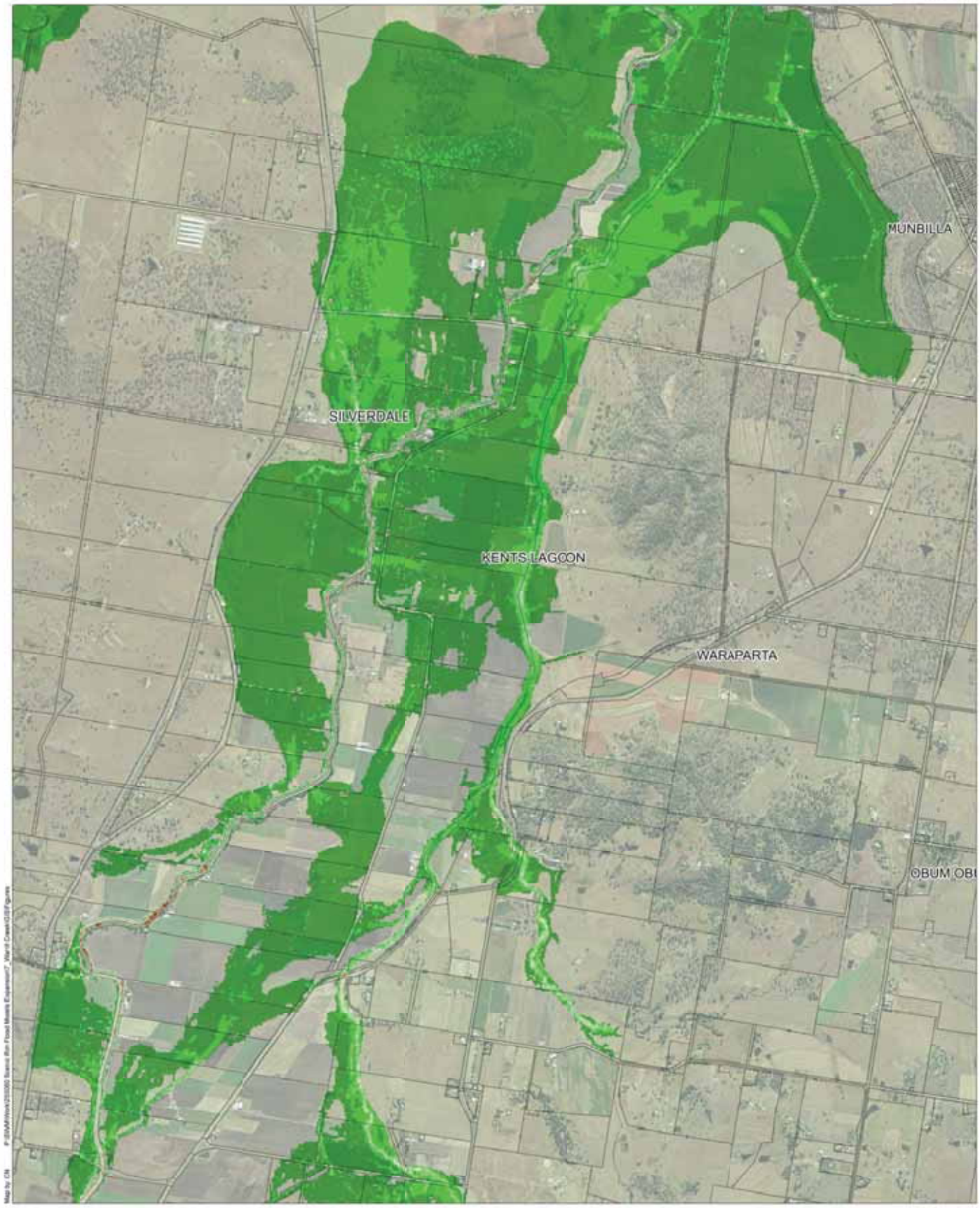
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-d**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

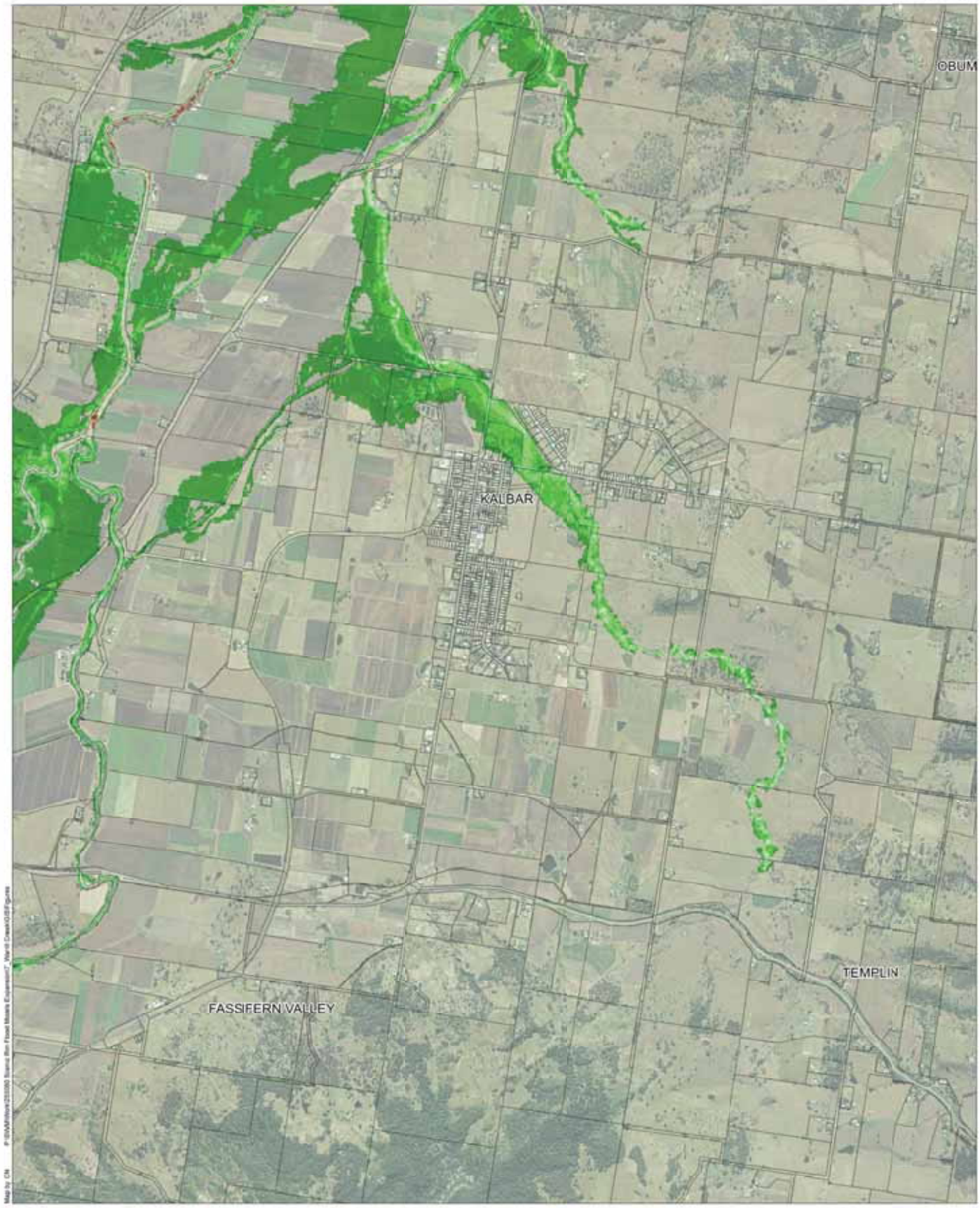
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-e**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

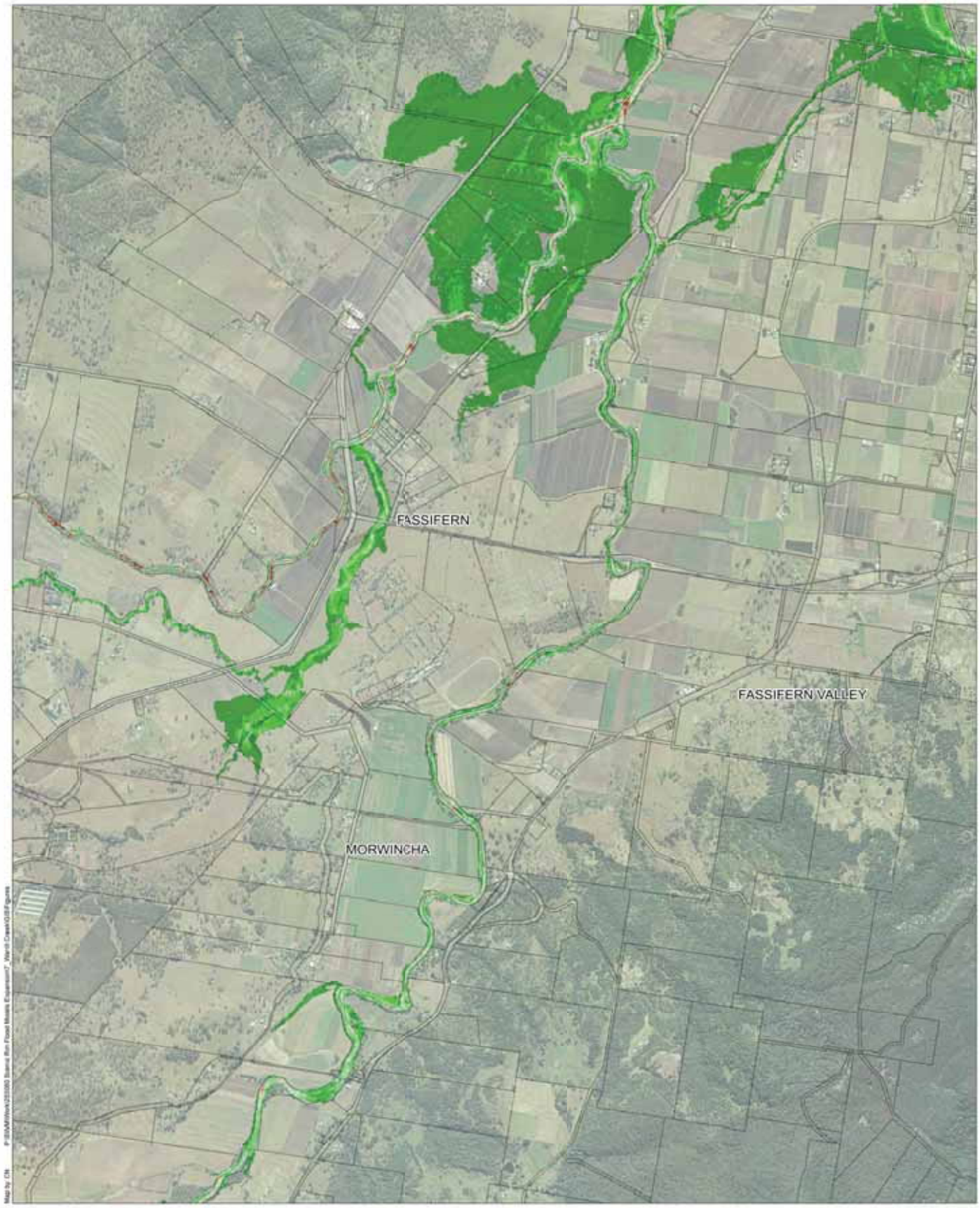
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E2-f

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

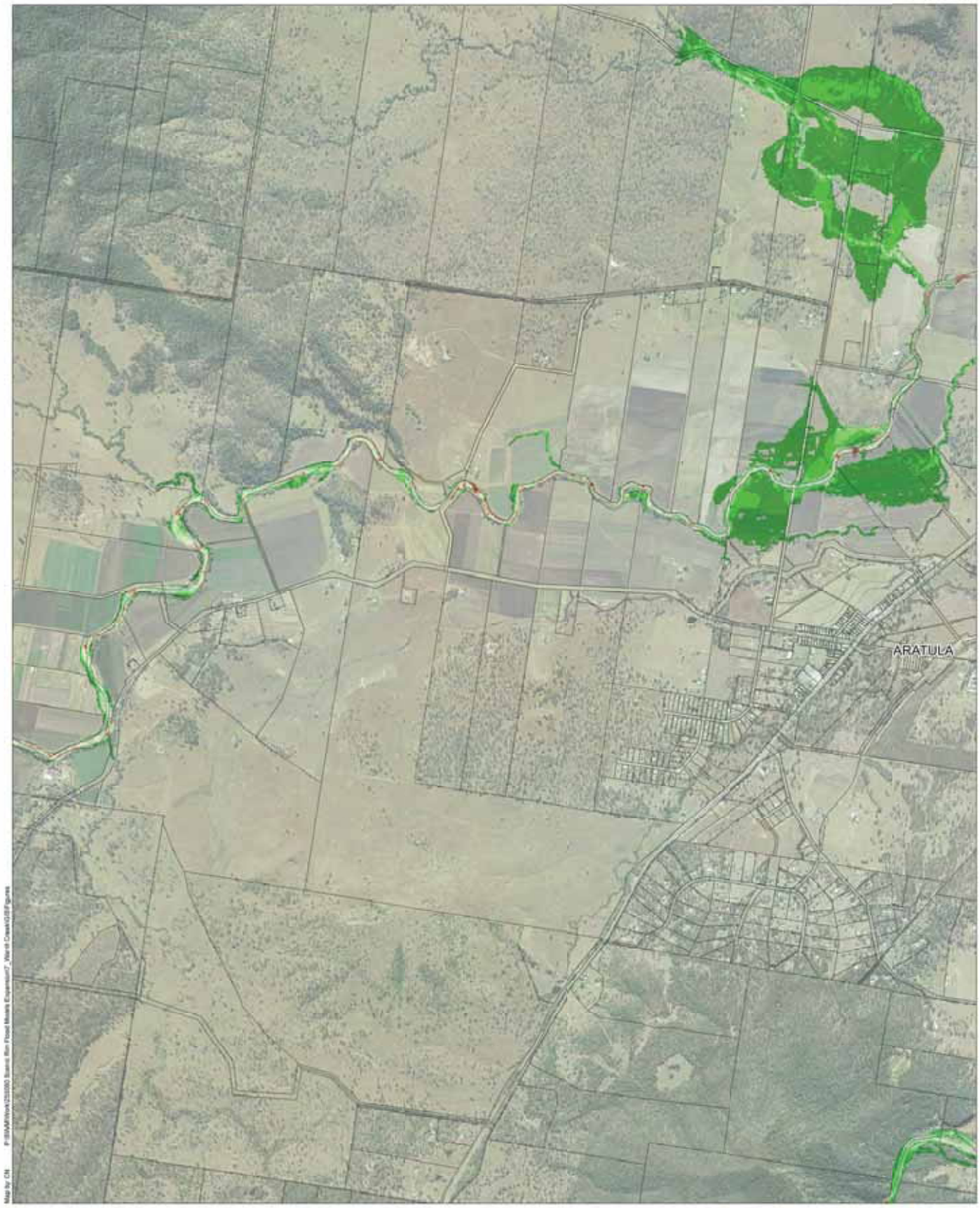
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-g**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

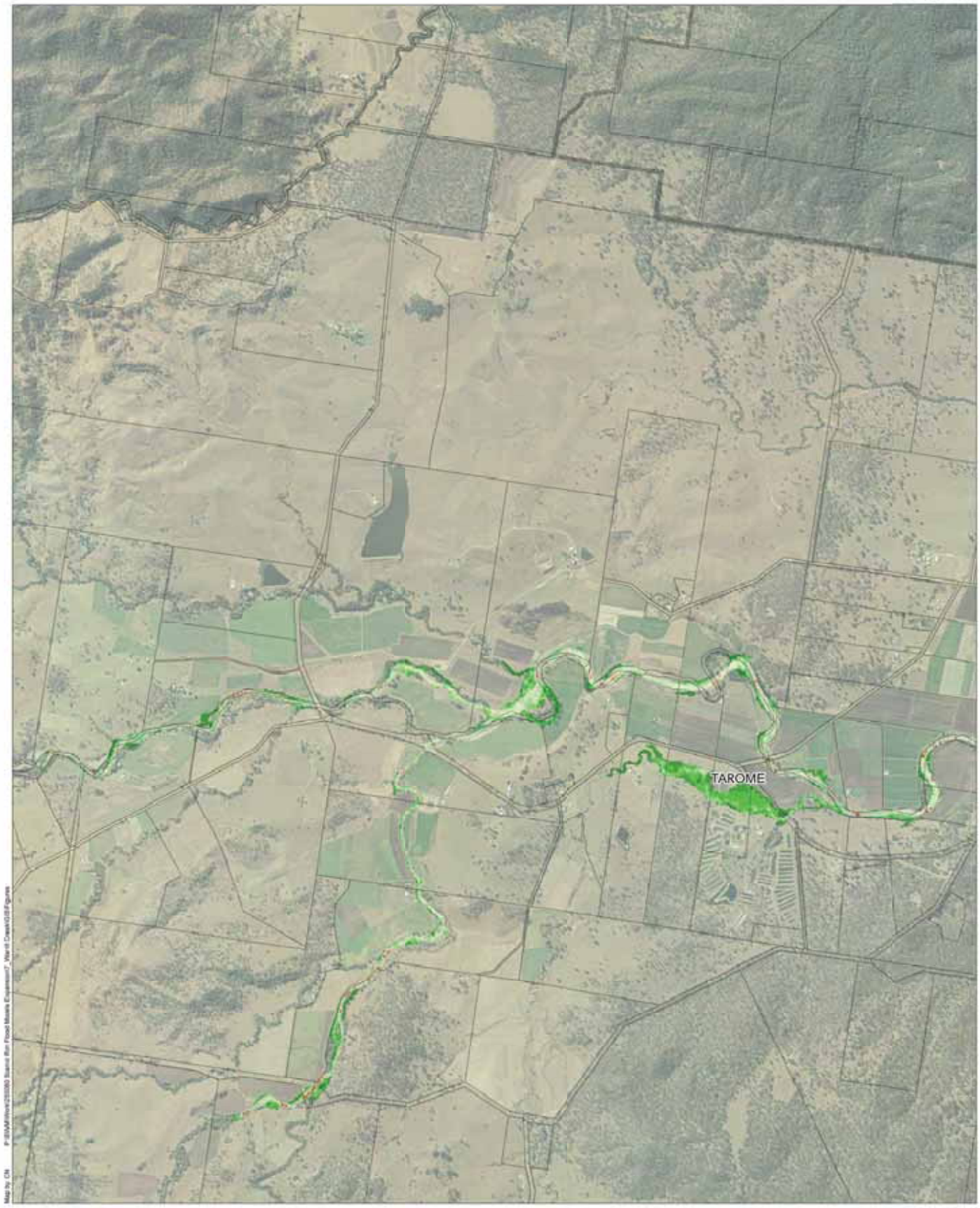
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-h**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

