



Structural



Civil



Flood

Flood Impact Assessment

DA3 – Loganview Green


QM Properties

610-626 Logan Reserve Road, Loganview

Job Reference Number – 9948

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1 Introduction

1.1. Purpose and Scope

Inertia Engineering has been commissioned by QM Properties to prepare a Flood Report for the proposed Development at 610-626 Logan Reserve Road, Loganview (the subject site).

The principal objectives of this study are to confirm the overland flow characteristics through the site and demonstrate that the proposed development works will ensure all stormwater drainage is directed to a lawful point of discharge in accordance with QUDM Section 3.4 (2013); and not adversely impact flood levels external to the subject site during a local overland flow storm event. This includes determining any required mitigation measures to be included within the proposed development.

1.2. Report Limitations

This report has been prepared by Inertia Engineering Pty Ltd for QM Properties and may only be used and relied on by QM Properties for the purpose agreed between Inertia Engineering and QM Properties as detailed within this report.

Inertia Engineering otherwise disclaims responsibility to any person other than QM Properties arising in connection with this report. Inertia Engineering also excludes implied warranties and conditions, to the extent legally permissible.

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Inertia Engineering has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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2 Site Characteristics

The land contained within the site is described as follows:

Title Details:	Lot 12 & 13 on RP105335
Street Address:	610-626 Logan Reserve Road, Loganview
Area:	Total: 49,520 m ²

2.1. Location

The subject site is located in Loganview, approximately 30km south from Brisbane CBD. The site is bound by similar rural residential lots



Figure 2-1 - Location Plan

2.2. Topography and Drainage

The site falls generally from north to south at a grad of approximately 5%. The highest point on the site is in the northern corner along the Logan Reserve Road frontage at RL 37.5 m AHD, and the lowest point is along the south-western boundary at RL 22 m AHD. At this low point an open watercourse flows in south south-westerly direction onto downstream lots. An upstream catchment to the north-east discharges onto the site as sheet flow. There is no piped infrastructure of note in the vicinity.

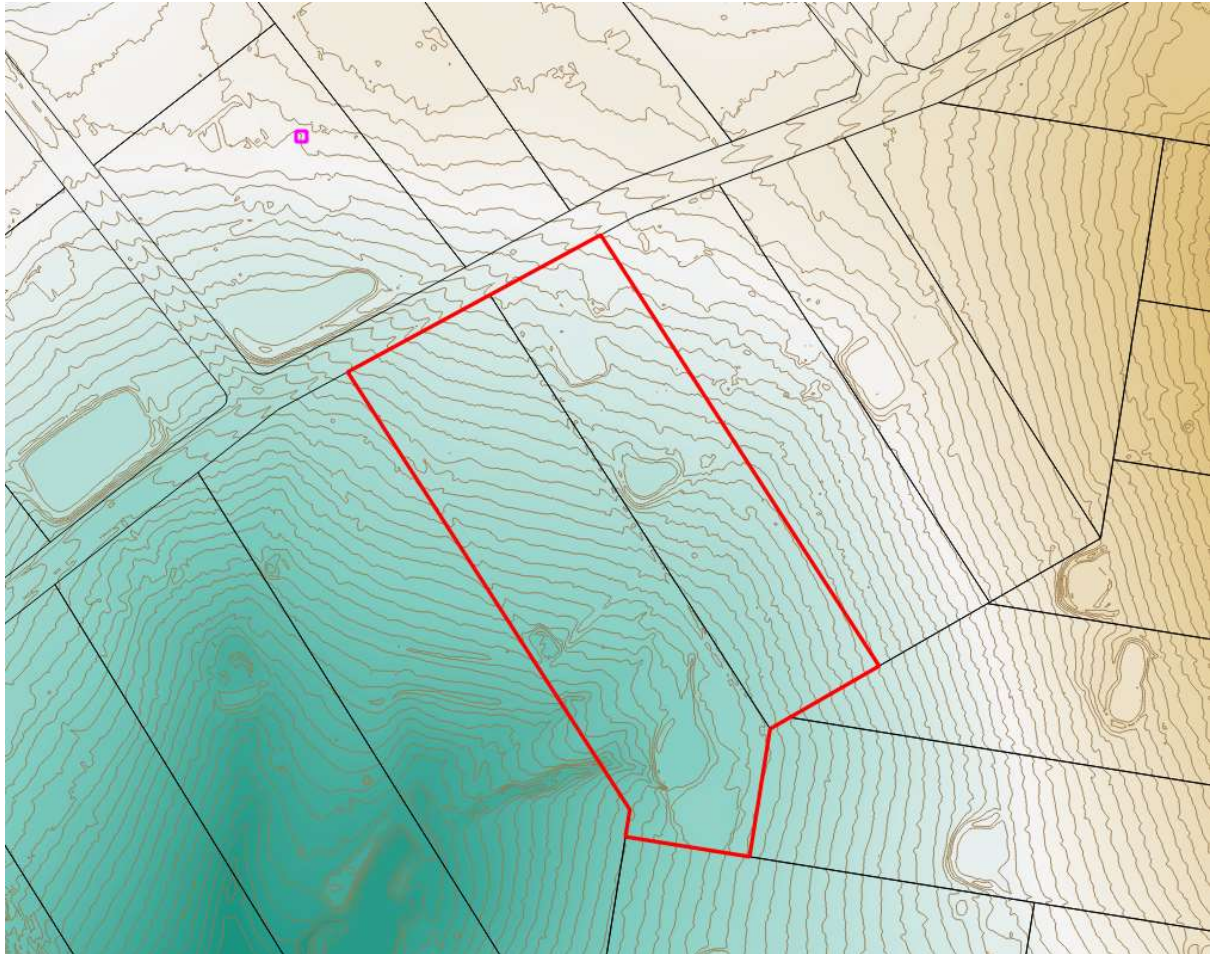


Figure 2-1 – Existing Topography

2.3. Proposed Development

The proposed development consists of a reconfiguration of a lot to create 53 residential allotments. Refer to Figure 2-2 for the proposed development layout. Access to the site is via DA 2 of the Loganview Green development to the south-east.

