

WATER SENSITIVE URBAN DESIGN (WSUD) STRATEGY REPORT

PROPOSED WAREHOUSE FACILITY

84 LINKS ROAD ST MARY'S

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Document Control

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1. EXECUTIVE SUMMARY

Sparks & Partners have been engaged by Full Tilt Constructions to provide civil engineering services to support the proposed Development Application for 84 Links Road, St Mary's. The engineering services include the design and documentation of the stormwater drainage infrastructure and finished pavement levels for the proposed development.

Penrith City Council being the approval authority for the proposed development, require an WSUD Strategy Report be prepared that takes into consideration the objectives and controls under Penrith Development Control Plan 2014 (PCCDCP) and Council's WSUD Policy and Technical Guidelines. In response to this requirement Sparks and Partners has undertaken modelling of the proposed WSUD measures and prepared this report to demonstrate that the proposed Industrial development identifies and incorporates water conservation and stormwater management measures into its design and operation in accordance with the requirements of the PCCDCP

2. INTRODUCTION

2.1 Existing Site

The proposed development occupies a total site area of 11,580m² in an irregular lot shape. The site is currently occupied by a warehouse and office building, hardstand, car park pavement areas and landscaping, and operates as a storage yard for construction hire plant and materials. Apart from a minor landscaping areas near the Links Road frontage, the site is entirely occupied by existing buildings or impervious hardstand. The site is bounded by Links Road on the northern boundary, 94 Links Road on the western boundary, 72 Links Road on the eastern boundary and 19, 21 & 25 Dunheved Circuit along the southern boundary.

2.2 Proposed Development

The proposed development involves alterations and additions to the existing building with the partial demolition of the existing building and construction of a new 3,330m² warehouse and office building with 2,305m² of surrounding hardstand works. The majority of the existing warehouse, carparking area and hardstand are to remain. Detailed architectural plans of the development have been prepared by SBA architects and are to be read in conjunction with this report.

3. INTEGRATED WATER MANAGEMENT

3.1 General

The objective of integrated water management is to provide a strategy that brings together the different aspects of the water cycle as a whole rather than an ad hoc approach to water management. This includes the management aspects of freshwater, wastewater and stormwater. The following integrated water management strategies have been considered and addressed for the proposed development:

1. Employ an integrated water collection and recycling system for capturing and recycling roofwater;

To demonstrate the above concept stormwater drainage plans and associated details have been prepared and are included in Appendix A for reference.

3.2 Rainwater Reuse

Through the reuse of collected roofwater for non-potable reuse the proposed demand on potable water resources is reduced. The proposed development will capture roof water from part of the building roof area (1,584m²). This collected roofwater will be conveyed to a 6kL tank for storage and reuse throughout the development. Re-use purposes will primarily include toilet flushing within the proposed industrial building. A water balance of the proposed reuse system has been completed to model the effectiveness and efficiency of the system. The water balance model was constructed using the MUSIC software package with the following inputs:

- Penrith City Council MUSIC Link;
- 6kL rainwater tank with 80% effectiveness = 4.8kL;
- Total approximate non-potable reuse of 260L per day based on:
 - Three proposed toilets at a usage rate of 0.1kL/day/toilet over 6 days a week (0.1kL per toilet x 3 toilets x 6/7days = 0.26kL/day).

Using the above determined non-potable demand the MUSIC model determines the rainwater tank has an approximate efficiency of 81%. This efficiency results in an approximate reduction in the proposed demand on potable water supplies of 80,000 litres per year. A copy of the MUSIC Link report is provided in Appendix B for reference.

3.3 Stormwater Quality

The proposed development does not result in an increase in impervious area from the existing conditions as existing hardstand is being directly replaced by roof as shown in the catchment plan provided in Appendix A. based on this, that the land use type is Commercial and Industrial no water treatment measures are proposed for the development in

accordance with table C3.1: Development Required to Consider Water Sensitive Urban Design of the PCCDCP.

3.4 Stormwater Quantity

A pre-DA meeting was held with Council on the 26th July 2018 to discuss the proposed development and receive feedback/direction from Council. Advice was received from Council that On-Site Detention (OSD) is not required for the development for the following reasons:

- There is no increase in hardstand area;
- The property is located at the downstream end of Councils formal drainage system that drains through the property.

3.5 Flooding

Flooding advice received is that the surrounding area is subject to flooding with the 15AEP flood level being estimated to be RL20.000m AHD. The site levels for the existing and proposed development range from RL 19.970 in the north- western corner, up to 22.500 in the southern corner of the site, with the existing and proposed buildings having floor levels of RL 20.590 and RL 22.000 respectively. These levels provide a freeboard of 0.59m and 2.0m which is above the minimum 0.5m required in accordance with pre-DA meeting comments and the requirements of Section 7 Industrial/Commercial – Extensions and Infill Development, 3.5 Flood Planning of the PCCDCP.

3.6 Maintenance and Monitoring

To ensure the continued efficient and correct operation of the proposed integrated water management infrastructure a 'maintenance and monitoring schedule' is included in the Appendix C of this plan. The schedule details the frequency of inspections, what is to be inspected and what rectifications to make if required for the water management infrastructure located within the proposed development. The schedule is to be implemented upon commissioning of the water management infrastructure and remain in place for the life of the development; with all records kept on site for inspection should the approval authority deem it necessary.

