ZAIT
Engineering Solutions Pty Ltd

FLOOD IMPACT STATEMENT

Address:	2 Riverside Drive, Putney
Prepared for:	Wincrest Group Pty Ltd
Date:	31 October 2022
Report Number:	22-3404
Issue:	B (16/01/23)

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1. Introduction

A development application is submitted to The City of Ryde Council for the proposed two-storey residential dwelling and detached secondary dwelling at No.2 Riverside Drive, Putney. Council indicated that the site is flood affected and a Flood Impact Statement is required to investigate the Post developed 100 year ARI water surface level, the impact the proposal will have on the inundation levels of the neighbouring sites, and the boundary fencing treatments necessary to pass the floodway flows.

The site is affected by flooding as stated in the Flood Information Sheet issued by City of Ryde Council dated 04/10/2022. The flood information is extracted from the *Parramatta River Ryde Sub Catchments Flood Study Report (Jan 2015).*

Zait Engineering Solutions have been commissioned to assess the flood characteristics of the site and to provide a Flood Impact Statement demonstrating compliance with the NSW Government Department of Planning's 'Floodplain Development Manual', and Ryde Development Control Plan 2014 Section C3.5 Flood Planning.

2. Site Analysis

The site is located within the municipality of The City of Ryde Council and is identified as Lot 114 DP 609204. The site is located on the Northern side of Riverside Dr and has a total site area of approximately 599.6m² in total. The site is bounded by residential allotments to the North and East, Riverside Dr to the South and Church St to the West (See Figure 1 – Site location).

The proposed development consists of the demolition of the existing single storey dwelling, and detached dwelling, and the construction of a new two-storey residential dwelling and new detached secondary dwelling. (See Figures 3 & 4 Pre-developed & post-developed site plans).

3. Flood Assessment and Recommendations

Flood information was provided by Council on 04/10/22. It demonstrates that the subject site impacted by both low and medium risk flooding that enters the property from Church Street and the rear boundary.

These flood depths have been interpolated to vary across the site. The flood Level determined for the main dwelling is calculated to be **RL16.13mAHD**. The flood determined at the location of the secondary dwelling is calculated to be **RL16.63mAHD.** These levels have been interpolated from the site specific survey with flood depths calculated to be 0-0.3m at the main dwelling, and 0.15m-0.24m at the location of the secondary dwelling.

With this, a Flood Planning Level (FPL) for the main dwelling and secondary dwelling is calculated to be **RL16.63mAHD** and **17.13mAHD** respectively.

3.1 Finished Floor Levels

As per City of Ryde Council's – *Floodplain Risk Management* for sites flood affected by both Low Risk and Medium Risk Flooding, controls for proposed habitable floor areas and the flood planning level are to provide 300-500mm freeboard above the 1% AEP. Non-habitable and Garage areas are to provide 150mm Freeboard for areas within Low Risk Flooding.

The flood information from Council has determined that the site is affected by the 1% AEP flood event and with the proposed dwelling and secondary dwelling impacted by Medium Risk Flooding, therefore there a 500mm freeboard is required. The proposed garage is impacted by low risk flooding and therefore a 150mm freeboard is required.

With this, the proposed minimum finished floor levels are required;
- The single residential dwelling is to provide a minimum habitable floor level of **FFL16.63mAHD**. This level provides 500mm Freeboard.

- The proposed garage of the single residential dwelling is to provide a minimum non-habitable floor level of **GFL16.28mAHD.** This level provides a 150mm Freeboard.

- The proposed secondary dwelling is to provide a minimum habitable floor level of **FFL17.13mAHD**. This level provide 500mm Freeboard.

With the recommendations above, the proposed architectural plans will provide adequate Finished Floor Levels that meet the flood requirements.

3.2 Building Components and Structural Soundness

The lowest ground level in the vicinity of the proposed main dwelling is located at the front of the building line with a Natural Ground Level (NGL) of RL15.60. With a minimum required habitable finished floor level of min.16.63mAHD, the ground floor of the proposed dwelling will be a maximum of 1.03m above the ground level.

