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DKT Studio

Date
11th March 2024

Job Number
221048

Flood Review for proposed Residential Development [Rev#5]
16 Lowana St, VILLAWOOD NSW

Dear Sir/Madam,

Please find following our review of flooding at the above site. The subject site is located on the northern side of Lowana St, refer **Figure A** and comprises Lot 634 DP 36612 with an area of 968m^2. Ground levels grade from RL +24.7 mAHD (south-east boundary) to +24.2 mAHD (north-east boundary); the site is subject to shallow overland flows during large storm events. The site currently contains a single dwelling. The site is located within the Villawood catchment, which has been modelled and described in (former) Bankstown Council's adopted flood study for that catchment, refer further details below.

Figure A: Site Location

The development as proposed consists of a new residential two-storey manor house (4 units total) where 2 units consists of 2 bedrooms and the other 2 units consists of 3 bedrooms. Carparking will be external and located at the rear of the site. The finished floor levels will be set as recommended in this report.

FLOOD INFORMATION

Canterbury-Bankstown Council's currently adopted flood study for the catchment is "*Villawood Catchment Study*" [author & date unknown], noting the site is not mapped in the "*Villawood Drain Study*" [Civic, July 2008] which is available online and we assume has been superseded. Council have provided 1%AEP flood levels and depths through the site, refer **Figure B**.

Flood information from the study as provided by Council indicates that:

A. The site is subject to very shallow inundation in the 1%AEP event, with flood depths typically less than 100mm.
B. The 1%AEP (100yr ARI) level varies from +24.0 (north corner) to +24.8 mAHD (south corner).
C. The highest adjacent 1%AEP flood level to Unit#1 is +24.40 mAHD.
D. The highest adjacent 1%AEP flood level to Unit#1 is +24.60 mAHD.
E. The 1%AEP V*D product is less than 0.05 for the entire site, and on this basis we conclude 1%AEP velocities are typically 0.5 m/s or less.
F. The site is subject to shallow inundation in the PMF event, no level has been specified but based on the extents we note an approximate maximum PMF level in the south corner of around RL +24.8 mAHD.

Based on these requirements and the 1%AEP depths / levels shown in **Figure B**, we recommend that floor levels be set as recommended in the Flood Mitigation section below.

FLOOD HAZARD AND RISK

NSW FDM Hazard

With respect to flood hazard, the NSW Floodplain Development Manual (2005) provides guidelines for determining the hydraulic flood hazard. A provisional hazard can be assigned to an area using Figure L2 and the combined impact of flood velocity and flood depth. In general, an area will be (provisionally) assigned High Hazard if any of the following criteria are satisfied:

- The flood depth (D) is greater than 1.0 m;
- The flood velocity (V) is greater than 2.0 m/s;
- The combination of V and D lie in the dark blue region (mathematically this is approximately where V + 3.33D is greater than 3.33).

By inference from the Risk Mapping (and depth / V*D mapping) we conclude that the subject site is Low Hazard in the 1%AEP event.

