Our Ref: 59919063:SEG
Contact: Stephen Gribble

19 December 2018

Toplace Pty Ltd
121 Majors Bay Rd
Concord NSW 2137

Attention: David Krepp

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Dear David,

PRELIMINARY FLOOD ADVICE - 146-154 O'RIORDAN STREET MASCOT

This letter provides preliminary flood advice for a proposed development at 146–154 O'Riordan Street Mascot. Number 154 O'Riordan Street has been tagged on Bayside Councils' flood maps as flood affected.

This advice has been based on telephone discussion with Council's development engineer and review of the following documents:

- Survey Drawing No.8216 of the site by Ramsey & Co. Surveyors dated 7-11-18;
- Preliminary DA Drawings by PTW Architects dated 26 November 2018;
- Mascot, Rosebery & Eastlakes Flood Study (WMA Water 2015);
- Mascot, Rosebery and Eastlakes Floodplain Risk Management Study & Plan (Royal HaskoningDHV, Draft May 2017);
- Council of Botany Bay Development Control Plan (2013);
- Building over and adjacent to Sydney Water stormwater assets (Guideline by Sydney Water, 2015)

Stormwater Network

Figure 1-1 is an extract from the Mascot, Rosebery & Eastlakes Flood Study showing the estimated 1% Annual Exceedance Probability (AEP) peak flood depth and the stormwater infrastructure in the vicinity of the site.

The site is within Sydney Water's West Mascot Catchment Stormwater Network No.63. Figure 1-1 shows both Sydney Water (yellow) and Council (black) stormwater assets in the vicinity of the Site. The main Sydney Water channel runs from east to west adjacent to the southern boundary of the site and the Mascot Park branch runs from north to south through the middle of site. The catchment area for the Branch includes O'Riordan Street between Coward Street and Bourke Street, Mascot Oval and the subject site.

The Mascot Park Branch is a significant constraint both hydraulically and to the architectural footprint of the proposed development. The easements for the Mascot Park Branch are indicated by (C), (G) and (H) on the site survey by Ramsey & Co. Surveyors.

Figure 1-1 also shows that the Southern and Western Suburbs Ocean Outfall Sewer (SWSOOS) is located at the south west corner of the site. This is the largest sewer system in NSW and has heritage significance. Although unrelated to flooding and stormwater, it is likely to be a constraint to the footprint of the proposed development (noting particularly the proposed basement levels).

