

STORMWATER REPORT
HOMEMAKER CENTRE PROPOSED
ALTERATIONS AND ADDITIONS

WOLSELEY ROAD, JAMISONTOWN

Revision 2
NOVEMBER 2017

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1 INTRODUCTION

1.1 General

This engineering report has been prepared to supplement the proposed Development Application (DA) to Penrith City Council for the Harvey Norman Penrith alterations and additions development at Wolseley Road, Jamisontown. The development consists of new floor space, as well as a revised road and carpark layout to accommodate the proposed alteration to Wolseley road.

The engineering matters addressed in this report are descriptive of the design approach to stormwater management in the development site, including water quantity controls and Water Sensitive Urban Design considerations. A full set of DA Drawings is provided in Appendix A of this report and should be viewed in conjunction with a reading of this report.

1.2 Engineering Objectives

The objective of the civil design undertaken in this development is to deliver a suitable stormwater system to the revised site, and to do so in a manner that ensures performance equal to or higher than the current system in terms of stormwater quality control, and comparable to that of the predeveloped site in terms of stormwater runoff quantity control. The system must also be designed so as to comply with the relevant standards and control policies as well as to be sympathetic to the end users of the site.

The design solution must also not conflict with the provision of a safe and efficient road and pedestrian footpath network for the workers and customers to the development and must give consideration to the needs of vehicular traffic through the homemaker centre during its construction. It must also operate safely without disturbance to any associated services in the site.

1.3 Engineering Principles

The following principles have been adopted as part of the design process:

- Consideration of design intent in relation to functionality and expectations and requirements of end user.
- Compliance with relevant Council and authority standards and policies.
- Design coordination with project team.
- A design philosophy sympathetic to the terrain and landform.
- Consideration of impact on existing infrastructure in terms of available capacity.

1.4 The Site & Its Context

The development site is located in the Penrith Homemaker Centre which acts a commercial hub containing a number of stores and outlets, as well as a bituminous on-grade carpark servicing these various stores. The entirety of the centre encompasses a 14ha area with the site catchments draining to various receiving nodes including a direct piped connection to Council's piped drainage system in Mulgoa Road and a piped conveyance of stormwater flows to an open basin (BASIN 2) to the north-west of the site. One of the major components of the stormwater system is a 1460m³ above-ground detention basin (BASIN 1) with twin ø1200mm piped storage both up-stream and downstream of this basin.

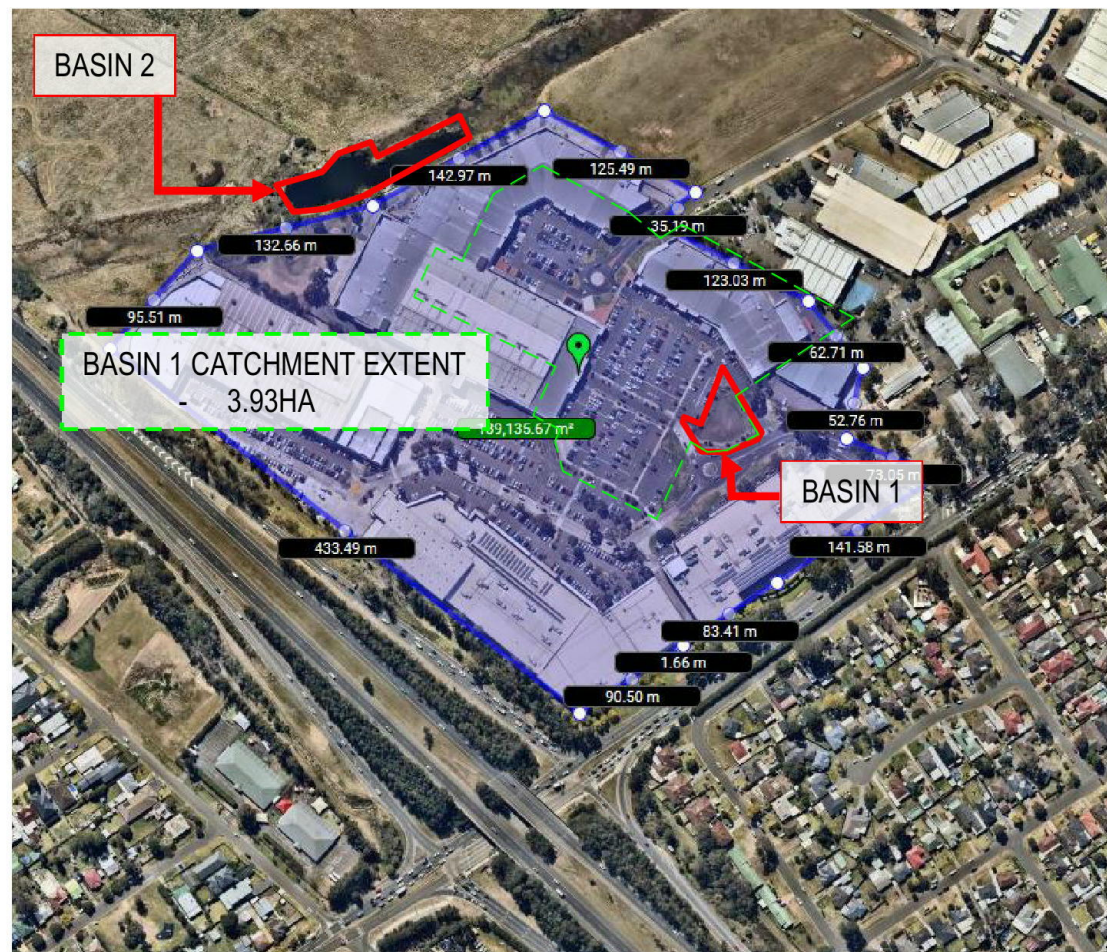


Figure 1.1: Approximate site extents of the Penrith Homemaker centre.

2 STORMWATER MANAGEMENT

2.1 Introduction

As mentioned, the existing stormwater system implements an above ground detention basin and a network of underground pipes. The locations of the components of this system coincide and conflict with the proposed revisions to Wolseley road as well as the revised carpark layout. The essential purpose of the civil design works described in this report is to provide a drainage system that will provide a level of stormwater control either equivalent or superior to that of the existing system, as well as being able to match the runoff characteristics of the site in its predeveloped states for all storm events up to the 100yr ARI event. The system will also be implemented to that ensure that the proposed development does not adversely impact on stormwater flows conveyed to the downstream system while also maintaining the water quality at a level that is adequate for distribution to the natural receiving nodes as defined by the various control policies referred to in the subsequent sections of this report. The following design features were all incorporated into the design to so as to achieve the principles outlined above:

- Point of stormwater discharge maintained between that of the existing and proposed system.
- Post-development flows off the site all limited to that of the pre-development flows for corresponding storm events.
- Detention volume significantly greater than that of the existing detention system.
- Pollutant reduction for additional hardstand areas in accordance with Penrith City Councils requirements.

2.1.1 Key Issues

The key issues and the proposed mitigation measures to be implemented as part of the proposed development are:

- **Stormwater Quantity** – In the absence of any mitigation measures, the increased impervious surfaces (such as roads, roofs, driveways, etc.) associated with the development would result in a subsequent increase in peak stormwater flows exiting the site during storm events. The revised on-site detention system (OSD) proposed for the development has been designed so as to ensure that the stormwater flows from the development are appropriately managed and controlled in accordance with the requirements stipulated in the 2014 Penrith City Council DCP. The design and operation of the proposed stormwater system is described in Section 2.2 below.
- **Water Quality** – Urban developments have the potential to contaminate stormwater from pollutants transferred from catchment surfaces. The stormwater system proposed for the alterations and additions to this site will include a water quality treatment train that ensures that any potential introduction of pollutants from additional hardstand catchment surfaces will be managed in terms of overall pollutant reduction. The design of this treatment system has been undertaken in accordance with the 2014 Penrith City Council DCP, the NSW Water Sensitive Urban Design Policy, and the Sydney Regional Environmental Plan. Consideration as to these issues is addressed in detailed in section 2.3.

2.2 Stormwater Quantity

2.2.1 Catchment Description

The existing catchment is predominantly composed of impervious catchment surfaces contributed by the carpark and the building roofs. The majority of the centre drains through an existing stormwater system toward the west to an existing basin located in the adjacent undeveloped lot, while the other catchments – namely the sections of the on-grade carpark interior to the surrounding buildings and the sections of roof on the interior side of the roof centrelines – drain toward the existing above ground detention basin contained within the site limits. For the purposes of characterising the predeveloped site for stormwater system modelling, the site area was taken as a 100% grassed pervious catchment, slowing stormwater runoff to the most stringent predeveloped conditions.

The developed catchment will comprise of a mixture of impervious and pervious areas. The vast majority of the runoff from the developed site is impervious and consists of roadways, footpaths, roof areas and other paved areas. The pervious component of the developed catchment consists of vegetated landscaping, private grassed areas as well as road reserve landscaping. For the purposes of characterising the post-developed site for stormwater modelling, the catchment area was modelled as a 100% impervious area so as to model the worst case post-development catchment character in relation to stormwater run-off. A detailed catchment description is contained in dwg 17691_DA_C250 attached in Appendix A of this report.

2.2.2 Existing Drainage System

The site currently implements an extensive stormwater drainage system consisting of an underground piped drainage network connected by a series grated surface inlet pits. As previously detailed, the majority of stormwater captured by the site area is directed to two above-ground detention basins (refer to figure 1.1 - section 1.4).

2.2.3 Proposed Drainage System

As mentioned previously, the proposed stormwater drainage system has been designed to two constraints:

1. To provide equivalent or superior performance in comparison to the existing system.
2. To provide equivalent or superior performance in comparison to the pre-developed state.

The proposed means of controlling stormwater discharge that is captured on the site is through the implementation of a below-ground, staged, 1675m³ on-site detention tank (OSD) combined with an above-ground detention area and a proposed 125m run of twin ø1200mm reinforced concrete pipes connecting up to the existing piped drainage network. The full design is contained in dwg's 17691_DA_C101-102 attached in Appendix A of this report.

This system has been designed and sized so as to exceed the detention storage provided by the existing system, as well as to meet the requirements stipulated in the 2014 Penrith City Council Development Control Plan; specifically that the peak discharge from the site in its post-developed state for all storm events up to and including the 100yr ARI event is

The means of designing to this constraint was a DRAINS computer model that conservatively simulated both the predeveloped site area and the proposed drainage system for all storm events up to the 100yr ARI event for direct comparison. The set up and results of this model are detailed in the proceeding section.

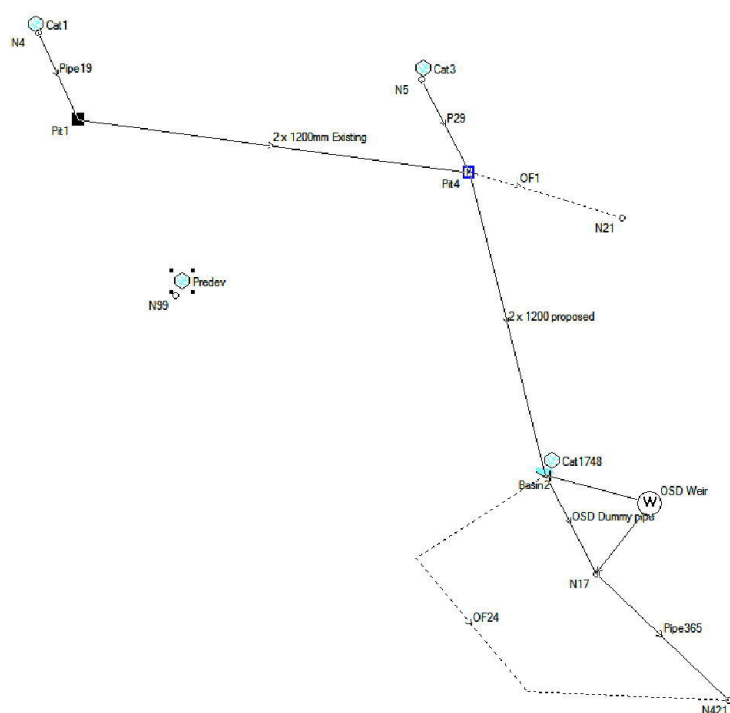


Figure 2.1 – DRAINS model layout.

The construction of the model was undertaken by applying 3 catchments to the proposed system at various inlet points, as well as a single predevelopment catchment applied to a node. The catchments were piped directly to the node pits (pit 1 and 4 in figure 2.1 above) to provide an upper-bound estimate of the rate at which the stormwater flows were entering the system for conveyance to the OSD tank and a correspondingly conservative overestimate of the peak rate of stormwater input to the storage tank. The discharge point of the system was to a lintel inlet pit on-site that currently served as the point of discharge for the existing system as evidenced by the site survey and previous engineering design drawings for the site. Tail water levels for the outlet node were estimated based on the top of kerb level for the 100 year storm event and the obvert of pipe for the 20yr (and below) storm event. The results of DRAINS model are tabulated immediately below.

ARI Event (year)	Pre-development Q (l/s)	Post-development Q (l/s)
1	0.163	0.16
2	0.466	0.229
5	0.883	0.297
10	1.03	0.513
20	1.23	0.881

100	1.65	1.57
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Table 2.1 – Pre/post development flows as computed by DRAINS model.

2.3 Water Quality

Constraints:

In consideration water quality for the development site, the design of a treatment system has been performed in accordance with the 2014 Penrith City Council DCP, the NSW Water Sensitive Urban Design Policy, and the Sydney Regional Environmental plan No. 20 - Hawkesbury/Nepean River (No.2 - 1997).

Penrith City Council's development control plan demands that the water quality treatment train must meet the pollutant reduction targets listed immediately below in table 2.2.

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

Table 2.2: Pollutant Reduction targets – 2014 Penrith City Council DCP

The modelling of this treatment train is to be performed via a MUSIC computer model as specified in the NSW Water Sensitive Urban Design policy and done-so in adherence to the directions given in the associated technical guidelines. This also achieves the requirements of the Sydney Regional Environmental Plan for the Hawkesbury/Nepean River (No. 20 – 1997) which states that protection of the stormwater inflows to the river system from pollutant contamination must also be adhered to.

Proposed Design:

The design of the treatment train consists of 6 x 460mm Stormwater 360 PSorb filter cartridges contained in a dedicated chamber located in the OSD tank. The system caters for the additional hardstand area that is being added to the site over the existing grassed detention basin and ensures any pollutants from this hardstand area are reduced to the levels contained in table 2.2 above. The design of this treatment train is contained in a separate DA from 2015 that was previously examined and approved by Penrith City Council, the drawings of which are attached in Appendix A (17691-15607_SK_C001-C003).

