WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

3 October 2023

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Dear Michael,

Re: Flood Assessment – St. Cecilia's Primary School, 7-15 Panonia Rd., Wyong

This letter is a flood assessment report for the proposed development at St Cecilia's Catholic Primary School (7-15 Panonia Road, Wyong). It describes the nature of flooding on the site and the requirements of the planning instruments that currently apply to the site.

This flood assessment is based on the following documents:

- Flood Information Certificate issued by Central Coast Council (15 November 2022) – Attachment 1
- Wyong River Floodplain Risk Management Study and Plan prepared by Catchment Simulation Solutions (January 2020)
- Architectural plans – prepared by Gardner Wetherill (issued 19 April 2023)
- Central Coast Local Environmental Plan (LEP) 2022
- Central Coast Development Control Plan (DCP) 2022.

The Proposed Development

Catholic Schools Broken Bay owns and operates St Cecilia's Primary School at 7-15 Panonia Road, Wyong (Lots 4-8 Sec. 5 in DP 4361 and Lot 22 in DP 569261). The site is adjacent to the Wyong River and is relatively flat (Figure 1). It is bounded by Wyong River to the south, Panonia Road to the north, Wyong Bowling Club to the west and an existing dwelling to the east (Figure 1).

The development application proposes to demolish the existing demountable Building F on the southern margin of the site and the existing Buildings A, C and I in the school's north (Figure 2). The plans also include the construction of a new 2-storey building in the north-eastern corner of the site (Figure 3). St Cecilia's Catholic Primary School is an existing school with a school population of 308 students and 25 staff. The proposed development does not increase the number of people that may be on site at any given time. Similarly, the proposed development does not change the number of vehicles that could be on site at any given time, which remains at 23.

The ground floor of the new building will consist of an undercroft interactive outdoor learning area, plant, a store room and bathrooms (Figure 4). It will not include any classrooms. The first floor of the new building will include 6 new classrooms, plant and bathrooms (Figure 5 and Figure 6). This level will be connected to the first floor of the hall building to the south-east via stairs.

Figure 1 Site Overview (source: amended from Six Maps, NSW Govt. Spatial Services).

Figure 2 Demolition plan

Figure 3: Site plan

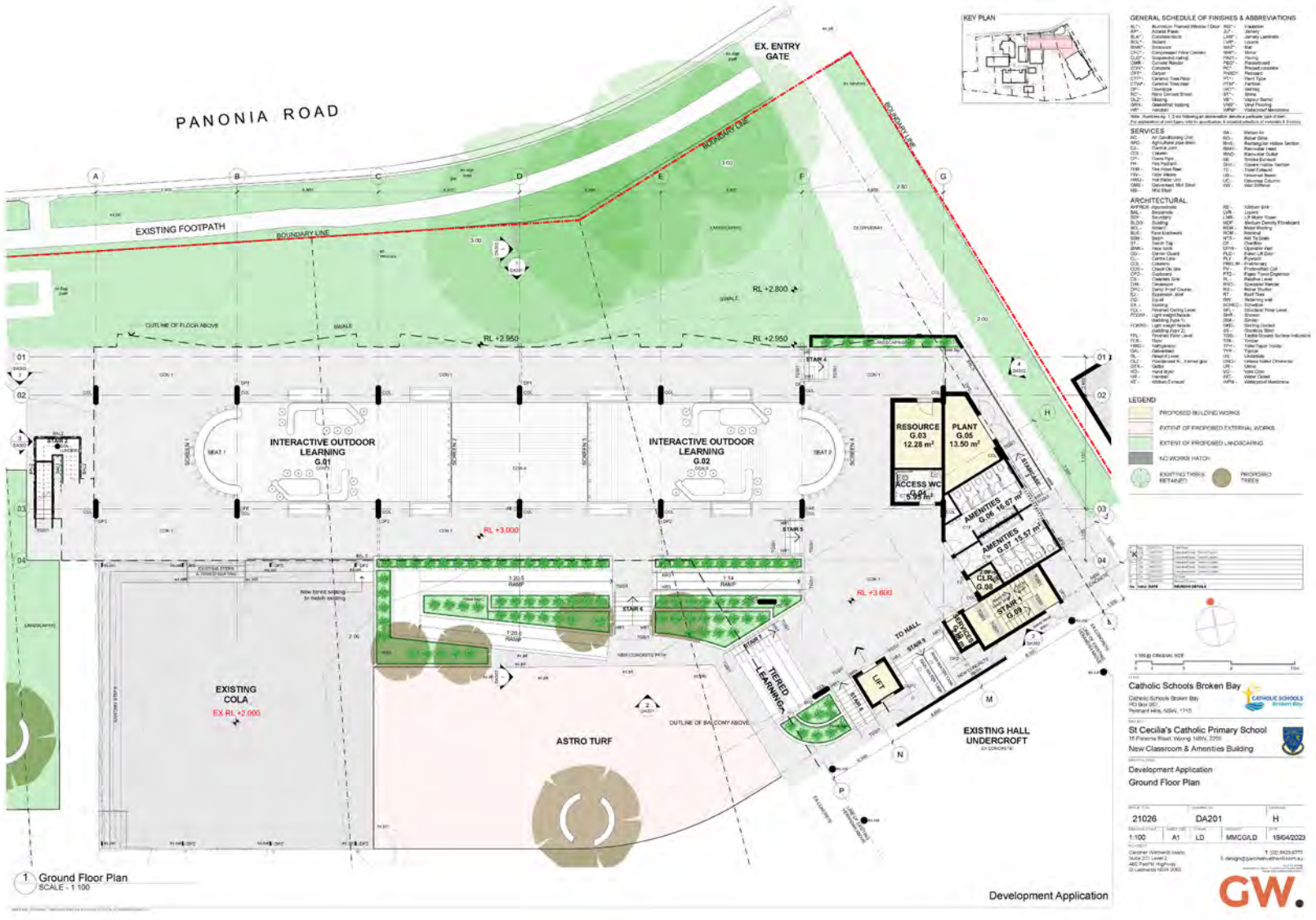

Figure 4: Ground floor plan

Figure 5: Level 1 floor plan

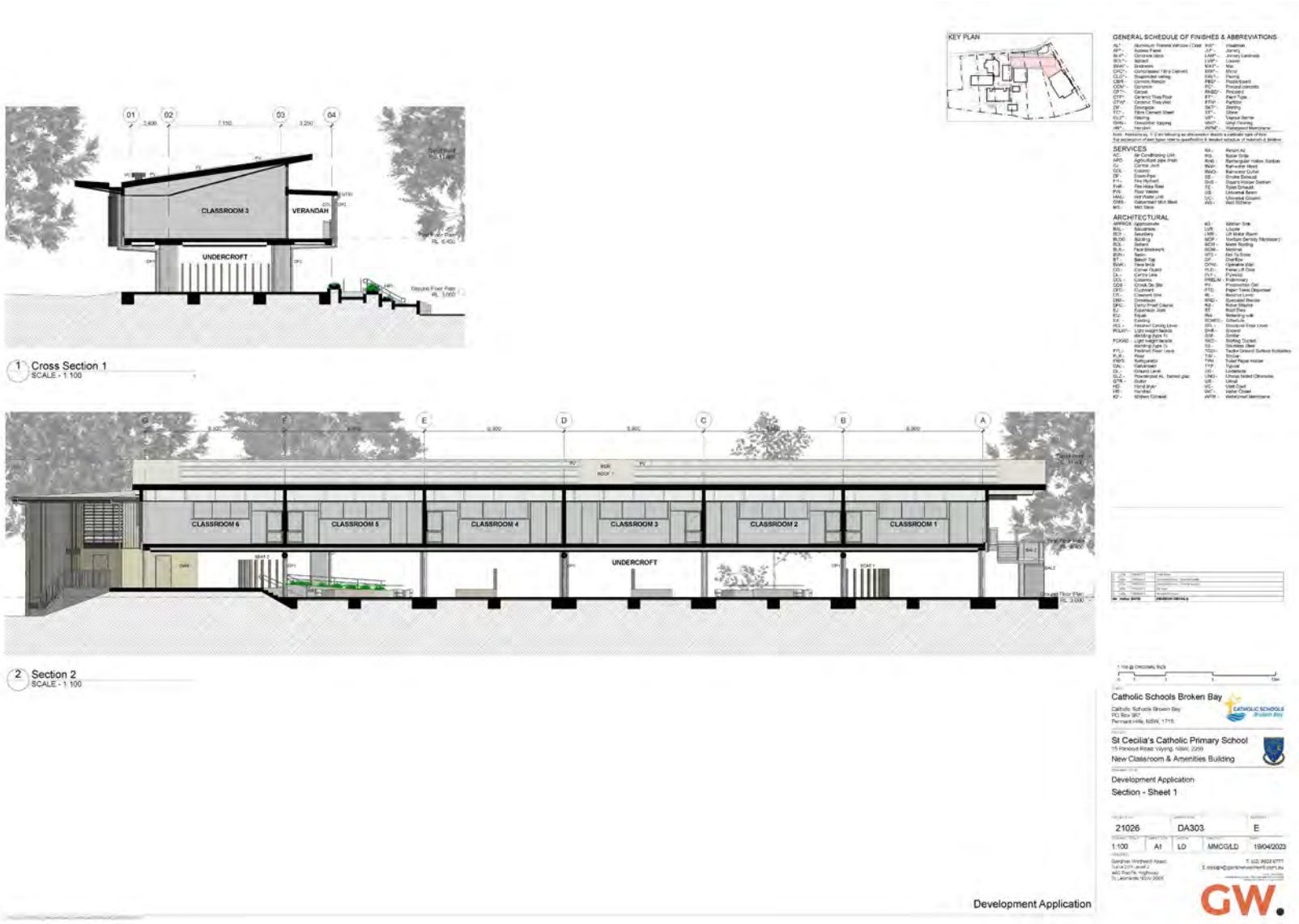

Figure 6: Sections

Floor Levels and Access

The site can be accessed by vehicles and pedestrians via Panonia Road. Vehicles are able to park in the existing car park along the western margin of the site or access the drop-off zone along Panonia Road. The new building can be accessed from the Panonia Road footpath via the paved area to the north-east of the existing staff building (Building D), which has a minimum level of 2.97 m AHD.

The first floor of the hall building can be accessed from the first floor of the new building.

Floor levels for all buildings on site can be found in Table 1.

Table 1: Floor levels and relevant ground levels around the site

Location		Level (m AHD)
New Building	Ground floor	3.00
	First floor	6.40
Building B - Hall	First floor	4.55
Building D – Staff Building	Ground floor	3.78
Building E - Library	Ground floor	4.52
	First floor	7.41
Building F – Classrooms	Ground floor	3.32
Building H – Classroom	Ground floor	4.22
Minimum ground level between new building's western end and Panonia footpath		2.97
Low Point A		2.37
Low Point B		2.11
Low Point C		1.88
Low Point D		1.90

There are several low points along local roads, the highest of which is Low Point A, which has an elevation of 2.37 m AHD (Figure 7). This low point is located immediately to the west of the intersection of Panonia Road and Leppington Street.

Topography

The site generally slope downwards from west to east (Figure 3), with its lowest point at approximately 1 m AHD in the south-eastern corner of the school, behind the school hall (Figure 8). Along the southern margin of the site ground levels drop rapidly to the Wyong River. The highest level on site is 3.5 m AHD in the vicinity of the existing staff building (Building D).

The Panonia Road footpath rises slightly from 2.9 m AHD at the north-western corner of the school to 3.0 m AHD near the intersection of Panonia Road and Marathon Street before falling to 2.6 m AHD at the north-eastern corner of the site (Figure 8).

