van der meer

STORMWATER MANAGEMENT REPORT

Greenwich Hospital Redevelopment
97-115 River Road
Greenwich NSW 2065

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Approved by:	Andrew Wallis	Hary Budhi
Position:	Civil Manager	Civil Engineer
Date:	04th May 2022	
Job No:	SY202-149	

REVISION STATUS

Revision	Description of Revision	Date	Issued By:
A	Draft Issue	25th February 2022	Hary Budhi
B	Approval Issue	11th April 2022	Hary Budhi
C	Approval Issue	20th April 2022	Hary Budhi
D	Approval Issue	04th May 2022	Hary Budhi

Recipients are responsible for eliminating all superseded documents in their possession.

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Table of Contents

1 Introduction

This stormwater management report is submitted to the Department of Planning, Industry and Environment (DPIE) in support of a State Significant Development Application (SSD-13619238) for the redevelopment of Greenwich Hospital into an integrated hospital and senior living facility on land identified as 97-115 River Road, Greenwich (the site). The extent of the site is shown below.

Figure 1 The site

The subject proposal is for the detailed design and construction of the facility following its concept approval under SSD-8699. Specifically, SSD-13619238 seeks approval for the following:

- Demolition of the existing hospital building and associated facilities at the site.
- Construction of a new hospital facility and integrated healthcare campus comprising of hospital, residential aged care, seniors housing, overnight respite, across:
    - A new main hospital building up to RL 80.0;
    - Two new seniors living buildings, Northern building up to RL 56.36, and Southern building up to RL 60.65;
    - A new respite care building up to RL 56.9;
- Construction of associated site facilities and services, including pedestrian and vehicular access and basement parking.
- Site landscaping and infrastructure works; and
- Preservation of Pallister House which will continue to host dementia care and administrative functions.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-13619238 were issued on 24 February 2021. In addition, a concept plan (SSD-8699) was approved on 10 November 2020 which included a number of future assessment requirement. This report has been prepared to respond to the following requirement of these:

SSD/SEAR Condition	Relevant section of report
SSD Condition **B25.** All future development applications for new built form must be accompanied by a Stormwater Management Plan detailing an assessment of any flood risk on Site and consideration of any relevant provisions of the NSW Floodplain Development Manual 2005, stormwater and drainage infrastructure, and details demonstrating that water sensitive urban design measures have been incorporated into the development. **B26.** All future development applications for new built form must detail measures to minimise operational water quality impacts on surface waters and groundwater. **B27.** All future development applications for new built form must include stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties, in particular properties adjoining the Site to the west and south and the bushland to the south-west.	**3. Stormwater Quantity Control** **4. Stormwater Quality Control** Stormwater treatment system is proposed to meet Sydney Water stormwater quality targets. Stormwater drainage is proposed within the site is proposed to prevent local flooding and reduce the surface water throughout the site. Overland flow paths to carry flows from major storm events through the site in a safe manner
SEAR Condition 15. Stormwater Drainage • Preliminary stormwater management plan for the development that: o Addresses the conditions imposed under SSD-8699 and prepared by a suitable qualified person in consultation with	**3. Stormwater Quantity Control** **4. Stormwater Quality Control** Stormwater drainage is proposed within the site is proposed to prevent local flooding and reduce the surface water throughout the site. Rainwater tank is proposed for the development to capture stormwater run-off from the roof catchment. Rainwater reuse will be proposed for irrigation purposes. Rainwater

council and any other relevant drainage authority ○ Details the proposed drainage design for the site including on-site detention facilities, water quality measures and the nominated discharge point ○ Demonstrates compliance with council or other drainage authority requirement • Stormwater plan detailing the proposed method of drainage without impacting on the downstream properties • Details of drainage infrastructure work that would be hand over to council	tank collection and pipe circulation to be detailed by hydraulic engineer. Rainwater tank is shown on civil engineering plan on Appendix A. Plan to be detailed with hydraulic engineer at later stage. Stormwater treatment system is proposed to meet Sydney Water stormwater quality targets. Rainwater tank and stormwater treatment system is shown on civil engineering plan on Appendix A. Hydraulic engineer to provide details on rainwater tank. Stormwater drainage is shown on civil engineering plan on Appendix A.
SEAR Plans and Documents Erosion and Sediment Control	**4.2 Stormwater Quality Control Measures – Erosion and Sediment Control** Erosion and sediment control measures are to be in place during construction. Erosion and sediment control plan is shown on civil engineering plan on Appendix A.

2 Site Analysis

2.1 Existing Site

The site is located within Lane Cove Council LGA. It consists of existing hospital building, asphalt car park, existing heritage building, and landscape area. The site is bounded by River Road, St Vincent Street, and Gore Creek.

The site area is approximately 3.37 ha. The site naturally drains towards St Vincent Road for the eastern area and drains towards Gore Creek for western area. From survey information, there is an existing council stormwater pipe on the western boundary that flows from River Road to Gore Creek underneath the existing hospital building.

Figure 2 Existing site

2.2 Proposed Works

The proposed development involves construction of new hospital building, two serviced senior living buildings, respite care building, and upgrade to existing infrastructure. The proposed development will require an upgrade of internal existing stormwater drainage to capture additional impervious and catchment area.

Lane Cove Council has advised that the existing council stormwater pipe underneath the existing hospital building is to be diverted away from the proposed senior living apartment building.

3 Stormwater Quantity Control

3.1 Objectives and Targets

The proposed development increases the total impervious area of the existing site and therefore may increase the peak discharge rate to the downstream drainage network and waterways. The main objective is to make sure the proposed method of drainage is not impacting on the downstream properties.

3.2 Proposed Drainage System

The drainage system for the proposed development will be designed to collect the majority of concentrated flows from impermeable surfaces such as paved footpaths, parking areas and buildings. Where possible (and practical), runoff from pervious areas will also be collected.

The proposed stormwater management system for the development includes:

- A pit and pipe network to collect minor storm runoff from areas
- 2x 70kL rainwater tank and stormwater treatment system to support Ecologically Sustainable Development
- Overland flow paths to carry flows from major storm events through the site in a safe manner
- The proposed point of discharge will be to an existing council stormwater pipe for the western catchment area
- The proposed point of discharge will be to kerb outlet on St Vincent Road on the for the eastern catchment area

According to Lane Cove Council DCP – Part O – Stormwater Management the drainage system requirement are as follows:

- *Drainage systems shall be designed to provide both minor and major flow conveyance systems as detailed in Australian Rainfall and Runoff (AR&R). Design ARI for residential flat buildings, commercial and industrial developments is 50 year or 2% AEP storm event.*

All stormwater pipe size within the site was designed up to 2% AEP. For storm event beyond 2% AEP, overland flow path was provided through the site in a safe manner where depth velocity product (d x v) less than 0.4 m/s.

A reduced set of concept civil engineering drawings is included in Appendix A.

3.3 On-site Stormwater Detention (OSD) Tank

On-site Stormwater Detention main objective is attenuate peak flows from the development due to increasing impervious area to make sure there will be no increase on peak flow on the downstream end. However due to the site proximity to the Lane Cove River Foreshore, an OSD tank will not provide a peak flows attenuation benefit. Flood study also has been done

by Water Modelling Solution to shows that the proposed development will not worsen the flood condition on the downstream properties.

