



CIVIL ENGINEERING REPORT: STORMWATER MANAGEMENT
PLAN

Cabramatta East Precinct Development

Broomfield Street, Cabramatta NSW 2166

PREPARED FOR
Moon Investments
PO Box 494
Bondi Junction
NSW 1355

Ref: S183030-01
Rev: 1
Date: 12.05.23

Civil Engineering Report: Stormwater Management Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
12.05.23	1	For Development Application Submission	M.Lloyd	J.Carroll

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1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Moon Investments to prepare the Civil Engineering design and documentation in support of a Development Application submission to Fairfield City Council for the proposed Cabramatta East Precinct Development at Broomfield Street, Cabramatta NSW 2166.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Flood Study and Modelling;
- Stormwater Drainage;
- Stormwater Detention;
- Stormwater Quality / Water Sensitive Urban Design;

1.2 The Development

1.2.1 Precinct and Surrounds

The Precinct is located within the suburb of Cabramatta in the Fairfield City Council Local Government Area (LGA). The Precinct comprises of a total of approximately 12.5 hectares of land, comprising of both private and publicly owned Council land (approximately 2.8 ha). The site is bound by Broomfield Street to the west, Fisher Street to the north and Cabramatta Road to the south.

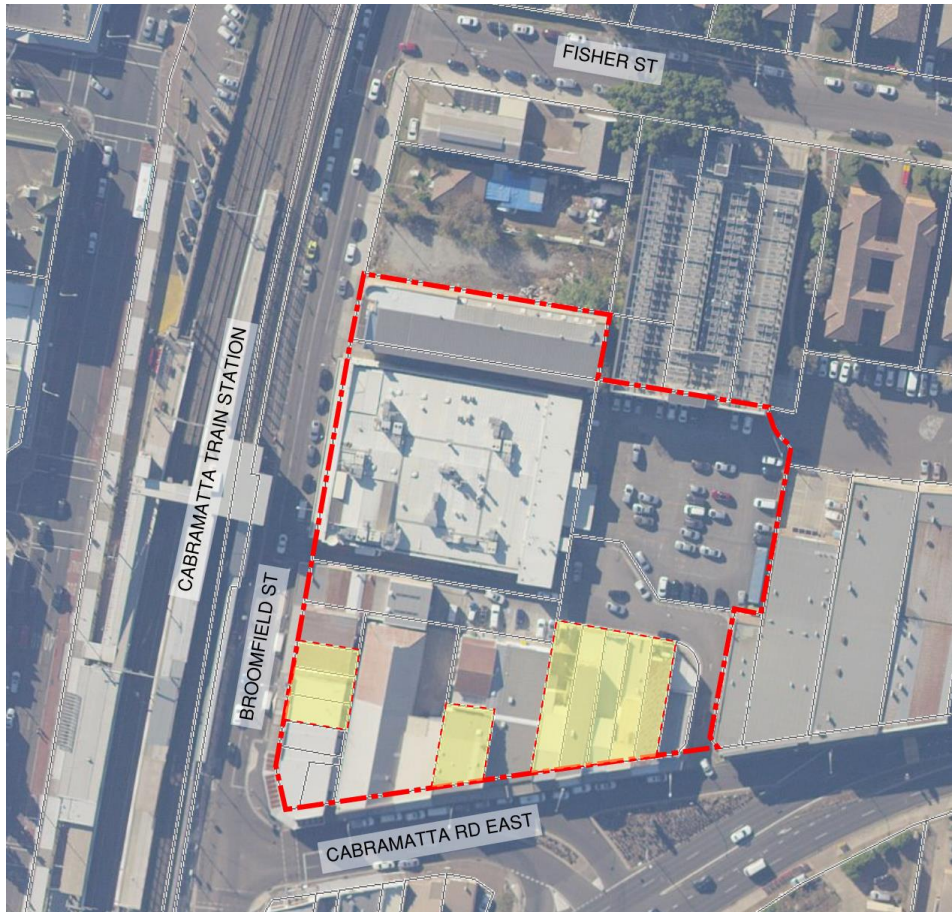


Figure 1.1 Site Locality Plan

1.2.2 Proposed Development

The proposed works involve the demolition and construction of the East Cabramatta Precinct in order to introduce a mix of retail and residential space that will accommodate the urban renewal strategy of the broader Cabramatta area. The proposed development will include a ground floor market square accompanied by a range of small to large scale retail outlets, revitalizing the precinct with pedestrian activity. Multiple residential apartments blocks are to be established above the ground floor amenity space, with buildings ranging between seven to eighteen storeys in height. The proposed development is to be delivered through four stages. However, this Development Application only discusses stages 1 and 2, with stages 3 and 4 to be provided in separate applications. A staging plan is provided in Figure 1.2.

