ARUP

NEXTDC Limited

Sunshine Coast 2

Stormwater Management Plan

Reference: 299953-SC2-AR-DA-REP-C-002

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Contents

Tables

Figures

Appendices

1. Introduction

This document has been prepared by Arup as part of a Development Application to Sunshine Coast Council (SCC) for the proposed development located at Lot 10 South Sea Islander Way, Maroochydore, QLD.

The purpose of this report is to address the stormwater quantity and quality issues at a conceptual level for the proposed development.

1.1 Project Overview

NEXTDC is an established and growing data centre developer and operator. Since its inception thirteen years ago, NEXTDC has developed multiple premium quality data centres nationally, all certified to the industry's highest standards. NEXTDC continues to grow their pipeline of world-class, next-generation data centres in Australian cities, with the latest expansion being the SC2 facility at Lot 10, South Sea Islander Way, Maroochydore, QLD 4558, Australia, directly adjacent to the existing SC1 facility. The SC2 facility is to comprise a multi-level data centre with a total capacity of 6MW IT, as well as collaboration and mission critical (MCX) office space.

1.2 Location

The project site is located within Maroochydore City Centre, bounded to the north by Future Way, to the east by Red Bill Lane, to the south by Sunshine Coast Parade, and to the west by South Sea Islander Way.

The proposed development is positioned on Lot 10 SP305311, South Sea Islander Way, Maroochydore, QLD, as shown in Figure 1.

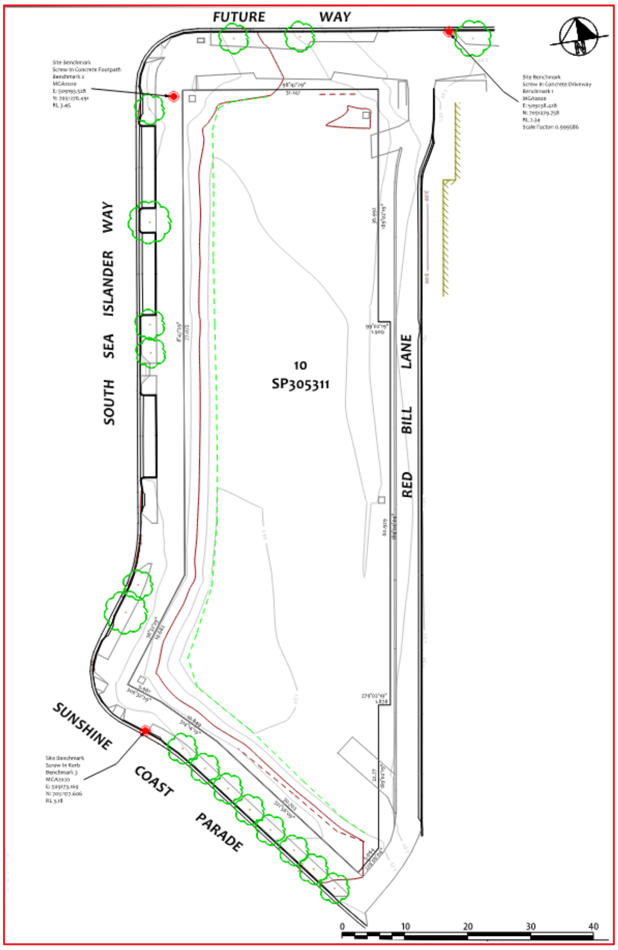


Figure 1 - Proposed site location at Lot 10 South Sea Islander Way, Maroochydore, QLD, 4558.

1.3 Background Information

This report was prepared using information obtained from the following sources:

- Detail and level survey for Lot 10 SP305311, prepared by ONF Surveyors, surveyed 5 March 2024, reference 12125_D1.
- Architectural drawings of the proposed development prepared by Architectus
- SCC MyMaps (online)
- Before You Dig Australia (BYDA) services

1.4 Abbreviations

Acronyms used within the report are outlined in Table 1 below.

Table 1: Abbreviations

Abbreviations	Description
AEP	Annual Exceedance Probability
DBYD	Dial Before You Dig
EV	Environmental Value
GP	Gross Pollutant
GPT	Gross Pollutant Trap
MCX	Mission critical
PDA	Priority Development Area
PMF	Probable Maximum Flood
QUDM	Queensland Urban Drainage Manual
RCBC	Reinforced Concrete Box Culvert
RCP	Reinforced Concrete Pipe
SCC	Sunshine Coast Council
SWMP	Stormwater Management Plan
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
WbD	Water by Design
WQO	Water Quality Objective

2. Existing Site and Drainage Characteristics

2.1 Existing Site

The proposed site consists of one allotment (10SP305311), with a total area of 3.711 ha. The existing site is currently undeveloped and grassed and is currently utilised as an informal off-street parking area.

2.2 Topography

A detail and level survey has been prepared by ONF Surveyors for NEXTDC (ref 12125_D1). This shows the existing site as generally flat, with levels varying between 2.4 and 3.4mAHD.

There is existing vehicular access to the site via Red Bill Lane. Existing services are located on site including water mains, electricity, stormwater drainage and sewerage.

2.3 Flood Risk from External Catchments

2.3.1 Summary

As part of a due diligence study for the site, a flood risk assessment was conducted. Consultation was undertaken with the Sunshine Coast Council who shared flood levels at the proposed site from both the Maroochy River and Cornmeal Creek Flood Studies. This information has been utilised to inform the required minimum floor levels for the proposed data centre to minimise flood risk.

Note that no modelling has been undertaken specifically for this project as the representation of the site of interest within the masterplan for the Maroochydore City Centre was adequate.

The outcome of the desktop assessment indicates that the on-site flood risk to the proposed data centre is minimal, with the ground floor level being above the Council's Probable Maximum Flood (PMF) level.

2.3.2 Catchment Extents and Existing Flow Regime

The site is located adjacent to the Maud Street Canal, which runs into Cornmeal Creek. The contributing area into the Maud Street Canal, upstream of the proposed site is approximately 120 hectares. The upstream catchment land use consists predominantly of developed areas (i.e., buildings, residential and paved areas) with some open space.

The Maud Street Canal and broader Cornmeal Creek catchments dictate flood levels up to approximately the 1 in 2000 AEP event (present climate). For events of larger magnitude, including the 1 in 2000 annual exceedance probability (AEP) event (2100 Climate Scenario) and the PMF event, backflow from the Maroochy River dominates the peak flood level.

An overview of the site locality and existing watercourses surrounding the site is shown in Figure 2.

Figure 2: Site Locality and Proximal Watercourses

2.3.3 Existing Flood Studies

The two existing flood studies which were used to inform this site assessment are summarised below in Table 2.

Table 2 Available Existing Flood Studies

Study Name	Author	Year	Model Type	Events Modelled	Calibrated/Uncalibrated
Maroochy River Flood Study	BMT WBM	2017	TUFLOW FV	50% AEP through to PMF (utilising Duration independent Storm)	Calibrated to multiple events
Cornmeal Creek Flood Study	Cardno	2013 & 2017	TUFLOW	39% AEP through to 0.05% AEP including Design case modelling associated with Maroochydore City Centre.	Calibrated to March 2012 event.

The Cornmeal Creek flood studies, including the 2023 Calibre study (not yet publicly available), have considered a fully developed Maroochydore priority development area (PDA). These studies have assessed flood impacts and demonstrated no flood worsening external to PDA. Therefore, it is deemed that all required mitigation provisions associated with the development has been considered by Council and no additional flood impact assessment is required

For more information on these studies, refer to the Sunshine Coast Flood and Drainage Study database.

2.3.4 Flood Risk

As discussed in Section 2.3.2, local Cornmeal Creek catchment flooding dictates flood levels throughout the majority of AEP events at the proposed site. It is only in extreme events, such as the 1 in 2000 AEP (2100 Climate Scenario) and PMF event that the critical flood level at the site is dictated by the Maroochy River. This is due to the high levels in the Maroochy River causing backwater affects through Cornmeal Creek and Maud Street Canal.

Flood levels have been extracted from the available flood studies have been provided by Sunshine Coast Council, with levels being extracted from the southern end of the lot (or from Maud Street Canal in smaller events). Flood levels and the relevant dataset are summarised in Table 3. Flood extents have also been presented in Figure 3. Note that the PMF flood extent has not been included in this image, as it covers the entire extent shown, together with the majority of the Maroochydore CBD.

Table 3: Flood Levels from External Catchments at the site

Event	WSL @ Proposed Site	Data Source
39% AEP	1.55	Cornmeal Creek Flood Study
10% AEP	1.87	Cornmeal Creek Flood Study
10% AEP in 2100	2.67	Cornmeal Creek Flood Study
1% AEP	2.54	Cornmeal Creek Flood Study
1% AEP in 2100	3.12	Cornmeal Creek Flood Study
0.5% AEP in 2100	3.28	Cornmeal Creek Flood Study
0.05% AEP	3.38	Cornmeal Creek Flood Study
0.05% AEP in 2100	3.60	Maroochy River Flood Study
PMF	4.96	Maroochy River Flood Study

