



Wagga Wagga City Council
PO Box 20
WAGGA WAGGA NSW 2650

110022/L100817

21 March 2011

Attention: Mr B Jeffrey

Dear Brad,

Re: Oura to Braehour Design Flood Event Mapping

Introduction

This letter details work carried out by WMAwater in order to produce indicative design flood information between Oura and Braehour.

Background

Previous work carried out by WMAwater (WMAwater, 2004) defined approximate 1% AEP flood levels between Braehour and the upstream township of Oura on the Murrumbidgee River. To assist council in utilising this information, WMAwater have been approached by Council to map these approximate design flood levels. Utilising data accumulated both within the Murrumbidgee River Wagga Wagga Flood Study (WMAwater, 2004) and an addendum to the Floodplain Risk Management Study & Plan (FRMS&P) (WMAwater, 2007) modelled flood levels for a range of events were turned into flood surfaces and contours for utilisation by Council staff.

Cross-sectional data was provided by previous work done in the Murrumbidgee River Wagga Wagga Flood Study (WMAwater, 2004). Cross-sections and design flow (based on Flood Frequency Analysis (FFA)) were utilised in HEC-RAS in order to obtain design flood information.

Methodology

The FRMS&P (WMAwater, 2007) supplied peak flood level information for a range of events, including the 1%, 2%, 5% and 10% AEP events and the PMF. This information was transferred into GIS; to generate both the design flood level extents and contours as can be seen in Figures 1 – 7. Note that the modelling carried out in order to establish the design flood levels was done using HEC-RAS. For further details including location of cross-sections used in analysis see Reference 2, WMAwater 2007.

The various locations at which the flood levels had been modelled were identified. The peak flood levels were applied to floodplain wide cross-sections with amendments made to improve surface generation. Floodplain wide cross-sections were drawn perpendicular to the river centreline and over bank contours. In order to aid surface generation, additional cross-sections locations were interpolated.

water + environmental engineers

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Using 3D Analyst in ARCGIS, flood level surfaces were generated. Both interpolated and design cross-sections were used to generate the surfaces for each of the design events (1%, 2%, 5%, 10% AEP and PMF). This process produced flood level surfaces which were later overlaid on the Digital Elevation Model (DEM) to obtain flood surfaces, depths and extents.

Using the calculated flood surfaces, contours were then generated at 0.1 m increments. The contours and the flood depth extents are presented in Figures 1-5.

Furthermore, 0.5 m freeboard was applied to the 1% AEP to create the Flood Planning Area (FPA) and the Flood Planning Levels (FPL) for the region. The FPA and FPL should be used when describing minimum floor levels for residential development. The FPA and associated FPL can be seen in Figure 7.