Due to significant overland flow which existing within the subject site, a large stormwater culvert system is to be introduced along the Eastern boundary of the proposed development to direct any overland flow away from the site. The Flood Modelling and Stormwater Management sections below (in conjunction with the supporting civil design drawing package – attached as Appendix A) details the flood study and culvert design.



Figure 1.2: Staging Plan

2. Flood Modelling and Overland Flow

Existing overland flow from the upstream catchment flows via Cabramatta Road East and discharges north through the site to Fisher Street. The proposed development would obstruct the existing flow path, and as such, a new stormwater culvert has been proposed to discharge flood waters around the site. To determine the required size of the culvert and measure resulting impacts of the new development, a TUFLOW flood investigation was performed by Catchment Simulation Solutions. The investigation also helps identify any issues with flooding on neighbouring properties as a result of the proposed works. The flood modelling results can be found in Appendix B.

Generally, the proposed flood management plan for the site comprises of the following elements, as discussed further later in the report:

- Stormwater flood diversion culvert
- Raised entry levels to provide adequate freeboard above the 1% AEP
- Flood gates along south-west frontage of Cabramatta Road East
- On-site detention (refer Section 3.0 of this report)
- Overland flow paths through the site

The below sections discuss the flood modelling implications on the stormwater culvert design, freeboard levels, and overland flow (including through neighboring properties).

2.1 Culvert Design

The proposed culvert consists of the following components:

- 1200 mm wide x 8000mm long grated inlet pit at the south-east site driveway.
- A 1200 mm wide x 600 mm high box culvert running along the eastern site boundary.
- An existing stormwater pit reconstructed to a surcharge pit suited for the box culvert.

The above arrangement allows flood waters to enter the culvert and pass around the site, then discharge into Fisher Street as per the existing scenario. The flood data provided by CSS incorporated a 50% blockage to the inlet pit.

Stormwater modelling software '12D Model' was utilized for site grading and for stormwater design across the site, including design of the culvert and inlet grate mentioned above. The critical storm hydrograph was provided from Catchment Simulation Solutions (CSS) at the culvert inlet to determine the inlet and culvert size. Additionally, the tailwater level was provided at the Fisher Street discharge point.

The stormwater model, inlet hydrograph and tailwater levels can be provided upon request.

In addition to the inlet hydrograph provided by CSS, additional flows were added to the pipe at the discharge point of the on-site detention tank.

The resulting hydraulic grade lines (HGL) can be found in the stormwater long sections (DAC4101-DAC4104) found in Appendix A of this report.

2.2 Flood Modelling and Freeboard Levels

The existing surface and proposed design surface were provided to CSS for their modelling purposes. The resultant flood depths, levels and velocities were then reported on for various locations across the site (see Figure 2.1). The site freeboard levels were determined based on the depth information

provided and Table 9 of the Fairfield City Council Stormwater Management Policy. A summary of these results can be seen in Table 2 below, with additional flooding information found in Appendix B.