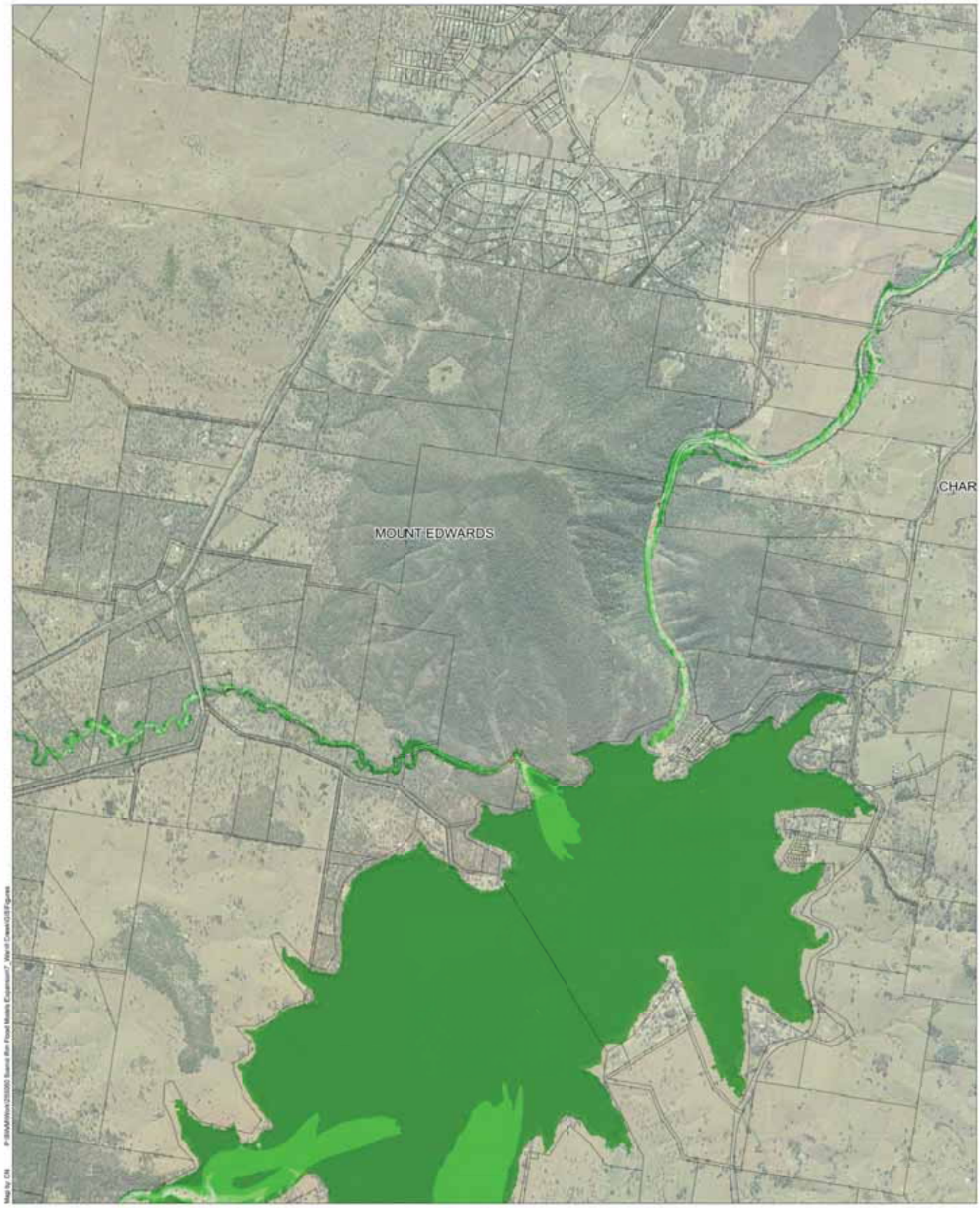
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-i**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

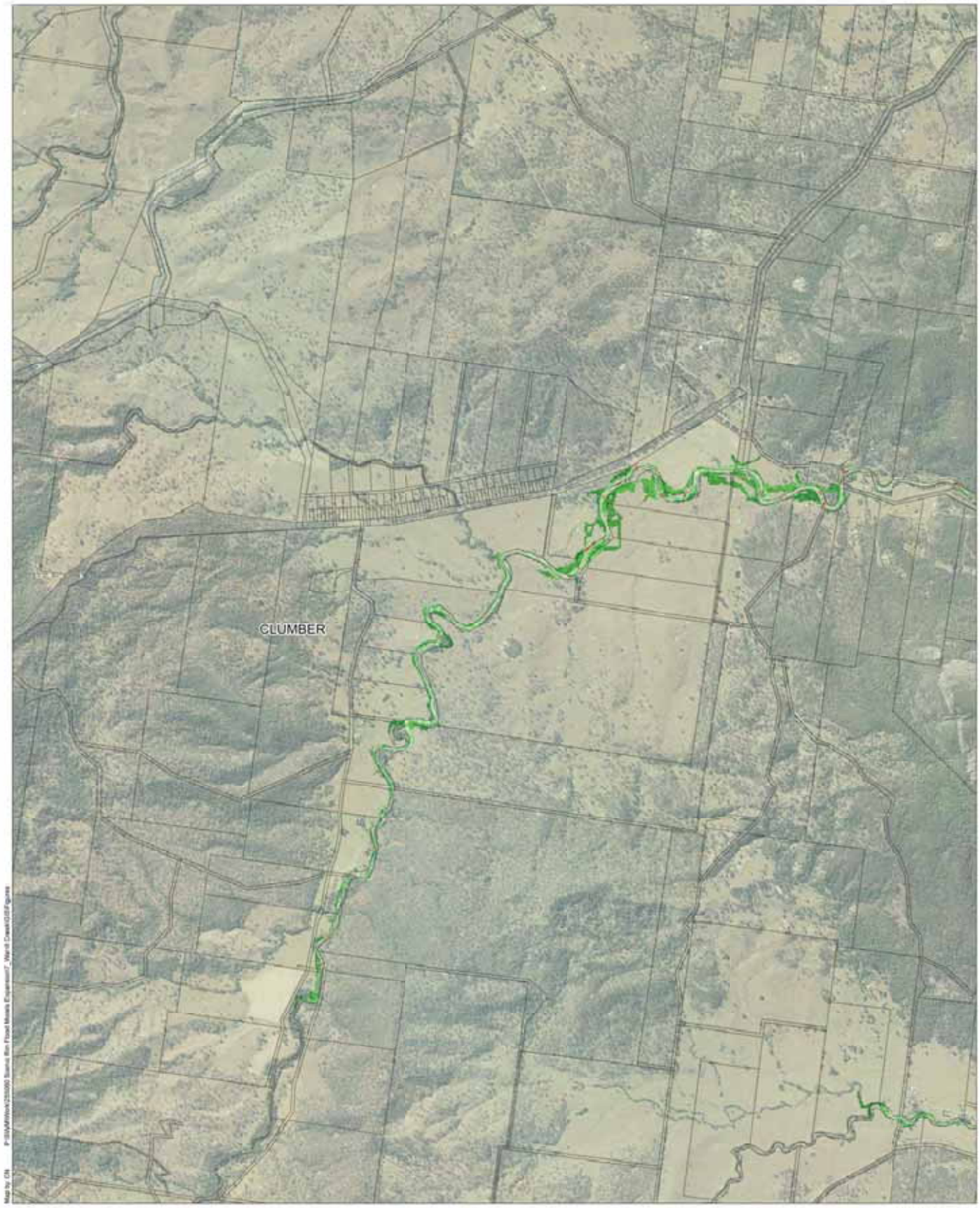
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-j**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

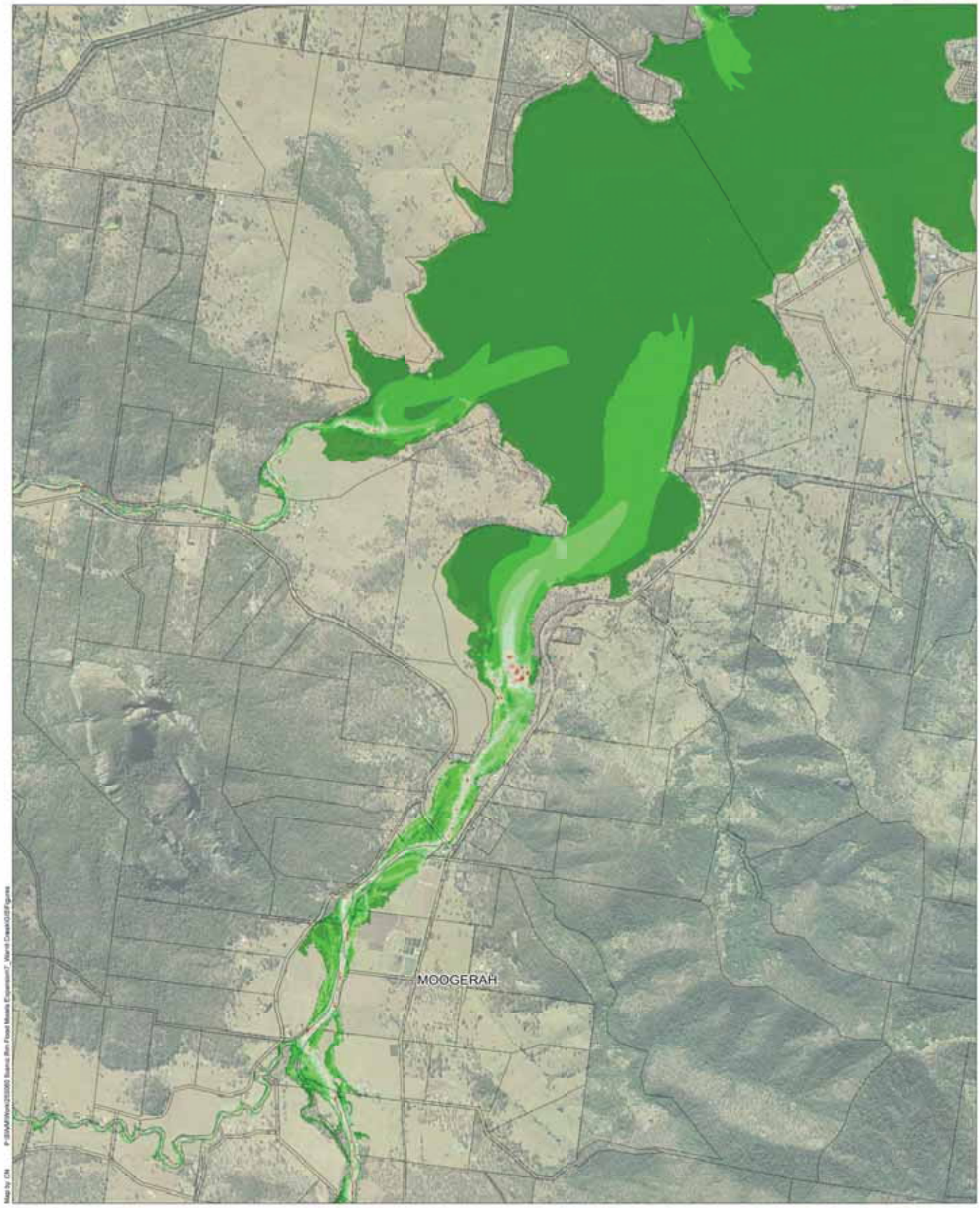
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-k**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

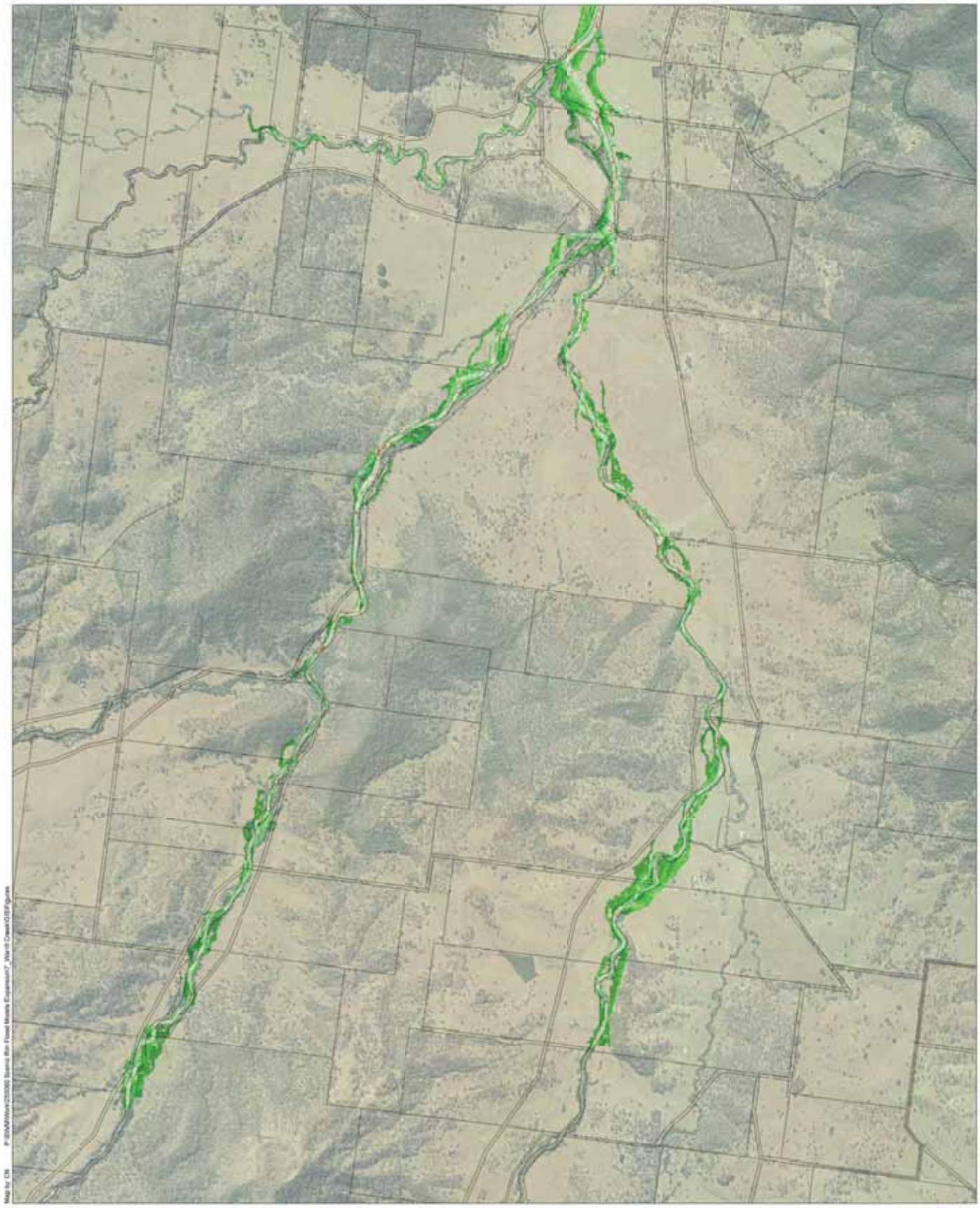
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-I**

10% AEP Event - Peak Velocities



Legend

SRRC Boundary

Cadastral Boundary

Velocity (m/s)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

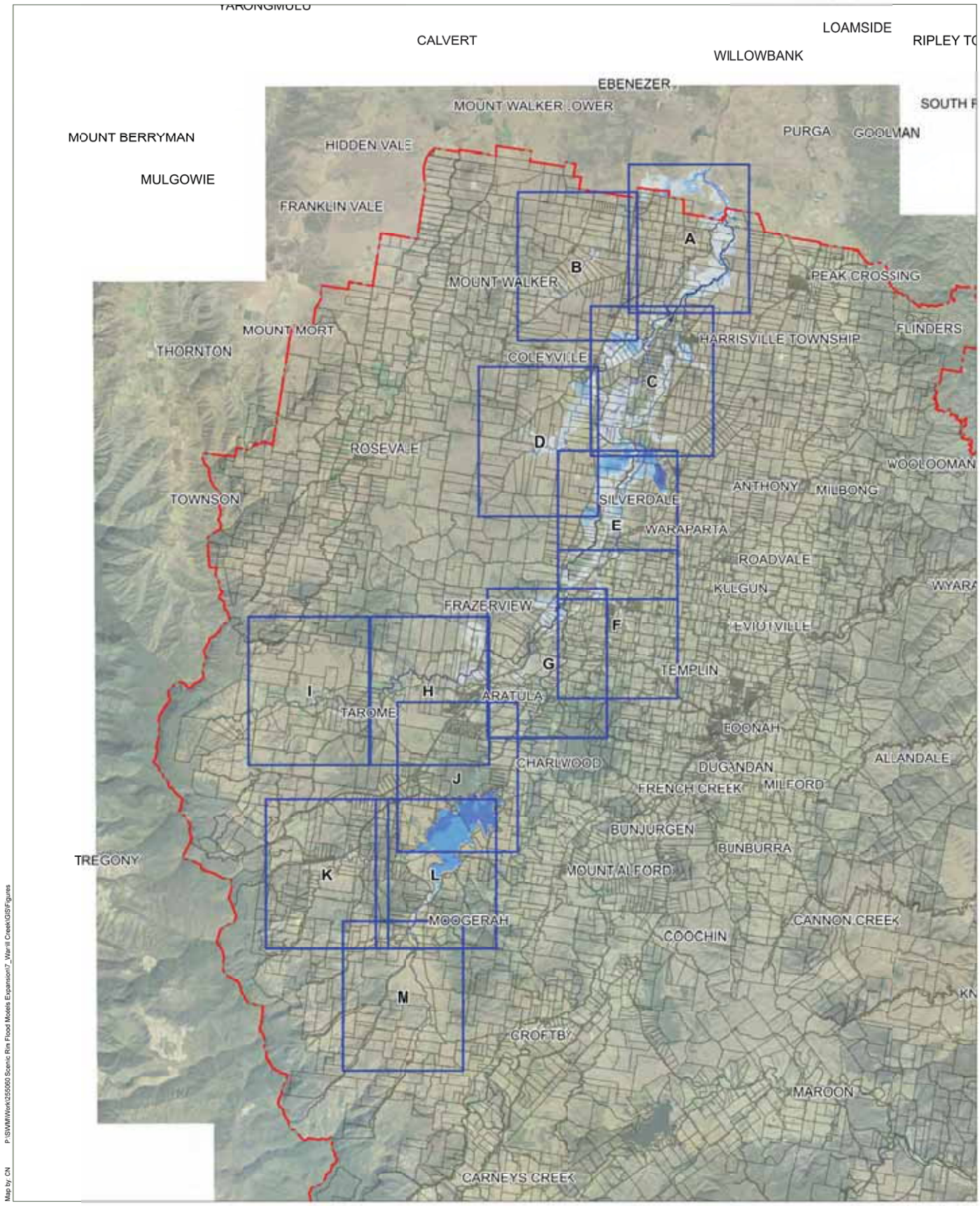
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E2-m**