The lowest ground level in the vicinity of the proposed secondary dwelling is located at the front of the building line with a Natural Ground Level (NGL) of RL16.42mAHD. With a minimum required habitable finished floor level of min.17.03mAHD, the ground floor of the proposed dwelling will be a maximum of 0.61m above the ground level.

From the above, the proposed ground floor levels of the development is to be constructed as a concrete slab with drop edge beams to the future structural engineer's details**.**

This form of construction will ensure structural soundness and the ability to withstand all forces of flowing waters, including debris and buoyancy. All building components below the 100YR ARI plus freeboard (i.e. the Flood Planning Level) are to be flood compatible materials as described above. All power points are to be at a minimum level of 16.63mAHD & 17.13mAHD (FPL) for the single dwelling and secondary dwelling respectively.

3.3 Boundary fencing

As the site is a flood-controlled lot, all new fencing within the flooded areas are to be flood fences so as to allow water to pass and not cause a blockage. This boundary fencing shown GREEN should provide a minimum gap of 100mm from Natural Ground Level in order to allow flood waters to pass. The fencing shown BLUE along the western frontage is to be open style fencing to allow the free flow of floodwater. The existing fencing at these locations are timber paling and colorbond which create blockage. The introduction of flow through fencing will significantly increase the flow widths along the Western Boundary and in turn reduce the flood depths.

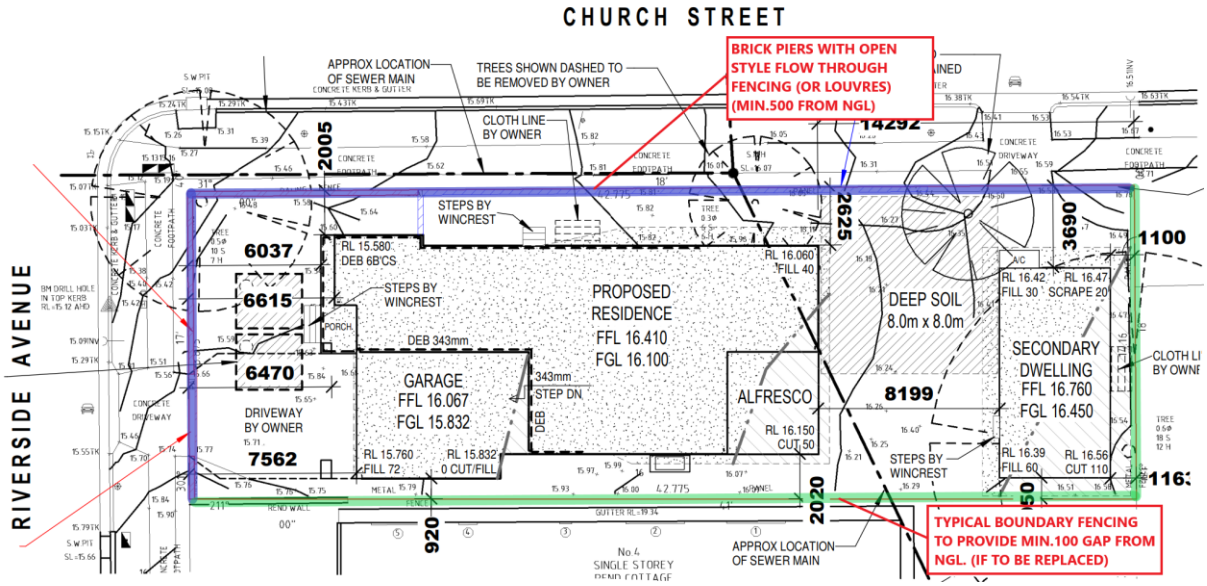

Figure 1 – Flood Fencing Plan

Source: Zait Engineering Solutions

3.4 Volume/Velocity

The flood storage volume of the site is expected to remain unchanged due to the proposed development. The proposal does not include any loss of flood storage and therefore a suitable development with regards to the flood storage volume.

The flood velocity in the vicinity of the site are expected to remain unchanged due to the proposed development as there is no increase or decrease in flow widths of structures within the 1% flow path.

3.5 Impact on adjacent lands

As per the Flood Extent shown in Figure 8, it can be seen that the site is unaffected by the 100-year ARI flood event. With this, the proposed development does not encroach within the flood extent and therefore will not have an impact on adjacent lands.

