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FLOOD IMPACT ASSESSMENT

Gillieston Public School Redevelopment and New Public Preschool

100 Ryans Road and 19 Northview Street, Gillieston Heights

Prepared for: Department of Education

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1 Introduction

This report presents the results of the Flood Impact Assessment undertaken for the proposed Gillieston Public School Redevelopment and new Public Preschool.

The Flood Impact Assessment of the 1% AEP event has been undertaken in accordance with the requirements of Maitland City Council's (the Council) Development Control Plan (DCP), Local Environmental Plans (LEP) and NSW Floodplain Development Manual to define flood behaviour for both pre-development (existing) and post-development (proposed) scenarios.

2 Significance of Environmental Impacts

Based on the identification of potential impacts and an assessment of the nature and extent of the impacts of the proposed activity, it is determined that all potential impacts can be appropriately mitigated to ensure that there is minimal impact on the locality, community and/or the environment.

3 Site Description

The Site is identified as 100 Ryans Road and 19 Northview Street, Gillieston Heights, legally described as Lot 51 DP 1162489 and Lot 2 DP1308605 respectively.

The Site is located within the Maitland Local Government Area (LGA) and is zoned RU2 Rural Landscape and R1 General Residential zone under the provisions of the Maitland Local Environmental Plan 2011 (MLEP2011).

Existing attributes of the subject site are noted as follows:

- The subject site exhibits an area of approximately 23,385m² and is located in the suburb of Gillieston Heights;
- The subject site has a frontage to Ryans Road to the east, Gillieston Road to the north, and Northview Street to the south;
- In its existing state, the subject site comprises the existing Gillieston Public School. Existing school buildings are primarily located in the west portion of the subject site with a large area of open space situated in the eastern portion. There are limited permanent structures located on the subject site with thirteen (13) existing demountable classrooms currently occupying the subject site. Permanent buildings consist of the Main Administration Building, Original Brick Cottage, Library and GLS building located in the centre of the subject site; and
- Carparking is provided from Gillieston Road for staff. Pedestrian access is available via this main entrance from Gillieston Road and via a separate pedestrian-only access gates on Northview Street and Ryans Road.

The existing site context is shown in Figure 1 and Figure 2 below.

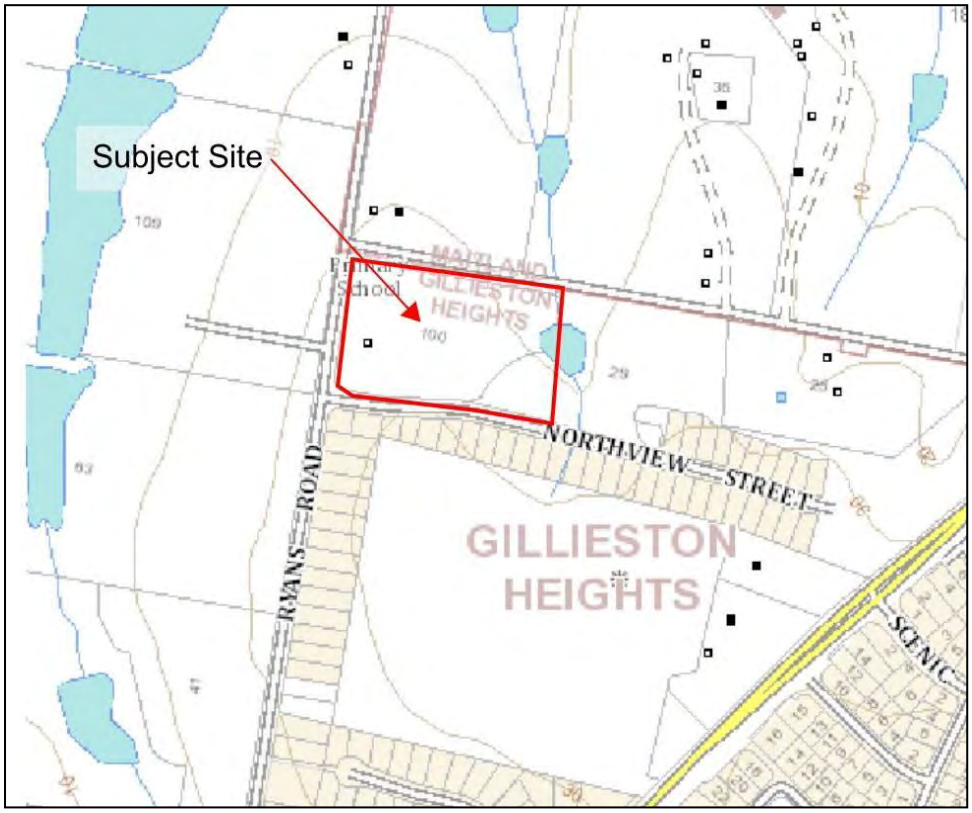

Figure 1 - Cadastral Map (Source: NSW Spatial Viewer, 2024)

Figure 2 - Site Aerial Map (Source: Near Map, 2024)

3.1 Existing conditions

The terrain of the existing school site falls in two directions, with a ridge aligned north-south generally along the developed building area. The western side of the ridge drains to the west to Ryans Road while the majority of the site on the eastern side of the ridge drains to the east. The eastern side of the ridge is where most of the proposed activity will be located.

The existing site has demountable buildings on the western side with limited existing infrastructure to the east. The site falls over approximately 13.5 m from a height of 22.5 m AHD in the north-west to approximately 15 m AHD in the north-east.

Figure 3 - Existing site contours

There are three existing underground stormwater pipes near the eastern site boundary, described as follows:

- A 600 mm diameter pipe from Northview Street discharging within the site to an open channel that runs to a farm dam;
- The farm dam discharges through a combination of a 300 mm diameter pipe and weir;
- A 900 mm diameter pipe under Gillieston Road conveys runoff from the open channel catchment and discharges flow to the northern side of Gillieston Road.

As shown in Figure 4 below, a 1st order stream starts from the south of Northview Street and traverses the north-eastern corner of the site, then continues to the north of the site until it merges with a 2nd order stream.

Figure 4 - Site location and local streams (source: NSW map)

The Site survey plan is presented in Appendix A of this report.

3.2 Proposed activity

The Gillieston Public School has been identified by the NSW Department of Education (DoE) as requiring redevelopment. The proposed Gillieston Public School Redevelopment and New Public Preschool is driven by service need including increase in expected student enrolments and the and removing demountable structure and replacement with permanent teaching spaces.

The Gillieston Public School Redevelopment and New Public Preschool comprises the following activity:

- Demolition and removal of existing temporary structures.
- Site preparation activity, including demolition, earthworks, tree removal.
- Construction of new:
  - 32 permanent general learning spaces and 3 support teaching spaces
  - Administration and staff hubs
  - Hall, canteen and library
  - Out of school hours care
  - Public preschool (standalone building for 60 places)
  - Covered Outdoor Learning Areas (COLAs)
  - Outdoor play areas, including games courts and yarning circle
  - New at-grade car parking
  - Extension of the existing drop-off / pick-up area and new bus bay
  - Realignment of the existing fencing
  - Associated stormwater infrastructure upgrades
  - Associated landscaping
  - Associated pedestrian and road upgrade activity.

4 Available Data

Topographic, flooding and rainfall data obtained from several sources have been utilised in this report. The origin and types of information underpinning the assumptions used in this study are presented below.

4.1 Published flood data

- Floodplain Risk Management Study and Plan. Final report. Prepared by WMA Water November 2015 (Flood study, WMA, 2015).
- Hunter River Branxton to Green Rocks Flood Study. Prepared by WMA Water September 2010.
- Wallis and Swamp Fishery Creek Flood Study. Volume 1: Final Report. Prepared by WMA Water February 2019.
- Flood maps from Maitland Citywide Development Control Plan 2011.
- State Emergency Service of New South Wales (NSW SES). Local Flood Plan. Prepared by Maitland City Council May 2022.

4.2 Other data

- Survey Plan by ADW Johnson dated on 21 September 2022 (included in Appendix A);
- Architectural Plans – Project Number 4814 – prepared by SHAC ;
- LIDAR data obtained from Elevation and Depth data portal managed by the Department of Finance, Service and Innovation (DFSI);
- GIS layers of cadastre and satellite imagery provided by Nearmap.

5 Flood Context and Site Location

5.1 Regional (Riverine) Flooding (Hunter River)

The site is located within the Hunter River catchment, and the total catchment area is approximately 22 000 km^2. Refer to below Figure 5 for the study area.

The site is not affected by backwater from the Hunter River in the Probable Maximum Flood (PMF) flood event. Refer to Appendix C for a flood map showing the extent of the PMF.

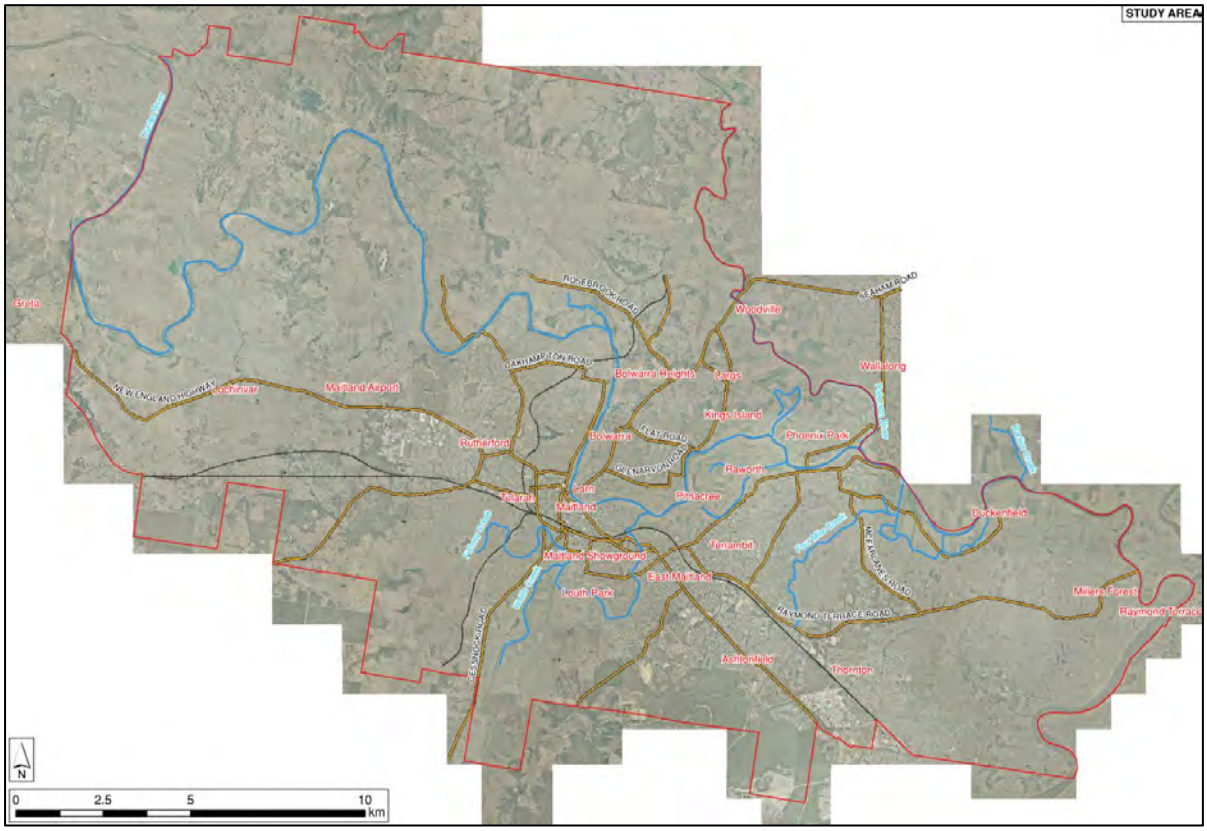

Figure 5 - Hunter River flood model study area (extracted from the flood study)

5.2 Creek Flooding (Wallis Creek and Swamp Fishery Creek)

The site is located within the Wallis Creek and Swamp Fishery Creek catchment. Wallis Creek and Swamp Fishery Creek are tributaries to the Hunter River. The site is located on high ground between the floodplains of the two creeks, as shown on the flood maps in Appendix C.

The site is in the Lower Flood Mitigation Schedule, refer to Figure 6. The scheme involved construction of new floodgates at Wallis Creek to prevent backwater flooding from Hunter River up to the 5% AEP flood event.

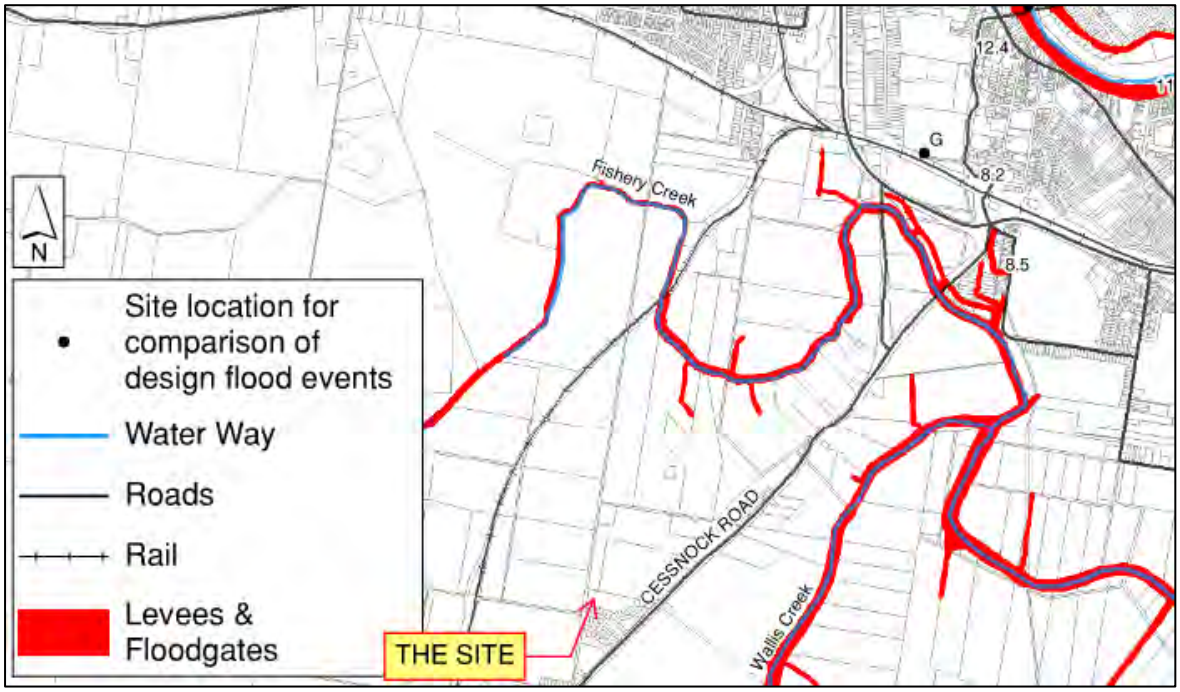

Figure 6 - Lower Hunter Flood Mitigation Scheme (extracted from the flood study)

5.3 Local Flooding

The local catchment area that drains to the culvert inlet at the north-east corner of the site (near Gillieston Road) was calculated from aerial imagery and by using land topography information from LIDAR data. The catchment area to this point is 9.35 ha. The catchment area is shown in the figure below.

