MUDGEE HOSPITAL REDEVELOPMENT

STATE SIGNIFICANT DEVELOPMENT APPLICATION REPORT – CIVIL ENGINEERING

Prepared for: Health Infrastructure NSW
By: enstruct group pty ltd
Revision: A
May 2018

MUDGEE HOSPITAL REDEVELOPMENT

STATE SIGNIFICANT DEVELOPMENT APPLICATION – CIVIL ENGINEERING

ISSUE AUTHORISATION

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Date:	May 2018
Author:	William Wright
Reviewer:	Qusai El-Jurf

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A	30/05/18	Issued for Approval	WW	QEJ	QEJ

Executive Summary

The purpose of this report is to present the Civil Engineering strategy proposed for the Mudgee Hospital Redevelopment (MHR) to support a State Significant Development Application (SSDA) and address the Drainage and Sediment, Erosion and Dust Controls Secretary's Environmental Assessment Requirements SEARs conditions from application number SSD9211.

Proposed Redevelopment

Detailed health service planning activities and building audits have concluded that the current health facilities at Mudgee are no longer suitable for the delivery of contemporary health services and do not allow for efficient bed utilisation and staffing.

In June 2017, the State Government announced an investment of $70.2M for the redevelopment of the Mudgee Hospital and Health Service, which will include an upgrade to expand and reconfigure inpatient and ambulatory care services.

Existing Site

The site generally falls from south to north and has a crest through the centre which causes the site to fall west and east. Mudgee Railway Precinct (decommissioned) which borders the north side of the site is listed as a heritage building. A large portion of the of the existing site discharges overland to the decommissioned rail reserve.

Drainage from the existing buildings discharges directly into the adjacent streets bounding the site via small surface level outlet pipes. There is no existing on-site stormwater detention (OSD) or Water Sensitive Urban Design (WSUD) measures on the existing site.

Onsite Stormwater Detention

Onsite stormwater detention (OSD) is required to restrict post-development peak discharge rates to pre-development peak discharge rates for storm events up to and including the 100-year ARI event. The minor storm, as specified in Appendix D5 of Mid-Western Regional Council's DCP, is the 10-year ARI event which will be contained underground via two new gravity stormwater networks.

Due to natural topography, the south west corner of the site and the majority of the proposed building's roof will bypass the OSD system and will discharge to an existing open channel between Atkinson Street and Mudgee Showground via water quality treatment measures.

The majority of the proposed roads and parking areas along with a section of the roof catchment will be attenuated in a detention basin OSD system. The volume of storage required to restrict the post-developed peak discharge rates to the permissible site discharge is 175 m^3.

Overland Flow

Overland flow from the site maintains the general arrangement of the existing site. Guidelines for developments adjoining land managed by the Office of Environment and Heritage state that there should be 'no increase in pre-development peak flows from rainfall events with a 1 in 5 year and 1 in 100 year recurrence interval'.

The proposed OSD basin discharges no stormwater to the Mudgee Railway Precinct during a 5 year average recurrence interval (ARI) rainfall event because the flow is contained within the proposed stormwater network discharging to Church Street. The existing has a 5 year ARI peak discharge rate of 168 l/s to the rail precinct.

Overland flow from the OSD basin discharges 330 l/s (peak) to the rail precinct during a 100 year ARI event. The existing site has a 100 year ARI peak discharge rate of 409 l/s to the rail precinct. Therefore, the proposed development does not increase the peak flow rates to the rail precinct but instead is an improvement on the existing situation.

WSUD Strategy

The new development will significantly increase impervious area. Thus, the new development requires pollution reduction measures incorporated within the design to remove potential contaminants from the system.

A detailed water quality analysis has been undertaken to develop the water sensitive urban design (WSUD) strategy for the proposed development and meet Mid-Western Regional Council's water quality targets. The development will achieve the pollution reduction targets identified in Council's DCP by utilising (WSUD) treatment initiatives.

The WSUD Strategy proposed for the development utilises a treatment train approach, consisting of the following: rain gardens, catch pit inserts, a fuel/water separator and a bioretention swale.

Stormwater Connection

Stormwater Network 1 will connect into an existing stormwater pit located in the north-west corner of the site which is connected to council's drainage network located in Church Street.

Stormwater Network 2 will connect into the existing open channel between Mudgee Showground and Atkinson Street

Contents

1 Introduction

enstruct group have been engaged by Health Infrastructure NSW (HI) as civil and structural engineering consultants on the Mudgee Hospital Redevelopment (MHR) project.

The purpose of this report is to present the Civil Engineering strategy proposed for the Mudgee Hospital Redevelopment (MHR) to support the State Significant Development Application (SSDA). Specifically, this report addresses the following Secretary's Environmental Assessment Requirements (SEARS) conditions from application no. SSD9211:

- 12 – Sediment, Erosion and Dust Controls
    - Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles.
- 16 – Drainage
    - Detail drainage associated with the proposal, including stormwater and drainage infrastructure.
    - Detail measures to minimise operational water quality impacts on surface waters and groundwater.

2 Existing Site Conditions

2.1 Site Description

The existing hospital site is bounded by Church Street to the west, Meares Street to the south, Lewis Street to the east and Mudgee Railway Station (decommissioned) to the north. The site generally falls from south to north and has a crest through the centre which causes the site to fall west and east.

The site falls approximately 6.1 m from RL 477.70 mAHD at the centre of the southern boundary to RL 471.80 mAHD in the north-west corner and the north-east corner.

2.2 Existing Site Drainage

A site visit conducted on 27/07/2017 determined that stormwater drainage from the existing buildings on site discharge directly into the adjacent streets bounding the site via small surface level outlet pipes. Investigation of the site determined that no onsite stormwater detention currently exists.

3 Proposed Development

3.1 Redevelopment Proposal

A new hospital building is proposed in the south-west corner of the site in the location of the existing Community Health Centre and Wellness Centre. A new public car park, staff car park, ambulance bay and service yard are located to the east and north-east of the proposed building which will require the demolition of the existing Main Hospital Building, Boiler House & Workshops and Store Building. Figure 3.1 shows the proposed site layout.

3.2 Proposed New Building Location

A site layout showing the existing buildings to be demolished with an overlay of the proposed new building and parking areas has been produced by architects Silver Thomas Hanley (STH) Architects. Figure 3.1 shows the location of the proposed new building and the demolition of existing buildings.

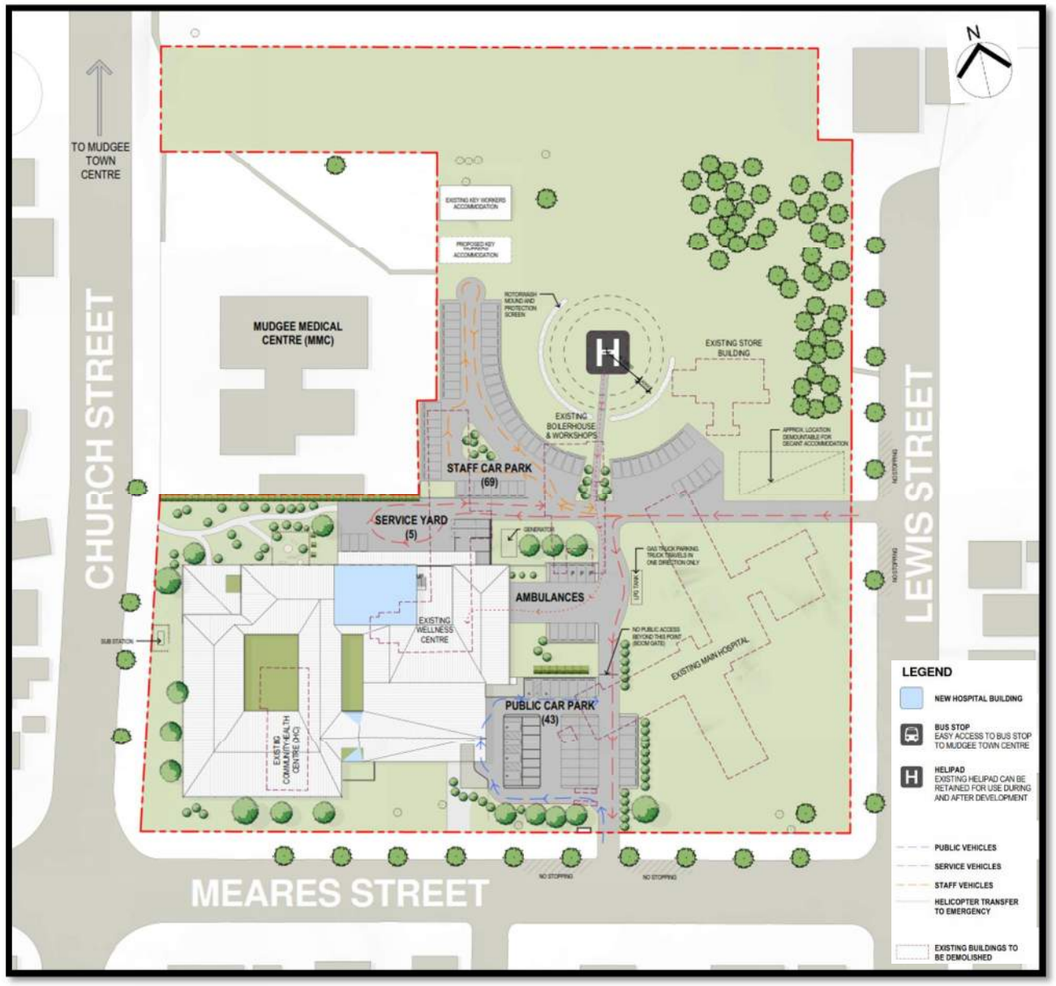


Figure 3.1 Proposed Location of New Development (Source: STH Architects)

4 *Stormwater Drainage*

Due to site topography and the lack of depth in the receiving council stormwater network in Church Street, two stormwater networks have been designed to convey flows from the proposed development. Drawing 130511-ENS-CIV-DWG-0200 of Appendix A shows the site stormwater layout.

4.1 *Stormwater Network 1*

The first stormwater network drains the majority of the pavement catchment to the east and north of the proposed new building as well as collecting runoff from the existing helipad. The network conveys stormwater west around the north side of the Mudgee Medical Centre (MMC).

The network includes an on-site stormwater detention (OSD) system, a 220 m^2 raingarden and a Rocla 1200 Ø Downstream Defender before discharging to a council stormwater pit in Church Street.

4.2 *Stormwater Network 2*

The second stormwater network drains the majority of the roof catchment in the south-west corner of the site. The network bypasses the OSD system due to the natural topography of the site falling towards the west. The network drains to a raingarden adjacent to the south-west boundary and Stormwater 360 Enviropod pit inserts are proposed for water quality purposes.

Survey information provided by Geolyse dated 11/09/17 (ref: 217467_01C_D01-D07) shows that there is no existing Council stormwater network adjacent to the south west corner of the site in Church Street.

A new stormwater line is proposed in Meares Street to connect to Council's stormwater open channel between Mudgee Showground and Atkinson Street.

On-Site Stormwater Detention

Council require that the stormwater peak discharge rate from the developed site is restricted to the peak discharge rate of the pre-developed site. DRAINS software has been used to hydraulically model the stormwater networks and size the OSD system. The results from the DRAINS model are contained within Appendix C.

The minor storm, as specified in Appendix D5 of Mid-Western Regional Council's DCP, is the 10-year ARI event which will be contained underground via two new gravity stormwater networks.

A 175 m3 above ground detention basin has been designed in the grassed area north of the MMC. A 300 mm diameter outlet pipe will restrict the discharge of Stormwater Network 1 to ensure that the combined discharge from both networks is below the permissible site discharge (PSD) rate.

Table 4.1 below presents the results of the hydraulic modelling for stormwater network 1, 2 and the total site. The results show that for all rainfall events up to and including the 1% AEP event, the proposed development generates a substantial improvement on stormwater discharge.

Table 4.1 – Stormwater Peak Discharge Rates

Rainfall Event	Pre Development	Post Development			Total SW Discharge Reduction
	Total Site (m^3/s)	SW Network 1 (m^3/s)	SW Network 2 (m^3/s)	Total Site (m^3/s)	
20% AEP	0.419	0.064	0.213	0.277	34%
10% AEP	0.542	0.087	0.254	0.341	37%
1% AEP	0.997	0.341	0.401	0.742	26%

5 *Overland Flow*

Overland flow from the site maintains the general arrangement of the existing site. The site drains from the higher southern end towards the lower northern corners. The north-west corner of the site drains into Church Street and the north-east corner of the site drains into Lewis Street. The east side of the site will remain undeveloped and will continue to drain overland towards Lewis Street.

5.1 *Stormwater Discharging to Heritage Land*

Guidelines for developments adjoining land managed by the Office of Environment and Heritage state that there should be 'no increase in pre-development peak flows from rainfall events with a 1 in 5 year and 1 in 100 year recurrence interval'.

Figure 5.1 shows the broad stormwater catchments of the existing site. Catchments 2 and 4 drain east and will remain the same after the proposed development.

Catchment 1 discharges to the heritage listed Mudgee Rail Recinct via overland flow in the existing situation and will be actively drained by a new stormwater network. For rainfall events larger than the stormwater network is designed for (10 year ARI) the network will surcharge and overland flow will be drained to the rail precinct, following the existing regieme.

5.1.1 Small Storm Event

The proposed OSD basin discharges no stormwater to the Mudgee Railway Precinct during a 5 year average recurrence interval (ARI) rainfall event because the flow is contained within the proposed stormwater network discharging to Church Street. The existing has a 5 year ARI peak discharge rate of 168 l/s to the rail precinct.

5.1.2 Large Storm Event

Overland flow from the OSD basin discharges 330 l/s (peak) to the rail precinct during a 100 year ARI event. The existing site has a 100 year ARI peak discharge rate of 409 l/s to the rail precinct. Therefore, the proposed development does not increase the peak flow rates to the rail precinct but instead is an improvement on the existing situation.

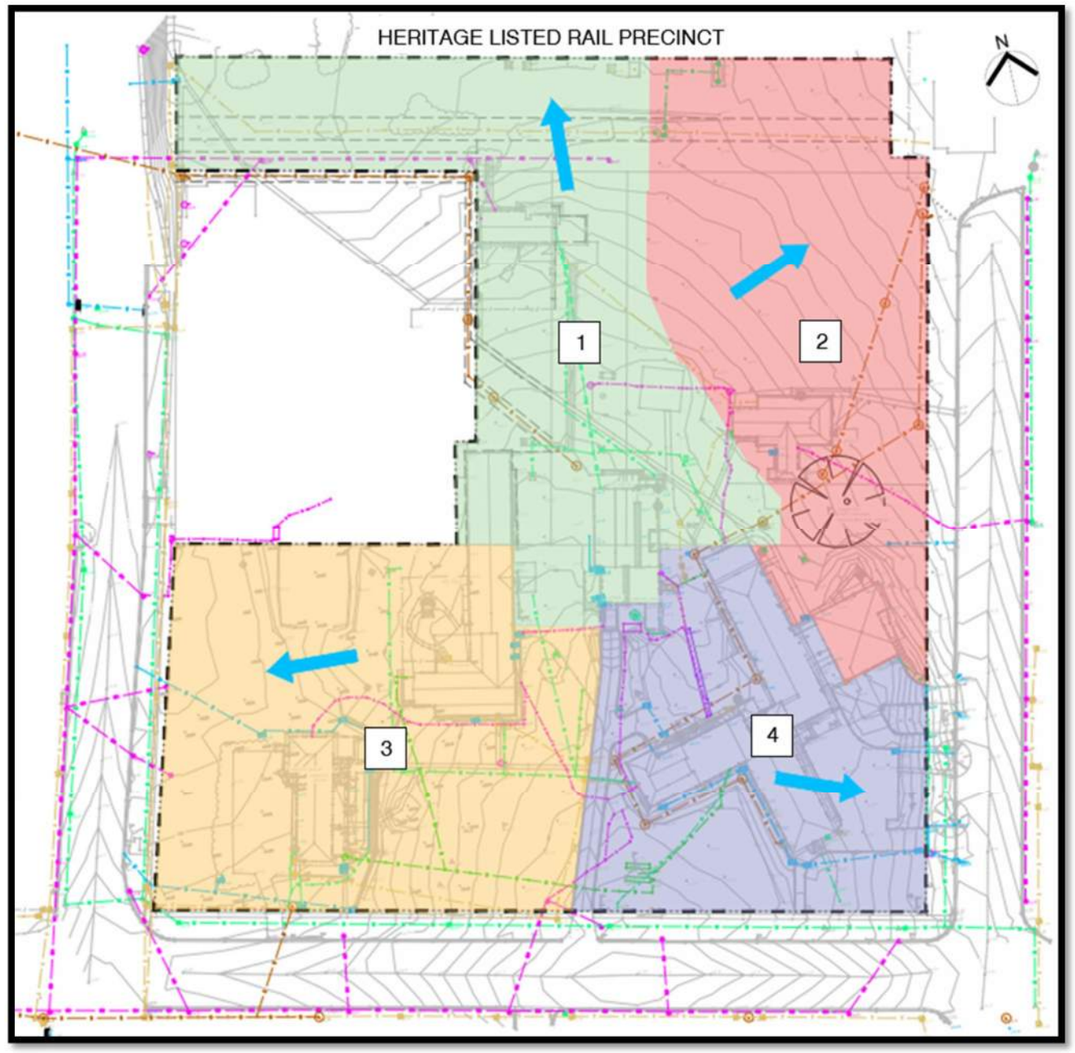


Figure 5.1 – Existing Site Catchment Plan

6 *Water Sensitive Urban Design*

The overall site stormwater management objectives applicable to the site were identified as follows:

Table 6.1 Stormwater Management Objectives

Management Objective	Measure
Environmental	Provision of appropriately designed OSD facilities, limitation of downstream discharge peaks and velocities. WSUD quality targets adhered to and treatment train hierarchy considered
Urban Amenity	Provision of a stormwater management strategy that ensures the effective drainage of the site and provision of aesthetic design forms that enhance amenity
Engineering Considerations	Effective management and control of peak discharges, discharge velocities and site detention; industry best practice technical analysis of catchment hydrology and system hydraulic performance
Economics	Provision of a cost effective, functional site drainage system that optimises performance, provides maximum value for expenditure and keeps on-going maintenance requirements to a minimum

The Stormwater Management Strategy proposed for site development has been prepared with consideration of the above objectives and Council's requirements and guidelines. The strategy focuses on minimising the impacts of the development on the adjoining properties and maximising the environmental, social and economic benefits achievable by utilising responsible and sustainable stormwater management practices.

6.1 *Water Quality Requirements*

Stormwater to Smartwater (S2S) is the name given to Council's plan to improve stormwater management across the Local Government Area (LGA). The provisions in S2S outline minimum requirements needed to obtain a Development Application and Occupation Certificate.

The document offers technical guidance and minimum requirements for designing infiltration trenches, raingardens, permeable paving and rainwater tanks. This document has been referred to when designing water quality treatments for the new development.

6.2 *Existing Site*

At present the extent of the current site contains a variety of healthcare facilities, associated hard standing areas for parking and access roads. A large portion of the site to the east and the north will not be affected by the proposed development. The area of the site which will be affected by the development is approximately 23,200 m^2. The existing impervious area of this section of this site is approximately 6,770 m^2 (30%). The proposed impervious area of this section post-development is approximately 11,170 m^2 (49.5%).

The new development will significantly increase impervious area. Thus, the new development requires pollution reduction measures incorporated within the design to remove potential contaminants from the system.

6.3 *WSUD Pollution Reduction Initiatives*

The development will achieve the pollution reduction targets identified in Mid-Western Regional Council's DCP by utilising water sensitive urban design (WSUD) treatment initiatives. The pollutant reduction requirements outlined in 6.2 below have been adopted as the minimum values for water quality treatment.

Table 6.2. Pollutant Reduction Targets

Pollutant	Guideline Reduction
Gross Pollutants (GP)	90%
Total Suspended Solids (TSS)	85%
Total Phosphorous (TP)	65%
Total Nitrogen (TN)	45%

6.4 *Raingardens*

Raingardens are specially designed garden beds which filter stormwater runoff from surrounding areas or stormwater pipes. They are also called bio-retention systems as they provide biological treatment of stormwater using soil, plants, roots and microbes.

Raingardens are designed to stop excess stormwater, nutrients, and sediment from polluting council's drainage system. Figure 4.1 below shows a detail of the proposed raingarden design.

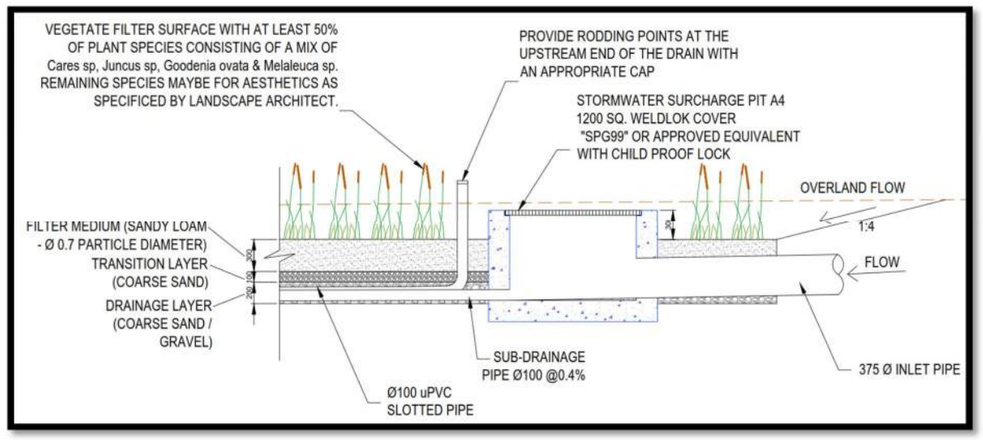


Figure 4.1 Raingarden Detail

A raingarden lets water collect and settle on the garden surface then soak through the plants and filter media. Sediment is trapped on the surface. Nutrients dissolved in the stormwater are used by the plants and toxins stick to the soil. The soil and plant roots work together to naturally filter the water and remove pollutants.

A 220 m2 raingarden is proposed for Stormwater Network 1 and a 90 m2 raingarden is proposed for Stormwater Network 2. Overflow pits will be provided within the raingardens to take excess flows and bypass them directly into the drainage systems.

6.5 *Pit Inserts*

Pit inserts, also known as litter baskets, are considered as an at-source primary treatment solution. It is an efficient and cost-effective pre-screening primary treatment system that captures and retains gross pollutants at drainage entry points. Pit inserts, consisting of a capture basket and a filter mesh liner, are usually fitted below the road invert or surface of the pit and hence are visually unobtrusive.

Pit inserts can be customised to fit almost any stormwater inlet pit and the mesh liner opening could vary depending on the targeted capture of solids, sediment and attached pollutants. Cleaning of the pit inserts is undertaken either manually or using a small vacuum truck. The cleaning frequency depends on the catchment type, size and expected pollutant loading.

Pit inserts have been proposed for the stormwater pits in the paved areas of Stormwater Network 1 and the stormwater pits adjacent to the proposed building for Stormwater Network 2. Figure 4.2 below presents schematic detail of a pit insert.

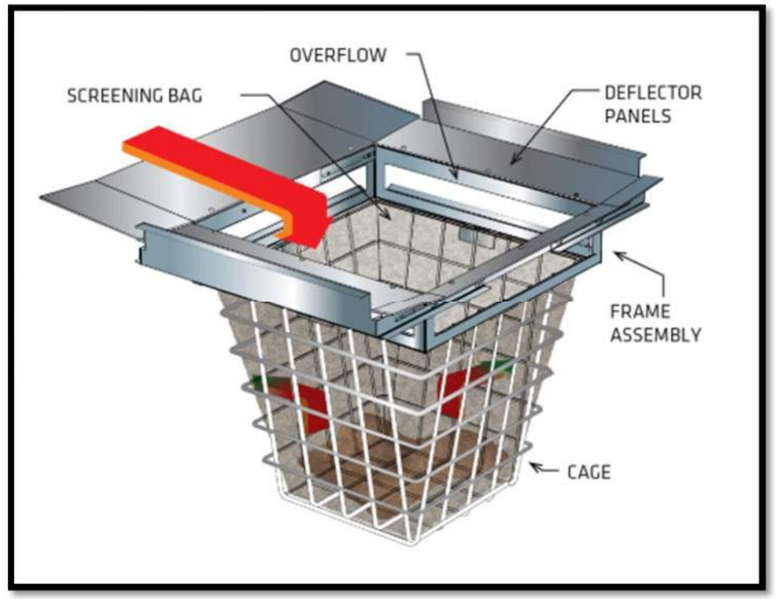


Figure 4.2 Enviropod® Pit Insert Detail (Source: Stormwater360)

6.6 *Downstream Defender*

A Rocla 1200 mm diameter Downstream Defender® has been specified to treat runoff from Stormwater Network 1 which includes large paved areas and runoff from the existing helipad. The Downstream Defender® device is an advanced hydrodynamic vortex separator that is specifically designed to provide high removal efficiencies of settleable solids and their associated pollutants, oil, and floatables over a wide range of flow rates.

