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Scenic Rim Flood Modelling

Albert River Flood Modelling – Consolidated Final Report

Scenic Rim Regional Council

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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 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 investigation completed for the Albert River catchment.

1.2 Study area

The Logan River is a large river system which discharges into Moreton Bay with its upstream catchment boundary at the Queensland/New South Wales border between Mount Lindesay and Mount Ernest. The Albert River is a large tributary of the Logan River which has a confluence with the Logan River some 25 km downstream of the SRRC boundary. The Albert River catchment is predominantly rural particularly in its upper reaches. The Scenic Rim Local Government boundary extends to Mount Wilbraham 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 Albert River 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 Albert River 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 Albert River RAFTS model was originally developed by Logan City Council (LCC) as part of a detailed Logan River system study. This model was adopted and refined by Aurecon in 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 Albert River 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 did not provide coverage of Albert River catchment only 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 Albert River 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 Albert River catchment, the following crossings were surveyed:

- Newton Bridge, Kerry Road at Albert River (Right Branch) crossing
- Junction Bridge, Kerry Road at Albert River crossing
- Keaveny Bridge, Kerry Road at Albert River crossing
- Ward Bridge, Kerry Road at Albert River crossing
- Kerry Bridge, Kerry Road at Albert River crossing
- Radke Bridge, Beaudesert-Nerang Road at Albert River crossing
- Flagstone Creek Bridge, Beaudesert-Beenleigh Road at Flagstone Creek crossing

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.

2.3 GIS data

The following GIS datasets were provided by SRRC which were utilised as per the 2015 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 Calibration data

2.4.1 Stream gauge data

A review of the stream gauge data within the project extents was undertaken. Whilst the LCC hydrologic model calibration focussed upon the Bromfleet gauge there are several additional gauges within the area reported by either the Bureau of Meteorology (BoM) or the Department of Natural Resources and Mines (DNRM). In addition to the three historical events previously modelled (1974, 1990 and 2013), the 2008 event has been included given its importance within the Albert River catchment for the Scenic Rim Local Government area.

The complete available stream gauge information for each of the historical flood events is detailed in Table 1 with the location of each of these gauges presented in Figure A-3, Appendix A.

Table 1 Available stream gauge information

Gauge Location	Owner	Years of record	Calibration Event			
			1974	1990	2008	2013
145105B - Nindooinbah Stn	NRM	1993 – present	N	N	Y	Y
145915D – Lumeah 2	NRM	1953 – present	Y	Y	Y	Y
145103A – Cainbable Creek	NRM	1962 – 1992	Y	Y	N	N
145102A – Bromfleet	NRM	1927 – present	N	y	Y	Y

Three of the calibration events, 1974, 1990 and 2013, had already been modelled by LCC, therefore only rainfall data for the 2008 event was sourced for this investigation. The rainfall stations, both BOM and DNRM stations, used for the calibration of the 2008 event are displayed in Figure A-4a, Appendix A. Ten pluviographs were available to represent rainfall patterns across the catchment, three BOM and seven DNRM. In addition, three BOM stations were used for event rainfall totals.

2.4.2 Flood level observations

Surveyed historical flood markings across the catchment were provided by SRRC for the 2008 and 2013 events. This consisted of surveyed flood levels at properties.

Debris levels for the 2008 event were available at 14 locations within the system, primarily in the upper reaches of the main river. Recorded debris levels available for the 2013 event were limited to two locations.

2.5 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 2, 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 2 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 2, the difference between AEP and ARI is minimal for the 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 Logan City Council RAFTS model for the Albert River catchment was considered suitable for use and adopted for this study. RAFTS is a runoff routing model and an industry standard tool commonly used for hydrologic studies.

3.1.1 Modelling extents

The Albert River sub-model adopted for this assessment extends from the upper limits of the catchment down to the confluence with the Logan River and was previously calibrated for the 1974, 1990 and 2013 events. Calibration was undertaken using gauge records at Cainbable Creek, Lumeah, Nindooinbah, and Bromfleet. Figure A-1, Appendix A, presents the Albert River hydrologic model layout and extents.

3.1.2 Initial RAFTS model parameters

As noted above the adopted LCC Albert River catchment hydrologic model was calibrated to the 1974, 1990 and 2013 flood events. The LCC RAFTS model flood routing used the Muskinghum-Cunge channel routing method. This specifies the storage constant and weighting factors (k and x) to be applied between nodes. These were previously entered directly into the LCC RAFTS model and the source calculations for these storage factors are not available.

The LCC RAFTS also includes a storage coefficient multiplication factor ‘Bx’. This uniformly modifies all subcatchment Storage Time Delay Coefficient values. The previously used storage factors ‘k’, ‘x’ and ‘Bx’ were assumed appropriate and adopted for use in this study. Review of the hydrographs from RAFTS shows a reasonable match in terms of flood time lag supporting the use of the previously developed storage factors.

These parameters were adopted as a starting point and modified as part of the joint calibration process. The adopted calibration parameters were then used to determine design event parameters for the design events.

Table 3 LCC RAFTS model calibration event parameters

Event	Calibration parameters		
	IL (mm)	CL (mm/hr)	Bx
1974	30	1.75	1.3
1990	50	2.7	1.3
2013	175	3.0	1.3

The initial loss parameter is largely event specific relating to the antecedent conditions in the catchment, and as expected varies between calibration events.

3.2 Development of 2008 RAFTS model

The provided LCC RAFTS Albert River model was adopted and refined to include more detail for the purposes of this study. The LCC model already included three historical calibration events. The 2008 event has been added and the RAFTS model updated to include this event.

For the 2008 event pluviograph rainfall data records were sourced from both the Bureau of Meteorology and the DNRM for all available gauges within the vicinity of the catchment. From this data temporal patterns were constructed for the event which occurred between 3 January 2008 and 8 January 2008. Developed temporal patterns were applied to the RAFTS catchment nodes on a nearest neighbour thiessian polygon methodology.

Anecdotal reporting of the 2008 event indicated that significantly higher levels of rainfall were observed within the upper reaches of the Albert/Logan River system and in particular greater flooding was observed within the SRRC than within the LCC area.

Given the reported potential distinct spatial variability in the magnitude of the event and as locations where pluvio data was available were limited daily rainfall totals at gauges within the vicinity of the catchment were sourced in order to estimate the event rainfall totals at the RAFTS nodes across the catchment. Event rainfall totals at each RAFTS node were estimated by interpolation between rainfall gauge (both daily and pluvio) locations.

Observation of the event rainfall totals across the catchment, and beyond, confirmed that significantly larger rainfall totals were observed in the upper south-eastern corner of the catchment with nearly twice the magnitude than that observed in the downstream areas.

Four gauge locations were available for calibration of the RAFTS model being Bromfleet, Beaudesert Pump Station, Lumeah and Cainbable Creek gauging stations. Calibration was achieved through the variation of initial and continuing losses for the catchment. In order to maintain consistency of approach with the RAFTS modelling for the other events a single set of losses were applied across the catchment. The Bx value was not altered again in order to maintain a consistent approach to the other modelled events.

The magnitude of the recorded peak flows in the upper (south eastern) reaches of the catchment (Cainbable and Lumeah gauges) was significantly larger than the three other analysed events. At Cainbable Creek the 2013 event peak discharge was recorded to be more than twice the 2008 event. However, at Bromfleet in the lower reach of the system the recorded peak discharges were significantly less than the 2013 event.

At the Cainbable Creek gauge the predicted RAFTS was of a similar shape and timing as the recorded data however the peak discharge was underestimated by the RAFTS model. Inversely, at the three other gauges the RAFTS model over predicted the peak flows when compared to the recorded data.

It was found that variation of the initial loss had little influence on the predicted peak discharges for this event at the gauge locations. A continuing loss of 3.5 mm/hr was adopted as the upper reasonable estimate of continuing loss.

In conclusion, the calibration of the 2008 hydrologic model is considered acceptable within the constraints of available data and the maintenance of consistence with previous RAFTS modelling. Comparison of discharge hydrographs is provided in Section 4.4.

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 Albert River hydraulic model has been developed to cover the entire floodplain, and a number of tributaries, 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. The upper extremes of the river and the tributaries have been modelled as a

10 m grid with the lower reaches a 30 m grid. Modelling these steeper narrow tributaries with a smaller grid size allows the channel to be represented in a greater definition within the model.

Modelling has been undertaken using the TUFLOW software (version 2013-12-AD).

3.3.2 Modelling extents

The extent of the Albert River system modelled and mapped extends from the upper extent of the catchment to the SRRC boundary and includes an area of approximately 255 km^2. The adopted model extents are presented in Figure A-2, Appendix A.

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 10 m/30 m grid size. This grid sizes selected allow sufficient detail for the channel and floodplain representation in the hydraulic model whilst allowing for reasonable model run times.

3.3.4 Initial roughness assumptions

Initial surface roughness values used in the hydraulic model are presented in Table 4 and were based on accepted industry values. Land use types were identified for areas using aerial photography provided.

Table 4 Initial roughness/Manning's n values

Land use type	Manning's n
Dense overbank vegetation in upper catchment	0.090
Low -Medium overbank vegetation in lower catchment	0.060
River Corridor – upstream reaches	0.070
River Corridor – downstream reaches	0.070

3.3.5 Hydraulic structures

Only limited information for bridges and cross-drainage structures was available with no as-constructed details available. The following simplified assumptions have been made regarding bridge structures:

- The bridge deck has the same level than 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

There are a number of bridges throughout the catchment that have not been included in the model due to a combination of a lack of available data and expectations that they will be overtopped under the 1% AEP event and therefore of limited impact on peak water levels.

3.3.6 Boundary conditions

The RAFTS model outputs were applied as inflows into the TUFLOW model. Total inflows from catchments upstream of the hydraulic model extents were applied at the upstream model boundary and local inflows from areas within the TUFLOW model were applied throughout the model.

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

Four events were used in the model calibration process being 1974, 1990, 2008 and 2013. Inflow hydrographs from the RAFTS 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 stream gauge data and recorded flood levels.

As the LCC hydrologic model was calibrated and peer reviewed no changes to the calibration parameters within the hydrologic model were made for the three events previously modelled. The hydraulic model parameters were adjusted to achieve the best match against the available recorded historical data.

An iterative joint calibration approach was then undertaken for the 2008 event 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 achieved before a good calibration has been considered to be achieved:

Table 5 Calibration targets

Water level	Discharge
+/- 0.15m at stream gauges	+/- 10%
+/- 0.5m at debris locations	n/a

4.3 Calibration data

4.3.1 Stream gauge data

A review of the stream gauge data within the project extents was undertaken. Whilst the LCC hydrologic model calibration focussed upon the Bromfleet gauge there are several additional gauges within the area reported by either the Bureau of Meteorology (BoM) or the Department of Natural Resources and Mines (DNRM). In addition to the three historical events previously modelled (1974, 1990 and 2013), the 2008 event has been included given its importance within the Albert River catchment for the Scenic Rim Local Government area.

The complete available stream gauge information for each of the historical flood events is detailed in Table 1 with the location of each of these gauges presented in Figure A-3, Appendix A.

Table 6 Available stream gauge information

Gauge Location	Owner	Years of record	Calibration Event			
			1974	1990	2008	2013
145105B - Nindooinbah Stn	NRM	1993 – present	N	N	Y	Y
145915D – Lumeah 2	NRM	1953 – present	Y	Y	Y	Y
145103A – Cainbable Creek	NRM	1962 – 1992	Y	Y	N	N
145102A – Bromfleet	NRM	1927 – present	N	y	Y	Y

Three of the calibration events, 1974, 1990 and 2013, had already been modelled by LCC, therefore only rainfall data for the 2008 event was sourced for this investigation. The rainfall stations, both BOM and DNRM stations, used for the calibration of the 2008 event are displayed in Figure A-4a, Appendix A. Ten pluviographs were available to represent rainfall patterns across the catchment, three BOM and seven DNRM. In addition, three BOM stations were used for event rainfall totals.

4.3.2 Flood level observations

Surveyed historical flood markings across the catchment were provided by SRRC for the 2008 and 2013 events. This consisted of surveyed flood levels at properties.

Debris levels for the 2008 event were available at 14 locations within the system, primarily in the upper reaches of the main river. Recorded debris levels available for the 2013 event were limited to two locations.

4.4 Calibration results summary

Overall, a reasonable calibration has been achieved based on the available information and the objectives of this study. As discussed above an iterative calibration process was followed with the following parameters adjusted to achieve the best match to the available historical data:

- Rainfall temporal patterns for 2008 event
- Initial and continuing loss rates for the 2008 historical event
- Roughness values on the Logan River and its tributaries

The results of the calibration process were discussed with SRRC as the calibration progressed to confirm acceptance of the outcomes. This report presents the final calibration results only however the other results were presented and reviewed by SRRC.

The final calibration results are presented in Table 7 for each of the four historical events. Graphical plots (Figures B1 to B22) presenting the comparison of model results against the recorded stream gauge data are provided in Appendix B. Figures A-4b, c, d and e show the historical event inundation extents and the calibration outcomes across the floodplain extents. This includes comparison against the stream gauge levels and debris marks where available. These are provided in Appendix A.

Table 7 Peak water level comparisons

Event	Stream Gauge (m AHD)	TUFLOW (m AHD)	Difference (m)
Cainbable Creek stream gauge			
1974	n/a	123.42	n/a
1990	121.54	123.03	+1.49
2008	124.83	124.91	+0.08
2013	122.84	123.98	+1.14

Event	Stream Gauge (m AHD)	TUFLOW (m AHD)	Difference (m)
Lumeah stream gauge			
1974	87.97	89.43	+1.46
1990	85.90	88.26	+2.36
2008	89.52	89.53	+0.01
2013	88.26	89.44	+1.19
Nindooinbah stream gauge			
1974	n/a	72.27	n/a
1990	n/a	71.80	n/a
2008	72.00	72.28	+0.28
2013	n/a	72.16	n/a
Bromfleet stream gauge			
1974	n/a	45.24	n/a
1990	40.82	41.68	+0.86
2008	43.40	44.61	+1.21
2013	43.90	44.71	+0.81

4.4.1 1974 event

There is only one stream gauge available for comparison for this event located at Lumeah in the mid to upper part of the catchment. The original calibration with a course 30 m grid produced water levels which were within 0.5 m of the stream gauge records however, there was not a good match with the shape of the event. With the finer grid in the upper reaches the difference in water levels predicted was greater however the shape of the event was better replicated.

The RAFTS model results reflect the shape and timing of the event relatively well whereas the TUFLOW model results predict the timing of the peaks during the event too soon when compared with the stream flow records. Sensitivity analysis on the roughness of the upper reaches of the main river and tributaries was undertaken in the hydraulic model in an attempt to slow the timing of the discharge peaks however this was found to have little effect on the discharge hydrographs predicted by the hydraulic model at this gauge location.

Given the limited number of calibration points for this event we are satisfied that the constructed hydraulic model is predicting a reasonable water level hydrograph in shape and level at the calibration location. It is also likely that limited rainfall and pluvio data would be available from 1974 to accurately represent the spatial distribution of the event across the catchment.

4.4.2 1990 event

The 1990 event can be described as a relatively small event in terms of both peak discharge and recorded water levels within the catchment.

It can be observed from comparison of the gauging discharge records and the original RAFTS output at the three gauging locations where data is available for this event (Bromfleet, Lumeah and Cainbable Creek) that there appears to be a discrepancy in the shape of the discharge hydrographs produced by RAFTS compared to that recorded. At Cainbable Creek the recorded discharge hydrograph has three distinct peaks of approximately equal magnitude. The RAFTS hydrograph also shows three peaks but of very different magnitudes. At Lumeah, which is located on the main Albert River reach upstream of the confluence with Cainbable Creek, the recorded discharge hydrograph again clearly shows three distinct peaks whereas the RAFTS hydrograph at this location is a single peak. Following the confluence of the main reach and Cainbable Creek at the Bromfleet gauge the hydrograph recorded and the RAFTS hydrograph as similar in shape for the first two peaks however, the third peak is clearly missing from the RAFTS hydrographs.

Similar to the 1974 event the hydraulic model appears to predict the peak of the event too soon when compared to both the streamflow and RAFTS hydrographs. Again, sensitivity analysis on the roughness of the upper reaches of the main river and tributaries was undertaken in the hydraulic model in an attempt to slow the timing of the discharge peaks however this was found to have little effect on the discharge hydrographs predicted by the hydraulic model at this gauge location.

Despite the timing of the peak the magnitude of the peaks predicted by the hydraulic model are relatively consistent with the RAFTS outputs.

Comparison of the water levels at both the Cainbable Creek and Lumeah gauge locations with streamflow records is difficult given the difference in the shape of the RAFTS hydrographs at these locations. However, the water level hydrographs generally follow the shape of the RAFTS discharge hydrographs at these gauges.

At Bromfleet the RAFTS discharge hydrograph is a better match to the streamflow discharge hydrograph excluding the third peak. At this location, the calibration predicts water levels 860 mm above the recorded levels.

There are some instabilities observed within the results for this event however these are apparent at low discharge and water levels. Given the intent of the hydraulic model construction is to represent large (1% AEP like) events this is not considered to be a significant issue in the model construction.

4.4.3 2008 event

As discussed in Section 3.2, the 2008 event was observed to have significant spatial variation in event rainfall totals across the catchment. Rainfall total in excess of twice the magnitude were observed in gauges located in the south-eastern areas of the catchment compared to those located within the lower reaches. This observation is confirmed by analysis of the recorded streamflow (discharge) hydrographs at the four available streamflow gauge locations within the catchment. Recorded peak discharges in the 2008 event were significantly larger than the 2013 event for the Cainbable Creek and Lumeah gauges however, peak discharges observed at Bromfleet in the lower reach of the system were smaller in the 2008 event than that recorded in the 2013 event.

Observation of the 2008 hydraulic model results show that whilst the peak discharges predicted by both the RAFTS and TUFLOW models showed variation to the recorded peak discharges the water level predicted at the gauge locations were within 0.3 m at the upper gauges and 1.21 m at Bromfleet. The shape of the water level hydrographs predicted by the TUFLOW model for this event were consistent with the recorded streamflow hydrographs.

Event debris levels were available at 14 locations within the system, primarily in the upper reaches of the main river. Comparison of recorded and predicted water levels are provided in Table 8 and Figure A-4d.

Table 8 2008 Debris mark comparison

Location	Recorded Flood Level (m AHD)	Water Surface Level – Calibration 2008 (m AHD)	Difference (m)	Comment
Lost World Concrete Causeway	233.97	234.00	0.03	
Bridge entrance Lot3 RP151691	209.69	208.99	-0.70	Potential effects of local structure not included in the model

Newton Bridge	194.42	193.04	-1.38	Located directly downstream of a relatively tight bend; may be some potential error in DEM data
Doyle Bridge	190.3	189.64	-0.66	Located directly downstream of a relatively tight bend; may be some potential error in DEM data
Junction Bridge	180.97	181.98	1.01	Area of complex flow with multiple breakouts
Ladybrook Bridge	178.16	177.88	-0.28	
Keaveny Bridge	167.38	167.41	0.03	
Newman Bridge	161.31	160.93	-0.38	
Ward Bridge	153.52	153.17	-0.35	
Duck Creek Bridge	136.18		0.57	Plots outside modelled inundation extent. Modelled water level in 2008 is 136.75 m AHD adjacent to recorded point
Kerry Bridge	115.61	115.38	-0.23	
Nindooinbah Bridge	87.7	87.79	0.09	
Radke Bridge	65.9	65.98	0.08	
Mundoolun Bridge	42.87	44.16	1.29	Modelled results show a local 200 mm fluctuation in peak water levels along the centreline of the road in this location

4.4.4 2013 event

Analysis of the 2013 model results indicates that at the three available calibration locations (Cainable Creek, Lumeah and Bromfleet) the discharge hydrographs predicted by RAFTS well match both the shape, timing and volume of the recorded data. The TUFLOW model discharge hydrographs generally peak earlier than both the recorded data and RAFTS predictions but are of a consistent shape and volume.

When analysing the water levels predicted by the TUFLOW model for this event the upper reach gauges (Cainbable and Lumeah) generally predict a larger narrower peak water level than observed in the recorded data. Sensitivity analysis of the roughness applied within these areas did not yield significant changes in the shape of peak water levels predicted at these locations. At the Bromfleet gauge the TUFLOW model is predicting water level peaks and a hydrograph shape generally consistent with the recorded data and within 0.81 m of the recorded peak water level at this location.

Figure A-4e presents the recorded debris levels available for the 2013 event with a good match at one location but the second location near the Bromfleet gauge is out by 1 m – as compared to the +0.81 m at the actual gauge – therefore the reliance on the recorded debris level for calibration purposes will be low.

4.4.5 Summary

Event	Summary comment
1974	▪ Calibration limited by one gauge record ▪ Likely that limited rainfall and pluvio data would be available from 1974 to accurately represent the spatial distribution of the event across the catchment ▪ RAFTS model results reflect the shape and timing of the event relatively well ▪ TUFLOW model results predicts the timing of the peaks during the event too soon when compared with the stream flow records ▪ Conclude that the TUFLOW model is predicting a reasonable water level hydrograph in shape and level at the calibration location
1990	▪ Relatively small event (peak discharge and recorded water levels) within the catchment ▪ Three gauging locations where data is available for this event ▪ Observed discrepancy in the shape of the discharge hydrographs produced by RAFTS compared to that recorded ▪ TUFLOW model predicts the peak of the event too soon when compared to both the streamflow and RAFTS hydrographs ▪ At Bromfleet the RAFTS discharge hydrograph is a better match to the streamflow discharge hydrograph excluding the third peak ▪ At Bromfleet the calibration predicts water levels 860 mm above the recorded levels
2008	▪ Large rainfall event with significant spatial variation in event rainfall totals across the catchment. Rainfall total in excess of twice the magnitude were observed in gauges located in the south-eastern areas of the catchment compared to those located within the lower reaches ▪ Four stream gauges and 14 debris points available for calibration ▪ Whilst the peak discharges predicted by both the RAFTS and TUFLOW models showed variation to the recorded peak discharges the water level predicted at the gauge locations were within 0.3 m at the upper gauges and 1.21 m at Bromfleet ▪ The shape of the water level hydrographs predicted by the TUFLOW model for this event were consistent with the recorded streamflow hydrographs ▪ A good correlation to 14 debris marks throughout the catchment was achieved
2013	▪ Three available calibration locations and two debris marks ▪ Discharge hydrographs predicted by RAFTS well match both the shape, timing and volume of the recorded data ▪ TUFLOW model discharge hydrographs generally peak earlier than both the recorded data and RAFTS predictions but are of a consistent shape and volume ▪ A good match to one debris mark with low reliance on second mark

4.5 Adopted calibration parameters

As detailed above, a joint calibration exercise was undertaken for the 2008 historical event and the parameters in Table 9 were adopted for the RAFTS model. The parameters that were used in the LCC hydrology study were also adopted in the hydraulic model calibration as they provided the most accurate results and provides a uniform approach between Councils.

Table 9 RAFTS model calibration parameters

Event	Joint Calibration		LCC Modelling	
	IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
January 1974	30	1.75	30	1.75
April 1990	50	2.7	50	2.7
January 2008	10	3.5	-	-
January 2013	175	3.0	175	3.0

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 10.

Table 10 Adopted roughness/Manning's n values

Land use type	Manning's n
Dense overbank vegetation in upper catchment	0.090
Low/Medium overbank vegetation in lower catchment	0.060
River Corridor – upstream reaches	0.090
River Corridor – downstream reaches	0.070

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 11. The final parameters adopted were consistent with the LCC modelling parameters.

Table 11 1% AEP event parameters

Design Event	Calibration parameters		
	Initial Loss Rate (mm)	Continuing Loss Rate (mm/hr)	Bx
1% AEP	0	1.0	1.3

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

A flood frequency analysis (FFA) using the available stream gauge data at Cainbable, Lumeah 2, Nindooinbah and Bromfleet was undertaken to estimate the peak flow for the 1% AEP design event. This was then used to confirm the design event modelling parameters.

The FFA is limited by the historical data available each site. Each gauge is well rated to a specific level where afterwards the gauge relies on extrapolation of the rating curve. Table 12 outlines the key details of each of the gauges used in the FFA. However, despite the limitations of the historical data, the FFA provides an appropriate reference point against which to compare the design event results and refine parameters.

Table 12 Stream gauge summary

Site no	Site	Catchment Area (km^2)	Zero gauge (m AHD)	Maximum Gauged level (m)	Maximum Gauged Flow (m^3/s)
145103A	Cainbable Creek at The Gorge	42	118.484	2.3	441.64
145101D	Lumeah 2	169	79.934	7.84	761.449
145105B	Beaudesert Pump Stn	266	62.873	0.594	587.712
145102A	Bromfleet	544	28.197	14.861	1794.452

The Cainbable gauge is well rated to flows up to 442 m3/s but relies on extrapolation of the rating curve for higher flows. The predicted 1% AEP flow at Cainbable Creek is 321 m3/s, which is significantly lower than the FFA 1% AEP estimate of 681 m³/s at this location. It is noted that there are significant periods where there is no data recorded for this gauge location. The reliability of this FFA is questionable.

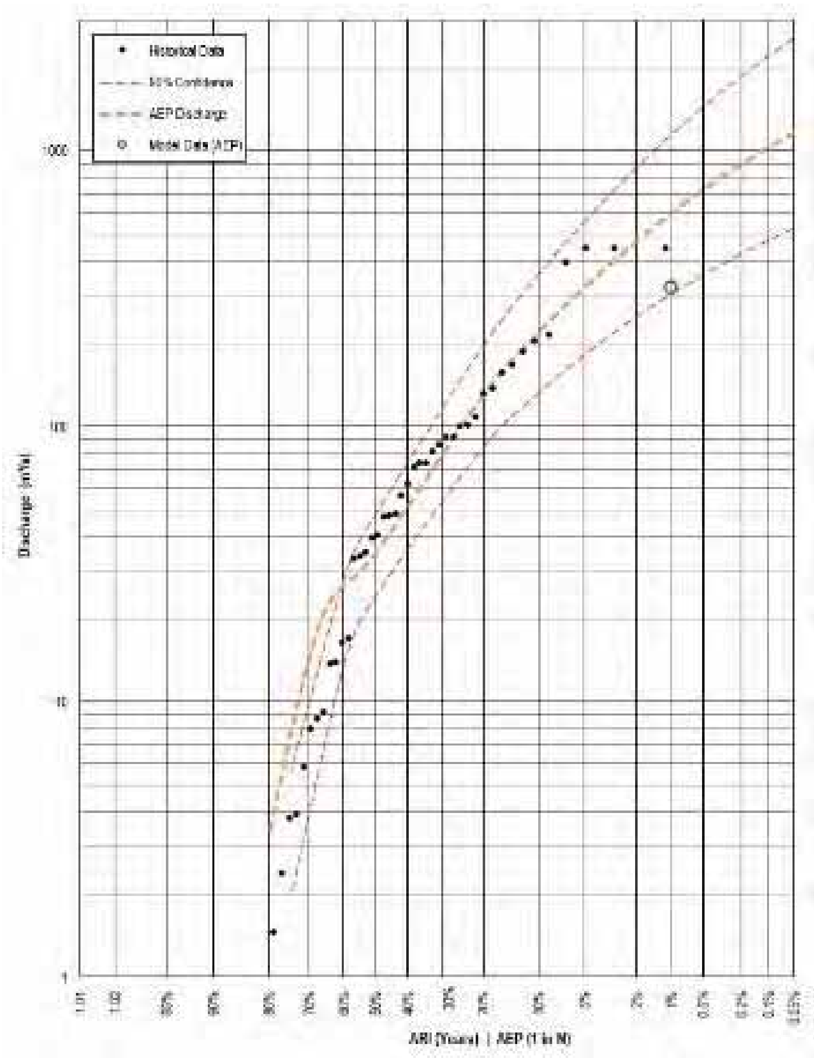

Figure 1 Flood frequency analysis – Cainbable Creek gauge

Figure 2 displays the FFA for the Lumeah 2 gauge. The Lumeah 2 gauge is well rated to flows up to 761 m^3/s but relies on extrapolation of the rating curve for higher flows. The predicted 1% AEP flow at Lumeah 2 is 1250 m^3/s, which is slightly higher than the FFA 1% AEP estimate of 958.5 m³/s at this location. The two key limiting factors of this analysis was that there is only 45 years of records at the gauge and the 1% AEP is in the extrapolation region of the rating curve.

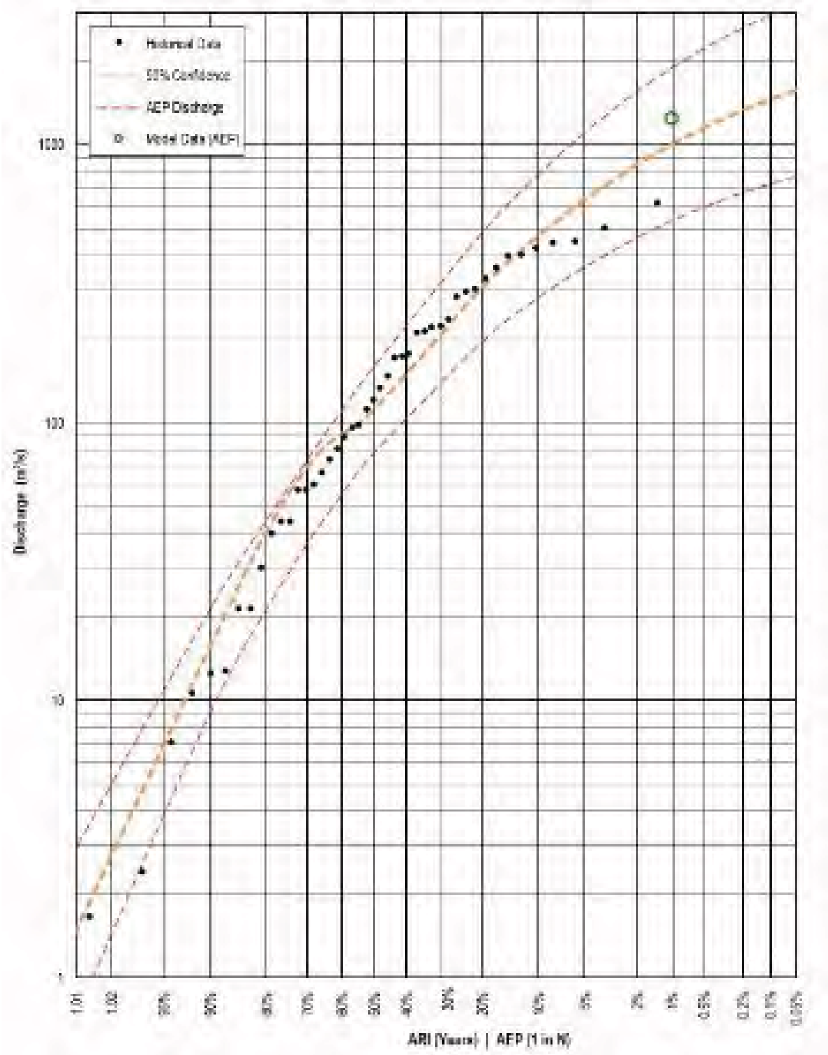

Figure 2 Flood frequency analysis – Lumeah 2 gauge

The Nindooinbah gauge is well rated to flows up to 588 m^3/s but relies on extrapolation of the rating curve for higher flows. The predicted 1% AEP flow at Nindooinbah is 1569 m^3/s, which is slightly lower than the FFA 1% AEP estimate of 1657 m^3/s at this location. The two key limiting factors of this analysis was that there is only 22 years of records at the gauge and the 1% AEP is in the extrapolation region of the rating curve.

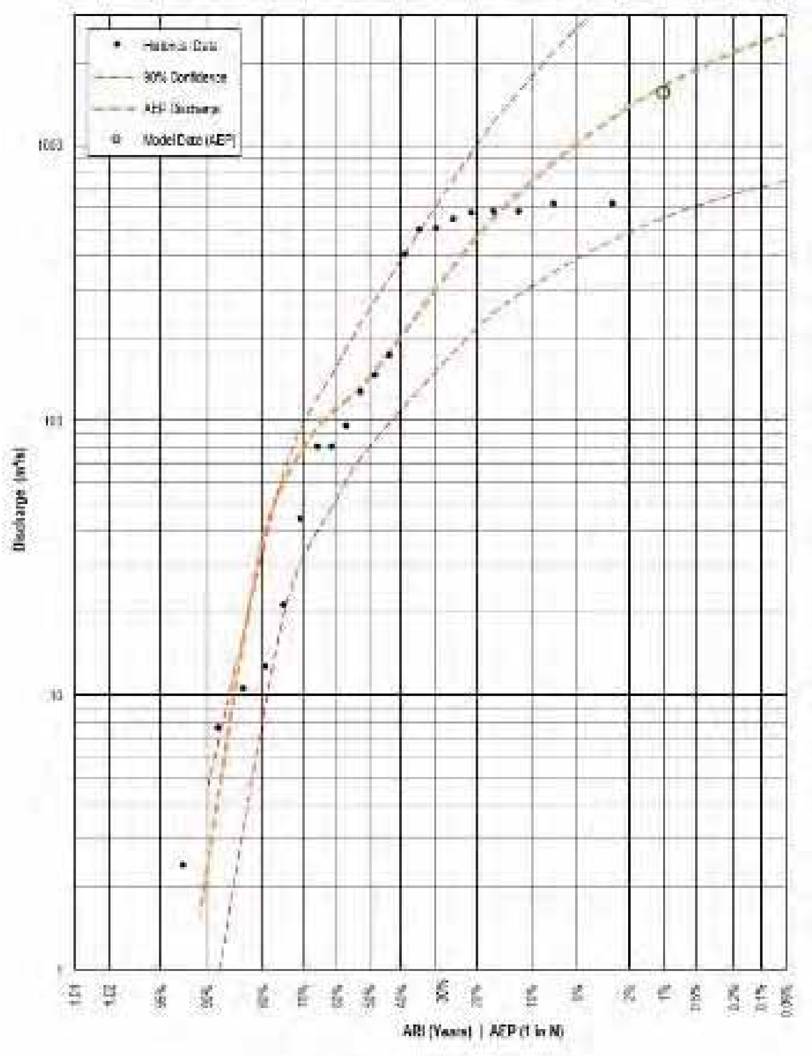

Figure 3 Flood frequency analysis – Beaudesert gauge

The Bromfleet gauge is well rated to flows up to 1794 m^3/s but relies on extrapolation of the rating curve for higher flows. The predicted 1% AEP flow at Bromfleet is 2271 m^3/s, which is higher than the FFA 1% AEP estimate of 1935 m^3/s at this location. Whilst data is recorded back to 1927 at this gauge peak flows are only available from 1986 giving 29 years of data for use in the FFA. Therefore, the reliability of this FFA is questionable.

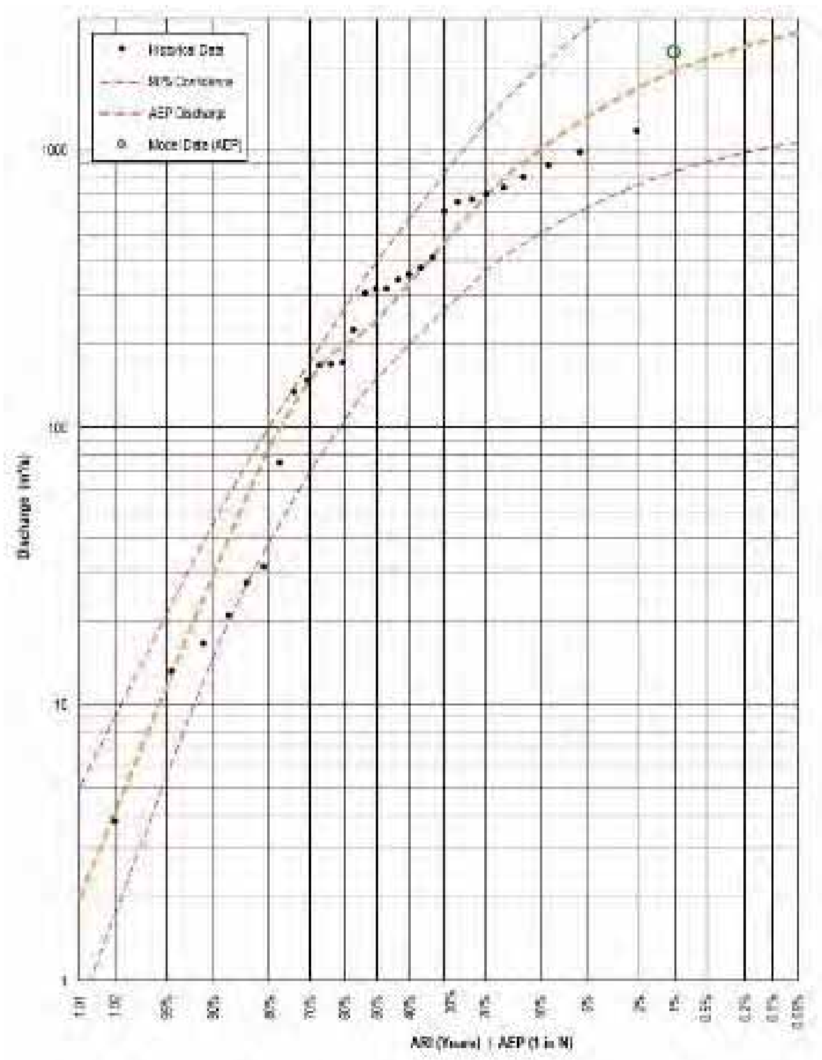

Figure 4 Flood frequency analysis – Bromfleet gauge

5.2 2%, 5% and 10% AEP events

5.2.1 Hydrology

Parameterisation of the RAFTS model for the 10%, 5% and 2% AEP events was based on the calibrated 1% AEP event hydrologic model. The event independent parameters were retained as per the calibrated 1% AEP event RAFTS 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 RAFTS loss model parameters are shown in Table 13.

Table 13 Albert River RAFTS model design event parameters

Design Event	Loss model parameters	
	Initial Loss (mm)	Continuing Loss Rate (mm/hr)
2% AEP	15	1.5
5% AEP	25	2.0
10% AEP	30	2.5

5.2.2 Hydraulics

The calibrated TUFLOW model developed to investigated the 1% AEP flooding behaviour within the Albert River catchment was adopted to assess the additional smaller design events. The model was developed using a multiple domain with both 30 m and 10 m grid resolutions. The model grid spacing approach 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 July 2017. Locations for ground survey were 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 Albert River catchment 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 14 details the Albert River crossing locations selected for survey. These structures have been included in the refined hydraulic model.

Table 14 Surveyed Albert River crossings

Locality	Description	Structure Type	Key structure dimensions (m)	Deck/Road Level (m AHD)
Darlington	Newton Bridge on Kerry Road	Concrete bridge	22.9 m (l) x 4.3 m (w)	189.1 m AHD
Darlington	Junction Bridge on Kerry Road	Concrete bridge	33.4 m (l) x 4.6 m (w)	177.3 m AHD
Hillview	Keaveny Bridge on Kerry Road	Timber bridge	37.4 m (l) x 4.9 m (w)	162.9 m AHD
Hillview	Ward Bridge on Kerry Road	Concrete bridge	41.1 m (l) x 4.8 m (w)	147.1 m AHD
Kerry	Kerry Bridge on Kerry Road	Concrete bridge	72.0 m (l) x 8.5 m (w)	105.0 m AHD
Tabragalba	Radke Bridge on Beaudesert-Nerang Road	Timber bridge	22.7 m (l) x 5.2 m (w)	54.9 m AHD
Birnam	Flagstone Creek Bridge at Beaudesert-Beenleigh Road	Concrete bridge	26.2 m (l) x 7.5 m (w)	48.1 m 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 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 to improved delineation between in and out of bank flow conditions.

5.2.3.4 Grid resolution

The 1% AEP model was originally developed using multiple domain square grid. The upper extremes of the river and the tributaries have been modelled as a 10 m grid with the lower reaches a 30 m grid. Modelling the steeper narrow tributaries with a smaller grid size allows the channel to be represented in a greater definition within the model. For the 10% to 2% AEP events, a greater portion of catchment discharge flows within the banks of the watercourse, however, as the upper extents have a smaller grid size, the existing grid resolution was deemed adequate.

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 Albert River 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 15 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 5.
  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.

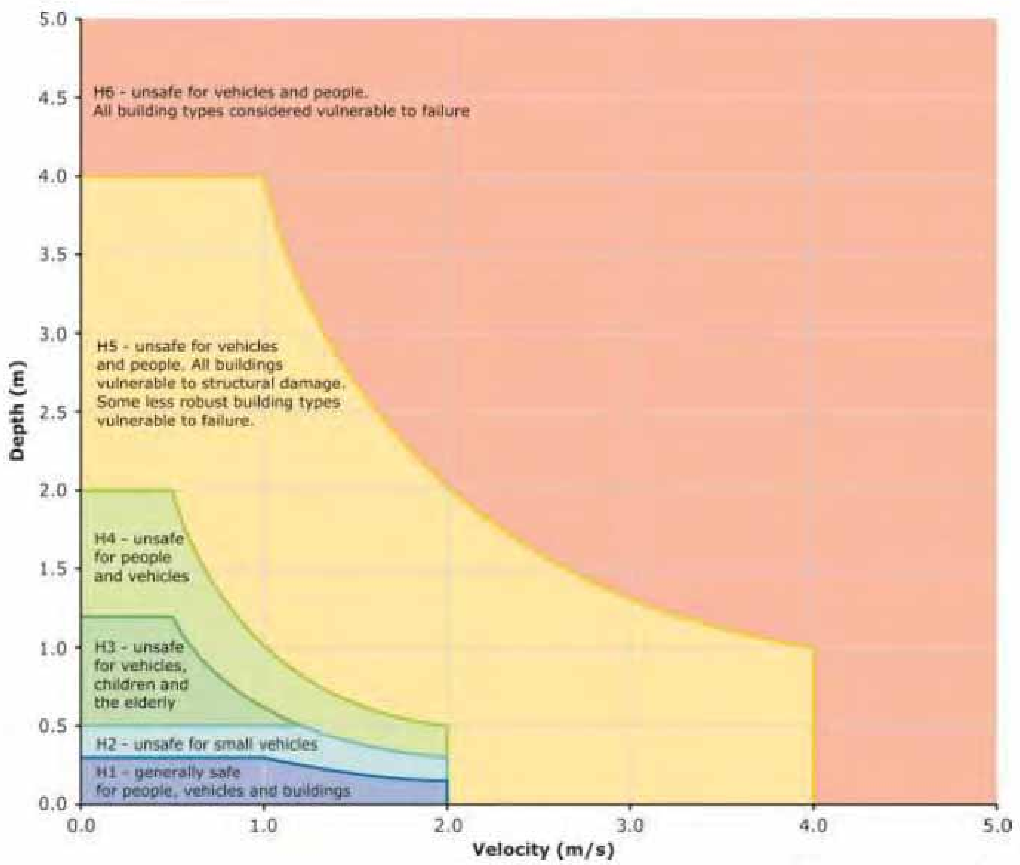

Figure 5 EMA revised flood hazard classification. ***Source: Australian Emergency Management Handbook Series (2013) - Technical flood risk management guideline: Flood hazard***

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 16. The table shows the increasing in peak discharge both with severity of the event and increasing distance travelled downstream through the catchment.

Table 16 Design event (AEP) peak discharges at key locations

Location	Peak Discharge (m^3/s)		
	10% AEP	5% AEP	10% AEP
Kerry Road – Newton bridge	109	149	190
Kerry Road – Junction Bridge	363	496	626
Kerry Road – Keaveny Bridge	417	582	743
Kerry Road – Ward Bridge	413	575	735
Kerry Road – Kerry Bridge	468	640	814
Albert River Crossing, Beaudesert-Nerang Road	525	667	1064
Albert River Crossing, Beaudesert-Beenleigh Road	45	79	128

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 Albert River 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 Bureau of Meteorology (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 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 Lumeah alert gauge

The Lumeah alert gauge is located upstream of the Nindooinbah Estate Road crossing of Albert River. The gauge is in a rural area surrounded primarily by pasture and grazing land. The current flood classification gauge levels for the Lumeah alert gauge are shown in Table 17.

Table 17 Existing BoM flood classifications – Lumeah alert gauge

Flood height (m)		
Minor	**Moderate**	**Major**
Lumeah Alert (Station #40936)		
5.0	7.0	9.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 18**Error! Reference source not found.**. The review indicates that the current flood classifications at the Lumeah alert gauge are not adequate.

Table 18 Lumeah alert gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
84.9	**5.0**	▪ Peak flood waters overtop the banks of the tributary upstream of the gauge ▪ Significant inundation of farmland upstream of the gauge ▪ Several minor access roads/tracks are overtopped cutting access ▪ Some properties are isolated	Minor
87.9	**8.0**	▪ Nindooinbah Estate Road is overtopped upstream of the connection with Lambert Road, but still trafficable. This road is about to lose access. ▪ Significant inundation of farmland upstream of the gauge ▪ More properties become isolated	Moderate
90.9	**11.0**	▪ Flooding in the tributary joins with flooding of the Albert River main channel ▪ Flood waters are overtopping the banks of the Albert River main channel ▪ Nindooinbah Estate Road is significantly overtopped and access is lost ▪ Lambert Road is overtopped and access is lost at the intersection with Nindooinbah Estate Road ▪ Numerous properties are isolated	Major

6.6.2 Bromfleet alert gauge

The Bromfleet alert gauge is located upstream of the Beaudesert-Beenleigh Road crossing of Albert River. The gauge is in a rural area surrounded primarily by pasture and grazing land. The current flood classification gauge levels for the Bromfleet alert gauge are shown in Table 19.

Table 19 Existing BoM flood classifications – Bromfleet alert gauge

Flood height (m)		
Minor	Moderate	Major
Bromfleet Alert (Station #40938)		
9.0	12.0	16.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 20. The review indicates that the current flood classifications at the Bromfleet alert gauge are not adequate.

Table 20 Bromfleet alert gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
40.2	**12.0**	▪ Flood waters are overtopping the banks of the Albert River main channel upstream of the gauge ▪ Mundoolun Connection Road is overtopped and access is lost ▪ Several minor access roads/tracks are overtopped leading to the isolation of some habitable properties	Minor
41.7	**13.5**	▪ Significant inundation of farmland upstream and downstream of the gauge ▪ Murdoolun Connection Roads is inundated in several locations ▪ Numerous minor access roads/tracks are overtopped ▪ Numerous properties are isolated	Moderate
43.8	**15.6**	▪ Widespread inundation of farmland upstream and downstream of the gauge ▪ Beaudesert-Beenleigh Road is overtopped cutting access ▪ Murdoolun Connection Roads is significantly inundated in several locations ▪ Numerous minor access roads/tracks are overtopped ▪ Numerous properties are isolated ▪ Beaudesert Nerang Road is overtopped at Albert River crossing	Major

6.6.3 Tamborine alert gauge

The Tamborine alert gauge is located upstream of the Nindooinbah Estate Road crossing of Albert River. The gauge is in a rural area surrounded primarily rural residential land. The current flood classification gauge levels for the Tamborine alert gauge are shown in Table 21.

Table 21 Existing BoM flood classifications – Tamborine alert gauge

Flood height (m)		
Minor	Moderate	Major
Tamborine Alert (Station #540691)		
10.0	11.0	15.0

A review of flood classification levels in light of modelled flooding conditions is provided below in Table 22. The review indicates that the current flood classifications at the Tamborine alert gauge are not adequate.

Table 22 Tamborine alert gauge analysis

Water level (m AHD)	Gauge Level (m)	Flood condition description	Suggested flood classification
32.3	**13.3**	▪ Flood waters are overtopping the banks of the Albert River main channel ▪ Numerous local access roads/tracks are overtopped ▪ A small number of habitable properties are isolated ▪ Waterford-Tamborine Road is about to overtop	Minor
32.8	**13.8**	▪ Extensive floodplain inundation in some locations around the gauge ▪ More properties become isolated ▪ Waterford-Tamborine road is overtopped ▪ Beenleigh-Beaudesert Road is about to overtop ▪ Plunkett Road is about to overtop ▪ Boomerang Road is overtopped ▪ Numerous local access roads/tracks are overtopped	Moderate
34.0	**15.0**	▪ Extensive floodplain inundation upstream and downstream of the gauge ▪ Numerous local access roads/tracks are overtopped and access is cut ▪ Waterford-Tamborine Road is overtopped ▪ Beaudesert-Beenleigh Road is overtopped ▪ Plunkett Road is overtopped ▪ Numerous properties are isolated	Major

6.6.4 Nindooinbah TM gauge

The Nindooinbah TM gauge is located upstream of the Beaudesert-Nerang Road crossing of Albert River. The gauge is in a rural area surrounded primarily by pasture and grazing land and is approximately 6km east of the Beaudesert township. The area is sparsely populated as is typical for rural grazing areas. Whilst gauge flood classifications were not available from the BoM for the Nindooinbah TM gauge, flood gauge level classifications are suggested below based on the BoM hazard rating descriptors in light of population and land use characteristics of the gauge area.

Table 23 Nindooinbah TM gauge analysis

Proposed Water level (m AHD)	Flood condition description	Suggested flood classification
70.9	▪ Flood waters are overtopping the banks of the Albert River main channel upstream of the gauge ▪ Large areas of pasture land are inundated upstream of the gauge ▪ Several minor access roads/tracks are overtopped	Minor

Proposed Water level (m AHD)	Flood condition description	Suggested flood classification
71.3	▪ Significant inundation of farmland upstream of the gauge ▪ Numerous minor access roads/tracks are overtopped leading to the isolation of some habitable properties ▪ Beaudesert Beenleigh Road is overtopped and access is lost upstream of the connection with Beaudesert Nerang Road	Moderate
72.1	▪ Widespread inundation of farmland upstream and downstream of the gauge ▪ Beaudesert-Beenleigh Road is overtopped is several locations cutting access ▪ Beaudesert-Nerang Road is overtopped is several locations cutting access	Major

6.6.5 Cainbable Creek TM gauge

The Cainbable Creek TM gauge is located on Cainbable Creek 9km upstream of the confluence with Albert River. The gauge is in a rural area surrounded primarily by pasture and grazing land. The area is sparsely populated as is typical for rural grazing areas. Whilst gauge flood classifications were not available from the BoM for the Cainbable Creek TM gauge, flood gauge level classifications are suggested below based on the BoM hazard rating descriptors in light of population and land use characteristics of the gauge area.

Table 24 Cainbable TM gauge analysis

Proposed Water level (m AHD)	Flood condition description	Suggested flood classification
124.5	▪ Flood waters are overtopping the banks of the Albert River main channel upstream of the gauge ▪ Several minor access roads/tracks are overtopped	Minor
125.1	▪ Large areas of pasture land are inundated upstream of the gauge ▪ Numerous minor access roads/tracks are overtopped leading to the isolation of some habitable properties ▪ Cainbable Creek Road is overtopped and access is lost gauge connection with Beaudesert Nerang Road	Moderate
125.6	▪ Widespread inundation of farmland upstream and downstream of the gauge ▪ Several habitable rural properties are inundated or isolated ▪ This is the peak level at the gauge for the 1% AEP storm event	Major

6.6.6 Opportunities for additional alert gauges

A new gauge should be considered at Kerry Road, downstream of the crossing of two creeks. This location is upstream of Darlington State School and Darlington and Burgess Campgrounds. It will give better warning to these sites.

7 Conclusions

Scenic Rim Regional Council (SRRC) is currently updating its existing flood modelling to gain a better understanding of the Natural Hazard (Flood) characteristics for a range of events from relatively frequent (10% AEP) to rare (1% AEP). This update to the existing flood study has been undertaken for the Albert River catchment within Council's boundaries to provide Council with detailed flood information across the floodplain.

Hydrologic modelling has been carried out using the established LCC RAFTS 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 30m & 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 30m & 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

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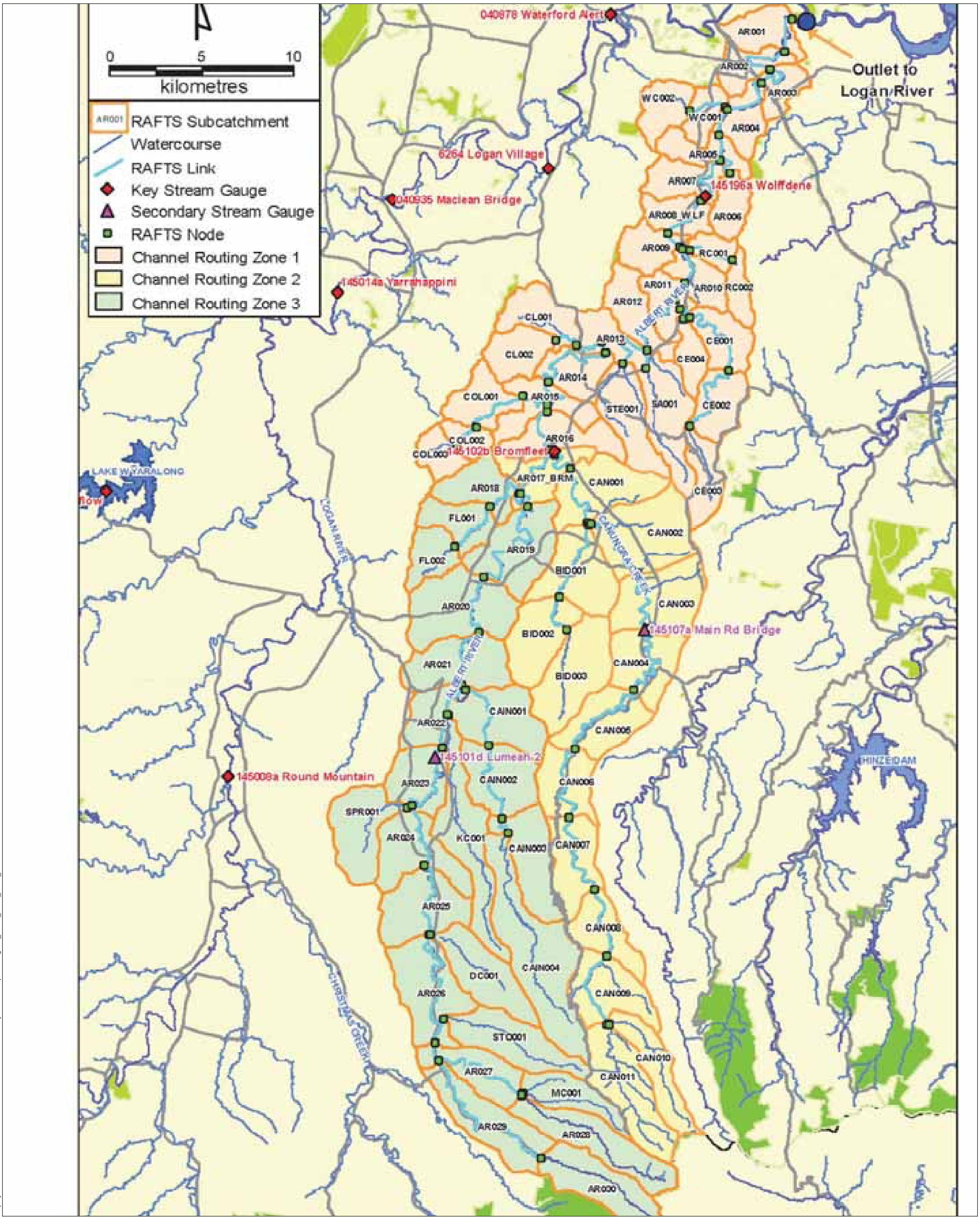
Figure F	Emergency Response Mapping

aurecon



Map by: JD P:\SWM\Work\247064 Albert River Flood Study\GIS\Workspaces\Fig001_Albert_River_Rafts_Model.wor

Legend

Notes:

No Window

A3 scale 1:200,000

0 5,000 m 10,000 m

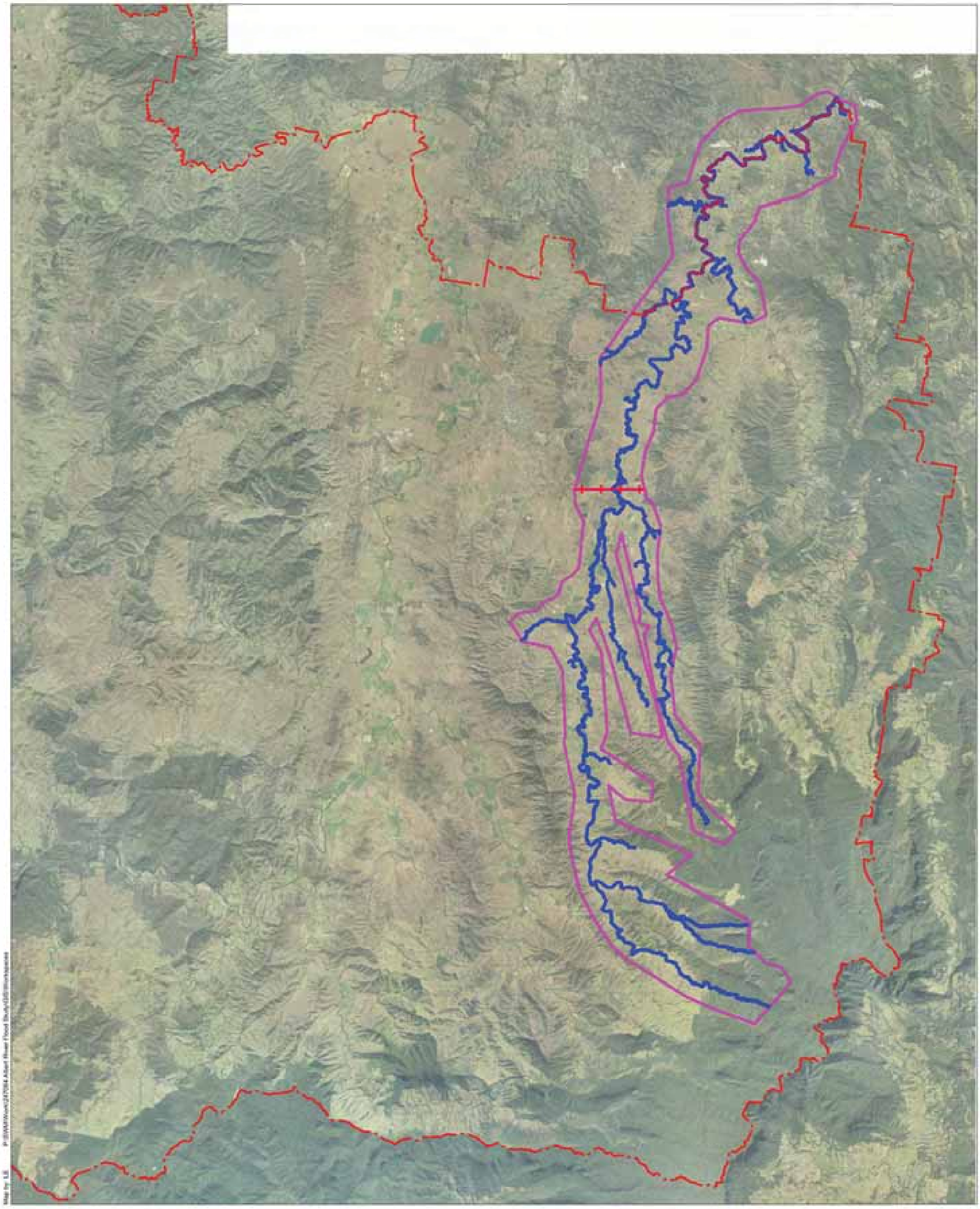
Date: 08/12/2015 Version: 0 Job No: 247064

Projection: MGA Zone 56

Albert River Flood Study Figure A-1

RAFTS Layout - Sourced from Logan City Council

aurecon



Legend

- 2d2d Boundary
- 2D Model Boundary
- SRRC Boundary
- Channel Land Use

Notes:

A3 scale 1:200,000

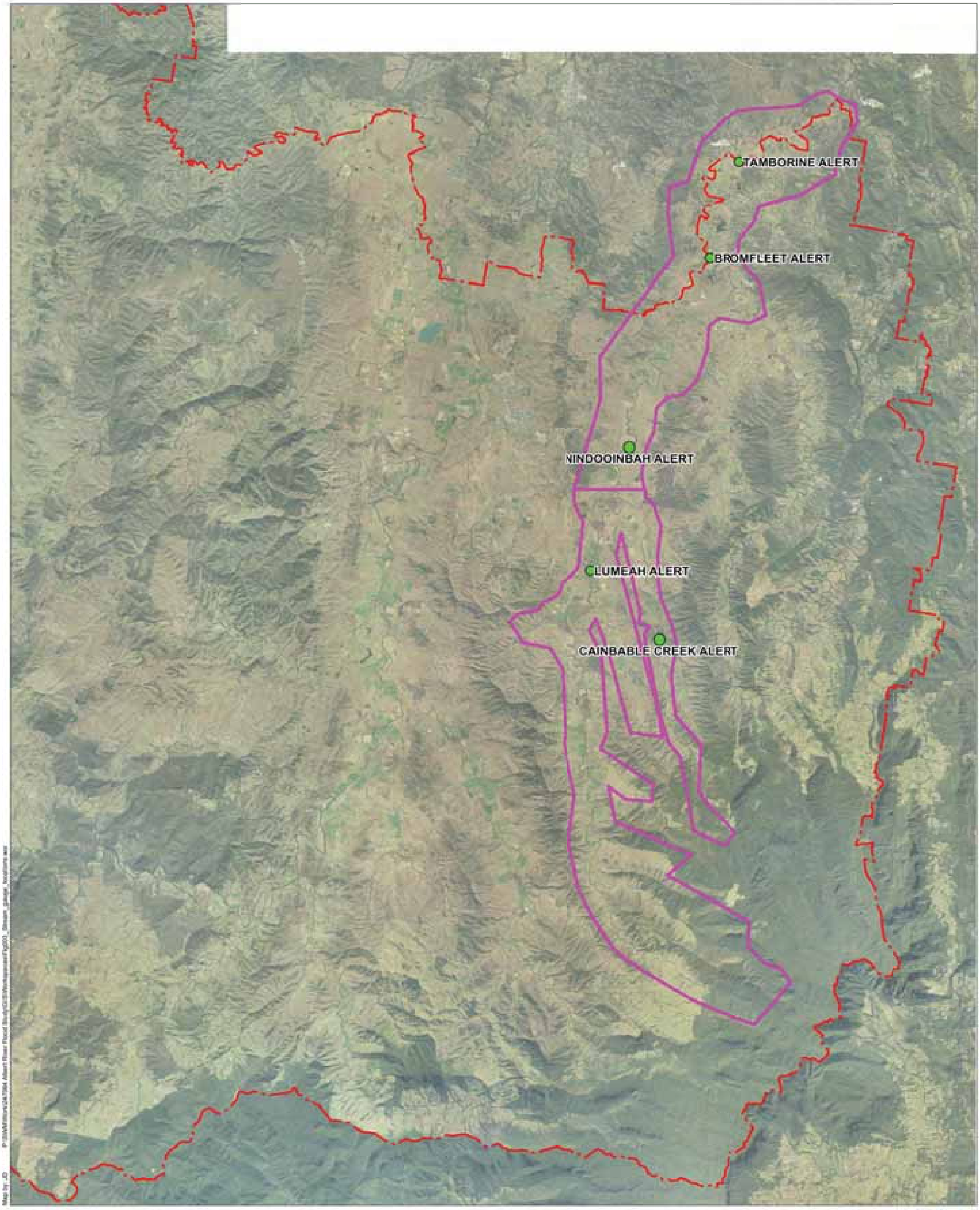
0 5,000 m 10,000 m

Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study **Figure A-2**

Hydraulic Model Extents

aurecon



Legend

Gauge Locations

SRRC Boundary

Notes:

A3 scale 1:200,000

0 5,000 m 10,000 m

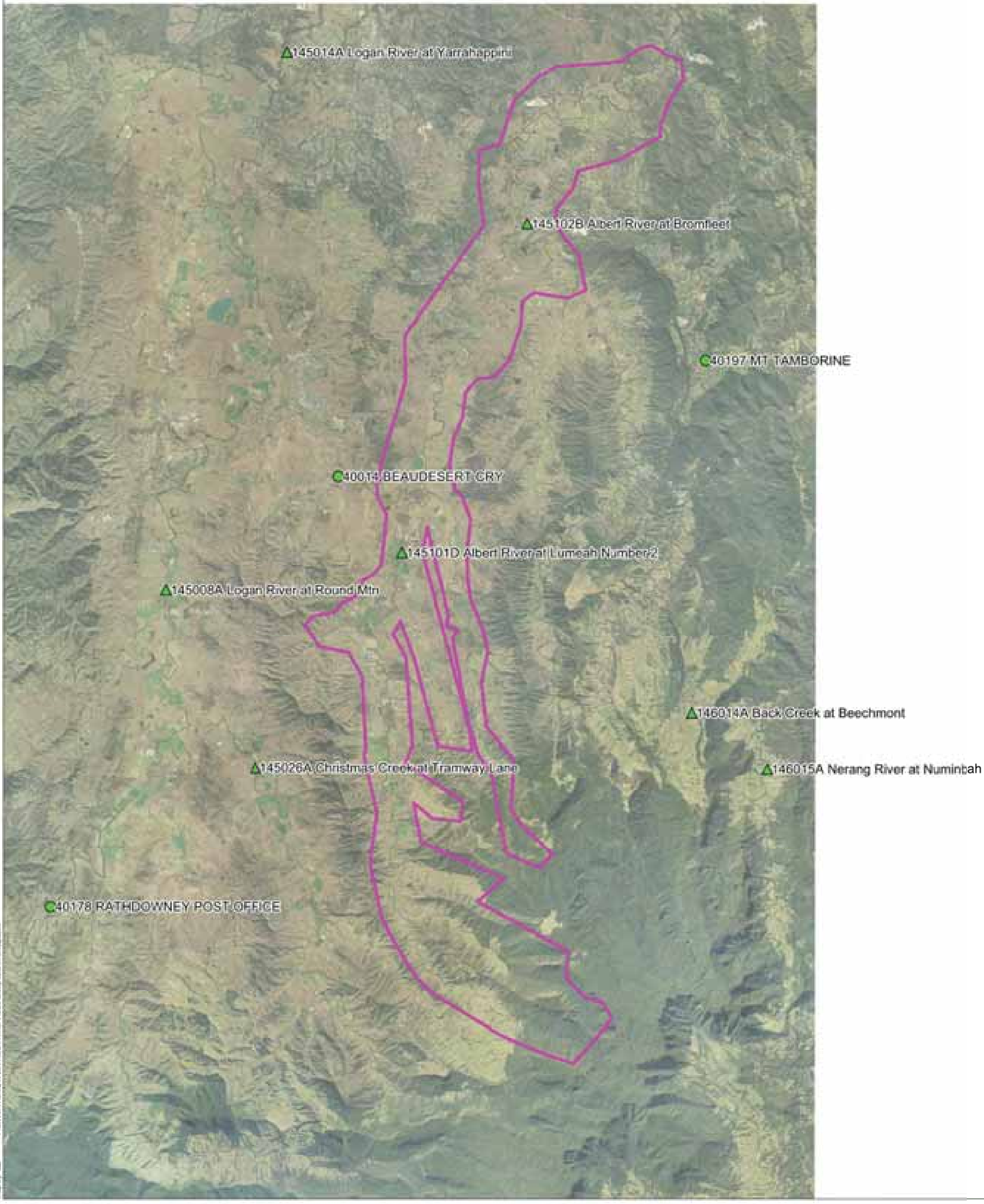
Date: 08/12/2015 Version: 0 Job No: 247064

Projection: MGA Zone 56

Albert River Flood Study Figure A3

Stream Gauge Locations

aurecon



Legend

- DNRM Rainfall Stations
- BOM Rainfall Stations
- Model Boundary

Notes:

A3 scale 1:200,000

0 — 5,000 m — 10,000 m

Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study Figure A-4a

Rainfall Gauge Locations

aurecon

Legend

- Debris Mark
- Gauge Location
- Inundation Extents

Notes:

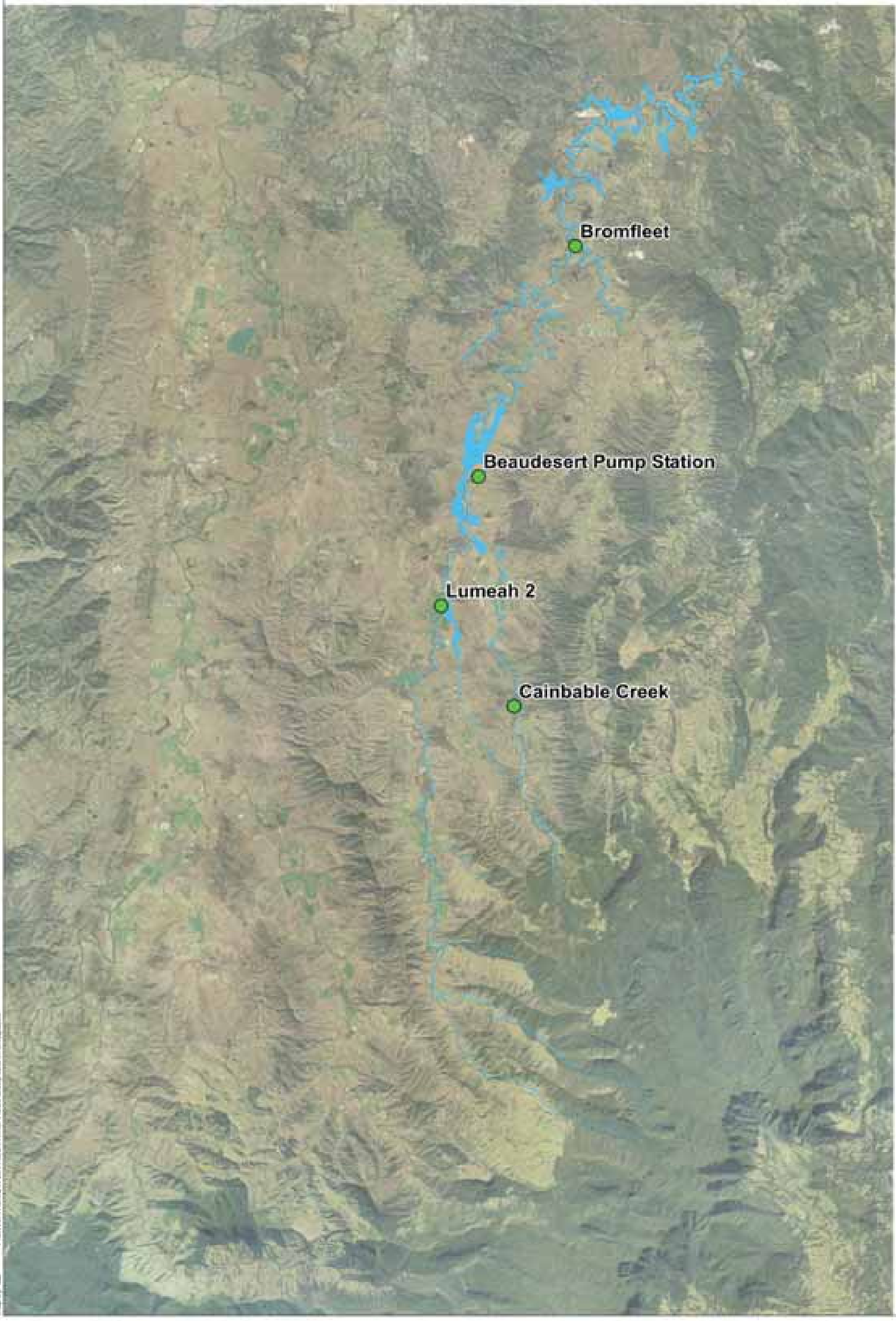
A3 scale 1:200,000

0 5,000 m 10,000 m

Date: 09/12/2015 Version: 0 Job No: 247064

Albert River Flood Study **Figure A-4b**

1974 Calibration Event



Legend

- Debris Mark
- Gauge Location
- Inundation Extents

Notes:

A3 scale 1:200,000

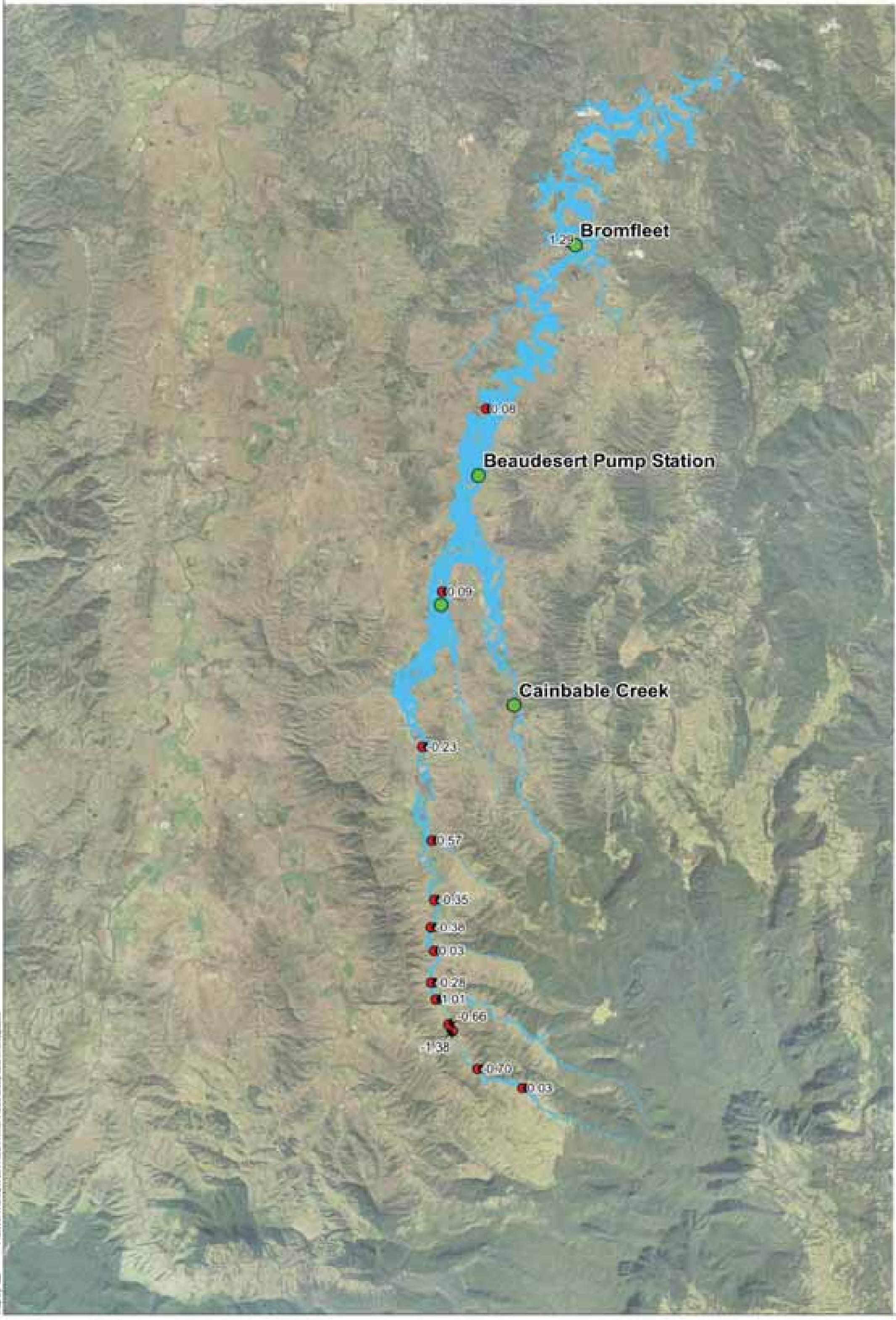
0 5,000 m 10,000 m

Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study **Figure A-4c**

1990 Calibration Event

aurecon



Legend

- Debris Mark
- Gauge Location
- Inundation Extent

Notes:

A3 scale 1:200,000

0 | 5,000 m | 10,000 m

Date: 08/12/2015 Version: 0 Job No: 247064

Projection: MGA Zone 56

Albert River Flood Study Figure A-4d

2008 Calibration Event

aurecon

Legend

- Gauge Location
- Debris Mark
- Inundation Extents

Notes:

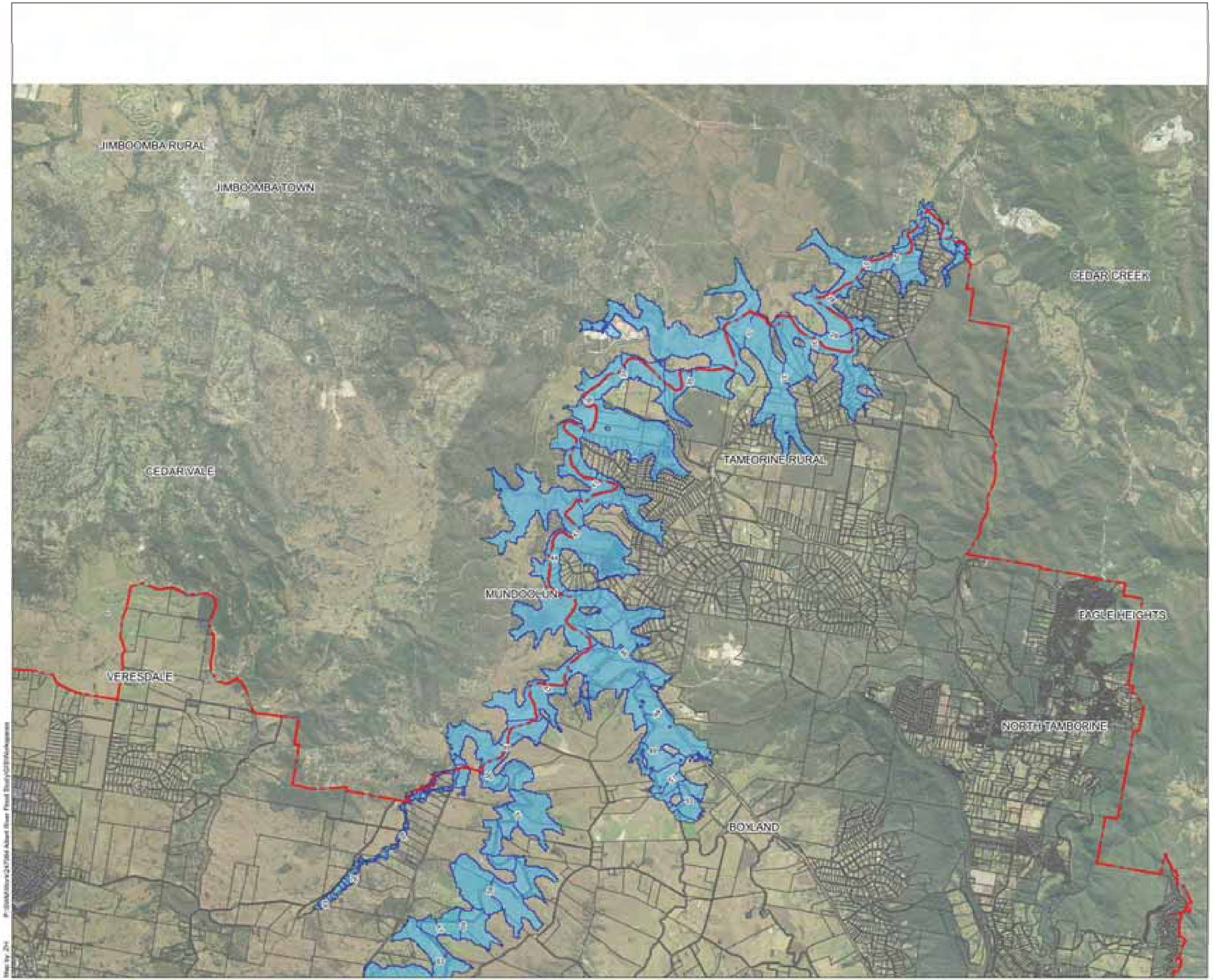
A3 scale 1:200,000

0 5,000 m 10,000 m

Date: 09/12/2015 Version: 0 Job No: 247064

Albert River Flood Study **Figure A-4e**

2013 Calibration Event



aurecon

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extents
- Peak Water Level Contour (m AHD)

Notes:

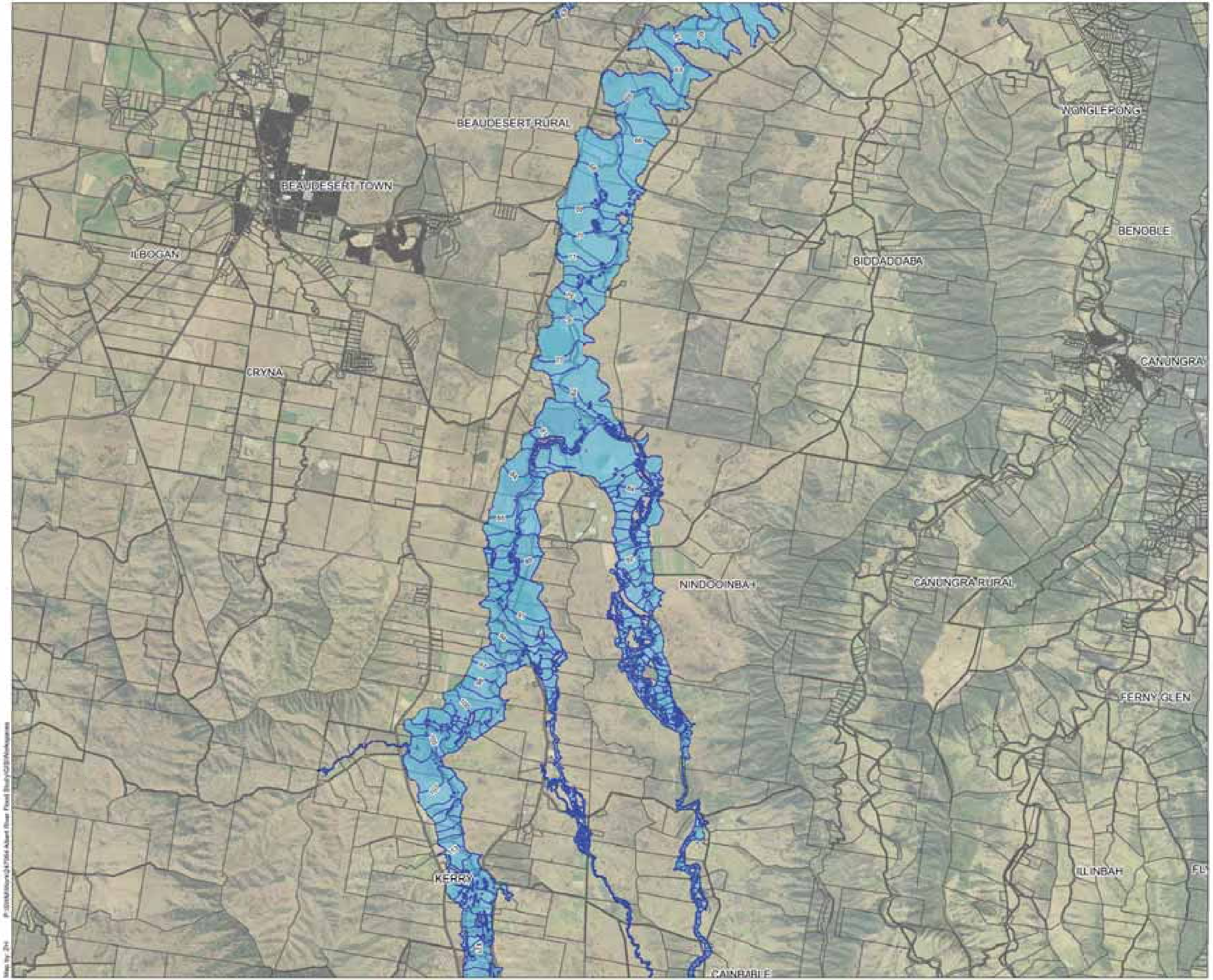
A3 scale 1:75,000

0 1875 m 3,750 m

Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study **Figure B1-a**

1% AEP Event - Inundation Extent & Peak Water Levels



Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extents
- Peak Water Level Contour (m AHD)

Notes:

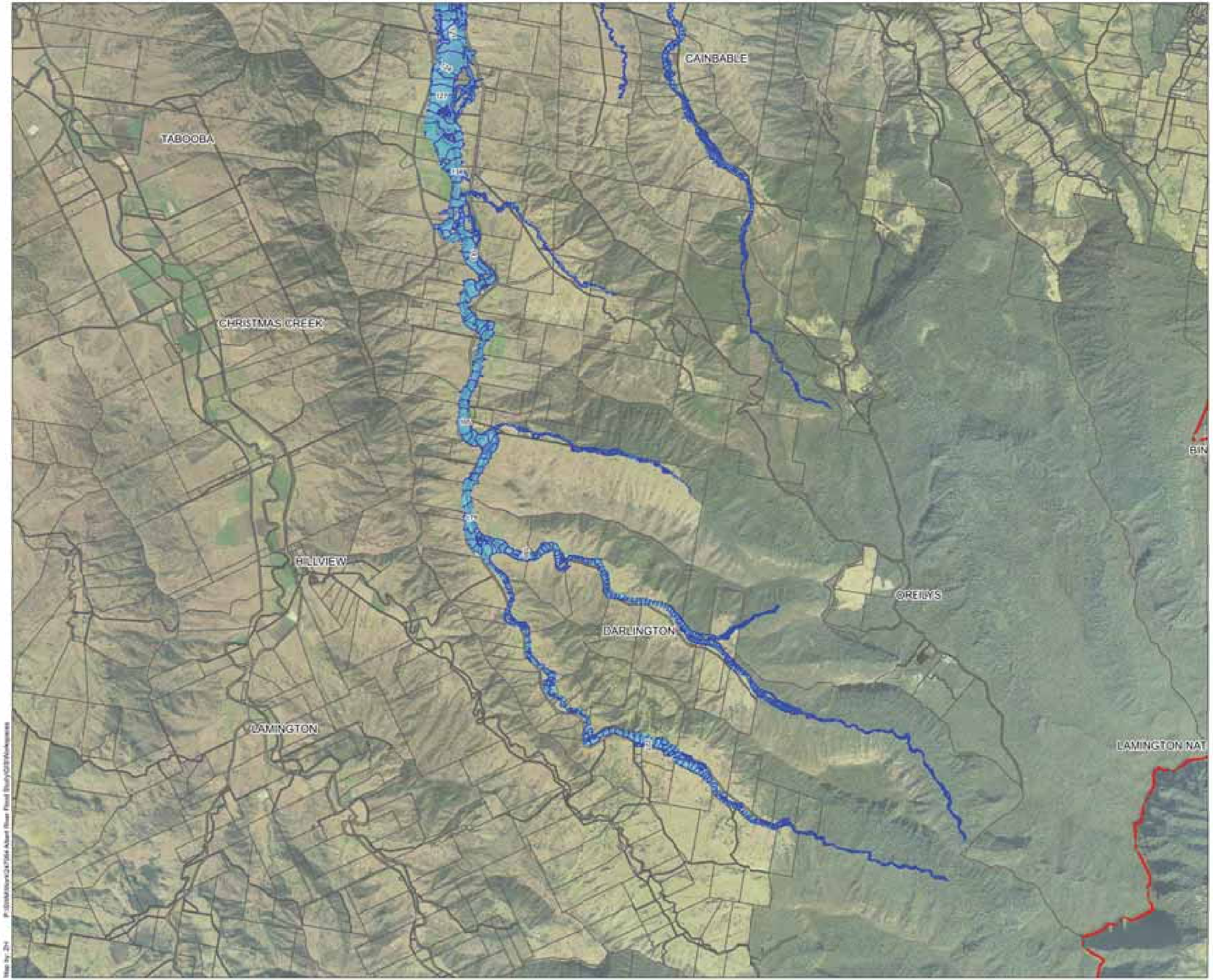
Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study

Figure B1-b

1% AEP Event - Inundation Extent & Peak Water Levels

Document Set ID: 10154450
Version: 1, Version Date: 21/12/2017



aurecon

Legend

- SRRC Boundary
- Cadastral Boundary
- Inundation Extents
- Peak Water Level Contour (m AHD)

Notes:

A3 scale 1:75,000

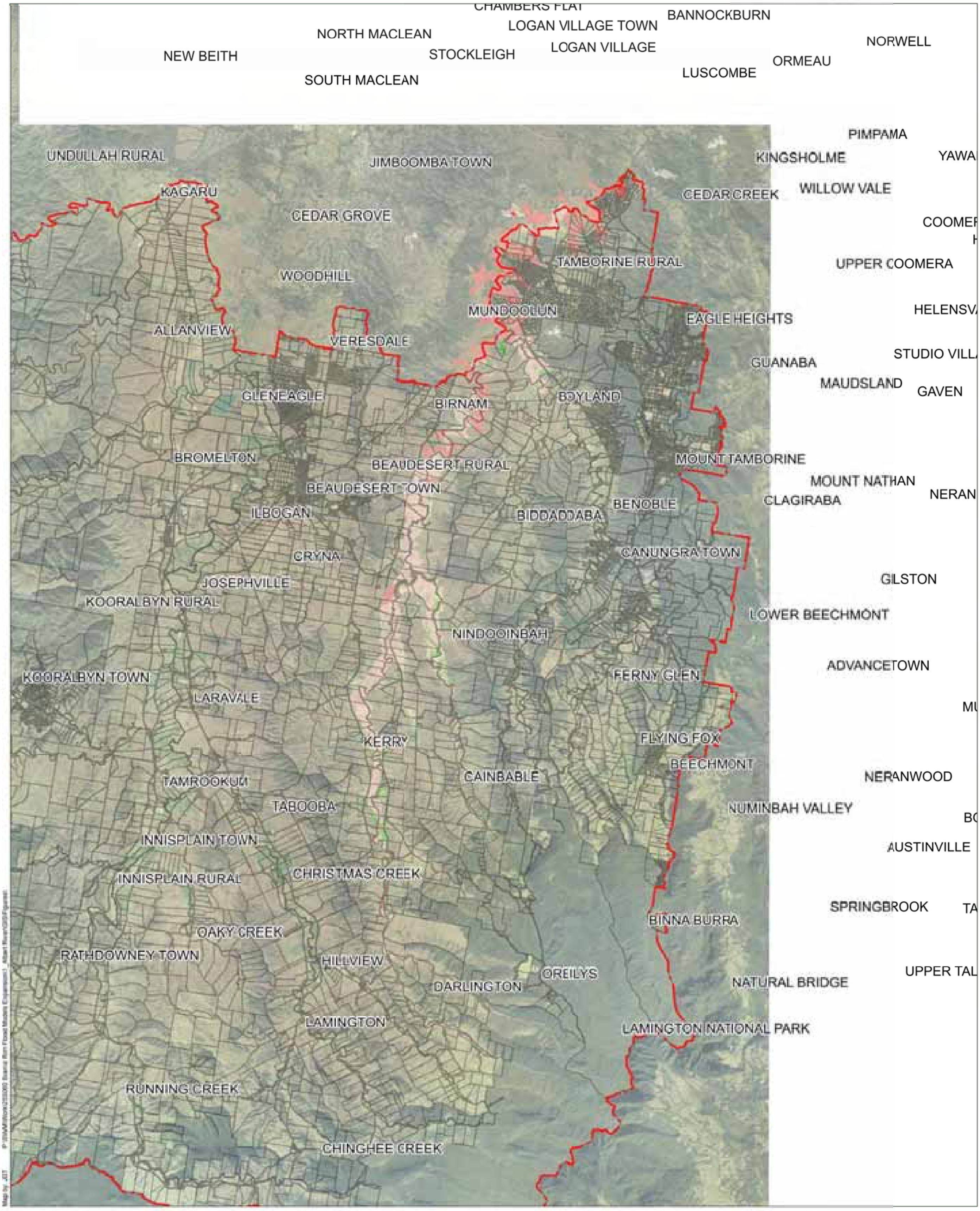
0 1875 m 3,750 m

Date: 08/12/2015 Version: 0 Job No: 247064

Albert River Flood Study

Figure B1-c

1% AEP Event - Inundation Extent & Peak Water Levels



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

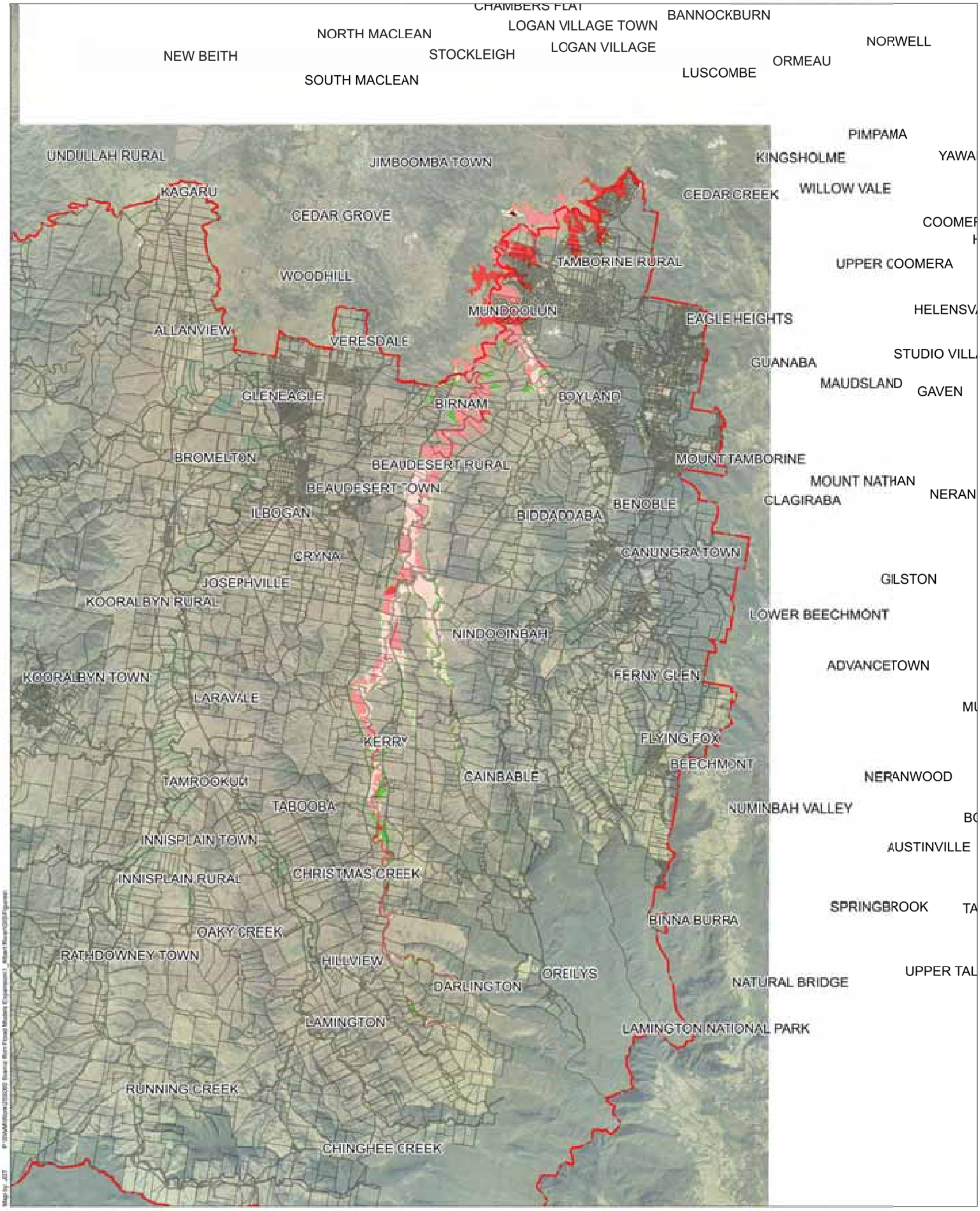
Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B2-a**

1% AEP Event - Climate Change Scenario 4.5 - Afflux Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary

Afflux (m)
< -0.80
-0.80 to -0.60
-0.60 to -0.40
-0.40 to -0.20
-0.20 to -0.03
-0.03 to 0.03
0.03 to 0.20
0.20 to 0.40
0.40 to 0.60
0.60 to 0.80
0.80 to 1.20
> 1.20
Was Dry Now Wet
Was Wet Now Dry

Notes:

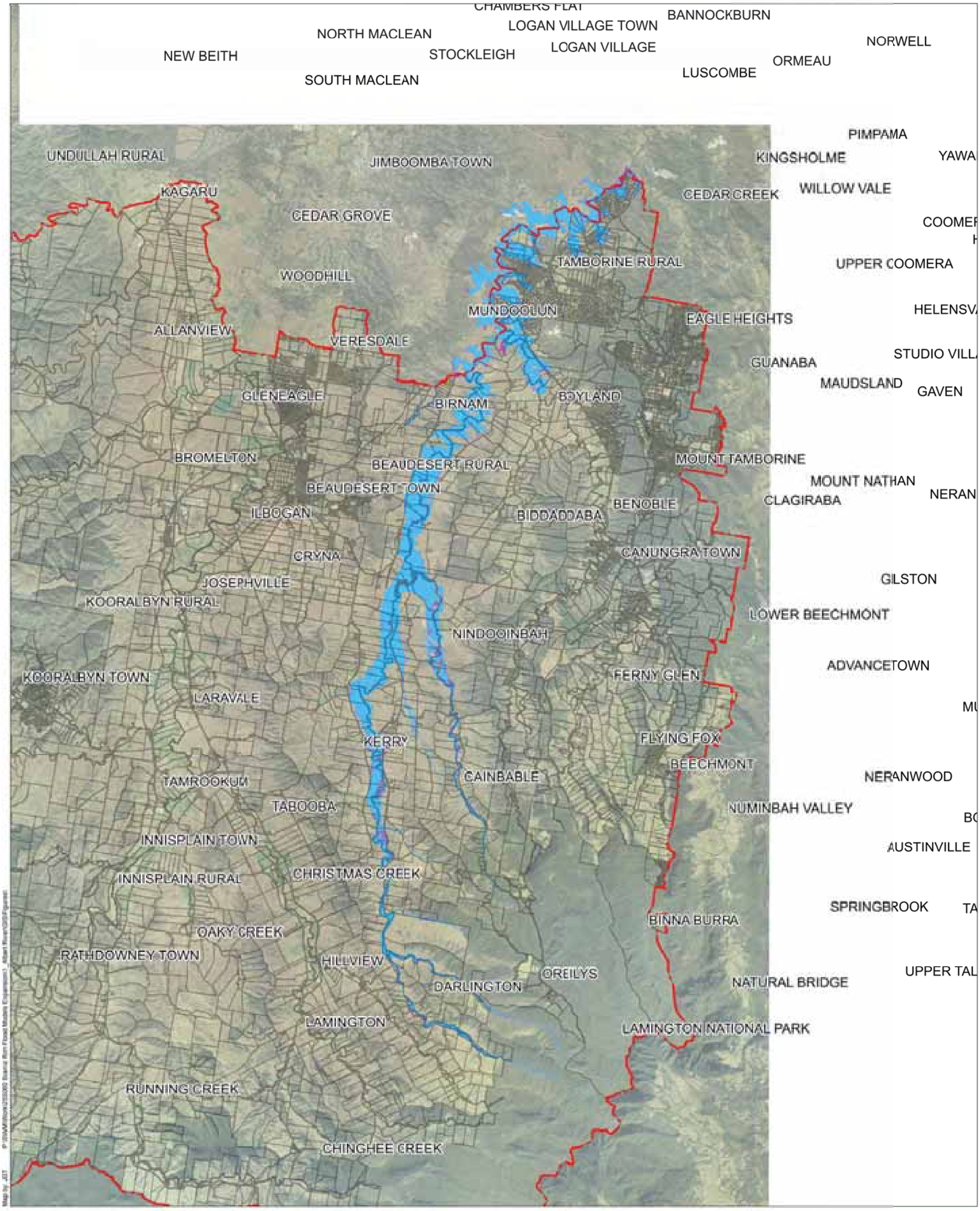
1:200,000
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B2-b**

1% AEP Event - Climate Change Scenario 8.5 - Afflux Map

aurecon



Legend

SRRC Boundary	Inundation Extent
Cadastral Boundary	Climate Change Inundation Extent

Notes:

1:200,000

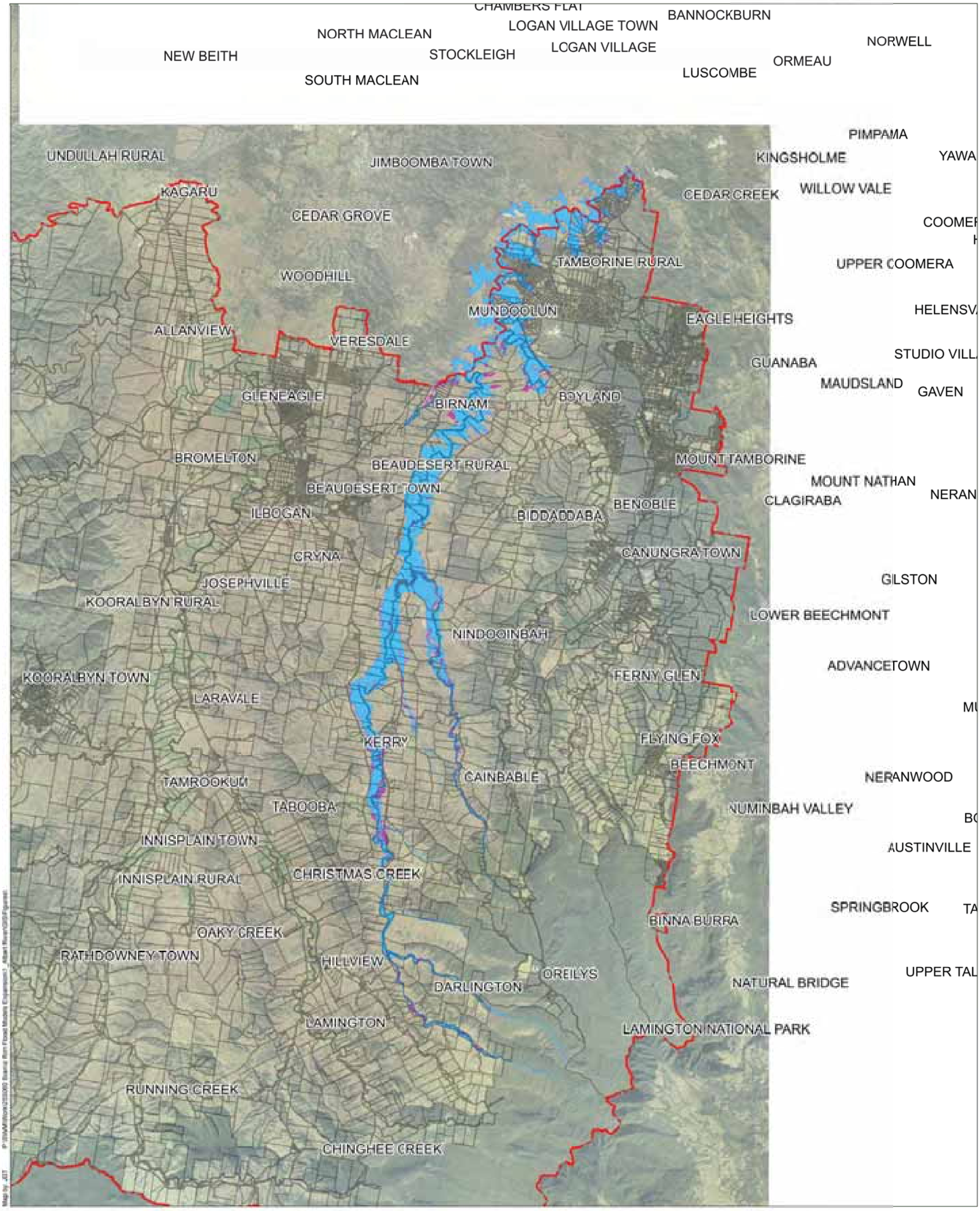
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B3-a**

1% AEP Event - Climate Change Scenario 4.5 - Inundation Extent



Legend

SRRC Boundary
Inundation Extent
Cadastral Boundary
Climate Change Inundation Extent

Notes:

1:200,000

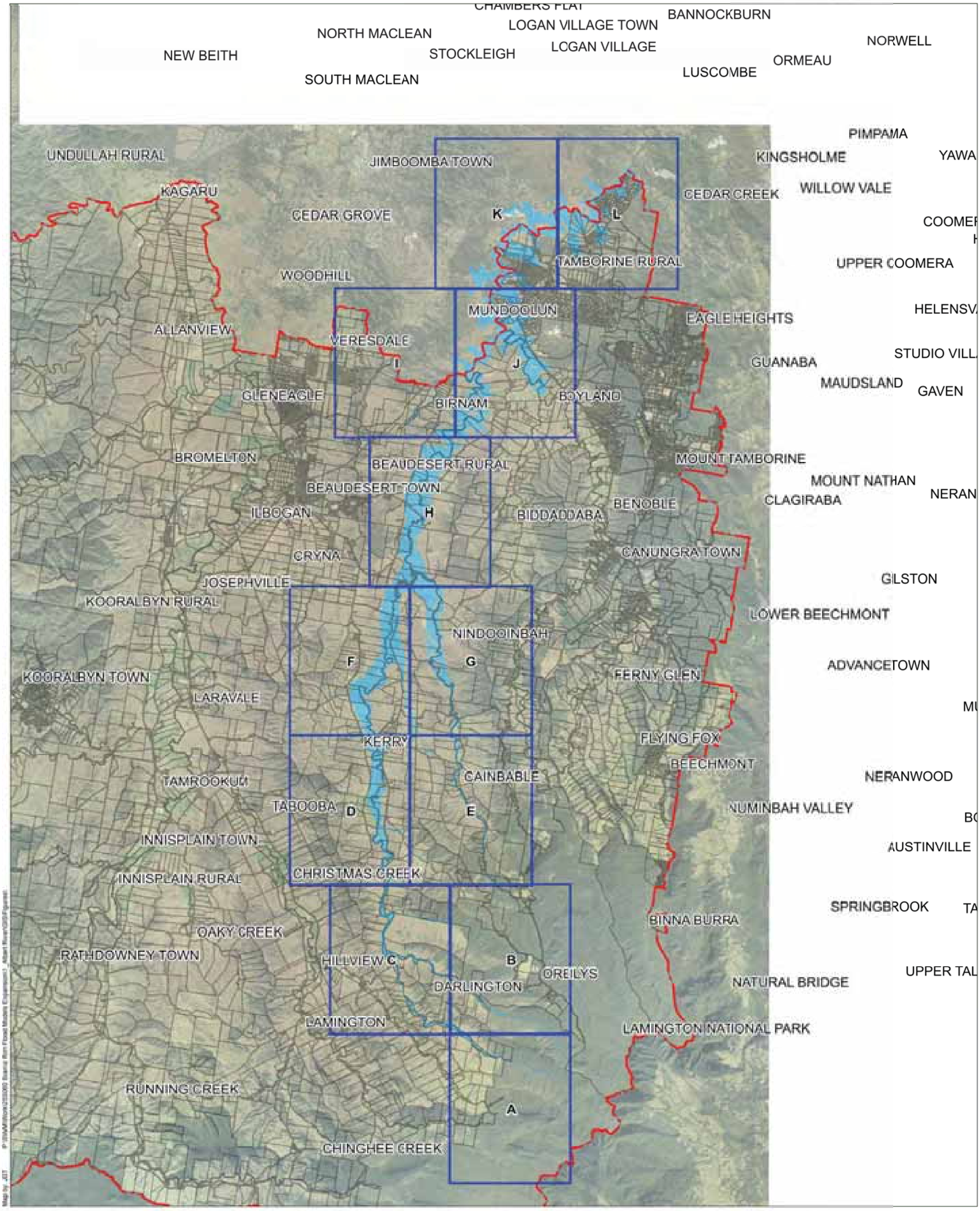
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B3-b**

1% AEP Event - Climate Change Scenario 8.5 - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:200,000

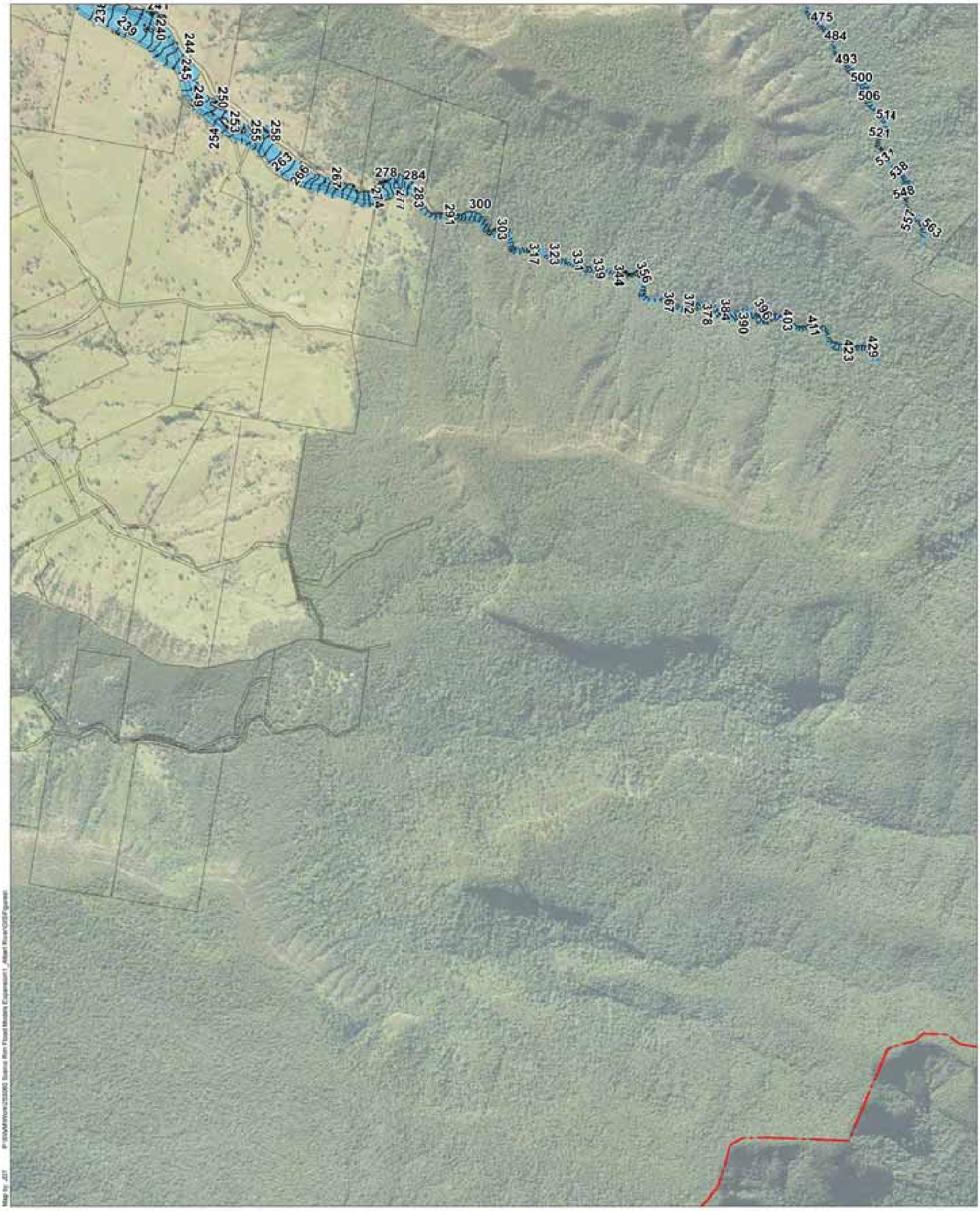
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

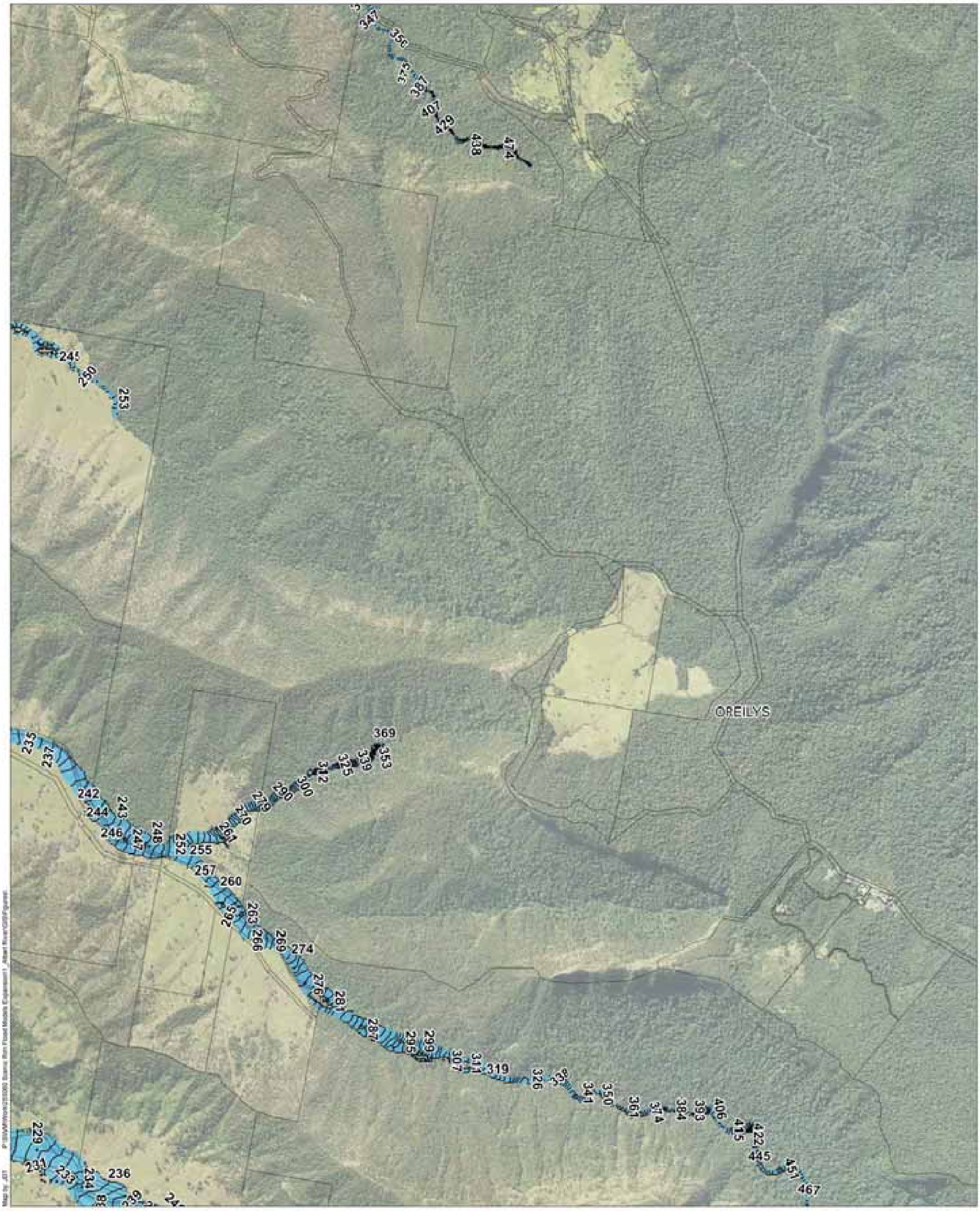
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-a**

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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