Yours faithfully,
WMAwater

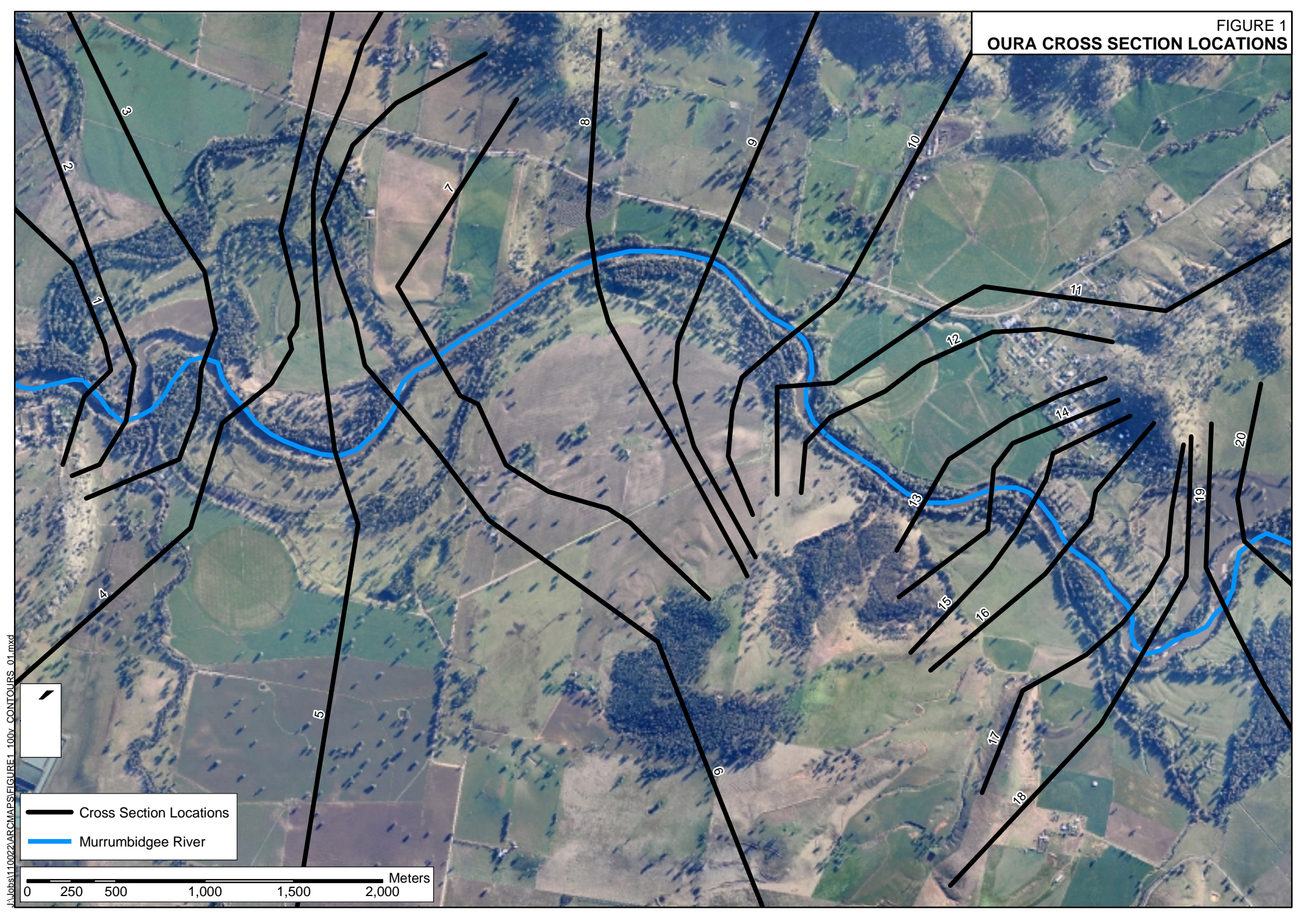
A handwritten signature in blue ink, appearing to read "Stephen Gray", written over a light gray rectangular background.

Stephen Gray
Associate

References

1. Wagga Wagga City Council
Murrumbidgee River Wagga Wagga Flood Study
WMAwater, September 2004.
2. Wagga Wagga City Council
Addendum to Murrumbidgee Floodplain Risk Management Study and Plan,
WMAwater, October 2007