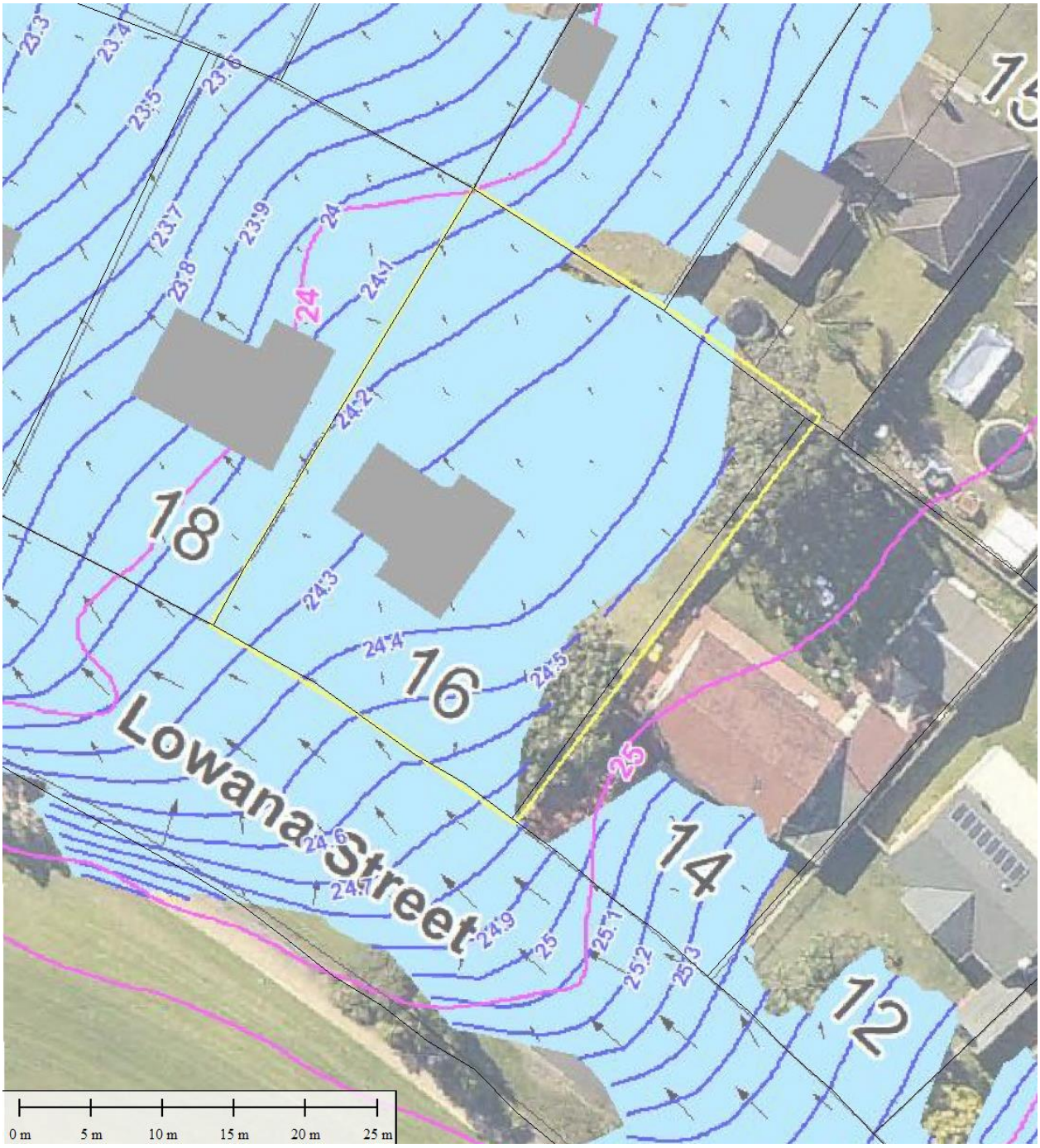

Figure B: 1%AEP flood depths & levels [extract]

ARR 2019 HAZARD

ARR2019 provides updated Hazard curves as described in Table 6.7.3 and 6.7.4 of ARR2019 Chapter 6, with the definitions as follows:

H1: Generally safe for vehicles, people and buildings [D<0.3m, V< 2m/s, V*D < 0.3].

H2: Unsafe for small vehicles [D<0.5m, V< 2m/s, V*D < 0.6].

H3: Unsafe for vehicles. children and the elderly [D<1.2m, V< 2m/s, V*D < 0.6].

H4: Unsafe for vehicles and people [D<2.0m, V< 2m/s, V*D < 1.0].

H5: Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure [D<4.0m, V< 4m/s, V*D < 4.0].

H6: Unsafe for vehicles and people. All building types considered vulnerable to failure.

Based on the provided depths and V*D mapping, we estimate that the site is entirely H1 hazard during the 1%AEP event.

FLOOD RISK

Some Council's adopt Flood Risk Precinct categories for the purpose of assessing flood risk at a particular site. These typically relate to (but do not necessarily correlate with) the Hydraulic Hazard zones discussed above. Canterbury-Bankstown Council's DCP 2023 Part 2.2 "Flood Risk Management" defines risk precincts as follows (for the former Bankstown LGA, within which the subject site is located):

> **High Flood Risk Precinct**: the area of land below the 100-year flood that is either subject to a high hydraulic hazard or where there are significant evacuation difficulties. Most development should be restricted in this precinct as development in high flood risk precinct is associated with higher risk to life and evacuation difficulties during the event of flood. In this precinct, there would be a significant risk of flood damages without compliance with flood related building and planning controls.
>
> **Medium Flood Risk**: land below the 100-year flood that is not subject to a high hydraulic hazard and where there are no significant evacuation difficulties. There would still be a significant risk of flood damage in this precinct. However, these damages can be minimised by the application of appropriate development controls.
>
> **Low Flood Risk**: defined as all other land within the floodplain (within the extent of the probable maximum flood) but not identified within either the High Flood Risk or the Medium Flood Risk Precinct. The risk of damages due to flood event in low flood risk precinct is low for most of the land uses.

The subject site is located within a **Medium Risk** area.

FLOOD MITIGATION MEASURES AND PRACTICAL CONSIDERATIONS

Flood Planning and Floor Levels

Canterbury-Bankstown Council's DCP 2023 Part 2.2 "Flood Risk Management" Schedule 5 "Catchments Affected by Stormwater Flooding" typically requires:

- Habitable floors to be set at the 1%AEP + 500mm level.
- Non-habitable floors to be set at the 5%AEP (20yr ARI) level.
- Garages and open-air carports / car spaces to be at the 5%AEP (20yr ARI) level.

On this basis:

A. Unit#1 should be set at a minimum of RL +24.90 mAHD (24.4 + 0.5 = 24.90).
B. Unit#2 should be set at a minimum of RL +25.10mAHD (24.6 + 0.5 = 25.10).
C. There are no available 20yr flood levels but given that the site is entirely H1 hazard in the 1%AEP event, cars will not become buoyant / mobile and we conclude that the open car-spaces are suitably located and safe with respect to flood risk.

Flood Mitigation Measures

The following flood mitigation measures are required, refer also **Figure C**.

A. Floor levels must be set as recommended above.
B. As approved by Pushpa (Bankstown Council Infrastructure Services Officer), there are no open subfloor requirements for the proposed development. Please refer appendix for emailed confirmation.

Flood Impacts

Council identifies the site to be subject to very minor overland flows in the 1%AEP storm event with no significant overland flow or large flood storage on the proposed site. Please refer appendix for emailed confirmation from Pushpa (Bankstown Council Infrastructure Services Officer); thus, conveyance and flood storage impacts will be minimised. We note that any fencing should be flood compatible to allow flows through.