3 Local Hydraulic Analysis

3.1. Objectives

The objectives for the local flood assessment are to confirm the flooding characteristics through the site and demonstrate that the proposed development works will not adversely impact flood levels external to the subject site during a local overland flow storm event.

3.2. Hydrology

The TUFLOW software package has been used to simulate local design storm events and to estimate design flood depths within the study area. The model has utilised a rain-on-grid methodology which applies design rainfall directly to the surface of the flood model. This type of model is suited to this analysis as the contributing catchment is irregular with poorly defined flow paths.

The local catchment is roughly bounded by Loganview Rd and Logan Reserve Rd, and is approximately 20ha in size. Refer to Appendix B for a map of the local contributing catchment.

The TUFLOW model was used to estimate the 1% AEP, 5% AEP, 10% AEP, and 0.5EY storm events.

3.2.1. Adopted Design Rainfalls

Design rainfall patterns and intensities for the area were determined using standard procedures given in Australian Rainfall and Runoff 2019 (AR&R 2019). An ensemble of 10 temporal patterns for each storm duration have been analysed, with the selected design storm being the first above the mean flow for each duration. The selected design storm for the 1% AEP is the 25 minute, temporal pattern 8 storm. This critical storm produces the greatest peak flow at the downstream boundary of the property. There has been a 20% increased rainfall allowance for climate change.

3.2.2. Land Use

Impervious percentages for the catchments have been applied based on aerial photography. The majority of the existing catchment is comprised of pervious surfaces.

3.2.3. Rainfall Losses

Initial loss (IL) and continuing losses (CL) have been applied to the model for the impervious and pervious portions of the catchment. The values utilised are from the AR&R data hub with median pre-burst values subtracted. The data hub starting loss values are:

- Impervious IL = 0mm CL = 0mm/hr; and
- Pervious IL = 20mm CL = 1.5mm/hr

3.3. Hydraulic Analysis

3.3.1. Model Setup

The 2D model was established to estimate the flood depths across the site and neighbouring lots and the following is of note;

- The extent of the model encompasses the local catchment which contributes runoff to the flow path through the site;
- The model adopted a grid cell size of 1m to capture the detail of the existing flow paths;
- A dynamic timestep approach was utilised as part of the Heavily Parallelised Computing (HPC) version of the 2D software; and
- The model was run for a number of durations to find the critical storm event. The 25 minute storm was found to produce peak flow rates in the area of interest.

3.3.2. Topography

The 2D model topography has been created from LiDAR data supplied from the Department of Natural Resources and Mines (DNRM). Site survey has been overlaid on the LiDAR surface where available. Dams within the catchment have been assumed to be full to the spillway prior to rainfall.

3.3.3. Mannings 'n' Roughness

The following Manning's n values have been adopted:

- Residential Areas = 0.15
- Dense Vegetation = 0.15
- Medium Vegetation = 0.1
- Light Vegetation = 0.05
- Open Space and Parks = 0.04
- Roads = 0.015
- Grassed Channels = 0.035
- Open Waterways = 0.025

3.3.4. Hydrologic Inputs

Inflows have been applied directly to the model grid as described in Section 3.2 above.

3.3.5. Tailwater Conditions

A free flowing downstream boundary has been applied to the TUFLOW model 700m downstream of the subject site.

Refer to Figure 3-1 showing the model configuration.

