BCC DS
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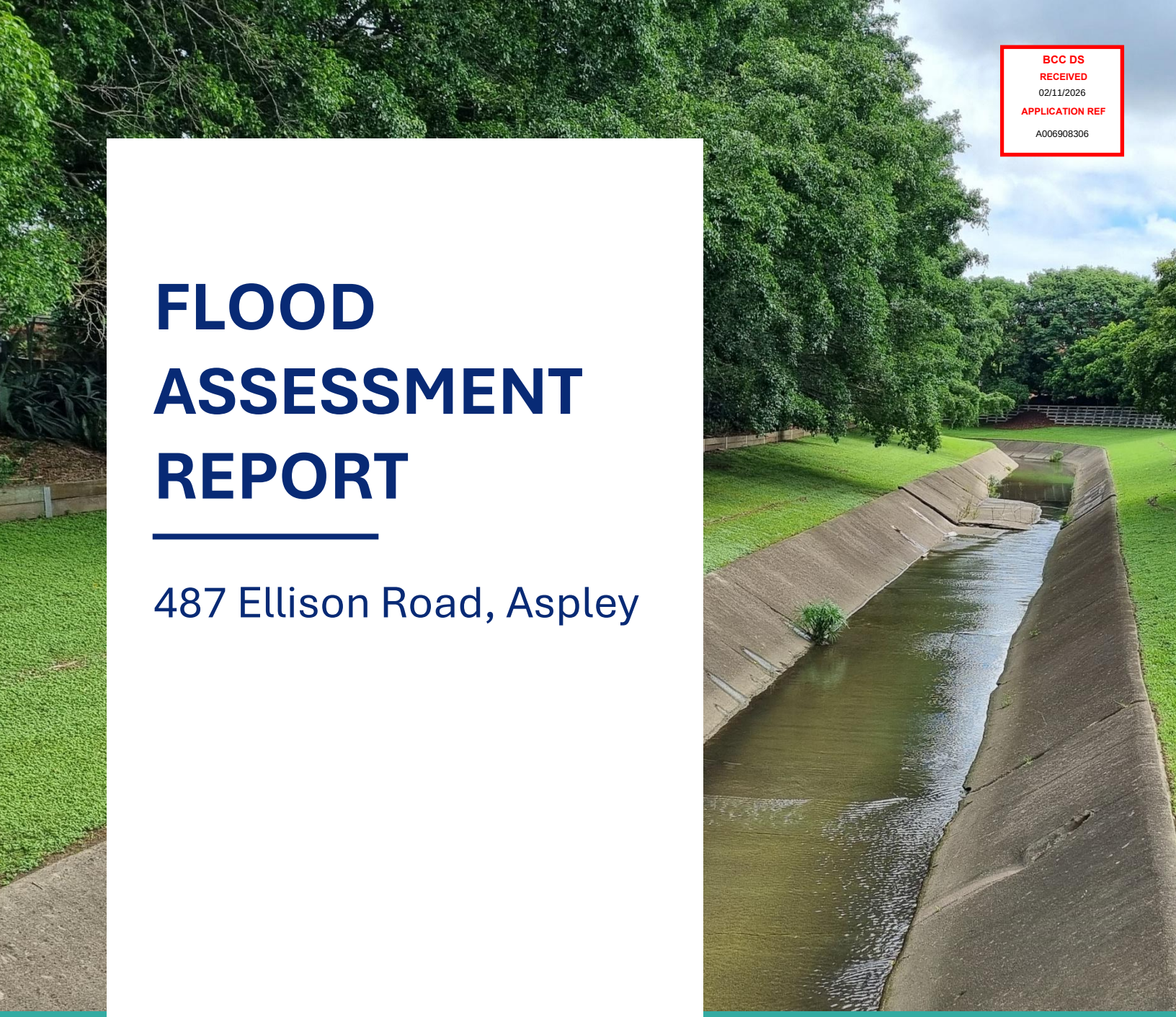

FLOOD ASSESSMENT REPORT

487 Ellison Road, Aspley

JULY 22 2026

FLOOD SMART ENGINEERING PTY LTD

Report Title: Flood Assessment Report
Project Address: 487 Ellison Road, Aspley
Project No: 24-104

Client: Affordable Modular Buildings

Revision No.	Report Date	Prepared By	Distributed To
001	25/08/2025	K. Charan	Affordable Modular Buildings
002	22/07/2026	K. Charan	Affordable Modular Buildings



Reviewed By: H. Mohammed
RPEQ # 22518

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1. Introduction

Flood Smart Engineering Pty Ltd has been commissioned by Affordable Modular Buildings to prepare a Flood Assessment Report for the proposed development works at 487 Ellison Road, Aspley.

The objective of this report is to assess the proposed development works with relation to Brisbane City Council's Flood Overlay Code. Detailed hydrologic and hydraulic assessments have been undertaken for this investigation.

This report has been prepared by Flood Smart Engineering Pty Ltd for use only by Affordable Modular Buildings in the capacity of the agreed purpose. Conclusions and recommendations within this report have been based upon the information provided by the client or other closely related associates and third-party groups (eg. government authorities) which is assumed to be accurate. Flood Smart Engineering Pty Ltd does not hold liability for any inaccurate information.

2. Site Details

Address	487 Ellison Road, Aspley
Title	Lot 1 on RP164545
Area	2,478m^2

2.1 Location

The subject site is located in Aspley, bound by residential properties to the north and west, Eustace Street to the east and Ellison Road to the south. The subject site is classed as Low Density Residential under BCC's City Plan 2014 zoning.



Figure 1 – Locality Plan (BCC City Plan 2014)

2.2 Topography & Infrastructure

The site grades down from approximately RL22.0m AHD at the southern end to approximately RL21.0m AHD at the northern end. The site is located within a local depression, receiving flows from the open channel located upstream in Marchant Park, and discharging downstream into Eustace Steet. Other properties in the surrounding area generally grade towards the local depression as shown in Figure 2 below.

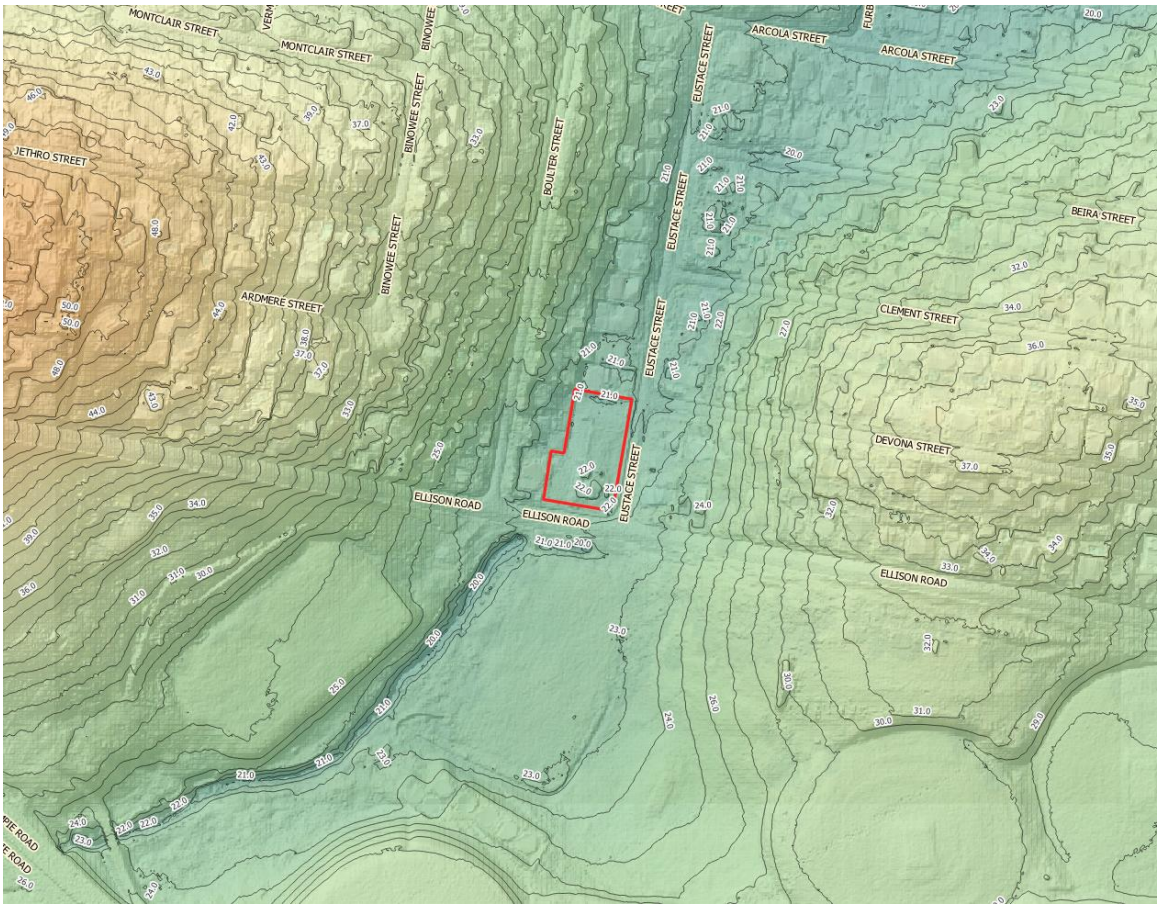

Figure 2 – Local Area Topography: LiDAR Data (m AHD)

The open channel located upstream in Marchant Park discharges into 2/1500mm diameter stormwater pipes which run underneath Ellison Road and further north underneath the site. The open channel also discharges to an 1800mm diameter stormwater pipe which runs underneath Ellison Road and further north underneath Eustace Street as shown in Figure 3 below.



