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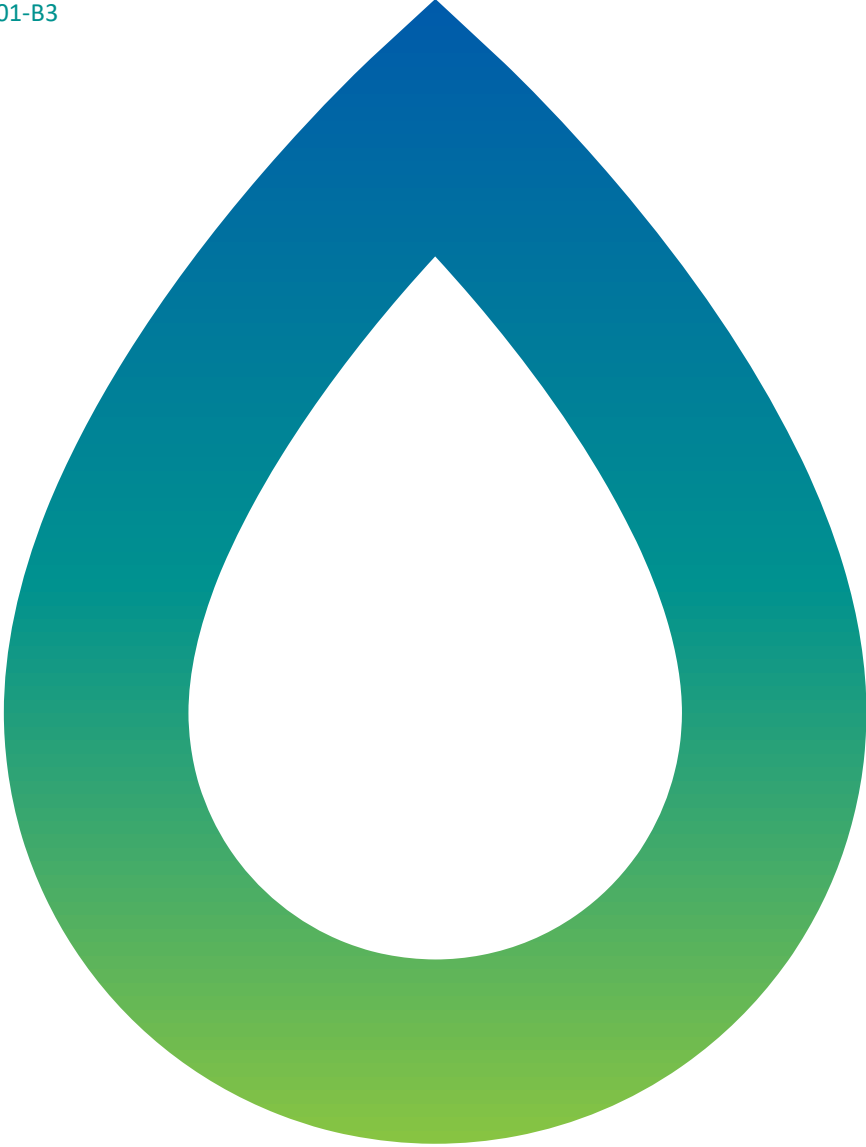
899-905 BEAMS ROAD, BRIDGEMAN DOWNS

Flood Impact Assessment

Plant Turrisi Pty Ltd

11 March 2026

2310-01-B3



DETAILS

Report Title 899-905 Beams Road, bridgeman downs, Flood Impact Assessment
Client Plant Turrisi Pty Ltd

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1 INTRODUCTION

WRM Water and Environment Pty Ltd was commissioned by Plant Turrisi Pty Ltd to prepare a flood impact assessment report for 899 - 905 Beams Road, Bridgeman Downs for submission to Brisbane City Council (Figure 1.1). Plant Turrisi Pty Ltd is proposing to subdivide the existing lots at 899 - 905 Beams Road, Bridgeman Downs located on Lot 1 on SP227357 and Lot 2 on SP227358 into low density residential allotments.

The southern area of the subject site is located within Council's mapped Overland Flow Flood Planning Area. Any development on site must therefore comply with the Performance Outcomes (PO) provided in Council's Flood Overlay Code (FOC).

It is noted that the overland flow path is also mapped by Council as a Local Waterway Corridor sub-category. While the design flood event for an overland flow path is the 2% AEP event, the 1% AEP event has also been investigated in this instance due to the flow path's location within the mapped Local Waterway Corridor. Assessment of a frequent storm event (20% AEP) was also undertaken.

This report describes the methodology and results for the flood assessment undertaken for the site.



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Figure 1.1 Site Location

2 AVAILABLE DATA

MODELLING DATA

2019 LiDAR survey data for the site and surrounds was obtained from the Department of Resources and Mines, via the Elvis Elevation and Depth spatial data cloud-based system for use in the model.

Plant Turrisi Pty Ltd supplied WRM with detailed ground survey of the site, Bridgeman Road and Beams Road immediately adjacent to and in close proximity to the site (Drawing/Plan No: 24054A0/1A) and the proposed subdivision plan (Drawing/Plan No: 12383P07 RevD-Con01). The survey extent and proposed development layout can be found in Appendix A.

HCE Engineers supplied WRM with the proposed earthworks design TIN for the site which represents the post-development conditions. The supplied TIN has been included within the post-development TUFLOW flood modelling of the site and surrounds.

LIMITATIONS

This assessment has been undertaken in accordance with good engineering practice. However, all models are limited by the accuracy of information, data and assumptions used for the modelling. The information produced in this report is based on the information available at the time of the analysis.

WRM has prepared this assessment on the basis of information provided by third parties, which WRM has not independently verified or checked beyond the agreed scope of work. WRM has assumed that this supplied information is complete and accurate. WRM does not accept liability in connection with such unverified information, including errors and omissions in the supplied data.

3 EXISTING SITE CONDITIONS

The site consists of two lots with a total area of approximately 1.9 ha which lies northeast of the intersection of Beams Road (south of the site) and Bridgeman Road (west of the site). Residential land is located to the north and east of the site. The adjacent residential land falls towards an overland flow path/waterway which traverse the site. The site lies 1 km southeast of the South Pine River.

The southern area of the subject site is located within Council's mapped Overland Flow Flood Planning Area. This southern area of the site is also located within Council's mapped Local Waterway Corridor.

Catchment delineation, via contour mapping and detailed survey, indicates that a catchment area of approximately 27.8 hectares has the potential to generate runoff for discharge through the overland flow path to the Bridgeman Road culvert/pipe system adjacent to the western site boundary.

The Bridgeman Road culvert/pipe system consist of:

- A headwall inlet with 825mm pipe within the base of the existing overland flow path.
- An 8.4 m x 1.2 m grated inlet above a large stormwater chamber.
- 3 by 1500mm diameter RCP culverts beneath Bridgeman Road.

The 825mm pipe and headwall inlet conveys low flows from the overland flow path to the large stormwater chamber, before discharge via the Bridgeman Road Culverts. During high/major flows the grated inlet above the large stormwater chamber collects high/major flows, before discharge via the Bridgeman Road Culverts.

4 PROPOSED DEVELOPMENT

The proposed development is for a reconfiguration of a Lot to create twenty-one residential lots of varying size and a drainage easement in favour of Council over the existing overland flow path/waterway corridor. The overland flowpath / waterway corridor will not be modified as part of the proposed development, however the existing driveway crossing and pipes across the overland flowpath within the drainage reserve will be removed. Some filling is proposed along the edges the overland flowpath flood extent to allow the creation of new flood free allotments.

HCE Engineers have supplied WRM with the proposed earthworks TIN for the site which represents the developed conditions. No changes to the existing pipe network at Bridgeman Road are proposed – all existing inlet pits and pipework at Bridgeman Road will be retained by the development, to maintain the existing flow regime downstream of the road. (the existing inlet pits and pipes act as the hydraulic control for flows downstream of the road).

For further details refer to HCE Engineers Civil Engineering Assessment Report and Stormwater Management Plan for the concept design drawings.

The proposed development will increase the impervious area of the site resulting in an increase in peak discharge from the site. No on-site detention is proposed as part of the development. This report has investigated potential impacts of increased peak discharge from the site as well as the filling along the fringes of the overland flowpath flood extent.

5 HYDROLOGICAL MODELLING

5.1 OVERVIEW

The XP-RAFTS hydrologic model was used to estimate design event discharge hydrographs as inflows to a TUFLOW hydraulic model of the overland flow path draining through the site.

Design discharges were determined using the ensemble methodology defined in Australian Rainfall & Runoff (ARR) (Ball et al., 2019). An ensemble of ten (10) temporal patterns was modelled for each storm duration to derive a range of estimated peak discharges for the 20%, 2% and 1% AEP events. The storm duration with the highest median peak discharge of the ensemble was selected and the temporal pattern that produces the median peak was used for design event modelling.

The XP-RAFTS estimated peak discharges were validated against Rational Method estimates.

5.2 EXISTING CONDITIONS MODEL CONFIGURATION

5.2.1 Sub-catchment configuration

The XP-RAFTS model covers a total catchment area of approximately 32 ha draining to the overland flow path that traverses the development site and extending approximately 120 m downstream of the western site boundary. The catchment area consists of 10 sub-catchments with areas ranging from 0.2 ha to 14.5 ha. The sub-catchment attributes are presented in Table 5.1. The XP-RAFTS model configuration and adopted model sub-catchments are shown in Figure 5.1.

Table 5.1 Sub-catchment attributes for existing conditions

Sub-catchment	Area (ha)	Slope (%)	Imperviousness (%)	PERN 'n'
BR01	14.5	5.4	19.3	0.04
BR02	3.4	8.1	14.6	0.05
BR03	8.0	3.7	16.0	0.05
BR04	0.7	7.2	25.1	0.04
BR05	1.4	6.2	6.4	0.07
BR06	0.3	3.9	3.9	0.05
BR07	0.6	6.4	34.7	0.04
BR08	0.4	4.0	62.9	0.04
BR09	2.5	3.5	16.2	0.05
J1	0.2	3.0	2.0	0.05

5.2.2 Design rainfalls and temporal patterns

Design rainfall intensity-frequency-duration (IFD) data for the catchment to the site was obtained from the BOM IFD portal. East Coast North point temporal patterns were obtained from the AR&R Datahub for use in the RAFTS model. The rainfall data is based on a single point location at the centroid of the catchment area.

The hydrologic model was run for all ten temporal patterns for storm durations between 10 minutes and 3 hours for all modelled AEP events.

Design rainfall intensities for the 20%, 2% and 1% AEP design events and durations from 10 minutes to 3 hours are given in Table 5.2.

Table 5.2 Adopted Design Rainfall Intensity

Duration	20% AEP Design Rainfall intensities (mm/hr)	2% AEP Design Rainfall intensities (mm/hr)	1% AEP Design Rainfall intensities (mm/hr)
10 min	142	221	245
15 min	120	188	207
20 min	105	164	181
25min	93	146	162
30min	83.9	132	146
45 min	65.6	104	116
1 hr	54.4	87.1	97.3
1.5 hr	41.4	67.3	75.4
2 hr	34.1	55.9	62.8
3 hr	25.9	43.1	48.6

Source: BOM.gov.au, 27.3375S, 152.9875E

5.2.3 Design rainfall losses

The storm initial loss (IL) and continuing loss (CL) method of accounting for rainfall loss was adopted. The ARR Data Hub recommends an IL of 14 mm/hr and a CL of 2.1 mm/hr. These ARR Data Hub values are recommendations for rural catchments and should be modified to reflect urban losses. The recommended IL/CL values were therefore reduced to reflect the estimated proportion of impervious area within the modelled catchment area. The adopted rainfall loss values are IL 12.2 mm/hr and CL 1.7 mm/hr. A storage coefficient of 1.2 was adopted for the model.

5.3 DEVELOPED CONDITIONS MODEL CONFIGURATION

Sub-catchments BR05 and BR06 represent catchments within the subject site that are to be developed. These site sub-catchments were modified to reflect the post-development scenario as presented in Table 5.3.

Losses for sub-catchments BR05 and BR06 were also modified to reflect the impact of the proposed development. The adopted rainfall loss values for these two sub-catchments are presented in Table 5.4. Model loss parameters remain unchanged for all other sub-catchments.

Per Section 4 above, it is noted that sub-catchment BR06 represents the residual lot which under the current development proposal remains undeveloped. It is anticipated that this residual lot is to be developed in the future. Accordingly, sub-catchment BR06 has been modelled in a developed state to anticipate future development of the site.

Table 5.3 Sub-catchment attributes for developed conditions

RAFTS Sub-catchment	Area	Slope (%)	Imperviousness (%)	PERN 'n'
BR05	0.3	6.2	90	0.025
BR06	1.4	3.9	90	0.025

Table 5.4 Sub-catchment losses for developed conditions

Sub-Catchment	Initial Loss (mm/hr)	Continuing Loss (mm/hr)
BR05	2.0	0
BR06	2.0	0

5.4 Model validation

The Rational Method was used to validate XP-RAFTS existing conditions model discharges to Bridgeman Road. Sub-catchment J1 in the XP-RAFTS model represents flows to the Bridgeman Road culverts which are critical for flow through the site. Table 5.5 compares the XP-RAFTS estimated peak discharges at J1 with Rational Method discharges for all modelled events.

The results show that the discharges estimated by the RAFTS model compare well against the Rational Method discharges and therefore is an acceptable validation. The Rational Method calculations are presented in Appendix B.

Table 5.5 Comparison of RAFTS model discharge to Rational Method discharge estimates

AEP (%)	Rational Method discharge (m ³ /s)	RAFTS model discharge (m ³ /s)	Difference (%)
20	5.5	6.0	8.7
2	10.5	10.9	3.8
1	12.2	12.3	0.8

5.5 Design discharge estimates

5.5.1 Existing conditions

The storm duration with the highest median peak discharge of the ensemble was selected and the temporal pattern that produces the median peak was used for design event modelling. The design discharge estimates and critical durations from the XP-RAFTS model at Bridgeman Road are shown in Table 5.6.

Table 5.6 RAFTS model peak discharge, critical duration and temporal patterns for existing conditions

AEP (%)	Peak discharge (m ³ /s)	Critical duration and temporal pattern
20	6.0	30 min TP5
2	10.9	25 min TP4
1	12.3	25 min TP4

The above critical duration and temporal patterns were adopted as the critical overland flow path storm events.

5.5.2 Developed conditions

The above critical storms (duration and temporal pattern) were simulated in the developed conditions model to estimate peak design discharges. As discussed in Section 5.3, only the catchments within the site were updated to reflect the increased runoff due to the proposed development. A comparison between the existing conditions and developed conditions peak discharges are shown in Table 5.7.

Table 5.7 RAFTS model Existing vs. Developed peak discharge comparison

Sub-Catchment	AEP (%)	Existing Peak discharge (m ³ /s)	Developed Peak discharge (m ³ /s)
BR05	20	0.26	0.40
	2	0.50	0.68
	1	0.58	0.75
BR06	20	0.07	0.09
	2	0.12	0.15
	1	0.14	0.16

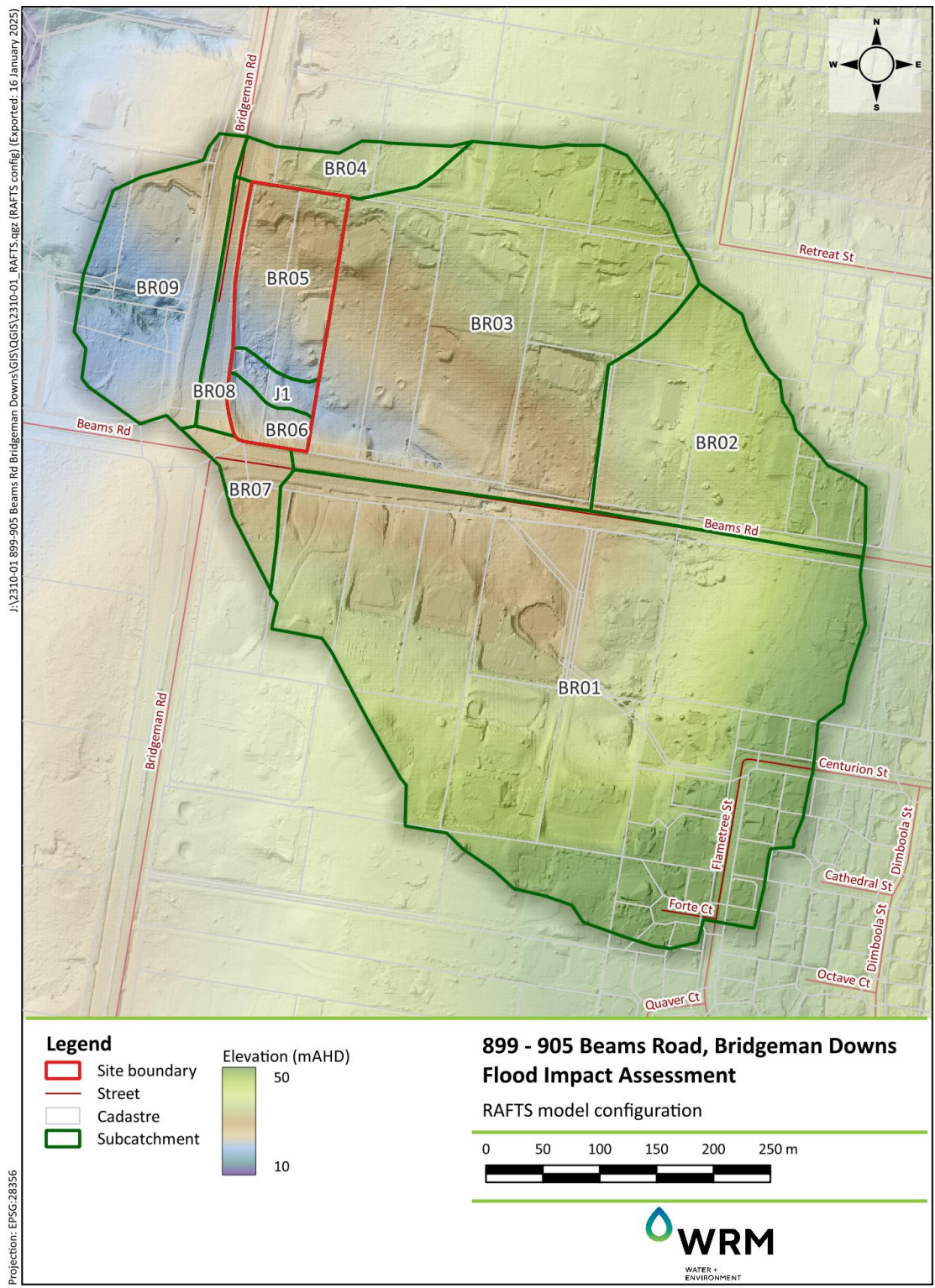


Figure 5.1 RAFTS model configuration

6 HYDRAULIC MODELLING

6.1 METHODOLOGY

The TUFLOW two-dimensional hydrodynamic model (BMT, 2024) was used to estimate the design flood levels in the vicinity of the site.

The TUFLOW model was run for two scenarios:

- Existing conditions; and
- Developed conditions (with the development in place).

Under the developed conditions no on-site detention is proposed to attenuate the peak discharge from the site.

The model was used to estimate design flood levels for the existing and proposed development conditions for 20%, 2%, and 1% AEP events.

6.2 EXISTING CONDITIONS MODEL CONFIGURATION

Figure 6.1 shows the TUFLOW model extent and configuration under existing conditions. The model extent covers an area of approximately 15 ha.

6.2.1 Model topographic data and grid size

LiDAR survey data from Elvis LIDAR was used to obtain the topography for the larger TUFLOW model extent. Detailed survey for the site and its vicinity was supplied by Simpson Rayner Surveys (Plan Reference: 24054A0/1A, 24118A0/1) which was used in the model. A TUFLOW model grid size of 1 m was adopted.

6.2.2 Hydraulic roughness

Table 6.1 shows the adopted existing conditions Manning’s n values for the study area. Figure 6.2 shows the adopted Manning’s locations.

Table 6.1 Existing TUFLOW model hydraulic roughness

Land Use Type	Manning’s n
Open space/ Light vegetation	0.045
Medium vegetation	0.06
Road	0.02
Building	0.4

6.2.3 Inflows and boundary conditions

Figure 6.1 shows the locations of the inflow boundaries. The discharges from the XP-RAFTS sub-catchments (refer to Section 5) for existing conditions were included as 2d_sa inflows into the model for sub-catchments BR01, BR02, BR03, BR05, BR06, BR09 and J1. Inflow boundaries within the existing road network (sub-catchments BR04, BR07 and BR08 utilised TUFLOW’s “SA to pits” functionality, which allows location runoff to be applied at the proposed pit inlet locations.

The outflow from the model area was included as a 2d HQ (head versus discharge) boundary, at approximately 120 m west of Bridgeman Road. A slope of 3% was adopted for the HQ boundary, based on the slope of the flowpath downstream of the boundary.

6.2.4 Hydraulic structures

The existing stormwater pits, manholes, pipes and culverts were included in the model based on the Survey data provided by Simpson Rayner Surveys. The pit and pipe network, represented as a 1d TUFLOW network, is shown in Figure 6.1.

The following blockage assumptions for the existing 8.4 m x 1.2 m grated inlet pit upstream of Bridgeman Road was adopted for all:

- 5% debris blockage of the inlet pit when under weir flow conditions; and
- 35% blockage of the grate when totally submerged and operating under orifice flow conditions.

