

Stormwater Management Plan

Recycling Facility

**25 Dunheved Cct
ST MARYS NSW 2760**



For

**reDirect Recycling Pty Ltd
21-25 Dunheved Cct
St Marys NSW 2760**

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2. Introduction and Background

2.1. Purpose

The purpose of this report is to investigate the properties of the existing stormwater system present at the development site and determine the remedial works required to ensure the system meets the specified performance requirements.

The principal objectives of this review are to provide:

- A summary of the stormwater system requirements.
- A summary of stormwater design parameters.
- A summary of the stormwater design strategy.

2.2. Site Description

The development site is described as Lot 143 in DP 1013185. This lot is addressed as 25 Dunheved Circuit, St Marys. The location of the site is shown in Figure 2.1.



Figure 2.1: Aerial Photograph of the Site Location (Nearmap, 3 August 2020)

The development site is presently an industrial recycling facility. It is bound by 21 Dunheved Circuit to the east, with which it shares a parking area; 84 Links Road to the north; 92-96 Links Road & 8 Kommer Place to the west; and 1-4, 5 & 6 Kommer Place to the south. All the surrounding lots are currently industrial. Stormwater at the current development is drained to the western boundary to an existing drainage easement.

The total site area is 6,140 m². The entire development consists of impervious roof and hardstand areas.

2.3. Existing Structures

The development site presently consists of the following structures:

- An industrial warehouse. Total roof area = 3,550 m².
- An administrative office. Total roof area = 180 m².
- External pavement, driveway, and car parking areas. Total pavement area = 2,410 m².

Figure 2.2 shows the overall stormwater drainage plan for the development. The full set of stormwater drawings is provided in Appendix A.

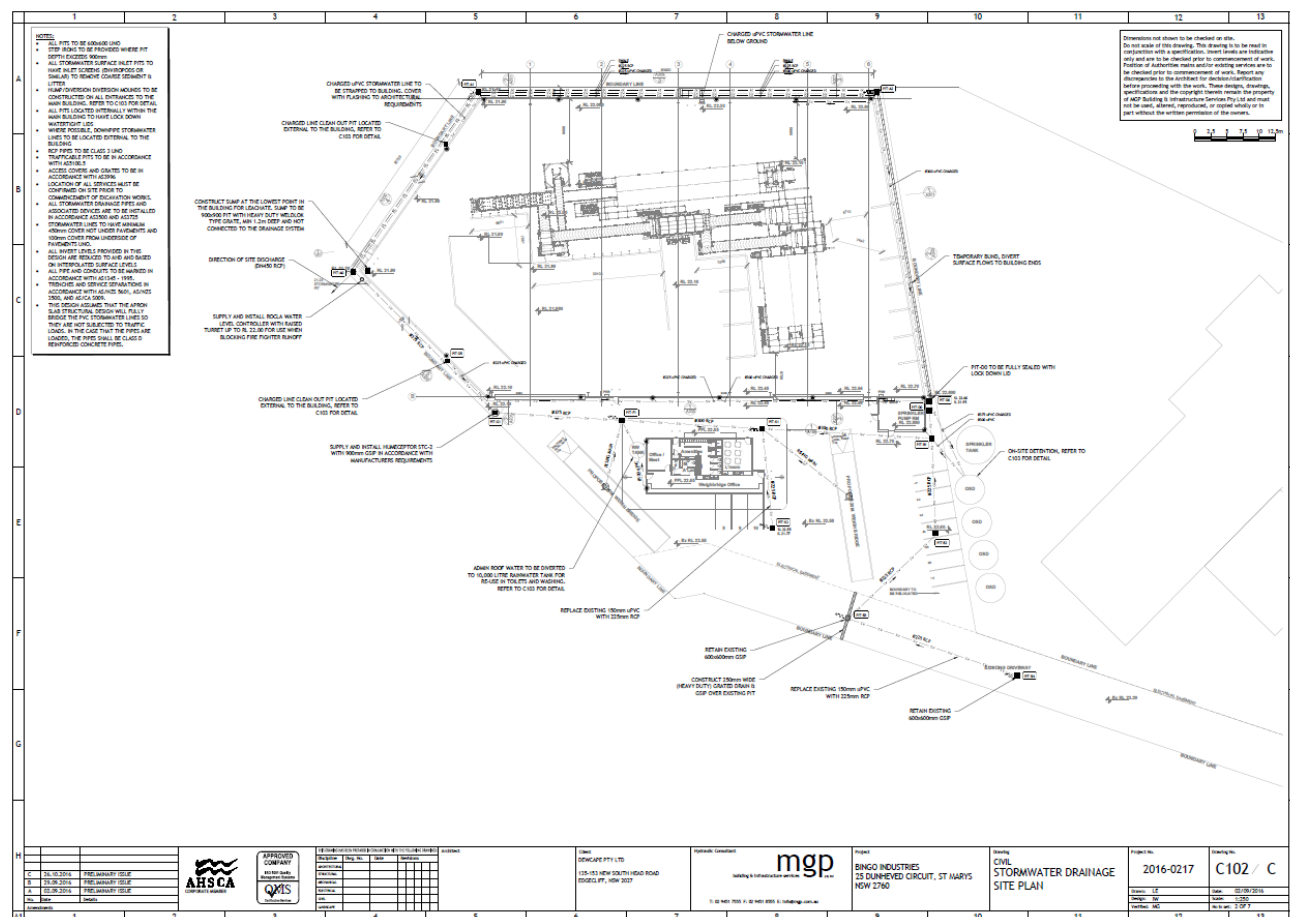


Figure 2.2: Stormwater Drainage Plan for the Existing Site

3. Proposed Site Use Changes & Reporting Requirements

3.1. Site Use

The site proponent (reDirect Recycling Pty Ltd) has proposed an increase in throughput for the existing resource recovery facility to process up to 150,000 tonnes per annum of general solid waste (non-putrescible) consisting of 110,000 tonnes per annum of wood waste, 30,000 tonnes per annum of plasterboard and 10,000 tonnes per annum of metal waste with a maximum storage capacity of up to 5,000 tonnes at any given time.

The proposed increase requires the preparation of an Environmental Impact Statement for the development which meets the Planning Secretary's Environmental Assessment Requirements (SEARs). It must meet the requirements in clauses 6 & 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. This report forms part of the Environmental Impact Statement for stormwater management.

3.2. Reporting Requirements

The following documentation of reporting requirements for stormwater management have been provided.

Planning Secretary's Environmental Assessment Requirements

The Planning Secretary's Environmental Assessment Requirements detail the following reporting requirements:

- *An assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater dependent communities nearby*
- *A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements*
- *Details of stormwater/wastewater management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water*
- *Description of the measures to minimise water use*
- *Detailed flooding assessment*
- *Description of the proposed erosion and sediment controls during construction*
- *Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality control criteria (including details of the contaminants of concerns that may leach from the waste into the wastewater and proposed mitigation measure to manage any impacts to receiving waters and monitoring activities and methodologies) and*
- *Characterisation of the nature and extent of any contamination on the site and surrounding area.*

NSW Environment Protection Authority

The NSW EPA has provided the following inputs on the Secretary's Environmental Assessment Requirements with respect to stormwater management:

In general, development should maintain or restore the community's uses and values of waterways, including human and environmental health, through the achievement of relevant NSW Water Quality Objectives (WQO). The Environmental Impact Statement (EIS) should provide the following for the construction and operational phases of the proposal:

- *Provide an assessment of any potential impacts of the proposal on the surface and groundwater of the area, with particular focus on water quality and the community's agreed environmental values and human uses for relevant watercourses (the NSW WQO).*
- *Provide a Stormwater Management Plan that outlines the general stormwater management measures for the proposal, including erosion and sediment controls, first flush systems, and the use of*

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sustainability measures such as Water Sensitive Urban Design to create more resilient and adaptable urban environments.

- *Outline opportunities for the use of integrated water cycle management practices and principles to optimise opportunities for sustainable water supply, wastewater and stormwater management across the proposal.*
- *Provide details of any potential discharge of pollutants to water, including fugitive discharges such as fuel or oil leaks. The EIS should take into consideration the characteristics and hydrology of the receiving waters and provide details of how any potential water pollution caused by the proposal will be prevented or mitigated.*

The EPA would expect that the building(s) be constructed to exclude all stormwater and that internal surfaces be graded inwards to contain any contaminated water (being any water that has come into contact with waste). The EPA notes that even where all waste storage and processing is conducted within an enclosed building, waste may be tracked on to external surfaces leading to the generation of contaminated water. Any external areas where waste vehicles travel or wait for loading/unloading must drain to a stormwater quality treatment device sufficient to remove any contaminants, both solid and dissolved, prior to discharge offsite.

Penrith City Council

Penrith City Council have provided the following inputs on the Secretary's Environmental Assessment Requirements with respect to stormwater management:

Stormwater Drainage

The following is requested to be addressed in any state significant development application lodged for this site:

- *Demonstration that the existing on-site stormwater system is of adequate capacity and there will be no increase in stormwater runoff from the site as a result of this proposal.*
- *The applicant should be requested to demonstrate that there will be no increase in runoff from the site as a result of the development for all storms up to and including the 1% AEP event.*

Water Sensitive Urban Design

The application is required to address Council's Water Sensitive Urban Design Policy and Technical Guideline. Increase in impervious area may require the provision and implementation of a water sensitive urban design strategy that complies with Council's Technical Guideline.

The Planning Secretary's Environmental Impact Assessment Requirements, along with the input provided by the NSW Environment Protection Authority and Penrith Council have been provided in Appendices B, C & D.

3.3. Reporting Matrix

Table 3.1 below indicates the sections in which the relevant SEARs requirements are addressed.

Requirement	Addressed in Section
An assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater dependent communities nearby.	Not addressed – development works do not have associated impacts on watercourses, riparian areas, groundwater, and groundwater dependent communities.
A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements.	Section 5
Details of stormwater/wastewater management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water.	Sections 6 & 7
Description of the measures to minimise water use.	Section 5
Detailed flooding assessment	Section 9
Description of the proposed erosion and sediment controls during construction.	Not addressed – there are no proposed development works requiring sediment and erosion control.
Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality control criteria (including details of the contaminants of concerns that may leach from the waste into the wastewater and proposed mitigation measure to manage any impacts to receiving waters and monitoring activities and methodologies).	Sections 7 & 8
Characterisation of the nature and extent of any contamination on the site and surrounding area.	Not addressed – contamination of the site and surrounding area have not been investigated.

Table 3.1: SEARs Requirements in This Report

4. Hydrological Data

4.1. General

A DRAINS model has been prepared in the review of the on-site detention system used in discharge control of stormwater. The data shown in Table 4.1 was used in conjunction with procedures outlined in Australia Rainfall and Runoff 2019 to determine pre- and post-development discharge rates.

	Rainfall Depths (mm) [33.4125 (S), 151.2875 (E)] issued 7 September 2020						
	Exceedance per Year (EY)			Annual Exceedance Probability (AEP)			
Duration	1EY	0.5EY	0.2EY	10%	5%	2%	1%
1 min	1.99	2.53	3.25	3.81	4.44	5.29	5.95
2 min	3.26	4.08	5.11	5.96	6.9	8.2	9.24
3 min	4.53	5.68	7.16	8.35	9.69	11.5	13
4 min	5.7	7.17	9.1	10.6	12.4	14.7	16.6
5 min	6.76	8.53	10.9	12.7	14.8	17.6	19.8
10 min	10.7	13.7	17.6	20.7	24.2	28.8	32.4
15 min	13.4	17.1	22.1	26	30.3	36.1	40.6
20 min	15.4	19.5	25.2	29.7	34.6	41.2	46.3
25 min	16.9	21.5	27.7	32.5	37.9	45.1	50.7
30 min	18.2	23	29.6	34.8	40.5	48.2	54.2
45 min	21	26.5	33.8	39.6	46.1	54.9	61.8
1 hour	23.1	29.1	36.8	43.1	50	59.6	67.1
1.5 hour	26.3	32.9	41.3	48.2	55.9	66.7	75.2
2 hour	28.9	36	44.9	52.2	60.6	72.4	81.8
3 hour	33	41	50.8	59.1	68.7	82.1	92.9
6 hour	42.3	52.5	65.1	75.9	88.5	106	120
12 hour	55.6	69.5	87.4	103	120	145	164

Table 4.1: Bureau of Meteorology Rainfall Depths for the Development Site

The Antecedent Moisture Condition for the site has also been determined based on daily rainfall for a Bureau of Meteorology rainfall station local to the site. The chosen rainfall station is Orchard Hills Treatment Works (067084), which has a daily rainfall record spanning 1970 – 2020. The rainfall record from this site has returned an Antecedent Moisture Condition of 3.18 for the top 100 rainfall events in the available record. A summary of the calculations for the Antecedent Moisture Condition have been provided in Appendix E.

4.2. Discharge Calculations

A Horton/ILSAX hydrological model was utilised to determine the pre-development discharge rates from the site. The discharge rates shown in Table 4.2 summarise the critical results for a variety of storm durations.

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Rainfall Event	Pre-Development Flow (L/s)	Critical Storm Duration (min)
1EY	56	15
0.5EY	98	10
0.2EY	144	10
10%	197	15
5%	235	15
2%	274	10
1%	319	10

Table 4.2: Pre-Development Discharges and Critical Durations

5. Water Balance Analysis

A rainfall reuse analysis has been conducted using daily rainfall data from Orchard Hills Treatment Works supplied by the Bureau of Meteorology. The analysis conducted resulted in a calculated percentage of 64.90% for the proportion of days in which reuse demand is met since the beginning of the rainfall record (1970).

A roof area of 180 m² plumbed to a 10 kL above-ground rainwater tank meets the reuse demand for this site.



Figure 5.1: BOM Weather Stations Local to the Development

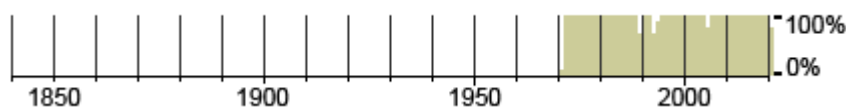


Figure 5.2: Available Daily Rainfall Data for Orchard Hills Treatment Works

The full set of water balance calculations have been provided in Appendix F.

6. Hydraulic Analysis

This section analyses how the OSD system designed for the development site may meet the requirements outlined in Section 3, while also contributing to the water quality treatment train. The content of this section discusses the method and results of the analyses used in the reporting of the design of this system.

6.1. On-Site Detention Parameters

The above-ground OSD tanks with discharge control contribute to both water quality and quantity exiting the site. Water quantity control is required such that the outflow from the site is limited to pre-development conditions in all rainfall events up to and including the 1% AEP event. The total site area draining to the OSD system is 6,140 m², and all rainfall on impervious areas are directed to the OSD system prior to discharge from the site.

The on-site detention characteristics are listed below:

- 4x 50 kL hydraulically linked OSD tanks.
- Diameter 120 mm orifice at RL 22.68.
- Diameter 300 mm high-level overflow pipe at TWL 25.75.

These characteristics have been assumed from on-site observations and Preliminary Stormwater Drainage Plans for the site prepared by MGP Building and Infrastructure Services. An extract of the OSD detail is shown in Figure 6.1 below, and the full drawing set is included in Appendix A.

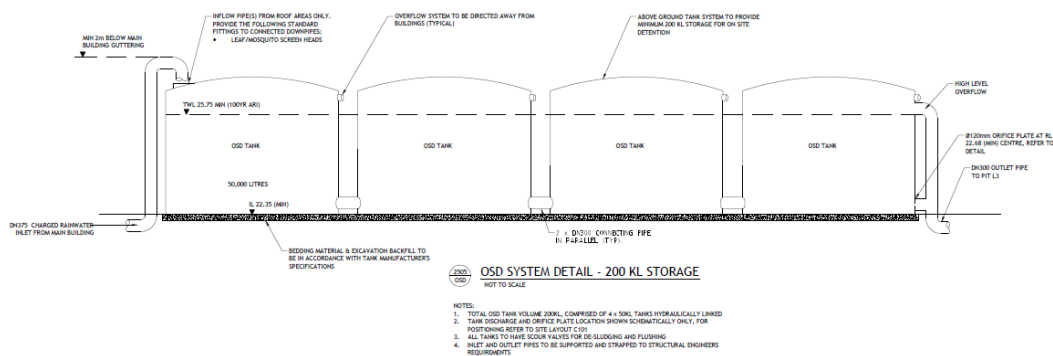


Figure 6.1: Preliminary OSD Arrangement for the Development Site

A summary diagram of the DRAINS model used to model the above parameters is shown in Figure 6.2.

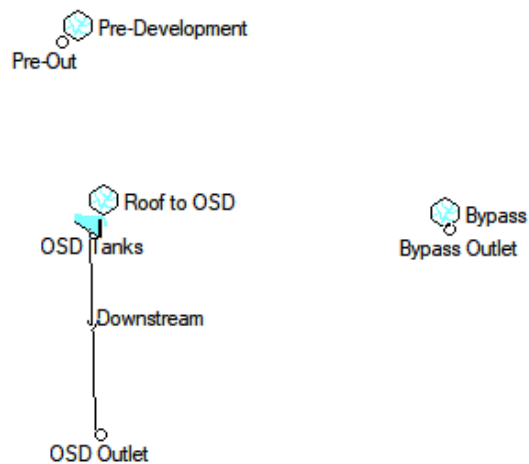


Figure 6.2: DRAINS Model Arrangement of the On-Site Detention System

A comparison of the pre-development and post-development critical outlet flows have been documented in Table 6.1 below. These results show that the post-development flows have been reduced to match the pre-development flows at a maximum in all rainfall events less frequent than the 0.5EY event.

Rainfall Event	Pre-Development Flow (L/s)	Post-Development Flow (L/s)
1EY	56	71
0.5EY	98	89
0.2EY	144	114
10%	197	132
5%	235	154
2%	274	183
1%	319	205

Table 6.1: Pre- and Post-Development Stormwater Discharge as Determined Using a DRAINS Model

7. Water Quality Analysis

7.1. General

The water quality for the site has been compared to the requirements of Penrith City Council's WSUD objectives as outlined in Section 3 which requires that the proposed development have pollutant load reductions as shown in Table 7.1.

To determine compliance with this requirement, a full analysis of the water quality of the stormwater discharge leaving the site was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software modelling package.

Pollutant	Percentage Reduction
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants (GP)	90%

Table 7.1: Penrith City Council Pollutant Load Reduction Requirements

7.2. MUSIC Input Parameters

The input parameters representing the urban catchment areas across the site have been adopted from the default values required for Penrith City Council MUSICLink. The site has been divided into sub-catchments that drain into the various treatment nodes of the treatment train. Figure 7.1 and Table 7.2 provide an arrangement and summary of the input values used for source nodes in the MUSIC model of the existing system.

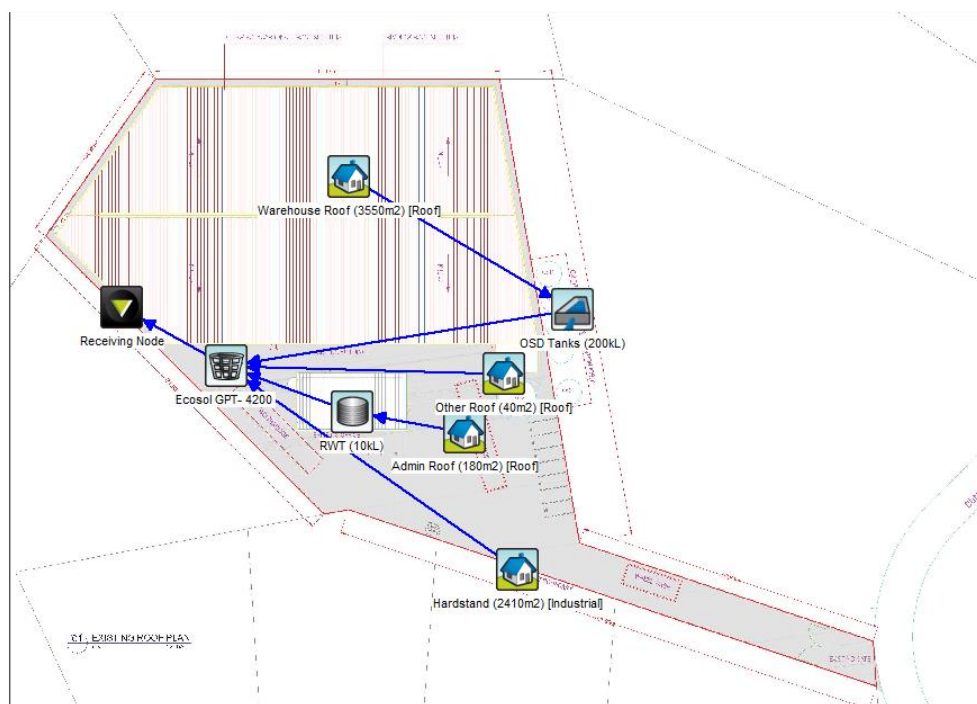


Figure 7.1: MUSIC Model Arrangement of the Treatment Train of the Existing Development

Data Type		Catchment Type		
		Roof Area	Hardstand Area	Landscaped Area
Area Parameters				
Impervious Area (%)		100	100	0
Pervious Area (%)		0	0	100
Rainfall Runoff Parameters				
Rainfall Threshold (mm/day)		1.4	1.4	1.4
Soil Storage Capacity (mm)		105	105	105
Initial Storage (%)		30	30	30
Field Capacity (mm)		70	70	70
Infiltration Capacity Coefficient		150	150	150
Infiltration Capacity Exponent		3.5	3.5	3.5
Total Suspended Solids (log mg/L)				
Base Flow	Mean	-	1.200	1.200
	Std Dev	-	0.170	0.170
Storm Flow	Mean	1.300	2.150	2.150
	Std Dev	0.320	0.320	0.320
Total Phosphorus (log mg/L)				
Base Flow	Mean	-	-0.850	-0.850
	Std Dev	-	0.190	0.190
Storm Flow	Mean	-0.890	-0.600	-0.600
	Std Dev	0.250	0.250	0.250
Total Nitrogen (log mg/L)				
Base Flow	Mean	-	0.110	0.110
	Std Dev	-	0.120	0.120
Storm Flow	Mean	0.300	0.300	0.300
	Std Dev	0.190	0.190	0.190

Table 7.2: MUSIC Model Input Parameters

7.3. Analysis Results

The pollutant reduction results for the designed treatment train are summarised in Table 7.3

	Pollutants Generated (kg/yr)	Residual Pollutants (kg/yr)	% Reduction Target	% Reduction Achieved
Total Suspended Solids	319	122	85	61.8
Total Phosphorus	0.765	0.504	60	34.1
Total Nitrogen	8.07	7.26	45	10.1
Gross Pollutants	102	0.555	90	99.5

Table 7.3: Existing Treatment Train Effectiveness as Reported by MUSIC Model

The above table demonstrates that the existing stormwater system does not meet the water quality requirements of Penrith City Council. The content of Section 8 outlines the remedial works required on the stormwater system which will ensure that the stormwater treatment train meets these requirements.

