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FLOOD MANAGEMENT REPORT
PROPOSED WOOLWORTHS
11-13 PERCY STREET, AUBURN, NSW

State Significant Development Application

Revision 03
DECEMBER 2020

Our Job No. 19513

henry&hymas

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1. GLOSSARY

ARI	Average Recurrence Interval
AEP	Annual Exceedance Probability
AHD	Australian Height Datum (National Survey datum)
DA	Development Application
DECC	Department of Environment and Climate Change
RAFTS	Computer software package for 1D hydrologic analysis
HEC-RAS	Computer software package for 1D hydraulic modelling
FFL	Finished Floor Level
Flow	Volume of water per time (also known as flow rate) (m3/s or L/s)
Freeboard	Height difference between flood water surface level and finished floor level
FWL	Flood Water (Surface) Level
Hydraulic	Science of a moving liquid in a confined space
Hydrograph	Graph showing the rate of flow versus time past a specific point in a river, channel, or conduit carrying flow.
Hydrologic	The study of the water on the earth and in its atmosphere
LPI	Department of Land and Property Information
RL	Reduced Level (surface elevation)
PMF	Probable Maximum Flood level
Sheet Flow	Overland flow with the form of a continuous but not concentrated flow on a surface
Topography	The arrangement of the natural and artificial physical features of an area
Velocity	Measure of the speed and direction of the water flow (m/s)

NSW Floodplain Development Manual

The Floodplain Development Manual is a document published in 2005 by the New South Wales State Government. The document details Flood Prone Land Policy which has the primary objective of reducing the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods. At the same time, the policy recognises the benefits from occupation and development of flood prone land.

2. INTRODUCTION

2.1. General

This report has been prepared in response to enquiries by the Secretary's Environmental Requirements (SEARs) in relation to flooding and drainage enquiries for the proposed development.

The report will address the issues raised in item number 14, relating to flooding including:

- description of the flood assessment and modelling;
- flood behaviour for range of storm events;
- and the impacts of storm events on the proposed development.

The subject site is located located at 11-13 Percy Street, Auburn within the Haslams Creek catchment which runs along the eastern boundary of the site. The locality sketch of the site is shown in Figure 3.1 below.

Figure 1 - Locality Sketch

The aim of this Flood Assessment Report is to ensure that the development does not have any impact on the existing flood extent or neighbouring properties. The report will address the following items:

- Nature of flooding in the locality - to ensure that the proposed development is compatible with the flow regime of the waterway and does not affect the existing flood extent up to and including 100 year ARI Storm events;
- Ensure that the proposed development maintains the Flood Planning Levels provided in Haslams Creek Floodplain Risk Study and Plan, January 2003 by Bewsher Consulting Pty Ltd on behalf of Auburn City Council.
- Land forming operations, their impact on flooding and their suitability for development

- Compensatory earthworks and an assessment of the effect on floodplain storage
- Ensure that proposed development complies with the Proposed Planning Matrix for the Haslams Creek Catchment extracted from Haslams Creek Floodplain Risk Study and Plan, January 2003 by Bewsher Consulting Pty Ltd
- Flood risk assessment – to assess the risks associated with the proposed development
- Recommendations on all precautions to minimise risk to personal safety of occupants and the risk of property damage for the development to address the flood impacts on the site
- Provide a Flood evacuation plan

3. SITE DESCRIPTION

3.1. Local and Regional Context

The existing site is located in the Sydney metropolitan suburb of Auburn and is approximately 3.5ha in area. It is bounded by Percy Street along the north-western boundary, it is surrounded by commercial and industrial premises along the north-eastern and south-western sides, while the south-eastern side is bounded by the Haslams Creek.

The site is currently mostly impervious and occupied by an industrial development; it appears as though there are no water quality or quantity measures provided for the existing development. Most of the site is occupied by buildings and the surrounding concrete carpark and driveways, at exception of a small strip of landscape along the north-western boundary. The surface of the site generally falls from west to east, from RL 7.50 to RL 4.20 at approximately 1.2%. A valley runs through the middle section of the site, acting as a waterway conveying the overland flood water from upstream towards Haslams Creek.

The catchment plan showing Haslam Creek catchment and the envelope of the subject site is shown in the catchment plan provided in Appendix A.

No exact information is available in regards to the grading of Percy Street, although it is assumed for the road to also fall from south-west to north-east.

3.2. The Proposed Development

The proposed site will be used for commercial purposes.
The redevelopment includes the demolition of the current warehouse and the construction of a 2-storey building occupying the majority of the site. The building will include a ground floor and a mezzanine floor for a Woolworths distribution centre warehouse. A concrete carpark and loading docks will surround the building.

The overall Architectural site plan for the ground floor is provided in Appendix B and Figure 2 below.

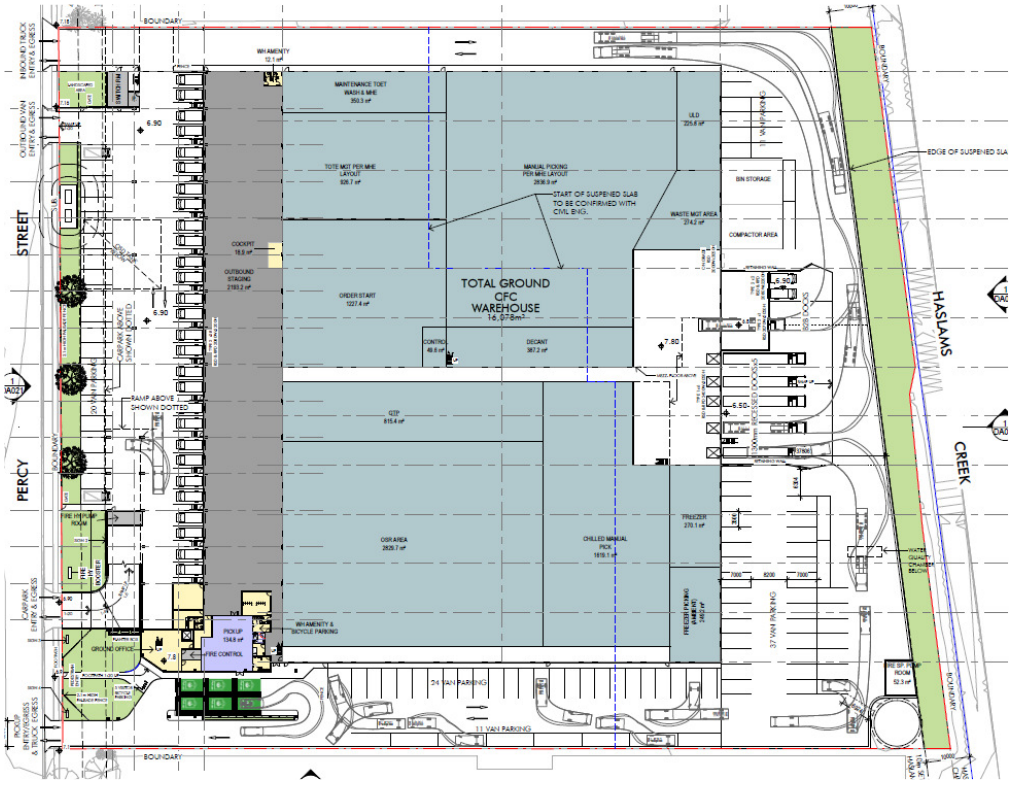


Figure 2 - Architectural Site Plan

4. FLOOD STUDY

4.1. Flood Study Source Information

The proposed site is located within the Haslams Creek catchment which eventually drains to Haslams Creek downstream. The flood study information regarding flood levels, flood risk, flood maps and proposed planning matrix for the Haslams Creek catchment are extracted from Haslams Creek Floodplain Risk Study and Plan, January 2003 by Bewsher Consulting Pty Ltd prepared for Auburn City Council.
It should be noted that the original Flood Study from 2003 was undertaken prior to completion of the Haslams Creek Overland Flood Study (RHDHV 2016). A draft of the flood study report was issued to Council in 2016. The study is yet to be adopted by Council, however, it provides the most accurate and up to date flood information for the subject site.

The Proposed Flood planning levels are based on the information received from Council via Flood Certificates and the Overland Flood Study.

The received flood certificate from Council (dated December 7 2020) provide the following levels:

Flood RL (m) AHD - West to East	
1 in 100year ARI flood Percy street	RL 7.30m to RL 7.00 AHD
1 in 100year ARI flood Haslams Creek	RL 5.70m to RL 5.20 AHD
PMF flood Percy street	RL 8.60m to RL 8.00 AHD
PMF flood Haslams Creek	RL 8.60m to RL 8.10 AHD

4.2. Creek Catchment

The subject site is located within the Haslams Creek catchment which is approximately seventeen square kilometres in area. The land use of the catchment is mainly residential with isolated industrial and commercial land use. Rookwood Cemetery (located on the south eastern side of the catchment) also forms part of Haslams Creek catchment, and divides the Cooks River and Haslams Creek catchments.

Upstream of Brixton Street to upstream of Parramatta Road, Haslams Creek is generally a concrete lined channel. From Parramatta Road to the M4 Motorway, the Creek has an unlined invert and concrete lined banks. The trunk drainage system for the catchment includes various stormwater channels and trunk drainage systems which discharge to Haslams Creek. The most of the trunk drainage system including Haslams Creek itself is under the control of Sydney Water Corporation (SWC).

