

21 / March / 2018

141456 CAAB

Penrith City Council  
PO Box 60  
Penrith NSW 2751

Attention: The General Manager

## Uniting Edinglassie Village, Emu Plains

### Stormwater Management Statement for DA Approval

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Dear Sir/Madam,

This letter has been prepared to supplement the Development Application to Penrith City Council for the proposed redevelopment of Edinglassie Village, Emu Plains. As the assessment is of Development Application nature, the proposed measures may need to be refined in conjunction with any modifications during the detailed design phased based on development consent conditions and the future Construction Certificate Application.

Uniting is proposing to redevelop the existing residential aged care facility located between the Great Western Highway, Emerald Street and Troy Street. Whilst it is acknowledged that the total site covers an extensive area, this statement is limited to the north-eastern portion of the site that is being developed under this development application. The proposed works include the staged demolition of existing buildings and construction of a new residential aged care building with two car parking areas, stormwater drainage and associated services.

The stormwater and civil plans associated with the application have been prepared in line with Council's Development Control Plan, "Stormwater Drainage Specification for Building Developments" and "Penrith City Council WSUD Technical Guidelines".

#### Stormwater Drainage:

Stormwater is proposed to be managed by utilising existing drainage connection points along the Great Western Highway. Although a new pit and pipe network is proposed to service the new facility and surrounds, portions of the existing stormwater network are required to be retained as a means of maintaining site operations and servicing several aged care buildings / independent living units within the site boundary. The tailwater level within the Great Western Highway was set at the 1 in 100-year flood level at both connection points to ensure that the downstream stormwater systems have adequate capacity to accommodate new flows generated by the development.

New drainage systems have been designed to cater for the 1 in 20-year storm event and all overflow routes will be able to cater for the 1 in 100-year ARI storm event in accordance with Council's Development Control Plan. The DRAINS calculations supporting the concept stormwater management plans are affixed to this statement under **Appendix A** and **Appendix B** respectively.



### Water Sensitive Urban Design (WSUD):

Following discussions with Council's water management officer the facility is considered an existing commercial/industrial development for the purposes of identifying WSUD requirements.

Due to the limited changes in impervious areas (less than 250m<sup>2</sup>) it is not intended to provide a water quality treatment train as per Penrith Council's Water Sensitive Urban Design Policy. Water sensitive urban design principles are intended to be addressed through the provision of the rainwater tank(s) for the newly developed buildings.

Stormwater for the proposed roof areas will be collected in a rainwater tank(s) as per Council's DCP requirements. The rainwater tank locations, plumbing lines, proposed reuse, and harvesting calculations will be documented on the hydraulic engineer's plans. Overflow from the rainwater tank(s) will be conveyed to the site pit and pipe drainage system where it will discharge to The Great Western Highway. The rainwater tanks will provide a degree of storm water attenuation as well as reduce potential pollutants loads as the harvested runoff is utilised for reuse, thereby limiting the nutrients discharged into waterways.

Correspondence with Council and supporting impervious area calculations comparing existing and proposed scenarios are attached to this statement as **Appendix C**.

### On-site Stormwater Detention (OSD):

Penrith City Council requires that development within the mandatory On-site Stormwater Detention (OSD) catchments maintain existing site discharge rates for all events up to and including the 1 in 100-year ARI storm event. It noted that the site is currently flood affected in the 1% Annual Exceedance Probability (AEP) flood and located outside of the Emu Plains North and West mandatory On-site Stormwater Detention (OSD) catchments. Excerpts showing the mandatory OSD catchment area from Penrith City Council's Stormwater Drainage Guidelines for Building Developments is attached as **Appendix D**.

Given the site falls outside of the OSD catchment area, the proposed changes to impervious area are negligible, the site is flood affected and rainwater tanks are intended to be provided it is not proposed to provide any on-site stormwater detention system.

### Sediment & Erosion Control

Sediment and erosion controls in line with relevant authority requirements are to be provided during construction. A plan indicating the minimum controls to be incorporated is included as **Appendix E**. A demolition, construction and environmental waste management plan is also included under **Appendix F**. These two plans form a guide on the minimum controls and management procedures to be provided however the implementation and maintenance of all construction related activities will be the sole responsibility of the contractor.

Should you require anything further please contact the undersigned.

Yours faithfully

**TAYLOR THOMSON WHITTING (NSW) PTY LTD**



**William Webb**  
Civil Engineer  
BE Civil DipEngPrac MIEAust

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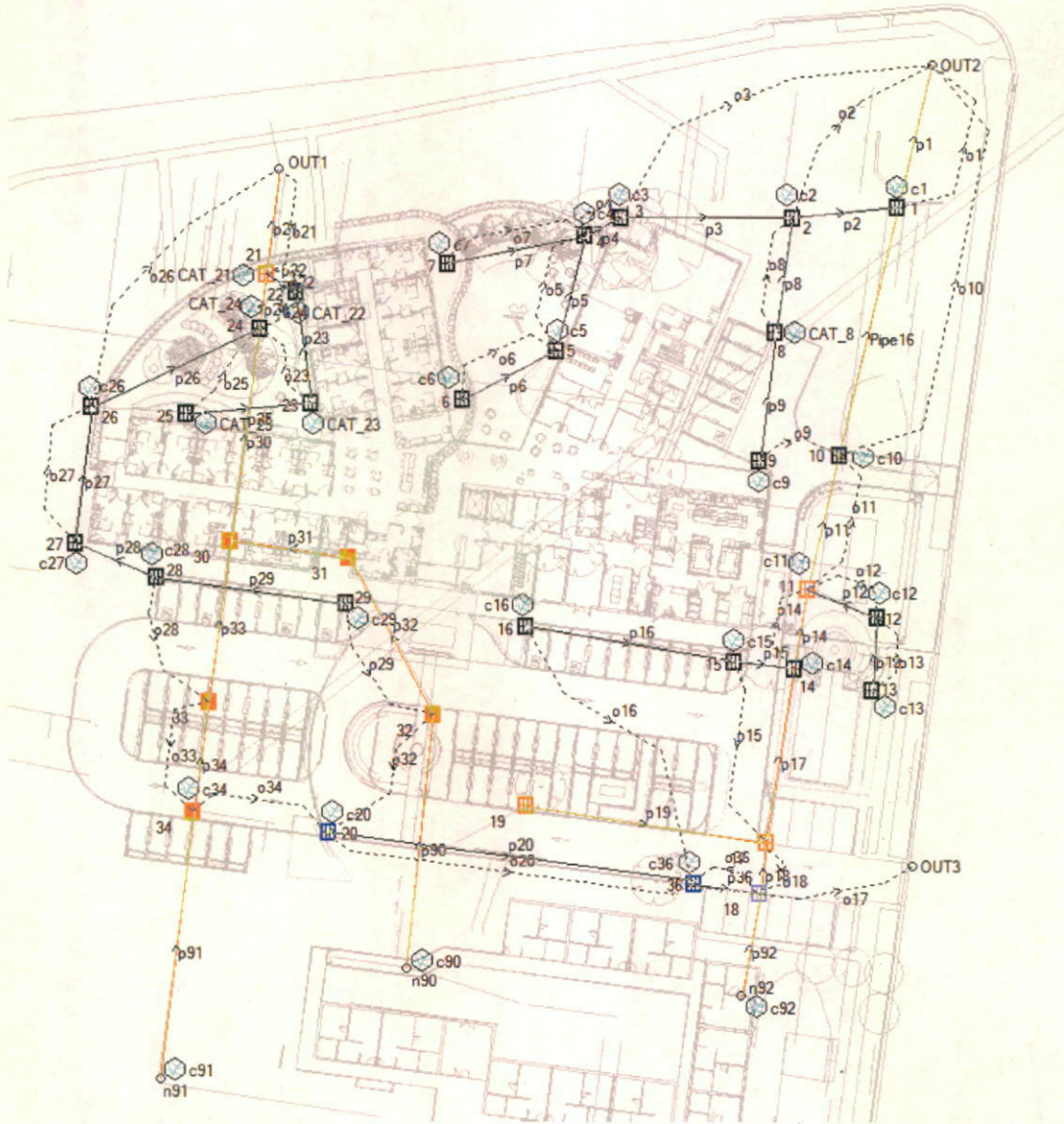


## Appendix A

### DRAINS Model and Calculations

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MODEL SET UP:





PIT / NODE DETAILS

Version 13

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	Part Full Shock	Inflow Loss	Pit is Hydrograph
	6 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283104.5	6262654 No	6 1 x Ku	No	New
	5 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283115.8	6262659 No	5 1 x Ku	No	New
	4 OnGrade	GSIP	900SQ			1.5	26.9		0	0	283119.2	6262673 No	252729 1 x Ku	No	New
	3 OnGrade	GSIP	900SQ			1.5	26.85		0	0	283123.5	6262675 No	4 1 x Ku	No	New
	2 OnGrade	GSIP	900SQ			1.5	26.75		0	0	283144	6262675 No	1 1 x Ku	No	New
	1 OnGrade	GSIP	900SQ			1.5	27		0	0	283156.5	6262676 No	2 1 x Ku	No	New
OUT2	Node						25.52		0		283160.6	6262693	78	No	
	13 OnGrade	GSIP	600SQ			1.5	26.95		0	0	283153.5	6262619 No	30 1 x Ku	No	New
	12 OnGrade	GSIP	900SQ			1.5	26.9		0	0	283154.1	6262628 No	26 1 x Ku	No	New
	11 OnGrade	GSIP	900SQ			1.5	26.85		0	0	283145.7	6262631 No	74 1 x Ku	No	Existing
	10 OnGrade	GSIP	900SQ			1.5	26.8		0	0	283149.6	6262647 No	12 1 x Ku	No	New
n91	Node						26.8		0		283068.5	6262573	64	No	
	34 OnGrade	GSIP	900SQ			1.5	26.93		0	0	283072.4	6262605 Yes	86 1 x Ku	No	Existing
	33 OnGrade	GSIP	900SQ			1.5	27.12		0	0	283074.2	6262618 Yes	85 1 x Ku	No	Existing
	30 OnGrade	GSIP	900SQ			1.5	27.35		0	0	283076.9	6262637 Yes	112 1 x Ku	No	Existing
	24 OnGrade	GSIP	900SQ			1.5	26.9		0	0	283080.3	6262662 No	7 1 x Ku	No	New
	21 OnGrade	GSIP	900SQ			1.5	26.8		0	0	283081.1	6262668 No	80 1 x Ku	No	Existing
OUT1	Node						25.84		0		283082.7	6262681	109	No	
n90	Node						26.4		0		283097.8	6262586	68	No	
	32 OnGrade	GSIP	900SQ			1.5	27.14		0	0	283101	6262616 Yes	100 1 x Ku	No	Existing
	31 OnGrade	GSIP	900SQ			1.5	27.35		0	0	283091	6262635 Yes	113 1 x Ku	No	Existing
n92	Node						26.8		0		283137.8	6262583	71	No	
	18 Sag	GSIP	900SQ	0.25		1.5	26.85	0.15	0	0	283140.1	6262595 No	91 1 x Ku	No	Existing
	17 OnGrade	GSIP	900SQ			1.5	27		0	0	283140.8	6262601 No	90 1 x Ku	No	Existing
	14 OnGrade	GSIP	900SQ			1.5	26.9		0	0	283144.1	6262622 No	252874 1 x Ku	No	New
	20 Sag	GSIP	900SQ	0.25		1.5	26.78	0.15	0	0	283088.5	6262602 No	88 1 x Ku	No	New
	36 Sag	Hornsby Cr	Hornsby 0.	0.25		1.5	26.75	0.15	0	0	283132.1	6262596 No	1389989 1 x Ku	No	New
	19 OnGrade	GSIP	900SQ			1.5	27.07		0	0	283112.2	6262605 No	89 1 x Ku	No	Existing
	29 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283090.6	6262629 No	159 1 x Ku	No	New
	28 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283068	6262632 No	10 1 x Ku	No	New
	27 OnGrade	GSIP	900SQ			1.5	27		0	0	283058.4	6262637 No	9 1 x Ku	No	New
	26 OnGrade	GSIP	900SQ			1.5	27		0	0	283060.3	6262653 No	8 1 x Ku	No	New
	7 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283102.8	6262670 No	252761 1 x Ku	No	New
	9 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283140.1	6262646 No	252774 1 x Ku	No	New
	8 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283142	6262662 No	3 1 x Ku	No	New
	25 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283071.6	6262652 No	252785 1 x Ku	No	New
	23 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283086.5	6262653 No	252783 1 x Ku	No	New
	22 OnGrade	GSIP	900SQ			1.5	26.95		0	0	283084.6	6262666 No	252781 1 x Ku	No	New
	16 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283112.1	6262627 No	252870 1 x Ku	No	New
	15 OnGrade	GSIP	900SQ			1.5	27.3		0	0	283137	6262623 No	252872 1 x Ku	No	New
OUT3	Node						26.75		0		283158.3	6262598	253295	No	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Typ	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Leng	id
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SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Effective Area %	In Remaining Area %	Effective Time (min)	In Remaining Time (min)	Effective Length (m)	In Remaining Length (m)	Effective Slope %	In Remaining Slope %	Effective Rough	In Remaining Rough
c6		6	0.027	100	0	5	8					
c5		5	0.035	100	0	5	8					
c4		4	0.035	100	0	5	8					
c3		3	0.0231	0	100	5	8					
c2		2	0.0393	0	100	5	8					
c1		1	0.0595	0	100	5	8					
c13		13	0.011	100	0	5	8					
c12		12	0.011	50	50	5	8					
c11		11	0.011	50	50	5	8					
c10		10	0.018	100	0	5	8					
c91	n91		0.132	100	0	5	8					
c34		34	0.0878	100	0	5	5					
CAT_24		24	0.016	100	0	5	8					
CAT_21		21	0.015	100	0	5	8					
c90	n90		0.138	100	0	5	8					
c92	n92		0.053	100	0	5	8					
c14		14	0.011	100	0	5	8					
c20		20	0.09	100	0	5	8					
c36		36	0.09	100	0	5	8					
c29		29	0.022	100	0	5	8					
c28		28	0.021	100	0	5	8					
c27		27	0.015	100	0	5	5					
c26		26	0.044	50	50	5	8					
c7		7	0.013	100	0	5	8					
c9		9	0.026	100	0	5	8					
CAT_8		8	0.041	100	0	5	8					
CAT_25		25	0.017	100	0	5	8					
CAT_23		23	0.023	100	0	5	8					
CAT_22		22	0.008	100	0	5	8					
c16		16	0.021	100	0	5	8					
c15		15	0.021	100	0	5	8					

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	RI (m)	Chg (m)	RL (m)	etc (m)
p6		6	5	14	26.24	26.1	1 Concrete, t	225	225	0.013	New	1	6	0	0				
p5		5	4	14	26.07	25.93	1 Concrete, t	300	300	0.013	New	1	5	0	0				
p4		4	3	5	25.9	25.85	1 Concrete, t	300	300	0.013	New	1	4	0	0				
p3		3	2	21	25.82	25.61	1 Concrete, t	300	300	0.013	New	1	3	0	0				
p2		2	1	11.729	25.58	24.759	7 Concrete, t	300	300	0.013	New	1	2	0	0				
p1		1	OUT2	17.121	24.387	24.08	1.79 Concrete, t	525	525	0.013	Existing	1	1	0	0				
p13		13	12	10	25.97	25.86	1.1 Concrete, t	150	150	0.013	New	1	13	0	0				
p12		12	11	10	25.72	25.64	0.8 Concrete, t	150	150	0.013	New	1	12	0	0				
p11		11	10	17	25.12	24.867	1.49 Concrete, t	525	525	0.013	Existing	1	11	0	0				
Pipe16		10	1	31	24.867	24.387	1.55 Concrete, t	525	525	0.013	Existing	1	10	0	0				



p91	n91		34	32	25.21	25.06	0.47 Concrete, t	600	600	0.013 Existing	1 n91	0	
p34		34	33	13	25.06	24.98	0.62 Concrete, t	525	525	0.013 Existing	1	34	0
p33		33	30	19.16	24.95	24.83	0.63 Concrete, t	600	600	0.013 Existing	1	33	0
p30		30	24	25	24.8	24.77	0.12 Concrete, t	600	600	0.013 Existing	1	30	0
p24		24	21	7	24.77	24.76	0.14 Concrete, t	600	600	0.013 Existing	1	24	0
p21		21 OUT1		13	24.71	24.645	0.5 Concrete, t	600	600	0.013 Existing	1	21	0
p90	n90		32	30.856	25.53	25.45	0.26 Concrete, t	450	450	0.013 Existing	1 n90	0	
p32		32	31	21	25.45	25.19	1.24 Concrete, t	450	450	0.013 Existing	1	32	0
p31		31	30	14	25.14	24.98	1.14 Concrete, t	450	450	0.013 Existing	1	31	0
p92	n92		18	11.941	25.679	25.58	0.83 Concrete, t	300	300	0.013 Existing	1 n92	0	
p18		18	17	5.301	25.58	25.5	1.51 Concrete, t	375	375	0.013 Existing	1	18	0
p17		17	14	21	25.5	25.3	0.95 Concrete, t	450	450	0.013 Existing	1	17	0
p14		14	11	10	25.3	25.21	0.9 Concrete, t	450	450	0.013 Existing	1	14	0
p20		20	36	48	25.97	25.73	0.5 Concrete, t	300	300	0.013 New	1	20	0
p36		36	18	9	25.7	25.61	1 Concrete, t	300	300	0.013 New	1	36	0
p19		19	17	28	25.65	25.54	0.39 Concrete, t	225	225	0.013 Existing	1	19	0
p29		29	28	23	26.24	26.01	1 Concrete, t	150	150	0.013 New	1	29	0
p28		28	27	10	25.98	25.88	1 Concrete, t	225	225	0.013 New	1	28	0
p27		27	26	17	24.93	24.87	0.35 Concrete, r	600	600	0.013 New	1	27	0
p26		26	24	21	24.85	24.79	0.29 Concrete, r	600	600	0.013 New	1	26	0
p7		7	4	17	26.24	26.07	1 Concrete, t	225	225	0.013 New	1	7	0
p9		9	8	17	26.09	25.92	1 Concrete, t	150	150	0.013 New	1	9	0
p8		8	2	15	25.89	25.74	1 Concrete, t	225	225	0.013 New	1	8	0
p25		25	23	15	26.17	26.02	1 Concrete, t	150	150	0.013 New	1	25	0
p23		23	22	13	25.99	25.86	1 Concrete, t	150	150	0.013 New	1	23	0
p22		22	21	3	25.83	25.8	1 Concrete, t	225	225	0.013 New	1	22	0
p16		16	15	25	26.22	25.97	1 Concrete, t	150	150	0.013 New	1	16	0
p15		15	14	6	25.94	25.88	1 Concrete, t	225	225	0.013 New	1	15	0

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S Chg (m)	Bottom Elev (m)	Height of S Chg (m)	Bottom Elev (m)	Height of Setc etc
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CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed
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OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth (m)	SafeDepth Major Stor (m)	SafeDepth Minor Stor (m)	SafeDepth DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
o6	6	5	5	0.1			4 m wide p	0.3	0.15	0.4	1	0	371	14
o5	5	4	4	0.1			4 m wide p	0.3	0.15	0.4	1	0	370	14
o4	4	3	3	0.1			4 m wide p	0.3	0.15	0.4	1	0	421	5
o3	3	OUT2	3	1.4			Swale with	0.15	0.1	1	1	0	252890	50
o2	2	OUT2	2	0.4			Swale with	0.15	0.1	1	1	0	368	12.7
o1	1	OUT2	1	0.5			Swale with	0.15	0.1	1	1	0	574158	18
o13	13	12	12	0.1			4 m wide p	0.3	0.15	0.4	1	0	362	10
o12	12	11	11	0.1			4 m wide p	0.3	0.15	0.4	1	0	364	12.1



011	11	10	0.1	0.9	4 m wide p	0.3	0.15	0.4	1	1	0	252895	17
010	10 OUT2	20	0.2	0.2	Swale with	0.15	0.1	1	1	0	0	366	31
034	34	34	0.1	0.1	7.5 m road	0.3	0.15	0.4	0.5	0	0	1060903	17
033	33	34	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	357	13
024	24	21	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	374	9
021	21 OUT1	20	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	252886	13
032	32	20	0.1	0.1	4 m wide p	0.3	0.15	0.4	0.5	0	0	2123231	18
036	18	36	0.1	0.1	7.5 m road	0.3	0.15	0.4	1	0	0	1389997	9
018	17	18	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	360	7.5
014	14	11	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	252914	10
020	20	36	0.6	0.6	7.5 m road	0.3	0.15	0.4	0.5	0	0	733714	48
017	36 OUT3	32	0.2	0.2	4 m wide p	0.3	0.15	0.4	0.5	0	0	361	17
029	29	32	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	375	18
028	28	33	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	376	17
027	27	26	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	372	30
026	26 OUT1	4	0.8	0.8	Swale with	0.15	0.1	1	1	0	0	252824	17
07	7	4	0.2	0.2	4 m wide p	0.3	0.15	0.4	1	1	0	252766	24
09	9	10	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	252806	9
08	8	2	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	367	15
025	25	24	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	373	12
023	23	24	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	252829	9
022	22	21	0.1	0.1	4 m wide p	0.3	0.15	0.4	1	1	0	253035	4
016	16	36	0.2	0.2	4 m wide p	0.3	0.15	0.4	1	1	0	252903	25
015	15	17	0.2	0.2	4 m wide p	0.3	0.15	0.4	1	1	0	252909	22

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover Cover (m)
p6	Concrete,1	225	0.6
p5	Concrete,1	300	0.6
p4	Concrete,1	300	0.6
p3	Concrete,1	300	0.6
p2	Concrete,1	300	0.6
p1	Concrete,1	525	0.6
p13	Concrete,1	150	0.6
p12	Concrete,1	150	0.6
p11	Concrete,1	525	0.6
p10	Concrete,1	525	0.6
p9	Concrete,1	600	0.6
p8	Concrete,1	525	0.6
p7	Concrete,1	525	0.6
p6	Concrete,1	600	0.6
p5	Concrete,1	600	0.6
p4	Concrete,1	600	0.6
p3	Concrete,1	600	0.6
p2	Concrete,1	600	0.6
p1	Concrete,1	450	0.6
p0	Concrete,1	450	0.6
p32	Concrete,1	450	0.6
p31	Concrete,1	450	0.6
p2	Concrete,1	300	0.6
p18	Concrete,1	375	0.6