4. Evacuation

It is recommended that evacuation procedures shall be carried out pending instructions from authorities i.e. State Emergency Services.

For Storms up to the 1% AEP, all occupants are to remain within the proposed dwellings, due to the proposed elevated level, and the short length of time of concentration. However, if previous warning is given, evacuation to Riverside Drive is safer. Occupants of the dwelling are to evacuate to the front of site and travel in a western direction along Riverside Drive. This is the shortest and safest travel distance to evacuate.

Evacuation during flooding may be quite dangerous and would NOT be recommended and should only take place prior to the water level reaching a level of 0.2m above the NGL at the front boundary. In the event of a probable maximum flood, early evacuation is paramount. All residents to seek refuge on higher grounds and as directed by authorities. A **Flood Emergency Response Plan** has been included at the end of this report.

Evacuation during flooding may be quite dangerous and is NOT be recommended.

5. Conclusion

In conclusion, the proposed two-storey dwelling and secondary dwelling, as presented in the architectural plans by **Wincrest Group (Dated 28.09.2021 Job No.17501 Issue H)**, will meet the requirements of The Department of Planning's 'Floodplain Development Manual', City of Ryde Council's Flood requirements as specified in City of Ryde Council's – *Floodplain Risk Management* for flood affected sites, and provided that all procedures and recommendations presented in this report are implemented.

Should you require any further explanations, please do not hesitate to contact our office.
Yours faithfully,

David Zaiter
BEng(Hons), MIEAust, CPENG, NER, RPEQ
Zait Engineering Solutions PTY LTD