FIGURE 1
OURA CROSS SECTION LOCATIONS

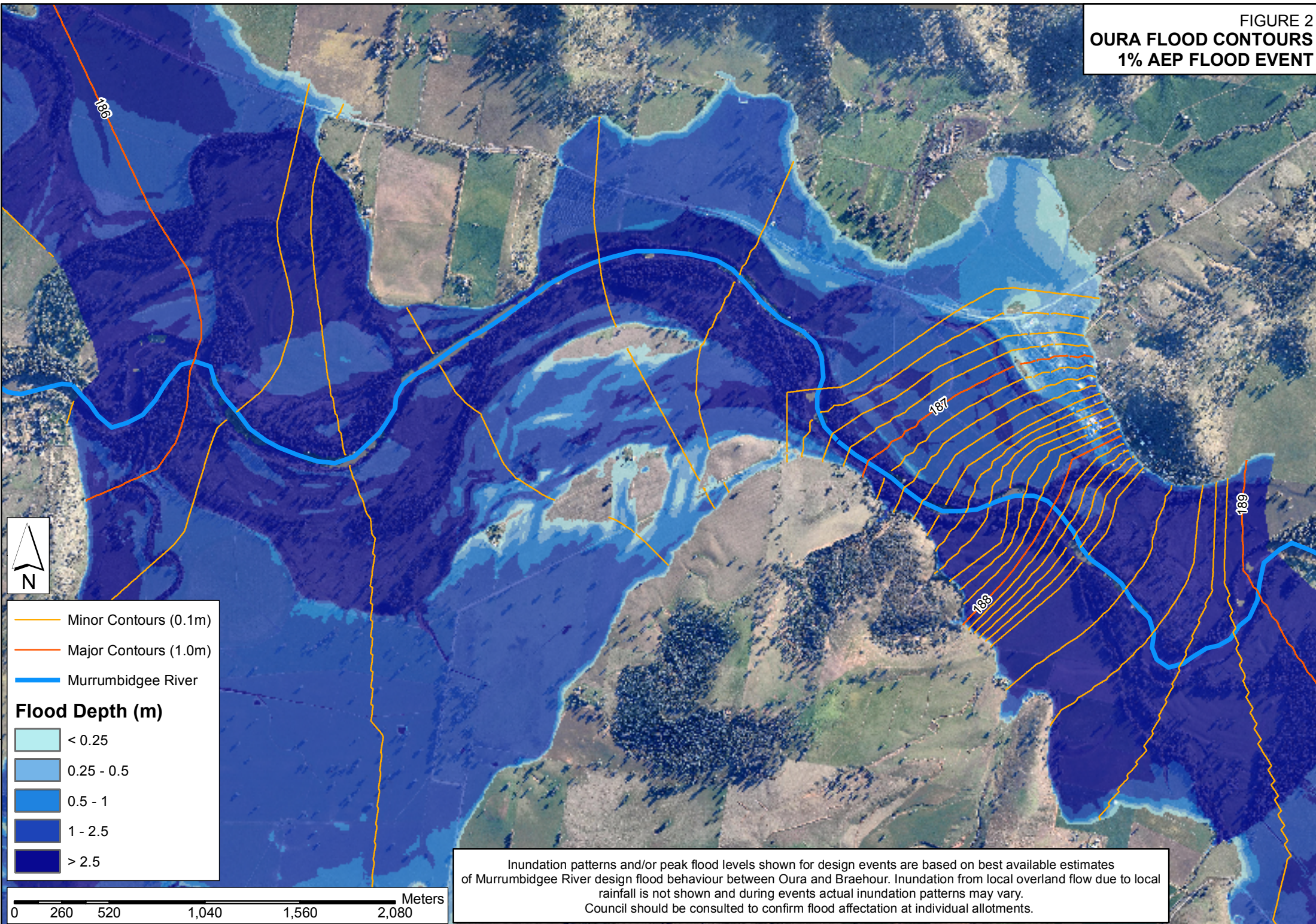


- Cross Section Locations
- Murrumbidgee River

0 250 500 1,000 1,500 2,000 Meters

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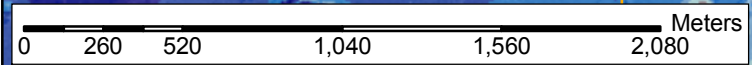
**FIGURE 2
OURA FLOOD CONTOURS
1% AEP FLOOD EVENT**



- Minor Contours (0.1m)
- Major Contours (1.0m)
- Murrumbidgee River

Flood Depth (m)