The MUSICLink report for the existing stormwater system is included in Appendix G.

7.4. Wastewater Prevention

It is noted that some industrial processes on the site will produce dirty water. Existing measures to prevent dirty water from entering the stormwater system will remain in place under the new site use. No wet waste directly producing wastewater will be processed at the site. Excess water from dust suppression will remain inside the confines of the building and runoff is directed to internal pits connected to the stormwater system. Grading of the internal surface and bunding adjacent to doors ensures no wastewater enters the stormwater system.

8. Remedial Stormwater Works

8.1. Modifications

All stormwater on the existing site is directed to an Ecosol GPT 4200. This trap makes use of an internal weir and physical screening to remove gross pollutants. A visual inspection of the pollutant trap indicated that its storage volume was at capacity and that maintenance is required.

As the Ecosol GPT acts as effective gross pollutant removal, it is suggested that installation of a tertiary treatment system downstream of the Ecosol GPT would be effective in providing stormwater treatment. The proposed tertiary system is the Ocean Protect StormFilter, which can be installed in a 1500 mm manhole and requires 150 mm of depth between inlet and outlet pipes. 4x 690 mm PSorb StormFilter cartridges have been proposed to allow for reasonable maintenance intervals. Reporting on the treatment train effectiveness of this system is provided in Section 8.2.

Maintenance and installation guides for the StormFilter device are provided in Appendix H. Schematic layouts of the system are provided in Appendix I.

8.2. Treatment Train Effectiveness

Figure 8.1 below shows the arrangement of the MUSIC model for the proposed upgrades to the existing stormwater system. Table 8.1 provides the treatment effectiveness of this system.

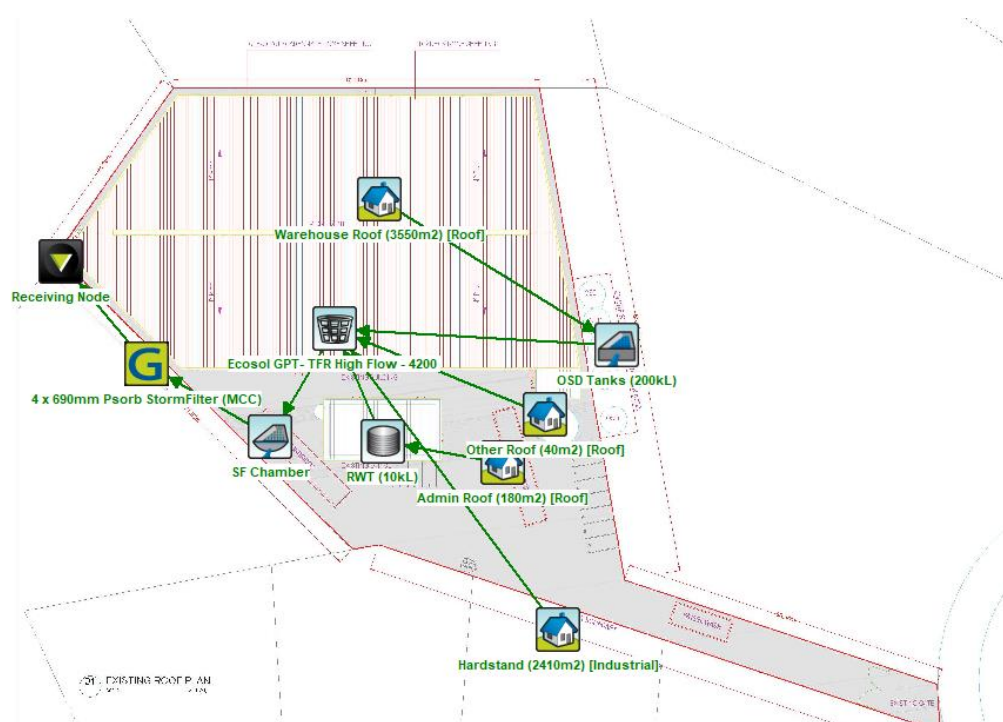


Figure 8.1: MUSIC Model Arrangement for Proposed Stormwater System Upgrade

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	Pollutants Generated (kg/yr)	Residual Pollutants (kg/yr)	% Reduction Target	% Reduction Achieved
Total Suspended Solids	320	15.3	85	95.2
Total Phosphorus	0.767	0.0737	60	90.4
Total Nitrogen	8.03	2.02	45	74.8
Gross Pollutants	102	0	90	100

Table 8.1: Upgraded Treatment Train Effectiveness as Reported by MUSIC

The MUSICLink report for the upgraded stormwater system is provided in Appendix J.

8.3. Maintenance Considerations

The results shown in Table 8.1 represent a significant improvement in the reduction of water pollutants over the existing system. The reductions achieved are significantly more than required by Penrith City Council, and compliant reduction can reasonable be achieved with 1x StormFilter cartridge rather than 4x StormFilter cartridges.

The proposed design has specified 4x StormFilter cartridges for maintenance purposes. For a site of this size, specifying any less than this number would result in the requirement of regular maintenance at very short intervals. The use of 4 cartridges has been suggested based on estimates of maintenance requirements for the site.

Further analysis of life cycle costing and appropriate maintenance intervals will be conducted by Ocean Protect prior to the supply of the StormFilter system.

9. Flood Analysis

The development site is subject to the catchment areas of South Creek and Ropes Creek. Flood studies of the area have been conducted previously for a range of rainfall events. This section discusses the impacts of various flood events on the development site.

9.1. Main Stream Flooding from South Creek

Worley Parsons conducted an Updated South Creek Flood Study commissioned by Penrith City Council in 2015. The extents of various flood events indicate that the development site is not impacted by the 20-year, 100-year and 200-year flooding events of South Creek. In the Probable Maximum Flood, the area is expected to be inundated to 26.8 mAHD, which is approximately 4 m above the finished surface level of the existing development. Figure 9.1 below indicates the extent of floodwaters in the Probable Maximum Flood. The flood extent maps for the development are included in Appendix K.

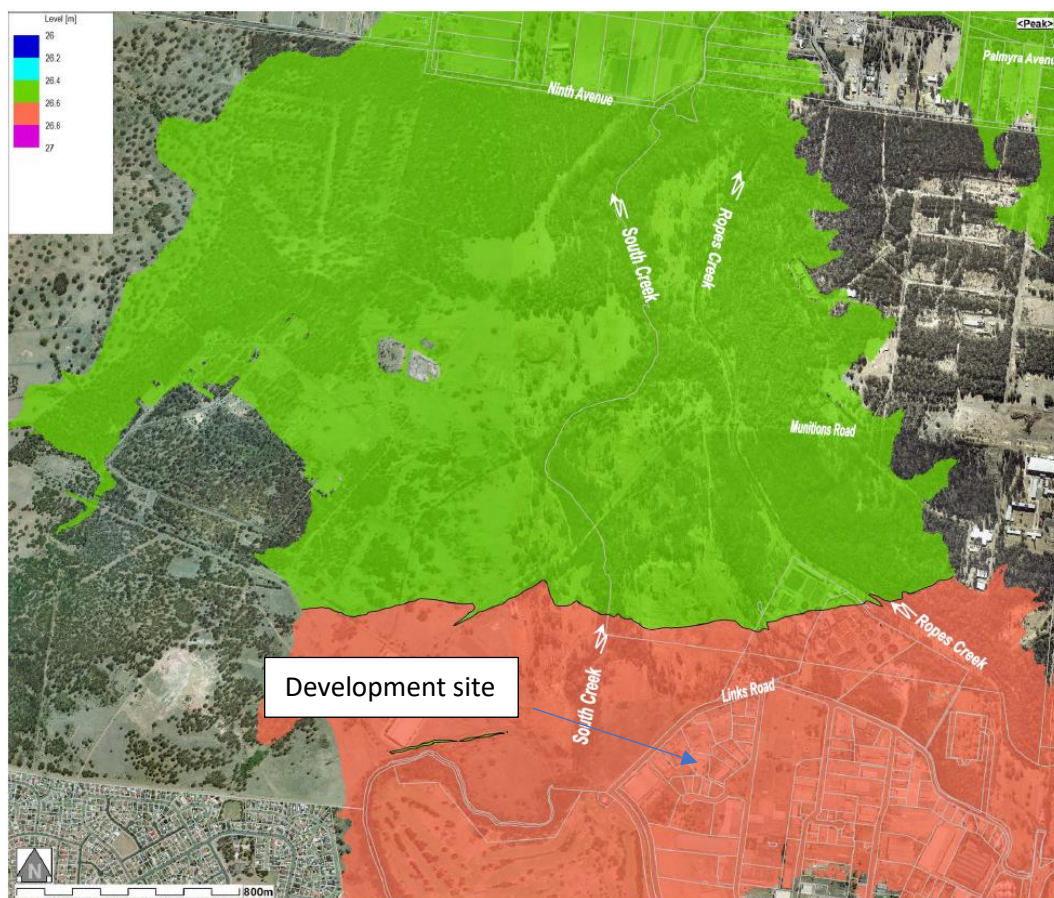


Figure 9.1: Extent of Flood Waters in the Probable Maximum Flood (Worley Parsons)

9.2. Overland Flooding

Cardno conducted an overland flow study in 2006 addressing the area surrounding the development site. An extract of the overland flow study shown in Figure 9.2 below shows that the development site is unaffected by overland flooding in the 20-year and 100-year flooding events but is affected during the PMF event.

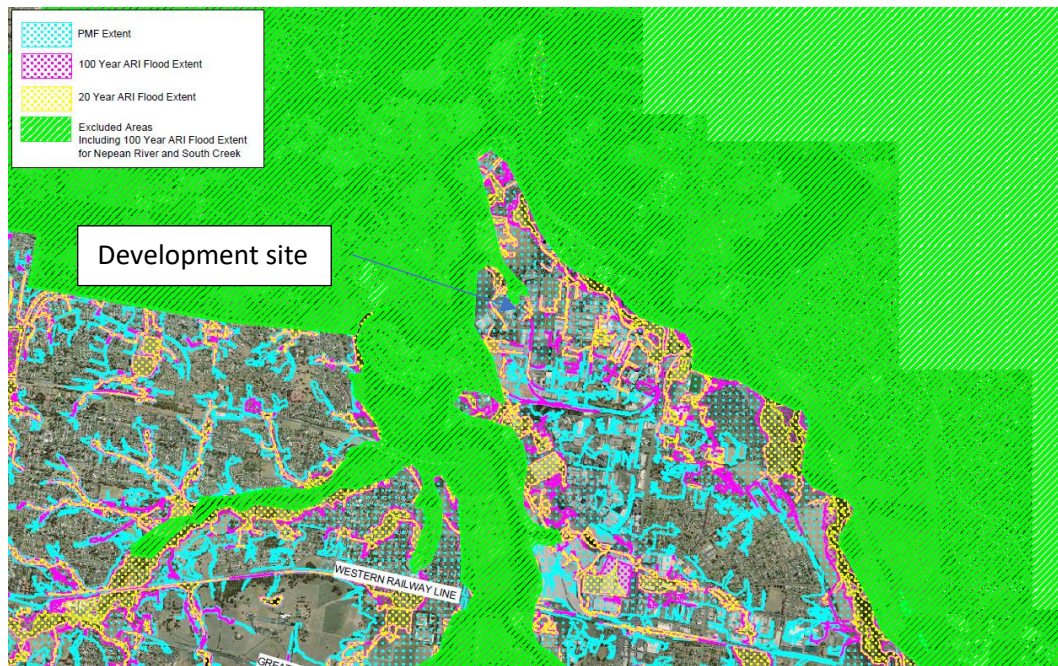


Figure 9.2: Extent of Flood Waters in Overland Flood Events (Cardno)

The development site is located outside the main stream and overland flooding extents for the 100-year ARI events. As such, a quantitative flood impact assessment is not required.

Appendix A: Stormwater Drainage Plans

RESOURCE RECOVERY FACILITY

25 Dunheved Circuit, St. Marys

STORMWATER / CIVIL WORKS

GENERAL NOTES

- G1. THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL DRAWINGS AND SPECIFICATIONS AND OTHER WRITTEN INSTRUCTIONS THAT MAY BE ISSUED.
- G2. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING FROM THE DRAWINGS. REFER ARCHITECTS DRAWINGS FOR ALL DIMENSIONS.
- G3. REFER ANY DISCREPANCY TO THE ENGINEER/ARCHITECT.
- G4. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE APPROPRIATE SAA SPECIFICATIONS OR CODE AND WITH THE REQUIREMENTS OF THE RELEVANT LOCAL AUTHORITY.
- G5. THE ALIGNMENT AND LEVEL OF ALL SERVICES SHOWN ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL CONFIRM THE POSITION AND LEVEL OF ALL SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DAMAGE TO SERVICES SHALL BE RECTIFIED AT THE CONTRACTORS EXPENSE.
- G6. NO WORKS ARE TO COMMENCE UNTIL THE REQUIRED TREE REMOVAL PERMITS HAVE BEEN GRANTED BY RELEVANT LOCAL AUTHORITY, AND THE APPROPRIATE NOTICE OF INTENTION TO COMMENCE GIVEN.
- G7. ALL SERVICES, OR CONDUITS FOR SERVICING SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF PAVEMENT CONSTRUCTION.
- G8. SUBSOIL DRAINAGE, COMPRISING 100 AGRICULTURE PIPE IN GEO-STOCKING TO BE PLACED AS SHOWN AND AS MAY BE DIRECTED BY THE SUPERINTENDENT. SUBSOIL DRAINAGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT LOCAL AUTHORITY CONSTRUCTION SPECIFICATION.
- G9. NO WORK IS PERMITTED WITHIN ADJOINING PROPERTIES WITHOUT WRITTEN PERMISSION FROM THE OWNERS OR RESPONSIBLE AUTHORITY.

DRAINAGE NOTES

- D1. ALL DRAINAGE OUTLET LEVELS SHALL BE CONFIRMED ON SITE, PRIOR TO CONSTRUCTION COMMENCING.
- D2. ALL PIPES WITHIN THE PROPERTY TO BE MIN. 100 DIA UPVC @ 1% MIN. GRADE. UNO.
- D3. ALL PITS WITHIN THE PROPERTY ARE TO BE FITTED WITH "WELDOLOK" OR APPROVED EQUIVALENT GRATES:
- LIGHT DUTY FOR LANDSCAPED AREAS
 - HEAVY DUTY WHERE SUBJECTED TO VEHICULAR TRAFFIC
- D4. PITS WITHIN THE PROPERTY MAY BE CONSTRUCTED AS:
- 1) PRECAST STORMWATER PITS
 - 2) CAST INSITU MASS CONCRETE
 - 3) CEMENT RENDERED 230mm BRICKWORK
- SUBJECT TO THE RELEVANT LOCAL AUTHORITY CONSTRUCTION SPECIFICATION.
- D5. ENSURE ALL GRATES TO PITS ARE SET BELOW FINISHED SURFACE LEVEL WITHIN THE PROPERTY. TOP OF PIT RLS ARE APPROXIMATE ONLY AND MAY BE VARIED SUBJECT TO APPROVAL OF THE ENGINEER. ALL INVERT LEVELS ARE TO BE ACHIEVED.
- D6. ANY PIPES BENEATH RELEVANT LOCAL AUTHORITY ROAD TO BE RUBBER RING JOINTED RCP. UNO.
- D7. ALL PITS IN ROADWAYS ARE TO BE FITTED WITH HEAVY DUTY GRATES WITH LOCKING BOLTS AND CONTINUOUS HINGE.
- D8. PROVIDE STEP IRONS TO STORMWATER PITS GREATER THAN 1200 IN DEPTH.
- D9. TRENCH BACK FILL IN ROADWAYS SHALL COMPRISE SHARP, CLEAN GRANULAR BACK FILL IN ACCORDANCE WITH THE RELEVANT LOCAL AUTHORITY SPECIFICATION TO NON-TRAFFICABLE AREAS TO BE COMPACTED BY RODDING AND TAMPING USING A FLAT PLATE VIBRATOR.
- D10. WHERE A HIGH EARLY DISCHARGE (HED) PIT IS PROVIDED ALL PIPES ARE TO BE CONNECTED TO THE HED PIT. UNO.
- D11. DOWN PIPES SHALL BE A MINIMUM OF DN100 SW GRADE UPVC OR 100X100 COLORBOND/ZINCALUME STEEL. UNO.
- D12. COLORBOND OR ZINCALUME STEEL BOX GUTTERS SHALL BE A MINIMUM OF 450 WIDE X 150 DEEP.
- D13. EAVES GUTTERS SHALL BE A MINIMUM OF 125 WIDE X 100 DEEP (OR OF EQUIVALENT AREA) COLORBOND OR ZINCALUME STEEL. UNO.
- D14. SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS & EMBANKMENTS, WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM. UNO.

EARTHWORKS NOTES

- E1. THE EARTHWORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT GEOTECHNICAL REPORT.
- E2. THE SITE OF THE WORKS SHALL BE PREPARED BY STRIPPING ALL EXISTING TOPSOIL, FILL AND VEGETATION.
- E3. SUBGRADE SHALL BE COMPACTED UNTIL A DRY DENSITY HAS BEEN ACHIEVED OF NOT LESS THAN 100% OF THE STANDARD MAXIMUM DRY DENSITY WHEN TESTED IN ACCORDANCE WITH AS 1289 TESTS E.1.1. OR E.1.2.
- E4. THE EXPOSED SUBGRADE SHOULD BE PROOF ROLLED TO DETECT ANY SOFT OR WET AREAS WHICH SHOULD BE LOCALLY EXCAVATED AND BACK FILLED WITH SELECTED MATERIAL.
- E5. THE BACK FILLING MATERIAL SHALL BE IMPORTED GRANULAR FILL OF LOW PLASTICITY, PREFERABLY CRUSHED SANDSTONE, AND TO BE PLACED IN LAYERS NOT EXCEEDING 150 LOOSE THICKNESS AND COMPACTED TO 98% OF STANDARD DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.
- E6. SITE WORKS ARE TO BE BATTERED TO ADJACENT PROPERTY LEVELS.
- E7. STORMWATER MUST NOT BE CONCENTRATED ON TO AN ADJACENT PROPERTY.
- E8. AT NO TIME DURING OR AFTER CONSTRUCTION IS STORMWATER TO BE PONDED ON ADJOINING PROPERTIES.
- E9. THE SITE SHALL BE GRADED AND DRAINED SO THAT STORMWATER WILL BE DIRECTED AWAY FROM THE BUILDING PLATFORM.
- E10. STORMWATER DRAINAGE SHALL BE PROVIDED AND MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION. ALL STORMWATER RUNOFF SHALL BE GRADED AWAY FROM THE SITE WORKS AND DISPOSED OF VIA SURFACE CATCHDRAINS AND STORMWATER COLLECTION PITS.
- E11. ALL SURFACE CATCH DRAINS SHALL BE GRADED AT 1% (1 IN 100) MINIMUM. THE GROUND SHALL GRADE AWAY FROM ANY DWELLING AT 5% (1 IN 20) FOR THE FIRST METRE THEN AT 2.5% (1 IN 40).
- E12. WHERE A CUT FILL PLATFORM IS USED THERE SHALL BE A MINIMUM BERM 1000 WIDE TO THE PERIMETER OF THE SITE WORKS WHICH SHALL BE SUPPORTED BY BATTERS OF 3:1 IN FILL.
- E13. ANY VERTICAL OR NEAR VERTICAL PERMANENT EXCAVATION (CUT) DEEPER THAN 600 IN MATERIAL OTHER THAN ROCK SHALL BE ADEQUATELY RETAINED OR BATTERED AT A MINIMUM OF 3:1.
- E14. WHERE BATTERS CANNOT BE PROVIDED TO SUPPORT THE CUT OR FILL, THEY SHALL BE ADEQUATELY RETAINED.
- E15. RETAINING WALLS ARE TO BE CONSTRUCTED WITH ADEQUATE SUBSOIL DRAINAGE.