3 References

- 2014 Penrith City Council Development Control Plan
- WSUD Policy and Technical Guidelines
- Sydney Region Environmental Plan No.20 – Hawkesbury/Nepean River (SREP 20).
- Pre-Lodgement Advice letter for Proposed Alterations to Domayne Building and Reconfiguration of Existing roundabout and Car Park, Lot 10 DP 1046110

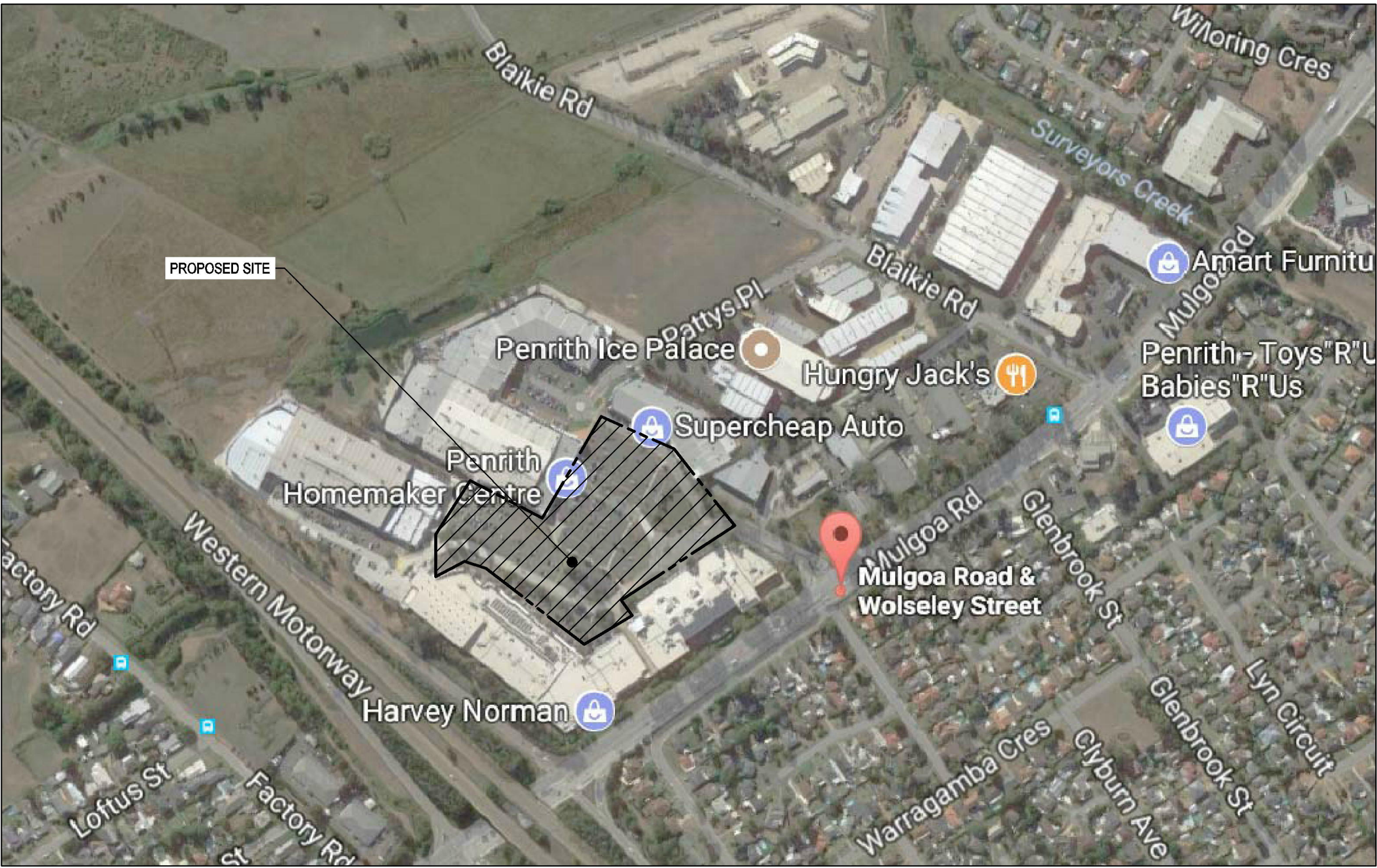
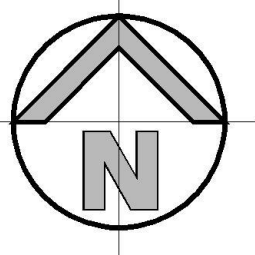
APPENDIX A

DEVELOPMENT APPLICATION DRAWINGS

PROPOSED PENRITH HOMEMAKER CENTRE ULGOA ROAD & WOLSELEY STREET, PENRITH CIVIL ENGINEERING WORKS

GENERAL NOTES:

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH PENRITH CITY COUNCIL'S SPECIFICATION. CONTRACTOR TO OBTAIN AND RETAIN A COPY ON SITE DURING THE COURSE OF THE WORKS.
2. ALL NEW WORKS ARE TO MAKE A SMOOTH JUNCTION WITH EXISTING CONDITIONS AND MARRY IN A 'WORKMANLIKE' MANNER.
3. THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL SERVICES WITH EACH RELEVANT AUTHORITY. ANY DAMAGE TO SERVICES SHALL BE RECTIFIED BY THE CONTRACTOR OR THE RELEVANT AUTHORITY AT THE CONTRACTOR'S EXPENSE. SERVICES SHOWN ON THESE PLANS ARE ONLY THOSE EVIDENT AT THE TIME OF SURVEY OR AS DETERMINED FROM SERVICE DIAGRAMS. HENRY AND HYMAS CONSULTING PTY. LTD. CANNOT GUARANTEE THE INFORMATION SHOWN NOR ACCEPT ANY RESPONSIBILITY FOR INACCURACIES OR INCOMPLETE DATA.
4. SERVICES & ACCESSSES TO THE EXISTING PROPERTIES ARE TO BE MAINTAINED IN WORKING ORDER AT ALL TIMES DURING CONSTRUCTION.
5. ADJUST EXISTING SERVICE COVERS TO SUIT NEW FINISHED LEVELS TO RELEVANT AUTHORITY REQUIREMENTS WHERE NECESSARY.
6. REINSTATE AND STABILISE ALL DISTURBED LANDSCAPED AREAS.
7. MINIMUM GRADE OF SUBSOIL SHALL BE 0.5% (1:200) FALL TO OUTLETS.
8. ALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS, EROSION AND SEDIMENTATION CONTROL PLAN AND PENRITH CITY COUNCIL'S REQUIREMENTS WHERE APPLICABLE.
9. CONTRACTOR TO CHECK AND CONFIRM SITE DRAINAGE CONNECTIONS ACROSS THE VERGE PRIOR TO COMMENCEMENT OF SITE DRAINAGE WORKS.
10. PROPERTIES AFFECTED BY THE WORKS ARE TO BE NOTIFIED IN ADVANCE WHERE DISRUPTION TO EXISTING ACCESS IS LIKELY.



LOCALITY SKETCH

NTS

SITWORKS NOTES

- DATUM : A.H.D.
- ORIGIN OF LEVELS : REFER TO BENCH OR STATE SURVEY MARKS WHERE SHOWN ON PLAN.
- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO THE COMMENCEMENT OF WORK.
- ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS & THE DIRECTIONS OF THE SUPERINTENDENT.
- EXISTING SERVICES UNLESS SHOWN ON THE SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- WHERE NEW WORKS ABOUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS ACHIEVED.
- THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
- CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATION IS TO BE UNDERTAKEN OVER TELSTRA OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
- CONTRACTOR TO OBTAIN AUTHORITY APPROVALS WHERE APPLICABLE.
- MAKE SMOOTH TRANSITION TO EXISTING SURFACES AND MAKE GOOD.
- THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED LANDSCAPE, ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND MECHANICAL DRAWINGS AND SPECIFICATIONS
- OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED RELATING TO DEVELOPMENT AT THE SITE.
- TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MINIMUM OF 50mm IN BITUMINOUS PAVING.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.
- GRADES TO PAVEMENTS TO BE AS IMPLIED BY RL'S ON PLAN . GRADE EVENLY BETWEEN NOMINATED RL'S. AREAS EXHIBITING PONDING GREATER THAN 5mm DEPTH WILL NOT BE ACCEPTED UNLESS IN A DESIGNATED SAG POINT.
- ALL COVERS AND GRATES ETC TO EXISTING SERVICE UTILITIES ARE TO BE ADJUSTED TO SUIT NEW FINISHED SURFACE LEVELS WHERE APPLICABLE.

DRAWING SCHEDULE

DRAWING SCHEDULE	
17691_DA_C000	COVER SHEET, DRAWING SCHEDULE, NOTES AND LOCALITY SKETCH
17691_DA_C100	GENERAL ARRANGEMENT PLAN
17691_DA_C101	DETAIL PLAN, SHEET 1 OF 2
17691_DA_C102	DETAIL PLAN, SHEET 2 OF 2
17691_DA_C200	STORMWATER MISCELLANEOUS DETAILS AND PIT LID SCHEDULE
17691_DA_C201	OSD PLAN, SECTIONS AND DETAILS
17691_DA_C250	STORMWATER CATCHMENT PLANS
17691_DA_SE01	SEDIMENT AND EROSION CONTROL PLAN
17691_DA_SE02	SEDIMENT AND EROSION CONTROL DETAILS

DRAINAGE NOTES:

1. ALL STORMWATER WORK TO COMPLY WITH AS 3500 PART 3.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MINIMUM COVER OF 600mm ON ALL PIPES.
3. PROTECTION OF PIPES DUE TO LOADS EXCEEDING W7 WHEEL LOAD SHALL BE THE CONTRACTORS RESPONSIBILITY.
4. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS. REFER TO THIS DRAWING FOR DETAILS.
5. MINIMUM COVER OVER EXISTING PIPES FOR PROTECTION DURING CONSTRUCTION SHALL BE 800mm.
6. NO CONSTRUCTION LOADS SHALL BE APPLIED TO PLASTIC PIPES.
7. FINISHED SURFACE LEVELS SHOWN ON LAYOUT PLAN DRGS TAKE PRECEDENCE OVER DESIGN DRAINAGE SURFACE LEVELS.
8. ALL PIPES UP TO AND INCLUDING 300 DIA. SHALL BE SOLVENT OR RUBBER RING JOINTED PVC CLASS SH PIPE TO AS1260. ALL OTHER PIPES TO BE RCP USING CLASS 2 RUBBER RING JOINTED PIPE. HARDIES FRC PIPE MAY BE USED IN LIEU OF RCP IF DESIRED IN GROUND. ALL AERIAL PIPES TO BE PVC CLASS SH.
9. ALL PITs IN NON TRAFFICABLE AREAS TO BE PREFABRICATED POLYESTER CONCRETE "POLYCRETE" WITH "LIGHT DUTY" CLASS B GALV. MILD STEEL GRATING AND FRAME.
ALL PITs IN TRAFFICABLE AREAS (CLASS TD1 LOADING MAX) TO HAVE 150mm THICK CONCRETE WALLS AND BASE CAST IN-SITU FC=32 MPa, REINFORCED WITH N12-200 BOTH LOADING WAYS CENTRALLY PLACE. U.N.O. ON SEPARATE DESIGN DRAWINGS IN THIS SET. GALV.MILD STEEL GRATING AND FRAME TO SUIT DESIGN LOADING. PRECAST PITs, RECTANGULAR OR CIRCULAR IN SHAPE, MAY BE USED IN LIEU AND SHALL COMPLY WITH RELEVANT AUSTRALIAN STANDARDS.
10. ALL PITs, GRATINGS AND FRAMES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND TO BE IN ACCORDANCE WITH AS3500.3 AND AS3996.
11. PIT CHAMBER DIMENSIONS ARE TO BE SELECTED TO SATISFY THE FOLLOWING:
 - PIPE SIZE
 - DEPTH TO INVERT
 - SKEW ANGLEREFER TYPICAL PIT CHAMBER DETAILS BELOW
IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER AS THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
12. FOR PIPE SIZES GREATER THAN Ø300mm, PIT FLOOR IS TO BE BENCH TO FACILITATE FLOW.
13. GALVANISED STEP IRONS SHALL BE PROVIDED AT 300 CTS FOR PITs HAVING A DEPTH EXCEEDING 1200mm. SUBSOIL DRAINAGE PIPE SHALL BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES. (MINIMUM LENGTH 3m)
14. ALL SUBSOIL PIPES SHALL BE 100mm SLOTTED PVC IN A FILTER SOCK, UNO, WITH 3m INSTALLED UPSTREAM OF ALL PITs.
15. ALL PIPEWORK SHALL HAVE MINIMUM DIAMETER 100.
16. MINIMUM GRADE FOR ROOFWATER DRAINAGE LINES SHALL BE 1%.
17. ALL PIPE JUNCTIONS AND TAPER UP TO AND INCLUDING 300 DIA. SHALL BE VIA PURPOSE MADE FITTINGS.
18. ALL ROOF DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH AS3500, PART 3. TESTING TO BE UNDERTAKEN AND REPORTS PROVIDED TO THE SUPERINTENDENT.
19. LOCATION OF THE DIRECT DOWN PIPE CONNECTIONS MAY VARY ON SITE TO SUIT SITE CONDITIONS, WHERE CONNECTION SHOWN ON LONG SECTIONS CHAINAGES ARE INDICATIVE ONLY.
20. PITs IN EXCESS OF 1.5 m DEEP TO HAVE WALL AND FLOOR THICKNESS INCREASED TO 200mm. REINFORCED WITH N12@200 CTS CENTRALLY PLACED BOTH WAYS THROUGHOUT U.N.O.ON SEPARATE DESIGN DRAWINGS IN THIS SET. IF DEPTH EXCEEDS 5m CONTACT ENGINEER.
21. SUBSOIL DRAINAGE LINES FOR LANDSCAPE AREA NOT SHOWN ON THESE DRAWINGS. REFER TO LANDSCAPING PLANS FOR DETAILS.
22. ALL STORMWATER PITs TO HAVE Ø100 uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.

SURVEY NOTES

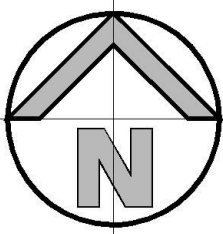
THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY THE SURVEYOR SPECIFIED IN THE TITLE BLOCK.

THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. HENRY AND HYMAS PTY. LTD. DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.


SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT HENRY AND HYMAS PTY. LTD. THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM ORIGINAL SURVEY DOCUMENTS.

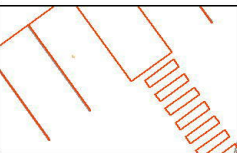
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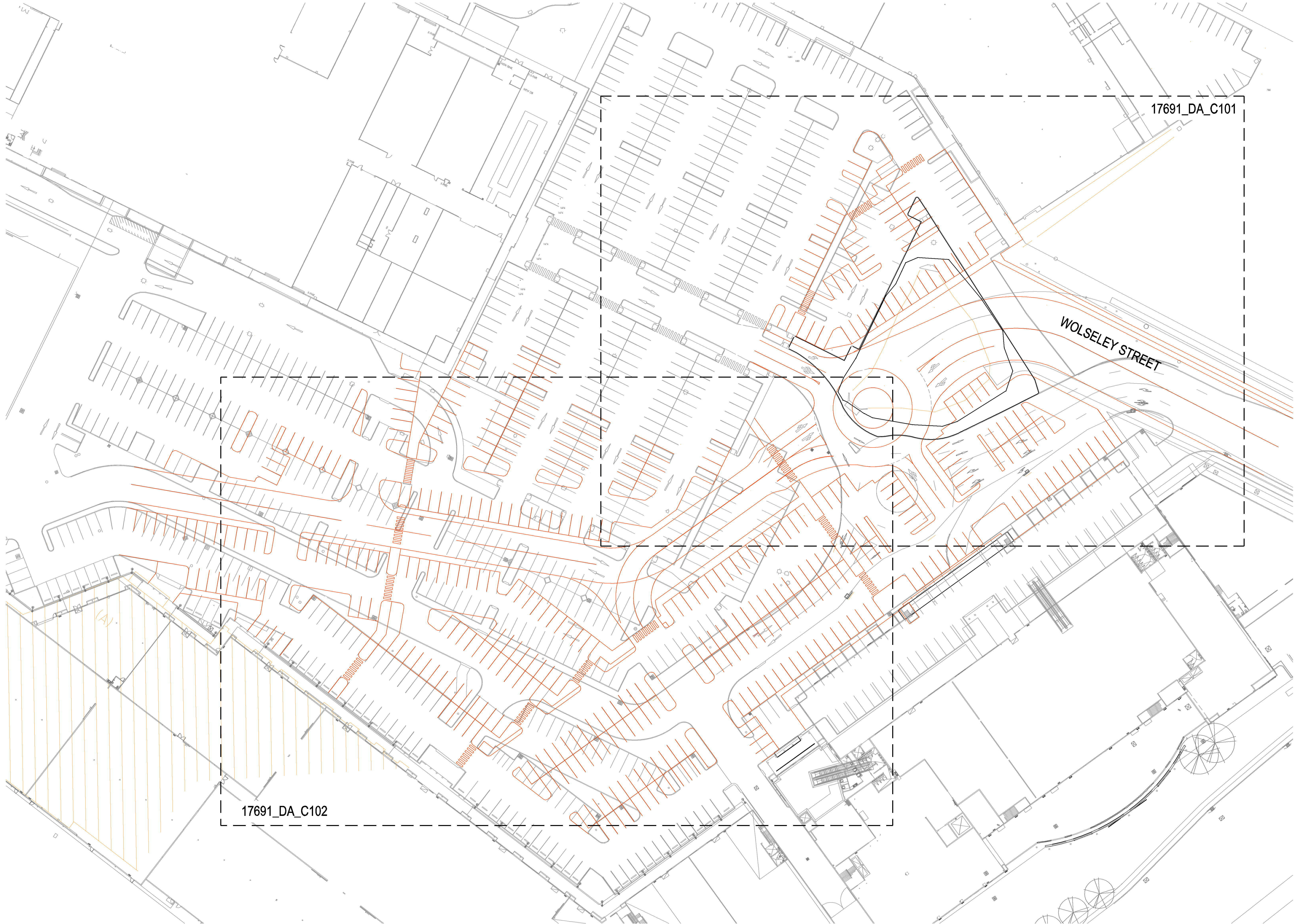


