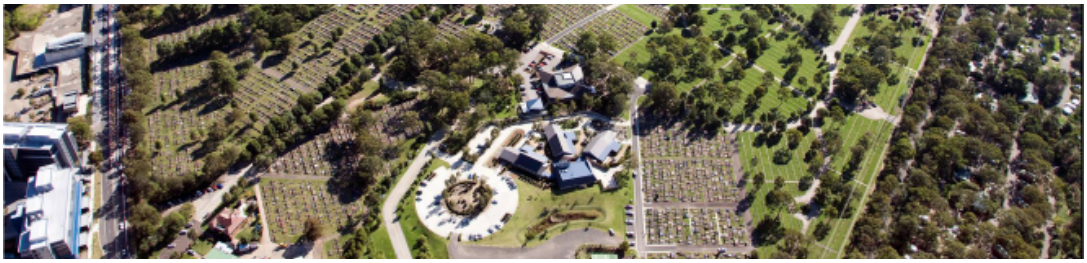
Civil

TaylorThomsonWhitting



Stormwater Management Plan
Wenona School, 255-265 Miller St North Sydney

for APP Corporation

11 June 2015

141211

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1.0 INTRODUCTION

This Stormwater Concept report has been prepared on behalf of Wenona School, the proponent for Wenona School's Project Archimedes. It accompanies an environmental impact statement (EIS) prepared in support of State Significant Development Application for the redevelopment of the Wenona Project.

A Concept Proposal has been prepared for the site by TZG architects.

The development site as highlighted in Figure 1.0 involves the demolition of existing childcare centre at 263 Miller St and the existing office building at 265 Miller St to facilitate the construction of a new 6 storey (3 storeys above Miller Street) education establishment.

A new pedestrian overpass crossing Elliot Street providing an improved link into the main senior campus is proposed. Minor alterations and addition to the existing Miller Street campus building 255 Miller Street is also proposed.

1.1 Site Location

The development site is located in North Sydney with Miller Street to the west and Elliot Street to the east – refer figure 1.

Figure 1 – Development Site Location Map

2.0 STORMWATER CONCEPT DESIGN

2.1 North Sydney Council Stormwater Disposal Consultation

TTW have liased with North Sydney Council's Development Engineer to confirm their stormwater disposal requirement. North Sydney Council have confirmed that an On-site detention (OSD) system is required.

Our consultation with Council confirms the following OSD system requirements:

- OSD system to limit the post-development discharge rates to less than or equal the permissible site discharge (PSD) rate.
- The PSD is based on 5-minute, 5-year Average recurrence Interval (ARI) storm event during the pre development scenario – refer section 2.2 below for details.

2.2 Stormwater Detention

A catchment area for the development was calculated to be 1,400 m^2 based on the architectural scheme.

The existing impervious fraction for this area is 67% - refer figure 2 for schematic plan.