Runoff from the local catchment (south of Northview Street) can overtop Northview Street when the capacity of the street drainage system and storage within the road sag is exceeded. Flow from the sag in Northview Street passes to land on the northern side and traverses through lots in a northerly direction overland towards Gillieston Road. Refer to sections 6 and 7 for more information.

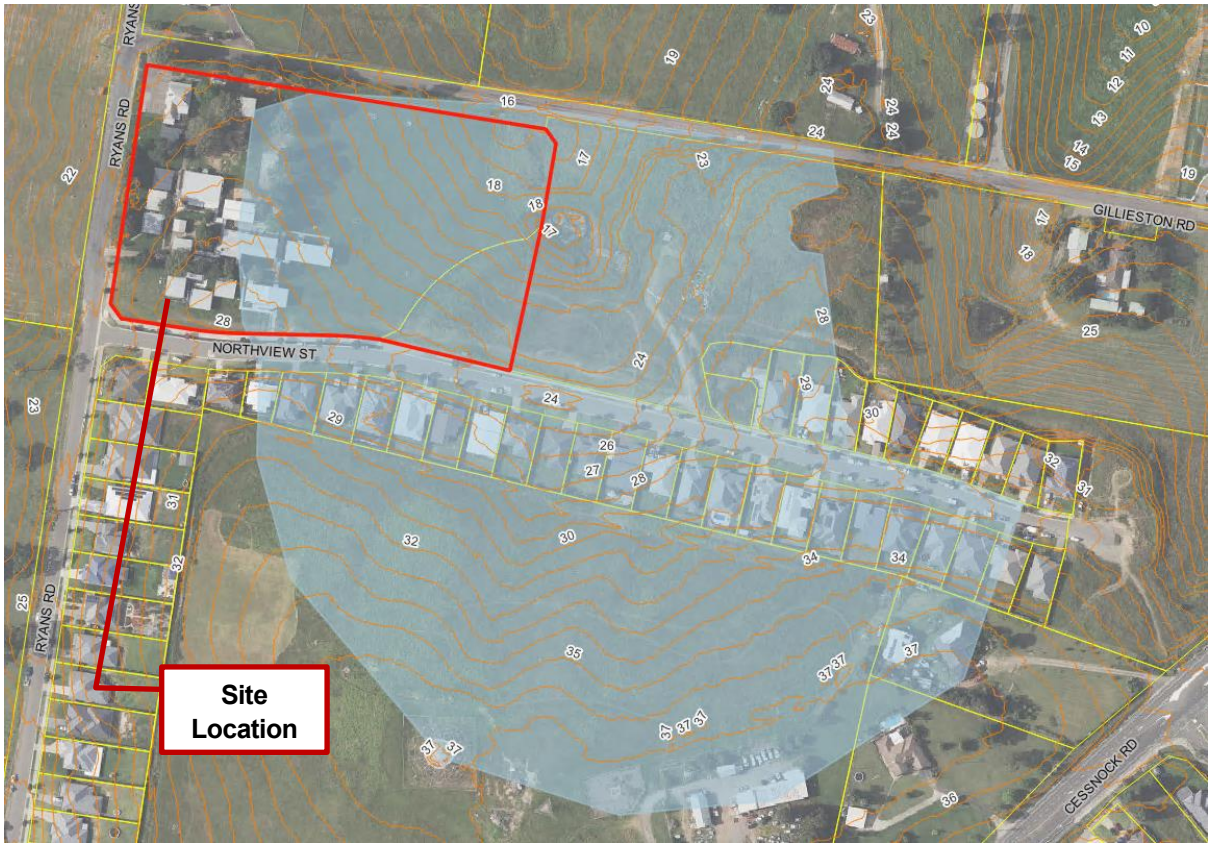

Figure 7 – Catchment area to the culvert inlet at the north-east corner of the site (near Gillieston Road)

6 Hydrological Modelling and Hydraulic Modelling

6.1 Hydrologic Modelling

The hydrological modelling for the catchment is described in the following sections.

6.1.1 Hydrologic Modelling Approach

Hydrologic modelling was undertaken within TUFLOW using the Direct Rainfall ('rainfall on the grid') methodology. In the hydrological model, rainfall is applied directly to the 2D terrain, and the model automatically routes the flow as determined by the elevation and roughness grids.

Direct rainfall modelling is a relatively new feature of hydraulic modelling and it is still being tested on a number of catchments to ensure it is reliably representing the flood behaviour of a given catchment. Runoff is generated over the entire catchment, rather than the more traditional approach of calculating an inflow hydrograph and lumping this in at selected location(s). This 'direct rainfall' approach means the whole catchment will be 'wet' and the hydraulic modelling results need to be filtered to show only those cells that genuinely represent areas of catchment flooding. This was achieved by only mapping inundation at cells with a flood depth greater than 0.05 m.

Direct rainfall was applied to the entire upstream catchment area in Figure 7 for the hydrological model. The design storm events applied to the catchment are the design storm events described in Section 6.1.2.

For the hydrological model, a grid cell size of 5 m was utilised. ARR 2019 procedure was adopted in analysing the various storm events and their respective temporal patterns. The resulting hydrographs were then analysed and the mean storm event was adopted as the critical design storm for further hydraulic analyses.

6.1.2 Design rainfall intensities and temporal patterns

This study uses design rainfall intensity-frequency-duration (IFD) data, derived for the latitude and longitude of the study area. This IFD data was issued by the Hydrometeorological Advisory Service of the Australian Bureau of Meteorology in 2016.

The IFD data provides average rainfall intensities of design storm events for recurrence intervals for 1% AEP event. Uniform areal distribution of design storms has been assumed for the catchment due to its small area. Rainfall depths and ensemble temporal patterns were developed for the design storm events for 1% AEP using techniques described in Australian Rainfall and Runoff (Ball et al. 2019).

Aerial reduction factors were not applied to the point burst rainfall totals provided by the Bureau of Meteorology due to the small size of the catchment.

Estimated average design storm rainfall intensities for 1% AEP storm event are presented in Table 1.

Table 1 - Average design rainfall depths for 1% AEP

Duration	Depth (mm)	Duration	Depth (mm)
5 min	22.1	45 min	70.7
10 min	36	1 hr	77.8
15 min	45.2	1.5 hr	88.6
20 min	51.9	2 hr	97.4
25 min	57 (Critical Storm)	3 hr	112
30 min	61.3	4.5 hr	131

6.1.3 Critical Storm

In accordance with the procedure described in Australia Rainfall and Runoff 2016, an ensemble of 10 temporal patterns was run through the hydrologic model for storm duration 20 minutes to 1080 minutes for the 1% AEP and 1 in 500 AEP storm events.

A peak flow hydrograph (Flow Vs Time) was determined for each storm simulation from the hydrologic model. The median peak discharge was determined from these hydrographs. Based on the generated hydrographs, the median storm with a duration of 25 minutes and temporal pattern no. 1 was found to be the critical duration for the 1% AEP event, and the median storm with a duration of 25 minutes and temporal pattern no. 4 was found to be the critical duration for the 1 in 500 AEP event. The peak discharges downstream of the existing dam and just upstream of Gillieston Road are presented in the table below.

Table 2 - Peak discharges downstream of the existing dam and just upstream of Gillieston Road for 1% AEP and 1 in 500 AEP

Storm and Temporal Pattern	Peak median discharge (m^3/s)
1% AEP 20 min TPXX	3.35
1% AEP 25 min TP01	3.40 (Critical Storm)
1% AEP 30 min TP04	3.07
1% AEP 45 min TP01	2.70
1 in 500 AEP 20 min TP05	4.91
1 in 500 AEP 25 min TP04	5.01 (Critical Storm)
1 in 500 AEP 30 min TP05	4.51
1 in 500 AEP 45 min TP03	3.75

6.2 Hydraulic Modelling

A TUFLOW 1D/2D model was used to hydraulically route flows through the catchment and to derive flow depths, velocities and hazard for the pre-development and post-development scenarios. This section describes the hydraulic modelling approach and hydraulic model development.

6.2.1 Choice of Hydraulic Model

A hydraulic TUFLOW model was created with the same model domain over the area of interest to simulate the critical duration storm in higher resolution than the hydrological model.

6.2.2 Tuflow 1D model domain

As mentioned in Section 3.1, three existing stormwater pipes near the eastern site boundary have been incorporated into 1D model domain without blockage applied for the pre-development scenario, refer to Figure 10 for existing stormwater pipe locations.

6.2.3 Tuflow 2D model domain

The 2D hydraulic model domain covers the area indicated as '2D domain boundary' in Figure 9. A grid size of 2.0 m was utilised for hydraulic assessment in this study. Each grid element contains information on ground topography (see Section 6.2.4), surface resistance to flow (see Section 6.2.5) and initial water level (see Section 6.2.7).

The grid cell size of 2.0 metre is considered to be sufficiently fine to appropriately represent the variations in topography and land use within the study area. It should be noted that TUFLOW samples elevation points at the cell centres, mid-sides and corners, as a consequence a 2.0 m square cell size results in surface elevations being sampled every 1.0 m.

6.2.4 Topography

A 1 m grid Digital Elevation Model (DEM) was adopted for the catchment. This DEM was used to represent ground elevations throughout the model domain. The Digital Triangular Model (DTM) extracted from the site-specific detailed survey was incorporated into the TUFLOW model for better precision of the local topography.

6.2.5 Roughness

The hydraulic roughness of a material is an estimate of the resistance to flow and energy loss due to friction between a surface and the flowing water. A higher hydraulic roughness indicates more flow resistance; for example, a hard area has a lower hydraulic roughness than a vegetated area as water flows more freely over hard pavement than through a vegetated area. Roughness in TUFLOW is modelled using the Manning's 'n' roughness co-efficient.

The existing building footprint within the catchment were modelled at ground level with the Manning 'n' hydraulic roughness value being applied as depth-varying roughness to simulate the blockage offered by the building and to simulate the effects of roofwater being collected by downpipes and discharge to the model domain. The building outlines were determined from aerial imagery and site survey plan.

Table 2 lists the adopted Manning's roughness parameters for each land use and Figure 8 represents TUFLOW model material ID classifications for each land use.

Table 3 - Adopted roughness parameters

Material ID	Description	Manning n
2	Roads	0.018
3	Buildings	Less than 0.03 m, n = 0.02. Above 0.1 m, n = 0.3
4	Ponds and other water	0.03
5	Moderate vegetation	0.05
8	Light vegetation (Default)	0.04

Figure 8 - Model Roughness coefficient classification

6.2.6 Model Downstream Boundaries

A stage-discharge (water level versus flow rate) curve was adopted as the downstream boundary condition. The downstream boundary was located approximately 200 m downstream of the Site (Refer to Figure 9 for boundary locations).

This stage-discharge relationship was generated by TUFLOW by specifying a downstream terrain slope.

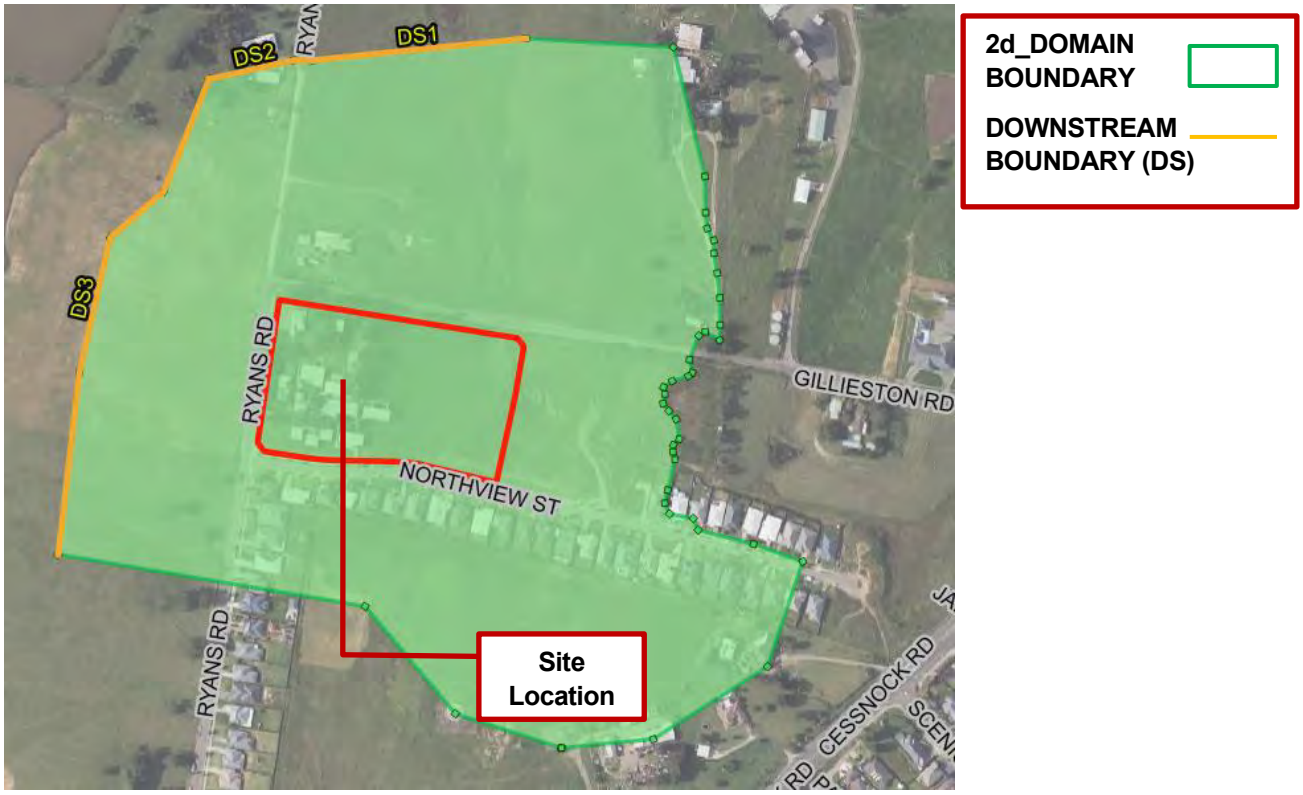

Figure 9 - 2d domain and downstream boundaries

6.2.7 Model Features

6.2.7.1 Pre-Development TUFLOW model

TUFLOW model features that were adopted are noted as below. Refer to below Figure 10 for locations and details.