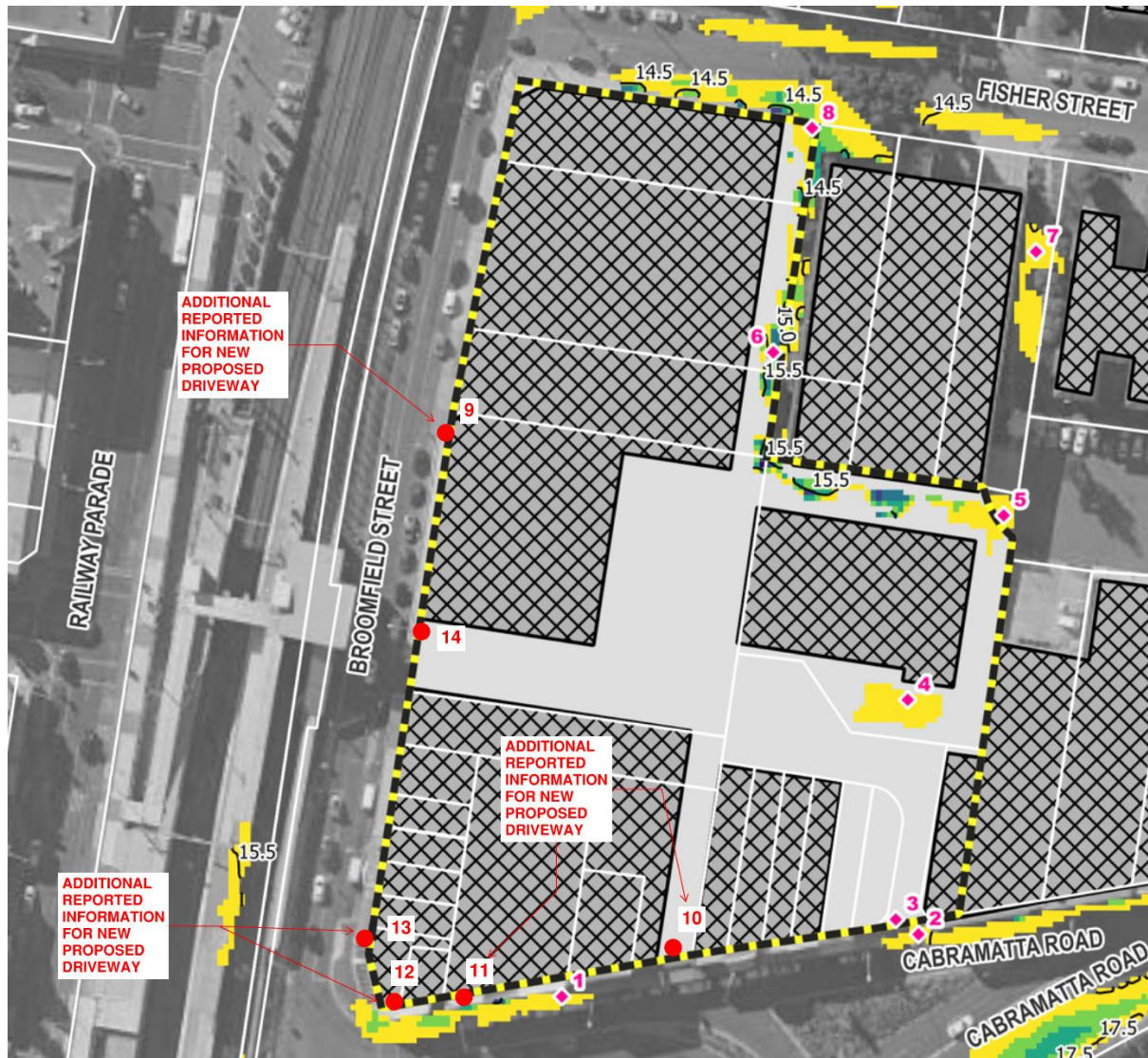


Figure 2.1 - Flood Reporting Locations

Table 1 – Flood Levels and Freeboard

Reporting Location	Water Level (mAHD)		Flood Level Difference (m)	Freeboard Level Required (RL m AHD)	Comments
	Existing	Developed			
1	16.67	16.61	-0.06	16.71 ¹	100mm provided to lobby and stairwell (non-habitable levels)
2	17.01	16.92	-0.09	N/A	Flood level reduced in street outside site boundary.
3	16.97	16.99	0.02	17.10	110mm provided above 1% AEP to the site entrance point.
4	-	16.15	-	N/A	Local stormwater conveyed to internal site stormwater pits and discharged. Internal stormwater system not included in CSS modelling.
5	-	15.72	-	N/A	Minor increase in levels through existing flood path.
6	14.78	15.00 ²	0.22	N/A	Existing flood levels locally increased in existing flood path.
7	15.01	15.05	0.03	N/A	Minimal increase to flood waters in this area
8	14.50	14.47	-0.03	N/A	Minimal decrease to flood waters in this area
9	-	15.05 (based on 0.1m depth advised by CSS)	-	1% AEP + 100mm (RL15.17)	100mm provided to garage level.
10	-	16.70 (as advised by CSS)	-	RL17.00	300mm provided to habitable levels.
11	-	16.87	-	RL17.17	300mm provided to habitable levels via proposed flood gate
12	-	16.61	-	RL16.91	300mm provided to habitable levels via proposed flood gate.
13	-	16.50	-	RL17.91	300mm provided to habitable levels via proposed flood gate.
14	-	15.50 ³	-	RL15.80 (min)	Adjacent habitable floor levels minimum 300mm above 1% AEP.

* Notes:

1. Lobby considered non-habitable (short-term occupancy only).

2. Level reported by CSS assumes a raised walkway in this area (later removed). Reported developed flood depth utilised to assess actual proposed flood level.

3. Flood level below <150mm shown. Reduced level shown conservatively assume 150mm depth in this location.

As seen above, flood freeboard has been provided in accordance with Table 9 of Fairfield City Council's Stormwater Management Policy. Whilst flood levels were modelled to increase slightly in adjacent Council-owned properties, these areas are existing overland flow paths (see existing scenario flood information in Appendix B).