This is also confirmed with Lane Cove Council DCP – OSD Exclusion and Catchment Map where the site is located within the OSD exclusion zone. van der Meer consulting has confirmed with Council Engineer regarding the OSD tank requirement. Lane Cove Council has advised that OSD is not required for the development. Council correspondence can be shown on Appendix B.

Hence, it can be concluded that OSD is not required for the proposed development.

Appendix 12 – Map - OSD Exclusion and Catchment Map

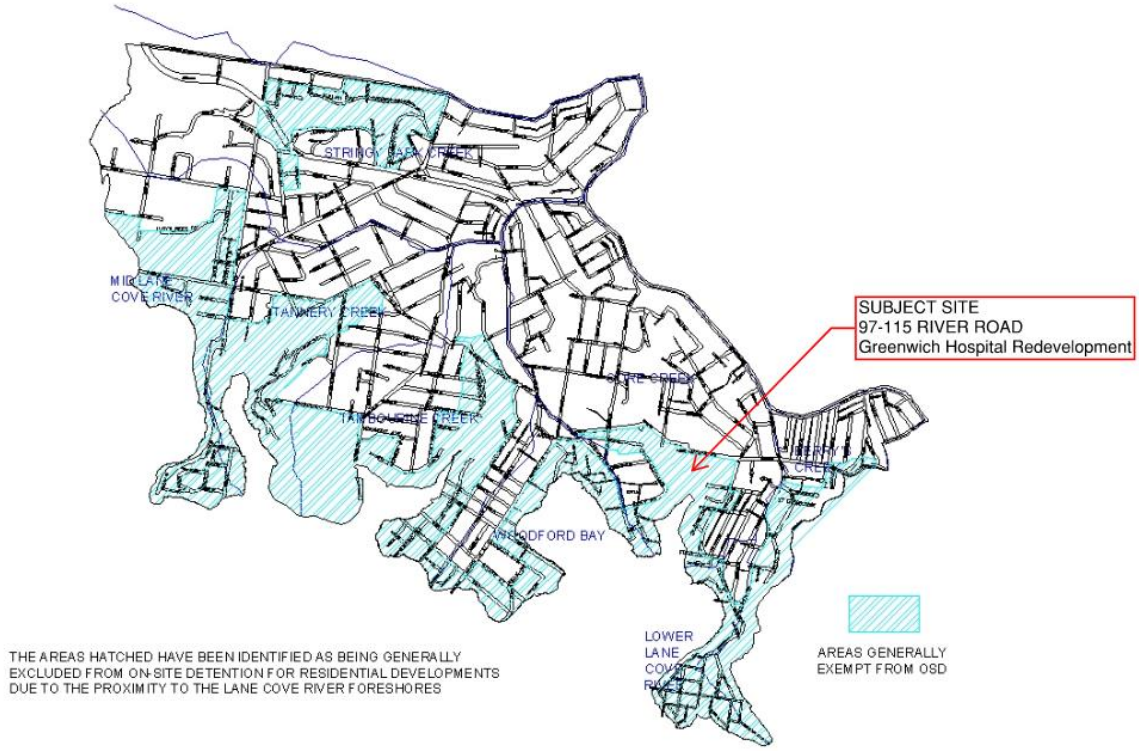

Figure 3 OSD exclusion and catchment map

4 Stormwater Quality Control

4.1 Objectives and Targets

Lane Cove Council has adopted the Lane Cove River Coastal Zone Management Plan and no specific stormwater quality targets have been nominated. For this reason, Sydney Water stormwater quality targets have been adopted and recommended for use in the Stormwater Management Plan. It should be noted that these targets are similar to the targets set by the adjoining City of Ryde also a party to the Lane Cove River Coastal Zone Management Plan.

The stormwater quality requirements are as follows:

- *85% reduction in the mean annual load of Total Suspended Solids (TSS)*
- *60% reduction in the mean annual load of Total Phosphorus (TP)*
- *45% reduction in the mean annual load of Total Nitrogen (TN)*
- *90% reduction in the mean annual load of gross pollutants*

4.2 Stormwater Quality Control Measures

The treatment train proposed for the redevelopment are summarised below:

Erosion & Sediment Control Plan

- During construction, water quality control is achieved by deposition and trapping of silts and clays which often have nutrients such as phosphorus and nitrogen attached to their surfaces. Silt fences will be erected prior to construction to control sediment runoff. This will reduce and isolate sediments and particulate matter.
- An Erosion and Sediment Control Plan has been provided in accordance with Council Development Control Plan (2012) and with Landcom's "Managing Urban Stormwater – Soils and Construction (2004). This will ensure that a significant portion of sediments and attached nutrients can be contained on site during construction. A copy of the Erosion and Sediment control plan is contained within the Civil Plans shown in Appendix A.

Rainwater Tanks

- 70kL rainwater tank will be placed at the proposed location within the proposed development for irrigation purposes

Psorb StormFilter

- Psorb StormFilter is a proprietary device containing multiple cartridge units in a single system, thereby suitable for large catchments. Also, the cartridges come with various filtration media available to target site-specific pollutants.
- 690mm Psorb Storm Filter cartridges as detailed in the engineering drawings. A total of 25 cartridges are proposed. The filters will be within the precast chamber with 25 filters. All surface flow is to be captured and directed into the chamber where practical.

OceanGuard 200µm

- OceanGuard™ is one of the stormwater treatment device designs to capture pollutant the run into the stormwater drains. It can be installed in the new or existing pits. It is effective to remove gross pollutant, total suspended solids, and attached pollutant. OceanGuard™ are to be provided in the nominated pit inlets.

4.3 Stormwater Quality Modelling

The effectiveness of the proposed water quality measures has been assessed using numerical modelling. Water quality modelling has been conducted using the software program MUSIC (Model for Urban Stormwater Improvement Conceptualisation). This program is used to establish the effectiveness of the water quality treatment proposed for the development site.

The MUSIC model layout is shown in Figure 4 below.

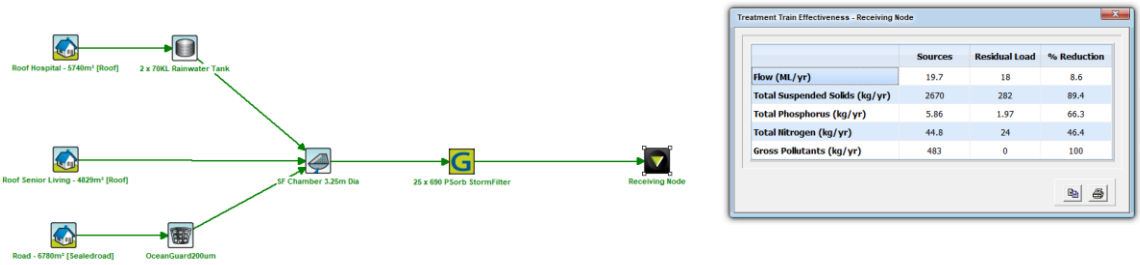

Figure 4 MUSIC model

4.3.1 MUSIC Results

The results of the MUSIC analysis are shown in Table 1 below. The values summarise the stormwater pollutant reduction for the entire treatment train.