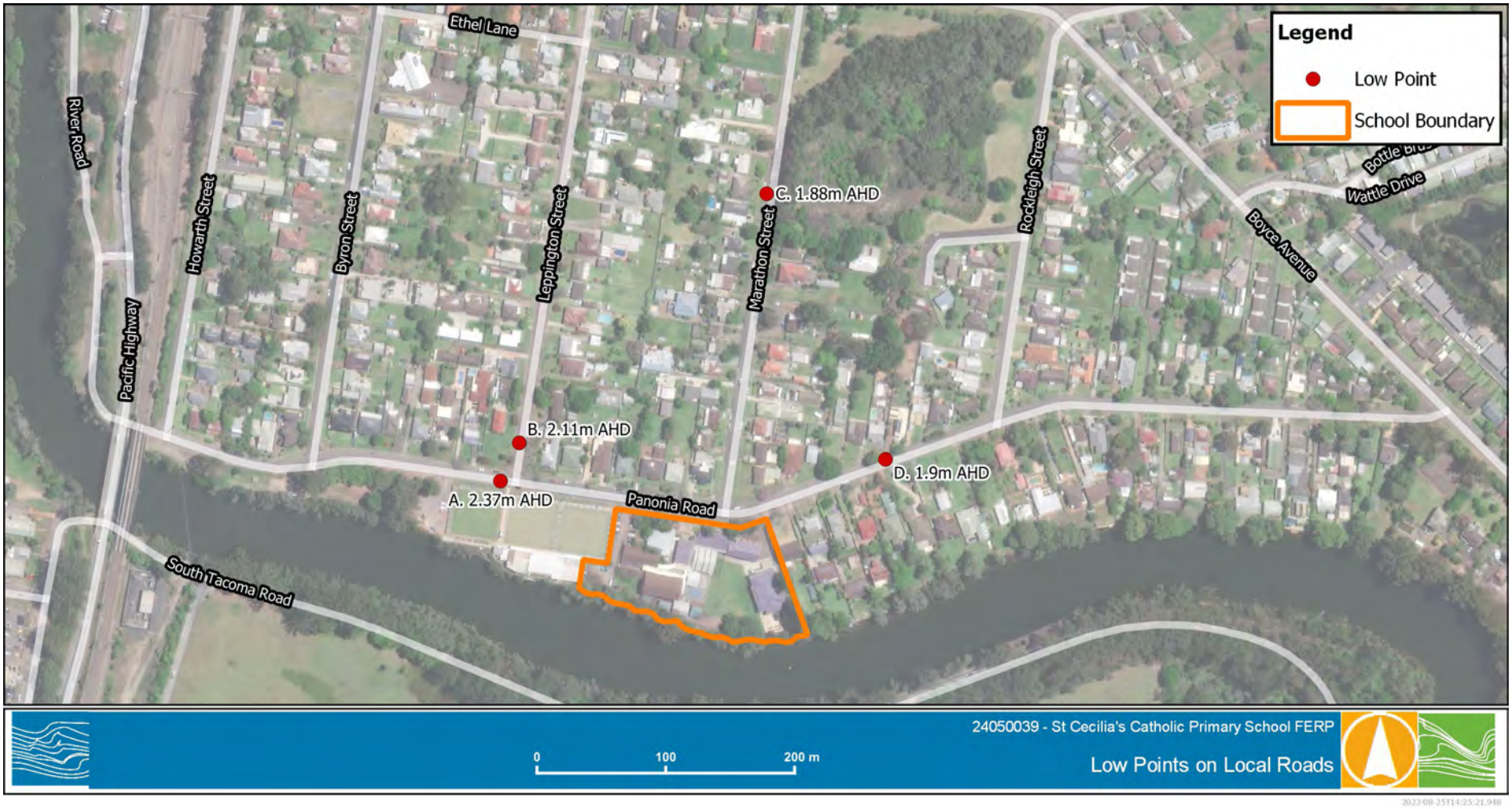

Figure 7: Low points on local roads

Figure 8: Topography in existing conditions

Flood Impacts

The site is subject to riverine flooding from the Wyong River, which flows eastwards along the site's southern boundary.

A Flood Information Certificate for the site has been provided by Central Coast Council (Attachment A). The flood levels for the site have been extracted from the certificate and from the Wyong River Floodplain Risk Management Study and Plan (Catchment Simulation Solutions, 2020) and are provided in Table 2.

Table 2: Summary of flood levels at gauge 061386 and at the site

	FLOOD LEVEL (m AHD)				
Flood	**Gauge 061386 (Wyong upstream of bridge)**	**Minimum Level on Site**	**Maximum Level on Site**	**Site Affectation**	**School Isolated**
20% AEP	2.0	Approx. 1.9	Approx. 1.9	Flooded areas: ■ Underneath the hall ■ Grassed area	Not Isolated
5% AEP	3.2	2.8	2.9	Flooded areas: ■ Underneath the hall ■ Grassed area ■ Underneath the new building ■ Areas around Buildings E and F	Not Isolated
1% AEP	4.0	3.2	3.4	Whole site flooded except area around Building D Above floor flooding: ■ Building F (up to 0.03 m deep)	Site Isolated by High Hazard Floodwaters
PMF	6.7	4.9	4.9	Whole site flooded Above floor flooding: ■ Building B – Hall (up to 0.4 m) ■ Building D – Staff (up to 1.2 m) ■ Building E – Library ground floor (up to 0.4 m) ■ Building F (up to 1.6 m deep) ■ Building H (up to 0.7 m)	Site Isolated by High Hazard Floodwaters

The Flood Information Certificate identifies the following classifications for the site:

- The school is **not** within a **flow path**. The Flood Information Certificate defines flow paths as areas where velocity is greater than 1 m/s in the 1% AEP flood. The Wyong River Flood Risk Management Study and Plan indicates that the velocity on site is less than 1 m/s in this event except along the southern margin (i.e., the river's edge). Therefore, the vast majority of the school is not in a flow path.
- Part of the school **is** in a **floodway**. The Flood Information Certificate defines floodways as areas where a significant volume of water flows during floods. The Wyong River FRMSP has mapped part of the site (mostly the eastern part of the site) as floodway. In large enough

events floodwaters flow through this area from the river to Panonia Road, inundating the local streets. Therefore, part of the site is in a floodway.

- A large part of the school **is** in a **high hazard area**. The Flood Information Certificate defines this as areas with H3 or above in the 1% AEP flood. The school has up to H4 floodwaters in this event, so a large part of the school is high hazard (Figure 9).
- The school is **not** in a **high risk area**. The Wyong River FRMSP maps the school with a medium flood risk in the 1% AEP event, which is based on a flood risk matrix of consequence vs likelihood. Therefore, the school is not in a high flood risk area in the 1% AEP flood.

Finally, St. Cecilia's Primary School is explicitly identified as a vulnerable facility in the *Wyong River Catchment Floodplain Risk Management Study & Draft Plan – Final Report (Revision 4, January 2020)* with the report suggesting that the property will be flooded and that site access will be cut by 20% AEP flood events, and recommending that owners and occupiers should seriously consider flood risk mitigation measures for their sites. The more detailed analysis undertaken for this flood assessment report shows that local topography protects the site from isolation up to the 5% AEP flood. This is explained in more detail in the following section.

Flood Behaviour

The area underneath the hall building and the grassed area to its west would be flooded in events as small as the 20% Annual Exceedance Probability (AEP) flood. An event of this magnitude has a 20% probability of occurring or being exceeded in any given year.

In the 5% AEP flood Building F, which contains the school canteen, may become isolated from the rest of the school buildings with a flood level of 2.8 – 2.9 m AHD, but the rest of the buildings would remain accessible. The hall building would be surrounded by floodwaters but would be accessible via the first floor of the new building.

Although flood levels in the 5% AEP flood exceed the Low Point A elevation of 2.4 m AHD, the school and Wyong Bowling Club to its west are located on a slight ridge between Panonia Road and Wyong River (i.e., the river bank). Thus, Panonia Road would not flood until flood levels to the east of the school reached approx. 2.8 m AHD. Therefore, the school would not be isolated in events up to and including the 5% AEP riverine flood (Figure 10).

It is noted that hydraulic hazard is a standard way to measure the threat posed by floodwaters to people and property, and it is based on the combination of maximum flood depth and velocity at any given location. Figure 11 shows the national flood hazard classification and the threat to life and property associated with each hazard class from H1 (minimum hazard) to H6 (maximum hazard). The minimum hydraulic hazard for a location can be identified using this classification system based on the flood depth at that location. In the 1% AEP flood the flood depth at Low Point A would be up to 0.98 m, which would have a minimum hydraulic hazard of H3 (Figure 11). Floodwaters of this hazard generally cause stability issues for vehicles, children and the elderly. Therefore, the school would be isolated in the 1% AEP flood.

Apart from the area in the northwest of the site where Building B is located, the entire site is within the extent of the 1% AEP flood with a maximum flood depth of approximately 1.73 m (Figure 12). The southern boundary and the eastern parts of the site would have high hazard floodwaters of hazard category H3 (unsafe for vehicles, children and the elderly) or above (Figure 11 and Figure 13) in an event of this magnitude. Although Building F would be the only building with above floor flooding (to a depth of approx. 0.03 m), most buildings would be isolated from one another.

In the PMF the site would be entirely flooded (Figure 13) with up to H5 hydraulic hazard (Figure 15), and above floor flooding in all buildings except for the first floor of the new building and the first floor of the existing library.

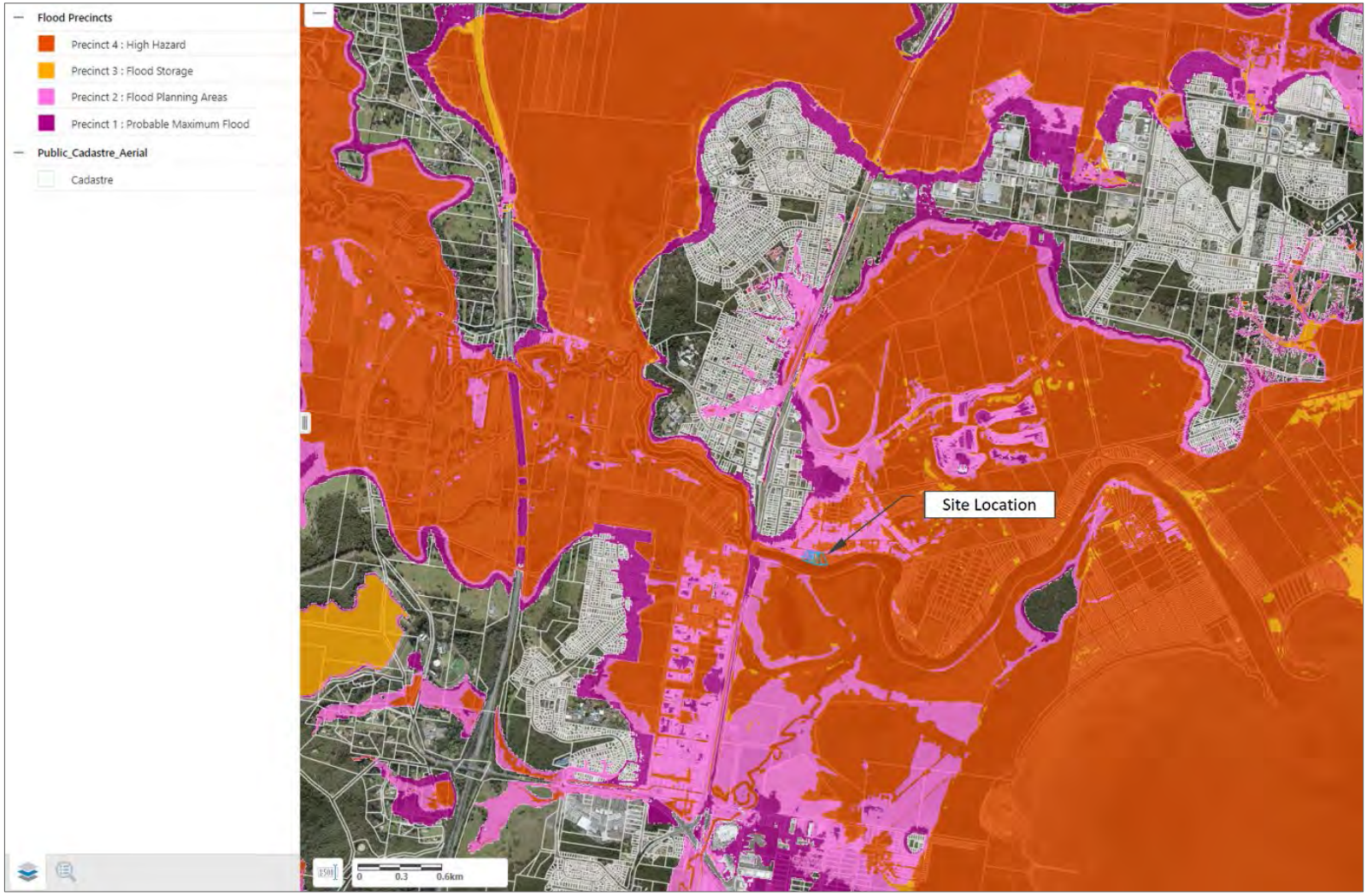

Figure 9: Council mapped flood precincts in the surrounding area (source: https://maps.centralcoast.nsw.gov.au/public/)