10% AEP Event - Peak Velocities



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:200,000

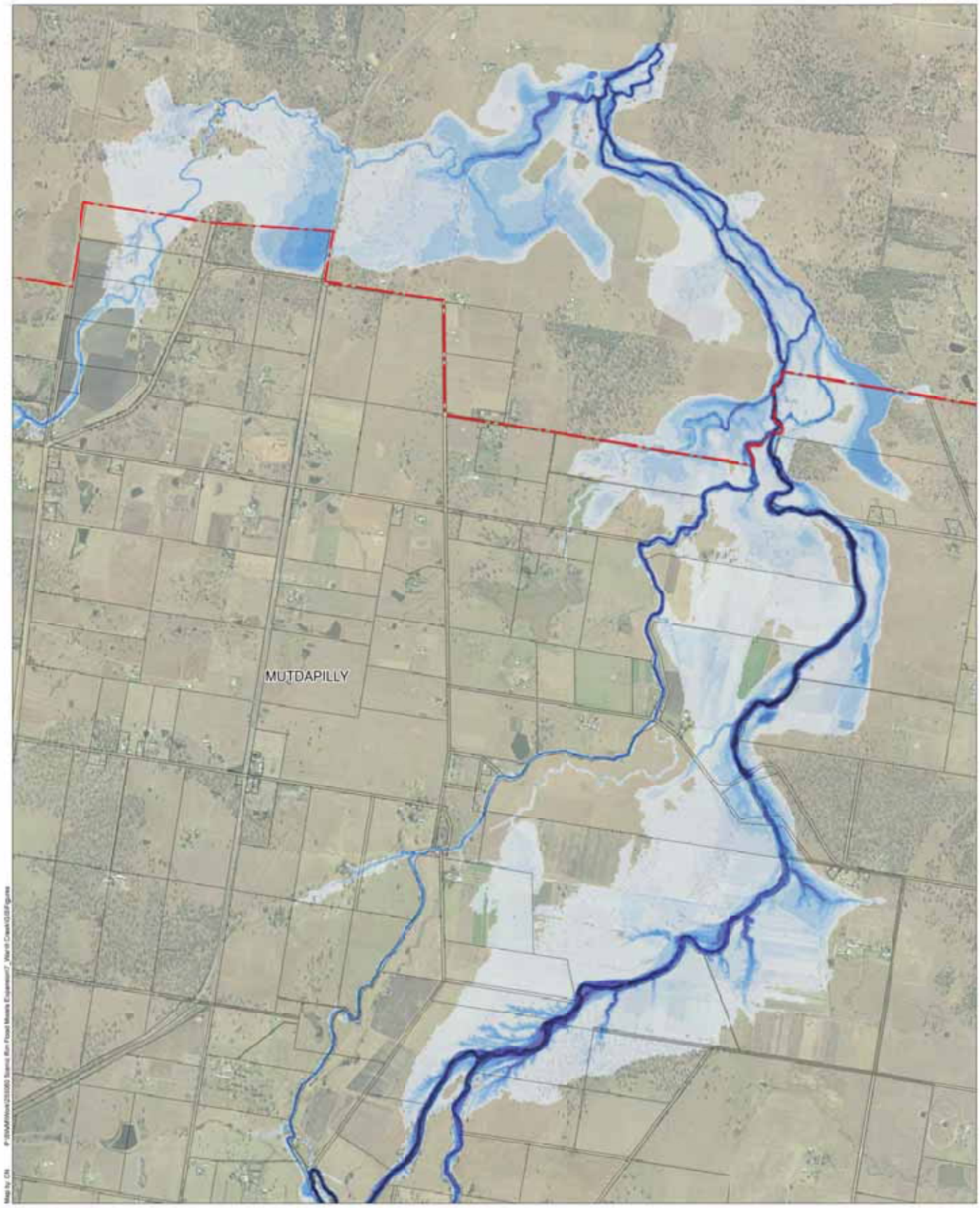
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

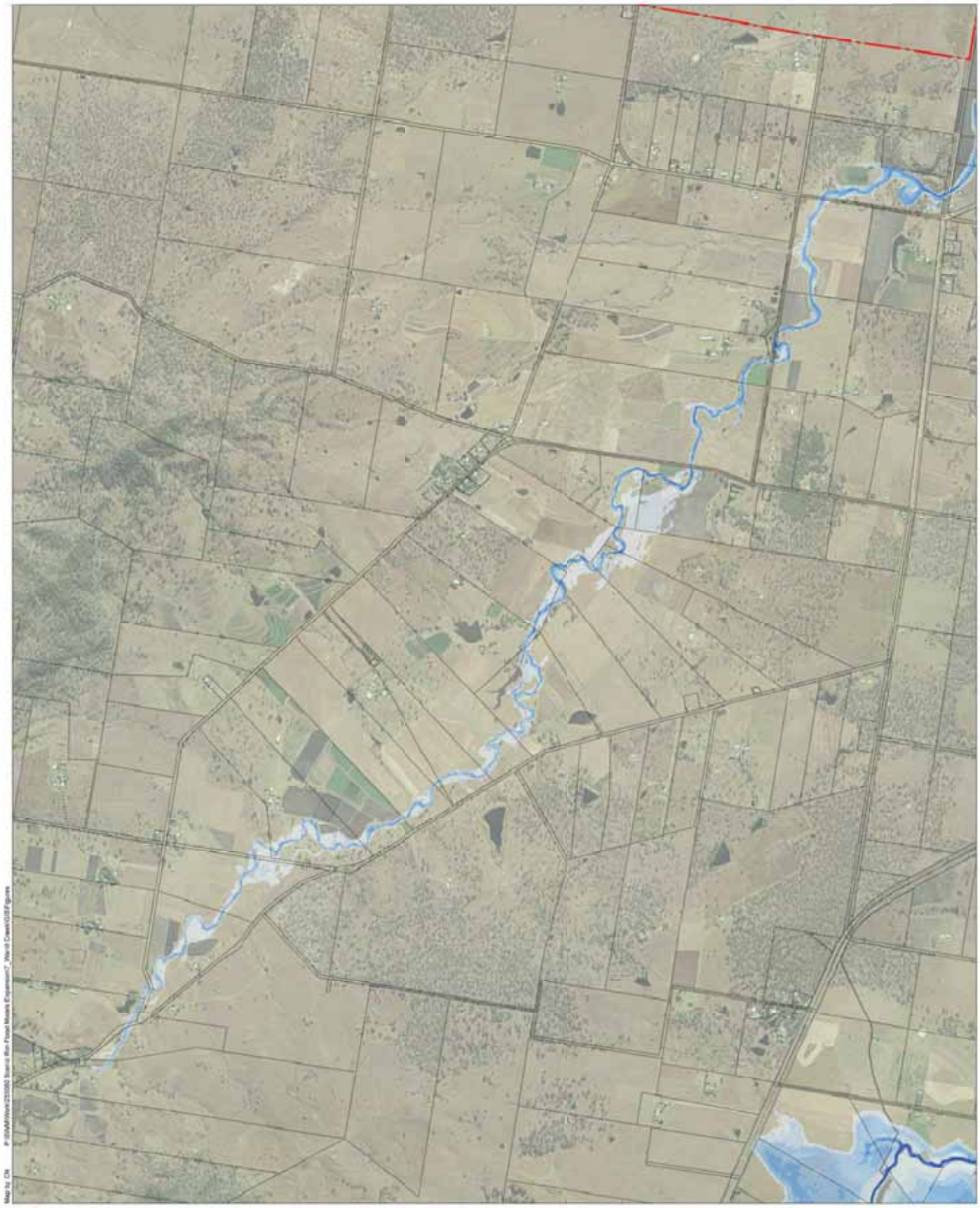
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-a**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

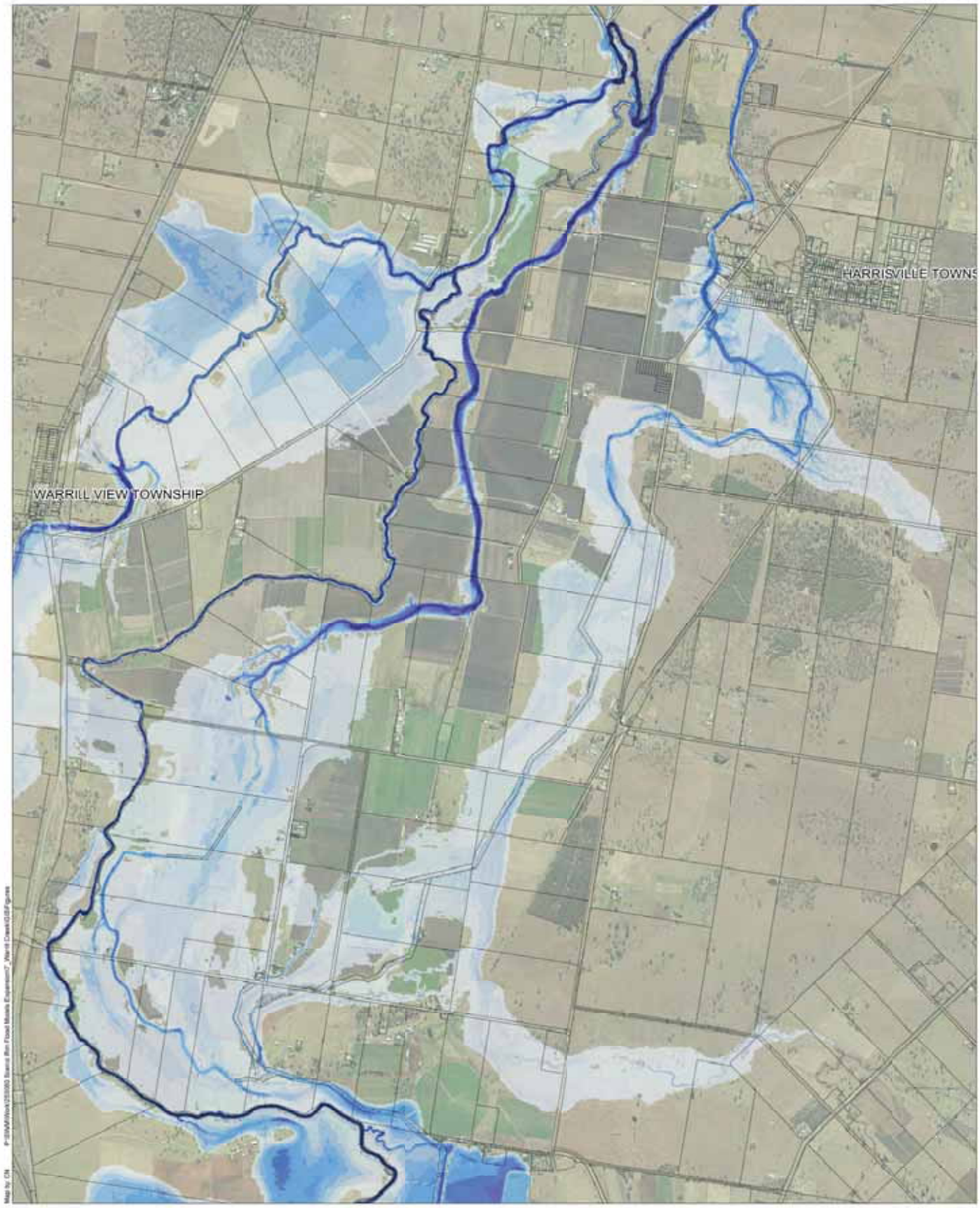
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-b**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

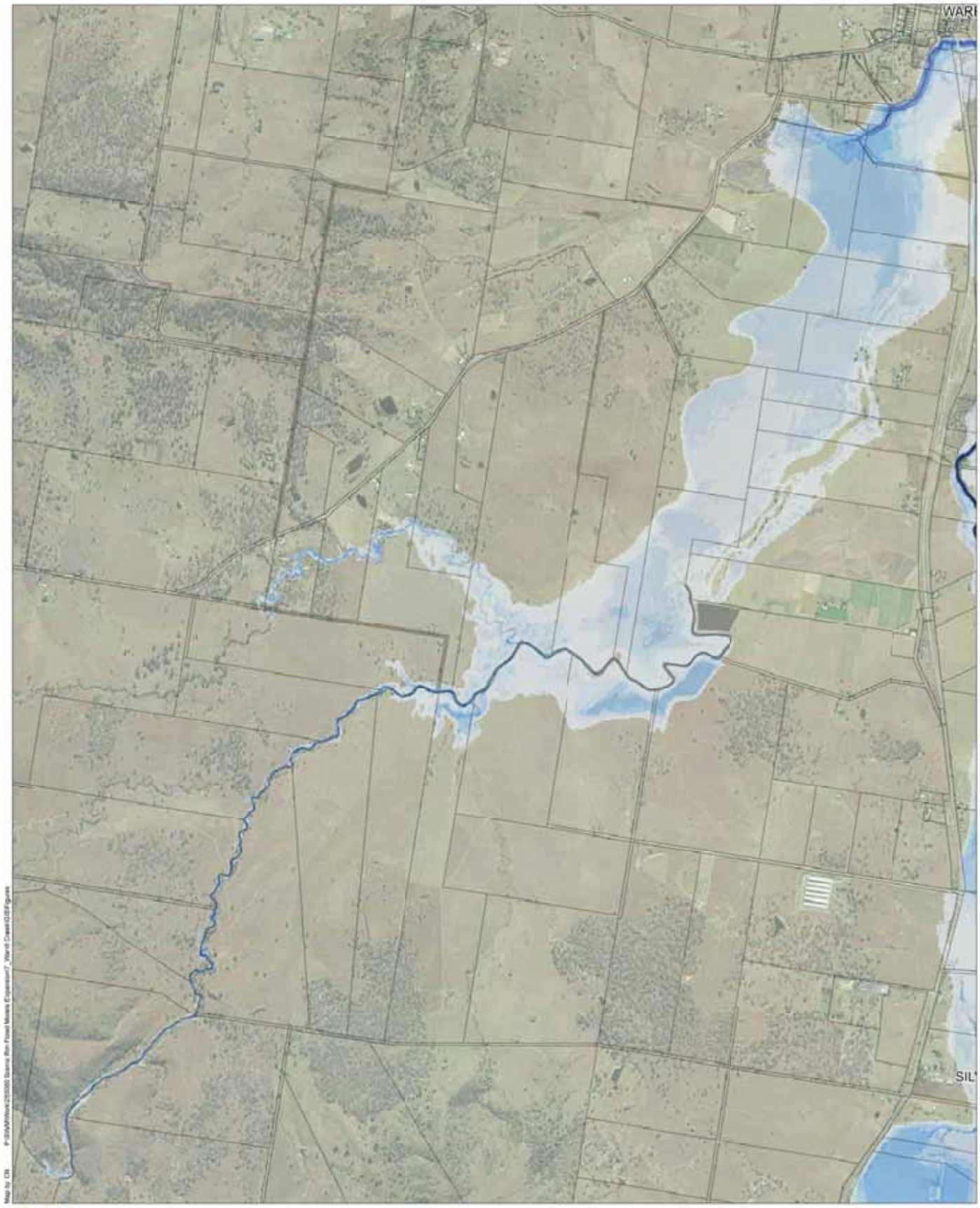
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-c**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

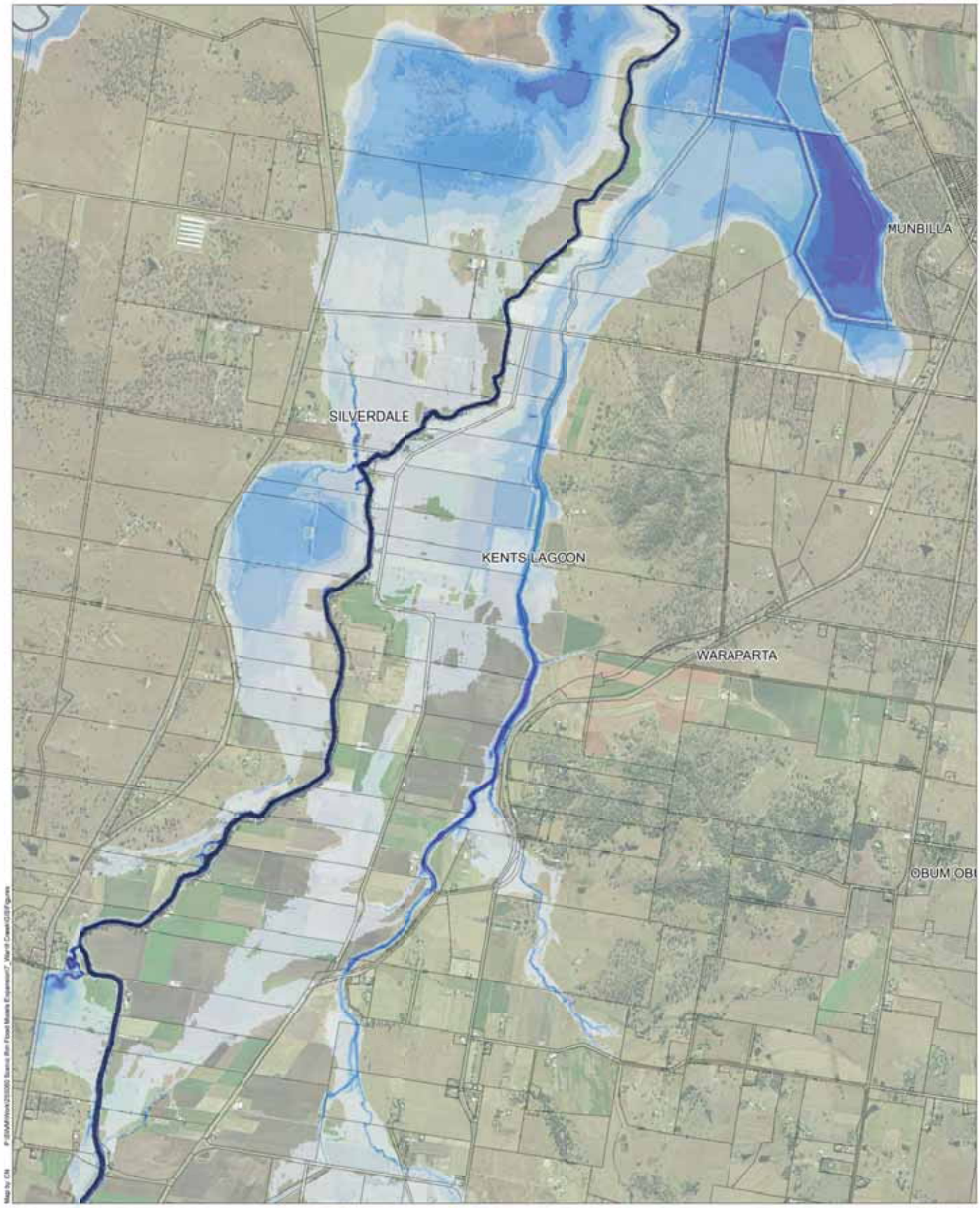
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-d**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