Table 1 MUSIC Results

Pollutant	Development Proposal			Pollutant Reduction Target
	Source Load (kg/yr)	Residual Load (kg/yr)	% Reduction	% Reduction
TSS	2670	282	89.4%	85%
TP	5.86	1.97	66.3%	60%
TN	44.8	24	46.4%	45%
Gross Pollutant	483	0	100%	90%

The MUSIC analysis results indicate that the proposed stormwater treatment devices are able to satisfy Sydney Water stormwater quality reduction objectives for TSS, TP, TN, and gross pollutants.

5 Maintenance

Monitoring and maintenance are required to ensure the stormwater treatment train works as intended for the life of the development. Any unusual event in regards to stormwater system should be investigated and mitigated as soon as possible such as localised flooding. However, treatment devices are designed to allow for overflow in the event that they block so even when the devices stop working it can go unnoticed.

This is why regular inspections are required for each treatment device. These are to be scheduled to ensure devices are cleaned as necessary and any defects discovered rectified. Inspections are also to be performed after any large rainfall event.

Refer to Appendix C for complete maintenance schedule for stormwater system/devices used in the subject site.

6 Conclusion

The key strategies to be adopted for this development include the following:

1. Pit and pipe network to collect minor storm runoff from surface areas which will minimise nuisance flooding
2. Overland flow path to carry major storms through and around the site without causing damage to property from flooding
3. 2x 70kL rainwater tank to capture roof runoff and reuse for irrigation purposes.
4. 1 precast Stormfilter chamber with 25 filters
5. OceanGuard 200µm to be installed in nominated inlet pit

The results from the investigations and modelling for this project that have been summarised in this report indicate the assessment of impact to the related infrastructure and ecosystem and show that the development with the proposed stormwater management strategy and management can meet council's stormwater objectives for the site and satisfy condition stated in the SSD consent and SEAR.

Appendix A – Civil Engineering Plans

HAMMONDCARE GREENWICH HOSPITAL REDEVELOPMENT GREENWICH NSW 2065

CIVIL DRAWING LIST

LOCALITY PLAN
NTS

REVISIONS:

No.	REVISION DESCRIPTION	DRAWN	DATE
C	ISSUED FOR APPROVAL	HB	04.05.22
B	ISSUED FOR APPROVAL	HB	20.04.22
A	ISSUED FOR APPROVAL	LO	11.04.22

SCALE BAR

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LEVEL 3, CLARENCE STREET, SYDNEY NSW 2000

PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
COVER SHEET

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
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DRAFTSPERSON	SCALE	DATE	SHEET SIZE
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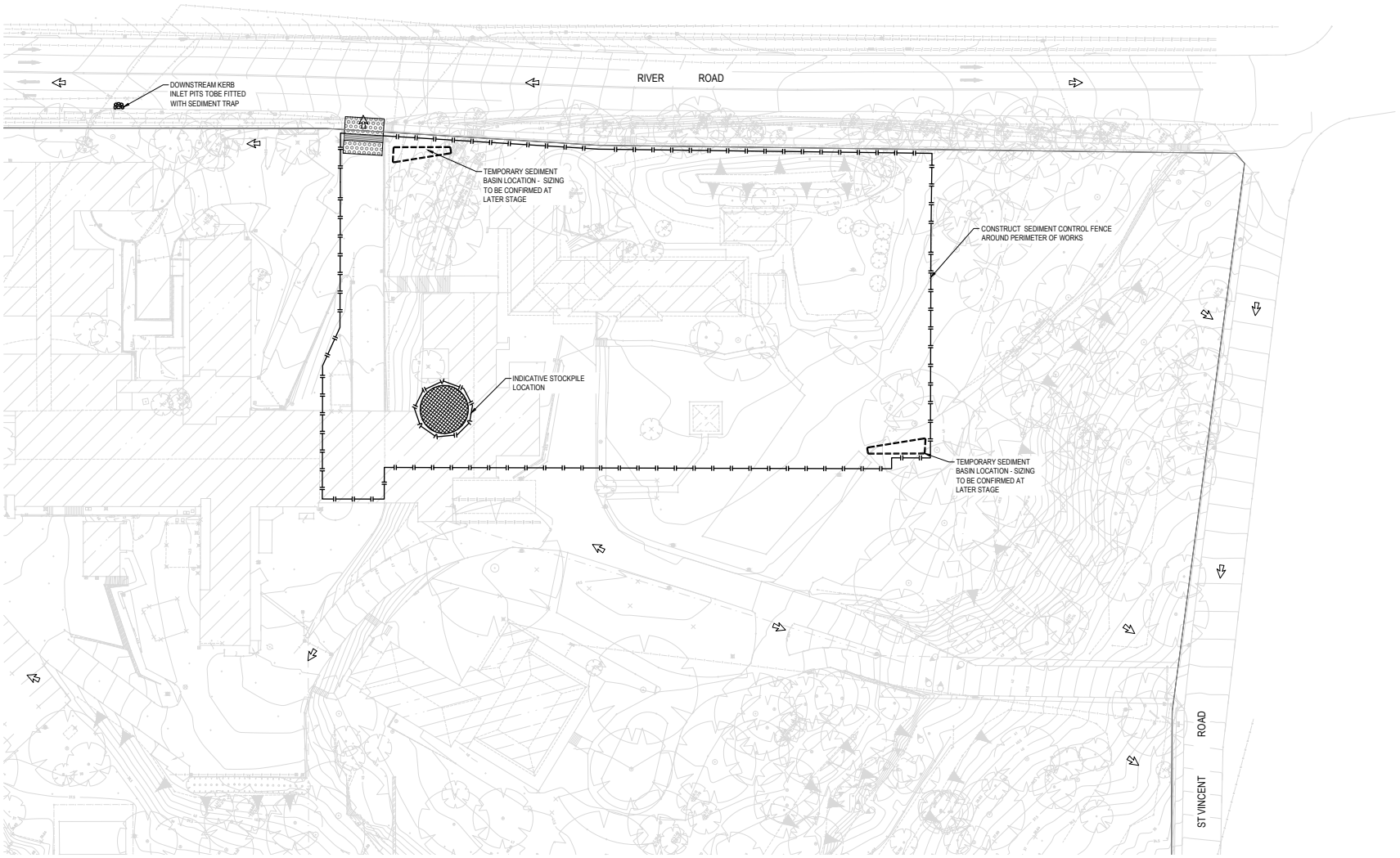

PLAN
SCALE 1:400

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-STORMWATER SEDIMENT TRAPS AT ALL PROPOSED PIT INLETS

-TEMPORARY CONSTRUCTION VEHICLE EXIT

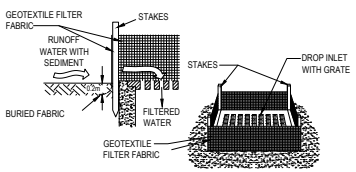
- SEDIMENT CONTROL FENCE

-DIVERSION DRAIN

-STOCKPILE AREA

-SANDBAG KERB INLET SEDIMENT TRAP

-TEMPORARY SEDIMENT BASIN



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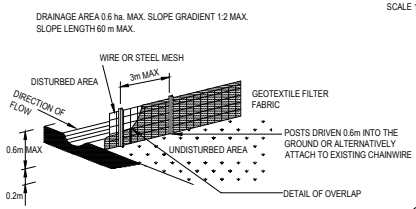

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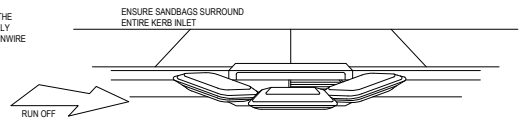