Northrop Engineers note that alternative methods were investigated to remove the need for flood gates along Cabramatta Road East. These included:

- Increased footpath crossfall -
Flood depths along the Cabramatta Road East frontage have been modelled in excess of 185mm. To achieve an additional 300mm freeboard to habitable floor levels, footpath crossfalls would exceed 14%. As such, this option was deemed unachievable.
- Internal ramping – to achieve floor levels 300mm above the 1% AEP, extensive internal ramping would be required (in some cases over 11.5m of ramp length). Such ramps were investigated, and it was found that internal ramps could not be installed without compromising fitout and consequential lease opportunities.

Given the above, floating flood gates were determined to be the most appropriate solution.

2.3 Overland Flow

Overland flow paths within the site were designed to convey stormwater to stormwater inlet pits in the proposed roadway and internal courtyard. In the unlikely event of pit blockage, levels within the site were designed to avoid entering buildings and convey stormwater to existing overland flow paths to the site's north. The majority of the runoff from the ground floor podium, proposed roadway and pedestrian area is to be captured by grated trench drains and drained to the proposed civil stormwater network (internal drainage to be designed by a hydraulic engineer in the detailed design phase). Refer to civil engineering drawings in Appendix A for the internal site catchment plan for each stage of the construction.

All internal site drainage collected as roof runoff is to be designed to convey all drainage from the 1 in 100 year ARI event via an above ground network (to be designed by a hydraulic engineer in the detailed design phase). All proposed roof area is to drain via the hydraulic engineering system into the proposed civil on-site detention tank, prior to discharging to the stormwater culvert along the Eastern boundary.

3. On-site Water Quantity Management

3.1 Site Discharge

The Fairfield City Council's Stormwater Management Policy (Section 4 'On-site Detention Systems'), provides guidance on the requirement for On-site Detention for development within the LGA. As specified by Section 4.2 in the Stormwater Management Policy, the proposed development must adhere to the following OSD performance criteria:

- Maximum PSD of 140l/sec/ha for the 9 hour 100 year ARI for the total site, and
- Maximum PSD of pre-development site discharge for the 5, 15, 30, 60, 90, 120 and 540 minute duration storms for the 5 and 100 year ARIs for the total site

In order to achieve this performance criteria, an On-site Detention systems is proposed. This strategy ensures optimal and consistent site discharge throughout the two stages of construction delivery of the proposed development. Modelling for Stage 2 also included the development proposed for Stage 3 (refer Figure 1.2 of this report) to ensure future development is accounted for. Refer to Northrop engineering drawings in Appendix A for staged OSD design.

The proposed detention tank is located directly adjacent a rainwater reuse tank. The proposed system allows the rainwater tank to overflow to the OSD tank, with non-return valves preventing the backflow of flood waters into the reuse chamber.

3.1.1 Methodology

Stormwater models for the proposed stormwater system have been produced in 12d 1D Dynamic Drainage Software (ILSAX) to determine the hydraulic performance of the post development network under a range of flood events specified by the Fairfield City Council's Stormwater Management Policy. Rainfall intensity duration and frequency data was adopted from the 1987 version of Australian Rainfall and Runoff. The model adopts the following parameters:

- Paved (impervious) area depression storage = 1mm
- Supplementary area depression storage = 0mm
- Grassed (pervious) area depression storage = 5 mm
- Soil type = 3
- AMC = 3

The pre-development surface condition of the subject site was considered to be 100% impervious.

3.1.2 Modelling Results

The modelling demonstrates that the proposed On-site detention systems are compliant with the performance criteria specified council's Stormwater Management Policy, for of each stage of delivery for the proposed development. The model results for each stage of construction are demonstrated in the sections below.

3.1.2.1 Stage 1 Results

The post-development total site discharge rate does not exceed the pre-development discharge rate for all storm events specified by Fairfield City council (refer Table 5.1). Furthermore, the discharge rate for the 9 hour 100 year ARI storm event is below the Maximum PSD threshold defined by council (refer to Table 5.2).

Table 5.1: Pre vs. Post-Development Site Discharge

Storm Event	Pre-Development Discharge (L/s)	OSD Discharge (L/s)	Bypass (L/s)	Total Site Discharge (L/s)	Compliance
5 Year ARI					
5min	243	112	20	132	OK
15min	263	119	22	141	OK
30min	247	114	20	134	OK
60min	233	110	19	129	OK
180min	131	106	11	117	OK
360min	98	90	8	98	OK
540min	74	68	6	74	OK
100 Year ARI					
5min	416	162	35	197	OK
15min	406	214	34	248	OK
30min	366	270	30	300	OK
60min	358	309	30	339	OK
90min	380	326	32	358	OK
120min	362	308	30	338	OK
540min	118	84	10	94	OK