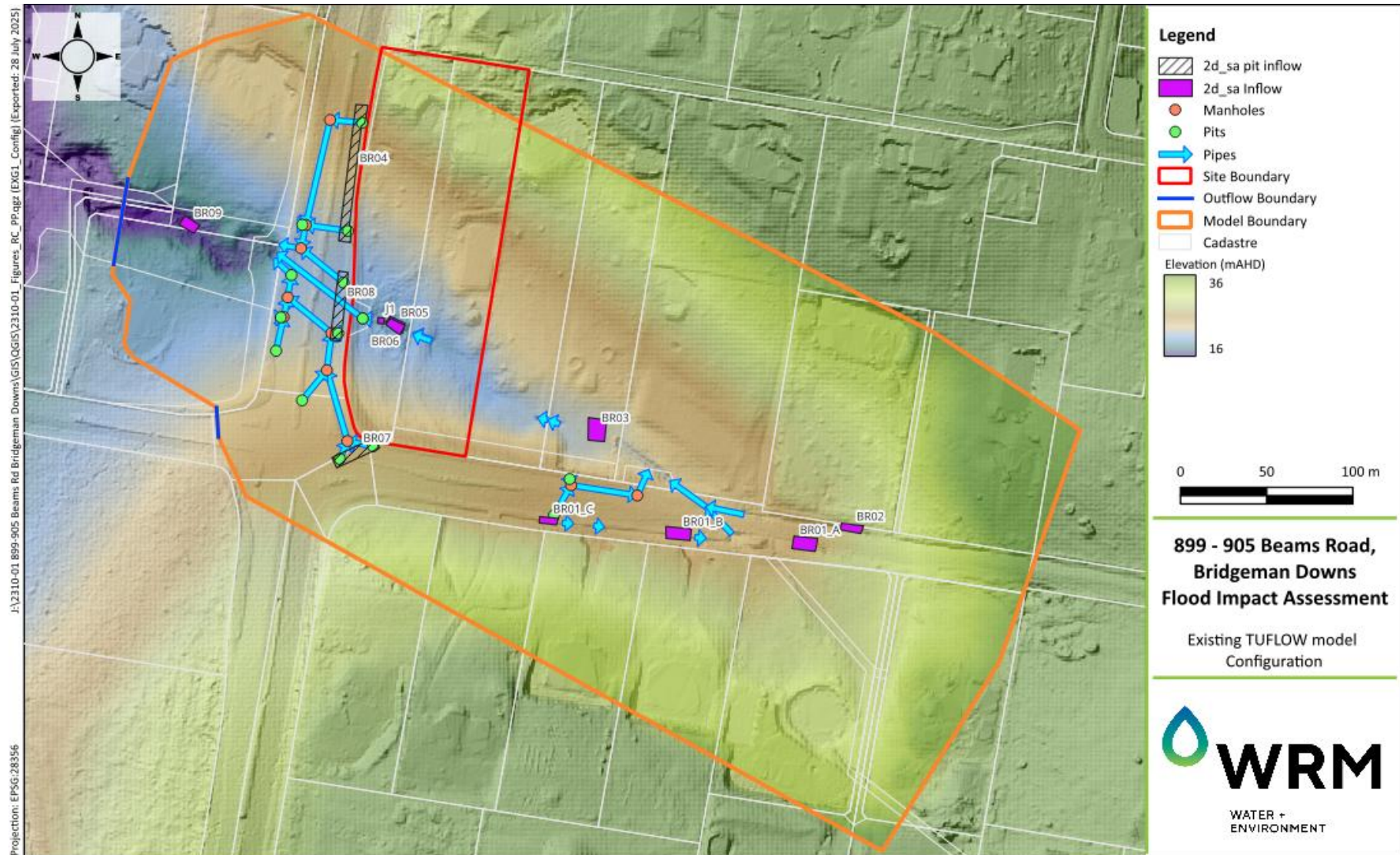


Figure 6.1 Existing Conditions TUFLOW model configuration

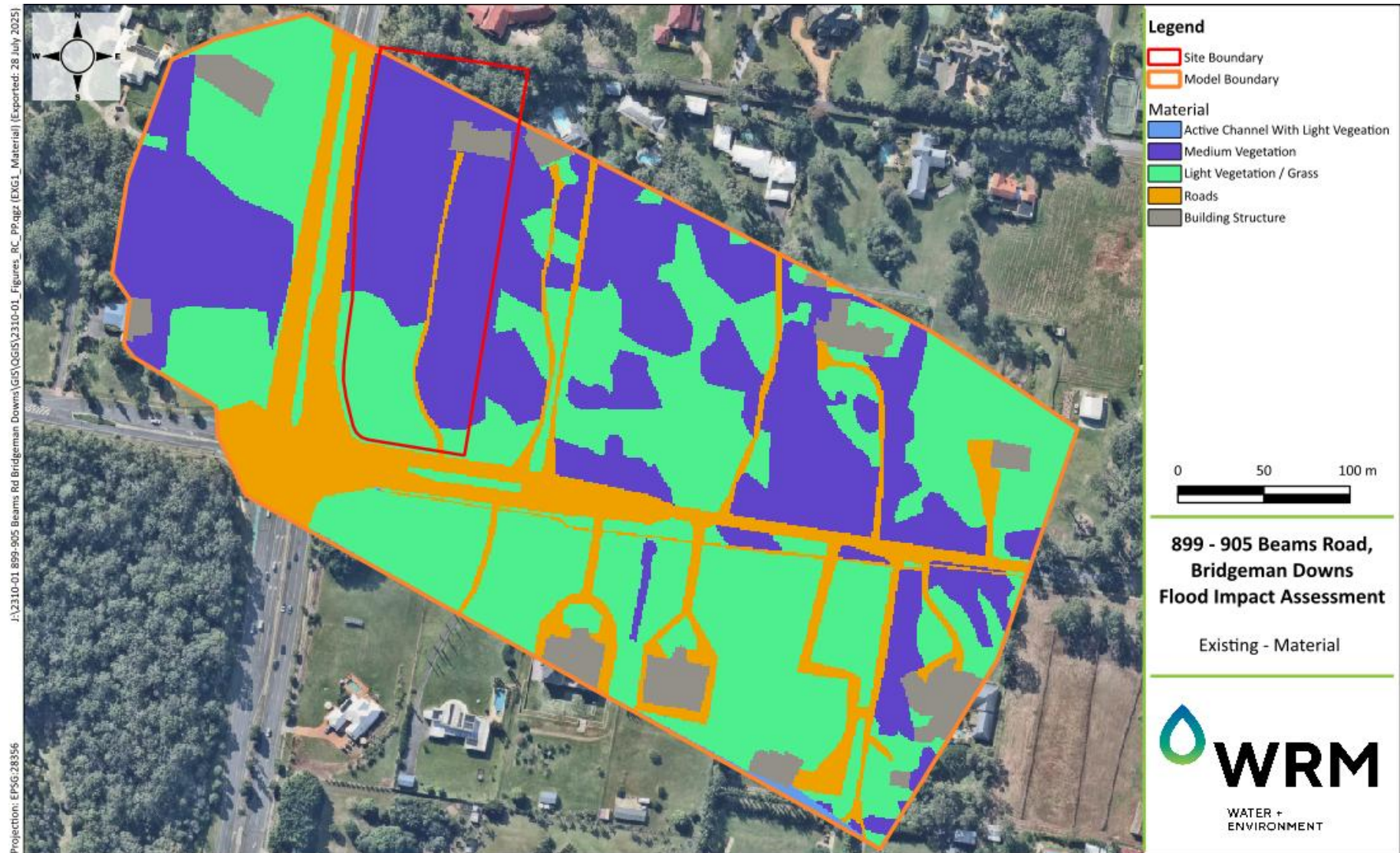


Figure 6.2 Existing Conditions TUFLOW materials mapping

6.3 DEVELOPED CONDITIONS MODEL CONFIGURATION

Figure 6.3 shows the developed conditions TUFLOW model configuration. The existing conditions TUFLOW model was modified to represent the proposed development as follows:

- HCE Engineers have supplied WRM with the proposed earthworks design TIN for the Site which represents the developed conditions (24283-XrefDA-Rev0.dwg). The supplied TIN has been included within the developed case TUFLOW flood modelling of the site and surrounds. Figure 6.4 is the developed case TUFLOW digital elevation model (DEMZ) for the model extent which shows the proposed earthworks TIN within the Site. Refer to the HCE Engineers Civil Engineering Assessment Report and Stormwater Management Plan for further earthworks level details.
- Roughness mapping within the site was adjusted to reflect the proposed development and retention of the waterway corridor / overland flowpath. It has been assumed that the downstream half of the overland flowpath would be revegetated as it will be under Council control, and has been assigned a medium vegetation roughness category, replacing the light vegetation condition adopted in the existing scenario. Table 6.2 shows the adopted developed conditions Manning’s n values for the study area which aligns with the principles of natural channel design. Figure 6.5 shows the adopted Manning’s locations.
- The pipe network layer was updated to remove the pipe culverts beneath the existing internal driveway crossing within the site boundary. No other changes were made to the existing pipe network.
- The discharges from the XP-RAFTS sub-catchments (refer to Section 5) for developed conditions were utilised in the model.

Table 6.2 Developed TUFLOW model hydraulic roughness

Land Use Type	Manning’s n
Open space/Light vegetation	0.045
Medium vegetation	0.06
Road	0.02
Building	0.4
Revegetated channel bed	0.06
Revegetated batters	0.08

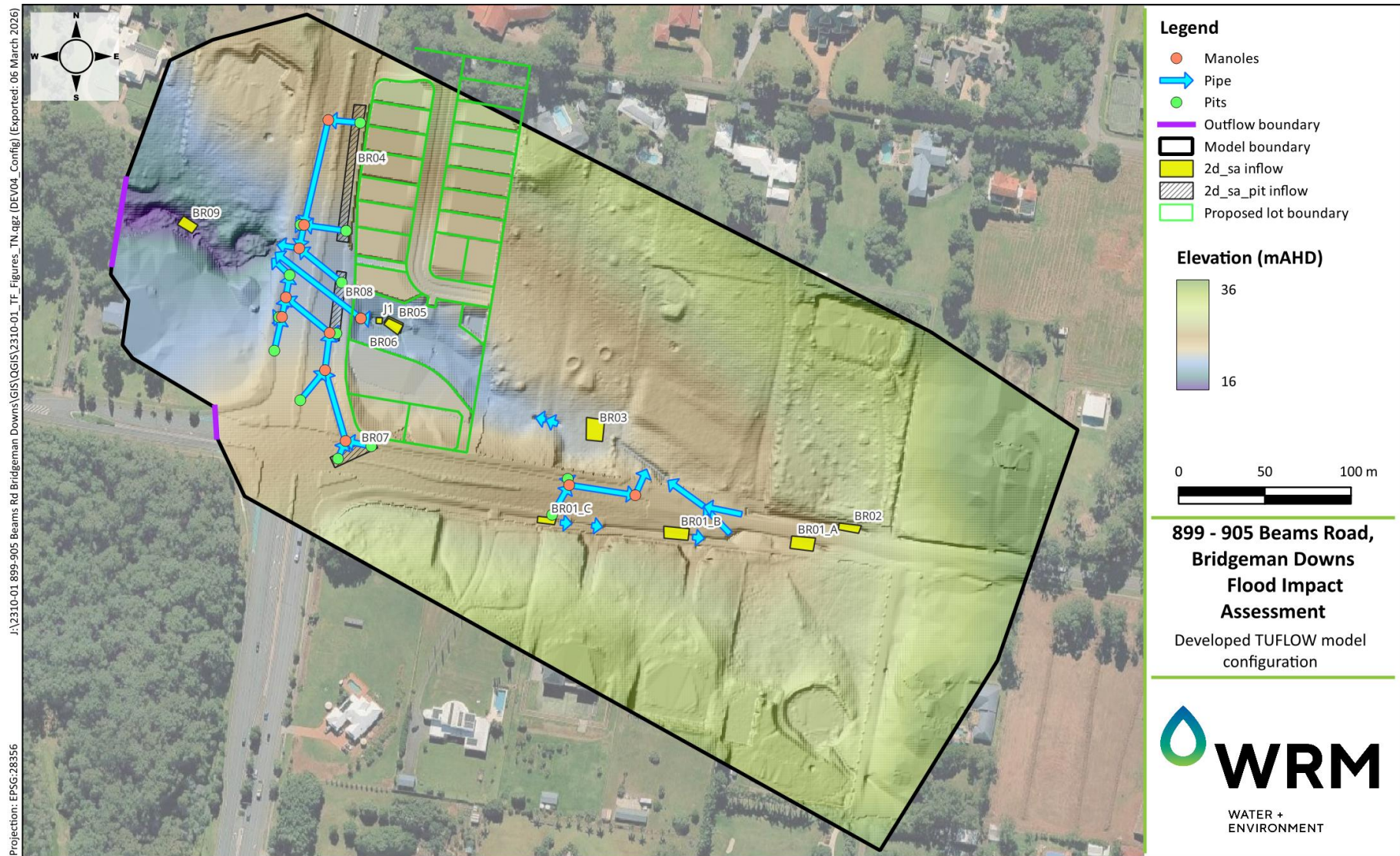


Figure 6.3 Developed Conditions TUFLOW model configuration

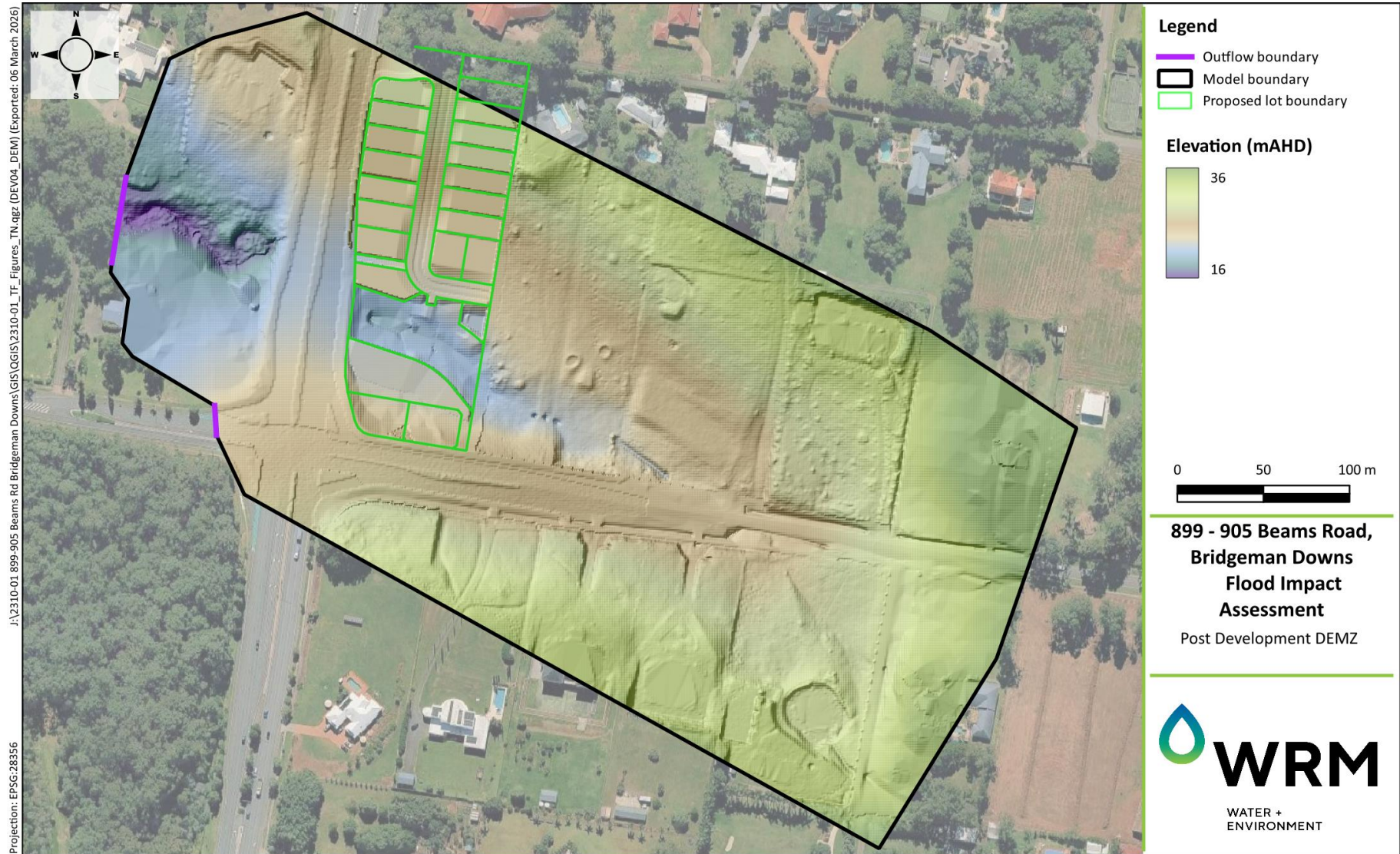


Figure 6.4 Developed Conditions TUFLOW digital elevation model (DEMZ)



Figure 6.5 Developed Conditions TUFLOW materials mapping

7 FLOOD IMPACT ASSESSMENT

7.1 EXISTING CONDITIONS MODEL RESULTS

Figure 7.1 to Figure 7.3 show the predicted existing conditions peak flood depths with water surface contours, velocity and hazard mapping respectively for the 2% AEP event.

The predicted existing conditions results mapping for the 20% and 1% AEP events are presented in Appendix C.

The following was observed from the flood modelling results:

- Bridgeman Road is not overtopped by overland flow during the 20%, 2%, and 1% AEP events.
- Some inundation is predicted at the intersection of Beams and Bridgeman Road and within the kerb and channel of Bridgeman Road. The maximum depth of flow in these areas is 50mm at the sag in Bridgeman Road and is attributed to surface flows exceeding the capacity of the pit and pipe stormwater network in the road.
- The maximum depth of flow within the existing channel on site is 1.8 m during the 2% AEP event.
- The highest 2% AEP event flood levels are described as follows:
 - The upstream site boundary: 21.78 mAHD
 - Centrally through the site: 21.26m AHD
 - At the existing Bridgeman Road culvert inlet structures adjacent to the western site boundary: 21.23 mAHD
 - Immediately downstream of the Bridgeman Road headwall outlet: 19.21 mAHD
 - Approximately 20m upstream of the site: 21.97 mAHD
 - Approximately 20m downstream of the site: 18.38 mAHD



Figure 7.1 Existing Conditions - 2% AEP Event Flood Depth with Water Level Contours Mapping



Figure 7.2 Existing Conditions - 2% AEP Event Velocity Mapping

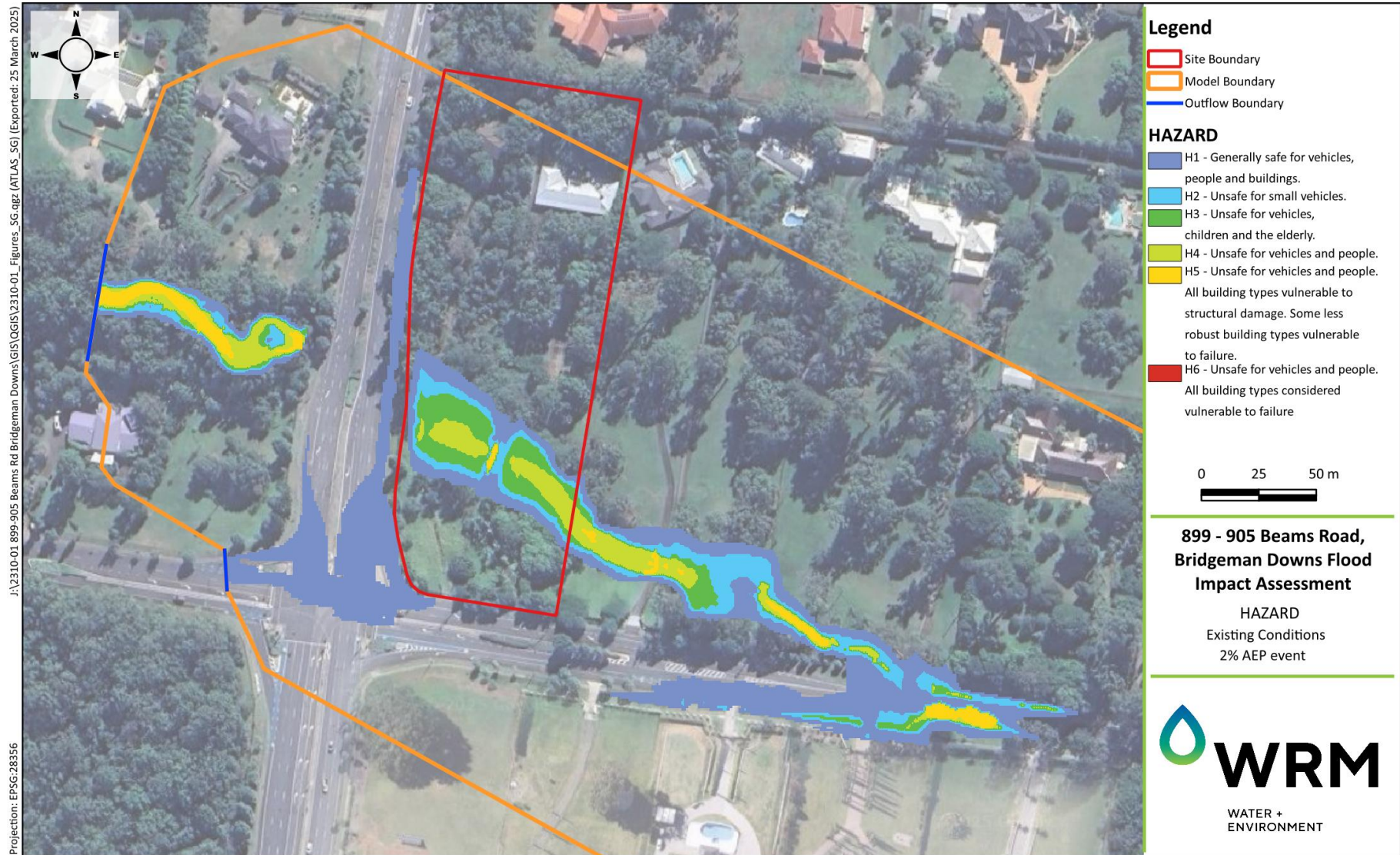


Figure 7.3 Existing Conditions - 2% AEP Event Hazard Mapping

7.2 DEVELOPED CONDITIONS MODEL RESULTS

Figure 7.4 to Figure 7.6 show the predicted post-development conditions peak flood depths with water surface contours, velocity and hazard mapping respectively for the 2% AEP.

Figure 7.7 and Figure 7.8 shows the predicted change in peak water level (i.e. afflux) and velocity, respectively, due to the proposed earthworks for the 2% AEP event.

The predicted post-development results mapping for the 20% and 1% AEP events are presented in Appendix D.

The following was observed from the flood modelling results:

- Inundation and flood immunity of Bridgeman Road is unchanged from existing conditions;
- The overland flow is confined to the retained waterway corridor.
- The maximum depth of flow within the channel on site is 1.81 m during the 2% AEP event.
- The highest 2% AEP event flood levels are described as follows:
 - The upstream site boundary: 21.67 mAHD
 - Centrally through the site: 21.25m AHD
 - The downstream site boundary: 21.23 mAHD
 - Approximately 20m upstream of the site: 21.89 mAHD
 - Approximately 20m downstream of the site: 18.38 mAHD
- Predicted 2% AEP flow velocities in the waterway corridor range from 1.2 m/s at the upstream site boundary to less than 0.4m/s in the backwater zone upstream of Bridgeman Road.
- Table 9.5.2 of QUDM (DEWS, 2017) indicates that for channels with grades of 2%, the maximum allowable velocity ranges from 1.4 m/s for 50% stable vegetal cover to 2.5 m/s for 100% stable vegetal cover. Hence the velocities are considered acceptable for existing overland flowpath.