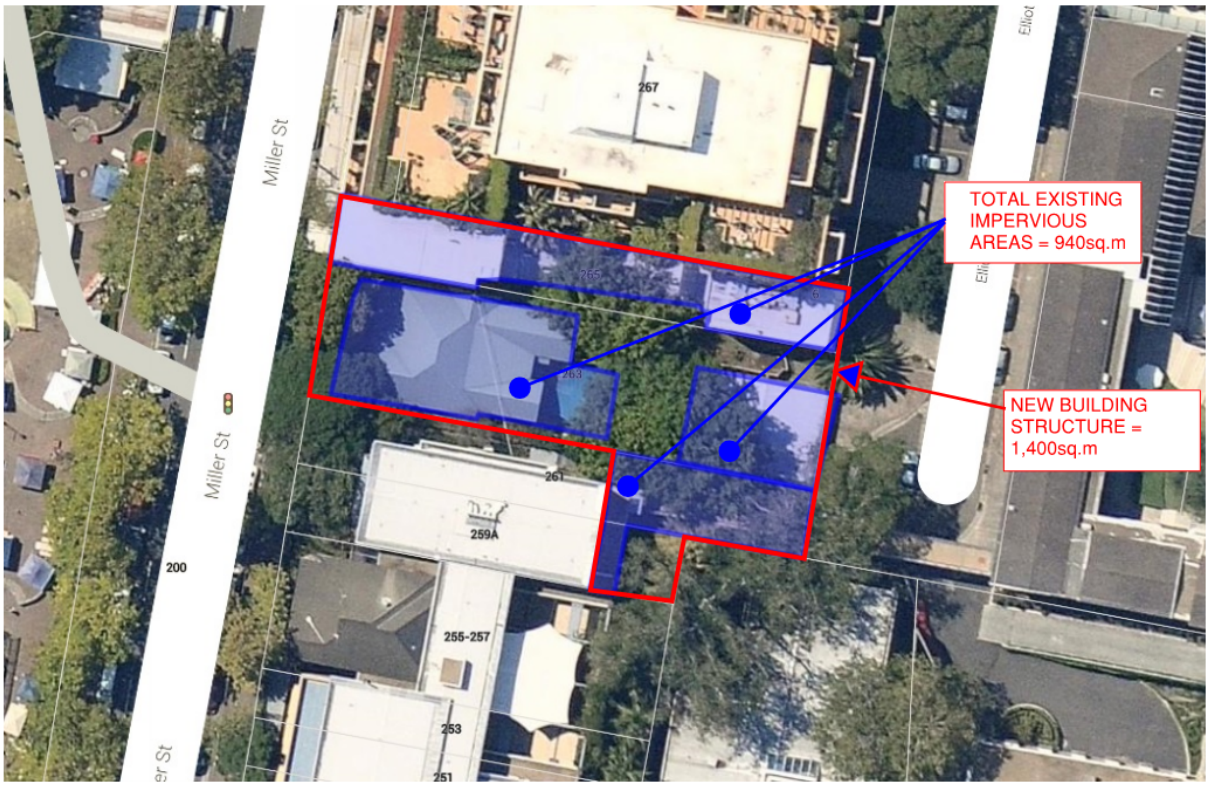

Figure 2 – Existing impervious area

Based on the existing impervious fraction of 67%, our PSD estimation is 46.3l/s. Refer table 1.0 below for calculation.

PSD Flows - Wenona School				
141211				
C^*_{10}=	0.56018			
Fy=	**0.95**			
ARI =	**5**	years		
I_{6min} =	**159**	mm/hr		
Pit	**Area**	**% Impervious**	**C**	**Pit Inflow**
1	1400	67%	0.75	46.3

Table 1.0 : PSD estimation

The OSD storage requirement has been estimated using the Mass Curve Analysis in accordance with Australian Rainfall Runoff (AR&R) (institution of Engineers Australia) 1987.

Our estimation shows the site is required to provide **32cu.m minimum** of storage with a PSD of 46.3 l/s up to and including the 100-year ARI storm events. The minimum OSD storage and PSD requirements have been agreed upon by TTW and North Sydney Council during the consultation process in March 2015. Refer to **Appendix A** for calculation.

The OSD tank system is proposed under the driveway ramp off Elliot Street as shown in our drawing **C02-P1 in Appendix B** of this report. The site's OSD system's outlet is proposed to connect to North Sydney Council's underground stormwater pipe system in Elliot Street. An overland flowpath is provided in an storm event beyond the OSD system capacity or when the system is blocked.

2.3 Water Sensitive Urban Design\

North Sydney Development Control Plan 2013 objective as per section 18.2.1 O2 states: *"To reduce stormwater discharge and improve stormwater quality through the incorporation of Water Sensitive Urban Design (WSUD) on-site."*

The proposed development includes OSD tank and rainwater re-use scheme. With these WSUB measures the post development water quality is better than the pre-development scenario.

2.4 Sediment, Erosion and Dust Controls

Construction works are to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The controls will depend on construction staging and methodology, but will most likely include sediment fences, sandbags around pits and a vehicle wash down. An erosion and sediment control plan has been prepared as part of the schematic design drawings. Refer **Appendix B** for details..

Prepared by:
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Nemesio Biason
Associate

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APPENDIX A

OSD tank Calculation

PSD Flows - Wenona School				
141211				
C^*_{10}=	0.56018			
Fy=	**0.95**			
ARI =	**5**	years		
I_{6min} =	**159**	mm/hr		
Pit	**Area**	**% Impervious**	**C**	**Pit Inflow**
1	1400	67%	0.75	46.3

Mass Curve Detention Analysis

Name and Location	Wenona School, North Sydney	
Catchment Area =	1400	sq.m
Time of concentration =	6	min
Runoff Coefficient =	1	
ARI =	100 years	
Discharge rate =	0.0463	cu.m/s

