[redacted]

OVERLAND FLOOD STUDY & FLOOD IMPACT REPORT

Proposed Residential Development

At

For

ADS ARCHITECTS

[redacted]

ABN: 90 616 216 196

NSW Nominated Architect
Pavlo Doroch 9170

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DOCUMENT CONTROL

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DOCUMENT APPROVAL

For Alpha Engineering	[redacted]
Name	Jean Jose Mauad
Position	Senior Civil Engineer
For Client	
Name	
Position	

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GLOSSARY

Annual Exceedance Probability (AEP)
The chance of a flood of a given or a larger size occurring in any one year, usually expressed as a percentage.

Australian Height Datum (AHD)
A common national surface level datum approximately corresponding to mean sea level.

Average Recurrence Interval (ARI)
The long-term average number of years between the occurrence of a flood as big as or larger than the selected event.

Catchment
The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Flood
Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse.

Flood Liable Land or Flood Prone Land
Land susceptible to flooding by the PMF.

Flood Planning Levels (FPLs)
Are the combinations of flood levels and freeboards selected for floodplain risk management purposes.

Freeboard
Is a factor of safety typically used in relation to the setting of floor levels.

Habitable Room
In industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to damage in the event of a flood.
In a residential situation: a living or working area, such as lounge room, dining room, rumpus room, kitchen, bedroom or workroom.

Peak Discharge
The maximum discharge occurring during a flood event.

Probable Maximum Flood
PMF is the largest flood that could conceivably occur at a location, usually estimated from probable maximum precipitation.

Probable Maximum Precipitation
PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year.

Runoff
The amount of rainfall which actually ends up as stream flow.

1 INTRODUCTION

1.1 Brief

Alpha Engineering & Development has been engaged to carry out a flood impact study as part of the development application at No. 118-120 Station Street, Penrith.

The current flood study has been prepared to meet the Council's requirements. In details, it is to assess the impact of flooding to the property and adjoining properties prior to and after the proposed development.

1.2 Limitations

This report is intended solely for Architecture Design Studio (NSW) Pty. Ltd. as the Client of Alpha Engineering & Development and no liability will be accepted for use of the information contained in this report by other parties than this client.

This report is limited to visual observations and to the information including the referenced documents made available at the time when this report was written.

1.3 Reference Documents

For the purpose of the study, the following information has been utilised:

(i) LIDAR data obtained from NSW Department of Finance, Services & Innovation.
(ii) Architectural Plan (Error! Reference source not found.).
(iii) Flood Level Information from Penrith City Council dated September 3 2020 (**Appendix A**).
(iv) Penrith City Council Development Control Plan 2014 – Part 3.5 Flood Planning and Part 3.6 Stormwater Management and Drainage.
(v) Penrith City Council Stormwater Drainage guidelines for Building Developments, 2016.
(vi) Penrith City Council Local Environment Plan 2010.
(vii) NSW Government The Floodplain Development Manual – The management of Flood Liable Land (2005)
(viii) Engineers Australia, Australian Rainfall & Runoff (AR&R 1987) and (AR&R 2016 and Revision Projects)
(ix) BMT WMB – TUFLOW Manual

2 EXISTING SITE CONDITIONS

2.1 Existing Topgraphy

The subject site at 118 Station Street, Penrith and 120 Station Street, Penrith is currently occupied by a single storey houses with a bricked garage at rear. The development site is located at junction of Station Street and Reserve Street and is flat surface falling towards road.

The existing development site is relatively flat with RL 28 on South East Direction and RL 27.5 on North West direction with the overland flow flowing in North-West Direction from Derby Street and Reserve Street to Station Street as shown in Figure 1. The overland flow is then directly through station street to the creek on Northwest direction which is finally connected to Nepean River.

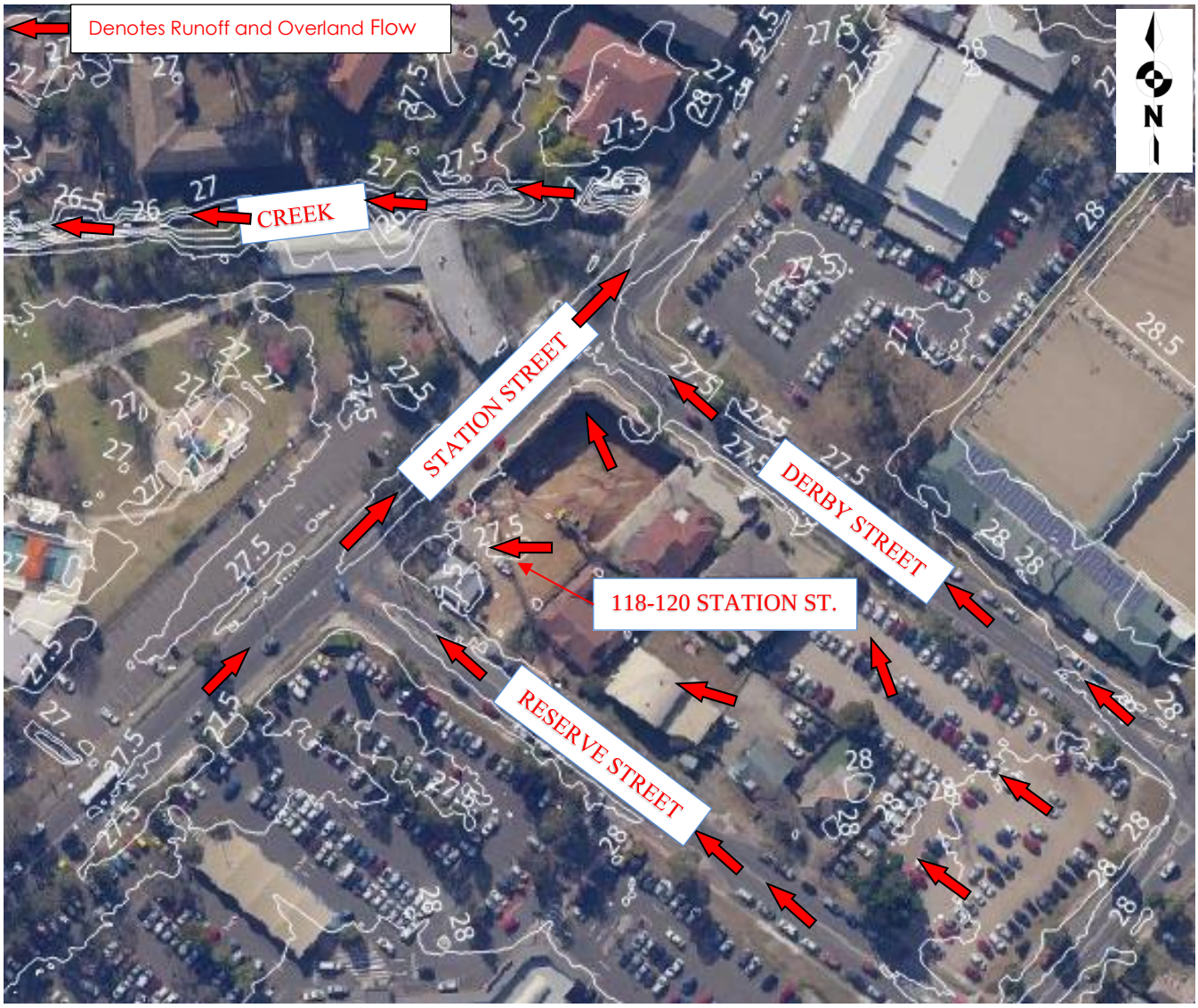

Figure 1: Site location

2.2 Council's issued flood information

Penrith City Council has provided flood level information advice for the site at its existing condition. Flood level information on Appendix A suggests that 1% AEP local overland flow flood affecting the proposed development is estimated to be RL 27.70m AHD**.**

3 PROPOSED DEVELOPMENT

The proposed development comprises of knockdown of existing dwellings and construction of Seven storied mixed use development. Ground floor level of the building is shown in Figure 2.

Refer to Architectural plan by Architecture Design Studio (NSW) Pty. Ltd. Attached to **Appendix F.**

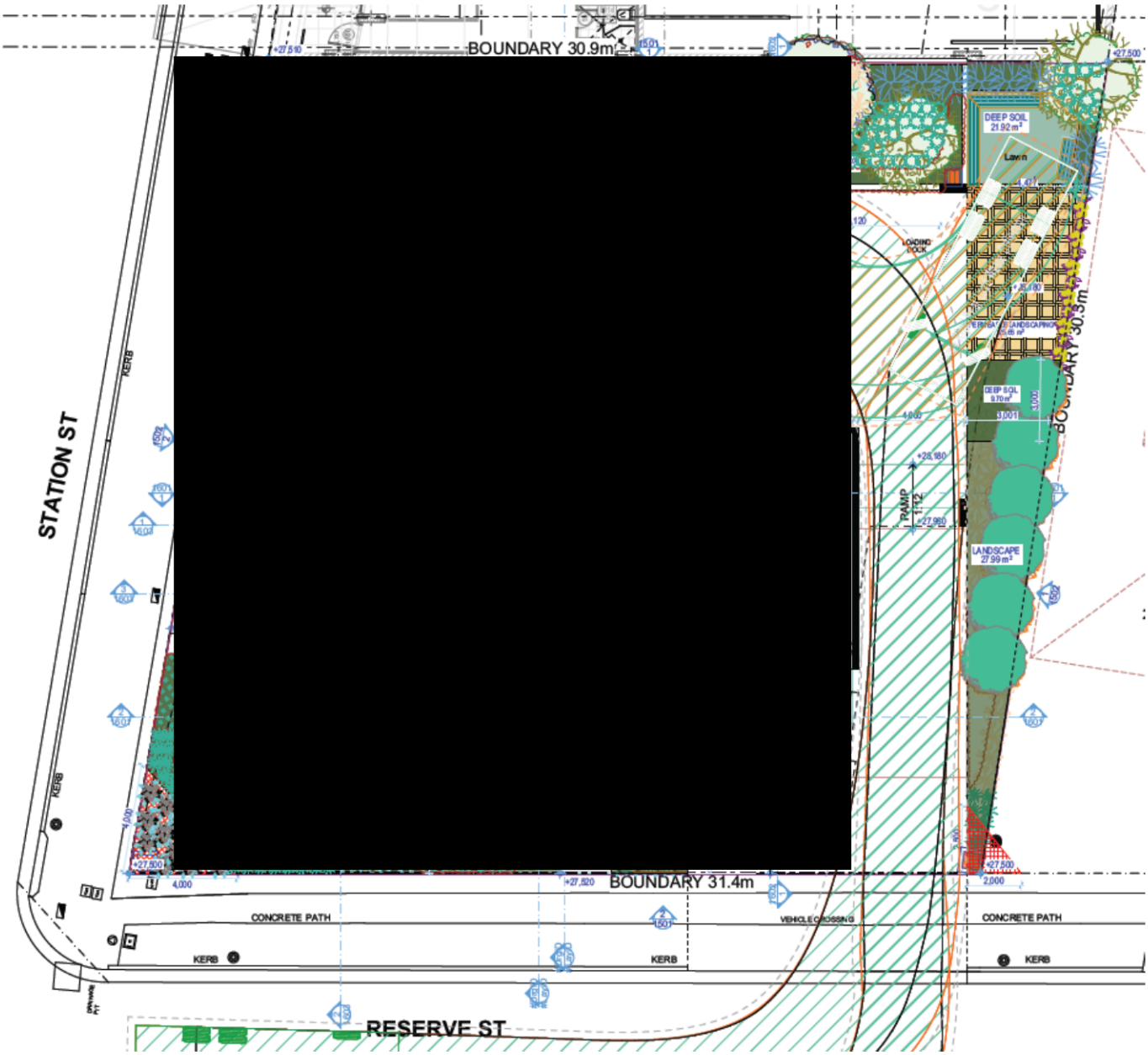

Figure 2: Proposed Ground Floor Plan

4 FLOOD STUDY

4.1 METHODOLOGY

The following methodology has been adopted to undertake the flood study.

- Use topographic map to establish contributing catchment extents;
- Use current satellite imagery to calculate land use data;
- Hydrological modelling to process ARR2016 rainfall data and to find out the peak flood discharge at inflow boundaries;
- Utilise detailed survey of development site to update the topography of the development site;
- Simulate 2 dimensional TUFLOW modelling in pre and post development scenario and analyse its impact;
- Address Council DCP controls related to flooding and recommend suitable flood risk management measures.

4.2 HYDROLOGICAL ANALYSIS

The local catchment area for the development site was determined using a combination of LiDAR data from the NSW Land and Property Information department, detailed survey information and site inspection of the topography.