Figure 7.4 Developed Conditions - 2% AEP Event Flood Depth with Water Level Contours Mapping

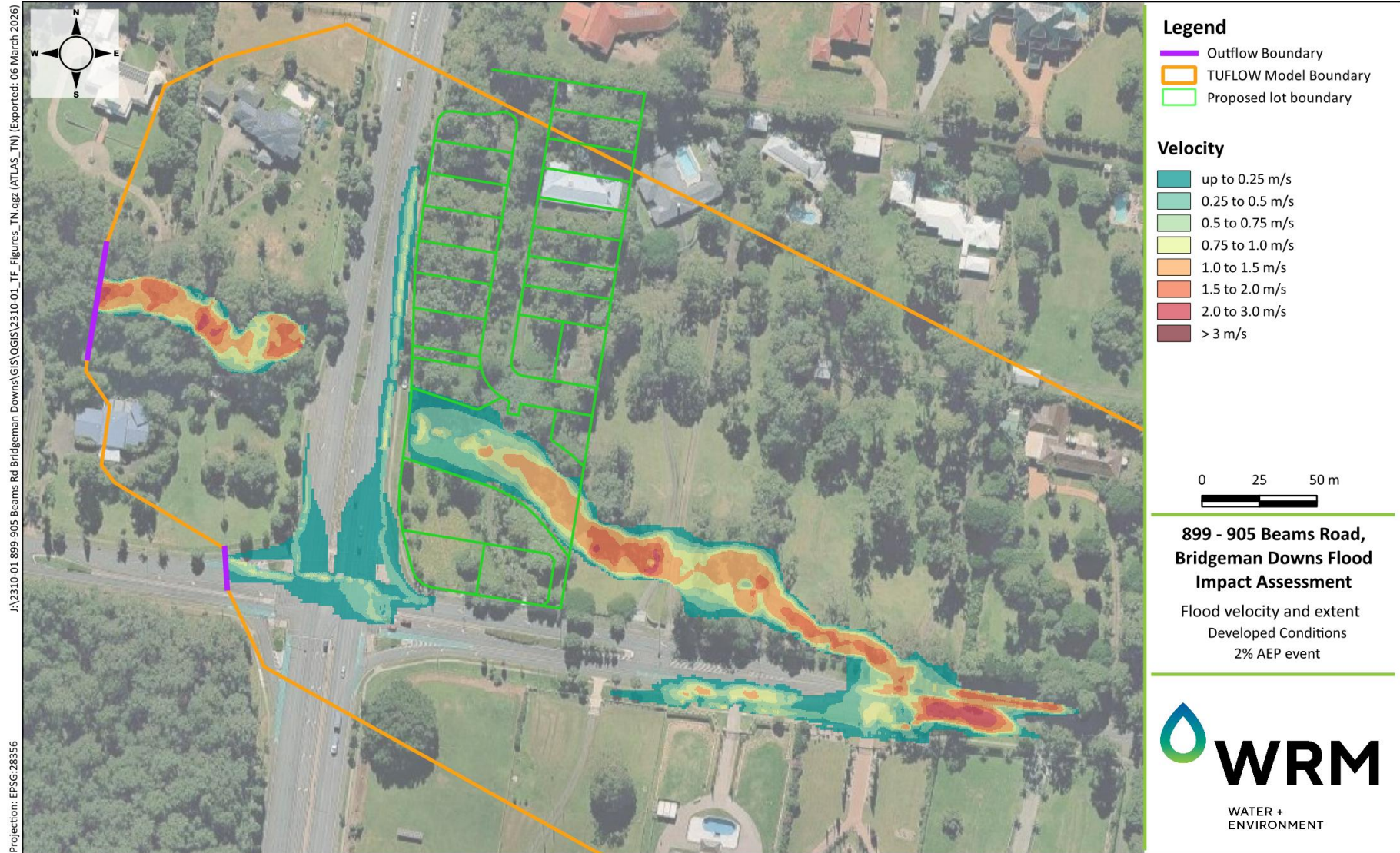


Figure 7.5 Developed Conditions - 2% AEP Event Velocity Mapping

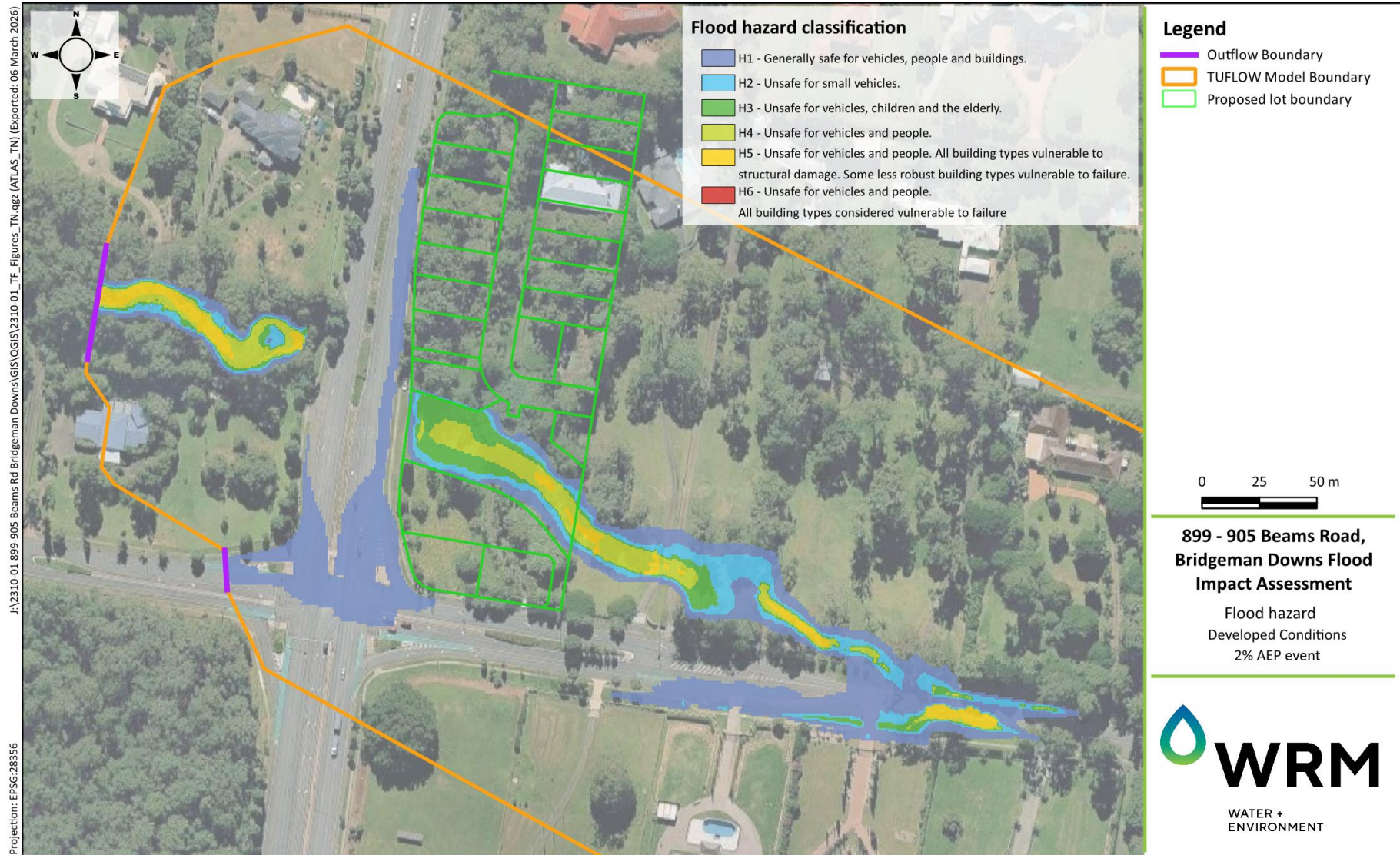


Figure 7.6 Developed Conditions - 2% AEP Event Hazard Mapping

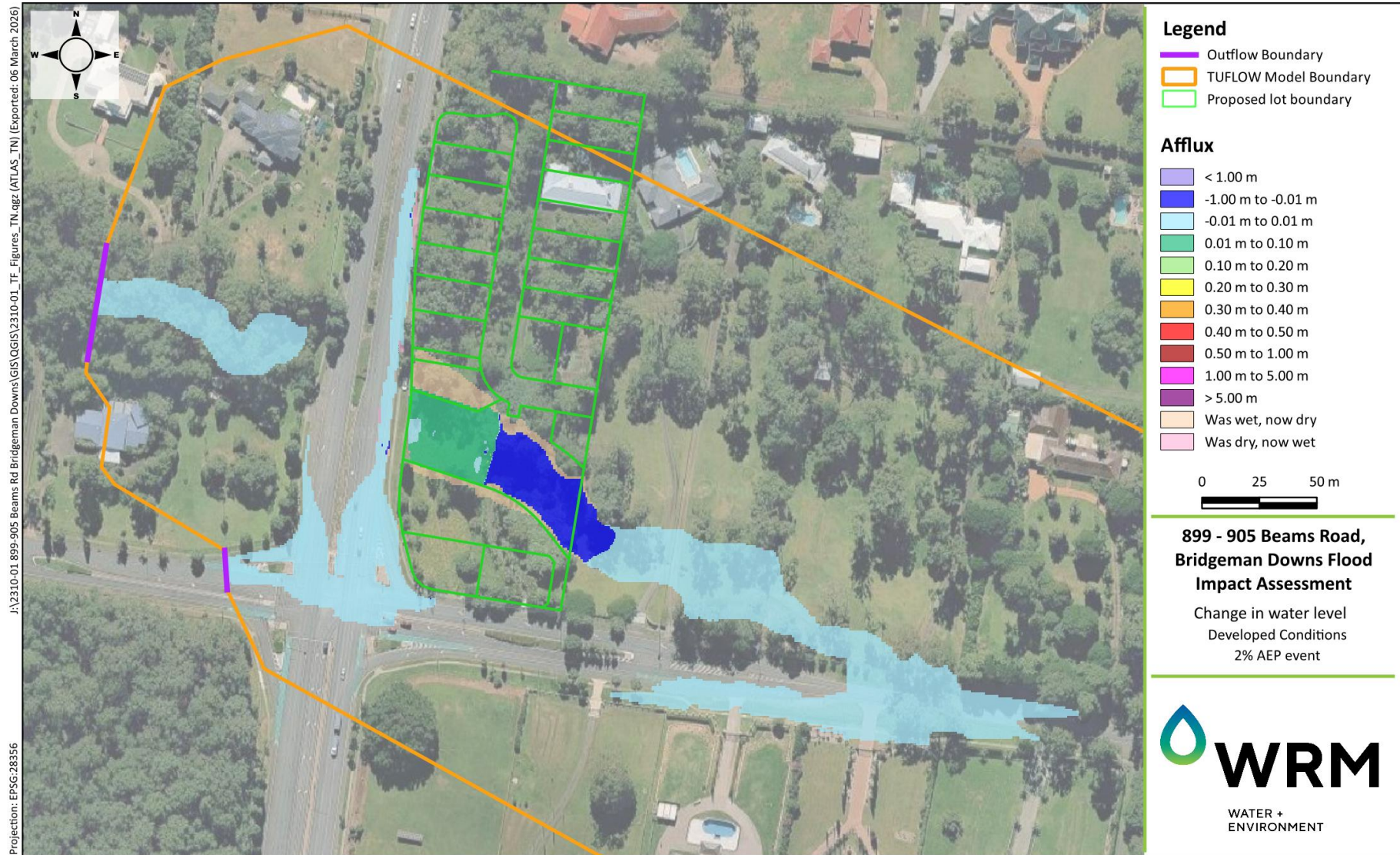


Figure 7.7 Flood Level Afflux Map - 2% AEP Event

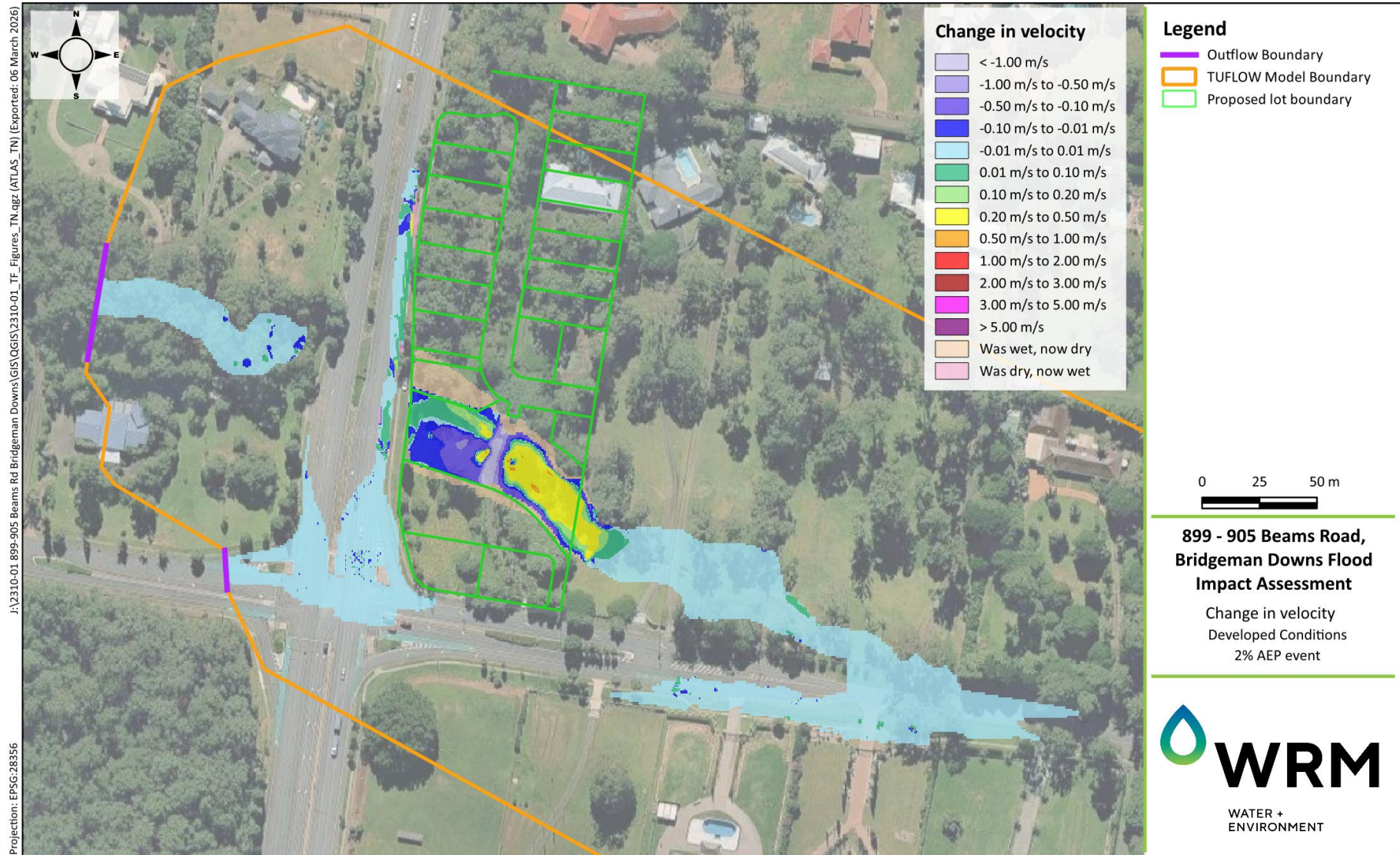


Figure 7.8 Velocity Impact Map - 2% AEP Event

7.2.1 Discussion

On examination of the impact mapping the following is of note:

7.2.1.1 Change in water level

- Within site boundary
 - During the 20%, 2% and 1% AEP events, there are changes in flood levels upstream and downstream of the pipe culverts beneath the existing internal driveway crossing within the site boundary. These pipe culverts are removed under proposed conditions causing a decrease in water level upstream of the existing driveway (reductions ranging from 0.5m in the 20% AEP event to 0.35m in the 1% AEP event) and an increase in water level (increases ranging from 0.013m in the 20% AEP event to 0.023m in the 1% AEP event) downstream of it.
 - The increase in water level is confined within the waterway corridor.
- Bridgeman Road and Beams Road
 - Flooding immunity and inundation of Bridgeman Road and Beams Road is generally unchanged from existing conditions.
- During the 20%, 2% and 1% AEP events, there is negligible change in flood levels external to the site, except for immediately upstream of the site where flood levels are reduced due to the removal of the existing driveway crossing.
- The proposed development does not result in any change in flood levels or flows downstream of Bridgeman Road, as the peak water levels at the inlet pits upstream of Bridgeman Road are unchanged in the developed scenario.

7.2.1.2 Change in velocity

- Within site boundary
 - During the 20%, 2% and 1% AEP events, there are changes in flood velocities upstream and downstream of the pipe culverts beneath the existing internal driveway crossing within the site boundary. These pipe culverts are removed under proposed conditions causing an increase in velocity of up to 0.53 m/s in some sections and a decrease in velocity of up to 1.6 m/s in some sections within the waterway corridor.
- Bridgeman Road and Beams Road
 - Flooding immunity and inundation of Bridgeman Road and Beams Road is generally unchanged from existing conditions.
- During the 20%, 2% and 1% AEP events, there is negligible change in flood velocity in most of the channel external to the site, except for immediately upstream of the site where increases in flood velocities are predicted, due to the removal of the existing driveway crossing. These predicted increases in velocity range between 0.01 to 0.45 m/s, increasing absolute velocities to a maximum of about 1.5m/s (which is still within the allowable limit for maximum velocities in grass channels with 100% stable vegetal cover as defined in Table 9.5.2 of QUDM (DEWS, 2017). The potential impacts associated with the increase in velocity are further discussed below.
- There are no significant changes to channel velocity downstream of Bridgeman Road.

7.2.1.3 Bed Shear Stress – post development

To further assess potential scour and erosion within the velocity impact areas immediately upstream of the site, bed shear stress outputs were extracted from the TUFLOW model. Figure 7.9 to Figure 7.11 display the predicted post-development bed shear stress mapping. The maximum bed

shear stress predicted by the model within the velocity impact areas for the 20%, 2% and 1% AEP events are 119 N/m², 146 N/m² and 154 N/m², respectively at a very isolated area where the channel gradient within the upstream lot is quite steep (approximately 5%). Throughout most of the zone of velocity impact on the upstream lot, maximum bed shear stress ranges between about 100 N/m² in a 20% AEP event to 120 N/m² in a 1% AEP event.

A literature review was conducted to investigate the relationship between bed shear stress and erosion, with reference to ACARP Project Number C20017: *Criteria for Functioning River Landscape Units in Mining and Post-Mining Landscapes* (Alluvium, 2014).

Specifically, Table 6.4 from Alluvium (2014) provides erosion thresholds (allowable shear stress) for different waterway boundary materials with the threshold for turf (grass) ranging from 45 to 177 N/m². Analysis of grassed areas upstream of the site, which are outside the direct influence of velocity impact zones, indicates that these areas experience bed shear stresses within similar ranges (between 105 N/m² and 180 N/m²), yet no evidence of erosion is observed. This suggests that the upstream grassed areas are resilient to the prevailing shear stress conditions.

Furthermore, it is important to note that the modelled conditions for the waterway corridor between the upstream site boundary and the existing driveway crossing are considered to represent existing conditions vegetational roughness. If the waterway corridor is intended to become thickly vegetated in its ultimate state (as per Council vegetation management) the channel vegetation is expected to achieve characteristics similar to those of the sensitivity case, with a high Manning's roughness of 0.15 and a 50% pipe blockage (refer to Section 7.3 for additional details). Bed shear stress mapping for the sensitivity case, presented in Figure 7.12 to Figure 7.14, demonstrates that the bed shear stress immediately upstream of the site remains well below the upper threshold of 177 N/m² for turf during the 20%, 2%, and 1% AEP events. As a result, the predicted velocities and bed shear stresses upstream of the site are unlikely to induce erosion in the grassed areas.

7.2.1.4 Change in flood hazard

When comparing the pre- and post-development hazard mapping for the 20%, 2% and 1% AEP events, the maximum predicted flood hazard category (H3 to H5) remains unchanged external to the site and within the waterway corridor at the site. It is of note changes to the extents of some hazard categories within the waterway corridor during post-development conditions occurs due to the removal of the existing driveway crossing, and not due to the filling at the fringe of the flood extent to create the new lots.

7.2.1.5 No on-site detention basin required

The developed case modelling included increased peak discharge from the site due to the introduction of additional impervious surfaces as part of the proposed development. However, despite this increase in peak discharge, the afflux mapping analysis demonstrates that there are no adverse impacts on water levels either within or external to the site. This outcome can be attributed to the capacity of the Bridgeman Road culverts, which restricts peak discharge controlling downstream flow conditions. Similar to existing conditions, attenuated flow is able to pond behind the road/culvert embankment within the site and the waterway corridor, as per existing conditions. Notably, the ponding does not extend upstream, nor does it affect the flood levels on adjacent upstream properties. As the development does not result in increases in flood levels or discharges at upstream, downstream or adjacent properties, it is concluded that on-site detention is not required for the proposed development.

7.2.1.6 Compliance with Flood Overlay Code

- Based on the above findings and as shown in the impact mapping, the proposed development does not result in a material adverse impact on flood levels, velocities or hazard external to the

site. The proposed development is therefore in accordance with Performance Outcome PO7 the Council's Flood Overlay Code.

- The proposed development does not materially worsen the hydraulic hazard within the waterway corridor and is compliant with Acceptable Outcome AO7.3 of the Flood Overlay Code.
- Additionally, the development does not result in unacceptable risk to people or property as the development provides flood free lots and maintains flood free road access to Bridgeman Road and Beams Road.
- For further details on development compliance, a tabulated response to the relevant Flood Overlay Code items is provided in Appendix E.