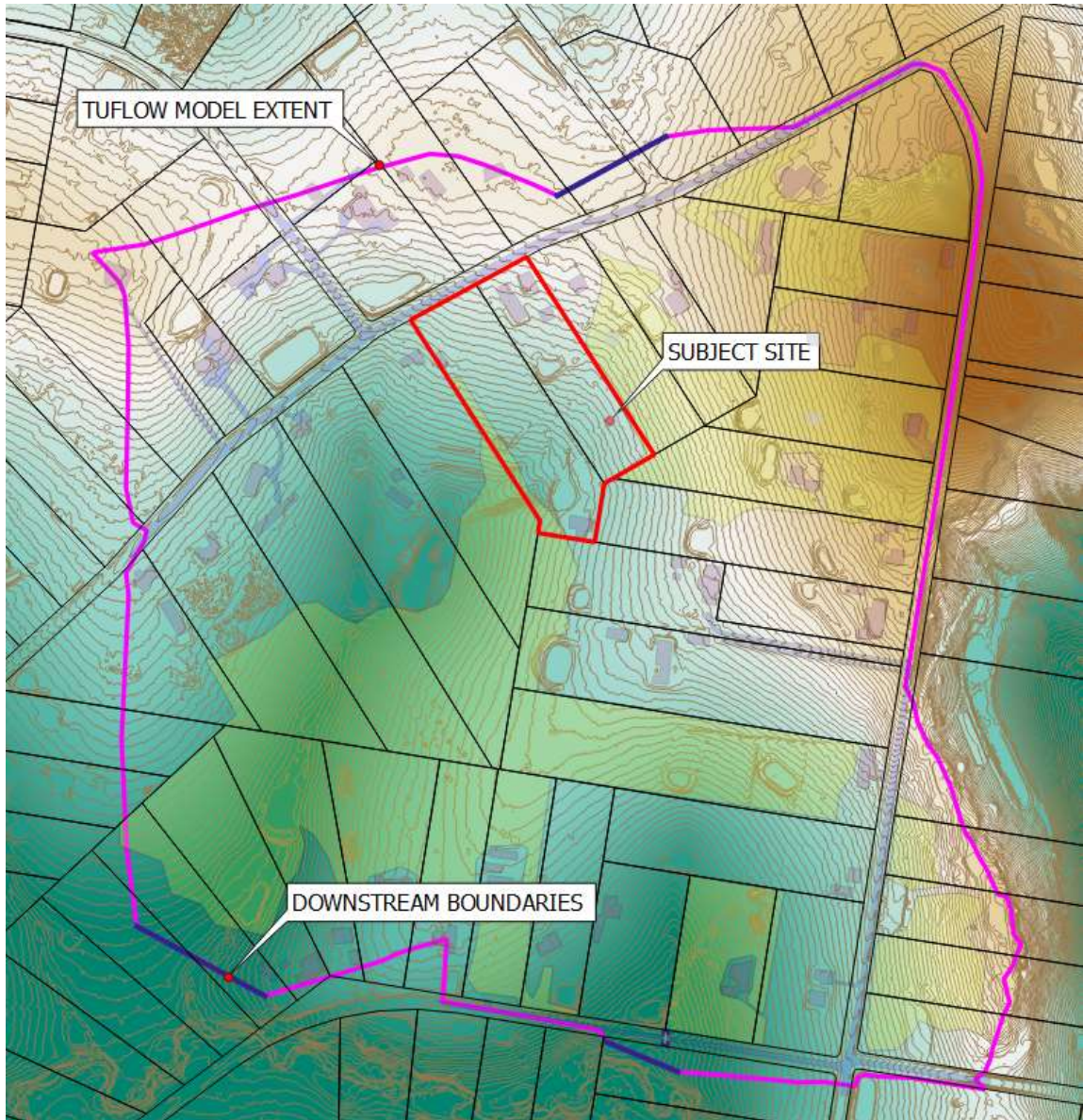


Figure 3-1 – Local TUFLOW Model Extent

3.4. Local Hydraulic Analysis Results – Pre-Development

Runoff from the upstream contributing catchment sheets across the sites north-eastern boundary and partially converges within a watercourse which discharges across the south-western boundary into the neighbouring lot. Peak flow in the 1% AEP downstream of the site is approximately 9.52 m³/s.

Figures 3-2 to 3-5 show the pre-development scenario peak flood depths for the 1% AEP, 5% AEP, 10% AEP, and 0.5EY flood events respectively.



Figure 3-2 – 1% AEP Peak Local Pre-Development Flood Depths



Figure 3-3 – 5% AEP Peak Local Pre-Development Flood Depths



Figure 3-4 – 10% AEP Peak Local Pre-Development Flood Depths



Figure 3-5 – 0.5EY Peak Local Pre-Development Flood Depths

Figure 3-6 show the pre-development 1% AEP velocity, which is generally between 1-2 m/s within the concentrated flow paths of the site.

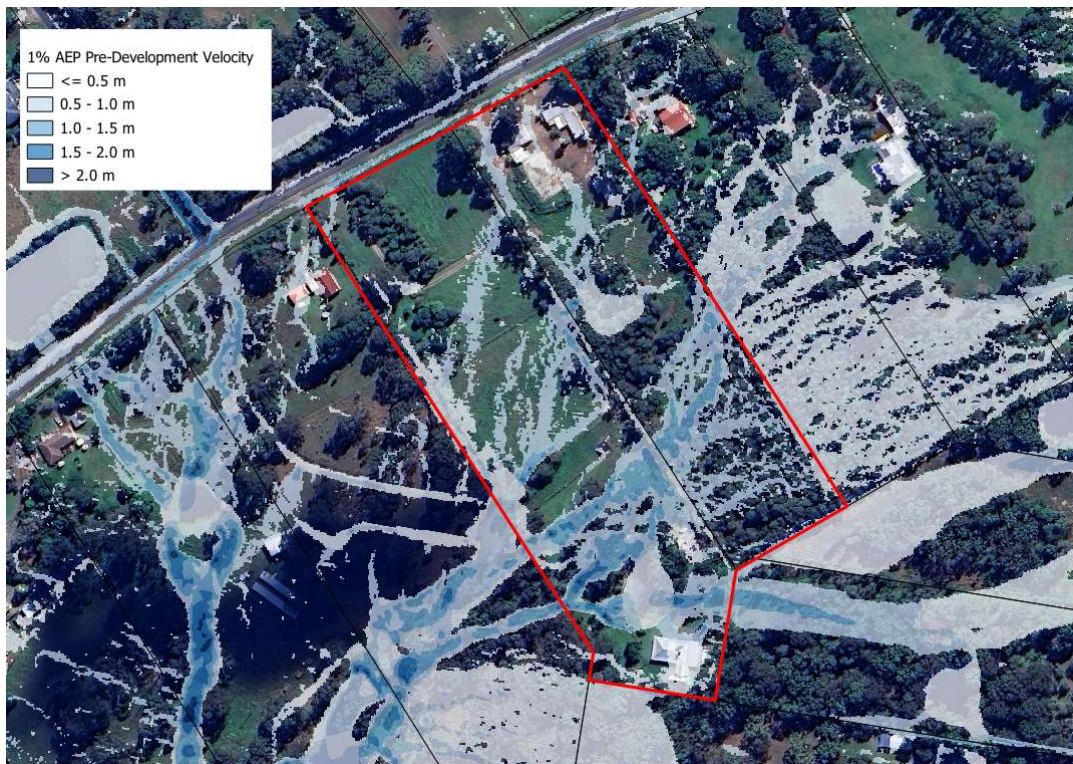


Figure 3-6 – 1% AEP Pre-Development Velocity

3.5. Local Hydraulic Analysis Results – Post-Development

The base case TUFLOW model was modified to represent the post-development scenario by incorporating the proposed works into the model. This includes the earthworks surface, proposed pipe networks, and increase to impervious surfaces. DA2 of the proposed Loganview Green development to the south-west have also been included as flows from these stages interact with DA3.



Figure 3-7 – Post-Development Model Modifications

The increase to impervious surfaces creates a greater volume of runoff discharging to the downstream boundary of the site. The following measures have been implemented to mitigate these increases:

- Upstream collection pits to intercept flow from the lots to the north. This is then piped through the site in a separate system to the discharge point, bypassing the detention basin;
- 4,430 m³ detention volume for internal flows;
- Low flow orifices – 6 x 600 mm @ RL 23.22 m AHD (base of detention basin);
- 1800 x 1800 pit @ RL 23.95 m AHD;
- 8 x 675 mm outlet pipes; AHD
- 12 m emergency overflow weir @ RL 24.8 m AHD.

Figures 3-8 to 3-11 show the post-development scenario peak flood depths for the 1% AEP, 5% AEP, 10% AEP, and 0.5EY flood events respectively.

