

Environmental Impact Statement

APPENDIX

G

FLOOD RISK ASSESSMENT

Our Ref 59915106: L01: MG/bcp
Contact Martin Griffin

17th May 2016

Mr Bruce Fordham
Enviro Recycling
51 Violet Street
REVESBY NSW 2212

Attention: Mr Bruce Fordham

Via email - bruce@enviroconsulting.com.au

Dear Bruce,

**FLOOD RISK ASSESSMENT FOR WASTE RECYCLING FACILITY AT 51 & 57
VIOLET STREET, REVESBY**

This flood risk assessment has been prepared by Cardno on behalf of Enviro Recycling to assess the compliance of the proposed expansion of an existing Waste Recycling Facility at 51 & 57 Violet Street, Revesby against relevantly applicable flood risk related development controls.

1. PROJECT BACKGROUND

This flood risk assessment accompanies an Environmental Impact Statement (EIS) for a State Significant Development (SSD) application, SSD 7349 for the proposed expansion of an existing Waste Recycling Facility.

2. BANKSTOWN CITY COUNCIL'S REQUIREMENTS

The NSW Department of Planning and Environment consulted with Bankstown City Council during preparation of the SEARs for SSD 7349. Council in their letter dated 04 March 2016 seeks the following flooding related issues to be considered as part of the EIS:

Flooding and Water Quality:

14. Riverine flooding – The site is located within the Georges River floodplain and will require the consideration of Bankstown Development Control Plan 2015 – Part 12 (Flood Risk Management).

15. Water quality – The site is located within the Georges River floodplain and will require the consideration of the water quality targets in accordance with the Georges River Coastal Zone Management Plan.

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 9
The Forum
203 Pacific Highway
St. Leonards NSW 2065

P.O. Box 19
St Leonards NSW 1590
Australia

Phone: +61 2 9496 7700
Fax: +61 2 9439 5170

www.cardno.com.au

16. Stormwater flooding – The site is located within the Milperra Drain Catchment identified in a flood risk precinct and will require consideration of the Bankstown DCP 2015 – Part 12 (Flood Risk Management).

Further consultations with Council's Catchment Management Planner and Council's Design Engineer have also confirmed that Council recently adopted a new flood study for the Milperra Catchment, which supersedes the 2013 model and model results. On 9 May 2016 Council officers provided Cardno with relevant mapping of the 100 year ARI and 20 year ARI flood behaviour including depth, water level, and velocity-depth product for the site, see **Attachment A**.

3. EXISTING SITE

The site is located within the suburb of Revesby in the Bankstown LGA. The site is located near the Milperra Drain which is a waterway that drains stormwater from the suburbs of Revesby and Milperra. Milperra Drain directs flows in a westerly direction before discharging to the Georges River. The location of the site is shown in **Figure 1**.