Figure 7.9 Developed Conditions - 20% AEP Event Bed Shear Stress Mapping

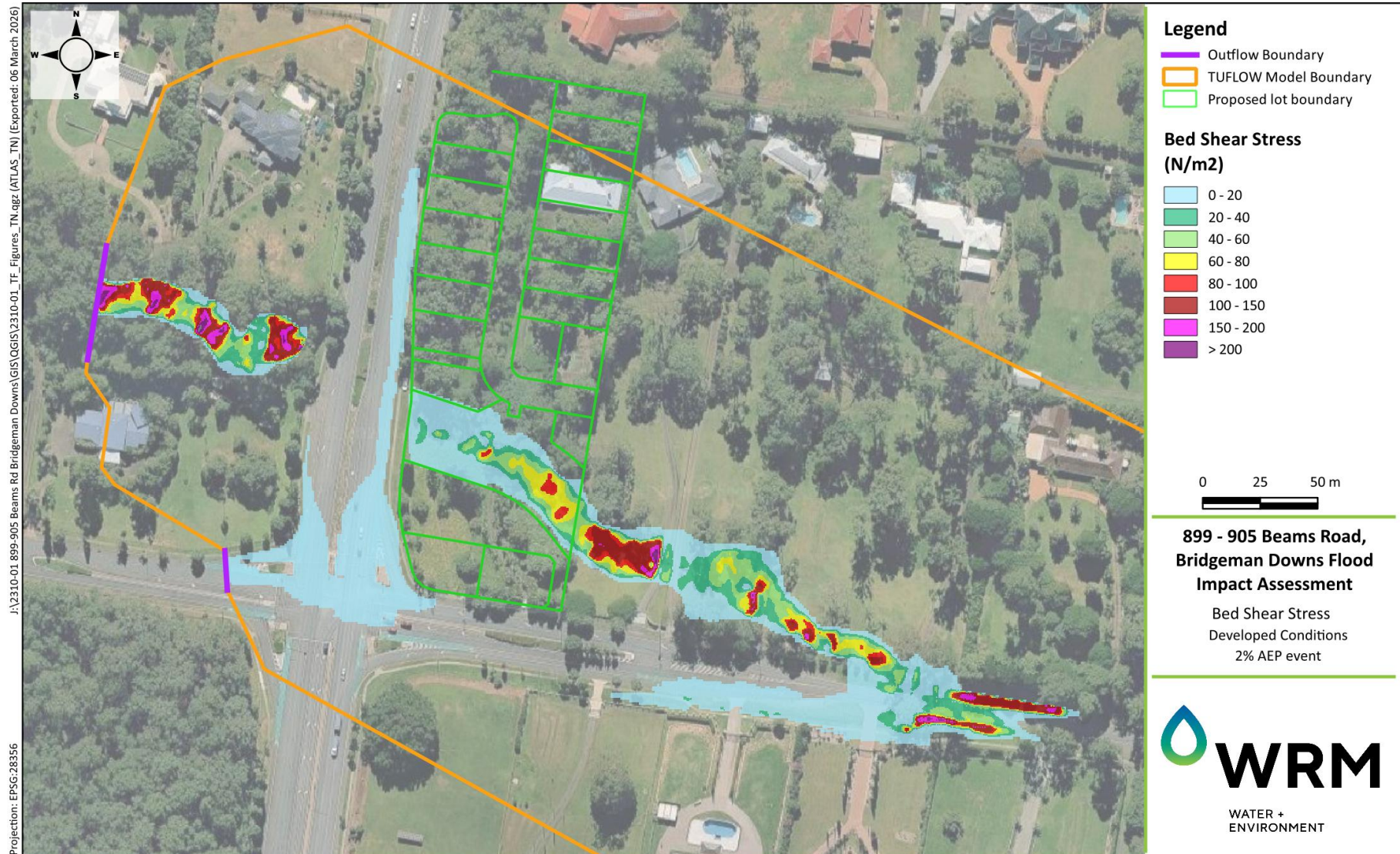


Figure 7.10 Developed Conditions - 2% AEP Event Bed Shear Stress Mapping

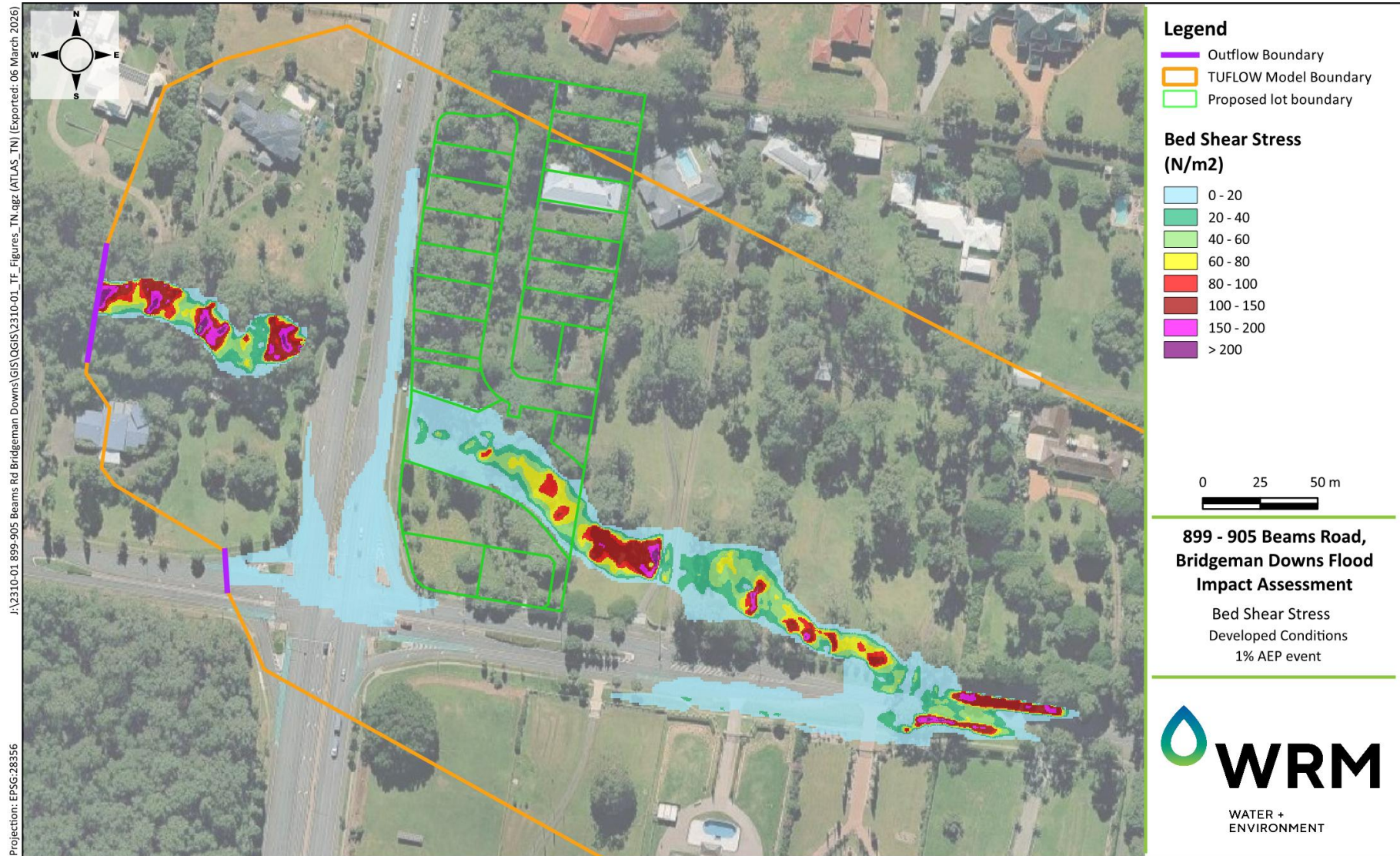


Figure 7.11 Developed Conditions - 1% AEP Event Bed Shear Stress Mapping



Figure 7.12 Sensitivity Case - 20% AEP Event Bed Shear Stress Mapping

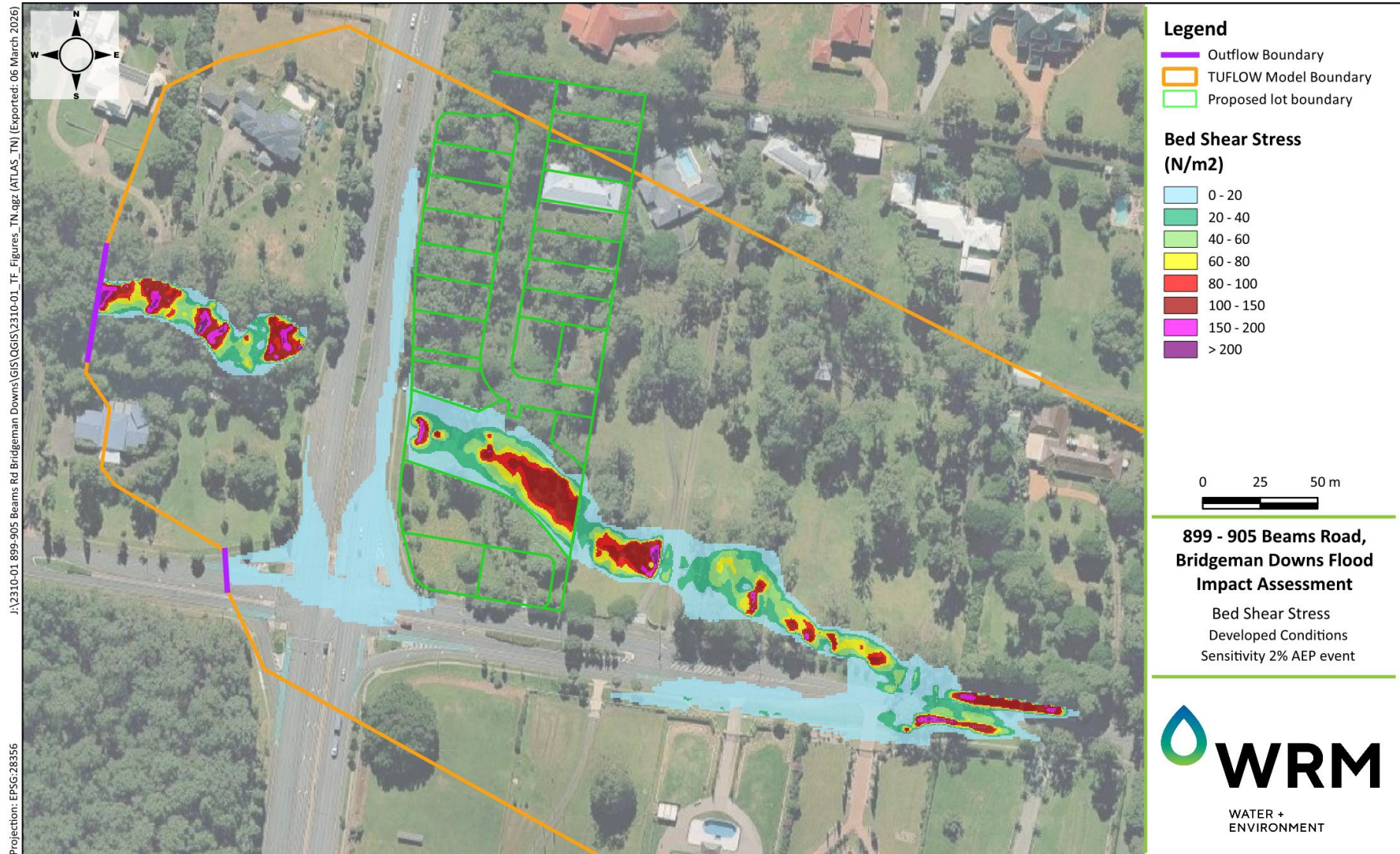


Figure 7.13 Sensitivity Case - 2% AEP Event Bed Shear Stress Mapping

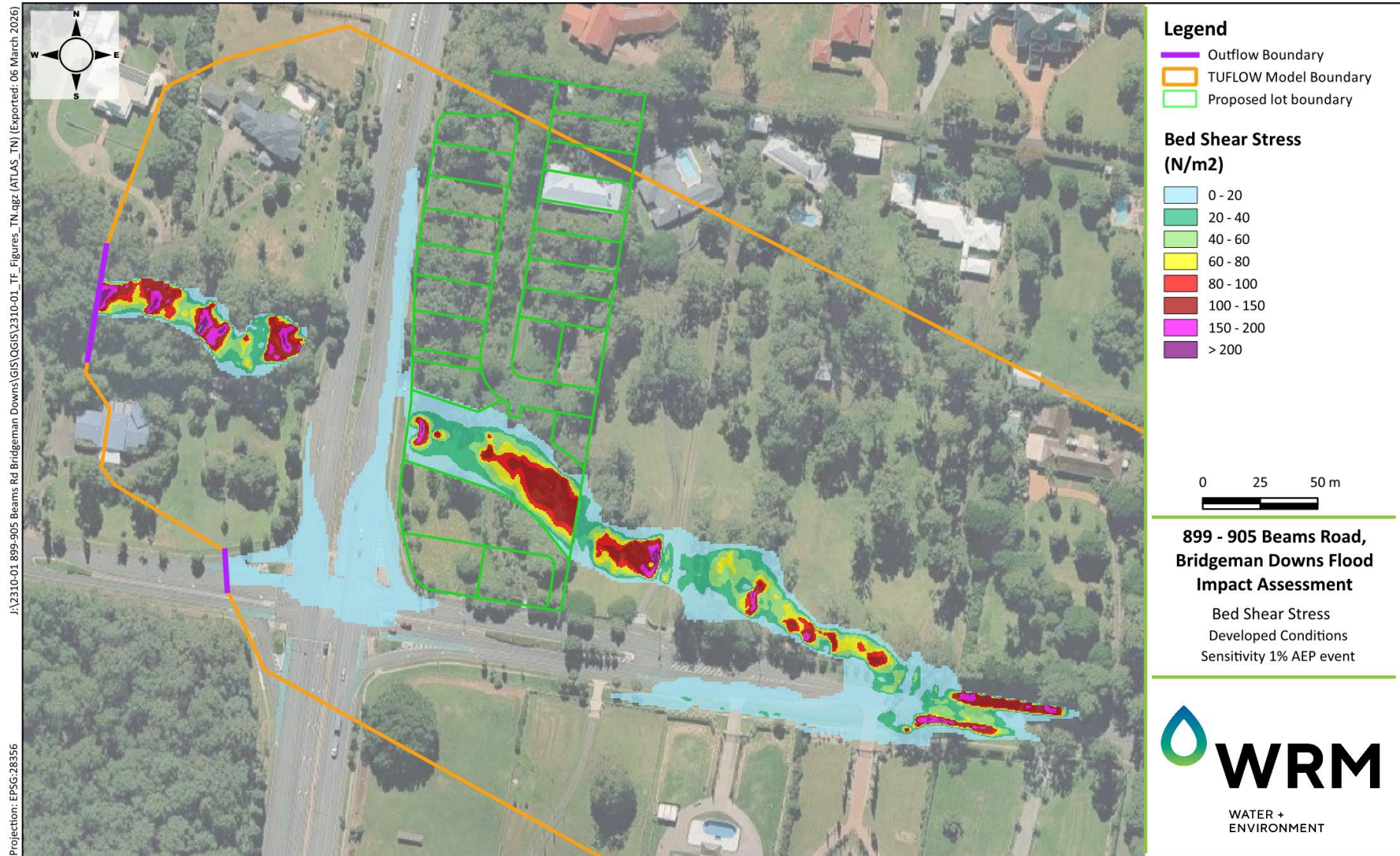


Figure 7.14 Sensitivity Case - 1% AEP Event Bed Shear Stress Mapping

7.3 SENSITIVITY ANALYSIS & MINIMUM DEVELOPMENT LEVELS

Section 10.7 of Council’s Flood Planning Scheme Policy states that a fully vegetated waterway corridor using a high Manning’s roughness ‘n’ of 0.15 should be used for determining development fill or building floor levels.

This highly vegetated roughness coefficient is adopted to consider any future unrestricted planting and lack of maintenance within the waterway corridor.

Accordingly, a sensitivity case TUFLOW model has been established. The sensitivity case model adopts the developed case model and changes the materials file such that the waterway corridor area is modelled with a Manning’s n value of 0.15. It also includes a 50% blockage to the 825 mm pipe within the site conveying to the Bridgeman Road culverts. Blockage to the large inlet pits upstream of Bridgeman Road is unchanged from the existing scenario.

Figure 7.15 and Figure 7.16 shows the 2% and 1% AEP event sensitivity case flood extent, respectively. It can be seen that flows are contained within the waterway corridor and proposed lots and road remain flood free.

Table 7.1 outlines the required allotment levels and future dwelling finished floor levels based on the defined flood event (2% AEP) sensitivity case model output.

It is further noted that the low point on the median in Bridgeman Road downstream of the site has a level of about 21.73 mAHD, and hence if full blockage of the inlet pits upstream of Bridgeman Road did occur, the relieving level for flows would be the Bridgeman Road level, which is over 0.6 m lower than the lowest proposed lot level of 22.35 mAHD (Lot 21). Hence the new allotments are not expected to be at risk of flooding should the inlet pits become fully blocked.

Table 7.1 Minimum Development Levels

Lots	Minimum Allotment Level ¹ (m AHD)	Min. Habitable Floor Level ² (m AHD)	Min. Non-Habitable Floor Level ³ (m AHD)	Corresponding DFE Level (m AHD)
Lots 1 - 8	21.54	21.74	21.54	21.24
Lot 19 - 21	21.97	22.17	21.97	21.67

¹ Required immunity level – 2% AEP + 300mm

² Required immunity level – 2% AEP + 500mm

³ Required immunity level – 2% AEP + 300mm

When comparing earthworks levels from the provided TIN, all allotments are in excess of the above minimum development levels. Compliance with Acceptable Outcome AO5.1, AO11.1, AO17.2, AO18.1 & AO18.2 of the Flood Overlay Code is achieved.

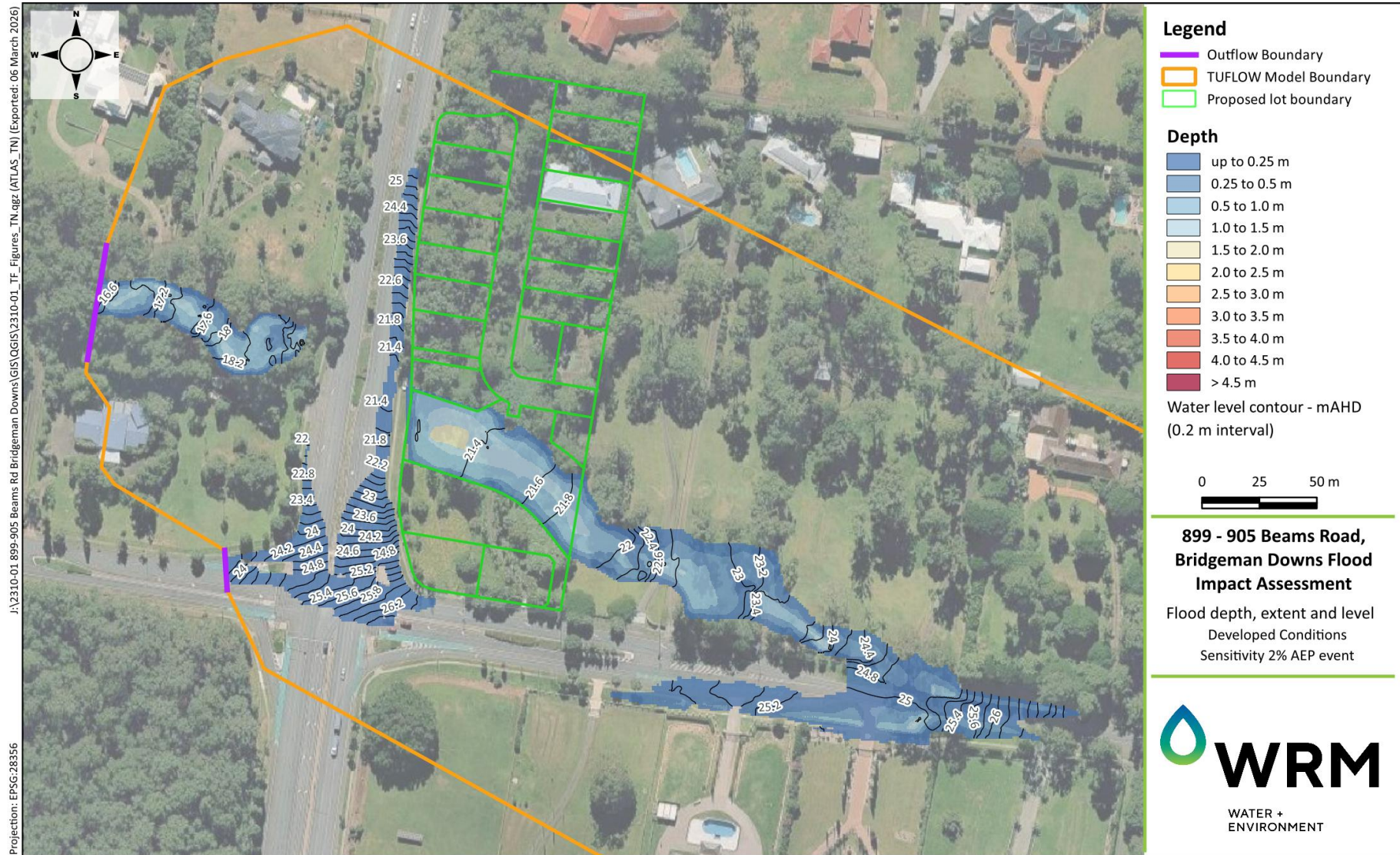


Figure 7.15 Sensitivity Case – 2% AEP Event Flood Depth with Water Level Contours

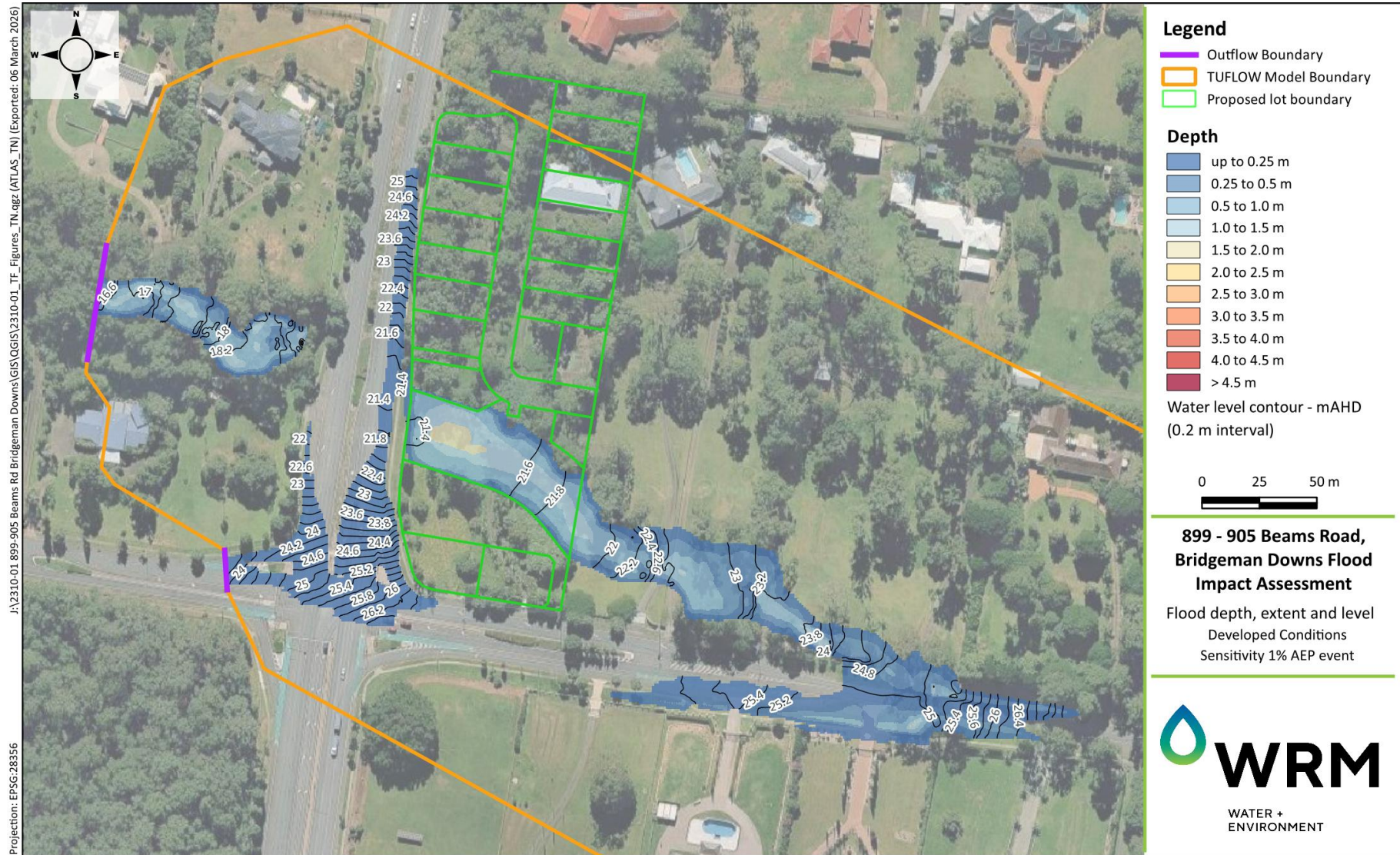


Figure 7.16 Sensitivity Case – 1% AEP Event Flood Depth with Water Level Contours

8 CONCLUSIONS

WRM Water and Environment Pty Ltd was commissioned by Plant Turrissi Pty Ltd to prepare a flood impact assessment report for 899 - 905 Beams Road, Bridgeman Downs [Lot 1 on SP227357 and Lot 2 on SP227358] for submission to Brisbane City Council.

The southern area of the subject site is located within Council's mapped Overland Flow Flood Planning Area. The overland flow path is also mapped by Council as a Local Waterway Corridor sub-category. While the design flood event for an overland flow path is the 2% AEP event, the 1% AEP event has also been investigated in this instance due to the flow path's location within the mapped Local Waterway Corridor. Assessment of a frequent storm event (20% AEP) was also undertaken.

The proposed development is for a reconfiguration of a Lot to create twenty-one residential lots of varying size and a drainage easement in favour of Council over overland flow path/waterway corridor.

To support the development application, a site-specific flood impact assessment has been undertaken to evaluate potential impacts and ensure compliance with Council's Flood Overlay Code.

Overall, the proposed development does not result in a material adverse impact on flood levels, velocities or hazard external to the site. The proposed development is therefore in accordance with Performance Outcome PO7 of the Council's Flood Overlay Code.

The proposed development does not materially worsen the on-site hydraulic hazards and is compliant with Acceptable Outcome AO7.3 of the Flood Overlay Code. Any changes in hydraulic hazard within the waterway corridor occur as a result of the removal of the existing driveway crossing and culverts which cross the waterway corridor in the existing scenario.

The flood modelling also demonstrates that despite increased peak discharge from the proposed development, the capacity of the Bridgeman Road culverts and the ponding of flow within the waterway corridor controls flow conditions resulting in no afflux to upstream or downstream land. It is therefore concluded that on-site detention is not required for the proposed development.