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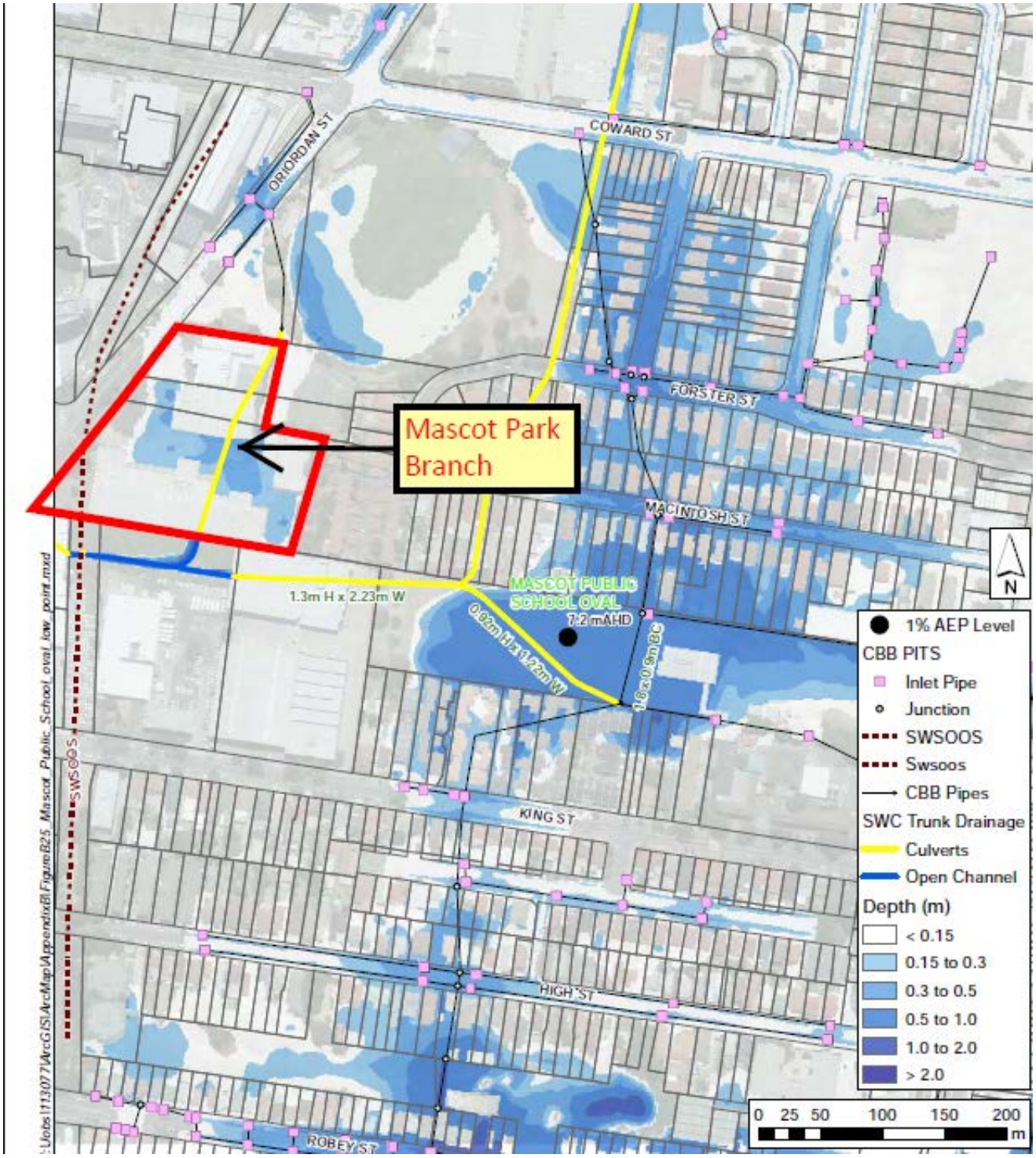


Figure 1-1 Extract from Mascot, Rosebery & Eastlakes Flood Study (WMA Water 2015)

Flood Behaviour

The Mascot, Rosebery & Eastlakes Flood Study used a DRAINS hydrologic model and 2-dimensional TUFLOW hydraulic model of pipe, channel and overland flows. Flooding in the channel adjacent to the southern boundary is estimated as confined to a narrow overbank area and does not extend into the site in both the 1% AEP and the Probable Maximum Flood (PMF). Trapped sag points are located to the north of the site in O'Riordan Street and Mascot Oval. Peak flood levels from the Study are summarised in Table 1-1. Existing ground levels on the site are above the estimated 1% AEP flood levels at these locations.

Table 1-1 Flood Levels from Mascot, Rosebery & Eastlakes Flood Study

Location	1% AEP	PMF
(1) Channel adjacent to southern boundary	6.0m AHD[1]	Not Stated
(2) O'Riordan Street sag	7.5m AHD[1]	8.0m AHD[1]
(3) Mascot Oval	7.9-8.0 m AHD[2]	8.4-8.5m AHD[2]

1. Level reported in Flood Study
2. Approximate level estimated from depth figures and received survey

Ponding of up to 0.3-0.5m depth in a 1% AEP event is shown within the site but it is considered that this may be caused by internal site runoff as the ground elevations are higher than the external levels and some flowpaths from the site may be blocked by buildings / ground levels. It is noted that internal property drainage and roof gutter flows are not generally modelled in broadscale catchment studies.

