TTW Structural Civil Traffic Façade

Flooding SSD Report

Children's Medical Research Institute (CMRI) – Gene Technologies Building (GTB)

Prepared for Children's Medical Research Institute (CMRI) NSW / 2 September 2025

212012

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Rev	Date	Prepared by	Approved by	Remarks
A	17/05/2024	RC/MK	JM	Draft SSDA Submission
B	20/06/2024	RC/MK	JM	Final SSDA Submission
C	12/12/2024	RC/JM	JM	Updated SSDA Submission
D	14/01/2025	RC/JM	JM	Updated SSDA Submission
E	02/09/2025	RC/MK	TM	Updated SSDA Submission - SIP

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1.0 Introduction

This report addresses the SEARS flooding requirements in relation to the proposed Children's Medical Research Institute (CMRI) - Gene Technologies Building (GTB) development. The relevant requirements of City of Parramatta's Development Control Plan (DCP) and engineering specifications are also referenced.

This Revision E repot has been updated (i.e. from the previous Revision D report) with references to the now endorsed (by NSW Department of Planning and Environment in January 2025) shelter-in-place (SIP) guidance for flash flooding.

1.1 Existing Site

The site (known as Lot 101 DP 1119583) is located on the corner of Hawkesbury Road and Research Lane, Westmead, which is within the Parramatta Local Government Area (LGA). The site is currently developed with the eastern corner of the site comprising of the Ainsworth Tower which was constructed as Stage 1 of the CMRI upgrade works. This structure will be retained alongside the proposed Stage 2 works described in this report. The site is bounded by Hawkesbury Road to the south-east, the Westmead Institute for Medical Research (WIMR) building to the south-west, the Kids Research Building to the north-west and Kids Park to the north-east. Figure 1 shows the site location and its surrounding areas.



Figure 1 - CMRI GTB Site Locality

1.2 Proposed Works

The proposed design includes the staged construction of a multi-storey medical research building including car park, landscaping and associated infrastructure, Children's Medical Research Institute, located at Lot 101 DP 1119583, Hawkesbury Road, Westmead.

The proposed Civil Works as part of this SSDA (State Significant Development application) comprise:

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- Site preparation works including demolition, bulk excavation and removal of existing structures on the site, tree and vegetation clearing and bulk earthworks;
- New stormwater collection and treatment;
- New pavements;
- Landscaping;
- Coordination with existing services; and
- Compliance with Development Control Plan (DCP) requirements.

The architectural departmental plan for the GTB site, prepared by Hassell Architectural Consultants for this project are attached in Appendix A. Refer to TTW's SSDA Civil Engineering Report Revision B (Appendix B) for TTW's civil design drawings that this flood assessment has been based upon.

1.3 SEARS Requirements

The development falls under a State Significant Development (SSD) application. The flooding related requirements for hospitals, medical centres and health research facilities specified as part of the Industry Specific Planning Secretary's Environmental Assessment Requirements (SEARS) are included in Table 1 below. These are addressed in the subsequent sections of this report to support the SSD submission.

Table 1 - Industry Specific (Hospitals) SEARS

SEARS Item	Requirements	Section Reference (this report)
14 - Flooding Risk	Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.	Previous flood studies discussed in Section 2.2. Current assessment discussed in Section 4.2-4.4. Potential effects of climate change discussed in Section 4.5.
	Where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a flood impact and risk assessment (FIRA) prepared in accordance with the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01.	Impacts of the development discussed in Section 4.5.
	Detail design solutions and operational procedures to mitigate flood risk where required.	Current assessment discussed in Section 4.2-4.4. Potential effects of climate change discussed in Section 4.5. Flood planning and development controls discussed in Section 5.3.

This report provides an assessment of flood conditions at the site in accordance with the requirements of the Secretary's Environmental Assessment Requirements (SEARs) and summarises the flood modelling results for both the existing and proposed site conditions in the 1% Annual Exceedance Probability (AEP) and Probable Maximum Flood (PMF) events. A flood impact assessment has also been undertaken to investigate the potential flood impacts of the proposed development, on neighbouring properties.

1.4 Guidance Documents

The following documents have been reviewed and referenced in preparing this report:

- City of Parramatta (CoP) Development Control Plan (DCP) 2023;
- Parramatta Local Environmental Plan (LEP) 2023;
- Upper Parramatta River Catchment Floodplain Risk Management Study and Plan (Bewsher, 2003);
- Parramatta Light Rail Flooding Technical Paper (Arup, 2017);

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- Parramatta Light Rail Stage 1 Infrastructure – Flood Assessment Report (WSPAJV, 2019);
- Children's Hospital Westmead (CHW) Paediatric Services Building (PSB) Flood Impact Assessment (Arup, Rev 01, February 2021);
- Children's Hospital Westmead (CHW) Kids Park Flood Impact Assessment (Arup, Rev 02, March 2023);
- Shelter-in-place guideline for flash flooding, NSW Department of Planning and Environment, January 2025;
- Flood Risk Management Manual, NSW Department of Planning and Environment, 2023; and
- Australian Rainfall and Runoff 2019.

1.5 Objectives and Methodology

The objective of this report is to assess the site's local flooding conditions in accordance with the *Flood Risk Management Manual (2023)* and address the flooding requirements of the SEARs with regards to the proposed redevelopment. This assessment involved the following methodology:

- Obtain available flood information relative to the site from the City of Parramatta Council.
- Obtain the hydraulic model (TUFLOW) previously established by Arup as part of the Kids Park flood impact assessment and determine the site existing flood characteristics for the 1% AEP and PMF events.
- Incorporate the proposed design into the base case TUFLOW model and assess the site flood characteristics in the proposed site conditions for the 1% AEP and PMF events.
- Prepare relevant flood maps including flood extents, depths, levels, velocities, hazards and impacts.
- Comment on flood characteristics and model outcomes for the existing and proposed site conditions in accordance with the flooding requirements of the SEARs.

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2.0 Existing Flood Information

TTW note that there are two identified flood mechanisms relevant to the CMRI Stage 2 redevelopment as follows:

- Mainstream flooding from Toongabbie Creek/Parramatta River.
- Localised overland flow.

2.1 Council Flood Enquiry

A Flood Enquiry application was submitted in April 2022 to acquire flood drainage investigation information from the City of Parramatta Council (Refer to Appendix AB). It was found that the site does not fall within the flood inundation area, based on the Upper Parramatta River Flood Study, as shown in Figure 2 and is not affected by the Parramatta River or Toongabbie Creek flood extents during all flood events up to and including the PMF.

It should, however, be noted that the Upper Parramatta River Flood Study was published in 2003 and is therefore outdated and does not conform to current flood study guidelines, particularly in terms of hydraulic modelling. Additionally, the investigation noted that the site is subject to detailed investigation to determine if the property is likely to be affected by overland stormwater run-off from the local catchment. Therefore, a site-specific flood assessment was undertaken to determine the site flood conditions with relation to the local catchment.

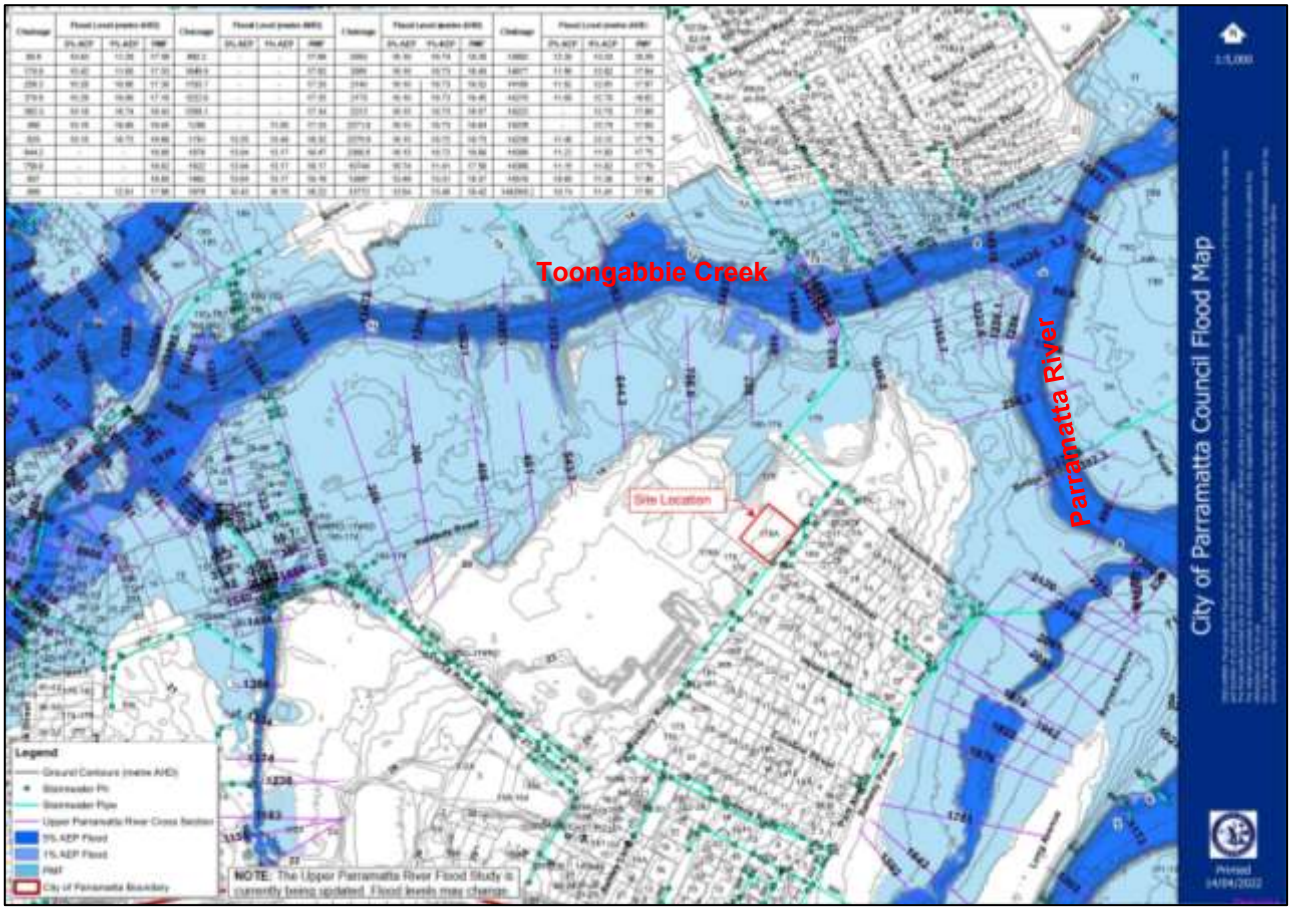


Figure 2 – Flood map provided by Council (based on Upper Parramatta River Catchment Floodplain Risk Management Study and Plan, Bewsher, 2003)

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2.2 Previous Flood Studies

Parramatta is a low-lying catchment area fed by 39 tributary creeks, any of which can cause flooding. Flood information in the City of Parramatta LGA has primarily been developed through a number of flood studies throughout the 2000s.

2.2.1 Parramatta Flood Study Reports

As aforementioned, the *Upper Parramatta River Catchment Floodplain Risk Management Study and Plan* is the original Flood Study (Bewsher, 2003) adopted by the City of Parramatta Council relative to the site. It was completed using River MIKE 11 software which is a one-dimensional model.

Due to changes in the catchment and advances in modelling software, Council commissioned Stantec to produce a draft Flood Study in 2023 to assist in floodplain management, development control and emergency management. The draft study models mainstream flooding from rivers and creeks and includes overland flooding from stormwater drains and the local overland catchment. This was the most significant update to the City's flood data in 20 years. Updated flood maps from this draft study were released on 18th September 2023. A comparison of the currently adopted 1% AEP event flood extent (derived from the 2003 Flood Study) and the draft 2023 flood extent is presented in Figure 3 and Figure 4 respectively. PMF extents for the current and draft study are presented in Figure 5 and Figure 6, respectively. It should be noted that these flood maps are taken from Council's interactive flood mapping service and that the 2023 results were still in draft form at the time of preparation of this report. Therefore, this information is consequently subject to change without notice.

Results indicate that Bewsher's 2003 flood study found that the site was unaffected by mainstream flooding but did not capture the vulnerability of the site to overland flooding. By contrast, the draft 2023 study found that the site is affected by overland flooding in both the 1% AEP and PMF events.



Figure 3 - Location of site (outlined in red) in relation to the current 1% AEP flood extents for the City of Parramatta LGA (Adapted from City of Parramatta Council, 2024).

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Figure 4 - Location of site (outlined in red) in relation to the proposed (draft) 1% AEP flood extents for the City of Parramatta LGA (Adapted from City of Parramatta Council, 2024).



Figure 5 - Location of site (outlined in red) in relation to the current PMF extents for the City of Parramatta LGA (Adapted from City of Parramatta Council, 2024).

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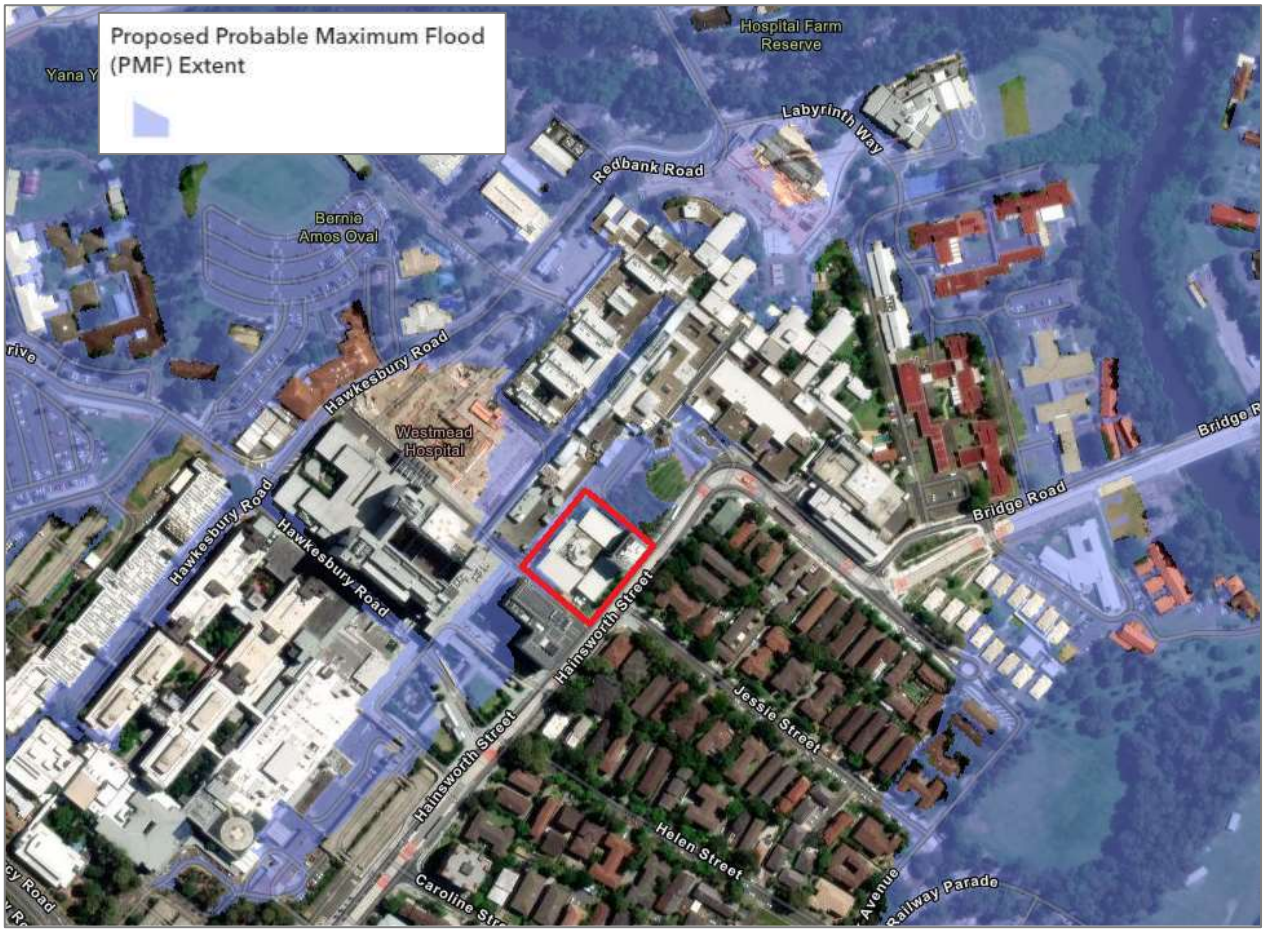


Figure 6 - Location of site (outlined in red) in relation to the proposed (draft) PMF extents for the City of Parramatta LGA (Adapted from City of Parramatta Council, 2024).

2.2.2 Parramatta Light Rail - Flooding Technical Paper (Arup, 2017)

Arup prepared a flooding study for Parramatta Light Rail – Stage 1 project (PLR) as part of the Environmental Impact Statement (EIS) for the light rail project. The study was carried out in response to the Secretary's Environmental Assessment Requirements (SEARs) to identify and assess the hydrology and flooding impacts of the project during both construction and operation.

Arup established five 1D/2D TUFLOW GPU models to identify overland flow behaviour within the catchment. The model was based on the Upper Parramatta River Catchment flood study previously completed by Bewsher (2003). The five models are identified as detailed below and shown in Figure 7:

- Westmead – Westmead terminus to Bridge Street bridge over Parramatta River, Cumberland Hospital
- North Parramatta Bridge Street bridge over Parramatta River, Cumberland Hospital to Lennox Bridge
- Parramatta CBD – Lennox Bridge to Parramatta River under bridge, Camellia
- Camellia - Parramatta River under bridge to Silver Water Road over Parramatta River
- Carlingford – Carlingford terminus to Rydalmere Street (Vineyard Creek outlet) Parramatta River

The temporal patterns adopted for the PLR project for events up to the 1% AEP are as per the Zone 1 patterns outlined in AR&R87. The design temporal distribution specified in the Generalised Short Duration Method (GSDM) procedure was utilised for determining PMP temporal rainfall distribution.

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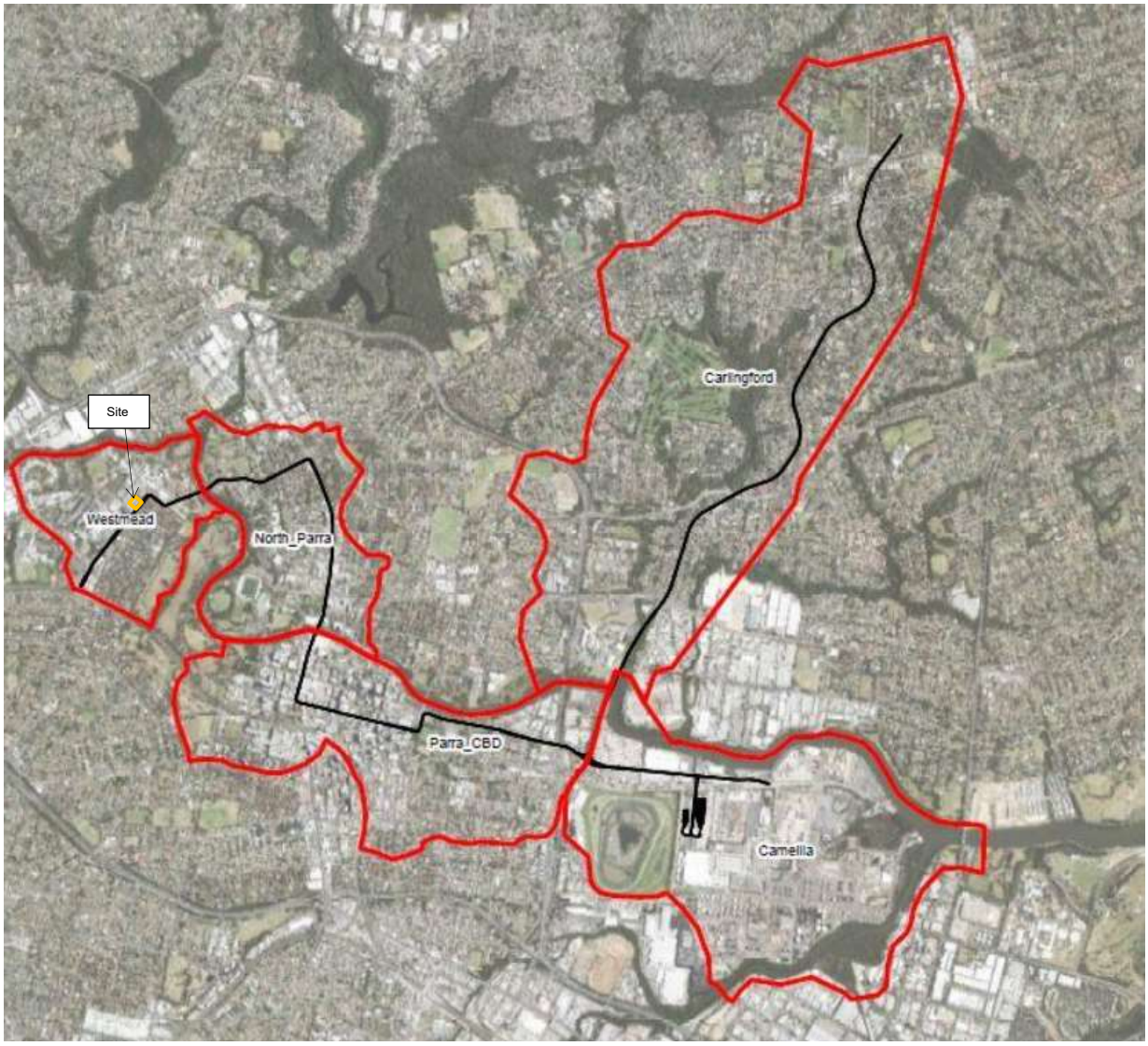


Figure 7 - Catchment Boundaries – (Source: Flooding Technical Paper – Parramatta Light Rail, Arup 2017)

2.2.3 PLR Stage 1 Infrastructure – Flood Assessment Report (WSPAJV, 2019)

The WSP, Aurecon, Parramatta Light Rail (PLR) Joint Venture (WSPAJV) completed a flood assessment for the Parramatta Light Rail – Stage 1 to assess the impacts of flooding on the project. The hydraulic 1D/2D TUFLOW model originally prepared by Arup (2017), during the EIS assessment, was used as the basis of this study. Figure 8 shows the catchment boundaries adopted in the modelling carried out as part of this study.

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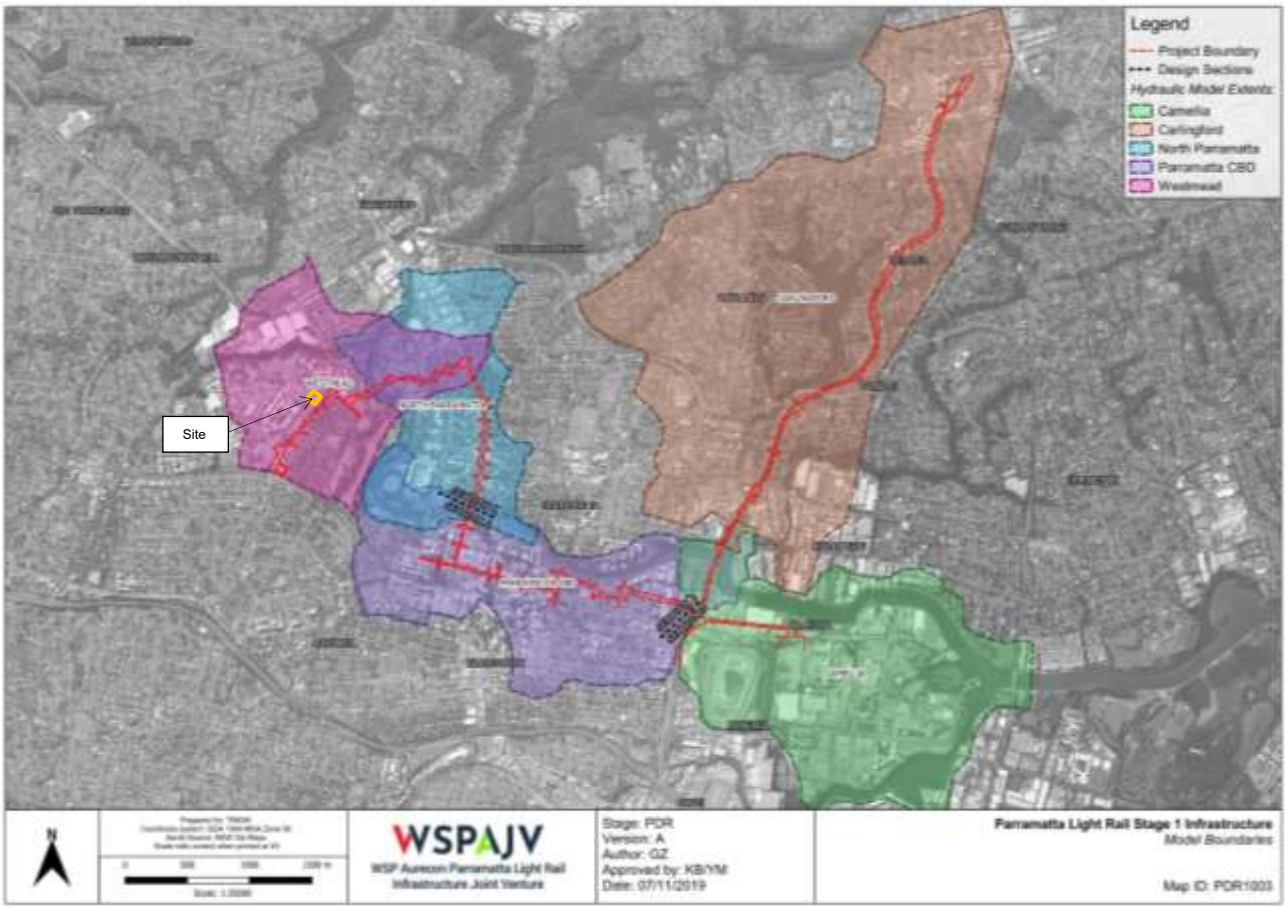


Figure 8 - Catchment Boundaries (Source: Parramatta Light Rail Stage 1– Parramatta Light Rail Stage 1 Flood Assessment Report WSPAJV, 2019)

As with the draft 2023 Flood Study, the PLR Stage 1 Infrastructure – Flood Assessment Report (WSPAJV, 2019) found that the CMRI site is affected by localised overland flooding.

The PLR Stage 1 Infrastructure – Flood Assessment Report shows peak flood depths across the CMRI Stage 2 site. The estimated peak flood depth for the 5% AEP, 1% AEP and PMF are shown in Figure 9, Figure 10 and Figure 11 respectively.

These maps show localised flooding to a maximum depth of 500mm in the 1% AEP and more extensive flooding to depths greater than 500mm in the PMF. The depth bands used make it difficult to determine exact flood levels, but these are estimated to be a maximum of about 21.5m in the 1% AEP and 21.8m in the PMF. These are generally consistent with the previous Arup study (2017) which is to be expected.

The PLR works are shown to have minimal impact on flood levels in the 1% AEP and PMF events. Figure 12 shows the peak flood afflux for the 1% AEP event which indicates developed flood levels will be within +/- 10mm of existing levels. Figure 13 shows the peak flood afflux for the PMF event which indicates flood levels will decrease between 30-100mm within the area north of the GTB site (i.e. area west of Kids Park) and increase up to 30mm in the forecourt area.