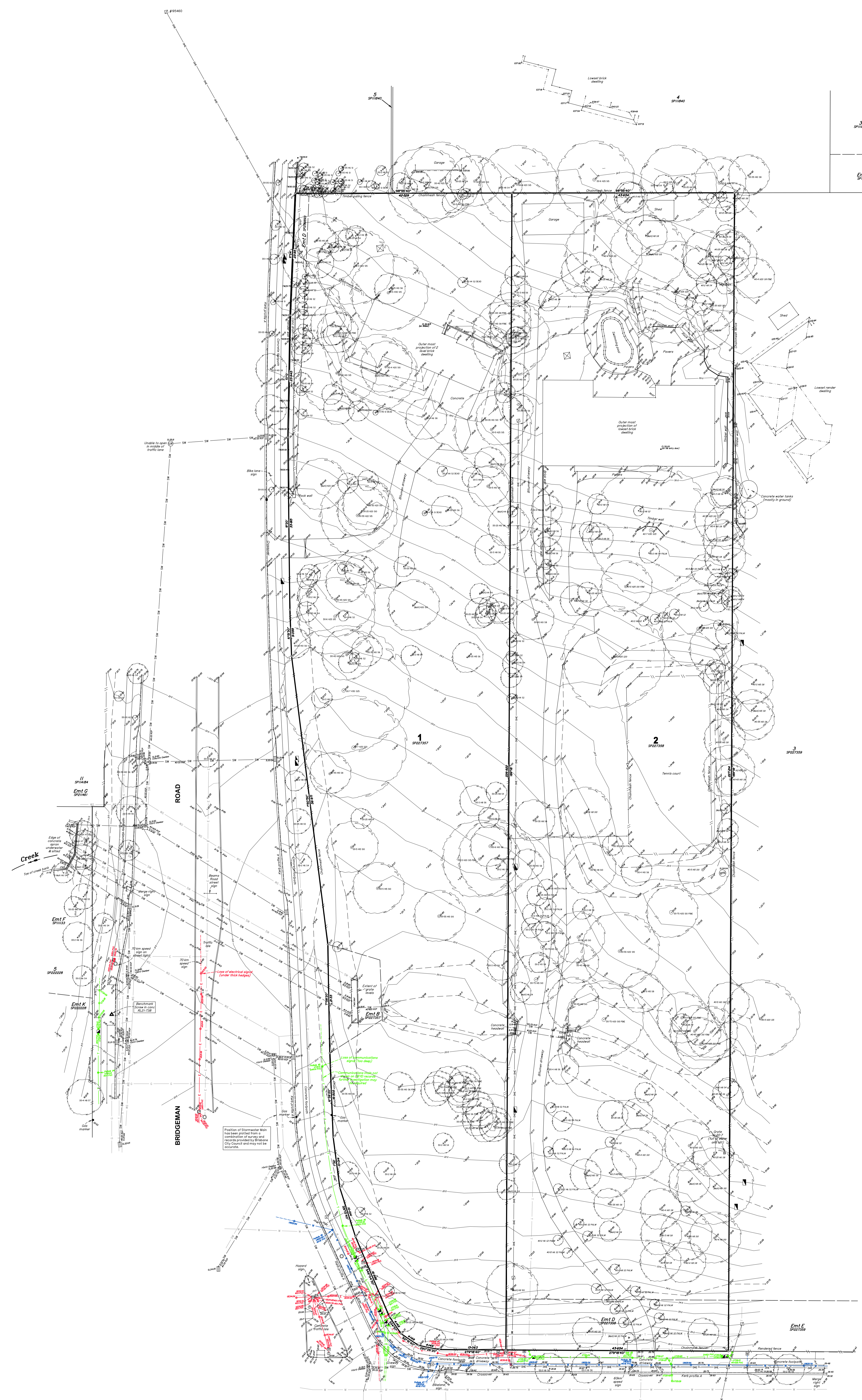
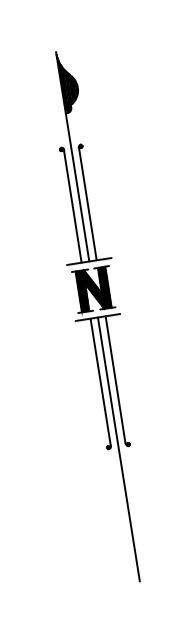
Additionally, the development does not result in unacceptable risk to people or property as the development provides flood free lots and maintains flood free road access to Bridgeman Road and Beams Road.

All allotments are in excess of the required minimum development levels. Compliance with Acceptable Outcome AO5.1, AO11.1, AO17.1, AO17.2, AO18.1 & AO18.2 of the Flood Overlay Code is achieved.

9 REFERENCES

Alluvium, 2014	Criteria for functioning river landscape units in mining and post mining landscapes. Final report for ACARP Project C20017, Alluvium on behalf of ACARP, 2014
DEWS, 2013	Queensland Urban Drainage Manual, Third edition 2013 – Provisional, Queensland Department of Energy and Water Supply (DEWS), April 2013
TUFLOW, 2024	TUFLOW User Manual – GIS Based 1D/2D Hydrodynamic Modelling, BMT WBM Pty Ltd
XP Software, 2018	XP-RAFTS User Manual, XP Software, 2018

APPENDIX A SITE SURVEY AND DEVELOPMENT LAYOUT



LEGEND

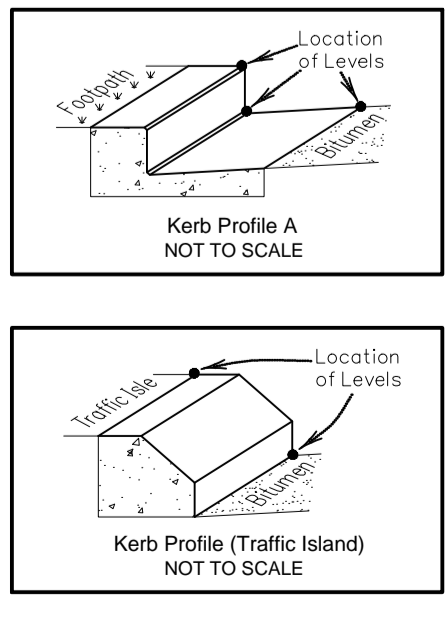
—	SEWER LINE	⊗	ELECTRICITY PIT
—	STORMWATER LINE	⊙	TRAFFIC LIGHTS
—	UNDERGROUND COMMUNICATIONS LINE BY ELECTRONIC LOCATION	⊕	ELECTRICITY PELLAR
—	UNDERGROUND ELECTRICITY LINE BY ELECTRONIC LOCATION	⊖	ELECTRICITY PELLAR
—	UNDERGROUND WATER LINE BY ELECTRONIC LOCATION	⊗	BENCHMARK
—	APPROXIMATE CONTINUATION OF SERVICE LINE ONLY	⊙	LIGHT POLE
—	FENCE LINE	⊕	COMMUNICATIONS PIT
—	OVERHEAD ELECTRICITY	⊖	WATER VALVE
—	OVERHEAD COMMUNICATIONS	⊗	WATER METER
—	OVERHEAD SERVICE BY FERRULES	⊕	GAS METER
—	MEASUREMENT TO UNDERGROUND SERVICE BY ELECTRONIC LOCATION	⊖	FIRE HYDRANT
—	UNDERGROUND COMMUNICATIONS LEVEL	⊗	CLOTHES LINE
—	UNDERGROUND ELECTRICITY LEVEL	⊕	SURFACE LEVEL
—	UNDERGROUND WATER LEVEL	⊖	INVERT LEVEL
—	UNDERGROUND GAS LEVEL	⊗	ROOF LEVEL
—	ROOF LINE	⊕	GUTTER LEVEL
—	GUTTER LINE	⊖	GATE
—	BANK	⊗	TREE
⊙	SEWERAGE MANHOLE	⊕	DIAMETER
⊖	STORMWATER MANHOLE	⊖	HEIGHT
⊗	ELECTRICITY POLE	⊗	SPREAD

Services shown in grayscale have been plotted from DBVD records only and may not be accurate.

Reduced levels on services:
 Communications - Centre
 Electricity - Centre
 Water - Centre
 Stormwater - Invert
 Sewer - Invert

NOTES:

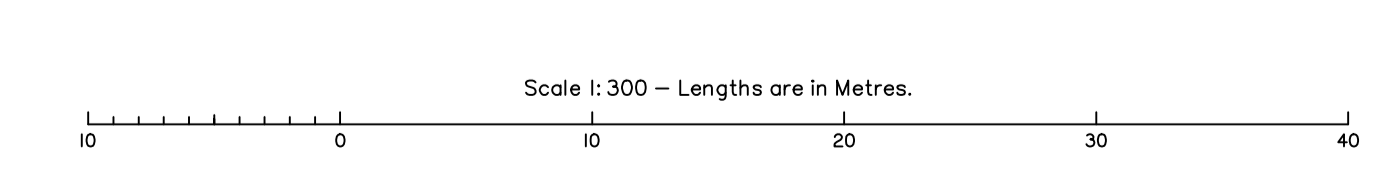
Contour interval is 0.5m.
 Contours have been generated and plotted by computer program.
 Note that spot levels shown do not necessarily represent Natural "Ground Level" as defined by the relevant Local Authority.
 Only visible features of underground services located.
 Position of underground Communications, Gas, Water and Electricity mains have been plotted from a combination of potholing, electronic location, field survey and plotting from DBVD records and may not be accurate.
 DBVD Communications services have been plotted from diagrammatic records only and so their position may not be accurate.
 Position of Sewer & Stormwater mains have been plotted from a combination of survey and records supplied by Queensland Urban Utilities and Brisbane City Council and may not be accurate.
 Unmapped services may also exist.
 Further services investigation by vacuum excavation may be required to fully map the chosen design alignment of the proposed gravity sewer, rising main or any other civil works proposed in the surveyed area.
 Accurate location of all services to be obtained prior to any detailed design, demolition, excavation or construction on or around the site.
 Only trees on site with a trunk diameter greater than 0.2m and council street trees have been located.
 Property boundaries shown have been compiled from a combination of Simpson Rayner Surveys Identification Survey Plan IS202002 and plans in the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development. To accurately define the property boundaries, further Identification Surveys may need to be undertaken.



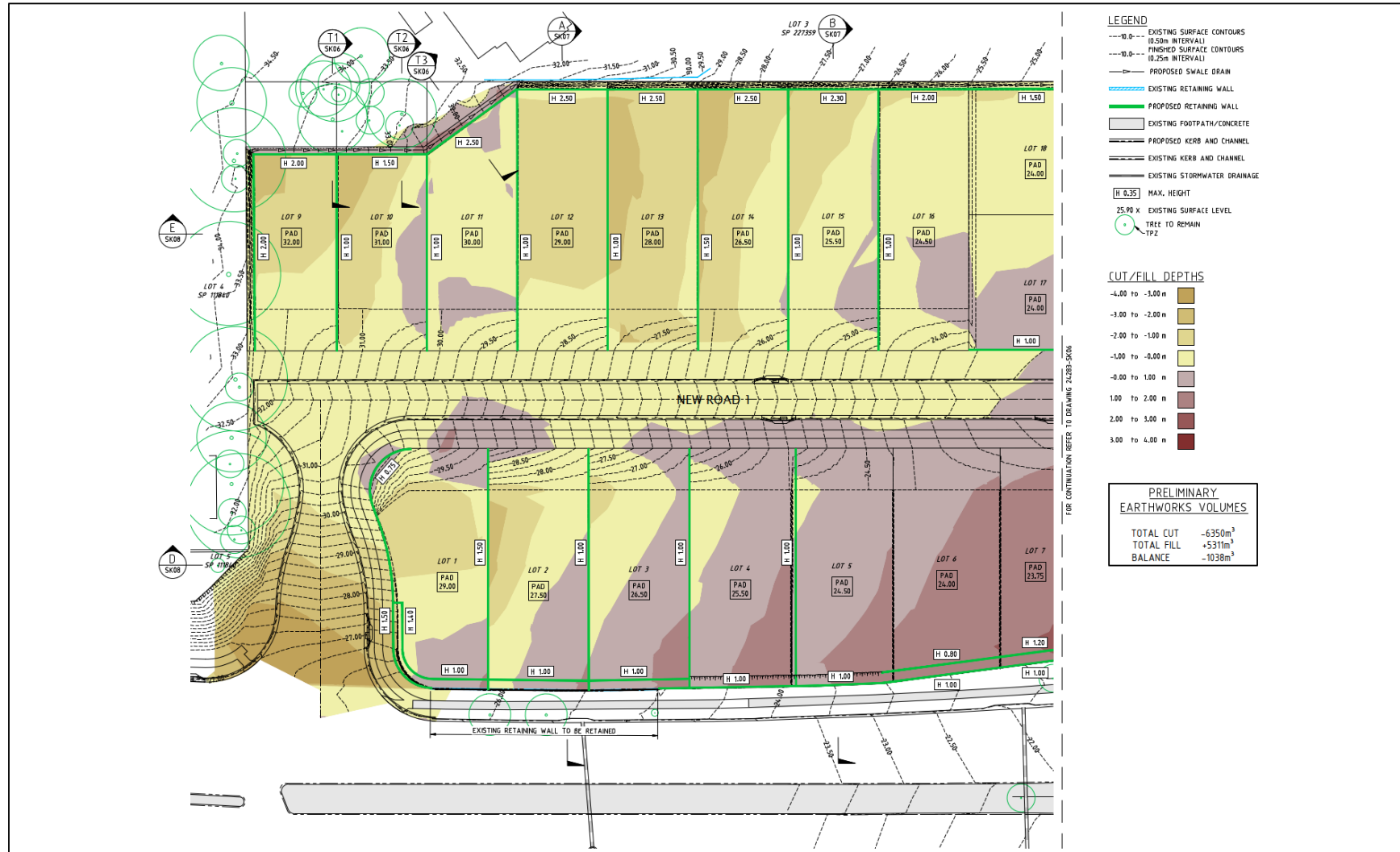
DATUM: MGA2020

This plan is on the azimuth of MGA2020. MGA2020 coordinates are correct at the origin point (STN 3125). Distances on this plan are level terrain distances. To achieve MGA2020 coordinates and distances a combined scale factor of 0.99950325 will have to be applied from the origin point (STN 3125).

STN 3125 (MGA 2020 Origin)
 Easting: 500191.335
 Northing: 6975670.454
 AHD RL: 43.014



SITE ADDRESS 899 & 905 Beams Road, Bridgeman Downs		DETAIL AND LEVEL SURVEY		SIMPSON RAYNER SURVEYS	
CLIENT Plant Turrisi Pty Ltd		LOCAL AUTHORITY Brisbane C.C		SIMPSON RAYNER SURVEYS PTY LTD A.C.N. 078 818 167 CADASTRAL LAND SURVEYORS, PLANNERS AND LAND DEVELOPMENT CONSULTANTS 5/MS3 Metroplex Avenue, MURARRIE QLD 4172 Telephone (07) 3899 8105 Fax (07) 3899 8107 Email: info@srsurveys.com.au	
LOCAL AUTHORITY Brisbane C.C	SURVEYED AK 26-11-2024	FIELD BK AK/TS	Over Lot 1 on SP227357 & Lot 2 on SP227358		
HORIZONTAL DATUM See Datum Note	DATE 13-12-2024	DRAFTED AK/TS	SCALE 1:300	PLAN REFERENCE 24118A0/1	
VERTICAL DATUM - AHD VEE PM177397 RL42.455	CHECKED AW/TS				



- LEGEND**
- 0.0 --- EXISTING SURFACE CONTOURS (0.50m INTERVAL)
 - 0.0 --- FINISHED SURFACE CONTOURS (0.25m INTERVAL)
 - --- PROPOSED SWALE DRAIN
 - --- EXISTING RETAINING WALL
 - --- PROPOSED RETAINING WALL
 - --- EXISTING FOOTPATH/CONCRETE
 - --- PROPOSED KERB AND CHANNEL
 - --- EXISTING KERB AND CHANNEL
 - --- EXISTING STORMWATER DRAINAGE
 - [H 0.35] MAX. HEIGHT
 - 25.00 X EXISTING SURFACE LEVEL
 - (O) TREE TO REMAIN
 - TPZ

- CUT/FILL DEPTHS**
- 4.00 to -3.00 m
 - 3.00 to -2.00 m
 - 2.00 to -1.00 m
 - 1.00 to -0.00 m
 - 0.00 to 1.00 m
 - 1.00 to 2.00 m
 - 2.00 to 3.00 m
 - 3.00 to 4.00 m

PRELIMINARY EARTHWORKS VOLUMES


TOTAL CUT	-6350m ³
TOTAL FILL	+5311m ³
BALANCE	-1038m ³

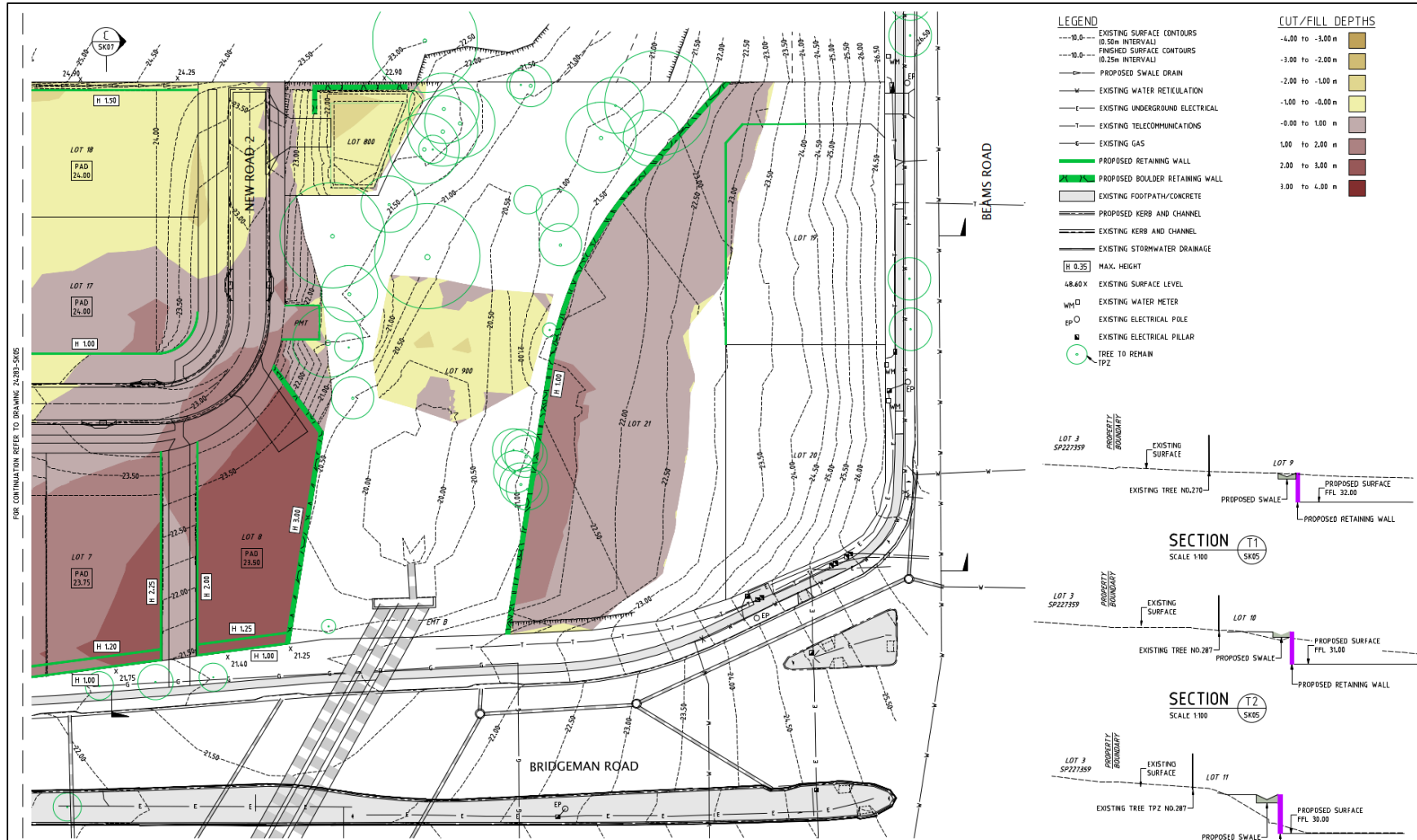
FOR CONTINUATION REFER TO DRAWING 24283-SK06

THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS CONSTRUCTED INFORMATION. NO POT HOLING HAS BEEN UNDERTAKEN TO VERIFY EXISTING SERVICE LOCATIONS AND DEPTHS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE POT HOLING TO VERIFY THE DESIGN.

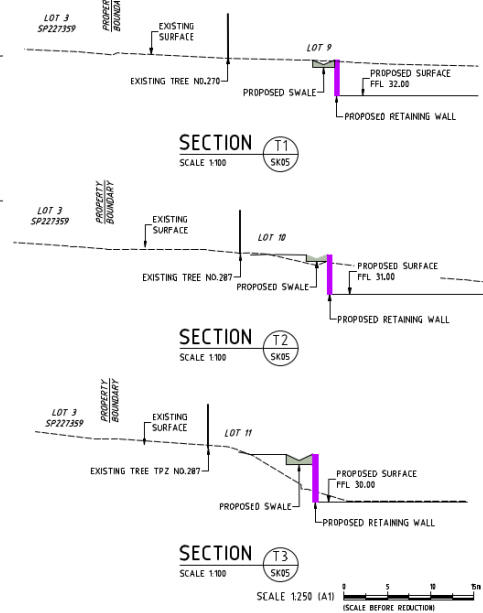
PLAN
SCALE 1:250

SCALE 1:250 (A1)
(SCALE BEFORE REDUCTION)

 <p>HCE Engineers Pty Ltd ABN 42 664 382 610 mail@hce-engineers.com.au 07 3829 1399</p>	PROJECT	TITLE	CLIENT	<div style="border: 2px solid red; padding: 5px; text-align: center; color: red; font-weight: bold;">NOT FOR CONSTRUCTION. CONCEPT ONLY.</div>	REVISION	DATE	DESIGNED BY	DRAWN BY	DATE	
	899-905 BEAMS ROAD BRIDGEMAN DOWNS, QLD 4035	CONCEPT EARTHWORKS PLAN SHEET 1 OF 2	PLANT TURRISI PTY LTD		A	ISSUED FOR CONSTRUCTION	17/03/25	/	JA	22/01/25
	LOT 1 SP 227357				B	RETAINING WALLS AI/ENDED	25/03/25	/		
	LOT 2 SP 227358				C	LAYOUT AI/ENDED	30/07/25	/		
					D	FURTHER ISSUE RESPONSE	14/11/25	/		
			E	HATCH AI/ENDMENTS	19/11/25	/				
									24283-SK05	



- LEGEND**
- 0.0--- EXISTING SURFACE CONTOURS (0.50m INTERVAL)
 - 10.0--- FINISHED SURFACE CONTOURS (0.25m INTERVAL)
 - PROPOSED SWALE DRAIN
 - EXISTING WATER RETICULATION
 - EXISTING UNDERGROUND ELECTRICAL
 - EXISTING TELECOMMUNICATIONS
 - EXISTING GAS
 - PROPOSED RETAINING WALL
 - PROPOSED BOULDER RETAINING WALL
 - EXISTING FOOTPATH/CONCRETE
 - PROPOSED KERB AND CHANNEL
 - EXISTING KERB AND CHANNEL
 - EXISTING STORMWATER DRAINAGE
 - [Symbol] H 0.35 MAX. HEIGHT
 - 48.60x EXISTING SURFACE LEVEL
 - WM EXISTING WATER METER
 - EP EXISTING ELECTRICAL POLE
 - EP EXISTING ELECTRICAL PILLAR
 - TREE TO REMAIN
 - TPZ
- CUT/FILL DEPTHS**
- 4.00 to -3.00 m
 - 3.00 to -2.00 m
 - 2.00 to -1.00 m
 - 1.00 to -0.00 m
 - 0.00 to 1.00 m
 - 1.00 to 2.00 m
 - 2.00 to 3.00 m
 - 3.00 to 4.00 m



FOR CONTINUATION REFER TO DRAWING 24283-SK06

THIS DESIGN HAS BEEN PREPARED BASED ON SERVICE AUTHORITY AS CONSTRUCTED INFORMATION. NO POT HOLING HAS BEEN UNDERTAKEN TO VERIFY EXISTING SERVICE LOCATIONS AND DEPTHS. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERTAKE POT HOLING TO VERIFY THE DESIGN.