Figure 3 – Existing Stormwater Infrastructure

2.3 Existing Use

The site currently contains an on-slab building at the south-eastern corner which is utilised for business purposes. The western and northern ends of the site are occupied by carparking and internal bitumen areas. The remainder of the site is vegetated by grass and trees. Driveway crossovers are located along Ellison Road (southern boundary) and Eustace Street (eastern boundary), providing vehicular access to the site.

2.4 Developed Use

It is proposed to construct a suspended office building north of the existing building on the site. The office building is proposed to be utilised for business purposes. Development plans are presented in Appendix B.

2.5 Council Data

The site is located within BCC's Overland Flow Flood Planning Area as shown in Figure 4.



Figure 4 – Overland Flow Flood Planning Area (BCC City Plan 2014)

3. Hydrology

3.1 Methodology

Hydrological calculations of the catchments were undertaken through DRAINS software using a Watershed Bounded Network Model (WBNM) runoff routing model. The WBNM runoff routing model utilises linking ordered basin or inter-basin storage sub-areas/sub-catchments.

The current 2016 IFD (Intensity-frequency-duration) rainfall data was sourced from BOM (Bureau of Meteorology). This data was utilised as a baseline and was uplifted in accordance with ARR (Australian Rainfall and Runoff) guidelines to provide consideration to newly adopted climate change factors. Uplifted IFD data was input into the WBNM model based upon the following parameters:

- Shared Socio-Economic Pathway (SSP) = SSP2-4.5 Moderate emissions
- Target Design Year = 2040
- 1.4 Degree Celsius temperature increase from 1990 IFD data baseline

3.2 Model Setup

The runoff routing model was set up to create inflow boundary conditions for the hydraulic TUFLOW model. The 2% AEP event was run for the 5, 10, 15, 20, 25, 60, 90, 120, 180, 270 and 360-minute rainfall durations. An initial loss of 15mm and continuing losses of 2.5mm/hr were used for the pervious catchments respectively. An initial loss of 0mm and continuing losses of 0mm/hr were used for the impervious catchments respectively. A lag parameter of 1.3 was utilised.

The 0.05% AEP event was run for the 5, 10, 15, 20, 25, 60, 90, 120, 180, 270 and 360-minute rainfall durations. An initial loss of 0mm and continuing losses of 2.5mm/hr were used for the pervious catchments respectively. An initial loss of 0mm and continuing losses of 0mm/hr were used for the impervious catchments respectively. A lag parameter of 1.3 was utilised.

3.3 Catchment Delineation

A single catchment (Catchment 1) was identified to contribute flows to local depression and to the site. The catchment was further delineated into multiple sub-catchments.

Sub-catchment slopes, impervious factors and routing lengths have been imported into the WBNM model to produce the design flows (2% AEP). The catchment plan is presented in Figure 3, Appendix A.

A summary of the sub-catchment properties and peak discharges is shown in Table 3-1 below. The critical storm for the site was found to be the 45-minute duration, storm pattern 4.

Table 3-1 – Sub-Catchment Properties and Peak Discharges (DRAINS)

Catchment	Sub-Catchment	Area (ha)	Impervious Area (%)	2% AEP Peak Discharge (m^3/s)	0.05% AEP Peak Discharge (m^3/s)
1 (84.46ha)	1-1	8.79	70	**4.73**	**9.06**
	1-2	11.85	70	**6.28**	**12.05**
	1-3	7.56	70	**4.10**	**7.84**
	1-4	9.04	60	**4.51**	**8.81**
	1-5	13.72	70	**7.21**	**13.85**
	1-6	6.79	80	**3.95**	**7.44**
	1-7	13.82	20	**5.41**	**11.29**
	1-8	12.89	40	**5.56**	**11.16**

With the input of the routing lengths, the following peak discharges were produced:

- 2% AEP: Inflow-1 = 29.48m^3/s
- 0.05% AEP: Inflow-1 = 57.45m^3/s

3.4 Rational Method

Rational Method Calculations were performed for the 2% AEP event using parameters as per QUDM requirements and guidelines. Site-specific IFD rainfall data was used for the calculations. The results are shown in Table 3-2 below.

Table 3-2 – Catchment Properties and 2% AEP Peak Discharges (Rational Method)

Catchment	Sheet Flow Length (m)	Sheet Flow Slope (%)	Pipe Flow Length (m)	Pipe Flow Slope (%)	Total TOC (Minutes)	Peak Discharge (m^3/s)
1	285	4.91	1700	2.06	33.0	**32.75**

A percentage difference calculation between the 2% AEP Rational Method and DRAINS peak discharges was undertaken. The results shown in Table 3-3 demonstrate no more than a 20% percentage difference for the catchment. The DRAINS peak discharges are therefore considered to be well calibrated and appropriate for use in the hydraulic modelling.

Table 3-3 – 2% AEP Peak Discharges Comparison

Catchment	Peak Discharge (2% AEP) – Rational Method	Peak Discharge (2% AEP) – DRAINS	Percentage Difference (%)
1	32.75	29.48	**11**

4. Hydraulics

4.1 Methodology

A TUFLOW 2d model was setup to simulate and analyse the 2% and 0.05% AEP overland flow flood events and to provide flood levels, depths, velocities and velocity-depths. The results were used to undertake an impact assessment analysis and determine flood immunity levels.

4.2 Existing Model Setup

The TUFLOW model was based on a 1m grid size with elevation data (2019 LiDAR data) sourced from the Queensland State Government. Unsteady flows were used (obtained from DRAINS) with changing relationships between discharge and time to produce the 2% and 0.05% AEP hydrographs. The hydrographs were input into the QT (discharge to time relationship) inflow boundary condition (2d_bc layer). A HQ (height to discharge relationship) outflow boundary condition was utilised to allow for flows to exit the model (2d_bc layer).

Stormwater infrastructure was input in the model as 1D elements with CN-SX connector lines (for conversion between 1D and 2D models). 50% blockages were utilised at the inlet locations for the stormwater infrastructure in accordance with QUDM (Queensland Urban Drainage Manual).

Dwellings and structures blocking the flow path were input into the model as raised elevation polygons. The Manning's roughness coefficients adopted in the model are summarised below in Table 4-1 and presented in Figure 4, Appendix A. The existing TUFLOW model setup is presented in Figure 5, Appendix A.

Table 4-1 – Manning's Roughness Coefficients

Surface Type	Manning's n Value
Roads	0.020
Private Properties	0.100
Light Vegetation	0.045
Medium Vegetation	0.070
Gravel	0.025

A developed TUFLOW model setup was not required as the proposed works involves a suspended office building which would not alter the existing scenario flood characteristics.

5. Model Results

5.1 Existing Model

The existing scenario 2% AEP overland flow flood levels and depths are presented in Figure 6, Appendix A. The velocity and velocity-depth product plots are presented in Figures 7 and 8 Appendix A, respectively. The results show that the entire site would be inundated. The upstream flood level of the site is RL22.55m AHD. The flood level affecting the proposed building office location is RL22.10m AHD. Flood depths reach up to approximately 1.05m at the northern end of the site.

The existing scenario 0.05% AEP overland flow flood levels and depths are presented in Figure 9, Appendix A. The velocity and velocity-depth product plots are presented in Figures 10 and 11 Appendix A, respectively. The results show that the entire site would be inundated. The upstream flood level of the site is RL22.85m AHD. The flood level affecting the proposed building office location is RL22.50m AHD.

5.2 Flood Impact Assessment

It is proposed to construct the office building as a suspended structure, and as such, the existing scenario flood conditions will not be altered. The proposed development is therefore not considered to cause an adverse impact to neighbouring properties or the surrounding area.

6. Overlay Code Assessments

6.1 Flood Immunity Level Requirements

Section A of the Flood Overlay Code (Table 8.2.11.3.D) nominates the minimum flood immunity requirements for office buildings as shown below in Table 6-1.