CONCLUSION

Based on the preparation of the concept stormwater drainage plans and MUSIC modeling results it is demonstrated that the principles of integrated water management have been incorporated into the design and operation of the proposed alterations and additions at 84 Links Rd, St Marys in accordance with PCCDCP. It is demonstrated that the proposed development achieves reductions in potable water import by capturing rainwater on site and reusing this for toilet flushing, and that the proposed developments employed water conservation measures will continue to operate effectively and efficiently through the implementation and use of a monitoring and maintenance schedule ensuring the integrity of the system is maintained.

APPENDIX A. CONCEPT STORMWATER DRAINAGE PLANS

PROPOSED WAREHOUSE ALTERATIONS AND ADDITIONS

84 LINKS RD, ST MARYS

SITE WORKS - GENERAL

1. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH LOCAL COUNCIL, AUSTRALIAN AND AUTHORITY STANDARDS.
2. ALL TRENCHING WORKS ARE TO BE RESTORED TO ORIGINAL CONDITION.
3. THE INTEGRITY OF ALL EXISTING AND NEW SERVICES IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
4. ALL PLANS ARE TO BE READ IN CONJUNCTION WITH APPROVED ARCHITECTS, STRUCTURAL ENGINEERS AND OTHER CONSULTANT'S PLANS. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER FOR CLARIFICATION.
5. THE ENGINEER SHALL BE GIVEN A MIN. OF 48 HOURS NOTICE FOR ALL STORMWATER DRAINAGE AND PAVEMENT INSPECTIONS. CONCRETE SHALL NOT BE DELIVERED UNTIL ENGINEERS APPROVAL IS OBTAINED.

SITE WORKS - ACCESS AND SAFETY

1. ALL WORKS ARE TO BE UNDERTAKEN IN A SAFE MANNER IN ACCORDANCE WITH ALL STATUTORY AND INDUSTRIAL RELATION REQUIREMENTS.
2. ACCESS TO ADJACENT BUILDINGS AND PROPERTIES SHALL BE MAINTAINED AT ALL TIMES.
3. WHERE NECESSARY SAFE PASSAGE SHALL BE PROVIDED FOR VEHICLES AND PEDESTRIANS THROUGH OR ADJACENT TO THE SITE.

FINISHED LEVELS

1. LEVELS BASED ON SURVEY PREPARED BY BEE & LETHBRIDGE, 2004/2, 08/05/2016. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.
2. FINISHED LEVELS SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED DESIGN PRIOR TO CONSTRUCTION CERTIFICATE APPLICATION. FINAL FINISHED LEVELS TO BE +/- 0.5m FROM LEVELS SHOWN.
3. CARPARK & SERVICE AREA LAYOUT AND GRADES TO COMPLY WITH AS2890.
4. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
5. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
6. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
7. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

SEDIMENT AND EROSION CONTROL

1. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH PENRITH CITY COUNCIL AND THE "BLUE BOOK" (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION, PRODUCED BY THE DEPARTMENT OF HOUSING). THESE MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED.
2. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY, THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCIL'S DESIGN, AND ALL OTHER REGULATORY AUTHORITY REQUIREMENTS.
3. WHERE PRACTICAL THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
 - a. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES, WHERE FENCES ARE ADJACENT TO EACH OTHER THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
 - b. CONSTRUCT TEMPORARY STABILISED SITE ACCESS, INCLUDING SHAKE DOWN AND WASH PAD.
 - c. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THESE SEDIMENT AND CONTROL PLANS (ONCE APPROVED)
4. THE CONTRACTOR SHALL UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
5. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. TACIFIERS MAY BE USED TO CONTROL DUST DURING EXTENDED PERIODS OF DRY WEATHER.
6. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
7. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED OUT.
8. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
9. THE CONTRACTOR SHALL ALLOW FOR THE ESTABLISHMENT OF ANY OTHER EROSION PROTECTION MEASURES, (IF APPLICABLE).
10. THE CONTRACTOR SHALL REGULARLY INSPECT (MINIMUM TWICE PER WEEK) ALL EROSION AND SEDIMENT CONTROL MEASURES TO ENSURE THEY ARE OPERATING EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.
11. ACCEPTABLE RECEPTORS SHALL BE USED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER. WASTE FROM THESE RECEPTORS SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.