PLAN
SCALE 1:250

SECTION T1
SCALE 1:100

SECTION T2
SCALE 1:100

SECTION T3
SCALE 1:100

SCALE 1:250 (A1)
(SCALE BEFORE REDUCTION)

 <p>HCE Engineers Pty Ltd ABN 42 664 382 610 mail@hce-engineers.com.au 07 3829 1599</p>	<p>PROJECT 899-905 BEAMS ROAD BRIDGEMAN DOWNS, QLD 4035 LOT 1 SP 227357 LOT 2 SP 227358</p>	<p>TITLE CONCEPT EARTHWORKS PLAN SHEET 2 OF 2</p>	<p>CLIENT PLANT TURRISI PTY LTD</p>	<p>NOT FOR CONSTRUCTION. CONCEPT ONLY.</p>	<p>REVISION A1 (END) - BENT</p>	<p>DATE 19/11/25</p>	<p>DESIGNED BY J.B.</p>	<p>DRAWN BY JA</p>	<p>DATE 22/01/25</p>
	<p>LOT 21 AND 22 A1 (END) - BENTS</p>	<p>DESIGNED BY J.B.</p>	<p>DRAWN BY JA</p>		<p>DATE 22/01/25</p>				
					<p>DRAWING NO. 24283-SK06</p>	<p>SCALE AS SHOWN</p>			

APPENDIX B RATIONAL METHOD CALCULATIONS

Catchment:		Catchments to J1 (BR01 - BR03, BR05, BR06 & J1) - Existing Conditions							
Catchment area and coefficient of runoff									
Catchment Area (ha)		27.8							
C ₁₀		0.72							
Overland flow travel time (Friend's Equ)									
Horton's 'n'		0.04							
Length (m)		100							
Slope (m/m)		0.03							
Overland flow travel time (mins)		15.92							
Channel characteristics									
Channel length (m)		618							
Channel slope (m/m)		0.03							
Manning's 'n'		0.035							
Channel bottom width (m)		1							
Channel side slope (m/m)		0.167							
Design Discharges									
ARI (years)	AEP (%)	Frequency Factor F _y	C _y	Channel Velocity ^a (m/s)	Channel Travel Time (mins)	t _c ^b (mins)	Rainfall Intensity (mm/h)	Peak Discharge (m ³ /s)	
1	63	0.8	0.58	1.95	5.29	21.21	66.5	2.96	
1.44	50	0.85	0.61	2.04	5.05	20.97	75.5	3.57	
4.48	20	0.95	0.68	2.28	4.53	20.45	103.7	5.48	
10	10	1	0.72	2.4	4.29	20.21	122.3	6.8	
20	5	1.05	0.76	2.52	4.09	20.01	141	8.23	
50	2	1.15	0.83	2.68	3.84	19.76	164.9	10.55	
100	1	1.2	0.86	2.78	3.7	19.63	182.6	12.18	
a - Channel velocity calculated using Mannings's equation									
b - Time of Concentration (t _c) = Overland Flow Travel Time + Channel Travel Time									

Catchment:		BR05 – Developed Conditions				
Catchment area and coefficient of runoff						
Catchment Area (ha)		1.35				
C ₁₀		0.84				
Time of concentration						
Standard inlet time (mins)		12				
Pipe length (m)		120				
Pipe velocity (m/s)		2				
Pipe travel time (mins)		1				
t _c (mins)		13				
Design Discharges						
ARI (years)	AEP (%)	Frequency Factor F _y	C _y	t _c (mins)	Rainfall Intensity (mm/h)	Peak Discharge (m ³ /s)
1	63	0.8	0.67	13	83.5	0.21
1.44	50	0.85	0.71	13	94.3	0.25
4.48	20	0.95	0.8	13	127.3	0.38
10	10	1	0.84	13	149.7	0.47
20	5	1.05	0.88	13	170.7	0.56
50	2	1.15	0.97	13	199	0.72
100	1	1.2	1	13	219.7	0.82

Catchment:		BR06 – Developed Conditions				
Catchment area and coefficient of runoff						
Catchment Area (ha)	0.29					
C ₁₀	0.84					
Time of concentration						
Standard inlet time (mins)	10					
Pipe length (m)	20					
Pipe velocity (m/s)	2					
Pipe travel time (mins)	0.17					
t _c (mins)	10.17					
Design Discharges						
ARI (years)	AEP (%)	Frequency Factor F _y	C _y	t _c (mins)	Rainfall Intensity (mm/h)	Peak Discharge (m ³ /s)
1	63	0.8	0.67	10	93	0.05
1.44	50	0.85	0.71	10	105	0.06
4.48	20	0.95	0.8	10	142	0.09
10	10	1	0.84	10	167	0.11
20	5	1.05	0.88	10	190	0.13
50	2	1.15	0.97	10	221	0.17
100	1	1.2	1	10	245	0.2

APPENDIX C EXISTING CONDITIONS MAPPING



J:\2310-01 899-905 Beams Rd Bridgeman Downs\GIS\OGIS\2310-01_Figures_SG_ogz (ATLAS_SG) [Exported: 25 March 2025]
 Projection: EPSG:28356



Legend

- Site Boundary
- Model Boundary
- Outflow Boundary

Velocity

- up to 0.25 m/s
- 0.25 to 0.5 m/s
- 0.5 to 0.75 m/s
- 0.75 to 1.0 m/s
- 1.0 to 1.5 m/s
- 1.5 to 2.0 m/s
- 2.0 to 3.0 m/s
- > 3 m/s

0 25 50 m



**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**

Flood velocity
 Existing Conditions
 1% AEP event

J:\2310-01 899-905 Beams Rd Bridgeman Downs\GIS\OGIS\2310-01_Figures_SG_ogz (ATLAS_SG) (Exported: 25 March 2025)
 Projection: EPSG:28356

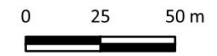


Legend

-  Site Boundary
-  Model Boundary
-  Outflow Boundary

HAZARD

-  H1 - Generally safe for vehicles, people and buildings.
-  H2 - Unsafe for small vehicles.
-  H3 - Unsafe for vehicles, children and the elderly.
-  H4 - Unsafe for vehicles and people.
-  H5 - Unsafe for vehicles and people.
All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
-  H6 - Unsafe for vehicles and people.
All building types considered vulnerable to failure



**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**

HAZARD
 Existing Conditions
 1% AEP event



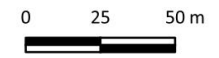
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 Projection: EPSG:28356


Legend

- Site Boundary
- Model Boundary
- Outflow Boundary

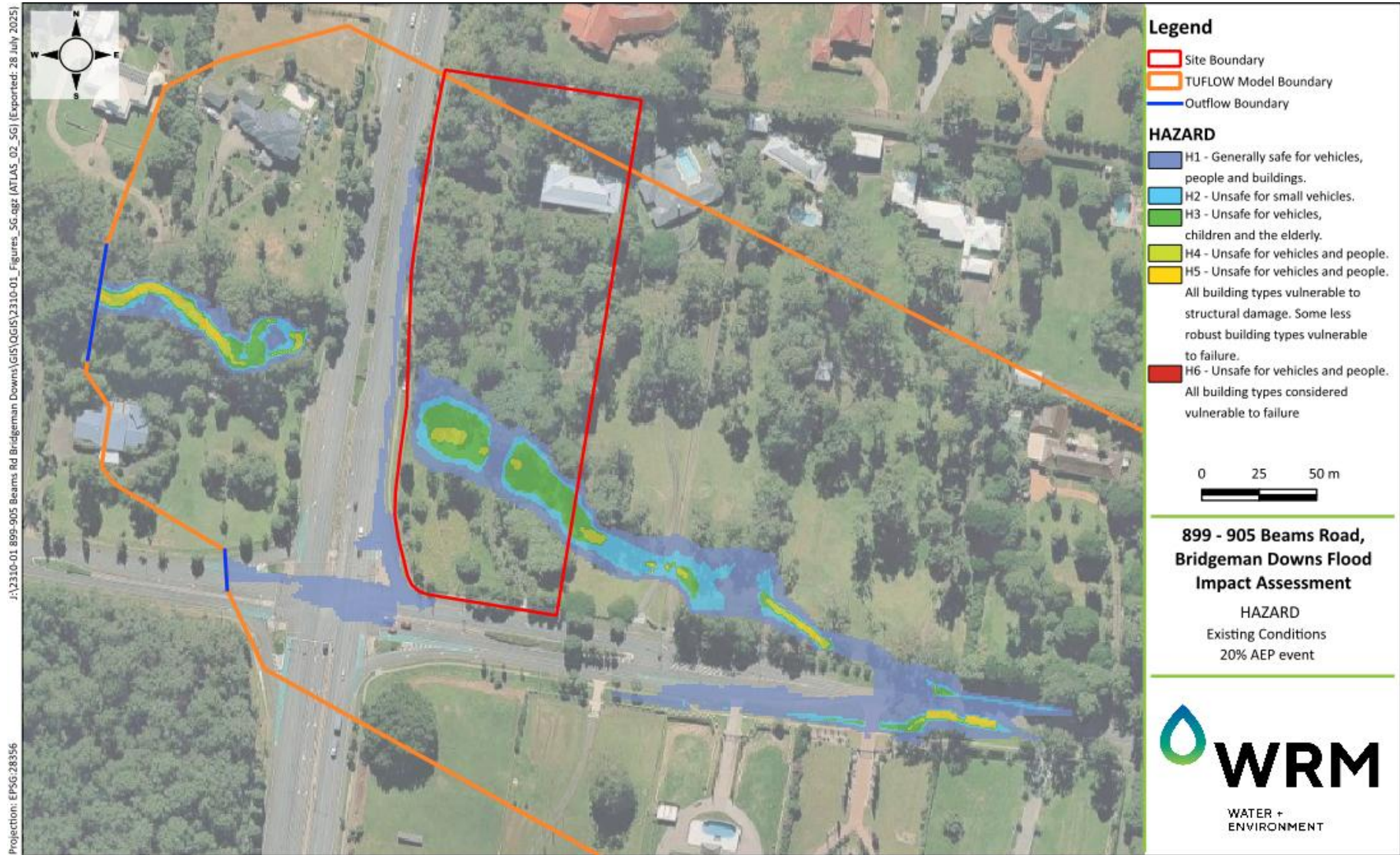
Velocity

- up to 0.25 m/s
- 0.25 to 0.5 m/s
- 0.5 to 0.75 m/s
- 0.75 to 1.0 m/s
- 1.0 to 1.5 m/s
- 1.5 to 2.0 m/s
- 2.0 to 3.0 m/s
- > 3 m/s

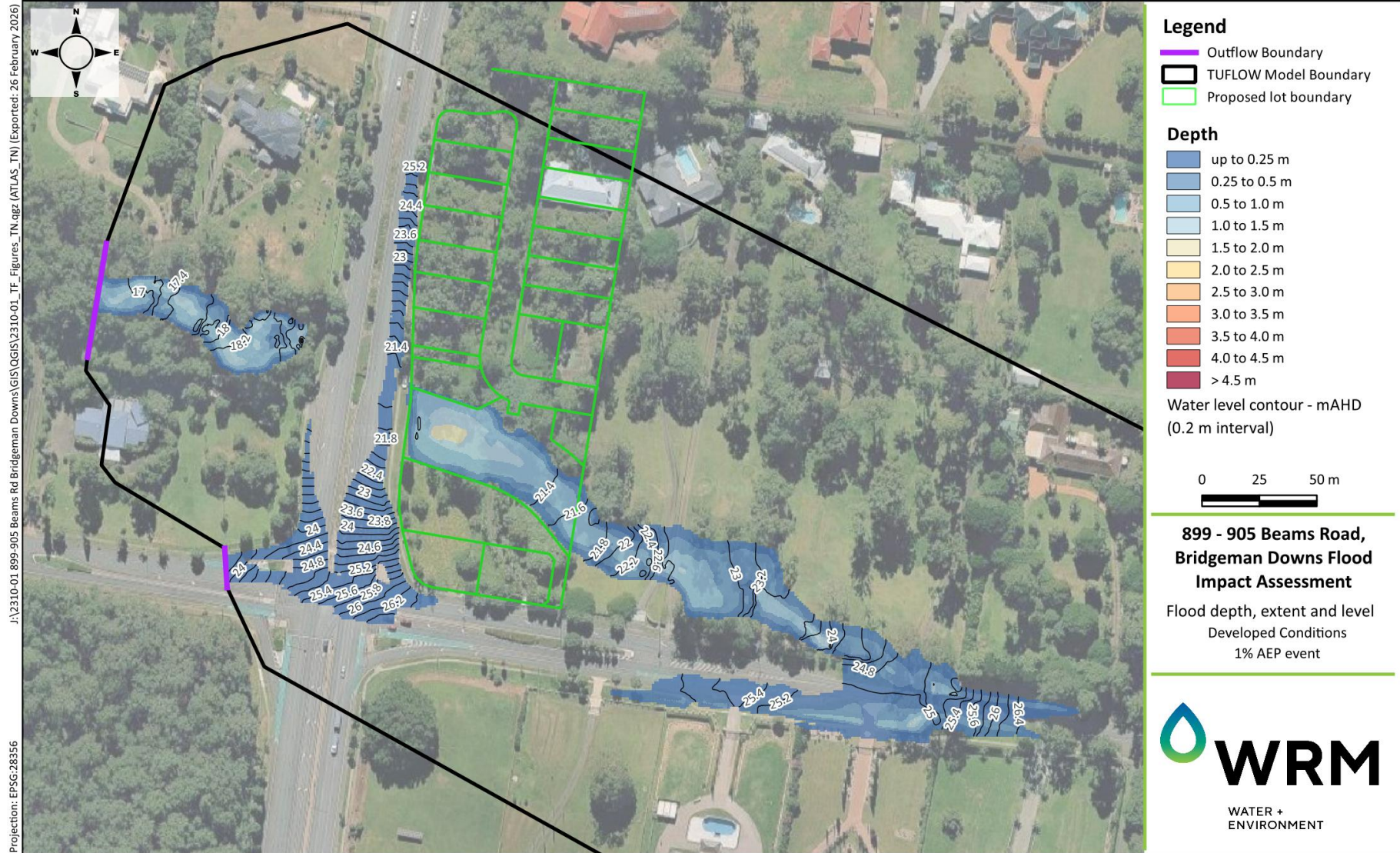


**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**

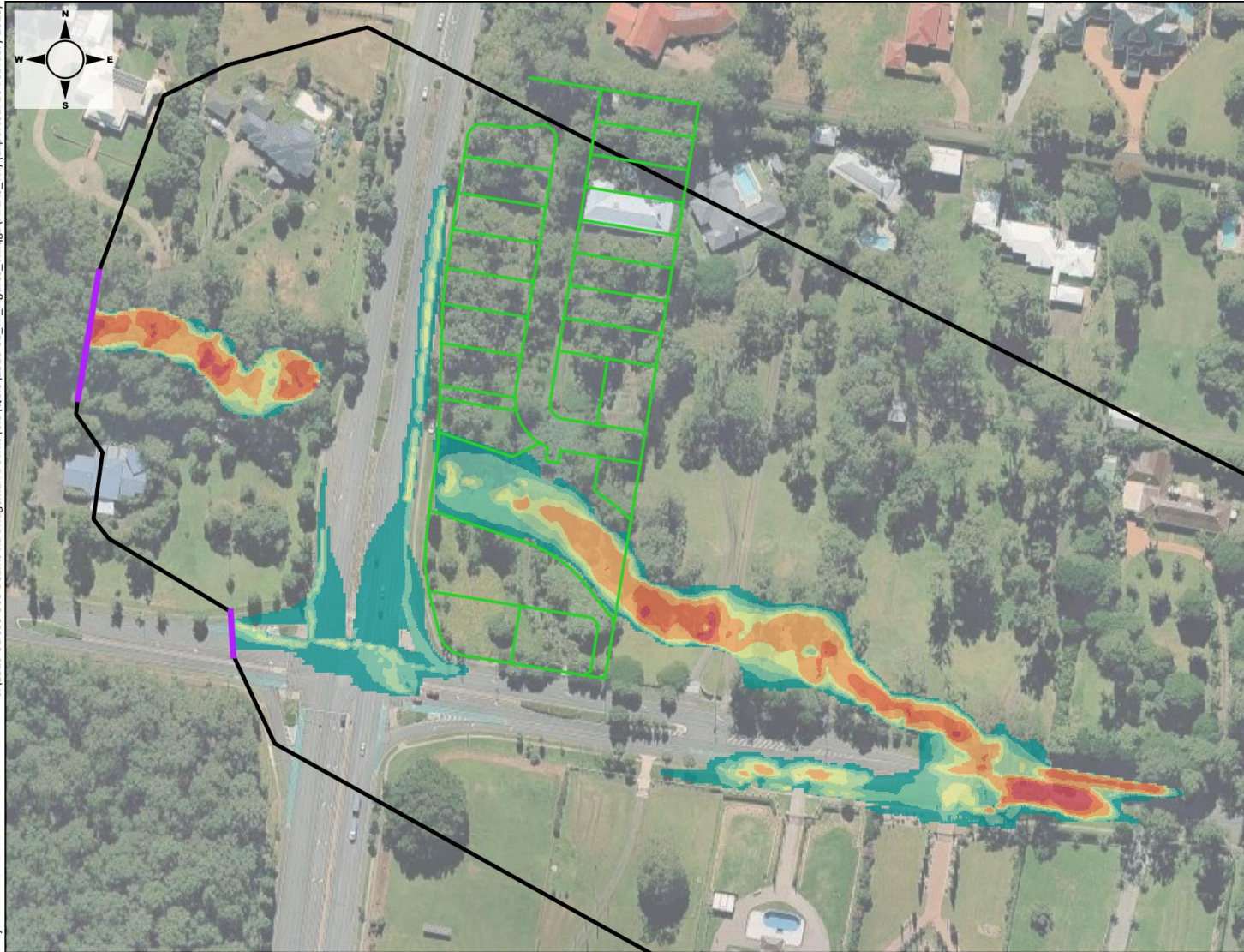
Flood velocity
 Existing Conditions
 20% AEP event






APPENDIX D DEVELOPED CONDITIONS MAPPING







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 Projection: EPSG:28356


Legend

-  Outflow Boundary
-  TUFLOW Model Boundary
-  Proposed lot boundary

Velocity

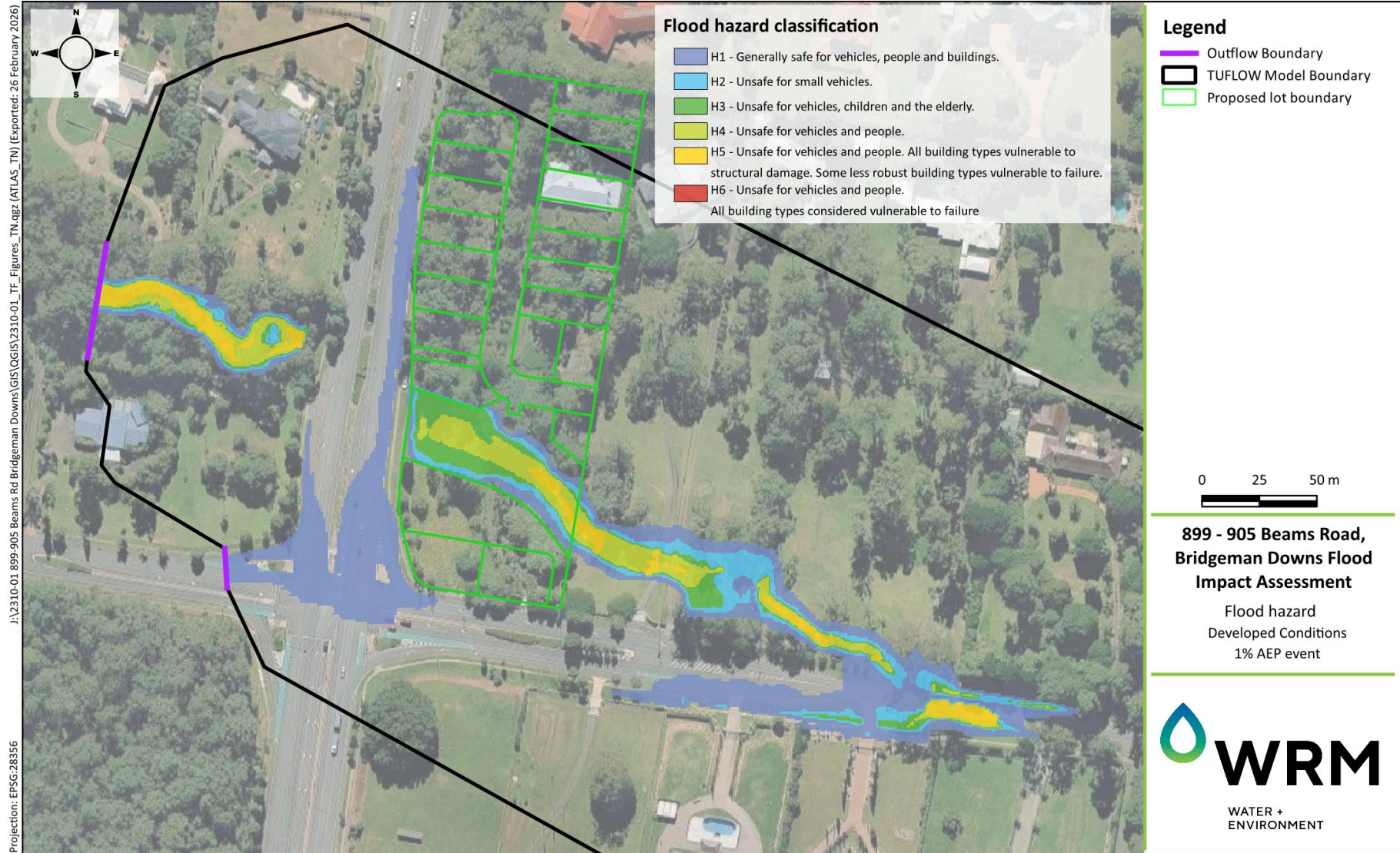
-  up to 0.25 m/s
-  0.25 to 0.5 m/s
-  0.5 to 0.75 m/s
-  0.75 to 1.0 m/s
-  1.0 to 1.5 m/s
-  1.5 to 2.0 m/s
-  2.0 to 3.0 m/s
-  > 3 m/s