Table 6-1 – Minimum Flood Immunity Levels (Flood Overlay Code)

Flooding Source	BCA Building Classification	Building Floor Level (m AHD)
Overland Flow	Class 5	2% AEP flood level

The 2% AEP overland flow flood level affecting the proposed office building is RL22.10m AHD and the only source of inundation affecting the site. The resulting minimum floor level requirement is therefore RL22.10m AHD.

The proposed development works involves construction of the office building as a suspended structure. Section A of the Flood Overlay Code (Table 8.2.11.3.E) nominates the minimum building undercroft requirements as shown below in Table 6-2.

Table 6-2 – Minimum Building Undercroft Clearances (Flood Overlay Code)

Flooding Source	Minimum Clearance Requirement
Overland Flow (Less than 0.6m^2/s velocity depths and less than 0.6m depths)	1.5m above ground elevation
Overland Flow (More than 0.6m^2/s velocity depths and more than 0.6m depths)	2.5m above ground elevation

The proposed suspended dwelling is to provide 2.50m building undercroft clearance to address the Acceptable Outcome, as the flood depths are in excess of 0.60m in the undercroft area of the dwelling. It is proposed to address the Performance Outcome (in accordance with the Flood Planning Scheme Policy SC6.11) and provide 0.90m of freeboard above the 2% AEP flood level (0.50m for building slab allowance and debris/underslung services + 0.40m for hydraulic clearance). The resulting minimum floor level to meet the undercroft clearance requirement is RL22.90m AHD.

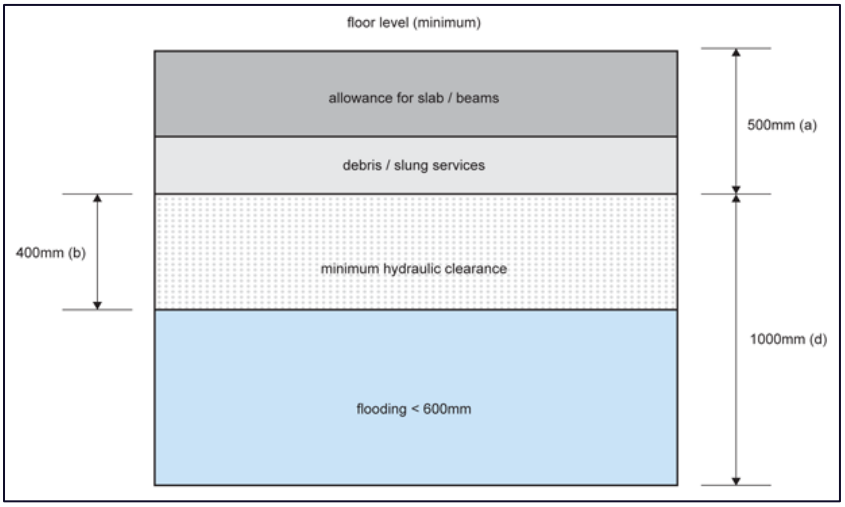

Figure 6 – BCC Minimum Undercroft Requirements

The 0.05% AEP overland flow flood level affecting the proposed office building is RL22.50m AHD. This is considered to be the minimum shelter-in-place for site occupants while being isolated by overland flow.

6.2 Flood Immunity Level Assessment

The minimum flood immunity requirements as per the Flood Overlay Code are summarised below:

- Flood Immunity: Building floor level = RL21.10m AHD
- Undercroft Clearance (PO): Building floor level = RL22.90m AHD
- Shelter-in-place floor level: RL22.50m AHD

The minimum finished floor level (undercroft clearance) meets the flood immunity requirement requirements. The minimum floor level for the office building is therefore **RL22.90m AHD** (providing up to 1.8m of undercroft clearance and an allowance for shelter-in-place).

Essential electrical services are to be located at minimum of **RL22.60m AHD**.

The proposed office building is to be structurally designed to be able to resist hydrostatic and hydrodynamic loads associated with flooding up to and including the 2% AEP overland flow event (flood depths up to 800mm and flood velocities up to 0.60m/s). The undercroft area of the office building is to contain battens with 75% openings to prevent debris blockages. The Flood Overlay Code is addressed in Appendix C.

6.3 Site Access

The proposed office building is understood to be used by existing users of the site and as such, not increasing the number of people at risk of flood hazard. The current carparking areas (which are not proposed to be altered) are therefore considered to be adequate for use. The proposed shelter-in-place areas also users of the site to stay safe of flood hazard during major overland flow events.

A Flood Risk Assessment has been undertaken in Table 6-3 to further address all relevant matters in accordance with Section 9 of the SC6.11 Flood Planning Scheme Policy.

Table 6-3 – Flood Risk Assessment

Flood Risk Matter	Flood Risk Response
Number of people likely to be at risk and who may need to be evacuated	The maximum number of people expected to be on the site at any given time is 30; 12 employees and 18 external clients.
Hazards in larger floods	The proposed development provides a shelter-in-places area (upper building floor level) at RL23.0m AHD which provides 0.50m of freeboard above the 0.05% AEP overland flow level. The hazard in larger flood events is therefore considered to be minimised.
Flood warning time	The flood warning time is approximately 27 minutes. It is proposed to implement a flood level indicator on the site which can be easily read to prepare site users for seeking of safe shelter. Once a flood level of RL21.60m AHD has been indicated, all site users are to evacuate to inside the proposed building office and remain until flood waters have receded to a point where Elison Road and Eustace Street are no longer inundated.
Evacuation routes	Evacuation is not proposed. People are to seek shelter within the proposed office building.
Isolation	Isolation could occur in a faster manner with intense rainfall.
Vertical evacuation	It is proposed for people on site to seek shelter in the upper building flood level of the proposed office which is significantly higher than the 0.05% AEP overland flow level. The isolation time has been calculated to be 66 minutes for the 2% AEP overland flow event; for which the

	business/property owner is to have essential and adequate supplies for.
Special care uses	Special needs groups may be on the site.
Burden placed on emergency services	The shelter-in-place strategy is not anticipated to place additional burden on emergency services.
Special care requirements at evacuation destination	Special needs groups are to be supervised/given care by their caregiver/s.
Length of flood recovery and potential social and economic impacts	The proposed development is to be structurally designed to be able to resist hydrostatic and hydrodynamic loads associated with flooding up to and including the 2% AEP overland flow event. Flood-resilient materials are to be incorporated where appropriate. Flood recovery and economic impacts are considered to be minimised.
Hazardous goods, mitigation and associated environmental impacts	Hazardous good are not anticipated to be stored on the site.
Flood-resilient design	The proposed development meets flood immunity requirements and is to be structurally designed appropriately. The proposed development is considered to be a flood-resilient design.
Impact of increases in rainfall intensity and sea level rise at 2050 and 2090	Increased rainfalls would reduce warning times and increase isolation times. A such, due to the 'flash-flooding' conditions, a shelter-in-place strategy has been proposed to reduce risk of flood hazard to people.
Overland flow severe storm impact assessment	The proposed development is not considered to have a significant impact on surrounding stormwater infrastructure.

7. Conclusions

The objective of this report is to assess the proposed development works with relation to Brisbane City Council's Flood Overlay Code. Detailed hydrologic and hydraulic assessment has been undertaken for this assessment.

It is proposed to construct a suspended office building north of the existing building on the site. The office building is proposed to be utilised for business purposes. Development plans are presented in Appendix B.

It is proposed to construct the office building as a suspended structure, and as such, the existing scenario flood conditions will not be altered. The proposed development is therefore not considered to cause an adverse impact to neighbouring properties or the surrounding area.

The minimum finished floor level (undercroft clearance) meets the flood immunity requirement requirements. The minimum floor level for the office building is therefore **RL22.90m AHD** (providing up to 1.8m of undercroft clearance and an allowance for shelter-in-place).

Essential electrical services are to be located at minimum of **RL22.60m AHD**.

The proposed office building is to be structurally designed to be able to resist hydrostatic and hydrodynamic loads associated with flooding up to and including the 2% AEP overland flow event (flood depths up to 800mm and flood velocities up to 0.60m/s). The undercroft area of the office building is to contain battens with 75% openings to prevent debris blockages. The Flood Overlay Code is addressed in Appendix C.

A Flood Risk Assessment has been undertaken in Table 6-3 to address all relevant matters in accordance with Section 9 of the SC6.11 Flood Planning Scheme Policy.