Table 5.2: 9hr 100 Year ARI Site Discharge

Stage One Area (m ²)	Max. PSD – 9hr 100 Year ARI (L/s)	Site Discharge (L/s)	Compliance
7465	104.50	93.8	OK

3.1.2.2 Stage 2+3 (Final) Results

The post-development total site discharge rate does not exceed the pre-development discharge rate for all storm events specified by Fairfield City council (refer Table 5.3). Furthermore, the discharge rate for the 9 hour 100 year ARI storm event is below the Maximum PSD threshold defined by council (refer to Table 5.4)

Table 5.3: Pre vs. Post-Development Site Discharge

Storm Event	Pre-Development Discharge (L/s)	OSD Discharge (L/s)	Bypass (L/s)	Total Site Discharge (L/s)	Compliance
5 Year ARI					
5min	326	236	22	258	OK
15min	344	237	23	260	OK
30min	322	236	22	258	OK
60min	307	235	21	256	OK
180min	169	158	11	169	OK
360min	126	118	8	126	OK
540min	96	89	7	96	OK
100 Year ARI					
5min	556	240	38	278	OK
15min	530	232	36	268	OK
30min	478	316	33	349	OK
60min	470	391	32	423	OK
90min	500	429	34	463	OK
120min	481	378	33	411	OK
540min	153	106	10	116	OK

Table 5.4: 9hr 100 Year ARI Site Discharge

Stage Two Area (m ²)	Max. PSD – 9hr 100 Year ARI (L/s)	Site Discharge (L/s)	Compliance
9665.52	135.32	116	OK

3.2 Stormwater Quality Management

The Fairfield City Council's Stormwater Management Policy (Section 6 'Water Quality Improvement'), provides guidance on the requirement for water quality management for development within the LGA. Section 6.3 highlights the separation of the LGA into three distinct stormwater management zones, and details the stormwater quality measures that apply to each zone. In reference to section 6.3, it states that *"Water quality improvement is not required within the Urban Zone."*

Noting that the subject site is within the Urban Zone, it has been inferred that stormwater quality measures are not required for the development.

4. Conclusion

Northrop Consulting Engineers has prepared this report to provide information to Fairfield City Council as a supplement to the Civil Engineering drawings (DAC0000-DAC9001) for the DA submission for the proposed development at East Cabramatta Precinct.

Following a TUFLOW investigation, a significant overland flow has been identified within and around the subject site. A large stormwater culvert system is to be introduced along the Eastern boundary of the proposed development to direct any overland flow away from the site. Flood gates have been proposed where required freeboard levels are above those practical for habitable floor levels.

The proposed stormwater management strategy demonstrates compliance with Council's Stormwater Management Policy. An onsite detention system has been proposed to satisfy councils stormwater discharge requirement for all stages of construction.

Appendix A – Engineering Drawings

BROOMFIELD STREET, CABRAMATTA

DEVELOPMENT APPLICATION CIVIL ENGINEERING PACKAGE



LOCALITY PLAN

SOURCE : NEARMAP.COM.AU (©2022)

Sheet List Table

Sheet Number	Sheet Title
DAC0000	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DAC0101	SPECIFICATION NOTES
DAC0201	GENERAL ARRANGEMENT PLAN
DAC1001	SEDIMENT AND SOIL EROSION CONTROL PLAN
DAC1101	SEDIMENT AND SOIL EROSION CONTROL DETAILS
DAC2001	BULK EARTHWORKS CUT TO FILL PLAN
DAC2201	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 01
DAC2202	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 02
DAC2203	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 03
DAC3001	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
DAC3002	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02
DAC3003	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03
DAC3004	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 04
DAC3011	TYPICAL SECTIONS
DAC4101	STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 01
DAC4102	STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
DAC4103	STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 01
DAC4104	STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
DAC4201	STORMWATER CATCHMENT PLAN
DAC5001	ALIGNMENT CONTROL PLAN
DAC5101	LONGITUDINAL SECTIONS
DAC5201	CROSS SECTIONS - SHEET 01
DAC5202	CROSS SECTIONS - SHEET 02
DAC5203	CROSS SECTIONS - SHEET 03
DAC9001	DETAILS SHEET

