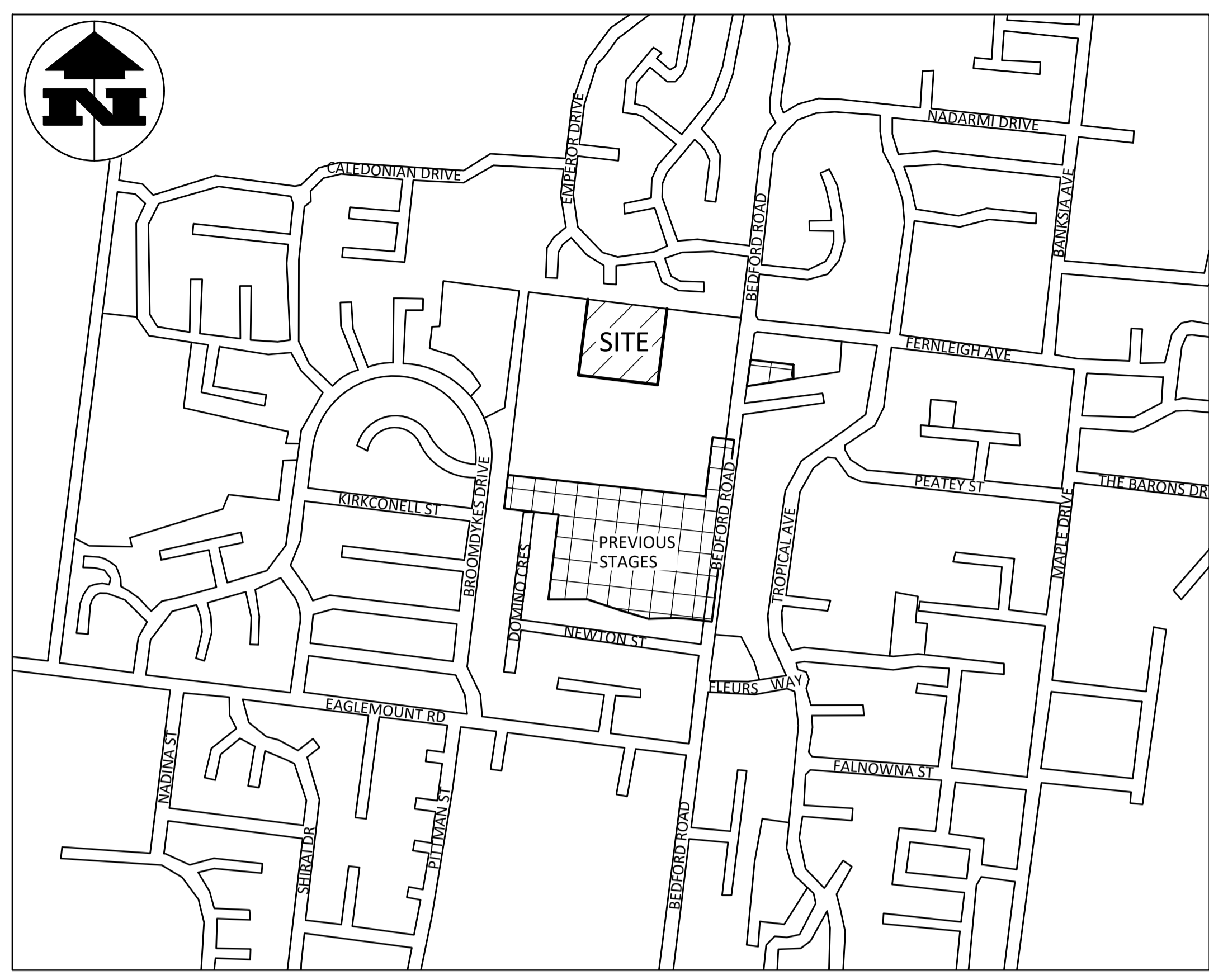


ANDERGROVE, MACKAY - STAGE 8 RESIDENTIAL DEVELOPMENT



LOCALITY MAP
STREET ADDRESS: BEDFORD ROAD, ANDERGROVE, QLD 4740
N.T.S

ROADWORKS DRAWING INDEX

C000	DRAWING LIST AND LOCALITY PLAN
C002	STAGING PLAN
C003	CONTROL LINE SETOUT PLAN
C011	EARTHWORKS PLAN
C020	SEDIMENT AND EROSION CONTROL NOTES AND DETAILS
C021	SEDIMENT AND EROSION CONTROL LAYOUT PLAN
C030	ROADWORKS AND DRAINAGE NOTES AND DETAILS
C031	ROADWORKS AND DRAINAGE LAYOUT PLAN
C032	INTERSECTION DETAIL PLAN
C038	BIO-RETENTION BASIN DETAIL PLAN AND SECTIONS
C040	WHITEFIG CLOSE LONGITUDINAL SECTIONS
C041	WHITEFIG CLOSE CROSS SECTIONS SHEET 1
C042	WHITEFIG CLOSE CROSS SECTIONS SHEET 2
C050	STORMWATER LONGITUDINAL SECTIONS SHEET 1
C051	STORMWATER LONGITUDINAL SECTIONS SHEET 2
C055	STORMWATER STRUCTURE DETAILS
C056	STORMWATER STRUCTURE REINFORCEMENT LAYOUT
C060	SEWERAGE RETICULATION NOTES AND DETAILS
C061	SEWERAGE RETICULATION LAYOUT PLAN
C062	SEWERAGE LONGITUDINAL SECTIONS
C070	WATER RETICULATION NOTES AND DETAILS
C071	WATER RETICULATION LAYOUT PLAN
C081	SIGNS AND LINEMARKING LAYOUT PLAN
C090	CATCHMENT PLAN
C095	STORMWATER CALCULATION TABLE 1
C096	STORMWATER CALCULATION TABLE 2

MRC STANDARD SPECIFICATIONS

C101	GENERAL
C201	CONTROL OF TRAFFIC
C211	CONTROL OF EROSION AND SEDIMENTATION
C212	CLEARING AND GRUBBING
C213	EARTHWORKS
C220	STORMWATER DRAINAGE - GENERAL
C221	PIPE DRAINAGE (INSTALL ONLY)
C223	DRAINAGE STRUCTURES
C224	OPEN DRAINS INCLUDING KERB AND CHANNEL
C230	SUBSURFACE DRAINAGE GENERAL
C231	SUBSOIL FOUNDATION DRAINS
C232	PAVEMENT DRAINS
C233	DRAINAGE MATS
C241	STABILISATION
C242	FLEXIBLE PAVEMENTS
C244	SPRAYED BITUMINOUS SURFACING
C245	ASPHALTIC CONCRETE
C248	PLAIN OR REINFORCED CONCRETE BASE
C261	PAVEMENT MARKINGS
C262	SIGNPOSTING
C263	GUIDE POSTS
C273	LANDSCAPING
C303	SERVICE CONDUITS
C305	TRENCHLESS CONDUIT INSTALLATION
C350	TRAFFIC SIGNALS
C501	BUSHFIRE PROTECTION
CQC	QUALITY CONTROL REQUIREMENTS
CQS	QUALITY SYSTEM REQUIREMENTS
	SEWERAGE
	WATER SUPPLY

MRC STANDARD DRAWING LIST

STORMWATER	
A3-3874	STORMWATER ACCESS CHAMBER DETAILS DIAMETER 1050 - 2100
A3-3875	ACCESS CHAMBER ROOF SLABS DIAMETER 1050 - 2100
A3-3878	ACCESS CHAMBER CAST IRON COVER AND FRAME BOLT DOWN
A3-3880	SEDIMENT CONTROL DEVICES SEDIMENT FENCE ENTRY/EXIT TRAP
A3-3881	SEDIMENT CONTROL DEVICES KERB AND FIELD INLETS, CHECK DAMS AND STRAW BALE BANK
A3-3885	GULLY ROADWAY TYPE GENERAL ARRANGEMENT CHANNEL LIP LINE
A3-3889	GULLY ANTI PONDING DEPRESSED 17mm
A3-845	EXCAVATION, BEDDING AND BACKFILLING OF STORMWATER DRAINAGE PIPES AND BOX CULVERTS
A3-870 B	DETAILS OF ALLOTMENT GRADINGS AND ALLOTMENT DRAINAGE
A3-898	EXCAVATION, BEDDING AND BACKFILLING OF STORMWATER DRAINAGE PIPES AND BOX CULVERTS
A4-43 A	PROPERTY DRAINAGE CONNECTION TO MCC PIPES

FOOTPATH

A2-500 B	CONCRETE FOOTPATH
----------	-------------------

ROADS

A2-576	KERB RAMP PLAN AND SECTIONS
A3-3871	KERB AND CHANNEL DRAINAGE CONNECTIONS
A3-3872	STREET NAME SIGN
A3-3873	WATER SERVICE CONDUITS
A3-865	KERB AND CHANNELS
A3-867	SUBSOIL DRAIN
A3-00856	SEWER MANHOLES
A3-04199	PIPE LAYING TYPICAL ARRANGMENTS
A3-04203	PROPERTY CONNECTION DETAILS, BURIED INTERFACE METHOD
A3-04208	STANDARD EMBEDMENT FLEXIBLE & RIGID PIPES
A3-04223	MAINTENANCE HOLES TYPICAL MANHOLE COVER ARRANGEMENTS

SEWERAGE

A3-00835	BEDDING AND BACKFILL FOR WATER MAIN CONSTRUCTION
A3-00837	HYDRANT & VALVE INSTALLATION
A3-00840	RESIDENTIAL WATER SERVICE CONNECTIONS - SINGLE AND DOUBLE
A3-04268	TYPICAL MAINS CONSTRUCTION RETICULATION MAIN ARRANGEMENTS
A3-04271	TYPICAL MAINS CONNECTION, CONNECTION TO EXISTING MAINS
A3-04275	ABOVE GROUND WATER METER ARRANGEMENT
A3-04282	THRUST BLOCK DETAILS, TIMBER AND RECYCLED PLASTIC BLOCKS

WATER

A3-00835	BEDDING AND BACKFILL FOR WATER MAIN CONSTRUCTION
A3-00837	HYDRANT & VALVE INSTALLATION
A3-00840	RESIDENTIAL WATER SERVICE CONNECTIONS - SINGLE AND DOUBLE
A3-04268	TYPICAL MAINS CONSTRUCTION RETICULATION MAIN ARRANGEMENTS
A3-04271	TYPICAL MAINS CONNECTION, CONNECTION TO EXISTING MAINS
A3-04275	ABOVE GROUND WATER METER ARRANGEMENT
A3-04282	THRUST BLOCK DETAILS, TIMBER AND RECYCLED PLASTIC BLOCKS

IPWEAQ STANDARD DRAWING LIST

DRAINAGE	
ACCESS CHAMBER	
DS-010	STORMWATER ACCESS CHAMBER DETAIL, 1050 TO 2100 DIAMETER
DS-011	ACCESS CHAMBER ROOF SLABS, DIA 1050 TO 2100
DS-013	ACCESS CHAMBER ROOF SLABS - RECTANGULAR, STANDARD REINFORCEMENT
DS-015	MANHOLE FRAME (ROADWAY AND NON-ROADWAY) 1050 TO 2100 DIAMETER
SEDIMENT CONTROL	
DS-040	SEDIMENT CONTROL DEVICES - SEDIMENT FENCE ENTRY/EXIT, SEDIMENT TRAPS
DS-041	SEDIMENT CONTROL DEVICES - KERB AND FIELD INLETS, CHECK DAMS, STRAW BALES
FIELD INLET	
DS-050	DRAINAGE PITS FIELD INLET TYPE 1 AND TYPE2
GULLY	
DS-061	DRAINAGE PITS, KERB INLET - PRECAST LINTEL DETAILS
DS-062	DRAINAGE PITS, KERB INLET - GRATE AND FRAME
DS-063	DRAINAGE PITS, KERB INLET - LIP IN LINE - GENERAL ARRANGEMENT
DS-068	DRAINAGE PITS, KERB INLET - KERB IN LINE ANTI-PONDING
DS-082	DRAINAGE DETAILS CULVERT INLET SCREEN
ROOFWATER	
D-0110	ROOFWATER, INSPECTION CHAMBER

WATER BY DESIGN

WSUD-003	STANDARD PROFILE - UNDERDRAIN CLEANOUT
WSUD-004	SATURATED ZONE - UNDERDRAIN CLEANOUT
WSUD-005	LARGE COARSE SEDIMENT FOREBAY
WSUD-006	WEIR DETAILS

BIORETENTION

WSUD-003	STANDARD PROFILE - UNDERDRAIN CLEANOUT
WSUD-004	SATURATED ZONE - UNDERDRAIN CLEANOUT
WSUD-005	LARGE COARSE SEDIMENT FOREBAY
WSUD-006	WEIR DETAILS

NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
* CERTIFY THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING IS ACCURATE.
* ACCEPT RESPONSIBILITY FOR THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING.
* ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY THE COUNCIL AND OTHERS.
N. Rozis (SIGNATURE)

CONTRACTOR SHALL COORDINATE WITH ELECTRICAL, COMMUNICATIONS, FIRE, HYDRAULIC SERVICES AND LANDSCAPE CONSULTANT'S DRAWINGS FOR LOCATIONS OF PROPOSED OR RETAINED SERVICES. NO PAVING OR KERB IS TO BE PLACED UNTIL ALL SERVICES UNDER HAVE BEEN PLACED AND TESTED.

STANDARD NOTES

- GENERAL
 - NO WORK IS TO COMMENCE ON SITE UNTIL APPROVAL TO PROCEED HAS BEEN GIVEN BY THE SUPERINTENDENT.
 - THE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATIONS AND STANDARD DRAWINGS LISTED. THE SUPERINTENDENT WILL ON REQUEST RESOLVE ANY POINT OF CONFLICT. DIMENSIONS ARE NOT TO BE SCALED.
 - WHERE A JUNCTION IS TO BE MADE TO EXISTING CONSTRUCTION THE CONTRACTOR SHALL CONFIRM THE LOCATION AND LEVEL OF THIS CONSTRUCTION PRIOR TO COMMENCING WORK ON ANY CRITICAL SECTION. THE SUPERINTENDENT MAY VARY LEVELS AND GRADIENTS OF NEW WORKS TO ACHIEVE A SATISFACTORY CONNECTION.
 - ALL CONSTRUCTION WORK SHALL COMPLY WITH THE QUEENSLAND WORKPLACE HEALTH AND SAFETY ACT (CURRENT VERSION). CONTACT YOUR NEAREST OFFICE OF THE DIVISION OF WORKPLACE HEALTH AND SAFETY FOR INFORMATION. Ph: 1300 369 915
 - THE CONTRACTOR SHALL TAKE ALL REASONABLE AND PRACTICAL MEASURES TO PREVENT OR REDUCE HARM TO THE ENVIRONMENT AS SET OUT IN THE ENVIRONMENTAL PROTECTION ACT (CURRENT VERSION).
- SERVICES NOTES
 - LOCATION & PROTECTION

THE LOCATION OF SERVICES SHOWN ON THESE PLANS HAS BEEN APPROXIMATED FROM KNOWN POSITIONS OF VALVES, INSPECTION/ACCESS CHAMBERS, ETC AND INFORMATION SUPPLIED BY SERVICES AUTHORITIES. DETAILS OF SERVICES ARE PROVIDED FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SUPPLIED.

THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION OF ALL SERVICES WITH THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK AND PROVIDING ALL NECESSARY MEASURES TO PROTECT ALL SERVICES DURING THE COURSE OF THE WORK.
 - AUTHORITY SERVICES CONFLICTS

SERVICE RELOCATIONS ARE SHOWN WHERE KNOWN. THE CONTRACTOR IS TO LOCATE, AND IF NECESSARY LEVEL, ALL SERVICES IN THE AREA OF THE WORKS PRIOR TO CONSTRUCTION. THE SUPERINTENDENT IS TO BE ADVISED IMMEDIATELY OF ANY UNIDENTIFIED CONFLICTS.
 - TELECOMMUNICATION CABLE

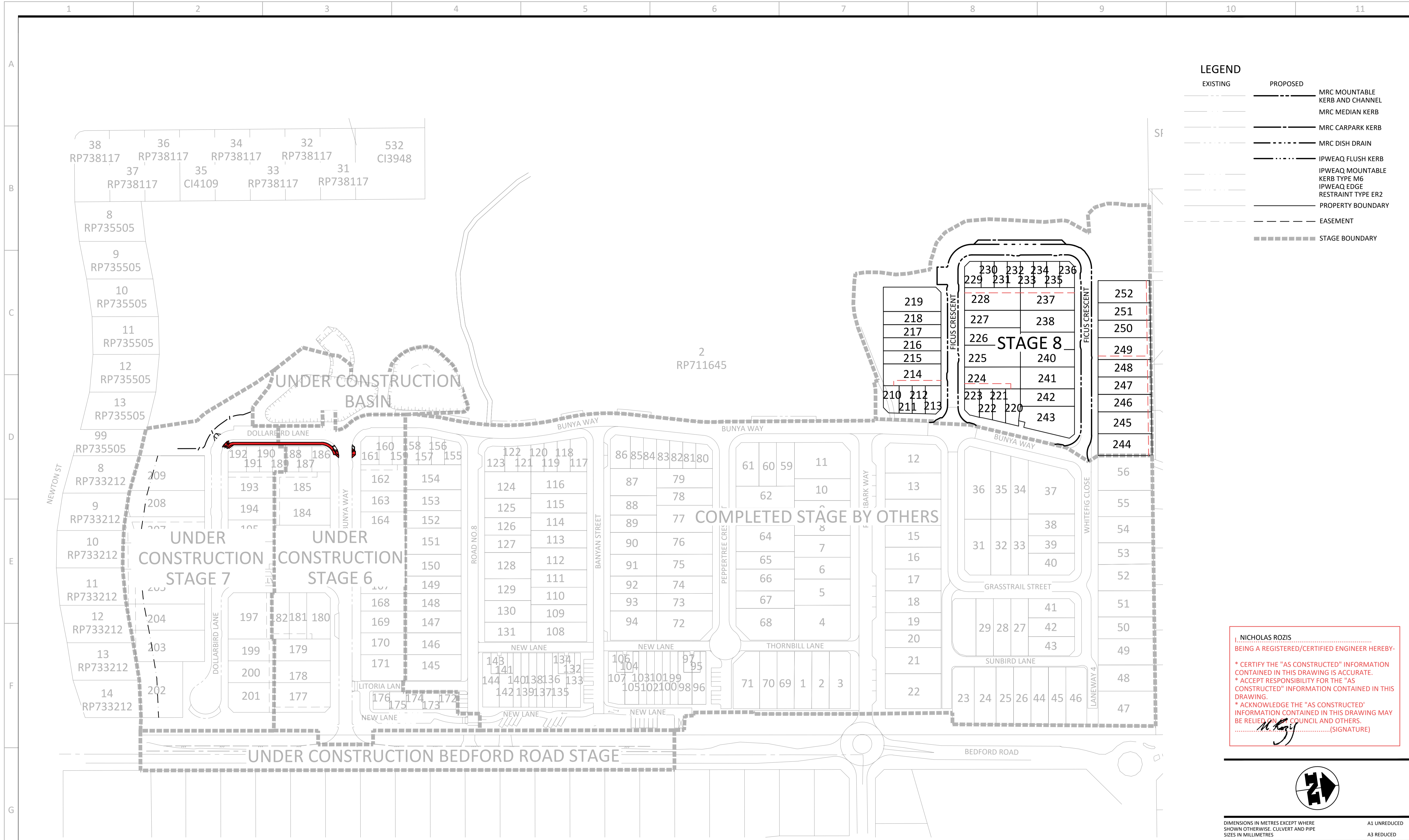
NO WORK IS TO BE CARRIED OUT WITHIN 3.0m OF CABLE IN URBAN AREAS AND 10.0m IN RURAL AREAS, WITHOUT FIRST CONSULTING THE RELEVANT AUTHORITY. THE CONTRACTOR IS TO MANUALLY EXPOSE AND PROTECT THE SERVICE WHEN EXCAVATING, OR WORKING, CLOSER TO TELECOMMUNICATION PLANT THAN THE ABOVE DISTANCES.
- TRAFFIC CONTROL
 - TRAFFIC CONTROL IS TO BE IN ACCORDANCE WITH THE QUEENSLAND TRANSPORT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (CURRENT ISSUE). IF REQUESTED BY THE SUPERINTENDENT THE CONTRACTOR IS REQUIRED TO PROVIDE FOR APPROVAL TRAFFIC MANAGEMENT PLANS DETAILING THE TRAFFIC MOVEMENTS TO BE PROVIDED, THEIR STAGING, AND THE SIGNAGE ADOPTED IN EACH STAGE.

STATUS
AS CONSTRUCTED

SURVEY CONTROL:	
PSM: 67982	
CNR BEDFORD ROAD AND FERNLEIGH AVENUE	
RL: 8.262 AHD	

R.P. DESCRIPTION	
LOT 2 RP 711645	
PARISH OF BASSETT	

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	F	31.08.16	RESPONSE TO COUNCILS COMMENTS	MS	BB	NR	NR								
	E	03.05.16	ISSUE FOR CONSTRUCTION	MS	BB	NR	NR								
	D	09.05.14	ISSUE FOR APPROVAL	MS	AY	JT	NR								
	C	16.04.14	FOR INFORMATION												
	B	22.01.14	FOR INFORMATION												



LEGEND

EXISTING	PROPOSED	
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC MEDIAN KERB
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	IPWEAQ MOUNTABLE KERB TYPE M6
---	---	IPWEAQ EDGE RESTRAINT TYPE ER2
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	STAGE BOUNDARY

NICHOLAS ROZIS
 BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
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 (SIGNATURE)

PLAN
SCALE A

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES	A1 UNREDUCED A3 REDUCED
SCALES	UNREDUCED / REDUCED
A	0 10 20 30 40 50m 1:1000 / 1:2000

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APP
F	31.08.16	RESPONSE TO COUNCILS COMMENTS	MS	BB	NR	NR
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D	09.05.14	ISSUE FOR APPROVAL	MS	AY	JT	NR
C	16.04.14	FOR INFORMATION				
B	22.01.14	FOR INFORMATION				

ASSOCIATED CONSULTANTS	APPROVED	CHECKED
	<i>M. Rozis</i> 7729	<i>B. Begaud</i>
	DATE 10/10/17	DATE 10/10/17

BORNHORST + WARD
 CONSULTING ENGINEERS
 CIVIL AND STRUCTURAL
 Level 4, 67 Astor Terrace, Spring Hill, QLD 4000

Bornhorst & Ward Pty Ltd
 Brisbane Australia
 Phone (07) 3013 4699
 Facsimile (07) 3013 4611
 mail@bornhorstward.com.au
 www.bornhorstward.com.au
 A.C.N. 010 151 354 A.B.N. 78 010 151 354

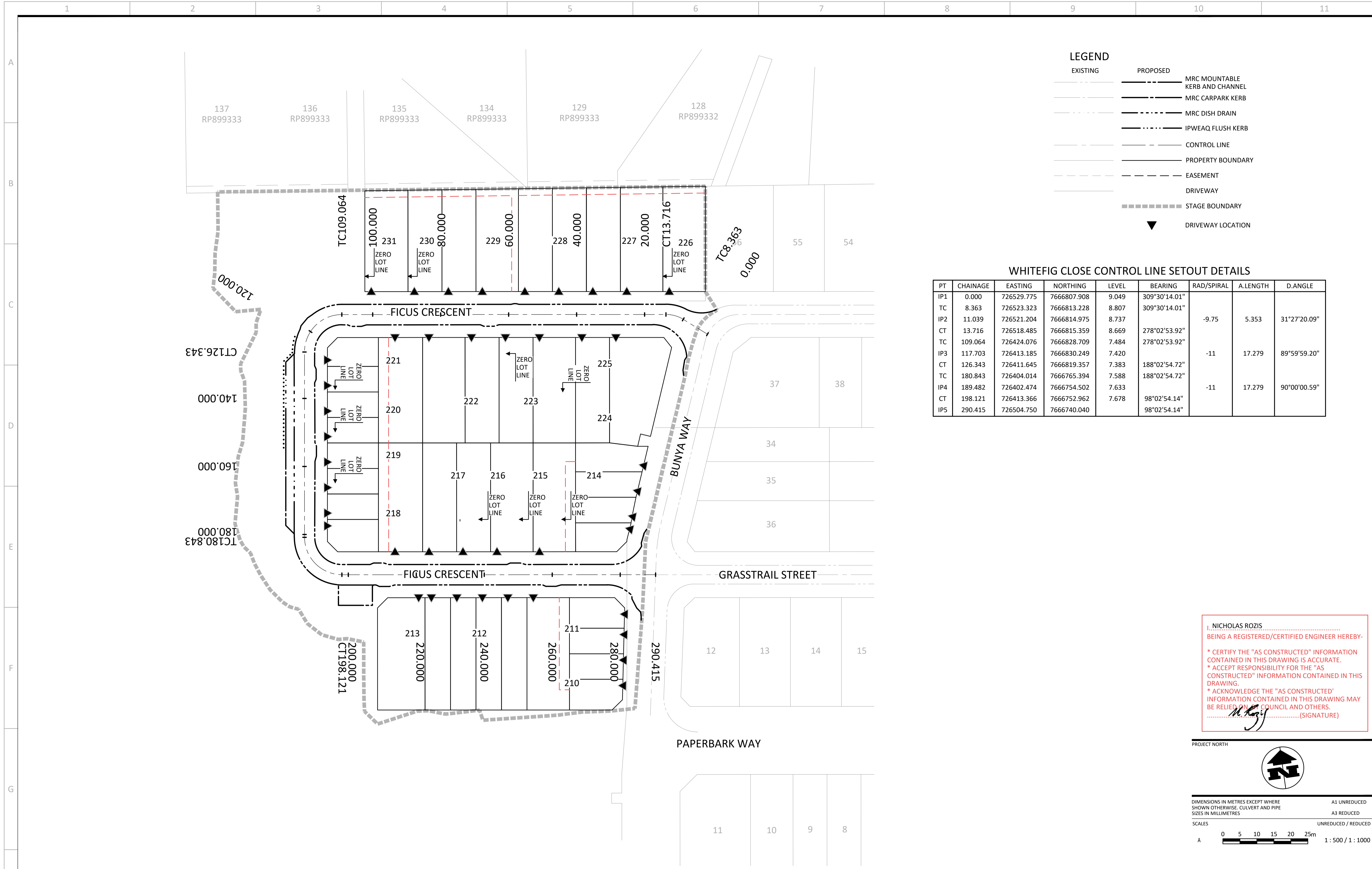
CLIENT
URBAN LAND DEVELOPMENT AUTHORITY

PROJECT
ANDERGROVE, MACKAY STAGE 8

SUBJECT
STAGING PLAN

PROJECT No.
12121D
 DRAWING No. REVISION
C002 F

AS CONSTRUCTED



LEGEND

EXISTING	PROPOSED	DESCRIPTION
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	CONTROL LINE
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	DRIVEWAY
---	---	STAGE BOUNDARY
	▼	DRIVEWAY LOCATION

WHITEFIG CLOSE CONTROL LINE SETOUT DETAILS

PT	CHAINAGE	EASTING	NORTHING	LEVEL	BEARING	RAD/SPIRAL	A.LENGTH	D.ANGLE
IP1	0.000	726529.775	7666807.908	9.049	309°30'14.01"			
TC	8.363	726523.323	7666813.228	8.807	309°30'14.01"			
IP2	11.039	726521.204	7666814.975	8.737		-9.75	5.353	31°27'20.09"
CT	13.716	726518.485	7666815.359	8.669	278°02'53.92"			
TC	109.064	726424.076	7666828.709	7.484	278°02'53.92"			
IP3	117.703	726413.185	7666830.249	7.420		-11	17.279	89°59'59.20"
CT	126.343	726411.645	7666819.357	7.383	188°02'54.72"			
TC	180.843	726404.014	7666765.394	7.588	188°02'54.72"			
IP4	189.482	726402.474	7666754.502	7.633		-11	17.279	90°00'00.59"
CT	198.121	726413.366	7666752.962	7.678	98°02'54.14"			
IP5	290.415	726504.750	7666740.040		98°02'54.14"			