Appendix A – Flood Figures



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FIGURE 1

TITLE
EXISTING SITE PLAN

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 20 40 60 80 m

N

SCALE	1 : 1000	REV.	001



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FIGURE 2

TITLE
DEVELOPED SITE PLAN

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 20 40 60 80 m

N

SCALE	1 : 1000	REV.	001

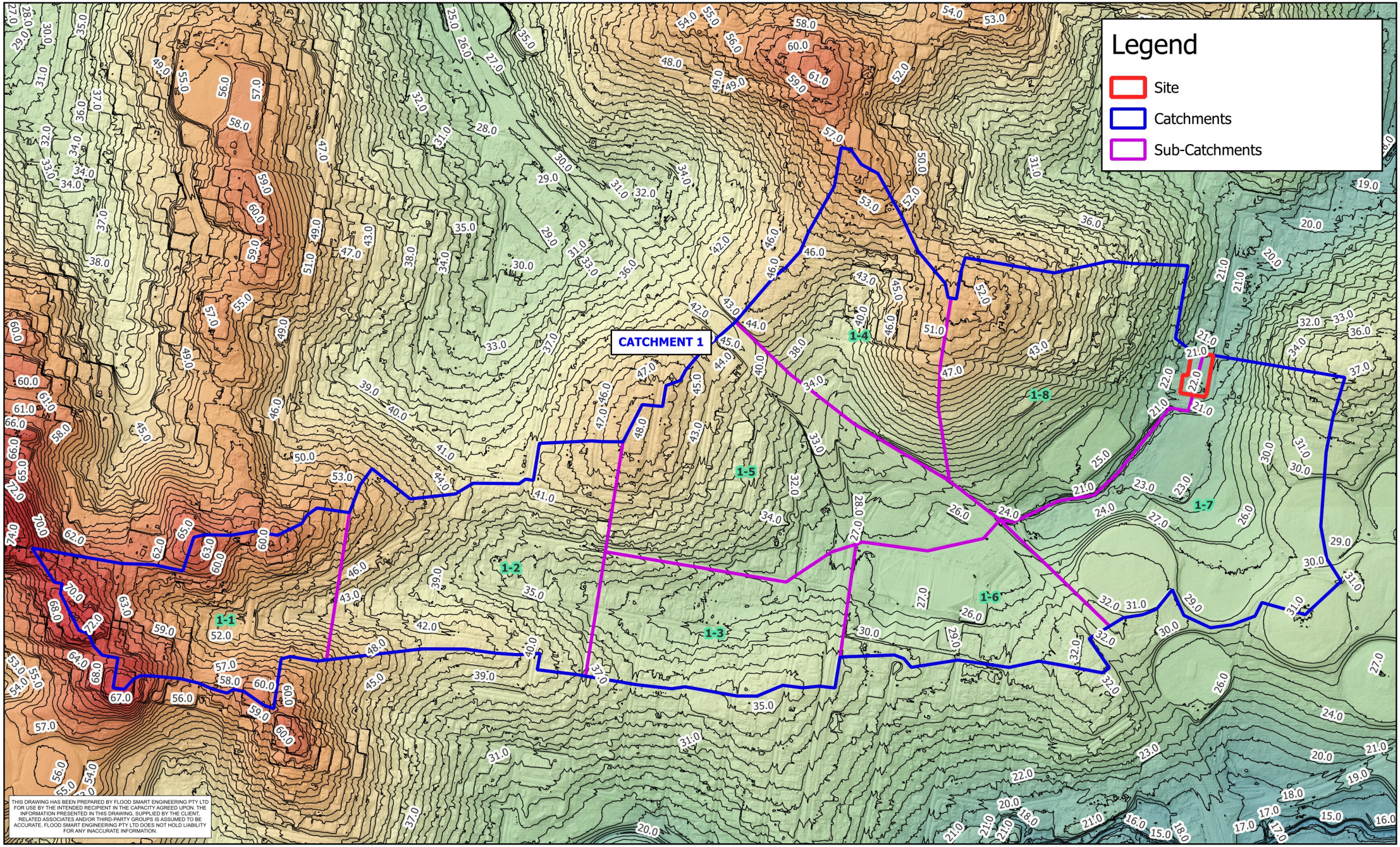

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FIGURE 3

TITLE
CATCHMENT PLAN

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 150 300 450 600 m

N

SCALE	1 : 7500	REV.	001



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FIGURE 4

TITLE
MANNING'S N SURFACES

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 40 80 120 160 m

N

SCALE	1 : 2000	REV.	001



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FIGURE 5

TITLE
EXISTING TUFLOW MODEL SETUP

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 40 80 120 160 m

N

SCALE	1 : 2000	REV.	001

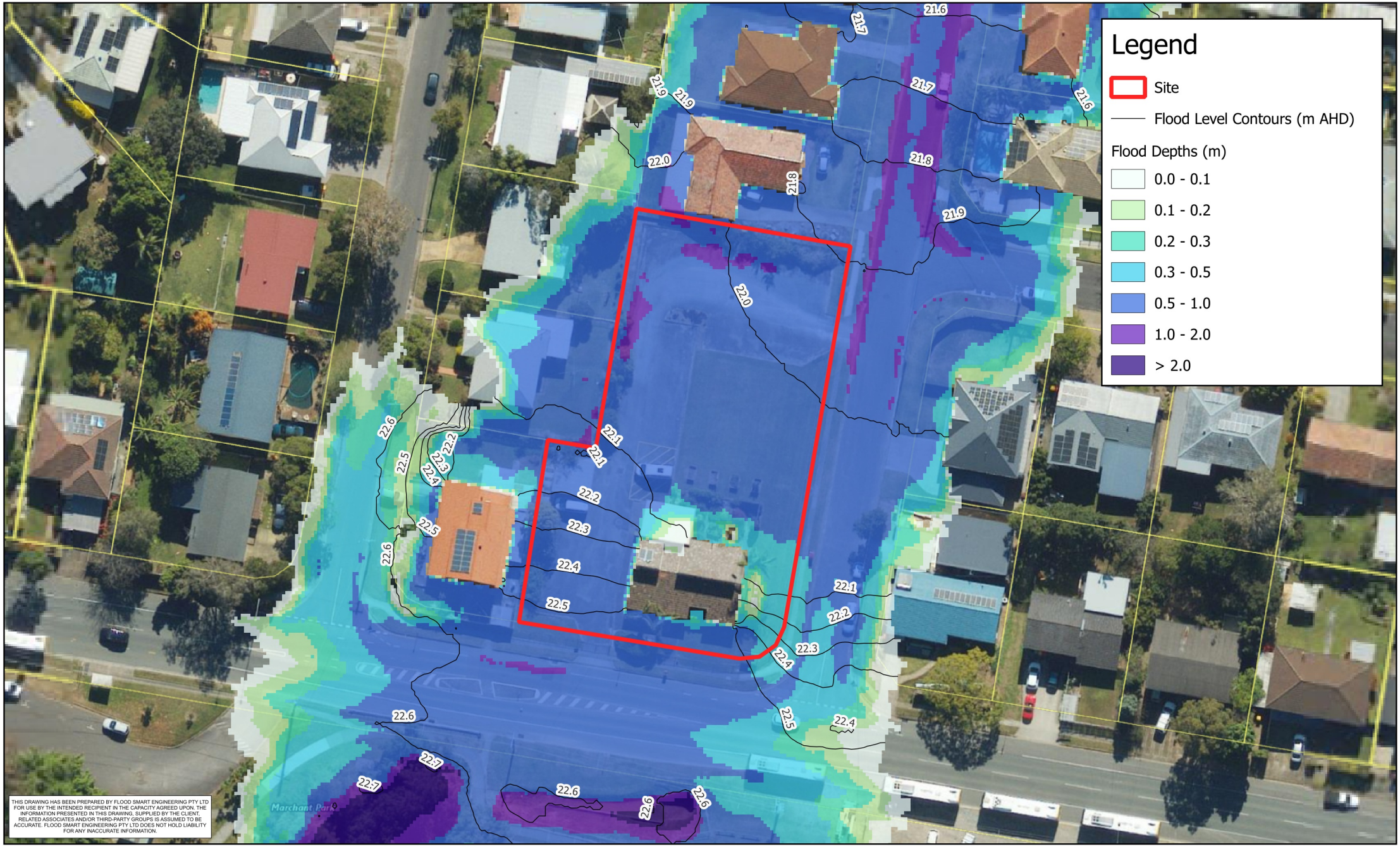

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FIGURE 6

TITLE
EXISTING SCENARIO 2% AEP FLOOD LEVELS & DEPTHS

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001



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FIGURE 7

TITLE
EXISTING SCENARIO 2% AEP FLOOD VELOCITIES

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001



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FIGURE 8

TITLE
EXISTING SCENARIO 2% AEP FLOOD VELOCITY-DEPTH PRODUCT

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	25/08/2025
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001