Flood Evacuation

All habitable areas will be well above the PMF levels onsite and therefore onsite residents may safely evacuate by via 'shelter-in-place' until floodwaters subside.

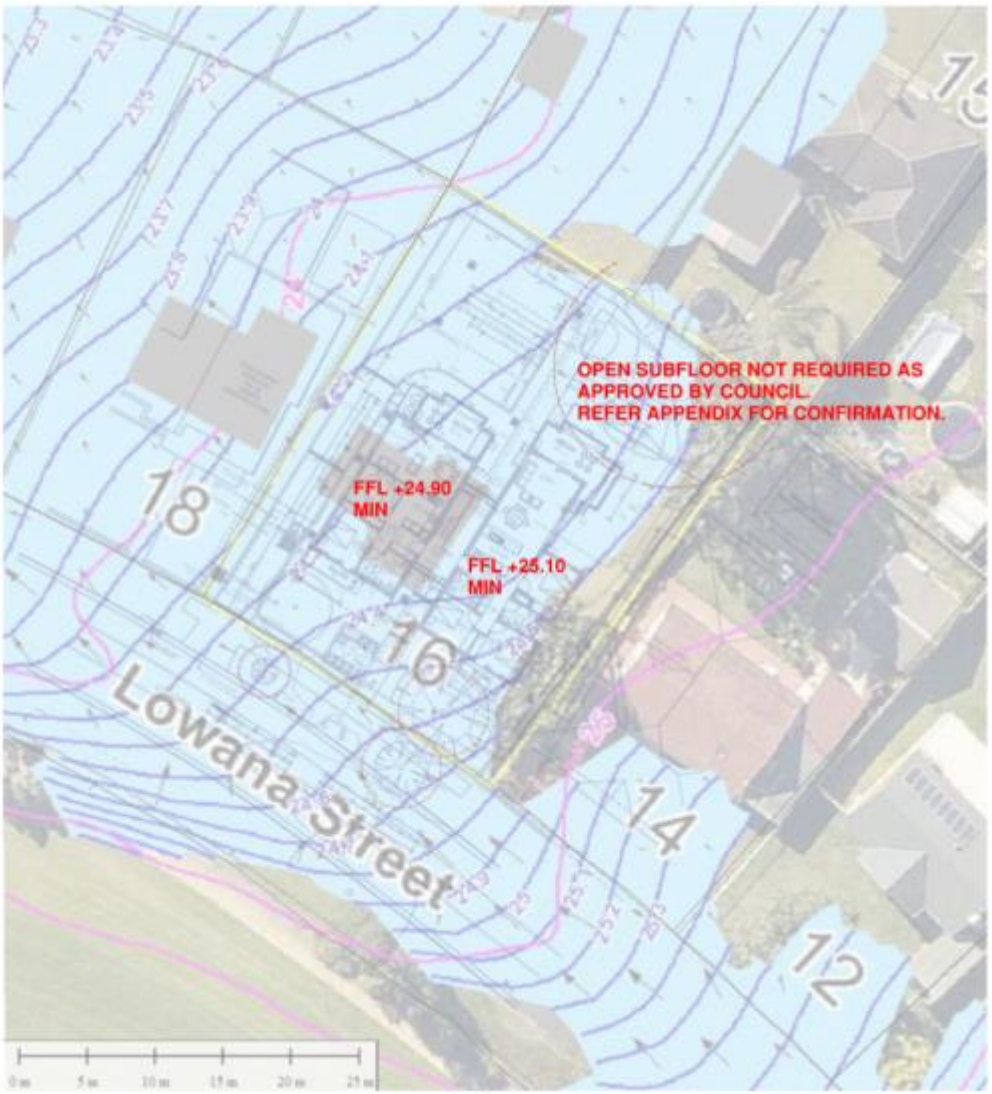

Figure C: Flood Mitigation Measures Required

CONCLUSIONS

We therefore conclude that:

1. The proposed development area is a new residential 4-unit development.
2. The site is subject to very shallow inundation in the 1%AEP event with very small velocities.
3. Flood mitigation measures should be implemented as recommended in this report.
4. Floor levels should be set as recommended in this report.

Yours faithfully,

Andrew Wiersma
BE (Hons) MEng MIEAust CPENG (NPER)
Senior Design Engineer
NPER no. 2428975

Alistair McKerron
BE MIEAust CPENG (NPER)
Senior Project Engineer
NPER no. 2220277

From: Pushpa Goonetilleke <Pushpa.GOONETILLEKE@cbcity.nsw.gov.au>
Sent: Friday, 2 February 2024 12:00 PM
To: Ralph Camilet
Cc: Sinas Kurtovic; Darren D'mello
Subject: RE: LAHC Development at 16 Lowana Street, VILLAWOOD - Phone Conversation Summary 1/02/2024

Hi Ralph

As discussed with you today, according to the flood information in Stormwater System Report, there is no significant overland flow or large flood storage on this property.

This is affected by very minor overland flow flooding in 1% AEP. Suspended slab or overland flows underneath the building is not necessary.

Yes, manage the habitable floor freeboard according to the flood level and allow the overland flow discharge around the property set back is ok.