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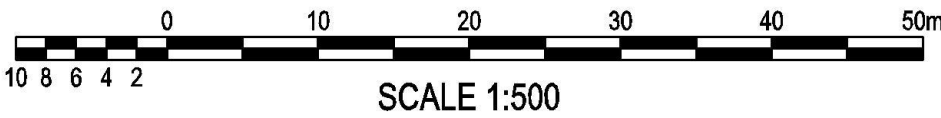
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WOSLEY SREET AND CARPARK
EXISTING LAYOUT
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WOSLEY SREET AND CARPARK
PROPOSED LAYOUT

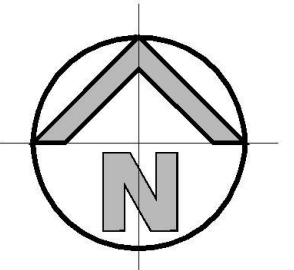
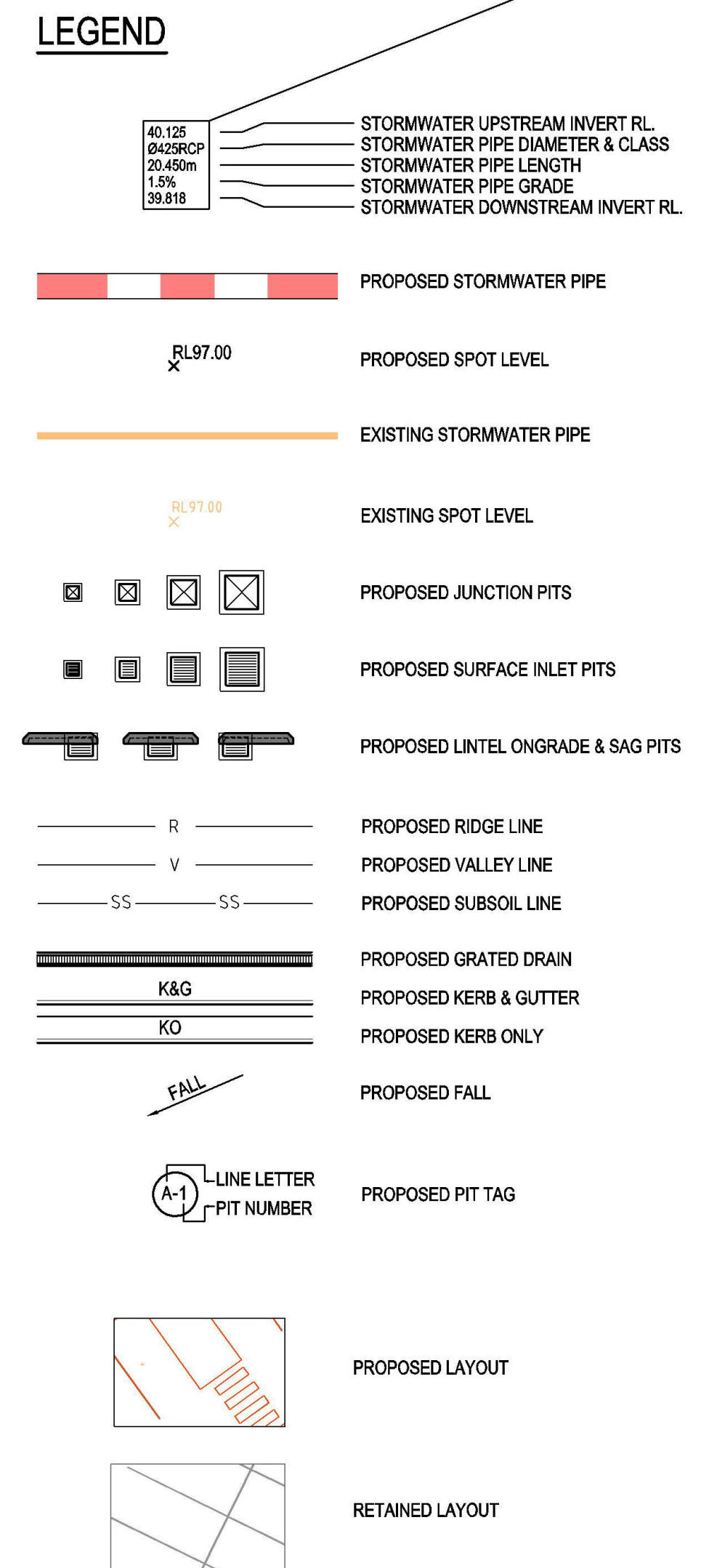


GENERAL ARRANGEMENT PLAN
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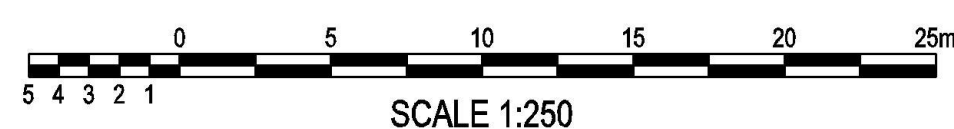


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FOR DA ONLY



SCALE: 1:250

FOR CONTINUATION REFER TO DWG 17691_DA_C102

<div>SURVEY INFORMATION SURVEYED BY LTS DATUM: AHD</div>										<div>Client HARVEY NORMAN Architect LEFFLER SIMES PTY LTD This drawing and design remains the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.</div>										<div>Level 5, 79 Victoria Avenue Chattwood NSW 2067 Telephone +61 2 9417 8400 Facsimile +61 2 9417 8337 Email enquiries@hiconsult.com.au Web www.henryandhymas.com.au</div> <div> Global Data & Com. Pty Ltd</div>										<div></div>										<div>Project PENRITH HOMEMAKER CENTRE CNR. MULGOA ROAD & WOLSELEY STREET, PENRITH Title DETAIL PLAN SHEET 1 OF 2</div>										<div>Drawn M.Cerna</div>		<div>Designed J.Gormly</div>		<div>Date SEP 17</div>	
																																								<div>Checked A.Francis</div>		<div>Approved A.Francis</div>		<div>Scale 1:250 @A1</div>											
<div>01 ISSUED FOR DA</div>										<div>MC JG 25/02/07</div>																														<div>Drawing number 17691_DA_C101</div>						<div>Revision 01</div>									
<div>REVISION AMENDMENT</div>										<div>DRAWN DESIGNED DATE REVISION AMENDMENT DRAWN DESIGNED DATE</div>																																													

Document Set ID: 8126220
Version: 1, Version Date: 07/04/2018

LEGEND

40.125	STORMWATER UPSTREAM INVERT RL
Ø425RCP	STORMWATER PIPE DIAMETER & CLASS
20.450m	STORMWATER PIPE LENGTH
1.5%	STORMWATER PIPE GRADE
39.818	STORMWATER DOWNSTREAM INVERT RL

PROPOSED STORMWATER PIPE

PROPOSED SPOT LEVEL

EXISTING STORMWATER PIPE

EXISTING SPOT LEVEL

PROPOSED JUNCTION PITS

PROPOSED SURFACE INLET PITS

PROPOSED LINTEL ONGRADE & SAG PITS

PROPOSED ABOVE GROUND DETENTION

PROPOSED RIDGE LINE

PROPOSED VALLEY LINE

PROPOSED SUBSOIL LINE

PROPOSED KERB & GUTTER

PROPOSED FALL

PROPOSED PIT TAG

PROPOSED LAYOUT

RETAINED LAYOUT

DETAIL PLAN

SCALE: 1:250

SCALE 1:250

SURVEY
INFORMATION
SURVEYED BY LTS
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA	MC	JS	24/10/2017					

Client
HARVEY NORMAN

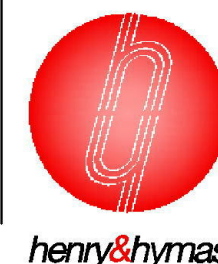
Engineer
LEFFLER SIMES PTY LTD

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Project
PENRITH HOMEMAKER CENTRE
CNR. MULGOA ROAD & WOLSELEY STREET, PENRITH

Title
DETAIL PLAN
SHEET 2 OF 2

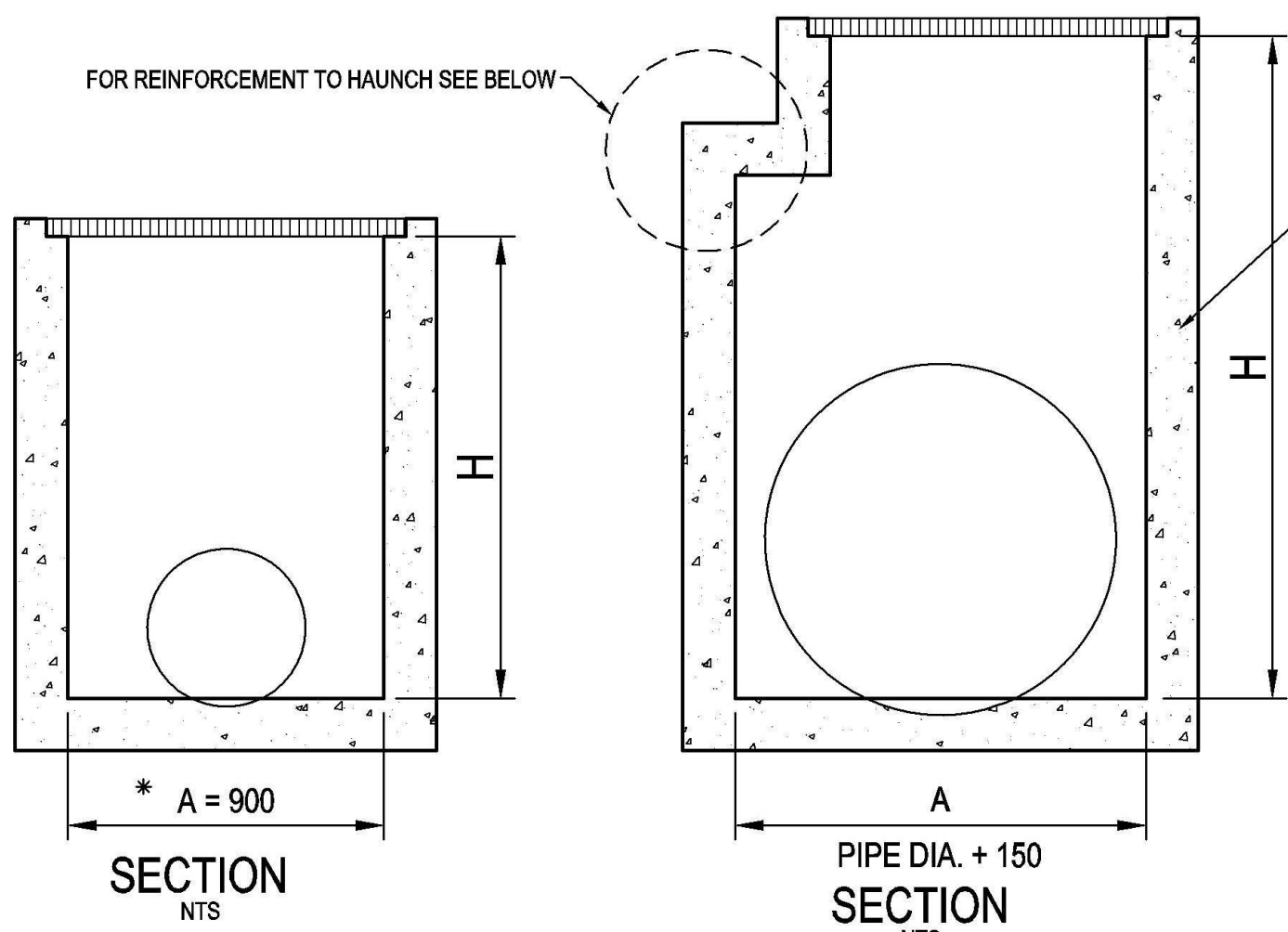
Drawn M.Cerna	Designed J.Gornly	Date OCT 17
Checked A.Francis	Approved A.Francis	Scale 1:250 @A1

Drawing number
17691_DA_C102

Revision
01

IT IS THE CONTRACTORS RESPONSIBILITY TO SELECT PIT CHAMBER SIZE WITH REGARDS TO PIPE SIZE, DEPTH TO INVERT AND SKEW ANGLE. REFER SKETCHES BELOW.

1. SELECT PIT CHAMBER USING THE STEPS BELOW.
2. SELECT PIT CHAMBER SIZE DEPENDING ON THE PIPE DIAMETERS
3. CHECK PIT CHAMBER SIZE TO SATISFY DEPTH TO INVERT REQUIREMENTS.
4. CHECK PIT CHAMBER DIMENSIONS TO SATISFY THE SKEW ANGLE IN THE TABLE.



*A = 600 FOR PIPES UP TO 375 DIA.

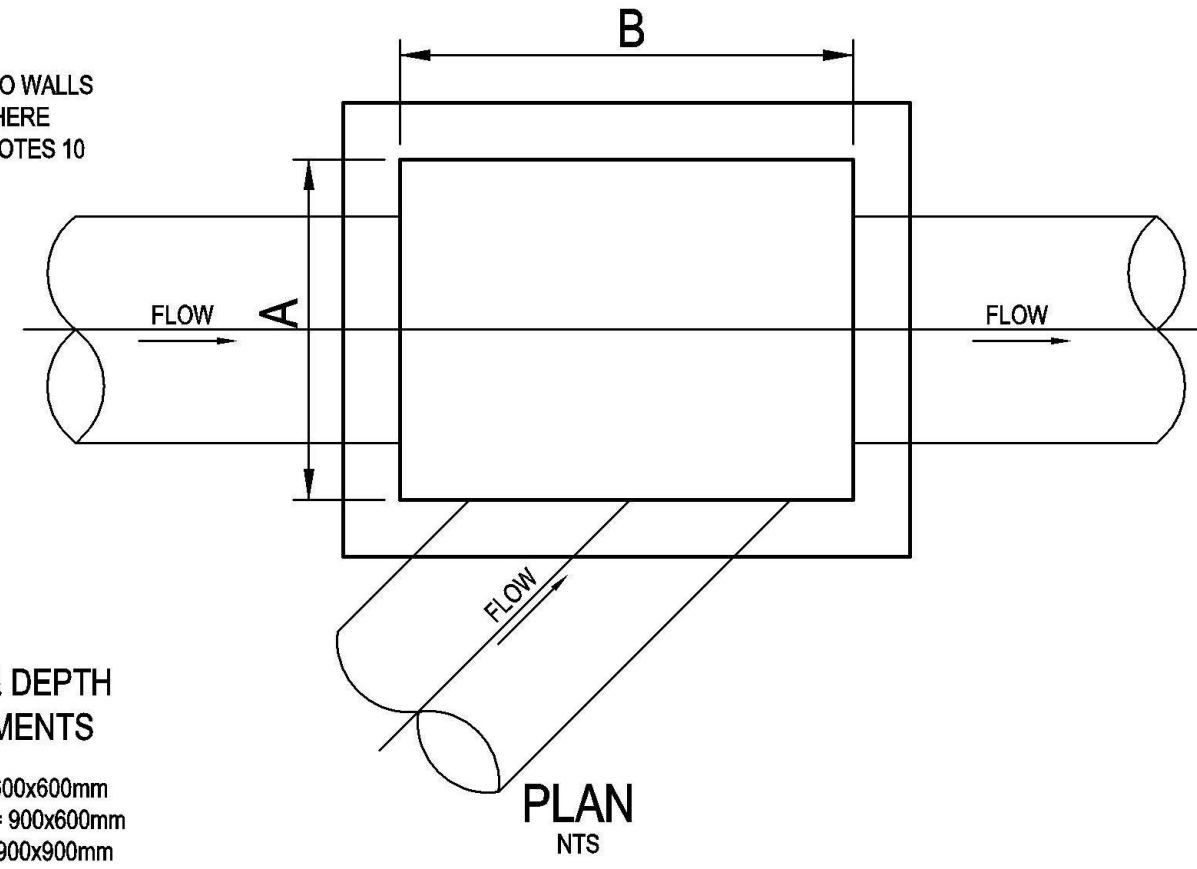
1. PIT CHAMBER DIMENSIONS FOR PIPES UP TO 600 DIA.