	10 Minute		Cumulative	Allowable	**Storage**	**15 Minute**		Cumulative	Allowable	**Storage**	**20 Minute**		Cumulative	Allowable	**Storage**	**25 Minute**		Cumulative	Allowable	**Storage**
	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**
Time	209.0	cu.m	cu.m	cu.m	cu.m	184.0	cu.m	cu.m	cu.m	cu.m	159	cu.m	cu.m	cu.m	cu.m	146	cu.m	cu.m	cu.m	cu.m
0	238	28	28	14	**14**	177	21	21	14	**7**	121	14	14	14	**0**	124	14	14	14	**1**
5	180	21	49	28	**21**	276	32	53	28	**25**	273	32	46	28	**18**	204	24	38	28	**11**
10			49	42	**7**	99	12	64	42	**23**	191	22	68	42	**27**	285	33	72	42	**30**
15			49	49	**0**			64	56	**9**	51	6	74	56	**19**	66	8	79	56	**24**
20			49	49	**0**			64	64	**0**			74	69	**5**	51	6	85	69	**16**
25								64	64	**0**			74	74	**0**			85	83	**2**
30								64	64	**0**			74	74	**0**			85	85	**0**
35								64	64	**0**			74	74	**0**			85	85	**0**
40													74	74	**0**			85	85	**0**
45													74	74	**0**			85	85	**0**
50																		85	85	**0**
55																				
60																				
65																				
70																				
75																				
80																				
85																				
90																				
95																				
100																				
105																				
110																				
115																				

	30 Minute		Cumulative	Allowable	**Storage**	**45 Minute**		Cumulative	Allowable	**Storage**	**60 Minute**		Cumulative	Allowable	**Storage**	**90 Minute**		Cumulative	Allowable	**Storage**	**120 Minute**		Cumulative	Allowable	**Storage**
	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**	I mm	Volume	Volume	Discharge	**Required**
	133	cu.m	cu.m	cu.m	cu.m	113	cu.m	cu.m	cu.m	cu.m	92.8	cu.m	cu.m	cu.m	cu.m	77	cu.m	cu.m	cu.m	cu.m	61.5	cu.m	cu.m	cu.m	cu.m
	128	15	15	14	**1**	49	6	6	6	**0**	43	5	5	5	**0**	44	5	5	5	**0**	32	4	4	4	**0**
	200	23	38	28	**10**	144	17	23	20	**3**	78	9	14	14	**0**	82	10	15	15	**0**	78	9	13	13	**0**
	263	31	69	42	**27**	251	29	52	33	**18**	187	22	36	28	**8**	202	24	38	29	**10**	46	5	18	18	**0**
	72	8	77	56	**22**	186	22	74	47	**26**	134	16	52	42	**10**	114	13	52	42	**9**	72	8	27	27	**0**
	88	10	88	69	**18**	97	11	85	61	**24**	258	30	82	56	**26**	144	17	68	56	**12**	142	17	43	41	**3**
	48	6	93	83	**10**	118	14	99	75	**23**	112	13	95	70	**25**	291	34	102	70	**32**	77	9	52	52	**0**
			93	93	**0**	76	9	107	89	**18**	99	12	106	84	**23**	75	9	111	84	**27**	266	31	83	66	**17**
			93	93	**0**	62	7	115	103	**12**	63	7	114	98	**16**	73	9	120	98	**22**	183	21	105	80	**25**
			93	93	**0**	34	4	119	117	**2**	53	6	120	111	**9**	61	7	127	112	**15**	83	10	114	94	**20**
			93	93	**0**			119	119	**0**	35	4	124	124	**0**	43	5	132	126	**6**	46	5	120	108	**12**
			93	93	**0**			119	119	**0**	29	3	127	127	**0**	60	7	139	139	**0**	49	6	125	122	**4**
			93	93	**0**			119	119	**0**	21	2	130	130	**0**	47	5	144	144	**0**	62	7	132	132	**0**
								119	119	**0**			130	130	**0**	29	3	148	148	**0**	63	7	140	140	**0**
								119	119	**0**			130	130	**0**	33	4	152	152	**0**	31	4	143	143	**0**
								119	119	**0**			130	130	**0**	30	4	155	155	**0**	32	4	147	147	**0**
													130	130	**0**	18	2	157	157	**0**	50	6	153	153	**0**
																21	2	160	160	**0**	28	3	156	156	**0**
																18	2	162	162	**0**	18	2	158	158	**0**
																		162	162	**0**	15	2	160	160	**0**
																		162	162	**0**	34	4	164	164	**0**
																					13	2	166	166	**0**
																					19	2	168	168	**0**

