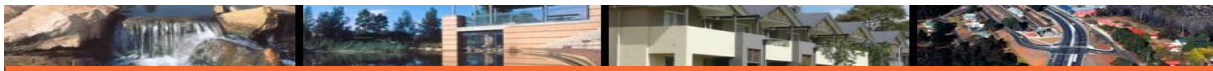


APPENDIX 19

Additional Flood Evacuation Assessment (JWP, August 2017)



Our Ref: 110251-02-Ltr_INSW_Flood_Evacuation_Further Info.docx

DC:dc

1 August 2017

C/- CABE
Atlas Norwest, Suite 502, Level 5
2-8 Brookhollow Avenue
Baulkham Hills NSW 2153

Attn: Joe Bevacqua

**Subject: ESQ1818 Development – Panthers North Precinct
Further Flood Evacuation Assessment**

Dear Joe,

Further to our meeting with Peter Cinque from the NSW State Emergency Service (SES) on Friday 14 July 2017, we have relooked at the flood evacuation traffic generation as per Peter's suggested approach for the surrounding development and updated the flood evacuation timeline assessment. Detail of the reassessment is provided below.

1. FLOOD EVACUATION TIMING TO MULGOA ROAD

As detailed on our previous advice of 21 April 2017, the proposed ESQ 1818 will include 1,237 car spaces. Assuming that every car space is occupied 1,237 car would need to evacuate from the development.

As agreed at the meeting with the SES, an additional 100 vehicle movements is to be included in the assessment for the Nursing Home, 375 vehicle movements for the Retirement village (1.5 car per dwelling) and an approximately half the capacity of the existing Panther Carpark (i.e. 300 vehicle movements) are to be assumed for the Mulgoa Road carpark.

The Panther Carpark on Mulgoa Road has two (2) exit points, one to Retreat Drive and the other to Panther Way, Therefore, it will be assumed that the vehicles for this carpark will be entering Mulgoa Road through either one of these exists and thus only 150 vehicle movements will be considered in the Retreat Drive Assessment.

Assuming the SES are already mobilised based on the predicted rainfall and that it will take one (1) hour for the general public to accept the warning after door knocking and a further hour to prepare to evacuate.

A number of different scenarios have been considered which are detailed below.

1.1 Scenario 1 - Nursing Home residents evacuate First

In this scenario, the Nursing Home would commence flood evacuation immediately after a flood evacuation notice has been given by the relevant authority.

Please note the evacuation time in all of these additional assessments remains consistent with the evaluation complete as part of the J. Wyndham Prince's 21 April 2017 assessment i.e. the Precinct has 4.3 hr from the on set of rainfall to evaluate the site before flood waters begin to inundate the lower portion of the development.

Therefore in this scenario, the 100 Nursing home vehicles movement are quickly evacuated (less than 30 minutes) and will not impact the other flood evacuation traffic from the local Precinct given the likely delay in the public's mobilisation. The following evacuation times could, therefore, be achieved.

Panther Precinct Evacuation	Total Evacuation Time (Hr)	Evacuation Time (Hr)	Delayed Evacuation	Surplus/Deficient Time to Evacuation (Hr)
Total Car 1387 (1237 from ESQ1818 and 150 from Retirement Village)	2.31	4.3	2	-0.01

1.2 Scenario 2 – Precinct resident all evacuate at the same time.

In this scenario, all flood evacuee do not choose to evacuate until a minimum two (2) hour after the original notice is given to evacuate. Thus all 1487 vehicilce movements will need to evacuate the Panther's Precinct at the same time resulting the following evacuation times.

Panther Precinct Evacuation	Total Evacuation Time (Hr)	Evacuation Time (Hr)	Delayed Evacuation	Surplus/Deficient Time to Evacuation (Hr)
Total Car 1487 (1237 from ESQ1818, 100 From the Nursing Home and 150 from Retirement Village)	2.48	4.3	2	-0.18

In both scenarios there is a small deficiency in time less than 11 minutes until flood water start to enter the development.

At the SES meeting a series of "shelter in place" options also were discussion and will be further examined in the evolution of the ESQ 1818 masterplans and ultimately submitted with the further Development Application for the site.

2. LOCAL FLOODING

The SES has requested that a further flood assessment be undertaken for the 1% AEP regional event combined with a 1% AEP local event. This event has a higher probability than the standard 1% AEP event that should be used to inform any development controls on this site however we have completed the assessment as requested.

The results the indicates that the ESQ 1818 site has no additional flood impacts occur during this event when compare to the other combined events already modelled and presented in our 6 September 2016 report titled Panther Precinct Master Plan – Flood Assessment Report

3. CONCLUSION

The further flood evacuation assessment completed for the Panther Precinct which includes the Retirement Village, Nursing Home and a portion of the Panther site generates a total vehicle movement of 1487.