STANDARD LINE TYPES AND SYMBOLS:

	PROPOSED KERB & GUTTER
	EXISTING KERB & GUTTER
	PROPOSED BELOW GROUND PIPELINE
	PROPOSED SUSPENDED PIPELINE
	EXISTING PIPELINE
	SUBSOIL DRAINAGE LINE
	PROPOSED KERB INLET PIT
	EXISTING KERB INLET PIT
	PROPOSED JUNCTION OR INLET PIT
	EXISTING JUNCTION OR INLET PIT
	DESIGN CENTRELINE
	EXISTING EDGE OF BITUMEN
	TELECOMMUNICATION CONDUIT
	GAS MAIN
	WATER MAIN
	SEWER MAIN
	UNDERGROUND ELECTRICITY CABLES
	PERMANENT MARK & S.S.M.
	BENCHMARK, SURVEY STATION

LOCATION PLAN



SCHEDULE OF DRAWINGS

SHEET No	DESCRIPTION
C01	GENERAL NOTES
C02	EXISTING STORMWATER CATCHMENT AREA PLAN
C03	EXISTING STORMWATER DRAINAGE PLAN
C04	REMEDIAL STORMWATER DRAINAGE PLAN

FOR APPROVAL

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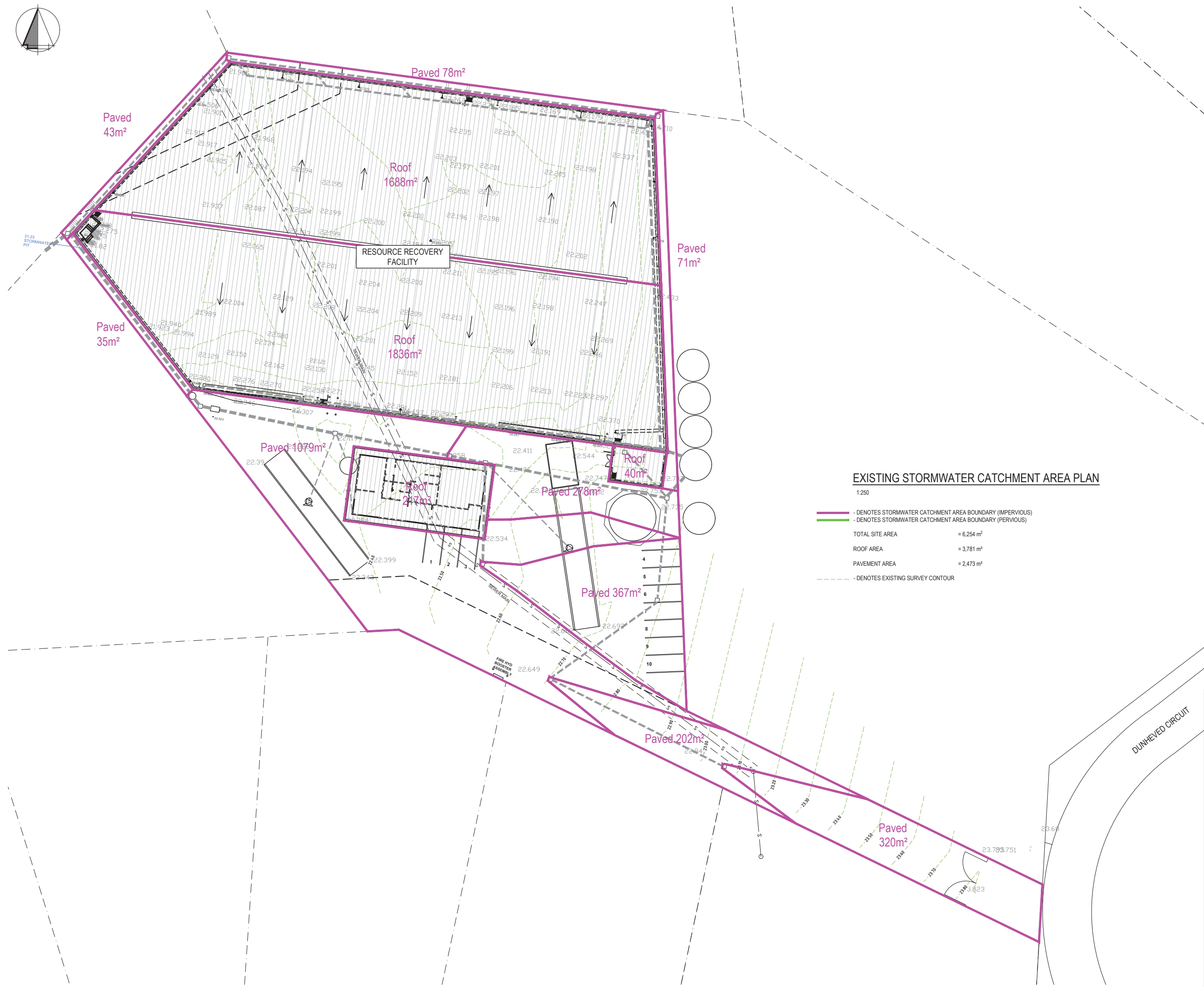
RESOURCE RECOVERY FACILITY

25 Dunheved Circuit, St. Marys
For BORG Construction

GENERAL NOTES

DESIGN SWH	DRAWN RCL	DATE FEB 2021	PROJECT No 10113
CHECKED	APPROVED	SCALE	DRG No C01 - A

A1 ORIGINAL SIZE



EXISTING STORMWATER CATCHMENT AREA PLAN

1:250

- DENOTES STORMWATER CATCHMENT AREA BOUNDARY (IMPERVIOUS)
- DENOTES STORMWATER CATCHMENT AREA BOUNDARY (PERVIOUS)
- TOTAL SITE AREA = 6,254 m²
- ROOF AREA = 3,781 m²
- PAVEMENT AREA = 2,473 m²
- DENOTES EXISTING SURVEY CONTOUR

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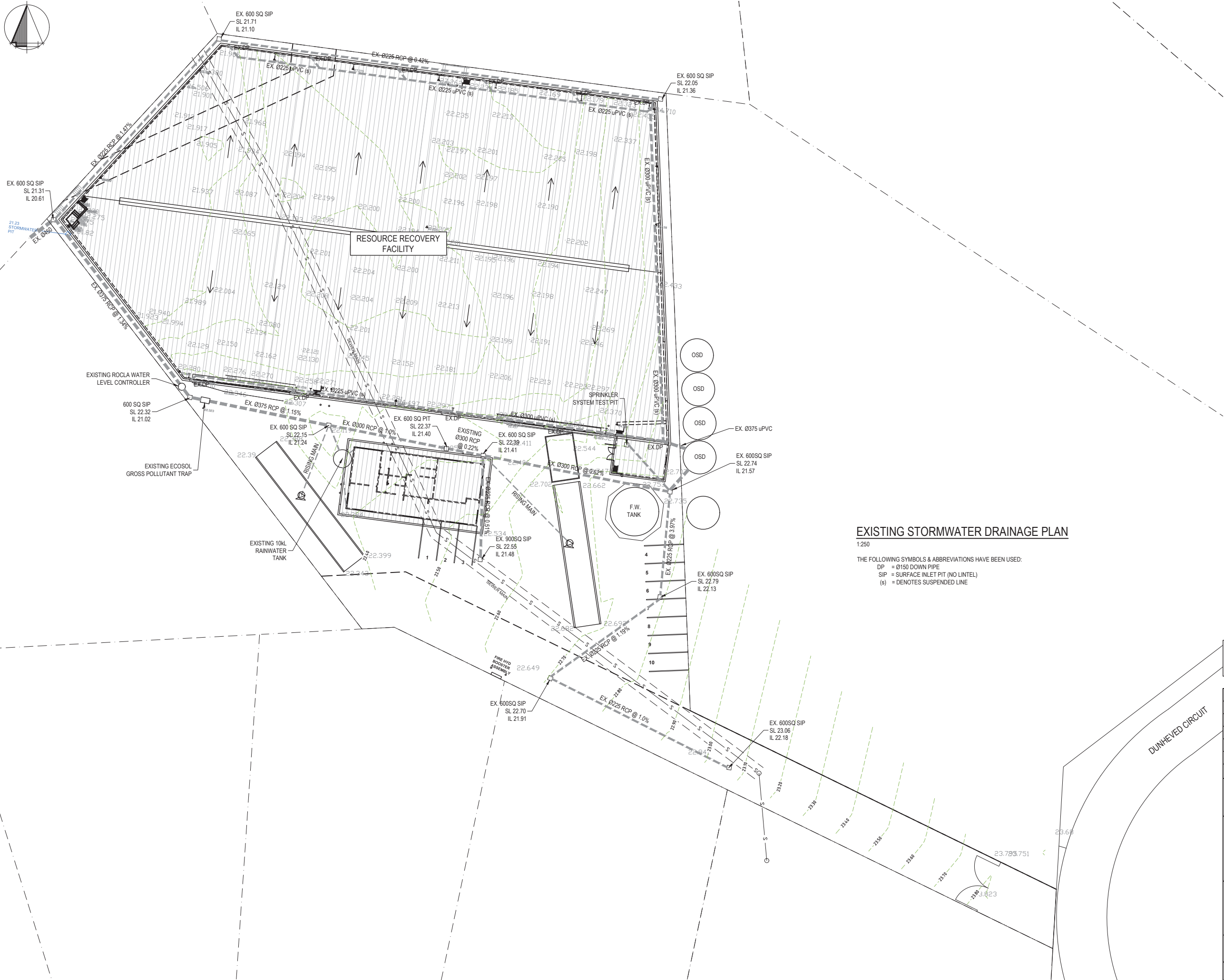
RESOURCE RECOVERY FACILITY

25 Dunheved Circuit, St. Marys
For BORG Construction

EXISTING STORMWATER CATCHMENT AREA PLAN

DESIGN	DRAWN	DATE	PROJECT No.
SWH	RCL	FEB 2021	10113
CHECKED	APPROVED	SCALE	DRG No.
		1:250	C02 - A

A1 ORIGINAL SIZE



EXISTING STORMWATER DRAINAGE PLAN

1:250

THE FOLLOWING SYMBOLS & ABBREVIATIONS HAVE BEEN USED:
DP = Ø150 DOWN PIPE
SIP = SURFACE INLET PIT (NO LINTEL)
(s) = DENOTES SUSPENDED LINE

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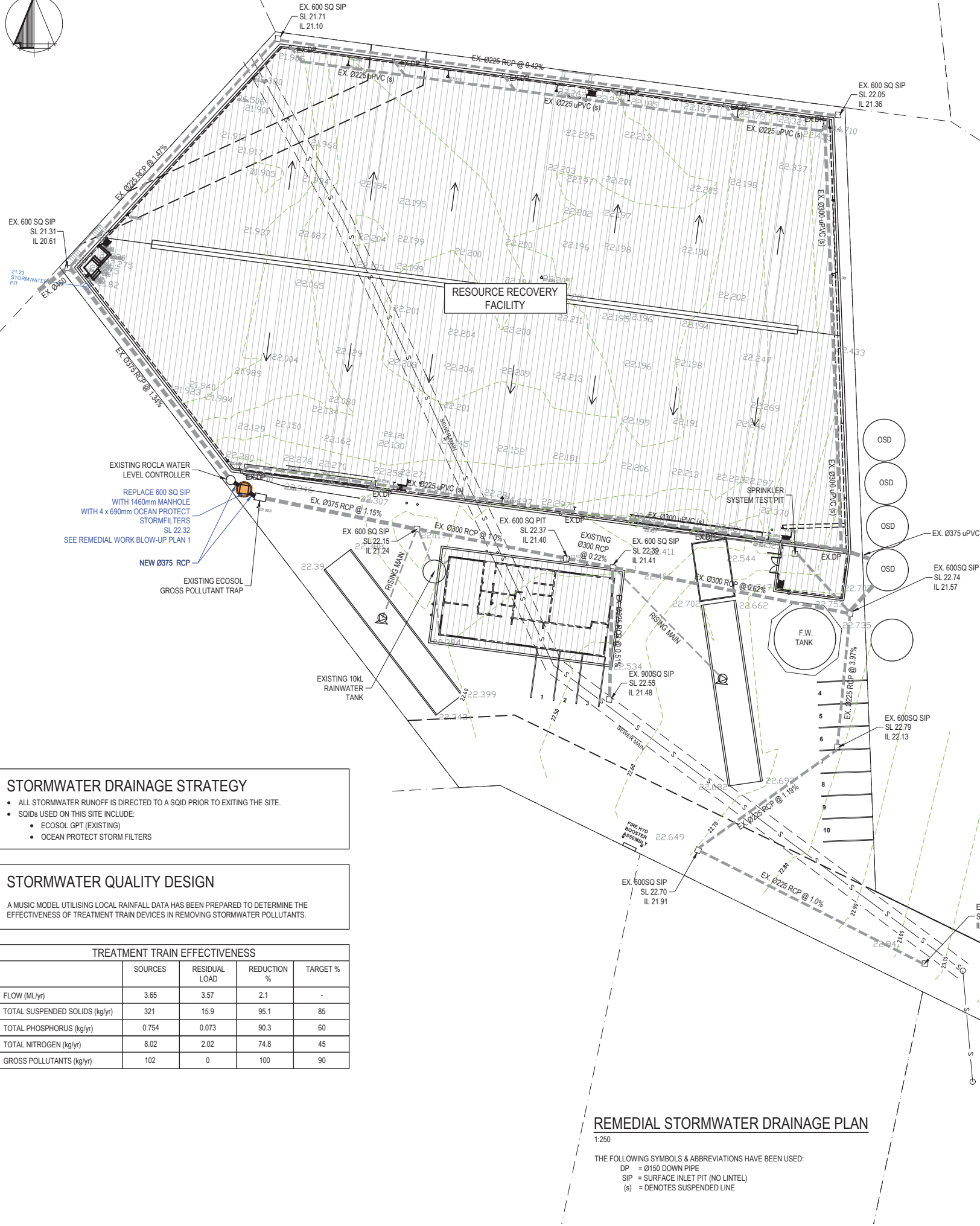
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RESOURCE RECOVERY FACILITY
25 Dunheved Circuit, St. Marys
For BORG Construction

EXISTING STORMWATER DRAINAGE PLAN

DESIGN SWH	DRAWN RCL	DATE FEB 2021	PROJECT No. 10113
CHECKED	APPROVED	SCALE 1:250	DRG No. C03 - A

A1 ORIGINAL SIZE



STORMWATER DRAINAGE STRATEGY

- ALL STORMWATER RUNOFF IS DIRECTED TO A SILD PRIOR TO EXITING THE SITE.
- SILDS USED ON THIS SITE INCLUDE:
 - ECOSOL GPT (EXISTING)
 - OCEAN PROTECT STORM FILTERS

STORMWATER QUALITY DESIGN

A MUSIC MODEL UTILISING LOCAL RAINFALL DATA HAS BEEN PREPARED TO DETERMINE THE EFFECTIVENESS OF TREATMENT TRAIN DEVICES IN REMOVING STORMWATER POLLUTANTS.

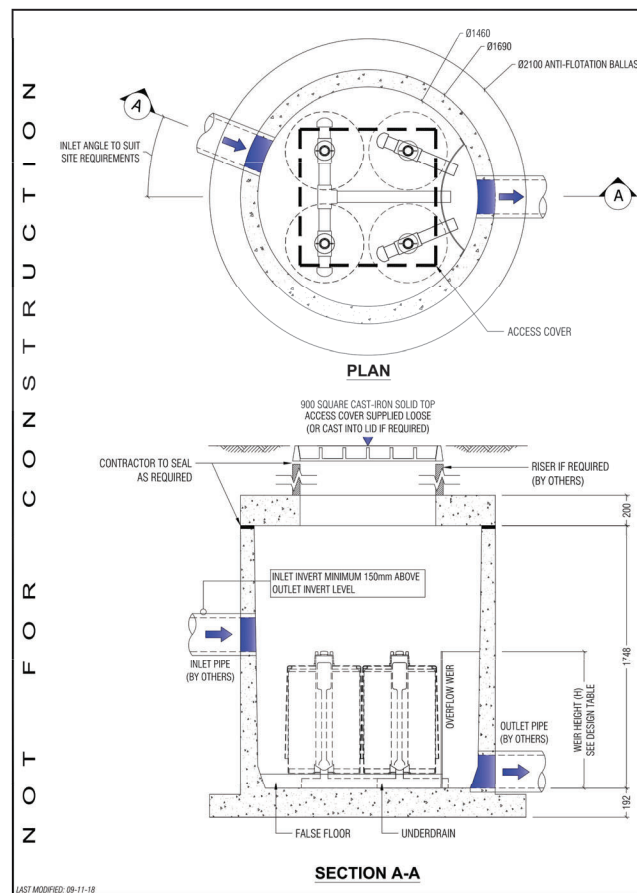
TREATMENT TRAIN EFFECTIVENESS

	SOURCES	RESIDUAL LOAD	REDUCTION %	TARGET %
FLOW (ML/yr)	3.65	3.57	2.1	-
TOTAL SUSPENDED SOLIDS (kg/yr)	321	15.9	95.1	85
TOTAL PHOSPHORUS (kg/yr)	0.754	0.073	90.3	60
TOTAL NITROGEN (kg/yr)	8.02	2.02	74.8	45
GROSS POLLUTANTS (kg/yr)	102	0	100	90

REMEDIAL STORMWATER DRAINAGE PLAN

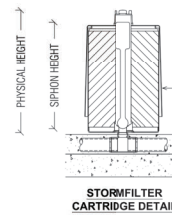
1:250

THE FOLLOWING SYMBOLS & ABBREVIATIONS HAVE BEEN USED:
DP = Ø150 DOWN PIPE
SIP = SURFACE INLET PIT (NO LINTEL)
(s) = DENOTES SUSPENDED LINE



STORMFILTER DESIGN TABLE

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT H ₁ (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39



SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID		()
NUMBER OF CARTRIDGES REQ'D			4	
SIPHON HEIGHT (310 / 460 / 690)		()
MEDIA TYPE (ZPG / PSORB)		()
WATER QUALITY FLOW RATE (L/S)		()
HYDRAULIC CAPACITY (L/S)			90	
PIPE DATA:				
INLET PIPE #1	(LL	MATERIAL	DIAMETER
INLET PIPE #2	(
INLET PIPE #3	(
OUTLET PIPE	(
PRECAST MANHOLE WEIGHT			4100kg	
PRECAST LID WEIGHT			1100kg	

GENERAL NOTES

- PRECAST STRUCTURE SUPPLIED WITH CORE HOLES TO SUIT OUTLET DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
- PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
- IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CERTIFYING ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
- ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
- SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
- DRAWING NOT TO SCALE.

INSTALLATION NOTES

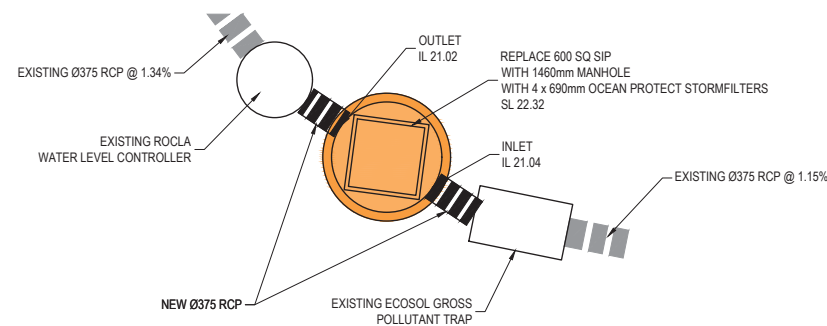
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.
- CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
- CONTRACTOR TO APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.



OCEAN PROTECT
4 CARTRIDGE STORMFILTER SYSTEM
DN1460 MANHOLE
SPECIFICATION DRAWING

PHONE: 1300 354 722

www.oceanprotect.com.au



REMEDIAL WORK BLOW-UP PLAN 1

1:20

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REMEDIAL STORMWATER DRAINAGE PLAN

DESIGN	DRAWN	DATE	PROJECT No.
SWH	RCL	FEB 2021	10113
CHECKED	APPROVED	SCALE	DRG No.
		1:250	C04 - A

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Appendix B: Planning Secretary's Environmental Assessment Requirements

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD-10474
Project Name	St Marys Resource Recovery Facility (Borg)
Development	The increase in throughput for an existing resource recovery facility to process up to 150,000 tonnes per annum (tpa) of general solid waste (non-putrescible) consisting of 110,000 tpa of wood waste, 30,000 tpa of plasterboard and 10,000 tpa of metal waste with a maximum storage capacity of up to 5,000 tonnes at any given time.
Location	25 Dunheved Circuit, St Marys; Lot 143 DP 1013185 within Penrith Local Government Area
Applicant	Borg Manufacturing Pty Limited
Date of Issue	DATEWILLBEINSERTEDHERE
General Requirements	<p>The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation). In addition, the EIS must include:</p> <ul style="list-style-type: none"> • a detailed description of the development, including: <ul style="list-style-type: none"> – an accurate history of the site, including development consents – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works – contributions required to offset the proposal and – infrastructure upgrades or items required to facilitate the development, including measures to ensure these upgrades are appropriately maintained. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • consideration of issues discussed in Attachment 2 (public authority responses to key issues) • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: <ul style="list-style-type: none"> – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes and – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.