Storage Required = 32 cu.m

PLATE ORIFICE SIZING

Wenona School

141211

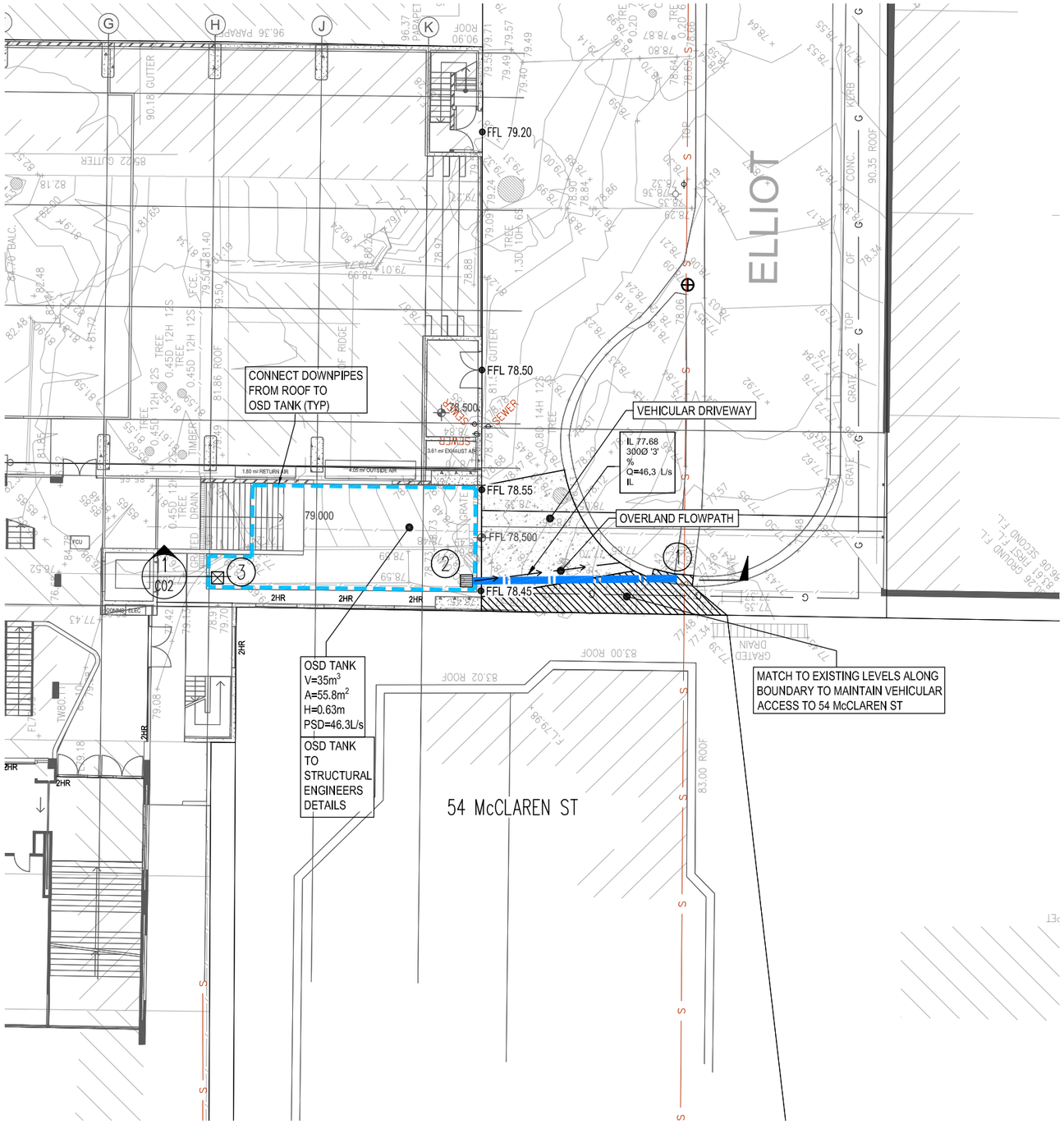
	1	2								
width =	3.2	2.0								
length =	3.6	2.0								
height	storage	discharge	o'flow		d=	0.16442	m			
0.630	32.1	0.04628	0					**170**	**mm dia orifice**	

