

ATTACHMENT 3

Flood Assessment

Prepared by:

Biome

Hydraulic Assessment



Flagstone Town Centre

Bluepoint Flagstone Pty Ltd

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1 Introduction

This Hydraulic Assessment has been prepared on behalf of Bluepoint Flagstone Pty Ltd and presents a hydraulic assessment of flooding at Lots 25009 and 25007 on SP303120, Homestead Drive, Flagstone (the subject site). This report has been produced as an assessment of the proposed earthworks to ensure non-worsening of peak flood levels external to the site.

1.1 Site Location

The subject site is located within the Logan City Council local government area at Homestead Drive, Flagstone, and comprises two (2) allotments, Lots 25009 and 25007 on SP303120. Sandy Creek is located to the north of the site. The site location is displayed in Figure 1.1.



Figure 1.1 Site Location



1.2 Council Flood Mapping

The Council flood mapping indicates that the northern part of the site is subject to flooding of Sandy Creek as depicted in Figure 1.2.

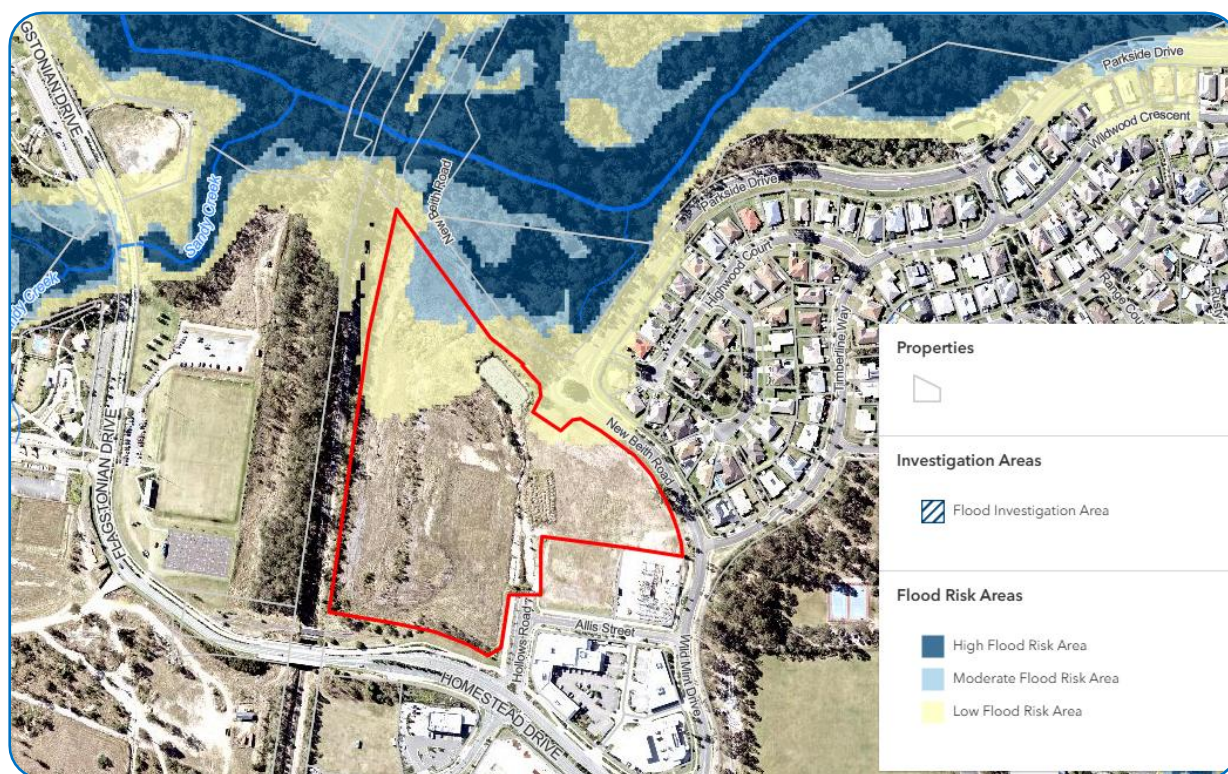


Figure 1.2 Logan City Council Flood Mapping



2 Proposed Works

The development seeks to construct a town centre precinct comprised mainly of commercial tenancies. Access to the site is proposed to be via both Hollows Road to the south and the Parkside Drive roundabout to the north. The development layout is displayed in Figure 2.1.