	<p>The EIS must also be accompanied by:</p> <ul style="list-style-type: none"> • high quality files of maps and figures of the subject site and proposal • a report from a qualified quantity surveyor providing: <ul style="list-style-type: none"> – a detailed calculation of the capital investment value (CIV) of the proposal (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived. The report shall be prepared on company letterhead and indicate the applicable GST component of the CIV – an estimate of the jobs that will be created by the development during the construction and operational phases of the proposed development and – certification that the information provided is accurate at the date of preparation.
<p>Key issues</p>	<p>The EIS must include an assessment of the potential impacts of the proposal (including cumulative impacts) and develop appropriate measures to avoid, mitigate, manage and/or offset these impacts. The EIS must address the following specific matters:</p> <ul style="list-style-type: none"> • Statutory and strategic context – including: <ul style="list-style-type: none"> – detailed justification for the proposal and the suitability of the site – detailed justification that the proposed land use is permissible with consent – a detailed description of the history of the site, including the relationship between the proposed development and all development consents and approved plans previously and/or currently applicable to the site – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. This includes, but is not limited to: <ul style="list-style-type: none"> ○ State Environmental Planning Policy (Infrastructure) 2007 ○ State Environmental Planning Policy (State and Regional Development) 2011 ○ State Environmental Planning Policy No 55 – Remediation of Land ○ Sydney Regional Environmental Plan No 20—Hawkesbury-Nepean River (No 2—1997) ○ Penrith Local Environmental Plan 2010 ○ Greater Sydney Region Plan: A Metropolis of Three Cities ○ Our Greater Sydney 2056: Central City District Plan ○ Future Transport Strategy 2056. • Suitability of the Site – including: <ul style="list-style-type: none"> – a detailed justification that the site can accommodate the proposed resource recovery facility, having regard to the scope of the operations of the existing facility and its environmental impacts and relevant mitigation measures. • Community and Stakeholder Engagement – including: <ul style="list-style-type: none"> – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of the consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal and – details of the proposed approach to future community and stakeholder engagement based on the results of the consultation.

	<ul style="list-style-type: none"> • Waste Management – including: <ul style="list-style-type: none"> – a description of each of the waste streams that would be accepted at the site including maximum daily, weekly and annual throughputs and the maximum size for stockpiles – details of the source of the waste streams to justify the need for the proposed processing capacity – a description of waste processing operations (including flow diagrams for each waste stream), including a description of the technology to be installed, resource outputs and the quality control measures that would be implemented – details of how waste would be stored (including the maximum daily storage capacity of the site) and handled on site, and transported to and from the site including details of how the receipt of non-conforming waste would be dealt with – detail the developments waste tracking system for incoming and outgoing waste – detail the quality of waste produced and final dispatch locations – details of the waste management strategy for construction and ongoing operational waste generated – the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021 and – details of consistency with the EPA's Standards for Managing Construction Waste in NSW. • Air Quality and Odour – including: <ul style="list-style-type: none"> – a quantitative assessment of the potential air quality, dust and odour impacts of the development in accordance with relevant Environment Protection Authority guidelines – the details of buildings and air handling systems and strong justification for any material handling, processing or stockpiling external to buildings and – details of proposed mitigation, management and monitoring measures. • Soils and Water – including: <ul style="list-style-type: none"> – an assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby – a detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements – details of stormwater/wastewater management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water – description of the measures to minimise water use – detailed flooding assessment – description of the proposed erosion and sediment controls during construction – characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from the waste into the wastewater and proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies) and – characterisation of the nature and extent of any contamination on the site and surrounding area. • Noise and Vibration – including: <ul style="list-style-type: none"> – a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers – cumulative impacts of other developments and
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	<ul style="list-style-type: none"> – details and justification of the proposed noise mitigation, management and monitoring measures. • Traffic and Transport – including: <ul style="list-style-type: none"> – details of all traffic types and volumes likely to be generated during construction and operation, including a description of key access / haul routes. Traffic flows are to be shown diagrammatically to a level of sufficient detail for easy interpretation – an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model – plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network – details and plans of any proposed internal road network, loading dock servicing and provisions, on-site parking provisions, and sufficient pedestrian and cyclist facilities, in accordance with the relevant Australian Standards – swept path diagrams depicting the largest vehicles entering, exiting and manoeuvring throughout the site and – details of road upgrades, infrastructure works or new roads or access points required for the development if necessary. • Fire and Incident Management – including: <ul style="list-style-type: none"> – identification of the aggregate quantities of combustible waste products to be stockpiled at any one time – technical information on the environmental protection equipment to be installed on the premises such as air, water and noise controls, spill clean-up equipment and fire (including location of fire hydrants and water flow rates at the hydrant) management and containment measures – details regarding the fire hydrant system and its minimum water supply capabilities appropriate to the site's largest stockpile fire load – details of size and volume of stockpiles and their management and separation to minimise fire spread and facilitate emergency vehicle access – demonstration of consistency with the NSW Fire & Rescue Fire Safety Guideline – Fire Safety in Waste Facilities (February 2020) and – detailed information relating to the proposed structures addressing relevant levels of compliance with Volume One of the National Construction Code (NCC). • Ecologically sustainable development – including a description of how the development will incorporate the principles of ecologically sustainable development in the design, construction and ongoing operation of the development. • Hazards and Risk – including a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is “potentially hazardous” a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • Visual – including an assessment of the potential visual impacts of the development on the amenity of the surrounding area. • Greenhouse gas and energy efficiency –including an assessment of the energy use of the proposal and all reasonable and feasible measures that would be implemented on site to minimise the proposal's greenhouse gas emissions. • Cultural Heritage and Aboriginal Cultural Heritage – including an assessment of Aboriginal cultural heritage values that satisfies the due diligence requirement of the <i>National Parks and Wildlife Act 1974</i>.
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	<ul style="list-style-type: none"> • Planning agreement/development contributions – including consideration of any applicable Section 7.11 Contribution Plan and/or details of any Voluntary Planning Agreement.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. These documents should be included as part of the EIS rather than as separate documents.
Consultation	<p>During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and potentially affected landowners. In particular you must consult with:</p> <ul style="list-style-type: none"> • Penrith City Council • Department of Planning, Industry and Environment, specifically the: <ul style="list-style-type: none"> ◦ Environment, Energy and Science Group (including the Climate Change and Sustainability Division) ◦ Water Group • Environment Protection Authority • Fire and Rescue NSW • Transport for NSW (including the former Roads and Maritime Services) • Sydney Water <p>The EIS must describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p>
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Planning Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.shop.nsw.gov.au/index.jsp>

<http://www.australia.gov.au/publications>

<http://www.epa.nsw.gov.au/>

<http://www.environment.nsw.gov.au/>

<http://www.dpi.nsw.gov.au/>

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
 - the location of the land, boundary measurements, area (sqm) and north point
 - the existing levels of the land in relation to buildings and roads
 - location and height of existing structures on the site
 - location and height of adjacent buildings and private open space
 - all levels to be to Australian Height Datum (AHD).
2. Locality/context plan drawn at an appropriate scale should be submitted indicating:
 - significant local features such as heritage items
 - the location and uses of existing buildings, shopping and employment areas
 - traffic and road patterns, pedestrian routes and public transport nodes.
3. Drawings at an appropriate scale illustrating:
 - detailed plans, sections and elevations of the existing building, which clearly show all proposed buildings
 - detailed plans of proposed access driveways, internal roads, carparking and external alterations services infrastructure.
4. Schedule of materials, colours and additions. finishes.

Documents to be Submitted

Documents to submit include:

- electronic copy of all the documents and plans for review prior to exhibition
- other copies as determined by the Department once the development application is lodged.

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Infrastructure) 2007
	Guide to Traffic Generating Development (RTA, 2002 as updated)
	Road Design Guide (RMS, 2015-2017)
	Guide to Traffic Management – Pt 12: Traffic Impacts of Development (Austroads, 2016)
	Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas (Austroads, 2014)
	Bicycle Parking Facilities: Guidelines for Design and Installation (AS 2890.3:2015)
	Integrated Public Transport Service Planning Guidelines: Sydney Metropolitan Area (TfNSW, 2013)
	Future Transport Strategy 2056 (TfNSW, 2018)
	Greater Sydney Services and Infrastructure Plan (TfNSW, 2018)
	NSW Freight & Ports Plan 2018-2023 (TfNSW, 2018)
Soils and Water	
<i>Erosion and Sediment</i>	Managing Urban Stormwater: Soils & Construction (Landcom, 2004)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000)
	Wind Erosion – 2nd Edition (DIPNR, 2003)
<i>Groundwater</i>	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 2000)
	NSW State Groundwater Policy Framework Document (DLWC, 1997)
	NSW Aquifer Interference Policy (NOW, 2012)
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW, 2011)
	Storing and Handling Liquids: Environmental Protection (DECC, 2007)
<i>Stormwater</i>	Managing Urban Stormwater: Strategic Framework. Draft (EPA, 1996)
	Managing Urban Stormwater: Council Handbook. Draft (EPA, 1997)
	Managing Urban Stormwater: Treatment Techniques (DEC, 2006)
	Managing Urban Stormwater: Source Control. Draft (EPA, 1998)
	Managing Urban Stormwater: Harvesting and Reuse (DEC, 2006)
<i>Wastewater</i>	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC, 1997)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC, 2000)
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (EPHC, NRMCC & AHMC, 2006)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) (EPHC, NRMCC & AHMC, 2009)
<i>Contamination</i>	State Environmental Planning Policy No. 55 – Remediation of Land
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DoP, 2011)
Heritage	
	Heritage Act 1977
	NSW Heritage Manual (HO and DUAP, 1996)
	The Burra Charter (ICOMOS Australia, 2013)
	Statements of Heritage Impact (HO and DUAP, 2002)
	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)
	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010)
Noise and Vibration	
	Assessing Vibration: A Technical Guide (DEC, 2006)
	Noise Policy for Industry (EPA, 2017)
	Environmental Criteria for Road Traffic Noise (EPA, 1999)
	Noise Guide for Local Government (EPA, 2013)
	Interim Construction Noise Guideline (DECC, 2009)
Air Quality	
	Protection of the Environment Operations (Clean Air) Regulation 2002
<i>Air Quality</i>	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016)
<i>Odour</i>	Assessment and Management of Odour from Stationary Sources in NSW (DEC 2006)
<i>Greenhouse Gas</i>	AGO Factors and Methods Workbook (AGO, 2018)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Bushfire	
	Planning for Bushfire Protection (RFS, 2006)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Waste	<p>Waste Avoidance and Resource Recovery Strategy 2014-2021 (EPA)</p> <p>The National Waste Policy: Less Waste More Resources 2009</p> <p>Waste Classification Guidelines (EPA 2008)</p> <p>Environmental guidelines: Composting and Related Organics Processing Facilities (DEC 2004)</p> <p>Environmental guidelines: Use and Disposal of Biosolid Products (EPA 1997)</p> <p>Composts, soil conditioners and mulches (Standards Australia, AS 4454)</p> <p>NSW Energy from Waste Policy Statement (EPA 2015)</p> <p>Standards for Managing Construction Waste in NSW (EPA 2018)</p>
Visual	<p>Control of Obtrusive Effects of Outdoor Lighting (AS 2482)</p>
Social	<p>Social Impact Assessment Guideline (DPE, 2017)</p>

ECLIPSE

Appendix C: NSW Environment Protection Authority Input on Planning Secretary's Environmental Assessment Requirements



DOC20/512671-1

Ms Susan Fox
Industry Assessments
Department of Planning, Industry and Environment
PARRAMATTA NSW 2124

Via Major Projects Portal

Dear Ms Fox,

**Request for input to the Secretary's Environmental Assessment Requirements (SEARs)
St Marys Resource Recovery Facility (Borg) (SSD-10474) (Penrith)**

I refer to the request for the NSW Environment Protection Authority's (EPA) input to the Secretary's Environmental Assessment Requirements (SEARs) for a Resource Recovery Facility at 25 Dunheved Circuit St Marys (SSD-10474).

The EPA understands the applicant seeks consent for development comprising:

- Resource Recovery Facility with throughput of 150,000 tonnes per annum, consisting of 110,000 tonnes wood/timber waste and 30,000 tonnes of plasterboard.

Based on the information provided, the proposal may require an environment protection licence (EPL) under the *Protection of the Environment (Operations) Act 1997* (POEO Act). The EPA recommends the proponent reviews the relevant thresholds under the POEO Act and considers whether the activities meet the requirements for an EPL, including, but not limited to:

- Clause 34 of Schedule 1 of the POEO Act - *recovery of general waste*, meaning the receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing, otherwise than for the recovery of energy.
- Clause 41 of Schedule 1 of the POEO Act - *non-thermal treatment of general waste*, meaning the receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing otherwise than by thermal treatment.
- Clause 42(1) of Schedule 1 of the POEO Act - *waste storage*, meaning the receiving from off site and storing (including storage for transfer) of waste.

The EPA has provided recommendations for SEARs that should be considered in relation to the proposal. Please see **Attachment A** for details.

If you have any questions in relation to this letter, please contact Mr Jarrod Grimston on 9895 6602 or via email at Jarrod.Grimston@epa.nsw.gov.au

Phone 131 555
Phone 02 9995 5555
(from outside NSW)

TTY 133 677, then
ask for 131 155

Locked Bag 5022
PARRAMATTA
NSW 2124

4 Parramatta Square
12 Darcy Street
PARRAMATTA NSW
2150

info@epa.nsw.gov.au
www.epa.nsw.gov.au
ABN 43 692 285 758

Yours sincerely

A handwritten signature in dark ink, appearing to read 'L Borysko', with a stylized, cursive script.

8 July 2020

Larissa Borysko
A/Unit Head, Regulatory Operations Metropolitan West
Environment Protection Authority

Attachment A – EPA Recommendations for SEARs for Resource Recovery Facility at 25 Dunheved Circuit St Marys

ATTACHMENT A

EPA recommendations for SEARS for Resource Recovery Facility at 25 Dunheved Circuit St Marys

Environment Protection Licence

Based on the information provided, the proposal may require an environment protection licence (EPL) under the *Protection of the Environment (Operations) Act 1997* (POEO Act). The EPA recommends the proponent reviews the relevant thresholds under the POEO Act and considers whether the activities meet the any of the requirements for an EPL. If the development is approved a licence application must be submitted to the EPA.

Appendix 1 of the EPA's *Guide to licensing under the Protection of the Environment Operations Act 1997* (EPA, 2016) provides a list of matters that must be considered when submitting a licence application to the EPA. An Environmental Impact Statement (EIS) should be prepared to include all the relevant matters listed in Appendix 1 of the Guide to licensing.

The Guide to licensing is available on the EPA's website at <https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/guide-to-licensing>

Noise

The EIS should include a Noise Impact Assessment (NIA) that takes into consideration the impacts of construction and operational noise for the life of the proposal. The NIA should be prepared in accordance with the following documents:

- *Noise Policy for Industry* (EPA, 2017);
- *Interim Construction Noise Guideline* (EPA, 2009); and
- *Assessing Vibration: a technical guideline* (EPA, 2006).

Water

In general, development should maintain or restore the community's uses and values of waterways, including human and environmental health, through the achievement of relevant NSW Water Quality Objectives (WQO). The Environmental Impact Statement (EIS) should provide the following for the construction and operational phases of the proposal:

- Provide an assessment of any potential impacts of the proposal on the surface and groundwater of the area, with particular focus on water quality and the community's agreed environmental values and human uses for relevant watercourses (the NSW WQO).
- Provide a Stormwater Management Plan that outlines the general stormwater management measures for the proposal, including erosion and sediment controls, first flush systems, and the use of sustainability measures such as Water Sensitive Urban Design to create more resilient and adaptable urban environments.
- Outline opportunities for the use of integrated water cycle management practices and principles to optimise opportunities for sustainable water supply, wastewater and stormwater management across the proposal.
- Provide details of any potential discharge of pollutants to water, including fugitive discharges such as fuel or oil leaks. The EIS should take into consideration the characteristics and hydrology of the receiving waters and provide details of how any potential water pollution caused by the proposal will be prevented or mitigated.

The EPA would expect that the building(s) be constructed to exclude all stormwater and that internal surfaces be graded inwards to contain any contaminated water (being any water that has come into contact with waste). The EPA notes that even where all waste storage and processing is conducted within an enclosed building, waste may be tracked on to external surfaces leading to the generation of contaminated water. Any external areas where waste vehicles travel or wait for loading/unloading must drain to a stormwater quality treatment device sufficient to remove any contaminants, both solid and dissolved, prior to discharge offsite.

Polluted Water

The EPA considers that polluted water means any water that has come into contact with waste.

Water which has come into contact with waste may become polluted with:

- gross pollutants;
- nutrients;
- organic matter;
- sediment;
- oil and grease; and/or
- dissolved contaminants / toxicants.

Polluted water may also refer to water that has come into contact with fuel or other chemicals. It is considered best practice to ensure that no polluted water is discharged from the Premises. However, discharge of polluted water should generally only be considered after other options have been shown to not be viable or to deliver less satisfactory environmental outcomes overall. The EPA only specifies pollutants on a licence where their discharge in all practical terms is unavoidable and measures to control the pollutants and their impacts can be feasibly implemented.

A licensee must demonstrate that it has considered all reasonable options for the prevention of pollution before the EPA will consider placing a discharge point on a licence.

Air Quality

The EIS for the proposal should include an Air Quality Impact Assessment (AQIA), prepared in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016*. The AQIA should include:

- Sources of all potential air emissions from the site, including vehicle movements, during construction and operation;
- Identification of sensitive receivers potentially impacted by air emissions during construction and operation;
- Assessment of potential impacts on identified sensitive receivers; and
- Details of air quality management and monitoring procedures proposed to minimise any impacts to the environment and human health during construction and operation.
- The AQIA should consider the proposals potential to produce odour and/or dust and the controls that will be put in place to reduce these impacts.

Wheel wash

Best practice waste management facilities contain a wheel wash to reduce risk of contaminants being tracked out onto public roads. The EPA notes that the Preliminary Environmental Assessment Report includes a plan that contains reference to a wheel wash for the site. The Proponent should set out in the EIS whether a wheel wash will be installed and if not, justification as to why a wheel wash will not be installed.

Waste Management

The EIS must include a detailed assessment of the waste management processes to be undertaken at the Premises. This includes but is not limited to:

- details of the sources of waste to be received at the Premises;
- details of the types and quantities of each type of waste to be received at the Premises;
- details of the maximum volume of waste to be stored on the Premises at any one time;
- details of the maximum annual throughput of waste to be processed at the Premises;
- a description of waste processing procedures for each waste type;
- a description of how the proponent will meet the EPA's record keeping and reporting requirements, including weighing material in and out of the Premises (refer to the EPA's Waste Levy Guidelines for more information – available at <http://www.epa.nsw.gov.au/your-environment/waste/waste-levy>);
- a detailed site plan(s) identifying areas for:
 - haulage;
 - waste receipt, processing, storage and loading (for each waste type)
 - quarantine;
 - infrastructure for environmental controls including dust, noise, water and wheel wash;
 - weighbridge;
 - site boundaries;
 - stormwater drainage areas; and
 - unused stabilised areas;
- details of the type and quantities of materials to be produced and their intended fate;
- details of any materials produced under a Resource Recovery Order, and the controls in place for meeting the conditions of that order;
- a description of procedures for dealing with non-conforming waste (i.e. waste not permitted to be received at the Premises).

Management of Dangerous Goods and Hazardous Materials

The EIS must provide details of the following for the construction and operational phase:

- Details of the type and quantity of all chemical substances to be used or stored on site; and
- Procedures for the classification, assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of as part of the proposal, in addition to the requirements for liquid and non-liquid wastes.

Incident Risks and Contingency Practices

The EIS must include a comprehensive assessment of the potential for an incident to occur at any stage of the proposal, the measures to be used to minimise the risk of incidents, and the procedures to be employed in the event of an incident.

Activities inside the Building

The EPA would like to reiterate that it will be a condition of any environment protection licence issued that all storage, processing, sorting, unloading and loading occur inside the building.

Changes to the Protection of the Environment Operations (Waste) Regulation

The Applicant should be aware that changes to the *Protection of the Environment Operations (Waste) Regulation* commenced on 16 November 2018, which legislates "Standards for managing construction waste in NSW" (<https://www.epa.nsw.gov.au/publications/managewaste/18p1270-standards-for-managing-construction-waste-in-nsw>). These standards must be complied with from 16 May 2019, regardless of when approval was given for the facility. The EPA encourages the

Proponent to be fully aware of these legislative requirements and ensure their operations are compliant.

Authorised amount and financial assurance

It should also be noted that there are several requirements for holders of environment protection licenses, including a limit on the maximum amount of waste permitted onsite at any one-time, monthly recording and reporting and provision of a financial assurance. The EPA would discuss these matters further if the proposal is approved and a licence application is submitted to the EPA.

This concludes the EPA's submission

Appendix D: Penrith Council Input on Planning Secretary's Environmental Assessment Requirements



Our reference: ECM: 9194843
Contact: Gavin Cherry
Telephone: 02 4732 8125

7 July 2020

Susan Fox
Email: Susan.fox@planning.nsw.gov.au

Dear Susan,

Response to Request for input into the Secretary's Environmental Assessment Requirements (SEARS) for St Marys Resource Recovery at 25 Dunheved Circuit, St Marys

I refer to the above request for SEAR's received by Council on 25 June 2020. Thankyou for the opportunity to comment on the proposed development. The following comments are provided for consideration and inclusion in the SEAR's response:-

Environmental Management Considerations

The proposal seeks to increase the processing capacity of the current resource recovery facility to 250 000 tonnes per annum of wood waste, metals and cardboard, with minor construction works also included. The activities carried out on site will be subject to an Environment Protection Licence (EPL) issued by the NSW Environment Protection Authority (EPA), as the development is considered a scheduled activity. In turn, the EPA is the regulatory body for environmental impacts associated with the use of the site and it is assumed that they will also provide comment on the proposal.

Nevertheless, the EIS prepared to support the state significant development application should provide a detailed and comprehensive description of the proposal. All environmental impacts of the proposal will need to be identified in the EIS and supported by technical assessment reports prepared by appropriately qualified persons and in accordance with applicable legislation, guidelines and standards. For this proposal, detailed information regarding how waste will be received, stored and processed is to be provided, and assessments of noise impacts, and impacts to local air quality are particularly important.

