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Water Sensitive Urban Design (WSUD) Management Report

INDUSTRIAL DEVELOPMENT

LOT 3, 7 DURSLEY ROAD YENNORA

PREPARED BY

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Document Control

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3	04.09.18	Issued for S4.55	DL	BB	BB
4	21.01.19	Reissued for S4.55	BB	DL	BB

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Introduction

Sparks & Partners have been engaged by Fife Capital to provide civil engineering services to support the Section S4.55 submission for the development of a warehouse, offices and hardstand occupying a portion of Lot 3, 7 Dursley Road, Yennora. The proposed industrial development has previously been approved under DA 2016/501/1 and Modification No 2016/501/2. The S4.55 design addresses amendments ot the site layout. This revised report civil design addresses comments on the S4.55 design received from council on 15/01/2019. The engineering services include the design and documentation of the stormwater drainage infrastructure and finished pavement levels for the proposed development.

Cumberland Council (formerly Holroyd City Council), being the approval authority for the proposed development, require Water Sensitive Urban Design (WSUD) measures to be incorporated into the site stormwater management. This report addresses the WSUD objectives and controls under the former Holroyd City Council Development Control Plan 2013 (DCP), On-site Stormwater Detention Policy 2015 and Upper Parramatta River Catchment Trust On-site Detention Policy Handbook. 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 stormwater management measures into its design and operation in accordance with the requirements of Council's policies.

Existing Site

Lot 3 has a total area of 10.95Ha and is currently used for the parking of trucks. The site previously contained industrial buildings and associated infrastructure, however many of these buildings have been previously demolished and removed from site. It is bounded by Dursley Road on the northern boundary, Pine Road on the eastern boundary, Prospect Creek on the southern boundary, and industrial developments at 5 Dursley Road and 202 Fairfield Road on the western boundary. The site generally falls from north to south toward Prospect Creek and is flood affected by overland flow from properties to the north. An existing stormwater channel and associated easement along the site's western boundary provide an overland flow path through the site in a north-south direction and discharges into Prospect Creek. Earthworks are currently undertaken on site under existing approvals.

Proposed Development

The proposed development under this approval contains Warehouse 1 (WH1), and associated offices and hardstand areas. The development of the remainder of the site has been submitted under a separate DA application. The whole site is being treated as a whole in regards to stormwater management. The WH1 development occupies a total area of 43,730m² of Lot 3 and consists of a warehouse building, office, hardstand, car park pavement areas, and landscaping. The warehouse building and office occupies a combined area of 25,820m², the pavement area occupies 11,820m², the landscaping occupies 3,900m², and a drainage easement occupies 2,190m². The development site is bounded by the balance of Lot 3 on the southern boundary.

Water Sensitive Urban Design

The objective of water sensitive urban design 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:

- Control the quality of stormwater that is disposed from the site;
- Control the quantity of stormwater that is discharged for the site.
- Maintain the capacity of the site to transfer upstream overland flows.

The management of stormwater on site considers not only the development of WH1, but also potential future warehouse developments within the site. To demonstrate the above, concept stormwater drainage plans and associated details have been prepared along with detailed modelling using the Council endorsed MUSIC software package. The concept stormwater drainage plans detail the location of the water management infrastructure including the on-site detention tank (OSD), gross pollutant trap (GPT), culvert, swale, pits and pipes and are included in Appendix A.

Stormwater Quality

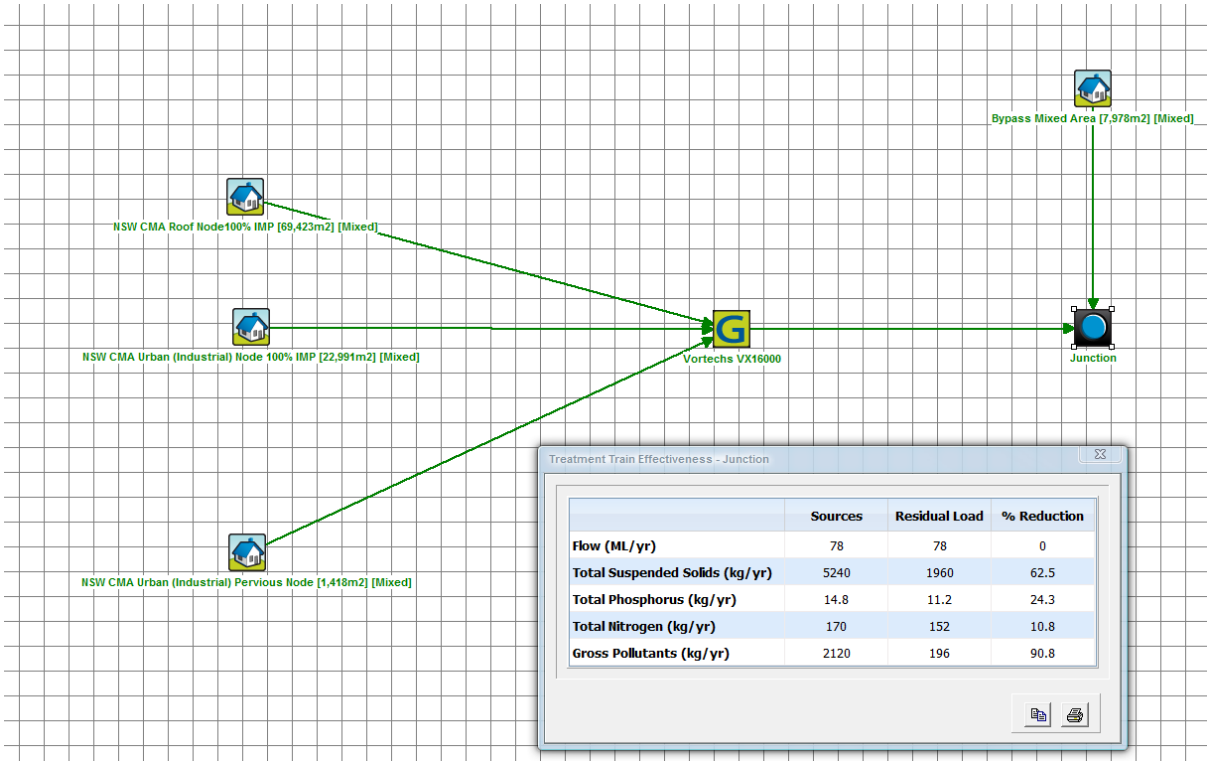
To ensure the quality of stormwater leaving the site is acceptable and meets council's requirements specific water quality treatment measures are to be employed. These treatment measures are to treat the collected stormwater runoff prior to discharge to the existing council drainage channel. The treatment measures consist of two Stormwater 360 Vortechs 16000 units or approved equivalent, positioned after the proposed on-site detention tank. As a single unit has a design treatment capacity of 710L/s, the provision of two units will distribute the high flow of water exiting the OSD (refer to *Stormwater Quantity* below) into approximately 600L/s per unit.

The Vortechs® System is from the Hydrodynamic separator class of products which is accepted as being able to capture and retain hydrocarbons. The process of doing this is via density separation using an underflow/overflow arrangement to retain floating pollutants within the flotation zone. It is well known that hydrocarbons in stormwater can be found in a variety of forms and is readily absorbed by sediments, silts and organics, hence the hydrocarbon pollutants removal rate is also directly associated with the removal rates of Gross Pollutants and TSS. Hydrocarbon removal for the Vortechs is unable to be performed using the MUSIC software, however through the removal of suspended solids and gross pollutants, hydrocarbon reduction in the order of 70%-90% will be achieved.

Modelling of the proposed treatment measures has been undertaken using the MUSIC software package version 6.3.0. The modelling results of the water quality achieved for the site is detailed in Table 1 – MUSIC Model Results below, along with a figure of the prepared model.

	Source Load	Residual Load	% Reduction Achieved	CC % Reduction Requirement	Compliance with Council Requirement
Total Suspended Solids (kg/yr)	5240	1960	62.5	50	Y
Gross Pollutants (kg/yr)	2120	196	90.8	80	Y

Table 1 - MUSIC Model Results



	Sources	Residual Load	% Reduction
Flow (ML/yr)	78	78	0
Total Suspended Solids (kg/yr)	5240	1960	62.5
Total Phosphorus (kg/yr)	14.8	11.2	24.3
Total Nitrogen (kg/yr)	170	152	10.8
Gross Pollutants (kg/yr)	2120	196	90.8

Stormwater Quantity

The proposed development requires the implementation of on-site detention (OSD) as per the former Holroyd City Council OSD Policy and UPRCT OSD Policy Handbook to control stormwater discharge from the site. The OSD has been designed to account for potential future developments in Lot 3 and Lot 12 (subject to a separate DA submission), and therefore includes additional storage than required for the proposed industrial development. The proposed OSD catchment area is approximately 101,810m^2 with 92.0% draining to the proposed on-site detention (OSD) facility, which includes hardstand (22,991m²), roof (69,423m²) and landscaped (1,418m²) areas. A catchment plan of the proposed development is included in Appendix A.

The Holroyd Council OSD summary sheet has been utilised to determine the required volume and discharge for the proposed development. The site is situated within the Prospect Creek' catchment. Based on the above catchment areas the storage required for the proposed development is approx. 3,432m³ with a maximum discharge of 1,177L/sec. The OSD summary sheet is located in Appendix B for review.

Flooding

The site has been identified as flood affected by council and a flood advice letter has been provided showing flood levels in the vicinity of the site. A copy of this letter is located in Appendix C. The approved DA submission addressed flooding in the vicinity by providing freeboard to prevent flood waters entering the building, and measures to direct overland flow toward the existing council drainage channel, allowing overland flow to pass unimpeded through the site into Prospect Creek. A summary of the proposed S4.55 flood mitigation measures are outlined further below.

Freeboard

Due to the changes to the site layout proposed in the S4.55 application, the flood protection wall proposed in the DA design is no longer feasible. Freeboard has been provided by raising the building to

RL15.500m, which provides 500mm of freeboard above the 100ARI top water levels in Dursley Road of RL15.000m.

Overland Flow

The approved DA design provided a swale and channel along a portion of the northern boundary on Dursley Road to intercept overland flow approaching from the north and direct flow into the existing drainage channel. The council flood modelling was completed by Lyall and Associates and they have been engaged by sparks and Partners to provide the design volume of overland flow enters the site from Dursley Road. The overland flow volume was confirmed as 1.32m3/s for the 100 year ARI flood and the channel has been designed for this flow. Refer to Appendix D for the overland flow rate confirmation and Appendix A for revised design drawings.

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 G 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 water sensitive urban design have been incorporated into the design and operation of the proposed development at Lot 3, 7 Dursley Road, Yennora, and is in accordance with the former Holroyd City Council policies. It is demonstrated that the proposed development achieves pollution reduction targets set by council and employs OSD for the control of stormwater discharge from the site in accordance with targets set by council. It is also demonstrated that the proposed development does not increase floodwater levels in surrounding properties by allowing overland flows to pass unimpeded through the site, and the proposed development is adequately protected from the overland flow. The site stormwater management 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 Drainage Plans

INDUSTRIAL DEVELOPMENT
LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW
CONCEPT STORMWATER MANAGEMENT

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.

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.

SEDIMENT AND EROSION CONTROL

1. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH (INSERT LOCAL 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 - 1:20YR ARI (EAVES), 1:100YR ARI (BOX)
   1.2. PIPED DRAINAGE - 1:10YR ARI
   1.3. EMERGENCY OVERLAND FLOWS - GAP FLOW BETWEEN 1:20YR ARI & 1:100YR ARI DIRECTED TO OSD WHERE PRACTICAL.
2. WORKS ARE CONCEPTUAL ONLY AND SUBJECT TO FINAL DESIGN AT THE CONSTRUCTION CERTIFICATE STAGE.
3. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH THE FOLLOWING AUSTRALIAN STANDARDS AS2032, AS3500 AND AS3725 AS A MINIMUM.
4. ALL PIPES LESS THAN OR EQUAL TO Ø300mm IN SIZE ARE TO BE SOLVENT WELD JOINTED UPVC CLASS SN8 U.N.O.
5. ALL PIPES Ø375mm OR GREATER IN SIZE ARE TO BE MIN. CLASS 2 REINFORCED CONCRETE PIPE (RCP) WITH RUBBER RING JOINT OR FIBRE REINFORCED CONCRETE (FRC) U.N.O. FRC PIPE IS TO BE VANTAGE PIPE "VPIPE+" WITH "VPIPE+ COLLAR" AT ALL JOINTS.
6. ALL PIPES ARE TO BE LAID AT MIN. 1.0% GRADE U.N.O.
7. PIPE BEDDING IS TO BE HS2 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 OBVERT 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.
10. 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.
11. 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.
12. DRAINAGE PIT COVERS ARE TO BE 'HEELSAFE' TYPE IN ALL PEDESTRIAN TRAFFICKED AREAS U.N.O.
13. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCING WORKS ON SITE.
14. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
15. DOWN PIPES CONNECTED DIRECT TO PIPES TO BE CONNECTED AT 45° TO THE FLOW DIRECTION WITH A CLEANING EYE PROVIDED AT GROUND LEVEL.

FINISHED LEVELS

1. LEVELS BASED ON SURVEY PREPARED BY LTS LOCKLEY REGISTERED SURVEYORS NSW Ref: 42964DT DATE 03/03/16. 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. DRIVEWAY LAYOUT AND DESIGN TO COMPLY WITH CUMBERLAND CITY COUNCIL ACCESS DRIVEWAY DESIGN AND CONSTRUCTION SPECIFICATION.
5. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
6. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H UNO.