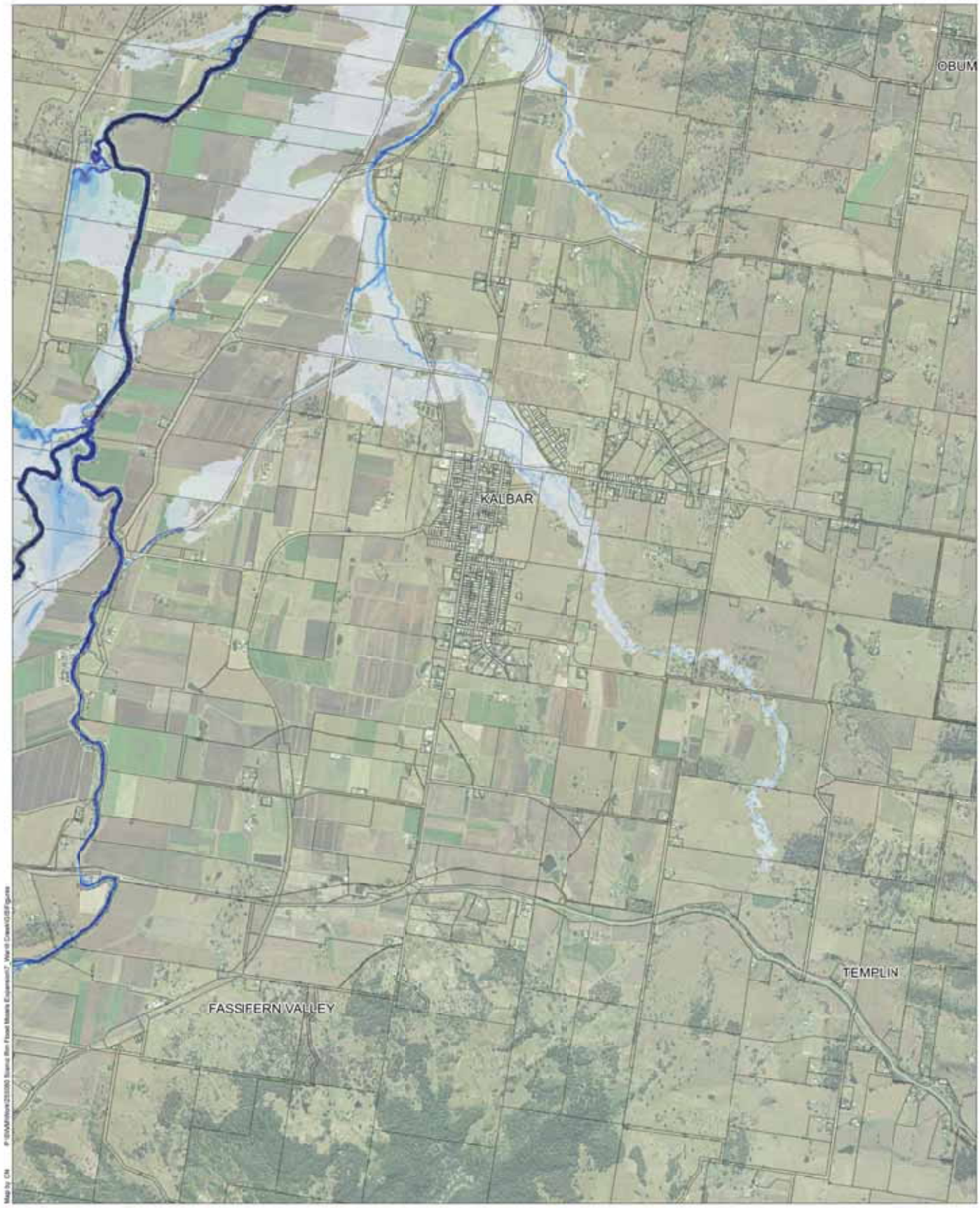
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-e**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

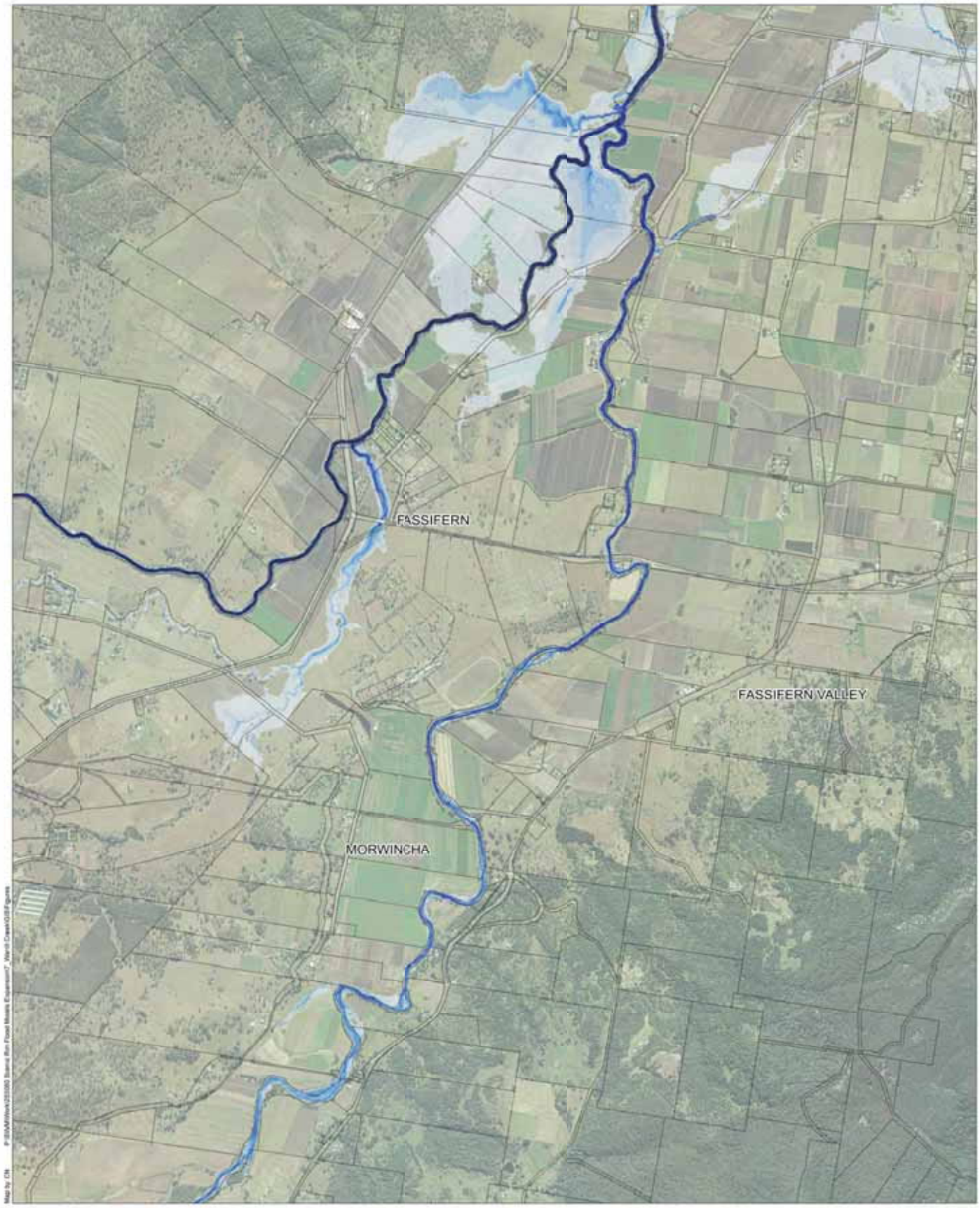
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-f**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

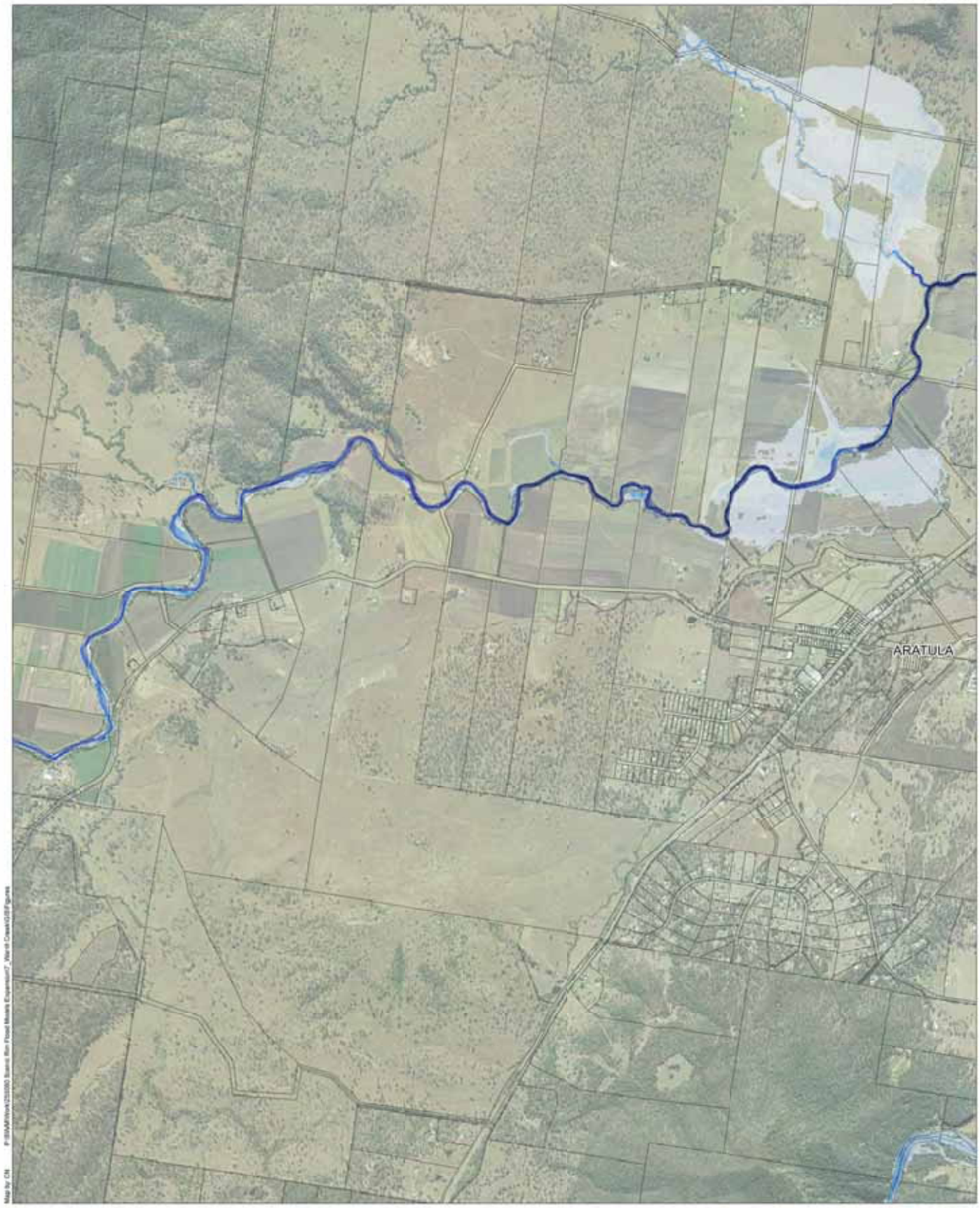
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-g**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

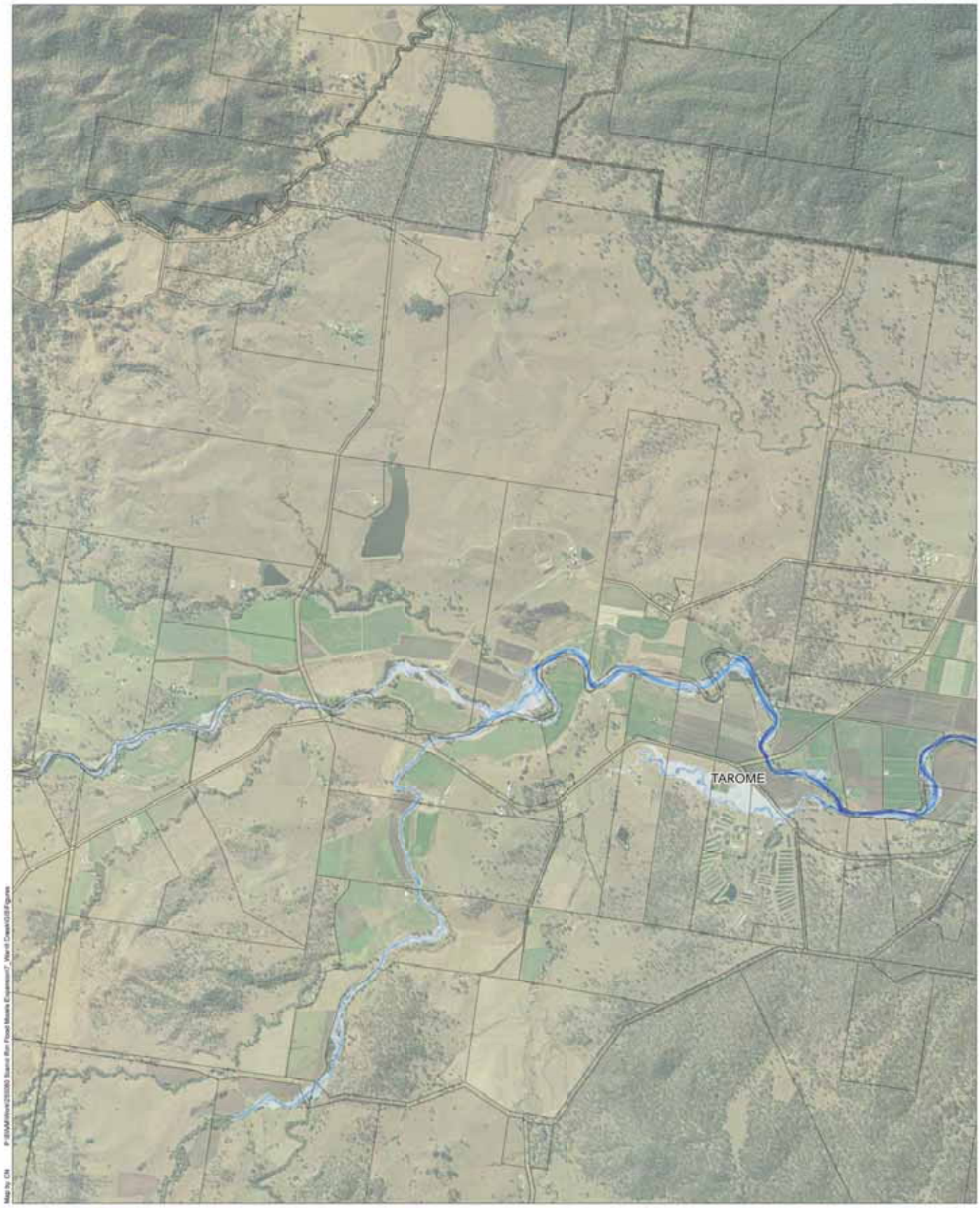
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-h**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

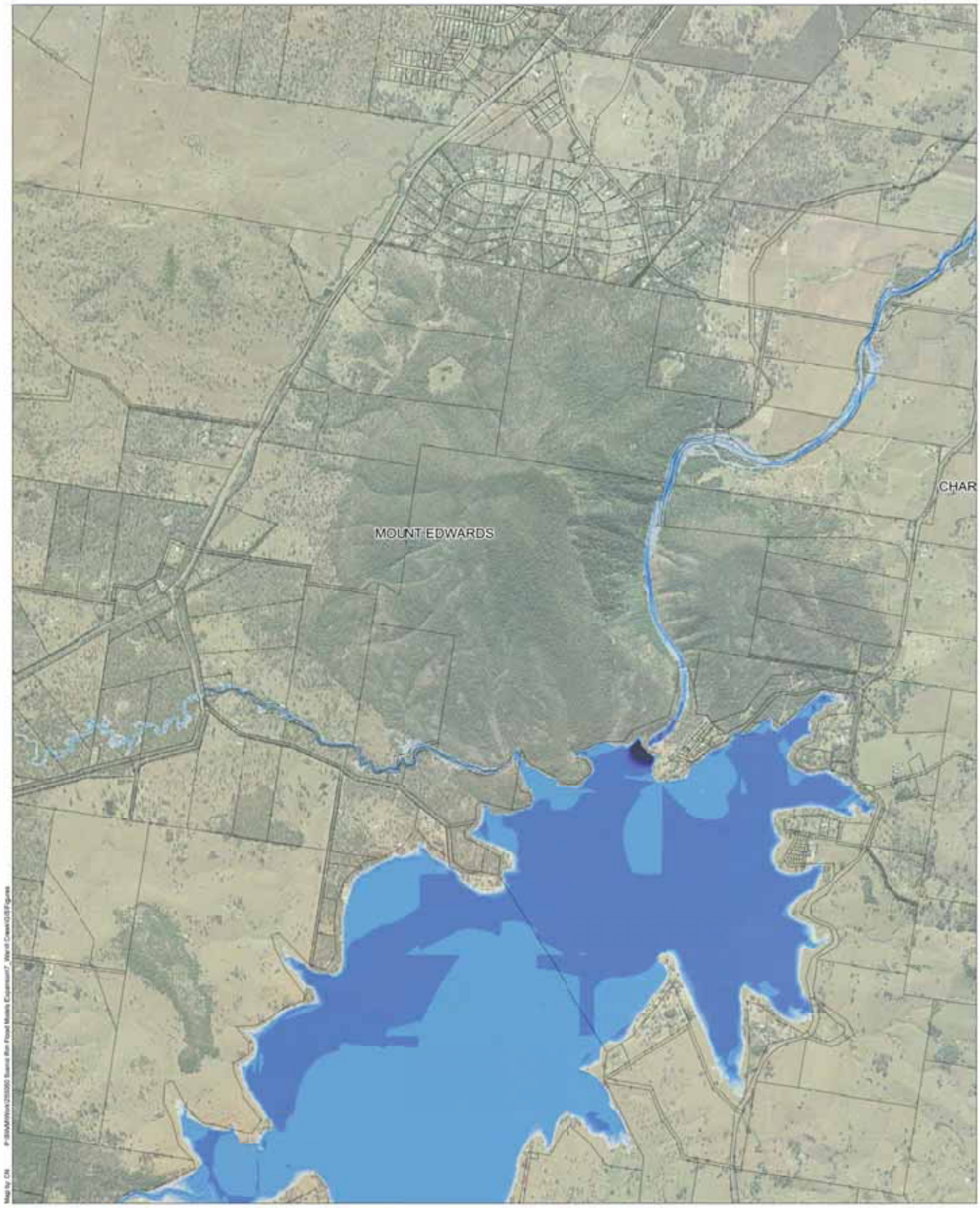
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-i**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