SANDBAG KERB INLET SEDIMENT TRAP
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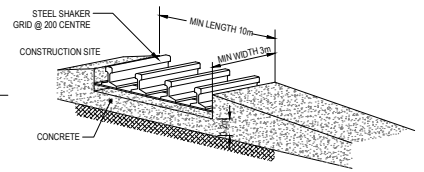

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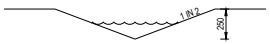

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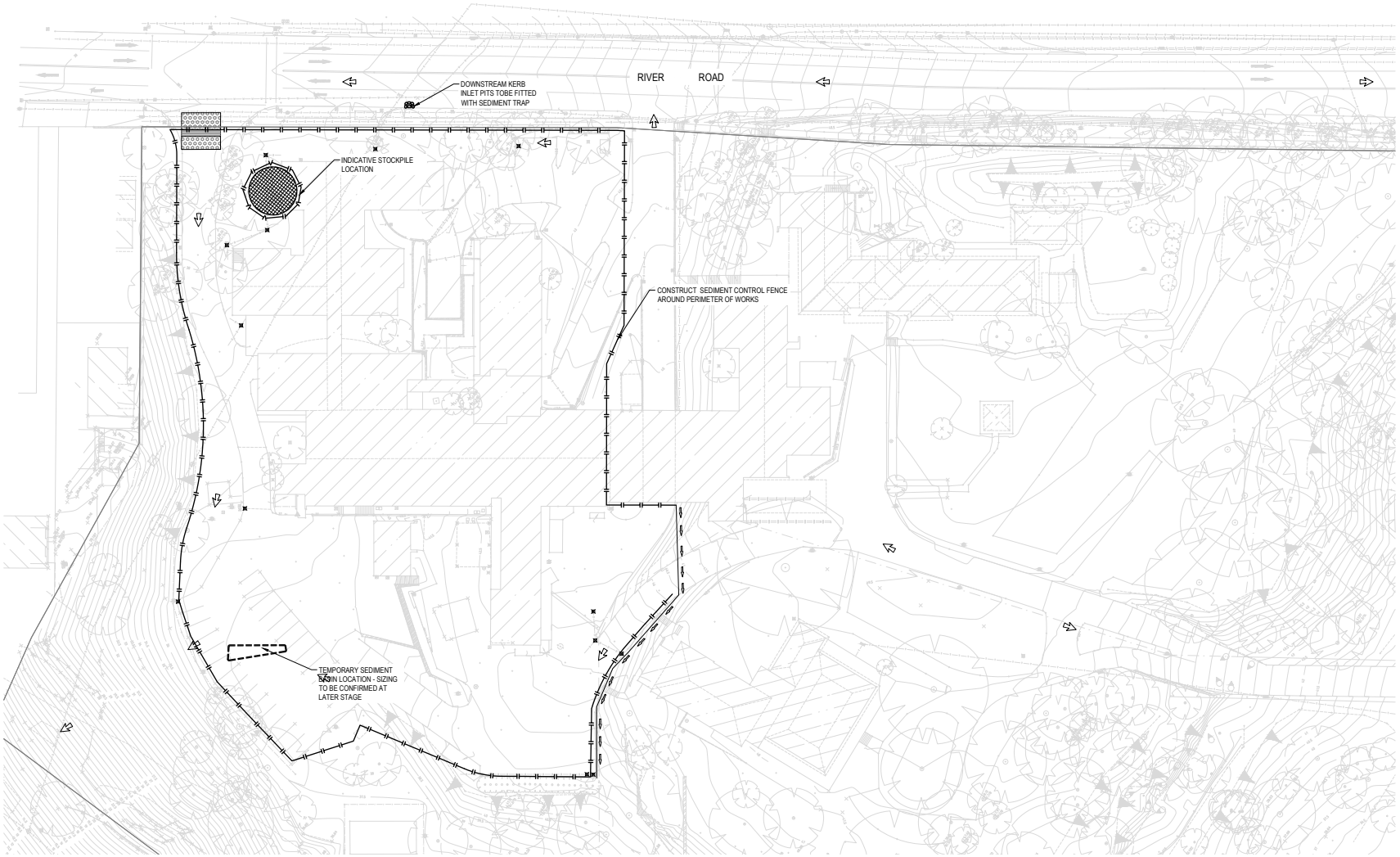

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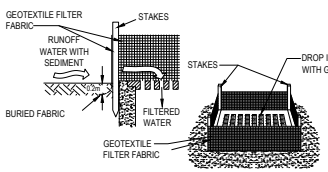

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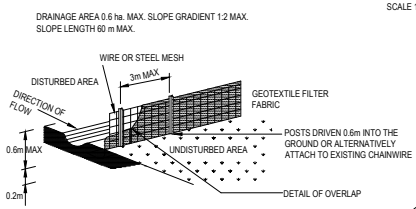

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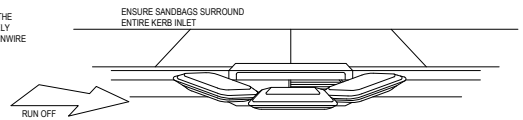
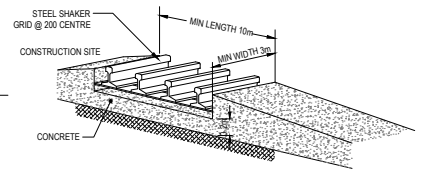


SANDBAG KERB INLET SEDIMENT TRAP
NTS



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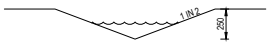

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REVISIONS:			
C	ISSUED FOR APPROVAL	HB	04.05.22
B	ISSUED FOR APPROVAL	HB	20.04.22
A	ISSUED FOR APPROVAL	LO	11.04.22
No.	REVISION DESCRIPTION	DRAWN	DATE

SCALE BAR
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ST LEONARDS NSW 2065

ARCHITECT
BICKERTONMASTERS
LEVEL 3, CLARENCE STREET, SYDNEY NSW 2000

PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
EROSION AND SEDIMENT CONTROL - STAGE 3