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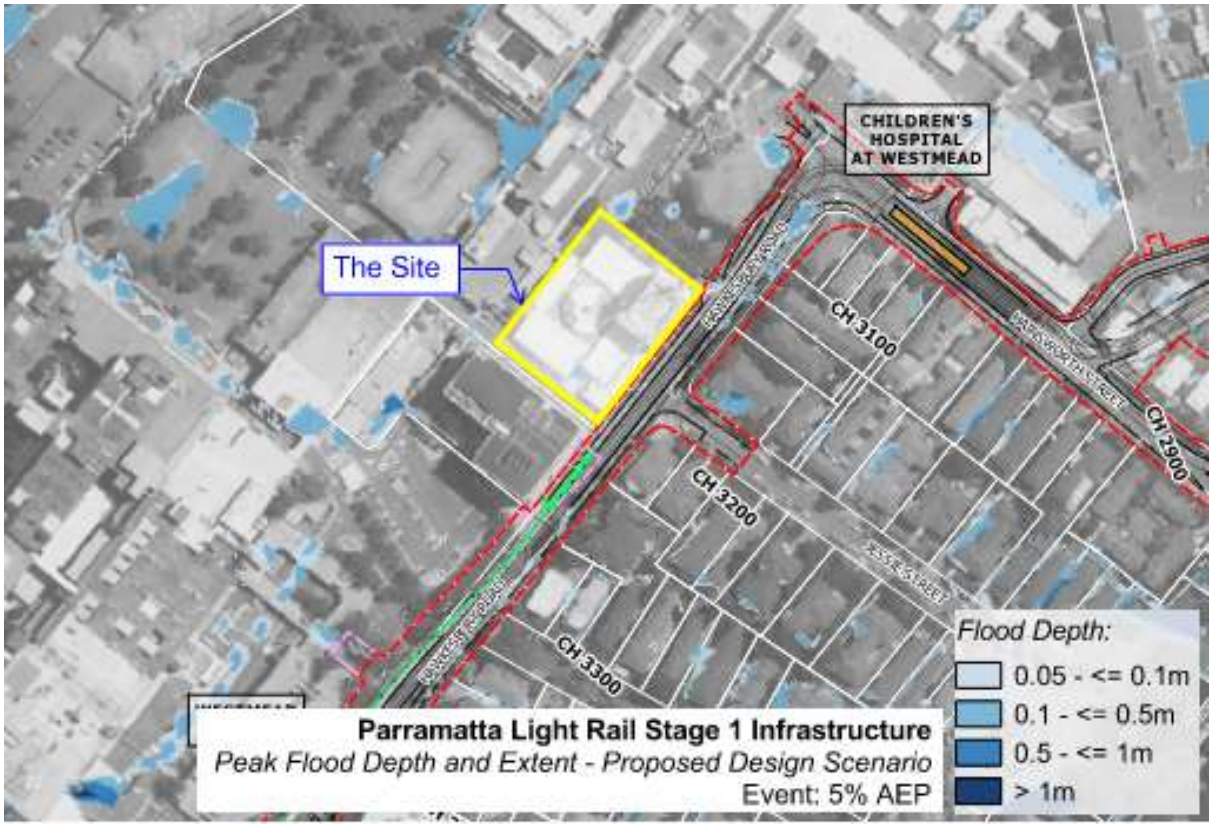


Figure 9 - PLR Stage 1 Infrastructure – 5% AEP Proposed Peak Flood Depth (Source: PLR Flood Assessment Report (PLR1INF-WSPA-ALL-SD-RPT-090001) Rev B 25/10/19, WSPAJV)

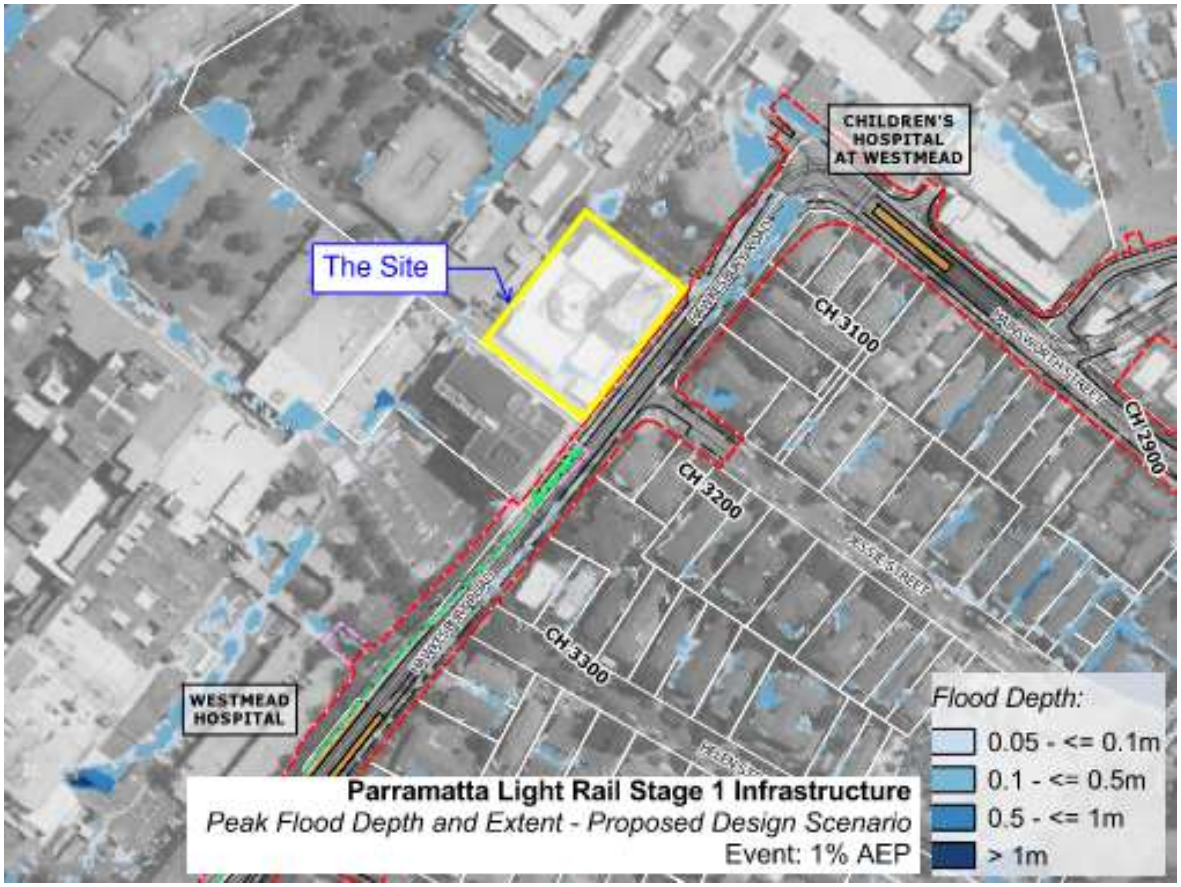


Figure 10 - PLR Stage 1 Infrastructure – 1% AEP Proposed Peak Flood Depth (Source: PLR Flood Assessment Report (PLR1INF-WSPA-ALL-SD-RPT-090001) Rev B 25/10/19, WSPAJV)

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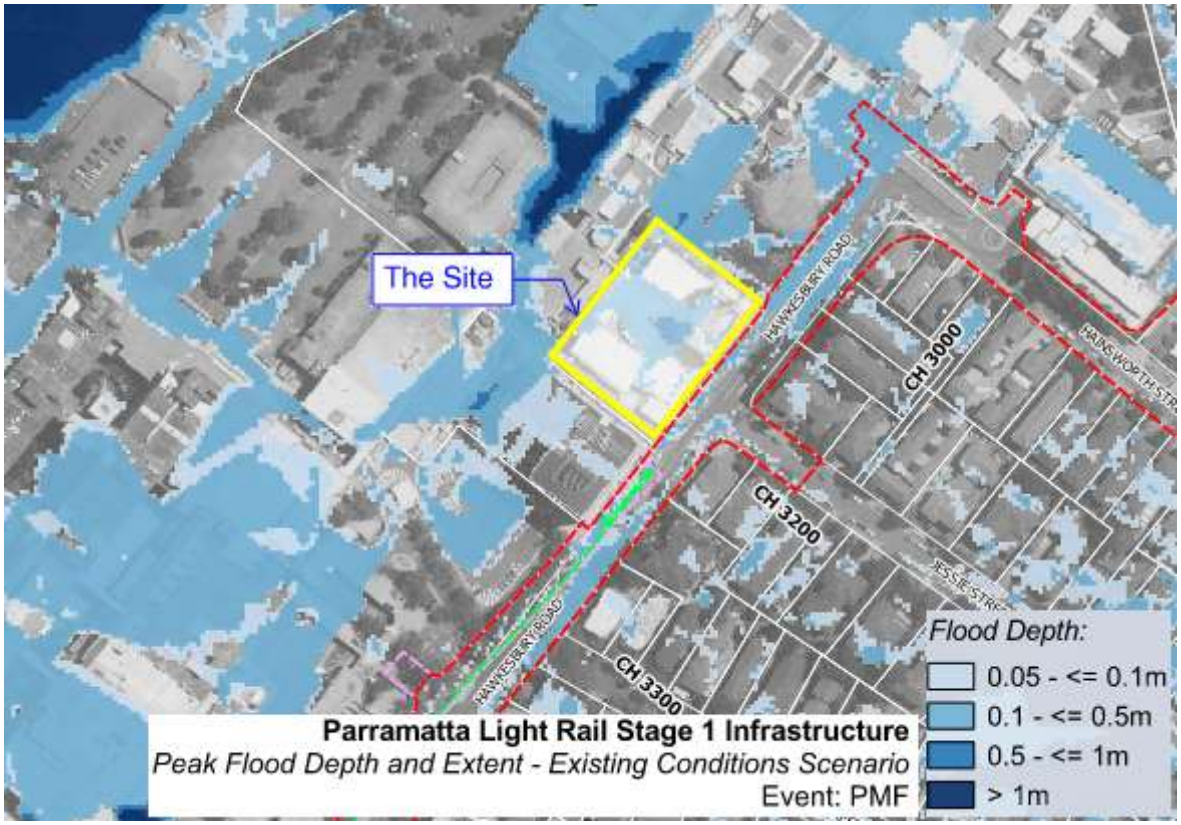


Figure 11 - PLR Stage 1 Infrastructure - PMF Proposed Peak Flood Depth (Source: PLR Flood Assessment Report (PLR1INF-WSPA-ALL-SD-RPT-090001) Rev B 25/10/19, WSPAJV)

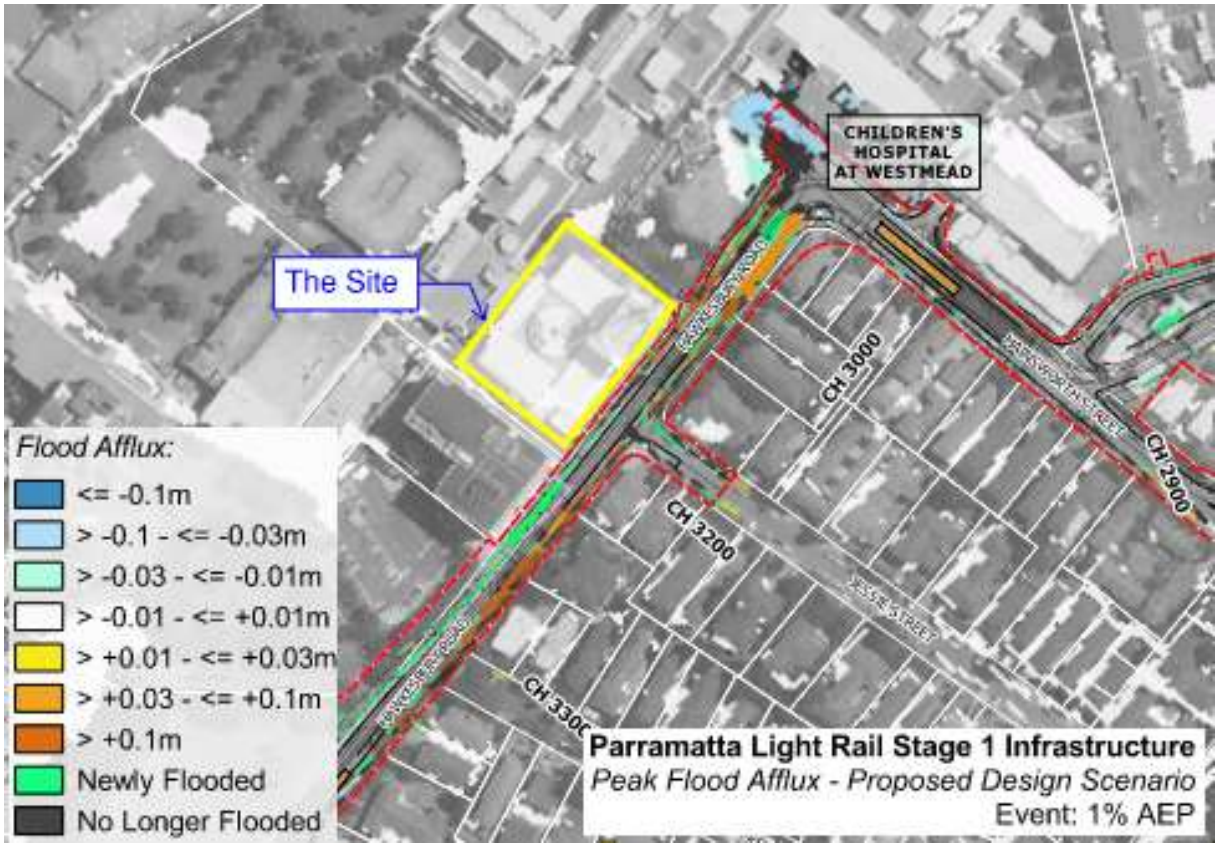


Figure 12 - PLR Stage 1 Infrastructure - 1% AEP Peak Flood Afflux (Source: PLR Flood Assessment Report (PLR1INF-WSPA-ALL-SD-RPT-090001) Rev B 25/10/19, WSPAJV)

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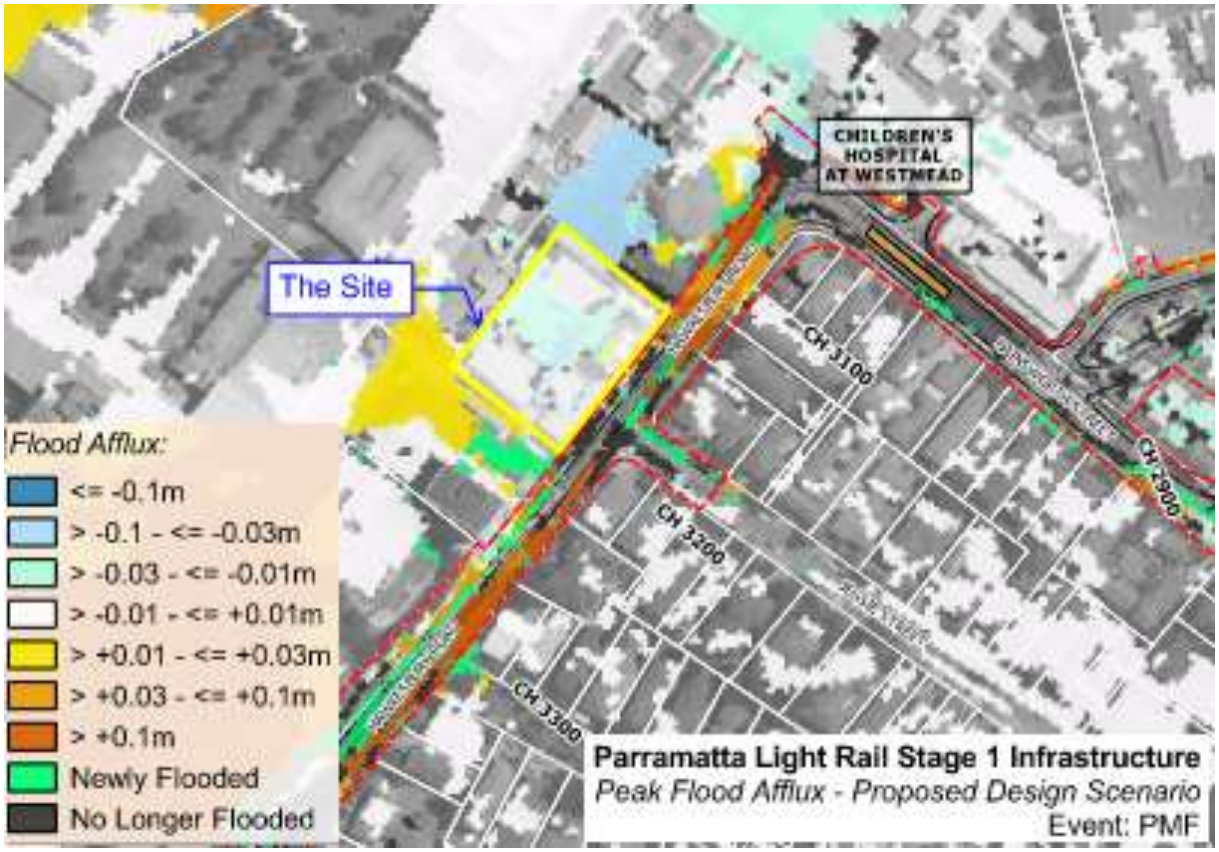


Figure 13 - PLR Stage 1 Infrastructure - PMF Peak Flood Afflux (Source: PLR Flood Assessment Report (PLR1INF-WSPA-ALL-SD-RPT-090001) Rev B 25/10/19, WSPAJV)

2.2.4 CHW PSB Building Flood Impact Assessment (Arup, 2021)

Arup were commissioned by NSW Health Infrastructure (HI) to undertake a Flood Impact Assessment for the proposed Paediatric Services Building (PSB) as part of the Children's Hospital Westmead (CHW) Stage 2 works.

The main purpose of this flood assessment was to provide an assessment of flood risk to the Paediatric Services Building development in compliance with, and adherence to, applicable planning controls including the Secretary's Environmental Assessment Requirements (SEARS)

As part of the flood assessment, Arup developed a site-specific flood model in TUFLOW using work previously completed for Central Acute Services Building (CASB) and for Parramatta Light Rail (PLR) and combined the above information with additional site survey to create a combined river and overland model. The final model extent and combined data are shown in Figure 14.

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Figure 14 - Model Extent and Combined Data, CHW Stage 2 (Arup, 2021)

This assessment investigated the potential flood affection of the site from both riverine flooding (i.e., from Toongabbie Creek and Upper Parramatta River) and overland flow flooding mechanisms. This assessment confirms that the site is not affected by floodwaters from Toongabbie Creek nor Parramatta River mainstream bank overflows during flood events up to and including the PMF.

Flood maps of the 1D/2D TUFLOW model for the 1% AEP and PMF relative to the site are presented in Figure 15 and Figure 16 respectively.

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Figure 15 - 1% AEP Riverine Flood Map (Source: Children's Hospital Westmead Stage 2 Flood modelling and assessment, Arup, 2021)



Figure 16 - PMF Riverine Flood Map (Source: Children's Hospital Westmead Stage 2 Flood modelling and assessment, Arup, 2021)

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Further, the flood modelling results for CHW Stage 2 (Arup, 2021) confirms that:

- The flood modelling results are not significantly different from those of PLR model.
- The peak flood levels around the PSB site do not significantly increase from the 1% AEP to the 0.5% AEP and 0.2% AEP events.
- The proposed Gene Technologies Building (the subject site of this study) immediate surrounding areas are generally affected by overland flows in the 1% AEP and PMF events.

2.2.5 CHW Kids Park Flood Impact Assessment (Arup, 2023)

Arup were commissioned by NSW Health Infrastructure (HI) to undertake a Flood Impact Assessment for the proposed Kids Park as part of the Children's Hospital Westmead (CHW) Stage 2 works.

The main purpose of this flood assessment was to provide an assessment of flood risk to the Kids Park development in compliance with, and adherence to, applicable planning controls including the Secretary's Environmental Assessment Requirements (SEARS).

It is understood that Arup adopted the TUFLOW flood model developed as part of the Children's Hospital Westmead Paediatric Services Building Flood Impact Assessment (Arup, 2021) as the basis for the Kids Park assessment. The base model adopted for the Kids Park assessment has been updated with the following:

- Updated survey information for the Kids Park/Forecourt area;
- The constructed Hawkesbury Road pedestrian crossing surveyed data;
- The constructed set down area road works at the Children's Hospital entryway;
- The constructed set down area stormwater works at the Children's Hospital entryway; and
- Refinements of the model 1d stormwater network to improve model stability.

Similar to the Children's Hospital Westmead Paediatric Services Building Flood Impact Assessment (Arup, 2021), the 2023 Arup assessment has demonstrated that the subject site is surrounded by overland flow flood inundation in the 1% AEP and PMF events. Flood maps of the developed case model for the 1% AEP and PMF relative to the site are presented in Figure 17 and Figure 18 respectively.

The 2023 Arup assessment also indicated that increases in flood level of more than 10mm are anticipated as a result of the Kids Park development. These impacted areas include the north-eastern, northern and north-western boundary areas of the GTB site. Figure 19 and Figure 20 show the estimated flood level affluxes for the 1% AEP and PMF events respectively.

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Figure 17 - 1% AEP Flood Map (Source: Children's Hospital Westmead Kids Park Flood Impact Assessment, Arup, 2023)

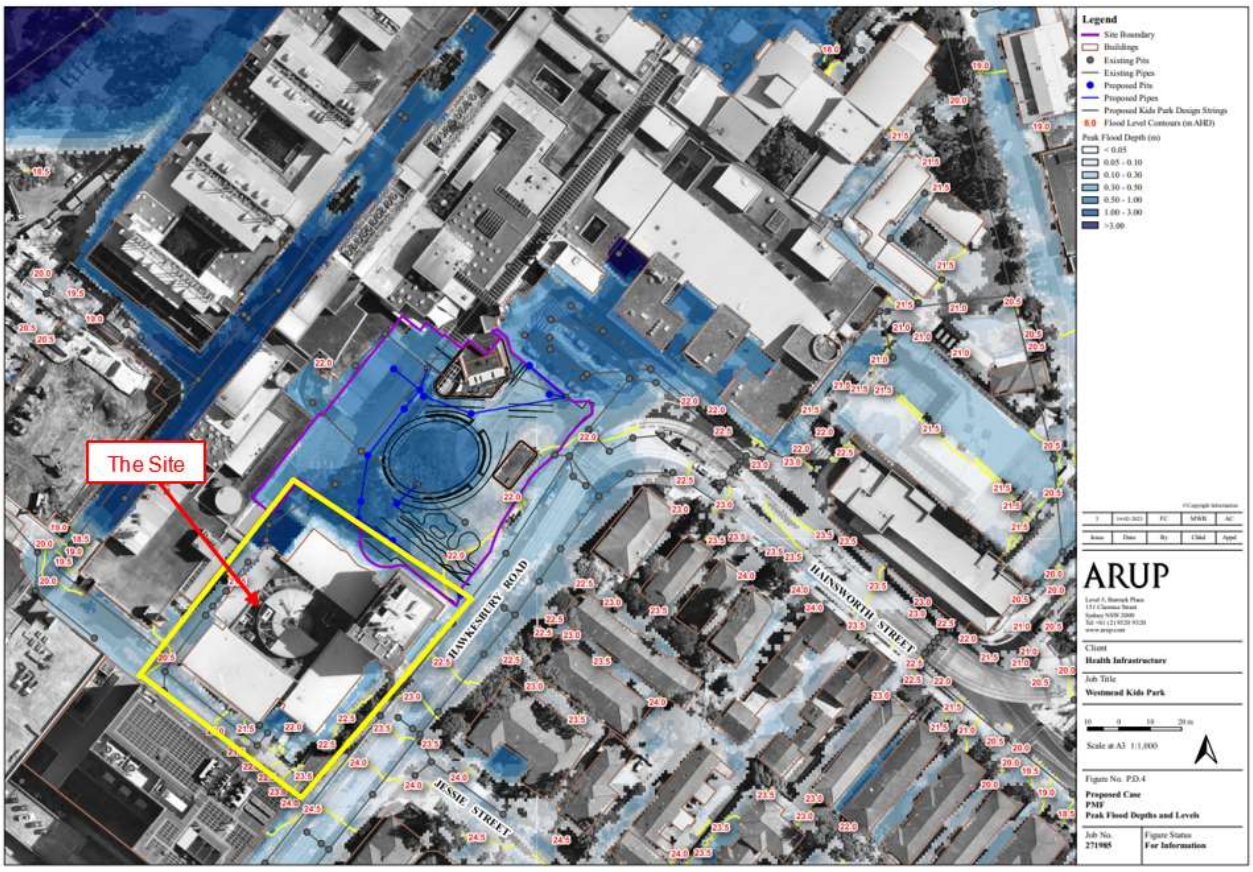


Figure 18 - PMF Flood Map (Source: Children's Hospital Westmead Kids Park Flood Impact Assessment, Arup, 2023)

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Figure 19 - 1% AEP Flood Level Afflux Map (Source: Children's Hospital Westmead Kids Park Flood Impact Assessment, Arup, 2023)



Figure 20 - PMF Flood Level Afflux Map (Source: Children's Hospital Westmead Kids Park Flood Impact Assessment, Arup, 2023)

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3.0 Hydraulic Model

The TUFLOW model and associated data adopted for the CHW Kids Park Flood Impact Assessment (Arup, 2023) were provided to TTW as part of the GTB assessment. TTW has used the developed case model of the 2023 Arup assessment as the basis to assess the site flood conditions. This model was used as the developed case model of the 2023 Arup assessment included the survey data and design of the Kids Park development area, which is located adjacent (north-east) of the GTB site. This has provided an up-to-date and more accurate representation of the surface elevations of the area surrounding the GTB site.

The GTB modelling has been carried out using the TUFLOW version 2020-10-AA single precision in HPC (Heavy Parallelised Computing) scheme with SGS (Sub-Grid Sampling) at 1m distance. These remained similar to that adopted for the Children's Hospital Westmead Kids Park Flood Impact Assessment (Arup, 2023). The Arup report provides a more detailed description of model development and assumptions adopted for the original TUFLOW model supplied to TTW.

3.1 2D Model Domain

The model domain as received from Arup covers an area of circa 2.25km^2 straddled upstream of the confluence point of Toongabbie River and Parramatta River as shown in Figure 21.

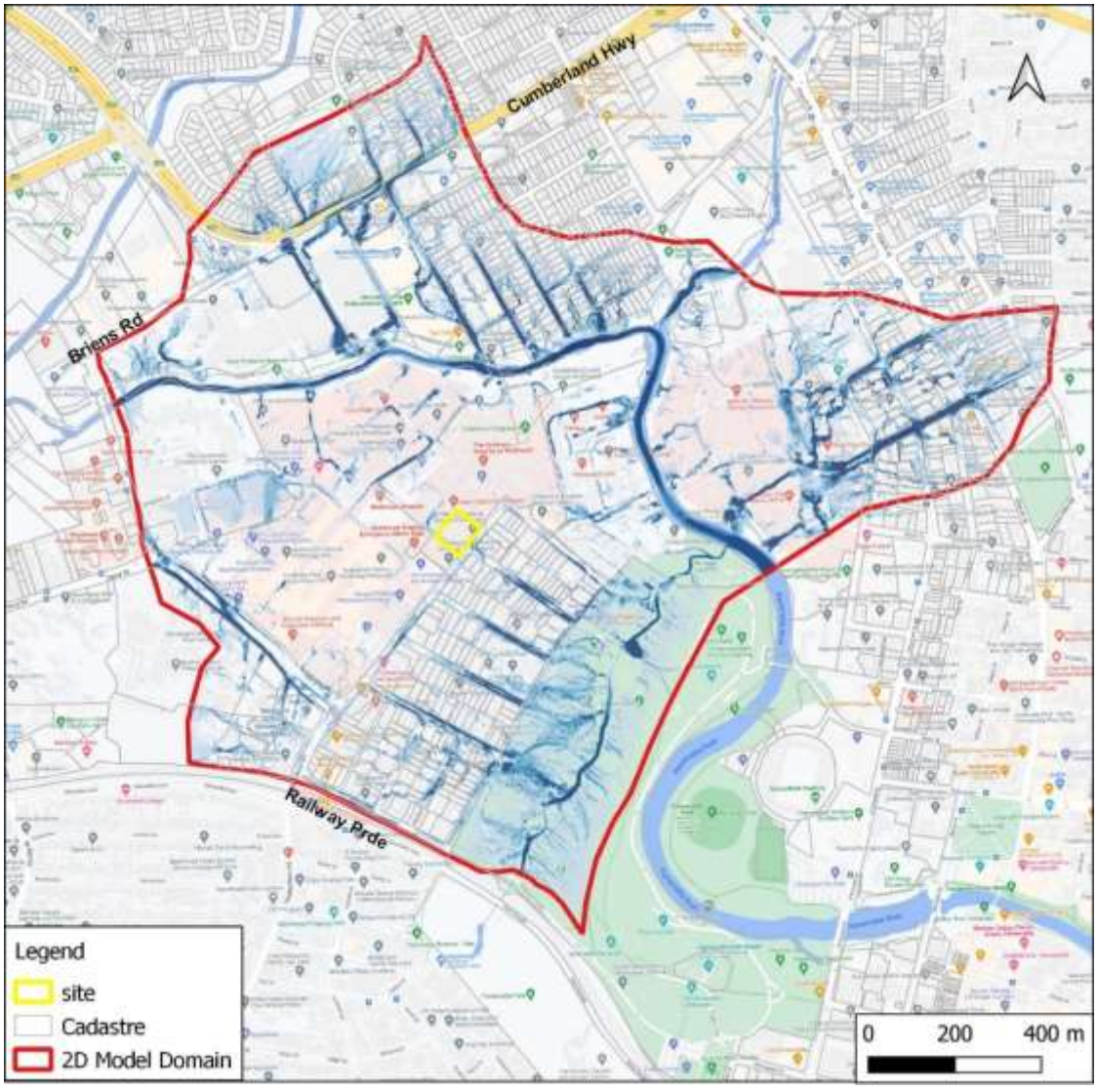


Figure 21– 2D Model Domain Boundary

The model uses a 2m grid cell size. The grid cell size of 2m is considered to be sufficiently fine to appropriately represent the variations in topography and land use within the study area.

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3.2 TUFLOW 1D Model Domain

The existing 1D network was retained inside the model, consistent with the original Children's Hospital Westmead Kids Park Flood Impact Assessment (Arup, 2023) model which includes the following data.

- Information received from Parramatta Light Rail;
- Information from CASB Flood Model;
- Information provided by LTS Lockley Survey;
- Pipe blockages based on the Council DCP requirements as applied in the CHW flood assessment; and
- Stormwater system proposed as part of the Kids Park development.

3.3 Topography

The surface elevation data adopted in the original Children's Hospital Westmead Kids Park Flood Impact Assessment (Arup, 2023) developed case model was used to form the existing surface in TUFLOW model for this GTB assessment, which included the design data of the Kids Park development.

3.4 Building Footprints

The footprints of buildings within the model domain were defined with nulled cells to act as blockage and prevent floodwater to flow through. Building outlines within the model remained similar to that of the original model provided.

3.5 Hydraulic Roughness and Rainfall Losses

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 resistance to the flow. Roughness in TUFLOW is modelled using the Manning's (n) roughness co-efficient. Manning's roughness materials adopted for this GTB assessment remained similar to the original 2023 Arup's model. Manning's values and rainfall losses adopted are detailed in Table 2.

Table 2 - Adopted Manning's Values

Land use category	Manning's (n)	IL (mm)	CL (mm)
Grass	0.030	10	2.5
Low Density Residential	1.000	6	1.5
Medium Density vegetation	0.045	10	2.5
Roof and Paved Ground	0.020	1	0
Road Pavement	0.020	1	0
Creek/Riverbed	0.035	0	0
Heavy Density vegetation	0.070	10	2.5
Creek/Riverbed between confluence of Toongabbie Creek	0.030	0	0

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3.6 Boundary Conditions

Arup's TUFLOW model (2023) defines the model inflows generally through 'rainfall-on-grid' methodology and further applied inflow hydrographs extracted from a DRAINS hydrologic model to simulate the discharge flows of the building roof catchments directly into the stormwater pipes.

The Toongabbie Creek and Parramatta River inflow/tailwater boundary conditions have been derived from the City of Parramatta Council's Parramatta River MIKE11 model and the PLR North Parramatta TUFLOW model. Arup's TUFLOW model assumes a coincidental riverine and overland flow flooding at Toongabbie Creek and Parramatta River which is a conservative approach. Therefore, model boundaries were retained as received.

3.7 Flood Modelling Events

The 1% AEP and PMF events have been modelled and assessed as part of this GTB assessment to determine the flood characteristics as well as flood impacts as a result of the GTB redevelopment. All five design storms and four design storms adopted in the 2023 Arup's assessment model for the 1% AEP and PMF events, respectively have been simulated for this GTB assessment. Table 3 below summarises the design storms modelled and assessed as part of this GTB assessment.

Table 3 – Design Storm Events Adopted

AEP Event	Design Duration
1%	15 min
	25 min
	90 min
	120 min
	540 min
PMF	15 min
	30 min
	60 min
	180 min

3.8 Flood Modelling Scenarios

A total of two modelling scenarios were assessed as part of this GTB assessment, which include:

- Pre-development Scenario – this is the scenario where the GTB site has been represented as it exists now and, as discussed in Section 3.0, the developed case model of the 2023 Arup assessment has been used.

- Post-development Scenario – this is the scenario where the works proposed as part of the GTB redevelopment have been considered and incorporated into the pre-development model. Design levels for the areas surrounding the proposed building footprint of GTB were incorporated into the pre-development model.

Figure 22 shows the design levels adopted for the post-development model in the GTB assessment. Some slight changes to the stormwater pit surface elevation were made by TUFLOW automatically based on the incorporated GTB project area design levels (only surface elevation of stormwater pits located within the GTB project area with new design levels are adjusted). All other model parameters remained similar to the pre-development model for the assessment. Figure 23 shows the changes in surface elevation between the post-development and pre-development models adopted for this GTB assessment.