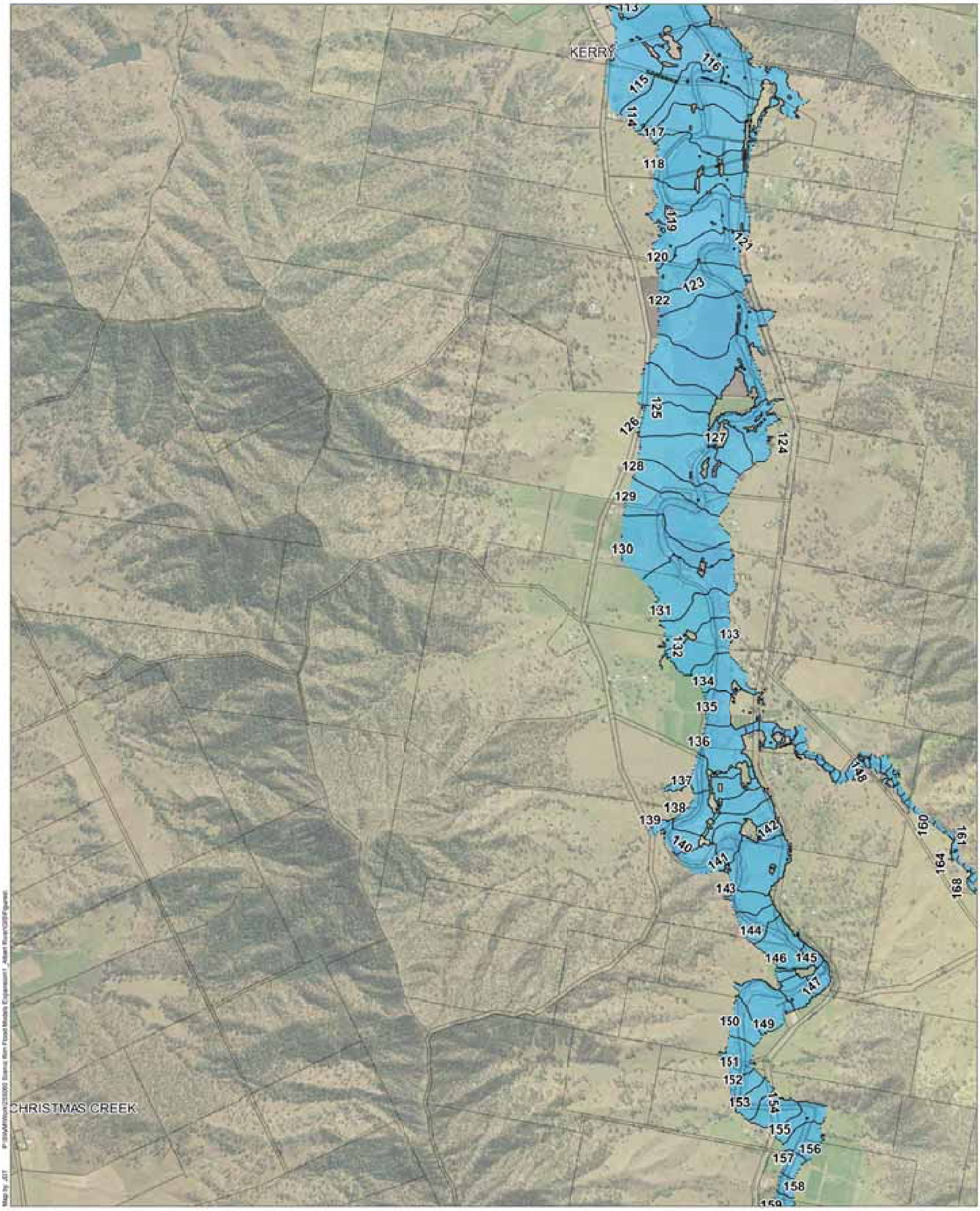
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-c**

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

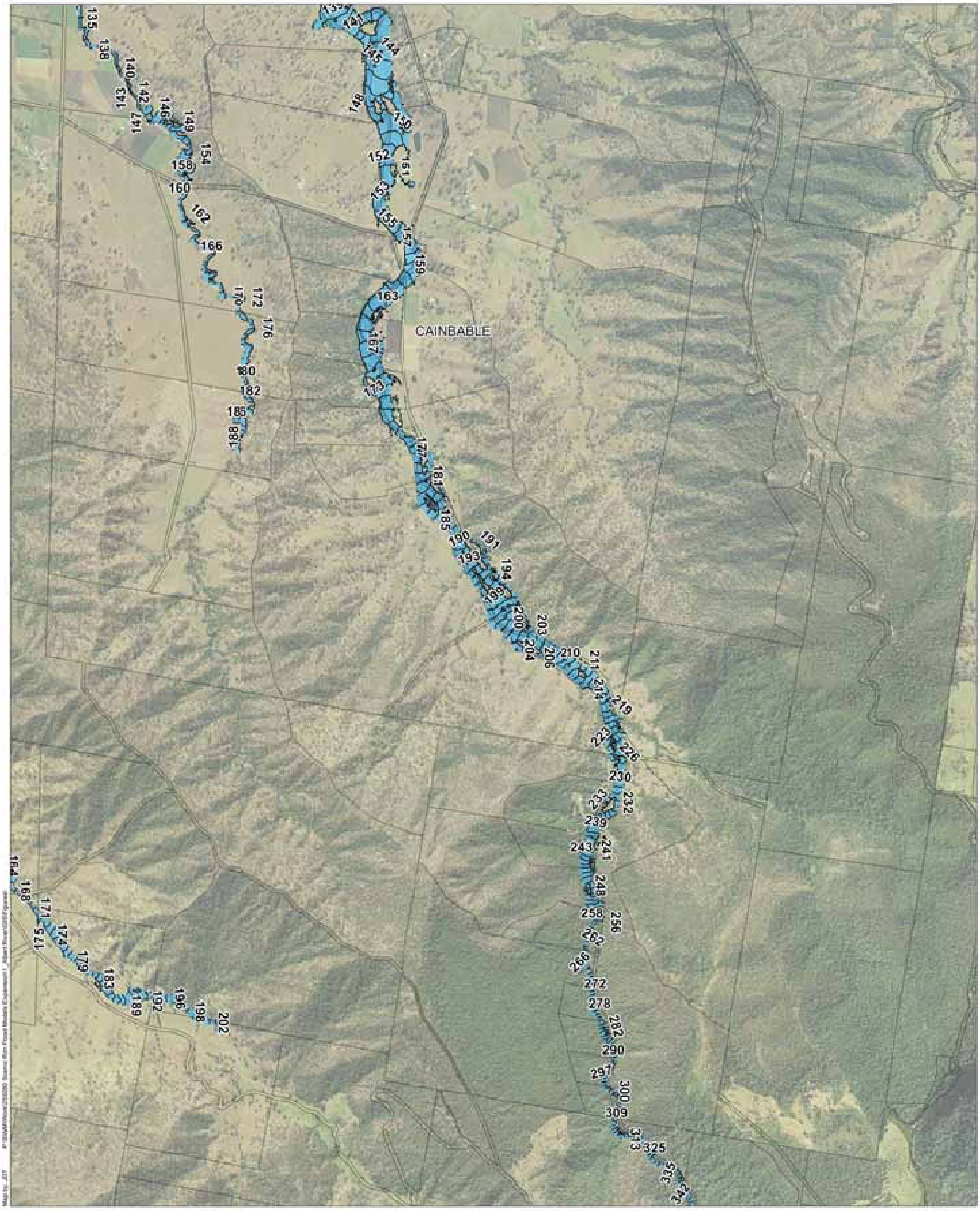
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-d**

1% AEP Event - Climate Change Scenario 4.5 Inundation Extent

aurecon



Legend

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

Notes:

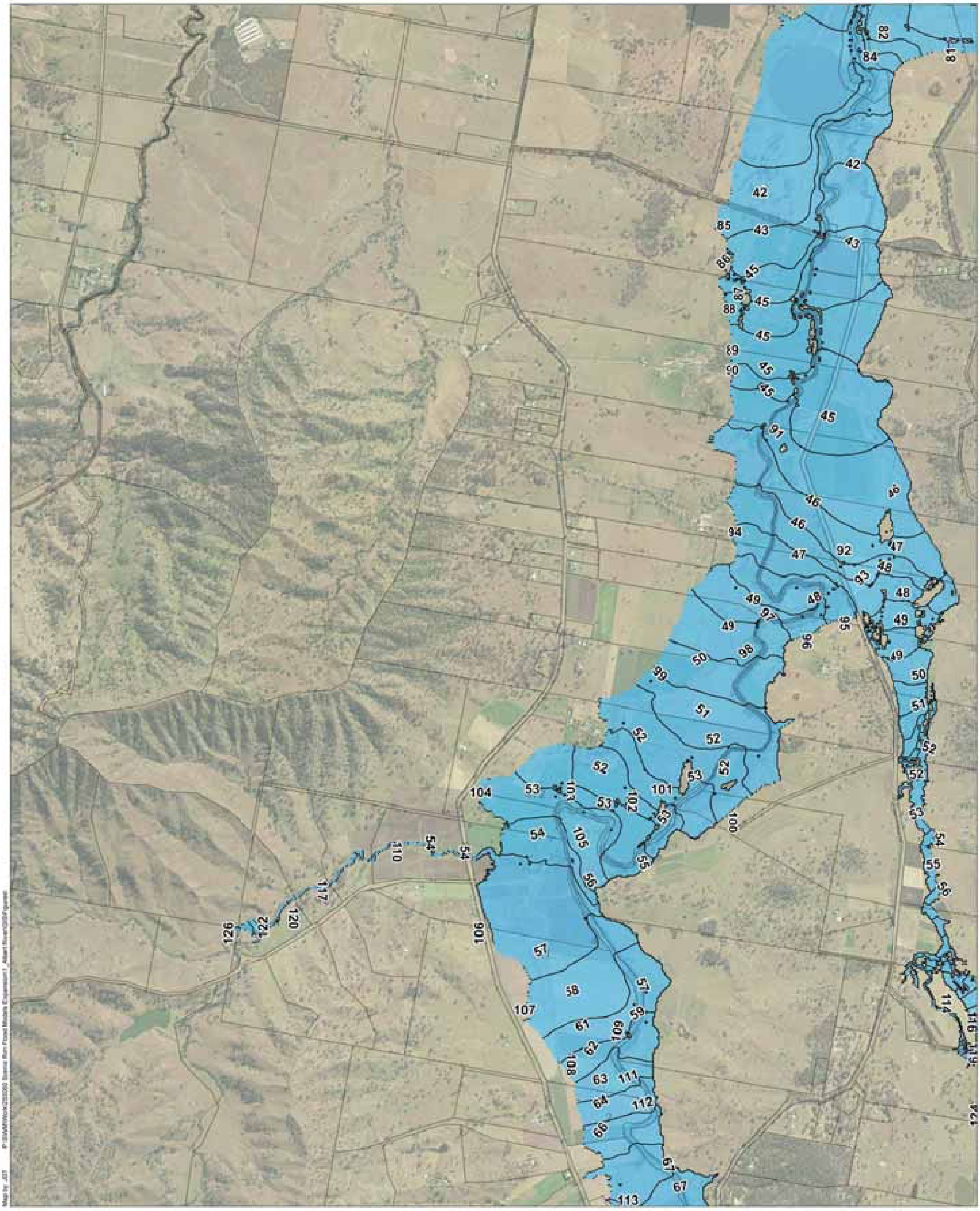
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B4-e**

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

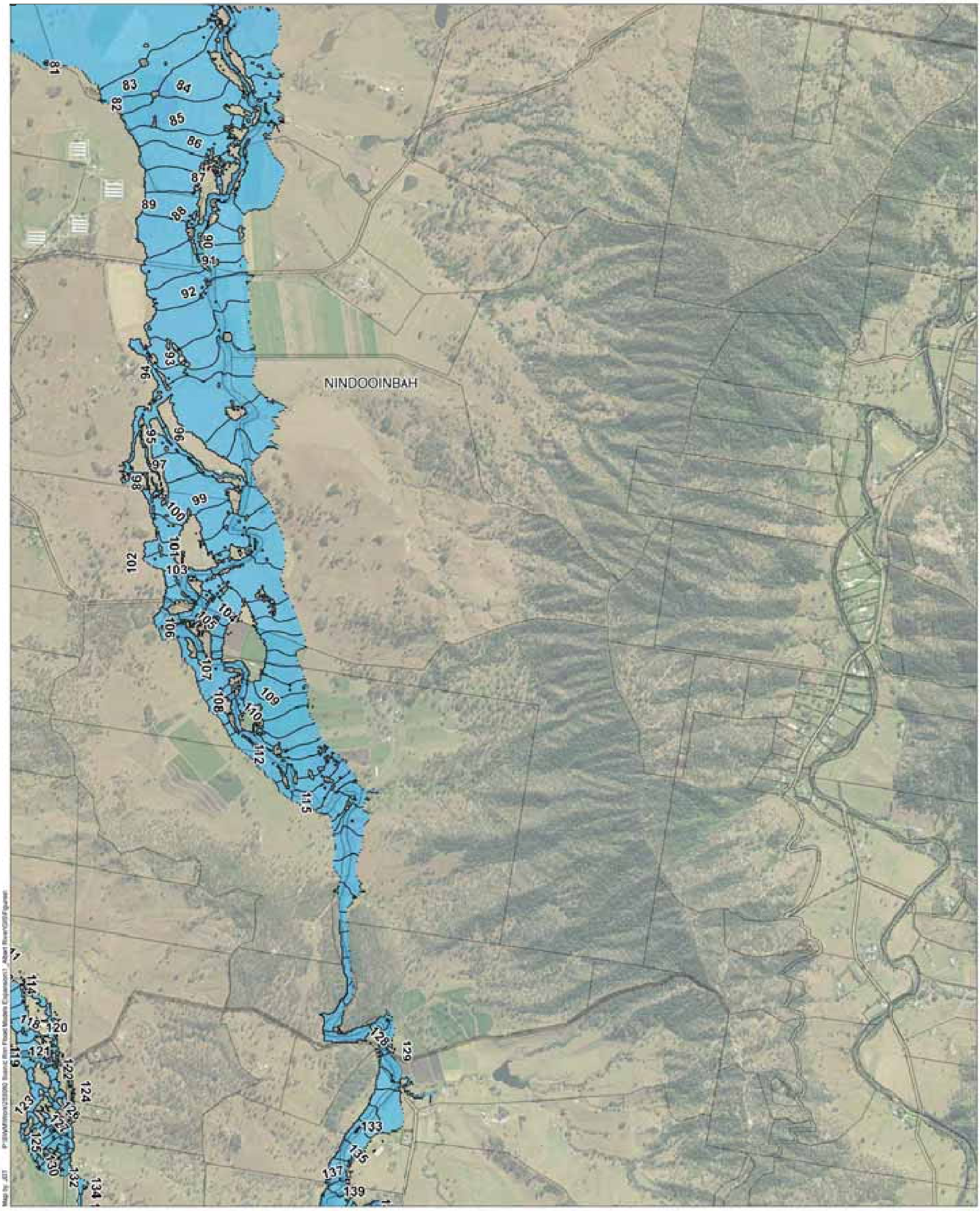
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-f**

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

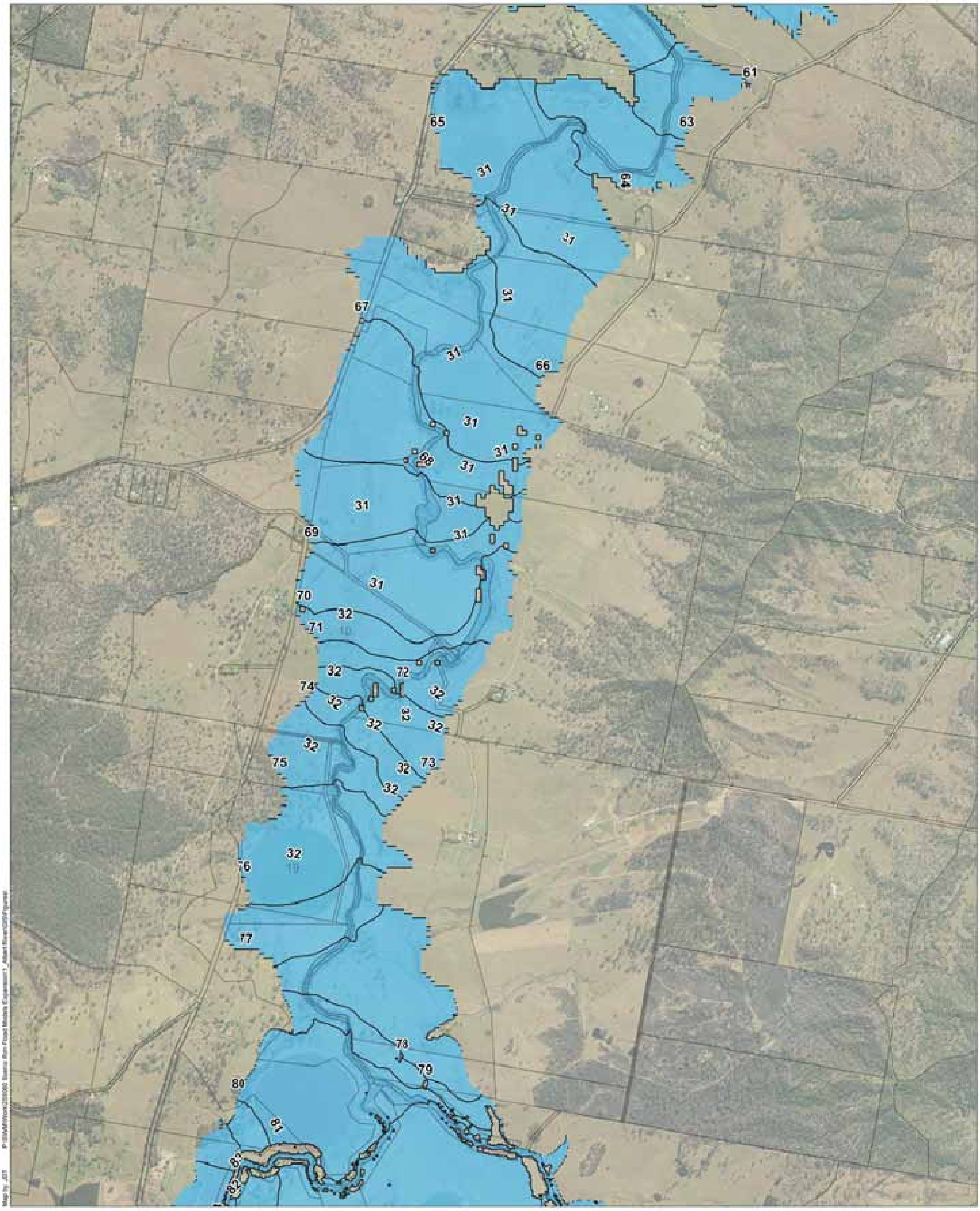
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-g**

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

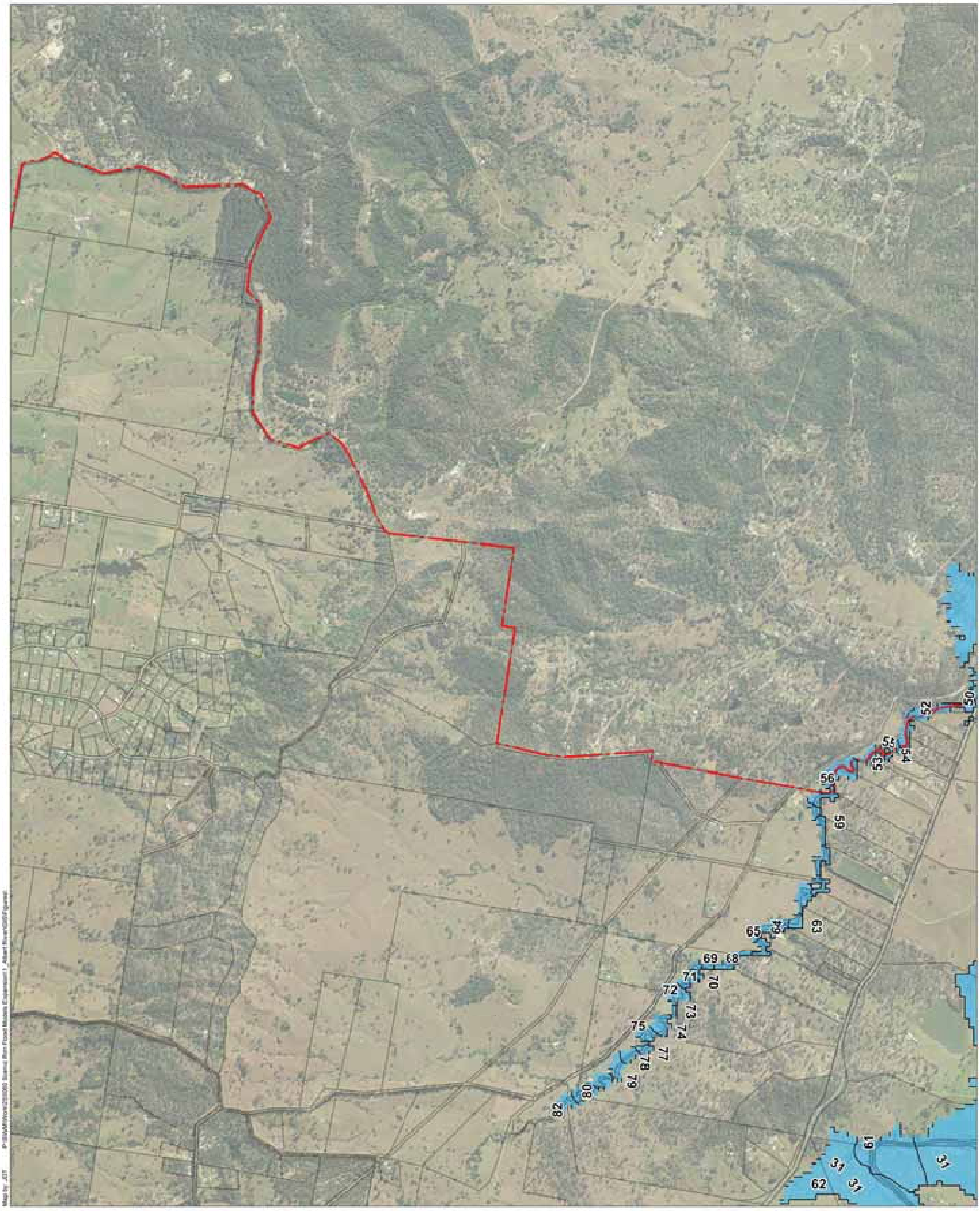
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-h**

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

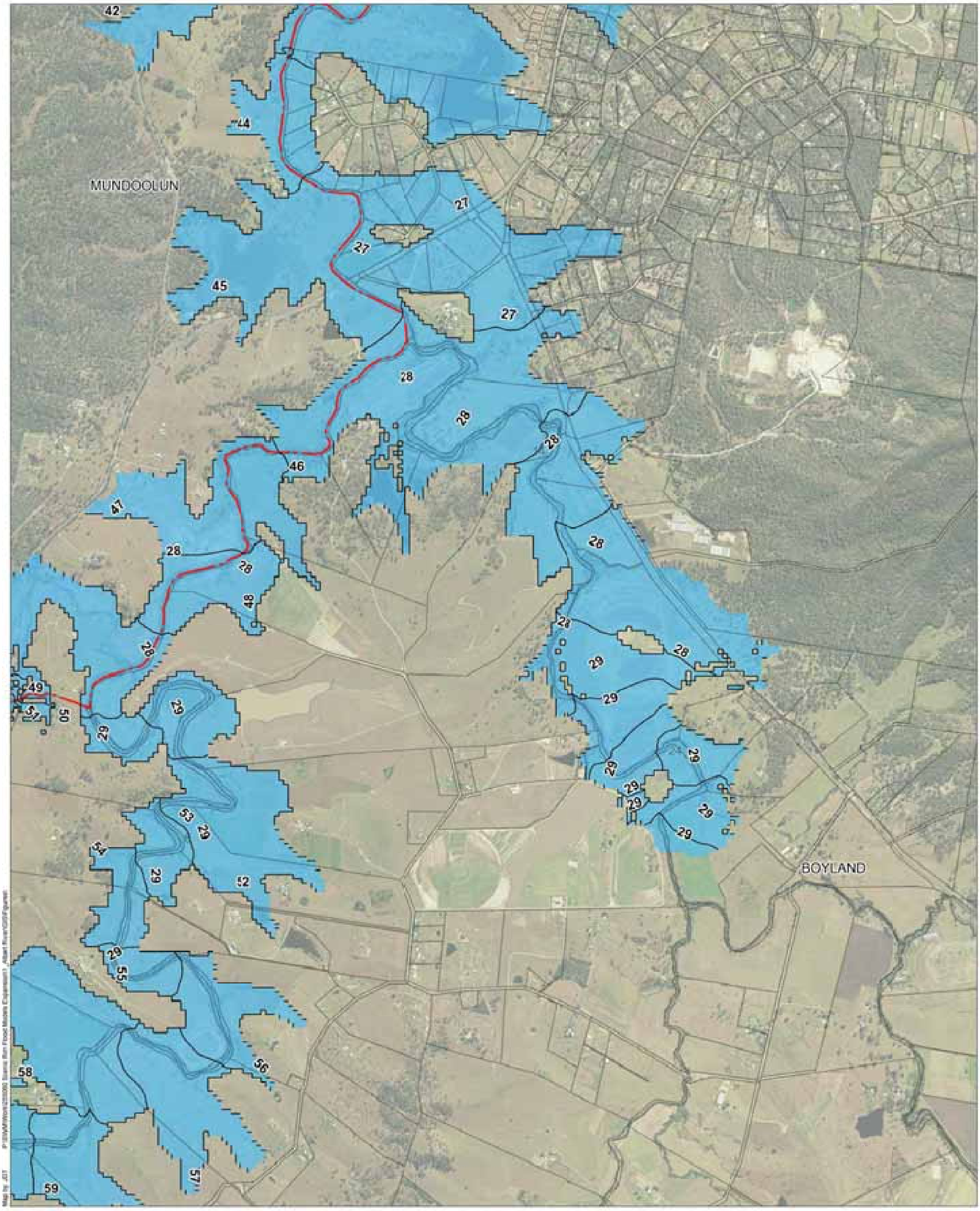
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-i**

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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-j**

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

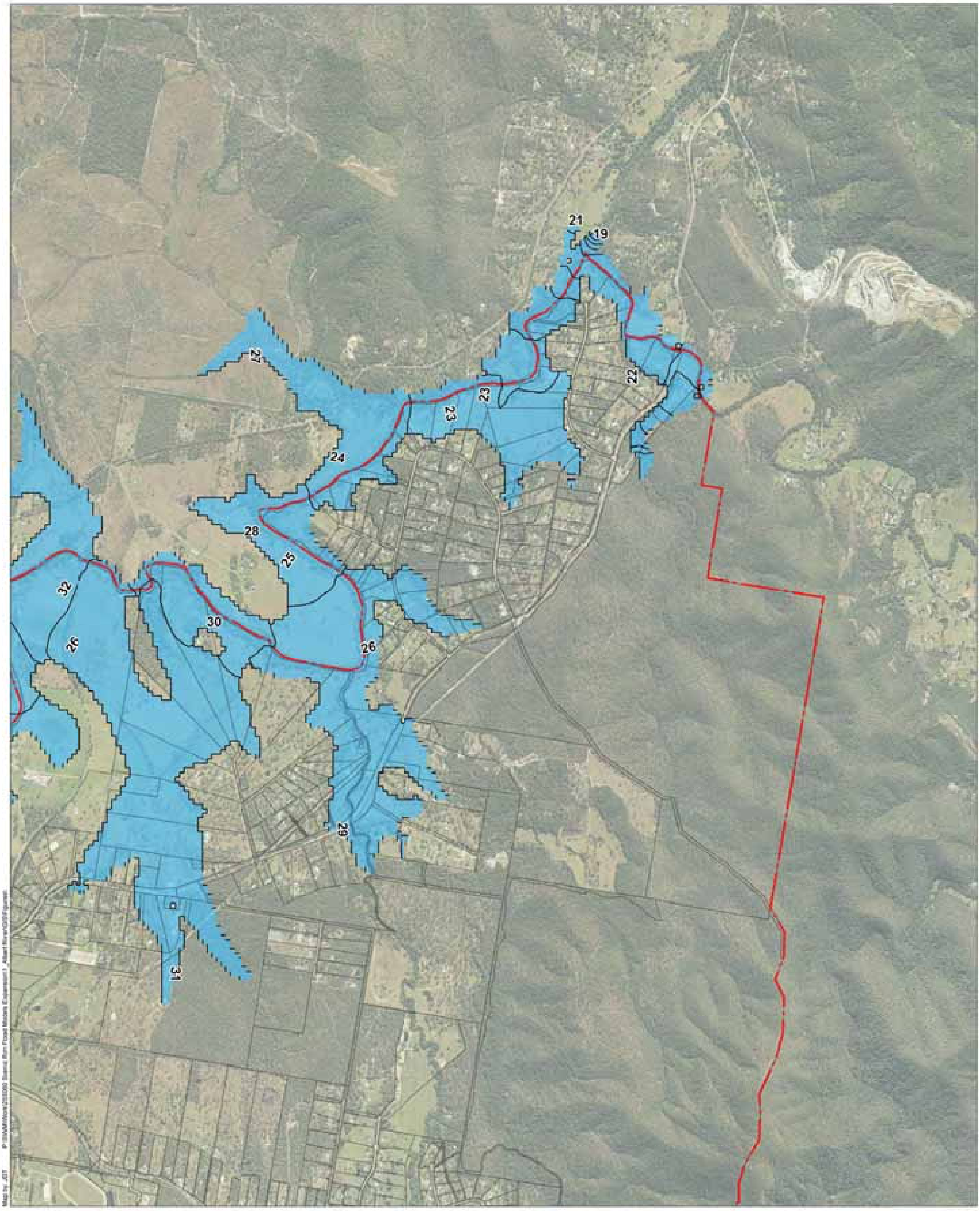
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-k**

1% AEP Event - Climate Change Scenario 4.5 Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,001

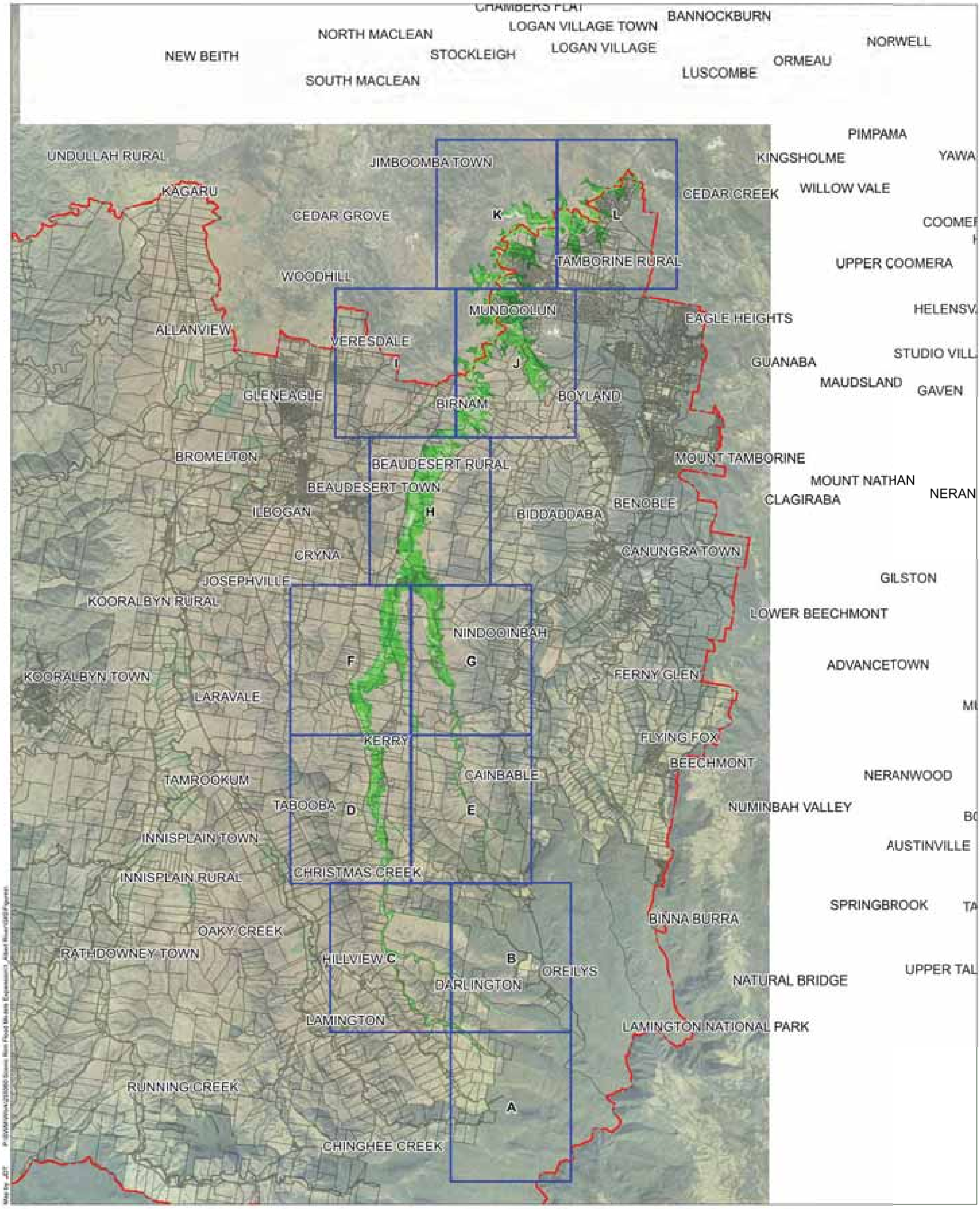
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B4-I**

1% AEP Event - Climate Change Scenario 4.5 Inundation Extent



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

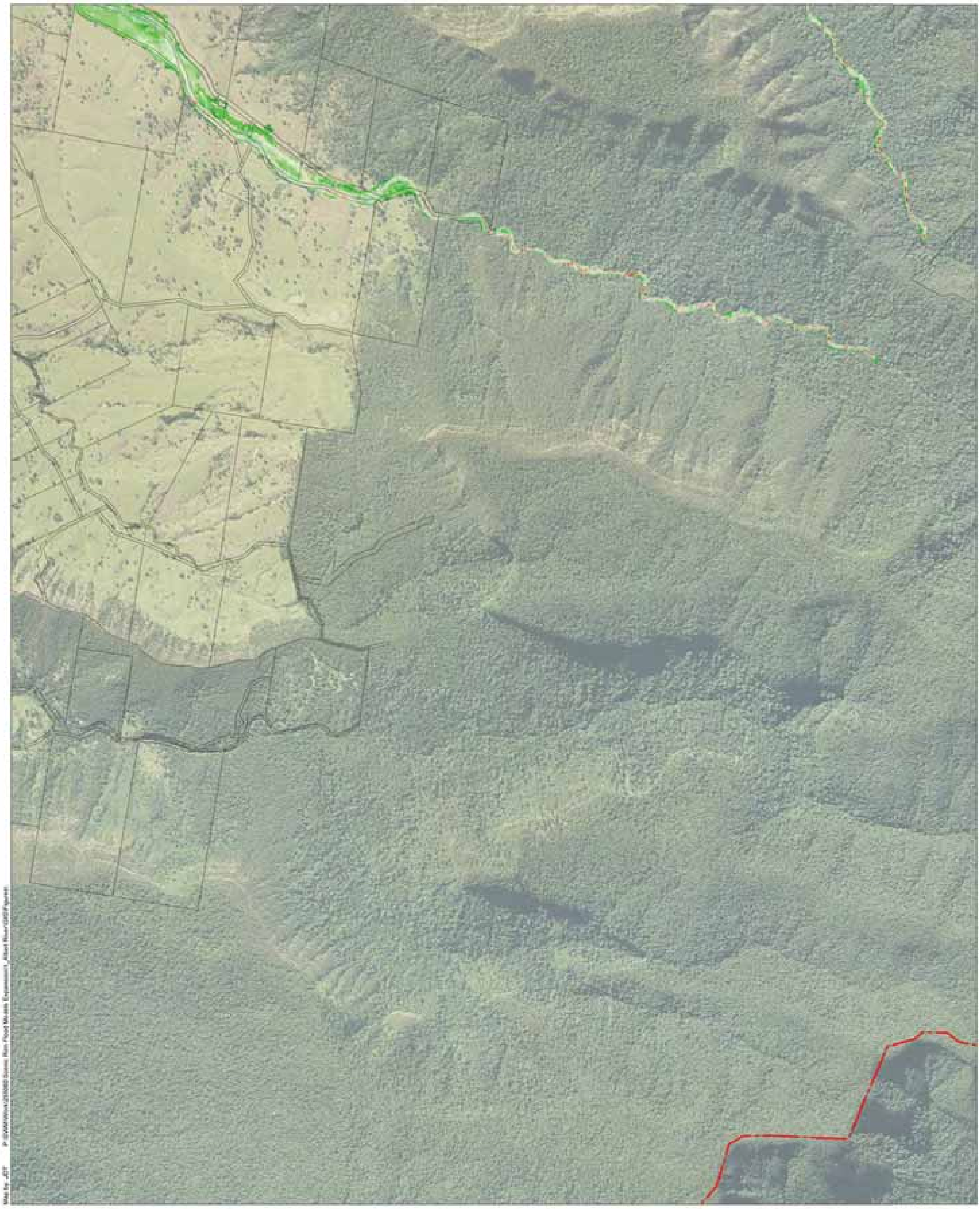
0 5,000 m 10,000 m

Projection: MGA Zone 56

Albert River Flood Study **Figure B5**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5	Notes:
Cadastral Boundary	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		

1:25,000

0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-a**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon

Legend

Notes:

	Velocity (m/s)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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	

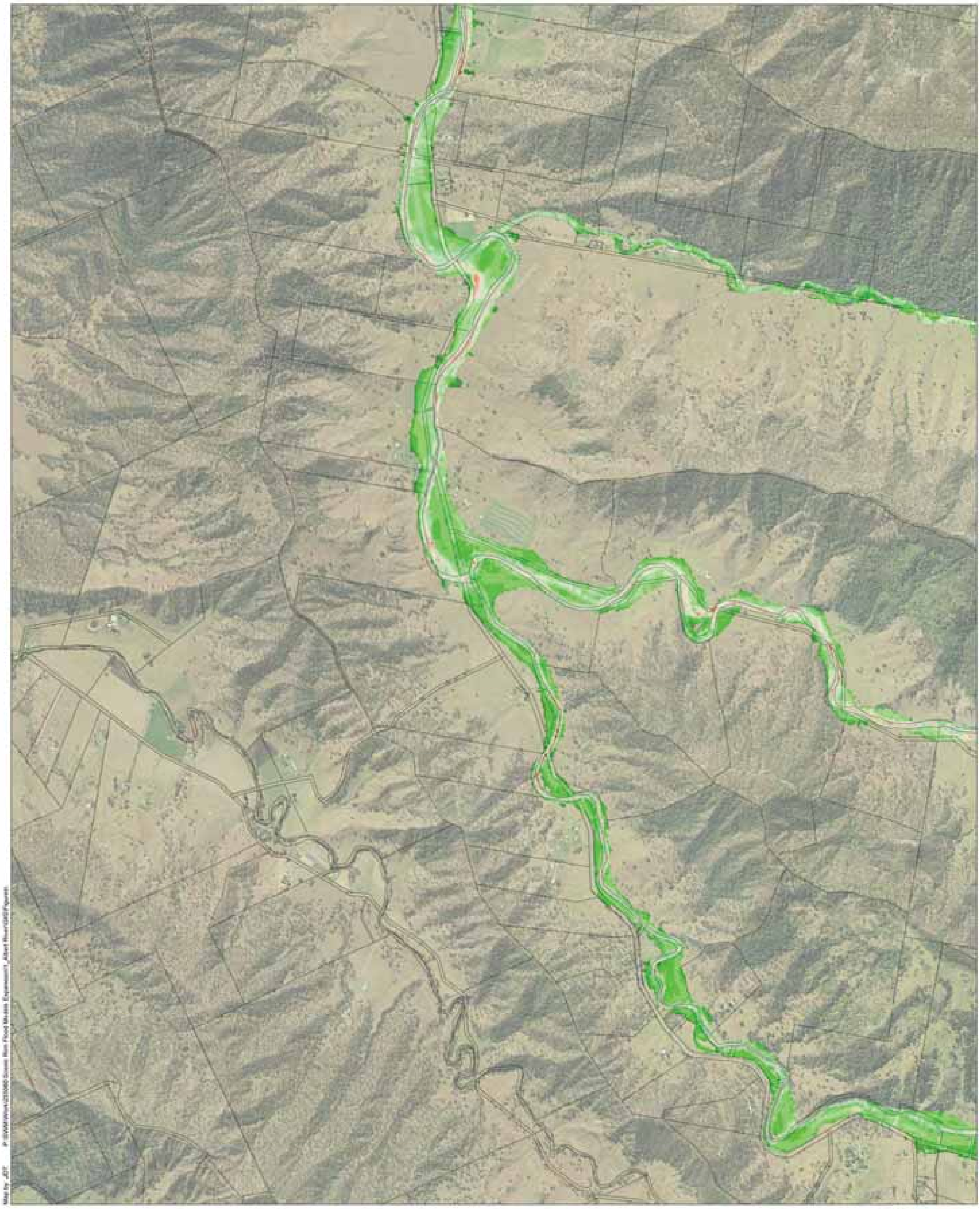
1:25,000

0 625 m 1,250 m

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-b**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities



Legend

Notes:

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

- 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

1:25,000

0 625 m 1,250 m

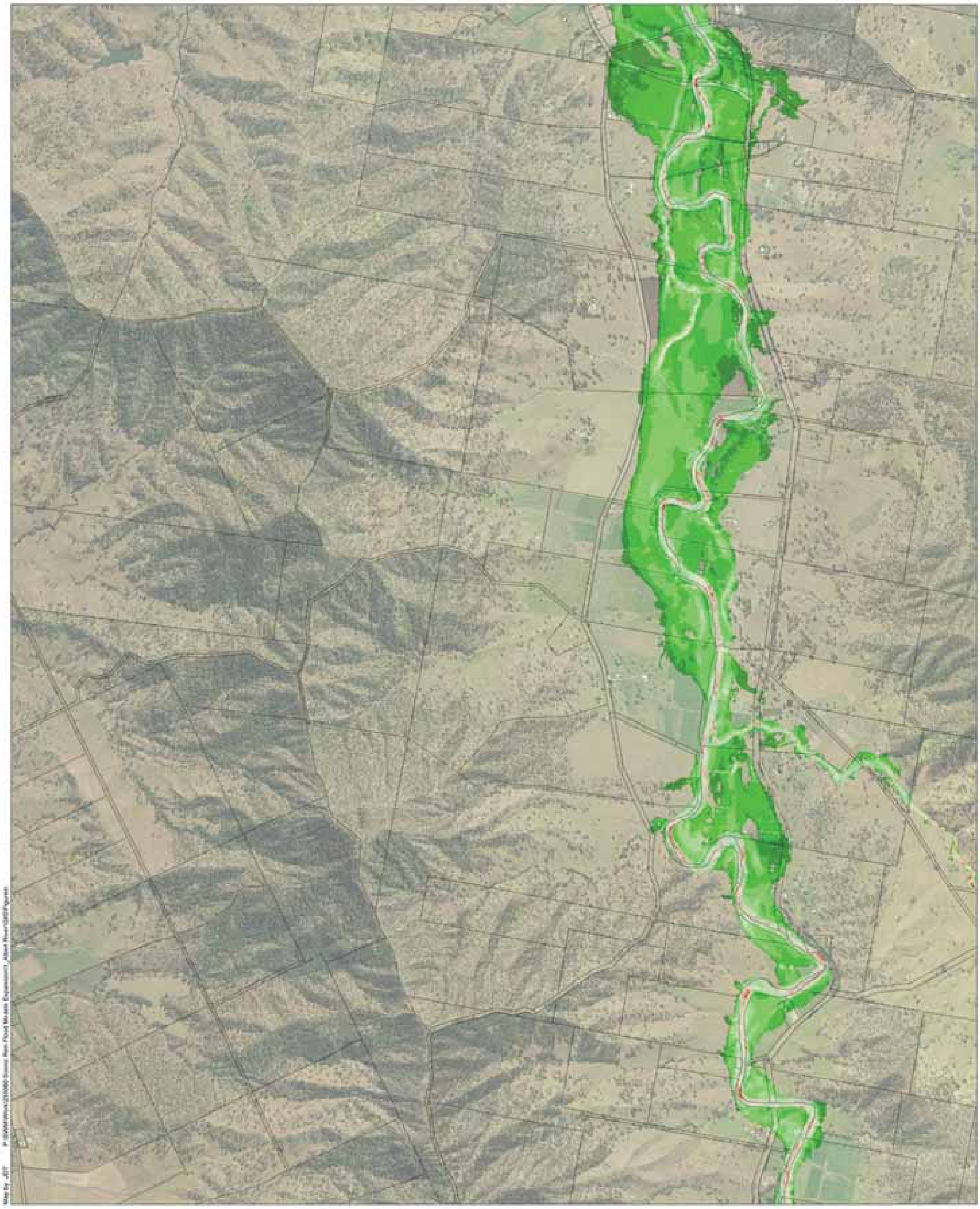
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-c**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

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

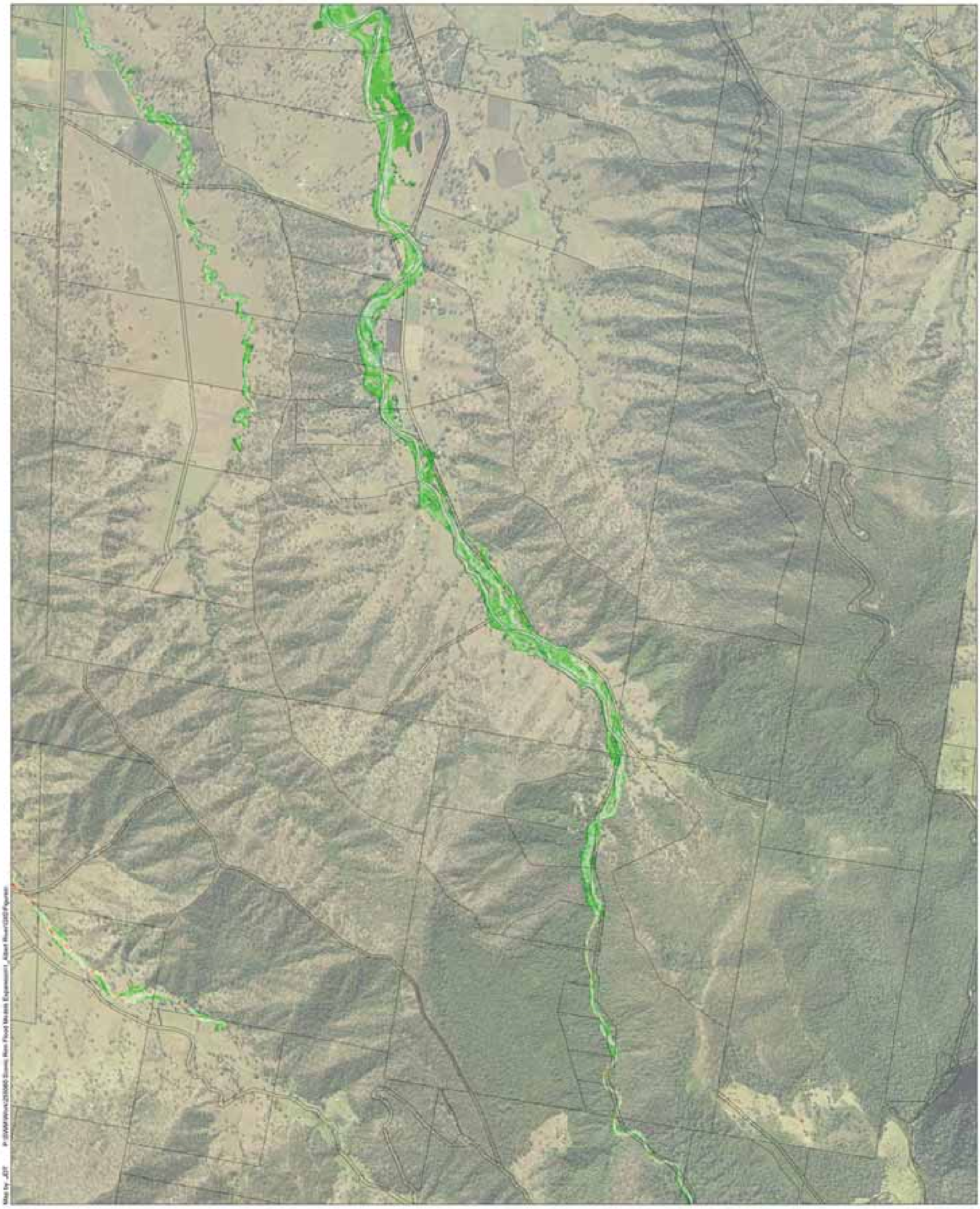
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-d**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

SRRC Boundary	Velocity (m/s)	
Cadastral Boundary	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	

1:25,000

0 625 m 1,250 m

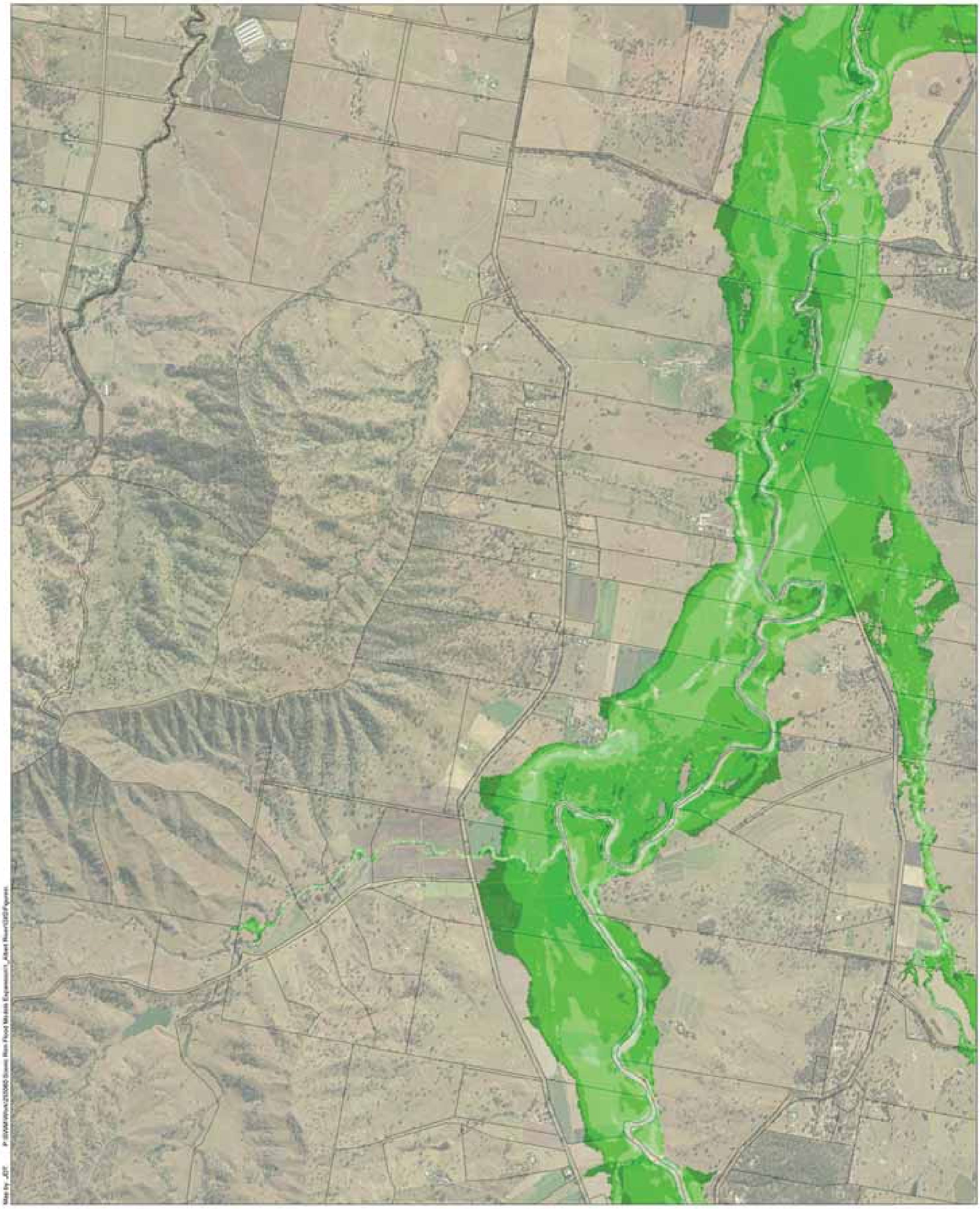
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-e**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary	0.0 to 0.5
Cadastral Boundary	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

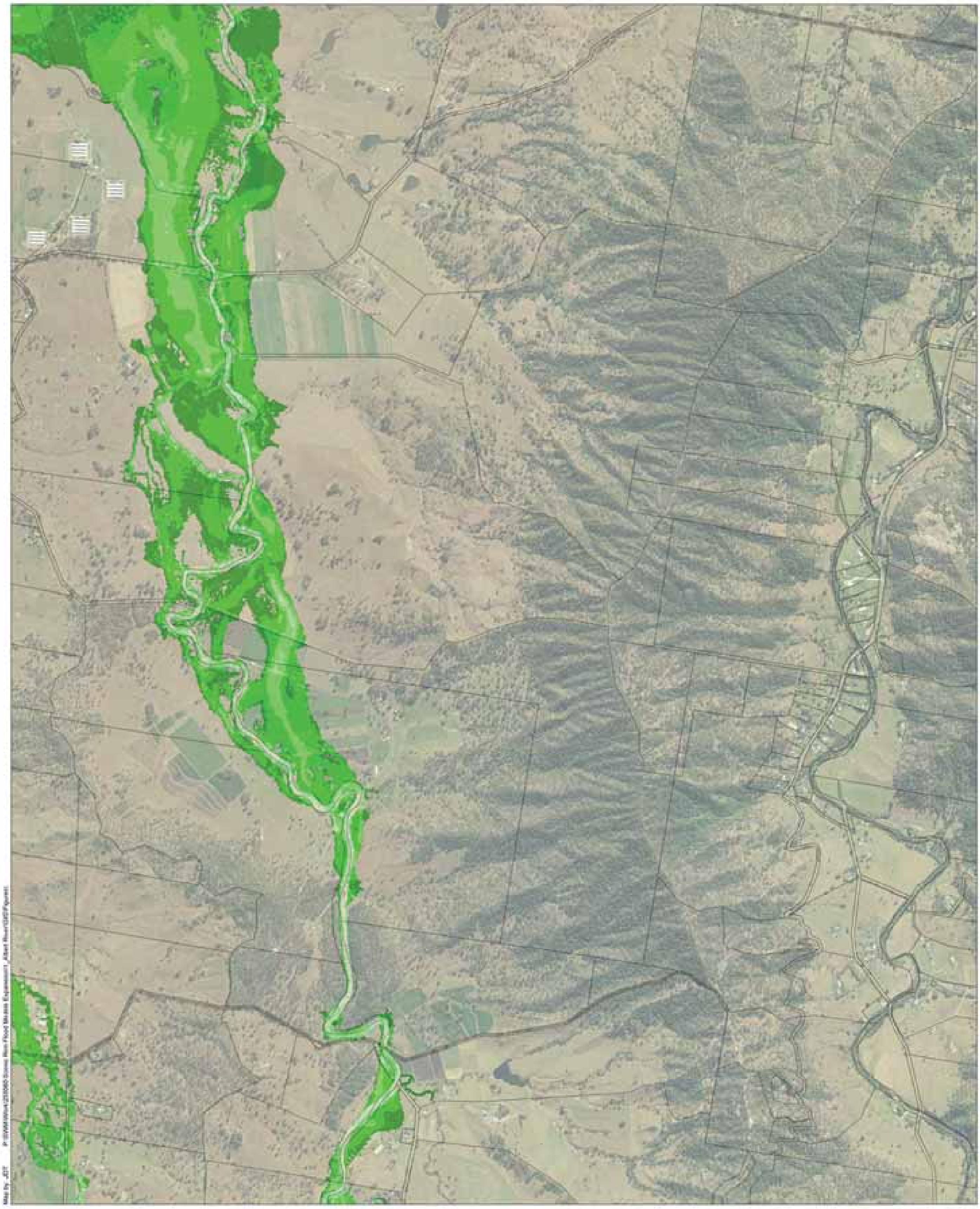
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure B5-f

1% AEP Event - Climate Change Scenario 4.5 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: 11/10/2017 Version: 0 Job No: 255060

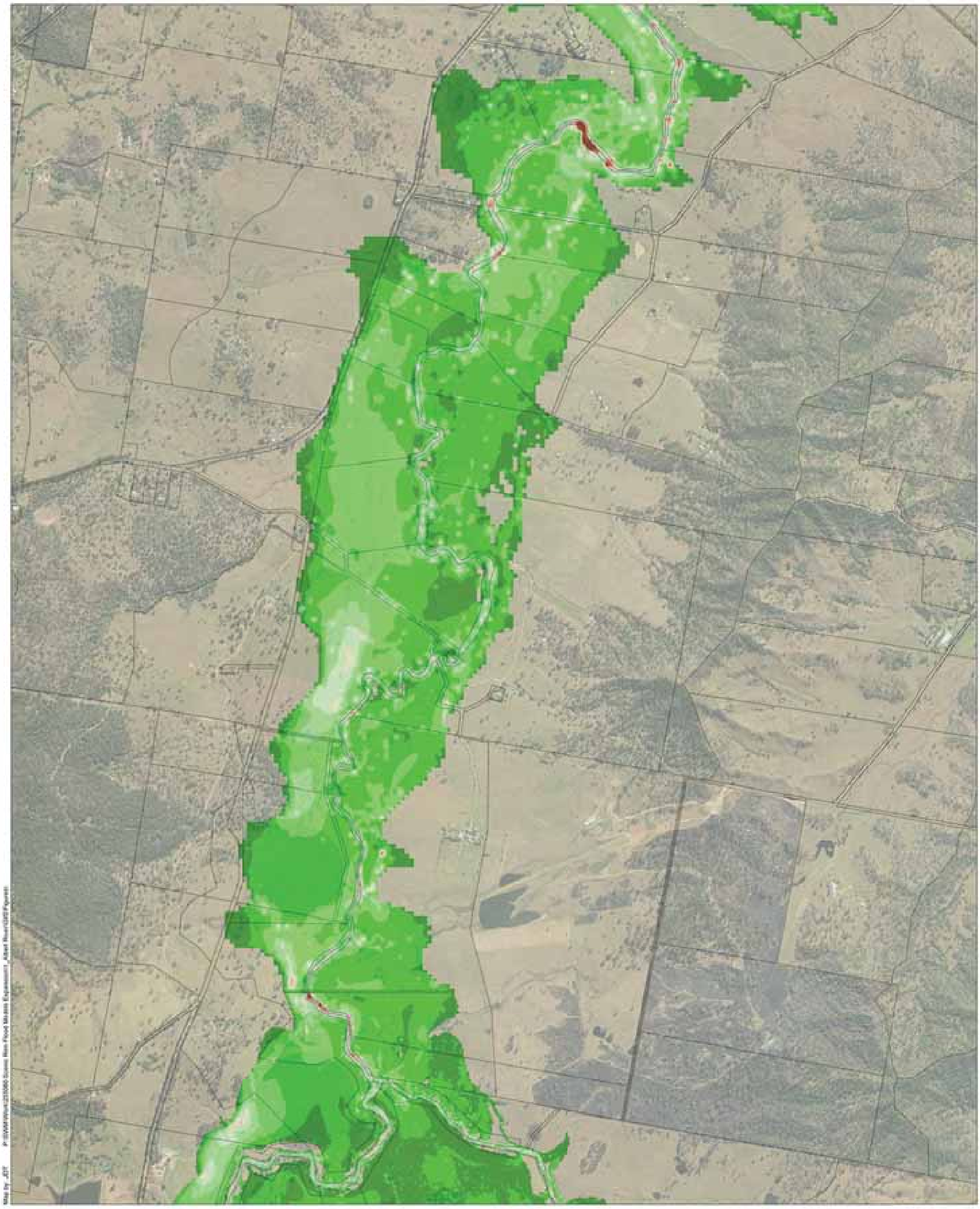
Projection: MGA Zone 56

Albert River Flood Study

Figure B5-g

1% AEP Event - Climate Change Scenario 4.5 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

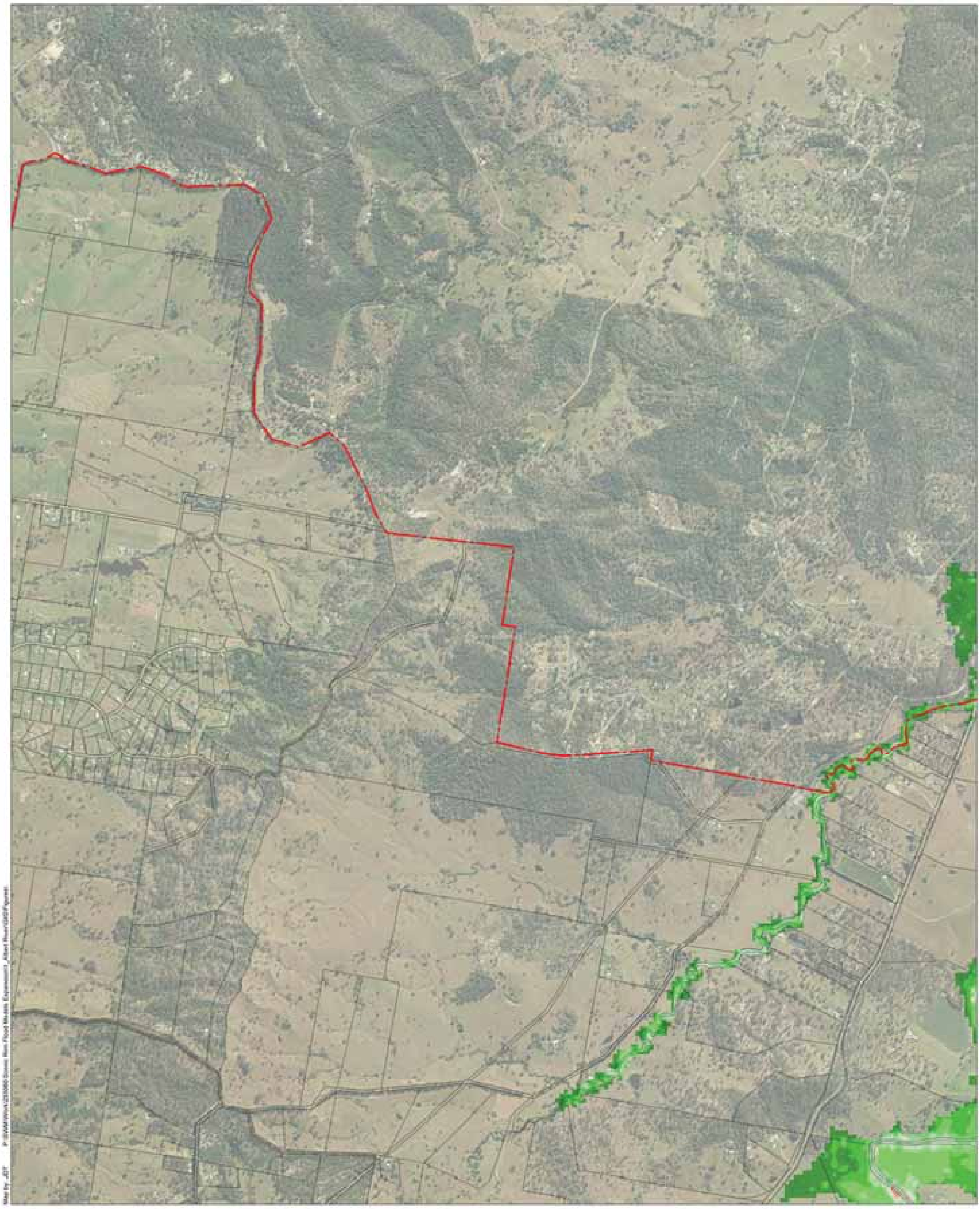
Date: 11/10/2017 Version: 0 Job No: 235060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-h**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

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	

1:25,000

0 625 m 1,250 m

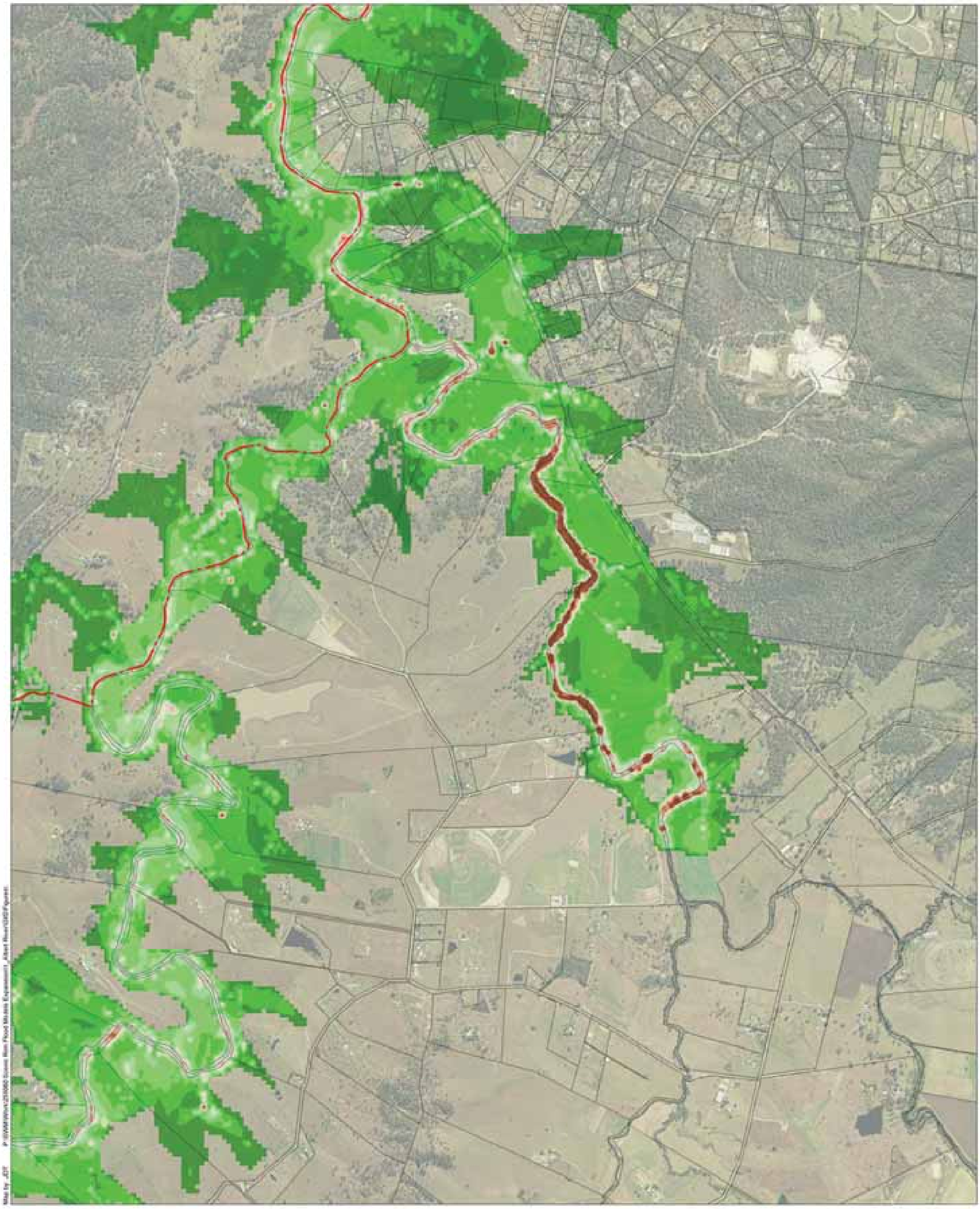
Date: 11/10/2017 Version: 0 Job No: 235060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-i**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

SRRC Boundary	**Velocity (m/s)**	
Cadastral Boundary	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	

1:25,000

0 625 m 1,250 m

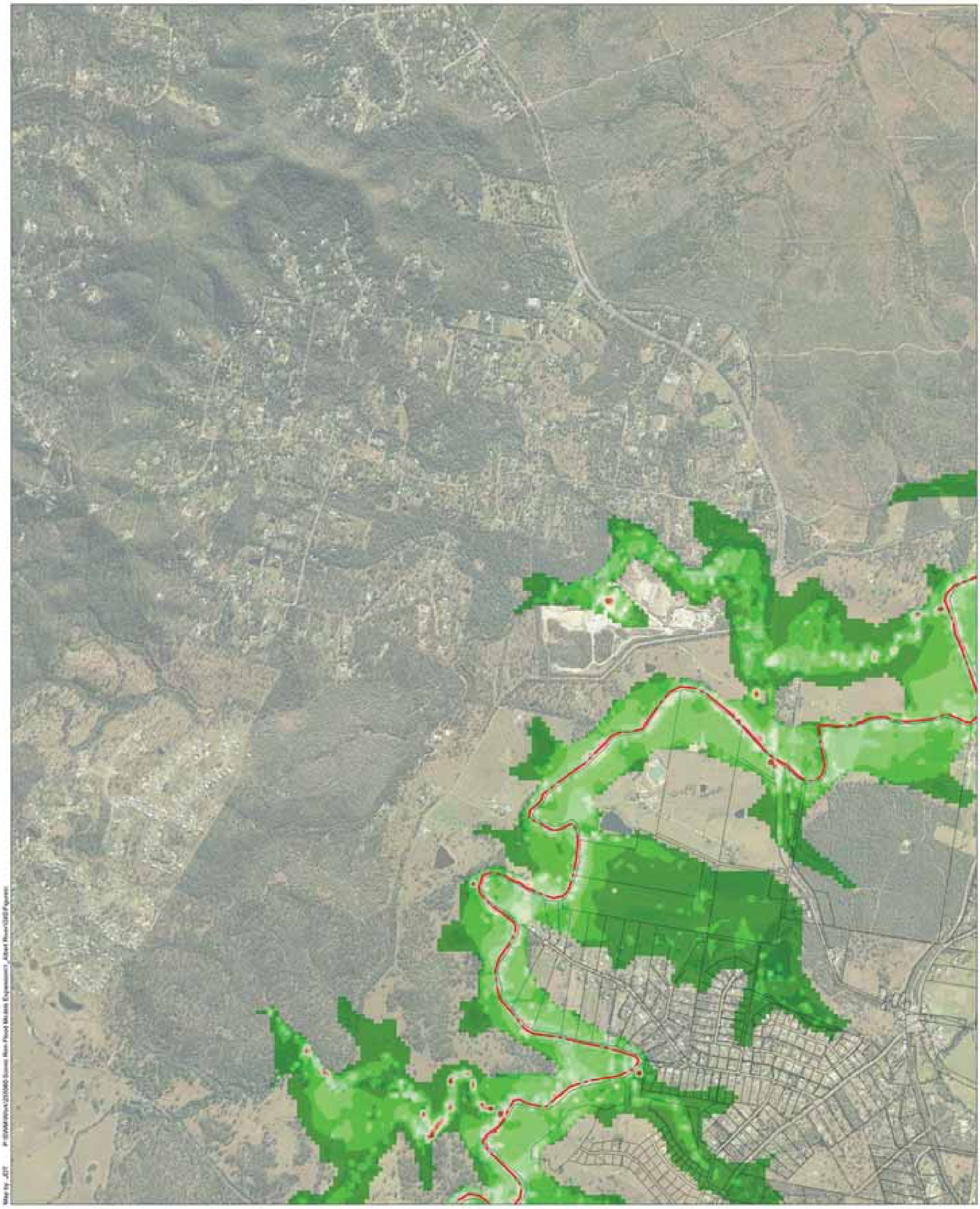
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-j**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

SRRC Boundary	**Velocity (m/s)**	
Cadastral Boundary	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	

1:25,000

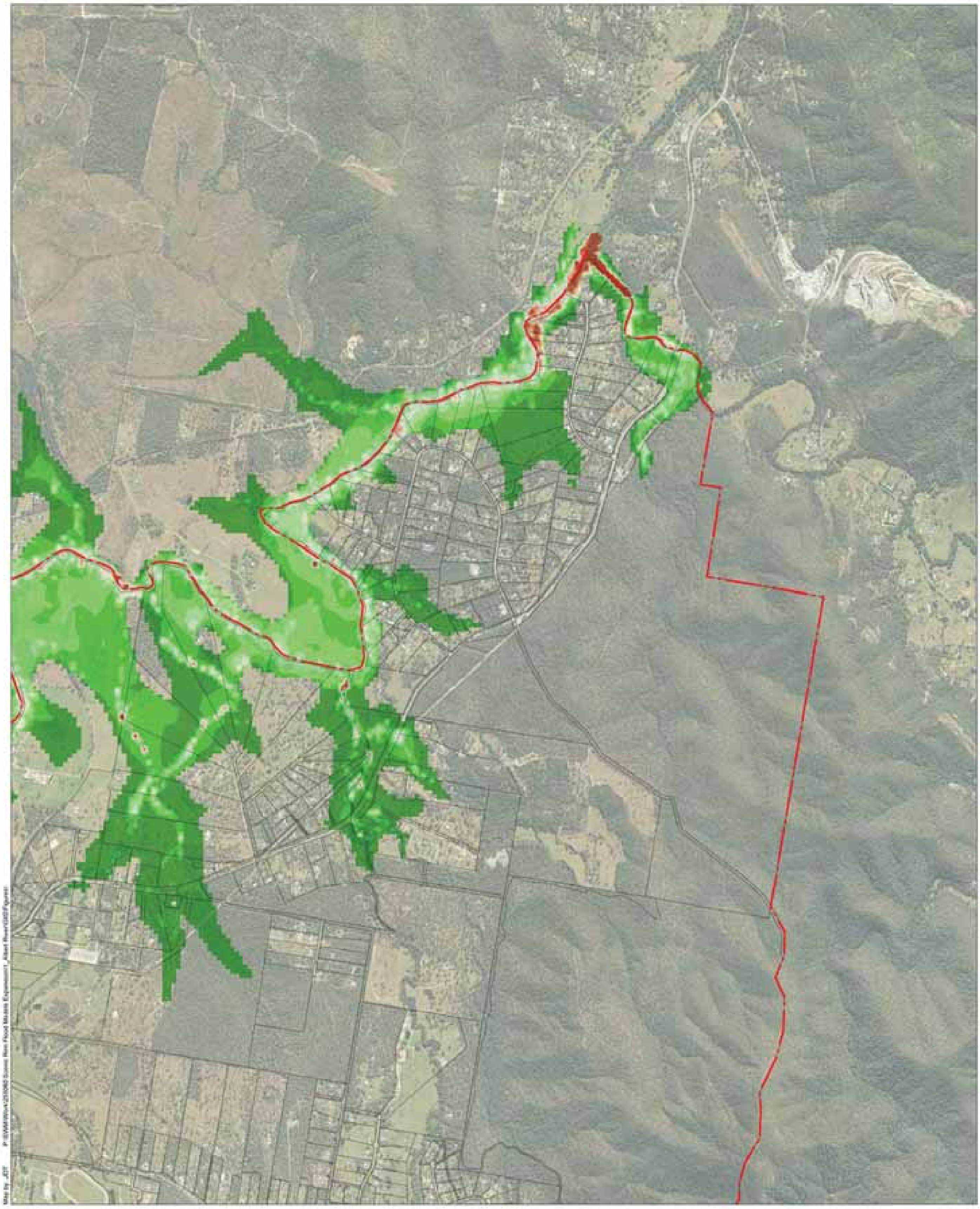
0 625 m 1,250 m

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-k**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

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

1:25,001

0 626 m 1,250 m

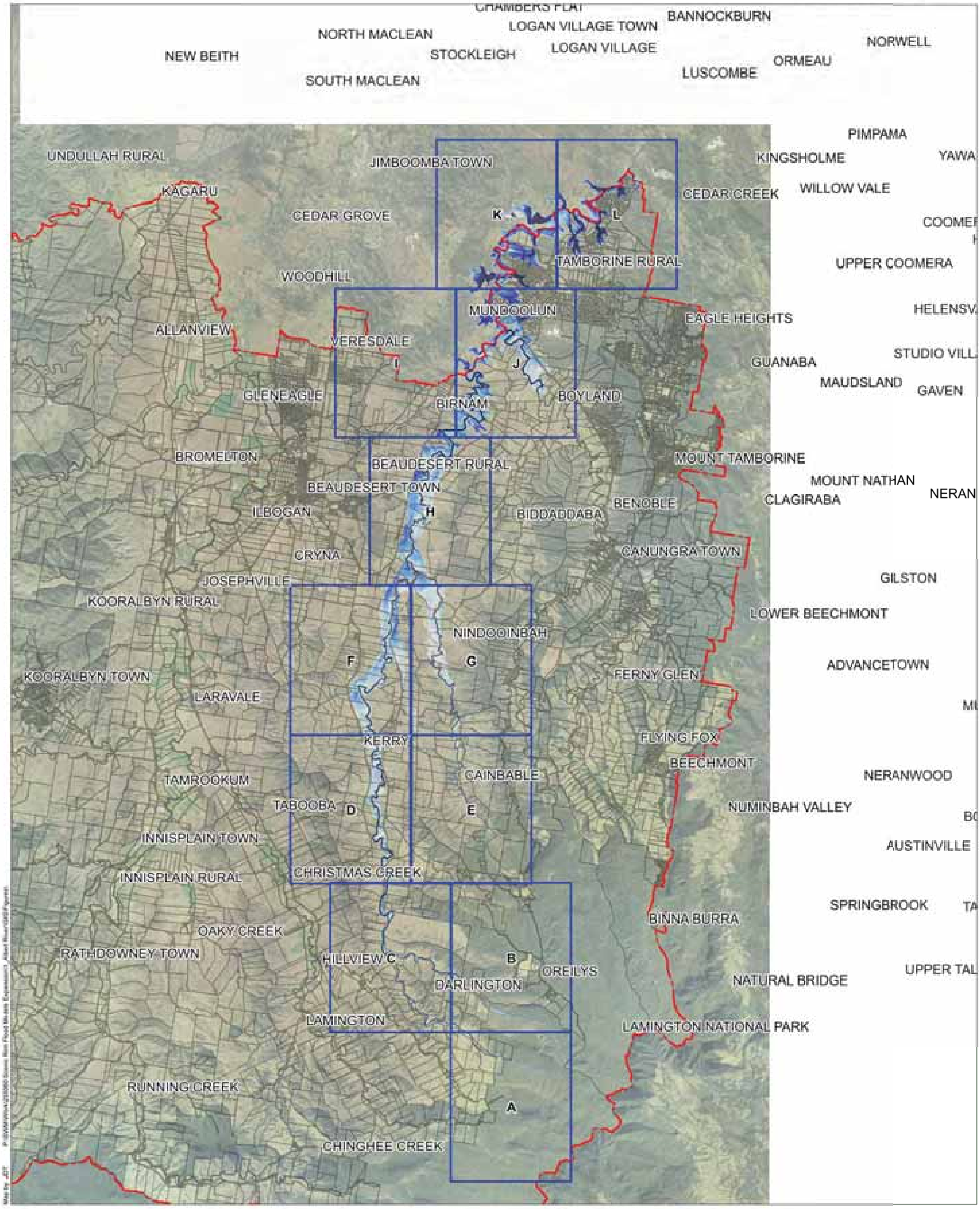
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B5-I**

1% AEP Event - Climate Change Scenario 4.5 Peak Velocities

aurecon



Legend

Notes:

SRRC Boundary

Cadastral Boundary

Depth (m)

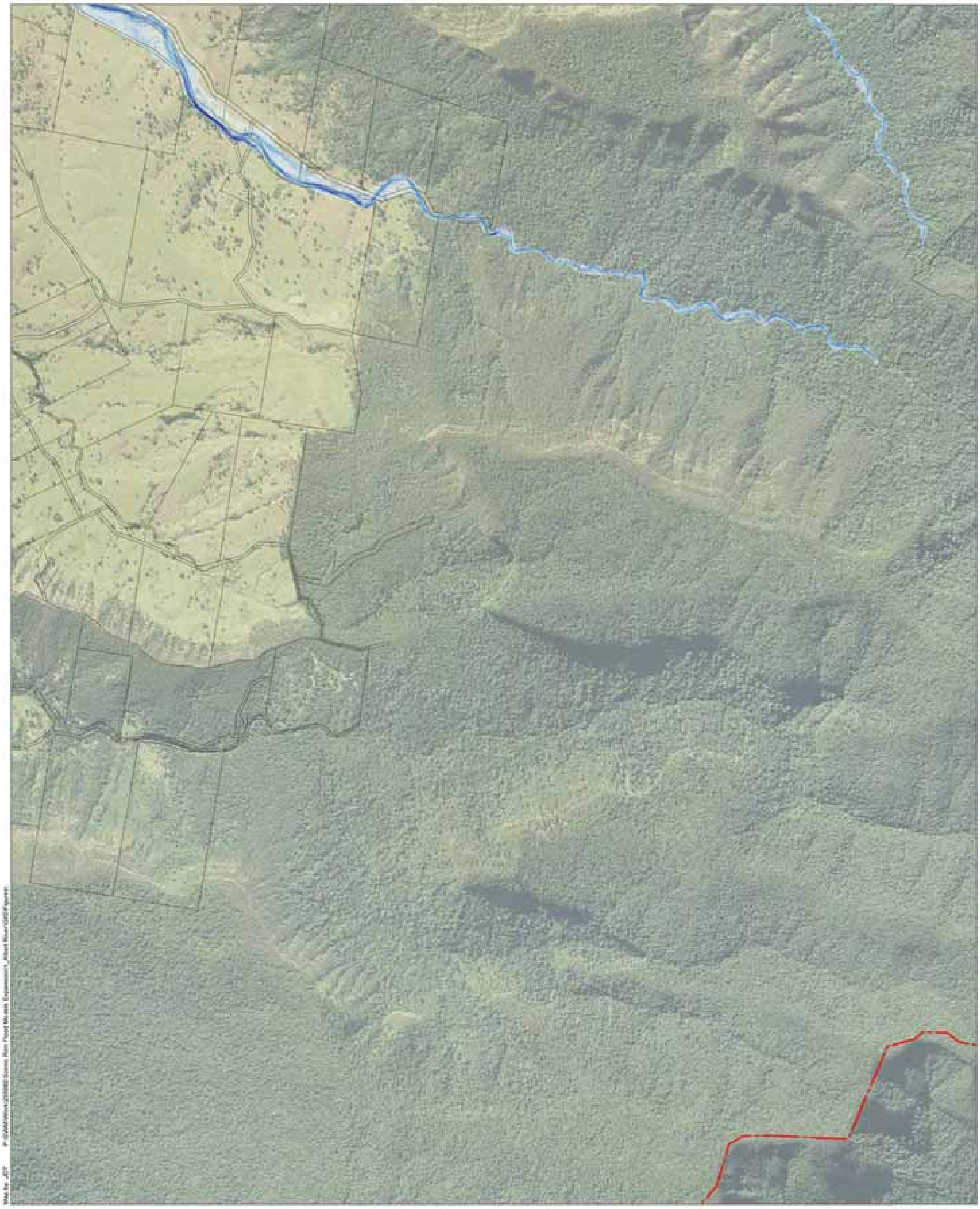
0.0 to 0.5
0.5 to 1.0
1.0 to 1.5
1.5 to 2.0
2.0 to 2.5
2.5 to 3.0
3.0 to 3.5
3.5 to 4.0
4.0 to 4.5
4.5 to 5.0
> 5.0

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

Date: 11/10/2017 Version: 0 Job No: 255087
Projection: MGA Zone 56

Albert River 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

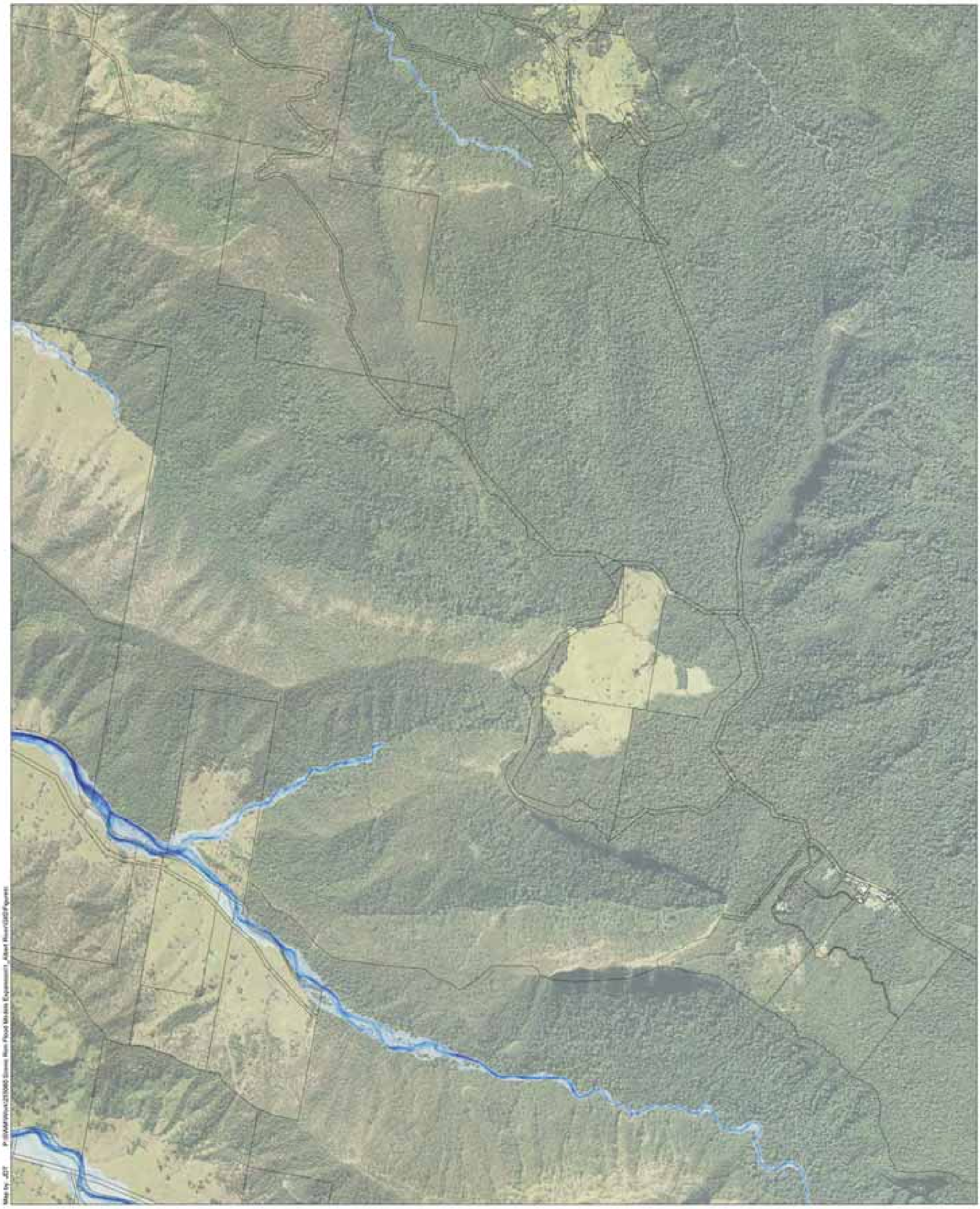
Date: 11/10/2017 Version: 0 Job No: 235060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-a**

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

aurecon



Legend

Notes:

Depth (m)

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	

1:25,000

0 625 m 1,250 m

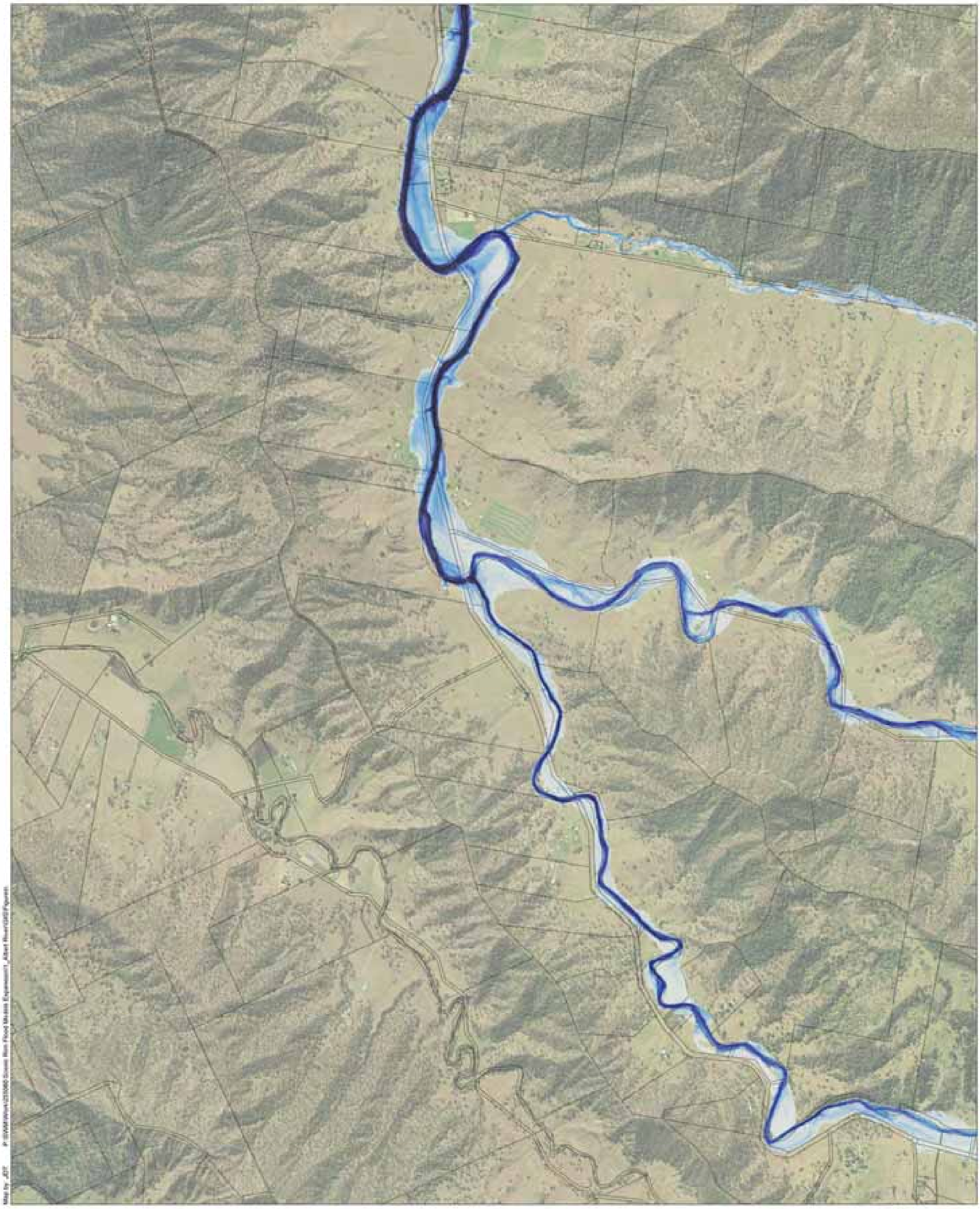
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-b**

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

aurecon



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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

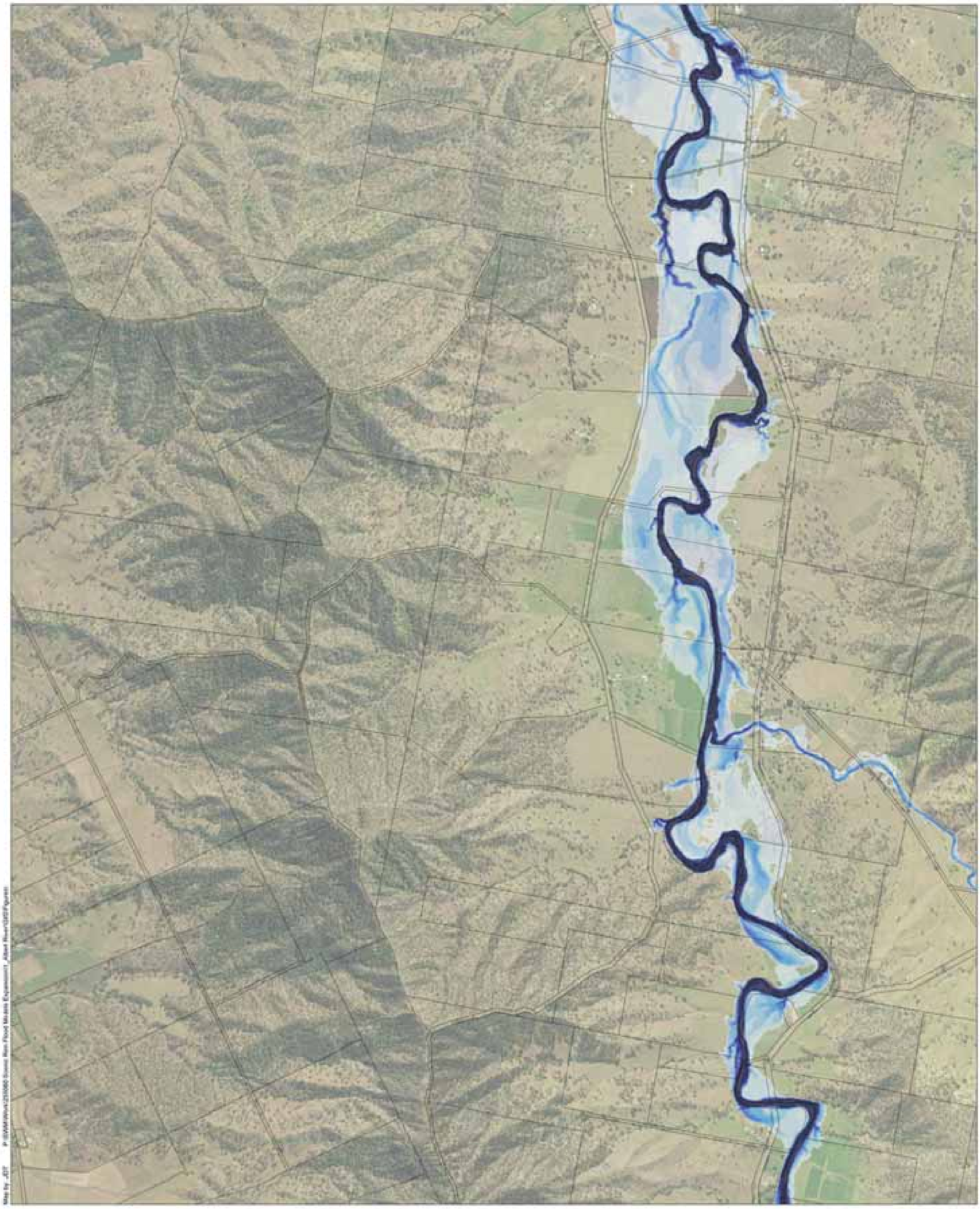
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-c**

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

aurecon



Legend

Notes:

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

1:25,000

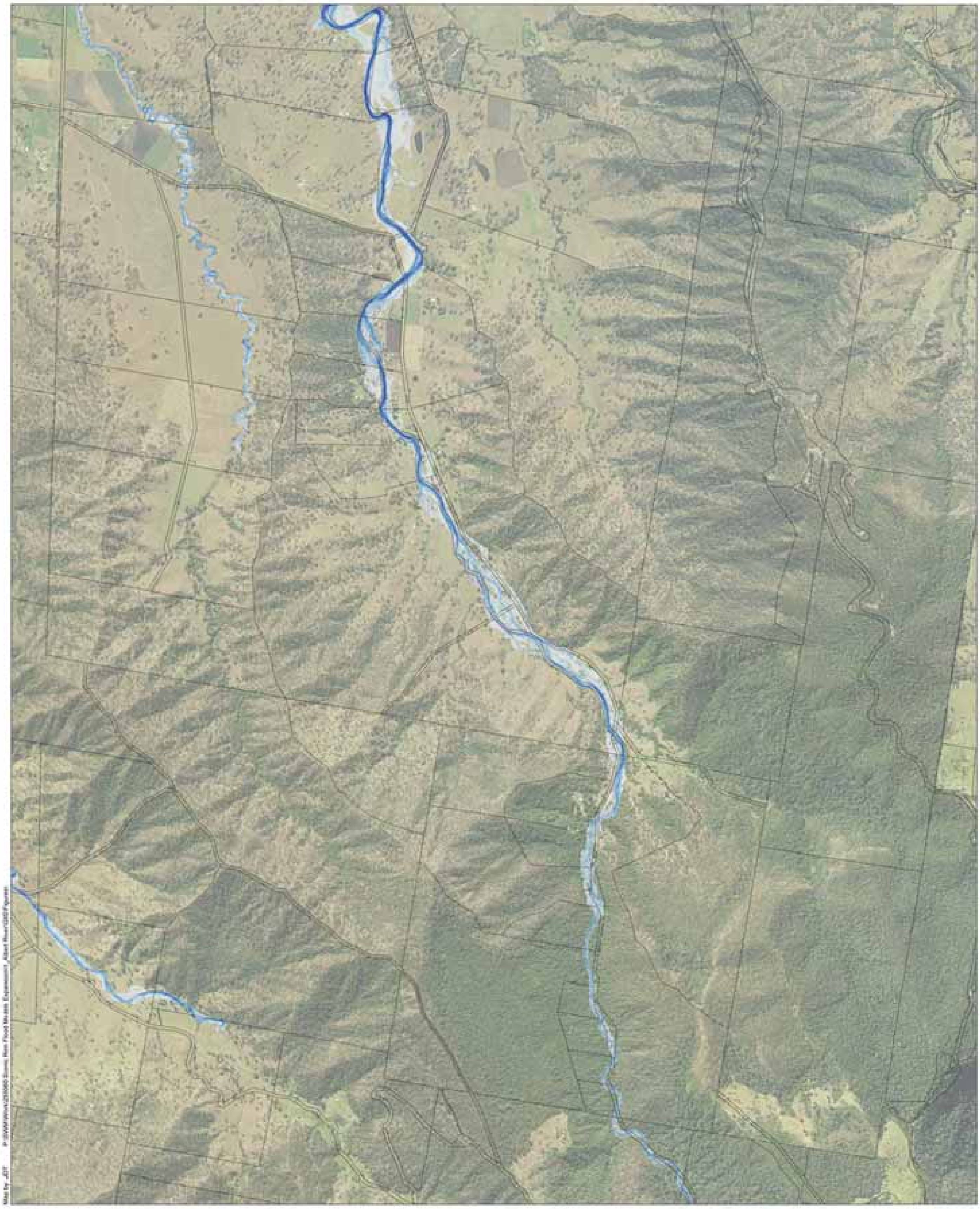
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B6-d**

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

aurecon



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

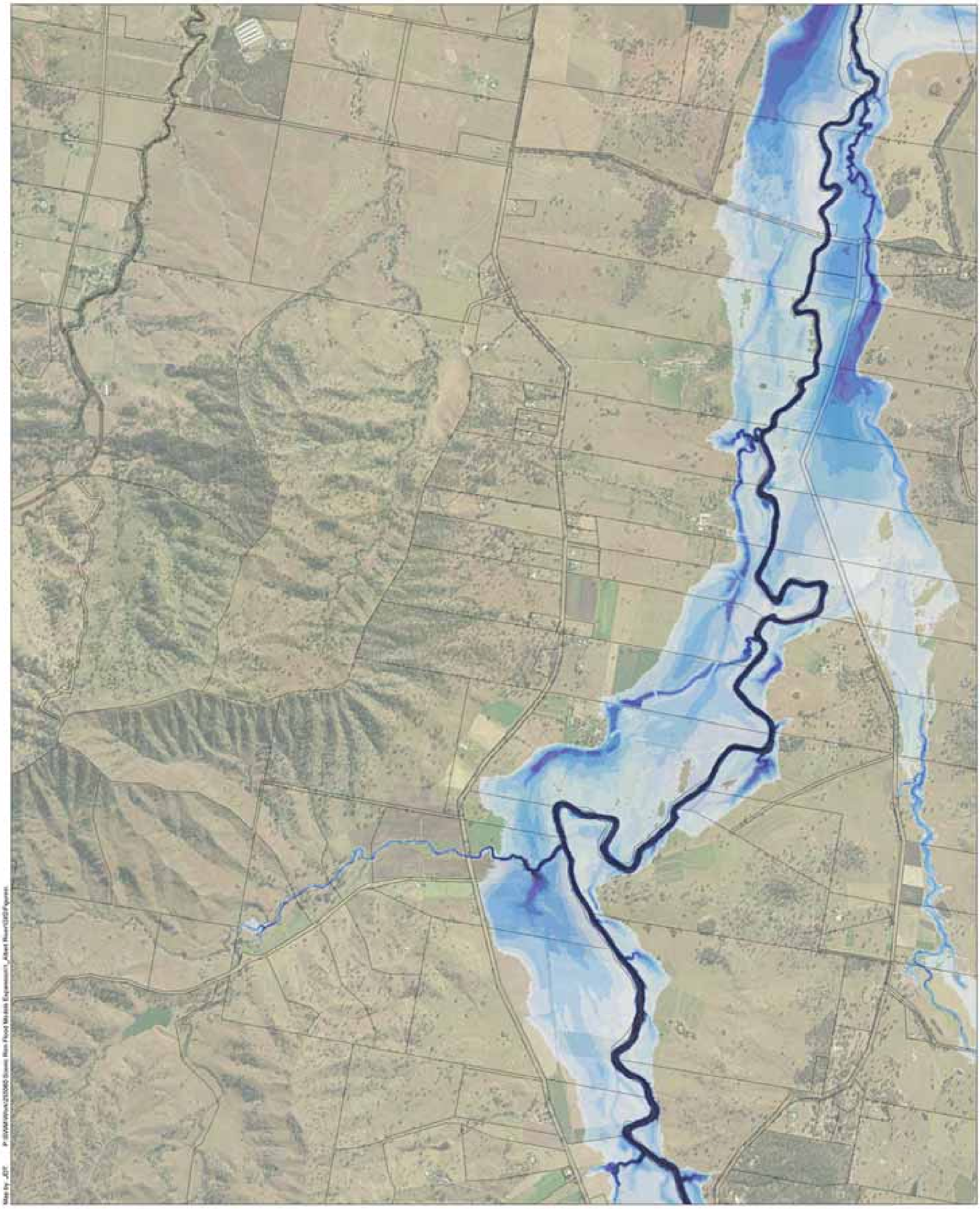
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-e**

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

aurecon



Legend

Notes:

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

1:25,000

0 625 m 1,250 m

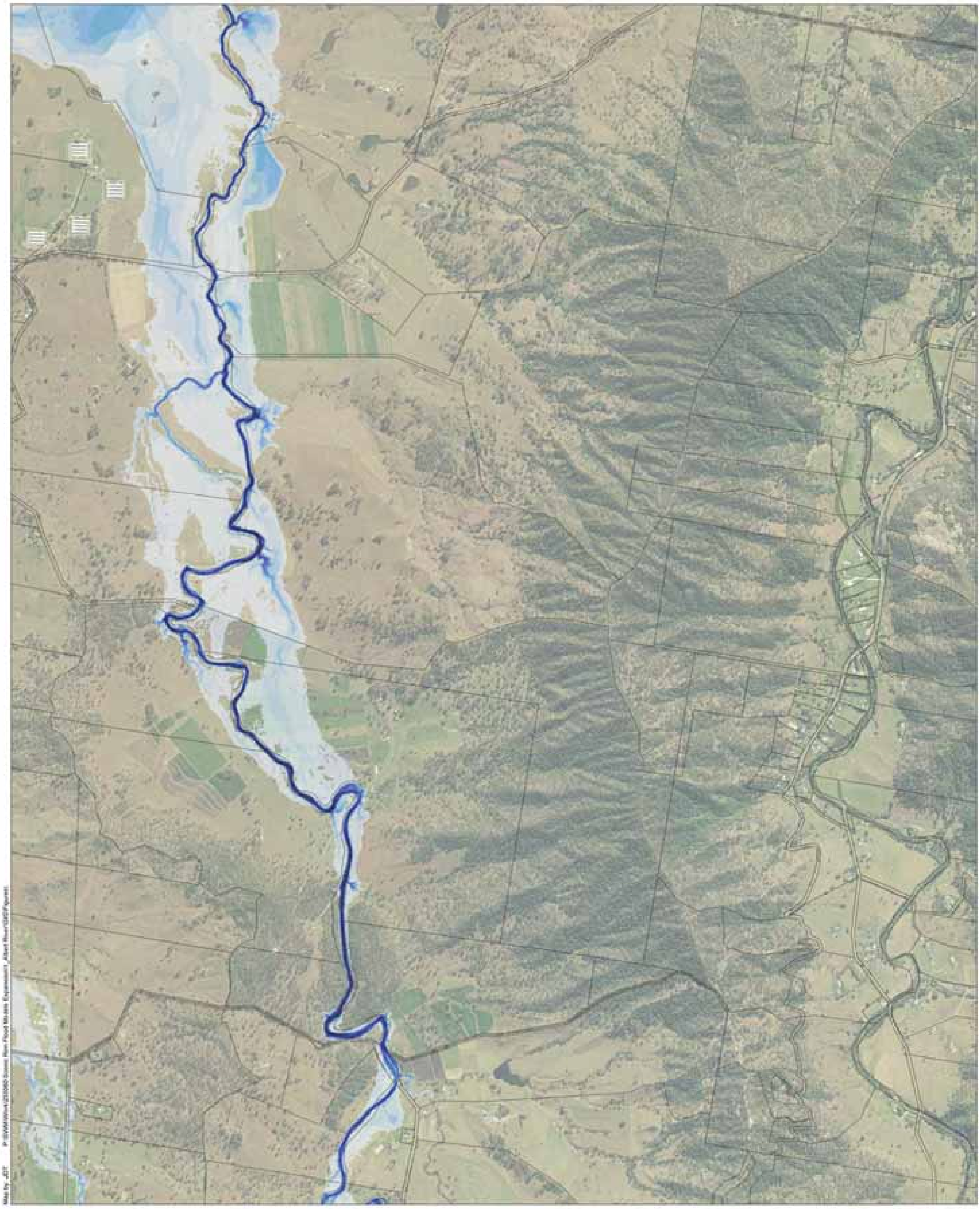
Date: 11/10/2017 Version: 0 Job No: 235060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-f**

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

aurecon



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

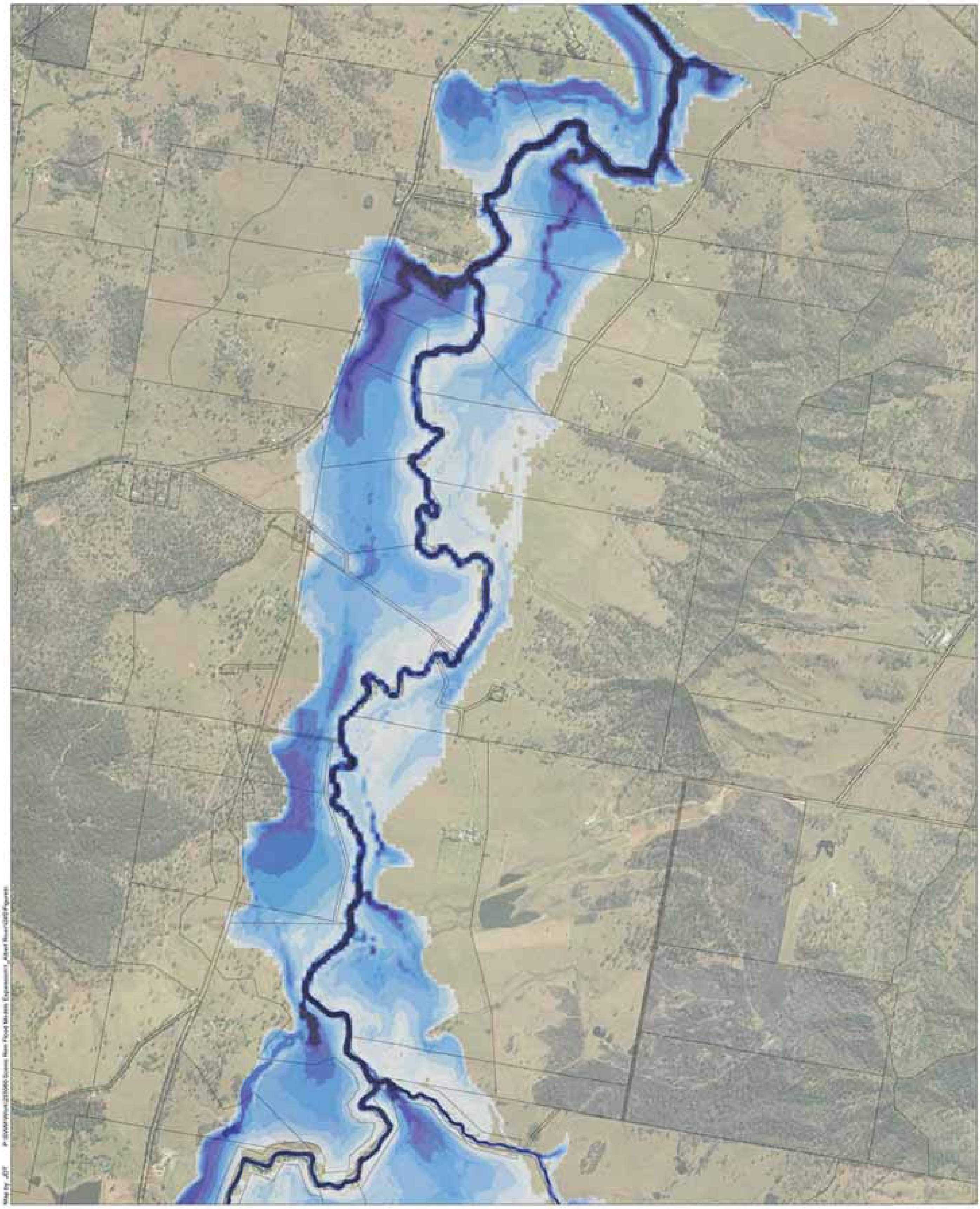
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-g**

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

aurecon



Legend

Notes:

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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	

1:25,000

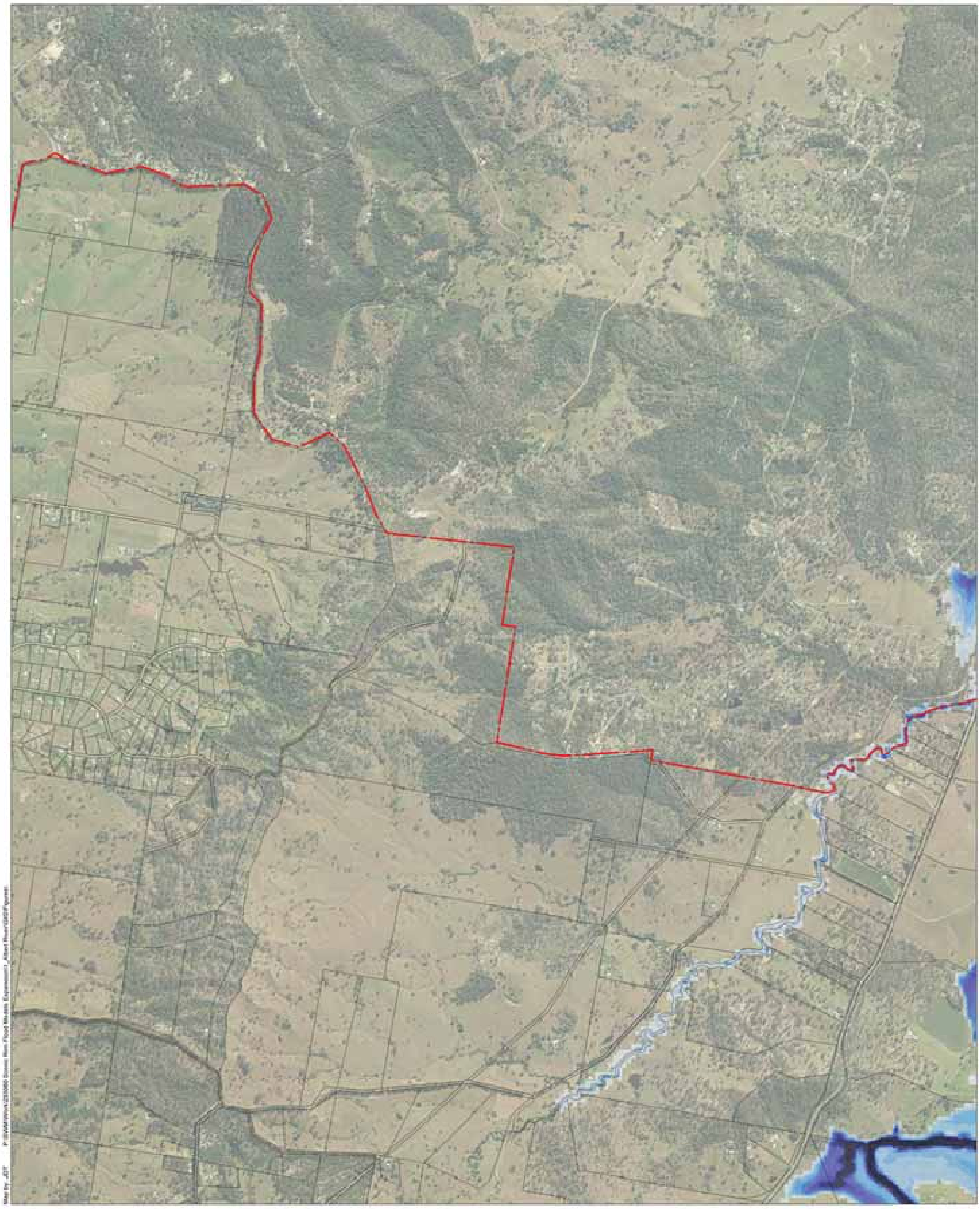
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-h**

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



Legend

Notes:

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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	

1:25,000

0 625 m 1,250 m

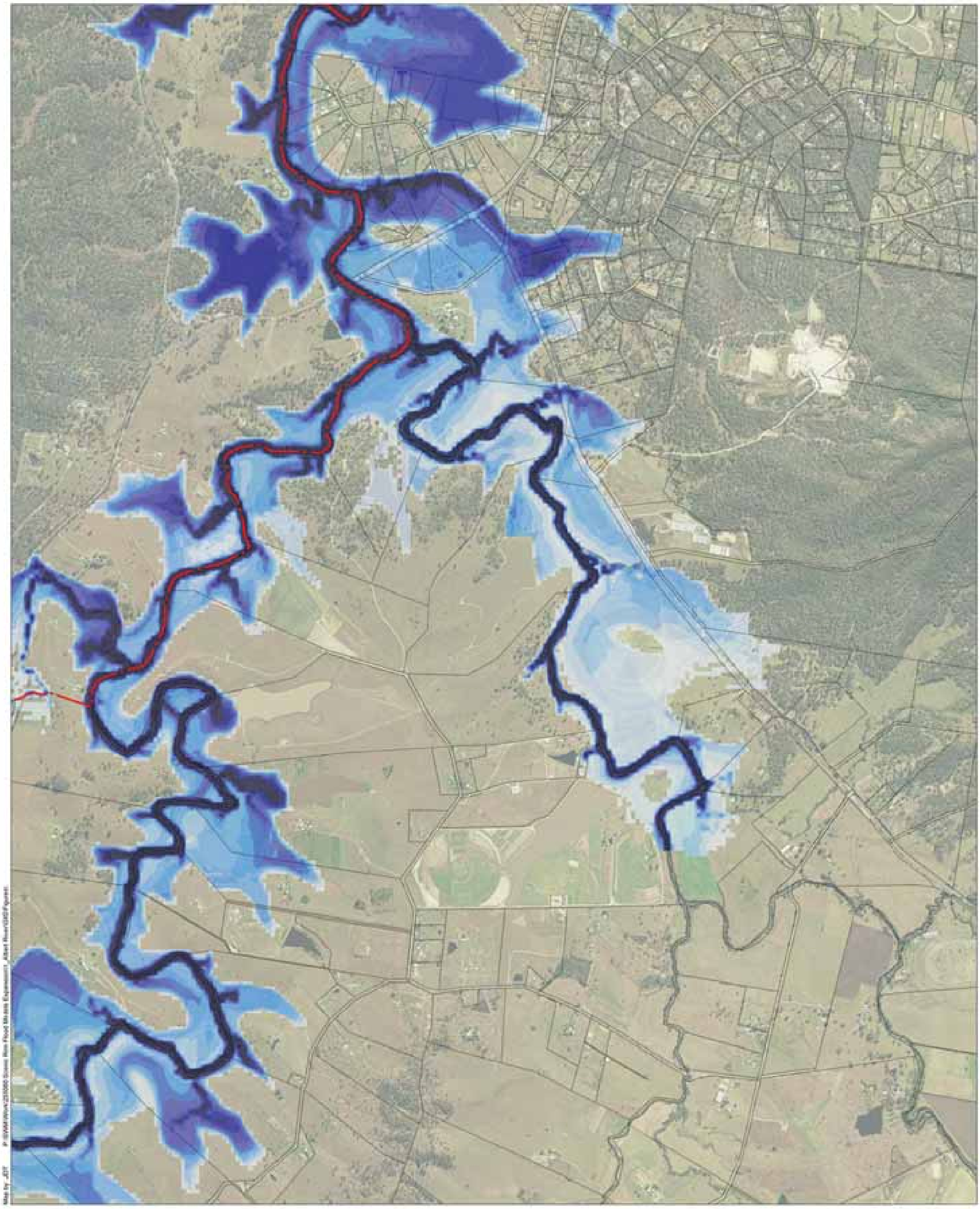
Date: 11/10/2017 Version: 0 Job No: 235060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-i**