STORMWATER

1. DESIGN CRITERIA
 - 1.1. ROOF DRAINAGE - 120YR ARI (EAVES), 1:100 YR ARI (BOX)
 - 1.2. PIPED DRAINAGE - 120YR ARI
 - 1.3. EMERGENCY OVERLAND FLOWS - GAP FLOW BETWEEN 120YR ARI & 1:100YR ARI DIRECTED TO OSD WHERE PRACTICAL.
2. ALL PROPOSED STORMWATER INFRASTRUCTURE CONCEPTUAL ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN
3. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH THE FOLLOWING AUSTRALIAN STANDARDS AS2032, AS3500 AND AS3725 AS A MINIMUM.
4. SOLVENT WELD-JOINTED UPVC CLASS S16 U.N.O.
5. REINFORCED CONCRETE PIPE (RCP) WITH SPIGGOT AND SOCKETED JOINT OR VANTAGE PIPE PLUS (VPIPE+) FIBRE REINFORCED CONCRETE (FRC) WITH VANTAGE PIPE PLUS JOINT U.N.O.
6. ALL PIPES ARE TO BE LAID AT MIN. 10% GRADE U.N.O.
7. PIPE BEDDING IS TO BE H2 UNDER ROADS AND TRAFFICKED AREAS AND SHALL BE H2 IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS U.N.O.
8. ALL PIPE BENDS AND JUNCTIONS ARE TO BE MADE WITH EITHER PURPOSE MADE FITTINGS OR STORMWATER DRAINAGE PITS.
9. MINIMUM COVER FROM THE OVERTOP OF THE STORMWATER PIPE OF 300mm IS TO BE PROVIDED IN LANDSCAPED AREAS AND 600mm IN VEHICULAR TRAFFICKED AREAS U.N.O.
10. WHERE MINIMUM COVER CANNOT BE ACHIEVED CONCRETE ENCASEMENT OF THE AFFECTED PIPE IS MAY BE UNDERTAKEN WITH 20MPa CONCRETE WITH A MIN. COVER OF 150mm TO ALL SIDES OF THE PIPE. THE CONTRACTOR SHALL CONFIRM THIS REQUIREMENT WITH THE ENGINEER OR SUPERINTENDENT.
11. LAID PIPELINES ARE TO HAVE THE FOLLOWING CONSTRUCTED TOLERANCES:
 - a. HORIZONTAL-1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT;
 - b. VERTICAL-1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT.
12. ALL DRAINAGE PITS ARE TO BE CAST IN-SITU, PRECAST DRAINAGE PITS MAY BE USED WITH APPROVAL FROM THE ENGINEER. THE CONTRACTOR SHALL SUBMIT A PRECAST PIT INSTALLATION WORK METHOD STATEMENT FOR ASSESSMENT BY THE ENGINEER FOR APPROVAL.
13. DRAINAGE PIT COVERS ARE TO BE EITHER GALVANISED STEEL OR CAST IRON CLASS 'B' IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS AND CLASS 'D' IN ALL VEHICULAR TRAFFICKED AREAS U.N.O.
14. DRAINAGE PIT COVERS ARE TO BE 'HEELSAFE' TYPE IN ALL PEDESTRIAN TRAFFICKED AREAS U.N.O.
15. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCING WORKS ON SITE.
16. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
17. TO THE FLOW DIRECTION WITH A CLEANING EYE PROVIDED AT GROUND LEVEL.