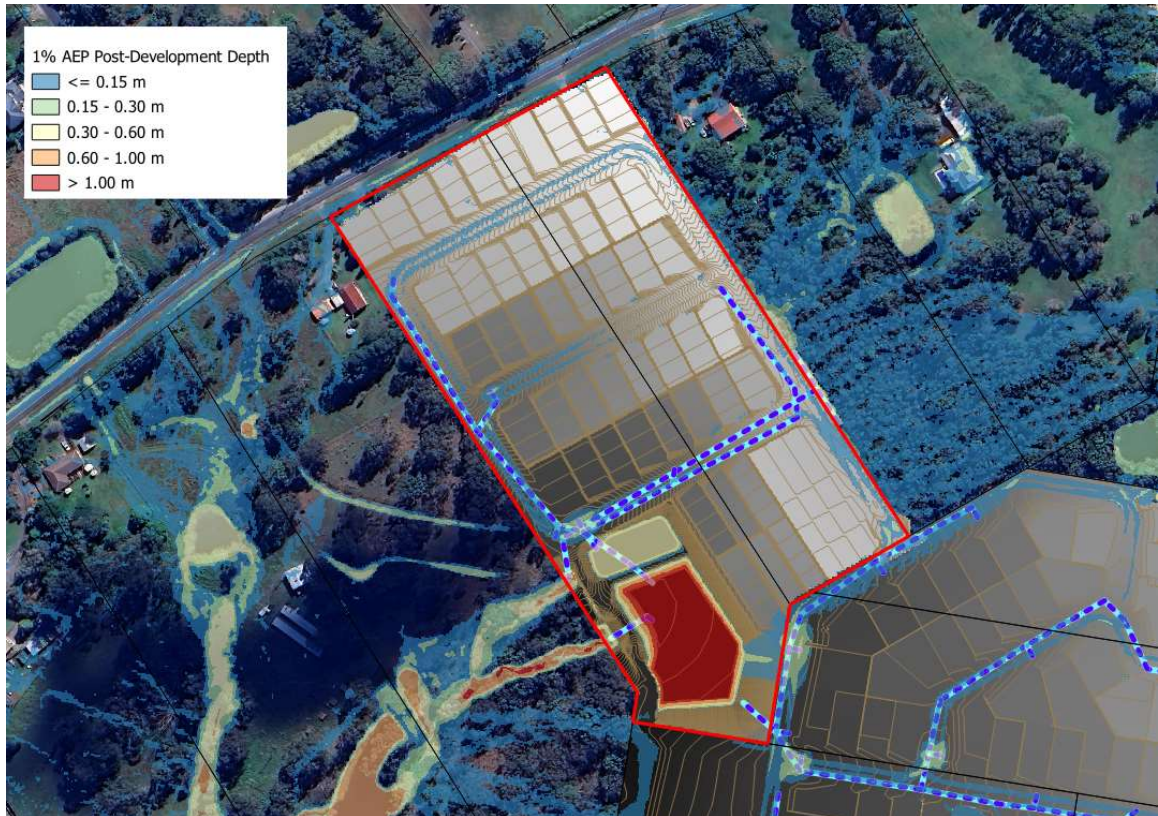


Figure 3-8 – 1% AEP Peak Local Post-Development Flood Depths



Figure 3-9 – 5% AEP Peak Local Post-Development Flood Depths



Figure 3-10 – 10% AEP Peak Local Post-Development Flood Depths



Figure 3-11 – 0.5EY Peak Local Post-Development Flood Depths

Figures 3-12 show the post-development 1% AEP velocity.



Figure 3-12 – 1% AEP Post-Development Velocity

3.6. Local Flood Impact Assessment

To assess the flood impact that the proposed development will have on surrounding properties during the local flood event, the results of the pre and post-development TUFLOW local models have been compared. Figures 3-13 to 3-16 below shows the 1% AEP, 5% AEP, 10% AEP, and 0.5EY flood level impact plots.

Peak flood levels downstream of the discharge points have increased over a short distance due to the concentration of flow from the outlet structures. The pre-development discharge condition included 3 identifiable flowpaths while the post-development scenario consolidates this to two flowpaths. The increases to flood level in this area are confined to previously flooded areas and are largely within LCC mapped waterway corridors. Minor ponding along the upstream boundary of the site is evident due to the earthworks directing sheet flow laterally to the proposed inlet pits.