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

aurecon



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

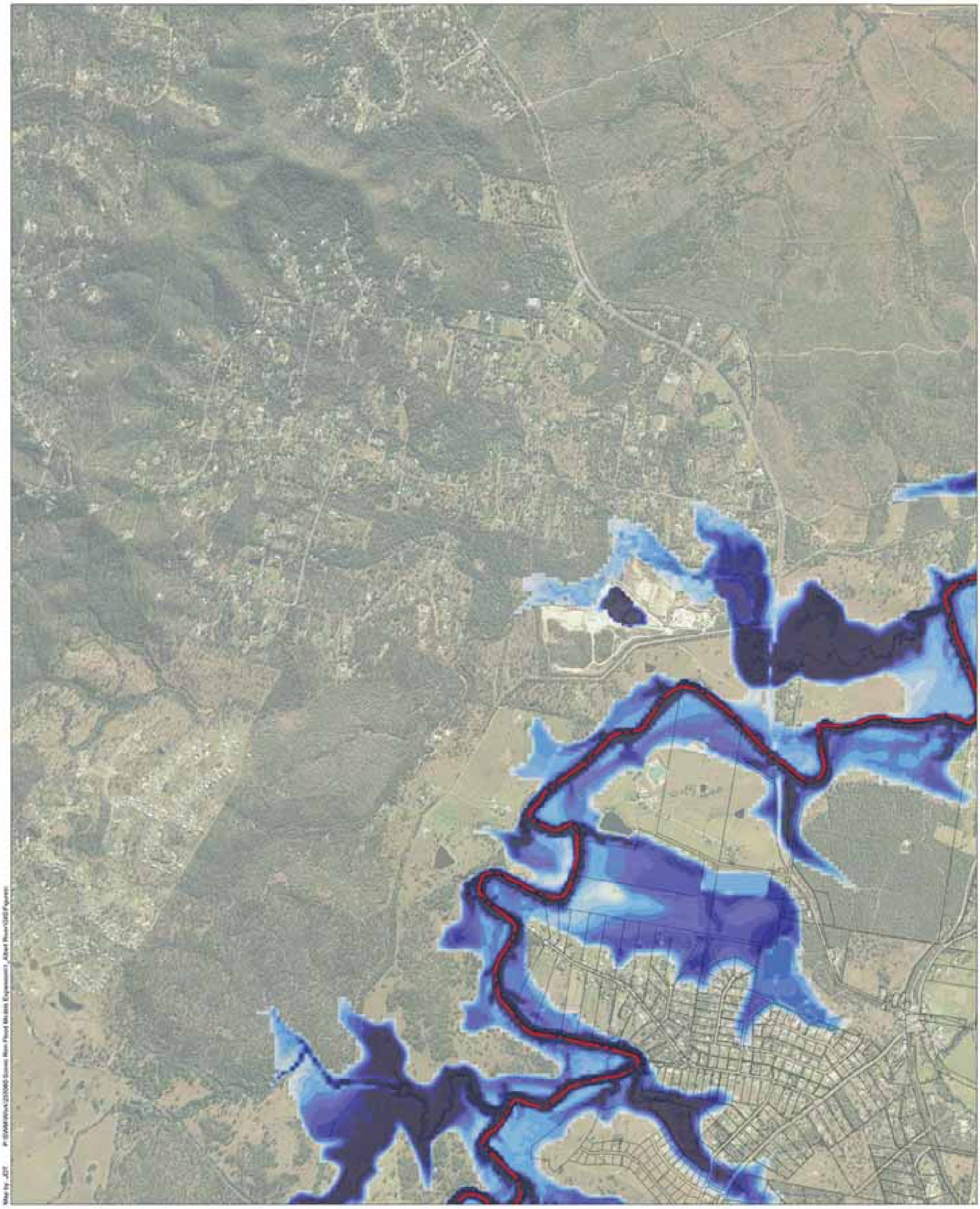
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-j**

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



Legend

Depth (m)

- SRRC Boundary
- Cadastral Boundary

- 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

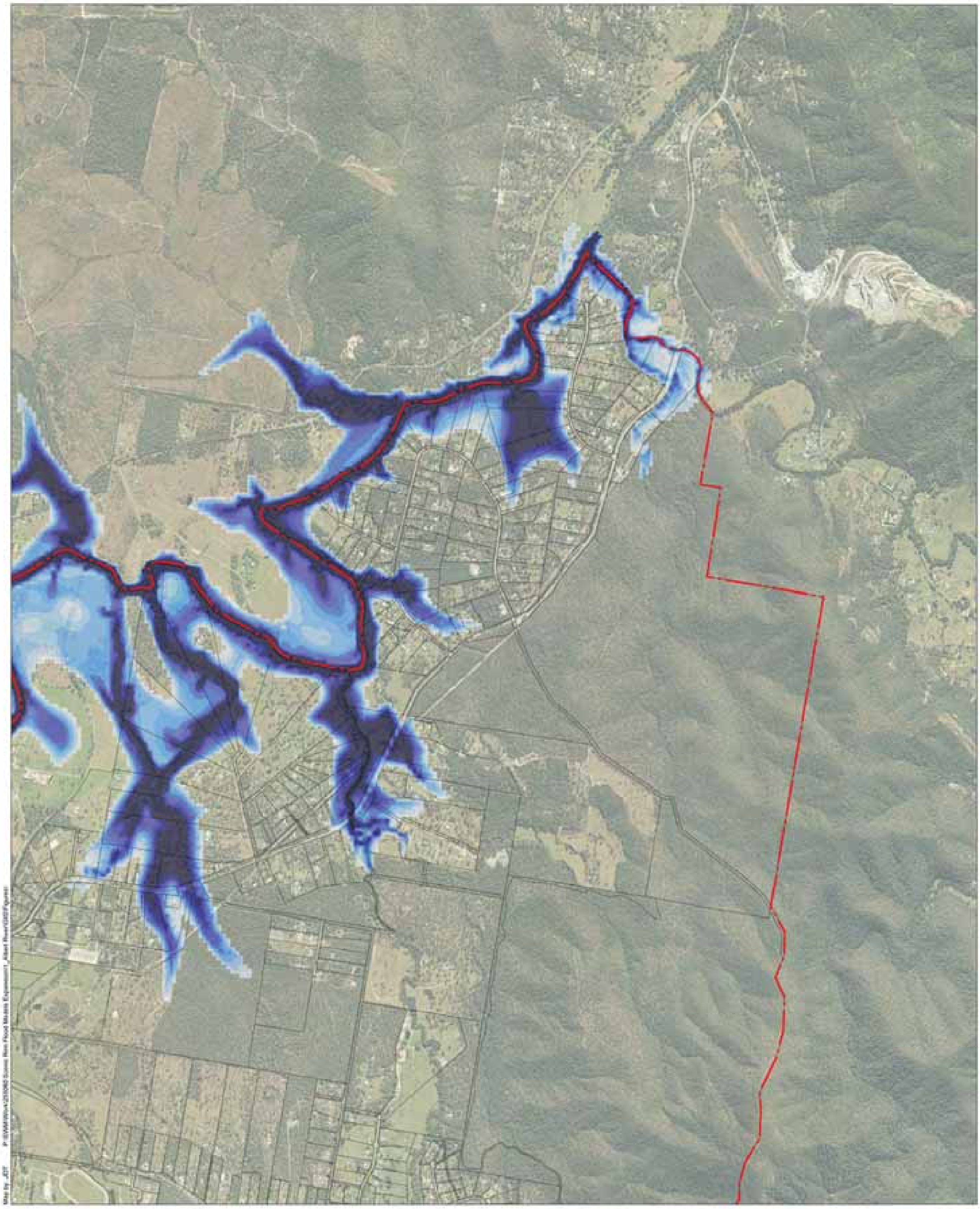
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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
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:

1:25,001

0 626 m 1,250 m

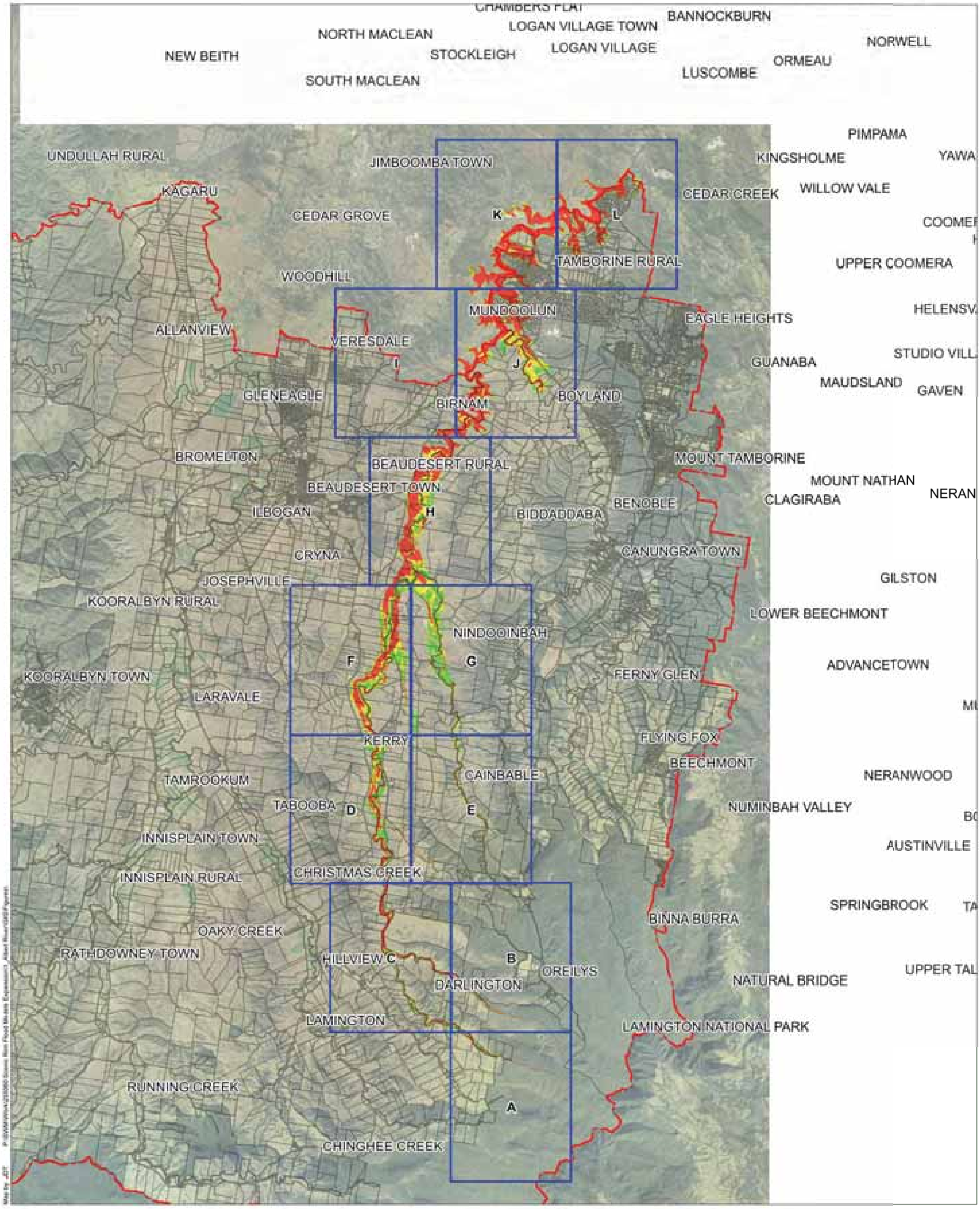
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B6-I**

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

aurecon



Legend

Notes:

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

1:200,000

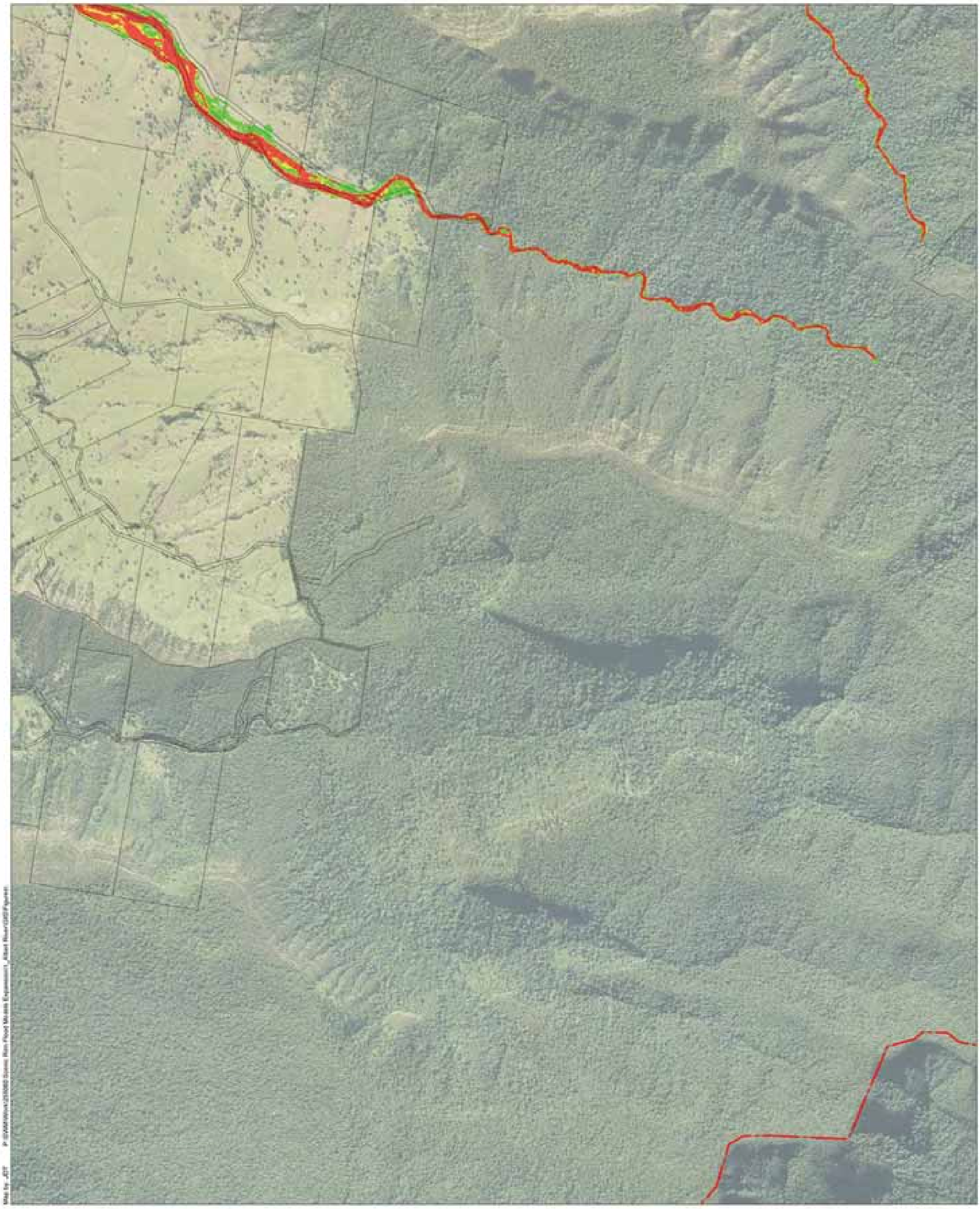
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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:

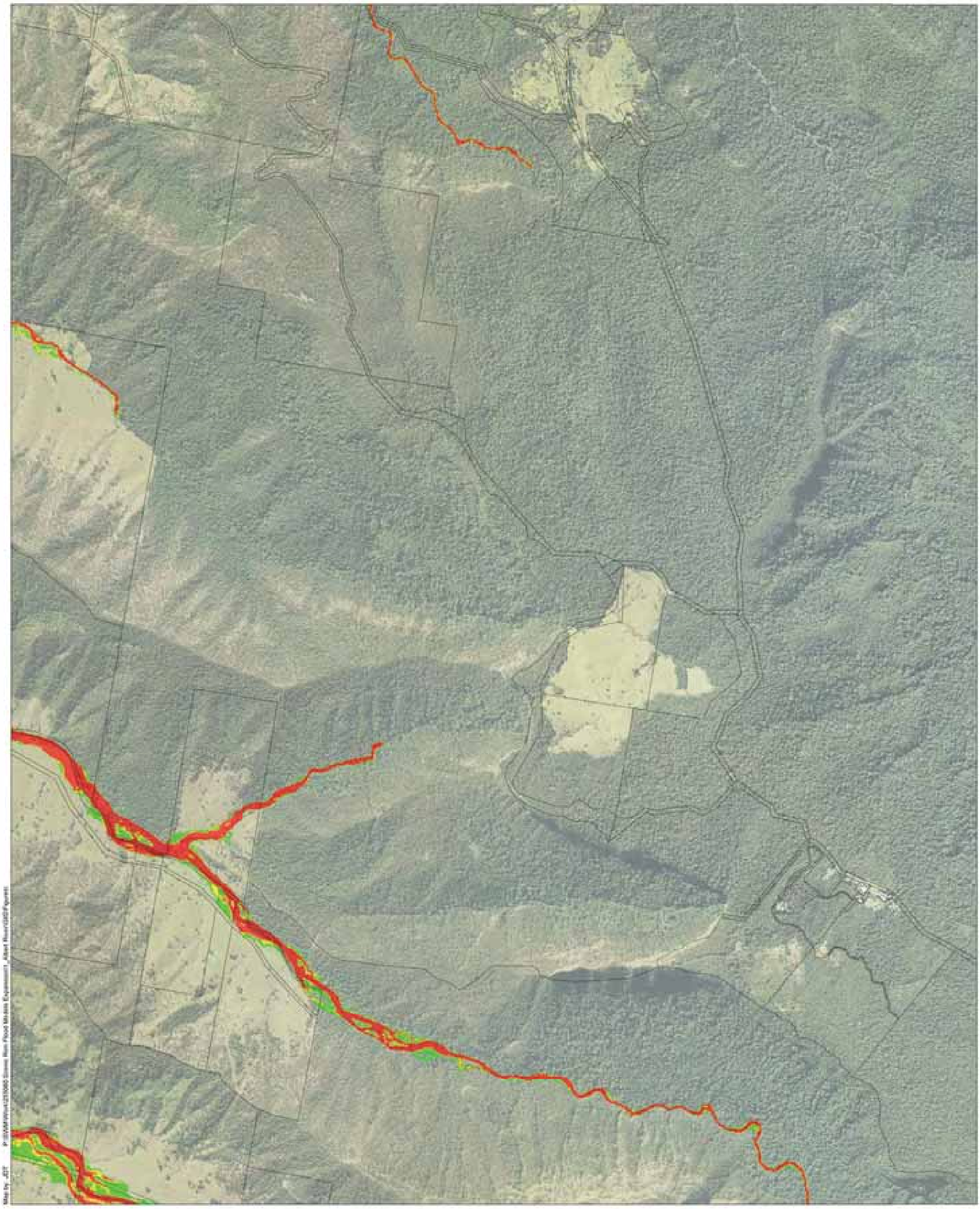
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-a**

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

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

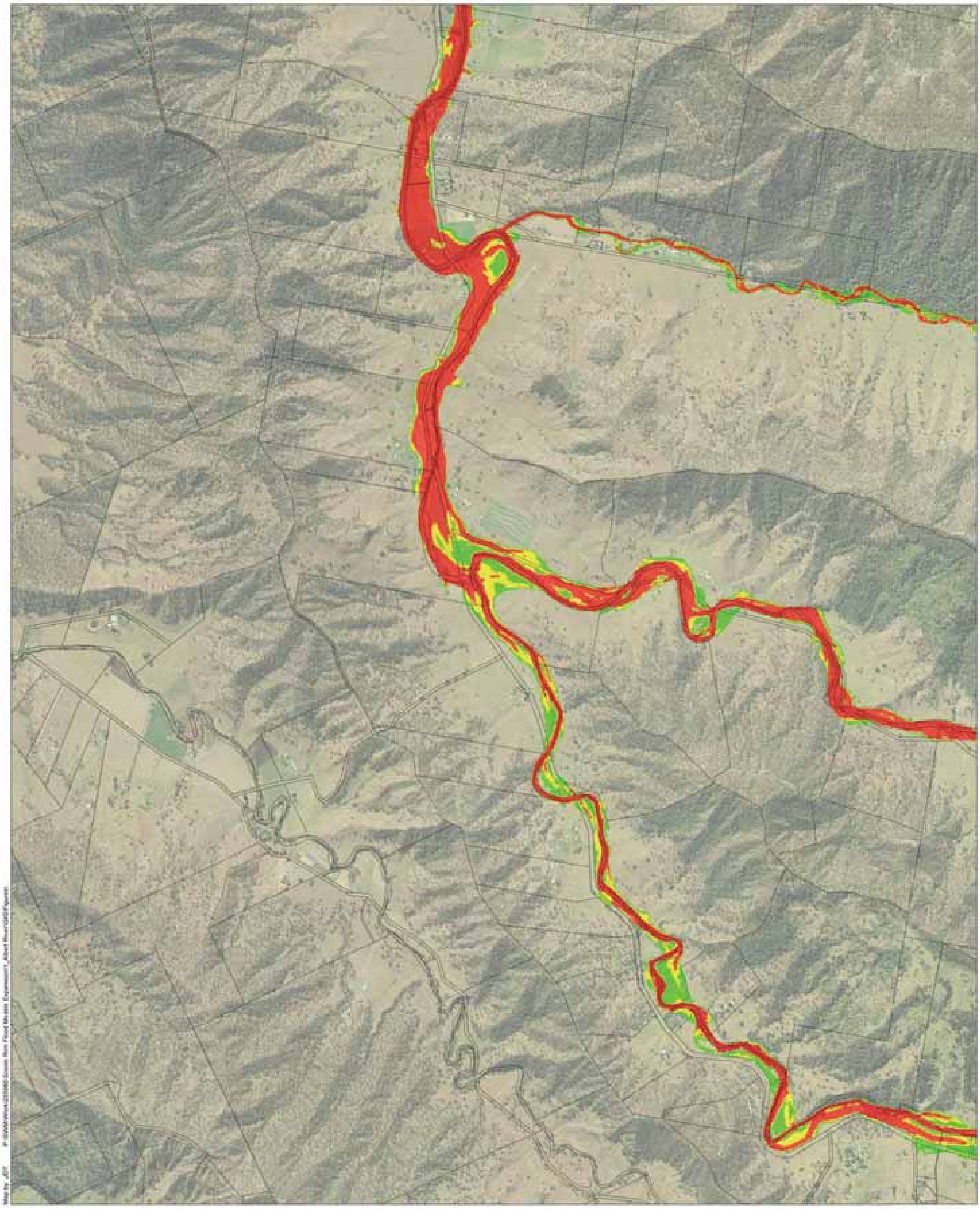
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-b**

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

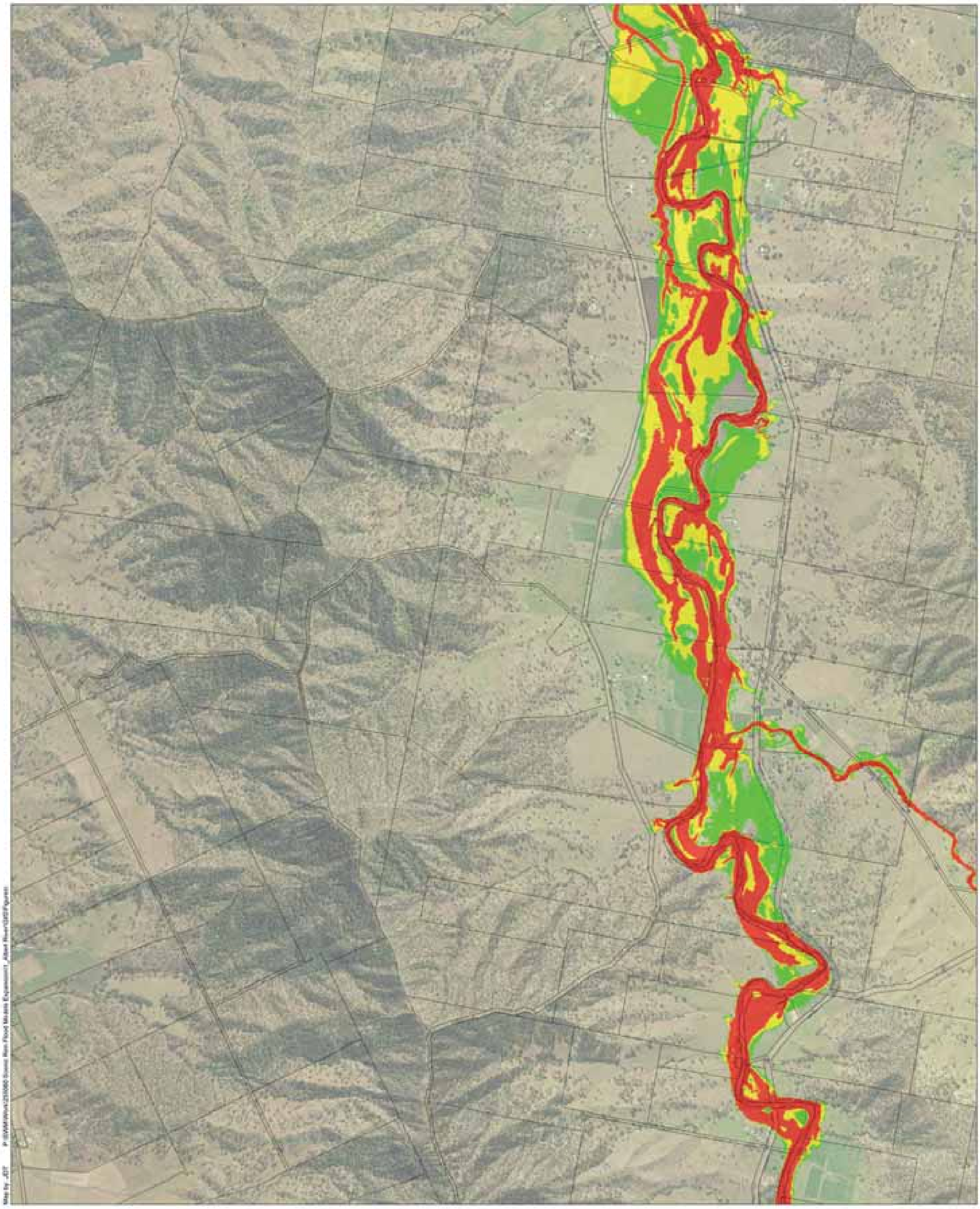
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

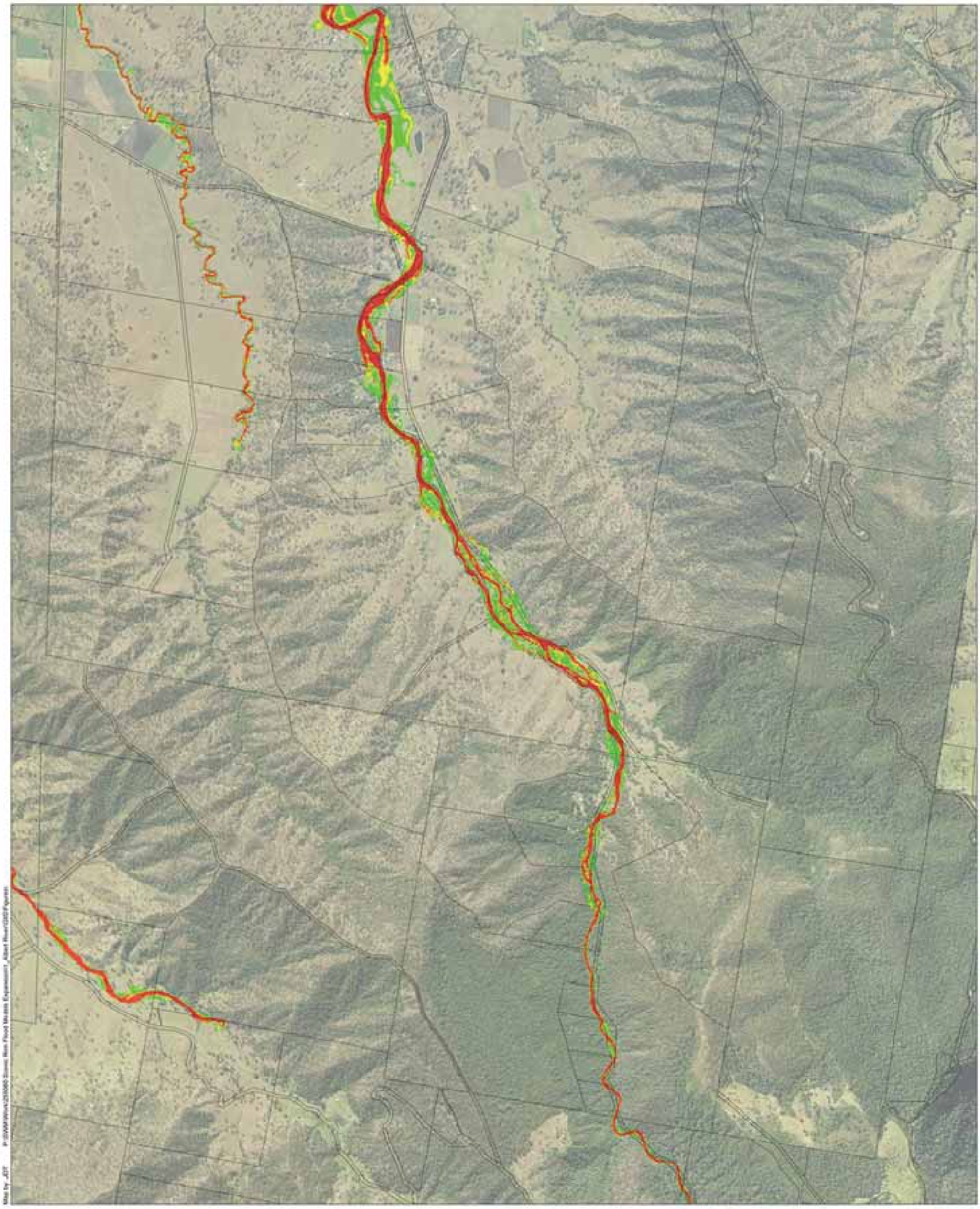
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B7-d**

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



Legend

SRRC Boundary
Cadastral Boundary

Low Hazard
Medium Hazard
High Hazard

Notes:

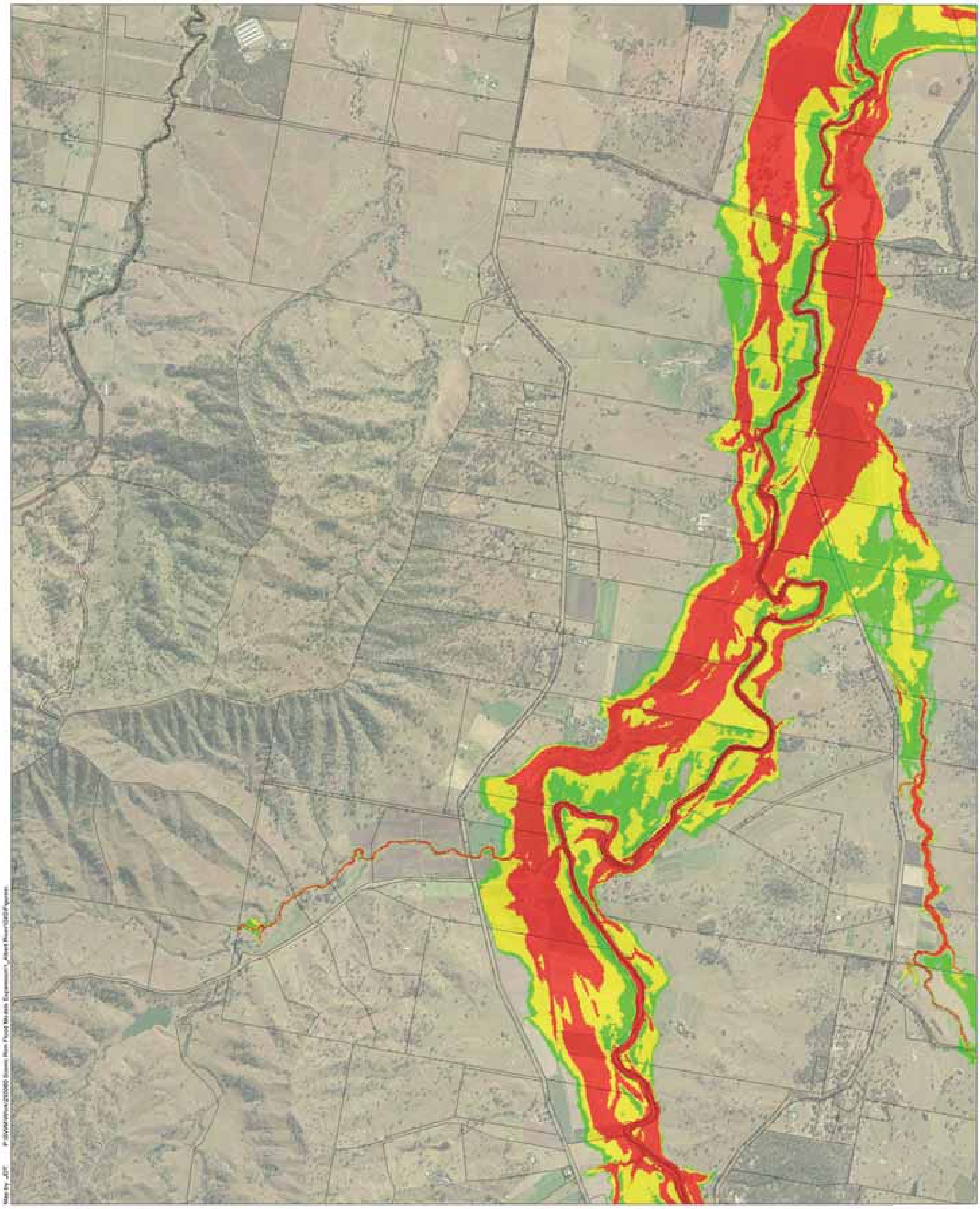
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-e**

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

aurecon



Legend

Notes:

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

1:25,000

0 625 m 1,250 m

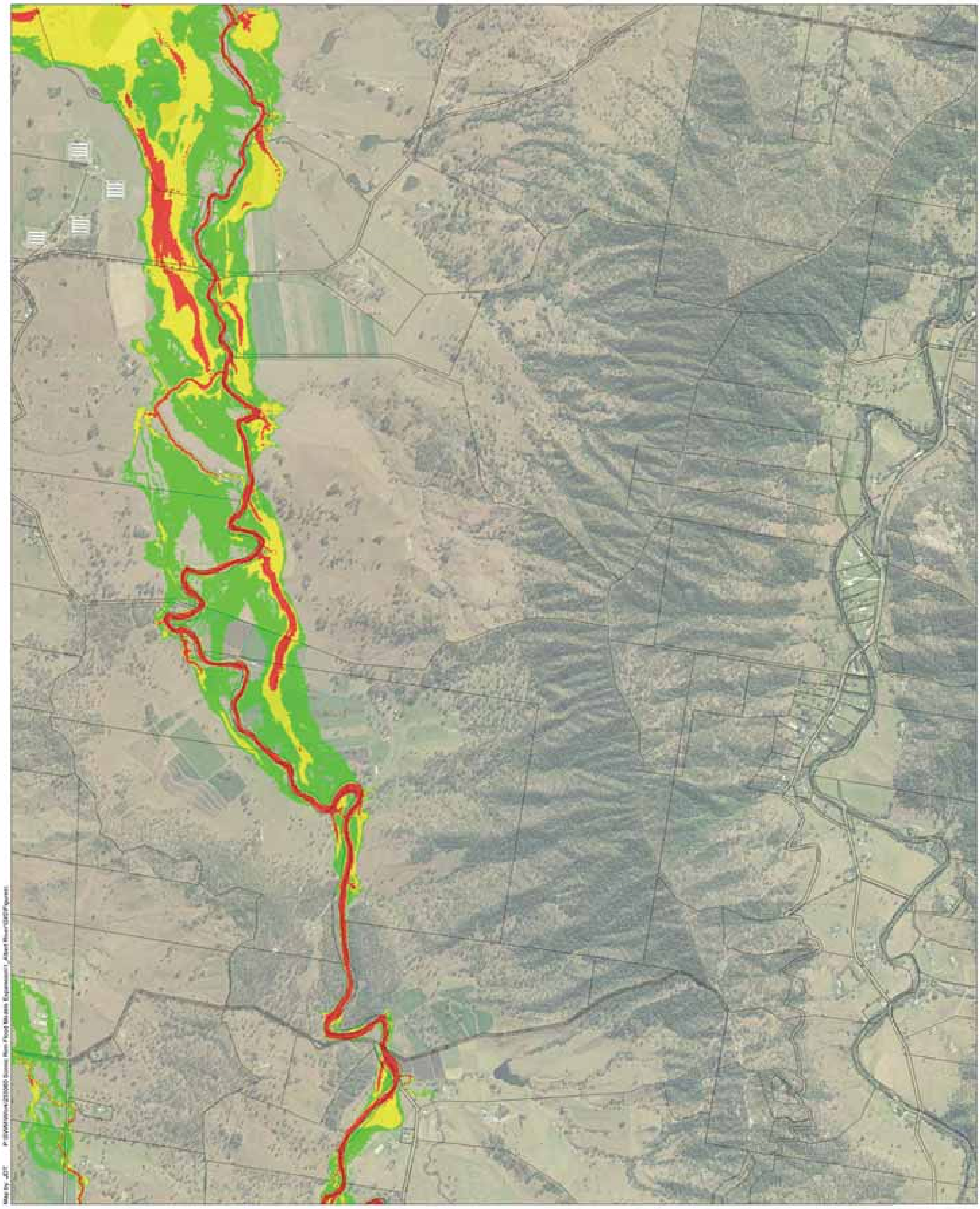
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

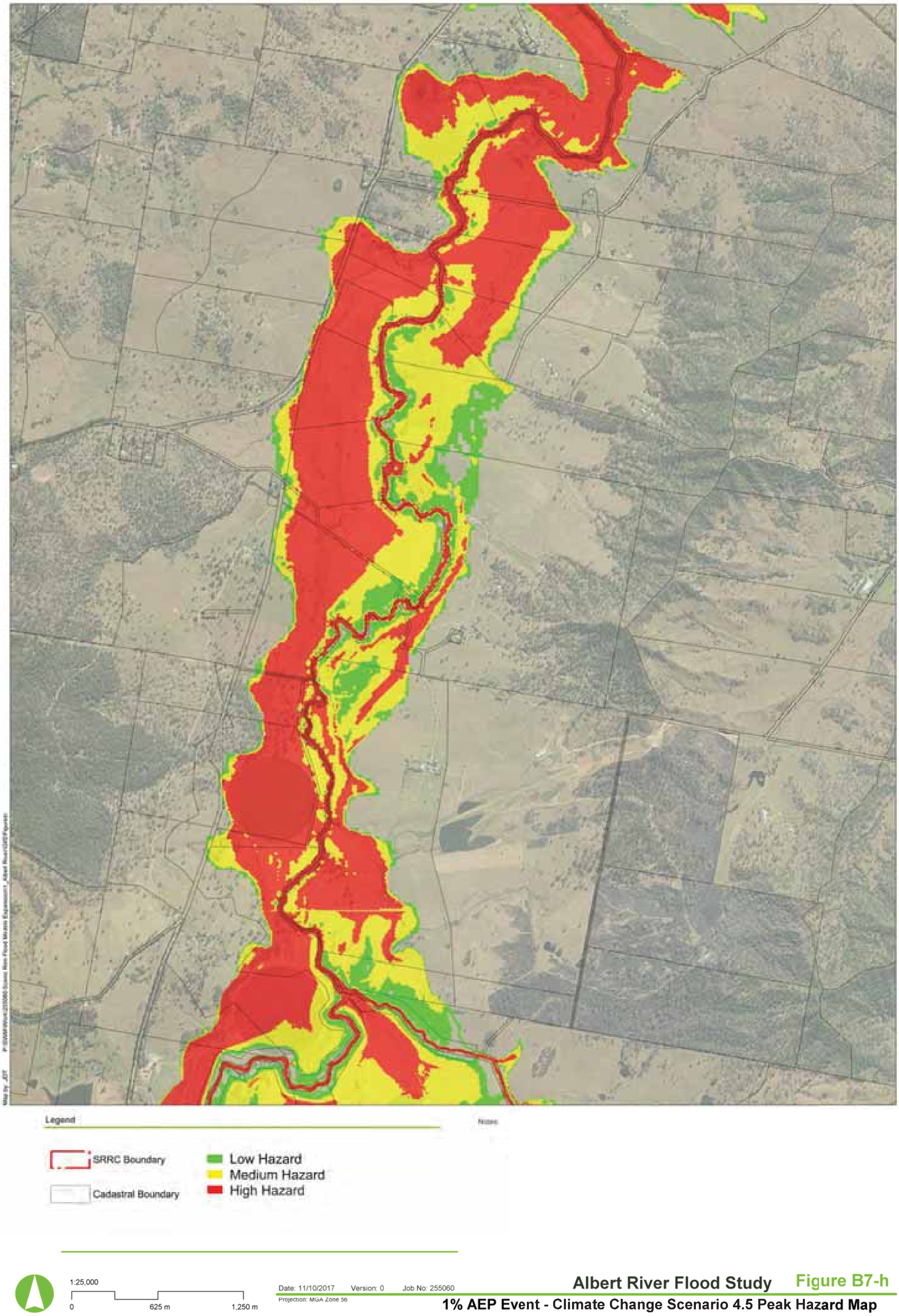
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B7-g**

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

aurecon

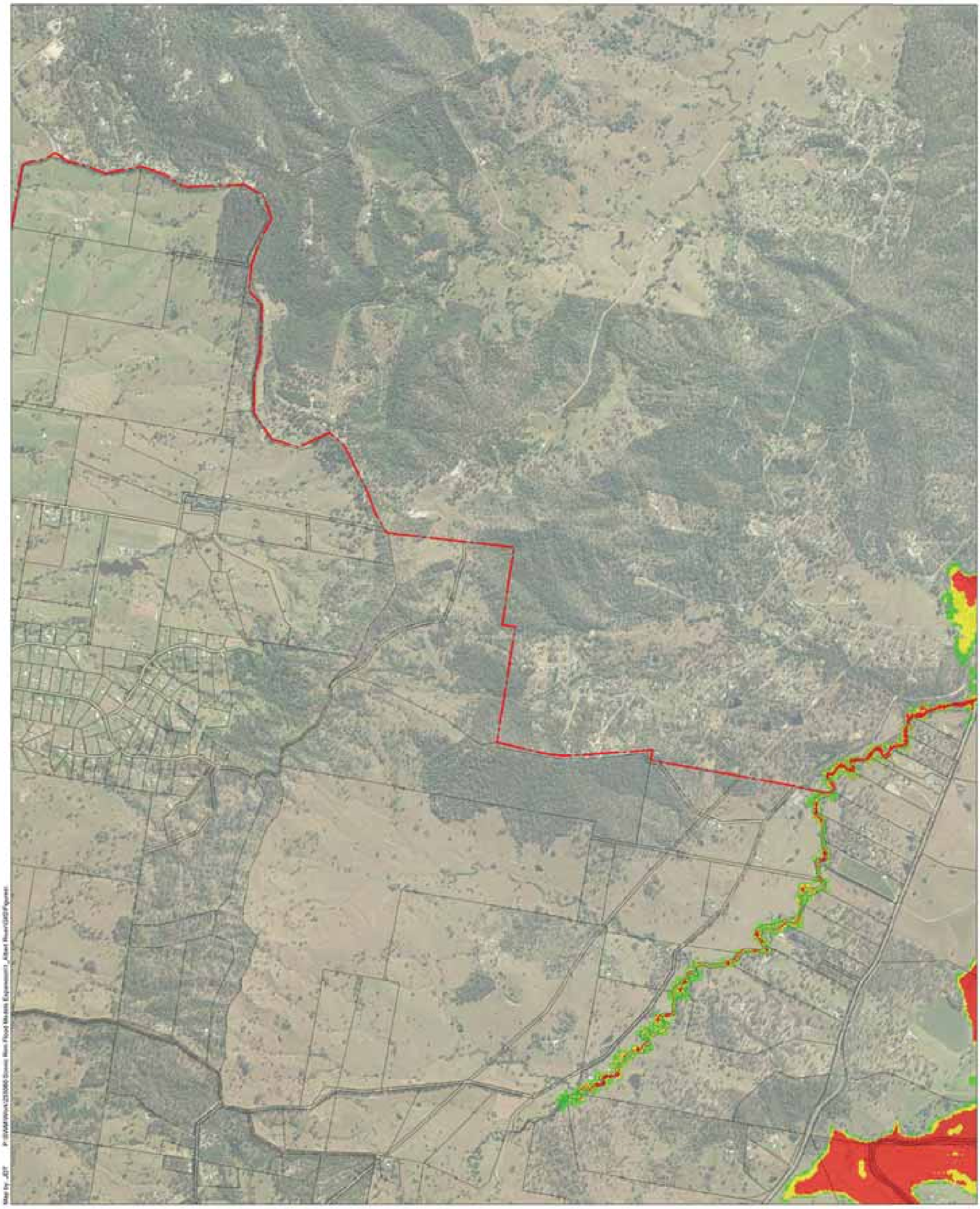


Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-h**

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

aurecon



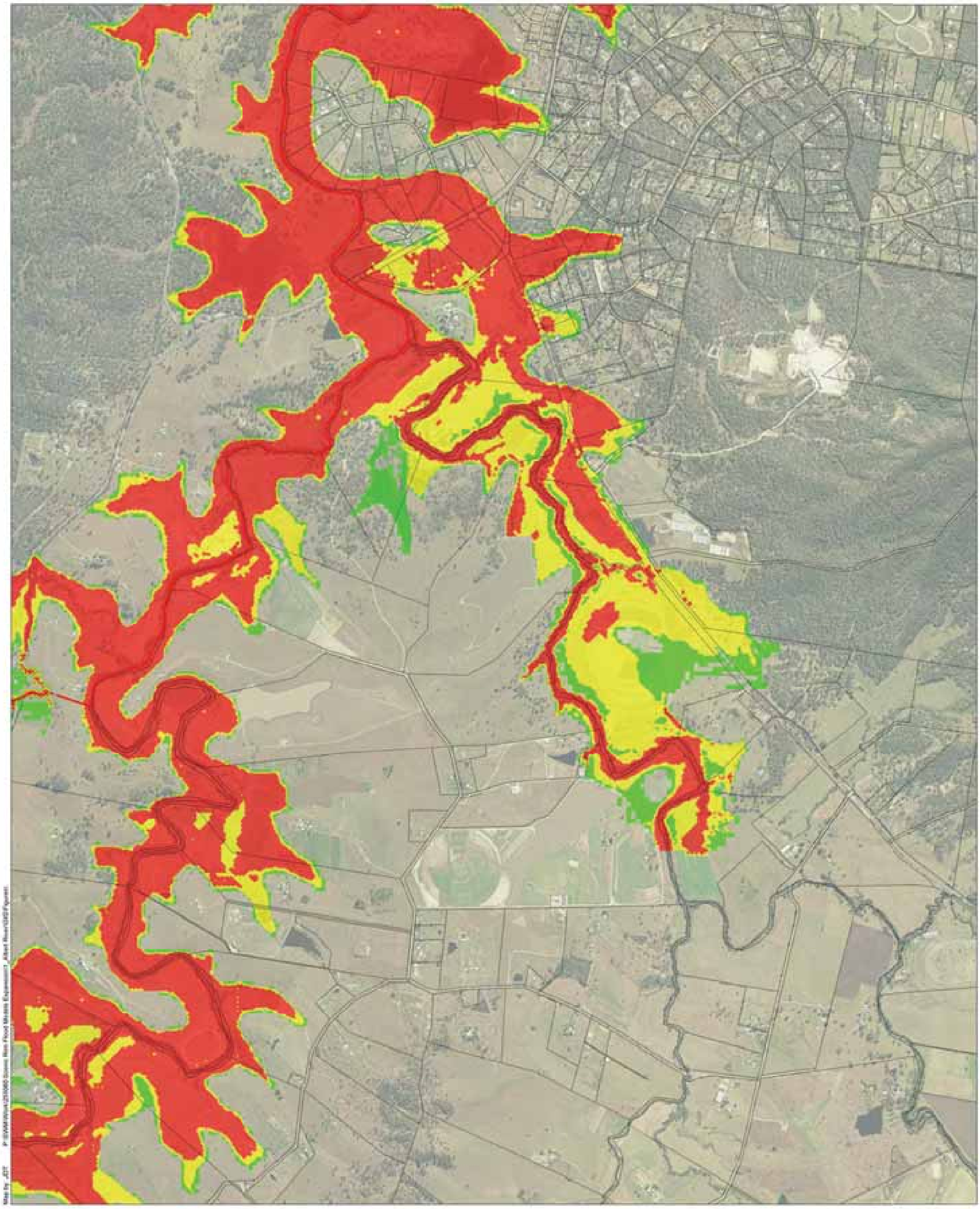
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-i**

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

aurecon



Legend

Notes:

SRRC Boundary

Cadastral Boundary

Low Hazard
Medium Hazard
High Hazard

1:25,000

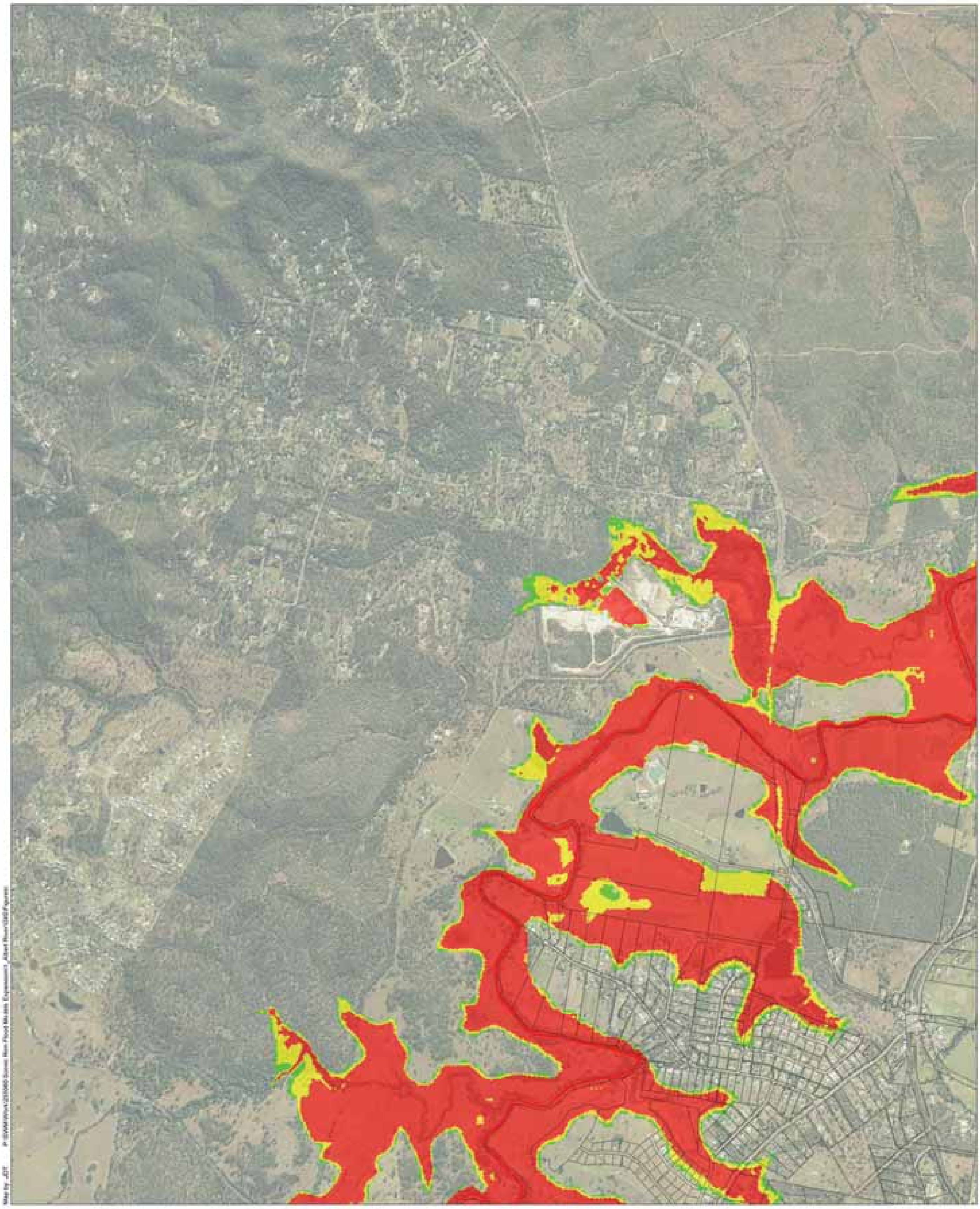
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-j**

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

aurecon



Legend

SRRC Boundary
Cadastral Boundary

Low Hazard
Medium Hazard
High Hazard

Notes:

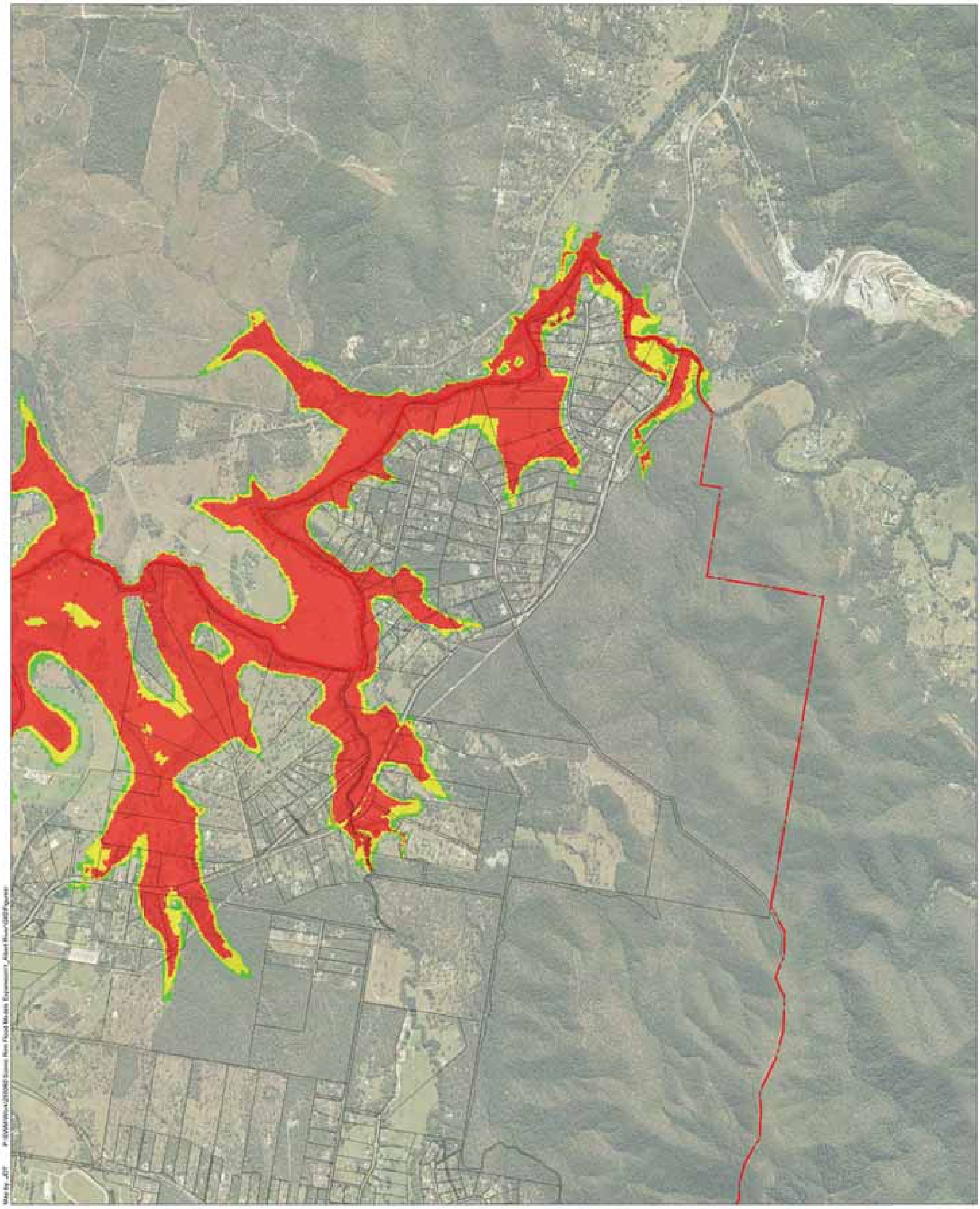
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure B7-k**

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

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,001

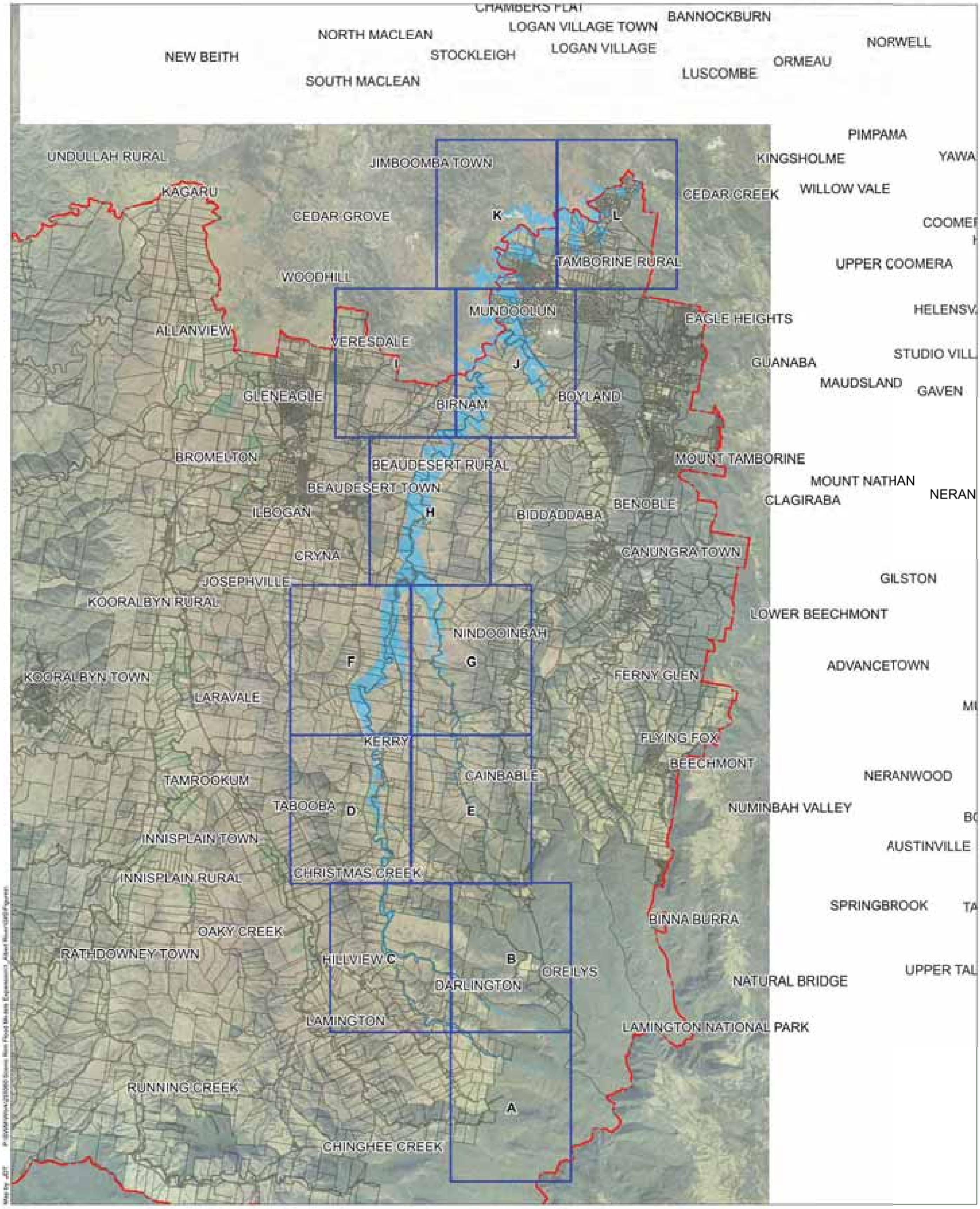
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure B7-I**

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



Legend

SRRC Boundary

Inundation Extent

Cadastral Boundary

Peak Water level Contour (mAHD)

Notes:

1:200,000

0 5,000 m 10,000 m

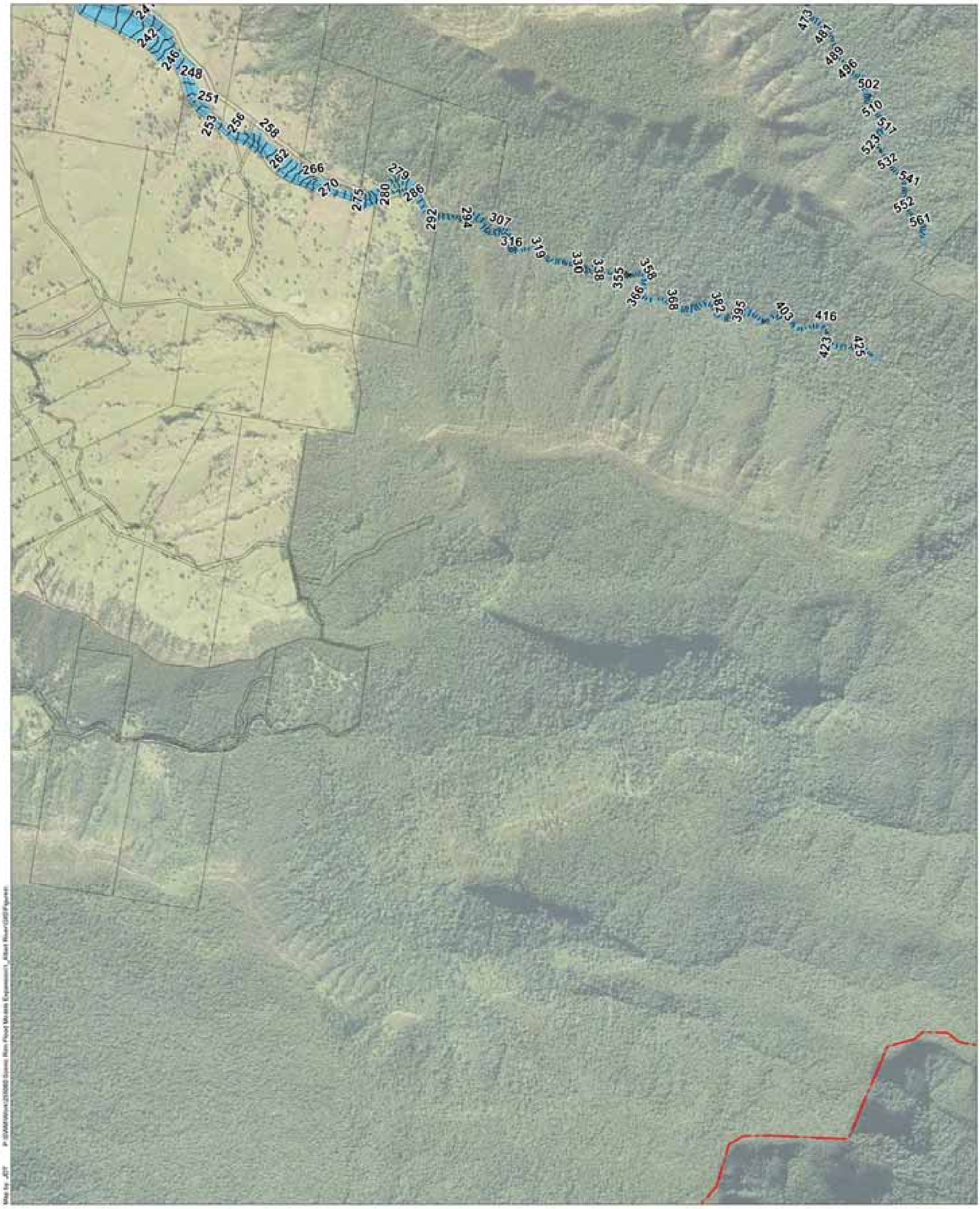
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

aurecon

Albert River 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

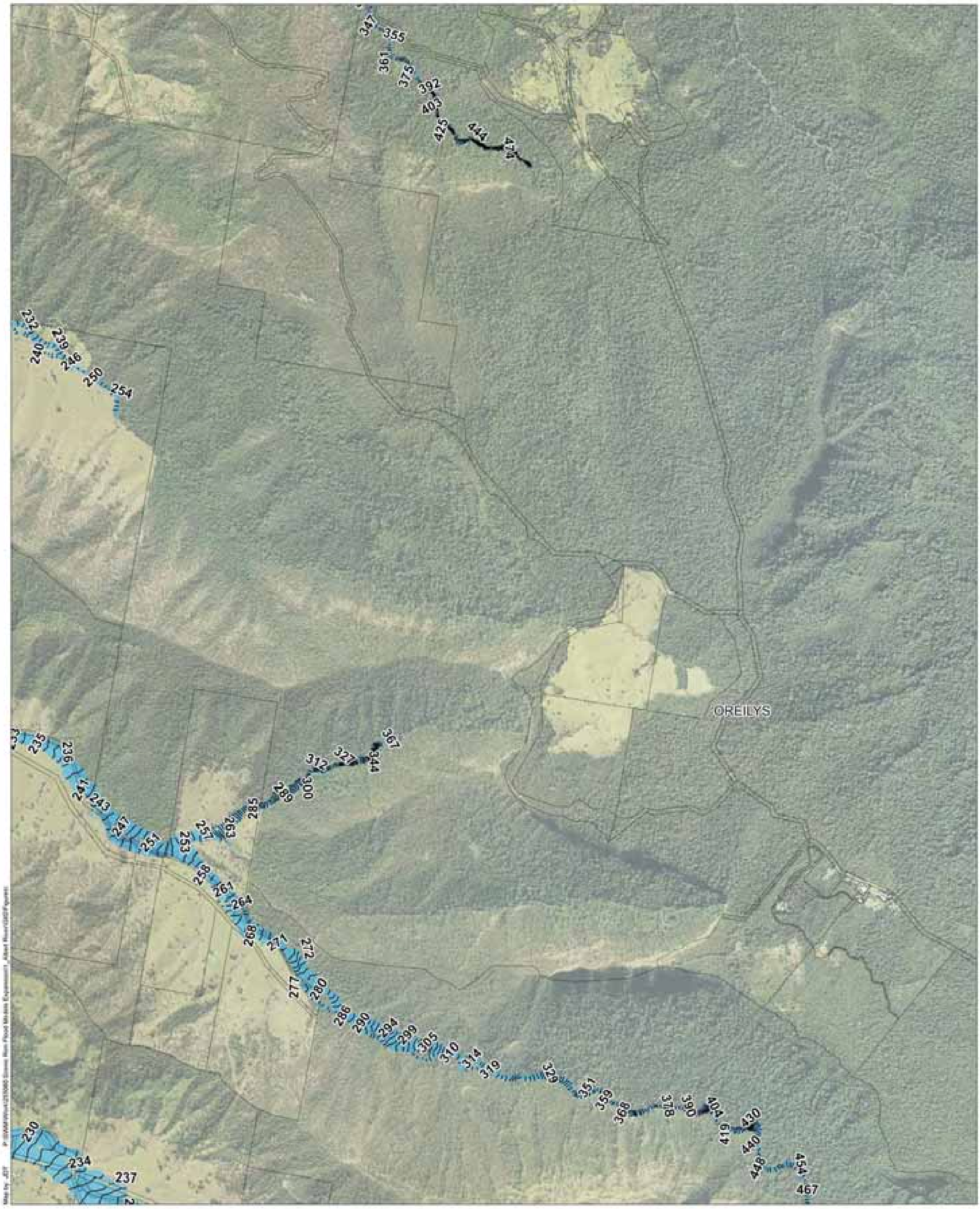
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-a**

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: 11/10/2017 Version: 0 Job No: 255060

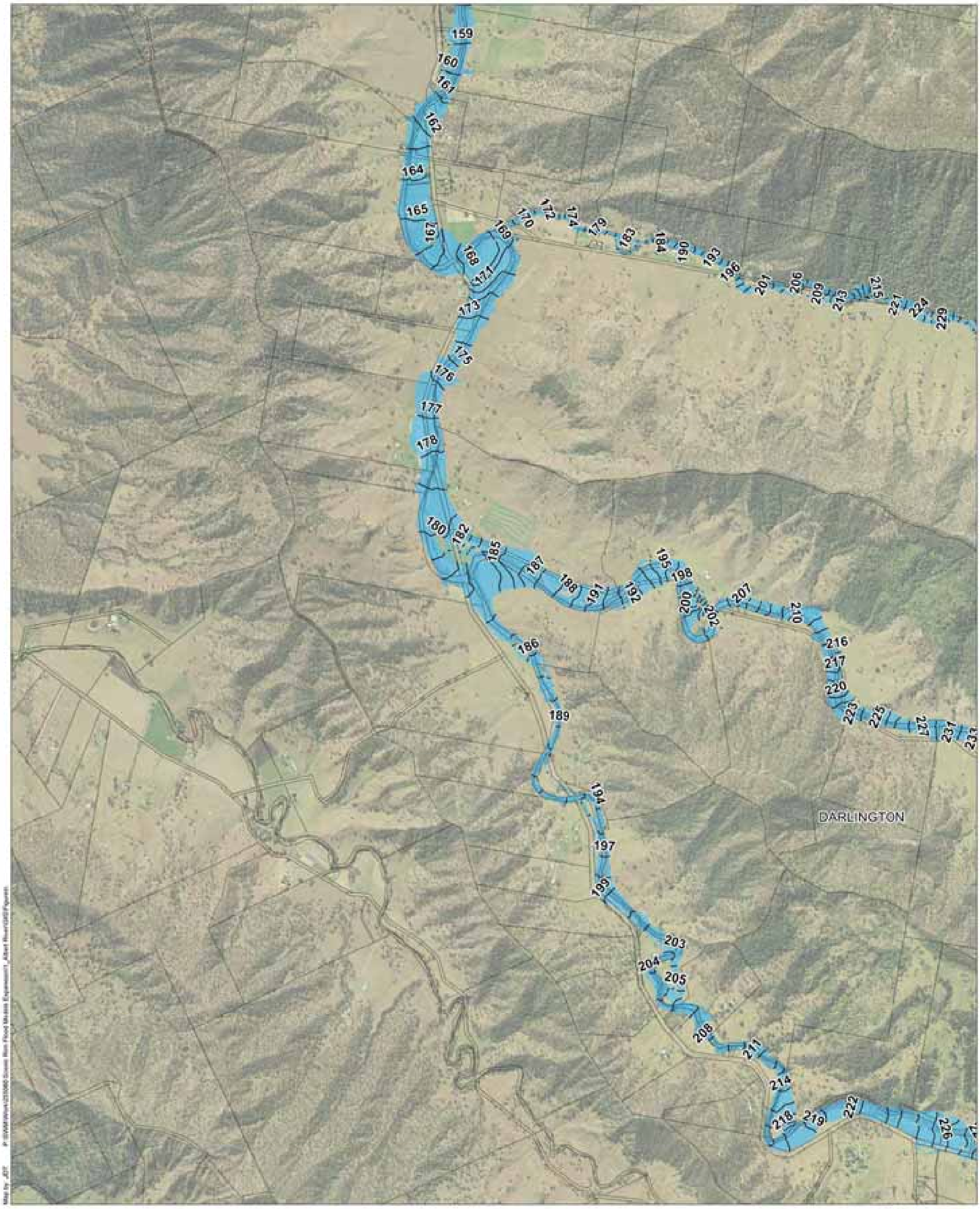
Projection: MGA Zone 56

Albert River Flood Study

Figure C1-b

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

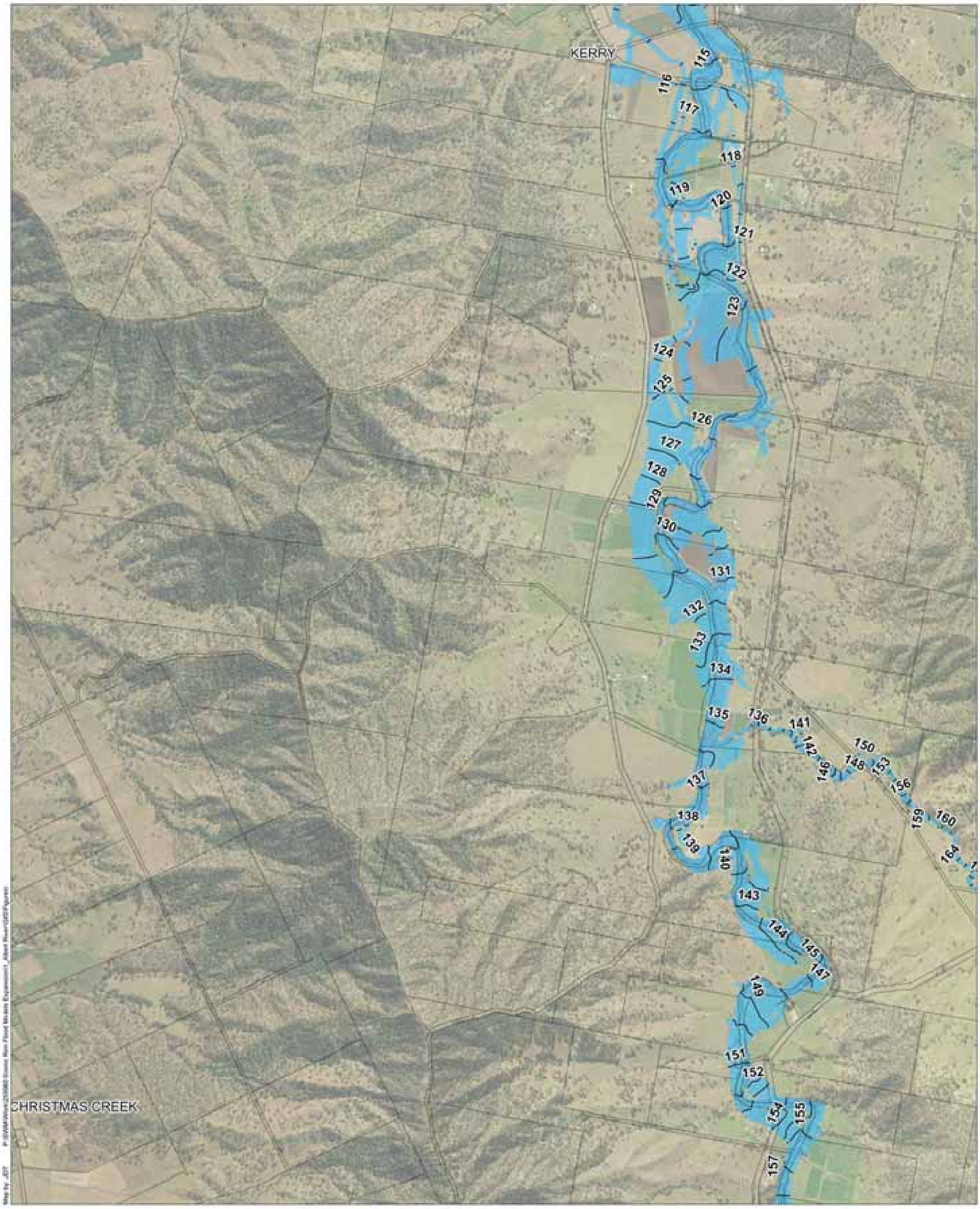
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-c**

2% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

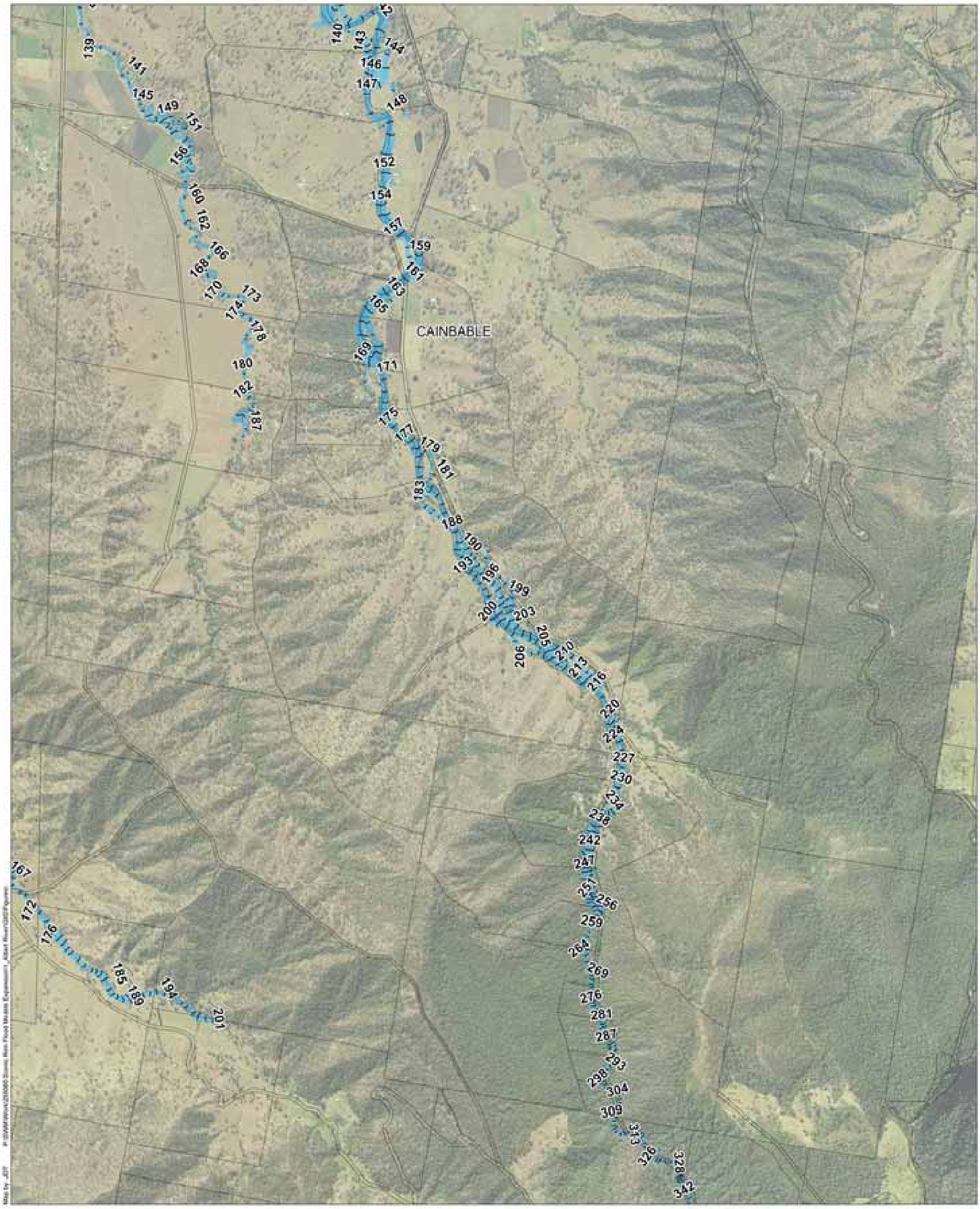
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

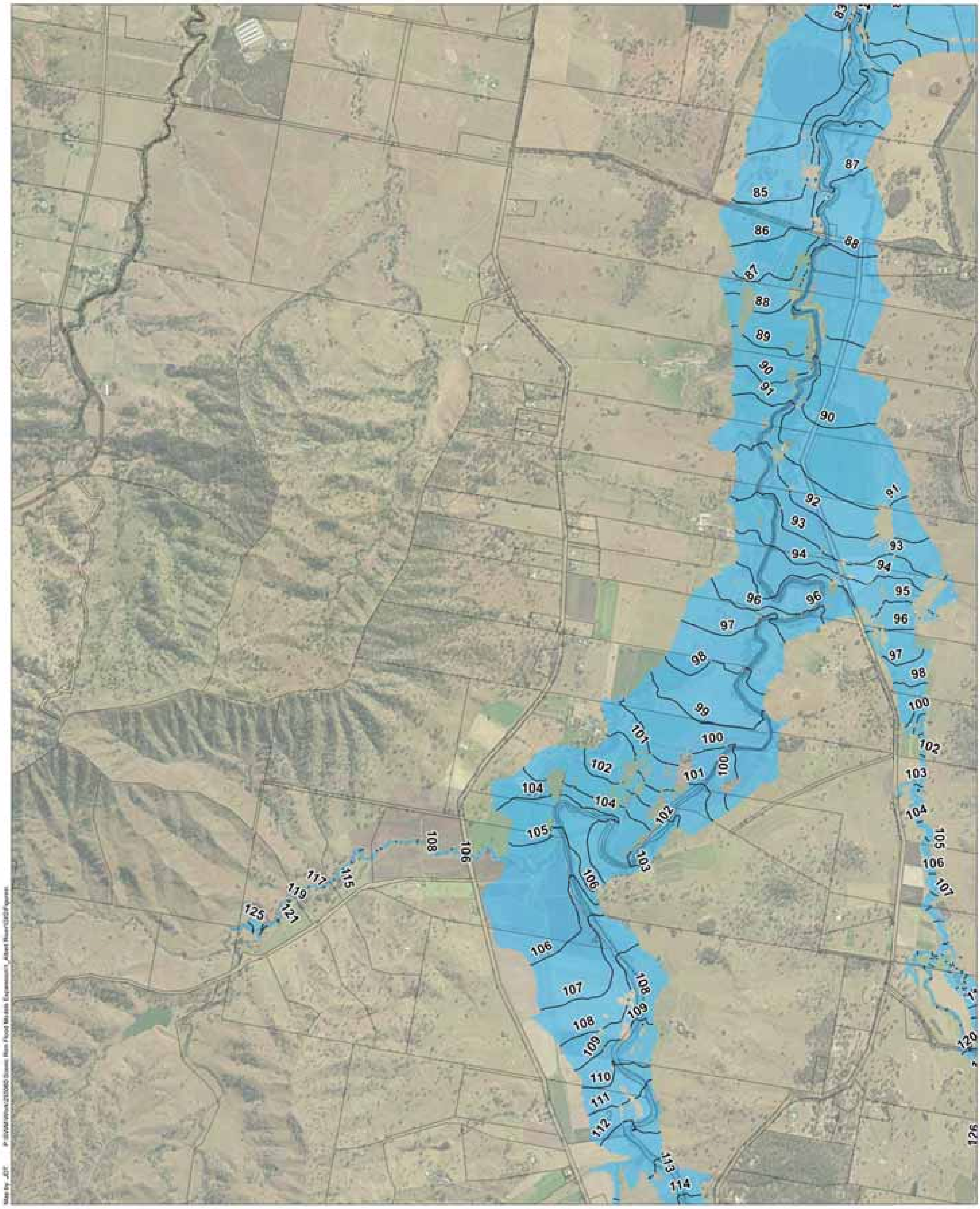
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

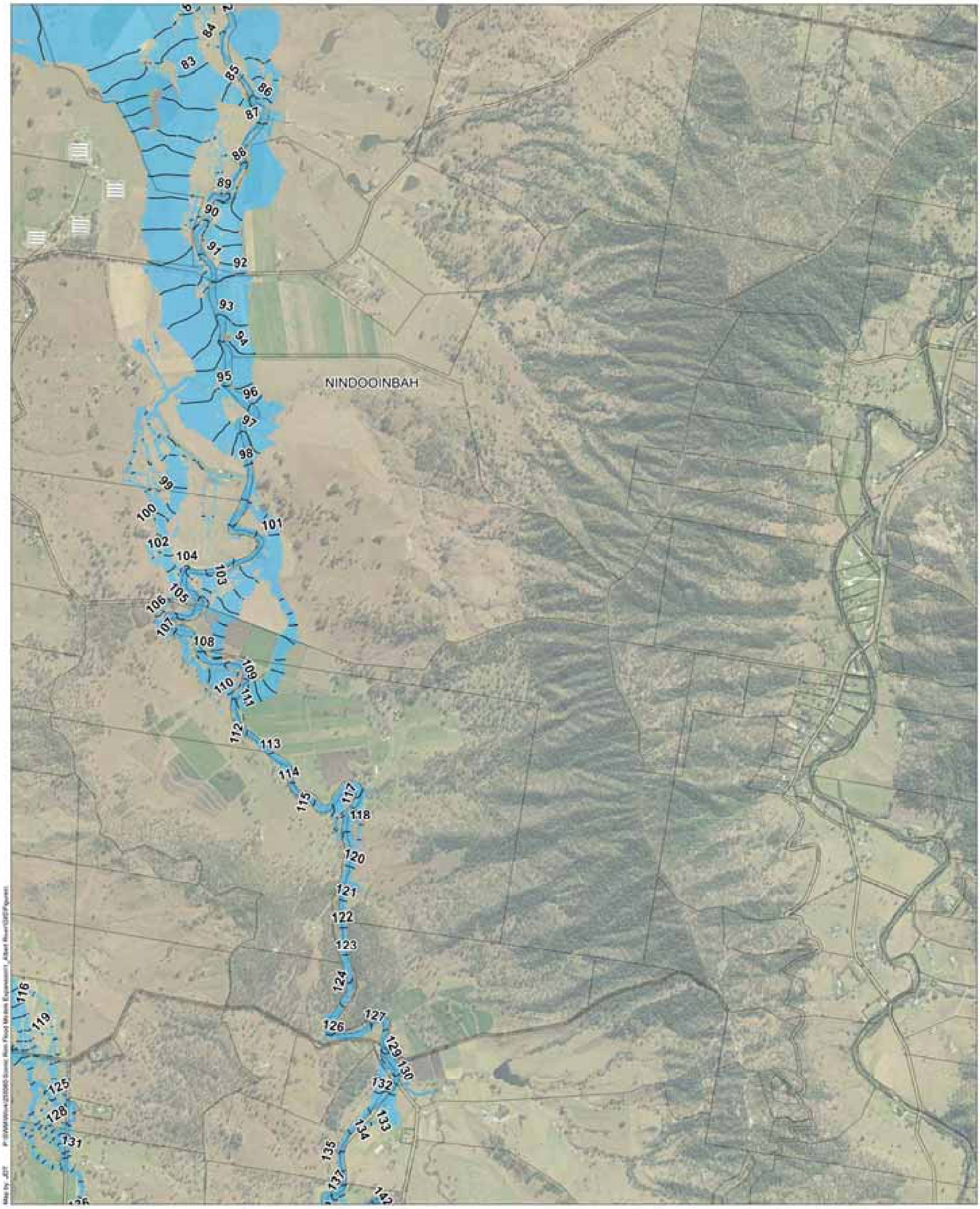
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure C1-f

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

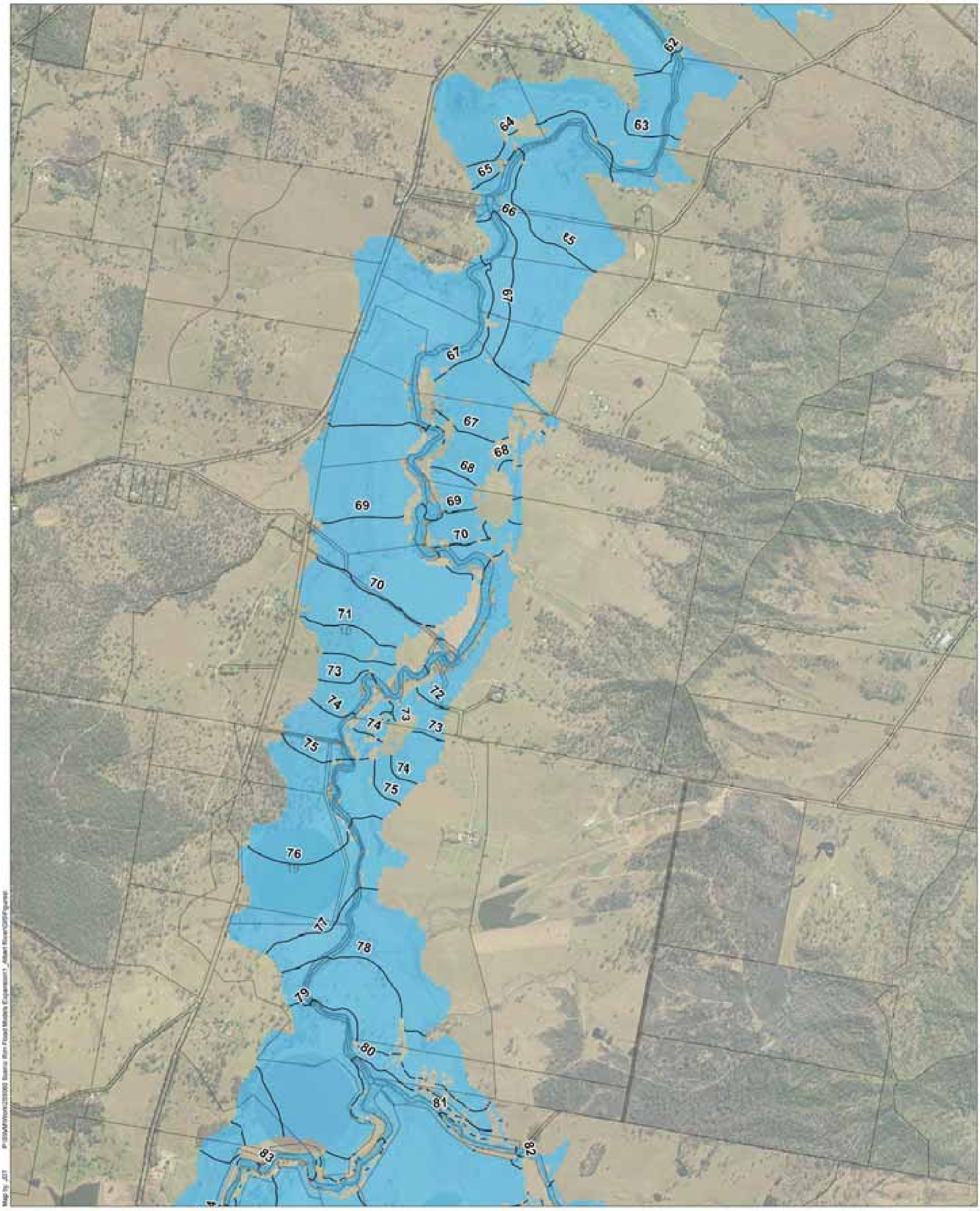
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-g**

2% AEP Event - Inundation Extent

aurecon



Legend

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

Notes:

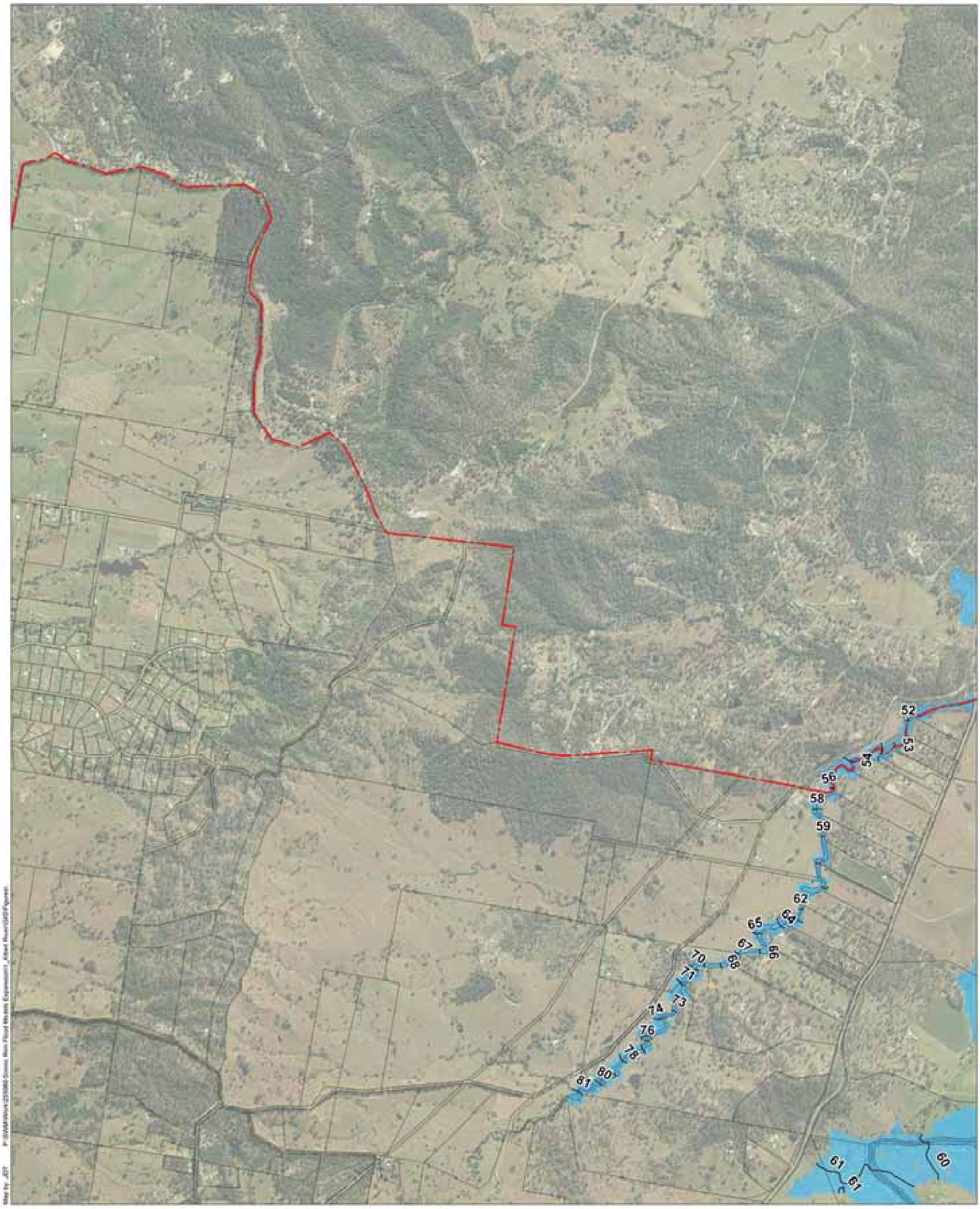
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C1-h**

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

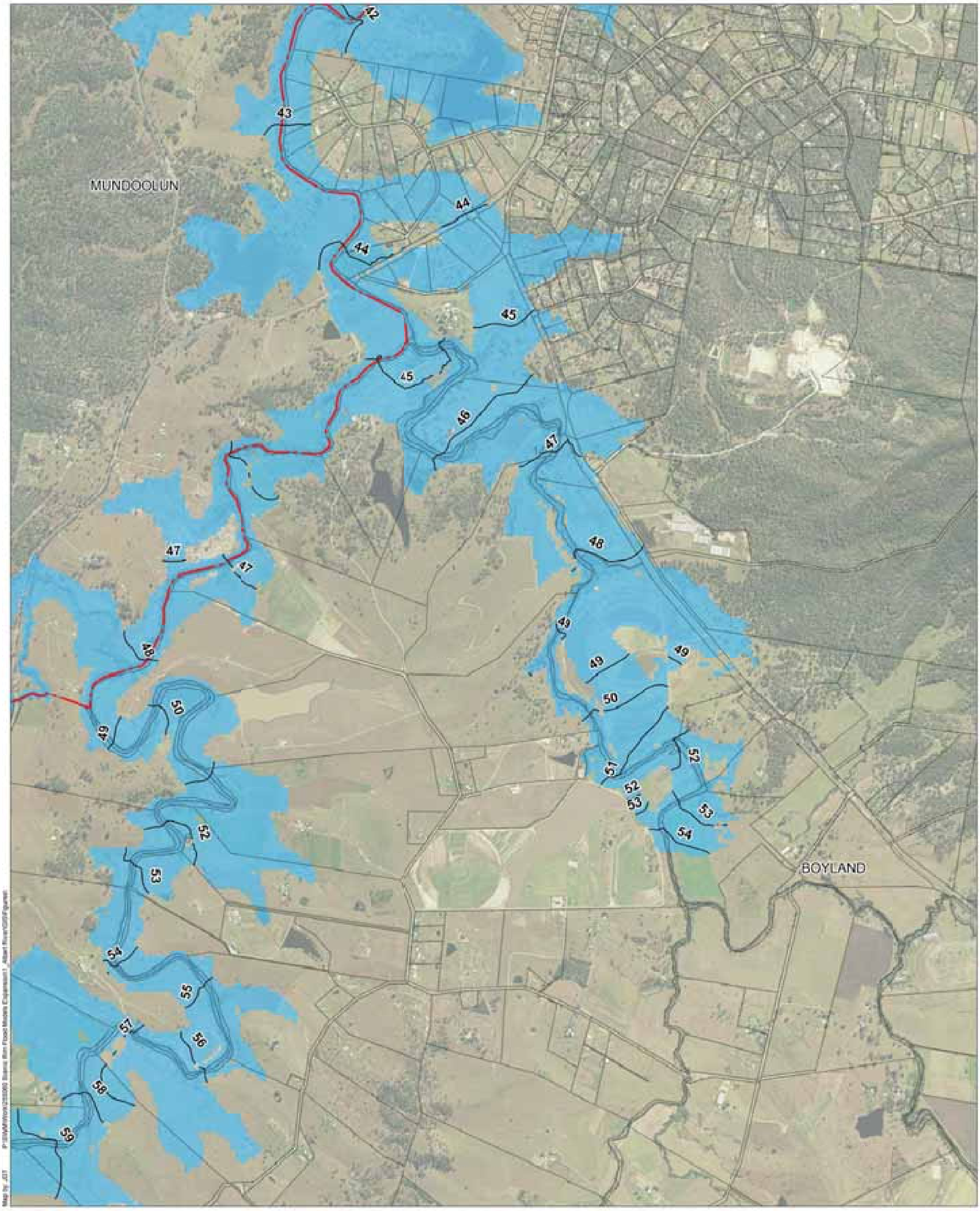
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-i**

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

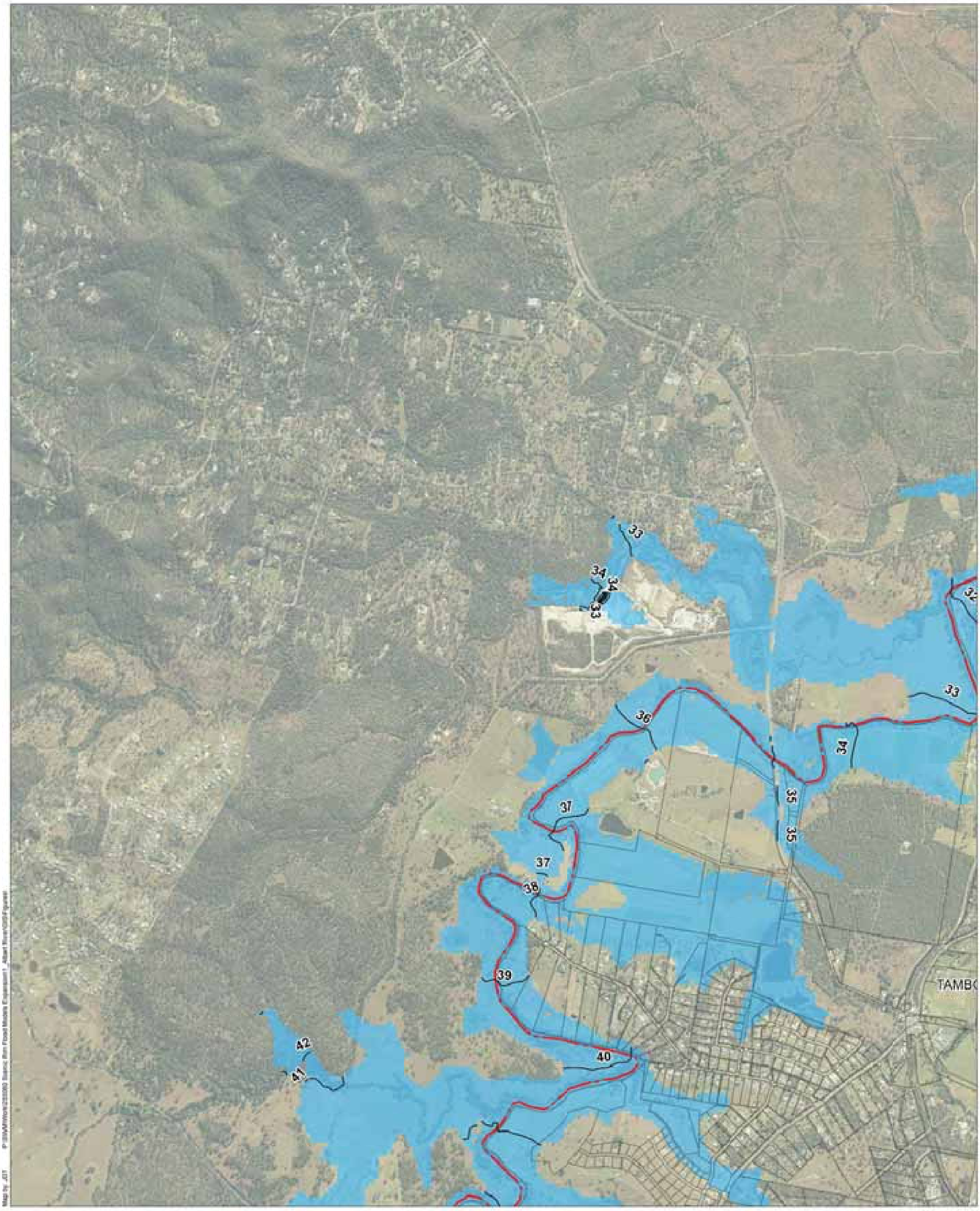
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-j**

2% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

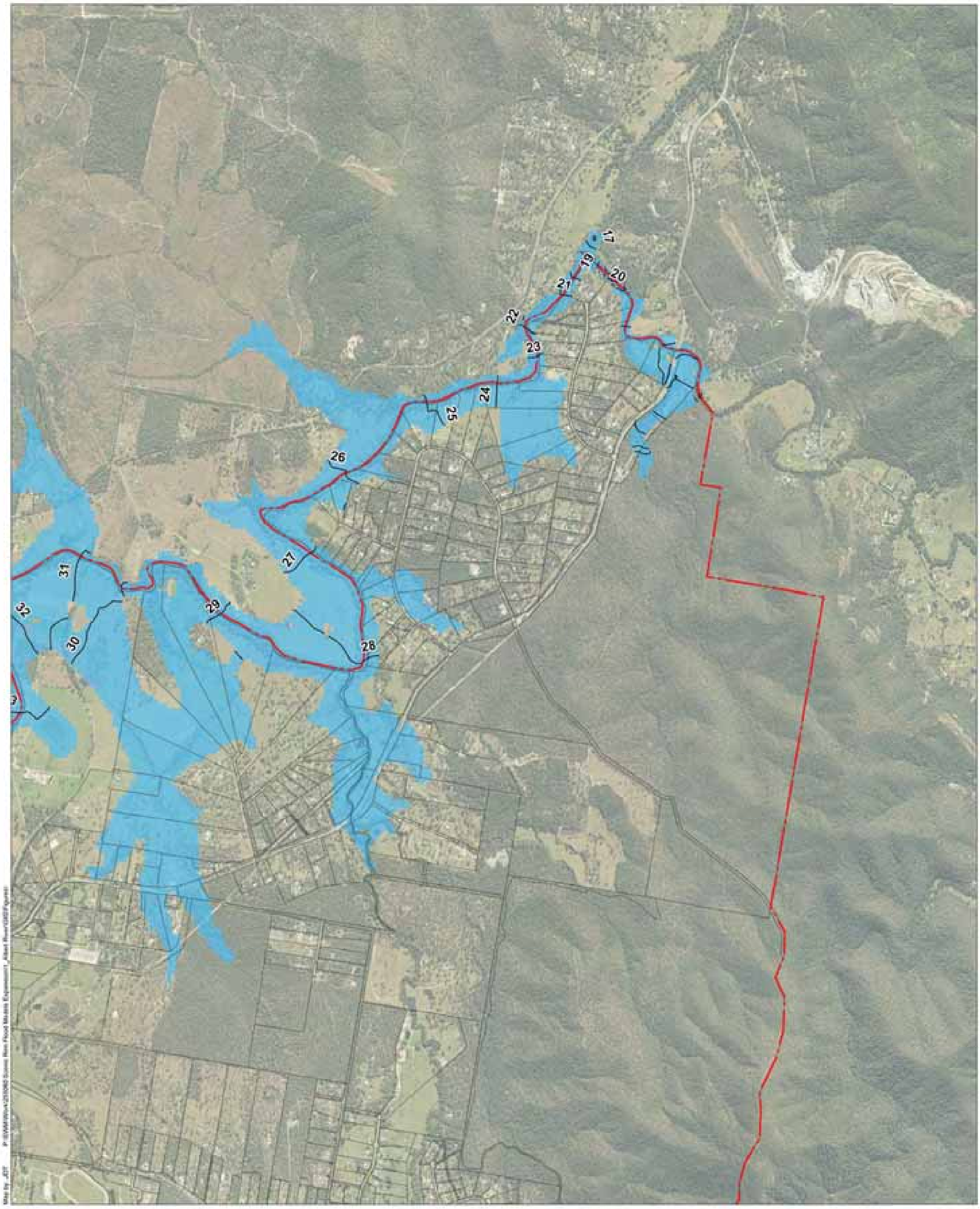
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-k**

2% AEP Event - Inundation Extent



Legend

SRRC Boundary

Inundation Extent

Cadastral Boundary

Peak Water level Contour (mAHD)

Notes:

1:25,001

0 626 m 1,250 m

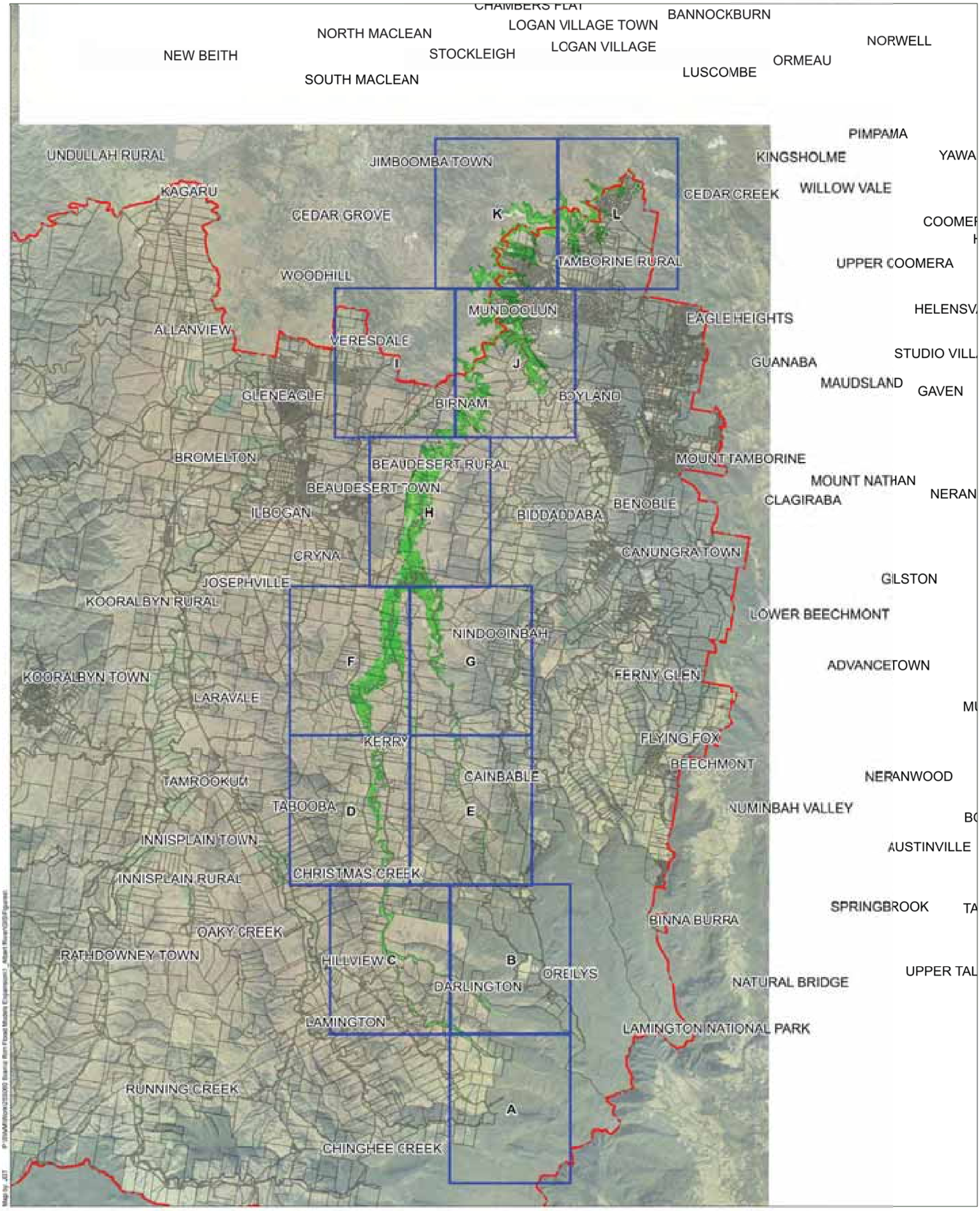
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C1-I**

2% AEP Event - Inundation Extent

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:

1:200,000

0 5,000 m 10,000 m

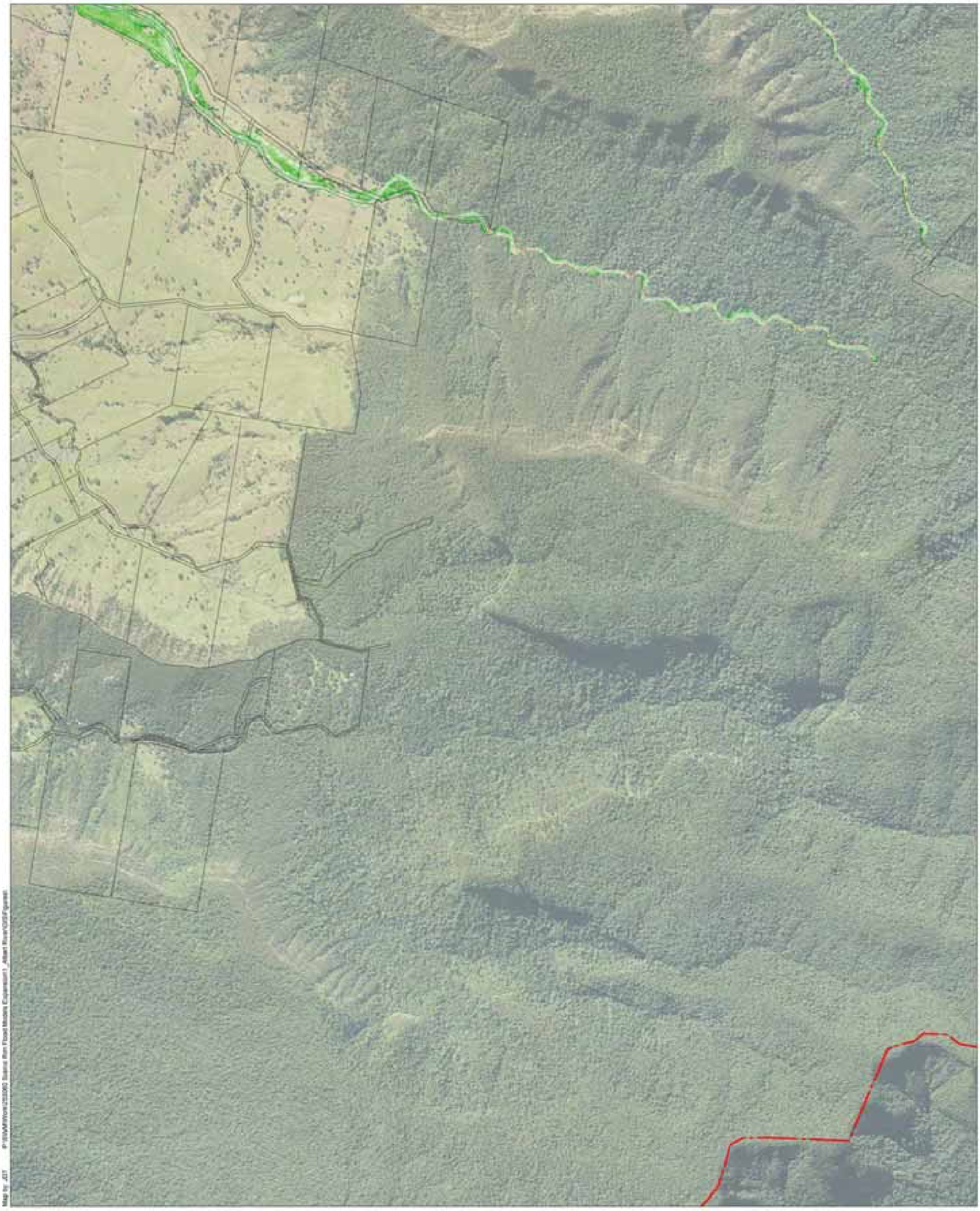
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

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: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C2-a**

2% AEP Event - Peak Velocities

aurecon

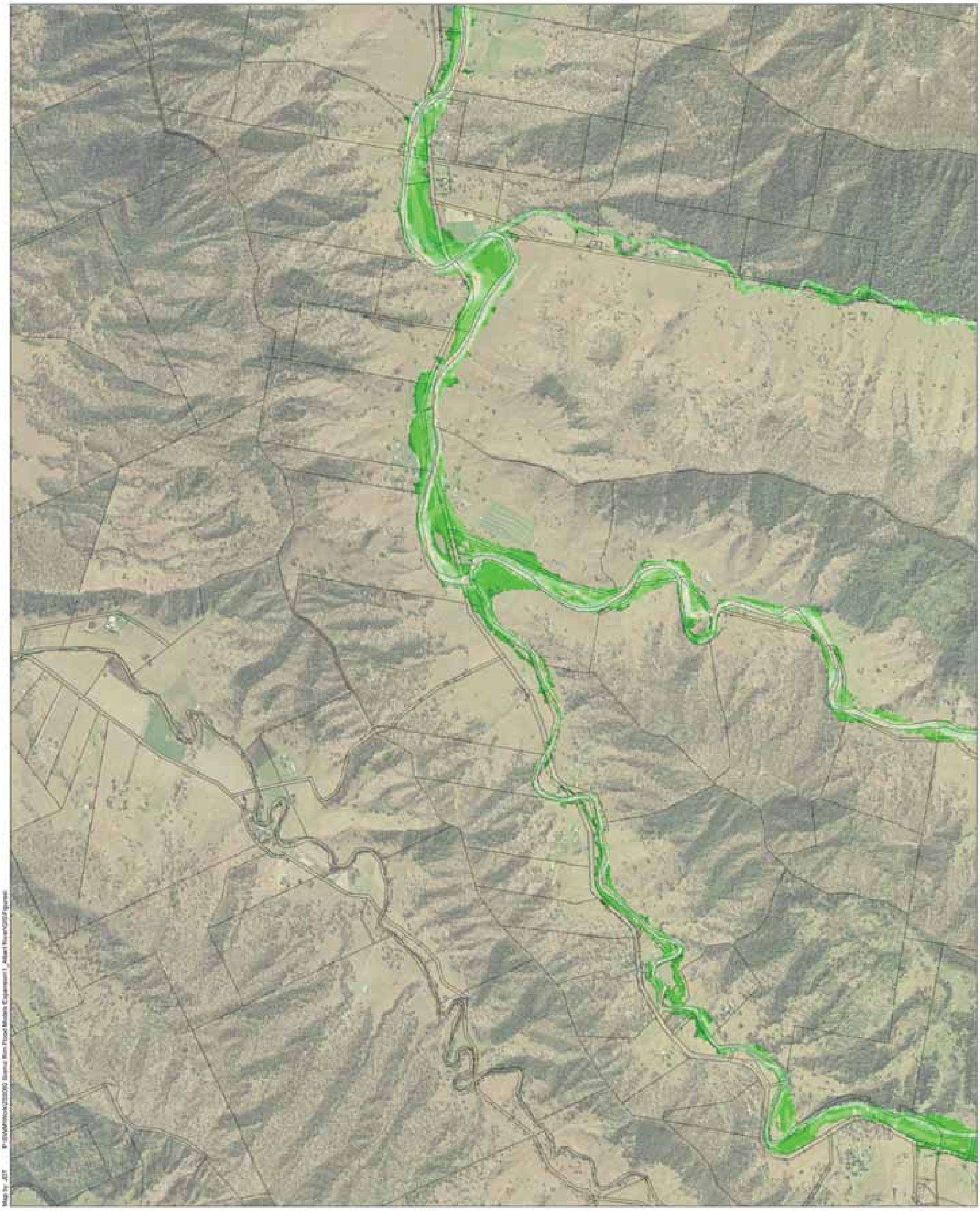
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-b**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