J. NICHOLAS ROZIS
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 (SIGNATURE)

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

SCALES: UNREDUCED / REDUCED

A 0 5 10 15 20 25m 1:500 / 1:1000

PLAN SCALE A

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EARTHWORKS NOTES

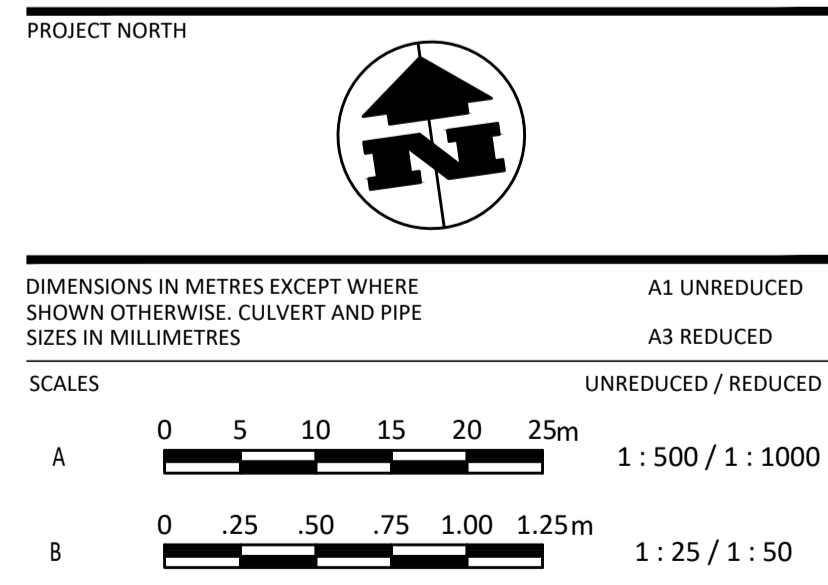
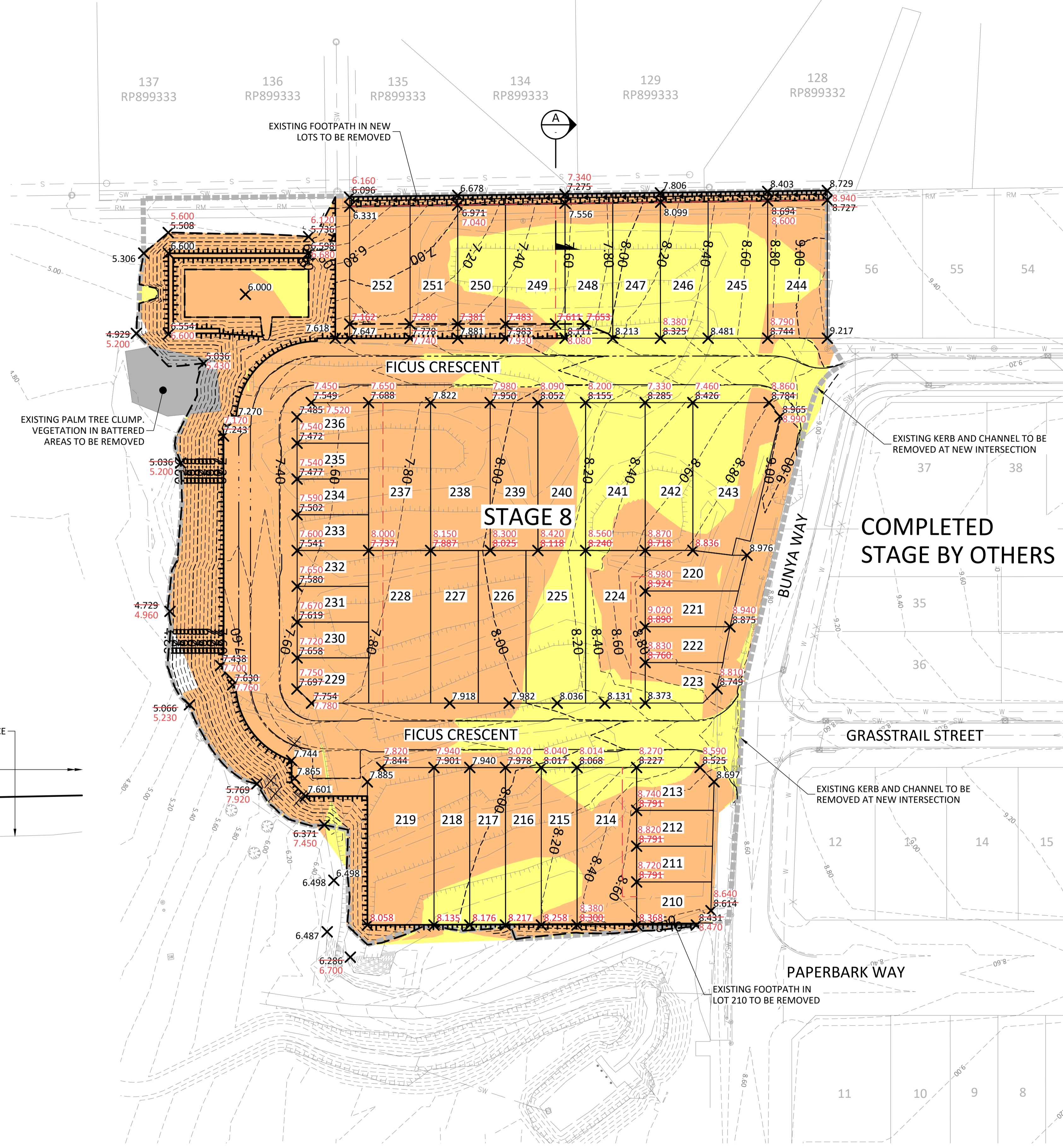
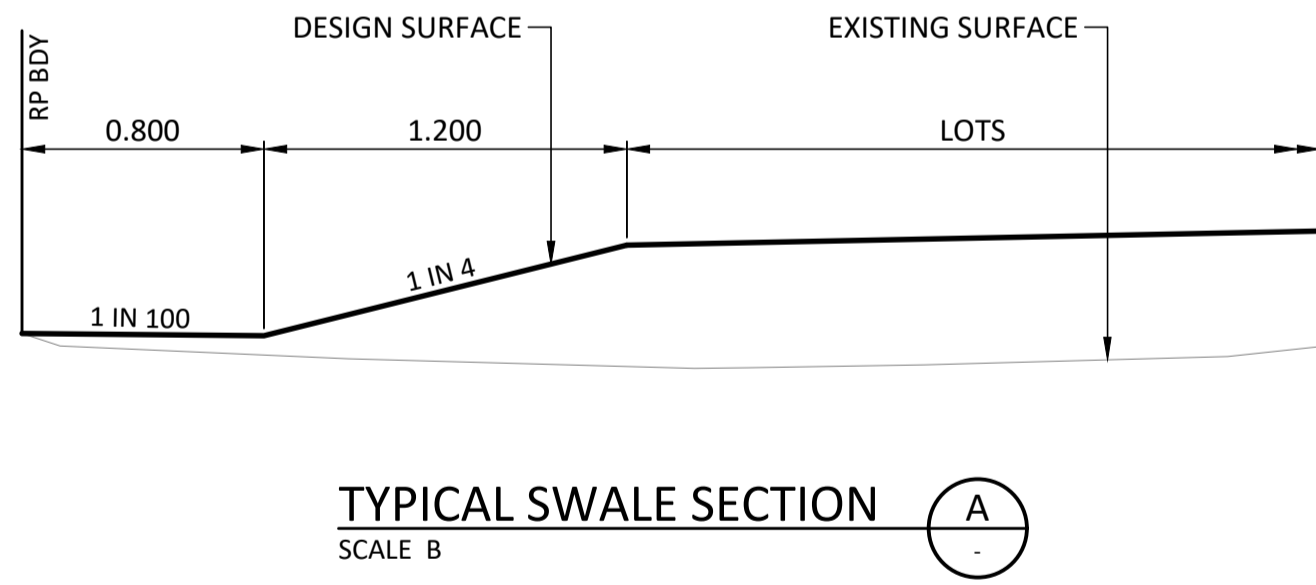
- NOTWITHSTANDING THE LIMITS OF CUTTING & FILLING SHOWN ON THE DRAWINGS, THE ACTUAL LIMITS SHALL BE DETERMINED ON SITE BY THE SUPERINTENDENT AT THE PRE-START MEETING, ALTERATIONS TO THE EARTHWORKS MAY BE INSTRUCTED BY THE SUPERINTENDENT DURING CONSTRUCTION. FINISHED SURFACE CONTOURS MAY BE ADJUSTED BY THE WRITTEN DIRECTION OF THE SUPERINTENDENT DURING CONSTRUCTION.
- REFER TO THE SPECIFICATION FOR COMPACTION DETAILS. ALL FILL MATERIALS WILL BE PLACED IN ACCORDANCE WITH THE APPROVED SPECIFICATION.
- EXCAVATED MATERIAL NOT REQUIRED FOR ROADWORKS OR NOMINATED SITE FILLING SHALL BE LOCATED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
- ALL SITE PREPARATION SHALL BE CARRIED OUT IN ACCORDANCE WITH AS3798-2007, "GUIDELINES ON EARTHWORKS FOR COMMERCIAL & RESIDENTIAL DEVELOPMENTS".
- WHERE UNSUITABLE MATERIAL IN AREAS TO BE FILLED IS ENCOUNTERED, THIS WILL BE TREATED AS SET OUT IN THE SPECIFICATION.
- LEVEL 1 INSPECTION & TESTING IS TO BE IMPLEMENTED ON THE SITE IN ACCORDANCE WITH AS 3798-2007 "GUIDELINES ON EARTHWORKS FOR COMMERCIAL & RESIDENTIAL DEVELOPMENTS". THE INSPECTION & TESTING AUTHORITY IS TO PROVIDE A COMPLIANCE CERTIFICATE & REPORT SETTING OUT THE INSPECTIONS, SAMPLING & TESTING CARRIED OUT DURING THE BULK EARTHWORKS.
- THE TOTAL COST OF THE GEOTECHNICAL INSPECTION & TESTING AUTHORITY (GITA) FOR THE LEVEL 1 INSPECTION & TESTING IS TO BE INCLUDED IN THE LUMP SUM OF THE TENDER. THE GITA IS TO MAINTAIN DAILY SITE RECORD SHEETS AS SET OUT IN AS 3798-2007.
- UNLESS NOTED OTHERWISE THE FREQUENCY OF TESTING IS TO BE IN ACCORDANCE WITH TABLE 8.1 OF AS 3798-2007.
- THE CONTRACTOR IS TO COMPLY WITH ALL REGULATIONS CONCERNING WORK HOURS, WARNING SIGNS, FENCING OR SECURITY & EMISSIONS FROM THE SITE INCLUDING DUST, WATER, SILT, NOISE & SMOKE.
- FILL BATTER SLOPES ARE TO BE OVERFILLED & TRIMMED BACK TO PROFILE.
- ALL VEHICLES EXITING FROM THE SITE WILL DO SO VIA THE TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP. VEHICLES WILL BE CLEANED & TREATED AS TO PREVENT MATERIAL BEING TRACKED OR DEPOSITED ON THE ADJOINING PUBLIC ROADS. REFER EROSION & SEDIMENT CONTROL DRAWINGS FOR FURTHER DETAILS.

LEGEND

EXISTING	PROPOSED	
		MRC MOUNTABLE KERB AND CHANNEL
		MRC CARPARK KERB
		MRC DISH DRAIN
		IPWEAQ FLUSH KERB
		PROPERTY BOUNDARY
		EASEMENT
		DRIVEWAY
		STORMWATER DRAINAGE
		OPEN CHANNEL
		BATTER
		CONTOURS
		FENCE
		SEWER
		RISING MAIN
		WATER
		TELSTRA
		FOOTPATH
		STAGE BOUNDARY
		TREE
		TREE TO BE REMOVED
		9.76 X EARTHWORKS LEVEL
		CUT
		FILL
		PALM TREE CLUMP

NOTE:
ALL EXISTING UNCOMPACTED FILL ON SITE BELOW DESIGN SURFACE TO BE EXCAVATED AND COMPACTED.

I, **NICHOLAS ROZIS**
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY:
* CERTIFY THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING IS ACCURATE.
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* ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY COUNCIL AND OTHERS.
(Signature) (SIGNATURE)



AS CONSTRUCTED

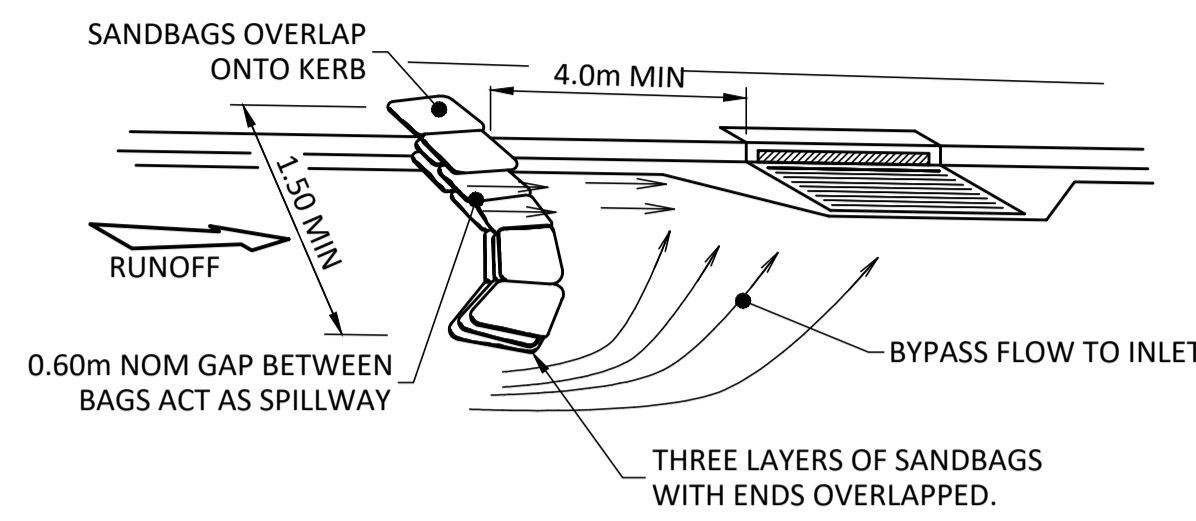
COPYRIGHT © - This document is and shall remain the property of BORNHORST & WARD Pty Ltd. The document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. Unauthorised use of this document in any form whatsoever is prohibited.		REV. DATE AMENDMENT / ISSUE H 02.09.16 REVISED BATTER IN NORTHERN LOTS G 31.08.16 REVISED EWKS F 16.08.16 RESPONSE TO COUNCILS COMMENTS E 03.05.16 ISSUE FOR CONSTRUCTION D 09.05.14 ISSUE FOR APPROVAL	DWN DES CHK APP BBE BBE NR NR MS BBE NR NR MS BBE NR NR MS AY IT NR	ASSOCIATED CONSULTANTS APPROVED <i>M. Rozis</i> 7729 RPEQ DATE 10/10/17	CHECKED <i>B. Begaud</i> DATE 10/10/17	BORNHORST + WARD CONSULTING ENGINEERS CIVIL AND STRUCTURAL Level 4, 67 Astor Terrace, Spring Hill, QLD 4000 Phone (07) 3013 4699 Facsimile (07) 3013 4611 mail@bornhorstward.com.au www.bornhorstward.com.au A.C.N. 010 151 354 A.B.N. 78 010 151 354	CLIENT URBAN LAND DEVELOPMENT AUTHORITY	PROJECT ANDERGROVE, MACKAY STAGE 8	SUBJECT EARTHWORKS PLAN	PROJECT No. 12121D DRAWING No. REVISION C011 H
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EROSION & SEDIMENT CONTROL PROGRAM

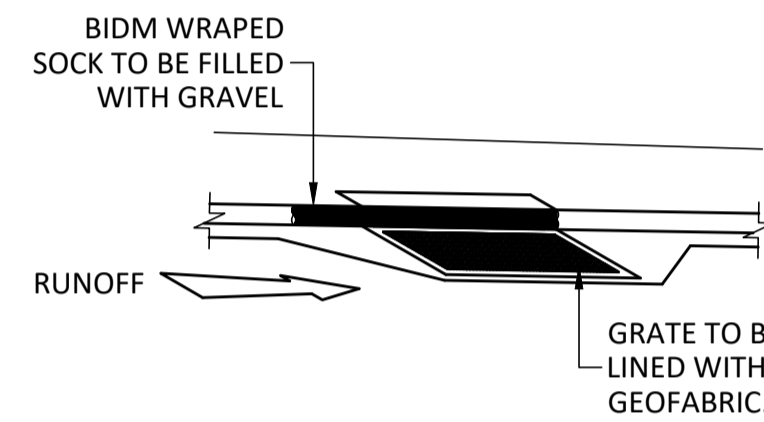
1. THIS PROGRAM & ASSOCIATED PLANS SHALL BE READ IN CONJUNCTION WITH THE SITE MANAGEMENT SPECIFICATION INCORPORATED IN THE CONTRACT DOCUMENTS. THE PROVISIONS OF THE SPECIFICATION ARE TO BE STRICTLY ADHERED TO.
2. THE BASIC OBJECTIVES OF THE EROSION & SEDIMENT CONTROL ARE :
 - 2.1. IDENTIFY CRITICAL AREAS & PROVIDE SPECIAL ATTENTION TO THOSE AREAS.
 - 2.2. PLAN SITE LAYOUTS SO THAT ACCESS TO ALL REQUIRED DRAINAGE EROSION & SEDIMENT CONTROL MEASURES IS MAINTAINED.
 - 2.3. LIMIT EXPOSURE TIME BY PROGRAMMING TO MINIMISE THE AREA OF LAND EXPOSED TO POTENTIALLY ADVERSE WEATHER CONDITIONS AT ANY ONE TIME.
 - 2.4. PROVIDE CONTROL MEASURES INCLUDING TEMPORARY & PERMANENT DRAINAGE, EROSION & SEDIMENT CONTROLS.
3. THE EROSION & SEDIMENT CONTROL SHALL COMPLY WITH LOCAL AUTHORITY EROSION & SEDIMENT CONTROL STANDARDS, THE SOIL EROSION & SEDIMENTATION CONTROL - ENGINEERING GUIDELINES FOR QUEENSLAND (CURRENT EDITIONS), & ALL OTHER LOCAL AUTHORITY EROSION & SEDIMENT CONTROL GUIDELINES.
4. ALL ESC DEVICES ARE TO BE INSPECTED WEEKLY, PRIOR TO EXPECTED & AFTER RAINFALL. ANY DAMAGE OR EXCESS EROSION/ SEDIMENT IS TO BE REPAIRED & MANAGED AS REQUIRED TO MAINTAIN CONTROL DEVICES.
5. WATER DISCHARGE
 - 5.1 CRITERIA: Samples must be taken & analysed prior to the release of water from ponds.
 - TSS<50 mg/L
 - pH BETWEEN 6.5 & 8.5.
 - 5.2 TREATMENT:
 - High TSS: Add Gypsum. LOCAL AUTHORITY Guideline suggests 32 to 70kg/400m³ water.
 - Low ph: Add Aglime/Hydrated Lime or Sodium Bicarbonate. Refer QLD SPP 2/02 Guidelin, Table 5 for suggested dosage rates.
 - High pH: Add Citric Acid. Testing for both pH & Alkalinity are necessary to determine dosage rates.
6. ALL WATER QUALITY DATA INCLUDING DATES OF RAINFALL, TESTING & WATER RELEASE MUST BE MAINTAINED IN AN ON-SITE REGISTER. THIS REGISTER IS TO BE MAINTAINED FOR THE DURATION OF THE APPROVED WORKS & BE AVAILABLE ON SITE FOR INSPECTION BY COUNCIL OFFICERS ON REQUEST.
7. ALL TEMPORARY EROSION & SEDIMENT CONTROL (ESC) MEASURES TO BE MAINTAINED & FULLY OPERATIONAL DURING THE MAINTENANCE PERIOD & ARE TO BE REMOVED AFTER THE SATISFACTORY COMPLETION OF AN OFF-MAINTENANCE INSPECTION BY COUNCIL.
8. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR IS TO PROVIDE A DETAILED PROGRAM TO THE SUPERINTENDENT SHOWING THE TIMING FOR ALL WORKS ASSOCIATED WITH THE PROJECT, NOMINATING, IN PARTICULAR, THE PROGRAM FOR INSTALLATION OF SOIL & EROSION CONTROL SYSTEMS.
9. EARTHWORKS SHALL BE CARRIED OUT IN SUCH A MANNER THAT THE SITE IS MAINTAINED IN A WELL DRAINED CONDITION, AREAS OF LOOSE SOIL ARE MINIMISED & CONCENTRATIONS OF STORMWATER ARE MINIMISED.
10. CONSTRUCTION ACCESS SHALL BE AT ONLY ONE NOMINATED POINT ON BUNYA WAY.
11. FOR DETAILS OF TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP AREA, REFER TO IPWEAQ STANDARD DRAWING DS-040.
12. SUPPLEMENTARY EROSION & SEDIMENT CONTROL DEVICES MAY BE REQUIRED AT THE DISCRETION OF THE SUPERINTENDENT AND/OR COUNCIL.
13. SEDIMENT CONTROL DEVICES SHALL BE PROVIDED WHERE SHOWN ON THE DRAWINGS. SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL AT LEAST 70% SOIL COVERAGE UPSTREAM & DOWNSTREAM OF THE DEVICE IS ACHIEVED AND/OR AS DIRECTED BY COUNCIL.
14. SEDIMENT FENCES TO BE PLACED AS SHOWN. FOR DETAILS OF SEDIMENT FENCE REFER TO IPWEAQ STANDARD DRAWING DS-041. THE ENDS OF ALL SEDIMENT FENCES ARE TO RETURN UP THE CONTOUR SO AS TO RETAIN ALL SEDIMENT.
15. SEDIMENT FENCES TO BE REPAIRED & EXCESSIVE SEDIMENT DEPOSITS SHALL BE REMOVED ONCE THE FENCE REACHES 75% OF ITS CAPACITY.
16. EXCAVATED MATERIAL WILL BE PLACED DIRECTLY INTO FILL AREAS IN ACCORDANCE WITH THE APPROVED EARTHWORKS SPECIFICATION.
17. ANY IMPORTED FILL MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF THE SPECIFICATION.

EROSION & SEDIMENTATION CONTROL NOTES:

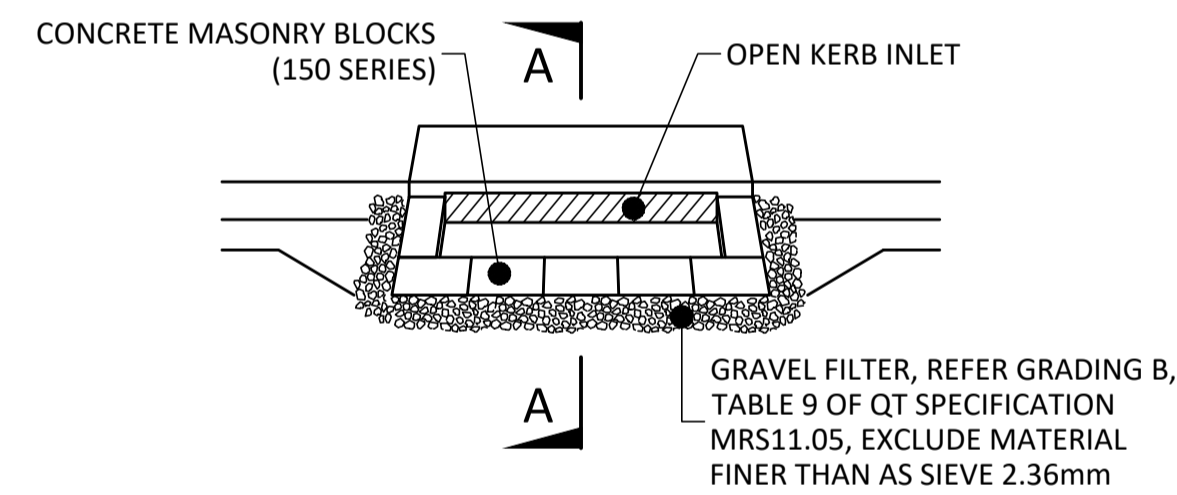
1. TOPSOIL
 - 1.1. STRIP & STOCKPILE AVAILABLE TOPSOIL (ASSUMED AVERAGE DEPTH 150mm) FROM ALL DISTURBED AREAS PRIOR TO EARTHWORKS. GRADE EVENLY BETWEEN ALLOTMENT FINISHED SURFACE LEVELS & ENSURE LOTS ARE FREE DRAINING.
 - 1.2. MINIMUM SLOPE ACROSS ALLOTMENTS TO BE 1%.
 - 1.3. ALL FOOTPATHS, BATTERS, & EARTHWORK AFFECTED ALLOTMENTS ARE TO BE TOPSOILED TO A MINIMUM DEPTH OF 130mm (LIGHTLY COMPACTED) & TURFED WHERE SPECIFIED.
 - 1.4. SEDIMENT FENCES TO BE PLACED AS SHOWN. FOR DETAILS OF SEDIMENT FENCE REFER TO RELEVANT AUTHORITY STANDARD DRAWINGS. SEDIMENT FENCES TO BE REPAIRED & EXCESSIVE SEDIMENT DEPOSITS SHALL BE REMOVED ONCE CAPACITY FALLS BELOW 75%.
2. SEDIMENT FENCES
 - 2.1. FOR DETAILS OF SEDIMENT FENCE REFER TO RELEVANT AUTHORITY STANDARD DRAWINGS
 - 2.2. SEDIMENT FENCES TO BE REPAIRED AS REQUIRED & EXCESSIVE SEDIMENT DEPOSITS SHOULD BE REMOVED.
 - 2.3. IN THE EVENT OF WET WEATHER, INSTALL KERB INLETS FILTER WITH GRAVEL RANGING FROM 50mm TO 75mm IN SIZE. REFER IPWEAQ STANDARD DRAWING DS-041. IF THE GRAVEL FILTER BECOMES CLOGGED WITH SEDIMENT DURING ITS USE, THE GRAVEL MUST BE PULLED AWAY FROM THE MESH & CLEANED OR REPLACED.
 - 2.4. REGULAR WEEKLY CHECKS OF SILT FENCES IS TO BE MADE ALONG WITH A CHECK AFTER ANY SIGNIFICANT STORM EVENT TO ENSURE INTEGRITY & PERFORMANCE.
3. TURFING
 - 3.1. PROVIDE TURFING TO ENTIRE WIDTH OF ALL SWALES, FOOTPATHS, & 1 IN 4 CUT & FILL BATTERS.
 - 3.2. FOOTPATH BATTERS ARE TO BE STABILISED WITH TOPSOIL (& TURFED) AS SOON AS PRACTICAL AFTER THE BATTERS HAVE BEEN COMPLETED. REMAINING EXPOSED AREAS ON LOTS ARE TO BE SEEDED & MULCHED (E.G HYDROMULCHED).
4. DURING CONSTRUCTION SEQUENCE
 - 4.1. TOPSOIL STOCKPILE SITE TO HAVE A SEDIMENTATION FENCE CONSTRUCTED ON D/S SIDE.
 - 4.2. SEDIMENTATION FENCES TO BE PLACED AS SHOWN.
 - 4.3. REGULARLY INSPECT BANKS & REPAIR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD.
 - 4.4. REMOVE SEDIMENT TO AVOID PONDING FROM CATCH DRAINS.
 - 4.5. REMOVE EXCESSIVE SEDIMENT FROM UPSTREAM OF CHECK DAM.
 - 4.6. ROAD RESERVE TO BE USED AS HAUL ROAD.
 - 4.7. A CATCH DRAIN BANK IS TO BE PROVIDED ON THE TOP SIDE OF ALL CUTS & DISCHARGE EITHER TO UNDISTURBED GRASS LANDS OR TO THE CROSS ROAD DRAINAGE
 - 4.8. SUPPLEMENTARY EROSION & SEDIMENT CONTROL DEVICES MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER.
 - 4.9. WATER QUALITY SAMPLES MUST BE TAKEN & ANALYSED PRIOR TO THE RELEASE OF ANY WATER FROM THE SEDIMENT POND. WATER QUALITY MUST SATISFY THE FOLLOWING CRITERIA: TSS<50mg/L pH BETWEEN 6.5 & 8.5. IF WATER QUALITY FAILS THE CRITERIA THEN THE USE OF A GYPSUM FLOCCULENT IS TO BE APPLIED AS DIRECTED BY THE SUPERINTENDENT.
 - 4.10. ALL WATER QUALITY DATA INCLUDING DATES OF RAINFALL, TESTING & WATER RELEASE MUST BE MAINTAINED IN AN ON-SITE REGISTER. THIS REGISTER IS TO BE MAINTAINED FOR THE DURATION OF THE APPROVED WORKS & BE AVAILABLE ON SITE FOR INSPECTION BY COUNCIL OFFICERS ON REQUEST.
 - 4.11. GRASS SEEDING IS TO ACHIEVE 70% COVER WITHIN 30 DAYS OF COMPLETION OF EARTHWORKS.
5. FOLLOWING CONSTRUCTION
 - 5.1. SEDIMENTATION FENCES TO BE MAINTAINED UNTIL TURFING IS COMPLETED & GRASS IS 80% ESTABLISHED.
 - 5.2. SEDIMENT BASINS TO BE CHECKED & DE-SILTED AFTER EVERY SIGNIFICANT STORM EVEN OR IN THE CASE OF NO SIGNIFICANT STORM EVENT, EVERY 12 WEEKS.



ONGRADE KERB INLET SEDIMENT TRAP
N.T.S.



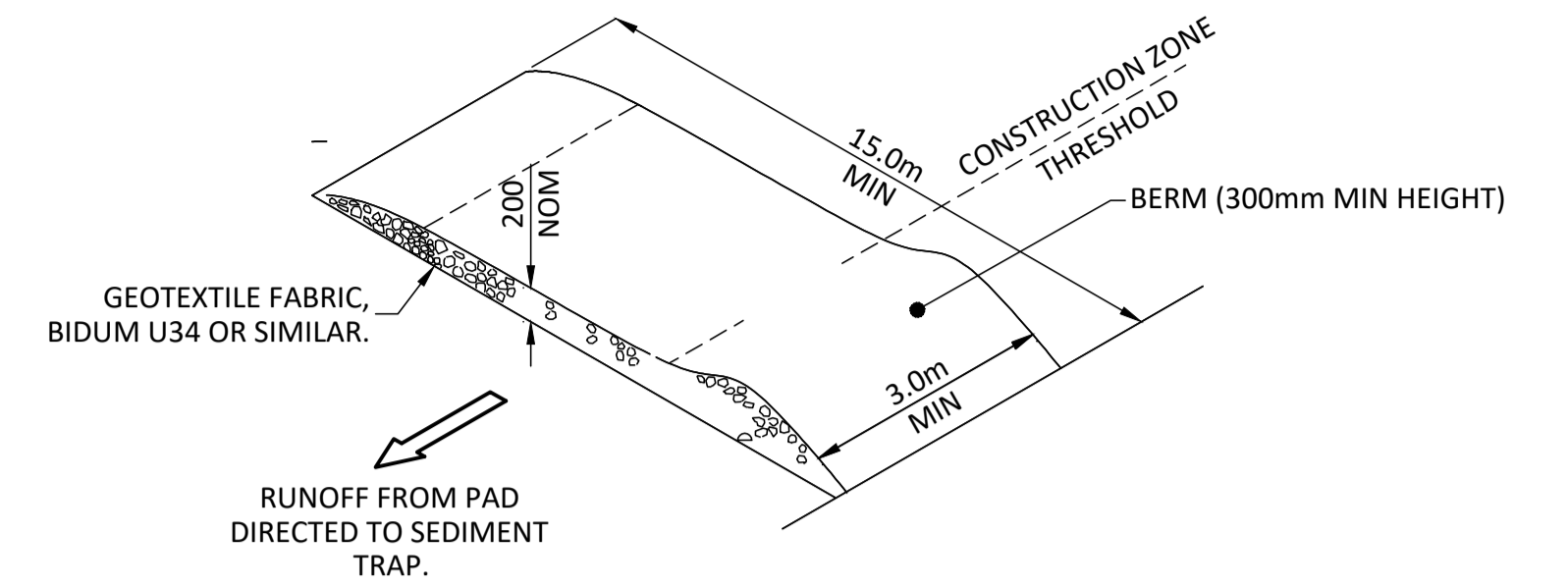
ON GRADE KERB INLET SEDIMENT TRAP ON EXISTING ROADS
N.T.S.



SECTION A-A

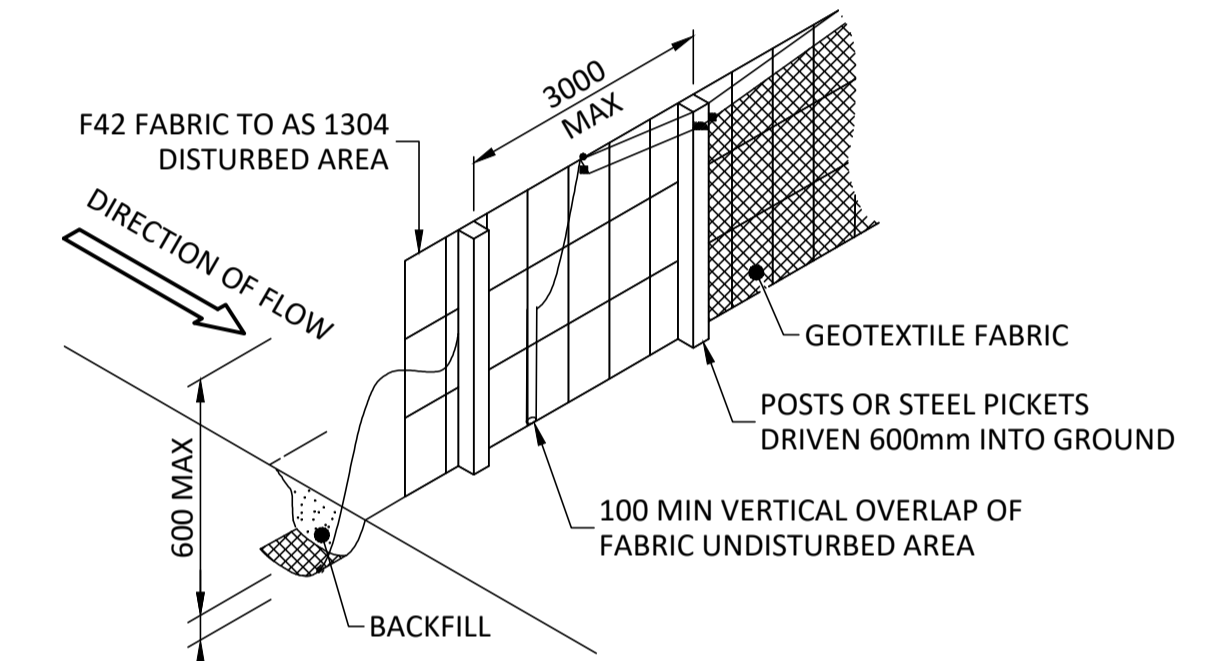
A STABILISED BYPASS 'OVERLAND FLOW PATH' SHOULD EXIST ADJACENT TO INLET IN GENUINE SAGS

SAG INLET SEDIMENT TRAP
N.T.S.

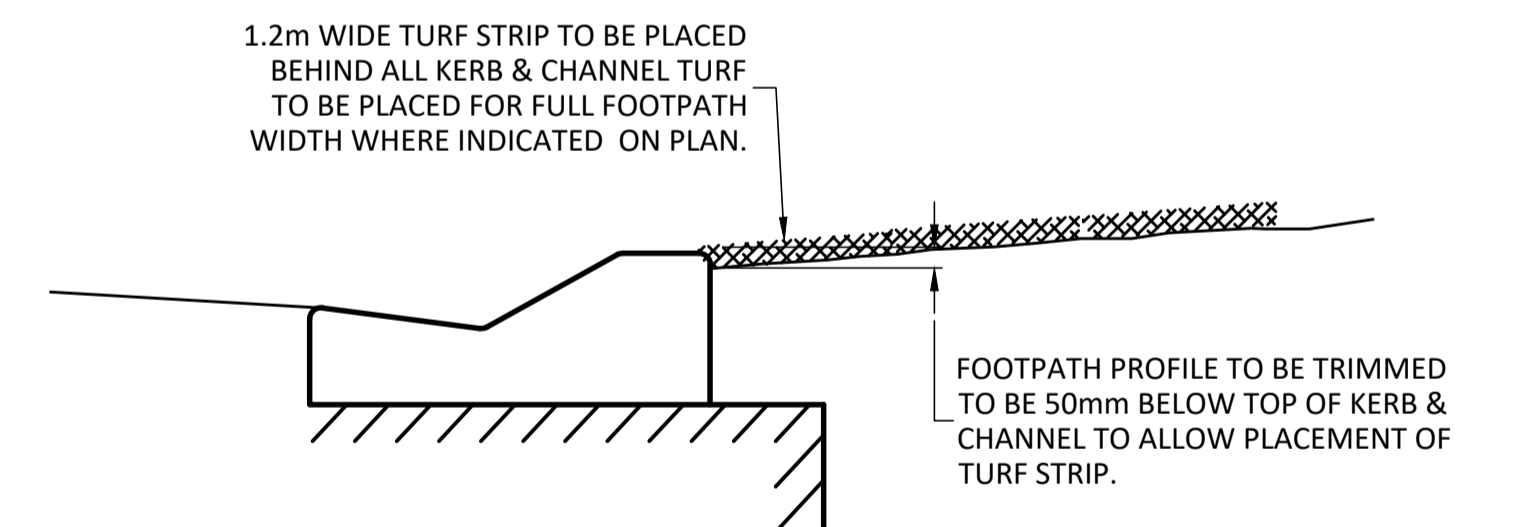


NOTE 1: UNBOUND PAVEMENT MATERIAL (GRAVEL) TO GRADING B, TABLE 7.3.4-A OF TMR SPECIFICATION MRTS05, EXCLUDE MATERIAL FINER THAN AS SIEVE 2.36mm.

TEMPORARY CONSTRUCTION ENTRY / EXIT SEDIMENT TRAP
N.T.S.



SILT FENCE ELEVATION
N.T.S.