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Figure 22 – Surface Elevation Adopted for GTB Project Area in Post-Development Model

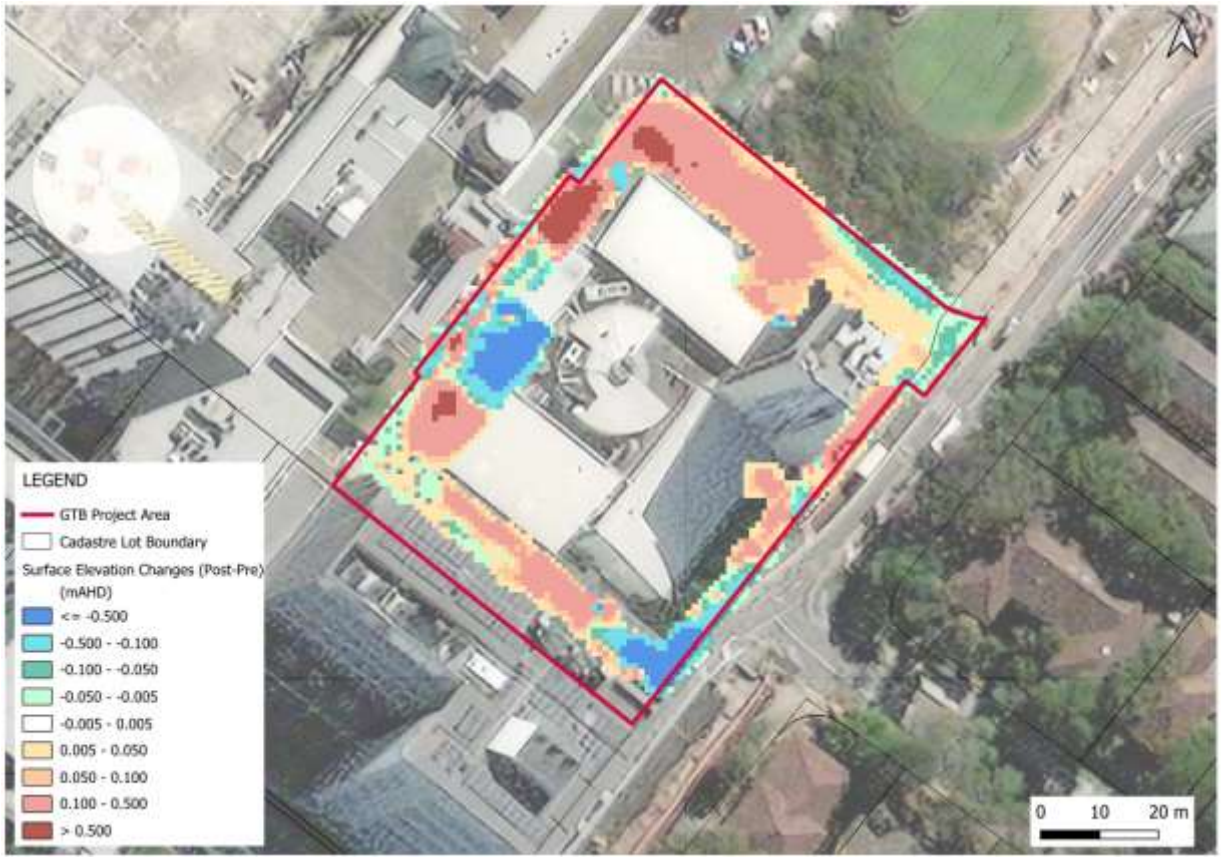


Figure 23 – Surface Elevation Changes in Post-Development Model When Compared to Pre-Development Model

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4.0 Hydraulic Modelling Results

4.1 Model Results Post Processing

It should be noted that the adopted TUFLOW model for this GTB assessment (i.e. based on original model by Arup for the 2023 assessment) uses the 'Rainfall-on-grid' approach, the SGS functionality within TUFLOW (to provide a better grid conveyance calculation) and design storms for each AEP event (as discussed in Section 3.7). Post-processing of the modelling results has been carried out as part of the GTB assessment as discussed below.

For each AEP event assessed, the maximum grids for all design storms modelled have been post-processed to create the maxmax (i.e. maximum of the individual maximum grids for individual AEP event) grids of that AEP event. Remapping was then carried out for all the maxmax grids created using the TUFLOW asc_to_asc remapping code (i.e. -wl), based on a 1m model elevation grid. This remapping process was required to ensure that the flood extent of the flood depth grid and other result grids were comparable.

4.2 Pre-Development Conditions

1% AEP Event

Flood results for existing conditions show that Hawkesbury roads and Research Lane, as well as the area along the adjacent to the Kids Park (i.e. within GTB project area), are generally affected by shallow overland flows with typical depths of less than 100mm in the 1% AEP flood event.

Model results also confirm that the flood depths are deeper than 100mm at some locations adjacent to the Ainsworth Tower entrance.

A few small trapped-low lying areas around the existing building such as the entrance ramp to the existing loading dock and rear courtyard are noticeable where the overland flows build up to greater than 100mm in depth.

The site, in existing conditions, incorporates a footpath and a garden along the eastern boundary with RLs of approximately 1m lower than the adjacent road. The overland flows across that low-lying area reach up to 180mm in depth during the 1% AEP event.

The 1% AEP flow velocities for the GTB project area and its immediate surrounding areas are generally estimated to be less than 0.5m/s with some small areas estimated to be as high as 0.9m/s.

The 1% AEP flood hazards are generally low (i.e. estimated at H1) over Hawkesbury Road and Research Lane as well as across the site, with some small pockets of areas estimated to be at H2 flood hazard category.

1% AEP flood depths, flood levels, flow velocities and flood hazards for the existing conditions are represented in Figure 24, Figure 25, Figure 26 and Figure 27 respectively.

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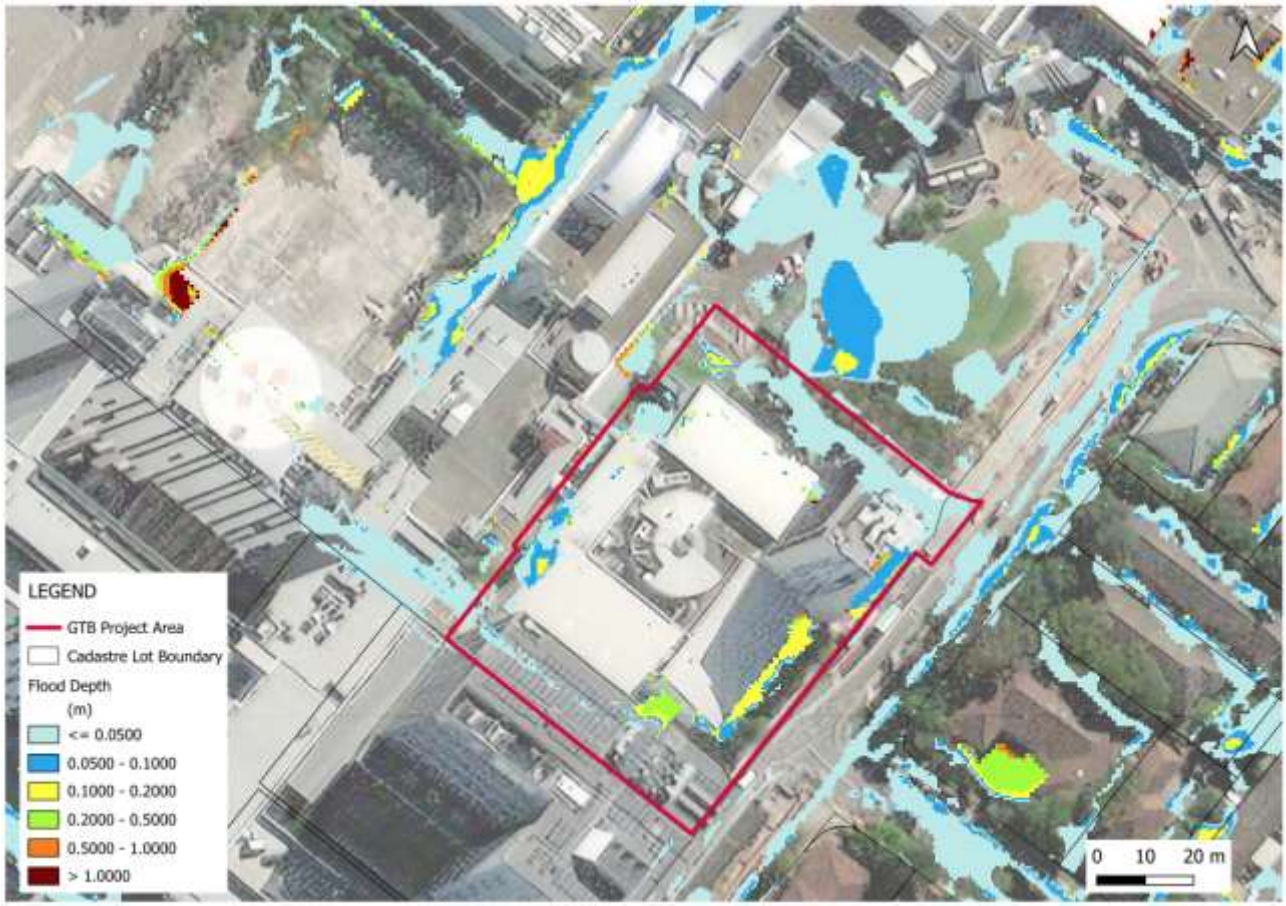


Figure 24. 1% AEP Flood Depths – Pre-Development Conditions

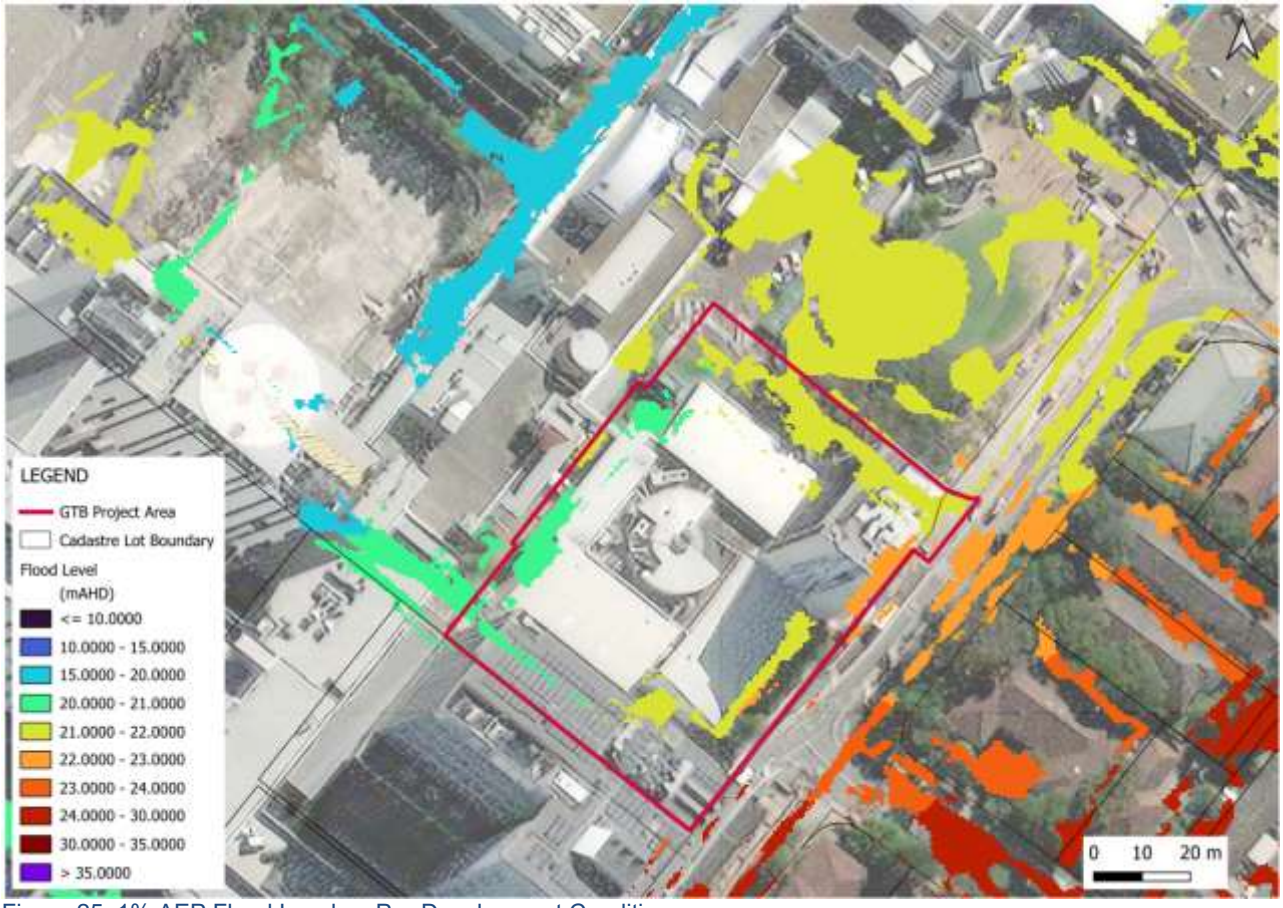


Figure 25. 1% AEP Flood Levels – Pre-Development Conditions

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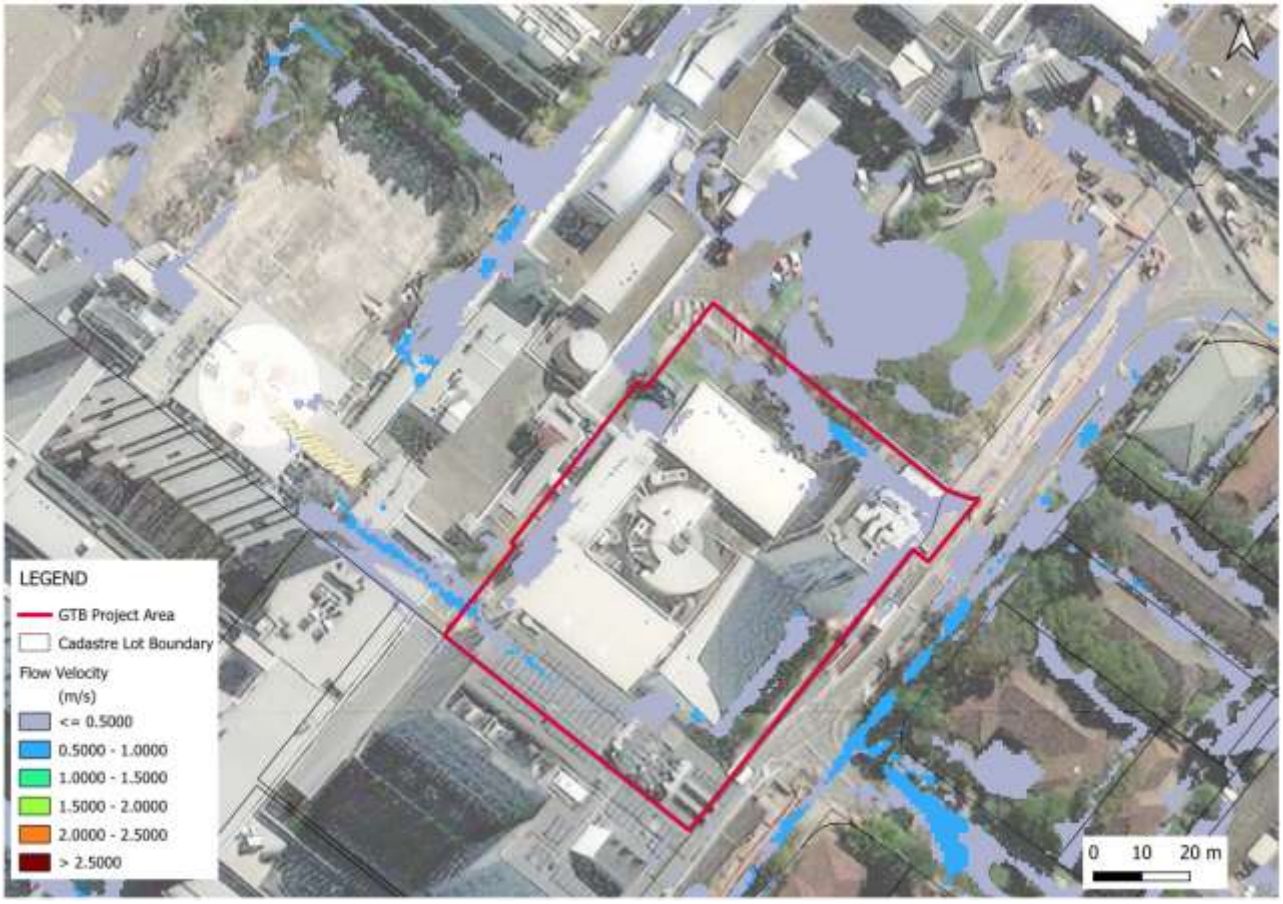


Figure 26. 1% AEP Flow Velocities – Pre-Development Conditions

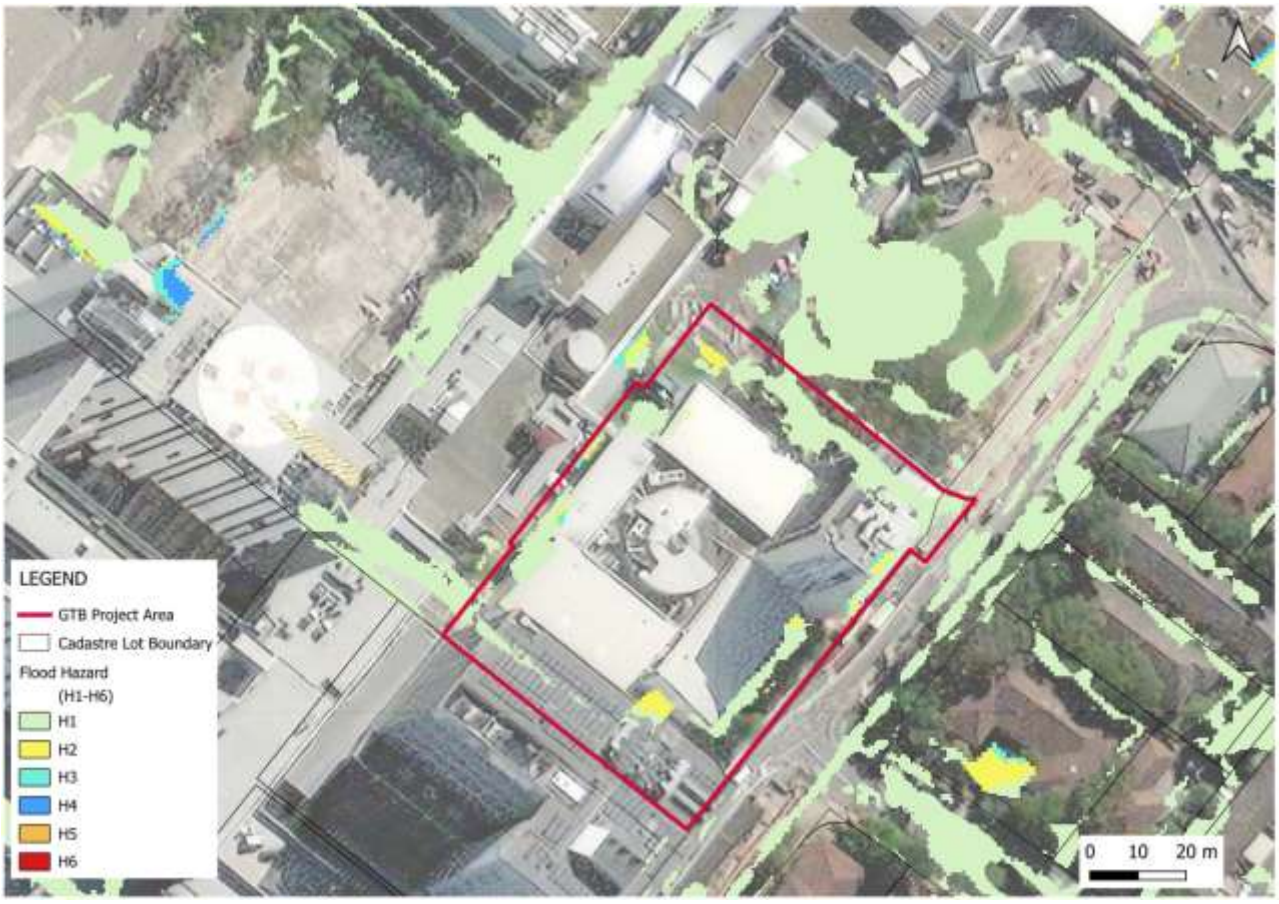


Figure 27. 1% AEP Flood Hazards – Pre-Development Conditions

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PMF Event

Flood modelling results suggest that the site is affected mainly by overland flows upon Hawkesbury Road during the PMF event. Overland flows from the residential areas south of Hawkesbury Road drain to Hawkesbury Road and flow northeast towards the site. Overland flows then partially flow through Research Lane along the southern site boundary while the rest of the flows continue running north along Hawkesbury Road along the eastern site boundary. Overland flows then flow west over the existing driveway north of the site running towards the Kids Park area located at the northern GTB project boundary.

Overland Flow depths over Hawkesbury Road and Research Lane are generally up to 200mm and 220mm respectively.

- The overland flows at the low-lying area along the eastern boundary reach up to 450mm in depth during the PMF and overflow onto Research Lane. The existing carpark to the north and the Kids Park area experience flow depths of up to 1.1m. These areas near the northern site boundary act as local flood storages during large flood events.
- Floodwaters build up to 650mm in depth over the existing loading dock area in the PMF event.

Flood hazards onsite as well as over the Hawkesbury Road and Research Lane range from H1 to H5 during the PMF, based on the Australian Emergency Management Institute hazard categories.

Estimated flood depths, flood levels, flow velocities and flood hazards in the PMF event are shown in Figure 28, Figure 29, Figure 30 and Figure 31 for existing site conditions respectively.

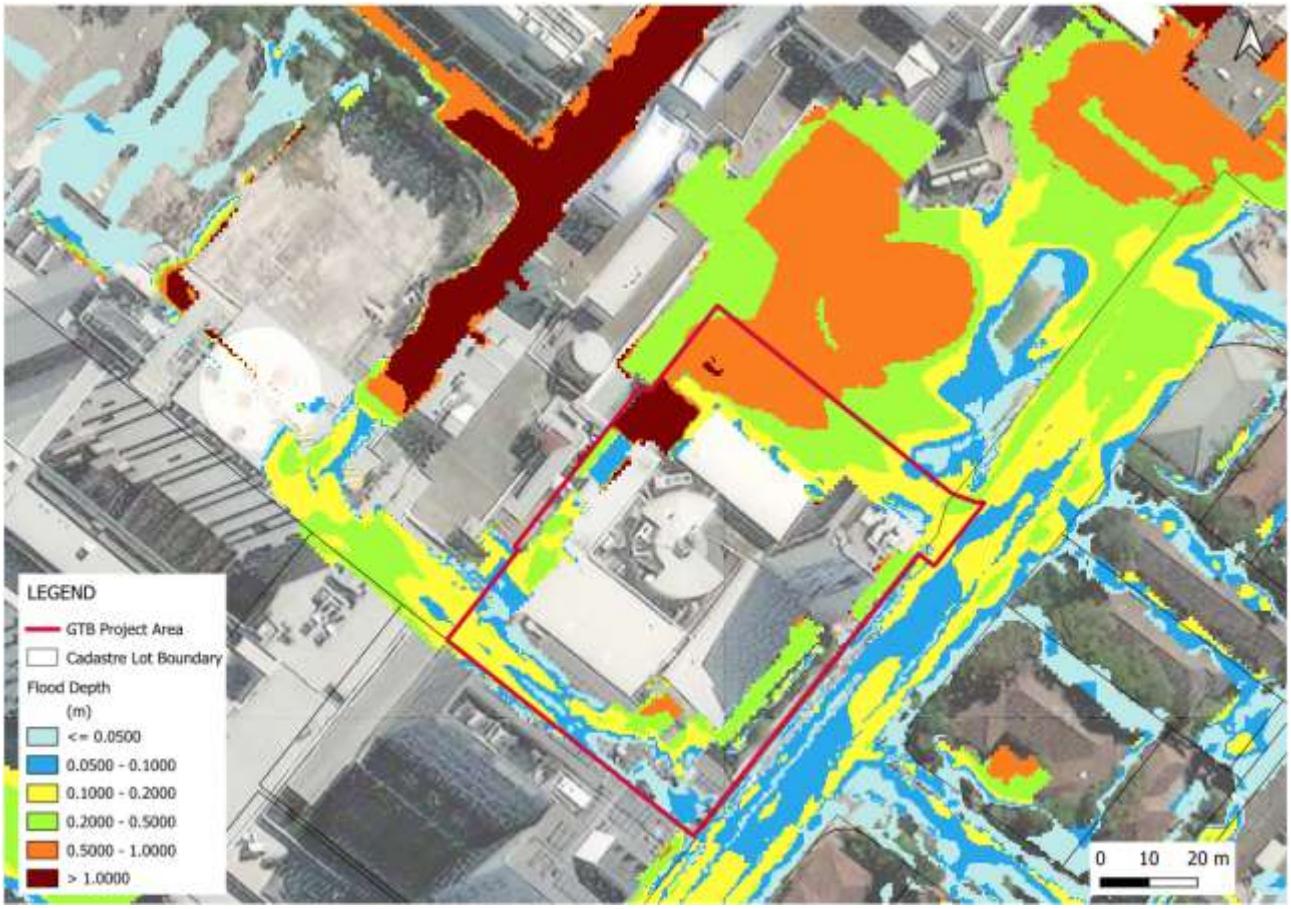


Figure 28. PMF Flood Depths – Pre-Development Conditions

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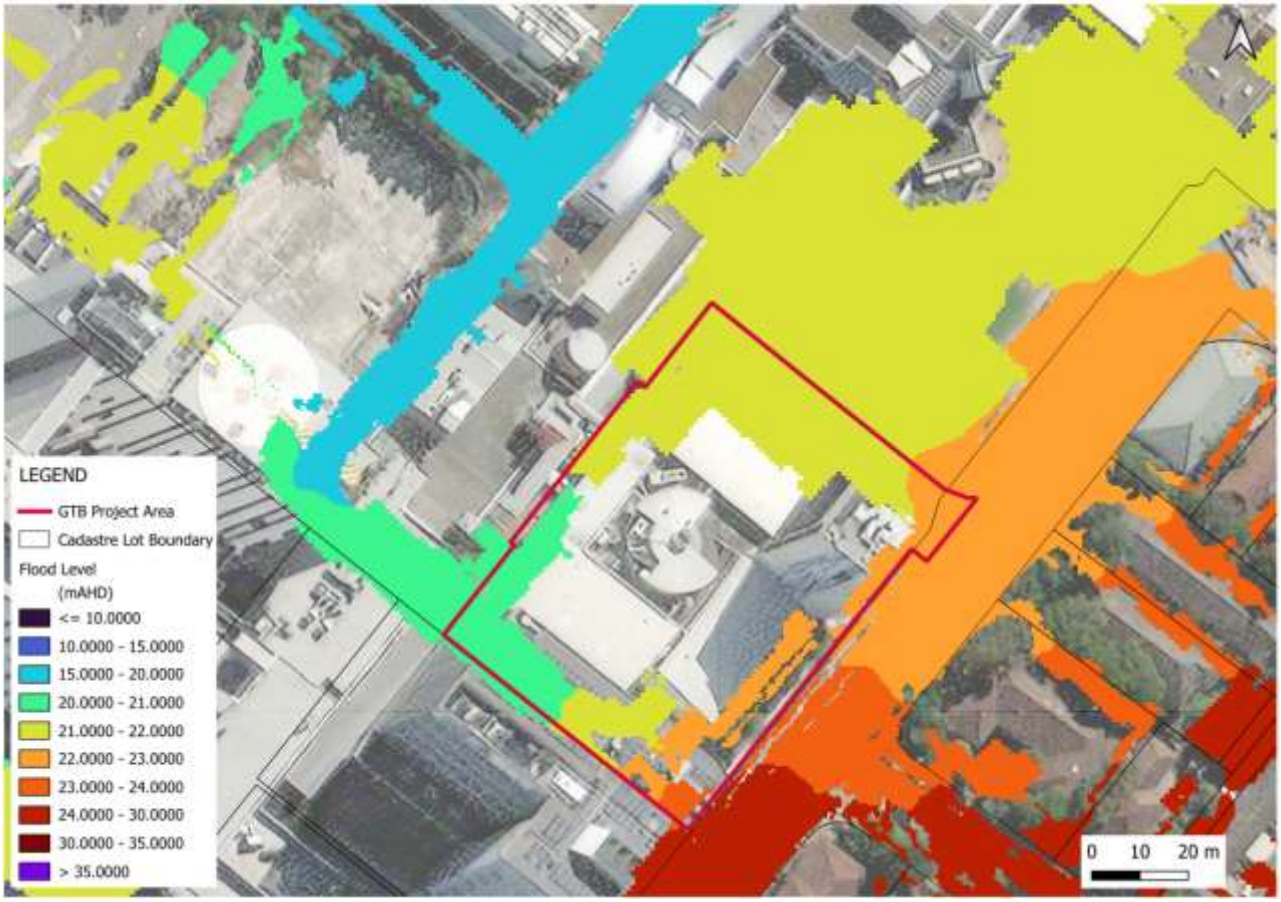