- SRRC Boundary
- Cadastral Boundary
- 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

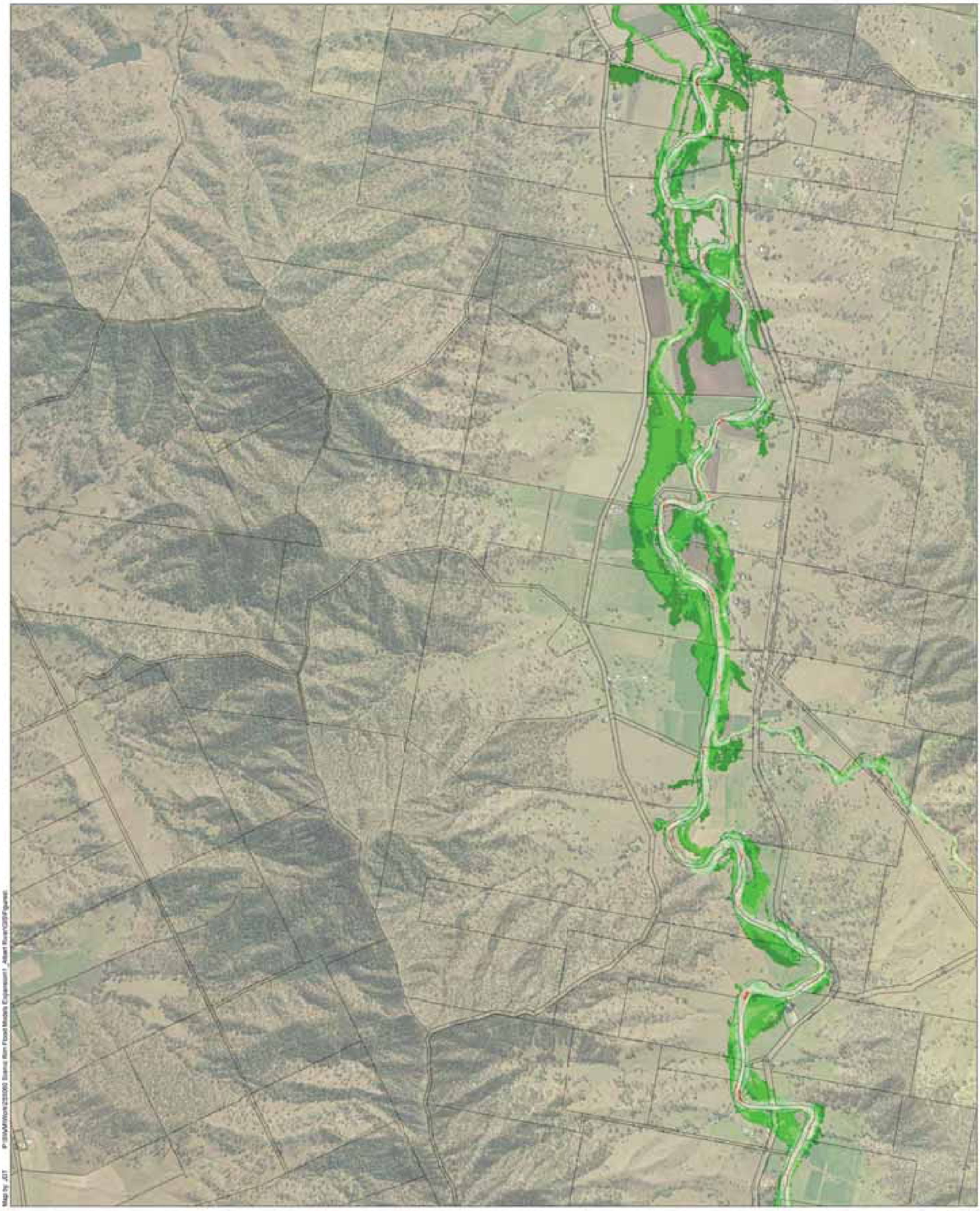
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

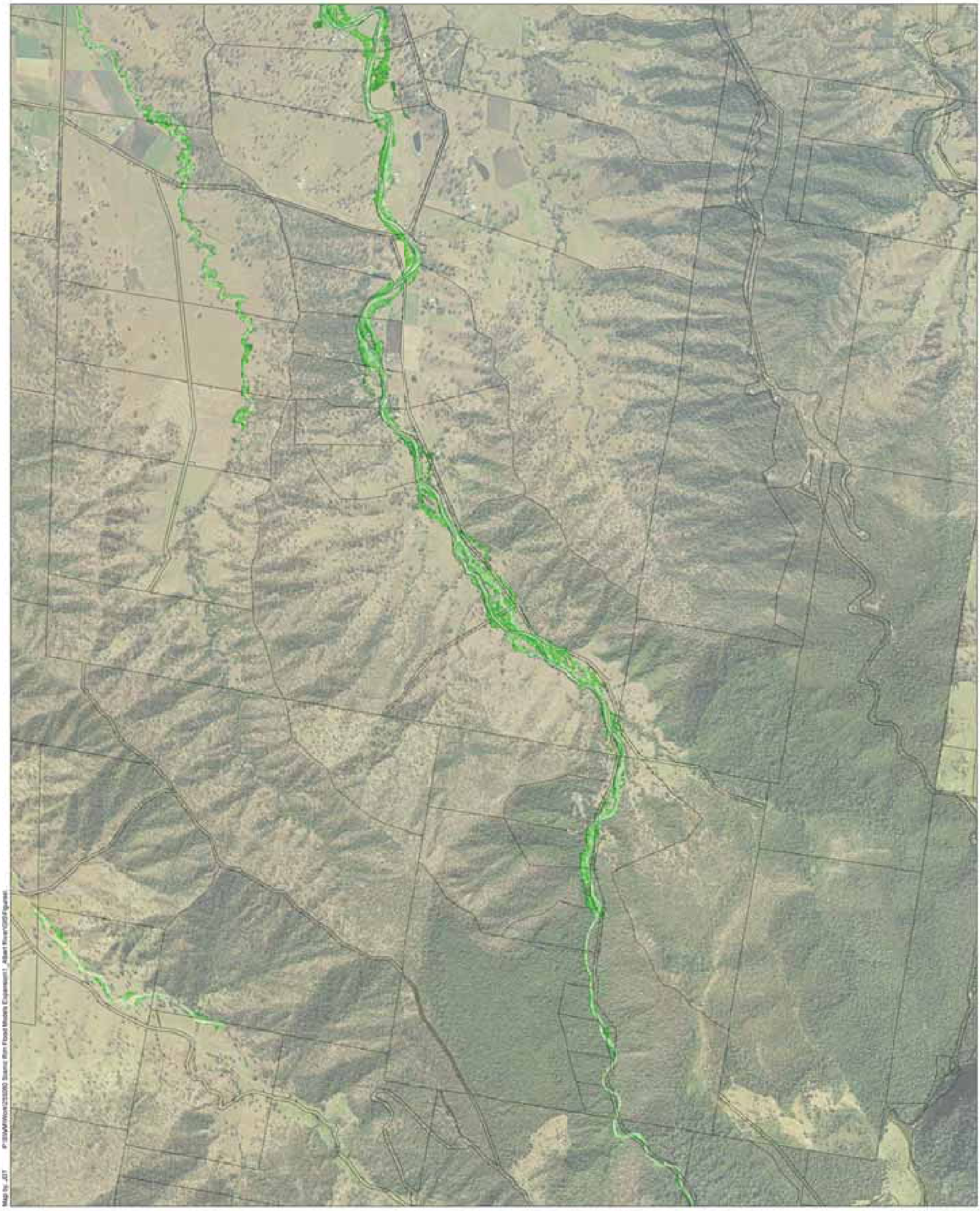
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-d**

2% AEP Event - Peak Velocities



Legend

SRRC Boundary	Velocity (m/s)
Cadastral Boundary	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

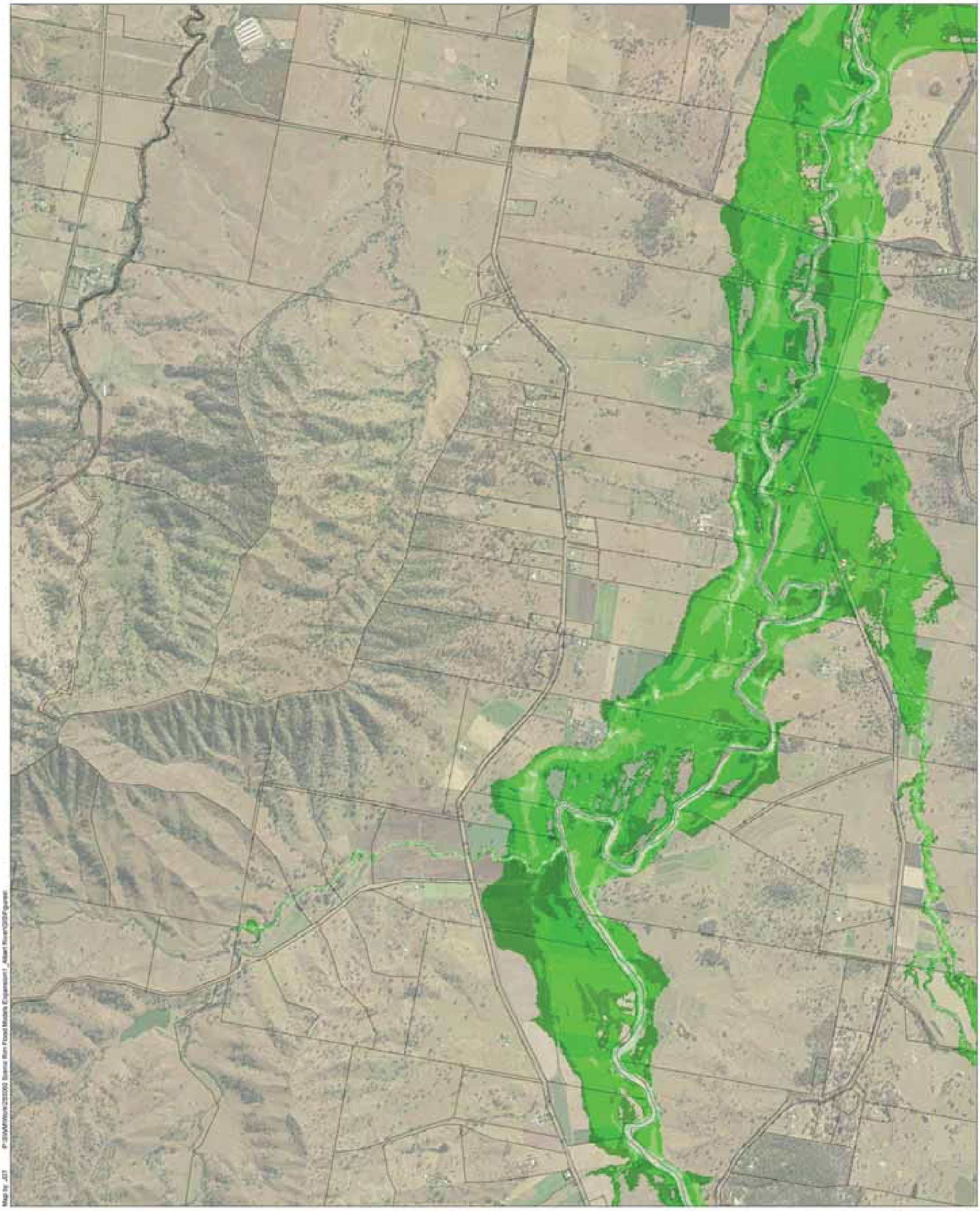
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

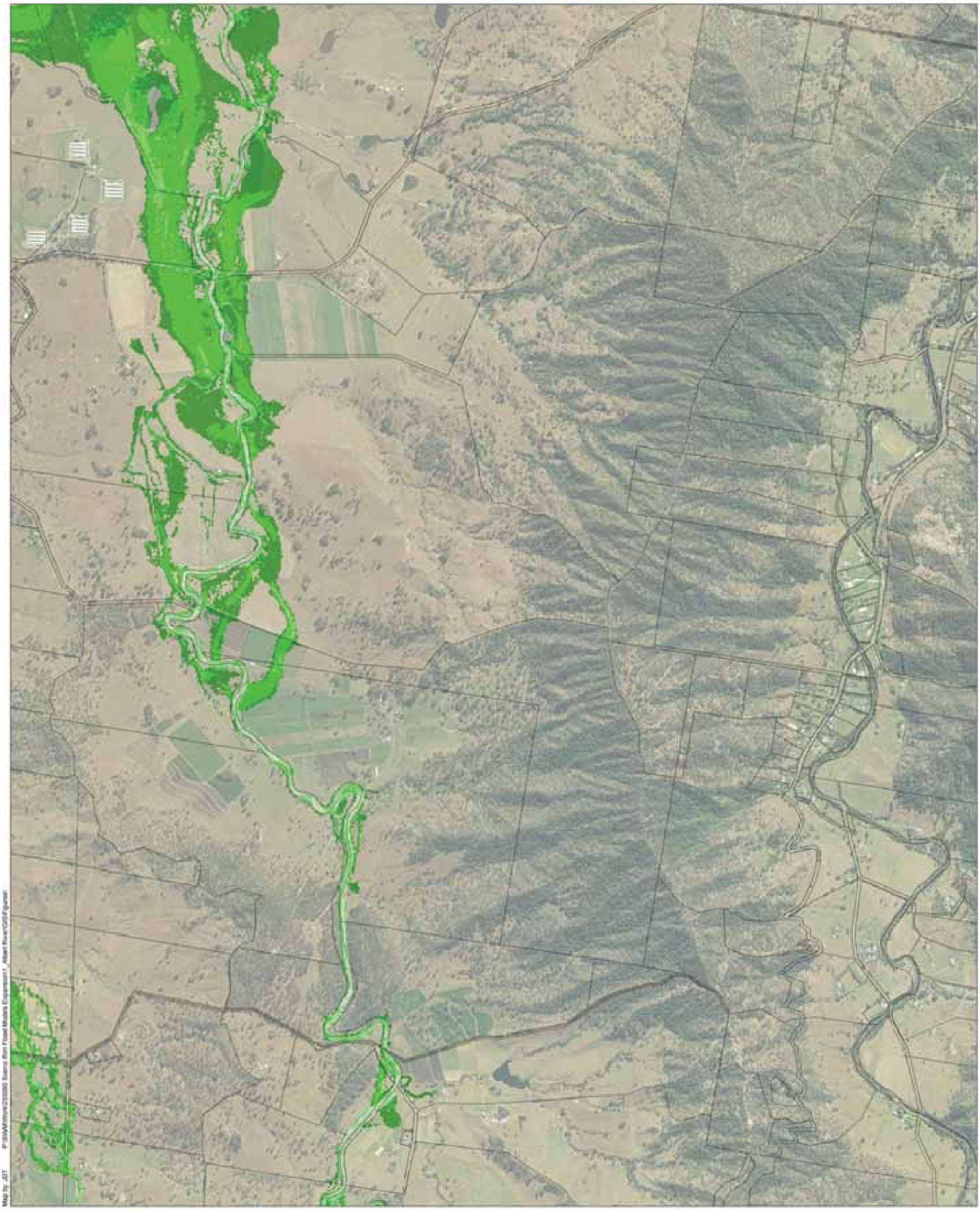
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-f**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

- 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

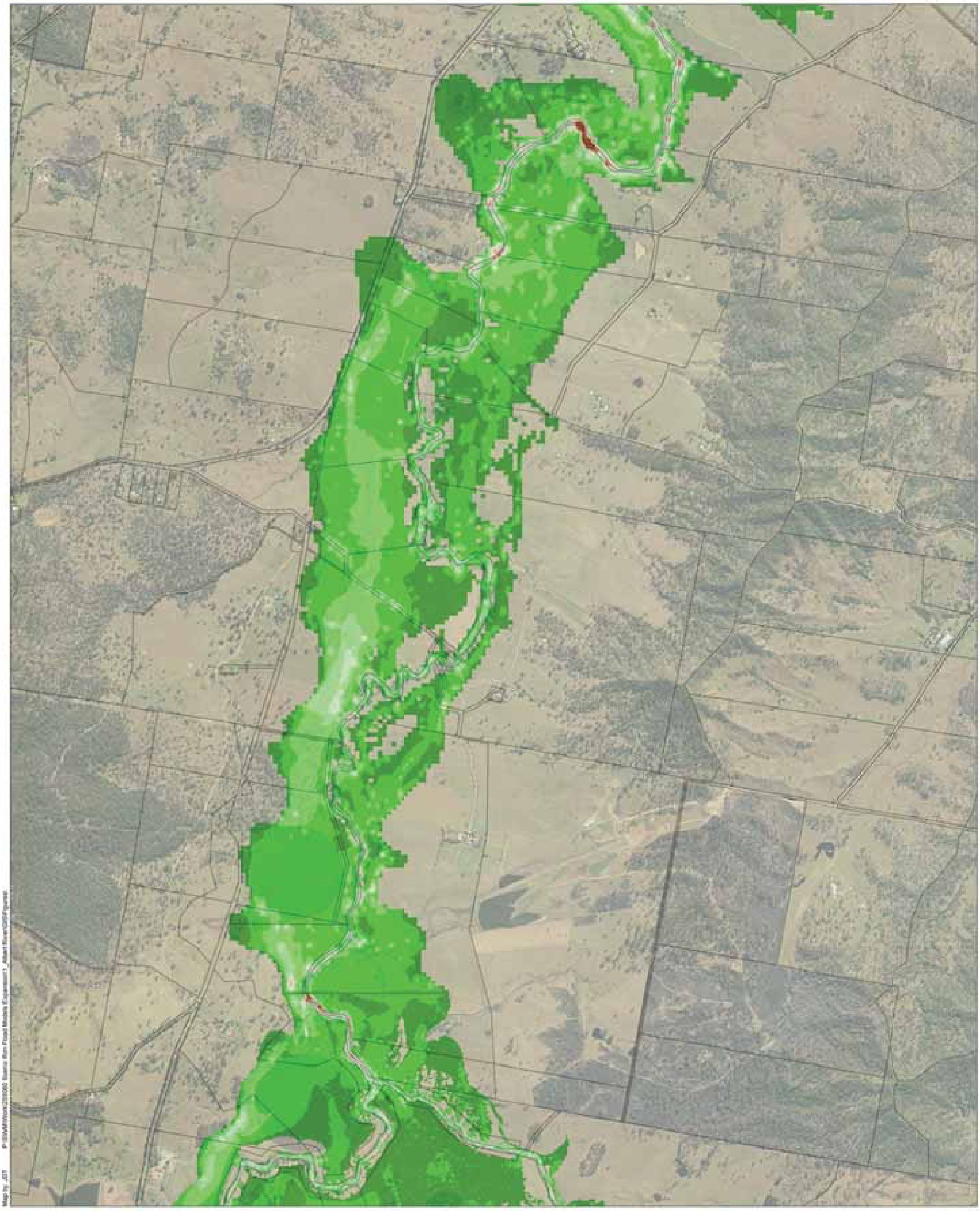
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-g**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

Boundary	Velocity (m/s)	Velocity (m/s)
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

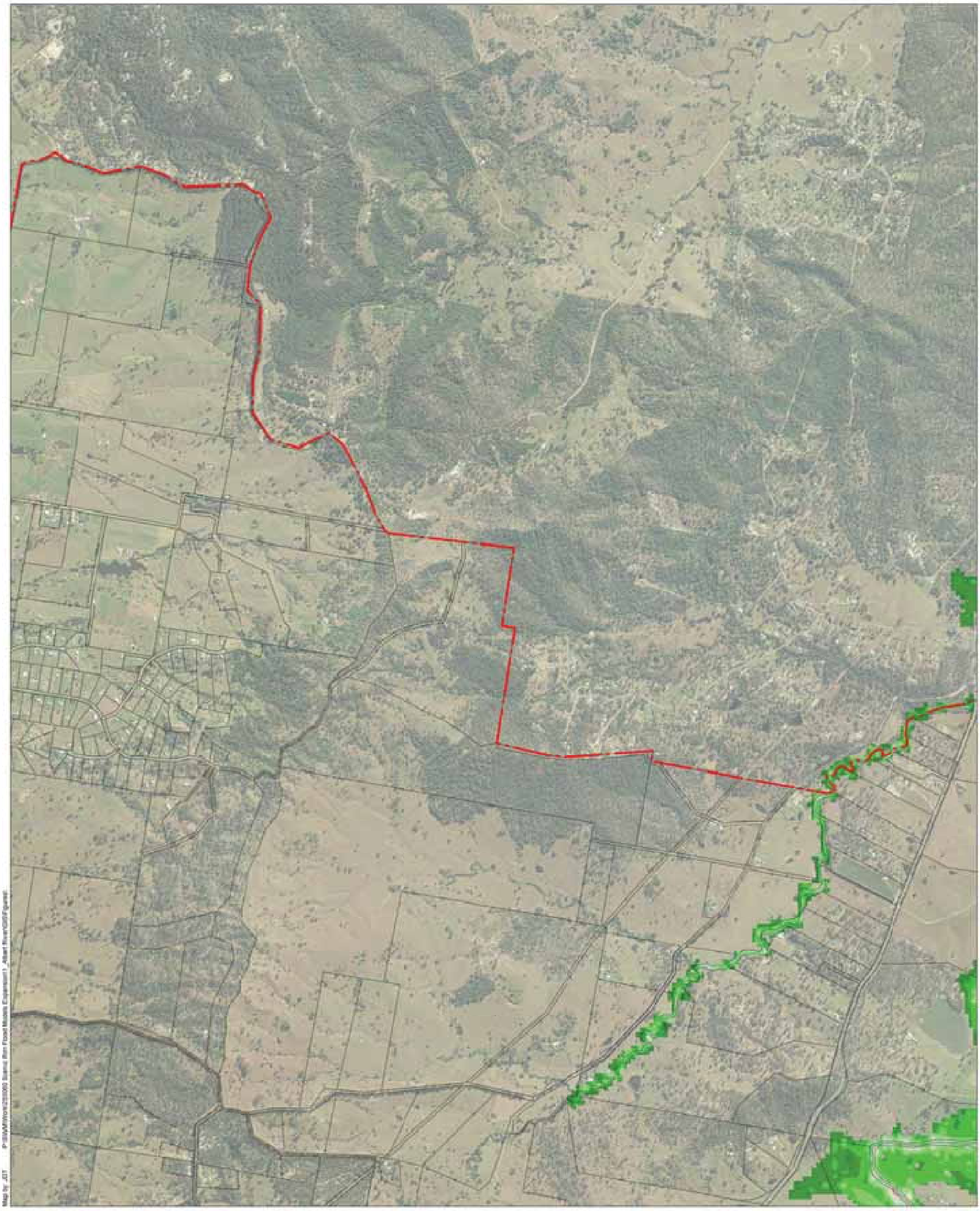
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-h**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

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

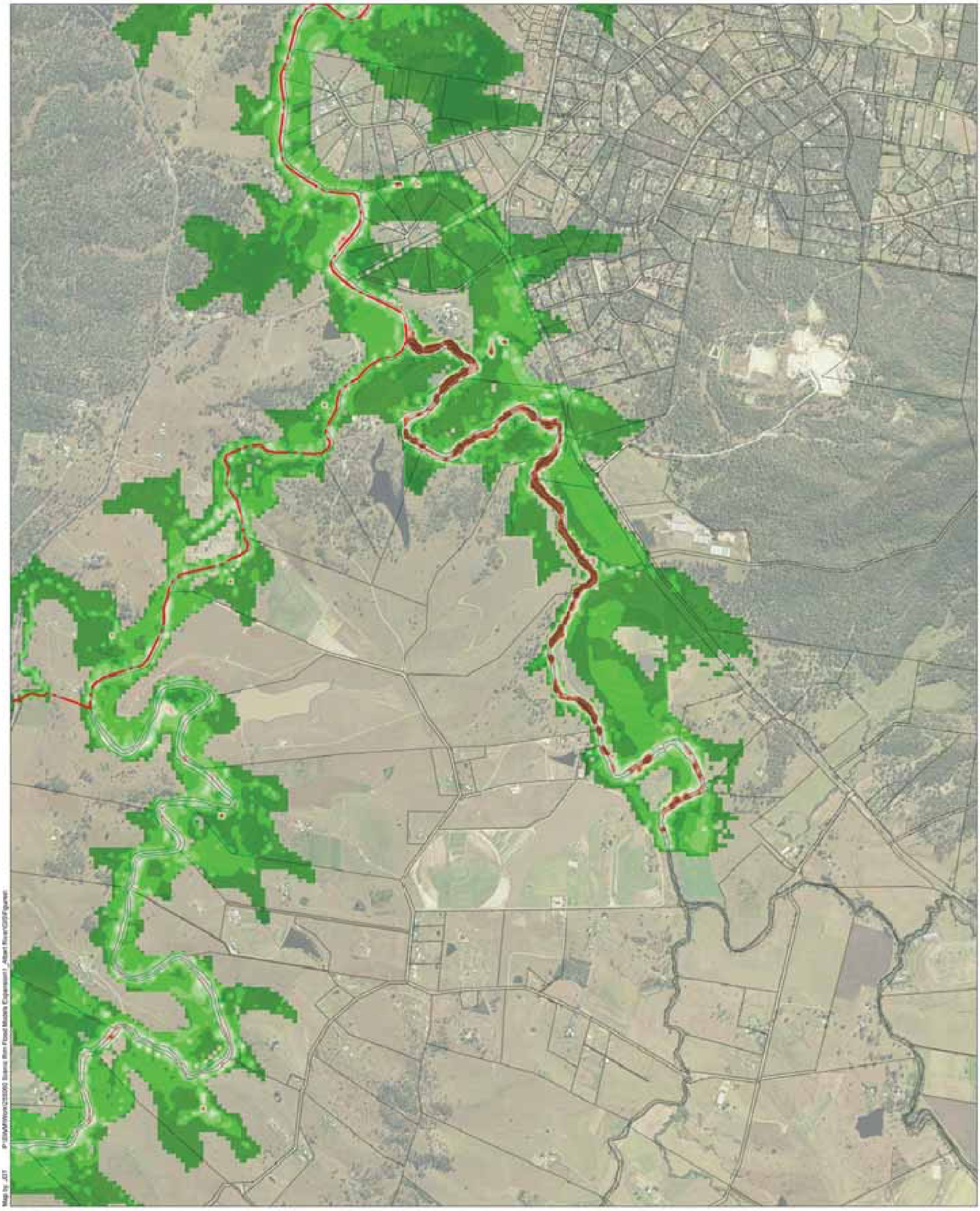
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-i**

2% AEP Event - Peak Velocities

aurecon



Legend

Notes:

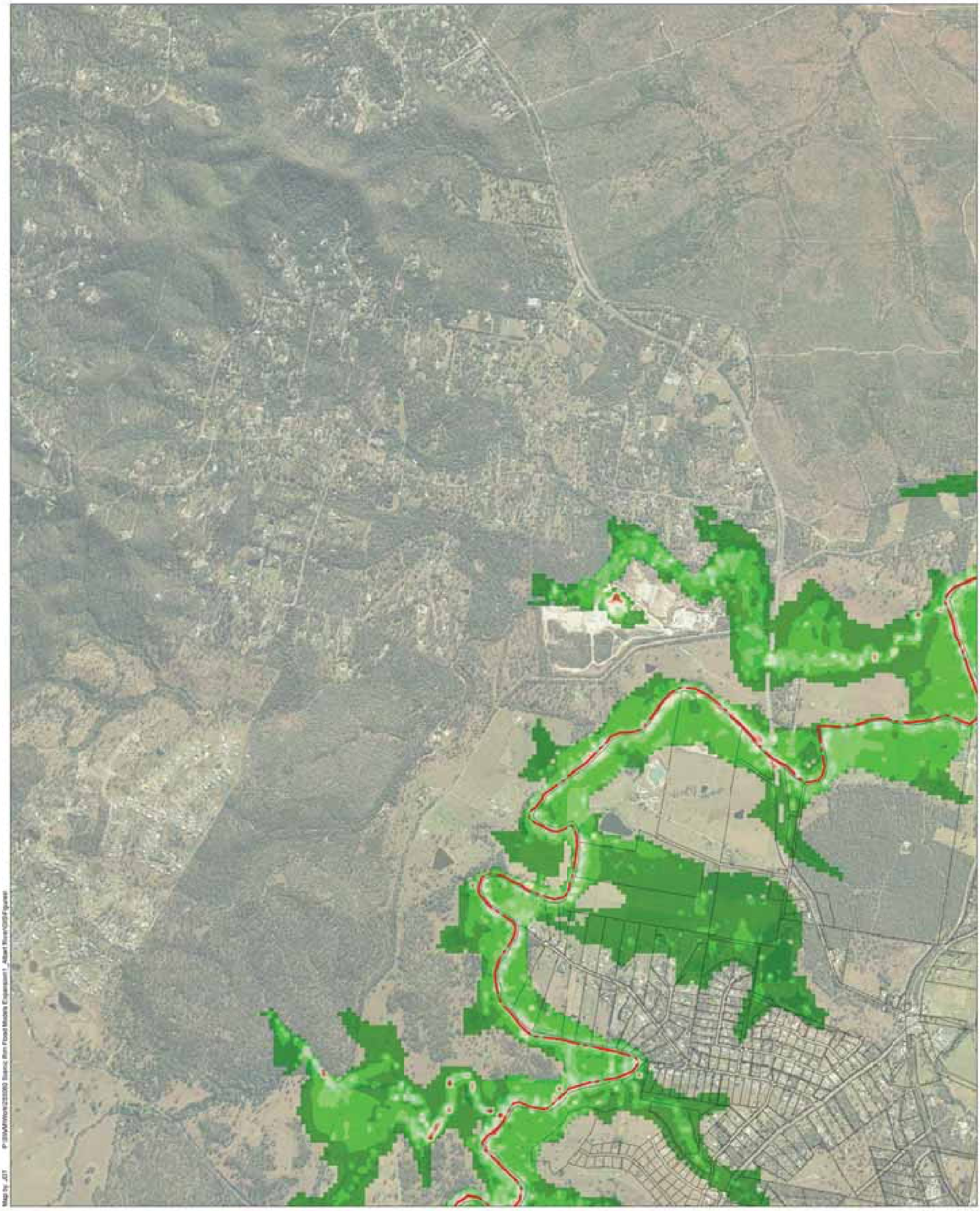
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-j**

2% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

- SRRC Boundary
- Cadastral Boundary
- 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

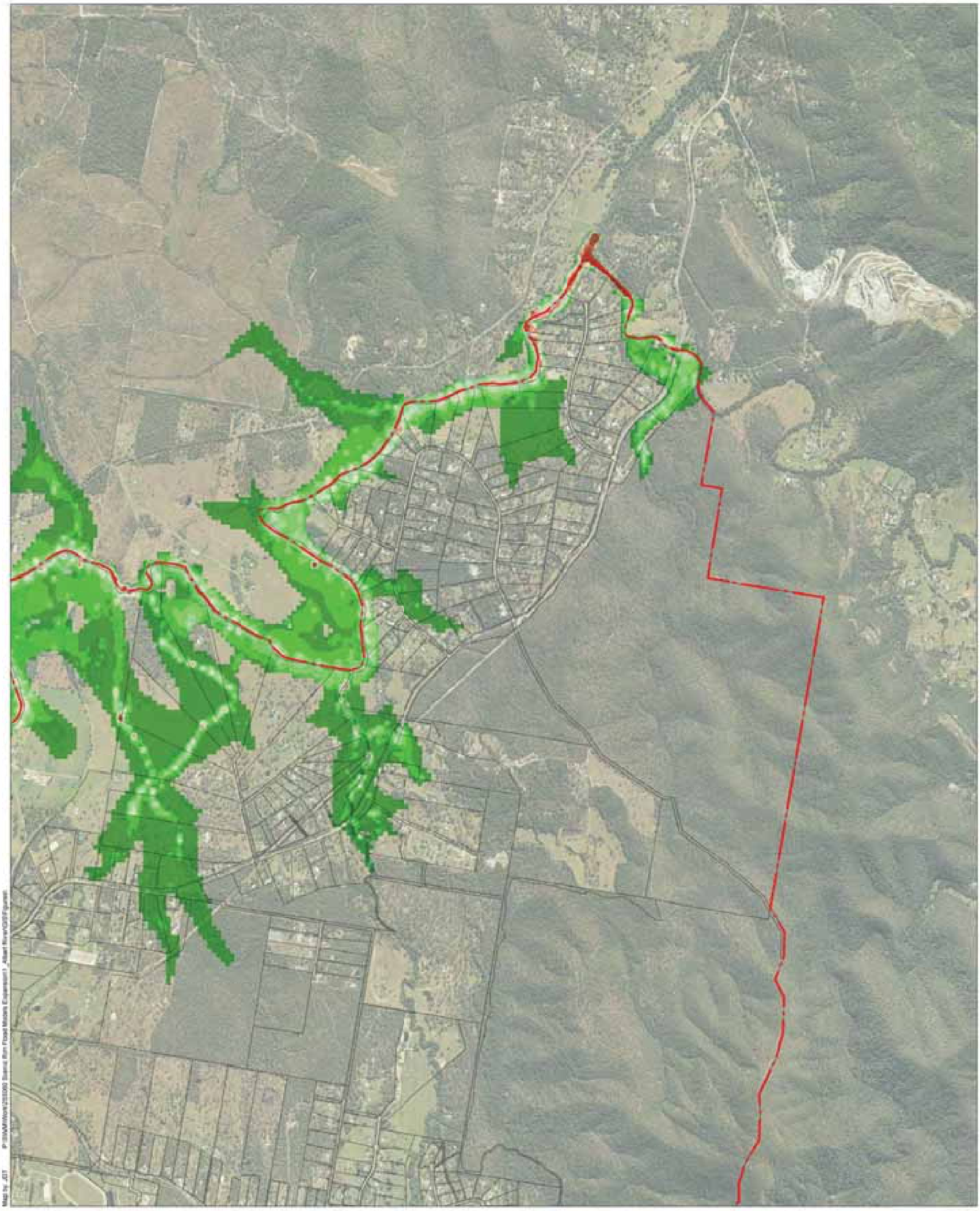
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-k**

2% AEP Event - Peak Velocities



Legend

	Velocity (m/s)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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:

1:25,001

0 626 m 1,250 m

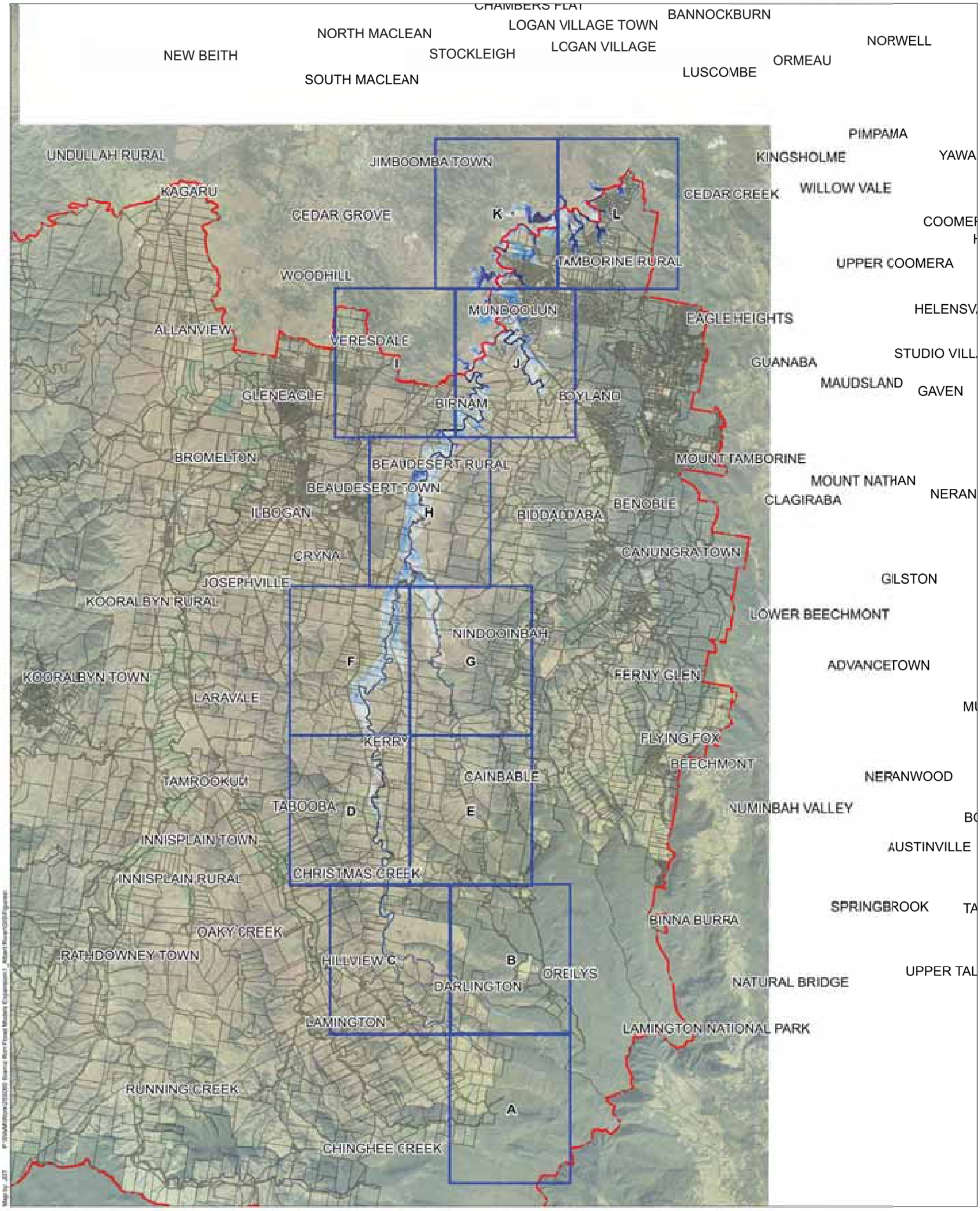
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C2-I**

2% AEP Event - Peak Velocities

aurecon



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:

1:200,000

0 5,000 m 10,000 m

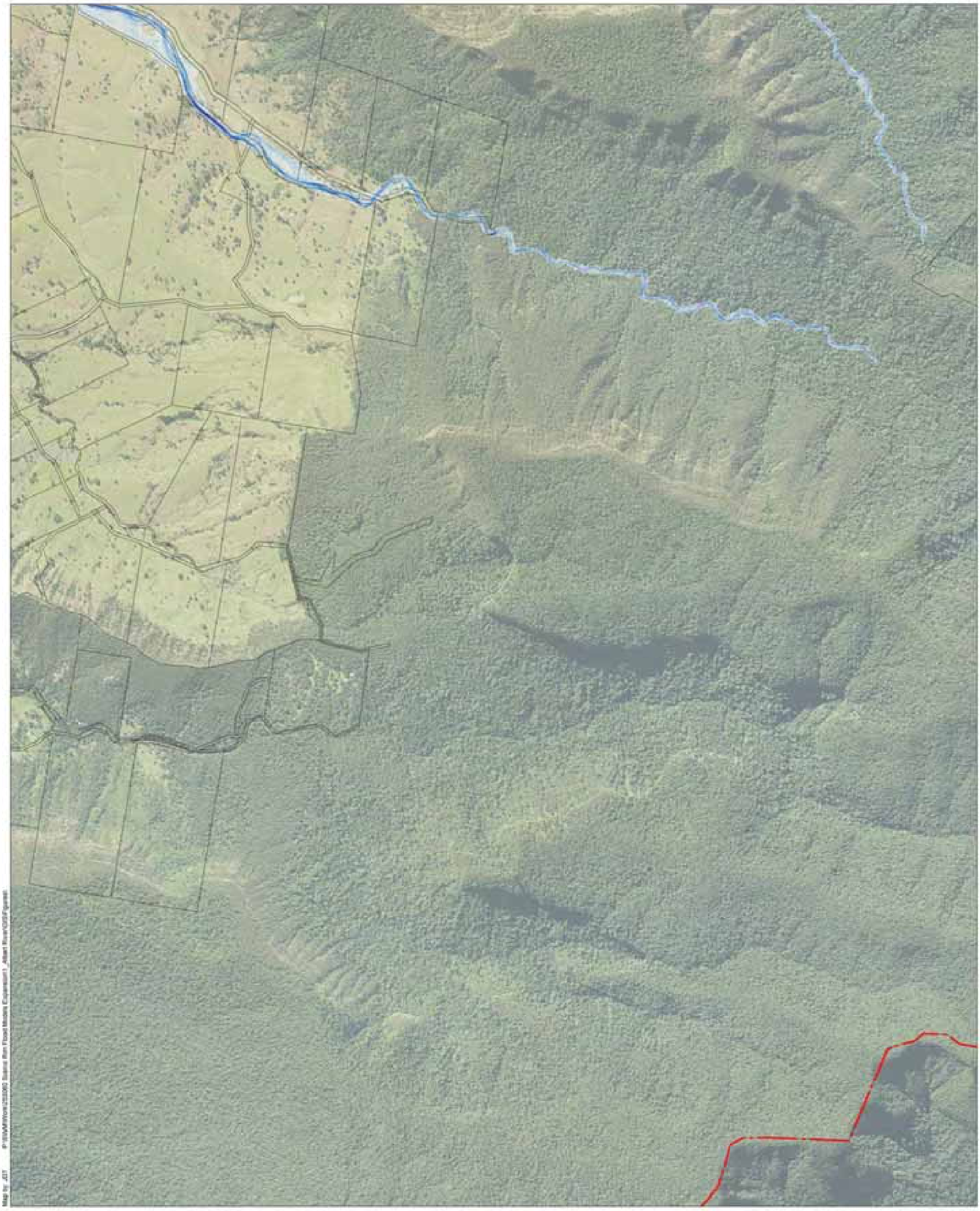
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3**

2% AEP Event - Peak Depth Map

aurecon



Legend

Notes:

Date: 11/10/2017 Version: 0 Job No: 255060

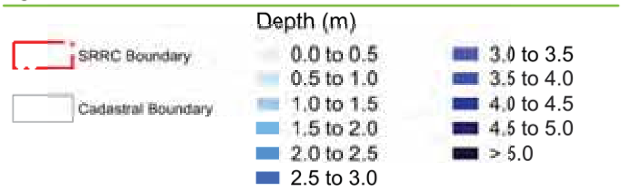
Projection: MGA Zone 56

Albert River Flood Study **Figure C3-a**

2% AEP Event - Peak Depth Map

aurecon

Legend



Notes:

1:25,000

0 625 m 1,250 m

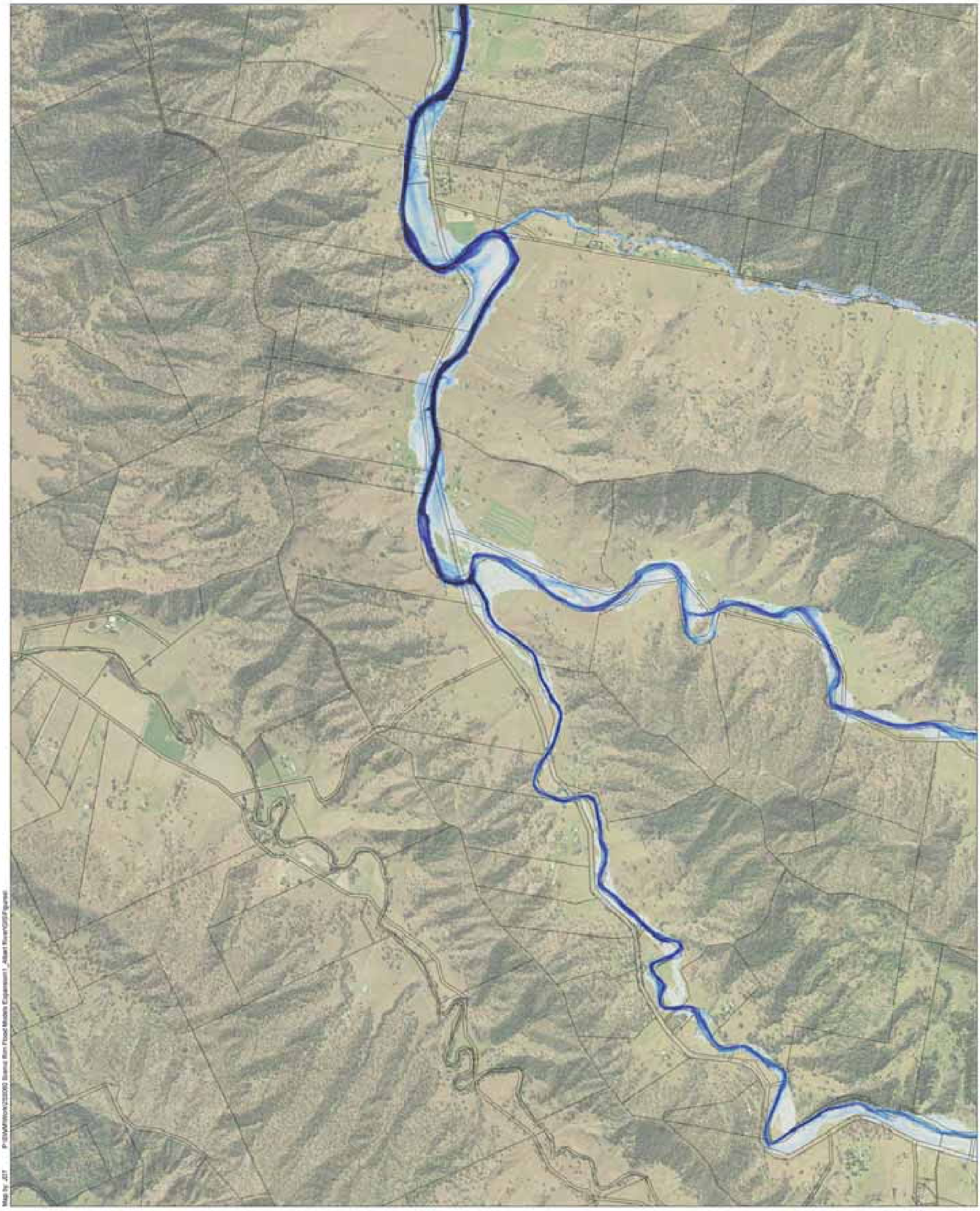
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-b**

2% AEP Event - Peak Depth Map

aurecon



Legend

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

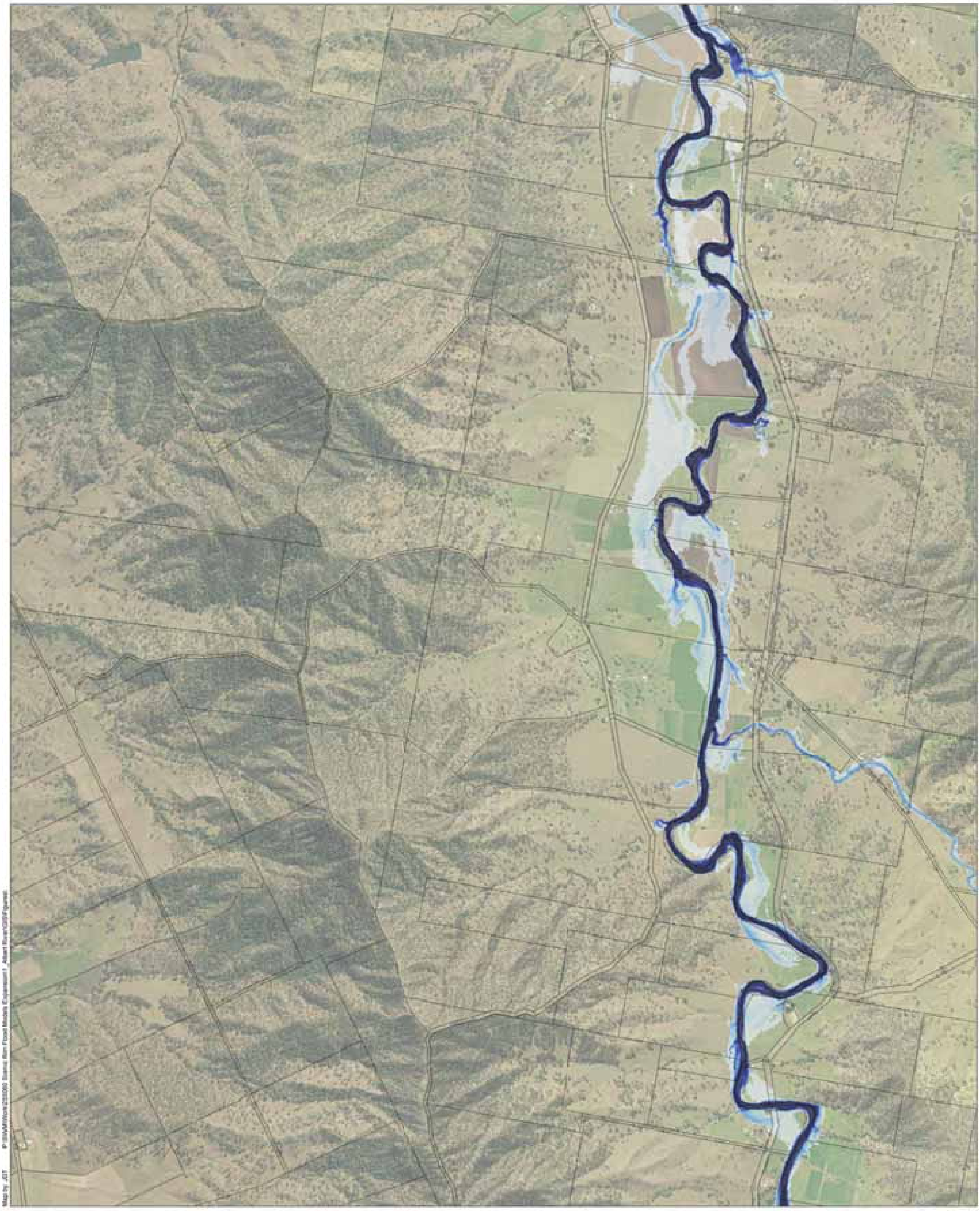
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

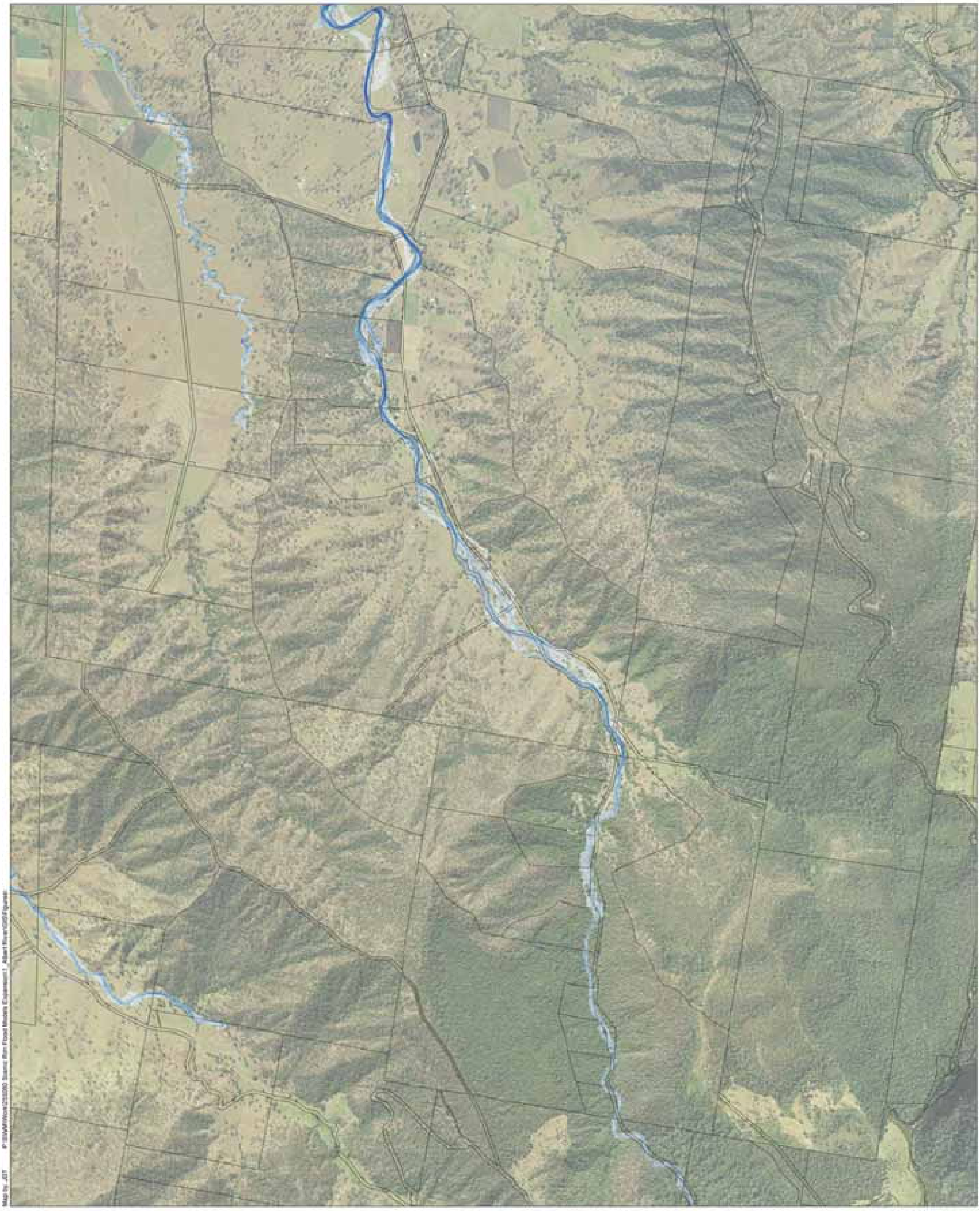
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-d**

2% AEP Event - Peak Depth Map

aurecon



Legend

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

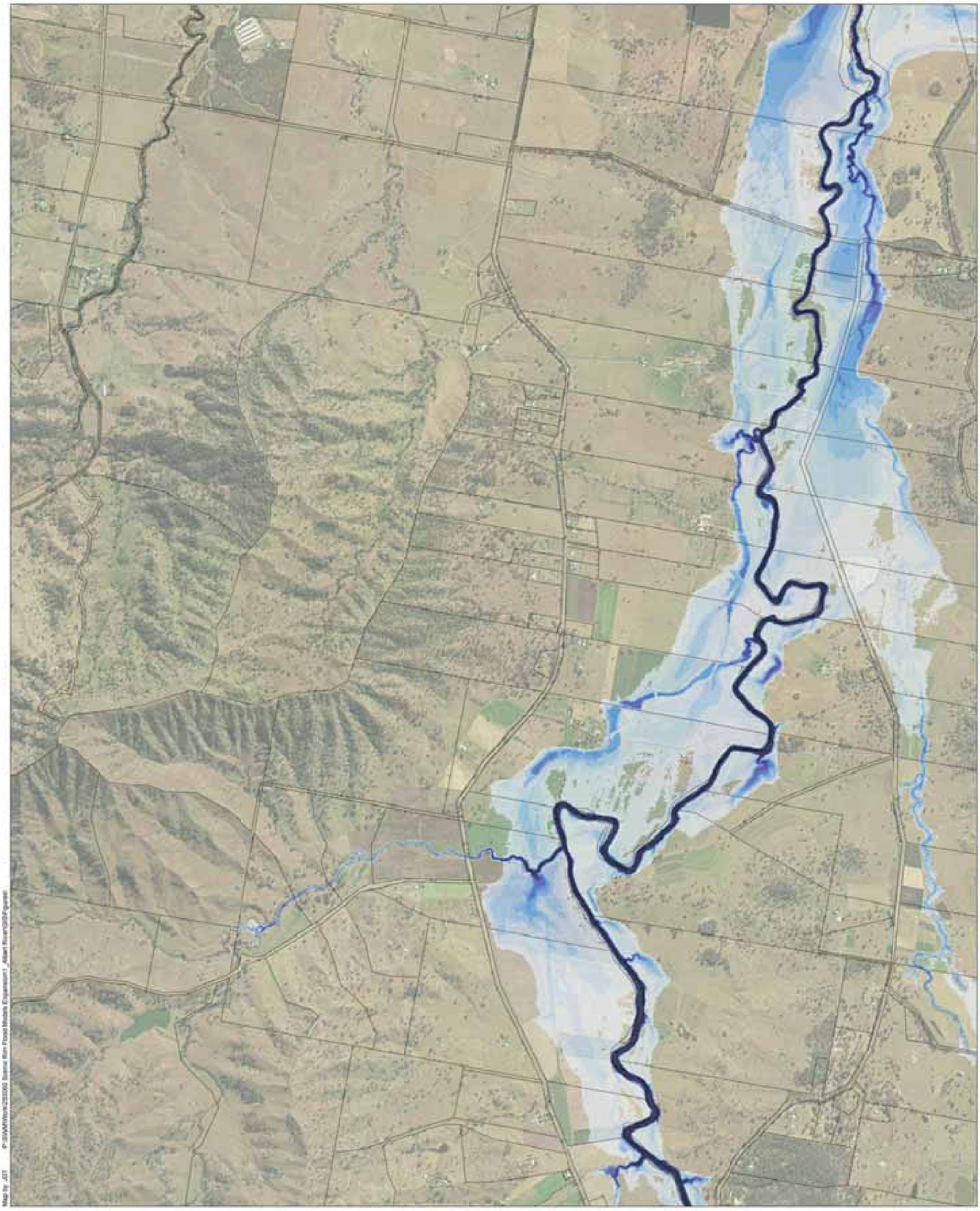
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-e**

2% AEP Event - Peak Depth Map



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

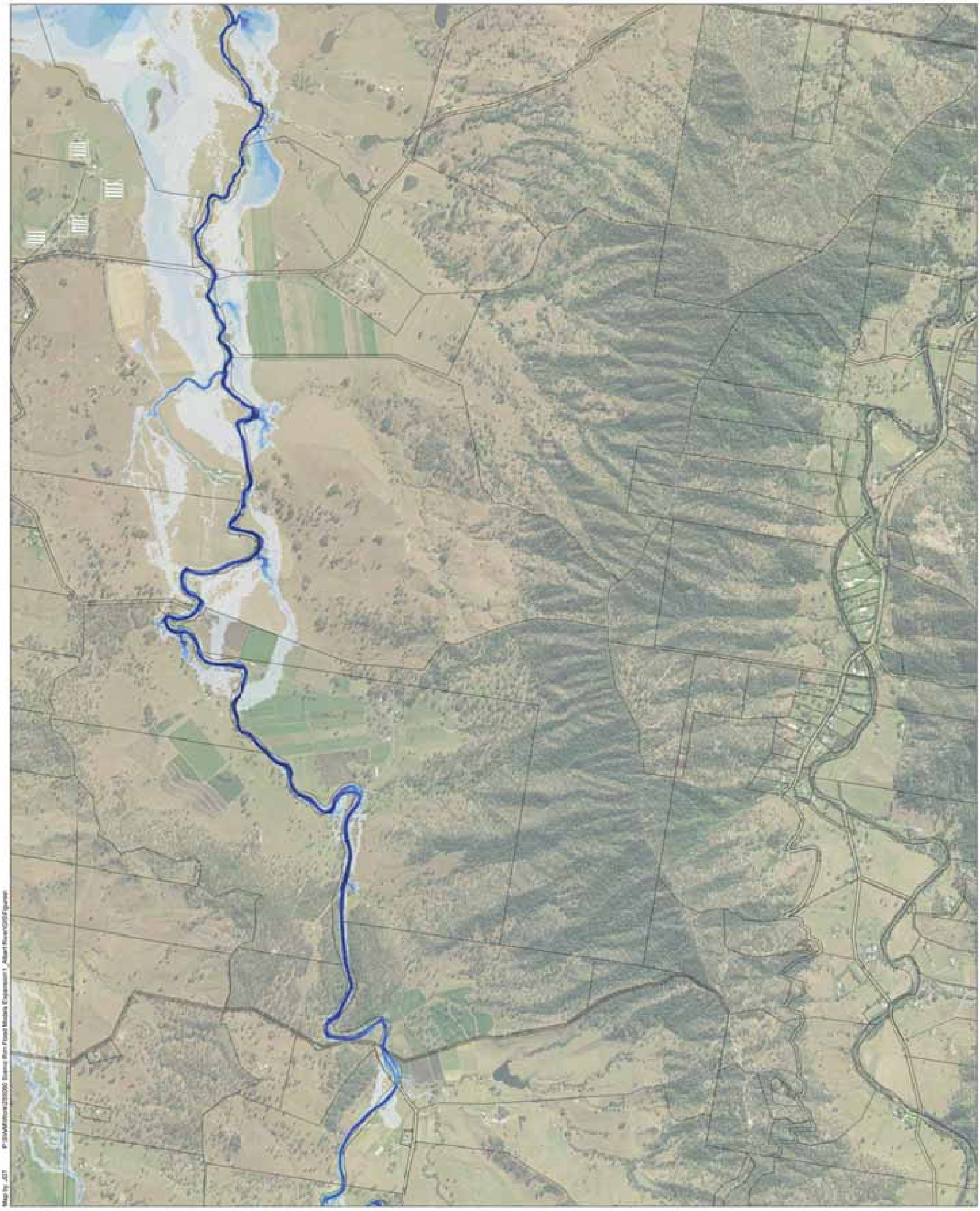
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

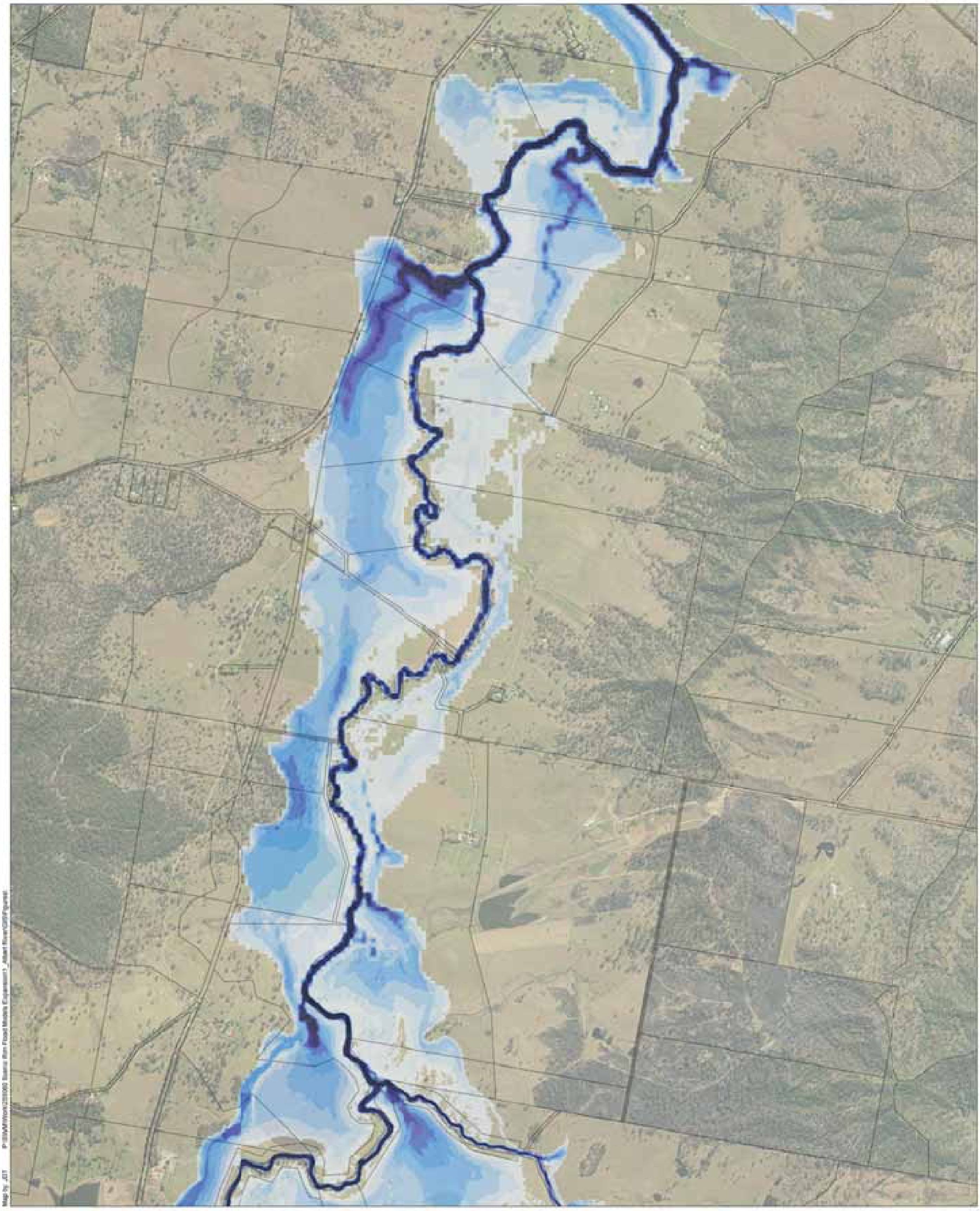
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-g**

2% AEP Event - Peak Depth Map



Legend

Depth (m)

- SRRC Boundary
- Cadastral Boundary
- 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

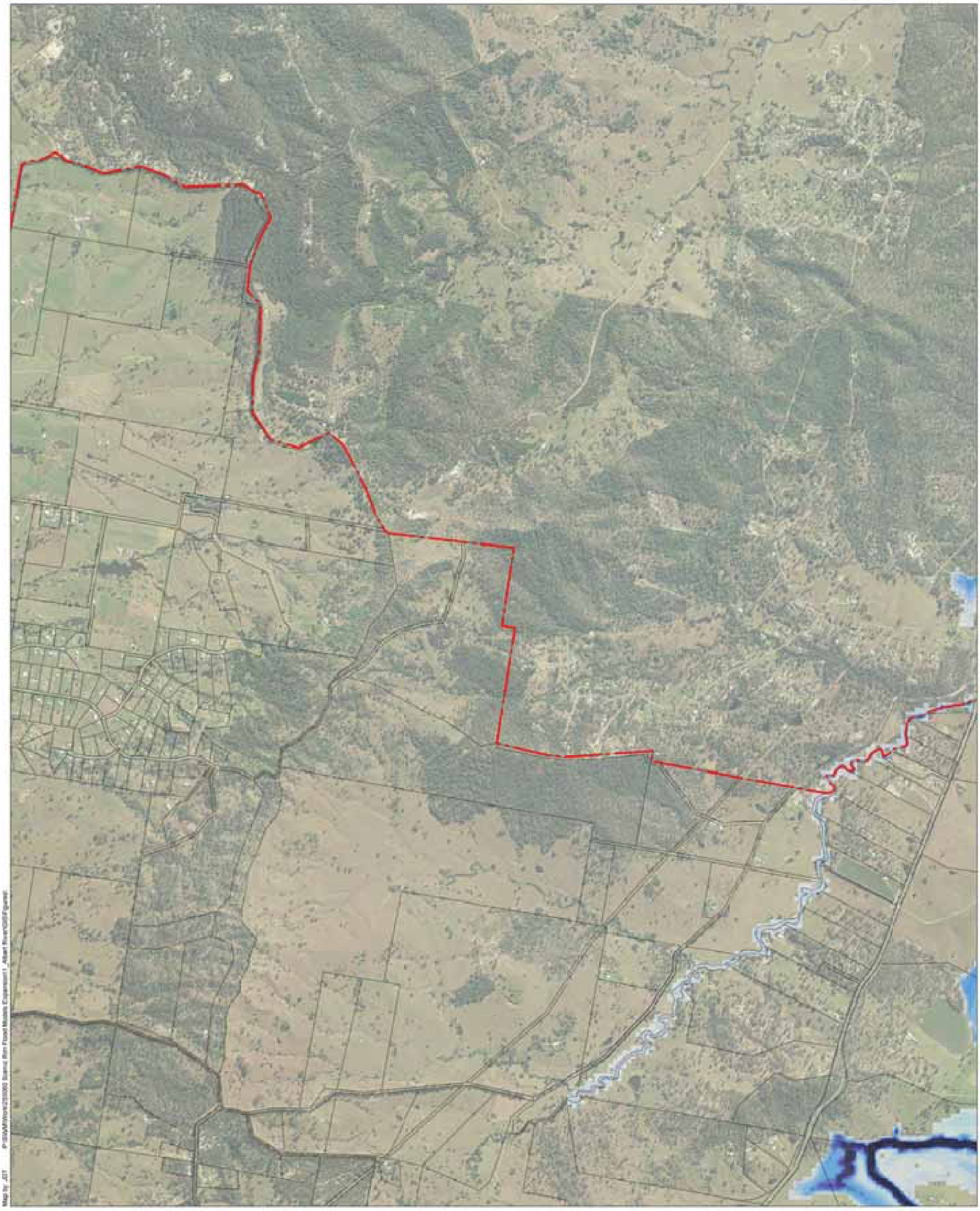
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-h**

2% AEP Event - Peak Depth Map

aurecon



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

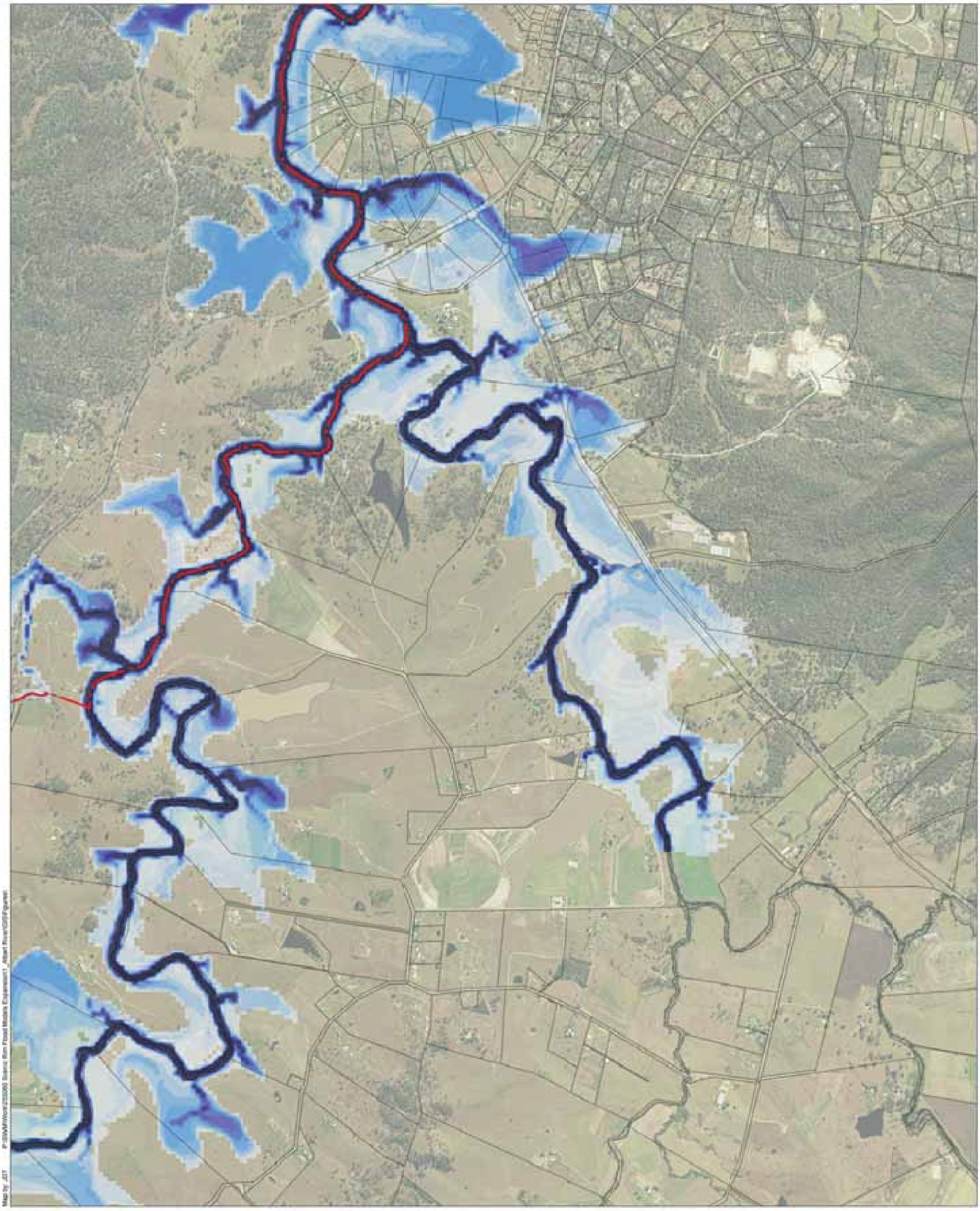
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure C3-i

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

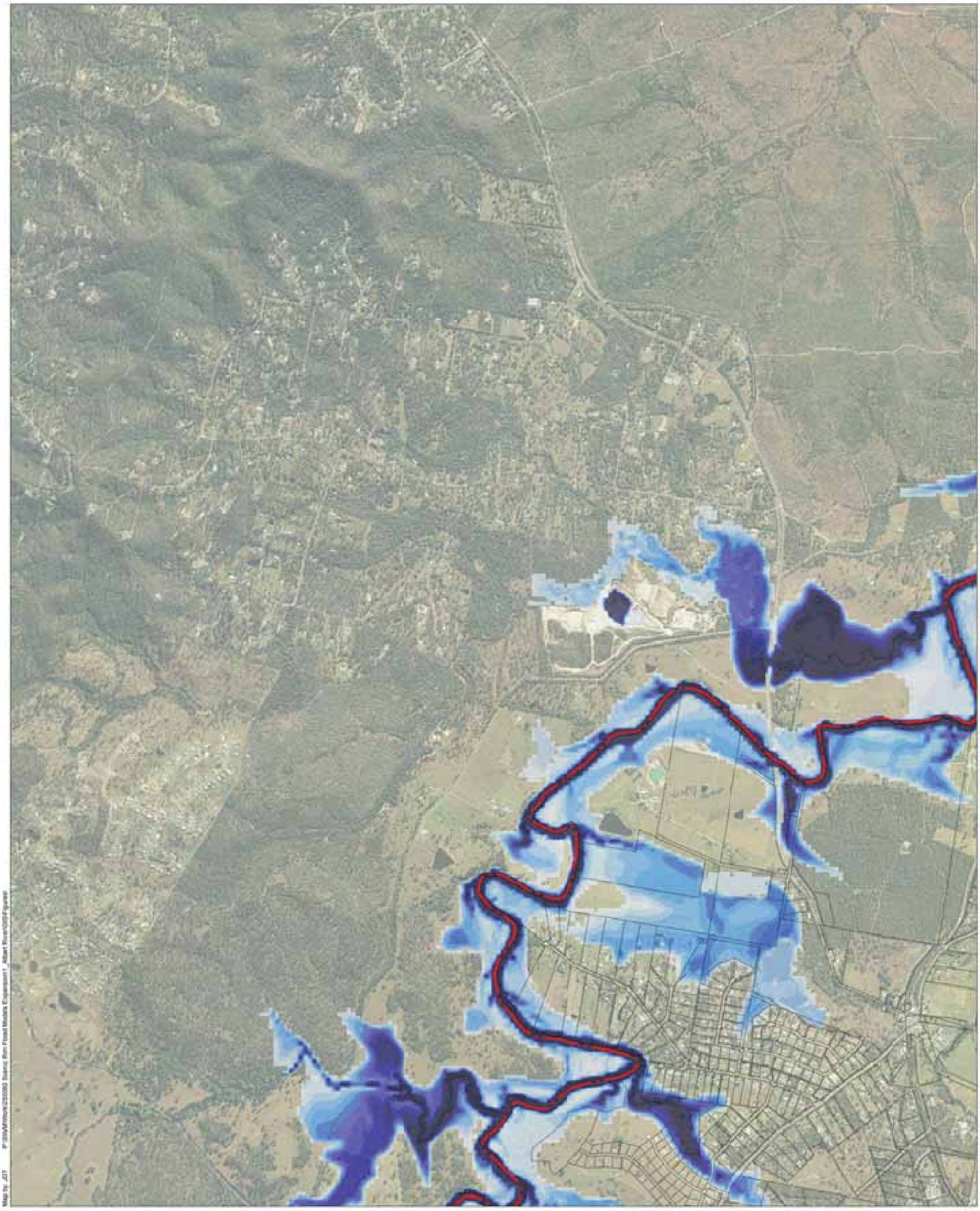
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-j**

2% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

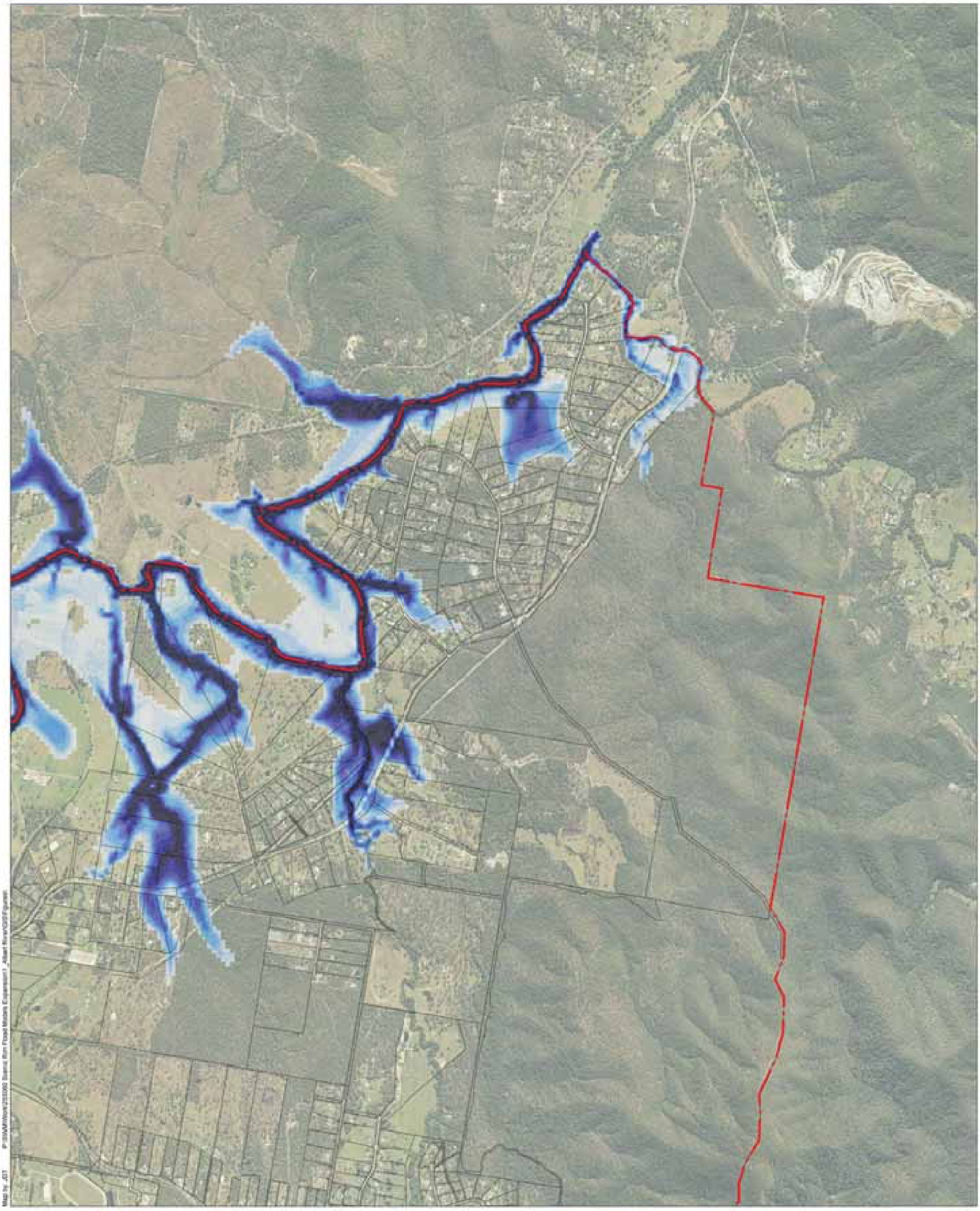
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-k**

2% AEP Event - Peak Depth Map

aurecon



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:

1:25,001

0 626 m 1,250 m

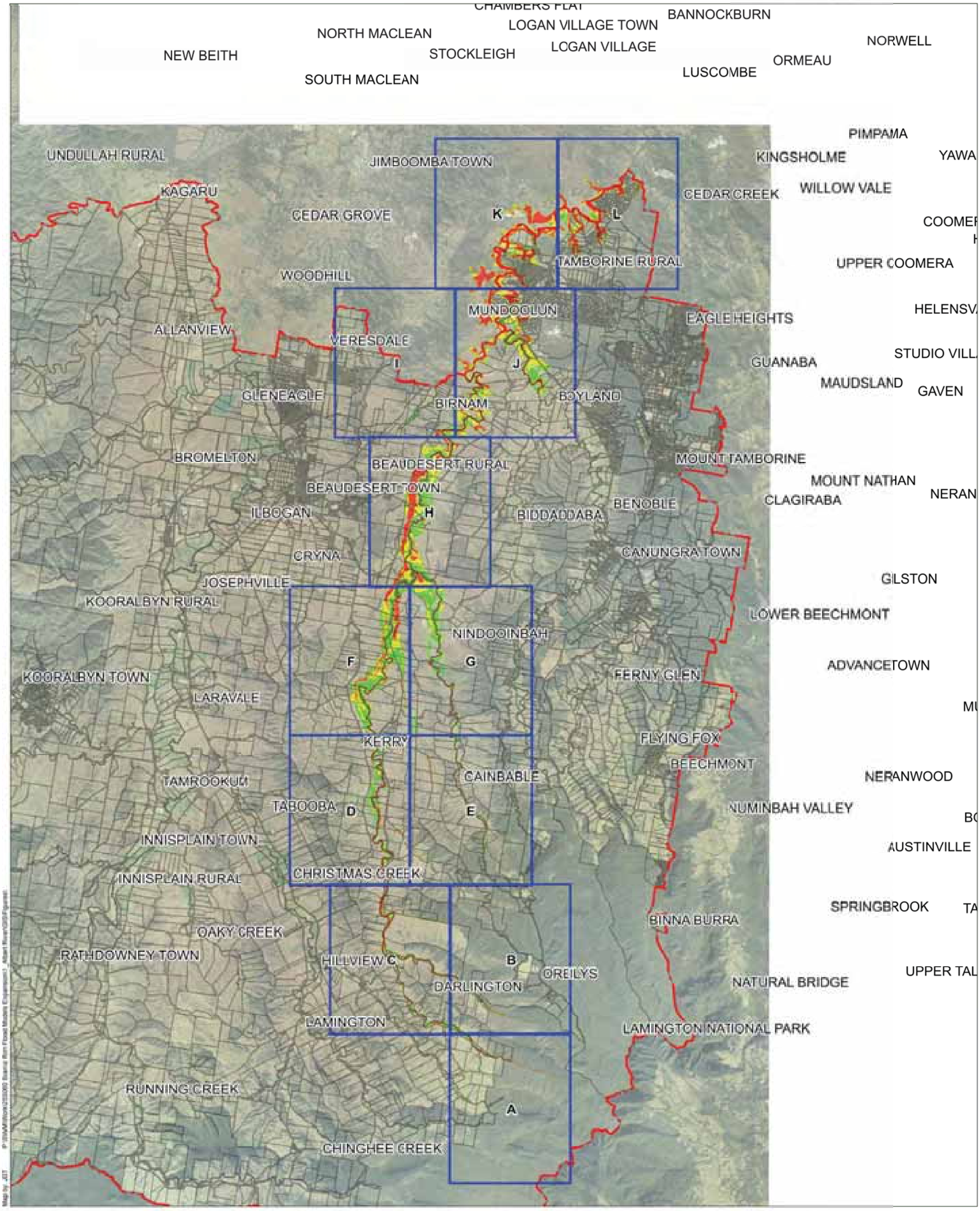
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C3-I**

2% AEP Event - Peak Depth Map

aurecon



Legend

Notes:

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

1:200,000

0 5,000 m 10,000 m

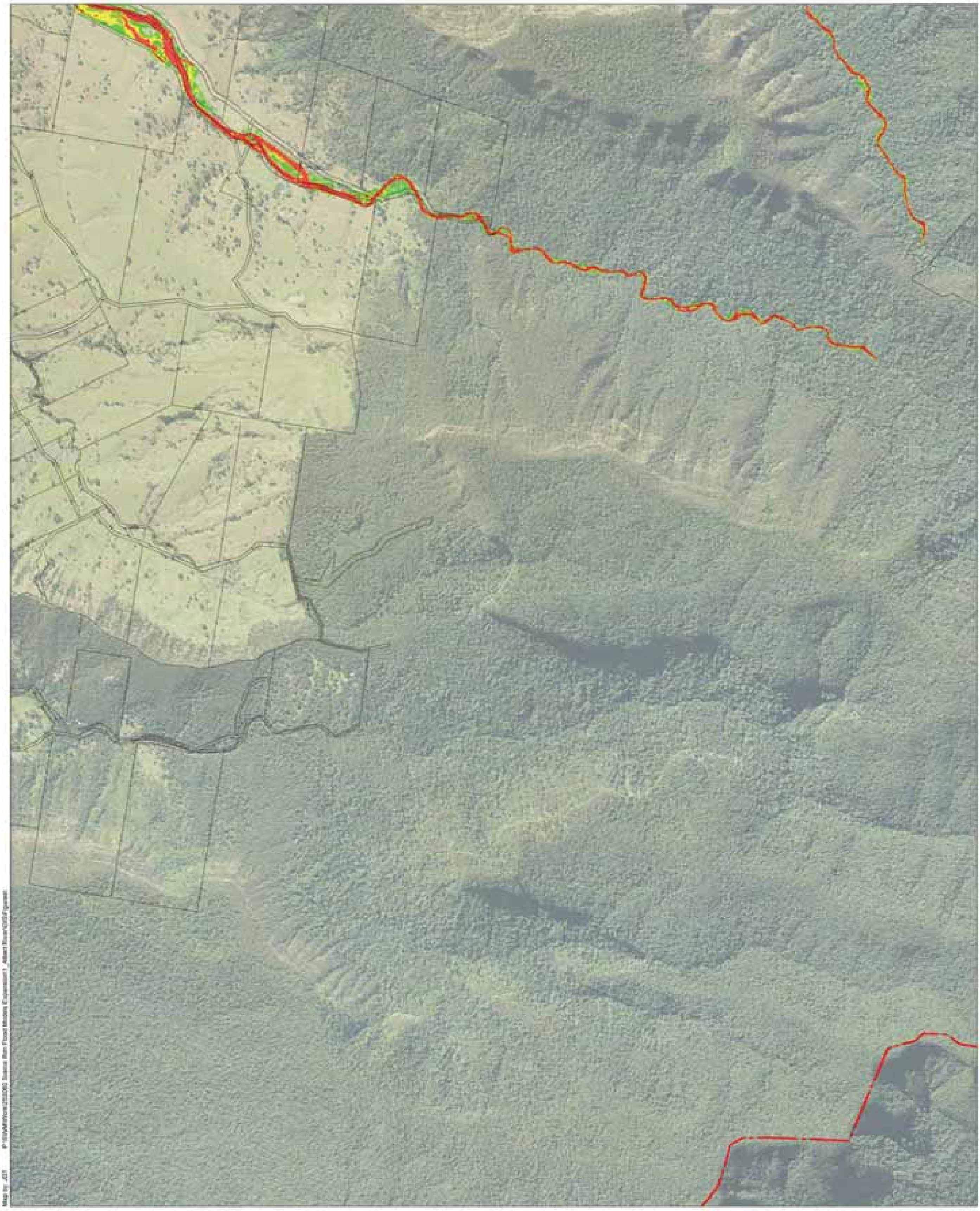
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C4**

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

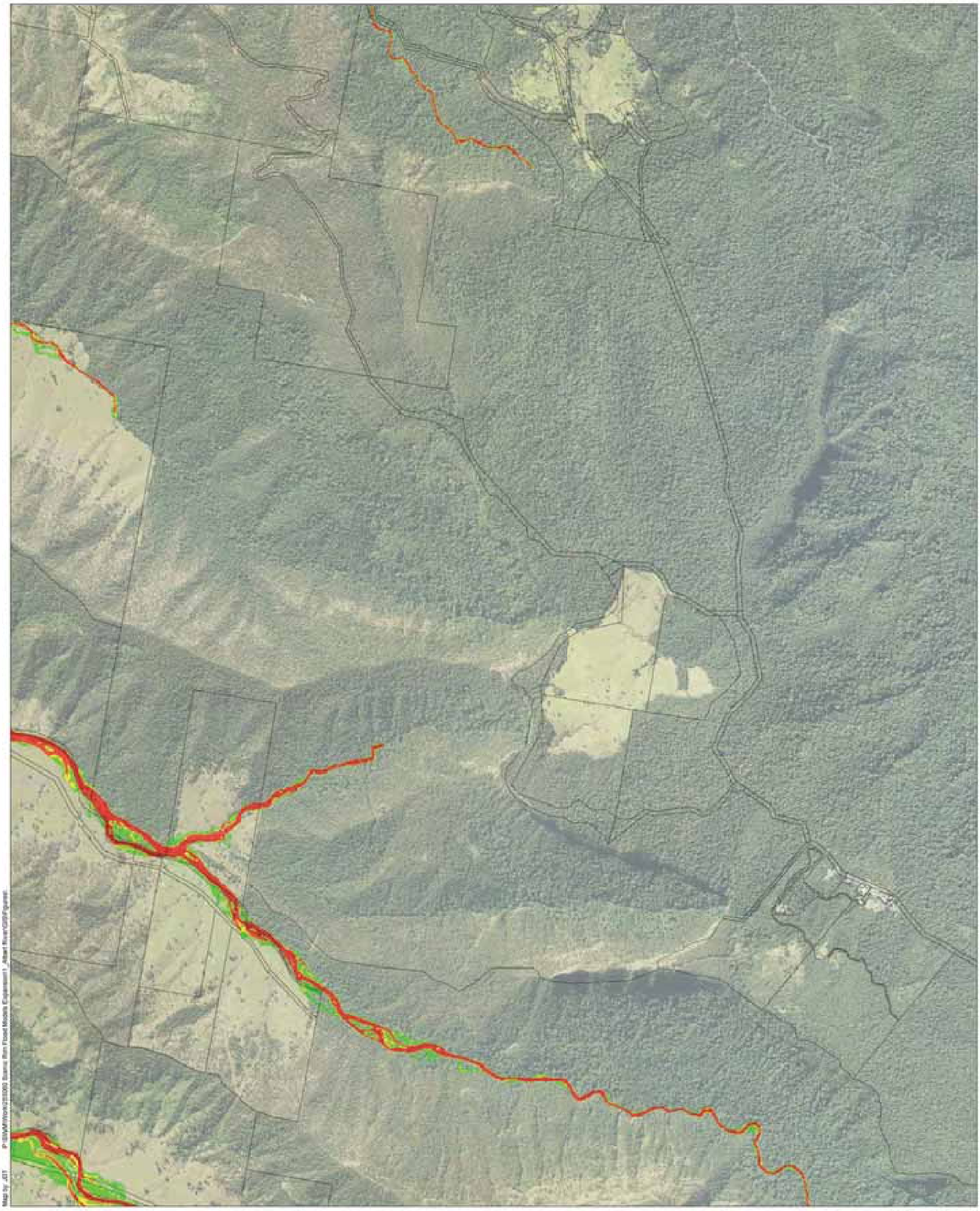
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study
Figure C4-a
2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

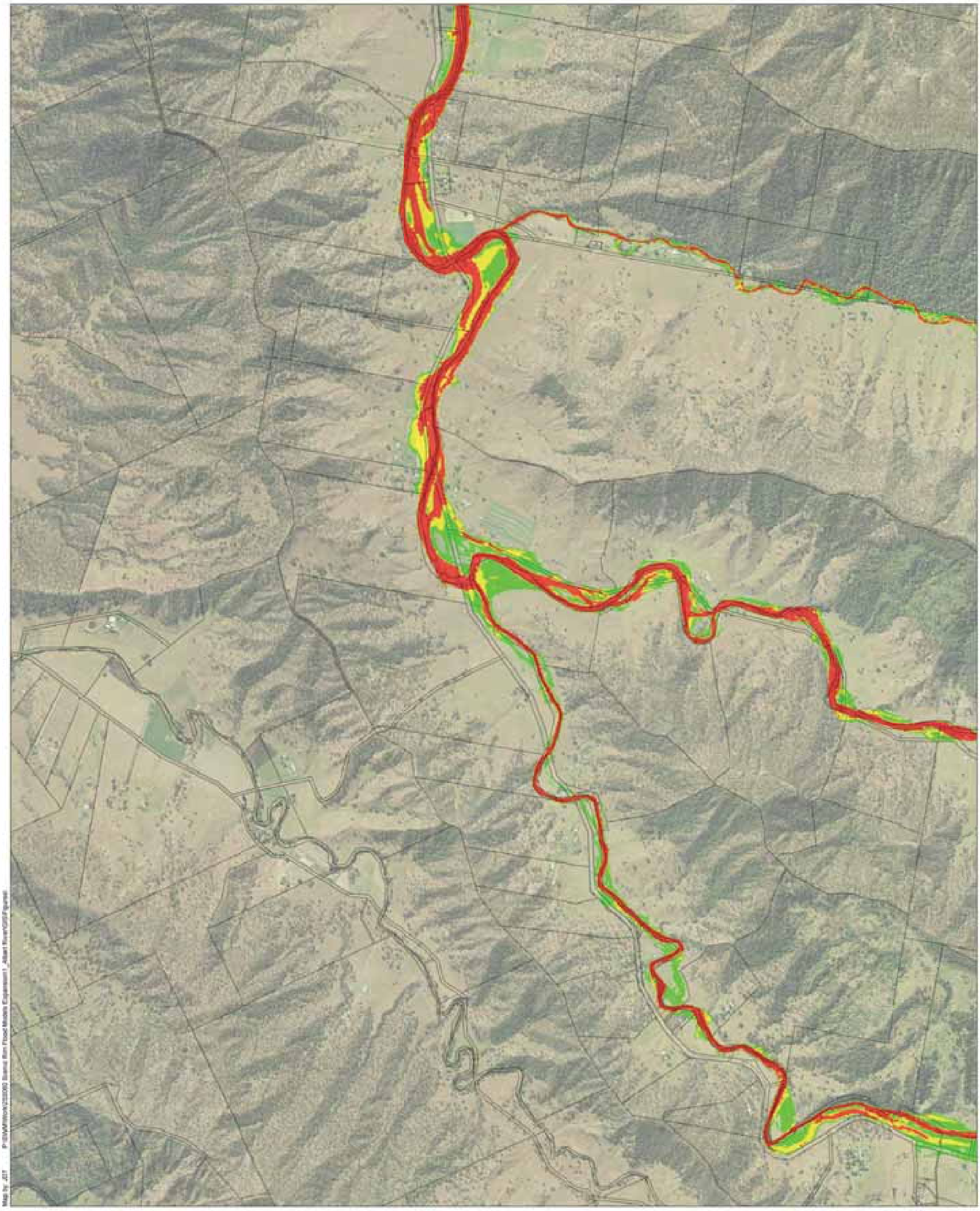
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C4-b**

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

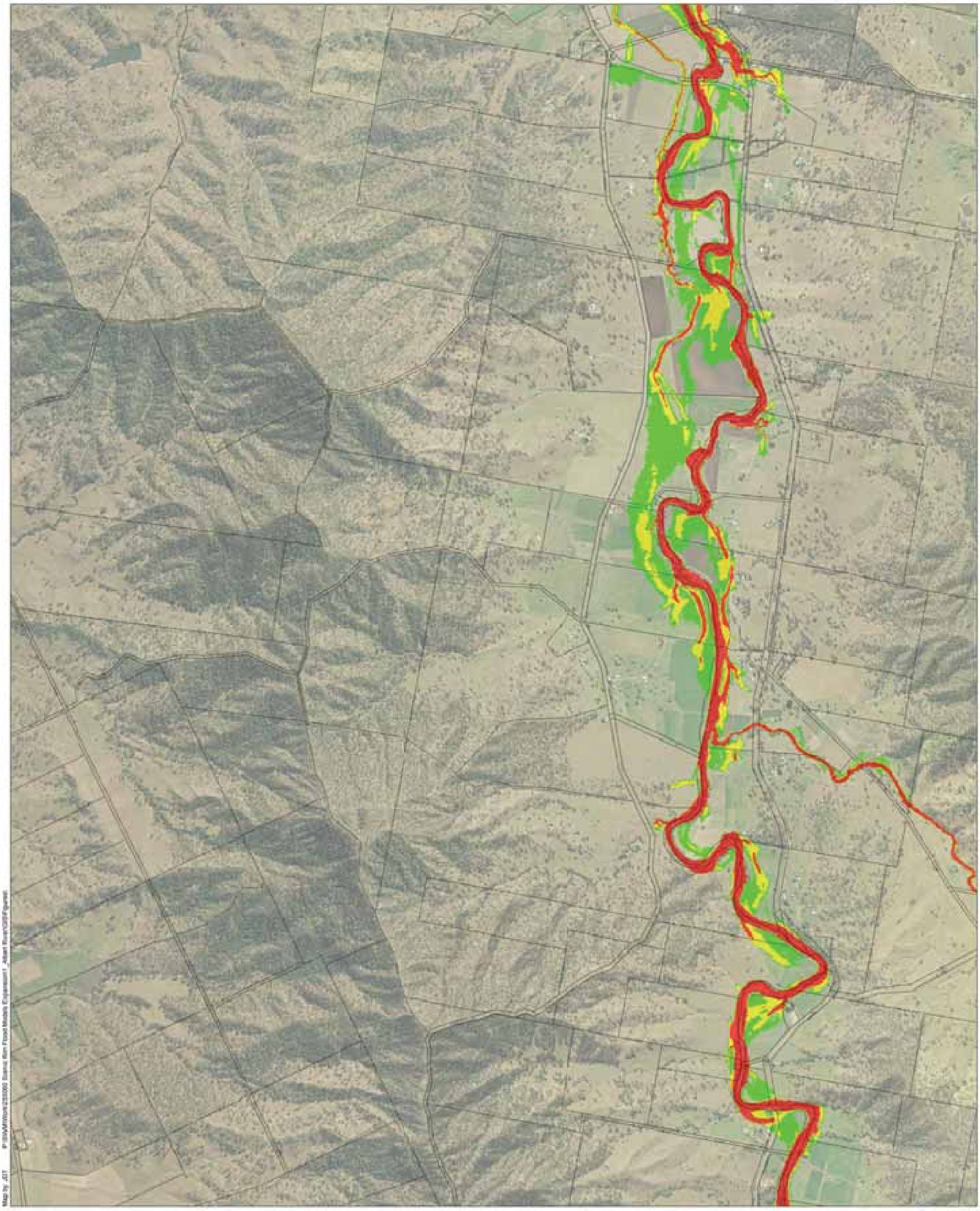
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C4-c**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

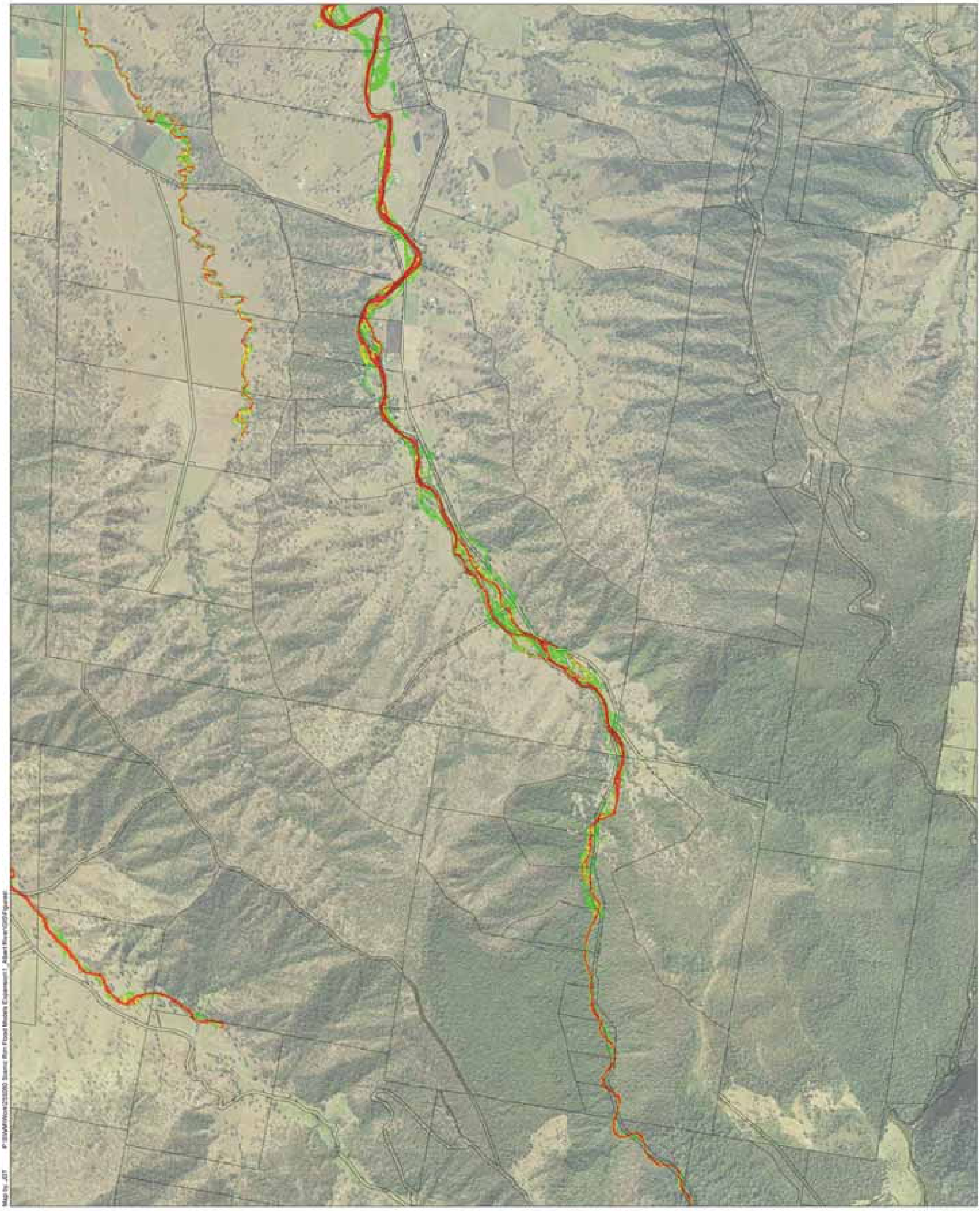
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River 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

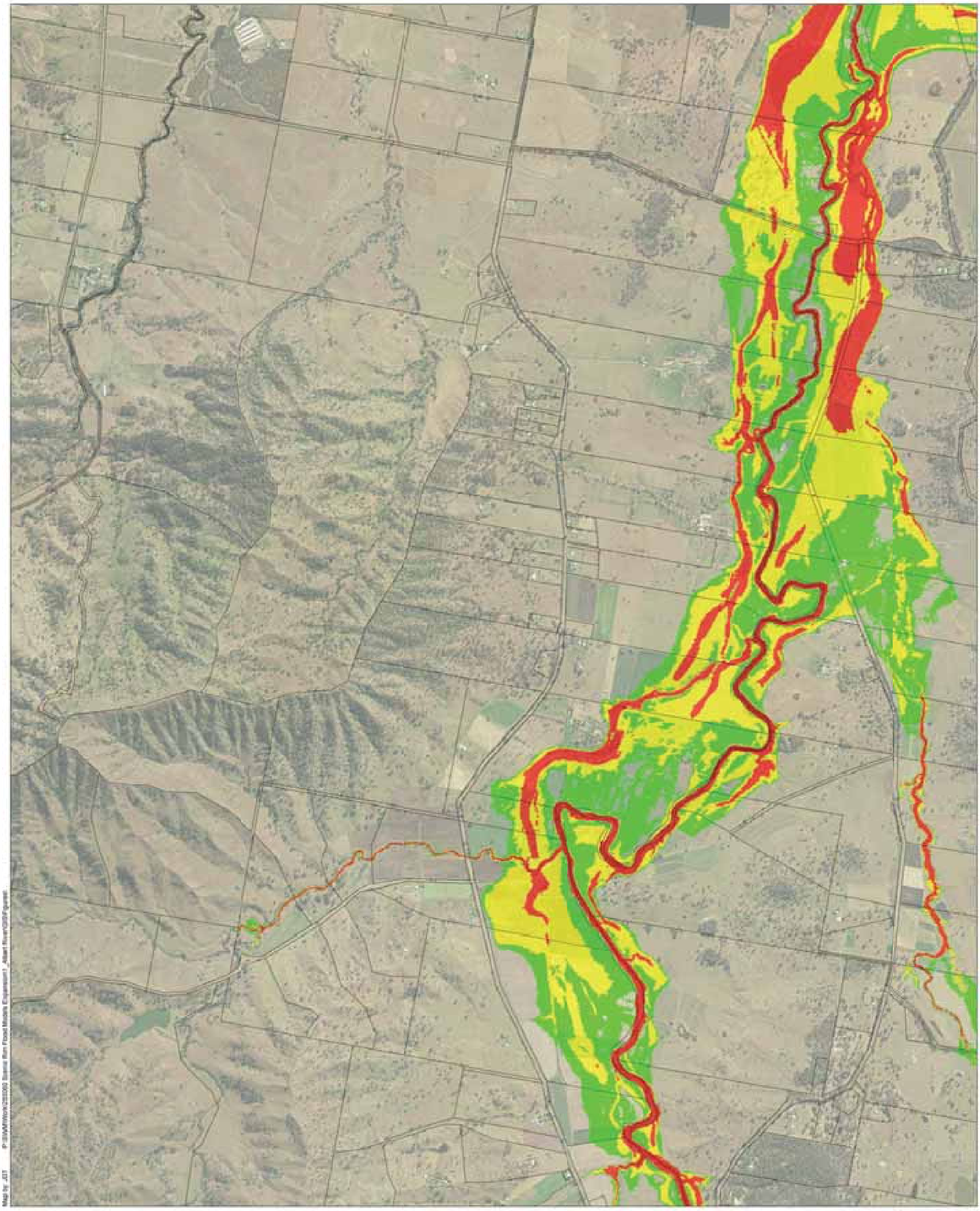
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C4-e**

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

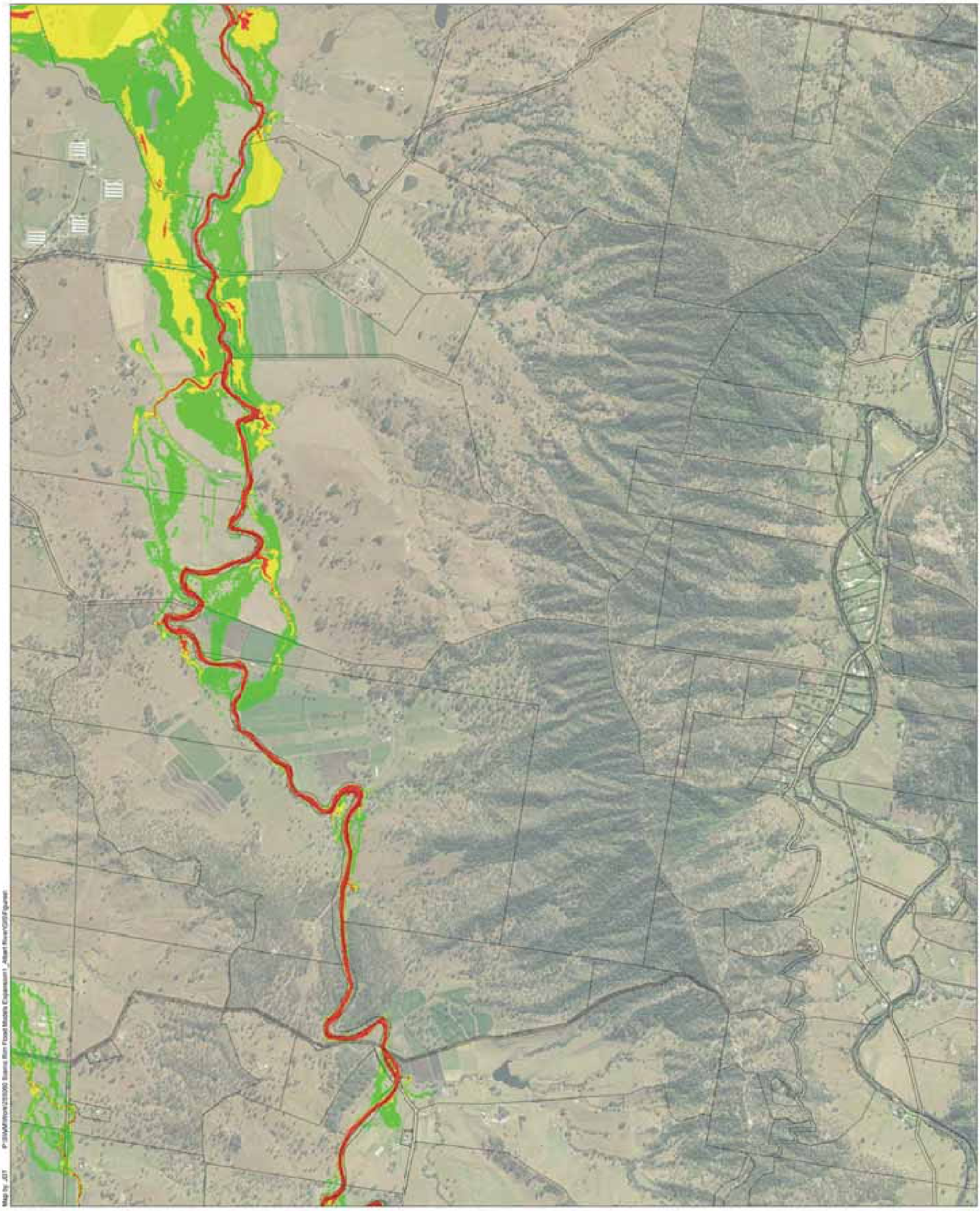
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C4-f**

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

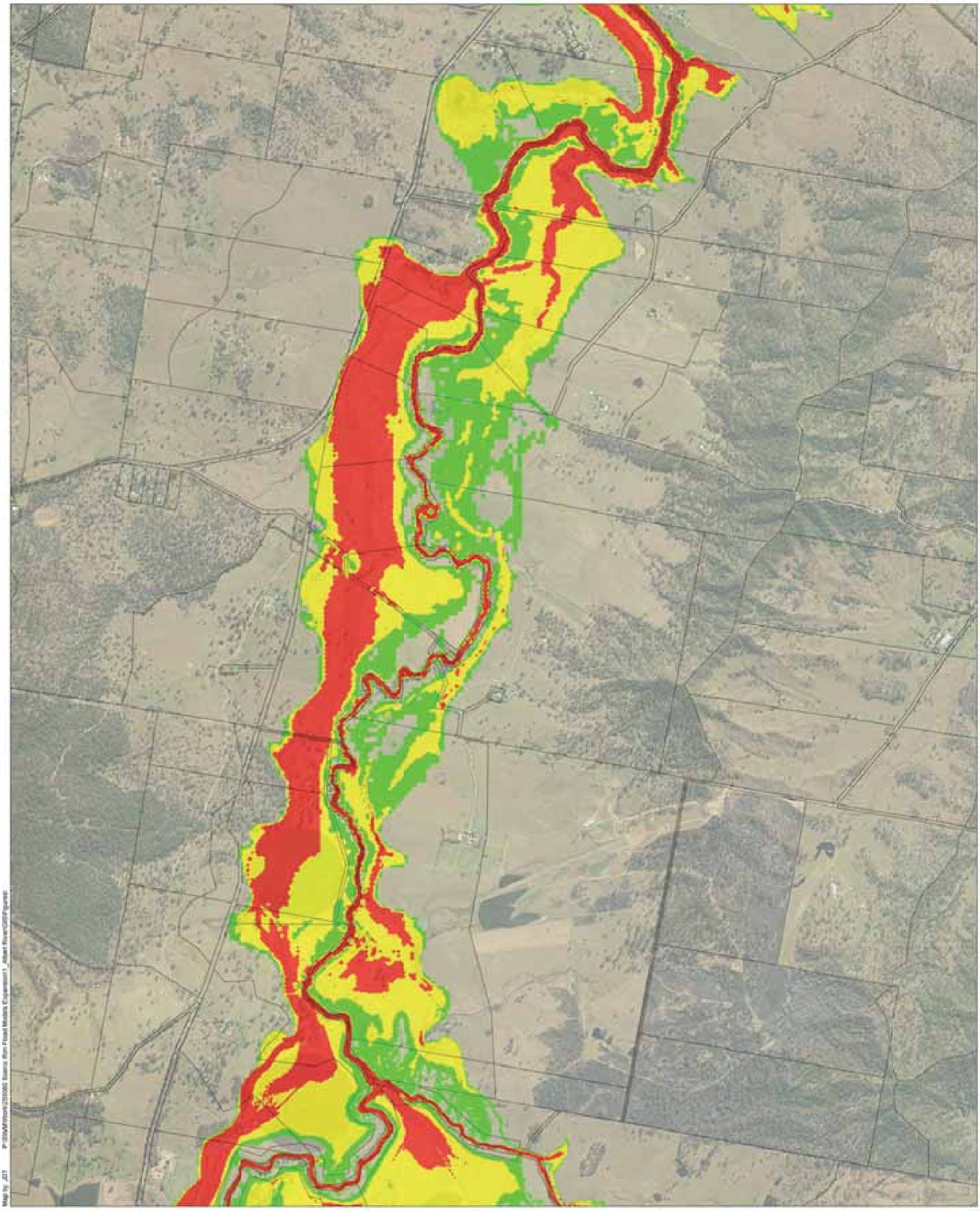
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River 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

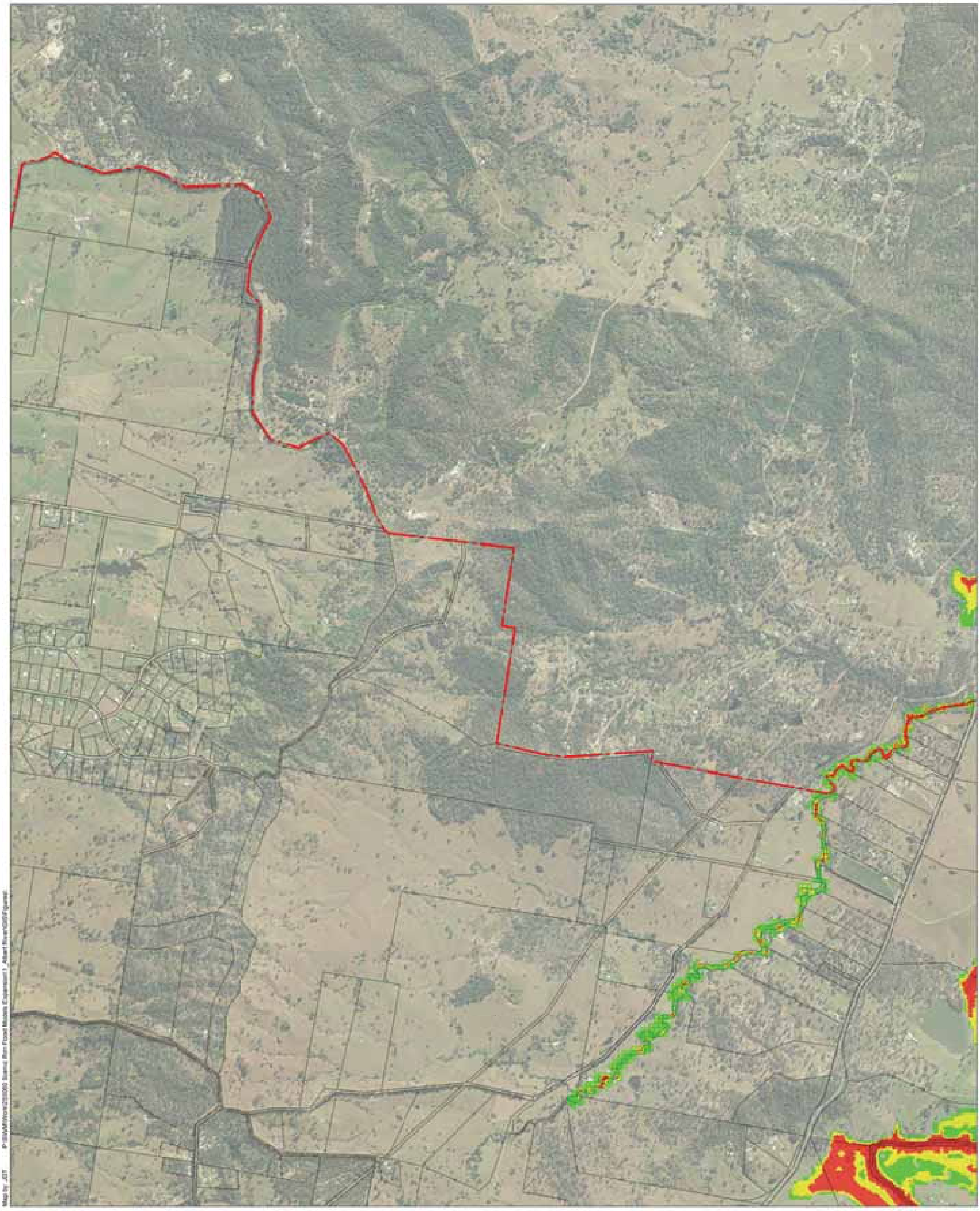
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C4-h**