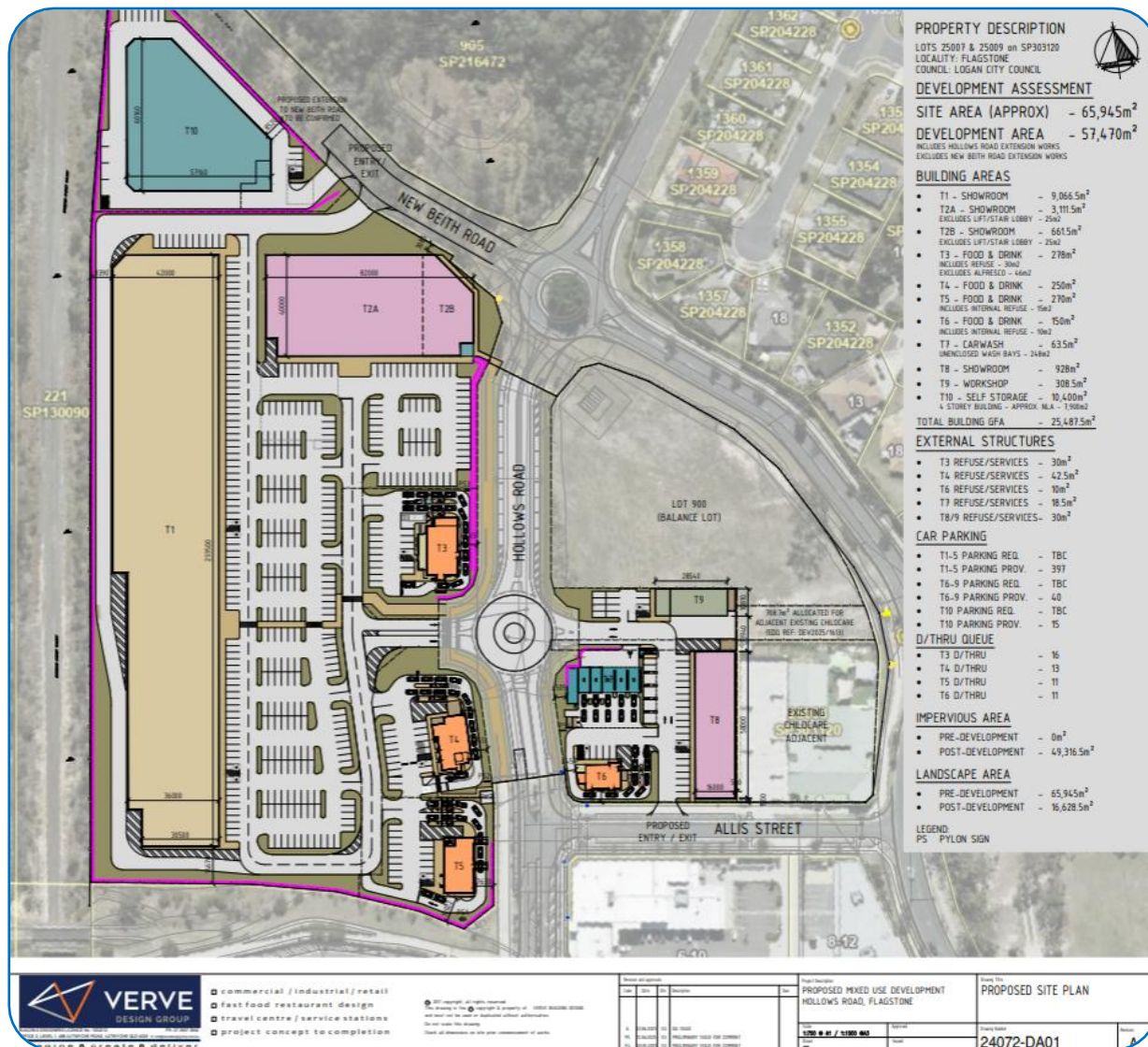


Figure 2.1 Proposed Development



3 Hydraulic Assessment

In order to assess the hydraulic characteristics of the site, the Flagstone and Sandy Creek 2024 *TUFLOW* model has been supplied by Council to utilise under a data agreement. This model encompasses the Flagstone Creek catchment to the west of the Logan River, including the section of Sandy Creek which runs to the north of the subject site.

The full model was simulated for all supplied duration to find the critical duration which produces peak flood levels at the site. Table 3.1 summarises the critical durations for all modelled events. All modelled events include RCP4.5 climate change provisions in accordance with LCC guidelines.

Table 3.1 Critical Storm Durations

Annual Exceedance Probability (AEP)	Duration
20%	90 minutes
10%	360 minutes
5%	360 minutes
2%	180 minutes
1%	180 minutes

3.1 Existing Results

The model has been simulated for all events to quantify baseline flooding behaviour across the site and surrounding properties. Flooding is limited to the northern portion of the site associated backwater effects located outside of the main flow path of Sandy Creek. The peak flood levels at the site for all events are summarised in Table 3.2.

Table 3.2 Peak Flood Levels

Annual Exceedance Probability (AEP)	Level (m AHD)
0.2EY	36.46
10%	35.85
5%	36.13
2%	36.47
1%	36.72

Peak depth plots for all events are displayed in Figures 3.1 to 3.5.



Figure 3.1 Existing 1% AEP Depth



Figure 3.2 Existing 2% AEP Depth



Figure 3.3 Existing 5% AEP Depth



Figure 3.4 Existing 10% AEP Depth



Figure 3.5 Existing 20% AEP Depth

The peak velocity across the site is less than 0.5 m/s, as this is in a backwater location of the creek outside of the main flowpath.



Figure 3.6 Existing 1% AEP Velocity



3.2 Post-Development Scenario

The proposed civil earthworks designed by Pinnacle Engineering (Figure 3.7 and 3.8) has been included in the post-development model. This design lifts the tenancies above the flood level and locates stormwater treatment basins within the flooded extent. The design TIN has been included within the post development model (Figure 3.9).

A Site Based Stormwater Management Plan has been prepared by Pinnacle Engineering that includes quantity control measures (detention) to address increases in peak discharge from the site.

As this report has been prepared to assess the impacts of the proposed earthworks within the flood affected area and not changes to peak discharge, the predevelopment hydrology has not been altered.