The upstream catchment for this site goes up to Doonmore street on North East direction, Jamison Road on South Direction and High Street on North Direction. The catchment has been divided into four sub-catchments as shown in Figure 3.

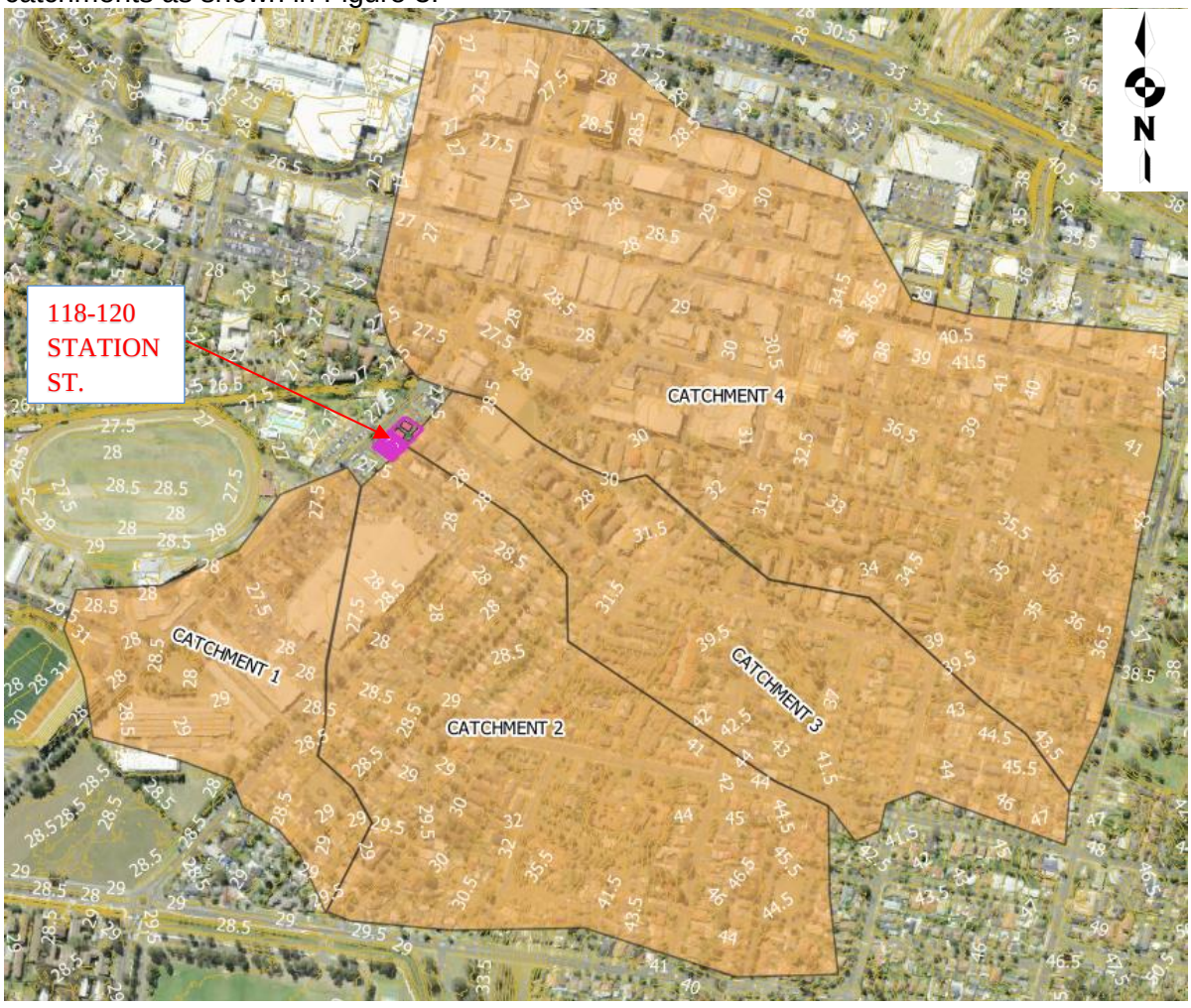

Figure 3: Catchment Map

DRAINS computer modelling was prepared based on catchment area, fraction impervious and basic rainfall loss factors. These catchment parameters and other hydrological parameters which are used in DRAINS modelling are outlined in the following **Tables 1 to 3**.

Catchment	Area (Ha)
Catchment 1	12.47
Catchment 2	30.32
Catchment 1	19.34
Catchment 1	56.45

Table 1: Catchment Area

	Parameter
Impervious area depression	1 mm
Pervious area depression	5 mm
Supplementary area depression	3 mm
Soil Type	3
Overland flow equation used	Kinematic Wave

Table 2: Hydrological parameter used

Annual Exceedance Probability (AEP)								
Duration	Duration in min	63.20%	50%	20%	10%	5%	2%	1%
1 min	1	1.96	2.25	3.18	3.82	4.47	5.35	6.04
2 min	2	3.21	3.63	5.01	5.98	6.96	8.32	9.40
3 min	3	4.46	5.06	7.01	8.39	9.77	11.7	13.2
4 min	4	5.61	6.39	8.90	10.7	12.4	14.9	16.8
5 min	5	6.65	7.60	10.6	12.8	14.9	17.8	20.1
10 min	10	10.6	12.2	17.2	20.8	24.3	29.1	32.8
15 min	15	13.2	15.2	21.6	26.0	30.4	36.4	41.1
20 min	20	15.1	17.4	24.7	29.7	34.8	41.6	47.0
25 min	25	16.6	19.1	27.0	32.5	38.1	45.6	51.4
30 min	30	17.9	20.5	28.9	34.8	40.7	48.7	55.0
45 min	45	20.7	23.6	33.0	39.7	46.3	55.4	62.6
1 hour	60	22.7	25.9	36.0	43.1	50.3	60.2	68.1
1.5 hour	90	25.9	29.3	40.4	48.2	56.2	67.3	76.2
2 hour	120	28.4	32.0	43.9	52.3	61.0	73.0	82.7
3 hour	180	32.5	36.5	49.7	59.2	69.0	82.6	93.7
4.5 hour	270	37.5	42.1	57.2	68.1	79.4	95.2	108
6 hour	360	41.8	46.9	63.8	76.1	88.7	106	121

Table 3: Rainall IFD Data obtained from Beareau of Meterology

DRAINS model was used to simulate the peak discharge generated by the above rainfall for upstream catchment, which is used as an inlet parameter in TUFLOW modelling. Design median hydrographs was extracted for catchment from the median rainfall ensemble as shown in Figure 4 to Figure 7 below.

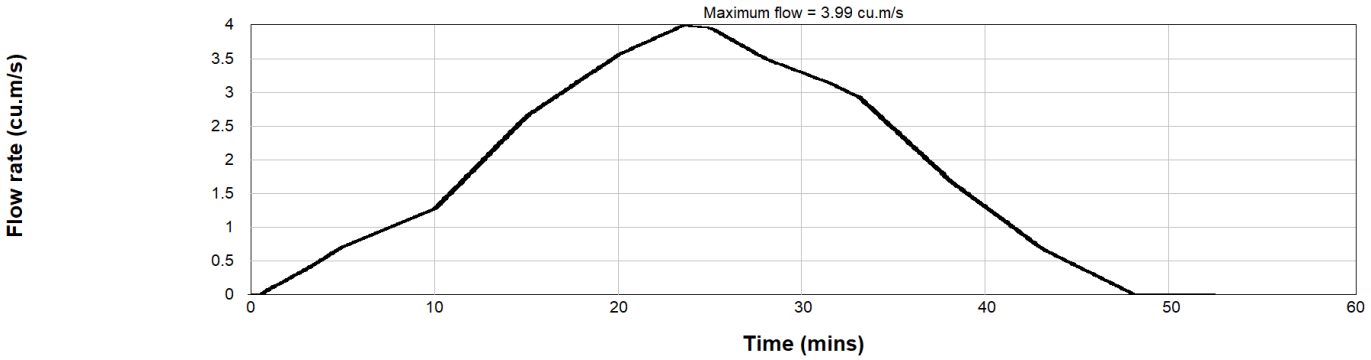

Figure 4: Flow Hydrograph for Catchment 1

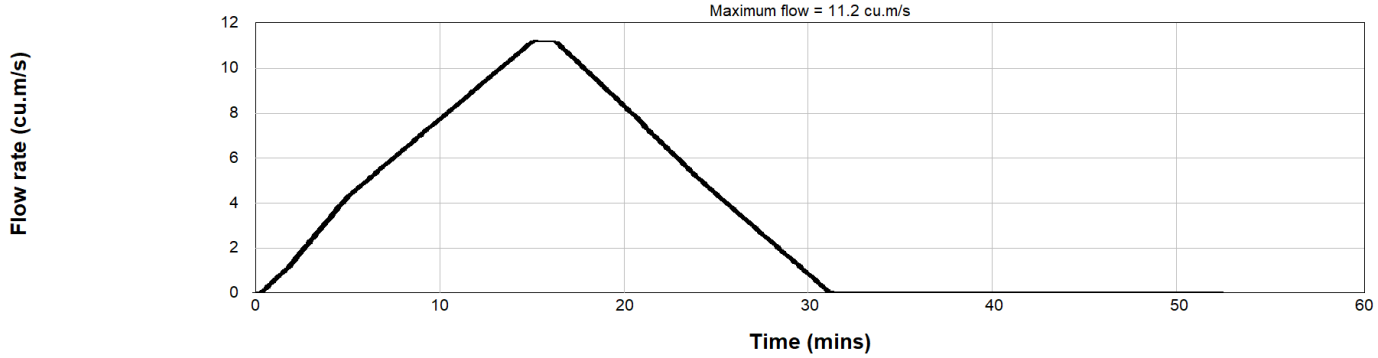

Figure 5: Flow Hydrograph for Catchment 2

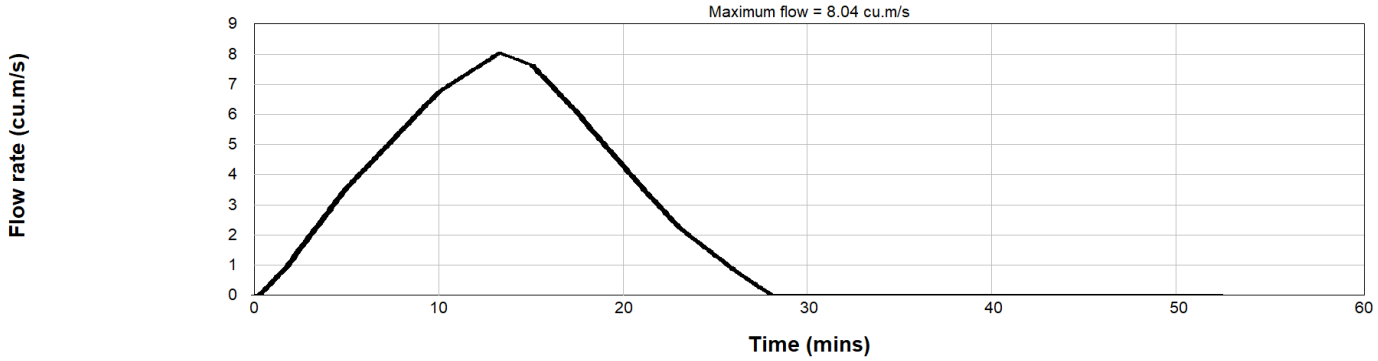

Figure 6: Flow Hydrograph for Catchment 3

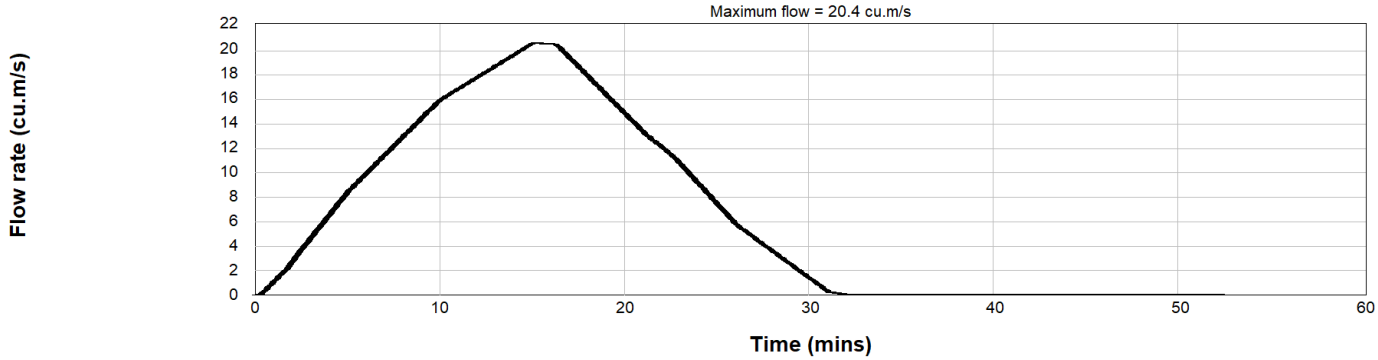

Figure 7: Flow Hydrograph for Catchment 4

The outcomes of the DRAINS model have been shown in Table 4 below for each sub-catchments. The peak flood event for 1% AEP and the storm duration during which peak flow was generated for each catchment is shown in Table 4 below.