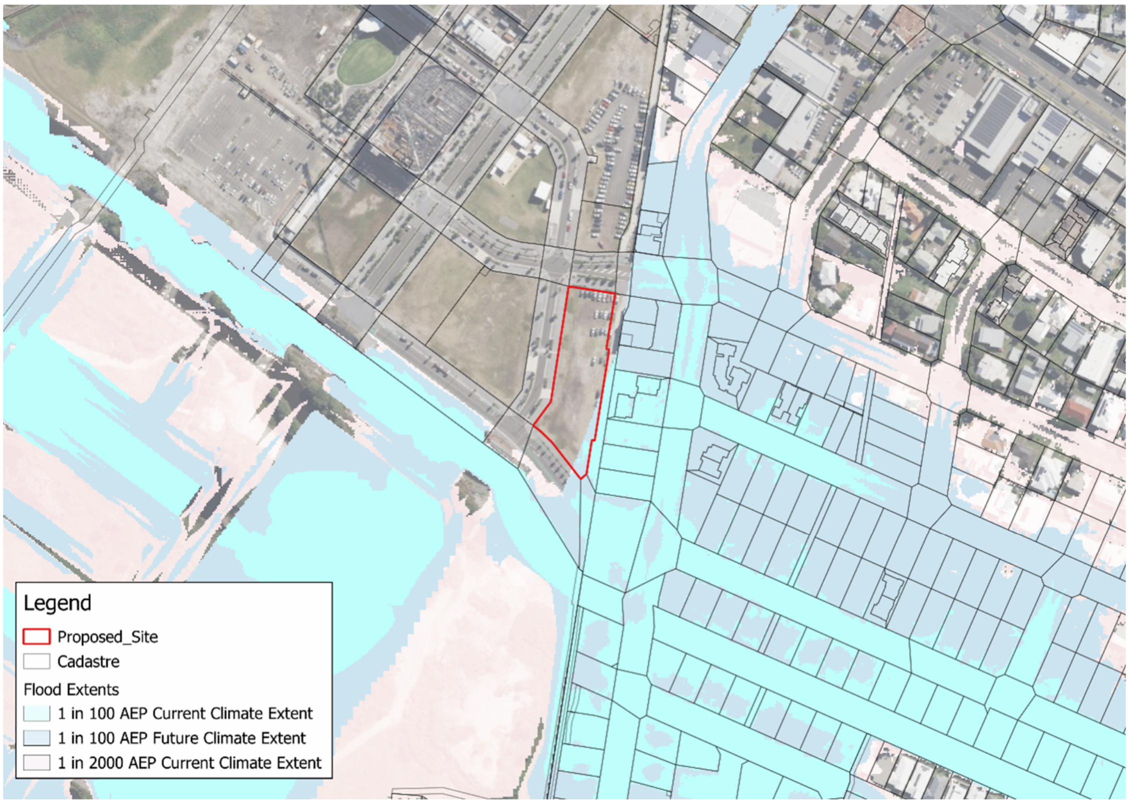


Figure 3: Ultimate Development Scenario Probable Maximum Flood Extents

As per Table 3, the PMF level at the site would reach 4.96mAHD. Consequently, the ground floor level of the proposed data centre has been set to the PMF level. Given the rarity and extremity of this event, an additional allowance for freeboard is deemed not appropriate, as would be typical when setting ground floor levels to 1% AEP events. In the ultimate development scenario, the proposed data centre would host all critical infrastructure above the PMF flood level.

However, in a PMF event, the building would not be accessible as surrounding streets are typically at elevations of 2.5mAHD to 3.5mAHD and, therefore, would be inundated by 1.5m to 2.5m of flood depth. The resulting isolation of the building is likely to persist for a number of hours (not days).

Flood free access in the 1% AEP is provided for the main entrance facing South Sea Islander Way. The basement carpark entrance, located along Red Bill Lane, is set to a level of 2.57mAHD, providing 1% AEP flood immunity to the basement carpark.

2.4 Existing Drainage and Lawful Point of Discharge

The existing drainage network is presented in Figure 4 and is based on the existing stormwater network information obtained from the SCC MyMap service.

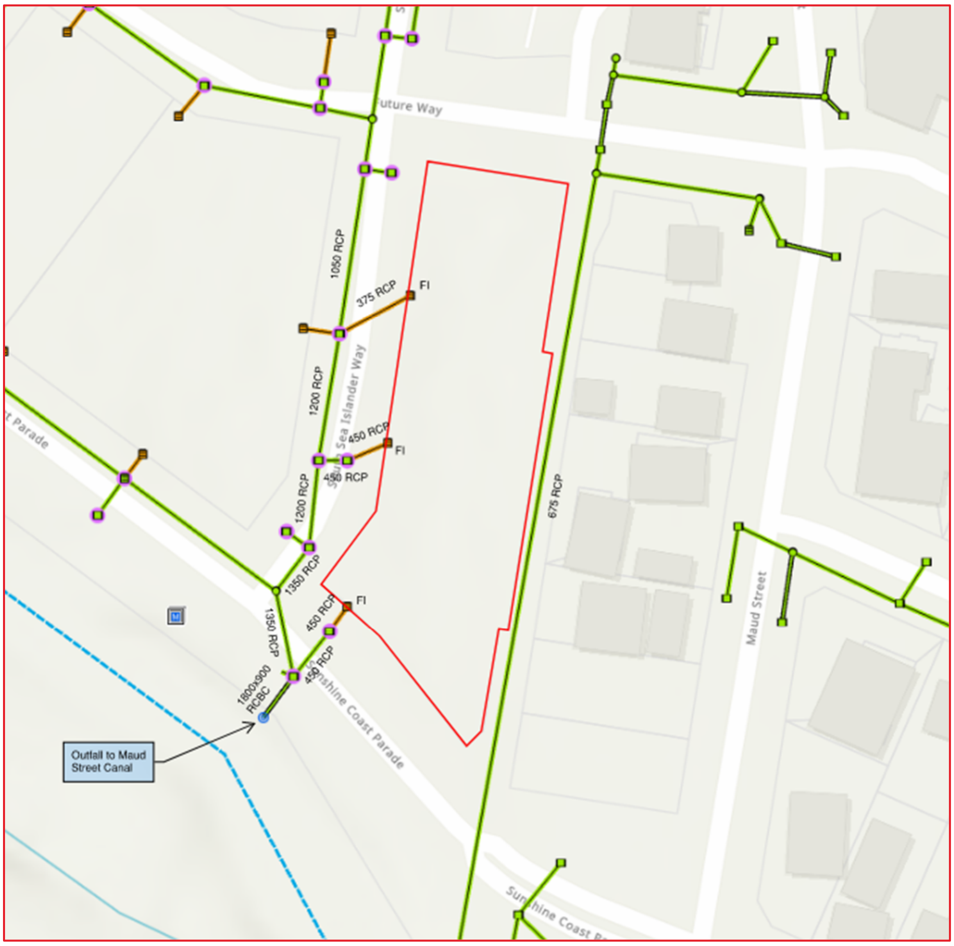


Figure 4: Existing stormwater network, as developed from the SCC ArcGIS service.

2.4.1 Network west of site

Relevant to the site, there is an existing 1050mm dia. steel reinforced concrete pipe (RCP) running south along South Sea Islander Way, in increasing diameter up to 1350mm. This discharges into a 1.8m x 0.9m reinforced concrete box culvert (RCBC) on the south side of Sunshine Coast Parade, which in turn outfalls into the Maud Street Canal.

There are three field inlets within the site itself, two connecting into the South Sea Islander Way pipe run with 375mm dia. and 450mm dia. connections respectively, and one 450mm connection on the southern boundary of the site connecting into an external 450mm dia. pipe which in turn connects into the RCBC.

2.4.2 Network east of site

A 675mm dia. RCP runs under Red Bill Lane, discharging directly into Maud Street Canal. No connectivity is currently provided to the site. The detail and level survey for Lot 10 SP305311 prepared by ONF Surveyors identified two gully pits along Red Bill Lane serviced by this RCP.

2.4.3 Existing stormwater outfalls

There are effectively three legal points of discharge, as summarised in Table 4. Further detail on the proposed stormwater drainage strategy can be found in Section 4.1.

Table 4: Existing stormwater outfalls

Outfall	Size (mm)	Description
Outfall 1	375mm dia. RCP	Field inlet connecting into the South Sea Islander Way RCP run.
Outfall 2	450mm dia. RCP	Field inlet connecting into the South Sea Islander Way RCP run.
Outfall 3	450mm dia. RCP	Field inlet connecting into the Sunshine Coast Parad RCP run, which in turn connects into the 1.8m x 0.9m RCBC.

3. Design Criteria

The primary aim of a stormwater management plan (SWMP) is to ensure stormwater generated from the developed catchment or site causes minimal nuisance, danger and damage to people, adjacent properties and the surrounding environment.

To control stormwater quantity and quality, the proposed development should meet the key design criteria outlined in Table 5 below.

Table 5: Design Criteria

Design Criteria	Description
Sunshine Coast Planning Scheme 2014	The Planning Scheme outlines the required performance outcomes that apply to the design, construction, operation and maintenance of stormwater infrastructure
Queensland Urban Drainage Manual (QUDM) Fourth Edition 2017	Stormwater Management Plans define the proposed management of stormwater quantity and quality, and the protection of receiving water features, such as the protection of existing waterways. Stormwater Management Plans should include consideration of issues such as protection from flooding, measures to reduce changes to the volume and velocity of stormwater runoff, measures to minimise harm to receiving waters by stormwater, opportunities to prevent the initial contamination of stormwater and to remove introduced contaminants, and water conservation and recycling.
State Planning Policy 2017	Maximum concentration-based water quality objectives and minimum reduction targets in mean annual pollutant loads.
Environmental Protection Policy 2009	Specific local Environmental Values (EVs) and/or Water Quality Objectives (QWOs) for Queensland catchments.

4. Proposed Stormwater Drainage Strategy

4.1 Proposed Stormwater Drainage Strategy

The proposed site catchment constitutes building roof area, soft and hard landscaping, and vehicle crossovers. Stormwater runoff is collected from the site and directed as follows:

- To the bioretention raingarden to the east of the site, before discharging into the Council stormwater network along Red Bill Lane.
- To the bioretention raingardens to the west of the site, before discharging into the Council stormwater network via the existing field inlets along South Sea Islander Way.
- Direct to the Council stormwater network along Red Bill Lane.

For the full extent of the proposed catchments, refer to Appendix A.

The bioretention raingardens proposed across the site total a ~142 m^2 filter area, greater than the required minimum 1.5% of the development site area (56 m^2), and acts to achieve the Water Quality Objectives in line with the deemed to comply solution presented in Section 6.1.2.

Where the constraints of the site mean that certain stormwater catchments cannot utilise the bioretention raingarden, a connection is proposed direct to the Council stormwater network along Red Bill Lane and the installation of a proprietary treatment device is proposed to achieve the Water Quality Objectives.

Gross pollutant traps (GPTs) are proposed on all surface level linear drainage features, and hydraulic connections are to be fitted with non-return valves to mitigate surcharging of the stormwater network.

Existing field inlets are to be retained as connections where soft landscaping is proposed. Pipe networks shall be designed to convey the 10-year AEP minor storm event. For larger storm events than the minor storm where flow exceeds pipe capacity, the development topography will be designed such that stormwater will leave the site via overland flow paths into the Maud Street Canal, as per existing conditions.

4.1.1 Catchment C1

Stormwater runoff from this catchment primarily consists of soft landscaping, hard landscaped footpaths, and vehicle parking adjacent to Red Bill Lane. Stormwater runoff will be collected from the site via surface level linear drainage features (e.g. gully pits, linear channels) and connected into the site stormwater network, before discharging into the Council stormwater network on Red Bill Lane.