ON-SITE DETENTION CALCULATION SUMMARY

1. ON-SITE DETENTION FOR THE DEVELOPMENT SITE DESIGNED TO ACHIEVE THE FOLLOWING

CATCHMENT	EVENT (YRS)	SITE STORAGE REQUIREMENT - SSR (m^3/ha)	PERMISSIBLE SITE DISCHARGE - PSD (l/s/ha)	SITE AREA (ha)	RESULTANT SSR (m^3)	RESULTANT PSD (L/s)	BYPASS FLOW - Q (L/s)	OSD DISCHARGE FLOW - Q (L/s)
PROSPECT CREEK	100	300	140	10.16	3267	124.1	67	1174

2. ORIFICE SIZED IN ACCORDANCE WITH ORIFICE EQUATION
   $Q = 0.62 \times A \times (2g \times H)^{0.5}$
   WHERE;
   100YR ORIFICE CONTROL
   ORIFICE SURFACE AREA (A) = $\pi \times r^2$
   GRAVITY (g) = 9.81m/s^2
   EFFECTIVE HEAD (H) = 1.90m
   FLOW (Q) = 1.24m^3/s
   100YR ORIFICE DIAMETER = 646mm

LOCALITY PLAN
NOT TO SCALE - COURTESY OF SIX MAPS

DRAWING SCHEDULE

ISSUED FOR S4.55

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NORTH POINT

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05.09.18		ISSUED FOR S4.55	BB	2

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CLIENT: FIFE CAPITAL
ARCHITECT: REIDCAMPBELL Architecture, Interiors, Project Management ACN 002 030 801 ABN 28 317 606 879
PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW
DRAWING TITLE: CIVIL DESIGN COVER SHEET, LOCALITY PLAN & DRAWING SCHEDULE

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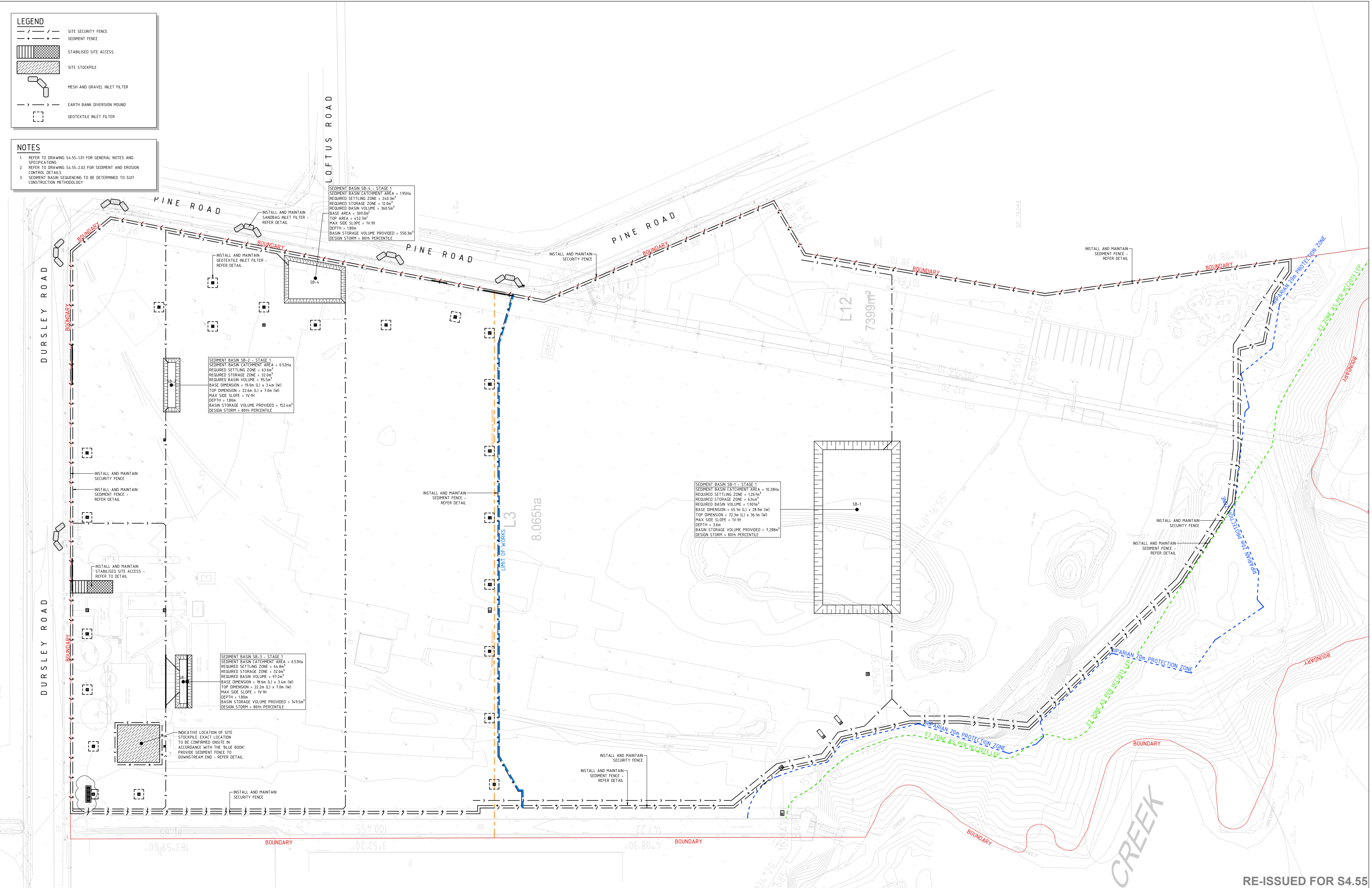
DATE: AUGUST 2018 | DESIGN: DL | DRAWN: DL | CHECKED: BB
SCALE: N.T.S
JOB No: 17260 | DWG No: S4.55-1.01 | REV: 2 | SHT: 1 OF 2



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VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

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SCALE 0 5 10 15 20 25 30 35 40 METERS

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05.09.18		ISSUED FOR S4.55	BB	1
21.01.19		RE-ISSUED FOR S4.55	BB	2

DATE	No	AMENDMENT	INIT	REV

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL
Architecture, Interiors, Project Management
ACN 002 033 801 ABN 28 317 605 875

PROJECT:
INDUSTRIAL DEVELOPMENT
LOTS 3 & 12, 7 DURSLEY ROAD,
YENNORA NSW

DRAWING TITLE:
CIVIL DESIGN
CONCEPT SEDIMENT AND EROSION
CONTROL PLAN

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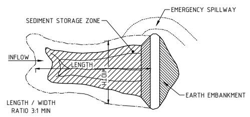
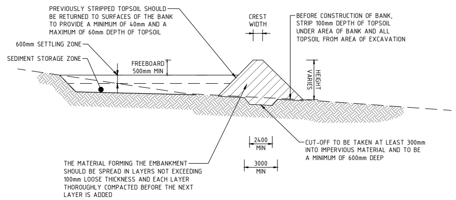
DATE: JAN 2019 | DESIGNED: DL
SCALE: 1:500m @A0 | DRAWN: DL
AHSCA CORPORATE MEMBER
JOB No: 17260 | DWG No: S4.55-2.01 | No IN SET: OF | REV: 2



SEDIMENT BASIN WET (TYPICAL) CROSS PLAN - TYPE D AND F SOILS

NOT TO SCALE

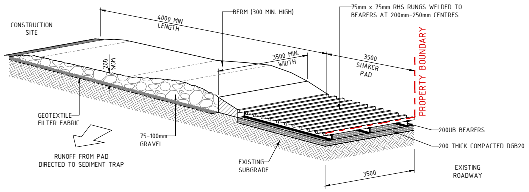


SEDIMENT BASIN WET (TYPICAL) CROSS SECTION - TYPE D AND F SOILS

NOT TO SCALE

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 500mm DEEP AND 1200mm WIDE ALONG THE CENTERLINE 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 MATERIAL WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95% 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 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP
7. CONSTRUCT THE EMERGENCY SPILLWAY
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP

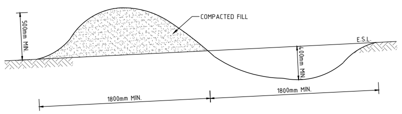


STABILISED SITE ACCESS

NOT TO SCALE

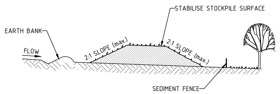
MAINTENANCE

- 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 TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
- INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.



DIVERSION BANK

NOT TO SCALE

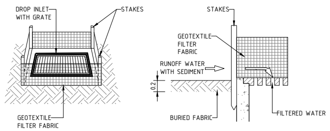


STOCKPILE

NOT TO SCALE

NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM 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.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

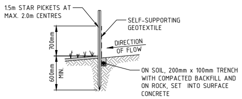


GEOTEXTILE INLET FILTER DROP INLET SEDIMENT TRAP

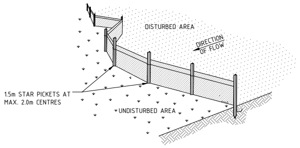
NOT TO SCALE

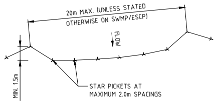
NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.0m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. 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.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



SECTION DETAIL





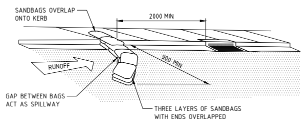
PLAN

SEDIMENT FENCE

NOT TO SCALE

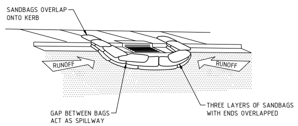
NOTES:

1. 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.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m 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.
4. 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.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



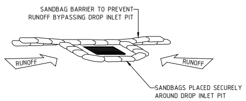
SEDIMENT TRAP FOR KERB INLET (ON GRADE - SANDBAG)

NOT TO SCALE



SEDIMENT TRAP FOR KERB INLET (AT LOW POINT - SANDBAG)

NOT TO SCALE



SEDIMENT TRAP FOR DROP INLET PIT

NOT TO SCALE

NOTE:

GROUND LEVEL AT END OF SANDBAG BARRIER MUST BE HIGHER THAN DROP INLET SANDBAG LAYER.

ISSUED FOR S4.55

1. DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY
2. DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION.
3. LEVELS ARE INDICATIVE ONLY AND ARE TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
4. AUTHORITIES MAINS AND/OR EXISTING SERVICES ARE TO BE LOCATED AND CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.

CHECKED	DATE	NORTH POINT
APPROVED	DATE	
PAGE A0	PLOT DATE September 5, 2018	
SCALE	SCALE AS SHOWN ON PLAN	

DATE	No	AMENDMENT	INIT	REV
05.09.18		ISSUED FOR S4.55	BB	1

CLIENT	FIFE CAPITAL
ARCHITECT	REIDCAMPBELL Architecture, Interiors, Project Management
PROJECT	INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW
DRAWING TITLE	CIVIL DESIGN CONCEPT SEDIMENT AND EROSION CONTROL DETAILS
DATE	AUGUST 2018
DESIGNED	DL
SCALE	AS SHOWN
DRAWN	DL
JOB No	17260
DWG No	S4.55-2.02
REV	1

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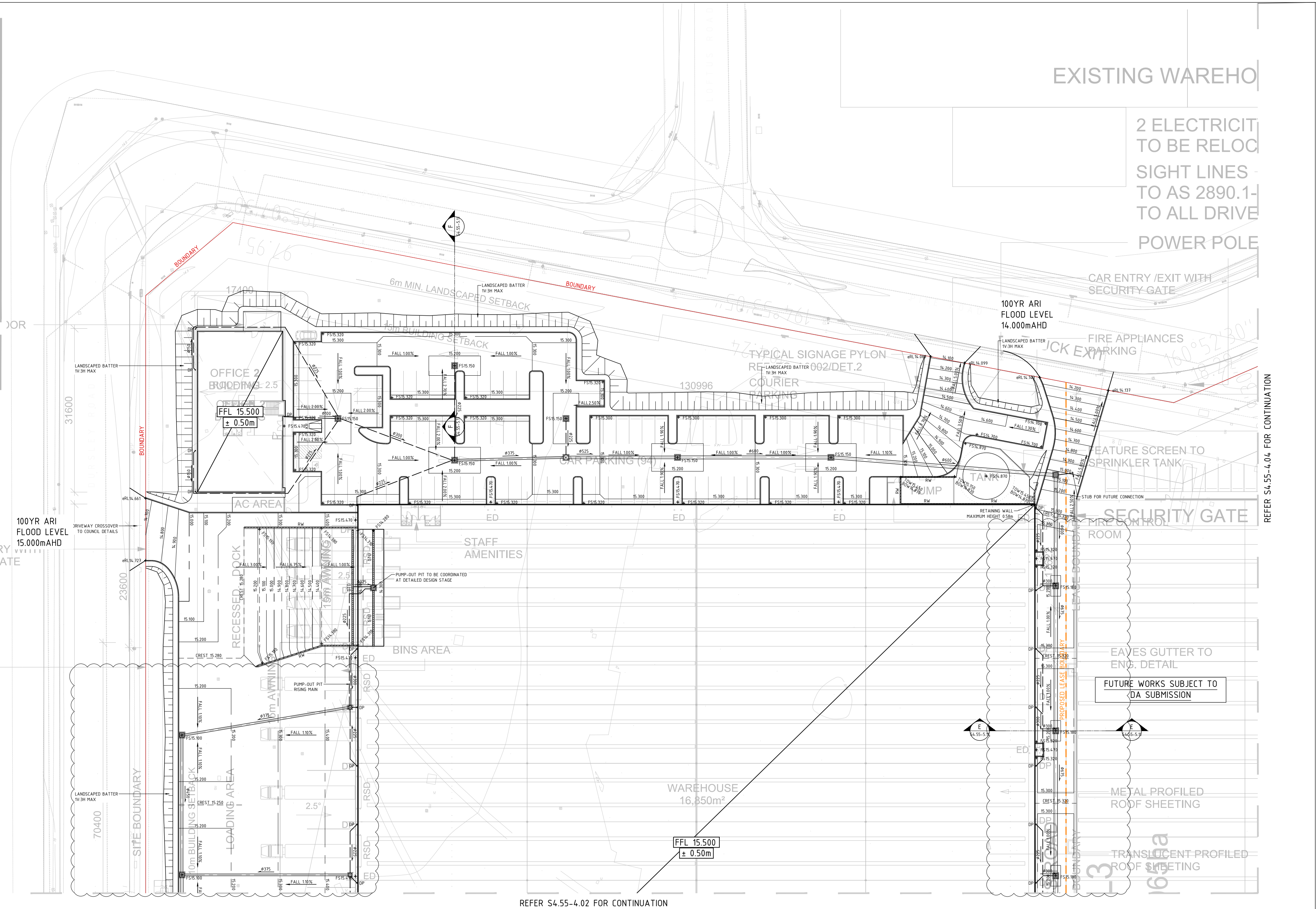
LEGEND