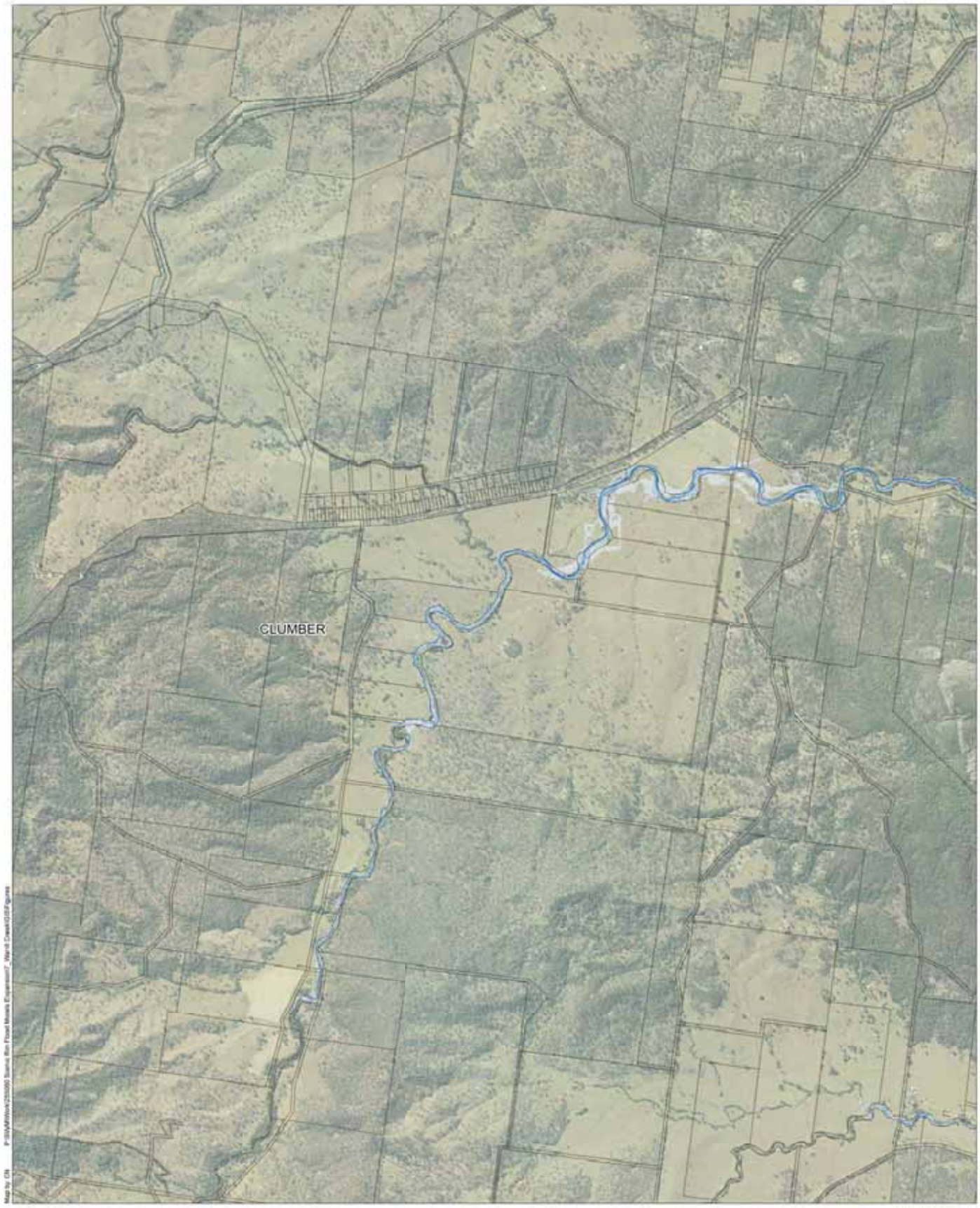
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-j**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

Notes:

1:25,000

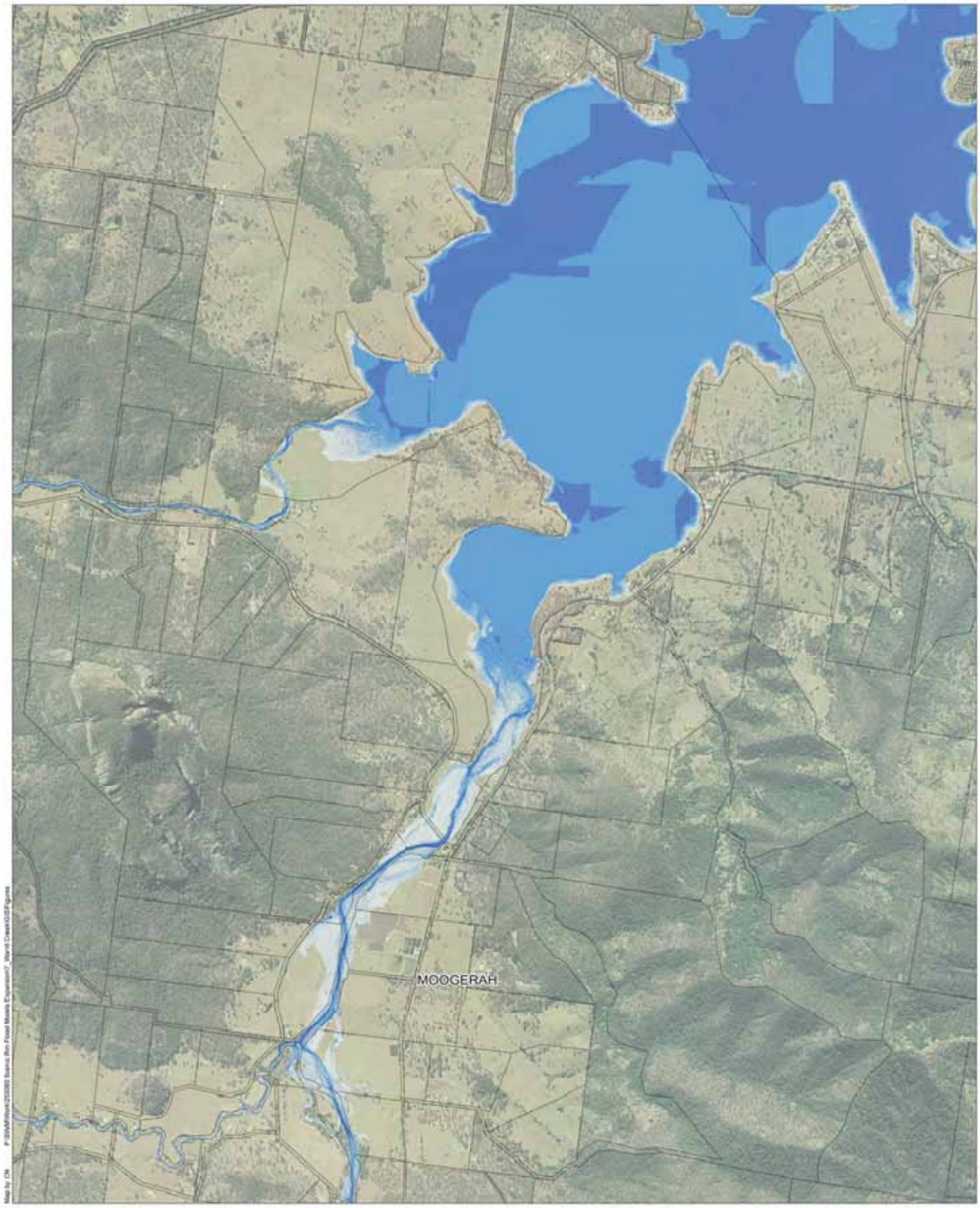
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-k**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

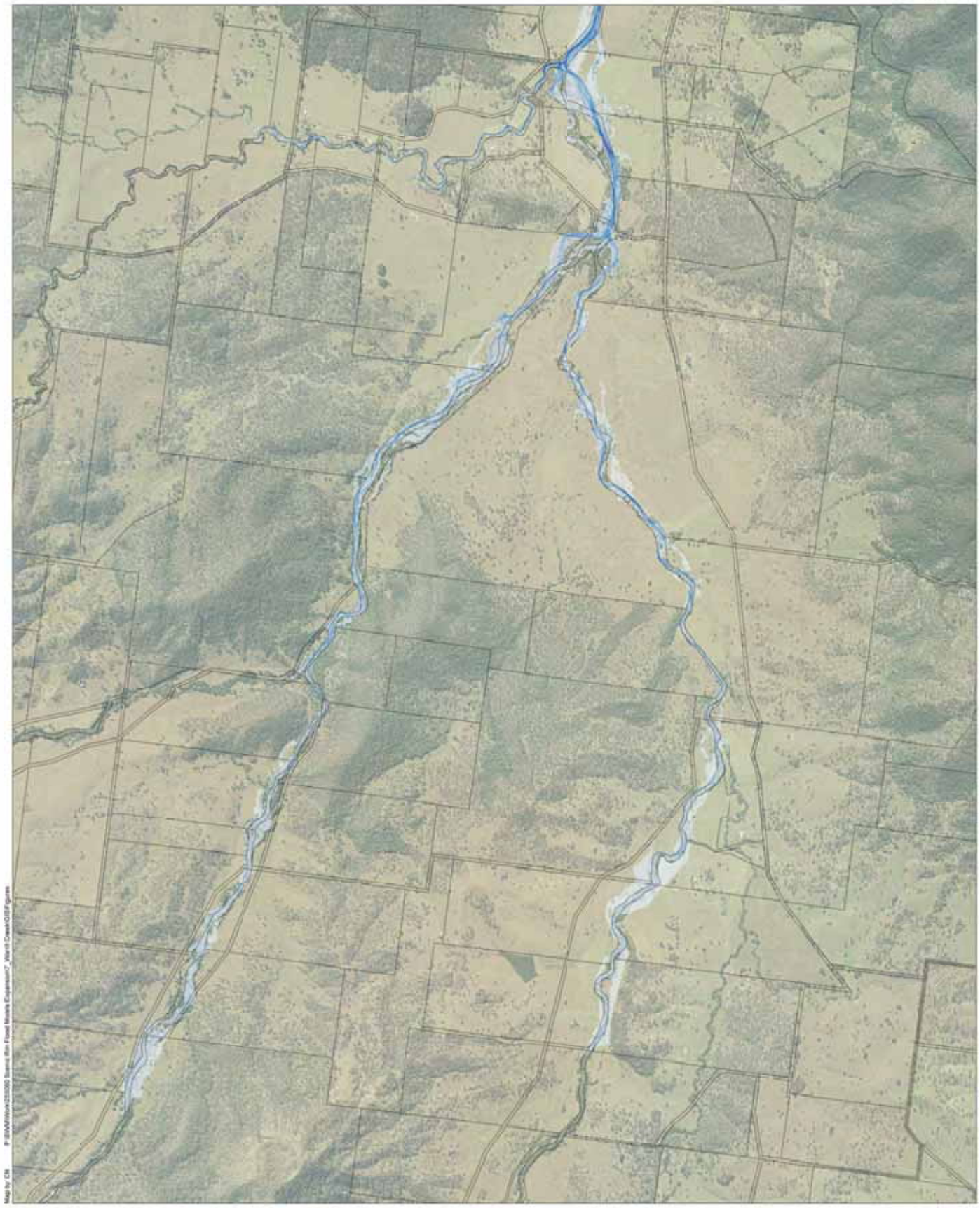
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-I**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

0.0 to 0.5	3.0 to 3.5
0.5 to 1.0	3.5 to 4.0
1.0 to 1.5	4.0 to 4.5
1.5 to 2.0	4.5 to 5.0
2.0 to 2.5	> 5.0
2.5 to 3.0	

Notes:

1:25,000

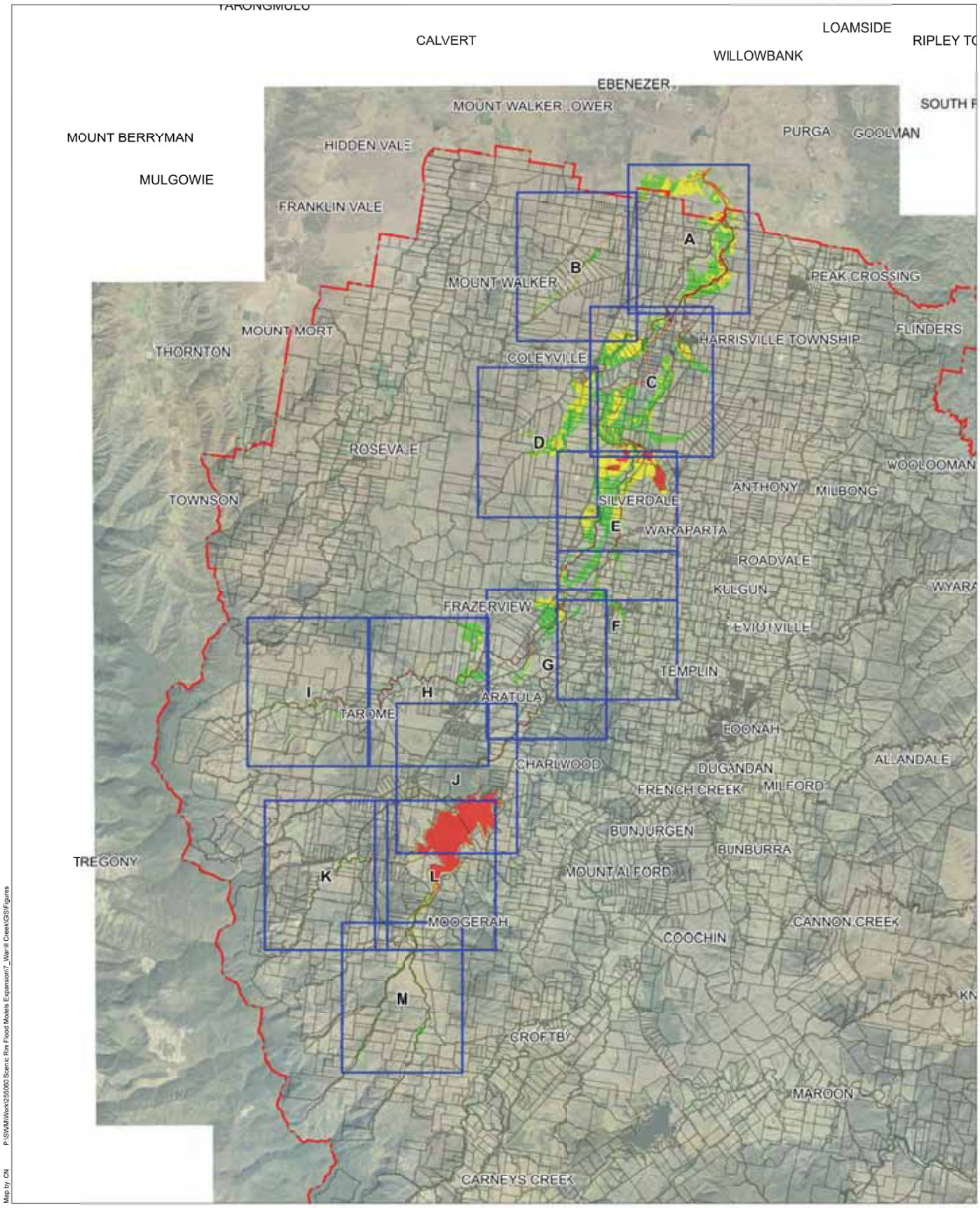
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E3-m**