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
AW	HB/LO		
DRAFTSPERSON	SCALE	DATE	SHEET SIZE
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JOB No.		DRAWING No.	REVISION
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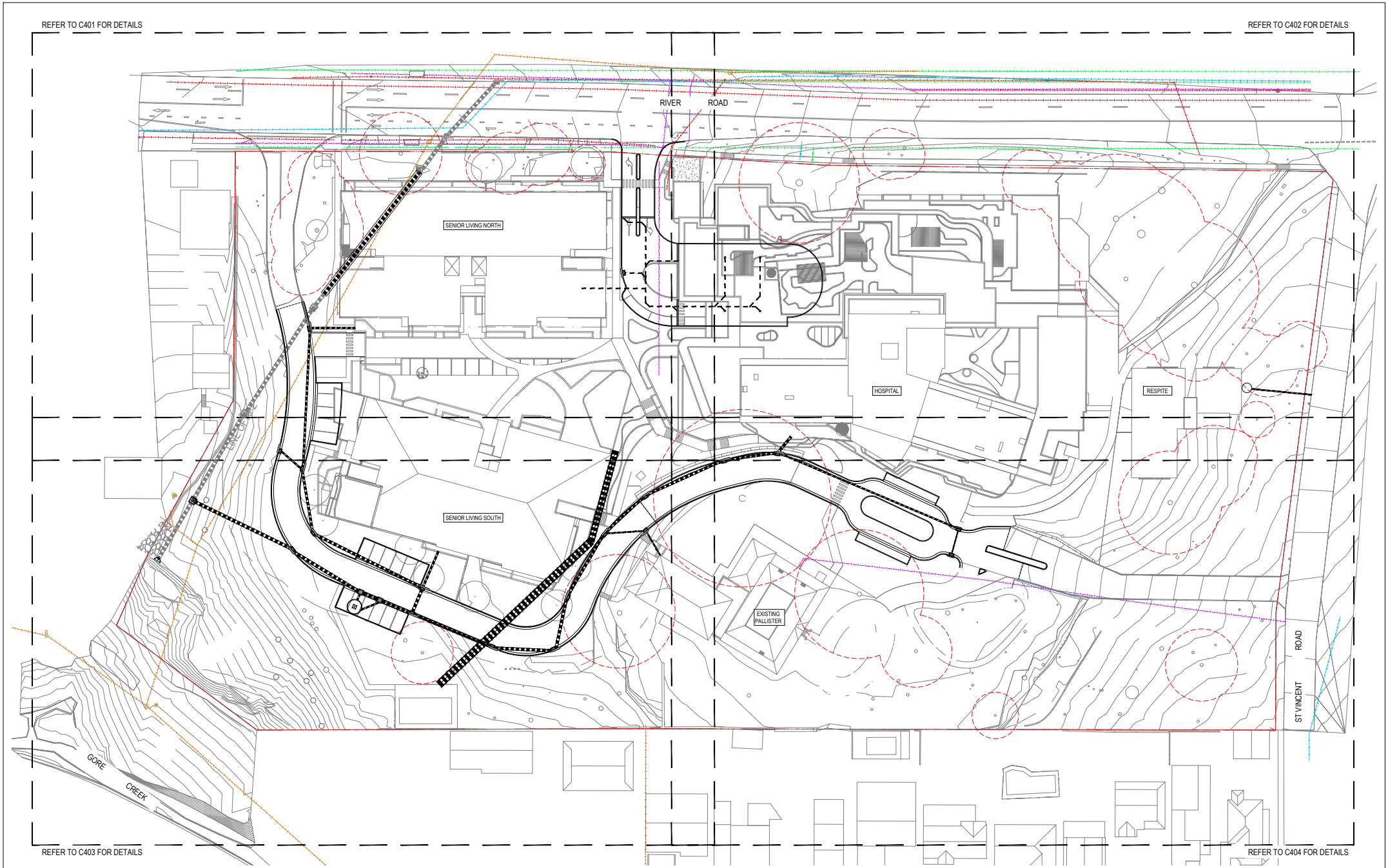

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REVISIONS:

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B	ISSUED FOR APPROVAL	HB	20.04.22
A	ISSUED FOR APPROVAL	LO	11.04.22

SCALE BAR
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SCALE 1:400

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PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LAYOUT - SITE PLAN

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
AW	HB/LO		
DRAFTSPERSON	SCALE	DATE	SHEET SIZE
HB/LO	AS SHOWN	FEB 2022	A1
JOB No.		DRAWING No.	REVISION
SY202-149		C400	C

WARNING

BEWARE OF UNDERGROUND SERVICES

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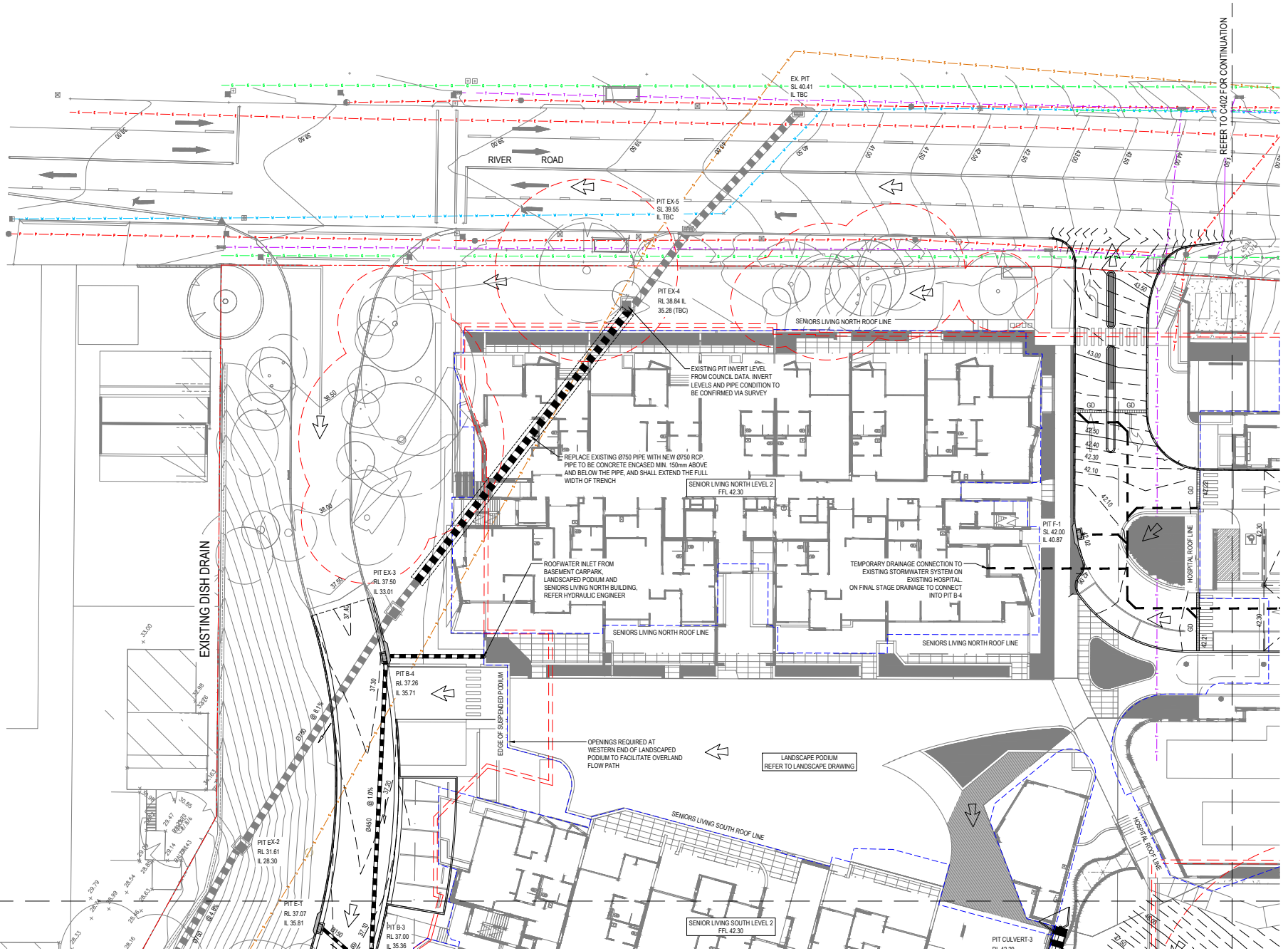
LEGEND