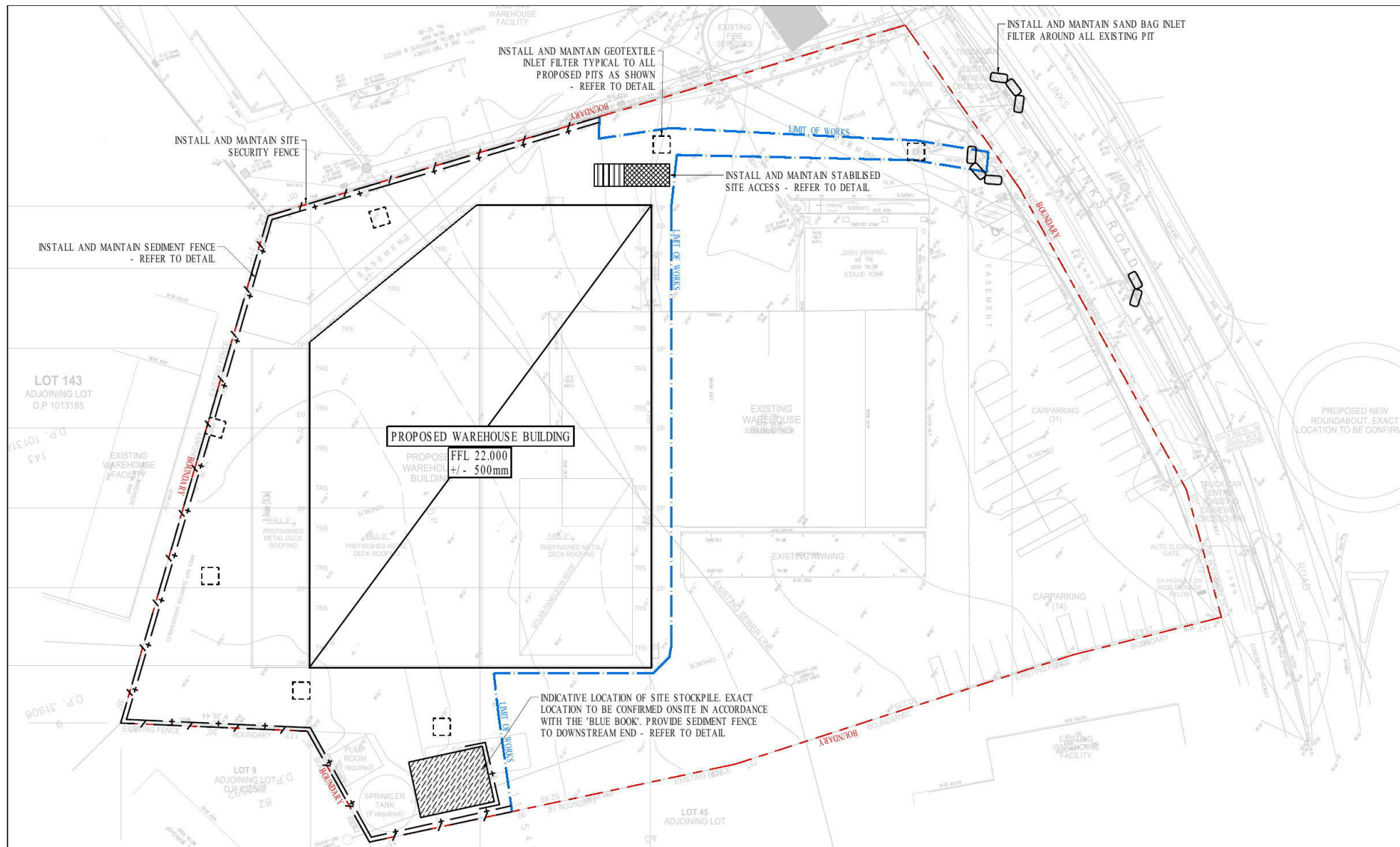


LOCALITY PLAN
NOT TO SCALE - COURTESY OF SIX MAPS

DRAWING SCHEDULE

- DA1.01 COVERSHEET, LOCALITY PLAN & DRAWING SCHEDULE
- DA2.01 EROSION & SEDIMENT CONTROL PLAN
- DA4.01 CONCEPT STORMWATER MANAGEMENT PLAN
- DA4.05 CONCEPT STORMWATER CATCHMENT PLAN

<p>1. DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY</p> <p>2. DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION.</p> <p>3. LEVELS ARE INDICATIVE ONLY AND ARE TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS</p> <p>4. AUTHORITIES MANS AND/OR EXISTING SERVICES ARE TO BE LOCATED AND CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS</p> <p>5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.</p>		<p>CHECKED DATE</p> <p>APPROVED DATE</p> <p>PAGE 1 LOT DATE August 24, 2018</p>	<p>NORTH POINT</p>	<table border="1"> <thead> <tr> <th>DATE</th> <th>No</th> <th>AMENDMENT</th> <th>INIT</th> <th>REV</th> </tr> </thead> <tbody> <tr> <td>24.08.18</td> <td></td> <td>90% ISSUE</td> <td>DD</td> <td>1</td> </tr> <tr> <td></td> <td></td> <td>DA ISSUE</td> <td>DD</td> <td>2</td> </tr> </tbody> </table>	DATE	No	AMENDMENT	INIT	REV	24.08.18		90% ISSUE	DD	1			DA ISSUE	DD	2	<table border="1"> <thead> <tr> <th>DATE</th> <th>No</th> <th>AMENDMENT</th> <th>INIT</th> <th>REV</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> 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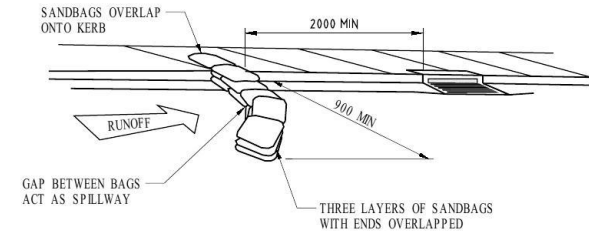
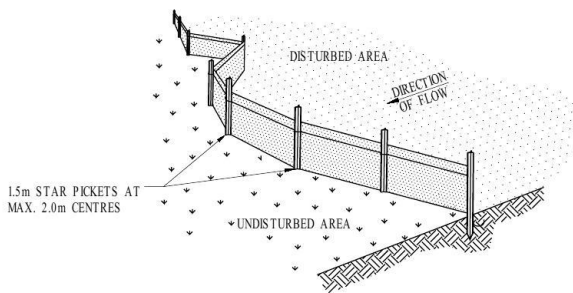
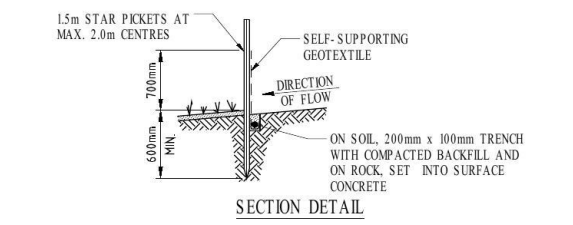


LEGEND

- SITE SECURITY FENCE
- - - SEDIMENT FENCE
- [Hatched Box] STABILISED SITE ACCESS
- [Diagonal Lines Box] SITE STOCKPILE
- [Circle with X] MESH AND GRAVEL INLET FILTER
- [Dashed Box] GEOTEXTILE INLET FILTER

NOTES

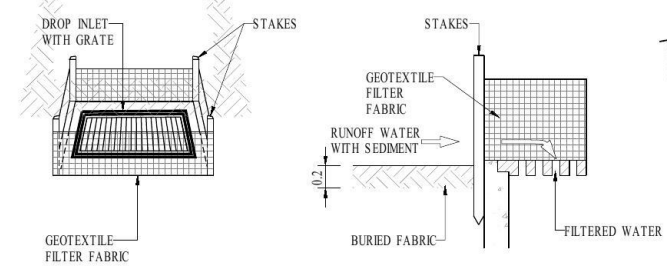
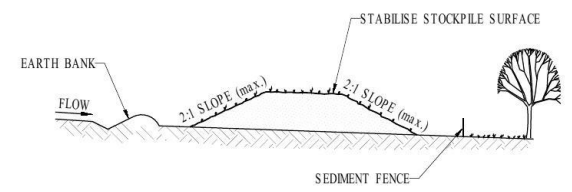
1. REFER TO DRAWING DA1.01 FOR NOTES AND SPECIFICATIONS