0 25 50 m

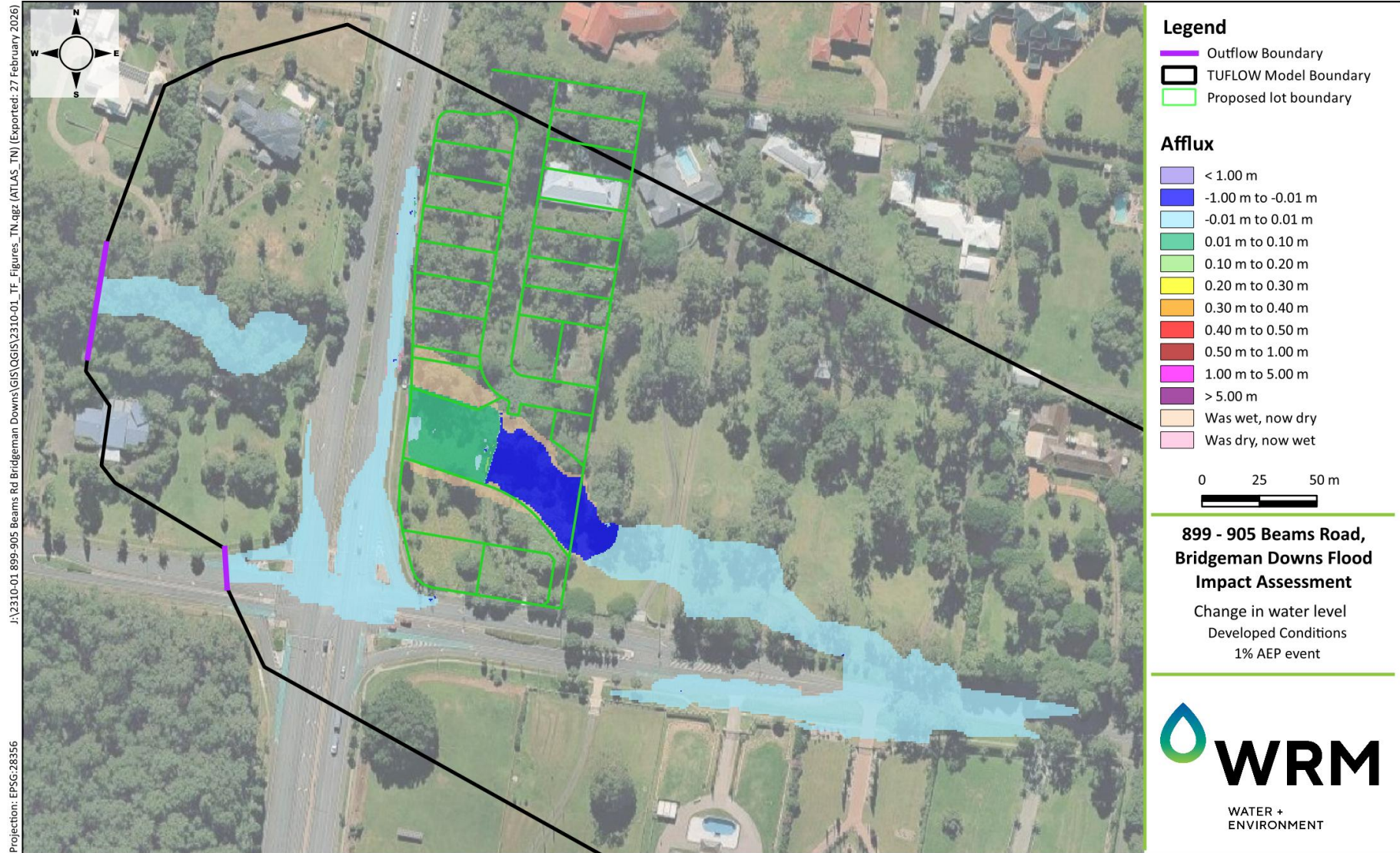


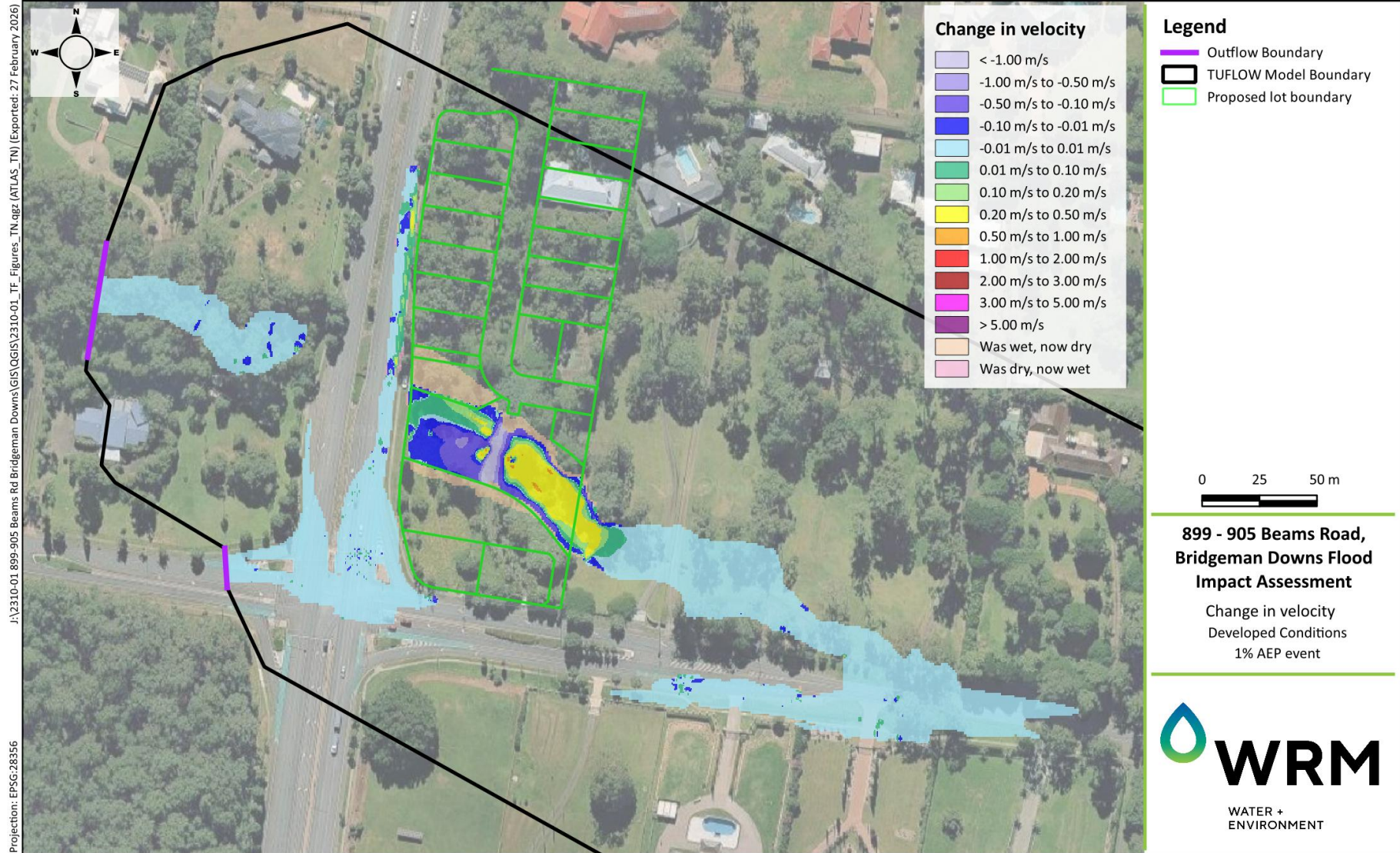
**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**

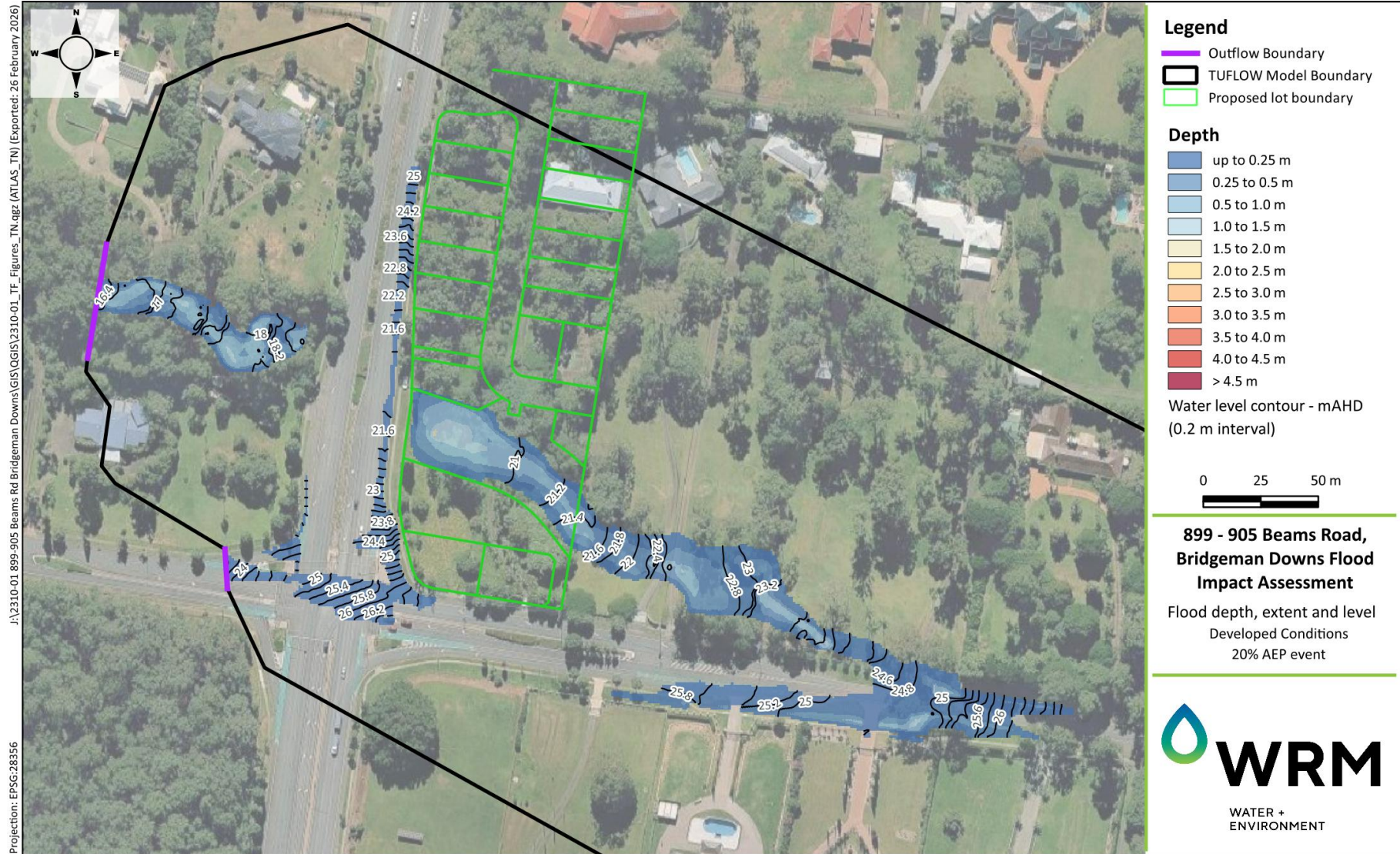
Flood velocity and extent
 Developed Conditions
 1% AEP event



J:\2310-01_899-905 Beams Rd Bridgeman Downs\GIS\QGIS\2310-01_TF_Figures_TN.qgz (ATLAS_TN) [Exported: 25 February 2026]
 Projection: EPSG:28356

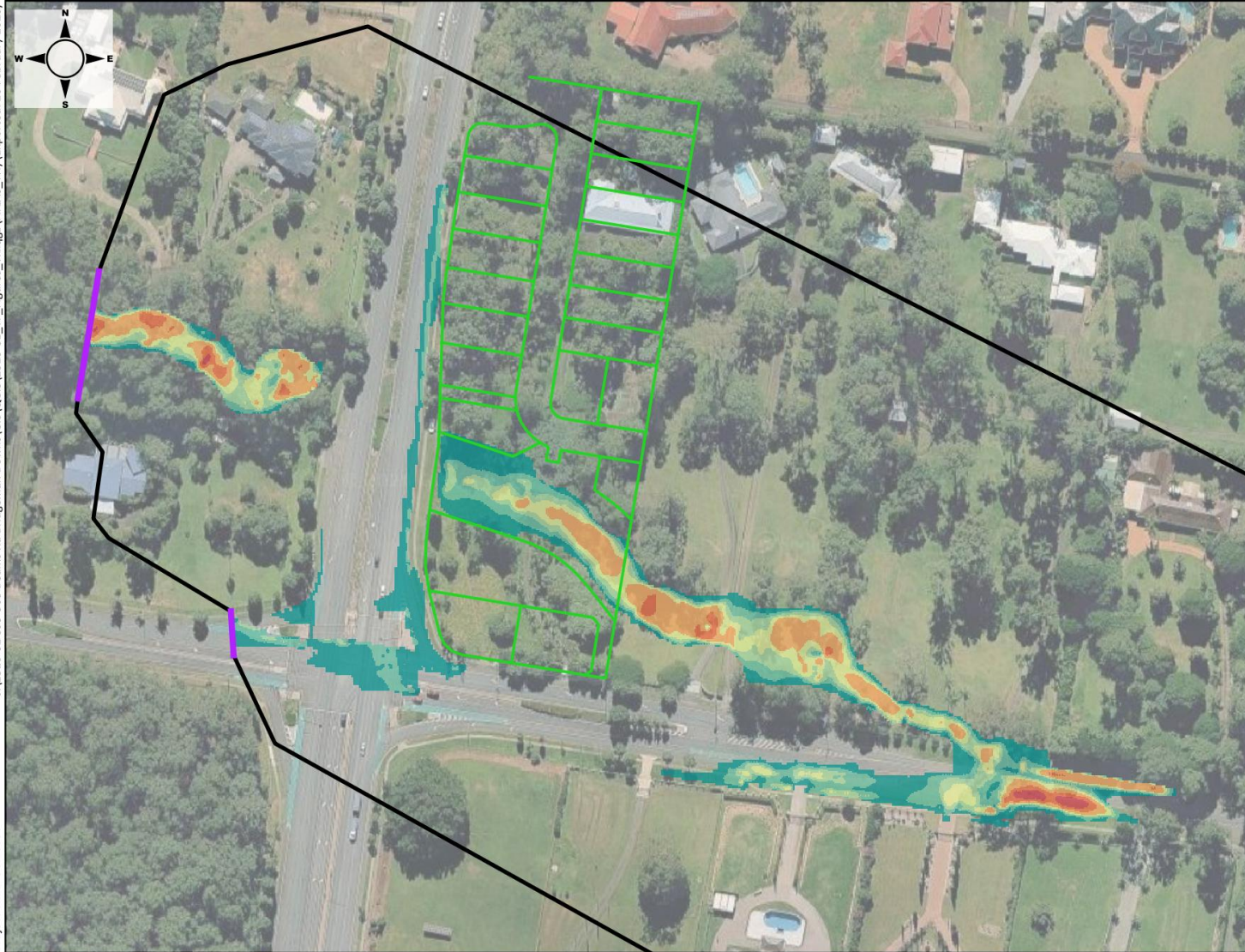






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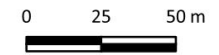
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 Projection: EPSG:28356


Legend

- Outflow Boundary
- TUFLOW Model Boundary
- Proposed lot boundary

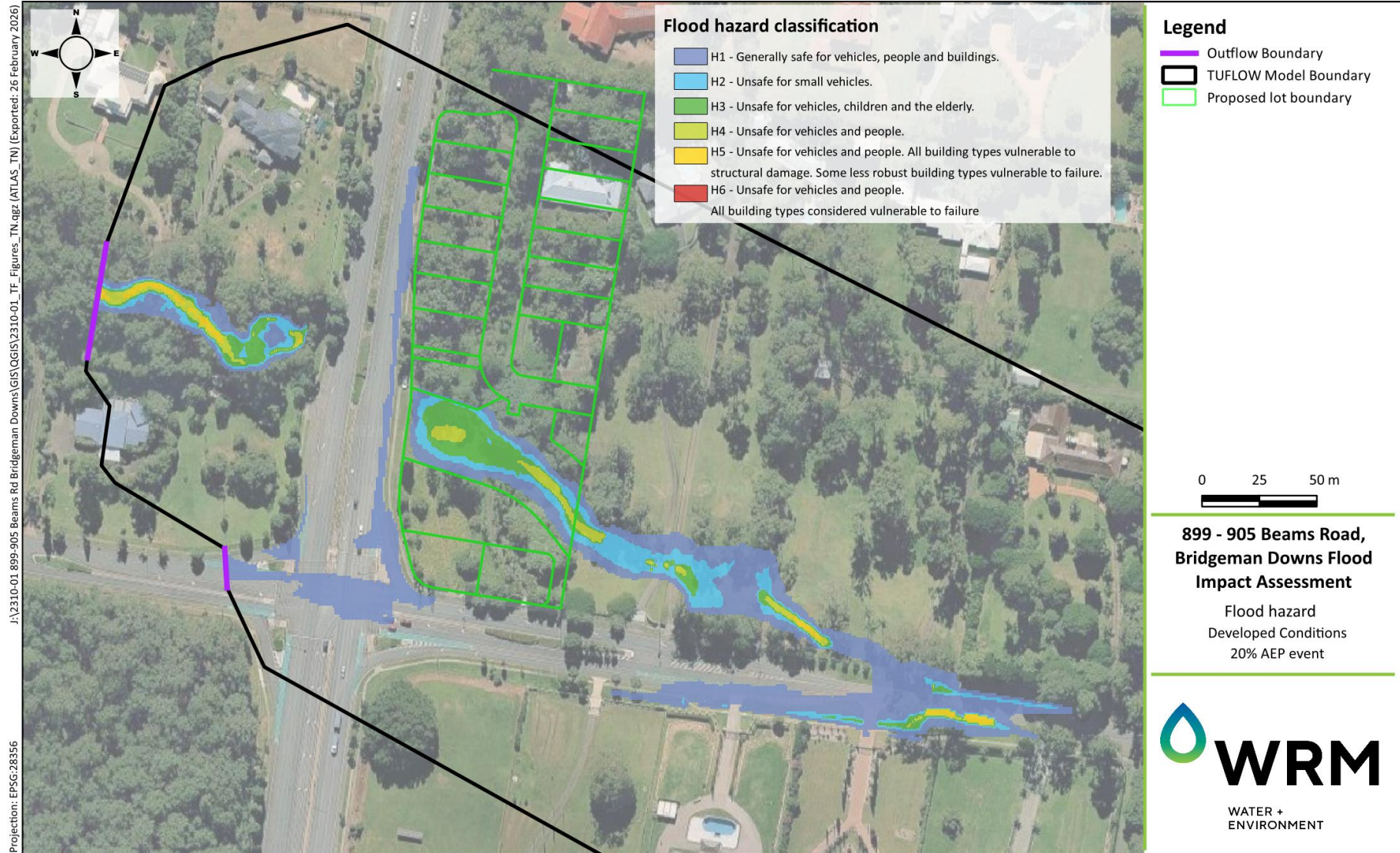
Velocity

- up to 0.25 m/s
- 0.25 to 0.5 m/s
- 0.5 to 0.75 m/s
- 0.75 to 1.0 m/s
- 1.0 to 1.5 m/s
- 1.5 to 2.0 m/s
- 2.0 to 3.0 m/s
- > 3 m/s

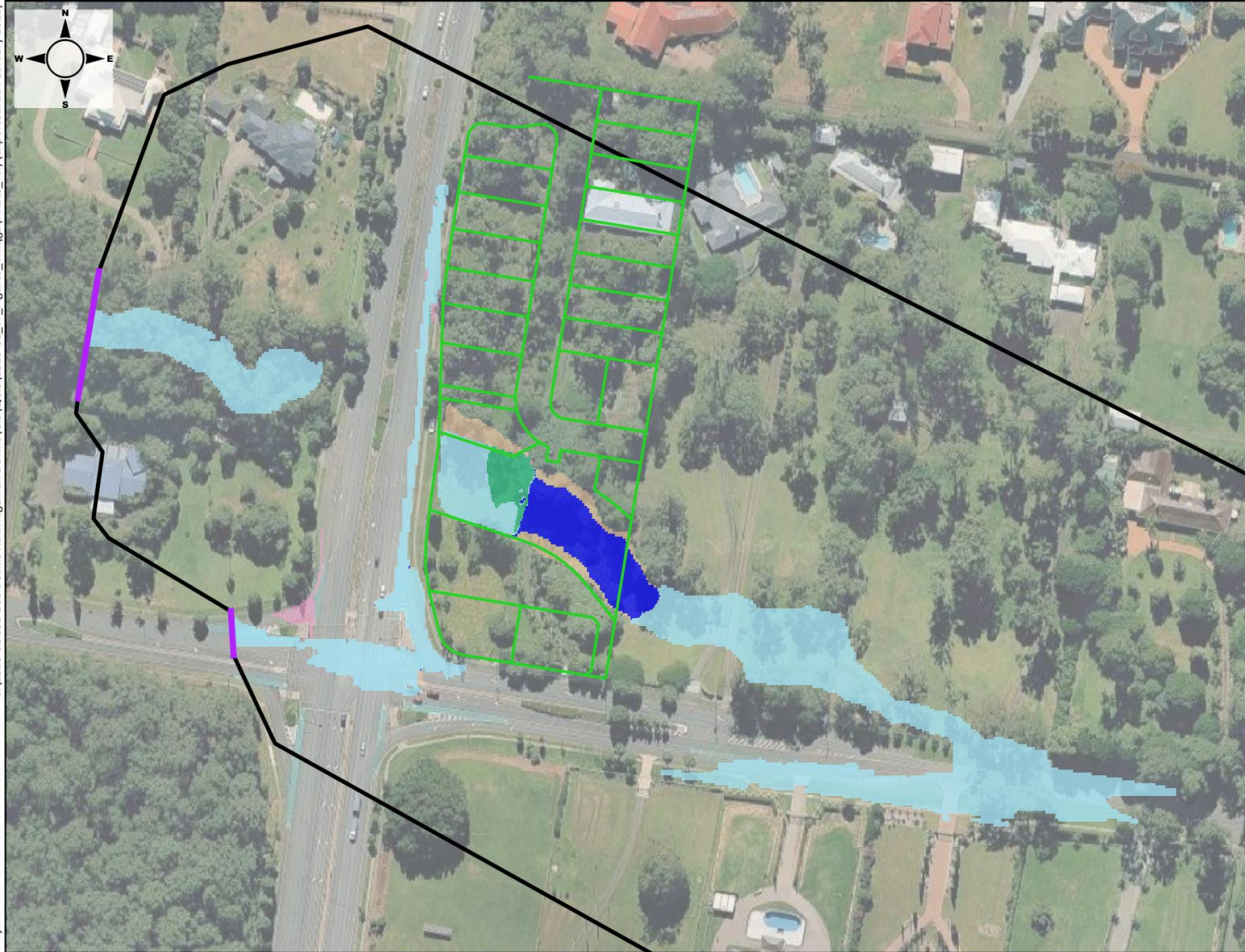


**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**




Flood velocity and extent
 Developed Conditions
 20% AEP event











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 Projection: EPSG:28356



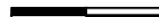
Legend

-  Outflow Boundary
-  TUFLOW Model Boundary
-  Proposed lot boundary

Afflux

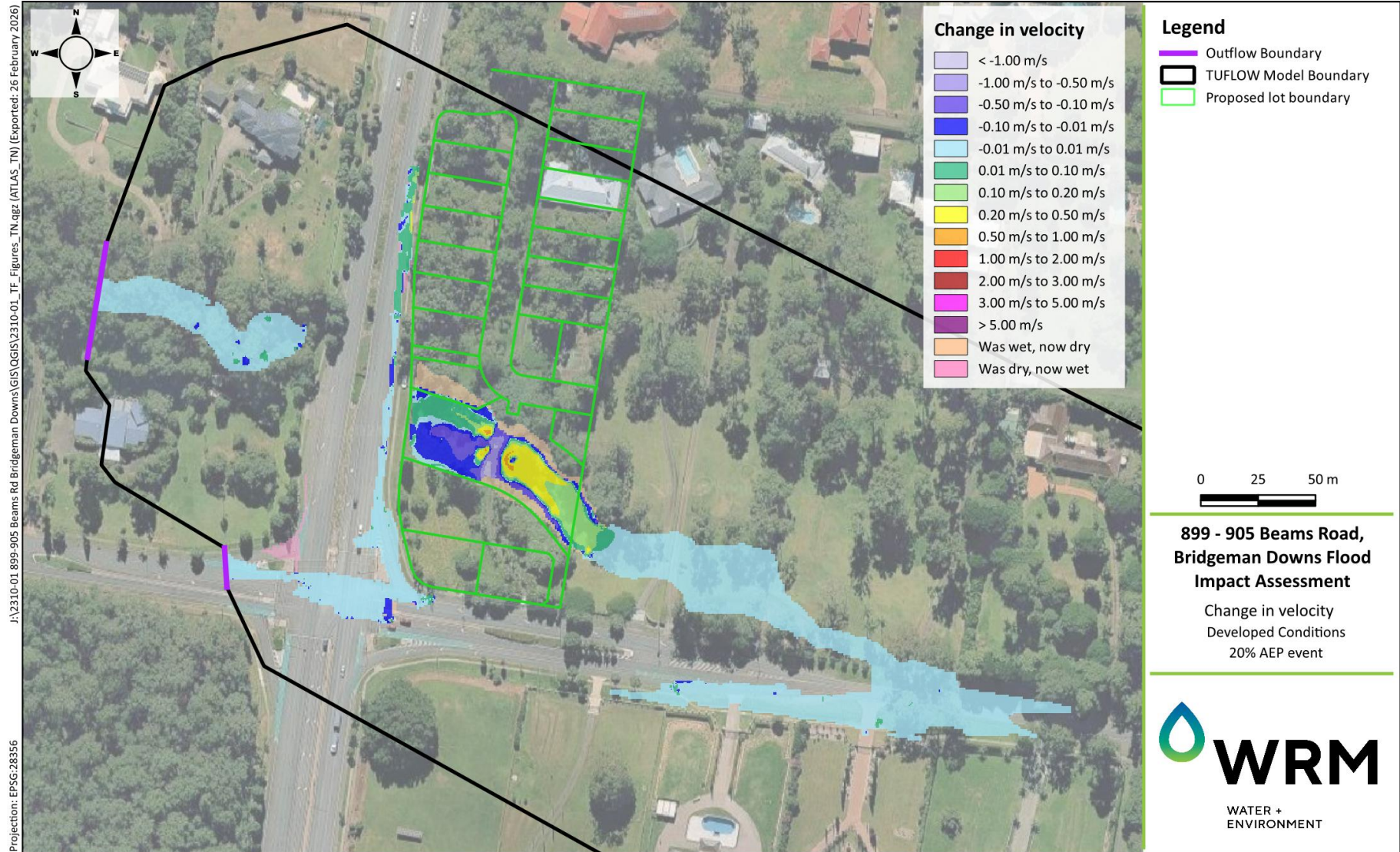
-  < 1.00 m
-  -1.00 m to -0.01 m
-  -0.01 m to 0.01 m
-  0.01 m to 0.10 m
-  0.10 m to 0.20 m
-  0.20 m to 0.30 m
-  0.30 m to 0.40 m
-  0.40 m to 0.50 m
-  0.50 m to 1.00 m
-  1.00 m to 5.00 m
-  > 5.00 m
-  Was wet, now dry
-  Was dry, now wet