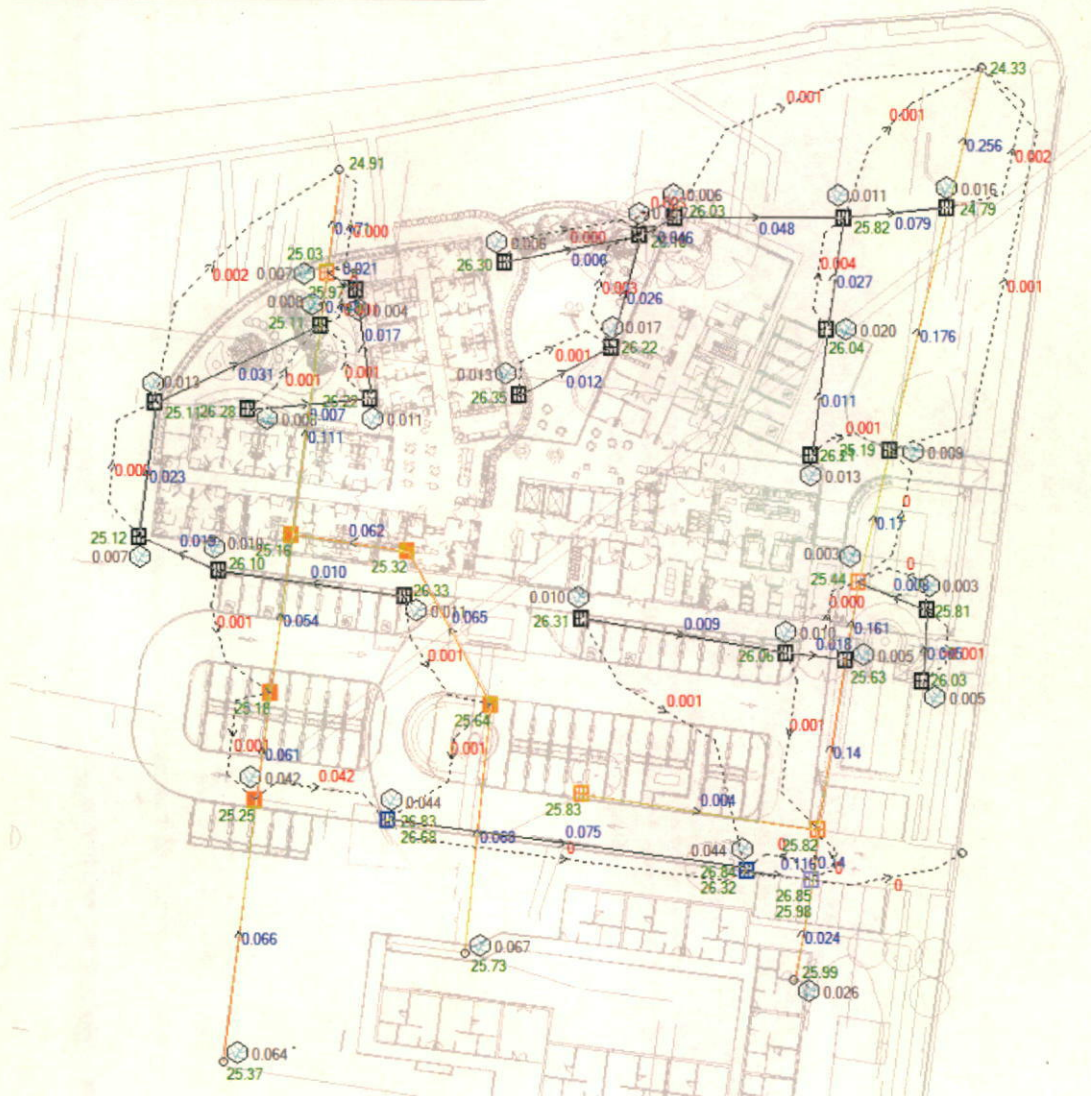
p17	Concrete, 1	450	0.6	1.01
p14	Concrete, 1	450	0.6	1.11
p20	Concrete, 1	300	0.6	0.48
p36	Concrete, 1	300	0.6	0.72
p19	Concrete, 1	225	0.6	1.16
p29	Concrete, 1	150	0.6	0.88
p28	Concrete, 1	225	0.6	0.86
p27	Concrete, 1	600	0.45	1.42
p26	Concrete, 1	600	0.45	1.46
p7	Concrete, 1	225	0.6	0.45
p9	Concrete, 1	150	0.6	1.03
p8	Concrete, 1	225	0.6	0.75
p25	Concrete, 1	150	0.6	0.6
p23	Concrete, 1	150	0.6	0.78
p22	Concrete, 1	225	0.6	0.74
p16	Concrete, 1	150	0.6	0.9
p15	Concrete, 1	225	0.6	0.76

This model has no pipes with non-return valves



### 5% AEP RESULTS:

Results for median storm in critical ensembles





DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surf Flow (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
	6	26.35	0.016		0.6	0.001	Inlet Capacity
	5	26.22	0.022		0.73	0.003	Inlet Capacity
	4	26.1	0.025		0.8	0.003	Inlet Capacity
	3	26.03	0.011		0.82	0.001	Inlet Capacity
	2	25.82	0.016		0.93	0.001	Inlet Capacity
	1	24.79	0.021		2.21	0.002	Inlet Capacity
OUT2		24.33	0.008				
	13	26.03	0.006		0.92	0.001	Inlet Capacity
	12	25.81	0.006		1.09	0	None
	11	25.44	0.005		1.41	0	None
	10	25.19	0.012		1.61	0.001	Inlet Capacity
n91		25.37	0.076				
	34	25.25	0.051		1.68	0.042	Inlet Capacity
	33	25.18	0.001		1.94	0.001	Inlet Capacity
	30	25.16	0		2.19	0	None
	24	25.11	0.012		1.79	0.001	Inlet Capacity
	21	25.03	0.01		1.77	0	Inlet Capacity
OUT1		24.91	0.004				
n90		25.73	0.079				
	32	25.64	0.001		1.5	0.001	Inlet Capacity
	31	25.32	0		2.03	0	None
n92		25.99	0.03				
	18	25.98	0	0	0.87	0	None
	17	25.82	0.001		1.18	0	None
	14	25.63	0.006		1.27	0	None
	20	26.68	0.103	0.2	0.1	0	Inlet Capacity
	36	26.32	0.063	0.1	0.43	0	Inlet Capacity
	19	25.83	0		1.24	0	None
	29	26.33	0.013		0.97	0.001	Inlet Capacity
	28	26.1	0.012		1.2	0.001	Inlet Capacity
	27	25.12	0.009		1.88	0	Inlet Capacity
	26	25.11	0.019		1.89	0.002	Inlet Capacity
	7	26.3	0.007		0.65	0	Inlet Capacity
	9	26.21	0.015		1.09	0.001	Inlet Capacity
	8	26.04	0.024		1.26	0.004	Inlet Capacity
	25	26.28	0.01		0.67	0.001	Inlet Capacity
	23	26.22	0.013		0.73	0.001	Inlet Capacity
	22	25.97	0.005		0.98	0	None
	16	26.31	0.012		0.99	0.001	Inlet Capacity
	15	26.06	0.012		1.24	0.001	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Tc (min)	Due to Storm
c6	0.013	0.013	0	5	5	8 5% AEP, 5 min burst, Storm 1
c5	0.017	0.017	0	5	5	8 5% AEP, 5 min burst, Storm 1
c4	0.017	0.017	0	5	5	8 5% AEP, 5 min burst, Storm 1
c3	0.006	0	0.006	5	5	8 5% AEP, 1 hour burst, Storm 6
c2	0.011	0	0.011	5	5	8 5% AEP, 1 hour burst, Storm 6
c1	0.016	0	0.016	5	5	8 5% AEP, 1 hour burst, Storm 6
c13	0.005	0.005	0	5	5	8 5% AEP, 5 min burst, Storm 1
c12	0.003	0.002	0.001	5	5	8 5% AEP, 20 min burst, Storm 10
c11	0.003	0.002	0.001	5	5	8 5% AEP, 20 min burst, Storm 10
c10	0.009	0.009	0	5	5	8 5% AEP, 5 min burst, Storm 1



c91	0.064	0.064	0	5	8 5% AEP, 5 min burst, Storm 1
c34	0.042	0.042	0	5	5 5% AEP, 5 min burst, Storm 1
CAT_24	0.008	0.008	0	5	8 5% AEP, 5 min burst, Storm 1
CAT_21	0.007	0.007	0	5	8 5% AEP, 5 min burst, Storm 1
c90	0.067	0.067	0	5	8 5% AEP, 5 min burst, Storm 1
c92	0.026	0.026	0	5	8 5% AEP, 5 min burst, Storm 1
c14	0.005	0.005	0	5	8 5% AEP, 5 min burst, Storm 1
c20	0.044	0.044	0	5	8 5% AEP, 5 min burst, Storm 1
c36	0.044	0.044	0	5	8 5% AEP, 5 min burst, Storm 1
c29	0.011	0.011	0	5	8 5% AEP, 5 min burst, Storm 1
c28	0.01	0.01	0	5	8 5% AEP, 5 min burst, Storm 1
c27	0.007	0.007	0	5	5 5% AEP, 5 min burst, Storm 1
c26	0.013	0.009	0.006	5	8 5% AEP, 20 min burst, Storm 10
c7	0.006	0.006	0	5	8 5% AEP, 5 min burst, Storm 1
c9	0.013	0.013	0	5	8 5% AEP, 5 min burst, Storm 1
CAT_8	0.02	0.02	0	5	8 5% AEP, 5 min burst, Storm 1
CAT_25	0.008	0.008	0	5	8 5% AEP, 5 min burst, Storm 1
CAT_23	0.011	0.011	0	5	8 5% AEP, 5 min burst, Storm 1
CAT_22	0.004	0.004	0	5	8 5% AEP, 5 min burst, Storm 1
c16	0.01	0.01	0	5	8 5% AEP, 5 min burst, Storm 1
c15	0.01	0.01	0	5	8 5% AEP, 5 min burst, Storm 1

#### PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
p6	0.012	0.95	26.318	26.219	5% AEP, 5 min burst, Storm 1
p5	0.026	1.17	26.176	26.11	5% AEP, 5 min burst, Storm 1
p4	0.046	1.26	26.054	26.038	5% AEP, 5 min burst, Storm 1
p3	0.048	1.37	25.97	25.823	5% AEP, 15 min burst, Storm 5
p2	0.079	4.01	25.677	24.875	5% AEP, 15 min burst, Storm 5
p1	0.256	2.8	24.617	24.325	5% AEP, 15 min burst, Storm 4
p13	0.005	2.08	25.998	25.917	5% AEP, 15 min burst, Storm 5
p12	0.008	1.24	25.779	25.722	5% AEP, 15 min burst, Storm 7
p11	0.17	2.16	25.325	25.195	5% AEP, 15 min burst, Storm 4
Pipe16	0.176	2.22	25.074	24.796	5% AEP, 15 min burst, Storm 9
p91	0.066	1.08	25.371	25.256	5% AEP, 5 min burst, Storm 1
p34	0.061	1.19	25.209	25.183	5% AEP, 5 min burst, Storm 1
p33	0.054	0.62	25.158	25.155	5% AEP, 15 min burst, Storm 9
p30	0.111	0.71	25.124	25.108	5% AEP, 15 min burst, Storm 9
p24	0.148	1.17	25.046	25.034	5% AEP, 15 min burst, Storm 9
p21	0.171	1.69	24.942	24.906	5% AEP, 15 min burst, Storm 9
p90	0.068	1.1	25.734	25.636	5% AEP, 5 min burst, Storm 1
p32	0.065	2.28	25.556	25.328	5% AEP, 5 min burst, Storm 1
p31	0.062	2.05	25.25	25.156	5% AEP, 5 min burst, Storm 1
p92	0.024	0.34	25.989	25.981	5% AEP, 15 min burst, Storm 9
p18	0.14	1.46	25.884	25.824	5% AEP, 15 min burst, Storm 9
p17	0.14	1.75	25.725	25.631	5% AEP, 15 min burst, Storm 9
p14	0.161	2.34	25.501	25.46	5% AEP, 15 min burst, Storm 9
p20	0.075	1.07	26.61	26.321	5% AEP, 15 min burst, Storm 10
p36	0.116	1.64	26.11	25.981	5% AEP, 15 min burst, Storm 9
p19	0.004	0.11	25.837	25.832	5% AEP, 5 min burst, Storm 1
p29	0.01	2.31	26.283	26.1	5% AEP, 5 min burst, Storm 1
p28	0.019	2.02	26.043	25.981	5% AEP, 5 min burst, Storm 1
p27	0.023	0.29	25.121	25.119	5% AEP, 15 min burst, Storm 4
p26	0.031	0.27	25.109	25.108	5% AEP, 15 min burst, Storm 9
p7	0.006	2.57	26.265	26.126	5% AEP, 5 min burst, Storm 1
p9	0.011	1.41	26.16	26.038	5% AEP, 5 min burst, Storm 1
p8	0.027	2.27	25.966	25.865	5% AEP, 5 min burst, Storm 1
p25	0.007	0.66	26.26	26.223	5% AEP, 5 min burst, Storm 1
p23	0.017	1.13	26.15	25.981	5% AEP, 5 min burst, Storm 1



p22	0.021	1.35	25.923	25.908	5% AEP, 5 min burst, Storm 1
p16	0.009	1.51	26.274	26.063	5% AEP, 15 min burst, Storm 10
p15	0.018	1.64	26.012	25.979	5% AEP, 5 min burst, Storm 1

#### CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
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#### OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
o6	0.001	0.001	0.908	0.011	0	1.13	0.23	5% AEP, 5 min burst, Storm 1
o5	0.003	0.003	0.908	0.015	0	1.53	0.24	5% AEP, 5 min burst, Storm 1
o4	0.003	0.003	0.908	0.015	0	1.53	0.27	5% AEP, 5 min burst, Storm 1
o3	0.001	0.001	0.054	0.017	0	0.41	0.14	5% AEP, 20 min burst, Storm 3
o2	0.001	0.001	0.054	0.025	0	0.6	0.19	5% AEP, 20 min burst, Storm 3
o1	0.002	0.002	0.054	0.03	0.01	0.73	0.21	5% AEP, 1 hour burst, Storm 6
o13	0.001	0.001	0.908	0.01	0	1.04	0.21	5% AEP, 5 min burst, Storm 1
o12	0	0	0.908	0	0	0	0	
o11	0	0	0.908	0	0	0	0	
o10	0.001	0.001	0.054	0.021	0	0.49	0.16	5% AEP, 15 min burst, Storm 9
o34	0.042	0.042	0.217	0.087	0.05	2.02	0.63	5% AEP, 5 min burst, Storm 1
o33	0.001	0.001	0.908	0.01	0	1.04	0.19	5% AEP, 5 min burst, Storm 1
o24	0.001	0.001	0.908	0.008	0	0.84	0.18	5% AEP, 15 min burst, Storm 9
o21	0	0	0.908	0	0	0	0	
o32	0.001	0.001	0.908	0.01	0	1.04	0.21	5% AEP, 5 min burst, Storm 1
o36	0	0	0.217	0	0	0	0	
o18	0	0	0.908	0	0	0	0	
o14	0	0	0.908	0	0	0	0	
o20	0	0	0.217	0	0	0	0	
o17	0	0	0.642	0	0	0	0	
o29	0.001	0.001	0.908	0.01	0	1.04	0.21	5% AEP, 5 min burst, Storm 1
o28	0.001	0.001	0.908	0.01	0	1.04	0.19	5% AEP, 5 min burst, Storm 1
o27	0	0	0.908	0	0	0	0	
o26	0.002	0.002	0.054	0.026	0	0.63	0.18	5% AEP, 20 min burst, Storm 10
o7	0	0	0.908	0	0	0	0	
o9	0.001	0.001	0.908	0.011	0	1.13	0.22	5% AEP, 5 min burst, Storm 1
o8	0.004	0.004	0.908	0.017	0	1.73	0.26	5% AEP, 5 min burst, Storm 1
o25	0.001	0.001	0.908	0.008	0	0.84	0.18	5% AEP, 5 min burst, Storm 1
o23	0.001	0.001	0.908	0.011	0	1.13	0.19	5% AEP, 5 min burst, Storm 1
o22	0	0	0.908	0	0	0	0	
o16	0.001	0.001	0.908	0.01	0	1.04	0.19	5% AEP, 5 min burst, Storm 1
o15	0.001	0.001	0.908	0.01	0	1.04	0.19	5% AEP, 5 min burst, Storm 1

#### DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
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Run Log for 180320.Edinglassie.SW(DA).WW.drn run at 11:44:56 on 20/3/2018

No water upwelling from any pit.

Freeboard was less than 0.15m at 20

Flows were safe in all overflow routes.







DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surf Flow (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
	6	26.93		0.022	0.02	0.005	Inlet Capacity
	5	26.91		0.039	0.04	0.006	Inlet Capacity
	4	26.89		0.039	0.01	0.012	Inlet Capacity
	3	26.84		0.038	0.01	0.005	Inlet Capacity
	2	26.71		0.032	0.04	0.004	Inlet Capacity
	1	26.42		0.034	0.58	0.006	Inlet Capacity
OUT2		26.25		0.05			
	13	26.63		0.009	0.32	0.002	Inlet Capacity
	12	26.62		0.011	0.28	0	Inlet Capacity
	11	26.54		0.009	0.31	0	None
	10	26.49		0.019	0.31	0.001	Inlet Capacity
n91		26.74		0.106			
	34	26.73		0.072	0.2	0.059	Inlet Capacity
	33	26.71		0.003	0.41	0.002	Inlet Capacity
	30	26.7		0	0.65	0	None
	24	26.66		0.027	0.24	0.002	Inlet Capacity
	21	26.59		0.015	0.21	0.001	Inlet Capacity
OUT1		26.5		0.01			
n90		26.83		0.11			
	32	26.8		0.003	0.34	0.002	Inlet Capacity
	31	26.74		0	0.61	0	None
n92		26.75		0.042			
	18	26.74	26.85	0	0.11	0	None
	17	26.66		0.003	0.34	0	None
	14	26.61		0.009	0.29	0	Inlet Capacity
	20	26.9	26.93	0.144	0.2	0.074	Outlet System
	36	26.83	26.9	0.169	0.2	0.087	Outlet System
	19	26.67		0	0.4	0	None
	29	26.92		0.018	0.38	0.002	Inlet Capacity
	28	26.73		0.017	0.57	0.002	Inlet Capacity
	27	26.66		0.012	0.34	0.001	Inlet Capacity
	26	26.66		0.031	0.34	0.004	Inlet Capacity
	7	26.89		0.01	0.06	0.001	Inlet Capacity
	9	27.03		0.021	0.27	0.003	Inlet Capacity
	8	26.83		0.033	0.47	0.007	Inlet Capacity
	25	26.94		0.014	0.01	0.006	Inlet Capacity
	23	26.91		0.018	0.04	0.002	Inlet Capacity
	22	26.63		0.006	0.32	0	None
	16	26.86		0.017	0.44	0.002	Inlet Capacity
	15	26.66		0.017	0.64	0.002	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Due to Storm Tc (min)	
c6	0.018	0.018	0	5	5	8 1% AEP, 5 min burst, Storm 1
c5	0.023	0.023	0	5	5	8 1% AEP, 5 min burst, Storm 1
c4	0.023	0.023	0	5	5	8 1% AEP, 5 min burst, Storm 1
c3	0.01	0	0.01	5	5	8 1% AEP, 15 min burst, Storm 8
c2	0.016	0	0.016	5	5	8 1% AEP, 15 min burst, Storm 8
c1	0.025	0	0.025	5	5	8 1% AEP, 15 min burst, Storm 8
c13	0.007	0.007	0	5	5	8 1% AEP, 5 min burst, Storm 1
c12	0.005	0.002	0.002	5	5	8 1% AEP, 20 min burst, Storm 8
c11	0.005	0.002	0.002	5	5	8 1% AEP, 20 min burst, Storm 8
c10	0.012	0.012	0	5	5	8 1% AEP, 5 min burst, Storm 1



c91	0.088	0.088	0	5	8 1% AEP, 5 min burst, Storm 1
c34	0.059	0.059	0	5	5 1% AEP, 5 min burst, Storm 1
CAT_24	0.011	0.011	0	5	8 1% AEP, 5 min burst, Storm 1
CAT_21	0.01	0.01	0	5	8 1% AEP, 5 min burst, Storm 1
c90	0.092	0.092	0	5	8 1% AEP, 5 min burst, Storm 1
c92	0.035	0.035	0	5	8 1% AEP, 5 min burst, Storm 1
c14	0.007	0.007	0	5	8 1% AEP, 5 min burst, Storm 1
c20	0.06	0.06	0	5	8 1% AEP, 5 min burst, Storm 1
c36	0.06	0.06	0	5	8 1% AEP, 5 min burst, Storm 1
c29	0.015	0.015	0	5	8 1% AEP, 5 min burst, Storm 1
c28	0.014	0.014	0	5	8 1% AEP, 5 min burst, Storm 1
c27	0.01	0.01	0	5	5 1% AEP, 5 min burst, Storm 1
c26	0.019	0.01	0.009	5	8 1% AEP, 20 min burst, Storm 8
c7	0.009	0.009	0	5	8 1% AEP, 5 min burst, Storm 1
c9	0.017	0.017	0	5	8 1% AEP, 5 min burst, Storm 1
CAT_8	0.027	0.027	0	5	8 1% AEP, 5 min burst, Storm 1
CAT_25	0.011	0.011	0	5	8 1% AEP, 5 min burst, Storm 1
CAT_23	0.015	0.015	0	5	8 1% AEP, 5 min burst, Storm 1
CAT_22	0.005	0.005	0	5	8 1% AEP, 5 min burst, Storm 1
c16	0.014	0.014	0	5	8 1% AEP, 5 min burst, Storm 1
c15	0.014	0.014	0	5	8 1% AEP, 5 min burst, Storm 1

#### PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
p6	0.013	0.33	26.931	26.922	1% AEP, 5 min burst, Storm 1
p5	0.032	0.45	26.909	26.895	1% AEP, 5 min burst, Storm 1
p4	0.058	0.82	26.857	26.844	1% AEP, 5 min burst, Storm 1
p3	0.061	0.86	26.791	26.719	1% AEP, 10 min burst, Storm 8
p2	0.102	1.44	26.552	26.424	1% AEP, 10 min burst, Storm 7
p1	0.262	1.21	26.312	26.25	1% AEP, 10 min burst, Storm 7
p13	0.005	0.29	26.632	26.623	1% AEP, 5 min burst, Storm 1
p12	0.01	0.59	26.589	26.546	1% AEP, 10 min burst, Storm 4
p11	0.141	0.65	26.507	26.489	1% AEP, 5 min burst, Storm 1
Pipe16	0.153	0.71	26.453	26.419	1% AEP, 5 min burst, Storm 1
p91	0.086	0.31	26.744	26.733	1% AEP, 5 min burst, Storm 1
p34	0.085	0.39	26.721	26.713	1% AEP, 5 min burst, Storm 1
p33	0.086	0.3	26.706	26.703	1% AEP, 5 min burst, Storm 1
p30	0.179	0.63	26.673	26.655	1% AEP, 5 min burst, Storm 1
p24	0.236	0.83	26.602	26.593	1% AEP, 5 min burst, Storm 1
p21	0.269	0.95	26.523	26.5	1% AEP, 5 min burst, Storm 1
p90	0.092	0.58	26.833	26.797	1% AEP, 5 min burst, Storm 1
p32	0.09	0.57	26.773	26.745	1% AEP, 5 min burst, Storm 1
p31	0.091	0.57	26.72	26.703	1% AEP, 5 min burst, Storm 1
p92	0.035	0.5	26.753	26.737	1% AEP, 5 min burst, Storm 1
p18	0.101	0.92	26.715	26.701	1% AEP, 5 min burst, Storm 1
p17	0.102	0.64	26.65	26.627	1% AEP, 5 min burst, Storm 1
p14	0.129	0.81	26.597	26.577	1% AEP, 5 min burst, Storm 1
p20	0.049	0.69	26.885	26.837	1% AEP, 45 min burst, Storm 5
p36	0.094	1.33	26.778	26.745	1% AEP, 5 min burst, Storm 1
p19	0.002	0.04	26.667	26.662	1% AEP, 15 min burst, Storm 6
p29	0.013	0.72	26.876	26.727	1% AEP, 5 min burst, Storm 1
p28	0.025	0.63	26.696	26.663	1% AEP, 5 min burst, Storm 1
p27	0.034	0.12	26.662	26.661	1% AEP, 5 min burst, Storm 1
p26	0.046	0.16	26.659	26.655	1% AEP, 5 min burst, Storm 1
p7	0.008	0.2	26.889	26.886	1% AEP, 5 min burst, Storm 1
p9	0.015	0.82	27.005	26.865	1% AEP, 5 min burst, Storm 1
p8	0.035	0.88	26.81	26.726	1% AEP, 5 min burst, Storm 1
p25	0.008	0.45	26.934	26.913	1% AEP, 15 min burst, Storm 2
p23	0.019	1.07	26.84	26.649	1% AEP, 5 min burst, Storm 1



p22	0.024	0.61	26.601	26.593	1% AEP, 5 min burst, Storm 1
p16	0.012	0.7	26.819	26.657	1% AEP, 5 min burst, Storm 1
p15	0.025	0.62	26.627	26.61	1% AEP, 5 min burst, Storm 1

#### CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
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#### OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
o6	0.005	0.005	1.479	0.018	0.01	1.82	0.28	1% AEP, 5 min burst, Storm 1
o5	0.006	0.006	1.479	0.019	0.01	1.92	0.31	1% AEP, 5 min burst, Storm 1
o4	0.012	0.012	1.479	0.024	0.01	4	0.31	1% AEP, 10 min burst, Storm 1
o3	0.005	0.005	0.159	0.039	0.01	0.94	0.24	1% AEP, 10 min burst, Storm 4
o2	0.004	0.004	0.159	0.037	0.01	0.88	0.23	1% AEP, 15 min burst, Storm 8
o1	0.006	0.006	0.159	0.043	0.01	1.04	0.26	1% AEP, 15 min burst, Storm 8
o13	0.002	0.002	1.479	0.013	0	1.33	0.24	1% AEP, 5 min burst, Storm 1
o12	0	0	1.479	0	0	0	0	
o11	0	0	1.479	0	0	0	0	
o10	0.001	0.001	0.159	0.026	0	0.62	0.19	1% AEP, 5 min burst, Storm 1
o34	0.059	0.059	1.46	0.096	0.06	2.34	0.66	1% AEP, 5 min burst, Storm 1
o33	0.002	0.002	1.479	0.012	0	1.23	0.23	1% AEP, 5 min burst, Storm 1
o24	0.002	0.002	1.479	0.013	0	1.33	0.24	1% AEP, 10 min burst, Storm 6
o21	0.001	0.001	1.479	0.01	0	1.04	0.19	1% AEP, 5 min burst, Storm 1
o32	0.002	0.002	1.479	0.013	0	1.33	0.21	1% AEP, 5 min burst, Storm 1
o36	0	0	1.46	0	0	0	0	
o18	0	0	1.479	0	0	0	0	
o14	0	0	1.479	0	0	0	0	
o20	0.074	0.074	1.46	0.104	0.07	2.61	0.69	1% AEP, 10 min burst, Storm 8
o17	0.087	0.087	1.497	0.055	0.03	4	0.54	1% AEP, 10 min burst, Storm 1
o29	0.002	0.002	1.479	0.013	0	1.33	0.21	1% AEP, 5 min burst, Storm 1
o28	0.002	0.002	1.479	0.012	0	1.23	0.23	1% AEP, 5 min burst, Storm 1
o27	0.001	0.001	1.479	0.01	0	1.04	0.19	1% AEP, 5 min burst, Storm 1
o26	0.004	0.004	0.159	0.036	0.01	0.87	0.23	1% AEP, 20 min burst, Storm 8
o7	0.001	0.001	1.479	0.009	0	0.94	0.17	1% AEP, 5 min burst, Storm 1
o9	0.003	0.003	1.479	0.015	0	1.53	0.24	1% AEP, 5 min burst, Storm 1
o8	0.007	0.007	1.479	0.022	0.01	4	0.23	1% AEP, 5 min burst, Storm 1
o25	0.006	0.006	1.479	0.019	0.01	1.92	0.31	1% AEP, 5 min burst, Storm 1
o23	0.002	0.002	1.479	0.013	0	1.33	0.24	1% AEP, 5 min burst, Storm 1
o22	0	0	1.479	0	0	0	0	
o16	0.002	0.002	1.479	0.012	0	1.23	0.23	1% AEP, 5 min burst, Storm 1
o15	0.002	0.002	1.479	0.012	0	1.23	0.23	1% AEP, 5 min burst, Storm 1

#### DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
------	--------	--------	----------------	--------------------	---------------------

Run Log for 180320.Edinglassie.SW(DA).WW.drn run at 11:43:25 on 20/3/2018

No water upwelling from any pit.

Freeboard was less than 0.15m at 36, 25, 23, 7, 4, 18, 20, 6, 5, 3, 2

Flows were safe in all overflow routes.



## Appendix B

### Stormwater Management Plan

---

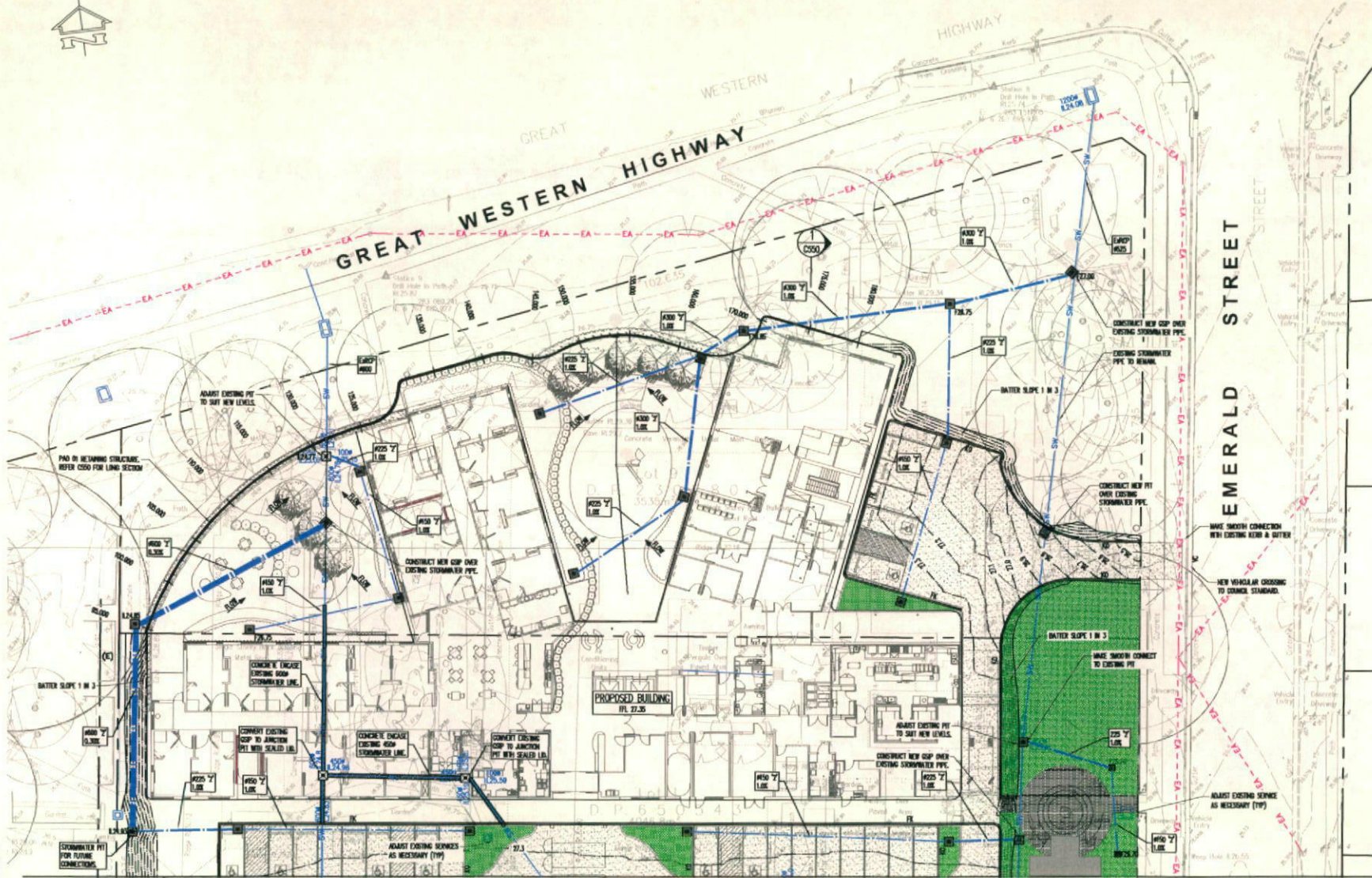




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**SITWORKS LEGEND**

- 72.20 Finished surface level
- Finished surface contour
- K&G Kerb and gutter
- ED Kerb only
- DD Dish drain
- FE Concrete edge strip
- Stormwater pit, flow direction and line with
- 600 x 75 1.25% Pipe size and slope / Pipe grade
- Catching stormwater line