4.1.2 Catchment C2

Stormwater runoff from this catchment primarily consists of soft landscaping, hard landscaped footpaths. Stormwater runoff will be collected from the site via surface level linear drainage features (e.g. gully pits, linear channels) and connected into the site stormwater network, before discharging into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.3 Catchment C3

Stormwater runoff from this catchment primarily consists of soft landscaping and minor hard landscaped footpaths along a corridor to the face of the building along South Sea Islander Way. Stormwater runoff will be collected and discharged into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.4 Catchment C4

Stormwater runoff from this catchment primarily consists of soft landscaping and minor hard landscaped footpaths along a corridor to the face of the building along South Sea Islander Way. Stormwater runoff will be collected and discharged into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.5 Catchment C5

Catchment C5 consists of a corridor of soft and hard landscaping to the face of the building along Red Bill Lane and crossovers into the building; the corridor is as narrow as 0.2m wide in places. Due to its extremely small catchment area and limited contribution to overall site flows, it is proposed that stormwater will discharge to Red Bill Lane as sheet flow and be picked up via the 675mm dia. RCP main along Red Bill Lane, before discharging into Maud Street Canal.

Any runoff that lands on the proposed bioretention raingarden within this catchment will be treated before discharging into the Council stormwater network along Red Bill Lane.

4.1.6 Catchment C6

Catchment C6 consists of a corridor of soft and hard landscaping to the face of the building along Red Bill Lane; the corridor is as narrow as 0.2m wide in places. Due to its extremely small catchment area and limited contribution to overall site flows, it is proposed that stormwater will discharge to Red Bill Lane as sheet flow and be picked up via the 675mm dia. RCP main along Red Bill Lane, before discharging into Maud Street Canal.

4.1.7 Catchment C7

Stormwater runoff collected from the roof of the building will be connected into the stormwater network serving Catchment C2, before discharging into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.8 Catchment C8

Stormwater runoff collected from the roof of the building will be connected into the bioretention raingarden to the west of the building, before discharging into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.9 Catchment C9

Stormwater runoff collected from the roof of the building will be connected into the bioretention raingarden to the west of the building, before discharging into the Council stormwater network along South Sea Islander Way via the existing field inlet.

4.1.10 Catchment C10

Stormwater runoff collected from the roof of the building will be connected into the bioretention raingarden to the east the building, before discharging into the Council stormwater network along Red Bill Lane.

4.1.11 Catchment C11

Stormwater runoff collected from the roof of the building will discharge directly into the Council stormwater network along Red Bill Lane; layout constraints prevent this catchment utilising the bioretention raingardens across the site. The installation of a proprietary treatment device is proposed to achieve the Water Quality Objectives.

4.2 Lawful Point of Discharge

The lawful point of discharge for the minor and major storm events for the proposed development will be as follows:

- Minor Storm: Maud Street Canal, via Council’s RCP stormwater mains along South Sea Islander Way and Red Bill Lane
- Major Storm: Maud Street Canal

5. Stormwater Quantity

5.1 Site Catchment Assessment

Based on an analysis of the ground floor plan, the post-development site will be 89% impervious. Refer to Table 6 for a summary of pre-development and post-development impervious areas for the site.

Table 6: Pre-development and post-development catchment areas

Area	Pre-Development		Post-Development	
	Area (sqm)	**Area (%)**	**Area (sqm)**	**Area (%)**
Pervious	3,711	100%	376	11%
Impervious	Nil	0	3,335	89%
Total	**3,711**	**-**	**3,711**	**-**

5.2 Peak Flows

5.2.1 Council Requirements

The proposed site is located within the greater catchment of Caloundra.

According to the SCC Stormwater Management Code, the acceptable outcomes AO2.2 and AO2.3 under Performance Outcome PO2 are as follows:

- AO2.2: Stormwater flows discharged from the development are either within the capacity of the downstream drainage system such that non-worsening occurs or are mitigated to pre-development characteristics.
- AO2.3 Development provides for the management of stormwater to incorporate appropriate allowance for climate change impacts (including rainfall intensity and sea level rise), in accordance with the Planning scheme policy for development works.

5.2.2 Detention

It is considered that detention is not required for the following reasons:

- The site is located in the greater catchment area.
- Stormwater runoff will be discharged directly to piped trunk stormwater infrastructure.
- The western and southern boundaries of the site are effectively all at the same elevation. i.e. for stormwater connection purposes, it could be assumed that these have been sized for 100% increase in pre-development flows.
- Installing a detention system may hold discharge to a point where the upstream catchment starts to contribute flow at the discharge point. Ideally, the site should discharge all runoff prior to the rising limb of the discharge hydrograph of wider catchment arriving at the site; and
- Demonstration that the Council stormwater infrastructure can accommodate the unattenuated flows.

5.2.3 Accommodation of Unattenuated Flows

Peak flows for the site were estimated using the Rational Method and the following input parameters:

- Intensity frequency duration data for the proposed site (source: BOM ARR 2016 data);
- 15-minute time of concentration for pre-development; and

- 5-minute time of concentration for post-development noting the existing piped network.

The estimated pre-development and post-development discharges are shown in Table 7 below. The 1% AEP with climate change suggest a maximum flow of 0.392m^3/s. The three available connections have capacity to convey this flow.

Table 7: Estimated peak flows for pre- and post-development conditions, including climate change allowance

AEP (%)	Pre-development (l/s)	Post-development (l/s)	Increase (l/s)	Increase (%)
1%	231	392	161	69.5%
2%	206	344	138	67.1%
5%	170	281	111	65.2%
10%	146	239	93	63.9%
20%	123	199	76	61.6%
50%	86	139	53	62.1%
63.2%	75	121	46	60.8%

6. Stormwater Quality

6.1 Operational Phase Stormwater Quality Management

6.1.1 Performance Criteria

According to the SCC's Flooding and Stormwater Management Guidelines, all stormwater leaving the site must be compliant with the minimum pollutant reduction targets to comply with the Queensland State Planning Policy for Water Quality, as summarised in Table 8.

Table 8: Operational Phase Water Quality Design Objectives

Pollutants	Design Objective (%)
Total Suspended Solids (TSS)	80%
Total Phosphorous (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants (GP)	90%

6.1.2 Deemed to comply solution

For the majority of the site, the following deemed to comply solution is proposed to achieve the water quality design objectives outlined in Table 8:

- Provision of a bioretention device with filter area equivalent to 1.5% of the development site area, where the minimum filter media depth is 0.5m and the minimum extended detention depth is 0.1m (at-source) or 0.3m (end-of-line).

For this site, this equates to a $56m^2$ filter area. The bioretention raingardens proposed across the site total a ~142 m2 filter area, greater than the required minimum.

6.1.3 Stormwater Quality Modelling

Where the layout constraints of the site prevent catchments from utilising the proposed bioretention raingardens across the site, mathematical modelling has been undertaken to assess the stormwater treatment strategy during the operational phase. Modelling was undertaken using MUSIC version 6 software, which has the capability to simulate discharge loads and concentrations of GP, TN, TP, and TSS.

Beyond bioretention raingardens, the proposed stormwater quality treatment train utilises proprietary devices to achieve the required water quality objectives. The stormwater quality devices listed in Table 9 have been proposed to suit the characteristics of the proposed development.

Table 9: Proposed Stormwater Quality Treatment Devices

SQID	Description
Atlan Stormsacks	Atlan Stormsacks are designed for the capture of gross pollutants, sediment, litter, oil and grease.
AtlanFilter	AtlanFilter improves stormwater quality of runoff by absorbing and retaining pollutants including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other pollutants.

6.1.3.1 Input Data

Model Assumptions

- Source nodes and treatment nodes have been specified to represent the generation and treatment of stormwater underdeveloped conditions only.

- The six minute rainfall data extending for 1997-2006 recorded in Caloundra was used to set up the meteorological template in the model.
- The time step selected for the modelling was six minutes.

Rainfall Run-off Parameters

MUSIC modelling rainfall run-off parameters used for the proposed development are as documented in Table 10 below. These rainfall run-off parameters are as documented in Water by Design (WbD) and MUSIC Modelling Guidelines (2018).

Table 10: MUSIC model runoff generation parameters (WbD, 2018)

MUSIC Model Parameter	Value (Commercial)
Rainfall threshold (mm)	1
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient (a)	243
Infiltration capacity coefficient (b)	0.60
Initial depth (mm)	50
Daily recharge rate (%)	0
Daily baseflow rate (%)	31
Daily deep seepage rate (%)	0

Pollutant Export Parameters

The MUSIC model was set up using the catchment nodes as outlined in Table 11. The pollutant export parameters utilised within the models are based on the recommendations of WbD MUSIC Modelling Guidelines Version 1.0 (2010).

Pollutant Source Nodes and Proposed Treatment Train

Table 11 identifies the catchment and pollutant surface type modelled in MUSIC for initial treatment device sizing.

Table 11: Catchment and Pollutant Sources

Catchment ID	Area (ha)	Surface Type	Fraction Impervious (%)
C1	0.0357	Urban – Commercial	54
C2	0.0189	Urban – Commercial	60
C3	0.0107	Urban – Commercial	0
C4	0.0110	Urban – Commercial	38
C5	0.0160	Urban – Commercial	54
C6	0.0082	Urban – Commercial	61
C7	0.0393	Commercial Roof	100
C8	0.0620	Commercial Roof	100

Catchment ID	Area (ha)	Surface Type	Fraction Impervious (%)
C9	0.0295	Commercial Roof	100
C10	0.0699	Commercial Roof	100
C11	0.0699	Commercial Roof	100

A conceptual layout of the treatment train modelled in MUSIC is presented in Appendix C

6.1.3.2 Music Modelling Results

The results of the MUSIC modelling predict that the water treatment measures incorporated achieve the water quality objectives outlined in Section 6.1.1 across the whole site. It is therefore proposed that these measures are incorporated to service this catchment. The MUSIC modelling results for the post-development scenario are summarised in Table 12.

Table 12: Expected Pollutant Concentrations

Pollutants	Design Objective (%)	Objective Achieved (%)	Objective Achieved (Y/N)
Total Suspended Solids (TSS)	80%	83%	Y
Total Phosphorous (TP)	60%	82%	Y
Total Nitrogen (TN)	45%	74%	Y
Gross Pollutants (GP)	90%	100%	Y

6.1.4 Treatment measures

In line with the above, the proposed treatment measures are:

- Bioretention raingardens proposed across the site total a ~142 m^2 filter area, greater than the required minimum 1.5% of the development site area (56 m^2).
- Gross pollutants traps (GPTs) on all inlet pits.
- Atlan Stormsacks and AtlanFilter treatment train to service Catchment C11.

6.2 Construction Phase Water Quality Management

6.2.1 Construction Phase Performance Criteria

The construction phase performance criteria listed in Table 13 is limited to parameters that are directly linked to construction site management practices. These criteria form the discharge standards and are therefore applicable to runoff events or pumped discharges from development sites as identified in Table A of the State Planning Policy July 2017.