- STORMWATER PIT — REFER DWG C402 FOR DETAILS
- STORMWATER PIPE — REFER DWG C402 FOR DETAILS
- STORMWATER PIPE (SUSPENDED) — REFER DWG C402 FOR DETAILS
- DP — DOWNPIPE CONNECTION
- ROOF AND BALCONY OUTLINE
- BASEMENT OUTLINE
- TREE PROTECTION ZONE
- E — EXISTING ELECTRICAL SERVICE
- P — EXISTING ELECTRICAL SERVICE (OVERHANG)
- S — EXISTING SEWER SERVICE
- W — EXISTING WATER MAIN
- G — EXISTING GAS SERVICE
- T — EXISTING TELECOM SERVICE



PLAN

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REVISIONS:			
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B	ISSUED FOR APPROVAL	HB	20.04.22
A	ISSUED FOR APPROVAL	LO	11.04.22
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SCALE 1:200

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PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LAYOUT - SHEET 1 OF 4

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
AW	HB/LO		
DRAFTSPERSON	SCALE	DATE	SHEET SIZE
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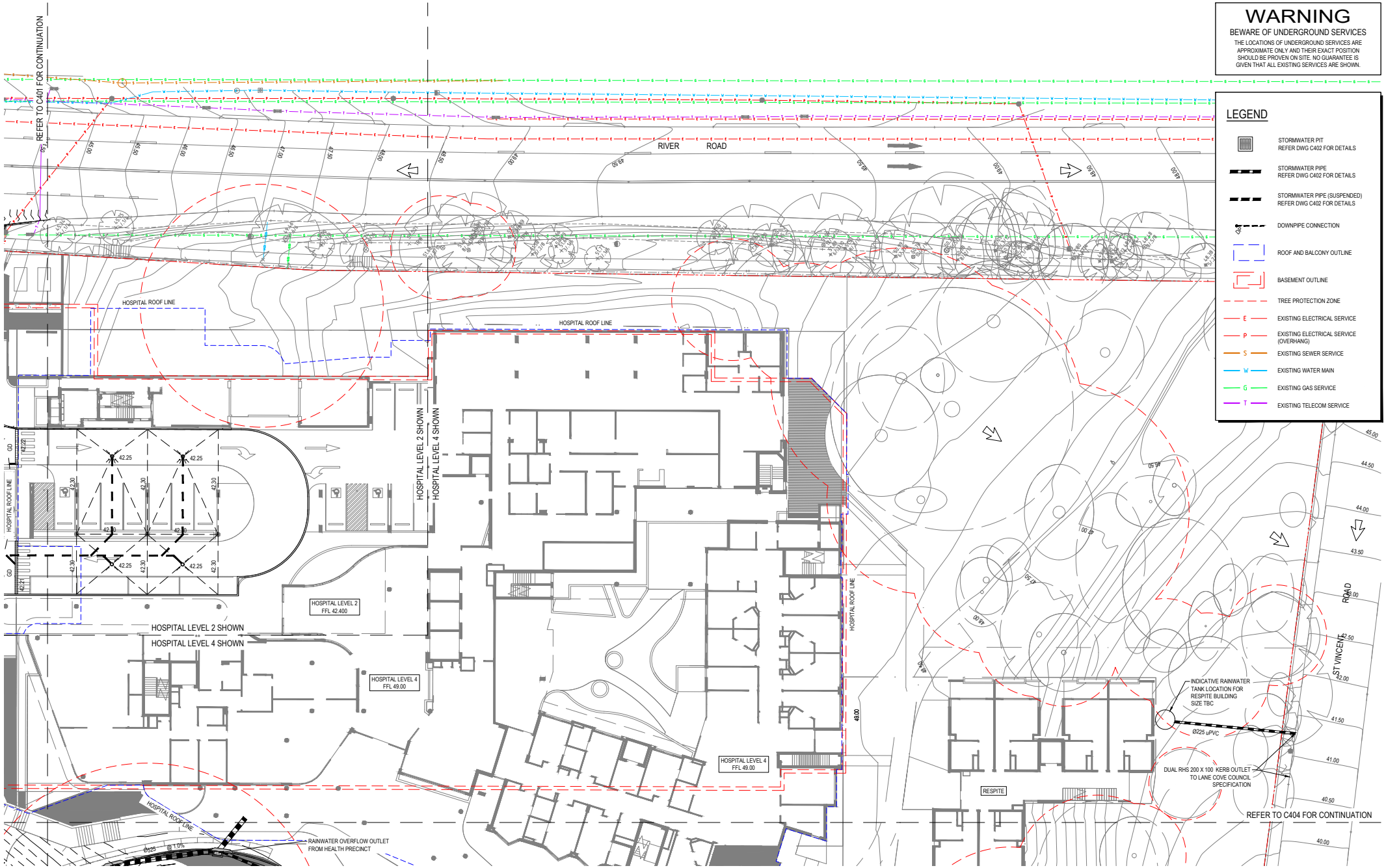

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REVISIONS:

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B	ISSUED FOR APPROVAL	HB	20.04.22
A	ISSUED FOR APPROVAL	LO	11.04.22

SCALE BAR
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PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LAYOUT - SHEET 2 OF 4

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
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DRAFTSPERSON	SCALE	DATE	SHEET SIZE
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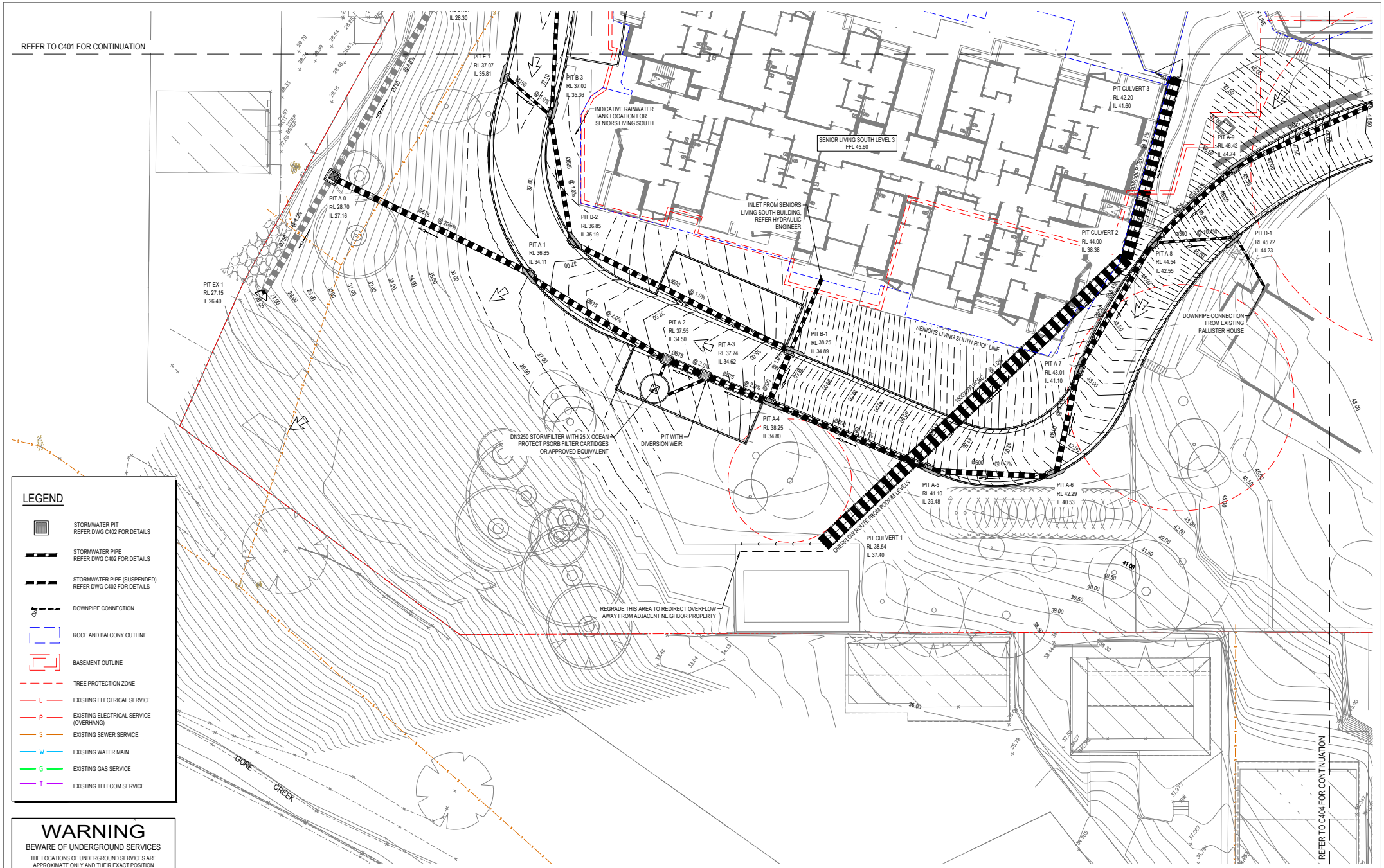