- The existing stormwater pipes discussed in Section 3.1 are modelled as 1d_nwk layer
- Initial water level and crest line for the existing dams located nearby eastern site boundary have been modelled as 2d_IWL layer and zsh_layer.

Using the above parameters, the 1% AEP flood events were simulated in the TUFLOW model to create a base case existing scenario flood model.

Figure 10 - Model features for existing culverts and dams

6.2.7.2 Post - Development TUFLOW model

The pre-development model was adopted and modified to represent the post-developed condition model.

A preliminary design surface has been prepared for the proposed activity. The proposed fill is shown below to impact the existing culvert structure to the north-east of the site that passes under Gillieston Road. the proposed site has been designed with ridge line (shown in Figure 11 below) to split the catchment into two sub-catchments, one is to discharge to the west of Gillieston Road via overland flow path and another one is to discharge to the east via an existing 900 mm diameter culvert under Gillieston Road. The eastern sub-catchment will be drained to an on-site detention (OSD) system prior to discharging to the existing 900 mm diameter culvert under Gillieston Road. A new 1/2400 x 900 mm stormwater culvert (reinforced concrete box culvert) is proposed approximately 40 m east of the existing 900 mm diameter culvert to convey runoff from the upstream catchment runoff under Gillieston Road to a new swale drain on the northern side of Gillieston Road.

A detention basin on the northern side of Gillieston Road is proposed to attenuate discharge in the overland flow path. The Civil Engineering Report by ACOR Consultants describes the hydrology and hydraulics of the Site and the OSD system, and the detention basin on the northern side of Gillieston Road. Refer to Appendix D for the plan drawing showing the location of the detention basin.

This post-developed condition model is to assess the impacts of the proposed activity and the new 1/2400 x 900 mm culvert under Gillieston Road.

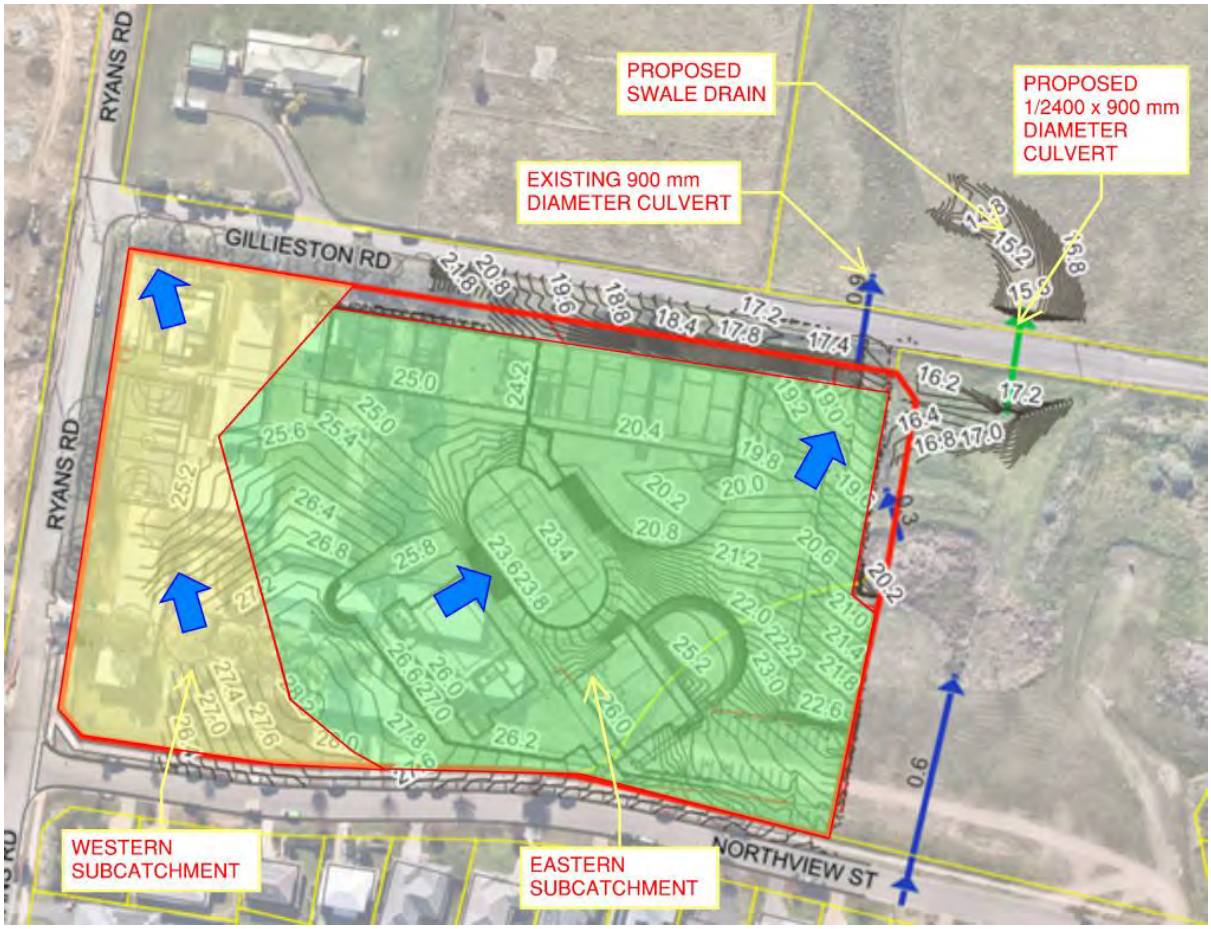

Figure 11 - Preliminary design surface and proposed layout

TUFLOW model features that were adopted and modified are noted as below. Refer to below Figure 12 and Figure 13 for locations and details.

- The proposed new 1/2400 x 900 mm stormwater culvert under Gillieston Road is modelled as 1d_nwk layer
- 2d_rf Rain on grid (ROG) layer has been modified to exclude the school site area shown in Figure 12
- Initial water level and crest line for the existing dam located nearby eastern site boundary have been modified to exclude the school site area shown in Figure 13.

Using the above parameters, the 1% AEP flood events were simulated in the TUFLOW model to create a post development scenario flood model.

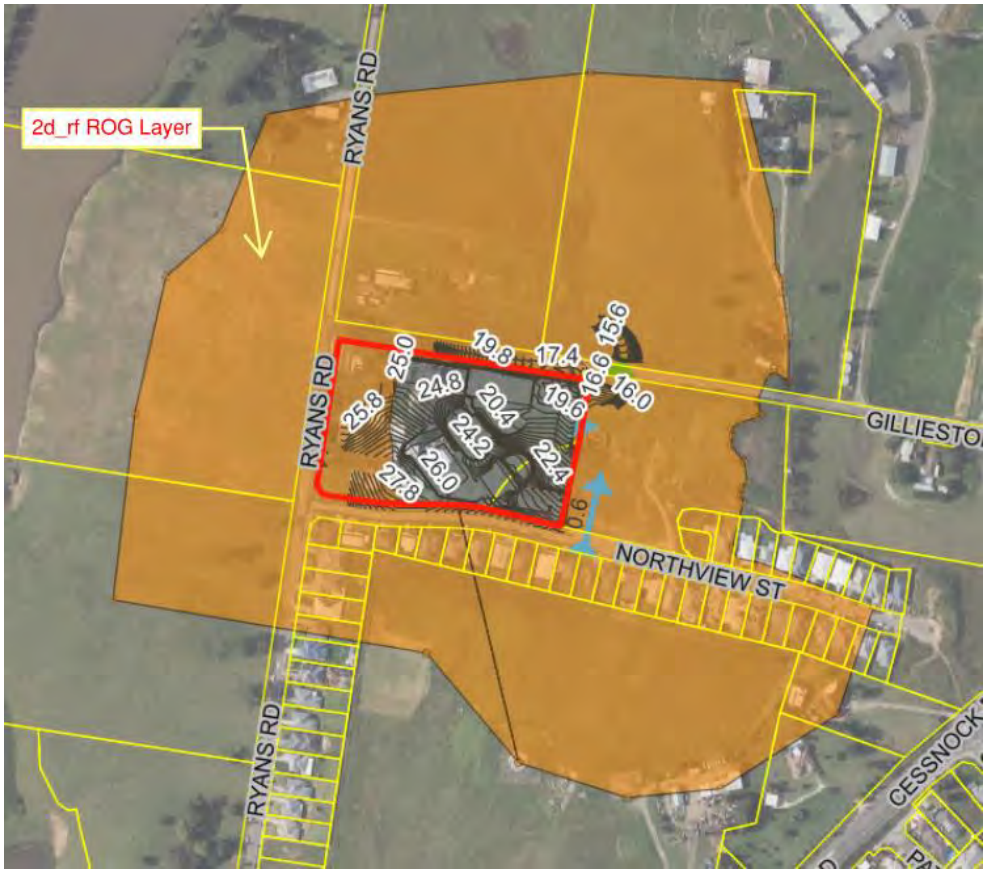

Figure 12 – Modified 2d_rf ROG Layer for post activity model

Figure 13 – Modified model features for existing dams

7 Results

This section summarises results of the hydraulic modelling of overland flows in the catchment. The 1% AEP overland flow critical duration and peak flow rate through the site are presented. The behaviour of the 1% AEP overland flow within the vicinity of the subject site are described in general terms, and the impact of overland flow on the subject site is discussed.

7.1 Map Outputs

The flood levels and depth, flood velocity and flood hazard vulnerability for the 1% AEP flood event were mapped for the pre-development and post-development conditions and enclosed under Appendix B of this report.

- Sheet F1. 1% AEP flood levels and depth – Existing (Pre-development) Scenario;
- Sheet F2. 1% AEP flood velocity map – Existing (Pre-development) Scenario;
- Sheet F3. 1% AEP flood hazard vulnerability map – Existing (Pre-development) Scenario.
- Sheet F11. 1% AEP flood levels and depth – Post Scenario without blockage;
- Sheet F12. 1% AEP flood velocity map – Post Scenario without blockage;
- Sheet F13. 1% AEP flood hazard vulnerability map – Post Scenario without blockage;
- Sheet F11.1. 1% AEP flood levels and depth – Post Scenario with blockage;
- Sheet F12.1. 1% AEP flood velocity map – Post Scenario with blockage;
- Sheet F13.1. 1% AEP flood hazard vulnerability map – Post Scenario with blockage;
- Sheet F1.1 1% AEP Climate Change flood levels and depth – Existing (Pre-development) Scenario;
- Sheet F2.1 1% AEP Climate Change flood velocity map – Existing (Pre-development) Scenario;
- Sheet F3.1 1% AEP Climate Change flood hazard vulnerability map – Existing (Pre-development) Scenario.
- Sheet F21. 1% AEP Climate Change flood levels and depth – Post Scenario without blockage;
- Sheet F22. 1% AEP Climate Change flood velocity map – Post Scenario without blockage;
- Sheet F23. 1% AEP Climate Change flood hazard vulnerability map – Post Scenario without blockage;
- Sheet F31. 1 in 500 AEP flood levels and depth – Existing (Pre-development) Scenario;
- Sheet F32. 1 in 500 AEP flood velocity map – Existing (Pre-development) Scenario;
- Sheet F33. 1 in 500 AEP flood hazard vulnerability map – Existing (Pre-development) Scenario.
- Sheet F41. 1 in 500 AEP flood levels and depth – Post Scenario without blockage;
- Sheet F42. 1 in 500 AEP flood velocity map – Post Scenario without blockage;
- Sheet F43. 1 in 500 AEP flood hazard vulnerability map – Post Scenario without blockage.

7.2 Pre-development 1% AEP Flood Behaviour

During the pre-development conditions, the majority of the site area is not flood affected by overland floodwater during the 1% AEP event. The overland flow enters the site from the sag point in Northview Street on the east side of the site area. Flow overtops the street with a peak flow rate of 2.04 m^3/s and is conveyed overland to the existing dam located near the eastern site boundary. A peak flow rate of 1.01 m^3/s was found in the existing 600 mm diameter inlet pipe to the existing dam.

When flow leaves the dam, a maximum flow rate of 3.51 m^3/s overtops the dam crest, and 0.21 m^3/s is conveyed in the existing 300 mm diameter outlet pipe. The flow meets the road embankment formed by Gillieston Rd at the north-eastern corner of the site. The road embankment provides flood storage on the upstream of the road (southern side). Minor flows are conveyed under Gillieston Rd via an existing 900 mm diameter stormwater pipe. Results show flow overtops Gillieston Rd with peak flow rate of 0.55 m^3/s. A peak flow rate of approximately 2.44 m^3/s was determined in the existing 900 mm diameter pipe (no blockage) under Gillieston Road. Blockage of the pipe will likely cause higher flow rates and flow depth over the road.

The peak velocity at the north-eastern site corner was estimated at 2.3 m/s with maximum depth of 2.04 m.

The flood hazard classification (flood hazard vulnerability) per Figure 143 was mapped. The majority of the site is safe for people, vehicles and buildings. Within the depression located in the north-eastern corner of the site, a peak flood hazard vulnerability up to H4 is shown.

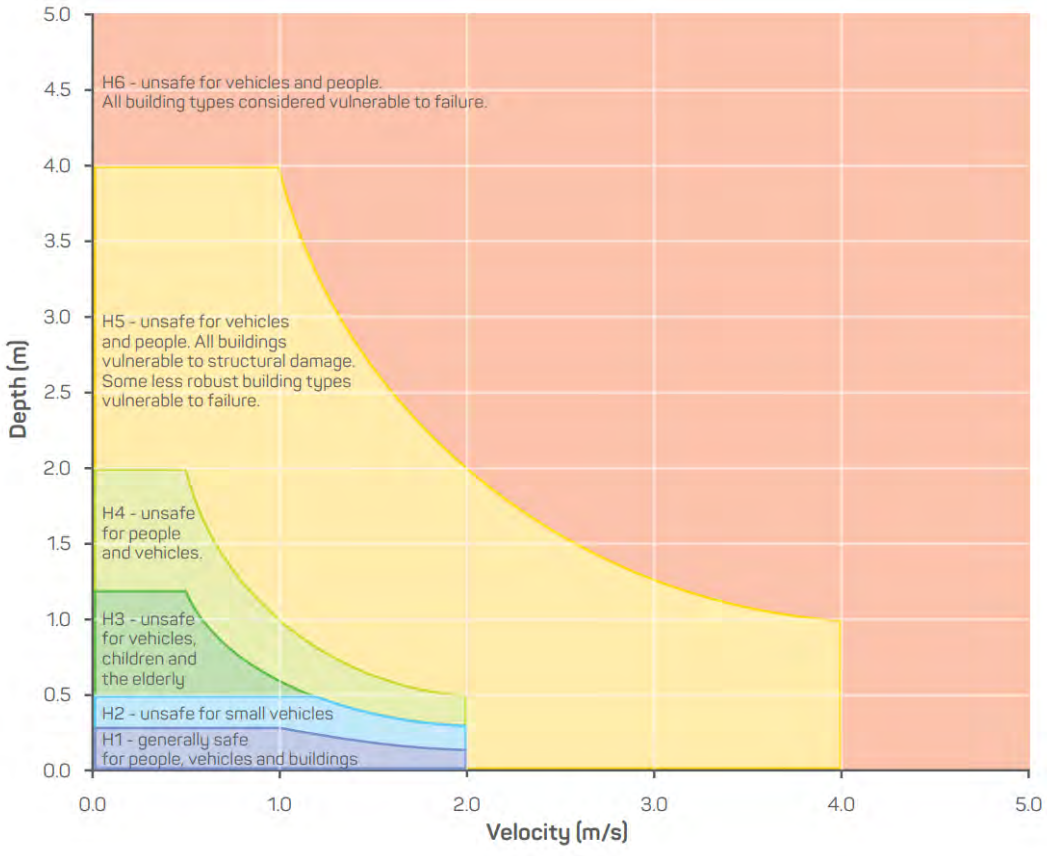

Figure 14 - Flood hazard classification

7.3 Post-development 1% AEP Flood Behaviour

During the post-development conditions, two following pipe design scenarios for the proposed new 1/2400 x 900 mm culvert have been undertaken to assess the impacts:

- Scenario 1 - No blockage applied
- Scenario 2 - 50% blockage applied.