5. FLOOD ASSESSMENT

5.1. Flood Levels and Flood Planning Levels

The flood extent map for Haslams Creek's catchment is shown in the Figure 3 below and in Appendix A. The map shows the 100yr ARI and PMF flood extents, as well as the existing terrain and existing drainage system.

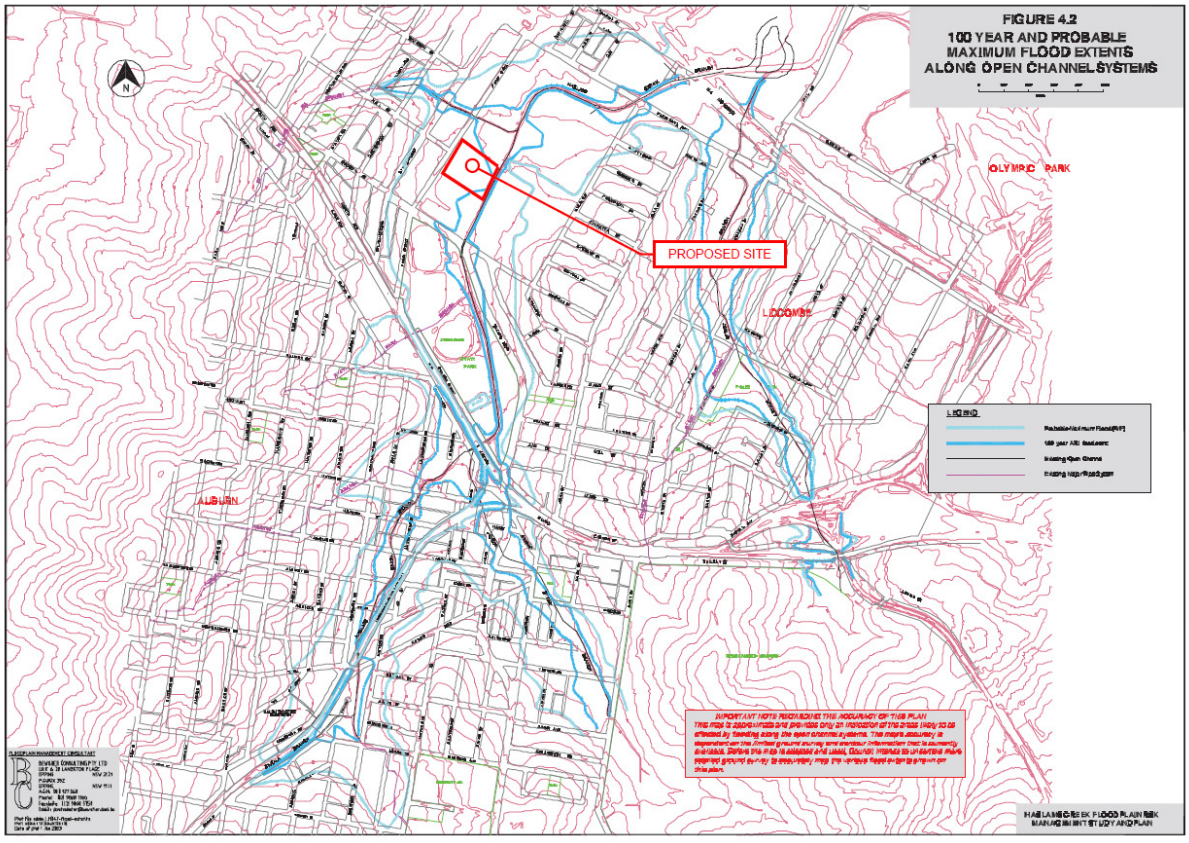


Figure 3 - 100yr ARI flood extent and PMF

From Figure 2 and 3, it is visible that the back of the subject site encroaches into the existing 100yr ARI flood extent.

Flood levels have been obtained from Cumberland Council through the letter "Flood levels at no 11-13 Percy Street, Auburn Being Lots 1&2 DP 1183821" dated 7 December 2020. The flood information about the property has been provided according to the information available to Council from the "Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016. The received letter and map can be found in Appendix C.

In accordance with the latest flood certificate, the site is classified as all of the following:

- A flood storage area
- A floodway area

- A flow path
- A high hazard area
- A high risk area

No. 11-13 Percy Street is found to be surrounded by flooding along 3 boundaries, although the flooding does not seem to affect the site along Percy Street. Overland flow is visible on the side of the neighbouring property no 15 Percy street. The eastern corner is affected by flooding and it is assumed to be the area that deems the site as a high risk area; for this reason no structures other than columns are proposed to be built in this area. The proposed columns will sustain a suspended slab for an open air carpark and circulation driveways at a much higher level, ensuring no reduction of the flood storage volume or impediment of flood water.

The requirement for the minimum habitable floor level is to be 0.5m above the flood level at the upstream side of the structure proposed in the development. The minimum floor level for non-habitable structures such as garages, laundry and sheds are 0.15m above the flood level at the upstream side of the structure (interpolation between flood levels is allowed). The maximum flood levels upstream of the proposed development are shown at the boundary near Location A as RL7.3m (RL 7.4m at location A) and RL7.0m at Location B. As stated on page 2 of the current flood certificate, interpolation between flood levels is allowed. This indication has also been confirmed by Rolyn Sario from Cumberland Council, therefore the flood level for the site has been established to be RL7.3m, which is the result of interpolation between the flood levels indicated at the corners of the site. As per the current flood certificate, the minimum finished floor level for the site will be RL7.80m (7.3m +0.50m freeboard).

Furthermore, in accordance with Table 5-Haslams Creek Floodplain in the Auburn Development Control Plan 2010 (refer to Appendix E), a High Flood Risk precinct is defined as an area within the envelope of land subject to a high hydraulic hazard (in accordance with the provisional criteria outlined in the Floodplain Management Manual) in a 100 year flood or potentially subject to evacuation difficulties.
Property no. 13 Percy Street is classified as a High Flood Risk zone, as such, the land is considered unsuitable for commercial and industrial development, as well as residential, subdivision, crucial utilities and essential community facilities.
Although, considering the nature of the existing development and the proposal of a new development that stays clear of the flood extent, it is believed that the site will be suitable for development.

Moreover, the lots were found to be affected by Probable Maximum Flood (PMF), hence an evacuation plan may also be required (refer to Appendix D).

5.2. Design Building Levels

The flood planning level for the subject site is taken as 0.5m freeboard to 100year storm event flood level, which provides flood protection for the site up to and including 100year ARI storm events (in accordance with the Floodplain Development Manual, April 2005 by NSW Environment and Heritage).

5.3. Flood Impact

From Figure 4 below, it is observed that the subject site is affected by the existing 100yr ARI flood extent in the south eastern corner of the site. The proposal is for a suspended structure over the flood extent in order to not have any adverse impact to the existing floodplain or neighbouring properties.

The flooding along Percy Street is shown to be restricted, in the 1:100yr event, along the front boundary of the site. The reason for the flooding on Percy Street is most likely due to the undersized existing stormwater system in the road. With the development of the subject site, more than 1ha that was previously discharged to Percy Street via an existing Ø400 pipe and a few Ø225 pipes, is being re-directed to the back of the site to discharge to Haslams Creek. By doing so, the development is significantly reducing the discharge on Percy Street and, therefore, improving the flooding situation on the road.
The re-development also proposes levels along the front boundary that ensure no spilling will occur from the road into the site. Since the spilling of flood water is prevented in the largest storm (1:100yr), it is assumed that there will be no risk of flooding even for smaller events such as 1:20yr

As part of the proposed development, there is no proposed filling within floodplain storage area, which ensures that there is no impact on flood regimes or floodplain storage.
The proposed development does not have any impact on the existing flood levels up to 1:100yr storm event.