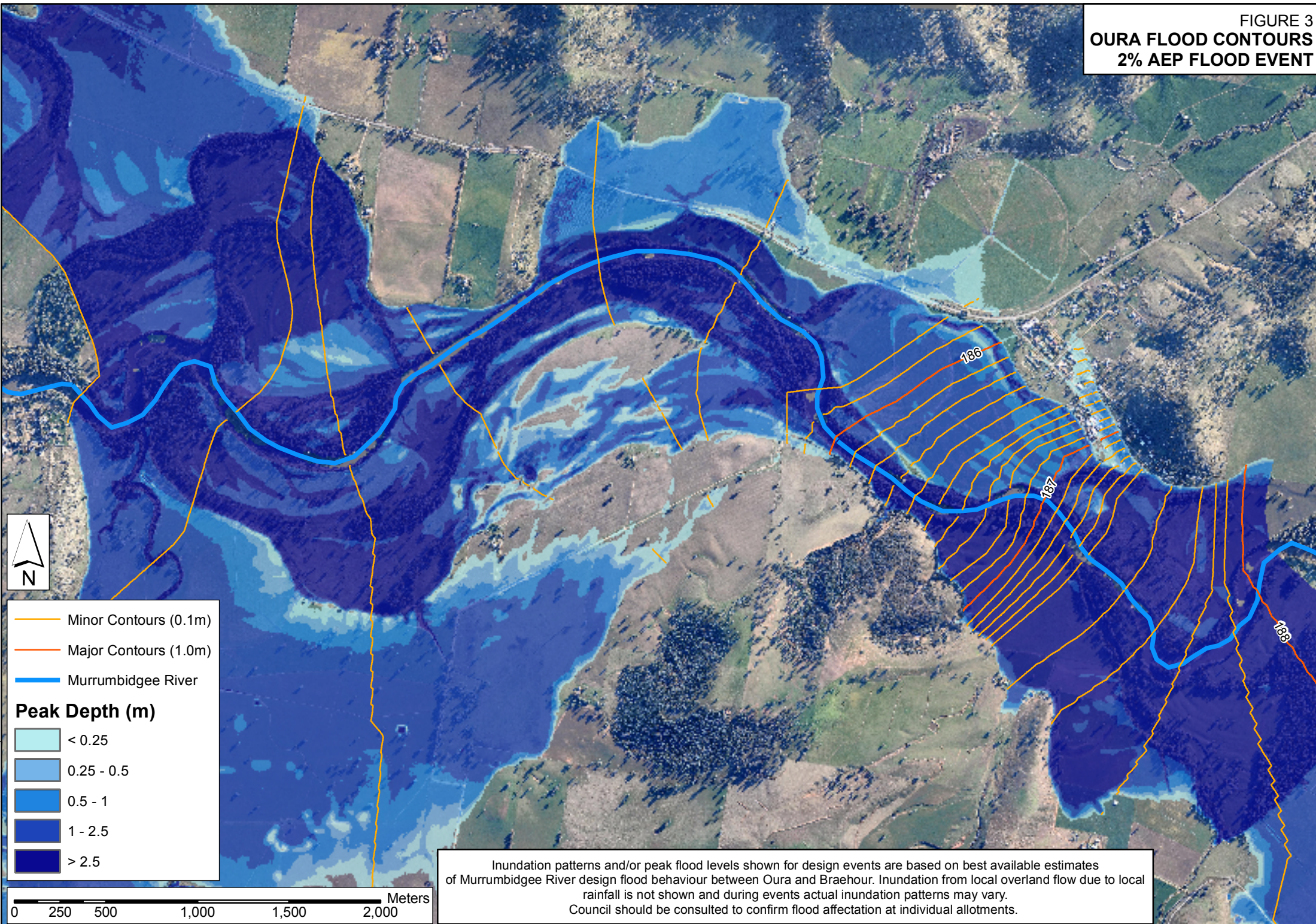
< 0.25
0.25 - 0.5
0.5 - 1
1 - 2.5
> 2.5



Inundation patterns and/or peak flood levels shown for design events are based on best available estimates of Murrumbidgee River design flood behaviour between Oura and Braehour. Inundation from local overland flow due to local rainfall is not shown and during events actual inundation patterns may vary. Council should be consulted to confirm flood affectation at individual allotments.