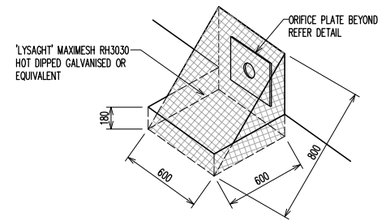
Based on $Q = CA\,(2gh)^{0.5}$

APPENDIX B

- Stormwater Concept Plan
- Erosion & Control Plan

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING S0001





TRASH SCREEN DETAIL
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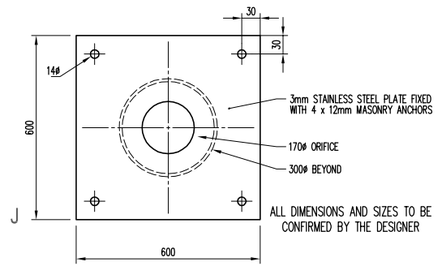

ORIFICE PLATE DETAIL
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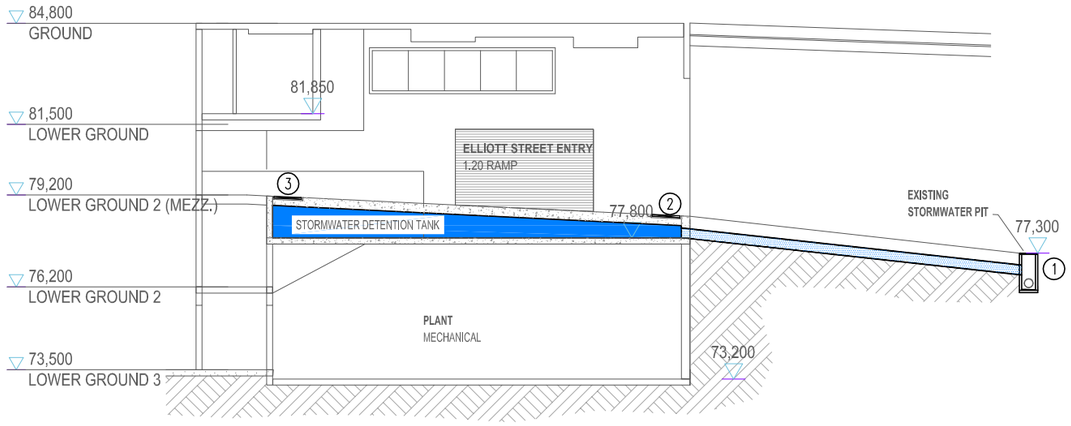

SECTION 1 / C02
SCALE 1:20

PRELIMINARY

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Rev	Description	Eng	Draft	Date
P1	ISSUE FOR APPROVAL	NB	SW	30.04.15

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Project
WENONA PROJECT
ARCHIMEDES

Sheet Subject
STORMWATER CONCEPT PLAN

Scale : A1 1:200 | Drawn JW | Authorised
Job No 141211 | Drawing No C02 | Revision P1
Plot File Created: Apr 30, 2015 - 3:47pm