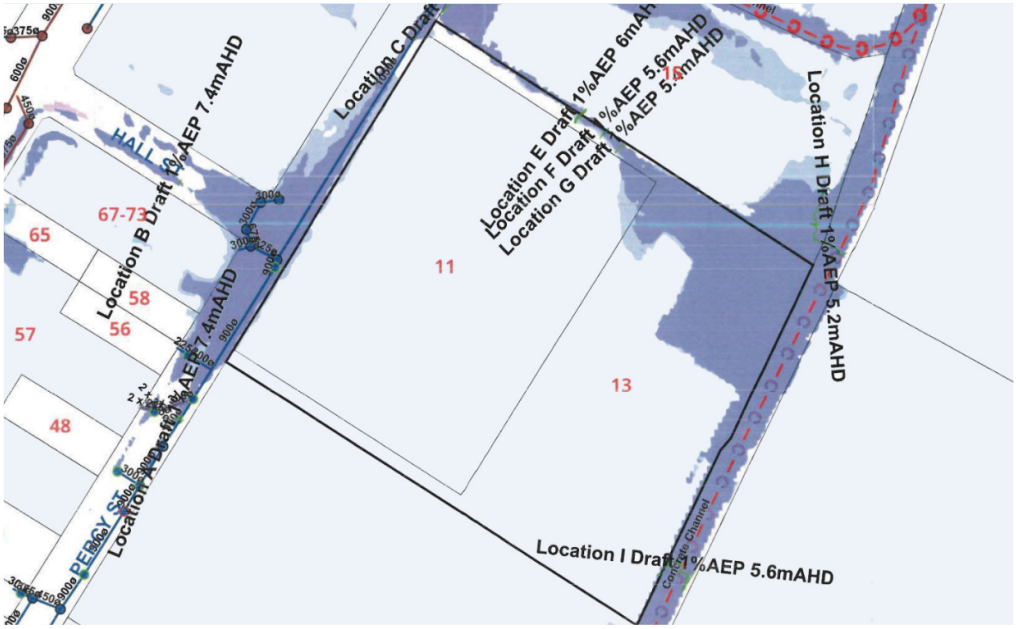


Figure 4 - 1:100yr Storm Event Flood Map

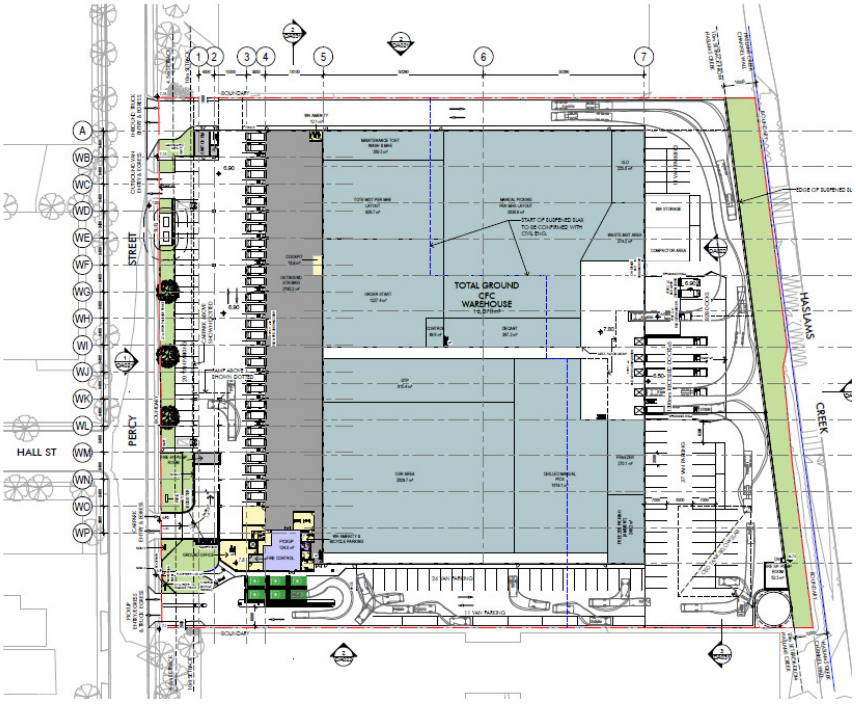


Figure 5 - Flood Extent and proposed site layout

5.4. Debris control structures

Blockage assessment was prepared in accordance with Australian Rainfall and Runoff (ARR2016).
It is proposed to have a 10m offset landscape zone from the rear boundary (Haslams Creek), in which no structures or columns are proposed.
Columns are proposed for the suspended slab and are located at 12.5m distance normal to the flow and 8m parallel to the flow.

Debris control structures or traps are structural measures provided in a watercourse upstream of critical structures to collect debris before it reaches the structure and causes problems.
For the proposed development, an existing culvert upstream of the site at Boorea Street will limit the size of the large non-floating debris reaching the suspended slab structure and only objects moved by the flow of flood water will reach the site.

The proposed column spacing results 12.5m wide openings, and the flood water depth is expected to be relatively shallow, it is highly unlikely that cars or trees could be blocked in the area below the suspended slab. As an additional measure to protect the columns, full height rail guards are proposed between the columns at approx. 4m distance. The rail and the columns will be located 10m from the channel in the direction of the flow, any bigger object will be directed in the channel and not in the under suspended area. The rails will prevent the large objects from floating under the slab.

Refer to drawing 19513_DA_C103 for full heigh rails location details.

5.5. Climate Change

Climate change has become a major environmental concern over the last 20 years. With the increasing amounts of greenhouse gases being released to the atmosphere due to human activity, the average earth surface temperature has been rising. As such, this may be affecting the climate and sea level.

Climate change has the potential to alter flood levels as a result of increased rainfall intensity and increase in receiving water levels (i.e. sea levels).

An assessment has been undertaken for the effect of climate change on the development. The assessment takes into consideration potential effect from increased rainfall intensity and sea level rise.

In relation to the subject site, the flooding that will be affected by climate change and sea level rise is the one resulting form Haslams Creek. The flooding on Percy Street will not be affected by sea level rise as it is caused by the undersized existing stormwater system as stated previously.

The site is being developed with structures with a life span of approximately 50years and a habitable floor that is (including freeboard) 2.2m higher than the current flood level).
Sea level rise, on average, is found to be between 2mm to 4mm per year. If we assume a sea level rise of 4mm per year, during the 50 years of life of the warehouse (0.002m x 50yrs = 0.2m), the sea level will rise by 200mm. As a result, the building will be located (2.2m – 0.2m= 2m) 2m above the flood level.
The development will be situated well above from any tidally influenced receiving waters so it won't be affected by potential sea level rise.
Furthermore, the proposed stormwater drainage system and stormwater management systems (including the proposed on-site detention system) would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water level within the basin.

5.6. Flood Emergency Procedures

Given the nature of the proposed development it is important to consider safe flood evacuation from the site under extreme flood conditions such as the 100year flood event and PMF.

The Bureau of Meteorology (Met. Bureau) is normally the government agency responsible for issuing flood warnings throughout Australia such as "flood watch" and "flood warning".

"Flood Watch" provides early advice of potential riverine flooding to emergency services and communities at risk of flooding. Flood watches are issued when the combination of forecast rainfall and catchment or other hydrological conditions indicate that there is a significant risk of potential flooding.

"Flood Warnings" are issued by the Bureau to advise that flooding is occurring or expected to occur in a geographical area based on defined criteria. Flood Warnings may include either qualitative or quantitative predications or may include a statement about future flooding that is more generalised. The type of prediction depends on the quality of real-time rainfall and river level data, the capability of rainfall and hydrological forecast models and the level of service required.

However, the Met. Bureau has limited resources and cannot provide a flood warning service for all areas.
Flood warning systems generally monitor rainfall and river gauges in the upper parts of catchments in real time and, through hydrologic/hydraulic models, predict the resulting flow and flood levels at some time in the future in the lower catchment.

Forecasts of continuing rain or anticipated changes in rainfall intensity can also be included in the models to provide additional forecasting ability.
The minimum 'turn-around time' between when the rainfall actually occurs and the predicted flood levels occur is about 6 hours. When there is less than 6 hours between the rainfall and the associated flood, the Met. Bureau classifies this as 'flash flooding'. In these catchments, by the time the Met. Bureau is aware of the excessively high rainfalls, the flooding has already occurred.
For the Haslams Creek catchment, the time between heavy rainfall and the occurrence of flooding can be less than one hour. Therefore, the Met. Bureau is unable to provide a specific flood warning service for the catchment.

The only warnings available from the Bureau of Meteorology in catchments that experience flash flooding are "severe weather warning" and "severe thunderstorm warning". Thunderstorm warnings are made by the Met. Bureau within the Newcastle–Sydney–Wollongong area and are based on information available from synoptic charts and Sydney Radar. The warnings are made before the rainfall actually occurs. It is usually provided for general areas (e.g. the Sydney area) and is not specifically targeted at individual, small catchments, such as the Haslams Creek catchment.

The New South Wales Emergency Service (NSW SES) is the authority that is responsible for "evacuation warnings", "evacuation order" and "all clear".

"Evacuation Warnings" are issued by the SES as a 'heads up' to prepare for possible future evacuation.
"Evacuation Order" is issued by the SES when evacuation is required and you have to leave immediately.
"All Clear" will be issued when it is safe for residents and businesses to return to a flood affected area, previously subject to an Evacuation Order.

NSW SES was consulted in regards to the flood emergency plan for the site and the 'shelter in place' measures, although they have responded with a letter (attached in Appendix G) saying that NSW SES does not provide reviews or private flood emergency plans.

5.7. Flood Evacuation

Unfortunately, there is limited scope to improve the flood warning in the Haslams Creek catchment as this relatively small urbanised catchment experiences 'flash flooding'. As such, the Met. Bureau will be unable to provide a specific flood warning service to this catchment. The NSW SES will be responsible for providing evacuation warnings.

The finished floor levels are proposed to be set 500mm above the 1% AEP flood levels, which will allow a building lockdown procedure to be initiated. Evacuation of the building will need to commence upon receipt of the SES evacuation warning and evacuation order or once the channel flood waters have subsided towards the end of the storm event when the SES provides the "all clear" sign.

In the case of a 1:100yr flood event, it is expected that the driveways in the northern corner of the site will experience 200-250mm ponding of flood water. This depth of water is considered safe for cars or larger vehicle to drive through, therefore

there is a chance for the staff on site to safely leave the site. The north-eastern driveway will experience 600mm of ponding flood water, therefore this driveway will not be usable for access during any large flood events. Refer to the map below for the operational driveways (Figure 6).

Although, the possibility of leaving the site will also be dictated by the extent of flooding in the adjacent roads and the closure of nearby roads. The advice is to drive from the site on Percy Street to Hall Street avoiding driving along Percy Street, although, since survey levels of the streets surrounding the site are not available, H&H not able to provide detailed advice on the extent and depth of flood waters on the surrounding streets. Because of this, H&H is not to be held responsible for the risk associated with driving on the nearby roads.