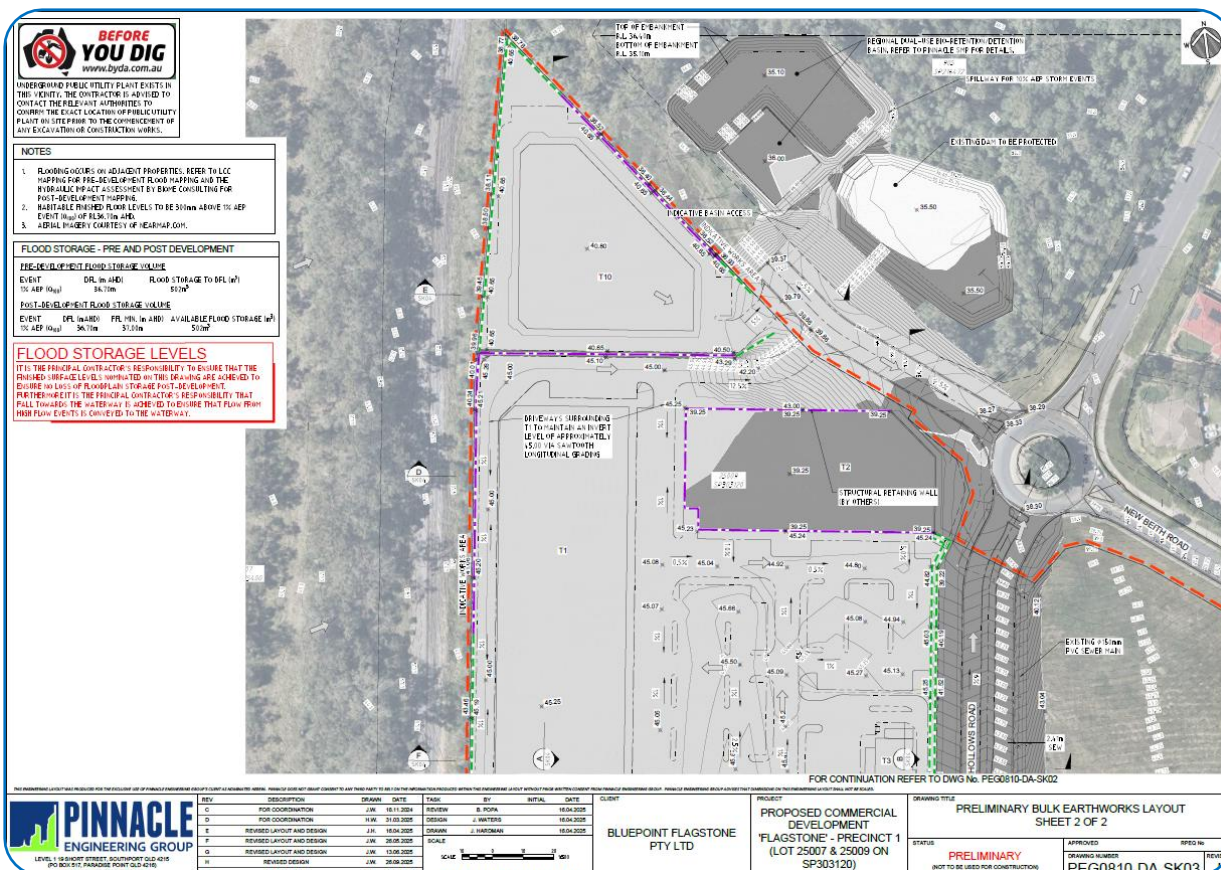


Figure 3.7 Proposed Design (Pinnacle Engineering)

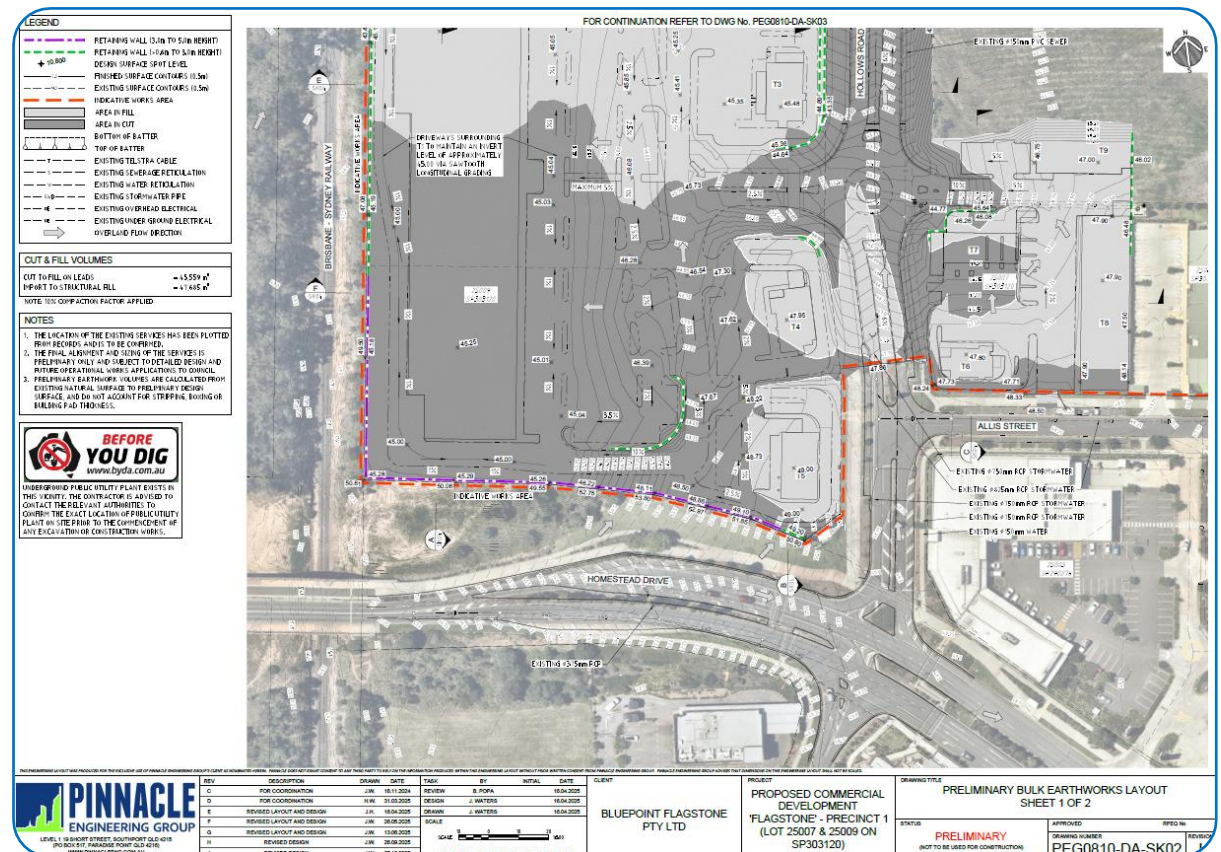


Figure 3.8 Proposed Design (Pinnacle Engineering)



Figure 3.9 Proposed Design



3.3 Post-Development Results

The post-development flooding characteristics are similar to the pre-development scenario. The proposed works create flood free pads and roads with immunity to the 1% AEP predicted flood levels. The post-development depth results are shown on Figures 3.10 – 3.14 below.