21.00	FINISHED SURFACE MAJOR CONTOUR LINE
21.10	FINISHED SURFACE MINOR CONTOUR LINE
21.10	FINISHED SURFACE CREST LINE
FFL 555.555	FINISHED FLOOR LEVEL OF PROPOSED BUILDING
+ FS555.555	FINISHED SURFACE LEVEL
+ eRL55.555	EXISTING SURFACE LEVEL
+ IOK55.555	INVERT OF KERB LEVEL
+ TOW55.555	TOP OF WALL LEVEL
+ BOW55.555	BOTTOM OF WALL LEVEL
FALL 1.28%	DIRECTION OF SURFACE FALL
KO	PROPOSED KERB ONLY - REFER DETAIL
KR	KERB RAMP - REFER DETAIL
	EXTENT OF BATTER
RW	RETAINING WALL
	VEHICLE BARRIER FENCE
	SECURITY FENCE
	DRAINAGE SWALE
	PROPOSED STORMWATER PIPE (≤Ø300)
	PROPOSED STORMWATER PIPE (>Ø300)
	EXISTING STORMWATER PIPE
	PROPOSED STORMWATER PIT
• DP	PROPOSED DOWNPIPE
GTD	PROPOSED GRATED TRENCH DRAIN
	ONSITE DETENTION TANK
Ø225	PIPE FLOW DIRECTION AND SIZE

NOTES

1. REFER TO DRAWING S4.55-1.01 FOR GENERAL NOTES AND SPECIFICATIONS
2. REFER TO DRAWING S4.55-4.05 FOR CONCEPT STORMWATER CATCHMENT PLAN
3. REFER TO DRAWINGS S4.55-4.11 - S4.55-4.13 FOR CONCEPT STORMWATER MANAGEMENT DETAILS



REFER S4.55-4.02 FOR CONTINUATION

ISSUED FOR S4.55

DATE	No	AMENDMENT	INIT	REV
20.08.18		PRELIMINARY DESIGN ISSUE	BB	1
24.08.18		90% DESIGN PROGRESS ISSUE	DL	2
05.09.18		ISSUED FOR S4.55	BB	3

PAGE A0 — PLOT DATE September 5, 2018

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL — Architecture, Interiors, Project Management — ACN 002 033 801 ABN 28 317 605 875

PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER MANAGEMENT PLAN SHEET 1

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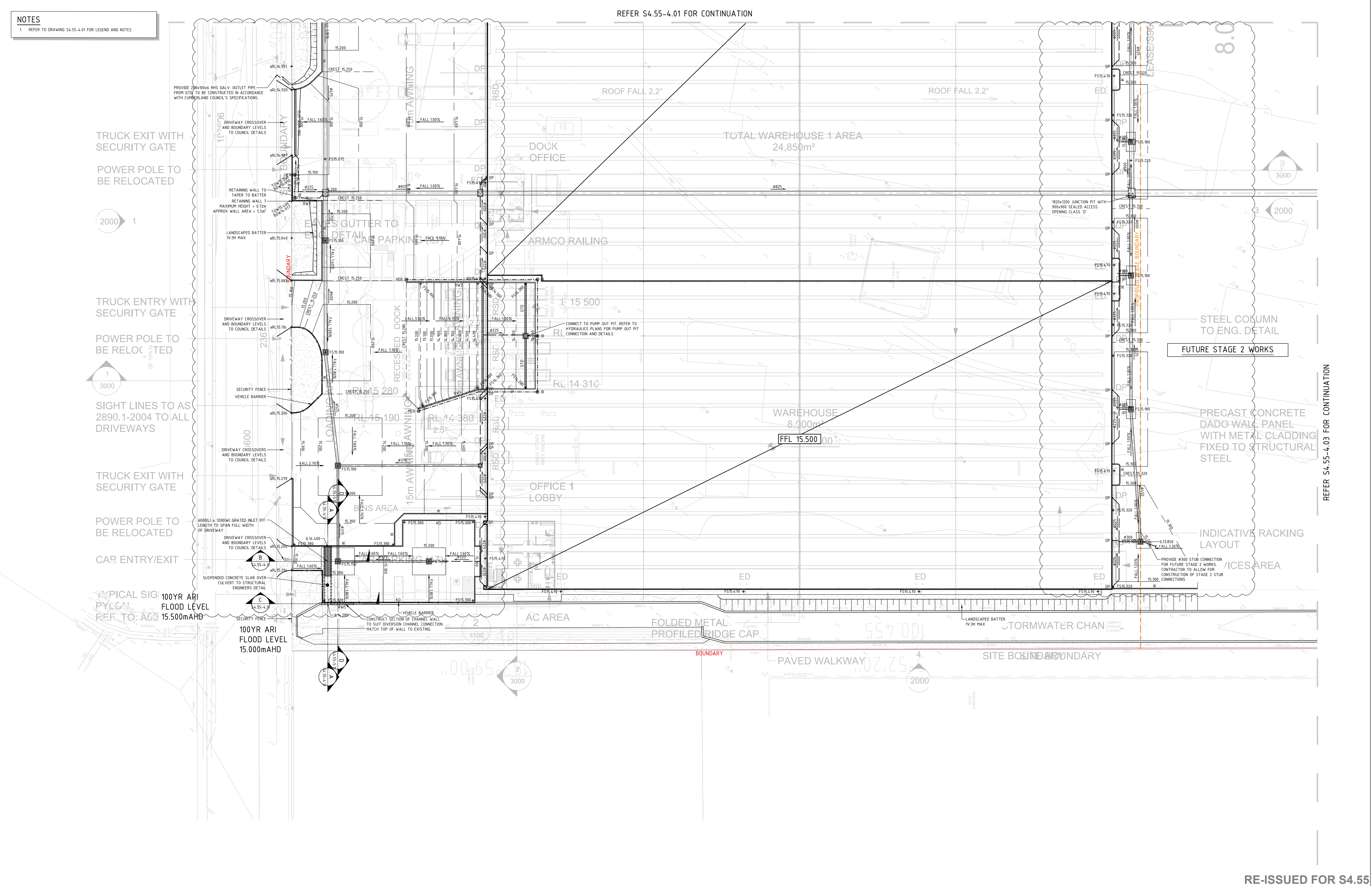
DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	REV
AUGUST 2018	DL	1:250m @A0	DL	17260	S4.55-4.01	3



RE-ISSUED FOR S4.55

DATE	No	AMENDMENT	INIT	REV
20.08.18		PRELIMINARY DESIGN ISSUE	BB	1
24.08.18		90% DESIGN PROGRESS ISSUE	DL	2
05.09.18		ISSUED FOR S4.55	BB	3
21.01.19		RE-ISSUED FOR S4.55	BB	4

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL — Architecture, Interiors, Project Management — ACN 002 033 801 ABN 28 317 605 875

PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER MANAGEMENT PLAN SHEET 2

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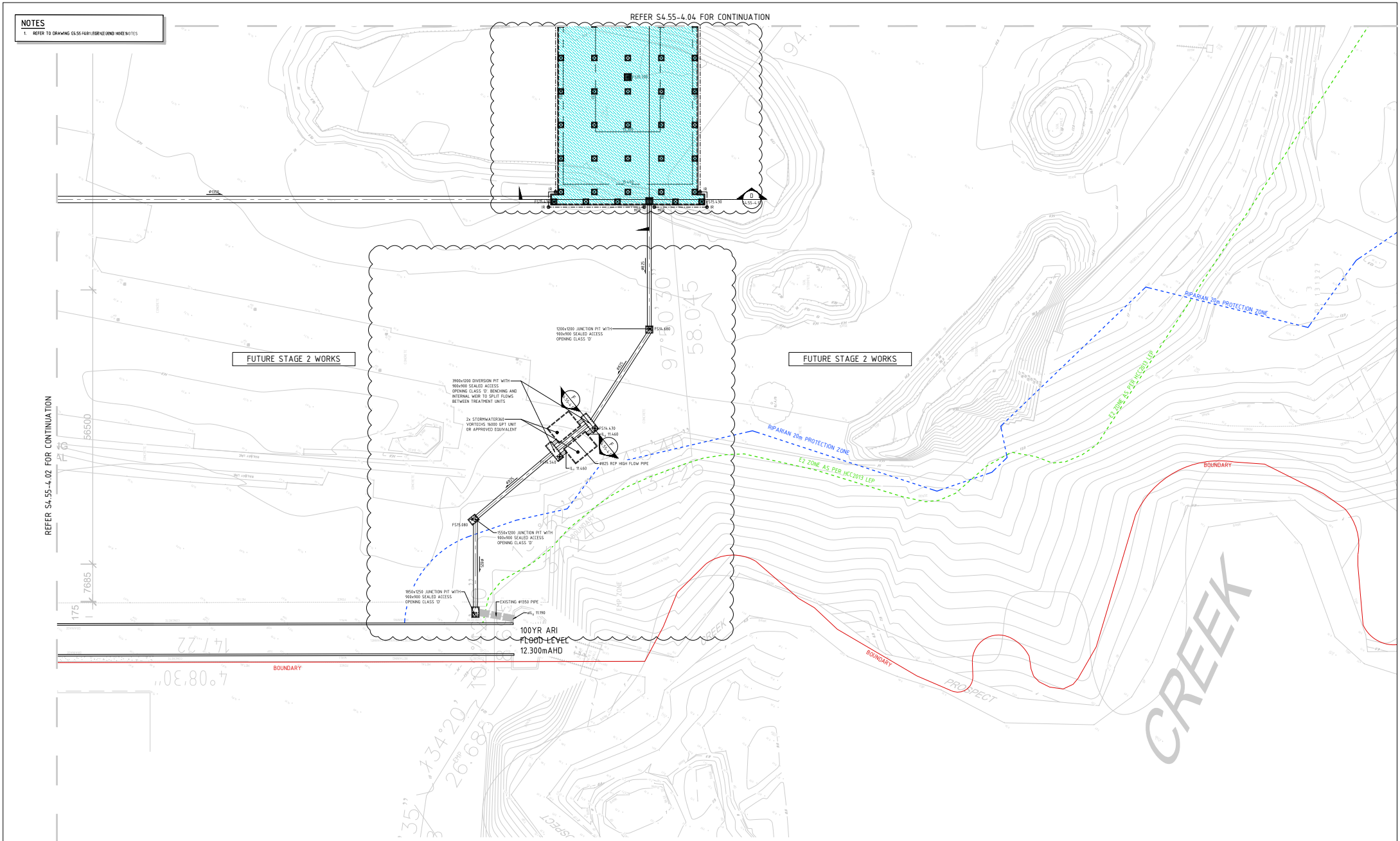
DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
JAN 2019	DL	1:250m @A0	DL	17260	S4.55-4.02	OF	4



RE-ISSUED FOR S4.55

DATE	No	AMENDMENT	INIT	REV
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04.08.18		90% DESIGN PROGRESS ISSUE	DL	2
06.09.18		ISSUED FOR S4.55	BB	3
21.01.19		RE-ISSUED FOR S4.55	BB	4

CHECKED | DATE
APPROVED | DATE
PLOT DATE: January 21, 2019
PAPER SIZE: A0
SCALE: 1:250 @ A0

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL Architecture, Interiors, Project Management

PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER MANAGEMENT PLAN SHEET 3

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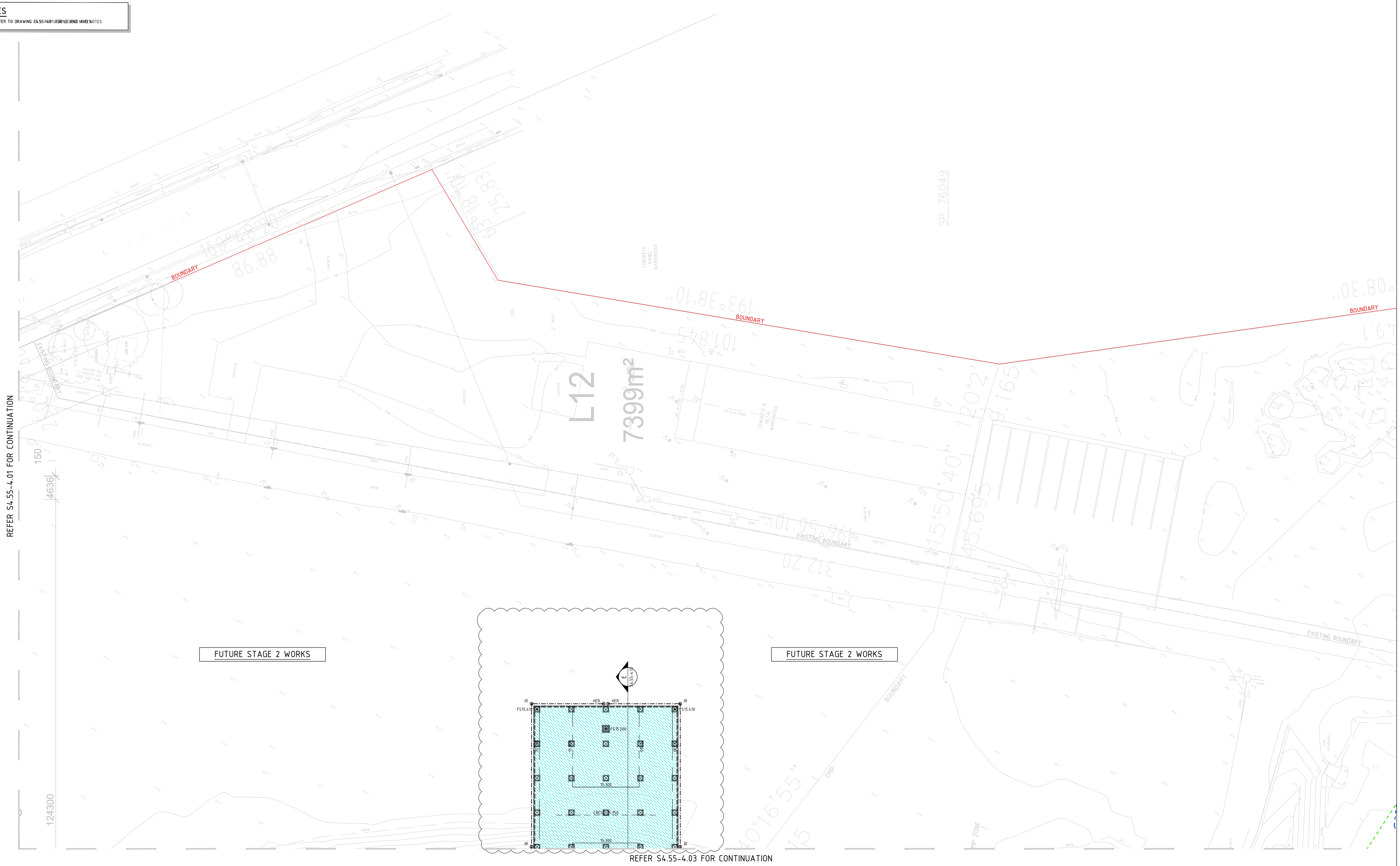
DATE: JAN 2019 | DRAWN: DL | CHECKED: | APPROVED:

SCALE: 1:250m @A0 | REVISION: DL

JOB No: 172603 | DRAWING No: S4.55-4.03 | SHEET: 4 OF 4

NOTES

1. REFER TO DRAWING S4.55-4.01 FOR LEGEND AND NOTES



RE-ISSUED FOR S4.55

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5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.

VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE A0 | PLOT DATE January 21, 2019

NORTH POINT

SCALE 0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 METERS

DATE	No	AMENDMENT	INIT	REV
24.08.18		90% DESIGN PROGRESS ISSUE	DL	1
05.09.18		ISSUED FOR S4.55	BB	2
21.01.19		RE-ISSUED FOR S4.55	BB	3

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL Architecture, Interiors, Project Management ACN 002 033 801 ABN 28 317 605 875

PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER MANAGEMENT PLAN SHEET 4

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DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
JAN 2019	DL	1:100	DL	17260	S4.55-4.04	---- OF	3

AHSCA CORPORATE MEMBER

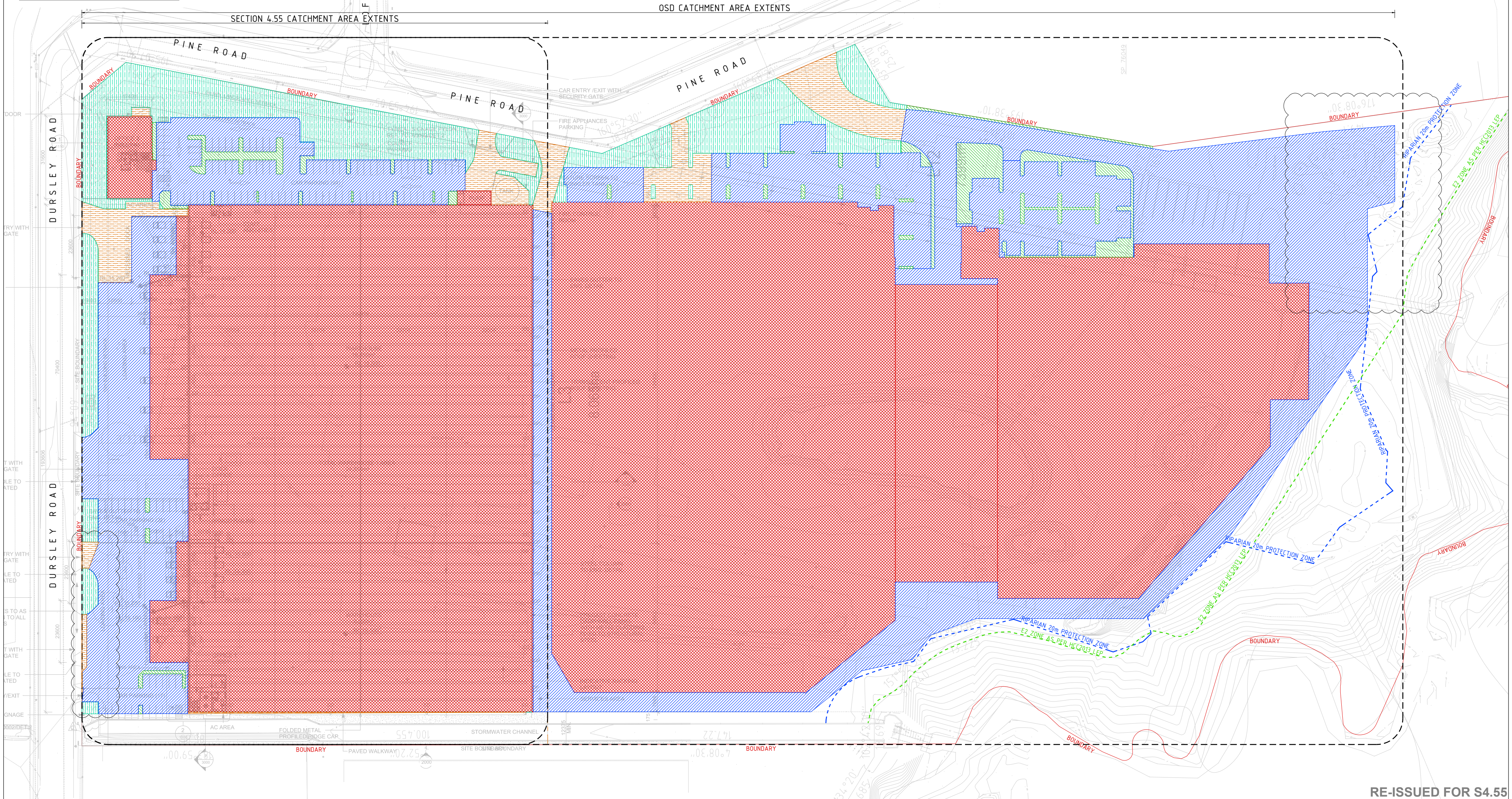
LEGEND

- IMPERVIOUS CATCHMENT AREA = 22,991m²
- PERVIOUS CATCHMENT AREA = 1,418m²
- ROOF CATCHMENT AREA = 69,423m²
- IMPERVIOUS BYPASS AREA = 2,537m²
- PERVIOUS BYPASS AREA = 5,441m²

TOTAL SITE AREA = 101,810m²

NOTES

1. REFER TO DRAWING S4.55-1.01 FOR GENERAL NOTES AND SPECIFICATIONS
2. CATCHMENTS FOR FUTURE WORKS SUBJECT TO DA SUBMISSION
3. ON-SITE DETENTION DESIGNED FOR TOTAL SITE CATCHMENT



RE-ISSUED FOR S4.55

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VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE A0 | PLOT DATE January 21, 2019

NORTH POINT

SCALE 0 5 10 15 20 25 30 35 40 METERS

DATE	No	AMENDMENT	INIT	REV
24.08.18		90% DESIGN PROGRESS ISSUE	DL	1
05.09.18		ISSUED FOR S4.55	BB	2
21.01.19		RE-ISSUED FOR S4.55	BB	3

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL — Architecture, Interiors, Project Management — ACN 002 033 801 ABN 28 317 605 875

PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER CATCHMENT PLAN

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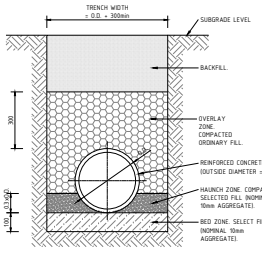
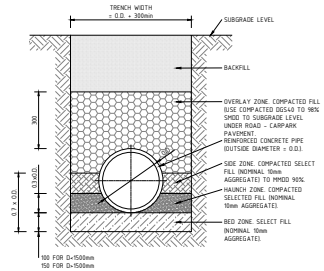
DATE	DESIGNED	DRAWN	SCALE	JOB No	DWG No	No IN SET	REV
JAN 2019	DL	DL	1:500m @A0	17260	S4.55-4.05	OF	3

AHSCA CORPORATE MEMBER



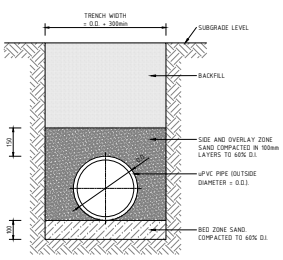
CONCRETE PIPE TRENCHING IN LANDSCAPING
SCALE 1:10

NOTES
1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
3. THE CONTRACTOR SHALL ENSURE THAT THE SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
4. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS
- 96% SMDD



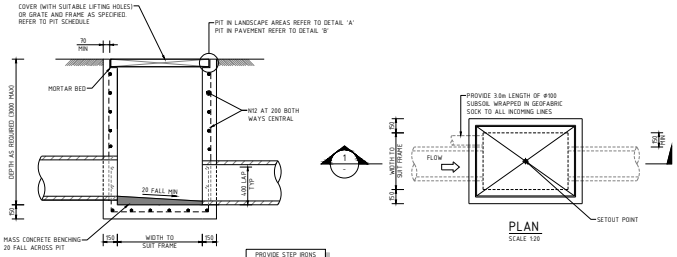
CONCRETE PIPE TRENCHING IN PAVED AREAS
SCALE 1:10

NOTES
1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
2. THE CONTRACTOR SHALL ENSURE THAT THE SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
3. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS
- 100% SMDD

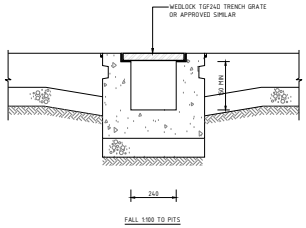


PIPE TRENCHING FOR uPVC PIPE
SCALE 1:10

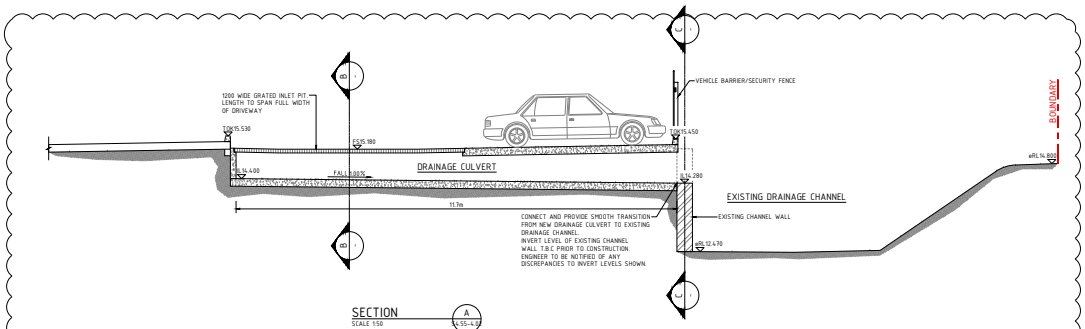
NOTES
1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
2. THE CONTRACTOR SHALL ENSURE THAT THE SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
3. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS
- 60%D.I.