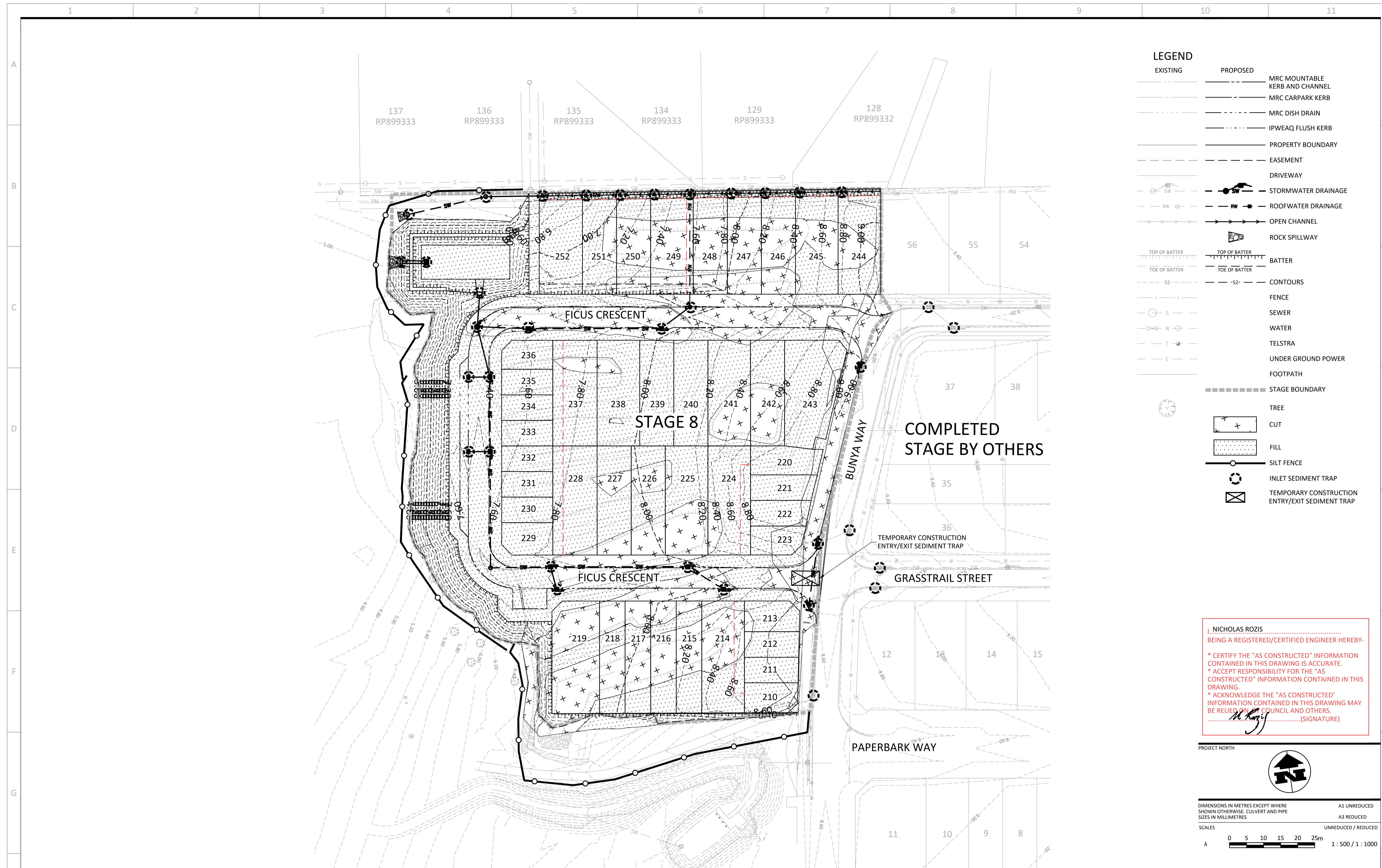


EROSION CONTROL AT KERB
N.T.S.

NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
* CERTIFY THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING IS ACCURATE.
* ACCEPT RESPONSIBILITY FOR THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING.
* ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY COUNCIL AND OTHERS.
N. Rozis (SIGNATURE)

AS CONSTRUCTED

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EXISTING	PROPOSED	
		MRC MOUNTABLE KERB AND CHANNEL
		MRC CARPARK KERB
		MRC DISH DRAIN
		IPWEAQ FLUSH KERB
		PROPERTY BOUNDARY
		EASEMENT
		DRIVEWAY
		STORMWATER DRAINAGE
		ROOFWATER DRAINAGE
		OPEN CHANNEL
		ROCK SPILLWAY
		TOP OF BATTER
		TOE OF BATTER
		CONTOURS
		FENCE
		SEWER
		WATER
		TELSTRA
		UNDER GROUND POWER
		FOOTPATH
		STAGE BOUNDARY
		TREE
		CUT
		FILL
		SILT FENCE
		INLET SEDIMENT TRAP
		TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP

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 * ACCEPT RESPONSIBILITY FOR THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING.
 * ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY COUNCIL AND OTHERS.
(Signature)

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

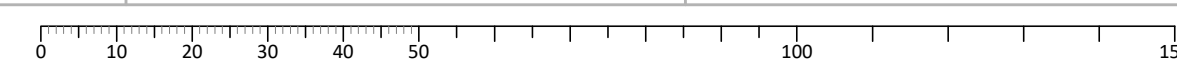
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PLAN
SCALE A

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STANDARD STORMWATER DRAINAGE NOTES

1. MATERIALS

1.1.2 PIPES
PIPES WORK SHALL COMPLY WITH THE FOLLOWING UNLESS NOTED OTHERWISE:

SIZE	CLASS	TYPE	JOINTING
≤ 300 DIA	REFER PROJECT DRAWINGS	RCP, FRC OR uPVC	RRJ
300 TO 600 DIA	REFER PROJECT DRAWINGS	RCP/FRC	SPIGOT AND SOCKET RRJ
> 675 DIA	REFER PROJECT DRAWINGS	RCP	INTERNAL FLUSH JOINT WITH EXTERNAL RUBBER BANDS

1.2 BEDDING, BACKFILL AND OVERLAY

BEDDING, HAUNCH / SIDE ZONE AND OVERLAY MATERIAL
THIS MATERIAL SHALL CONFORM TO THE FOLLOWING GRADING:

AS SIEVE SIZE	% PASSING BY MASS	
	BED AND HAUNCH ZONES	SIDE ZONES
9.5	100	50-100
2.36	50 - 100	30-100
0.60	20 - 90	15-50
0.30	10 - 60	-
0.15	0 - 25	-
0.075	0 - 10	0-25

1.2.1 BACKFILL

THE BACKFILL SHALL CONFORM TO THE FOLLOWING:

LOCATION	TRENCH	EMBANKMENT
EXISTING ROAD TO REMAIN IN USE	CEMENT STABILIZED FILL	N/A
NEW ROAD	GRAVEL (CBR>15% SOAKED)	*ORDINARY FILL
OTHER LOCATIONS	*ORDINARY FILL	*ORDINARY FILL

* ORDINARY FILL SHALL CONFORM TO THE REQUIREMENT DETAILED IN THE MRC EARTHWORKS SPECIFICATION C213.

2. CONSTRUCTION

2.1 UNLESS NOTED OTHERWISE BEDDING, HAUNCH OVERLAY AND BACKFILLING TO BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, AS3725 FOR CONCRETE PIPES AND AS2032, PARTS 5 AND 7 FOR uPVC PIPE UNDERGROUND INSTALLATION

NOMINAL DIAMETER OF PIPE (mm)	MINIMUM WIDTH OF TRENCH (mm)	MAXIMUM ALLOWABLE WIDTH OF TRENCH INSTALLATION (mm)
< 300	150	-
300	900	1100
375	975	1200
450	1050	1300
525	1125	1500
600	1200	1600
675	1300	1700

NOTE: SPACING BETWEEN MULTIPLE PIPES TO BE:
150mm FOR PIPES <300Ø
300mm FOR PIPES > 300Ø & <600Ø
600mm FOR PIPES >600Ø & <1800Ø

2.2 FOR DIAMETER < 600 ADOPT H3 BEDDING AND H2 FOR LARGER PIPES. FOR ALL PLASTIC PIPES THE SIDE AND HAUNCH ZONE MATERIAL IS TO EXTEND 75mm ABOVE THE CROWN OF THE PIPE

2.3 DRAINAGE TRENCH COMPACTION:

MINIMUM DRY DENSITY COMPACTION RATIOS TO AS 1289.5.4.1 (STANDARD COMPACTION)

ZONE	LOCATION	MATERIAL	MIN. DRY DENSITY (%)	
			COHESIVE	NON COHESIVE
BEDDING	ALL	REFER NOTE 1.2	98	N/A
BACKFILL	UNDER ROAD	GRANULAR (TOP 300mm)	98	N/A
BACKFILL	UNDER ROAD	CBR 15	98	N/A
BACKFILL	FOOTPATH	*ORDINARY FILL	95	N/A
BACKFILL	OTHER	*ORDINARY FILL	95	N/A

* REFER NOTE 1.2.1

TESTING FREQUENCY: 1 TEST PER 30 LINEAL METERS OF TRENCH PER LAYER OR A MINIMUM OF 2 TESTS PER LAYER FOR TRENCHES < 50m IN LENGTH.

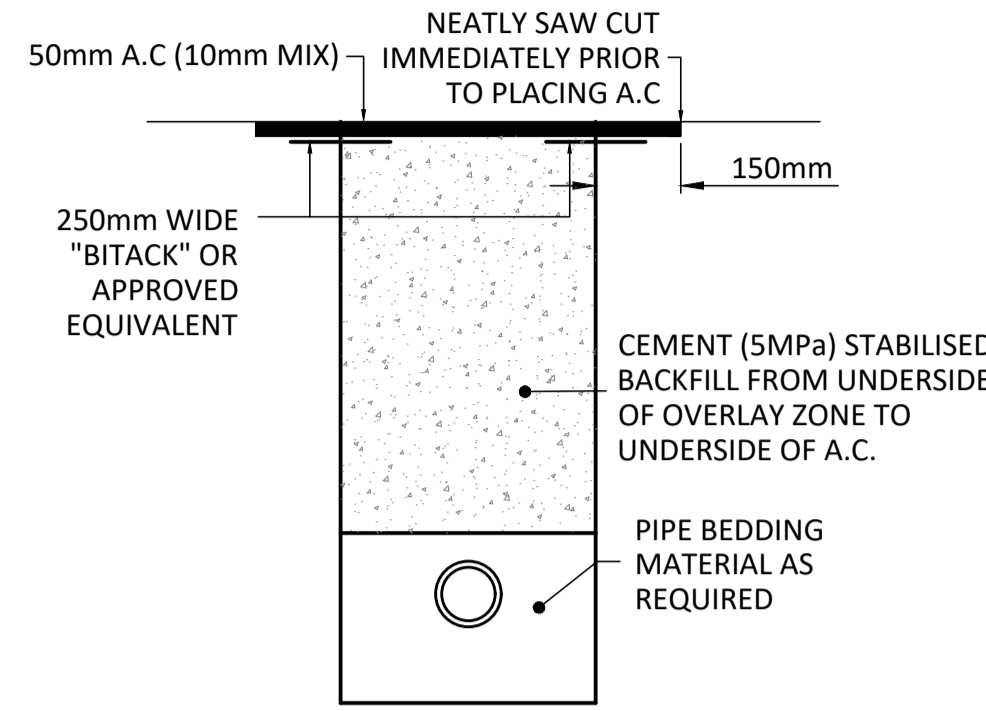
2.4 A 2.0m LENGTH OF 80 DIA. SUBSOIL DRAIN, SLEEVED IN A GEOTEXTILE SOCK, IS TO BE PLACED IN THE BEDDING UPSTREAM OF ALL DRAINAGE STRUCTURES OUTFALLING INTO THE DRAINAGE STRUCTURE.

NOTE:
CONCRETE PIPES WITHING ROAD RESERVE MUST BE REINFORCED CONCRETE RUBBER RING JOINT.

2.5 WORKS UNDER EXISTING PAVEMENT (WHICH IS TO REMAIN IN USE)

2.5.1 STATE CONTROLLED ROADS UNLESS APPROVED OTHERWISE BY THE MANAGING CONTRACTOR ARE TO BE PLACED BY TUNNEL BORING.

2.5.2 OTHER PAVEMENTS ADOPT PIPE DETAIL - TRENCH THROUGH EXISTING ROAD



PIPE DETAIL - TRENCH THROUGH EXISTING ROAD

2.6 MAXIMUM CONSTRUCTION LOADS FOR CLASS 3 RCP STORMWATER LINES NOT TO EXCEED A 10tonne VIBRATOR SMOOTH ROLLER AT 450mm COVER AND A 25 tonne EXCAVATOR AT 600mm COVER.

STANDARD ROADWORKS NOTES

1. PAVEMENT AND SURFACING

1.1 PAVEMENT THICKNESSES SHOWN ON DRAWINGS ARE PRELIMINARY. THE SUPERINTENDENT WILL NOMINATE FINAL PAVEMENT THICKNESSES FOLLOWING DETAILED SUBGRADE EVALUATION AS NOMINATED IN THE SPECIFICATIONS.

1.2 A PRIMER IS REQUIRED ON THE BASE COURSE SURFACE BEFORE ANY ASPHALTIC CONCRETE SURFACING, OR SEALING, IS CARRIED OUT. REFER SPECIFICATION FOR TYPICAL REQUIREMENTS. DETAILS TO BE CONFIRMED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION.

1.3 BITUMINOUS SURFACING SHALL NOT BE COMMENCED UNTIL THE PROFILE, SURFACE COMPACTION, QUALITY AND FINISH OF THE PAVEMENT HAVE BEEN APPROVED BY THE SUPERINTENDENT. SHOULD THE PAVEMENT, DUE TO ANY REASON OR CAUSE, LOSE THE REQUIRED QUALITY, STABILITY, DENSITY OR FINISH BEFORE THE SURFACING IS COMPLETE, IT SHALL BE RECTIFIED AT THE SOLE EXPENSE OF THE CONTRACTOR.

2. PAVEMENT MATERIALS

2.1 WHERE PAVEMENT MATERIALS ARE SPECIFIED BY SOAKED CBR VALUES, THIS SHALL BE DEFINED AS THE FOUR DAY SOAKED CBR VALUE WHEN TESTING IN ACCORDANCE WITH AS 1289.6.1.6 - METHOD F1.1

2.2 ALL PAVEMENT MATERIAL INCORPORATED INTO THE FINISHED PAVEMENT SHALL BE FREE FROM STICKS, ORGANIC MATTER, CLAY LUMPS AND OTHER DELETERIOUS MATERIAL. VISUAL INSPECTION OF THE MATERIAL DURING AND AFTER PLACEMENT SHALL BE USED TO ENSURE COMPLIANCE WITH THIS CLAUSE.

3. MATERIAL COMPLIANCE TESTING

3.1 PRIOR TO DELIVERY OF ANY MATERIAL ON SITE SUBMIT MATERIAL COMPLIANCE TEST RESULTS TO THE SUPERINTENDENT

3.2 TESTING REQUIRED TO DEMONSTRATE COMPLIANCE OF MATERIALS SHALL BE UNDERTAKEN AT THE RATE OF ONE (1) TEST PER 500 CUBIC METRES SOLID MEASUREMENT OR PART THEREOF UNLESS OTHERWISE DETERMINED BY THE SUPERINTENDENT OR SPECIFIED UNDER THE JOB SPECIFICATION.

4. CONSTRUCTION

4.1 THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT TWENTY-FOUR (24) HOURS IN ADVANCE OF WHEN THE SUBGRADE WILL BE READY FOR THE SUPERINTENDENT'S INSPECTION. PAVING SHALL NOT COMMENCE UNTIL THE SUPERINTENDENT HAS INSPECTED AND APPROVED THE SUBGRADE PREPARATION.

4.2 THE MINIMUM STANDARDS OF COMPACTION SHALL BE:
SUBGRADE - 100% STANDARD COMPACTION
SUBGRADE REPLACEMENT MATERIAL - 95% MODIFIED COMPACTION
SUB-BASE - 95% MODIFIED COMPACTION
BASE - 98% MODIFIED COMPACTION

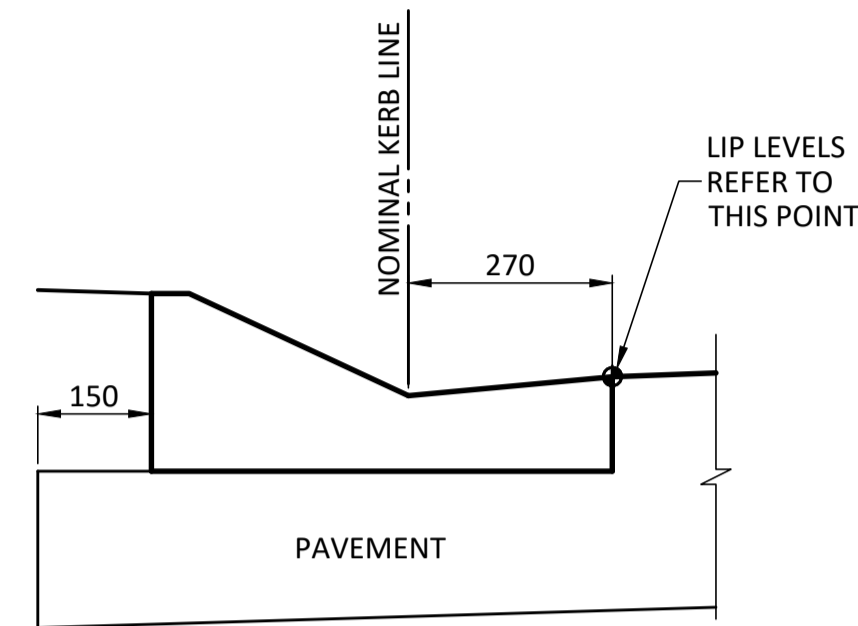
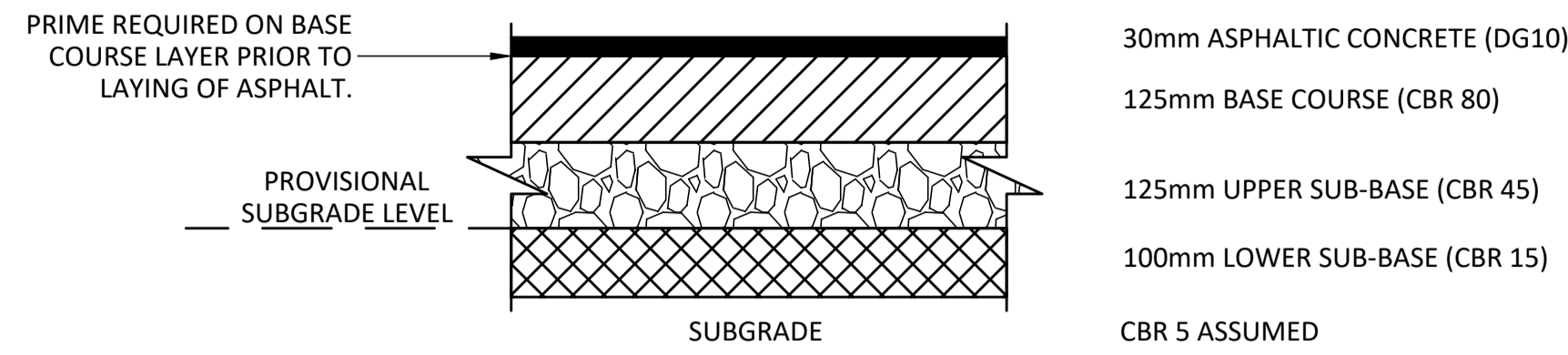
4.3 COMPACTION TESTS ARE REQUIRED ON SUBGRADE, SUBGRADE REPLACEMENT, SUB-BASE AND BASE LAYERS AT A FREQUENCY OF ONE (1) TEST PER 100 METRES FOR ROADWAY OR ONE (1) TEST PER 500m2 FOR GENERAL PAVING

5. SIDE DRAINS & CONDUITS

5.1 SUB-SURFACE PAVEMENT DRAINS ARE TO BE PROVIDED BENEATH ALL KERB AND KERB AND CHANNEL UNLESS NOTED OTHERWISE AND ARE TO DRAIN AT A MINIMUM 1% TO THE NEAREST STORMWATER STRUCTURE. REFER SPECIFICATION AND STANDARD DRAWINGS.

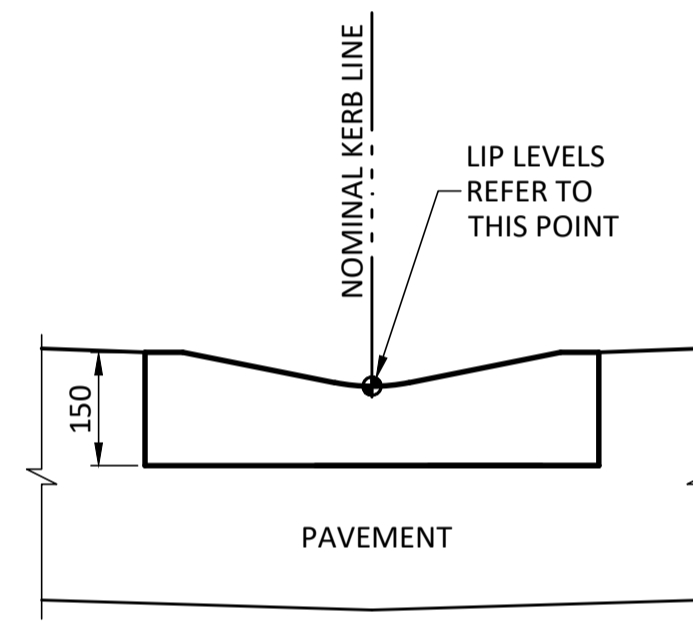
5.2 THE CONTRACTOR IS TO CONFIRM THE LOCATION OF SERVICE CONDUITS WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION.

PAVEMENT TYPE : B



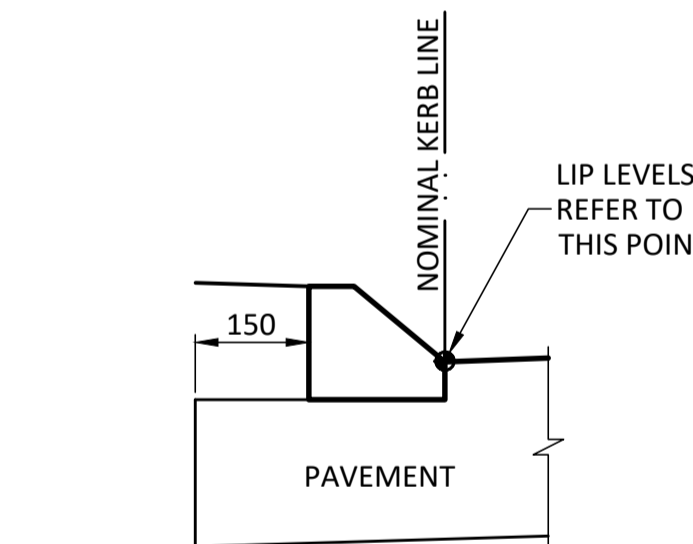
MRC MOUNTABLE KERB AND CHANNEL

REFER MRC STD DWG A3-865 FOR DETAILS N.T.S.



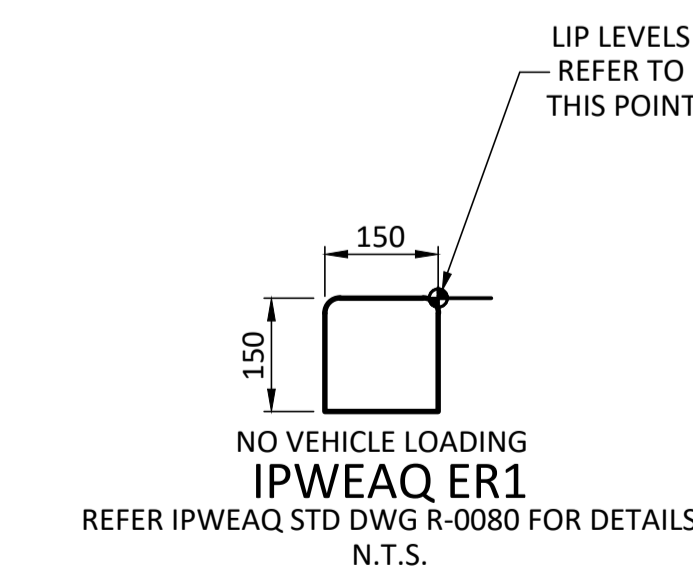
MRC DISH DRAIN

REFER MRC STD DWG A3-865 FOR DETAILS N.T.S.



MRC CARPARK KERB

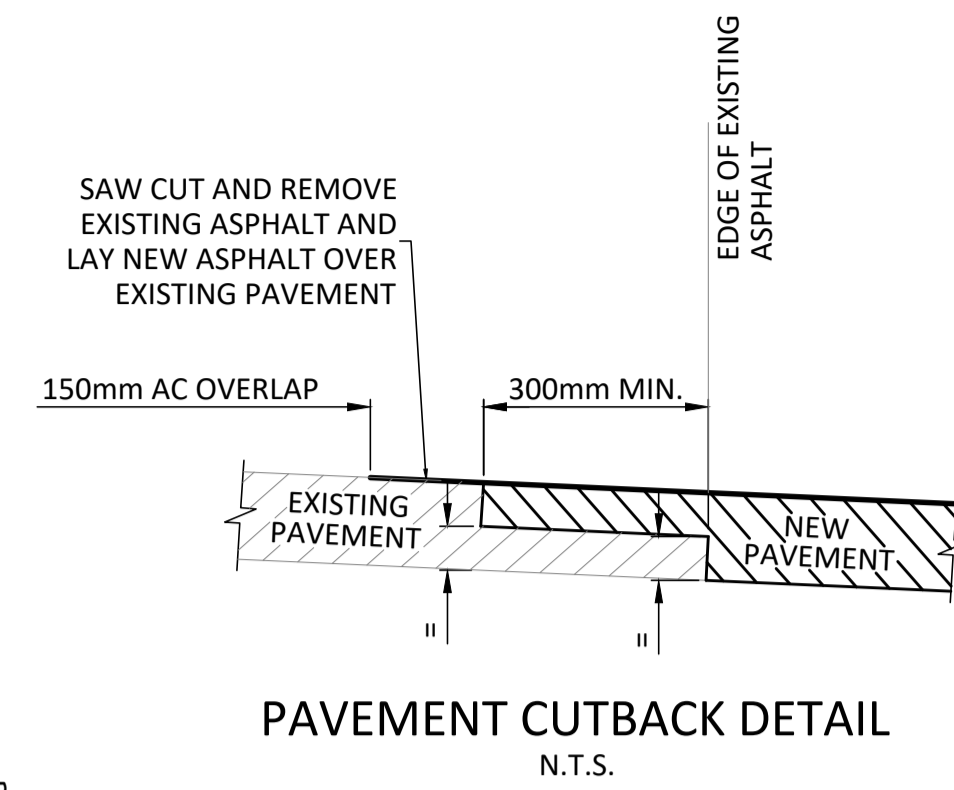
REFER MRC STD DWG A3-865 FOR DETAILS N.T.S.



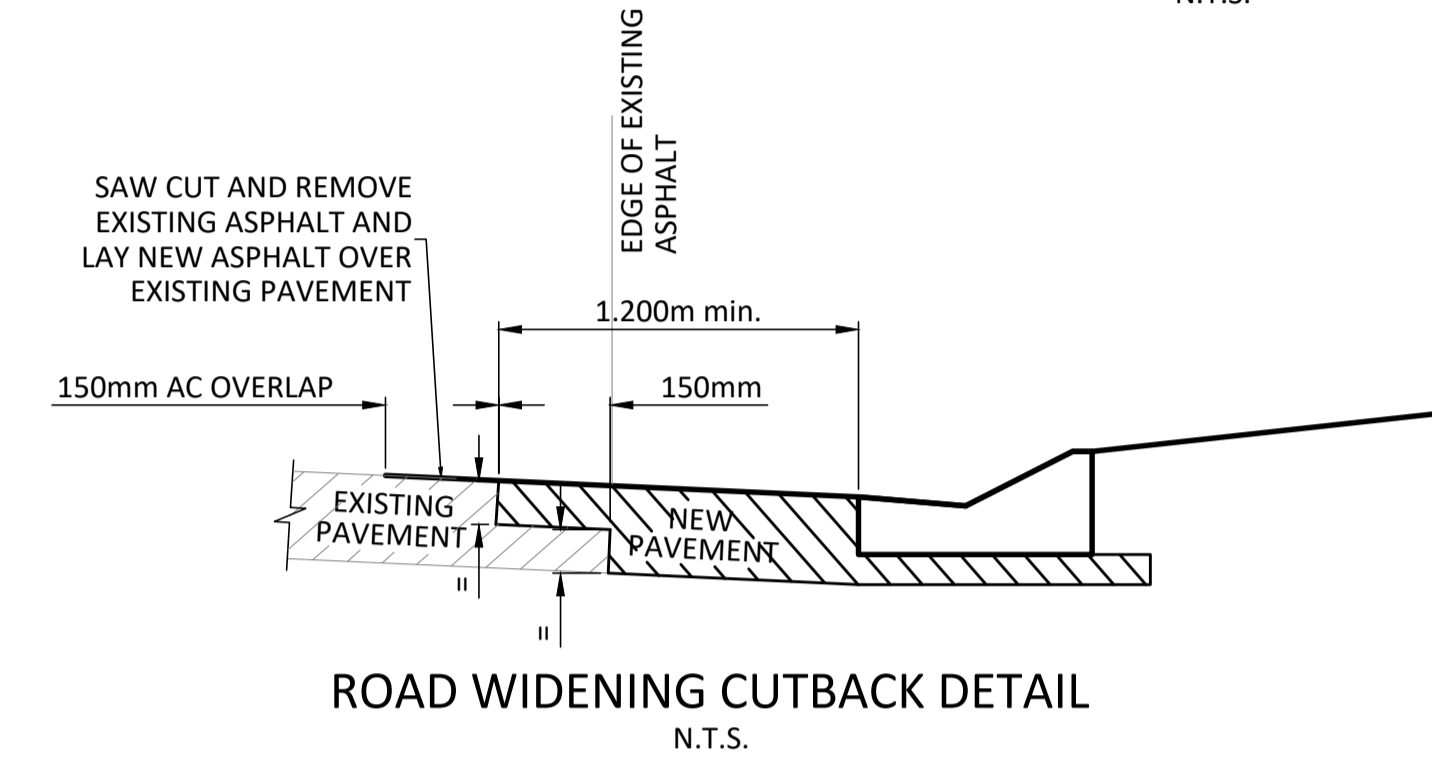
IPWEAQ ER1

REFER IPWEAQ STD DWG R-0080 FOR DETAILS N.T.S.

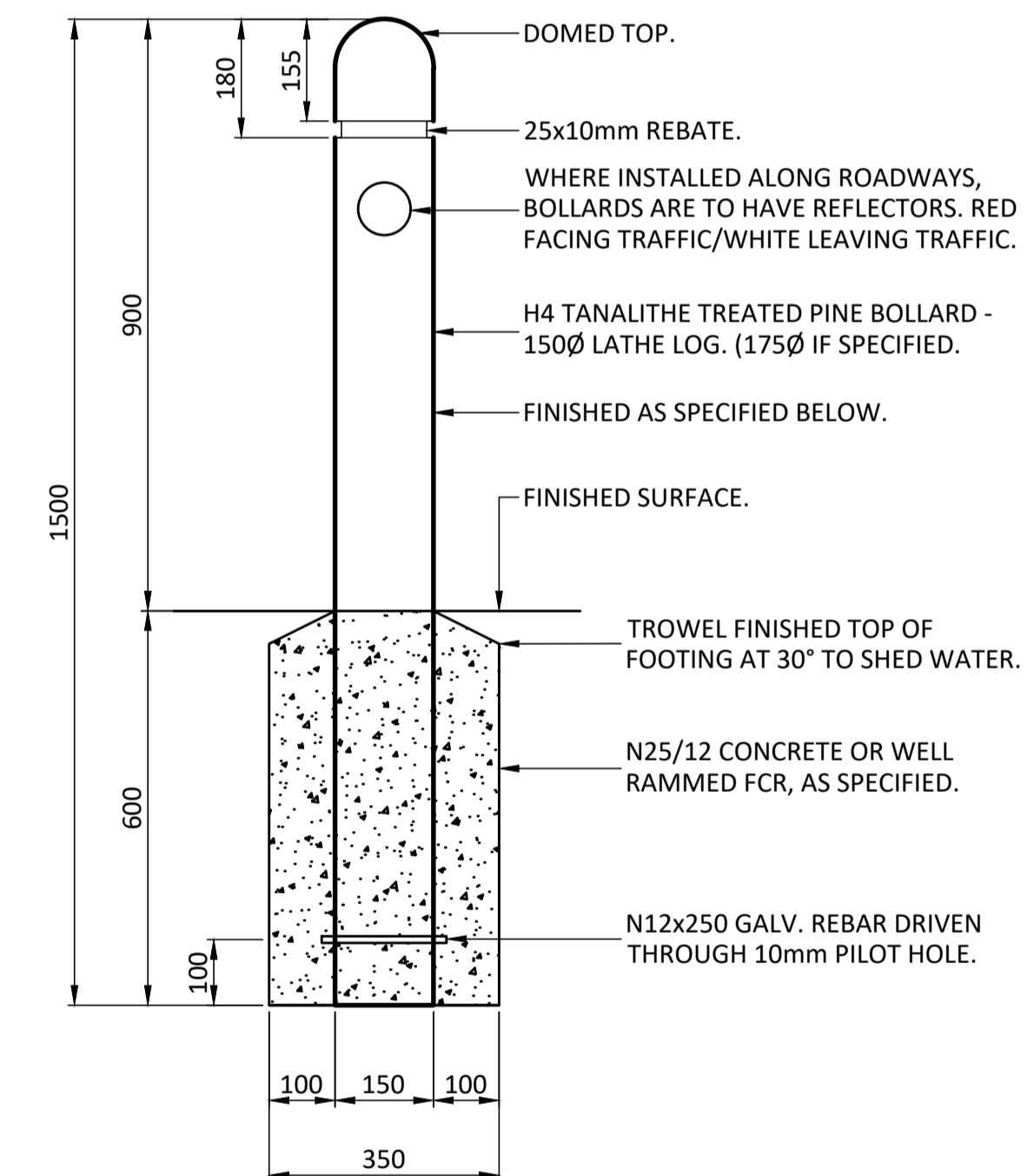
30mm ASPHALTIC CONCRETE (DG10)
125mm BASE COURSE (CBR 80)
125mm UPPER SUB-BASE (CBR 45)
100mm LOWER SUB-BASE (CBR 15)
CBR 5 ASSUMED



PAVEMENT CUTBACK DETAIL N.T.S.