My Regards

CANTERBURY BANKSTOWN

Pushpa Goonetilleke - Infrastructure Services Officer
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E Pushpa.GOONETILLEKE@cbcity.nsw.gov.au
www.cbcity.nsw.gov.au

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Like & follow us

The City of Canterbury Bankstown acknowledges the traditional custodians of the land, water and skies of Canterbury-Bankstown, the Darug (Darag, Dharug, Daruk, Dharuk) People. We recognise and respect Darug cultural heritage, beliefs and relationship with the land. We acknowledge the First Peoples' continuing importance to our CBCity community.

From: Ralph Camilet <ralph@greenview.net.au>
Sent: Thursday, 1 February 2024 2:58 PM
To: Pushpa Goonetilleke <Pushpa.GOONETILLEKE@cbcity.nsw.gov.au>
Cc: Sinas Kurtovic <Sinas@DKTstudio.com>; Darren D'mello <Darren.D'Mello@facs.nsw.gov.au>
Subject: LAHC Development at 16 Lowana Street, VILLAWOOD - Phone Conversation Summary 1/02/2024

Hi Pushpa,

Thank you for your time in discussing the flooding query for the project at 16 Lowana Street, Villawood.

To summarise our phone conversation this afternoon, Council are OK for the LAHC development to be solid throughout that is no open subfloor to allow flow underneath. We will adopt a similar subfloor as per the approved neighbouring development at No. 18 Lowana Street, Villawood.

We confirm we will still meet the habitable floor level requirement of 500mm above the 1% Flood level.

We understand Council are accepting of the solid subfloor for this project as the flood depths are quite shallow and will still go around the building.

Let me know if you have any issues with what has been summarised otherwise I'll inform LAHC team to proceed (cc'd in email).

Thanks again!

Regards,

Ralph Camilet

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council@cbcity.nsw.gov.au

CITY OF CANTERBURY BANKSTOWN

To: DKT Studio
6/10-12 Martin Pl
MORTDALE NSW 2223

STORMWATER SYSTEM REPORT
16 Lowana Street, VILLAWOOD NSW 2163

Date: 23-Feb-2023
Ref: WP-SIAONL-329/2023
Development type: **Residential Development**

NO — FLOOD/OVERLAND FLOW STUDY REQUIRED

The site is affected by the following Council stormwater system components:

- Overland flowpath for excess stormwater runoff from the upstream catchment east of the site.

- Stormwater inundation from excess stormwater runoff from the upstream catchment and associated with the drainage system through Lowana St.

The site will be subject to stormwater inundation from this overland flowpath during large storm events. Refer to the attached **"100 Year ARI Flood & PMF Extent Maps from Villawood Catchment Study"** showing the flood contours to m AHD**. Provision should be made on site, and at boundary fences, for this stormwater runoff to pass unobstructed over the site. Stormwater flowing naturally onto the site must not be impeded or diverted.

The estimated 100 year ARI* flood level at the site is RL 24.4 m AHD.**

For this development, a flood /overland flow study to determine the 100 year ARI* water surface level is not necessary provided that the **proposed development including floor levels, shall comply with the development controls specified in Part B12 Schedule 5, of Bankstown's Development Control Plan 2015 - Catchments Affected by Stormwater Flooding.**

The Development Application submission shall be based on an AHD datum for levels where sites are affected by overland flow / flooding. Refer Bankstown Council's *Development Engineering Standards**.**

Habitable floor levels are to be at least 500mm above the 100 year ARI* flood level at the site adjacent to the proposed building.

Runoff from the secondary dwelling is to be collected and disposed of to Council's requirements detailed in Bankstown Council's *Development Engineering Standards****.

This report is given without the benefit of development plans or a site survey. **Council may choose to vary some report requirements following evaluation of detailed plans when they are submitted.**

This report relates to the exposure of the subject site to Council's stormwater system, both underground and overland. It does not assess the suitability or otherwise of this site for the proposed development.