Sub-catchment	Median Storm	1% AEP Peak Flow (m^3/s)
Catchment 1	25 minutes (storm 1)	3.99
Catchment 2	15 minutes (storm 6)	11.22
Catchment 3	15 minutes (storm 2)	8.04
Catchment 4	15 minutes (storm 2)	20.4

Table 4: DRAINS Result

4.3 HYDRAULIC ANALYSIS

The two dimensional flood modelling software TUFLOW was used for the hydraulic analysis of the pre and post development flow conditions.

4.3.1 Hydraulic Modelling Assumptions

Assumptions have been made during the development of the TUFLOW model to simulate the proposed development. These include:

- Buildings directly adjacent to the proposed development were modelled as complete obstructions which is a conservative approach because water is not modelled within these areas;
- Roughness values applied to the catchment are outlined below in Table 5 below.

Land Use Type	Manning's 'n'
Road	0.025
Paved areas	0.025
Turfed areas	0.045
Concrete Creek	0.012

Table 5: Model Land Use Roughness values

4.3.2 Model Schematisation

4.3.2.1 Model set-up

A fine grid size of 2m by 2m was used for Two-dimensional flood impact analysis around the vicinity of the subject site.

4.3.2.2 Boundary Conditions

A flow hydrograph inlet boundary is established at Reserve Street, Derby Street and Station Street as shown in Figure 8. Similarly, Outlet boundary condition has been placed along creek located in Northwest direction of proposed development as shown in Figure 8. The upstream inlet boundaries are modelled as Head-Discharge boundary while the downstream Outlet boundary is modelled as a normal depth boundary.

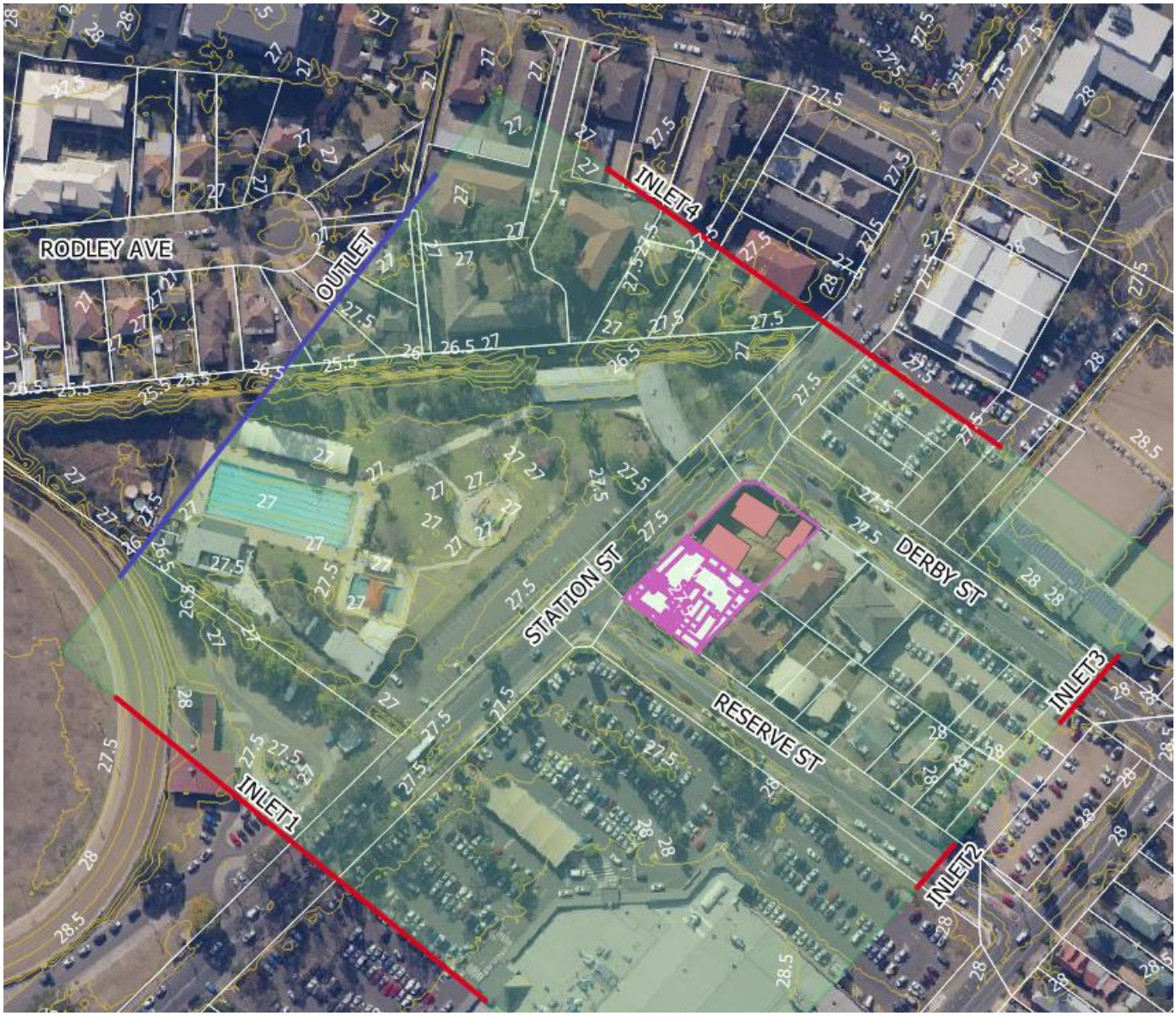

Figure 8: Location of Boundary Conditions

4.3.3 Pre-Development Conditions 1% AEP

The TUFLOW model was run based on existing site conditions and the flow rates applied as inflow hydrographs. The pre-development flood maps and indicative depths of inundation have been attached to this report as **Appendix B**.

4.3.4 Post-Development Conditions 1% AEP

The TUFLOW model for the post developed site was modelled with the identical parameters and assumptions developed in the pre-development scenario with the exception that the building footprint was altered to reflect the new envelope. Furthermore, after doing few trial runs, following flood risk control treatments were also incorporated as post-development scenario to retain the flood extent within the subject development and to enhance the flood storage:

a. The proposed mixed development building is modelled as complete obstruction

b. All the fences on frontage of Reserve Street and Station Street are modelled as flow through type with bottom 200mm left open for floodwater to pass through.

The post-development flood maps showing extent of flooding, flood hazard and indicative depths of inundation maps have been attached to this report as **Appendix C**.

4.4 DISCUSSION ON IMPACT

A comparison of the flood extents between the pre and post development show that there are some minor changes in flood extent due to the proposed development. The overland flow paths during the pre-development condition are mostly retained.

The afflux map shows comparison of the flood extents between the pre and post development as a Wet/Dry map in **Appendix E**. It shows there are areas which were flooded before, that will be dry and there are some newly flooded areas created by the development. The newly flooded area are mostly within the site itself.

Similarly, the flood impact map shows the maximum increase in flood depth is limited to around 10mm within the site and some areas of 122-158 Station Street and along Reserve Street as shown in **Appendix D**. It has also lowered flood levels in some areas by as much as 10mm than the existing condition within the property which is highly positive outcome of the development. The increase in flood depth upto 10mm due to proposed development can be attributed to the error tolerances of the ALS survey (LIDAR data) and calculations within the flood model. This justifies that the adjacent properties are not adversely affected.

Minimum flood contours and flood levels for Post Development have been plotted in **Appendix C.**

Once the following flood related development controls are in place for the proposed development, the development possess no risks to its occupants and has not adverse impact to neighbouring properties. The flood levels are generally consistent between the existing site conditions.

Flood related development controls

- Raising of Finished Ground Floor level to 1% AEP flood level plus 500mm freeboard.
- Raising the crest of driveway entry to basement to 1% AEP flood level plus 300mm freeboard.
- Provision of flow through fencing with bottom 200mm left open.
- Providing a flood free evacuation access to the evacuation point.
- Providing flood warning signage around the flood affected area.
- Preparing Flood Risk Management Plan and Flood Evacuation Plan for the building.

5 FLOOD RISK PLANNING CONSIDERATION

The objective of this report is to determine the overland flow characteristics and review the impact that the proposed development will have on the surrounding properties and address Council's DCP and LEP requirements related to flooding. In order to comply flooding requirements, following flood controls are prescribed for this development.

Based on Penrith City Council's DCP 2014 Part 3.5 Flood Planning, Penrith City council Stormwater Drainage guidelines for Building Development, 2016 and Penrith City Council Local Environment Plan 2010, this flood impact statement has been prepared to address all the planning requirements stipulated on the LEP. Accordingly, this Flood impact report has been prepared to comply with LEP Part 7.2 (Flood Planning) in following ways:

(1) The objectives of this clause are as follows:

a) to minimise the flood risk to life and property associated with the use of land,
The 1% flood level affecting the proposed development is RL 27.68.The finished floor levels of the proposed habitable area of the ground floor has been designed to ensure there is a 500mm freeboard from the 100-year maximum flood level at RL 28.18. The proposed non-habitable area and crest level for driveway has been designed at RL 27.98 by providing a 300mm freeboard to comply with Penrith City Council Stormwater Drainage guidelines for Building Development Clause 2.1.2 (Freeboard).

b) **To limit uses to those compatible with flow conveyance function and flood hazard,**
The proposed site will NOT have a significant impact on the flood behaviour which may result in a detrimental increase in the potential flood affectation to other developments or properties. The flood in the proposed development is categorised as Medium flood risk (refer to **Appendix D**). The category does not change due to the development.

c) To manage uses to be compatible with flood risks,
The proposed development will not have significant impacts on adjoining properties in the floodplain as the nature of the flood water will not change significantly (refer to **Appendix B and Appendix C)**

d) To enable safe and effective evacuation of land,
The ground floor level for the proposed development is provided 500mm above 100 year maximum flood level. Thus, it is safe to stay inside the building during high flood event.

e) To ensure the existing flood regime and flow conveyance capacity is not compromised.
From the flood impact map in Appendix D, it is clear that due to proposed development the increase in flood depth is approximately 10mm in some portion of Reserve Street and some portion of 122-158 Station Street. The increase in flood depth upto 10mm due to proposed development can be attributed to the error tolerances of the ALS survey (LIDAR data) and calculations within the flood model. This justifies that the adjacent properties are not adversely affected.

f) To avoid detrimental effects on the environment that would cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or waterways.
As listed above the proposed development causes increase in flood depth of 10mm in some portion of Reserve Street of 122-158 Station Street. Thus, it does not create any detrimental effect to environment.

(2) This clause applies to following land –

a) Land at or below the flood planning level and b) land identified as "Flood Planning Map" on Clause Application Map.
This property has been identified as Flood affected as presented in Flood Level information provided by council (refer to **Appendix A).**

(3) Development consent is required for any development on land to which this clause applies.