The flood evacuation time analysis indicates that there is be a very small (11 minute) deficiency in the time needed to evacuate the Precinct. This minor deficiency is considered to be acceptable given the conservative nature of the vehicle assessment for the ESQ18181 development. It has been assumed that all 1237 car space within the ES1818 development are occupied at the time of the flood. If as little of 77 space (only 6.2%) of the carpark were free at the time of the flood, sufficient time would then be available for all occupiers of the Panther Precinct to safely evacuate to Mulgoa Road.

We hope that this time line assessment together with the additional flood assessment enables SES/INSW to have confidence that the residents of ESQ1818 development will have a manageable and safe flood evacuation strategy and the amendment of the LEP can be supported.

Should there be any queries regarding this matter please do not hesitate to contact David Crompton on 4720 3340 or dcrompton@jwprince.com.au

Yours faithfully

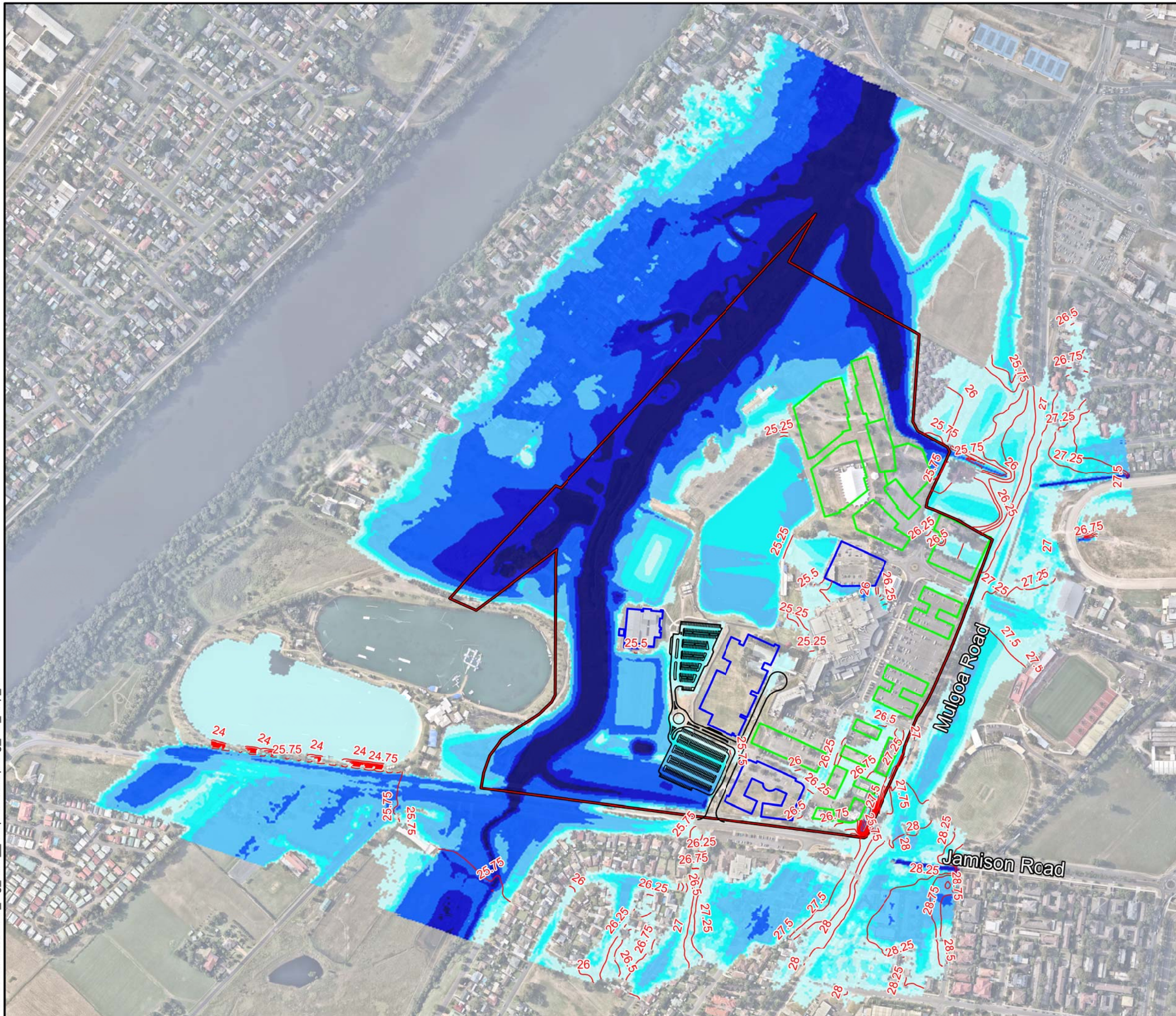
J. WYNDHAM PRINCE

A handwritten signature in blue ink, appearing to read 'D. Crompton', is positioned below the printed name of J. Wyndham Prince.