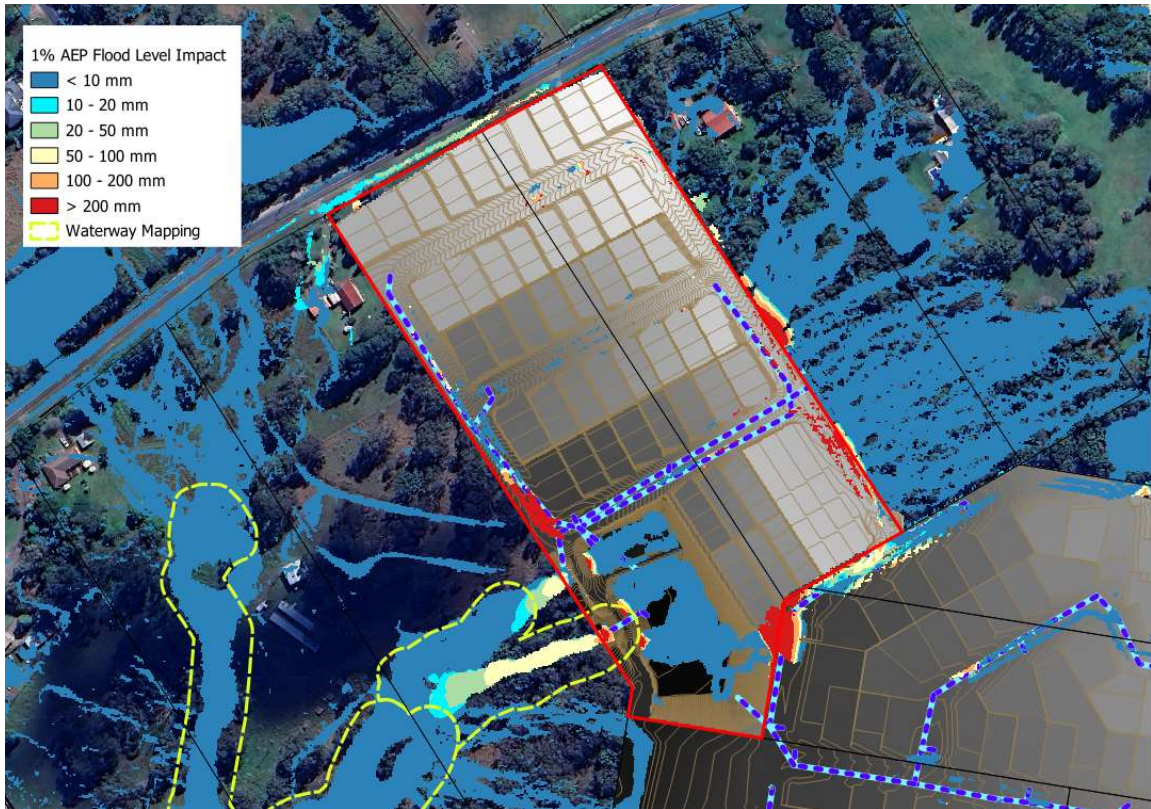


Figure 3-13 – 1% AEP Local Flood Level Impact

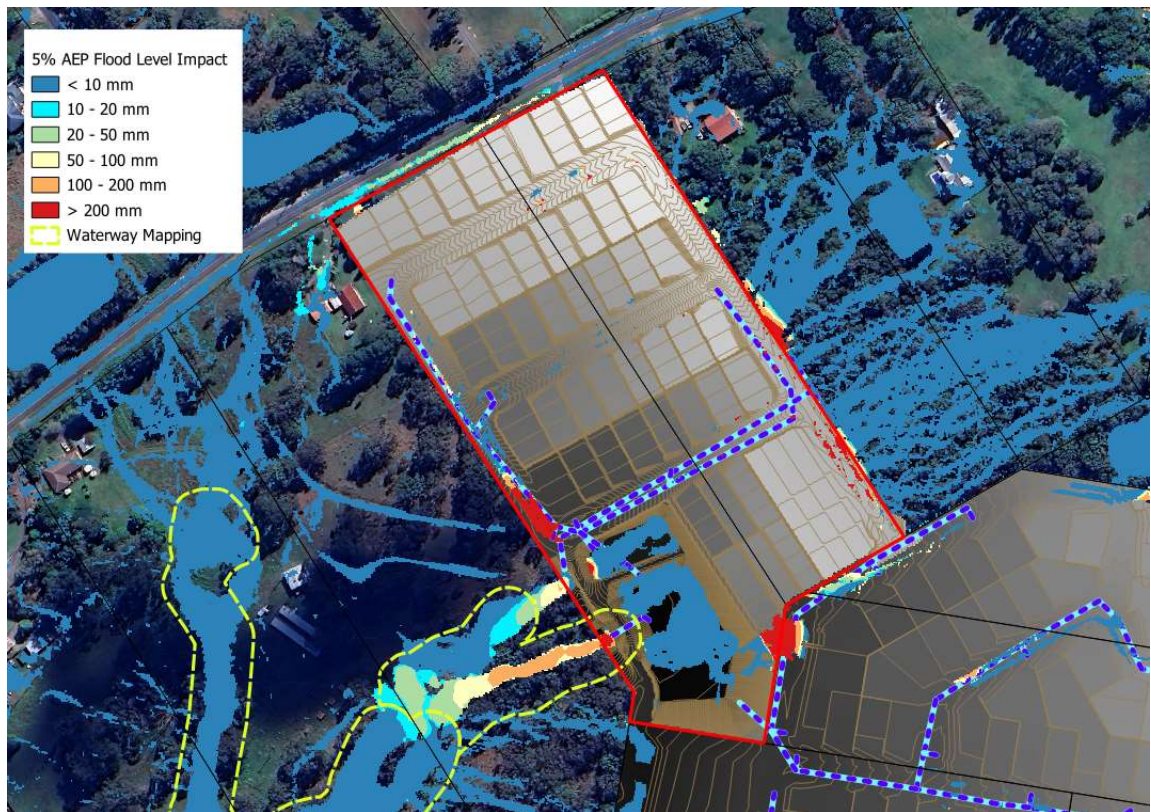


Figure 3-14 – 5% AEP Local Flood Level Impact

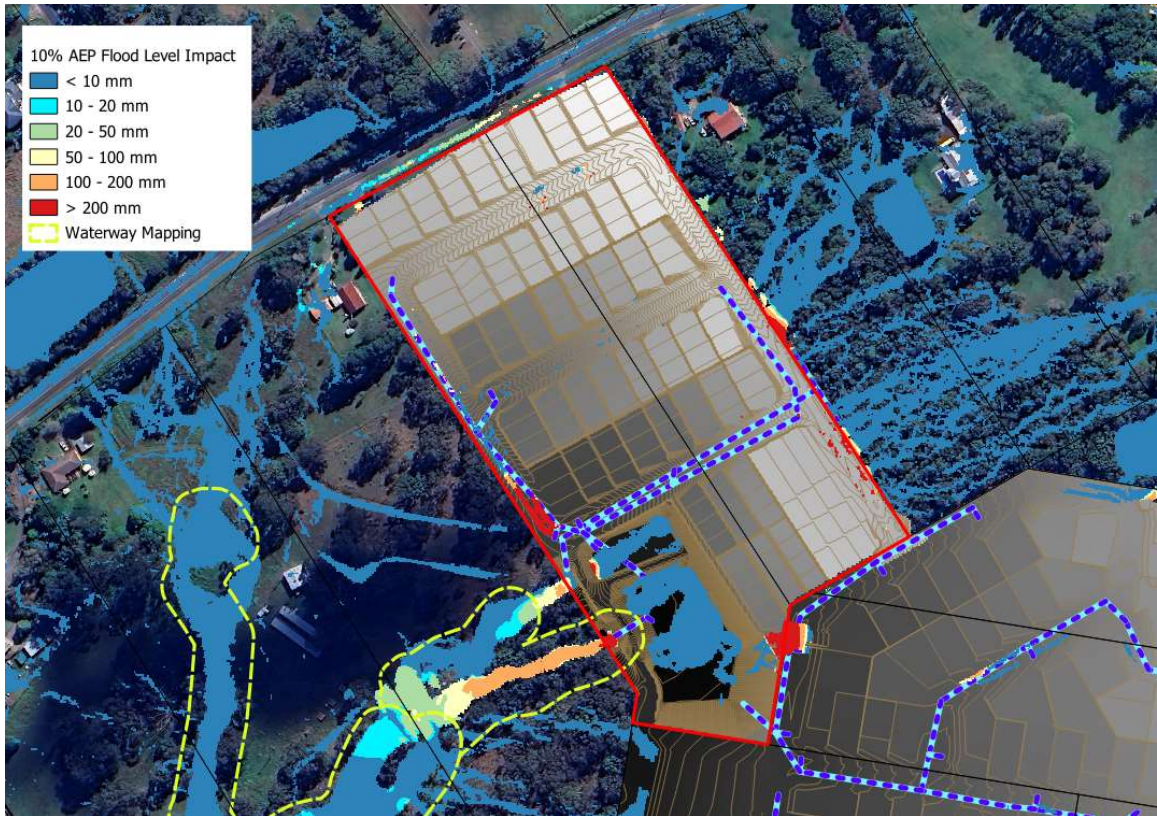


Figure 3-15 – 10% AEP Local Flood Level Impact