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

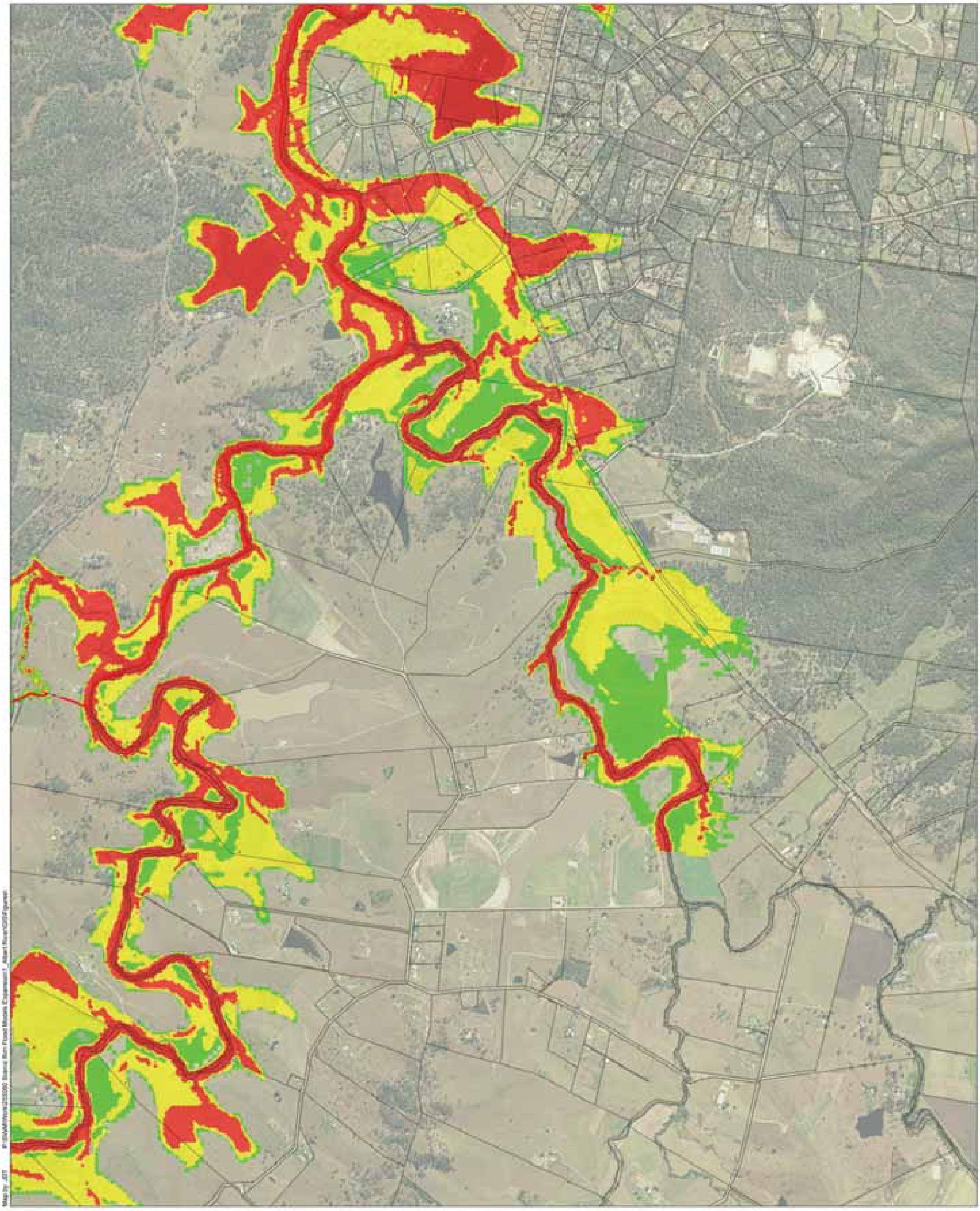
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

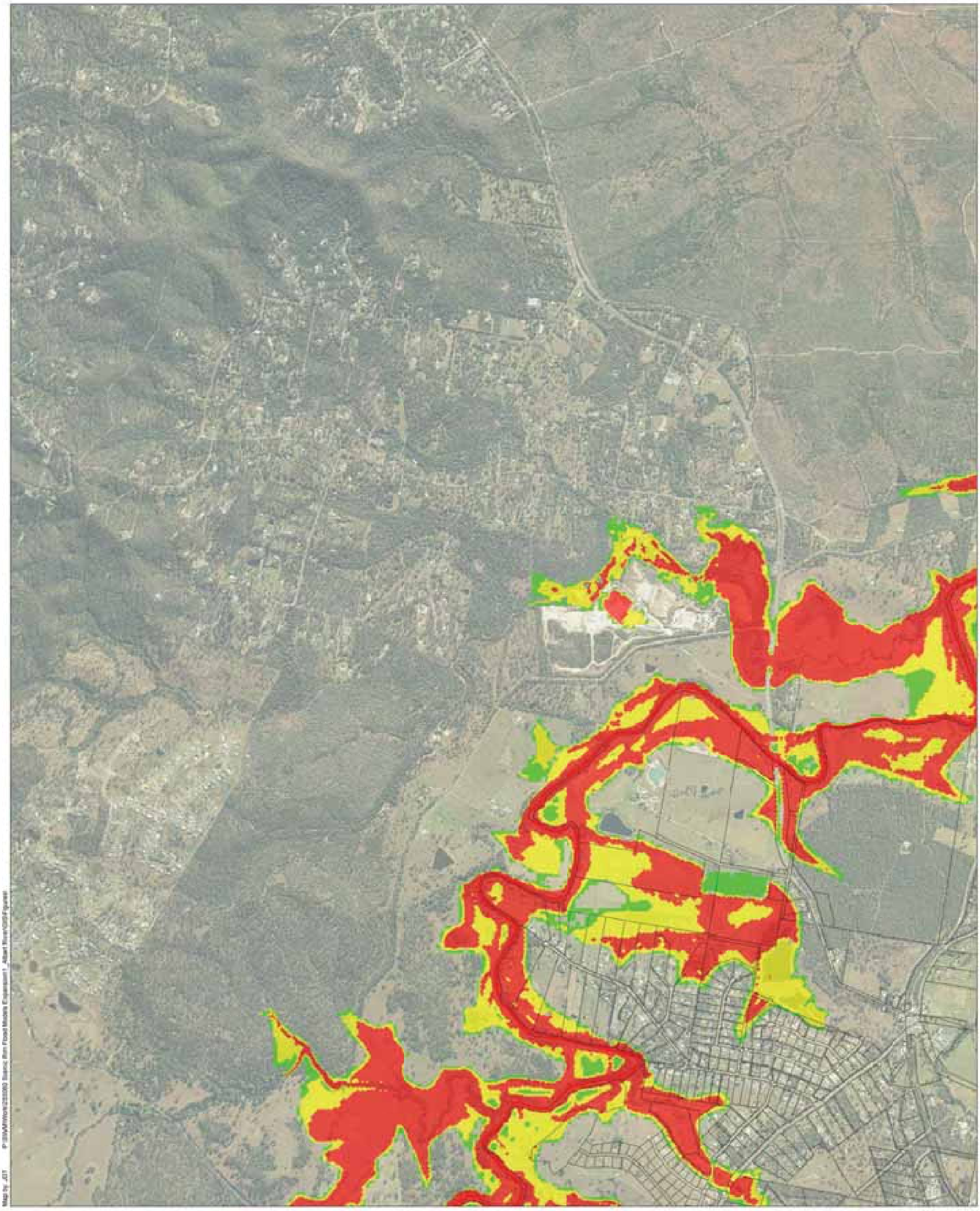
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

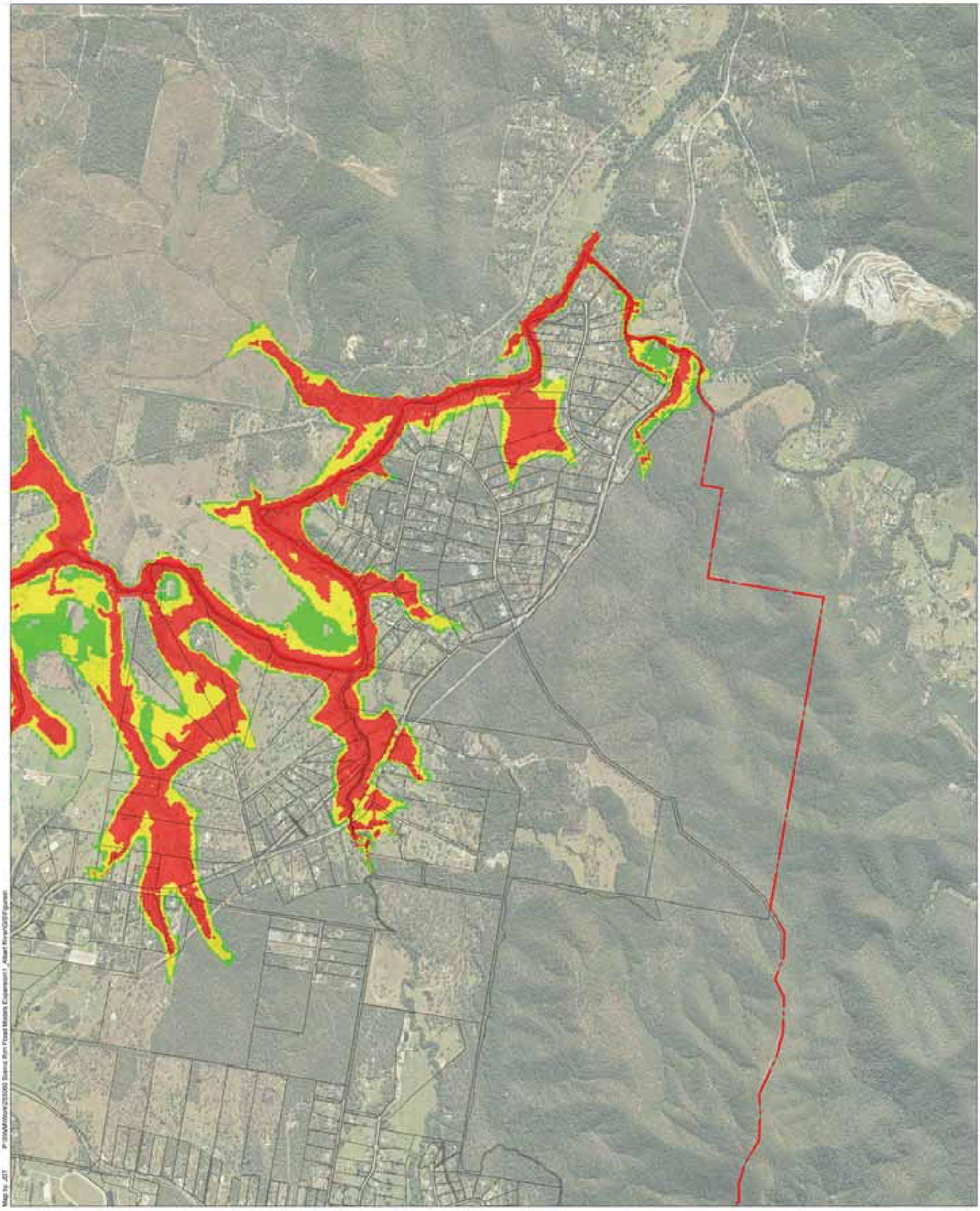
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure C4-k

2% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

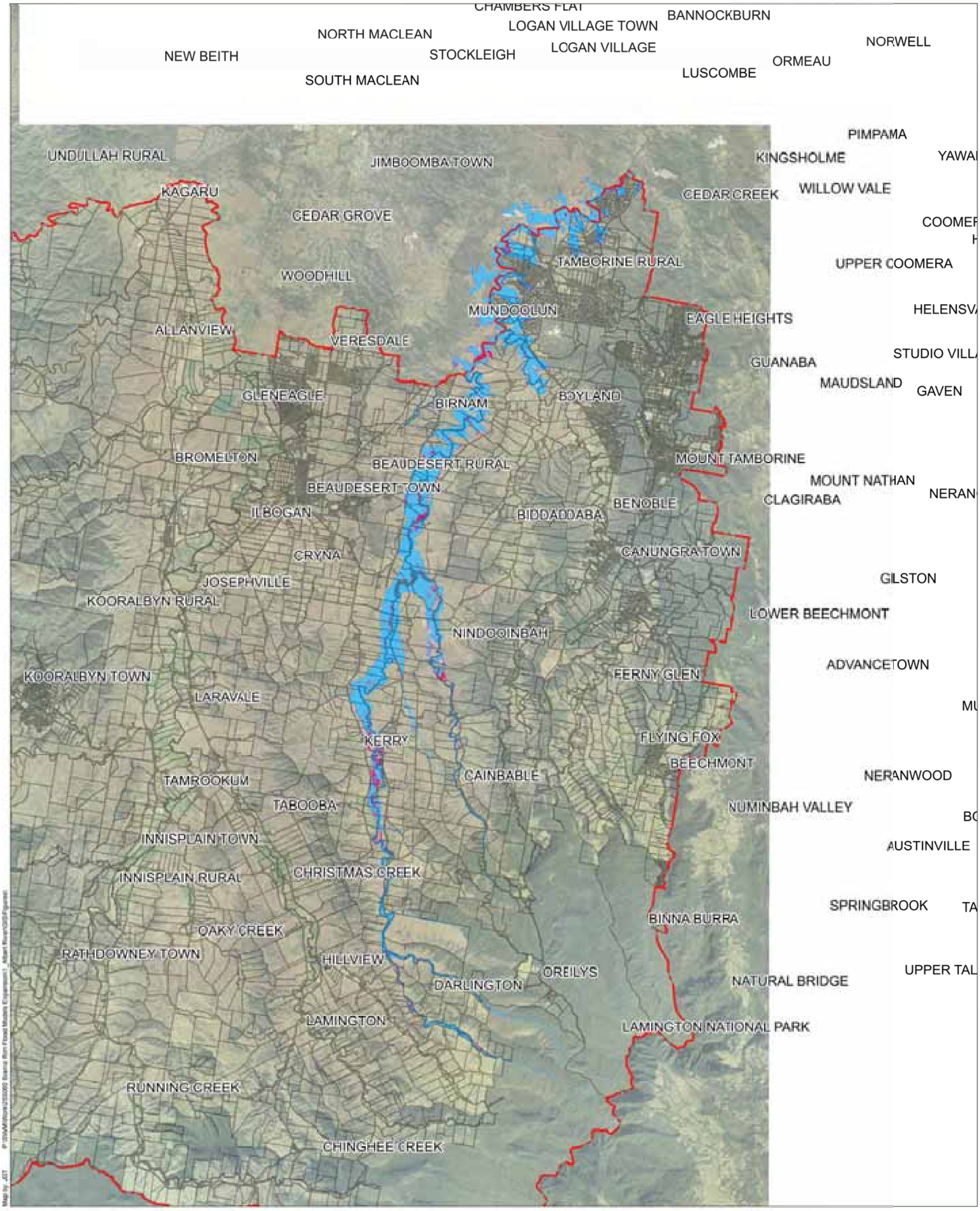
Notes:

1:25,001
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C4-I**

2% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Inundation Extent
Cadastral Boundary
Climate Change Inundation Extent

Notes:

1:200,000

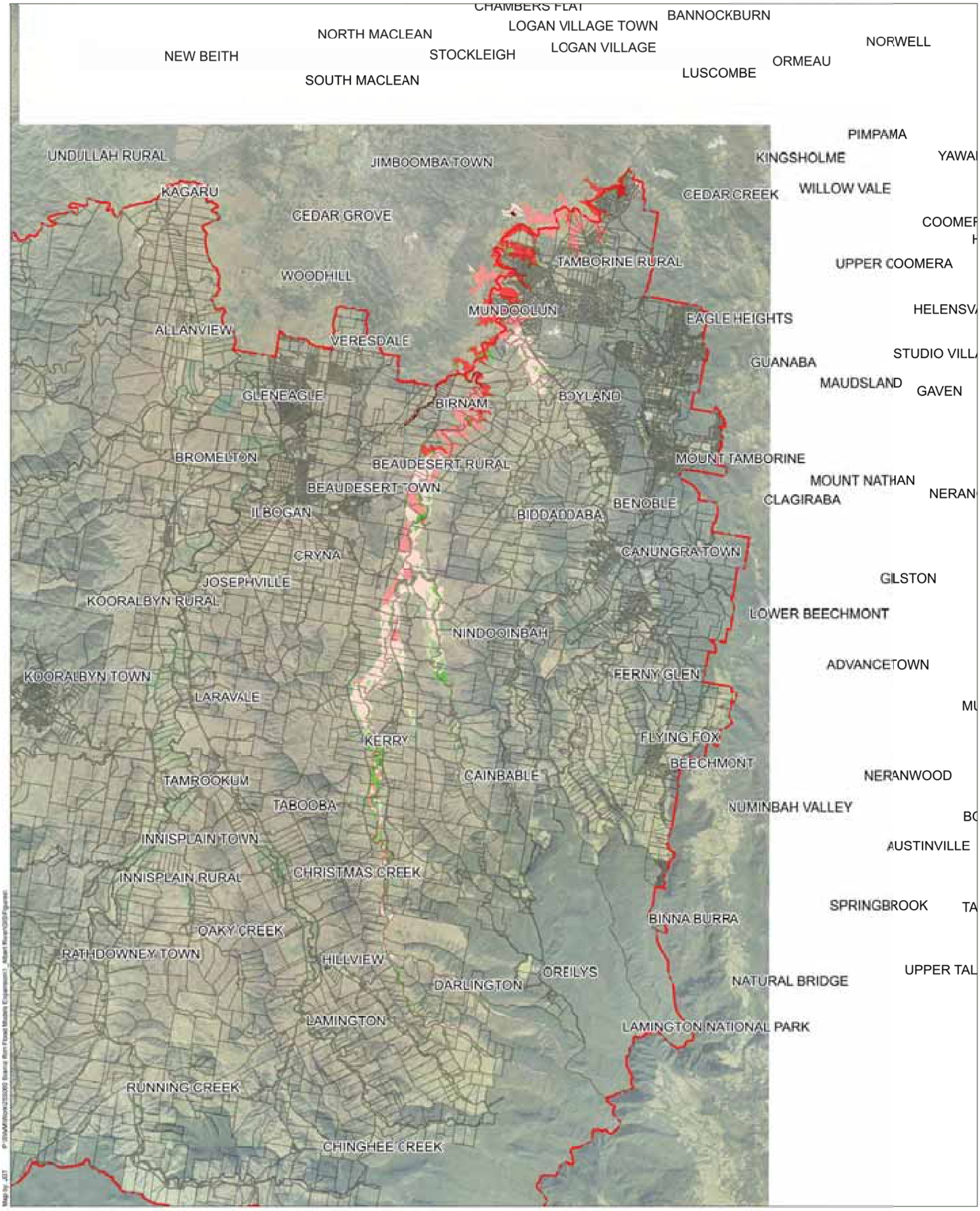
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure C5-a**

2% AEP Event - Climate Change Scenario 4.5 - Inundation Extent



Legend

SRRC Boundary
Cadastral Boundary

< -0.80
-0.80 to -0.60
-0.60 to -0.40
-0.40 to -0.20
-0.20 to -0.03
-0.03 to 0.03
0.03 t
0.20 t
0.40 t
0.60 t
0.80 t
> 1.20
Was Dry Now Wet
Was Wet Now Dry

Notes:

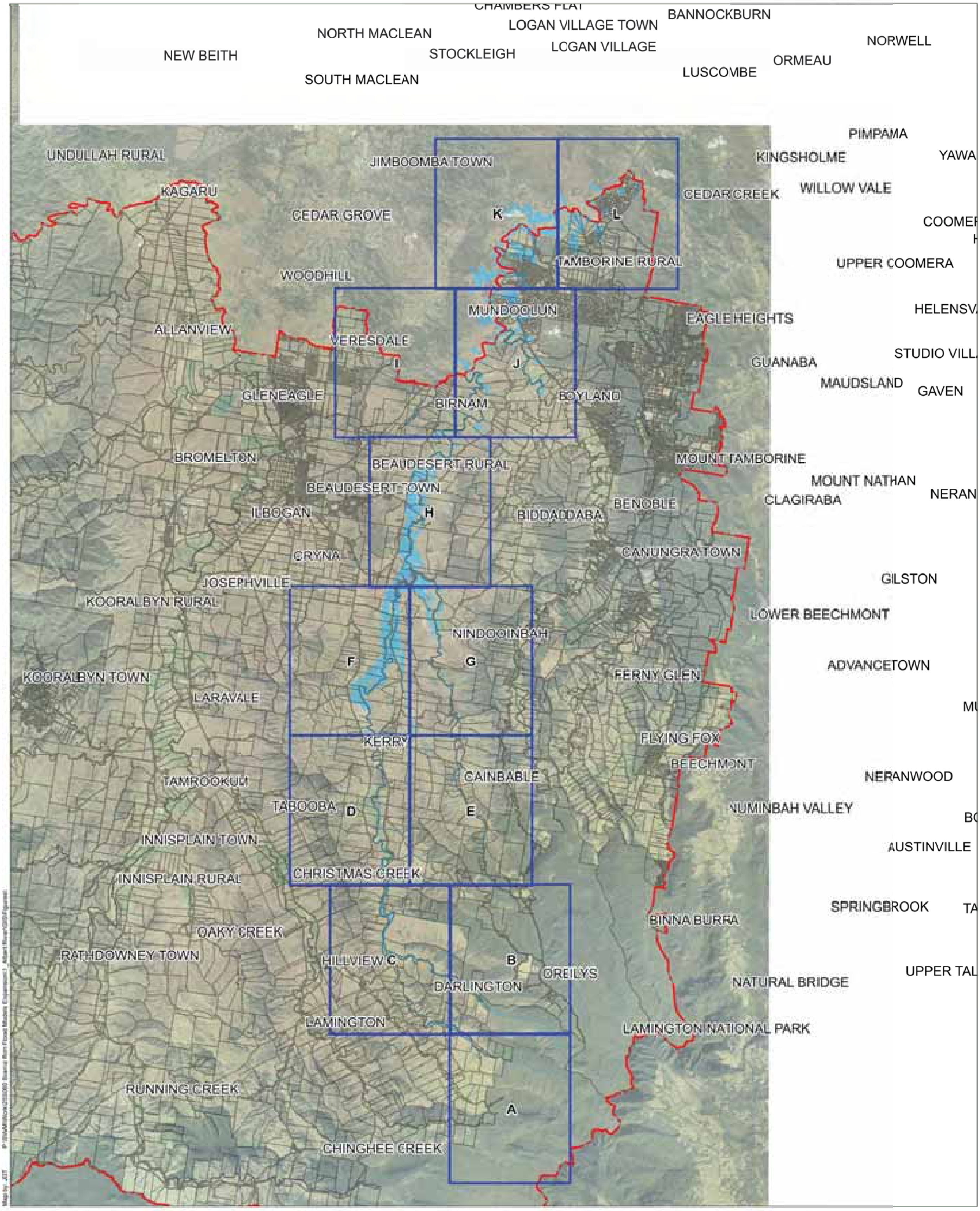
1:200,000
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure C5-b**

2% AEP Event - Climate Change Scenario 4.5 - Afflux Map

aurecon



Legend

SRRC Boundary

Inundation Extent

Cadastral Boundary

Peak Water level Contour (mAHD)

Notes:

1:200,000

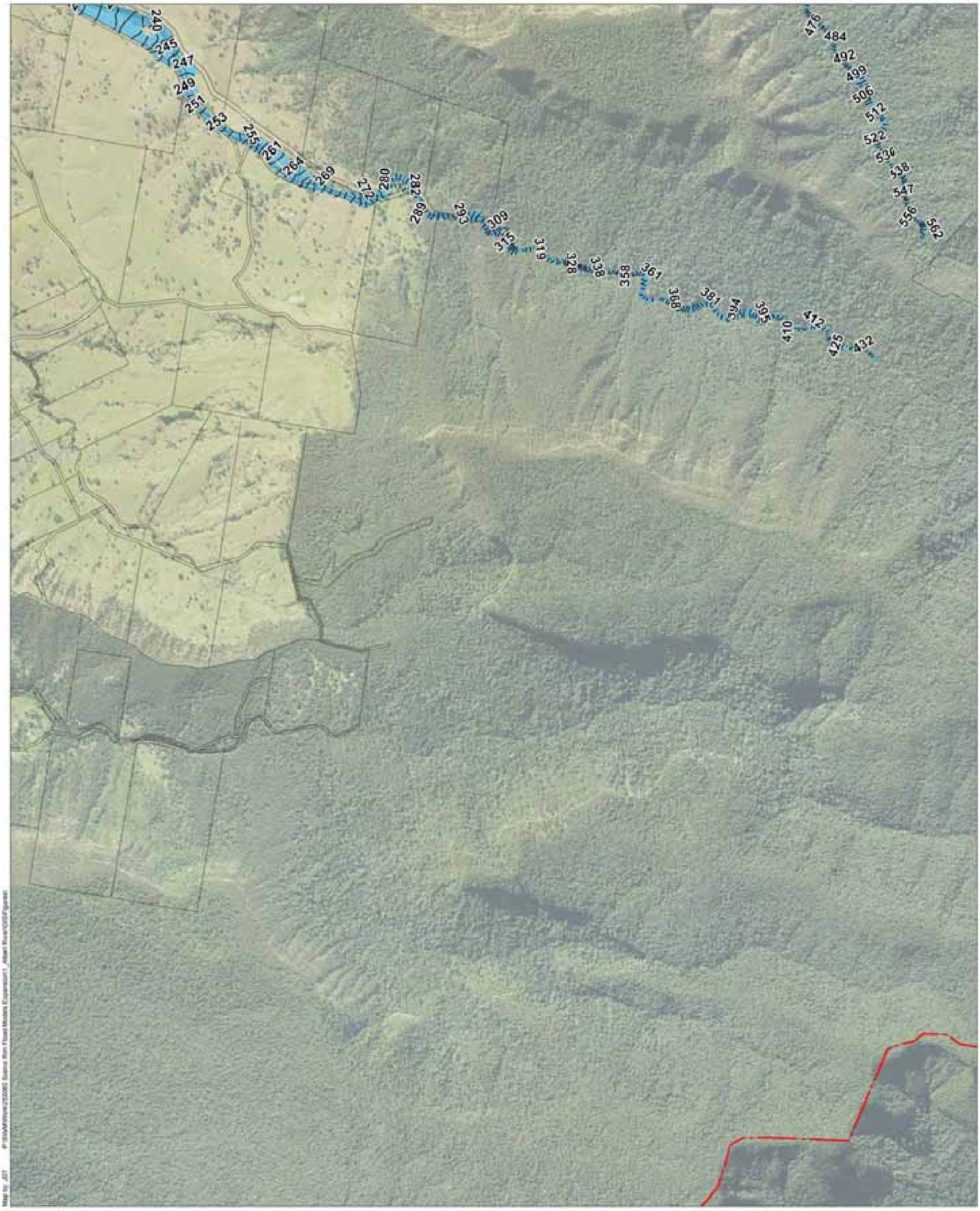
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

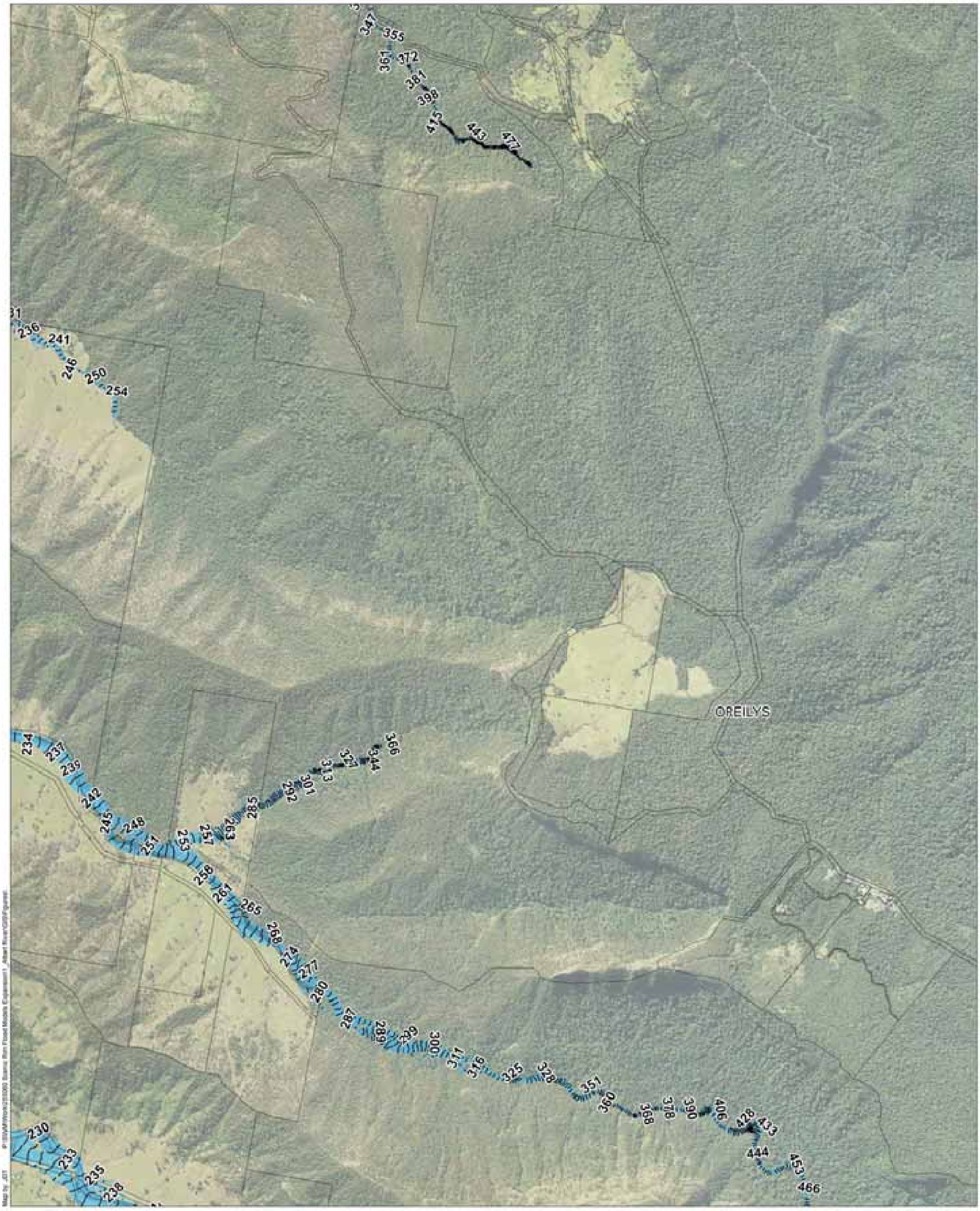
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-b**

5% AEP Event - Inundation Extent

aurecon

Legend

SRRC Boundary

Inundation Extent

Cadastral Boundary

Peak Water level Contour (mAHD)

Notes:

1:25,000

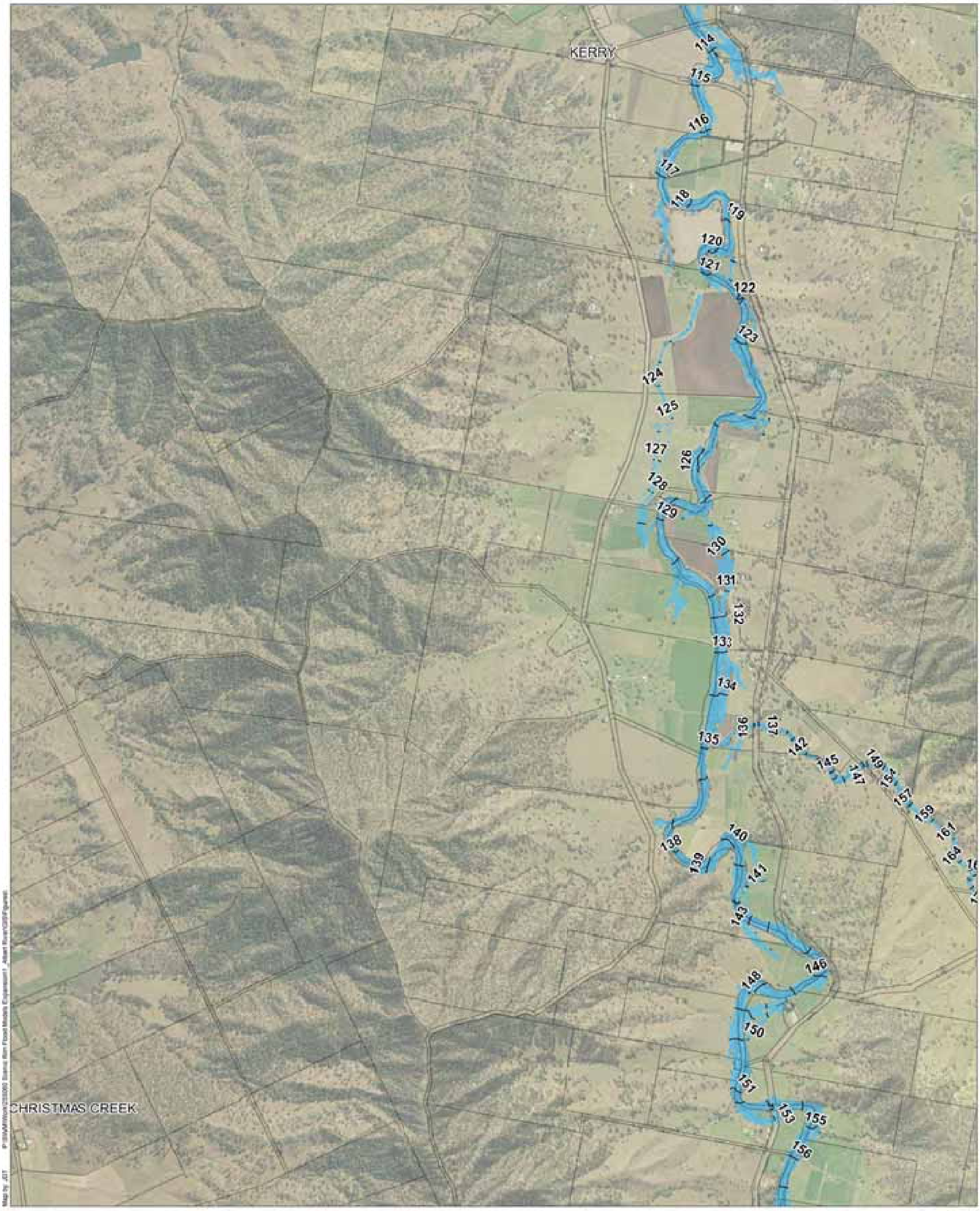
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

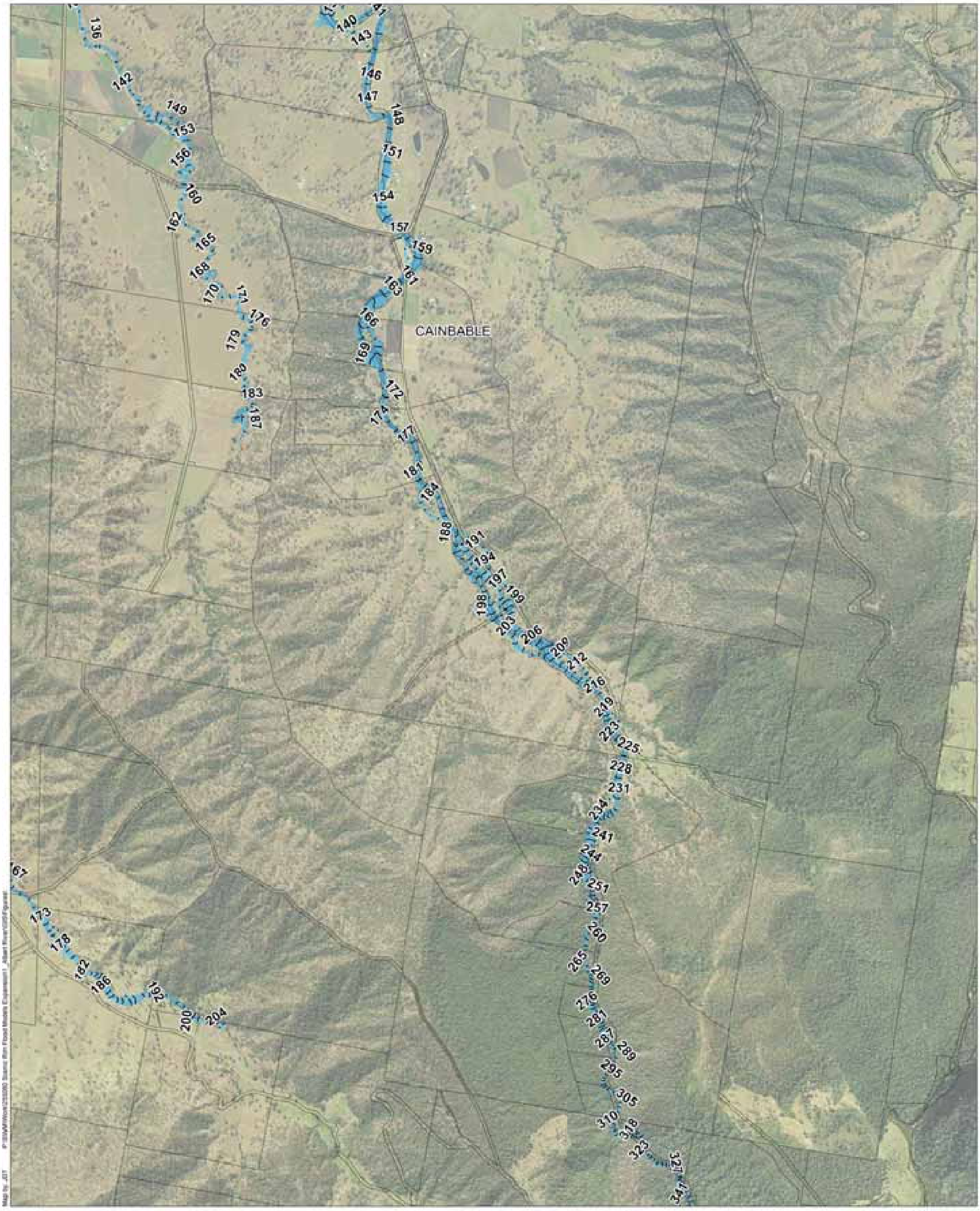
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-d**

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

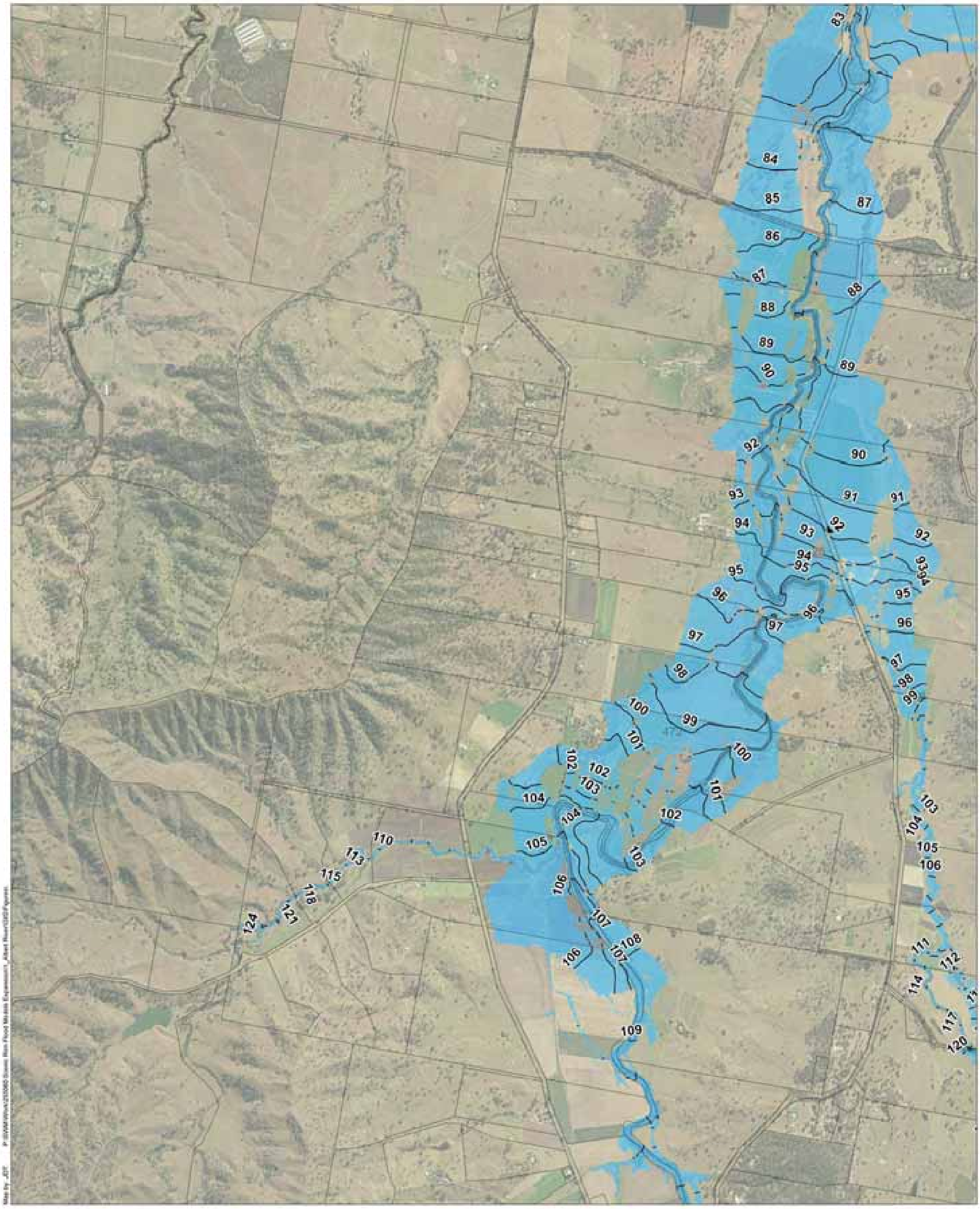
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-e**

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

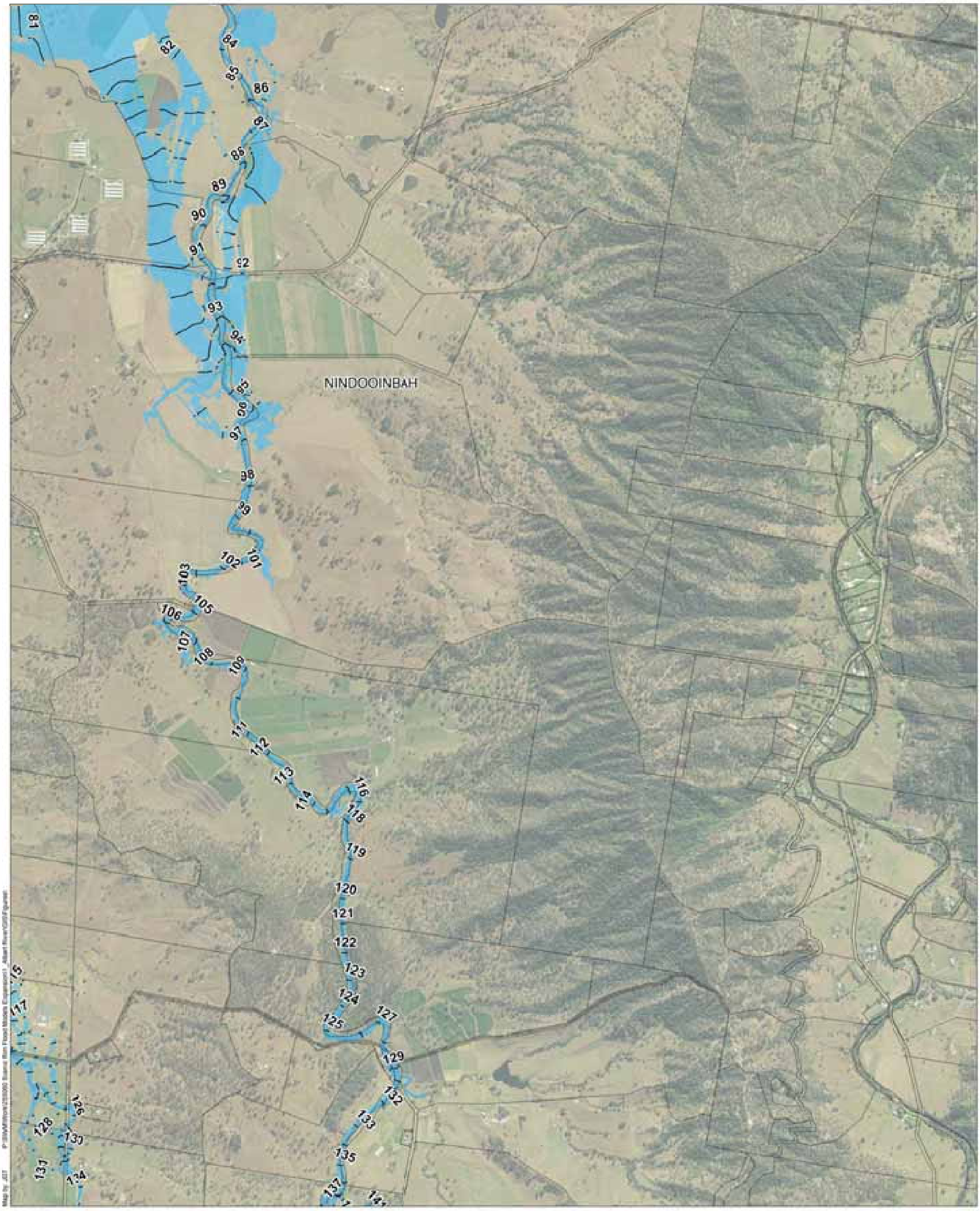
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

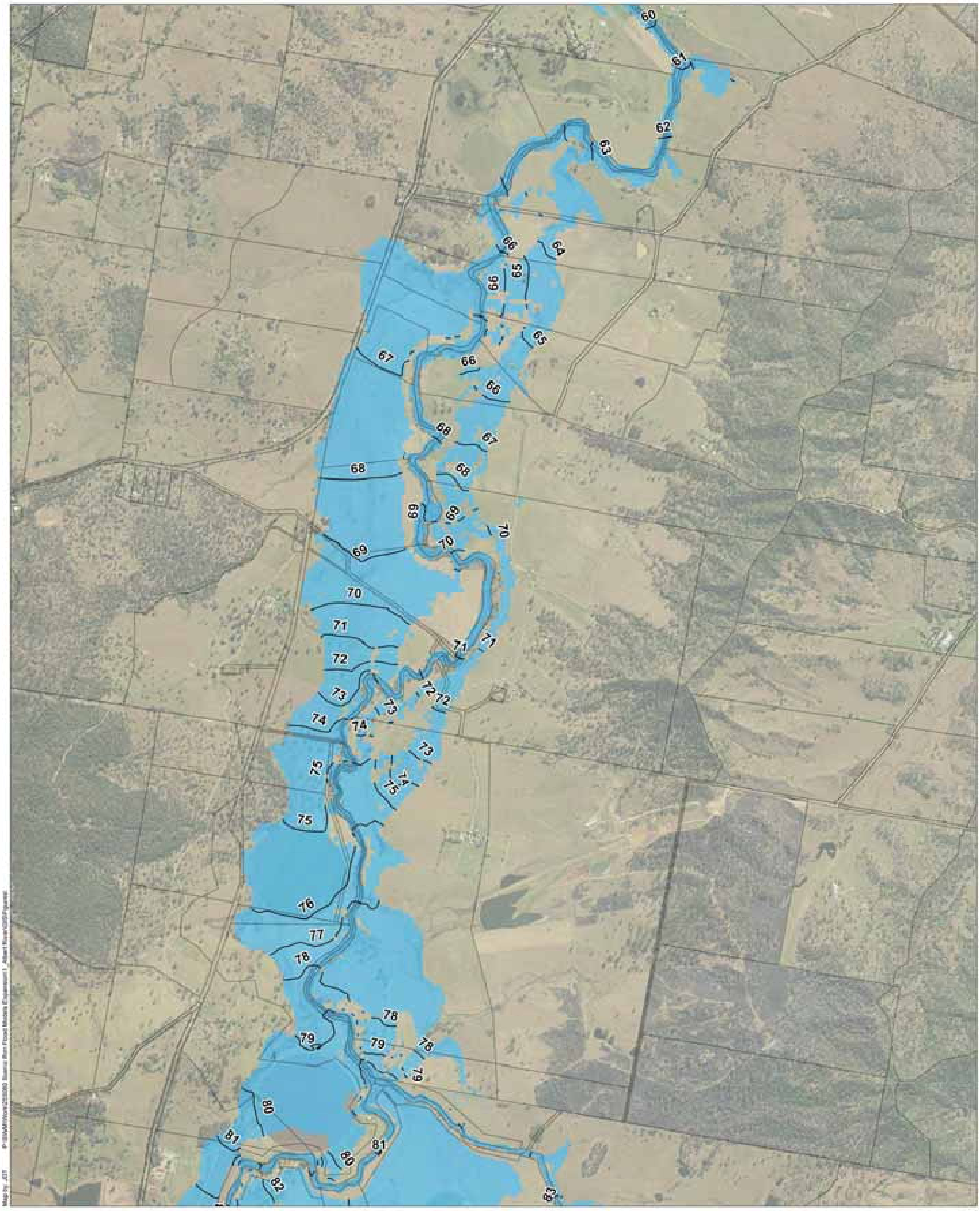
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

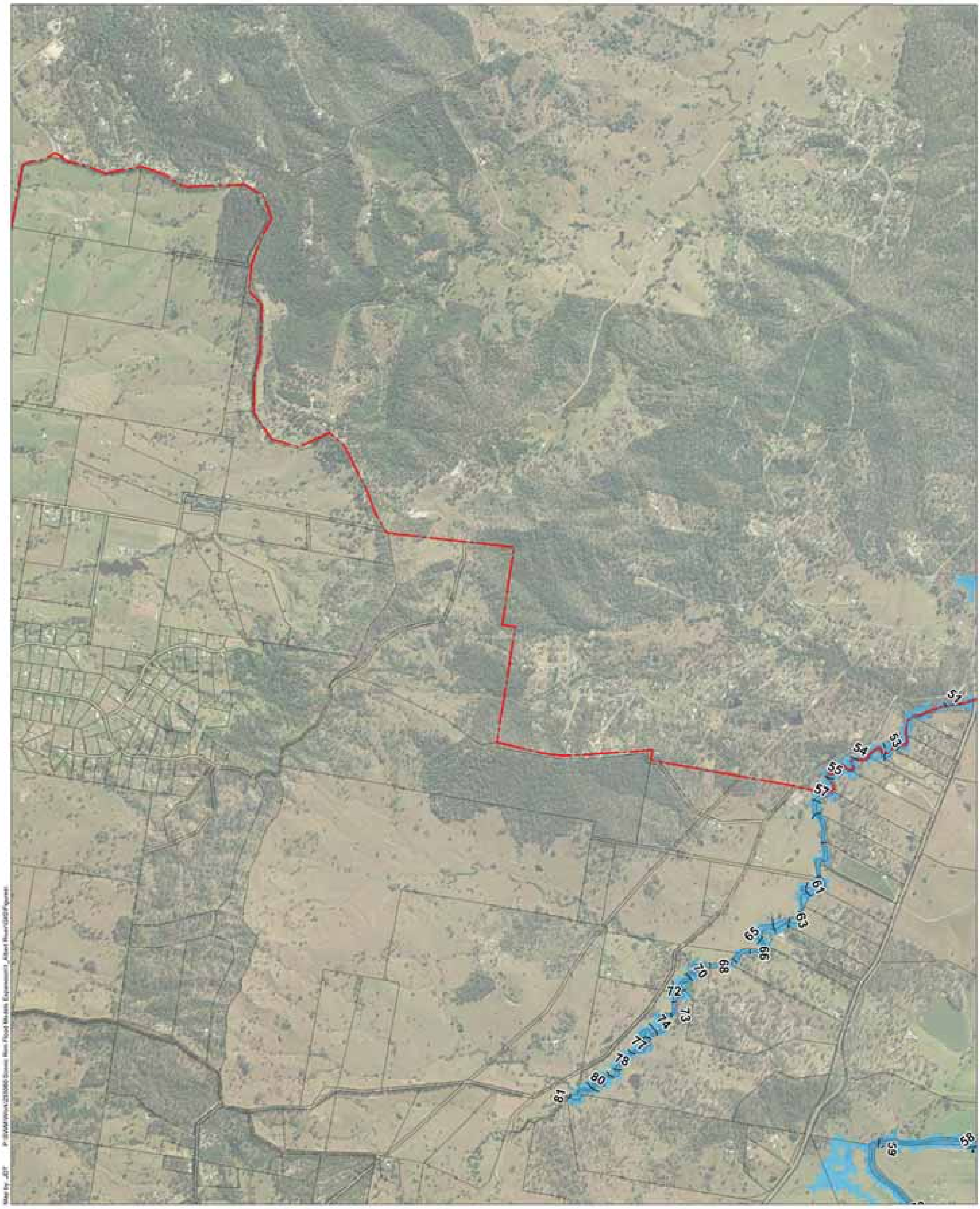
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-h**

5% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

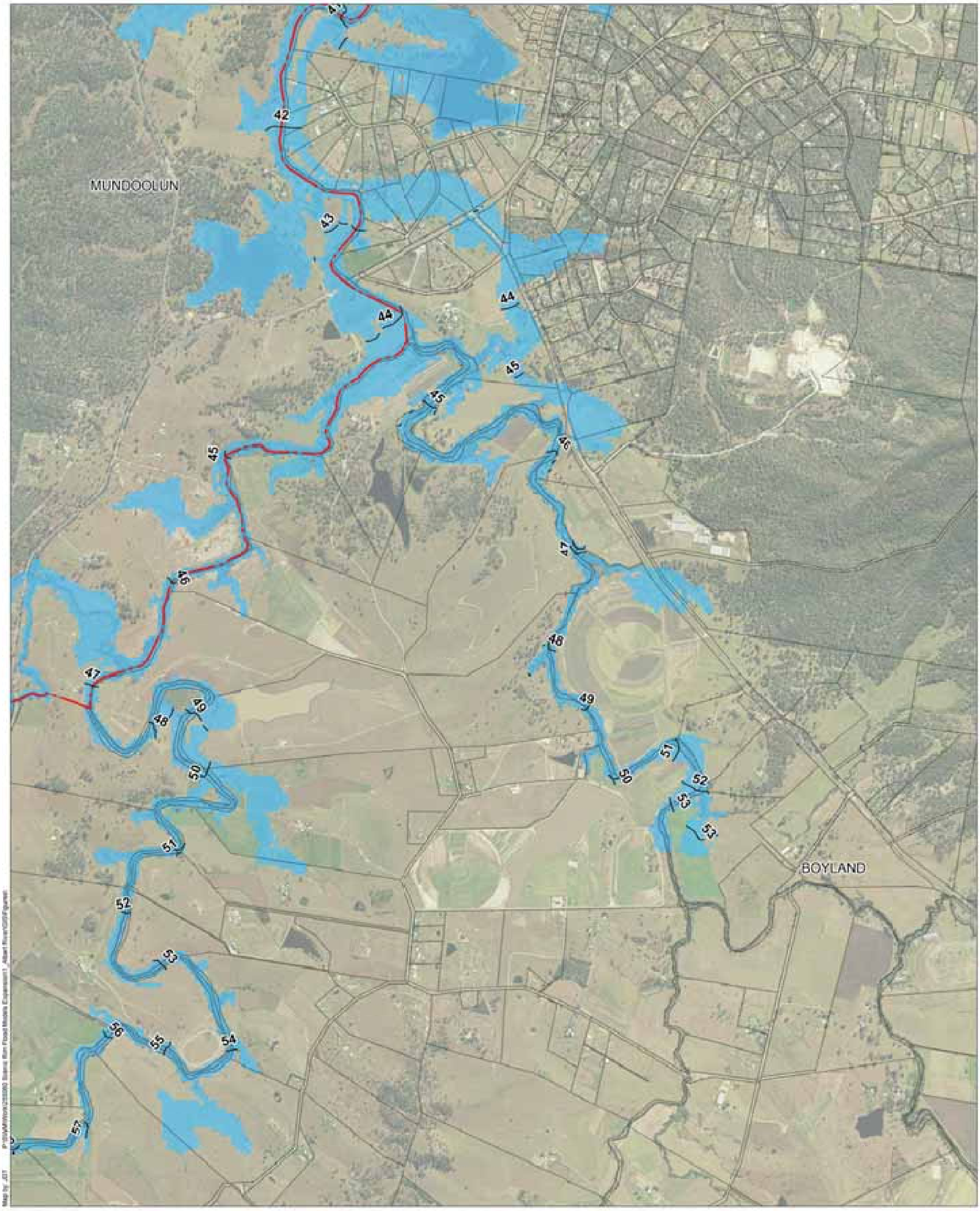
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

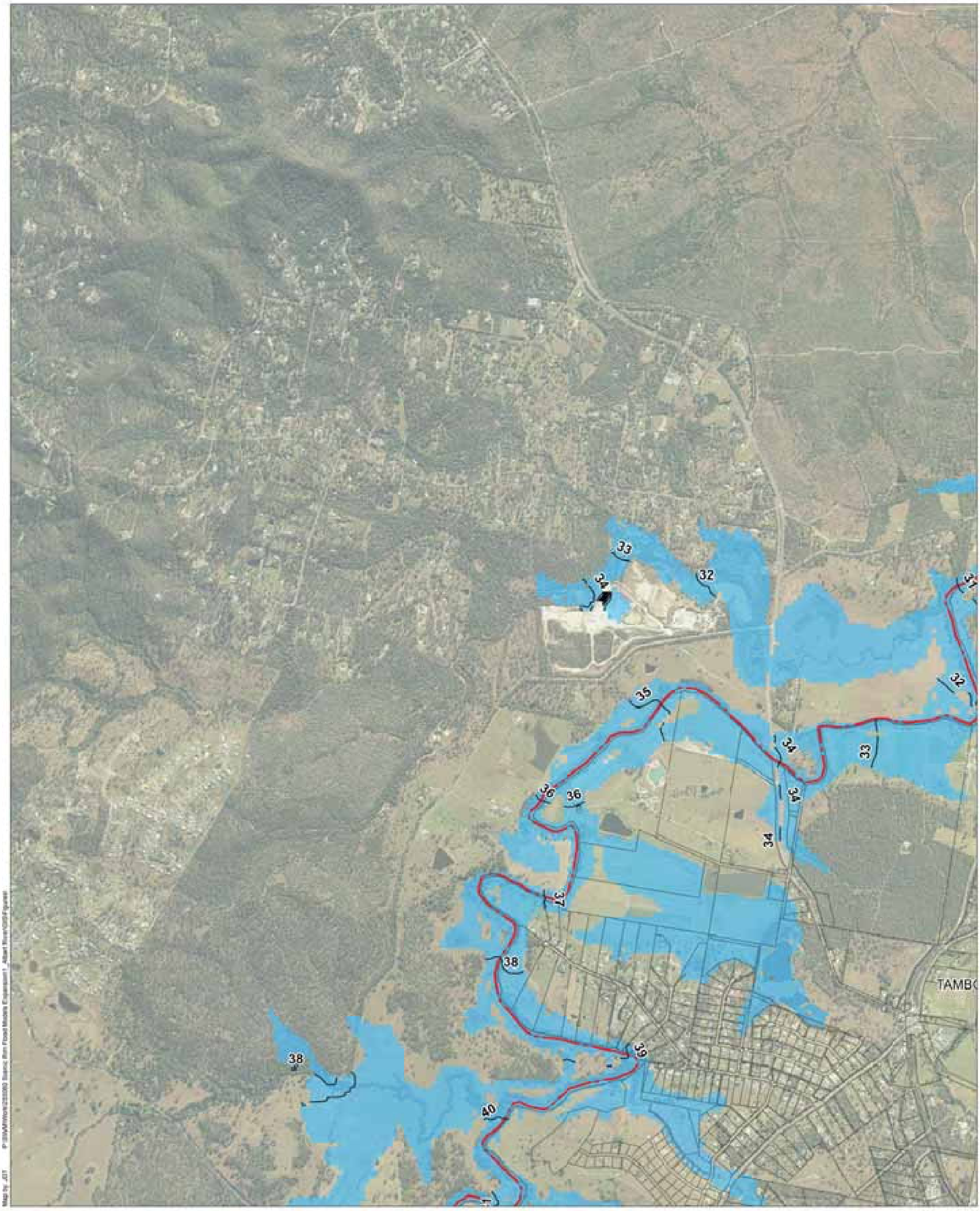
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-j**

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

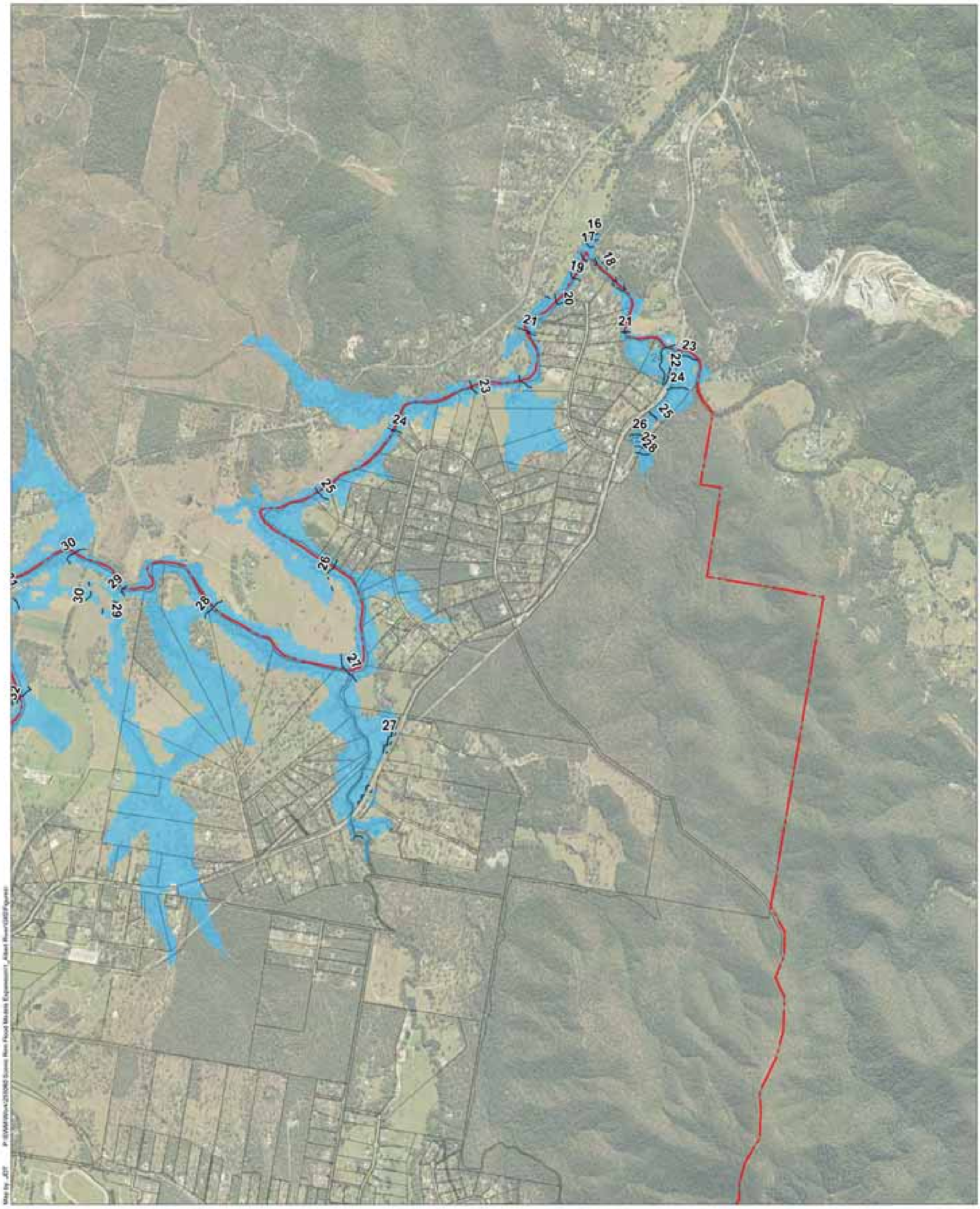
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D1-k**

5% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,001

0 626 m 1,250 m

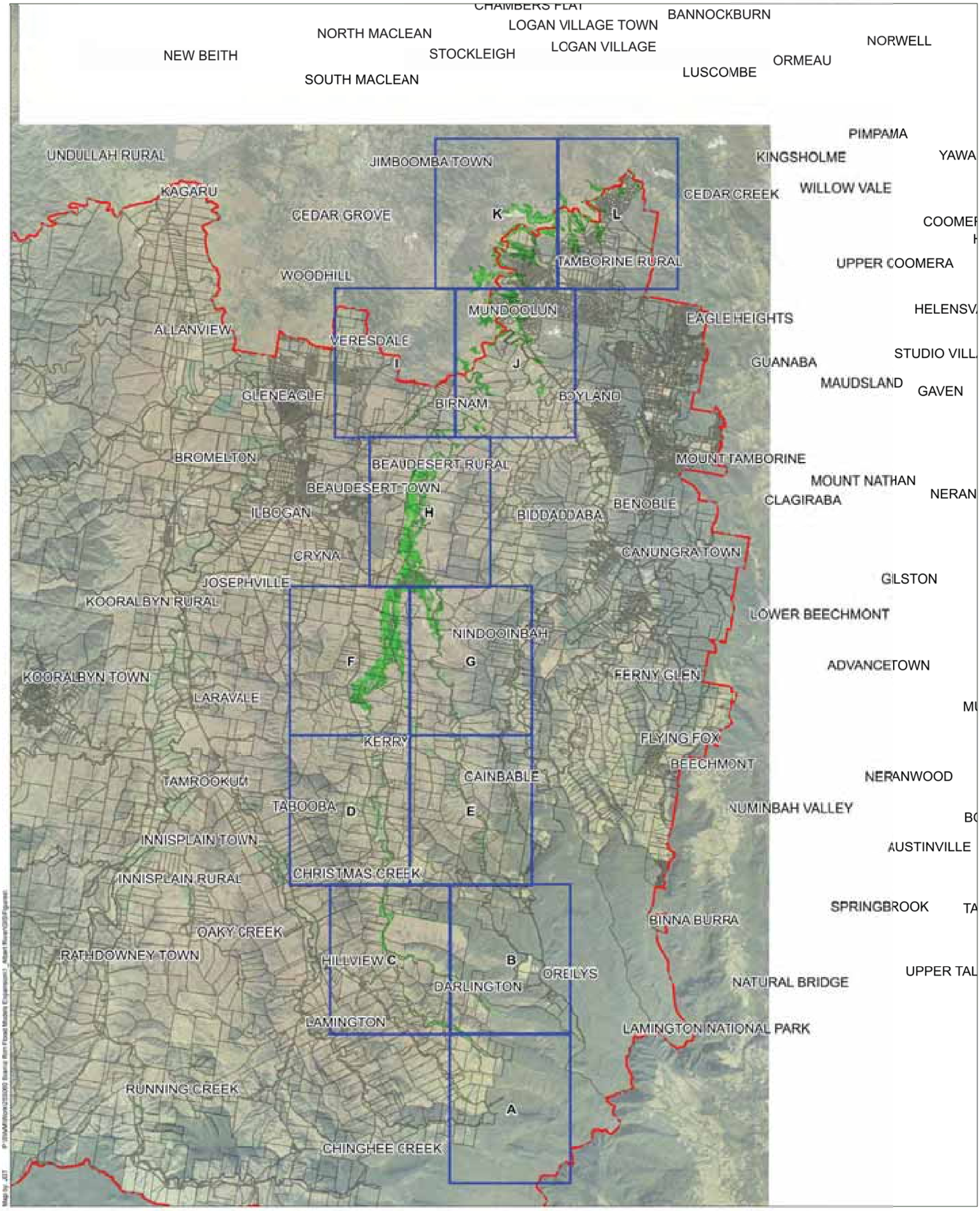
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study

Figure D1-I

5% AEP Event - Inundation Extent



Legend

Notes:

	Velocity (m/s)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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	

1:200,000

0 5,000 m 10,000 m

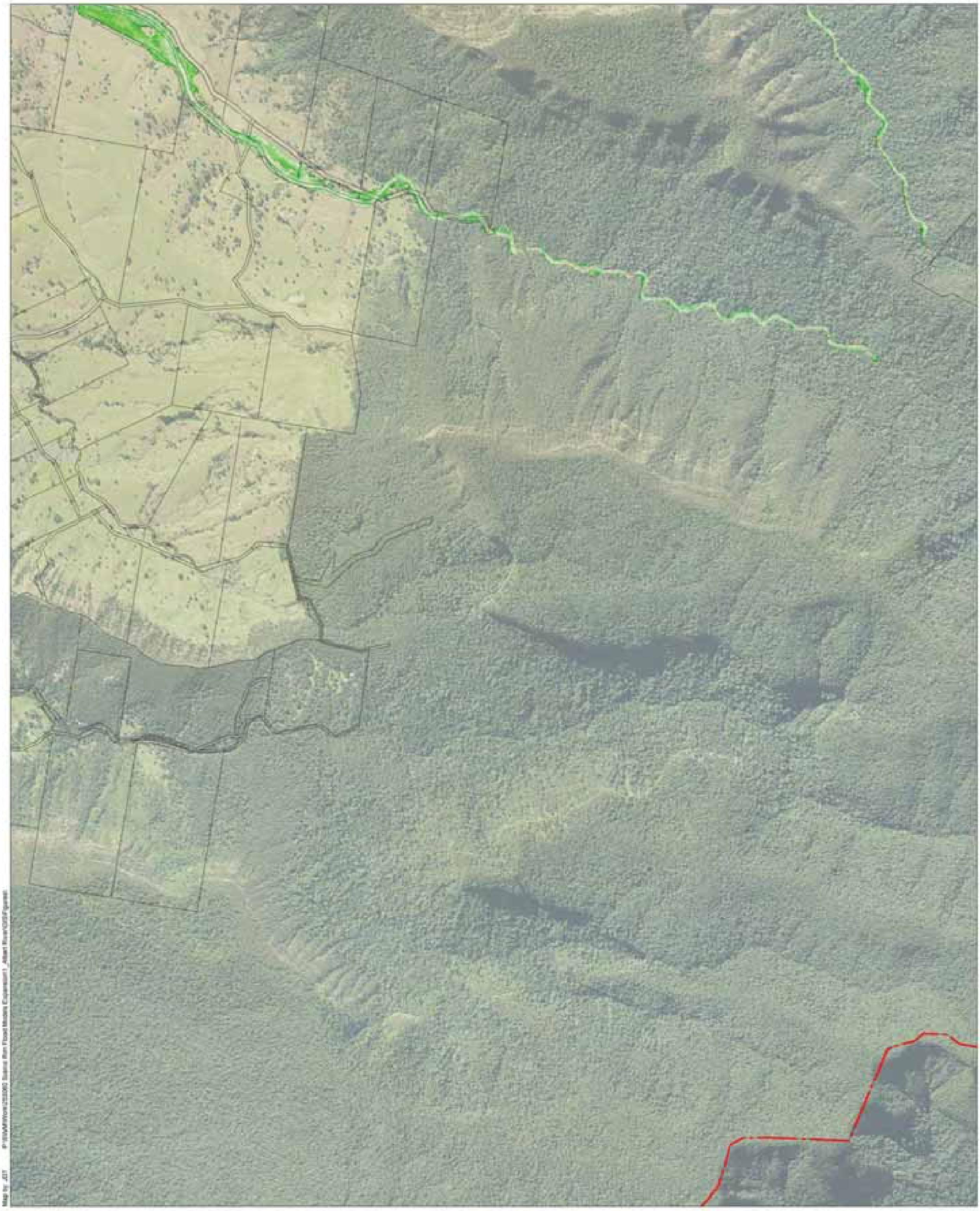
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2**

5% AEP Event - Peak Velocities

aurecon



Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-a**

5% 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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-b**

5% AEP Event - Peak Velocities

aurecon

Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

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

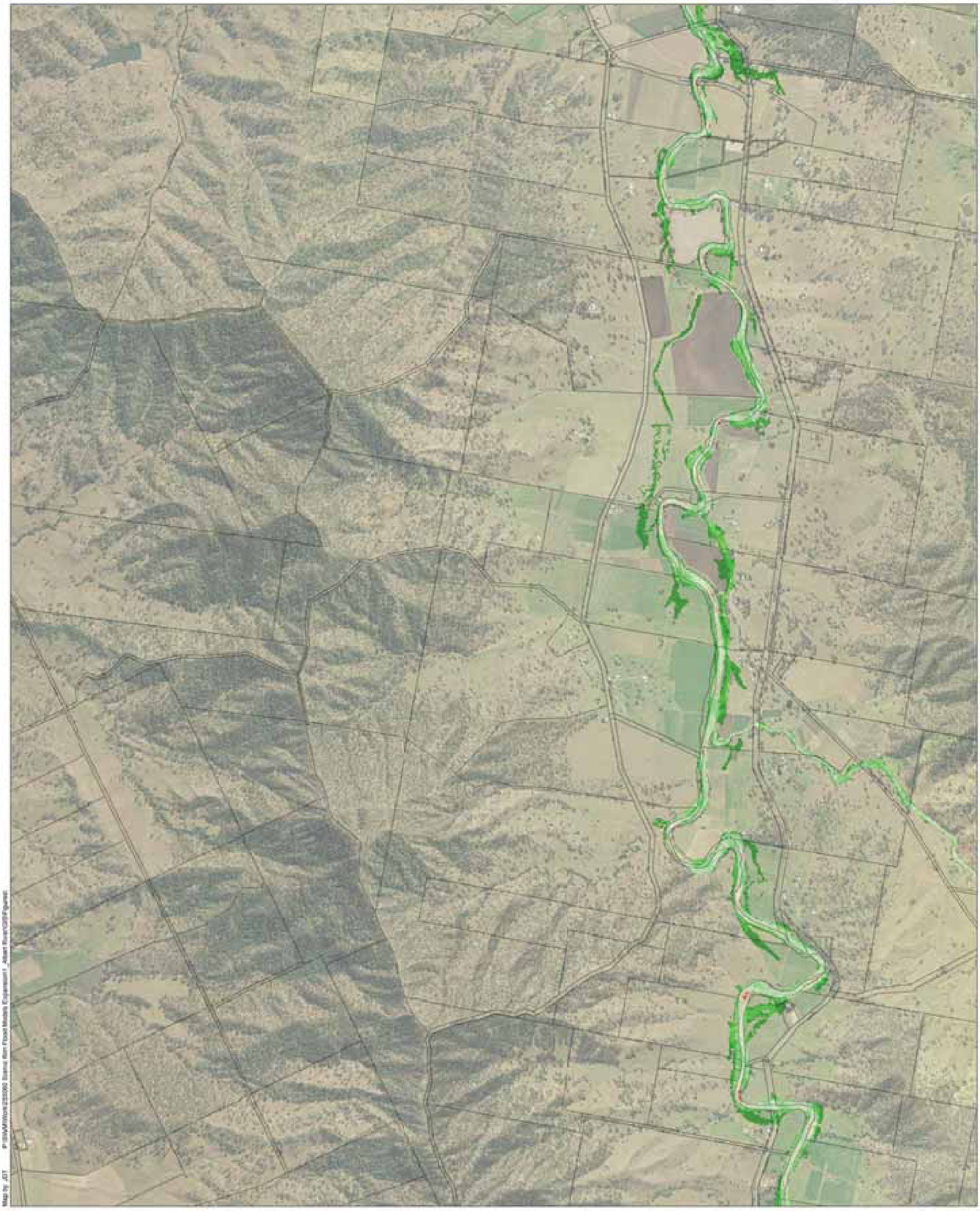
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-c**

5% AEP Event - Peak Velocities



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

- 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

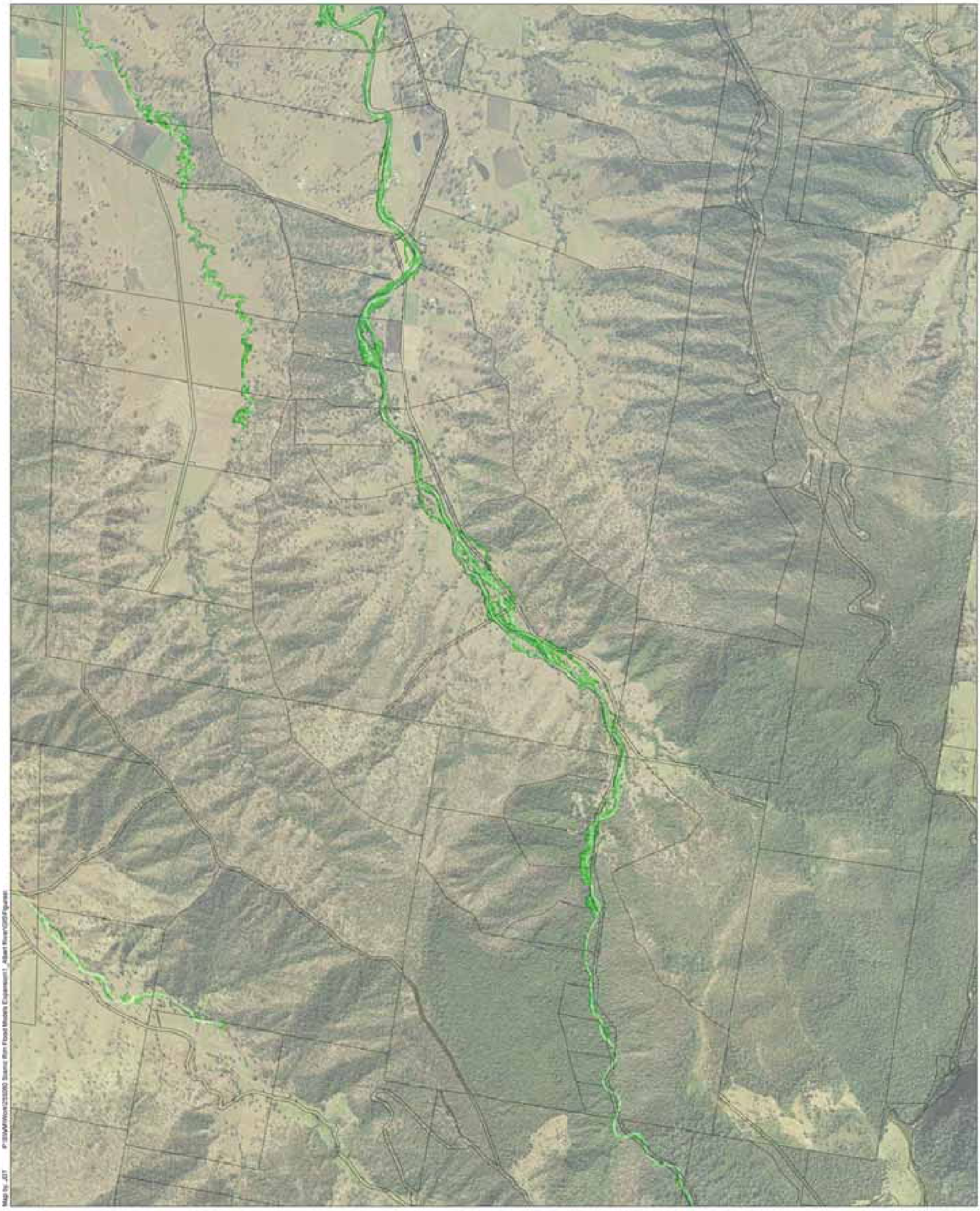
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-d**

5% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary	0.0 to 0.5
Cadastral Boundary	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

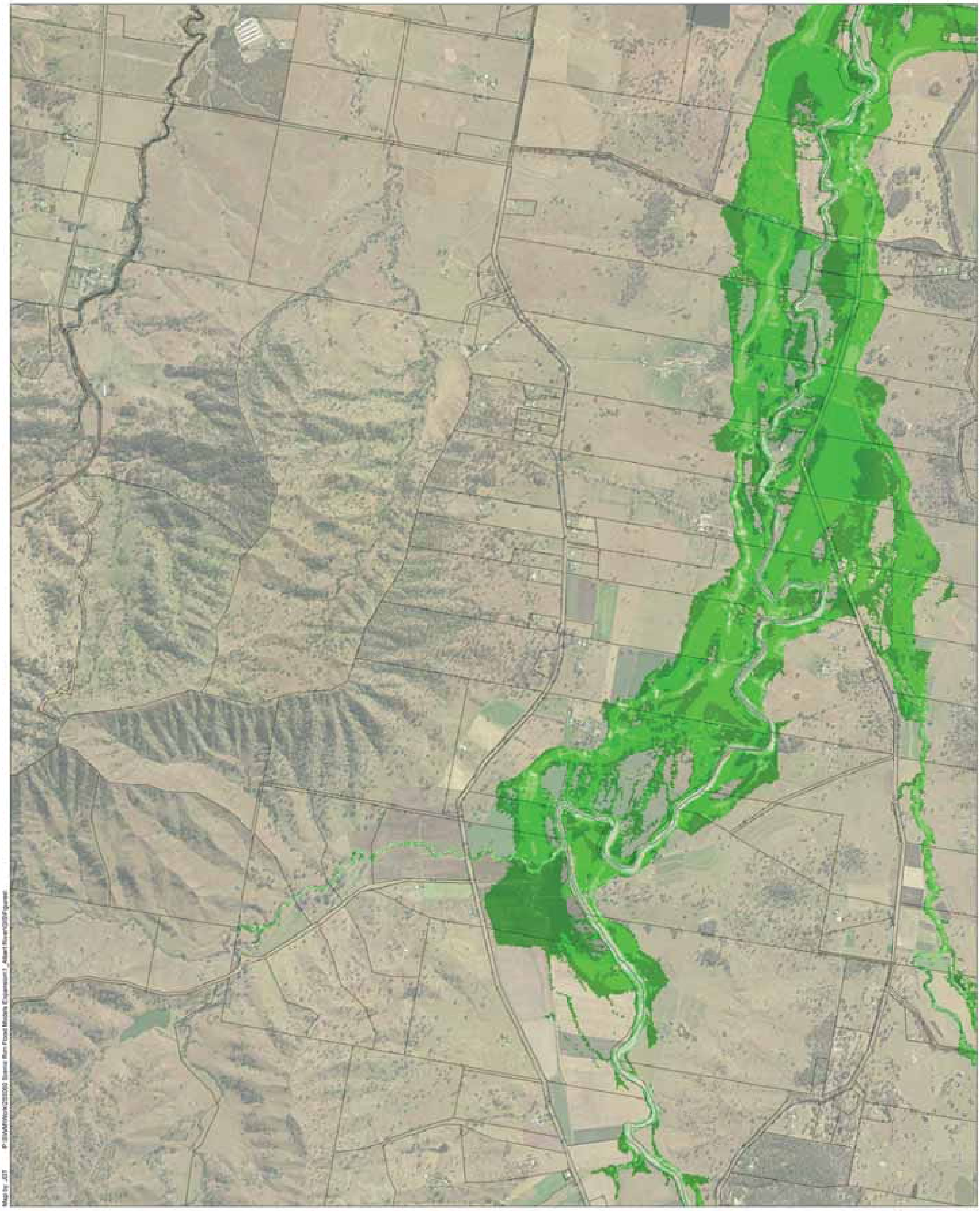
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-e**

5% AEP Event - Peak Velocities

aurecon



Legend

	Velocity (m/s)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

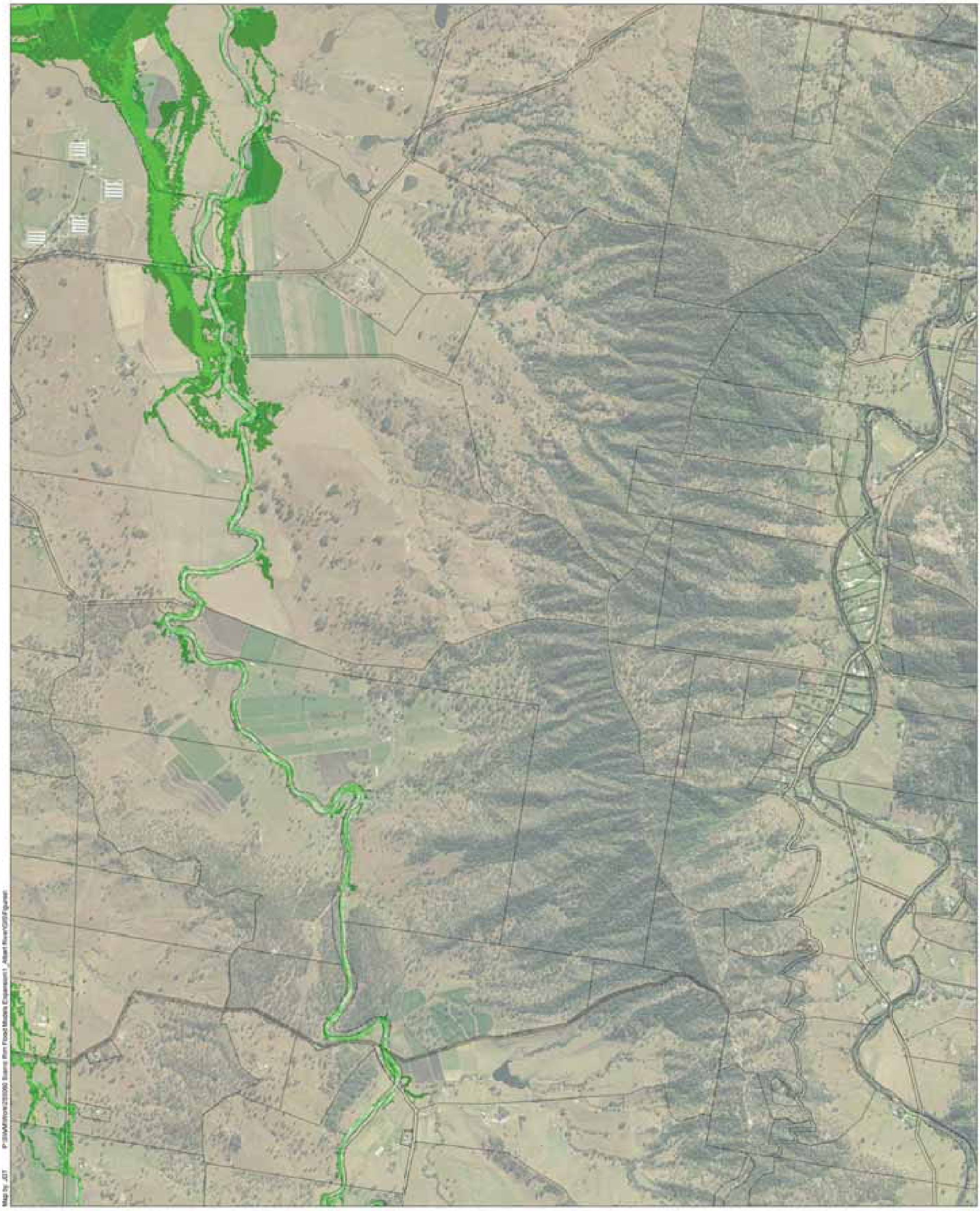
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-f**

5% AEP Event - Peak Velocities



Legend

Velocity (m/s)

SRRC Boundary	
Cadastral Boundary	

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

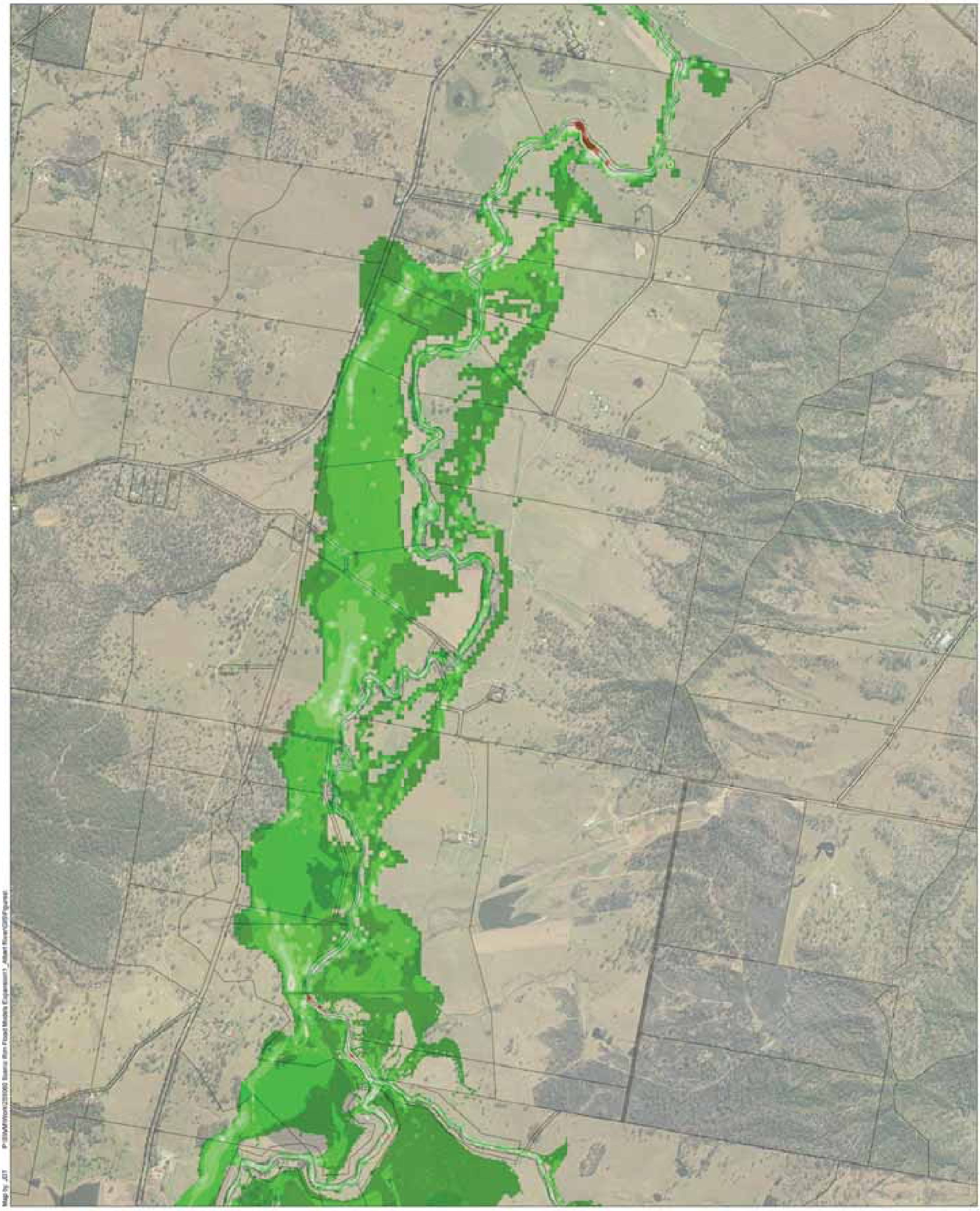
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-g**

5% 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

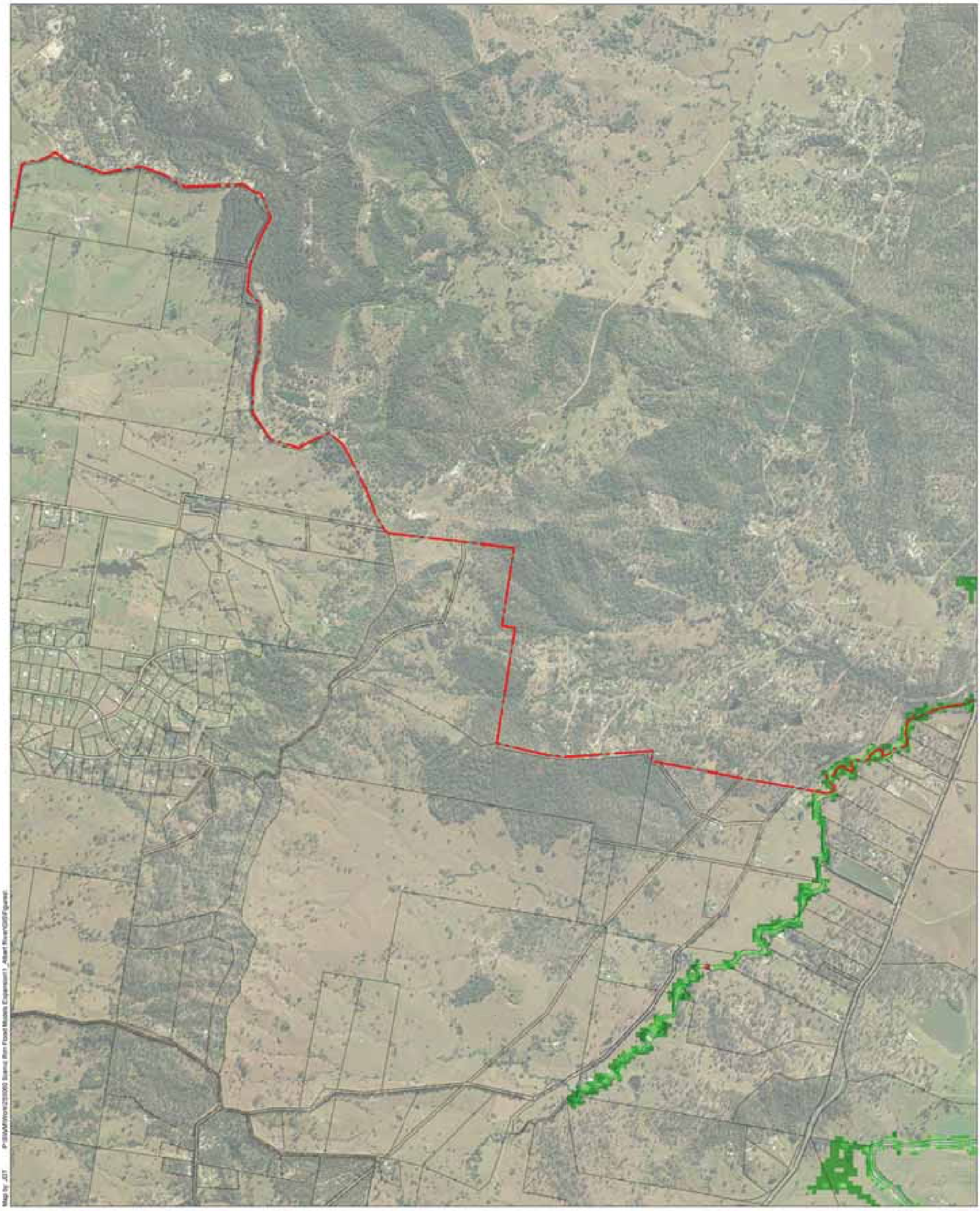
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-h**

5% AEP Event - Peak Velocities

aurecon



Legend

	Velocity (m/s)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

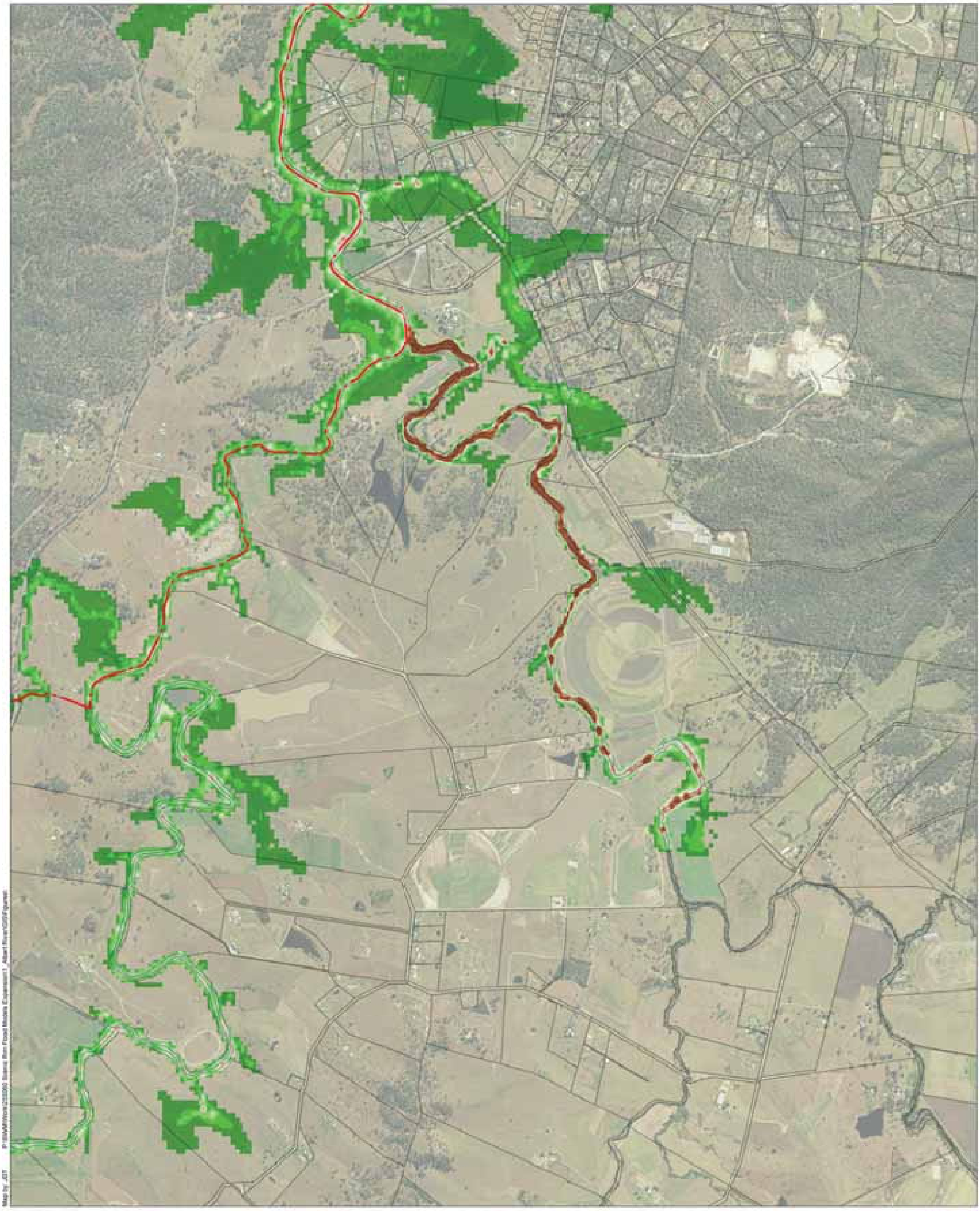
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-i**

5% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

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

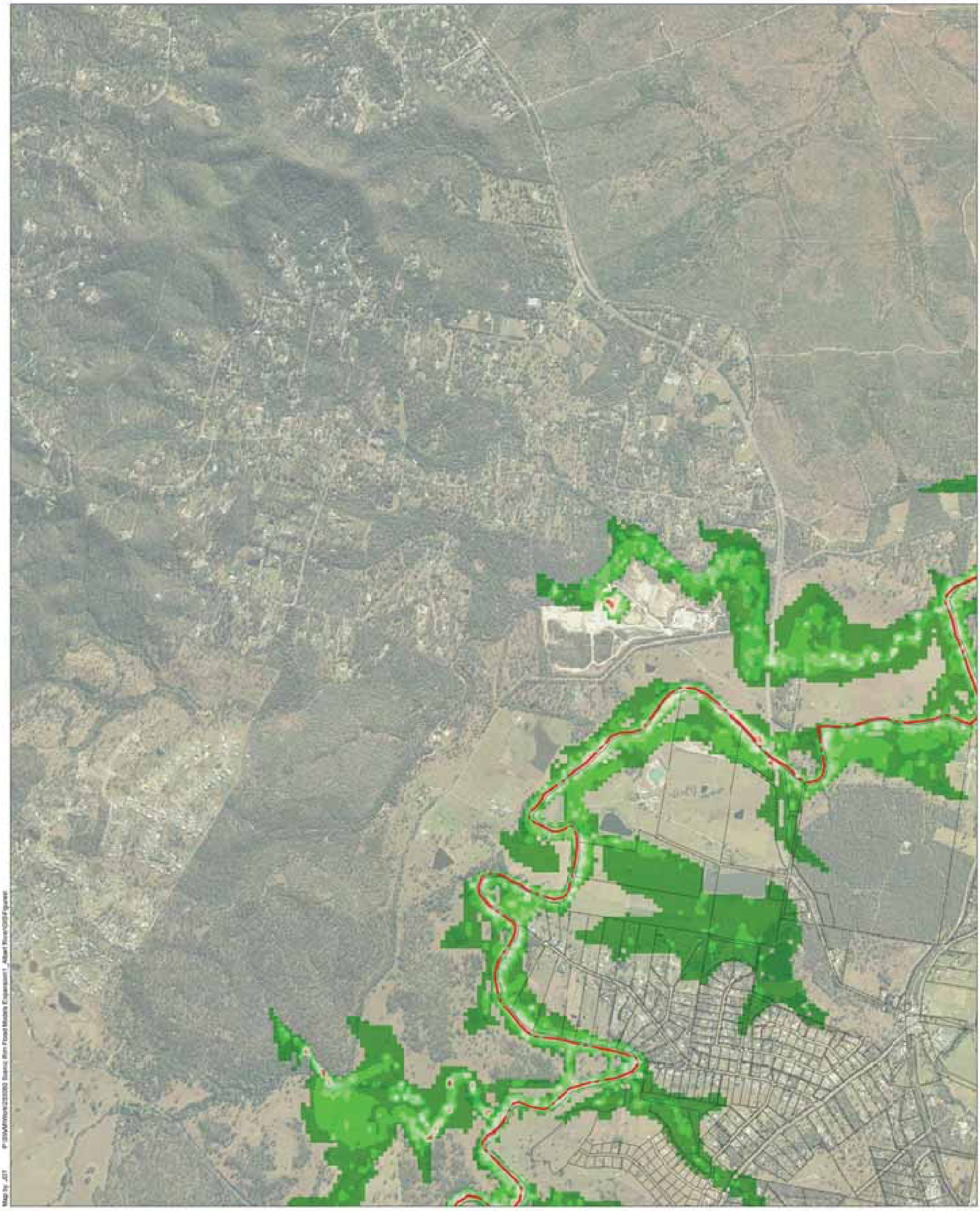
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-j**

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

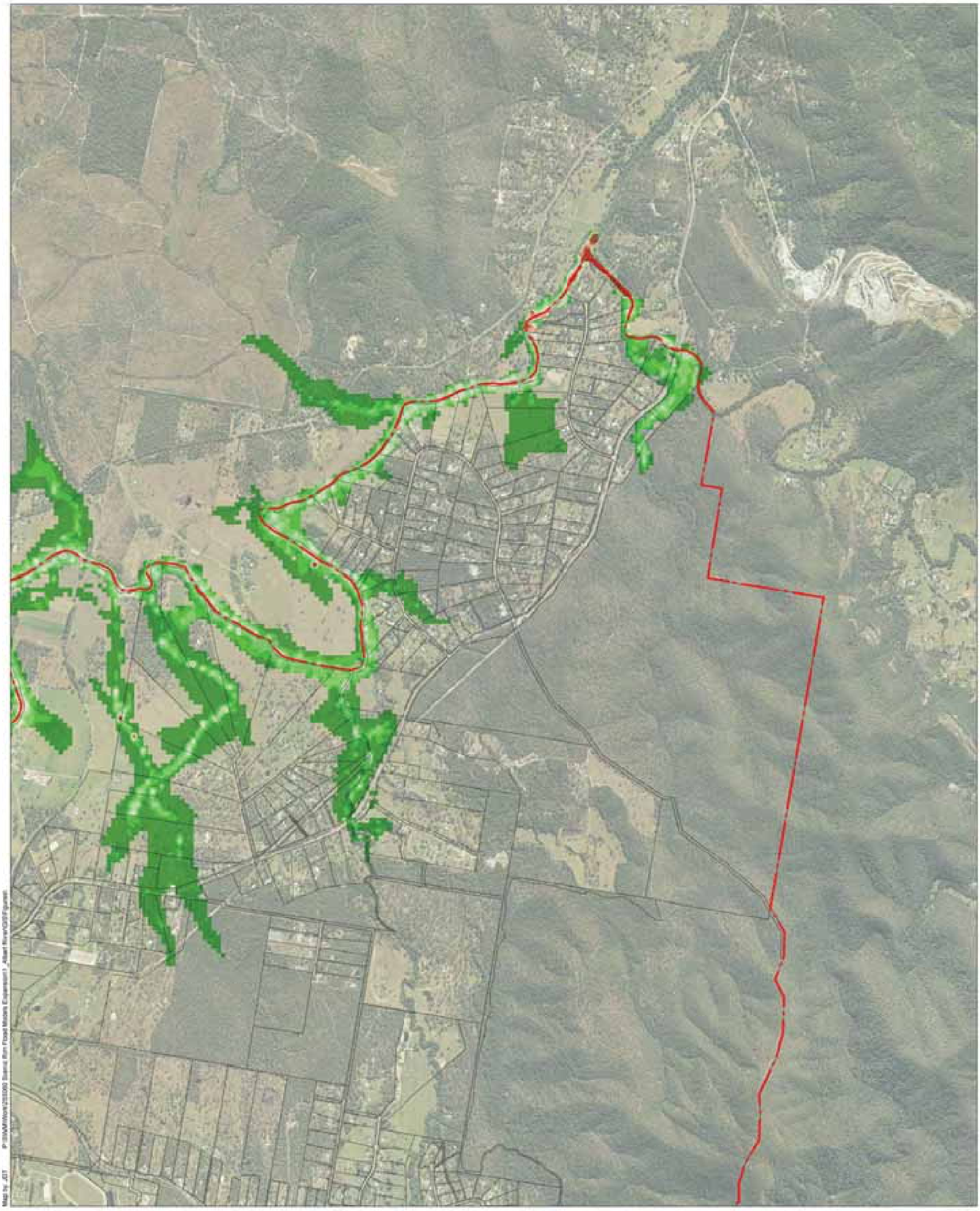
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-k**

5% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary	Velocity (m/s)	
Cadastral Boundary	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:

1:25,001

0 626 m 1,250 m

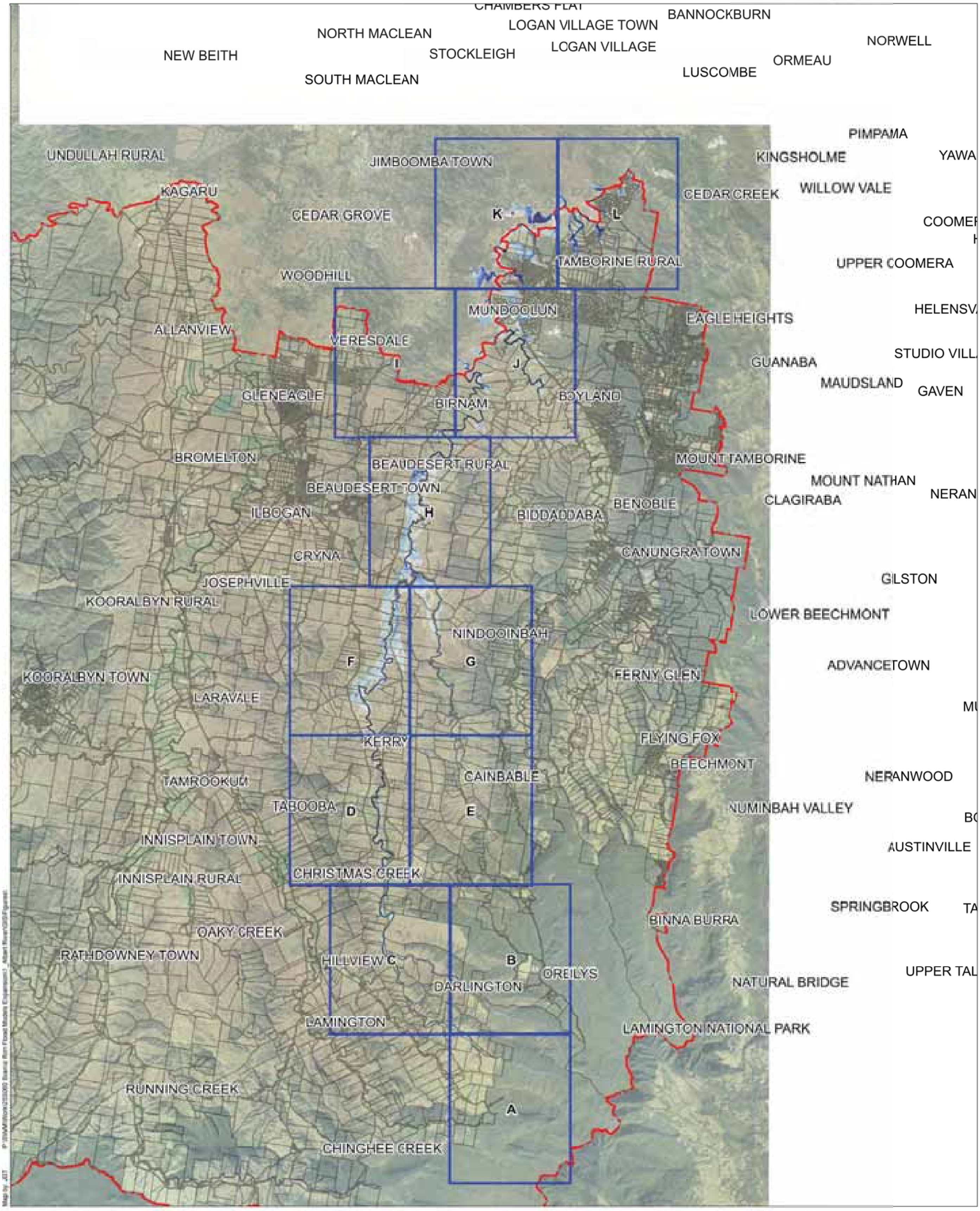
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D2-I**

5% AEP Event - Peak Velocities

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:

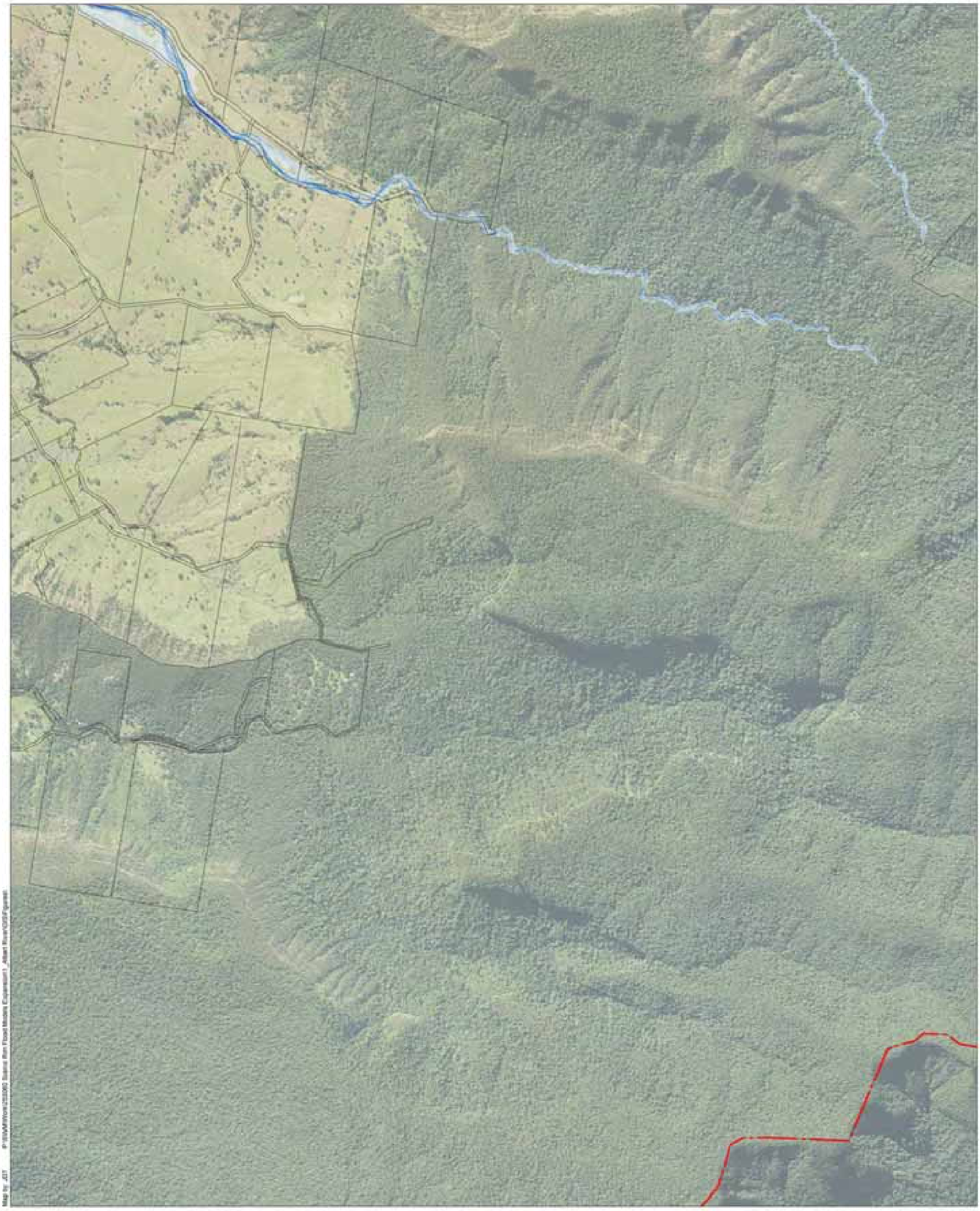
1:200,000
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River 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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study

Figure D3-a

5% AEP Event - Peak Depth Map

aurecon

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

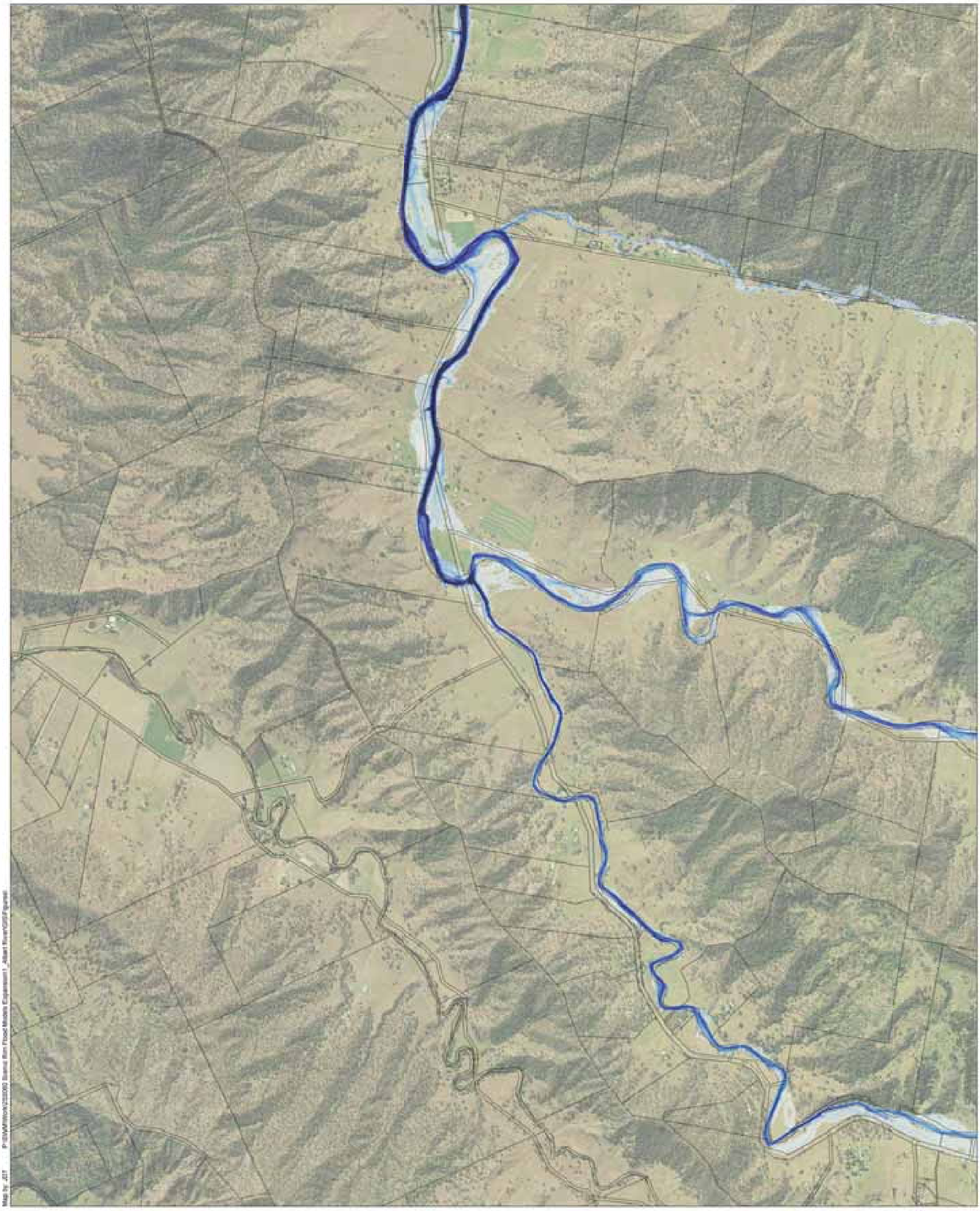
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-b**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