ROAD WIDENING CUTBACK DETAIL N.T.S.



ROUND TIMBER BOLLARD N.T.S.

NOTES:

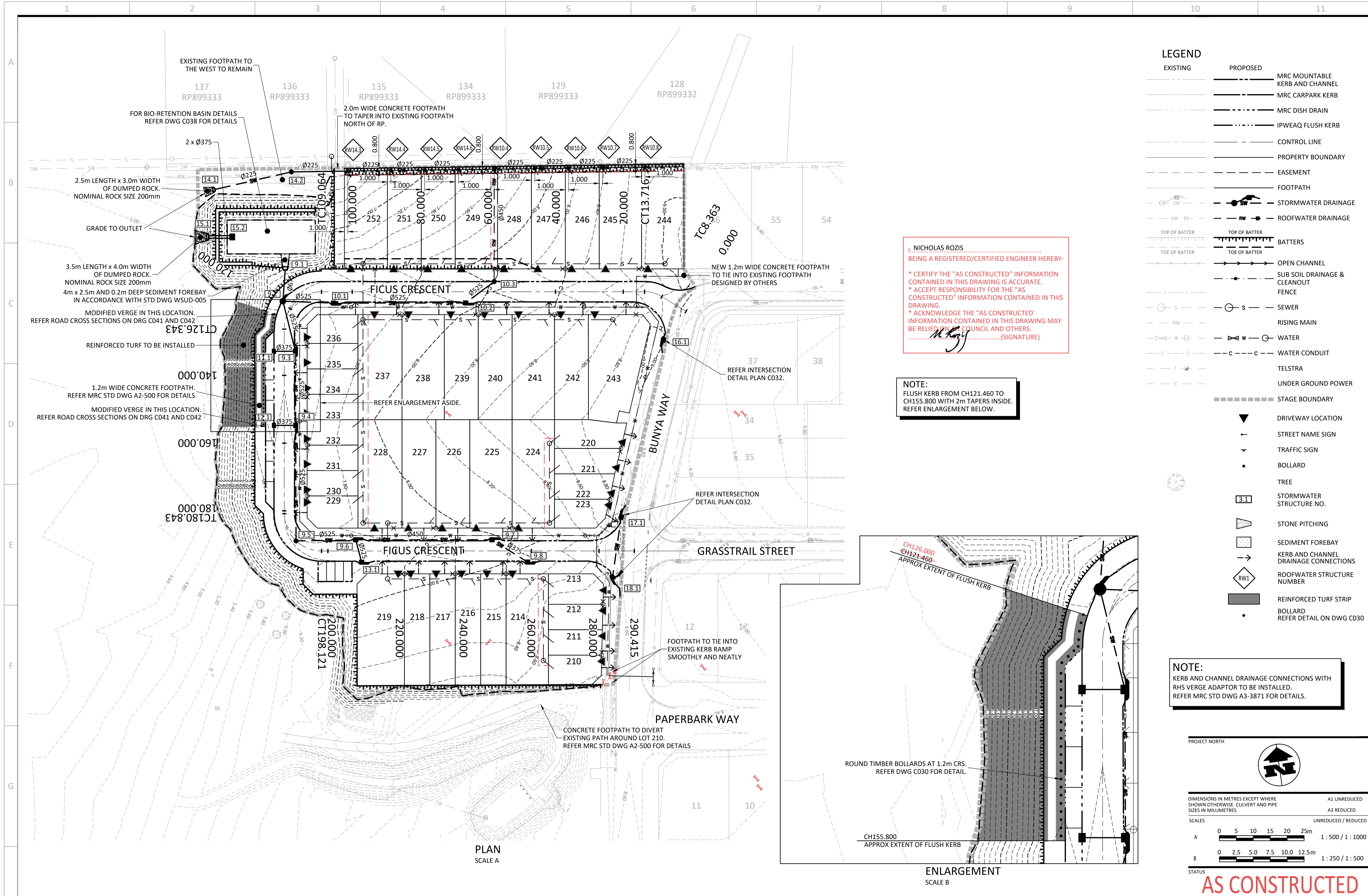
- SPACE BOLLARDS AT 1200mm CENTRES MAN, u.n.o.
- ALL TIMBER SHALL BE H4 'TANALITH E' TREATED PINE LATHE LOGS TO AS.1604.1-2000 OR SIMILAR APPROVED.
- FINISHES - BOLLARDS ARE TO BE TANALITH TREATED PRIOR TO INSTALLATION. ONLY IF SPECIFIED A PAINT FINISH CAN BE APPLIED. APPLY 2 COATS OF DULUX 'WEATHER SHIELD' OR SIMILAR.
- FOOTINGS TO BE CLEAR OF WATER & SEWERAGE ASSETS AS PER MACKAY WATER POLICY 16.

I, NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY:

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N. Rozis (SIGNATURE)

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F	31.08.16	RESPONSE TO COUNCILS COMMENTS	MS	BBE	NR	NR																																																						
E	03.05.16	ISSUE FOR CONSTRUCTION	MS	BBE	NR	NR																																																						
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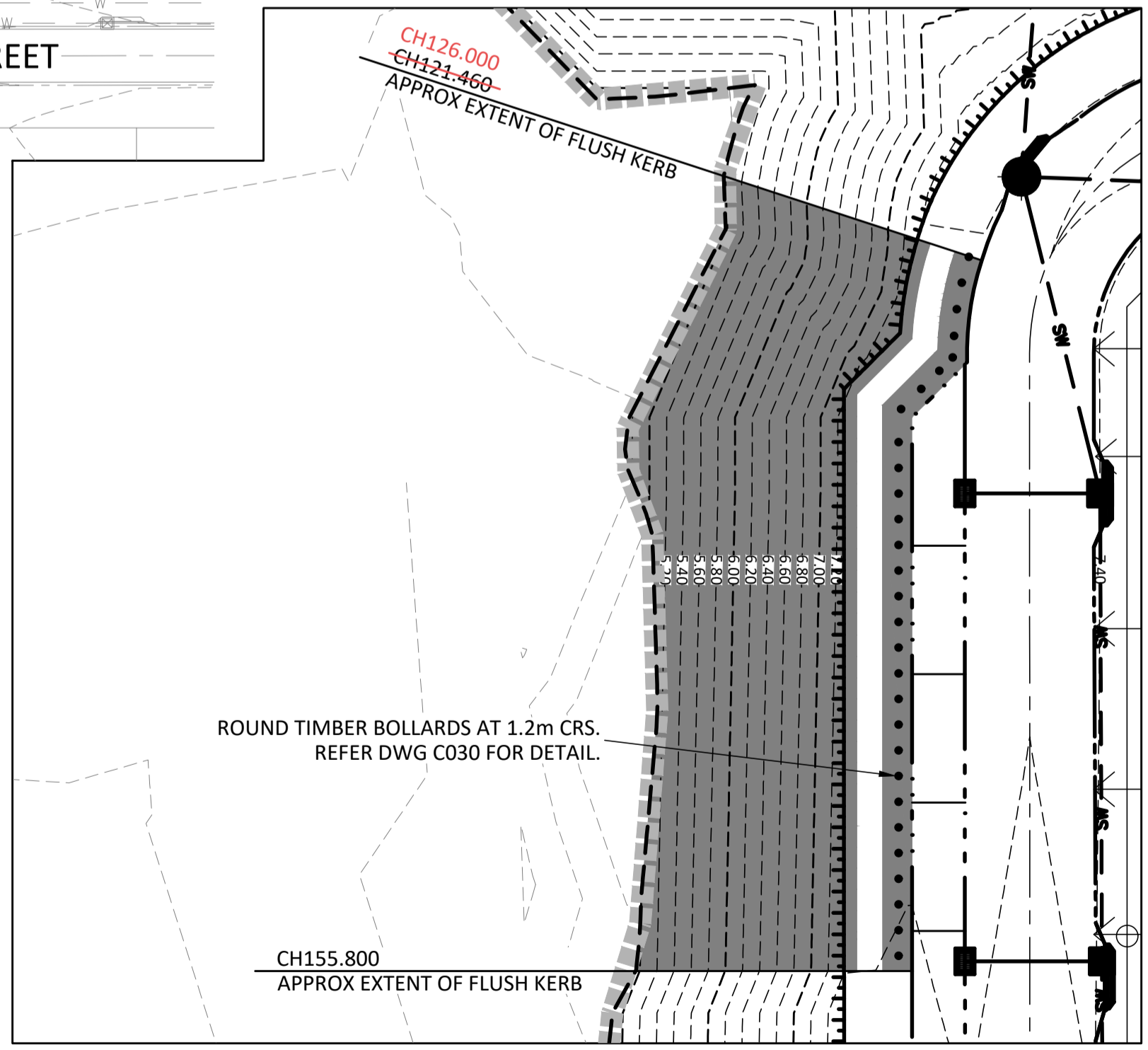
LEGEND

EXISTING	PROPOSED	DESCRIPTION
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	CONTROL LINE
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	FOOTPATH
---	---	STORMWATER DRAINAGE
---	---	ROOFWATER DRAINAGE
---	---	BATTERS
---	---	OPEN CHANNEL
---	---	SUB SOIL DRAINAGE & CLEANOUT FENCE
---	---	SEWER
---	---	RIISING MAIN
---	---	WATER
---	---	WATER CONDUIT
---	---	TELSTRA
---	---	UNDER GROUND POWER
---	---	STAGE BOUNDARY
---	---	DRIVEWAY LOCATION
---	---	STREET NAME SIGN
---	---	TRAFFIC SIGN
---	---	BOLLARD
---	---	TREE
---	---	STORMWATER STRUCTURE NO.
---	---	STONE PITCHING
---	---	SEDIMENT FOREBAY
---	---	KERB AND CHANNEL DRAINAGE CONNECTIONS
---	---	ROOFWATER STRUCTURE NUMBER
---	---	REINFORCED TURF STRIP
---	---	BOLLARD REFER DETAIL ON DWG C030

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 (SIGNATURE)

NOTE:
 FLUSH KERB FROM CH121.460 TO CH155.800 WITH 2m TAPERS INSIDE. REFER ENLARGEMENT BELOW.

NOTE:
 KERB AND CHANNEL DRAINAGE CONNECTIONS WITH RHS VERGE ADAPTOR TO BE INSTALLED. REFER MRC STD DWG A3-3871 FOR DETAILS.



PLAN SCALE A

ENLARGEMENT SCALE B

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

A1 UNREDUCED	1:500 / 1:1000
A3 REDUCED	1:250 / 1:500

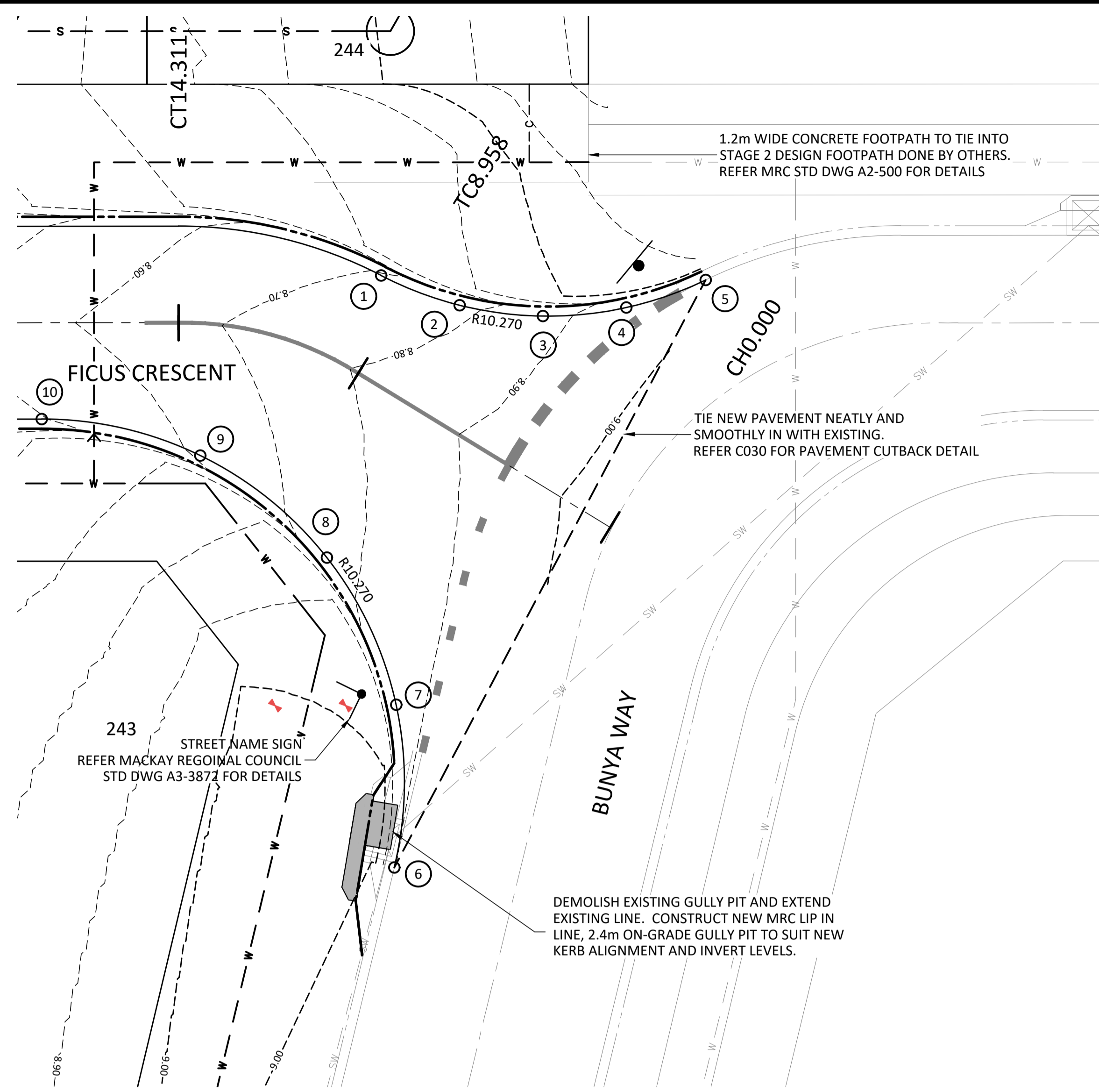
SCALES UNREDUCED / REDUCED

A 0 5 10 15 20 25m

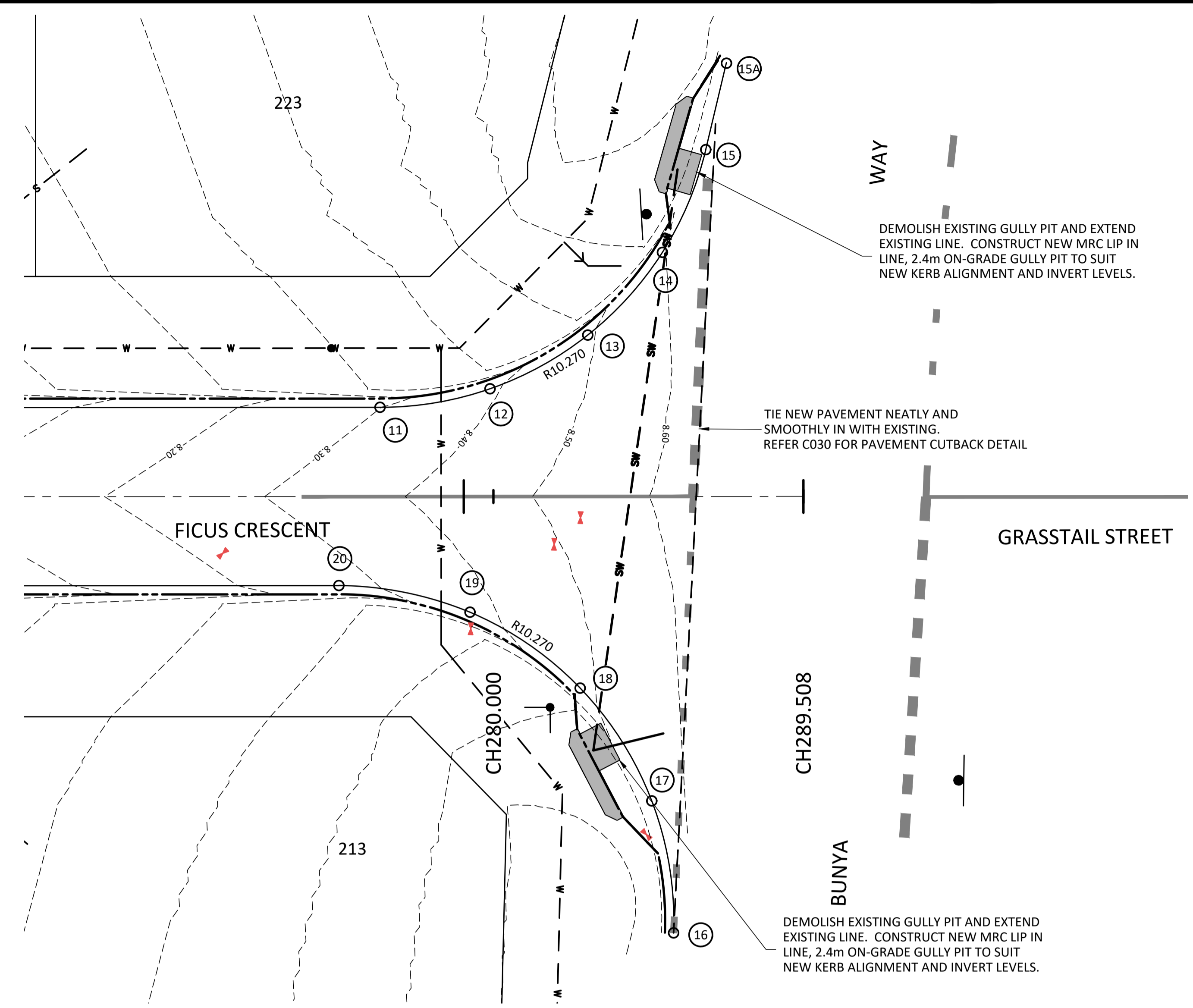
B 0 2.5 5.0 7.5 10.0 12.5m

STATUS

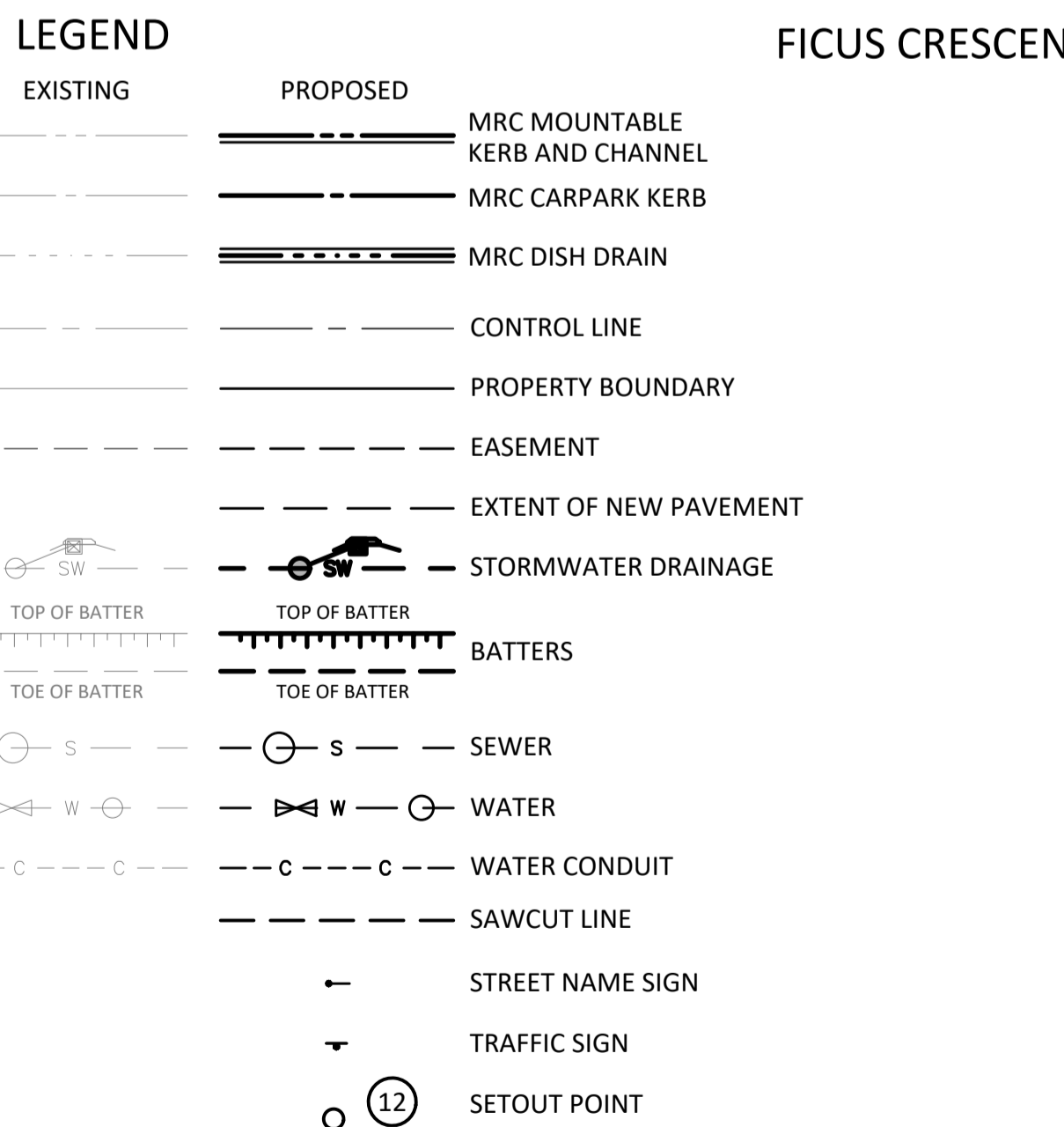
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FICUS CRESCENT - BUNYA WAY NORTHERN INTERSECTION DETAIL PLAN
SCALE A



FICUS CRESCENT - BUNYA WAY SOUTHERN INTERSECTION DETAIL PLAN
SCALE A



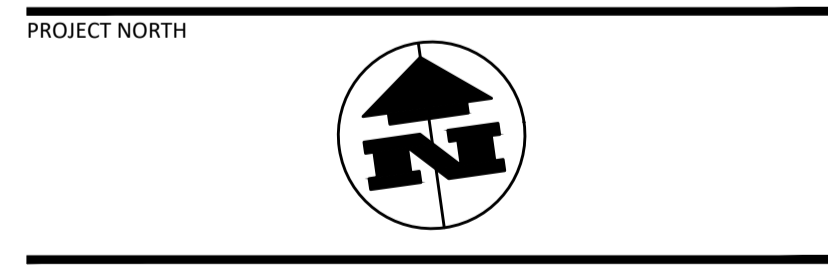
FICUS CRESCENT-BUNYA WAY INTERSECTION SETOUT DETAILS

PT NO	EASTING	NORTHING	LEVEL	
1	726524.354	7666815.875	8.678	8.703
2	726526.436	7666814.731	8.747	8.772
3	726528.725	7666814.097	8.833	8.853
4	726531.099	7666814.005	8.907	8.929
5	726533.430	7666814.461	8.942	
6	726522.371	7666799.235	8.889	
7	726523.070	7666803.786	8.863	8.870
8	726521.710	7666808.185	8.743	8.753
9	726518.565	7666811.548	8.593	8.610
10	726514.266	7666813.199	8.476	8.494

PT NO	EASTING	NORTHING	LEVEL	
11	726492.28	7666744.57	8.299	
12	726495.69	7666744.66	8.388	
13	726498.89	7666745.87	8.49	
14	726501.52	7666748.06	8.595	8.600
15	726503.28	7666750.99	8.664	8.635
15A	726504.28	7666753.52	8.689	
16	726498.93	7666727.35	8.577	
17	726498.84	7666731.45	8.561	8.571
18	726497.15	7666735.18	8.48	8.495
19	726494.13	7666737.96	8.37	8.380
20	726490.26	7666739.33	8.269	8.279

FICUS CRESCENT - BUNYA WAY SOUTHERN INTERSECTION SETOUT DETAIL

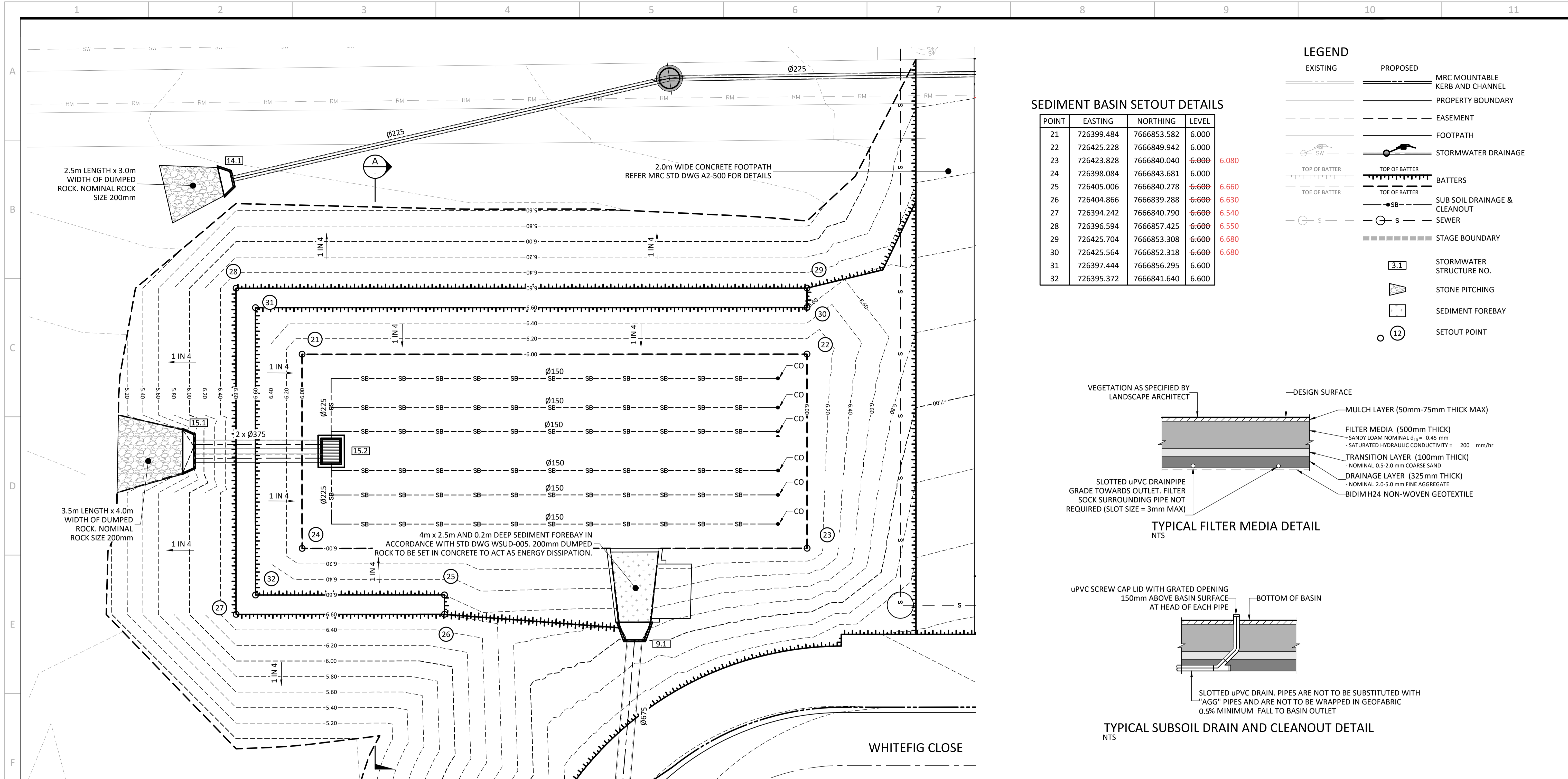
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PROJECT NORTH
DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES
A1 UNREDUCED
A3 REDUCED
UNREDUCED / REDUCED
A 0 1.0 2.0 3.0 4.0 5.0m 1:100 / 1:200
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SEDIMENT BASIN SETOUT DETAILS

POINT	EASTING	NORTHING	LEVEL
21	726399.484	766853.582	6.000
22	726425.228	766849.942	6.000
23	726423.828	766840.040	6:000
24	726398.084	766843.681	6.000
25	726405.006	766840.278	6:600
26	726404.866	766839.288	6:600
27	726394.242	766840.790	6:600
28	726396.594	766857.425	6:600
29	726425.704	766853.308	6:600
30	726425.564	766852.318	6:600
31	726397.444	766856.295	6.600
32	726395.372	766841.640	6.600

LEGEND

EXISTING: MRC MOUNTABLE KERB AND CHANNEL, PROPERTY BOUNDARY, EASEMENT, FOOTPATH, STORMWATER DRAINAGE

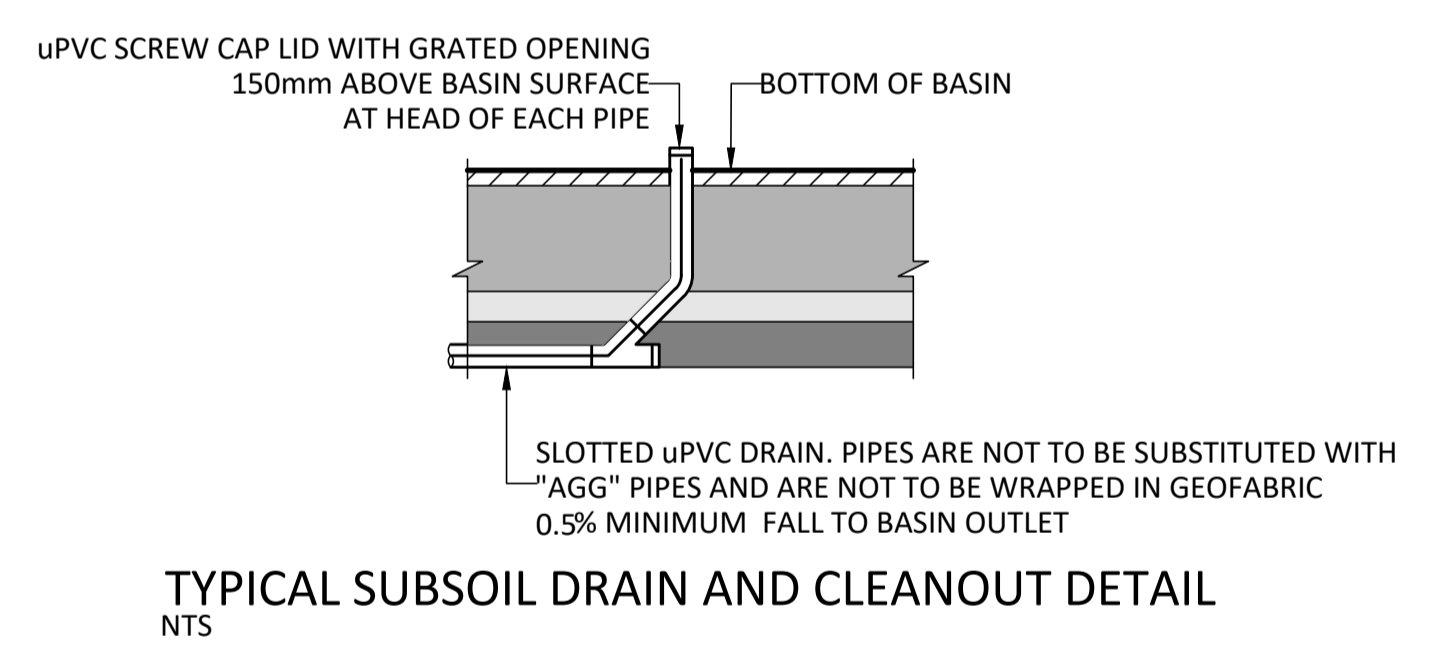
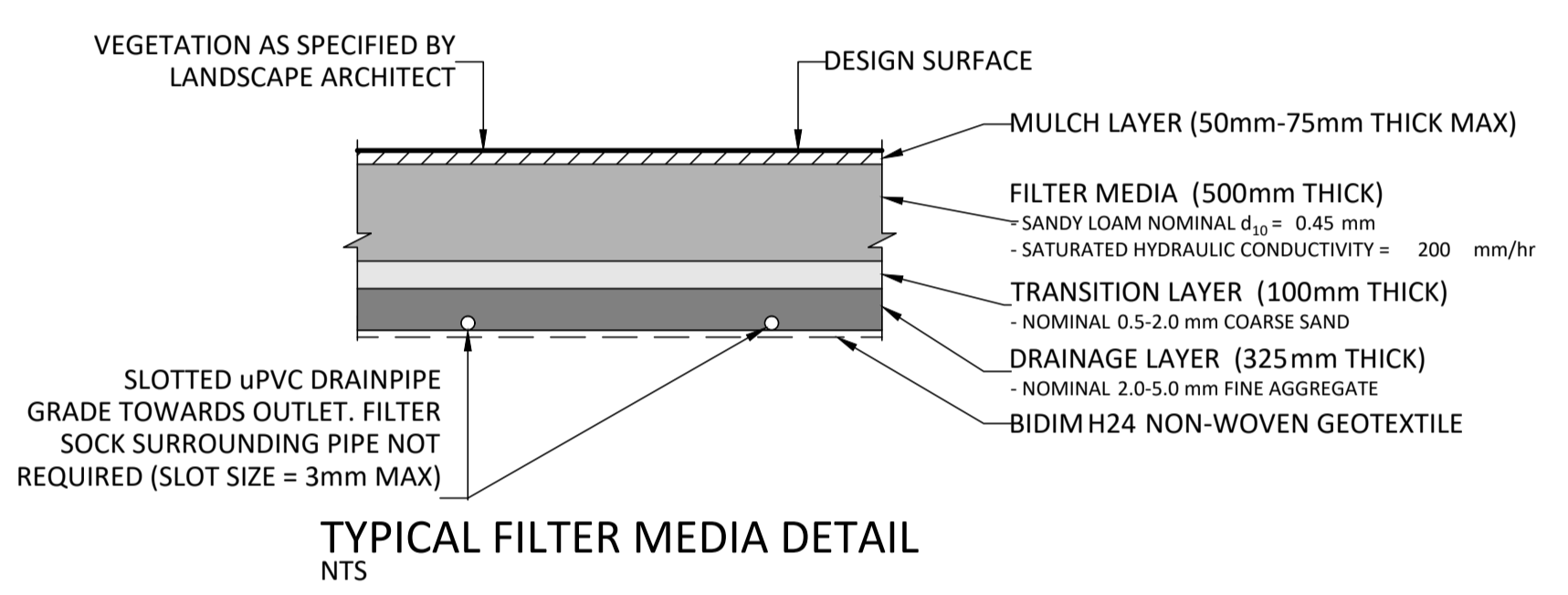
PROPOSED: BATTERS, SUB SOIL DRAINAGE & CLEANOUT, SEWER, STAGE BOUNDARY