Figure 29. PMF Flood Levels – Pre-Development Conditions

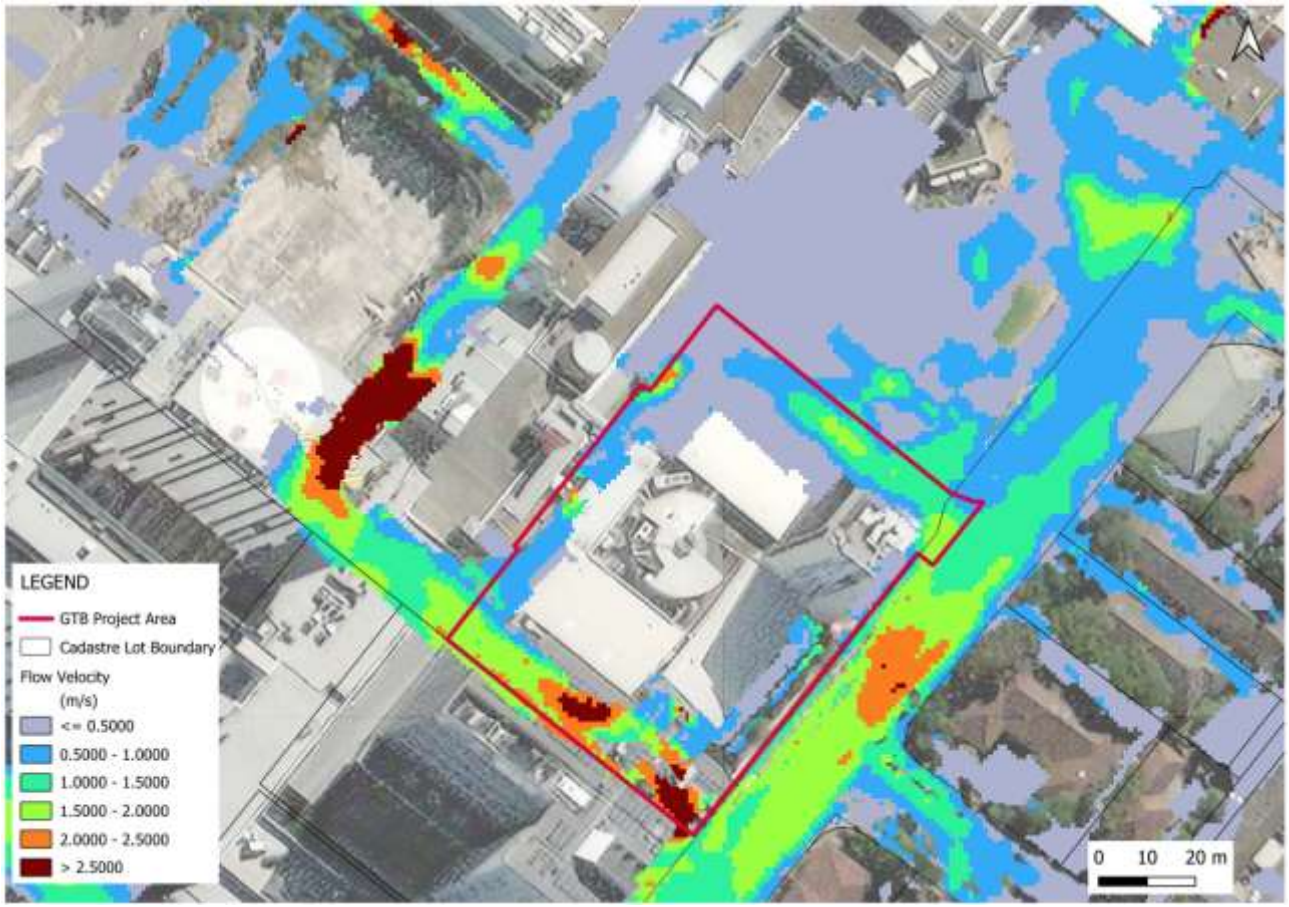


Figure 30. PMF Flow Velocities – Pre-Development Conditions

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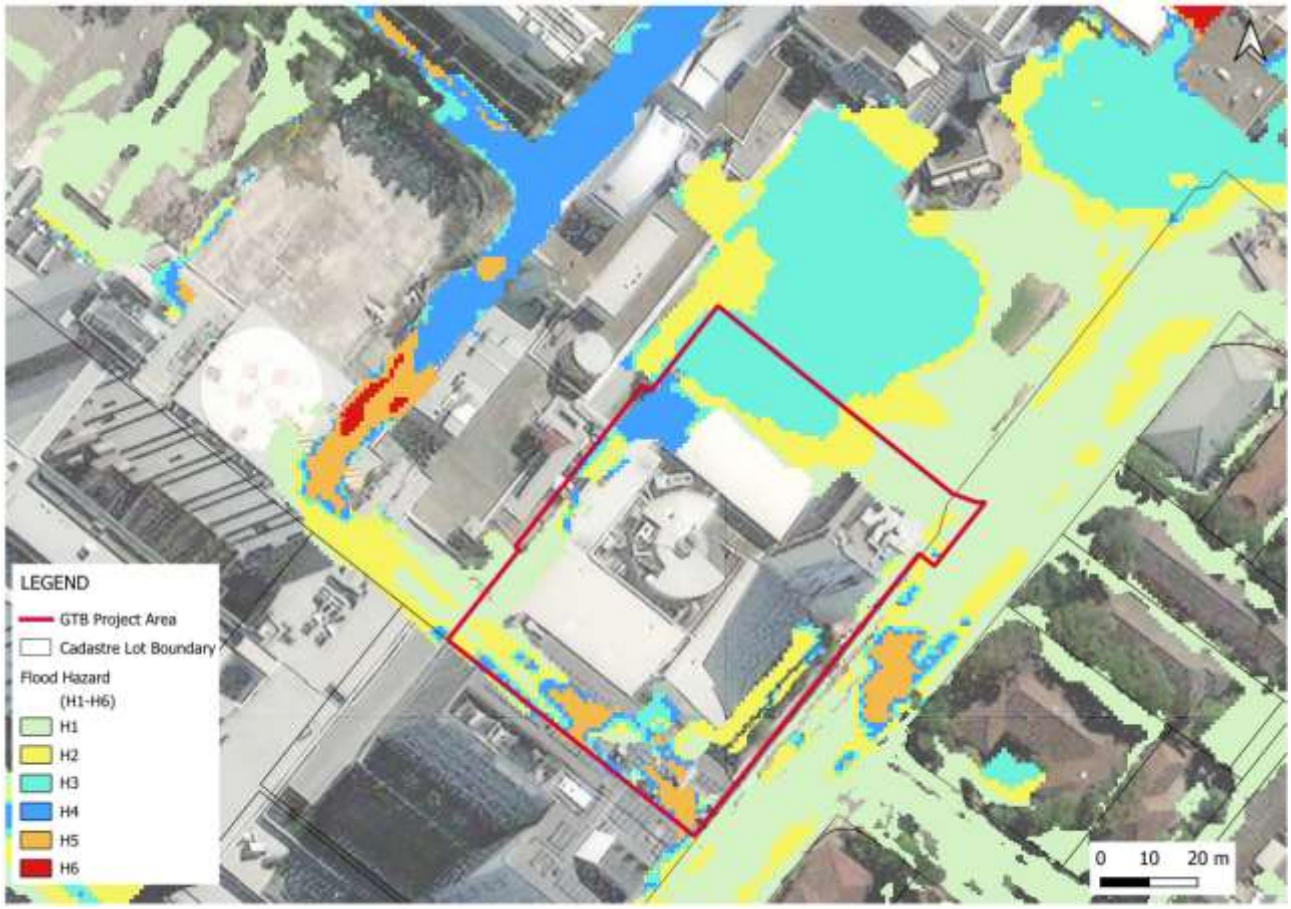


Figure 31. PMF Flood Hazards – Pre-Development Conditions

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4.3 Post-Development Conditions

1% AEP Event

Simulated 1% AEP flood depths, flood levels, flow velocities and flood hazards for the post-development site conditions are shown in Figure 32, Figure 33, Figure 34 and Figure 35 respectively.

Flood results confirm that:

- The local flood behaviour in the post-development conditions is generally similar to pre-development conditions during the 1% AEP event.
- The site and the area in close proximity are generally affected by shallow (typical depth of less than 100mm), low hazard overland flows in the post-development conditions during the 1% AEP event.
- Overland flows over a small area near the north-western site boundary are as deep as 0.65m during the 1% AEP event.
- The existing carpark to the north experiences the flow depths of up to 150mm in the 1% AEP.
- The crest of the ramp to the proposed basement carparking area of the Gene Technologies Building (i.e. near south-west corner of GTB site) has been set (i.e. at 21.13mAHD) to provide more than 500mm of freeboard to the estimated 1% AEP flood level (i.e. at approximately 20.56mAHD) in this area, to prevent floodwater from entering the basement carparking area.
- While there is some residual flooding at the substation, this is to be addressed with the implementation of a retaining wall, which is still in the design process.

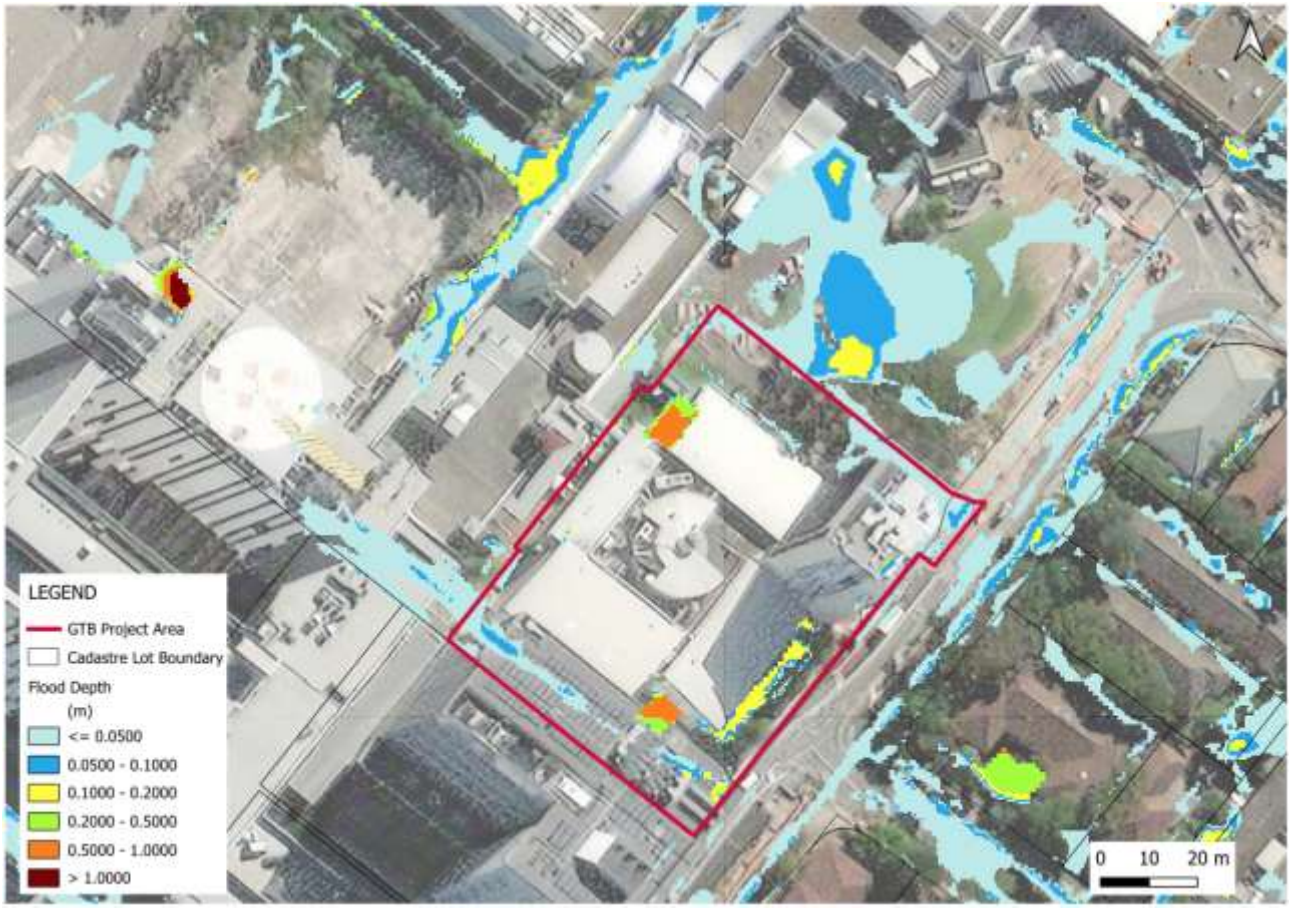


Figure 32. 1% AEP Flood Depths – Post-Development Conditions

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Figure 33. 1% AEP Flood Levels – Post-Development Conditions

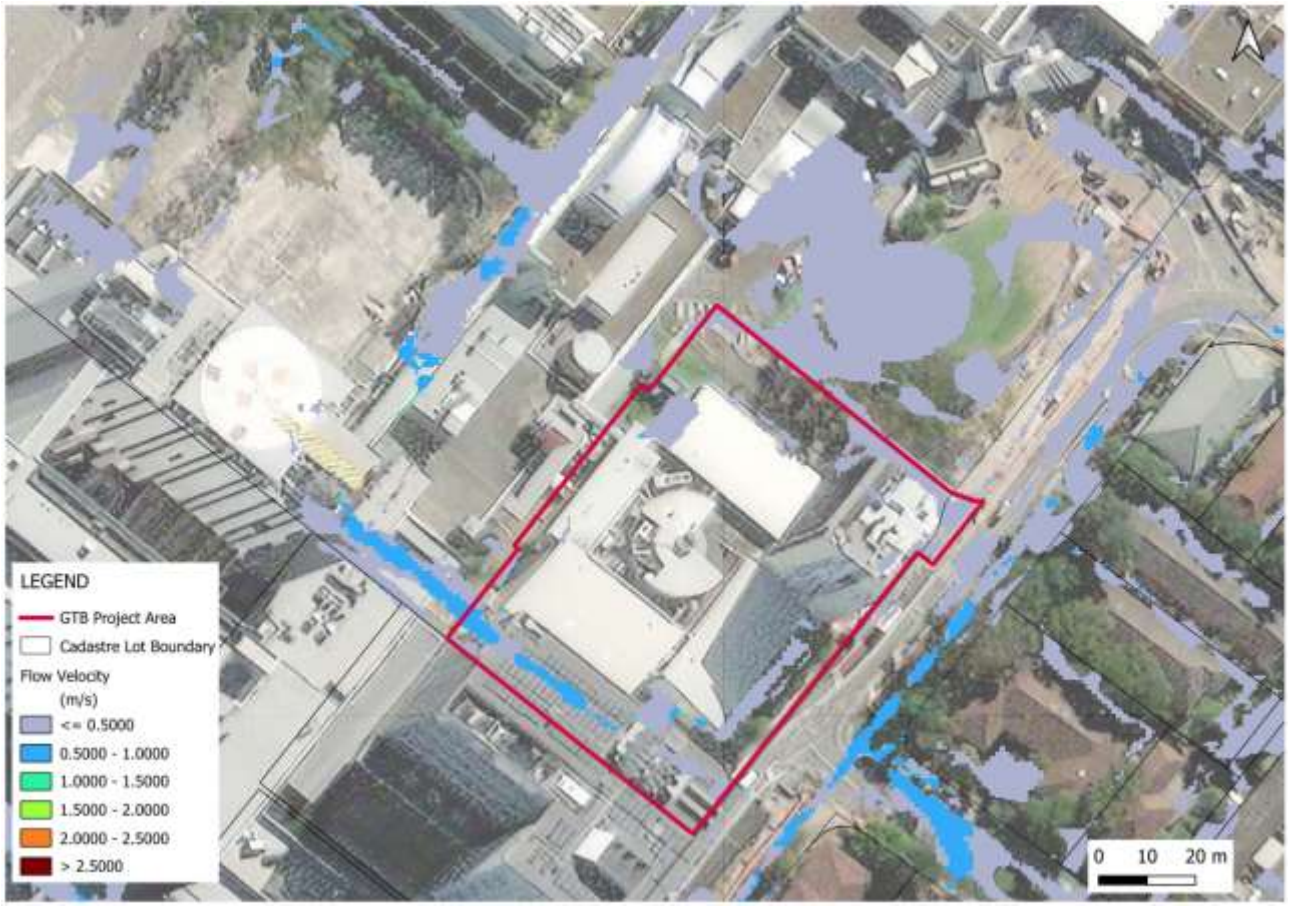


Figure 34. 1% AEP Flow Velocities – Post-Development Conditions

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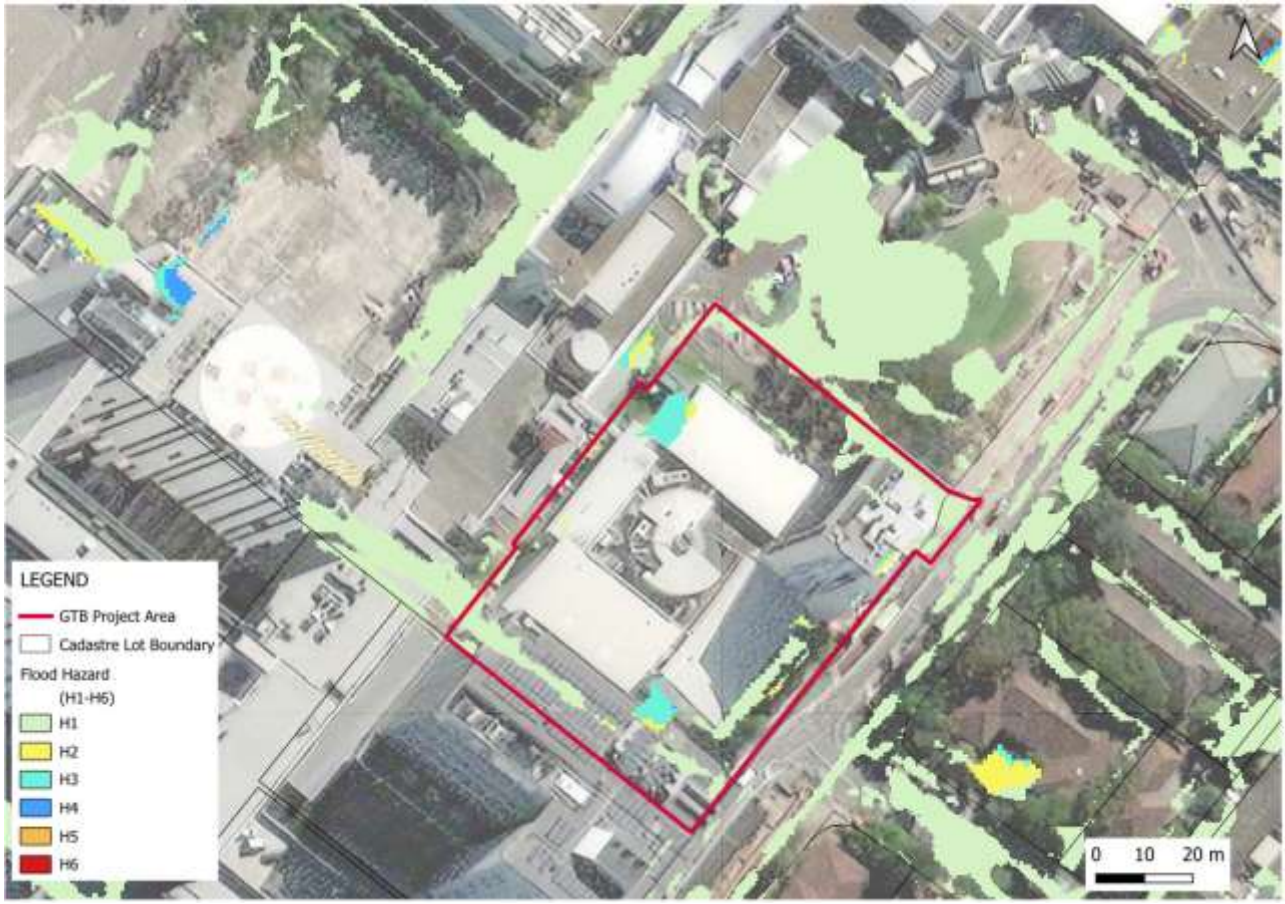


Figure 35. 1% AEP Flood hazards – Post-Development Conditions

PMF Event

The estimated PMF flood depths, flood levels, flow velocities and flood hazards for the post-development site conditions are depicted in Figure 36, Figure 37, Figure 38 and Figure 39 respectively.

Flood results confirm that:

- The local flood behaviour in the post development conditions is generally similar to predevelopment conditions for the PMF event.
- The surrounding road areas, in close proximity to the site, Hawkesbury Road and Research Lane, are estimated to generally experience flood depths of less than 200mm in the PMF event.
- Overland flows over the area near the north-western site boundary are as deep as 1.6m during the PMF event.
- The existing carpark to the north experiences flow depths of up to 0.75m in the PMF event.
- The crest of the ramp to the proposed basement carparking area of the Gene Technologies Building (i.e. near south-west corner of GTB site) has been set (i.e. at 21.13mAHD) to remain higher than the flood level estimated for the PMF event assessed, hence preventing the basement carparking area to be inundated by floodwater.
- Pools of floodwater are observed along the proposed building boundary and flood mitigation measures have been proposed (i.e. in the form of flood barriers or flood doors) on openings around the perimeter of the proposed building, to increase flood immunity and prevent floodwater from entering the building area. Refer to TTW's civil design drawings attached within TTW's SSDA Civil Engineering Report Revision B (Appendix B) for the proposed flood mitigation measures proposed.

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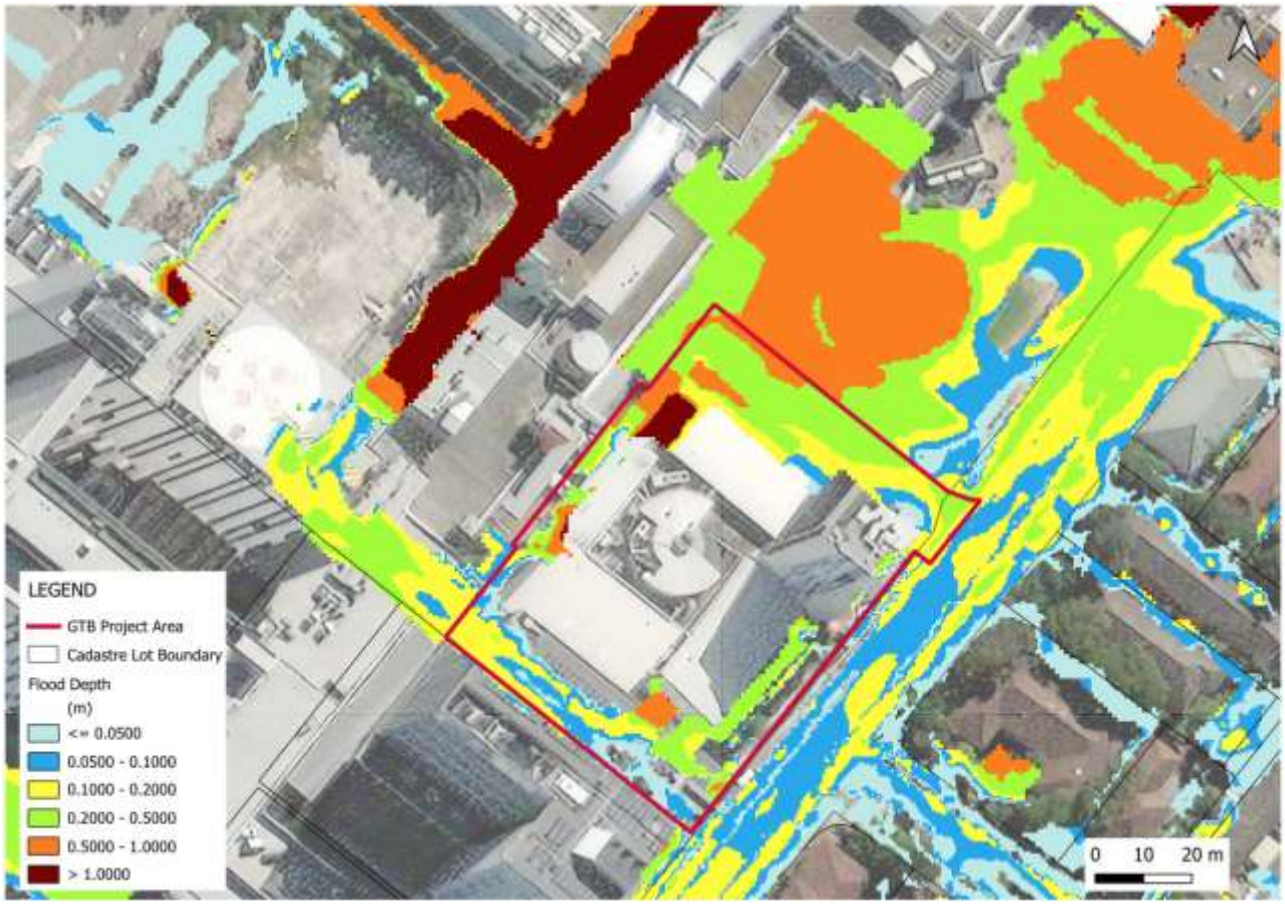


Figure 36. PMF Flood Depths – Post-Development Conditions

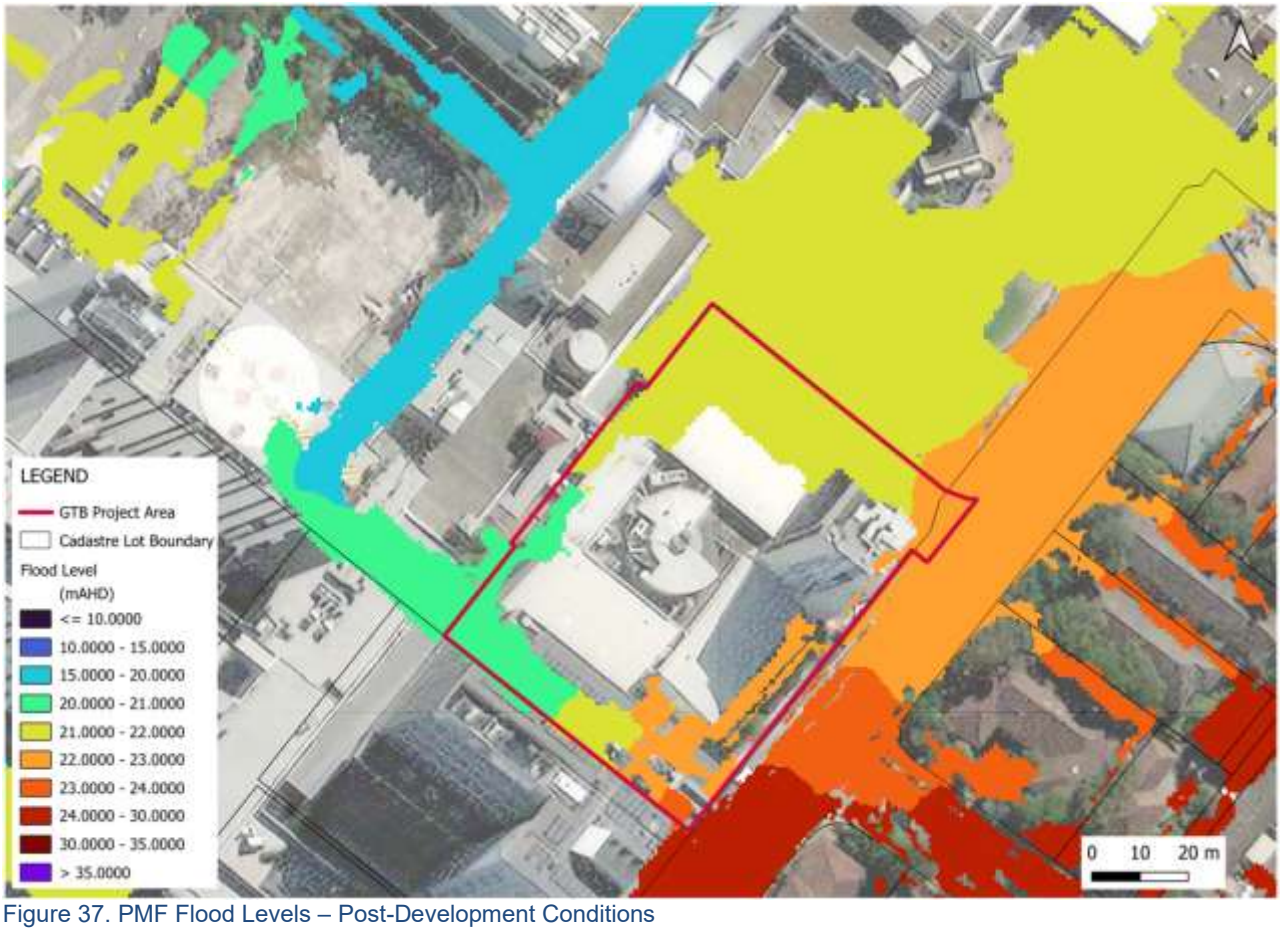


Figure 37. PMF Flood Levels – Post-Development Conditions

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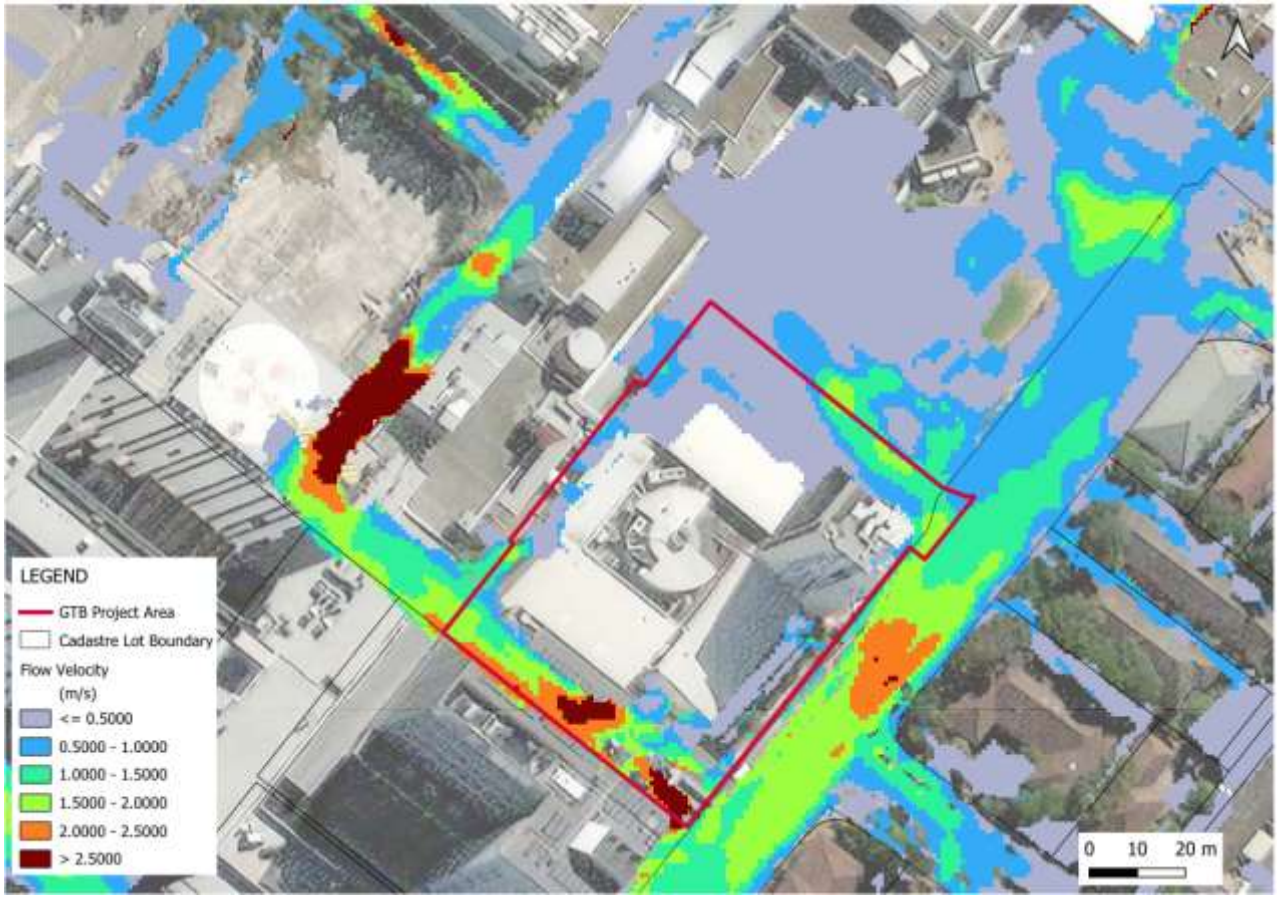


