

# MEMORANDUM

To	Alex Lisney	From	Catherine Walker
Copy	N/A	Reference	20056-1
Date	1 November 2022	Pages	48
Subject	HammondCare Wahroonga Stage 2 – Flood Assessment		

## 1 PROJECT BACKGROUND

This Flood Report is submitted to the Department of Planning and Environment (DPE) in support of a State Significant Development Application (SSD-45121248) for the redevelopment of part of the site at 4-12 Neringah Avenue South, Wahroonga for the purposes of delivering additional community health services, seniors housing, as well as upgraded palliative care facilities that will contribute to the broader operation of 'Neringah Hospital.' The extent of the site is shown below.



**Figure 1-1** Outline of the site, with the portion of the site subject to the SCC shaded dark red (R4 zone)

Specifically, this SSDA seeks approval for the following:

- Site preparation works comprising:
  - Demolition of the Neringah Hospital building, kiosk, and existing at-grade carparks;
  - Clearing of nominated vegetation on the proposed development areas;

- Bulk earthworks including basement excavation; and
- Remediation works where necessary across the site.
- Construction and use of an integrated seniors housing and health services facility across two buildings ranging from 4-5 storeys above ground, comprising:
  - 2 basement levels containing minimum of 130 car parking spaces and service dock;
  - 12 residential aged care facility beds (extension to existing Stage 1 provision);
  - 18 palliative care hospice beds (Schedule 3 health services facility);
  - Community healthcare services, including outpatient palliative care, centre for positive aging and Hammond at Home;
  - 57 seniors housing dwellings;
  - On-site administration, amenities, and ancillary operations spaces.
  - Ground level and on-building landscaping works, including the provision of a through site pedestrian link connecting Archdale Park and Balcombe Park;
  - Public domain works, specifically, regrading of part of the pedestrian walkway known as 'Archdale Walk' to provide accessible connection; and
  - Extension and augmentation of infrastructure and services as required including new site signage.

This report has been prepared to respond to the Secretary's Environmental Assessment Requirements (SEARs) for SSD-45121248 that were issued on 24 June 2022. A table referencing responses has been provided below.

**Table 1-1 Flood-related SEARs**

Secretary's Environmental Assessment Requirements – Flooding Risk	Relevant Section of this Report
Identify any flood risk on-site in consultation with Council and having regard to the most recent flood studies for the development area and the potential effects of climate change, sea level rise and an increase in rainfall intensity.	Sections 2 through 6 detail the flood risk assessment process undertaken by WMS and assessment outcomes.
Assess the impacts of the development, including any changes to flood risk onsite or off-site, and detail design solutions to mitigate flood risk where required.	Not relevant, as no flood risk identified.

## 2 SITE INSPECTION

A site inspection was undertaken by WMS on the 21<sup>st</sup> of July 2022 to gain an appreciation of the upstream catchment, hydraulic features and drainage network in the vicinity of the site. The photos taken during the site inspection are provided in Appendix A.

## 3 LOCAL TOPOGRAPHY

Following a review the available topographic data (1 m resolution LiDAR – NSW Gov, 2020), it has been identified that the site is located in the upper reaches of the Cockle Creek catchment, a tributary of Cowan Creek, which drains northwards into the Hawkesbury River. The site location and study area topography are illustrated in Figure 3-1.

The topographic data (1 m resolution LiDAR – NSW Gov, 2020) indicates that the catchment boundary (approximately aligning with the Pacific Highway at this location) is located only 90 m south (upstream) of the site. With limited upstream catchment, it is anticipated that the flood risk at the site is minimal, as there would be limited runoff accumulating from the south and entering the site.

Furthermore, an above ground, brick water supply tank (Wahroonga Reservoir) is located approximately 30 m south (upstream) of the site. This structure would likely obstruct any runoff from the Pacific Highway from reaching the site, further reducing the catchment draining to the site. In addition, rain that falls on the roof of the reservoir would be directed to the stormwater discharge point on Neringah Avenue South rather than running northwards into the site.