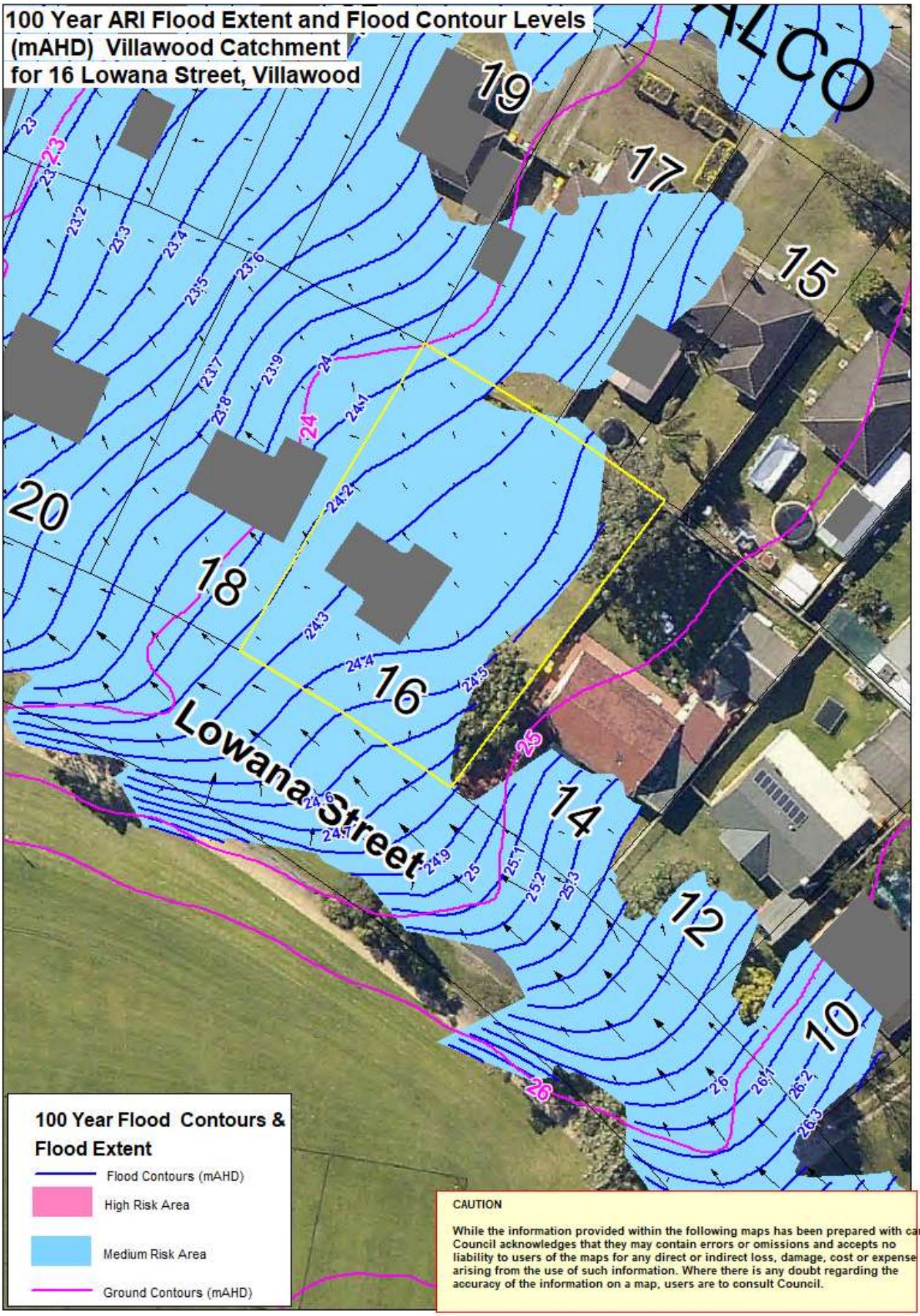
* Average Recurrence Interval

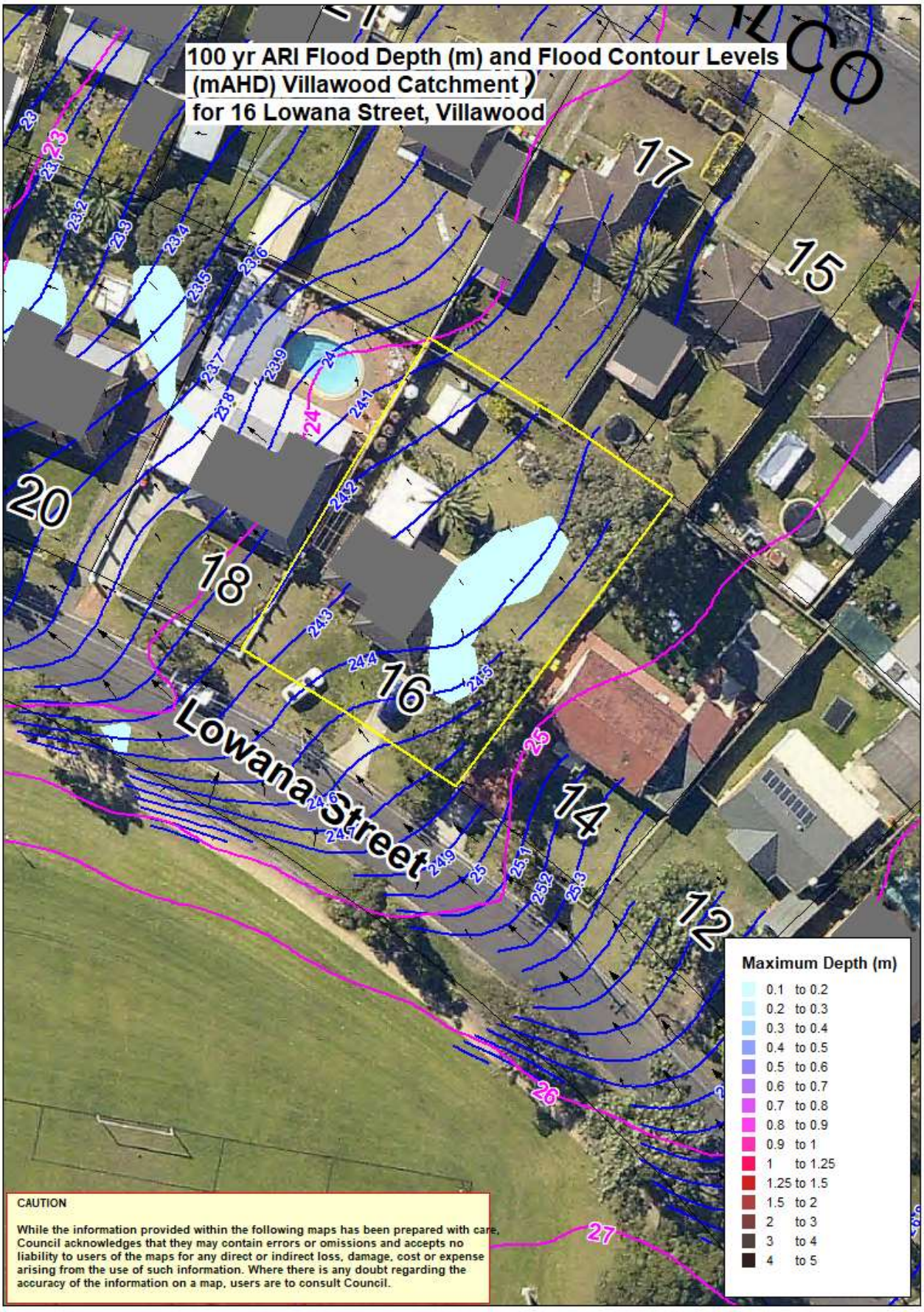
** Australian Height Datum

*** Bankstown Council's *Development Engineering Standards* and *Bankstown's Development Control Plan 2015* is available from Council's Customer Service Centre.

PMF Probable Maximum Flood

Pushpa Goonetilleke
ENGINEER


100 Year ARI Flood Extent and Flood Contour Levels (mAHD) Villawood Catchment for 16 Lowana Street, Villawood
19
17
15
20
18
16
14
12
10
Lowana Street
100 Year Flood Contours & Flood Extent
Flood Contours (mAHD)
High Risk Area
Medium Risk Area
Ground Contours (mAHD)
CAUTION
While the information provided within the following maps has been prepared with care, Council acknowledges that they may contain errors or omissions and accepts no liability to users of the maps for any direct or indirect loss, damage, cost or expense arising from the use of such information. Where there is any doubt regarding the accuracy of the information on a map, users are to consult Council.