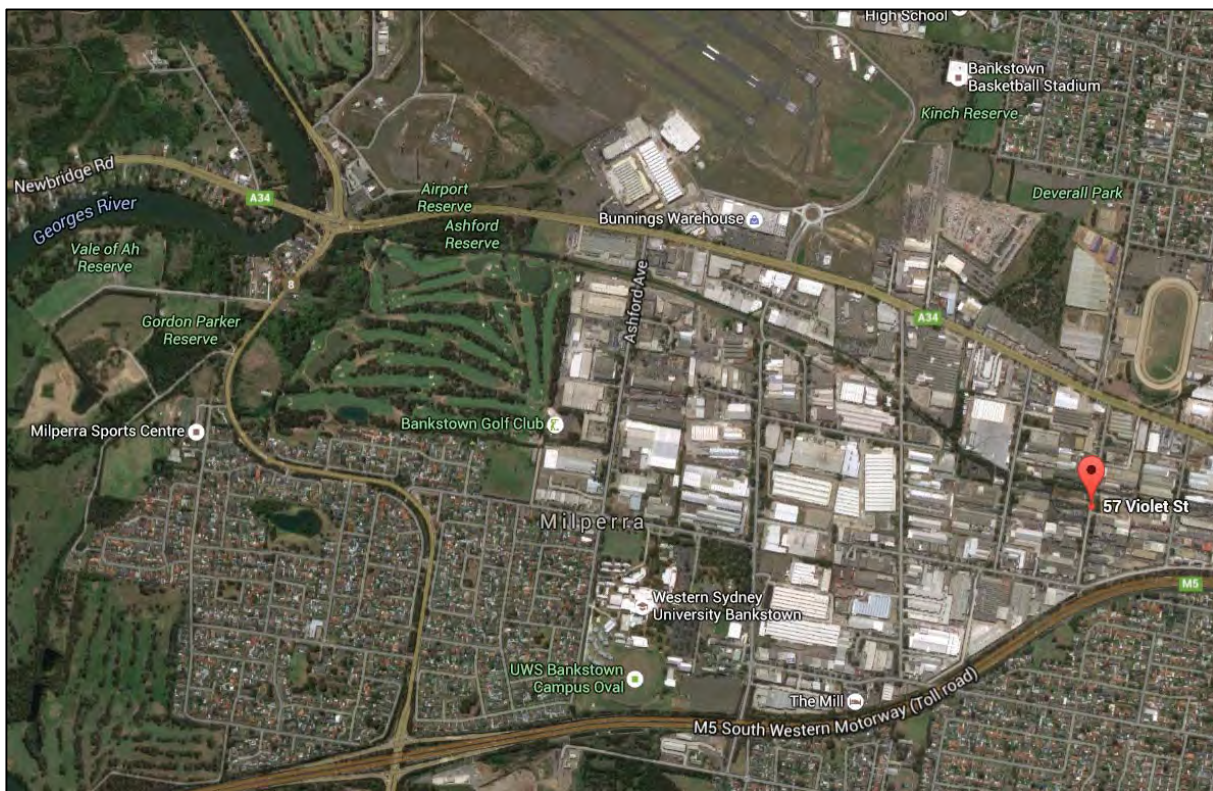


Figure 1 – Location of Subject Site (Source: GoogleMaps)

The site is currently comprised of a number of warehouse structures of different size and construction, and large areas of impervious surfaces acting as both carpark and car storage yard. Aerial photo of the current site layout is presented in **Figure 2**.



Figure 2 – Existing Site Layout

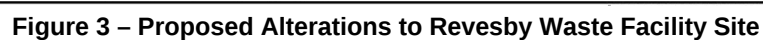
4. PROPOSED DEVELOPMENT

The proposal seeks consent to undertake the following:

- Expansion of the area of the existing Waste Recycling Facility use carried out at premises located at 51, into adjoining premises to the south at 57 Violet Street.
- Diversification of waste recycling streams to include both:
 - o Construction and Demolition (C&D) waste (existing approved waste stream); and
 - o Commercial and Industrial (C&I) waste (proposed additional waste stream).
- Expansion of waste recycling volumes from 30,000 t p/annum to 250,000 t p/annum.
- Partial demolition, rebuilding and fitout works to existing site buildings and associated engineering (structural, civil, hydraulic) to accommodate the proposed operations.

The proposed alterations to the existing site are shown in **Figure 3** and include:

- Building demolitions (shown pink);
- Construction of a 20 vehicle car park;
- Installation of entry / exit weighbridges.



5. FLOOD AFFECTATION

Bankstown City Council provided Cardno with mapping of the 100 year ARI and 20 year ARI flood behaviour including depth, water level, and velocity-depth product for the site. The flood figures provided by Bankstown Council have been provided in **Attachment A**.

Included in **Figure 4** below are 100 year ARI peak depths and water levels (in m AHD). Overlaid over this figure is the proposed site layout changes including the new carpark, weighbridges and the location of the buildings to be demolished. The key points to note in relation to the 100 year ARI flood affectation of the site is as follows:

- The peak depth of flooding in the site is less than 0.2 metres for the majority of the site, with very minor locations of depths up to 0.3 metres deep. The affectation of the site is restricted to the western edge of the property near two existing access driveways.
- The site is affected by negligible areas of flooding with a velocity depth product in excess of $0.05 \text{ m}^2/\text{s}$ meaning that not only is depth of flooding minimal but also the velocity of flows is less than 0.25 m/s.
- The water level gradient through the site is quite steep in a north-west direction with water levels being higher than the flatter water level gradients on Violet Street adjacent to the site. This implies that the minor affectation of the site is not caused by tailwater flooding from Milperra Drain but rather by overland flow from the minor stormwater catchment upstream.

Therefore the minor affectation of the site in the 100 year ARI event is caused by the local catchment upstream and not tailwater flooding from Milperra Drain or Georges River. The majority of overland flow is expected to be sourced on site and therefore the affectation is likely to be suitably addressed by stormwater infrastructure design.