Table 13: Construction Phase Water Quality Design Objectives

Issue		Design Objectives
Drainage control	Temporary drainage works	1. Design life and design storm for temporary drainage works: Disturbed area open for <12 month – 2EY event Disturbed area open for 12-24 months – 5EY event Disturbed area open for > 24 months – 10% AEP event 2. Design capacity excludes minimum 150mm freeboard. 3. Temporary culvert crossing – minimum 63.2% AEP hydraulic capacity
Erosion control	Erosion control measures	1. Minimise exposure of disturbed soils at any time 2. Divert water run-off from undisturbed areas around disturbed areas 3. Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods 4. Implement erosion control methods corresponding to identified erosion risk rating
Sediment control	Sediment control measures Design storm for sediment control basins Sediment basin dewatering	1. Determine appropriate sediment control measures using: Potential soil loss rate, or Monthly erosivity, or Average monthly rainfall 2. Collect and drain stormwater from disturbed soils to sediment basin for design storm event: Design storm for sediment basin sizing is 80th % five-day event or similar 3. Site discharge during sediment basin dewatering: TSS < 50mg/l TSS, and Turbidity not > 10% receiving water turbidity, and pH between 6.5 and 8.5
Water quality	Litter and other water, hydrocarbons and other contaminants	1. Avoid wind-blow litter; remove gross pollutants 2. Ensure there is no visible oil or grease sheen on released waters 3. Dispose of waste containing contaminants at authorised facilities

6.2.2 Pre-Construction

The following measures shall be implemented prior to works commencing to ensure minimum water quality disturbance and adverse impacts. The measures below can be adopted in a staged approach and may be implemented prior to commencing works in any one area of the site:

- Sediment fences constructed to the perimeter of the construction area as required
- Drainage structure protection devices installed on existing stormwater inlet structures within the site and roadways adjacent to the site
- Diversion of upstream stormwater runoff away from proposed works areas
- Monitoring of stormwater quality discharging from the development

- Implementation of additional measures/modification of existing measures if the quality of stormwater discharging from the site is negatively impacted
- Designation of:
  - Areas of plant and construction material storage
  - Transport routes across the site to minimise dust disturbance
- Stabilisation of disturbed areas
- Implementation of sediment basins prior to discharge stormwater
- Regular inspection of erosion control measures

7. Stormwater Quality Monitoring Program

Stormwater will discharge into the existing stormwater network, before eventually reaching the Maud Street Canal, which runs into Cornmeal Creek.

Stormwater quality best management practices are proposed and therefore no further stormwater quality monitoring is proposed. The proposed mitigation measures and treatment devices are well established with a proven history of usage across sites within the region.

8. Maintenance Requirements

8.1 General

During the operational life of the development, the treatment train will require ongoing maintenance to ensure its long-term effectiveness and to minimise whole-life cost. This maintenance regime is likely to comprise of the following as necessary:

- Routine inspection cleaning and maintenance
- Replacement of filter media and cartridges within bioretention/proprietary systems
- Removal of litter and debris
- Sediment removal
- Unblocking inlets and outlets (system flushing)
- Any other items in accordance with the manufacturer's recommendations/owner's manual. Refer to Appendix B for details.

8.2 Inspection Frequency

Inspection frequency will depend on the manufacturer's recommendations for each of the proprietary treatment devices specified. It is generally recommended that two inspections should be scheduled per year following the installation of a new unit. These may consist of minor maintenance activities (route inspection, debris removal) or major maintenance activities (sediment sampling). Refer to Appendix B for details.

8.3 Access Requirements for Maintenance

The location of the bioretention rain garden and proprietary treatment devices will enable maintenance vehicle access directly from Red Bill Lane; refer to the civil concept stormwater management sketch (Appendix A) for the proposed location of treatment measures.

Should the location of the bioretention rain garden change through design development, the site is sufficiently accessible from South Sea Islander Way, Sunshine Coast Parade, and Red Bill Lane to facilitate maintenance activities.

8.4 Asset Handover

It is intended that stormwater controls detailed in this document remain under private ownership and will not be handed over as Council assets.

9. Conclusion

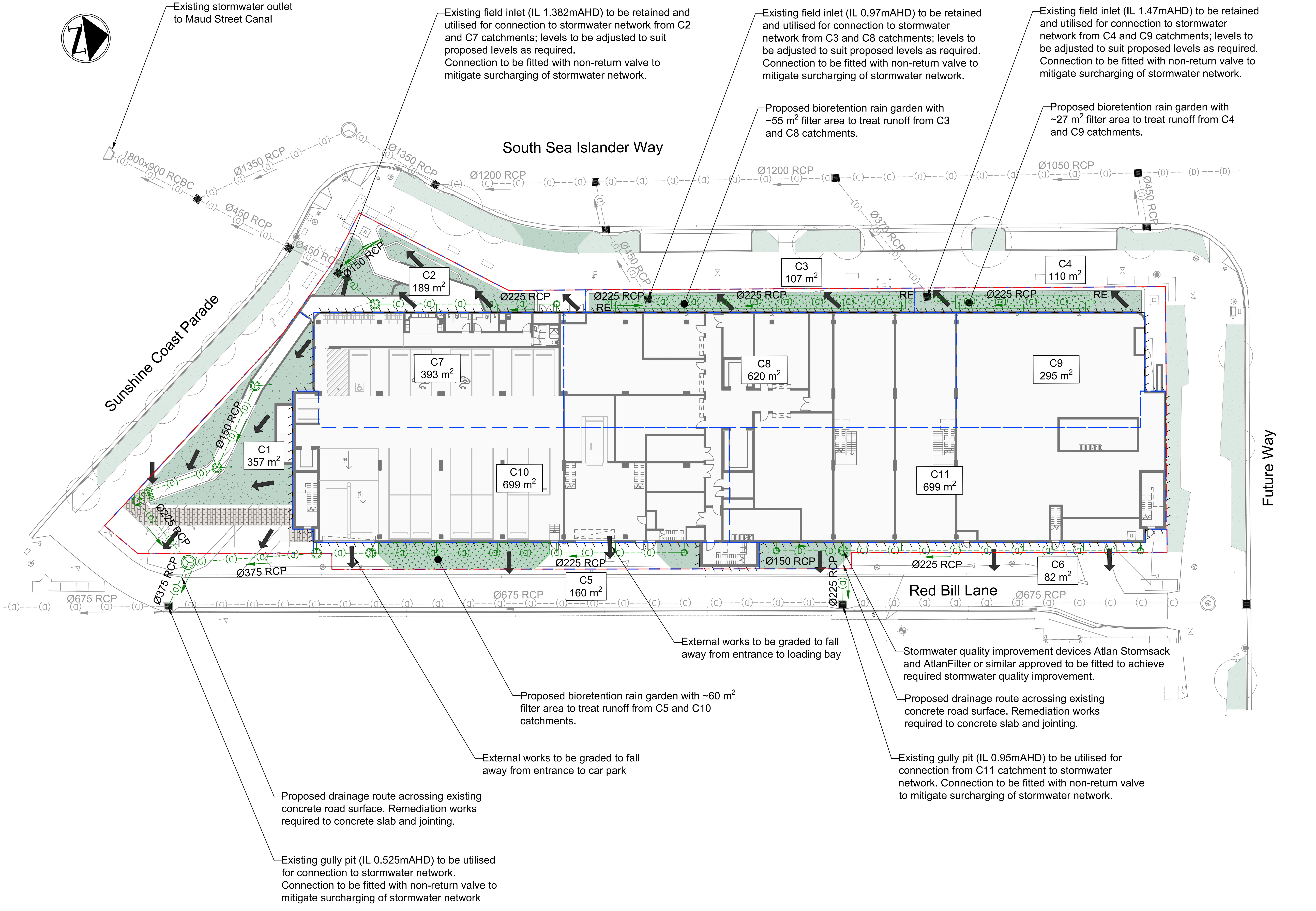
This Stormwater Management Plan has been developed in accordance with the design guidelines and codes listed in Table 5 to manage the potential impacts of the proposed development. This plan has the following key outcomes:

- Stormwater detention is not proposed for the development due to proximity to outfall to waterway via piped trunk stormwater infrastructure and demonstrating that the stormwater infrastructure can accommodate the unattenuated flows.
- Water Quality Objectives have been achieved through provision of bioretention raingardens with ~142m^2 filter area, greater than the required 1.5% of the development site area. Where the layout constraints of the site prevent catchments from utilising the proposed bioretention raingardens across the site, proprietary treatment devices are proposed and MUSIC modelling has been undertaken to demonstrate that this achieves the Water Quality Objectives for the site.
- Installation of erosion and sediment control measures during the construction phase shall be undertaken to minimise soil erosion and control sediment discharge from the site.

The implementation of the measures outlined above for the development at Lot 10 SP305311 demonstrates the suitability of the proposed development with regards to stormwater quantity and quality.

Appendix A

Concept Stormwater Management Sketch



Notes

1. All dimensions provided in millimetres and all levels provided in metres (AHD) unless noted otherwise.
2. This drawing shall be read in conjunction with all relevant project documentation.
3. Drawings to be printed in colour.
4. Detail and level survey information provided by ONF Surveyors, reference 12125_D1, dated 05/03/2024.
5. Existing stormwater network information is detailed from the ONF Surveyors topographical survey and SCC ArcGIS information. Further survey required to confirm.
6. Number and location of bioretention rain gardens indicative and subject to change during design development while satisfying minimum filter area requirements.

Legend

- Existing Site / Lot Boundary
- Existing Stormwater Pipe
- Existing Stormwater Manhole
- Existing Stormwater Catch Pit/Field Inlet
- Existing Stormwater Outlet
- Proposed Stormwater Pipe
- Proposed Stormwater Manhole
- Proposed Stormwater Linear Channel
- Proposed Bioretention Rain Garden
- Stormwater Catchment
- Proposed Overland Flow Path
- Building Outline
- Proposed Soft Landscaping
- RE Rodding Eye

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)

Issue	Date	By	Chkd	Appd
3	10/12/24	CW	MRH	DMW
	Development Application Issue - Update			
2	16/10/24	CW	MRH	DMW
	Development Application Issue			
1	23/08/24	MRH	DMW	DMW
	Development Application - Draft Issue			

Client
NEXTDC Limited

Job Title
NEXTDC SC2

Scale at A1: 1:250
Discipline: Civil

ARUP
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www.arup.com

CONSULT AUSTRALIA Member Firm
Arup Pty Ltd ABN 76 625 912 665

Drawing Title
Concept Stormwater Management Plan

Drawing Status
Development Application Issue

Job No	Drawing No	Issue
299953	SC2-AR-DA-SKT-C-003	3

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Appendix B

Maintenance Guidelines for Proprietary Treatment Devices

OPERATION & MAINTENANCE MANUAL

AtlanFilter

(Formerly SPELFilter)

Atlan
STORMWATER

atlan.com.au

CONTENTS

INTRODUCTION

Understanding how to correctly and safely maintain the AtlanFilter (formerly SPELFilter) is essential for the preservation of the filter's condition and its operational effectiveness. The AtlanFilter is a highly engineered stormwater filtration device designed to remove sediments, heavy metals, nitrogen and phosphorus from stormwater runoff.