3.1 STORMWATER STRUCTURE NO.

STONE PITCHING

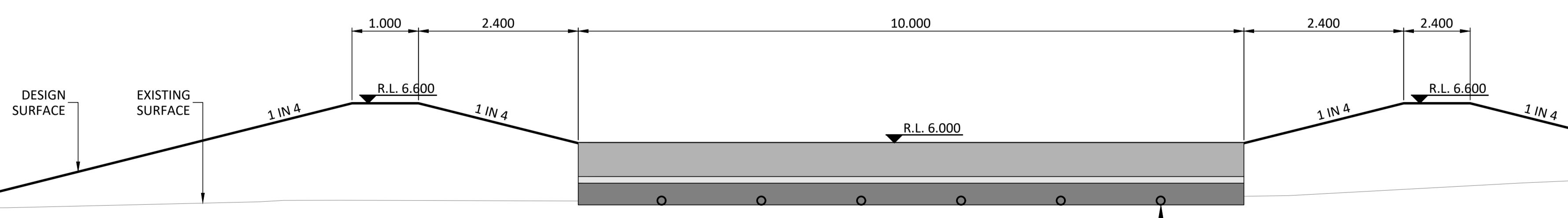
SEDIMENT FOREBAY

12 SETOUT POINT



PLAN SCALE A

WHITEFIG CLOSE



SECTION A SCALE B

SLOTTED uPVC DRAIN. PIPES ARE NOT TO BE SUBSTITUTED WITH "AGG" PIPES AND ARE NOT TO BE WRAPPED IN GEOFABRIC 0.5% MINIMUM FALL TO BASIN OUTLET

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PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

SCALES: UNREDUCED / REDUCED

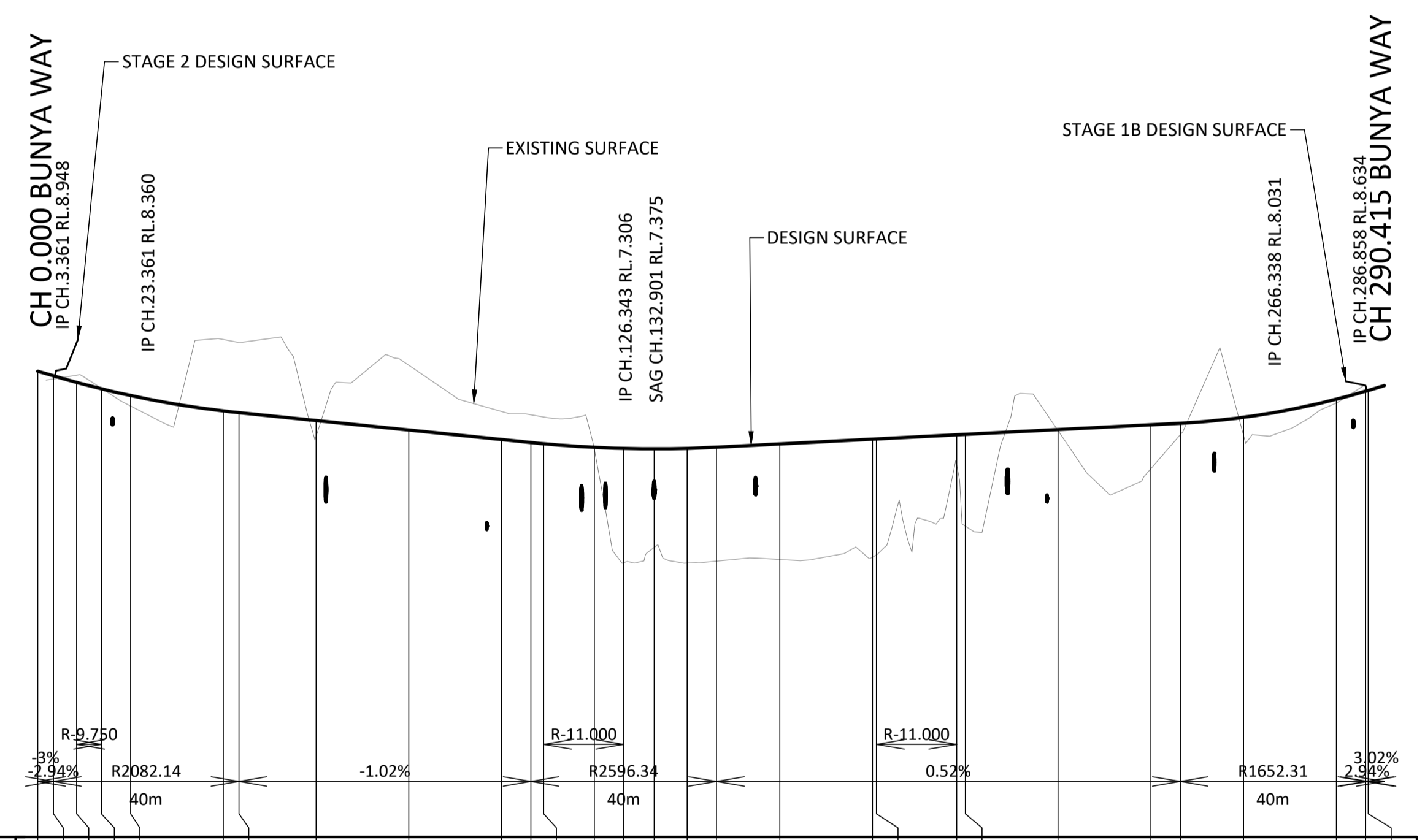
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B 0 1.0 2.0 3.0 4.0 5.0m 1:100 / 1:200

STATUS

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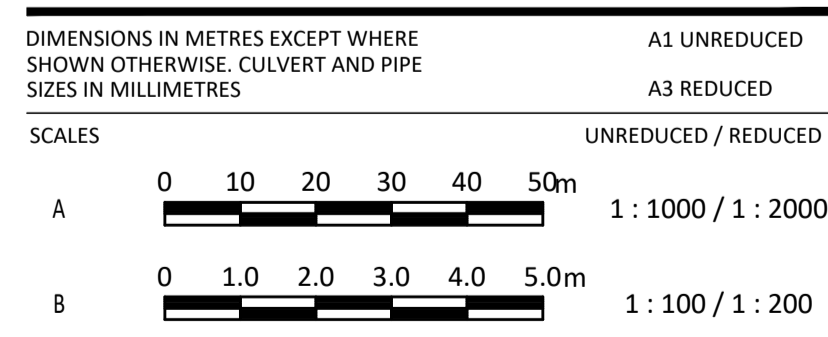


HORIZONTAL DATA
VERTICAL DATA
DATUM -1.00

EXISTING SURFACE LEVEL	CUT / FILL DEPTH TO EXISTING SURFACE	CONTROL LINE FINISHED LEVEL	CONTROL LINE CHAINAGES
0.000	9.049	8.000	0+000
3.361	8.948	8.065	3+361
8.948	-0.065	8.883	8+948
8.363	0.154	8.961	8+363
13.716	0.009	8.679	13+716
20.000	-0.229	8.296	20+000
40.000	1.541	9.733	40+000
43.361	1.511	9.666	43+361
60.000	-0.351	7.634	60+000
80.000	1.394	9.174	80+000
100.000	0.605	8.181	100+000
106.343	0.597	8.108	106+343
109.064	0.576	8.060	109+064
120.000	-0.037	7.370	120+000
126.343	-2.463	4.921	126+343
132.901	-2.128	5.247	132+901
140.000	-2.473	4.912	140+000
146.343	-2.458	4.951	146+343
160.000	-2.491	4.990	160+000
180.000	-2.545	5.039	180+000
180.843	-2.506	5.083	180+843
198.121	-0.652	7.026	198+121
200.000	-1.981	5.707	200+000
220.000	-0.027	7.764	220+000
240.000	-0.949	6.946	240+000
246.338	-0.249	7.678	246+338
260.000	-0.400	7.655	260+000
280.000	-0.082	8.362	280+000
286.338	0.115	8.734	286+338
286.858	-0.011	8.623	286+858
290.415			290+415

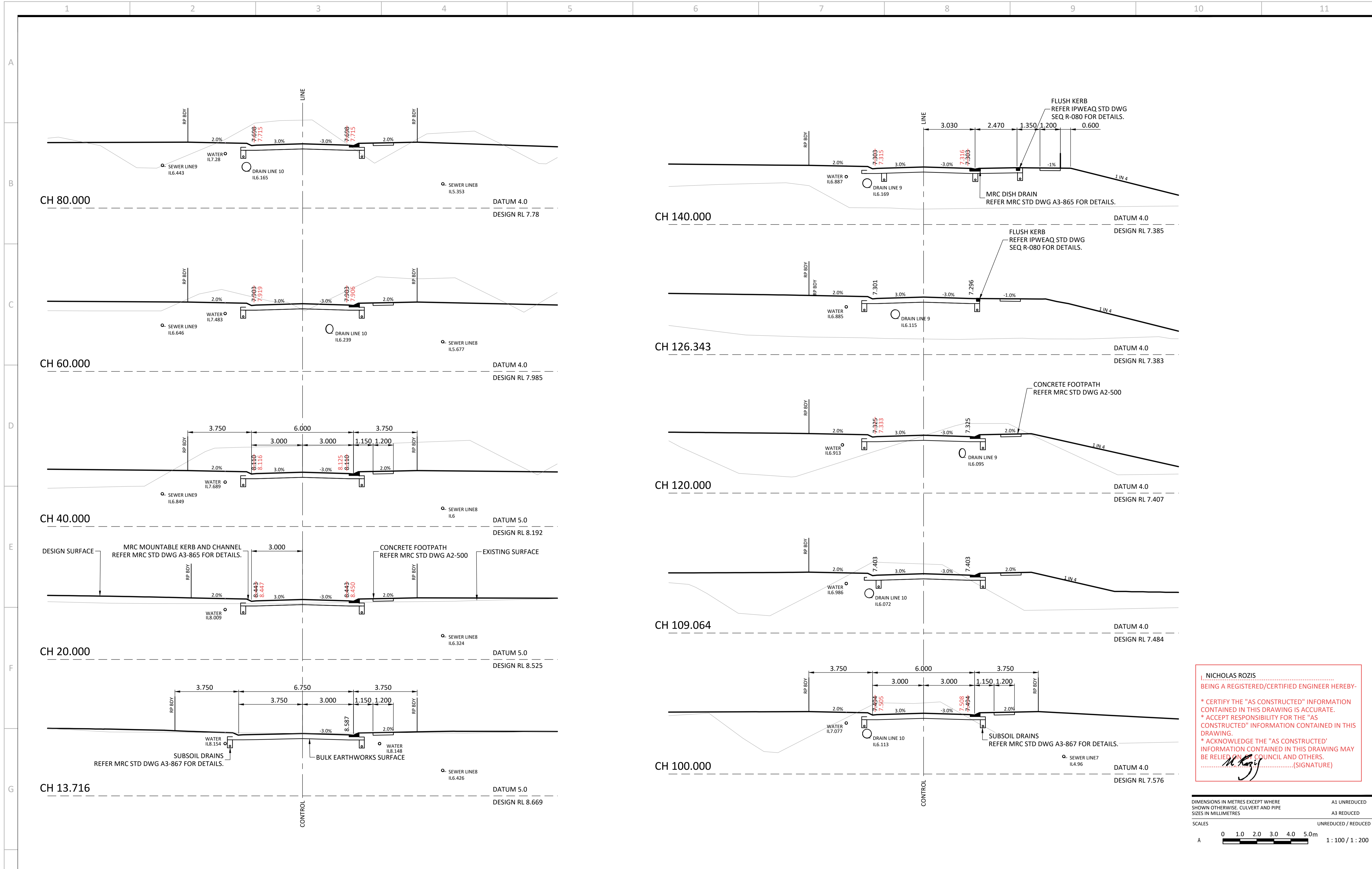
FICUS CRESCENT LONGITUDINAL SECTION
SCALE A (HOR)
SCALE B (VER)

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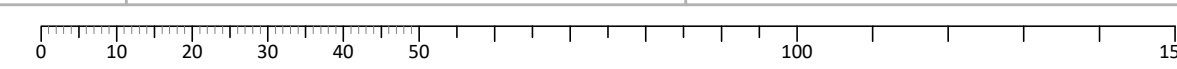
FICUS CRESCENT CROSS SECTIONS
SCALE A

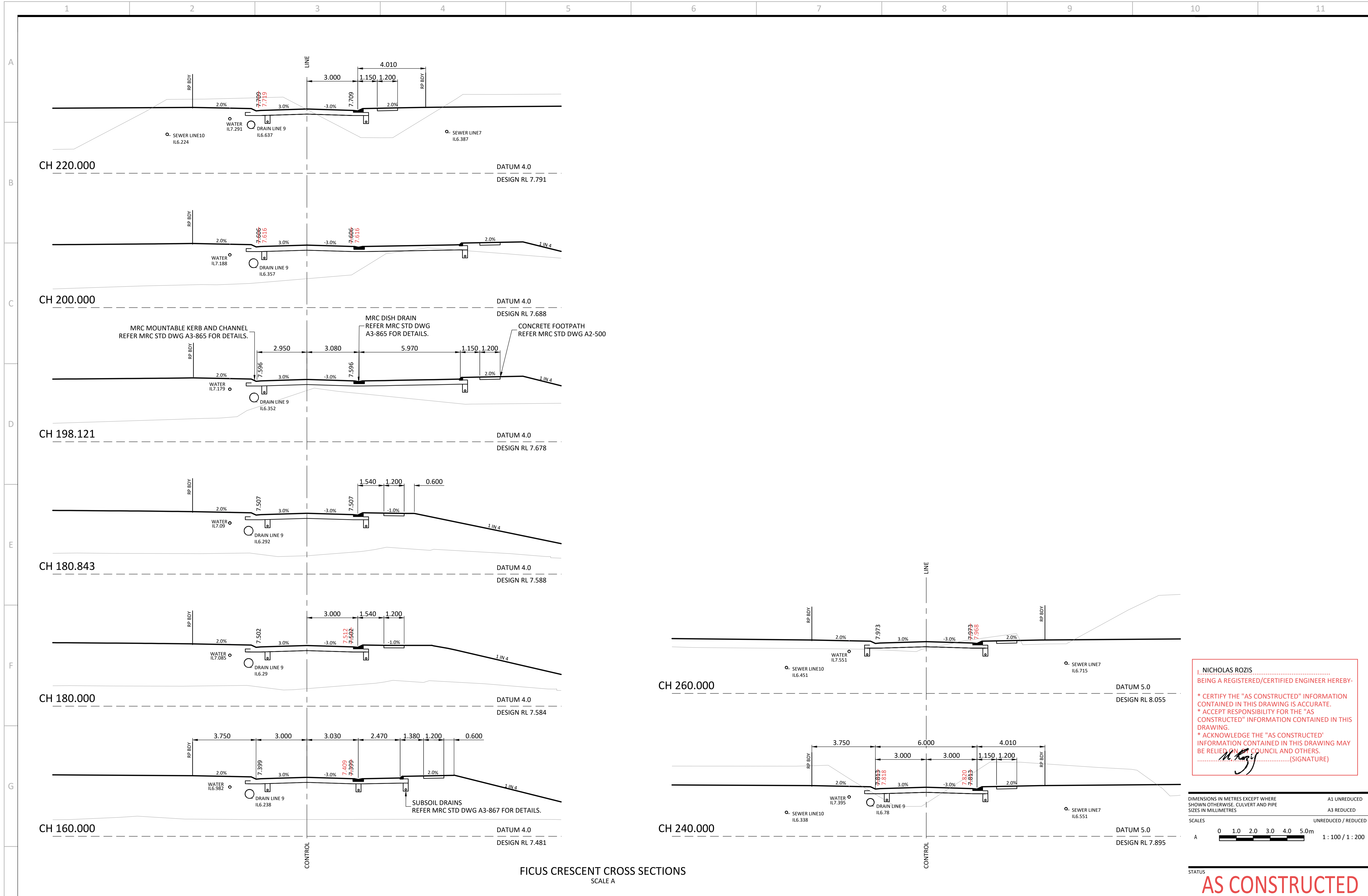
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A3 REDUCED
UNREDUCED / REDUCED
SCALES
A 0 1.0 2.0 3.0 4.0 5.0m
1 : 100 / 1 : 200

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FICUS CRESCENT CROSS SECTIONS
SCALE A

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DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES
A1 UNREDUCED
A3 REDUCED
UNREDUCED / REDUCED
A 0 1.0 2.0 3.0 4.0 5.0m 1:100 / 1:200

STATUS
AS CONSTRUCTED

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APP
F	31.08.16	RESPONSE TO COUNCILS COMMENTS	MS	BB	NR	NR
E	03.05.16	ISSUE FOR CONSTRUCTION	MS	BB	NR	NR
D	09.05.14	ISSUE FOR APPROVAL	MS	AY	JT	NR
C	16.04.14	FOR INFORMATION				
B	22.01.14	FOR INFORMATION				

ASSOCIATED CONSULTANTS	APPROVED	CHECKED
	<i>N. Rozis</i> 7729 RPEQ	<i>B. Begaud</i>
	DATE 10/10/17	DATE 10/10/17

APPROVED	CHECKED
<i>N. Rozis</i> 7729 RPEQ	<i>B. Begaud</i>
DATE 10/10/17	DATE 10/10/17

BORNHORST + WARD
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL
Level 4, 67 Astor Terrace, Spring Hill, QLD 4000

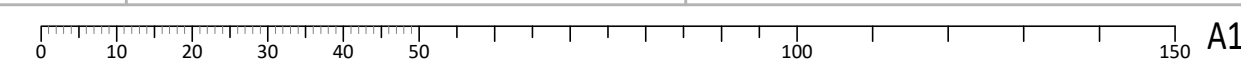
Bornhorst & Ward Pty Ltd
Brisbane Australia
Phone (07) 3013 4699
Facsimile (07) 3013 4611
mail@bornhorstward.com.au
www.bornhorstward.com.au
A.C.N. 010 151 354 A.B.N. 78 010 151 354

CLIENT
URBAN LAND DEVELOPMENT AUTHORITY

PROJECT
ANDERGROVE, MACKAY STAGE 8

SUBJECT
FICUS CRESCENT CROSS SECTIONS SHEET 2

PROJECT No.	12121D
DRAWING No.	C042
REVISION	F



STRUCTURE NAME	9.8	9.7	9.6	9.5	9.4	9.3	9.2	9.1
STRUCTURE DESCRIPTION	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC MANHOLE 1050mm DIA	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT (SAG) L.L.L; S TYPE Lintel; TYPE MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	HEADWALL
PIPE SIZE (mm)	375	450	525	525	525	525	675	
PIPE CLASS	3	3	3	3	3	3	3	
PIPE GRADE (%)	0.70%	0.72%	0.23%	0.25%	0.23%	0.34%	0.09%	
PIPE SLOPE (1 in X)	0.67%	0.70%	0.27%	0.25%	0.25%	0.25%	0.25%	
FULL PIPE VELOCITY (m/s)	149.21	142.86	364.64	400.00	400.00	400.00	400.03	
PART FULL VELOCITY (m/s)	0.34	0.55	1.05	1.04	1.23	1.40	1.43	
DATUM RL	-6.0							
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.517	7.511	7.426	7.295	7.090	6.951	6.805	6.675
PIPE FLOW (Cumecs)	0.038	0.087	0.227	0.224	0.267	0.303	0.513	
PIPE CAPACITY AT GRADE (Cumecs)	0.144	0.239	0.225	0.215	0.215	0.215	0.420	
DEPTH TO INVERT	0.993	0.975	1.067	1.304	1.120	1.210	1.100	
INVERT LEVEL OF DRAIN	6.940 6.958	6.872 6.858	6.838 6.846	6.340 6.331	6.226 6.206	6.162 6.151	6.100 6.093	6.000
DESIGN SURFACE LEVEL	7.955 7.934	7.852 7.833	7.639 7.623	7.625 7.655	7.380 7.347	7.296 7.268	7.335 7.303	7.100
SETOUT COORDINATES / ROAD CHAINAGE	0.000 CH 258.912	12.369 CH 248.434	52.556 CH 208.247	70.218 CH 189.823	104.315 CH 154.762	126.177 CH 132.899	141.422 CH 119.449	150.682 E 726414.377 N 7666836.620
CHAINAGE	12.369	40.187	17.662	34.096	21.863	15.244	9.261	

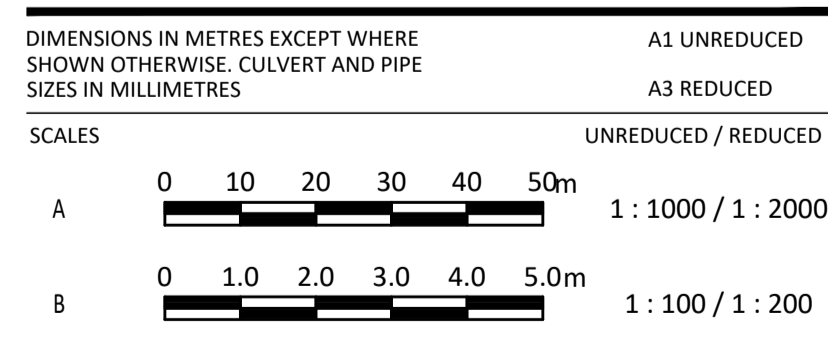
STRUCTURE NAME	10.8	10.7	10.6	10.5	10.4	10.3	10.2	10.1	9.2
STRUCTURE DESCRIPTION	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 600x600 TYPE 2	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C	MRC INLET PIT L.L.L; S TYPE Lintel; MOUNTABLE K&C
PIPE SIZE (mm)	225	225	225	225	450	525	525	525	
PIPE CLASS	PVC	PVC	PVC	PVC	4	3	3	3	
PIPE GRADE (%)	2.18%	2.54%	2.20%	2.21%	0.30%	0.49%	0.28%	0.34%	
PIPE SLOPE (1 in X)	2.20%	2.52%	2.20%	2.20%	0.30%	0.25%	0.25%	0.25%	
FULL PIPE VELOCITY (m/s)	45.45	39.65	45.45	45.45	333.33	399.99	400.00	400.00	
PART FULL VELOCITY (m/s)	0.37	0.74	1.03	1.31	0.40	0.28	0.61	0.83	
DATUM RL	-6.0								
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.496	7.486	7.390	7.332	7.250	7.013	6.974	6.881	6.805
PIPE FLOW (Cumecs)	0.015	0.029	0.041	0.052	0.064	0.062	0.132	0.180	
PIPE CAPACITY AT GRADE (Cumecs)	0.067	0.071	0.067	0.067	0.156	0.215	0.215	0.215	
DEPTH TO INVERT	1.025	0.968	0.968	0.923	0.876	1.593	1.613	1.312	1.280
INVERT LEVEL OF DRAIN	7.396 7.401	7.129 7.121	6.872 6.856	6.856 6.867	6.648 6.636	6.392 6.371	6.212 6.218	6.100 6.094	6.043
DESIGN SURFACE LEVEL	8.280 8.421	8.000 8.089	7.740 7.824	7.520 7.558	7.240 7.240	7.015 7.015	6.835 6.811	6.447 6.442	6.335 6.303
SETOUT COORDINATES / ROAD CHAINAGE	-12.501 E 726523.739 N 7666851.740	12.501 E 726511.340 N 7666853.329	10.001 E 726501.420 N 7666854.599	10.001 E 726491.500 N 7666855.870	32.003 E 726479.597 N 7666857.397	65.182 CH 58.107	105.133 CH 66.529	114.685 CH 105.519	129.621 CH 119.449
CHAINAGE	12.501	10.001	10.001	12.001	33.179	105.133	38.990	14.936	

STRUCTURE NAME	11.1	9.3
STRUCTURE DESCRIPTION	MRC FIELD INLET 900x600 TYPE 2 IN DISH DRAIN	MRC INLET PIT (SAG) L.L.L; S TYPE Lintel; TYPE MOUNTABLE K&C
PIPE SIZE (mm)	375	
PIPE CLASS	3	
PIPE GRADE (%)	0.55%	
PIPE SLOPE (1 in X)	0.40%	
FULL PIPE VELOCITY (m/s)	0.11	
PART FULL VELOCITY (m/s)	0.65	
DATUM RL	-7.0	
H.G.L IN PIPE & W.S.E IN STRUCTURE	6.951	6.951
PIPE FLOW (Cumecs)	0.012	
PIPE CAPACITY AT GRADE (Cumecs)	0.111	
DEPTH TO INVERT	0.925	0.976
INVERT LEVEL OF DRAIN	6.318 6.306	6.271 6.293
DESIGN SURFACE LEVEL	7.243	7.296 7.268
SETOUT COORDINATES / ROAD CHAINAGE	0.000 CH 132.899	6.323 CH 132.899
CHAINAGE	6.323	1.137

NOTE:
STORMWATER CONCRETE PIPE WITHIN ROAD RESERVE MUST BE REINFORCED CONCRETE RUBBER RING JOINT.

STORMWATER DRAINAGE LONGITUDINAL SECTION
HORIZONTAL SCALE A
VERTICAL SCALE B

NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY:
* CERTIFY THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING IS ACCURATE.
* ACCEPT RESPONSIBILITY FOR THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING.
* ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY THE COUNCIL AND OTHERS.
(Signature)



AS CONSTRUCTED

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REV.	DATE	AMENDMENT / ISSUE																																										
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STRUCTURE NAME	12.1	9.4	13.1	9.6	14.6	14.5	14.4	14.3	14.2	14.1	15.2	15.1
STRUCTURE DESCRIPTION	MRC FIELD INLET 900x600 TYPE 2 IN DISH DRAIN	MRC INLET PIT L.I.L. S TYPE Linlet; MOUNTABLE K&C	MRC INLET PIT L.I.L. S TYPE Linlet; MOUNTABLE K&C	MRC INLET PIT L.I.L. S TYPE Linlet; MOUNTABLE K&C	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC FIELD INLET 400x400 GRATE	MRC MANHOLE 1050mm DIA	MRC FIELD INLET 900x1200 TYPE 2 REFER C056	HEADWALL
PIPE SIZE (mm)	375	525	525	525	225	225	225	225	225	(2x)375	375	375
PIPE CLASS	3	3	3	3	PVC	PVC	PVC	PVC	PVC	3	3	3
PIPE GRADE (%)	0.67% 0.40%	0.44% 0.25%	0.44% 0.25%	0.44% 0.25%	2.06% 2.00%	1.98% 2.00%	2.08% 2.00%	0.50% 0.50%	0.45% 0.30%	0.82% 0.40%	0.82% 0.40%	0.82% 0.40%
PIPE SLOPE (1 in X)	250.00	400.01	400.01	400.01	50.00	50.00	50.00	200.00	329.30	250.00	250.00	250.00
FULL PIPE VELOCITY (m/s)	0.17	0.36	0.36	0.36	0.36	0.65	0.93	1.29	1.28	0.00	0.00	0.00
PART FULL VELOCITY (m/s)	0.74	0.92	0.92	0.92	1.29	1.51	1.66	1.29	1.28	0.00	0.00	0.00
DATUM RL	-7.0	-6.0	-6.0	-6.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.091 7.090 7.035	7.428 7.426 7.344	7.428 7.426 7.344	7.428 7.426 7.344	6.149 6.143 6.105	6.143 6.105 6.072	6.143 6.105 6.072	6.143 6.105 6.072	6.143 6.105 6.072	5.936 5.856 5.640	5.028 5.000 5.000	5.028 5.000 5.000
PIPE FLOW (Cumecs)	0.018	0.079	0.079	0.079	0.014	0.026	0.037	0.051	0.051	0.000	0.000	0.000
PIPE CAPACITY AT GRADE (Cumecs)	0.111	0.215	0.215	0.215	0.064	0.064	0.064	0.032	0.025	0.222	0.222	0.222
DEPTH TO INVERT	0.926	1.216	1.216	1.216	0.974	0.908	0.928	0.800	0.705	1.272	1.000	1.000
INVERT LEVEL OF DRAIN	6.996 6.383 6.340 6.370 6.206	6.447 6.430 6.408 6.400 6.380	6.447 6.430 6.408 6.400 6.380	6.447 6.430 6.408 6.400 6.380	5.987 5.993 5.787 5.767 5.778 5.590 5.567	5.787 5.767 5.778 5.590 5.567	5.787 5.767 5.778 5.590 5.567	5.283 5.294 5.274	5.190 5.179 5.185	5.080 5.100	5.028 5.043 4.986 5.000	5.028 5.043 4.986 5.000
DESIGN SURFACE LEVEL	7.322	7.647 7.632	7.647 7.632	7.647 7.632	6.650 6.695	6.650 6.695	6.650 6.695	6.000 6.093	5.005 5.895	5.564	6.295 6.300	6.000
SETOUT COORDINATES / ROAD CHAINAGE	0.000 CH 154.762	0.000 CH 209.949	0.000 CH 209.949	0.000 CH 209.949	10.001 N 7666858.729	10.001 E 726459.261	10.001 N 7666860.000	20.002 E 726449.341	12.682 N 7666862.882	16.691 E 726420.206	0.000 E 726400.271	6.993 E 726393.347
CHAINAGE	0.000 6.404	0.000 6.815	0.000 6.815	0.000 6.815	10.001 10.001	10.001 10.001	10.001 20.002	12.682 32.684	16.691 49.375	23.133 72.508	0.000 6.993	6.993 6.993

STORMWATER DRAINAGE LONGITUDINAL SECTION
HORIZONTAL SCALE A
VERTICAL SCALE B

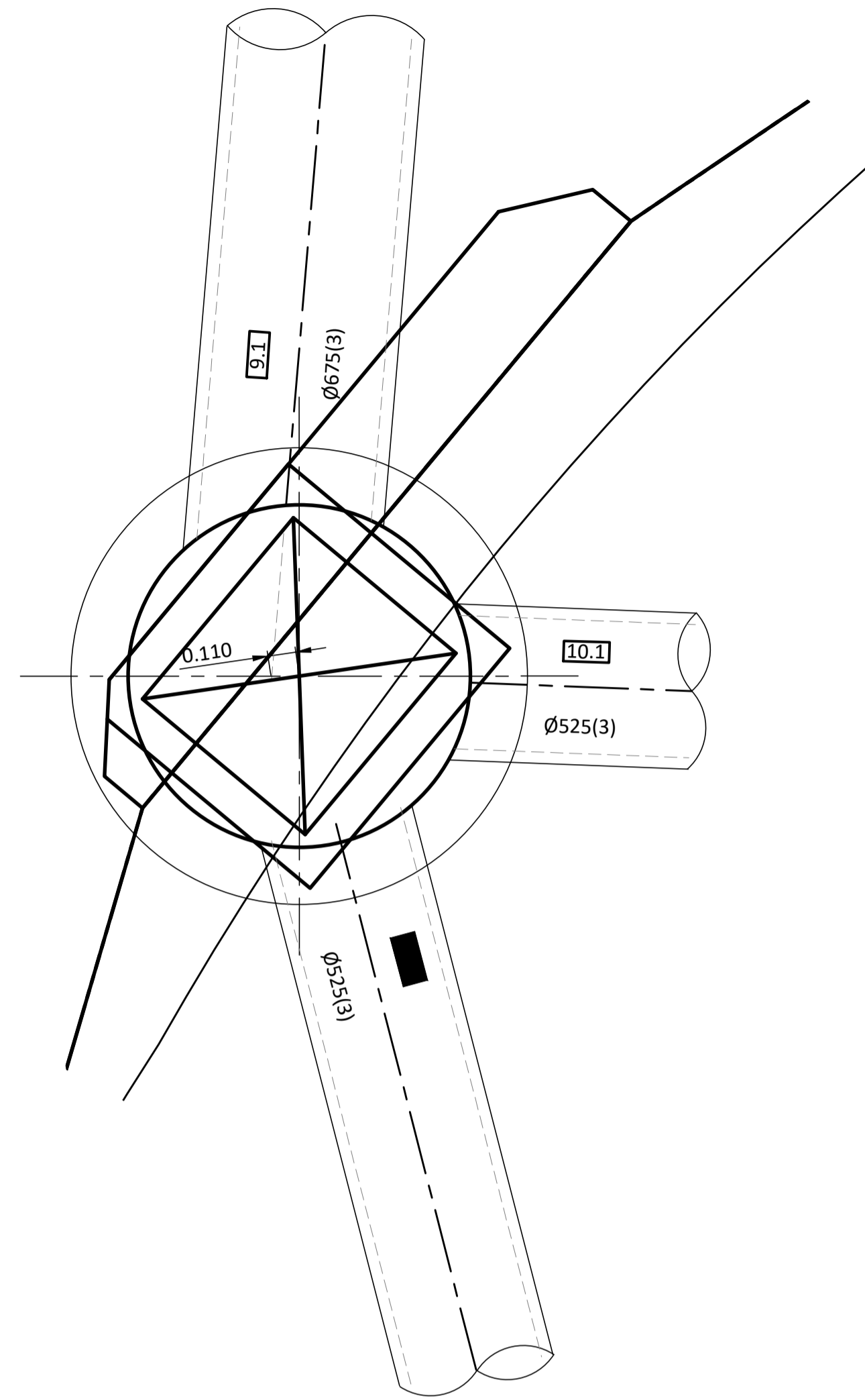
NICHOLAS ROZIS
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NOTE:
STORMWATER CONCRETE PIPE WITHIN ROAD RESERVE MUST BE REINFORCED CONCRETE RUBBER RING JOINT.