In carrying out the above required assessments, the applicant will need to identify all sensitive receivers. Though not yet constructed, it needs to be noted that Council has received an application for a town centre-type development in Jordan Springs East. The future residents of this development should be considered in any assessment relating to environmental impacts, such as potential noise and air quality impacts. These residents will be located less than one kilometre from the development site.

Also, it is important to acknowledge that SEPP 55 does require that the consent authority consider whether the site is suitable for the proposed use. Given that the current proposal does include hardstand works (though the extent is not known), it is considered that it would be an opportune time to ensure that the site is not contaminated prior to any further development. Should remediation works be required, development consent is to be obtained , as all remediation works in the



Penrith Local Government Area are considered Category 1 works as a result of SREP 20 (Clause 11(4)). In turn, should remediation works be necessary, they should be incorporated into the development proposal.

The SEAR's request also suggests that a BDAR waiver is intended to be sought. The appropriateness of this suggestion is a matter for the Department to consider and may warrant consultation with OEH, given any request for a waiver which suggests the mapping may not be appropriate is considered to warrant a review and amendment of the mapping, if it was deemed that there are no communities evident on site that warrants an assessment under the Biodiversity Offset Scheme.

Engineering and Traffic Management Considerations

Stormwater Drainage

The following is requested to be addressed in any state significant development application lodged for this site:-

- Demonstration that the existing on-site stormwater system is of adequate capacity and there will be no increase in stormwater runoff from the site as a result of this proposal.
- The applicant should be requested to demonstrate that there will be no increase in runoff from the site as a result of the development for all the storms up to and including the 1% AEP event.

Water Sensitive Urban Design

The application is required to address Council's Water Sensitive Urban Design Policy and Technical Guideline. Increase in impervious area may require the provision and implementation of a water sensitive urban design strategy that complies with Council's Technical Guideline.

Road Design and Car Parking / Access

It is noted that the applicant's submission in their "traffic" comments indicate that they do not consider that there will be any significant impact of their traffic on the road network and that they will address this in the EIS. The development however is a proposed expansion of the existing waste recovery business (previously Bingo) using the existing access and buildings. The resulting intensification of usage including heavy vehicle volumes and possibly types is a key consideration that is considered to warrant works to the road reserve to cater for the resulting impact. The existing access driveway, Dunheved Circuit and the roads in this industrial precinct are very narrow and congested but. They have been deemed acceptable for existing operations and intensity but the proposed expansion will warrant works to cater for the increased traffic generation. It is understood that this was a specific matter raised within a preceding SSD application for this site, which was suitably addressed by the applicant through the provision of proposed road works and kerb re-alignments. The SSD application was approved but did not eventuate.

The proposed development must therefore address the impact of the proposed heavy vehicle traffic on the existing access driveway and road network as well as the internal parking, manoeuvring and operational issues.

It is considered necessary that a detailed traffic and parking study be prepared and submitted by the applicant as part of the SSD application that addresses traffic volumes, frequency of movements, road capacity and infrastructure impacts and required civil works. This includes an analysis against the Australian Standards and Penrith DCP 2014. The report should also address the following:-

- Heavy vehicle traffic generation, access, and manoeuvring in the local road network, the site access and internal arrangements.
- The narrowness of Dunheved Circuit for the proposed heavy vehicle access
- Ongoing issues with heavy vehicle parking in the reserve area opposite the site
- Impact on traffic safety and congestion in Dunheved Circuit, intersection with Links Road, Links Road other inspections and including the intersection with Forester Road
- Consider and address the impact on traffic safety and congestion in Links Road which will increase due to current additional future traffic generated by the Lend Lease Central Precinct sub-division which will access Links Road
- Confirm the largest heavy vehicle proposed to access the site and these B-double turn or other heavy vehicle paths for entering / exiting (left in/ left out, right in/ right out) from their driveway into Dunheved Circuit loop and B-double turns (left in/left out, right in/right out) at Dunheved Circuit / Dunheved circuit loop (north leg and south leg) intersections. This will identify the road works required to accommodate this development and for which Council require the applicant to provide at their full cost.
- The applicant should then include suitable plans for works to accommodate these turns for assessment.
- Demonstration that all vehicles are to enter and leave the site in a forward direction;
- Demonstration that appropriate signage is to be installed to direct staff/delivery vehicle drivers/ visitors to on-site parking and delivery areas;
- Demonstration that signage which is clearly visible from the public road shall be directional signage and line marking shall be installed indicating directional movements and the location of loading areas and visitor/staff car parking to the satisfaction of the Principal Certifying Authority;
- Demonstration that all vehicle parking and manoeuvring must be in accordance with AS/NZS 2890.1:2004, AS/NZS 2890.1:2004/Amdt



1:2005, AS/NZS 2890.2:2002, AS 2890.3:1993, AS 2890.5:1993, AS 2890.6:2009 and Council's requirements. This includes vehicular access from Dunheved Circuit / Dunheved Circuit loop, access driveway and internal manoeuvring for a 4.6 metre high 26 metre long B-Double vehicle in accordance with Roads and Maritime Services guidelines, Austroads guidelines and AS2890.2:2002;

- Demonstration that all car spaces and loading areas are to be sealed/line marked and dedicated for the parking of vehicles only and not be used for storage of materials/products/waste materials etc;
- Demonstration that secure bicycle parking is to be provided at convenient locations at the facility in accordance with AS 2890.3:1993;
- Demonstration that accessible parking is to be provided at accessible paths of travel at the facility in accordance with AS 2890.6:2009;
- Demonstration that the required sight lines around the driveway entrances and exits are not to be compromised by street trees, landscaping or fencing;
- Demonstration that sight distance requirements at driveways are to be in accordance with AS 2890.1:2009.

Should you wish to discuss any matters further and allow for further dialogue as requested between officers, please do not hesitate to contact me on 4732 8125.

Yours sincerely,

Gavin Cherry
Development Assessment Coordinator

Appendix E: Antecedent Moisture Condition Summary Calculations

Product code	Bureau of Year	Month	Day	Rainfall Period (Quality)	Project No: 10113	25 Dunheved Circuit, St Marys										
IDCIAC0009	67084	1970	12	1	0	Y										
IDCIAC0009	67084	1970	12	2	0	Y										
IDCIAC0009	67084	1970	12	3	0	Y										
IDCIAC0009	67084	1970	12	4	0	Y										
IDCIAC0009	67084	1970	12	5	0	Y										
IDCIAC0009	67084	1970	12	6	5.3	1 Y										
IDCIAC0009	67084	1970	12	7	1.3	1 Y										
IDCIAC0009	67084	1970	12	8	9.7	1 Y										
IDCIAC0009	67084	1970	12	9	85.9	1 Y										
IDCIAC0009	67084	1970	12	10	28.7	1 Y										
IDCIAC0009	67084	1970	12	11	0	Y										
IDCIAC0009	67084	1970	12	12	13.7	1 Y										
IDCIAC0009	67084	1970	12	13	0	Y										
IDCIAC0009	67084	1970	12	14	0	Y										
IDCIAC0009	67084	1970	12	15	5.1	1 Y										
IDCIAC0009	67084	1970	12	16	0.5	1 Y										
IDCIAC0009	67084	1970	12	17	0	Y										
IDCIAC0009	67084	1970	12	18	0	Y										
IDCIAC0009	67084	1970	12	19	6.9	1 Y										
IDCIAC0009	67084	1970	12	20	0	Y										
IDCIAC0009	67084	1970	12	21	0	Y										
IDCIAC0009	67084	1970	12	22	0	Y										
IDCIAC0009	67084	1970	12	23	0	Y										
IDCIAC0009	67084	1970	12	24	7.9	1 Y										
IDCIAC0009	67084	1970	12	25	0.8	1 Y										
IDCIAC0009	67084	1970	12	26	0	Y										
IDCIAC0009	67084	1970	12	27	0	Y										
IDCIAC0009	67084	1970	12	28	2	1 Y										
IDCIAC0009	67084	1970	12	29	16.8	1 Y										
IDCIAC0009	67084	1970	12	30	19.1	1 Y										
IDCIAC0009	67084	1970	12	31	0	Y										
IDCIAC0009	67084	1971	1	1	0	Y										
IDCIAC0009	67084	1971	1	2	0	Y										
IDCIAC0009	67084	1971	1	3	0	Y										
IDCIAC0009	67084	1971	1	4	0	Y										
IDCIAC0009	67084	1971	1	5	2	1 Y										
IDCIAC0009	67084	1971	1	6	0	Y										
IDCIAC0009	67084	1971	1	7	0	Y										
IDCIAC0009	67084	1971	1	8	0	Y										
IDCIAC0009	67084	1971	1	9	0	Y										
IDCIAC0009	67084	1971	1	10	0	Y										
IDCIAC0009	67084	1971	1	11	0	Y										
IDCIAC0009	67084	1971	1	12	0	Y										
IDCIAC0009	67084	1971	1	13	1	1 Y										
IDCIAC0009	67084	1971	1	14	1.5	1 Y										
IDCIAC0009	67084	1971	1	15	0	Y										
IDCIAC0009	67084	1971	1	16	0	Y										
IDCIAC0009	67084	1971	1	17	13.2	1 Y										
IDCIAC0009	67084	1971	1	18	0.3	1 Y										
IDCIAC0009	67084	1971	1	19	0.3	1 Y										
IDCIAC0009	67084	1971	1	20	10.7	1 Y										
IDCIAC0009	67084	1971	1	21	0.5	1 Y										
IDCIAC0009	67084	1971	1	22	0	Y										
IDCIAC0009	67084	1971	1	23	0	Y										
IDCIAC0009	67084	1971	1	24	0	Y										
IDCIAC0009	67084	1971	1	25	0	Y										
IDCIAC0009	67084	1971	1	26	0	Y										
IDCIAC0009	67084	1971	1	27	0	Y										
IDCIAC0009	67084	1971	1	28	0	Y										
IDCIAC0009	67084	1971	1	29	25.1	1 Y										
IDCIAC0009	67084	1971	1	30	17.8	1 Y										
IDCIAC0009	67084	1971	1	31	23.6	1 Y										
IDCIAC0009	67084	1971	2	1	56.6	1 Y										
IDCIAC0009	67084	1971	2	2	3.8	1 Y										
IDCIAC0009	67084	1971	2	3	0	Y										
IDCIAC0009	67084	1971	2	4	7.6	1 Y										
IDCIAC0009	67084	1971	2	5	9.4	1 Y										
IDCIAC0009	67084	1971	2	6	0.8	1 Y										
IDCIAC0009	67084	1971	2	7	4.3	1 Y										
IDCIAC0009	67084	1971	2	8	0	Y										
IDCIAC0009	67084	1971	2	9	5.8	1 Y										
IDCIAC0009	67084	1971	2	10	0.5	1 Y										
IDCIAC0009	67084	1971	2	11	23.6	1 Y										
IDCIAC0009	67084	1971	2	12	0.5	1 Y										
IDCIAC0009	67084	1971	2	13	0	Y										
IDCIAC0009	67084	1971	2	14	0	Y										
IDCIAC0009	67084	1971	2	15	0	Y										
IDCIAC0009	67084	1971	2	16	0	Y										
IDCIAC0009	67084	1971	2	17	1.8	1 Y										
IDCIAC0009	67084	1971	2	18	11.2	1 Y										
IDCIAC0009	67084	1971	2	19	3	1 Y										
IDCIAC0009	67084	1971	2	20	2.8	1 Y										
IDCIAC0009	67084	1971	2	21	1.5	1 Y										
IDCIAC0009	67084	1971	2	22	0	Y										
IDCIAC0009	67084	1971	2	23	0	Y										
IDCIAC0009	67084	1971	2	24	4.3	1 Y										
IDCIAC0009	67084	1971	2	25	0.5	1 Y										
IDCIAC0009	67084	1971	2	26	0	Y										
IDCIAC0009	67084	1971	2	27	3	1 Y										
IDCIAC0009	67084	1971	2	28	0	Y										
IDCIAC0009	67084	1971	3	1	0	Y										
IDCIAC0009	67084	1971	3	2	0	Y										
IDCIAC0009	67084	1971	3	3	20.3	1 Y										
IDCIAC0009	67084	1971	3	4	1.5	1 Y										
IDCIAC0009	67084	1971	3	5	0	Y										
IDCIAC0009	67084	1971	3	6	1.5	1 Y										
IDCIAC0009	67084	1971	3	7	0	Y										
IDCIAC0009	67084	1971	3	8	8.6	1 Y										
IDCIAC0009	67084	1971	3	9	0.3	1 Y										
IDCIAC0009	67084	1971	3	10	0	Y										
IDCIAC0009	67084	1971	3	11	0	Y										
IDCIAC0009	67084	1971	3	12	0	Y										
IDCIAC0009	67084	1971	3	13	0	Y										

Appendix F: Water Balance Summary Calculations

Product code	Bureau of	Year	Month	Day	Rainfall Period (Quality	Vol	0
IDCJAC0009	67084	1970	12	1	0	Y	0	##
IDCJAC0009	67084	1970	12	2	0	Y	0	##
IDCJAC0009	67084	1970	12	3	0	Y	0	##
IDCJAC0009	67084	1970	12	4	0	Y	0	##
IDCJAC0009	67084	1970	12	5	0	Y	0	##
IDCJAC0009	67084	1970	12	6	5.3	1 Y	1	##
IDCJAC0009	67084	1970	12	7	1.3	1 Y	0	##
IDCJAC0009	67084	1970	12	8	9.7	1 Y	2	##
IDCJAC0009	67084	1970	12	9	85.9	1 Y	15	##
IDCJAC0009	67084	1970	12	10	28.7	1 Y	5	##
IDCJAC0009	67084	1970	12	11	0	Y	0	##
IDCJAC0009	67084	1970	12	12	13.7	1 Y	2	##
IDCJAC0009	67084	1970	12	13	0	Y	0	##
IDCJAC0009	67084	1970	12	14	0	Y	0	##
IDCJAC0009	67084	1970	12	15	5.1	1 Y	1	##
IDCJAC0009	67084	1970	12	16	0.5	1 Y	0	##
IDCJAC0009	67084	1970	12	17	0	Y	0	##
IDCJAC0009	67084	1970	12	18	0	Y	0	##
IDCJAC0009	67084	1970	12	19	6.9	1 Y	1	##
IDCJAC0009	67084	1970	12	20	0	Y	0	##
IDCJAC0009	67084	1970	12	21	0	Y	0	##
IDCJAC0009	67084	1970	12	22	0	Y	0	##
IDCJAC0009	67084	1970	12	23	0	Y	0	##
IDCJAC0009	67084	1970	12	24	7.9	1 Y	1	##
IDCJAC0009	67084	1970	12	25	0.8	1 Y	0	##
IDCJAC0009	67084	1970	12	26	0	Y	0	##
IDCJAC0009	67084	1970	12	27	0	Y	0	##
IDCJAC0009	67084	1970	12	28	2	1 Y	0	##
IDCJAC0009	67084	1970	12	29	16.8	1 Y	3	##
IDCJAC0009	67084	1970	12	30	19.1	1 Y	3	##
IDCJAC0009	67084	1970	12	31	0	Y	0	##
IDCJAC0009	67084	1971	1	1	0	Y	0	##
IDCJAC0009	67084	1971	1	2	0	Y	0	##
IDCJAC0009	67084	1971	1	3	0	Y	0	##
IDCJAC0009	67084	1971	1	4	0	Y	0	##
IDCJAC0009	67084	1971	1	5	2	1 Y	0	##
IDCJAC0009	67084	1971	1	6	0	Y	0	##
IDCJAC0009	67084	1971	1	7	0	Y	0	##
IDCJAC0009	67084	1971	1	8	0	Y	0	##
IDCJAC0009	67084	1971	1	9	0	Y	0	##
IDCJAC0009	67084	1971	1	10	0	Y	0	##
IDCJAC0009	67084	1971	1	11	0	Y	0	##
IDCJAC0009	67084	1971	1	12	0	Y	0	##
IDCJAC0009	67084	1971	1	13	1	1 Y	0	##
IDCJAC0009	67084	1971	1	14	1.5	1 Y	0	##
IDCJAC0009	67084	1971	1	15	0	Y	0	##
IDCJAC0009	67084	1971	1	16	0	Y	0	##
IDCJAC0009	67084	1971	1	17	13.2	1 Y	2	##
IDCJAC0009	67084	1971	1	18	0.3	1 Y	0	##
IDCJAC0009	67084	1971	1	19	0.3	1 Y	0	##
IDCJAC0009	67084	1971	1	20	10.7	1 Y	2	##
IDCJAC0009	67084	1971	1	21	0.5	1 Y	0	##
IDCJAC0009	67084	1971	1	22	0	Y	0	##
IDCJAC0009	67084	1971	1	23	0	Y	0	##
IDCJAC0009	67084	1971	1	24	0	Y	0	##
IDCJAC0009	67084	1971	1	25	0	Y	0	##
IDCJAC0009	67084	1971	1	26	0	Y	0	##
IDCJAC0009	67084	1971	1	27	0	Y	0	##
IDCJAC0009	67084	1971	1	28	0	Y	0	##
IDCJAC0009	67084	1971	1	29	25.1	1 Y	5	##
IDCJAC0009	67084	1971	1	30	17.8	1 Y	3	##
IDCJAC0009	67084	1971	1	31	23.6	1 Y	4	##
IDCJAC0009	67084	1971	2	1	56.6	1 Y	10	##
IDCJAC0009	67084	1971	2	2	3.8	1 Y	1	##
IDCJAC0009	67084	1971	2	3	0	Y	0	##
IDCJAC0009	67084	1971	2	4	7.6	1 Y	1	##
IDCJAC0009	67084	1971	2	5	9.4	1 Y	2	##
IDCJAC0009	67084	1971	2	6	0.8	1 Y	0	##
IDCJAC0009	67084	1971	2	7	4.3	1 Y	1	##
IDCJAC0009	67084	1971	2	8	0	Y	0	##
IDCJAC0009	67084	1971	2	9	5.8	1 Y	1	##
IDCJAC0009	67084	1971	2	10	0.5	1 Y	0	##
IDCJAC0009	67084	1971	2	11	23.6	1 Y	4	##
IDCJAC0009	67084	1971	2	12	0.5	1 Y	0	##
IDCJAC0009	67084	1971	2	13	0	Y	0	##
IDCJAC0009	67084	1971	2	14	0	Y	0	##
IDCJAC0009	67084	1971	2	15	0	Y	0	##
IDCJAC0009	67084	1971	2	16	0	Y	0	##
IDCJAC0009	67084	1971	2	17	1.8	1 Y	0	##
IDCJAC0009	67084	1971	2	18	11.2	1 Y	2	##
IDCJAC0009	67084	1971	2	19	3	1 Y	1	##
IDCJAC0009	67084	1971	2	20	2.8	1 Y	1	##
IDCJAC0009	67084	1971	2	21	1.5	1 Y	0	##

Project No:	10113	25 Dunheved Circuit, St Marys
Rainwater Tank Volume:	10	kL
Rainwater Tank Catchment Area:	180	m2
Rainwater Tank Starting Volume:	0	%
Reuse for Toilets:	0.1	kL/day/toilet
Reuse for Landscaping:	0.4	kL/m2/year
No. Toilets:	4	
Landscaping Area:	0	m2
Reuse Demand:	0.40	kL/day
Demand Met	64.90	%



Appendix G: MUSICLink Report – Existing Site

MUSIC-link Report

Project Details		Company Details	
Project:	10113 - 25 Dunheved Cct, St Marys [EXISTING]	Company:	ECLIPSE Consulting Engineers
Report Export Date:	10/11/2020	Contact:	Anthony Healey
Catchment Name:	10113 - 25 Dunheved Cct	Address:	305/12 Century Cct NORWEST NSW 2153
Catchment Area:	0.618ha	Phone:	02 9894 8500
Impervious Area*:	100%	Email:	anthony@eclipseconsulting.com.au
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	Penrith		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	Reduction	Node Type	Number	Node Type	Number
Flow	2.14%	Detention Basin Node	1	Urban Source Node	4
TSS	61.8%	Rain Water Tank Node	1		
TP	34.1%	GPT Node	1		
TN	10.1%				
GP	99.5%				

Comments

- This model represents the stormwater system as currently installed at the site following multiple site investigations.
- C** values do not apply to rainwater tanks.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Detention	OSD Tanks (200kL)	Hi-flow bypass rate (cum/sec)	None	99	99
GPT	Ecosol GPT- 4200	Hi-flow bypass rate (cum/sec)	None	99	0.051
Receiving	Receiving Node	% Load Reduction	None	None	2.14
Receiving	Receiving Node	GP % Load Reduction	90	None	99.5
Urban	Admin Roof (180m2)	Area Impervious (ha)	None	None	0.018
Urban	Admin Roof (180m2)	Area Pervious (ha)	None	None	0
Urban	Admin Roof (180m2)	Total Area (ha)	None	None	0.018
Urban	Hardstand (2410m2)	Area Impervious (ha)	None	None	0.241
Urban	Hardstand (2410m2)	Area Pervious (ha)	None	None	0
Urban	Hardstand (2410m2)	Total Area (ha)	None	None	0.241
Urban	Other Roof (40m2)	Area Impervious (ha)	None	None	0.004
Urban	Other Roof (40m2)	Area Pervious (ha)	None	None	0
Urban	Other Roof (40m2)	Total Area (ha)	None	None	0.004
Urban	Warehouse Roof (3550m2)	Area Impervious (ha)	None	None	0.355
Urban	Warehouse Roof (3550m2)	Area Pervious (ha)	None	None	0
Urban	Warehouse Roof (3550m2)	Total Area (ha)	None	None	0.355

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	RWT (10kL)	% Reuse Demand Met	80	None	53.97
Rain	RWT (10kL)	Total Nitrogen - C** (mg/L)	0	0	1.4
Rain	RWT (10kL)	Total Phosphorus - C** (mg/L)	0	0	0.13
Rain	RWT (10kL)	Total Suspended Solids - C** (mg/L)	0	0	12
Receiving	Receiving Node	TN % Load Reduction	45	None	10.1
Receiving	Receiving Node	TP % Load Reduction	60	None	34.1
Receiving	Receiving Node	TSS % Load Reduction	85	None	61.8

Only certain parameters are reported when they pass validation



Appendix H: Ocean Protect StormFilter Installation and Maintenance Guide



StormFilter

Operations & Maintenance Manual

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Why do I need to perform maintenance?	2
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Personnel health and safety	3
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Maintenance Procedures	4
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Minor Service.....	5
Major Service (Filter Cartridge Replacement)	5
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Hazardous Material Spill.....	6
Blockages	6
Major Storms and Flooding	6
Disposal of Waste Materials.....	6
Maintenance Services.....	6

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the StormFilter as recommended by the manufacturer.