The filters can be housed in either a concrete or fibreglass structure that evenly distributes the flow between cartridges.

Flow through the filter cartridges is gravity driven and self-regulating, which makes the AtlanFilter system a low maintenance, high performance stormwater treatment device.

This guide will provide the necessary steps that are to be taken to correctly and efficiently ensure the life of the AtlanFilter product.

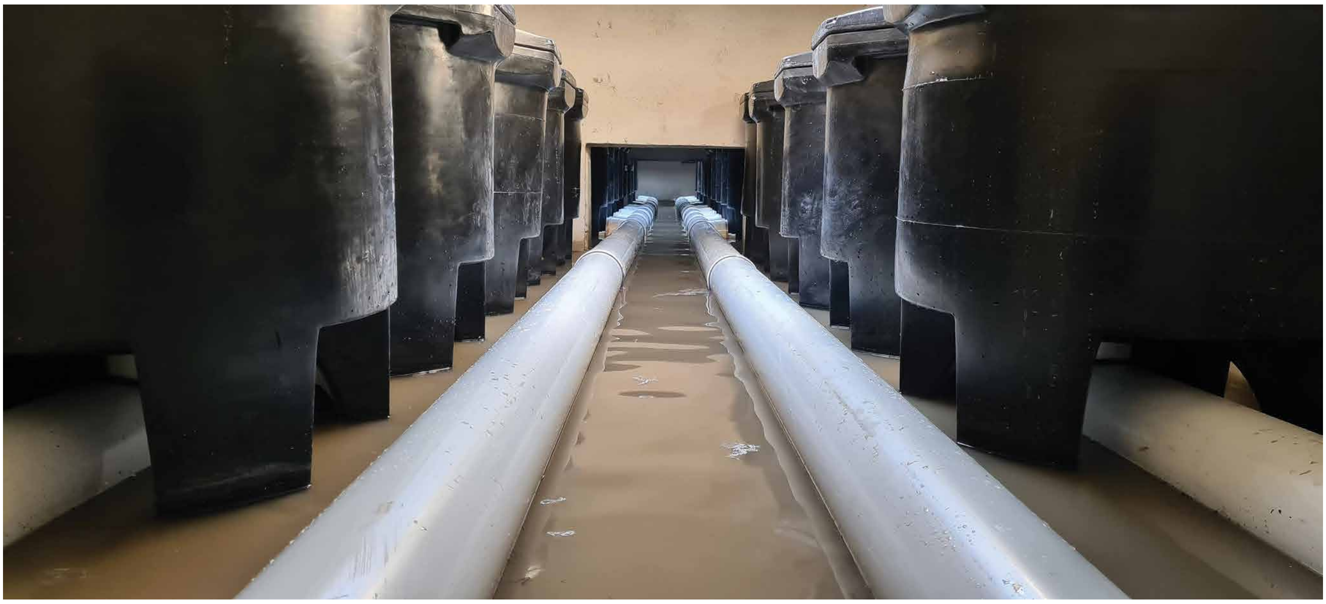


Figure 1 - AtlanFilters in a concrete chamber / vault

FEATURES

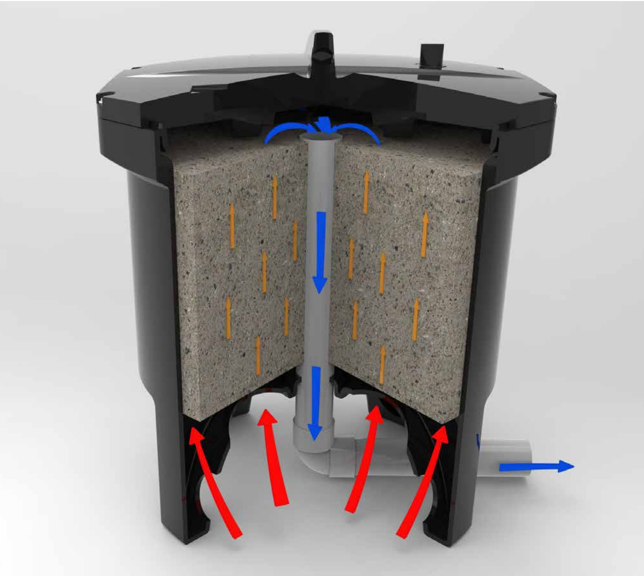


Figure 2 - Diagram of water flow through AtlanFilter

The AtlanFilter has a patented design that facilitates influent flow over the entire surface area of the media, providing consistent pollutant removal within a small footprint.

The AtlanFilter provides highly effective media filtration using gravity flow conditions, without the need for moving parts or floating valves. This eliminates the risk of mechanical failure, such as stuck valves and seizing components during its service life. This provides highly robust treatment performance.

Hydraulic head provided by a suitably sized weir in the filter vault forces stormwater through the filter media via the inlet ports underneath the filter cartridge.

Refer to the table below for minimum head required for the AtlanFilter cartridges to assist in sizing the weir.

The water to be treated enters the AtlanFilter cartridge via an upwards direction as the water level builds up around the AtlanFilter. This 'up flow' reduces the amount of sediment that could enter the media cartridge, as the sediment is allowed to drop to the vault floor under gravity. Any remaining sediment in the water is introduced through the filter media under hydraulic pressure and is filtered.

Water is filtered through the media, where dissolved and particulate Total Nitrogen and Total Phosphorus are removed via reaction with the media, in addition to the removal of Total Suspended Solids / sediment.

AtlanFilter Media Self-Backwash feature

A one-way air release valve located at the top of the filter cartridge allows air to escape as the cartridge fills up with water. This creates a siphonic flow condition as the air is completely evacuated from inside the AtlanFilter cartridge. Siphonic flow conditions are maintained until such time the water level outside of the cartridge falls beneath the inlet ports underneath the filter. At this moment, the water level inside the AtlanFilter cartridge is higher than the surrounding water level.

The water inside the AtlanFilter cartridge is then expelled upon the break of the siphon, and the water flows down and out of the inlet ports under gravity, onto the vault floor.

This is a highly effective backwash of the media and allows the expulsion of a high proportion of sediment out from the AtlanFilter media. The expelled sediment can be removed either manually or with a vacuum from the vault floor.

This backwash effect allows the media to remain highly conductive and is the key to the industry leading longevity of the AtlanFilter cartridge system, which does not need replacement for at least 5 years, and typically will achieve up to 6-8years of service, subject to the AtlanFilter being regularly maintained in accordance with this guideline and in accordance with the specific needs of the catchment.

Figure 3 - Typical Outlet Weir Wall

FEATURES

Self Supporting Feet

Each AtlanFilter cartridge stands on 4 feet, which negates the need for the construction of a false floor in the vault. The feet are bolted to the vault floor with the supplied stainless steel angles and M10 bolts. The feet allow a clear height from the vault floor up to the inlet ports of 240mm. The absence of a false floor allows plenty of room for backwashed sediment to evacuate from underneath the cartridges and thereby avoid blocking the inlet ports to the AtlanFilter from sediment buildup. It is for this reason that Atlan recommended the sediment buildup not exceed 150mm above the vault floor, so as to avoid blocking the inlet ports of the AtlanFilter. Blockage of the inlet ports due to sediment accumulation in the vault floor will cause the AtlanFilter to go into bypass and be ineffective. Hence it is important to keep up to date with monitoring and maintaining the AtlanFilter vault.

Figure 4 - Bolting the feet.

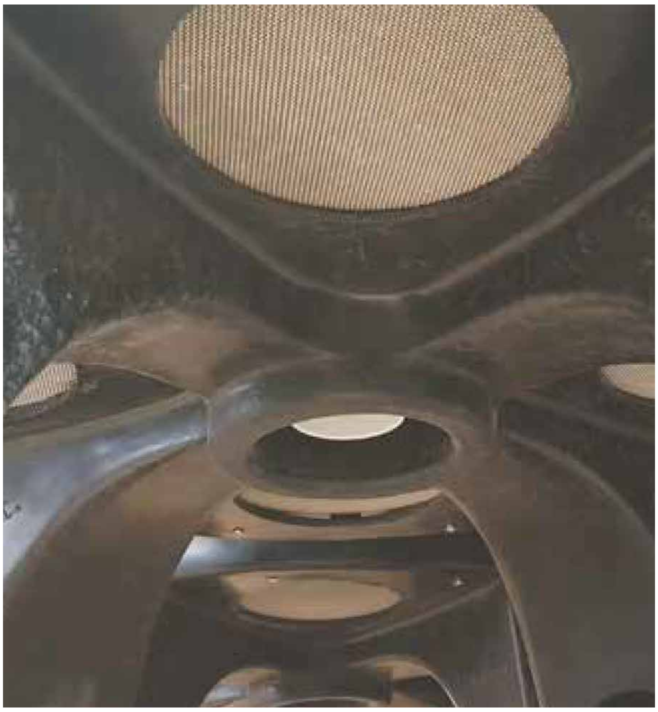


Figure 5 - Underside of the AtlanFilter showing the screened inlet ports and the connection for the outlet pipe in the middle.

Figure 6 - the top of the AtlanFilter showing the location of the one way air valve.

SIZES

Atlan Stormwater manufactures two height cartridges for varying site constraints as shown below. Each cartridge is designed to treat stormwater at a flow rate of 1.5 litres per second and 3.0 litres per second for the half height cartridge (model no. FIL-1.5) and full-height cartridge (model no. FIL-3.0) respectively.