For scenario 2, a blockage assessment has been undertaken using Australian Rainfall & Runoff (ARR), and 10% design blockage has been calculated during the assessment for 1% AEP storm event. However, 50% blockage has been applied to the new culvert for sensitivity check for the post-development conditions.

Scenario 1

During the post developed condition, the flood behaviours in Northview Street on the east side of the site area predominantly remain similar as the predeveloped condition. Flow overtops the street with a peak flow rate of 2.03 m^3/s and is conveyed overland to the existing dam located near the eastern site boundary. A peak flow rate of 1.01 m^3/s was found in the existing 600 mm diameter inlet pipe to the existing dam.

When flow leaves the dam, a maximum flow rate of 3.36 m^3/s overtops the dam crest and 0.22 m^3/s was conveyed in the existing 300 mm diameter outlet pipe. A peak flow rate of 3.57 m^3/s is conveyed in the proposed new 1/2400 x 900 mm stormwater culvert under Gillieston Road without any overtopping to the road.

The peak velocity at the north-eastern site corner was estimated at 3.03 m/s with maximum depth of 1.64 m.

The flood hazard classification (flood hazard vulnerability) per Figure 14 was mapped. At the existing 300 mm diameter outlet location in the north-eastern corner of the site, a peak flood hazard vulnerability up to H5 is shown.

Scenario 2

The flood behaviours in Northview Street to the downstream existing dam remain the same as Scenario 1. However, during the 50% blockage condition, a peak flowrate of 2.73 m^3/s was estimated in the new proposed 1/2400 x 900 mm stormwater culvert under Gillieston Road with 0.66 m^3/s overtopping the road. A peak water level at 17.26 m AHD was found on the upstream side of Gillieston Road was found. The depth of flow over Gillieston Road is less than 0.1 m and remains trafficable with peak flood hazard vulnerability of H1. Refer to the below table for summary.

Table 4 – Summary of results

	Scenario 1	Scenario 2
Peak discharge Northview Street (m^3/s)	2.03	2.03
Peak discharge Existing 600 mm diameter pipe (m^3/s)	1.01	1.01
Peak discharge Dam (m^3/s)	3.36	3.34
Peak discharge Existing 300 mm diameter pipe (m^3/s)	0.22	0.22
Peak discharge Proposed new culvert (m^3/s)	3.57	2.73
Peak discharge Gillieston Road (m^3/s)	0.20	0.66
Top water level on upstream side of Gillieston Road (m AHD)	0	17.26

7.4 Sensitivity Analysis

Climate Change

A sensitivity analysis was undertaken for climate change according to Australian Rainfall and Runoff (2019) *A guide to flood estimation* (version 4.2). Climate Scenario Shared Socioeconomic Pathway (SSP) SSP3-7.0 (high potential future development options) and long-term (2081-2100) horizon was adopted for determination of the increase in rainfall intensity for the 1% AEP event. Using the Watercom Climate Change Tool, the percentage increase in rainfall intensity for the foregoing scenario is 59% for storm durations less than 1 hour.

In this scenario for post-development conditions:

- the peak water level (17.32 m AHD) at the north-east corner of the site is significantly lower than the proposed floor level of the development (20.46 m AHD)
- the depth of flow over Gillieston Road is less than 0.1 m and remains trafficable with peak flood hazard vulnerability of H1.

The flood maps for the 1% AEP event with Climate Change are presented in Appendix B.

Storm greater than the 1% AEP

A sensitivity analysis was undertaken for the 1 in 500 AEP event. In this scenario for post-development conditions the peak water level (17.16 m AHD) at the north-east corner of the site is significantly lower than the proposed floor level of the development (20.46 m AHD).

8 Flood Risk Management

The behaviour of the 1% AEP floodwaters at the site has been described in Section 5 for pre and post-development site conditions.

Based on the foregoing we offer the following response, having due regard for the requirements of Maitland City Council's DCP and LEP and the Floodplain Development Manual (NSW DIPNR 2005).

8.1 Flood hazard classification

The flood model shows the majority of the site is not flood affected and exposed no flood hazard rating during the pre-development scenario. The flood water is mainly confined within the local dam and flood storage at the north-eastern corner of the site without posing risks to the existing buildings. In the post-development scenario, the flood hazard vulnerability level is shown to reduce at the north-east corner of the site.

The proposed retaining wall can be designed to cope with velocity 2-3 m/s. This will be undertaken in detailed design.

8.2 Flood Evacuation

As discussed in the Section 5.1 and based on Appendix C, the site is not directly affected during the PMF flood event of the Hunter River or Wallis and Swamp Fishery Creek.

According to the Wallis and Swamp Fishery Creek Flood Study (WMA Water, 2019) in the 1% AEP Wallis and Swamp Fishery Creek flood event, flooding will cut access along Cessnock Road to the north of the site to a depth of 0.2 metres. This will prevent evacuation to Maitland to the north. The flood study demonstrates that flood water does not overtop Cessnock Road in the 2%, 5%, 10%, 20% and 50% AEP events (events more frequent than the 1% AEP).

Appendix C presents the SES Flood Emergency Response Classifications for the 1% AEP Wallis and Swamp Fishery Creek flood event. This shows that Gillieston Public School is within the 'High Flood Island / Trapped Perimeter' classification area. This means that evacuation by road is not possible from this area until flood water recedes and roads are reopened. The school principal should be aware of this.

An Emergency Response Team (with duty officer available 24 hours a day, 7 days a week) within the NSW Department of Education liaises with the NSW State Emergency Service (NSW SES) Zone Management and Incident Management Teams on a weekly basis to determine potential risks from natural hazards including floods. As natural hazard events develop, the Emergency Response Team (through direct communication with the (NSW SES) supports schools with decision making to close or evacuate prior to the onset of flooding.

Consultation with the NSW Department of Education Emergency Response Team will be undertaken and a Flood Risk Response Plan developed for the school and provided to Maitland City Council. The NSW Department of Education Emergency Response Team will liaise with the school administration and Principal in development and implementation of the Flood Risk Response Plan. The Flood Risk Response Plan will be incorporated into the school emergency management plan. This is a process that has been undertaken for multiple schools in Northern NSW in recent years. The Flood Risk Response Plan can be linked to the School Transport Plan.

Shelter in place for local overland flow events is considered appropriate for the school. Overland flow events are typically short in duration and do not pose a risk to the proposed development building area of the school.

In the unlikely event that the evacuation route is cut by flooding prior to evacuation, the school would be reliant on emergency services for provision of supplies and evacuation, as is the case under existing operations.

9 Conclusion

This Flood Impact Assessment has been undertaken for the proposed redevelopment of Gillieston Public School at 100 Ryans Road and 19 Northview Street, Gillieston Heights (Lot 51 DP 1162489 and Lot 2 DP1308605).

The assessment found that:

- the impact of fill by the proposed activity on the overland flow at the eastern side of the site is mitigated by the proposed new 1/2400x 900 mm stormwater culvert under Gillieston Road
- the proposed new 1/2400 x 900 mm stormwater culvert (unblocked) conveys the 1% AEP peak discharge under Gillieston Road without flow overtopping the road
- in the unlikely event of 50% blockage of the proposed new 1/2400 x 900 mm stormwater culvert, flow will overtop Gillieston Road with depths less than 0.1 m and remains trafficable with peak flood hazard vulnerability of H1
- proposed building floor levels are significantly higher than the peak water level at the north-east corner of the site for the 1% AEP Climate Change event and the 1 in 500 AEP event.
- the proposed activity incorporates a stormwater detention tank that attenuates peak discharge rates from the developed area of the site to existing conditions peak discharge rates for storm events up to the 1% AEP (refer to Civil Engineering Report by ACOR Consultants)
- evacuation routes are readily available for the area and evacuation from the site can be achieved prior to inundation of the evacuation route to the north. This will be facilitated by the NSW Department of Education Emergency Response Team.

9.1 Mitigation Measures

Design (D. Construction (C). Operation (O).

Project Stage	Mitigation Measure
D	New culvert under Gillieston Road ▪ A new 1/2400 x 900 mm reinforced concrete box culvert is proposed to drain overland flow under Gillieston Road. The culvert has been sized to mitigate the effect of proposed fill encroaching into the overland flow path.
D	New detention basin north of Gillieston Road ▪ A new detention basin is proposed to attenuate discharge in the overland flow path. Refer to the Civil Engineering Report by ACOR Consultants and Appendix D for details regarding this detention basin.
O	Flood evacuation ▪ When notified of possible flooding or isolation by the NSW SES or Emergency Response Team within the NSW Department of Education, the school body is to assist with coordinating the evacuation of the school.

Appendix A Survey Plan

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(A) EASEMENT TO DRAIN WATER VARIABLE WIDTH AFFECTING THE PART (S) SHOWN SO BURDENED IN THE TITLE DIAGRAM (DP1162489)

(X) LAND EXCLUDES MINERALS AND IS SUBJECT TO RIGHTS TO MINE WITHIN THE PART SHOWN SO INDICATED IN THE TITLE DIAGRAM (A290830)

LEGEND

CH CUBBY HOUSE
● SI SIGN
26.20 FFL SPOT HEIGHT DENOTES BUILDING FINISHED FLOOR LEVEL
24.80 SPOT HEIGHT TOP OF ELECTRICAL SERVICE
24.71 SPOT HEIGHT TOP OF COMMUNICATIONS SERVICE
23.92 SL SPOT HEIGHT DENOTES SURFACE LEVEL
23.12 IV SPOT HEIGHT DENOTES INVERSE LEVEL
26.66 TRW SPOT HEIGHT TOP OF RETAINING WALL
26.50 BRW SPOT HEIGHT BOTTOM OF RETAINING WALL

- W(D) UNDERGROUND WATER MAIN (QL D)
- E(D) UNDERGROUND ELECTRICITY (QL D)
- RW(D) RECYCLED WATER MAIN QL D
- G(D) UNDERGROUND GAS MAIN (QL D)
- U(D) UNDERGROUND COMMS (QL D)

- EPIT ELECTRICAL PIT
- EP ELECTRICAL PILLAR
- SL STREET LIGHT
- ELECTRICAL PIT
- PP POWER POLE
- GRT GRATED PIT
- SURFACE INLET PIT
- HYD HYDRANT
- SV STOP VALVE
- WM WATER METER
- SIO SEWER INSPECTION PIT
- SMH SEWER MAN HOLE
- CMK COMMS MARKER
- TEL COMMUNICATIONS PIT
- (1) PHOTOGRAPH DIRECTION (SEE SHEET 7)
- BOUNDARY LINE
- MINOR CONTOUR LINE
- MAJOR CONTOUR LINE
- FENCE LINE
- GAS LINE DBYD APPROX. POSITION ONLY
- W WATER LINE APPROX. POSITION ONLY
- RW RECYCLED WATER APPROX. POSITION ONLY
- S SEWER LINE DBYD APPROX. POSITION ONLY
- E ELECTRICAL LINE APPROX. POSITION ONLY
- T COMMS. DBYD APPROX. POSITION ONLY
- O/H OVERHEAD POWER LINE
- D DRAINAGE LINE
- STORMWATER PIPE
- TOP & TOE OF BANKS

WINDOW
WIN

TREE DETAILS
S:12 D:1 H:18
FOLIAGE SPREAD · TREE HEIGHT · TRUNK DIAMETER

NOTES:-

1. WHERE RELEVANT, UNDERGROUND UTILITIES HAVE BEEN LOCATED BY ELECTRONIC DETECTION, SITE INSPECTION AND/OR BY ESTIMATION BASED UPON SUPPLIED DBYD INFORMATION PLANS. ADDITIONAL SERVICES MAY EXIST THROUGHOUT THE SITE. TRUE LEVELS & POSITION WILL NEED TO BE VERIFIED BY POTHOLING OR MANUAL EXCAVATION PRIOR TO COMMENCING ANY CONSTRUCTION WORKS.
2. REFER TO AS5488-2013-CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI) FOR THE DEFINITION OF SERVICE LOCATION ACCURACIES SHOWN IN THIS PLAN.
3. QL - 'D': INFORMATION IS THE MOST BASIC LEVEL OF UTILITY LOCATION USING INFORMATION BASED ON EXISTING SERVICES PLANS, BY MEASURING BOUNDARY OFFSETS AND THROUGH THE ASSISTANCE OF ELECTROMAGNETIC WANDING, GROUND PENETRATING RADAR ETC. THIS METHOD OF UTILITY LOCATION SHOULD ALWAYS BE TREATED AS AN INDICATION OF THE PRESENCE OF A SERVICE ONLY AND SHOULD NOT BE RELIED ON ALONE FOR DESIGN PURPOSES.
4. PRIOR TO ANY EXCAVATION AND/OR CONSTRUCTION WORKS WITHIN THE VICINITY OF AN UNDERGROUND SERVICE, THE RELEVANT SERVICE AUTHORITY SHOULD BE INFORMED.
5. DIMENSIONS, EASEMENTS AND OTHER TITLE-RELATED INFORMATION SHOWN ON THIS PLAN HAVE BEEN OBTAINED FROM SEARCHES OF EXISTING TITLE DOCUMENTS AVAILABLE ON PUBLIC RECORD AND HAVE NOT NECESSARILY BE CONFIRMED BY CURRENT SURVEY.
6. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DETAIL SURVEY PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
7. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DETAIL SURVEY AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.