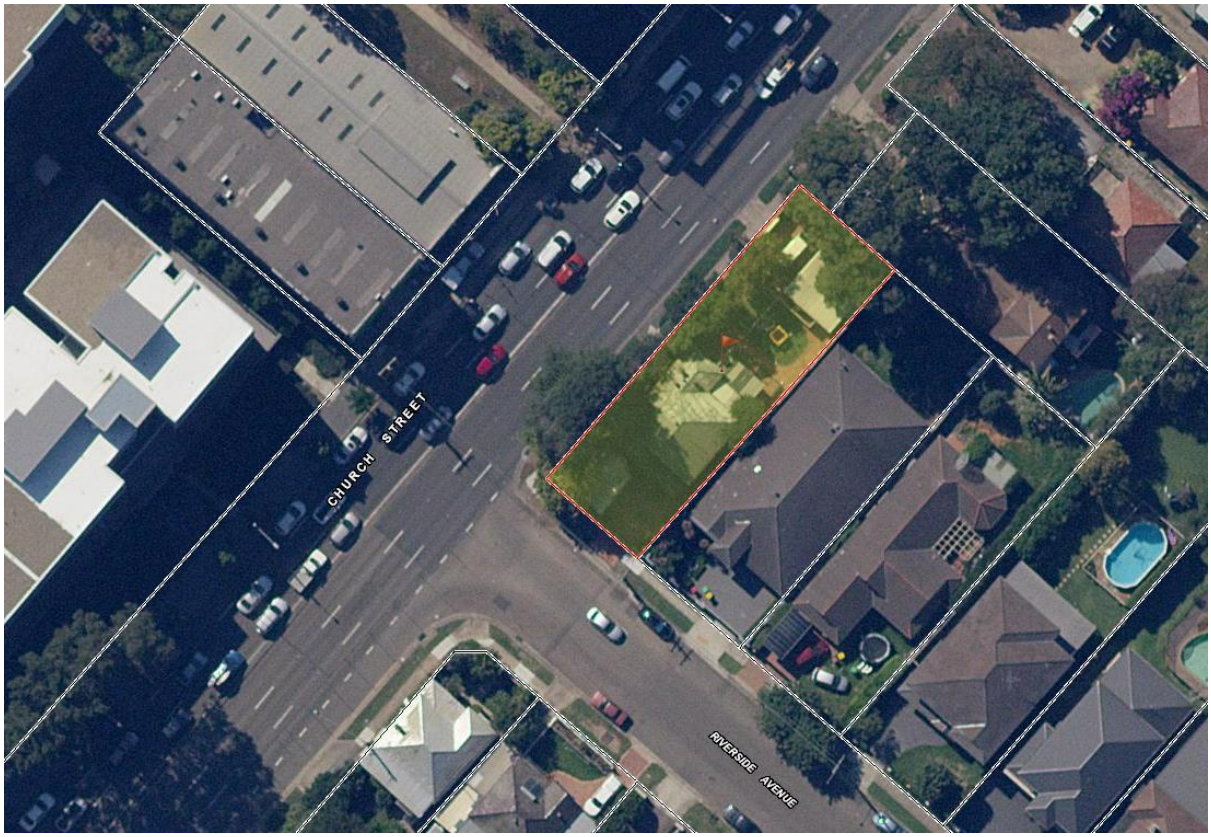

Figure 2 - Site Plan
(Source: *SIX Maps website accessed October 2022*)

Figure 3 - Site Plan
(Source: *SIX Maps website accessed October 2022*)

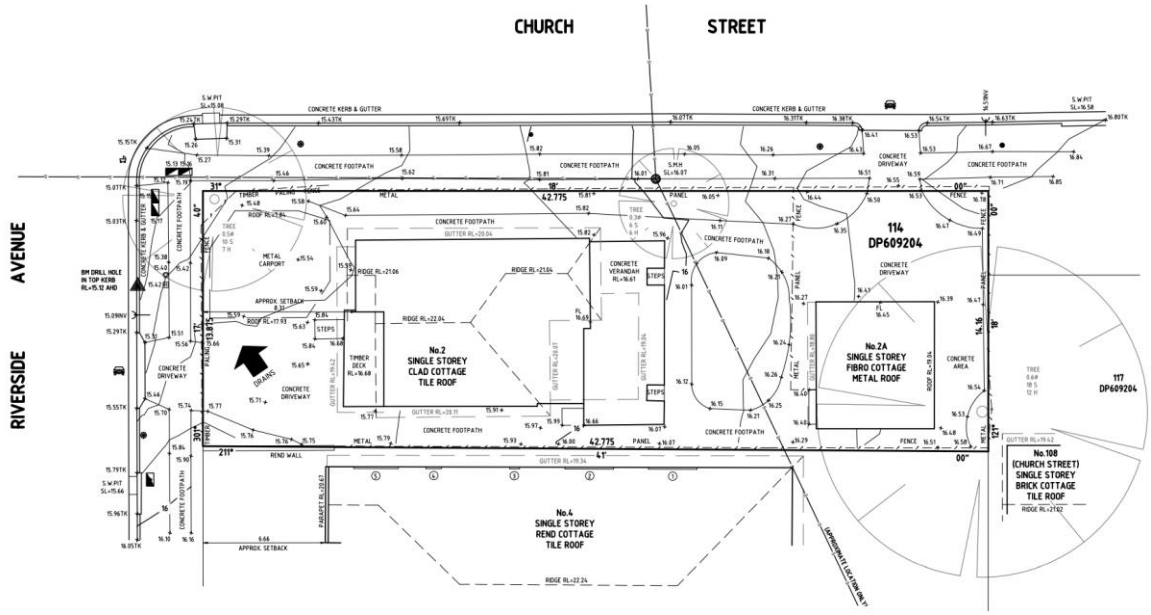

Figure 4 - Pre- Developed Site Plan
Source: Site Survey by Terralinks (Dated 10.06.2021; Job No.6233)