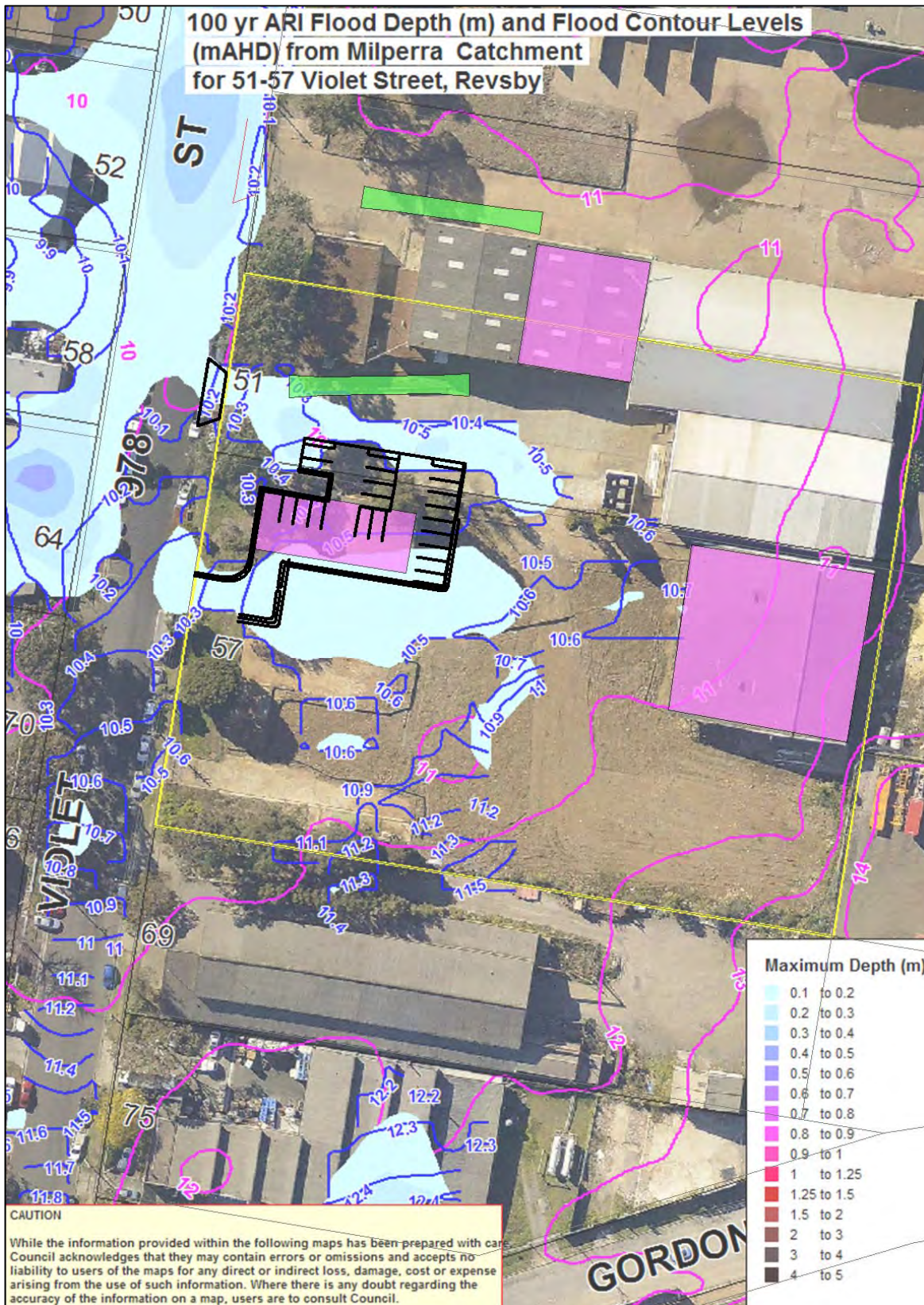


Figure 4 - 100 year ARI Flood Depths and Proposed Development (Source: Bankstown City Council)

6. RELEVANT FLOOD RELATED CONTROLS

The proposed development is located within Bankstown City Council LGA, and the applicable development controls are found in Bankstown DCP 2015 – Part 12 (Flood Risk Management). Flood related development controls for stormwater overland flow are outlined within the development matrix included in Schedule 5 of DCP 2015. The development controls that are relevant are dependent on the following:

- Flood risk precinct: As shown in **Figure 4**, and confirmed within correspondence from Bankstown City Council, the central western part of the site is defined as medium flood risk as it is partially affected by low hazard 100 year ARI flooding.
- Land-use category: In Schedule 2 of DCP 2015, a total of eight land use categories are identified based on their contribution to flood risk. The development falls under the category of 'Commercial or Industrial' in accordance with Schedule 2 as this category includes 'material recycling yards'.