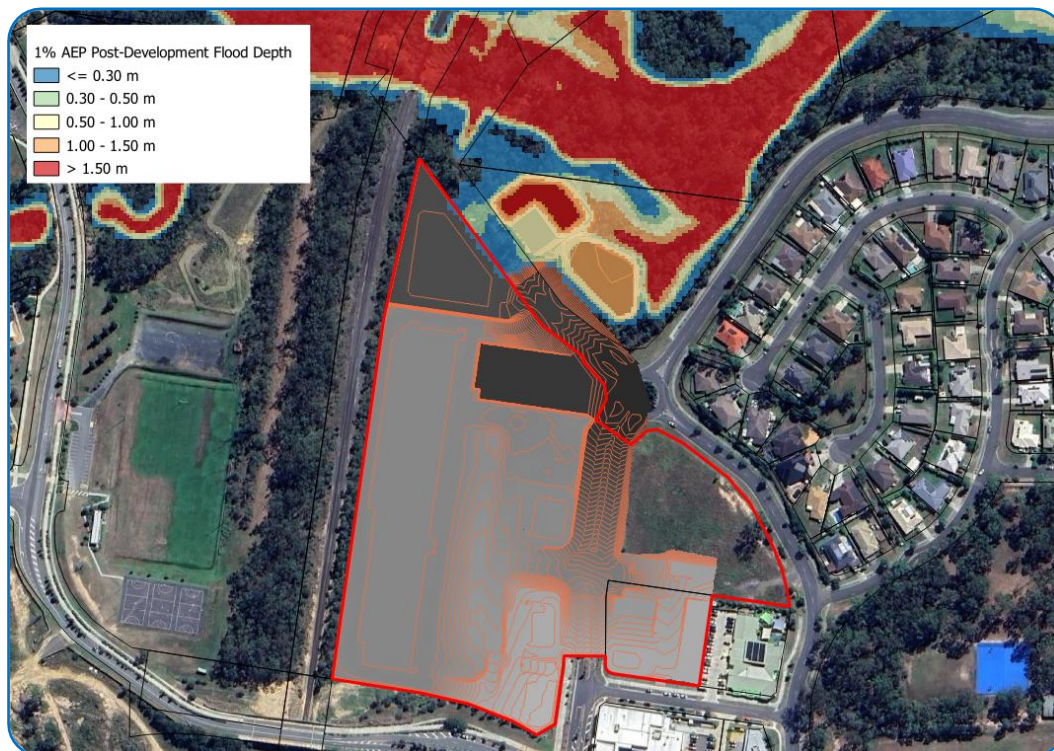


Figure 3.10 Post-Development 1% AEP Depth

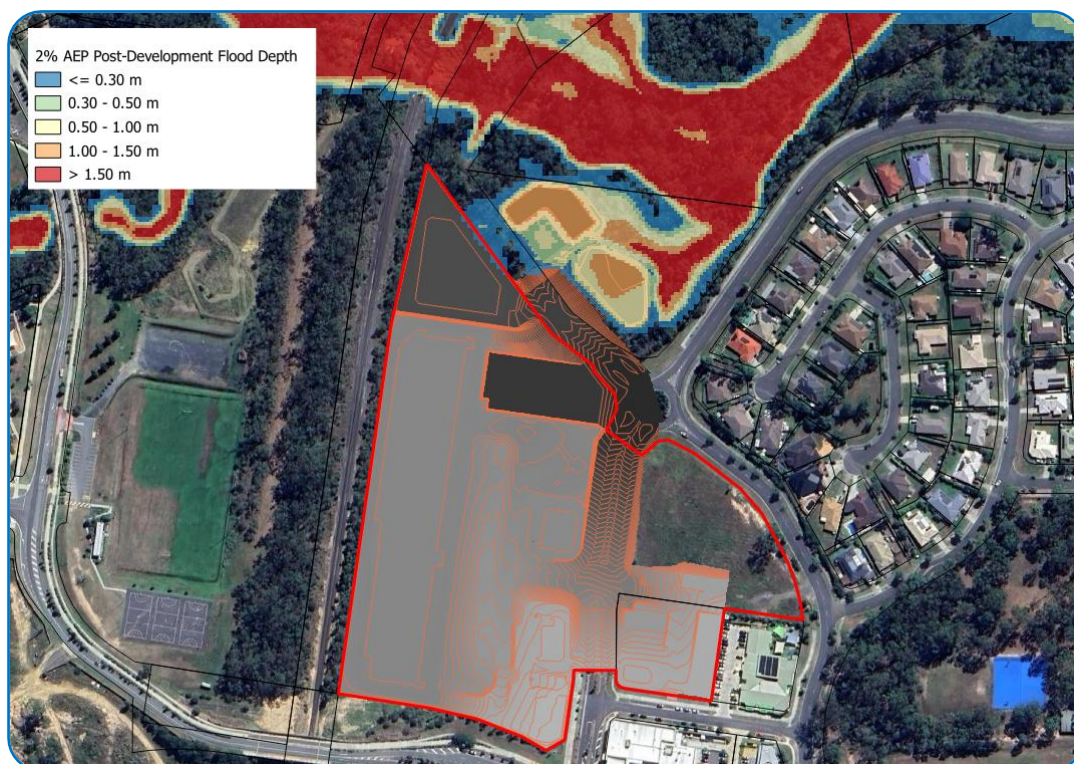


Figure 3.11 Post-Development 2% AEP Depth

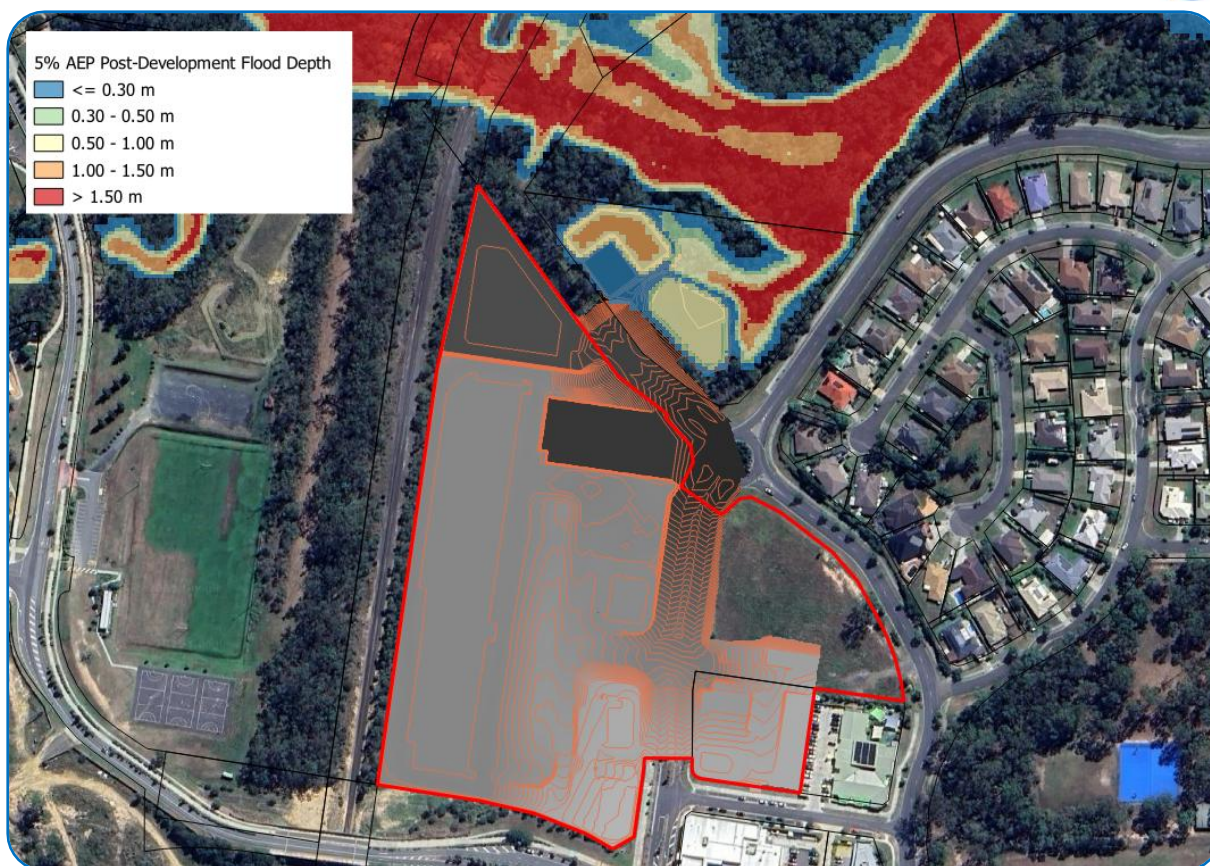


Figure 3.12 Post-Development 5% AEP Depth

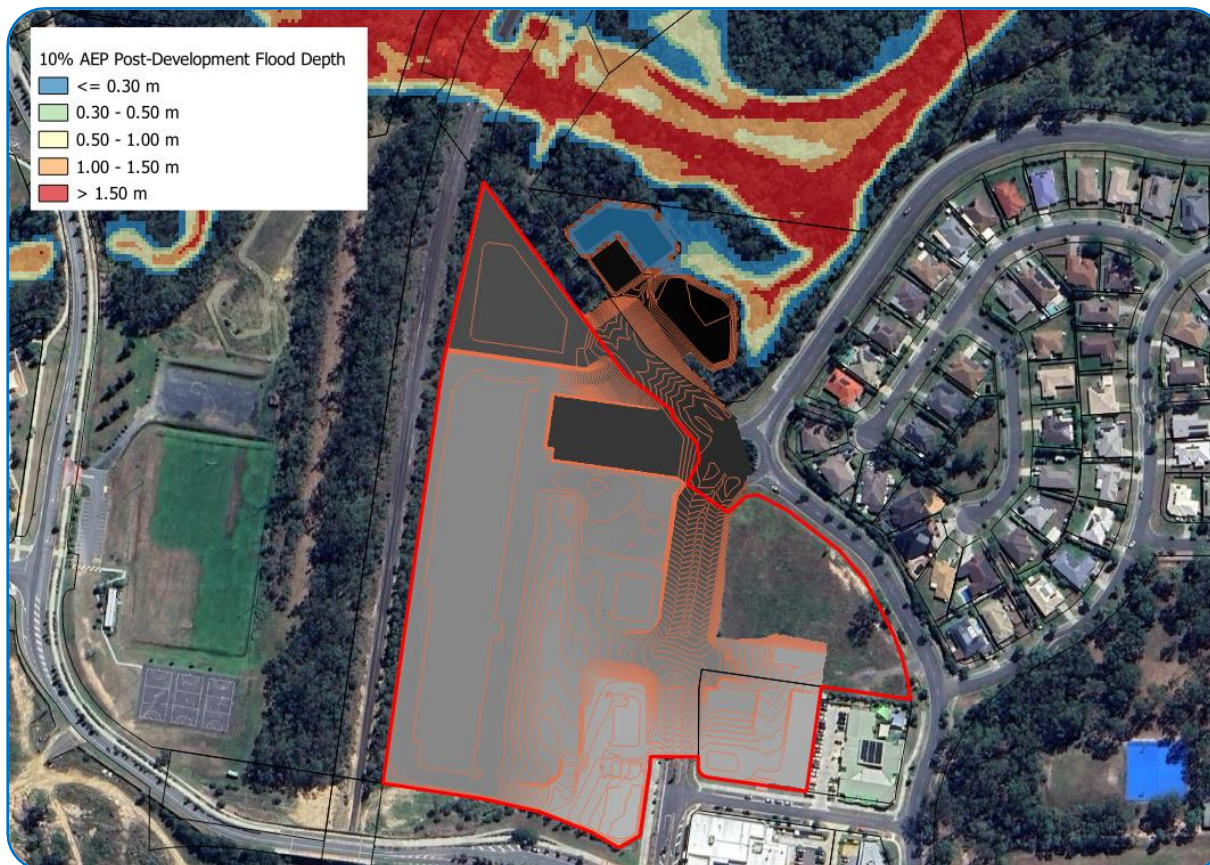