The frequency of cleanout is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. This information can be used to establish a routine maintenance schedule.

Figure 4.3 shows a schematic diagram of a Downstream Defender®.

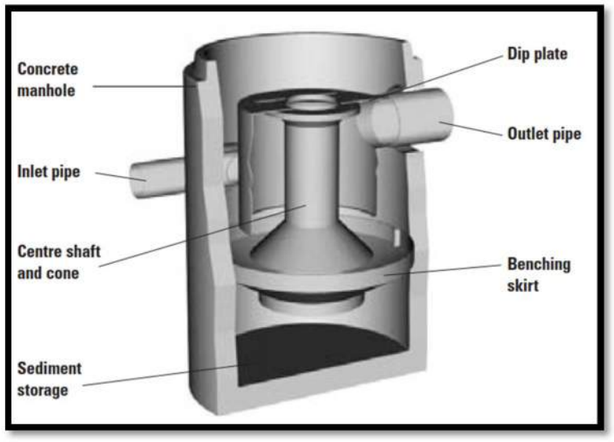


Figure 4.3 Schematic Diagram of a Downstream Defender® (Source: Rocla)

6.7 *Music Modelling*

A detailed water quality analysis has been undertaken to develop the WSUD strategy for the proposed development to meet Council's water quality targets. The water quality modelling for this study has been undertaken using the industry standard software model MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6.2.

Appendix B contains a schematic diagram of the proposed water quality treatment train layout and the results of the MUSIC water quality model for the site.

The WSUD strategy will be further developed with the landscape architect to achieve site aspirations and water quality targets.

7 *Sediment and Erosion Control*

Sediment and erosion controls will be provided during the construction phase in accordance with Council guidelines and Landcom – Managing Urban Stormwater "Blue Book" Guidance. These control measures have been developed in consideration of the necessary earthworks associated with the development.

A Sedimentation and Erosion Control Plan (refer Appendix A) has been prepared for the site works which includes measures such as sediment basins, catch drains to direct runoff to the sediment basin, sediment fences surrounding disturbed areas to capture sediment runoff, sandbags at all existing pits collecting stormwater runoff from disturbed areas, and a truck shaker tray at each point of access to the work area.

The measures to be adopted are summarised in the table below:

Table 4. Sedimentation Control

Measure	Location	Purpose
Sediment Fence	Near site boundary along the downstream side of the site.	To prevent sediment leaving the site with stormwater runoff. Stormwater will pass through the fence but the fence will trap the sediment.
Shaker Grid and Wash Down	At construction exit from the site.	To remove ground materials from the construction vehicle wheels prior to the vehicle leaving the site and discharging material onto the public roadway.
Sand Bag Sediment Traps	Directly upstream of all stormwater kerb inlet structures located in close proximity of the site.	To prevent sediment discharged from the site from entering the stormwater inlet structure and contaminating the water course.
Inlet Sediment Trap	Around any stormwater surface inlet structures	To prevent sediment discharged from the site from entering the stormwater inlet structure and contaminating the water course.
Sediment Basin	At the downstream end of the site near the boundary.	To store sediment on site during the construction phase. Basins to be cleaned out prior to the completion of the landscaping in the basins.

Final details of Erosion and Sediment Control measures for the early works and main works are to be implemented on site by the successful contractor. The Contractor will be required to take into account the site works staging including the preferred site access points, site shed locations and temporary stockpile locations in developing and implementing these requirements but will be ultimately responsible for managing temporary stormwater and sediment and erosion control during construction.

APPENDIX A

CIVIL ENGINEERING DRAWINGS

FOR GENERAL NOTES REFER TO DRAWING CV-000-01

RE-DEVELOPMENT - MASTER PLAN
MUDGEE HOSPITAL NSW AUSTRALIA

enstruct

CIVIL ENGINEERING DRAWING LIST:

130511-ENS-CIV-DWG-0000-C	COVER SHEET - DRAWING LIST
130511-ENS-CIV-DWG-0001-A	GENERAL NOTES
130511-ENS-CIV-DWG-0200-G	GENERAL STORMWATER PLAN
130511-ENS-CIV-DWG-0400-B	EROSION AND SEDIMENT CONTROL PLAN
130511-ENS-CIV-DWG-0450-B	EROSION AND SEDIMENT CONTROL DETAILS

enstruct
enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
http: //www.enstruct.com.au

NOTE
CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK OR PREPARATION OF SHOP DRAWINGS. DO NOT SCALE THIS DRAWING

ISSUE	DATE	FOR
A	19.12.17	DRAFT SCHEMATIC DESIGN
B	02.02.18	100% SD ISSUE
C	30.05.18	SSDA ISSUE

CONSULTANT

CONSULTANT

CONSULTANT

CONSULTANT

CONSULTANT

PROJECT MANAGER

CLIENT

NSW GOVERNMENT Health Infrastructure

CLIENT NUMBER

PROJECT
MUDGEE HOSPITAL
RE-DEVELOPMENT
NSW AUSTRALIA

ENSTRUCT PROJECT NUMBER
5498

DRAWING KEY

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE

SCALE
@B1 DO NOT SCALE

STATUS
PRELIMINARY

DRAWING
COVER SHEET - DRAWING LIST

DRAWING NUMBER	ISSUE
130511-ENS-CIV-DWG-0000	C

FOR GENERAL NOTES REFER TO DRAWING CV-000-01

GENERAL

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH WILLOUGHBY COUNCIL DESIGN GUIDELINES AND SPECIFICATIONS. WHERE DISCREPANCIES OCCUR THE MORE STRINGENT SPECIFICATION WILL TAKE PREFERENCE.
2. COORDINATES AND REDUCED LEVELS ARE GIVEN IN METRES UNO.
3. REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
4. ALL COORDINATES ARE TO MAP GRID OF AUSTRALIA (MGA) UNO.
5. DIMENSIONS ARE IN MILLIMETRES UNO.
6. WORKMANSHIP MUST BE IN ACCORDANCE WITH THE DRAWINGS, RELEVANT AUSTRALIAN STANDARDS AND CODES OF PRACTICE.
7. DO NOT SCALE OFF FROM DRAWINGS. WRITTEN DIMENSIONS SHALL ALWAYS TAKE PRECEDENCE OVER SCALED DIMENSIONS.
8. WHERE REFERENCE IS MADE TO PROPRIETARY COMPONENT NAMES ON THE DRAWINGS, THE CONTRACTOR MAY PROPOSE ALTERNATIVES FOR APPROVAL BY THE ENGINEER IN ADVANCE, AS LONG AS THEY ARE EQUIVALENT OR BETTER.
9. SERVICES SHOWN ON THE DRAWINGS ARE FOR INFORMATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK THE EXISTENCE AND LOCATION OF SERVICES PRIOR TO COMMENCING CONSTRUCTION.
10. ON COMPLETION OF THE WORKS, THE CONTRACTOR MUST RESTORE AREAS DISTURBED FOR HIS OWN CONVENIENCE TO THE ORIGINAL CONDITION AND LEAVE THE SITE NEAT AND TIDY.
11. ALL NEW WORKS SHALL MAKE SMOOTH JUNCTION WITH EXISTING CONDITIONS.WHERE DETAILS DO NOT EXIST, CONTACT THE ENGINEER.
12. SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO SOIL DISTURBANCE IN KEEPING WITH THE "MANAGING STORMWATER MANUAL", 2004 BY LANDCOM AND TO COUNCIL'S SOIL EROSION AND SEDIMENT CONTROL POLICY.
13. CONTRACTOR SHALL MAINTAINED DUST CONTROL THROUGHOUT THE DURATION OF THE PROJECT.
14. ALL PITS DEEPER THAN 1.2m SHALL HAVE STEP IRONS PROVIDED IN ACCORDANCE WITH COUNCIL'S STANDARDS.
15. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITH THEIR EASEMENT AND CONFORM WITH COUNCIL'S STANDARDS.
16. SUBSOIL DRAINS SHALL BE CONSTRUCTED TO THE SATISFACTION OF THE COUNCIL.
17. MINIMUM 100mm THICK TOPSOIL SHALL BE SPREAD ON ALL FOOTPATHS,BERMS, BATTERS AND SITE REGRADING AREAS. EXCESS TOPSOIL SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER.
18. THE CONTRACTOR SHALL PROVIDE MINIMUM 48 HOURS NOTICE TO THE ENGINEER FOR ALL INSPECTIONS.
19. THE CONTRACTOR SHALL MAINTAIN SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO THE ADJOINING PROPERTIES.
20. THE CONTRACTOR SHALL UNDERTAKE TRAFFIC CONTROL MEASURES TO ENGINEERS SATISFACTION AND SHALL DISPLAY APPROPRIATE WARNING SIGNS THROUGHOUT THE DURATION OF CONSTRUCTION.
21. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. ALL SITE WORKS MUST BE CARRIED OUT USING THE BENCH MARKS NOTED ON THIS DRAWING.
22. 100 YEAR FLOW PATHS TO BE FORMED AT TIME OF CONSTRUCTION.
23. ABBREVIATIONS:

ALT	-	ALTERNATE	LV	-	LENGTH VARIES
T	-	TOP	AB	-	ALTERNATE BARS REVERSED
B	-	BOTTOM	NSOE	-	NOT SHOWN ON ELEVATION
NF	-	NEAR FACE	NSOP	-	NOT SHOWN ON PLAN
FF	-	FAR FACE	NTS	-	NOT TO SCALE
EF	-	EACH FACE	ADD	-	ADDITIONAL BARS
C	-	CENTRALLY LOCATED	TSB	-	THREADED STARTER BAR
ES	-	EQUAL SPACES	UNO	-	UNLESS NOTED OTHERWISE
EW	-	EACH WAY	MC	-	MASS CONCRETE
GL	-	GROUND LEVEL	C/S	-	BRICKWORK COURSES
RL	-	REDUCED LEVEL	U/S	-	UNDERSIDE
FFL	-	FINISHED FLOOR LEVEL	PL	-	PLATE
SSL	-	STRUCTURAL SLAB LEVEL	BW	-	BOTH WAYS
RC	-	REINFORCED CONCRETE	FW	-	FILLET WELD
IL	-	INVERT LEVEL	KO	-	KERB ONLY
TYP	-	TYPICAL	RK	-	ROLL KERB
CL	-	CENTRE LINE	KT	-	KERB WITH TOE
STA	-	STAGGERED BARS	FK	-	FLUSH KERB
NOM	-	NOMINAL	K&G	-	KERB AND GUTTER
MAX	-	MAXIMUM	A.H.D	-	AUSTRALIAN HEIGHT DATUM
MIN	-	MINIMUM	ha	-	HECTARE
CJ	-	CONSTRUCTION JOINT	BDY	-	BOUNDARY
LJ	-	LONGITUDINAL JOINT	DD	-	DISH DRAIN
CT	-	CONTRACTION JOINT			

TEMPORARY WORKS

1. THE CONTRACTOR MUST MAKE ALL ARRANGEMENTS TO CONTROL PEDESTRIAN AND VEHICULAR TRAFFIC ON FOOTPATHS AND PUBLIC ROADS AROUND THE SITE AND MUST INSTALL AND MAINTAIN WARNING SIGNS AND SAFETY DEVICES IN ACCORDANCE WITH AS1742.3 AND RTA TRAFFIC MANAGEMENT GUIDELINES.
2. UPON COMPLETION OF THE WORKS, ALL TEMPORARY WORKS MUST BE REMOVED AND AFFECTED AREAS REINSTATED TO MATCH EXISTING.

SURVEY

1. DETAILED GROUND SURVEY WITHIN THE SITE AND BOUNDARIES WERE SUPPLIED BY PROJECT SURVEYORS, GEOLYSE ORANGE, REFERENCE NUMBER 217467_01C-D01-D07, DATED 11/09/2017.
2. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. ENSTRUCT GROUP DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE.
3. SURVEY MARKS SHALL BE MAINTAINED AT ALL TIMES. WHERE RETENTION IS NOT POSSIBLE THE ENGINEER SHALL BE NOTIFIED AND CONSENT PRIOR TO THEIR REMOVAL.
4. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT ENSTRUCT GROUP.
5. ALL WORKS TO BE SET OUT BY A REGISTERED SURVEYOR.

DEMOLITION

1. DEMOLITION WORKS MUST COMPLY WITH THE REQUIREMENTS OF AS2601.
2. EXISTING STRUCTURES MUST BE DEMOLISHED AS NECESSARY WITHIN THE EXTENTS OF THE NEW WORKS. THIS INCLUDES FOUNDATIONS TO EXISTING STRUCTURES. DEMOLITION MATERIAL MUST BE REMOVED OFF-SITE OR AS DIRECTED BY THE PROJECT MANAGER.

STORMWATER DRAINAGE

1. ALL PIPES LARGER THAN 225Ø, SUBJECT TO VEHICLE LOADING, MUST BE REINFORCED CONCRETE CLASS '3' RUBBER RING JOINT TO AS1342 UNO.
2. THE CONTRACTOR IS TO ORGANISE AND STAGE CONSTRUCTION WORK AND UNDERTAKE ANY DIVERSION WORKS TO ENSURE THE EXISTING DRAINAGE IS ABLE TO CONVEY ALL STORMWATER FLOWS THAT MAY OCCUR DURING THE PERIOD OF THE CONSTRUCTION WORKS.
3. THE CONTRACTOR IS TO PROVIDE DIVERSION WORKS ETC TO PROTECT WORKS IN PROGRESS UNTIL SUCH A TIME AS THE WORKS ARE IN A FINISHED AND STABLE CONDITION.
4. ANY DAMAGE TO THE WORKS DUE TO STORMWATER FLOWS OR FLOODING DURING THE CONSTRUCTION PERIOD IS AT THE CONTRACTOR'S RISK.
5. SETOUT POINTS FOR STORMWATER STRUCTURES ARE AS INDICATED IN THE DRAWINGS UNLESS OTHERWISE NOTED.
6. ALL PAVED SURFACE LEVELS AND GRADES TO BE COORDINATED WITH GULLY PIT LEVELS TO ENSURE NO UNDRAINED AREAS OCCUR.
7. THE SIDES OF ALL PIPE TRENCH EXCAVATIONS DEEPER THAN 1.0m SHALL BE FULLY SUPPORTED AT ALL TIMES AND HAVE APPROPRIATE EDGE PROTECTION.
8. ALL NEW PIPES TO BE LAID IN AN UPSTREAM DIRECTION. THE LINE, LEVEL AND LOCATION OF EXISTING SERVICES CROSSING THE LINE OF THE PROPOSED STORMWATER PIPE SHALL BE DETERMINED BY EXCAVATION PRIOR TO THE LAYING OF THE PIPE. IF CONFLICT IS APPARENT, THE ENGINEER SHALL BE NOTIFIED AND INSTRUCTIONS AS TO WHETHER THE EXISTING SERVICE IS TO BE ADJUSTED OR THE PROPOSED PIPE INVERT ALTERED WILL BE ISSUED.
9. PIPE BEDDING, HAUNCH AND BACKFILL TO BE AS SHOWN ON THE CIVIL DETAILS DRAWINGS AND THE CIVIL SPECIFICATION.
10. SUBSOIL DRAINAGE PIPES TO BE SLOTTED PIPE AND FILTER SOCK CLASS 1000 TO AS2439 PART 1 LAID AT PREFERABLE MINIMUM GRADE 1 IN 100 OR ABSOLUTE MINIMUM 1 IN 200 WHERE LIMITED BY OUTFALL LEVELS.
11. STORMWATER STRUCTURES ARE TO BE CONSTRUCTED PERPENDICULAR TO THE INCOMING PIPEWORK UNLESS OTHERWISE NOTED.
12. PRECAST COMPONENTS SHALL BE CONNECTED BY MEANS OF EPOXY OR CHEMICAL GROUTED BARS OF THE SAME DIAMETER AND SPACING AS THE SMALLER BARS IN THE RESPECTIVE COMPONENTS.
13. PRE-CAST PITS MUST HAVE LIFTING ANCHORS.
14. WORKING LOADS ARE THOSE DUE TO FILL MATERIAL AND STANDARD HIGHWAY VEHICLES AS PER AS3725. CONSTRUCTION LOADS HAVE NOT BEEN ALLOWED FOR.
15. ALL EXPOSED EDGES ON STORMWATER PITS TO BE ROUNDED TO 5mm RAD. UNO.

EARTHWORKS

1. ALL TREES AND SHRUBS (UNLESS NOTED TO BE PROTECTED ON THE LANDSCAPE PLANS), RUBBLE, EXISTING PAVEMENT AND EXISTING STRUCTURES WITHIN THE SITE SHALL BE REMOVED AND REUSED OR RECYCLED WHERE POSSIBLE. WHERE NOT POSSIBLE, THIS MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF AS PART OF THE CONTRACT.
2. ANY TREES WITHIN THE WORKS AREA WHICH, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, ARE UNSOUND OR WOULD CONSTITUTE A DANGER, SHALL BE CUT DOWN AND REMOVED (EXCEPT THOSE IDENTIFIED AS BEING PROTECTED). ALL STUMPS OF TREES CUT DOWN WITHIN THE BOUNDS OF THE CONSTRUCTION AREA WHICH ARE LARGER THAN 250mm IN GIRTH, SHALL BE COMPLETELY REMOVED.
3. ALL ROOTS SHALL BE REMOVED FOR A DEPTH OF 1m. CAVITIES FORMED BY THE REMOVAL OF ROOTS SHALL BE BACKFILLED AND COMPACTED.
4. AFTER CLEARING AND GRUBBING ARE COMPLETE, THE CONTRACTOR SHALL STRIP AND STOCKPILE TOPSOIL FROM THE CLEARED AREA (INCLUDING AREAS THAT HAVE BEEN CLEARED AND GRUBBED). REMOVAL OF TOPSOIL FROM ANY SECTION OF THE WORKS SHALL ONLY COMMENCE AFTER SEDIMENT AND EROSION CONTROLS HAVE BEEN IMPLEMENTED.
5. TOPSOIL SHALL BE STRIPPED FROM WITHIN THE FORMATION AREAS OF ROADS, PATHWAYS, BUILDING PADS AND MISCELLANEOUS PAVEMENTS, INCLUSIVE OF BATTERS, AND IS TO BE CONSERVED FOR THE TOP-DRESSING OF FORMED FOOTWAYS, BERMS AND BATTERS TO THE SPECIFIED DEPTH, OR WHERE NO DEPTH IS SPECIFIED TO A MINIMUM DEPTH OF 150mm, OR AS DETERMINED ON-SITE.
6. EXCAVATED FILL MATERIAL NOT SUITABLE FOR REUSE ON-SITE MUST BE REMOVED OFF-SITE OR OTHERWISE USED IN LANDSCAPING AREAS WHERE AGREED IN ADVANCE WITH ENGINEER.
7. EROSION AND SEDIMENT CONTROL MUST BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL CITY COUNCIL DCP, DA AND CC CONDITIONS, AND BE INSTALLED TO THE SATISFACTION OF THE ENGINEER.
8. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO LIMIT THE CREATION OF DUST NUISANCE, WHICH MIGHT ARISE DURING THE EXECUTION OF THE WORKS.
9. FILL MATERIAL MUST BE PLACED IN MAXIMUM LAYERS OF 200mm (LOOSE) OR AS OTHERWISE GIVEN IN THE SPECIFICATION AND COMPACTED TO THE LEVELS AS SPECIFIED ON THE DRAWINGS.
10. COMPACTED FILL MUST BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF AS3798 AND AS GIVEN IN THE CIVIL SPECIFICATION.
11. BEFORE PLACING FILL, PROOF ROLL EXPOSED SUBGRADE WITH AN 12 TONNE (MIN) DEADWEIGHT SMOOTH DRUM VIBRATORY ROLLER TO DIRECT THEN REMOVE SOFT SPOTS (AREAS WITH MORE THAN 2mm MOVEMENT UNDER ROLLER. PROOF ROLLING SHALL COMPRISE 6 PASSES OF A MINIMUM.
12. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN :
    (A) 1 TEST PER 200m³ OF FILL PLACED PER 200mm THICK LAYER OF FILL
    (B) 3 TESTS PER LAYER
    (C) 1 TEST PER 2000m³ OF EXPOSED SUBGRADE
    TESTING SHALL BE "LEVEL1" TESTING IN ACCORDANCE WITH AS 3798 (2007) AT CONTRACTOR EXPENSE.
13. NO FILLING SHALL TAKE PLACE TO EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF GEOTECHNICAL ENGINEER AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED.
14. THE CONTRACTOR SHALL ALLOW FOR AND COORDINATE ALL MONITORING AND MAINTENANCE REQUIREMENTS IN RELATION TO SOIL AND GROUNDWATER CONDITIONS DURING CONSTRUCTION.
15. ALL LAND DISTRIBUTED BY EARTHWORKS SHALL BE HYDROMULCHED, OR SIMILARLY TREATED TO ESTABLISH GRASS COVER, SEED MIXTURES ARE TO BE APPROVED BY COUNCIL PRIOR TO SPRAYING ALL GRASSED AREAS SHALL BE REGULARLY WATERED AND MAINTAINED UNTIL EXPIRATION OF THE MAINTENANCE PERIOD.

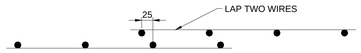
LOCATION	STANDARD DRY DENSITY (AS (1289 E 5.1.1.)
UNDER BUILDING SLABS ON GROUND	98-102%
UNDER PADS, FOOTWAYS AND CARPARKS	98-102%
LANDSCAPED AREAS UNLESS NOTED OTHERWISE	95-102%

UTILITIES

1. LOCATE ALL PIPES, DUCTS, CABLES, RETAINING WALLS AND EXCAVATIONS OUTSIDE A 1:2 (VERTICAL:HORIZONTAL) ZONE OF INFLUENCE FROM THE BOTTOM EDGE OF THE FOOTING.
2. THE CONTRACTOR MUST TAKE EVERY PRECAUTION TO PROTECT EXISTING GAS, WATER, STORMWATER, SEWERAGE, ELECTRICITY, TELEPHONE CONDUITS AND OTHER EXISTING WORKS AND SERVICES.
3. CIVIL WORKS REQUIRED TO PROTECT EXISTING SERVICES IS TO BE AT THE FULL COST OF THE CONTRACTOR.
4. THE LOCATION OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITION OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE.
5. ENSTRUCT GROUP CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.
6. CONTRACTOR SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.
7. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.
8. CONTRACTORS ARE TO UNDERTAKE A SERVICE SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULT ARE TO BE KEPT ON SITE AT ALL TIMES.