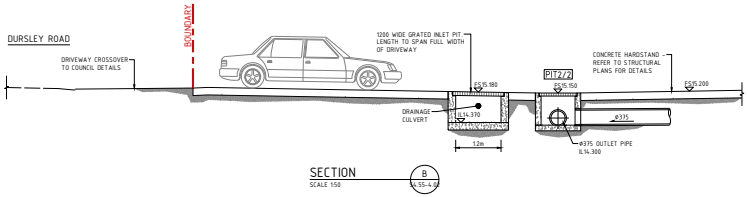


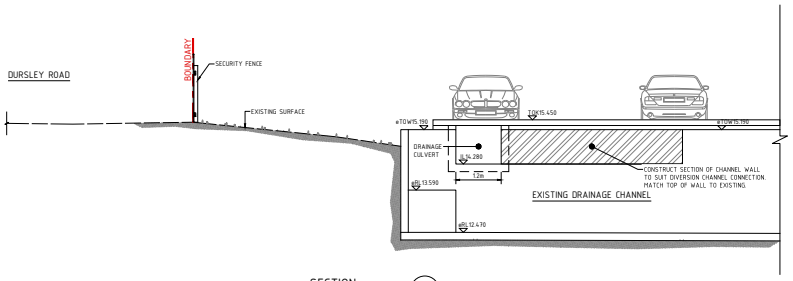
SURFACE INLET / JUNCTION PIT
(PIPE SIZES ≤ ø450)

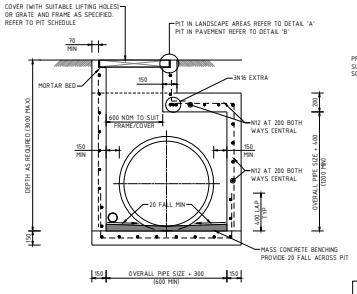


TYPICAL GRATED TRENCH DRAIN (GTD) SECTION
SCALE 1:10

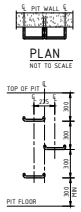




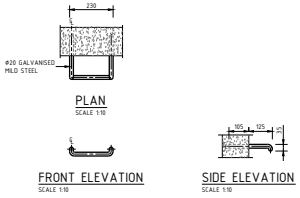




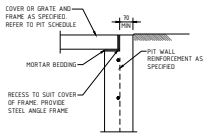
SURFACE INLET / JUNCTION PIT
(PIPE SIZES > ø450)



STEP IRON PLACEMENT TO PIT WALL
NOT TO SCALE



STEP IRON DETAIL
SCALE 1:10



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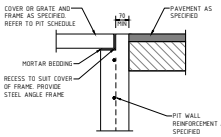
SCALE 1:10



DETAIL 'B'
SCALE 1:10

RE-ISSUED FOR S4.55

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04.08.18		90% DESIGN PROGRESS ISSUE	MW	1
05.09.18		ISSUED FOR S4.55	BB	2
21.01.19		RE-ISSUED FOR S4.55	BB	3

DATE	No	AMENDMENT	INIT	REV

CLIENT: FIFE CAPITAL

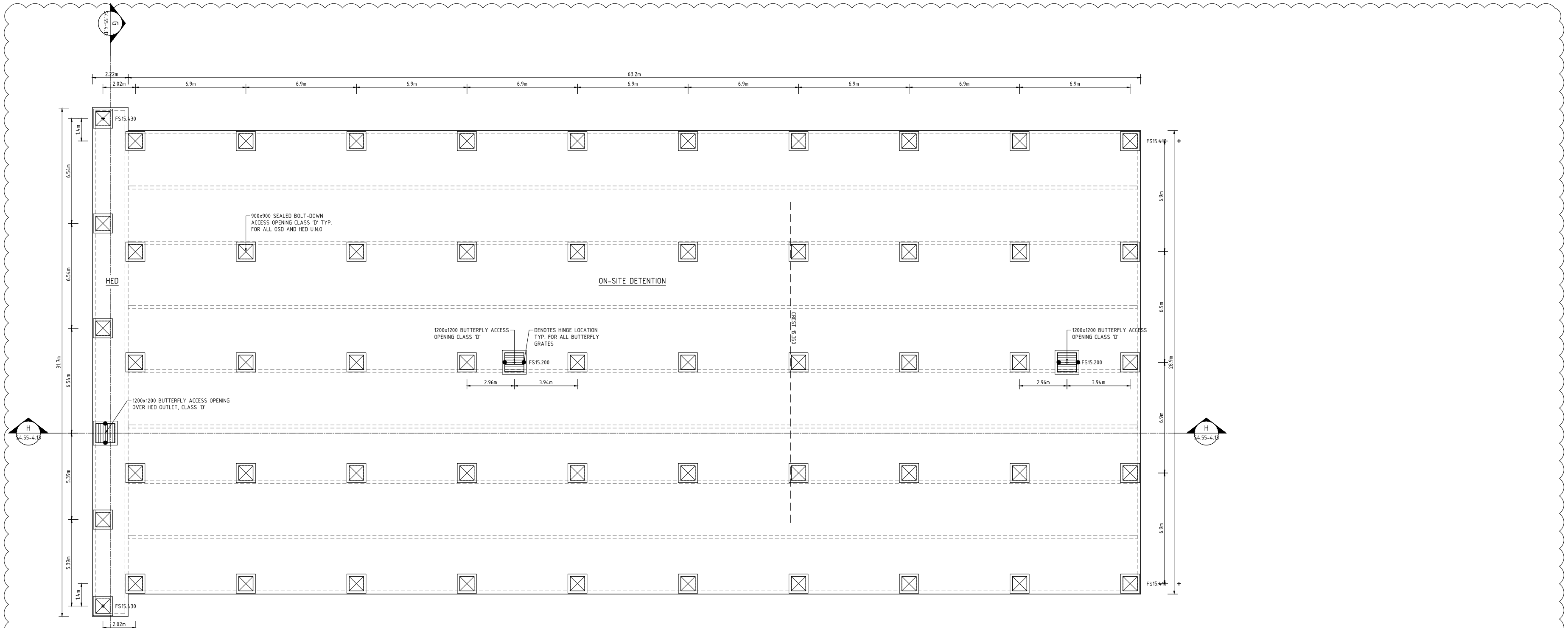
ARCHITECT: REIDCAMPBELL
Architecture, Interiors, Project Management
ACN 002 030 801 ABN 28 317 606 879

PROJECT: INDUSTRIAL DEVELOPMENT
LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

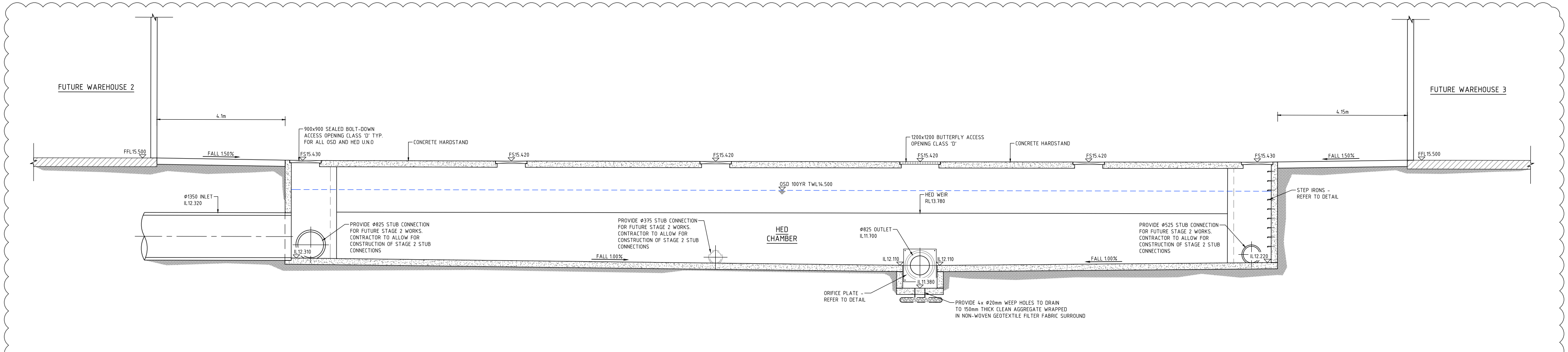
DRAWING TITLE: CIVIL DESIGN
CONCEPT STORMWATER MANAGEMENT DETAILS SHEET 1

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5022 | F 02 9893 2888 | E admin@sparksandpartners.com.au

DATE: JAN 2019
SCALE: AS SHOWN
DRAWN: DL
DESIGN: DL
JOB No: 17260
DWG No: S4.55-4.11
REV: 3
SHT: 3 OF 3



OSD TANK - ROOF PLAN
SCALE 1:100



OSD TANK SECTION (G / S4.55-4.12)
SCALE 1:50

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VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

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PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE A0 | PLOT DATE January 21, 2019
NORTH POINT

SCALE: SCALE AS SHOWN ON PLAN

DATE	No	AMENDMENT	INIT	REV
24.08.18		90% DESIGN PROGRESS ISSUE	MW	1
05.09.18		ISSUED FOR COORDINATION	DL	2
05.09.18		ISSUED FOR S4.55	BB	3
21.01.19		RE-ISSUED FOR S4.55	BB	4

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL Architecture, Interiors, Project Management ACN 002 033 801 ABN 28 317 605 875

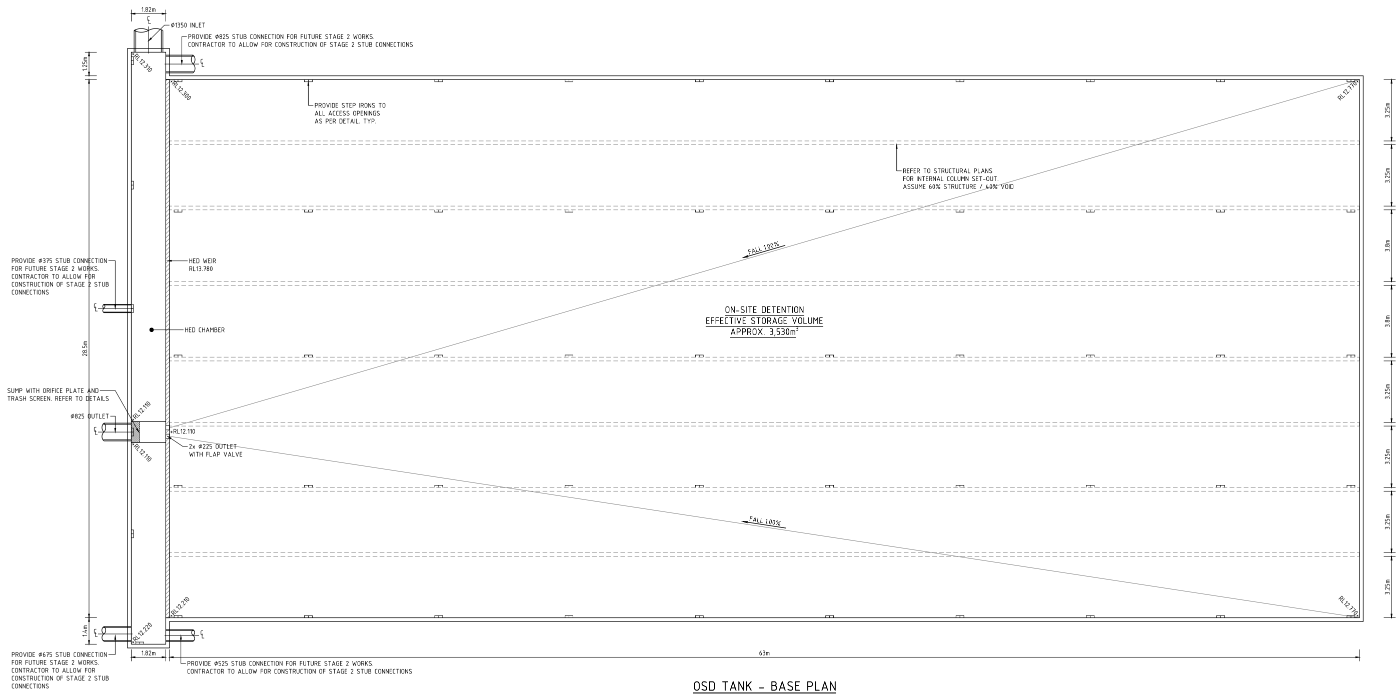
PROJECT: INDUSTRIAL DEVELOPMENT LOTS 3 & 12, 7 DURSLEY ROAD, YENNORA NSW

DRAWING TITLE: CIVIL DESIGN CONCEPT STORMWATER MANAGEMENT DETAILS SHEET 2

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

DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
JAN 2019	DL	AS SHOWN	DL	17260	S4.55-4.12	OF	4

AHSCA The Association of Hydraulic Services Consultants Australia (NSW) Inc. CORPORATE MEMBER



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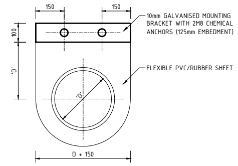

FLAP VALVE
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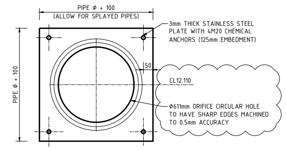

ORIFICE PLATE - TYPE A
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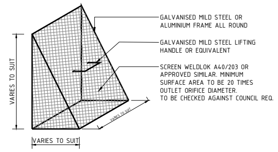
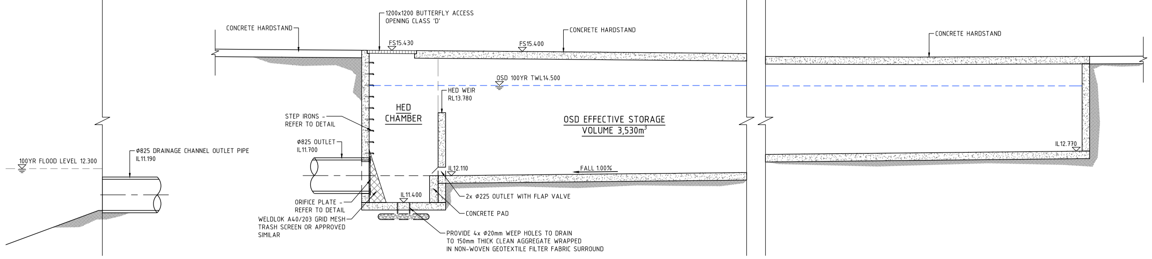


TYPICAL REMOVABLE SCREEN DETAIL
NOT TO SCALE

NOTES
PROVIDE FIXING CLIPS OR BRACKETS TO WALL OF PIT AT OUTLET. ALLOW FOR EASE OF REMOVAL.