Figure 3.13 Post-Development 10% AEP Depth

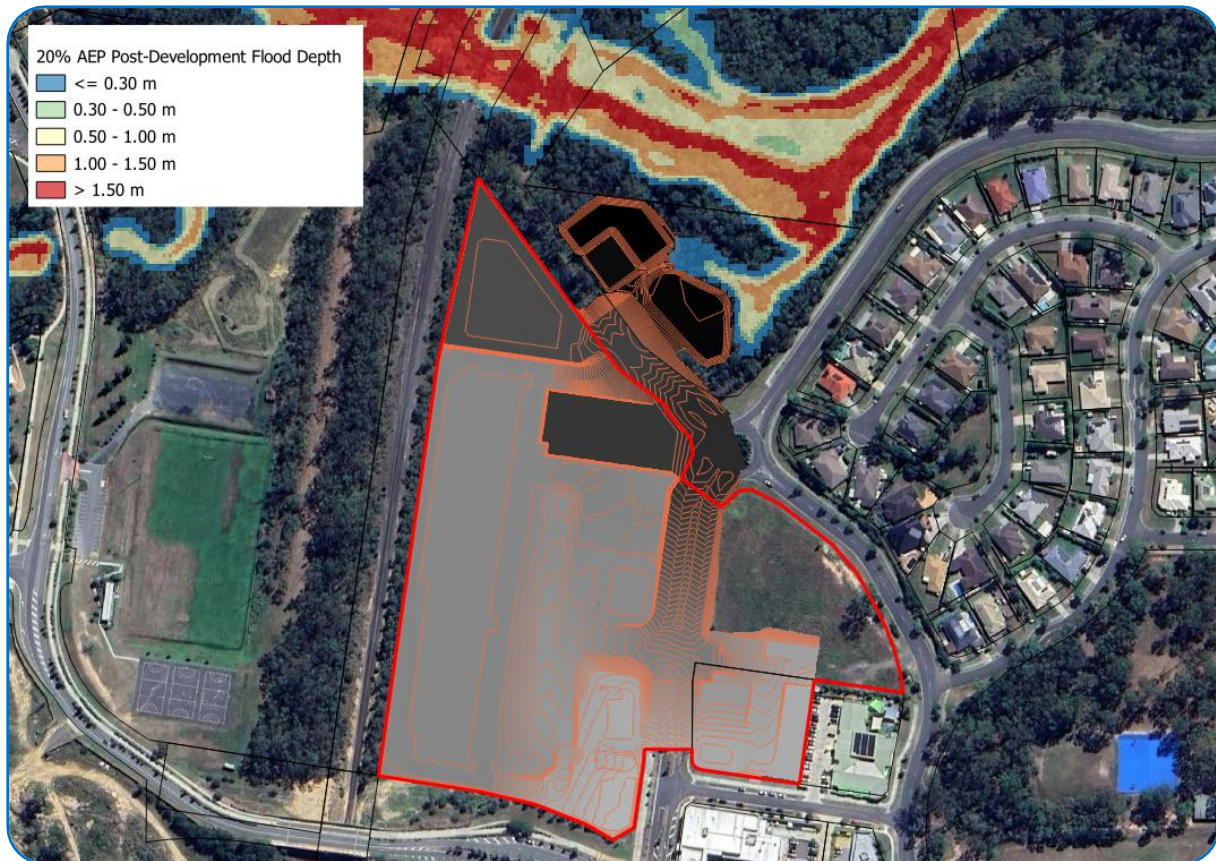


Figure 3.14 Post-Development 20% AEP Depth



4 Impact Assessment

In order to illustrate the impact of the proposed works on peak flood levels, a spatial analysis of the pre and post-development results has been prepared.

The results of the modelling indicate that the proposed works will have no impact on flood levels external to the site. Figure 4.1 illustrates the expected 1 % AEP flood level afflux, with lower events provided in Figures 4.2 -4.5.