Development Control Plan Requirements

Floodplain management requirements are described in Part 10 – Stormwater Management Technical Guidelines of the Botany Bay DCP (2013). Section 8 of the policy (extract attached) lists criteria for new developments, including the following which are relevant to proposed development of this site:

1. A freeboard of 500mm above the estimated 1% AEP for habitable buildings/structures;
2. A freeboard of 300mm above the estimated 1% AEP for non-habitable buildings/structures (eg garages, ramps to basement parking);
3. The crest level of ramps and steps at basement entry points shall be a minimum of 300mm above the following:
    a. 1% AEP flood level;
    b. Top of kerb adjacent to the layback; or
    c. Overflow RL from any on-site stormwater system.
4. For a site which falls towards the street and not affected by overland flow flooding, the finished floor level of habitable area shall be a minimum of 300mm above the top of kerb fronting the site;
5. For a site which falls to the rear and not affected by overland flow flooding, the finished floor level of habitable area shall be a minimum of 300mm above the highest natural surface RL directly adjoining the proposed floor.

In addition to the above constraints the DCP requires that "the raising of floor levels, or any site levels, shall not create or exacerbate flooding on any other private or public properties, including public roads and open space." Council engineers have indicated that a flood study is not likely to be required.

Flood Planning Levels

Flood planning levels for this site would generally be determined based on the peak flood levels external to the site, not the internal flood levels from the modelling as these would be dependent on internal site conditions which are not explicitly modelled. It is assumed that roof gutter and surface drainage would be designed to manage internal runoff. Therefore:

- A minimum flood planning level of 8.5m AHD is estimated for habitable areas based on a 500mm freeboard to the peak external 1% AEP flood level of 8.0m AHD (noting the peak flood level on the southern boundary is lower at 6.0m AHD). (As per DCP Extract Point 1)

- Ramp crests and entries to basements would need to be a minimum of 300mm above the external 1% AEP flood level (ie 8.0 + 0.3 = 8.3m AHD) or 300mm above the top of kerb adjacent to the layback. (As per DCP Extract Point 2)
- Parts of the site could be categorised as not affected by overland flood falling towards and away from the street, thus the minimum habitable floor level would need to 300mm above the top of kerb or adjoining surface level respectively. (As per DCP extract Points 4 and 5)
- Potentially some aspects of the freeboard could be provided by constructing a bund wall at locations on the site (eg a low perimeter wall on the boundary)

Internal Stormwater Drainage

Councils' DCP requires that internal drainage is designed in accordance with Australian Standard 3500.3. This Standard requires that floor levels be 300mm above the ponding level of any sag pits where water may pond against or enter a building.

Sydney Water Requirements

Sydney Water has comprehensive guidelines for Building over and adjacent to their stormwater assets. This document is on their website (http://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdux/~edisp/dd_051552.pdf). The general requirements include (which are further detailed in the document):

- 1m horizontal clearance and 0.6m vertical clearance to any proposed structure;
- A Flood Impact Assessment may be required.

Potentially there are three options for developing adjacent to the Mascot Park Branch stormwater:

1. *Leave as is and reduce the development footprint to be outside of the easement*
2. *Divert the Mascot Park Branch stormwater pipe along the site boundaries as shown on Figure 2*
   - This is Sydney Water's preferred option;
   - Will allow the development to have a single basement;
   - Currently proposed building setbacks almost allow enough space for this; and
   - Work will be required in the lot to the south to construct a new connection to the main branch channel
3. *Leave Mascot Park Branch on current alignment and develop over it*.
   - Sydney Water would only permit this if diversion is not feasible;
   - Separate basements would be required;
   - Stormwater pipe would likely to require reconstruction as its expected life may be less than that of a new building;
   - Building structure would need to be structurally independent to stormwater pipe.

It is recommended that a Water Servicing Coordinator (WSC) be engaged to liaise with Sydney Water regarding requirements for their assets in proposed development of the site.

Further Information

Flooding extent and peak levels for this letter are estimated from the Flood Study report. Council can provide detailed flood advice for a fee of $253 (application form and payment required at Council's customer service centre). The TUFLOW model of the flood study for additional analysis (eg if required by Sydney Water for their stormwater analysis) is available from Council for a fee of $1,325.