1. PIT CHAMBER FOR PIPES GREATER THAN 600 DIA.

FOR B = 600mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 225mm
FOR B = 900mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 375mm
FOR B = 1200mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 600mm
FOR B = 1500mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 825mm
FOR B = 1800mm - MAX. SIDE ENTRY PIPE AT 45° SKEW = 1050mm

2. PIT SIZE & DEPTH REQUIREMENTS

H = 0-900mm - Ax B = 600x600mm
H = 900-1200mm - Ax B = 900x600mm
H = >1200mm - Ax B = 900x900mm



3. PIT CHAMBER FOR SIDE ENTRY ON SKEW

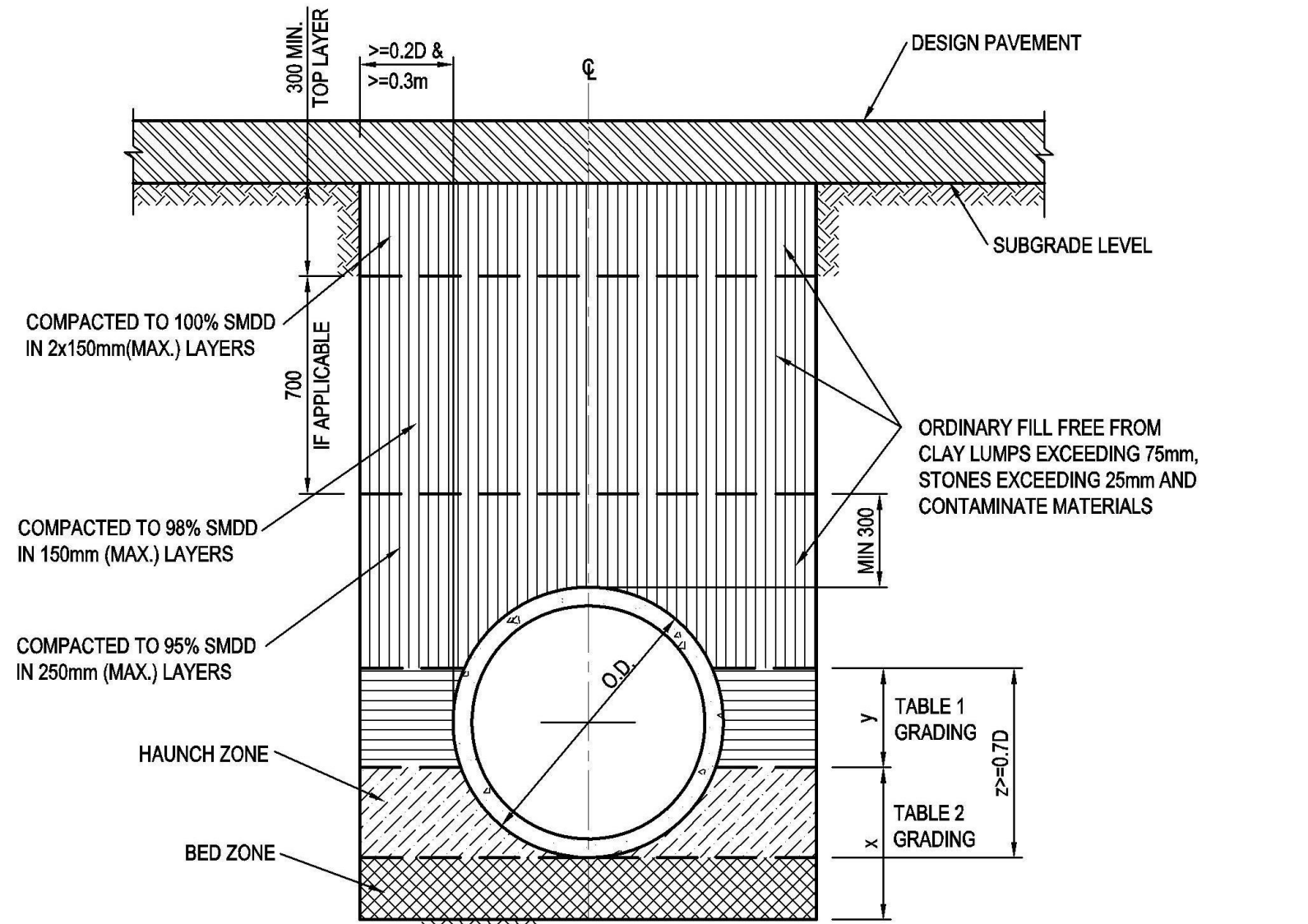
TABLE 1	
SIEVE SIZE (MM)	WEIGHT PASING (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

TABLE 2	
SIEVE SIZE (MM)	WEIGHT PASING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

TABLE 3				
SUPPORT TYPE	BED ZONE X	HAUNCH ZONE Y	BED AND HAUNCH ZONES COMPACTION	MAX BEDDING FACTOR
HS1		0.1D	50	2.0
HS2	100 IF D<=1500, OR 150 IF D>=1500	0.3D	60	2.5
HS3		0.3D	70	4.0

DRAINAGE NOTES:

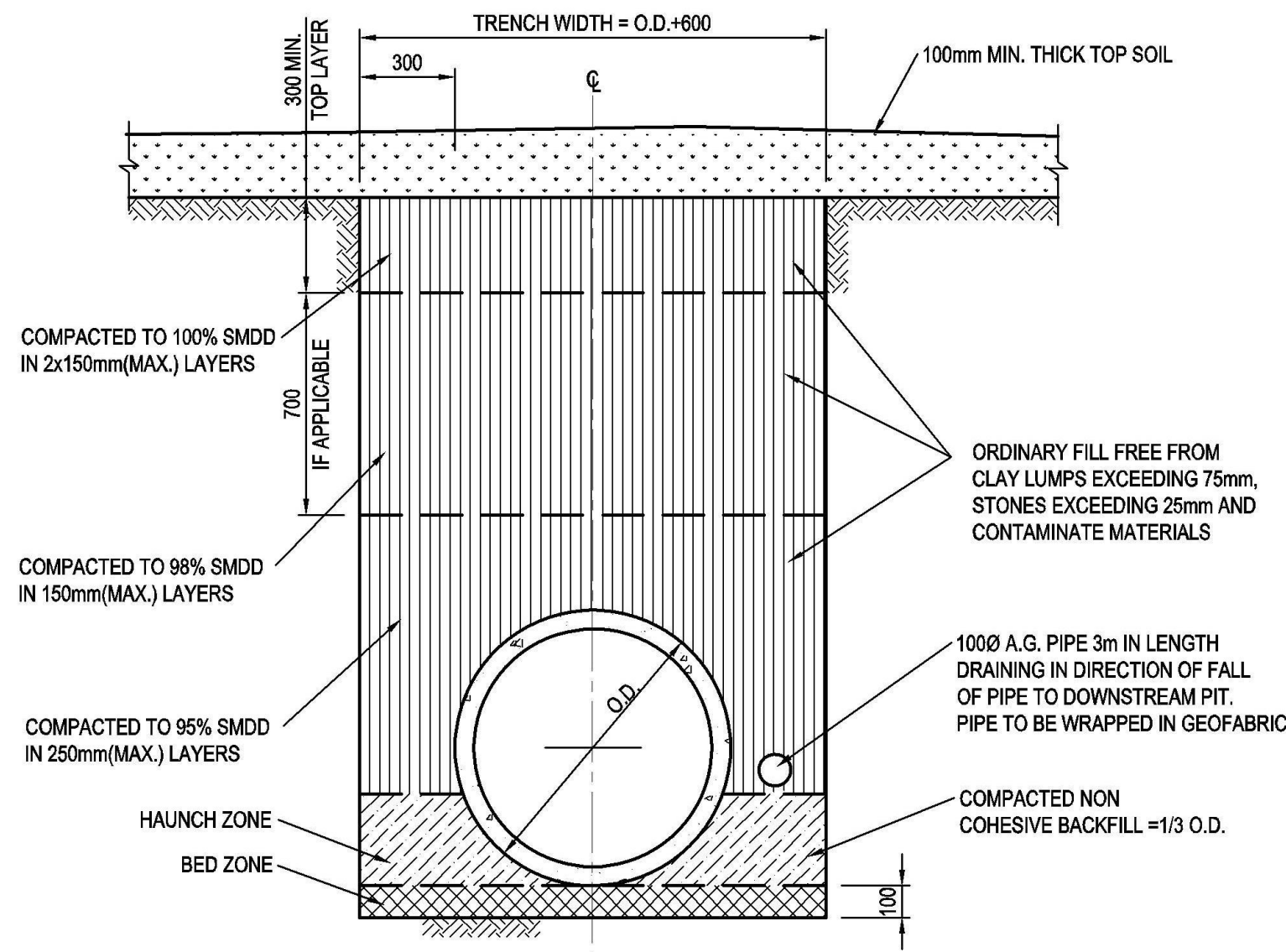
1. ALL STORMWATER WORK TO COMPLY WITH AS 3500 PART 3.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MINIMUM COVER OF 600mm ON ALL PIPES.
3. PROTECTION OF PIPES DUE TO LOADS EXCEEDING W7 WHEEL LOAD SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
4. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS. REFER TO THIS DRAWING FOR DETAILS.
5. MINIMUM COVER OVER EXISTING PIPES FOR PROTECTION DURING CONSTRUCTION SHALL BE 800mm.
6. NO CONSTRUCTION LOADS SHALL BE APPLIED TO PLASTIC PIPES.
7. FINISHED SURFACE LEVELS SHOWN ON LAYOUT PLAN DRGS TAKE PRECEDENCE OVER DESIGN DRAINAGE SURFACE LEVELS.
8. ALL PIPES UP TO AND INCLUDING 300 DIA. SHALL BE SOLVENT OR RUBBER RING JOINTED PVC CLASS SH PIPE TO AS1260. ALL OTHER PIPES TO BE RCP USING CLASS 2 RUBBER RING JOINTED PIPE. HARDIES FRC PIPE MAY BE USED IN LIEU OF RCP IF DESIRED IN GROUND. ALL AERIAL PIPES TO BE PVC CLASS SH.
9. ALL PITS IN NON TRAFFICABLE AREAS TO BE PREFABRICATED POLYESTER CONCRETE "POLYCRETE" WITH "LIGHT DUTY" CLASS B GALV. MILD STEEL GRATING AND FRAME. ALL PITS IN TRAFFICABLE AREAS (CLASS "D" LOADING MAX) TO HAVE 150mm THICK CONCRETE WALLS AND BASE CAST IN-SITU f_{ck} =32 MPa. REINFORCED WITH N12-200 BOTH LOADING WAYS CENTRALLY PLACE. U.N.O. ON SEPARATE DESIGN DRAWINGS IN THIS SET. GALV. MILD STEEL GRATING AND FRAME TO SUIT DESIGN LOADING. PRECAST PITS, RECTANGULAR OR CIRCULAR IN SHAPE, MAY BE USED IN LIEU AND SHALL COMPLY WITH RELEVANT AUSTRALIAN STANDARDS.
10. ALL PITS, GRATINGS AND FRAMES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND TO BE IN ACCORDANCE WITH AS3500.3 AND AS3996.
11. PIT CHAMBER DIMENSIONS ARE TO BE SELECTED TO SATISFY THE FOLLOWING:
 - PIPE SIZE
 - DEPTH TO INVERT
 - SKEW ANGLEREFER TYPICAL PIT CHAMBER DETAILS BELOW
IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER OF THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
12. FOR PIPE SIZES GREATER THAN Ø300mm, PIT FLOOR IS TO BE BENCH TO FACILITATE FLOW.
13. GALVANISED STEP IRONS SHALL BE PROVIDED AT 300 CTS FOR PITS HAVING A DEPTH EXCEEDING 1200mm. SUBSOIL DRAINAGE PIPE SHALL BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES. (MINIMUM LENGTH 3m).
14. ALL SUBSOIL PIPES SHALL BE 100mm SLOTTED PVC IN A FILTER SOCK, UNO, WITH 3m INSTALLED UPSTREAM OF ALL PITS.
15. ALL PIPEWORK SHALL HAVE MINIMUM DIAMETER 100.
16. MINIMUM GRADE FOR ROOFWATER DRAINAGE LINES SHALL BE 1%.
17. ALL PIPE JUNCTIONS AND TAPER UP TO AND INCLUDING 300 DIA. SHALL BE VIA PURPOSE MADE FITTINGS.
18. ALL ROOF DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH AS3500, PART 3. TESTING TO BE UNDERTAKEN AND REPORTS PROVIDED TO THE SUPERINTENDENT.
19. LOCATION OF THE DIRECT DOWN PIPE CONNECTIONS MAY VARY ON SITE TO SUIT SITE CONDITIONS, WHERE CONNECTION SHOWN ON LONG SECTIONS CHAINAGES ARE INDICATIVE ONLY.
20. PITS IN EXCESS OF 1.5 m DEEP TO HAVE WALL AND FLOOR THICKNESS INCREASED TO 200mm. REINFORCED WITH N12@200 CTS CENTRALLY PLACED BOTH WAYS THROUGHOUT U.N.O. ON SEPARATE DESIGN DRAWINGS IN THIS SET. IF DEPTH EXCEEDS 5m CONTACT ENGINEER.
21. SUBSOIL DRAINAGE LINES FOR LANDSCAPE AREA NOT SHOWN ON THESE DRAWINGS. REFER TO LANDSCAPING PLANS FOR DETAILS.
22. ALL STORMWATER PITS TO HAVE Ø100 uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.



PIPE TRENCH INSTALLATION BENEATH PAVEMENT

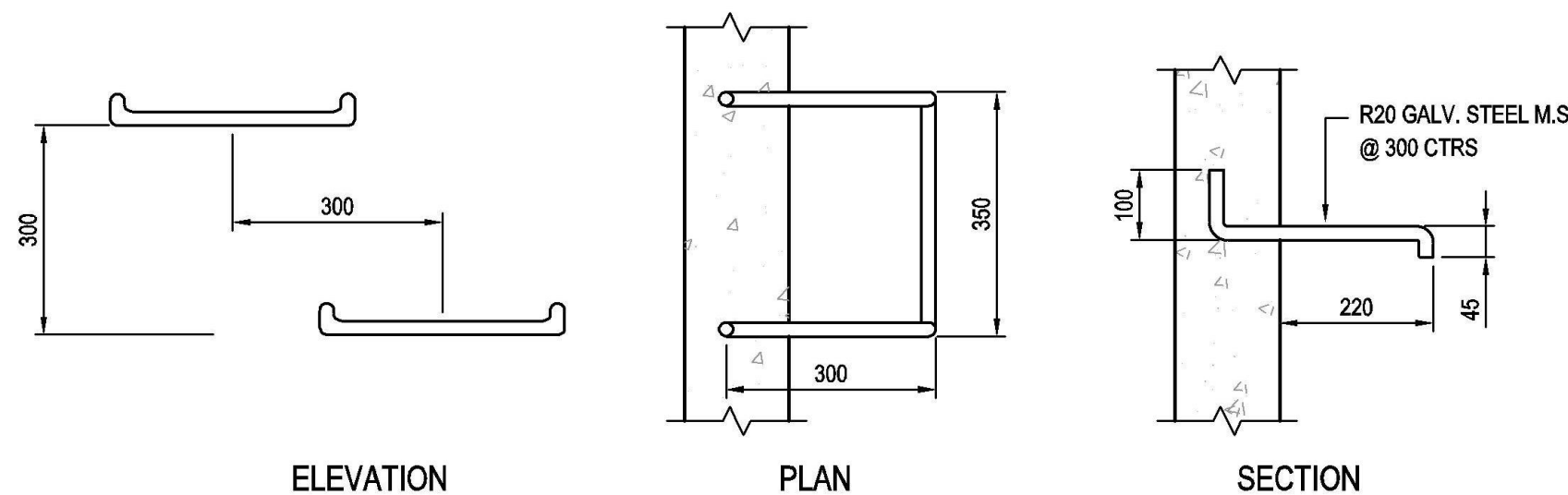
(HS SUPPORT TO BE USED UNDER ROADWAY)
SCALE 1:20