CONCRETE

1. THE MINIMUM CONCRETE GRADE MUST BE 25MPa UNO. THE GRADE DESIGNATION SPECIFIES THE REQUIRED CHARACTERISTIC CYLINDER STRENGTH (MPa) AT 28 DAYS.
2. EXCEPT WHERE OTHERWISE NOTED ON THE DRAWINGS, THE FOLLOWING CLASSES OF FORMWORK MUST BE USED ALL IN ACCORDANCE WITH AS3610; SURFACES THAT WILL BE RENDERED-CLASS 4, CONCEALED FROM VIEW BELOW GROUND-CLASS 5, ALL OTHER SURFACES-CLASS 3.
3. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
4. IN-SITU CONCRETE KERB AND GUTTERING MUST BE PROVIDED WITH JOINTS AT 4m INTERVALS. JOINTS MUST BE FORMED BY CUTTING THE NEWLY PLACED CONCRETE COMPLETELY THROUGH NORMAL TO THE LINE OF KERB AND RADIALLY ON CURVES. EVERY FOURTH JOINT IS TO BE FORMED AS AN EXPANSION JOINT.
5. KERBS AND GUTTERS MUST BE COVERED AND KEPT DAMP FOR NOT LESS THAN THREE DAYS.
6. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT ADDITION WITH AMENDMENTS, AS3735 AND WS-SPEC (WATER SERVICES SPECIFICATION).
7. COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF CONCRETE OR PLASTIC BAR CHAIRS FOR BOTTOM REINFORCEMENT, AND PLASTIC TIPPED WIRE BAR CHAIRS FOR TOP REINFORCEMENT. ALL CHAIRS TO BE SPACED 750 CRS. MAXIMUM.
8. FABRIC LAP DETAIL:



9. REINFORCEMENT SHALL NOT BE BENT OR HEATED ON-SITE WITHOUT THE ENGINEER'S PRIOR APPROVAL.
10. CONCRETE TO BE MECHANICALLY VIBRATED TO ACHIEVE A DENSE HOMOGENOUS MASS COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS.
11. SURFACE FINISH TO BE BROOMED UNLESS SHOWN OTHERWISE.
12. DECORATIVE FINISHES, COLORS OR PATTERNS TO BE APPLIED AS SHOWN ON THE ARCHITECT'S PLAN.

SIGNS AND LINEMARKING

1. ALL PAVEMENT MARKINGS, CHEVRONS AND REFLECTORS ARE TO BE IN ACCORDANCE WITH RMS QA SPECIFICATION R141 & R142, CURRENT RMS DELINEATION GUIDELINES, AUSTRALIAN STANDARDS AND RMS SUPPLEMENTS.
2. ALL SIGNS TO BE IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARD AS 1743 - ROAD SIGNS,RMS SUPPLEMENTS AND COUNCIL'S SPECIFICATIONS UNLESS STATED OTHERWISE.
3. ROAD SIGNS ARE SIZE 'A', UNLESS OTHERWISE SHOWN. LOCATE OUTSIDE OF CLEAR ZONES.
4. AUTHORIZATION FOR THE INSTALLATION OF ALL REGULATORY SIGNPOSTING AND LINE MARKING ILLUSTRATED ON THIS PLAN IS TO BE OBTAINED FROM RMS, TRAFFIC ENGINEERING SERVICES.REGULATORY SIGNPOSTING AND LINE MARKING SHOWN ON THESE PLANS ARE NOT APPROVED FOR INSTALLATION.
5. ALL NEW PAVEMENT MARKINGS ARE TO BE INSTALLED IN WHITE REFLECTIVE, THERMOPLASTIC PAINT.
6. PAVEMENT MARKINGS THAT FORM NO PART OF THE FINAL WORKS ARE TO BE REMOVED BY WATER BLASTING OR OTHER METHOD AS APPROVED BY THE SUPERINTENDENT/PROJECT MANAGER.

enstruct
enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
http: //www.enstruct.com.au

NOTE
CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK OR PREPARATION OF SHOP DRAWINGS. DO NOT SCALE THIS DRAWING

ISSUE	DATE	FOR
A	19.12.17	DRAFT SCHEMATIC DESIGN

CONSULTANT

CONSULTANT

CONSULTANT

CONSULTANT

CONSULTANT

PROJECT MANAGER

CLIENT

NSW GOVERNMENT Health Infrastructure

CLIENT NUMBER

PROJECT
MUDGEE HOSPITAL
RE-DEVELOPMENT
NSW AUSTRALIA

ENSTRUCT PROJECT NUMBER
5498

DRAWING KEY

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
0 4 10

SCALE
@81 DO NOT SCALE

STATUS
PRELIMINARY

DRAWING
GENERAL NOTES

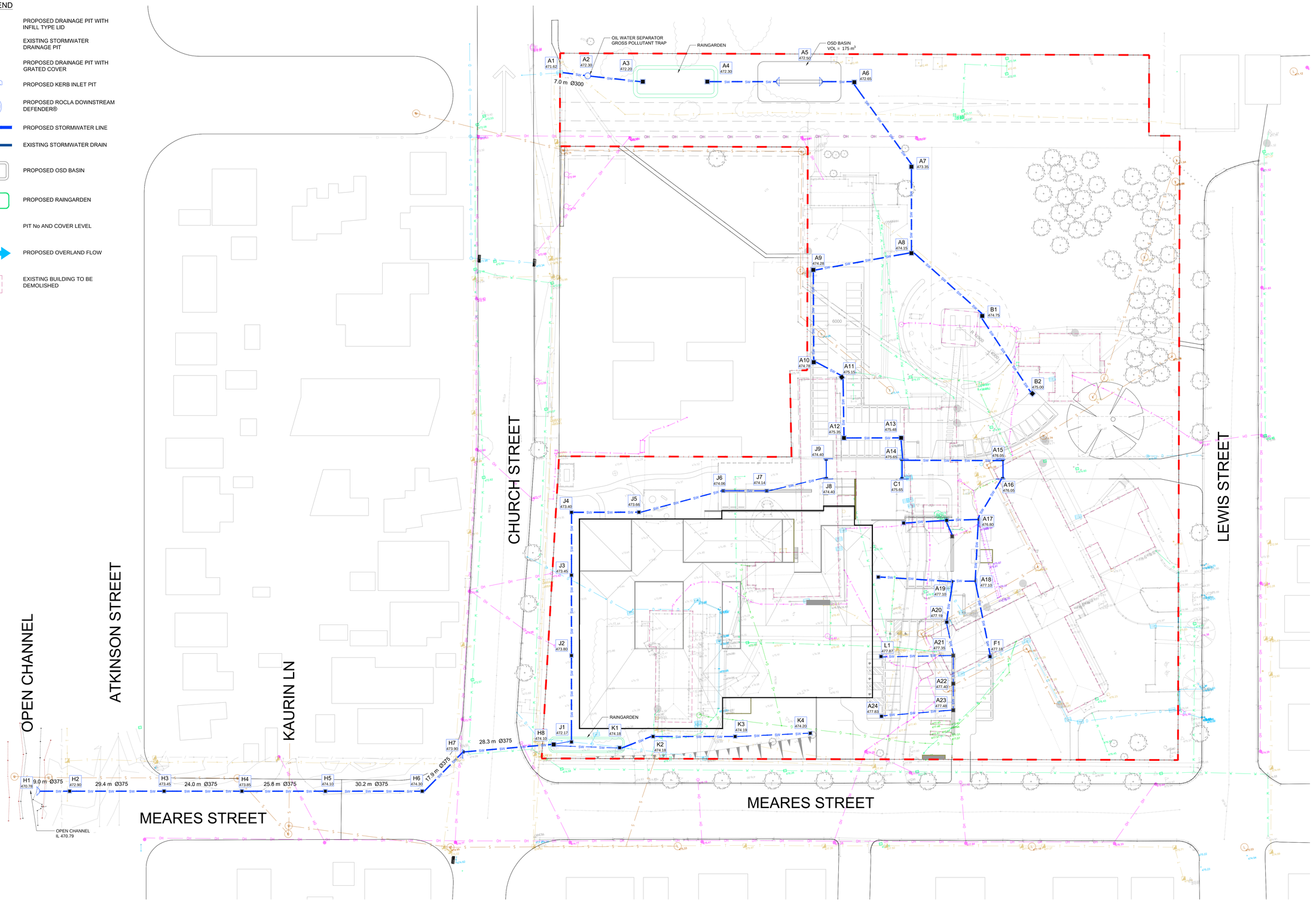
DRAWING NUMBER
130511-ENS-CIV-DWG-0001

ISSUE
A

FOR GENERAL NOTES REFER TO DRAWING CV-000-01

LEGEND

- PROPOSED DRAINAGE PIT WITH INFILL TYPE LID
- EXISTING STORMWATER DRAINAGE PIT
- PROPOSED DRAINAGE PIT WITH GRATED COVER
- PROPOSED KERB INLET PIT
- PROPOSED ROCLA DOWNSTREAM DEFENDER®
- SW — PROPOSED STORMWATER LINE
- D — EXISTING STORMWATER DRAIN
- PROPOSED OSD BASIN
- PROPOSED RAINGARDEN
- PIT No AND COVER LEVEL
- PROPOSED OVERLAND FLOW
- EXISTING BUILDING TO BE DEMOLISHED



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ISSUE	DATE	FOR
A	20.11.17	PRELIMINARY
B	06.12.17	PRELIMINARY
C	19.12.17	DRAFT SCHEMATIC DESIGN
D	25.01.18	SCHEMATIC DESIGN
E	02.02.18	100% SD ISSUE
F	16.05.18	SOUTH SW NETWORK CHANGED
G	29.05.18	SOUTH SW NETWORK UPDATED

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PROJECT MANAGER

CLIENT

NSW GOVERNMENT Health Infrastructure

CLIENT NUMBER

PROJECT
MUDGEE HOSPITAL
RE-DEVELOPMENT
NSW AUSTRALIA

ENSTRUCT PROJECT NUMBER
5498

DRAWING KEY

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
0 2 50

SCALE
1:500 @B1 DO NOT SCALE

STATUS
PRELIMINARY

DRAWING
GENERAL STORMWATER PLAN

DRAWING NUMBER 130511-ENS-CIV-DWG-0200
ISSUE G

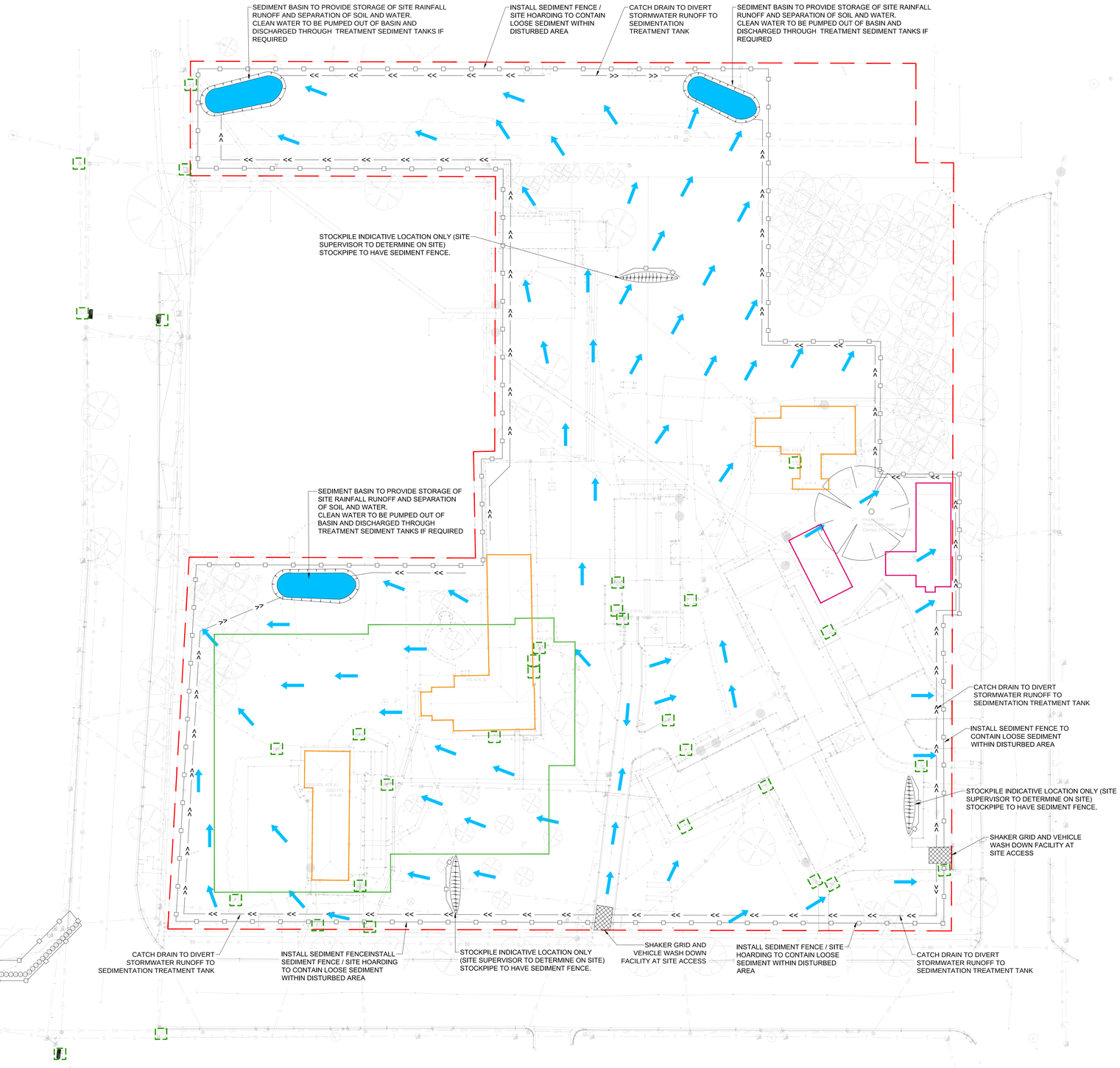
FOR GENERAL NOTES REFER TO DRAWING CV-000-01

LEGEND

- SITE BOUNDARY
- PROPOSED TEMPORARY SEDIMENT FENCE / SITE HOARDING
- PROPOSED TEMPORARY CATCH DRAIN
- PROPOSED TEMPORARY SHAKER GRID AND WASH DOWN FACILITY
- TEMPORARY SANDBAGS AROUND PITS:
  1. AFTER PAVEMENT WORKS ARE COMPLETE IF WORKS ARE ONGOING UPSTREAM
  2. TO EXISTING GRATED PITS DOWNSTREAM OF CONSTRUCTION WORKS
- PROPOSED STOCKPIPLE LOCATION WITH SEDIMENT FENCE
- STOCKPIPLE FOR TRENCHING
- OVERLAND FLOW DIRECTION
- MAIN BUILDING
- DEMOUNTABLE BUILDINGS
- BUILDINGS TO BE DEMOLISHED

NOTE:

- THIS PLAN IS FOR GUIDANCE ONLY.
- SITE MANAGER TO INSTALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH LANDCOM - MANAGING URBAN STORMWATER "BLUE BOOK" GUIDANCE, TO COMPLEMENT SELECTED CONSTRUCTION METHODS AND STAGING.
- REFER TO DWG No: 130511-ENS-CIV-DWG-0450 FOR SEDIMENT AND EROSION CONTROL DETAILS



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Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
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http: //www.enstruct.com.au

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ISSUE	DATE	FOR
A	19.12.17	PRELIMINARY
B	30.05.18	SSDA ISSUE

CONSULTANT

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CONSULTANT

PROJECT MANAGER

CLIENT

NSW GOVERNMENT Health Infrastructure

CLIENT NUMBER

PROJECT
MUDGEE HOSPITAL
RE-DEVELOPMENT
NSW AUSTRALIA

ENSTRUCT PROJECT NUMBER
5498

DRAWING KEY

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
0 2 50

SCALE
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STATUS
PRELIMINARY

DRAWING
EROSION AND SEDIMENT CONTROL PLAN

DRAWING NUMBER	ISSUE
130511-ENS-CIV-DWG-0400	B

EROSION AND SEDIMENT CONTROL:

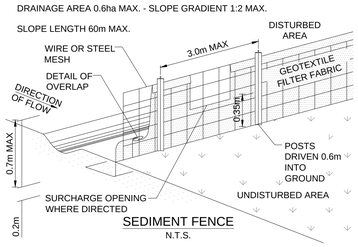
1. THE CONTRACTOR SHALL PROVIDE ADEQUATE TRUCK WASH FACILITIES AT THE SITE EXIT AND SHALL CLEAN ALL VEHICLES EXITING THE SITE TO ENSURE MATERIALS AND MUD IS NOT TRANSPORTED AND DEPOSITED OFF SITE. WATER FROM ANY WASHBAY IS TO BE DIVERTED TO THE SEDIMENT FENCE OR TO THE SEDIMENT BASIN PRIOR TO DISCHARGE.
2. NOTWITHSTANDING THE EROSION AND SEDIMENT CONTROL NOTES THE CONTRACTOR SHALL NOTE THEIR OVERARCHING OBLIGATION WITH THE CITY OF RYDE COUNCIL IN RESPECT OF ENVIRONMENTAL CONTROLS. PARTICULARLY ONGOING TESTING OF DISCHARGE, MAINTENANCE, DREDGING OF SEDIMENTATION PONDS AND FINAL FILTRATION AT OUTLETS.
3. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO PROTECT THE ENVIRONMENT AND IN PARTICULAR SHALL CONTROL EROSION, SEDIMENTATION AND POLLUTION DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE EPA, DEC, COUNCIL, AND THE EROSION AND SEDIMENT CONTROL PLAN.
4. EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION' (2004 - BLUE BOOK), AND CITY OF RYDE COUNCIL'S DCP.
5. EROSION AND SEDIMENT CONTROL DEVICES SHALL BE CONFIRMED IN THE QUALITY PLAN PRODUCED BY THE CONTRACTOR AND SHALL BE IMPLEMENTED AND ADJUSTED TO SUIT CONSTRUCTION ACCESS AND STAGING.
6. FOLLOWING EVERY RAINFALL EVENT EXCEEDING 10mm OR WHEN BASINS ARE GREATER THAN 50% FULL, WATER SHALL BE TESTED FOR COMPLIANCE WITH EPA'S STANDARDS AND, IF FOUND NOT TO COMPLY, WATER SHALL BE TREATED BY APPROPRIATE FLOCCULATION, FILTRATION OR OTHER APPROVED METHODS.
7. WATER SHALL NOT BE REMOVED FROM SEDIMENT BASIN UNTIL TESTED WATER MEETS EPA WATER QUALITY REQUIREMENTS e.g <50 MG/L SUSPENDED SOLIDS.
8. CONTRACTOR TO PROVIDE ALL PERIMETER SITE FENCING FOR SECURITY & SAFETY PURPOSES AS REQUIRED.
9. PUMP TO SYDNEY WATER SEWER ONLY WHEN WATER QUALITY MEETS EPA GUIDELINES (E.G. TSS < 50mg/L)
10. OBTAIN APPROVALS FROM SYDNEY WATER OR COUNCIL TO PUMP TO RECEIVING PIT.
11. EMPTY SEDIMENT BASIN WITHIN 72 HOURS OF RAINFALL. TREAT WATER AS NECESSARY TO ACHIEVE REQUIRED WATER QUALITY STANDARDS.
12. THE EARLY WORKS ARE OUTSIDE THE 100 YEAR ARI FLOOD EXTENTS OF UNIVERSITY CREEK; HENCE WILL NOT IMPACT THE FLOODING REGIME OF THE CREEK.

STOCKPILE NOTES:

1. PROTECT ALL STOCKPILES FROM SCOUR AND EROSION. DO NOT STOCKPILE LOOSE MATERIAL IN ROADWAYS, NEAR DRAINAGE PITS OR IN WATERCOURSES.
2. SPOIL & TOPSOIL STOCKPILES SHALL BE LOCATED AWAY FROM DRAINAGE LINES AND AREAS WHERE WATER MAY CONCENTRATE. STOCKPILES ARE TO BE SURROUNDED BY SEDIMENT FENCE.
3. IF STOCKPILES ARE TO BE IN PLACE FOR LONGER THAN 30 DAYS THEN THEY SHALL BE STABILIZED BY COVERING WITH MULCH OR WITH TEMPORARY VEGETATION.
4. FOLLOWING CONSTRUCTION, TOPSOIL SHALL BE RESPREAD TO A MINIMUM DEPTH OF 100mm ON BARE SOIL SURFACES AND REVEGETATED.

NOTE:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH 130511-ENS-CIV-DWG-0400

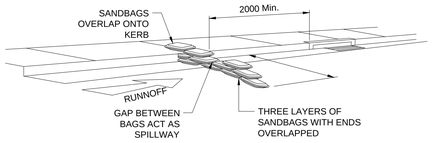


SEDIMENT FENCE
N.T.S.

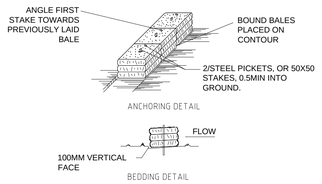
INSTALLATION

1. EXCAVATE A TRENCH 200mm DEEP.
2. DRIVE POSTS 500-700mm INTO GROUND AT A MAXIMUM SPACING OF 3.0m CENTRES.
3. PLACE AND FIX SUPPORT MESH (F52) TO POST.
4. LAY BIDIM GEOFABRIC (SF 2000) AGAINST THE SUPPORT MESH AND FIX BY TIE WIRE, STAPLES OR HOG RINGS.
5. PLACE BIDIM IN TRENCH AND BACKFILL WITH SOIL.

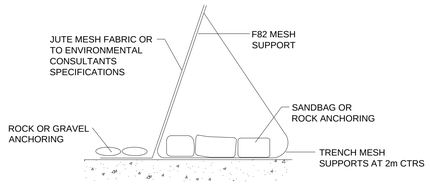
NOTE:
POSITION OF SEDIMENT FENCE AS DIRECTED BY SUPERINTENDENT. FENCE TO REMAIN IN PLACE UNTIL EXCAVATION IS BELOW FOOTPATH LEVEL.



SANDBAG SEDIMENT TRAP
N.T.S.



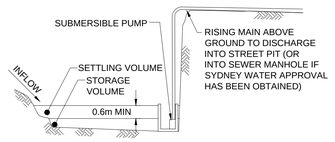
SEDIMENT STRIP CONTROL
N.T.S.



ALTERNATIVE SEDIMENT FENCE
N.T.S.

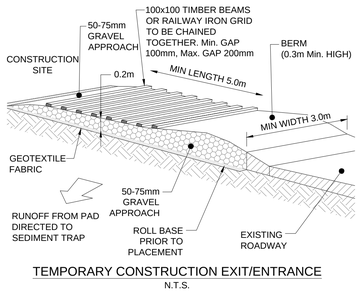
ALTERNATIVE SEDIMENT FENCE NOTES

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE JUTE MESH TO THE WELDED MESH FACING USING UV-RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE JUTE MESH. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.

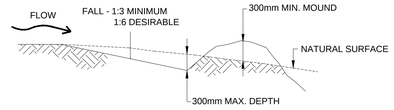


TYPICAL SECTION THROUGH SEDIMENT BASIN
N.T.S.

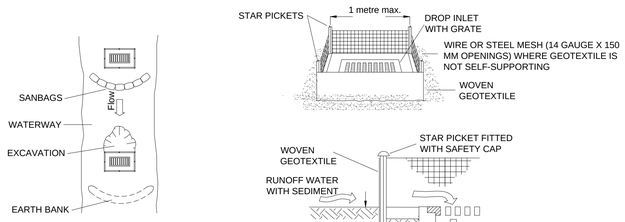
NOTE:
BASIN SIZE AND DEPTH TO SUIT EXCAVATION CONSTRAINTS



TEMPORARY CONSTRUCTION EXIT/ENTRANCE
N.T.S.



CATCH DRAIN
N.T.S.

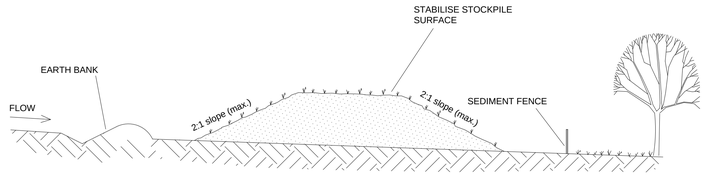


FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT

CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARDS DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DON NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

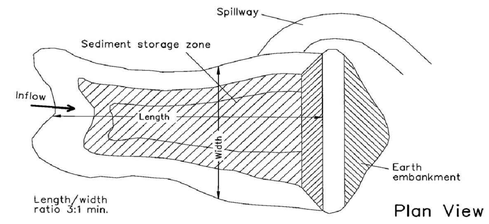
GEOTEXTILE INLET FILTER
N.T.S.

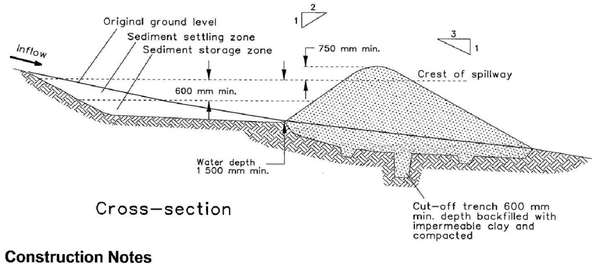


CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FORM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.