J:\Jobs\110022\ARC\MAPS\FIGURE2_100v_CONTOURS.mxd

**FIGURE 3
OURA FLOOD CONTOURS
2% AEP FLOOD EVENT**



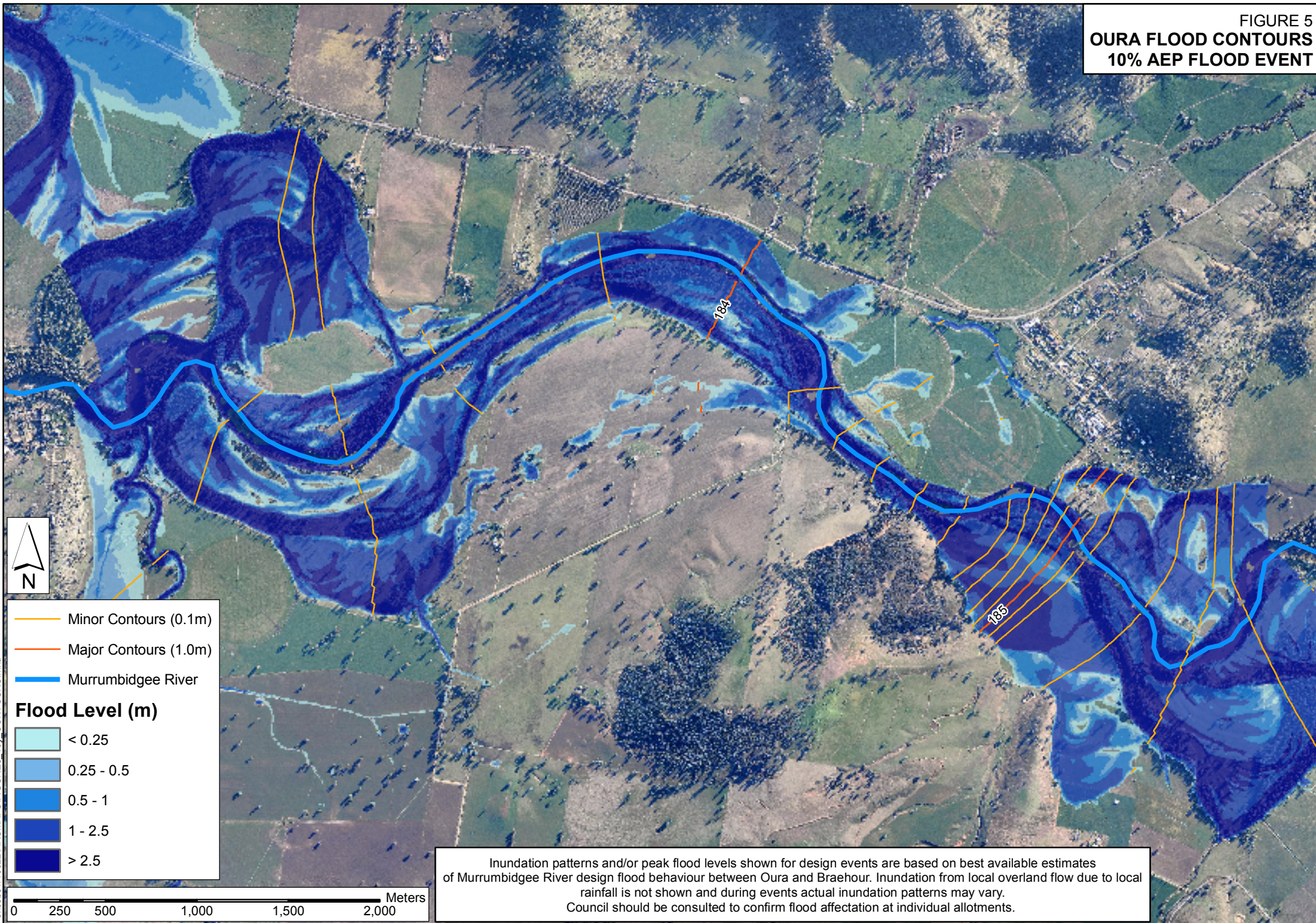
- Minor Contours (0.1m)
 - Major Contours (1.0m)
 - Murrumbidgee River
- Peak Depth (m)**
- < 0.25
 - 0.25 - 0.5
 - 0.5 - 1
 - 1 - 2.5
 - > 2.5

0 250 500 1,000 1,500 2,000 Meters

Inundation patterns and/or peak flood levels shown for design events are based on best available estimates of Murrumbidgee River design flood behaviour between Oura and Braehour. Inundation from local overland flow due to local rainfall is not shown and during events actual inundation patterns may vary. Council should be consulted to confirm flood affectation at individual allotments.

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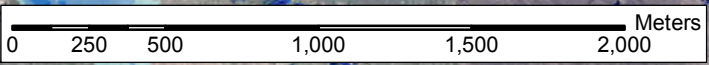
**FIGURE 5
OURA FLOOD CONTOURS
10% AEP FLOOD EVENT**



- Minor Contours (0.1m)
- Major Contours (1.0m)
- Murrumbidgee River

Flood Level (m)