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
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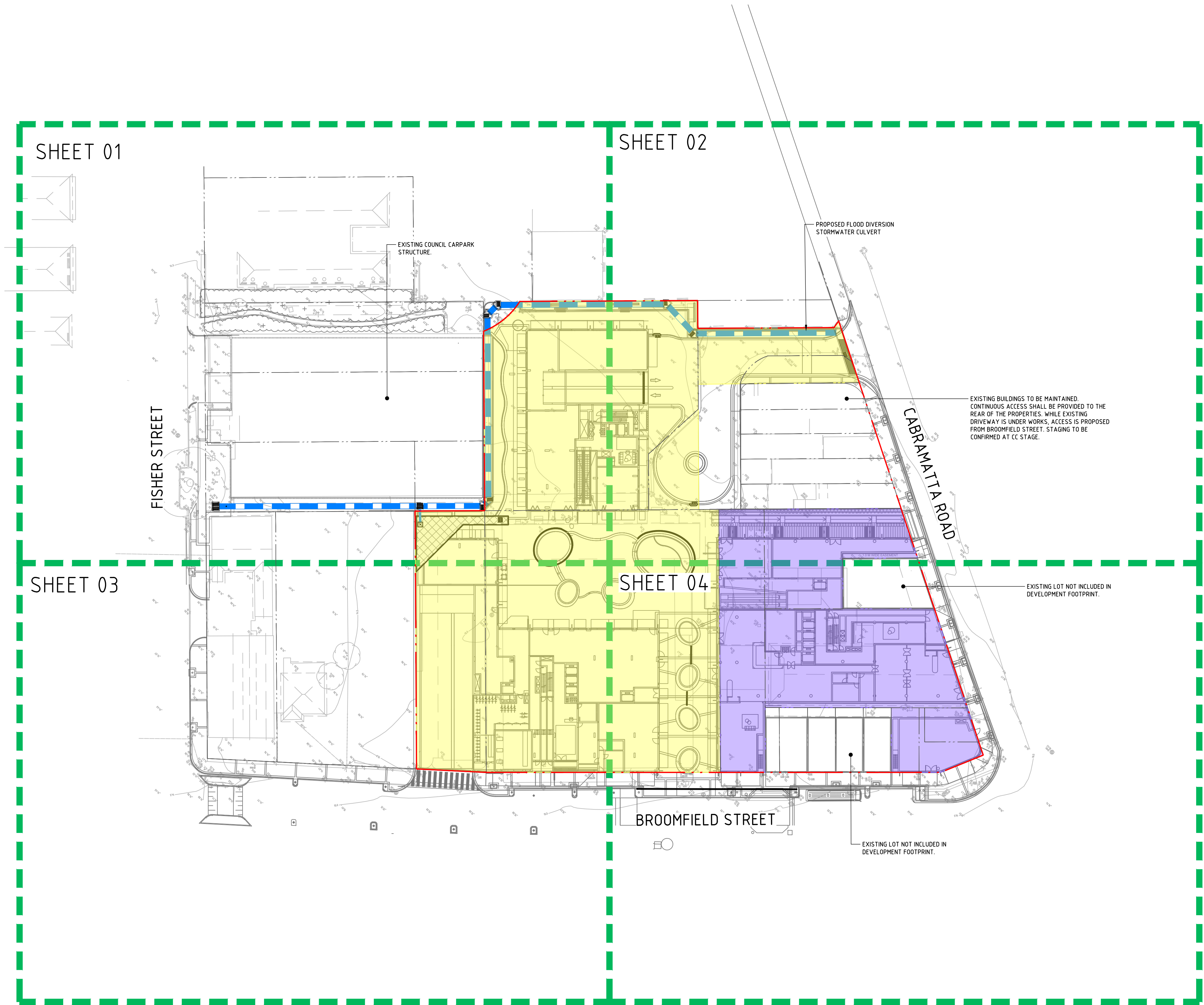
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BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC0000	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION

DRAWN: U. MANDAL
DESIGNED: J. CARROLL
JOB MANAGER: B. LAWRENCE
VERIFIER:



LEGEND

SITE BOUNDARY LINE

EXISTING BOUNDARY LINE

EXISTING CONTOURS

SHEET LAYOUT @ 200 SCALE

STAGE 1 WORK EXTENT

STAGE 2 WORK EXTENT

NOT FOR CONSTRUCTION

DRAWING TITLE

CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION
GENERAL ARRANGEMENT PLAN

JOB NUMBER

183030-01

DRAWING NUMBER

DAC0201

REVISION

03

DRAWING SHEET SIZE = A1

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02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

MOON INVESTMENTS

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ARCHITECT

plus

architecture

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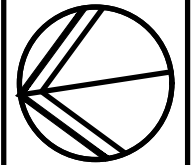
BROOMFIELD STREET
CABRAMATTA