STOCKPILES
N.T.S.





Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

enstruct
enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
http: //www.enstruct.com.au

NOTE
CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK OR PREPARATION OF SHOP DRAWINGS. DO NOT SCALE THIS DRAWING

ISSUE	DATE	FOR
A	19.12.17	PRELIMINARY
B	30.05.18	SSDA ISSUE

CONSULTANT
CONSULTANT
CONSULTANT
CONSULTANT
CONSULTANT
PROJECT MANAGER
CLIENT

NSW GOVERNMENT Health Infrastructure

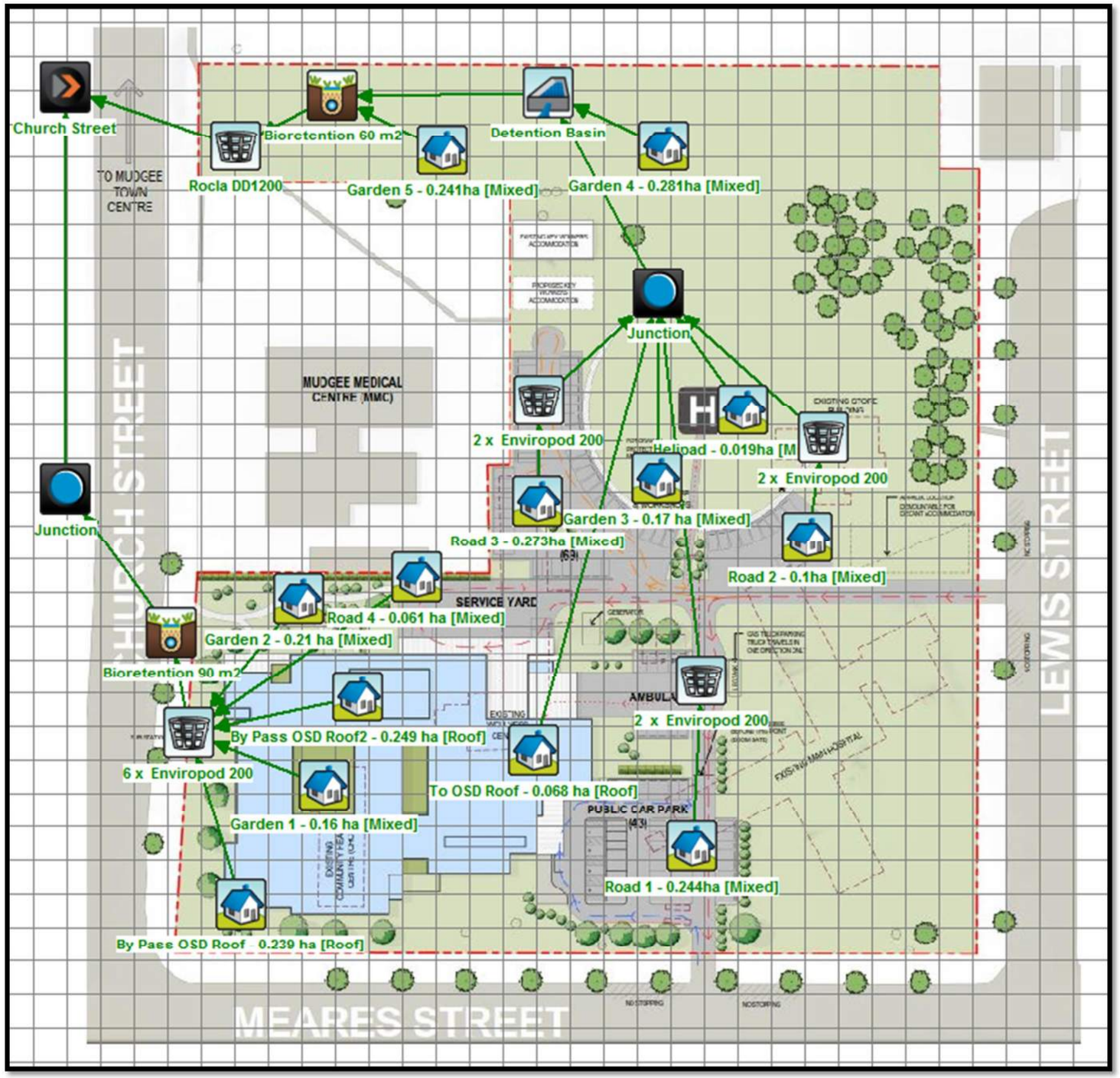
CLIENT NUMBER
PROJECT
MUDGEE HOSPITAL
RE-DEVELOPMENT
NSW AUSTRALIA
ENSTRUCT PROJECT NUMBER
5498
DRAWING KEY

TRUE NORTH PROJECT NORTH
GRAPHIC SCALE 0 4 10
SCALE
NOTED@81 DO NOT SCALE
STATUS
PRELIMINARY
DRAWING
EROSION AND SEDIMENT CONTROL DETAILS

DRAWING NUMBER 130511-ENS-CIV-DWG-0450
ISSUE B

APPENDIX B

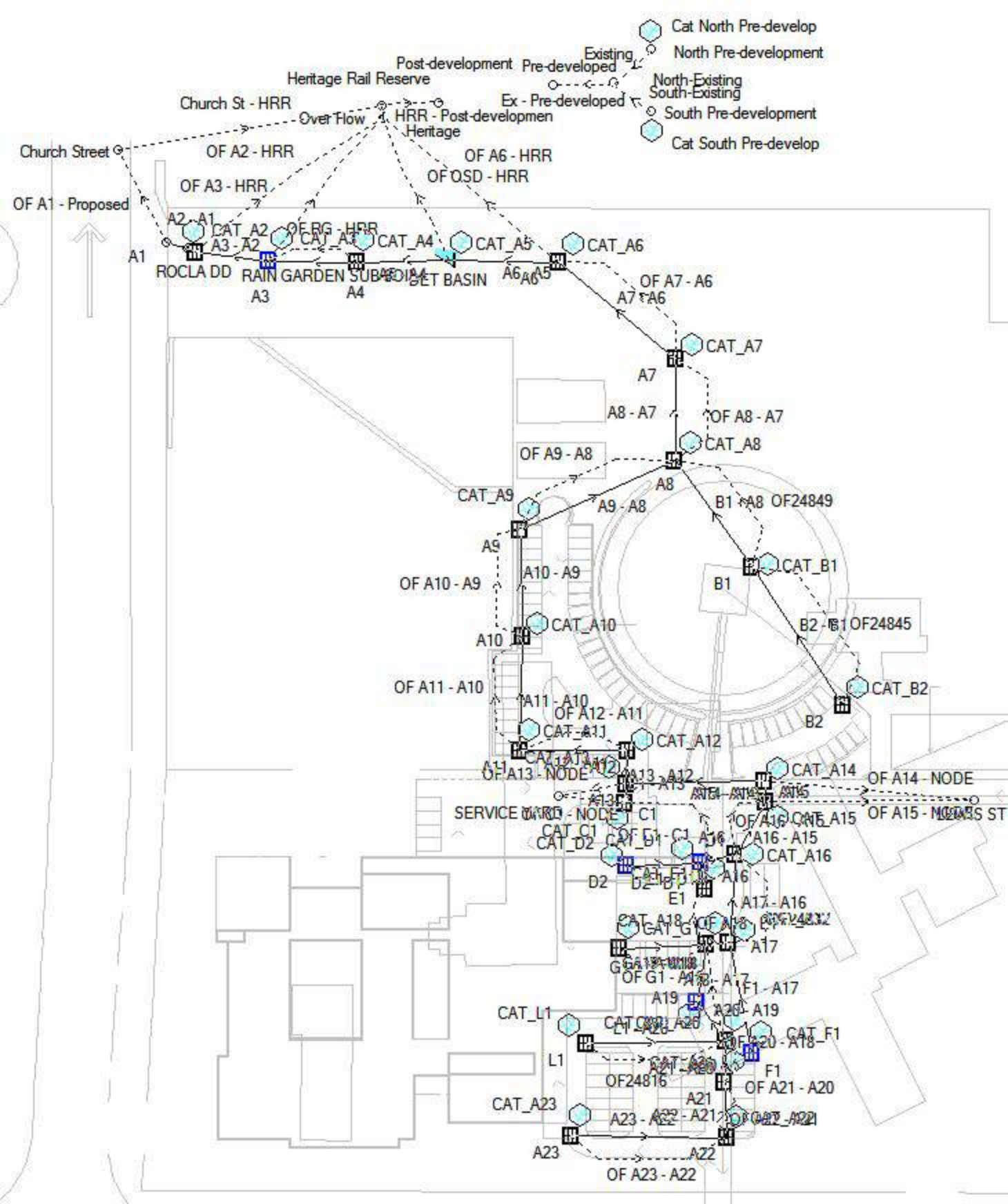
STORMWATER QUALITY DESIGN



	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.78	4.53	5.2
Total Suspended Solids (kg/yr)	959	52.4	94.5
Total Phosphorus (kg/yr)	1.86	0.524	71.9
Total Nitrogen (kg/yr)	11.2	5.96	46.9
Gross Pollutants (kg/yr)	149	1.47	99

APPENDIX C

STORMWATER HYDRAULIC MODELLING


Cat North Pre-develop
North Pre-development
Existing
Post-development
Pre-developed
Heritage Rail Reserve
North-Existing
South-Existing
Church St - HRR
Ex - Pre-developed
South Pre-development
Over Flow
HRR - Post-developmen
Heritage
Cat South Pre-develop
Church Street
OF A2 - HRR
OF A6 - HRR
OF OSD - HRR
OF A3 - HRR
OF A1 - Proposed
A2 - A1
CAT_A2
A3 - A2
CAT_A3
CAT_A4
CAT_A5
CAT_A6
A1
ROCLA DD
RAIN GARDEN
SUBCOIL4
SET BASIN
A3
A4
A6
A5
OF A7 - A6
A7 - A6
CAT_A7
A7
A8 - A7
OF A8 - A7
CAT_A8
OF A9 - A8
A8
CAT_A9
A9 - A8
B1 - A8
OF24849
A9
CAT_B1
B1
A10 - A9
OF A10 - A9
CAT_A10
A10
B2 - B1
OF24845
CAT_B2
OF A11 - A10
A11 - A10
OF A12 - A11
B2
CAT_A11
CAT_A12
A11
A12
OF A13 - NODE
A13 - A12
CAT_A14
OF A14 - NODE
A13
A14
A15
SERVICE BOARD - NODE
C1
OF A16 - A15
CAT_A15
OF A15 - NODE
CAT_C1
CAT_D2
CAT_D1
C1 - A16
A16 - A15
CAT_A16
D2
D1
A16
E1
A17 - A16
CAT_G1
A17
OF G1 - A17
F1 - A17
A19
A19
CAT_L1
CAT_F1
L1
A20 - A18
F1
OF24816
OF A21 - A20
A21
CAT_A23
A23 - A22
A23
A22
OF A23 - A22

Calculation Sheet

Job	MUDGEE HOSPITAL REDEVELOPMENT	Design	MD	Office	Sydney
	Mudgee NSW	Date	May-18	Job No	5498
		Checked	WW		
		Date	May-18		

MUDGEE HOSPITAL REDEVELOPMENT

STORMWATER NETWORK 1

enstruct

DRAINS OUTPUT

May 2018

enstruct

PROJECT MUDGEE HOSPITAL REDEVELOPMENT

TITLE DRAINS DATA - SOUTH DEVELOPED SCENARIO

JOB No 5498

PREPARED MD DATE 30/05/2018

CHECKED WW DATE 30/05/2018

DATA

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 1

PIT / NODE DETAILS Version 13

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	
B2	OnGrade	GD	900sqm		5.9	475		0	0.3	-63143.08	-79486.37	No	11372611	1 x Ku	No	New	
B1	OnGrade	GD	900sqm		4.2	475		0	0.3	-84178.33	-47566.34	No	11372614	1 x Ku	No	New	
A8	OnGrade	GD	1200sqm		1.9	474.15		0	0.3	-102174.3	-22613	No	11372622	1 x Ku	No	New	
A7	OnGrade	GD	900sqm		1.3	473.37		0	0.3	-102009.1	972.018	No	11372627	1 x Ku	No	New	
A6	OnGrade	GD	900sqm		0.9	472.7		0	0.3	-129153.9	23471.658	No	11372631	1 x Ku	No	New	
A4	OnGrade	GD	1200sqm		2	472.3		0	0.3	-176149	23411.933	No	33242410	1 x Ku	No	New	
A3	Sag	GD	1200sqm	40	4.2	472.05	0.2	0	0.5	-196734.4	23743.26	No	11372639	1 x Ku	No	New	
ROCLA DD	OnGrade	GD	1200sqm		1.8	472.04		0	0.3	-213799.9	25868.203	No	11372643	1 x Ku	No	New	
A1	Node					471.62		0		-220451	28144.188		11372776		No		
A23	OnGrade	GD	900sqm		5.9	477.83		0	0.3	-126277.8	-179752.1	No	11372655	1 x Ku	No	New	
A22	OnGrade	GD	900sqm		5.9	477.48		0	0.3	-90158.76	-180268.5	No	11372593	1 x Ku	No	New	
A21	OnGrade	GD	900sqm		2.2	477.4		0	0.3	-90520.21	-167359.6	No	31338521	1 x Ku	No	New	
A20	OnGrade	GD	900sqm		1.9	477.35		0	0.3	-90357.04	-157782.3	No	11372597	1 x Ku	No	New	
A19	Sag	GD	900sqm	2	1.7	477.19	0.15	0	0.5	-96974.64	-148512.7	No	31338528	1 x Ku	No	New	
A18	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		1.9	477.1		0	0.3	-94830.58	-135283.1	No	31338530	1 x Ku	No	New	
A17	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		2	477.1		0	0.3	-89556.33	-134677.9	No	11372600	1 x Ku	No	New	
A16	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		0.7	476.8		0	0.3	-88028.08	-114157.2	No	31338634	1 x Ku	No	New	
A15	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		0.7	476.05		0	0.3	-81140.36	-102189.6	No	11372606	1 x Ku	No	New	
A14	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		0.1	476.05		0	0.3	-81215.06	-97184.38	No	31338593	1 x Ku	No	New	
A13	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		2.4	475.65		0	0.3	-113498	-97780.82	No	11372664	1 x Ku	No	New	
A12	OnGrade	GD	900sqm		2.4	475.48		0	0.3	-113188.4	-90162.2	No	11372616	1 x Ku	No	New	
A11	OnGrade	GD	1200sqm		2.4	475.13		0	0.3	-138318.9	-90132.32	No	11372618	1 x Ku	No	New	
A10	OnGrade	GD	1200sqm		1	474.78		0	0.3	-137691.4	-63418.13	No	31338613	1 x Ku	No	New	
A9	OnGrade	GD	1200sqm		1.8	474.28		0	0.3	-138049.9	-38676.14	No	11372620	1 x Ku	No	New	
L1	OnGrade	GD	900sqm		5.9	477.87		0	0.3	-122805.3	-158280.4	No	11372659	1 x Ku	No	New	
D2	Sag	GD	900sqm	2	5.9	477.6	0.15	0	0.5	-113541	-116864.4	No	11372662	1 x Ku	No	New	
D1	Sag	GD	900sqm	2	2.2	476.9	0.15	0	0.5	-96200.11	-116292.1	No	11372604	1 x Ku	No	New	
F1	Sag	GD	900sqm	2	5.9	477.18	0.15	0	0.5	-84272.31	-160440.5	No	31338514	1 x Ku	No	New	
G1	OnGrade	GD	900sqm		5.9	478		0	0.3	-114981.3	-136179.9	No	31338649	1 x Ku	No	New	
E1	OnGrade	GD	900sqm		5.9	476.9		0	0.3	-95253.46	-122243.1	No	31338682	1 x Ku	No	New	
C1	OnGrade	Hornsby Council Inlets (Kl+grate), 3	Hornsby 1.2 m lintel		5.9	475.65		0	0.3	-113648.6	-102342	No	31338703	1 x Ku	No	New	
LEWIS ST	Node					473.6		0		-32430.3	-101696.5		31339228		No		
SERVICE YARD	Node					474.3		0		-129246.8	-100728.3		31339242		No		
North Pre-developr	Node							0		-107508.3	73003.499		37664470		No		
Heritage Rail Rese	Node					471.5		0		-170232.5	59933.271		38950707		No		
Heritage	Node					472		0		-169901.3	56905.265		38950734		No		
Church Street	Node							0		-231743.8	49534.461		39105465		No		
Post-development	Node							0		-157054.7	60471.14		39105660		No		
South Pre-developr	Node							0		-107508.3	58442.296		40985394		No		
Existing	Node							0		-116467	65129.09		40985398		No		
Pre-developed	Node							0		-130408.6	64741.824		40985401		No		

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id		
DET BASIN	471.45	15		Culvert	0.5					-154754.7	24053.073	No			11372634		
	472.5	360															
	473	400															

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough
CAT_B2	B2	0.0505	95	5	0	5	5	5									
CAT_B1	B1	0.1212	100	0	0	5	5	5									
CAT_A8	A8	0.1643	0	100	0	5	5	5									
CAT_A7	A7	0.0778	0	100	0	5	5	5									
CAT_A6	A6	0.1095	0	100	0	5	5	5									
CAT_A5	DET BASIN	0.1569	0	100	0	5	5	5									
CAT_A4	A4	0.0551	0	100	0	5	5	5									
CAT_A3	A3	0.0626	0	100	0	5	5	5									
CAT_A2	ROCLA DD	0.0775	0	100	0	5	5	5									
CAT_A23	A23	0.0196	100	0	0	5	5	5									
CAT_A22	A22	0.0553	50	50	0	5	5	5									
CAT_A21	A21	0.0253	100	0	0	5	5	5									
CAT_A20	A20	0.0253	95	5	0	5	5	5									

CAT_A19	A19	0.028	30	70	0	5	5	5									
CAT_A18	A18	0.0304	30	70	0	5	5	5									
CAT_A17	A17	0.0089	95	5	0	5	5	5									
CAT_A16	A16	0.0099	95	5	0	5	5	5									
CAT_A15	A15	0.0095	95	5	0	5	5	5									
CAT_A14	A14	0.0045	95	5	0	5	5	5									
CAT_A13	A13	0.0065	100	0	0	5	5	5									
CAT_A12	A12	0.0247	95	5	0	5	5	5									
CAT_A11	A11	0.0387	100	0	0	5	5	5									
CAT_A10	A10	0.0537	95	5	0	5	5	5									
CAT_A9	A9	0.0522	95	5	0	5	5	5									
CAT_L1	L1	0.015	95	5	0	5	5	5									
CAT_D2	D2	0.0348	100	0	0	5	5	5									
CAT_D1	D1	0.0114	95	5	0	5	5	5									
CAT_F1	F1	0.0238	100	0	0	5	5	5									
CAT_G1	G1	0.0284	100	0	0	5	5	5									
CAT_E1	E1	0.05	70	30	0	5	5	5									
CAT_C1	C1	0.0138	95	5	0	5	5	5									
Cat North Pre-deve	North Pre-development	1.44	20.1	79.9	0	5	5	0									
Cat South Pre-dev	South Pre-development	1.12	34.1	65.9	0	5	5	0									
PIPE DETAILS																	
Name	From	To	Length	U/S IL	D/S IL	Slope	Type	Dia	I.D.	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg	Rl	Chg
			(m)	(m)	(m)	(%)		(mm)	(mm)						(m)	(m)	(m)
B2 - B1	B2	B1	31.1	474	473.55	1.45	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	B2	0			
B1 - A8	B1	A8	29.5	473.55	473.13	1.42	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	B1	0			
A8 - A7	A8	A7	24.38	472.9	472.4	2.05	Concrete, not under roads, 1% minimum slope	450	450	0.3	New	1	A8	0			
A7 - A6	A7	A6	31.8	472.38	471.7	2.14	Concrete, not under roads, 1% minimum slope	450	450	0.3	New	1	A7	0			
A6 - A5	A6	DET BASIN	10	471.68	471.63	0.5	Concrete, under roads, 0.5% minimum slope	450	450	0.3	NewFixed	1	A6	0			
A5 - A4	DET BASIN	A4	20.94	471.5	471.4	0.48	Concrete, not under roads, 0.5% minimum slope	300	300	0.3	NewFixed	1	DET BASIN	0			
RAIN GARDEN SU	A4	A3	20	471.38	471.36	0.1	Concrete, not under roads, 1% minimum slope	150	150	0.3	New	1	A4	0			
A3 - A2	A3	ROCLA DD	16.3	471.35	471.27	0.49	Concrete, not under roads, 0.5% minimum slope	300	300	0.3	New	1	A3	0			
A2 - A1	ROCLA DD	A1	7	471.23	471.2	0.43	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	ROCLA DD	0			
A23 - A22	A23	A22	22.05	477.005	476.785	1	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	A23	0			
A22 - A21	A22	A21	19.62	476.71	476.514	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	A22	0			
A21 - A20	A21	A20	7.9	476.49	476.411	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	A21	0			
A20 - A19	A20	A19	19.62	476.39	476.194	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	A20	0			
A19 - A18	A19	A18	12	476.17	476.05	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	A19	0			
A18 - A17	A18	A17	7	476.03	475.96	1	Concrete, not under roads, 1% minimum slope	300	300	0.3	New	1	A18	0			
A17 - A16	A17	A16	18.8	475.94	475.752	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	A17	0			
A16 - A15	A16	A15	14.7	475.68	475.075	4.12	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	A16	0			
A15 - A14	A15	A14	5.2	475.06	475.008	1	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	A15	0			
A14 - A13	A14	A13	31.6	474.99	474.65	1.08	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	A14	0			
A13 - A12	A13	A12	6	474.63	474.5	2.17	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	A13	0			
A12 - A11	A12	A11	26.8	474.48	474.11	1.38	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	A12	0			
A11 - A10	A11	A10	21.8	474.09	473.78	1.42	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	A11	0			
A10 - A9	A10	A9	28.3	473.76	473.28	1.7	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	A10	0			
A9 - A8	A9	A8	30.8	473.26	473.11	0.49	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	A9	0			
L1 - A20	L1	A20	23	476.946	476.486	2	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	L1	0			
D2 - D1	D2	D1	12.7	476.575	475.94	5	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	D2	0			
D1 - A16	D1	A16	9.4	475.924	475.83	1	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	D1	0			
F1 - A17	F1	A17	23.8	476.298	476.06	1	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	F1	0			
G1 - A18	G1	A18	23	477.04	476.13	3.96	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	G1	0			
E1 - D1	E1	D1	4.3	475.983	475.94	1	Concrete, under roads, 0.5% minimum slope	225	225	0.3	New	1	E1	0			
C1 - A13	C1	A13	5.2	474.782	474.73	1	Concrete, under roads, 0.5% minimum slope	225	225	0.3	New	1	C1	0			
DETAILS of SERVICES CROSSING PIPES																	
Pipe	Chg	Bottom	Height of Service	Chg	Bottom	Height of S	Chg	Bottom	Height of S	etc							
	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	etc							
CHANNEL DETAILS																	
Name	From	To	Type	Length	U/S IL	D/S IL	Slope	Base Width	L.B. Slope	R.B. Slope	Manning	Depth	Roofed				
				(m)	(m)	(m)	(%)	(m)	(1:?)	(1:?)	n	(m)					
OVERFLOW ROUTE DETAILS																	
Name	From	To	Travel	Spill	Crest	Weir	Cross	Safe Depth	SafeDepth	Safe	Bed	D/S Area		id			
			Time	Level	Length	Coeff. C	Section	Major Storr	Minor Storr	DxV	Slope	Contributing					
			(min)	(m)	(m)			(m)	(m)	(sq.m/sec)	(%)	%					
OF24845	B2	B1	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		11373063			10
OF24849	B1	A8	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		11373068			10
OF A8 - A7	A8	A7	0.1				4 m wide pathway	0.3	0.15	0.4	3.2	0		11373080			24.38
OF A7 - A6	A7	A6	0.2				4 m wide pathway	0.3	0.15	0.4	2.05	0		11373082			32.76
OF A6 - HRR	A6	Heritage	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		11373085			10
OF OSD - HRR	DET BASIN	Heritage	0.2	472.5	9	1.74	4 m wide pathway	0.3	0.15	0.4	1	0		11373088			21
OF RG - HRR	A4	A3	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		33242391			18
OF A3 - HRR	A3	Heritage	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		35436488			12
OF A2 - HRR	ROCLA DD	Heritage	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		11373096			12
OF A1 - Proposed	A1	Church Street	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		39105562			10