NOTE:
TYPE HS2 TO BE USED AS A TYPICAL SUPPORT FOR TRENCHES UNDER ROADWAY UNLESS SPECIFIED SEPERATELY

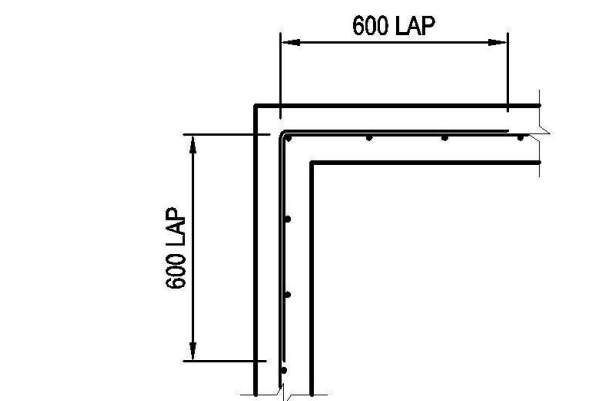


PIPE TRENCH INSTALLATION IN LANDSCAPE AREAS

(H1 & H2 SUPPORT)
SCALE 1:20

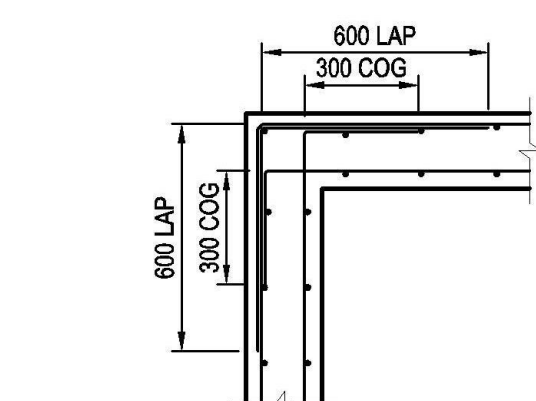


TYPICAL STEP IRON DETAIL



150 WALL - CORNER DETAIL

SCALE 1:20



200 WALL - CORNER DETAIL

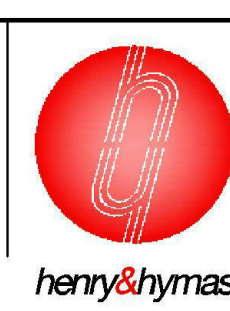
SCALE 1:20

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REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA	MC	JS	25/10/2017					

Client	HARVEY NORMAN
Architect	LEFFLER SIMES PTY LTD
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Project	PENRITH HOMEMAKER CENTRE CNR. MULGOA ROAD & WOLSELEY STREET, PENRITH
Drawn	M.Cerna
Designed	J.Gormly
Checked	A.Francis
Approved	A.Francis
Title	STORMWATER MISCELLANEOUS DETAILS

Drawn	M.Cerna	Designed	J.Gormly	Date	SEP 17
Checked	A.Francis	Approved	A.Francis	Scale	AS NOTED@A1
Drawing number	17691_DA_C200	Revision	01		

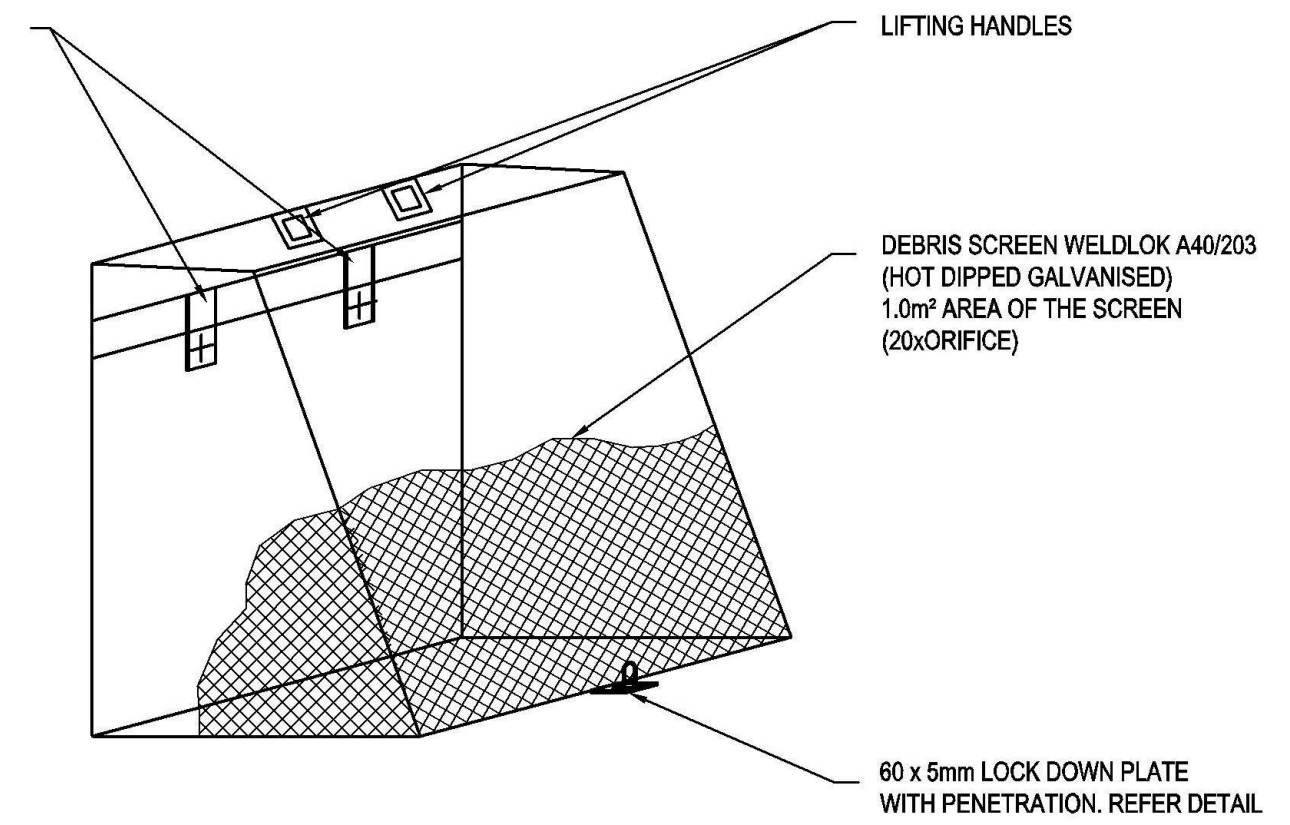


OSD PLAN
SCALE: 1:200

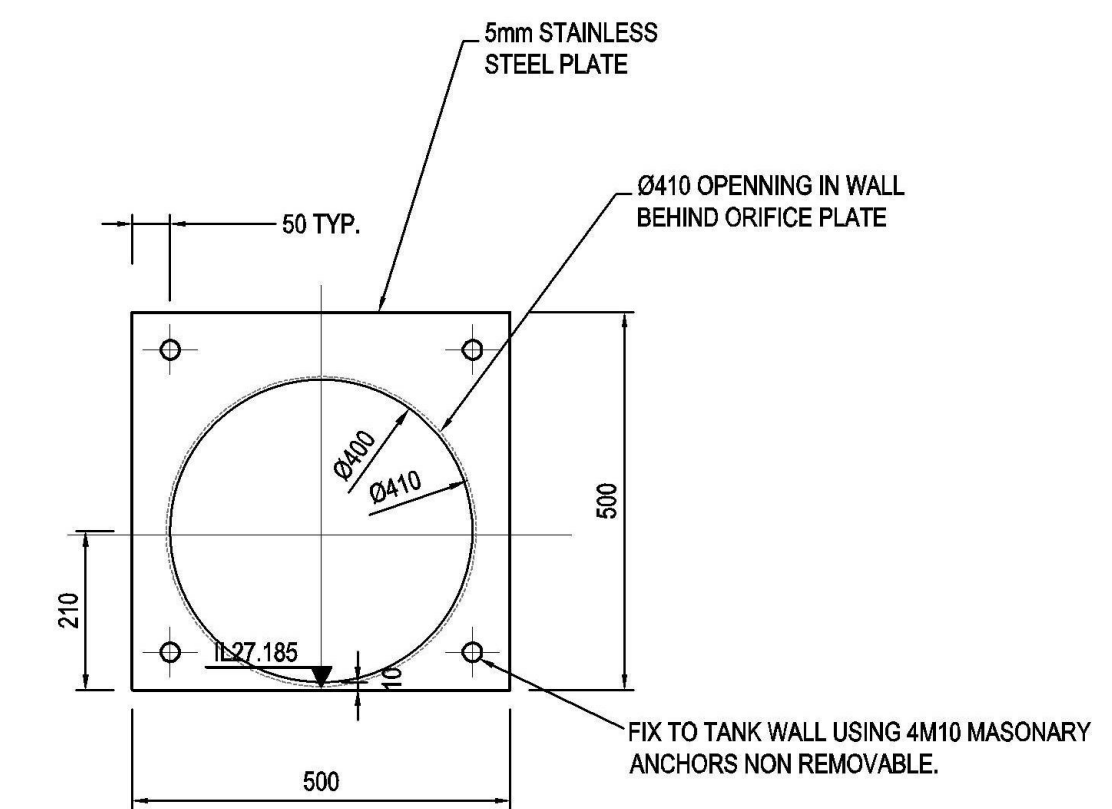
100 x 16 MOUNTING BAR WITH BRACKETS, SCREEN TO BE ATTACHED (GENERALLY ON A SLIDING MECHANISM) TO THE WALL, BUT SHOULD BE REMOVABLE (WITHOUT THE USE OF TOOLS) TO PERMIT CLEANSING AND EASY INSPECTION OF THE OUTLET CONTROL. ALL STEEL TO BE HOT DIPPED GALVANISED.

SCREEN TYPE WELDLOK A40/203 IS RECOMMENDED FOR ORIFICES LARGER THAN 150mm AND SCREEN AREA 20 x THE ORIFICE AREA FOR THAT TYPE OF SCREEN - REFER UPRCT SECTION 4-13

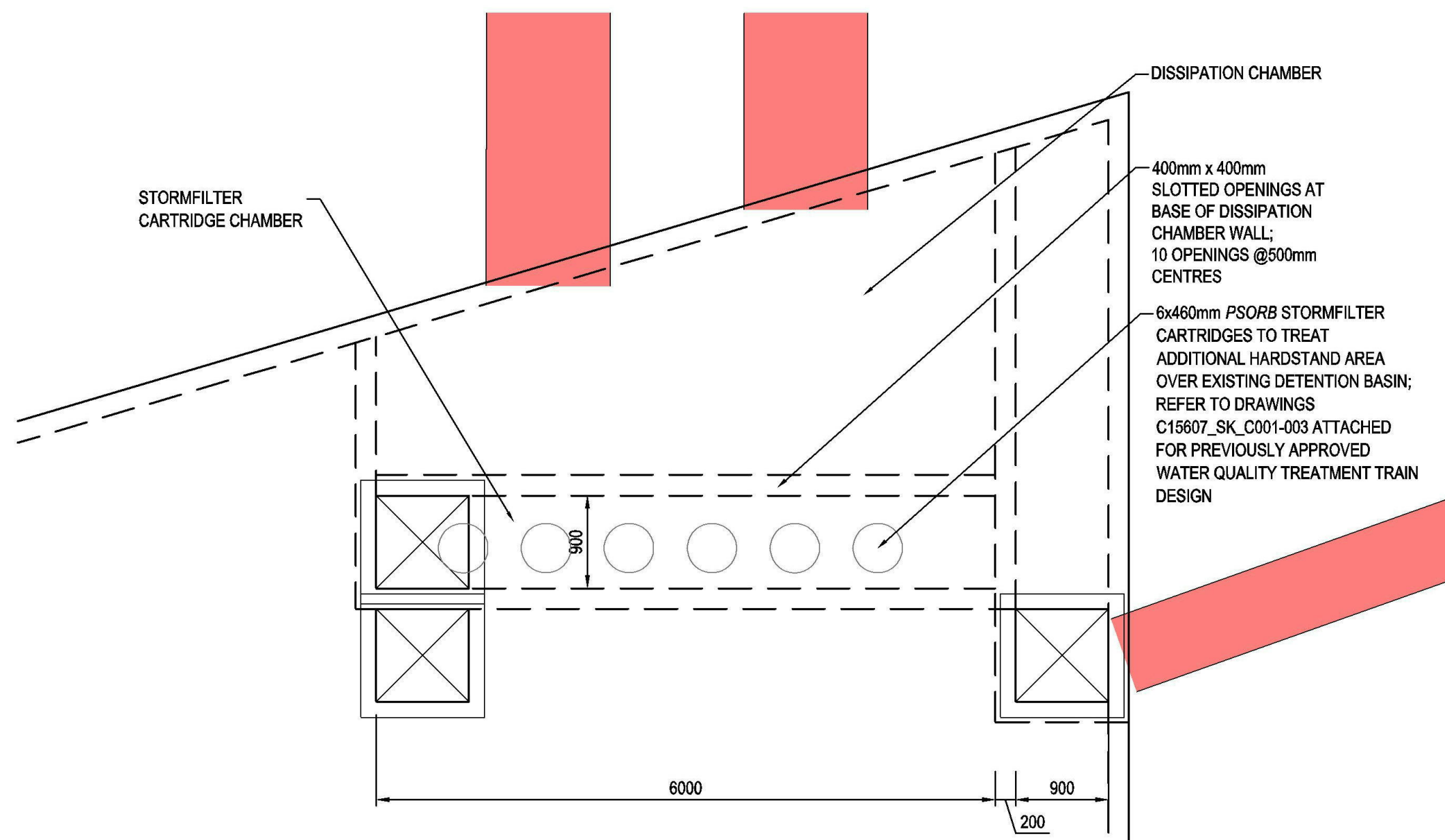
MAXIMESH RH3030 IS RECOMMENDED FOR ORIFICES LESS THAN 150mm IN DIAMETER AND SCREEN AREA 50x THE ORIFICE AREA REFER BURWOOD COUNCIL AND UPPER PARRAMATTA RIVER CATCHMENT TRUST HANDBOOK.



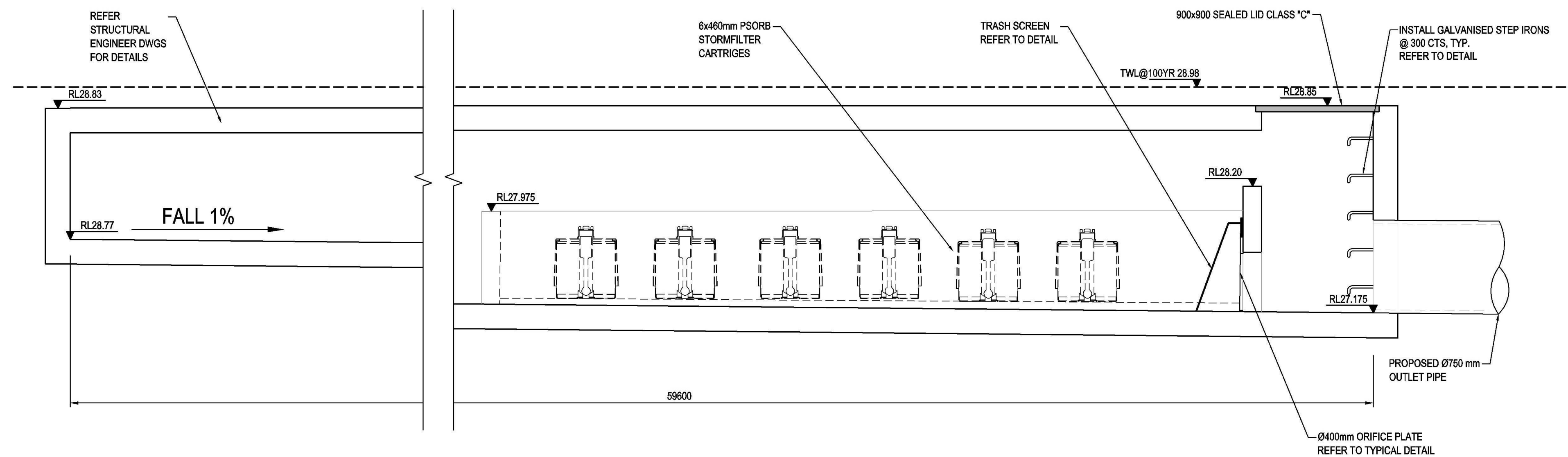
DEBRIS SCREEN DETAIL
NOT TO SCALE
ALL STEEL TO BE HOT DIPPED GALVANISED



ORIFICE PLATE
SCALE 1:10



DISCHARGE / CARTRIDGE / DISSIPATION CHAMBER DETAIL
SCALE 1:50



SECTION A
SCALE: 1:25

FOR DA ONLY

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA	MC	JS	25/10/2017					

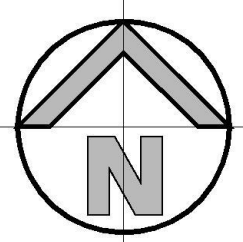
Client	HARVEY NORMAN
Architect	LEFFLER SIMES PTY LTD
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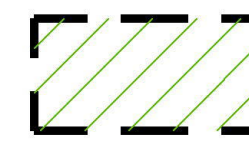
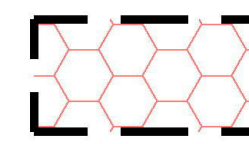
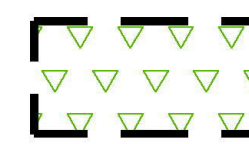
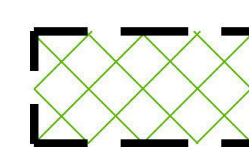
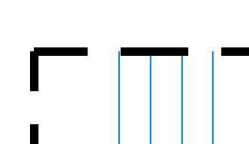