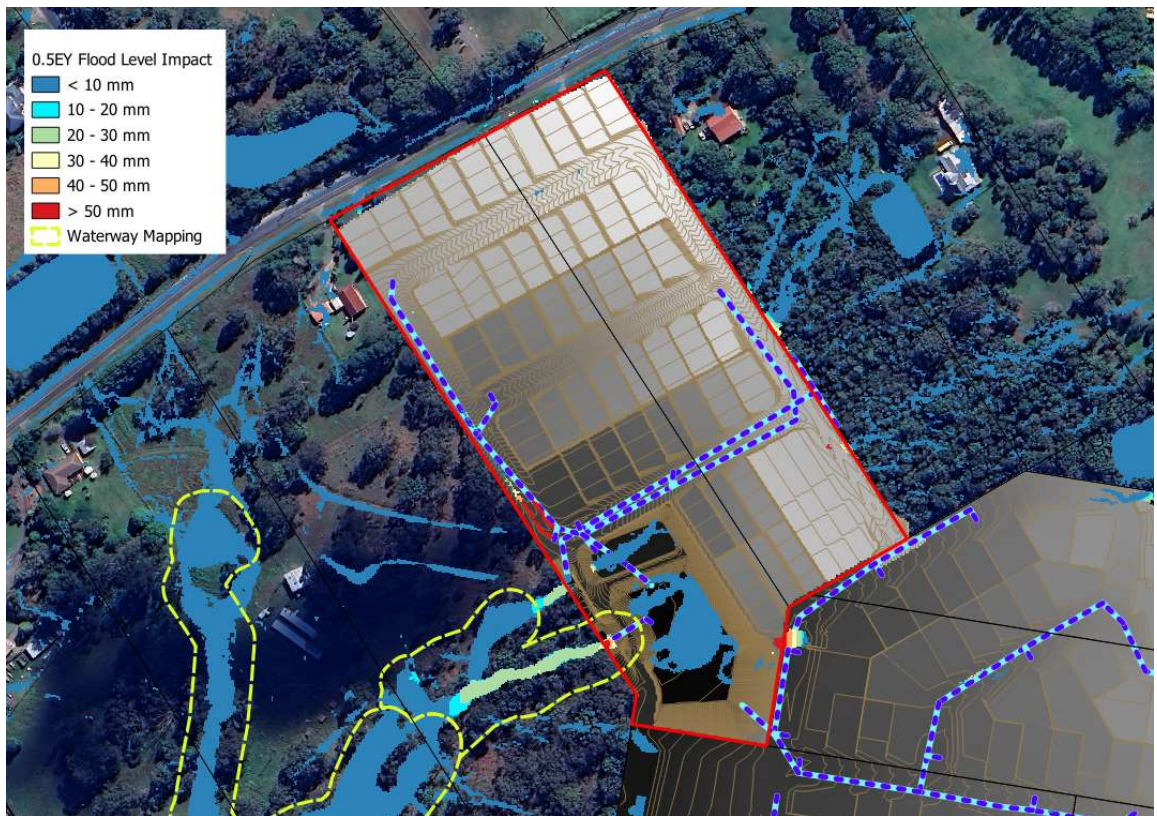


Figure 3-16 – 0.5EY Local Flood Level Impact

Figure 3.17 shows the velocity impact in the 1% AEP. There are minor increases isolated to the two outlet locations of up to 0.155 m/s.