0 25 50 m



**899 - 905 Beams Road,
 Bridgeman Downs Flood
 Impact Assessment**

Change in water level
 Developed Conditions
 20% AEP event



APPENDIX E OVERLAY CODE RESPONSE

Flood overlay code

Table 8.2.11.3.A—Performance outcomes and acceptable outcomes

Performance outcomes	Acceptable outcomes	Comments
<p>Section A—If for accepted development subject to compliance with identified requirements (acceptable outcomes only) or assessable development for a dwelling house including any secondary dwelling</p> <p>Note—Development for a dwelling house does not require assessment against any other sections of this code.</p>		
<p>PO1 Development involving any habitable or non-habitable part of a dwelling house, including any secondary dwelling, is located and designed to:</p> <ul style="list-style-type: none"> a. minimise the risk to people from flood hazard; b. achieve acceptable flood immunity; c. minimise property impacts from a flood event up to and including the defined flood event; d. minimise disruption to residents, recovery time and rebuilding or restoration costs after a flood event up to and including the defined flood event. 	<p>AO1.1 Development for a dwelling house including any secondary dwelling:</p> <ul style="list-style-type: none"> a. is not located in the Brisbane River flood planning area 1, 2a or 2b sub-categories or the Creek/waterway flood planning area 1 or 2 sub-categories; or b. is only located in these sub-categories, if a Registered Professional Engineer Queensland certifies that the dwelling house and any secondary dwelling are structurally designed to be able to resist hydrostatic and hydrodynamic loads associated with flooding up to and including the defined flood event. <p>AO1.2 Development for a dwelling house and any secondary dwelling complies with the minimum flood planning levels in Table 8.2.11.3.B. Note—If located in an area that has no flood level information available from the Council such as an overland flow path, a Registered Professional Engineer of Queensland with expertise in undertaking flood studies is to certify that the flood level and development levels for the dwelling house and any secondary dwelling achieve the required flood planning levels in Table 8.2.11.3.B.</p> <p>AO1.3</p>	<p>Not Applicable.</p> <p>The proposed development is not a dwelling house.</p>

	<p>Development involving a building undercroft complies with the minimum clearance requirements in Table 8.2.11.3.E.</p> <p>Editor's note—For creek/waterway, storm-tide and river flooding, applicable flood planning information is available from Council's FloodWise Property Report.</p> <p>Note—The Flood planning scheme policy provides guidance on undercroft design.</p>	
<p>PO2 Development within the Creek/waterway flood planning area sub-categories or Overland flow flood planning area sub-category:</p> <ol style="list-style-type: none"> a. maintains the conveyance of flood waters to allow flow and debris to pass predominantly unimpeded through the site; b. does not concentrate, intensify or divert floodwater onto upstream, downstream or adjacent properties; c. will not result in a material increase in flood levels or flood hazard on upstream, downstream or adjacent properties. 	<p>AO2 Development:</p> <ol style="list-style-type: none"> a. is not located within the Creek/waterway flood planning area 1, 2 or 3 sub-categories or the Overland flow flood planning area sub-category; or b. provides an open undercroft area from natural ground level to habitable floor level for any area inundated by the defined flood event; or <p>Note—This undercroft area is not suitable for providing non-habitable rooms, secure storage of valuables, or future enclosing for storage or car parking. The clear area may include structural elements such as columns and floor substructure. The Flood planning scheme policy provides guidance on undercroft design.</p> <p>Editor's note—An open undercroft design may be achieved through a 'valance' treatment around the perimeter of an otherwise internally clear undercroft.</p> <p>Editor's note—For Creek/waterway, storm-tide and river flooding, applicable flood planning information is available from Council's FloodWise Property Report.</p> <ol style="list-style-type: none"> c. a flood study from a Registered Professional Engineer Queensland with expertise in undertaking flood studies certifies that the development in the Creek/waterway flood planning area or Overland flow flood planning area sub-categories will not result in a material increase in flood level or flood hazard on upstream, downstream or adjacent properties. 	<p>Not Applicable.</p> <p>The proposed development is not a dwelling house.</p>

	<p>Note—Flood studies demonstrate that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy and ensure that where an undercroft is required to manage flood impacts it complies with Table 8.2.11.3.E.</p>	
<p>Section B—If accepted development subject to compliance with identified requirements (acceptable outcomes only) or assessable development other than for a dwelling house or reconfiguring a lot</p> <p>Note—If development that is accepted development subject to compliance with identified requirements complies with the acceptable outcomes of this part, no further assessment against this code is required.</p>		
<p>PO3 Development:</p> <ul style="list-style-type: none"> a. is compatible with flood hazard in a defined flood event; b. minimises the risk to people from flood hazard; c. does not reduce the ability of evacuation resources including emergency services to access and evacuate the site in a flood emergency, with consideration to the scale of the development; d. minimises impacts on property from flooding; e. minimises disruption to residents, business or site operations and recovery time due to flooding; f. minimises the need to rebuild structures after a flood event greater than the defined flood event. <p>Note—Where Table 8.2.11.3.C identifies that a flood risk assessment is required, compliance with this performance outcome can be achieved by submitting a flood risk assessment, which may be included within a flood study, addressing the criteria within this performance solution. Preparing flood risk assessments and flood studies is required to be in accordance with the Flood planning scheme policy. Note—An emergency management plan prepared in accordance with the Flood planning scheme policy, which sets out procedures for evacuation due to flooding may be</p>	<p>AO3 Development for a material change of use is identified in Table 8.2.11.3.C as compatible with the flood hazard in the relevant flood planning area.</p>	<p>Not Applicable.</p> <p>The proposed development is not a material change of use.</p>

<p>used to demonstrate compliance with this performance outcome.</p>		
<p>PO4 Development for a park ensures that the design of a park and location of structures and facilities responds to the flood hazard and balances the safety of intended users with:</p> <ul style="list-style-type: none"> a. maintaining continuity of operations; b. impacts of flooding on asset life and ongoing maintenance costs; c. efficient recovery after flood events; d. recreational benefits to the city; e. availability of suitable land within the park. 	<p>AO4.1 Development involving a building or structure in a park complies with the flood planning levels specified in Table 8.2.11.3.D.</p> <p>AO4.2 Development involving a building or structure in a park where Table 8.2.11.3.D does not apply:</p> <ul style="list-style-type: none"> a. is not located within the 20% AEP flood extent of any creek/waterway or overland flow path; or b. is located above the 20% AEP flood level of any creek/waterway or overland flow path. 	<p>Not Applicable.</p> <p>The proposed development is not a material change of use.</p>
<p>Section C—If for assessable development other than for a dwelling house</p>		
<p>PO5 Development is located and designed to:</p> <ul style="list-style-type: none"> a. minimise the risk to people from flood hazard on the site; b. minimise flood damage to the development and contents of buildings up to the defined flood event; c. provide suitable amenity; d. minimise disruption to residents, recovery time and the need to rebuild structures after a flood event up to and including the defined flood event. 	<p>AO5.1 Development complies with the flood planning levels specified in Table 8.2.11.3.D. Note—If located in an area with no Council-derived flood levels such as an overland flow path, a Registered Professional Engineer Queensland with expertise in undertaking flood studies is to derive the applicable flood level and certify that the development meets the required flood planning levels in Table 8.2.11.3.D. The study is to demonstrate that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.</p> <p>AO5.2 Development is:</p> <ul style="list-style-type: none"> a. not located in the: <ul style="list-style-type: none"> i. Brisbane River flood planning area 1, 2a, or 2b sub-categories; ii. Creek/waterway flood planning area 1 or 2 sub-categories; 	<p>The proposal complies.</p> <p>The proposed finished surface levels provided by HCE Engineers in the design earthworks TIN provide a flood immune development area which complies with the minimum development levels.</p>

	<ul style="list-style-type: none"> iii. Overland flow flood planning area sub-category; or b. only located in these sub-categories if a Registered Professional Engineer Queensland with expertise in undertaking flood studies certifies that: <ul style="list-style-type: none"> i. the development design, siting and any mitigation measures will ensure the development is structurally adequate to resist hydrostatic, hydrodynamic and debris impact loads associated with flooding up to the defined flood event; and ii. the risk to people is managed to an acceptable level. 	
<p>PO6 Development involving essential electrical services or a basement storage area is suitably located and designed to ensure public safety and minimise flood recovery and economic consequences of damage during a flood.</p>	<p>AO6.1 Development ensures that:</p> <ul style="list-style-type: none"> a. all areas containing essential electrical services comply with the flood planning levels in Table 8.2.11.3.D; or b. if a basement contains essential electrical services or a private basement storage area, the basement is a waterproof structure with walls and floors impermeable to the passage of water with all entry points and services located at or above the relevant flood planning level in Table 8.2.11.3.D. <p>Note—A basement storage area does not include a bike storage room, change room, building maintenance storage and non-critical electrical services.</p> <p>AO6.2 Development involving a basement that relies on a pumping solution to manage floodwater ingress or for dewatering after a flood provides a secondary pump system with a backup power source for the pump.</p>	<p>Not Applicable to this development application.</p>

<p>PO7 Development does not directly or indirectly create a material adverse impact on flood behaviour or drainage on properties that are upstream, downstream or adjacent to the development.</p>	<p>A07.1 Development:</p> <ul style="list-style-type: none"> a. does not block, or divert floodwaters for any area affected by creek/waterway or overland flow flooding, excluding storm-tide flooding and Brisbane River flooding sources; or b. does not result in a material increase in flood level or hydraulic hazard on upstream, downstream or adjacent properties. <p>Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.</p> <p>A07.2 Development retains existing overland flow paths and does not rely wholly on piped solutions to manage major flows.</p> <p>A07.3 Development which creates a new overland flow path or significantly modifies an existing overland flow path via earthworks does not materially worsen hydraulic hazard on the site from existing conditions.</p> <p>Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.</p>	<p>The proposal complies.</p> <p>The proposed development does not result in a material adverse impact on flood levels, velocities or hazard external to the site.</p> <p>The proposed development does not materially worsen the on-site or offsite hydraulic hazards.</p> <p>The flood modelling also demonstrates that despite increased peak discharge from the proposed development, the capacity of the Bridgeman Road culverts and the ponding of flow with the waterway corridor controls flow conditions resulting in no afflux to upstream or downstream land. It is therefore concluded that on-site detention is not required for the proposed development.</p>
<p>PO8 Development for filling or excavation in an area affected by creek/waterway flooding does not</p>	<p>A08 Development ensures that no filling or excavation greater than 100mm is located in the</p>	<p>Not Applicable.</p>

<p>directly, indirectly or cumulatively cause any material increase in flooding or hydraulic hazard or involve significant redistribution of flood storage from high to lower areas in the floodplain.</p> <p>Note—This can be demonstrated by undertaking earthworks in compliance with the Compensatory earthworks planning scheme policy.</p> <p>Note—This part of the code applies to all development other than a dwelling house and any secondary dwelling which involves filling or excavation, whether or not the development application comprises a separate development application for operational work involving filling or excavation.</p>	<p>Creek/waterway flood planning area 1, 2 or 3 sub-categories if contained in the 5% AEP flood extent of any Creek/waterway flood planning area sub-category for which no waterway corridor has been mapped in the Waterway corridors overlay.</p>	<p>The site is not located within a Creek/Waterway Flood Planning Area.</p>
<p>PO9 Development ensures that the building and site design:</p> <ul style="list-style-type: none"> a. maintains the conveyance capacity of existing overland flow paths and creek/waterways; b. ensures floodwaters and flood debris can pass predominantly unimpeded under a structure or building to minimise property or building damage, including for a flood larger than the defined flood event; c. mitigates flood impacts by ensuring that filling, excavation and location of services are designed to allow for the conveyance of floodwater across the site. <p>Note—The Flood planning scheme policy provides guidance on relevant considerations in determining minimum undercroft clearances and treatment of ground level in undercroft areas where floodwater conveyance is required underneath development.</p>	<p>AO9.1 Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub-category:</p> <ul style="list-style-type: none"> a. complies with the minimum building undercroft clearance requirements in Table 8.2.11.3.E; b. not located directly above any part of a waterway corridor as mapped in the Waterway corridors overlay. <p>AO9.2 Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub category:</p> <ul style="list-style-type: none"> a. has a ground level within the undercroft area that is free draining; b. does not involve excavation below ground level of more than 300mm within the undercroft area. 	<p>Not Applicable to this development application.</p>
<p>PO10 Development for vulnerable uses, difficult to evacuate uses or assembly uses optimises vehicular access and efficient evacuation from</p>	<p>AO10 Development for vulnerable uses, difficult to evacuate uses or assembly uses:</p>	<p>Not Applicable.</p> <p>The proposed development is not for a vulnerable use.</p>

<p>the development to parts of the road network unaffected by flood hazard, in order to:</p> <ol style="list-style-type: none"> protect safety of users and emergency services personnel; support efficient emergency services access and site evacuation with consideration to the scale of development. <p>Note—A flood risk assessment may be required to address the performance outcomes or acceptable solutions which deal with evacuation and isolation arrangements, and the ability to take refuge. The Flood planning scheme policy provides information for undertaking flood risk assessments.</p>	<ol style="list-style-type: none"> is not isolated in any event up to the relevant flood planning level specified in Table 8.2.11.3.L and Table 8.2.11.3.D; or has direct vehicle access to a critical route or interim critical route in the Critical infrastructure and movement network overlay for evacuation in a flood; or can achieve vehicular evacuation to a suitable flood-free location. <p>Note—A suitable flood-free location is of a size and nature sufficient to provide for the size and characteristics of the population likely to need evacuation to that area.</p>	
<p>PO11 Development has access which, having regard to hydraulic hazard, provides for safe vehicular and pedestrian movement and emergency services access to adjoining roads.</p>	<p>AO11.1 Development provides an access or driveway into the site which is:</p> <ol style="list-style-type: none"> trafficable during the defined flood event; not located in the Creek/waterway flood planning area 1 sub-category; not located in the Overland flow flood planning area sub-category if the hydraulic hazard is unsafe in the defined flood event; the access or driveway is not inundated by a 10% AEP flood. <p>AO11.2 Development located in the Creek/waterway flood planning area 1, 2, 3 or 4 sub-categories locates any disabled access in the highest part of the site. Note—explanation of hydraulic hazard provided in the Flood planning scheme policy.</p>	<p>The proposal complies.</p> <p>Flood free access to the site is provided from Beams Road and Bridgeman Road.</p>
<p>PO12 Development involving a new road, a bridge or culvert is designed to minimise impacts to flood behaviour, minimise disruption to traffic during a flood and allow for emergency access.</p>	<p>AO12 Development involving a new road complies with the flood planning levels in Table 8.2.11.3.F.</p>	<p>Not Applicable to this development application.</p>
<p>PO13</p>	<p>AO13.1</p>	<p>Not Applicable to this development application.</p>

<p>Development for pedestrian and cyclist paths:</p> <ol style="list-style-type: none"> provides a suitable level of trafficability; manages the impacts of flooding on asset life and ongoing maintenance costs; balances route availability with recreational and transport connectivity benefits to the city. 	<p>Development for cyclist and pedestrian facilities other than on public roads, including those traversing through a park and adjacent to a watercourse and overland flow path, are located above the 39% AEP (2 year ARI) flood immunity from all flooding sources.</p> <p>Note—If the site is subject to more than one type of flooding, the requirement that affords the greatest level of protection will apply.</p> <p>AO13.2 All new on-road cyclist and pedestrian facilities comply with the flood planning levels and trafficability standards for the applicable category of road in Table 8.2.11.3.F or Table 8.2.11.3.K.</p>	
<p>PO14 Development which increases the residential population within the Brisbane River flood planning area sub-categories minimises the risk to people in all flood events with consideration to flood hazard, including warning time.</p>	<p>AO14 Development in the Brisbane River flood planning area sub-categories in areas where the 1% AEP flood level is greater than 12.8m AHD involving:</p> <ol style="list-style-type: none"> an increase in the number of residential dwellings; or additional residential lots <p>is not subject to an unsafe hydraulic hazard in the 0.2% AEP flood event.</p> <p>Note—Explanation of a hydraulic hazard is provided in the Flood planning scheme policy.</p>	<p>Not Applicable to this development application.</p>
<p>Additional performance outcomes and acceptable outcomes for essential community infrastructure</p>		
<p>PO15 Development involving essential community infrastructure:</p> <ol style="list-style-type: none"> remains functional to serve community need during and immediately after a flood event, or is part of a network that is able to maintain the function of the essential community infrastructure when parts of the development are unable to function during or after a flood; 	<p>AO15 Development involving essential community infrastructure:</p> <ol style="list-style-type: none"> is ancillary to and not relied upon for the provision of the essential service during a flood; or is located above the flood planning levels in Table 8.2.11.3.G; 	<p>Not Applicable to this development application.</p>

<p>b. is designed, sited and operated to avoid adverse impacts on the community or the environment due to the impacts of flooding on infrastructure, facilities or access and egress routes;</p> <p>c. is able to remain functional or is part of a network which is able to remain functional even when other infrastructure or services (such as electricity supply) may be compromised in a flood event;</p> <p>d. contains mitigation measures which are not entirely dependent on human activation to respond to a flood event.</p> <p>Note—Protection of function is required up to and including the flood event in Table 8.2.11.3.G.</p>	<p>c. has access to or provides the necessary back-up emergency electricity and communications supply in times of flood;</p> <p>d. is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by the flood event listed for the development type in Table 8.2.11.3.G;</p> <p>e. that services a local area:</p> <ul style="list-style-type: none"> i. is able to be accessed in times of flood to service local community needs up to the event listed for that development type in Table 8.2.11.3.G; or ii. has a service continuity plan that demonstrates the continued provision of service during the relevant flood event. 	
<p>Additional performance outcomes and acceptable outcomes if development involves the processes in Table 8.2.11.3.H</p>		
<p>PO16 Development involving the storage and handling of hazardous materials avoids or minimises risks to public health and safety and the environment, by:</p> <ul style="list-style-type: none"> a. protecting underground tanks for hazardous materials against the forces of buoyancy, velocity flow and debris impacts; b. securing above-ground tanks for hazardous materials against flotation and lateral movement; c. preventing damage to hazardous materials pipework or entry of floodwater into hazardous materials pipework; d. preventing damage to or off-site release of packages, drums or containers storing hazardous materials. 	<p>AO16</p> <ul style="list-style-type: none"> a. Development does not include the storage or handling of hazardous chemicals that exceed the hazardous chemicals flood hazard threshold quantities in Table 8.2.11.3.M. b. Development involving the processes listed in Table 8.2.11.3.H: <ul style="list-style-type: none"> i. where located in the Flood overlay area, occurs only in the Creek/waterway flood planning area 5 sub-category or the Brisbane River flood planning area 5 sub-category; or ii. is consistent with the standards contained in the Management of hazardous chemicals in flood affected areas planning scheme policy and can 	<p>Not Applicable to this development application.</p>

<p>Note—A chemical hazards flood risk report prepared in accordance with the Management of hazardous chemicals in flood affected areas planning scheme policy can assist in demonstrating achievement of this performance outcome. Note—A pump drainage system is not an acceptable measure to meet the performance outcome.</p>	<p style="text-align: center;">operate without risk of environmental harm during a flood event.</p> <p>Note—The Management of hazardous chemicals in flood affected areas planning scheme policy sets out further information and processes including risk assessment for the management of hazardous chemicals in flood planning areas.</p>	
<p>Additional performance outcomes and acceptable outcomes for reconfiguring a lot</p>		
<p>PO17 Development locates and designs all lots resulting from reconfiguring a lot to:</p> <ol style="list-style-type: none"> a. minimise the risk to people from flood hazard; b. minimise damage to property from flood hazard; c. facilitate safe and efficient evacuation. <p>Note—</p> <ul style="list-style-type: none"> • Consideration of all floods up to the probable maximum flood is relevant to minimising the risk to people. • Flood warning time is not considered sufficient in the Creek/waterway planning area sub-categories or the Overland flow flood planning area sub-category. • Filling above the flood planning level for a flood event greater than the defined flood event cannot be assumed to mitigate the flood hazard. 	<p>AO17.1 Development creating new lots is identified in Table 8.2.11.3.I as suitable within the relevant flood planning area.</p> <p>AO17.2 Development provides for reconfiguring a lot design that achieves a road and lot layout which:</p> <ol style="list-style-type: none"> a. provides trafficable vehicular egress for evacuation during a defined flood event; b. optimises hazard-free movement away from sources of flood hazard within the development. <p>Note—Further advice on road and lot layout is contained in the Flood planning scheme policy.</p> <p>AO17.3 Development which creates a new residential lot in an area subject to Brisbane River flooding, if the 1% AEP flood level is greater than 12.8m AHD is not subject to a hydraulic hazard greater than 0.6m²/s DV or 0.6m deep in a 0.2% AEP flood.</p> <p>Note—Refer to the Flood planning scheme policy for further explanation on the 0.2% AEP flood.</p>	<p>The proposal complies.</p>
<p>PO18 Development involving reconfiguring a lot:</p> <ol style="list-style-type: none"> a. minimises the risk to people from flood hazard; 	<p>AO18.1 Development involving reconfiguring a lot ensures:</p> <ol style="list-style-type: none"> a. all lots comply with the flood planning levels in Table 8.2.11.3.J; 	<p>The proposal complies.</p> <p>The proposed finished surface levels provided by HCE Engineers in the design earthworks TIN provide a flood immune development area,</p>

<ul style="list-style-type: none"> b. creates safe evacuation routes or avoids isolation of the development during a flood greater than the defined flood event; c. minimises damage to property and services; d. provides lots and roads that are not frequently flooded or subject to nuisance ponding or seepage; e. ensures lots created for park or private open space minimise the risk to people from flood hazard and are fit for purpose; f. provides a lot that is not substantially burdened by flood mitigation infrastructure. 	<p>b. a new road complies with the flood planning levels in Table 8.2.11.3.F.</p> <p>AO18.2 Development involving reconfiguring a lot creating more than 6 residential lots or a lot for industry ensures the flood planning levels of a dedicated road fronting the development or providing primary access within 200m of the development:</p> <ul style="list-style-type: none"> a. complies with Table 8.2.11.3.K; or b. has acceptable trafficability in accordance with the requirements in the Flood planning scheme policy and the Queensland Urban Drainage Manual. <p>Note—The Flood planning scheme policy contains supporting information about trafficability on existing roads and serviceability during floods.</p> <hr/> <p>AO18.3 Development protects the conveyance of flood hazard area by providing an easement over the:</p> <ul style="list-style-type: none"> a. 2% AEP flood extent for overland flow flooding; b. 1% AEP flood extent for creek/waterway flooding. 	<p>lots and internal roads, which complies with the minimum development levels.</p> <p>Easements to be ceded to Council for waterway corridor / overland flowpath.</p>
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