100 yr ARI Flood Depth (m) and Flood Contour Levels (mAHD) Villawood Catchment
for 16 Lowana Street, Villawood
Lowana Street
20
18
16
17
15
14
12
Maximum Depth (m)
0.1 to 0.2
0.2 to 0.3
0.3 to 0.4
0.4 to 0.5
0.5 to 0.6
0.6 to 0.7
0.7 to 0.8
0.8 to 0.9
0.9 to 1
1 to 1.25
1.25 to 1.5
1.5 to 2
2 to 3
3 to 4
4 to 5
CAUTION
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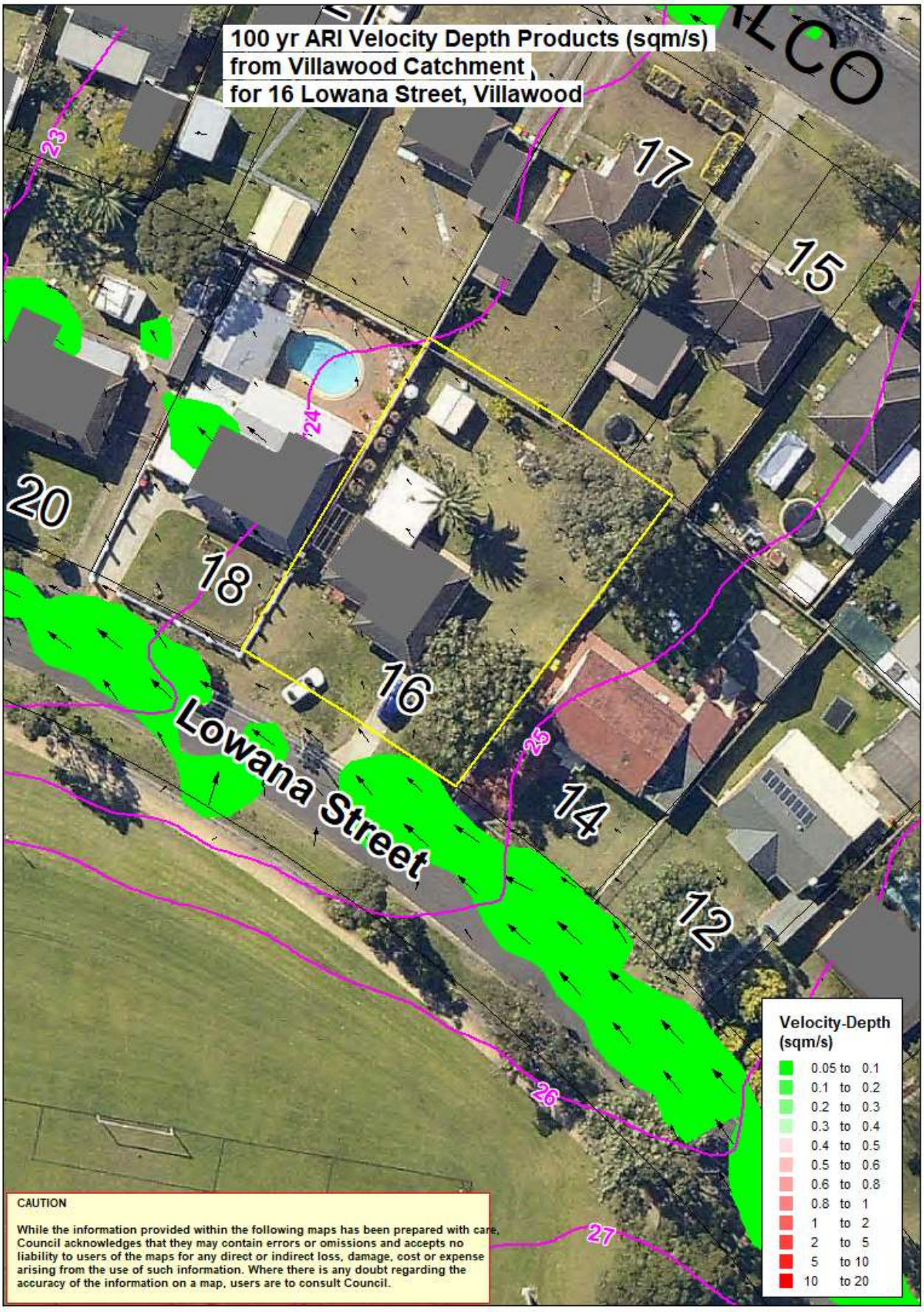