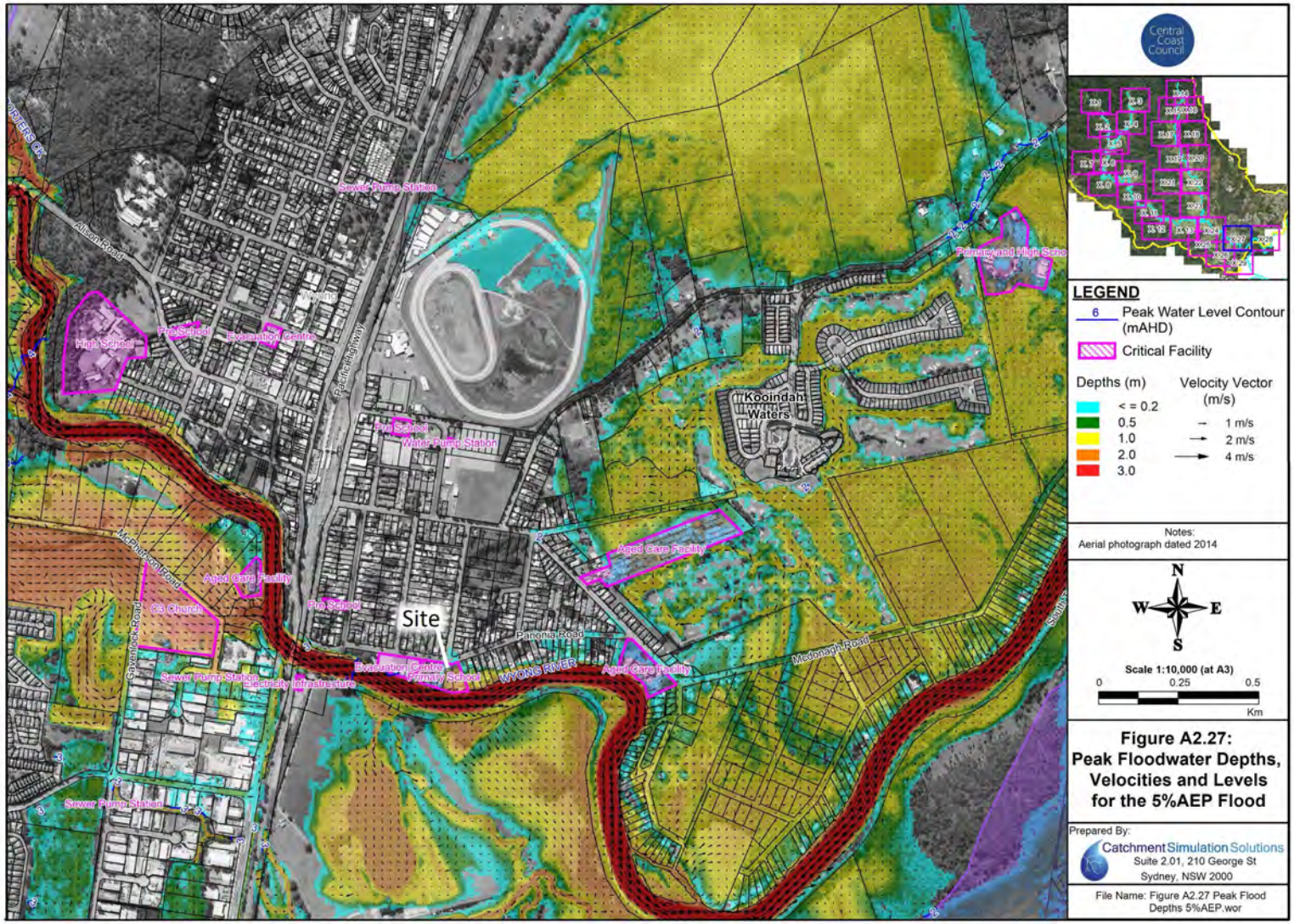

Figure 10: Flood depths and flow velocities in riverine 5% AEP flood

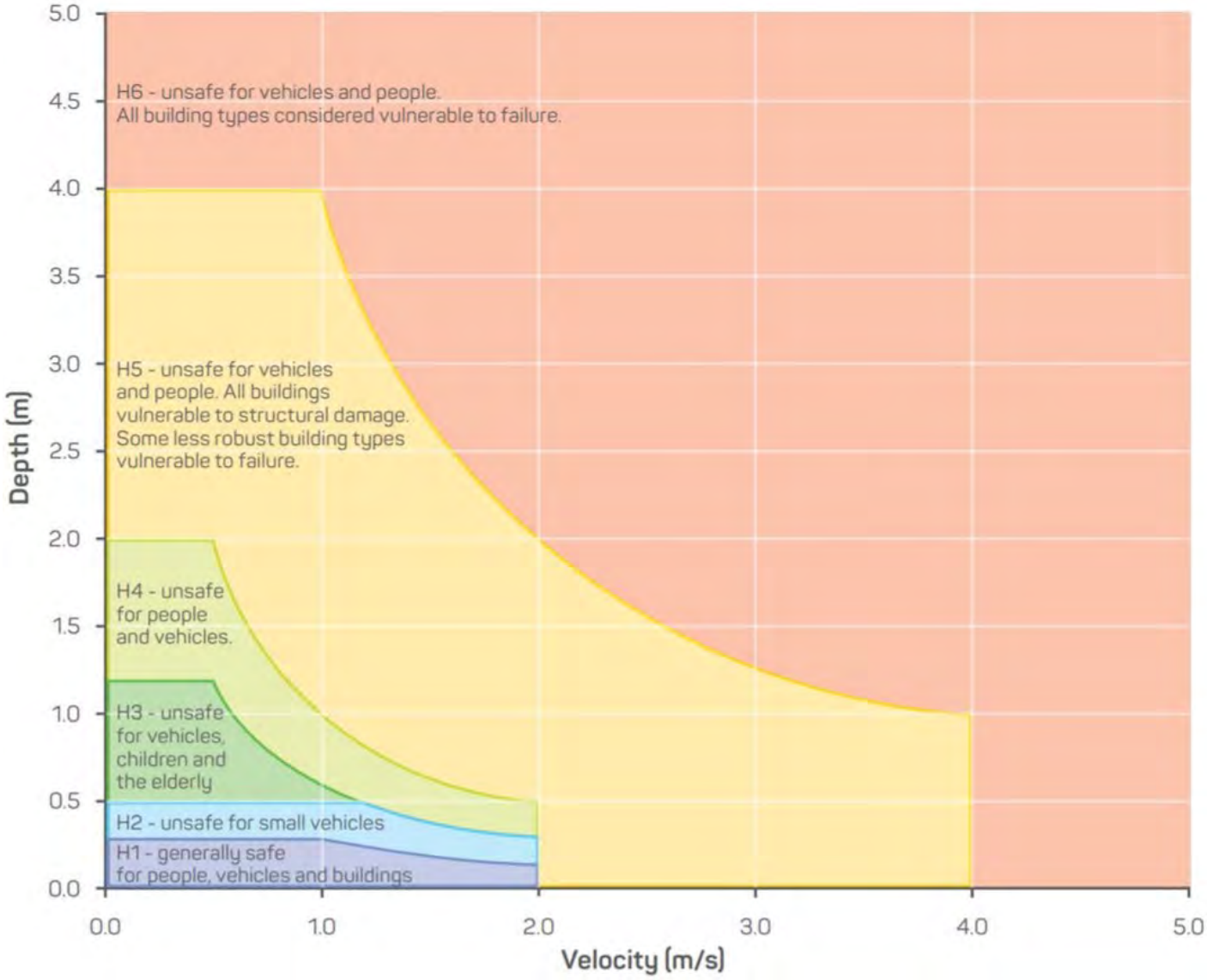

Figure 11: Flood hazard vulnerability curves (Smith et al., 2014)