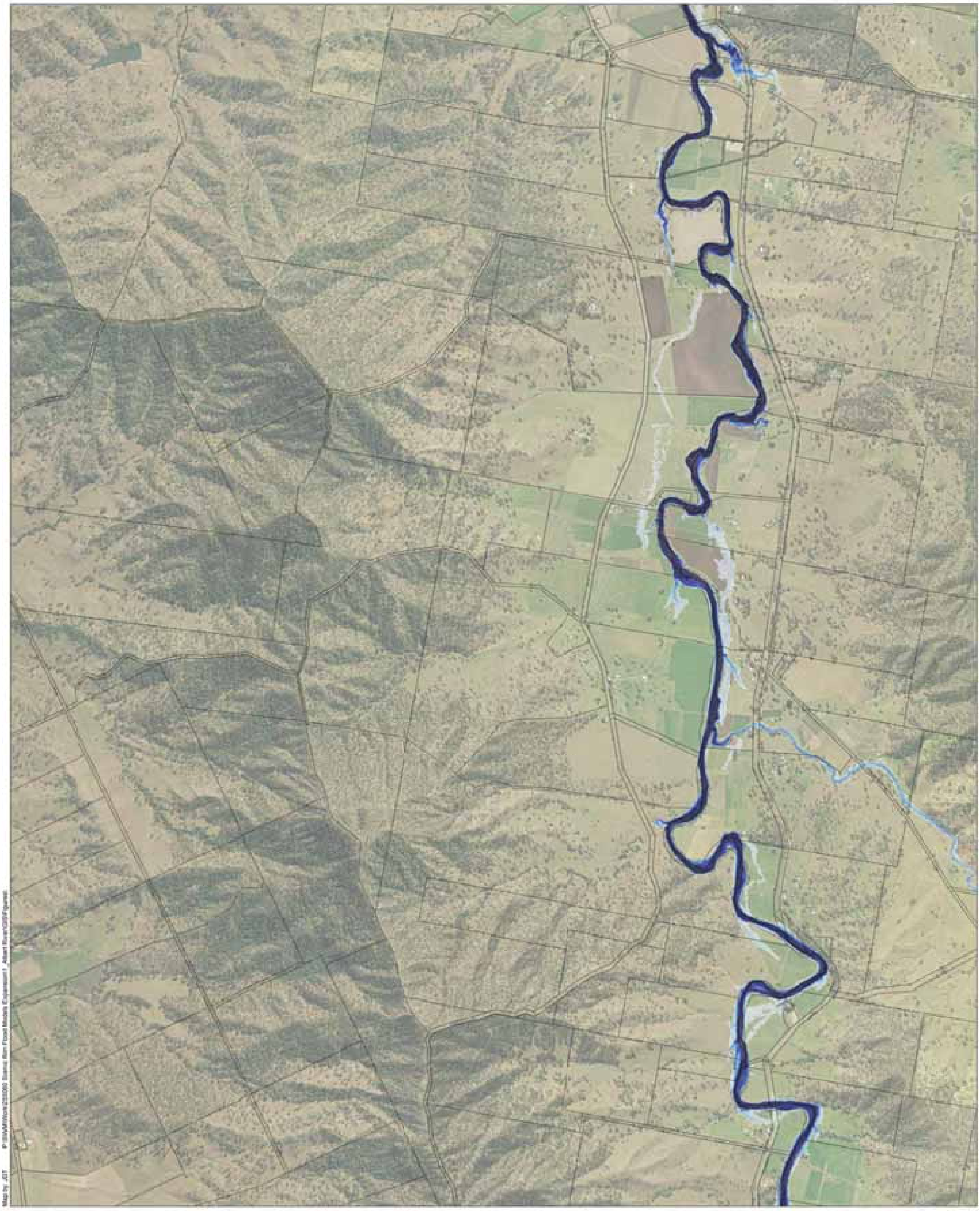
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-c**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

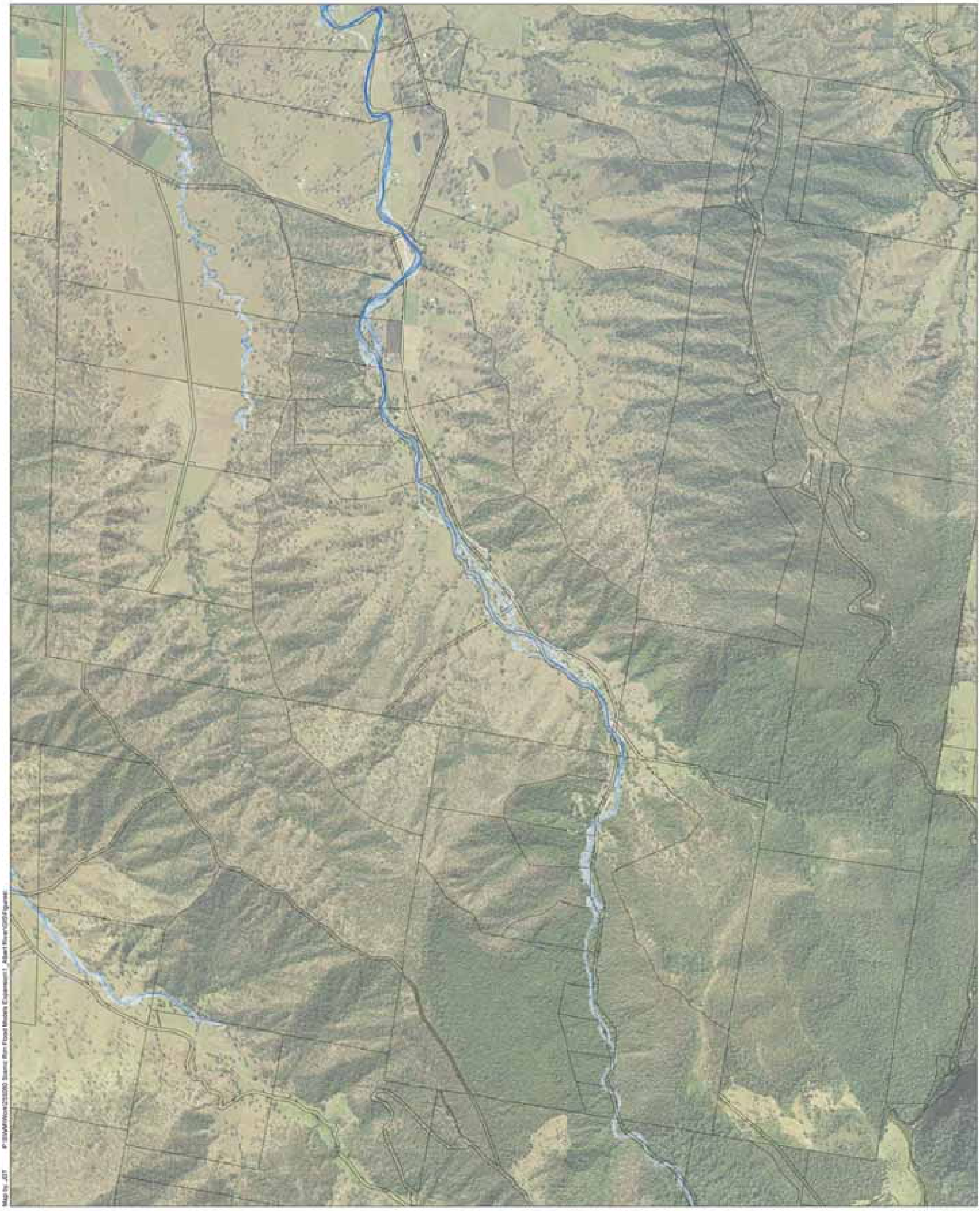
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure D3-d

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

- SRRC Boundary
- Cadastral Boundary
- 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

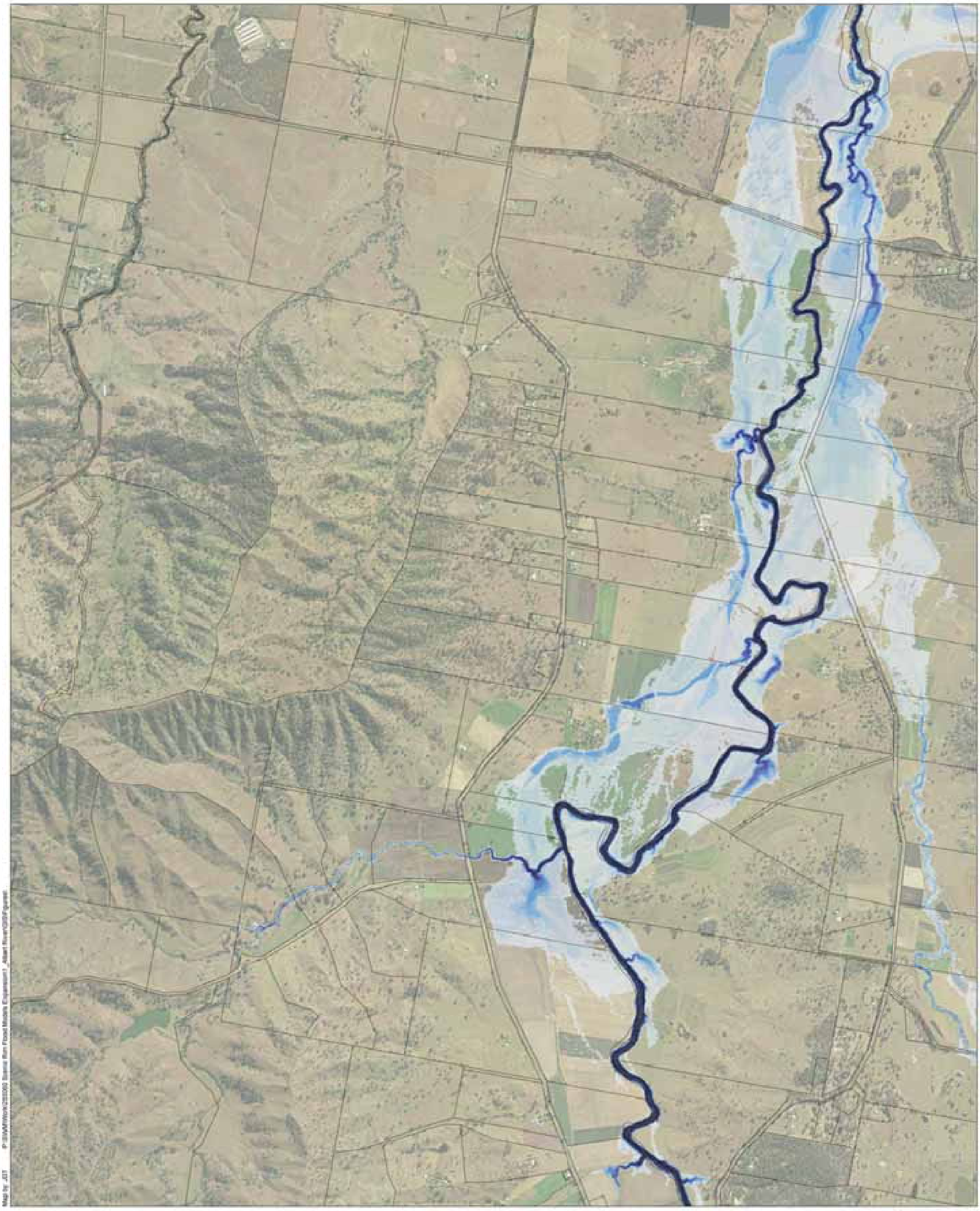
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-e**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

- SRRC Boundary
- Cadastral Boundary

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

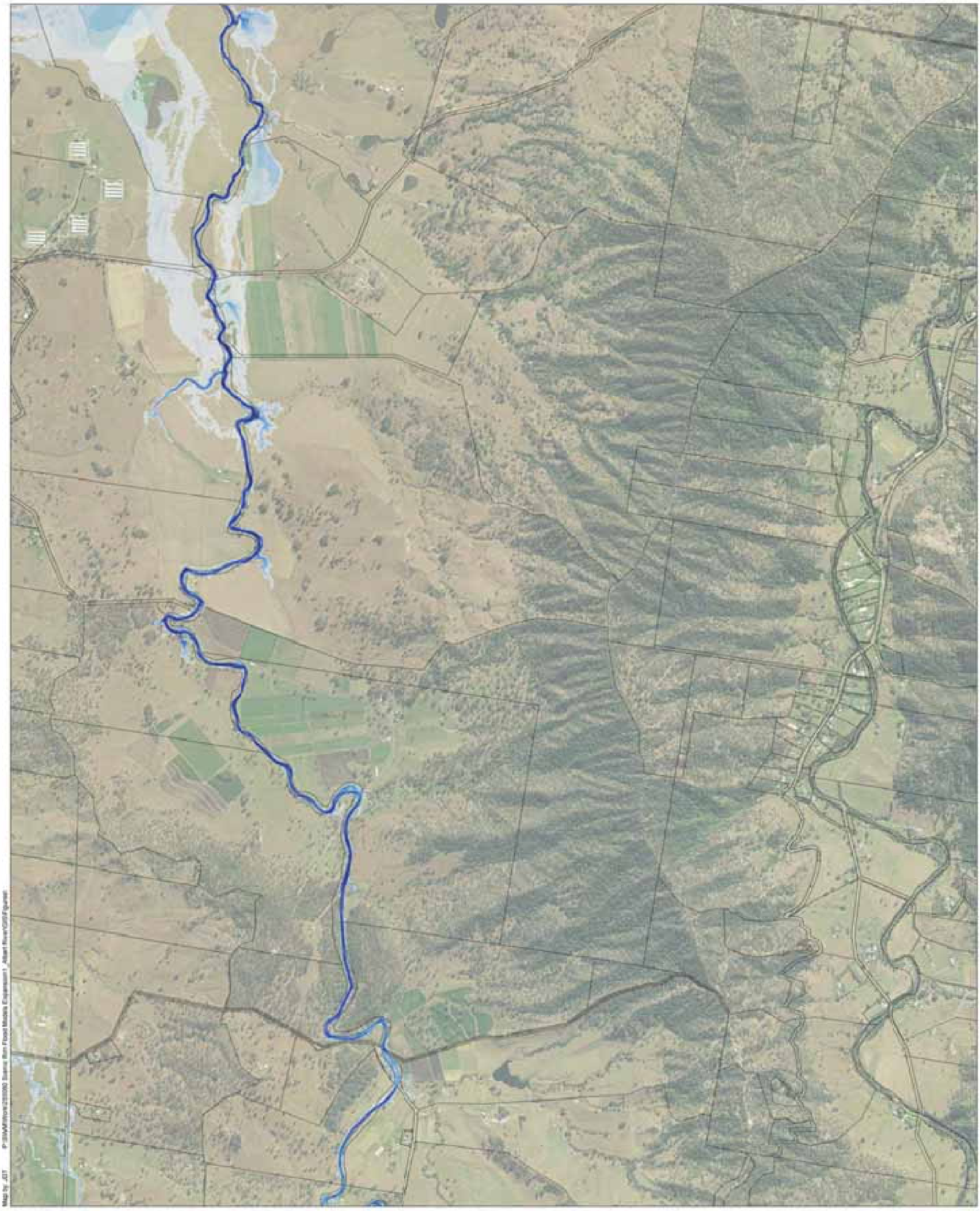
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-f**

5% AEP Event - Peak Depth Map



Legend

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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	

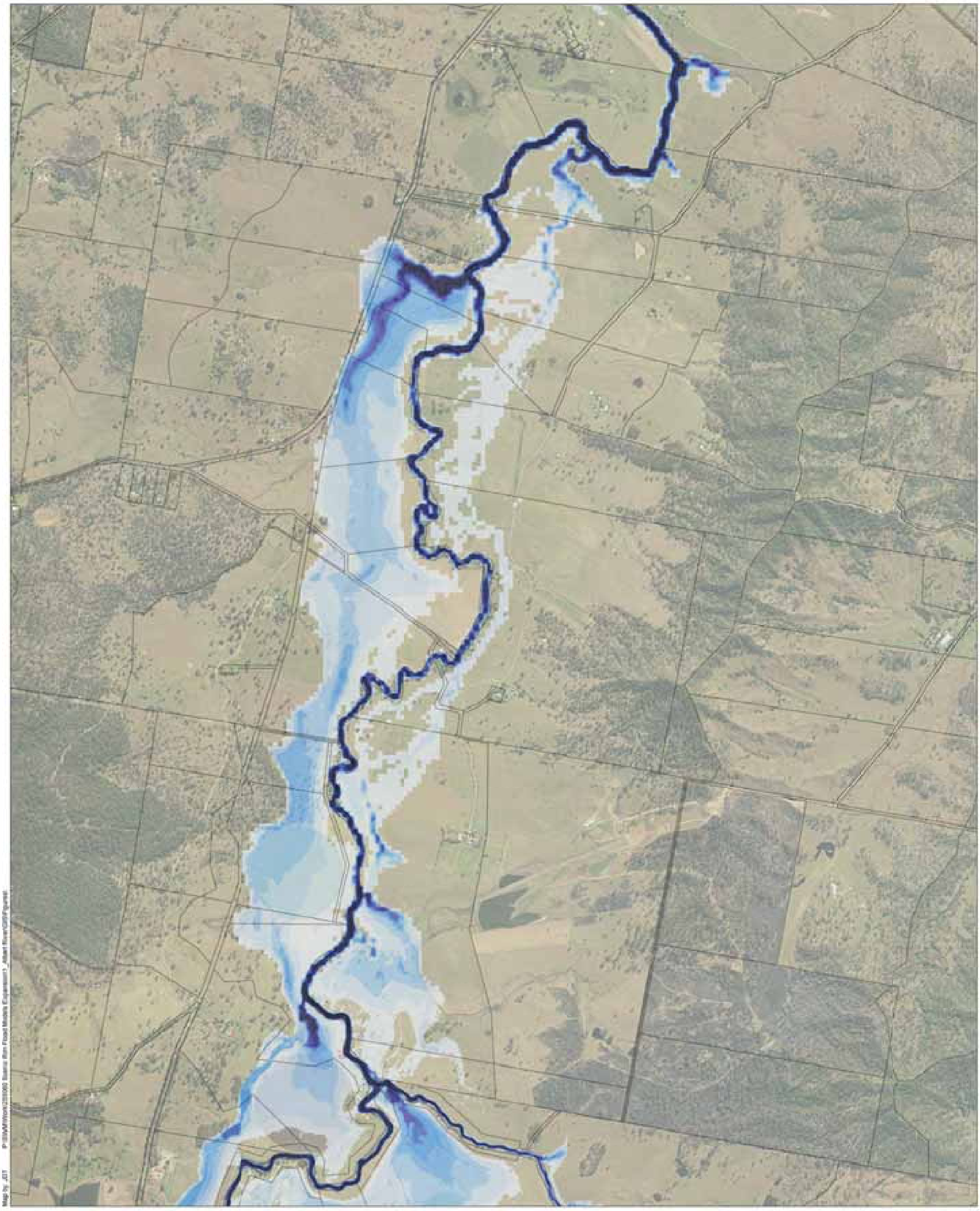
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure D3-g**

5% AEP Event - Peak Depth Map



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

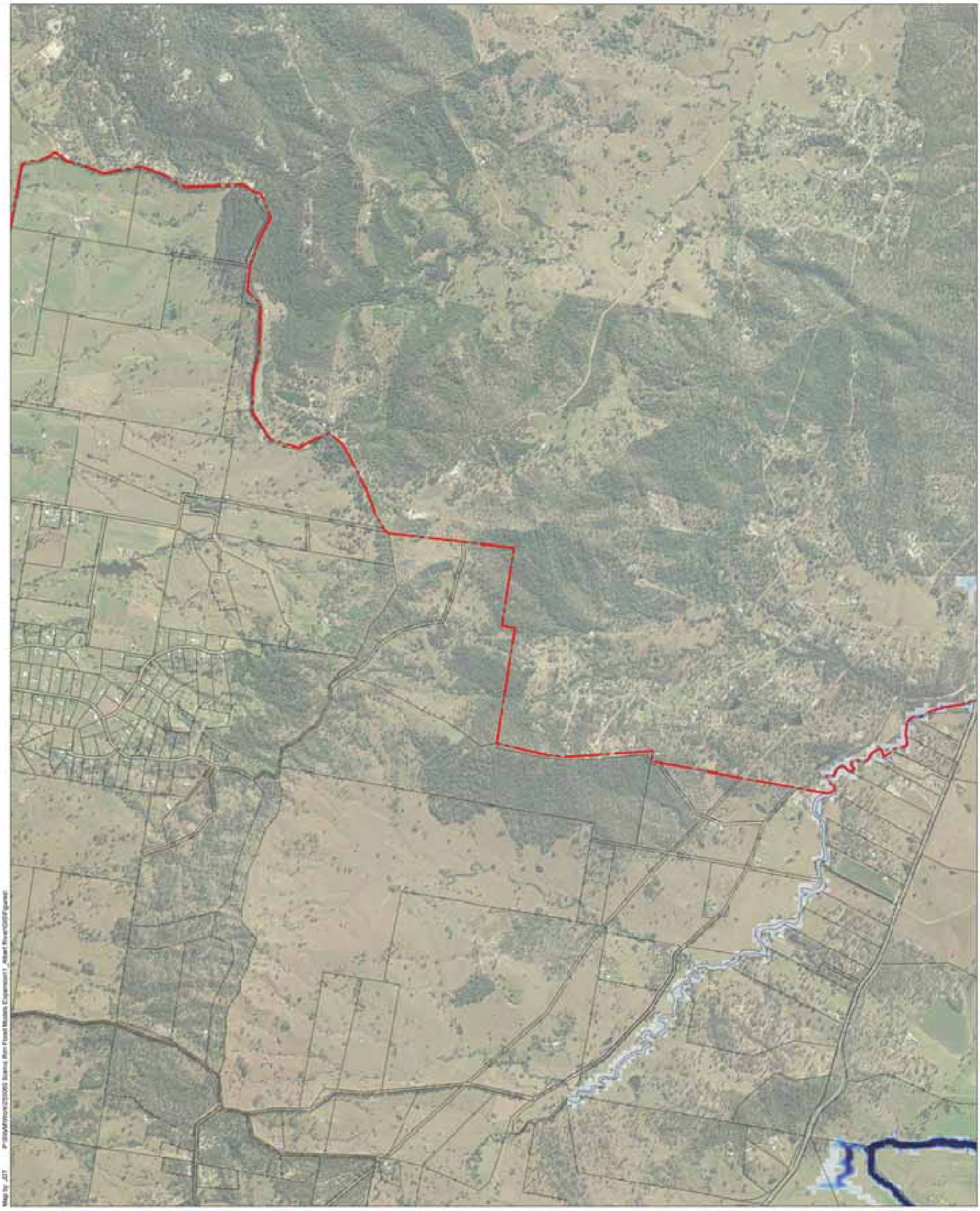
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-h**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

- SRRC Boundary
- Cadastral Boundary

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

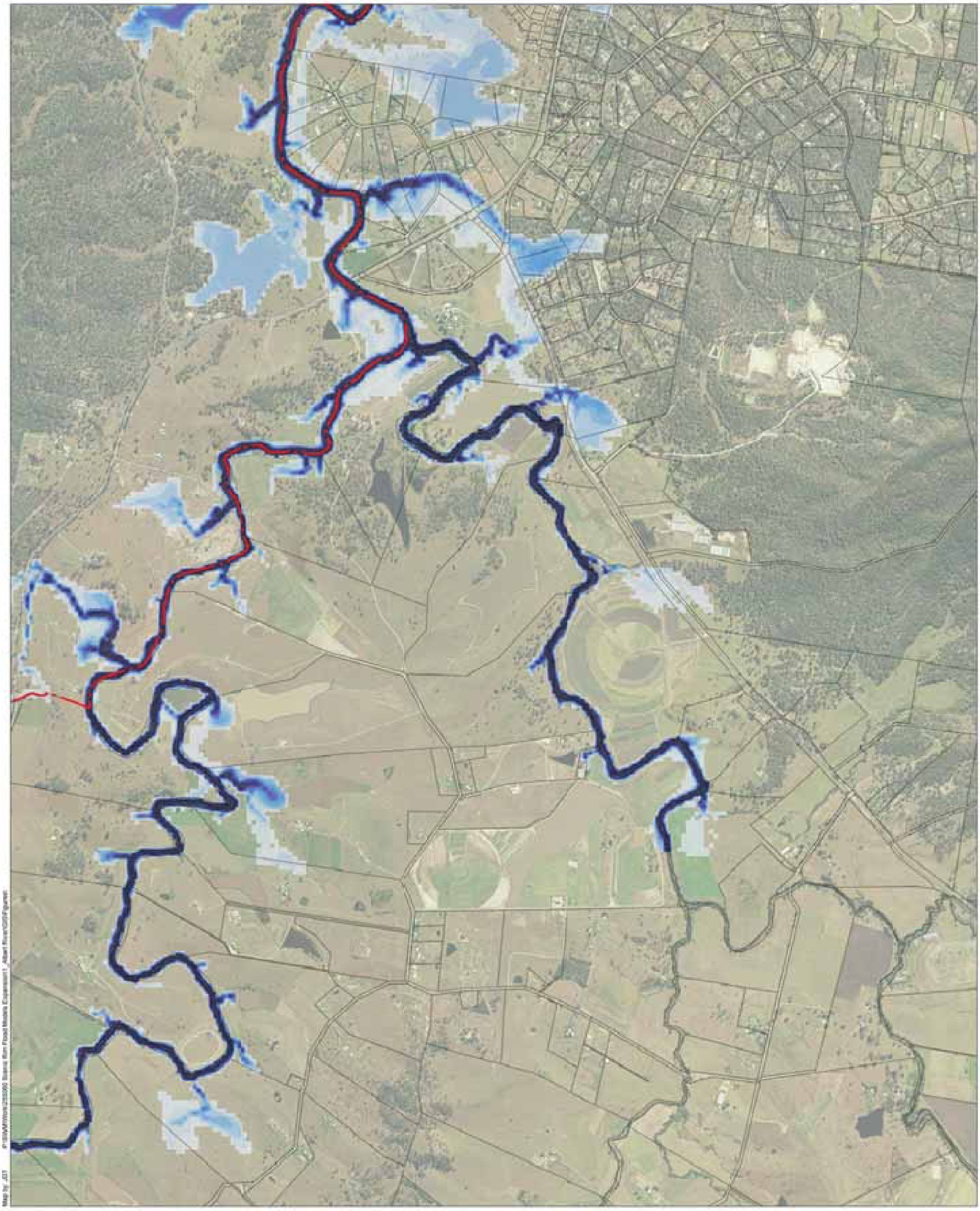
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-i**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5	
Cadastral Boundary	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

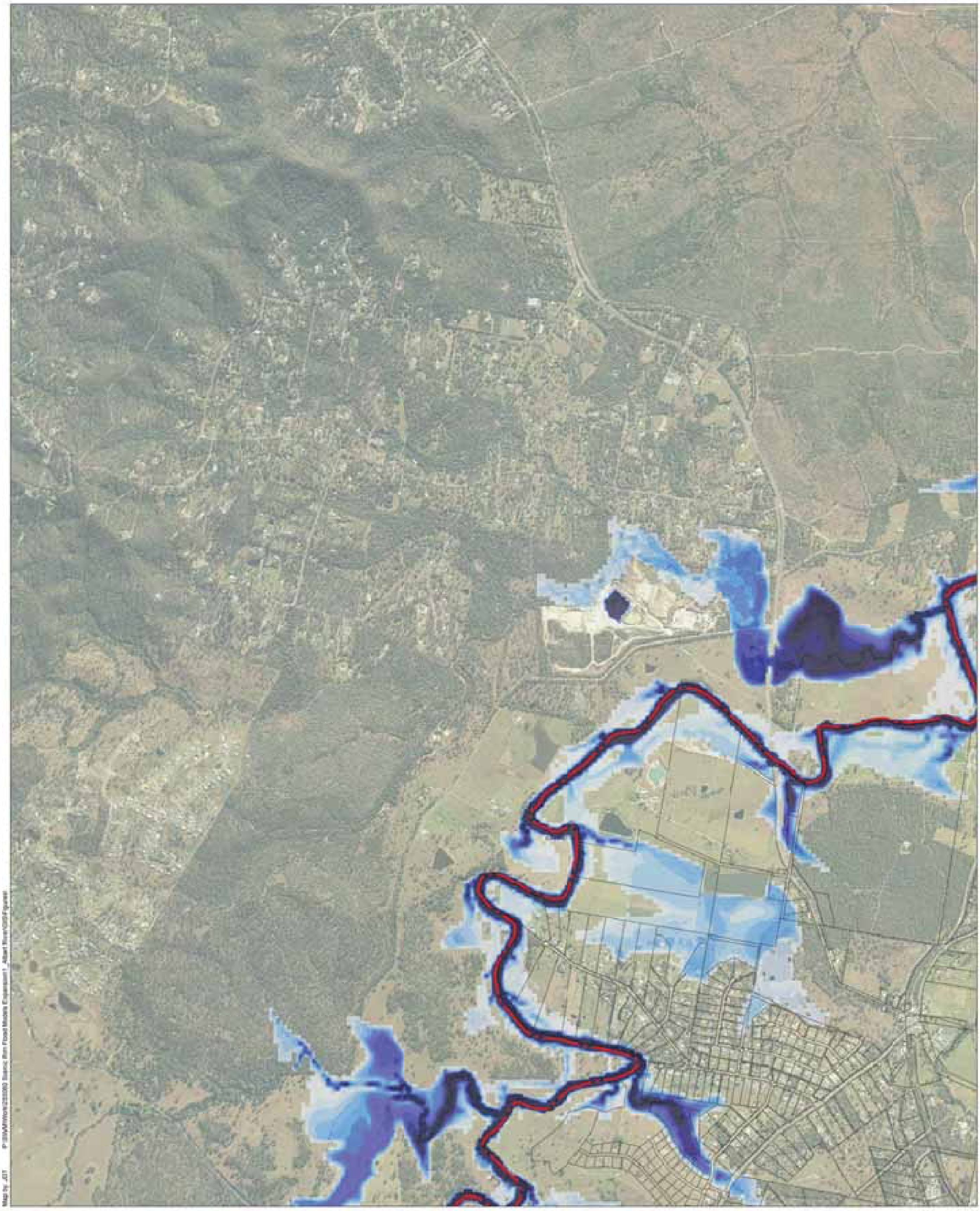
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-j**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

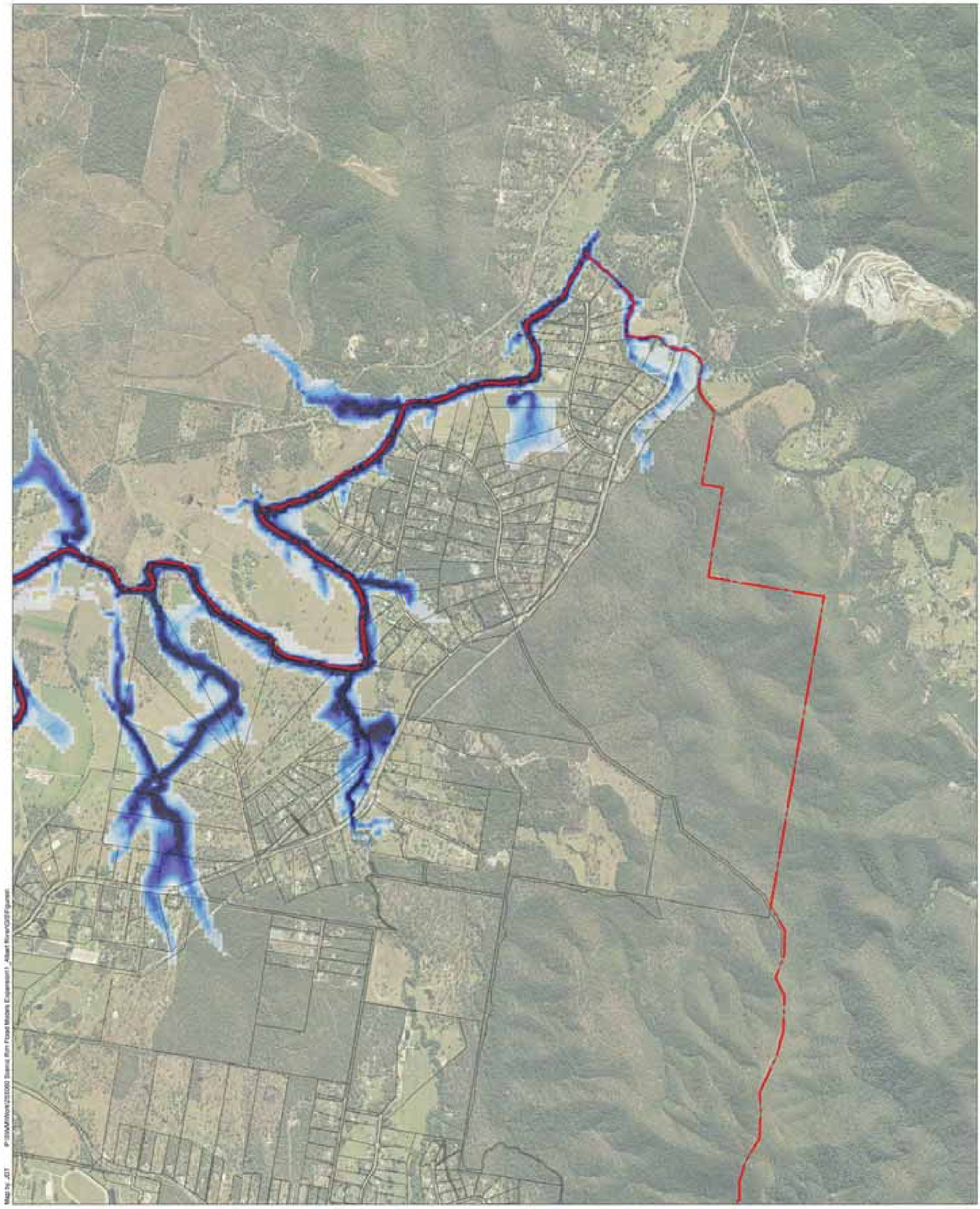
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-k**

5% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5
Cadastral Boundary	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:

1:25,001

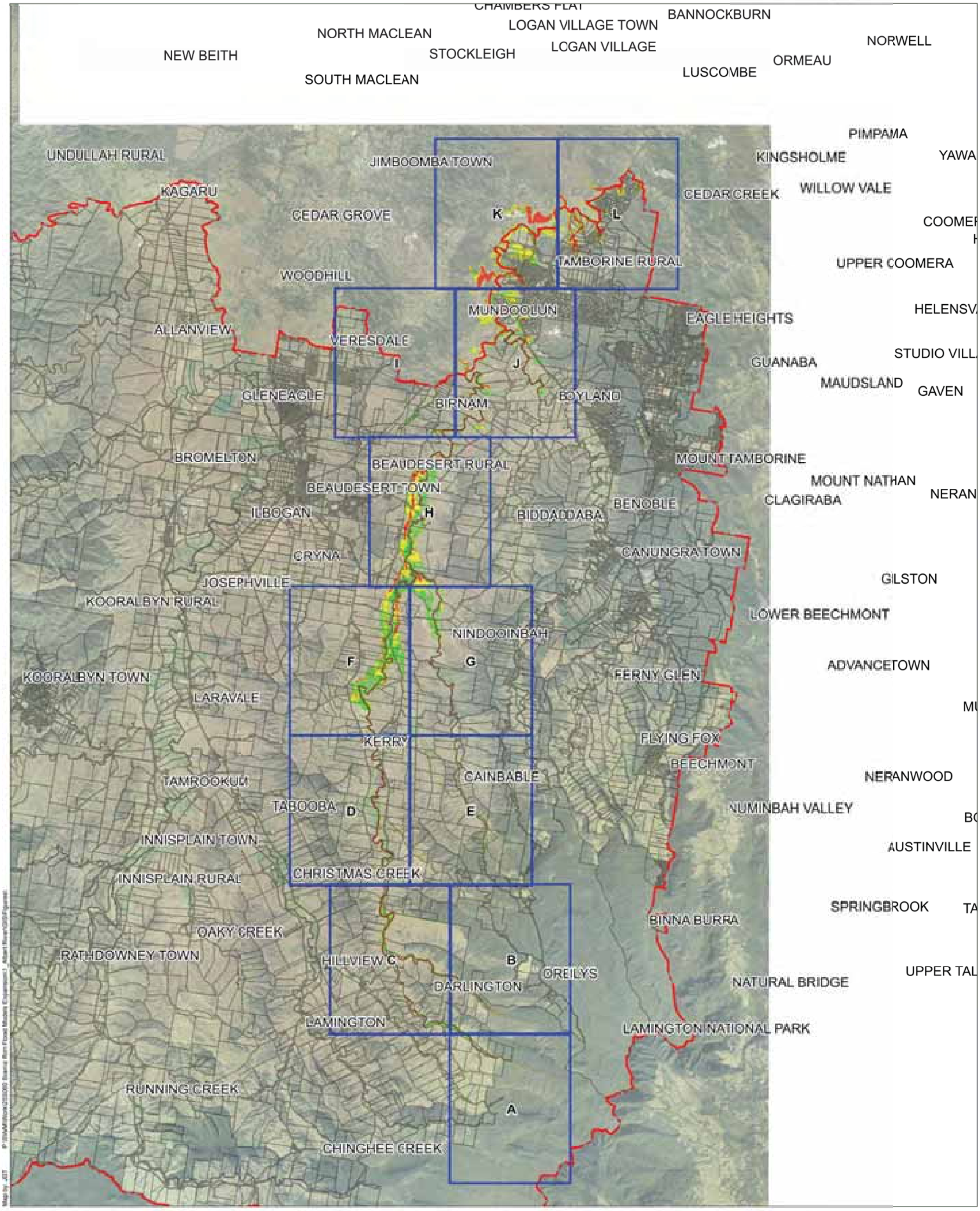
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D3-I**

5% AEP Event - Peak Depth Map



Legend

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

Notes:

1:200,000

0 5,000 m 10,000 m

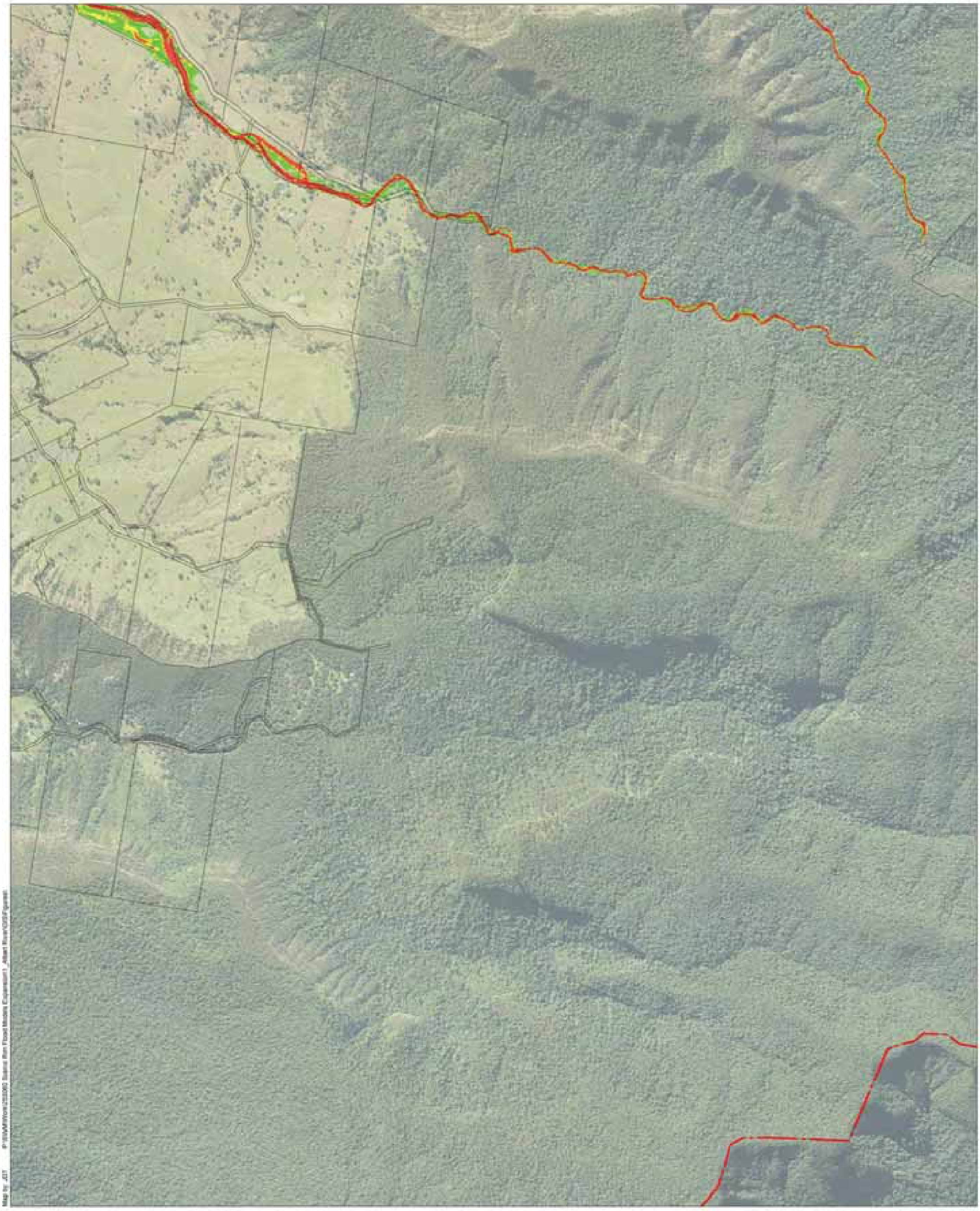
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4**

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: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure D4-a**

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

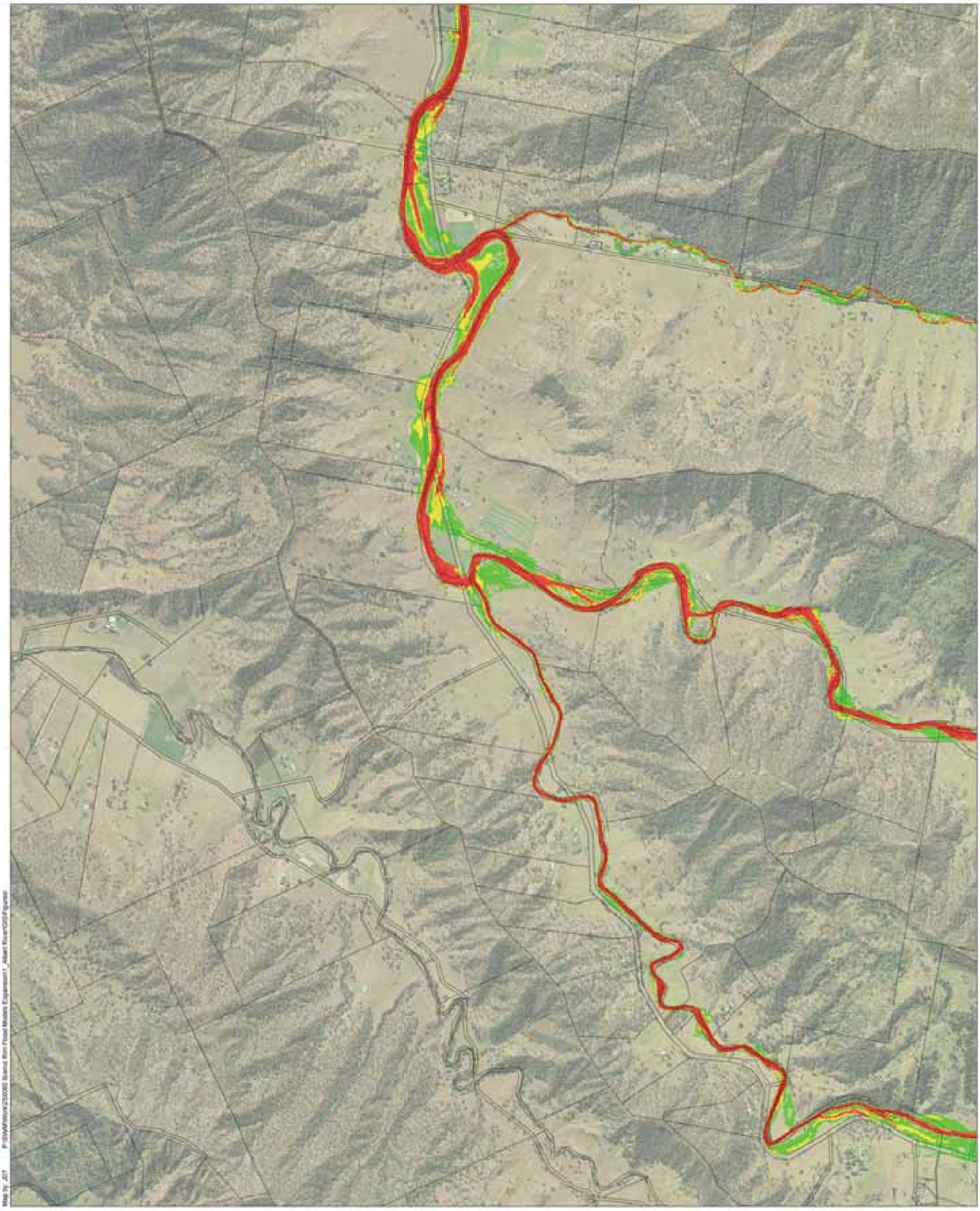
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River 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

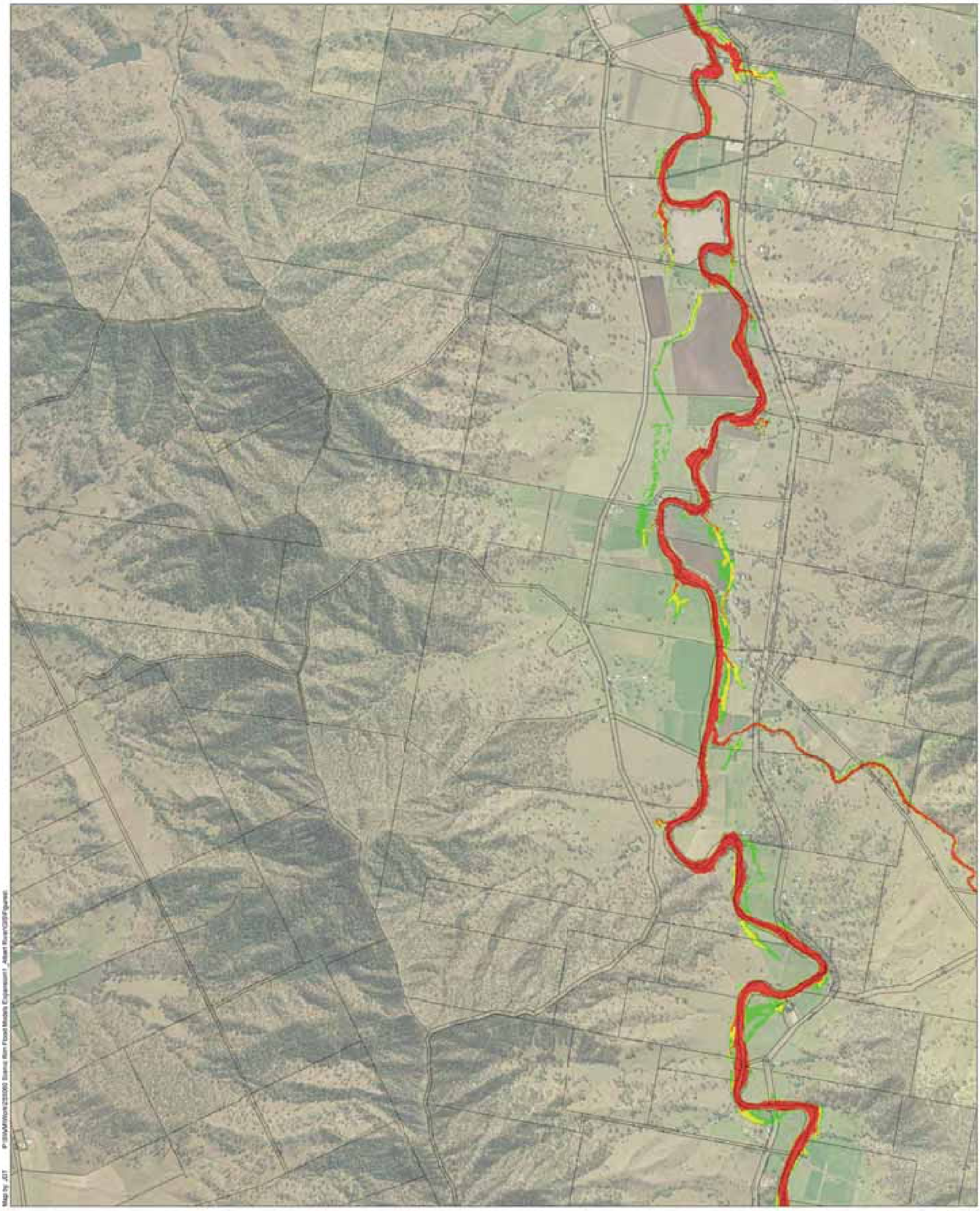
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4-c**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

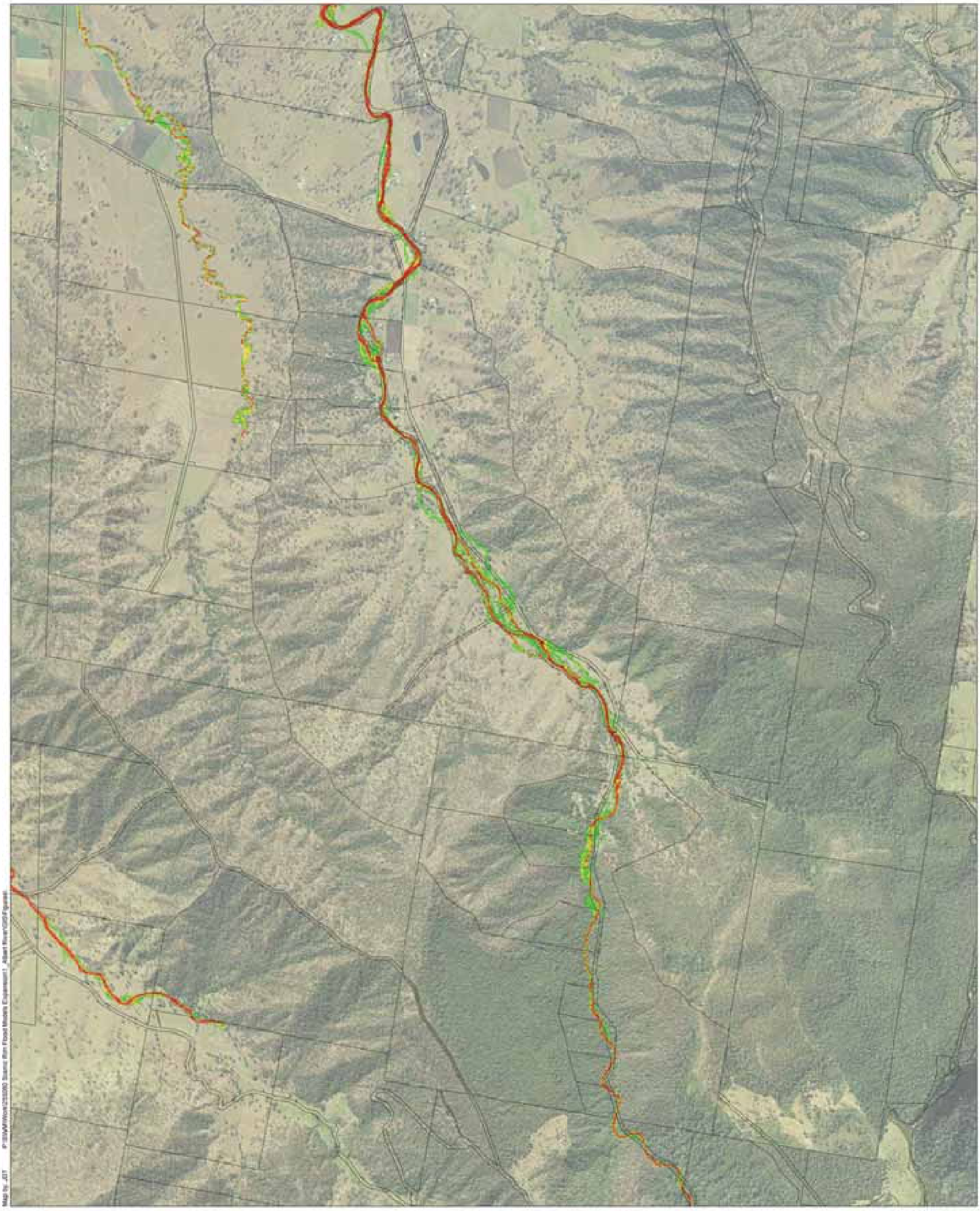
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4-d**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

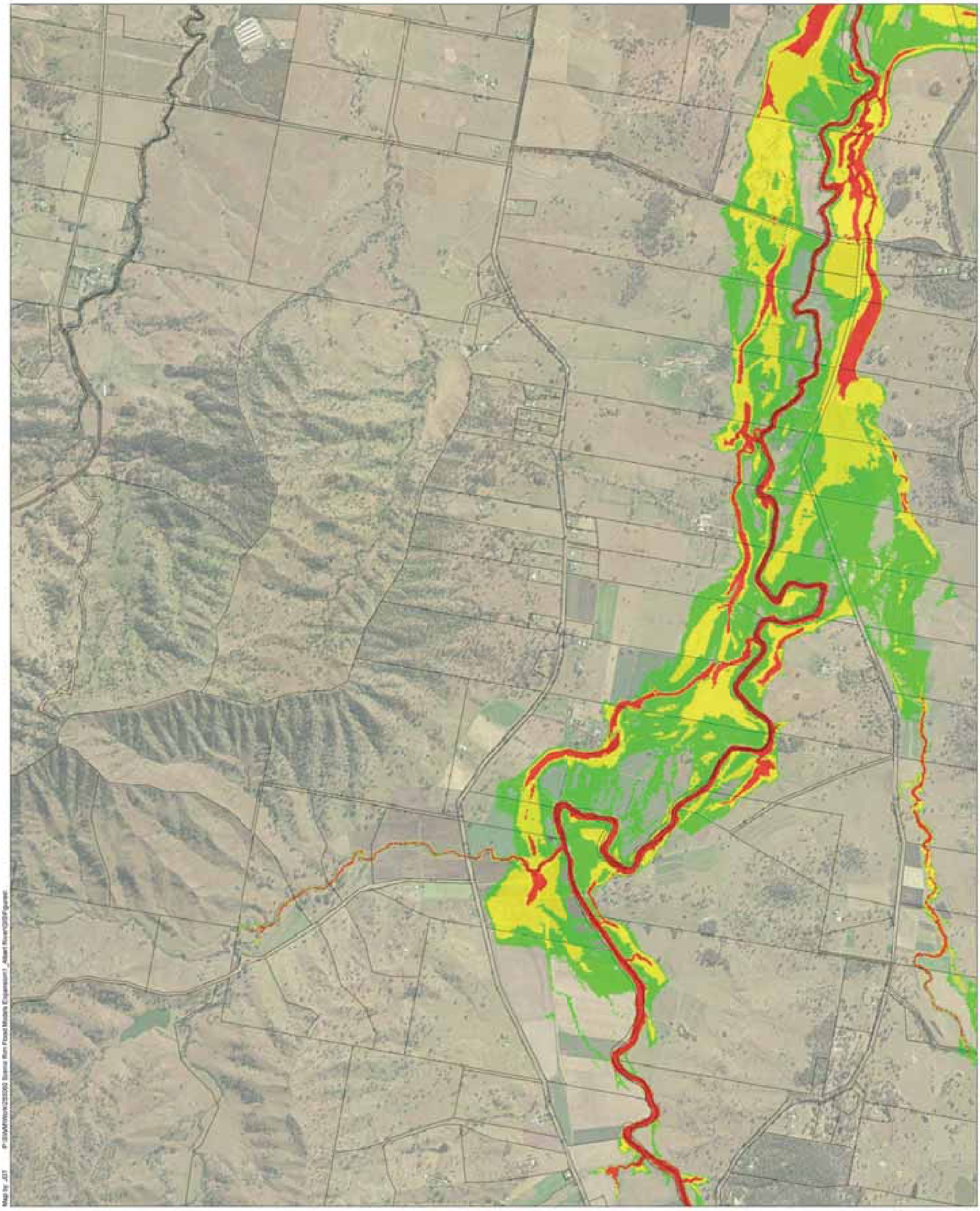
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study
Figure D4-e
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: 11/10/2017 Version: 0 Job No: 255060

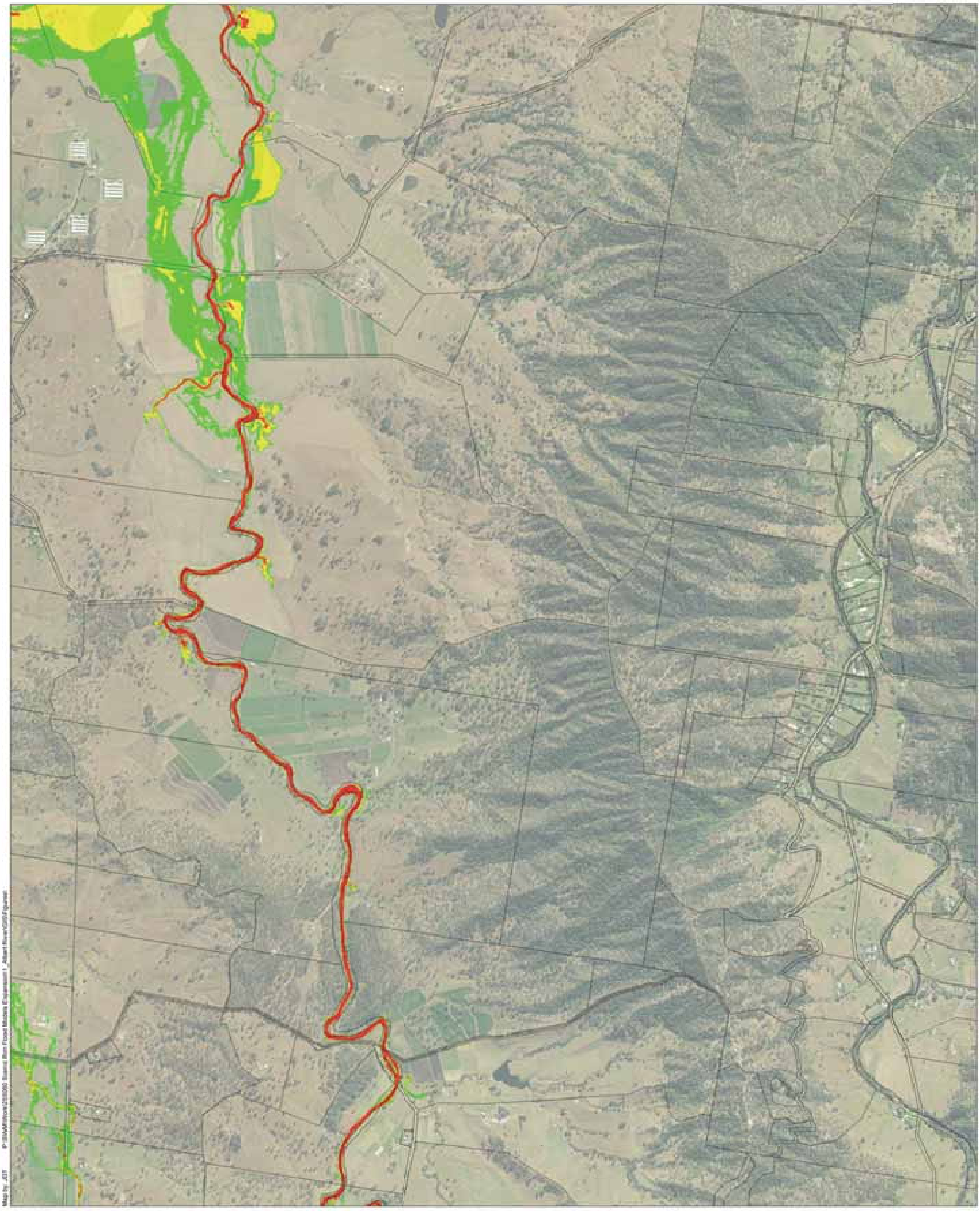
Projection: MGA Zone 56

Albert River Flood Study

Figure D4-f

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

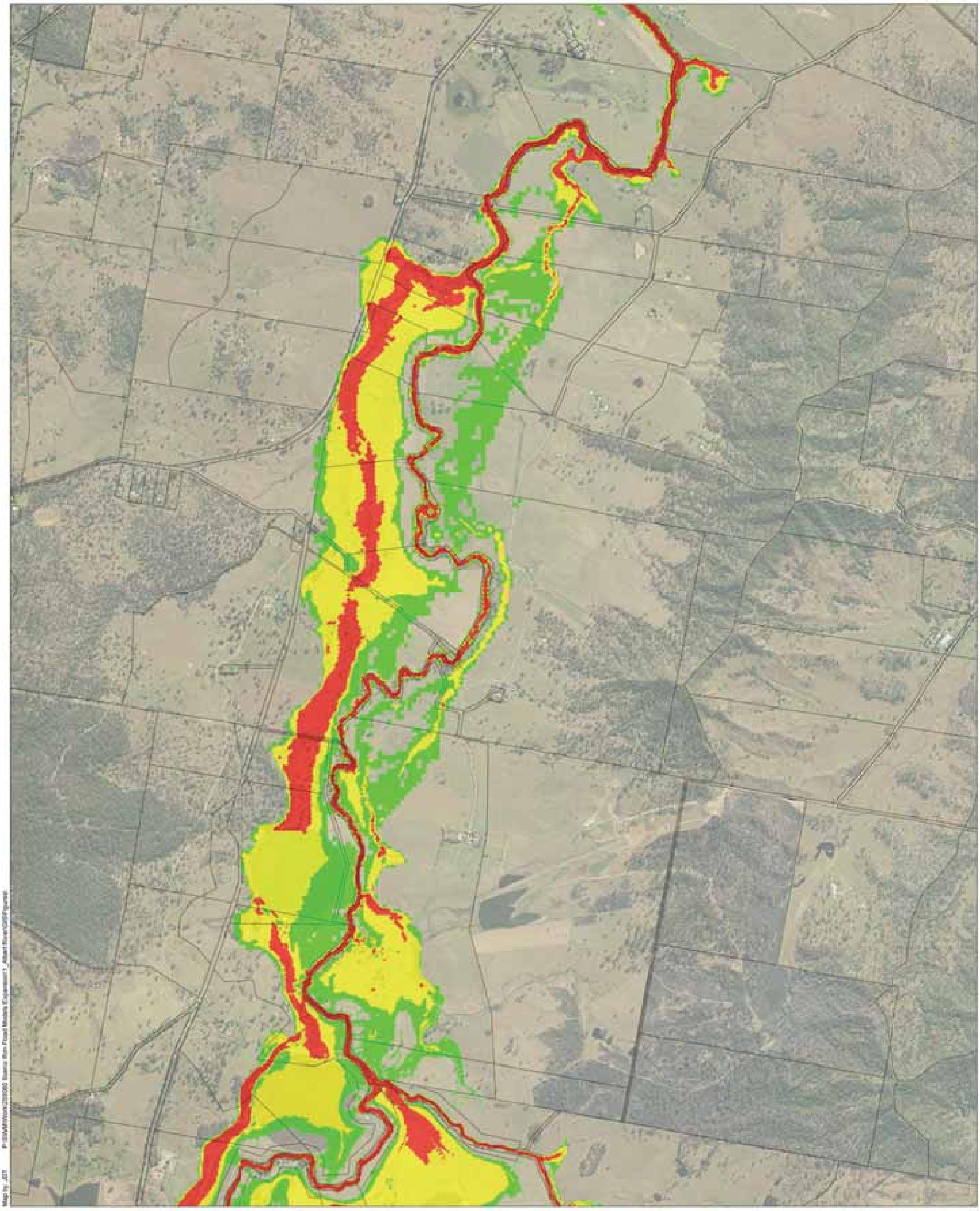
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure D4-g**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

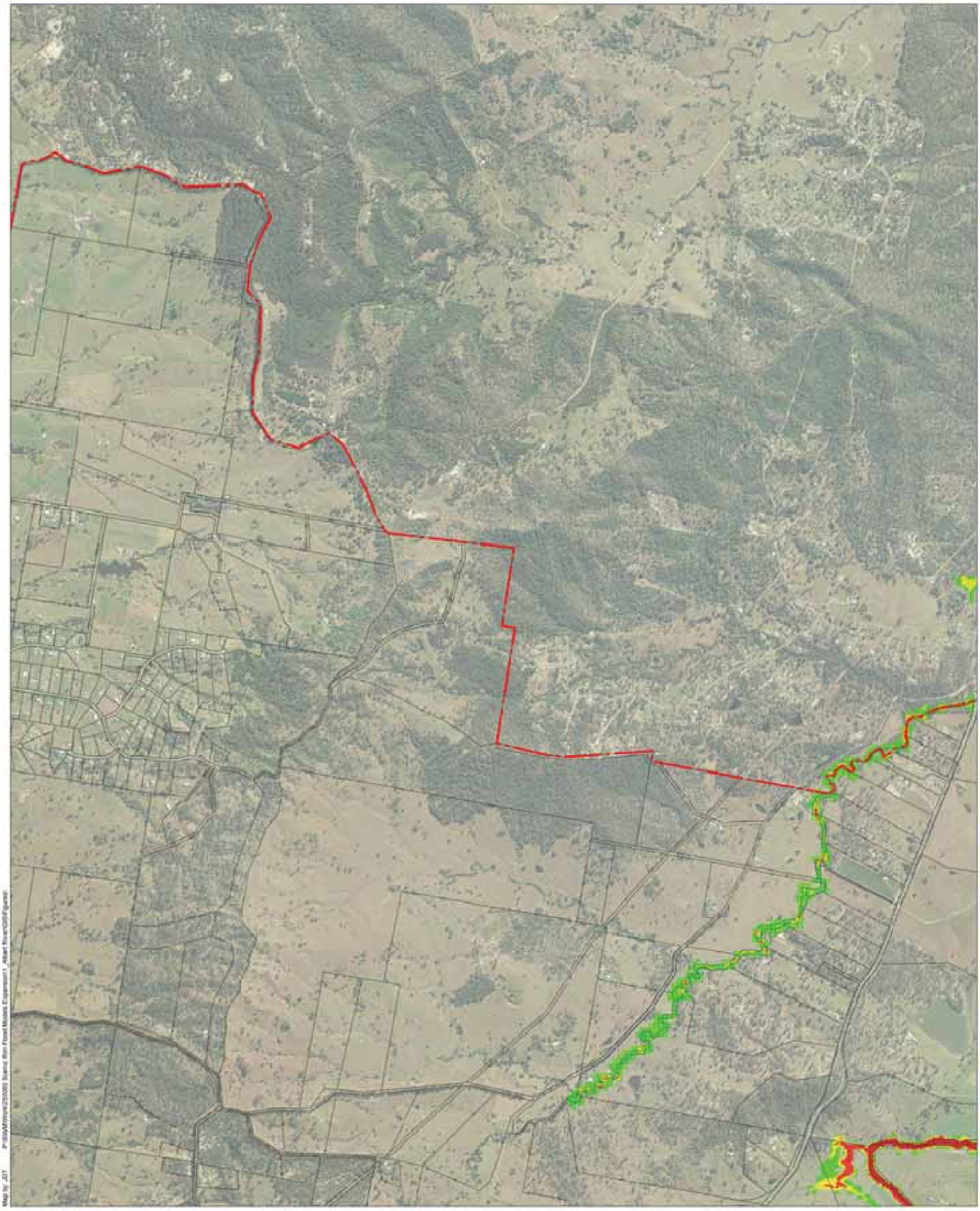
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4-h**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

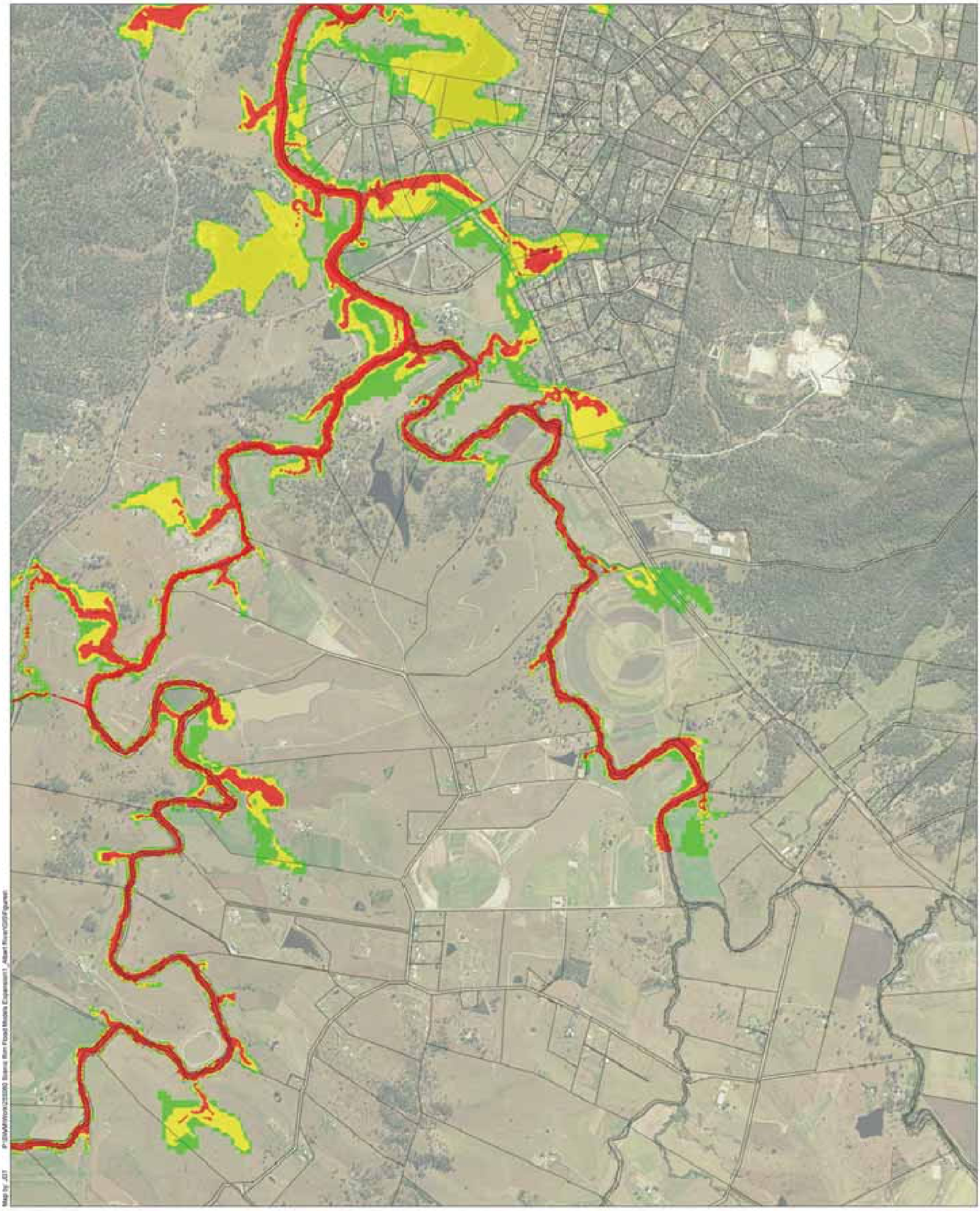
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure D4-i**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary

Low Hazard
Medium Hazard
High Hazard

Notes:

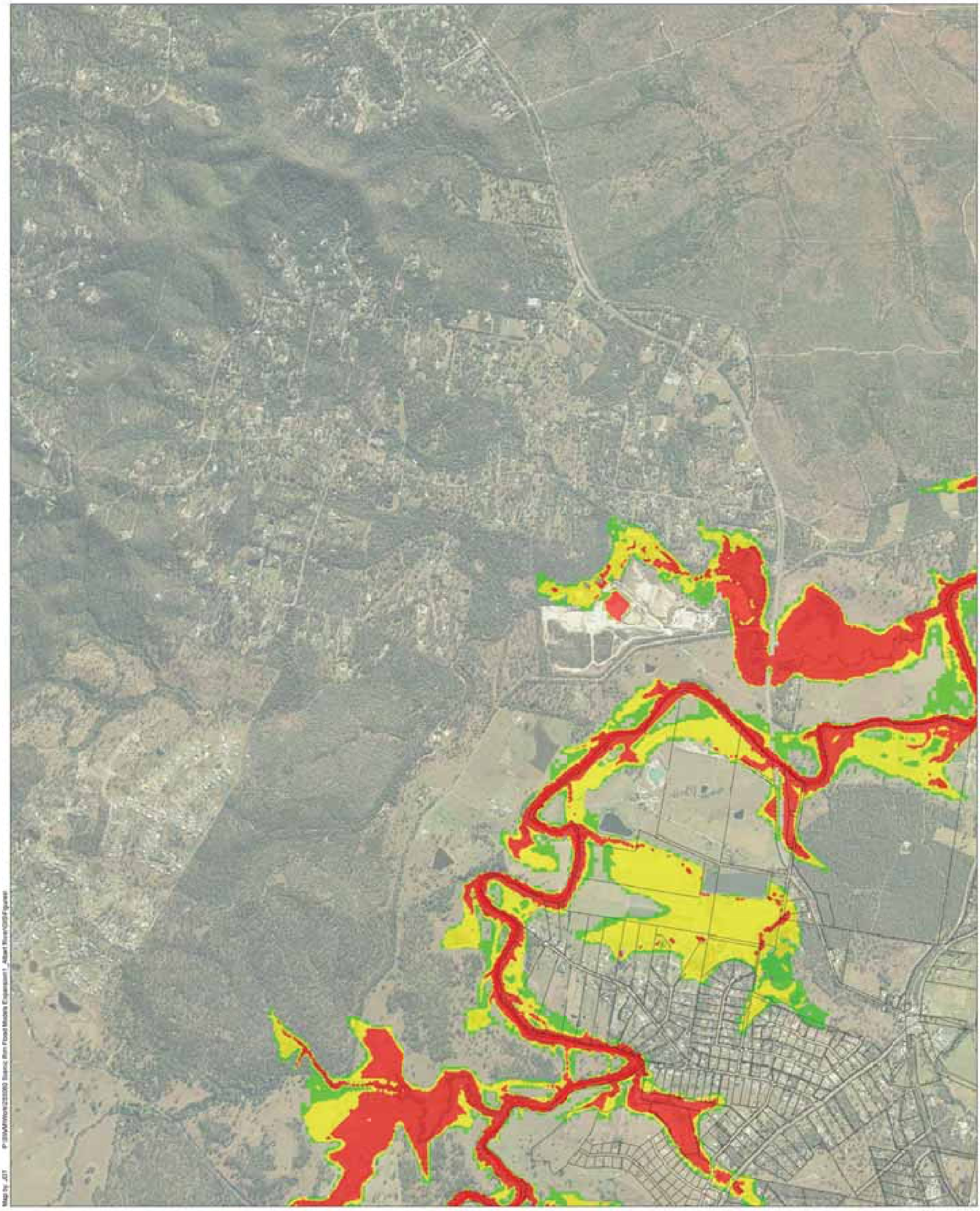
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure D4-j**

5% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,000

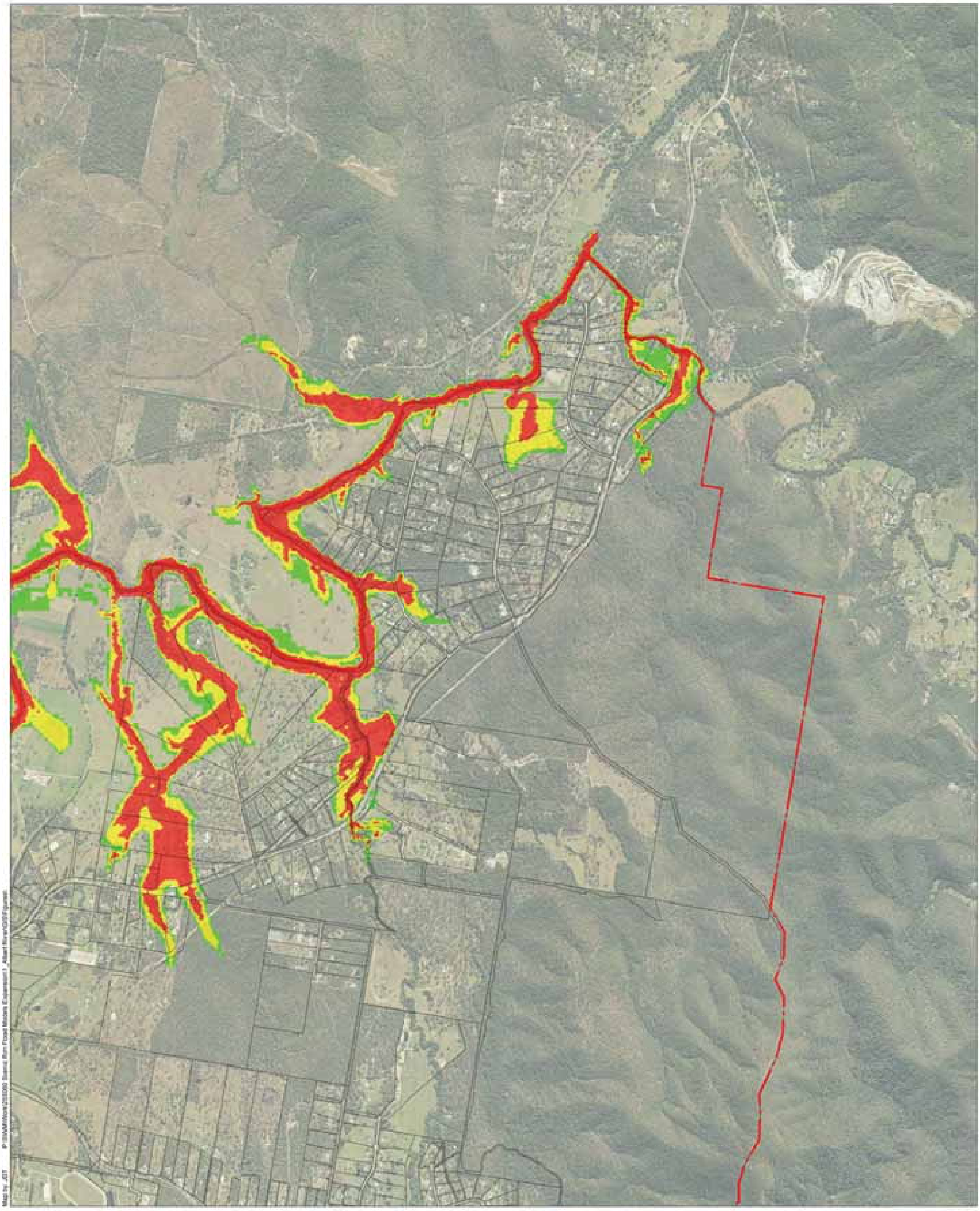
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4-k**

5% AEP Event - Peak Hazard Map



Legend

SRRC Boundary

Cadastral Boundary

Low Hazard

Medium Hazard

High Hazard

Notes:

1:25,001

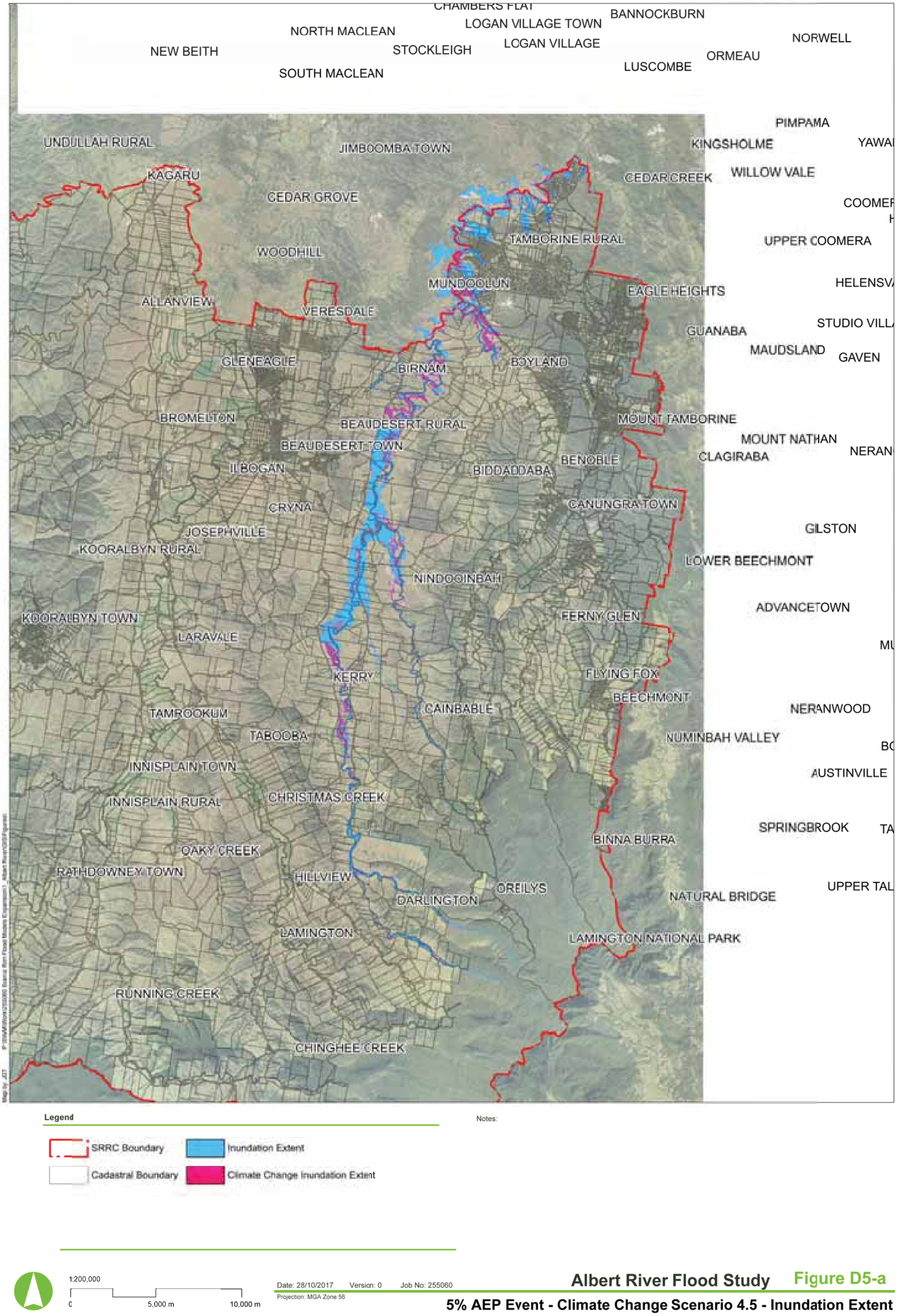
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D4-l**

5% AEP Event - Peak Hazard Map

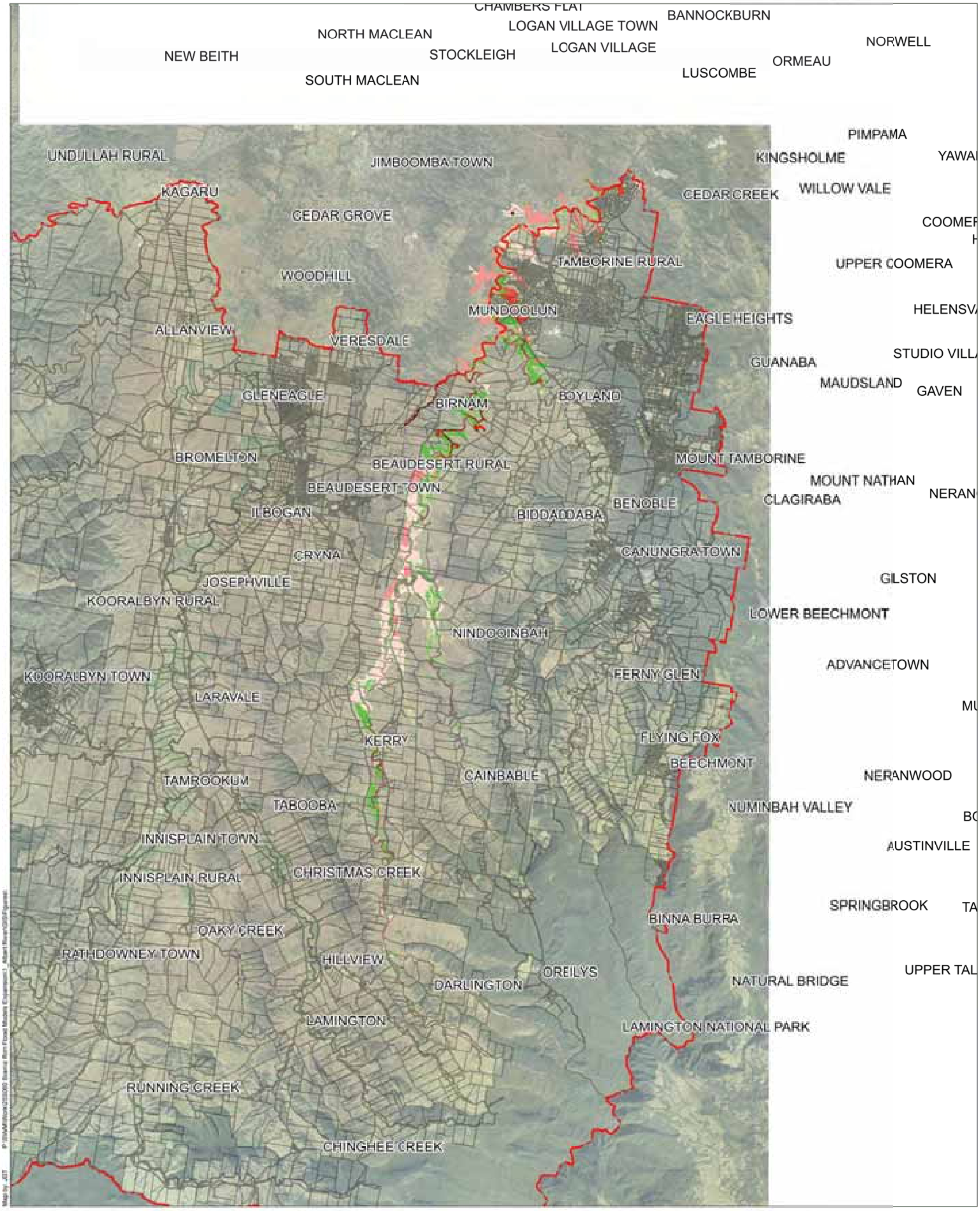


Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D5-a**

5% AEP Event - Climate Change Scenario 4.5 - Inundation Extent



Legend

SRRC Boundary

Cadastral Boundary

< -0.80
-0.80 to -0.60
-0.60 to -0.40
-0.40 to -0.20
-0.20 to -0.03
-0.03 to 0.03
0.03 t
0.20 t
0.40 t
0.60 t
0.80 t
> 1.2C
Was Dry Now Wet
Was Wet Now Dry

Notes:

1:200,000

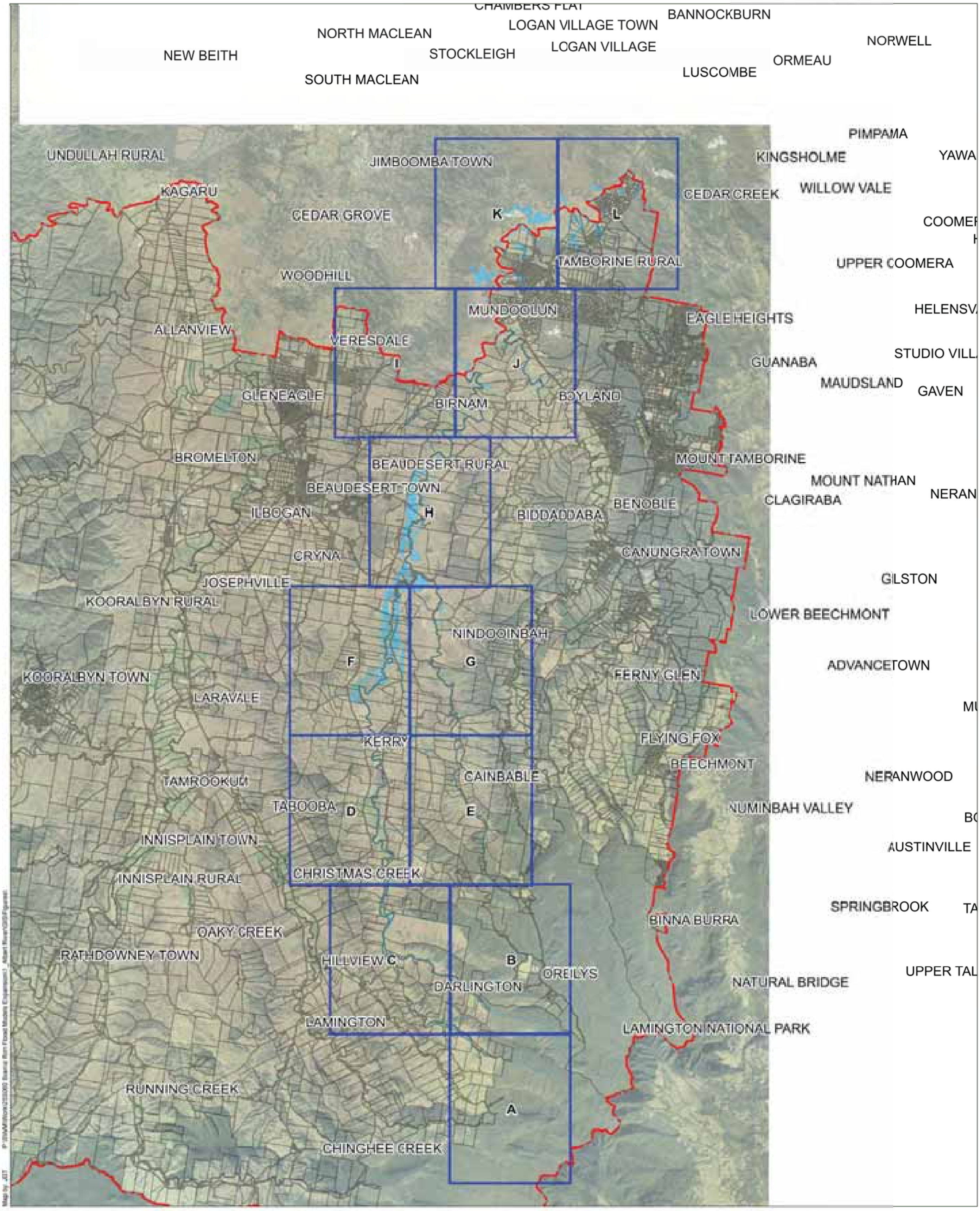
0 5,000 m 10,000 m

Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure D5-b**

5% AEP Event - Climate Change Scenario 4.5 - Afflux Map



Legend

SRRC Boundary

Inundation Extent

Cadastral Boundary

Peak Water level Contour (mAHD)

Notes:

1:200,000

0 5,000 m 10,000 m

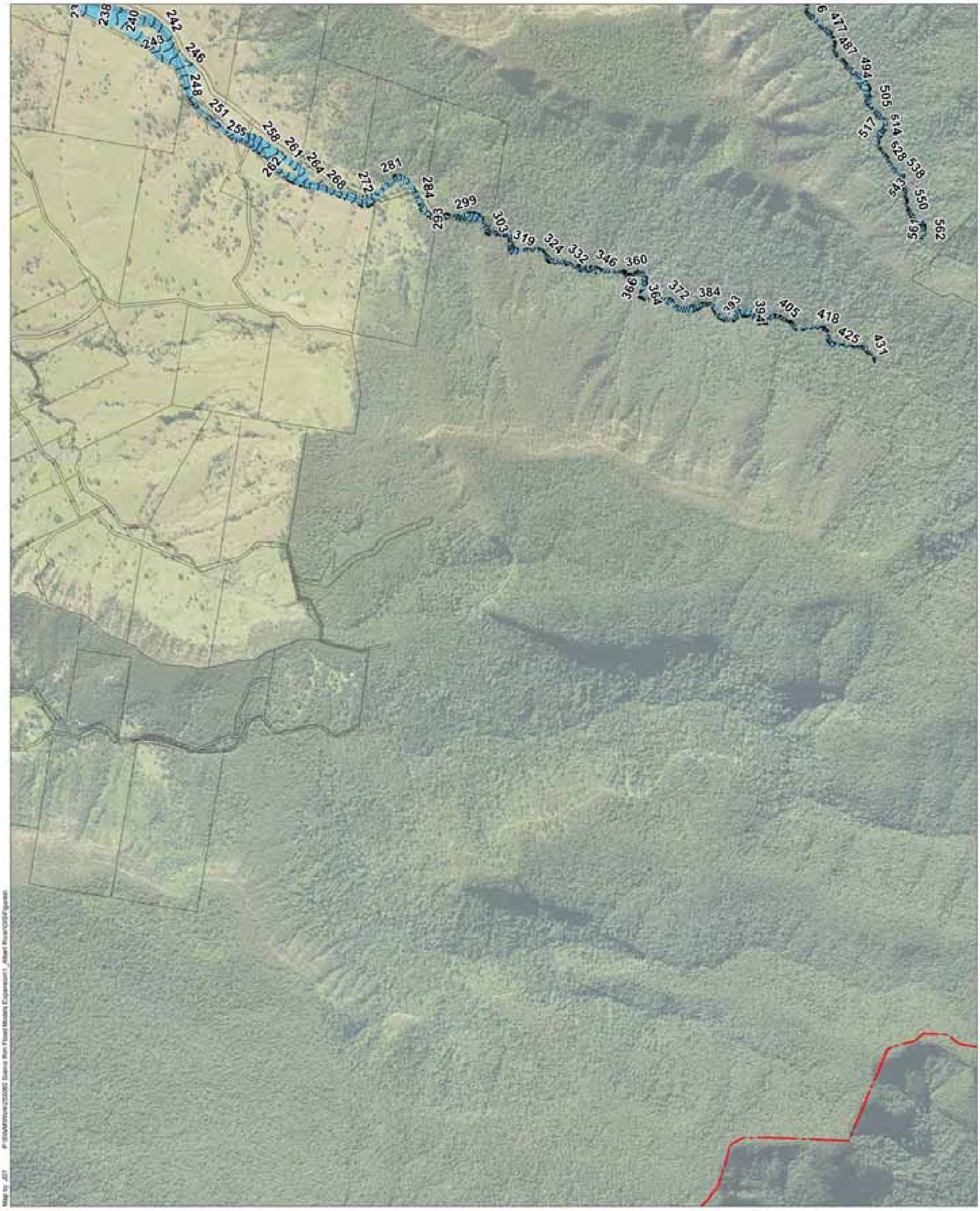
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1**

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

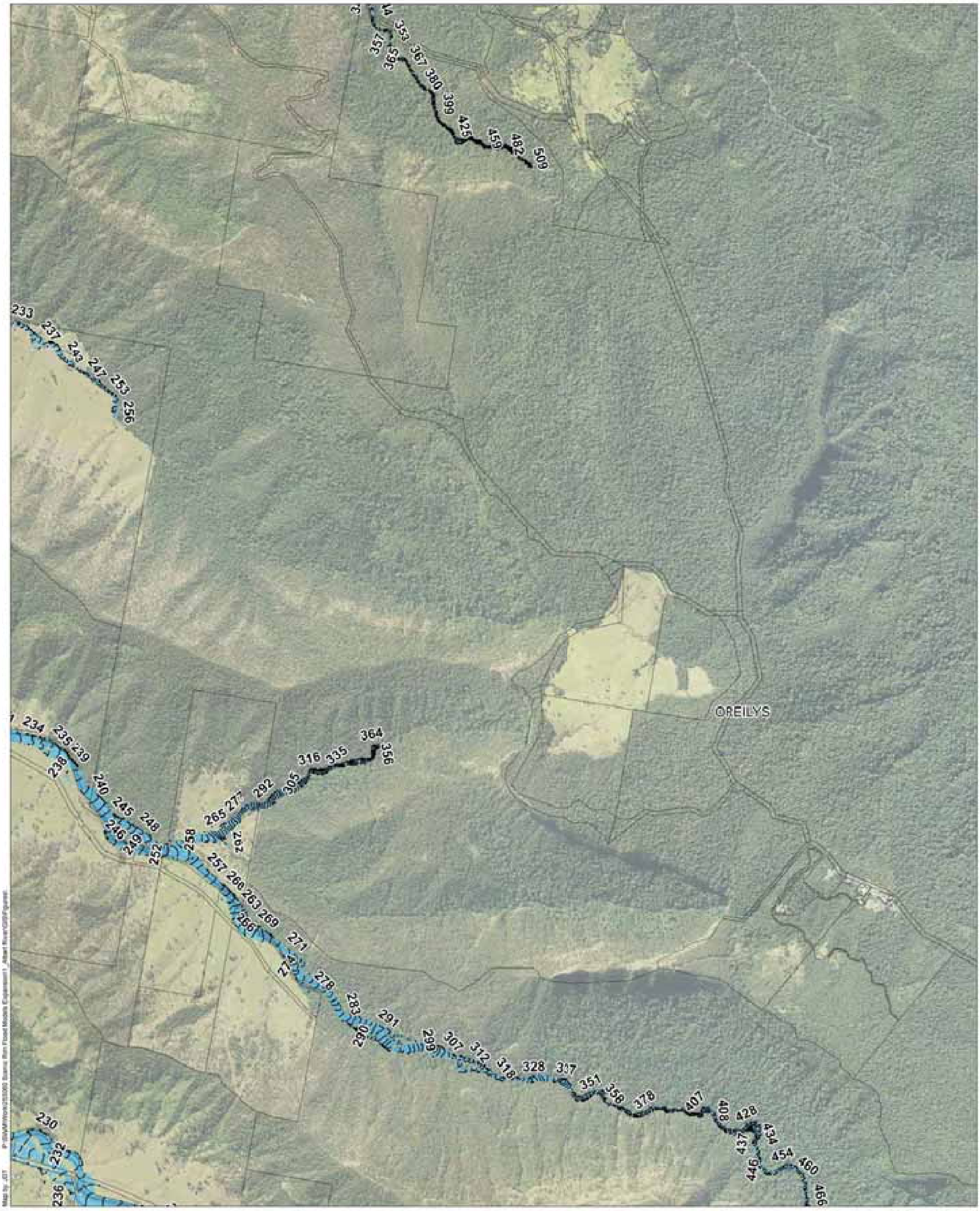
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-a**

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: 11/10/2017 Version: 0 Job No: 255060

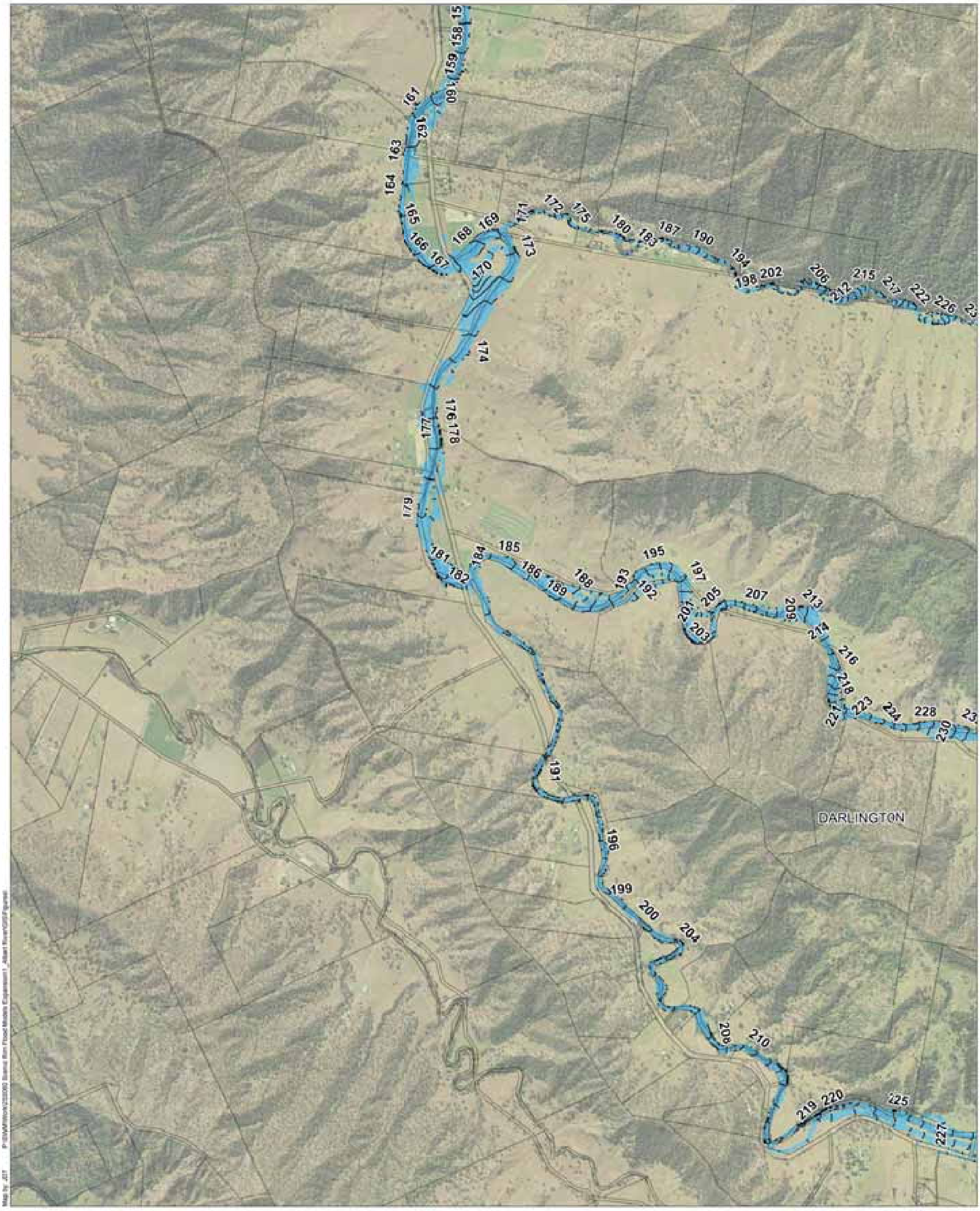
Projection: MGA Zone 56

Albert River 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

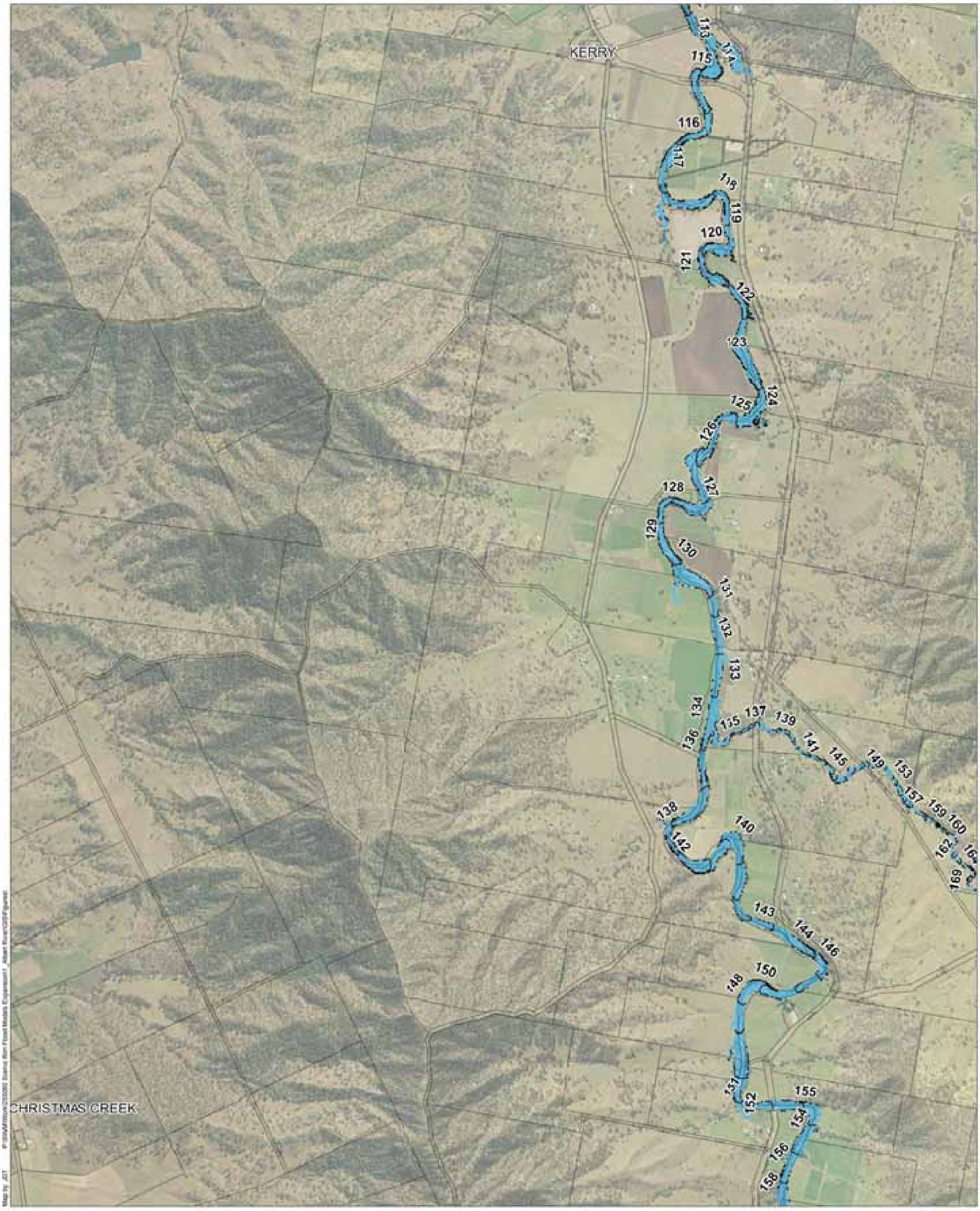
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-c**

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

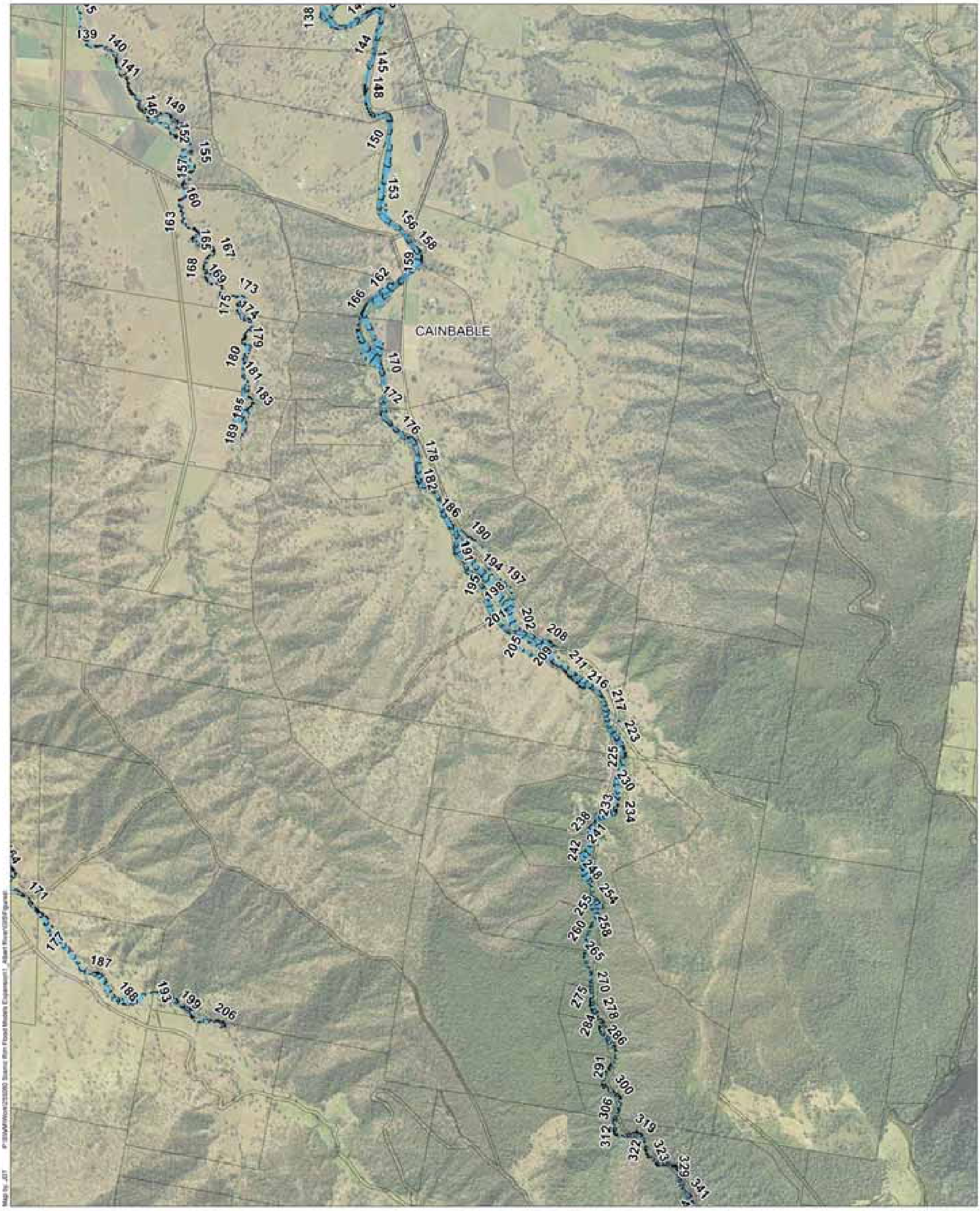
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-d**

10% AEP Event - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Inundation Extent

Peak Water level Contour (mAHD)

Notes:

1:25,000

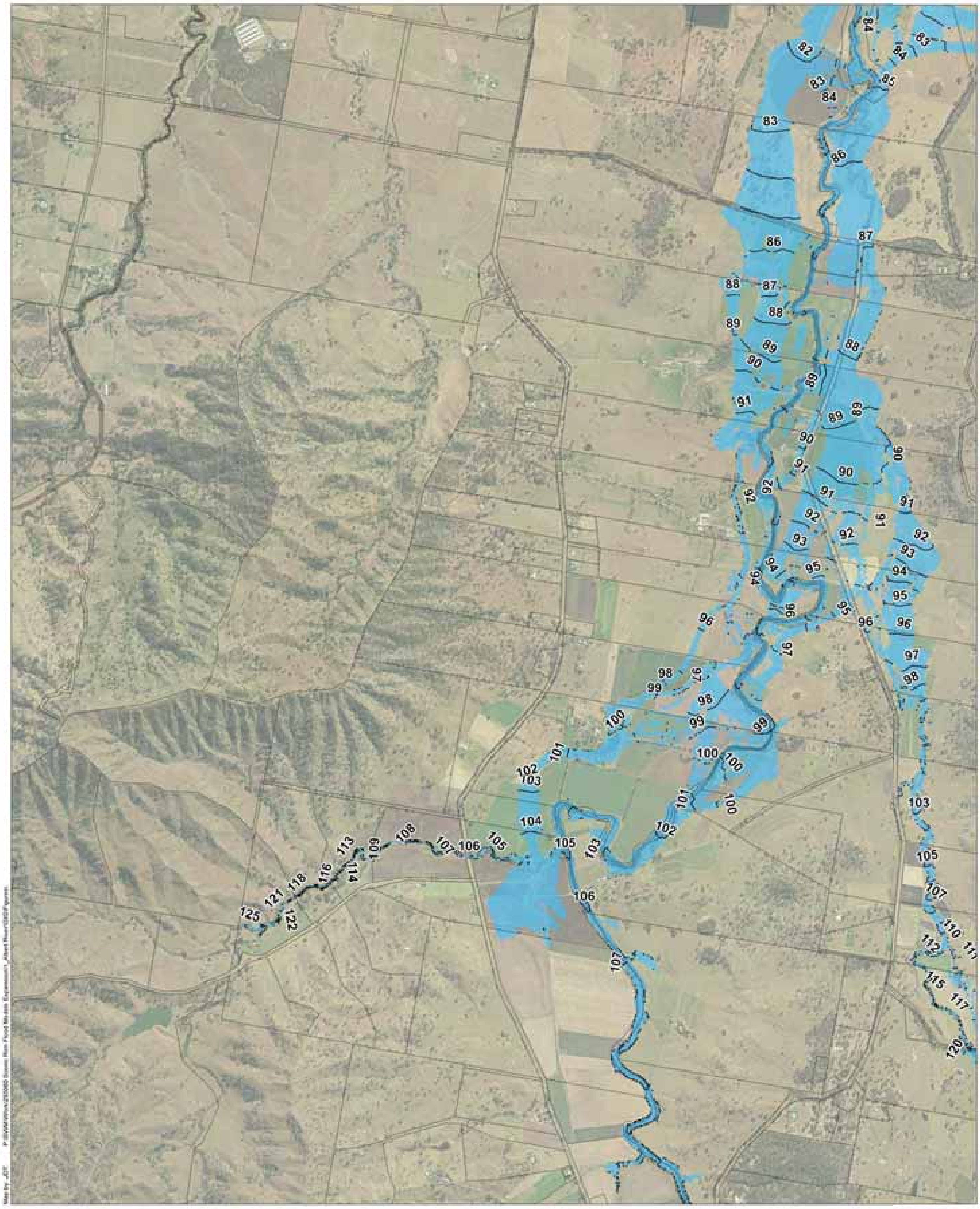
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-e**

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: 11/10/2017 Version: 0 Job No: 255060