10% AEP Event - Peak Depth Map



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures

Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

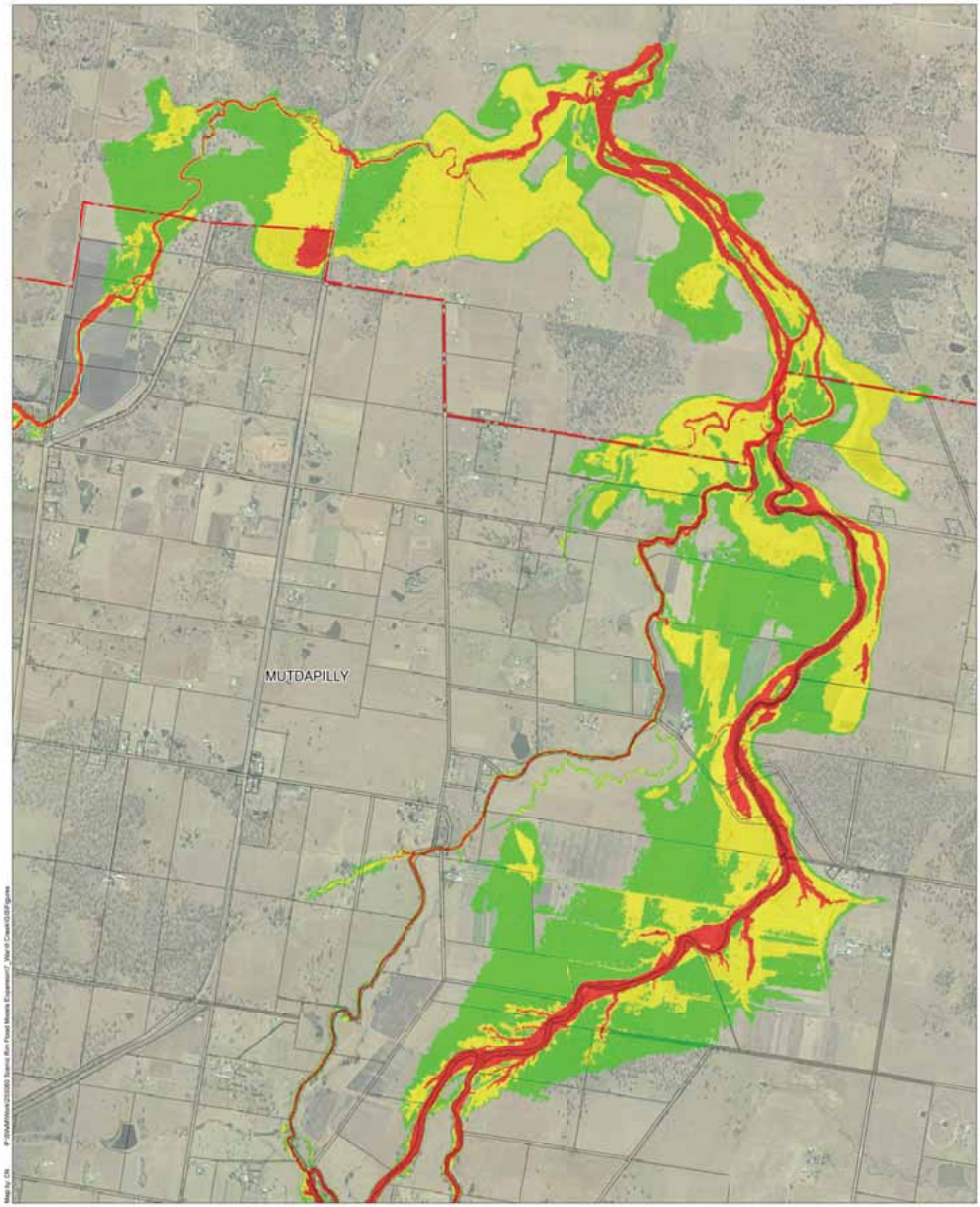
1:200,000
0 5,000 m 10,000 m

Date: 15/08/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

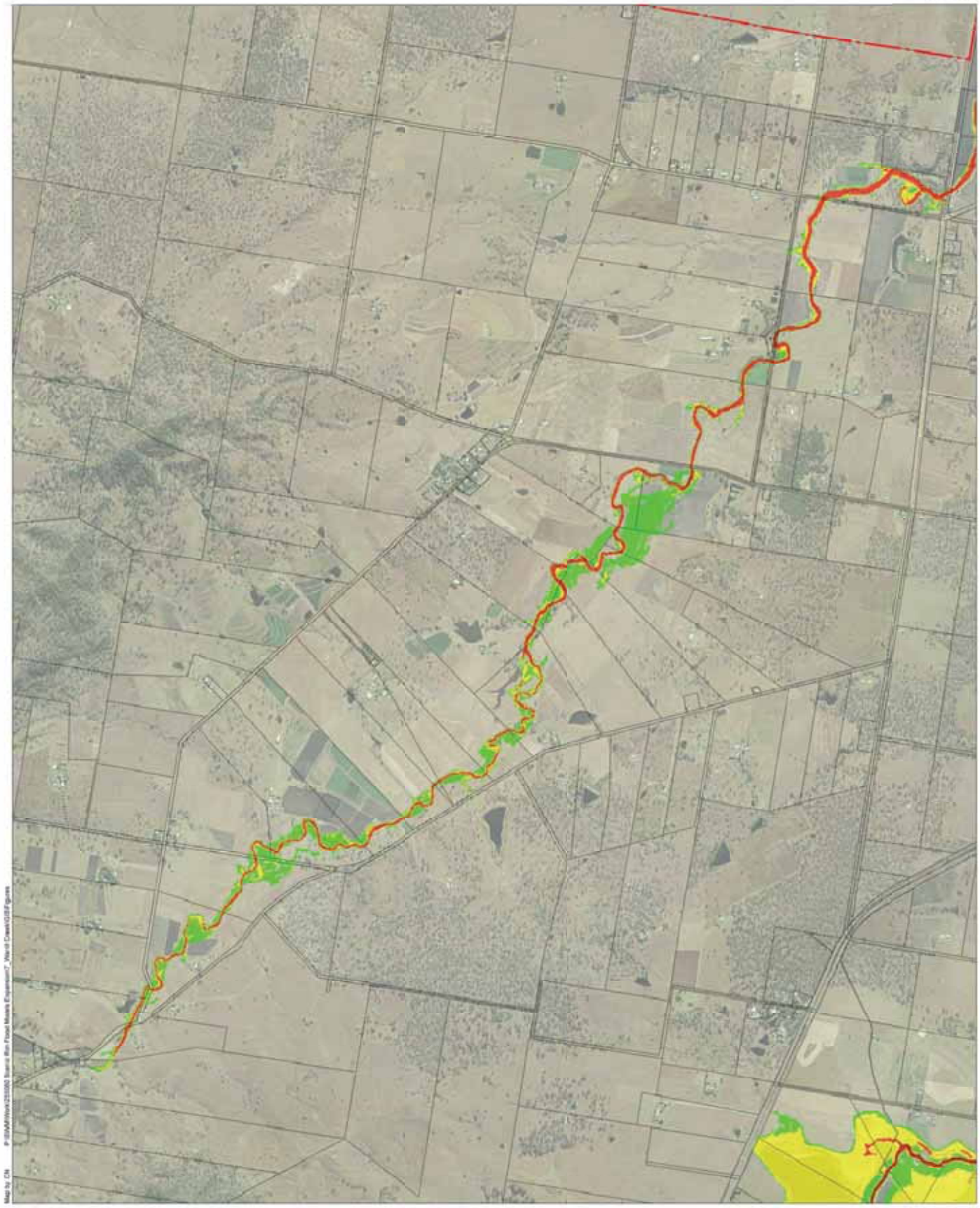
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-a**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

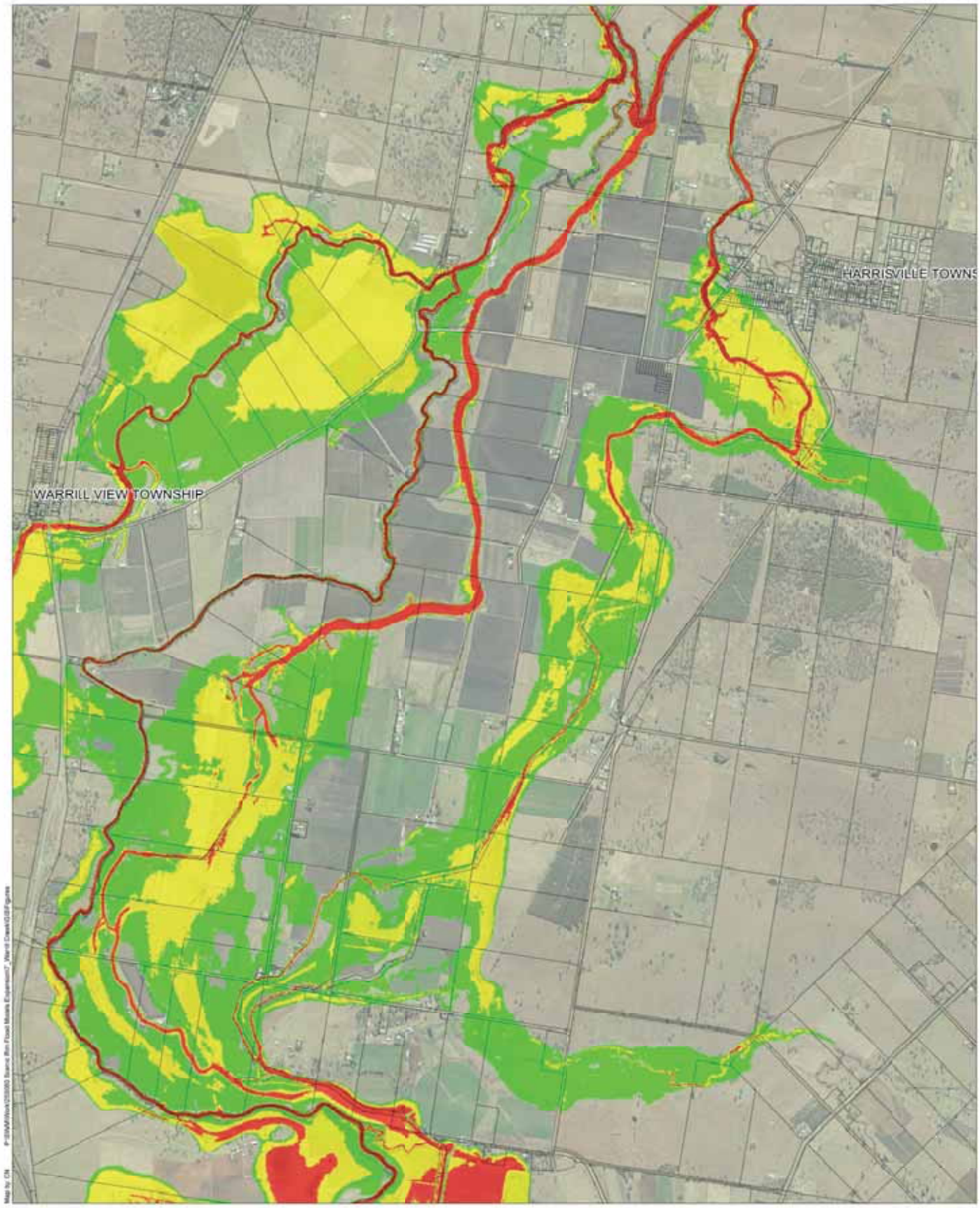
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-b**

10% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

0 625 m 1,250 m

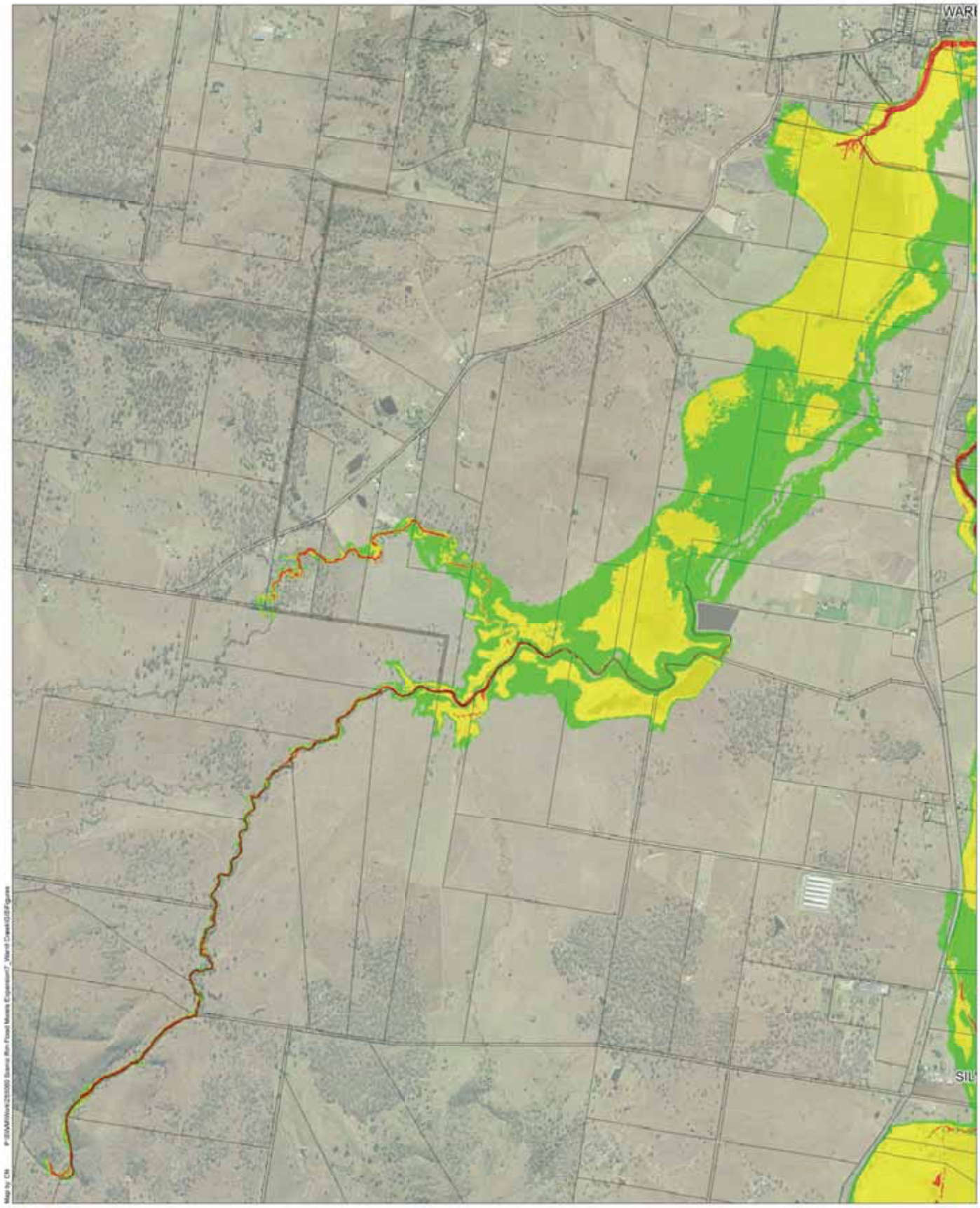
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-c**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

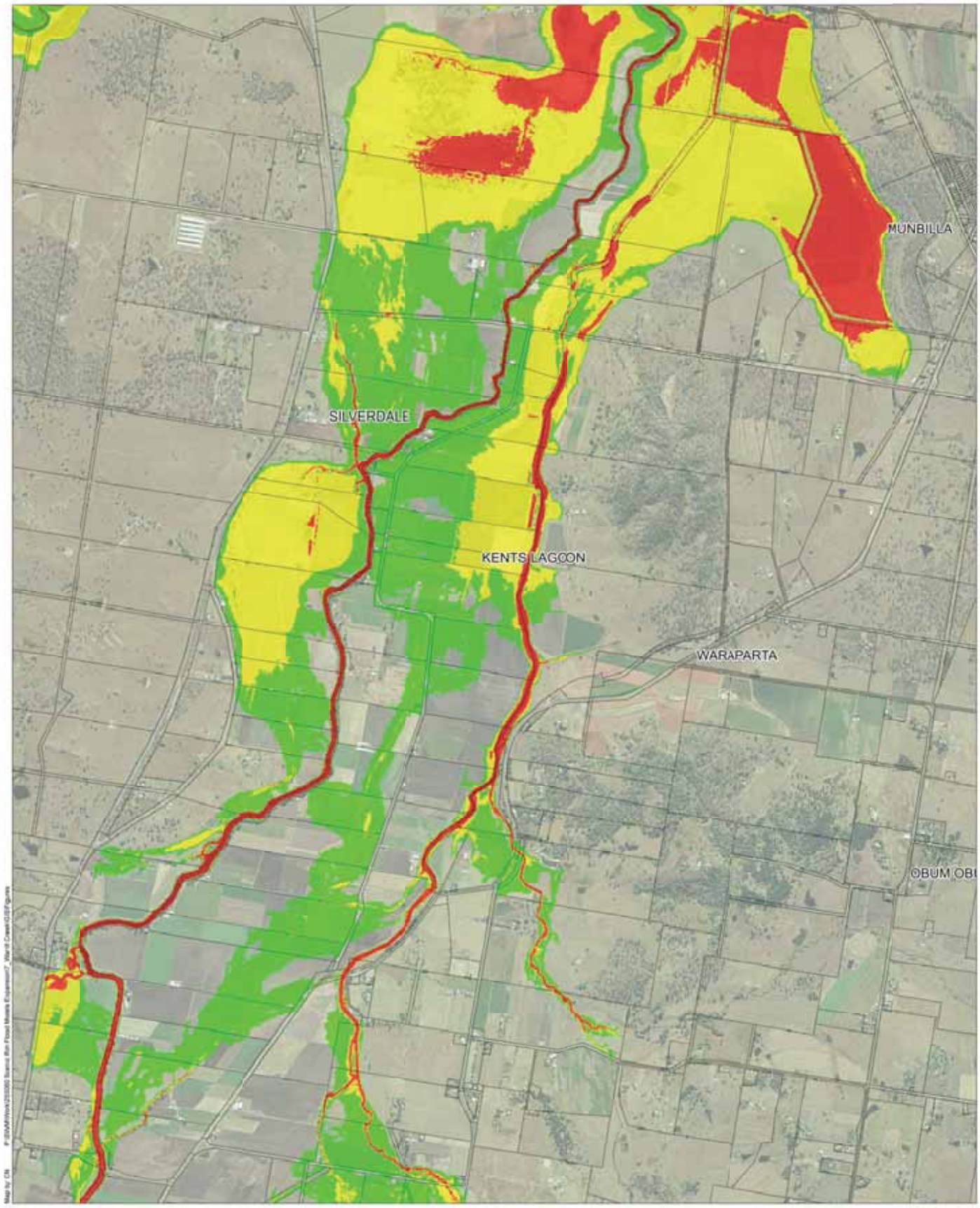
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-d**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

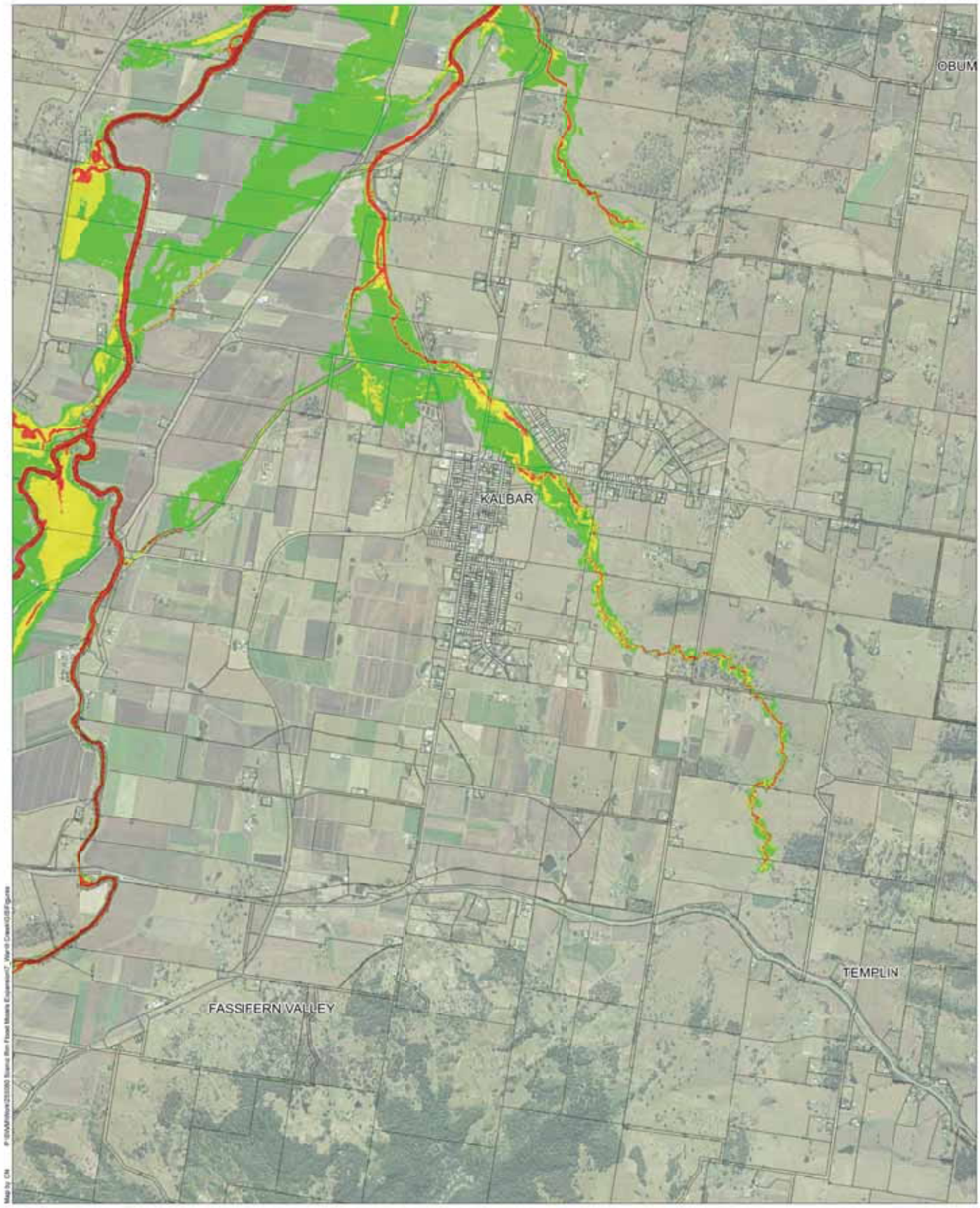
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-e**

10% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Low Hazard
- Medium Hazard
- High Hazard

Notes:

1:25,000

0 625 m 1,250 m

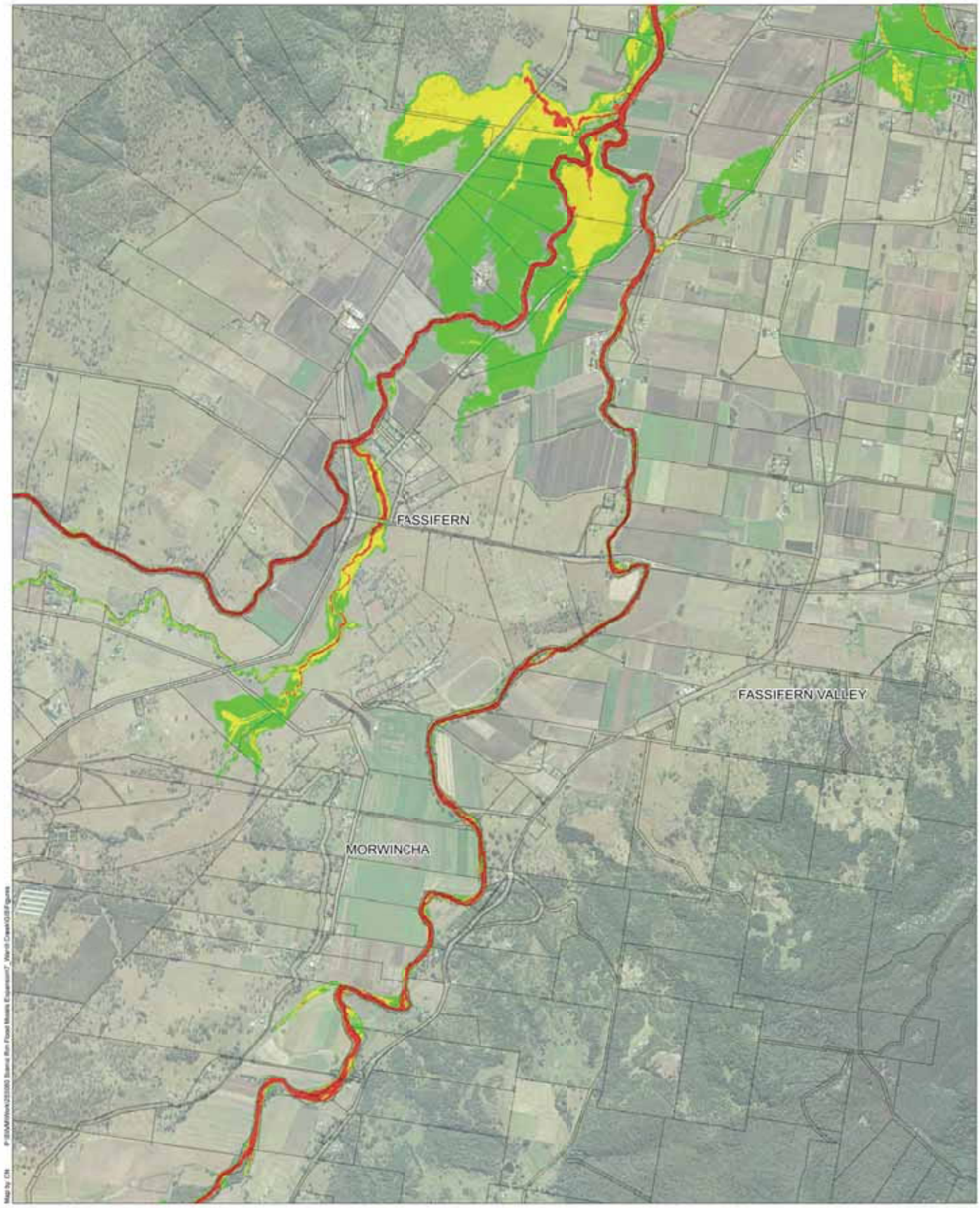
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study Figure E4-f

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

0 625 m 1,250 m

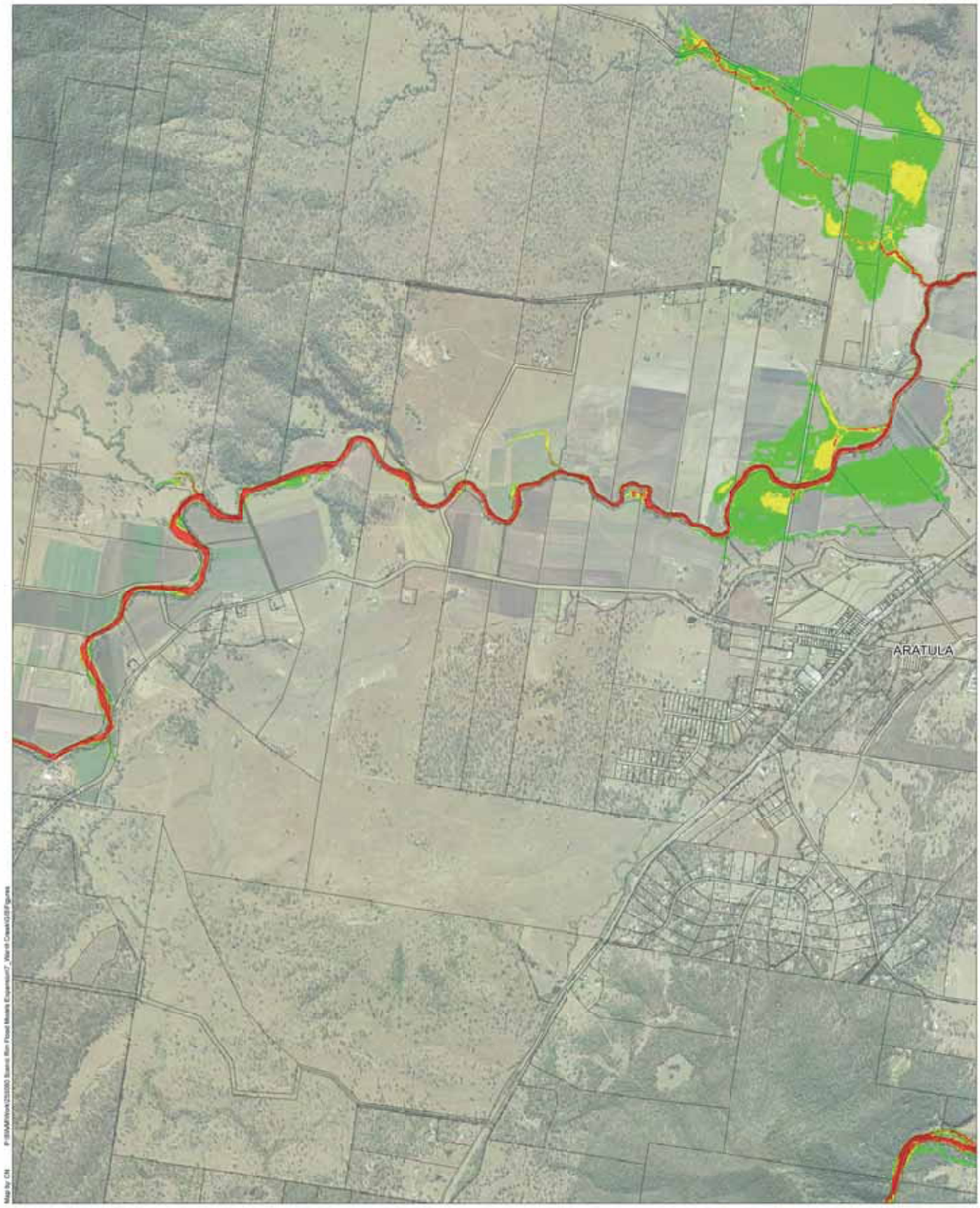
Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-g**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

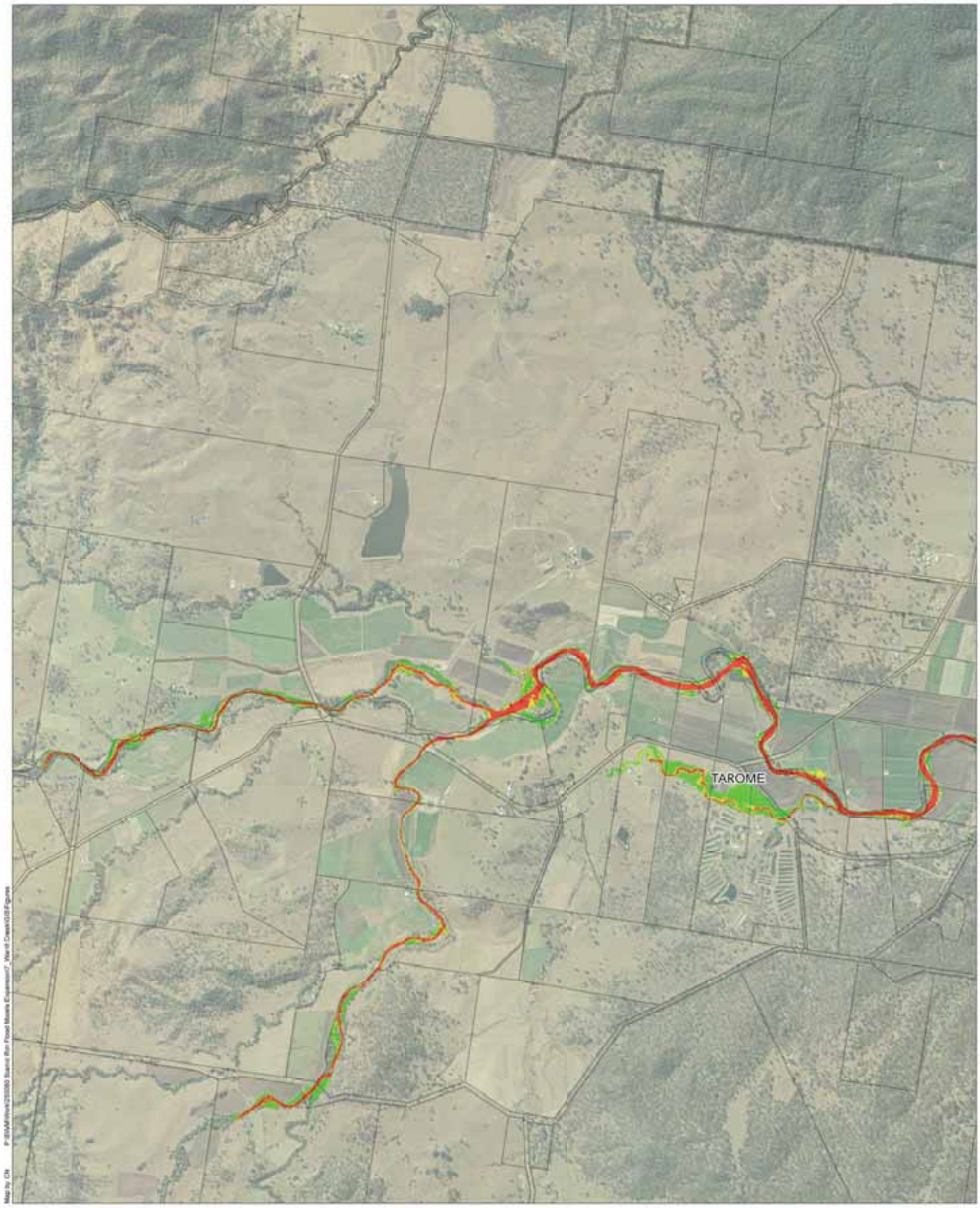
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-h**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

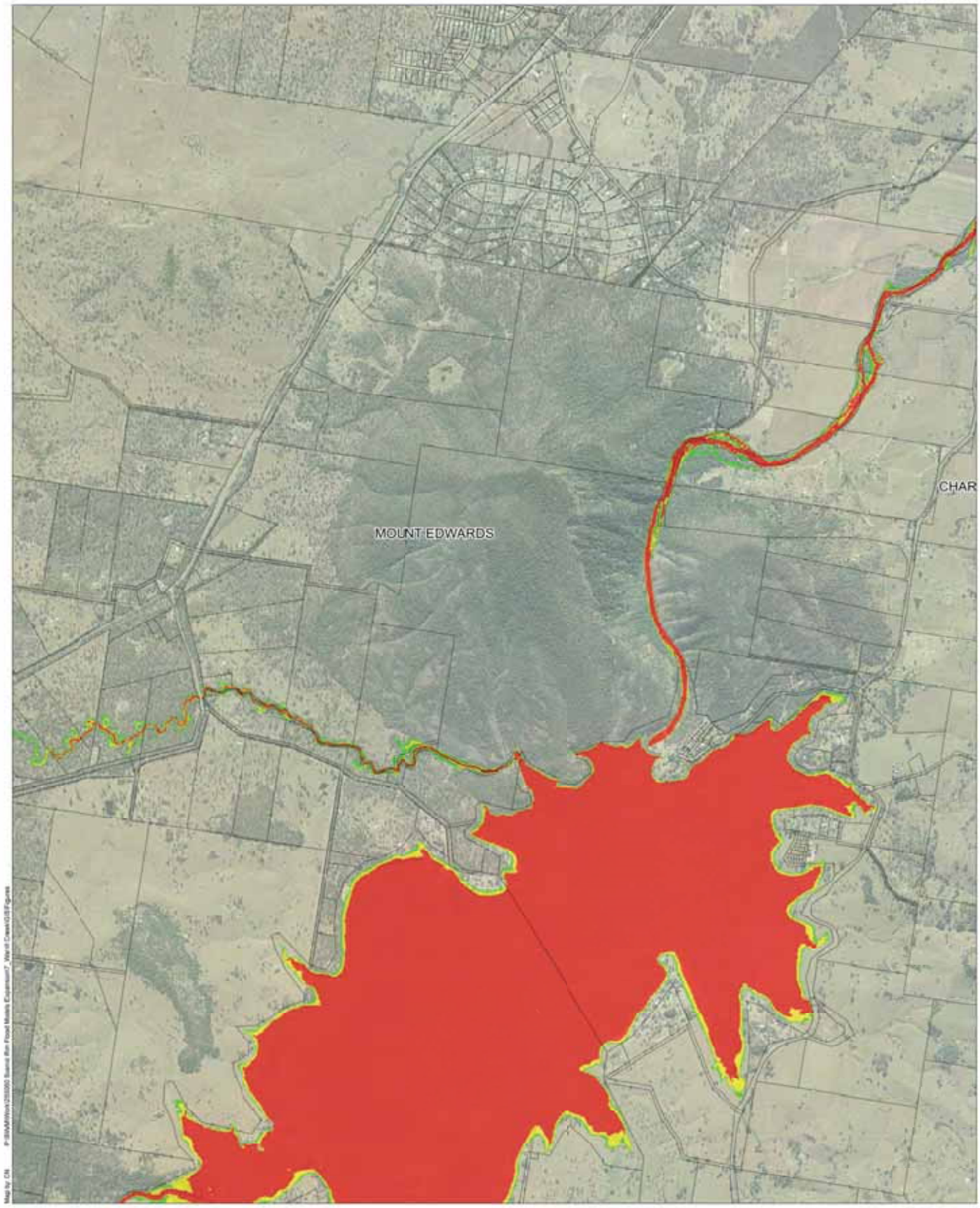
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-i**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

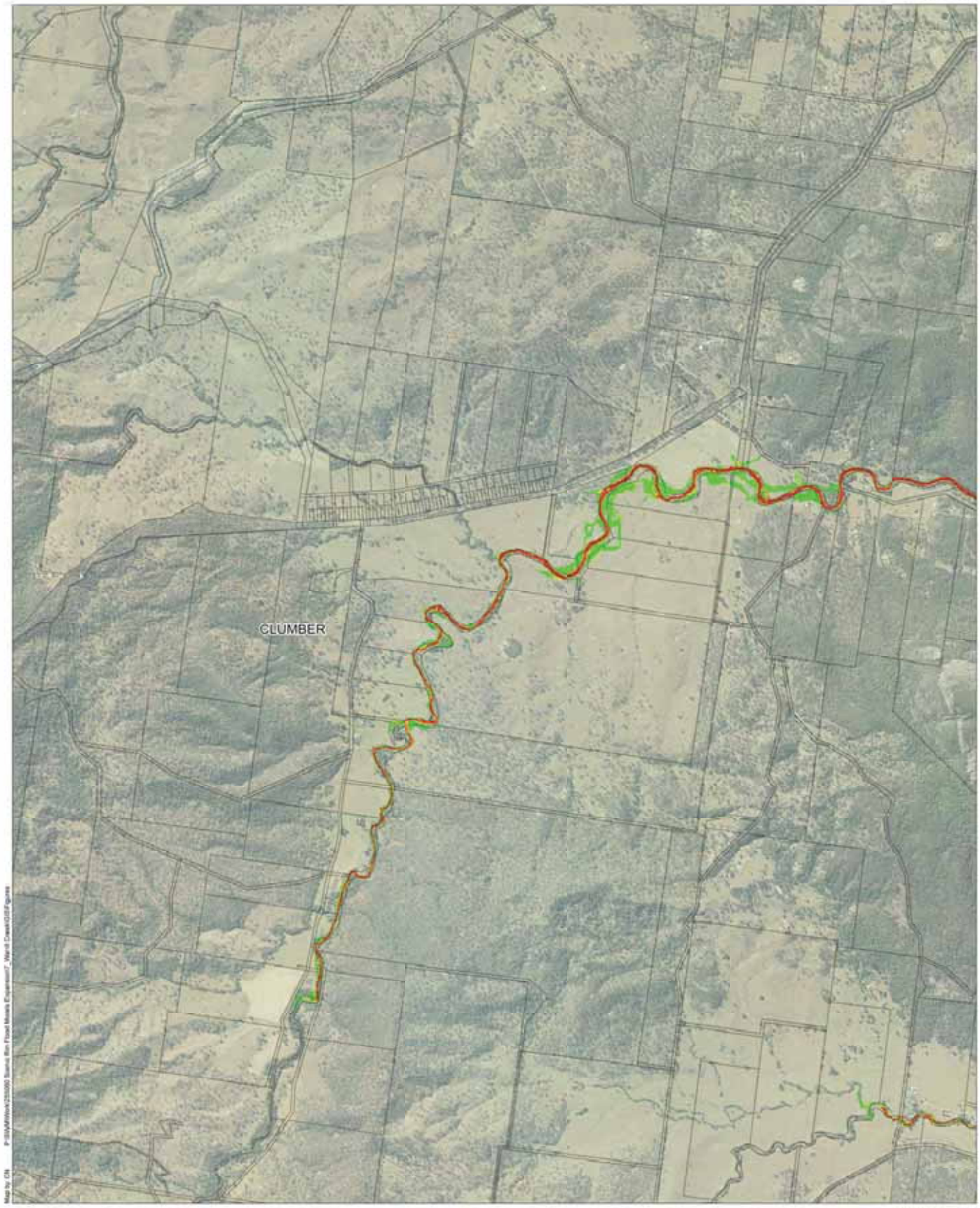
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-j**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