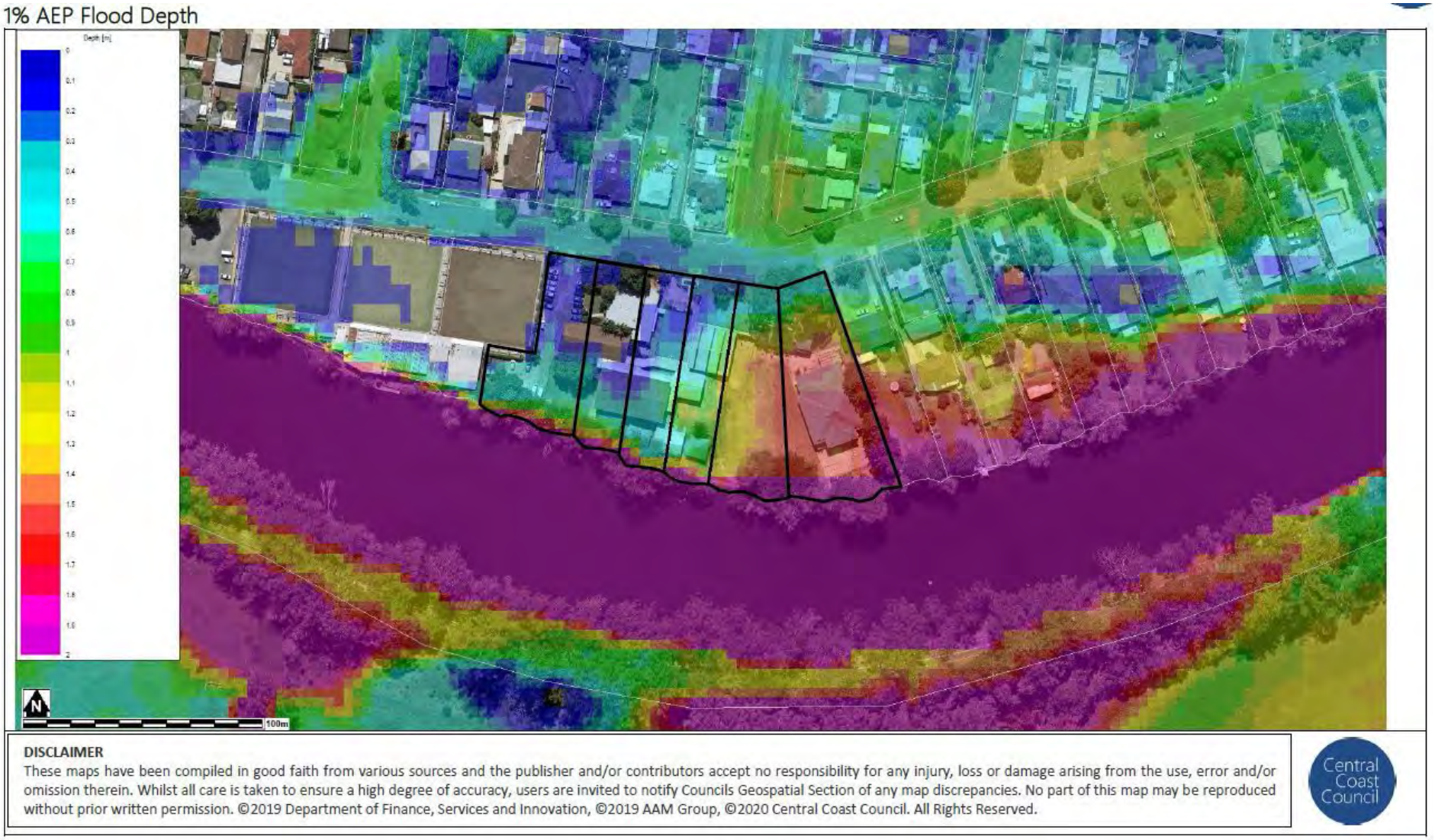

Figure 12: Flood depths in the riverine 1% AEP flood

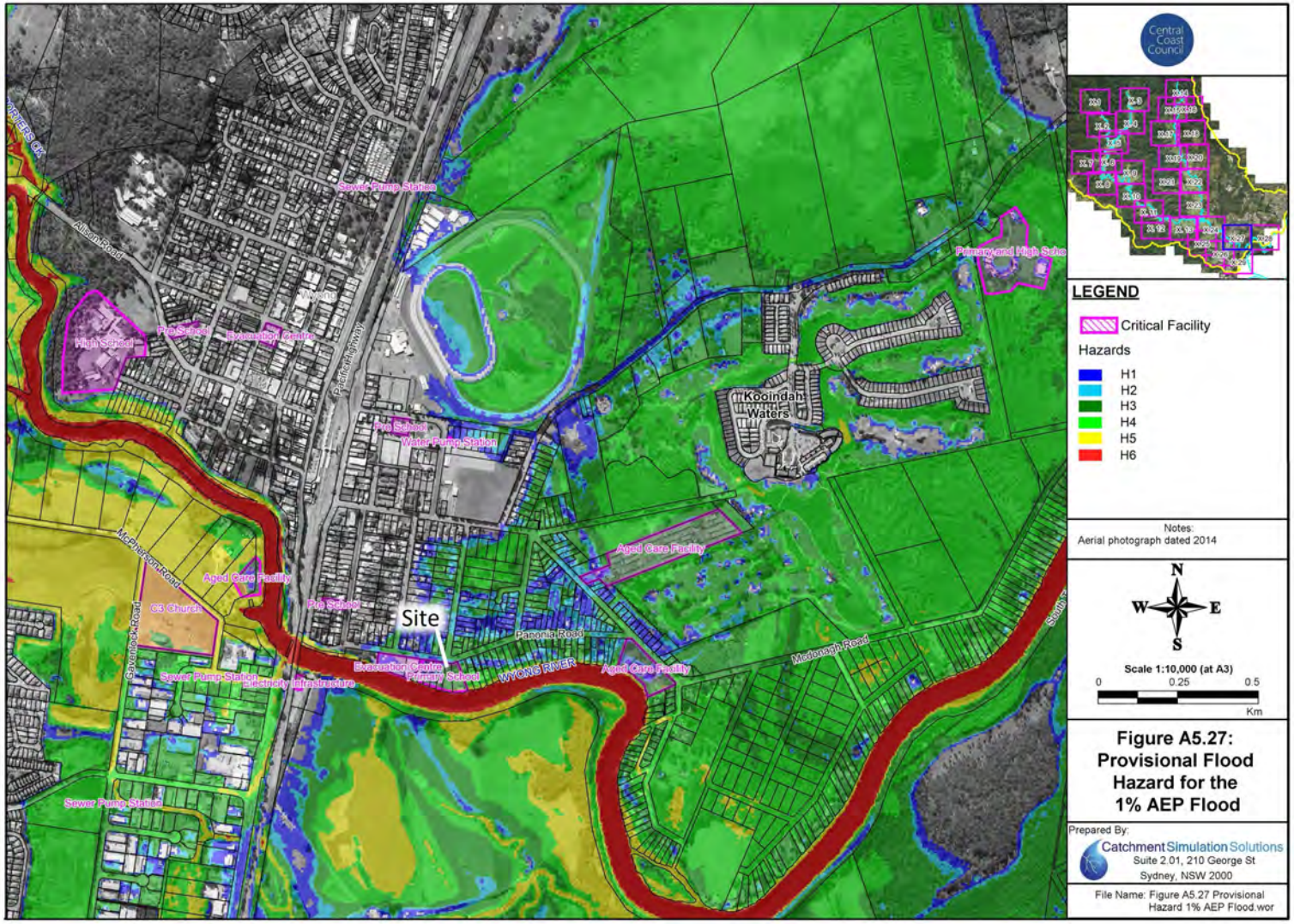

Figure 13: Hydraulic hazard in the riverine 1% AEP flood

Figure 14: Flood depths in the riverine PMF

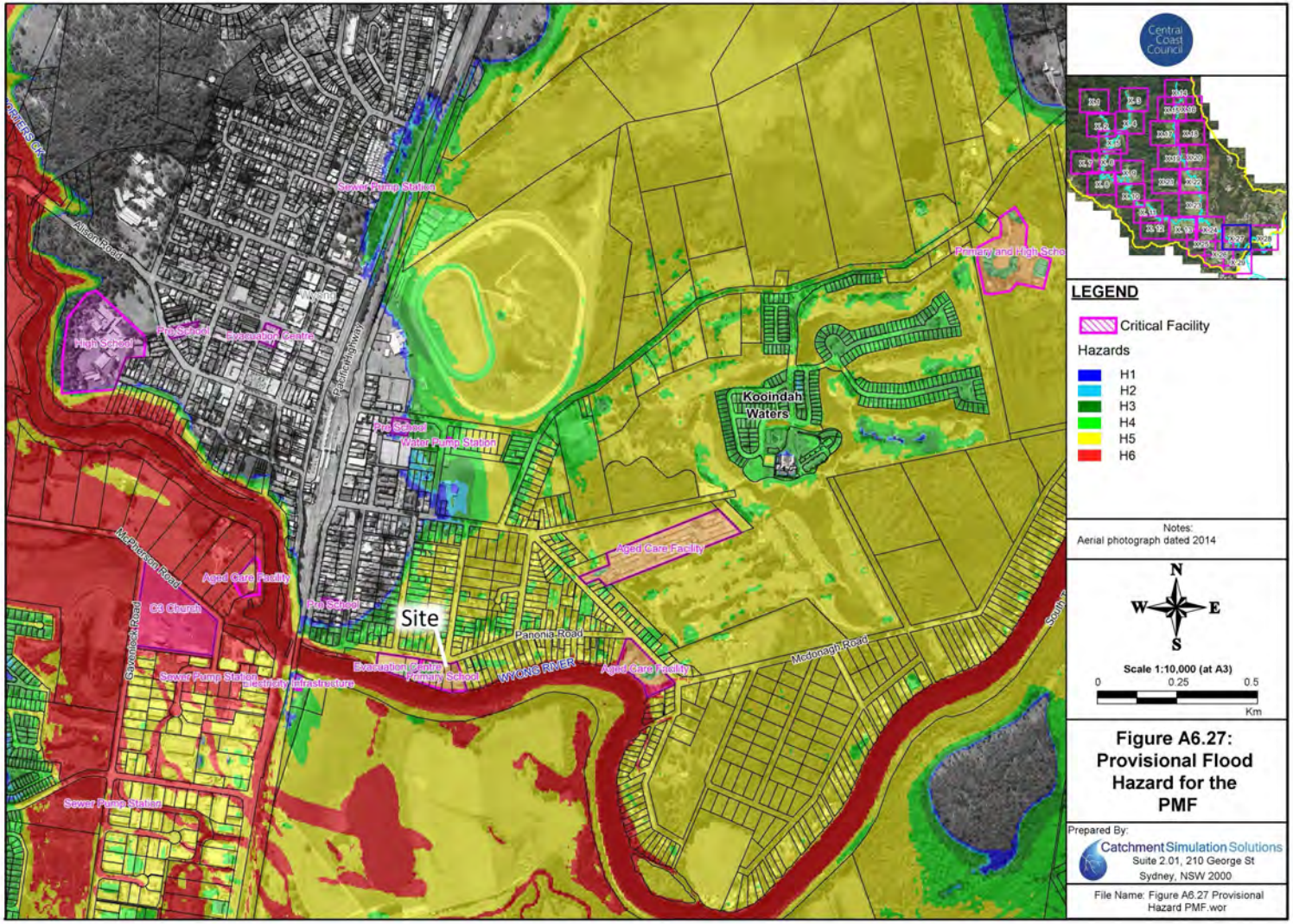

Figure 15: Hydraulic hazard in the riverine PMF

In the 1% AEP event the school would be isolated by high hazard floodwaters on local roads (Figure 13), which would flood Low Point A to a depth of up to 1.0 m.

Flood Duration and Rate of Rise

The Wyong River Floodplain Risk Management Study and Plan (Catchment Simulation Solutions, 2020) suggests that in a flood rising as fast as the PMF the local roads could be cut within 6 hours of the start of the rainfall event. This could happen within 1 hour of the Wyong River flood level reaching 1.9 m AHD at the south-eastern corner of the site. However, not all floods will rise as quickly as a PMF. For example, the design 1% AEP flood would take 3 hrs to rise from the riverbank to isolate the site.

Panonia Road could be isolated for in excess of 34 hours in a long duration PMF. The duration of inundation for most of the school would be similar.

Central Coast Local Environmental Plan (LEP) 2022 Requirements

The *Central Coast Local Environmental Plan 2022* is the primary legal planning instrument for guiding land use and planning decisions made by Council. The provisions of *Clause 5.21 Flood Planning* are extracted in Table 3, with responses pertaining to this site. Note that several points in this table also apply to the discussion of the Development Control Plan (DCP) requirements in the following section.

Table 3: Central Coast Local Environmental Plan 2022 Clause 5.21 Flood Planning

Clauses	**Comments Pertaining to the Site**
5.21 Flood planning	
(1) The objectives of this clause are as follows—	
(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—	
(a) is compatible with the flood function and behaviour on the land, and	The site functions as a flood storage area and a floodway and is classified as a high hazard area in the 1% AEP flood. Development on the site would therefore in principle not be compatible with the flood function and behaviour of the land from flooding. However, the proposed redevelopment is more compatible with the flood function and behaviour on the land than the existing arrangement because of the removal of building structures at ground level (i.e. near the northern site boundary and one building near the southern site boundary) and their replacement incorporating a raised structure with a largely unobstructed undercroft area for the new development near the northern site boundary. In the event of flooding on site, this allows for the storage and passage of floodwaters through the undercroft area where water would have been previously displaced by solid structures. As the site is currently in use as a school, it should be assessed under provisions of "existing use rights" under the LEP. **Complies**
(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	The proposed development would involve the removal of existing buildings at ground level, to be replaced with a new building with a similar footprint but a raised first floor level of 6.40 m AHD, with an undercroft to accommodate floodwaters. The proposed new building's support pillars, minor structures forming 2 outdoor learning areas, plant area and bathroom facilities