Using the planning and development matrix included in Schedule 3 of Part 12 of DCP 2015 the relevant flood related development controls are shown in *italics* below, with comment on the proposed developments performance.

- **Floor Levels:**
 - *Non-habitable floor levels to be no lower than the 20-year flood unless justified by site-specific assessment.*
 - *The level of habitable floor areas to be equal to or greater than the 100-year flood level plus freeboard. If this level is impractical for a development in a Business zone, the floor level should be as high as possible.*
 - *A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the undercroft area is not to be enclosed. The use of roller shutters or similar measures (such as hit and miss brickwork) to enclose this area is however permissible.*
- **Building Components & Method:** *All structures to have flood compatible building components below the 100-year flood level plus freeboard.*
- **Structural Soundness:** *Engineer's report to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100-year flood plus freeboard.*

The above controls relating to floor levels, building components, and structural soundness are not relevant for this DA, as no new buildings are proposed for construction, and no additions are proposed for existing buildings on the site. Additionally, the existing buildings on the site that are to be retained, are not located within the 100 year ARI flood extents and therefore controls relating to floor levels, building components, and structural soundness are also not a concern for the existing structures.

- **Flood Effects:**

- Applicant to demonstrate to Council's satisfaction (by way of an engineers report if requested) that the development will not increase flooding effects elsewhere, having regard to: loss of flood storage; changes in flood levels, flows and velocities; the cumulative impacts of multiple developments in the vicinity. The report should also identify the presence of any "major overland flow paths" (refer to Note 8 in Notes to Table). Note: Where major overland flow paths are present, this may result in restrictions of the proposed development to maintain the functioning of the flowpath, and/or to manage the impacts of development on properties. Refer also to Council's Development Engineering Standards Policy.
- Council may require that the creation of an easement, or that a Restriction be placed on the Title Certificate identifying the location of "major overland flow paths" or locations of significant backwater flooding.

The overland flow affectation of the site is minor, and the catchment contributing to the affectation is mostly site generated stormwater. Therefore the risk of flood effects due to loss of flood storage is negligible and the risk of increased conveyance is expected to be addressed within the stormwater design for this site as most of the flows are sourced on-site. Similarly, affectation does not occur upstream of the site as the catchment is local therefore there is no need for any easement to be created.

- **Car Parking and Driveway Access**

- The minimum surface level of open car parking spaces or carports shall be as high as practical, but no lower than the 20-year flood or the level of the crest of the road at the location where the site has access. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 20-year flood.
- Garages capable of accommodating more than 3 motor vehicles on land zoned for urban purposes, or enclosed car parking, must be protected from inundation by floods up to the 100-year flood.
- The level of the driveway providing access between the road and parking space shall be no lower than 0.3m below the 100-year flood or such that the depth of inundation during a 100-year flood is not greater than either the depth at the road or the depth at the car parking space. A lesser standard may be accepted for single detached dwelling houses where it can be demonstrated that risk to human life would not be compromised.
- Enclosed car parking and car parking areas accommodating more than 3 vehicles (other than on Rural zoned land), with a floor level below the 20-year flood or more than 0.8m below the 100-year flood level, shall have adequate warning systems, signage and exits.
- Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100-year flood.

The intention of these controls relate to ensuring vehicle stability and the safety of pedestrians in the event of flooding of carpark areas.

The peak depth of affectation in the 100 year ARI event for the proposed carpark is less than 0.2 metres with a velocity-depth product of less than 0.05 m²/s, meaning a velocity of less than 0.25 m/s. The NSW *Floodplain Development Manual* (NSW Government, 2005) provides a summary of depth and velocity conditions whereby vehicles and pedestrians become unstable in Figure L1 of Appendix L. The figure has been included in **Figure 5**.