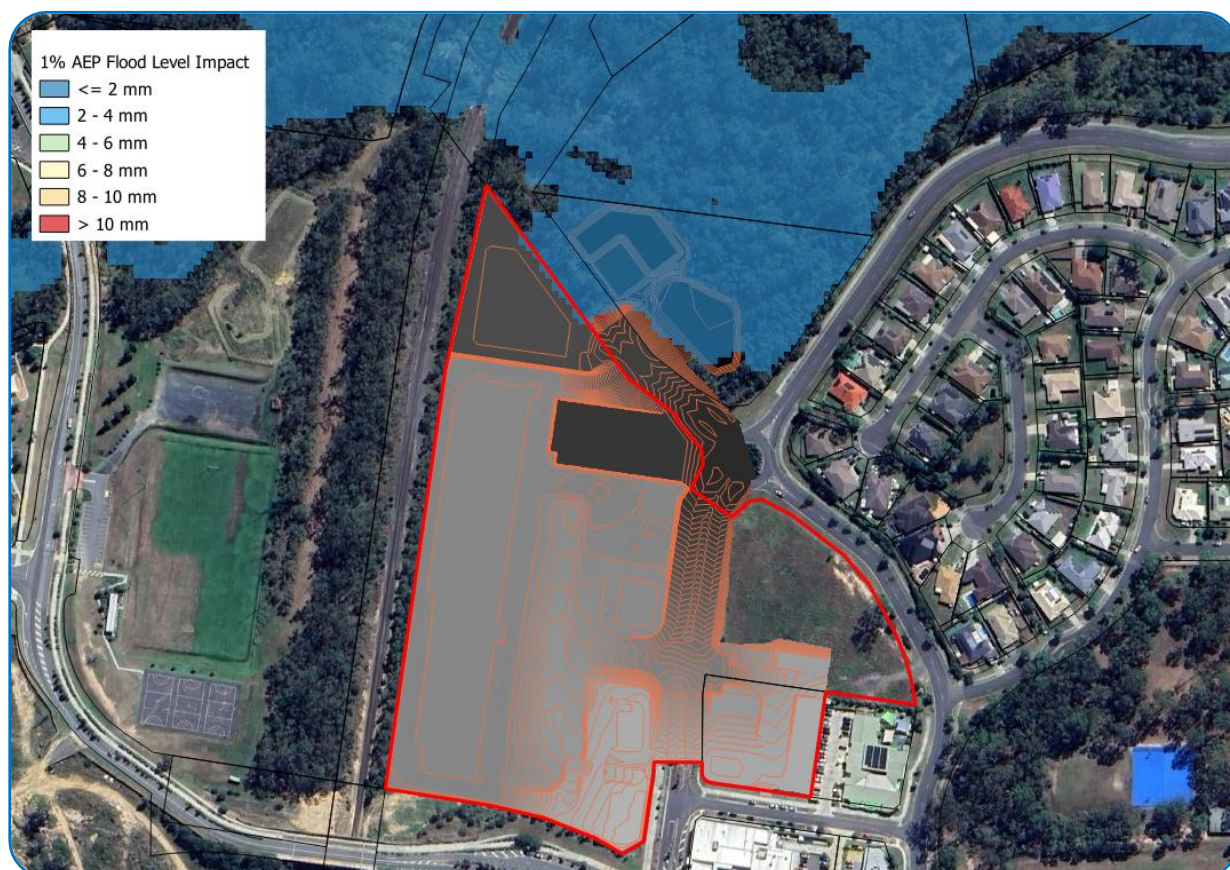


Figure 4.1 1 % AEP Flood Level Impact

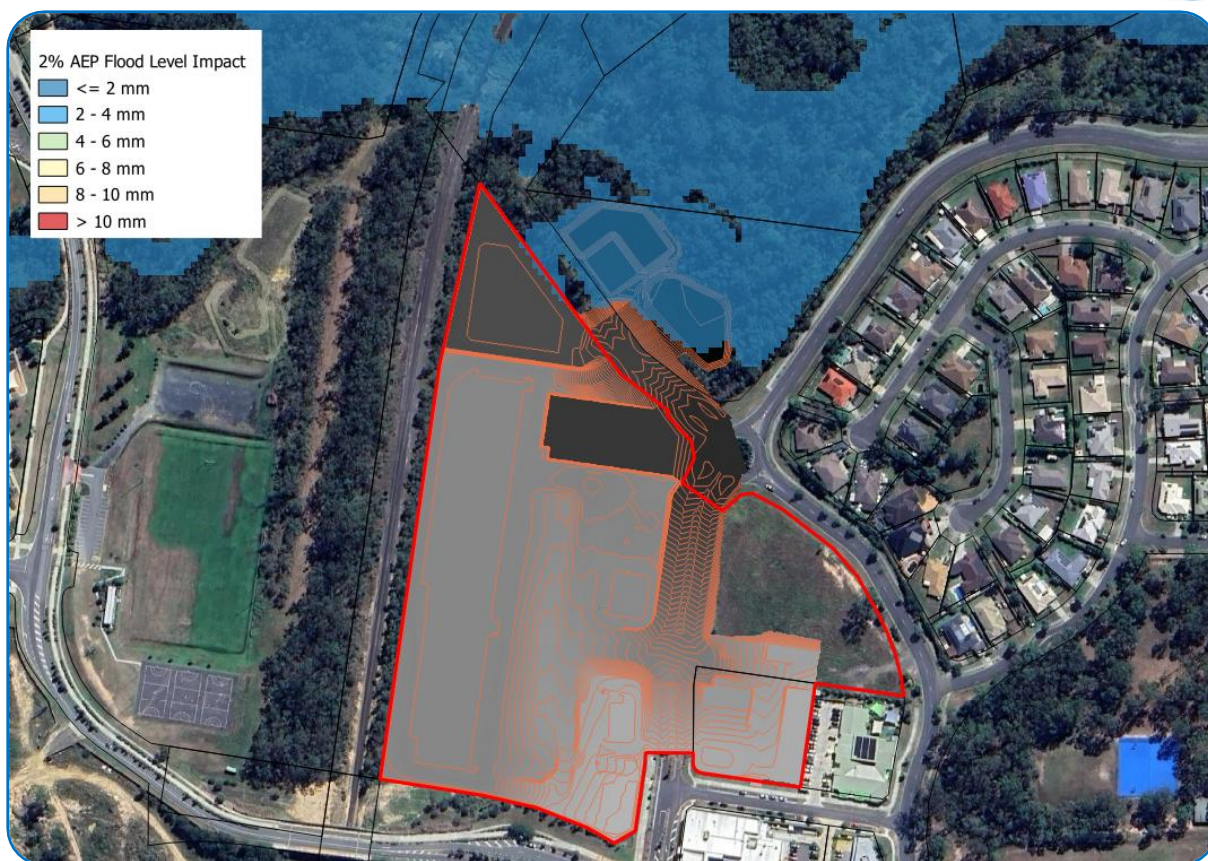


Figure 4.2 2 % AEP Flood Level Impact



Figure 4.3 5 % AEP Flood Level Impact

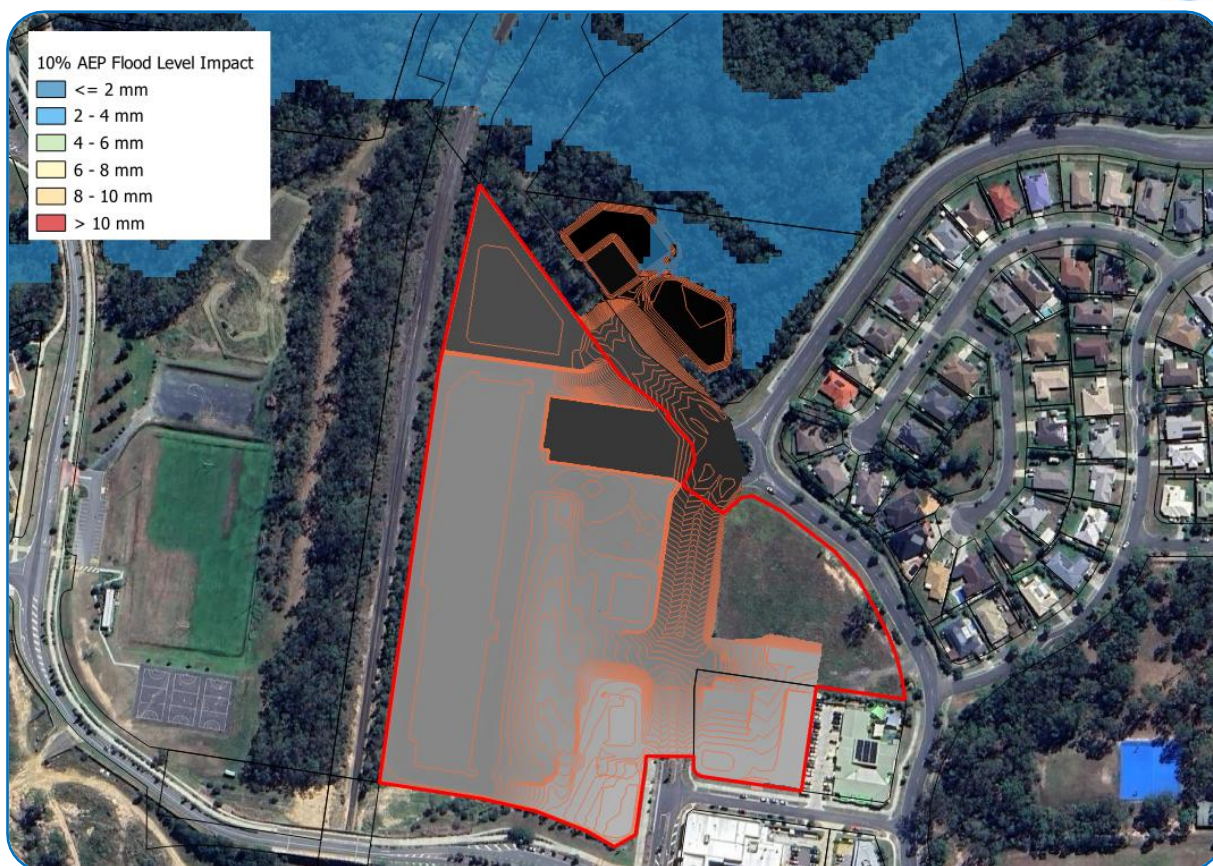


Figure 4.4 10 % AEP Flood Level Impact

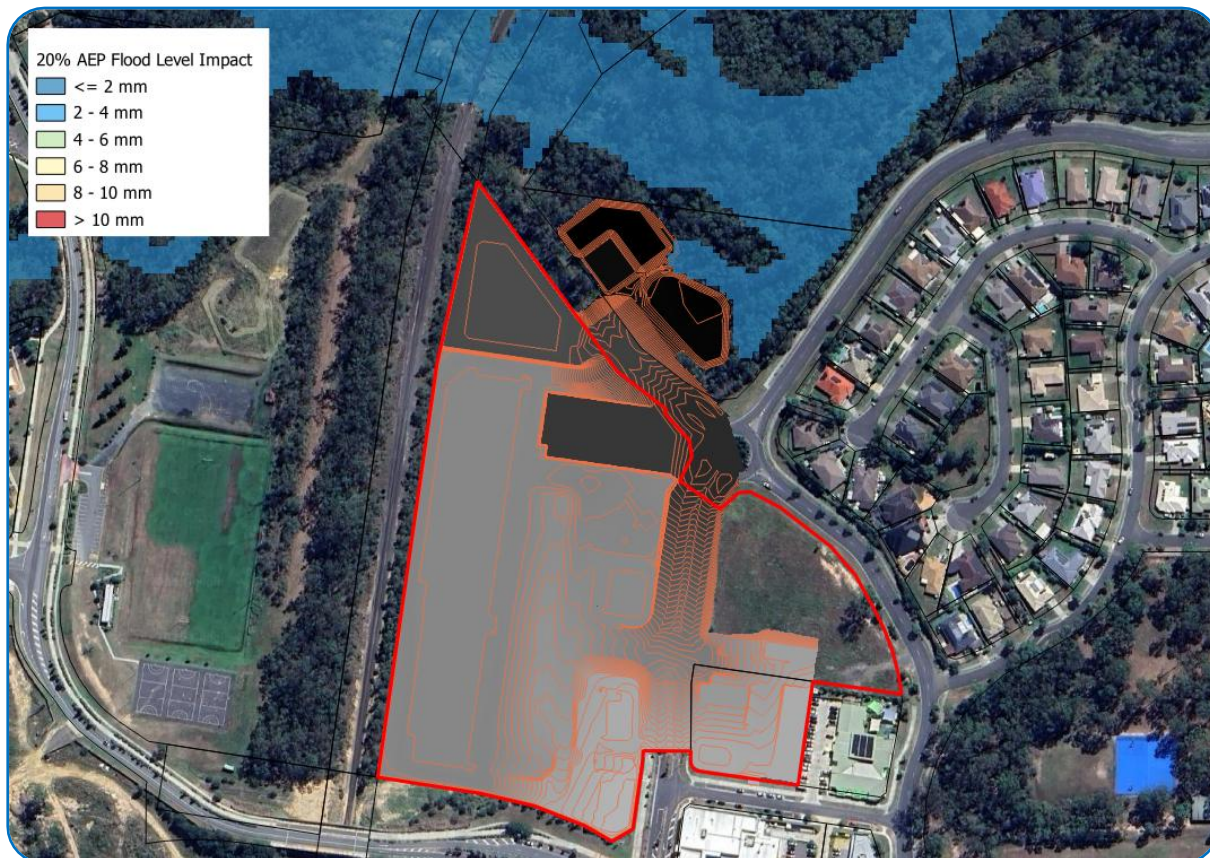


Figure 4.5 20% AEP Flood Level Impact



5 Conclusions

This report has been prepared as an assessment of flood impacts of the earthworks by Pinnacle Engineering proposed as part of the Flagstone Town Centre development. The earthworks achieve flood immunity for the proposed building pads, roads, and carparks. The stormwater treatment basins are located within the flooded area.

The results of the analysis indicate that the proposed works will achieve non-worsening to local flood levels in all modelled events.