	on the ground floor undercroft area, provide significantly less obstruction to floodwaters than the existing Buildings A and C in this location. As such, the proposed development would decrease flood impacts on site and the potential flood affectation of other neighbouring development or properties. **Complies**
(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	The floor level of the new building is set at 6.40 m AHD. This is significantly higher than the current floor levels of 3.26 m AHD which were below the minimum habitable floor level of 3.9 m AHD for the site (i.e. 1% AEP level of 3.4 m AHD + 500 mm freeboard). The proposed floor level is 2.5 m above the minimum habitable floor level, and 1.5 m above the site's maximum PMF level. In the PMF, flood depths are 1.4 to 3.9 m across the entire site, with a maximum hydraulic hazard of H5 (i.e., unsafe for vehicles and people, and all buildings vulnerable to damage) (Figure 14). The building has been designed and will be constructed to remain stable when exposed to flood and debris force to improve the safety of anyone who fails to evacuate from the building before it is isolated. The higher floor levels of the proposed redevelopment would result in safer occupation of the site in the event of flooding. The redevelopment would not change the evacuation requirements of the site as there would be no change to the number of people, or age groups represented, evacuating from the site. **Complies**
(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	The proposed new floor levels are 1.5 m above the site's PMF. While sheltering in place is not recommended for the development, higher floor levels reduce risk to life compared to the existing development, as there is floor area above the reaches of flooding in the event that evacuation fails. The building has been designed and will be constructed to remain stable when exposed to flood and debris force to improve the safety of anyone who fails to evacuate from the building before it is isolated. However, there can be hazardous flooding on the site and local roads, and flooding may pose a threat to life if people are on the premises or have not yet safely evacuated when flooding occurs. A Flood Emergency Response Plan has been prepared for the proposed development to manage the flood risk to life. Considering the school population consists of mainly children and the site may be isolated for over 34 hours, a Shelter-In-Place strategy is not appropriate as a primary flood emergency response strategy. Rather, the primary flood emergency response strategy for the school is to evacuate before the site becomes isolated. In the event that any site occupants fail to evacuate before the site becomes isolated by floodwaters, it would be possible to shelter on the upper floor of the new building above flooding. **Complies**
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a	The proposal includes the permanent removal of an existing structure near the southern boundary of the site adjacent the Wyong River, and the replacement of existing buildings near the northern site boundary with a similar footprint. Therefore, there will

reduction in the stability of river banks or watercourses.	not be any development in areas that are not already currently developed, and as such, would not impact on currently vegetated areas. Any potential environmental impacts during construction will be managed with appropriate construction environmental management measures. **Complies**
(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,	Sea-level rise associated with climate change will cause more frequent inundation at the site. The Wyong River Catchment FRMSP models anticipated climate change impacts and reports predicted increases to 1% AEP flood levels in this area. Considering that the redevelopment is more likely to reduce flood affectation and have a favourable impact on the flood function of the site, the impact of the development on flood behaviour under climate change conditions is not deemed to be an area of concern. **Complies**
(b) the intended design and scale of buildings resulting from the development,	The re-development of the site concerns a reconfiguration of existing facilities inside the same, or largely similar, footprint and will not affect this condition. **Complies**
(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,	The floor level of the new building is set at 6.40 m AHD, which is 2.5 m above the minimum habitable floor level of 3.9 m AHD, and 1.5 m above the maximum PMF for the site. In the PMF, flood depths are 1.4 to 3.9 m across the entire site, with a maximum hydraulic hazard of H5 (i.e., unsafe for vehicles and people, and all buildings vulnerable to damage) (Figure 14). The building has been designed and will be constructed to remain stable when exposed to flood and debris force to improve the safety of anyone who fails to evacuate from the building before it is isolated. While the redevelopment of the site would not strictly satisfy the conditions of the LEP, the higher floor levels would result in safer occupation of the site in the event of flooding. The redevelopment would not change the evacuation requirements of the site as there would be no change to the number of people, or age groups represented, evacuating from the site. A Flood Emergency Response Plan has been prepared for the proposed development to manage the flood risk to life. Considering the school population consists of mainly children and the site may be isolated for over 34 hours, a Shelter-In-Place strategy is not appropriate as a primary flood emergency response strategy. Rather, the primary flood emergency response strategy for the school is to evacuate before the site becomes isolated. In the event that any site occupants fail to evacuate before the site becomes isolated by floodwaters, it would be possible to shelter on the upper floor of the new building above flooding. The Flood Emergency Response Plan prepared for the proposed development improves the likelihood that all site occupants will safely evacuate off site before the school becomes isolated by flooding. The Plan includes vertical evacuation to the upper floor of the new building as a back-up flood emergency response strategy to

	ensure that all site occupants are evacuated to a shelter above the reach of flooding even if they fail to evacuate off site before the evacuation route is cut. This is an improvement on the vertical evacuation capability of the existing school. **Complies**
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	It would not be possible to modify, relocate or remove the proposed development as a response measure. However, the proposal itself involves the removal of existing buildings which have a high flood risk and developing more flood compatible buildings. **Complies**

Central Coast Development Control Plan (DCP) 2022 Requirements

Part B: Northern Area (Former Wyong LGA) of *Chapter 3.1 Floodplain Management and Water Cycle Management* of the *Central Coast Development Control Plan 2022* (DCP 2022) applies to this site.

According to Council online mapping the site is Flood Precinct 4: High Hazard (Figure 9). The site also incorporates areas designated Flood Precinct 2: Flood Planning and Flood Precinct 3: Flood Storage (albeit a small area for the latter).

Appendix A of the DCP defines the Land Use Categories. Educational facilities are considered *Critical or Sensitive Facilities* which, for Flood Precincts 2, 3 and 4 are subject to the following requirement:

> *If the proposal is to be pursued further, a performance based assessment is to be provided demonstrating that the proposed development is compatible with the flooding characteristics of the site (refer to Section 3.2 and Appendix C).*

Section 3.2 is now number *3.1.4.2 Performance Based Assessment* in the DCP 2022, which states that:

> *Council will consider development proposals that do not meet the prescriptive requirements of this DCP only if a report prepared by a suitably qualified engineering professional accompanies the application and addresses the following* (see first column of Table 3).

Note that several clauses are identical to the LEP clauses commented on above.

Table 4: WDCP 2013 Chapter 3.3 Floodplain Management Section 3.2 Performance Based Assessments

Clauses	Comments Pertaining to the Site
a) is compatible with the established flood hazard of the land. In areas where flood hazard has not been established through previous studies or reports, the flood hazard must be established in accordance with the Floodplain Development Manual.	The site functions as a flood storage area and a floodway and is classified as a high hazard area in the 1% AEP flood. Development on the site would therefore in principle not be compatible with the flood function and behaviour of the land from flooding. However, the proposed redevelopment is more compatible with the flood function and behaviour on the land than the existing arrangement because of the removal of building structures at ground level (i.e. near the northern site boundary and one building near the southern site boundary) and their replacement incorporating a raised structure with a largely unobstructed undercroft area for the new development near the northern site boundary. In the

Clauses	Comments Pertaining to the Site
	event of flooding on site, this allows for the storage and passage of floodwaters through the undercroft area where water would have been previously displaced by solid structures. As the site is currently in use as a school, it should be assessed under provisions of "existing use rights" under the LEP. **Complies**
b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties;	The proposed development would involve the removal of existing buildings at ground level, to be replaced with a new building with a similar footprint but a raised first floor level of 6.40 m AHD, with an undercroft to accommodate floodwaters. The proposed new building's support pillars, minor structures forming 2 outdoor learning areas, plant area and bathroom facilities on the ground floor undercroft area, provide significantly less obstruction to floodwaters than the existing Buildings A and C in this location. As such, the proposed development would decrease flood impacts on site and the potential flood affectation of other neighbouring development or properties. **Complies**
c) incorporates appropriate measures to manage risk to life and property from flood;	The floor level of the new building is set at 6.40 m AHD, which is 2.5 m above the minimum habitable floor level of 3.9 m AHD, and 1.5 m above the maximum PMF for the site. In the PMF, flood depths are 1.4 to 3.9 m across the entire site, with a maximum hydraulic hazard of H5 (i.e., unsafe for vehicles and people, and all buildings vulnerable to damage) (Figure 14). The building has been designed and will be constructed to remain stable when exposed to flood and debris force to improve the safety of anyone who fails to evacuate from the building before it is isolated. The higher floor levels would result in safer occupation of the site in the event of flooding and would reduce the existing risk to life. The redevelopment would not change the evacuation requirements of the site as there would be no change to the number of people, or age groups represented, evacuating from the site. A Flood Emergency Response Plan has been prepared for the proposed development to manage the flood risk to life. Considering the school population consists of mainly children and the site may be isolated for over 34 hours, a Shelter-In-Place strategy is not appropriate as a primary flood emergency response strategy. Rather, the primary flood emergency response strategy for the school is to evacuate before the site becomes isolated.

Clauses	Comments Pertaining to the Site
	In the event that any site occupants fail to evacuate before the site becomes isolated by floodwaters, it would be possible to shelter on the upper floor of the new building above flooding. The proposed development also reduces the flood risk to property as it reconfigures the existing classroom arrangement to place classrooms above the PMF level. **Complies**
d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses;	The proposal includes the permanent removal of an existing structure near the southern boundary of the site adjacent the Wyong River, and the replacement of existing buildings near the northern site boundary with a similar footprint. Therefore, there will not be any development in areas that are not already currently developed, and as such, would not impact on currently vegetated areas. Any potential environmental impacts during construction will be managed with appropriate construction environmental management measures. **Complies**
e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.	This redevelopment concerns a reconfiguration of existing facilities which will, if anything, reduce flood risk. The proposed development therefore satisfies this condition. **Complies**
f) is consistent with the principles of Ecologically Sustainable Development.	The proposal includes the permanent removal of an existing structure near the southern boundary of the site adjacent the Wyong River, and the replacement of existing buildings near the northern site boundary with a similar footprint and, most likely, a more favourable arrangement in relation to flood events. Principles of Ecologically Sustainable Development will be satisfied by utilising appropriate construction practices undertaken in an environmentally friendly way. **Complies**
g) adequately considers the impact of climate change. *i It is to be noted that with regard to climate change, appropriate benchmarks based on the best available current information have been used in producing the flood risk management studies and plans that inform this document.* *ii Some prescriptive requirements such as flood planning level requirements may be relaxed if Council can be satisfied that the projected life*	Sea-level rise associated with climate change will cause more frequent inundation at the site. The Wyong River Catchment FRMSP models anticipated climate change impacts and reports predicted increases to 1% AEP flood levels in this area. However, there is a considerable uncertainty around the timing and magnitude of future flood levels associated with climate change. St Cecilia's Catholic Primary School is an existing school with an existing flood risk. This flood risk will be

Clauses	Comments Pertaining to the Site
of the proposed development is for a relatively short-term and therefore does not warrant the imposition of controls that consider impacts beyond the cessation of the proposed development. This will only be considered for uses where the residual risk to the occupation of the development is considered to be low. This may include certain temporary or demountable structures but would not include residential developments.	exacerbated by climate change. The proposed development improves the flood risk to life and to property at the site by providing classrooms areas above the PMF level of 4.9 m AHD, whereas the existing classrooms have floor levels of 3.26 m AHD and would be inundated in floods with a 1% AEP magnitude or greater. The proposed development therefore better equips the school to manage the increased flood risk brought by climate change. It is noted that the habitable floor levels of the proposed new building will be 1.5 m above the current PMF level. This provides adequate freeboard for the worst-case sea level rise forecasts within the design life of the building. Therefore, the proposed development will assist the existing school in managing the increasing flood risk due to climate change. **Complies**

The following is noted in the DCP:

> *Note 1: The information listed above can be used to justify minor variations to the prescriptive provisions. Appendix C provides further detail with regard to applying the Performance Criteria mentioned above and will need to be addresses [sic] in full for large scale proposals and/or significant variations.*
> *Note 2: The prescriptive controls have been developed to ensure that proposals that meet the requirements of the relevant Prescriptive Control Schedule will meet the objectives of this Plan. A performance based assessment is likely to involve the submission of independent studies and reports. It is recommended that you should discuss the level of detail required and the likelihood of achieving a successful outcome using a performance based assessment with Council staff using the pre-application process prior to making any decision to purchase and/or develop flood prone land.*

Appendix C of the DCP sets out detailed assessment criteria, of which we highlight the following:

Compatibility with established Flood Hazard / Flooding Impacts and Behaviour
ii Flood behaviour / iii Duration of flooding / vii Depth and velocity for relative flood event.

Detailed understanding of the changes to the nature of the flooding under the proposed development scenario compared to the existing would require flood modelling. However, the proposed development will not have an impact on the duration of flooding, although it does reduce the duration of above floor flooding in the subject classrooms from over 34 hours in existing conditions to no above floor flooding in the proposed new building.