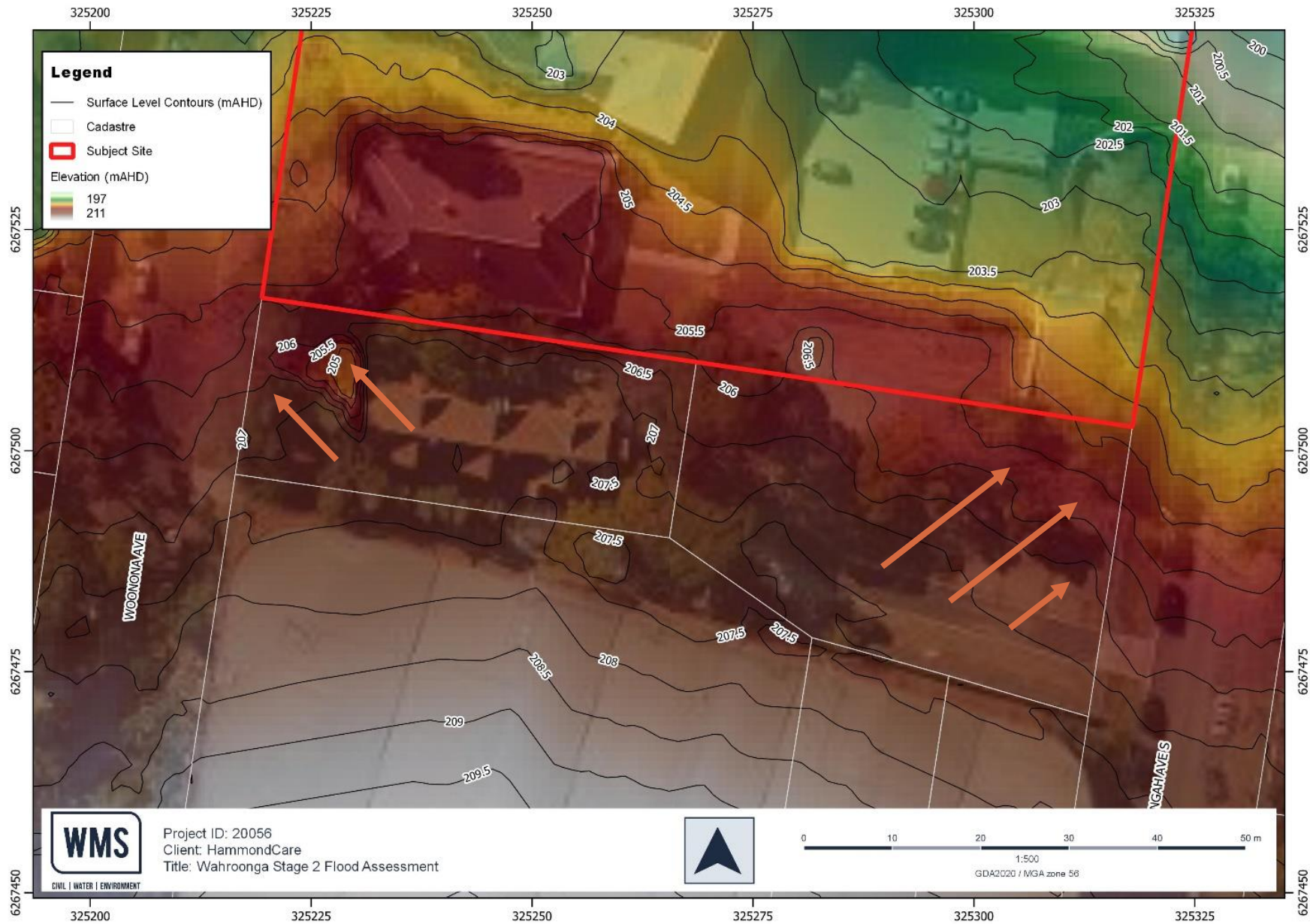
Between the reservoir and the site there is an area of 0.245 hectares of vacant land, currently characterised by grassy vegetation. There is the potential for rainfall that does not infiltrate the pervious surface here to runoff to the north and into the site. Information from hospital staff indicates however that this has not occurred in recent heavy rainfall events (5<sup>th</sup> July 2022 and 6<sup>th</sup> March 2022), and that this area drains in an easterly direction to Neringah Avenue South.