REGISTERED SURVEYOR CERTIFICATION:-

1. THE BOUNDARIES DEPICTED ON THIS PLAN HAVE BEEN DEFINED FOR DETAIL PLAN PURPOSES ONLY IN ACCORDANCE WITH CLAUSE 9 OF THE SURVEY AND SPATIAL INFORMATION REGULATION 2017. THE BOUNDARIES HAVE BEEN DEFINED BY PARTIAL SURVEY AND EXISTING PLAN AND TITLE DIMENSIONS WHERE POSSIBLE. WHILST EVERY CARE HAS BEEN TAKEN TO ENSURE THE ACCURACY OF THE SURVEY SUITS THE REQUIRED PURPOSE, A MORE COMPREHENSIVE SURVEY MAY RESULT IN DIFFERENCES IN THE DEFINITION OF THE SUBJECT BOUNDARIES. NO RESPONSIBILITY CAN BE ACCEPTED FOR ANY FUTURE DIFFERENCE IN BOUNDARY LOCATION WHICH MIGHT RESULT FROM RE-SURVEY OF SUBJECT OR ADJOINING LANDS OR FROM SUBSEQUENT REGISTRATION OF NEW SURVEY INFORMATION.

SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT 2002, AS AMENDED

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nearmap
AERIAL IMAGE TAKEN FROM NEARMAP
DATED: 6.08.2022
(USED IN ACCORDANCE WITH COMMERCIAL LICENCE)

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A	21-09-22	INITIAL ISSUE	JJW	MC	JJW	DLE	CO-ORDINATE SYSTEM: MGA 56 GDA 94 ORIGIN OF CO-ORDINATES: P.M.60149 DATE OF SURVEY 6/9/2022	DATUM: AHD CONTOUR INTERVAL: ORIGIN OF LEVELS: P.M.60149 RL:21.398 0.5m	0 10.0 20.0m SCALE: 1:400 (FULL)	1 OF 7

drawing title:

GILLIESTON PUBLIC SCHOOL

location: Corner of Northview ST. & Ryans Road Gillieston Heights

council: Maitland

dwg ref: 240375(1)-DET-001-A.dwg

client: NSW GOVERNMENT SINSW

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GILLIESTON ROAD

RYANS ROAD

SHADE AWNING OVER SAND PIT

ELECTRICAL KIOSK

ELECTRICAL PIT

METAL ROOF OVER PLAY EQUIPMENT

"LEARNING CENTRE" SINGLE STOREY BK & METAL ROOF

VERANDAH

CONC. CARPARK

KERB

COMMS. PIT

ROOM 11 DEMOUNTABLE

ROOM 4 DEMOUNTABLE

ROOM 12 DEMOUNTABLE

GIRLS TOILET 26.19 FFL

ROOM 5 DEMOUNTABLE UNDER CONSTRUCTION 25.97 FFL

"ROOM 3" SINGLE STOREY F/C CLAD CLASSROOMS METAL ROOF 27.22 FFL

"ROOM 2"

MAIN ELECTRICAL DIST. BOARD

WATER TANK

SEPTIC

U/G TANKS NOT LOCATED BY SURVEY

SEPTIC PUMP OUT POINT

METAL SHED

PAVERS

RAMP

STAIRS

FLAGPOLES & BELL

SEATS

TABLE

CONC.

GARDEN

51 DP1162489

(X)

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N

RYANS ROAD

METAL SHED
CONC.
STAIRS
ROOM 6 DEMOUNTABLE
28.8 HEAD 27.0 SILL
GARDEN
VEGE PATCH
ROOM 7 DEMOUNTABLE
29.1 HEAD 27.3 SILL
G.I.
G.A'S SHED METAL
29.76 ROOF RIDGE
ROOM 1 DEMOUNTABLE
30.25 HEAD 28.45 SILL
GIRLS TOILET UNDER CONST.
28.15 FFL
BOYS TOILET
28.1 FFL
ROOM 10 DEMOUNTABLE
28.13 FFL
30.85 HEAD 29.05 SILL
ROOM 9 DEMOUNTABLE
28.85 FFL
31.02 HEAD 29.77 SILL
31.75 GL
ROOM 8 DEMOUNTABLE
28.82 FFL
31.50 HEAD 29.75 SILL
31.81 GL
STAFF ROOM & FIRST AID DEMOUNTABLE
28.85 FFL
OFFICE DEMOUNTABLE
31.50 HEAD 30.20 SILL
31.35 HEAD 28.24 SILL
30.20 HEAD 27.69 SILL
30.48 HEAD 28.20 SILL
29.30 HEAD 28.44 SILL
27.22 FFL
30.97 ROOF RIDGE
VERANDAH
RAMP
BLUE
COVERED
WALKWAY
COLA
31.85 ROOF RIDGE
PAVERS
BOAT
SEAT
STAIR
CH
DOOR
LIBRARY SINGLE STOREY W'BOARD METAL ROOF
27.99 FFL
33.15 ROOF RIDGE
30.05 HEAD 28.85 SILL
30.90 HEAD 28.85 SILL
CANTEEN
27.08 FFL
HALL DEMOUNTABLE BUILDINGS
STORAGE
APPROX. POSITION
UNDER CONST. DEMOUNTABLE BUILDINGS
27.52 FFL
GARDEN'S
MAIL BOX
CONC.
DRIVE
51
DP1162489
ROAD
NORTHVIEW
STREET
274°57'35" ~ 24.725
A 24.745 R 190.5
278°40'50" - 33.375
323°40'55" 9.795
271°14'20" - 42.51

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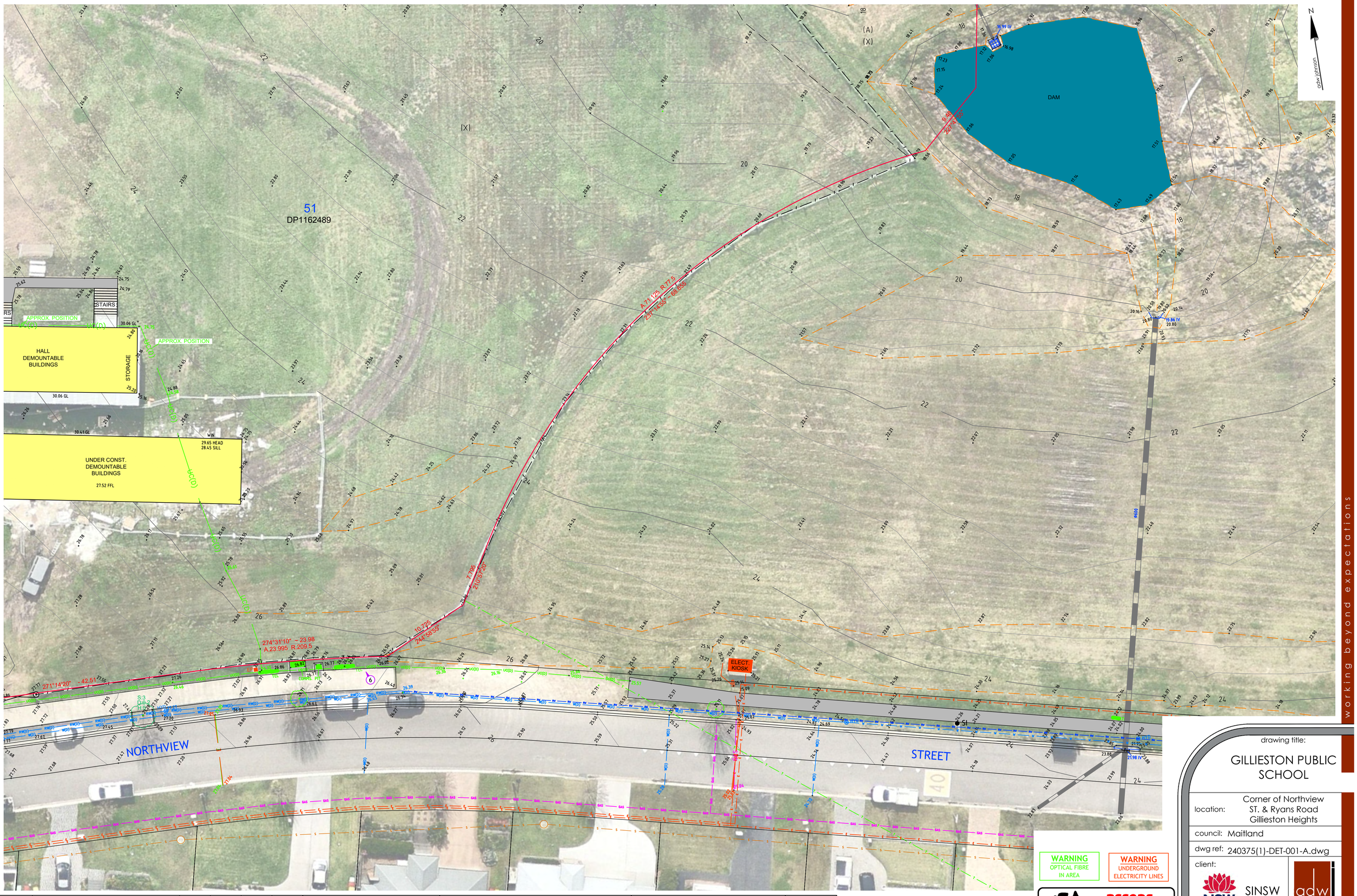

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5 OF 7

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LEGEND

- W(D) — UNDERGROUND WATER MAIN (QL D)
- E(D) — UNDERGROUND ELECTRICITY (QL D)
- RW(D) — RECYCLED WATER MAIN QL D
- G(D) — UNDERGROUND GAS MAIN (QL D)
- UC(D) — UNDERGROUND COMMS (QL D)
- GAS — GAS LINE DBYD APPROX. POSITION ONLY
- W — WATER LINE APPROX. POSITION ONLY
- RW — RECYCLED WATER LINE APPROX. POSITION ONLY
- S — SEWER LINE DBYD APPROX. POSITION ONLY
- E — ELECTRICAL LINE APPROX. POSITION ONLY
- T — COMMS. DBYD APPROX. POSITION ONLY
- O/H — OVERHEAD POWER LINE
- D — DRAINAGE LINE
- STORMWATER PIPE

QL - 'D': INFORMATION IS THE MOST BASIC LEVEL OF UTILITY LOCATIONS USING ONLY INFORMATION BASED ON EXISTING DIAL-BEFORE-YOU-DIG PLANS AND BY MEASURING BOUNDARY OFFSETS AS WELL AS ASSISTANCE VIA GROUND PENETRATING RADAR ETC. THIS METHOD OF UTILITY LOCATIONS SHOULD ALWAYS BE TREATED AS AN INDICATION OF THE PRESENCE OF A SERVICE ONLY AND SHOULD NOT BE USED FOR DESIGN.

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RYANS ROAD

GILLIESTON ROAD

NORTHVIEW STREET

2 DP997874

1 DP986279

51 DP1162489 2.064ha

213 DP1186997

17 DP263196

116

117 DP1172940

1180

1181

119 DP1195378

ELECTRICAL KIOSK

ELECTRICAL PIT

APPROX POSITION

NOTES:-

1. PLEASE REFER TO AS5488-2013-CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI) FOR THE DEFINITION OF SERVICE LOCATION ACCURACIES SHOWN IN THIS PLAN.
2. ALL UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN LOCATED BY ELECTRONIC DETECTION, SITE INSPECTION AND/OR BY ESTIMATION BASED UPON SUPPLIED DBYD INFORMATION PLANS. ADDITIONAL SERVICES MAY EXIST THROUGHOUT THE SITE. TRUE LEVELS & POSITION WILL NEED TO BE VERIFIED BY POTHOLES BEFORE ANY CONSTRUCTION COMMENCES.
3. DIMENSIONS SHOWN ON THIS PLAN ARE BASED ON PRELIMINARY BOUNDARY DEFINITION ONLY. ANY FUTURE PLAN OF SURVEY OF ADJOINING LOTS REGISTERED SUBSEQUENT TO THIS INITIAL SURVEY MAY IMPACT SUBJECT BOUNDARIES. ALL DIMENSIONS, AREAS AND EASEMENTS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF THE PLAN WITH LAND AND PROPERTY INFORMATION.
4. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
5. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DESIGN AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
6. THE WINDOWS, GUTTERS AND ROOFLINES OF BUILDINGS LOCATED ON ADJOINING PROPERTIES HAVE BEEN LOCATED BY INDIRECT SURVEY METHODS AND ARE SHOWN ON THIS PLAN IN THEIR APPROXIMATE LOCATION FOR THE PURPOSE OF GENERAL SITE ANALYSIS ONLY.

NOTES:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED. ALL BEARINGS, DIMENSIONS, AREAS AND EASEMENTS ARE SUBJECT TO FINAL SURVEY.
2. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
3. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
4. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DETAIL SURVEY AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
5. THE BOUNDARIES DEPICTED ON THIS PLAN HAVE BEEN DEFINED FOR DETAIL PLAN PURPOSES ONLY IN ACCORDANCE WITH CLAUSE 9 OF THE SURVEY AND SPATIAL INFORMATION REGULATION 2017. THE BOUNDARIES HAVE BEEN DEFINED BY PARTIAL SURVEY AND EXISTING PLAN AND TITLE DIMENSIONS WHERE POSSIBLE. WHILST EVERY CARE HAS BEEN TAKEN TO ENSURE THE ACCURACY OF THE SURVEY SUITS THE REQUIRED PURPOSE, A MORE COMPREHENSIVE SURVEY MAY RESULT IN DIFFERENCES IN THE DEFINITION OF THE SUBJECT BOUNDARIES. NO RESPONSIBILITY CAN BE ACCEPTED FOR ANY FUTURE DIFFERENCE IN BOUNDARY LOCATION WHICH MIGHT RESULT FROM RE-SURVEY OF SUBJECT OR ADJOINING LANDS OR FROM SUBSEQUENT REGISTRATION OF NEW SURVEY INFORMATION.

SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT 2002, AS AMENDED

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	21-09-22	INITIAL ISSUE	JJW	MC	JJW	DLE	CO-ORDINATE SYSTEM: MGA 56 GDA 94 ORIGIN OF CO-ORDINATES: P.M.60149 DATE OF SURVEY 6/9/2022	DATUM: AHD CONTOUR INTERVAL: ORIGIN OF LEVELS: P.M.60149 RL:21.398 0.5m	0 10.0 20.0m SCALE: 1:400 (FULL)	6 OF 7

drawing title: GILLIESTON PUBLIC SCHOOL

location: Corner of Northview ST. & Ryans Road Gillieston Heights

council: Maitland

dwg ref: 240375(1)-DET-001-A.dwg

client: NSW GOVERNMENT SINSW

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central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
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working beyond expectations

• project management • civil engineering • infrastructure • superintendency • economic analysis • social impact • town planning • surveying • development feasibility • visualisation • urban design

PHOTO 1

PHOTO 4

PHOTO 7

PHOTO 2

PHOTO 5

PHOTO 8

PHOTO 3

PHOTO 6

PHOTO 9

PHOTO 10

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	21-09-22	INITIAL ISSUE	JJW	MC	JJW	DLE	CO-ORDINATE SYSTEM: MGA 56 GDA 94 ORIGIN OF CO-ORDINATES: P.M.60149 DATE OF SURVEY 6/9/2022	DATUM: AHD CONTOUR INTERVAL: ORIGIN OF LEVELS: P.M.60149 RL:21.398 0.5m	0 10.0 20.0m SCALE: 1:400 (FULL)	7 OF 7

drawing title:

GILLIESTON PUBLIC SCHOOL

location: Corner of Northview ST. & Ryans Road Gillieston Heights

council: Maitland

dwg ref: 240375(1)-DET-001-A.dwg

client: SINSW

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hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
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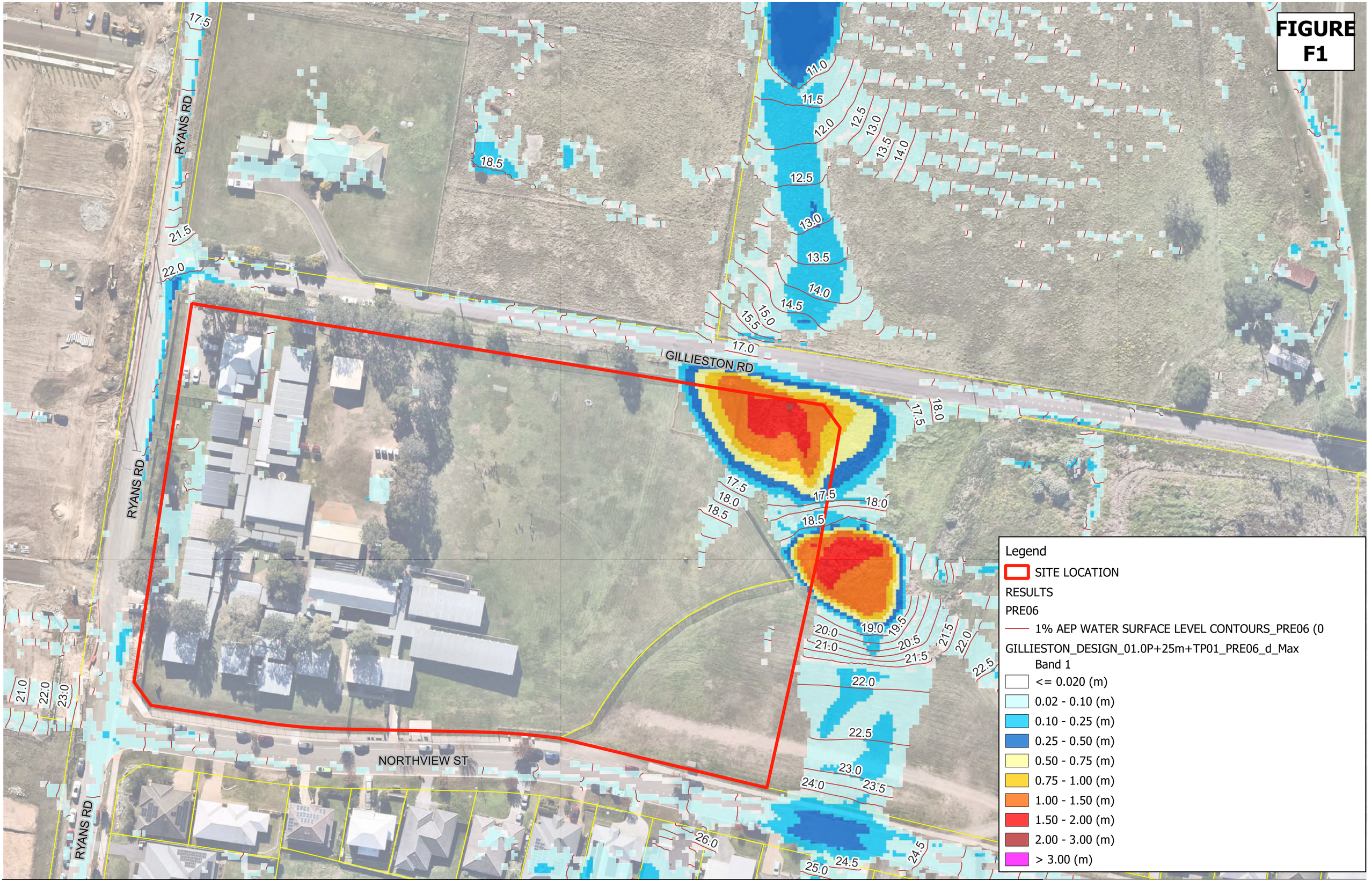
Appendix B Flood Maps

FIGURE F1



REV B
DATE: 15.04.2025
DRAWN: GM
APPROVED: KU

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD DEPTHS PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F2

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06

GILLIESTON_DESIGN_01.0P+25m+TP01_PRE06_V_Max

Band 1

- 0.5 and below (m/s)
- 0.5 - 1.0 (m/s)
- 1.0 - 1.5 (m/s)
- 1.5 - 2.0 (m/s)
- 2.0 - 3.0 (m/s)
- 3.0 and above (m/s)

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD VELOCITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F3

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06

GILLIESTON_DESIGN_01.0P+25m+TP01_PRE06_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD HAZARD VULNERABILITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F11

RYANS RD

GILLIESTON RD

NORTHVIEW ST

RYANS RD

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

1% AEP WATER SURFACE LEVEL CONTOURS_POST03

GILLIESTON_DESIGN_01.0P+25m+TP01_POST03_d_Max

Band 1

- <= 0.020 (m)
- 0.02 - 0.10 (m)
- 0.10 - 0.25 (m)
- 0.25 - 0.50 (m)
- 0.50 - 0.75 (m)
- 0.75 - 1.00 (m)
- 1.00 - 1.50 (m)
- 1.50 - 2.00 (m)
- 2.00 - 3.00 (m)
- > 3.00 (m)

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD DEPTHS POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F12

RYANS RD

GILLIESTON RD

NORTHVIEW ST

RYANS RD

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

GILLIESTON_DESIGN_01.0P+25m+TP01_POST03_V_Max

Band 1

0.5 and below (m/s)

0.5 - 1.0 (m/s)

1.0 - 1.5 (m/s)

1.5 - 2.0 (m/s)

2.0 - 3.0 (m/s)

3.0 and above (m/s)

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD VELOCITY POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F13

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

GILLIESTON_DESIGN_01.0P+25m+TP01_POST03_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

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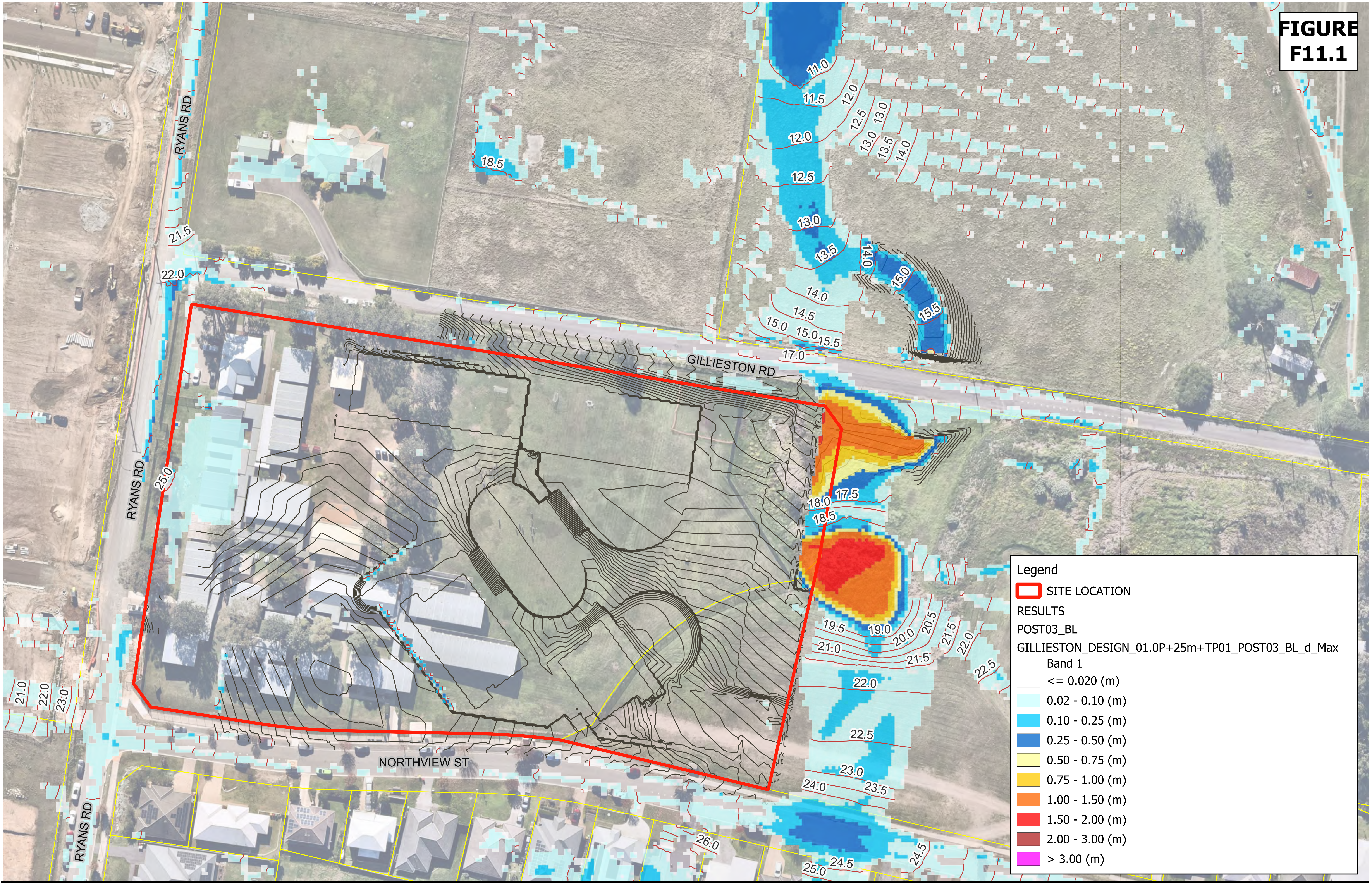
PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD HAZARD VULNERABILITY POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m



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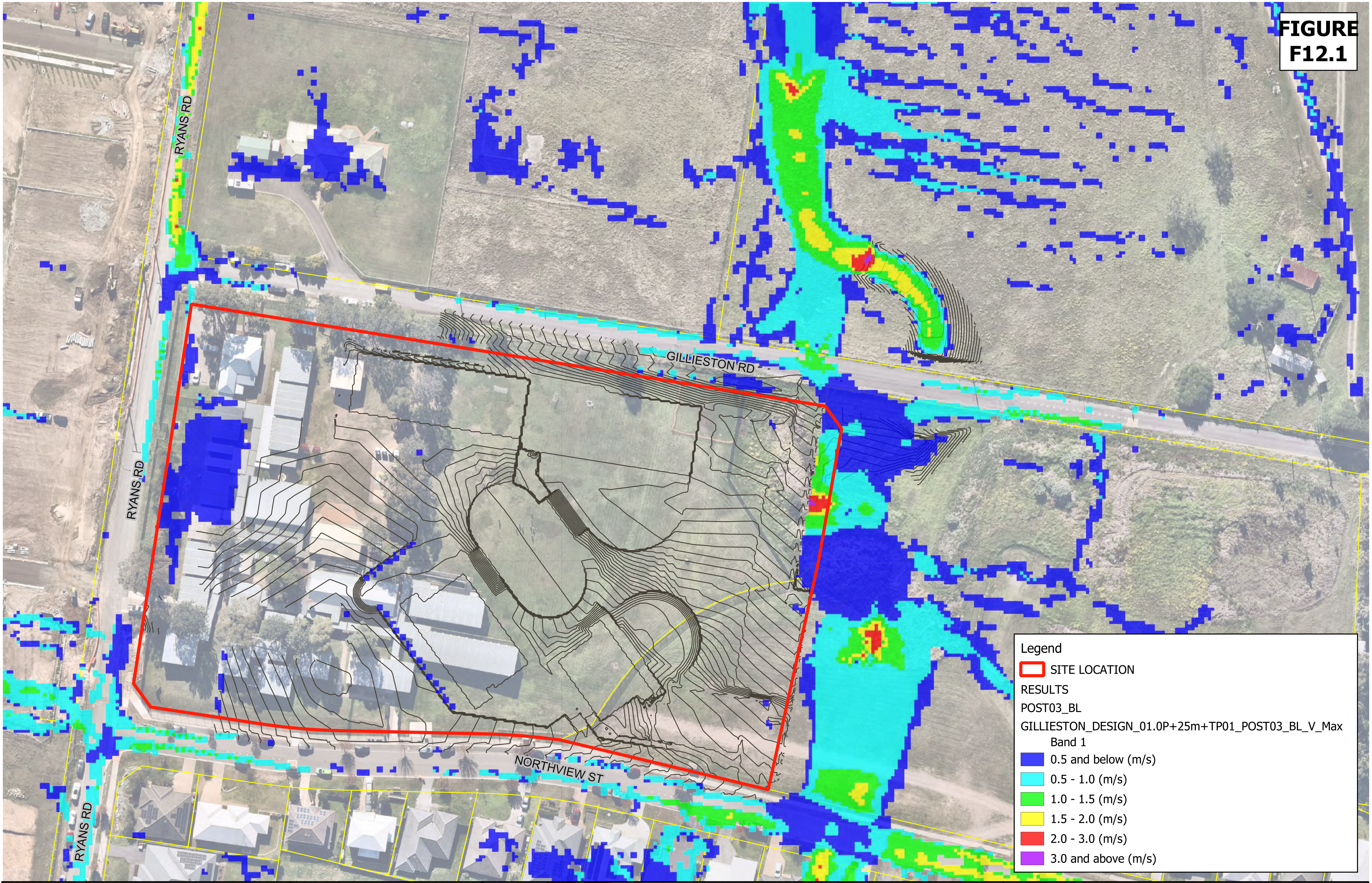
PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD DEPTHS
POST DEVELOPMENT SCENARIO WITH BLOCKAGE

0 50 100 m



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DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD VELOCITY
POST DEVELOPMENT SCENARIO WITH BLOCKAGE

0 50 100 m

FIGURE F13.1

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

- SITE LOCATION
- RESULTS
- POST03_BL
- GILLIESTON_DESIGN_01.0P+25m+TP01_POST03_BL_ZAEM1_Max
- Band 1
- H1
- H2
- H3
- H4
- H5
- H6

REV B
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP MAXIMUM FLOOD HAZARD VULNERABILITY POST DEVELOPMENT SCENARIO WITH BLOCKAGE