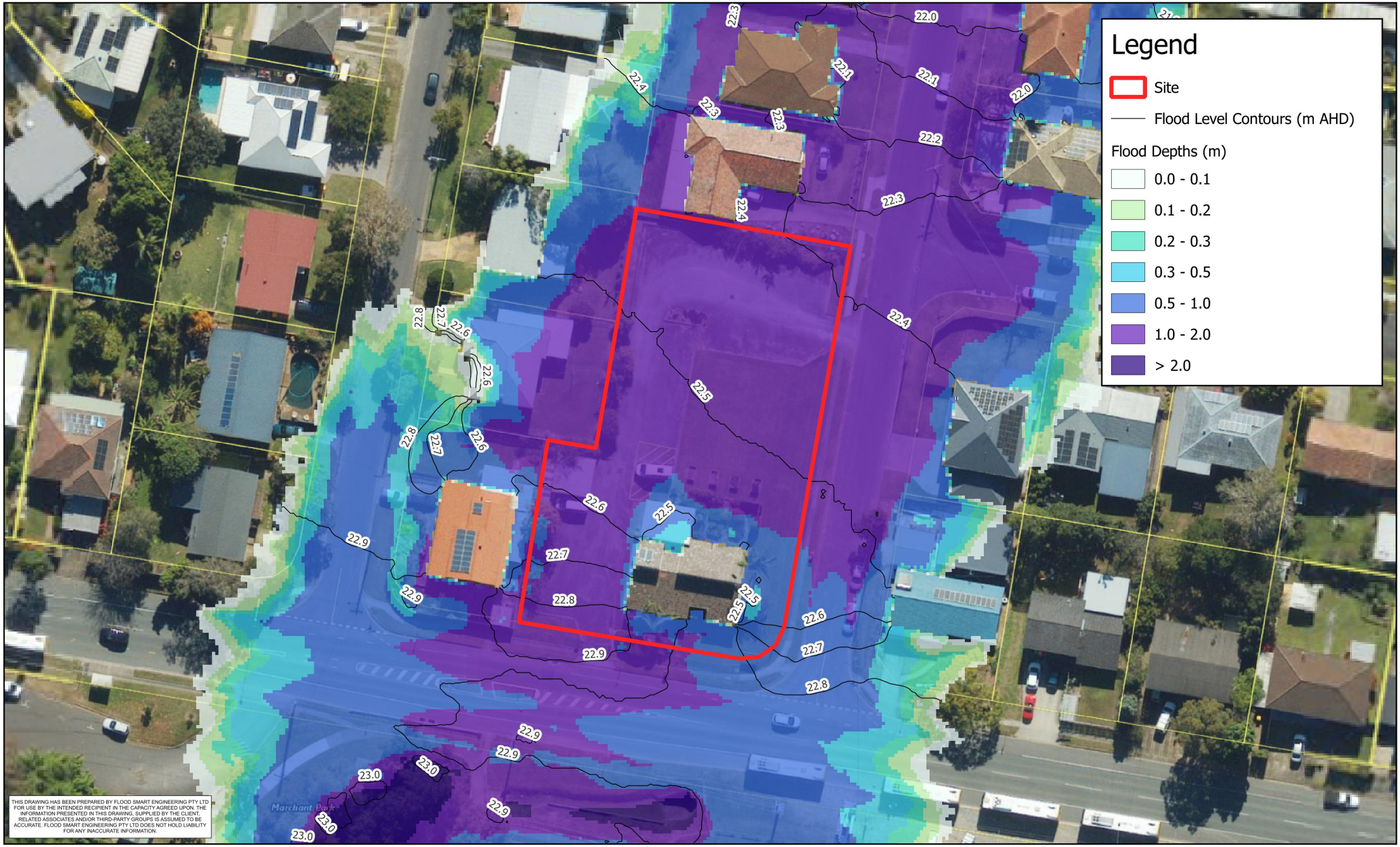

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FIGURE 9

TITLE
EXISTING SCENARIO 0.05% AEP FLOOD LEVELS & DEPTHS

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	01/07/2026
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001

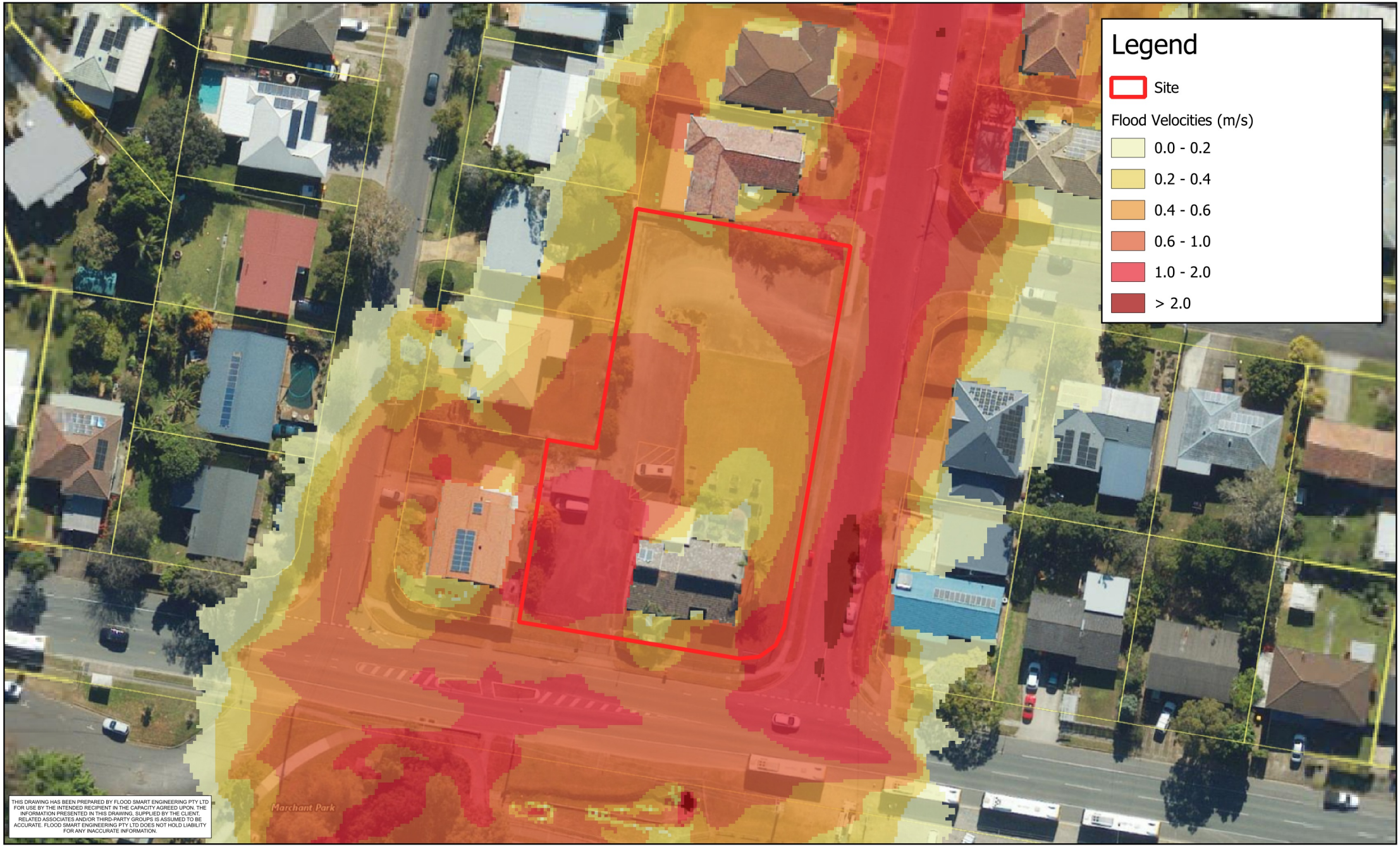

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FIGURE 10

TITLE
EXISTING SCENARIO 0.05% AEP FLOOD VELOCITIES

ADDRESS
487 ELLISON ROAD, ASPLEY

DRAWN	KC
REVIEW	HM
DATE	01/07/2026
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001