In case of road closures or unsuitability of the surrounding roads for driving, staff should shelter in place.
Shelter in Place is a mitigation strategy to protect staff and visitors inside the facility. In general Shelter in Place is the most appropriate strategy to be adopted in emergency situations. The decision to Shelter in Place by Sorting Facility should be considered when:

- Emergency Service Organisation can support/protect the facility.
- Facility capabilities are adequate to care for customers and staff for the estimated event duration.
- Evacuation would pose a greater risk to staff and visitors.

A decision to Shelter in Place should always be accompanied by alternative plans for Pre-Emptive Relocation or Evacuation.
Refer to Appendix F for Shelter in Place Flood Evacuation Plan.

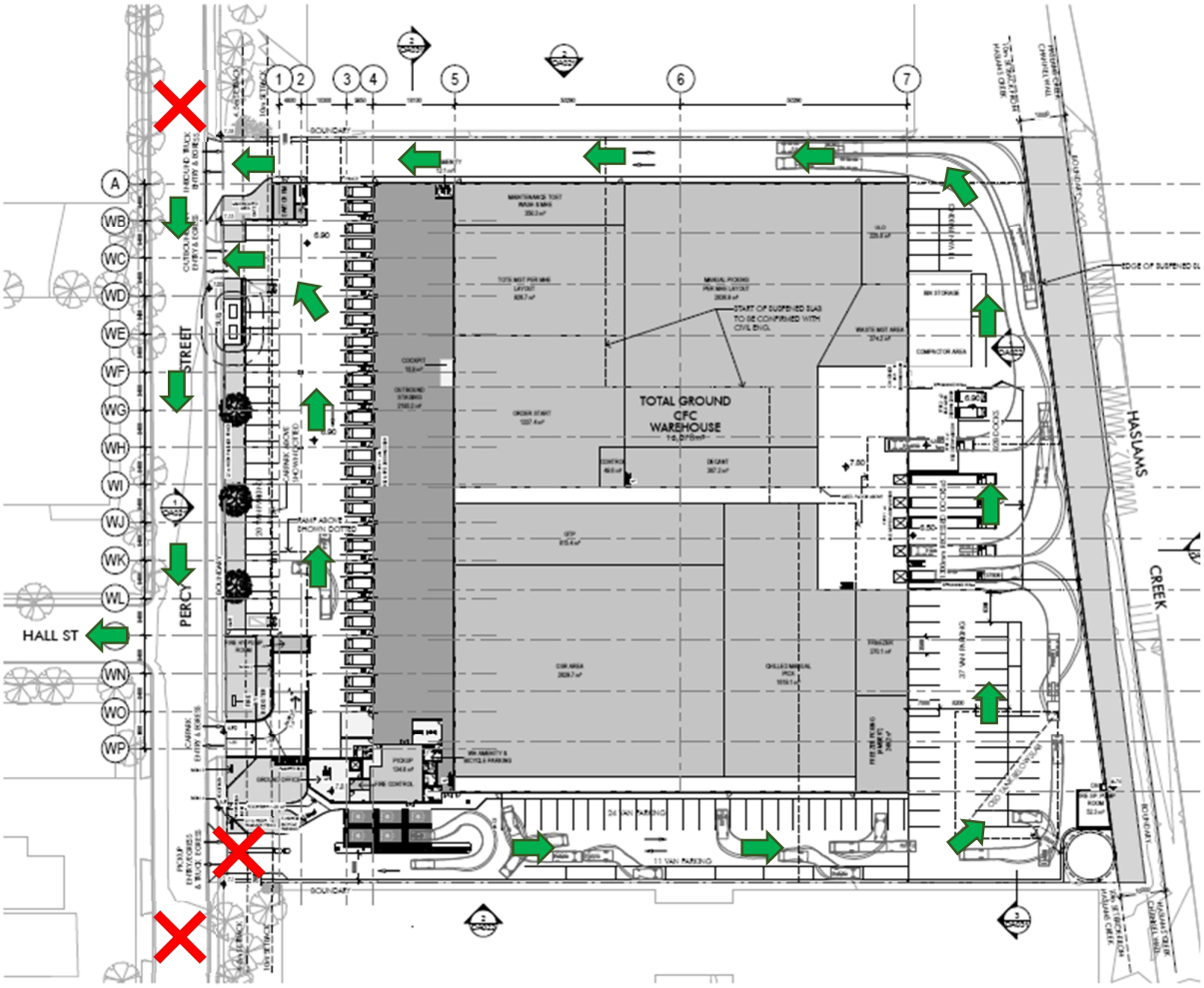


Figure 6 - Usable driveways

In the case of a PMF flood event, the exit driveways will not be suitable to leave the site as the entire ground flood will be inundated by the flood waters.
Staff will need to shelter in place on the mezzanine floor, which is located at a higher level. Refer to Appendix F for Shelter in Place Flood Evacuation Plan.
Where possible, all cars, equipment stock and other material subject to water damage is to be moved to the mezzanine carpark in the early stages of the flood event, while flood water is not visibly ponding on Percy Street.

Based on the size of the Haslams Creek catchment and the random nature of rainfall patterns, it is understood that the Channel will take a few hours to reach its maximum flood level. Which means that at very worst, there will be a few hours warning for a major flood. This is sufficient time to enable evacuation of the staff, customers and cars. The effective warning time is typically used to move equipment, move stock, evacuate people and move cars from the parking area.

Once the property has received the flood warning from NSW SES, it is the responsibility of the warehouse management to start implementing the evacuation plan. This will be ensuring that the Staff leave the site in an orderly manner or prepare for the building lockdown.
In case of flash flooding the staff need to remain in the building until the water inundation has subsided and until the NSW has provided an "all clear" sign.

5.8. Risk to Life

Risk to life issues relate to the consequences and threats that the full range of floods including the flood used to derive the FPL and rarer floods may pose to the life of the people present on the site.
In the case of a 1:100year, flood the main hazard is associated with the floodway from the Creek at the rear of the site. This area is not accessible during any flood events and therefore it poses no risk to life.
At the front of the site, the northern driveways to Percy Street experience some flooding, although the expected depth of water can be considered safe for cars and large vehicles to drive over. Since the reason for the flooding along Percy Street is the result of backflow from the existing stormwater infrastructure, ponding flood water depth and velocity does not pose a risk to life.

However, during a PMF event the entire surrounds, including a few adjacent blocks around the site and the entire new building will be flooded. The proposed evacuation strategy during PMF events is to "Shelter in Place" on the mezzanine floor as the ground floor will be flooded. Leaving the site will be possible only at the early stages of the "evacuation order" from NSW SES.

In case of road closures or unsuitability of the surrounding roads for driving, staff should shelter in place, no matter which flood event.
If proper procedure for 'shelter in place' evacuation is followed, no risk of life is expected, although significant water damage is expected for the building, stock and machinery located on ground floor.

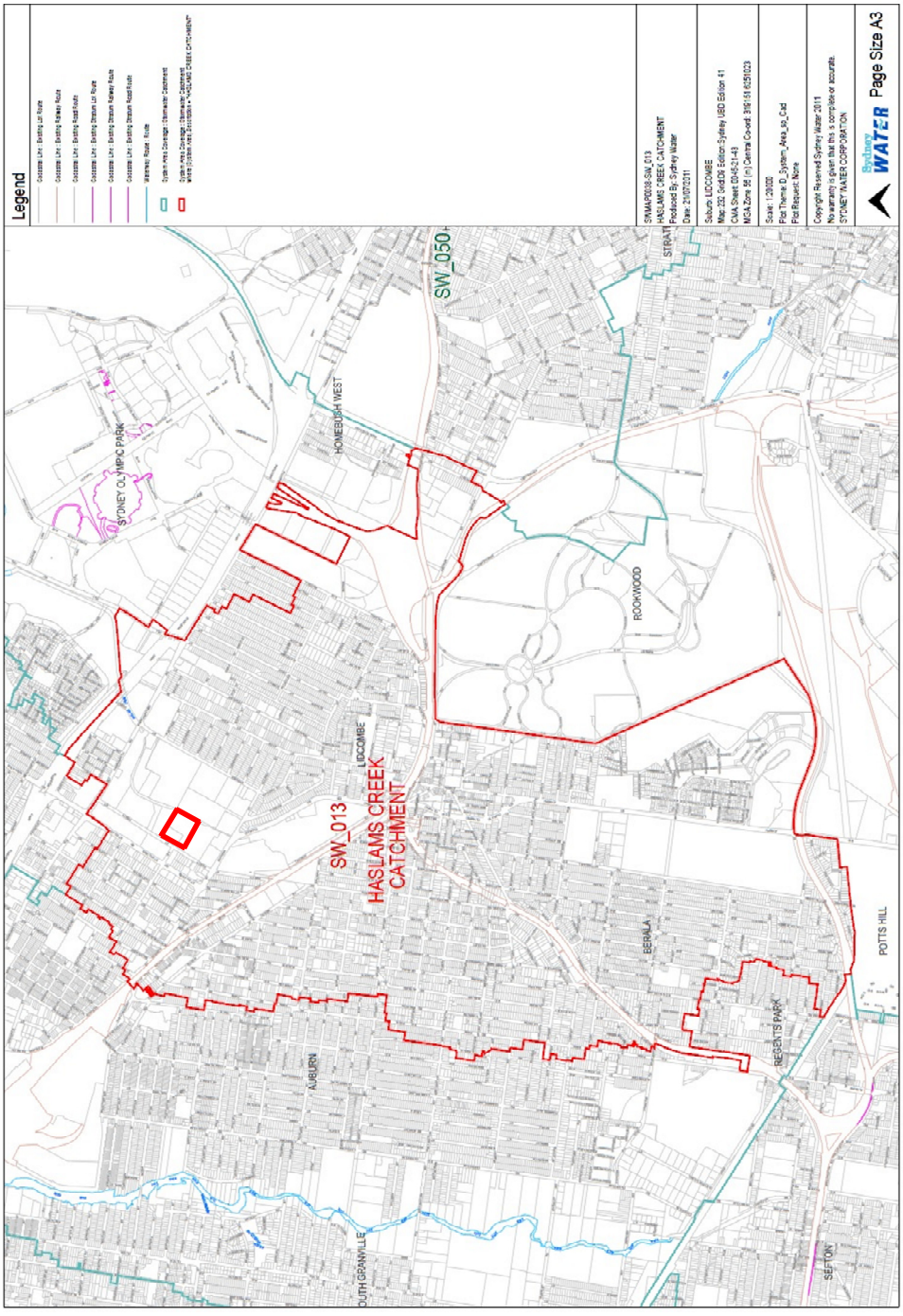
6. CONCLUSIONS

This flood assessment has been carried out in accordance with Haslams Creek Floodplain Risk Management Study and plan by Bewsher Consulting Pty Ltd which has been prepared for Auburn Council. It maintains all the requirements in accordance with Council's flood study and plan for the catchment within which the site sits.