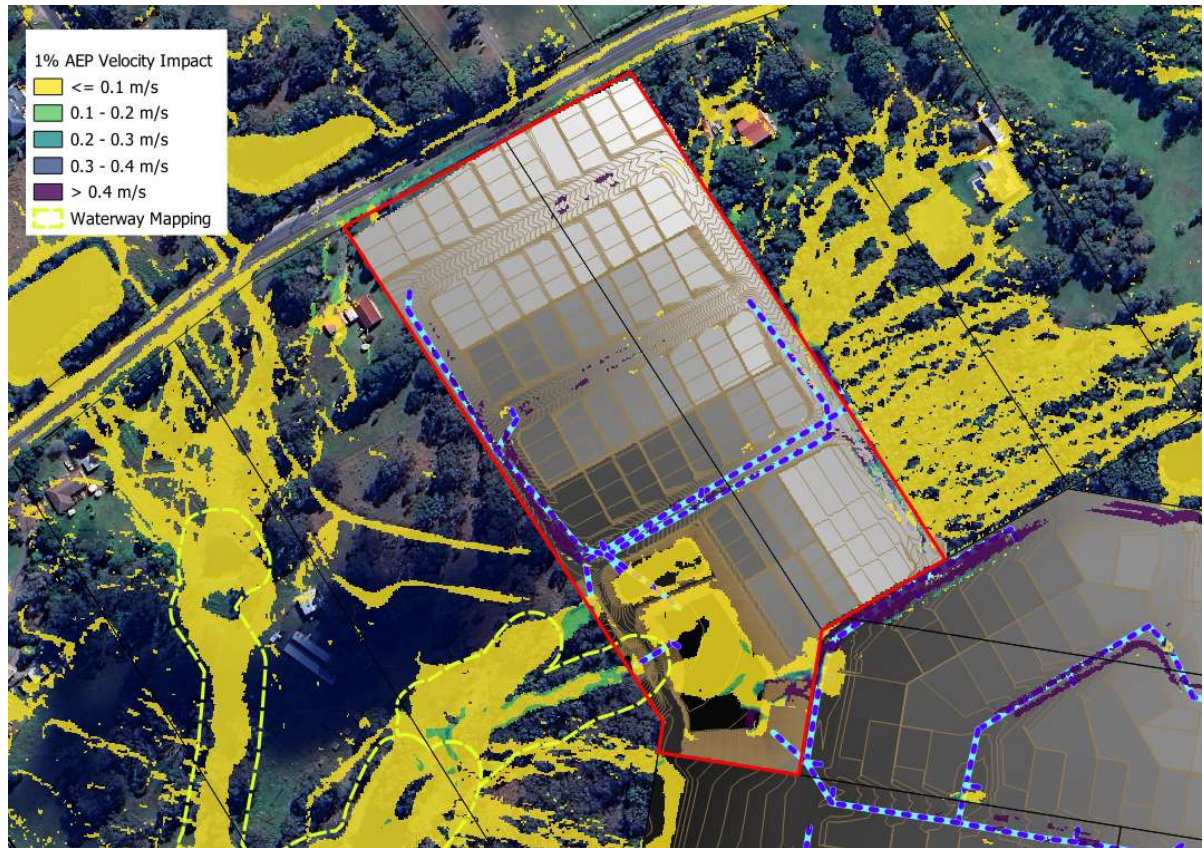


Figure 3-17 – 1% AEP Local Flood Velocity Impact

4 Conclusions

Inertia Engineering was commissioned by QM Properties to prepare a Flood Report for the proposed development at 610-626 Logan Reserve Road, Loganview, Loganview to support the proposed residential subdivision (DA3).

Local flood events have been analysed using a TUFLOW rain-on-grid model. This model incorporates the local catchment which contributes flow to the discharge point under to the south-west of the site.

The increase in impervious areas due to the development increases the maximum peak runoff. This has been mitigated by the inclusion of a large detention basin for internal flows. A separate pipes system conveys upstream runoff through the site.

Peak flood levels downstream of the discharge points have increased over isolated areas due to the concentration of flows from the detention basin. These impacts are however largely within the LCC mapped waterway corridor.

5 References

QUDM (2016) – Queensland Urban Drainage Manual Fourth Edition, 2016

TUFLOW (2020) – BMT Group LTD, Version 2020-03-AE

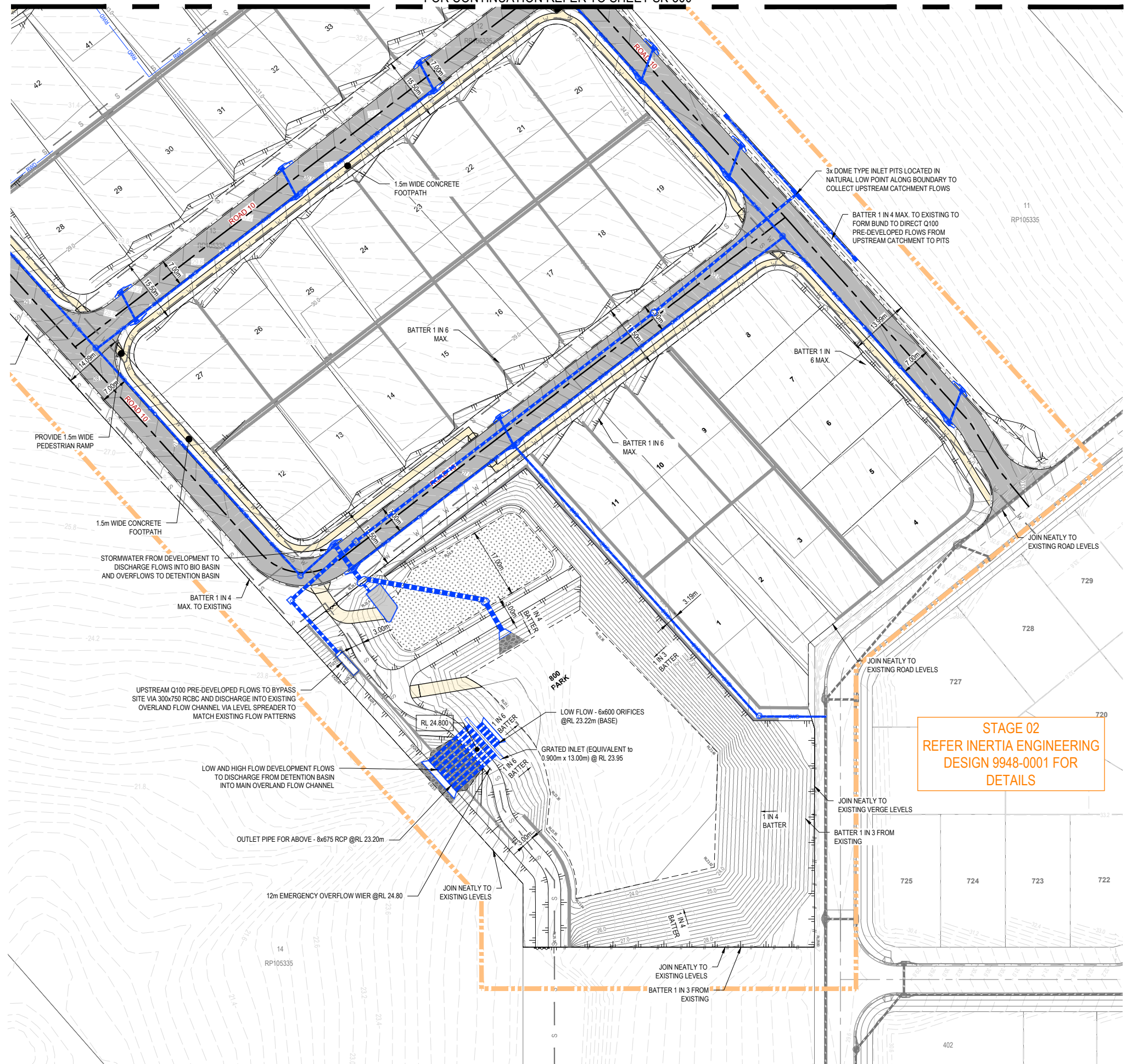


Appendix A – Proposed Development Plans

LEGEND

- EXISTING PROPERTY BOUNDARY
- PROPOSED PROPERTY BOUNDARY
- EXISTING CONTOURS (AT 0.20m INTERVALS)
- DESIGN CONTOURS (AT 0.25m INTERVALS)
- EXISTING KERB
- EXISTING ROAD CENTRELINE
- PROPOSED RETAINING WALL
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- EXISTING BATTER TOP
- PROPOSED BATTER TOP
- PROPOSED BATTER TOE
- PROPOSED KERB
- PROPOSED ROAD CENTRELINE
- PROPOSED STAGE BOUNDARY
- PROPOSED PAVEMENT
- PROPOSED FOOTPATH