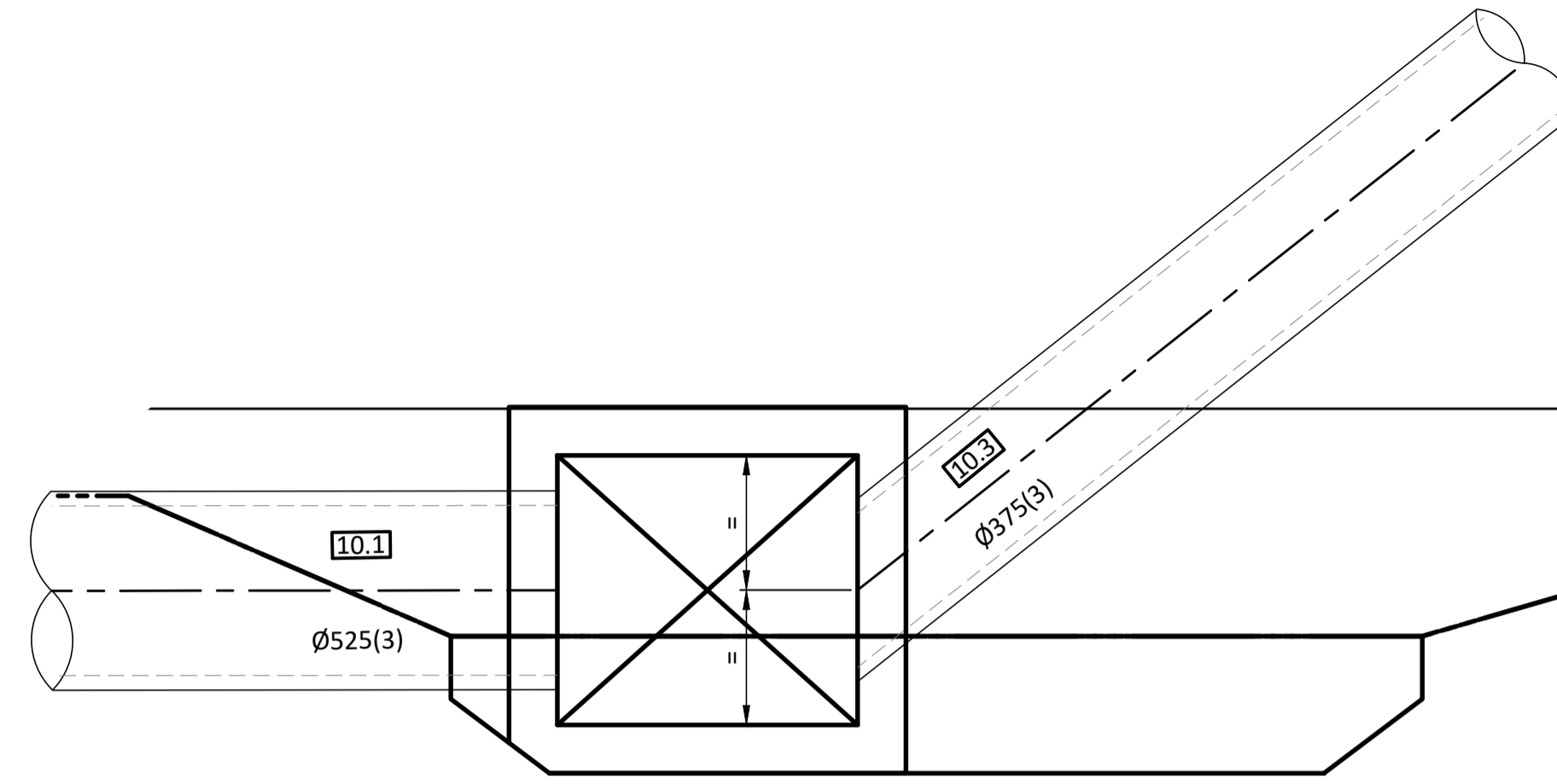
DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES	A1 UNREDUCED A3 REDUCED
SCALES	UNREDUCED / REDUCED
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B	0 1.0 2.0 3.0 4.0 5.0m 1:100 / 1:200

AS CONSTRUCTED

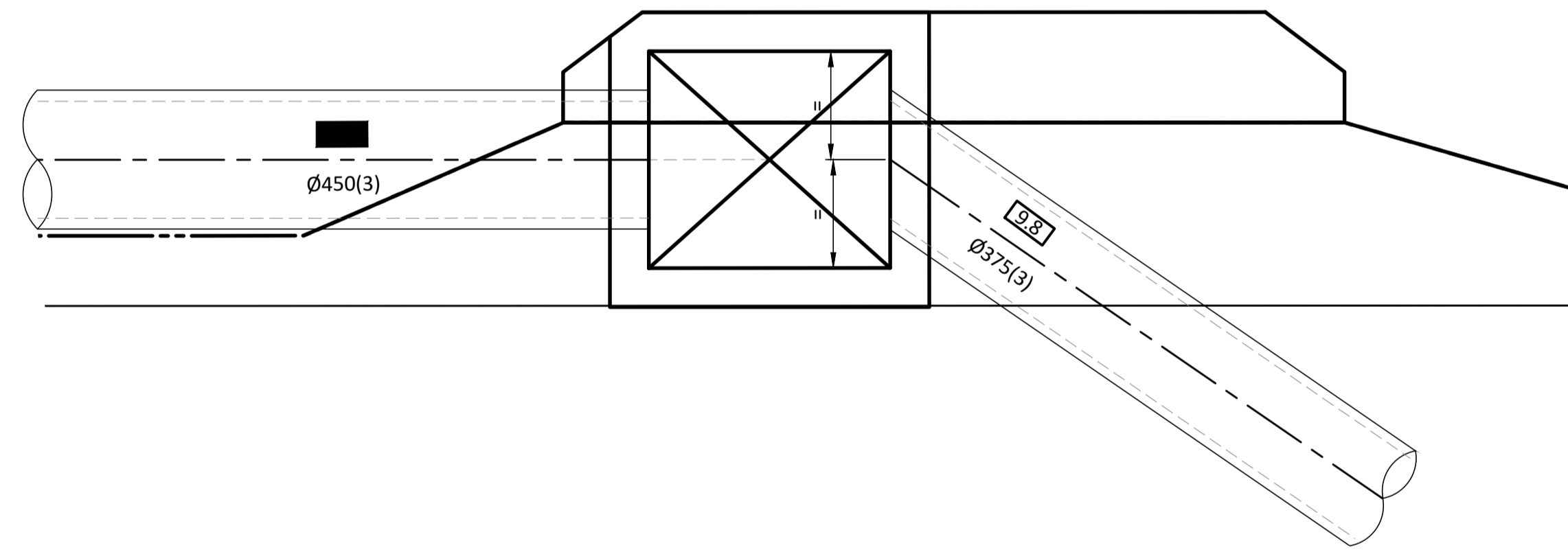
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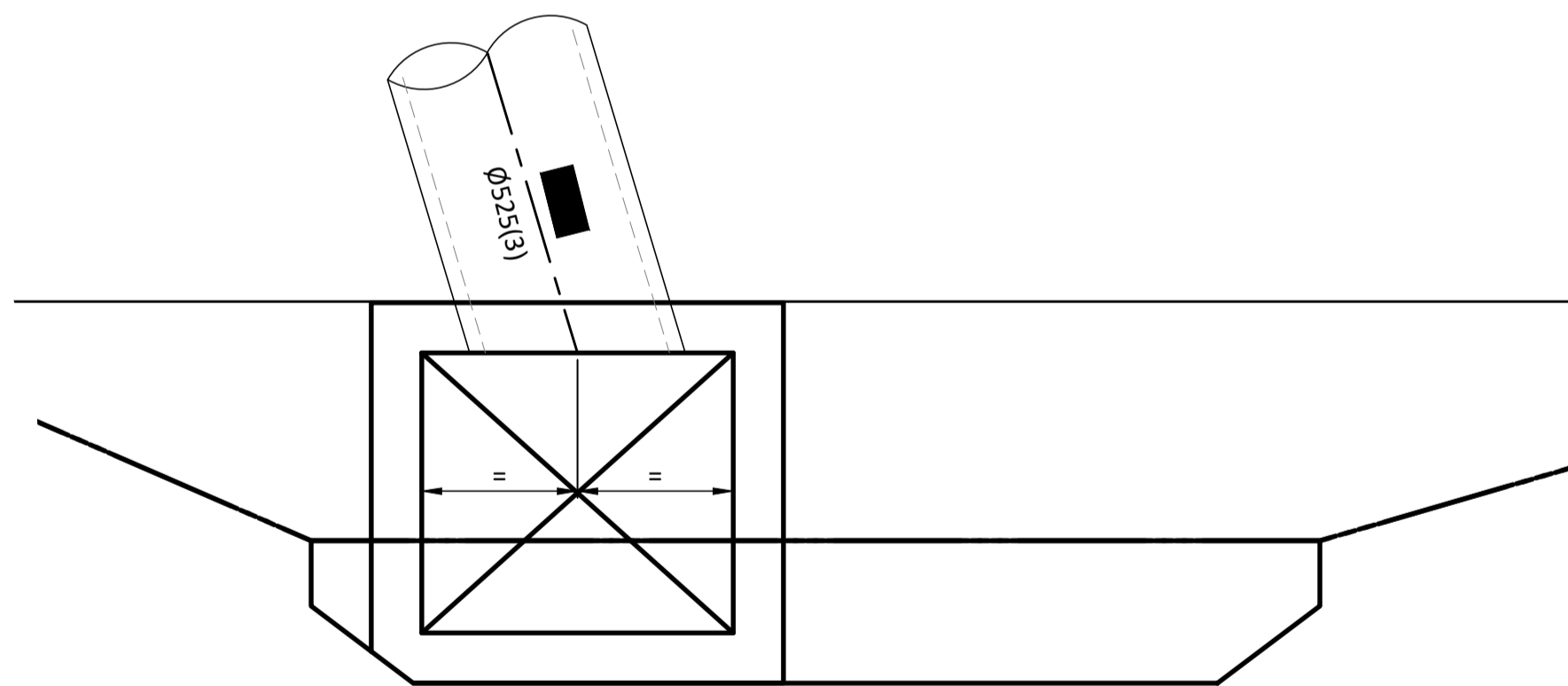
9.2 - LIP IN LINE (SAG) GULLY PIT
SCALE A



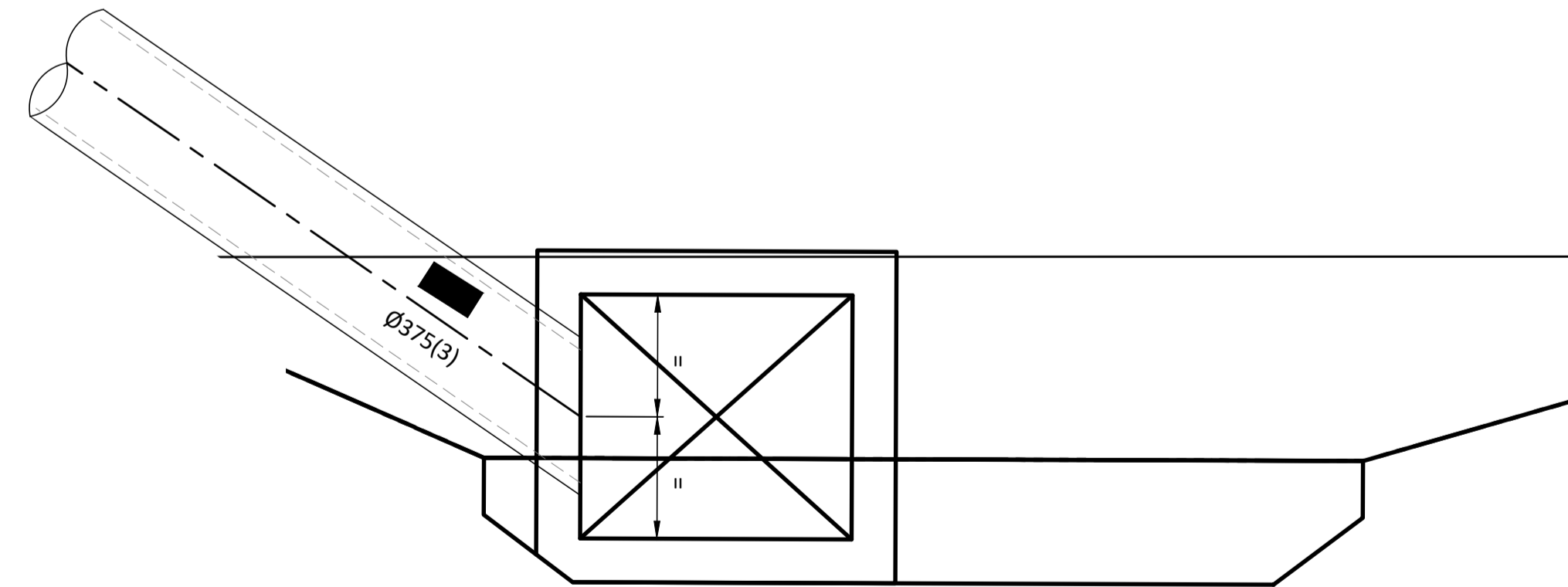
10.2 - LIP IN LINE GULLY PIT
SCALE A



9.7 - LIP IN LINE GULLY PIT
SCALE A



13.1 - LIP IN LINE GULLY PIT
SCALE A



9.8 - LIP IN LINE GULLY PIT
SCALE A

I, **NICHOLAS ROZIS**
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N. Rozis (SIGNATURE)

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

A1 UNREDUCED
A3 REDUCED

SCALES UNREDUCED / REDUCED

A 0 0.2 0.4 0.6 0.8 1 m 1:20 / 1:40

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APP
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C	16.04.14	FOR INFORMATION				
B	22.01.14	FOR INFORMATION				

ASSOCIATED CONSULTANTS

APPROVED	CHECKED
<i>N. Rozis</i> 7729 RPEQ	<i>B. Begaud</i>
DATE 10/10/17	DATE 10/10/17

BORNHORST + WARD
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL
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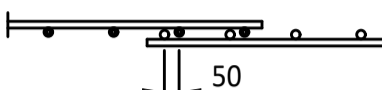
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URBAN LAND DEVELOPMENT AUTHORITY

PROJECT
ANDERGROVE, MACKAY STAGE 8

SUBJECT
STORMWATER STRUCTURE DETAILS

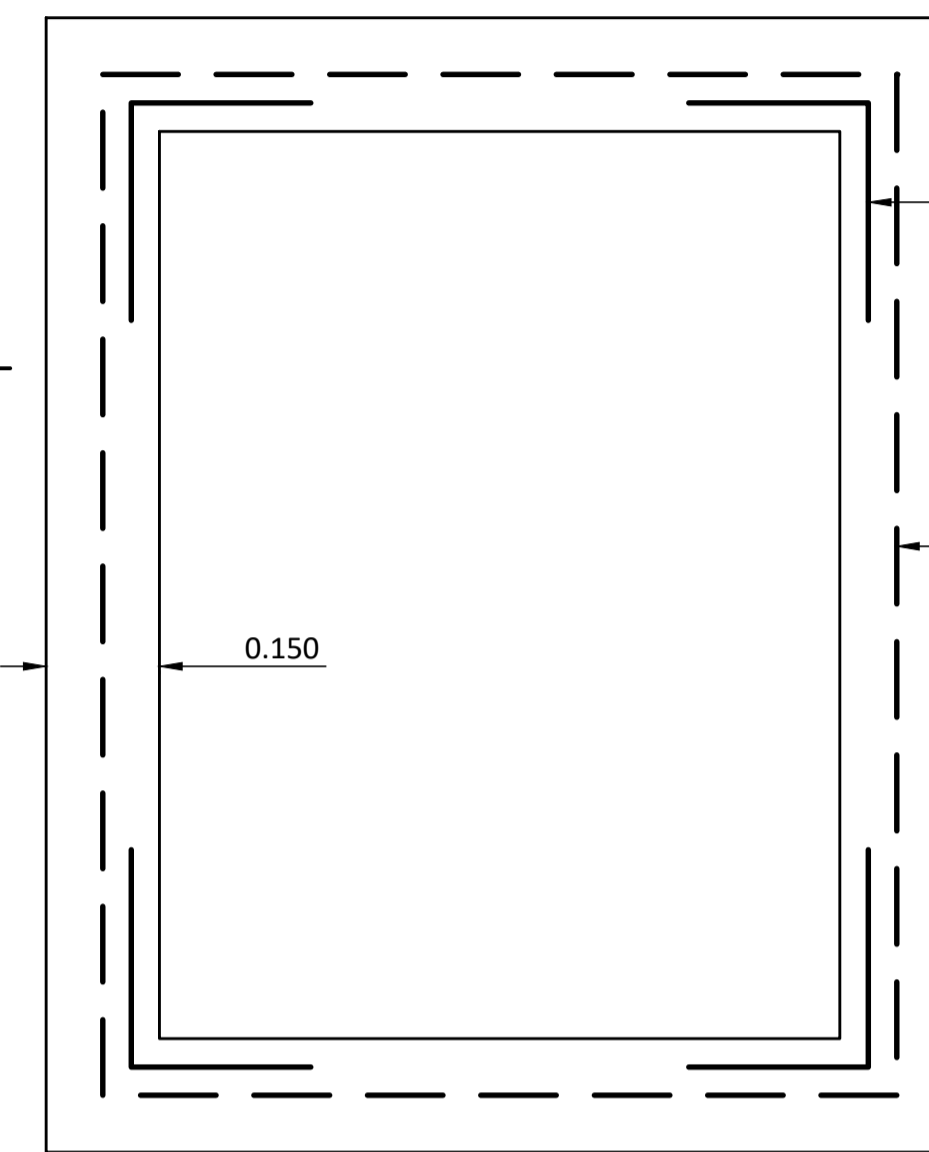
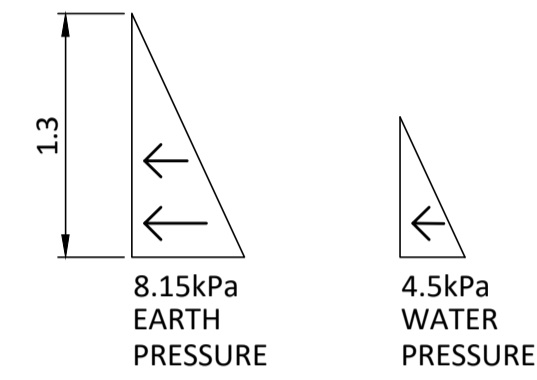
PROJECT No.
12121D
DRAWING No. REVISION
C055 F

GENERAL CONCRETE NOTES

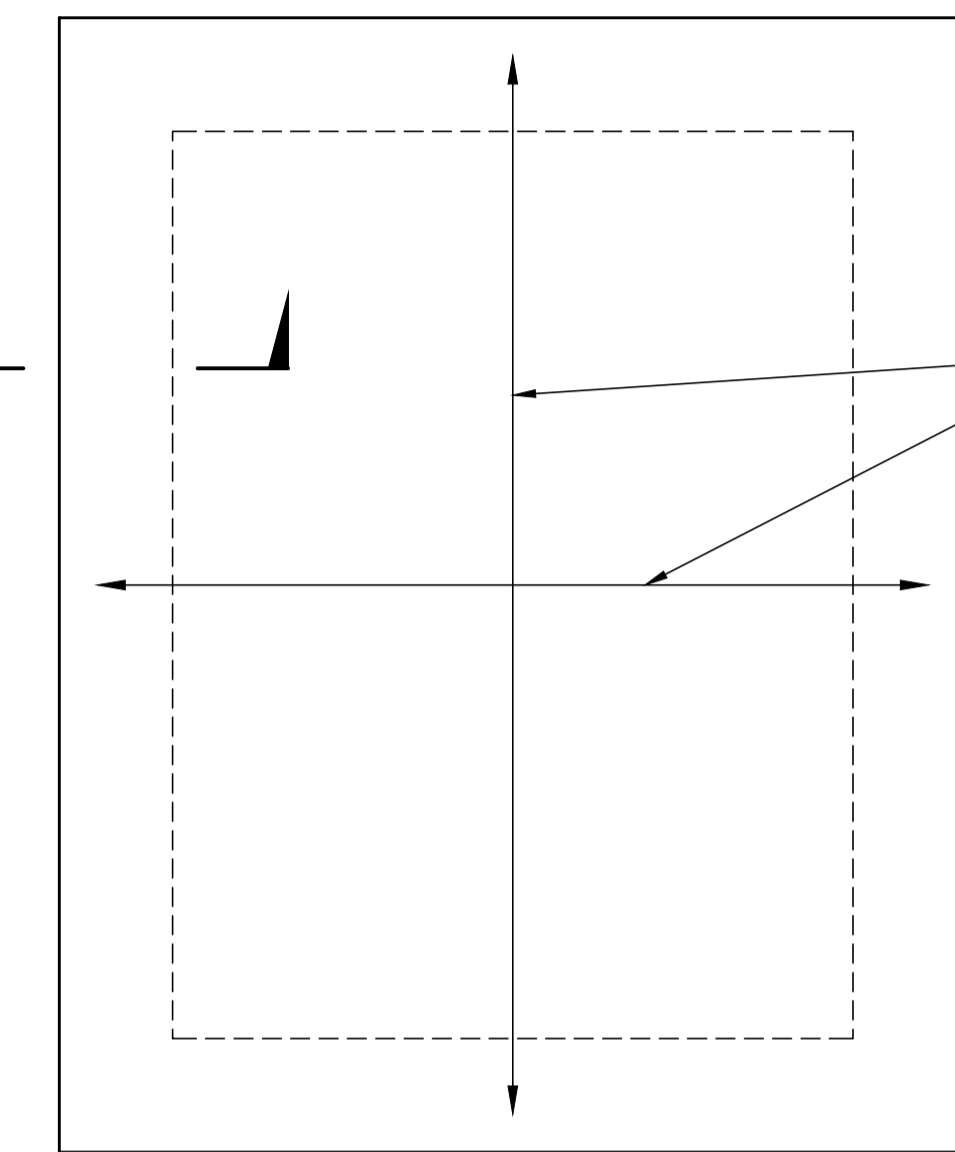
- 1. ALL CONCRETE** AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE SAI CONCRETE STRUCTURES CODE AS 3600.
 - 2. SURFACE FINISH.** FORMWORK IS TO BE IN ACCORDANCE WITH THE SAI FORMWORK CODE AS 3610. EXCEPT WHERE SPECIFIED OTHERWISE, CONCRETE EXPOSED TO VIEW IN THE FINAL PROJECT IS TO BE CLASS 3 FINISH AND CLASS 4 ELSEWHERE.
 - 3. MESH LAPS** 
 - ALL LAPS ARE TO BE WIRED TOGETHER AT 1000mm CENTRES.
 - 4. BAR LAPS** ARE TO BE AS SHOWN BELOW UNLESS NOTED OTHERWISE.
- | BAR | HORIZONTAL LAP | VERTICAL LAP |
|-----|----------------|--------------|
| N12 | 500 | 500 |
| N16 | 600 | 600 |
| N20 | 800 | 700 |
| N24 | 1000 | 800 |
| N28 | 1400 | 1150 |
| N32 | 1800 | 1350 |
| N36 | 2300 | 1750 |
- 5. CONDUITS, PIPES, ETC** MUST NOT BE PLACED IN COVER CONCRETE.
 - 6. PENETRATIONS.** BORNHORST & WARD IS TO BE NOTIFIED BEFORE ANY CONCRETE IS PLACED AND OF ANY SLAB PENETRATION BIGGER THAN 150 x 150mm NOT DETAILED ON THE DRAWINGS. BARS ARE TO BE DISPLACED AROUND SLAB PENETRATIONS AND ARE NOT TO BE CUT.
 - 7. REINFORCEMENT SUPPORT.** ALL REINFORCEMENT IS TO BE SUPPORTED ON CHAIRS OR HANGERS. MESH IS TO BE SUPPORTED AT 800mm CENTRES BOTH WAYS.
 - 8. INSPECTION.** ALL REINFORCEMENT IS TO BE ACCURATELY POSITIONED, ADEQUATELY SUPPORTED, AND THEN INSPECTED BY BORNHORST & WARD BEFORE ANY CONCRETE IS PLACED.
 - 9. CURING.** AFTER POURING AND UNTIL FINAL TROWEL ALL EXPOSED SURFACES ARE TO BE SPRAYED WITH ALIPHATIC ALCOHOL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. WITHIN ONE HOUR OF FINAL TROWEL, APPLY THE FINAL CURING COMPOUND "MULTICURE AC90", (AVAILABLE FROM SEAL HARD AUSTRALIA PTY LTD).
 - 10. STRIPPING.** FORMWORK MAY BE STRIPPED AFTER 7 DAYS

STANDARD NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE OTHER PROJECT DRAWINGS AND SPECIFICATION.
- IF IN DOUBT, ASK ! DIMENSIONS ARE NOT TO BE SCALED.
- CONTRACTOR TO CHECK WORK IN DETAIL PRIOR TO CALLING FOR INSPECTION BY THE ENGINEER.
- WHERE PROPRIETARY ITEMS HAVE BEEN SPECIFIED, EQUIVALENT PROPRIETARY ITEMS MEETING THE FUNCTIONAL PERFORMANCE AND/OR TECHNICAL REQUIREMENTS, MAY BE SUBSTITUTED WITH THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
- ALL PROPRIETARY PRODUCTS ARE TO BE USED/INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATION AND/OR DETAILS.
- AS 3735 EXPOSURE CLASSIFICATION **B1**



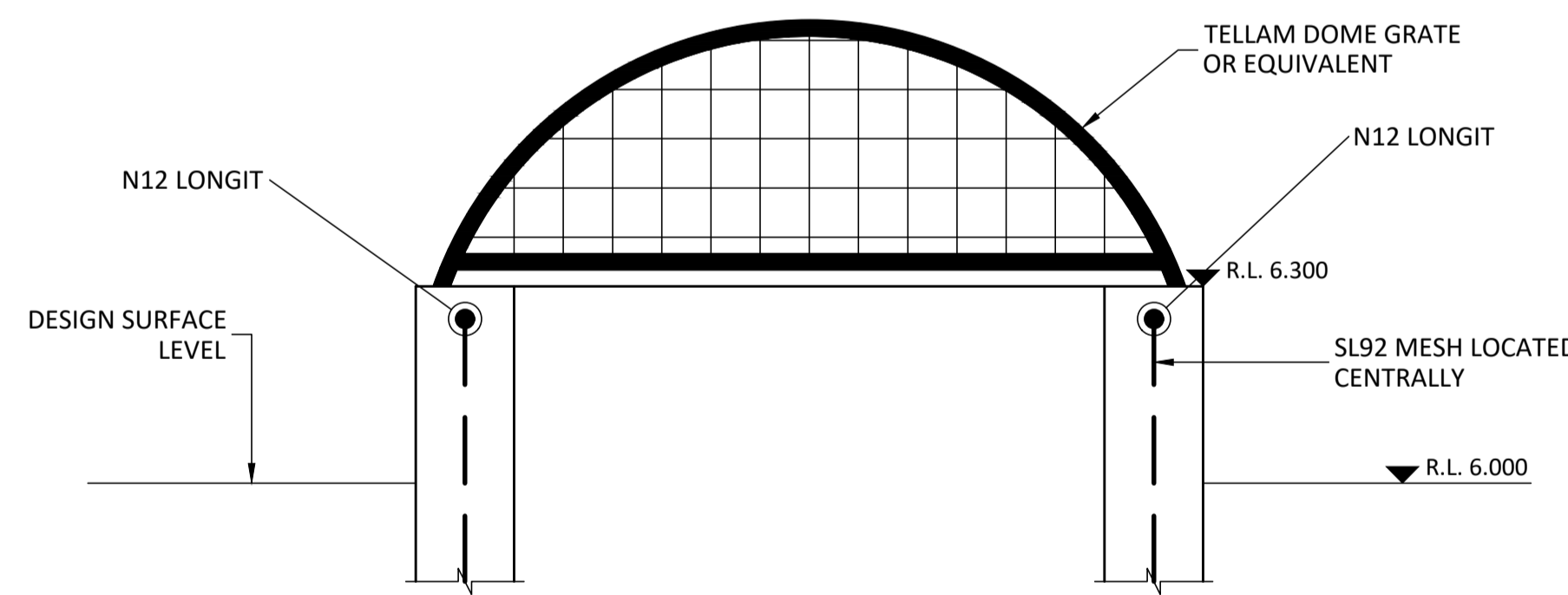
15.2 - 900 x 1200 STORMWATER CHAMBER WALL REINFORCEMENT LAYOUT
SCALE A



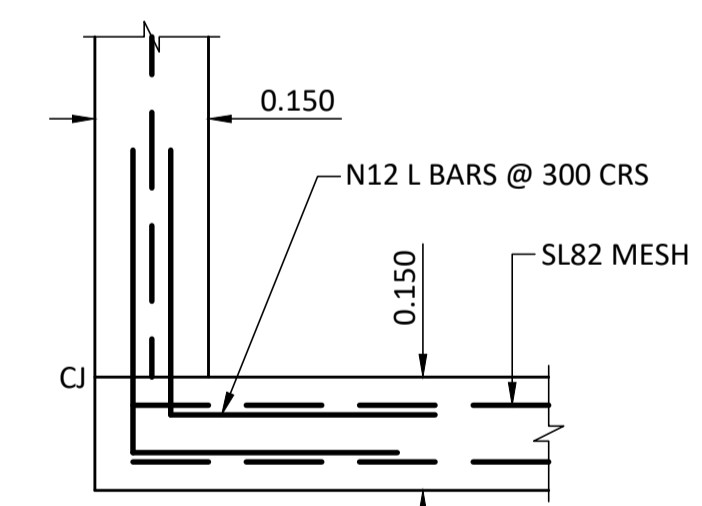
15.2 - 900 x 1200 STORMWATER CHAMBER BOTTOM SLAB REINFORCEMENT LAYOUT
SCALE A

CONCRETE NOTES

- 1. POUR SLAB** ON POLYMERIC FILM UNDERLAY ON SUBGRADE (NOT BEDDING SAND OR ANY OTHER FREE DRAINING MATERIAL) ROLLED OUT TO A SMOOTH STONE-FREE FINISH.
- 2. CONCRETE** IS TO HAVE A MAXIMUM AGGREGATE SIZE OF 20mm AND SLUMP OF 80mm. EXCEPT AS NOTED BELOW CONCRETE IS TO BE STRENGTH GRADE N40 GENERALLY



TYPICAL TOP SLAB SECTION
N.T.S



TYPICAL BOTTOM SLAB SECTION
N.T.S

NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
* CERTIFY THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING IS ACCURATE.
* ACCEPT RESPONSIBILITY FOR THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING.
* ACKNOWLEDGE THE "AS CONSTRUCTED" INFORMATION CONTAINED IN THIS DRAWING MAY BE RELIED ON BY COUNCIL AND OTHERS.
N. Rozis (SIGNATURE)

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES	A1 UNREDUCED A3 REDUCED
SCALES	UNREDUCED / REDUCED
A	0 0.1 0.2 0.3 0.4 0.5m 1 : 10 / 1 : 20

AS CONSTRUCTED

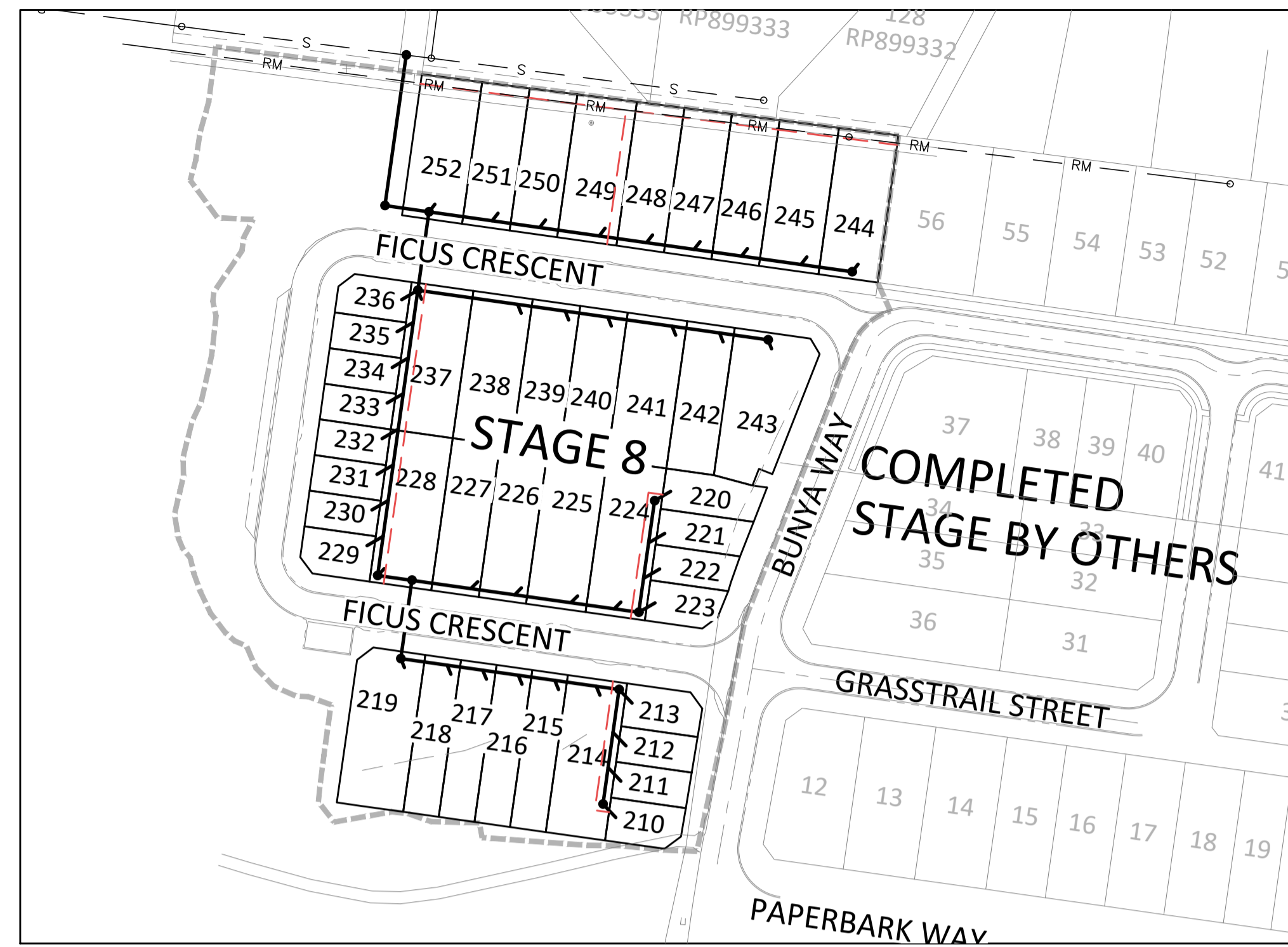
COPYRIGHT © - This document is and shall remain the property of Bornhorst & Ward Pty. Ltd. The document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. Unauthorised use of this document in any form whatsoever is prohibited.	REV. DATE AMENDMENT / ISSUE F 31.08.16 RESPONSE TO COUNCILS COMMENTS E 03.05.16 ISSUE FOR CONSTRUCTION D 09.05.14 ISSUE FOR APPROVAL C 16.04.14 FOR INFORMATION B 22.01.14 FOR INFORMATION	DWN DES CHK APP MS BBc NR NR MS BBc NR NR MS AY JT NR	ASSOCIATED CONSULTANTS APPROVED <i>N. Rozis</i> 7729 RPEQ DATE 10/10/17	CHECKED <i>B. Begaud</i> DATE 10/10/17	BORNHORST + WARD CONSULTING ENGINEERS CIVIL AND STRUCTURAL Level 4, 67 Astor Terrace, Spring Hill, QLD 4000 Bornhorst & Ward Pty Ltd Brisbane Australia Phone (07) 3013 4699 Facsimile (07) 3013 4611 mail@bornhorstward.com.au www.bornhorstward.com.au A.C.N. 010 151 354 A.B.N. 78 010 151 354	CLIENT URBAN LAND DEVELOPMENT AUTHORITY	PROJECT ANDERGROVE, MACKAY STAGE 8	SUBJECT STORMWATER STRUCTURE REINFORCEMENT LAYOUT	PROJECT No. 12121D DRAWING No. REVISION C056 F
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SEWER RETICULATION WHITEFIG CLOSE, ANDERGROVE

LIVE SEWER WORK

CONSULTING ENGINEERS ARE TO CONTACT COUNCIL'S SEWERAGE UTILITY SERVICES 24 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR THIS WORK TO BE CARRIED OUT. (EXCAVATION, SAFE-SHORING AND ASSOCIATED WORK BY CONTRACTOR.) EXCAVATION WORKS CARRIED OUT BY CONTRACTORS AT DEPTH OF 1.5m OR GREATER MUST PROVIDE A 'SAFE WORK PLAN' AS PER WORKPLACE HEALTH AND SAFETY LEGISLATION TO COUNCIL PRIOR TO COUNCIL COMMENCING ANY WORKS. IT IS THE DEVELOPERS RESPONSIBILITY TO ENSURE ALL LIVE SEWER WORKS ARE COMPLETE BEFORE ALLOWING PRIVATE DRAINAGE TO BE CONNECTED.