Figure 38. PMF Flow Velocities – Post-Development Conditions

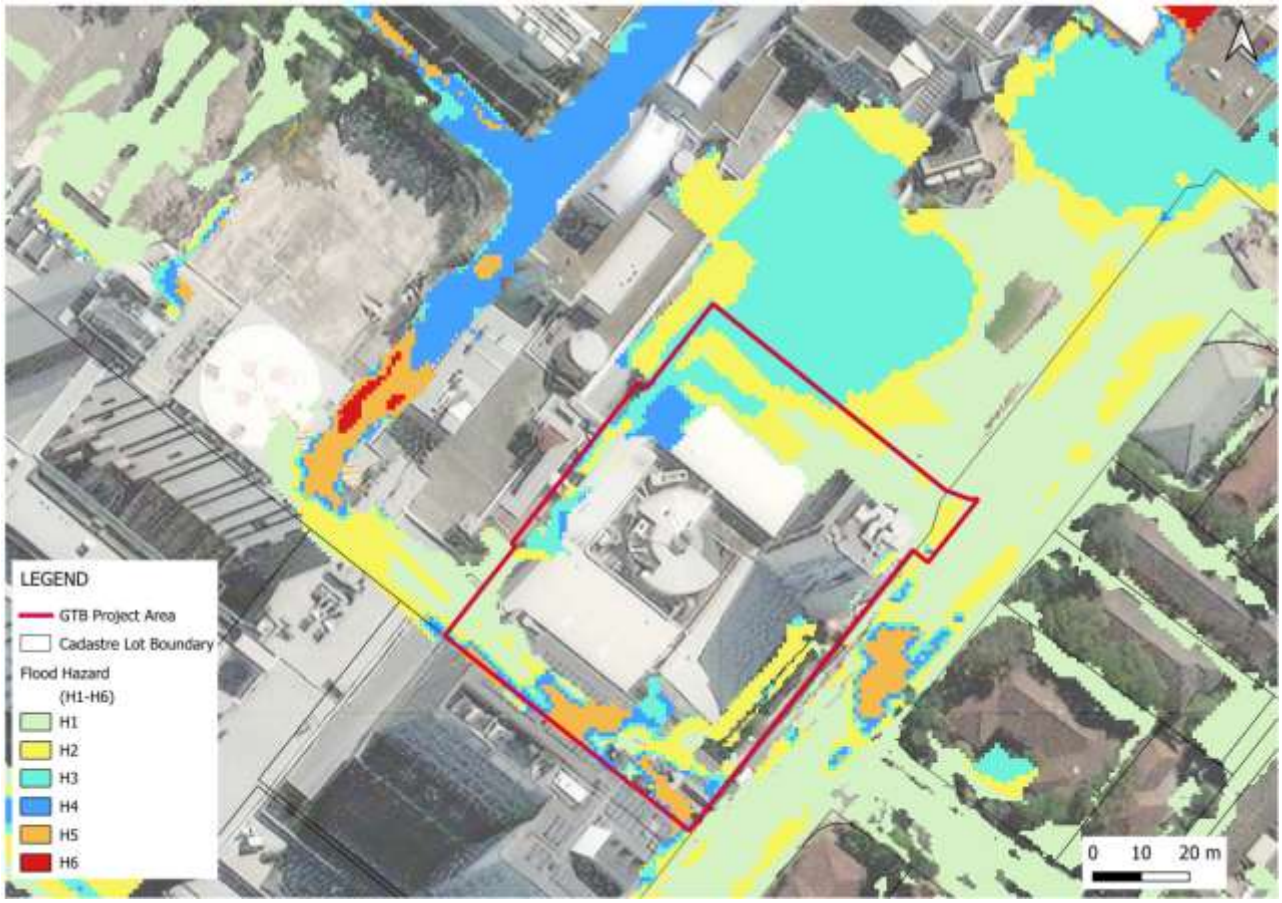


Figure 39. PMF hazards – Post-Development Conditions

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4.4 Summary of Results

Table 4 provides a summary of the change in flood level and flood hazard in the existing and post-development scenarios across various point locations across the site. Refer to Figure 40 for location reference.

Table 4 - Summary of 1% AEP and PMF flood levels and hazards in existing vs post-development scenarios. Refer to Figure 40 for point location.

Point Location		1% AEP				PMF			
		*Level (m AHD)		*Hazard		*Level (m AHD)		*Hazard	
		Existing	Post	Existing	Post	Existing	Post	Existing	Post
A	Basement entry	20.5	20.5	H1	H1	20.6	20.6	H2	H1
B	Main entry	21.6	-	H1	-	22.0	22.0	H2	H1-2
C	Fire stair exit & loading dock	-	-	-	-	-	-	-	-
D	Fire stair exit	-	21.5	-	H1	22.0	22.0	H3	H2
E	Pedestrian entry	-	-	-	-	-	-	-	-
F	Existing car park	21.4	21.4	H1	H1	22.0	22.0	H3	H3
G	Kids park	21.4	21.4	H1	H1	22.0	22.0	H3	H3
H	Research Lane	-	-	-	-	21.2	21.2	H5	H5
I	Hawkesbury Road	-	-	-	-	23.0	23.0	H5	H5

* Note that a dash (-) indicates that the area is not affected by flooding.

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Figure 40 - Point locations for levels and hazard information included within Table 4

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4.5 Offsite Flood Impact Assessment

A flood impact assessment was carried out to ensure the proposed development would not cause any offsite impact beyond the accepted +20mm on nearby roads and properties in the 1% AEP event. The results show that increases in estimated flood levels as high as 22mm are estimated over some areas north of the GTB project boundary, within the existing carpark and Kids Park areas. Although this estimated flood level afflux area is located outside the GTB project boundary, it remains within the lot boundary owned by the Children's Hospital Westmead (i.e. within Lot 101 DP 1119583). It is therefore considered acceptable.

Furthermore, a small area on Hawkesbury Road corridor north-east of Ainsworth Tower is estimated to be inundated in the 1% AEP event (i.e. flood free in the pre-development conditions). The inundation of this small area on Hawkesbury Road corridor is unavoidable due to the lowering of the area to tie-in with the road levels. Although this is so, the estimated flood hazard in this newly impacted area is categorised as H1 which is considered to be safe for traffic. It is therefore also considered to be acceptable.

Based on the above, the offsite flood impacts due to the proposed GTB redevelopment are considered to be within the accepted range and will not result in additional flood risks in the 1% AEP event. Further, previous flood studies of the area (as discussed in Section 2.2) have confirmed that the site is not impacted by mainstream flooding (i.e. flooding from the nearby Toongabbie Creek and Parramatta River). As such, the proposed development will not have any adverse offsite impacts, nor will it impact hydrology, drainage lines, downstream assets or watercourses. The 1% AEP flood level affluxes map is shown in Figure 40.

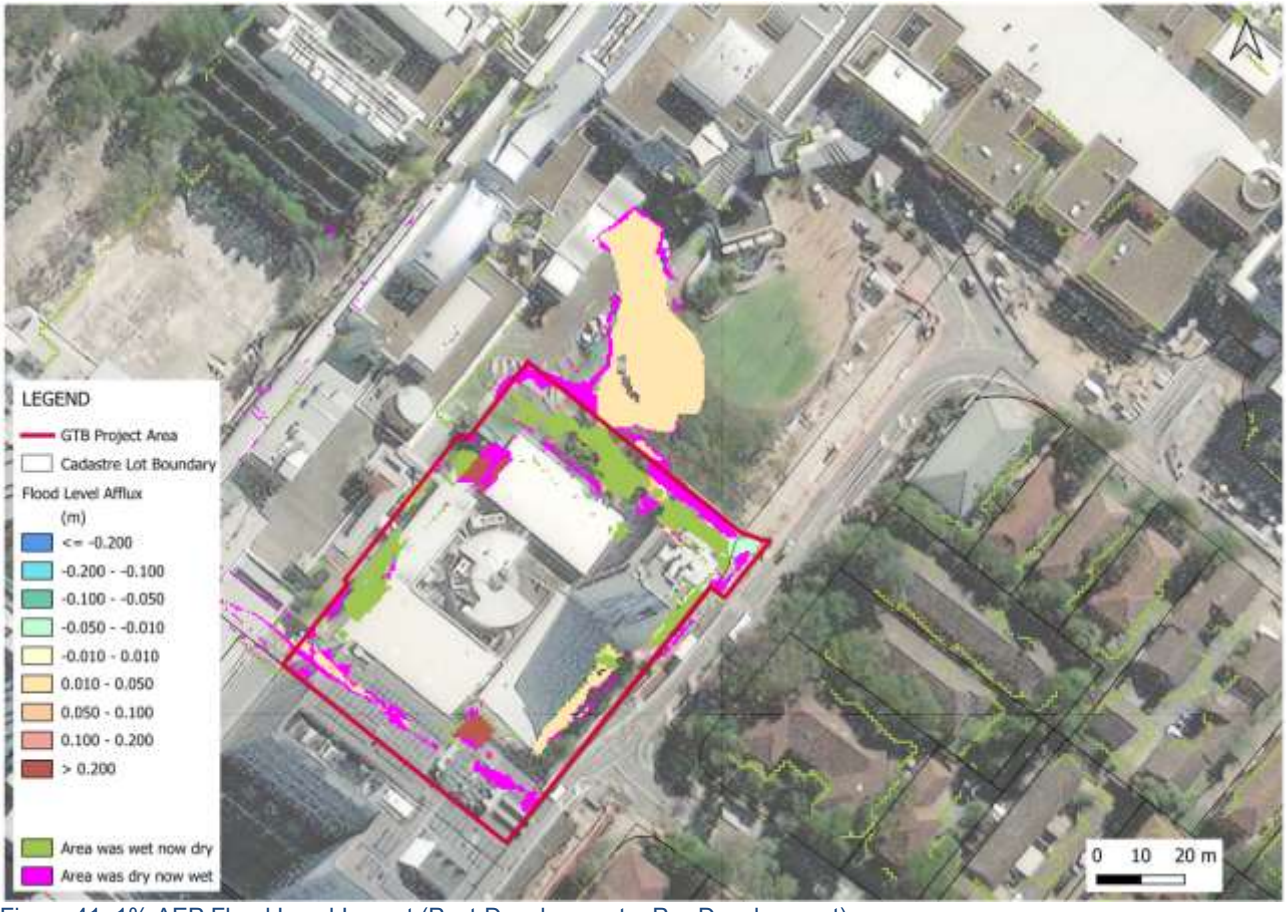


Figure 41. 1% AEP Flood Level Impact (Post-Development – Pre-Development)

It is understood that flood impact assessment (especially to assess the likely flood level increases) will generally not be required for the PMF event, but for consistency of reporting and to understand the full spectrum of likely flood impacts the proposed GTB redevelopment works will have to the surrounding areas, flood level affluxes map has also been prepared for the PMF event. These affluxes are shown in Figure 41. The results show that a much larger area (especially to the north of GTB project boundary) experiences increases in flood levels of more than 10mm. Despite these additionally impacted areas, the maximum flood level increases for the areas to the north remain at 22mm.

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The maximum flood level increases on the Hawkesbury Road corridor, north-east of Ainsworth Tower is estimated to be around 50mm in the PMF event. The maximum flood level increases near the main entrance to the Children's Hospital Westmead (i.e. road where Hawkesbury Road and Hainsworth Street meet) is estimated to be 17mm or less. Nonetheless, the estimated PMF flood hazards for the GTB site's surrounding areas remained generally similar to that of the pre-development conditions.



Figure 42. PMF Flood Level Impact (Post-Development – Pre-Development)

4.6 Climate Change

Based on a previous Flood Impact Assessment reports prepared by Arup for the Children's Hospital Westmead Paediatric Services Building and Kids Park developments (2021 and 2023 respectively), the 0.5% AEP and 0.2% AEP events have been adopted in the modelling as proxy of the 1% AEP climate change event.

As this GTB redevelopment assessment is based on the TUFLOW model provided by Arup and used for the above studies, the same approach to storms used for climate change has been adopted. As such, three storm events (15min, 30min and 540min storms) have been simulated for both the 0.5% AEP and 0.2% AEP events, similar to the 2021 and 2023 Arup's assessments.

The modelling results show that the overland flow flooding, in the CMRI threshold, do not change noticeably from 1% AEP to the 0.5% AEP and 0.2% AEP events (i.e. within 100mm). The 0.5% AEP and 0.2% AEP flood levels for the post-development site conditions are depicted in Figure 42 and Figure 43 respectively.

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Figure 43. 0.5% AEP Flood Levels – Post-Development Conditions

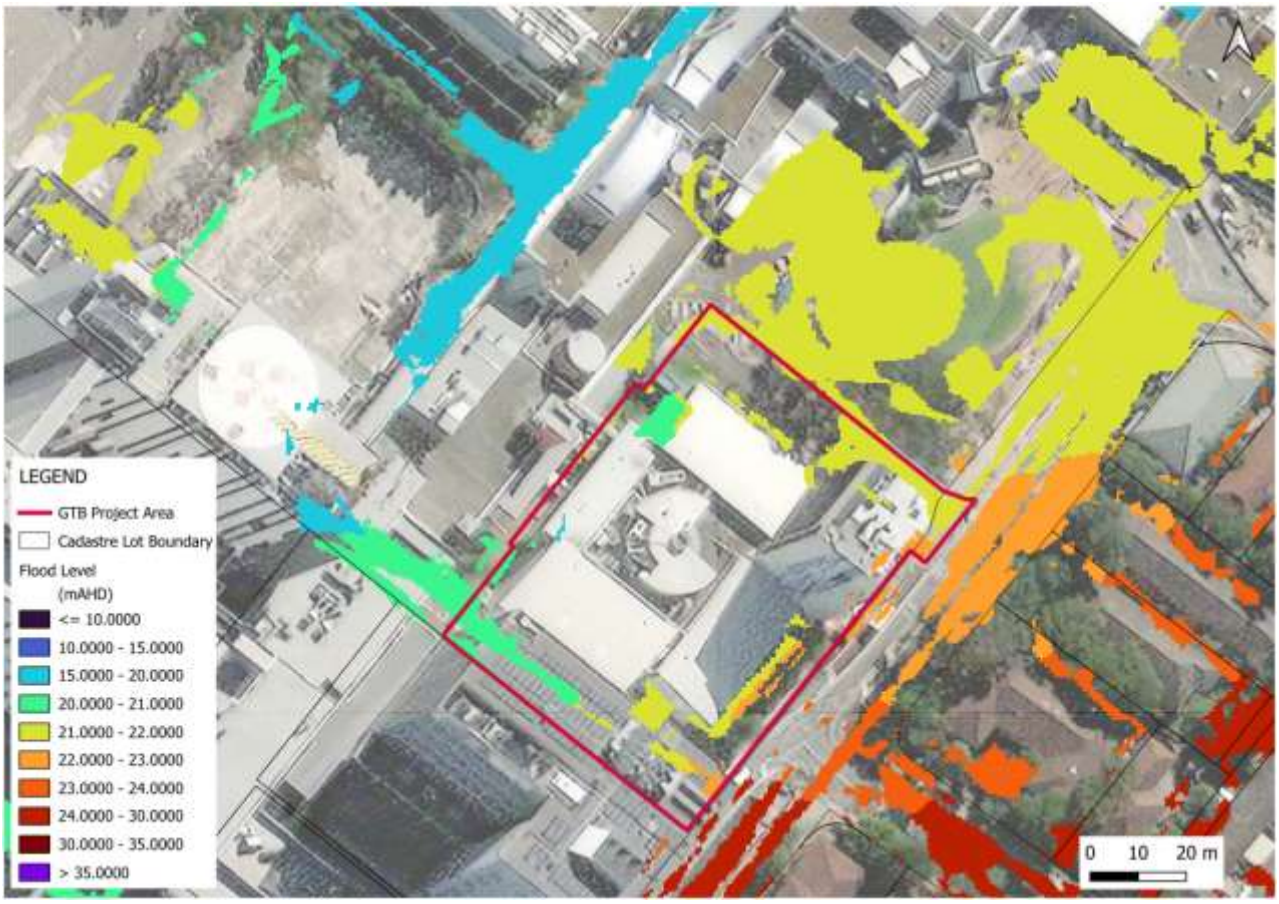


Figure 44. 0.2% AEP Flood Levels – Post-Development Conditions

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5.0 Flood Planning Requirements

The current Development Control Plan (DCP) in place in the City of Parramatta was published in 2023, providing additional planning and design guidelines to support the aims and objectives of the Local Environment Plan (LEP). DCPs provide detailed controls and standards for addressing development issues at a local level and cover various development types, including residential, commercial and industrial.

Under Section 4.15 of the Environmental Planning and Assessment Act 1979, the consent authority is required to take into consideration the relevant provisions of the DCP in determining a development application. Section 5.11 of the City of Parramatta's DCP provides a risk-based approach to planning and development in the flood prone lands of the LGA. The New South Wales State Government flood prone land policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible.

The objectives of the City of Parramatta's DCP in relation to flooding are:

- Manage the floodplain in an economically, environmentally, and socially sustainable manner.
- Allow development in the floodplain that is appropriate to the flood hazard and risk at a particular location.
- Ensure that development minimises the risk to life and property from flooding and its impacts.
- Deliver a risk-based approach to floodplain development and mitigation of potential harm based on a merit assessment consistent with the current Floodplain Development Manual.
- Ensure the proponents of development and the community in general are aware of the potential flood hazard and consequent risk associated with the use and development within the floodplain.
- Ensure that the proposed development does not expose existing development to unacceptable risks or impacts associated with flooding.
- Require hazard, risk and safety assessments to demonstrate how risk and potential for harm to people, property, buildings, and the environment from floodwaters will be adequately mitigated.
- Ensure development does not adversely increase the potential flood affectation on other development or properties, either individually or in combination with similar developments that are likely to occur within the same catchment.
- Ensure development on flood prone land does not result in unreasonable impacts upon the amenity or ecology of an area.
- Ensure buildings and uses are compatible with the identified flood risk. Development with a lower sensitivity to the flood hazard may be considered for location within the floodplain subject to appropriate design and siting controls provided that the potential risks and consequences that could still arise from flooding remain acceptable.
- Ensure early site planning and consideration of flood conditions to achieve an integrated flood response that manages flood risk and provides optimum development design outcomes to provide adequate amenity on and off site, and interface with the public domain.
- Avoid intensification of development and land use within high flood risk or floodways.
- Achieve adequate, safe flood conveyance and management of floodwaters while providing for the rehabilitation, conservation, embellishment, naturalisation of floodways and other flood affected lands where appropriate.
- Ensure the risks associated with car park basements in flood prone areas are adequately mitigated.
- Prevent any changes to landform that would adversely impact flood behaviour or the course of its natural conveyance.

The stringency of development controls is dependent on the land use type of the development alongside the Flood Risk Precinct the site is located in.

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5.1 Land Use Type

Whilst CMRI GTB is located on the Westmead Hospital site, due to its research function it can be assessed as 'Commercial or Industrial' based on Table 5.1.1.1 from the Parramatta DCP. An extract of the Commercial or Industrial land uses is presented in Figure 45.

Commercial or Industrial	• Advertising structures; • Agriculture; • Amusement centres; • Business Premises; • Car parks; • Correctional centres; • Crematorium; • Depots; • Entertainment facilities; • Food and drink premises; • Freight transport facilities; • Funeral homes; • Function centres; • Hardware and building supplies; • Health consulting rooms; • Heavy industries; • Hotel accommodation; • Industries; • Information and education facilities;	• Industrial retail outlets; • Kiosks; • Landscape and garden supplies; • Light industries; • Markets; • Materials recycling or recovery centres; • Medical centres; • Mixed-use development; • Mortuaries; • Office premises; • Passenger transport facilities; • Places of public worship; • Public administration buildings (other than essential uses and facilities); • Pubs; • Recreation facilities (indoor); • Recreation facilities (major); • Registered clubs;	• Restricted premises; • Retail Premises; • Service stations; • Sex services premises; • Shop top housing; Signage; Specialised retail premises; • Storage premises; • Transport depot; • Truck depot; • Tourist and visitor accommodation; • Vehicle body repair workshops; • Vehicle repair stations; • Vehicle showrooms; • Veterinary hospitals; • Warehouse or distribution centres; • Waste or resource management facilities; • Wholesale supplies.

Figure 45. Commercial or industrial land uses, as outlined in the City of Parramatta DCP, 2023.

5.2 Flood Risk Precinct Categorisation

The Flood Risk Precincts are outlined in Table 5.

Table 5 - City of Parramatta Council Flood Risk Precincts (adapted from Stantec, 2023)

Flood Risk Precinct	Description
High Flood Risk	Includes 1% AEP high hazard area, defined as H4 and above (hazards that are unsafe for all people and vehicles). These are areas where high flood damages, potential risk to life, or evacuation difficulties are anticipated, or development would significantly and adversely affect flood behaviour. Most development is restricted within these areas.
Medium Flood Risk	Includes medium and low hazard areas within the 1% AEP extent. These are areas where there is still a significant risk of flood damage or safety concerns, but where this risk can be minimised by the application of appropriate development controls.
Low Flood Risk	Includes the remaining area within the PMF extent that is not identified as either High Flood Risk or Medium Flood Risk Precinct. The risk of flood damage in these areas is low and most land uses would be permitted.
Everywhere Else	Areas outside the PMF. There may still be isolated impacts from local overland flow.

Low Flood Risk Category means all other land within the extent of the Probable Maximum Flood but not identified within either the High Flood Risk or the Medium Flood Risk Category. Based on the flood modelling overland sheet flows through and adjacent to the site are shallow and of low hydraulic hazard during the 1% AEP event (refer Section 4.3Section 4.54 of report). Therefore, the site is generally classified as Low to Medium Flood Risk.

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5.3 Flood Planning and Development Controls

The following discuss the development controls that are applicable to the GTB site development, as set out in the Parramatta DCP 2023 Part 5 C24.

BUILDING COMPONENTS AND METHOD
1. All structures to have flood compatible building components and construction below the 1% AEP (100 year ARI) flood level plus freeboard.
2. All structures to have flood compatible building components and construction below the PMF.

It is recommended that all habitable floor levels are located above the 100-year ARI flood level plus 500mm freeboard. The results show that the site to be generally flood free in the 1% AEP flood event. Small ponding areas near the proposed building are normally due to application of 'rainfall-on-grid' approach and could be not considered flooding. Entrance levels to the proposed building will still require higher levels in relation to adjacent external ground levels to redirect shallow overland flows away from the entrances.

STRUCTURAL SOUNDNESS
1. Unless otherwise approved by Council, a structural engineer's report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 1% AEP (100 year ARI) flood level plus freeboard.
2. A structural engineer's report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including the PMF level.

As discussed in Section 4.2 to 4.4, the modelling results show the site to be generally flood free in the 1% AEP flood event and any structures would not be adversely impacted by floodwaters up to and including the 100 year ARI flood event.

FLOOD AFFECTATION
1. A hydraulic engineer's report is required to certify that the development will not increase flood affectation elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity.
2. The impact of the development on flooding elsewhere is to be considered having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity.

Based on this site-specific flood assessment, the proposed GTB redevelopment will not materially change the local flood behaviour and offsite flood impacts as the proposed GTB redevelopment works are considered to be minimal and non-actionable.

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CAR PARKING AND DRIVEWAY ACCESS
1. The minimum surface level of unenclosed parking spaces or carports shall be as high as practical, but no lower than 0.1 metres below the 1% AEP (100 year ARI) flood level. In the case of garages and other enclosed parking areas for less than 3 motor vehicles, the minimum surface level shall be as high as practical, but no lower than the 1% AEP (100 year ARI) flood level, plus 0.15 metres freeboard.
2. The minimum surface level of unenclosed parking spaces or carports shall be as high as practical and shall not significantly interfere with the overland flow path.
3. Garages, and other enclosed car parking areas, capable of accommodating more than 3 motor vehicles, must be protected from inundation by floods equal to or greater than the 1% AEP (100 year ARI) flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level. Where below ground car parking is proposed additional measures must achieve protection up to the PMF.
4. The driveway footpath crossing providing access between the road and property boundary shall be as high as practical and generally rising in the egress direction, providing this does not obstruct or displace floodwaters.
5. Unless otherwise approved by Council and provided this does not obstruct or displace floodwaters, the level of the driveway providing access between the road and parking spaces shall be no lower than 0.2 metres below the 1% AEP (100 year ARI) flood level.
6. Enclosed car parking, and car parking areas accommodating more than 3 motor vehicles, with a floor below the 1% AEP (100 year ARI) flood level, shall have adequate warning systems, signage, exits and evacuation routes. Refer to Flood Warning and Emergency Response Planning section for requirements.
7. Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 1% AEP (100 year ARI flood).

Based on the modelling results, as discussed in Section 4.2-4.4, the site is estimated to be generally flood free in the 1% AEP flood event. The entrance to the proposed basement carpark area has been raised to provide freeboard to the external level. Levels are raised providing a crest to the basement entry ramp to ensure no overland flow from Research Lane enters the basement. The proposed site levels tie in with the Hawkesbury Road upgrade and PLR works.

Table 6 outlines the Finished Floor Levels (FFLs) at various entry points around the site, alongside the DCP floor level requirements. Refer to Figure 46 for the point locations. This indicates that the development complies with the requirements of the DCP.

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Table 6 - Council DCP Floor Requirements Alongside Proposed Finished Floor Levels. Refer to below Figure.

Location		Design FFL (m AHD)	*1% AEP Flood Level (m AHD)	*PMF Level (m AHD)	Council DCP Floor Level Requirements (m AHD)
A	Main entry	22.00	-	21.98	N/A (1% AEP+500mm)
B	Egress stair (east) Leads into basement car park	22.00	21.50	22.00	22.00 (PMF)
C	Entry to proposed courtyard	22.00	20.90	22.00	21.40 (1% AEP+500mm)
D	Entry to existing courtyard	22.00	-	-	N/A (1% AEP+500mm)
E	Access ramp to basement	21.13	20.5	20.6	20.6 (PMF)
F	Egress stair (west) Leads into basement car park	21.37	-	-	N/A (PMF)
G	Entry into south corridor (adjacent to mechanical plant)	23.33	-	23.31	N/A (1% AEP+500mm)
H	Staff entry / entry to fire hydrant and pump room	22.00	-	-	N/A (1% AEP+500mm)
I	Staff entry / entry to fire hydrant and pump room	22.70	-	22.2	N/A (1% AEP+500mm)

* Note that a dash (-) indicates that the area is not affected by flooding.

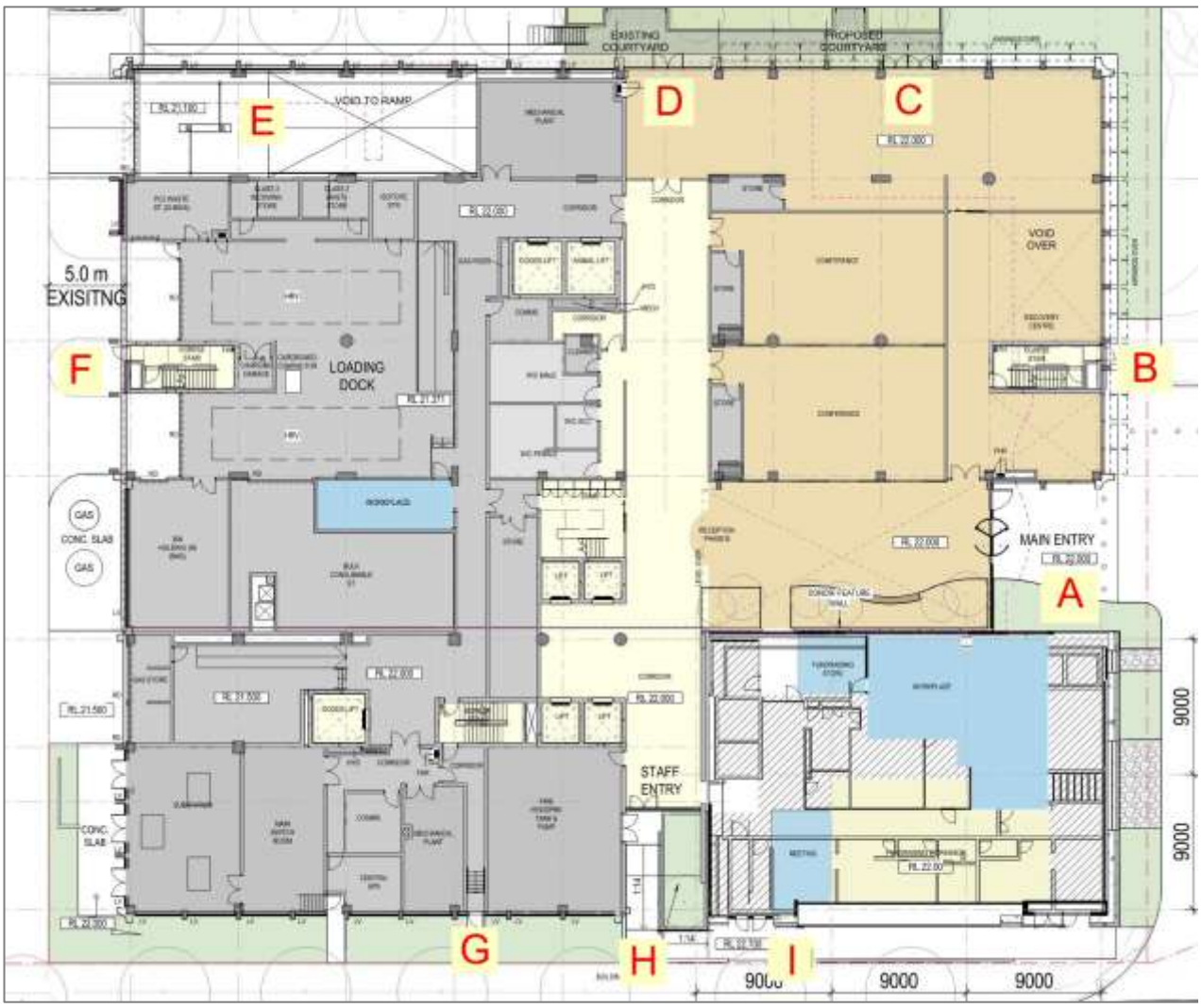


Figure 46 - Location of points discussed in Table 6

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6.0 Flood Emergency Response Plan

EVACUATION
1. Reliable access and egress for pedestrians is required during a 5% AEP (20 year ARI) flood.
2. Reliable access for pedestrians and vehicles required to a publicly accessible location during the PMF peak flood.
3. Reliable access for pedestrians required from the site to an area of refuge (including shelter in place) above the PMF level, on site (e.g. second storey) or off site.
4. Applicant is to demonstrate the development is consistent with any relevant flood emergency response plan, flood risk management plan or similar plan.
5. Applicant is to demonstrate that evacuation in accordance with the requirements of this DCP is available for the potential development resulting from the subdivision.
6. Adequate flood warning is to be available to allow safe and orderly evacuation without increased reliance upon SES or other authorised emergency services personnel.