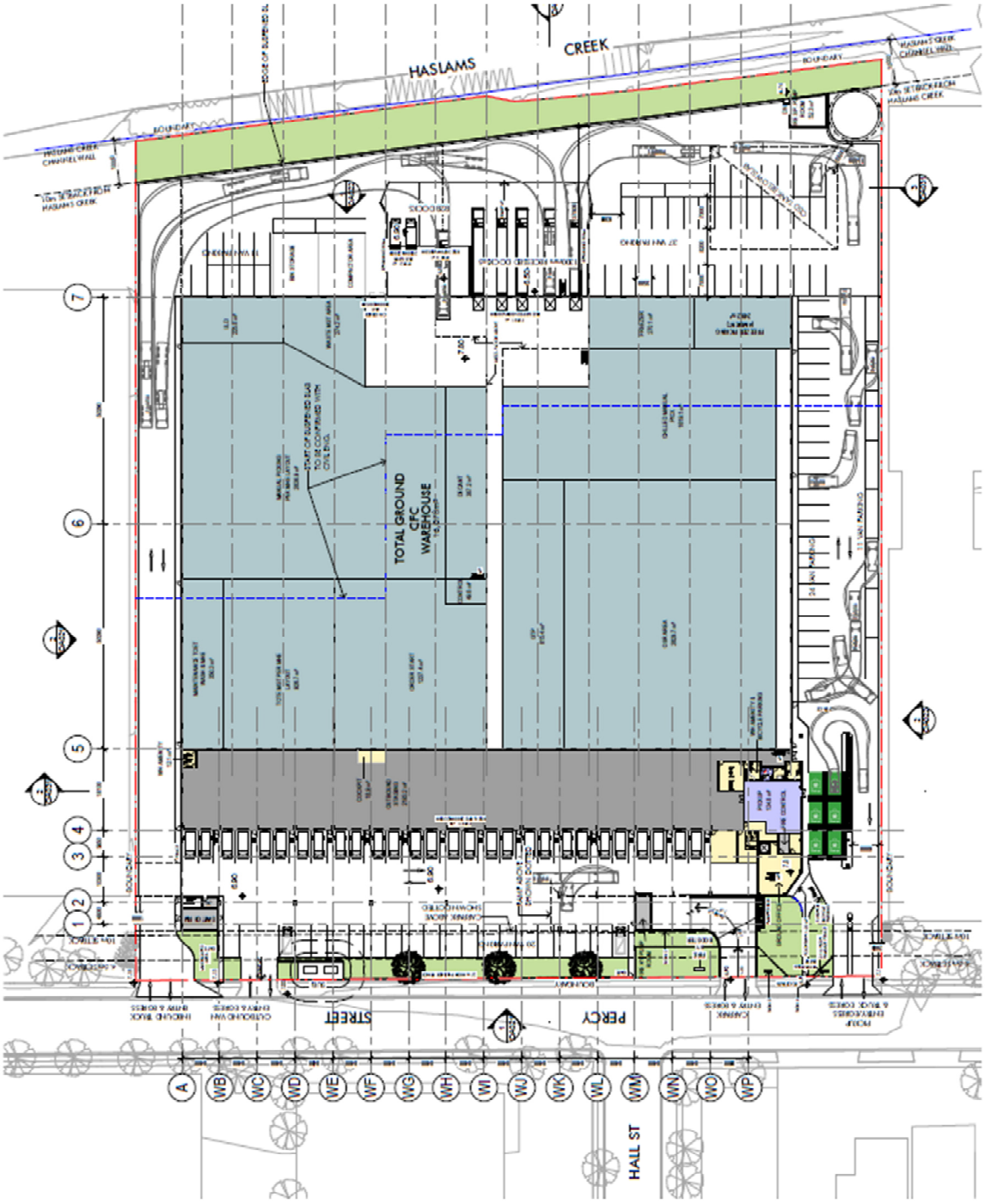
The proposed building levels have a minimum 0.5m freeboard to 100yr ARI storm events which makes the proposed site envelope flood protected up to and including 100yr ARI events. This flood assessment also concludes that there is no social or financial impact to the community. Since there is no filling activities or encroachment within the 100yr flood extents, there is no flood affectation to the existing flood regimes, floodplain storage or adjacent properties.
The proposed development complies with all criteria which need to be fulfilled in accordance with the proposed planning matrix for the Haslams Creek floodplain catchment within which the site sits.

Whilst it is inevitable that the development will be impacted by major floods such as the PMF, with adequate warning measures and evacuation procedures in place, the safety of the occupants of the Warehouse can be assured.

APPENDIX A – HASLAMS CREEK CATCHMENT PLAN



APPENDIX B – ARCHITECTURAL PLAN



APPENDIX C – 1%AEP FLOOD LEVELS

CUMBERLAND CITY COUNCIL

7 December 2020

Our Reference EC2020/1028
Contact Rolyn Sario
Telephone 8757 9536

Letizia Villa
Unit 2.01, 828 Pacific Highway
GORDON NSW 2072

Dear Sir/Madam

FLOOD LEVELS AT NO 11-13 PERCY STREET, AUBURN
BEING LOTS 1&2 DP 1183821

Council refers to your request dated 2 December 2020 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Draft Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year and this site has been assessed as a high flood risk. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) as follows:

1. At location A - 7.4 mAHD
2. At location B - 7.0 mAHD
3. At location C - 6.8 mAHD
4. At location D - 6.0 mAHD
5. At location E - 5.6 mAHD
6. At location F - 5.4 mAHD
7. At location G - 5.2 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

16 Memorial Avenue, PO Box 42, Merrylands NSW 2160
T 02 8757 9000 E council@cumberland.nsw.gov.au W cumberland.nsw.gov.au
ABN 22 798 563 329

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a) *a flood storage area,*
b) *a floodway area,*
c) *a flow path,*
d) *a high hazard area,*
e) *a high risk area."*

Council has determined that part of the flood control lies in five of the five items above – items *a, b, c, d* and *e* therefore, a CDC cannot be issued on this site. The identified flood items are represented by the darker area within the 1% AEP flood extent on the attached map. If the development is proposed within any part of this zone (dark blue area), a pre and post flood study must accompany the Development Application. Alternatively, if the development is proposed within the uncoloured and/or light blue areas (flood fringe zone), a CDC may be considered for this site. However, the surface flows must not be impeded (blocked) and the redevelopment shall allow the free movement of the flood around any proposed structure(s).

In all cases, flood level on adjacent properties shall not be increased. Supporting documentation is to accompany the development.

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

The relationship between these levels and the ground surface may be determined by a survey of the property undertaken by a Registered Surveyor.

It should be noted that where the development or redevelopment of the property is proposed, reference should be made to the relevant Development Control Plan with regard to flooding and drainage issues. Please include a copy of this letter and map with any Development Application that you may lodge with Council for the subject site.

For modelling purposes, the models (pre and post development flood study) shall be calibrated to Council's 1%AEP Flood levels (or interpolated levels) at least 10 metres upstream and downstream from the property boundaries. Surface flows through the property shall not be obstructed nor diverted on to another property.