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REVISIONS:

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A	ISSUED FOR APPROVAL	LO	11.04.22

SCALE BAR
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PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LAYOUT - SHEET 3 OF 4

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
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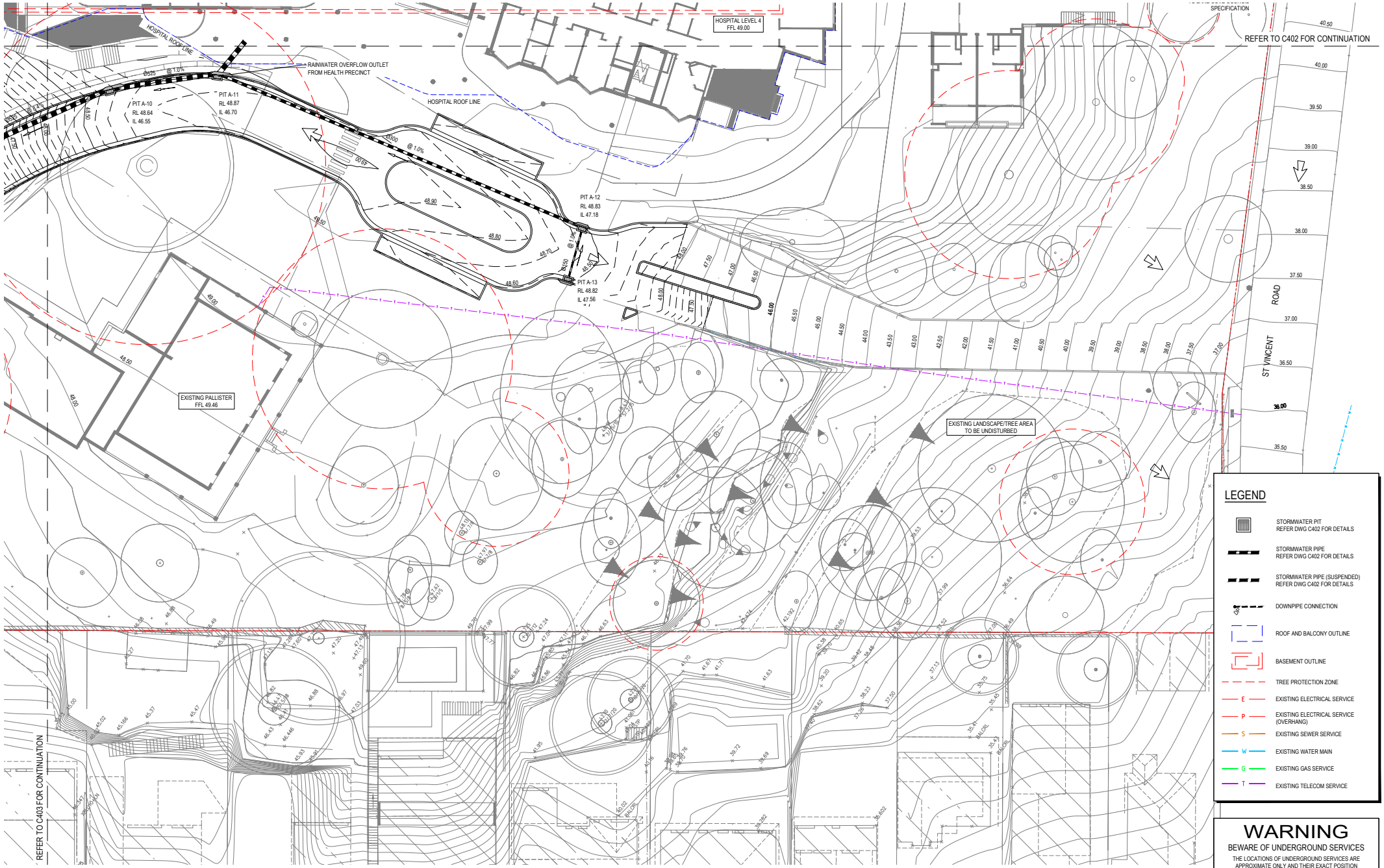
SY202-149		C403	C



PLAN
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REVISIONS:

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97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LAYOUT - SHEET 4 OF 4

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

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DRAFTSPERSON	SCALE	DATE	SHEET SIZE
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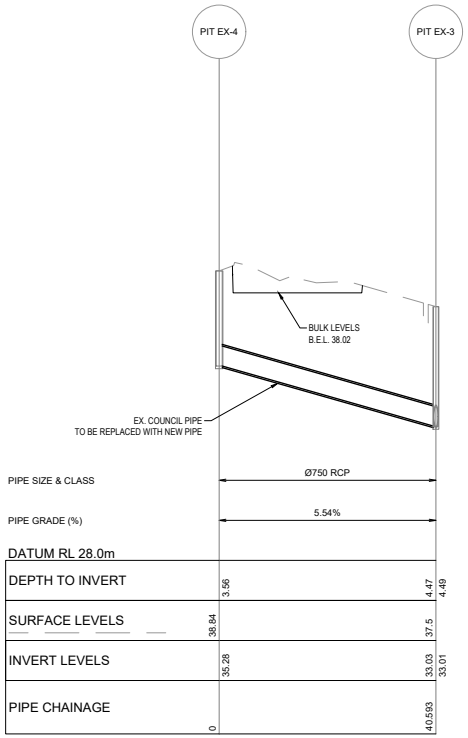
SY202-149		C404	C



LINE EX-4 TO EX-3

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

WARNING

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A	ISSUED FOR APPROVAL	LO	11.04.22

SCALE BAR
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SCALE 1:100
0 10 20 30 40 50m
SCALE 1:500

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BICKERTONMASTERS
LEVEL 3, CLARENCE STREET, SYDNEY NSW 2000

PROJECT TITLE
GREENWICH HOSPITAL
97-115 RIVER ROAD
GREENWICH NSW 2065

DRAWING TITLE
DRAINAGE LONG. SECTION

DRAWING STATUS
APPROVAL ISSUE
NOT TO BE USED FOR CONSTRUCTION

PROJECT LEADER	DESIGNER	SIGNATURE	
AW	HB/LO		
DRAFTSPERSON	SCALE	DATE	SHEET SIZE
HB/LO	AS SHOWN	FEB 2022	A1
JOB No.		DRAWING No.	REVISION
SY202-149		C411	C

Appendix B – Council Correspondence

Hary Budhi

From: Maran Muthiah <MMuthiah@lanecove.nsw.gov.au>
Sent: Monday, 22 March 2021 3:42 PM
To: Hary Budhi
Cc: Sebastian Szewcow; Jacky Zeng
Subject: RE: Greenwich Hospital - Stormwater OSD Exemption Request

Hi Hary

This site is located in OSD exemption area.
So no is OSD required.