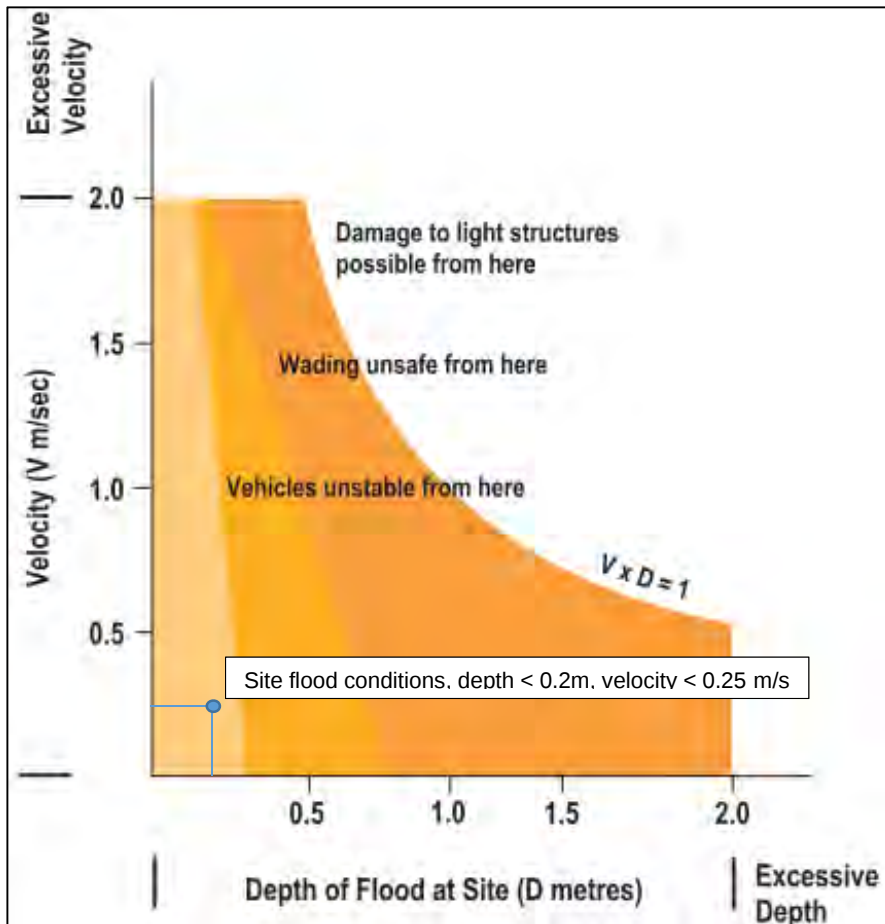


Figure 5 – Assessment of Vehicle Stability for the Site in 100 year ARI event.

As shown in **Figure 5**, the overland flow conditions experienced on site in all events up to and including the 100 year ARI event do not pose a risk to either vehicle or pedestrian stability therefore the controls relating to carpark design are deemed to be satisfied.

- **Evacuation:**

- *Reliable access for pedestrians or vehicles required during a 100-year flood.*
- *The development is to be consistent with any relevant flood evacuation strategy, Flood Plan adopted by Council or similar plan.*

The majority of the site is not affected by floods up to and including the 100 year ARI event with the majority of the site flood free. Additionally, the site lies outside of the Georges River Probable Maximum Flood (PMF) extents therefore it is assumed that the site does not require any evacuation routes to be assigned as flood risk is negligible.

- **Management and Design:**

- *Site Emergency Response Flood Plan required where floor levels are below the design floor level, (except for single dwelling-houses).*

No new buildings or additions are proposed within the DA therefore the requirement for the preparation of a Site Emergency Response Flood Plan is not applicable to the proposed development.

- *Applicant to demonstrate that area is available to store goods above the 100-year flood level plus freeboard.*
- *No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood.*

The extent of flooding in the 100 year ARI event is restricted to the proposed access driveways and portions of the proposed carpark. The areas of minor affectation are not proposed for storage of any goods that may result in pollution or potentially hazardous materials. Therefore these controls are deemed to be satisfied.

7. Conclusion

It is concluded that the proposed development of the site located at 51 and 57 Violet Street, Revesby aligns with the minor overland flow affectation experienced at the site up to the 100 year ARI and, as a result, is in accordance with Bankstown City Council's flood controls as specified in the DCP.

Should you have any queries, please contact the undersigned.