OF A23 - A22	A23	A22	0.2				4 m wide pathway	0.3	0.15	0.4	1	0		11372847		30
OF A22 - A21	A22	A21	0.2				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1.09	0		11373032		20
OF A21 - A20	A21	A20	0.2				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1.09	0		31339180		20
OF A20 - A18	A20	A18	0.2				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1.09	0		31339190		20
OF A18 - E1	A18	E1	0.2				4 m wide pathway	0.3	0.15	0.4	1.09	0		11373039		19.62
OF24832	A17	A16	0.1				4 m wide pathway	0.3	0.15	0.4	4.48	0		11373044		19.42
OF A16 - A15	A16	A15	0.1				4 m wide pathway	0.3	0.15	0.4	4.48	0		31339220		19.42
OF A15 - NODE	A15	LEWIS ST	0.4				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	3	0		31339229		60
OF A14 - NODE	A14	LEWIS ST	0.4				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	3	0		31339230		60
OF A13 - NODE	A13	SERVICE YARD	0.1				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	3	0		31339239		20
OF A12 - A11	A12	A11	0.2				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1.09	0		31339247		25
OF A11 - A10	A11	A10	0.2				4 m wide pathway	0.3	0.15	0.4	2	0		11373070		30
OF A10 - A9	A10	A9	0.2				4 m wide pathway	0.3	0.15	0.4	2	0		11373074		25
OF A9 - A8	A9	A8	0.1				4 m wide pathway	0.3	0.15	0.4	1.79	0		11373076		19.57
OF24816	L1	A20	0.2				4 m wide pathway	0.3	0.15	0.4	3.19	0		11373026		27
OF G1 - A18	G1	A18	0.2				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1.09	0		31339199		20
OF E1 - C1	E1	C1	0.1				4 m wide pathway	0.3	0.15	0.4	4.48	0		31339213		19.42
OF C1 - NODE	C1	SERVICE YARD	0.1				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	3	0		31339235		20
North-Existing	North Pre-development	Existing	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		40985404		10
HRR - Post-develo	Heritage Rail Reserve	Post-development	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		39225651		10
Over Flow	Heritage	Heritage Rail Reserve	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		38950738		10
Church St - HRR	Church Street	Heritage Rail Reserve	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		39225637		10
South-Existing	South Pre-development	Existing	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		40985408		10
Ex - Pre-developed	Existing	Pre-developed	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		40985411		10
PIPE COVER DETAILS																
Name	Type	Dia (mm)	Safe Cover (m)	Cover (m)												
B2 - B1	Concrete, under roads, 1% minimum slope	225	0.6	0.74												
B1 - A8	Concrete, not under roads, 1% minimum slope	225	0.45	0.76												
A8 - A7	Concrete, not under roads, 1% minimum slope	450	0.45	0.48												
A7 - A6	Concrete, not under roads, 1% minimum slope	450	0.45	0.5												
A6 - A5	Concrete, under roads, 0.5% minimum slope	450	0.6	-0.67	Unsafe											
A5 - A4	Concrete, not under roads, 0.5% minimum slope	300	0.45	-0.38	Unsafe											
RAIN GARDEN SU	Concrete, not under roads, 1% minimum slope	150	0.45	0.51												
A3 - A2	Concrete, not under roads, 0.5% minimum slope	300	0.45	0.37	Unsafe											
A2 - A1	Concrete, under roads, 1% minimum slope	300	0.6	0.09	Unsafe											
A23 - A22	Concrete, under roads, 1% minimum slope	225	0.6	0.44	Unsafe											
A22 - A21	Concrete, under roads, 1% minimum slope	300	0.6	0.44	Unsafe											
A21 - A20	Concrete, under roads, 1% minimum slope	300	0.6	0.58	Unsafe											
A20 - A19	Concrete, under roads, 1% minimum slope	300	0.6	0.63												
A19 - A18	Concrete, under roads, 1% minimum slope	300	0.6	0.69												
A18 - A17	Concrete, not under roads, 1% minimum slope	300	0.45	0.74												
A17 - A16	Concrete, under roads, 1% minimum slope	300	0.6	0.72												
A16 - A15	Concrete, under roads, 1% minimum slope	375	0.6	0.56	Unsafe											
A15 - A14	Concrete, under roads, 1% minimum slope	375	0.6	0.58	Unsafe											
A14 - A13	Concrete, not under roads, 1% minimum slope	375	0.45	0.59												
A13 - A12	Concrete, under roads, 1% minimum slope	375	0.6	0.57	Unsafe											
A12 - A11	Concrete, not under roads, 1% minimum slope	375	0.45	0.59												
A11 - A10	Concrete, not under roads, 1% minimum slope	375	0.45	0.59												
A10 - A9	Concrete, not under roads, 1% minimum slope	375	0.45	0.59												
A9 - A8	Concrete, under roads, 1% minimum slope	375	0.6	0.61												
L1 - A20	Concrete, under roads, 1% minimum slope	225	0.6	0.61												
D2 - D1	Concrete, under roads, 1% minimum slope	225	0.6	0.7												
D1 - A16	Concrete, under roads, 1% minimum slope	225	0.6	0.71												
F1 - A17	Concrete, under roads, 1% minimum slope	225	0.6	0.63												
G1 - A18	Concrete, under roads, 1% minimum slope	225	0.6	0.7												
E1 - D1	Concrete, under roads, 0.5% minimum slope	225	0.6	0.66												
C1 - A13	Concrete, under roads, 0.5% minimum slope	225	0.6	0.61												

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PROJECT	MUDGEE HOSPITAL REDEVELOPMENT	JOB No	5498
TITLE	20% AEP - RESULTS	PREPARED ER	DATE 30/05/2018
		CHECKED WW	DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 1

DRAINS results prepared from Version 2018.01

RESULTS 20% AEP

PIT / NODE DETAILS				Version 8								
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint					
B2	474.14		0.015		0.86	0.001	Inlet Capacity					
B1	473.77		0.037		1.23	0.004	Inlet Capacity					
A8	473.22		0.044		0.93	0.001	Inlet Capacity					
A7	472.71		0.021		0.66	0	None					
A6	472.42		0.028		0.28	0.001	Inlet Capacity					
A4	472.3		0.013		0	0.036	Outlet System					
A3	471.86	472.09	0.063	6	0.19	0	Inlet Capacity					
ROCLA DD	471.7		0.019		0.34	0	None					
A1	471.62		0									
A23	477.07		0.006		0.76	0	None					
A22	476.85		0.015		0.63	0	None					
A21	476.62		0.008		0.78	0	None					
A20	476.54		0.007		0.81	0	None					
A19	476.34	477.2	0.007	0.1	0.85		Inlet Capacity					
A18	476.23		0.008		0.87	0	None					
A17	476.14		0.003		0.96	0	None					
A16	475.86		0.003		0.94	0	None					
A15	475.27		0.003		0.78	0	None					
A14	475.16		0.001		0.89	0	None					
A13	474.89		0.002		0.76	0	None					
A12	474.7		0.007		0.78	0	None					
A11	474.33		0.012		0.8	0	None					
A10	474.01		0.016		0.77	0	None					
A9	473.58		0.015		0.7	0	None					
L1	477.02		0.004		0.85	0	None					
D2	476.69	477.62	0.01	0.1	0.91		Inlet Capacity					
D1	476.06	476.91	0.003	0.1	0.84		Inlet Capacity					
F1	476.38	477.2	0.007	0.1	0.8		Inlet Capacity					
G1	477.14		0.008		0.86	0	None					
E1	476.12		0.014		0.78	0	None					
C1	474.9		0.005		0.75	0	None					

SUB-CATCHMENT DETAILS												
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm					
CAT_B2	0.013	0.013	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_B1	0.032	0.032	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_A8	0.023	0	0.023	5	5	5	20% AEP, 10 min burst, Storm 8					
CAT_A7	0.011	0	0.011	5	5	5	20% AEP, 10 min burst, Storm 2					
CAT_A6	0.016	0	0.016	5	5	5	20% AEP, 10 min burst, Storm 8					
CAT_A5	0.022	0	0.022	5	5	5	20% AEP, 10 min burst, Storm 8					
CAT_A4	0.008	0	0.008	5	5	5	20% AEP, 10 min burst, Storm 8					
CAT_A3	0.009	0	0.009	5	5	5	20% AEP, 10 min burst, Storm 8					
CAT_A2	0.011	0	0.011	5	5	5	20% AEP, 10 min burst, Storm 7					
CAT_A23	0.005	0.005	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_A22	0.01	0.007	0.004	5	5	5	20% AEP, 10 min burst, Storm 7					
CAT_A21	0.007	0.007	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_A20	0.007	0.006	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A19	0.005	0.002	0.003	5	5	5	20% AEP, 10 min burst, Storm 7					
CAT_A18	0.005	0.002	0.003	5	5	5	20% AEP, 10 min burst, Storm 7					
CAT_A17	0.002	0.002	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A16	0.003	0.002	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A15	0.002	0.002	0	5	5	5	20% AEP, 15 min burst, Storm 5					

CAT_A14	0.001	0.001	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A13	0.002	0.002	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_A12	0.006	0.006	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A11	0.01	0.01	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_A10	0.014	0.013	0.001	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_A9	0.013	0.013	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_L1	0.004	0.004	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_D2	0.009	0.009	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_D1	0.003	0.003	0	5	5	5	20% AEP, 15 min burst, Storm 5					
CAT_F1	0.006	0.006	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_G1	0.008	0.008	0	5	5	5	20% AEP, 5 min burst, Storm 1					
CAT_E1	0.011	0.01	0.002	5	5	5	20% AEP, 15 min burst, Storm 6					
CAT_C1	0.004	0.003	0	5	5	5	20% AEP, 15 min burst, Storm 5					
Cat North Pre-develop	0.228	0.071	0.164	5	5	0	20% AEP, 10 min burst, Storm 7					
Cat South Pre-develop	0.19	0.093	0.105	5	5	0	20% AEP, 10 min burst, Storm 7					
PIPE DETAILS												
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm							
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)								
B2 - B1	0.012	1.28	474.066	473.77	20% AEP, 15 min burst, Storm 5							
B1 - A8	0.04	7.94	473.591	473.255	20% AEP, 10 min burst, Storm 9							
A8 - A7	0.183	4.99	473.026	472.713	20% AEP, 10 min burst, Storm 10							
A7 - A6	0.186	3.22	472.556	472.445	20% AEP, 10 min burst, Storm 2							
A6 - A5	0.194	1.22	472.413	472.41	20% AEP, 10 min burst, Storm 7							
A5 - A4	0.061	0.86	472.354	472.3	20% AEP, 45 min burst, Storm 8							
RAIN GARDEN SUB-SOIL	0.03	1.69	472.142	471.881	20% AEP, 2 hour burst, Storm 4							
A3 - A2	0.062	0.88	471.737	471.7	20% AEP, 45 min burst, Storm 8							
A2 - A1	0.064	0.9	471.637	471.62	20% AEP, 45 min burst, Storm 8							
A23 - A22	0.005	1.45	477.039	476.86	20% AEP, 5 min burst, Storm 1							
A22 - A21	0.015	1.16	476.782	476.617	20% AEP, 10 min burst, Storm 4							
A21 - A20	0.021	1.63	476.562	476.538	20% AEP, 15 min burst, Storm 6							
A20 - A19	0.032	1.86	476.477	476.35	20% AEP, 15 min burst, Storm 9							
A19 - A18	0.034	1.46	476.28	476.233	20% AEP, 15 min burst, Storm 3							
A18 - A17	0.046	1.59	476.158	476.141	20% AEP, 10 min burst, Storm 4							
A17 - A16	0.052	2.44	476.043	475.89	20% AEP, 10 min burst, Storm 9							
A16 - A15	0.076	2.97	475.785	475.27	20% AEP, 15 min burst, Storm 3							
A15 - A14	0.078	1.8	475.216	475.164	20% AEP, 10 min burst, Storm 4							
A14 - A13	0.079	1.85	475.143	474.89	20% AEP, 10 min burst, Storm 4							
A13 - A12	0.083	2.32	474.764	474.702	20% AEP, 10 min burst, Storm 4							
A12 - A11	0.09	7.49	474.542	474.325	20% AEP, 10 min burst, Storm 4							
A11 - A10	0.098	6.51	474.163	474.01	20% AEP, 10 min burst, Storm 9							
A10 - A9	0.107	2.38	473.92	473.575	20% AEP, 10 min burst, Storm 10							
A9 - A8	0.116	2.61	473.418	473.358	20% AEP, 10 min burst, Storm 1							
L1 - A20	0.004	1.04	476.98	476.545	20% AEP, 15 min burst, Storm 5							
D2 - D1	0.009	1.87	476.616	476.064	20% AEP, 5 min burst, Storm 1							
D1 - A16	0.023	2.87	475.982	475.931	20% AEP, 15 min burst, Storm 3							
F1 - A17	0.006	1.29	476.339	476.141	20% AEP, 5 min burst, Storm 1							
G1 - A18	0.008	1.62	477.079	476.251	20% AEP, 5 min burst, Storm 1							
E1 - D1	0.011	0.78	476.068	476.064	20% AEP, 15 min burst, Storm 6							
C1 - A13	0.003	0.16	474.898	474.899	20% AEP, 15 min burst, Storm 5							
CHANNEL DETAILS												
Name	Max Q	Max V			Due to Storm							
	(cu.m/s)	(m/s)										
OVERFLOW ROUTE DETAILS												
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF24845	0.001	0.001	0.908	0.008	0	0.84	0.15	20% AEP, 15 min burst, Storm 5				
OF24849	0.004	0.004	0.908	0.016	0	1.63	0.28	20% AEP, 5 min burst, Storm 1				
OF A8 - A7	0.001	0.001	1.434	0.006	0	0.64	0.26	20% AEP, 10 min burst, Storm 7				
OF A7 - A6	0	0	1.3	0	0	0	0					
OF A6 - HRR	0.001	0.001	0.908	0.01	0	1.04	0.18	20% AEP, 10 min burst, Storm 9				
OF OSD - HRR	0	0	0.908	0	0	0	0					
OF RG - HRR	0.036	0.036	0.908	0.034	0.02	4	0.47	20% AEP, 45 min burst, Storm 8				
OF A3 - HRR	0	0	0.908	0	0	0	0					
OF A2 - HRR	0	0	0.908	0	0	0	0					
OF A1 - Proposed	0.064	0.064	0.908	0.042	0.02	4	0.59	20% AEP, 45 min burst, Storm 8				
OF A23 - A22	0	0	0.908	0	0	0	0					
OF A22 - A21	0	0	0.321	0	0	0	0					

OF A21 - A20	0	0	0.321	0	0	0	0					
OF A20 - A18	0	0	0.321	0	0	0	0					
OF A18 - E1	0	0	0.948	0	0	0	0					
OF24832	0	0	1.421	0	0	0	0					
OF A16 - A15	0	0	1.421	0	0	0	0					
OF A15 - NODE	0	0	0.532	0	0	0	0					
OF A14 - NODE	0	0	0.532	0	0	0	0					
OF A13 - NODE	0	0	0.532	0	0	0	0					
OF A12 - A11	0	0	0.321	0	0	0	0					
OF A11 - A10	0	0	1.284	0	0	0	0					
OF A10 - A9	0	0	1.284	0	0	0	0					
OF A9 - A8	0	0	1.215	0	0	0	0					
OF24816	0	0	1.432	0	0	0	0					
OF G1 - A18	0	0	0.321	0	0	0	0					
OF E1 - C1	0	0	1.421	0	0	0	0					
OF C1 - NODE	0	0	0.532	0	0	0	0					
North-Existing	0.228	0.228	0.908	0.073	0.07	4	0.98	20% AEP, 10 min burst, Storm 7				
HRR - Post-developmen	0.064	0.064	0.908	0.042	0.02	4	0.59	20% AEP, 45 min burst, Storm 8				
Over Flow	0.001	0.001	0.908	0.01	0	1.04	0.18	20% AEP, 10 min burst, Storm 9				
Church St - HRR	0.064	0.064	0.908	0.042	0.02	4	0.59	20% AEP, 45 min burst, Storm 8				
South-Existing	0.19	0.19	0.908	0.067	0.06	4	0.92	20% AEP, 10 min burst, Storm 7				
Ex - Pre-developed	0.419	0.419	0.908	0.099	0.12	4	1.24	20% AEP, 10 min burst, Storm 7				
DETENTION BASIN DETAILS												
Name	Max WL	MaxVol	Max Q	Max Q	Max Q							
			Total	Low Level	High Level							
DET BASIN	472.41	126.8	0.061	0.061	0							
Run Log for Mudgee Hospital run at 12:00:34 on 30/5/2018												
Upwelling occurred at: A4												
Flows were safe in all overflow routes.												

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PROJECT MUDGEE HOSPITAL REDEVELOPMENT

TITLE 10% AEP - RESULTS

JOB No 5498

PREPARED ER DATE 30/05/2018

CHECKED WW DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 1

DRAINS results prepared from Version 2018.01

RESULTS 10% AEP

PIT / NODE DETAILS				Version 8							
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint				
B2	474.15		0.017		0.85	0.001	Inlet Capacity				
B1	473.79		0.043		1.21	0.005	Inlet Capacity				
A8	473.27		0.05		0.88	0.001	Inlet Capacity				
A7	472.77		0.024		0.6	0.001	Inlet Capacity				
A6	472.53		0.031		0.17	0.002	Inlet Capacity				
A4	472.3		0.015		0	0.069	Outlet System				
A3	472.08	472.15	0.086	12.7	0	0	Outlet System				
ROCLA DD	471.76		0.021		0.28	0	None				
A1	471.62		0								
A23	477.08		0.007		0.75	0	None				
A22	476.86		0.017		0.62	0.001	Inlet Capacity				
A21	476.64		0.01		0.76	0	None				
A20	476.56		0.009		0.79	0	None				
A19	476.36	477.21	0.008	0.1	0.83		Inlet Capacity				
A18	476.27		0.009		0.83	0	None				
A17	476.17		0.003		0.93	0	None				
A16	475.88		0.003		0.92	0	None				
A15	475.3		0.003		0.75	0	None				
A14	475.18		0.002		0.87	0	None				
A13	474.93		0.002		0.72	0	None				
A12	474.74		0.008		0.74	0	None				
A11	474.36		0.013		0.77	0	None				
A10	474.04		0.018		0.74	0	None				
A9	473.69		0.018		0.59	0	None				
L1	477.02		0.005		0.85	0	None				
D2	476.7	477.62	0.012	0.1	0.9		Inlet Capacity				
D1	476.07	476.91	0.004	0.1	0.83		Inlet Capacity				
F1	476.4	477.2	0.008	0.1	0.78		Inlet Capacity				
G1	477.15		0.01		0.85	0	None				
E1	476.13		0.016		0.77	0	Inlet Capacity				
C1	474.93		0.006		0.72	0	None				

SUB-CATCHMENT DETAILS												
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm					
CAT_B2	0.016	0.015	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_B1	0.039	0.039	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A8	0.032	0	0.032	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A7	0.015	0	0.015	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A6	0.021	0	0.021	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A5	0.031	0	0.031	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A4	0.011	0	0.011	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A3	0.012	0	0.012	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A2	0.015	0	0.015	5	5	5	10% AEP, 20 min burst, Storm 7					
CAT_A23	0.006	0.006	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A22	0.013	0.009	0.005	5	5	5	10% AEP, 10 min burst, Storm 1					
CAT_A21	0.008	0.008	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A20	0.008	0.008	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A19	0.006	0.002	0.004	5	5	5	10% AEP, 10 min burst, Storm 3					
CAT_A18	0.007	0.003	0.004	5	5	5	10% AEP, 10 min burst, Storm 3					

CAT_A17	0.003	0.003	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A16	0.003	0.003	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A15	0.003	0.003	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A14	0.001	0.001	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A13	0.002	0.002	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A12	0.008	0.008	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A11	0.012	0.012	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A10	0.017	0.016	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_A9	0.016	0.016	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_L1	0.005	0.005	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_D2	0.011	0.011	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_D1	0.004	0.003	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_F1	0.008	0.008	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_G1	0.009	0.009	0	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_E1	0.013	0.011	0.001	5	5	5	10% AEP, 5 min burst, Storm 1					
CAT_C1	0.004	0.004	0	5	5	5	10% AEP, 5 min burst, Storm 1					
Cat North Pre-develop	0.3	0.074	0.226	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat South Pre-develop	0.244	0.11	0.14	5	5	0	10% AEP, 10 min burst, Storm 3					
PIPE DETAILS												
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm							
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)								
B2 - B1	0.014	1.36	474.07	473.787	10% AEP, 5 min burst, Storm 1							
B1 - A8	0.046	9.03	473.592	473.283	10% AEP, 5 min burst, Storm 1							
A8 - A7	0.228	4.48	473.061	472.787	10% AEP, 10 min burst, Storm 3							
A7 - A6	0.235	3.99	472.559	472.528	10% AEP, 10 min burst, Storm 9							
A6 - A5	0.255	1.6	472.513	472.506	10% AEP, 10 min burst, Storm 9							
A5 - A4	0.083	1.18	472.4	472.3	10% AEP, 45 min burst, Storm 5							
RAIN GARDEN SUB-SOIL	0.03	1.7	472.208	472.055	10% AEP, 3 hour burst, Storm 2							
A3 - A2	0.084	1.18	471.827	471.769	10% AEP, 1 hour burst, Storm 9							
A2 - A1	0.087	1.23	471.65	471.62	10% AEP, 1 hour burst, Storm 9							
A23 - A22	0.006	1.12	477.05	476.875	10% AEP, 10 min burst, Storm 6							
A22 - A21	0.018	1.22	476.788	476.636	10% AEP, 10 min burst, Storm 9							
A21 - A20	0.025	1.43	476.58	476.557	10% AEP, 10 min burst, Storm 9							
A20 - A19	0.037	1.99	476.484	476.36	10% AEP, 10 min burst, Storm 9							
A19 - A18	0.042	1.54	476.293	476.27	10% AEP, 10 min burst, Storm 9							
A18 - A17	0.056	1.67	476.175	476.171	10% AEP, 10 min burst, Storm 9							
A17 - A16	0.065	3.07	476.042	475.909	10% AEP, 10 min burst, Storm 3							
A16 - A15	0.093	3.19	475.796	475.295	10% AEP, 10 min burst, Storm 9							
A15 - A14	0.095	1.89	475.234	475.181	10% AEP, 10 min burst, Storm 9							
A14 - A13	0.096	1.95	475.161	474.928	10% AEP, 10 min burst, Storm 9							
A13 - A12	0.101	2.3	474.787	474.738	10% AEP, 10 min burst, Storm 9							
A12 - A11	0.111	8.55	474.546	474.359	10% AEP, 10 min burst, Storm 3							
A11 - A10	0.118	7.21	474.167	474.045	10% AEP, 10 min burst, Storm 9							
A10 - A9	0.132	2.66	473.932	473.69	10% AEP, 10 min burst, Storm 9							
A9 - A8	0.143	1.63	473.59	473.389	10% AEP, 10 min burst, Storm 9							
L1 - A20	0.005	1.1	476.983	476.553	10% AEP, 5 min burst, Storm 1							
D2 - D1	0.011	1.96	476.62	476.075	10% AEP, 5 min burst, Storm 1							
D1 - A16	0.026	2.78	475.989	475.938	10% AEP, 10 min burst, Storm 7							
F1 - A17	0.007	0.95	476.352	476.176	10% AEP, 10 min burst, Storm 6							
G1 - A18	0.009	1.71	477.083	476.267	10% AEP, 5 min burst, Storm 1							
E1 - D1	0.012	0.76	476.079	476.075	10% AEP, 10 min burst, Storm 8							
C1 - A13	0.004	0.14	474.94	474.94	10% AEP, 10 min burst, Storm 6							
CHANNEL DETAILS												
Name	Max Q	Max V			Due to Storm							
	(cu.m/s)	(m/s)										
OVERFLOW ROUTE DETAILS												
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF24845	0.001	0.001	0.908	0.01	0	1.04	0.18	10% AEP, 5 min burst, Storm 1				
OF24849	0.005	0.005	0.908	0.018	0.01	1.82	0.29	10% AEP, 5 min burst, Storm 1				
OF A8 - A7	0.001	0.001	1.434	0.009	0	0.94	0.33	10% AEP, 10 min burst, Storm 3				
OF A7 - A6	0.001	0.001	1.3	0.009	0	0.94	0.24	10% AEP, 20 min burst, Storm 7				
OF A6 - HRR	0.002	0.002	0.908	0.012	0	1.23	0.21	10% AEP, 20 min burst, Storm 7				