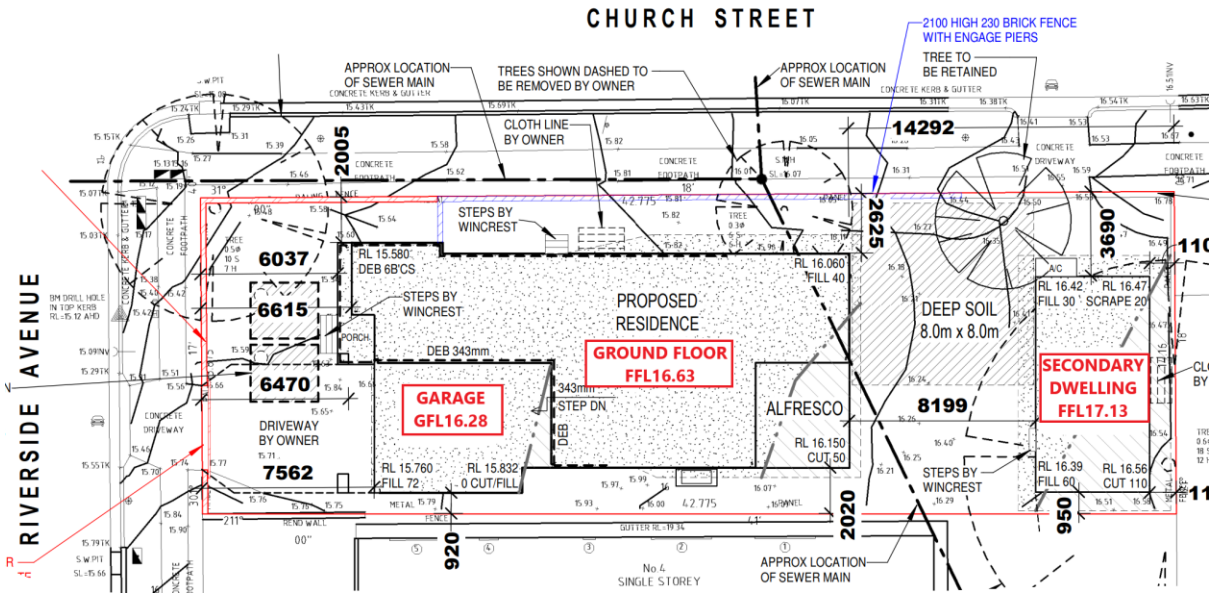

Figure 5 - Post-Developed Site Plan/Floor Level Recommendations

Source: Architectural Plans by Wincrest Group (Dated 28.09.2021 Job No.17501 Issue H)

City of Ryde

Lifestyle and opportunity @ your doorstep

Kylie Wright
Suite 4, Level 2 George Street
NORTH STRATHFIELD NSW 2137

4 October 2022 Our ref: D22/127178

Dear Ms. Wright,

RE: Request for Flood Information – No. 2 Riverside Avenue, Putney

Reference is made to your application received on 26th September 2022 seeking flood level information pertaining to the above-mentioned address.

Please find attached flood level data sheet providing flood levels for the 100 year ARI (Average Recurrence Interval) flood event and the PMF (Probable Maximum Flood) event.

This information is derived from models established as part of the Parramatta River – Ryde Sub Catchments Flood Study and Floodplain Risk Management Study and Plan.

Council's database indicates the presence of a 1100mm (w) x 650mm (h) concrete culvert near the site.

Please be advised that flood models are approximate. Care and expertise is required in the interpretation of these flood levels. In addition, this flood information does not take into account any local overland flow issues.

Any person or organisation who acts on the information provided does so at his / her / its own risk. To the extent permitted by law, the City of Ryde accepts no responsibility and excludes all liability whatsoever in respect of any use of or reliance upon this information.

Should you require any further information, please feel free to contact me on (02) 9952 8105.

Yours sincerely,

Anil Shrestha
Senior Stormwater Engineer

Figure 6: ***City of Ryde Council - Flood Information Sheet (Dated 04.10.2022)***

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FLOOD INFORMATION REQUEST

Property Address: No. 2 Riverside Avenue, Putney
Issue Date: 4 October 2022
Flood Study Reference: Parramatta River Ryde Sub Catchments Flood Study Report (Jan 2015)
Flood Model Reference: TUFLOW Model (March 2014)

Flood Level Location Map

Flood Level Data Table

Location	100 Year ARI Flood Event (m AHD)	Probable Maximum Flood (m AHD)
A	Nil	15.64
B	15.72	15.80
C	Nil	15.79
D	15.90	16.01
E	16.07	16.21
F	15.89	15.98
G	16.13	16.29
H	16.05	16.18
I	16.49	16.82
J	16.35	16.56
K	16.54	16.86
L	16.56	16.80
M	16.63	16.95
N	16.76	16.92
O	16.97	17.25

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Figure 7 - ***City of Ryde Council - Flood Information Sheet continued (Dated 04.10.2022)***

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Notes:

- All levels are based on Australian Height Datum (AHD).
- Flood levels are indicative only.
- The flood levels were derived using Aerial Laser Survey (ALS) data which is considered as approximate.
- This flood level information is for existing site conditions only.
- Concept plans are required for all new development proposals.
- The floor levels of the proposed habitable floor area should be set with a freeboard of 300 mm (Overland Flow and Low Risk) and 500 mm (Medium Risk and High Risk) to the 100 year ARI flood level. A freeboard of 150 mm (Overland Flow and Low Risk) and 300 mm (Medium Risk and High Risk) is applicable for non-habitable floor areas. Refer City of Ryde Development Control Plan 2014.
- A site specific flood study / risk assessment may be required for any future development. Engage a suitably qualified engineer to assist you in this matter. Any study or assessment shall be in accordance with the NSW Government's Floodplain Development Manual 2005 and the City of Ryde Development Control Plan 2014.
- Site specific ground and building survey levels should be used to relate flood levels and to assess the impact of flooding.

Flood Risk Map

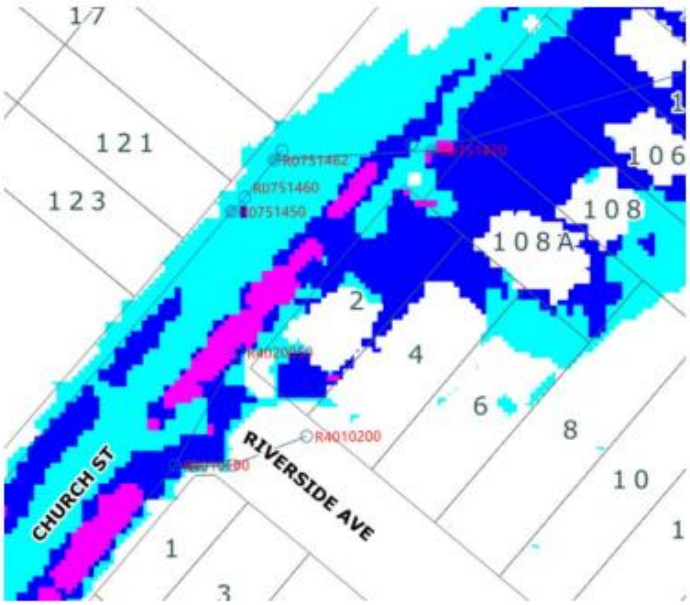

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Figure 8 - ***City of Ryde Council - Flood Information Sheet continued (Dated 04.10.2022)***

Flood Extent (100 Year ARI Event)

Flood Extent (Probable Maximum Flood)

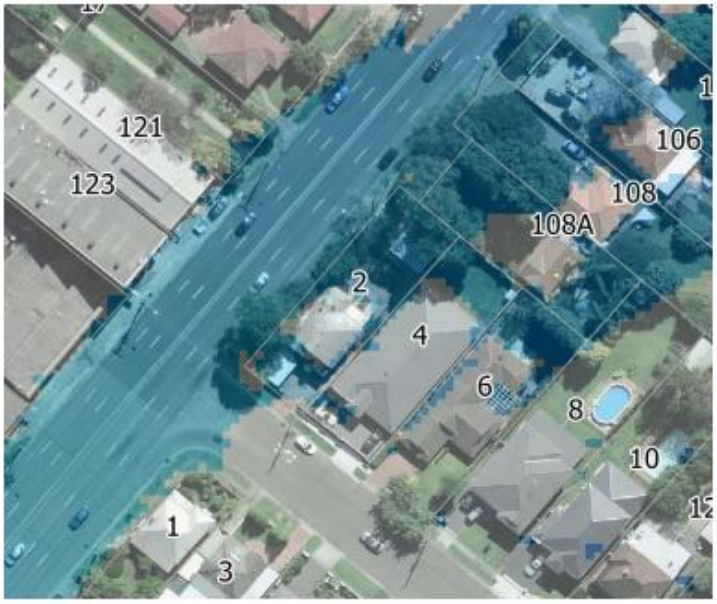

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Figure 9 - ***City of Ryde Council - Flood Information Sheet continued (Dated 04.10.2022)***