Yours faithfully,



Martin Griffin
Engineer
for **Cardno**
(02) 9496 7859
martin.griffin@cardno.com.au

ATTACHMENT A – FLOOD MAPPING OF SUBJECT SITE (SOURCE: BANKSTOWN CITY COUNCIL)

100 yr ARI Flood Depth (m) and Flood Contour Levels (mAHD) from Milperra Catchment for 51-57 Violet Street, Revsby



20 yr ARI Flood Depth (m) and Flood Contour Levels (mAHD) from Milperra Catchment for 51-57 Violet Street, Revsby



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.

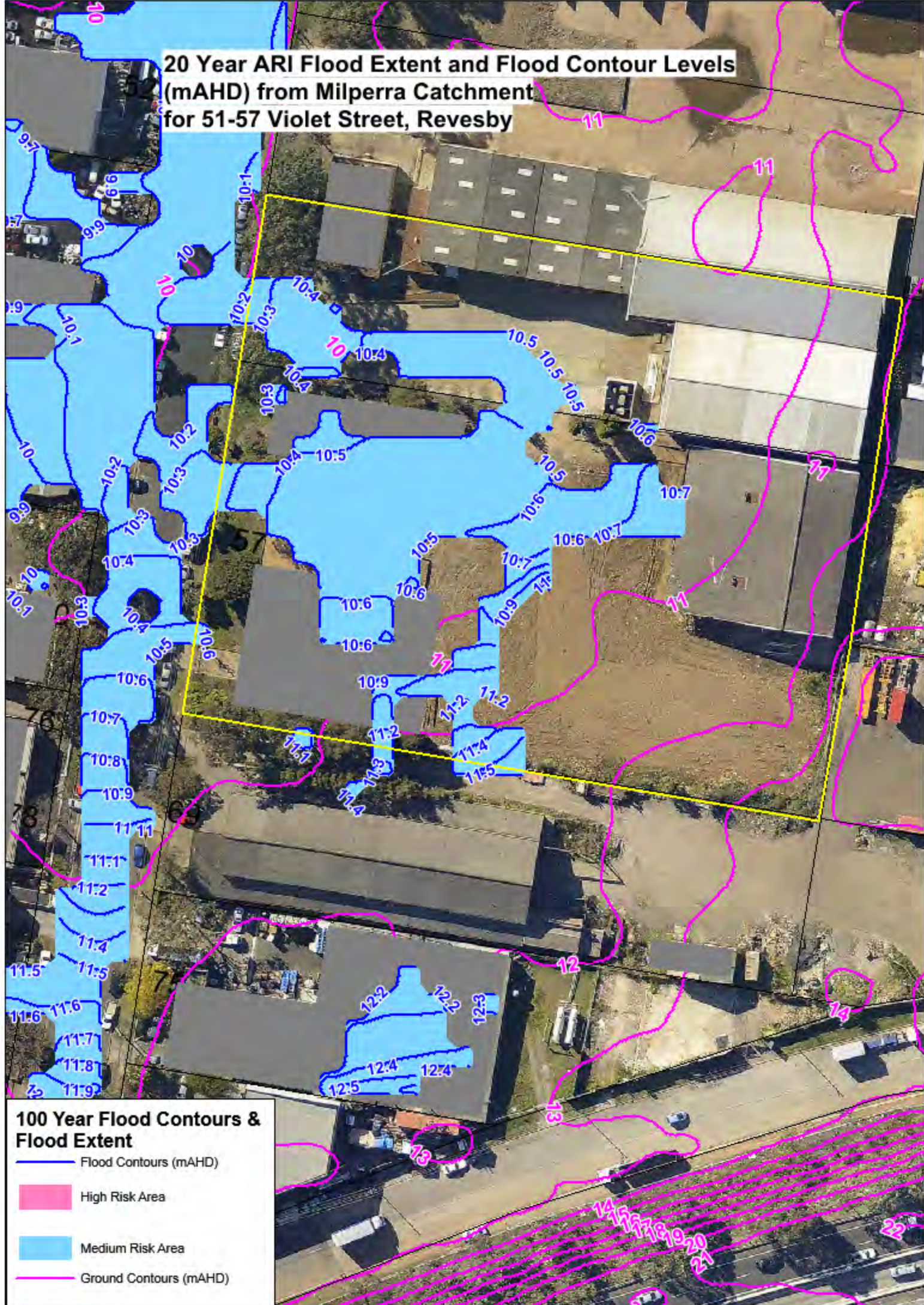
100 Year ARI Flood Extent and Flood Contour Levels (mAHD) from Milperra Catchment for 51-57 Violet Street, Revesby