(4) Development consent must not be granted for development on land that is at or below the flood planning level unless the consent authority is satisfied that the development-

a) is compatible with the flood hazard of the land, and
The proposed development does not have an impact on the flood extent of the pre-development conditions as shown on the flood impact mapping (**Appendix C and Appendix D**).

b) **if located in a floodway, is compatible with the flow conveyance function of the floodway and the flood hazard within the flood way, and**
The proposed development is proposed with all the fences on frontage of Reserve Street and Station Street as flow through type with bottom 200mm left open for floodwater to pass through, which will help to reduce the flood hazard within the flood way.

c) **Is likely to adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and**
As seen from the Flood Map for Pre and Post Development in **Appendix B and Appendix C**, the water surface elevation of the flooding does not increase and are similar to that of Pre Development Water Surface Elevation. In addition, Flood Impact Map on **Appendix D** shows no sign of flood affection to other development or properties.

d) Is not likely to significantly alter flow distributions and velocities to the detriment of other properties or the environment, and
As seen from the Flood Map for Pre and Post Development in **Appendix B** and **Appendix C**, the velocity of the flooding for post development does not increase and are similar to that of Pre Development Velocity.

e) Is not likely to adversely affect the safe and effective evacuation of the land and the surrounding area, and
As seen from Flood Impact map in **Appendix D,** the increase in depth is approximately 10mm in some portion of Reserve street. Thus it is not adversely affecting the safe and effective evacuation of the land and the surrounding area.

f) Is not likely to significantly detrimentally affect the environment or cause avoidable erosion, destruction of riparian vegetation or affect the restoration and establishment of riparian vegetation, or a reduction in the stability of river banks or waterways, and
From the TUFLOW flood modelling of the pre and post development scenarios, the water surface, flood extents and velocities do not significantly increase. These are all factors which may cause environmental impacts if they are increased. However, since they do not increase, there will be no adverse impacts on the environment. (refer to **Appendix B and Appendix C)**

g) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and

The proposed development is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding. The flood level, extent or velocities do not increase significantly. Therefore, the proposed development will not have any unsustainable social or economic costs to the community due to flooding.

h) incorporates appropriate measures to manage risk to life from flood, and i) is consistent with any relevant floodplain risk management plan
The finished floor level of the habitable proposed area is designed to be at least 500mm above the 100 year flood water surface level. The non-habitable area and driveway crest level to basement parking is designed to have a 300mm freeboard. These measures will ensure that the flood waters will not enter the building for a 100 Year ARI flooding event. Flood warning signs are also to be placed around the site to ensure occupants are aware of the flooding risks.

5) A Development consent must not be granted for development on land identified as "Flood planning land" on the Clause Application Map, unless the consent authority is satisfied that the development will not adversely affect the safe and effective evacuation of the land and the surrounding area.

6) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.

7) In this clause, flood planning level means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metres freeboard.
The flood planning levels have been obtained by taking the existing flood level and adding a 500mm freeboard for habitable areas and 300mm for non-habitable areas such as the alfresco and 300mm for crest level for entry to basement parking. This has been summarised in Table 4 below.

5.1 Floor Level

Habitable floor level to be no lower than the 1% AEP flood level plus 500mm freeboard and non-habitable floor levels and crest of driveway to basement to be no lower than the 1% AEP flood level plus 300mm freeboard. Table 6 below shows the minimum flood level right upstream of the development area and the corresponding flood planning level (or minimum Ground Floor level) required for the development:

Location	1% AEP Flood Level	Freeboard (mm)	Flood Planning Level or Min. FFL Required (AHD)
Ground Floor FFL	27.68	500	28.18
Crest for Driveway to Basement	27.68	300	27.98

Table 6: Proposed Minimum Finish Floor Level

Finished floor levels shown in Table 6 must be adopted for the development in order to comply with Council's DCP requirements.

5.2 Building Components and Method

We recommend that all structures of this dwelling shall be flood compatible building components up to 1% AEP flood level plus 500mm freeboard.

All external power points, air conditioning units, hot water systems, pumps for rainwater tanks and any other valuable household items/machineries shall be placed above the habitable floor level.

Rainwater Tanks shall be located outside the flood affected area or shall be raised above 1% AEP flood level using the suspended support structurally designed to withstand forces created by floodwater.

5.3 Structural Soundness

To assure the structural soundness of the proposed building, we recommend an engineer's report is required to be submitted certifying that the structures can withstand the forces of floodwater, debris and buoyancy upto and including 1% AEP flood level plus 500mm prior to CC.

5.4 Flood Effects

The subject site has been affected by flooding from 1% AEP event. From modelling, the proposed development has not impacted on the nature of flooding. Accordingly, the flooding affectation is insignificant when considering the following aspects of flooding:

i. The development does not concentrate overland flow anywhere that could increase the risks to the occupants and neighboring properties
ii. The development does not divert any overland flow that could change flood levels, flows and velocities caused on neighboring land, and

Council's issued flood levels and Council's adopted flood study were used to benchmark the flood impact for this development.

5.5 Evacuation

It is recommended that during any flood event, staying within the building as much as practical due to the proposed finish floor level is higher than flood level in 1% AEP event and due to the short duration of flooding by its nature.

It is advised the residents of the property shall prepare their own Home Emergency Plan which outlines what needs to be done in an emergency. Such Emergency toolkit is available at website http://www.seshomeemergencyplan.com.au/

5.6 Conclusion & Recommendations

The key strategies, flood controls and recommendations to be adopted for this development included the following:

1. The minimum finished ground floor level, non-habitable floor level and crest level for driveway shall be adopted as per Table 6 above.
2. The building materials below the minimum finished floor level shall be constructed from flood compatible materials and designed to withstand flood pressure and impacts from debris carried in flood waters.
3. Boundary fencing at frontage of Reserve Street and Station Street is to be open flow type fence with bottom 200mm left open for flood water to pass through. (Refer to Figure 9 and Figure 10 below for sample)
4. Flood Warning signs shall be placed along the open flow type fence to warn the people about dangers of flooding.

The results from the investigations and modelling for this development that have been summarised in this report indicate that the development with the proposed flood control strategies that can facilitate unobstructed safe conveyance of flood waters through the site without detrimentally affecting the building, occupants and the neighbouring properties.

Figure 9: Typical security fencing

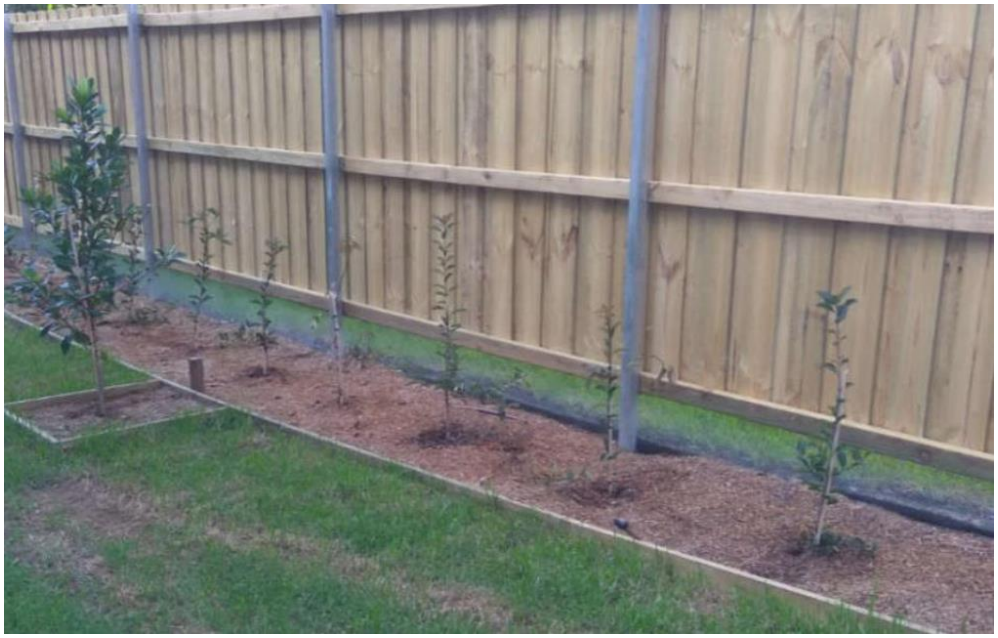

Figure 10: Typical flow through boundary fencing

6 APPENDICES

APPENDIX	TITLE
APPENDIX A	CATCHMENT PLAN & PROPOSED EARTHWORKS
APPENDIX B	PRE-DEVELOPMENT FLOOD MAPS
APPENDIX C	POST-DEVELOPMENT FLOOD MAPS
APPENDIX D	FLOOD IMPACT MAP
APPENDIX E	FLOOD Afflux MAP
APPENDIX F	ARCHITECTURAL PLAN

APPENDIX A

FLOOD LEVEL INFORMATION FROM COUNCIL

PENRITH

Our reference: ECM 9275330
Contact: Dr Elias Ishak
Telephone: [redacted]

3 September 2020

Ms Melissa Mokdassi
4.03/16 Railway Parade
BURWOOD NSW 2134

Dear Ms Mokdassi

Flood Level Enquiry
Lot 4 DP 112466 No. 118 Station Street Penrith and
Lot 6 DP 1003862 No. 120 Station Street Penrith

Please find enclosed Flood Level information for the above property.

Should you require any further information please do not hesitate to contact me on 4732 7579

Yours sincerely

[redacted]

Dr Elias Ishak
Senior Engineer – Floodplain Management

[redacted]

Flood Information
Lot 4 DP 112466 - No. 118 Station Street Penrith

Date of issue: 3 September 2020

The 1% AEP local overland flow flood level affecting the above property is estimated to be RL27.7m AHD.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions

AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.

AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Legend

	Extent of 1% AEP local catchment overland flow path. Generally depths less than 150mm is not shown.

Notes:

1. The contours shown above in yellow numbering are at 0.5m intervals and are based on Aerial Laser Scanning (ALS) Survey undertaken in 2002. The contour levels are approximate and for general information only. Accurate ground levels should be obtained by a Registered Surveyor.
2. The flood level is based on current information available to Council at the date of issue. The flood level may change in the future if new information becomes available. The 1% AEP flood is the flood adopted by Council for planning controls. Rarer and more extreme flood events will have a greater effect on the property.
3. Council's studies are reflected in flood mapping for the City which show properties potentially affected by overland flows in excess of 150mm.
4. This property is shown on Council's flood mapping as potentially so affected.
5. Council imposes flood related development controls where, in its opinion, such controls are justified. Such controls may or may not be imposed with respect to this property in the event of an application for development consent.
6. If a development proposal is submitted with respect to this property, Council will consider the possibility of flood or overland flow in the context of the application. Council may impose a requirement that the applicant for development consent carry out a detailed assessment of the possible overland water flows affecting the property (a flood study) and/or may impose other controls on any development designed to ameliorate flood risk.
7. You are strongly advised if you propose to carry out development upon the property, that you retain the assistance of an experienced flooding engineer and have carried out a detailed investigation.
8. Council accepts no liability for the accuracy of the flood levels (or any other data) contained in this certificate, having regard to the information disclosed in Notes "1" to "4". As such you should carry out and rely upon your own investigations.

[redacted]

Dr Elias Ishak
Senior Engineer – Floodplain Management

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

Flood Information
Lot 6 DP 1003862 - No. 120 Station Street Penrith

Date of issue: 3 September 2020

The 1% AEP local overland flow flood level affecting the above property is estimated to be RL27.7m AHD.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions

AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.

AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Legend

	Extent of 1% AEP local catchment overland flow path. Generally depths less than 150mm is not shown.

Notes:

9. The contours shown above in yellow numbering are at 0.5m intervals and are based on Aerial Laser Scanning (ALS) Survey undertaken in 2002. The contour levels are approximate and for general information only. Accurate ground levels should be obtained by a Registered Surveyor.
10. The flood level is based on current information available to Council at the date of issue. The flood level may change in the future if new information becomes available. The 1% AEP flood is the flood adopted by Council for planning controls. Rarer and more extreme flood events will have a greater effect on the property.
11. Council's studies are reflected in flood mapping for the City which show properties potentially affected by overland flows in excess of 150mm.
12. This property is shown on Council's flood mapping as potentially so affected.
13. Council imposes flood related development controls where, in its opinion, such controls are justified. Such controls may or may not be imposed with respect to this property in the event of an application for development consent.
14. If a development proposal is submitted with respect to this property, Council will consider the possibility of flood or overland flow in the context of the application. Council may impose a requirement that the applicant for development consent carry out a detailed assessment of the possible overland water flows affecting the property (a flood study) and/or may impose other controls on any development designed to ameliorate flood risk.
15. You are strongly advised if you propose to carry out development upon the property, that you retain the assistance of an experienced flooding engineer and have carried out a detailed investigation.
16. Council accepts no liability for the accuracy of the flood levels (or any other data) contained in this certificate, having regard to the information disclosed in Notes "1" to "4". As such you should carry out and rely upon your own investigations.

