

Kozarovski and Partners
14/52-54 Kingsway
Cronulla 2230
Mobile: 0412 997767
(02) 8544 8720
e-mail: pavelk@optusnet.com.au
Date: 24 September 2013
Amended: 15 October 2013
Amended2:29 October 2014

Overland flow Management Study Report for proposed sub-division at Niblick Crescent Golf Course

Summary

It is proposed to create four new blocks of land fronting Niblick Crescent. The first three blocks are approximately 700 m² each, while the fourth block is only 260 m² and it is intended to be added to No. 17. The land is a part of the Golf Course. This report addresses the management of the overland flow generated during 100 year flood from the catchments upstream of the proposed four blocks.

The initial proposal was based on constructing a swale immediately upstream of the new blocks to divert the runoff and dispose it downstream. The swale would concentrate the flow which is not desirable. It is proposed to intercept the flow from the upstream catchments and direct the local flow runners along the southern fences of the first three blocks using dwarf walls. The upstream runoff would be disposed at 3 locations instead of one.

Any development on the 3 new blocks would require a preparation of a stormwater drainage plan incorporating an On Site Detention. A low flood hazard overland flow runner would have to be incorporated into the drainage design by-passing the OSD. The required maximum width of a low flood hazard overland flow path is 0.9m, with a depth of flow of 150 mm (the worst case).

The second amendment to the report was undertaken to take into account the recent drainage upgrade for the Oatlands House. The runoff from the Oatlands House and the surrounding lands was intercepted into an On Site Detention system and disposed to a lake within the golf course reducing the catchments A3 and A4.

Hydrologic Assessment

The catchment layout is shown on the catchment map attached to this report. The 1 in 100 year peak discharge values were calculated using DRAINS model. The calculated

discharge values are shown in Table 1. The flow from blocks 1, 2 and 3 would be directed along the southern fences to Niblick Crescent, while the flow from block 4 would have to be managed by No. 17 as a part of the overall drainage system for this site. It must be noted that the proposed subdivision would significantly reduce flow entering No. 17 from some 350 l/s to 58 l/s.

Table 1, 100 year peak discharge, Gerard Street Catchment

Location	Block 1	Block 2	Block 3	Block 4
Area (ha)	0.461	0.425	0.195	0.157
Q_100y (l/s)	173	151	77	58

Hydraulic model

HEC-RAS, a steady state hydraulic model was adopted for the project. The location of the cross sections and the extent of the 100 year ARI flood are shown on Drawing C-2397-01. The flood profiles and the print out of the cross sections are given in Appendix A.

The model was run using an option for mixed conditions (both super-critical and sub-critical). The hydraulic model results are given in Table 2. It can be seen from the table that the hydraulic hazard (a product of depth and velocity) is less than 0.4 m²/s at all cross sections.

Table 2, 100 year ARI Flood, HEC-RAS results

XS	Q (m ³ /s)	Invert (m)	WL (m)	Depth (m)	V (m/s)	V x D (m ² /s)	Top Width (m)
1.4	0.173	58.25	58.362	0.112	1.69	0.18928	1.83
1.3	0.173	57.16	57.268	0.108	1.27	0.13716	2.52
1.2	0.173	55.9	56.01	0.11	1.74	0.1914	1.8
1.1	0.173	54.85	54.969	0.119	1.35	0.16065	2.15
2.4	0.151	56.25	56.341	0.091	1.49	0.13559	2.23
2.3	0.151	55.45	55.548	0.098	1.08	0.10584	2.83
2.2	0.151	54.47	54.566	0.096	1.39	0.13344	2.25
2.1	0.151	53.2	53.337	0.137	1.48	0.20276	1.49
3.5	0.077	54.8	54.871	0.071	1.26	0.08946	1.73
3.4	0.077	54.13	54.206	0.076	0.82	0.06232	2.48
3.3	0.077	53.32	53.37	0.05	1.14	0.057	2.71
3.2	0.077	52.6	52.673	0.073	0.77	0.05621	2.75
3.1	0.077	52.3	52.466	0.166	1.28	0.21248	0.72

The width of the overland flow runners varies between 0.9m to 2.8m. It should be noted that the width of the overland flow runners can be reduced to 0.9 m while maintaining a