Figure 3-1 Study Area and Topography





**Figure 3-2** Topography Immediately Upstream (south) of Subject Site (orange arrows indicate likely direction of runoff flow)



## **4 EXISTING CONDITIONS – FLOOD RISK ASSESSMENT**

### **4.1 AVAILABLE FLOOD INFORMATION**

As previously mentioned, the site is located at the catchment boundary of the Cockle Creek, a tributary of Cowan Creek, which drains northwards into the Hawkesbury River.

There is no publicly available flood information for the Neringah Hospital Site. As such, WMS has undertaken a desktop review of the local topography and catchment and a site visit to better understand the site characteristics and form an understanding of the potential flood risk at the site.

### **4.2 MAINSTREAM FLOOD RISK**

The closest watercourses in the vicinity of the site are a local open drainage channel at Warwilla Avenue (refer Photos 19 and 20), located approximately 150 m north (downstream) of the site, and Cockle Creek, located approximately 520 m north (downstream) of the site. There is an elevation difference of at least 10 m between the subject site and these watercourses, and, as such, it is unlikely that water from the drainage channel or Cockle Creek would reach the site in the event of a flood. Therefore, the subject site is not considered to be at risk of flooding from mainstream sources.

### **4.3 OVERLAND FLOW FLOOD RISK**

The site inspection undertaken on the 21<sup>st</sup> July 2022 confirmed that the local topography slopes steeply downward from south to north, with the subject site located near the crest of the hill at the Pacific Highway. The Wahroonga Reservoir sits between the Pacific Highway and the subject site, and would likely act as a barrier to local runoff that might flow from the Pacific Highway towards the site, and divert it towards the adjacent Woonona and Neringah Avenues (refer Photos 6–12). Direct rainfall on the roof of the Wahroonga Reservoir would be collected and conveyed to the local drainage network via the reservoir's gutters and roof drainage system.

Both Woonona and Neringah Avenues grade steeply downwards towards Warwilla Avenue to the north, and the presence of several drainage pits indicate the avenues are serviced by a local drainage network (refer Photos 1–3, 21–23, 25, 27, 28 and 31). Inspection of the topography and site observations also show that the ground levels at the subject site are generally higher than the road crest levels at Woonona and Neringah Avenues, indicating that stormwater runoff would likely flow north along Woonona and Neringah Avenues towards Warwilla Avenue, and therefore would be unlikely to enter the subject site.

A small parcel of land between the subject site and the Wahroonga Reservoir (refer Photos 4, 5, 13, 14, 32–36) was inspected during the site visit (though access to the private land was not available). Based on the topography (refer Figure 3-2), local runoff from this area is likely to drain northeast and northwest towards Neringah and Woonona Avenues, respectively. Furthermore, due to the limited size of the area, any runoff that potentially makes its way into the subject site from this parcel of land would not be expected to pose a flood risk to the site.

## 5 NSW STATE LEGISLATION: FLOOD PLANNING

Development within the Flood Planning Area in the Ku-ring-gai LGA must demonstrate compliance with Ku-ring-gai Local Environmental Plan (LEP) 2015, Clause 5.21: Flood Planning.

Following our review of flood risk at the site, WMS is of the opinion that the site is not subject to mainstream nor overland flood risk. For the sake of completeness, we have provided comments on each LEP requirement to satisfy the approving authority that the proposed development is able to demonstrate compliance with all requirements.

The objectives of Clause 5.21 – Flood Planning are as follows:

- a) To minimise the flood risk to life and property associated with the use of land;
- b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,
- c) to avoid adverse or cumulative impacts on flood behaviour and the environment,
- d) to enable the safe occupation and efficient evacuation of people in the event of a flood.