OSD TANK SECTION (H / S4.55-4.12)
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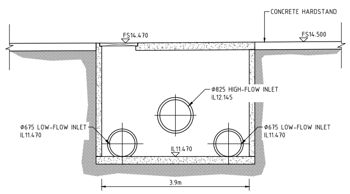

SECTION (I / S4.55-4.12)
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VERIFICATION
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PAGE A0 | PLOT DATE January 21, 2019
NORTH POINT

SCALE
SCALE AS SHOWN ON PLAN

DATE	No	AMENDMENT	INIT	REV
24.08.18		90% DESIGN PROGRESS ISSUE	MW	1
05.09.18		ISSUED FOR COORDINATION	DL	2
05.09.18		ISSUED FOR S4.55	BB	3
21.01.19		RE-ISSUED FOR S4.55	BB	4

DATE	No	AMENDMENT	INIT	REV

CLIENT
FIFE CAPITAL

ARCHITECT
REIDCAMPBELL
Architecture, Interiors, Project Management
ACN 002 033 801 ABN 28 317 605 875

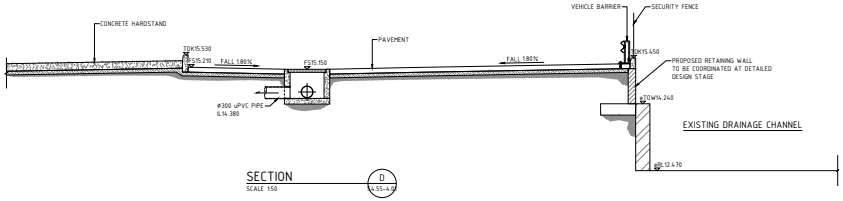
PROJECT
INDUSTRIAL DEVELOPMENT
LOTS 3 & 12, 7 DURSLEY ROAD,
YENNORA NSW

DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER
MANAGEMENT DETAILS SHEET 3

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

DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
JAN 2019	DL	AS SHOWN	DL	17260	S4.55-4.13	OF	4

AHSCA CORPORATE MEMBER



SECTION D
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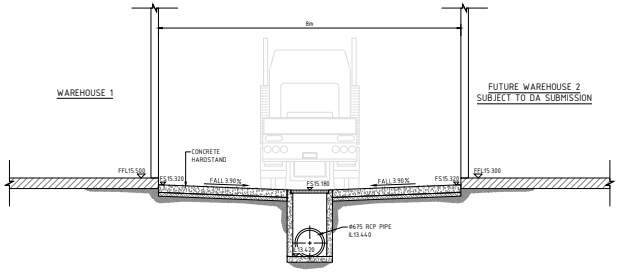
S4.55-4.01



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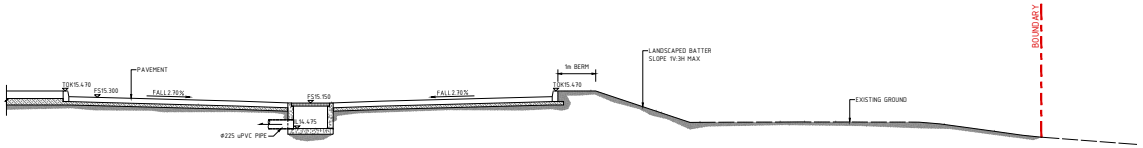
S4.55-4.01



SECTION F
SCALE 1:50
S4.55-4.01

ISSUED FOR S4.55

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PAPER SIZE: A0 | September 5, 2018
NORTH POINT
SCALE: 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 METERS

DATE	No	AMENDMENT	INIT	REV
05.09.18		ISSUED FOR S4.55	BB	1

DATE	No	AMENDMENT	INIT	REV

CLIENT: FIFE CAPITAL

ARCHITECT: REIDCAMPBELL Architecture, Interiors, Project Management
ACN 002 030 801 ABN 28 317 606 879

PROJECT: INDUSTRIAL DEVELOPMENT
LOTS 3 & 12, 7 DURSLEY ROAD,
YENNORA NSW

DRAWING TITLE: CIVIL DESIGN
TYPICAL SITE SECTIONS SHEET 1

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HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5022 | F 02 9893 2888 | E admin@sparksandpartners.com.au

AHSCA

DATE	AUGUST 2018
SCALE	AS SHOWN
DRAWN	DL
JOB No	17260
DWG No	S4.55-5.11
REV	1
SHT	1 OF 1

Appendix B – OSD Calculations

	A	B	C	F	G	H	I
1						Form B1	
2	**HOLROYD CITY COUNCIL**						
3	**On-Site Detention Calculation Sheet**						
4	**A 'PROSPECT CREEK' CATCHMENT**						
5	Project:	7 DURSLEY ROAD			Lot No.	3	
6	Location:	YENNORA			DP No.	231327	
7	Designer:	BB			**D.A. No.**	**2016/501/1**	
8	Phone:	(02) 9891 5033		17260		*Master*	
9	OSD Area:			**UPRCT**		**UPRCT**	
10						**Drowned**	
11	Total OSD Area:			10.188	ha		
12	Site Area Considered			10.188	ha	**10.188**	ha
13	Permissable Site Discharge			140	l/s/ha		
14	Site Storage Requirement			300	m3/ha		
15	Basic Storage Volume			3056.31		3056.31	
16	Basic Discharge			1426.28		1426.28	
17	Top Water Level		AHD	14.500	m		
18	Weir RL(HED)		AHD	13.780	m		
19	Orifice centre line RL		AHD	12.110	m		
20	Outlet discharge RL				AHD	11.190	m
21	1% Flood level				AHD	12.360	m
22	Area of Site to Storage			9.386	**92%**	**9.386**	**92%**
23	Percentage of Site			92.13		92.13	
24	Storage per ha of contributing area			325.61		325.61	
25	Volume/PSD Adjustment			132.55		132.55	
26	PSD for site			1243.80		1243.80	
27	Maximum Head to Orifice Centre			**2.390**		**2.140**	
28	Calculated Orifice Diameter			**0.611**		**0.611**	
29	Maximum discharge			1243.80		1177.68	
30	Head for high early discharge			**1.670**		**1.420**	
31	High Early Discharge			1039.704	**84%**	959.319	**77%**
32	Mean Discharge			1141.752		1068.497	
33	Average Discharge per Hectare			121.640		113.836	
34							
35	Final Site Storage Ratio			348.25		365.55	
36	**Site Storage Volume Required**			**3268.82**		**3431.17**	
37	Volume Provided			3530	**108%**	**3530**	**103%**
38	**Volume Provided**				**0%**	**0.0**	**0%**
39						**0.0**	
40					**0%**	**0.0**	**0%**
41							
42	Issued for DA/CC	**S4.55**					
43	Date of Revision	**21-Jan-19**					
44	Checked By:						
45	Date Checked:						

Appendix C – Council Flood Letter

16 Memorial Avenue
PO Box 42
Merrylands NSW 2160

T 02 9840 9840
F 02 9840 9734
E hcc@holroyd.nsw.gov.au
www.holroyd.nsw.gov.au

DX 25408 Merrylands
TTY 02 9840 9988
ABN 20 661 226 766

Engineering Services

Our Reference: SC7-03
Contact: R Sario
Telephone: 9840 9874

2 December 2015

Cardno – c/ David Whyte
Level 9, The Forum, 203 Pacific Highway
ST LEONARDS NSW 2065

Dear Sir/Madam

FLOOD LEVELS AT NO 7 DURSLEY ROAD, YENNORA
BEING LOT 4 IN DP 1045391

I refer to your request dated 28 November 2015 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Draft Prospect Creek Overland Flood Study" prepared by Lyall & Associates in March 2015.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) are as follows:

1.	At location A	-	15.0 mAHD
2.	At location B	-	14.5 mAHD
3.	At location C	-	14.0 mAHD
4.	At location D	-	13.5 mAHD
5.	At location E	-	13.0 mAHD
6.	At location F	-	12.5 mAHD
7.	At location G	-	12.0 mAHD
8.	At location H	-	13.5 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

a) a flood storage area,
b) a floodway area,
c) a flow path,
d) a high hazard area,
e) a high risk area."

Council has determined that part of the flood control lie within three of the five items above - items *b, d* and *e*; therefore, a CDC cannot be issued on this site.

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

FLOOD LEVELS AT NO 7 DURSLEY ROAD, YENNORA
BEING LOT 3 IN DP 231327

I refer to your request dated 28 November 2015 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Draft Prospect Creek Overland Flood Study" prepared by Lyall & Associates in March 2015.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) are as follows:

9.	At location A	-	15.0 mAHD
10.	At location B	-	14.5 mAHD
11.	At location C	-	14.0 mAHD
12.	At location D	-	13.5 mAHD
13.	At location E	-	13.0 mAHD
14.	At location F	-	12.5 mAHD
15.	At location G	-	12.0 mAHD
16.	At location H	-	14.5 mAHD
17.	At location I	-	14.0 mAHD
18.	At location J	-	13.0 mAHD
19.	At location K	-	11.5 mAHD
20.	At location L	-	14.0 mAHD
21.	At location M	-	14.5 mAHD
22.	At location N	-	15.0 mAHD
23.	At location O	-	15.5 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

a) a flood storage area,
b) a floodway area,
c) a flow path,
d) a high hazard area,
e) a high risk area."

Council has determined that part of the flood control lie within four of the five items above - items *b, c, d* and *e*; therefore, a CDC cannot be issued on this site.

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

FLOOD LEVELS AT NO 7 DURSLEY ROAD, YENNORA
BEING LOT 12 IN DP 1048988

I refer to your request dated 28 November 2015 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Draft Prospect Creek Overland Flood Study" prepared by Lyall & Associates in March 2015.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) are as follows:

24.	At location A	-	14.5 mAHD
25.	At location B	-	14.0 mAHD
26.	At location C	-	13.5 mAHD
27.	At location D	-	13.0 mAHD
28.	At location E	-	11.5 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

a) a flood storage area,
b) a floodway area,
c) a flow path,
d) a high hazard area,
e) a high risk area."

Council has determined that part of the flood control lies in one of the five items above - items *b*; therefore, a CDC cannot be issued on this site.

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

The relationship between these levels and the ground surface may be determined by a survey of the property undertaken by a Registered Surveyor.

It should be noted that where the development or redevelopment of the property is proposed, reference should be made to the relevant Development Control Plan with regard to flooding and drainage issues. Please include a copy of this letter and map with any Development Application that you may lodge with Council for the subject site.

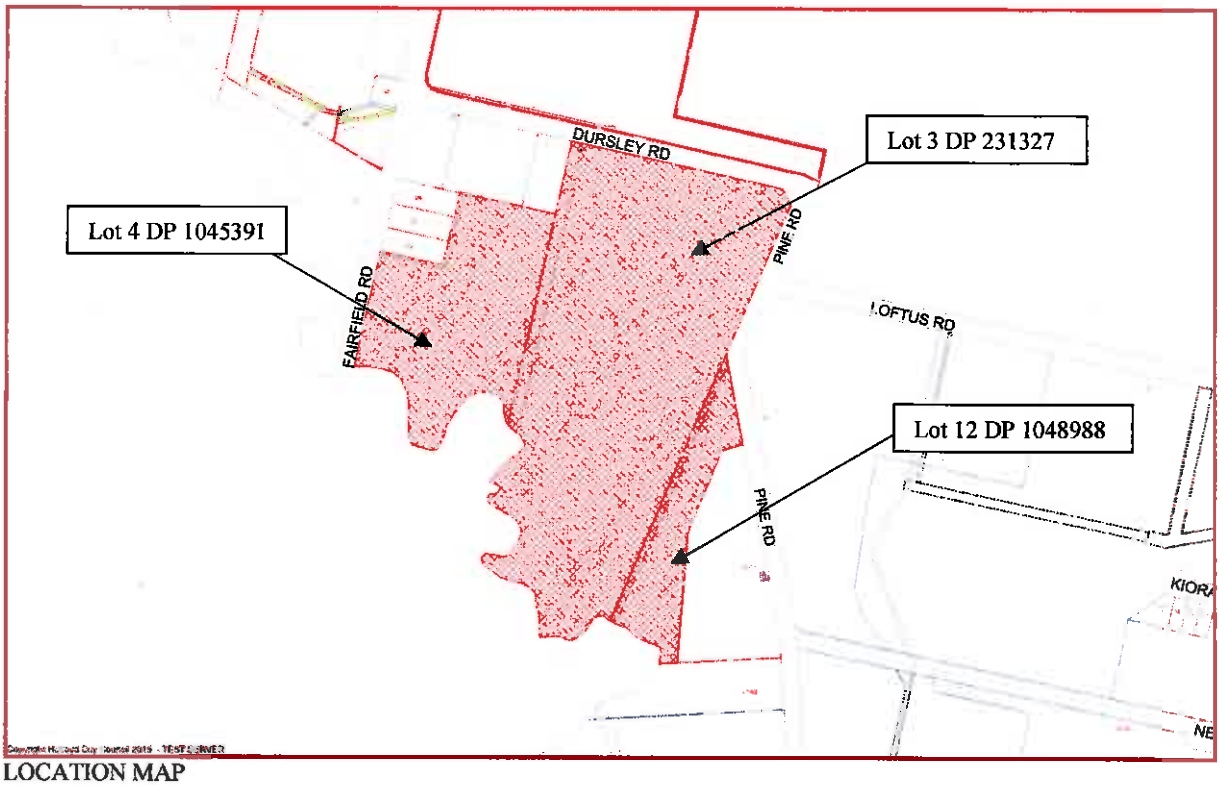
Flood levels are not static due to changing circumstances (e.g. revision of the flood model) and accordingly the above flood level is only valid for six months from the above date.

If you have any questions, please do not hesitate to contact Council's Senior Stormwater Engineer, Mr Mark Evens on 9840 9870 or Council's Drainage Engineer, Mr Rolyn Sario on 9840 9874.