Regards
Maran Muthiah

Maran Muthiah | *Development Engineer*

A: 48 Longueville Road Lane Cove
P:
E: MMuthiah@lanecove.nsw.gov.au

From: Hary Budhi <hary.budhi@vandermeer.com.au>
Sent: Monday, 22 March 2021 3:34 PM
To: Maran Muthiah <MMuthiah@lanecove.nsw.gov.au>
Cc: Vincent Chau <VChau@lanecove.nsw.gov.au>; Andrew Wallis <andrew.wallis@vandermeer.com.au>; Rod Burrough <rod.burrough@vandermeer.com.au>; Michael Chavet <michael.chavet@vandermeer.com.au>; Liam O'Neil <liam.oneil@vandermeer.com.au>
Subject: Greenwich Hospital - Stormwater OSD Exemption Request

Hi Maran,

I tried to contact you through council number but couldn't reach you. I got your email from Vincent.

I am a Civil Engineer from van der Meer consulting and currently working on Greenwich Hospital project (97-115 River Road).
A development which already approved on SSD-8699.

I have question in regards to OSD requirement of the subject site.

The subject site is located within the Lane Cove River foreshores and within the OSD exclusion area.
I believe we do not required to have an OSD tank within our development.

We have done a similar project on 1 Sirius Road, and we are not required to have an OSD tank.

Can we ask for an OSD exemption for our development?
Please don't hesitate to call me on 0450 537 795 if you wish to discuss.

Thank you.

Regards ,

Hary Budhi

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E hary.budhi@vandermeer.com.au
W www.vandermeer.com.au
M

Appendix C – Maintenance Schedule

STORMWATER MAINTENANCE SCHEDULE

Property: GREENWICH HOSPITAL, 97-115 River Road
Date: 25 February 2022
Prepared By: Van der Meer Consulting

van der Meer Consulting (NSW)
ABN 56 158 266 301

Level 6, 39 Chandos Street,
St Leonards, NSW 2065

Telephone: +61 2 9436 0433

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
INLET & JUNCTION PITS			
Inside Pit	6 Monthly	Owner	Remove grate and inspect internal walls and base, repair where required, remove any collected sediment, debris and litter.
Outside of Pit	4 Monthly/ After Major Storm	Owner	Clean grate of collected sediment, debris, litter and vegetation
General inspection of complete stormwater drainage system	6 Monthly	Owner	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
STORMWATER CARTRIDGE FILTER (STORMFILTER BY OCEANPROTECT)			
General Maintenance notes:	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. The manufacturer's maintenance personnel are fully trained and carry certification for confined space entry applications. It is also recommended that the owner of the Stormfilter familiarises themselves with the **manufacturer's operation and maintenance manual** which is available at https://oceanprotect.com.au/stormfilter/. In the event of major storms or flooding the condition of the Stormfilter will need to be assessed, and if required, repaired by qualified maintenance personnel. If a hazardous material spill occurs the cartridge media will also need to be inspected by qualified maintenance personnel. Waste from the Stormfilter must be transported to a waste facility that is appropriately licensed to accept such waste. If oil is present, the waste cannot be re-used onsite.		
Inspection	6 Monthly	Owner	Establish safe working area around access point. Complete visual Inspection of cartridges & chamber, including: 1.Check for blockage of inlet 2.Check if filter is clear of litter and debris. Larger gross pollutants can be removed if safe to do so. Visually inspect oil and sediment build up 3.Check for blockage of outlet

Minor Service	12 Monthly	Maintenance Contractor	Establish safe working area around access point. 1.Remove any blockages of inlet 2.Remove litter and debris from Stormfilter. Evaluate cartridge media for erosion, if cartridge media is exhausted schedule a major service (see below). Measure and record the level of accumulated sediment in the chamber. If accumulated sediment is greater than 100mm: remove stormfilter cartridges, use the vacuum unit to removed accumulated sediment and pollutants in the chamber, use high pressure water to clean the stormfilter chamber, re-install stormfilter cartridges. 3.Remove any blockages of outlet
Replacement of cartridge media	As required	Maintenance Contractor	The replacement of the cartidge media should occur once the cartridges have deemed to have been exhausted in a major service. The process is as follows: remove each individual cartridge hood to allow access to the exhausted media, then utilise a vacuum unit to remove exhausted media from each cartridge, use the vacuum unit to remove accumulated sediment and pollutants in the chamber, use a high pressure water to clean StormFilter chamber, then inspect each empty StormFilter cartridges for any damage, rectify damage as required and re-fill each cartridge with media in line with project specifications. Finally, re-install the replenished StormFilter cartridges. Refer to the manufacturer operation and maintenance manual for further information. (https://oceanprotect.com.au/stormfilter/)
PIT INSERT (OCEANGUARD BY OCEANPROTECT)			
General Maintenance notes:	The OceanGuard pit insert is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines/ It is also recommended that the owner of the Oceanguard Pit Insert familiarises themselves with the **manufacturer's operation and maintenance manual** which is available at https://oceanprotect.com.au/oceanguard/. In the event of major storms or flooding the condition of the Oceanguard will need to be assessed, and if required, have a minor service performed. If a hazardous material spill occurs the captured pollutants from within the filtration bag should be removed and disposed of in accordance with any additional requirements that may relate to the type of spill event. Waste from the Stormfilter must be transported to a waste facility that is appropriately licensed to accept such waste. If oil is present, the waste cannot be re-used onsite.		

Minor Service	2-4 Times Annually	Owner	1. Inspect for damage to support frame (pit & grate). Rectification works for structural issues to be undertaken immediately. 2. Check for blockage of inlet and remove blockage. 3. Clean filtration bag by: Use two lifting hooks to remove the filtration bag, empty contents into a disposal container, inspect and evaluate filtration bag (if filtration bag is damaged a major service should be undertaken), rejuvenate filtration bag by removing pollutant with a stiff brush, re-install filtration bag. 4. Check for blockage of outlet pipe and remove blockage.
Major Service	As Required	Owner	A major service is required if a filtration bag inspection reveals damage. If required the filtration bag should be replaced following the procedures of the minor service.

Additional maintenance required if one of the following events occurs on site:

a. Hazardous material spillage

b. Flooding/blockage occurs upstream of the stormfilter/oceanguard

c. After major storm event