Flood hazards remain low over the adjacent roads during the 1% AEP event with low velocities and depths. Therefore, evacuation routes remain accessible during all events up to and including the 1% AEP event. In addition, vertical evacuation to higher floors via internal stairs is available during all events including the PMF allowing refuge to be taken in the critical rare events from local and regional events.

Furthermore, the PMF flood hazards on Hawkesbury Road to the south (i.e. towards Queens Road) generally remains low (i.e. H1 and H2) meaning vehicular evacuation remains possible at all times, although pedestrians will need to remain at the site, on the higher elevation floors, until pavements and roads become safe for pedestrians. Modelling results of the PMF storms assessed have indicated that the surrounding roads will be deemed unsafe for traffic (i.e. flood hazards of H2 or higher) less than 10 minutes from the onset of storm, but these roads will return to H1 flood hazards (i.e. safe for traffic) in less than 5 hours.

With less than 10 minutes from the onset of the critical PMF storm until the surrounding roads are deemed unsafe and isolation time of less than 6 hours, it is recommended that the facility is prepared for a shelter-in-place strategy.

Shelter-in-place (SIP) Guidance for Flash Flooding, published by the NSW Department of Planning and Environment (DPE) in January 2025 provides considerations that can inform whether SIP is an appropriate response strategy in a flash flood environment, alongside design considerations that should be met. Table 7 outlines the varying factors that must be considered when proposing SIP, and how this site meets the recommendations.

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Table 7 – DPE SIP Guidelines

SIP Guideline	Response
Initial assessment	
1. Does shelter in place align with existing emergency management strategies for the area, as determined through the flood risk management process and by the NSW SES?	The main flood mechanism impacting the immediate area around the site is flash flooding via overland flow. Pre-emptive closure of the site is recommended when there is advanced warning of a major storm event. However, flash flood events are characterised by minimal warning times and therefore there may not be sufficient warning time to achieve evacuation at the site, as discussed below.
2. Has evacuation off-site (the primary emergency management strategy) been investigated and determined to be unachievable?	With less than 10 minutes from the onset of the critical PMF storm until inundation of the adjoining roads of the proposed GTB site, there is little warning time to implement evacuation off-site in the event of flooding. NSW SES state that evacuation of a site must not require people to drive or walk through flood water. It is therefore recommended that the facility is prepared for a shelter-in-place strategy in the event of flooding that affects the proposed GTB site.
3. Does the development include medical centres, emergency service and community facilities, and sensitive and hazardous land uses, some of which may not be suitable for shelter in place?	While the facility is a medical research facility, it does not receive hospital patients. It is also deemed more hazardous to attempt to evacuate the site once a severe storm event has already commenced, as this would involve moving vulnerable site users from a safe environment onto roads of medium to high hazards.
4. Shelter in place for greenfield development is not supported	N/A, the development is not a greenfield development.
5. Whether there is existing government developed flood warning systems that give advanced detailed forecasts of flash flooding to allow sufficient time to evacuate to the proposed refuge locations[2] [2] Flash flood warning systems are not failsafe and should not be the only mechanism to get people to shelter in place.	While there are flood warnings issued by the Bureau of Meteorology and the Australian Warning System, the flash flooding nature at the site (and the inherently limited warning time associated with this type of flooding) limits the capacity of NSW SES to issue flood notifications and action statements with sufficient lead time. There is less than 10 minutes from the onset of the critical PMF storm until inundation of the surrounding roads. Therefore, warnings may not be available or occur with advanced warning to accomplish evacuation.
6. Can the community effectively be informed of the risks associated with the emergency management strategy?	Education and signage are important ways to inform site users of the flood risks present on site and the flood protocols and procedures involved in the SIP strategy. These should be considered and implemented prior to the facility becomes operational.
Following satisfaction of the above, the following must be assessed:	
7. Detailed assessment of evacuation off-site (the primary emergency management strategy) to determine that evacuation off-site is not achievable	With less than 10 minutes from the onset of the critical PMF storm until inundation of the surrounding roads for the proposed GTB site, there is little warning time to implement evacuation off-site. NSW SES state that evacuation of a site must not require people to drive or walk through flood water.

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	It is therefore recommended that the facility is prepared for a shelter-in-place strategy.
8. The flood behaviour at the site, with consideration of climate change and assessment of the potential maximum duration of isolation up to and including the PMF to identify that: a) flash flooding is the only flood risk present at the site, whether it be from overland flooding, local creek or riverine flooding, and b) the flooding occurs within less than 6 hours from the commencement of causative rain and the duration of shelter in place due to isolation by floodwaters is less than 12 hours from the commencement of rainfall, and c) the development is not subject to high hazard flooding (e.g. floodways, high hazard H5 or H6 areas) or surrounding roadways are not subject to high hazard flooding.[3] [3] Flood Risk Management Guideline FB03 Flood Hazard, DCCEEW, 2023.	Impacts of climate change have been considered and assessed as part of the flood assessment and discussed in Section 4.6. a) The site is impacted by flash flooding derived from rainfall runoff. The site is not impacted by mainstream flooding. b) There is less than 10 minutes from the onset of the critical PMF storm until inundation of the surrounding roads for the proposed GTB site. The duration of isolation is short due to the flash nature of flooding in the area, with the facility only cutoff from access roads for less than 5 hours. c) While the GTB building itself is not impacted by flooding, its surrounding areas are subject to medium to high hazards flooding, as indicated in 39, in the PMF event. Nonetheless, it is deemed more hazardous to attempt to evacuate the site once a severe storm event has already commenced, as this would involve moving vulnerable site users from safe refuge into roads of medium to high hazards.
9. How shelter in place will be: a) used as part of the site's emergency management response, including actions before, during and after sheltering in place, and b) communicated to occupants and visitors of the building and how this communication will be maintained for the life of the development.	a) This will be outlined in a standalone Flood Emergency Response Plan (FERP) for the site. The FERP will be prepared prior to the GTB building becomes operational. b) This will be discussed and included in a standalone Flood Emergency Response Plan (FERP) for the site. The FERP will be prepared prior to the GTB building becomes operational.
10. An understanding of the secondary risks and how the proponent proposes they will be managed is outlined in the FIRA. Secondary risks include medical emergencies, building fire, health and wellbeing. a) Table 12 of EM01 should be used to consider whether the risks could be effectively managed.	This will be considered and discussed in a standalone Flood Emergency Response Plan (FERP) for the site. The FERP will be prepared prior to the GTB building becomes operational. a) Table 12 of the EM01 notes that, for a day hospitals, a key consideration for SIP is as follows: '*Where possible, new day hospitals should be located above the PMF level. However, at a minimum there should be access to adequate space above the PMF within a day hospital building for patients, staff and visitors where the facility is not intended to be evacuated outside the floodplain*.' With the proposed GTB ground level to be protected from PMF flooding and remaining higher floor levels free from flooding, there will be sufficient areas to shelter in place and meeting Table 12 SIP requirement above. Table 12 of the EM01 also notes "*Consider developing a PA system to communicate directions and safety messages to the population in the lead-up to and during a flood to assist*

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	in improving the safety of the community." A PA system will be available for the proposed GTB building, as part of the building fire response strategy.
Design criteria for consideration	
i. the floor level of the shelter in place part of the development be above the PMF, and	Table 6 summarises the proposed FFL and estimated flood levels around the GTB building, and confirmed that the ground floor of the proposed GTB building is set at or above the PMF levels and is therefore safe for refuge across all floors.
ii. structural soundness for conditions in a PMF event, considering flood and debris forces, be verified by a suitably qualified structural engineer, and	As a medical research facility, structural soundness of the GTB building will be achieved.
iii. area and access to the area does not rely on access to electricity, is self-directing, and have clearly marked internal access for all people on site, including consideration of access for potential occupants and/or visitors	As a medical research facility, access and clearly marked internal access will be achieved.
iv. protection from weather and appropriate heating and cooling	As a medical research facility this will be achieved.
v. access to personal hygiene facilities such as a toilet	As a medical research facility this will be achieved.
vi. a minimum floor space of 2 m² per person	Given that the facility will not accept hospital patients, this will be achieved.
vii. items for self-sufficiency that are stored, maintained and are regularly updated in an accessible location above the PMF, including sufficient drinking water and food for occupants, fire extinguishers, radios and torches with spare batteries, and a first aid kit with an automated external defibrillator (AED)	As a medical research facility this will be achieved.
viii. centralised communal shelters may be considered but must be freely accessible internally at all times and externally accessible during events	As the proposed GTB building are set above the PMF, with meeting rooms, office rooms, and common areas available for shelter.
ix. access is provided to onsite systems that generate power of the shelter in place location during and after the event for a full range of flood events up to the PMF	This will be achieved as the electrical room of the GTB building is protected against inundation up to (and including) the PMF event.
x. detail how these requirements will be maintained and enforced for the life of the development.	A standalone Flood Emergency Response Plan (FERP) for the site will be prepared and available prior to the operation of the GTB building. This will be a 'living documents which need to be regularly reviewed once the GTB building is operational to ensure they remain appropriate to address the risk to the site, can be practically implemented, and consider changing

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	information and lessons learnt from any floods since the last review. It is recommended that the FERP is reviewed following staff changes, flood drills as well as flood events to ensure that the details remain relevant for the site.

Based on the above and with less than 10 minutes from the onset of the critical PMF storm until the surrounding roads are deemed unsafe, it is recommended that the proposed GTB building is prepared for a shelter-in-place strategy. NSW SES state that evacuation of a site must not require people to drive or walk through flood water. The duration of isolation is short due to the flashy nature of flooding in the area, with the proposed GTB building being cut off from access roads for less than 5 hours in PMF event. It should also be noted that all proposed building areas on ground floor will not experience above-floor inundation in the PMF event, hence are safe to shelter in from the ground floor and upwards.

The site will be prepared for the short-term refuge required in terms of provisions, facilities and first aid, which will be located above the PMF event level, and will be managed by staff on site who will have designated responsibilities. During the shelter-in-place strategy, all staff and students are to remain indoors.

Weather warnings and BOM will be required to be monitored to give advanced warning of flooding although the short response time at the site will mean that there will unlikely be time to evacuate the building and why a shelter in place strategy is proposed.

All users of the site and known visitors to the site will be given advance warning of closure of the site. Users of the site will be directed by staff and signage to the higher levels. Constant users of the site will also be drilled in the flood emergency response procedures.

There will be no increased reliance on NSW SES or any other emergency services.

MANAGEMENT AND DESIGN
1. Applicant is to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this DCP and the relevant FRMS and FRMP.
2. Flood emergency response plan required where the site is affected by the 1% AEP (100 year ARI) flood level. Plan is to detail procedures that would be in place for an emergency (such as warning systems, signage and evacuation emergency drills) and should consider the following aspects: (i) preparing for a flood, (ii) responding when a flood is likely, (iii) responding during a flood, and (iv) recovery after a flood. Must be consistent with Flood Warning and Emergency Response Planning requirements outlined in DCP.
3. Applicant is to demonstrate that sufficient area is available to store goods above the 1% AEP (100 year ARI) flood level plus 0.5 metre freeboard.
4. No Storage of materials below the Flood Planning Level (1% AEP flood plus 0.5 metre freeboard) which may cause pollution or be potentially hazardous during any flood.

As discussed above, and in Section 4.2-4.4, the modelling results show that the site to be generally flood free in the 1% AEP flood event and as such the DCP does not require a full Flood Emergency Response Plan. Adequate space is available within the building to store goods, and it is recommended that hazardous materials are not stored in the basement level and ideally on Level 1 and above.

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7.0 Summary

TTW has been engaged to carry out a flood assessment in relation to the Children's Medical Research Institute (CMRI) - Gene Technologies Building (GTB) development and support a State Significant Development application. Hydraulic modelling has been carried out based on the TUFLOW developed by Arup as part of the Children's Hospital Westmead Paediatric Services Building (2021) and Kids Park Flood Impact Assessment (2023).

The modelling results are discussed in Section 4.2 to Section 4.5 of this report. The results show that the proposed GTB redevelopment works will not result in unacceptable flood impacts for areas outside the Children's Hospital Westmead property boundary in the 1% AEP event.

Further, the results show that flood hazards for the surrounding areas of the GTB site generally remained similar to the pre-development scenario, for areas external to the Children's Hospital Westmead property boundary. Nonetheless, further checks and assessments should be carried out in the detailed design phase (i.e. prior to construction) of the project to confirm that the modelling outcome discussed within this report is maintained and that appropriate levels have been set for the key locations within the GTB site.

Flood hazards surrounding the site are low in the 1% AEP event and suitable for pedestrians and vehicles. Council's DCP does not require a Flood Emergency Response Plan for sites not within the 1% AEP, however, during the larger and very rare PMF event, a shelter in place strategy is proposed due to the higher hazards simulated and the potential speed and lack of suitable warning time available. This will be in line with the Department of Environment's 'Shelter in place Guideline' as outlined in Section 6.0.

Users of the site will have shelter available on the higher floors of the building and vertical evacuation will be suitably prepared for, in terms of provisions and facilities, and managed by onsite staff. Ongoing education of flood risk and hazards will be given and emergency drills carried out periodically. Observation of online BOM weather warnings and radar will be used to inform of large weather events that may cause inundation at the site and its surrounds.

Prepared by
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MICHAEL KOI
Associate (Flood)

Authorised By
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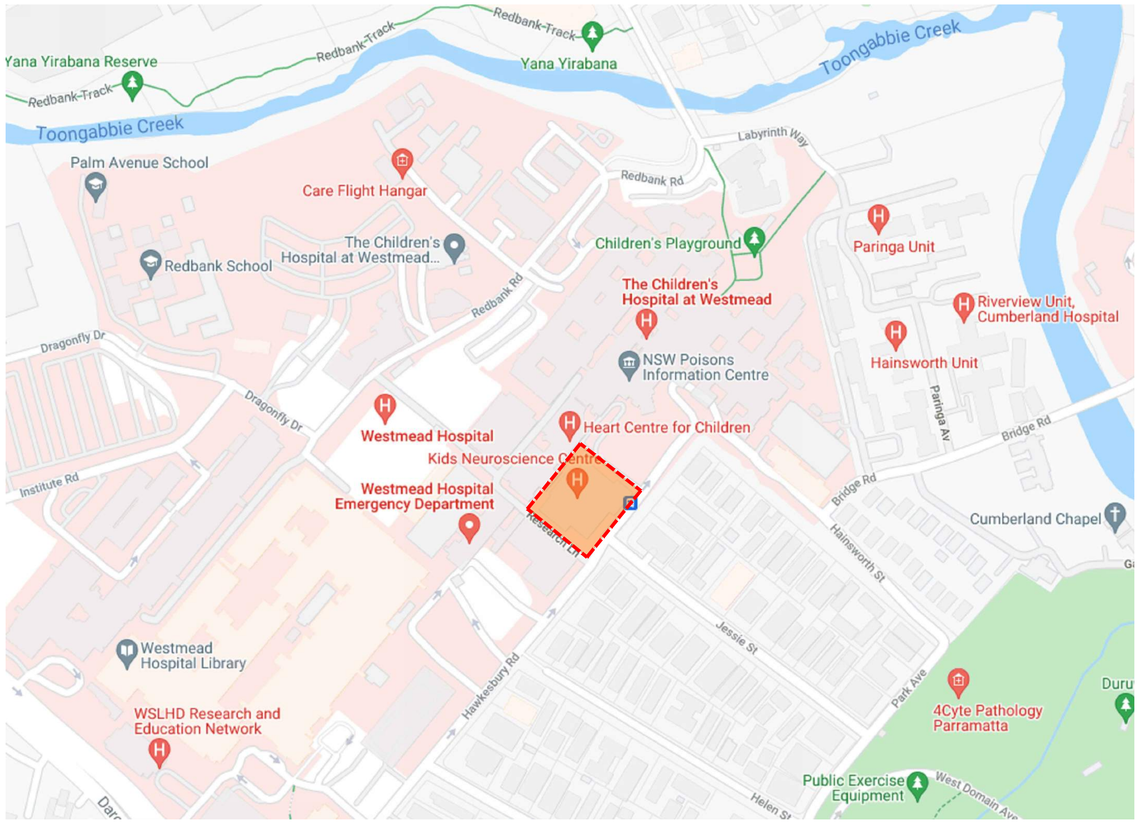
Appendix A – Architectural Plan

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THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C001

CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD



LOCALITY PLAN
NTS

DRAWING SHEET LIST	
DRAWING NO.	DRAWING TITLE
C000	COVER SHEET
C001	NOTES AND LEGENDS SHEET
C004	EXISTING LTS DETAIL AND SERVICES SURVEY
C005	EXISTING BEE & LETHBRIDGE DETAIL AND SERVICES SURVEY
C006	COMBINED EXISTING DETAIL AND SERVICES SURVEY
C020	SITEWORKS AND STORMWATER PLAN - GROUND LEVEL
C021	STORMWATER PLAN - BASEMENT LEVEL
C023	BULK EARTHWORKS PLAN
C030	DRIVEWAY LONGITUDINAL SECTIONS
C040	SECTIONS
C050	DETAILS - STORMWATER
C051	DETAILS - CITY OF PARRAMATTA

FileName: C000 COVER SHEET.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 4:21pm

A1

Rev	Description	Eng	Draft	Date
P3	SCHEMATIC DESIGN	VC	WW	10.05.24
P2	SCHEMATIC DESIGN	WL	WW	19.08.22
P1	ISSUE FOR SSD	WL	WW	12.08.22

Rev Description Eng Draft Date

Rev Description Eng Draft Date

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Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
COVER SHEET

SCHEMATIC DESIGN
NOT TO BE USED FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
NTS	WW	TM

Job No	Drawing No	Revision
212012	C000	P3

Plot File Created: May 08, 2024 - 4:21pm

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GENERAL NOTES

1. Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the ENGINEER
2. Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
3. Make smooth connection with all existing works.
4. Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
5. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority; the Contractor is to ensure that the drawings used for construction have been approved by all relevant authorities prior to commencement site.
6. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
7. For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

1. These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	Rev	Date
LTS	SURVEY	32572 111DT		01.09.2022
Bee&Lethbridge	SURVEY	15283D	00	06.2012
HASSELL	GA FLOOR PLAN_LEVEL 2	DA-1201	B	29.02.2024
HASSELL	GA FLOOR PLAN_LEVEL 1	DA-1200	B	29.02.2024

STORMWATER DRAINAGE NOTES

1 Stormwater Design Criteria :
(A) Average exceedance probability -
1% AEP for roof drainage to first external pit
5% AEP for paved and landscaped areas
(B) Rainfall intensities -
Time of concentration: 5 minutes
1% AEP = 209 mm/hr
5% AEP = 163 mm/hr
(C) Rainfall losses -
Impervious areas: IL = 1.5 mm , CL = 0 mm/hr
Pervious areas: IL = 29mm , CL = 2 mm/hr

2. Pipes 300 dia and larger to be reinforced concrete Class "2" approved spigot and socket with rubber ring joints U.N.O.
5. Precast pits may be used external to the building subject to approval by Council.
6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
7. Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
8. Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
9. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
10. Care is to be taken with invert levels of stormwater lines. Grades shown are not to be reduced without approval.
11. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
12. Subsoil drains to be slotted flexible uPVC U.N.O.
13. Adopt invert levels for pipe installation (grades shown are only nominal).
14. All drainage works to be installed in accordance with PCC standard details.

CONCRETE FINISHING NOTES

1. All exposed concrete pavements are to be broomed finished.
2. All edges of the concrete pavement including keyed and dowelled joints are to be finished with an edging tool.
3. Concrete pavements with grades greater than 10 % shall be heavily broomed finished.
4. Carborundum to be added to all stair treads and ramped crossings U.N.O.

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels : SSM156523 R.L 16.485 MONS ROAD
Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM
Coordinate system : SURVEYOR TO CONFIRM
Survey prepared by : LTS
Setout Points : CONTACT THE SURVEYOR

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or
adjusted in any way.
Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from : BEE & LETHBRIDGE
15283D

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct.
Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

SITEWORKS NOTES

1. All basecourse material to comply with RMS specification No 3051 and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.
2. All trench backfill material shall be compacted to the same density as the adjacent material.
3. All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
(A) Local authority requirements,
(B) EPA - Pollution control manual for urban stormwater,
(C) LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. The erosion and sediment control shall be implemented and adapted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water
into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

SAFETY IN DESIGN

Contractor to refer to Appendix B of the Civil Specification for the Civil Risk and Solutions Register.

EXISTING SERVICES

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicably possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicably possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions. Refer to geotechnical report by JK Geotechnics (16 Nov 2017, ref:30993ZArpt) for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practices as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to geotechnical/environmental report by JK Geotechnics (16 Nov 2017, ref:30993ZArpt) for details.

CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing works.

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the surrounding environment.

SITE ACCESS/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshall to supervise vehicle movements where necessary.

KERBING NOTES

Includes all kerbs, gutters, dish drains, crossings and edges.

1. All kerbs, gutters, dish drains and crossings to be constructed on minimum 75mm granular basecourse compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
2. Expansion joints (EJ) to be formed from 10mm compressible cork filler board for the full depth of the section and cut to profile. Expansion joints to be located at drainage pits, on tangent points of curves and elsewhere at 12m centres except for integral kerbs where the expansion joints are to match the joint locations in slabs.
3. Weakened plane joints to be min 3mm wide and located at 3m centres except for integral kerbs where weakened plane joints are to match the joint locations in slabs.
4. Broomed finished to all ramped and vehicular crossings, all other kerbing or dish drains to be steel float finished.
5. In the replacement of kerbs -
Existing road pavement is to be sawcut 900mm from lip of gutter. Upon completion of new kerbs, new basecourse and surface is to be laid 900mm wide to match existing materials and thicknesses.
Existing allotment drainage pipes are to be built into the new kerb with a 100mm dia hole.
Existing kerbs are to be completely removed where new kerbs are shown.

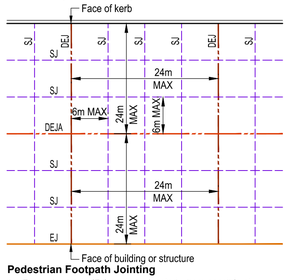
JOINTING NOTES

Vehicular Pavement Jointing

1. All vehicular pavements to be jointed as shown on drawings.
2. Dowelled expansion joints (DEJ) should generally be located at a maximum of 24.0m centres. Dowel bars to be plain round steel bars of Grade 250N, 450mm long and placed at 300mm spacing. Dowel diameter as specified below U.N.O

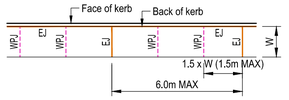
Design base thickness, D (mm)	Dowel diameter (mm)
150 < D ≤ 190	20
200 < D ≤ 240	24
250 < D ≤ 270	30
280 < D ≤ 340	33
D > 350	36 (500 long)

3. Dowelled expansion joint type A (DEJA) should generally be located longitudinally and at a maximum of 24.0m centres. Refer to DEJA detail provided on detail sheets.
4. Sawn joints should generally be located at a maximum of 6.0m centres or 1.5 x the spacing of perpendicular sawn joints
5. Provide 10mm wide full depth expansion joints (EJ) between buildings/structures and all concrete or unit pavers.
6. The timing of the saw cut is to be confirmed by the contractor on site. Site conditions will determine how many hours after the concrete pour before the saw cuts are commenced. Refer to the specification for weather conditions and temperatures required.
7. Vehicular pavement jointing as follows.



Pedestrian Footpath Jointing

1. Expansion joints (EJ) are to be located where possible at tangent points of curves and elsewhere at max 6.0m centres.
2. Weakened plane joints (WPJ) are to be located at a max 1.5 x width of the pavement.
3. Where possible joints should be located to match kerbing and / or adjacent pavement joints.
4. All pedestrian footpath jointings as follows U.N.O.



Wall Jointing

1. For concrete walls, weakened plane joints (WPJ) or control joints (CJ) to be located at a maximum of 8.0m centres. Expansion joints (EJ) to be located at a maximum of 30.0m centres U.N.O.
2. For blockwork walls, dowelled control joints (CJ) to be located at maximum of 8.0m spacing U.N.O.

FileName: C001 NOTES AND LEGENDS SHEET.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 4:25pm

A1

SCHEMATIC DESIGN
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Rev	Description	Eng	Draft	Date
P2	SCHEMATIC DESIGN	VC	WW	10.05.24
P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
NOTES AND LEGENDS SHEET

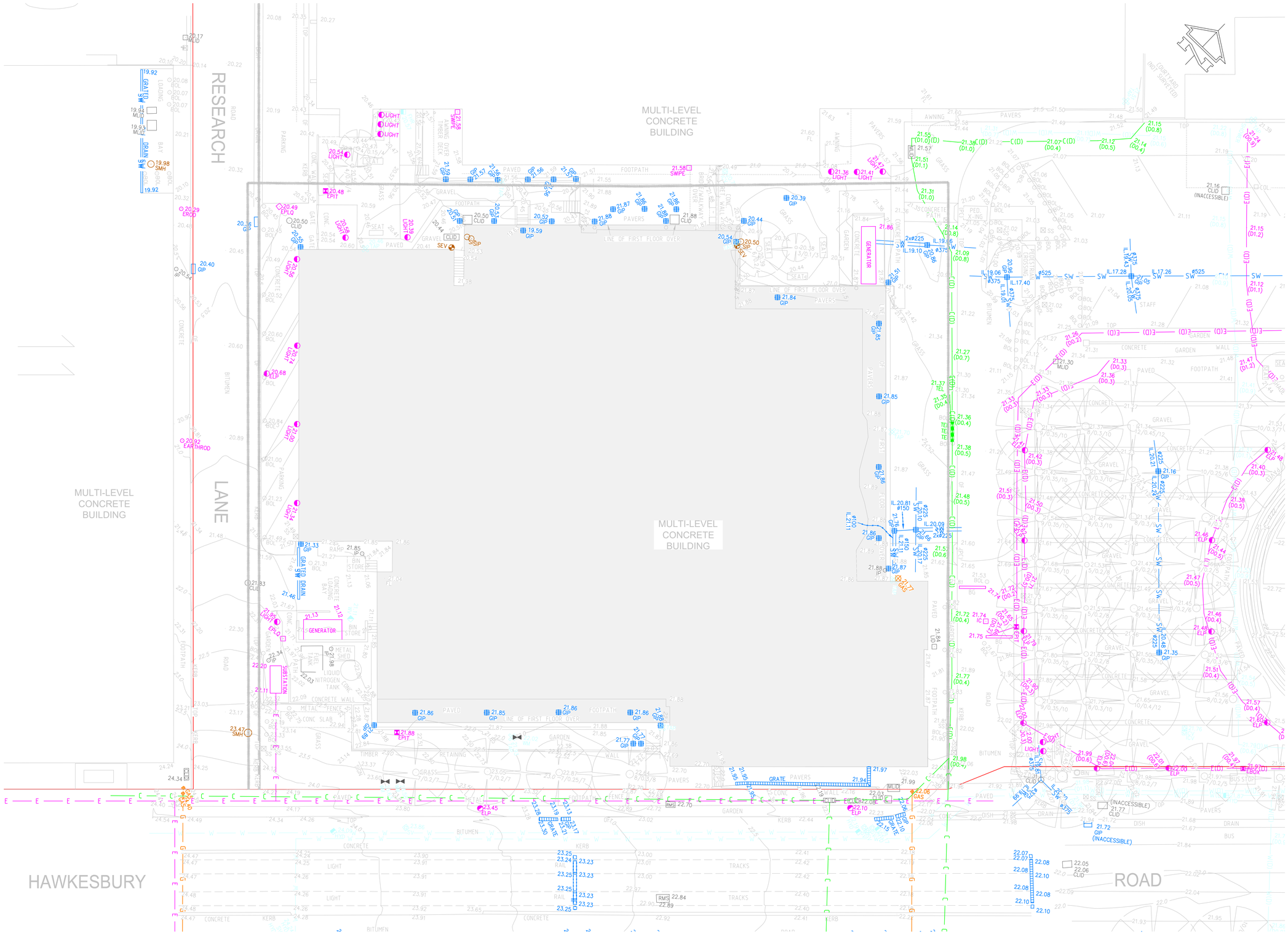
Scale : A1 NTS | Drawn WW | Authorised TM
Job No 212012 | Drawing No C001 | Revision P2
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EXISTING SERVICES LEGEND - LTS

- E(D) — EXISTING OVERHEAD ELECTRICAL
- eE — EXISTING UNDERGROUND ELECTRICAL
- G — EXISTING GAS
- C(D) — EXISTING TELECOMMUNICATIONS
- S — EXISTING SEWER
- W(D) — EXISTING WATER
- EXISTING STORMWATER



SCALE 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10 m

FileName: C004 EXISTING LTS DETAIL AND SERVICES SURVEY.dwg - USER: wendyn - Plot File Created: May 08, 2024 - 4:59pm

A1

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Sheet Subject
EXISTING LTS DETAIL AND SERVICES SURVEY