The proposed redevelopment is more compatible with the flood function and behaviour on the land than the existing arrangement because of the removal of building structures at ground level (i.e. near the northern site boundary and one building near the southern site boundary) and their replacement incorporating a raised structure with a largely unobstructed undercroft area for the new development near the northern site boundary. In the event of flooding on site, this allows for the storage and passage of floodwaters through the undercroft area where water would have been previously displaced by solid structures.

Therefore, the proposed development improves the existing school's compatibility with the established flood hazard and flood behaviour on the site. Flood modelling is not required to demonstrate this.

Complies

Manage Risk to Life
x-xvii all criteria.

The proposed new floor levels are 1.5 m above the site's PMF and 2.5 m above the Minimum Habitable Floor Level. While sheltering in place is not recommended for the development, higher floor levels reduce risk to life compared to the current development as there is floor area above the reaches of flooding in the event that evacuation fails. It therefore results in an improvement to the management of Risk to Life. The building has been designed and will be constructed to remain stable when exposed to flood and debris force to improve the safety of anyone who fails to evacuate from the building before it is isolated.

A Flood Emergency Response Plan has been prepared for the proposed development to manage the flood risk to life. Considering the school population consists of mainly children and the site may be isolated for over 34 hours, a Shelter-In-Place strategy is not appropriate as a primary flood emergency response strategy. Rather, the primary flood emergency response strategy for the school is to evacuate before the site becomes isolated. In the event that any site occupants fail to evacuate before the site becomes isolated by floodwaters, it would be possible to shelter on the upper floor of the new building above flooding.

Complies

Warning and Evacuation
xix-xxv all criteria.

A Flood Emergency Response Plan has been prepared for the proposed development to manage the flood risk to life. Considering the school population consists of mainly children and the site may be isolated for over 34 hours, a Shelter-In-Place strategy is not appropriate as a primary flood emergency response strategy. Rather, the primary flood emergency response strategy for the school is to evacuate before the site becomes isolated.

A Minor Flood Warning or a quantified flood warning for a flood level > 2.7 m at Wyong Bridge would provide a minimum of 6 hours of warning time before the site becomes isolated by riverine flooding, which is 4 hours in excess of the time required to evacuate the site on foot. Therefore, if a Minor, Moderate or Major Flood Warning or a quantified flood warning for a flood level > 2.7 m for the Wyong River at Wyong Bridge is issued by the BoM while the school is in operation the school will be closed and parents/caregivers notified to pick up their children immediately. If anybody remains on site after 3 hours, all remaining site occupants will evacuate immediately to the evacuation centre at Club Wyong. The 3 hours of wait time and 2 hours of evacuation time would take 1 hour less than the minimum time available before the school becomes isolated by flooding.

If any students, staff or visitors remain on site when it becomes isolated by floodwaters, they will shelter on the upper floor of the new building.

Complies

Emergency Services
xliv development will not unduly increase dependency on emergency services.

The detailed Flood Emergency Response Plan prepared for the proposed development facilitates timely evacuation of the site before the local roads experience flooding. This effectively reduces the likelihood of dependence on emergency services.

Complies

Conclusion

This letter has set out the flood management considerations for the proposed development at St Cecilia's Catholic Primary School based on the current LEP and DCP applicable to the site.

The proposed development complies with the provisions of the existing LEP and DCP. In addition, the development would:

- Reduce the existing flood risk to life and to property;
- Improve the existing school's compatibility with the flood function and flood hazard of the site; and
- Better equip the existing school to manage the increasing flood risk due to climate change.

Yours faithfully
For Water Technology Pty Ltd

Steven Molino
Director

Enclosures: 2
N:\Jobs\24050039_St Cecilia School Wyong FERP\Deliverables\Reporting\Final\Flood Assessment Report\24050039_L01v01a St Cecilias Flood Assessment Report.docx

Attachment 1 | Flood Information Certificate

Flood Information Certificate

Property Address:	7-15 Panonia Rd, WYONG
Lot /DP:	6/DP4361
Date Prepared:	15 November 2022
Source of information:	Wyong River Floodplain Risk Management Study and Plan, 2020

This Flood Certificate provides advice furnished in good faith by the council relating to the likelihood of the land identified above being flooded and to the nature or extent of any such flooding ("flood risk") .

Flood level and flood planning advice is provided in the tables below and as maps in the Appendix. This advice regarding flood risk has been derived from the flood study listed above. Should you have any enquiries concerning this certificate, please do not hesitate to contact Andrew Dewar on 1300 463 954 during the hours of 8.00am to 4.15pm Monday to Friday

Flood Level Information Table

Flood Event	Minimum Level (m AHD)	Maximum Level (m AHD)
PMF	4.92	4.94
1% AEP	3.23	3.34
5% AEP	2.79	2.86

Planning Information Table

Flood Control Lot	☒
Minimum Habitable Floor Level	3.84m AHD
Complying Development: Flood Exclusionary Categories	
(a) Flood Storage Area	☒
(b) Floodway Area	☒
(c) Flow Path	☐
(d) High Hazard Area (H3, H4, H5, H6 Hazard Categorisation)	☒
(e) High Risk Area	☐

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Minimum Habitable Floor Level in the Planning Information Table above is also known as the Flood Planning Level. It is derived from the maximum 1% AEP Flood Level plus 0.5m freeboard and an allowance for sea level rise if applicable. For large lots the maximum 1% AEP flood level may vary across the lot; as such the Minimum Habitable Floor Level would vary at different locations on the lot, which may result in a lower Minimum Habitable Floor Level than the one quoted in the Planning Information Table. Note that Minimum Habitable Floor Levels are based on a flood size that has a 1% chance each year of either being reached or exceeded. Larger floods still have a small chance of occurring. For this reason, Council recommends that property owners consider the merits of choosing a floor level above the minimum floor level if practical to do so.

Flood Mapping related to this address is included in the Appendix. On the Environmental Layers you can choose to view 1% AEP (1 in 100y) flood extents, as well as Flood Precincts, which are referred to in the Development Control Plan.
https://maps.centralcoast.nsw.gov.au/public/

Development Controls set appropriate floor levels, construction materials, pedestrian and vehicular access, car parking and impacts on surrounding property for a proposed development; either complying development (fast tracked - see below) or a DA. Council's development controls vary depending on the location:

- Former Gosford: LEP 2014 Clauses 5.21 & 7.3, DCP 2013 Chapter 6.7
- Former Wyong: LEP 2013 Clauses 5.21 & 7.3, DCP 2013 Chapter 3.3

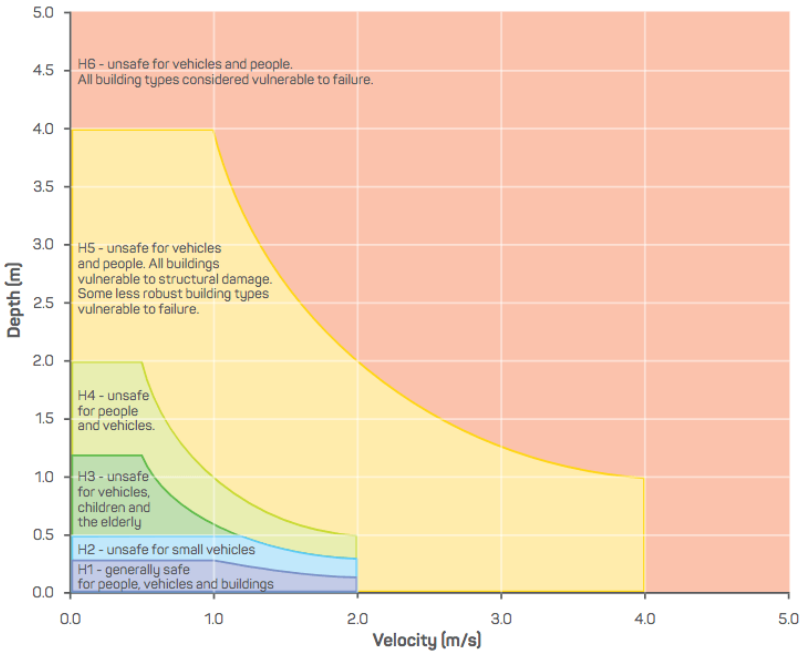
https://www.centralcoast.nsw.gov.au/plan-and-build/planning-controls-and-guidelines

Complying Development is a fast-track approval process for straightforward residential, commercial and industrial development (e.g. Granny Flats). From 1 July 2021, all Complying Development Certificate (CDC) applications must be lodged through the online NSW Planning Portal. If the application meets specific criteria it can be determined by a registered certifier. Under Clause 3A.38 of the Codes SEPP 2008 Development must not be carried out on any part of a *flood control lot* that is considered to be in one of the following exclusionary categories: (a) flood storage area, (b) floodway area, (c) flow path, (d) high hazard area, (e) high risk area. Complying Development may be allowable at this address if none of the five flood exclusionary categories in the Planning Information Table above are marked "Yes".
https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Planning-Approval-Pathways/Complying-development

Flood Hazard: Flooding has the potential to cause loss: loss of life, injury or economic loss. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.

Council classifies flood hazard using thresholds related to the stability of people as they walk or drive through flood waters, or shelter in a building during a flood. This method classifies hazard on a spectrum of H1 to H6 as described by the hazard vulnerability curves below. For further information refer to: Flood Hazard: Guideline 7.3, Australian Institute for Disaster Resilience 2017 https://knowledge.aidr.org.au/media/3518/adr-guideline-7-3.pdf

Flood Information Certificate



Source – Australian Institute for Disaster Resilience 2017. Hydraulic Hazard: refer also to Australian Rainfall and Runoff Section 7.2.7 General Flood Hazard Curves (Figure 6.7.9) http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/

Disclaimers

a. This certificate is based on Council's relevant flood study, which covers a large area and utilises *airborne laser scanning* ground level data. Flood depths as shown on the maps at specific locations may not accurately account for localised changes in ground topography; the accuracy of flood depth information at a specific location may be improved by taking the flood level and subtracting the accurate ground level at a particular location, which could be established by a Registered Surveyor.

b. Without limiting s.733 of the *Local Government Act* 1993, Council expressly disclaims all and any liability and responsibility in respect of loss, damage or injury to person or property arising from anything done or omitted to be done by any person in reliance, whether wholly or in part, upon any part of this information. Any person having regard to the information contained in this document is encouraged to seek, at their discretion, all other sources of information on the subject matter as they consider appropriate, which may include local knowledge and/or professional advice.

c. Council does not, and cannot, warrant that it will, in its capacity as a consent authority under the *Environmental Planning and Assessment Act 1979*, grant consent to a DA that seeks to erect or use dwellings or other structures on the above property that conform with the levels set out in the above information. Council assesses DAs based on merit, which must consider various development controls as set out in the LEP and DCP. For any development proposal on a *Flood Control Lot* Council recommends the applicant to engage the services of a professional engineer who specialises in Flood Risk Management.

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Flood Information Certificate

Glossary

AEP	*Annual Exceedance Probability*: The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage. For example, the 1% AEP flood has a 1% probability of occurring in any given year. This flood is sometimes referred to as 1 in 100, 100yr ARI or Q100
AHD	*Australian Height Datum* is the reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.
Airborne Laser Scanning	A ground level measurement system in which a laser is emitted from an instrument in an aircraft and directed to the ground in a scanning pattern
DA	Development Application
DCP	Development Control Plan
Flood Control Lot	A land parcel that is subject to flood related development controls
Flood Hazard	Flooding which has the potential to cause loss: loss of life, injury or economic loss. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.
Flood Storage Area	Areas that are important for the temporary storage of floodwaters during the passage of flood.
Floodway Area	Those areas where a significant volume of water flows during floods.
Flow Path	Those areas where a flow path is identified in the relevant flood study, generally associated with velocities greater than 1 metre per second in the 1% AEP flood.
Freeboard	A factor of safety used in relation to the setting of floor levels. The typical freeboard set by the NSW Government is 0.5m, unless Council can demonstrate a different freeboard can apply as defined in an adopted Floodplain Risk Management Plan.
Ground Levels	Highest and lowest ground levels on the property, predominately based on ground level information databases created by *Airborne Laser Scanning*. A Registered Surveyor can confirm exact ground levels.
High Hazard Area	Those areas where flooding has the potential to be unsafe or cause damage. Council considers those areas that are Hazard Category H3 or above in a 1% AEP flood to be high hazard. Refer to Section on Flood Hazard below.
High Risk Area	Those areas of high flood risk as identified in a flood study or Floodplain Risk Management Plan.
LEP	Local Environment Plan
PMF	The *Probable Maximum Flood* is an extreme flood deemed to be the largest flood that could conceivably occur at a specific location. It is generally not physically or economically possible to provide complete protection against this flood event but should be considered for emergency response. The PMF defines the extent of flood prone land (i.e. the floodplain).