0 50 100 m

FIGURE F1.1

GILLIESTON RD

NORTHVIEW ST

RYANS RD

RYANS RD

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06 - CLIMATE CHANGE

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_PRE06_CC_d_Max

Band 1

- <= 0.020 (m)
- 0.02 - 0.10 (m)
- 0.10 - 0.25 (m)
- 0.25 - 0.50 (m)
- 0.50 - 0.75 (m)
- 0.75 - 1.00 (m)
- 1.00 - 1.50 (m)
- 1.50 - 2.00 (m)
- 2.00 - 3.00 (m)
- > 3.00 (m)

REV A
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD DEPTHS PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F2.1

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06 - CLIMATE CHANGE

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_PRE06_CC_

Band 1

- 0.5 and below (m/s)
- 0.5 - 1.0 (m/s)
- 1.0 - 1.5 (m/s)
- 1.5 - 2.0 (m/s)
- 2.0 - 3.0 (m/s)
- 3.0 and above (m/s)

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD VELOCITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F3.1

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06 - CLIMATE CHANGE

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_PRE06_CC_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

REV A
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FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD HAZARD VULNERABILITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F21

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03 - CLIMATE CHANGE

1% AEP CC WATER SURFACE LEVEL CONTOURS_POST03

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_POST03_CC_d_Max

Band 1

- <= 0.020 (m)
- 0.02 - 0.10 (m)
- 0.10 - 0.25 (m)
- 0.25 - 0.50 (m)
- 0.50 - 0.75 (m)
- 0.75 - 1.00 (m)
- 1.00 - 1.50 (m)
- 1.50 - 2.00 (m)
- 2.00 - 3.00 (m)
- > 3.00 (m)

REV A
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD DEPTHS
POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F21

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03 - CLIMATE CHANGE

1% AEP CC WATER SURFACE LEVEL CONTOURS_POST03

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_POST03_CC_d_Max

Band 1

- <= 0.020 (m)
- 0.02 - 0.10 (m)
- 0.10 - 0.25 (m)
- 0.25 - 0.50 (m)
- 0.50 - 0.75 (m)
- 0.75 - 1.00 (m)
- 1.00 - 1.50 (m)
- 1.50 - 2.00 (m)
- 2.00 - 3.00 (m)
- > 3.00 (m)

REV A
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD DEPTHS
POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F22

RYANS RD

GILLIESTON RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03 - CLIMATE CHANGE

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_POST03_CC_V_Max

Band 1

- 0.5 and below (m/s)
- 0.5 - 1.0 (m/s)
- 1.0 - 1.5 (m/s)
- 1.5 - 2.0 (m/s)
- 2.0 - 3.0 (m/s)
- 3.0 and above (m/s)

REV A
DATE: 15.04.2025
DRAWN: GM
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD VELOCITY
POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F23

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03 - CLIMATE CHANGE

GILLIESTON_DESIGN_01.0P_CC+25m+TP01_POST03_CC_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

REV A
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

1% AEP CC MAXIMUM FLOOD HAZARD VULNERABILITY POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F31

GILLIESTON RD

NORTHVIEW ST

RYANS RD

RYANS RD

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06

0.2% AEP WATER SURFACE LEVEL CONTOURS_PRE06

GILLIESTON_DESIGN_00.2P+25m+TP04_PRE06_d_Max

Band 1

<= 0.020 (m)

0.02 - 0.10 (m)

0.10 - 0.25 (m)

0.25 - 0.50 (m)

0.50 - 0.75 (m)

0.75 - 1.00 (m)

1.00 - 1.50 (m)

1.50 - 2.00 (m)

2.00 - 3.00 (m)

> 3.00 (m)

REV A
DATE: 15.04.2025
DRAWN: GM
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD DEPTHS PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F32

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06

GILLIESTON_DESIGN_00.2P+25m+TP04_PRE06_V_Max

Band 1

0.5 and below (m/s)

0.5 - 1.0 (m/s)

1.0 - 1.5 (m/s)

1.5 - 2.0 (m/s)

2.0 - 3.0 (m/s)

3.0 and above (m/s)

REV A
DATE: 15.04.2025
DRAWN: GM
APPROVED: KU

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD VELOCITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F33

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

PRE06

GILLIESTON_DESIGN_00.2P+25m+TP04_PRE06_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

REV A
DATE: 15.04.2025
DRAWN: GM
APPROVED: KU

CLIENT / ARCHITECT

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ACOR CONSULTANTS ENGINEERS | MANAGERS | INFRASTRUCTURE PLANNERS | DEVELOPMENT CONSULTANTS

PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD HAZARD VULNERABILITY PRE DEVELOPMENT SCENARIO

0 30 60 90 m

FIGURE F41

RYANS RD

GILLIESTON RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

0.2% AEP WATER SURFACE LEVEL CONTOURS_POST03

GILLIESTON_DESIGN_00.2P+25m+TP04_POST03_d_Max

Band 1

- <= 0.020 (m)
- 0.02 - 0.10 (m)
- 0.10 - 0.25 (m)
- 0.25 - 0.50 (m)
- 0.50 - 0.75 (m)
- 0.75 - 1.00 (m)
- 1.00 - 1.50 (m)
- 1.50 - 2.00 (m)
- 2.00 - 3.00 (m)
- > 3.00 (m)

REV A
DATE: 15.04.2025
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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD DEPTHS
POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F42

RYANS RD

GILLIESTON RD

NORTHVIEW ST

RYANS RD

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

GILLIESTON_DESIGN_00.2P+25m+TP04_POST03_V_Max

Band 1

- 0.5 and below (m/s)
- 0.5 - 1.0 (m/s)
- 1.0 - 1.5 (m/s)
- 1.5 - 2.0 (m/s)
- 2.0 - 3.0 (m/s)
- 3.0 and above (m/s)

REV A
DATE: 15.04.2025
DRAWN: GM
APPROVED: KU

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD VELOCITY
POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

FIGURE F43

RYANS RD

GILLIESTON RD

RYANS RD

NORTHVIEW ST

RYANS RD

Legend

SITE LOCATION

RESULTS

POST03

GILLIESTON_DESIGN_00.2P+25m+TP04_POST03_ZAEM1_Max

Band 1

H1

H2

H3

H4

H5

H6

REV A
DATE: 15.04.2025
DRAWN: SGM
APPROVED: KU

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PROPOSED DEVELOPMENT
FLOOD IMPACT ASSESSMENT

GILLIESTON PUBLIC SCHOOL
100 GILLIESTON ROAD, GILLIESTON HEIGHTS

0.2% AEP MAXIMUM FLOOD HAZARD VULNERABILITY POST DEVELOPMENT SCENARIO WITHOUT BLOCKAGE

0 50 100 m

Appendix C Regional Flood Maps

- Hunter River 1% AEP and PMF Flood Extents
- Wallis and Swamp Fishery Creek Flood Study PMF Flood Extents
- SES Flood Emergency Response Classifications for the 1% AEP Wallis and Swamp Fishery Creek flood event.

Maitland Citywide Development Control Plan 2011

Floodplain Management DCP - Flood Extents_Sheet 004B

- Probable Maximum Flood (PMF)
- Flood Planning Area (1:100 ARI plus 0.5m)
- 1:100 ARI (1% Annual Exceedance Probability)

Cadastre

Base data 03/03/1997 © NSW LPMA
Addendum data 01/04/2011 © Maitland City Council

N
W E
S

0 400 800
metres

Scale: 1:20,000 @ A3

Projection: GDA 1994
Zone 56

Map identification number:

Floodplain Management DCP_FLD_004B_020_20140827

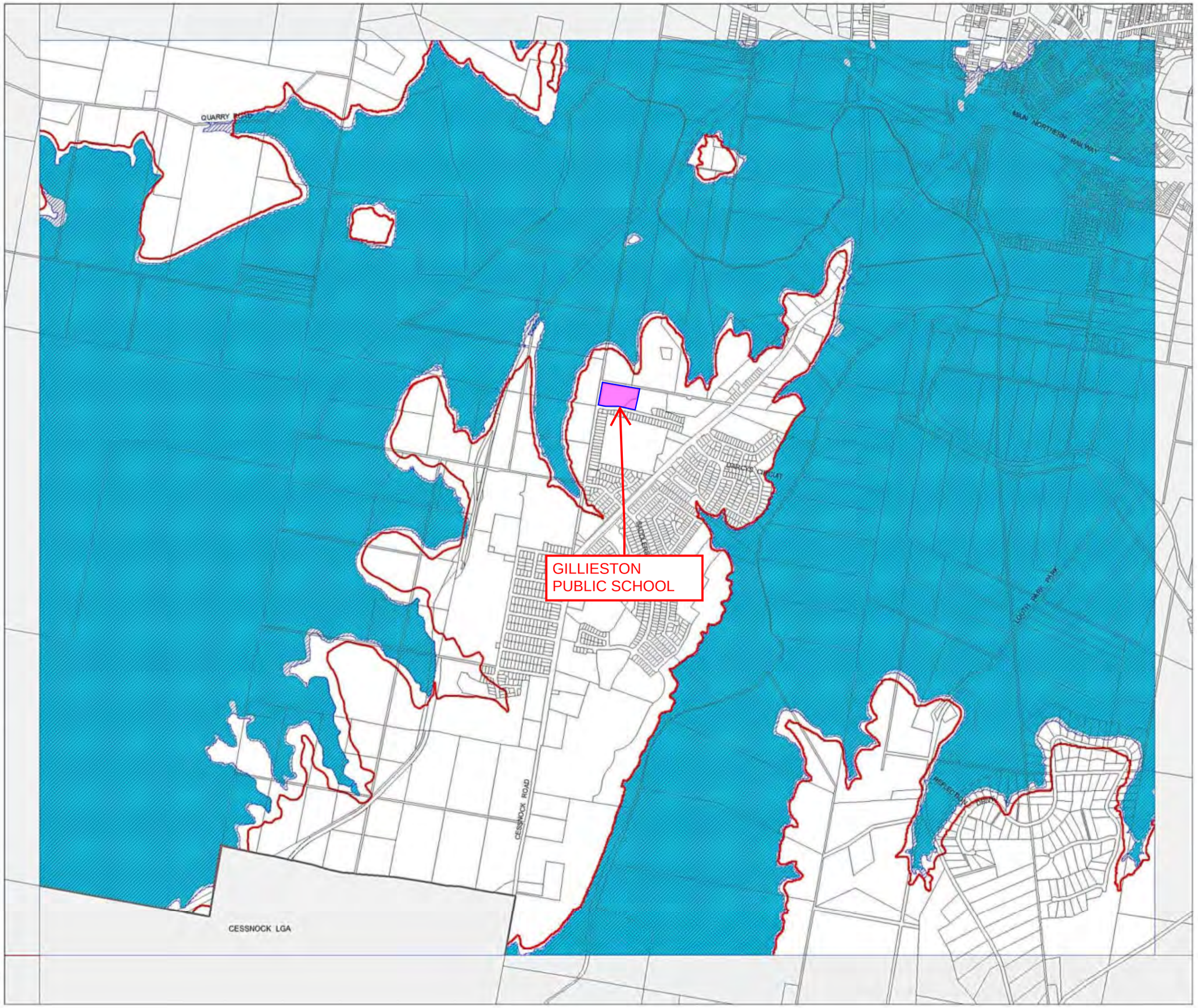


FIGURE D9(c)
PEAK FLOOD DEPTHS AND LEVEL CONTOURS
PMF EVENT

Note:
The Hunter River flood is the dominant flooding behaviour within the Hunter River flood extent for this design storm event.

Rutherford
Telarah
Stony Creek
Hunter River
Horseshoe Bend
Lynes Canal
South Maitland
East Maitland
Mount Dee
Swamp-Fishery Creek
Bishops Creek
Gillieston Heights
Wallis Creek
GILLIESTON PUBLIC SCHOOL
Louth Park
Black Waterholes Creek
Testers Hollow
Loxford
Cliftleigh
Butai Creek

N

Major Contour (1 m Interval)
Minor Contour (0.5 m Interval)
PMF Hunter River Flood Extent
Study Area
Depth (m)
0 - 0.5
0.5 - 1
1 - 2
2 - 3
> 3

0 0.5 1 2 Km

Results show flood behaviour due to Wallis and Swamp-Fishery Creek local catchment flooding. Hunter River Flooding is the dominant major flood mechanism in the lower catchment and has been documented in the Hunter River: Branxton to Green Rocks Flood Study.

J:\Jobs\117039\ArcGIS\ArcMap\Report_Maps\Appendix_D\FigureD09c_PeakFloodDepths_Levels_PMF.mxd

FIGURE D34(c)

SES FLOOD EMERGENCY RESPONSE CLASSIFICATIONS
1% AEP EVENT

Rutherford
Telarah
Horseshoe Bend
South Maitland
East Maitland
Mount Dee
Gillieston Heights
Louth Park
Loxford
Cliftleigh

Bungaree St
Steam St
Alan Walsh Dr
New England Hwy
Junction St
Mount Dee Rd
Cessnock Rd
O'Connells Rd
Gullivers Road
Louth Park Road
Gullivers Ln
Dagworth Rd
Testers Hollow
Valley View Ln