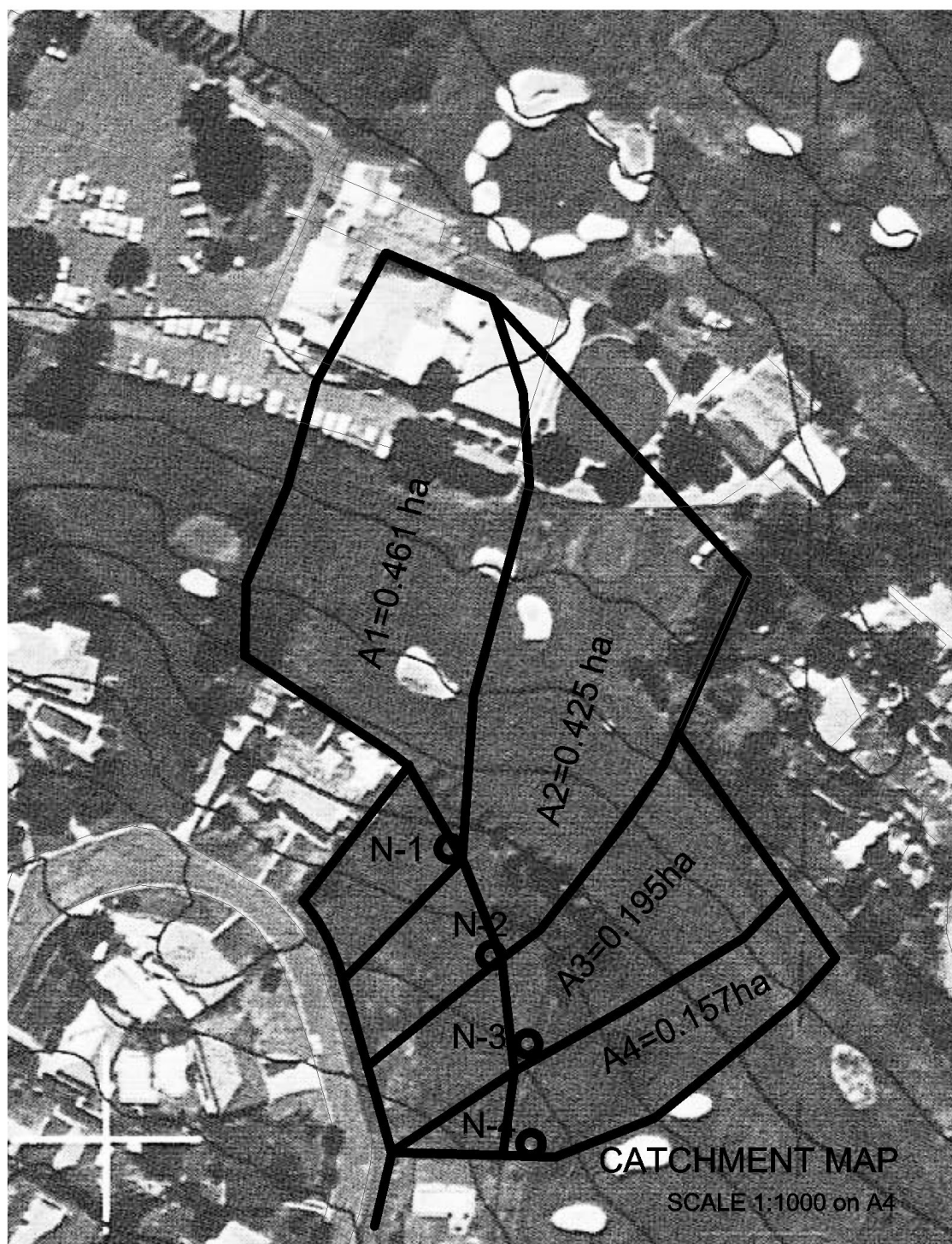
low hydraulic hazard (Table 3). The depth of the designed overland flow runner would be less than 200 mm.

Table 3, minimum required width of overland flow runners

Location	Block 1	Block 2	Block 3
Q _{100y} (l/s)	173	151	77
Overland flow runner width (m)	0.9	0.9	0.9
V x D (m ² /s)	0.192	0.168	0.086



Pavel Kozarovski, MIEAust, CPEng, NPER-3



APPENDIX A

FLOOD PROFILEs & CROSS SECTIONS