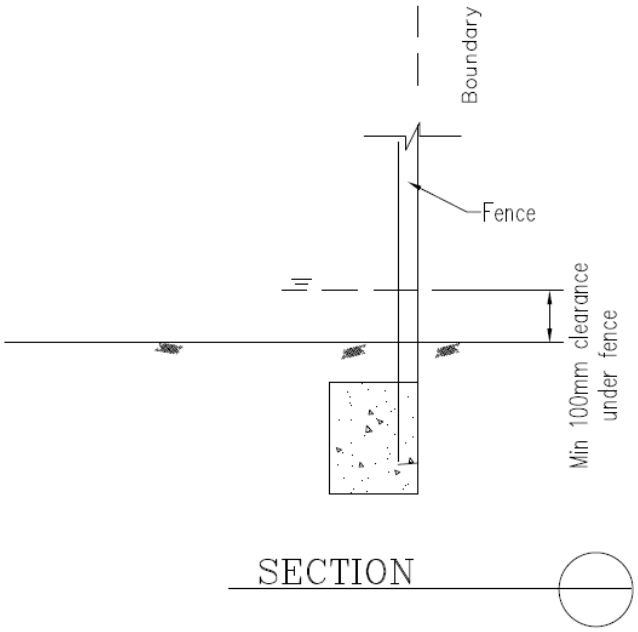

Figure 10 - Flood Fencing Detail

Re: Flood Emergency Response Plan for the
Proposed development at No.2 Riverside Dr, Putney

A laminated copy of this Flood Emergency Response Plan should be permanently attached (glued) on an internal cupboard door and to the inside of the electrical meter box at No.2 Riverside Drive, Putney

Council has advised that this property is subject to flooding in a 1 % AEP (1 in 100year ARI) storm event. The Probable Maximum Flood (PMF) is the highest flood level that is ever likely to occur, however it is extremely rare. Council has no information regarding tsunamis in the area.
Habitable living areas are designed to be a minimum of 0.5m above the 1 % AEP Flood Level and staying within the building will provide protection for a wide range of floods.

Emergency Procedure

1. Floods in the area are considered as "flash floods" and no warning system is available.
Storms leading to major flooding are typically 2 hours long, however shorter storms as little as a % hour long can produce significant flooding. Once the storm passes floodwaters usually disappear rapidly.
2. During floods many local and major streets and roads will be cut by floodwaters.
Travelling through floodwaters on foot, or in a vehicle can be very dangerous as the water may be polluted, obstructions can be hidden under the floodwaters, or you could be swept away. We recommend staying within the building as much as practical as this is the safest option. If you need to leave the building do so early in the flood event, before the flood level reaches 300mm above NGL at the boundary.
3. Study this response plan and learn the safe travel routes that show the paths that are less likely to be cut by floodwaters. Keep in mind that neighbouring streets may be worse affected by the flooding. Should you wish to evacuate, contact the SES or Police for information such as which streets are flooded and which route to take to your nearest evacuation centre.
4. As the flood level approaches the garage floor level (but only if safe to do so) relocate any items that may be damaged by water, or poisons, or wastes to as high a level as possible.
5. As the flood level approaches the habitable floor level:
   i) gather medicines, special requirements for babies or the elderly, mobile phones, first aid kit, special papers and any valuables into one location,
   ii) put on strong shoes, raise any items within the building that may be damaged by water (e.g. photo albums) to as high a level as possible, with electrical items on top. Turn off and disconnect any large electrical items such as a TV that cannot be raised.
   iii) place towels across the bottom and lower sides of external doors to slow down the entry of water through the door.
6. In the very rare event that floodwaters may enter the building collect items from 5.i) above and move to an upper level if possible, or if in a single level building provide a chair in the kitchen to enable access to the kitchen bench preferably adjacent to the window. Ensure window is not locked or key readily available. Do not evacuate the building unless instructed to do so by the SES or the Police. Remember floodwaters are much deeper and flow much faster outside.
7. In the case of a medical emergency ring 000 as normal, but explain about the flooding.
8. A laminated copy of this flood plan should be permanently attached (glued) on an inside cupboard door in the kitchen and laundry and to the inside of the electrical meter box.
9. This flood management plan should be reviewed every 5 years, particularly with the potential sea level rise due to Climate Change.