FOR CONTINUATION REFER TO DRAWING No C201

AL 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Rev	Description	Eng	Draft	Date
1	ISSUE FOR DA	MM	AW	03/03/18

Architect  
**Morrison Design Partnership Architects**  
 Level 3, Suite 302/69 Chifley Street  
 St Leonards NSW 2065  
 Phone: (02) 9966 6566  
 WWW.MDP.AU

Client Engineer  
**TTW Taylor Thomson Whitting**  
 812 8439 7268 | 148 Chifley Street St Leonards NSW 2065

Project  
**EDINGLASSIE VILLAGE, EMU PLANS**

Sheet Subject  
**SITWORKS AND STORMWATER MANAGEMENT PLAN SHEET 1 OF 2**

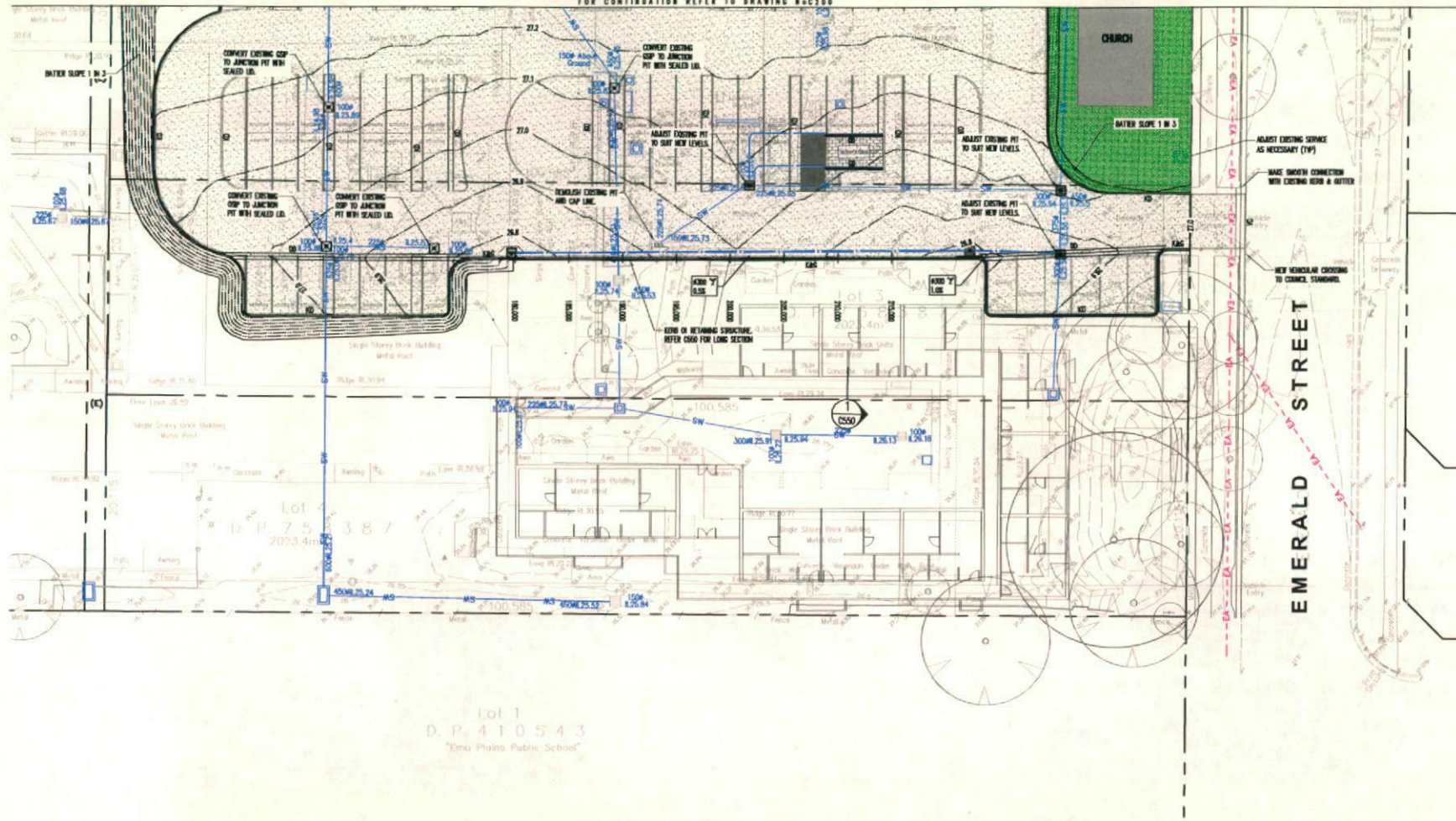
Scale: A1 1:200	Drawn AW	Authorised
JOB No: 141456	Drawing No: C200	Revision: P1
File No: C:\projects\Mar 23, 2018 - 1:13pm		





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FOR CONTINUATION REFER TO DRAWING No C200

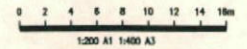


**SITWORKS LEGEND**

- 72.30 Finished surface level
- ===== Finished surface contour
- K&S Kerk and gutter
- KS Kerk only
- DS Dish drain
- EC Concrete edge strip
- Stormwater pit, flow direction and line with
- 100 x 75 x 125 Pipe size and class
- 150 x 75 x 125 Pipe size
- Existing stormwater line
- Proposed stormwater line
- Grated drain

Lot 1  
D.P. 410543  
"Emu Plains Public School"

EMERALD STREET



Morrison Design - 100% issue - Not to be changed - 23/03/2018 - 1:200

PT 100M FOR DA 11/03/18 11/03/18 11/03/18		11/03/18 11/03/18 11/03/18		11/03/18 11/03/18 11/03/18		11/03/18 11/03/18 11/03/18		11/03/18 11/03/18 11/03/18	
Rev Description 11/03/18 11/03/18 11/03/18		Rev Description 11/03/18 11/03/18 11/03/18		Rev Description 11/03/18 11/03/18 11/03/18		Rev Description 11/03/18 11/03/18 11/03/18		Rev Description 11/03/18 11/03/18 11/03/18	
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Architect  
 Morrison Design Partnership  
 Architects  
 Level 3, Suite 302/ 69 Chichester Street  
 St Leonards NSW 2065  
 Phone: (02) 9969 5066  
 www.mdp.com.au

Client Engineer  
**TTW** Taylor Thomson Whitting  
 612 9439 7268 | 48 Chandos Street St Leonards NSW 2065

Project  
 EDINGLASSIE VILLAGE,  
 EMU PLANS

Sheet Subject  
 SITWORKS AND  
 STORMWATER MANAGEMENT  
 PLAN SHEET 2 OF 2

Scale: A1  
 1:200  
 Job No:  
 141456  
 Drawing No:  
 C201  
 Authorised:  
 P1  
 File No: C:\projects\141456\141456.dwg  
 Plot File: C:\projects\141456\141456.dwg



## Appendix C

### WSUD Correspondence and Impervious Area Calculations

---



## William Webb

---

**From:** William Webb  
**Sent:** Tuesday, 6 February 2018 4:28 PM  
**To:** tim.gowing@penrith.city  
**Subject:** RE: Residential Aged Care Facility & WSUD Policy

**Categories:** 141456

Tim,

Thanks for your time over the phone today.

Summary of our discussions below:

- We consider the RACF as an existing commercial/industrial development for the purposes of WSUD requirements.
- It is intended to submit impervious area calculations showing increases in hard surface area has been limited to 250m<sup>2</sup>.
- Rainwater tanks are currently proposed as part of the redevelopment.
- The above items are subject to a merit based assessment on lodgement of application.

Regards,

William Webb  
Civil Engineer

---

**From:** William Webb  
**Sent:** Monday, 5 February 2018 4:49 PM  
**To:** tim.gowing@penrith.city  
**Subject:** Fw: Residential Aged Care Facility & WSUD Policy

Hi Tim,

I tried getting hold of you this arvo however the call went to voicemail.

I'll try again tomorrow morning.

Regards,

William



---

**From:** Joshua Hull <[Joshua.Hull@penrith.city](mailto:Joshua.Hull@penrith.city)>  
**Sent:** Monday, February 5, 2018 1:16 PM  
**To:** William Webb  
**Subject:** RE: Residential Aged Care Facility & WSUD Policy

Hi William,

I have forwarded your email to Tim Gowing, Senior Water Management Officer to respond directly. Tim's team assesses WSUD measures for new development. Tim can be contacted on 4732 7933 or by email at [tim.gowing@penrith.city](mailto:tim.gowing@penrith.city)

Kind Regards,

**Joshua Hull**  
Development Engineer

E [Joshua.Hull@penrith.city](mailto:Joshua.Hull@penrith.city)  
T +612 4732 7925 | F +612 4732 7958 | [+61 402 395 440](tel:+61402395440)  
PO Box 60, PENRITH NSW 2751  
[www.visitpenrith.com.au](http://www.visitpenrith.com.au)  
[www.penrithcity.nsw.gov.au](http://www.penrithcity.nsw.gov.au)

**PENRITH**  
CITY COUNCIL



---

**From:** William Webb [<mailto:William.Webb@ttw.com.au>]  
**Sent:** Monday, 5 February 2018 11:21 AM  
**To:** Joshua Hull <[Joshua.Hull@penrith.city](mailto:Joshua.Hull@penrith.city)>  
**Subject:** Residential Aged Care Facility & WSUD Policy

Hi Josh,

Hope you had a good break over xmas and start to the year.

I previously spoke with a development engineer from Council on the redevelopment of Edinglassie Village at Emu Plains.

The site currently exists as a residential aged care facility and the intent is to revitalise the site. The use would remain unchanged.

The advice provided at the time was that the site is considered as an existing residential flat OR a commercial/industrial alteration and addition for the purposes of WSUD requirements. As the increases in impervious area were limited to 250m<sup>2</sup> the intention was to address water quality with rainwater tanks. We're in the process of preparing for DA and I've been requested to have this confirmed in writing prior to submission to reduce the possibilities of additional documentation submissions.

Can you confirm if the initial advice that was provided is correct?