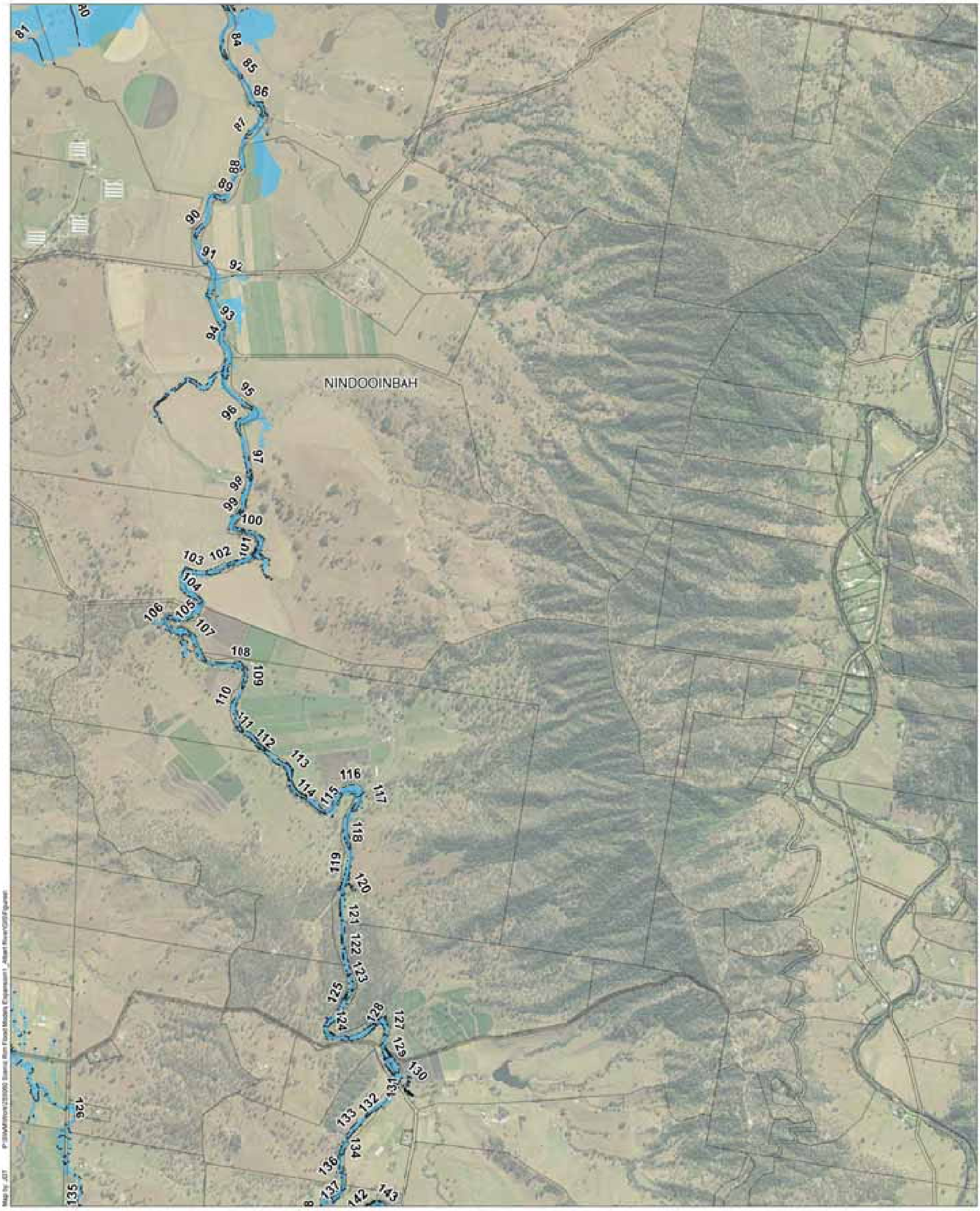
Projection: MGA Zone 56

Albert River Flood Study

Figure E1-f

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

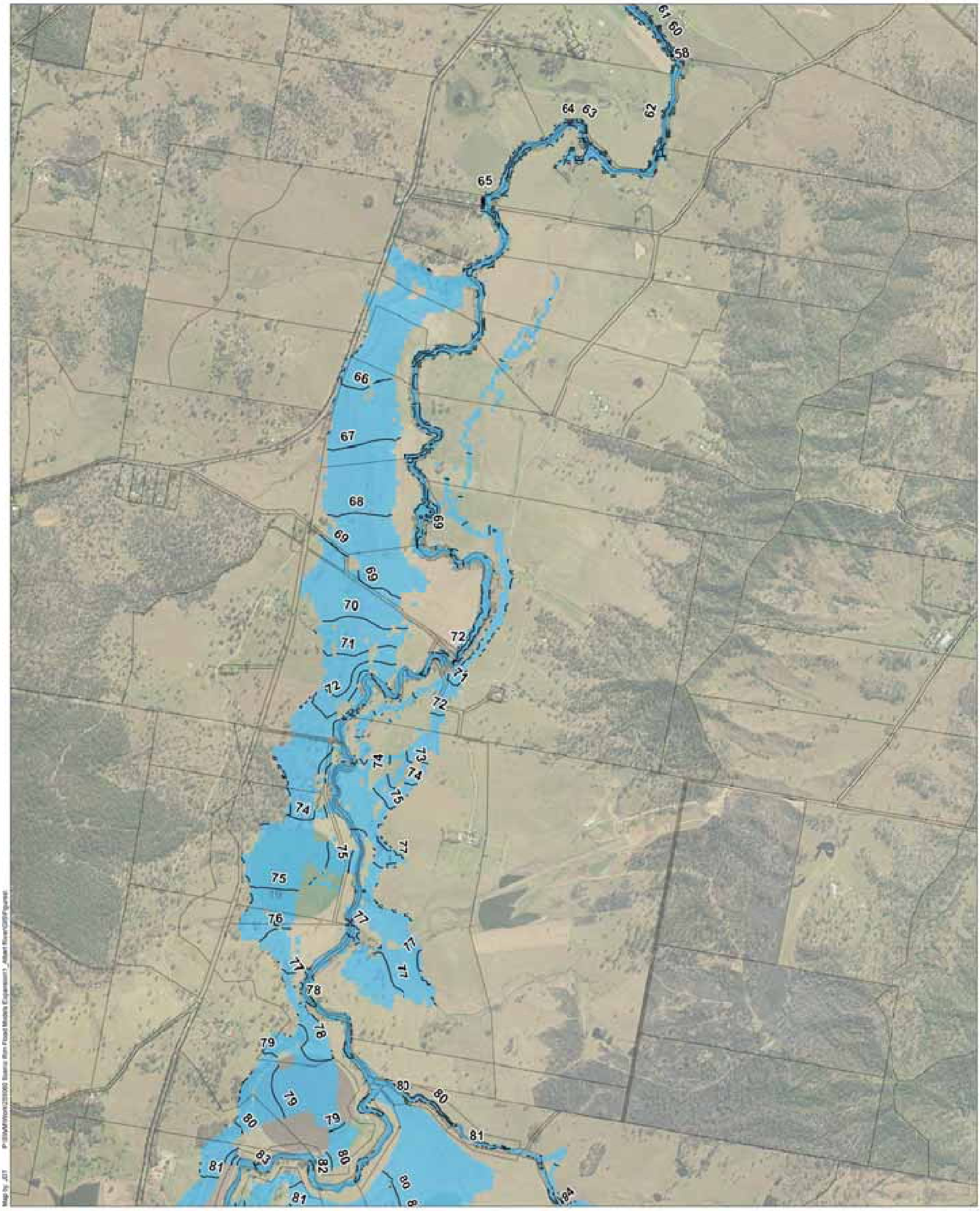
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-g**

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

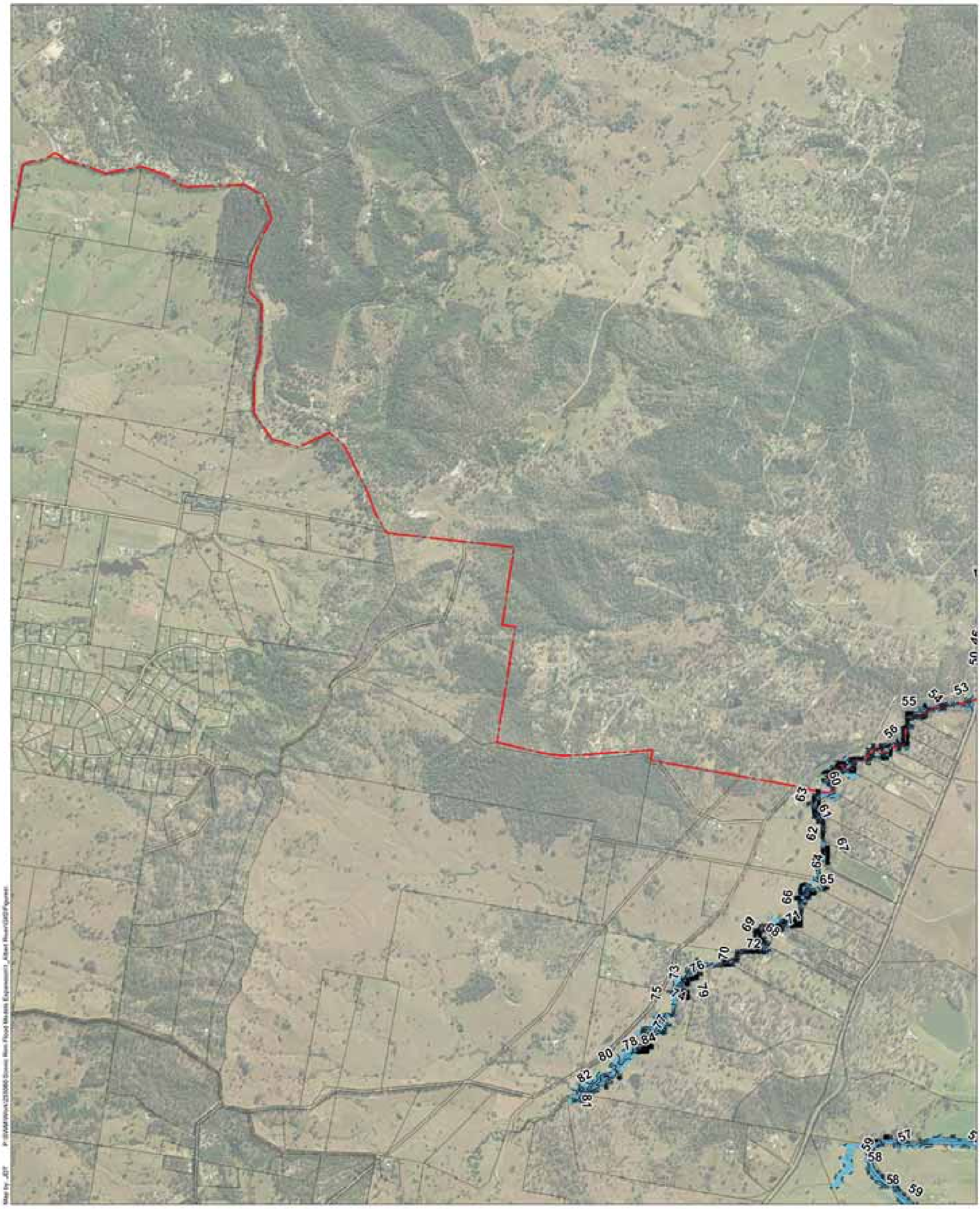
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-h**

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

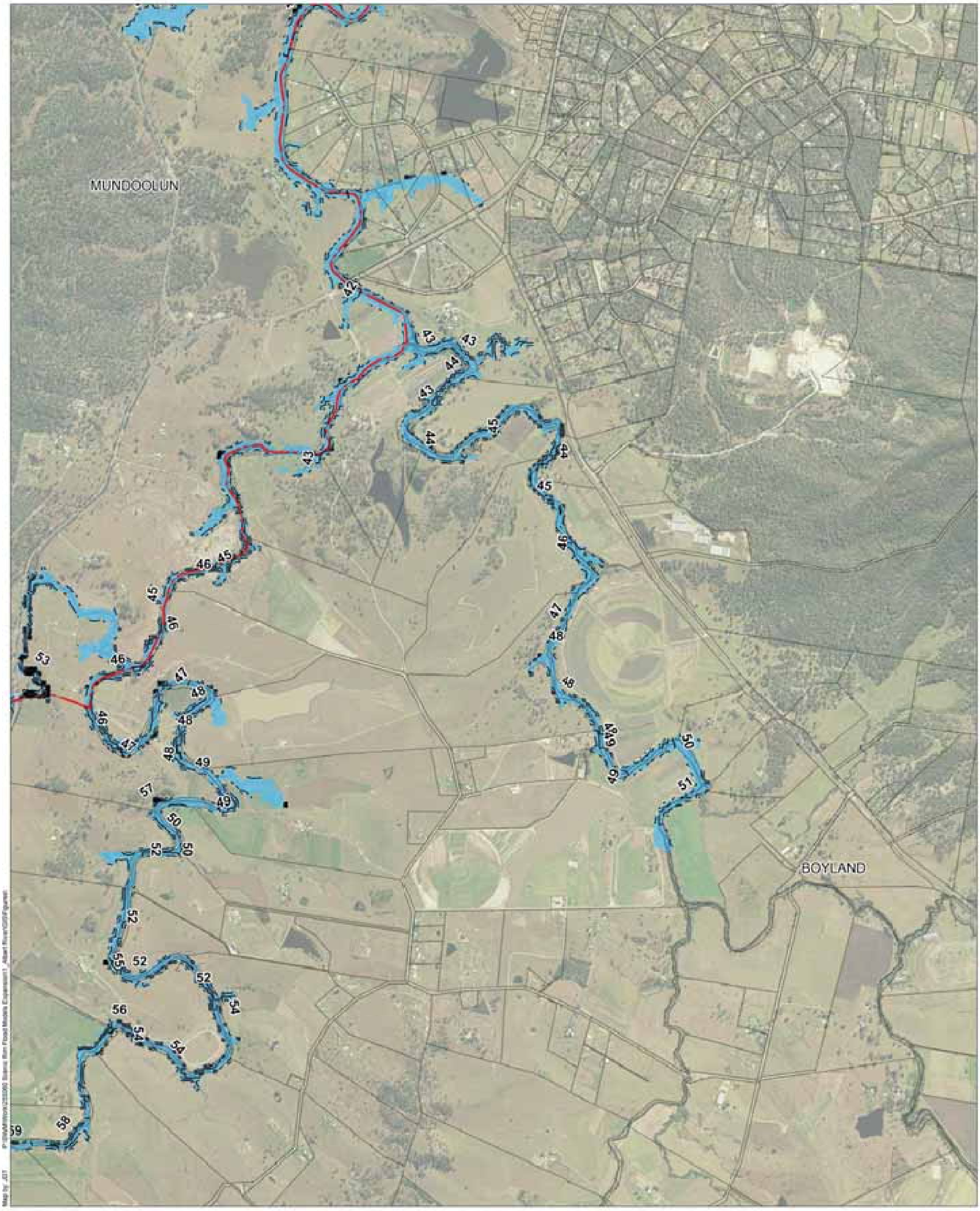
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-i**

10% AEP Event - Inundation Extent

aurecon



Legend

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

Notes:

1:25,000

0 625 m 1,250 m

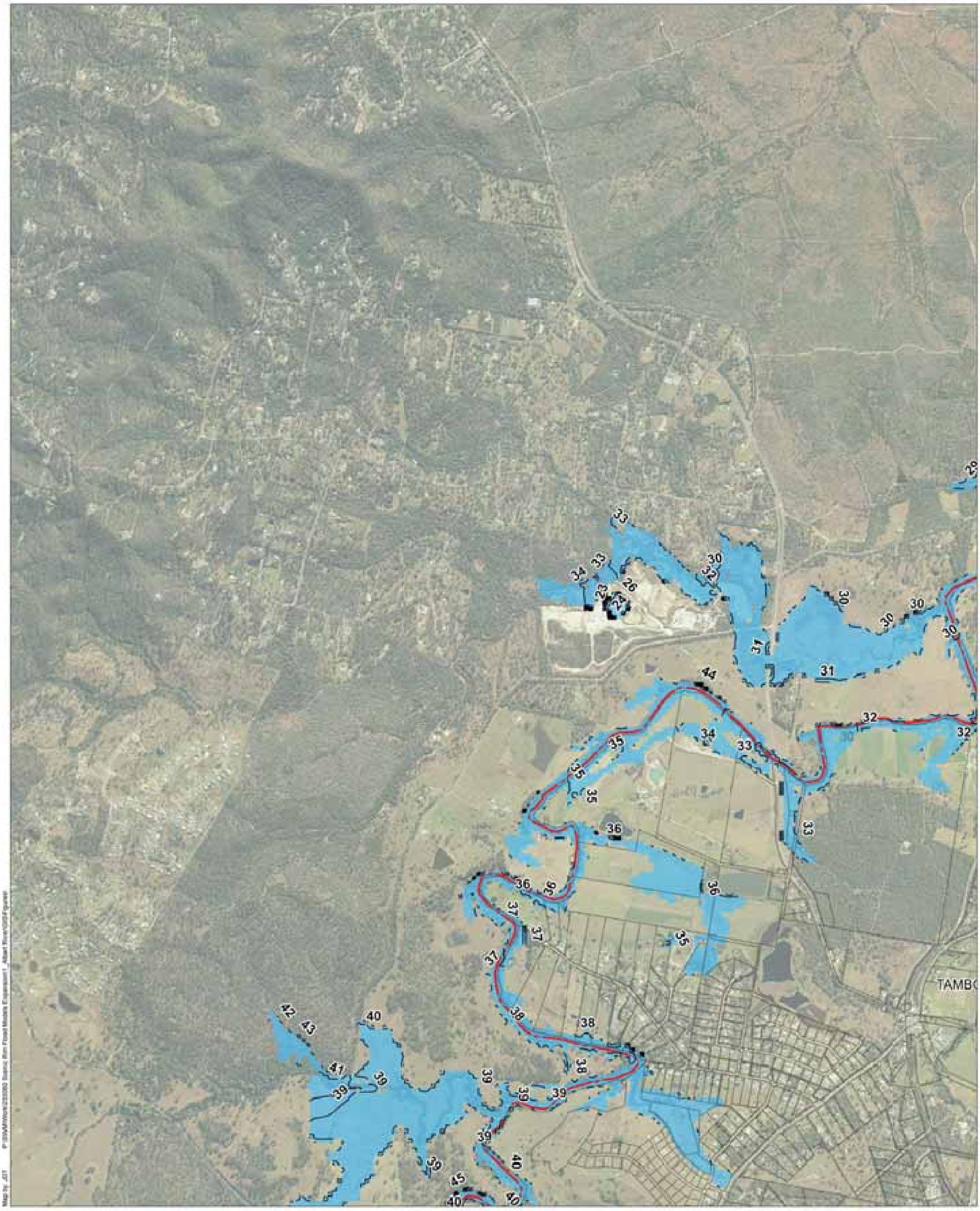
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-j**

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

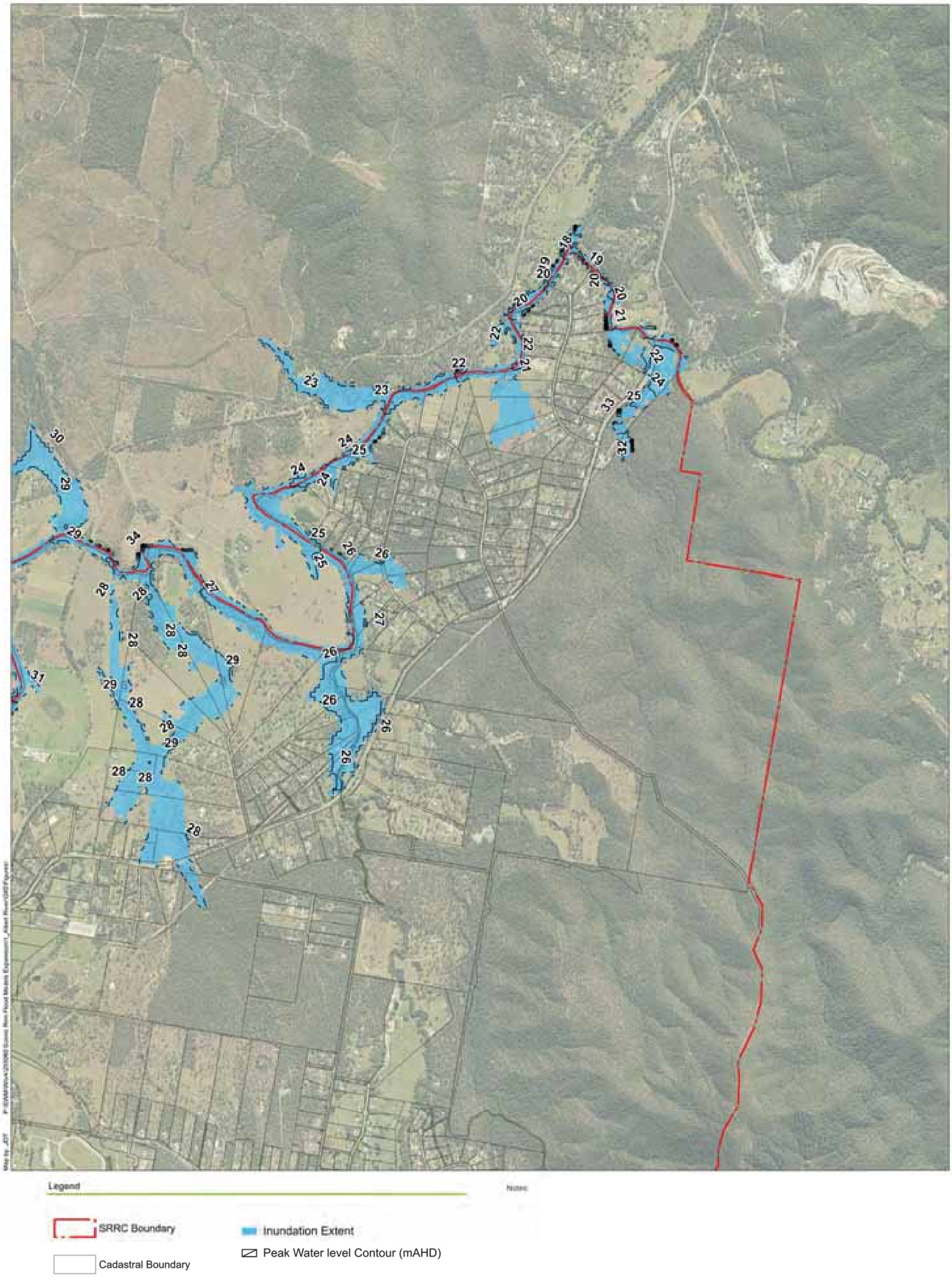
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E1-k**

10% AEP Event - Inundation Extent

aurecon

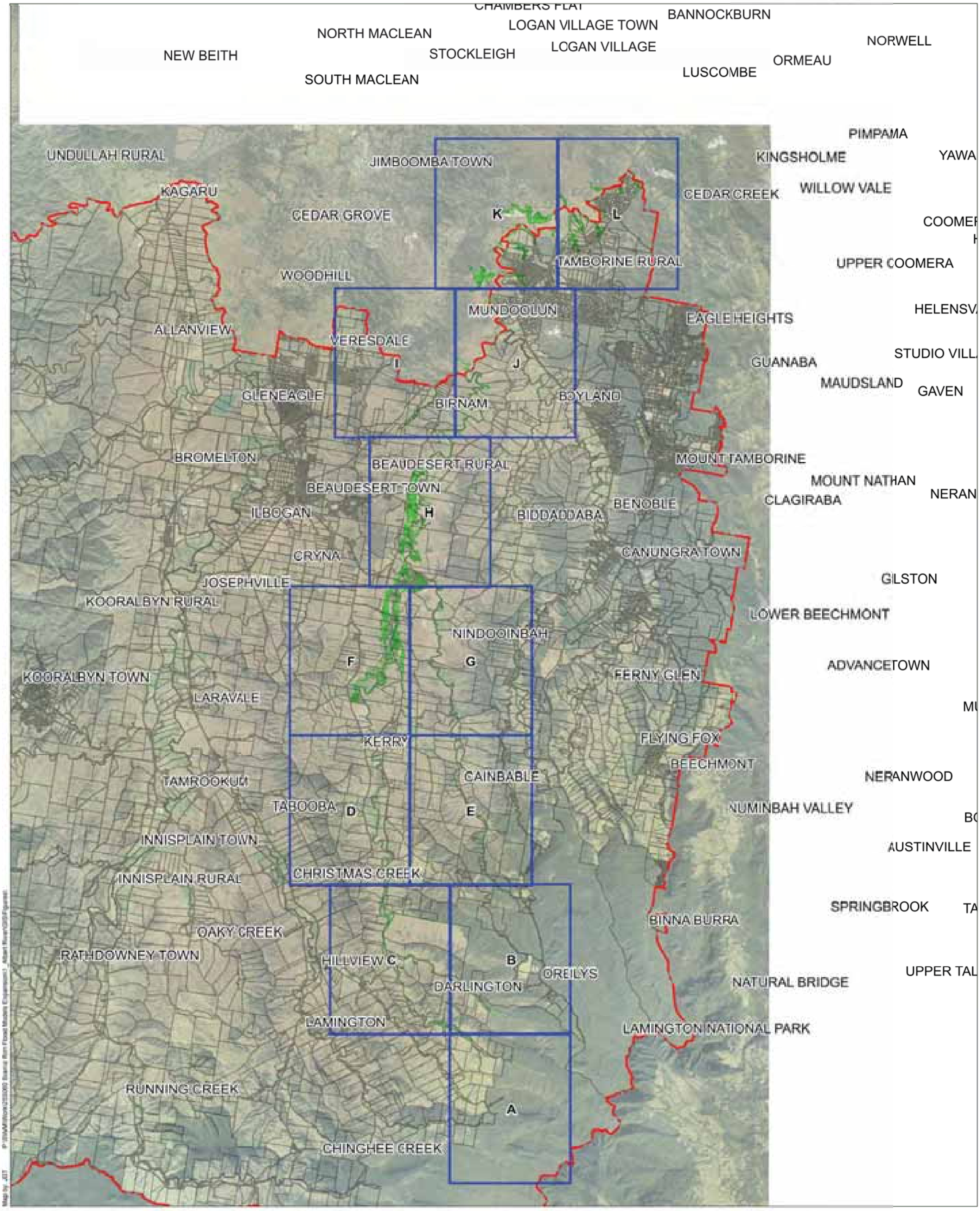


Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E1-I**

10% AEP Event - Inundation Extent

aurecon



Legend

Notes:

Velocity (m/s)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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	

1:200,000

0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

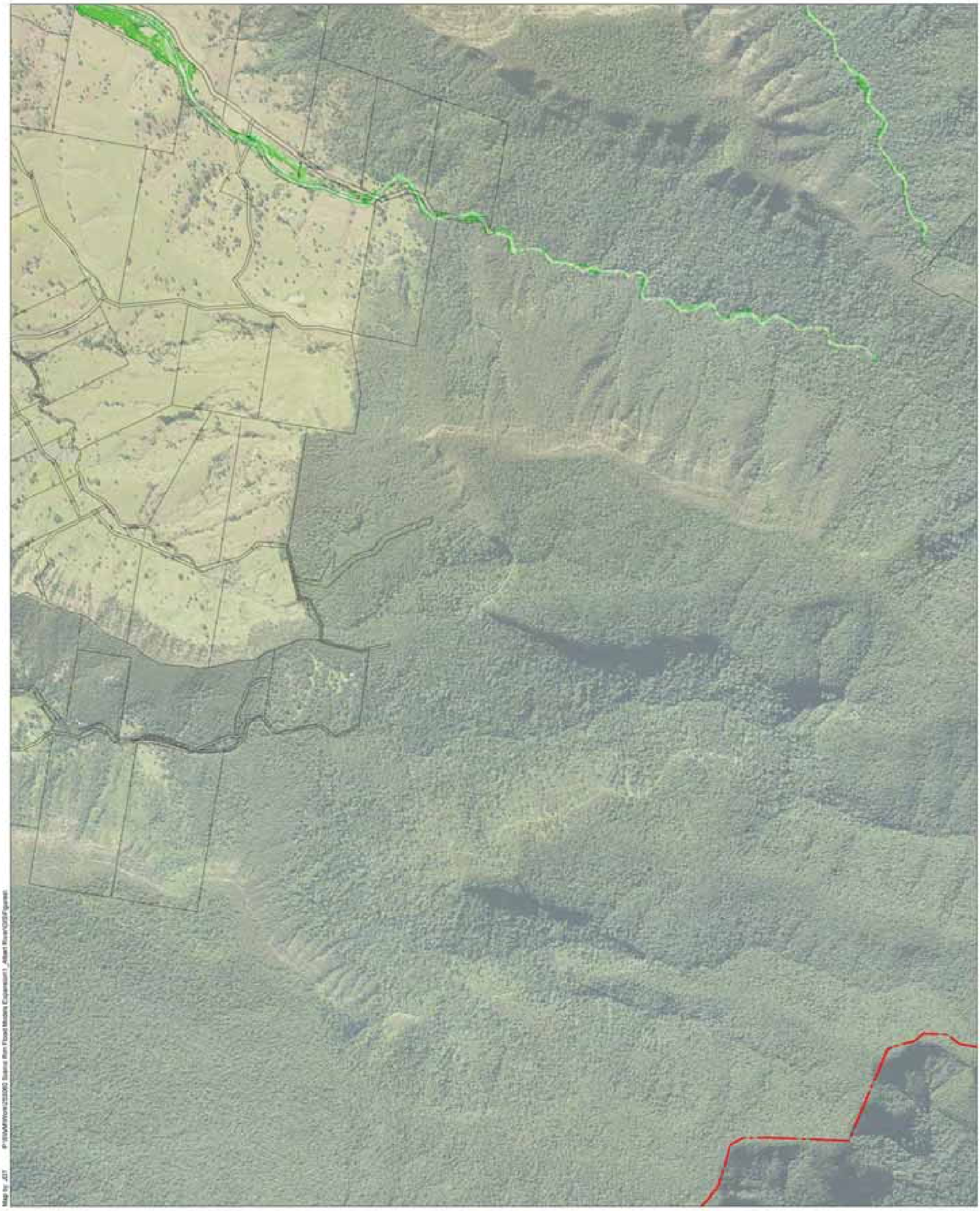
Projection: MGA Zone 56

Albert River Flood Study **Figure E2**

10% AEP Event - Peak Velocities

Document Set ID: 10154450
Version: 1, Version Date: 21/12/2017

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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-a**

10% AEP Event - Peak Velocities

Legend

Velocity (m/s)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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

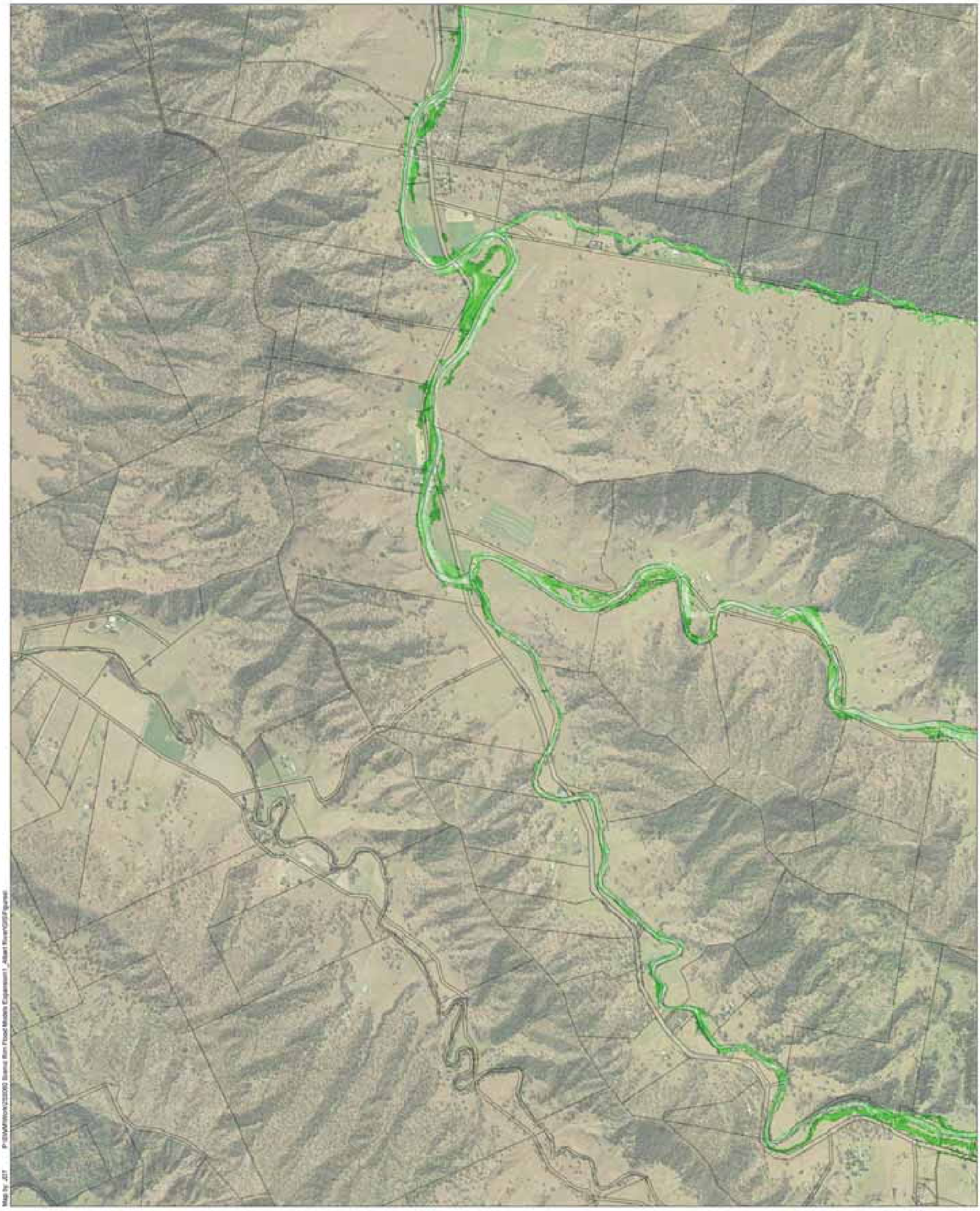
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-b**

10% 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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-c**

10% 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

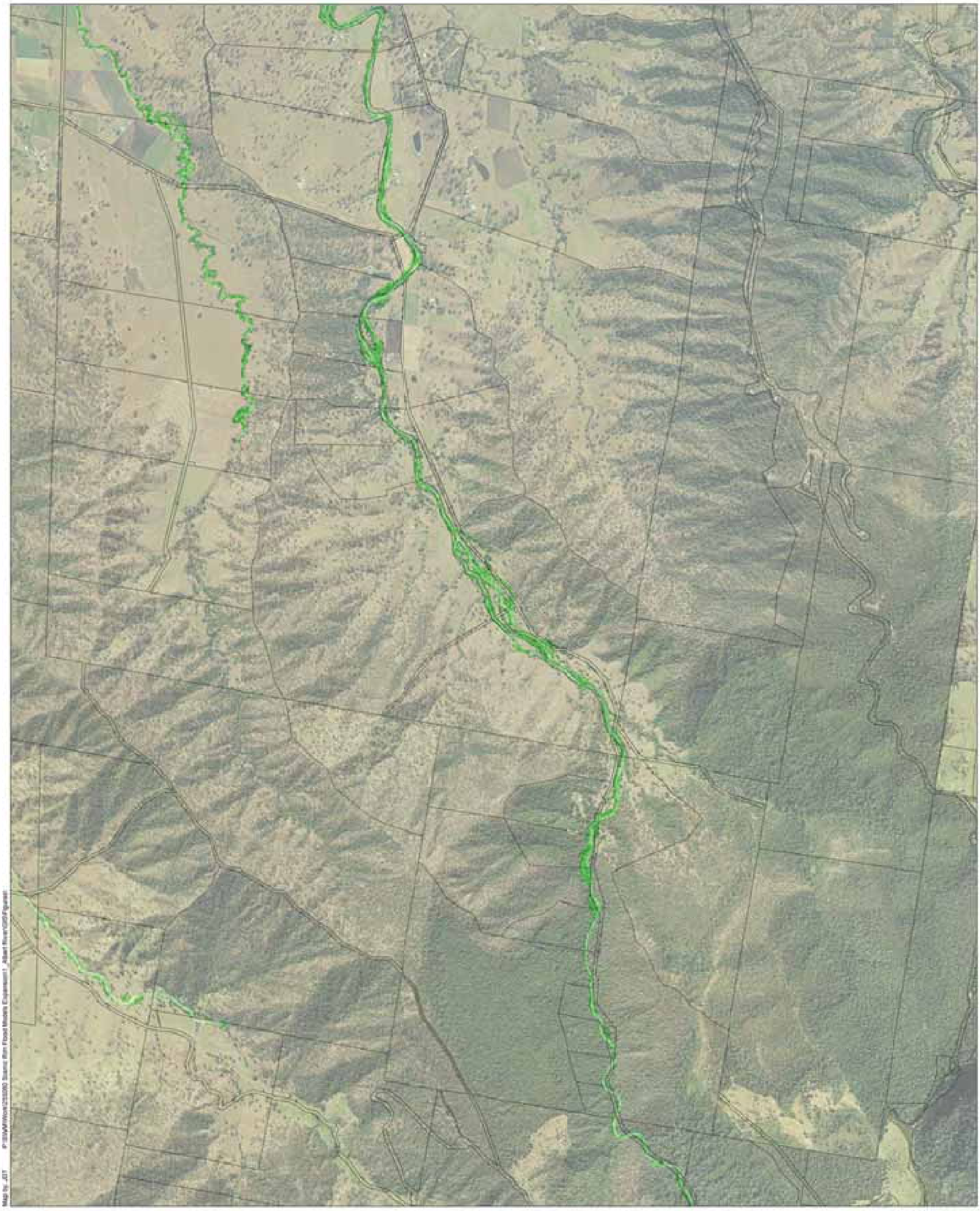
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-d**

10% 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

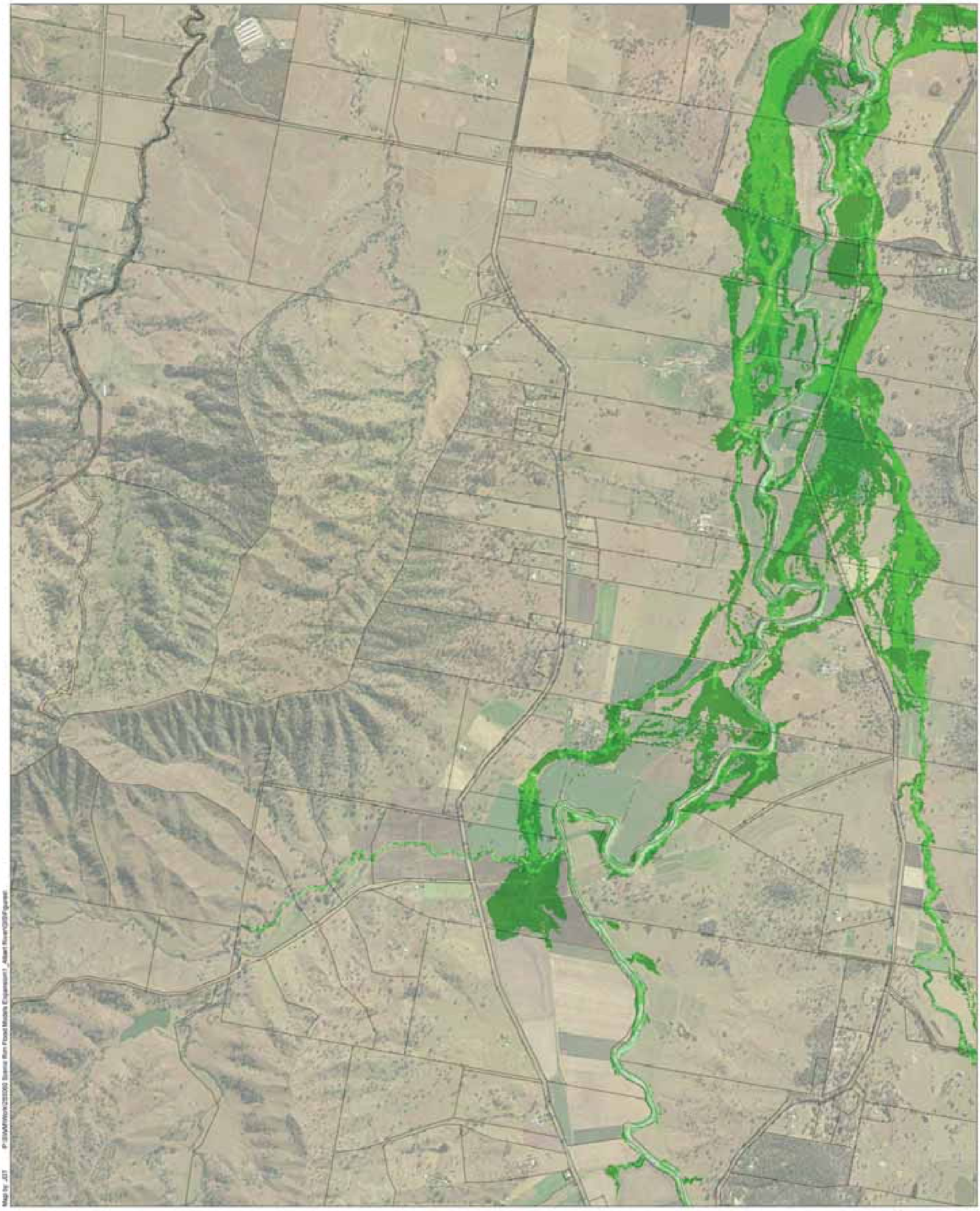
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-e**

10% AEP Event - Peak Velocities



Legend

Velocity (m/s)

SRRC Boundary

Cadastral Boundary

- 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

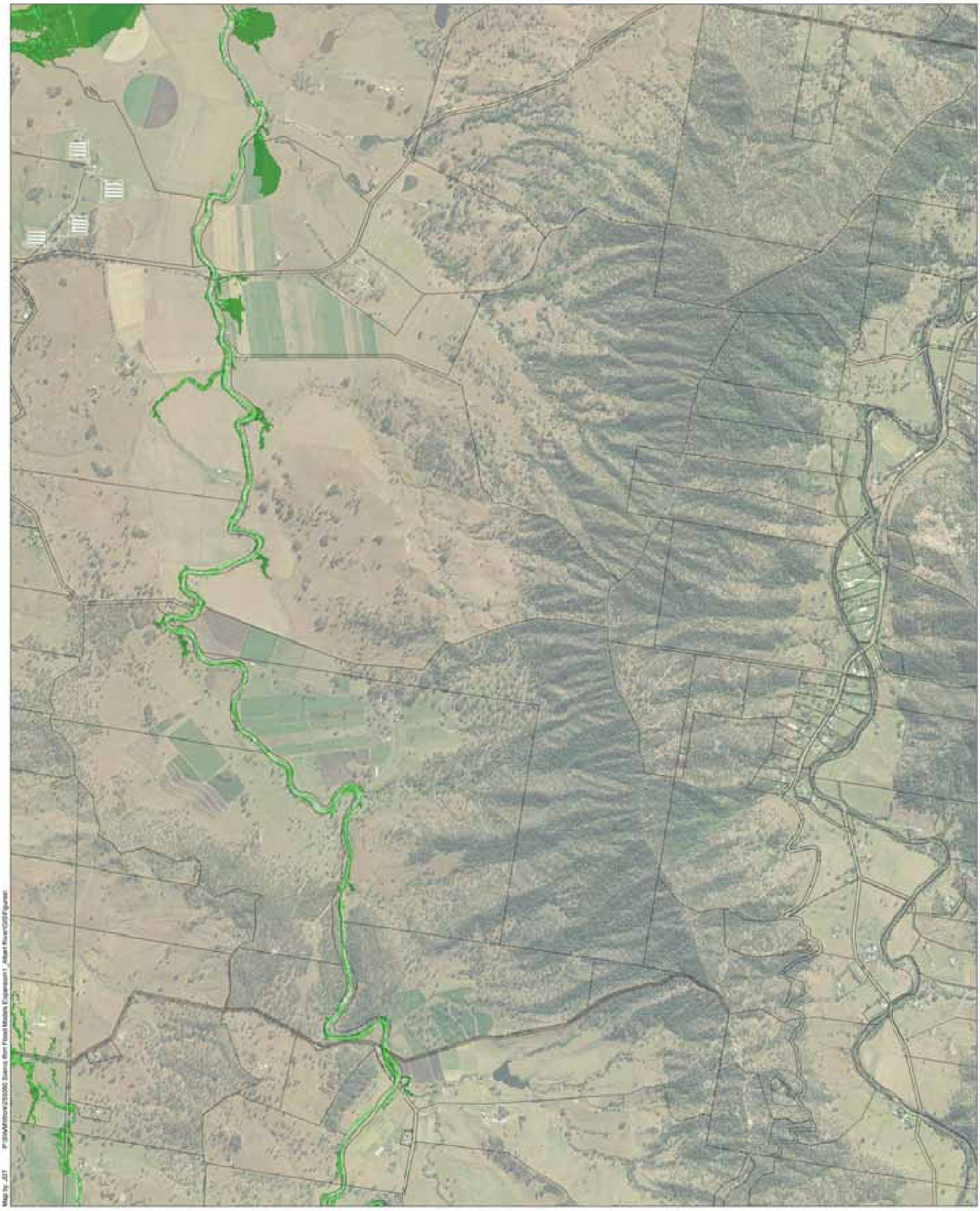
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-f**

10% AEP Event - Peak Velocities



Legend

Velocity (m/s)

- SRRC Boundary
- Cadastral Boundary

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: 11/10/2017 Version: 0 Job No: 255060

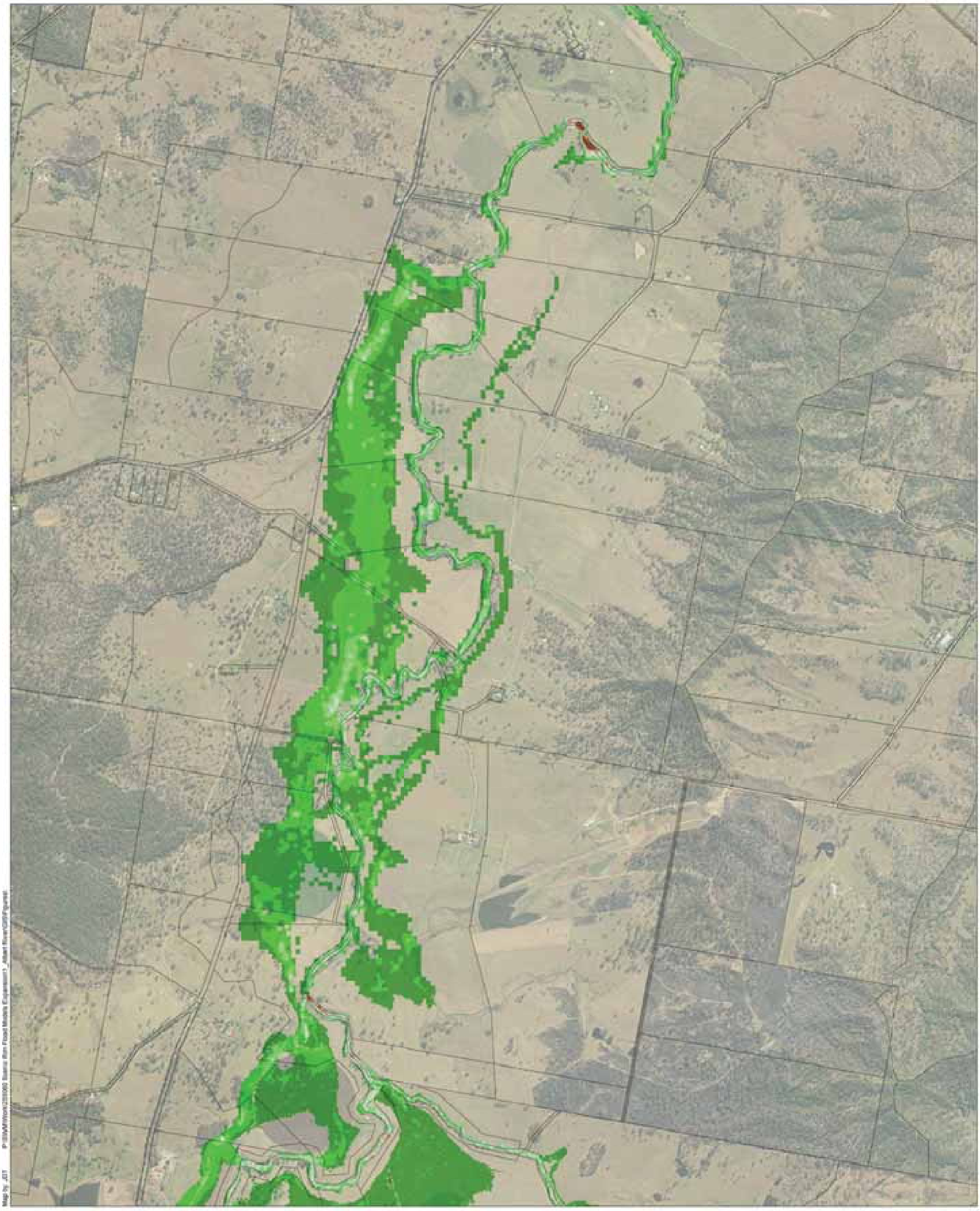
Projection: MGA Zone 56

Albert River Flood Study

Figure E2-g

10% AEP Event - Peak Velocities

aurecon



Legend

SRRC Boundary	**Velocity (m/s)**	
Cadastral Boundary	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

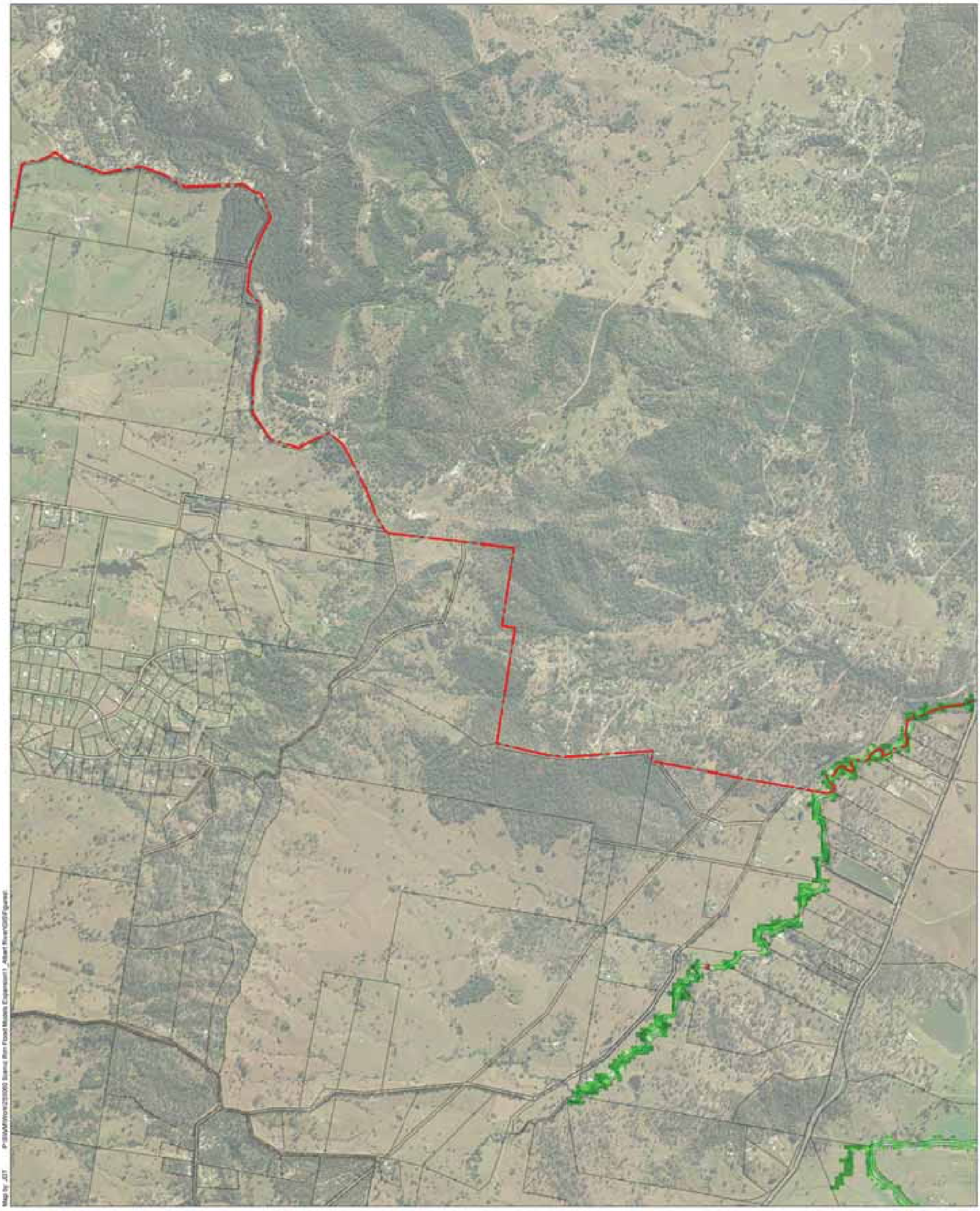
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-h**

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

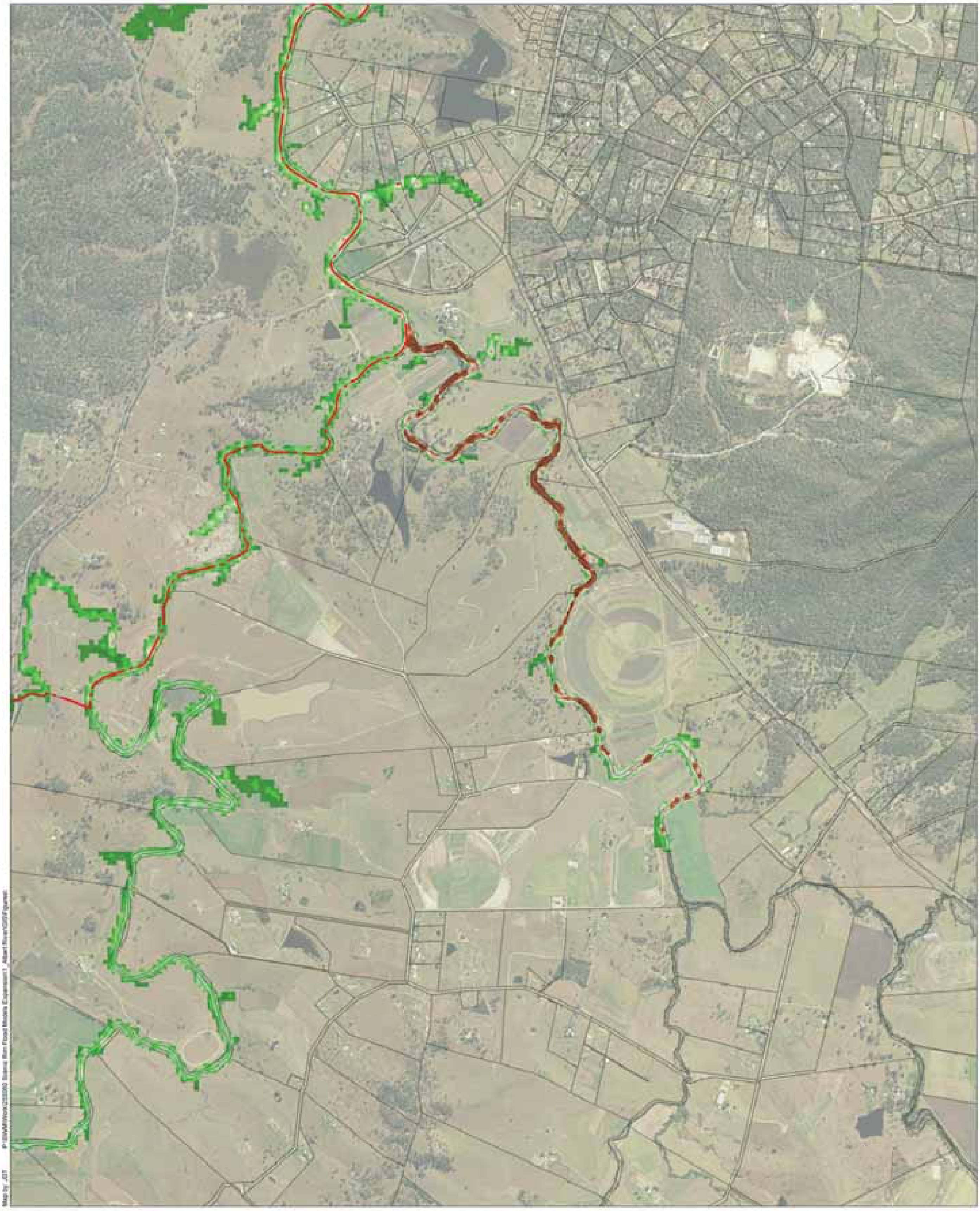
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-i**

10% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

- SRRC Boundary
- Cadastral Boundary
- 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

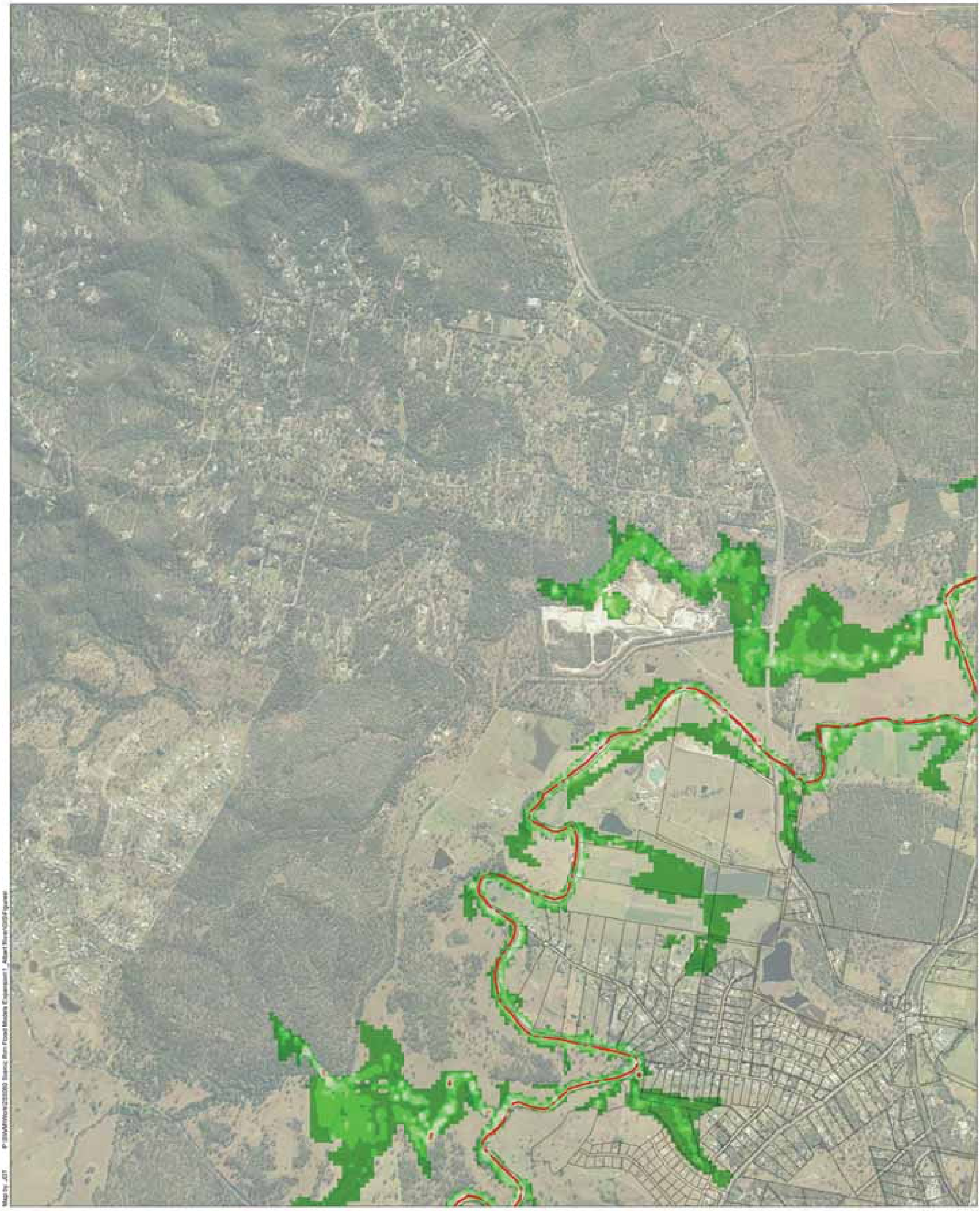
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-j**

10% AEP Event - Peak Velocities

aurecon



Legend

Notes:

1:25,000

0 625 m 1,250 m

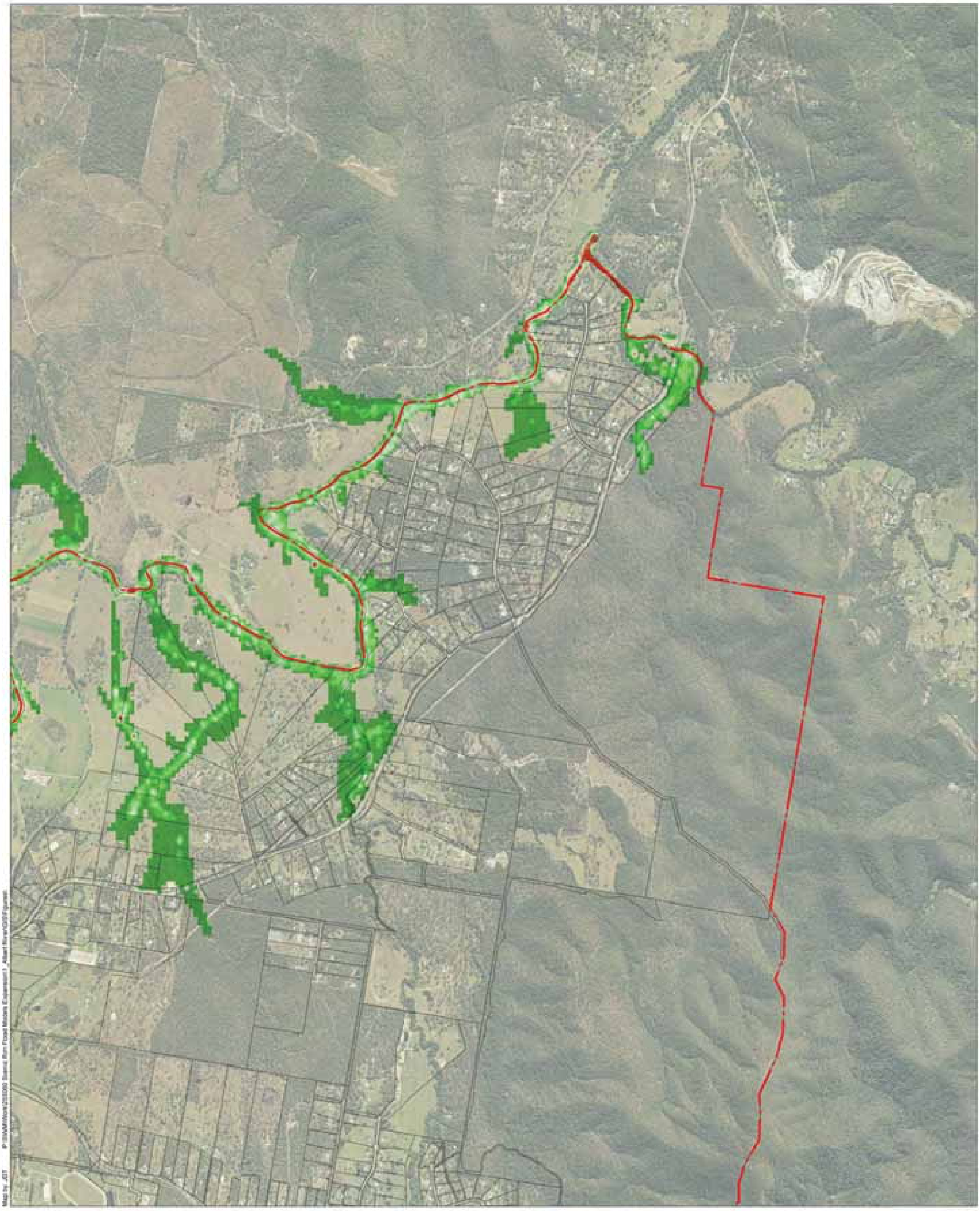
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-k**

10% AEP Event - Peak Velocities

aurecon



Legend

Velocity (m/s)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5
Cadastral Boundary	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:

1:25,001

0 626 m 1,250 m

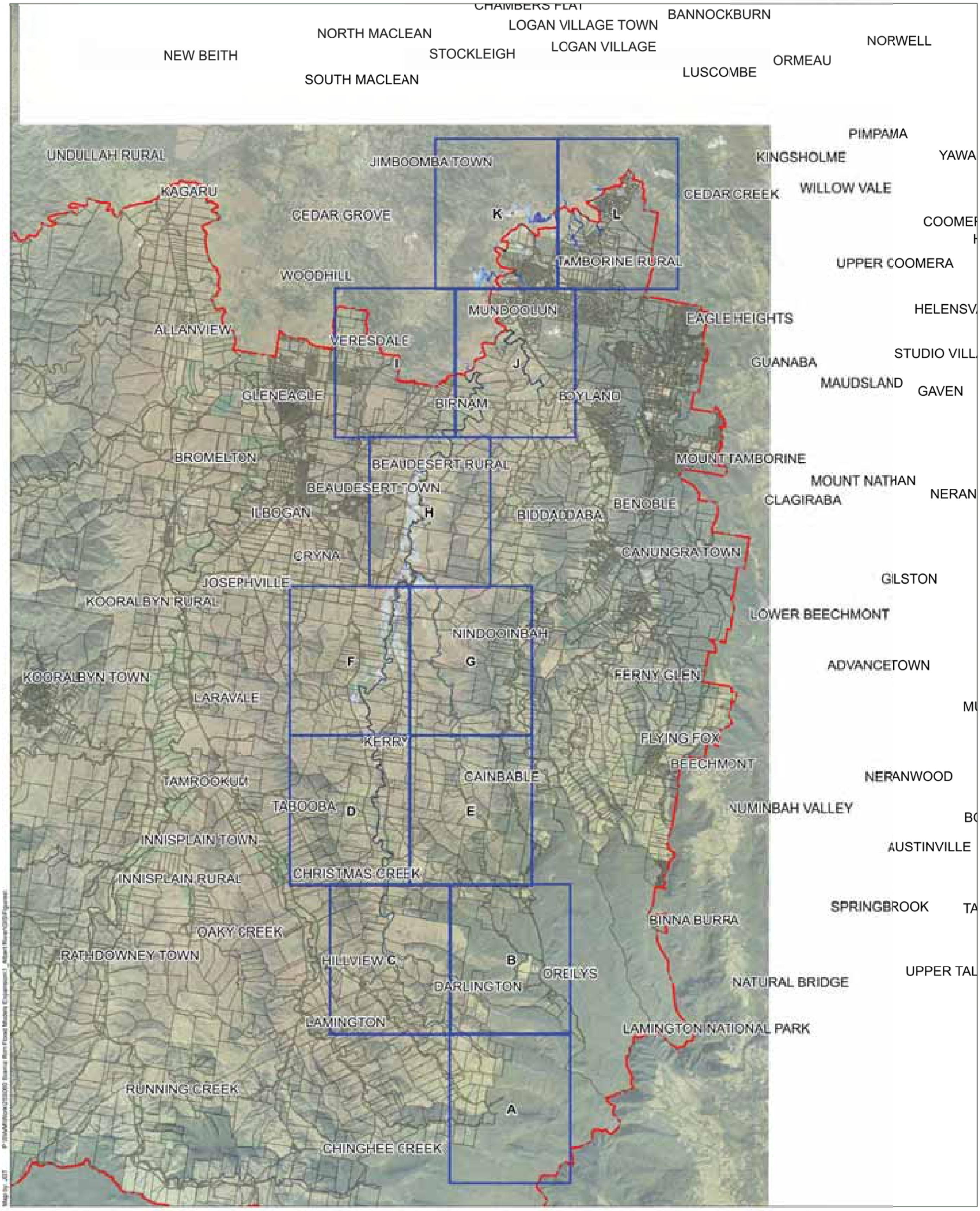
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E2-I**

10% AEP Event - Peak Velocities

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:

1:200,000

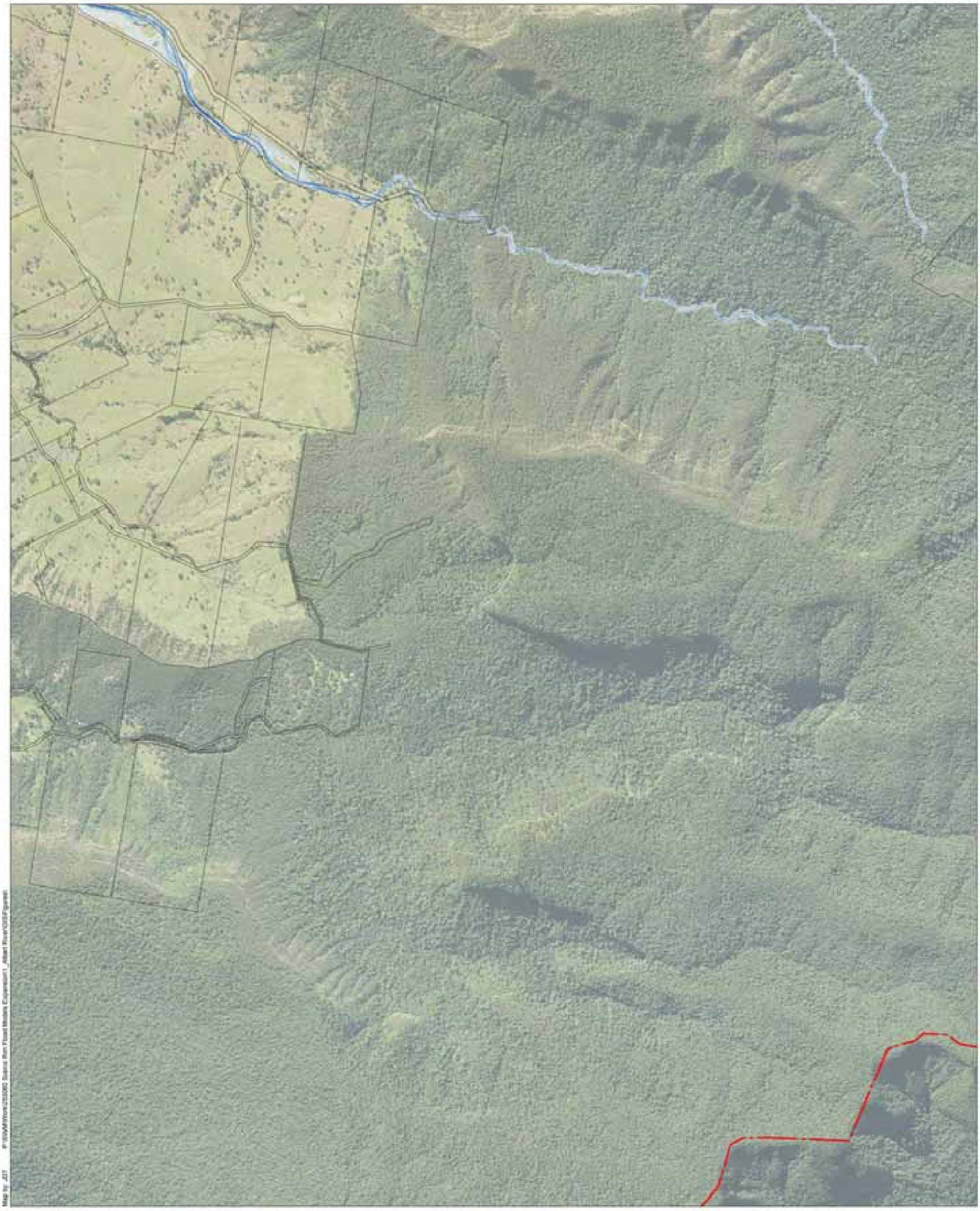
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3**

10% AEP Event - Peak Depth Map



Legend

Depth (m)

SRRC Boundary	0.0 to 0.5	3.0 to 3.5	
Cadastral Boundary	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: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study

Figure E3-a

10% AEP Event - Peak Depth Map

Legend

Depth (m)

SRRC Boundary	0.0 to 0.5
Cadastral Boundary	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

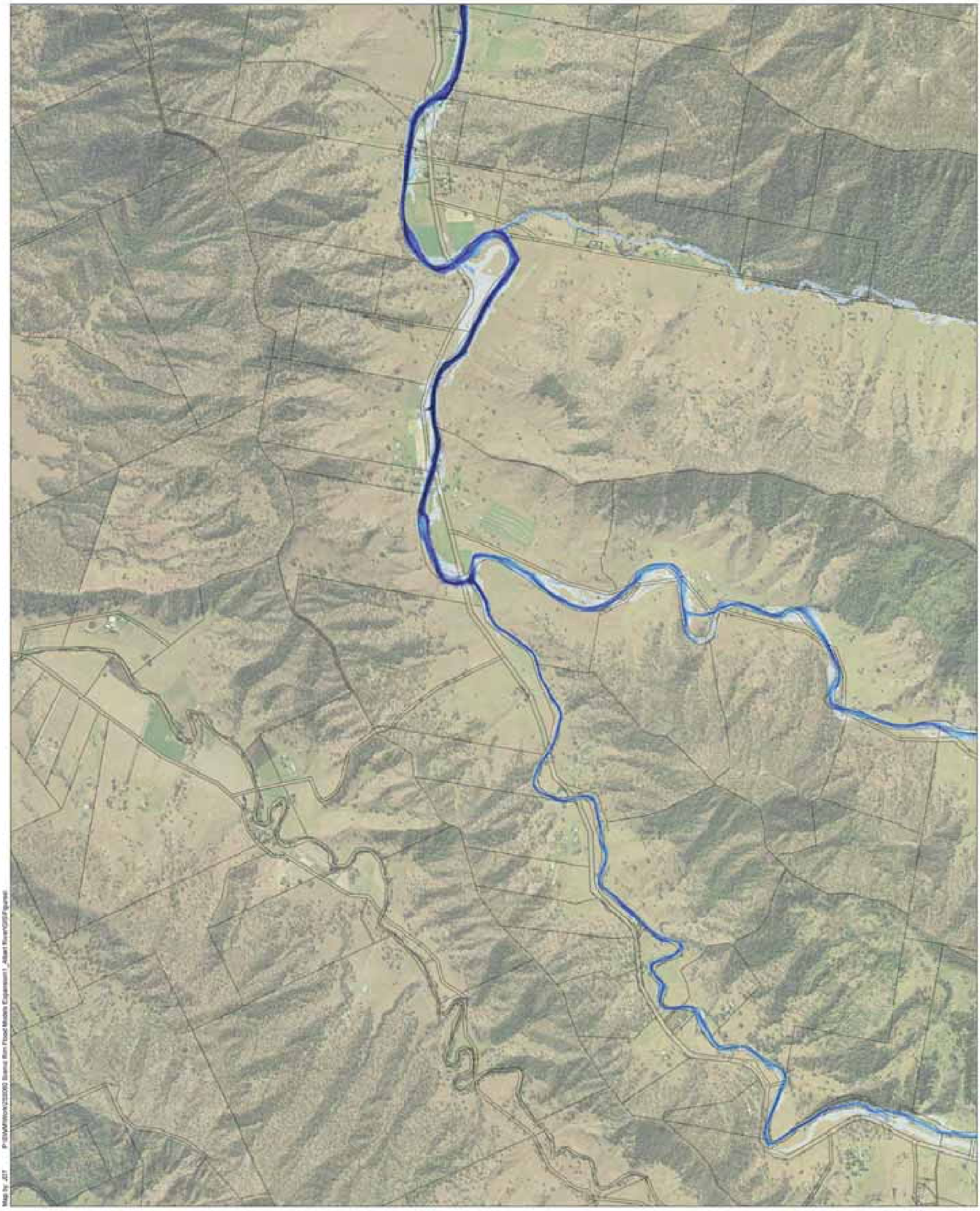
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-b**

10% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

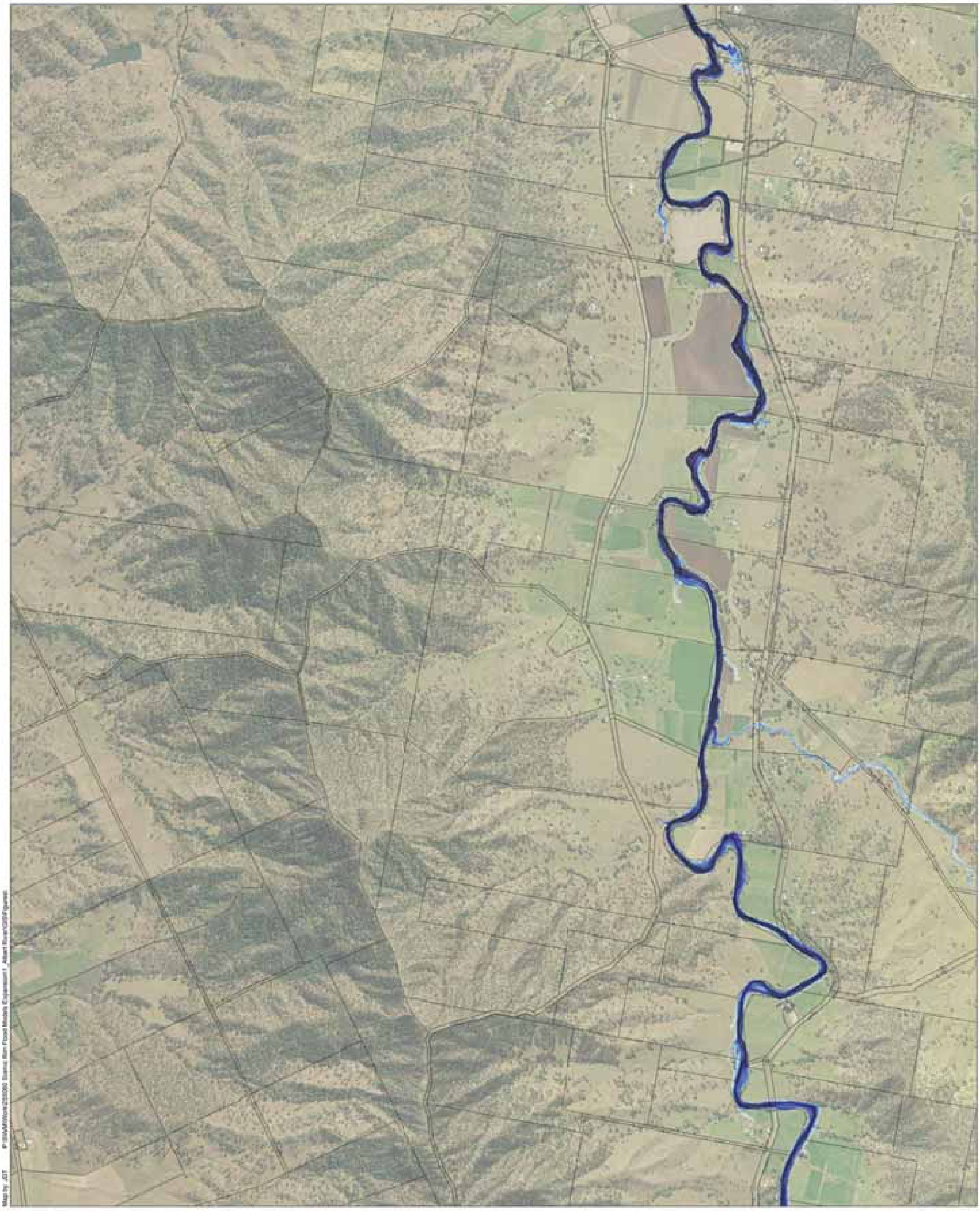
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-c**

10% 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:

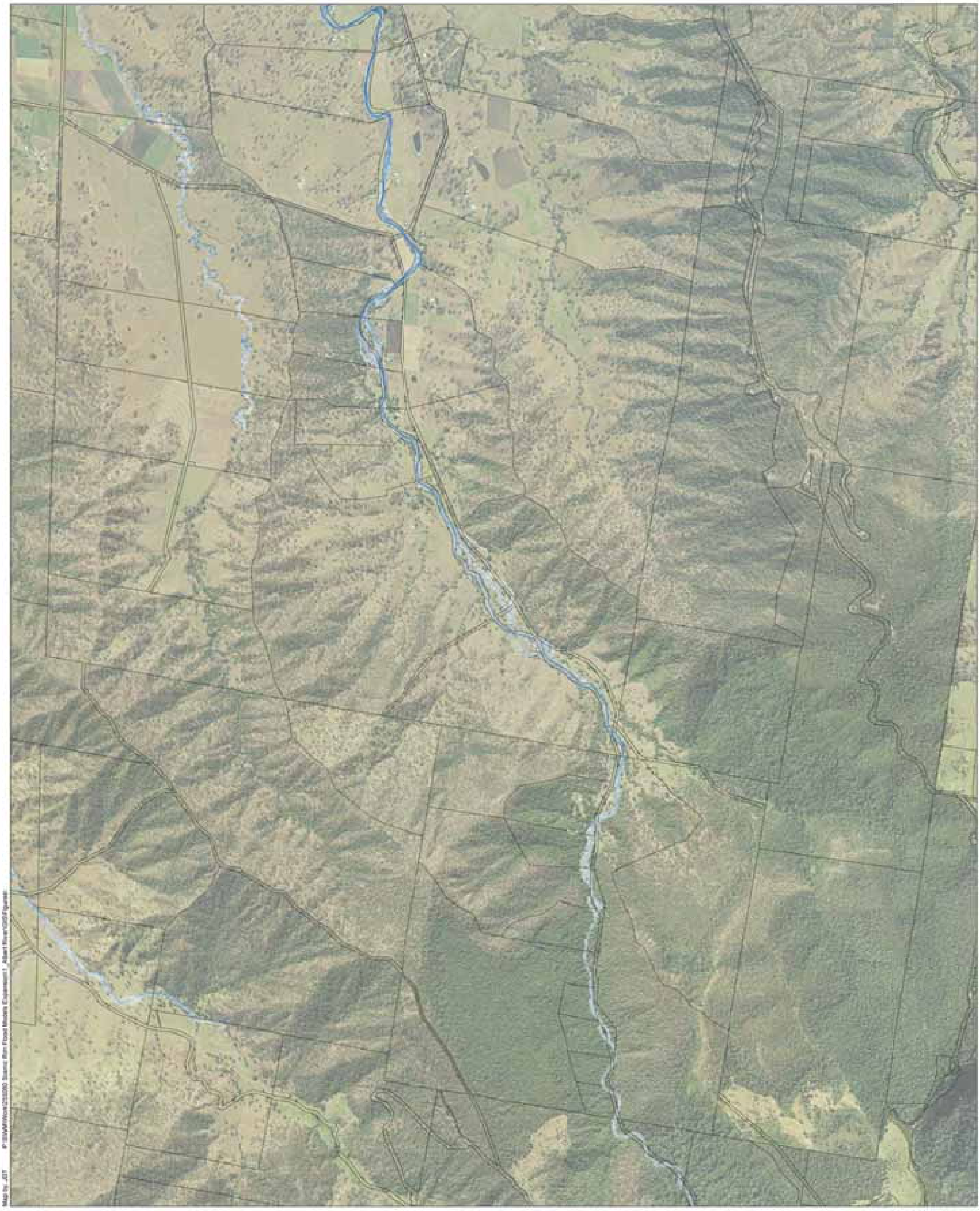
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E3-d**

10% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary

Cadastral Boundary

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

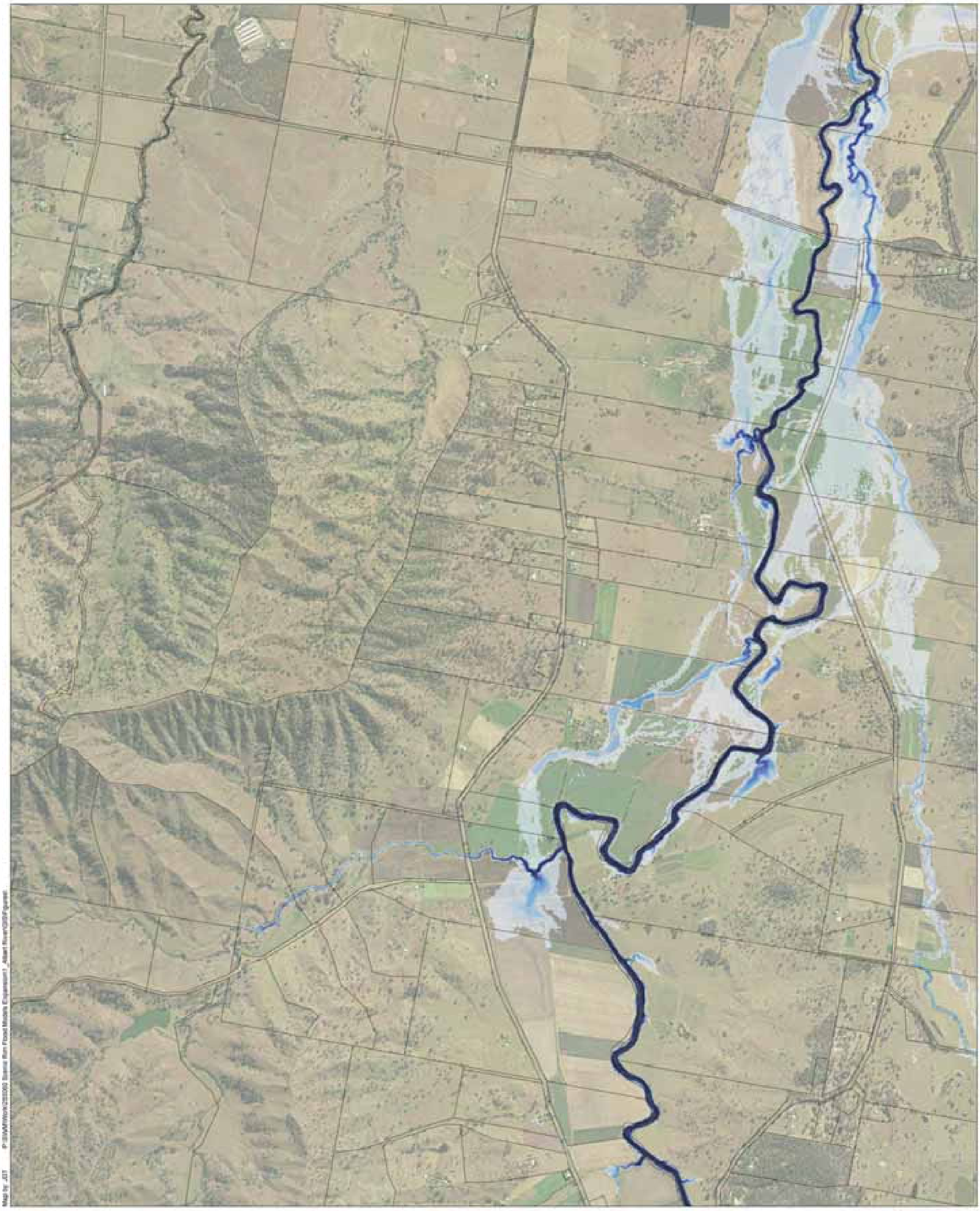
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-e**

10% AEP Event - Peak Depth Map



Legend

	Depth (m)	
SRRC Boundary	0.0 to 0.5	3.0 to 3.5
	0.5 to 1.0	3.5 to 4.0
Cadastral Boundary	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

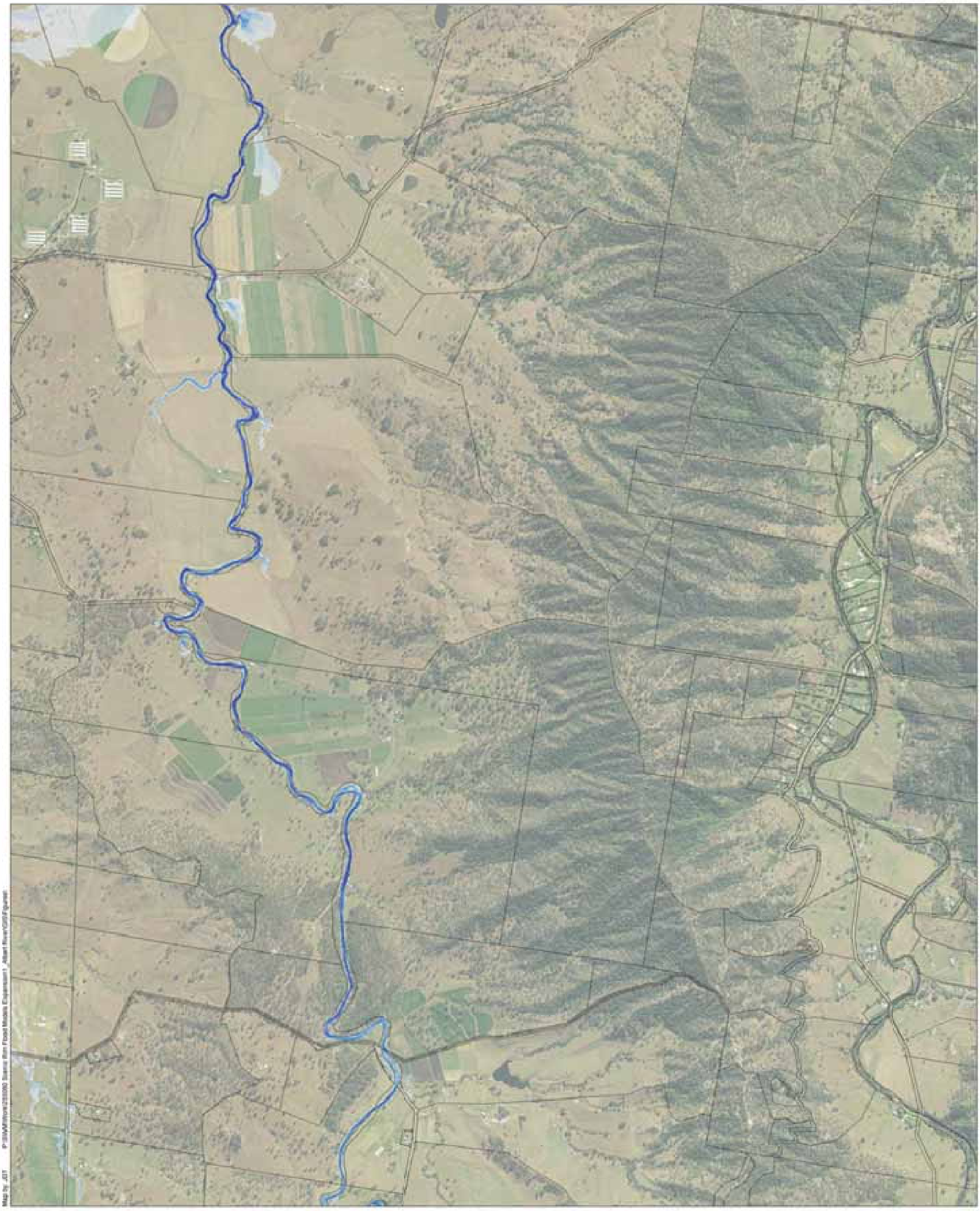
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-f**

10% AEP Event - Peak Depth Map

aurecon



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

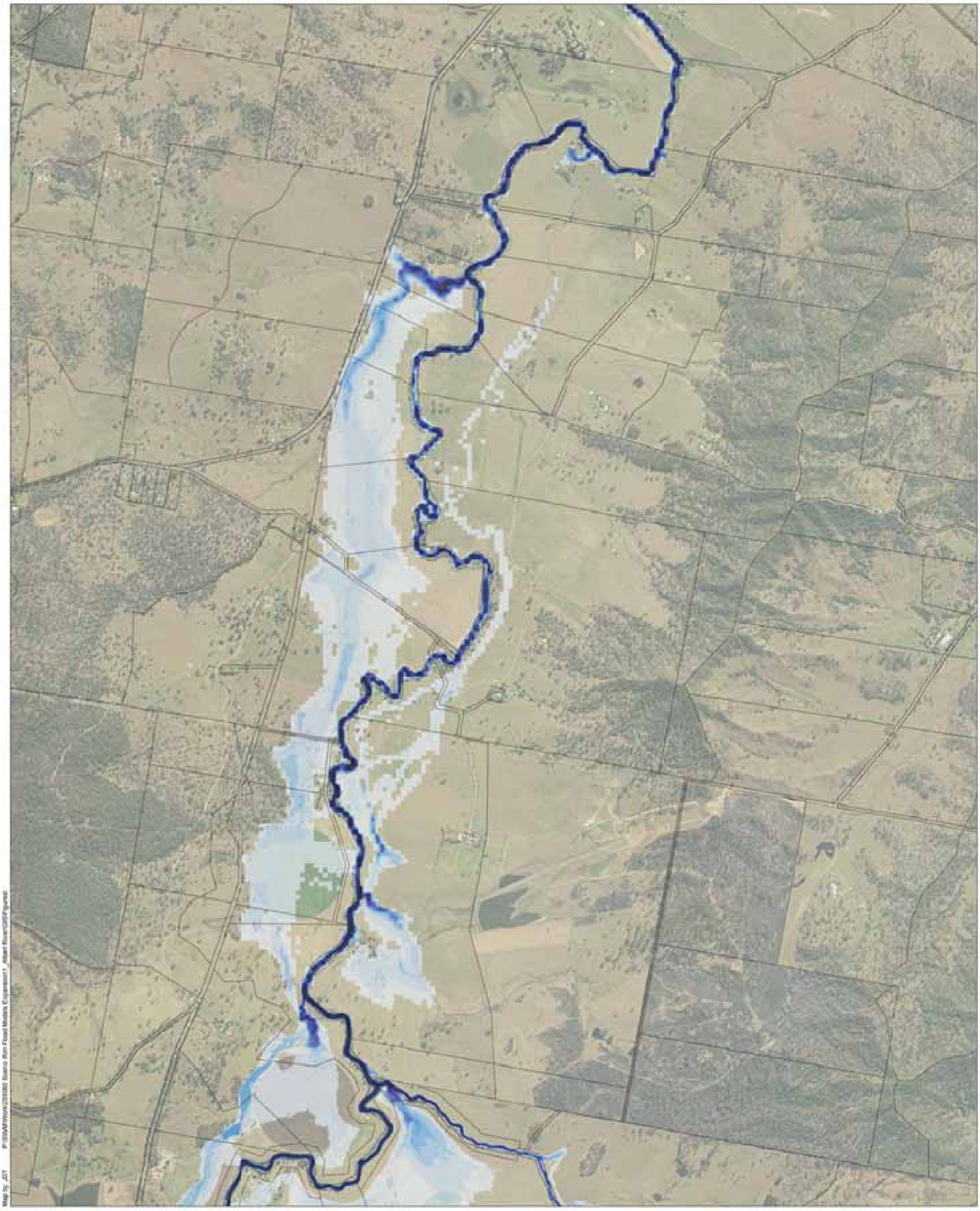
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-g**

10% AEP Event - Peak Depth Map



Legend

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	

SRRC Boundary

Cadastral Boundary

Notes:

1:25,000

0 625 m 1,250 m

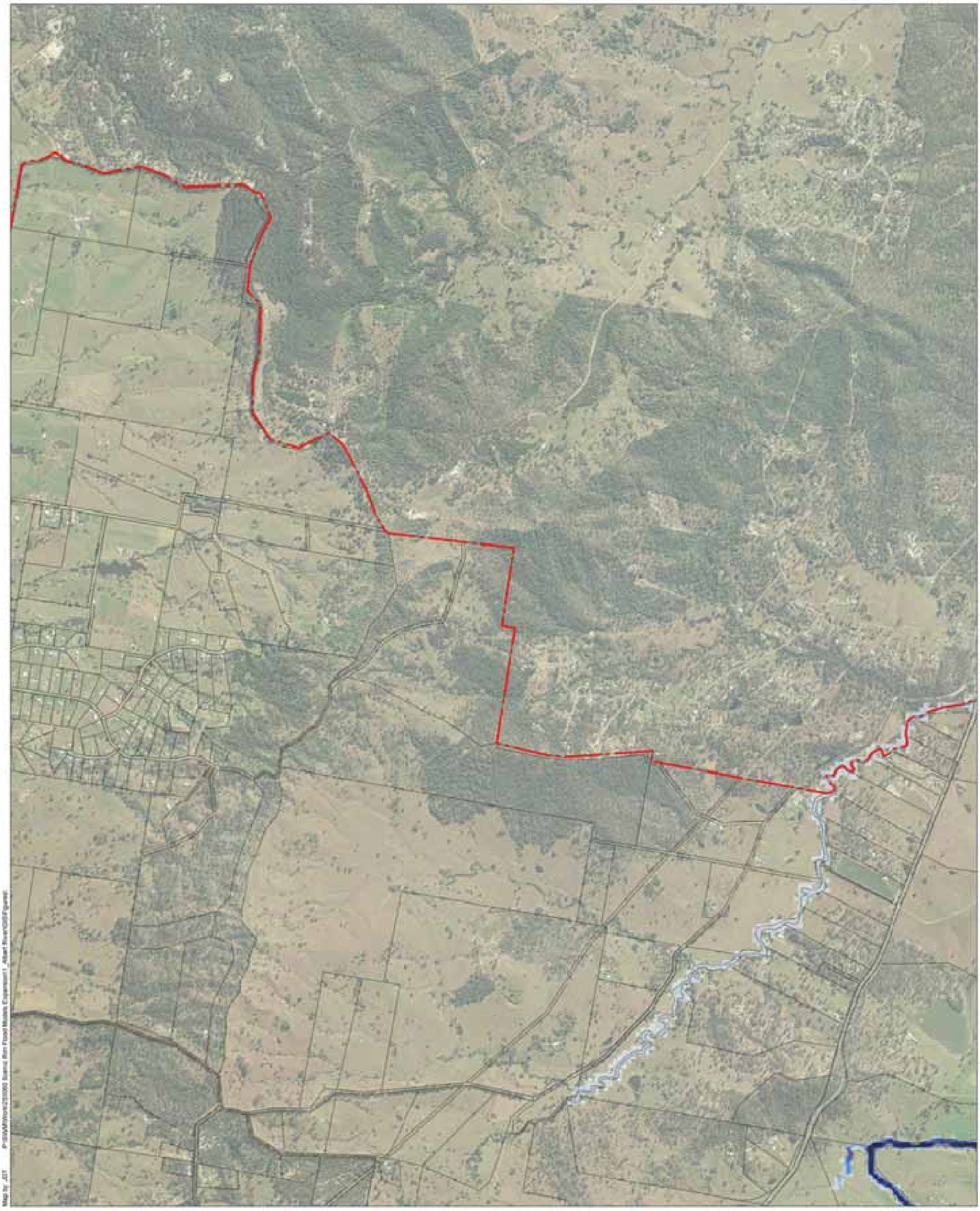
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-h**

10% AEP Event - Peak Depth Map

aurecon



Legend

SRRC Boundary

Cadastral Boundary

Depth (m)

Depth (m)	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

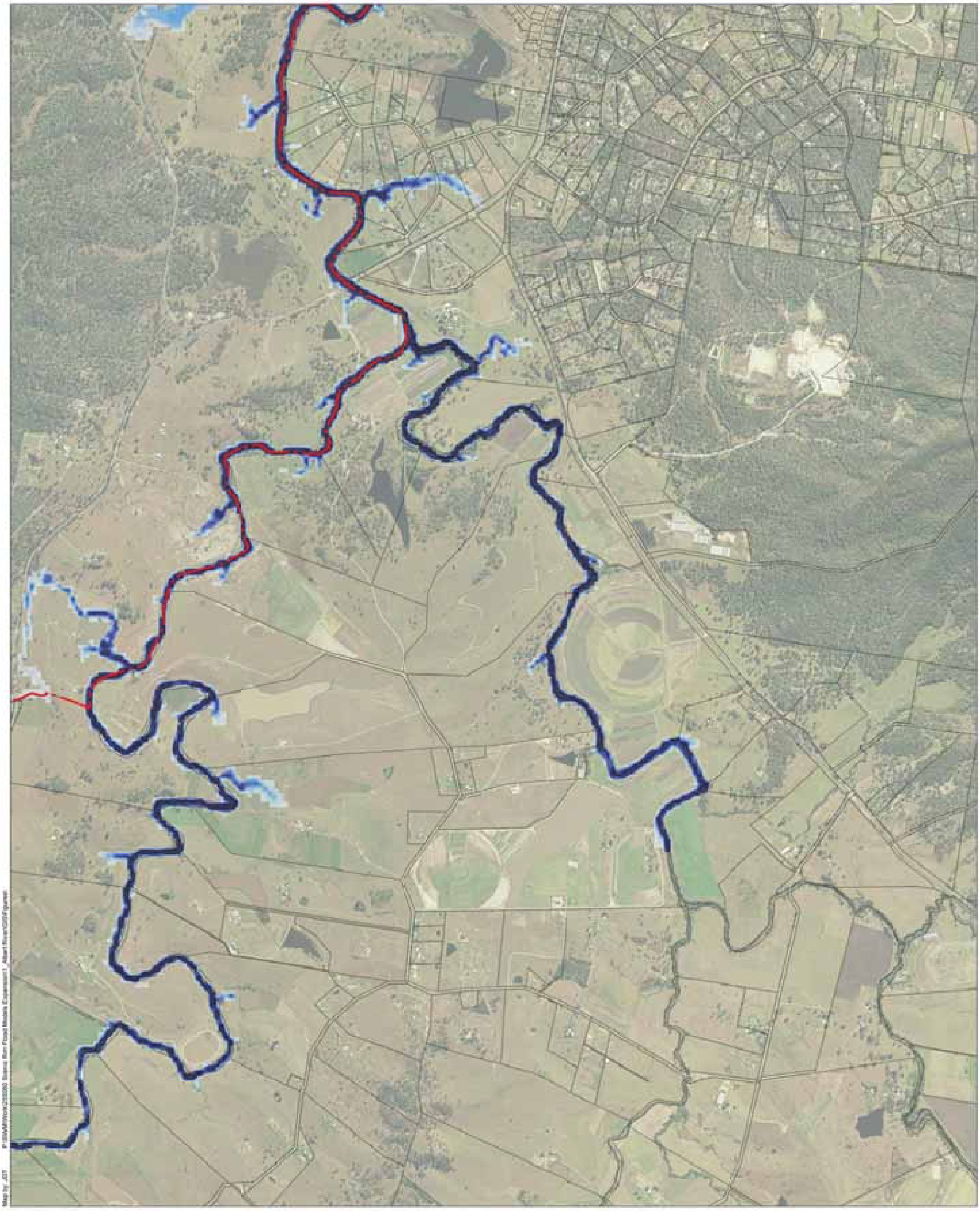
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-i**

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

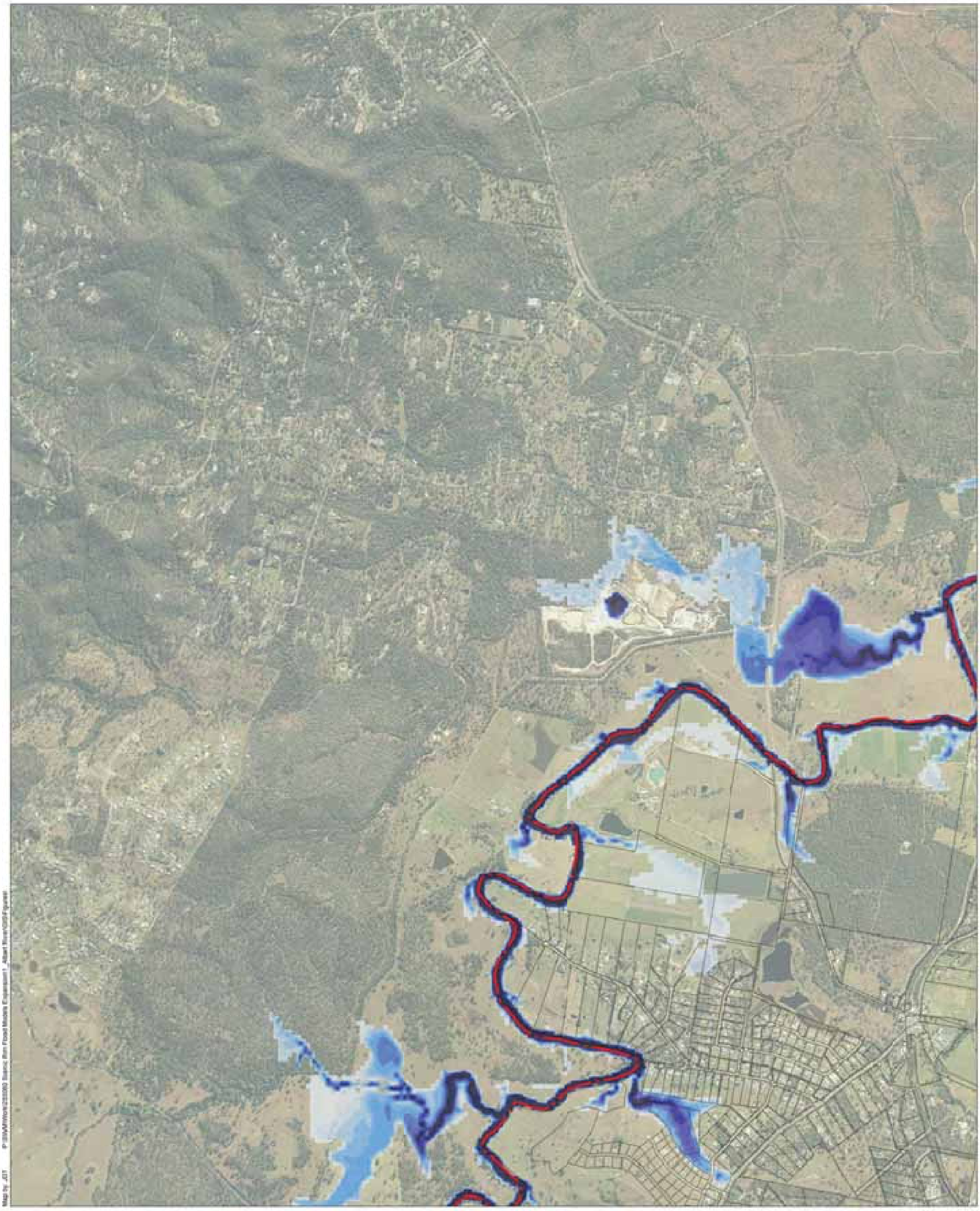
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-j**

10% AEP Event - Peak Depth Map



Legend

SRRC Boundary	Depth (m)	
Cadastral Boundary	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

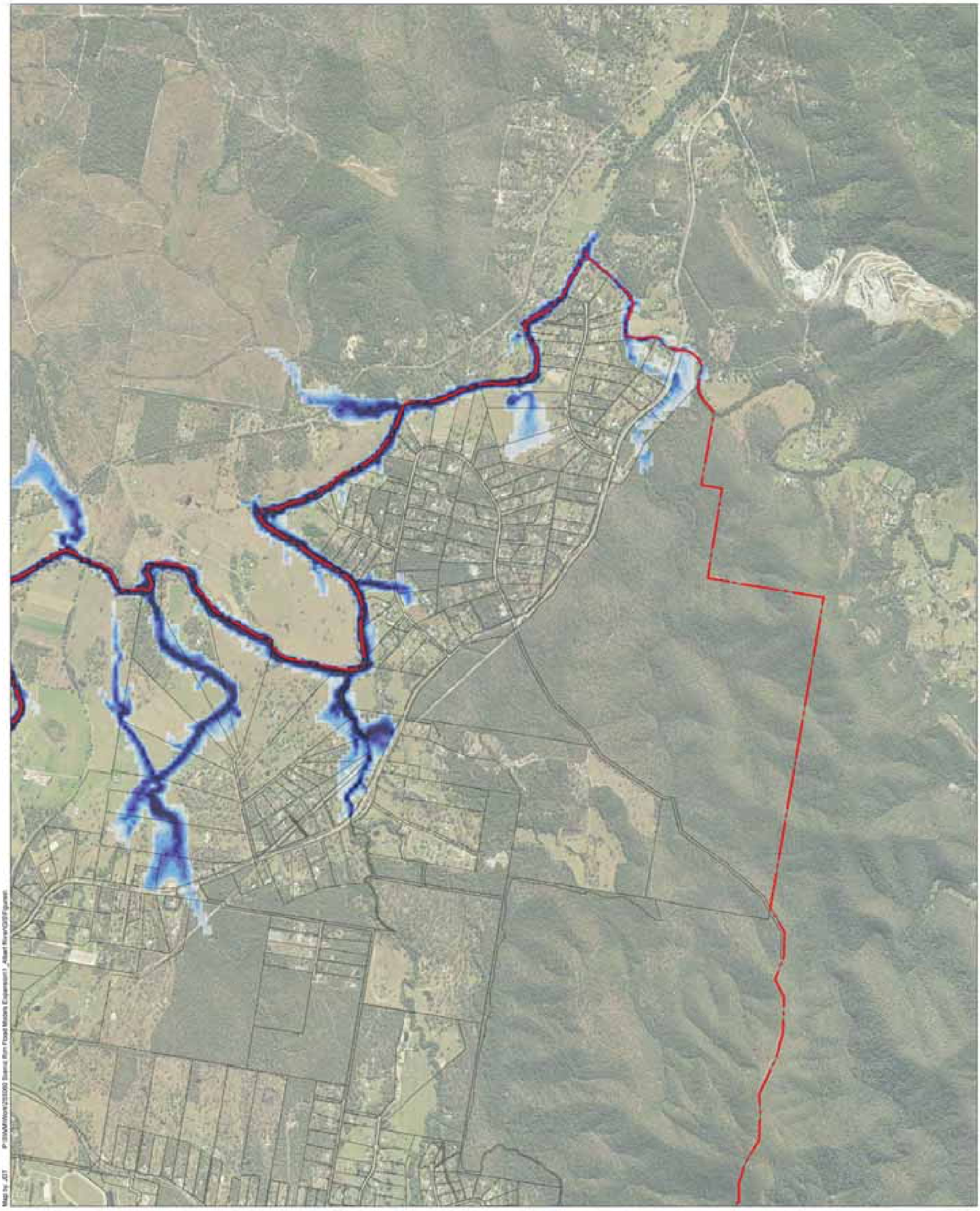
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-k**

10% AEP Event - Peak Depth Map

aurecon



Legend

Depth (m)

SRRC Boundary	
Cadastral Boundary	

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:

1:25,001

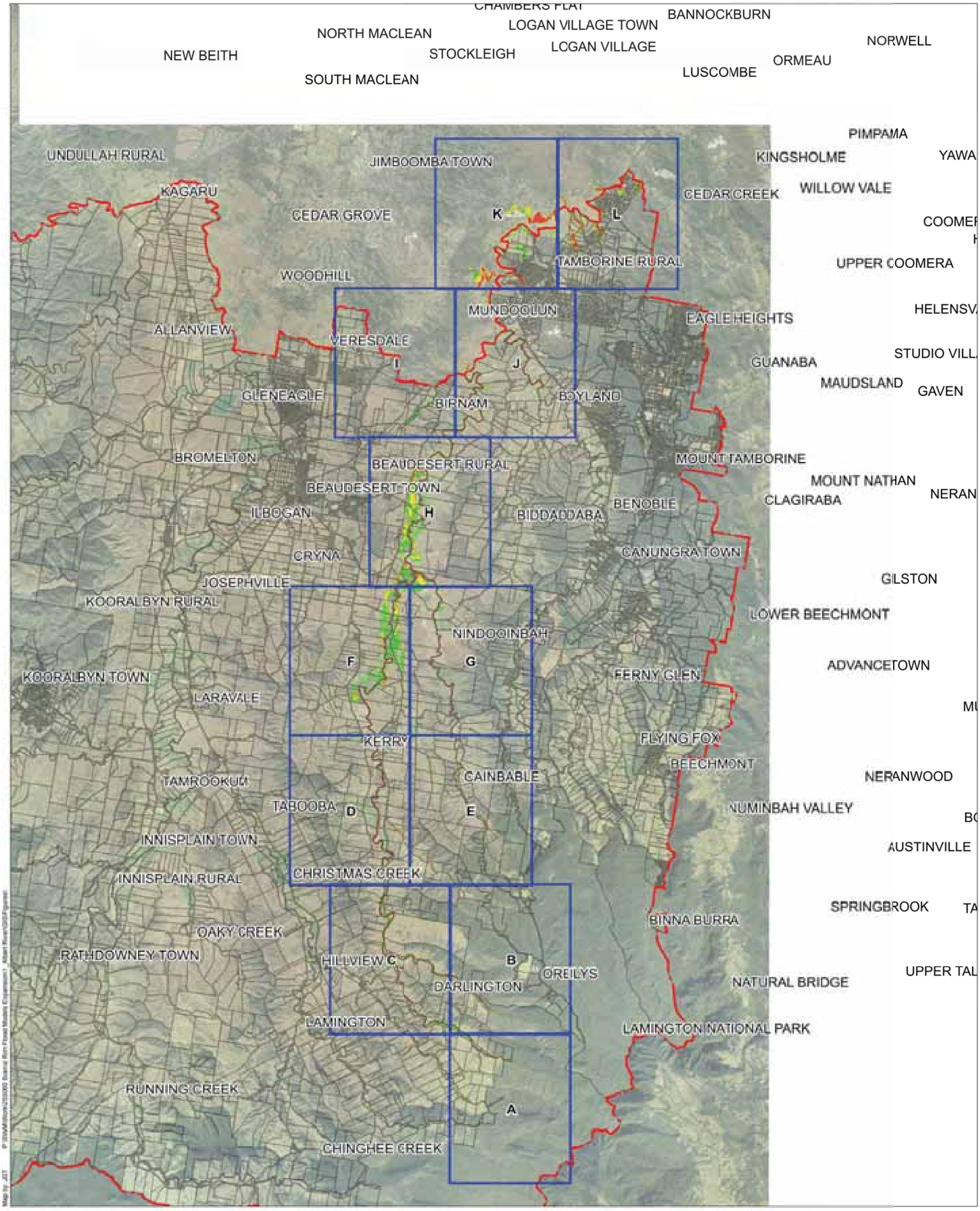
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E3-I**

10% AEP Event - Peak Depth Map



Legend

Notes:

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

1:200,000

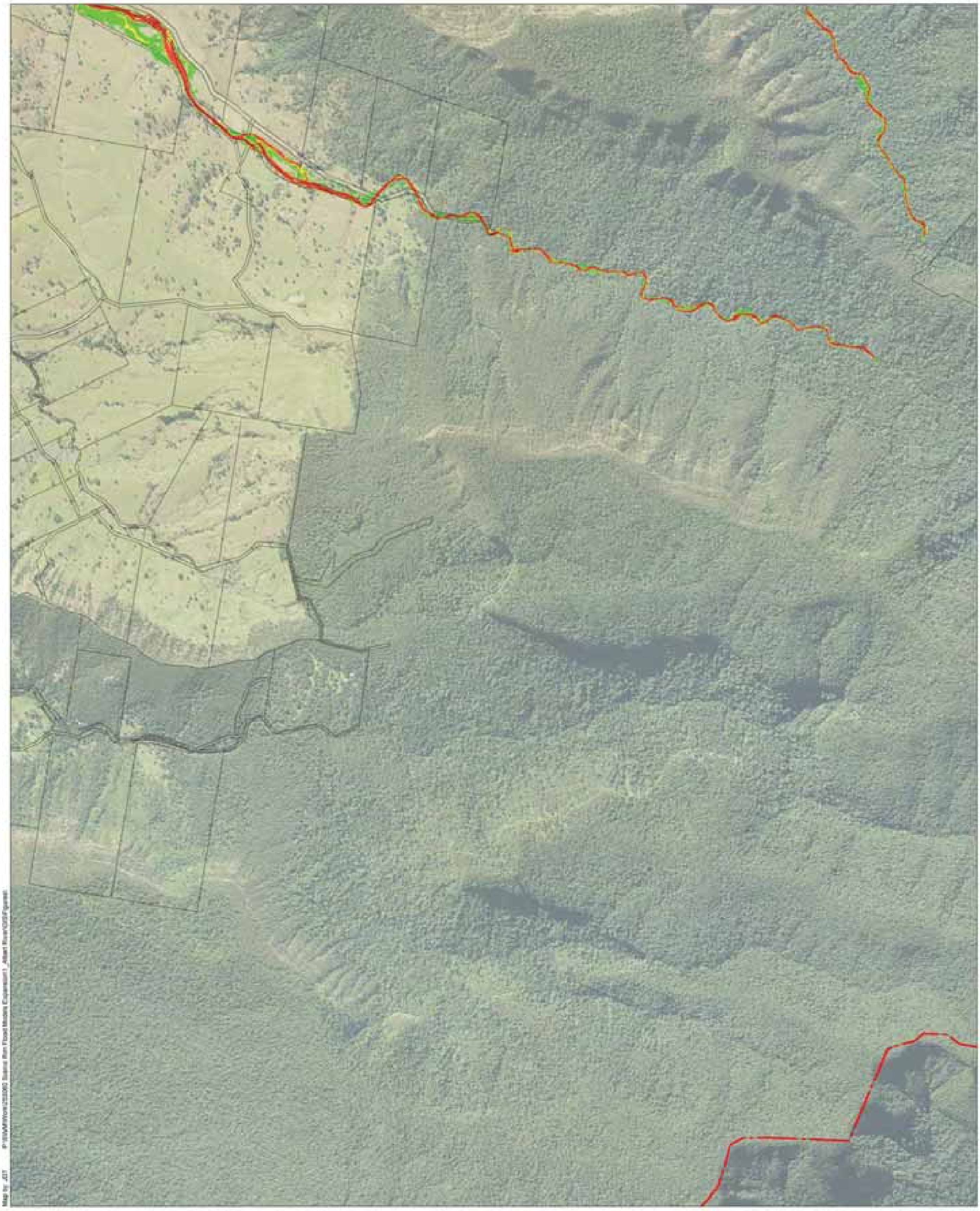
0 5,000 m 10,000 m

Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E4**

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

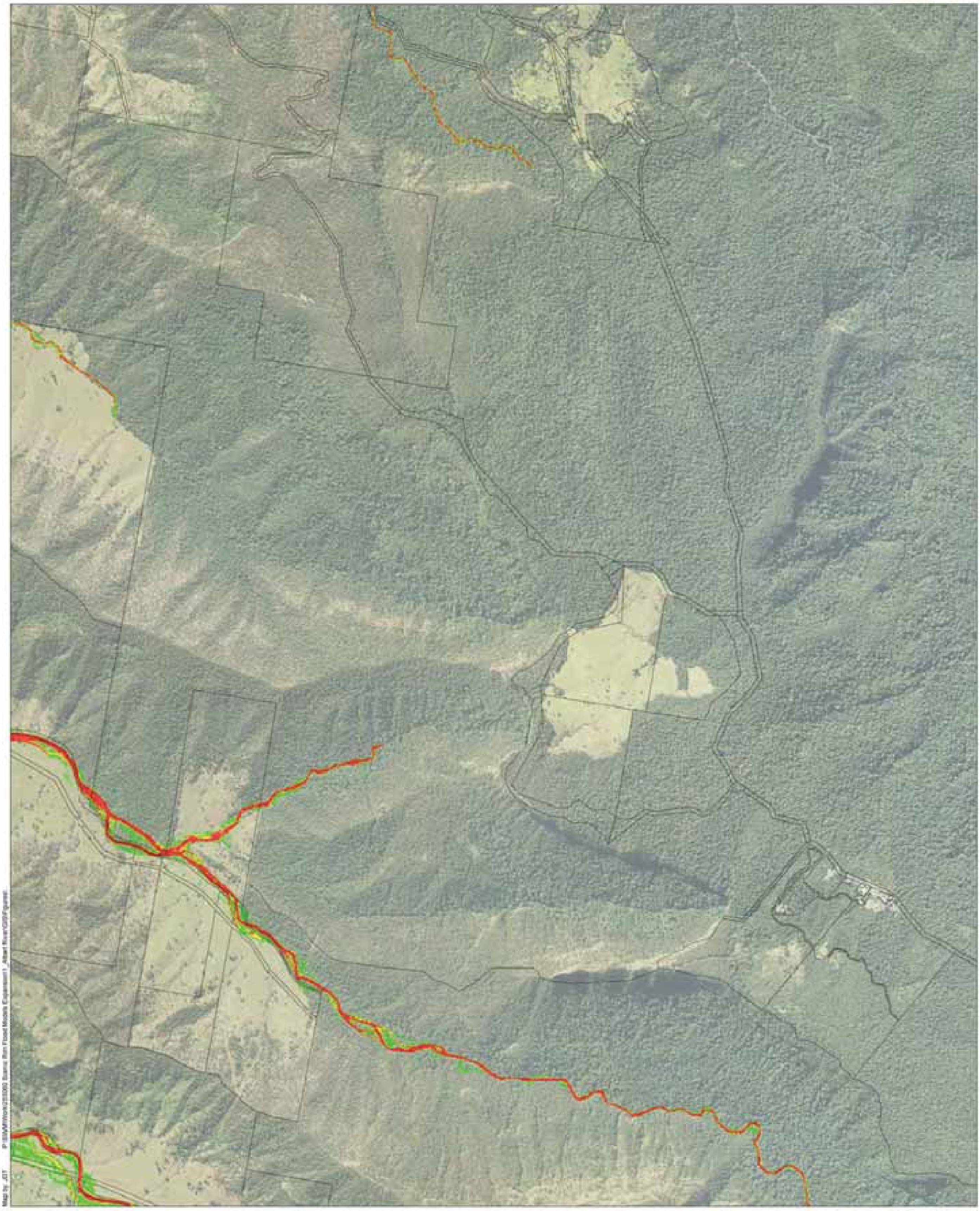
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E4-a**

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: 11/10/2017 Version: 0 Job No: 255060

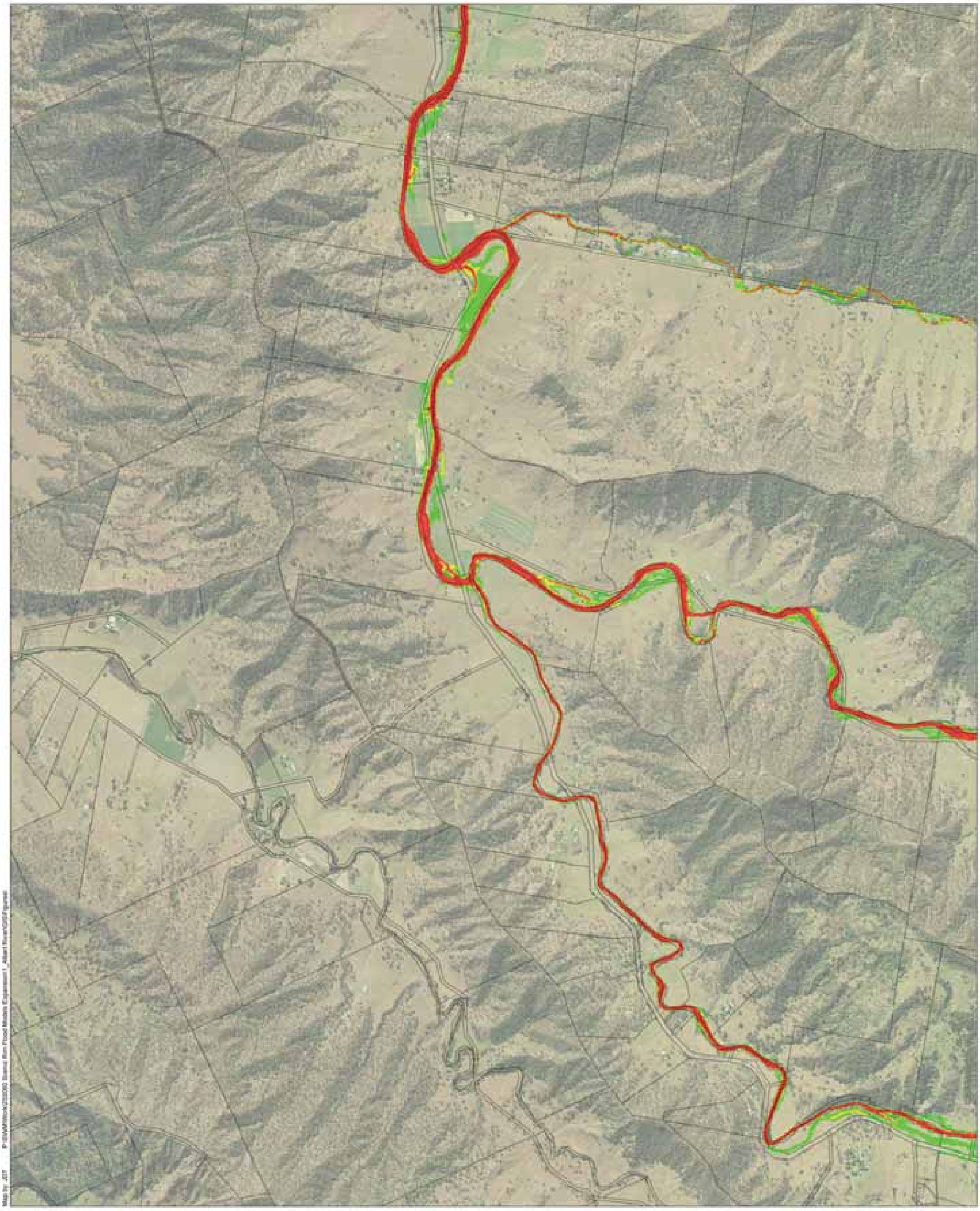
Projection: MGA Zone 56

Albert River Flood Study

Figure E4-b

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

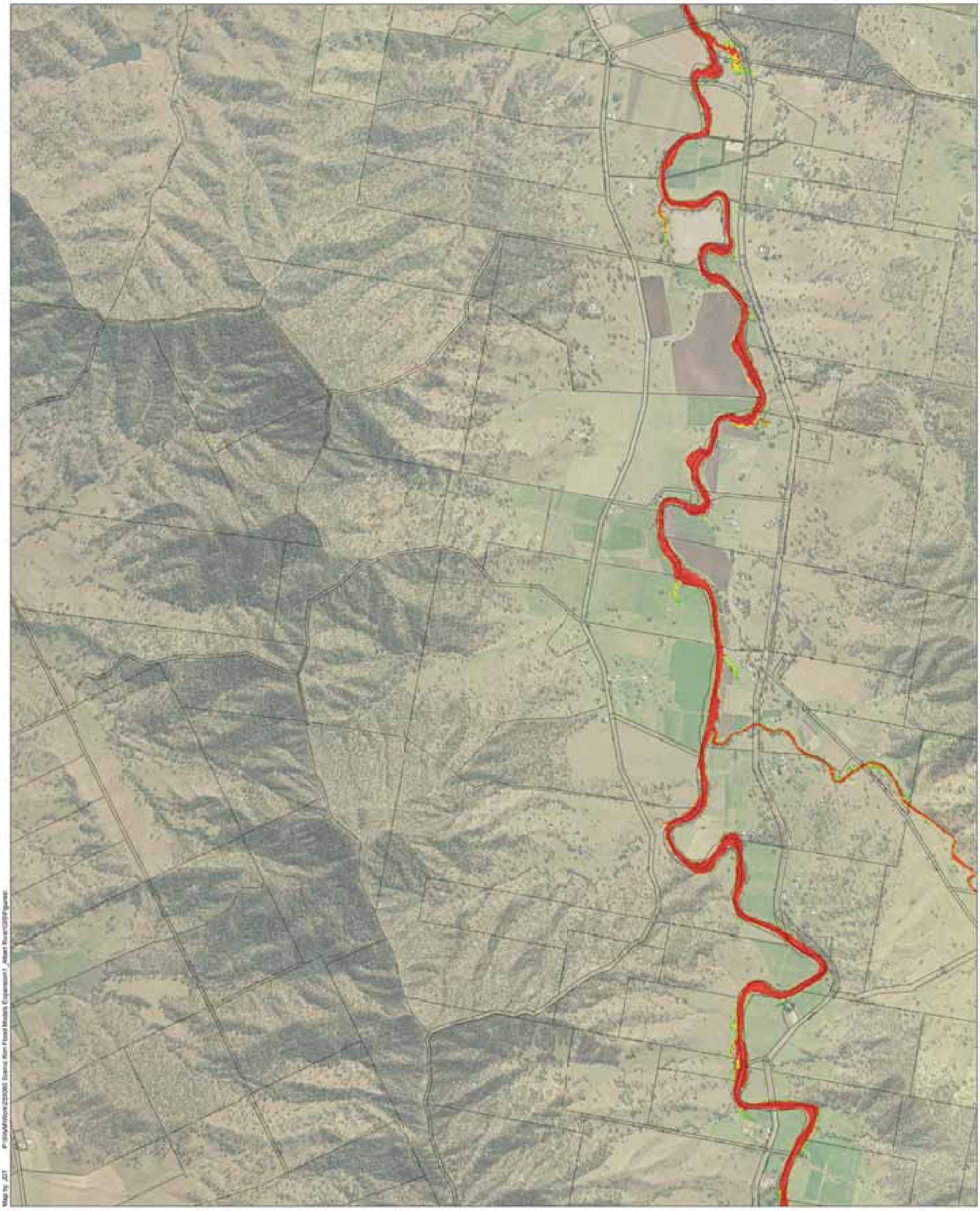
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-c**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

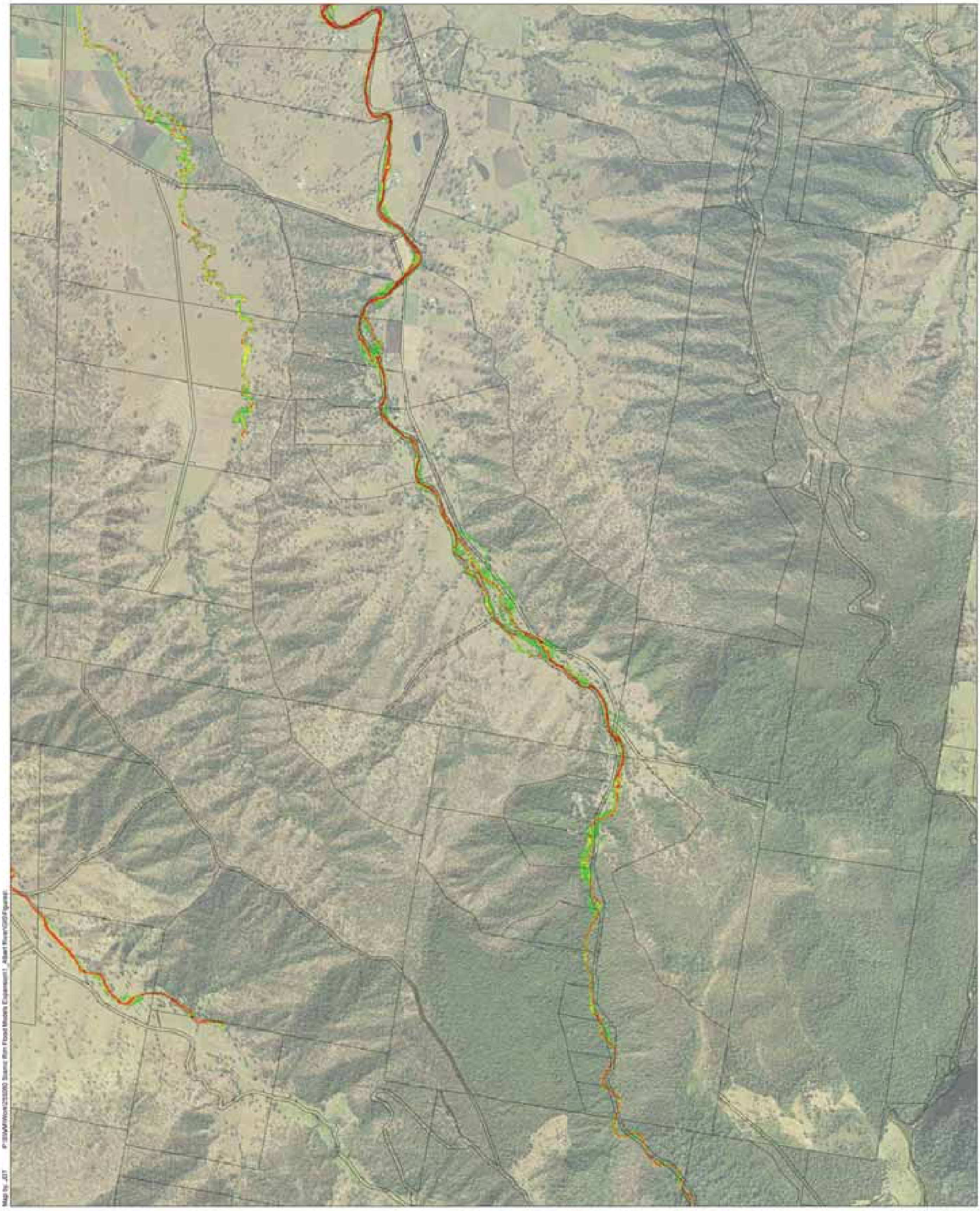
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-d**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

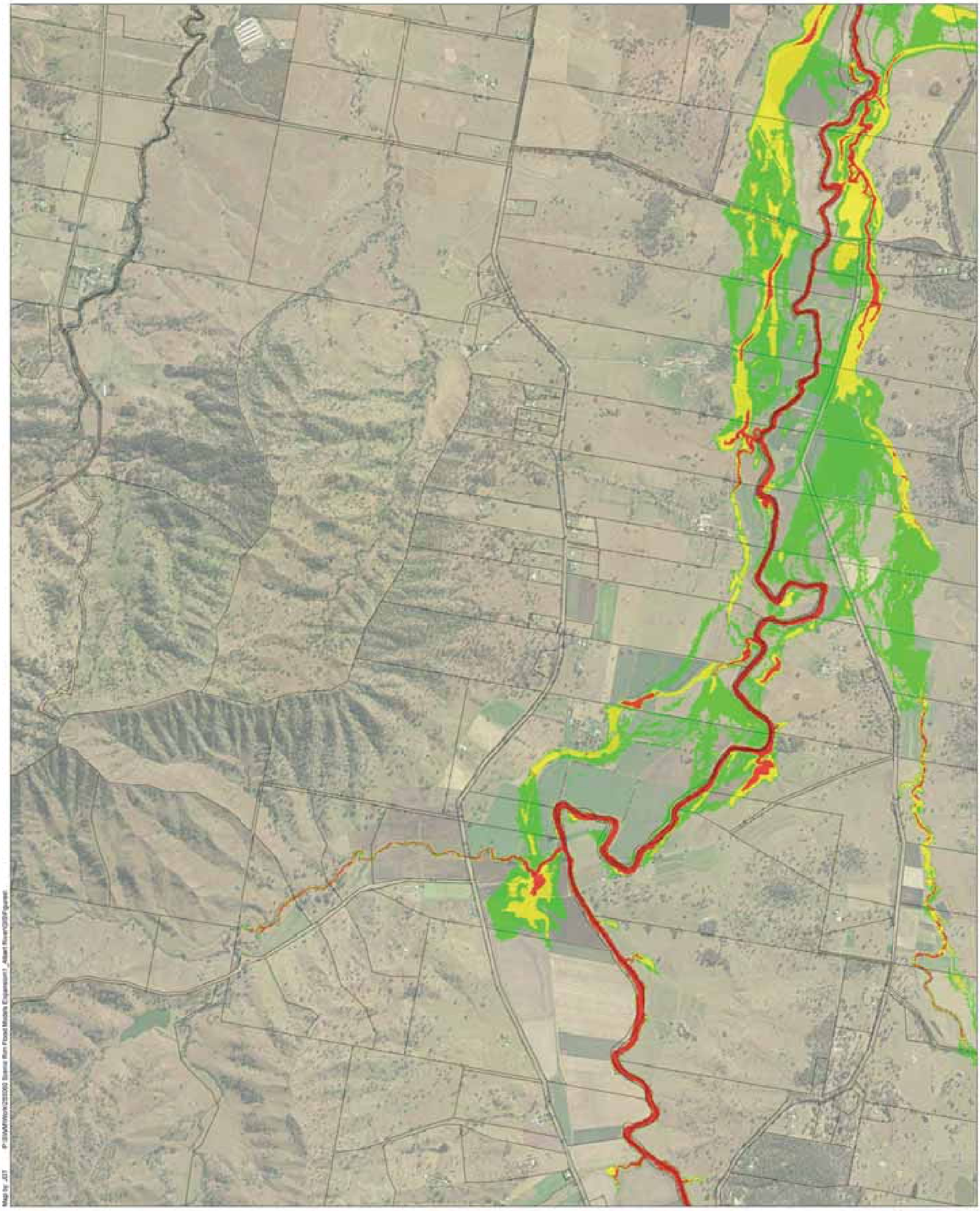
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-e**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

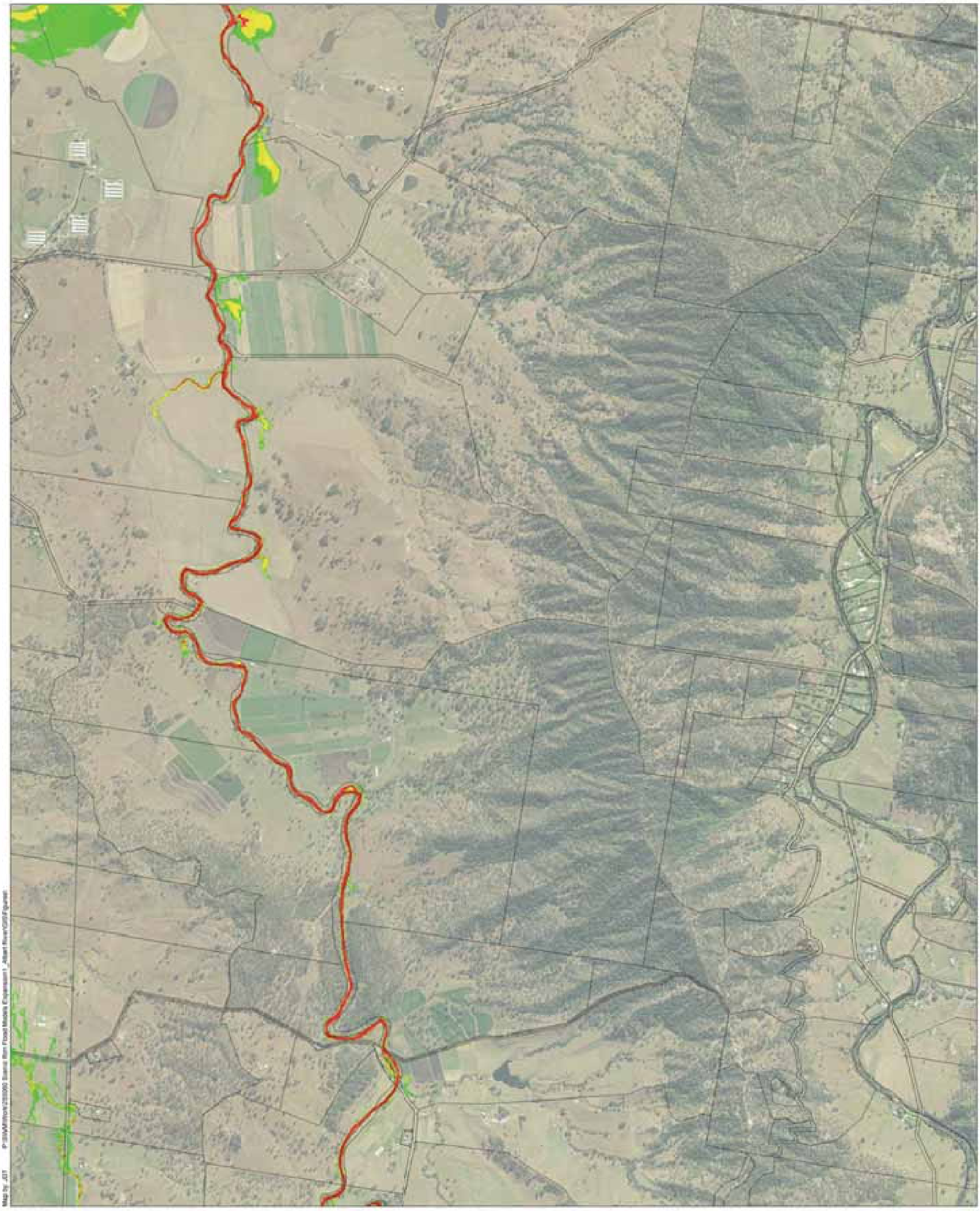
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-f**

10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

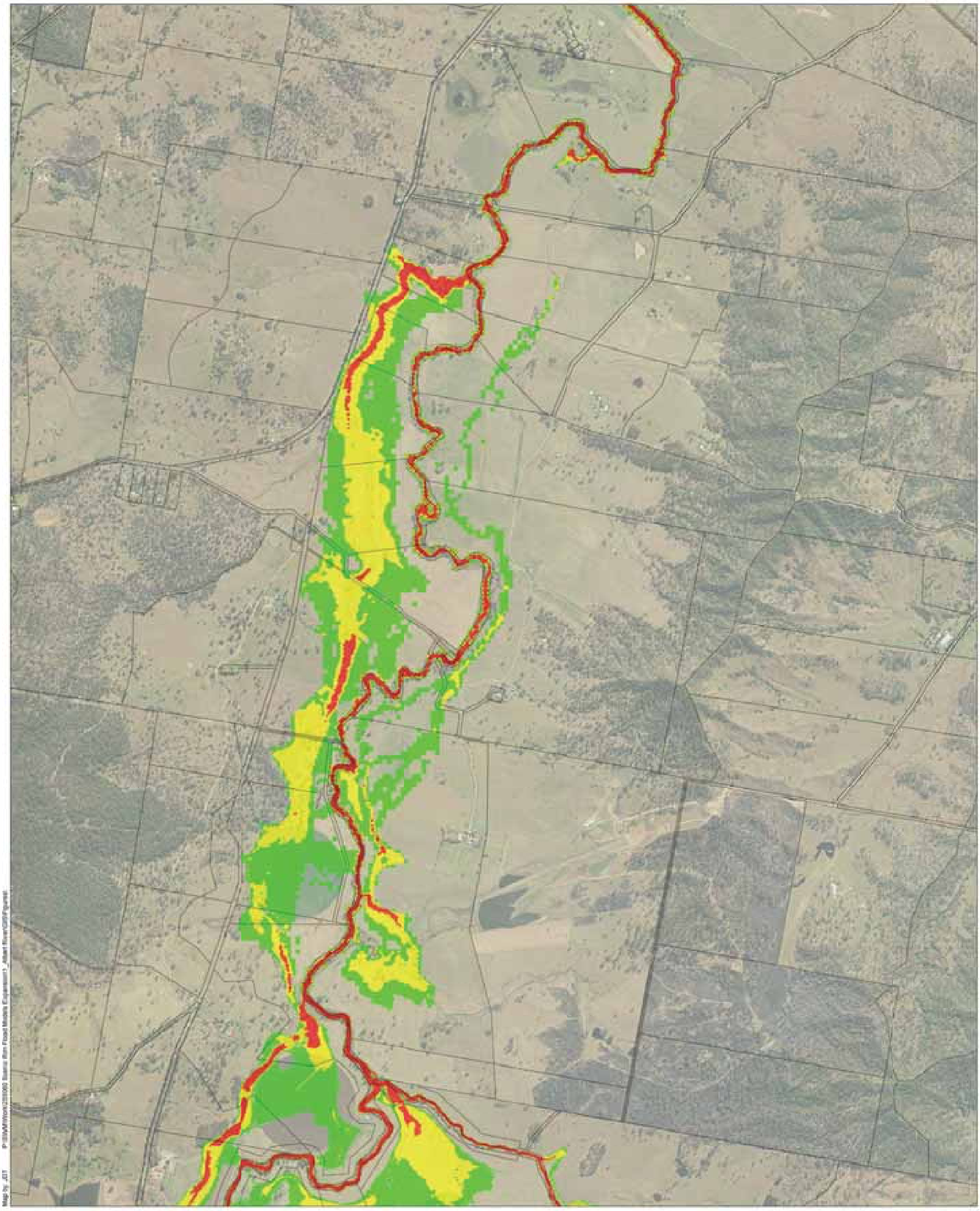
1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-g**

10% AEP Event - Peak Hazard Map

aurecon



Legend

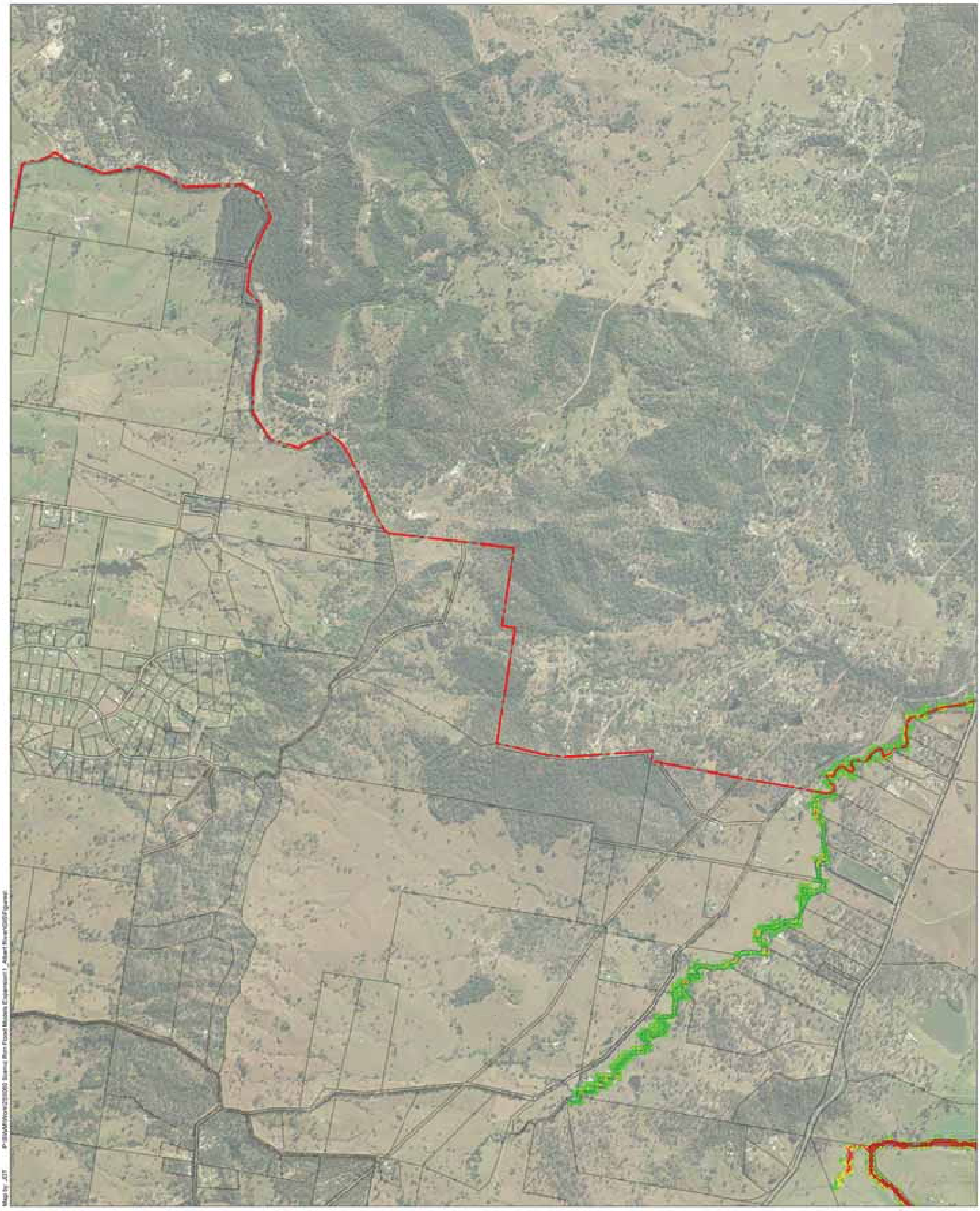
SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study
Figure E4-h
10% AEP Event - Peak Hazard Map



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

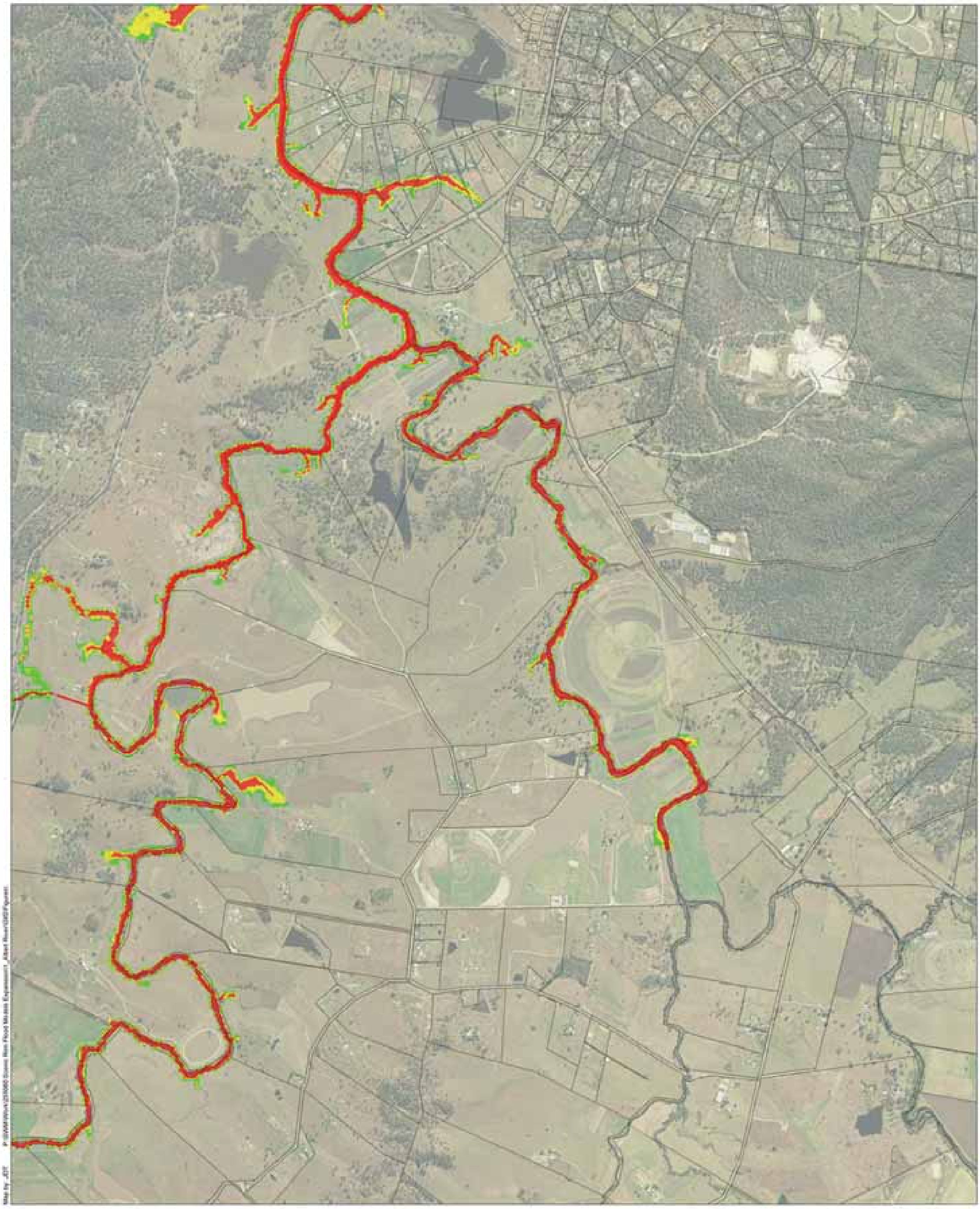
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River 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

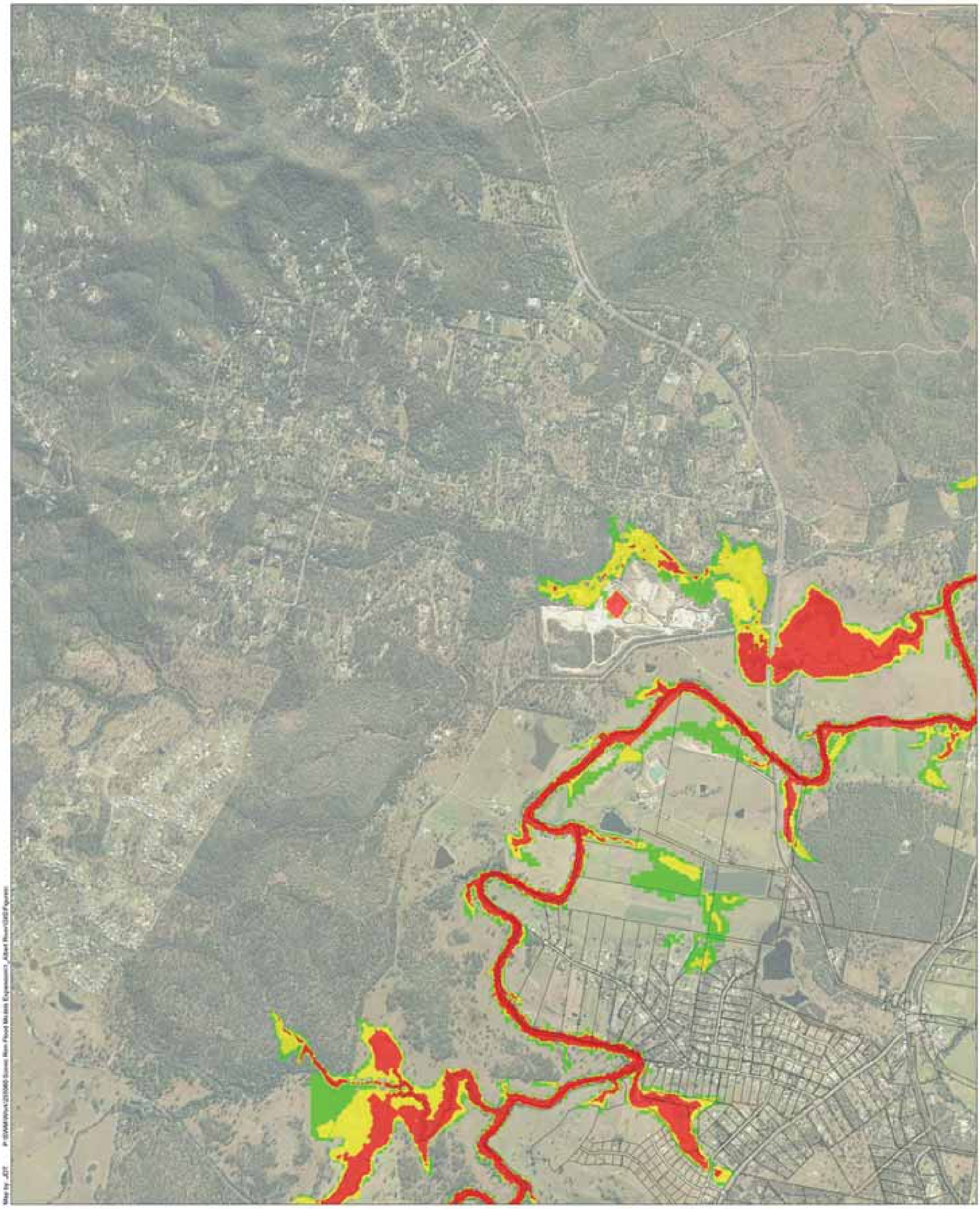
Date: 11/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E4-j**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary

Low Hazard
Medium Hazard
High Hazard

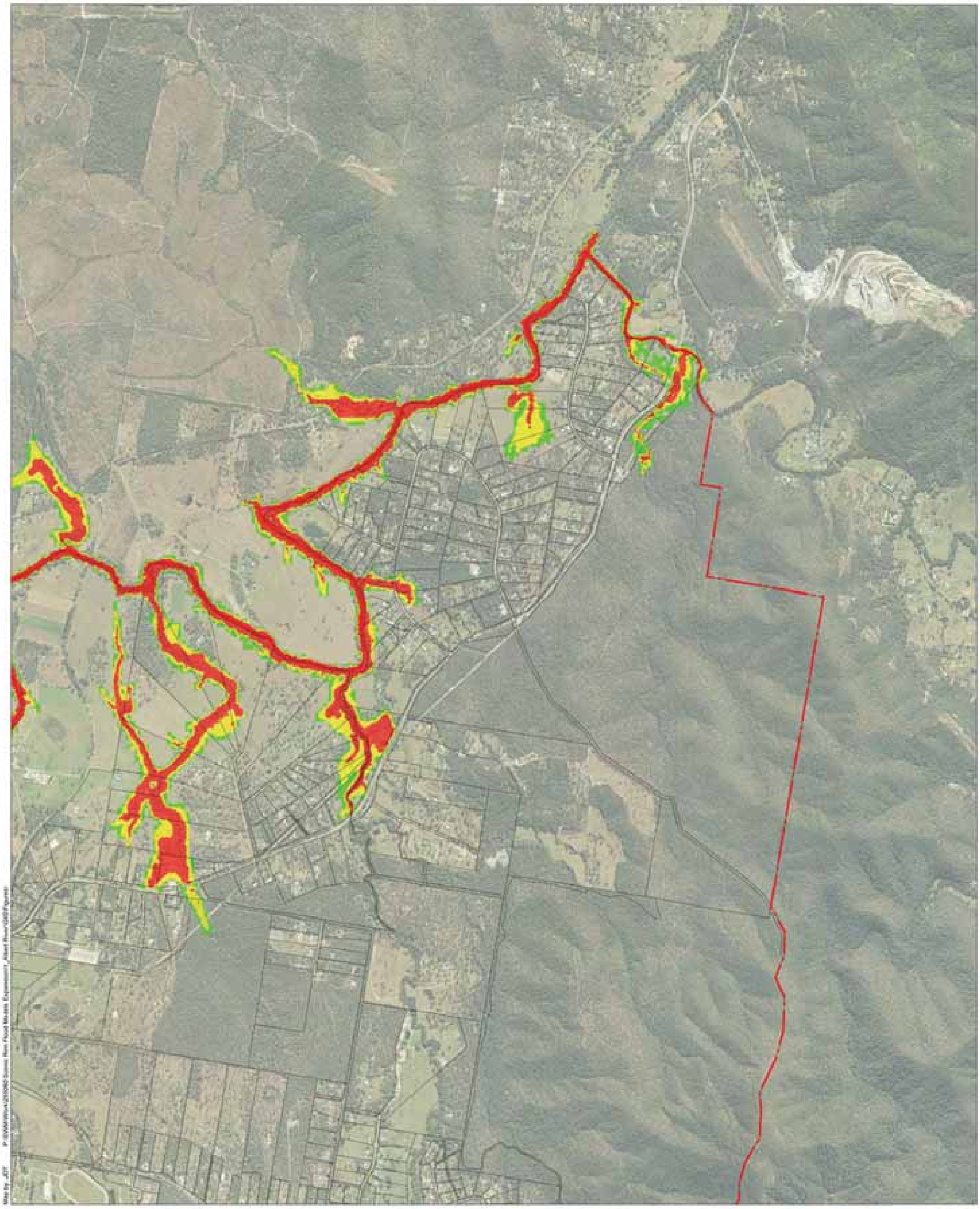
Notes:

1:25,000
0 625 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study
Figure E4-k
10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Cadastral Boundary
Low Hazard
Medium Hazard
High Hazard

Notes:

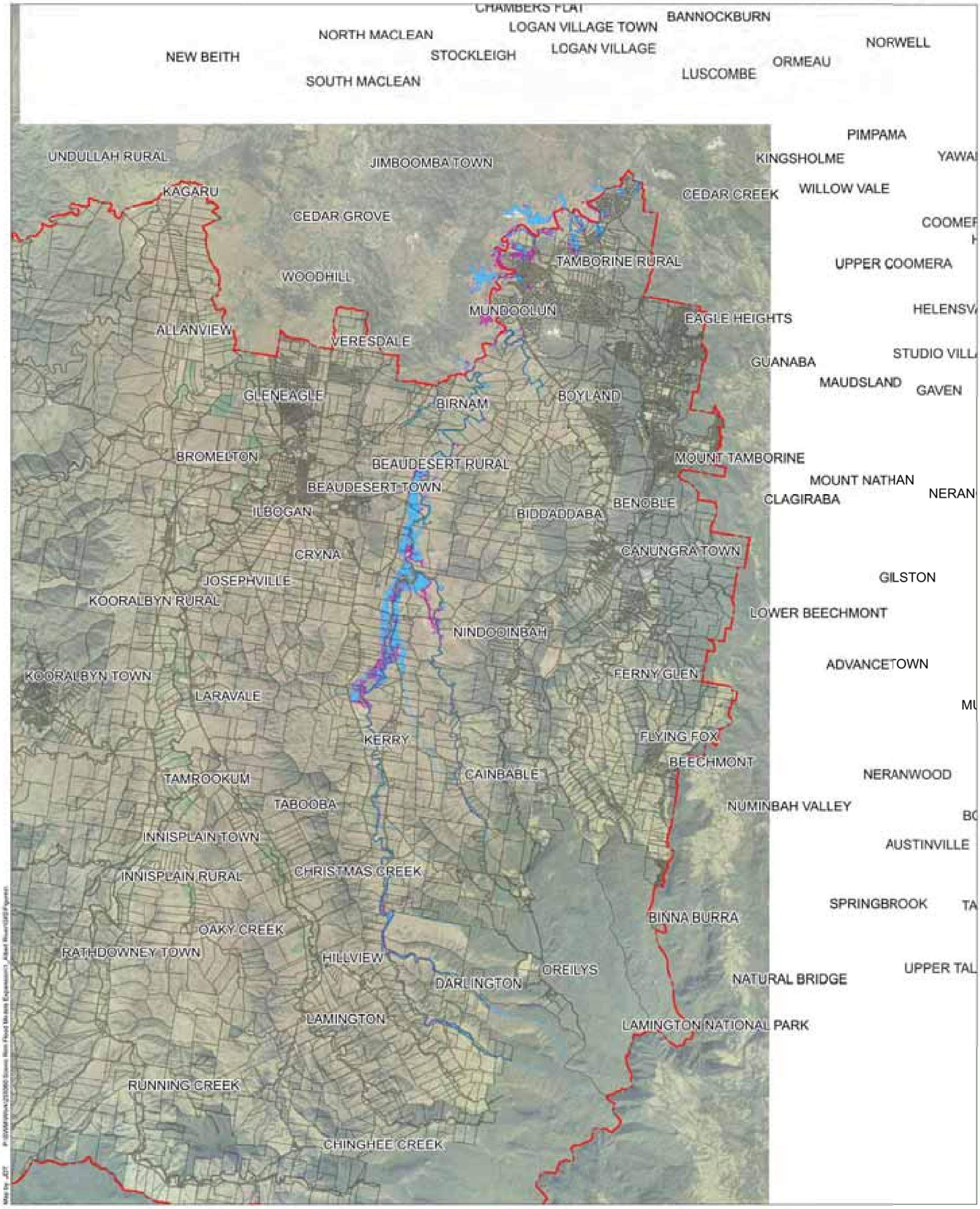
1:25,001
0 626 m 1,250 m

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure E4-I**

10% AEP Event - Peak Hazard Map

aurecon



Legend

SRRC Boundary
Inundation Extent
Cadastral Boundary
Climate Change Inundation Extent

Notes:

1:200,000

0 5,000 m 10,000 m

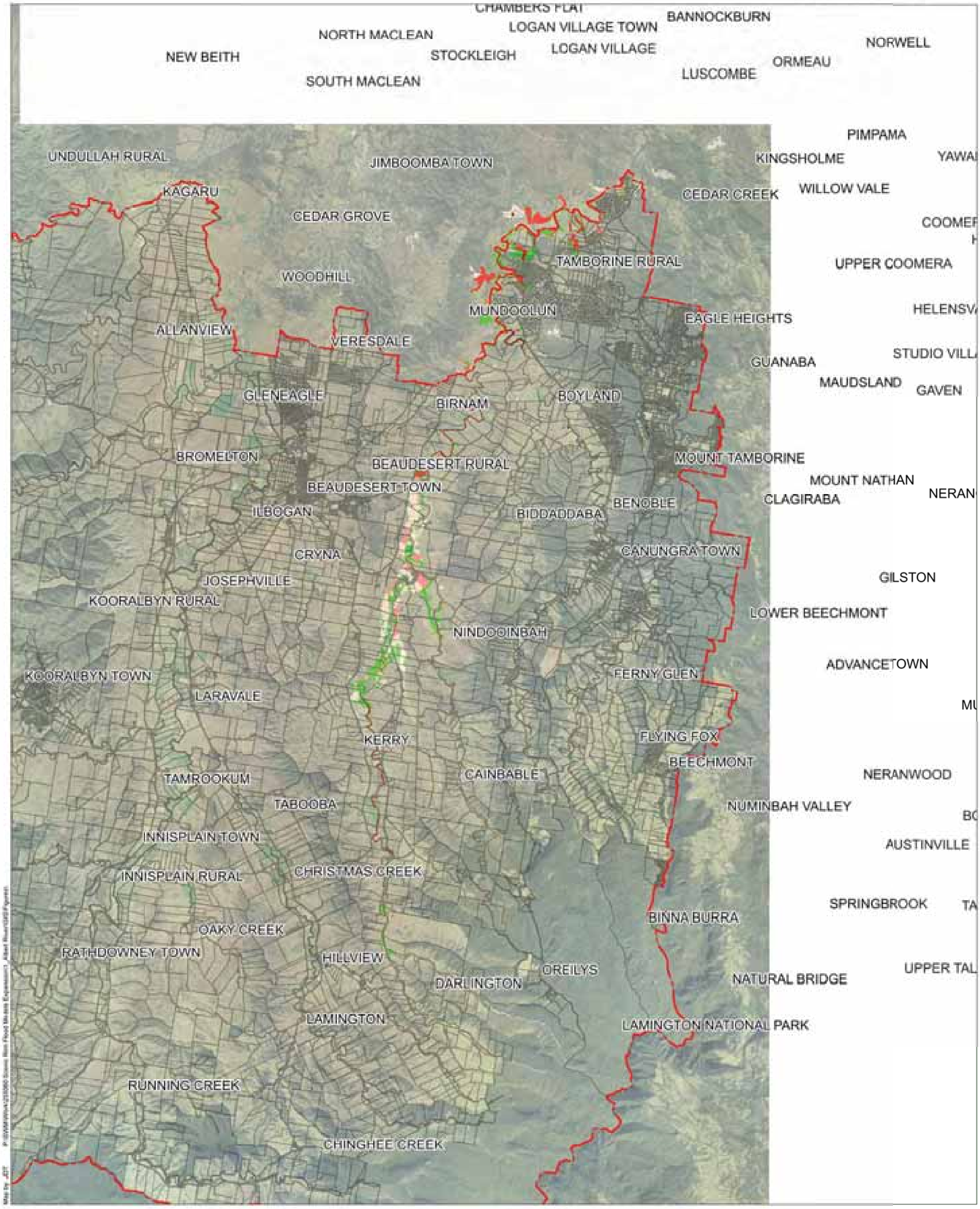
Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study **Figure E5-a**

10% AEP Event - Climate Change Scenario 4.5 - Inundation Extent

aurecon



Legend

SRRC Boundary

Cadastral Boundary

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

0.03 t
0.20 t
0.40 t
0.60 t
0.80 t
> 1.2(

Was Dry Now Wet
Was Wet Now Dry

Notes:

1:200,000

0 5,000 m 10,000 m

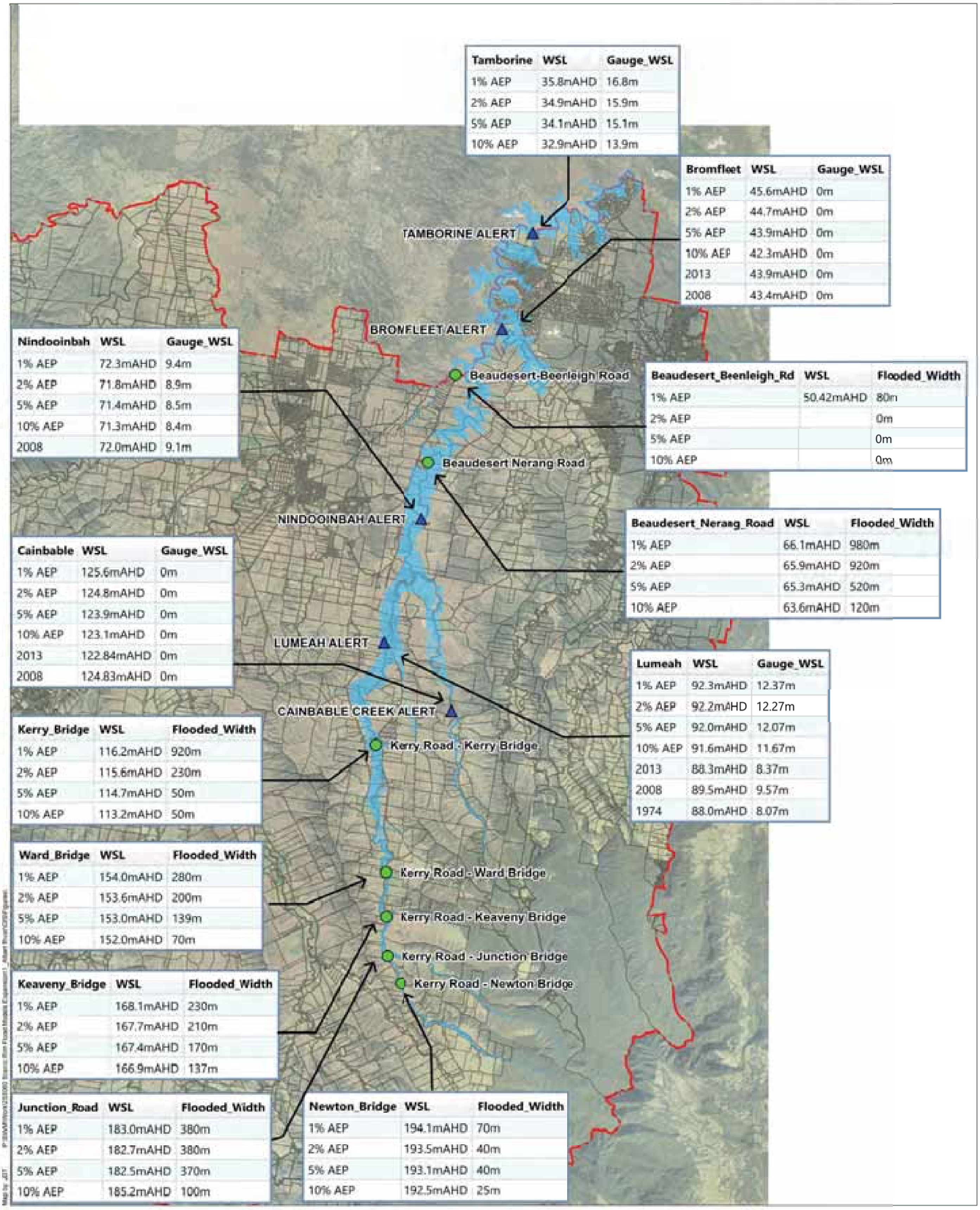
Date: 28/10/2017 Version: 0 Job No: 255060

Projection: MGA Zone 56

Albert River Flood Study Figure E5-b

10% AEP Event - Climate Change Scenario 4.5 - Afflux Map

aurecon



Tamborine	WSL	Gauge_WSL
1% AEP	35.8mAHD	16.8m
2% AEP	34.9mAHD	15.9m
5% AEP	34.1mAHD	15.1m
10% AEP	32.9mAHD	13.9m

Bromfleet	WSL	Gauge_WSL
1% AEP	45.6mAHD	0m
2% AEP	44.7mAHD	0m
5% AEP	43.9mAHD	0m
10% AEP	42.3mAHD	0m
2013	43.9mAHD	0m
2008	43.4mAHD	0m

Nindooinbah	WSL	Gauge_WSL
1% AEP	72.3mAHD	9.4m
2% AEP	71.8mAHD	8.9m
5% AEP	71.4mAHD	8.5m
10% AEP	71.3mAHD	8.4m
2008	72.0mAHD	9.1m

Beaudesert_Beenleigh_Rd	WSL	Flooded_Width
1% AEP	50.42mAHD	80m
2% AEP		0m
5% AEP		0m
10% AEP		0m

Beaudesert_Nerang_Road	WSL	Flooded_Width
1% AEP	66.1mAHD	980m
2% AEP	65.9mAHD	920m
5% AEP	65.3mAHD	520m
10% AEP	63.6mAHD	120m

Cainbable	WSL	Gauge_WSL
1% AEP	125.6mAHD	0m
2% AEP	124.8mAHD	0m
5% AEP	123.9mAHD	0m
10% AEP	123.1mAHD	0m
2013	122.84mAHD	0m
2008	124.83mAHD	0m

Lumeah	WSL	Gauge_WSL
1% AEP	92.3mAHD	12.37m
2% AEP	92.2mAHD	12.27m
5% AEP	92.0mAHD	12.07m
10% AEP	91.6mAHD	11.67m
2013	88.3mAHD	8.37m
2008	89.5mAHD	9.57m
1974	88.0mAHD	8.07m

Kerry_Bridge	WSL	Flooded_Width
1% AEP	116.2mAHD	920m
2% AEP	115.6mAHD	230m
5% AEP	114.7mAHD	50m
10% AEP	113.2mAHD	50m

Ward_Bridge	WSL	Flooded_Width
1% AEP	154.0mAHD	280m
2% AEP	153.6mAHD	200m
5% AEP	153.0mAHD	139m
10% AEP	152.0mAHD	70m

Keaveny_Bridge	WSL	Flooded_Width
1% AEP	168.1mAHD	230m
2% AEP	167.7mAHD	210m
5% AEP	167.4mAHD	170m
10% AEP	166.9mAHD	137m

Junction_Road	WSL	Flooded_Width
1% AEP	183.0mAHD	380m
2% AEP	182.7mAHD	380m
5% AEP	182.5mAHD	370m
10% AEP	185.2mAHD	100m

Newton_Bridge	WSL	Flooded_Width
1% AEP	194.1mAHD	70m
2% AEP	193.5mAHD	40m
5% AEP	193.1mAHD	40m
10% AEP	192.5mAHD	25m

Legend

SRRC Boundary
Cadastral Boundary
Gauges
Crossings

Notes:

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

Date: 11/10/2017 Version: 0 Job No: 255060
Projection: MGA Zone 56

Albert River Flood Study **Figure F1**
Emergency Flood Map

Appendix B
Calibration plots

1974 event

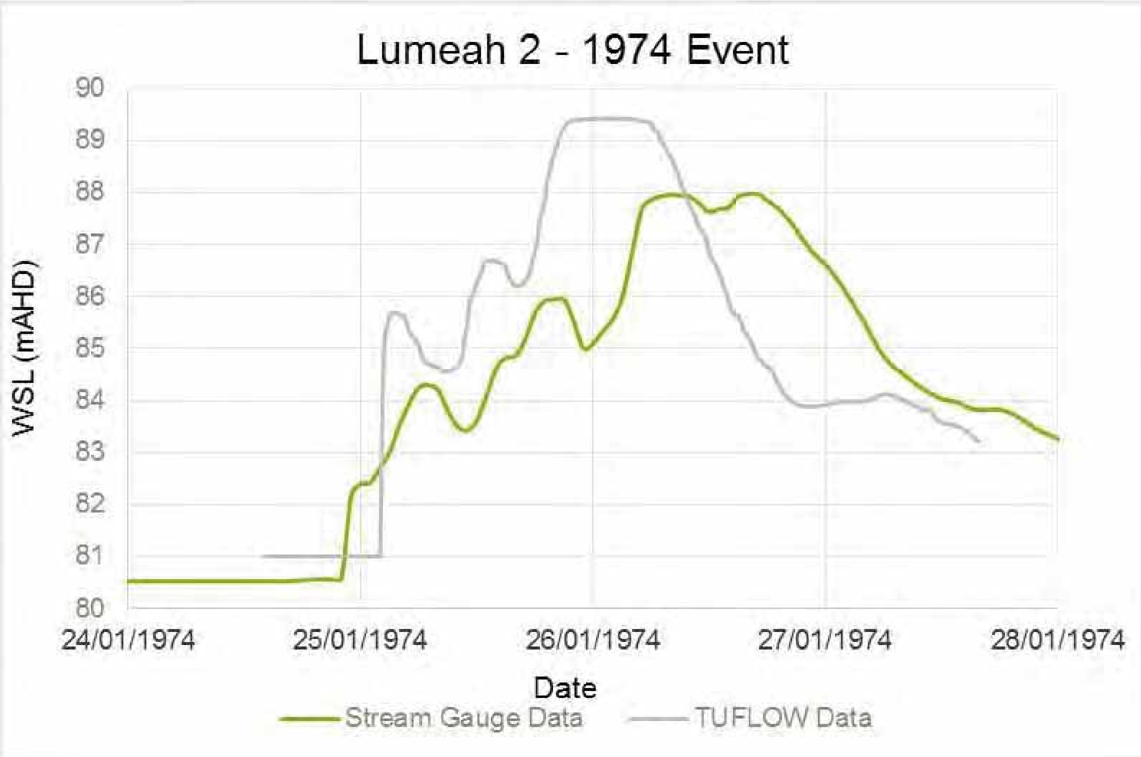


Figure B1 **Lumeah stream gauge levels – 1974 Event**

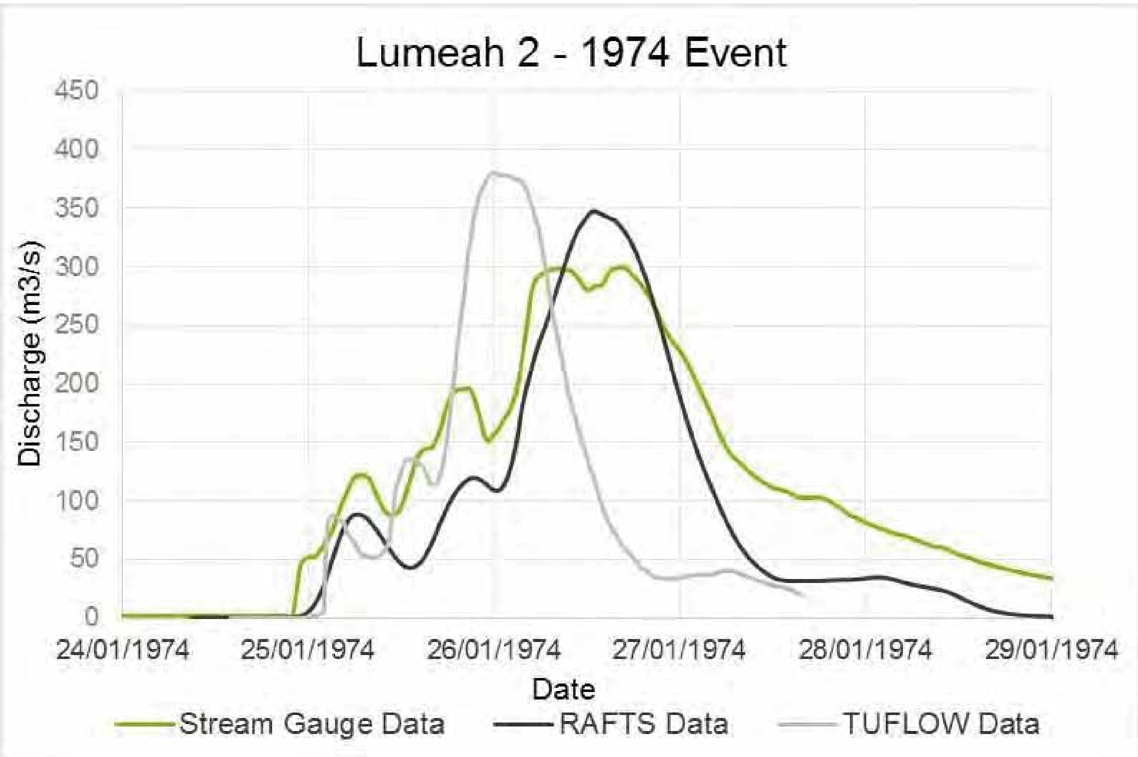


Figure B2 **Lumeah stream gauge discharge – 1974 Event**

Document Set ID: 10154450
Version: 1, Version Date: 21/12/2017

1990 event

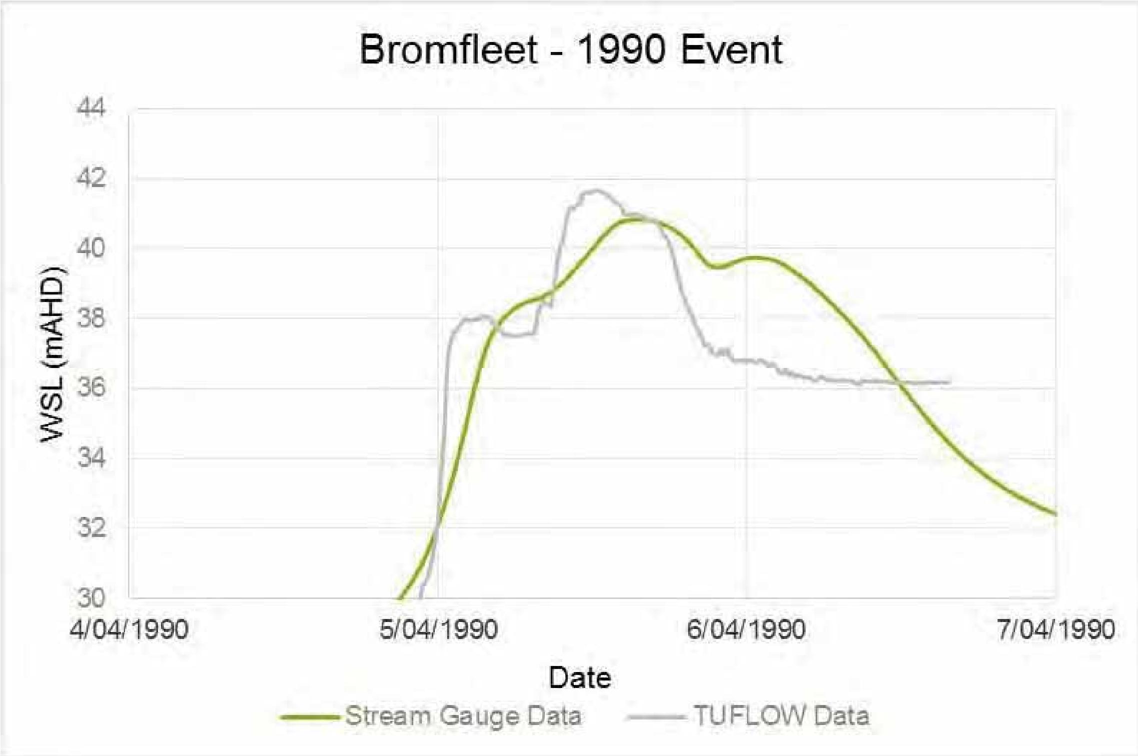


Figure B3 **Bromfleet stream gauge levels – 1990 Event**

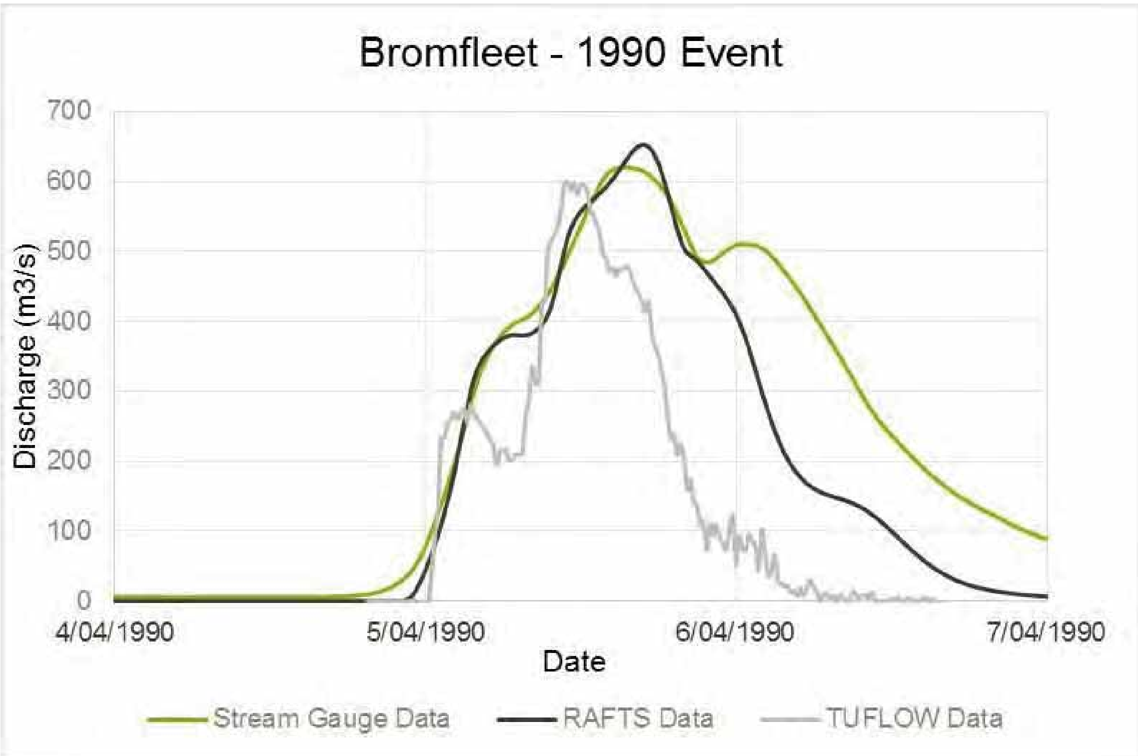


Figure B4 **Bromfleet stream gauge discharge – 1990 Event**

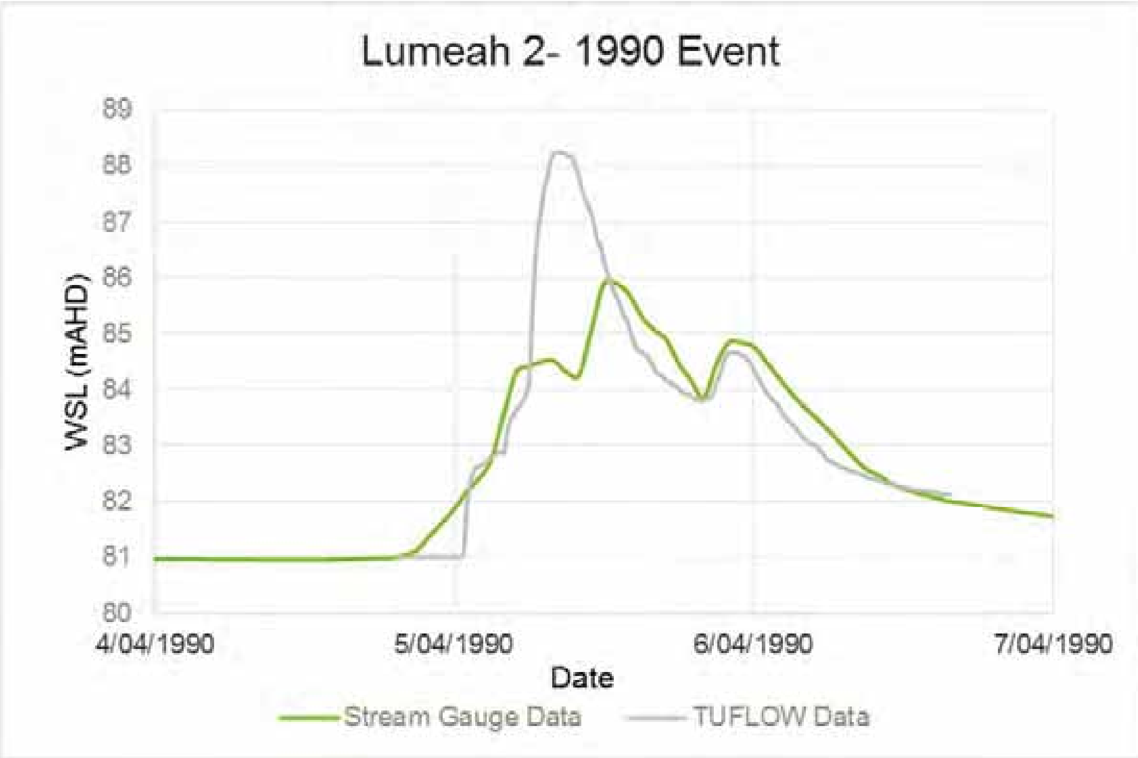


Figure B5 Lumeah stream gauge levels – 1990 Event

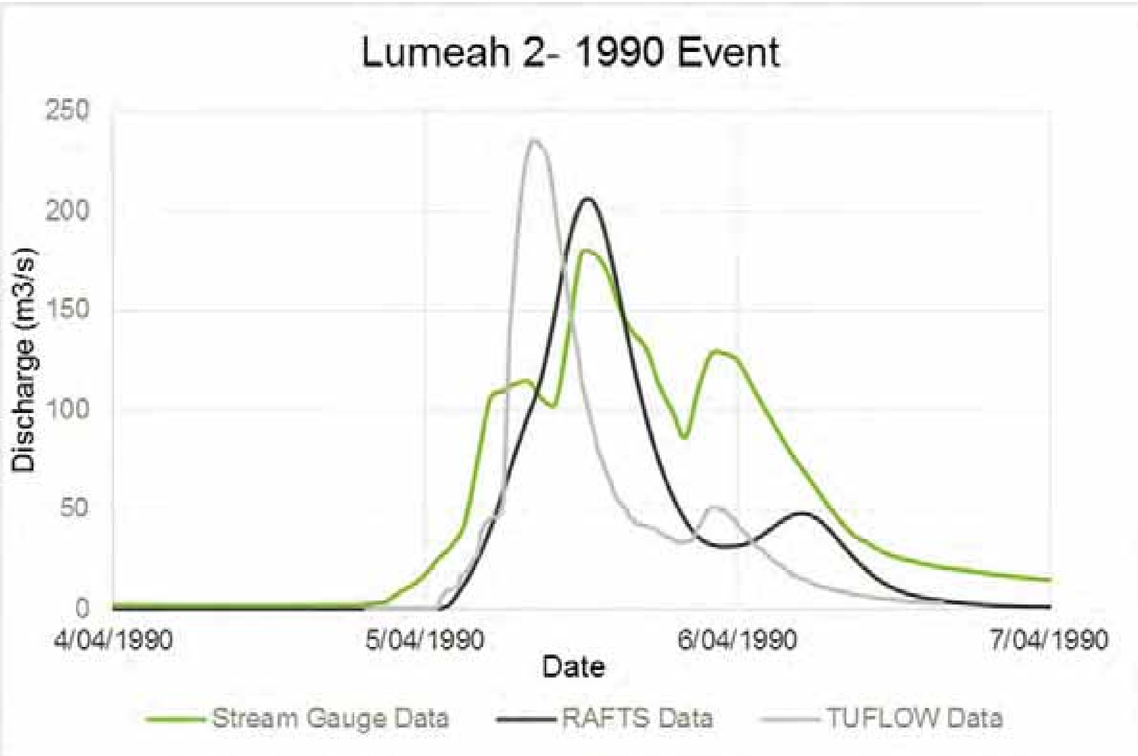


Figure B6 Lumeah stream guage discharge – 1990 event

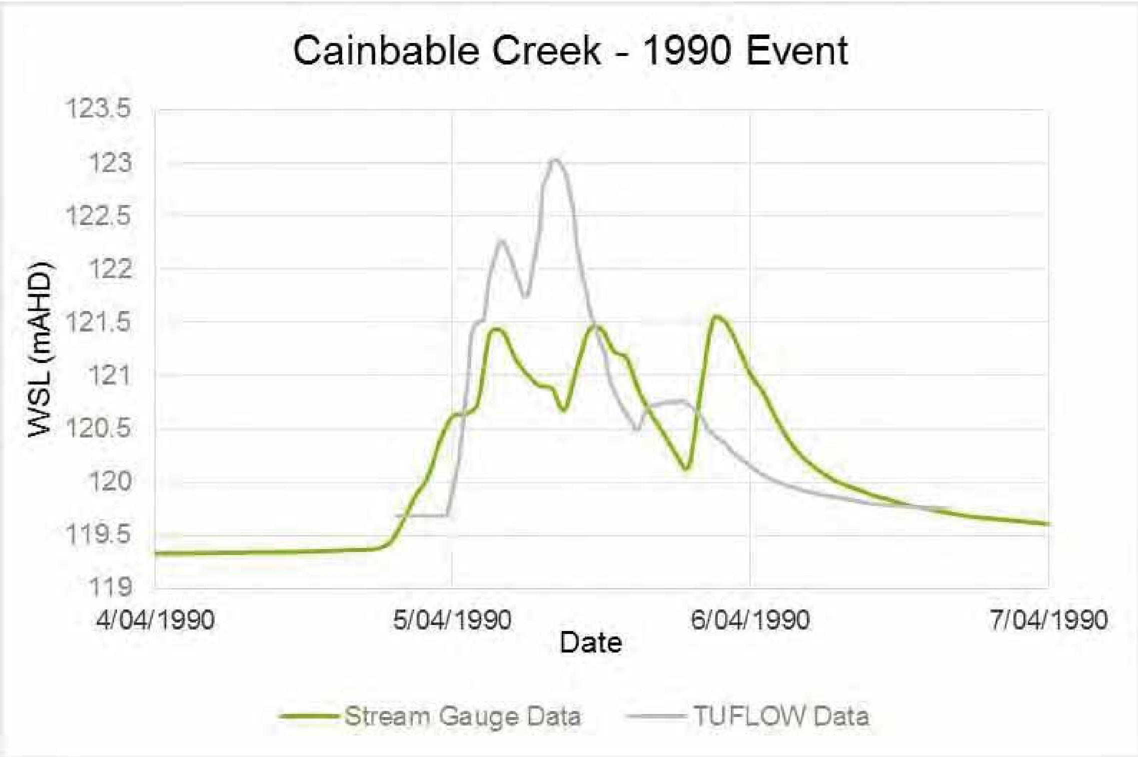


Figure B7 **Cainbable Creek stream gauge levels -1990 event**

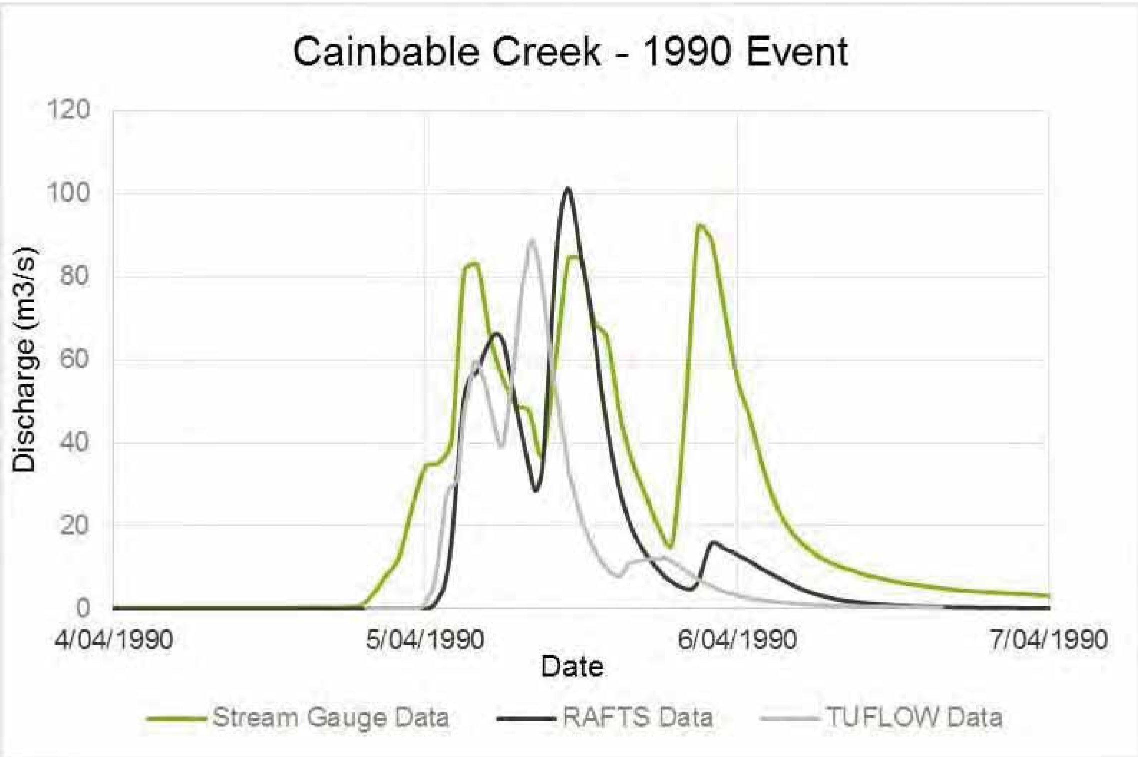


Figure B8 **Cainbable Creek stream gauge discharge - 1990 Event**

2008 event

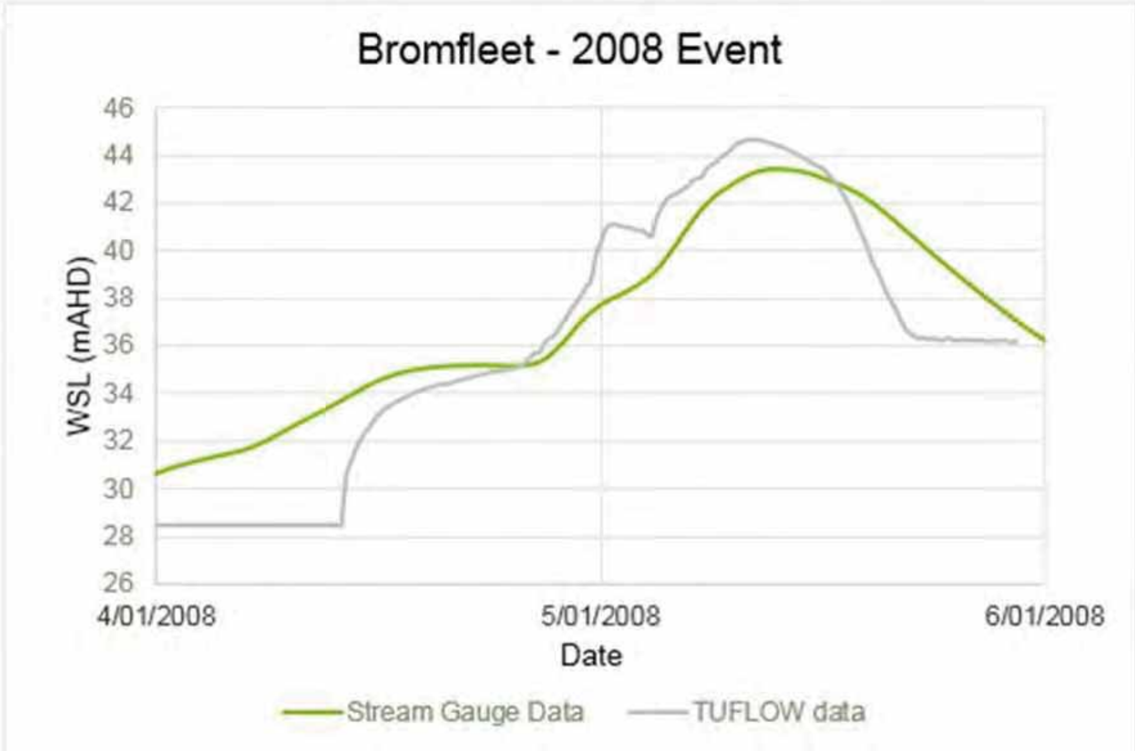


Figure B9 Bromfleet stream gauge levels – 2008 Event

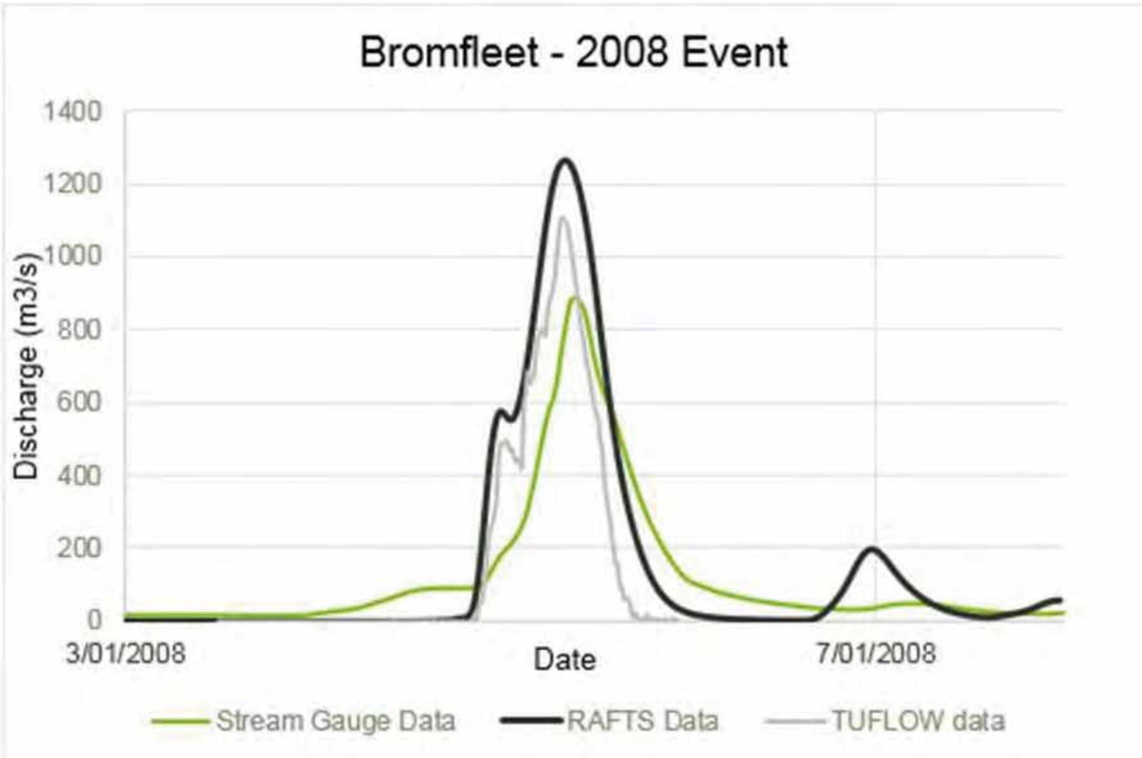


Figure B10 Bromfleet stream gauge discharge – 2008 Event

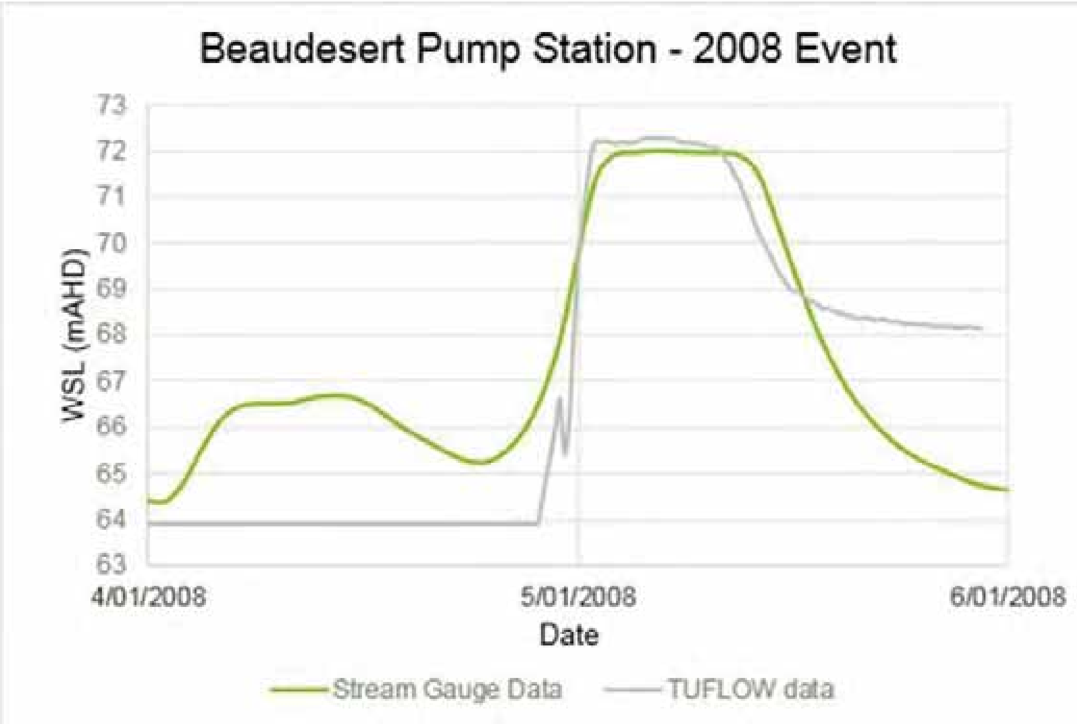


Figure B11 **Beaudesert Pump Station stream gauge levels – 2008 Event**

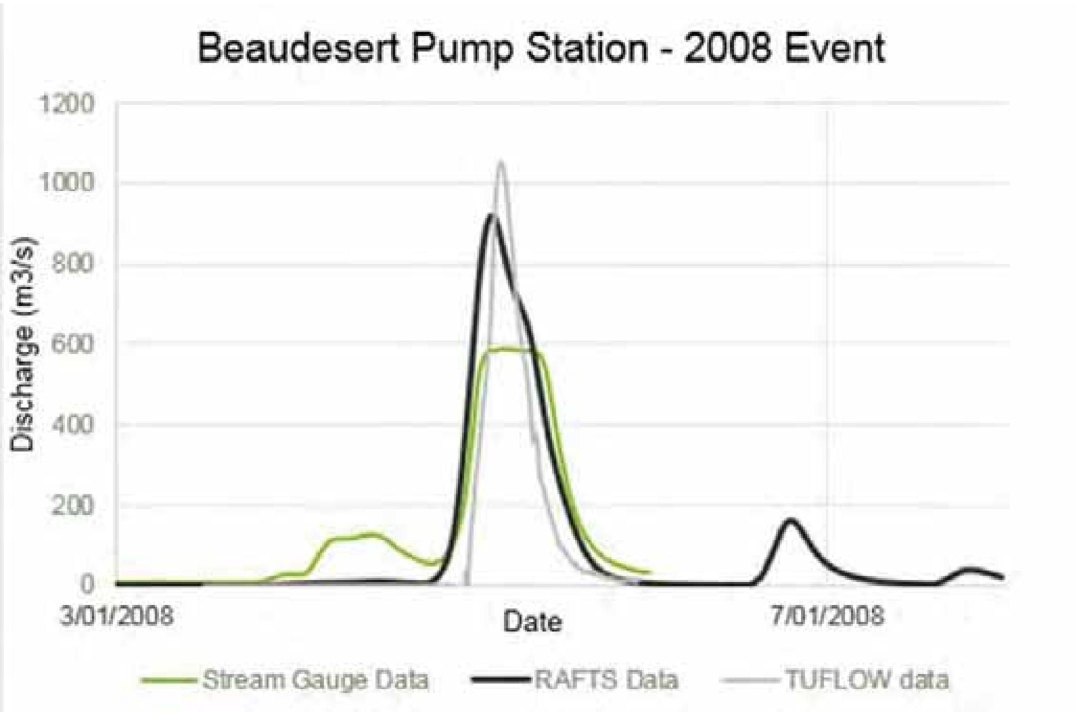


Figure B12 **Beaudesert Pump Station stream gauge discharge – 2008 Event**

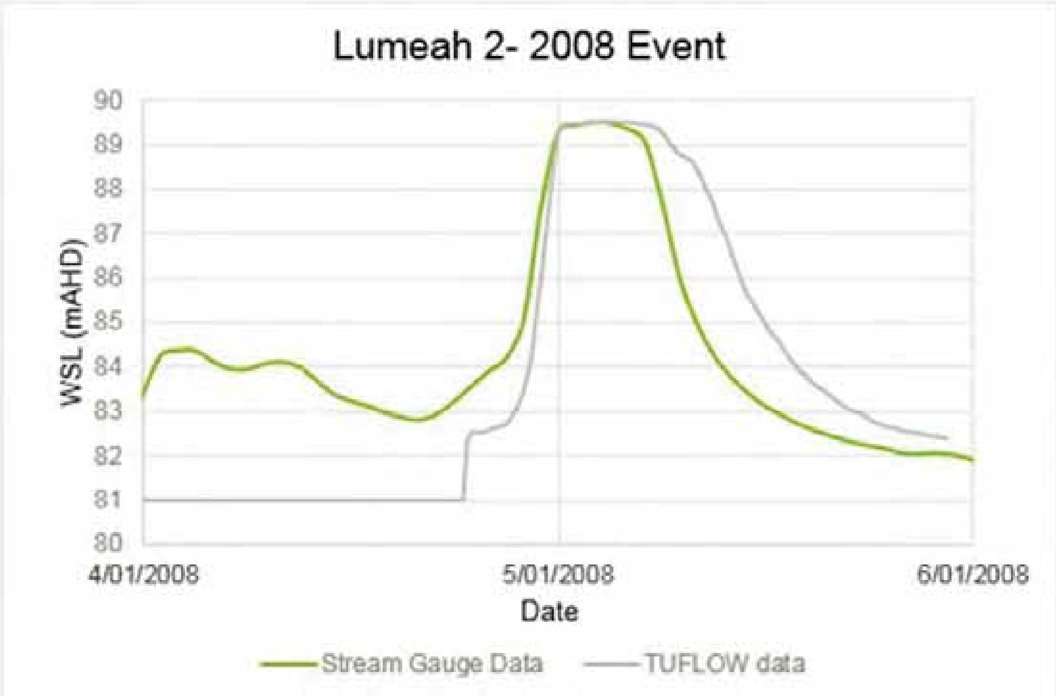


Figure B13 Lumeah stream gauge levels – 2008 Event

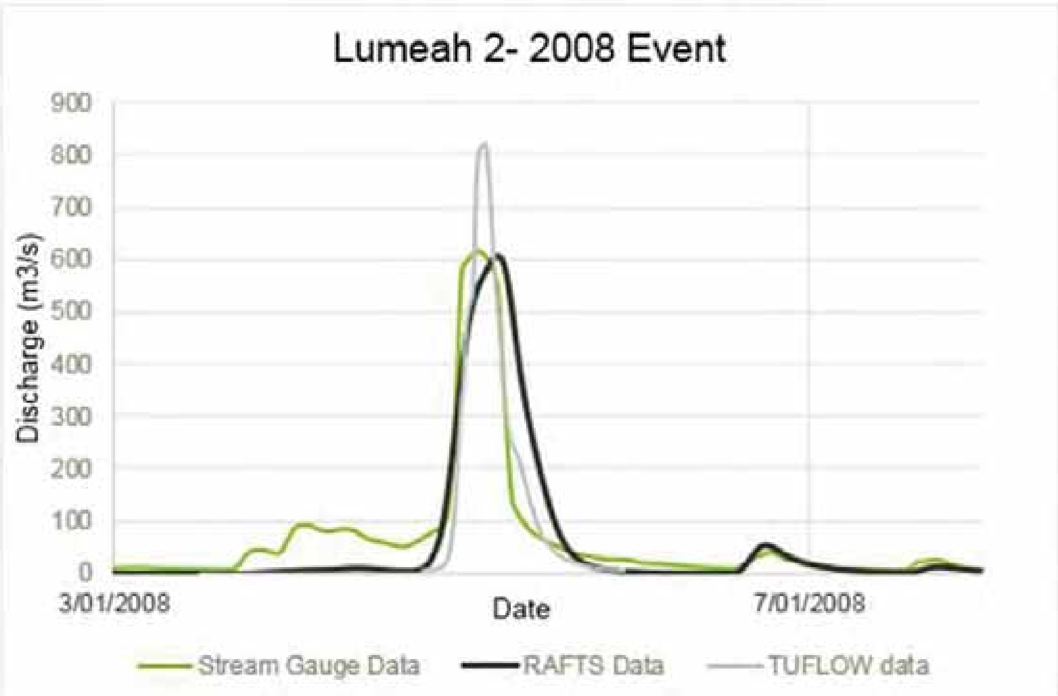


Figure B14 Lumeah stream gauge discharge – 2008 Event

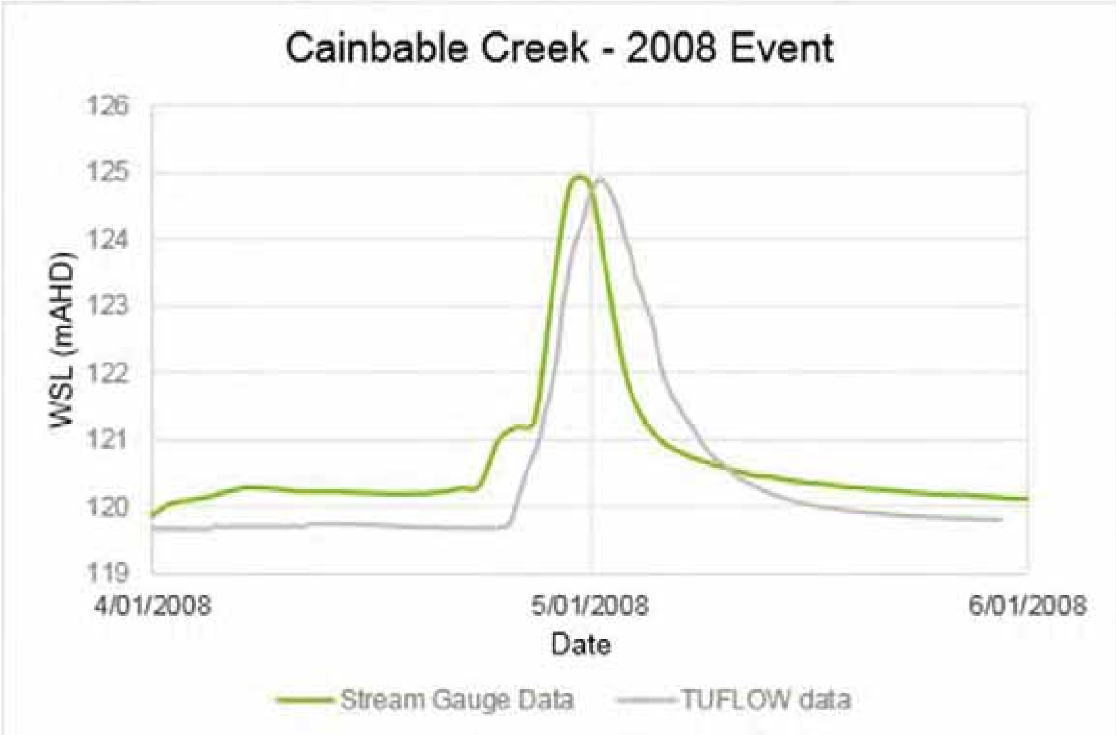


Figure B15 **Cainbable Creek stream gauge levels – 2008 Event**

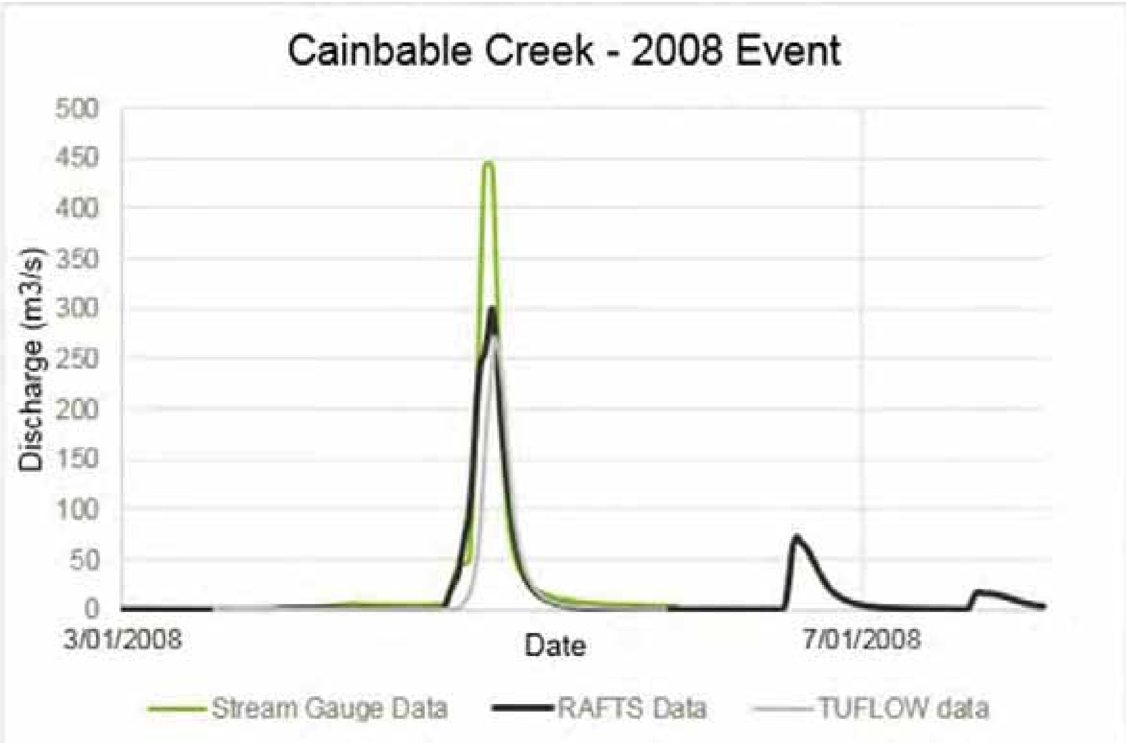


Figure B16 **Cainbable Creek stream gauge discharge – 2008 Event**

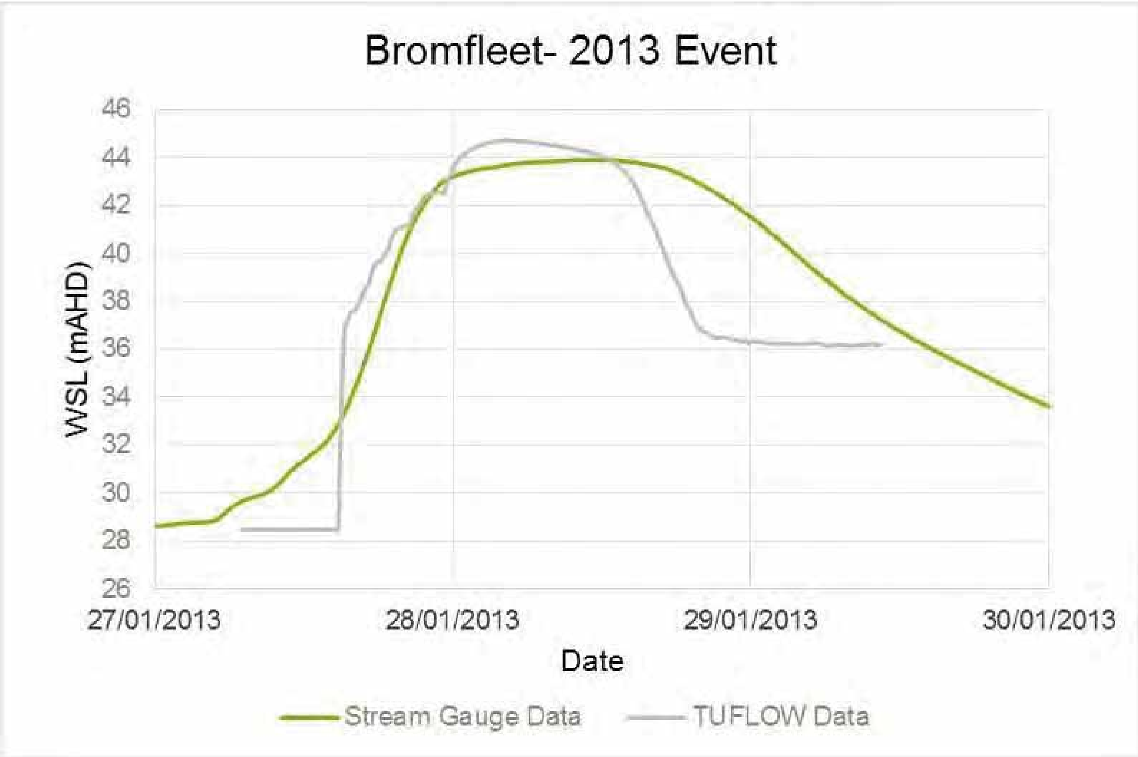


Figure B17 **Bromfleet stream gauge levels – 2013 Event**

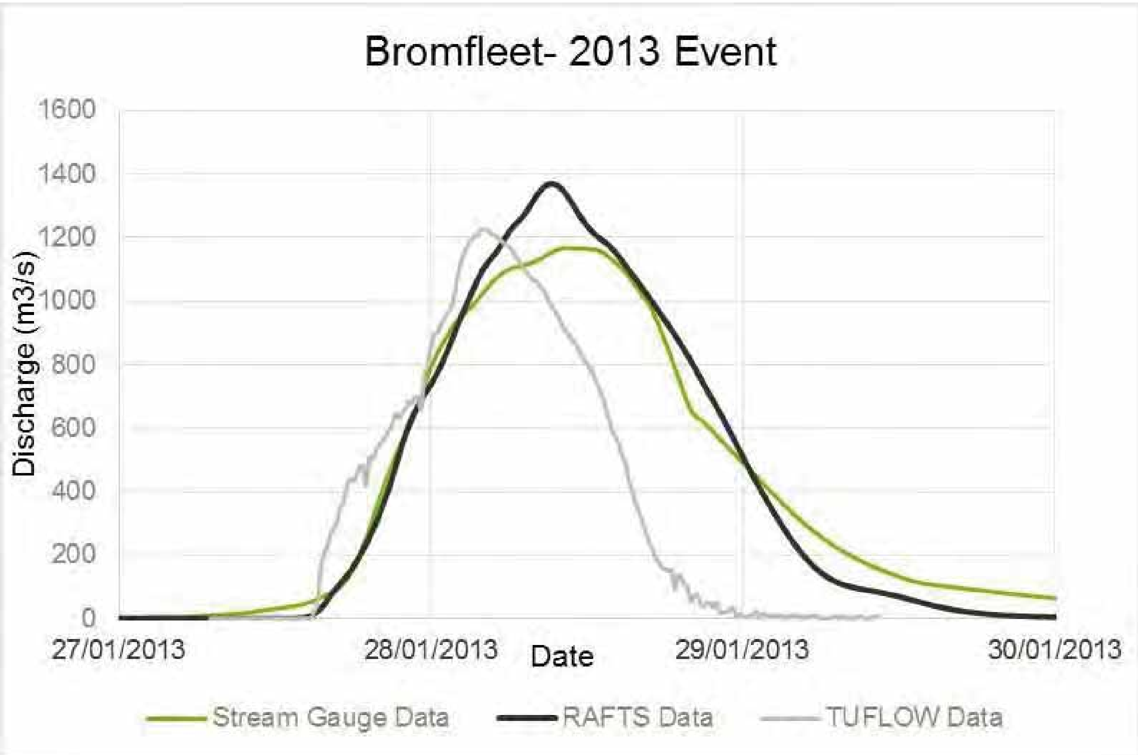


Figure B18 **Bromfleet stream gauge discharge – 2013 Event**

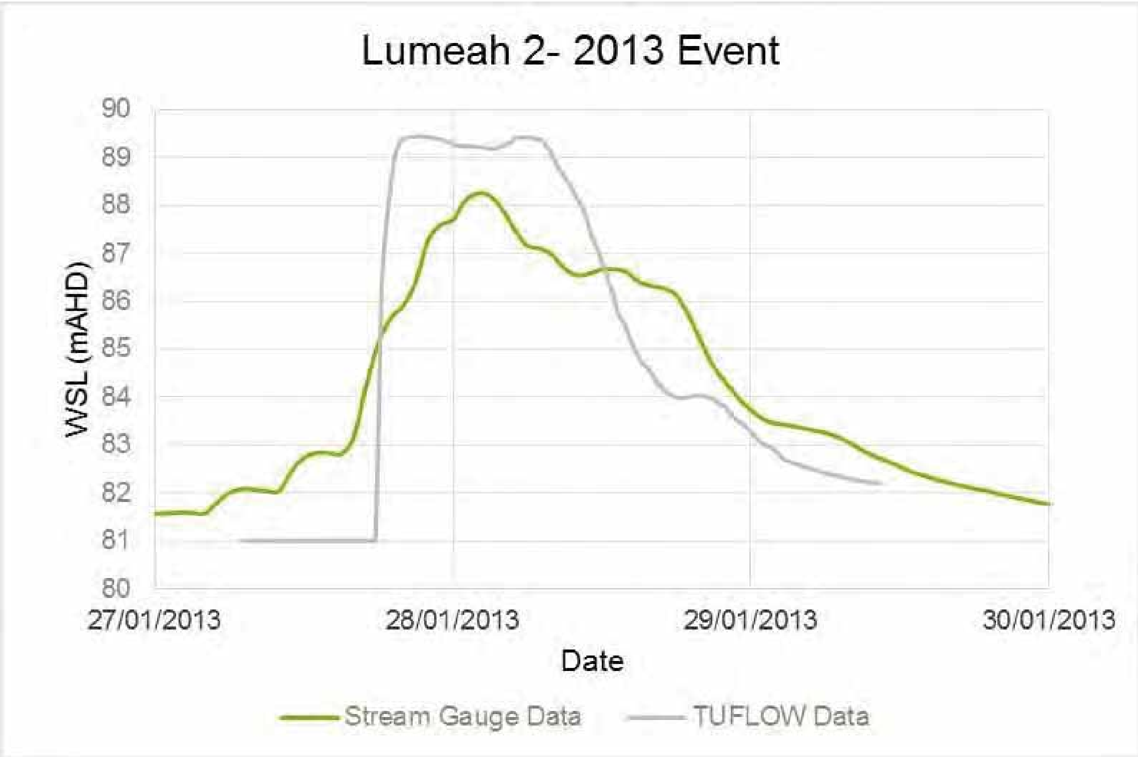


Figure B19 Lumeah stream gauge levels – 2013 Event

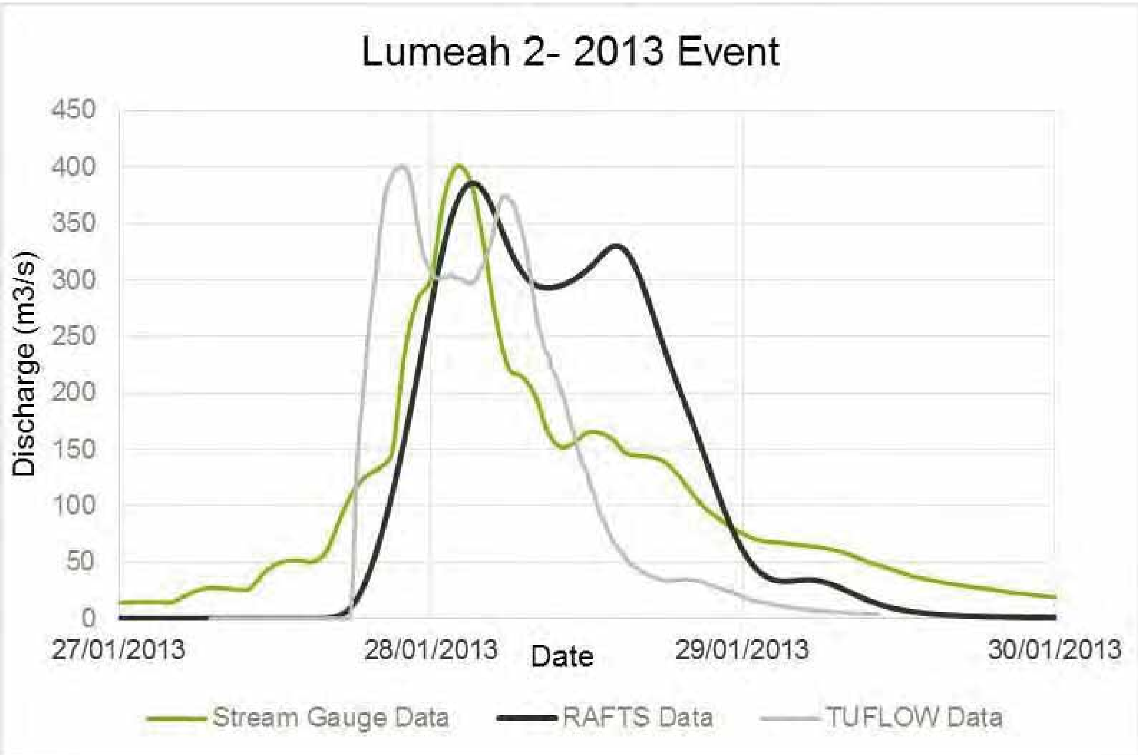


Figure B20 Lumeah stream gauge discharge – 2013 event

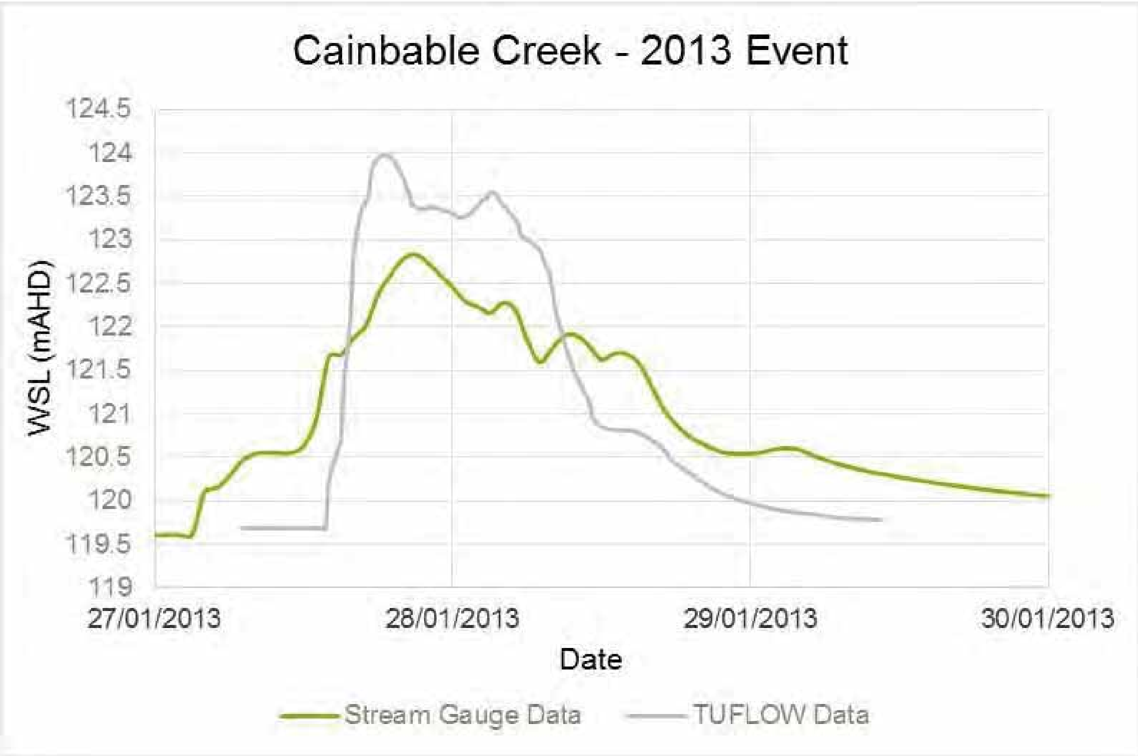


Figure B21 Cainbable Creek stream gauge levels – 2013 Event

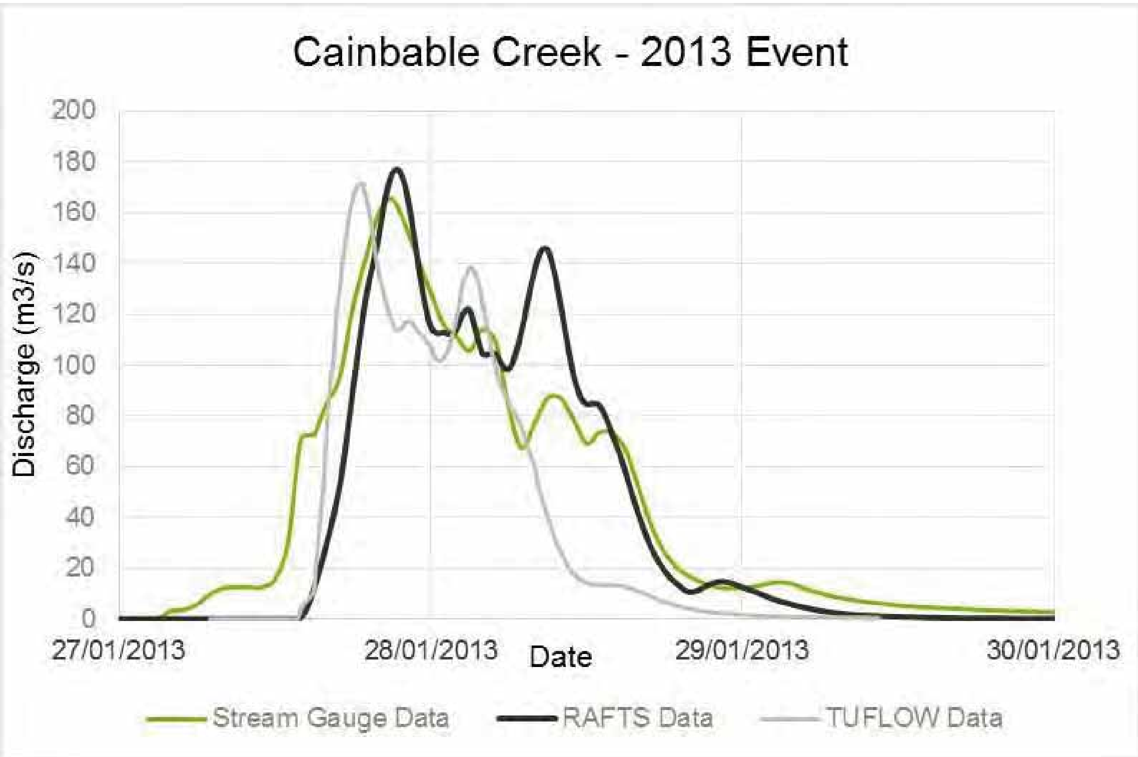


Figure B22 Cainbable Creek stream discharge – 2013 Event

aurecon

Bringing ideas to life

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