	Full Height FIL-3.0	**Half Height FIL-1.5**
AtlanFilter total height	860mm	660mm
AtlanFilter Diameter	740mm	740mm
Minimum Head required	850mm	550mm
Treatment flow rate	3.0 L/s	1.5 L/s
Height of inlet ports above vault floor	250mm	250mm
Filtered water collection pipe diameter	50mm	50mm

AtlanFilter Full Height - FIL-3.0

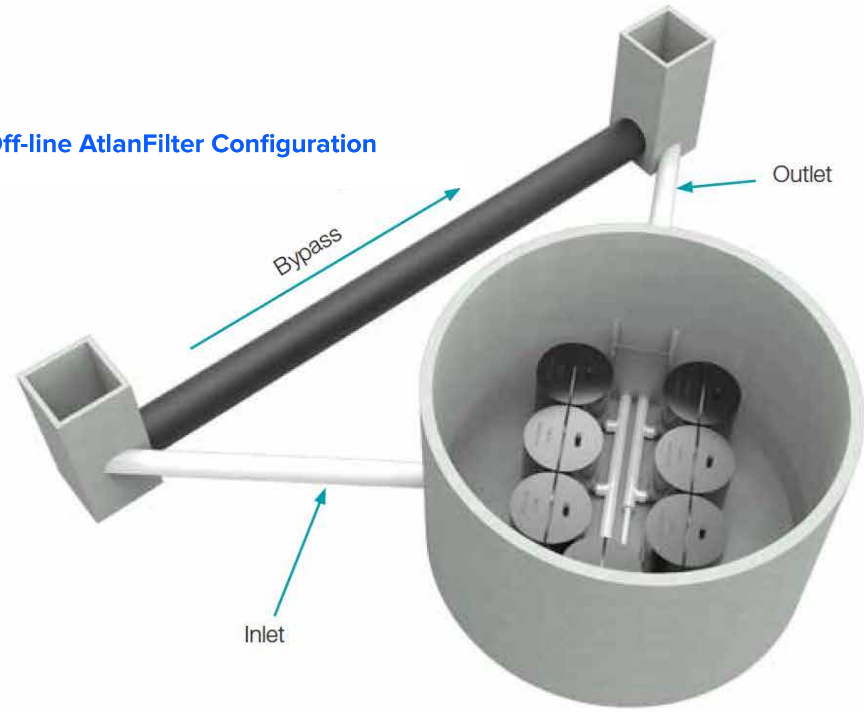
AtlanFilter Half Height - FIL1.5

SYSTEM CONFIGURATION

AtlanFilter cartridges are installed in concrete or fibreglass tanks commonly referred to as ‘vaults’. The vault selection and configuration are based on site characteristics and/or constraints; computational stormwater quality modelling; and selected AtlanFilter models. Typical AtlanFilter system configurations are shown below.

In-line AtlanFilter Configuration

Off-line AtlanFilter Configuration



HEALTH AND SAFETY

A. Personal health & safety

When carrying out the necessary installation operations of the AtlanFilter all contractors and staff personnel must comply with all current workplace health and safety legislation.

The below measures should be adhered to as practically as possible.

- Comply with all applicable laws, regulations and standards.
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

B. Personal protective equipment/safety equipment

When carrying out the necessary installation operations of the AtlanFilter, wearing the appropriate personal protective equipment and utilising the adequate safety equipment is vital to reducing potential hazards.

Personal protective equipment / safety equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots
- Ear muffs
- Hard hat/s
- Sunscreen

C. Confined space

In the event access is required into the vault, confined space permits will be required which is not covered in this Guide. Typical equipment required for confined space entry include:

- Harness
- Gas detector
- Tripod
- Spotter

D. Traffic Control

It is not uncommon for Atlan Filter cartridges to be installed underneath trafficable areas. Minimum traffic control measures will need to be put in place in accordance with traffic control plans set out by respective local and state road authorities.

Vaults are to be treated as confined space.

Entry by permit only.

Monitor weather conditions prior to operation maintenance. Do not enter a vault during an episode of heavy rain as this can create a risk of drowning.

MAINTENANCE FREQUENCY

The AtlanFilter's design allows for a greater life span when frequently maintenance. Maintenance is broken up into three categories which include:

- Standard inspection
- General cleaning
- Cartridge replacement.

Standard Inspection

Standard inspections are conducted at regular four month intervals. At this time, an approved trained maintenance officer or Atlan representative shall undertake all measures outlined in Maintenance Procedure, Standard Inspection.

General Cleaning

At the end of each standard inspection, trigger measures will identify if general cleaning is required.

General cleaning will need to be executed immediate during standard inspections if the follow triggers are satisfied:

- Build-up of debris/pollutants within the vault greater than 150mm;
- Accumulation of debris/pollutants on the outlet chamber of the AtlanFilter vault;
- After large storm events, tidal or flooding impacts at the request of the owner;

Cartridge Replacement

Stormwater treatment is dependent on the effectiveness of the AtlanFilter cartridge system. As the AtlanFilter ages, pollutants will inundate the cartridge and ultimately reduce the treatment flow rate. At this point, a AtlanFilter flow test apparatus will be utilities to determine if replacement cartridges are required.

Based on the [site] concept modelling (MUSIC) and previous industry experience, we estimate the life of the AtlanFilter to be between 6 - 8 years. As a minimum requirement, each AtlanFilter cartridge should be replaced within 10 years.

The life cycle of the AtlanFilter can be impacted if standard inspections and general maintenance is not undertaken in accordance with this operation and maintenance Guide.

Other factors that will affect the above life cycle of the AtlanFilter include:

- Installation of cartridge system during construction phase and impacted by construction sediment loads;
- Neglecting to install pre-treatment using an industry approved GPT or a surface inlet pit trash bag such as the Atlan StormSack.
- Unforeseen environmental hazards affecting the AtlanFilter functionality.

MAINTENANCE PROCEDURES

Stormwater pollutants captured and retained by the AtlanFilter system need to be periodically removed to ensure environmental values are upheld. All associated maintenance works is heavily dependent on the site's operational activities and generated stormwater pollutants. To ensure the longevity of the installed AtlanFilter treatment system, it is imperative that the procedures detailed in this Guide are followed and all appropriate measures are actioned immediately.

Standard inspection

The standard inspection requires personal experience of Atlan products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

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Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

Site Inspection Procedures

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the Atlan Filters.

Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have set up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist. Sign off and forward a copy of the report to property manager and Atlan representative.

7. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

8. Sign off and forward a copy of the report to property manager and Atlan representative

GENERAL CLEANING

Vacuum out of Filter tank, removal, and disposal of pollutants at the completion of a standard inspection, general cleaning may be deemed necessary immediately or scheduled for a future date. Steps undertaken for general cleaning should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

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6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist.

7. Pollutant removal from tank

Perform clean-up using a licenced vacuum truck contractor or wet/dry vacuum, depending on level of sediment built up and/or tank size.

8. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

9. Sign off and forward a copy of the report to property manager and Atlan representative

CARTRIDGE RECYCLING AND REPLACEMENT

AtlanFilter cartridges can be swapped out for new cartridges. The spent AtlanFilter cartridges can be collected from site and sent to Atlan Stormwater's facilities, where the spent media will be removed from the cartridge in factory conditions and disposed of in accordance with environmental regulations.

The AtlanFilter cartridge will be recharged with new media, thereby recycling and repurposing the cartridge.

AtlanFilter replacement procedures may vary depending on the configuration of the AtlanFilters, the type of vault and engineers' specs. Replacement instructions for manhole AtlanFilter systems and precast vault AtlanFilter systems are contained in this section.

At the completion of a standard inspection, AtlanFilter replacement may be deemed necessary immediately or scheduled for a future date. Steps undertaken for cartridge replacement should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free.

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the AtlanFilters.

Perform safety procedures ie. attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have sent up the gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

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Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space procedures are followed.

6. Remove exhausted cartridges

Disconnect all internal pipe work from inside the vault. Unbolt anti-floatation measures and remove cartridges from the vault using Gantry Tripod method.

7. Pollutant removal

Using a wet/dry vacuum or sucker truck, suck out all the residual pollutant from the vault.

8. Install pipework and AtlanFilters

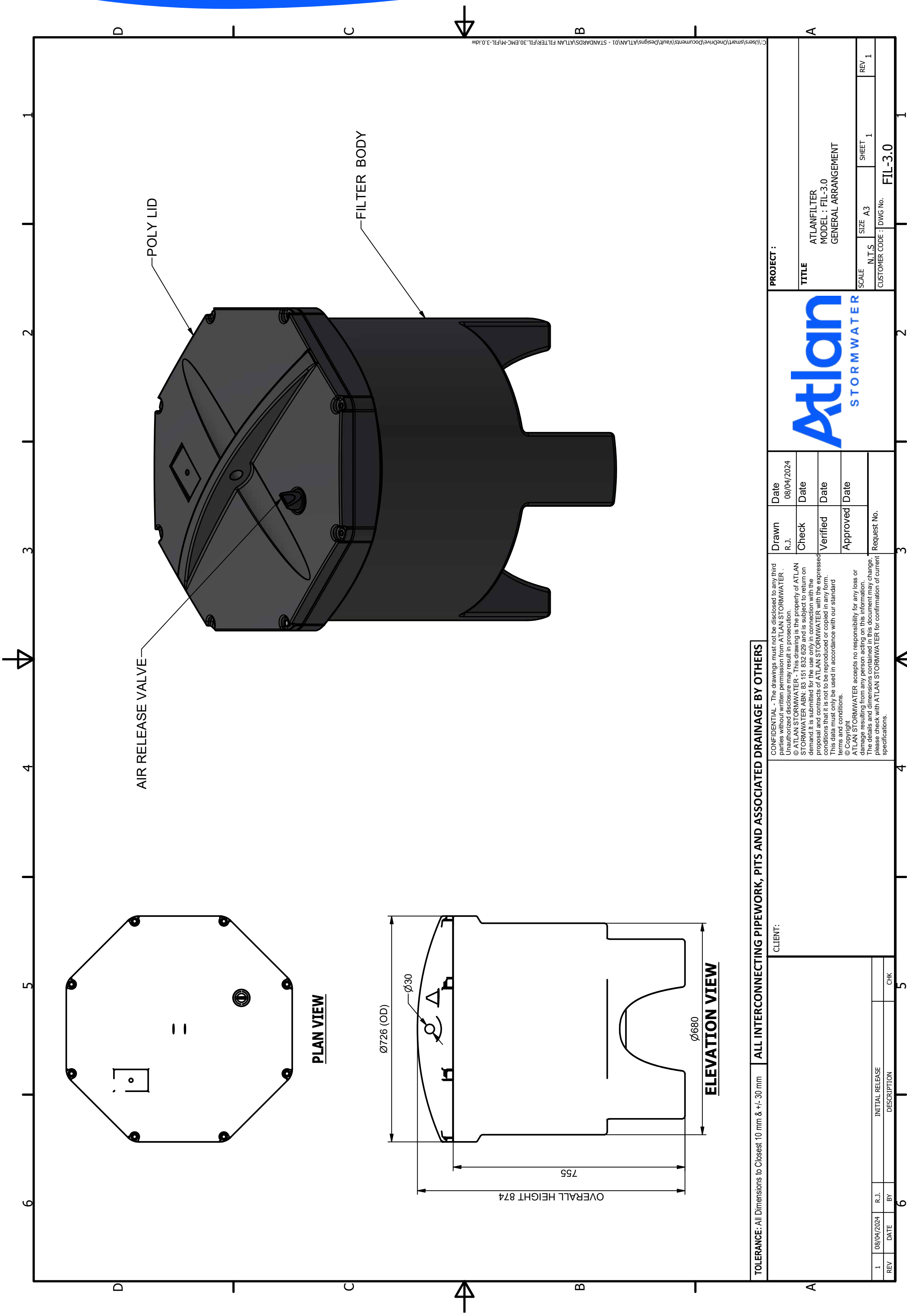
Please refer to the below standard install diagrams for the AtlanFilters. Then refer to your site specific drawings, as site requirements may require something different to the standard layout. Lower filters into tank, position into place, connect filter outlet pipework with the supplied fittings.