Project	PENRITH HOMEMAKER CENTRE CNR. MULGOA ROAD & WOLSELEY STREET, PENRITH
Title	OSD PLAN, SECTIONS AND DETAILS

Drawn	M.Cerna	Designed	J.Gornly	Date	SEP 17
Checked	A.Francis	Approved	A.Francis	Scale	AS NOTED @A1
Drawing number	17691_DA_C201	Revision	01		

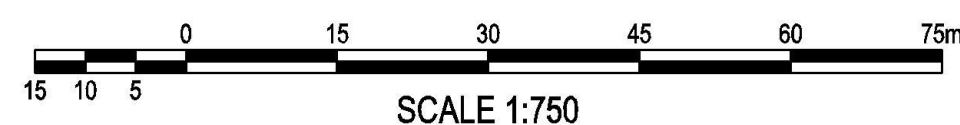


LEGEND:

-  CATCHMENT 1 = 2.1723 ha
DRAINING TO EXISTING STORMWATER
DETENTION BASIN FOR REDIRECTION TO
PROPOSED OSD
-  CATCHMENT 2 = 1.6375 ha
DRAINING THROUGH PIT EX-2 TO EXISTING
STORMWATER DETENTION BASIN FOR
REDIRECTION TO PROPOSED OSD
-  CATCHMENT 3 = 0.1275 ha
TO REPLACE EXISTING DETENTION BASIN
ADDITIONAL HARDSTAND TO BE TREATED
BY 6x460mm PSORB STORMFILTER
CARTRIDGES
-  CATCHMENT 4 = 0.1435 ha
ABOVE-GROUND DETENTION DRAINING
DIRECTLY TO PROPOSED OSD
-  CATCHMENT 5 = 3.45 ha
DRAINING TO BASIN 2 WEST OF SITE

STORMWATER CATCHMENT PLAN

SCALE: 1:750



FOR DA ONLY

SURVEY
INFORMATION
SURVEYED BY LTS
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	ISSUED FOR DA	MC	JS	25/10/2017					

Client
HARVEY NORMAN

Architect
LEFFLER SIMES PTY LTD

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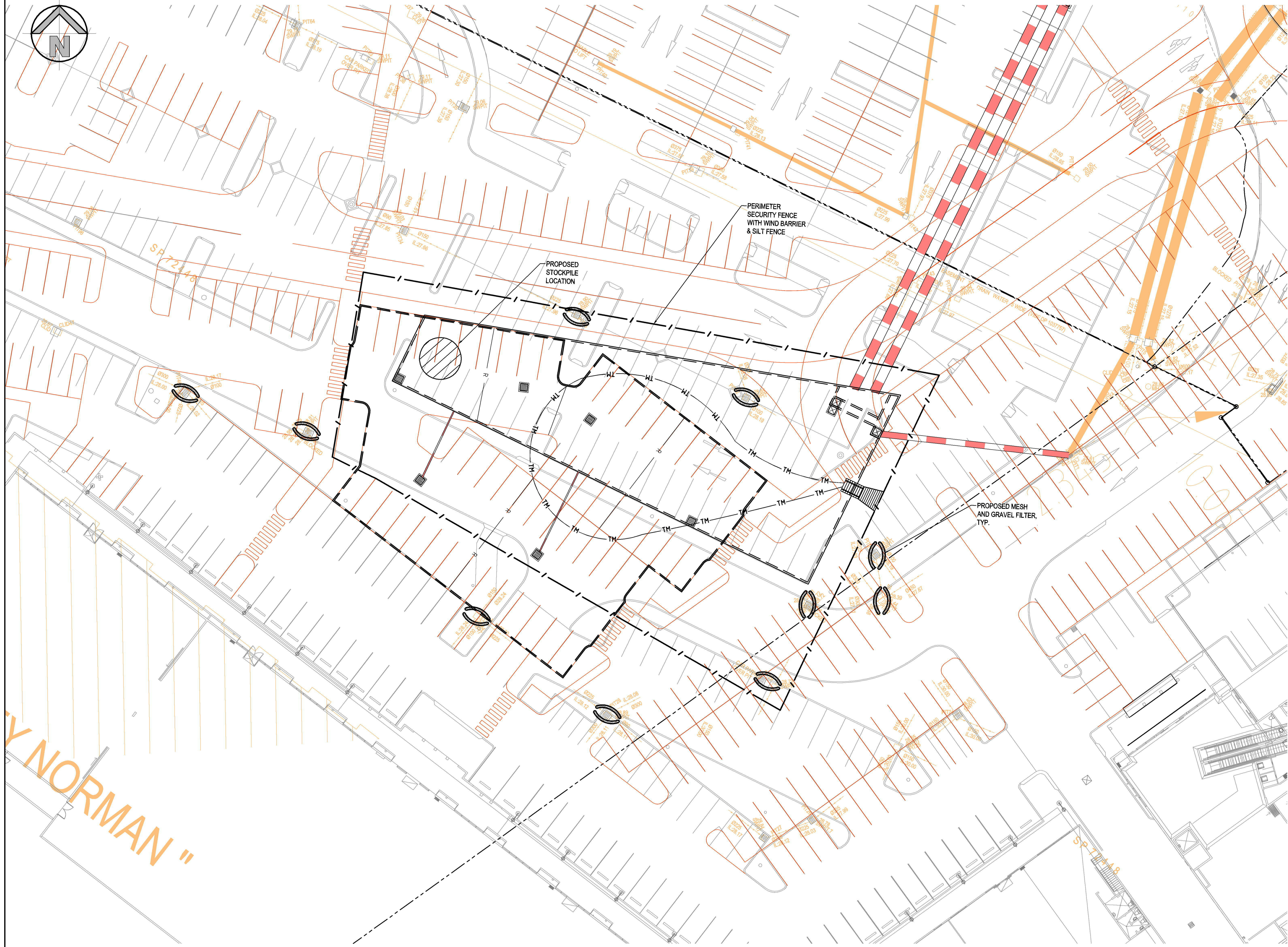


Project
PENRITH HOMEMAKER CENTRE
CNR. MULGOA ROAD & WOLSELEY STREET, PENRITH

Title
STORMWATER CATCHMENT PLAN

Drawn M.Cerna	Designed J.Gormly	Date SEP 17
Checked A.Francis	Approved A.Francis	Scale 1:750 @A1

Drawing number 17691_DA_C250	Revision 01
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LEGEND

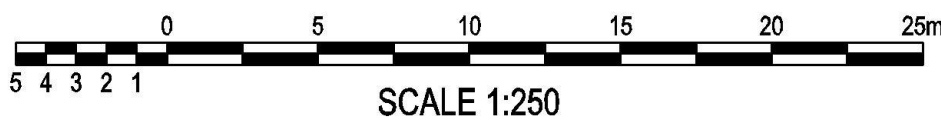
- TM TM → TRAFFIC MANOEUVRING
- PROPOSED SEDIMENTATION FENCE
- PROPOSED LIMIT OF WORK
- CD CD → CATCH DIVERSION DRAIN
- PROPOSED VEHICLE SHAKER GRID
- PROPOSED STABILISED SITE ACCESS
- PROPOSED STOCKPILE LOCATION
- PROPOSED HAYBALE FILTER
- O/F → OVERFLOW
- PROPOSED MESH & GRAVEL INLET FILTER

SEDIMENT & EROSION CONTROL NOTES

- ALL SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH RESPECTIVE COUNCIL SPECIFICATIONS AND LANDCOM'S 'SOIL AND CONSTRUCTION' MANUAL.
- ALL PERIMETER & SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN EARTH WORKS AND/OR CLEARING.
- THE SEDIMENT & EROSION CONTROL PLAN MAY REQUIRE FUTURE ADJUSTMENT TO REFLECT CONSTRUCTION STAGING. IT IS ALSO THE CONTRACTORS RESPONSIBILITY TO PREPARE THEIR OWN SEDIMENT AND EROSION CONTROL PLAN WHICH SUITS THE DESIGNED CONSTRUCTION STAGING.
- FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- ALL TEMPORARY EARTH BERMS, DIVERSIONS & SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED & MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
- ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE LOCATION.
- ALL TOPSOIL IS TO BE STOCKPILED ON SITE FOR REUSE (AWAY FROM TREES AND DRAINAGE LINES). MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO SEAL THE EARTHWORKS.
- ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND STRAW MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION U.N.O. BY LANDSCAPE ARCHITECTS.
- UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY COUNCIL SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.
- EROSION AND SILT PROTECTION MEASURES ARE TO BE MAINTAINED AT ALL TIMES
- MESH AND GRAVEL INLET FILTERS TO BE PLACED ON ALL COUNCIL PITS WITHIN 50 mm OF THE SITE.