No.	DESCRIPTION	DIA. SEWER	M.H. No.	M.H. TYPE	COVER TYPE	LOT NO	F.S.L.	E.S.L.	I.L	DEPTH
1a	CONTRACTOR TO BUILD MANHOLE 1/7 OVER EXISTING SEWER LINE & PROVIDE STUB. STUB IS TO BE PLUGGED.	Ø150	1/7	A	B	N/A	EXISTING	EXISTING	EXISTING	-
1b	CONTRACTOR IS TO LAY SEWER FROM STUB TO MANHOLE 2/7 & ALL UP STREAM SEWER.									
1c	COUNCIL TO REMOVE CROWN OF EXISTING PIPE AND CONNECT AND UNPLUG STUB UPON COMPLETION OF 'SUCCESSFUL ON MAINTENANCE INSPECTION' AND TESTING.									



LOCALITY PLAN
SITE ADDRESS: BEDFORD ROAD, ANDERGROVE, QLD 4740
N.T.S.

SEWERAGE NOTES

- GENERAL
 - ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH RELEVANT AUTHORITY SPECIFICATIONS AND STANDARDS.
 - WHERE NEW WORK IS TO JOIN TO EXISTING, THE CONTRACTOR SHALL CONFIRM EXISTING LEVELS PRIOR TO CONSTRUCTION.
 - ALL WORK ASSOCIATED WITH LIVE SEWERS OR MANHOLES ARE TO BE CARRIED OUT BY THE RELEVANT AUTHORITY UNLESS NOTED OTHERWISE.
 - THE CONSTRUCTION OF SEWERAGE WORK SHOWN ON THIS DRAWING MUST BE SUPERVISED BY A CONSULTING ENGINEER WHO HAS BEEN APPROVED BY THE CHIEF ENGINEER OF THE SEWERAGE DEPARTMENT OF RELEVANT AUTHORITY TO CARRY OUT SEWERAGE WORKS WITHIN THE LOCAL AREA. SEWERAGE WORKS NOT COMPLYING WITH THIS REQUIREMENT WILL NOT BE PERMITTED TO CONNECT INTO THE COUNCIL'S SEWERAGE SYSTEM.
 - THE CONTRACTOR SHALL VERIFY FINISHED SURFACE LEVELS ON SITE BEFORE CONSTRUCTION OF SEWERS & HOUSE CONNECTION BRANCHES.
- SEWER
 - ALL SEWERS SHALL BE PE CLASS 'SDR17' UNLESS SHOWN OTHERWISE.
 - AIR TESTS OF SEWERS SHALL BE CARRIED OUT TO THE REQUIREMENTS OF THE RELEVANT AUTHORITY.
 - TEST EVIDENCE IS REQUIRED FOR ALL SEWER PIPES & SPECIALS & C.I. FITTINGS.
 - WHERE SEWERS HAVE A GRADE OF 1 IN 6 OR STEEPER, BULKHEADS SHALL BE CONSTRUCTED AT 2m CENTERS.
- HOUSE CONNECTIONS
 - HOUSE CONNECTIONS (100mm) SHALL BE PROVIDED INTO EACH ALLOTMENT WHERE SHOWN AT SUCH A LEVEL THAT ALL OF THE BUILDING AREA OF THE ALLOTMENT CAN BE DRAINED IN ACCORDANCE WITH THE STANDARD SEWERAGE BYLAWS.
 - NOTWITHSTANDING HOUSE CONNECTION LEVELS SHOWN ON THE PLANS, THE MAXIMUM DEPTH OF RESIDENTIAL HOUSE CONNECTIONS SHALL BE 1.0m.
 - O.B'S SHALL BE LOCATED GENERALLY BETWEEN 1.0m AND 1.2m FROM THE DOWNSTREAM PROPERTY ALIGNMENT.
 - HOUSE CONNECTION BRANCHES SHALL EXTEND INTO THE PROPERTY A MINIMUM OF 300mm AND A MAXIMUM OF 750mm PAST ROOFWATER.
 - HOUSE CONNECTIONS CROSSING UNDERGROUND ELECTRICITY ALLOCATION TO HAVE A MINIMUM OF 1.10m COVER.
 - ROOFWATER CONNECTIONS TO BE EXTENDED 0.5m PAST SEWER.
- WORKPLACE HEALTH AND SAFETY
 - ALL WATER & SEWER CONSTRUCTION WORK SHALL COMPLY WITH THE REQUIREMENTS OF QUEENSLAND WORKPLACE HEALTH & SAFETY ACT 1995. CONTACT NEAREST OFFICE OF THE DIVISION OF WORKPLACE HEALTH AND SAFETY FOR INFORMATION.

LEGEND

EXISTING	PROPOSED	DESCRIPTION
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	FOOTPATH
---	---	STORMWATER DRAINAGE
---	---	ROOFWATER DRAINAGE
---	---	BATTERS
---	---	OPEN CHANNEL
---	---	FENCE
---	---	SEWER
---	---	WATER
---	---	WATER CONDUIT
---	---	TELSTRA
---	---	UNDER GROUND POWER
---	---	STAGE BOUNDARY
---	---	DRIVEWAY LOCATION
---	---	SEWER STRUCTURE NUMBER

NOTE: SERVICE LOCATIONS AND DEPTHS ARE ESTIMATED FROM SURVEY DATA AND RECORDS. THE ACTUAL LOCATION OF SERVICES IS TO BE DETERMINED ON SITE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS

"DIAL BEFORE YOU DIG" TO BE CONTACTED
PH: 1100 FOR LOCATION FOR THE LOCATION OF EXISTING PUBLIC UTILITIES, PRIOR TO EXCAVATION

LEVEL DATUM

DATUM - AHD D
PSM: 67982
LEVEL: RL 41.910
LOCATED: CNR BEDFORD RD & FERNLEIGH AVE

R.P. DESCRIPTION

LOT 2 RP 711645
PARISH OF BASSETT

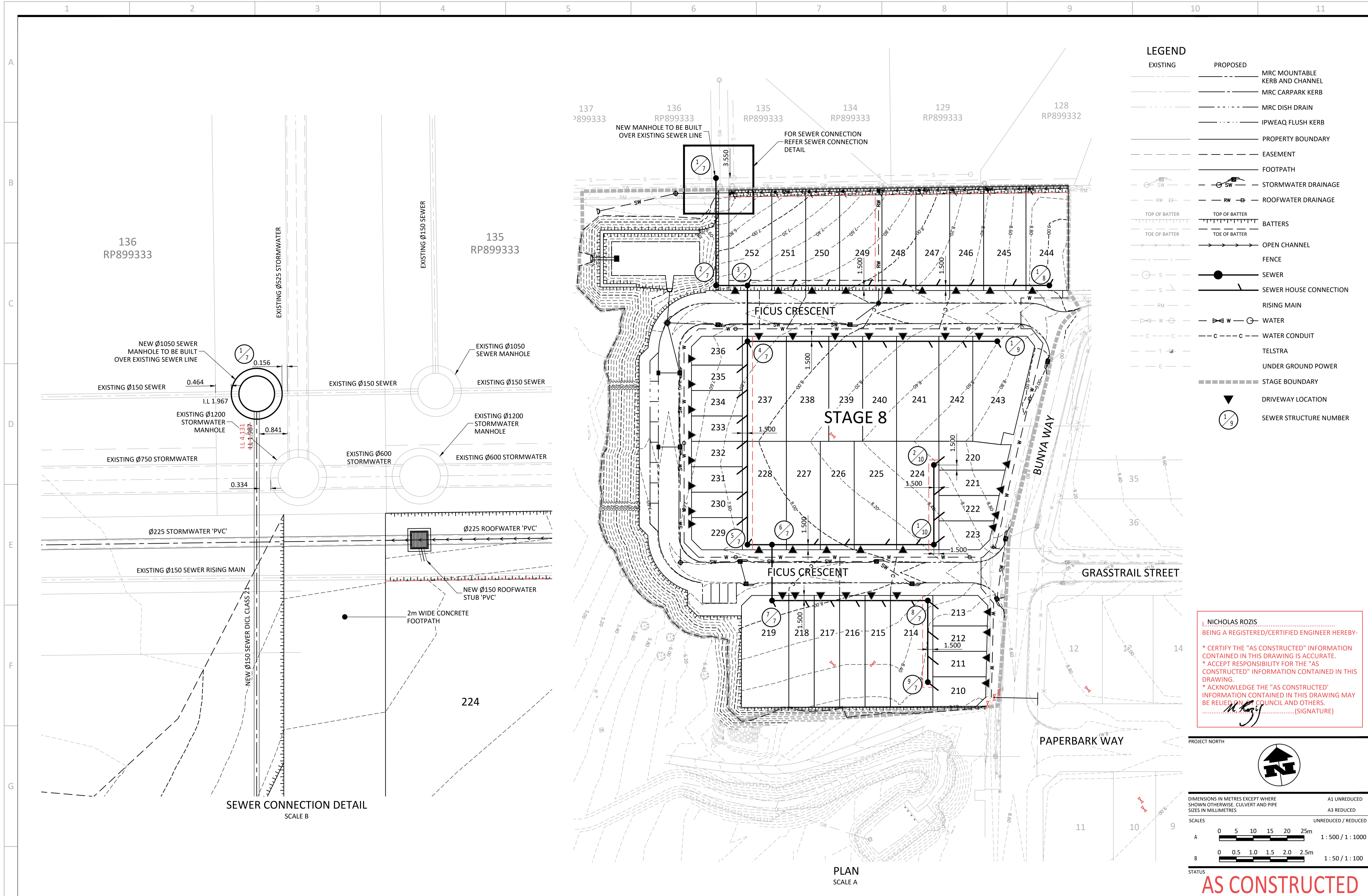
CONSULTANT : BORNHORST + WARD PTY LTD
CONTACT : JOSH TAYLOR
TELEPHONE : (07) 3013 4699

ALL WATER AND SEWER CONSTRUCTION WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE QUEENSLAND WORKPLACE HEALTH AND SAFETY ACT 1995. CONTACT THE DIVISION OF WORKPLACE HEALTH AND SAFETY FOR INFORMATION. PHONE 1300 369 915

I, NICHOLAS ROZIS
BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
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N. Rozis (SIGNATURE)

STATUS
AS CONSTRUCTED

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LEGEND		
EXISTING	PROPOSED	
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	FOOTPATH
SW	SW	STORMWATER DRAINAGE
RW	RW	ROOFWATER DRAINAGE
---	---	BATTERS
---	---	OPEN CHANNEL
---	---	FENCE
S	S	SEWER
S	S	SEWER HOUSE CONNECTION
RM	RM	RIISING MAIN
W	W	WATER
C	C	WATER CONDUIT
T	T	TELSTRA
E	E	UNDER GROUND POWER
---	---	STAGE BOUNDARY
▼	▼	DRIVEWAY LOCATION
1/7	1/7	SEWER STRUCTURE NUMBER

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 (SIGNATURE)

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

A1 UNREDUCED
 A3 REDUCED

SCALES UNREDUCED / REDUCED

A 0 5 10 15 20 25m 1:500 / 1:1000

B 0 0.5 1.0 1.5 2.0 2.5m 1:50 / 1:100

STATUS

AS CONSTRUCTED

REV	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APP
F	31.08.16	RESPONSE TO COUNCILS COMMENTS	MS	BBE	NR	NR
E	03.05.16	ISSUE FOR CONSTRUCTION	MS	BBE	NR	NR
D	09.05.14	ISSUE FOR APPROVAL	MS	AY	JT	NR
C	16.04.14	FOR INFORMATION				
B	22.01.14	FOR INFORMATION				

ASSOCIATED CONSULTANTS

APPROVED	CHECKED
<i>N. Rozis</i> 7729 RPEQ	<i>B. Beaud</i>
DATE 10/10/17	DATE 10/10/17

BORNHORST + WARD
 CONSULTING ENGINEERS
 CIVIL AND STRUCTURAL
 Level 4, 67 Astor Terrace, Spring Hill, QLD 4000

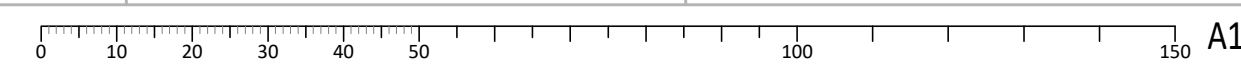
Bornhorst & Ward Pty Ltd
 Brisbane Australia
 Phone (07) 3013 4699
 Facsimile (07) 3013 4611
 mail@bornhorstward.com.au
 www.bornhorstward.com.au
 A.C.N. 050 151 354 A.B.N. 78 010 151 354

CLIENT
URBAN LAND DEVELOPMENT AUTHORITY

PROJECT
ANDERGROVE, MACKAY STAGE 8

SUBJECT
SEWERAGE RETICULATION LAYOUT PLAN

PROJECT No.	DRAWING No.	REVISION
12121D	C061	F



MANHOLE/END NAME	9/7	8/7	7/7	6/7	5/7	4/7	3/7	2/7	1/7
MANHOLE TYPE	EZY PIT								
LID TYPE	B								
JUNCTION LINE				10					
DROP TYPE	A			A					
DEPTH TO HC	0.691			0.964					
HOUSE CONNECTION	IL 7.68m			IL 6.81m					
INVERT LEVEL	IL 7.69m			IL 6.75m					
HC TYPE	A			A					
HC LOT No.	Lot210			Lot229					
CH. FROM D/S MH	16.338			51.917					

MANHOLE/END NAME	1/8	3/7
MANHOLE TYPE	EZY PIT	
LID TYPE	B	
JUNCTION LINE		7
DROP TYPE	A	C
DEPTH TO HC	1.516	
HOUSE CONNECTION	IL 7.48m	
INVERT LEVEL	IL 7.24m	
HC TYPE	C	
HC LOT No.	Lot244	
CH. FROM D/S MH	78.455	

MANHOLE/END NAME	1/9	4/7
MANHOLE TYPE	EZY PIT	
LID TYPE	B	
JUNCTION LINE		7
DROP TYPE	A	C
DEPTH TO HC	0.921	
HOUSE CONNECTION	IL 7.65m	
INVERT LEVEL	IL 7.53m	
HC TYPE	A	
HC LOT No.	Lot243	
CH. FROM D/S MH	63.784	

MANHOLE/END NAME	2/10	1/10	6/7
MANHOLE TYPE	EZY PIT		
LID TYPE	B		
JUNCTION LINE			7
DROP TYPE	A	C	A
DEPTH TO HC	0.625		
HOUSE CONNECTION	IL 7.86m		
INVERT LEVEL	IL 7.77m		
HC TYPE	A		
HC LOT No.	Lot220		
CH. FROM D/S MH	14.804		

FINISHED LEVELS OF MH COVERS

LOCATION	HEIGHT (mm)
NEW SUBDIVISIONS	75
ROADS, LANE WAYS, FOOTWAYS & DRIVEWAYS	FLUSH
OTHER AS SPECIFIED (EG ABOVE FLOOD LEVEL)	

REFER MRC STD DWG A3-04223 FOR DETAILS

NOTE:
ADD LEVELS TO "DESIGN SURFACE LEVEL" AS REQUIRED FOR TABLE ABOVE

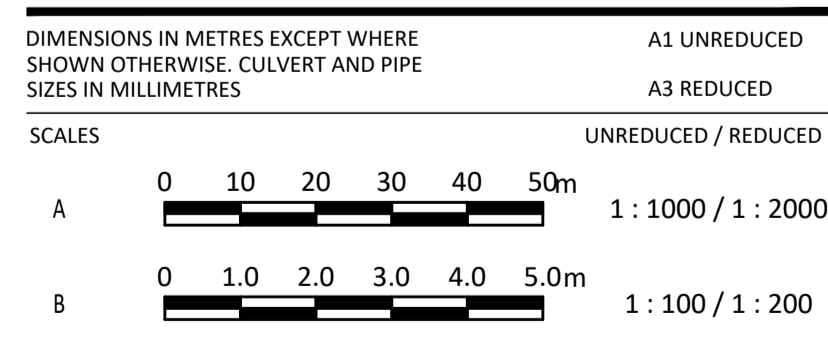
DATUM RL	-6.000									
STREET ETC	ALLOTMENT			ROAD	ALLOTMENT			ROAD	EASEMENT	
DIAMETER	150Ø SN8			150Ø SN8	150Ø SN8			150Ø SN8	150Ø DICL	
GRADE	1 in 100.00 1 in 100.00			1 in 125.00 1 in 125.00	1 in 180.00 1 in 180.00			1 in 180.00 1 in 180.00	1 in 180.00 1 in 180.00	
JUNCTION INVERT LEVEL				6.213				6.278		
DEPTH TO INVERT	1.355			1.519	1.613			2.042	5.089	
INVERT LEVEL OF SEWER	7.930 7.320			6.378 6.372	6.278 6.276			4.214 4.977	4.354 4.307	
DESIGN SURFACE LEVEL	8.340 8.376			7.920 7.891	7.866 7.866			7.600 7.626	7.524 6.098	
RUNNING CHAINAGE	0.000			24.093	70.047			170.286	211.244	

DATUM RL	-5.000	
STREET ETC	ALLOTMENT	
DIAMETER	150Ø SN8	
GRADE	1 in 55.00 1 in 62.50	
JUNCTION INVERT LEVEL		
DEPTH TO INVERT	2.500	
INVERT LEVEL OF SEWER	6.515	
DESIGN SURFACE LEVEL	8.050 9.014	
RUNNING CHAINAGE	89.097	

DATUM RL	-6.000	
STREET ETC	ALLOTMENT	
DIAMETER	150Ø SN8	
GRADE	1 in 58.00 1 in 100.00	
JUNCTION INVERT LEVEL		
DEPTH TO INVERT	1.573	
INVERT LEVEL OF SEWER	7.015	
DESIGN SURFACE LEVEL	8.640 8.588	
RUNNING CHAINAGE	73.722	

DATUM RL	-5.000		
STREET ETC	ALLOTMENT		
DIAMETER	150Ø SN8		150Ø SN8
GRADE	1 in 31.00 1 in 100.00		1 in 175.00 1 in 180.00
JUNCTION INVERT LEVEL			6.213
DEPTH TO INVERT	1.157		1.720
INVERT LEVEL OF SEWER	7.334 7.320		6.310 6.213
DESIGN SURFACE LEVEL	8.360 8.248		7.866
RUNNING CHAINAGE	23.494		71.255

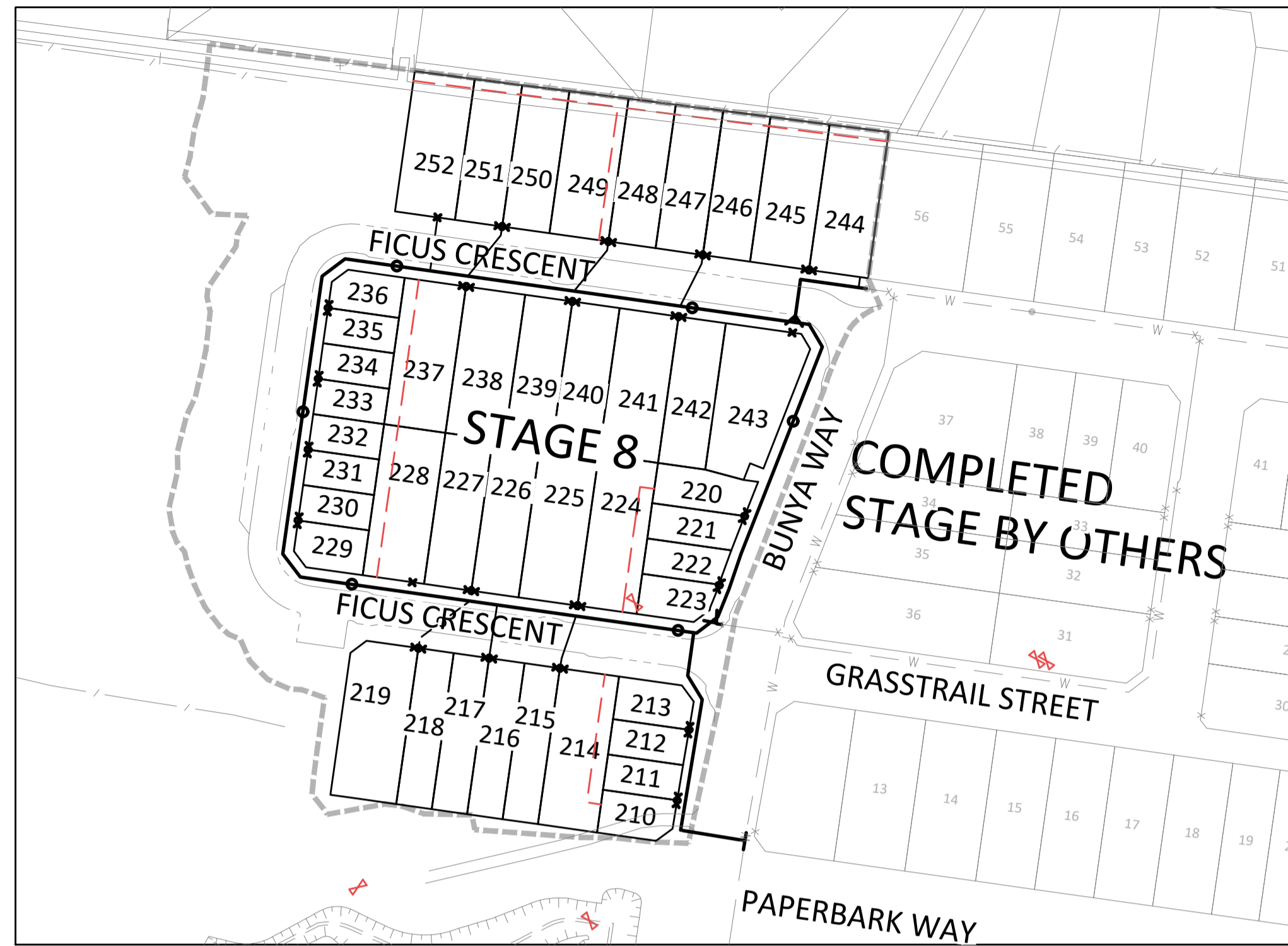
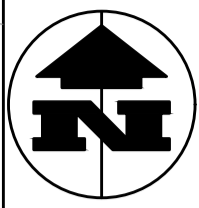
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AS CONSTRUCTED

WATER RETICULATION WHITEFIG CLOSE, ANDERGROVE



LOCALITY PLAN
SITE ADDRESS: BEDFORD ROAD, ANDERGROVE, QLD 4740
N.T.S.

PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR TO ARRANGE FOR THE COMPLYING OF APPROVED TRAFFIC PLAN AND SEEK APPROVAL FROM PLANNING AND TRAFFIC BRANCH. WORK MAY BE REQUIRED TO BE CARRIED-OUT DURING WEEKENDS AND/OR LATE AT NIGHT ONLY.

xxCAUTIONxx
APPROX. LOCATION OF PUBLIC UTILITIES ONLY. EXACT LOCATION AND DEPTH TO BE DETERMINED ON SITE BY RELEVANT AUTHORITY PERSONNEL PRIOR TO COMMENCING WORK.

ANCHOR BLOCK NOTES

1. CONCRETE SHALL BE PLACED IN CONTACT WITH UNDISTURBED SOIL.
2. CONCRETE SHALL BE CLASS N32 MPA STRENGTH, 20mm AGGREGATE & 75mm SLUMP, eg 20.20.75.
3. UNLESS DETAILED OTHERWISE, ALL ANCHOR BLOCK DETAILS SHALL COMPLY WITH MRC STANDARD DWG A3-0836

NOTE:
ALL WORKS TO BE TO PLUMBING AND DRAINAGE CODE BY LICENCED PERSON. CONTRACTOR TO ARRANGE COUNCIL PLUMBING INSPECTION AND CERTIFICATION.

NOTE:
ALL WATER SERVICE CONNECTIONS TO COMPLY WITH MRC STD DWG A3-00840

NOTE:
ALL LIVE CONNECTION WORKS TO BE DONE BY COUNCIL/MACKAY WATER

LEVEL DATUM
DATUM - AHD
PSM: 67982
LEVEL: RL 41.910
LOCATED: CNR BEDFORD RD & FERNLEIGH AVE

R.P. DESCRIPTION
LOT 2 RP 711645
PARISH OF BASSETT

CONSULTANT : BORNHORST + WARD PTY LTD
CONTACT : JOSH TAYLOR
TELEPHONE : (07) 3013 4699

ALL WATER AND SEWER WORK UNDERTAKEN BY THE CONTRACTOR IS TO COMPLY WITH THE REQUIREMENTS OF THE QUEENSLAND WORKPLACE HEALTH AND SAFETY ACT 1995.
CONTACT THE DIVISION OF WORKPLACE HEALTH AND SAFETY FOR INFORMATION. PHONE 1300 369915

CONSTRUCTION INSPECTIONS:
NOTIFICATION OF INSPECTIONS MUST BE RECEIVED BY INSPECTING OFFICER AT LEAST TWO (2) WEEKS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
PLEASE CONTACT JOSH TAYLOR ON (07) 3013 4699

WATER NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH RELEVANT AUTHORITY SPECIFICATIONS AND STANDARDS.
2. UNLESS SPECIFIED OTHERWISE, ALL MATERIALS AND WORK SHALL COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS.
3. ADOPT TOP OF KERB AS PERMANENT LEVEL.
4. COVER ON MAINS FROM PERMANENT LEVEL TO BE AS FOLLOWS:
- 63, 100 & 150 DIAMETER PIPE - 600mm
200, 250 & 300 DIAMETER PIPE - 1000mm
5. CONDUITS TO BE INSTALLED IN ACCORDANCE WITH COUNCILS SPECIFICATIONS.
6. A WATER SUB-METER SUPPLIED AT THE DEVELOPER'S COST, IS TO BE INSTALLED AT THE SERVICE POINT OF EACH UNIT.
7. UPVC PIPES SHALL BE SERIES 2 CLASS 16 AND COMPLY WITH A.S 1477. MPVC PIPES SHALL COMPLY WITH SERIES 2 CLASS 16 AND COMPLY WITH A.S. 4765. FITTINGS SHALL BE CEMENT LINED GREY IRON IN ACCORDANCE WITH A.S. 2544, OR DUCTILE IRON CEMENT LINED (DICL) IN ACCORDANCE WITH A.S. 2280.

DUCTILE IRON CEMENT LINED (DICL) PIPES AND FITTINGS SHALL BE CLASS K9 AND COMPLY WITH A.S. 2280. PIPES AND FITTINGS SHALL BE POLYETHYLENE SLEEVED.

MILD STEEL (MSCL) PIPES SHALL COMPLY WITH A.S. 1579 AND BE CEMENT LINED IN ACCORDNACE WITH A.S. 1281. PIPE COATING SHALL COMPLY WITH A.S. 4321 (SINTAKOTE II).