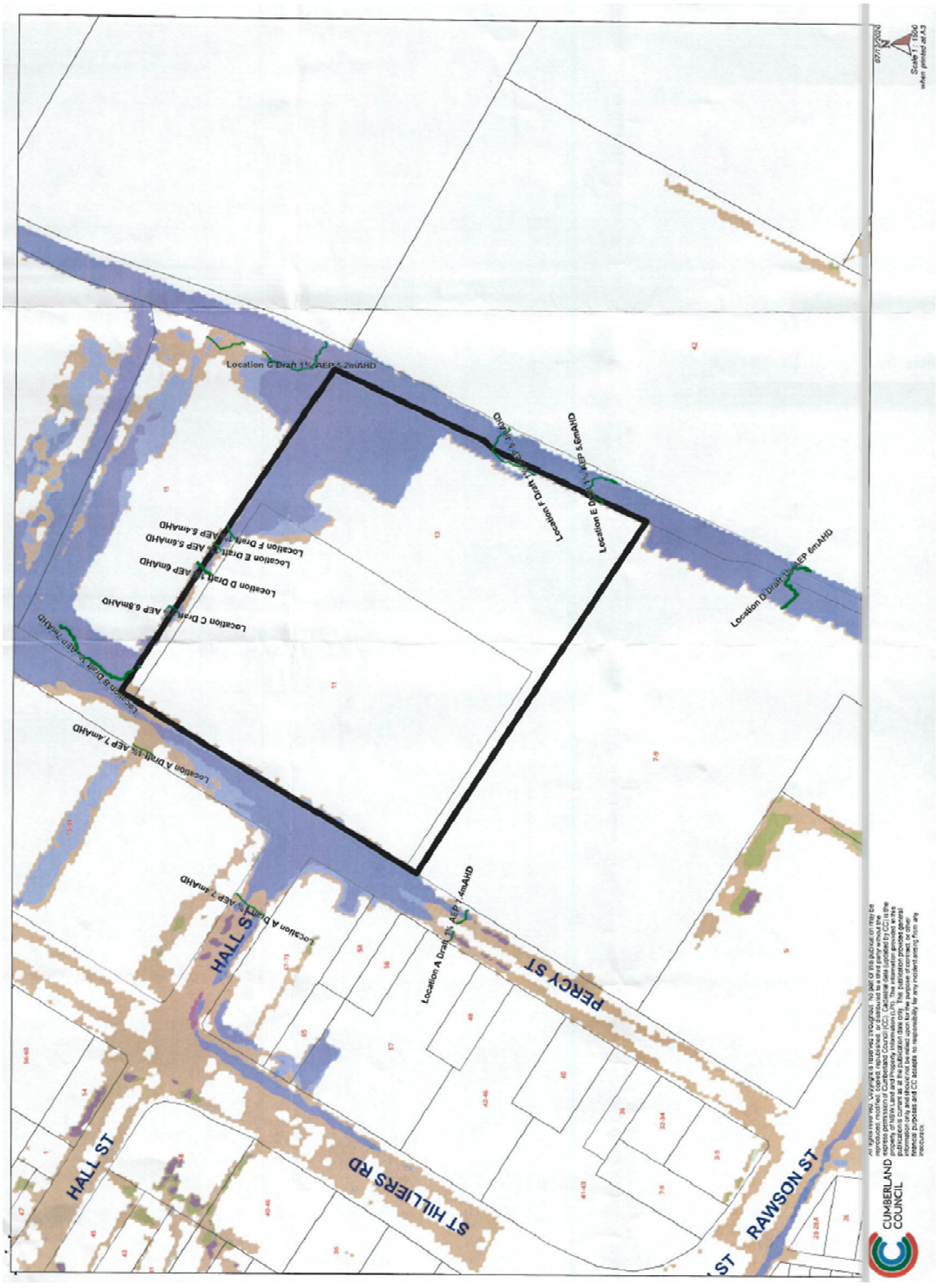
Note:
The brown shaded area on the attached Map represents the flood waters with a depth of flow less than 100mm and does not attract any flood controls. It is presented on the flood map to show the continuity of flooding within the area.

Flood levels are not static due to changing circumstances (e.g. revision of the flood model) and accordingly the above flood level is only valid for six months from the above date.

If you have any further enquiries regarding this matter please contact Council's Senior Stormwater Engineer, Mr Mark Evens on 02 8757 9538 or Council's Drainage Engineer, Mr Rolyn Sario on 02 8757 9536.

Yours sincerely,

SIVA SIVAKUMAR
MANAGER – ENGINEERING & TRAFFIC


PERCY ST
HALL ST
ST HILLIERS RD
RAWSON ST
CUMBERLAND COUNCIL

APPENDIX D – PMF LEVELS

CUMBERLAND CITY COUNCIL

7 December 2020

Our Reference EC2020/1028
Contact Rolyn Sario
Telephone 8757 9536

Letizia Villa
Unit 2.01, 828 Pacific Highway
GORDON NSW 2072

Dear Sir/Madam

PROBABLE MAXIMUM FLOOD LEVELS AT NO 11-13 PERCY STREET, AUBURN BEING LOTS 1&2 DP 1183821

Council refers to your request dated 2 December 2020 requesting flood information at the above property.

The above property is shown to be affected by the Probable Maximum Flood (PMF), according to the information available to Council from the "Draft Haslams Creek Overland Flood Study" prepared by Royal Haskoning DHV in March 2016.

The PMF flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) as follows:

1. At location A - 9.8 mAHD
2. At location B - 8.8 mAHD
3. At location C - 8.6 mAHD
4. At location D - 8.2 mAHD
5. At location E - 8.0 mAHD

Flood levels are not static due to changing circumstances (e.g. revision of the flood model) and accordingly the above flood level is only valid for six months from the above date.

The coloured areas on the attached map represents the extent of the flood event. The light brown areas do not attract flood controls.

PMF levels are primarily used for evacuation purposes in the development of the property.

16 Memorial Avenue, PO Box 42, Merrylands NSW 2160
T 02 8757 9000 E council@cumberland.nsw.gov.au W cumberland.nsw.gov.au

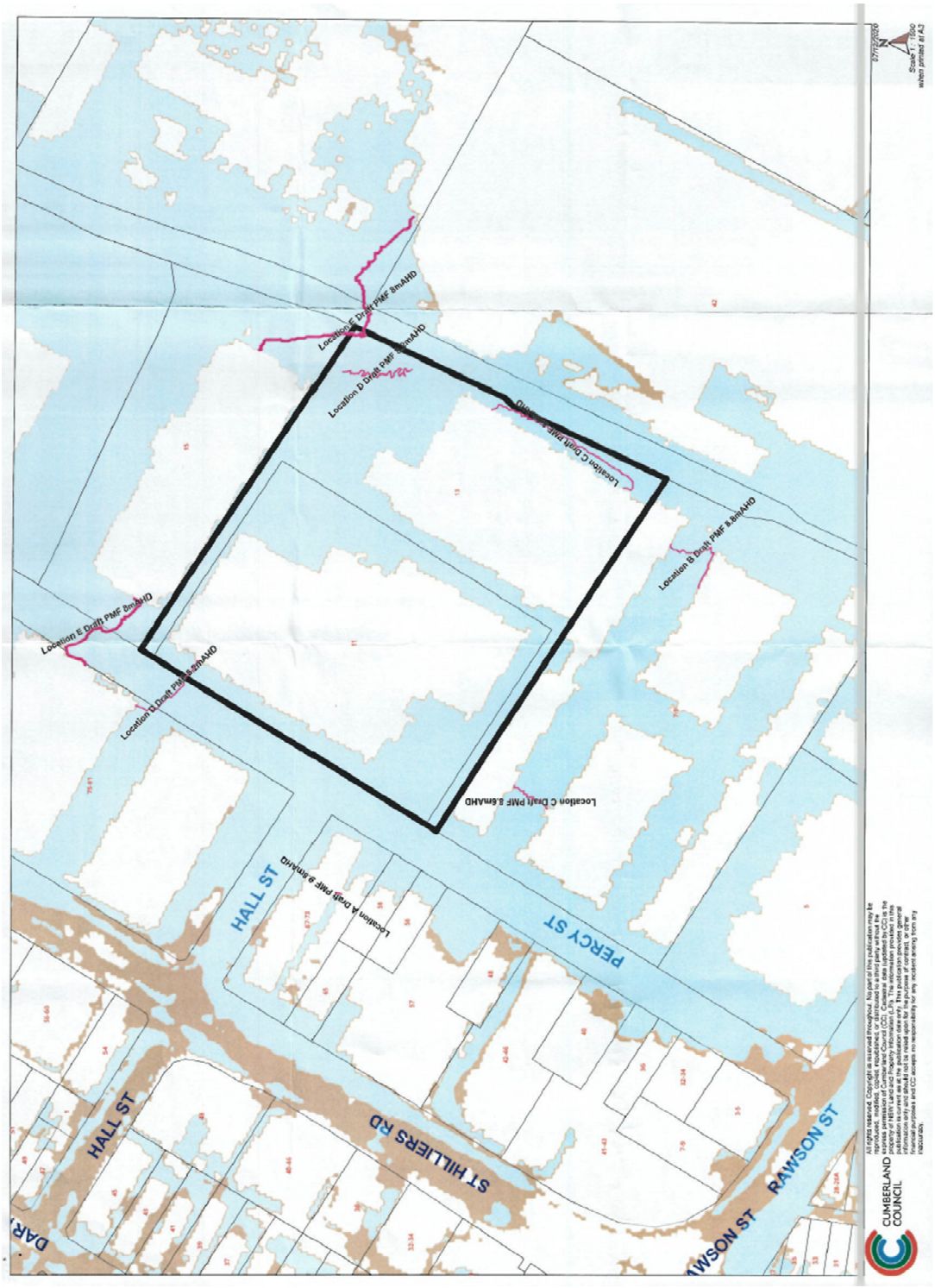
Welcome *Belong* Succeed

henry&hymas

If you have any further enquiries regarding this matter please contact Council's Senior Stormwater Engineer, Mr Mark Evens on 8757 9538 or Council's Drainage Engineer, Mr Rolyn Sario on 02 8757 9536.

Yours sincerely,

SIVA SIVAKUMAR
MANAGER – ENGINEERING & TRAFFIC


Location E Draft PMF 8mAHD
Location D Draft PMF 8mAHD
Location C Draft PMF 8.6mAHD
Location B Draft PMF 8.8mAHD
Location E Draft PMF 8mAHD
Location D Draft PMF 8mAHD
Location C Draft PMF 8.6mAHD
Location A Draft PMF 8.8mAHD
HALL ST
PERCY ST
HALL ST
ST HILLIERS RD
RAWSON ST
RAWSON ST
CUMBERLAND COUNCIL

APPENDIX E – HASLAMS CREEK FLOODPLAIN DEVELOPMENT CONTROLS

Table 5 – Development controls.