100 Year Flood Contours & Flood Extent

- Flood Contours (mAHD)
- High Risk Area
- Medium Risk Area
- Ground Contours (mAHD)

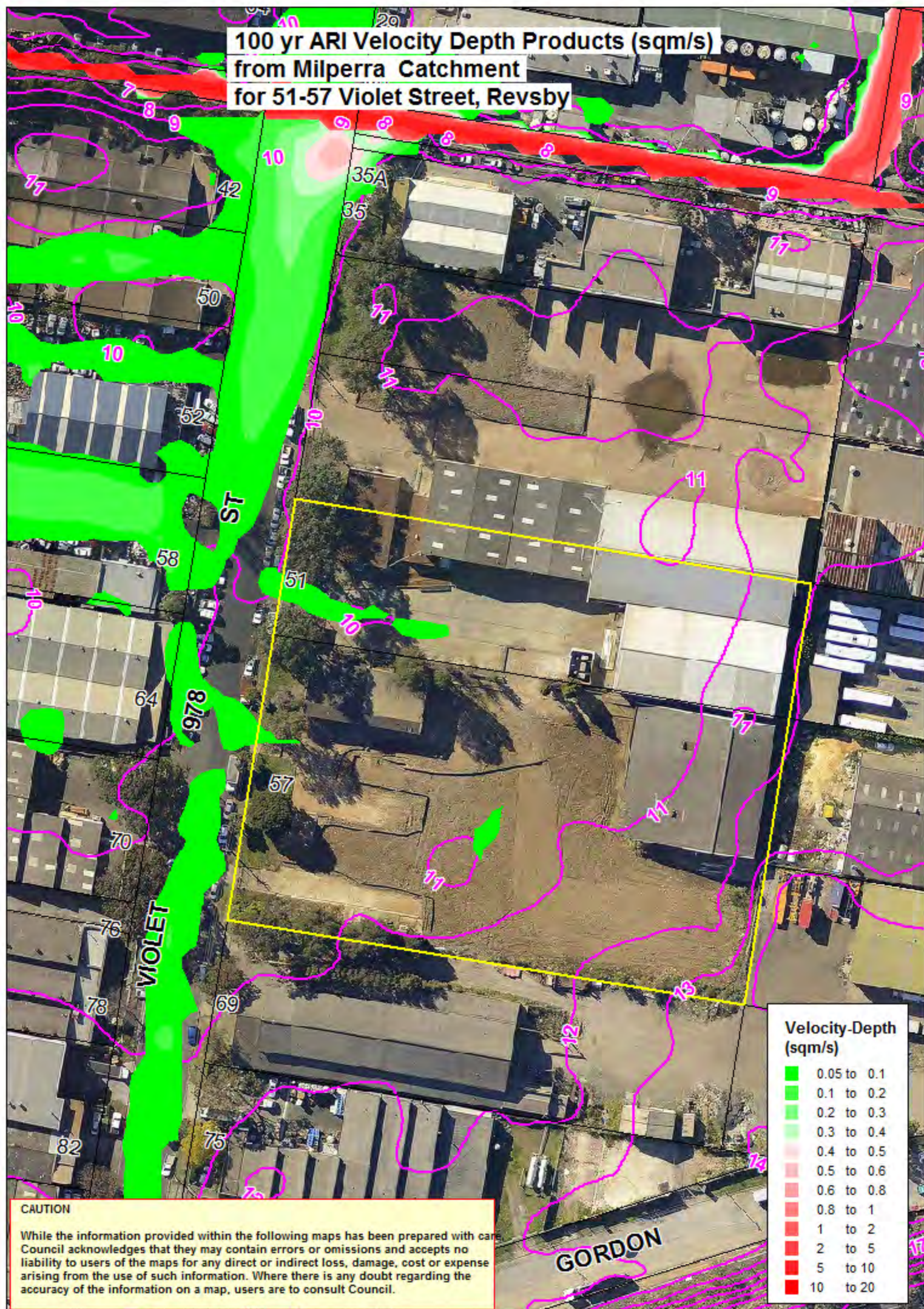
20 Year ARI Flood Extent and Flood Contour Levels (mAHD) from Milperra Catchment for 51-57 Violet Street, Revesby