9. Install anti–floatation system

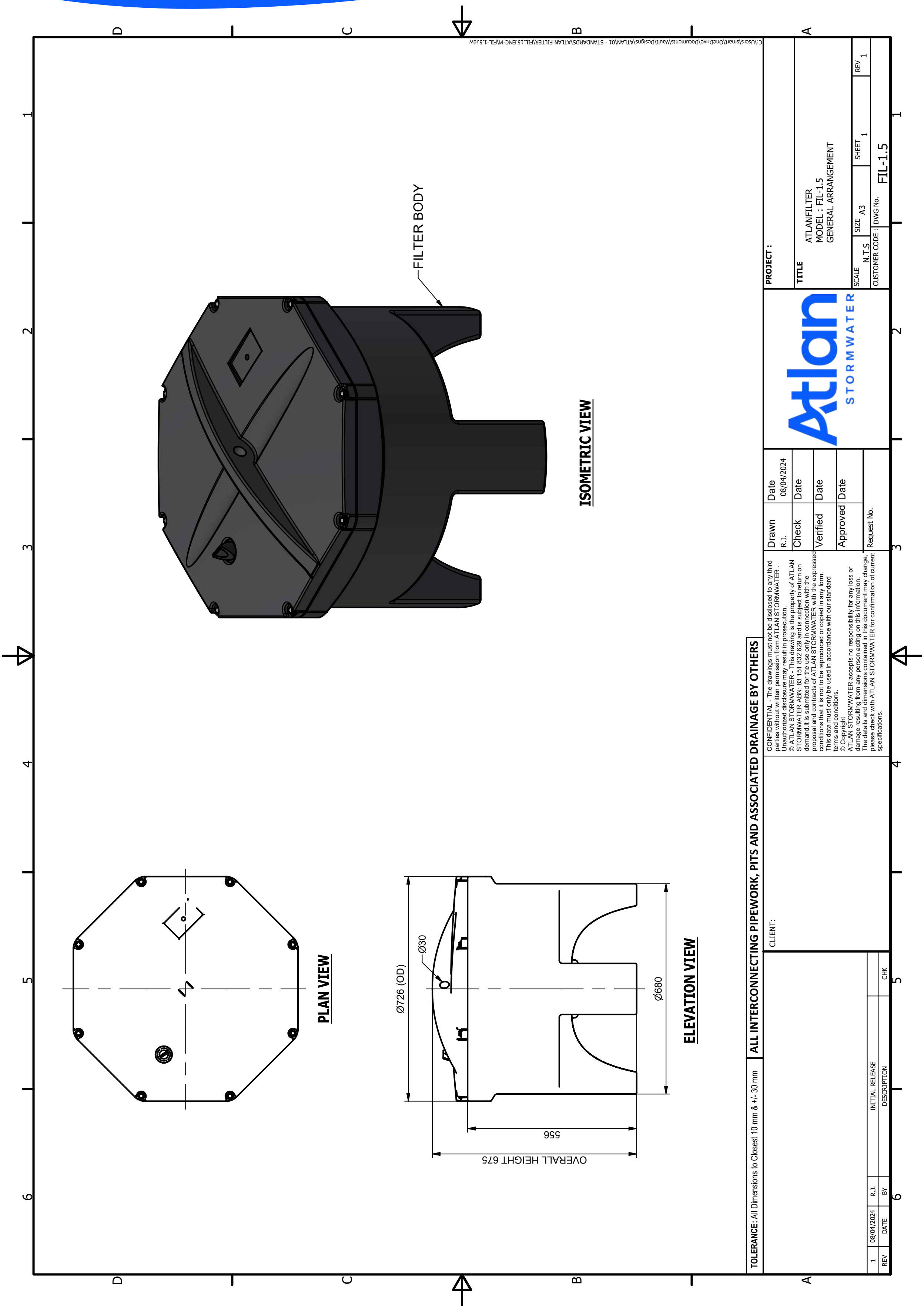
Please refer to the detailed drawings showing how the anti-floatation (anchor) bars are to be installed.

10. Sign off and forward a copy of the report to property manager and Atlan representative

Drawing
Full Height



Drawing
Half Height



SITE EXIT & CLEAN UP

At the end of the scheduled maintenance, approved contractors or Atlan maintenance crew are required to reinstate the site to pre-existing conditions. Steps included but limited to are:

- Ensure all access covers are securely inserted back into their frames;
- Remove and dispose collected pollutants from the site in accordance with local regulator authorities;
- Retrieve all traffic control measures and maintenance tools; and
- Return all exhausted and/or damaged Atlan products to Atlan Stormwater to begin recycling program.

Joy in water

'We believe clean waterways are a right not a privilege and we work to ensure a Joy in Water experience for you, with your children and grandchildren.'

Andy Hornbuckle

Atlan
STORMWATER

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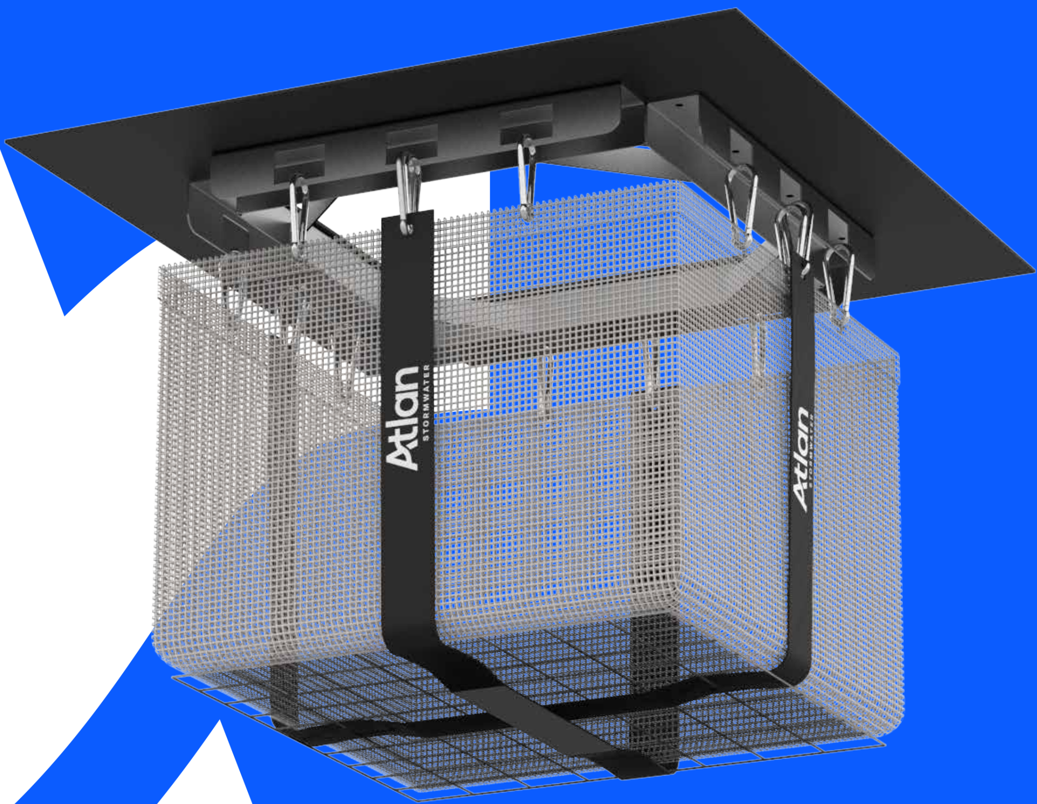
Silverwater NSW 2128
atlan.com.au

0524

OPERATION & MAINTENANCE MANUAL

StormSack



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INTRODUCTION

Maintenance of the Atlan StormSack is essential to preservation of its condition to ensure lifetime operational effectiveness.

The Atlan StormSack is a highly engineered water quality device that is deployed directly in the stormwater system as primary treatment to capture contaminants close to the surface for ease of maintenance.

To ensure full operational capacity, it is vital to ensure that the pollutants it captures are periodically removed, and filtration components are thoroughly cleaned.

This manual should be used in conjunction with the relevant site traffic management and safety plans, as well as any other provided documentation from Atlan.

The Atlan StormSack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising the existing or new storm drain infrastructure. The StormSack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

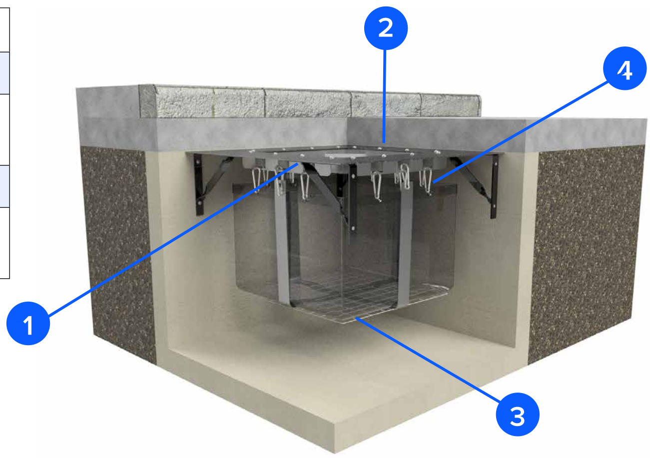
Typically the StormsSack is serviceable from the street level, and therefore maintenance does not usually require confined space entry into the catch basin structure. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or sucker truck.

COMPONENTS

- Adjustable Flange Deflector: Black HDPE attached to support frame
- Catchment Bag: 200micron woven poly fabric
- Support Hardware: Stainless steel 304
- Bag Support: Stainless steel 304 mesh
- Replaceable Oil Boom: Polypropylene 3 inch (76 mm) diameter (optional add-on)

Application	Regulatory Issue	Target Pollutants
Council Storm Drain Retrofits	At-source litter capture	Sediment, Litter, O&G
Commercial/Retail/Residential	Stormwater Compliance	Sediment, Litter, O&G
Litter Prone Urban Areas	Cost effective litter control	Litter ≥ 5 mm
Scrap Metal/Solid Waste/Oil Storage/Etc	Industrial Multi-Sector General Permit	Gross Pollutants, O&G
Part of Treatment Train	Council Stormwater Quality Improvement Targets	Sediment, Litter, O&G
Construction Sediment/Erosion	Sediment Control Plan	Sediment/Erosion Control

Features	
1.	Aluminium frame
2.	Black poly surround secured to frame • Can be cut to suit on site
3.	Reinforced StormSack bag
4.	Carabiners attach bag to frame for easy service and replacement



Standard StormSack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times.