The planning requirements set out in the LEP are detailed and addressed regarding the proposed development in Table 5-1.

**Table 5-1 Ku-ring-gai LEP, Section 5.21, Flood Planning – Requirements**

Planning Requirements	Comment	Compliant (tick/cross)
(1) Objectives, see list above.	n/a	n/a
(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development	<i>The proposed development is not within a flood precinct planning area defined by Ku-ring-gai Council and satisfies the planning requirements as outlined below.</i>	✓
(a) is compatible with the flood function and behaviour on the land, and	<i>The Flood Risk Assessment indicates the site is <u>not</u> subject to mainstream (riverine) or overland flow flood risk.</i>  <i>As such, the proposed development is considered compatible with the existing flood function.</i>	✓
(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and	<i>The proposed development is <u>not</u> located within or adjacent to existing watercourses or overland flow paths, and therefore it is not expected that the proposed development would adversely affect flood behaviour on other developments.</i>	✓
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and	<i>The proposed development site is not considered subject to flood risk. As such, safe occupation is considered feasible without the need for evacuation during flood events.</i>	✓
(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	<i>The proposed development site is not considered subject to flood risk. As such, safe occupation is considered feasible without posing risk to life from flooding.</i>	✓
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.	<i>The proposed development is wholly contained within the existing site and will not encroach on riparian corridors or watercourses.</i>	✓
(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters		



(a) the impact of the development on projected changes to flood behaviour as a result of climate change,	<i>An increase in rainfall intensity associated with climate change could be expected to increase rainfall intensity within and immediately upstream of the site. This is anticipated to be adequately managed through appropriate stormwater management design.</i>	✓
(b) the intended design and scale of buildings resulting from the development,	<i>The proposed development is wholly contained within the site, in keeping with the current scale of development within the site.</i>	✓
(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,	<i>The proposed development site is not considered subject to flood risk. As such, safe occupation is considered feasible without the need for evacuation during flood events.</i>	✓
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	<i>The site is not affected by riverine flooding or coastal erosion, and removal or relocation of buildings is unlikely to be necessary due to overland flow.</i>	✓

## 6 RECOMMENDATIONS

Based on a site inspection, desktop review of available topographic data and professional experience in this region, WMS has determined that the Neringah Hospital site would not be subject to flood risk from mainstream sources (i.e. water overtopping the banks of a watercourse).

Furthermore, there is a limited catchment area upstream of the site (estimated at approximately 0.245 hectares), which grades towards Neringah Avenue South, indicating that the site would also not be subject to flood risk from overland flow.

The proposed hospital upgrade development should however take into consideration the following:

- Ensure runoff that may enter the site from the vacant land north of the site is appropriately directed to drains either within the site or Neringah Avenue South; and
- Ensure that runoff generated by rainfall within the site is managed appropriately and in accordance with the Ku-rin-gai Development Control Plan Part 24 – Water Management and any other relevant policies and guidelines (this falls under the Stormwater Management scope of works being undertaken by Northrop).

No further flood risk assessment nor hydrologic/hydraulic modelling is considered necessary for the Neringah Hospital Site under existing conditions or developed conditions.