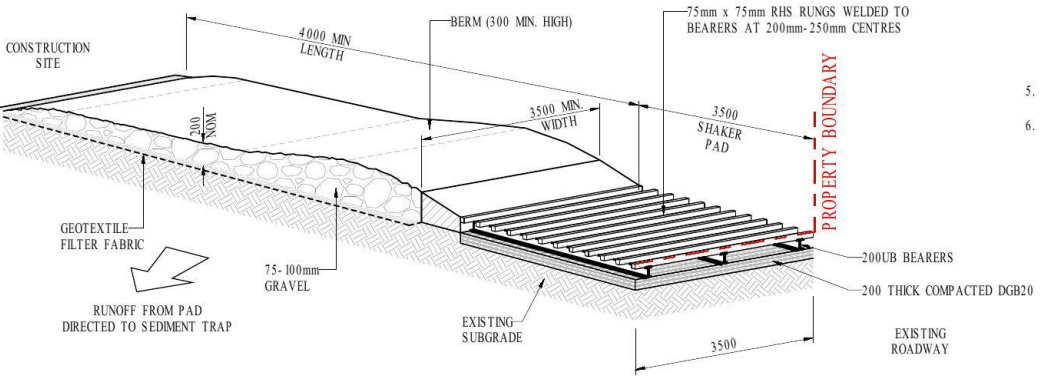
- NOTES:**
- CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
 - CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
 - DRIVE 15m LONG STAR PICKETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
 - FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
 - JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
 - BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT AND EROSION CONTROL PLAN

SCALE: 1:400



- NOTES:**
- FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
 - CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
 - DRIVE 15m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
 - FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
 - JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
 - BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



- MAINTENANCE**
- THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY.
 - THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
 - ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
 - INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD.
 - ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
 - INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

STOCKPILE

NOT TO SCALE

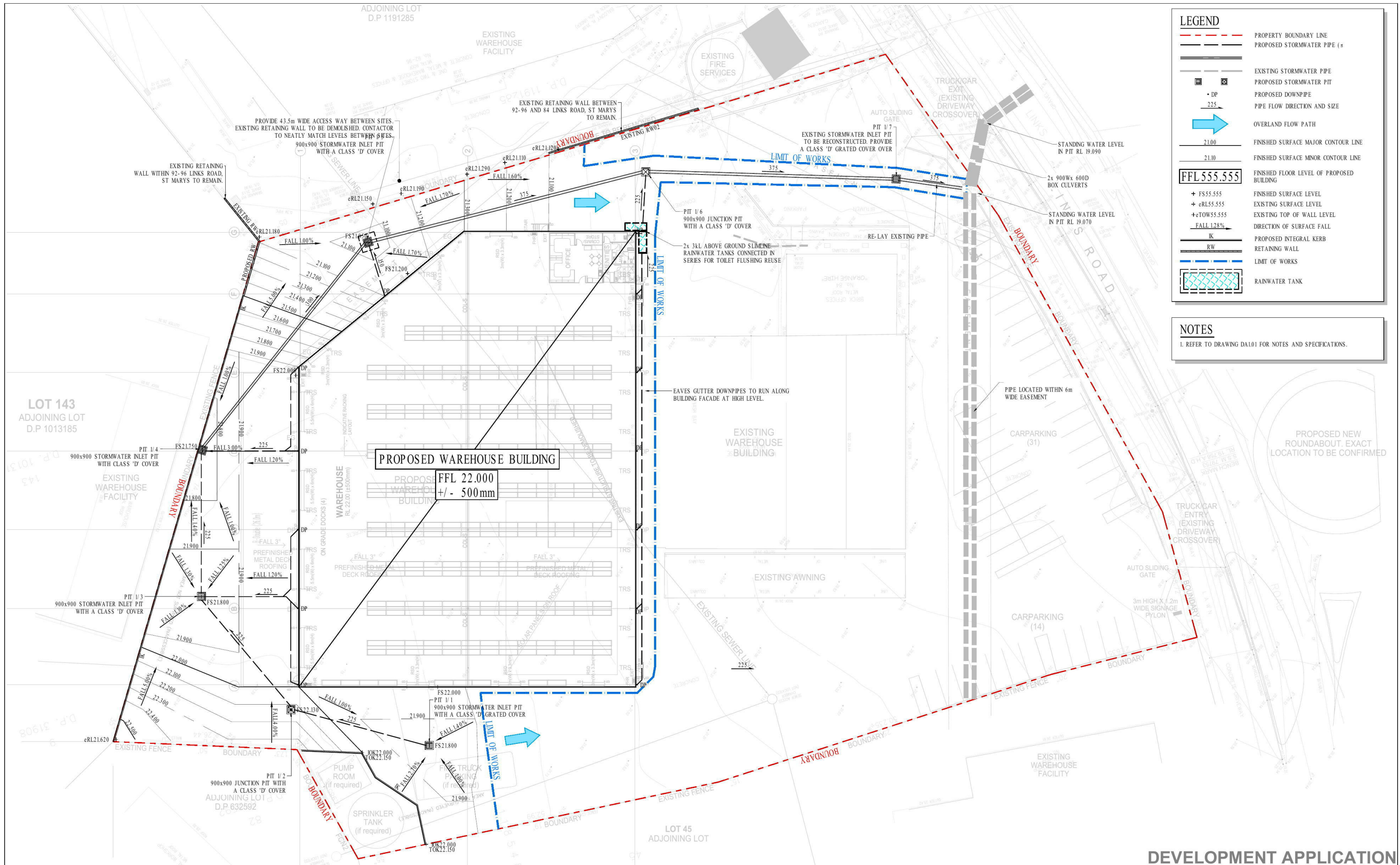
- NOTES:**
- PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
 - CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
 - WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT. 4. WHERE 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.
 - CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