The StormFilter is designed and sized to meet stringent regulatory requirements. It removes the most challenging target pollutants (including fine solids, soluble heavy metals, oil, and soluble nutrients) using a variety of media. For more than two decades, StormFilter has helped clients meet their regulatory needs and, through ongoing product enhancements, the design continues to be refined for ease of use and improved performance.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the StormFilter.

Health and Safety

Access to a StormFilter unit requires removing heavy access covers/grates, and it is necessary to enter into a confined space. Pollutants collected by the StormFilter will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your StormFilter require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the StormFilter, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

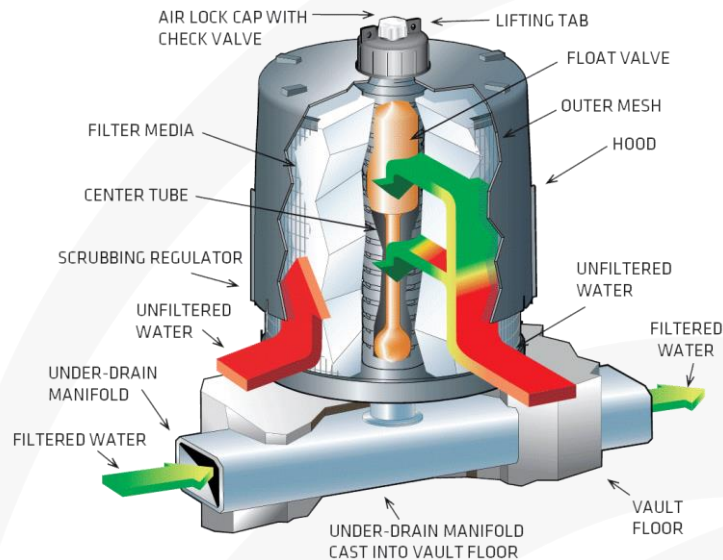
- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of StormFilter maintenance can be performed from surface level, there will be a need to enter the StormFilter system (confined space) during a major service. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it Work?

Stormwater enters the cartridge chamber, passes through the filtration media and begins filling the cartridge center tube. When water reaches the top of the cartridge the float valve opens and filtered water is allowed to drain at the designed flow rate. Simultaneously, a one-way check valve closes activating a siphon that draws stormwater evenly throughout the filter media and into the center tube. Treated stormwater is then able to discharge out of the system through the underdrain manifold pipework.



As the rain event subsides, the water level outside the cartridge drops and approaches the bottom of the hood, air rushes through the scrubbing regulators releasing the water column and breaking the siphon. The turbulent bubbling action agitates the surface of the cartridge promoting trapped sediment to drop to the chamber floor. After a rain event, the chamber is able to drain dry by way of an imperfect seal at the base of the float valve.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the StormFilter requires an inspection every 6 months with a minor service at 12 months. Additionally, as the StormFilter cartridges capture pollutants the media will eventually become occluded and require replacement (expected media life is 1-3 years).

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the StormFilter.

	Description of Typical Activities	Frequency
Inspection	Visual Inspection of cartridges & chamber Remove larger gross pollutants Perform minimal rectification works (if required)	Every 6 Months
Minor Service	Evaluation of cartridges and media Removal of accumulated sediment (if required) Wash-down of StormFilter chamber (if required)	Every 12 Months
Major Service	Replacement of StormFilter cartridge media	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Inspection

The purpose of the inspecting the StormFilter system is to assess the condition of the StormFilter chamber and cartridges. When inspecting the chamber, particular attention should be taken to ensure all cartridges are firmly connected to the connectors. It is also an optimal opportunity to remove larger gross pollutants and inspect the outlet side of the StormFilter weir.

Minor Service

This service is designed to ensure the ongoing operational effectiveness of the StormFilter system, whilst assessing the condition of the cartridge media.

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. Evaluate StormFilter cartridge media (if exhausted schedule major service within 6 months)
4. Measure and record the level of accumulated sediment in the chamber
(if sediment depth is less than 100 mm skip to step 9)
5. Remove StormFilter cartridges from the chamber
6. Use vacuum unit to removed accumulated sediment and pollutants in the chamber
7. Use high pressure water to clean StormFilter chamber
8. Re-install StormFilter cartridges
9. Replace access cover(s)

Major Service (Filter Cartridge Replacement)

For the StormFilter system a major service is reactionary process based on the outcomes from the minor service, specifically the evaluation of the cartridge media.

Trigger Event	Maintenance Action
Cartridge media is exhausted ^[1]	Replace StormFilter cartridge media ^[2]

[1] Multiple assessment methods are available, contact Ocean Protect for assistance

[2] Replacement filter media and components are available for purchase from Ocean Protect.

This service is designed to return the StormFilter device back to optimal operating performance

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. By first removing the head cap, remove each individual cartridge hood to allow access to the exhausted media.
4. Utilise a vacuum unit to remove exhausted media from each cartridge
5. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
6. Use high pressure water to clean StormFilter chamber
7. Inspect each empty StormFilter cartridges for any damage, rectify damage as required
8. Re-fill each cartridge with media in line with project specifications
9. Re-install replenished StormFilter cartridges
10. Replace access cover(s)

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the StormFilter unit should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess them for contamination, depending on the type of spill event it may be necessary to replace the filtration media.

Blockages

In the unlikely event that flooding occurs upstream of the StormFilter system the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
2. Inspect the StormFilter unit checking the underdrain manifold as well as both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the StormFilter after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the StormFilter must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter media has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

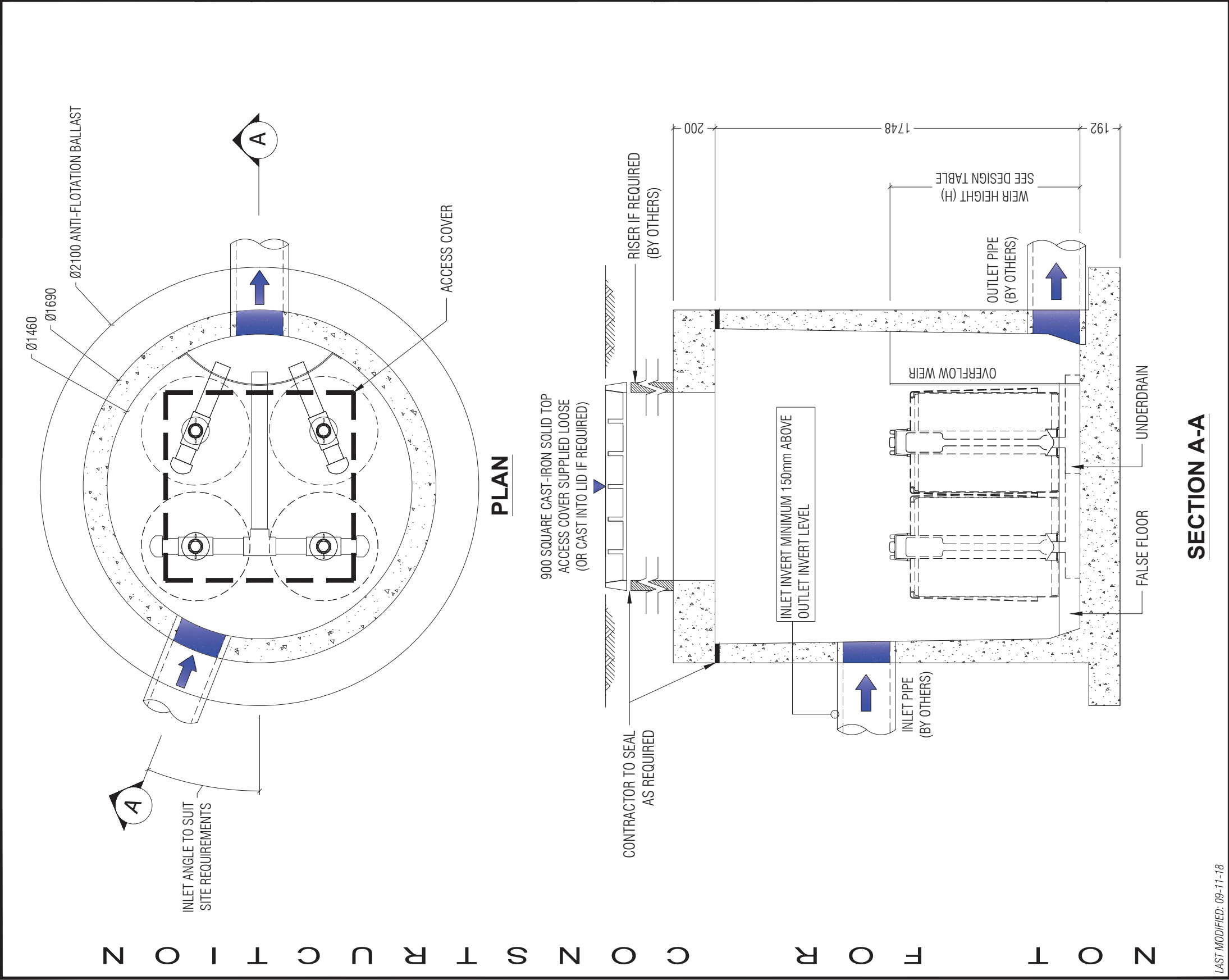
With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our StormFilter system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement media for cartridges.

For more information please visit www.OceanProtect.com.au

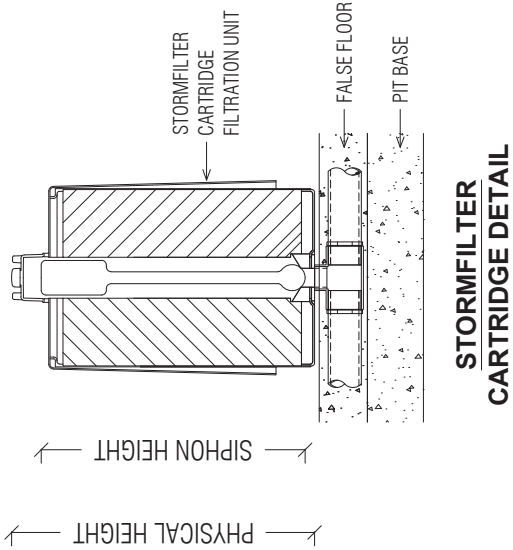


Appendix I: Ocean Protect StormFilter Schematic Drawings



STORMFILTER DESIGN TABLE				
<ul style="list-style-type: none">• STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.• THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).• FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE; SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.				
CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310	
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600	
TYPICAL WEIR HEIGHT [H] (mm)	920	690	540	
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7	
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39	
SITE SPECIFIC DATA REQUIREMENTS				
STRUCTURE ID	[]			
NUMBER OF CARTRIDGES REQ'D	4			
SIPHON HEIGHT (310 / 460 / 690)	[]			
MEDIA TYPE (ZPG / PSORB)	[]			
WATER QUALITY FLOW RATE (L/S)	[]			
HYDRAULIC CAPACITY (L/S)	90			
PIPE DATA:				
I.L.	MATERIAL			
INLET PIPE #1	[]	[]	[]	
INLET PIPE #2	[]	[]	[]	
INLET PIPE #3	[]	[]	[]	
OUTLET PIPE	[]	[]	[]	
PRECAST MANHOLE WEIGHT		4100kg		
PRECAST LID WEIGHT		1100kg		

<



GENERAL NOTES

1. PRECAST STRUCTURE SUPPLIED WITH CORE HOLES TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
2. PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
3. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CERTIFYING ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
4. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
5. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
6. DRAWING NOT TO SCALE.

INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.
2. CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
3. CONTRACTOR TO APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.



Appendix J: MUSICLink Report – Upgraded System

MUSIC-link Report

Project Details		Company Details	
Project:	10113 - 25 Dunheved Cct, St Marys [UPGRADE]	Company:	ECLIPSE Consulting Engineers
Report Export Date:	10/11/2020	Contact:	Anthony Healey
Catchment Name:	10113 - 25 Dunheved Cct	Address:	305/12 Century Cct NORWEST NSW 2153
Catchment Area:	0.618ha	Phone:	02 9894 8500
Impervious Area*:	100%	Email:	anthony@eclipseconsulting.com.au
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	Penrith		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	Reduction	Node Type	Number	Node Type	Number
Flow	2.14%	Detention Basin Node	1	Urban Source Node	4
TSS	95.2%	Rain Water Tank Node	1		
TP	90.4%	Sedimentation Basin Node	1		
TN	74.8%	GPT Node	1		
GP	100%	Generic Node	1		

Comments

- C** values are not used for rainwater tanks
- The SF Chamber node is a proprietary treatment chamber not used as traditional detention.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Detention	OSD Tanks (200kL)	Hi-flow bypass rate (cum/sec)	None	99	99
GPT	Ecosol GPT- TFR High Flow - 4200	Hi-flow bypass rate (cum/sec)	None	99	0.051
Receiving	Receiving Node	% Load Reduction	None	None	2.14
Receiving	Receiving Node	GP % Load Reduction	90	None	100
Receiving	Receiving Node	TN % Load Reduction	45	None	74.8
Receiving	Receiving Node	TP % Load Reduction	60	None	90.4
Receiving	Receiving Node	TSS % Load Reduction	85	None	95.2
Sedimentation	SF Chamber	High Flow Bypass Out (ML/yr)	None	None	0
Urban	Admin Roof (180m2)	Area Impervious (ha)	None	None	0.018
Urban	Admin Roof (180m2)	Area Pervious (ha)	None	None	0
Urban	Admin Roof (180m2)	Total Area (ha)	None	None	0.018
Urban	Hardstand (2410m2)	Area Impervious (ha)	None	None	0.241
Urban	Hardstand (2410m2)	Area Pervious (ha)	None	None	0
Urban	Hardstand (2410m2)	Total Area (ha)	None	None	0.241
Urban	Other Roof (40m2)	Area Impervious (ha)	None	None	0.004
Urban	Other Roof (40m2)	Area Pervious (ha)	None	None	0
Urban	Other Roof (40m2)	Total Area (ha)	None	None	0.004
Urban	Warehouse Roof (3550m2)	Area Impervious (ha)	None	None	0.355
Urban	Warehouse Roof (3550m2)	Area Pervious (ha)	None	None	0
Urban	Warehouse Roof (3550m2)	Total Area (ha)	None	None	0.355

Only certain parameters are reported when they pass validation

Failing Parameters

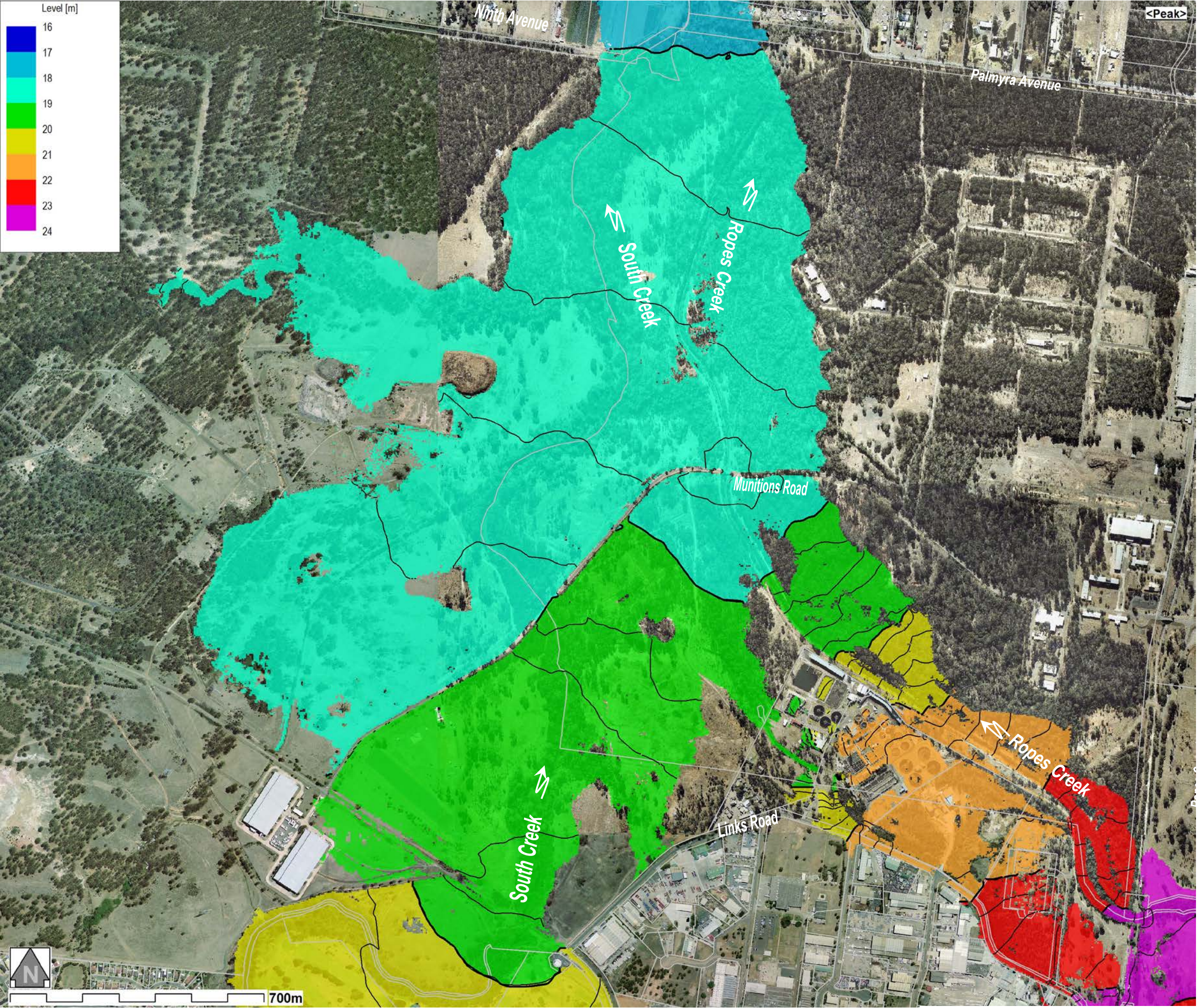
Node Type	Node Name	Parameter	Min	Max	Actual
Rain	RWT (10kL)	% Reuse Demand Met	80	None	53.97
Rain	RWT (10kL)	Total Nitrogen - C** (mg/L)	0	0	1.4
Rain	RWT (10kL)	Total Phosphorus - C** (mg/L)	0	0	0.13
Rain	RWT (10kL)	Total Suspended Solids - C** (mg/L)	0	0	12
Sedimentation	SF Chamber	Notional Detention Time (hrs)	8	12	0.0879
Sedimentation	SF Chamber	Total Nitrogen - k (m/yr)	500	500	1
Sedimentation	SF Chamber	Total Phosphorus - k (m/yr)	6000	6000	1
Sedimentation	SF Chamber	Total Suspended Solids - k (m/yr)	8000	8000	1