Haslams Creek Floodplain

(Also applies to Duck River and Cooks River Floodplain in interim - subject to review)

Planning Consideration	Flood Risk Precincts (FRP's)																		
	Low Flood Risk							Medium Flood Risk							High Flood Risk						
	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development	Essential Community Facilities	Critical Utilities	Subdivision	Residential	Commercial & Industrial	Recreation & Non-Urban	Concessional Development
Floor Level		5									2,3,4	2,3	1	6						1	2,6
Building Components		2									1	1	1	1						1	1
Structural Soundness		3									2	2	2	2						1	1
Flood Affectation		2								1	2	2	2	2						1	1
Evacuation		2,4	*	3,4	4					*	3,4	3,4	1	3						1	3
Management & Design		1,2,3	1							1	2,3,5	2,3,5	2,3,5	2,3,5						2,3,5	2,3,5

Not Relevant

Unsuitable Land Use

* Refer to '*Management & Design*' planning consideration for subdivision

Note: *Filling of the site, where acceptable to Council, may change the FRP considered to determine the controls applied in the circumstances of individual applications .*

Floor level

1	All floor levels to be equal to or greater than the 5 year ARI flood level plus freeboard unless justified by site specific assessment.
2	Floor levels of open car parking areas to be equal to or greater than the 20 year ARI flood plus freeboard. This may be achieved with a suspended floor which allows the continued passage of flood waters or filling if justified by a site specific assessment, as required with reference to flood affectation and other controls below. Enclosed car parking (e.g. garages or basement car parking) must be protected from the 100 year ARI flood.
3	Habitable floor levels to be equal to or greater than the 100 year ARI flood plus freeboard.
4	Below ground swimming pools should be free from inundation from storms up to the 5 year ARI. Where required, the private open space of a dwelling should be a usable outdoor recreation area which, during storm events equal to less than the 5 year ARI, is free from inundation by overland flows exceeding 50mm.
5	All floor levels to be equal to or greater than the probable maximum flood plus freeboard.
6	Floor levels to be as close to the design floor level (the level nominated above that would apply if not concessional development) as practical and no lower than the existing floor level when undertaking alterations or additions.

Note: The freeboard height in the Haslams Creek floodplain is variable primarily, due to the implications of sub-critical and super-critical flows caused by obstructions to the flowpath of flood waters, and can be determined by reference to a map and tables produced as part of the Haslams Creek FRMP and held in the offices of Council. The freeboard height for the Duck River and Cooks River floodplains is 0.5m.

Building components and method (Also see Table 7)

1	All structures to have flood compatible building components below or at the 100 year ARI flood level.
2	All structures to have flood compatible building components below or at the PMF level.

Structural soundness

1	Engineers report to certify that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood.
2	Applicant to demonstrate that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood.

3	Applicant to demonstrate that any structure can withstand the forces of floodwater, debris and buoyancy up to and including a PMF flood.

Flood affectation

1	Engineers report required to certify that the development will not increase flood affectation elsewhere.
2	The impact of the development on flooding elsewhere to be considered.

Note: When assessing flood affectation the following must be considered:
1. Loss of storage area in the floodplain (except for filling occurring up to the 20 year ARI.
2. Changes in flood levels caused by alteration of conveyance of flood waters.
3. Filling between the 20 year and 100 year ARI flood levels will not be permitted.

Evacuation

1	Reliable access for pedestrians required during a 5 year ARI flood.
2	Reliable access for pedestrians and vehicles required during a PMF flood.
3	Reliable access for pedestrians or vehicles is required from the dwelling, commencing at a minimum flood level equal to the lowest habitable floor level to an area of refuge above the PMF level, either on-site of off-site.
4	Applicant to demonstrate that the development is to be consistent with any relevant DISPLAN or flood evacuation strategy.

Management and design

1	Applicant to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this Part.
2	Site Emergency Response Flood plan required (except for single-dwelling houses) where floor levels are below the design floor level.
3	Applicant to demonstrate that area is available to store goods above the 100 year flood plus 0/5m (freeboard).
4	Applicant to demonstrate that area is available to store goods above the PMF flood plus 0.5m (freeboard).
5	No external storage of materials below design floor level which may cause pollution or be potentially hazardous during any flood.

DEVELOPMENT CONTROL No.	ACTION
Floor Level - control no.2	The proposed levels within the parking areas are proposed to be higher than the 20yr ARI
Floor Level - control no.3	The proposed floor level is proposed to be that of the 1:100yr flood level + 500MM freeboard
Building components and methods - control no.1	All the building components that are below or at the 100yr ARI flood level are flood compatible.
Structural soundness - control no.2	A certificate will be issued by the Structural Engineer at construction phase.
Flood affectation - control no.2	It is proposed to build a suspended structure over the flood extent in order to eliminate the need of any filling in the area. As a consequence, the flood storage volume will not be impacted, therefore not negatively impacting any other area of the site or downstream of the property as a result of the development.
Evacuation - control no.3	Refuge for the staff present in the facility during a flood event is provided on the mezzanine floor, which is located above the PMF level.
Evacuation - control no.4	Refer to evacuation plan and shelter in place plan
Management and design - control no.2	Refer to evacuation plan and shelter in place plan
Management and design - control no.3	The entire habitable floor is proposed to be at a level that results from the 1:100yr flood level + 500mm freeboard
Management and design - control no.5	No proposed external storage below the design floor level

APPENDIX F – FLOOD EMERGENCY RESPONSE PLAN

	FLOOD WARDENS	STAFF	RESIDENTS AND VISITORS
PREPARE	-Check Bureau of Meteorology periodically for Severe Weather Warnings and broadcast to staff.	-Notify the Flood Warden if Weather Warning is current but has not been broadcast. -Be aware of who the flood wardens are on duty.	- Be aware of location of muster Point. Recommended only as a emergency solution.
HEAVY RAINFALL BEGINS			
MANAGE	- Monitor the level in the Creek	− Encourage less mobile persons to evacuate the shop and the site.	- Exercise caution if leaving. Less mobile persons to seek assistance. - Obey speed limits in car park and public roads.
WARNING ALARM TO SOUND WHEN WATER LEVEL IN HASLAMS CREEK IS RISING			
MONITOR	- Verify alarm. - Advise staff and visitors of situation. - Monitor water level at regular intervals.	- Wait for guidance from wardens as to actions. - Reassure customers. - Monitor water levels if appropriate.	- Look to staff and wardens for guidance. - While not recommended, this is the last chance to leave site for higher ground.
IDENTIFY MAJOR FLOOD	- Sound alarm, if a dangerous water level is identified and alarm has not sounded. - Warden to contact Local Emergency Management Officer or Duty Officer at SES Local Headquaters on **132 500**. Advise them of the situation.	− Sound alarm, if a dangerous water level is identified and alarm has not sounded.	- Notify staff if water is at the beginning of the driveway.
FLOOD ALARM TO SOUND WHEN WATER LEVEL REACHES 1m BELOW THE NORTHBRIDGE ROAD			
ACTION	− Remain calm. − Warden to Verify alarm, unless manually activated Encourage orderly vacate the store and the site. -Check if there is flooding on Percy street. − Check all staff have left the carpark. Close the access of the site if there is flooding on Percy street.	− Remain calm. − Assist with movement of less mobile persons.	− Remain calm. − Calmly move to higher ground.
ASSESS	− Warden to stay in touch with SES and Local Emergency	− Remain calm. − Reassure customers.	− Remain calm.

	Management Officer to determine when flood waters are receding. − Warden to assess if ok to return if inundation has subsided.	− Wait for guidance from Wardens.	− Wait for guidance from Staff.
RECOVERY	− Coordinate clean up of debris.	− Assist with clean up of debris on site.	− Once notification has been received exit site, taking care to avoid debris left from the flood.

General advice for flood emergency

- Do not go into an affected area until the all clear has been given by the Emergency Services
- If you can, contact staff to ensure they are okay and are aware of the work situation
- Keep listening to your local radio station and other media, including social media, for information, updates and advice
- Follow all instructions given to you by the Emergency Services
- Update your emergency with what you have learnt from this disaster
- Protect your business site from any further damage should be checked by a licensed electrician before power is turned back on
- Make personal contact with your insurance claims manager, the sooner the insurance company is alerted, the quicker the insurance claim can be processes as the company has to alert the insurance assessor
- Notify other businesses and/or suppliers of any change of address or contact number for your business, including the Post Office

You can also contact Cumberland Council for local flood information on 02 8757 9000 or visit one of the websites:

- www.cumberland.nsw.gov.au
- www.floodsafe.com.au/local-flood-information-and-events

You can also listen to local radio stations for local warnings, updates and information, such 702 ABC SYDNEY 702 AM; 2CH 1170 AM; 2DAY FM 104.1 FM; 2GB 873 AM; 2ME 1638 AM; 2SM/GORILLA 1269 AM; 2UE 954 AM; 2VTR HAWKESBURY 89.9 FM; BLU FM 89.1 FM; MIX 106.5 106.5 FM; NOVA 96.9 FM; RADIO 2MORO 1620 AM; RADIO 2RDJ 88.1 FM; SBS RADIO 97.7 FM; SYDNEY'S 95.3 95.3 FM; TRIPLE M 104.9 FM; WFSM 101.7 FM.