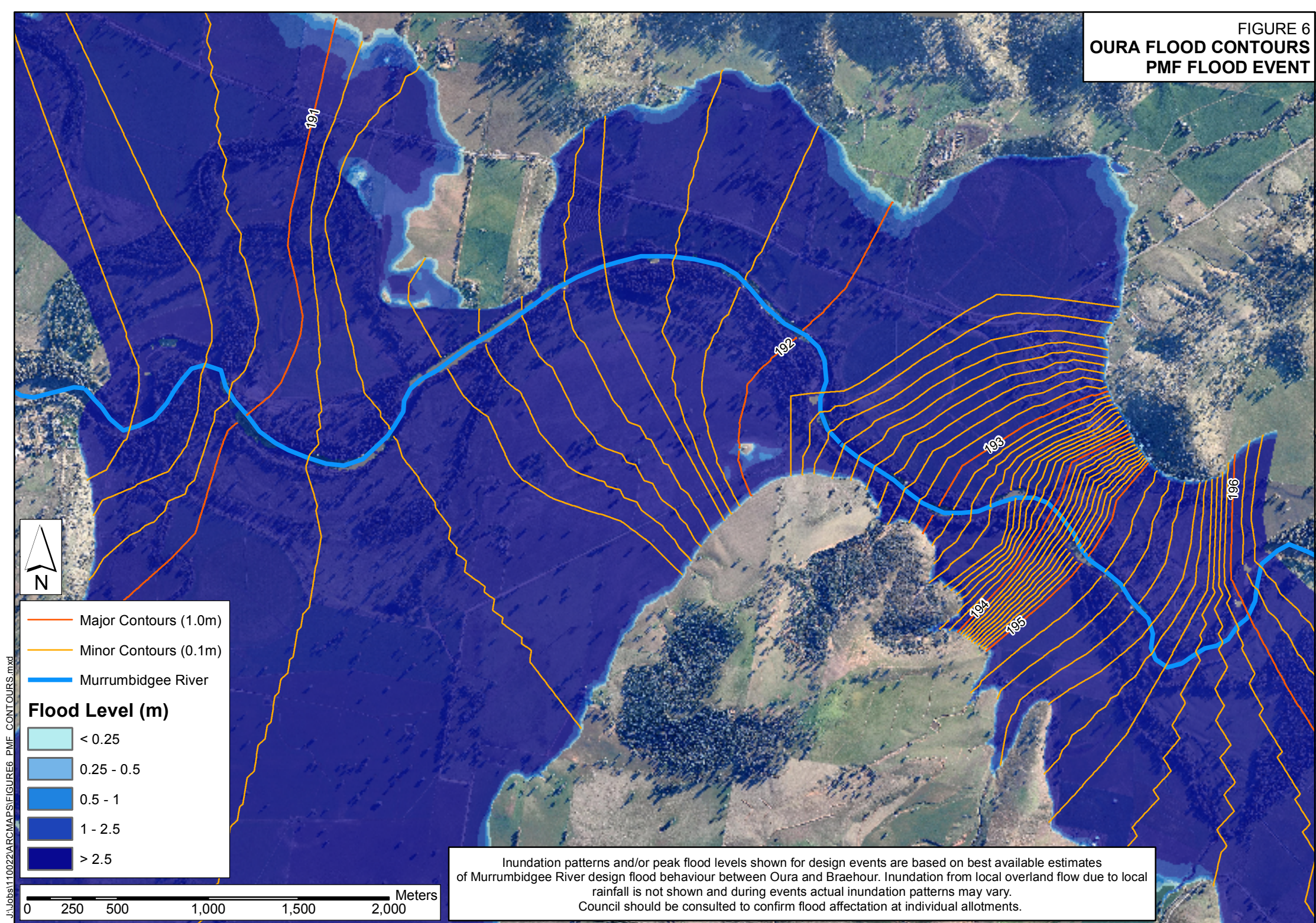
< 0.25
0.25 - 0.5
0.5 - 1
1 - 2.5
> 2.5



Inundation patterns and/or peak flood levels shown for design events are based on best available estimates of Murrumbidgee River design flood behaviour between Oura and Braehour. Inundation from local overland flow due to local rainfall is not shown and during events actual inundation patterns may vary. Council should be consulted to confirm flood affectation at individual allotments.

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FIGURE 6
OURA FLOOD CONTOURS
PMF FLOOD EVENT



Inundation patterns and/or peak flood levels shown for design events are based on best available estimates of Murrumbidgee River design flood behaviour between Oura and Braehour. Inundation from local overland flow due to local rainfall is not shown and during events actual inundation patterns may vary. Council should be consulted to confirm flood affectation at individual allotments.

FIGURE 7
FLOOD PLANNING AREA AND LEVELS