DAVID CROMPTON

Manager – Stormwater and Environment Group

APPENDIX A – FIGURES



PANTHERSGROUP

J. WYNDHAM PRINCE

CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
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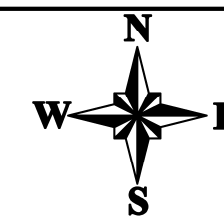
LEGEND

Depth (m)

- 0.0 to 0.2
- 0.2 to 0.3
- 0.3 to 0.5
- 0.5 to 1.0
- 1.0 to 2.0
- 2.0 to 3.0
- 3.0 +

27.00 Flood Level (m AHD)

— Panthers Precinct Boundary



Scale 1: 6,000 @ A3

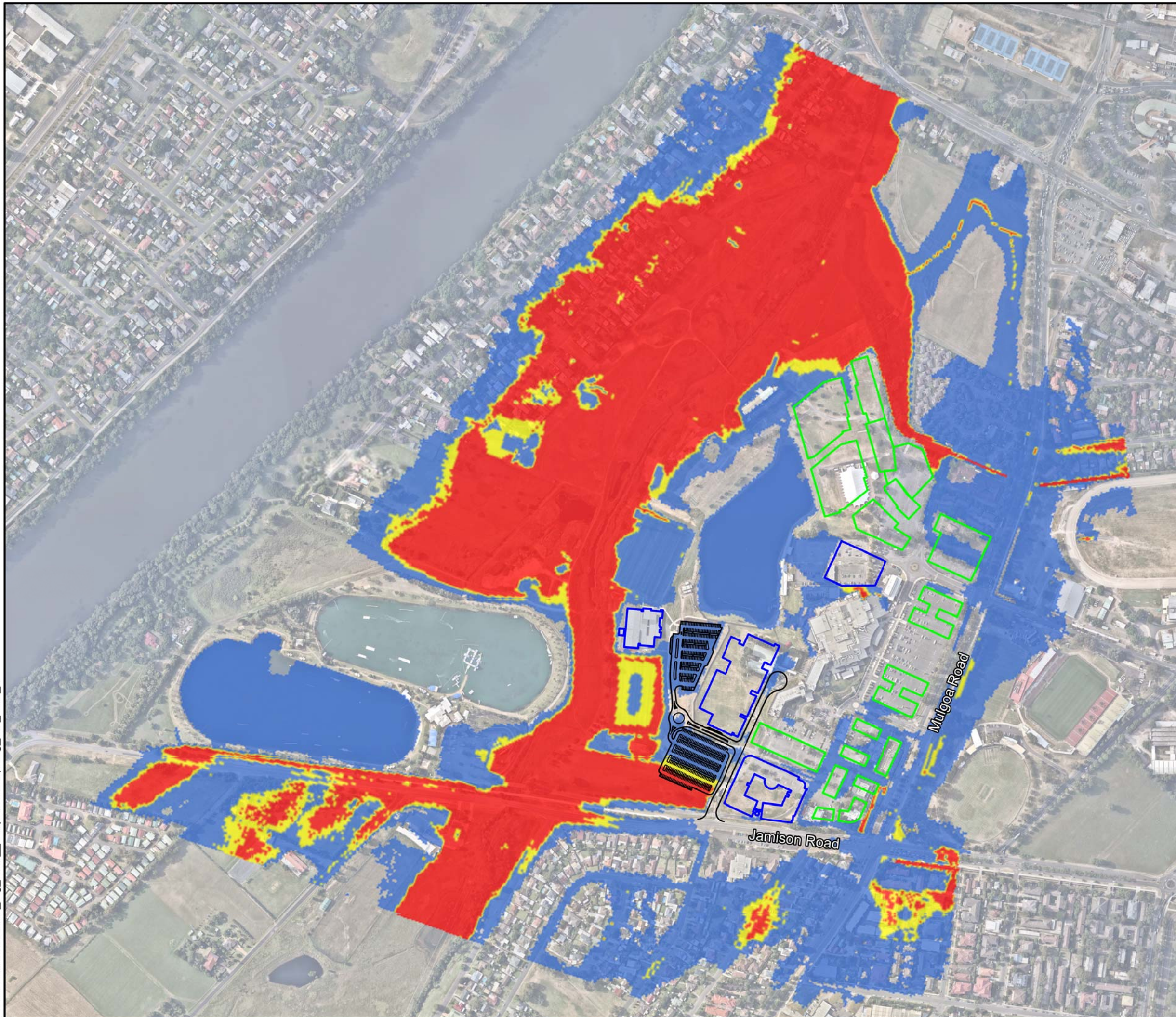


Figure 8-25 Panthers Precinct Master Plan

1% AEP Local +
1% AEP Regional
Future Conditions
Flood Depth and Level

Date : 24/07/2017

Issue : A



PANTHERSGROUP

J. WYNDHAM PRINCE

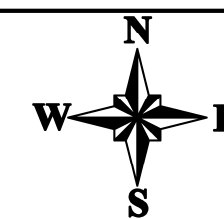
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LEGEND

Hazard Categorisation

- LOW HAZARD
- TRANSITION HAZARD
- HIGH HAZARD



Scale 1: 6,000 @ A3



Figure 8-26
Panthers Precinct
Master Plan
1% AEP Local +
1% AEP Regional
Future Conditions
Flood Hazard Categorisation