GEOTEXTILE INLET FILTER DROP INLET SEDIMENT TRAP

NOT TO SCALE

DEVELOPMENT APPLICATION

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LEGEND

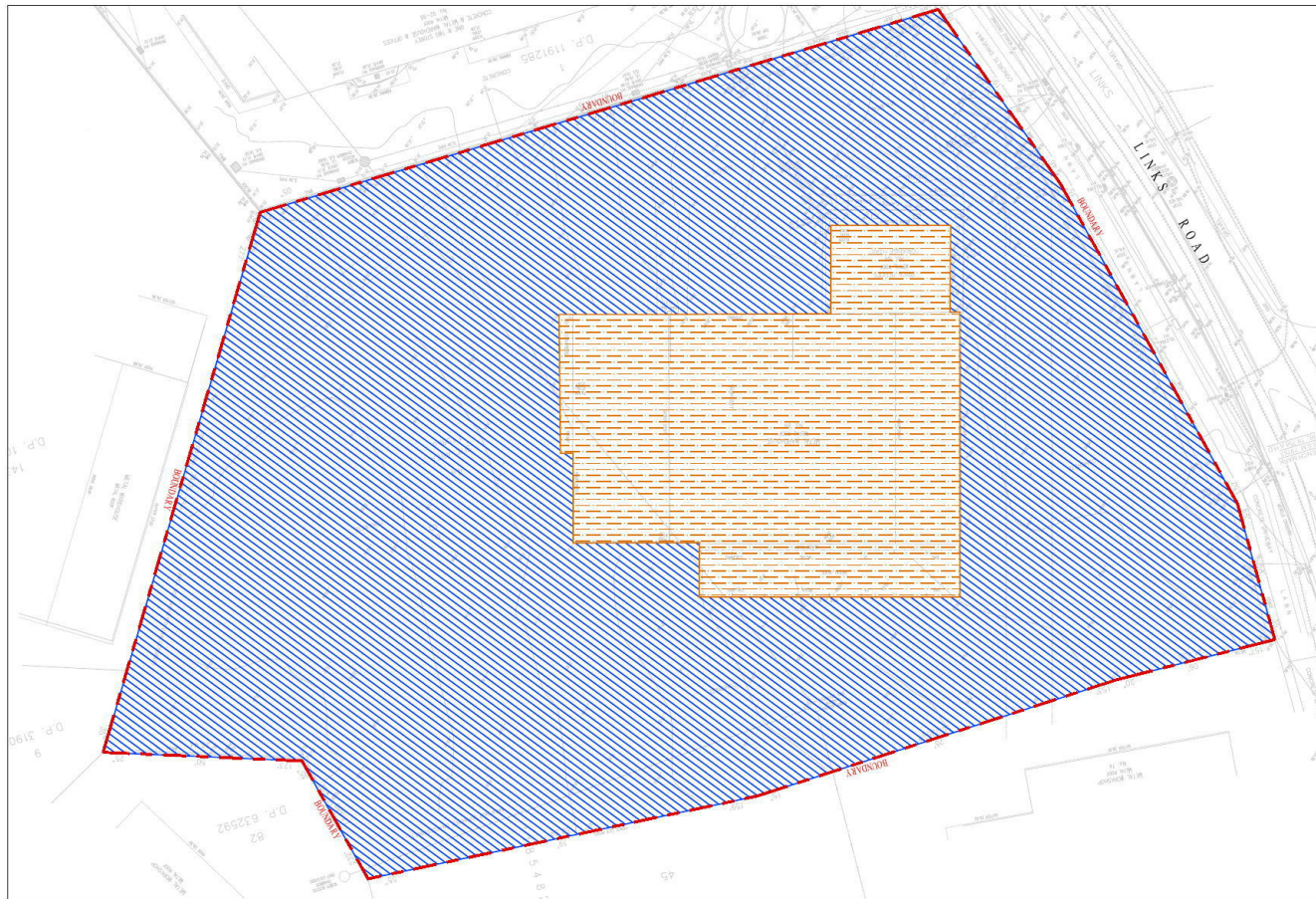
- PROPERTY BOUNDARY LINE
- PROPOSED STORMWATER PIPE (≤ 225)
- EXISTING STORMWATER PIPE
- PROPOSED STORMWATER PIT
- PROPOSED DOWNPIPE
- PIPE FLOW DIRECTION AND SIZE
- OVERLAND FLOW PATH
- FINISHED SURFACE MAJOR CONTOUR LINE
- FINISHED SURFACE MINOR CONTOUR LINE
- FINISHED FLOOR LEVEL OF PROPOSED BUILDING
- FINISHED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- EXISTING TOP OF WALL LEVEL
- DIRECTION OF SURFACE FALL
- PROPOSED INTEGRAL KERB
- RETAINING WALL
- LIMIT OF WORKS
- RAINWATER TANK