Only certain parameters are reported when they pass validation

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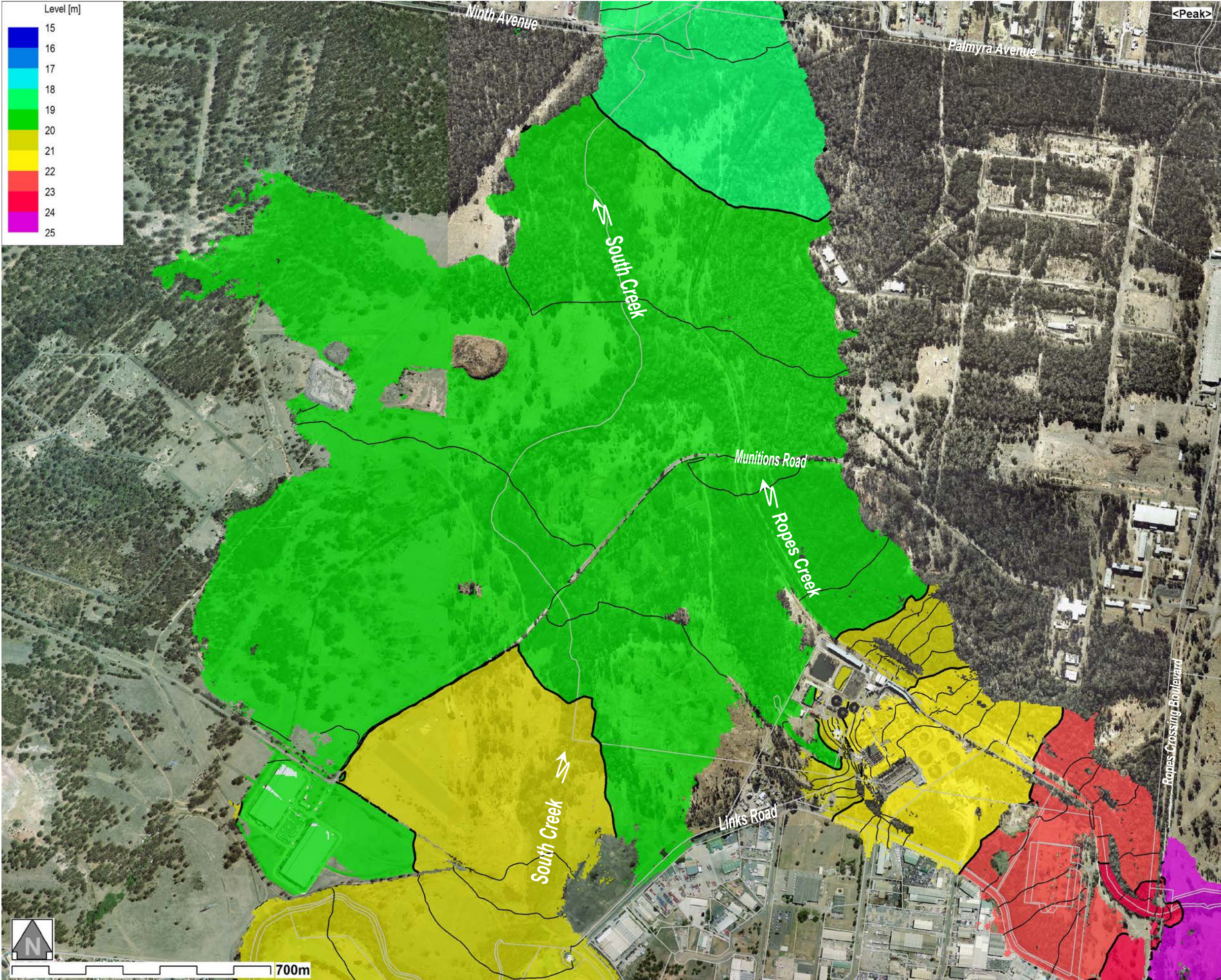
Appendix K: Flood Extents for the Existing Development (Worley Parsons)

FIGURE 6.30



PREDICTED FLOOD LEVELS AT THE
PEAK OF THE 20 YEAR RECURRENCE FLOOD
[EXTENT 9 OF 17]

FIGURE 6.47

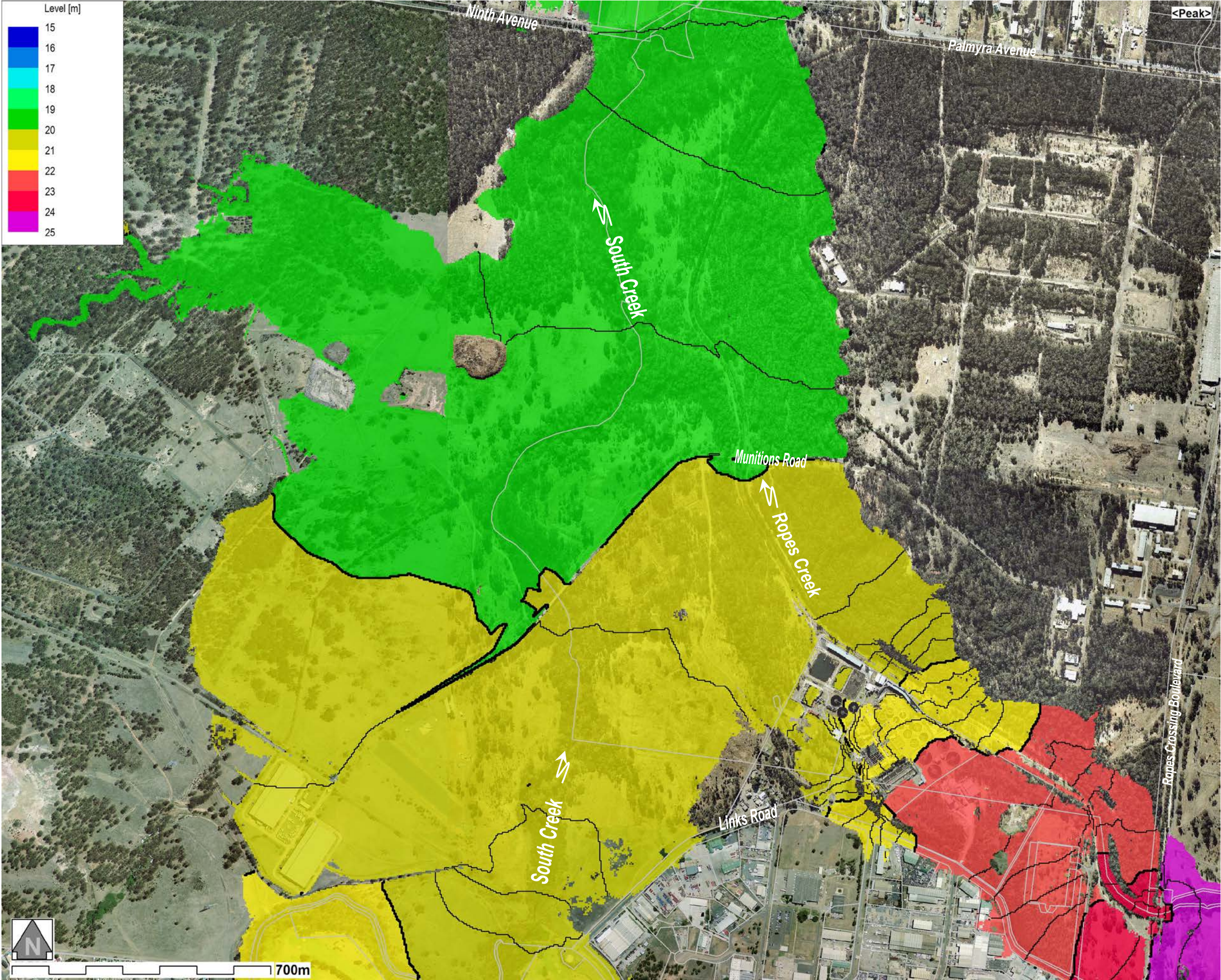


LEGEND:

- Flood Level Contour at 1 metre Interval
- Flood Level Contour at 0.2 metre Interval

PREDICTED FLOOD LEVELS AT THE
PEAK OF THE 100 YEAR RECURRENCE FLOOD
[EXTENT 9 OF 17]

FIGURE 6.64



LEGEND:



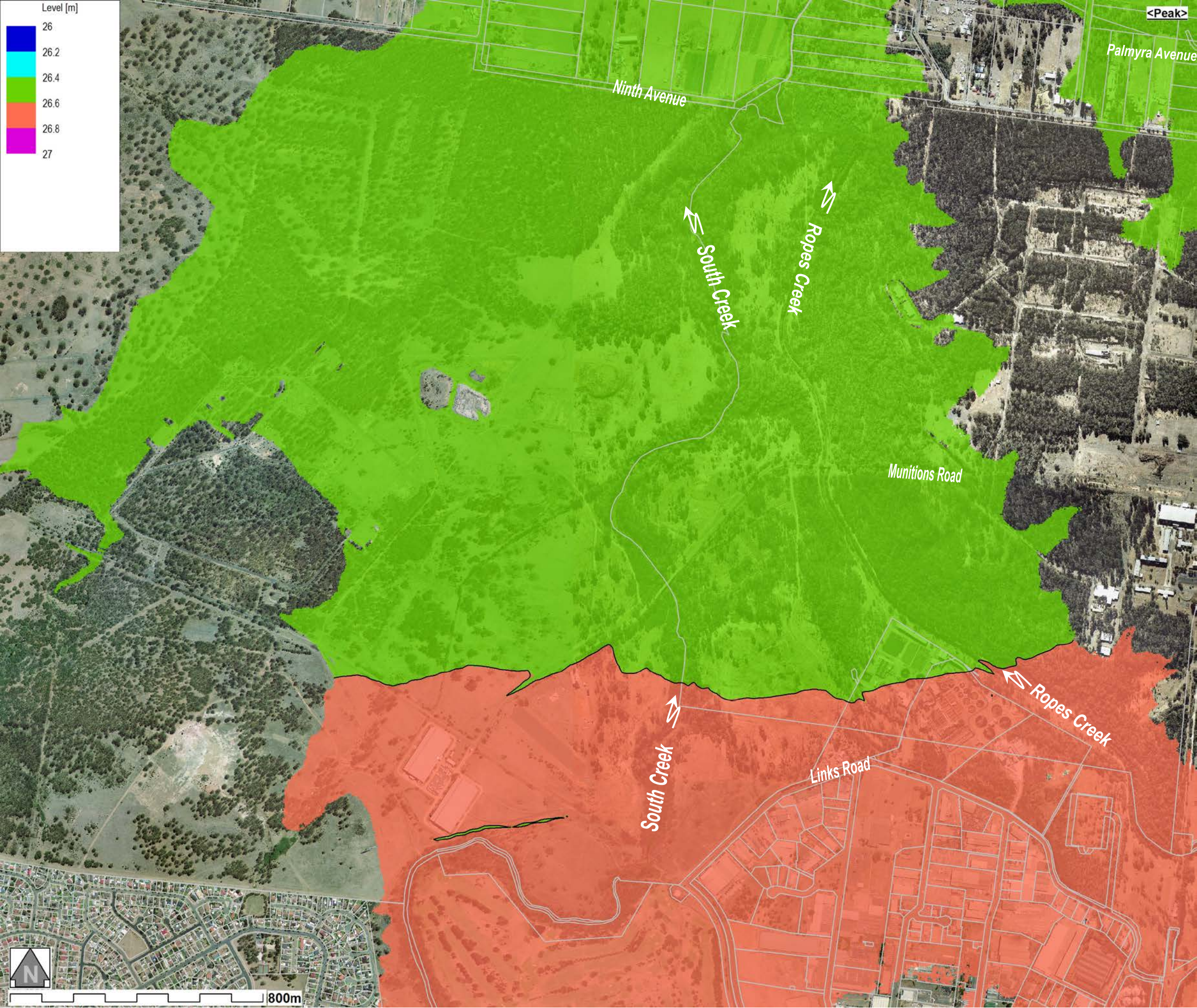
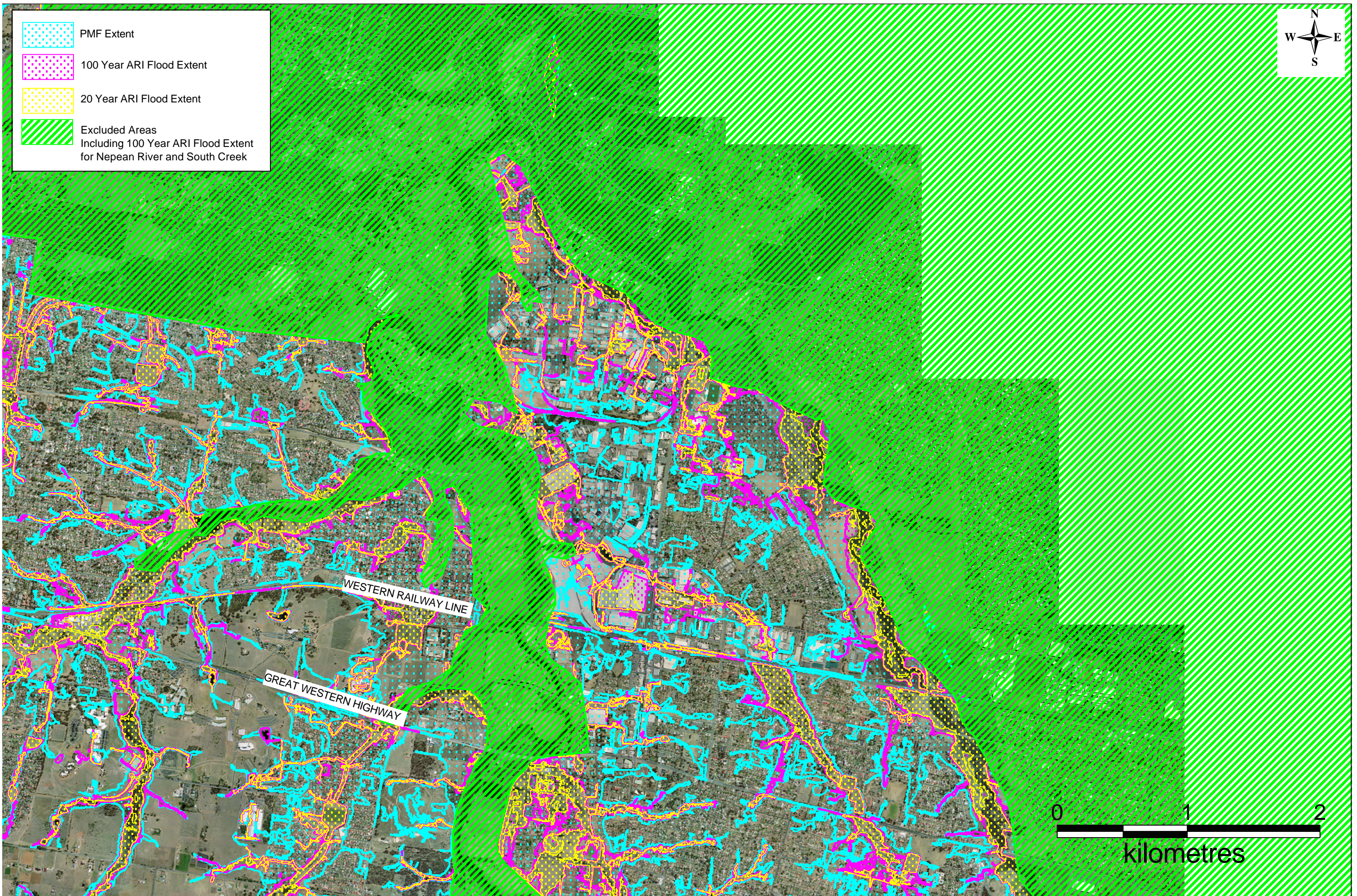
-  Flood Level Contour at 1 metre Interval
-  Flood Level Contour at 0.2 metre Interval



FIGURE 6.81



Appendix L: Overland Flooding Extents for the Existing Development (Cardno)



RESOURCE RECOVERY FACILITY

25 Dunheved Circuit, St. Marys

STORMWATER / CIVIL WORKS

GENERAL NOTES

- G1. THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL DRAWINGS AND SPECIFICATIONS AND OTHER WRITTEN INSTRUCTIONS THAT MAY BE ISSUED.
- G2. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING FROM THE DRAWINGS. REFER ARCHITECT'S DRAWINGS FOR ALL DIMENSIONS.
- G3. REFER ANY DISCREPANCY TO THE ENGINEER/ARCHITECT.
- G4. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE APPROPRIATE SAA SPECIFICATIONS OR CODE AND WITH THE REQUIREMENTS OF THE RELEVANT LOCAL AUTHORITY.
- G5. THE ALIGNMENT AND LEVEL OF ALL SERVICES SHOWN ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL CONFIRM THE POSITION AND LEVEL OF ALL SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DAMAGE TO SERVICES SHALL BE RECTIFIED AT THE CONTRACTORS EXPENSE.
- G6. NO WORKS ARE TO COMMENCE UNTIL THE REQUIRED TREE REMOVAL PERMITS HAVE BEEN GRANTED BY RELEVANT LOCAL AUTHORITY, AND THE APPROPRIATE NOTICE OF INTENTION TO COMMENCE GIVEN.
- G7. ALL SERVICES, OR CONDUITS FOR SERVICING SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF PAVEMENT CONSTRUCTION.
- G8. SUBSOIL DRAINAGE, COMPRISING 100 AGRICULTURE PIPE IN GEO-STOCKING TO BE PLACED AS SHOWN AND AS MAY BE DIRECTED BY THE SUPERINTENDENT. SUBSOIL DRAINAGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT LOCAL AUTHORITY CONSTRUCTION SPECIFICATION.
- G9. NO WORK IS PERMITTED WITHIN ADJOINING PROPERTIES WITHOUT WRITTEN PERMISSION FROM THE OWNERS OR RESPONSIBLE AUTHORITY.

DRAINAGE NOTES

- D1. ALL DRAINAGE OUTLET LEVELS SHALL BE CONFIRMED ON SITE, PRIOR TO CONSTRUCTION COMMENCING.
- D2. ALL PIPES WITHIN THE PROPERTY TO BE MIN. 100 DIA UPVC @ 1% MIN. GRADE. UNO.
- D3. ALL PITS WITHIN THE PROPERTY ARE TO BE FITTED WITH "WELDLOK" OR APPROVED EQUIVALENT GRATES.
- LIGHT DUTY FOR LANDSCAPED AREAS
- HEAVY DUTY WHERE SUBJECTED TO VEHICULAR TRAFFIC
- D4. PITS WITHIN THE PROPERTY MAY BE CONSTRUCTED AS:
- 1) PRECAST STORMWATER PITS
- 2) CAST INSITU MASS CONCRETE
- 3) CEMENT RENDERED 230mm BRICKWORK
- SUBJECT TO THE RELEVANT LOCAL AUTHORITY CONSTRUCTION SPECIFICATION.
- D5. ENSURE ALL GRATES TO PITS ARE SET BELOW FINISHED SURFACE LEVEL WITHIN THE PROPERTY. TOP OF PIT R.L.'S ARE APPROXIMATE ONLY AND MAY BE VARIED SUBJECT TO APPROVAL OF THE ENGINEER. ALL INVERT LEVELS ARE TO BE ACHIEVED.
- D6. ANY PIPES BENEATH RELEVANT LOCAL AUTHORITY ROAD TO BE RUBBER RING JOINTED RCP. UNO.
- D7. ALL PITS IN ROADWAYS ARE TO BE FITTED WITH HEAVY DUTY GRATES WITH LOCKING BOLTS AND CONTINUOUS HINGE.
- D8. PROVIDE STEP IRONS TO STORMWATER PITS GREATER THAN 1200 IN DEPTH.
- D9. TRENCH BACK FILL IN ROADWAYS SHALL COMPRISE SHARP, CLEAN GRANULAR BACK FILL IN ACCORDANCE WITH THE RELEVANT LOCAL AUTHORITY SPECIFICATION TO NON-TRAFFICABLE AREAS TO BE COMPACTED BY RODDING AND TAMPING USING A FLAT PLATE VIBRATOR.
- D10. WHERE A HIGH EARLY DISCHARGE (HED) PIT IS PROVIDED ALL PIPES ARE TO BE CONNECTED TO THE HED PIT. UNO.
- D11. DOWN PIPES SHALL BE A MINIMUM OF DN100 SW GRADE UPVC OR 100X100 COLORBOND/ZINCALUME STEEL. UNO.
- D12. COLORBOND OR ZINCALUME STEEL BOX GUTTERS SHALL BE A MINIMUM OF 450 WIDE X 150 DEEP.
- D13. EAVES GUTTERS SHALL BE A MINIMUM OF 125 WIDE X 100 DEEP (OR OF EQUIVALENT AREA) COLORBOND OR ZINCALUME STEEL. UNO.
- D14. SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS & EMBANKMENTS, WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM. UNO.

EARTHWORKS NOTES

- E1. THE EARTHWORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT GEOTECHNICAL REPORT.
- E2. THE SITE OF THE WORKS SHALL BE PREPARED BY STRIPPING ALL EXISTING TOPSOIL, FILL AND VEGETATION.
- E3. SUBGRADE SHALL BE COMPACTED UNTIL A DRY DENSITY HAS BEEN ACHIEVED OF NOT LESS THAN 100% OF THE STANDARD MAXIMUM DRY DENSITY WHEN TESTED IN ACCORDANCE WITH AS 1289 TESTS E.1.1. OR E.1.2.
- E4. THE EXPOSED SUBGRADE SHOULD BE PROOF ROLLED TO DETECT ANY SOFT OR WET AREAS WHICH SHOULD BE LOCALLY EXCAVATED AND BACK FILLED WITH SELECTED MATERIAL.
- E5. THE BACK FILLING MATERIAL SHALL BE IMPORTED GRANULAR FILL OF LOW PLASTICITY, PREFERABLY CRUSHED SANDSTONE, AND TO BE PLACED IN LAYERS NOT EXCEEDING 150 LOOSE THICKNESS AND COMPACTED TO 98% OF STANDARD DRY DENSITY AT A MOISTURE CONTENT WITHIN 2% OF OPTIMUM.
- E6. SITE WORKS ARE TO BE BATTERED TO ADJACENT PROPERTY LEVELS.
- E7. STORMWATER MUST NOT BE CONCENTRATED ON TO AN ADJACENT PROPERTY.
- E8. AT NO TIME DURING OR AFTER CONSTRUCTION IS STORMWATER TO BE PONDED ON ADJOINING PROPERTIES.
- E9. THE SITE SHALL BE GRADED AND DRAINED SO THAT STORMWATER WILL BE DIRECTED AWAY FROM THE BUILDING PLATFORM.
- E10. STORMWATER DRAINAGE SHALL BE PROVIDED AND MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION. ALL STORMWATER RUNOFF SHALL BE GRADED AWAY FROM THE SITE WORKS AND DISPOSED OF VIA SURFACE CATCHDRAINS AND STORMWATER COLLECTION PITS.
- E11. ALL SURFACE CATCH DRAINS SHALL BE GRADED AT 1% (1 IN 100) MINIMUM. THE GROUND SHALL GRADE AWAY FROM ANY DWELLING AT 5% (1 IN 20) FOR THE FIRST METRE THEN AT 2.5% (1 IN 40).
- E12. WHERE A CUT FILL PLATFORM IS USED THERE SHALL BE A MINIMUM BERM 1000 WIDE TO THE PERIMETER OF THE SITE WORKS WHICH SHALL BE SUPPORTED BY BATTERS OF 3:1 IN FILL.
- E13. ANY VERTICAL OR NEAR VERTICAL PERMANENT EXCAVATION (CUT) DEEPER THAN 600 IN MATERIAL OTHER THAN ROCK SHALL BE ADEQUATELY RETAINED OR BATTERED AT A MINIMUM OF 3:1.
- E14. WHERE BATTERS CANNOT BE PROVIDED TO SUPPORT THE CUT OR FILL, THEY SHALL BE ADEQUATELY RETAINED.
- E15. RETAINING WALLS ARE TO BE CONSTRUCTED WITH ADEQUATE SUBSOIL DRAINAGE.