[redacted]

Dr Elias Ishak
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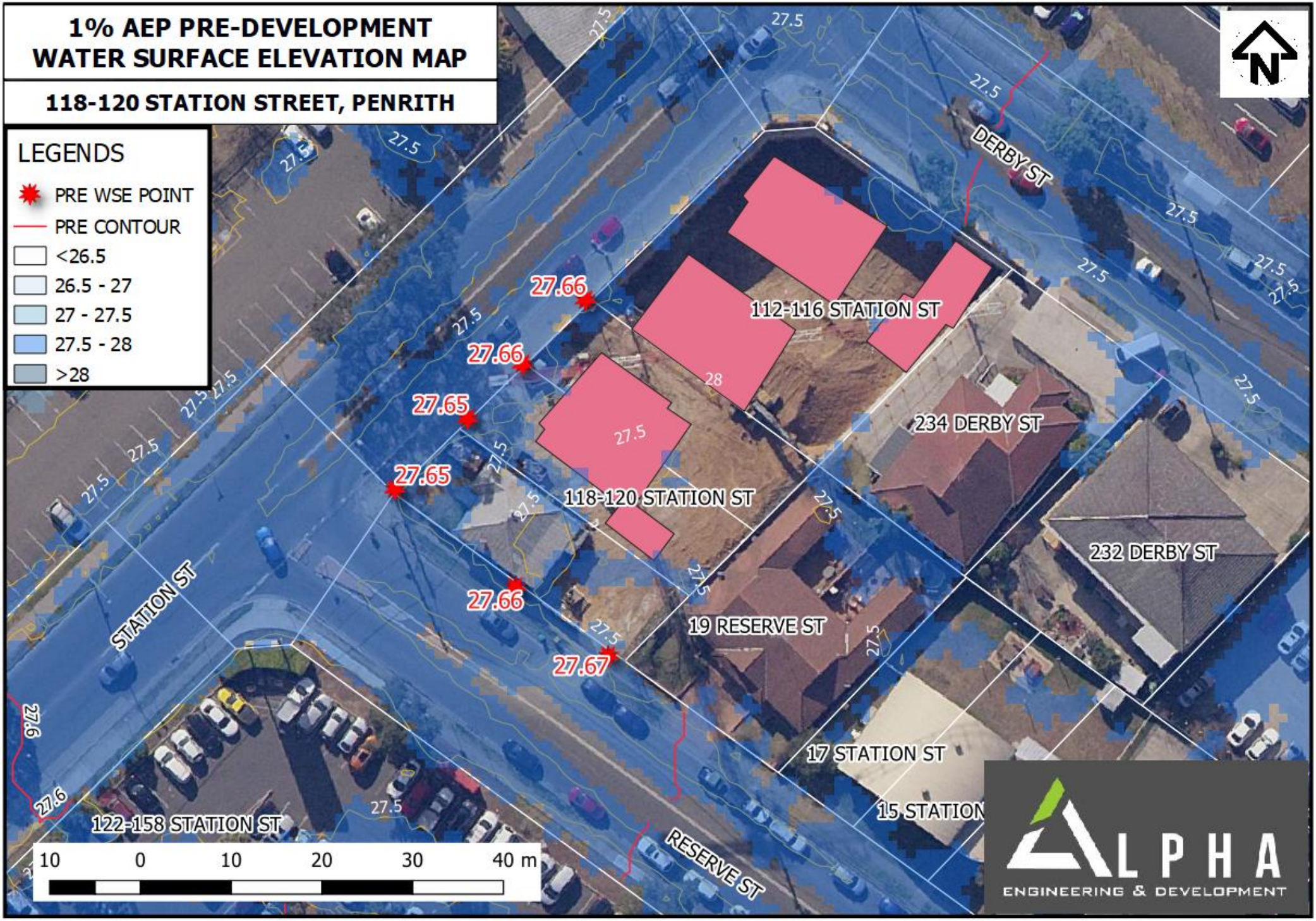
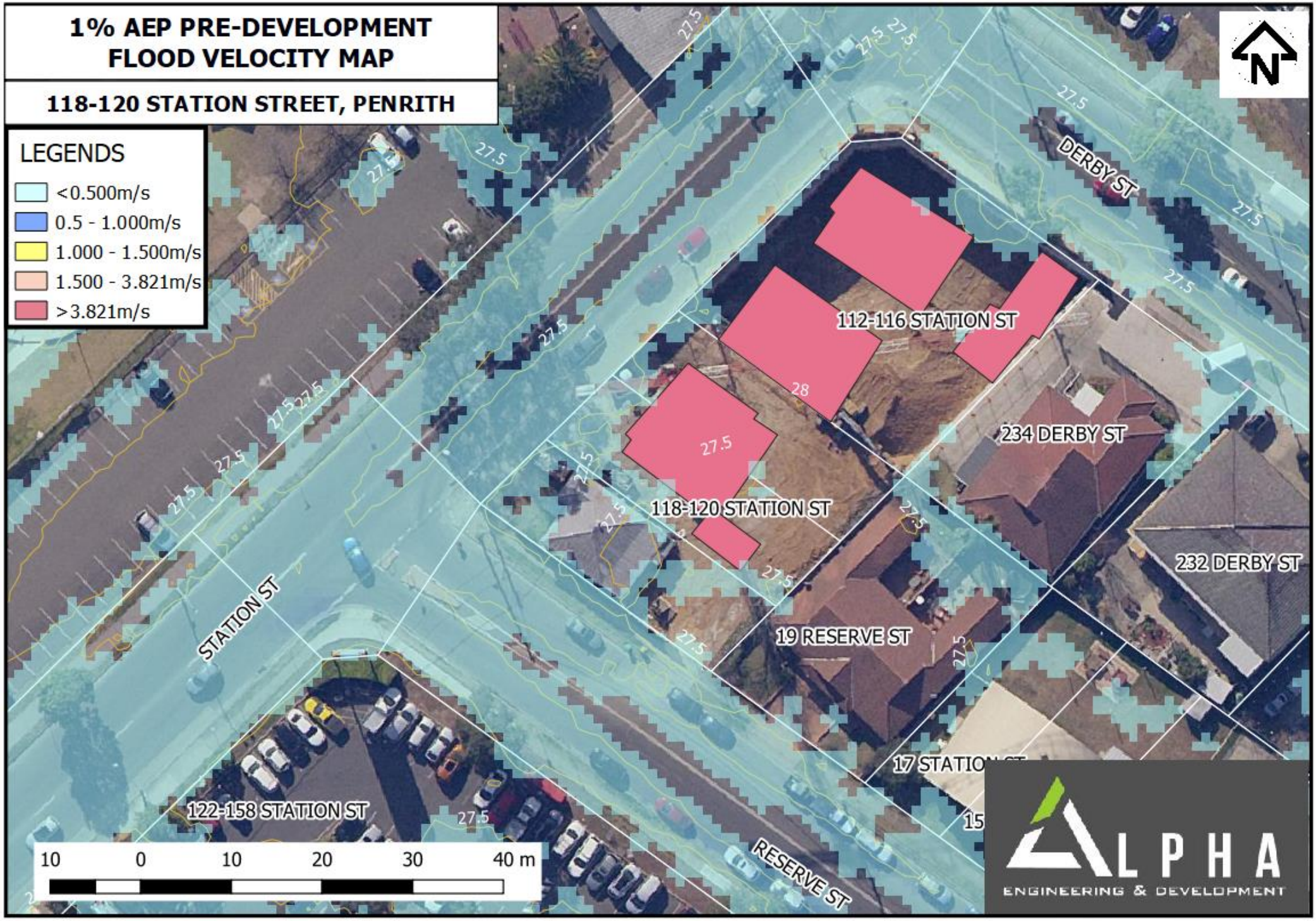
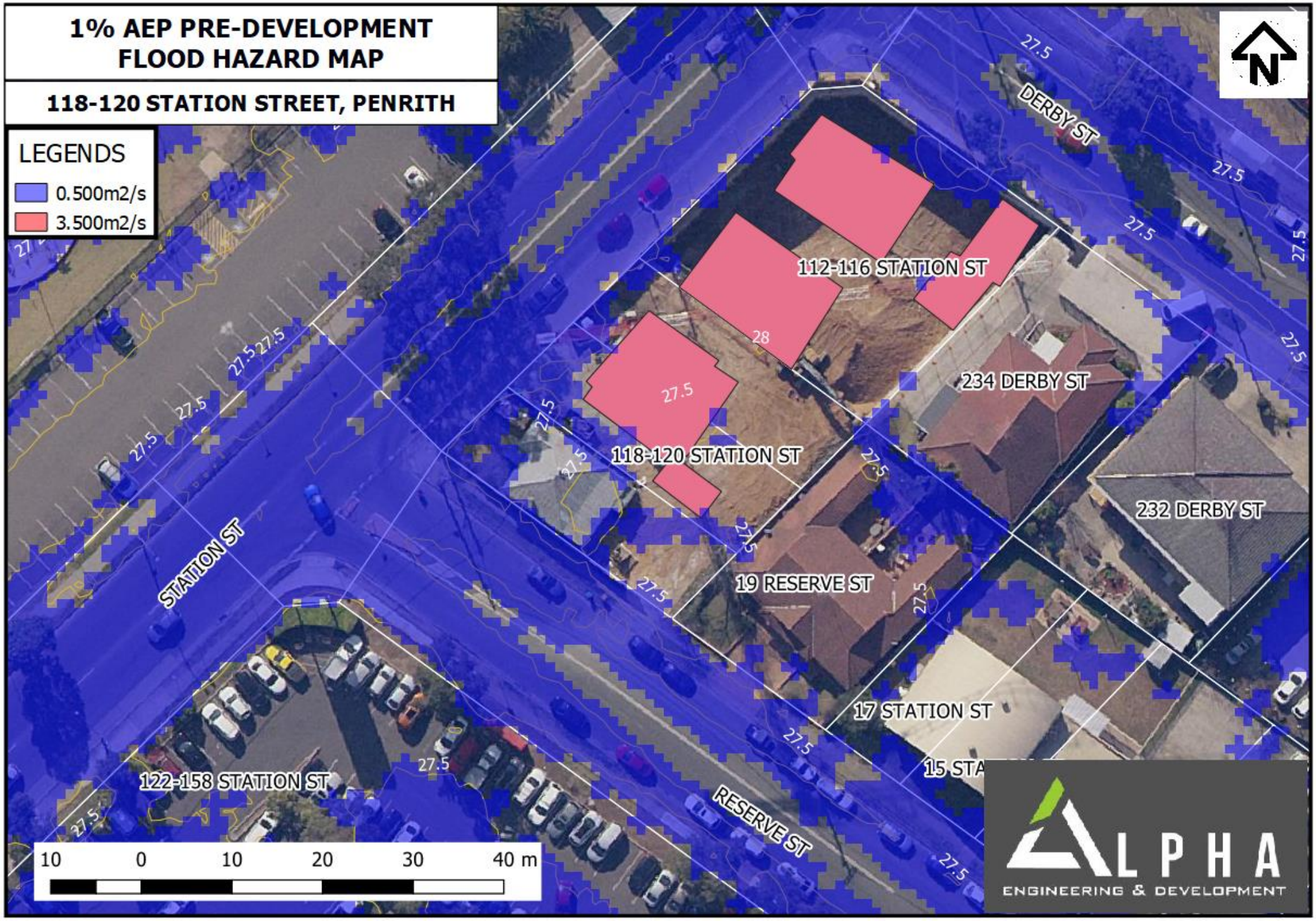
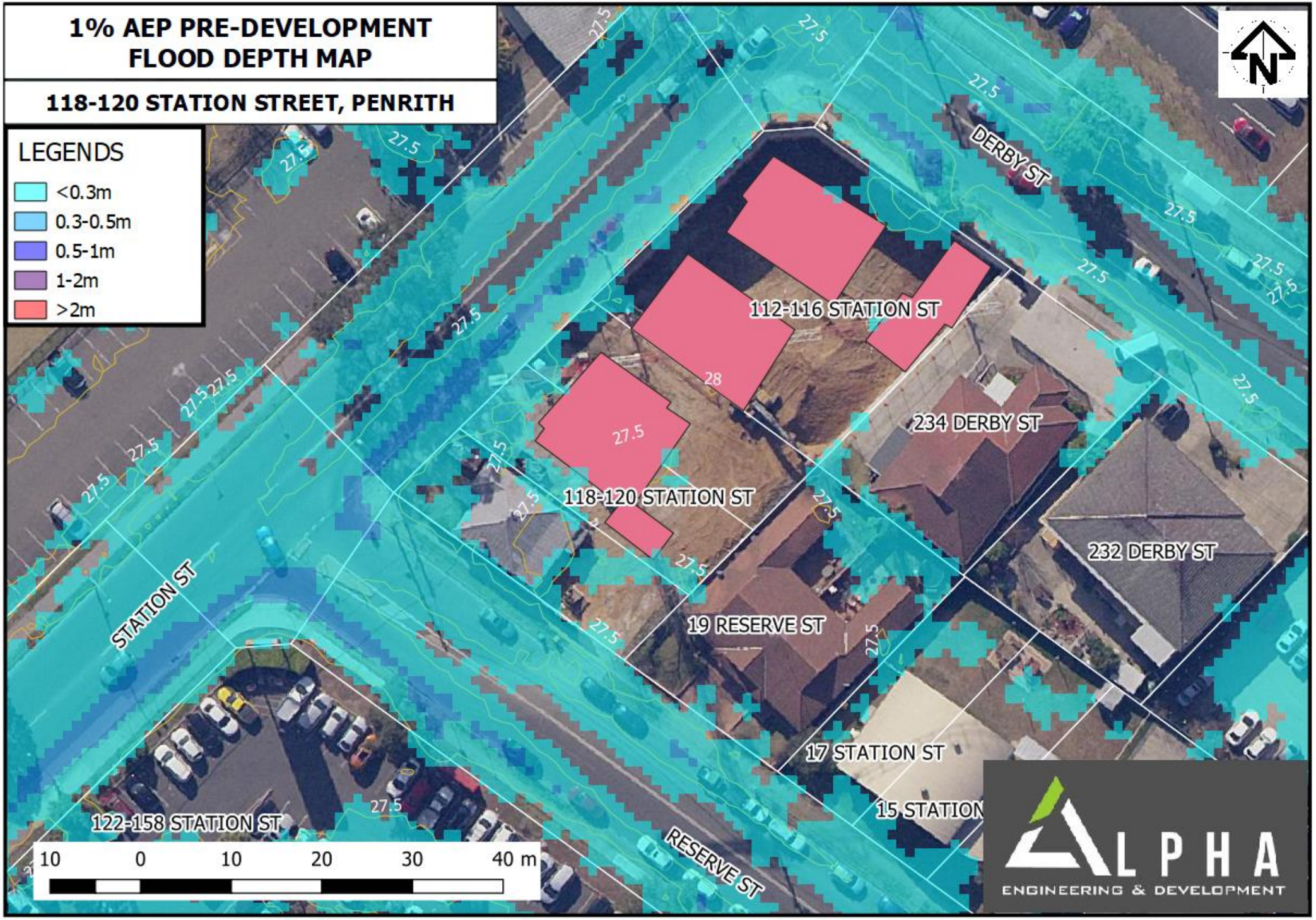
APPENDIX B