OF OSD - HRR	0.008	0.008	0.908	0.023	0.01	4	0.25	10% AEP, 45 min burst, Storm 5		
OF RG - HRR	0.069	0.069	0.908	0.043	0.03	4	0.62	10% AEP, 45 min burst, Storm 8		
OF A3 - HRR	0	0	0.908	0	0	0	0			
OF A2 - HRR	0	0	0.908	0	0	0	0			
OF A1 - Proposed	0.087	0.087	0.908	0.048	0.03	4	0.66	10% AEP, 1 hour burst, Storm 9		
OF A23 - A22	0	0	0.908	0	0	0	0			
OF A22 - A21	0.001	0.001	0.321	0.017	0.01	0.19	0.33	10% AEP, 10 min burst, Storm 1		
OF A21 - A20	0	0	0.321	0	0	0	0			
OF A20 - A18	0	0	0.321	0	0	0	0			
OF A18 - E1	0	0	0.948	0	0	0	0			
OF24832	0	0	1.421	0	0	0	0			
OF A16 - A15	0	0	1.421	0	0	0	0			
OF A15 - NODE	0	0	0.532	0	0	0	0			
OF A14 - NODE	0	0	0.532	0	0	0	0			
OF A13 - NODE	0	0	0.532	0	0	0	0			
OF A12 - A11	0	0	0.321	0	0	0	0			
OF A11 - A10	0	0	1.284	0	0	0	0			
OF A10 - A9	0	0	1.284	0	0	0	0			
OF A9 - A8	0	0	1.215	0	0	0	0			
OF24816	0	0	1.432	0	0	0	0			
OF G1 - A18	0	0	0.321	0	0	0	0			
OF E1 - C1	0	0	1.421	0	0	0	0			
OF C1 - NODE	0	0	0.532	0	0	0	0			
North-Existing	0.3	0.3	0.908	0.083	0.09	4	1.1	10% AEP, 20 min burst, Storm 7		
HRR - Post-developmen	0.087	0.087	0.908	0.048	0.03	4	0.66	10% AEP, 1 hour burst, Storm 9		
Over Flow	0.008	0.008	0.908	0.023	0.01	4	0.25	10% AEP, 45 min burst, Storm 5		
Church St - HRR	0.087	0.087	0.908	0.048	0.03	4	0.66	10% AEP, 1 hour burst, Storm 9		
South-Existing	0.244	0.244	0.908	0.075	0.08	4	1.01	10% AEP, 10 min burst, Storm 3		
Ex - Pre-developed	0.542	0.542	0.908	0.113	0.16	4	1.38	10% AEP, 20 min burst, Storm 7		
DETENTION BASIN DETAILS										
Name	Max WL	MaxVol	Max Q	Max Q	Max Q					
			Total	Low Level	High Level					
DET BASIN	472.51	159.2	0.091	0.083	0.008					

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PROJECT MUDGEE HOSPITAL REDEVELOPMENT

TITLE 1% AEP - RESULTS

JOB No 5498
PREPARED ER DATE 30/05/2018
CHECKED WW DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 1

DRAINS results prepared from Version 2018.01

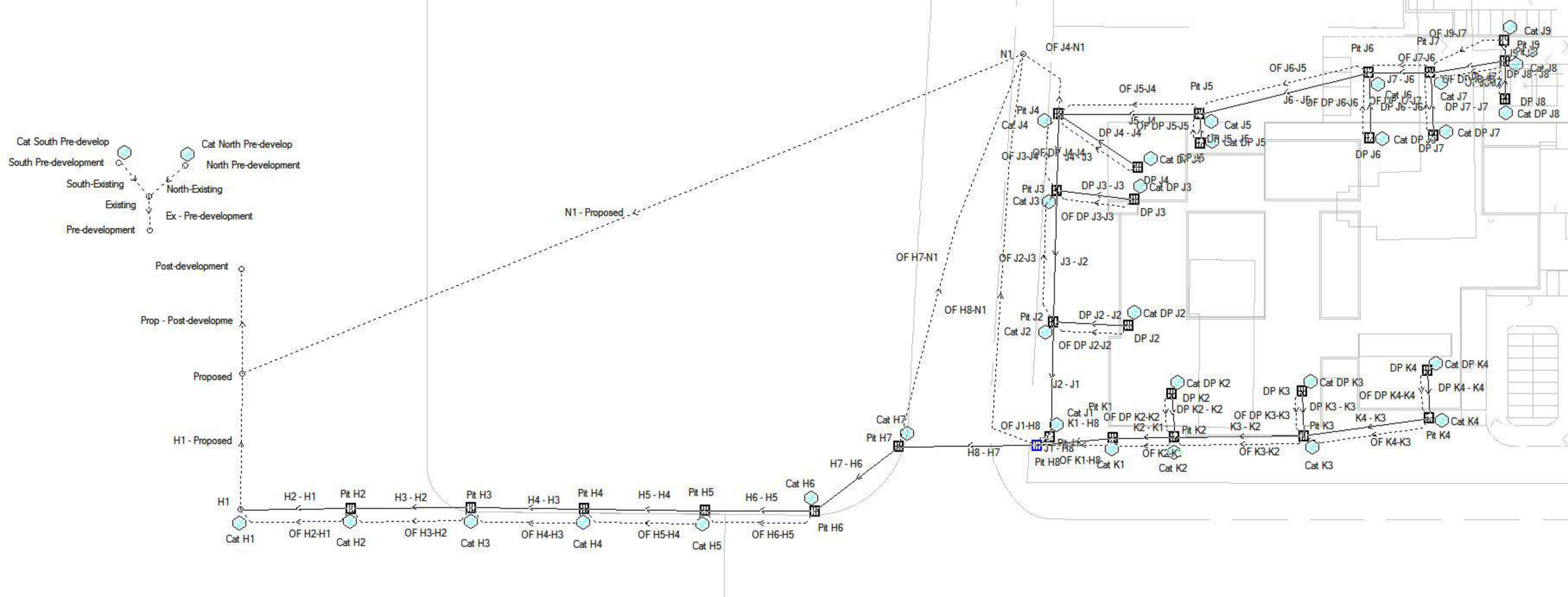
RESULTS 1% AEP

PIT / NODE DETAILS				Version 8							
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint				
B2	474.98		0.029		0.02	0.003	Inlet Capacity				
B1	474.86		0.084		0.14	0.012	Inlet Capacity				
A8	473.86		0.16		0.29	0.012	Inlet Capacity				
A7	473.31		0.05		0.06	0.004	Inlet Capacity				
A6	472.7		0.06		0	0.121	Outlet System				
A4	472.3		0.027		0	0.089	Outlet System				
A3	472.18	472.25	0.115	34.3	0	0.014	Outlet System				
ROCLA DD	471.81		0.038		0.23	0.001	Inlet Capacity				
A1	471.62		0								
A23	477.13		0.011		0.7	0	None				
A22	476.97		0.029		0.51	0.002	Inlet Capacity				
A21	476.83		0.017		0.57	0.001	Inlet Capacity				
A20	476.79		0.016		0.56	0	Inlet Capacity				
A19	476.7	477.21	0.014	0.2	0.49		Inlet Capacity				
A18	476.6		0.026		0.5	0	Inlet Capacity				
A17	476.41		0.005		0.69	0	None				
A16	476.05		0.006		0.75	0	None				
A15	475.92		0.005		0.13	0	None				
A14	475.82		0.003		0.23	0	None				
A13	475.65		0.004		0	0.014	Outlet System				
A12	475.43		0.014		0.05	0	Inlet Capacity				
A11	475.07		0.024		0.06	0	None				
A10	474.65		0.031		0.13	0.001	Inlet Capacity				
A9	474.28		0.03		0	0.039	Outlet System				
L1	477.05		0.008		0.82	0	None				
D2	476.73	477.63	0.02	0.2	0.87		Inlet Capacity				
D1	476.22	476.91	0.006	0.1	0.68		Inlet Capacity				
F1	476.45	477.21	0.014	0.2	0.73		Inlet Capacity				
G1	477.18		0.016		0.82	0.001	Inlet Capacity				
E1	476.3		0.029		0.6	0.002	Inlet Capacity				
C1	475.65		0.011		0	0.012	Outlet System				

SUB-CATCHMENT DETAILS												
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm					
CAT_B2	0.025	0.024	0.001	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_B1	0.061	0.061	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A8	0.06	0	0.06	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A7	0.029	0	0.029	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A6	0.04	0	0.04	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A5	0.058	0	0.058	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A4	0.02	0	0.02	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A3	0.023	0	0.023	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A2	0.028	0	0.028	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A23	0.01	0.01	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A22	0.023	0.014	0.01	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A21	0.013	0.013	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A20	0.012	0.012	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A19	0.011	0.004	0.007	5	5	5	1% AEP, 10 min burst, Storm 10					

CAT_A18	0.012	0.005	0.008	5	5	5	1% AEP, 10 min burst, Storm 10					
CAT_A17	0.004	0.004	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A16	0.005	0.005	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A15	0.005	0.005	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A14	0.002	0.002	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A13	0.003	0.003	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A12	0.012	0.012	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A11	0.019	0.019	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A10	0.026	0.026	0.001	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_A9	0.026	0.025	0.001	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_L1	0.007	0.007	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_D2	0.017	0.017	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_D1	0.006	0.005	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_F1	0.012	0.012	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_G1	0.014	0.014	0	5	5	5	1% AEP, 5 min burst, Storm 1					
CAT_E1	0.022	0.016	0.006	5	5	5	1% AEP, 10 min burst, Storm 7					
CAT_C1	0.007	0.007	0	5	5	5	1% AEP, 5 min burst, Storm 1					
Cat North Pre-develop	0.553	0.148	0.423	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat South Pre-develop	0.443	0.196	0.271	5	5	0	1% AEP, 10 min burst, Storm 10					
PIPE DETAILS												
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm							
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)								
B2 - B1	0.023	0.57	474.763	474.725	1% AEP, 5 min burst, Storm 1							
B1 - A8	0.072	1.8	474.173	473.84	1% AEP, 5 min burst, Storm 1							
A8 - A7	0.319	2	473.481	473.292	1% AEP, 10 min burst, Storm 8							
A7 - A6	0.344	2.17	472.99	472.7	1% AEP, 10 min burst, Storm 3							
A6 - A5	0.378	2.38	472.596	472.552	1% AEP, 10 min burst, Storm 3							
A5 - A4	0.092	1.3	472.421	472.3	1% AEP, 30 min burst, Storm 4							
RAIN GARDEN SUB-SOIL	0.03	1.7	472.256	472.183	1% AEP, 6 hour burst, Storm 10							
A3 - A2	0.099	1.4	471.888	471.829	1% AEP, 30 min burst, Storm 1							
A2 - A1	0.112	1.59	471.662	471.62	1% AEP, 30 min burst, Storm 2							
A23 - A22	0.01	1.05	477.069	476.916	1% AEP, 5 min burst, Storm 1							
A22 - A21	0.03	0.93	476.85	476.826	1% AEP, 5 min burst, Storm 1							
A21 - A20	0.042	0.6	476.807	476.799	1% AEP, 10 min burst, Storm 6							
A20 - A19	0.059	0.84	476.744	476.703	1% AEP, 10 min burst, Storm 10							
A19 - A18	0.068	0.96	476.632	476.598	1% AEP, 10 min burst, Storm 10							
A18 - A17	0.089	1.26	476.452	476.415	1% AEP, 10 min burst, Storm 7							
A17 - A16	0.103	1.55	476.208	476.057	1% AEP, 10 min burst, Storm 7							
A16 - A15	0.149	1.56	475.983	475.92	1% AEP, 10 min burst, Storm 10							
A15 - A14	0.153	1.39	475.85	475.824	1% AEP, 10 min burst, Storm 10							
A14 - A13	0.155	1.4	475.814	475.653	1% AEP, 10 min burst, Storm 10							
A13 - A12	0.144	1.31	475.457	475.433	1% AEP, 10 min burst, Storm 7							
A12 - A11	0.153	1.39	475.198	475.07	1% AEP, 10 min burst, Storm 1							
A11 - A10	0.169	1.53	474.789	474.652	1% AEP, 10 min burst, Storm 7							
A10 - A9	0.193	1.75	474.512	474.28	1% AEP, 10 min burst, Storm 7							
A9 - A8	0.198	1.79	474.065	473.88	1% AEP, 5 min burst, Storm 1							
L1 - A20	0.007	1.26	476.992	476.792	1% AEP, 5 min burst, Storm 1							
D2 - D1	0.017	2.24	476.631	476.164	1% AEP, 5 min burst, Storm 1							
D1 - A16	0.042	1.15	476.121	476.057	1% AEP, 5 min burst, Storm 1							
F1 - A17	0.012	1.1	476.368	476.35	1% AEP, 5 min burst, Storm 1							
G1 - A18	0.013	1.91	477.092	476.527	1% AEP, 5 min burst, Storm 1							
E1 - D1	0.021	0.52	476.238	476.233	1% AEP, 10 min burst, Storm 7							
C1 - A13	0.007	0.17	475.65	475.654	1% AEP, 5 min burst, Storm 1							
CHANNEL DETAILS												
Name	Max Q	Max V			Due to Storm							
	(cu.m/s)	(m/s)										
OVERFLOW ROUTE DETAILS												
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF24845	0.003	0.003	1.479	0.015	0	1.53	0.26	1% AEP, 10 min burst, Storm 7				
OF24849	0.012	0.012	1.479	0.025	0.01	4	0.3	1% AEP, 5 min burst, Storm 1				
OF A8 - A7	0.012	0.012	1.434	0.022	0.01	4	0.41	1% AEP, 10 min burst, Storm 10				
OF A7 - A6	0.004	0.004	1.44	0.014	0.01	1.43	0.36	1% AEP, 10 min burst, Storm 4				

OF A6 - HRR	0.121	0.121	1.479	0.055	0.04	4	0.76	1% AEP, 15 min burst, Storm 10		
OF OSD - HRR	0.175	0.175	1.479	0.065	0.06	4	0.88	1% AEP, 30 min burst, Storm 4		
OF RG - HRR	0.089	0.089	1.479	0.048	0.03	4	0.68	1% AEP, 20 min burst, Storm 9		
OF A3 - HRR	0.014	0.014	1.479	0.026	0.01	4	0.32	1% AEP, 1 hour burst, Storm 6		
OF A2 - HRR	0.001	0.001	1.479	0.009	0	0.94	0.17	1% AEP, 10 min burst, Storm 10		
OF A1 - Proposed	0.112	0.112	1.479	0.053	0.04	4	0.74	1% AEP, 30 min burst, Storm 2		
OF A23 - A22	0	0	1.479	0	0	0	0			
OF A22 - A21	0.002	0.002	1.176	0.026	0.01	0.29	0.47	1% AEP, 10 min burst, Storm 10		
OF A21 - A20	0.001	0.001	1.176	0.017	0.01	0.19	0.35	1% AEP, 10 min burst, Storm 7		
OF A20 - A18	0	0	1.176	0	0	0	0			
OF A18 - E1	0	0	1.48	0	0	0	0			
OF24832	0	0	1.421	0	0	0	0			
OF A16 - A15	0	0	1.421	0	0	0	0			
OF A15 - NODE	0	0	0.88	0	0	0	0			
OF A14 - NODE	0	0	0.88	0	0	0	0			
OF A13 - NODE	0.014	0.014	0.88	0.046	0.05	0.65	1.13	1% AEP, 10 min burst, Storm 10		
OF A12 - A11	0	0	1.176	0	0	0	0			
OF A11 - A10	0	0	1.442	0	0	0	0			
OF A10 - A9	0.001	0.001	1.442	0.007	0	0.74	0.19	1% AEP, 5 min burst, Storm 1		
OF A9 - A8	0.039	0.039	1.454	0.032	0.02	4	0.57	1% AEP, 10 min burst, Storm 4		
OF24816	0	0	1.432	0	0	0	0			
OF G1 - A18	0.001	0.001	1.176	0.019	0.01	0.22	0.36	1% AEP, 5 min burst, Storm 1		
OF E1 - C1	0.002	0.002	1.421	0.009	0	0.94	0.36	1% AEP, 10 min burst, Storm 7		
OF C1 - NODE	0.012	0.012	0.88	0.043	0.05	0.56	1.09	1% AEP, 10 min burst, Storm 10		
North-Existing	0.553	0.553	1.479	0.115	0.16	4	1.38	1% AEP, 10 min burst, Storm 10		
HRR - Post-developmen	0.341	0.341	1.479	0.089	0.1	4	1.15	1% AEP, 20 min burst, Storm 8		
Over Flow	0.251	0.251	1.479	0.076	0.08	4	1.02	1% AEP, 20 min burst, Storm 8		
Church St - HRR	0.112	0.112	1.479	0.053	0.04	4	0.74	1% AEP, 30 min burst, Storm 2		
South-Existing	0.443	0.443	1.479	0.102	0.13	4	1.27	1% AEP, 10 min burst, Storm 10		
Ex - Pre-developed	0.997	0.997	1.479	0.158	0.28	4	1.74	1% AEP, 10 min burst, Storm 10		
DETENTION BASIN DETAILS										
Name	Max WL	MaxVol	Max Q	Max Q	Max Q					
			Total	Low Level	High Level					
DET BASIN	472.55	175.3	0.267	0.092	0.175					
Run Log for Mudgee Hospital run at 11:58:40 on 30/5/2018										
Upwelling occurred at: A4, C1, A13, A6, A9										
Freeboard was less than 0.15m at A10, A3, A7, A11, A12, B1, B2, A15										
Flows were safe in all overflow routes.										


Cat South Pre-develop
Cat North Pre-develop
South Pre-development
North Pre-development
South-Existing
North-Existing
Existing
Ex - Pre-development
Pre-development
Post-development
Prop - Post-developme
Proposed
H1 - Proposed
N1 - Proposed
N1
OF J4-N1
OF H7-N1
OF H8-N1
H1
H2 - H1
H3 - H2
H4 - H3
H5 - H4
H6 - H5
H7 - H6
H8 - H7
Pit H2
Pit H3
Pit H4
Pit H5
Pit H6
Pit H7
Pit H8
Cat H1
Cat H2
Cat H3
Cat H4
Cat H5
Cat H6
Cat H7
OF H2-H1
OF H3-H2
OF H4-H3
OF H5-H4
OF H6-H5
OF J1-H8
OF K1-H8
J1 - H8
K1 - H8
Cat J1
Pit K1
Cat K1
OF J2-J3
J3 - J2
J2 - J1
Pit J2
Cat J2
DP J2 - J2
Cat DP J2
DP J2
OF DP J2-J2
Pit J3
Cat J3
DP J3 - J3
Cat DP J3
DP J3
OF DP J3-J3
OF J3-J4
J4 - J3
Pit J4
Cat J4
DP J4 - J4
Cat DP J4
DP J4
OF DP J4-J4
OF J5-J4
J5 - J4
Pit J5
Cat J5
DP J5 - J5
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OF J6-J5
J6 - J5
Pit J6
Cat J6
DP J6 - J6
Cat DP J6
DP J6
OF DP J6-J6
OF J7-J6
J7 - J6
Pit J7
Cat J7
DP J7 - J7
Cat DP J7
DP J7
OF DP J7-J7
OF J9-J7
Pit J9
Cat J9
DP J8 - J8
Cat DP J8
DP J8
OF DP J8-J8
OF J8-J7
J8 - J7
OF K2-K1
K2 - K1
Pit K2
Cat K2
DP K2 - K2
Cat DP K2
DP K2
OF DP K2-K2
OF K3-K2
K3 - K2
Pit K3
Cat K3
DP K3 - K3
Cat DP K3
DP K3
OF DP K3-K3
OF K4-K3
K4 - K3
Pit K4
Cat K4
DP K4 - K4
Cat DP K4
DP K4
OF DP K4-K4

Calculation Sheet

Job	MUDGEE HOSPITAL REDEVELOPMENT	Design	MD	Office	Sydney
	Mudgee NSW	Date	May-18	Job No	5498
		Checked	WW		
		Date	May-18		

MUDGEE HOSPITAL REDEVELOPMENT

STROMWATER NETWORK 2

enstruct

DRAINS OUTPUT

May 2018

enstruct

PROJECT	MUDGEE HOSPITAL REDEVELOPMENT	JOB No	5498		**DATA**
TITLE	DRAINS DATA - SOUTH DEVELOPED SCENARIO	PREPARED	MD	DATE	30/05/2018
		CHECKED	WW	DATE	30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 2