100 yr ARI Velocity Depth Products (sqm/s)
from Villawood Catchment
for 16 Lowana Street, Villawood
23
17
15
24
20
18
16
Lowana Street
25
14
12
26
27
Velocity-Depth (sqm/s)
0.05 to 0.1
0.1 to 0.2
0.2 to 0.3
0.3 to 0.4
0.4 to 0.5
0.5 to 0.6
0.6 to 0.8
0.8 to 1
1 to 2
2 to 5
5 to 10
10 to 20
CAUTION
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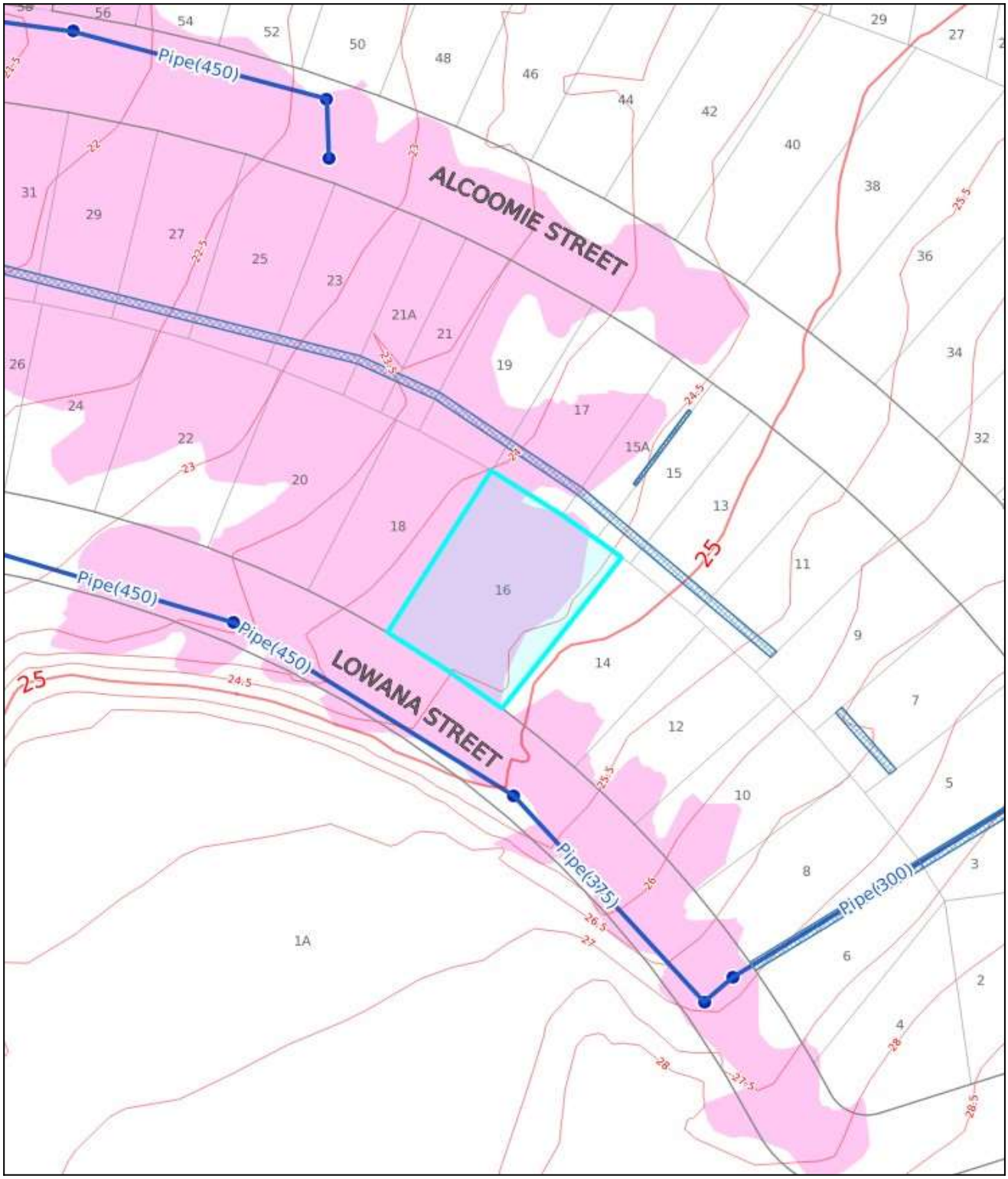
PMF Extent Map for 16 Lowana Street, Villawood