PRE DEVELOPMENT FLOOD MAPS



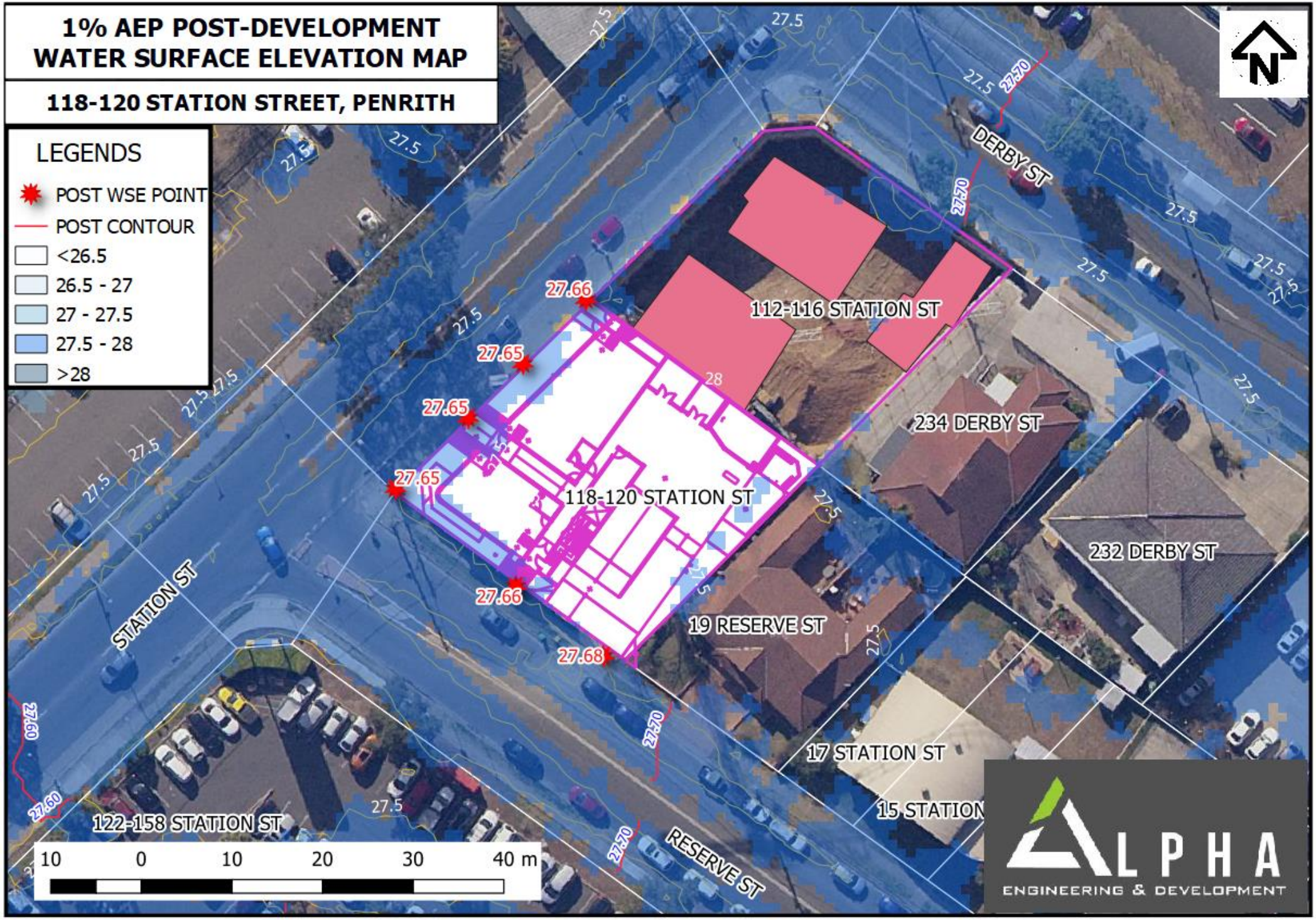


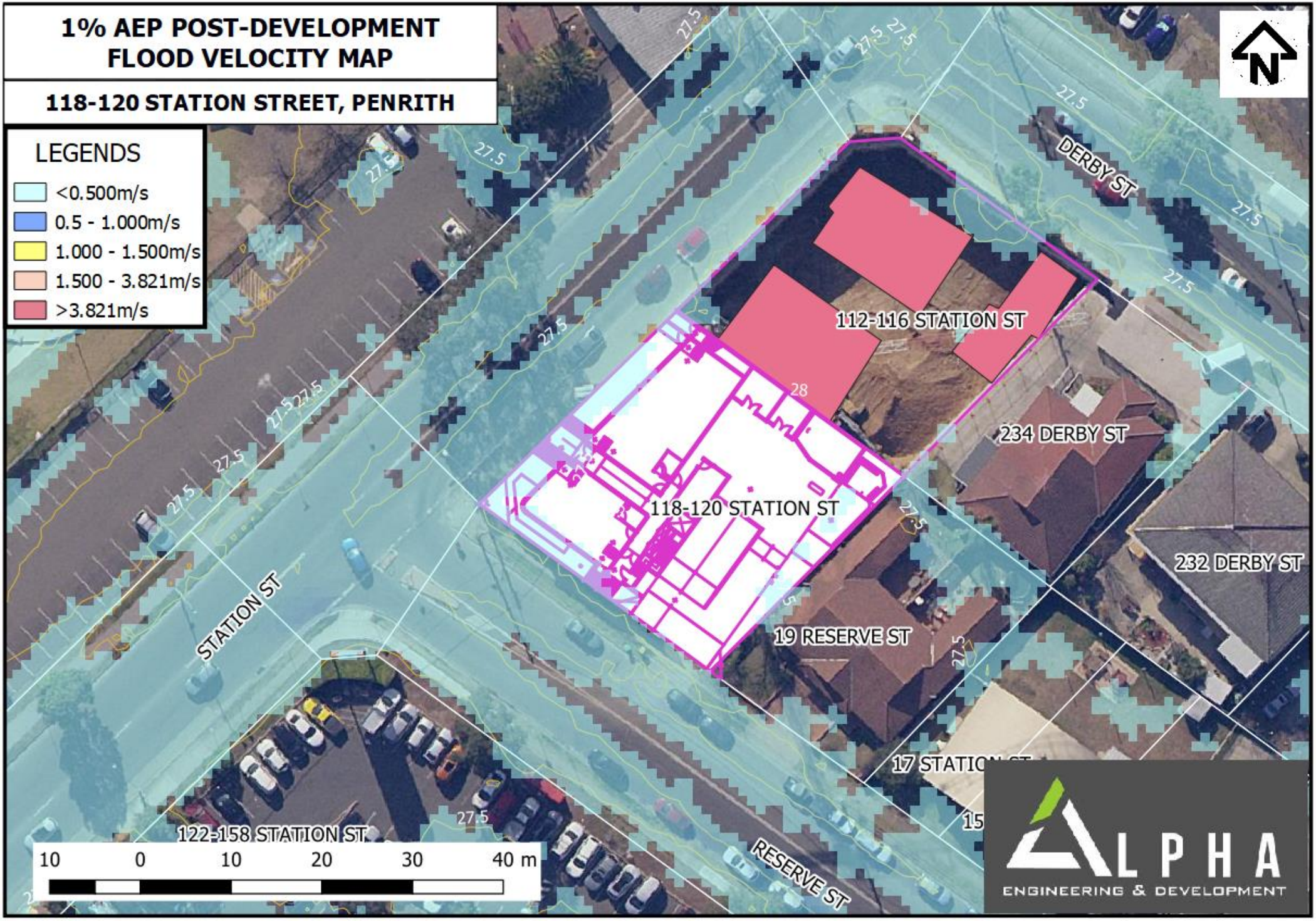


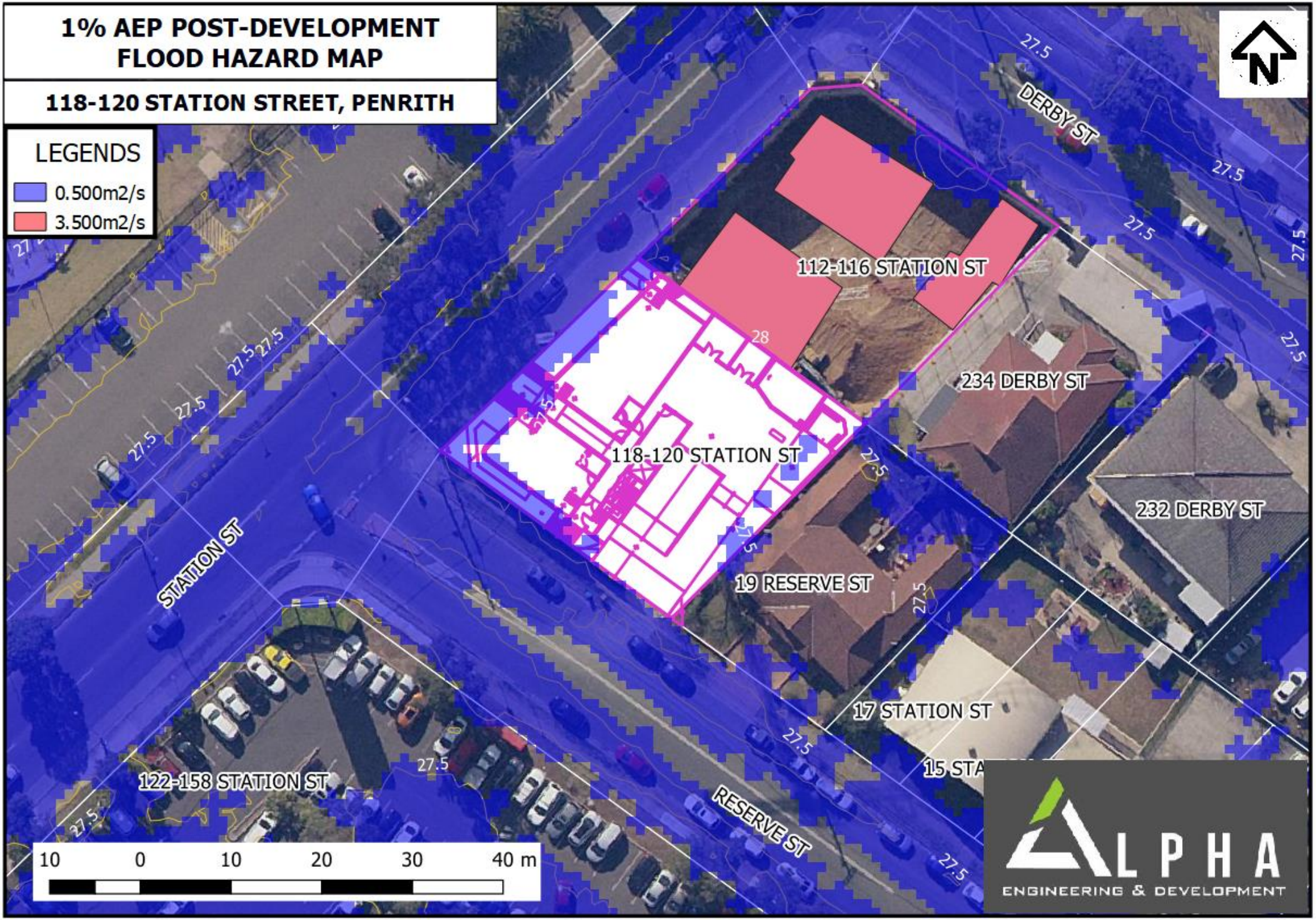


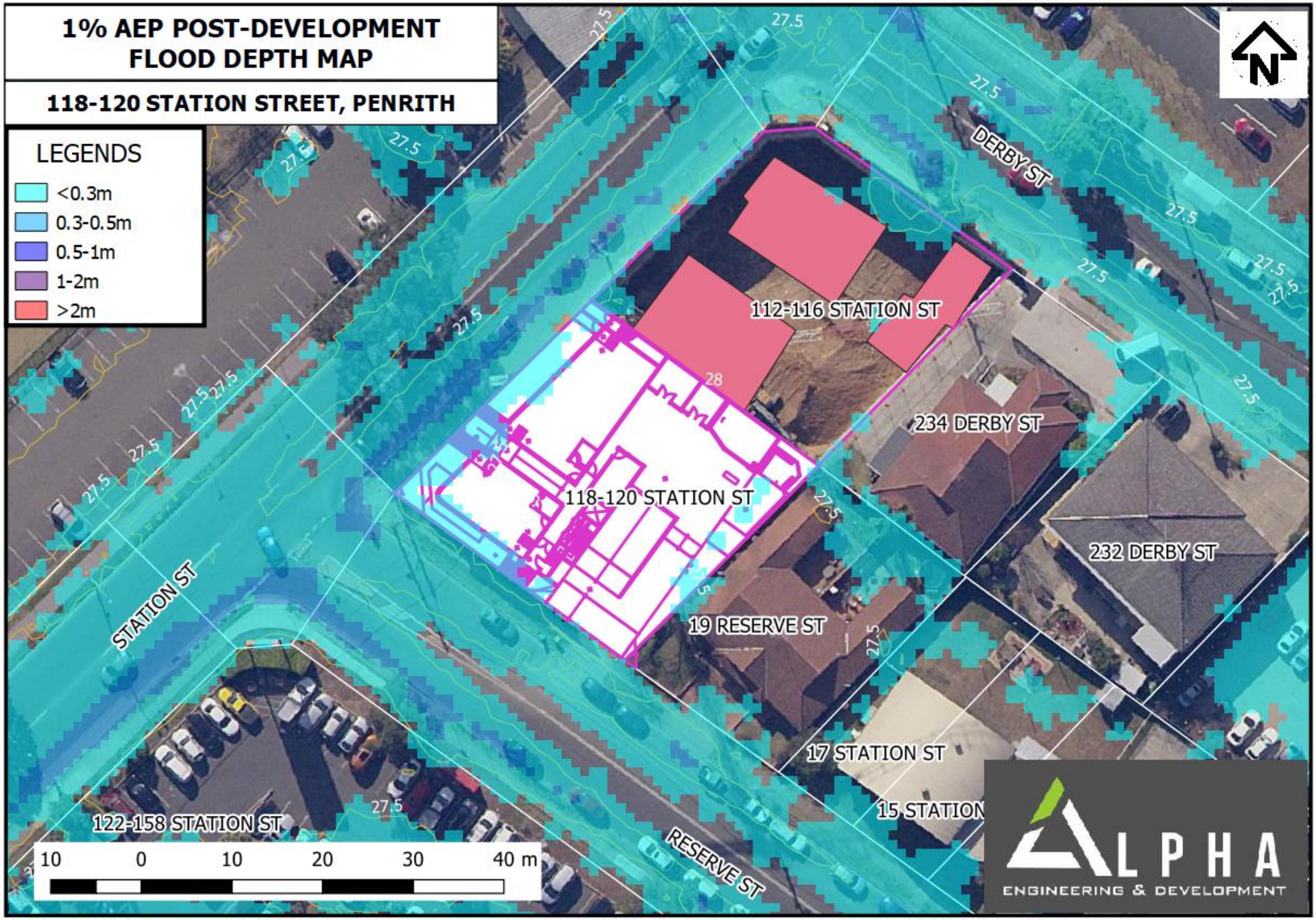
APPENDIX C

POST DEVELOPMENT FLOOD MAPS



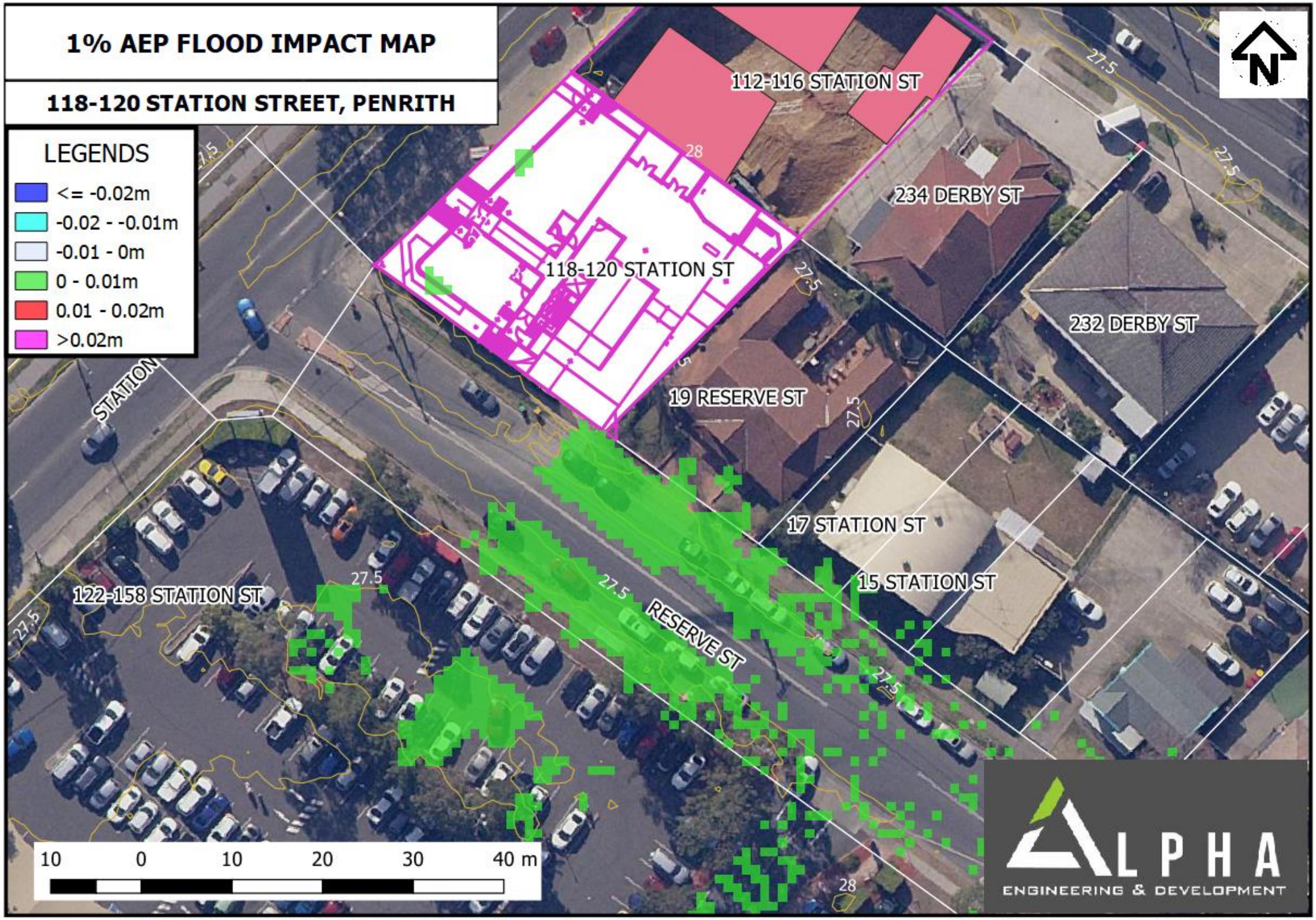






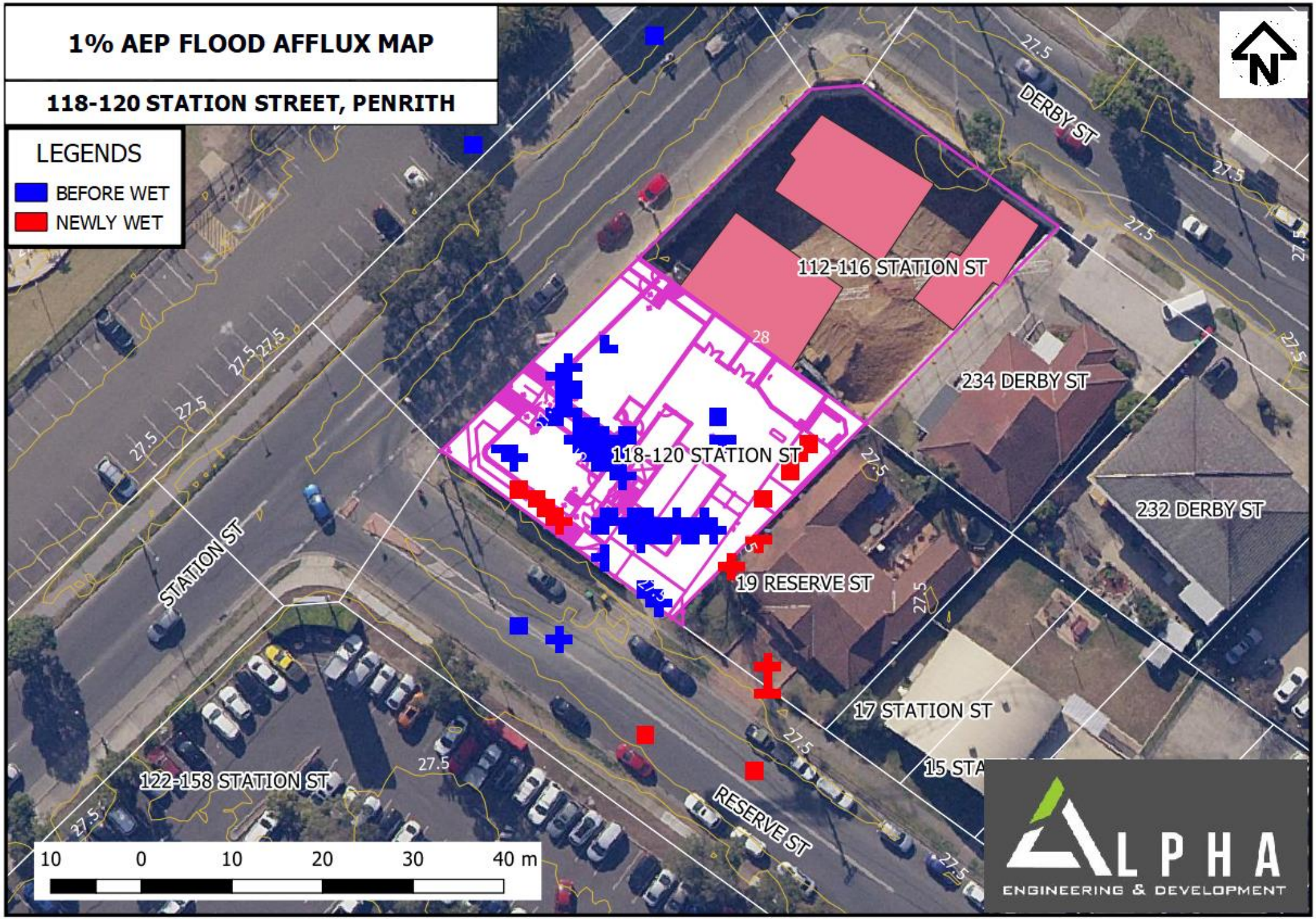
APPENDIX D

1% AEP FLOOD IMPACT MAP



APPENDIX E