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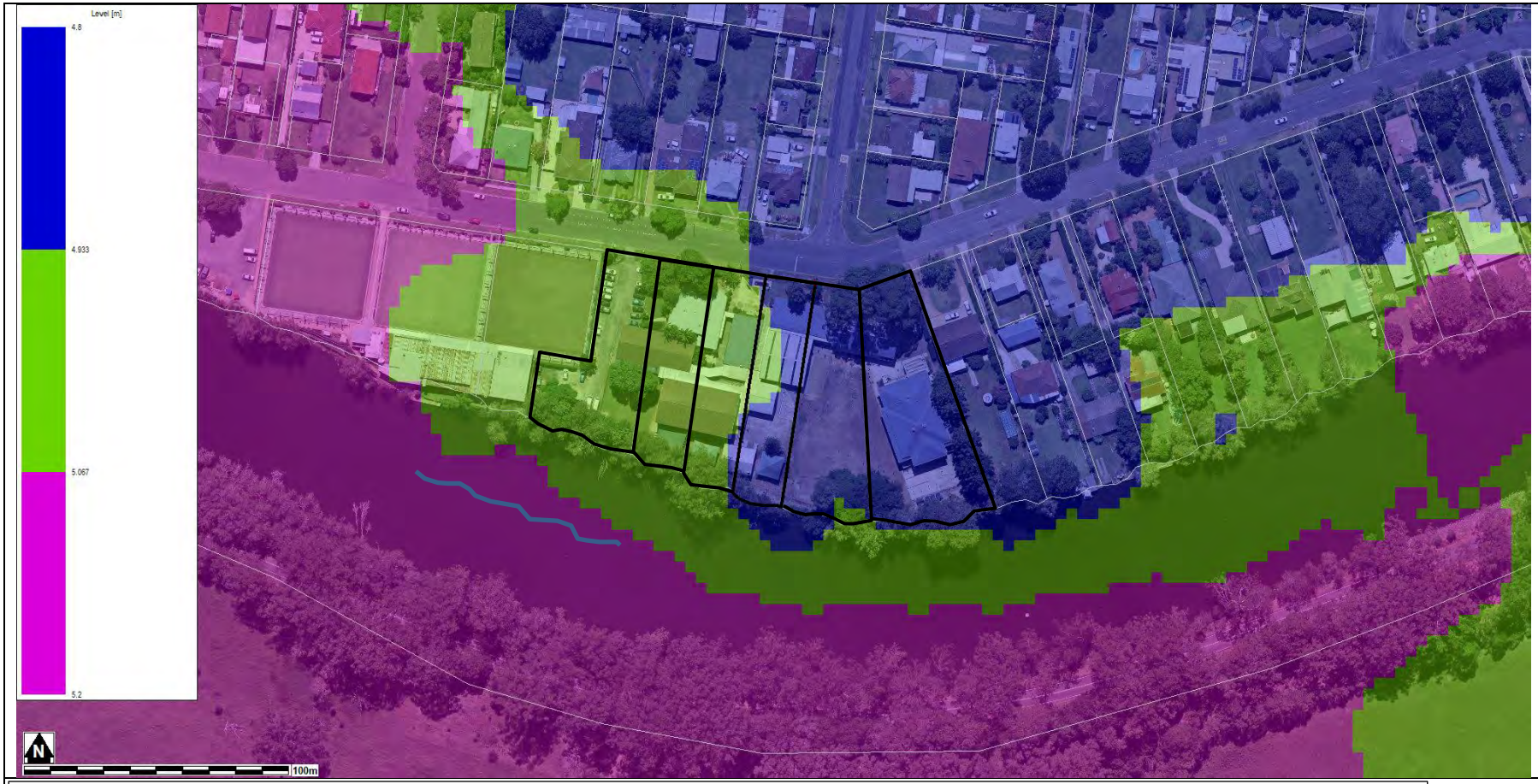
Flood Information Certificate

PMF Flood Extents



DISCLAIMER

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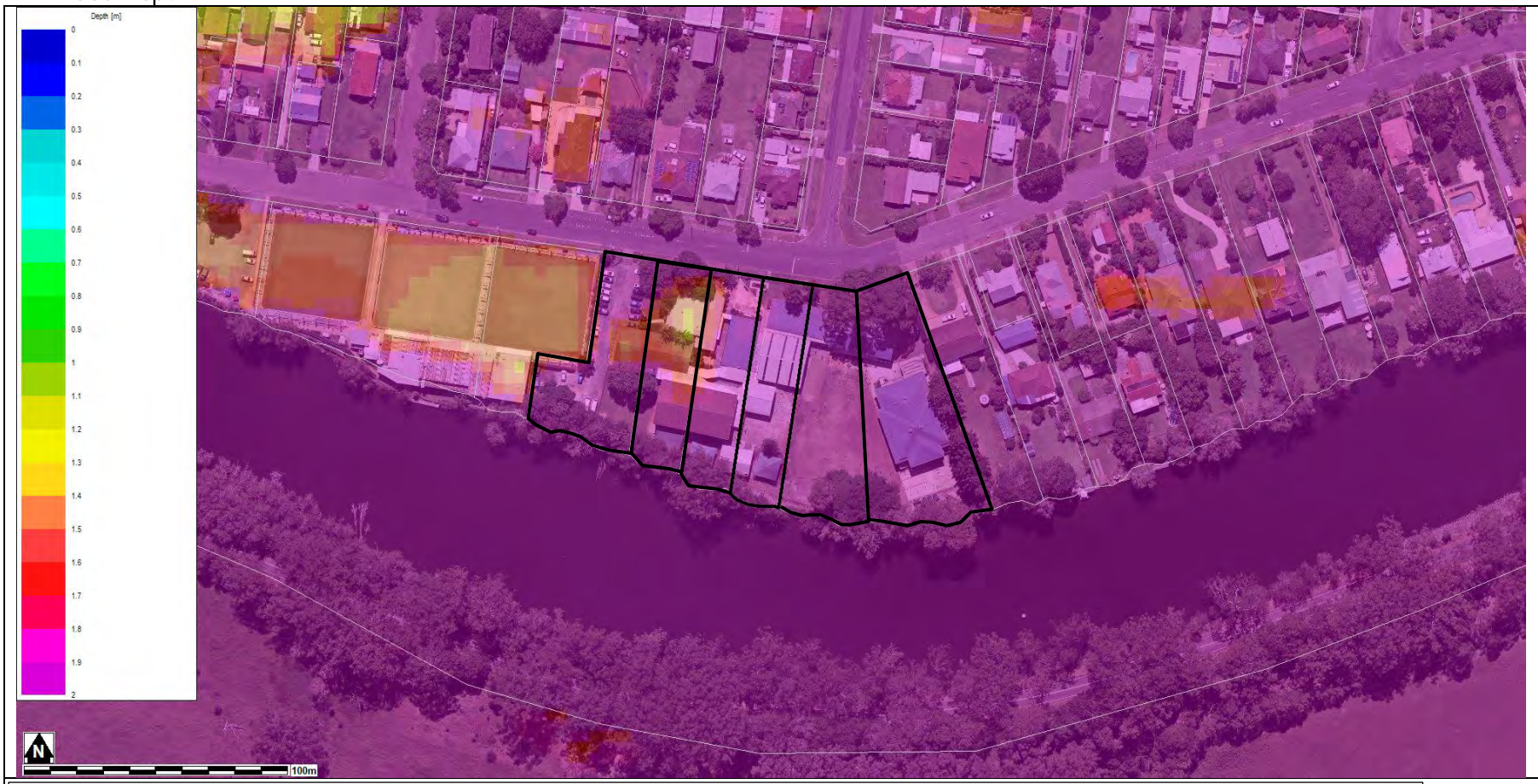
Wyong Office: 2 Hely St / PO Box 20 Wyong NSW 2259 **Gosford Office:** 49 Mann St / PO Box 21 Gosford NSW 2250