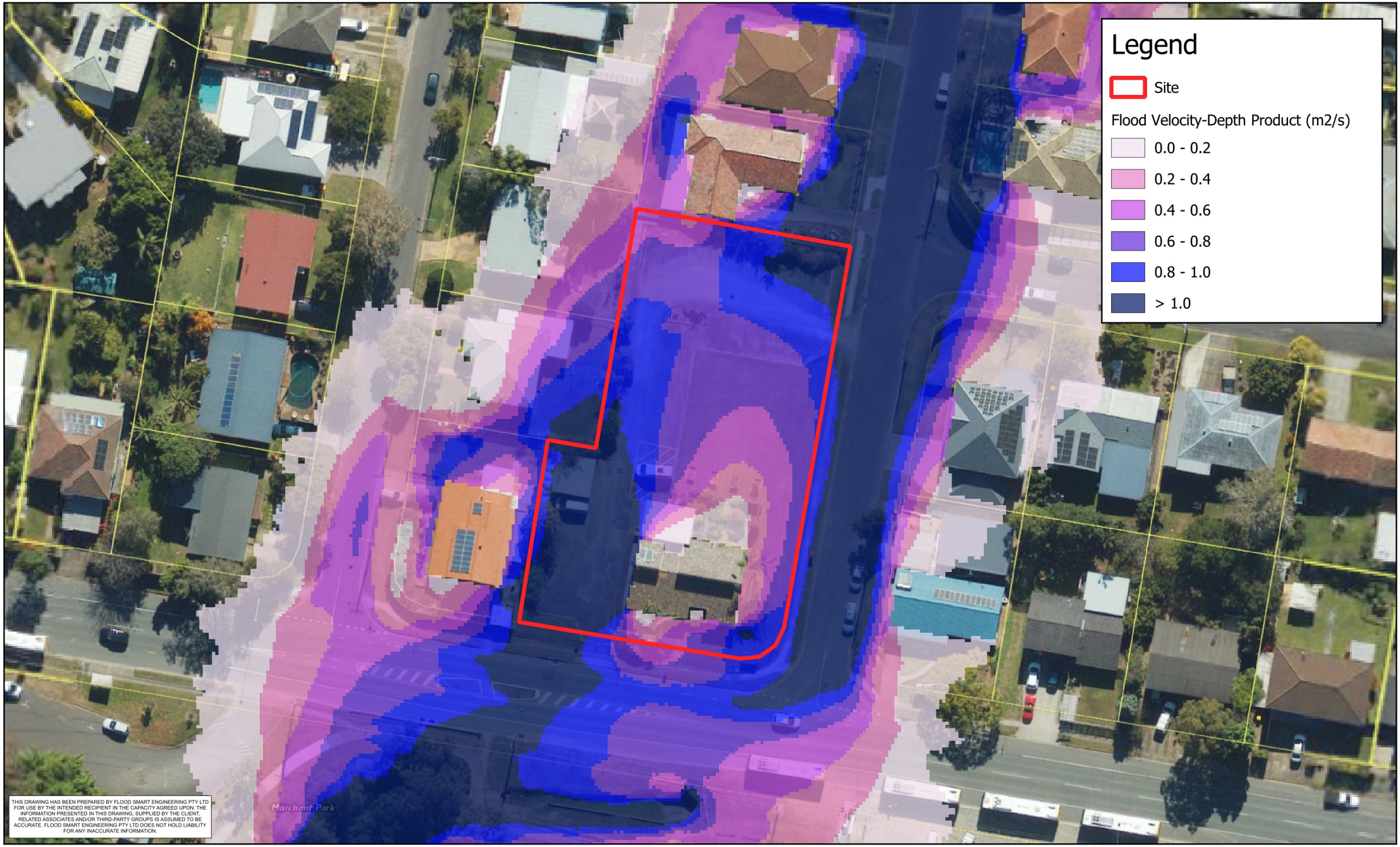

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FIGURE 11

TITLE
EXISTING SCENARIO 0.05% AEP FLOOD VELOCITY-DEPTH PRODUCT

ADDRESS
487 ELLISON ROAD, ASPLEY

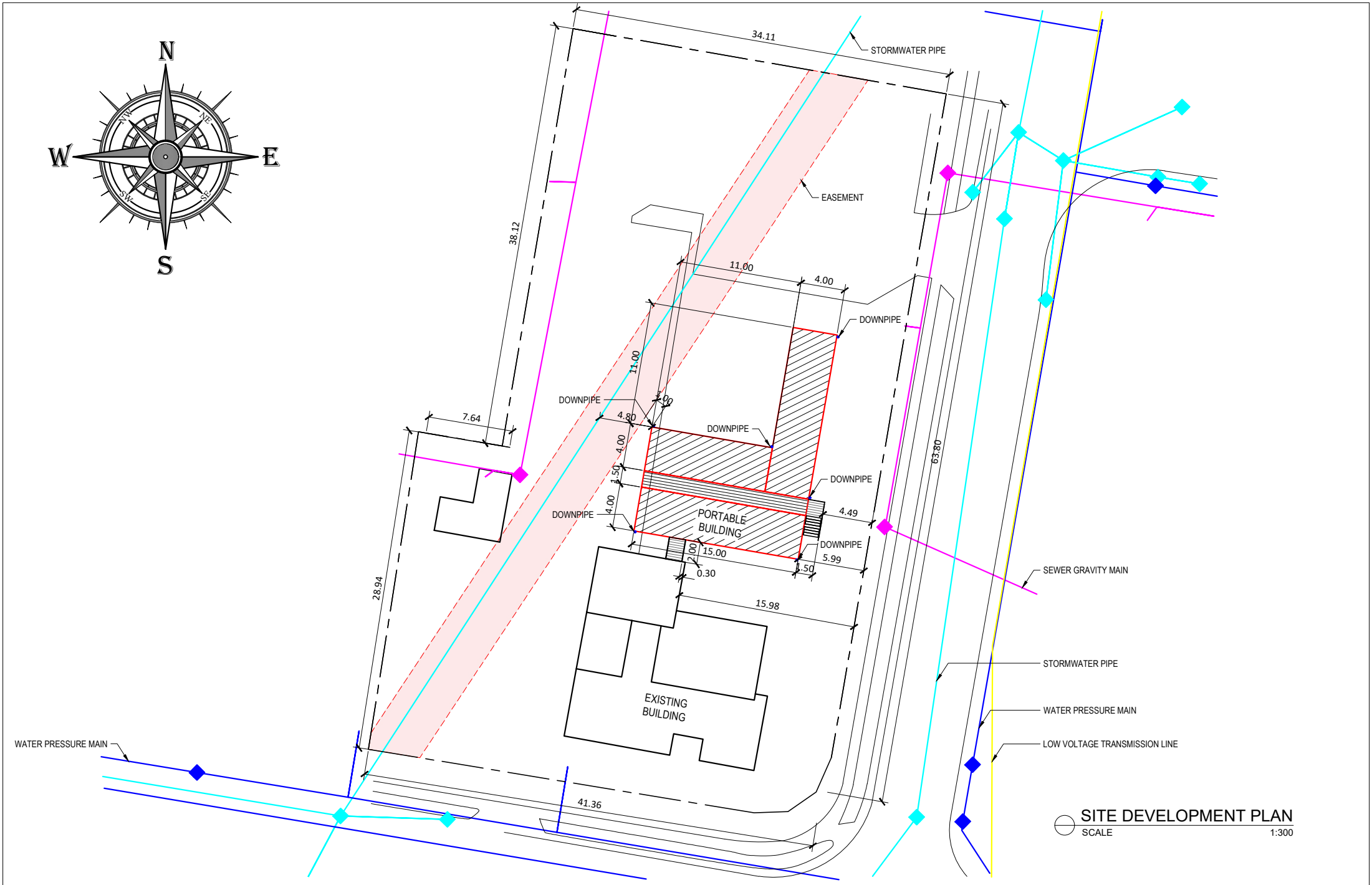
DRAWN	KC
REVIEW	HM
DATE	01/07/2026
PROJECT NO.	24-104