PIT / NODE DETAILS — Version 13

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is
DP K3	OnGrade	Downpipe	Downpipe		5.3	475		0	0.3	-166975.4	-172934.3	No	6277779	1 x Ku	No	New
Pit K3	OnGrade	GD	900sqm		2.1	474.19		0	0.5	-166609.7	-182533.6	No	16810	1 x Ku	No	New
Pit K2	OnGrade	GD	900sqm		1.3	474.18		0	0.5	-194466.5	-182795.3	No	274879	1 x Ku	No	New
Pit K1	OnGrade	GD	900sqm		1.3	474.18		0	0.5	-207730.3	-182964.6	No	32894583	1 x Ku	No	New
Pit H8	Sag	GD	900sqm	18	1.9	474.1	0.2	0	0.5	-224006.4	-184523.8	No	32179819	1 x Ku	No	New
Pit H7	OnGrade	GD	900sqm		0.8	473.9		0	0.5	-253818.9	-184824.7	No	32179828	1 x Ku	No	New
Pit H6	OnGrade	GD	900sqm		0.8	474.3		0	0.5	-271859.9	-198707.2	No	32179830	1 x Ku	No	New
Pit H5	OnGrade	GD	900sqm		0.4	474.1		0	0.5	-295409.8	-198547.4	No	32179832	1 x Ku	No	New
Pit H4	OnGrade	GD	900sqm		0.4	473.85		0	0.5	-321434	-198237.6	No	32179836	1 x Ku	No	New
Pit H3	OnGrade	GD	900sqm		0.4	473.45		0	0.5	-345754.3	-197927.8	No	32179834	1 x Ku	No	New
Pit H2	OnGrade	GD	900sqm		0.4	472.9		0	0.5	-371597.7	-198112.5	No	32179838	1 x Ku	No	New
H1	Node					472.05		0		-395383.1	-198396		32179854		No	
DP K2	OnGrade	Downpipe	Downpipe		3.5	475		0	0.3	-195064.1	-173502.1	No	7156921	1 x Ku	No	New
DP J3	OnGrade	Downpipe	Downpipe		2.8	475		0	0.3	-202957.8	-131660.3	No	7896902	1 x Ku	No	New
Pit J3	OnGrade	GD	900sqm		0.7	473.45		0	0.5	-219846.4	-129676.1	No	274882	1 x Ku	No	New
Pit J2	OnGrade	GD	900sqm		0.6	473.8		0	0.5	-220590	-157931	No	16824	1 x Ku	No	New
Pit J1	OnGrade	GD	900sqm		1.3	474.17		0	0.5	-221168.9	-182761.5	No	32894570	1 x Ku	No	New
DP J5	OnGrade	Downpipe	Downpipe		2.5	475		0	0.3	-188867.8	-119520.9	No	10041773	1 x Ku	No	New
Pit J5	OnGrade	GD	900sqm		1	473.66		0	0.5	-189013.1	-113233.3	No	4774325	1 x Ku	No	New
Pit J4	OnGrade	GD	900sqm		2.4	473.4		0	0.5	-219423.9	-113295.6	No	32179509	1 x Ku	No	New
DP J6	OnGrade	Downpipe	Downpipe		2.7	475		0	0.3	-152408.1	-118475	No	10041881	1 x Ku	No	New
Pit J6	OnGrade	GD	900sqm		1.7	474.06		0	0.5	-152586	-104364.3	No	4774318	1 x Ku	No	New
DP J7	OnGrade	Downpipe	Downpipe		2.6	475		0	0.3	-138737.2	-117877.4	No	10041893	1 x Ku	No	New
Pit J7	OnGrade	GD	900sqm		1.9	474.14		0	0.5	-139444.8	-104364.3	No	4774315	1 x Ku	No	New
Pit J9	OnGrade	Hornsby Council Inlets (KI+grate), 3	Hornsby 1.2 m lintel		3.1	474.4		0	0.5	-123437.8	-97393.55	No	31338654	1 x Ku	No	New
Pit J8	OnGrade	Hornsby Council Inlets (KI+grate), 3	Hornsby 1.2 m lintel		2.8	474.4		0	0.5	-123330.2	-101804.1	No	31338656	1 x Ku	No	New
DP K4	OnGrade	Downpipe	Downpipe		5.9	475		0	0.3	-140081.9	-168523.8	No	31339172	1 x Ku	No	New
Pit K4	OnGrade	GD	1200sqm		7.9	474.2		0	0.5	-139573.9	-178719.4	No	31339177	1 x Ku	No	New
DP J2	OnGrade	Downpipe	Downpipe		5.9	475		0	0.3	-204248.7	-158768.9	No	31339229	1 x Ku	No	New
N1	Node					472.75		0		-227049.9	-100346.9		31339279		No	
DP J4	OnGrade	Downpipe	Downpipe		2.3	475		0	0.3	-202204.8	-124775.6	No	31839853	1 x Ku	No	New
DP J8	OnGrade	Downpipe	Downpipe		3.1	475		0	0.3	-123294.2	-110079.1	No	32180139	1 x Ku	No	New
Post-development	Node							0		-395169.5	-146653.8		34458142		No	
Proposed	Node							0		-395064.1	-169158.6		34458152		No	
South Pre-development	Node							0		-421658.5	-123882.6		34585645		No	
North Pre-development	Node							0		-407407.1	-124347.3		36114288		No	
Existing	Node							0		-415152.4	-131008.2		36114389		No	
Pre-development	Node							0		-415023.3	-138237.2		36114395		No	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Cat DP K3	DP K3	0.0656	100	0	0	5	5	0										0				1
Cat K3	Pit K3	0.0486	0	100	0	5	5	0										0				1
Cat K2	Pit K2	0.0291	0	100	0	5	5	0										0				1
Cat K1	Pit K1	0.0107	0	100	0	5	5	0										0				1
Cat H7	Pit H7	0.0226	100	0	0	5	5	0										0				1
Cat H6	Pit H6	0.0251	100	0	0	5	5	0										0				1
Cat H5	Pit H5	0.0288	100	0	0	5	5	0										0				1
Cat H4	Pit H4	0.0288	100	0	0	5	5	0										0				1
Cat H3	Pit H3	0.0288	100	0	0	5	5	0										0				1
Cat H2	Pit H2	0.0288	100	0	0	5	5	0										0				1
Cat H1	H1	0.0288	100	0	0	5	5	0										0				1
Cat DP K2	DP K2	0.117	100	0	0	5	5	0										0				1
Cat DP J3	DP J3	0.0489	100	0	0	5	5	0										0				1
Cat J3	Pit J3	0.0247	0	100	0	5	5	0										0				1
Cat J2	Pit J2	0.0268	0	100	0	5	5	0										0				1
Cat J1	Pit J1	0.0235	0	100	0	5	5	0										0				1
Cat DP J5	DP J5	0.0855	100	0	0	5	5	0										0				1
Cat J5	Pit J5	0.0557	5	95	0	5	5	0										0				1
Cat J4	Pit J4	0.066	5	95	0	5	5	0										0				1
Cat DP J6	DP J6	0.057	100	0	0	5	5	0										0				1
Cat J6	Pit J6	0.0249	100	0	0	5	5	0										0				1
Cat DP J7	DP J7	0.0666	100	0	0	5	5	0										0				1
Cat J7	Pit J7	0.0325	100	0	0	5	5	0										0				1
Cat J9	Pit J9	0.0081	100	0	0	5	5	0										0				1
Cat J8	Pit J8	0.017	100	0	0	5	5	0										0				1
Cat DP K4	DP K4	0.0243	100	0	0	5	5	0										0				1
Cat K4	Pit K4	0.0269	0	100	0	5	5	0										0				1
Cat DP J2	DP J2	0.0283	100	0	0	5	5	0										0				1
Cat DP J4	DP J4	0.0326	100	0	0	5	5	0										0				1
Cat DP J8	DP J8	0.0064	100	0	0	5	5	0										0				1
Cat South Pre-develop	South Pre-development	1.12	34.1	65.9	0	5	5	0										0				1
Cat North Pre-develop	North Pre-development	1.44	20.1	79.9	0	5	5	0										0				1

PIPE DETAILS

Name	From	To	Length	U/S IL	D/S IL	Slope	Type	Dia	I.D.	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg	Rl	Chg	RL	etc			
			(m)	(m)	(m)	(%)		(mm)	(mm)						(m)	(m)	(m)	(m)	(m)			
DP K3 - K3	DP K3	Pit K3	10	473.34	473.24	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP K3	0								
K3 - K2	Pit K3	Pit K2	25.3	473.19	472.94	0.99	Concrete, not under roads, 1% minimum slope	300	300	0.3	New	1	Pit K3	0								
K2 - K1	Pit K2	Pit K1	10.3	472.86	472.76	0.97	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit K2	0								
K1 - H8	Pit K1	Pit H8	19.9	472.76	472.561	1	uPVC, not under roads, 1% minimum slope	150	154	0.03	New	1	Pit K1	0								
H8 - H7	Pit H8	Pit H7	28.3	472.12	471.97	0.53	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	Pit H8	0								
H7 - H6	Pit H7	Pit H6	17.9	471.95	471.86	0.5	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit H7	0								
H6 - H5	Pit H6	Pit H5	30.2	471.84	471.69	0.5	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	Pit H6	0								
H5 - H4	Pit H5	Pit H4	25.8	471.67	471.54	0.5	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	Pit H5	0								
H4 - H3	Pit H4	Pit H3	24	471.52	471.4	0.5	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit H4	0								
H3 - H2	Pit H3	Pit H2	29.4	471.38	471.24	0.48	Concrete, under roads, 1% minimum slope	375	375	0.3	New	1	Pit H3	0								
H2 - H1	Pit H2	H1	9	471.22	471.17	0.56	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit H2	0								
DP K2 - K2	DP K2	Pit K2	10	473.1	473	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP K2	0								
DP J3 - J3	DP J3	Pit J3	10	472.6	472.5	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J3	0								
J3 - J2	Pit J3	Pit J2	24.8	472.41	472.29	0.48	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit J3	0								
J2 - J1	Pit J2	Pit J1	24.8	472.27	472.14	0.52	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit J2	0								
J1 - H8	Pit J1	Pit H8	5	472.14	472.12	0.4	uPVC, not under roads, 1% minimum slope	150	154	0.03	New	1	Pit J1	0								
DP J5 - J5	DP J5	Pit J5	10	472.96	472.86	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J5	0								
J5 - J4	Pit J5	Pit J4	20.6	472.71	472.55	0.78	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit J5	0								
J4 - J3	Pit J4	Pit J3	19.3	472.53	472.43	0.52	Concrete, not under roads, 1% minimum slope	375	375	0.3	New	1	Pit J4	0								
DP J6 - J6	DP J6	Pit J6	10	473.25	473.15	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J6	0								
J6 - J5	Pit J6	Pit J5	27.1	473.06	472.79	1	Concrete, not under roads, 1% minimum slope	300	300	0.3	New	1	Pit J6	0								
DP J7 - J7	DP J7	Pit J7	10	473.42	473.32	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J7	0								
J7 - J6	Pit J7	Pit J6	13	473.21	473.08	1	Concrete, under roads, 1% minimum slope	300	300	0.3	New	1	Pit J7	0								
J9 - J8	Pit J9	Pit J8	5.3	473.545	473.492	1	Concrete, under roads, 1% minimum slope	225	225	0.3	New	1	Pit J9	0								
J8 - J7	Pit J8	Pit J7	18.7	473.472	473.285	1	Concrete, under roads, QUDM minimum slope	225	225	0.3	New	1	Pit J8	0								
DP K4 - K4	DP K4	Pit K4	10	473.6	473.5	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP K4	0								
K4 - K3	Pit K4	Pit K3	23.1	473.5	473.26	1.04	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	Pit K4	0								
DP J2 - J2	DP J2	Pit J2	10	472.67	472.57	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J2	0								
DP J4 - J4	DP J4	Pit J4	10	472.7	472.6	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J4	0								
DP J8 - J8	DP J8	Pit J8	10	473.6	473.5	1	Concrete, not under roads, 1% minimum slope	225	225	0.3	New	1	DP J8	0								

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg	Bottom	Height of Service	Chg	Bottom	Height of S	Chg	Bottom	Height of S	etc
	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	(m)	Elev (m)	(m)	etc

CHANNEL DETAILS

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

OVERFLOW ROUTE DETAILS

Name	From	To	Travel	Spill	Crest	Weir	Cross	Safe Depth	SafeDepth	Safe	Bed	D/S Area		id
			Time	Level	Length	Coeff. C	Section	Major Storr	Minor Storr	DxV	Slope	Contributing		
			(min)	(m)	(m)			(m)	(m)	(sq.m/sec)	(%)	%		
OF DP K3-K3	DP K3	Pit K3	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179730
OF K3-K2	Pit K3	Pit K2	0.2				4 m wide pathway	0.3	0.15	0.4	1	0		32179749
OF K2-K1	Pit K2	Pit K1	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179758
OF K1-H8	Pit K1	Pit H8	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179773
OF H8-N1	Pit H8	N1	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179985
OF H7-N1	Pit H7	N1	1.1				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	1	0		32180010
OF H6-H5	Pit H6	Pit H5	0.3				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	0.5	0		32180019
OF H5-H4	Pit H5	Pit H4	0.3				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	0.5	0		32180029
OF H4-H3	Pit H4	Pit H3	0.3				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	0.5	0		32180034
OF H3-H2	Pit H3	Pit H2	0.3				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	0.5	0		32180038
OF H2-H1	Pit H2	H1	0.3				7.5 m roadway with 3% crossfall and barrier kerb	0.3	0.15	0.4	0.5	0		32180044
H1 - Proposed	H1	Proposed	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		34458144
OF DP K2-K2	DP K2	Pit K2	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179721
OF DP J3-J3	DP J3	Pit J3	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179695
OF J3-J4	Pit J3	Pit J4	0.2				4 m wide pathway	0.3	0.15	0.4	1	0		32179790
OF J2-J3	Pit J2	Pit J3	0.2				4 m wide pathway	0.3	0.15	0.4	1.5	0		32179784
OF J1-H8	Pit J1	Pit H8	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32894568
OF DP J5-J5	DP J5	Pit J5	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179678
OF J5-J4	Pit J5	Pit J4	0.1				4 m wide pathway	0.3	0.15	0.4	1.5	0		32179502
OF J4-N1	Pit J4	N1	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		4774338
OF DP J6-J6	DP J6	Pit J6	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179666
OF J6-J5	Pit J6	Pit J5	0.2				4 m wide pathway	0.3	0.15	0.4	1.5	0		32179485
OF DP J7-J7	DP J7	Pit J7	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179649
OF J7-J6	Pit J7	Pit J6	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179464
OF J9-J7	Pit J9	Pit J7	0.1				4 m wide pathway	0.3	0.15	0.4	3.7	0		31698593
OF J8-J7	Pit J8	Pit J7	0.1				4 m wide pathway	0.3	0.15	0.4	1.6	0		11373060
OF DP K4-K4	DP K4	Pit K4	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179736
OF K4-K3	Pit K4	Pit K3	0.2				4 m wide pathway	0.3	0.15	0.4	1	0		32179743
OF DP J2-J2	DP J2	Pit J2	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179707
N1 - Proposed	N1	Proposed	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		34458146
OF DP J4-J4	DP J4	Pit J4	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32179686
OF DP J8-J8	DP J8	Pit J8	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		32180155
Prop - Post-developme	Proposed	Post-development	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		34458157
South-Existing	South Pre-development	Existing	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		36114399
North-Existing	North Pre-development	Existing	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		36114394
Ex - Pre-development	Existing	Pre-development	0.1				4 m wide pathway	0.3	0.15	0.4	1	0		36114403

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover (m)	Cover (m)
DP K3 - K3	Concrete, not under roads, 1% minimum slope	225	0.45	0.69
K3 - K2	Concrete, not under roads, 1% minimum slope	300	0.45	0.67
K2 - K1	Concrete, not under roads, 1% minimum slope	375	0.45	0.91
K1 - H8	uPVC, not under roads, 1% minimum slope	154	0.3	1.26
H8 - H7	Concrete, under roads, 1% minimum slope	375	0.6	1.52
H7 - H6	Concrete, not under roads, 1% minimum slope	375	0.45	1.54

H6 - H5	Concrete, under roads, 1% minimum slope	375	0.6	2																			
H5 - H4	Concrete, under roads, 1% minimum slope	375	0.6	1.9																			
H4 - H3	Concrete, not under roads, 1% minimum slope	375	0.45	1.64																			
H3 - H2	Concrete, under roads, 1% minimum slope	375	0.6	1.25																			
H2 - H1	Concrete, not under roads, 1% minimum slope	375	0.45	0.47																			
DP K2 - K2	Concrete, not under roads, 1% minimum slope	225	0.45	0.92																			
DP J3 - J3	Concrete, not under roads, 1% minimum slope	225	0.45	0.69																			
J3 - J2	Concrete, not under roads, 1% minimum slope	375	0.45	0.63																			
J2 - J1	Concrete, not under roads, 1% minimum slope	375	0.45	1.12																			
J1 - H8	uPVC, not under roads, 1% minimum slope	154	0.3	1.82																			
DP J5 - J5	Concrete, not under roads, 1% minimum slope	225	0.45	0.54																			
J5 - J4	Concrete, not under roads, 1% minimum slope	375	0.45	0.44	Unsafe																		
J4 - J3	Concrete, not under roads, 1% minimum slope	375	0.45	0.46																			
DP J6 - J6	Concrete, not under roads, 1% minimum slope	225	0.45	0.65																			
J6 - J5	Concrete, not under roads, 1% minimum slope	300	0.45	0.54																			
DP J7 - J7	Concrete, not under roads, 1% minimum slope	225	0.45	0.56																			
J7 - J6	Concrete, under roads, 1% minimum slope	300	0.6	0.6																			
J9 - J8	Concrete, under roads, 1% minimum slope	225	0.6	0.6																			
J8 - J7	Concrete, under roads, QUDM minimum slope	225	0.6	0.6																			
DP K4 - K4	Concrete, not under roads, 1% minimum slope	225	0.45	0.44	Unsafe																		
K4 - K3	Concrete, not under roads, 1% minimum slope	225	0.45	0.44	Unsafe																		
DP J2 - J2	Concrete, not under roads, 1% minimum slope	225	0.45	0.97																			
DP J4 - J4	Concrete, not under roads, 1% minimum slope	225	0.45	0.54																			
DP J8 - J8	Concrete, not under roads, 1% minimum slope	225	0.45	0.64																			
This model has no pipes with non-return valves																							

enstruct

PROJECT	MUDGEE HOSPITAL REDEVELOPMENT		
TITLE	20% AEP - RESULTS	JOB No	5498
		PREPARED ER	DATE 30/05/2018
		CHECKED WW	DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 2

DRAINS results prepared from Version 2018.01

RESULTS 20% AEP

PIT / NODE DETAILS				Version 8									
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint						
DP K3	474.24		0.02		0.76	0	None						
Pit K3	474.19		0.02		0	0.006	Outlet System						
Pit K2	474.17		0.028		0.01	0.002	Inlet Capacity						
Pit K1	474.15		0.019		0.03	0	None						
Pit H8	472.44	474.1	0.005	0.4	1.66	0	Inlet Capacity						
Pit H7	472.25		0.007		1.65	0	None						
Pit H6	472.14		0.007		2.16	0	None						
Pit H5	471.97		0.009		2.13	0	None						
Pit H4	471.83		0.009		2.02	0	None						
Pit H3	471.7		0.009		1.75	0	None						
Pit H2	471.54		0.009		1.36	0	None						
H1	471.1		0.009										
DP K2	474.28		0.035		0.72	0	None						
DP J3	473.42		0.015		1.58	0	None						
Pit J3	473.39		0.006		0.06	0	None						
Pit J2	473.38		0.007		0.42	0	None						
Pit J1	473.35		0.006		0.82	0	None						
DP J5	473.52		0.026		1.48	0	None						
Pit J5	473.46		0.014		0.2	0	None						
Pit J4	473.4		0.017		0	0.066	Outlet System						
DP J6	473.64		0.017		1.36	0	None						
Pit J6	473.59		0.008		0.47	0	None						
DP J7	473.62		0.02		1.38	0	None						
Pit J7	473.59		0.01		0.55	0	Inlet Capacity						
Pit J9	473.63		0.002		0.77	0	None						
Pit J8	473.61		0.005		0.79	0	None						
DP K4	474.21		0.007		0.79	0	None						
Pit K4	474.2		0.007		0	0.004	Outlet System						
DP J2	473.39		0.008		1.61	0	None						
DP J4	473.41		0.01		1.59	0	None						
DP J8	473.64		0.002		1.36	0	None						

SUB-CATCHMENT DETAILS													
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm						
Cat DP K3	0.018	0.018	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat K3	0.007	0	0.007	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat K2	0.004	0	0.004	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat K1	0.002	0	0.002	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat H7	0.006	0.006	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H6	0.007	0.007	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H5	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H4	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H3	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H2	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat H1	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP K2	0.031	0.031	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP J3	0.013	0.013	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J3	0.004	0	0.004	5	5	0	20% AEP, 10 min burst, Storm 8						

Cat J2	0.004	0	0.004	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat J1	0.003	0	0.003	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat DP J5	0.023	0.023	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J5	0.008	0.001	0.008	5	5	0	20% AEP, 10 min burst, Storm 7						
Cat J4	0.01	0.001	0.009	5	5	0	20% AEP, 10 min burst, Storm 7						
Cat DP J6	0.015	0.015	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J6	0.007	0.007	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP J7	0.018	0.018	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J7	0.009	0.009	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J9	0.002	0.002	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat J8	0.005	0.005	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP K4	0.007	0.007	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat K4	0.004	0	0.004	5	5	0	20% AEP, 10 min burst, Storm 8						
Cat DP J2	0.008	0.008	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP J4	0.009	0.009	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat DP J8	0.002	0.002	0	5	5	0	20% AEP, 5 min burst, Storm 1						
Cat South Pre-develop	0.19	0.093	0.105	5	5	0	20% AEP, 10 min burst, Storm 7						
Cat North Pre-develop	0.228	0.071	0.164	5	5	0	20% AEP, 10 min burst, Storm 7						
PIPE DETAILS													
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm								
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)									
DP K3 - K3	0.017	0.44	474.199	474.19	20% AEP, 5 min burst, Storm 1								
K3 - K2	0.025	0.35	474.182	474.176	20% AEP, 20 min burst, Storm 5								
K2 - K1	0.052	0.47	474.16	474.154	20% AEP, 10 min burst, Storm 6								
K1 - H8	0.053	2.83	473.603	472.715	20% AEP, 10 min burst, Storm 3								
H8 - H7	0.11	2.27	472.29	472.251	20% AEP, 10 min burst, Storm 7								
H7 - H6	0.115	1.53	472.192	472.137	20% AEP, 10 min burst, Storm 7								
H6 - H5	0.12	1.71	472.068	471.964	20% AEP, 10 min burst, Storm 7								
H5 - H4	0.126	1.58	471.925	471.828	20% AEP, 10 min burst, Storm 3								
H4 - H3	0.132	1.57	471.788	471.696	20% AEP, 10 min burst, Storm 3								
H3 - H2	0.137	1.58	471.655	471.539	20% AEP, 10 min burst, Storm 3								
H2 - H1	0.143	1.65	471.495	471.447	20% AEP, 10 min burst, Storm 3								
DP K2 - K2	0.031	0.77	474.205	474.177	20% AEP, 15 min burst, Storm 5								
DP J3 - J3	0.013	0.32	473.406	473.393	20% AEP, 15 min burst, Storm 3								
J3 - J2	0.063	0.57	473.386	473.376	20% AEP, 5 min burst, Storm 1								
J2 - J1	0.057	0.52	473.363	473.347	20% AEP, 5 min burst, Storm 1								
J1 - H8	0.058	3.14	472.698	472.441	20% AEP, 30 min burst, Storm 6								
DP J5 - J5	0.023	0.58	473.489	473.481	20% AEP, 5 min burst, Storm 1								
J5 - J4	0.082	0.74	473.472	473.4	20% AEP, 15 min burst, Storm 3								
J4 - J3	0.075	0.68	473.392	473.389	20% AEP, 5 min burst, Storm 1								
DP J6 - J6	0.015	0.38	473.653	473.642	20% AEP, 5 min burst, Storm 1								
J6 - J5	0.055	0.77	473.551	473.468	20% AEP, 15 min burst, Storm 9								
DP J7 - J7	0.018	0.49	473.613	473.608	20% AEP, 5 min burst, Storm 1								
J7 - J6	0.034	0.48	473.592	473.597	20% AEP, 10 min burst, Storm 5								
J9 - J8	0.002	0.22	473.615	473.613	20% AEP, 10 min burst, Storm 4								
J8 - J7	0.01	0.39	473.604	473.597	20% AEP, 10 min burst, Storm 6								
DP K4 - K4	0.007	0.16	474.203	474.202	20% AEP, 5 min burst, Storm 1								
K4 - K3	0.01	0.25	474.193	474.19	20% AEP, 15 min burst, Storm 2								
DP J2 - J2	0.008	0.21	473.377	473.376	20% AEP, 10 min burst, Storm 3								
DP J4 - J4	0.009	0.22	473.408	473.4	20% AEP, 10 min burst, Storm 3								
DP J8 - J8	0.002	0.63	473.627	473.621	20% AEP, 5 min burst, Storm 1								
CHANNEL DETAILS													
Name	Max Q	Max V			Due to Storm								
	(cu.m/s)	(m/s)											
OVERFLOW ROUTE DETAILS													
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm					
OF DP K3-K3	0	0	0.908	0	0	0	0						
OF K3-K2	0.006	0.006	0.908	0.022	0	4	0.22	20% AEP, 10 min burst, Storm 1					
OF K2-K1	0.002	0.002	0.908	0.012	0	1.23	0.25	20% AEP, 10 min burst, Storm 4					
OF K1-H8	0	0	0.908	0	0	0	0						
OF H8-N1	0	0	0.908	0	0	0	0						
OF H7-N1	0	0	0.307	0	0	0	0						

OF H6-H5	0	0	0.217	0	0	0	0					
OF H5-H4	0	0	0.217	0	0	0	0					
OF H4-H3	0	0	0.217	0	0	0	0					
OF H3-H2	0	0	0.217	0	0	0	0					
OF H2-H1	0	0	0.217	0	0	0	0					
H1 - Proposed	0.148	0.148	0.908	0.06	0.05	4	0.83	20% AEP, 10 min burst, Storm 4				
OF DP K2-K2	0	0	0.908	0	0	0	0					
OF DP J3-J3	0	0	0.908	0	0	0	0					
OF J3-J4	0	0	0.908	0	0	0	0					
OF J2-J3	0	0	1.112	0	0	0	0					
OF J1-H8	0	0	0.908	0	0	0	0					
OF DP J5-J5	0	0	0.908	0	0	0	0					
OF J5-J4	0	0	1.112	0	0	0	0					
OF J4-N1	0.066	0.066	0.908	0.042	0.03	4	0.61	20% AEP, 10 min burst, Storm 3				
OF DP J6-J6	0	0	0.908	0	0	0	0					
OF J6-J5	0	0	1.112	0	0	0	0					
OF DP J7-J7	0	0	0.908	0	0	0	0					
OF J7-J6	0	0	0.908	0	0	0	0					
OF J9-J7	0	0	1.426	0	0	0	0					
OF J8-J7	0	0	1.149	0	0	0	0					
OF DP K4-K4	0	0	0.908	0	0	0	0					
OF K4-K3	0.004	0.004	0.908	0.016	0	1.63	0.27	20% AEP, 10 min burst, Storm 4				
OF DP J2-J2	0	0	0.908	0	0	0	0					
N1 - Proposed	0.066	0.066	0.908	0.042	0.03	4	0.61	20% AEP, 10 min burst, Storm 3				
OF DP J4-J4	0	0	0.908	0	0	0	0					
OF DP J8-J8	0	0	0.908	0	0	0	0					
Prop - Post-developme	0.213	0.213	0.908	0.071	0.07	4	0.96	20% AEP, 10 min burst, Storm 3				
South-Existing	0.19	0.19	0.908	0.067	0.06	4	0.92	20% AEP, 10 min burst, Storm 7				
North-Existing	0.228	0.228	0.908	0.073	0.07	4	0.98	20% AEP, 10 min burst, Storm 7				
Ex - Pre-development	0.419	0.419	0.908	0.099	0.12	4	1.24	20% AEP, 10 min burst, Storm 7				
DETENTION BASIN DETAILS												
Name	Max WL	MaxVol	Max Q	Max Q	Max Q							
			Total	Low Level	High Level							
Run Log for Mudgee Hospital run at 11:51:02 on 30/5/2018												
Upwelling occurred at: Pit J4, Pit K4												
Freeboard was less than 0.15m at Pit K1, Pit J3, Pit K2, Pit K3												
Flows were safe in all overflow routes.												