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REV	DESCRIPTION	DATE	DRAWN	REVIEW
C	ROAD INTERSECTION AND LOT 4 BOUNDARY MINOR UPDATE	22.05.25	DMP	RL
B	FOR INFORMATION	24.04.25	NS	RL
A	FOR INFORMATION	08.01.25	NS	ML
			QA CHECKED	RL

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PROJECT: DEVELOPMENT APPLICATION FOR RESIDENTIAL SUBDIVISION AT LOGANVIEW ROAD, LOGAN RESERVE
 DRAWING TITLE: ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 2

FOR INFORMATION
 JOB No: 9948-0301 DWG No: SK-301 - A REV: A

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LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING CONTOURS (AT 0.20m INTERVALS)
- EXISTING KERB
- EXISTING ROAD CENTRELINE
- CATCHMENT BOUNDARY
- PROPOSED STAGE BOUNDARY
- CATCHMENT LABEL
- EXISTING POINT OF DISCHARGE
- EXISTING SEASONAL WATER BODIES EXTENTS FLUCTUATE
- SURFACE FLOW DIRECTION

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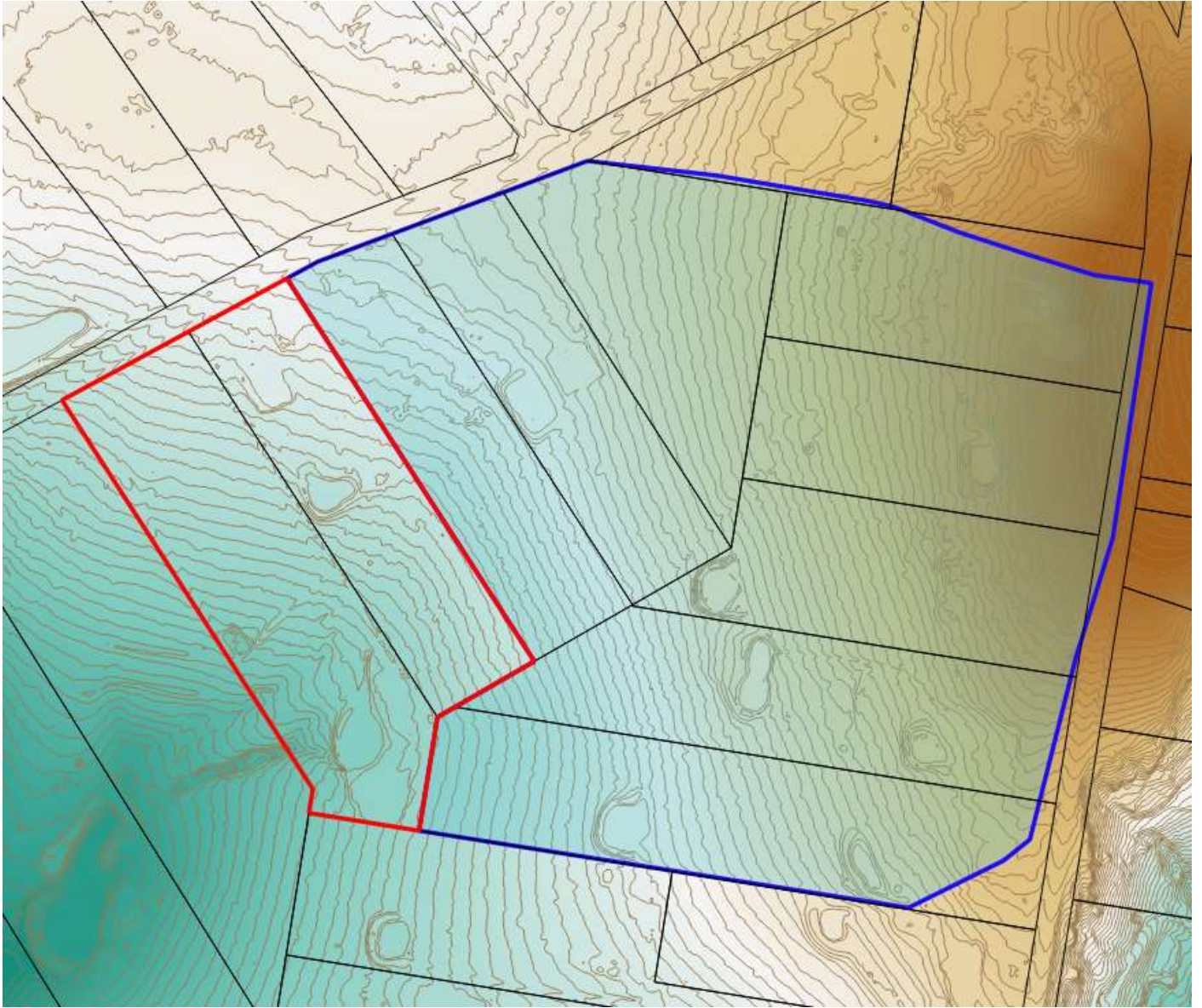
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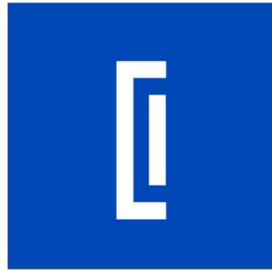
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Appendix B – Upstream Catchment Plan





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