NOTES

1. REFER TO DRAWING DA1.01 FOR NOTES AND SPECIFICATIONS.

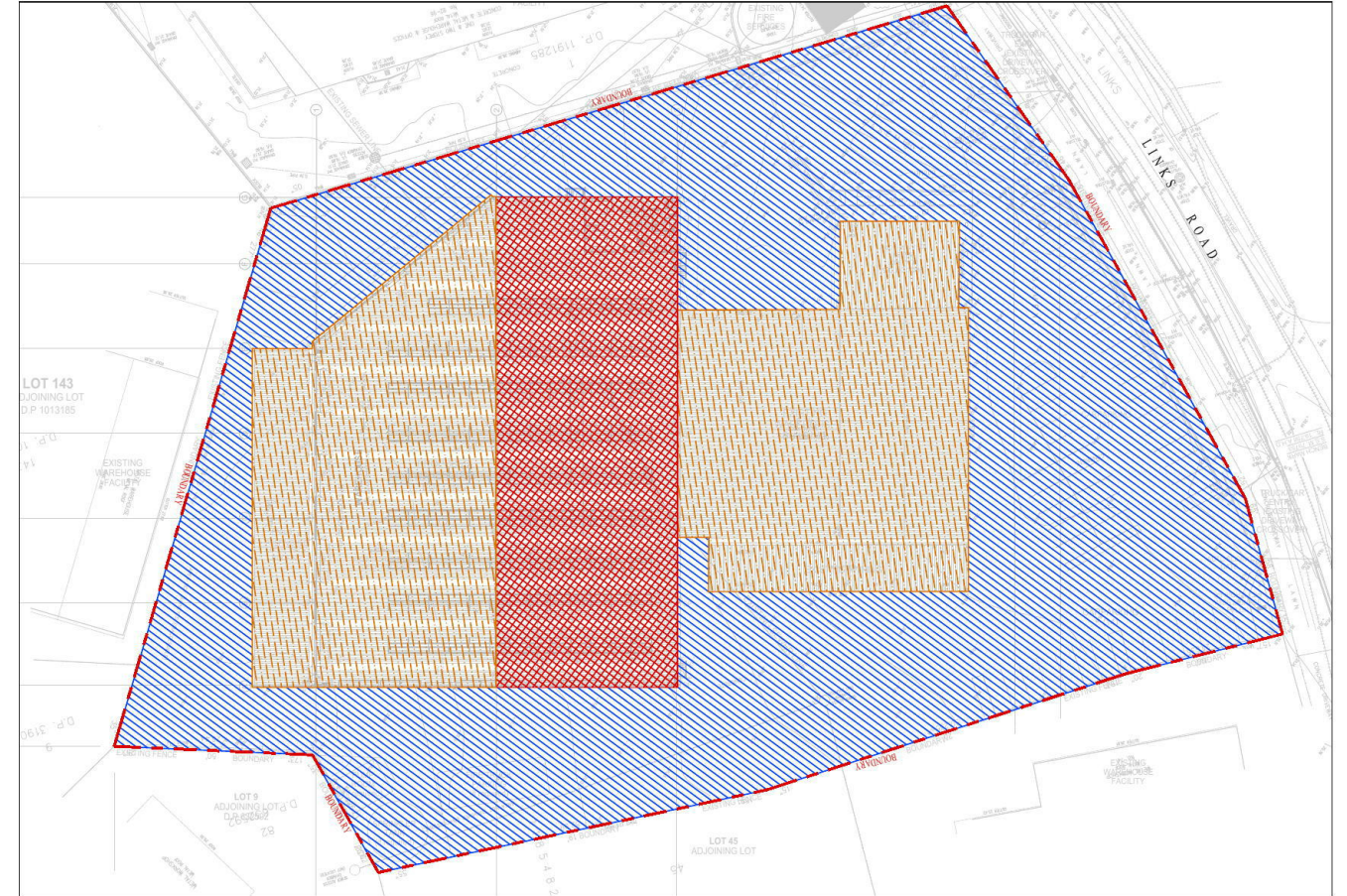
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DEVELOPMENT APPLICATION



EXISTING STORMWATER CATCHMENT PLAN
SCALE 1:500

LEGEND	
	EXISTING HARDSTAND CATCHMENT AREA = 9,549m ²
	EXISTING ROOF CATCHMENT AREA = 2,033m ²
	TOTAL CATCHMENT AREA = 11,582m ²



PROPOSED STORMWATER CATCHMENT PLAN
SCALE 1:500

LEGEND	
	PROPOSED HARDSTAND CATCHMENT AREA = 6,643m ²
	PROPOSED ROOF CATCHMENT AREA = 3,355m ²
	PROPOSED ROOF TO RWI CATCHMENT AREA = 1,584m ²
	TOTAL CATCHMENT AREA = 11,582m ²

NOTES	
1.	NO NET INCREASE IN IMPERVIOUS AREA BETWEEN EXISTING AND PROPOSED DEVELOPMENT CONDITIONS.