GILLIESTON PUBLIC SCHOOL

N

- Roads Cut
- Flood Extent
- Study Area

Classification of Communities

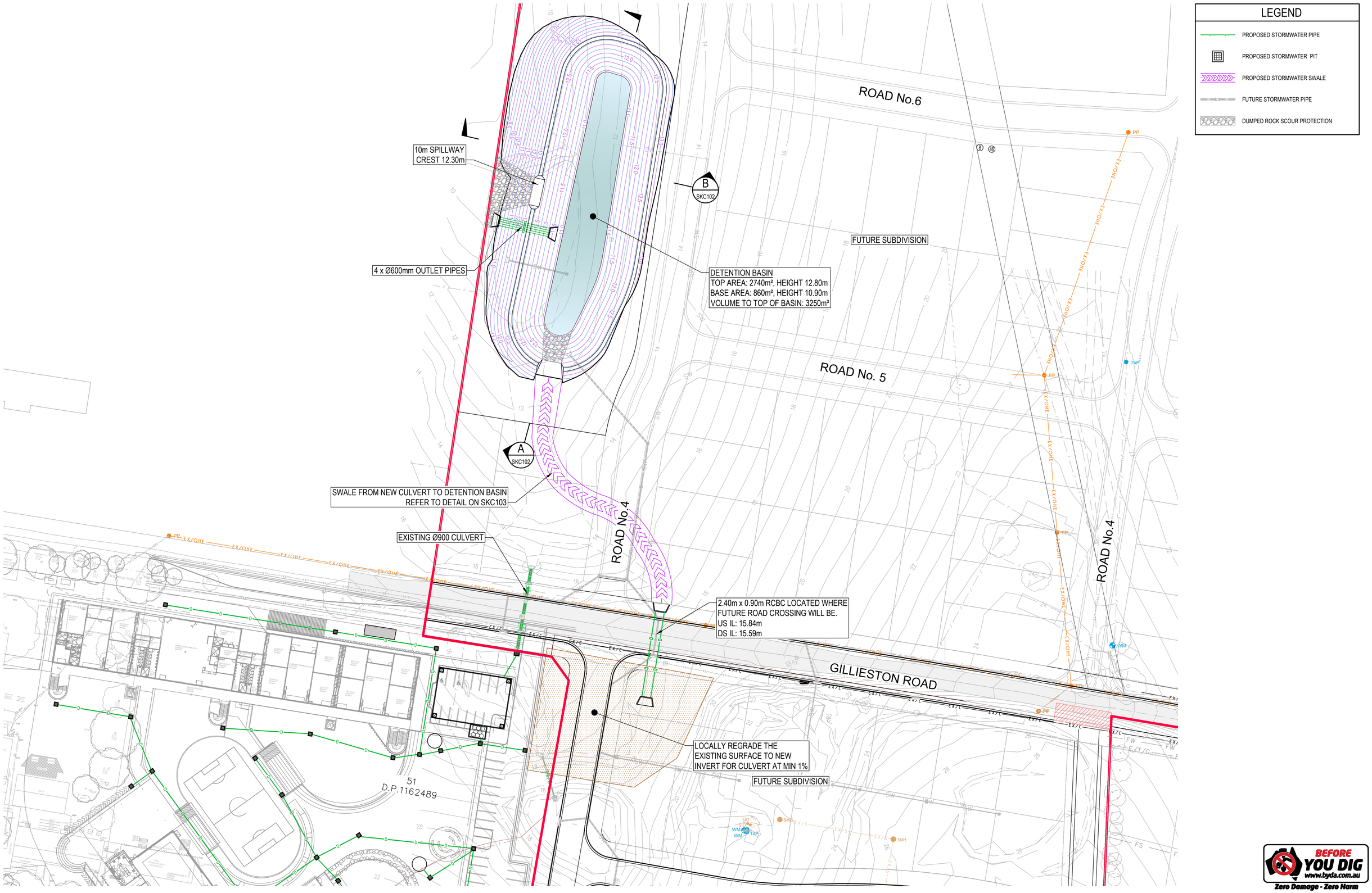
- Low Flood island / Trapped Perimeter
- High Flood Island / Trapped Perimeter
- Rising Road Access
- Overland Escape Route
- Indirectly Affected

0 0.5 1 2 Km

Results show flood behaviour due to Wallis and Swamp-Fishery Creek local catchment flooding. Hunter River Flooding is the dominant major flood mechanism in the lower catchment and has been documented in the Hunter River: Branxton to Green Rocks Flood Study.

J:\Jobs\117039\ArcGIS\ArcMap\Report_Maps\Appendix_D\FigureD34c_FERC_SES_1pc_AEP.mxd

Appendix D Proposed Northern Basin Plan



Issue.	Description	Date	Drawn	Approved
B	ISSUED FOR INFORMATION	27.11.24	MDM	JR
A	ISSUED FOR INFORMATION	18.11.24	MDM	JR

North

Scale

SCALE BAR 1:100 @A1 1:200 @A3

SCALE BAR 1:500 @A1 1:1000 @A3

PRINT IN COLOUR

Client: NSW Government Education School Infrastructure

Architect: SHAC
Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

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Project
GILLIESTON PUBLIC SCHOOL
100 RYANS ROAD
GILLIESTON HEIGHTS, NSW, 2321

NOT FOR CONSTRUCTION

Drawing Title
CIVIL
PROPOSED NORTHERN BASIN PLAN

Drawn	Designed	Q.A. Check	Date	Scale @ A1
MDM	NS			1:500

Project No.	Drawing No.	Issue
NS221454	SKC101	B

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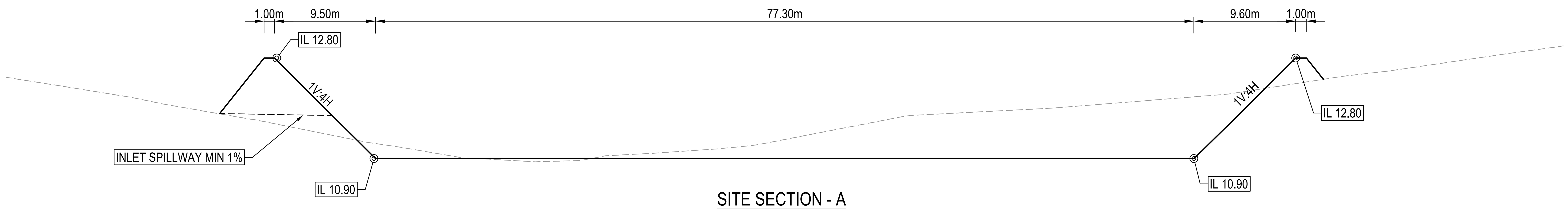
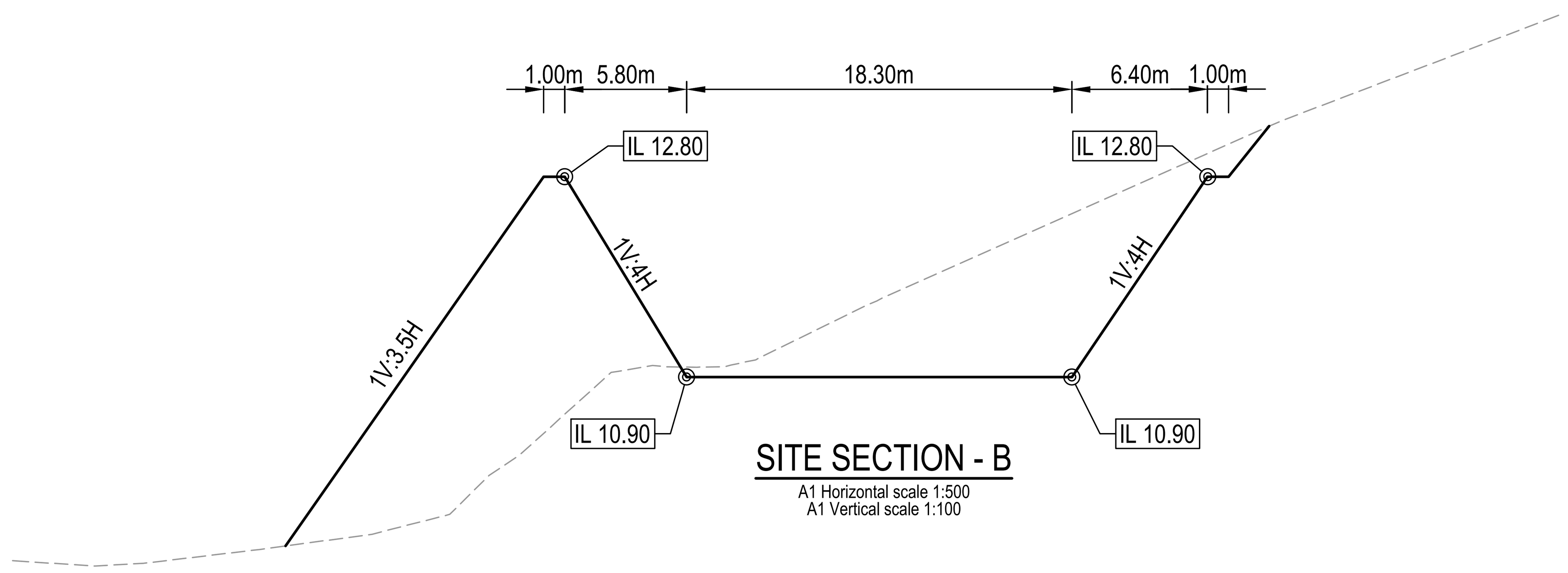
Zero Damage - Zero Harm



SITE SECTION - A
A1 Horizontal scale 1:500
A1 Vertical scale 1:100



SITE SECTION - B
A1 Horizontal scale 1:500
A1 Vertical scale 1:100

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Zero Damage - Zero Harm

Issue.	Description	Date	Drawn	Approved
B	ISSUED FOR INFORMATION	27.11.24	MDM	JR
A	ISSUED FOR INFORMATION	18.11.24	MDM	JR

North

Scale
SCALE BAR 1:100 @A1 1:200 @A3 (0, 1, 2, 4, 6m)
SCALE BAR 1:500 @A1 1:1000 @A3 (0, 5, 10, 20, 30m)

PRINT IN COLOUR

Client
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Architect
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100 RYANS ROAD
GILLIESTON HEIGHTS, NSW, 2321

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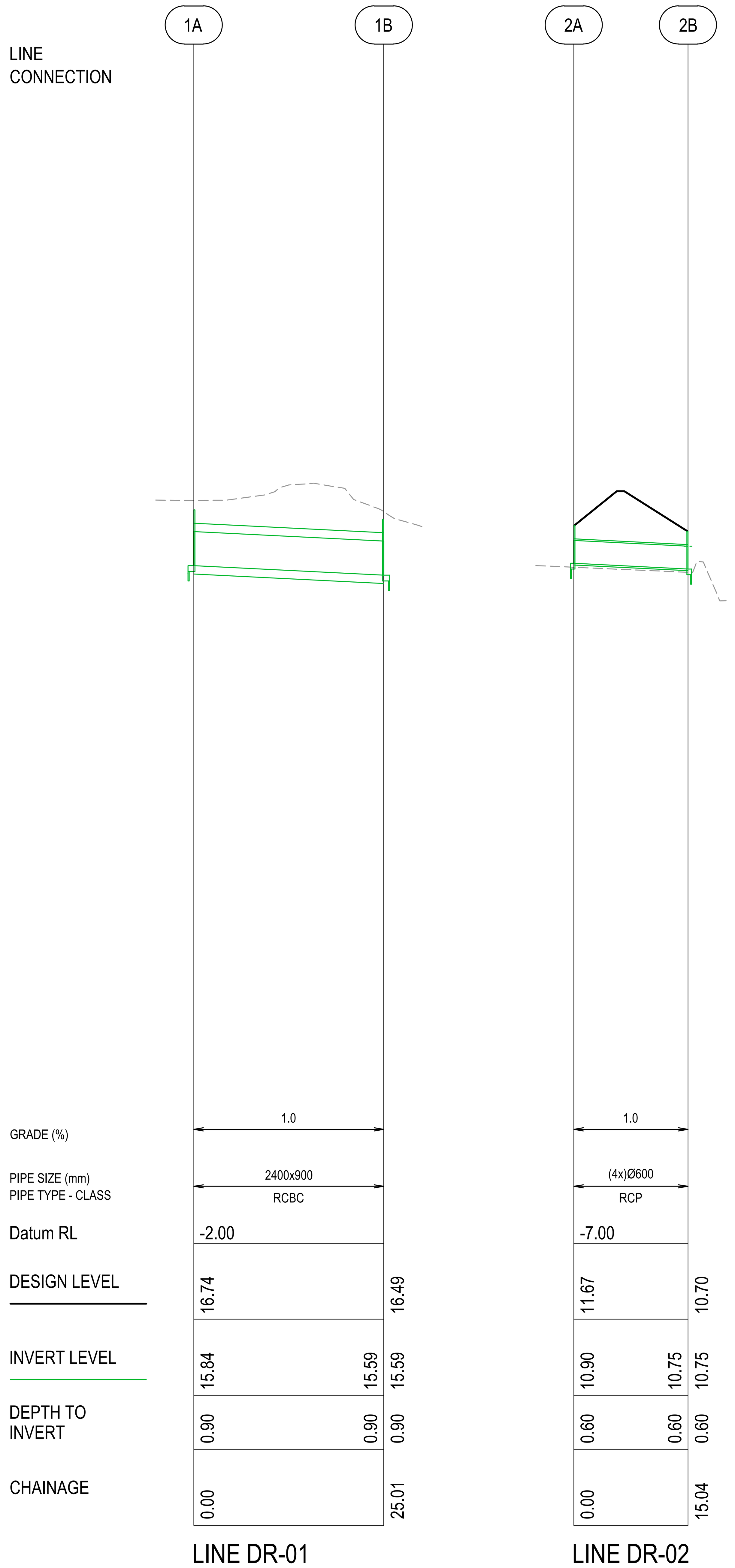
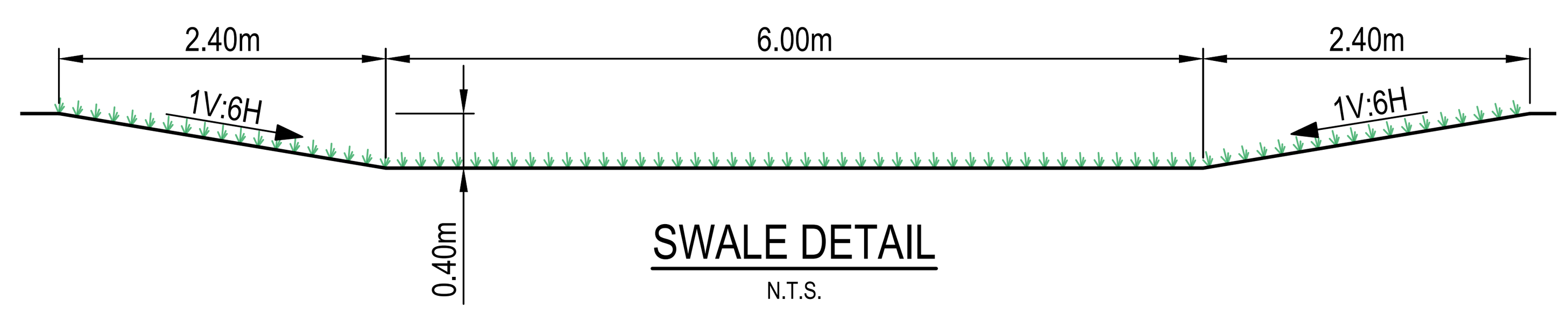
Drawing Title
CIVIL
PROPOSED NORTHERN BASIN SECTIONS

Drawn	Designed	Q.A. Check	Date	Scale @ A1
MDM	NS			AS SHOWN

Project No.	Drawing No.	Issue
NS221454	SKC102	B

Nov 27, 2024 - 5:08pm





BEFORE YOU DIG
www.byda.com.au
Zero Damage - Zero Harm

Issue	Description	Date	Drawn	Approved
B	ISSUED FOR INFORMATION	27.11.24	MDM	JR
A	ISSUED FOR INFORMATION	18.11.24	MDM	JR

North

Scale
SCALE BAR 1:100 @A1 1:200 @A3 (0 1 2 4 6m)
SCALE BAR 1:500 @A1 1:1000 @A3 (0 5 10 20 30m)

PRINT IN COLOUR

Client: NSW Government Education School Infrastructure

Architect: SHAC
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Project: GILLIESTON PUBLIC SCHOOL
100 RYANS ROAD
GILLIESTON HEIGHTS, NSW, 2321

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Drawing Title: CIVIL
PROPOSED NORTHERN BASIN DRAINAGE DETAILS

Drawn	Designed	Q.A. Check	Date	Scale @ A1
MDM	NS			AS SHOWN

Project No.	Drawing No.	Issue
NS221454	SKC103	B