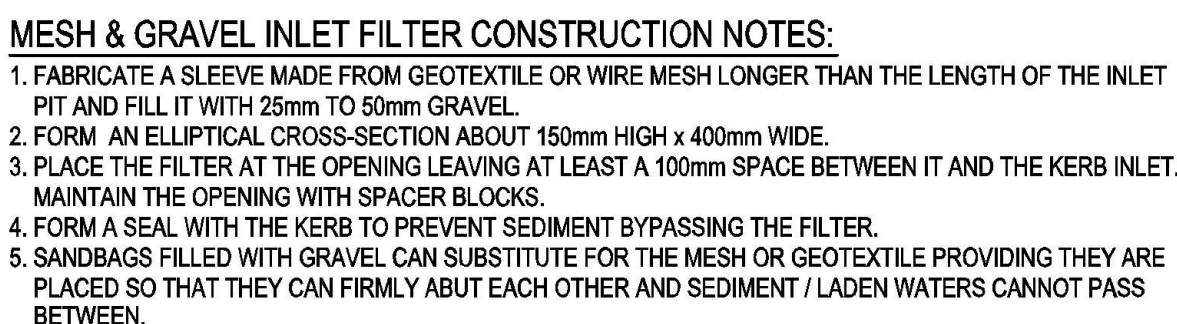
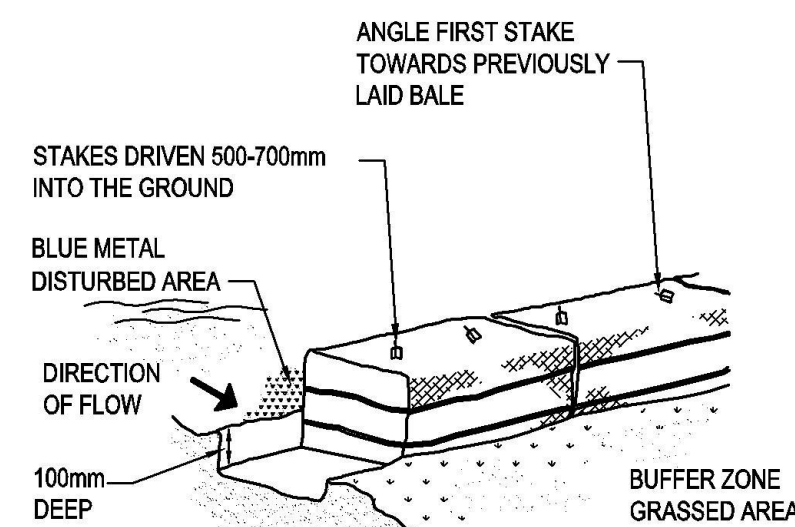
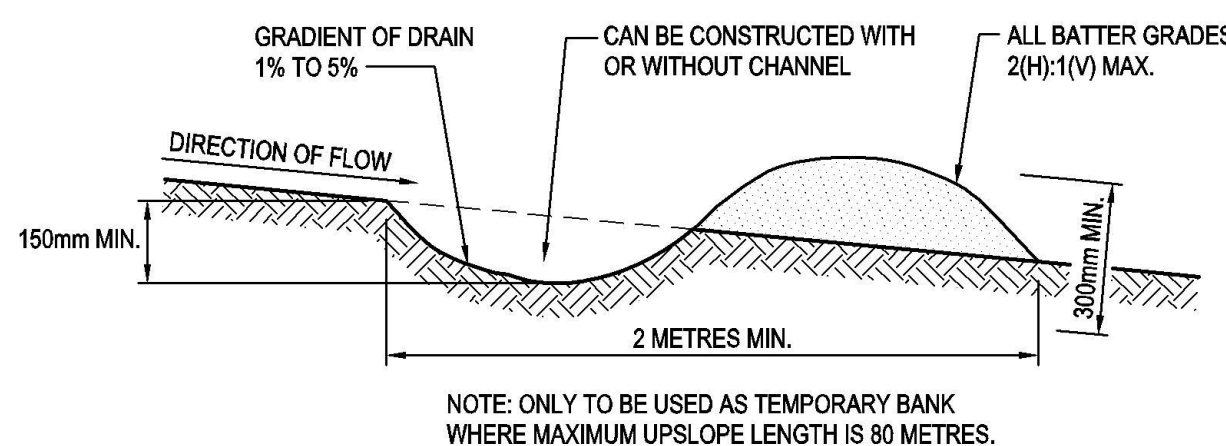
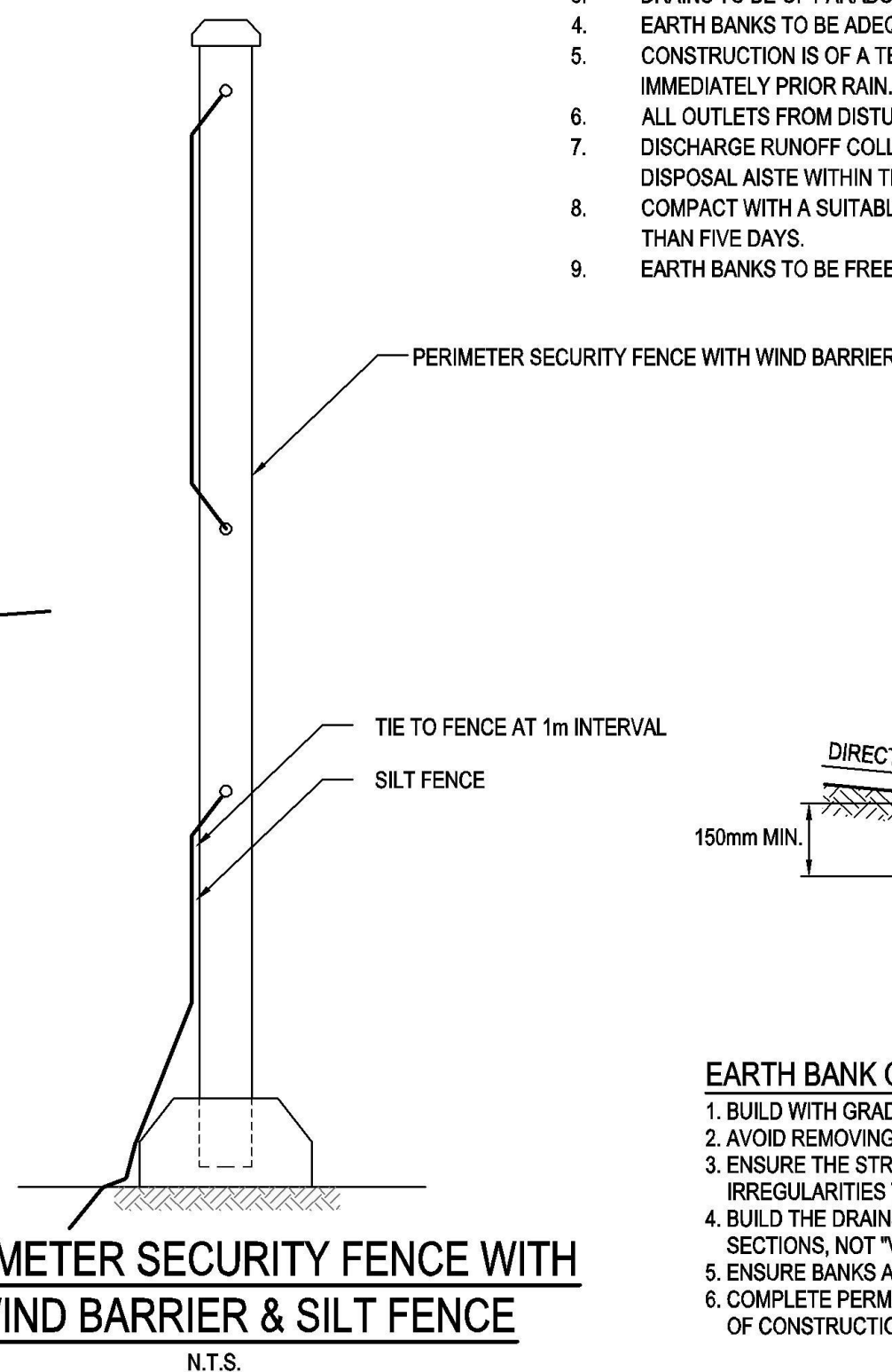
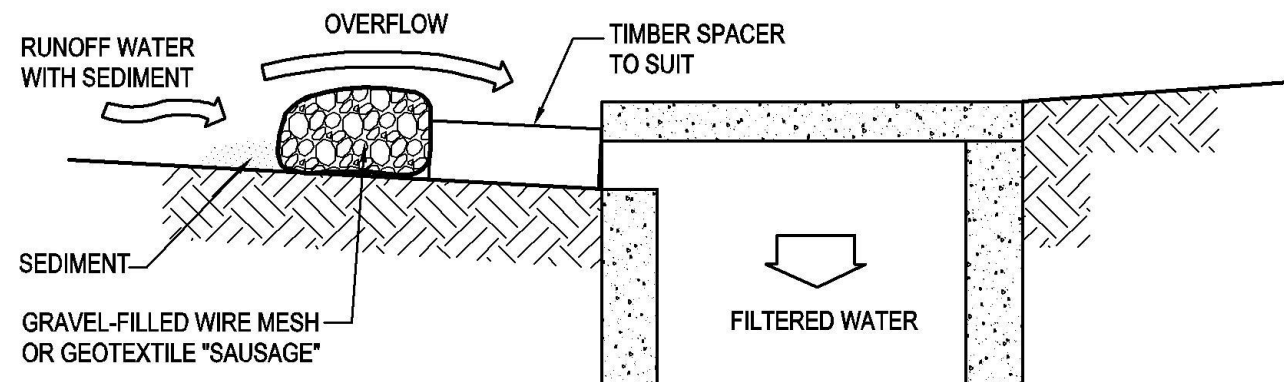
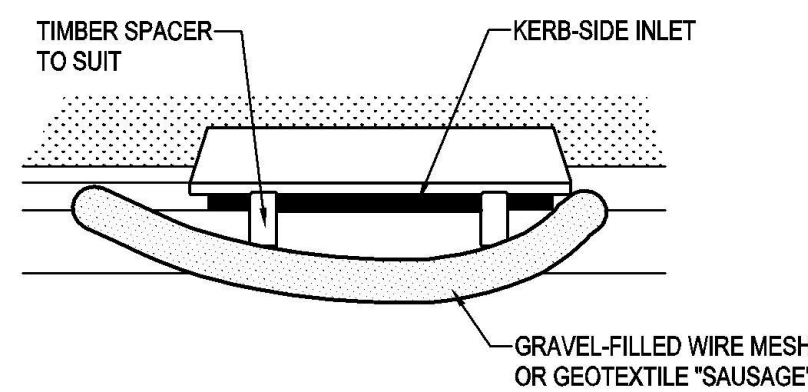
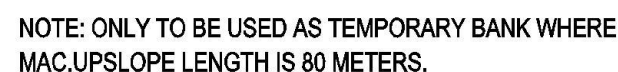
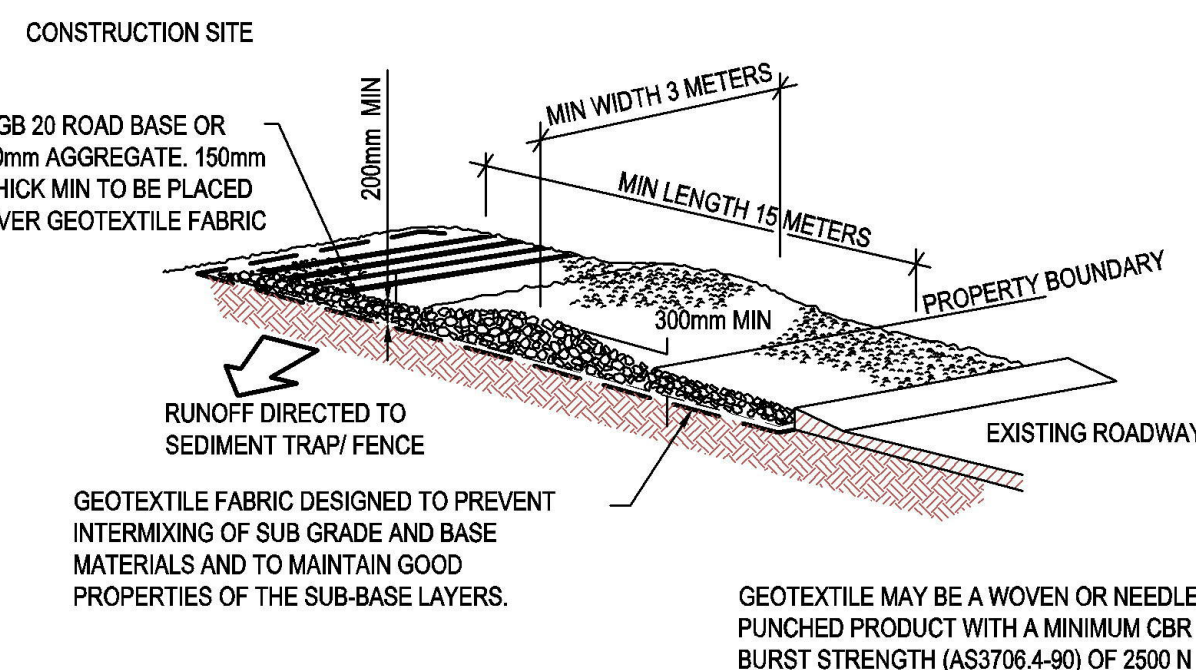
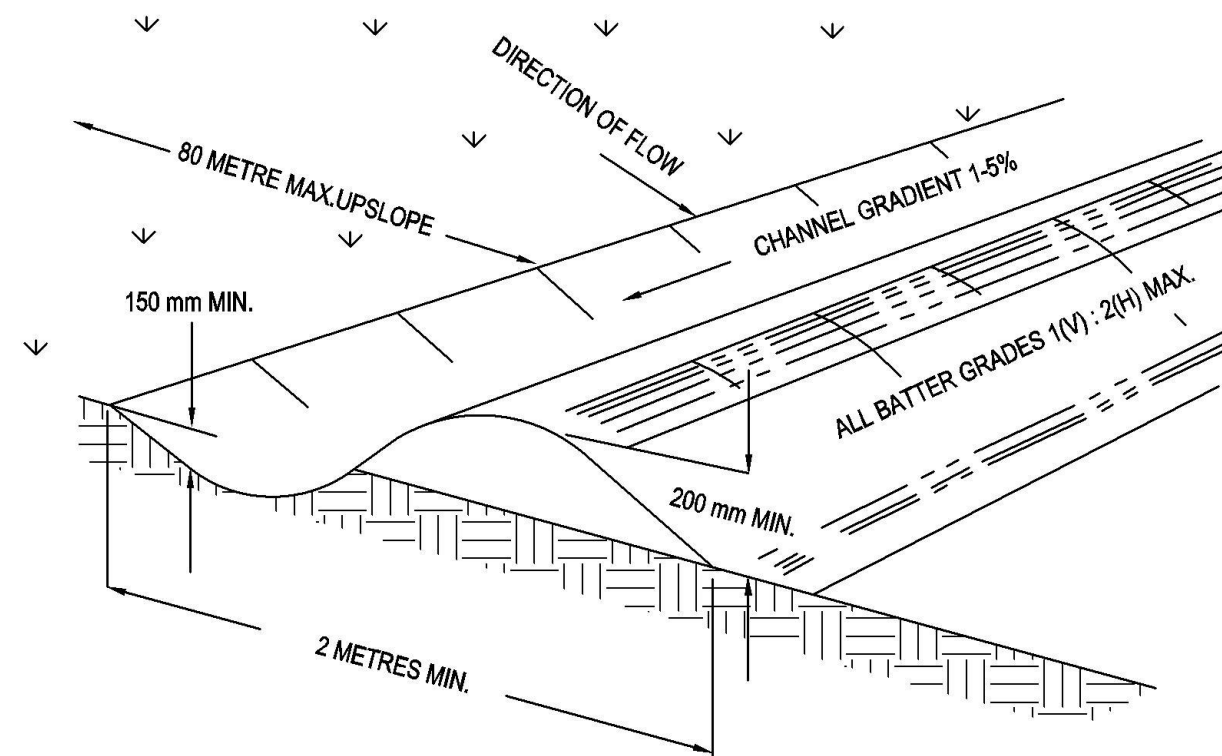
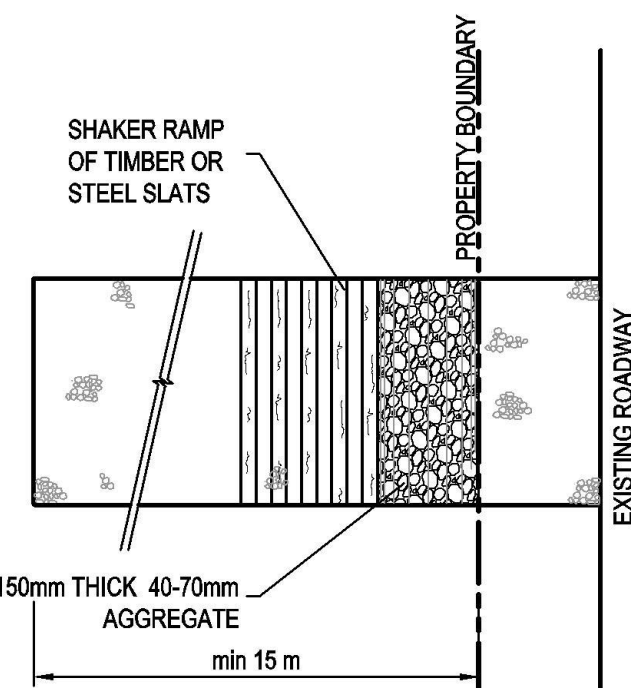
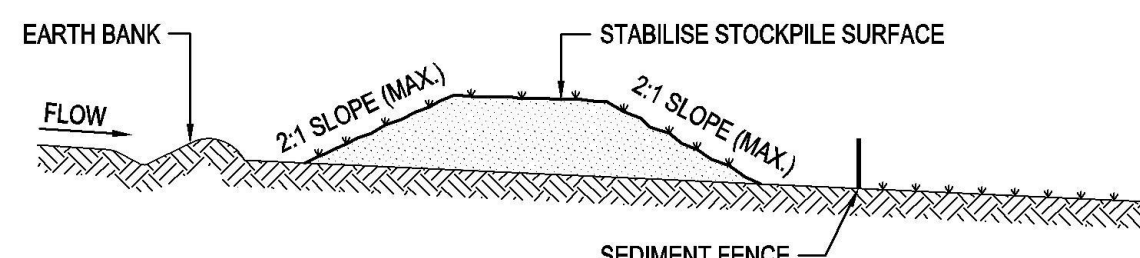
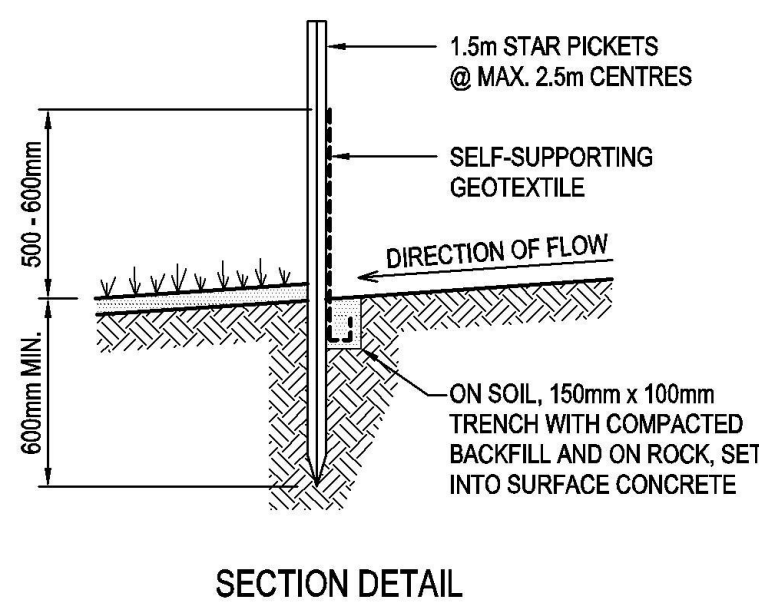
NOTE:
THE SEDIMENT AND EROSION MEASURES SHOWN ON THIS DRAWING ARE FOR THE INITIAL EARTHWORK STAGES. AS CONSTRUCTION CONTINUES, IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE ALL PITS ARE PROTECTED WITH MESH AND GRAVEL FILTERS

SEDIMENT EROSION PLAN
SCALE: 1:250



FOR DA ONLY

<div><div>SURVEY INFORMATION</div><div>SURVEYED BY LTS</div><div>DATUM: AHD</div><div>ORIGIN OF LEVELS:</div></div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							</
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SEDIMENT BASIN SIZING TYPE D SOILS	
VOLUMETRIC RUNOFF COEFFICIENT, CV	0.5 (APPENDIX F - TABLE F2)
75TH PERCENTILE 5 DAY TOTAL RAINFALL DEPTH, R	19.30 mm
CATCHMENT AREA, A	1 Ha (UNIT AREA)
SETTLING ZONE VOLUME (PER HECTARE) 10 CV A R	96.50 m³
DISTURBED CATCHMENT AREA	1 Ha (UNIT AREA)
R K L S P C	73 m³
SEDIMENT ZONE VOLUME (0.17 A (R K L S P C)/1.3	9.4m³ < 50% SETTLING VOL.ADOPT 48.3 m³ PER HECTARE
TOTAL SEDIMENT BASIN VOLUME REQUIRED :	144.8 m³/Ha

CONSTRAINT	VALUE	(SOURCE)*
RAINFALL EROSIONIVITY (R-FACTOR)	2250	APPENDIX B
LENGTH/SLOPE GRADIENT FACTOR, LS	0.65	APPENDIX A - TABLE A1
SOIL ERODIBILITY (K-FACTOR)	0.038	(ASSUMED BASED ON SOIL TYPE)
EROSION CONTROL PRACTICE FACTOR (P-FACTOR)	1.3 (COMPACTED)	APPENDIX A - TABLE A2
COVER FACTOR (C-FACTOR)	1.0 (DURING EARTHWORKS)	APPENDIX A - FIGURE A5
CALCULATED SOIL LOSS, A (RUSLE EQUATION)	73 t/ha/YR	A = R K L S P C
SOIL HYDROLOGIC GROUP	GROUP C	(ASSUMED BASED ON SOIL TYPE)
SEDIMENT TYPE	TYPE D	(ASSUMED BASED ON SOIL TYPE)
75TH PERCENTILE 5-DAY RAINFALL EVENT	19.3 mm (CAMDEN)	TABLE 6.3-A RAINFALL OUTLET

1. THE CAPTURED STORMWATER IN THE SETTLING ZONE SHOULD BE DRAINED TO MEET THE MINIMUM STORAGE CAPACITY REQUIRED WITHIN A FIVE (5) DAY PERIOD FOLLOWING RAINFALL, PROVIDED THE ACCEPTABLE WATER QUALITY (NFR) AND TURBIDITY HAVE BEEN ACHIEVED.
2. CHEMICAL FLOCCULANT SUCH AS GYPSUM MAY BE DOSED TO AID SETTLING WITHIN 24 HOURS OF CONCLUSION OF EACH STORM. THE APPLIED DOSING RATES SHOULD ACHIEVE THE TARGET QUALITY WITHIN 36 TO 72 HOURS OF THE STORM EVENT.
3. INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENT AND/OR WEEKLY. ENSURE THAT ALL SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL (REFER TO PEGS INSTALLED IN BASINS IN ACCORDANCE WITH THE SWMP). ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES.