1% AEP FLOOD AFFLUX MAP



APPENDIX F

ARCHITECURE PLAN

Issue For DA

ADS ARCHITECTS

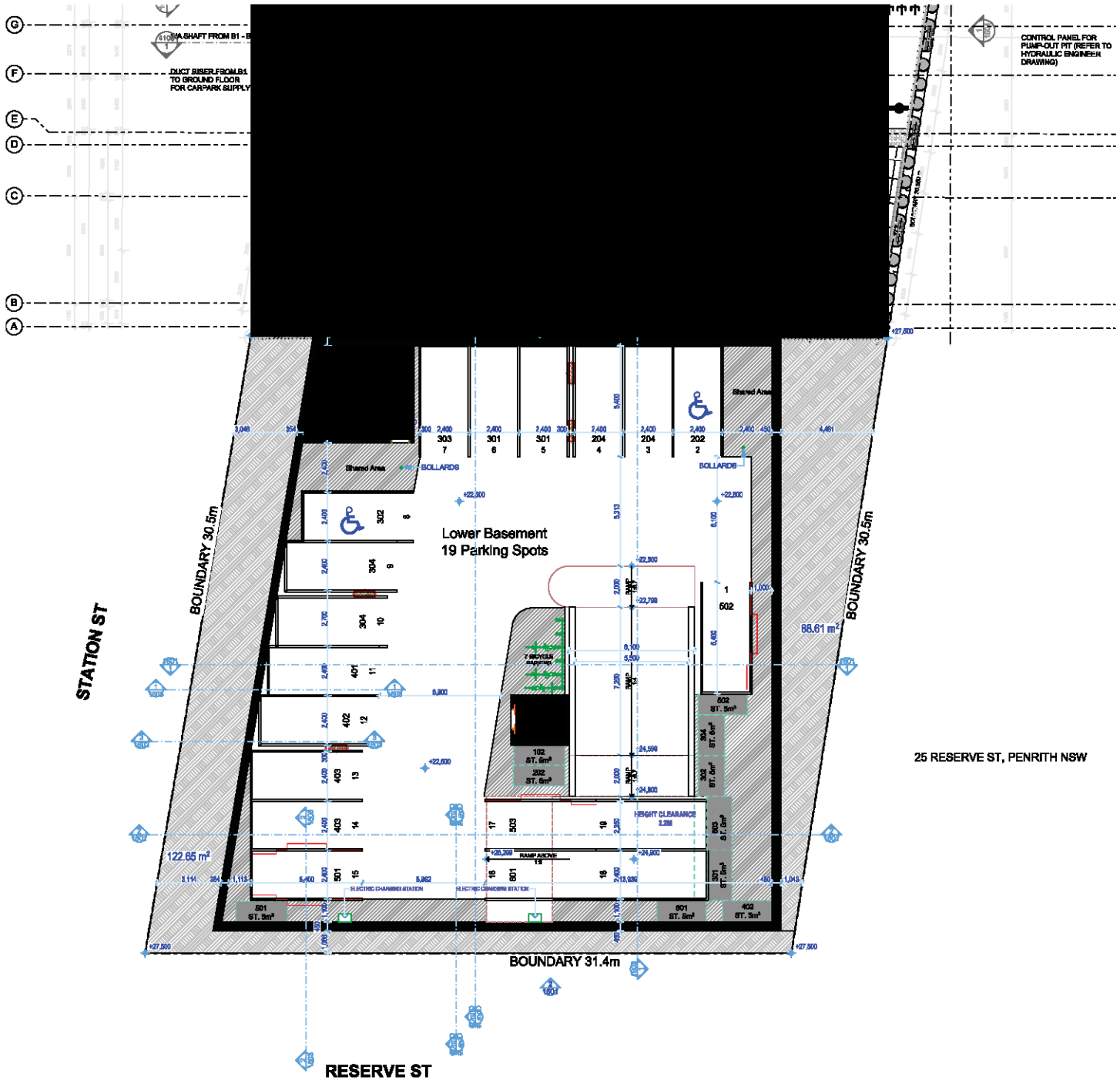
Jim Aitken Partners

MIXED USE DEVELOPMENT

SITE PLAN

0401

Pn_0735



Issue For DA

ADS ARCHITECTS

Jim Aitken Partners

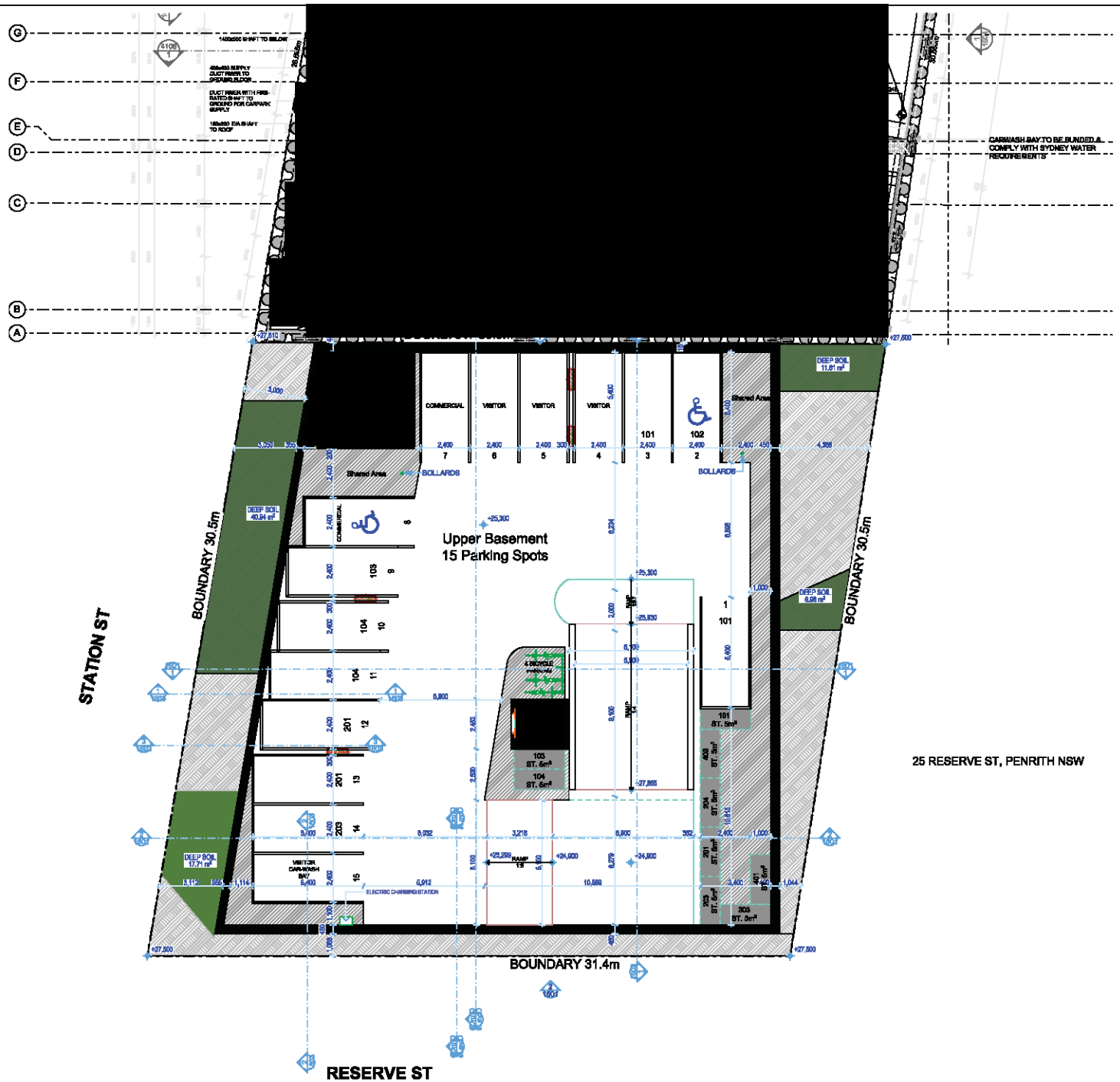
MIXED USE DEVELOPMENT

LOWER BASEMENT FLOOR BASEMENT PLAN

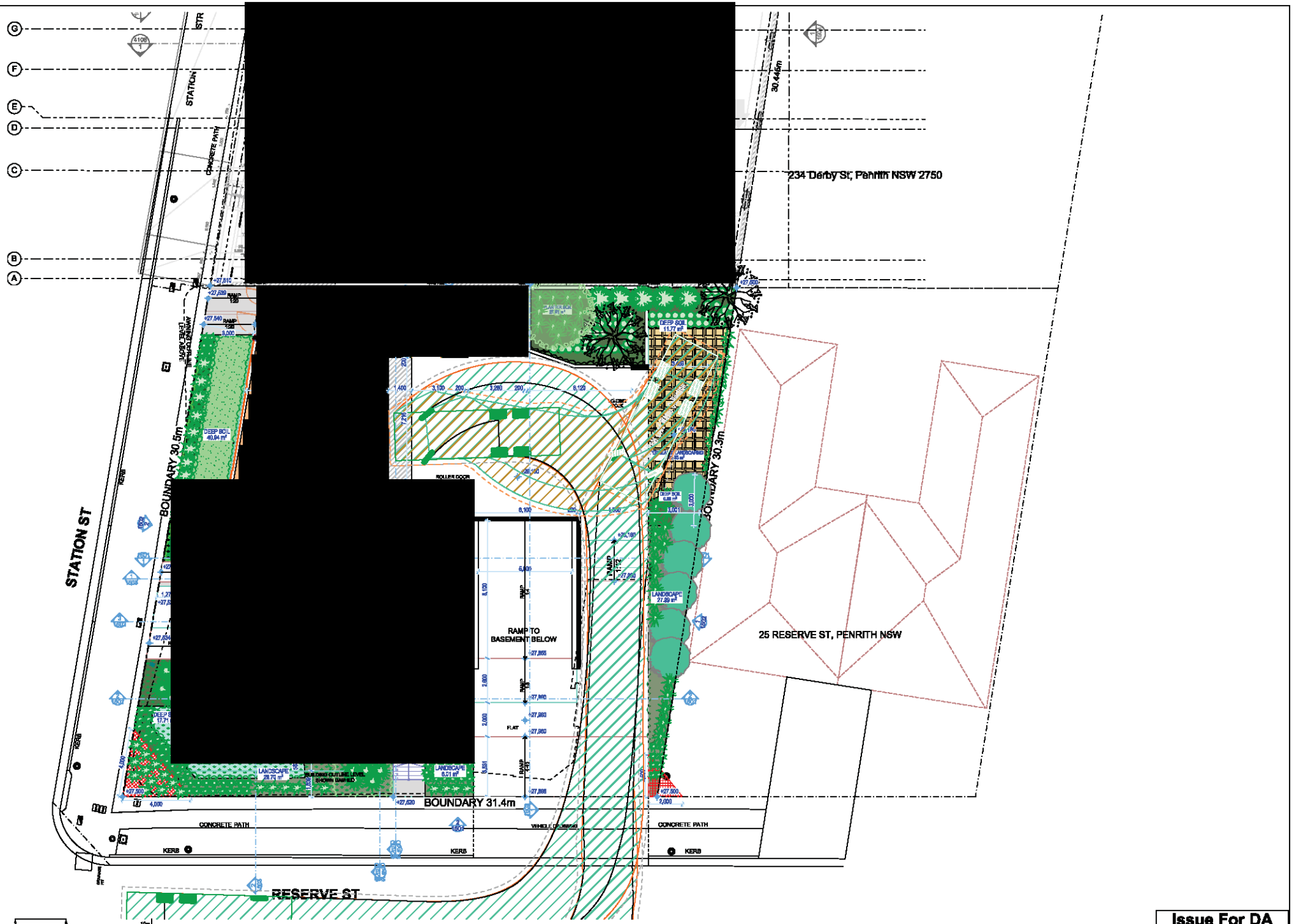
Drawing No. 1101

Revision B4

Project No. Pn_0735



Issue For DA



Issue For DA

ADS ARCHITECTS

ABN: 00 000 000 000

NSW Nominated Architect
Pavlo Dorosh 0000

Jim Aitken Partners

MIXED USE DEVELOPMENT

Address
110 - 120 STATION STREET
PENRITH NSW 2750 Australia

Project No. Pn_0735

GROUND FLOOR
GROUND FLOOR / PODIUM PLAN

Drawing No. 1201

Number 04

Date 23/06/2020

Checked JS