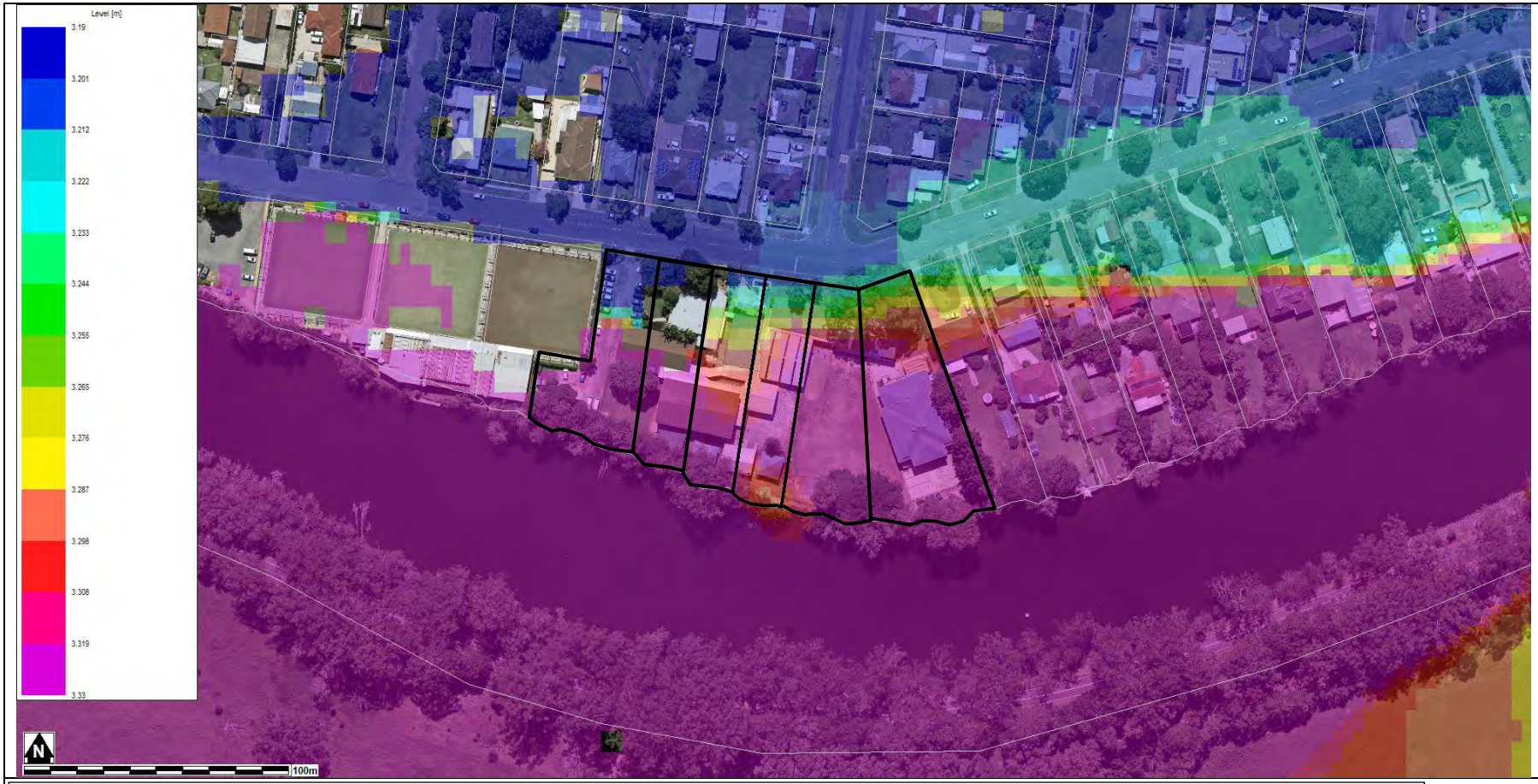
Flood Information Certificate

PMF Flood Depth



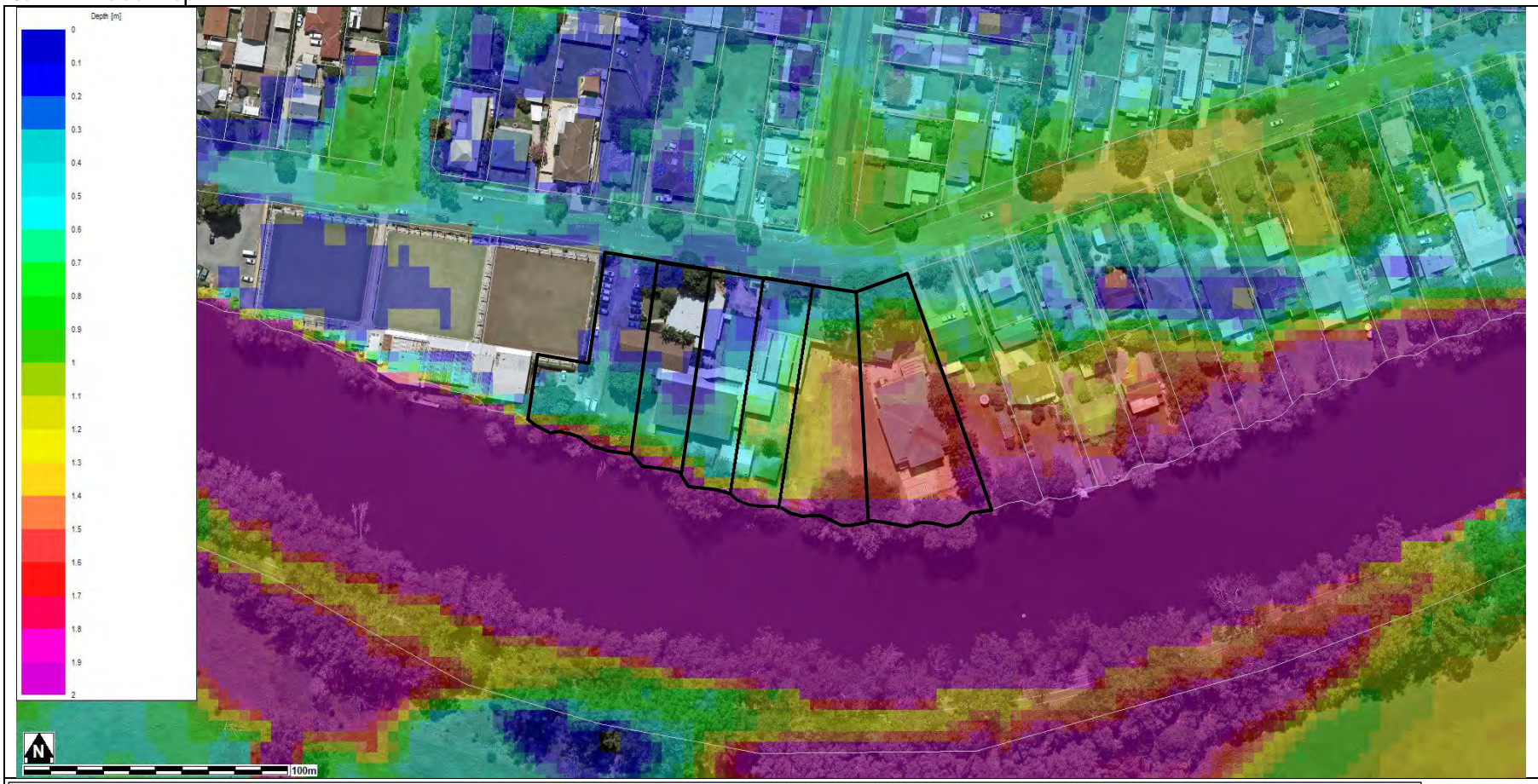
Flood Information Certificate

1% AEP Flood Extents



Flood Information Certificate

1% AEP Flood Depth



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5% AEP Flood Extents

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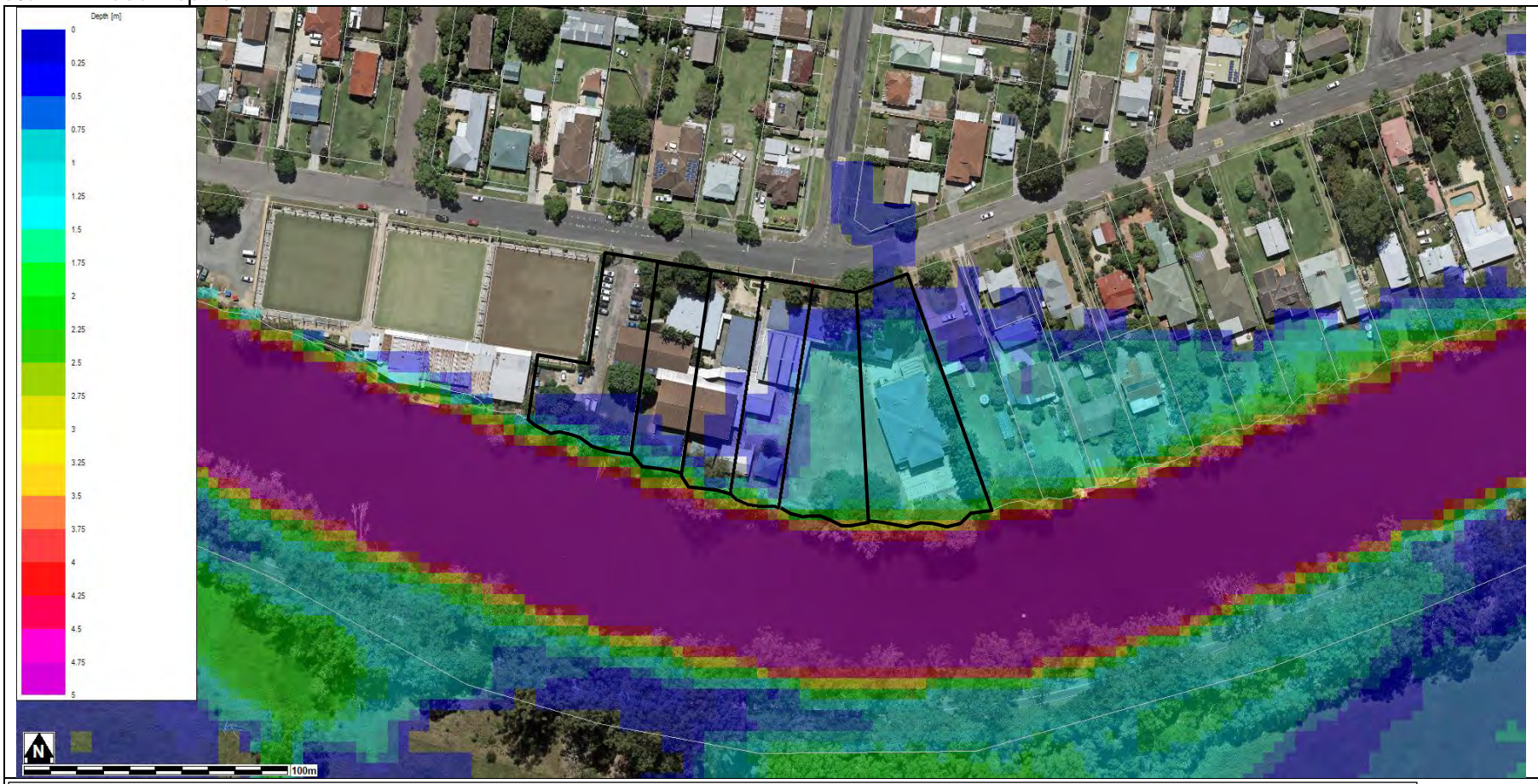
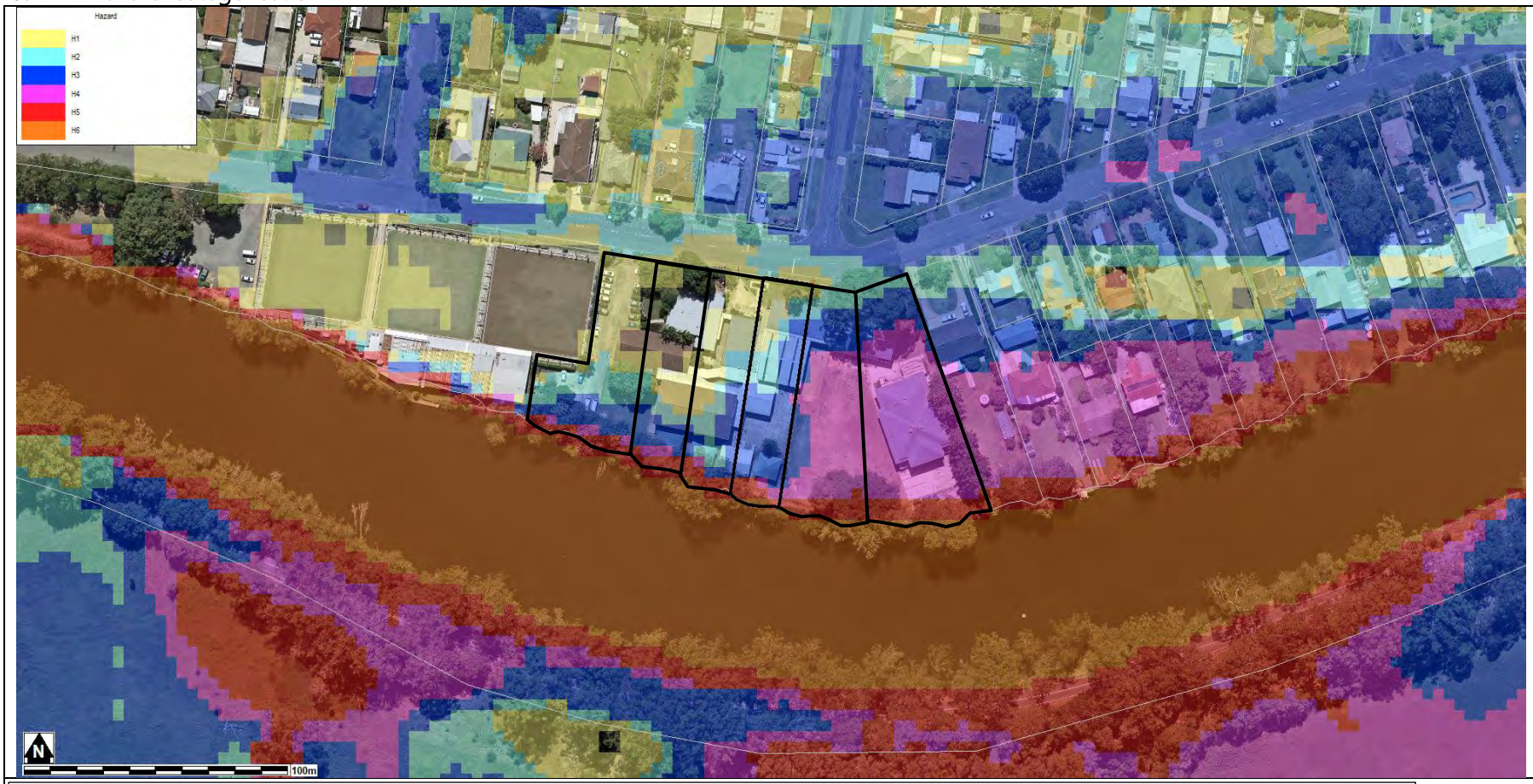
Flood Information Certificate

5% AEP Flood Depths



Flood Information Certificate

1% AEP Hazard Categorisation



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Flood Information Certificate

Hydraulic Categorisation