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1:200	WW	TM

Job No	Drawing No	Revision
212012	C004	P2

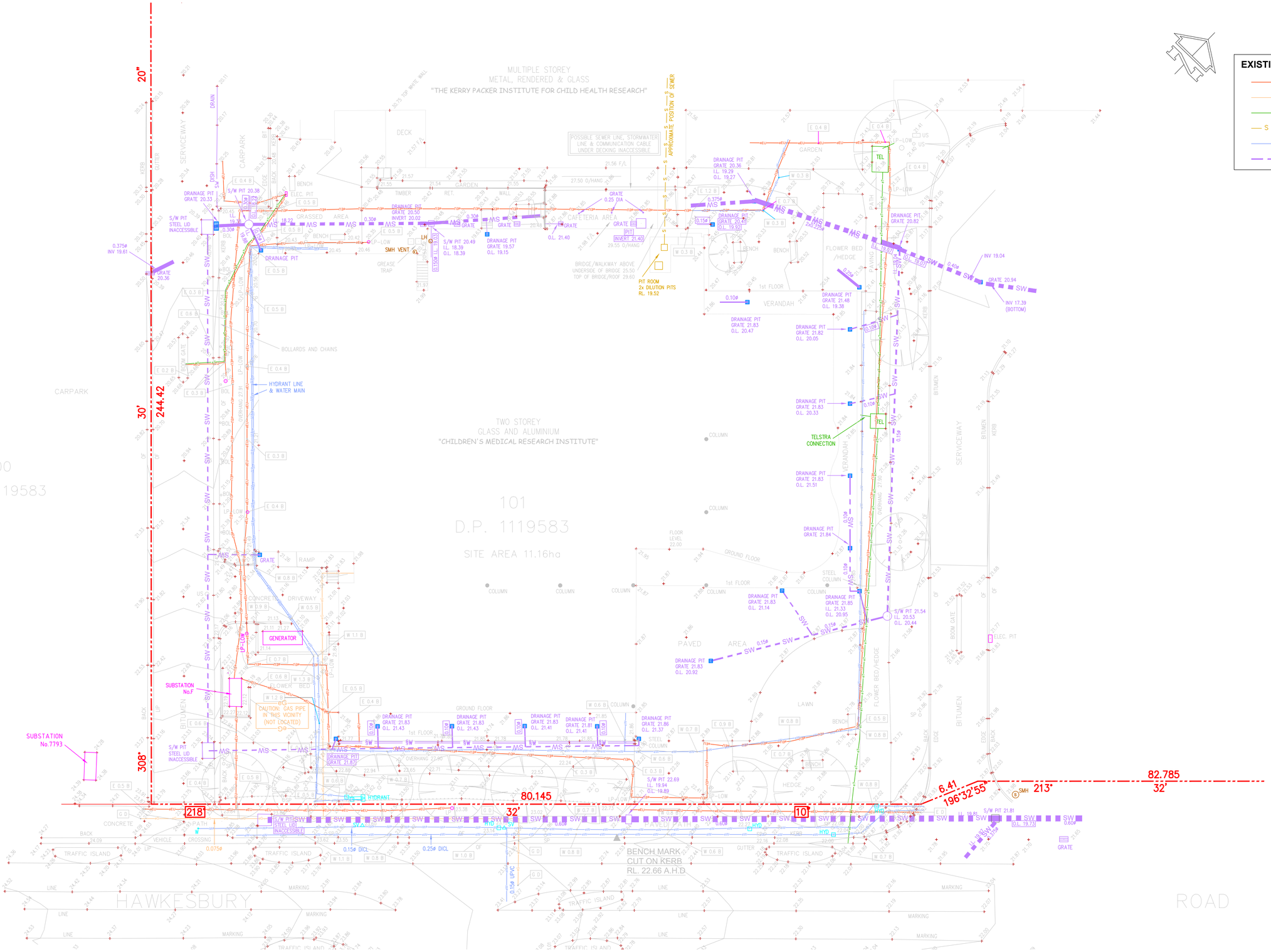
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EXISTING SERVICES LEGEND - Bee & Lethbridge

- eEU — EXISTING UNDERGROUND ELECTRICAL
- eG — EXISTING GAS
- eT — EXISTING TELECOMMUNICATIONS
- S — EXISTING SEWER
- eW — EXISTING WATER
- SW — EXISTING STORMWATER



SCALE 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10 m

FileName: C005 EXISTING BEE & LETHBRIDGE DETAIL AND SERVICES SURVEY.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 4:54pm

A1

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P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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Sheet Subject
EXISTING BEE & LETHBRIDGE DETAIL AND SERVICES SURVEY

Scale : A1 1:200 | Drawn WW | Authorised TM
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EXISTING SERVICES LEGEND - LTS

E(D)	EXISTING OVERHEAD ELECTRICAL
eE	EXISTING UNDERGROUND ELECTRICAL
G	EXISTING GAS
C(D)	EXISTING TELECOMMUNICATIONS
S	EXISTING SEWER
W(D)	EXISTING WATER
	EXISTING STORMWATER

EXISTING SERVICES LEGEND - Bee & Lethbridge

eEU	EXISTING UNDERGROUND ELECTRICAL
eG	EXISTING GAS
eT	EXISTING TELECOMMUNICATIONS
S S	EXISTING SEWER
eW	EXISTING WATER
SW	EXISTING STORMWATER

SCALE 1:200 0 2 4 6 8 10 m
AT ORIGINAL SIZE

FileName: C006 COMBINED EXISTING DETAIL AND SERVICES SURVEY.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 5:01pm

A1

SCHEMATIC DESIGN

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P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
COMBINED EXISTING DETAIL AND SERVICES SURVEY

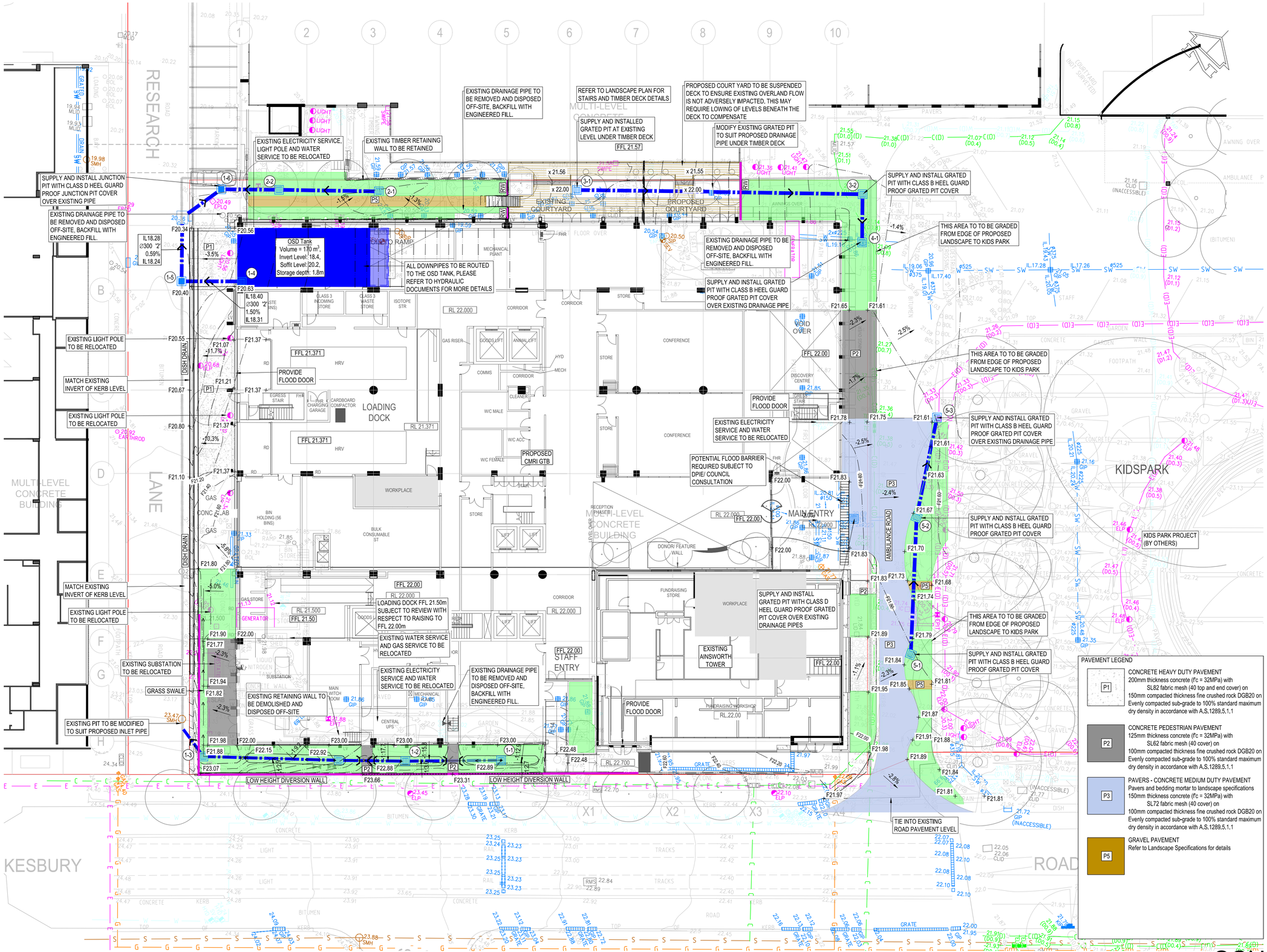
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1:200	WW	TM

Job No	Drawing No	Revision
212012	C006	P2

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SITEWORKS LEGEND:

- SITE BOUNDARY
- LIMIT OF WORK
- × F22.20 FINISHED SURFACE LEVEL
- 22.50 FINISHED SURFACE CONTOUR
- KG KERB AND GUTTER
- KO KERB ONLY
- FK FLUSH KERB
- DD DISH DRAIN
- STORMWATER PIPE, FLOW DIRECTION
- uIL10.00 Ø600 '2' 1.25% Q=345L/s dIL9.65 — UPSTREAM PIPE INVERT LEVEL; PIPE SIZE AND STRENGTH CLASS; PIPE GRADIENT; PEAK DESIGN FLOW; DOWNSTREAM PIPE INVERT LEVEL
- JUNCTION PIT
- GRATED INLET PIT
- GD# GRATED DRAIN
- SUBSOIL DRAINAGE LINE, Ø100mm U.N.O.
- FP FLUSHING POINT
- IR INTERMEDIATE RISER
- GRASS SWALE
- LOW HEIGHT DIVERSION WALL
- RW RETAINING WALL

EXISTING SERVICES LEGEND - LTS

- E(D) EXISTING OVERHEAD ELECTRICAL
- eE EXISTING UNDERGROUND ELECTRICAL
- G EXISTING GAS
- C(D) EXISTING TELECOMMUNICATIONS
- S EXISTING SEWER
- W(D) EXISTING WATER
- EXISTING STORMWATER

WORKS NEAR EXISTING SERVICES

ALL EXISTING UNDERGROUND SERVICES ARE TO BE LOCATED ON SITE PRIOR TO COMMENCING WORKS

WORKS NEAR EXISTING TREES

PRECAUTIONS ARE TO BE UNDERTAKEN TO ENSURE EXISTING TREES IN THE VICINITY OF WORKS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES

CIVIL SPECIFICATIONS

DRAWINGS TO BE READ IN CONJUNCTION WITH THE CIVIL SPECIFICATION. REFER APPENDIX A FOR INSPECTION HOLD POINTS

HIGH PRESSURE GAS MAIN

PRECAUTIONS ARE TO BE UNDERTAKEN TO ENSURE HIGH PRESSURE GAS MAIN IN THE VICINITY OF WORKS IS NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. LIAISE WITH THE ASSET OWNER AS REQUIRED

HIGH VOLTAGE ELECTRICAL CABLE

PRECAUTIONS ARE TO BE UNDERTAKEN TO ENSURE HIGH VOLTAGE CABLE IN THE VICINITY OF WORKS IS NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. LIAISE WITH ASSET OWNER AS REQUIRED

EXISTING STORMWATER ASSETS

SIZE, INVERT LEVEL AND CONDITION OF ALL AFFECTED EXISTING STORMWATER ASSETS TO BE CONFIRMED PRIOR TO COMMENCING WORKS

SCALE 1:200 0 2 4 6 8 10 m
AT ORIGINAL SIZE

SCHEMATIC DESIGN

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FileName: 0200 SITEWORKS AND STORMWATER PLAN - GROUND LEVEL.dwg - USER: wendyw - Plot File Created: May 09, 2024 - 11:55am

A1

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P4	SCHEMATIC DESIGN	VC	WW	10.05.24
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Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
SITEWORKS AND STORMWATER PLAN - GROUND LEVEL

Scale : A1 1:200 | Drawn WW | Authorised TM

Job No 212012 | Drawing No C020 | Revision P4

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NOTES:
-DOWNPIPES FROM ABOVE TO BE UPVC MATERIAL AND RUN HARD UP AGAINST WALLS / COLUMNS WITH APPROVED PVC COATED CLIPS AND THREADED RODS FIXED INTO THE STRUCTURE WITH MASONRY ANCHORS AS REQUIRED.
-FLOOR WASTE, STRIP DRAIN, AGI DRAIN, TRENCH GRATE AND DOWNPIPE OUTLETS TO BE 100 DIA. UPVC AT MIN. 1:100 GRADE UNO.
-PIPE PENETRATIONS THROUGH FOOTINGS / BEAMS / SLABS TO BE WRAPPED WITH MOISTURE PROOF LAGGING AND PROVIDED WITH FLEXIBLE JOINTING UPON ENTRY AND EXIT INTO STRUCTURAL ELEMENT.
-ALL BASEMENT DRAINAGE PIPES ARE TO BE INSTALLED IN ACCORDANCE WITH THE RELEVANT STANDARDS FOR GROUNDWATER INSTALLATION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL AND TEST THE PIPE WORK AGAINST THE ANTICIPATED HYDROSTATIC PRESSURE BASED ON THE DESIGN GROUNDWATER TABLE RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
-ALL BASEMENT STORMWATER PITS ARE TO BE INTEGRATED AND TIED TO THE STRUCTURAL SLAB AS PER THE STRUCTURAL ENGINEER'S, THE STORMWATER PUMP STATION IS TO BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES AND SPECIFICATIONS FOR GROUNDWATER INSTALLATION.
-CONTRACTOR TO ALLOW FOR TEMPORARY DEWATERING OF EXCAVATION BELOW THE GROUNDWATER TABLE AND/OR PERCHED WATER TABLE TO AUTHRORITY REQUIREMENTS
-THE CONTRACTOR SHALL ENSURE THAT ALL BASEMENT DRAINAGE INCLUDING PIPE TO PIPE AND PIPE TO PIT CONNECTIONS ARE ALL FULLY SEALED AND WATERTIGHT TO WITHSTAND HYDROSTATIC PRESSURE. NO PHYSICAL EVIDENCE OF LEAKAGE OR DAMPNESS SHALL BE PERMISSIBLE.
-THE EXTERNAL PIT WALLS OF ALL BASEMENT STORMWATER PITS AND THE PUMP STATION ARE TO BE LINED WITH A WATER PROOF MEMBRANE OR APPROVED EQUIVALENT PRODUCT TO PREVENT GROUNDWATER INGRESS.
-AT THE CONCLUSION OF WORKS AND PRIOR TO SITE HANDOVER, THE CONTRACTOR SHALL COMPLETE CCTV INVESTIGATION OF ALL BASEMENT STORMWATER PITS AND PIPES TO CONFIRM ALL ARE UNIMPEDED AND OTHERWISE IN GOOD WORKING CONDITION

PUMP AND RISING MAIN BY HYDRAULIC ENGINEER'

MINIMUM 180mm WIDE SPOON DRAIN TO BE FORMED WITHIN STRUCTURAL SLAB AROUND FULL PERIMETER OF THE BASEMENT. MIN. DEPTH OF 20mm AT HIGH POINTS FALLING AT 1:200 GRADE TO FLOOR WASTE OUTLETS (FW). REFER TO TYPICAL DETAIL

PIPE PENETRATION WITHIN SHOTCRETE WALL SUBJECT TO FURTHER COORDINATION WITH STRUCTURAL ENGINEERS. PIPE TO BE WRAPPED WITH MOISTURE PROOF LAGGING THROUGH PENETRATION AND PROVIDED WITH FLEXIBLE JOINTING UPON ENTRY AND EXIT INTO STRUCTURAL ELEMENT.

ALL STORMWATER PIT LIDS WITHIN BASEMENT TO BE CLASS D. PITS TO BE TIED TO STRUCTURAL SLAB TO MITIGATE BUYOANCY FORCES. TYPICAL

ONSITE DETENTION TANK. REFER GROUND FLOOR PLAN FOR OSD TANK AND OVERFLOW DETAIL ARRANGEMENT

200mm WIDE CLASS D TRENCH GRATE CAST INTO THE STRUCTURAL SLAB AT BASE OF RAMP. REFER TO TYPICAL DETAIL.
PROVIDE 150DIA CONNECTION TO NEAREST PIT AT 1:100 GRADE

225DIA HDPE @ 1:200

150DIA COLLECTOR DRAINS @ 1:200

NETWORK OF 100DIA. SLOTTED AG DRAINS WRAPPED IN GEOSOCKS TO BE PROVIDED WITHIN DRAINAGE LAYER BELOW THE BASEMENT SLAB FOOTPRINT. REFER DETAIL.
AG DRAINS TO RUN AT NOMINAL 1:200 GRADE AND DISCHARGE TO COLLECTOR DRAIN.
DISCHARGE OF AG DRAINS TO STORMWATER NETWORK SUBJECT TO LPD ADVICE AND CITY OF PARAMATTA APPROVAL

FURTHER COORDINATION BETWEEN SERVICES CONSULTANTS REQUIRED FOR RAINWATER TANKS, FIRE TANKS LOCATIONS AND OVERFLOWS.

100DIA uPVC LOTTED AG DRAIN WRAPPED IN GEOSOCK TO BE PROVIDED AT THE BASE OF STRUCTURAL WALL. PROVIDE HARD CONNECTION TO FLOOR WASTE OUTLETS AS INDICATED. TYPICAL THROUGHOUT THE BASEMENT. REFER TO DETAILS ON C050. DISCHARGE OF AG DRAINS TO POINT OF DISCHARGE IS SUBJECT TO CITY OF PARAMATTA APPROVAL

FLOOR WASTE (FW) TO BE MINIMUM 100mm DIA. STAINLESS STEEL AND NON SLIP. FW TO BE PROVIDED WITH 100DIA HARD CONNECTION AT 1:100 GRADE TOWARDS POINT OF CONNECTION
SPS TRUFLO FLATE GRATE RWO OR APPROVED EQUIVALENT PRODUCT. TYP

LEGEND

- FW — Floor waste
- HP — High point
- Perimeter spoon drain
- Stormwater drain
- Stormwater pit
- Pump well
- RM — Ag drain - drainage blanket
- Collector drain - drainage blanket
- AG — Ag drain - drainage blanket
- Trench grate

SCALE 1:200 0 2 4 6 8 10 m
AT ORIGINAL SIZE

SCHEMATIC DESIGN
NOT TO BE USED FOR CONSTRUCTION

FileName: C021 STORMWATER PLAN - BASEMENT LEVEL.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:35pm

A1

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P3	SCHEMATIC DESIGN	VC	WW	10.05.24
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P1	ISSUE FOR SSD DRAFT	WL	WW	12.08.22

Rev Description Eng Draft Date | Rev Description Eng Draft Date

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Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
STORMWATER PLAN - BASEMENT LEVEL

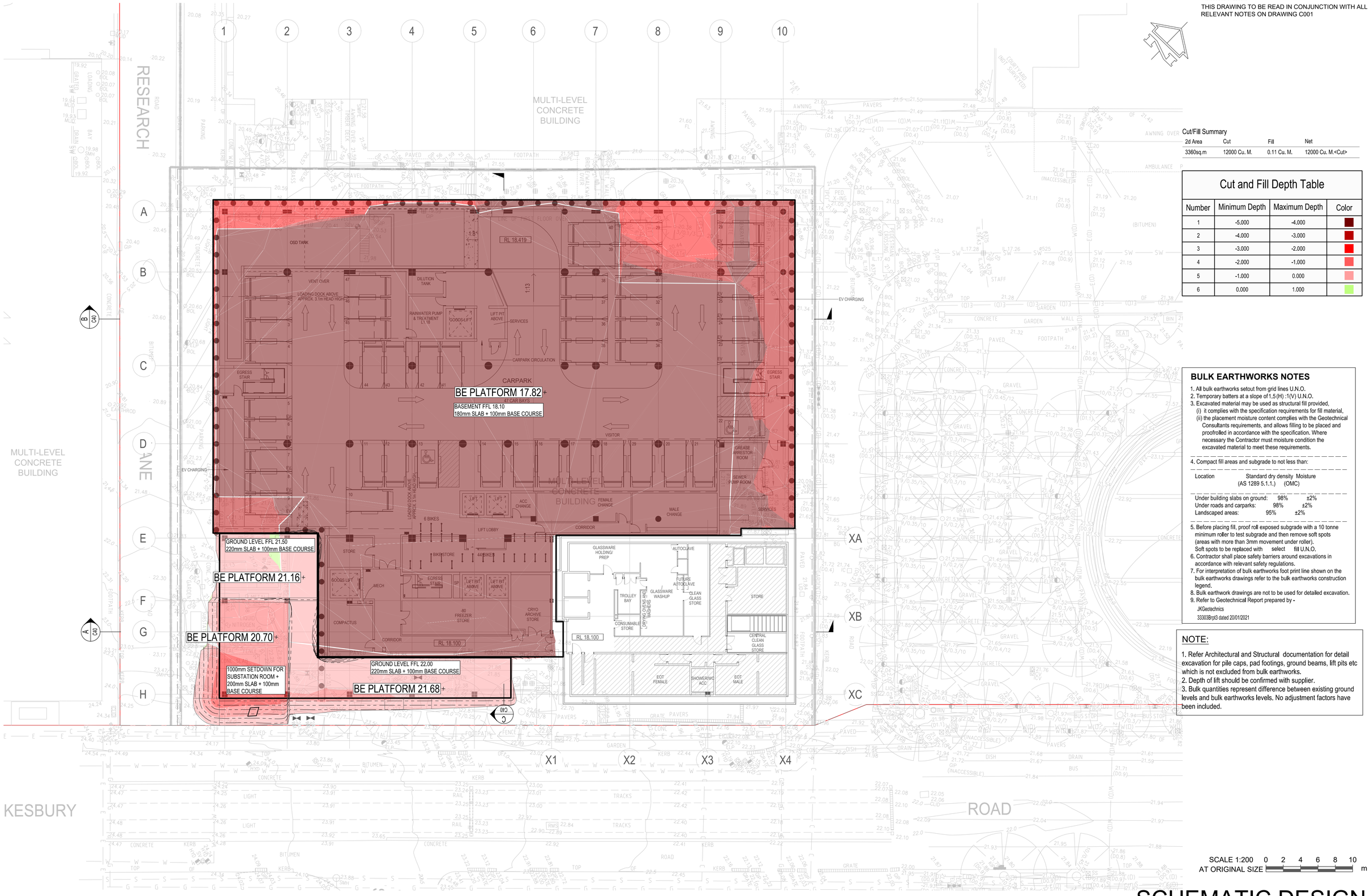
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Job No	Drawing No	Revision
212012	C021	P3

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Cut/Fill Summary

2d Area	Cut	Fill	Net
3360sq.m	12000 Cu. M.	0.11 Cu. M.	12000 Cu. M.<Cut>

Cut and Fill Depth Table

Number	Minimum Depth	Maximum Depth	Color
1	-5.000	-4.000	
2	-4.000	-3.000	
3	-3.000	-2.000	
4	-2.000	-1.000	
5	-1.000	0.000	
6	0.000	1.000	

BULK EARTHWORKS NOTES

1. All bulk earthworks setout from grid lines U.N.O.
2. Temporary batters at a slope of 1.5 (H) :1(V) U.N.O.
3. Excavated material may be used as structural fill provided,
   (i) it complies with the specification requirements for fill material,
   (ii) the placement moisture content complies with the Geotechnical Consultants requirements, and allows filling to be placed and proofrolled in accordance with the specification. Where necessary the Contractor must moisture condition the excavated material to meet these requirements.
4. Compact fill areas and subgrade to not less than:

Location	Standard dry density (AS 1289 5.1.1.)	Moisture (OMC)
Under building slabs on ground:	98%	±2%
Under roads and carparks:	98%	±2%
Landscaped areas:	95%	±2%

5. Before placing fill, proof roll exposed subgrade with a 10 tonne minimum roller to test subgrade and then remove soft spots (areas with more than 3mm movement under roller). Soft spots to be replaced with select fill U.N.O.
6. Contractor shall place safety barriers around excavations in accordance with relevant safety regulations.
7. For interpretation of bulk earthworks foot print line shown on the bulk earthworks drawings refer to the bulk earthworks construction legend.
8. Bulk earthwork drawings are not to be used for detailed excavation.
9. Refer to Geotechnical Report prepared by -
   JKGeotechnics
   33303Brpt3 dated 20/01/2021

NOTE:

1. Refer Architectural and Structural documentation for detail excavation for pile caps, pad footings, ground beams, lift pits etc which is not excluded from bulk earthworks.
2. Depth of lift should be confirmed with supplier.
3. Bulk quantities represent difference between existing ground levels and bulk earthworks levels. No adjustment factors have been included.

SCALE 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10 m

SCHEMATIC DESIGN

NOT TO BE USED FOR CONSTRUCTION

FileName: C023 BULK EARTHWORKS PLAN.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:22pm

A1

Rev	Description	Eng	Draft	Date
P2	SCHEMATIC DESIGN	VC	WW	10.05.24
P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
BULK EARTHWORKS PLAN

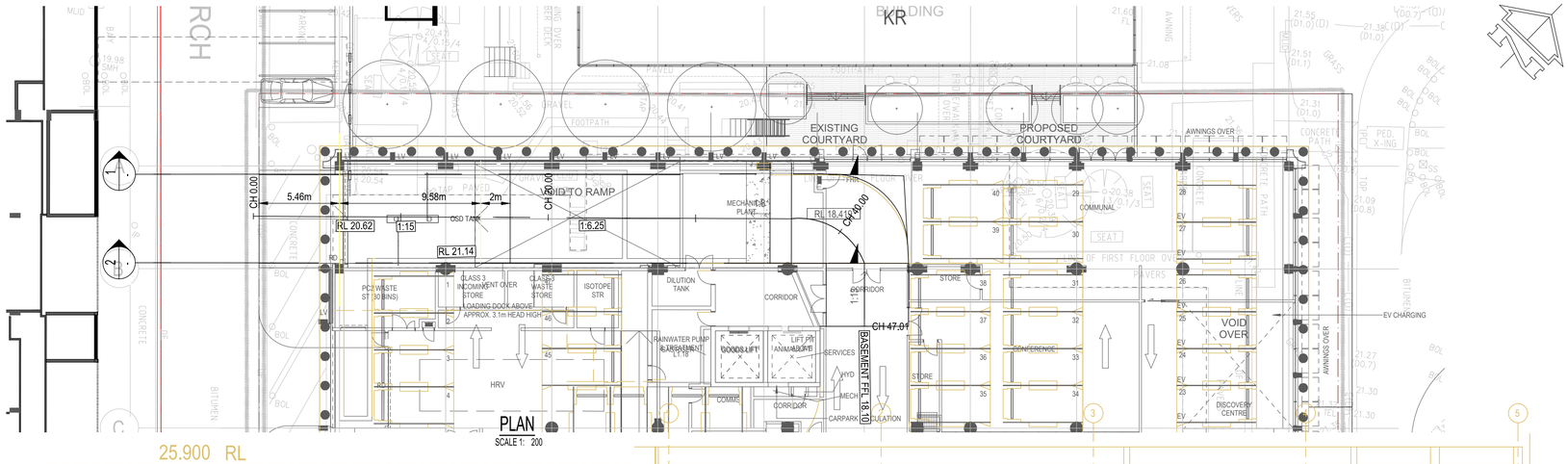
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1:200	WW	TM

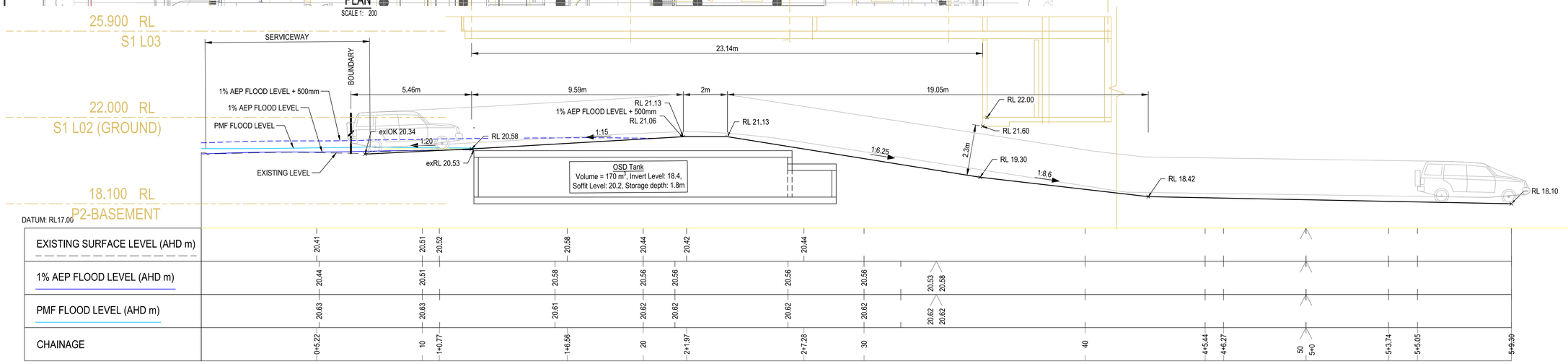
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212012	C023	P2

Plot File Created: May 08, 2024 - 8:22pm

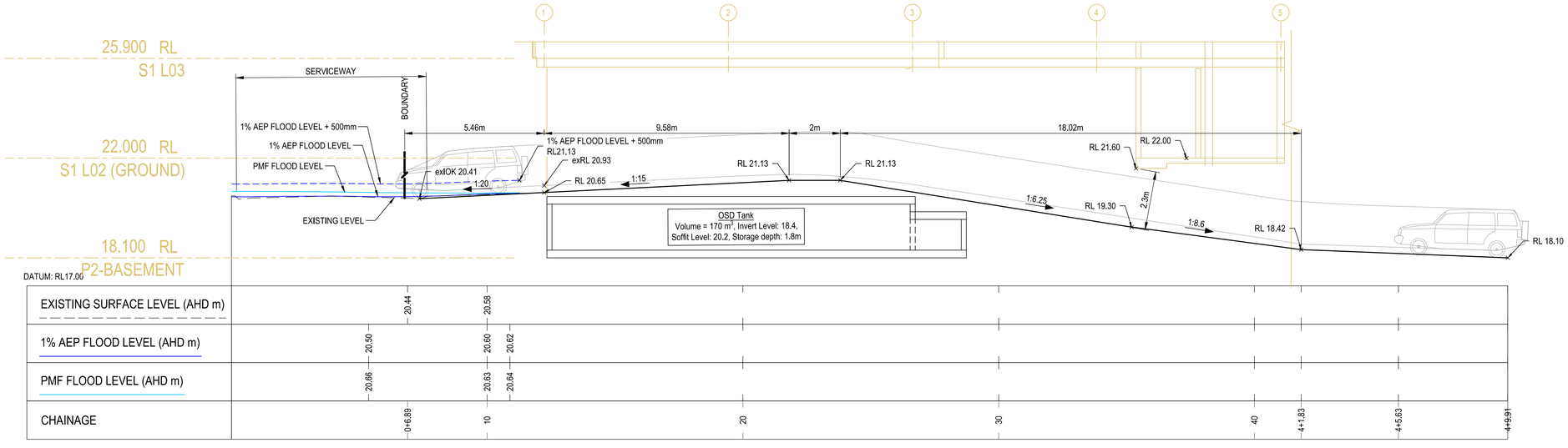
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SECTION 1 LONGITUDINAL SECTION
Scale: 1:100