Yours faithfully

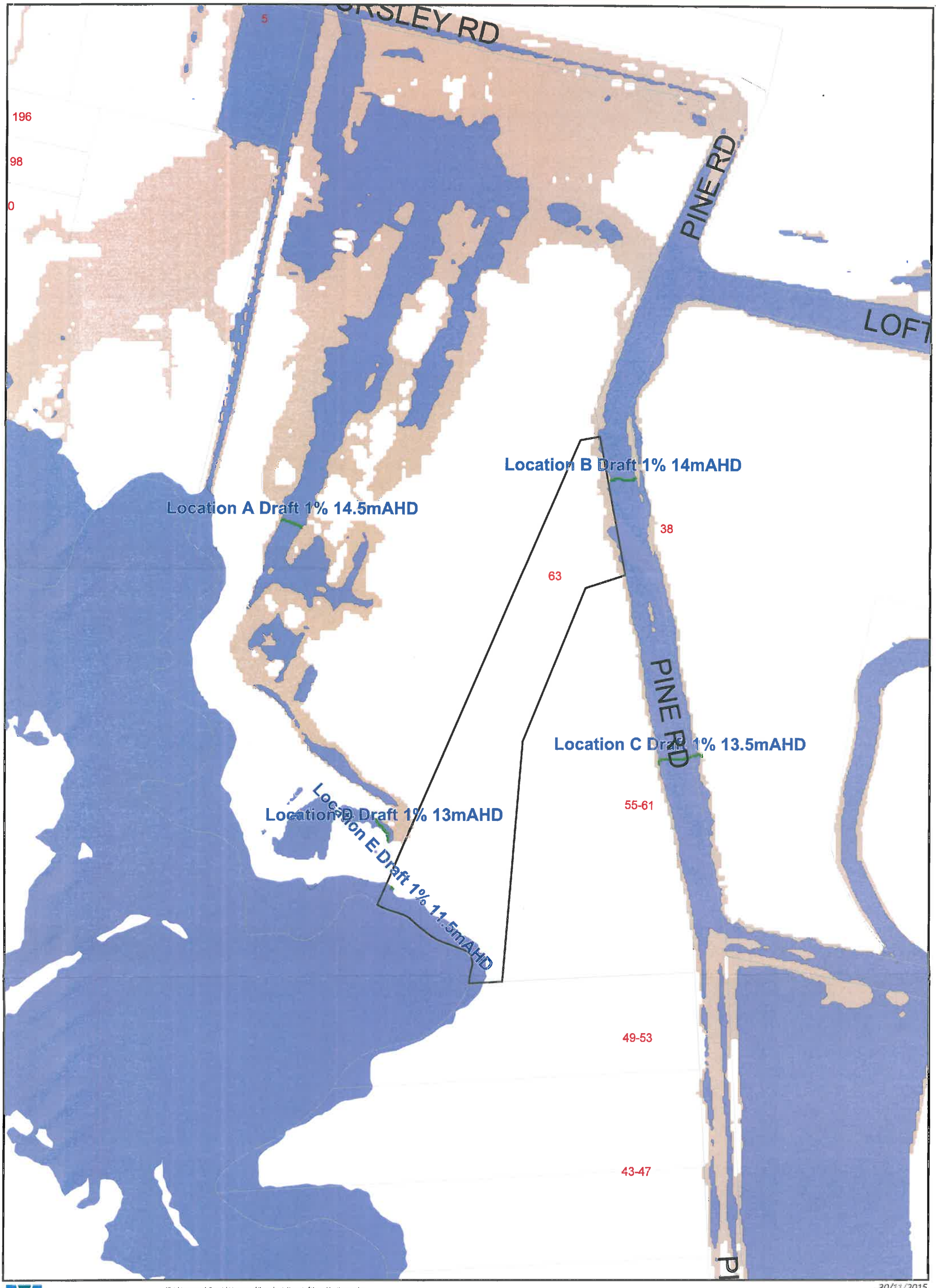
Merv Ismay
GENERAL MANAGER

Per:
ACTING DIRECTOR ENGINEERING SERVICES



LOCATION MAP

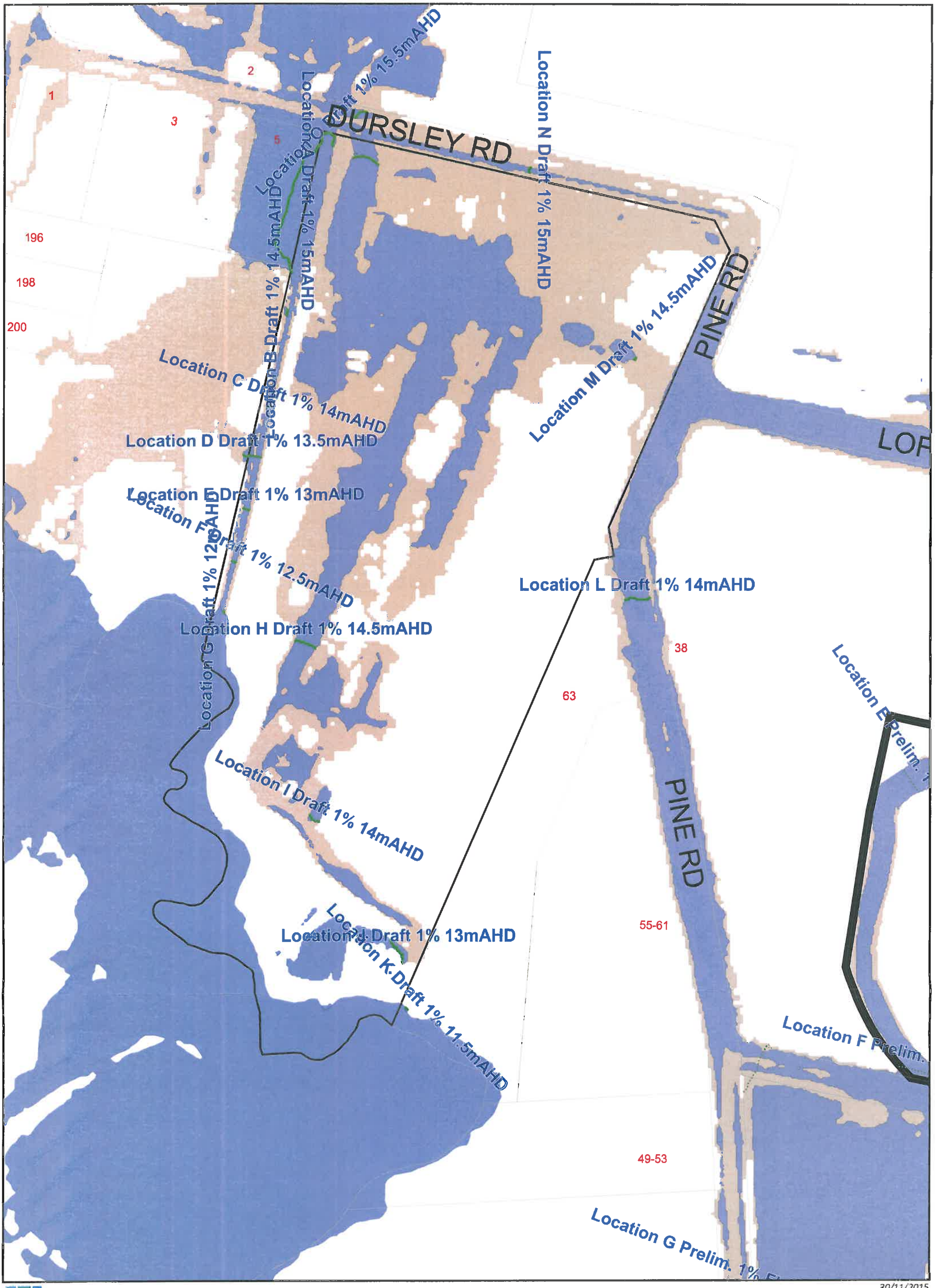
NOT ON SCALE



30/11/2015

N

A3@ 1:2000

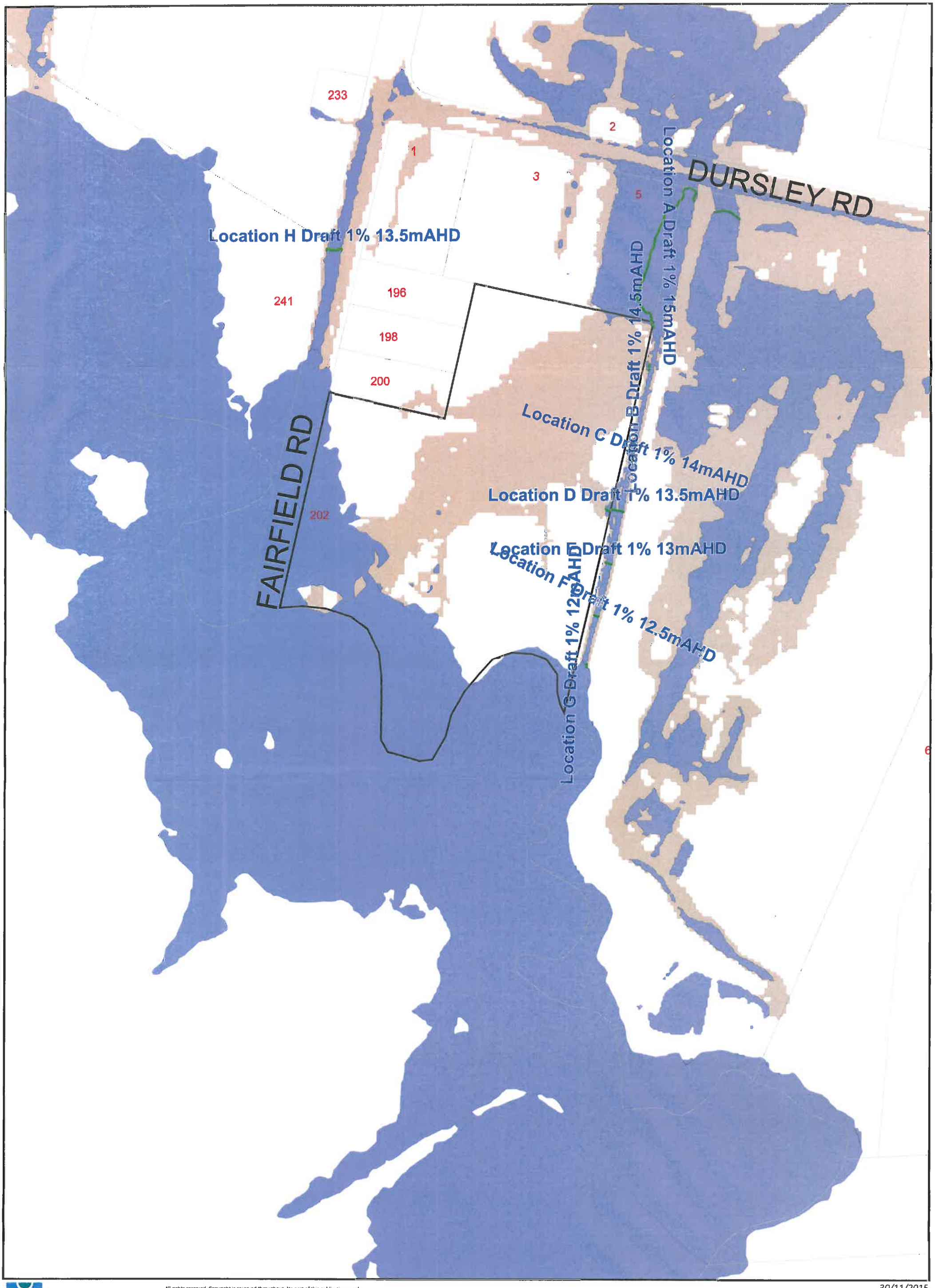


Holroyd City
a place for everyone

30/11/2015

N

A3@ 1:2000



30/11/2015

A3@ 1:2000

Appendix D – Overland Flow Rate Confirmation

Benjamin Barrett

From: Morgan Walter
Sent: Friday, 18 January 2019 3:42 PM
To: Benjamin Barrett
Subject: FW: Enquiry - Draft Prospect Creek Overland Flood Study - Overland Flow Request (18178)

Morgan Walter
Civil Engineering Manager / Civil & Environmental Engineer
morgan@sparksandpartners.com.au
0414 930 828

Sparks+Partners Consulting Engineers
Hydraulic / Civil / Fire / sparksandpartners.com.au
PO Box 979 / Level 1, 91 George Street / Parramatta NSW 2150
Office 02 9891 5033 / admin@sparksandpartners.com.au

From: lacewater@bigpond.com.au <lacewater@bigpond.com.au>
Sent: Thursday, 1 November 2018 4:52 PM
To: Morgan Walter <morgan@sparksandpartners.com.au>; lacewater@bigpond.com
Cc: Danya Leiva <danya@sparksandpartners.com.au>; Benjamin Barrett <benjamin@sparksandpartners.com.au>
Subject: RE: Enquiry - Draft Prospect Creek Overland Flood Study - Overland Flow Request (18178)

Morgan,

We have run the Prospect Creek TUFLOW Model for 100 year ARI design storms ranging in duration between 25 and 270 minutes and advise that the peak flow discharging onto the site in its north-west corner is a maximum of 1.32 m^3/s.

We trust that this advice will assist you in further developing the design layout of the site.

Please do not hesitate to contact me should you wish to discuss any of the above.

Regards

Scott Button Principal

p: 02 9929 4466 m: 0412 668 988 f: 02 9929 4458
www.lyallandassociates.com.au

From: Morgan Walter <morgan@sparksandpartners.com.au>
Sent: Thursday, 1 November 2018 2:54 PM
To: lacewater@bigpond.com; lacewater@bigpond.com.au
Cc: Danya Leiva <danya@sparksandpartners.com.au>; Benjamin Barrett <benjamin@sparksandpartners.com.au>
Subject: Re: Enquiry - Draft Prospect Creek Overland Flood Study - Overland Flow Request (18178)

Hi Scott,

To Sparks and Partners is fine. I'm out in a meeting at the moment, please send invoice to me and to accounts@sparksandpartners.com.au and I'll arrange payment.

Thanks

Get Outlook for Android

Morgan Walter
Civil Engineering Manager / Civil & Environmental Engineer
morgan@sparksandpartners.com.au
0414 930 828

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Hydraulic / Civil / Fire / sparksandpartners.com.au
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From: lacewater@bigpond.com.au <lacewater@bigpond.com.au>
Sent: Thursday, November 1, 2018 2:45:06 PM
To: Morgan Walter; lacewater@bigpond.com
Cc: Danya Leiva; Benjamin Barrett
Subject: RE: Enquiry - Draft Prospect Creek Overland Flood Study - Overland Flow Request (18178)

Morgan,

I rang but you were away from your desk.

Qn: Do you want me to make the invoice out to Sparks + Partners Consulting Engineers, or someone else?