STANDARD LINE TYPES AND SYMBOLS:

	PROPOSED KERB & GUTTER
	EXISTING KERB & GUTTER
	PROPOSED BELOW GROUND PIPELINE
	PROPOSED SUSPENDED PIPELINE
	EXISTING PIPELINE
	SUBSOIL DRAINAGE LINE
	PROPOSED KERB INLET PIT
	EXISTING KERB INLET PIT
	PROPOSED JUNCTION OR INLET PIT
	EXISTING JUNCTION OR INLET PIT
	DESIGN CENTRELINE
	EXISTING EDGE OF BITUMEN
	TELECOMMUNICATION CONDUIT
	GAS MAIN
	WATER MAIN
	SEWER MAIN
	UNDERGROUND ELECTRICITY CABLES
	PERMANENT MARK & S.S.M.
	BENCHMARK, SURVEY STATION

LOCATION PLAN



SCHEDULE OF DRAWINGS

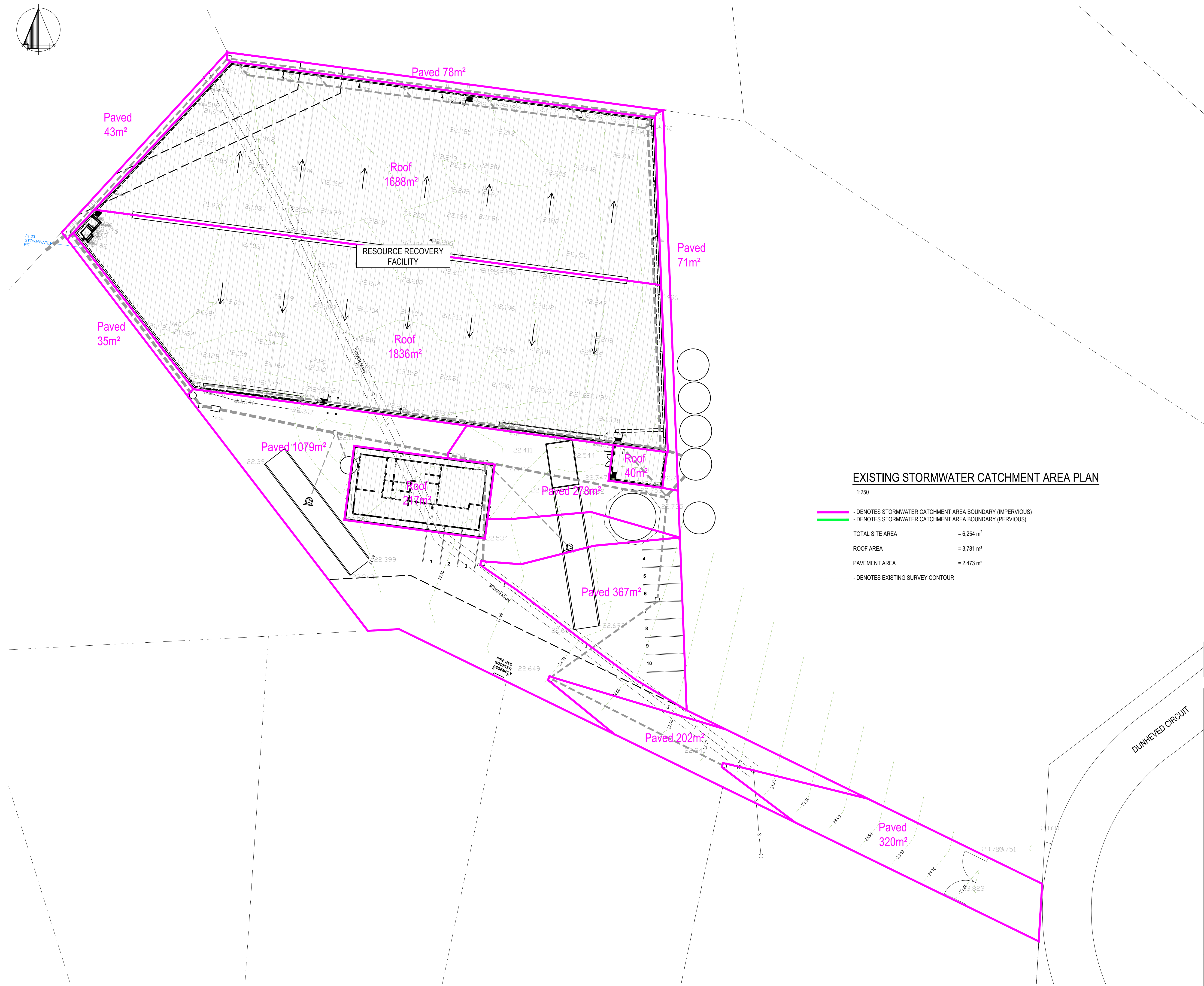
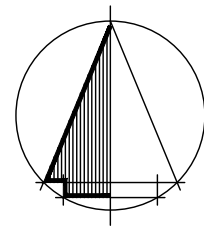
SHEET No	DESCRIPTION
C01	GENERAL NOTES
C02	EXISTING STORMWATER CATCHMENT AREA PLAN
C03	EXISTING STORMWATER DRAINAGE PLAN
C04	REMEDIAL STORMWATER DRAINAGE PLAN

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RESOURCE RECOVERY FACILITY 25 Dunheved Circuit, St. Marys For BORG Construction		
GENERAL NOTES		
DESIGN SWH	DRAWN RCL	DATE FEB 2021
CHECKED	APPROVED	SCALE
PROJECT No 10113		DRG No C01 - A

AT ORIGINAL SIZE



EXISTING STORMWATER CATCHMENT AREA PLAN

1:250

- DENOTES STORMWATER CATCHMENT AREA BOUNDARY (IMPERVIOUS)
 - DENOTES STORMWATER CATCHMENT AREA BOUNDARY (PERVIOUS)
- TOTAL SITE AREA = 6,254 m²
- ROOF AREA = 3,781 m²
- PAVEMENT AREA = 2,473 m²
- DENOTES EXISTING SURVEY CONTOUR

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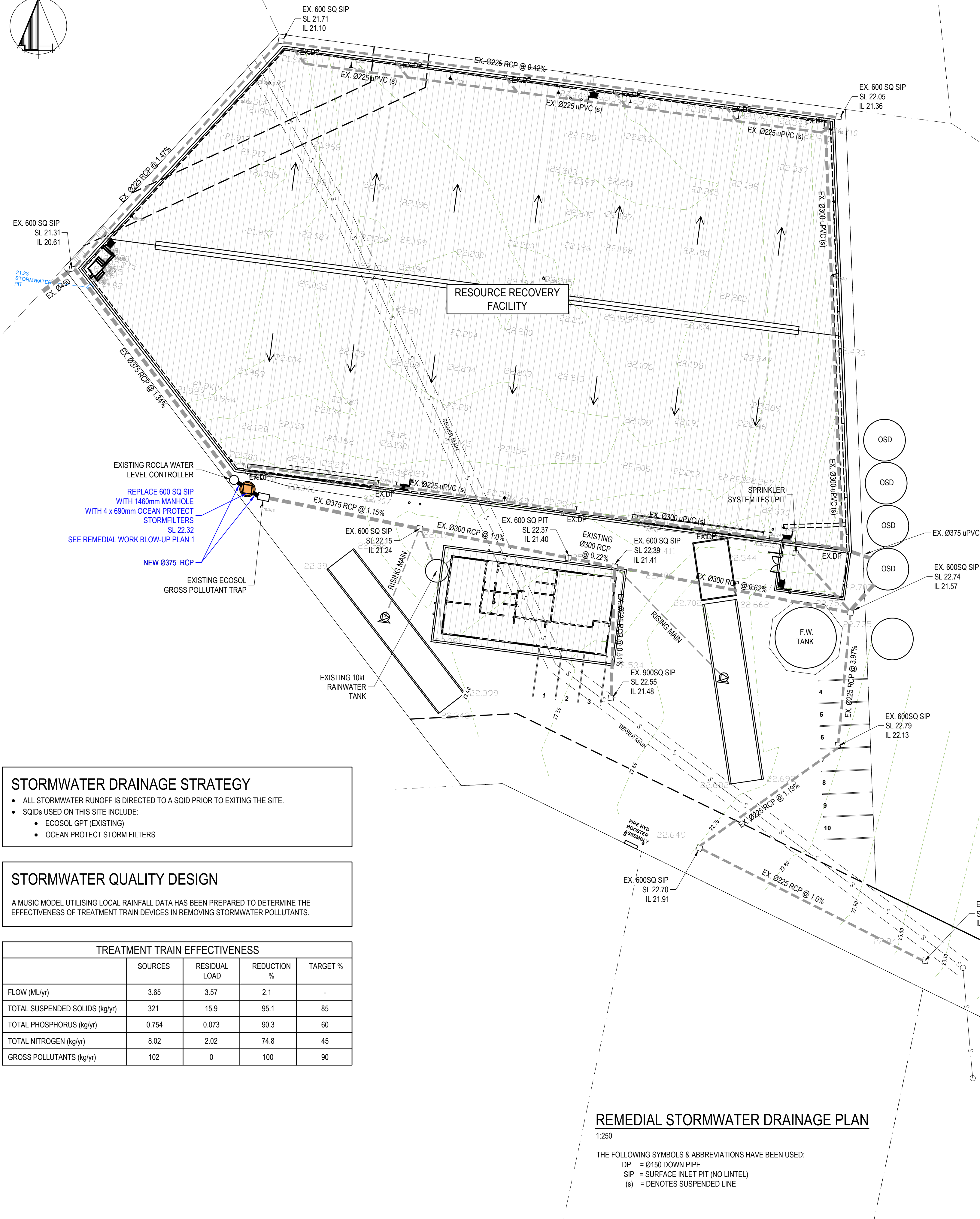
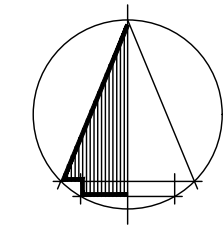
25 Dunheved Circuit, St. Marys

For BORG Construction

EXISTING STORMWATER CATCHMENT AREA PLAN

DESIGN	DRAWN	DATE	PROJECT No.
SWH	RCL	FEB 2021	10113
CHECKED	APPROVED	SCALE	DRG No.
		1:250	C02 - A

A1 ORIGINAL SIZE



STORMWATER DRAINAGE STRATEGY

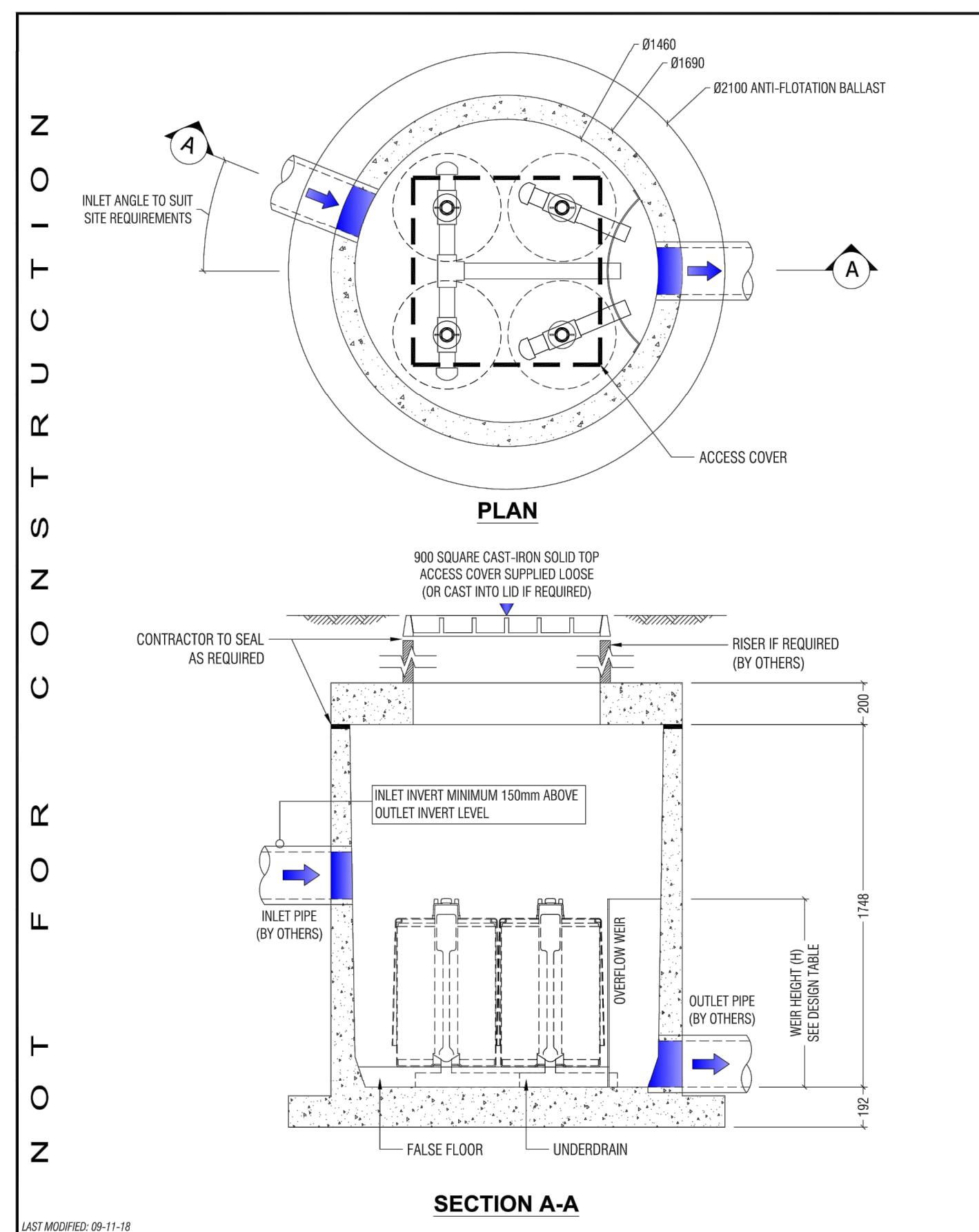
- ALL STORMWATER RUNOFF IS DIRECTED TO A SOLID PRIOR TO EXITING THE SITE.
- SQIDS USED ON THIS SITE INCLUDE:
 - ECOSOL GPT (EXISTING)
 - OCEAN PROTECT STORM FILTERS

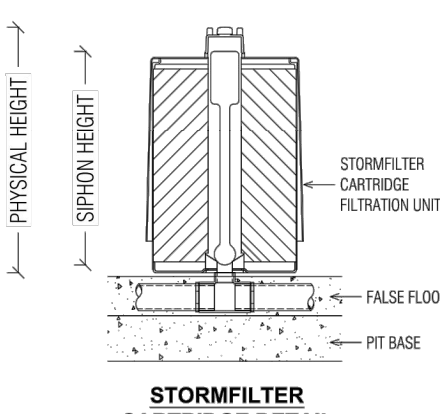

STORMWATER QUALITY DESIGN

A MUSIC MODEL UTILISING LOCAL RAINFALL DATA HAS BEEN PREPARED TO DETERMINE THE EFFECTIVENESS OF TREATMENT TRAIN DEVICES IN REMOVING STORMWATER POLLUTANTS.

TREATMENT TRAIN EFFECTIVENESS

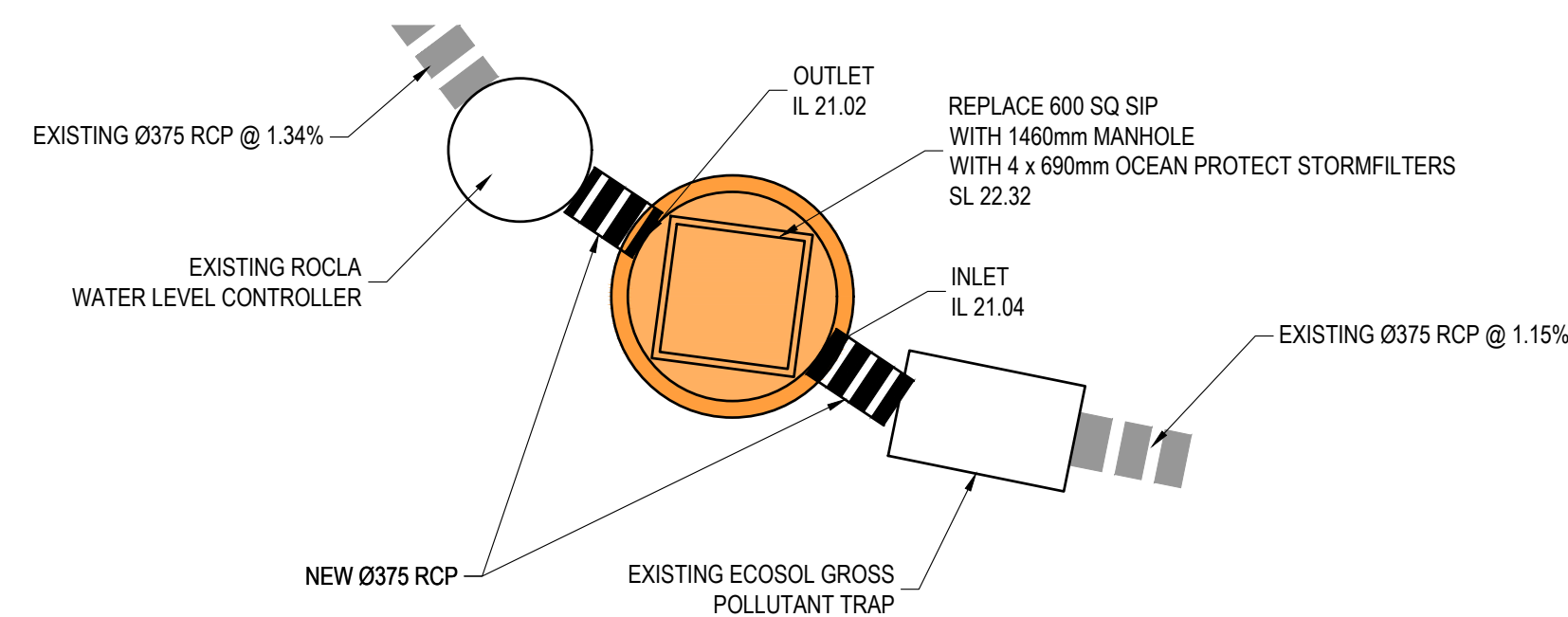
	SOURCES	RESIDUAL LOAD	REDUCTION %	TARGET %
FLOW (ML/yr)	3.65	3.57	2.1	-
TOTAL SUSPENDED SOLIDS (kg/yr)	321	15.9	95.1	85
TOTAL PHOSPHORUS (kg/yr)	0.754	0.073	90.3	60
TOTAL NITROGEN (kg/yr)	8.02	2.02	74.8	45
GROSS POLLUTANTS (kg/yr)	102	0	100	90



STORMFILTER DESIGN TABLE			
<ul style="list-style-type: none">STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.			
CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT (H) (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39
		SITE SPECIFIC DATA REQUIREMENTS	
		STRUCTURE ID [] [] [] []	
		NUMBER OF CARTRIDGES REQ'D [] [] [] [] 4	
		SIPHON HEIGHT (310 / 460 / 690) [] [] [] []	
		MEDIA TYPE (ZPG / PSORB) [] [] [] []	
		WATER QUALITY FLOW RATE (L/S) [] [] [] []	
		HYDRAULIC CAPACITY (L/S) [] [] [] [] 90	
		PIPE DATA: [] [] [] [] [] [] [] [] [] [] [] []	
		INLET PIPE #1 [] [] [] [] [] [] [] [] [] [] [] []	
		INLET PIPE #2 [] [] [] [] [] [] [] [] [] [] [] []	
		INLET PIPE #3 [] [] [] [] [] [] [] [] [] [] [] []	
		OUTLET PIPE [] [] [] [] [] [] [] [] [] [] [] []	
PRECAST MANHOLE WEIGHT [] [] [] [] 4100kg			
PRECAST LID WEIGHT [] [] [] [] 1100kg			
GENERAL NOTES			
<ol style="list-style-type: none">PRECAST STRUCTURE SUPPLIED WITH CORE HOLES TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CERTIFYING ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.DRAWING NOT TO SCALE.			
INSTALLATION NOTES			
<ol style="list-style-type: none">ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).CONTRACTOR TO APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.			
		OCEAN PROTECT 4 CARTRIDGE STORMFILTER SYSTEM DN1460 MANHOLE SPECIFICATION DRAWING	

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RESOURCE RECOVERY FACILITY 25 Dunheved Circuit, St. Marys For BORG Construction		
REMEDIAL STORMWATER DRAINAGE PLAN		
DESIGN SWH	DRAWN RCL	DATE FEB 2021
CHECKED	APPROVED	SCALE 1:250
PROJECT No. 10113		DRG No. C04 - A