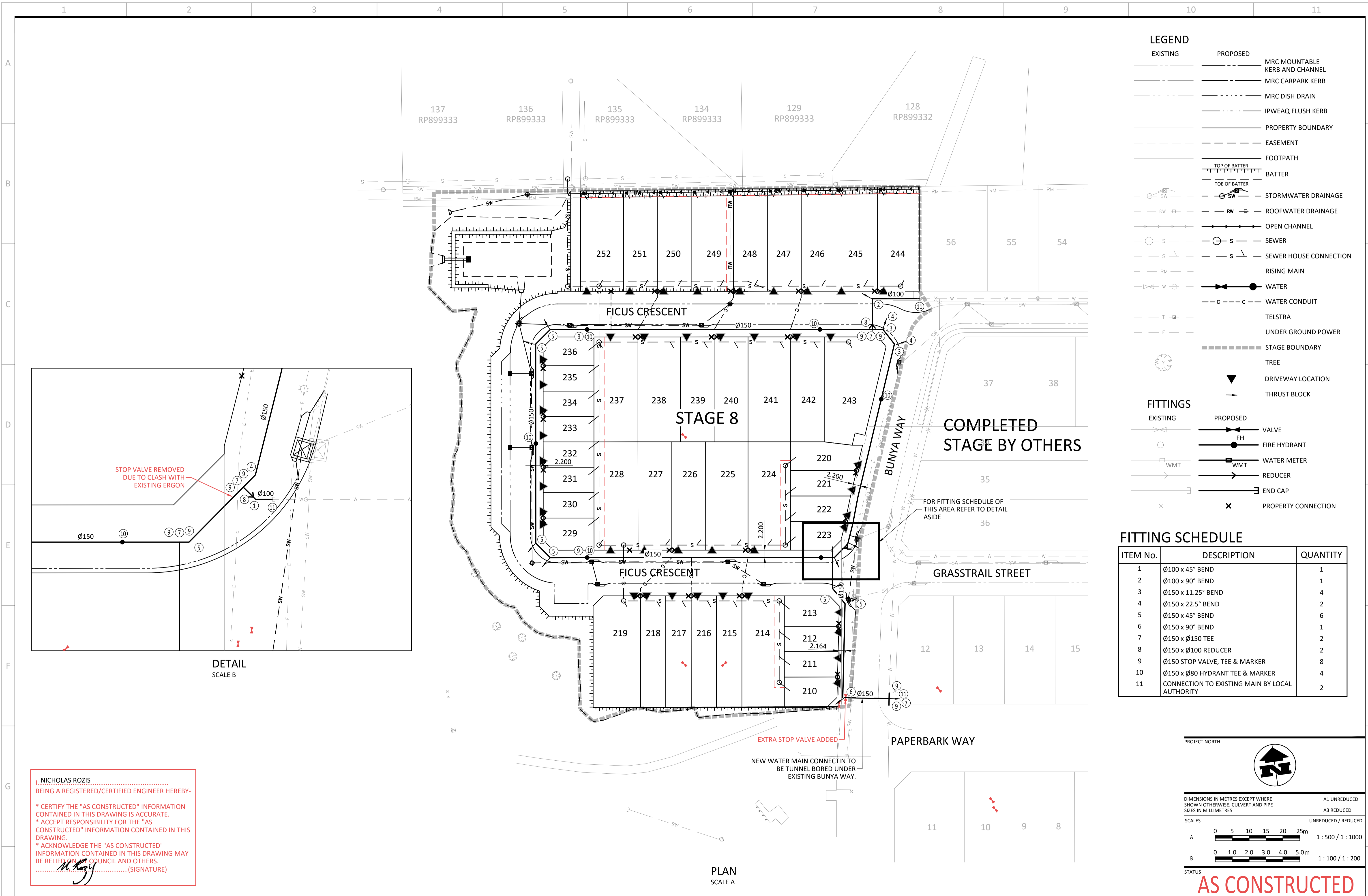
POLYETHYLENE PIPES OF 63 OD SHALL BE CLASS PN16 PE80B AND COMPLY WITH A.S. 4130. FITTINGS SHALL COMPLY WITH A.S. 1460.
8. ALL CONCRETE FOOTPATHS TO BE CLEAR OF WATER MAINS.
9. THE CONSTRUCTION OF THE WATER RETICULATION WORK SHOWN ON THIS DRAWING MUST BE SUPERVISED BY AN ENGINEER WHO HAS RPEQ REGISTRATION. WORKS NOT COMPLYING WITH THIS REQUIREMENT WILL NOT BE PERMITTED TO CONNECT INTO COUNCIL'S RETICULATION SYSTEM.

NICHOLAS ROZIS
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N. Rozis (SIGNATURE)

STATUS
AS CONSTRUCTED

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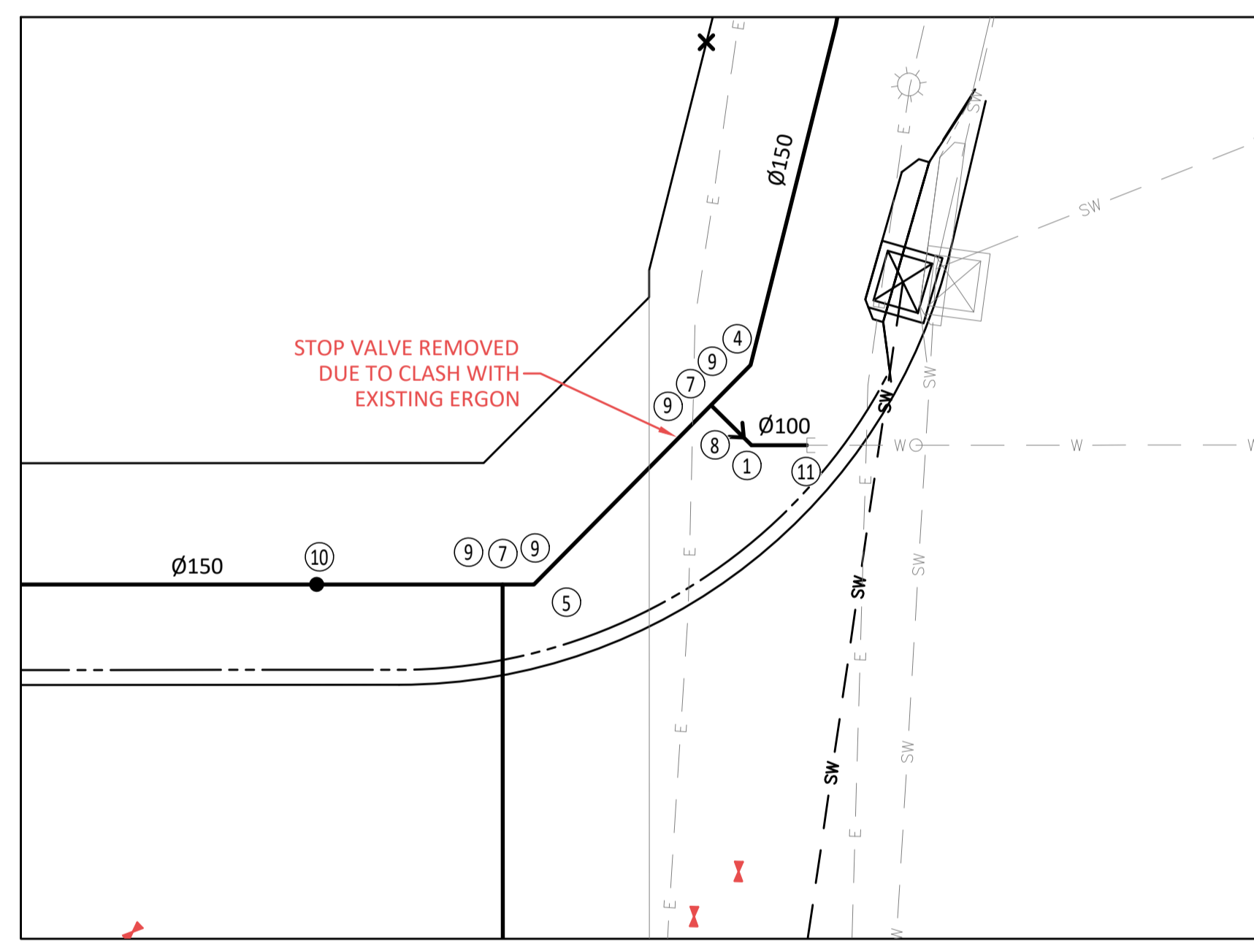
EXISTING	PROPOSED	
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	FOOTPATH
---	---	BATTER
---	---	STORMWATER DRAINAGE
---	---	ROOFWATER DRAINAGE
---	---	OPEN CHANNEL
---	---	SEWER
---	---	SEWER HOUSE CONNECTION
---	---	RISING MAIN
---	---	WATER
---	---	WATER CONDUIT
---	---	TELSTRA
---	---	UNDER GROUND POWER
---	---	STAGE BOUNDARY
---	---	TREE
---	---	DRIVEWAY LOCATION
---	---	THRUST BLOCK

FITTINGS

EXISTING	PROPOSED	
---	---	VALVE
---	---	FH FIRE HYDRANT
---	---	WMT WATER METER
---	---	REDUCER
---	---	END CAP
---	---	PROPERTY CONNECTION

FITTING SCHEDULE

ITEM No.	DESCRIPTION	QUANTITY
1	Ø100 x 45° BEND	1
2	Ø100 x 90° BEND	1
3	Ø150 x 11.25° BEND	4
4	Ø150 x 22.5° BEND	2
5	Ø150 x 45° BEND	6
6	Ø150 x 90° BEND	1
7	Ø150 x Ø150 TEE	2
8	Ø150 x Ø100 REDUCER	2
9	Ø150 STOP VALVE, TEE & MARKER	8
10	Ø150 x Ø80 HYDRANT TEE & MARKER	4
11	CONNECTION TO EXISTING MAIN BY LOCAL AUTHORITY	2



DETAIL
SCALE B

PLAN
SCALE A

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PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

A1 UNREDUCED
A3 REDUCED

SCALES UNREDUCED / REDUCED

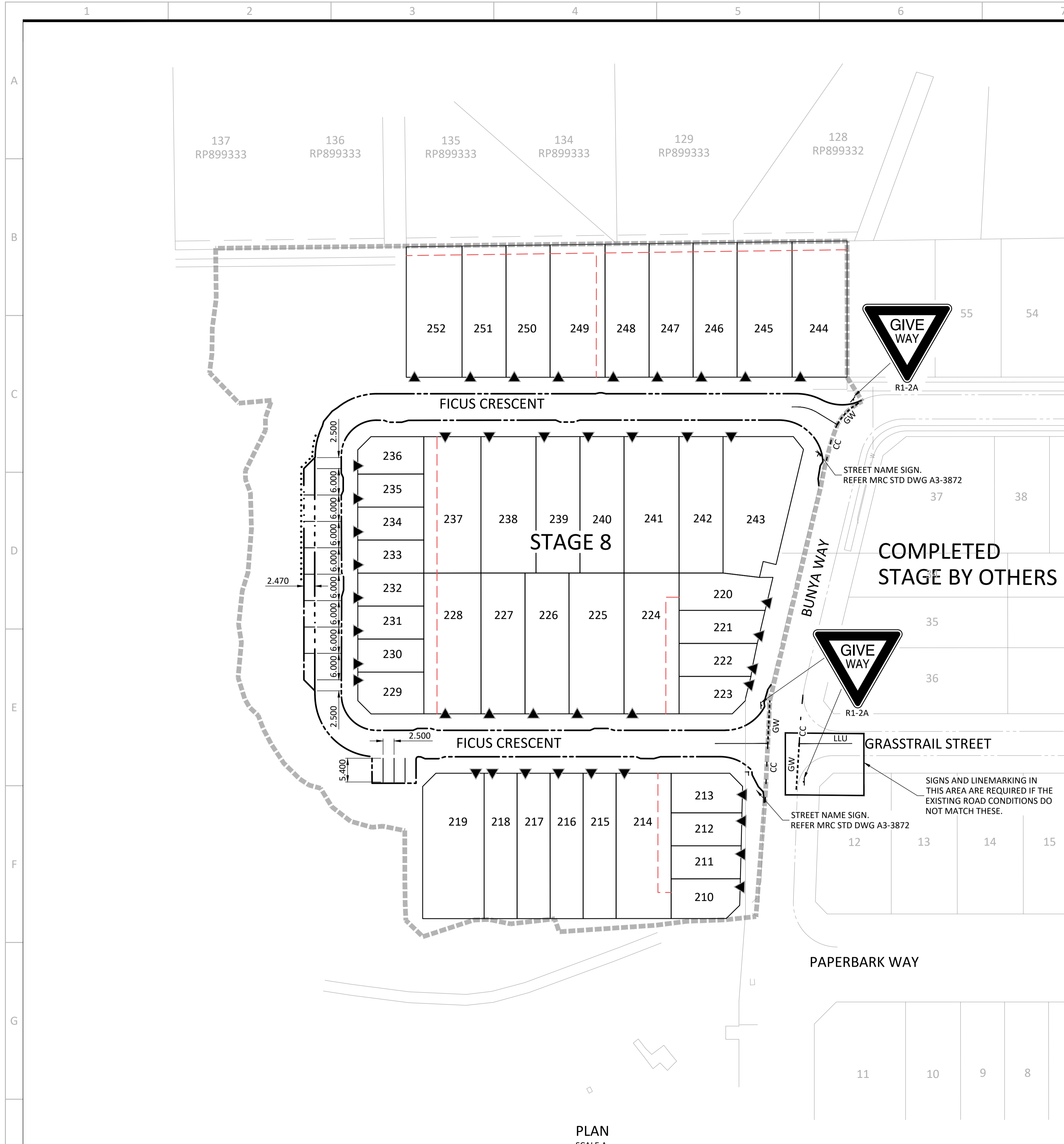
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B 0 1.0 2.0 3.0 4.0 5.0m 1:100 / 1:200

STATUS

AS CONSTRUCTED

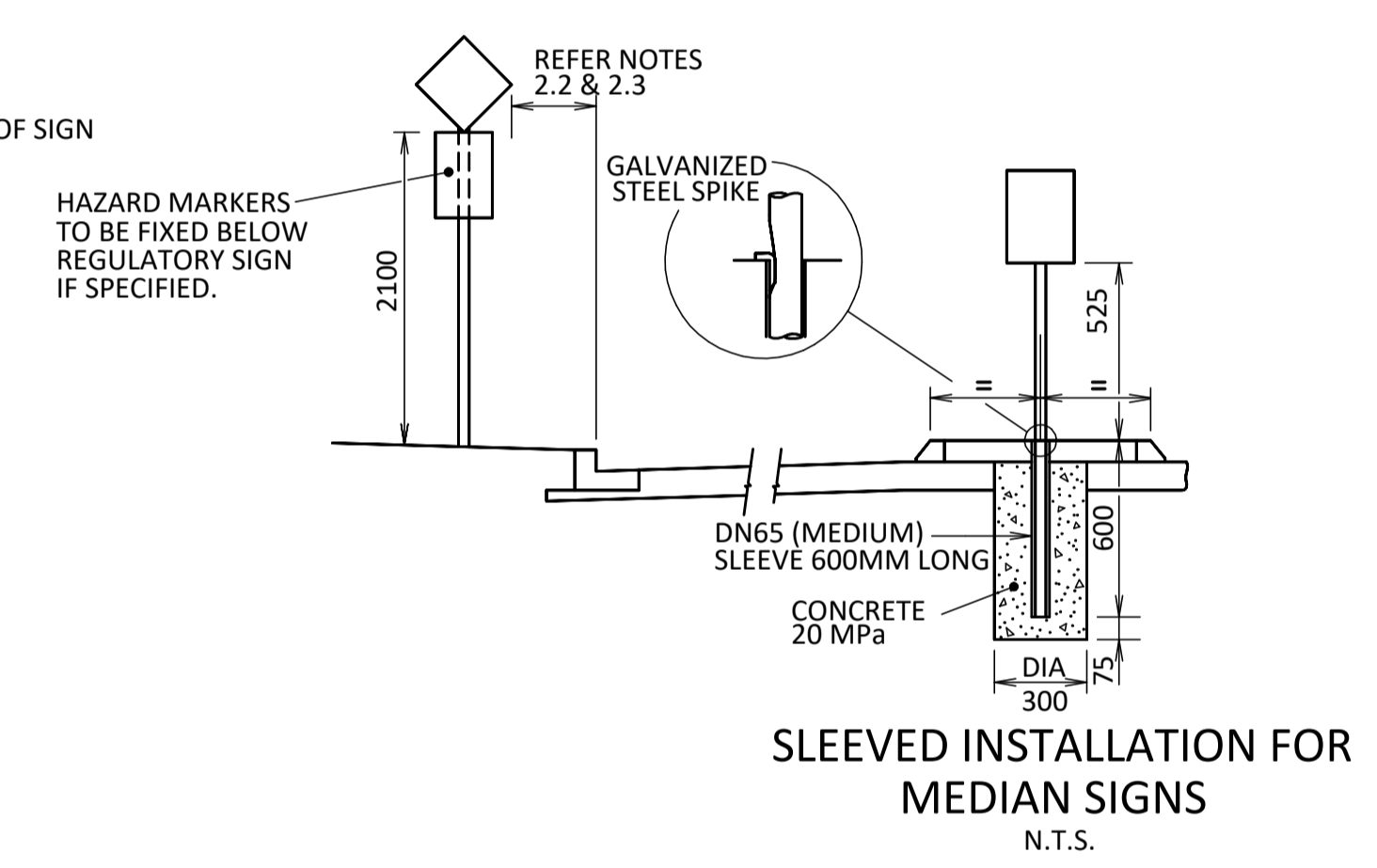
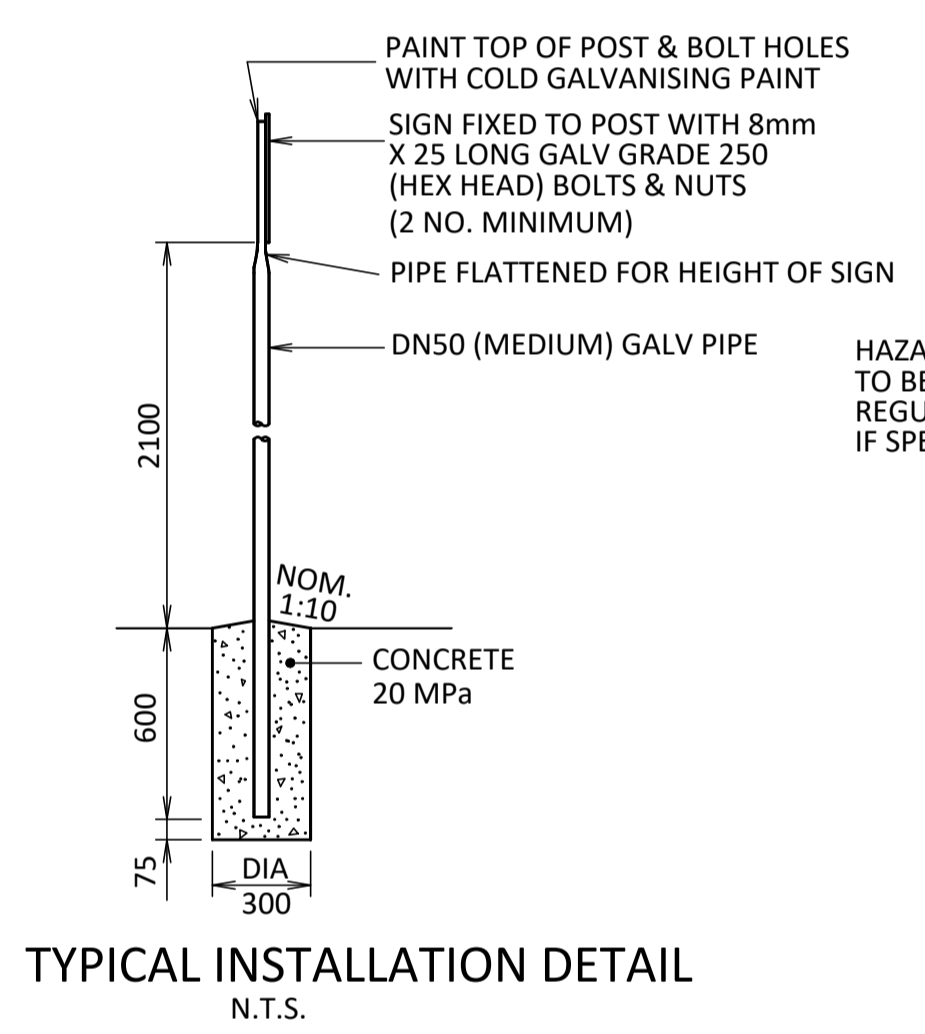
COPYRIGHT © - This document is and shall remain the property of Bornhorst & Ward Pty. Ltd. The document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement. Unauthorised use of this document in any form whatsoever is prohibited.		REV. DATE AMENDMENT / ISSUE H 12.10.16 PROPERTY CONNECTIONS UPDATED G 31.08.16 RESPONSE TO COUNCILS COMMENTS F 03.05.16 ISSUE FOR CONSTRUCTION E 12.06.14 WATER SERVICE AMENDED D 09.05.14 ISSUE FOR APPROVAL	DWN DES CHK APP MS MS BBe NR MS BBe NR NR MS BBe NR NR MS AY JT NR	ASSOCIATED CONSULTANTS APPROVED M. Rozis 7729 DATE 10/10/17	CHECKED B. Begaud DATE 10/10/17	BORNHORST + WARD CONSULTING ENGINEERS CIVIL AND STRUCTURAL Level 4, 67 Astor Terrace, Spring Hill, QLD 4000 Phone (07) 3013 4699 Facsimile (07) 3013 4611 mail@bornhorstward.com.au www.bornhorstward.com.au A.C.N. 010 151 354 A.B.N. 78 010 151 354	CLIENT URBAN LAND DEVELOPMENT AUTHORITY	PROJECT ANDERGROVE, MACKAY STAGE 8	SUBJECT WATER RETICULATION LAYOUT PLAN	PROJECT No. 12121D DRAWING No. REVISION C071 H
--	--	--	--	--	---------------------------------------	--	---	--	--	---



LEGEND

EXISTING	PROPOSED	DESCRIPTION
---	---	MRC MOUNTABLE KERB AND CHANNEL
---	---	MRC CARPARK KERB
---	---	MRC DISH DRAIN
---	---	IPWEAQ FLUSH KERB
---	---	PROPERTY BOUNDARY
---	---	EASEMENT
---	---	FOOTPATH
---	---	STAGE BOUNDARY
▼	▼	DRIVEWAY LOCATION
---	---	STREET NAME SIGN
▼	▼	TRAFFIC SIGN

- STANDARD SIGNS AND LINE MARKING NOTES**
- GENERAL**
 - ALL SIGNS AND PAVEMENT MARKING IS TO BE IN ACCORDANCE WITH THE QUEENSLAND TRANSPORT MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (CURRENT EDITION).
 - SIGNS**
 - ALL SIGNS TO BE REFLECTORISED CLASS 1 TO AS1906.1:2007 UNLESS NOTED OTHERWISE.
 - SIGNS ARE TO BE INSTALLED WITH THE FOLLOWING CLEARANCES TO EDGE OF SIGN: LOCATION CLEARANCE NO KERB 600 BEHIND GUIDE POSTS BARRIER KERB 300 FROM FACE MOUNTABLE KERB 500 FROM FACE OF KERB
 - PARKING CONTROL SIGNS TO BE MOUNTED TO FACE APPROACHING TRAFFIC AT 45° TO KERB OR CARRIAGEWAY EDGE. ALL OTHER SIGNS TO BE TURNED AWAY BY 5° FROM THE NORMAL TO APPROACHING HEADLIGHT.
 - SIGN SUPPORTS**
 - SLEEVED SIGN SUPPORTS ARE TO BE PROVIDED IN ALL AREAS WHERE THEY ARE IN A PAVED SURFACE.
 - LINEMARKING**
 - REDUNDANT LINEMARKING IS TO BE GROUND OFF.
 - THERMOPLASTIC LINEMARKING TO BE USED FOR ALL CONCRETE SURFACES.



SIGN INSTALLATION DETAILS
NOTE: INSTALL HAZARD SIGNS IN ACCORDANCE WITH THE SLEEVED INSTALLATION DETAIL.

LINEMARKING LEGEND

TYPE	DESCRIPTION	DIMENSIONS
LLU	LANE LINE UNBROKEN	100
CC	CONTINUITY LINE	1.0 3.0 1.0 3.0 1.0
GW	GIVE WAY	0.6 TYPICAL 0.6 TYPICAL 0.6 TYPICAL

- NOTES:**
- ALL DIMENSIONS ARE IN METERS.
 - REFER TO AS 1742.3-2002 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES' FOR APPLICATION OF LINETYPES.
 - LINE THICKNESS FOR SEPERATION LINES TO BE 0.15m FOR MULTILANE ROADS.
 - IF INDICATED ON THE DRAWINGS RRP'S ARE TO BE INSTALLED IN ACCORDANCE WITH THE MUTCD

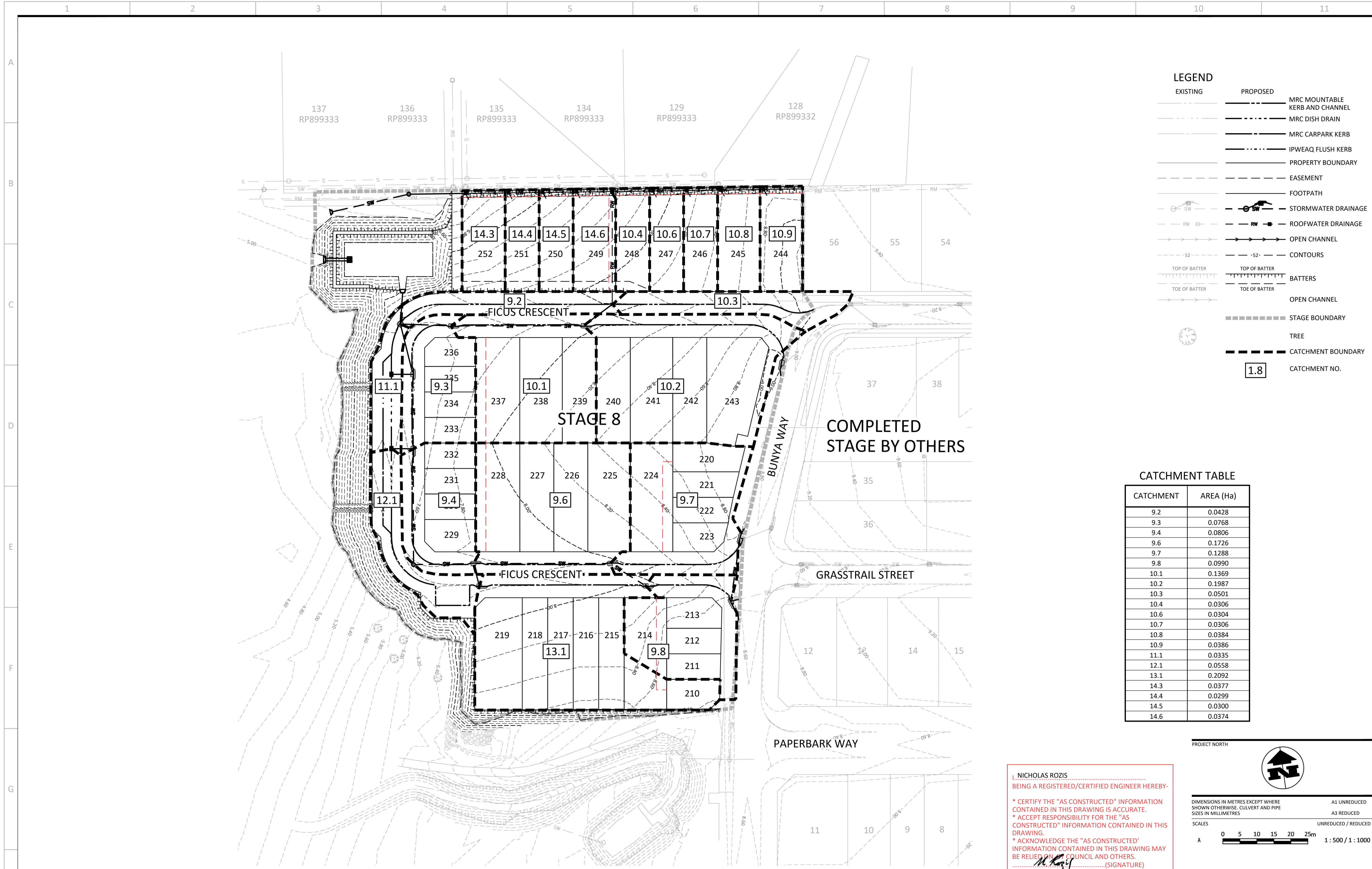
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PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES

SCALE: UNREDUCED / REDUCED
A 0 5 10 15 20 25m 1:500 / 1:1000

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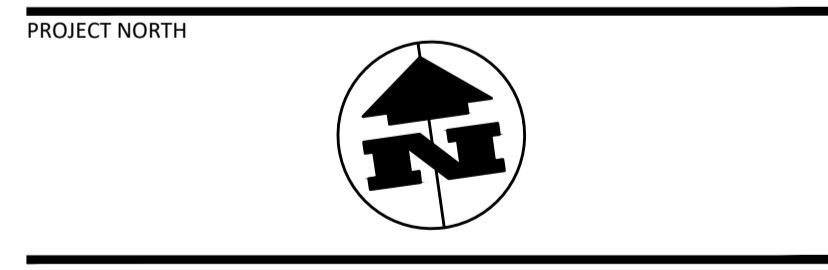
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---	---	FOOTPATH
---	---	STORMWATER DRAINAGE
---	---	ROOFWATER DRAINAGE
---	---	OPEN CHANNEL
---	---	CONTOURS
---	---	BATTERS
---	---	OPEN CHANNEL
---	---	STAGE BOUNDARY
---	---	TREE
---	---	CATCHMENT BOUNDARY
---	---	CATCHMENT NO. 1.8

CATCHMENT TABLE

CATCHMENT	AREA (Ha)
9.2	0.0428
9.3	0.0768
9.4	0.0806
9.6	0.1726
9.7	0.1288
9.8	0.0990
10.1	0.1369
10.2	0.1987
10.3	0.0501
10.4	0.0306
10.6	0.0304
10.7	0.0306
10.8	0.0384
10.9	0.0386
11.1	0.0335
12.1	0.0558
13.1	0.2092
14.3	0.0377
14.4	0.0299
14.5	0.0300
14.6	0.0374

PLAN
SCALE A

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DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES
 A1 UNREDUCED
 A3 REDUCED
 UNREDUCED / REDUCED
 1 : 500 / 1 : 1000

AS CONSTRUCTED

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DESIGN ARI		LOCATION				TIME			SUB-CATCHMENT RUNOFF					INLET DESIGN				DRAIN DESIGN											HEADLOSSED											PART FULL		DESIGN LEVELS																		
STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENTS CONTRIBUTING	LAND USE	SLOPE OF CATCHMENT	SUB-CATCHMENT TIME OF CONCENTRATION	RAINFALL INTENSITY	10y- RUNOFF CO-EFFICIENT	CO-EFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUM OF (C*A)	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	ROAD GRADE AT INLET	MINOR FLOW ROAD CAPACITY	INLET TYPE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONCENTRATION	RAINFALL INTENSITY	TOTAL (C*A)	MAJOR TOTAL FLOW	MAJOR SURFACE FLOW CAPACITY	MAJOR SURFACE FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE/BOX DIMENSIONS (CLASS)	FLOW VELOCITY FULL (PIPE GRADE VELOCITY)	TIME OF FLOW IN REACH	STRUCTURE CHART No.	STRUCTURE RATIOS FOR 'K' VALUE CALCULATIONS	VELOCITY HEAD	U/S HEADLOSS COEFFICIENT	U/S PIPE STRUCTURE HEADLOSS	LAT. HEADLOSS CO-EFFICIENT	LAT. PIPE STRUCTURE HEADLOSS	W.S.E CO-EFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEADLOSS (L'S)	DEPTH	VELOCITY	PIPE U/S L.L	PIPE D/S L.L	PIPE U/S H.G.L	PIPE D/S H.G.L	W.S.E	SURFACE OF K&C INVERT LEVEL	STRUCTURE No.									
5	100			%	min	mm/h			ha	ha	ha	l/s	l/s	%	l/s		l/s		min.	mm/h	ha	l/s	l/s	l/s	l/s	m	%	mm	m/s	min.																m	m/s	m	m	m	m	m	m							
5	9.6															MRC-LIL-M/K+C-S																9.6																			7.426						9.6			
5	100	14.6	14.6 to 14.5		10	161	0.86	0.86	0.037	0.032	0.032	14	14			MRC-FI-400x400	14	0		10	161	0.032		14	14	10	2	225	0.36	0.06	14.6	G2	0.007	9.7	0.065							0.065	0.05	0.01	0.073	1.29	5.987	5.787	6.149	6.143	6.213	6.961	14.6							
					10	282	0.86	1.00	0.037	0.037	0.037	29	29						W/D =	10	282	0.037		29	29																																			
5	100	14.5	14.5 to 14.4		10	161	0.86	0.86	0.03	0.026	0.026	12	12			MRC-FI-400x400	12	0		10.13	160	0.058		26	26	10	2	225	0.65	0.108	14.5	T1	0.021	1.79	0.038							0.038	0.33	0.033	0.1	1.51	5.767	5.567	6.105	6.072	6.143	6.695	14.5							
					10	282	0.86	1.00	0.03	0.03	0.03	23	23						W/D =	10.11	281	0.067		53	53																																			
5	100	14.4	14.4 to 14.3		10	161	0.86	0.86	0.03	0.026	0.026	11	11			MRC-FI-400x400	11	0		10.24	159	0.084		37	37	12.68	2	225	0.93	0.197	14.4	T1	0.044	1.14	0.051							0.051	0.68	0.086	0.123	1.66	5.547	5.294	6.022	5.936	6.072	6.43	14.4							
					10	282	0.86	1.00	0.03	0.03	0.03	23	23						W/D =	11	280	0.097		76	76																																			
5	100	14.3	14.3 to 14.2		10	161	0.86	0.86	0.038	0.032	0.032	14	14			MRC-FI-400x400	14	0		10.37	158	0.116		51	51	16.69	0.5	225	1.29	0.359	14.3	T1	0.084	0.95	0.08							0.08	1.3	0.216	0.225	1.29	5.274	5.19	5.856	5.64	5.936	6.093	14.3							
					10	282	0.86	1.00	0.038	0.038	0.038	30	30						W/D =	10.31	278	0.135		104	104																																			
5	100	14.2	14.2 to 14.1													MRC-MH1050				10.58	157	0.116		51	51	23.13	0.3	225	1.28	0.494	14.2	T1/T2	0.083	0.24	0.02							0.02	1.27	0.295	0.225	1.28	5.17	5.1	5.62	5.325	5.64	5.895	14.2							
																			W/D =	10.42	277	0.135		104	104																																			

STORMWATER DRAINAGE CALCULATION TABLE 2

NICHOLAS ROZIS
 BEING A REGISTERED/CERTIFIED ENGINEER HEREBY-
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	F 31.08.16 RESPONSE TO COUNCILS COMMENTS	MS BBG NR NR			DATE 10/10/17	DATE 10/10/17						
	E 03.05.16 ISSUE FOR CONSTRUCTION	MS BBG NR NR										
	D 09.05.14 ISSUE FOR APPROVAL	MS AY JT NR										
	C 16.04.14 FOR INFORMATION											
	B 22.01.14 FOR INFORMATION											