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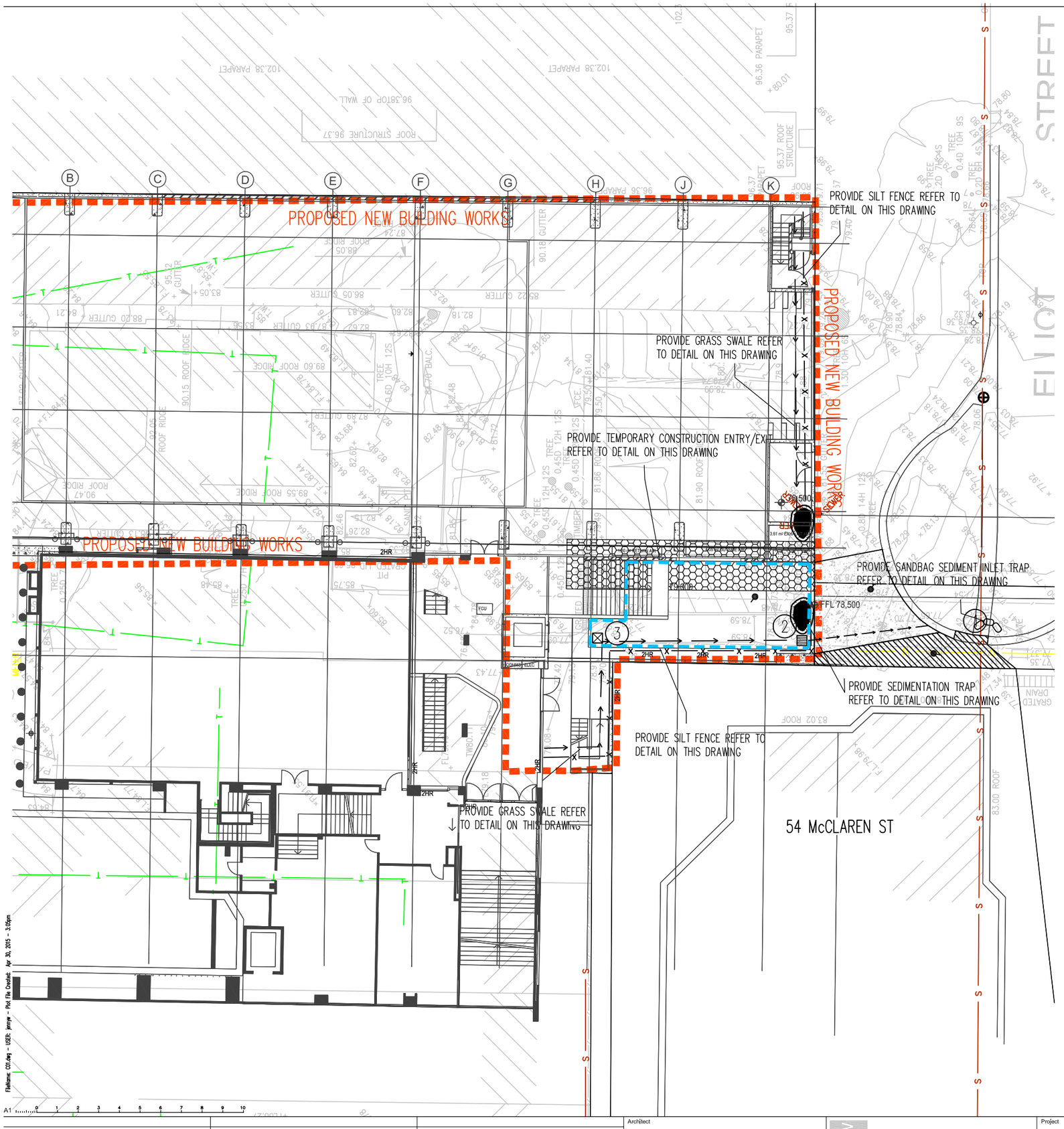

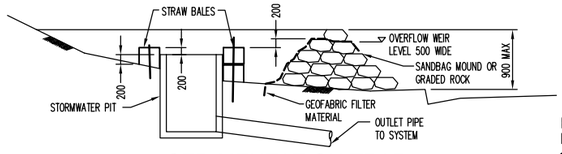

SEDIMENTATION TRAP
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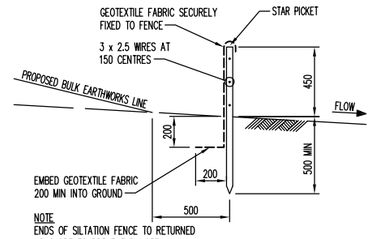

SILTATION FENCE DETAIL
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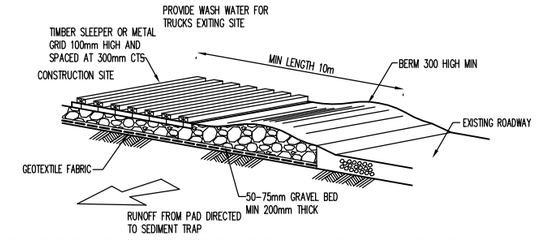

TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS

TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA – Pollution control manual for urban stormwater,
   (C) LANDCOM NSW – Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities. The erosion and sediment control plan shall be implemented and adopted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL LEGEND

- Batter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Sandbag sediment trap
- Catch drain
- Overland flow path

PRELIMINARY

Rev	Description	Eng	Draft	Date
P2	ISSUE FOR APPROVAL	NB	SW	30.04.15
P1	APPROVAL	NB	JW	16.03.15

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Project
WENONA PROJECT
ARCHIMEDES

Sheet Subject
EROSION & SEDIMENT CONTROL PLAN

Scale : A1	Drawn	Authorised
1:200	JW	

Job No	Drawing No	Revision
141211	C01	P2

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