Yours sincerely,



Catherine Walker  
Regional Manager – New South Wales

## **APPENDIX A**

### **SITE INSPECTION PHOTOS**



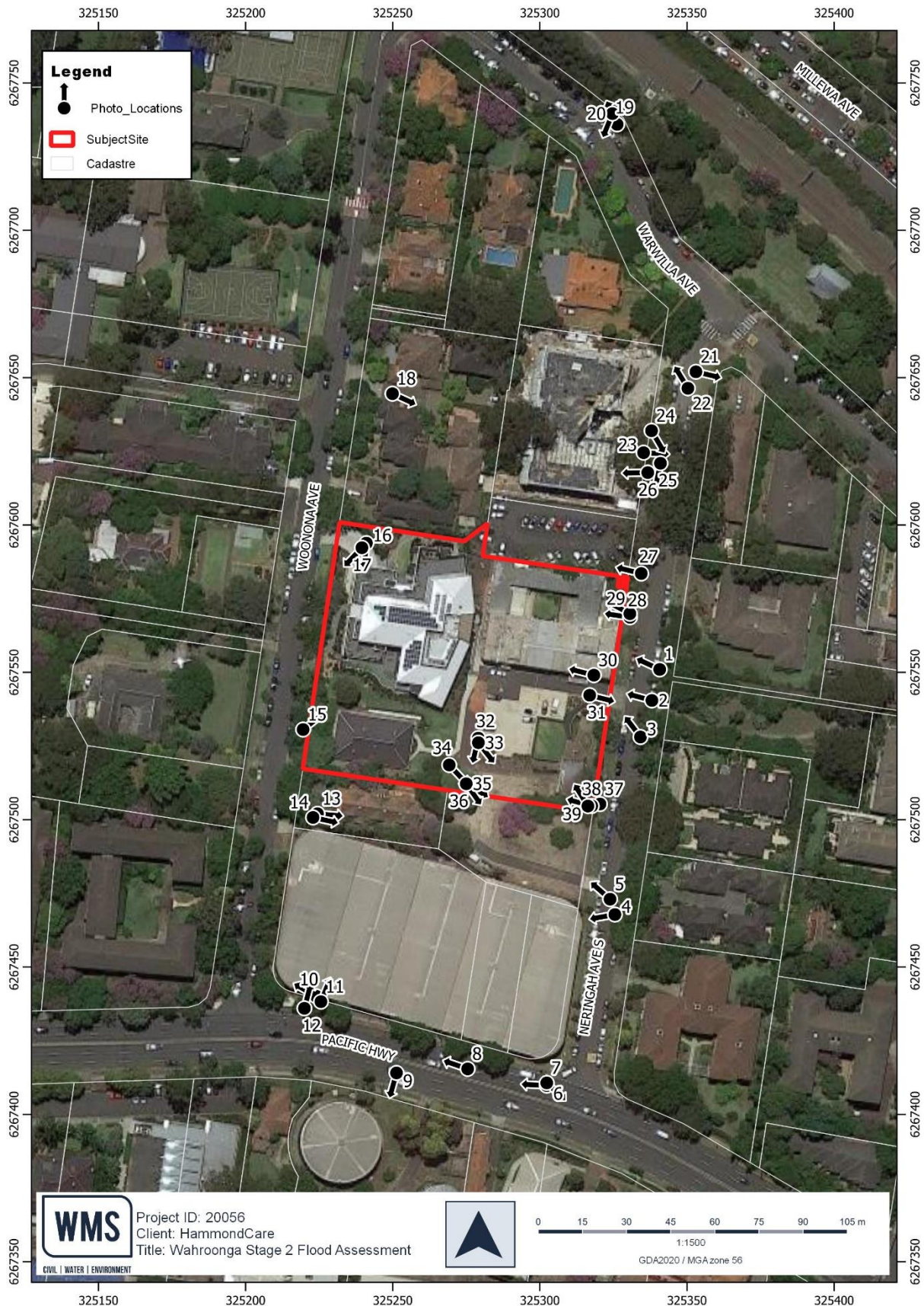


Figure A-1 Photo Locations





Photo 1





*Photo 2*





Photo 3





Photo 4





*Photo 5*





Photo 6





*Photo 7*





Photo 8





*Photo 9*





Photo 10



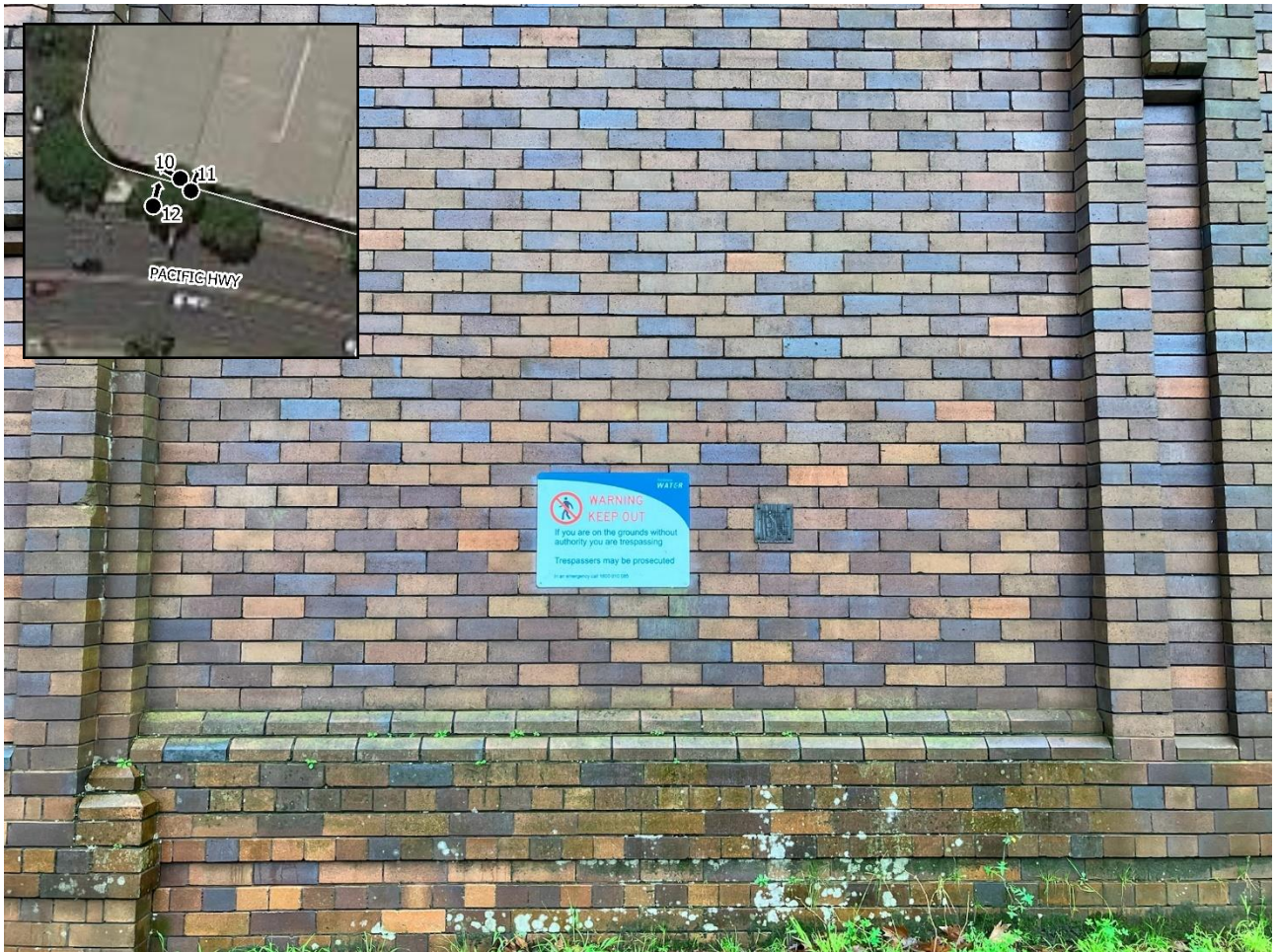


Photo 11





**Photo 12**





Photo 13





Photo 14





Photo 15





Photo 16



Photo 17





Photo 18





**Photo 19**





**Photo 20**





Photo 21





Photo 22





Photo 23





Photo 24





Photo 25





Photo 26





Photo 27





Photo 28





Photo 29





*Photo 30*





Photo 31





*Photo 32*





*Photo 33*





*Photo 34*





*Photo 35*





*Photo 36*





*Photo 37*





*Photo 38*





Photo 39