SOWING SEASON	SEED MIX
AUTUMN/WINTER	OATS@40KG/ha + JAPANESE MILLET@10kg/ha
SPRING/SUMMER	OATS@20kg/ha + JAPANESE MILLET@20kg/ha

NOTE: THESE PLANT SPECIES ARE FOR TEMPORARY REVEGETATION ONLY. THEY WILL ONLY PROVIDE PROTECTION FROM EROSION FOR SIX MONTHS. WHERE THE LOTS ARE TO BE LEFT UNDEVELOPED FOR A LONGER PERIOD, THE CONTRACTOR SHALL SEEK ADVICE FROM THE SITE SUPERINTENDENT AS TO MORE APPROPRIATE REVEGETATION METHODS.

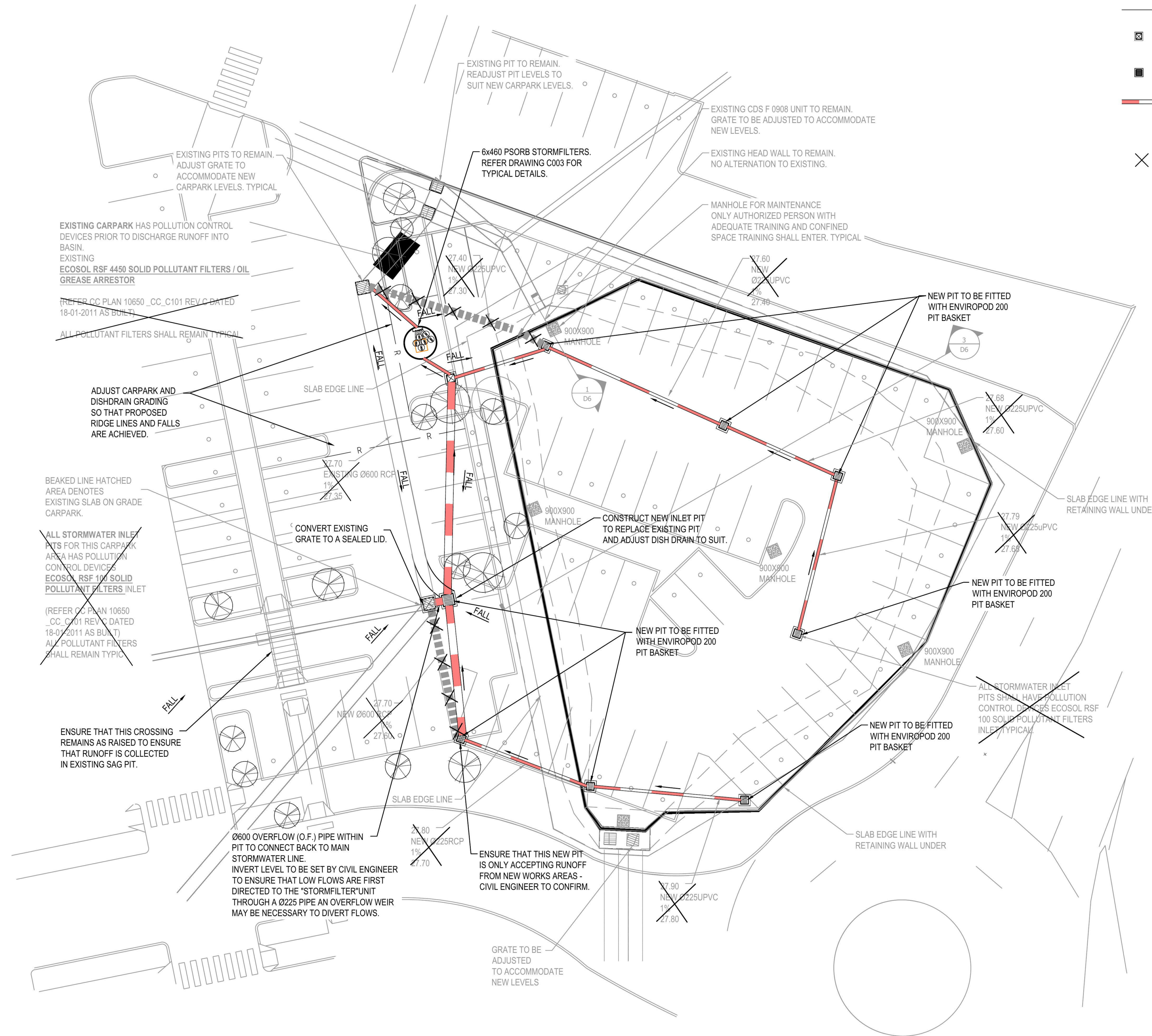
REVEGETATION IN ACCORDANCE WITH THE ABOVE TABLE WILL BE ENHANCED BY ADDING LIME AT A RATE OF 4kg/TONNE OF TOPSOIL AND 7.5kg/TONNE OF SUBSOIL.

4. THE LONG TERM GROUND COVER FACTORS FOR THE CONSTRUCTION WORKS IS NOT TO EXCEED THE FOLLOWING LIMITS:

LAND	MAXIMUM C-FACTOR	REMARKS
WATERWAYS AND OTHER AREAS OF CONCENTRATED FLOWS, POST CONSTRUCTION	0.05	APPLIES AFTER TEN WORKING DAYS OF COMPLETION OF FORMATION AND BEFORE CONCENTRATED FLOWS ARE APPLIED. FOOT AND VEHICULAR TRAFFIC IS PROHIBITED IN THIS AREA AND 70% GROUND COVER IS REQUIRED.
STOCKPILES, POST CONSTRUCTION	0.10	APPLIES AFTER TEN WORKING DAYS FROM COMPLETION OF FORMATION. 60% GROUND COVER IS REQUIRED.
ALL LANDS, INCLUDING WATERWAYS AND STOCKPILES, DURING CONSTRUCTION.	0.15	APPLIES AFTER 20 DAYS OF INACTIVITY, EVEN THOUGH WORKS MAY BE INCOMPLETE. 50% GROUND COVER IS REQUIRED.

FOR DA ONLY

Drawn M.Cerna	Designed J.Gormly	Date OCT 17
Checked A.Francis	Approved A.Francis	Scale AS NOTED @A1
Drawing number 17691_DA_SE02		Revision 01



	<p>PROPOSED RIDGE LINE</p> <p>PROPOSED JUNCTION PITS</p> <p>PROPOSED SURFACE INLET PITS</p> <p>PROPOSED STORMWATER PIPE AND O.F. FLOW</p> <p>DIRECTION OF FALLS FOR SURFACE GRADING</p>
	<p>STORMWATER ELEMENTS OR NOTE TO BE DELETED FROM DESIGN</p>

1. REFER GENERAL NOTES FOR SPECIFICATIONS
2. REFER TO ARCHITECTS DRAWINGS FOR ALL SET-OUT DIMENSIONS, LEVELS, SETDOWNS, HOBS AND FALLS. AS 3500.)

CONFIRM LOCATION, SIZE, CONDITION AND LEVELS OF ALL EXISTING SERVICES PRIOR COMMENCEMENT OF WORK.

ALL WORK TO BE IN ACCORDANCE WITH SPECIFICATION, AUTHORITIES REQUIREMENTS, BCA AND RELEVANT AUSTRALIAN STANDARDS(IN PARTICULARLY AS 3500.)

DISCONNECT, CAP OFF AND REMOVE ALL EXISTING REDUNDANT SERVICES TO AUTHORITIES APPROVAL.

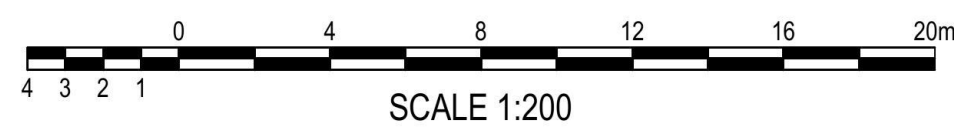
ALL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND OTHERS CONSULTANTS DOCUMENTS. ALL DISCREPANCIES SHALL BE REFERRED TO THE PROJECT MANAGER BEFORE PROCEEDING WITH THE WORK.

LOCATION OF ALL PIPEWORK IS DIAGRAMMATIC ONLY. FINAL LOCATION TO BE CO-ORDINATED ON SITE AND APPROVED BY THE PROJECT MANAGER PRIOR TO COMMENCEMENT OF ANY WORK.

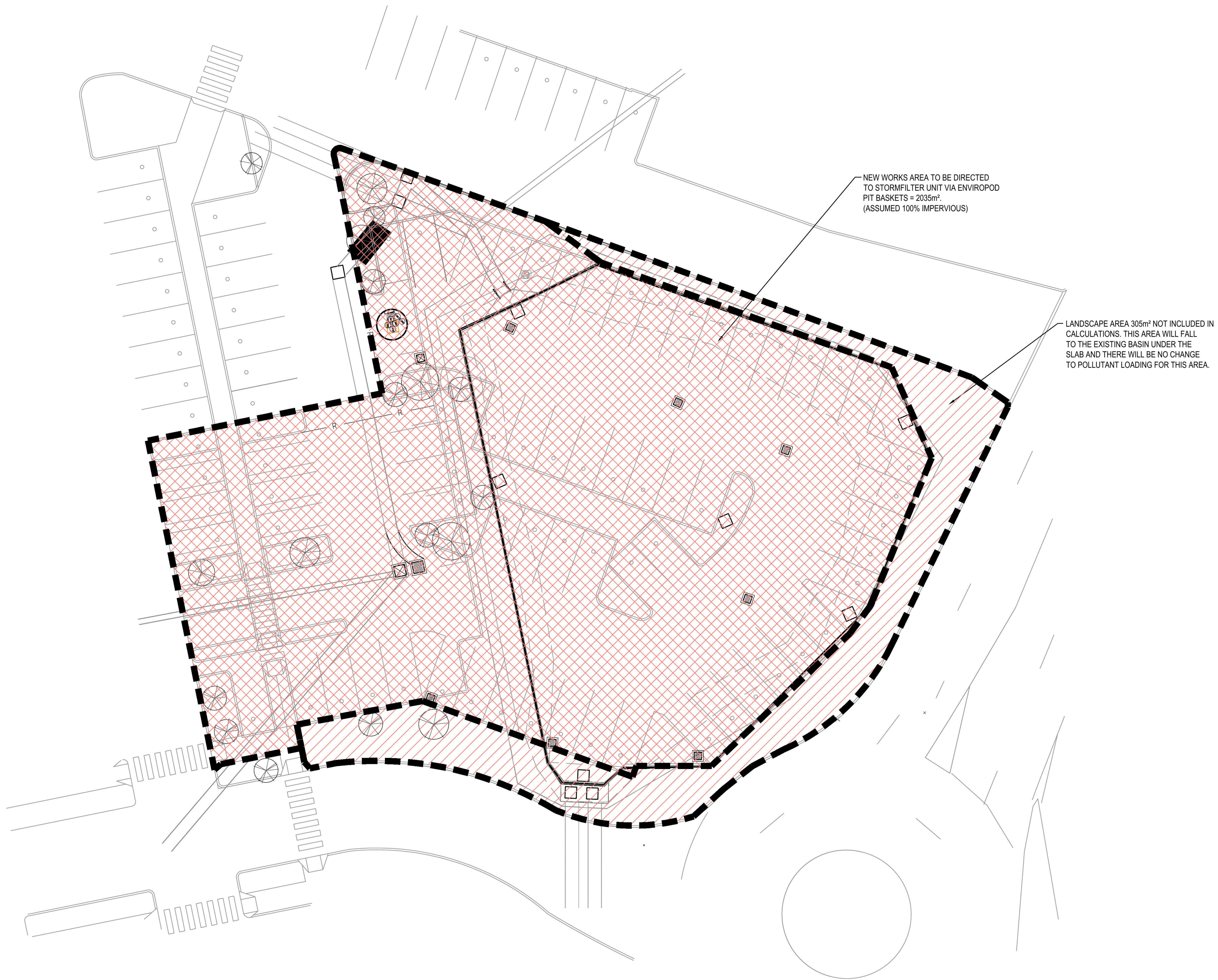
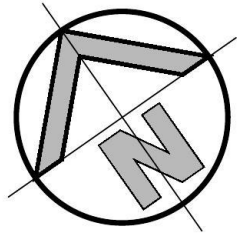
EXISTING BASIN VOLUME	1,085m ³
PROPOSED ADDITIONAL IMPERVIOUS AREA OVER EXISTING BASIN (PROPOSED CARPARK)	1,275m ²
ADDITIONAL VOLUME REQUIRED DUE TO ADDITIONAL IMPERVIOUS (SSR = 280m ³ /ha)	35.7m ³
TOTAL BASIN VOLUME PROVIDED	1,120.7m ³

- NEW CARPARK TO MAINTAIN EXISTING BASIN
- EXISTING BASIN VOLUME TO BE INCREASED TO ACCOMMODATE ADDITIONAL IMPERVIOUS AREA
- POLLUTION CONTROL DEVICE TO BE UPGRADED TO ACCOMMODATE ADDITIONAL IMPERVIOUS AREA

SCALE 1:200





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MUSIC MODELLING CATCHMENT PLAN
SCALE 1:200



FOR INFORMATION ONLY

										Client		CALARDU PENRITH PTY.LTD.		<div>Level 5, 79 Victoria Avenue Chatswood NSW 2057</div> <div><div>Telephone +61 2 9417 8400 Facsimile +61 2 9417 8337 Email email@hhconsult.com.au Web www.henryandhymas.com.au</div><div></div></div>	Project		CARPARK EXTENSION WATER QUALITY TREATMENT PROPOSAL		Drawn	Designed	Date
										Architect		LEFFLER SIMES ARCHITECTS			Checked		Approved		Scale		
															T.Dempsey		A. Francis		1:200 @ A1		
																Drawing number		Revision			
																15607_SK_C002		01			

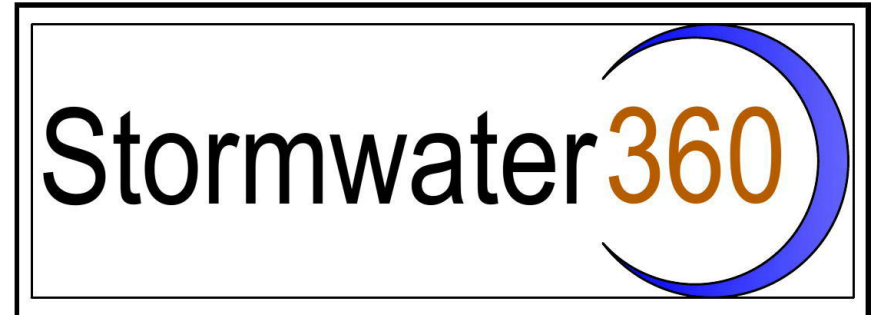
STORMFILTER DESIGN TABLE					
<ul style="list-style-type: none"> STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S. THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S). ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED. 					
CARTRIDGE HEIGHT	690		460		310
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550
TREATMENT BY MEDIA SURFACE AREA L/S/m ²	1.4	0.7	1.4	0.7	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.32



GENERAL NOTES

1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
PLEASE CONTACT STORMWATER360 FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE STANDARD DETAIL DRAWING SHOWS THE MAXIMUM NUMBER OF CARTRIDGES. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH AS3600.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTRROADS T44 LOAD RATING WITH 0.2m FILL MAXIMUM.
7. THE STRUCTURE THICKNESS SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 460mm (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360 AUSTRALIA : PHONE : 1300 354 722 OR www.stormwater360.com.au

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID		XXX	
WATER QUALITY FLOW RATE (L/s)		XXX	
PEAK FLOW RATE (L/s)		XXX	
RETURN PERIOD OF PEAK FLOW (yrs)		XXX	
# OF CARTRIDGES REQUIRED (8-22)		XXX	
CARTRIDGE HEIGHT (310, 460 or 690mm)		460	
MEDIA TYPE (PERLITE, PERLITE/ZEOLITE OR ZPG)		ZPG	
PRECAST VAULT WEIGHT		XXX kg	
PRECAST LID WEIGHT		XXX kg	
PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	XXX	XXX	XXX
INLET PIPE #2	N/A	N/A	N/A
OUTLET PIPE	XXX	XXX	XXX
<p>PIPE ORIENTATION</p>			
LADDER		YES/NO	
ANTI-FLOTATION BALLAST	N/A	N/A	
	N/A	N/A	
NOTES/SPECIAL REQUIREMENTS:			



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