0 15 30 45 60 m

N

SCALE	1 : 750	REV.	001

Appendix B – Development Plans

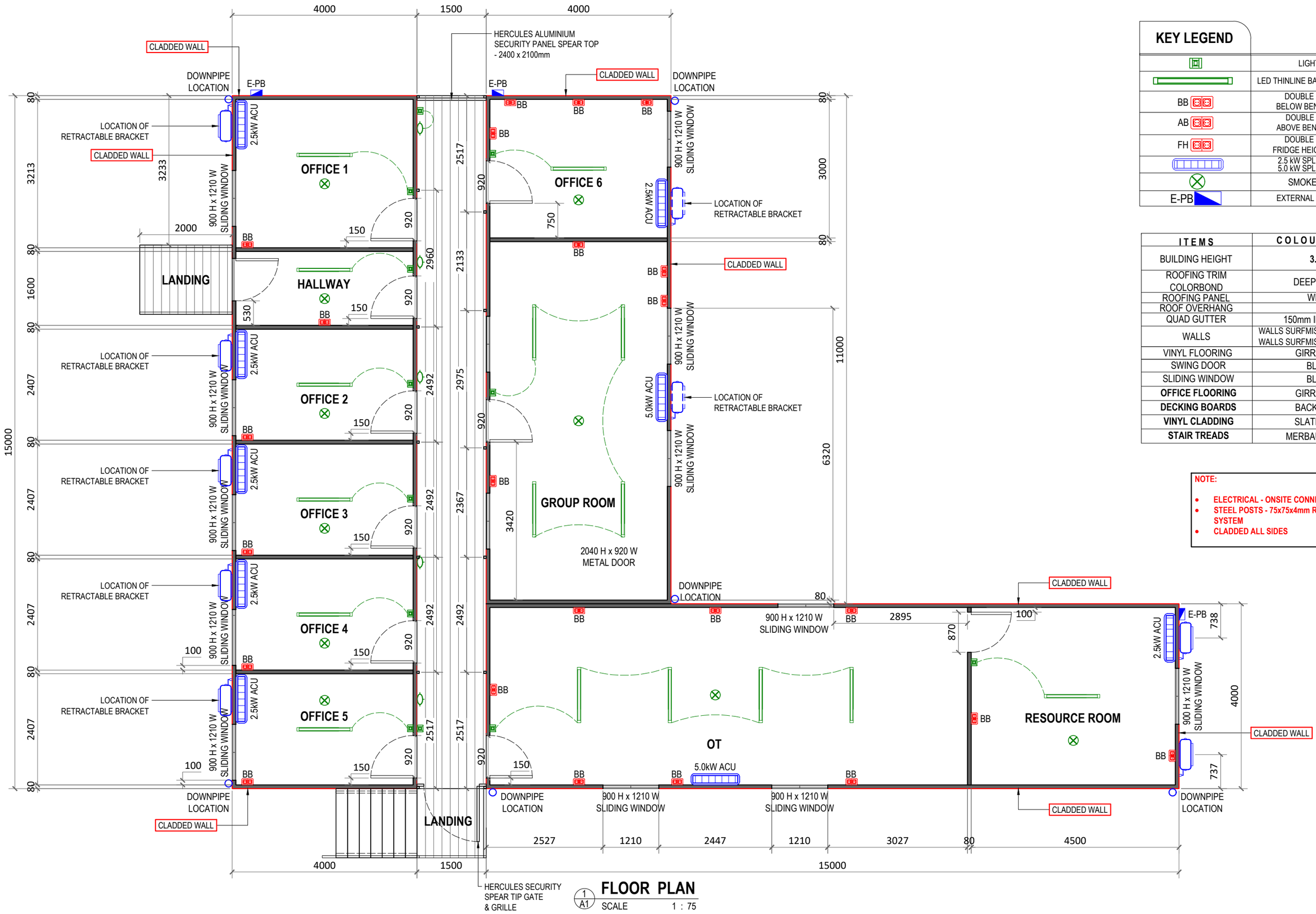


SITE DEVELOPMENT PLAN
SCALE 1:300

AFFORDABLE MODULAR BUILDINGS
PORTABLE BUILDING GROUP PTY LTD ABN: 54 655 549 241
TRANSPORTABLE BUILDINGS RESIDENTIAL & COMMERCIAL
OFFICES / ABLUTION BLOCKS / WORKERS ACCOMMODATION / LUNCH ROOMS / TINY HOMES / GRANNY FLATS / SHIPPING CONTAINER MODIFICATIONS / HOME OFFICES

PROJECT : PORTABLE BUILDINGS JOINED - 2 x 4.0m WIDE x 15.0m LONG & 4.0m WIDE x 11.0m w/ DECK & PATIO
CLIENT: Inv 1027 - VIVIENNE WILLIAMS
PROJECT LOCATION: 487 ELLISON ROAD, ASPLEY, QLD 4034

REV # 3



1 / A1 **FLOOR PLAN**

SCALE 1 : 75

KEY LEGEND

	LIGHT SWITCH
	LED THINLINE BATTEN CEILING LIGHT
BB	DOUBLE POWER POINT BELOW BENCH (BB) - 300mm
AB	DOUBLE POWER POINT ABOVE BENCH (AB) - 1050mm
FH	DOUBLE POWER POINT FRIDGE HEIGHT (FH) - 1850mm
	2.5 kW SPLIT SYSTEM ACU 5.0 kW SPLIT SYSTEM ACU
	SMOKE DETECTOR
E-PB	EXTERNAL POWER BOARD

ITEMS	COLOUR / SIZES
BUILDING HEIGHT	**3.0m**
ROOFING TRIM COLORBOND	DEEP OCEAN
ROOFING PANEL	WHITE
ROOF OVERHANG	
QUAD GUTTER	150mm INSTALLED
WALLS	WALLS SURFMIST / WHITE INTERNAL WALLS SURFMIST / WHITE EXTERNAL
VINYL FLOORING	GIRRAWEEN
SWING DOOR	BLACK
SLIDING WINDOW	BLACK
OFFICE FLOORING	GIRRAWEEN
DECKING BOARDS	BACKBEACH
VINYL CLADDING	SLATE GREY
STAIR TREADS	MERBAU TIMBER

NOTE:

- ELECTRICAL - ONSITE CONNECTION
- STEEL POSTS - 75x75x4mm RAIL SYSTEM
- CLADDED ALL SIDES

AFFORDABLE MODULAR BUILDINGS
PORTABLE BUILDING GROUP PTY LTD ABN: 54 655 549 241
OFFICES / ABLUTION BLOCKS / WORKERS ACCOMMODATION / LUNCH ROOMS / TINY HOMES / GRANNY FLATS / SHIPPING CONTAINER MODIFICATIONS / HOME OFFICES

TRANSPORTABLE **BUILDINGS** RESIDENTIAL & COMMERCIAL

PROJECT : PORTABLE BUILDINGS JOINED - 2 x 4.0m WIDE x 15.0m LONG & 4.0m WIDE x 11.0m w/ DECK & PATIO
CLIENT: Inv 1027 - VIVIENNE WILLIAMS
PROJECT LOCATION: 487 ELLISON ROAD, ASPLEY, QLD 4034

REV # 7

Appendix C – Flood Overlay Code

Table 8.2.11.3.A—Performance outcomes and acceptable outcomes

Performance outcomes	Acceptable outcomes	Comments
Section B—If accepted development subject to compliance with identified requirements (acceptable outcomes only) or assessable development other than for a dwelling house or reconfiguring a lot		
PO3 Development: a. is compatible with flood hazard in a defined flood event; b. minimises the risk to people from flood hazard; c. does not reduce the ability of evacuation resources including emergency services to access and evacuate the site in a flood emergency, with consideration to the scale of the development; d. minimises impacts on property from flooding; e. minimises disruption to residents, business or site operations and recovery time due to flooding; f. minimises the need to rebuild structures after a flood event greater than the defined flood event. Note—Where Table 8.2.11.3.C identifies that a flood risk assessment is required, compliance with this performance outcome can be achieved by submitting a flood risk assessment, which may be included within a flood study, addressing the criteria within this performance solution. Preparing flood risk assessments and flood studies is required to be in accordance with the Flood planning scheme policy. Note—An emergency management plan prepared in accordance with the Flood planning scheme policy, which sets out procedures for evacuation due to flooding may be used to demonstrate compliance with this performance outcome.	**AO3** Development for a material change of use is identified in Table 8.2.11.3.C as compatible with the flood hazard in the relevant flood planning area.	**AO3** The development is defined as compatible with the flood hazard in the relevant flood planning area.
PO4 Development for a park ensures that the design of a park and location of structures and facilities responds to the flood hazard and balances the safety of intended users with: a. maintaining continuity of operations; b. impacts of flooding on asset life and ongoing maintenance costs;	**AO4.1** Development involving a building or structure in a park complies with the flood planning levels specified in Table 8.2.11.3.D.	**NA**
	AO4.2 Development involving a building or structure in a park where Table 8.2.11.3.D does not apply:	**NA**

c. efficient recovery after flood events; d. recreational benefits to the city; e. availability of suitable land within the park.	a. is not located within the 20% AEP flood extent of any creek/waterway or overland flow path; or b. is located above the 20% AEP flood level of any creek/waterway or overland flow path.	
Section C—If accepted development subject to compliance with identified requirements (acceptable outcomes only) for a park or assessable development other than for a dwelling house		
PO5 Development is located and designed to: a. minimise the risk to people from flood hazard on the site; b. minimise flood damage to the development and contents of buildings up to the defined flood event; c. provide suitable amenity; d. minimise disruption to residents, recovery time and the need to rebuild structures after a flood event up to and including the defined flood event.	**AO5.1** Development complies with the flood planning levels specified in Table 8.2.11.3.D. Note—If located in an area with no Council-derived flood levels such as an overland flow path, a Registered Professional Engineer Queensland with expertise in undertaking flood studies is to derive the applicable flood level and certify that the development meets the required flood planning levels in Table 8.2.11.3.D. The study is to demonstrate that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy. **AO5.2** Development is: a. not located in the: i. Brisbane River flood planning area 1, 2a, or 2b sub-categories; ii. Creek/waterway flood planning area 1 or 2 sub-categories; iii. Overland flow flood planning area sub-category; or b. only located in these sub-categories if a Registered Professional Engineer Queensland with expertise in undertaking flood studies certifies that: i. the development design, siting and any mitigation measures will ensure the development is structurally adequate to resist hydrostatic, hydrodynamic and debris impact loads associated with flooding up to the defined flood event; and ii. the risk to people is managed to an acceptable level.	**PO5** It is proposed to address a Performance Outcome regarding the undercroft clearance requirements. It is proposed to provide a minimum finished floor level of RL23.00m AHD (providing up to 1.80m of undercroft clearance). The proposed building: a) Minimises risk to people from flood hazard. b) Achieves acceptable flood immunity. c) Minimises property impacts up to the defined flood event. d) Minimises disruptions to residents, recovery time and restoration cost up to the defined flood event. The development will be designed to ensure that it is structurally adequate to resist hydrostatic, hydrodynamic and debris impact loads associated with flooding up to the defined flood event and the risk to people is managed to an acceptable level.