**Table 1: Water Sensitive Urban Design Requirements**

Landuse	Development Type	Water Conservation (Section 3.1)	Water Quality (Section 3.2)
Residential	Alterations and Additions, Dual Occupancy, detached dwellings and residential land uses not addressed below	√ - BASIX	No
	New single dwellings and dual occupancy	√ - BASIX	No
	Existing Residential villas, flats and townhouses with additional impervious area greater than 250m <sup>2</sup> .	√ - BASIX	No
	Residential development of 5 or more dwellings including multi dwelling housing, residential housing residential flat buildings and mixed use development.	√ - BASIX	√
Commercial & Industrial	All new commercial, retail, mixed use and industrial development greater than 2,500m <sup>2</sup> total site area.	√ - WELS	√
	Alterations and additions where the increase in the roofed and impervious area* is equal to or greater than 250m <sup>2</sup> .	√ - WELS	√
	Commercial, retail, mixed use and industrial development not addressed above.	√ - WELS	No

Kind regards,

**William Webb**

Civil Engineer

48 Chandos Street St Leonards NSW 2065

P +612 9439 7288 | D



Structural  
Civil  
Traffic  
Facade



ttw.com.au

This email has been scanned by the Symantec Email Security.cloud service.

For more information please visit <http://www.symanteccloud.com>

**William Webb**

Civil Engineer







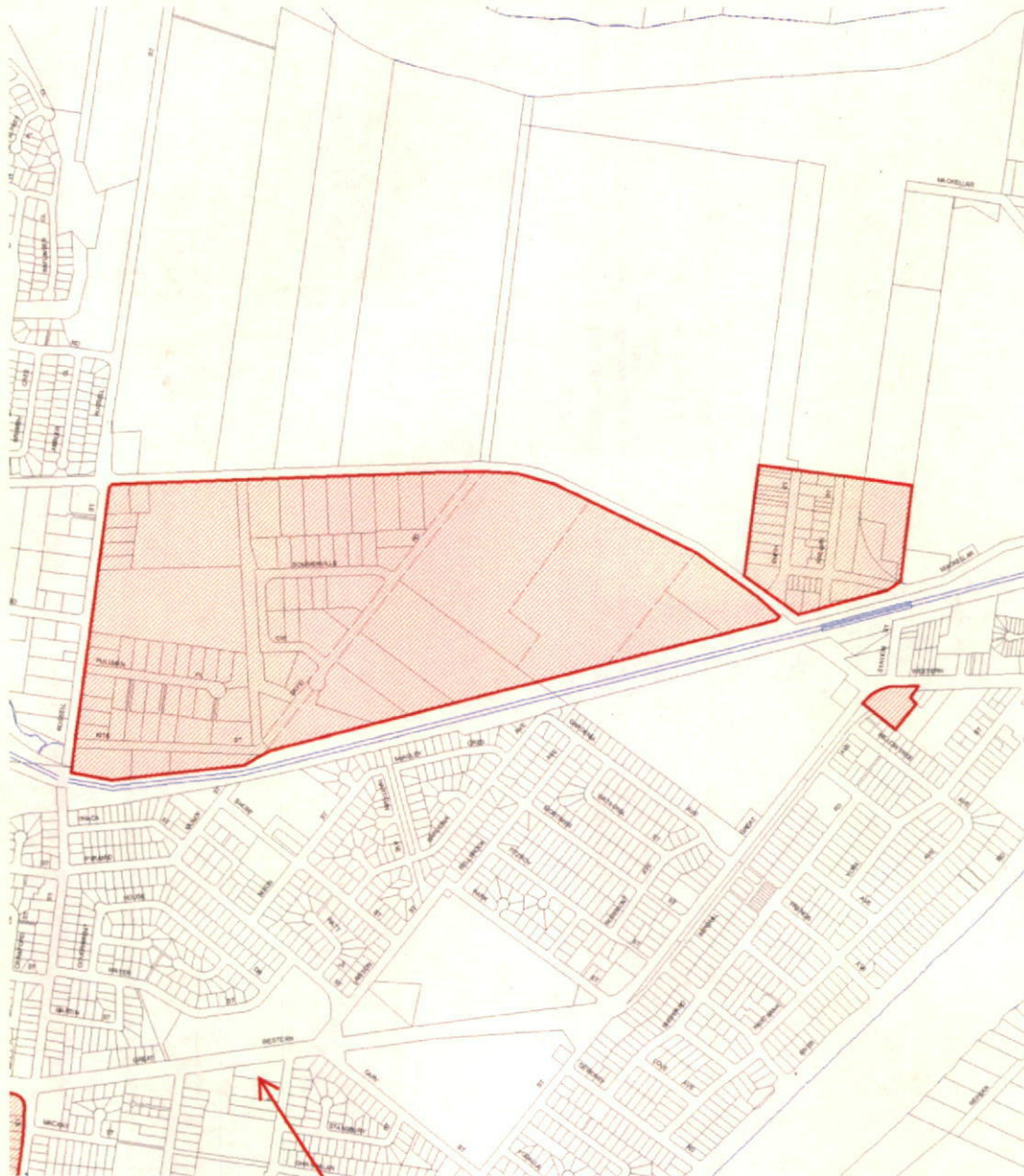
## Appendix D

### Mandatory OSD Catchment Area – Emu Plains North

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## ON-SITE DETENTION AREA - EMU PLAINS (NORTH)



Not to Scale

SITE LOCATION



## Appendix E

### Erosion and Sediment Control Plan & Details

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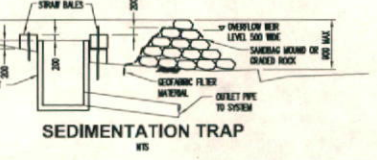
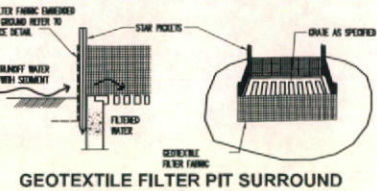
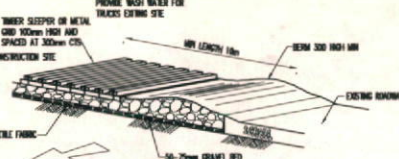
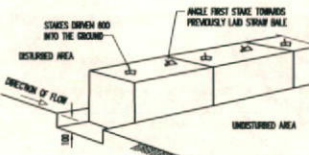
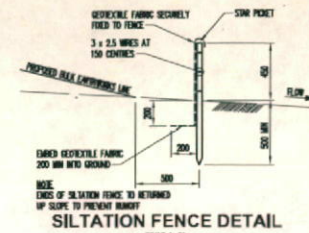
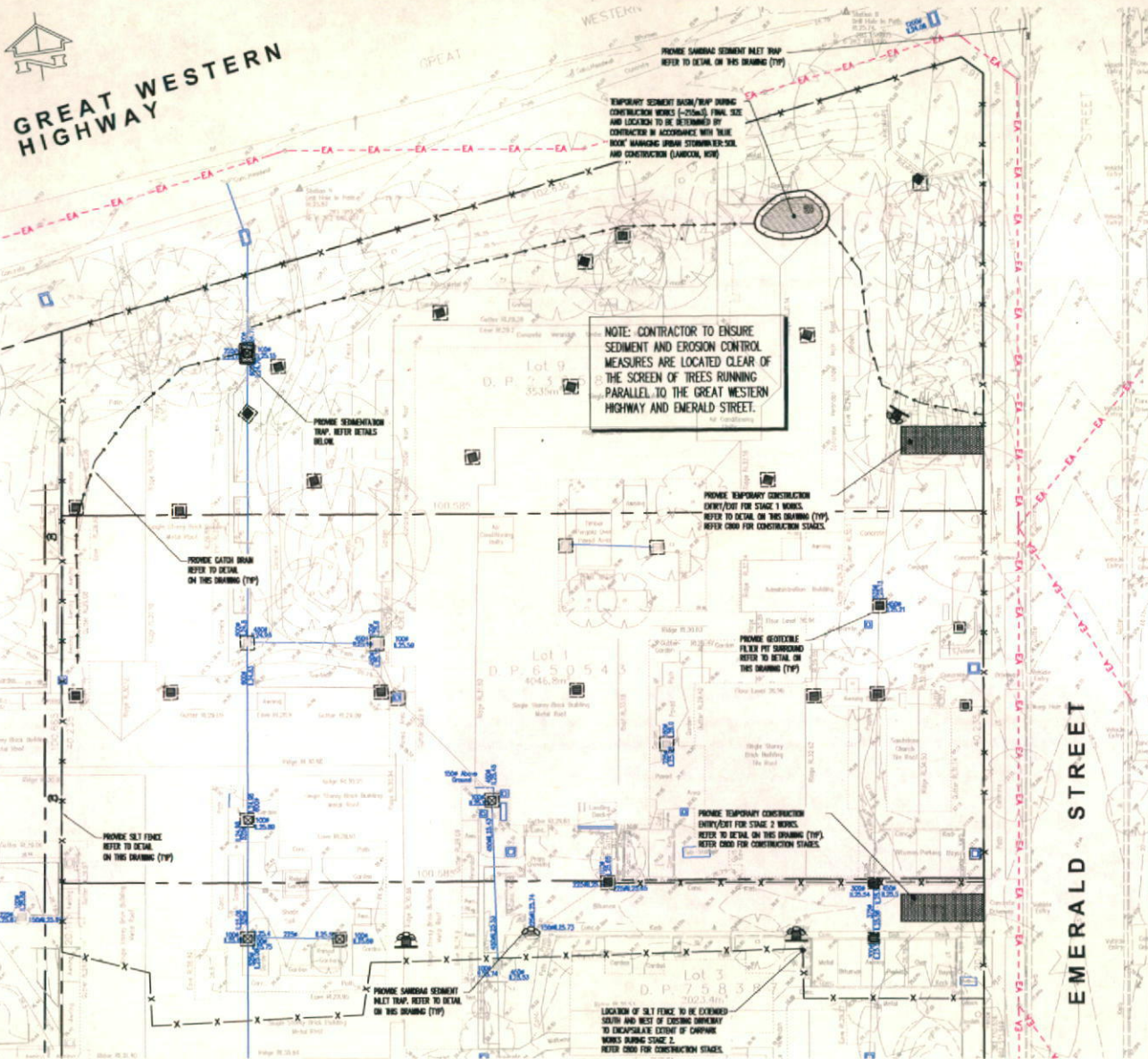




GREAT WESTERN HIGHWAY

WESTERN

EMERALD STREET



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EROSION AND SEDIMENT CONTROL NOTES

- 1. All work shall be generally carried out in accordance with... 2. Erosion and sediment control measures shall be provided for the whole of the works... 3. Material of erosion and sediment control devices... 4. When strawmat pits are constructed... 5. Material the area of site being disturbed at any one time... 6. Protect all stockpiles of materials from silt and erosion... 7. All soil and water control measures are to be put back in place... 8. Control water from upstream of the site such that it does not enter the disturbed area... 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. Material of strawmat pipes and pits clear of debris and sediment... 12. Check out all erosion and sediment control devices after each storm event... 13. Check out all erosion and sediment control devices after each storm event.