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
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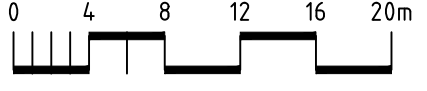
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MOON INVESTMENTS	plus architecture
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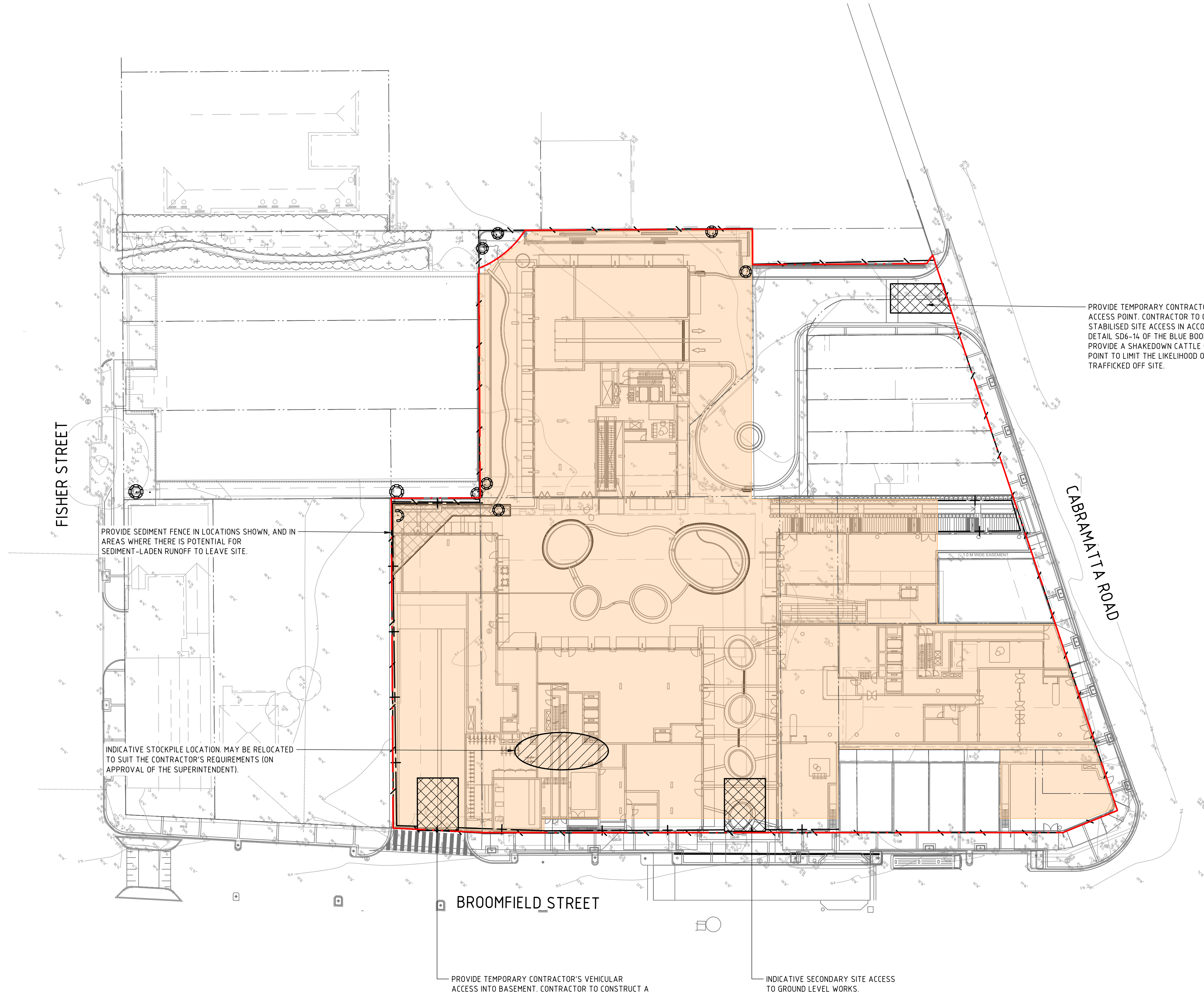
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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SEDIMENT AND SOIL EROSION CONTROL PLAN

JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC1001	02
DRAWING SHEET SIZE = A1	

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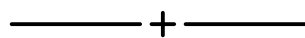
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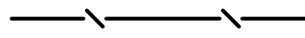
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EXISTING CONTOURS



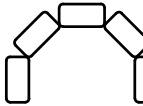
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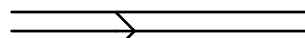
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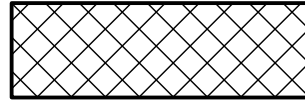
WIRE MESH AND GRAVEL
SEDIMENT FILTER



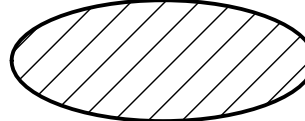
SANDBAG SEDIMENT FILTER



DRAINAGE SWALE



STABILISED SITE ACCESS



STOCKPILE



PROPOSED BASEMENT EXTENTS

GENERAL NOTES:

1.