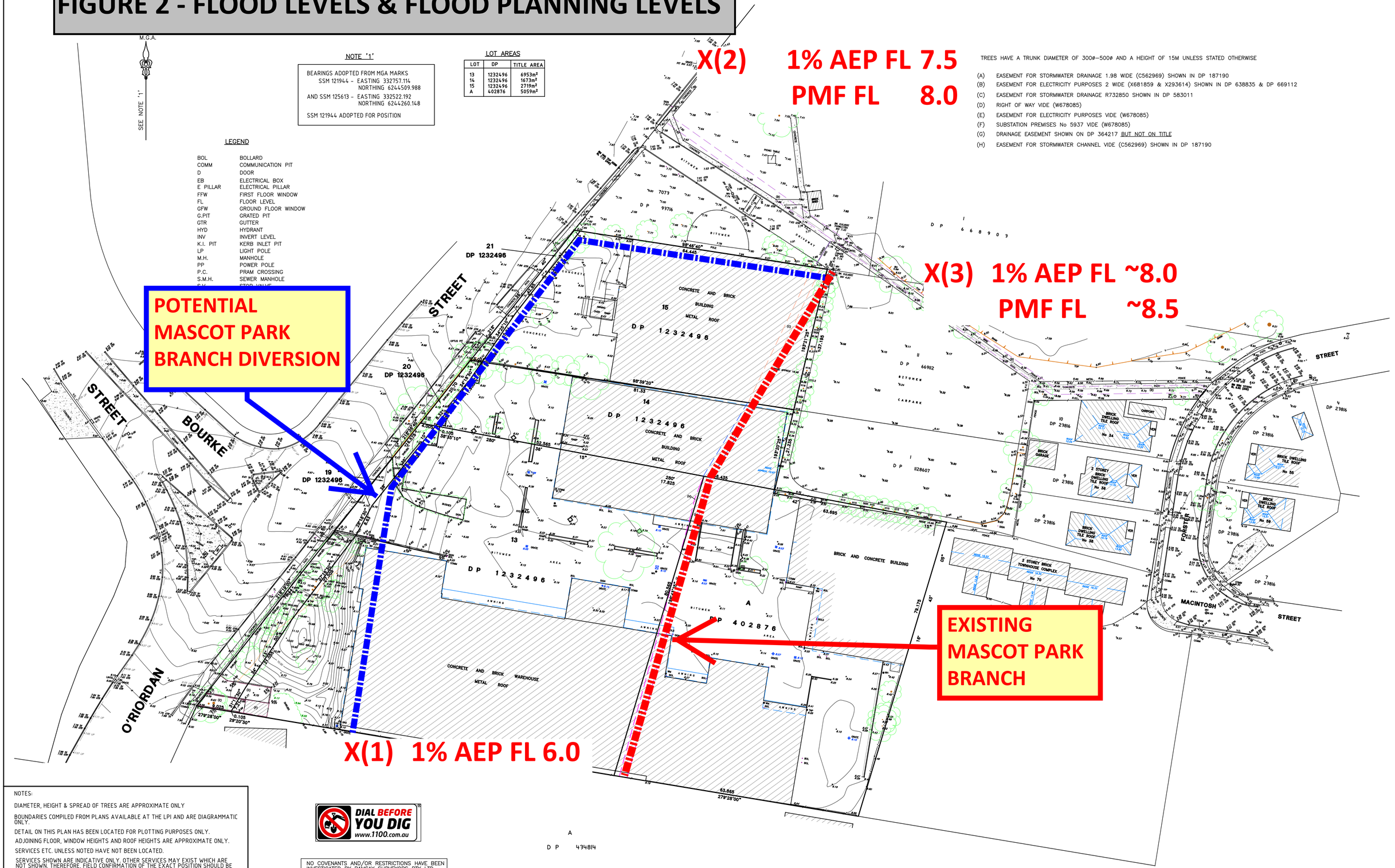
Should you have any further questions please do not hesitate to phone the undersigned.

Yours sincerely,

Stephen Gribble
Senior Civil Engineer
for Cardno
Direct Line: +61 2 9496 7863
Email: Stephen.Gribble@cardno.com.au

Enc: Figure 2 (1 page)
Botany Council DCP Extract (1 page)

FIGURE 2 - FLOOD LEVELS & FLOOD PLANNING LEVELS



NOTES:

DIAMETER, HEIGHT & SPREAD OF TREES ARE APPROXIMATE ONLY

BOUNDARIES COMPILED FROM PLANS AVAILABLE AT THE LPI AND ARE DIAGRAMMATIC ONLY.