100 Year Flood Contours & Flood Extent

- Flood Contours (mAHD)
- High Risk Area
- Medium Risk Area
- Ground Contours (mAHD)

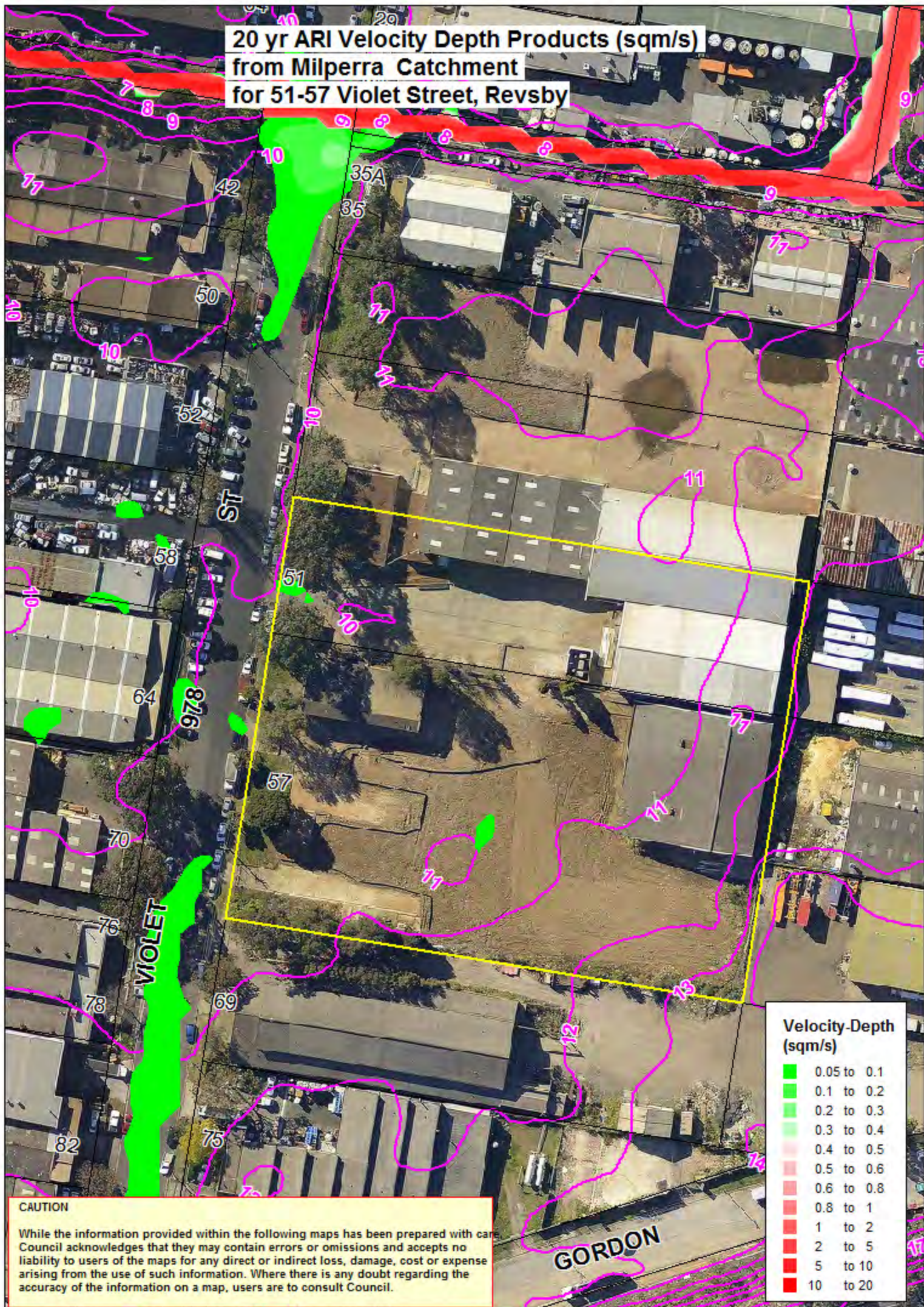
**100 yr ARI Velocity Depth Products (sqm/s)
from Milperra Catchment
for 51-57 Violet Street, Revsby**



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.

**20 yr ARI Velocity Depth Products (sqm/s)
from Milperra Catchment
for 51-57 Violet Street, Revsby**



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.