HEALTH & SAFETY

IMPORTANT: A full site based risk assessment should be completed prior to commencing work on your Atlan StormSack.

PERSONAL HEALTH & SAFETY

When carrying out maintenance operations of the Atlan StormSack all contractors and staff personnel must comply with all current workplace health and safety legislation. The below measures should be adhered as practically as possible:

- Comply with all applicable laws, regulations and standards.
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

PERSONAL PROTECTIVE EQUIPMENT

When carrying out maintenance operations of the Atlan StormSack, wearing the appropriate personal protective equipment is vital to reducing potential hazards. Personal protective equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots

CAPTURED POLLUTANTS

The material captured by the Atlan StormSack can be harmful and needs to be handled correctly. The nature and amount of the captured pollutants depends on the characteristics of the site.

Pollutants can include from organic material such as leaves and sticks through to debris such as plastics, glass and other foreign objects such as syringes.

EQUIPMENT HANDLING

Handling activities such as a removing the drain grate a well as managing pedestrians and other non-worker personnel at the site should be exercised in accordance with specified safety procedures and guidelines.

CONFINED SPACES

Confined space entry procedures are not covered in this manual. It is requested that all personnel carrying out maintenance of the Atlan StormSack must evaluate their own needs for confined space entry and compliance with occupational health and safety regulations. Non trained staff are not permitted to participle in any confined space entries.

When maintenance operations cannot be carried out from the surface and there is a need to enter confined space, only personnel that currently hold a Confined Space Entry Permit are allowed to enter the confined space.

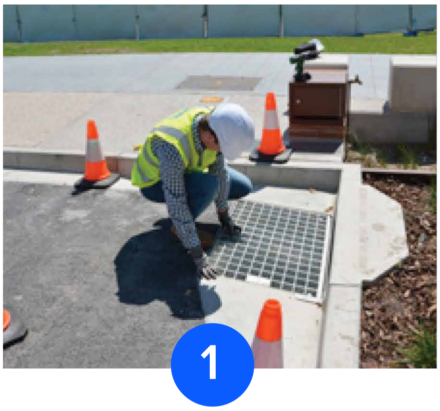
TRAFFIC MANAGEMENT

Typically stormwater gully pits are situated on roads and carparks, or adjacent to roads in a footpath or swale. As traffic requirements vary depending on the circumstance of the site, separate traffic control plans should be prepared for each site.

The specific road safety requirements for each site can be obtained from the relevant road authority to ensure all maintenance operations comply with the laws and regulations. State government publications can also be useful to find out the signage requirements, placement of safety cones and barricades that are required when working on public roads.

MAINTENANCE OF THE ATLAN STORMSACKS IS A SPECIALIST ACTIVITY

When carrying out maintenance operations of the Atlan StormSack, factors such as equipment handling methods, pollutants and site circumstances can impose potential risks to the maintainer and nearby civilians.



OPERATIONS

GENERAL MONITORING

The Atlan StormSack must be checked on a regular basis to analyse whether it requires maintenance or cleaning. As gully pit grates are usually quite heavy, it is vital to exercise the correct lifting techniques and also ensure that the area surrounding the open pit is shielded from access of non-work personnel.

To ensure optimal performance of the Atlan StormSack, the material collected by the filter bag should not exceed the level of approximately a half to two thirds of the total bag depth. When this material collected is showing signs of exceeding this level they should be scheduled to be emptied.

It is also recommended that additional monitoring is conducted following moderate to extreme rainfall events, especially when previous months have had little or no rainfall.

GULLY PIT COVER REMOVAL

Opening a hinged pit cover

1. Insert the lifting hooks beneath the grate.
2. Check hinge points are not damaged and debris is not caught in the hinge area.
3. Fully open pit grate, ensuring that the grate will stay in the open position without any external forces applied. Grates that do not remain open without being held, should be removed or secured during maintenance activities.

Opening a non-hinged pit cover

1. Place lifting hooks beneath grate, where possible in the four corners of the grate. Concrete lids may have Gatic lifting points, a key arrangement or holes in the lid, which may require special equipment such as Gatic lifters. Alternatively if safe to do so grip the grade with your hands.

2. Position each person on either side of the grate.

3. Lift the grate, ensuring that good heavy lifting posture is used at all times.

4. Place the grate on angle on the gutter, to allow for the lifting hooks to be removed.

5. For extremely heavy one-piece grates and concrete Gatic covers, insert the lifters in place and slide the lids back.

REPAIRS

Depending on the extent of the damage to the Atlan StormSack unit, it can usually be repaired.

Filter Bag Tears

Small tears to the filter bag can be repaired by either sewing the tear back together with additional fabric to increase the strength of the stitching, or by sewing a patch of filter material onto the filter bag.

Spill Procedures

In the event of a spill discharging into a gully pit, all effected sediment must be removed from the filter bags and the filter bags are to be removed and replaced with new filter bags.

Replacement Parts

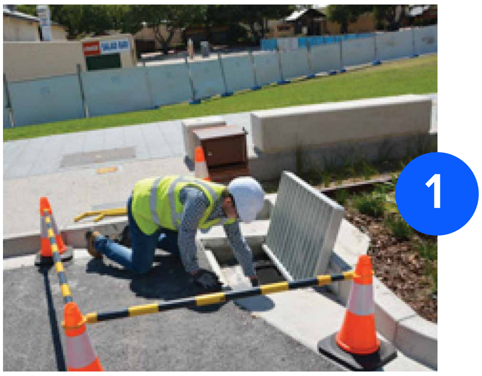
If large tears or irreparable damage to the frame and structure are present, it is advisable to replace the components.

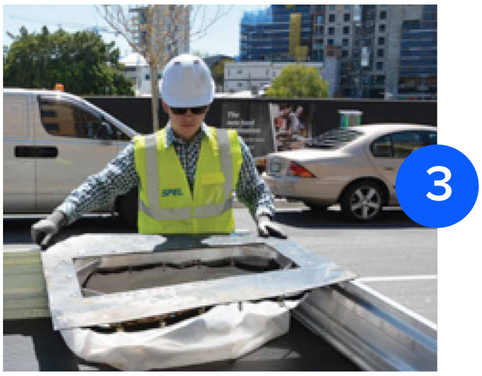
All required spare parts can be sourced directly from Atlan Stormwater.

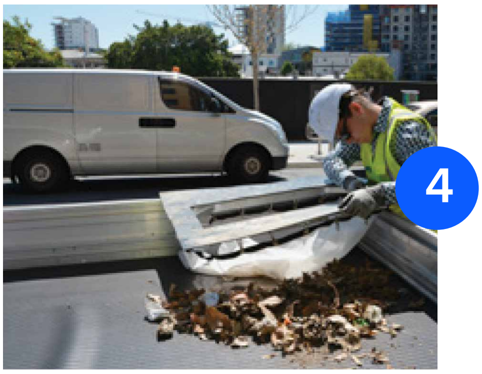
CLEANING METHODS

CLEANING USING AN VACUUM TRUCK

1. Open gully pit.
2. Place the vacuum hose, suck out all of the sediment, organic leaf material, litter and other materials that were collected in the filter bag.
3. Allow the filter bag to be sucked up in the vacuum hose for a few seconds to allow for the filter mesh pores to be cleaned.
4. Use the vacuum hose to remove any build-up of material around the overflows and in the bottom of the pit.
5. Remove filter back from pit.
6. Remove any sediment and litter caught in the gully pit grate.
7. Back opening channels are to be cleared of any debris to ensure flow is not hindered.
8. Thoroughly examine the structural integrity of the filter bag and frame.
9. Reinstate filter bag and gully pit covers.







CLEANING BY HAND

CAUTION: Correct PPE must be warn - refer to page three. Remain alert for dangerous objects and wildlife.

1. Open gully pit.
2. Using the correct lifting technique, lift the StormSack out by the diagonal lifting corners fitted to the frame. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the StormSack, or remove excess material using a shovel or etc. Take care not to damage the bag when removing litter form the bag.
3. Lift the StormSack clear of the stormwater pit and position over the collection bin or vehicle.
4. Lift and empty the bag by holding the bottom lifting loops only.
5. Brush the StormSack with a stiff brush to remove the sediment from the filter pores.
6. Thoroughly examine the structural integrity of the filter bag and frame.
7. Reinstate StormSack and gully pit covers.

MATERIAL DISPOSAL

Collected materials can be potentially harmful to humans and the environment. Once all captured material from the Atlan StormSack has been removed, it must be taken off site and disposed of at a transfer station or a similar approved disposal site.

BLOCKAGE TROUBLESHOOTING

In the unlikely event of surface flooding around a gully pit which has a Atlan StormSack fitted, the following steps should be carried out:

- Check the overflow bypass.
- If overflow is clear and surface flooding still exists remove the Atlan StormSack and check the outlet pipe for blockages.
- Removal of the Atlan StormSack can be difficult if clogged with sediment and holding water.
- If the filter is clogged brush the side walls to dislodge particles trapped at the interface allowing water to flow through the filter.
- If the outlet pipe is blocked a vacuum truck may be required to unblock it. Litter can be removed from the Atlan StormSack using the vacuum truck before removal. If a vacuum truck is not available please follow the hand maintenance cleaning steps prior to unblocking the outlet pipe.

ATLAN STORMSACK MAINTENANCE CHECKLIST

SITE DETAILS	
Client	
Location of system on site	
Site address	
Site contact name and number	

CHECKLIST ITEMS	YES/NO	COMMENTS
Is the pit free from pollutants and debris?	SELECT	
Is there movement or damage to the cage?	SELECT	
Is there movement or damage to the plastic pit seals?	SELECT	
Is structural integrity in good condition including fixings, joints and connections?	SELECT	
Is the filter bag pores clean and not clogged?	SELECT	
Is the filter bag damaged in any way?	SELECT	
Are the inlet and outlet pipes free from debris and damage?	SELECT	
Is the cover grate free from debris and damage?	SELECT	
Does the StormSack need repairs or replacement parts?	SELECT	
Has captured material been disposed of responsibly at an approved disposal site?	SELECT	

MAINTENANCE & REPAIR NOTES

SIGN OFF	
Name of service technician	
Date	

Joy in water

'We believe clean waterways are a right not a privilege and we work to ensure a Joy in Water experience for you, with your children and grandchildren.'

Andy Hornbuckle

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STORMWATER

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Appendix C

MUSIC Model Conceptual Treatment Train

MUSIC Model Conceptual Treatment Train