PO6 Development involving essential electrical services or a basement storage area is suitably located and designed to ensure public safety and minimise flood recovery and economic consequences of damage during a flood.	**AO6.1** Development ensures that: a. all areas containing essential electrical services comply with the flood planning levels in Table 8.2.11.3.D; or b. if a basement contains essential electrical services or a private basement storage area, the basement is a waterproof structure with walls and floors impermeable to the passage of water with all entry points and services located at or above the relevant flood planning level in Table 8.2.11.3.D. Note—A basement storage area does not include a bike storage room, change room, building maintenance storage and non-critical electrical services. **AO6.2** Development involving a basement that relies on a pumping solution to manage floodwater ingress or for dewatering after a flood provides a secondary pump system with a backup power source for the pump.	**AO6.1** Essential electrical services comply with the flood planning levels in Table 8.2.11.3.D. **AO6.2 - NA**
PO7 Development does not directly or indirectly create a material adverse impact on flood behaviour or drainage on properties that are upstream, downstream or adjacent to the development.	**AO7.1** Development: a. does not block, or divert floodwaters for any area affected by creek/waterway or overland flow flooding, excluding storm-tide flooding and Brisbane River flooding sources; or b. does not result in a material increase in flood level or hydraulic hazard on upstream, downstream or adjacent properties. Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy. **AO7.2** Development retains existing overland flow paths and does not rely wholly on piped solutions to manage major flows.	**AO7.1** a. The development is not considered to cause adverse impacts to the surrounding area or neighbouring properties. **AO7.2** The development retains the existing overland flow path. **AO7.3 - NA**

	AO7.3 Development which creates a new overland flow path or significantly modifies an existing overland flow path via earthworks does not materially worsen hydraulic hazard on the site from existing conditions. Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.	
PO8 Development for filling or excavation in an area affected by creek/waterway flooding does not directly, indirectly or cumulatively cause any material increase in flooding or hydraulic hazard or involve significant redistribution of flood storage from high to lower areas in the floodplain. Note—This can be demonstrated by undertaking earthworks in compliance with the Compensatory earthworks planning scheme policy. Note—This part of the code applies to all development other than a dwelling house and any secondary dwelling which involves filling or excavation, whether or not the development application comprises a separate development application for operational work involving filling or excavation.	**AO8** Development ensures that no filling or excavation greater than 100mm is located in the Creek/waterway flood planning area 1, 2 or 3 sub-categories if contained in the 5% AEP flood extent of any Creek/waterway flood planning area sub-category for which no waterway corridor has been mapped in the Waterway corridors overlay.	**NA**
PO9 Development ensures that the building and site design: a. maintains the conveyance capacity of existing overland flow paths and creek/waterways; b. ensures floodwaters and flood debris can pass predominantly unimpeded under a structure or building to minimise property or building damage, including for a flood larger than the defined flood event; c. mitigates flood impacts by ensuring that filling, excavation and location of services are designed to allow for the conveyance of floodwater across the site. Note—The Flood planning scheme policy provides guidance on relevant considerations in determining minimum undercroft clearances and treatment of ground level in undercroft areas where floodwater	**AO9.1** Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub-category: a. complies with the minimum building undercroft clearance requirements in Table 8.2.11.3.E; b. not located directly above any part of a waterway corridor as mapped in the Waterway corridors overlay. **AO9.2** Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub category: a. has a ground level within the undercroft area that is free draining;	**PO9** It is proposed to address a Performance Outcome regarding the undercroft clearance requirements. It is proposed to provide a minimum finished floor level of RL23.00m AHD (providing up to 1.80m of undercroft clearance). The proposed building: a) maintains the conveyance capacity of existing overland flow paths and creek/waterways; b) ensures floodwaters and flood debris can pass predominantly unimpeded under a structure or building to minimise property or building damage, including for a flood larger than the defined flood event; c) mitigates flood impacts by ensuring that filling, excavation and location of services are designed to

conveyance is required underneath development.	b. does not involve excavation below ground level of more than 300mm within the undercroft area.	allow for the conveyance of floodwater across the site. It is not proposed to alter ground levels within the undercroft area, maintaining free-draining conditions.
PO10 Development for vulnerable uses, difficult to evacuate uses or assembly uses optimises vehicular access and efficient evacuation from the development to parts of the road network unaffected by flood hazard, in order to: a. protect safety of users and emergency services personnel; b. support efficient emergency services access and site evacuation with consideration to the scale of development. Note—A flood risk assessment may be required to address the performance outcomes or acceptable solutions which deal with evacuation and isolation arrangements, and the ability to take refuge. The Flood planning scheme policy provides information for undertaking flood risk assessments.	**AO10** Development for vulnerable uses, difficult to evacuate uses or assembly uses: a. is not isolated in any event up to the relevant flood planning level specified in Table 8.2.11.3.L and Table 8.2.11.3.D; or b. has direct vehicle access to a critical route or interim critical route in the Critical infrastructure and movement network overlay for evacuation in a flood; or c. can achieve vehicular evacuation to a suitable flood-free location. Note—A suitable flood-free location is of a size and nature sufficient to provide for the size and characteristics of the population likely to need evacuation to that area.	**NA**
PO11 Development has access which, having regard to hydraulic hazard, provides for safe vehicular and pedestrian movement and emergency services access to adjoining roads.	**AO11.1** Development provides an access or driveway into the site which is: a. trafficable during the defined flood event; b. not located in the Creek/waterway flood planning area 1 sub-category; c. not located in the Overland flow flood planning area sub-category if the hydraulic hazard is unsafe in the defined flood event; d. the access or driveway is not inundated by a 10% AEP flood. **AO11.2** Development located in the Creek/waterway flood planning area 1, 2, 3 or 4 sub-categories locates any disabled access in the highest part of the site. Note—explanation of hydraulic hazard provided in the Flood planning scheme policy.	**PO11** The development provides floor levels suitable for shelter-in-place requirements, providing 0.50m of freeboard above the 0.05% AEP overland flow level. Site occupants are to remain within the proposed building during major storm events. The expected isolation time is 66 minutes which the business/property owner is to is to have essential and adequate supplies for **AO11.2 - NA**
PO12	**AO12**	**NA**

Development involving a new road, a bridge or culvert is designed to minimise impacts to flood behaviour, minimise disruption to traffic during a flood and allow for emergency access.	Development involving a new road complies with the flood planning levels in Table 8.2.11.3.F.	
PO13 Development for pedestrian and cyclist paths: a. provides a suitable level of trafficability; b. manages the impacts of flooding on asset life and ongoing maintenance costs; c. balances route availability with recreational and transport connectivity benefits to the city.	**AO13.1** Development for cyclist and pedestrian facilities other than on public roads, including those traversing through a park and adjacent to a watercourse and overland flow path, are located above the 39% AEP (2 year ARI) flood immunity from all flooding sources. Note—If the site is subject to more than one type of flooding, the requirement that affords the greatest level of protection will apply. **AO13.2** All new on-road cyclist and pedestrian facilities comply with the flood planning levels and trafficability standards for the applicable category of road in Table 8.2.11.3.F or Table 8.2.11.3.K.	**NA**
PO14 Development which increases the residential population within the Brisbane River flood planning area sub-categories minimises the risk to people in all flood events with consideration to flood hazard, including warning time.	**AO14** Development in the Brisbane River flood planning area sub-categories in areas where the 1% AEP flood level is greater than 12.8m AHD involving: a. an increase in the number of residential dwellings; or b. additional residential lots is not subject to an unsafe hydraulic hazard in the 0.2% AEP flood event. Note—Explanation of a hydraulic hazard is provided in the Flood planning scheme policy.	**NA**