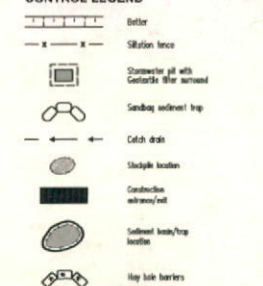
Sequence Of Works

- 1. Prior to commencement of excavation the following all management devices must be installed... 1.1. Construct all 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 systems... 1.4. Construct sedimentation traps/basins including outlet control and overflow... 1.5. Construct kerb lined drains... 1.6. Provide silt fences between stages of existing pits... 1.7. Construct geotextile filter pit surround around all proposed pits as they are constructed... 1.8. On completion of pavement provide long kerb lined sediment control pits... 1.9. 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 sewage water into Council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environmental 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 Council's storm water drainage system. This should include comments from a suitably qualified environmental consultant outlining the suitability of these remedial measures to manage the water discharged from the site into Council's storm water drainage systems. Outlining the proposed, ongoing monitoring, contingency plans and remedial program that will be in place to continuously monitor the quality of water discharged from the 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



PRELIMINARY

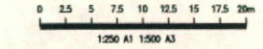
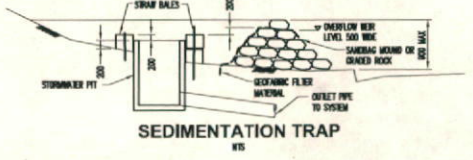
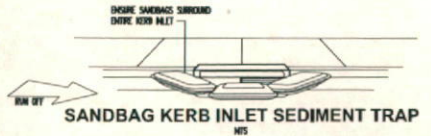


Table with columns: Scale (A1: 1:2500), Drawn (AIV), Authorised, Job No (141456), Drawing No (C700), Revision (P1), File No (C:\Users\...), Date (25/03/2018), Version (1:0100)

NOTE: CONTRACTOR TO ENSURE SEDIMENT AND EROSION CONTROL MEASURES ARE LOCATED CLEAR OF THE SCREEN OF TREES RUNNING PARALLEL TO THE GREAT WESTERN HIGHWAY AND EMERALD STREET.

TYPICAL SECTION THROUGH CATCH DRAIN



Architect: Morrison Design Partnership Architects, Level 3, Suite 3027 89 Charles Street, St Leonards NSW 2065, Phone: (02) 9966 5566, www.mdp.com.au

Client: EDINGLASSIE VILLAGE, EMU PLANS, Taylor Thomson Whitting, 81/2 9439 7288 1 48 Charles Street St Leonards NSW 2065

Project: EDINGLASSIE VILLAGE, EMU PLANS, Erosion & Sediment Control Plan and Details



## **Appendix F**

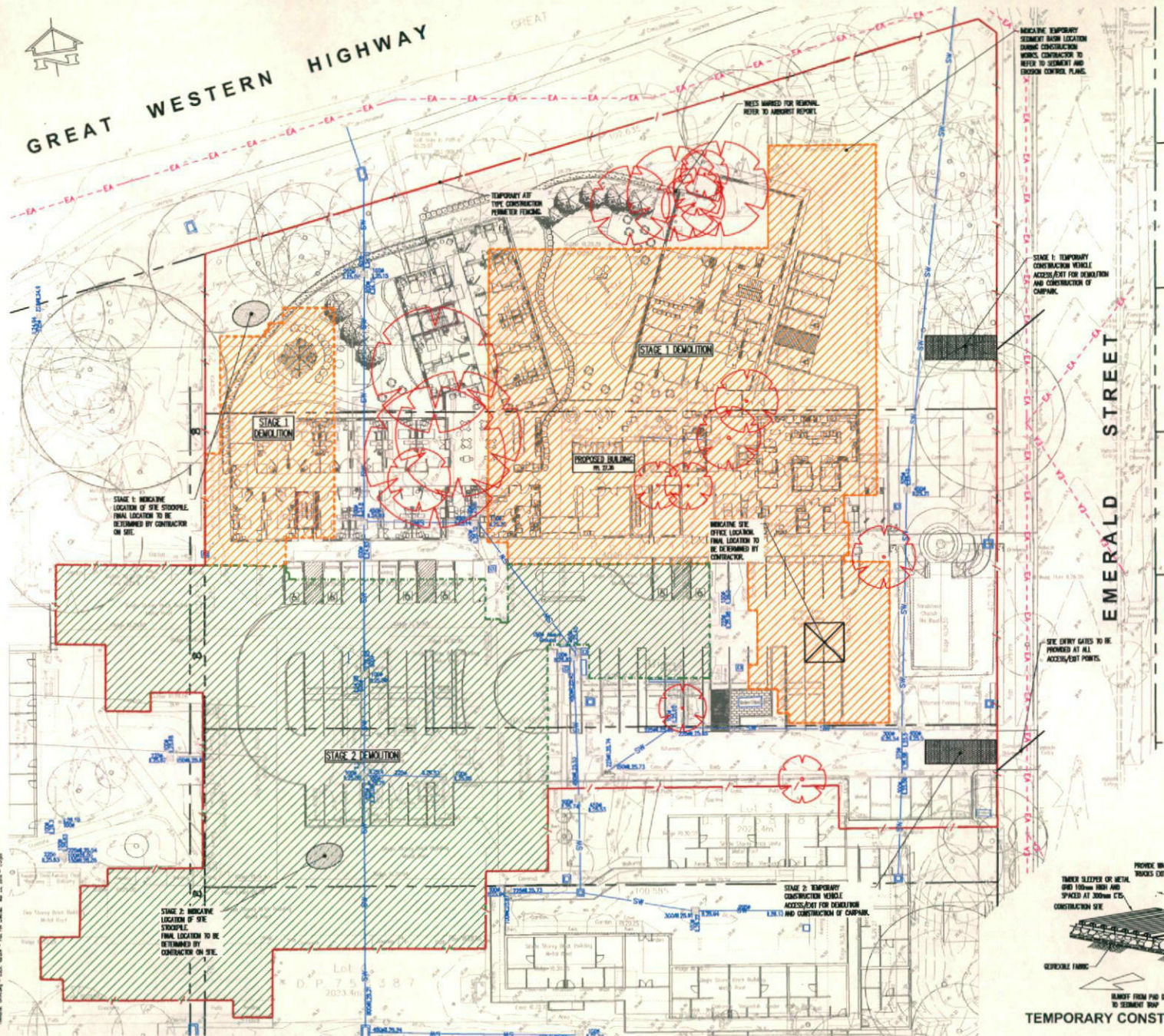
### **Demolition, Construction and Environmental Waste Management Plan**

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GREAT WESTERN HIGHWAY



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NOTES

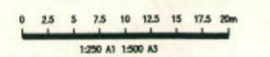
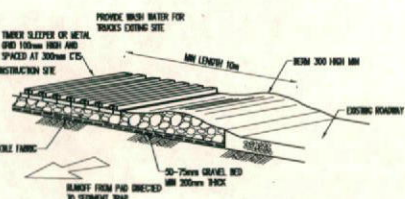
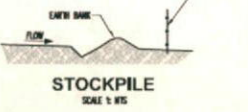
**Tree Removal Control**  
1. Council tree preservation orders and orders shall be adhered to and no tree is to be felled, topped or removed without prior approval. This includes damage to tree and systems throughout the site or contractor related activities.  
2. Trees to be retained as per the arborist report shall be fenced off and appropriately identified.  
3. All areas that are to be left as unobstructed shall be fenced off from the proposed construction zone.

**Environmental Control**  
1. The contractor shall take sole responsibility for the implementation of erosion and sedimentation control measures to the satisfaction of Council, EMS, other relevant stakeholders and the site superintendent.  
2. The erosion and sedimentation control measures shown shall be in place and maintained until the project is completed.  
3. Erosion and sedimentation control measures implemented on site shall be routinely inspected to ascertain their effectiveness (especially following heavy events) and reported/adjusted as necessary to ensure their continued effective function throughout the duration of the construction works.  
4. Stockpile locations and catch drains shall be clear of all trees, drainage lines, and marked the path of all lines.  
5. Stockpiles shall be protected from erosion.  
6. The contractor shall undertake a weekly surface cleaning of the temporary construction entrances/exits by dry brooms (or equivalent measures) to ensure the removal of build-up of any foreign materials to the satisfaction of the superintendent.  
7. Additional environmental controls including but not limited to dust, vibration, noise, fumes, leaks, the layout, vehicles and other contaminants must be managed to the requirement of Council, EMS and other relevant stakeholders.

**Traffic Control**  
1. The contractor shall take sole responsibility for the control of all traffic (both construction and public) including vehicle and pedestrian movements to the satisfaction of Council, EMS, other relevant stakeholders and the site superintendent.  
2. The contractor shall prepare a Construction Management Plan and Traffic Management Plan to the satisfaction of Council, EMS, other relevant stakeholders and the site superintendent.  
3. The Traffic Management Plan shall adhere to the requirements of:  
a. Traffic Control of Work Sites issued by EMS  
b. Manual of Uniform Traffic Control Devices AS 1742  
c. Local Council Standards

**Water Control**  
1. The contractor shall take sole responsibility for the proper management of runoff, seepage and sludge from the subject site in such a way as not to cause nuisance, damage of property or injury of persons.  
2. Runoff that is captured in the subject basin shall be applied to provide the required storage capacity within a 10 (1) day period following rainfall of 20 mm (or greater) of the basin outlet (MS) (whichever occurs first). Discharge into the surrounding roadway shall only be carried out when satisfactory water quality levels are achieved as per EPA Guidelines and prior approval has been granted by the relevant authority whether it be Council, EMS or other relevant authority.  
3. In the event that discharge is unable to be carried out due to highly turbid water, chemical treatment such as gypsum may be used to aid settlement rates within the first 24 hours of the conclusion of the storm event. The dosing rate applied to the basin shall adhere to the largest MS) within 24 to 72 hours of the storm event ceasing.  
4. The contractor shall take sole responsibility for the maintenance of temporary ditches, pumps and other equipment necessary to ensure the management of stormwater on the site.

**Demolition and Waste Control**  
1. All demolition works shall be approved and supervised by Council. It is to be noted that Council generally requires a minimum of 24-48 hours notice for the inspection of any demolition works.  
2. Demolished and waste materials shall be appropriately stored and secured in designated waste storage areas on site of all times prior to the 30 day reuse application or removal and disposal of site.  
3. Waste materials to be removed off site shall be transported in accordance with the requirements of the Protection of the Environment Operations Act 1997 and only to a location that is legally able to be used as a resource recovery, recycling/energy centre or waste disposal facility.  
4. The following waste materials shall be separated and recycled:  
o Heavy  
o Metal  
o Plastic  
o Timber  
o Cardboard/paper  
o Glass  
o Plaster  
5. The separation of the above regulations shall be achieved by correct separation and to be undertaken on site, utilising the materials into labelled material stockpiles. Alternatively, mixed waste is able to be stored on site and then transferred to a recycling station and sorted off site.  
6. The waste and recycle tipping receipts shall be kept on site at all times and presented to Council and the superintendent upon request.  
7. Tines approved for removal may be marked and retained on site for landscape reuse. Main stockpiles must be monitored and covered over as necessary to avoid groundwater contamination. All surplus material is to be disposed of legally off-site.



Project: EDINGLASSIE VILLAGE, EMU PLANS	Client: Morrison Design Partnership Architects	Scale: 1:250	Drawn: AVV	Author: AVV
Client: Taylor Thomson Whitting	Level: 3, Suite 3027 89 Chisholm Street, St Leonards NSW 2065	Sheet Subject: DEMOLITION, CONSTRUCTION AND ENVIRONMENTAL WASTE MANAGEMENT PLAN	Job No: 141456	Drawing No: C600
Phone: (02) 9965 5566	www.ttw.com.au	Revision: P1	Rev No: 00000	Date: Mar 23 2018