SECTION 2 LONGITUDINAL SECTION
Scale: 1:100

SCALE 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10 m

SCALE 1:100 AT ORIGINAL SIZE 0 1 2 3 4 5 m

SCHEMATIC DESIGN
NOT TO BE USED FOR CONSTRUCTION

FileName: C030 DRIVEWAY LONGITUDINAL SECTIONS.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:29pm

A1

Rev	Description	Eng	Draft	Date
P4	SCHEMATIC DESIGN	VC	WW	10.05.24
P3	SCHEMATIC DESIGN	WL	WW	07.10.22
P2	SCHEMATIC DESIGN	WL	WW	19.08.22
P1	FOR INFORMATION	TM	WW	26.05.22

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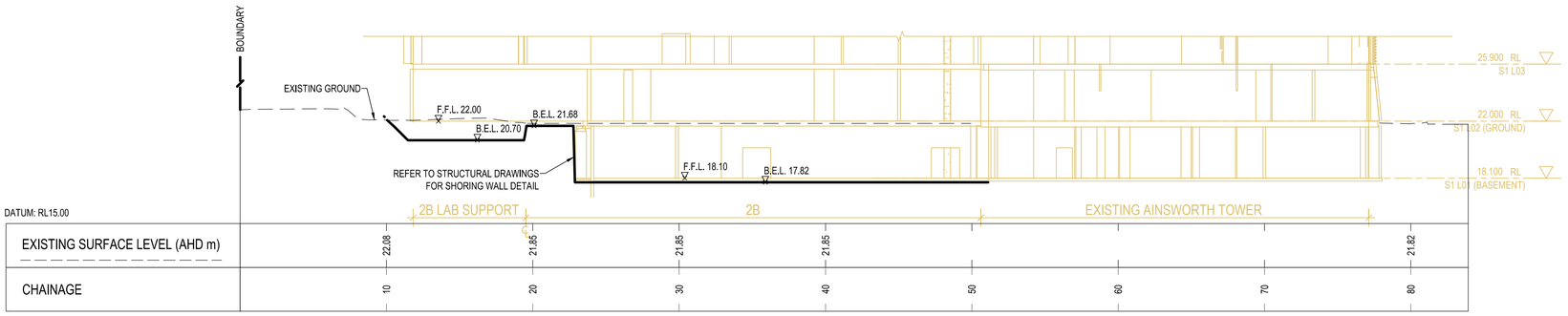
Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
DRIVEWAY LONGITUDINAL SECTIONS

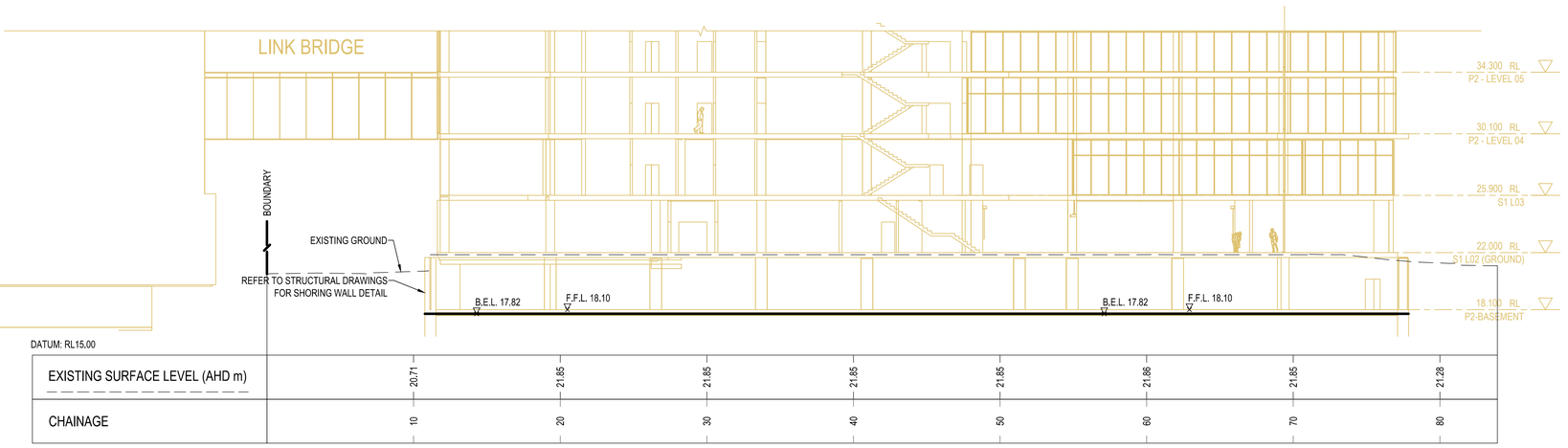
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Authorised: TM
Job No: 212012
Drawing No: C030
Revision: P4
Plot File Created: May 08, 2024 - 8:29pm

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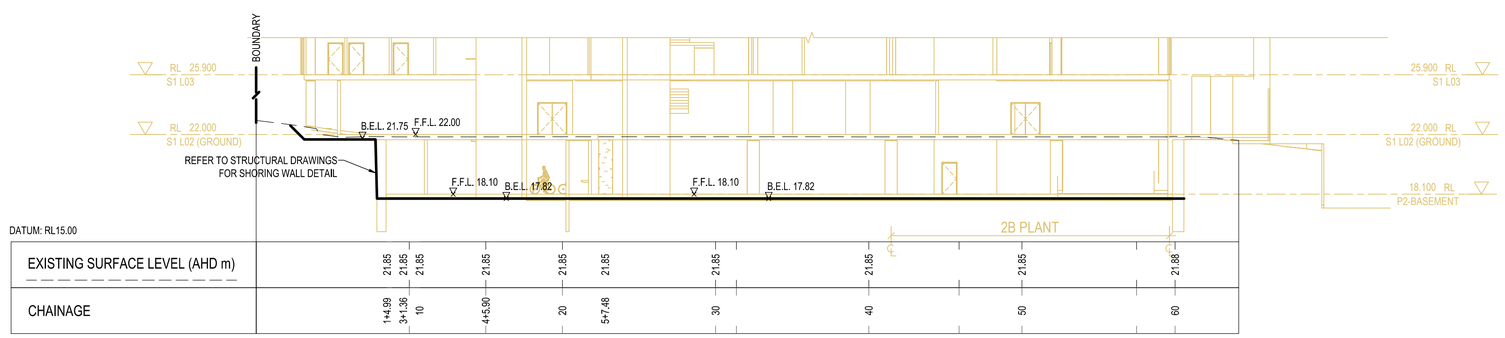
THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C001



SECTION A
Scale: 1:200



SECTION B
Scale: 1:200



SECTION C
Scale: 1:200

SCALE 1:200 0 2 4 6 8 10 m
AT ORIGINAL SIZE

SCHEMATIC DESIGN

NOT TO BE USED FOR CONSTRUCTION

FileName: C040 SECTIONS.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:46pm

A1

Rev	Description	Eng	Draft	Date
P2	SCHEMATIC DESIGN	VC	WW	10.05.24
P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
SECTIONS

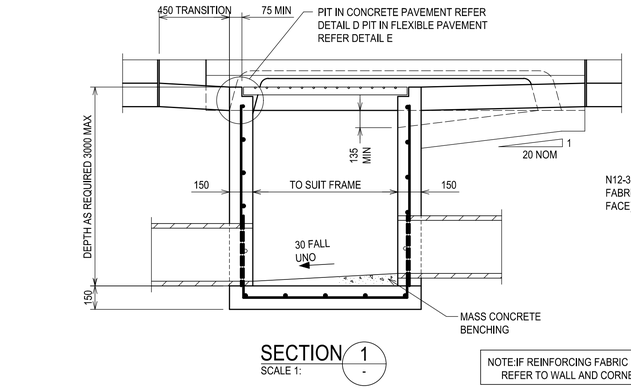
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Job No	Drawing No	Revision
212012	C040	P2

Plot File Created: May 08, 2024 - 8:46pm

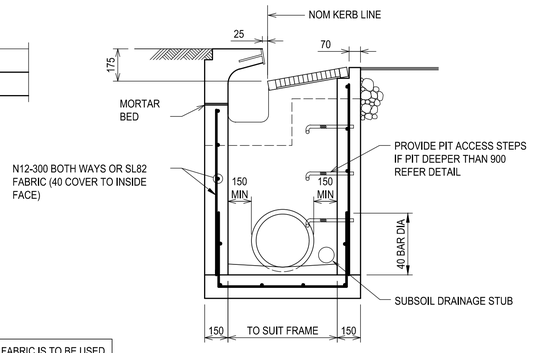
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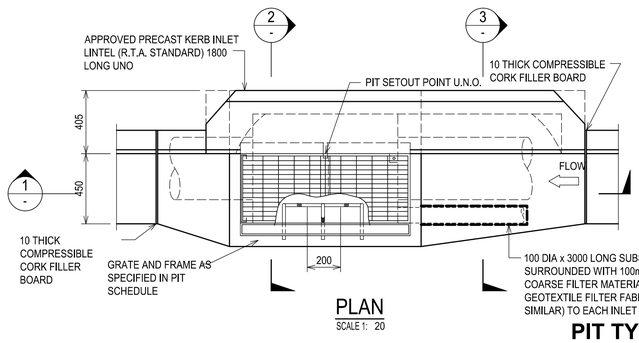


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SCALE 1: -

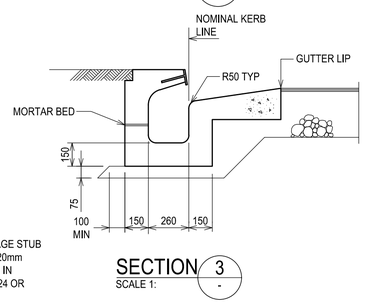
NOTE:IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS



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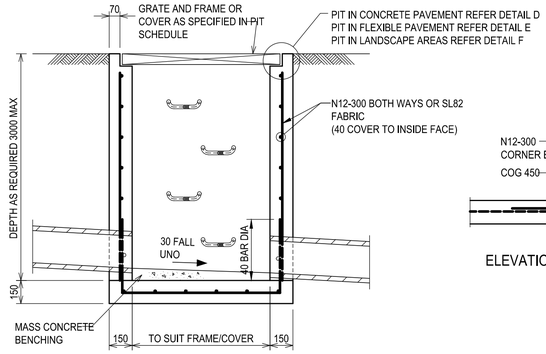


PLAN
SCALE 1: 20



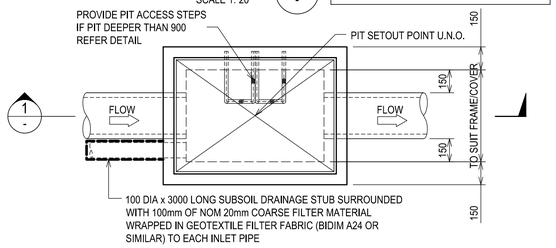
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SCALE 1: -

PIT TYPE xx



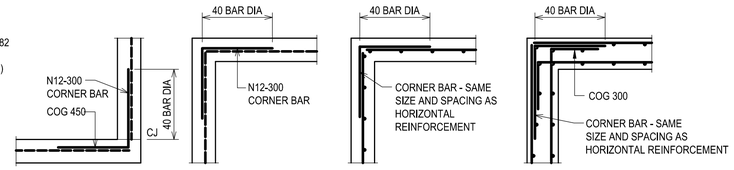
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SCALE 1: 20

NOTE:IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS

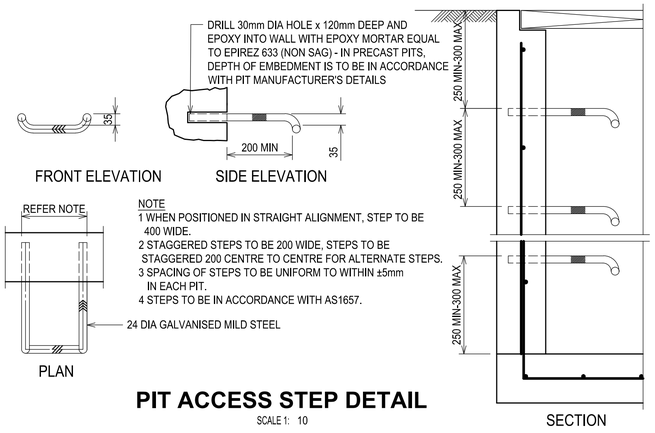


PLAN
SCALE 1: 20

PIT TYPE B

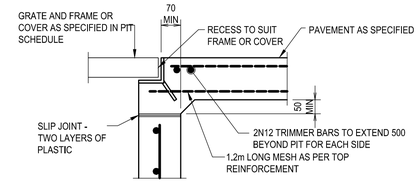


PIT CORNER DETAILS
SCALE 1: 20

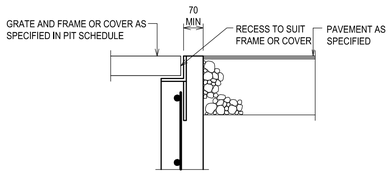


NOTE
1 WHEN POSITIONED IN STRAIGHT ALIGNMENT, STEP TO BE 400 WIDE.
2 STAGGERED STEPS TO BE 200 WIDE, STEPS TO BE STAGGERED 200 CENTRE TO CENTRE FOR ALTERNATE STEPS.
3 SPACING OF STEPS TO BE UNIFORM TO WITHIN ±5mm IN EACH PIT.
4 STEPS TO BE IN ACCORDANCE WITH AS1657.

PIT ACCESS STEP DETAIL
SCALE 1: 10



DETAIL D
SCALE 1: 10



DETAIL E
SCALE 1: 10

FileName: C050 DETAILS - STORMWATER.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:47pm

A1

SCHEMATIC DESIGN
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Rev	Description	Eng	Draft	Date
P2	SCHEMATIC DESIGN	VC	WW	10.05.24
P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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Engineer
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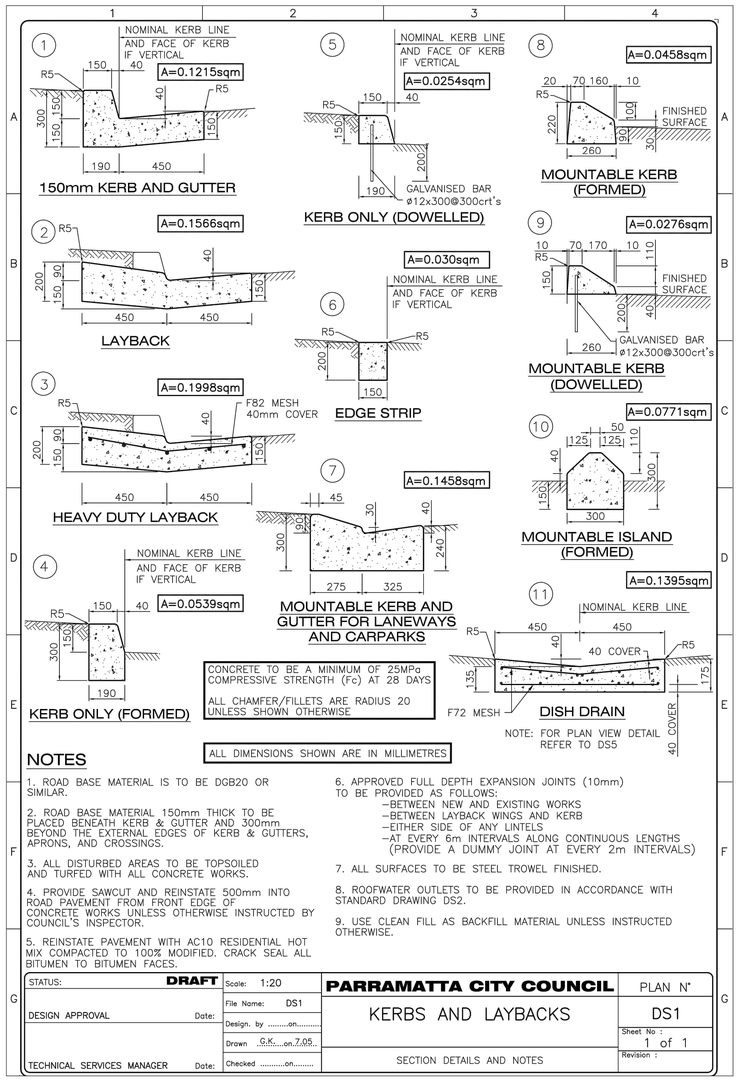
Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
DETAILS - STORMWATER

Scale : A1: AS SHOWN
Drawn: WW
Authorised: TM
Job No: 212012
Drawing No: C050
Revision: P2
Plot File Created: May 08, 2024 - 8:47pm

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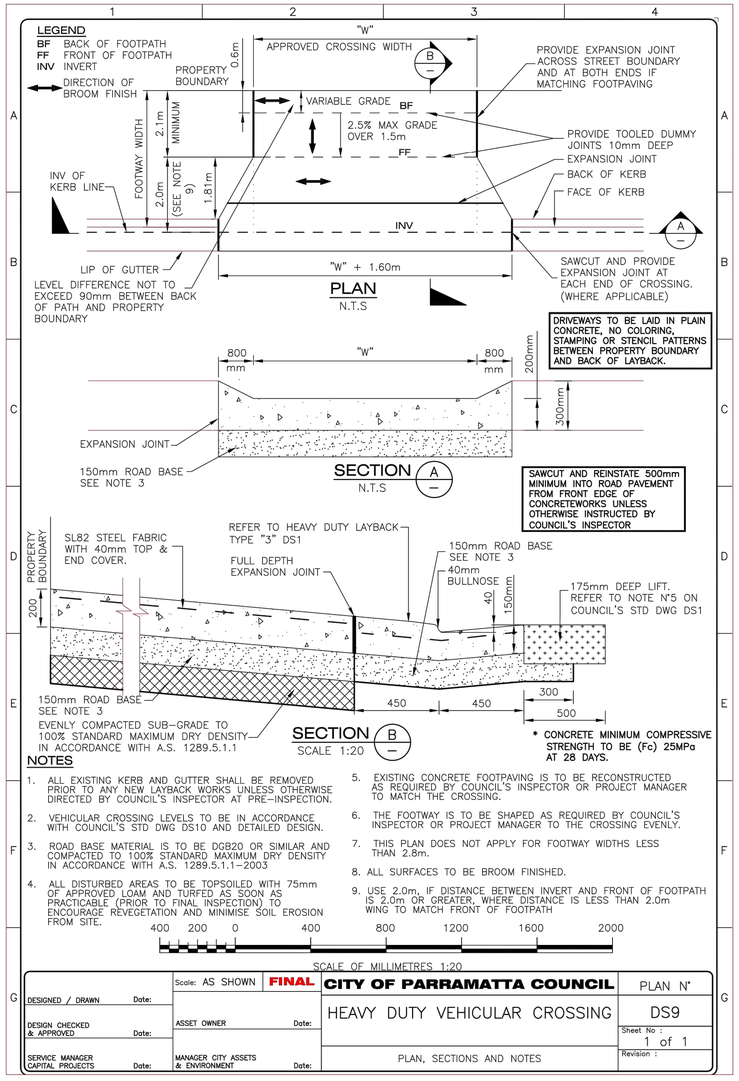
THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C001



NOTES

1. ROAD BASE MATERIAL IS TO BE DGB20 OR SIMILAR.
2. ROAD BASE MATERIAL 150mm THICK TO BE PLACED BENEATH KERB & GUTTER AND 300mm BEYOND THE EXTERNAL EDGES OF KERB & GUTTERS, APRONS, AND CROSSINGS.
3. ALL DISTURBED AREAS TO BE TOPSOILED AND TURFED WITH ALL CONCRETE WORKS.
4. PROVIDE SAWCUT AND REINSTATE 500mm INTO ROAD PAVEMENT FROM FRONT EDGE OF CONCRETE WORKS UNLESS OTHERWISE INSTRUCTED BY COUNCIL'S INSPECTOR.
5. REINSTATE PAVEMENT WITH AC10 RESIDENTIAL HOT MIX COMPACTED TO 100% MODIFIED. CRACK SEAL ALL BITUMEN TO BITUMEN FACES.
6. APPROVED FULL DEPTH EXPANSION JOINTS (10mm) TO BE PROVIDED AS FOLLOWS:
   - –BETWEEN NEW AND EXISTING WORKS
   - –BETWEEN LAYBACK WINGS AND KERB
   - –EITHER SIDE OF ANY LINTELS
   - –AT EVERY 6m INTERVALS ALONG CONTINUOUS LENGTHS (PROVIDE A DUMMY JOINT AT EVERY 2m INTERVALS)
7. ALL SURFACES TO BE STEEL TROWEL FINISHED.
8. ROOFWATER OUTLETS TO BE PROVIDED IN ACCORDANCE WITH STANDARD DRAWING DS2.
9. USE CLEAN FILL AS BACKFILL MATERIAL UNLESS INSTRUCTED OTHERWISE.

STATUS: DRAFT	Scale: 1:20	PARRAMATTA CITY COUNCIL	PLAN N°
DESIGN APPROVAL Date:	File Name: DS1	KERBS AND LAYBACKS	DS1
	Design. by .....on.....		Sheet No : 1 of 1
TECHNICAL SERVICES MANAGER Date:	Drawn G.K. on 7.05	SECTION DETAILS AND NOTES	Revision :
	Checked .....on.....		



NOTES

1. ALL EXISTING KERB AND GUTTER SHALL BE REMOVED PRIOR TO ANY NEW LAYBACK WORKS UNLESS OTHERWISE DIRECTED BY COUNCIL'S INSPECTOR AT PRE–INSPECTION.
2. VEHICULAR CROSSING LEVELS TO BE IN ACCORDANCE WITH COUNCIL'S STD DWG DS10 AND DETAILED DESIGN.
3. ROAD BASE MATERIAL IS TO BE DGB20 OR SIMILAR AND COMPACTED TO 100% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH A.S. 1289.5.1.1–2003
4. ALL DISTURBED AREAS TO BE TOPSOILED WITH 75mm OF APPROVED LOAM AND TURFED AS SOON AS PRACTICABLE (PRIOR TO FINAL INSPECTION) TO ENCOURAGE REVEGETATION AND MINIMISE SOIL EROSION FROM SITE.
5. EXISTING CONCRETE FOOTPAVING IS TO BE RECONSTRUCTED AS REQUIRED BY COUNCIL'S INSPECTOR OR PROJECT MANAGER TO MATCH THE CROSSING.
6. THE FOOTWAY IS TO BE SHAPED AS REQUIRED BY COUNCIL'S INSPECTOR OR PROJECT MANAGER TO THE CROSSING EVENLY.
7. THIS PLAN DOES NOT APPLY FOR FOOTWAY WIDTHS LESS THAN 2.8m.
8. ALL SURFACES TO BE BROOM FINISHED.
9. USE 2.0m, IF DISTANCE BETWEEN INVERT AND FRONT OF FOOTPATH IS 2.0m OR GREATER, WHERE DISTANCE IS LESS THAN 2.0m WING TO MATCH FRONT OF FOOTPATH

400 200 0 400 800 1200 1600 2000

SCALE OF MILLIMETRES 1:20

DESIGNED / DRAWN Date:	Scale: AS SHOWN FINAL	CITY OF PARRAMATTA COUNCIL	PLAN N°
DESIGN CHECKED & APPROVED Date:	ASSET OWNER Date:	HEAVY DUTY VEHICULAR CROSSING	DS9
SERVICE MANAGER CAPITAL PROJECTS Date:	MANAGER CITY ASSETS & ENVIRONMENT Date:	PLAN, SECTIONS AND NOTES	Sheet No : 1 of 1
			Revision :

FileName: C051 DETAILS - CITY OF PARRAMATTA.dwg - USER: wendyw - Plot File Created: May 08, 2024 - 8:55pm

A1

SCHEMATIC DESIGN

NOT TO BE USED FOR CONSTRUCTION

Rev	Description	Eng	Draft	Date
P2	SCHEMATIC DESIGN	VC	WW	10.05.24
P1	SCHEMATIC DESIGN	WL	WW	19.08.22

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612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
CMRI - GENE TECHNOLOGIES BASELINE BUILDING, WESTMEAD

Sheet Subject
DETAILS - CITY OF PARRAMATTA

Scale : A1	Drawn	Authorised
AS SHOWN	WW	TM

Job No	Drawing No	Revision
212012	C051	P2

Plot File Created: May 08, 2024 - 8:55pm

Appendix B – City of Parramatta Council Flood Certificate

© 2025 Taylor Thomson Whitting

Our Reference: FL/77/2022
Contact: Peter Sirianni
Telephone: 02 9806 8250
Fax: 02 9806 5906

Wendy Liu
Level 13, No. 379 Collins Street
MELBOURNE VIC 3000

14 April 2022

FLOOD ENQUIRY APPLICATION

Property Details

Address	Westmead Childrens Hospital, 178 Hawkesbury Road, WESTMEAD NSW 2145
	This form applies for up to three adjoining sites relating to the same development. A separate Flood Enquiry form and fee will be required for more than 3 or separate lots.

Delivery Preference

wendy.liu@ttw.com.au

Reason for Enquiry

Flood drainage Investigation Emailed

Property Type

***** GST not applicable from 1 July 2013*****

Flooding Application - Commercial	$542.50

Disclaimer: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
The flood levels shown on the back of this form are only an approximate guide and have been derived using the current computer simulated model.
The information provided in this document is presented in good faith to assist the public in understanding Council's drainage requirements that apply within the Parramatta Local Government Area. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.
City of Parramatta Council, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above.

Refer to back of this form for level information issued

Flood Enquiry Information Issued - 14 April 2022

Mainstream Flooding

Is this property affected by mainstream flooding? **178 Hawkesbury Road, WESTMEAD**		☒ Yes ☐ No
Flood Levels	Closest Cross Sections: *(Please refer to Flood Study):* **Refer to Flood Map**	
5% AEP	Refer to Flood Map	**Comments**: **See Note on Flood/Hazard Map**
1% AEP		
PMF		
☒ Refer to flood maps provided for detailed flood levels.		
Flood information is obtained from the following flood study report: **Upper Parramatta River Flood Study – Draft 8 (UPRCT)**		

Note: Flood inundation can be verified by detail survey to AHD undertaken by a Registered Surveyor.

Local Flooding

Is the property located within a Hatched Grey Area? *Properties located within a **Hatched Grey Area** are subjected to flooding from the local catchment.*	☐ Yes ☒ No
Is the property located within a Grey Area? *Properties located within a **Grey Area** are subjected to additional site drainage controls to manage flooding in the local catchment.*	☐ Yes ☒ No
Is the property likely to be affected by overland stormwater run-off from the local catchment? ***Note:** No site inspection conducted for this assessment. Based solely on the information supplied for this flood enquiry application.*	☐ Yes ☒ Subject to Detailed Investigation
***Note:** You are required to contact Council's Development Service Engineer for any details and requirements relating to development that is affected by local flooding.*	

Additional Recommended Actions

☒	The Applicant needs to discuss the proposal to re-develop this site with Council's Town Planner and Development Services Engineer.
☒	The Applicant needs to contact Council's Town Planner and organise a pre-lodgement meeting to discuss any proposal to redevelop this property.
☒	The Applicant needs to refer to Council's Local Floodplain Risk Management policy for details relating to developing a land affected by flooding.

Definitions: (As per NSW Floodplain Development Manual dated April 2005)

1. **AHD** – a common national surface level datum approximately corresponding to mean sea level.
2. **ARI** – the long term average number of years between the occurrences of a flood as big as or larger than, the selected event.
3. **PMF** – is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation.
4. **AEP** – Annual Exceedance Probability is the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.

Chainage	Flood Level (metre AHD)			Chainage	Flood Level (metre AHD)			Chainage	Flood Level (metre AHD)			Chainage	Flood Level (metre AHD)		
	5% AEP	1% AEP	PMF		5% AEP	1% AEP	PMF		5% AEP	1% AEP	PMF		5% AEP	1% AEP	PMF
80.9	10.63	11.29	17.39	992.2	-	-	17.96	2055	10.16	10.74	16.20	13882	12.38	13.24	18.28
170.8	10.42	11.00	17.33	1049.5	-	-	17.92	2091	10.16	10.73	16.45	14077	11.96	12.82	17.94
259.3	10.28	10.90	17.30	1155.7	-	-	17.35	2146	10.16	10.73	16.52	14180	11.92	12.81	17.97
370.9	10.29	10.89	17.10	1222.6	-	-	17.35	2170	10.16	10.73	16.45	14215	11.88	12.79	18.02
392.3	10.18	10.74	16.43	1258.1	-	-	17.34	2212	10.15	10.73	16.57	14222	-	12.75	17.86
490	10.10	10.66	16.50	1286	-	11.00	17.33	2271.8	10.15	10.73	16.64	14229	-	12.74	17.85
625	10.15	10.72	16.66	1761	13.25	13.40	16.32	2275.9	10.15	10.72	16.73	14238	11.48	12.12	17.79
644.2	-	-	18.08	1876	13.04	13.17	16.47	2300.8	10.15	10.72	16.66	14306	11.23	11.90	17.75
756.8	-	-	18.02	1922	13.04	13.17	16.17	10744	10.74	11.41	17.56	14386	11.15	11.82	17.70
857	-	-	18.00	1962	13.04	13.17	16.19	13697	12.49	13.31	18.37	14516	10.69	11.36	17.48
899	-	12.81	17.99	1979	10.43	10.76	16.22	13772	12.54	13.40	18.42	14626/5.2	10.74	11.41	17.56

Legend

- Ground Contours (metre AHD)
- Stormwater Pit
- Stormwater Pipe
- Upper Parramatta River Cross Section
- 5% AEP Flood
- 1% AEP Flood
- PMF
- City of Parramatta Boundary

NOTE: The Upper Parramatta River Flood Study is currently being updated. Flood levels may change.

N

1:5,000

City of Parramatta Council Flood Map

DISCLAIMER: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this Information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
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Printed
14/04/2022

NOTE: The Upper Parramatta River Flood Study is currently being updated. Hazard extents may change.

N

1:5,000

City of Parramatta Council Flood Hazard Map

DISCLAIMER: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this Information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
The flood levels provided are only an approximate guide and have been derived using the current computer simulated model.
It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.
The information provided on this document is presented in good faith. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.
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Legend

- Ground Contours (metre AHD)
- Stormwater Pit
- Stormwater Pipe
- Upper Parramatta River Cross Section
- High Hazard - 1% AEP
- Low Hazard
- City of Parramatta Boundary