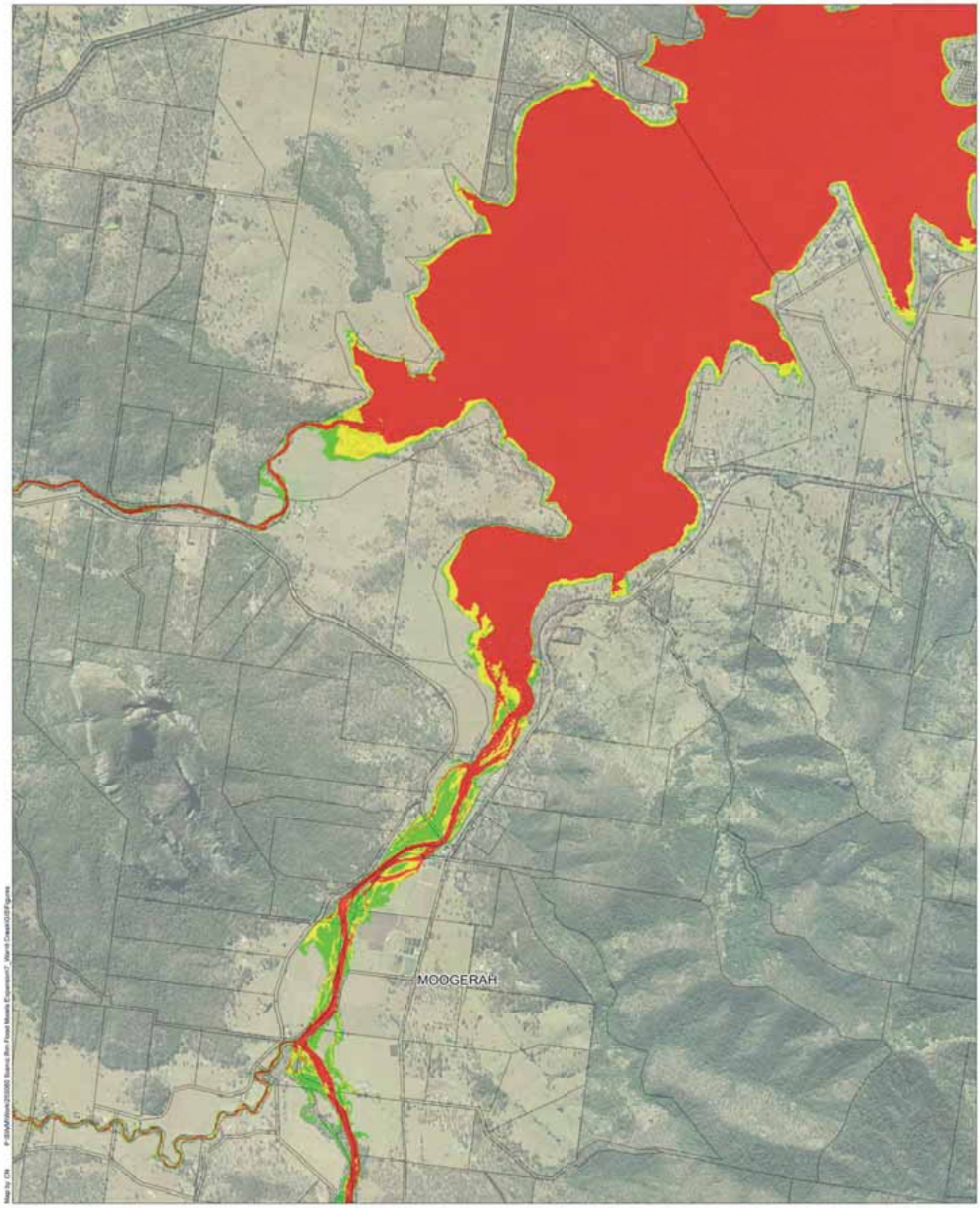
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-k**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

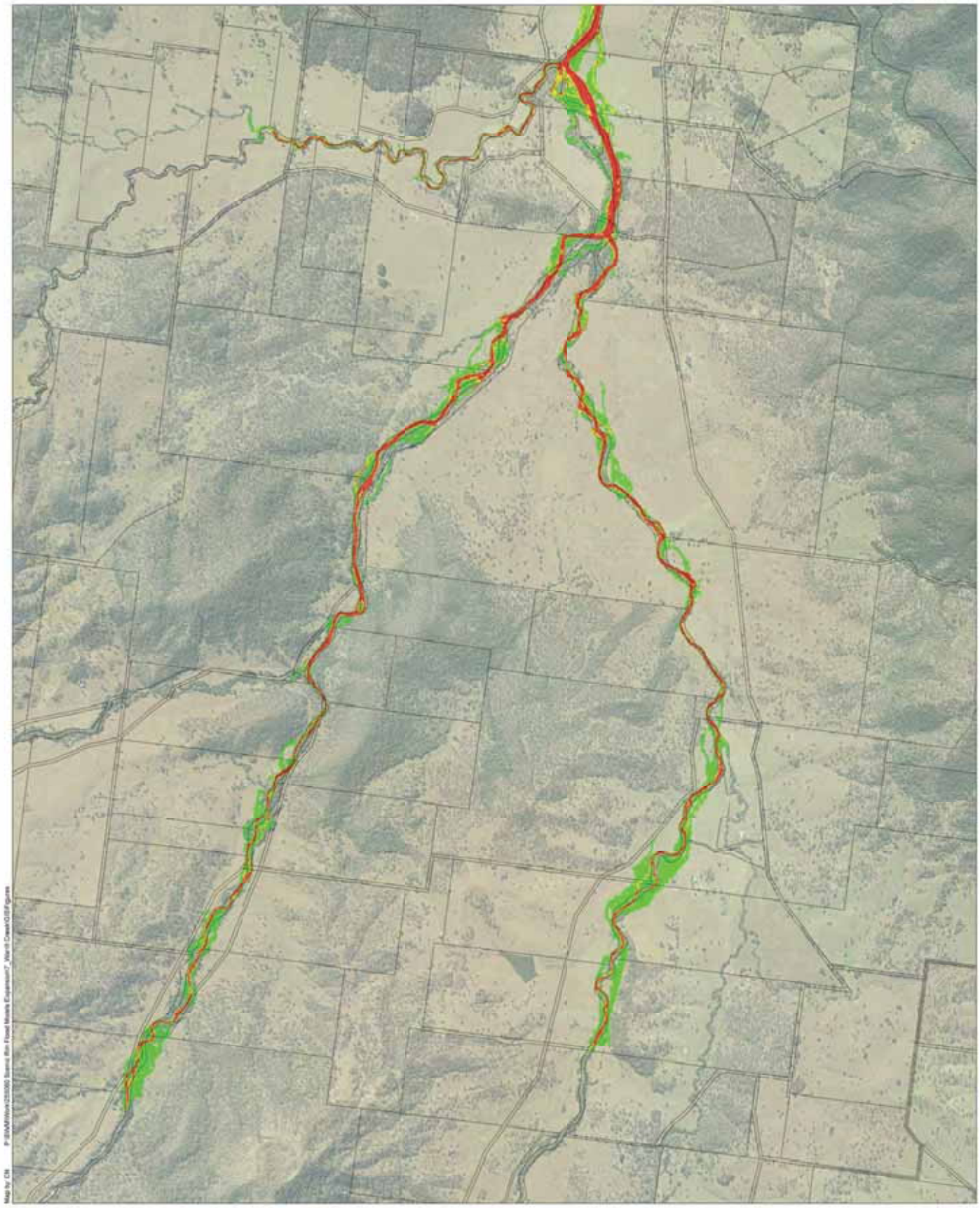
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-I**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

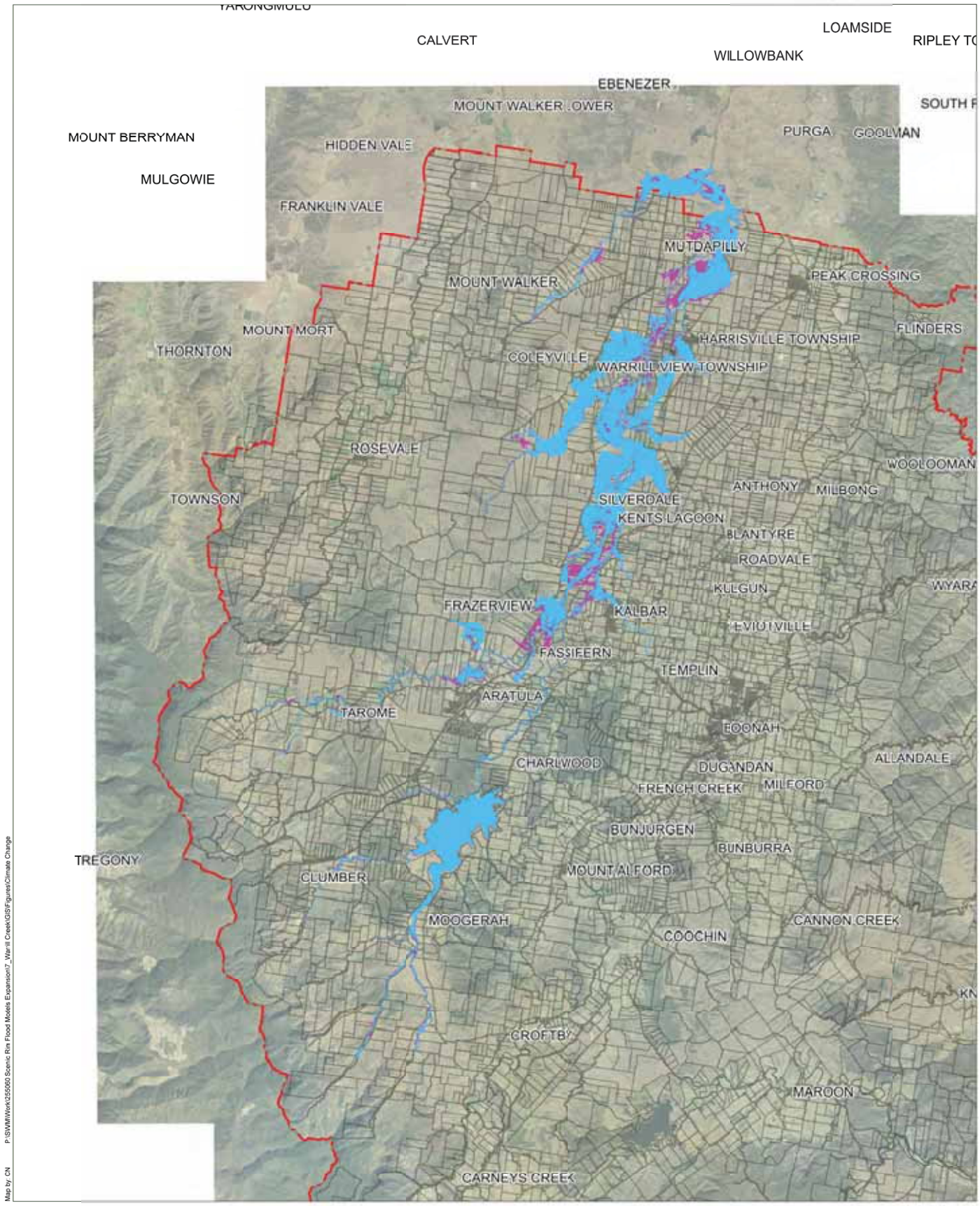
0 625 m 1,250 m

Date: 8/01/2018 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E4-m**

10% AEP Event - Peak Hazard Map



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extent
- Climate Change Inundation Extent

Notes:

1:200,000

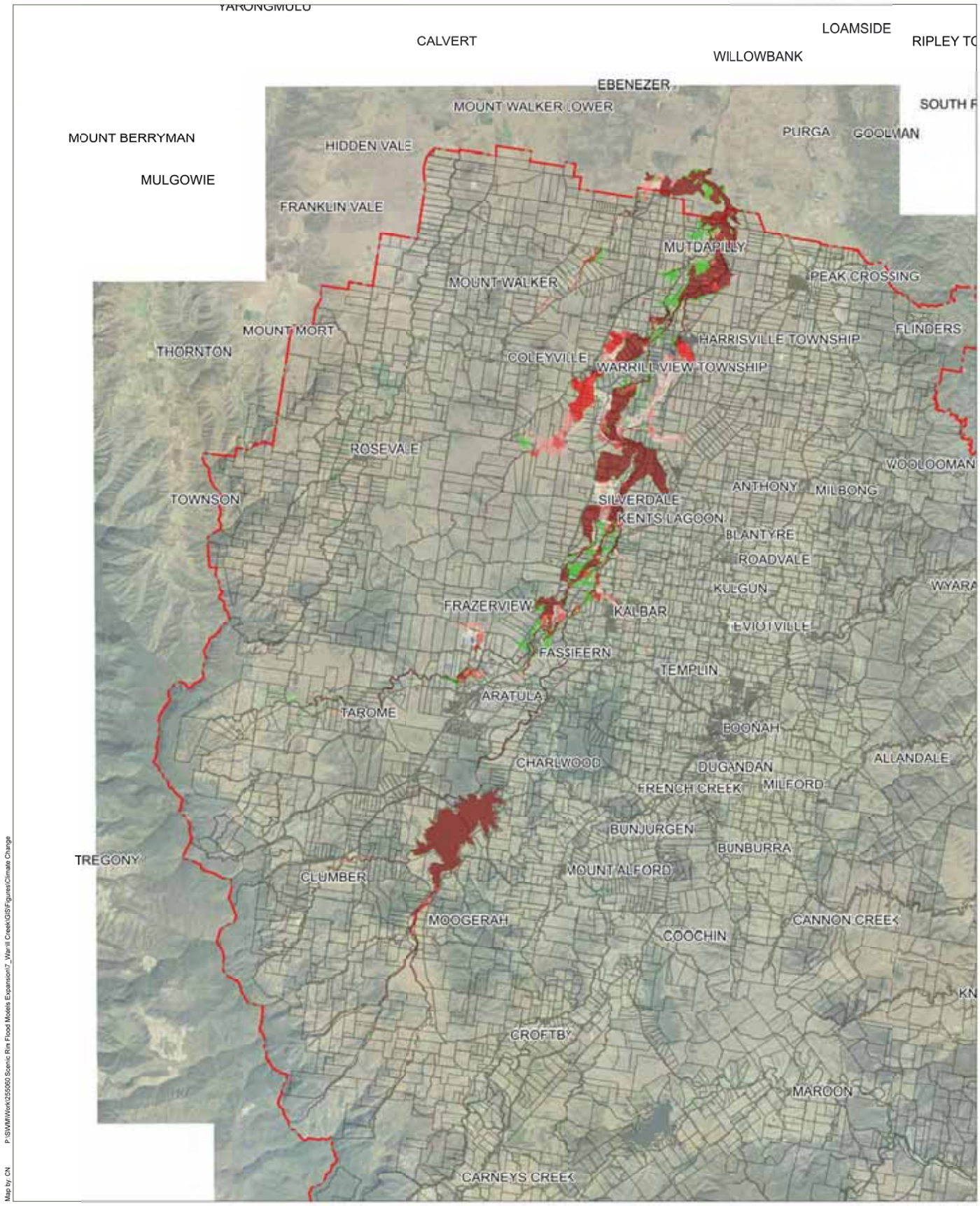
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E5 - a**

Climate Change Scenario 4.5 - 10% AEP Event Inundation Extent



Map by: CN P:\SWMM\Work\255060 Scenic Rim Flood Models Expansion\7_Warrill Creek\GIS\Figures\Climate Change

Legend

- SRRC Boundary
- Cadastral Boundary

Afflux (m)

< -0.80	0.03 to 0.20
-0.80 to -0.60	0.20 to 0.40
-0.60 to -0.40	0.40 to 0.60
-0.40 to -0.20	0.60 to 0.80
-0.20 to -0.03	0.80 to 1.20
-0.03 to 0.03	> 1.20

- Was Dry Now Wet
- Was Wet Now Dry

Notes:

1:200,000

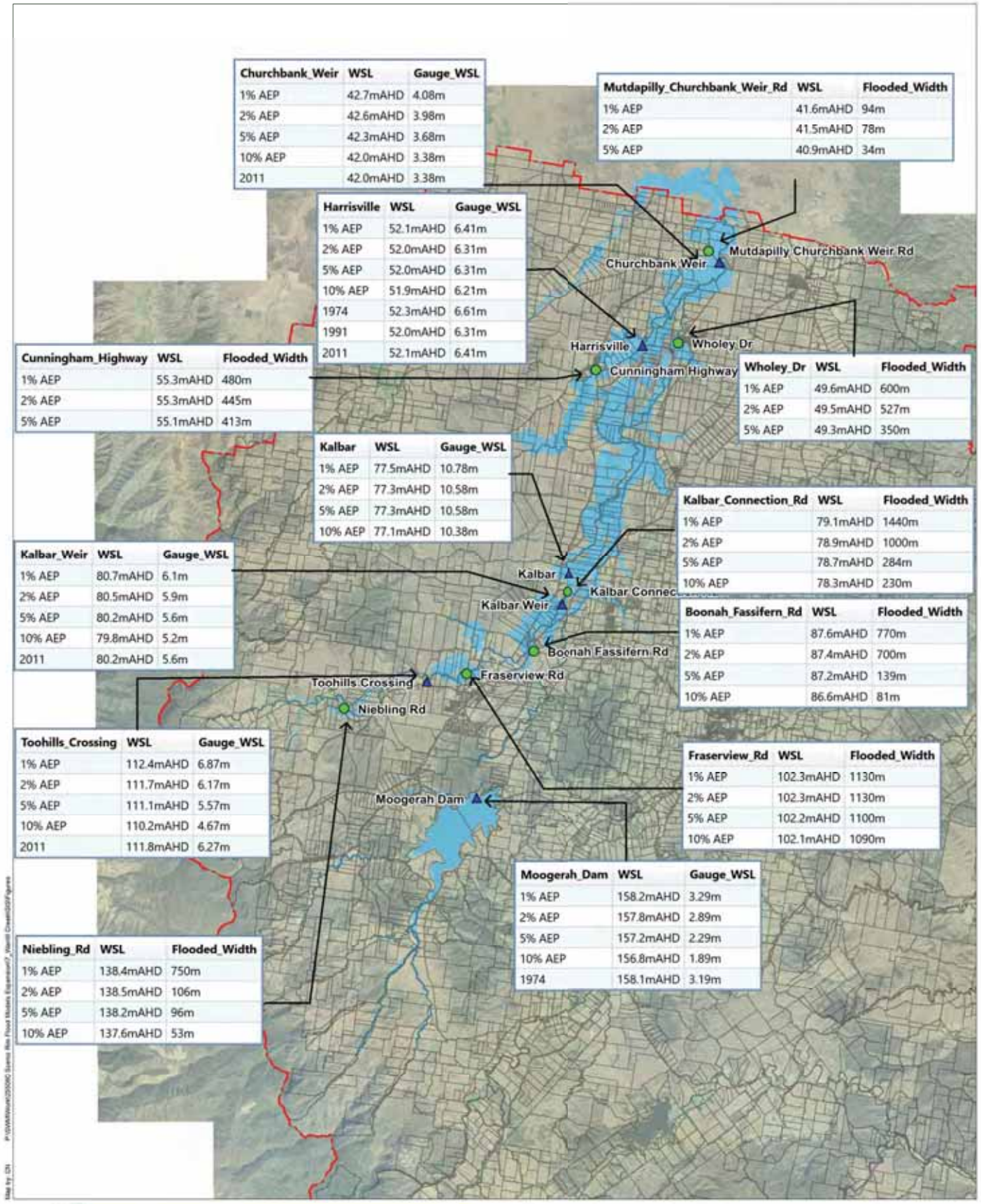
0 5,000 m 10,000 m

Date: 18/08/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Warrill Creek Flood Study **Figure E5 - b**

Climate Change Scenario 4.5 - 10% AEP Event Afflux Map



Warrill Creek Flood Study **Figure F**

Emergency Response Mapping - Stream Gauge & Road Crossing Details

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