Scott

From: Morgan Walter <morgan@sparksandpartners.com.au>
Sent: Tuesday, 16 October 2018 6:34 PM
To: lacewater@bigpond.com
Cc: Danya Leiva <danya@sparksandpartners.com.au>; Benjamin Barrett <benjamin@sparksandpartners.com.au>
Subject: Enquiry - Draft Prospect Creek Overland Flood Study - Overland Flow Request (18178)

To Lyall and Associates,

We are currently working on a project at 7 Dursley Rd, Yennora which is shown as being flood affected by overland flow asper the Draft Prospect Creek Overland Flood Study, March 2015 prepared by yourselves. Our enquiry is that we would like to know if you can provide a flow for the overland flow through our site and if so what the fee would be to provide this information.
Attached is a mark up of the flood mapping that has been provided by Council showing the location of interest. The purpose of knowing the flow is that the development consists of the construction of a new industrial building and we want to undertake calculations to size the necessary infrastructure to divert the flow through/around the site. Our current estimates based on a comparison of the existing survey and flood mapping has this flow at approximately 2.0m³/sec.

Your assistance is appreciated and if you have any questions please contact me on the details below.

Regards

Morgan Walter
Civil Engineering Manager / Civil & Environmental Engineer
morgan@sparksandpartners.com.au
0414 930 828

Sparks+Partners Consulting Engineers
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Appendix E – Holroyd Council Checklist

HOLROYD CITY COUNCIL

Stormwater and On Site Detention Drawing Submission Checklist

General

Council requires the submission of fully detailed On Site Detention (OSD) drawings to assist in determining the likely impacts that the development may have on the existing natural and built environments, both public and private. This will include any impacts on existing stormwater systems, overland flow and flooding conditions and those impacts on the assessment of the proposal with regard to Councils' Development Control Plans.

The purpose of this Checklist is to function as a supplement to the checklists within the Upper Parramatta River Catchment Trust OSD handbook. It will ensure that OSD and stormwater drawings submitted to Council contain the necessary and correct information and details which will enable an expedient assessment to be carried out by Council's officers to expedite the assessment process.

Prior to completing this Checklist, the Design Engineer shall read and be familiar with Council's Stormwater and OSD Policy.

***** Please note: It is imperative that the Design Engineer carefully reads the Checklist as inaccurate or incomplete checklists may result in delays with processing or possible refusal of the Development Application. *****

All details and information contained in this Checklist shall be submitted and/or shown on the stormwater drainage and OSD drawings.

N/A shall be indicated adjacent to any details or information that are not relevant to the proposed stormwater drainage or OSD proposal.

No boxes in any of the following checklists that are relevant, shall be left blank or without an N/A adjacent to the box.

Note that in certain circumstances, Council may request additional information for clarity.

CHECKLIST – PART 1

☑ **1.** A completed Upper Parramatta River Catchment Trust "On-Site-Detention Concept Plan and Detailed Design submission checklist" has been completed and submitted. (Please attach UPRCT checklist to this document)

☑ **2.** The designer is suitably accredited to carry out the design. Name, signature and qualification of the designing engineer are indicated on the drawings.

☑ **3.** The proposed OSD system/s complies with Council's Policy on Stormwater and OSD.

1

☑ **4.** Copies (Refer to number of copies as outlined in Council's Development Application Submission Checklist) of the fully detailed OSD Drawing at a scale of 1:100 are provided (where development site size, excluding section details, requires more than two A1 drawing sheets at 1:100 scale, the drawing may be reduced in scale to 1:200).

☑ **5.** Four (4) copies of[2] the OSD Design Summary Calculations are attached. The correct Permissible Site Discharge (PSD) and Site Storage Requirement (SSR) values have been used (see OSD Policy for Values).

☑ **6.** Site layout on the stormwater and OSD drawing corresponds with, and compliments, Architectural and Landscape Drawings.

☑ **7.** Roof Plan of all proposed buildings is provided.

☑ **8.** Downpipe locations are clearly indicated for all proposed buildings.

☑ **9.** All stormwater pipes are clearly shown, **ie thicker linetype**, from downpipes and pits to the outlet connection point into Council's drainage system/kerb & gutter.

☑ **10.** The site stormwater connection point into Council's drainage system/kerb & gutter is indicated on the drawing along with its invert level.

☑ **11.** All pipe sizes and grades are indicated **adjacent** to all pipes proposed on the site.

☑ **12.** All pit sizes, surface and invert levels are indicated adjacent to all pits proposed on the site. (Note :- minimum pit size 450mm x 450mm)

☑ **13.** All walls, kerbs or crests proposed on the site are indicated along with their respective levels. (eg top of wall level)

☑ **14.** Retaining walls forming above ground storage basin/s are of watertight construction (ie: Masonry/Brick) and a typical section detail is provided.

☑ **15.** Finished surface levels are indicated within all courtyards/driveways/detention storage areas.

NA **16.** The stormwater outlet pipe is connected into the kerb and gutter at a distance, no further than 45 degrees from the property boundary.

NA **17.** A 1.2m high pool type fence/suitable barrier or railing has been provided where a vertical drop into an above ground basin exceeds 500mm.

☑ **18.** All services within the site and footpath area are accurately indicated on the stormwater and OSD drawing.

☐ **19.** All vehicular crossings proposed are located a minimum of 1.0m clear of power poles and 1.2m clear of large Telstra manholes, where relevant.

☑ **20.** Size and layout of the vehicular crossing complies with Council's vehicular crossing policy.

☑ **21.** Detailed cross-section of the discharge control unit/below ground tank is in accordance with the Council Standard Section details. (Note: The Council's Standard Sections are attached in Appendix B of the OSD policy).

☑ **22.** Typical section detail of a surface inlet pit is provided.

☑ **23.** A minimum grade of 1% has been provided on the base of the above ground detention basin located in landscaped/turfed areas to a grated collection pit.

NA **24.** Sub-soil drainage is indicated within above ground detention basins located in landscaped areas. (Note :- Subsoil drainage shall connect to the collection pits of the detention basin)

☑ **25.** Areas of the site that by-pass the detention system/s are clearly delineated on the Hydraulic Drawing.

☑ **26.** Finished floor levels of dwellings are a minimum of 300mm above the top of water level of the OSD and garages are a minimum of 100mm above the top of water level of the OSD.

☑ **27.** Satisfactory access is provided within the front setback area and/or rear courtyard into the detention storage area/s with maximum 1 in 4 batters or steps.

☑ **28.** Convenient access from the front setback to the rear courtyard area of the development, and vice-versa, is provided for the lawn mower and garbage bins.

☑ **29.** A notation has been provided on the OSD drawing, stating:-

All walls forming the detention basin shall be constructed wholly within the property boundaries of the site being developed.

NA **30.** Notation has been included on the stormwater and OSD drawing to ensure landscaped areas within the OSD storage areas are mulched with decorative Rock Mulch. (ie non floatable).

☑ **31.** All trees to remain on the subject site or those on neighbouring properties which overhang or are within 5m of the site boundaries of the subject site are to be accurately located and indicated on the OSD Drawing.

☑ **32.** No filling or excavation is proposed within required protection zone of trees to remain.

CHECKLIST – PART 2

The Design Engineer shall complete the following in relation to the matters that are relevant to the development site or proposed stormwater and OSD system. Any items that are ticked below shall be addressed through the submitted OSD drawing or the submission of additional details (refer to Holroyd Council OSD policy for specific requirements).

☑ **1.** The orifice outlet of the proposed detention system will function as a drowned discharge outlet, ie. submerged.

☑ **2.** The site is located in/or adjacent to a low point in the catchment area or a Council drainage easement/open channel is located within or adjoins the site or the upstream catchment is greater than 0.5 Ha.

☑ **3.** Localised overland flows generated in a 1 in 100 year ARI storm event currently drain through site.

NA **4.** An easement is required through an adjoining property/properties in order to drain the sites On Site Detention/Stormwater system.

NA **5.** The proposed development requires a pump out system for the basement level.

Designer: BENJAMIN BARRETT

Accreditation: BE, MIEAust, CPEng 3300498, RPEQ

Drawing Reference & Revision No: .....

Signed: .....

Date: 21.01.19 **DA No:** DA 2016/501/1

Appendix F – UPRCT Checklist

B8A OSD STORMWATER CONCEPT PLAN SUBMISSION

This form is to be completed by the stormwater designer and submitted to Council together withthe plan/s and any necessary attachments.

PROJECT ADDRESS: LOT 3, 7 DURSLEY ROAD YENNORA

OSD DESIGNER DETAILS:

Company Name: SPARKS AND PARTNERS CONSULTING ENGINEERS

Address: LVL 1, 91 GEORGE STREET, PARRAMATTA

Telephone No.: (02) 9891 5033 **Fax No:** NA

Accreditation Organisation: EA **Accreditation Reference:** 3300498

Name of designer: BENJAMIN BARRETT **Date:** 21.01.19
(Print Name)

Council Reviewer's Name: _____ **Date:** _____

CHECKLIST

	Complies with Handbook		Council agrees	
	Yes	**No**	**Yes**	**No**
1. Flooding:				
Is the site (whole or partly) below the 1 in 100 year flood level?	☑	☐	☐	☐
If yes, does the OSD system reflect the flood affectation?	☑	☐	☐	☐
Have floodplain issues been addressed (eg storage, obstructed flow etc)?	☑	☐	☐	☐
2. External catchment: (refer section 4.1.3)				
Is there an external catchment draining into the site?	☑	☐	☐	☐
If Yes, have calculations of 100 year ARI flow been submitted & full area of catchment shown? REFER TO APPENDIX H OF WSUD REPORT FOR FLOW CONFIRMATION FROM FLOOD MODEL ENGINEER	☑	☐	☐	☐
3. OSD Storage : (refer Sections 4.1.4,4.1.6 & 6.5)				
The storage volume has been estimated with calculations	☑	☐	☐	☐
The area to be drained has been shown on plan and is more than 85%?	☑	☐	☐	☐
Is there free discharge at the outlet or provision made for drowned outlet?	☑	☐	☐	☐
Has the storage been located at the lowest point of the site to collect surface & roof gutter overflow?	☑	☐	☐	☐
4. Site information:				
The following information has been shown on the plans: - scaled site layout showing all buildings, roadways and landscaped areas	☑	☐	☐	☐
- spot levels and contours (including adjoining properties)	☑	☐	☐	☐
- location, dimensions and extent of detention storages	☑	☐	☐	☐
- location of any floodways or flowpaths through the site	☑	☐	☐	☐
- location of any other constraints, e.g. easements, sewer & other services or Water Sensitive Urban Design (WSUD) features	☑	☐	☐	☐

Appendix G – Maintenance & Monitoring Schedule

Job No.: 17260

Author Name: Benjamin Barrett (BE Civil MIEAust CPEng NER RPEQ)

Date: 5 September 2018

Signature:

PROJECT ADDRESS: Lot 3, 7 Dursley Road, Yennora

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.	

On-Site Detention Tank						
Trash Screen	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect trash screen to ensure correct operation. Remove accumulated litter & debris. If device is not functioning properly repair or replace.	
Orifice Plate	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect orifice plate to ensure correct operation. Check orifice diameter size is correct and no damage is present to orifice edge. Check orifice plate is securely fastened to wall with no gaps present between plate and face of wall. If gaps are present fill with sealant or mortar to provide water tight seal.	
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.	
Water Quality Measures						
Stormwater360 Vortechs Stormwater Treatment System	Refer Manufactures Manual	Maintenance / Specialised Contractor			Refer to manufacturers operation and maintenance manual	

Appendix H – Response Letter to Council Comments

SPARKS +PARTNERS CONSULTING ENGINEERS

PO Box 979
Level 1, 91 George Street
PARRAMATTA NSW 2150

Office 02 9891 5033
Fax 02 9891 3898
admin@sparksandpartners.com.au

sparksandpartners.com.au

ABN 95 161 152 969

21 January 2019
Job No: 17260_S4.55

Cumberland Council
C/o
FIFE Capital
Level 12, 89 York Street
Sydney NSW 2000

RE: Application No. DA 2016/501/3 – 7 Dursley Road, Yennora NSW 2161- Response to Council Comments 15th January 2019.

Attention Sarah Pritchard,

We Sparks & Partners Consulting Engineers being the civil/stormwater engineer for the above proposed development have reviewed the comments provided by Council dated 15th January 2019 and provide the following responses regarding Development Engineering concerns to assist in the development assessment.

Council Comment	S+P Response
1. No new stormwater/civil works will be permitted within E2 Zoned part of the site. In this regard, stormwater discharge from the development to the existing headwall shall be conveyed by the existing stormwater RC pipe. The existing RC pipe shall be clearly and accurately located and shown on the engineering plans. The size and condition of the pipe shall be checked and confirmed by a qualified civil engineer.	Stormwater drainage has been revised to connect to the existing 1350mm stub pipe, previously constructed within the channel headwall. The surveyed pipe extends beyond the E2 zone and no works will be required within the E2. Refer to revised drawing 17260_S4.55-4.03[4].
2. If the discharge flow from the development sites is greater than	The OSD discharge pipe is an 825 diameter pipe. The existing stub pipe is a 1350

the capacity of the existing stormwater RC pipe, the stormwater and OSD system shall be revised to restrict the discharge flow so it can be managed with no adverse impact to the development site or the surrounding properties.	diameter, which has sufficient capacity for the design flow.
3. In comparing the landscape and engineering plans, there appears to be some inconsistency with regard to what is proposed within the Dursley Road frontage. The landscape plan indicates canopy trees within the setback to Dursley Road but the stormwater plans indicate a concrete channel that is in part open, and in part covered with a suspended slab. The landscape, stormwater and architectural plans are to be updated for consistency.	The Dursley road frontage design has been coordinated with the landscape and architectural plans. Refer to revised drawing 17260_4.02[4] and revised WSUD Report Rev 4 for further information.

Should you have any questions with regard to the above please do not hesitate to contact the undersigned.

Regards,

Benjamin Barrett
Senior Civil Engineer
BE Civil MIEAust CPEng NER RPEQ
benjamin@sparksandpartners.com.au