DETAIL ON THIS PLAN HAS BEEN LOCATED FOR PLOTTING PURPOSES ONLY.

ADJOINING FLOOR, WINDOW HEIGHTS AND ROOF HEIGHTS ARE APPROXIMATE ONLY.

SERVICES ETC. UNLESS NOTED HAVE NOT BEEN LOCATED.

SERVICES SHOWN ARE INDICATIVE ONLY. OTHER SERVICES MAY EXIST WHICH ARE NOT SHOWN. THEREFORE, FIELD CONFIRMATION OF THE EXACT POSITION SHOULD BE MADE PRIOR TO COMMENCEMENT OF ANY EXCAVATION.

ANY POINT OR FEATURE CRITICAL TO THE PREPARATION OF PLANS AND/OR CONSTRUCTION SHOULD BE ACCURATELY LOCATED PRIOR TO COMPLETION OF THOSE PLANS AND/OR COMMENCEMENT OF CONSTRUCTION

ORIGIN OF LEVELS: SSM 96420 – RL 9.902 (AHD) CLASS LB ORDER L2 (SCIMS 22/5/18)

CONTOUR INTERVALS ARE 0.2 MINOR AND 1.0 MAJOR

USE STATED DIMENSIONS. DO NOT SCALE.

DIAL BEFORE YOU DIG www.1100.com.au

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AMENDMENTS

DATE	DESCRIPTION
18–10–18	BOUNDARIES ADJUSTED
31–10–18	DETAIL MOVED ONTO MGA CO–ORDINATES & BEARINGS ADJUSTED.
7–11–18	BOURKE ST & SURROUND DETAIL ADDED. MEDIAN STRIP IN O'RIORDAN ST REMOVED.

L.G.A: BAYSIDE

LOCALITY: MASCOT

INSTRUCTED BY: MICHAEL ESBER

RE: TOPLACE PTY LTD

H RAMSAY & CO.
SURVEYORS EST. 1962
Ramsay Surveyors Pty Limited ACN 607 389 748
"CARLINGFORD CENTRAL" SUITE 15, 241–245 PENNANT HILLS RD, CARLINGFORD NSW 2118
P.O. BOX 2244 CARLINGFORD NSW 2118 PH: (02) 9635 5840
EMAIL: surveyor@hramsay.com.au www.hramsay.com.au

PLAN SHOWING DETAIL AND LEVELS OVER LOTS 13,14,15,19,20 & 21 IN DP 1232496 AND LOT A IN DP 402876 ALSO ADJOINING LANDS AS SHOWN O'RIORDAN STREET MASCOT

SCALE	NOT TO SCALE
DATUM	AHD
SURVEY	JK
DRAWN	CSM
DATE	21/5/18
OUR REF	8216
SHEET	6 OF 6 SHEETS

8. Finished Floor Levels

All new developments shall have finished floor levels complying with the following minimum criteria:

(i) For a site within Council's identified flood area or within the vicinity of Council or Sydney Water drainage easement/reserve or stormwater drainage system (including open/covered channel, watercourse and underground drainage pipes/culverts), the finished floor levels shall be minimum 500mm (habitable buildings/structures) and 300mm (non-habitable buildings/structures, such as garages, ramps to the basement car parking area) above the estimated 1% AEP flood level.

(ii) For developments associated only with extension of a single dwelling where this requirement may create a major problem, Council will consider lowering the criteria, depending on the size of the proposed extension and its proposed use.

(iii) For a site falls toward the streets and not affected by overland flow path and flooding, the finished floor level of the habitable area shall be minimum 300mm above the top of kerb fronting the site.

(iv) For site falls to the rear and not affected by overland flow path and flooding, the finished floor level of the habitable area shall be minimum 300mm above the highest natural surface RL directly adjoining the proposed floor.

(v) For site with belowground basement, the crest levels of ramps and steps at the entry points shall be minimum of 300mm above the following:

- 1% AEP flood level where such is known; or
- top of kerb adjacent to the layback; or
- overflow RL from any on-site stormwater systems; and

(vi) The raising of floor levels, or any site levels, shall not create or exacerbate flooding on any other private or public properties, including public roads and open space.