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PROJECT	MUDGEE HOSPITAL REDEVELOPMENT		
TITLE	10% AEP - RESULTS	JOB No	5498
		PREPARED ER	DATE 30/05/2018
		CHECKED WW	DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 2

DRAINS results prepared from Version 2018.01

RESULTS 10% AEP

PIT / NODE DETAILS				Version 8								
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint					
DP K3	474.28		0.023		0.72	0	None					
Pit K3	474.19		0.023		0	0.022	Outlet System					
Pit K2	474.18		0.039		0	0.028	Outlet System					
Pit K1	474.17		0.041		0.01	0.014	Inlet Capacity					
Pit H8	472.45	474.12	0.023	1.4	1.65	0	Inlet Capacity					
Pit H7	472.26		0.008		1.64	0	None					
Pit H6	472.15		0.009		2.15	0	None					
Pit H5	471.98		0.01		2.12	0	Inlet Capacity					
Pit H4	471.85		0.01		2	0	Inlet Capacity					
Pit H3	471.72		0.01		1.73	0	Inlet Capacity					
Pit H2	471.56		0.01		1.34	0	Inlet Capacity					
H1	471.17		0.01									
DP K2	474.36		0.04		0.64	0	None					
DP J3	473.43		0.017		1.57	0	None					
Pit J3	473.4		0.007		0.05	0.001	Inlet Capacity					
Pit J2	473.38		0.007		0.42	0	None					
Pit J1	473.36		0.006		0.81	0	None					
DP J5	474.09		0.03		0.91	0	None					
Pit J5	473.57		0.016		0.09	0.002	Inlet Capacity					
Pit J4	473.4		0.019		0	0.095	Outlet System					
DP J6	473.69		0.02		1.31	0	None					
Pit J6	473.66		0.009		0.4	0	None					
DP J7	473.74		0.023		1.26	0	None					
Pit J7	473.71		0.011		0.43	0.001	Inlet Capacity					
Pit J9	473.69		0.003		0.71	0	None					
Pit J8	473.68		0.006		0.72	0	None					
DP K4	474.21		0.008		0.79	0	None					
Pit K4	474.2		0.007		0	0.006	Outlet System					
DP J2	473.4		0.01		1.6	0	None					
DP J4	473.56		0.011		1.44	0	None					
DP J8	473.68		0.002		1.32	0	None					

SUB-CATCHMENT DETAILS												
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm					
Cat DP K3	0.021	0.021	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat K3	0.01	0	0.01	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat K2	0.006	0	0.006	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat K1	0.002	0	0.002	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat H7	0.007	0.007	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H6	0.008	0.008	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H5	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H4	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H3	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H2	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat H1	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP K2	0.037	0.037	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP J3	0.016	0.016	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J3	0.005	0	0.005	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat J2	0.005	0	0.005	5	5	0	10% AEP, 20 min burst, Storm 7					

Cat J1	0.005	0	0.005	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat DP J5	0.027	0.027	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J5	0.011	0.001	0.01	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat J4	0.013	0.001	0.012	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat DP J6	0.018	0.018	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J6	0.008	0.008	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP J7	0.021	0.021	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J7	0.01	0.01	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J9	0.003	0.003	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat J8	0.005	0.005	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP K4	0.008	0.008	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat K4	0.005	0	0.005	5	5	0	10% AEP, 20 min burst, Storm 7					
Cat DP J2	0.009	0.009	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP J4	0.01	0.01	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat DP J8	0.002	0.002	0	5	5	0	10% AEP, 5 min burst, Storm 1					
Cat South Pre-develop	0.244	0.11	0.14	5	5	0	10% AEP, 10 min burst, Storm 3					
Cat North Pre-develop	0.3	0.074	0.226	5	5	0	10% AEP, 20 min burst, Storm 7					
PIPE DETAILS												
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm							
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)								
DP K3 - K3	0.02	0.51	474.217	474.19	10% AEP, 10 min burst, Storm 10							
K3 - K2	0.027	0.38	474.184	474.18	10% AEP, 5 min burst, Storm 1							
K2 - K1	0.052	0.47	474.173	474.17	10% AEP, 5 min burst, Storm 1							
K1 - H8	0.053	2.85	473.613	472.715	10% AEP, 15 min burst, Storm 7							
H8 - H7	0.116	2.1	472.307	472.259	10% AEP, 20 min burst, Storm 4							
H7 - H6	0.118	1.44	472.21	472.158	10% AEP, 20 min burst, Storm 4							
H6 - H5	0.124	1.67	472.078	471.983	10% AEP, 10 min burst, Storm 9							
H5 - H4	0.131	1.52	471.944	471.852	10% AEP, 10 min burst, Storm 9							
H4 - H3	0.139	1.5	471.812	471.723	10% AEP, 10 min burst, Storm 9							
H3 - H2	0.146	1.6	471.67	471.56	10% AEP, 10 min burst, Storm 9							
H2 - H1	0.154	1.72	471.504	471.458	10% AEP, 10 min burst, Storm 9							
DP K2 - K2	0.04	1	474.218	474.18	10% AEP, 5 min burst, Storm 1							
DP J3 - J3	0.015	0.39	473.41	473.394	10% AEP, 10 min burst, Storm 2							
J3 - J2	0.065	0.59	473.39	473.383	10% AEP, 5 min burst, Storm 1							
J2 - J1	0.057	0.52	473.383	473.37	10% AEP, 30 min burst, Storm 3							
J1 - H8	0.059	3.14	472.738	472.503	10% AEP, 1 hour burst, Storm 3							
DP J5 - J5	0.027	0.69	474.065	473.57	10% AEP, 10 min burst, Storm 4							
J5 - J4	0.096	0.87	473.556	473.4	10% AEP, 10 min burst, Storm 8							
J4 - J3	0.067	0.61	473.404	473.419	10% AEP, 5 min burst, Storm 1							
DP J6 - J6	0.017	0.44	473.671	473.661	10% AEP, 10 min burst, Storm 8							
J6 - J5	0.063	0.89	473.694	473.57	10% AEP, 10 min burst, Storm 2							
DP J7 - J7	0.022	0.55	473.753	473.733	10% AEP, 10 min burst, Storm 1							
J7 - J6	0.041	0.57	473.709	473.707	10% AEP, 5 min burst, Storm 1							
J9 - J8	0.004	0.15	473.705	473.706	10% AEP, 5 min burst, Storm 1							
J8 - J7	0.01	0.26	473.676	473.716	10% AEP, 10 min burst, Storm 6							
DP K4 - K4	0.008	0.2	474.212	474.203	10% AEP, 10 min burst, Storm 8							
K4 - K3	0.01	0.25	474.194	474.19	10% AEP, 30 min burst, Storm 6							
DP J2 - J2	0.013	0.34	473.538	473.507	10% AEP, 5 min burst, Storm 1							
DP J4 - J4	0.011	0.27	473.555	473.4	10% AEP, 10 min burst, Storm 7							
DP J8 - J8	0.002	0.19	473.675	473.677	10% AEP, 10 min burst, Storm 7							
CHANNEL DETAILS												
Name	Max Q	Max V			Due to Storm							
	(cu.m/s)	(m/s)										
OVERFLOW ROUTE DETAILS												
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF DP K3-K3	0	0	0.908	0	0	0	0					
OF K3-K2	0.022	0.022	0.908	0.029	0.01	4	0.4	10% AEP, 10 min burst, Storm 9				
OF K2-K1	0.028	0.028	0.908	0.031	0.01	4	0.44	10% AEP, 10 min burst, Storm 6				
OF K1-H8	0.014	0.014	0.908	0.025	0.01	4	0.34	10% AEP, 10 min burst, Storm 8				
OF H8-N1	0	0	0.908	0	0	0	0					
OF H7-N1	0	0	0.307	0	0	0	0					
OF H6-H5	0	0	0.217	0	0	0	0					

OF H5-H4	0	0	0.217	0	0	0	0					
OF H4-H3	0	0	0.217	0	0	0	0					
OF H3-H2	0	0	0.217	0	0	0	0					
OF H2-H1	0	0	0.217	0	0	0	0					
H1 - Proposed	0.161	0.161	0.908	0.062	0.05	4	0.86	10% AEP, 10 min burst, Storm 9				
OF DP K2-K2	0	0	0.908	0	0	0	0					
OF DP J3-J3	0	0	0.908	0	0	0	0					
OF J3-J4	0.001	0.001	0.908	0.008	0	0.84	0.2	10% AEP, 5 min burst, Storm 1				
OF J2-J3	0	0	1.112	0	0	0	0					
OF J1-H8	0	0	0.908	0	0	0	0					
OF DP J5-J5	0	0	0.908	0	0	0	0					
OF J5-J4	0.002	0.002	1.112	0.011	0	1.13	0.28	10% AEP, 5 min burst, Storm 1				
OF J4-N1	0.095	0.095	0.908	0.049	0.03	4	0.7	10% AEP, 10 min burst, Storm 9				
OF DP J6-J6	0	0	0.908	0	0	0	0					
OF J6-J5	0	0	1.112	0	0	0	0					
OF DP J7-J7	0	0	0.908	0	0	0	0					
OF J7-J6	0.001	0.001	0.908	0.008	0	0.84	0.16	10% AEP, 5 min burst, Storm 1				
OF J9-J7	0	0	1.426	0	0	0	0					
OF J8-J7	0	0	1.149	0	0	0	0					
OF DP K4-K4	0	0	0.908	0	0	0	0					
OF K4-K3	0.006	0.006	0.908	0.021	0.01	4	0.26	10% AEP, 10 min burst, Storm 9				
OF DP J2-J2	0	0	0.908	0	0	0	0					
N1 - Proposed	0.095	0.095	0.908	0.049	0.03	4	0.7	10% AEP, 10 min burst, Storm 9				
OF DP J4-J4	0	0	0.908	0	0	0	0					
OF DP J8-J8	0	0	0.908	0	0	0	0					
Prop - Post-developme	0.254	0.254	0.908	0.077	0.08	4	1.02	10% AEP, 10 min burst, Storm 9				
South-Existing	0.244	0.244	0.908	0.075	0.08	4	1.01	10% AEP, 10 min burst, Storm 3				
North-Existing	0.3	0.3	0.908	0.083	0.09	4	1.1	10% AEP, 20 min burst, Storm 7				
Ex - Pre-development	0.542	0.542	0.908	0.113	0.16	4	1.38	10% AEP, 20 min burst, Storm 7				
DETENTION BASIN DETAILS												
Name	Max WL	MaxVol	Max Q	Max Q	Max Q							
			Total	Low Level	High Level							
Run Log for Mudgee Hospital run at 11:47:31 on 30/5/2018												
Upwelling occurred at: Pit J4, Pit K4, Pit K2, Pit K3												
Freeboard was less than 0.15m at Pit K1, Pit J5, Pit J3												
Flows were safe in all overflow routes.												

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PROJECT MUDGEE HOSPITAL REDEVELOPMENT

TITLE 1% AEP - RESULTS

JOB No 5498
PREPARED ER DATE 30/05/2018
CHECKED WW DATE 30/05/2018

DRAINS File Path:	P:\j1-5400\5498\00 - Enstruct Documents\0.3 - Analysis\Civil\DRAINS\Models\171027 Drainage Design - 1.drn
DRAINS Version:	DRAINS Version 2018.01 - 20 May 2018
Modeller's Name:	Will Wright
Description:	Drainage Network 2

DRAINS results prepared from Version 2018.01

RESULTS 1% AEP

PIT / NODE DETAILS				Version 8								
Name	Max HGL	Max Pond	Max Surface	Max Pond	Min	Overflow	Constraint					
		HGL	Flow Arriving	Volume	Freeboard	(cu.m/s)						
			(cu.m/s)	(cu.m)	(m)							
DP K3	474.41		0.037		0.59	0	None					
Pit K3	474.19		0.044		0	0.053	Outlet System					
Pit K2	474.18		0.08		0	0.095	Outlet System					
Pit K1	474.18		0.116		0	0.088	Outlet System					
Pit H8	473.34	474.19	0.109	5.1	0.76	0	Inlet Capacity					
Pit H7	473.11		0.013		0.79	0.001	Inlet Capacity					
Pit H6	472.97		0.014		1.33	0.001	Inlet Capacity					
Pit H5	472.77		0.017		1.33	0.001	Inlet Capacity					
Pit H4	472.6		0.018		1.25	0.001	Inlet Capacity					
Pit H3	472.42		0.018		1.03	0.001	Inlet Capacity					
Pit H2	472.17		0.018		0.73	0.001	Inlet Capacity					
H1	472.05		0.018									
DP K2	474.67		0.067		0.33	0	None					
DP J3	473.48		0.028		1.52	0	None					
Pit J3	473.42		0.013		0.03	0.001	Inlet Capacity					
Pit J2	473.42		0.013		0.38	0	Inlet Capacity					
Pit J1	473.42		0.012		0.75	0	Inlet Capacity					
DP J5	473.83		0.049		1.17	0	None					
Pit J5	473.62		0.03		0.04	0.004	Inlet Capacity					
Pit J4	473.4		0.046		0	0.223	Outlet System					
DP J6	474.1		0.032		0.9	0	None					
Pit J6	474.01		0.029		0.05	0.001	Inlet Capacity					
DP J7	474.25		0.038		0.75	0	None					
Pit J7	474.12		0.019		0.02	0.003	Inlet Capacity					
Pit J9	474.15		0.005		0.25	0	Inlet Capacity					
Pit J8	474.15		0.01		0.25	0	Inlet Capacity					
DP K4	474.24		0.014		0.76	0	None					
Pit K4	474.21		0.013		0	0.015	Outlet System					
DP J2	473.45		0.016		1.55	0	None					
DP J4	473.45		0.019		1.55	0	None					
DP J8	474.16		0.004		0.84	0	None					

SUB-CATCHMENT DETAILS												
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm					
	Flow Q	Max Q	Max Q	Tc	Tc	Tc						
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)						
Cat DP K3	0.033	0.033	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat K3	0.018	0	0.018	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat K2	0.011	0	0.011	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat K1	0.004	0	0.004	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat H7	0.011	0.011	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H6	0.013	0.013	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H5	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H4	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H3	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H2	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat H1	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat DP K2	0.058	0.058	0	5	5	0	1% AEP, 5 min burst, Storm 1					

Cat DP J3	0.024	0.024	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J3	0.009	0	0.009	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat J2	0.01	0	0.01	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat J1	0.009	0	0.009	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat DP J5	0.043	0.043	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J5	0.021	0.001	0.019	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat J4	0.025	0.002	0.023	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat DP J6	0.029	0.029	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J6	0.012	0.012	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat DP J7	0.033	0.033	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J7	0.016	0.016	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J9	0.004	0.004	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat J8	0.009	0.009	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat DP K4	0.012	0.012	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat K4	0.01	0	0.01	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat DP J2	0.014	0.014	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat DP J4	0.016	0.016	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat DP J8	0.003	0.003	0	5	5	0	1% AEP, 5 min burst, Storm 1					
Cat South Pre-develop	0.443	0.196	0.271	5	5	0	1% AEP, 10 min burst, Storm 10					
Cat North Pre-develop	0.553	0.148	0.423	5	5	0	1% AEP, 10 min burst, Storm 10					
PIPE DETAILS												
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm							
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)								
DP K3 - K3	0.033	0.82	474.316	474.19	1% AEP, 5 min burst, Storm 1							
K3 - K2	0.03	0.42	474.189	474.18	1% AEP, 5 min burst, Storm 1							
K2 - K1	0.05	0.45	474.176	474.18	1% AEP, 2 hour burst, Storm 3							
K1 - H8	0.052	2.79	473.862	473.347	1% AEP, 2 hour burst, Storm 6							
H8 - H7	0.142	1.29	473.19	473.089	1% AEP, 10 min burst, Storm 8							
H7 - H6	0.144	1.31	473.062	472.993	1% AEP, 10 min burst, Storm 8							
H6 - H5	0.146	1.32	472.866	472.736	1% AEP, 10 min burst, Storm 7							
H5 - H4	0.154	1.39	472.728	472.635	1% AEP, 15 min burst, Storm 6							
H4 - H3	0.163	1.47	472.549	472.455	1% AEP, 15 min burst, Storm 6							
H3 - H2	0.172	1.56	472.395	472.171	1% AEP, 15 min burst, Storm 2							
H2 - H1	0.183	1.65	472.13	472.05	1% AEP, 15 min burst, Storm 10							
DP K2 - K2	0.058	1.47	474.28	474.18	1% AEP, 5 min burst, Storm 1							
DP J3 - J3	0.024	0.61	473.433	473.416	1% AEP, 5 min burst, Storm 1							
J3 - J2	0.079	0.71	473.417	473.419	1% AEP, 5 min burst, Storm 1							
J2 - J1	0.052	0.47	473.426	473.428	1% AEP, 2 hour burst, Storm 1							
J1 - H8	0.054	2.9	473.374	473.36	1% AEP, 3 hour burst, Storm 8							
DP J5 - J5	0.043	1.08	473.766	473.624	1% AEP, 5 min burst, Storm 1							
J5 - J4	0.161	1.45	473.524	473.4	1% AEP, 5 min burst, Storm 1							
J4 - J3	0.08	0.73	473.415	473.45	1% AEP, 5 min burst, Storm 1							
DP J6 - J6	0.03	0.76	474.042	474.016	1% AEP, 5 min burst, Storm 1							
J6 - J5	0.103	1.46	473.82	473.624	1% AEP, 5 min burst, Storm 1							
DP J7 - J7	0.033	0.84	474.152	474.119	1% AEP, 5 min burst, Storm 1							
J7 - J6	0.062	0.88	474.043	474.008	1% AEP, 5 min burst, Storm 1							
J9 - J8	0.005	0.12	474.185	474.184	1% AEP, 10 min burst, Storm 5							
J8 - J7	0.015	0.38	474.132	474.119	1% AEP, 5 min burst, Storm 1							
DP K4 - K4	0.012	0.31	474.212	474.209	1% AEP, 5 min burst, Storm 1							
K4 - K3	0.012	0.3	474.207	474.19	1% AEP, 5 min burst, Storm 1							
DP J2 - J2	0.014	0.36	473.526	473.462	1% AEP, 5 min burst, Storm 1							
DP J4 - J4	0.017	0.42	473.477	473.4	1% AEP, 10 min burst, Storm 9							
DP J8 - J8	0.004	0.09	474.16	474.162	1% AEP, 10 min burst, Storm 10							
CHANNEL DETAILS												
Name	Max Q	Max V			Due to Storm							
	(cu.m/s)	(m/s)										
OVERFLOW ROUTE DETAILS												
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF DP K3-K3	0	0	1.479	0	0	0	0					
OF K3-K2	0.053	0.053	1.479	0.039	0.02	4	0.55	1% AEP, 10 min burst, Storm 7				

OF K2-K1	0.095	0.095	1.479	0.049	0.03	4	0.7	1% AEP, 10 min burst, Storm 8				
OF K1-H8	0.088	0.088	1.479	0.048	0.03	4	0.67	1% AEP, 10 min burst, Storm 7				
OF H8-N1	0	0	1.479	0	0	0	0					
OF H7-N1	0.001	0.001	1.201	0.018	0.01	0.21	0.36	1% AEP, 5 min burst, Storm 1				
OF H6-H5	0.001	0.001	1.46	0.022	0.01	0.25	0.27	1% AEP, 10 min burst, Storm 3				
OF H5-H4	0.001	0.001	1.46	0.023	0.01	0.27	0.29	1% AEP, 5 min burst, Storm 1				
OF H4-H3	0.001	0.001	1.46	0.023	0.01	0.27	0.3	1% AEP, 5 min burst, Storm 1				
OF H3-H2	0.001	0.001	1.46	0.023	0.01	0.27	0.3	1% AEP, 5 min burst, Storm 1				
OF H2-H1	0.001	0.001	1.46	0.023	0.01	0.27	0.3	1% AEP, 5 min burst, Storm 1				
H1 - Proposed	0.19	0.19	1.479	0.067	0.06	4	0.92	1% AEP, 15 min burst, Storm 10				
OF DP K2-K2	0	0	1.479	0	0	0	0					
OF DP J3-J3	0	0	1.479	0	0	0	0					
OF J3-J4	0.001	0.001	1.479	0.008	0	0.84	0.18	1% AEP, 20 min burst, Storm 1				
OF J2-J3	0	0	1.468	0	0	0	0					
OF J1-H8	0	0	1.479	0	0	0	0					
OF DP J5-J5	0	0	1.479	0	0	0	0					
OF J5-J4	0.004	0.004	1.468	0.016	0.01	1.63	0.32	1% AEP, 15 min burst, Storm 7				
OF J4-N1	0.223	0.223	1.479	0.072	0.07	4	0.97	1% AEP, 10 min burst, Storm 7				
OF DP J6-J6	0	0	1.479	0	0	0	0					
OF J6-J5	0.001	0.001	1.468	0.008	0	0.84	0.23	1% AEP, 10 min burst, Storm 1				
OF DP J7-J7	0	0	1.479	0	0	0	0					
OF J7-J6	0.003	0.003	1.479	0.014	0	1.43	0.26	1% AEP, 5 min burst, Storm 1				
OF J9-J7	0	0	1.426	0	0	0	0					
OF J8-J7	0	0	1.463	0	0	0	0					
OF DP K4-K4	0	0	1.479	0	0	0	0					
OF K4-K3	0.015	0.015	1.479	0.026	0.01	4	0.34	1% AEP, 10 min burst, Storm 6				
OF DP J2-J2	0	0	1.479	0	0	0	0					
N1 - Proposed	0.223	0.223	1.479	0.072	0.07	4	0.97	1% AEP, 10 min burst, Storm 7				
OF DP J4-J4	0	0	1.479	0	0	0	0					
OF DP J8-J8	0	0	1.479	0	0	0	0					
Prop - Post-developme	0.401	0.401	1.479	0.097	0.12	4	1.22	1% AEP, 10 min burst, Storm 7				
South-Existing	0.443	0.443	1.479	0.102	0.13	4	1.27	1% AEP, 10 min burst, Storm 10				
North-Existing	0.553	0.553	1.479	0.115	0.16	4	1.38	1% AEP, 10 min burst, Storm 10				
Ex - Pre-development	0.997	0.997	1.479	0.158	0.28	4	1.74	1% AEP, 10 min burst, Storm 10				
DETENTION BASIN DETAILS												
Name	Max WL	MaxVol	Max Q	Max Q	Max Q							
			Total	Low Level	High Level							
Run Log for Mudgee Hospital run at 11:49:40 on 30/5/2018												
Upwelling occurred at: Pit K1, Pit J4, Pit K4, Pit K2, Pit K3												
Freeboard was less than 0.15m at Pit J5, Pit J6, Pit J7, Pit J3												
Flows were safe in all overflow routes.												
These overflow routes carried water uphill (adding energy): OF K1-H8. These results may be invalid. You should check for water flowing round in circles (e.g. negative flow in adjacent pipes) at these locations. You may need to reformulate the model.												
IGNORE THESE WARNINGS AT YOUR OWN PERIL.\cf1												