Being prepared now can significantly reduce loss of life, loss of property, loss of possessions and loss of business. Being prepared now can also help you respond better and allow your business to recover faster when these events happen. Every disaster recovery plan has five key steps:

- Identify Risks
- Minimise or eliminate risks
- Identify who has to do what should a disaster occur
- Determine and plan your recovery contingencies
- Communicate the plan to all the people it refers to.

Natural disasters can damage property and people but they can also often help build a sense of community. Talk to other business owners and help each other where possible. Share information.

As part of the recovery from natural disasters, communities and Government are also supported by the non-government sector. Community partners such as the Salvation Army, Adventist Disaster and Relief Agency (ADRA), Anglicare, St.Vincent DePaul and the Red Cross provide a range of assistance to support people and communities in time of need.

Disaster Recovery Centres may be established following some disasters. Recovery centres may provide a range of welfare services including financial assistance, personal support, organising temporary accommodation and providing information and referrals. If you have been affected by floods and require assistance contact Disaster Welfare Services on 1800 018 444.

SHELTER IN PLACE - FLOOD EVACUATION PLAN	
Issue:	In the event of an extreme flood, evacuation from the site may not be possible, and all staff and visitors (the occupants) may be required to remain on site until such stage as the flood recedes, or until directed to leave the site by emergency services personnel. The reason that evacuation from site may not be possible is because the roads surrounding the site will also be flooded. For this reason, the Flood Evacuation Plan for the site will be to Shelter in Place, whereby the occupants can remain in the building and be safe from rising flood waters. The site is affected by flooding in the 1:100yr event and PMF. Flooding will generally be caused by rising flood waters from Haslams Creek located along the southern boundary of the site and on Percy Street along the frontage of the site. To put this in perspective, the flood level for a 1 in 100 year storm will range from RL7.0m to 7.4m along Percy Street in front of the site, which is below the ground floor. For the Probable Maximum Flood (PMF) which is the largest flood possible, the flood level will be higher than the floor level (ranging from RL8.2m to 8.6m). For the safety of the occupants, procedures and actions must be put in place for managing such a flood. These will include preparation prior to flooding, during flooding and after the flood recedes. The following are identified issues in which occupants become exposed to flood hazards: 1. Occupants exposed to flood waters within site grounds (outside building); 2. Occupants exposed to flood waters within building; 3. Occupants exposed to flood waters while accessing or leaving site. Prior to the flood reaching its peak, procedures and actions should have already been implemented to prevent further exposure to occupants within the site.
Documentation / Forms	All events and actions to be documented with the following forms: • Injury Report • Property Damage Report • Media Contact Report • Fatality Report
Where there is a possibility that the building may be exposed to a flood, staff members should consider the following actions: (a) Immediately advise the duty manager, their workplace manager, immediate supervisor or Warden who will notify the Emergency Coordinator; (b) Ensure that they do not use any property services such as lifts; the operation of which may be affect by the flood. (c) Remain in their normal area unless it is unsafe to do so as leaving may expose them to possible risk. If individual residents do depart it may also create difficulties in accounting for them; (d) Follow the directions of Wardens if there is a need to evacuate the building; (e) Move to a designated assembly area or such other location as directed; and (f) Remain at the evacuation assembly area until it is unsafe to do so or directed to return by the Emergency Coordinator or the officer in charge of the responding Emergency Service.	

SHELTER IN PLACE - FLOOD EVACUATION PLAN		
Preparation Phase:	**Action**	**Time**
Staff to be made aware of the threat posed by flooding - New staff to be made aware of the risk of flooding. - New staff to be trained in the procedures and actions to implement in the event of a flood. - Existing staff to undergo refresher training on an annual basis.		
During heavy rainfall events, duty manager to monitor weather warning services: Bureau of Meteorology, NSW SES, Local Emergency Operations Controller (LEOCon).		
All staff to be trained on shelter in place evacuation procedures and refreshed annually.		
Local SES and LEOCon to be advised of shelter in place flood evacuation strategy. The Emergency Coordinator is to ensure that the details of the relevant contacts (SES and LEOCon) are located in a prominent location in the duty manager's office.		
Install permanent signage in appropriate locations describing flood risk and evacuation routes within the building and assembly point.		
Residents to be educated of the hazard posed by floods and the shelter in place evacuation strategy and procedure. This should be undertaken for all new staff and on an ongoing basis thereafter.		
Regular maintenance and testing of flood warning system and emergency power supply to be carried out. Maintenance and testing should be made in accordance with the manufacturer's, supplier's and legislative requirements.		
Visitor books and staff list should be maintained at all times to ensure that all occupants are able to be accounted for.		
Respond Phase	**Action**	**Time**
Weather Warning Received		
Upon receipt of a severe weather warning, the Emergency Coordinator shall notify all staff and visitors of a potential risk of flood. The warning should be broadcasted through the PA system. A role call/head count should be taken to ensure all staff are accounted for. The visitor book should also be checked to ensure all visitors are accounted for.		
Any visitors or staff in external areas are to be brought inside.		
Duty manager to stay in contact with LEOCon and NSW SES to monitor the situation.		
Non-essential electrical equipment on ground floor to be unplugged.		
Emergency power supply to be switched on in preparation for shelter in place requirements.		
Evacuation Alarm Signalled		
All staff and visitors to shelter at ground floor or mezzanine floor, depending on severity of storm event advised by NSW SES and LEOCon.		
Duty Manager to inform NSW SES and LEOCon that shelter in place flood evacuation strategy has been implemented.		
If possible, vehicles parked on site shall be moved to the Mezzanine floor (the highest vehicular trafficable location)		

Lifts to be parked on mezzanine floor and isolated to prevent accidental use or persons becoming trapped. Barriers placed across lift doors at ground level.		
All ground-floor electrical circuits to be isolated.		
All ground floor electrical equipment to be unplugged.		
Staff to reassure visitors to stay calm and prevent any persons from moving out of the building by reminding them that the floor level is higher than the highest possible flood level.		
Staff to remain with all persons until the flood level recedes and NSW SES advises the situation is all clear.		
Warning issued by SES to evacuate site		
If NSW SES issues the order to evacuate from the site, Duty manager to remain in constant communication with NSW SES. Duty manager to confirm location of evacuation site, method of evacuation and safest evacuation route with NSW SES, and then inform staff of details.		
Staff to lead organised groups of visitors and other staff (all persons) to the evacuation site following the selected evacuation route.		
Prior to moving to evacuation site, staff to perform role call/ headcount to account for all persons. This role call/ headcount should be undertaken again upon the arrival of the evacuated site.		
Staff to remain with all persons until the NSW SES advises the situation is all clear.		
Recover Phase	**Action**	**Time**
Cleaning and repairs to be carried out as required depending on the extent of flood damage. This may include property within the building or outside including services. This process should be managed by the relevant OPAL maintenance team.		
Testing of services and equipment to be conducted by qualified tradesmen before being re-instated.		
Review effectiveness of flood evacuation plan and update if required. If flood evacuation plan is update, inform NSW SES and LEOCon of amendments to the plan.		
All staff are to be informed of updated flood evacuation plan and retrained as required.		

APPENDIX G – STATE EMERGENCY SERVICE (SES) ADVICE

10 December 2020

Boro Seizov
Partner, Senior Civil Engineer
Henry & Hymas
Suite 2.01 828 Pacific Highway
GORDON NSW 2072

Cc: seizovb@hhconsult.com.au

Dear Boro,

ADVICE: NSW STATE EMERGENCY SERVICE ON FLOOD EMERGENCY RESPONSE PLAN

Thank you for contacting the NSW State Emergency Service in relation to the preparation of a Flood Emergency Response Plan for a distribution centre for Woolworths located on 11-13 Percy Street, Auburn.

We appreciate your business taking such a proactive approach in preparing for Flood and Storm Emergencies.

The Floodplain Development Manual 2005, Section N7.1 discusses the limitations of private flood plans. In accordance with section N7.2 the NSW SES does not provide support development conditions requiring endorsement or review of private plans by the NSW SES. NSW SES also does not provide reviews on private flood emergency plans due to lack of resources to deal with the volume across NSW.

To provide support and assist, NSW SES directs you to the online resources which are available to the community on the www.ses.nsw.gov.au website which include helpful pages such as:

- Know Your Risk (enter your town or postcode).
- Local Plans and Guides
- Flood Storm and Tsunami Plans which includes locally endorsed NSW SES Flood Emergency Sub Plans
- Emergency Business Continuity Plan online tool which steps you through the process of developing your own Business Emergency Plan.

We note that specific local advice may be helpful when completing steps 6 and 8 of the online Emergency Business Continuity Plan.

NSW SES - Metro Zone
2 Johnston Road, Bass Hill NSW
PO Box 431,Kingswood NSW 2197
P 132 500
E communityplanning@ses.nsw.gov.au
www.ses.nsw.gov.au
ABN: 88 712 649 015

For future enquiries please contact us via the Contact Us form on the NSW SES website, with a request for the local NSW SES Unit to contact you to provide guidance on these parts of your Emergency Plan.

Yours faithfully,

Shelly Stingmore

Shelly Stingmore
Coordinator Planning
Metro - Hazard Planning
NSW State Emergency Service
Mobile 0408 286 022
Email: shelly.stingmore@one.ses.nsw.gov.au