DATE: Feb 23, 2023, 1:27 PM

1:1,128

Metres 20 40 60

PREPARED BY: Pushpa G

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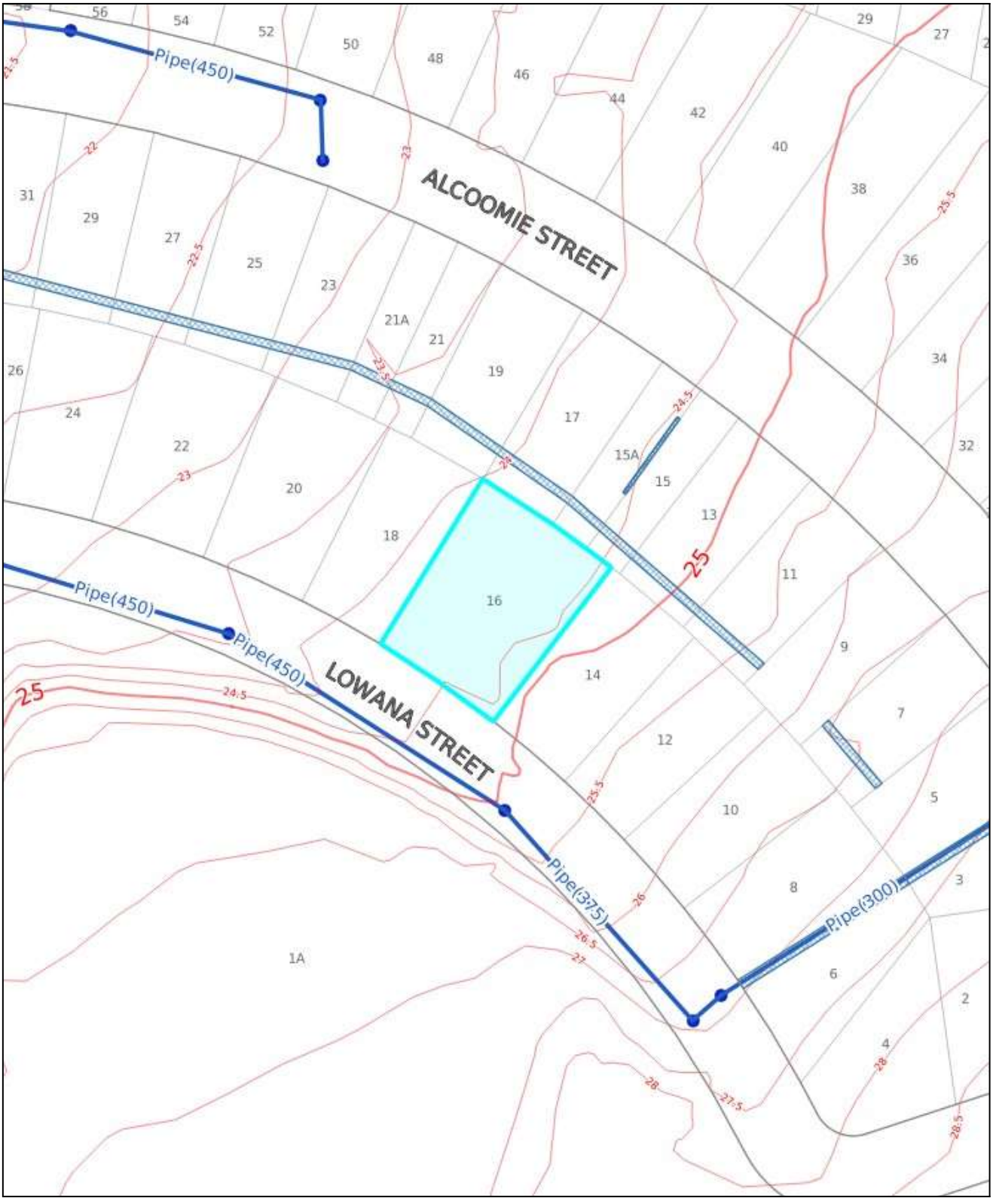
GIS Map for 16 Lowana Street, Villawood



DATE: Feb 23, 2023, 12:20 PM

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Metres 20 40 60

PREPARED BY: Pushpa G

Aerial Map for 16 Lowana Street, Villawood

DATE: Feb 23, 2023, 12:22 PM

1:1,128

Metres 20 40 60

PREPARED BY: Pushpa G

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LEGEND


Canterbury Bankstown LGA
Surrounding LGA's

Jetty


Jetty

Parcel Associate

Parcel Frontage

Parcel Frontage

Parcel Boundary

Parcel Boundary

Parcel Easements (Line)

Parcel Easements (Line)

Parcel Easements (Polygon)


Parcel Easements (Polygon)

Contours (Major 10m)

Contours (Major 10m)

Contours (Intermediate 5m)

Contours (Intermediate 5m)

Contours (Minor <5m)

Contours (Minor <5m)

Drains

Drains

Pits


Pits

Sydney Water Stormwater Channels


Sydney Water Stormwater Channels

PMF (River and Stormwater)

PMF (River and Stormwater)