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FOR INFORMATION ONLY
FOR CLIENT APPROVAL
FOR TENDER
FOR CONSTRUCTION

CHECKED	DATE	NORTH POINT
APPROVED	DATE	
PAGE	LOT DATE	
A1	August 24, 2018	
SCALE 0 5 10 15 20 25 30 35 40 METRES		

DATE	No	AMENDMENT	INIT	REV
24.08.18		DA ISSUE	DD	1

DATE	No	AMENDMENT	INIT	REV

CLIENT	
ARCHITECT	

PROJECT	PROPOSED WAREHOUSE ALTERATIONS AND ADDITIONS 84 LINKS RD, ST MARYS
DRAWING TITLE	CIVIL DESIGN CONCEPT STORMWATER CATCHMENT PLAN

DATE	JUL 2018	DESIGNED	BB	
SCALE	1:500	DRAWN	ZC	
JOB No	18133	DWG No	DA4.05	No IN SET
				REV
				1

DEVELOPMENT APPLICATION

SPARKS + PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

APPENDIX B. MUSICLink REPORT

MUSIC-*link* Report

Project Details		Company Details	
Project:	84 Links Rd, St Marys (18133)	Company:	Sparks & Partners Consulting Engineers
Report Export Date:	24/08/2018	Contact:	Benjamin Barrett
Catchment Name:	18133_MUSIC_RWT_REV1	Address:	Level 1, 91 George St, Parramatta NSW 2150
Catchment Area:	0.158ha	Phone:	9891 5033
Impervious Area*:	100%	Email:	benjamin@sparksandpartners.com.au
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Mminutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.31		
Study Area:	Penrith		
Scenario:	Penrith Development		

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

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	Reduction	Node Type	Number	Node Type	Number
Flow	8.22%	Rain Water Tank Node	1	Urban Source Node	1
TSS	14%				
TP	10.1%				
TN	9.15%				
GP	100%				

Comments

The model has been constructed to demonstrate compliance for rainwater reuse only and not for water quality

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	Rainwater Tank 6kL	% Reuse Demand Met	80	None	81.1131
Receiving	Receiving Node	% Load Reduction	None	None	8.22
Receiving	Receiving Node	GP % Load Reduction	90	None	100
Urban	Roof to RWT 1584m2 (100% IMP)	Area Impervious (ha)	None	None	0.158
Urban	Roof to RWT 1584m2 (100% IMP)	Area Pervious (ha)	None	None	0
Urban	Roof to RWT 1584m2 (100% IMP)	Total Area (ha)	None	None	0.158

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Receiving	Receiving Node	TN % Load Reduction	45	None	9.15
Receiving	Receiving Node	TP % Load Reduction	60	None	10.1
Receiving	Receiving Node	TSS % Load Reduction	85	None	14

Only certain parameters are reported when they pass validation

NOTE: A successful self-validation check of your model does not constitute an approved model by Penrith City Council
MUSIC-*link* now in MUSIC by eWater – leading software for modelling stormwater solutions

APPENDIX C. MAINTENANCE & MONITORING SCHEDULE

Job No.: 18133

Date: 24 August 2018

PROJECT ADDRESS: 84 Links Rd, St Marys

General Notes:

1. Maintenance is to be carried out with regard to relevant occupational health and safety guidelines and standards. This includes all confined space, traffic management, fall arrest and other requirements.
2. Initial monitoring and inspections of the stormwater system post commissioning are to be carried out every 3 months for the first year of operation. The amount and type of debris is to be noted and recorded. This information shall be used to determine if modification of the frequency of inspections is required.
3. The frequency of inspections shown in the stormwater maintenance schedule are the maximum periods. Inspection frequencies may be reduced upon completion of the initial monitoring and inspection program as noted in note 2.
4. Blank copies of the maintenance schedule are to be made and filled out during each subsequent inspection with the details kept on site for future reference.

Inspected by:

Date of Inspection:

Date of Next Inspection:

Item to be Inspected	Frequency	Performed by	Inspected	Maintenance Required	Maintenance Procedure	Maintenance Completed
			Yes/No	Yes/No		Date
General						
Eaves/Box Guttering System and Downpipes	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect and remove any build up of sediment, debris, litter and vegetation within gutter system.	
Stormwater surface inlet and junction pits	Four Monthly/ After Major Storm	Owner / Maintenance Contractor			Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter and vegetation. (e.g. Vacuum/eductor truck) Inspect and ensure grate is clear of sediment, debris, litter and vegetation. Ensure flush placement of grate on refitment	
General inspection of complete stormwater drainage system (that's visible)	Bi-annually	Owner / Maintenance Contractor			Inspect all drainage structures noting any dilapidation, carry out required repairs.	

Rainwater Tank						
First Flush Device	6 Monthly	Owner / Maintenance Contractor				Inspect first flush device to ensure correct operation. Remove accumulated litter & debris. If device is not functioning properly repair or replace.
Internal Inspection	6 Monthly	Owner / Maintenance Contractor				Check for evidence of access by animals, birds or insects including the presence of mosquito larvae. If present, identify access point and close. If evidence of algal growth, find and close points of light entry.
Tank and tank roof	6 Monthly	Owner / Maintenance Contractor				Check structural integrity of tank including roof and access covers. Any dilapidation including holes or gaps are to be noted and repaired.