ALL GRATED TRENCH DRAINS INSTALLED SHALL BE PROTECTED FROM SEDIMENT VIA GEOTEXTILE INLET FILTERS OR SIMILAR.

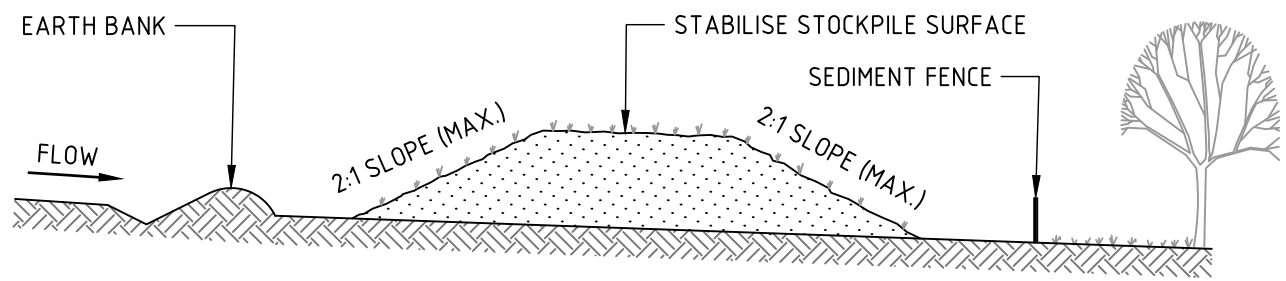
2.

CONTINUOUS ACCESS SHALL BE PROVIDED TO REAR GARAGES OF THE FOLLOWING LOTS:
- LOT 1, DP212183
- LOT 2, DP212183
- LOT 7, DP29232
- LOT 8, DP29232
- LOT 9, DP580587

3.

PONDING IN THE BASEMENT MAY OCCUR DURING RAIN EVENTS. PUMPING OF ANY PONDED WATER MAY BE NECESSARY (UPON APPROVAL OF THE SUPERINTENDENT). ALL WATER PUMPED OR OTHERWISE REMOVED FROM EXCAVATIONS OR BASEMENT AREAS MUST BE FILTERED TO ACHIEVE SUSPENDED SOLIDS/NON-FILTERABLE RESIDUE LEVELS COMPLYING WITH THE "AUSTRALIA WATER QUALITY GUIDELINES FOR FRESH AND MARINE WATERS", AND AS APPROVED BY THE RELEVANT COUNCIL AUTHORITY. IN THEIR ABSENCE, PUMPED WATER SHOULD COMPLY WITH THE FOLLOWING CHARACTERISTICS AS A MINIMUM:
- pH BETWEEN 6.5-6.8
- TOTAL SUSPENDED SOLIDS - 50mg/L; AND
- ELECTRICAL CONDUCTIVITY OF 0.2ms/cm, OR LESS THAN OR EQUAL TO BACKGROUND LEVELS.

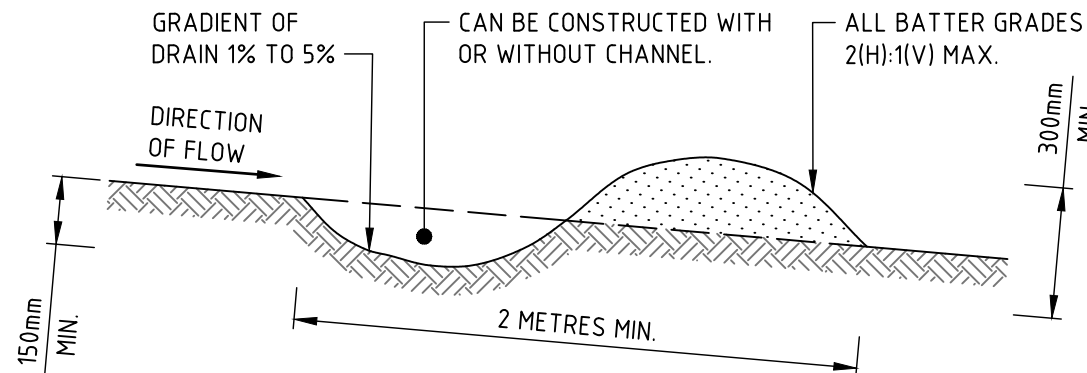
DRAWN: U MANDAL
 DESIGNED: J CARROLL
 JOB MANAGER: B LAWRENCE
 VERIFIER:



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) 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 2m 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 (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

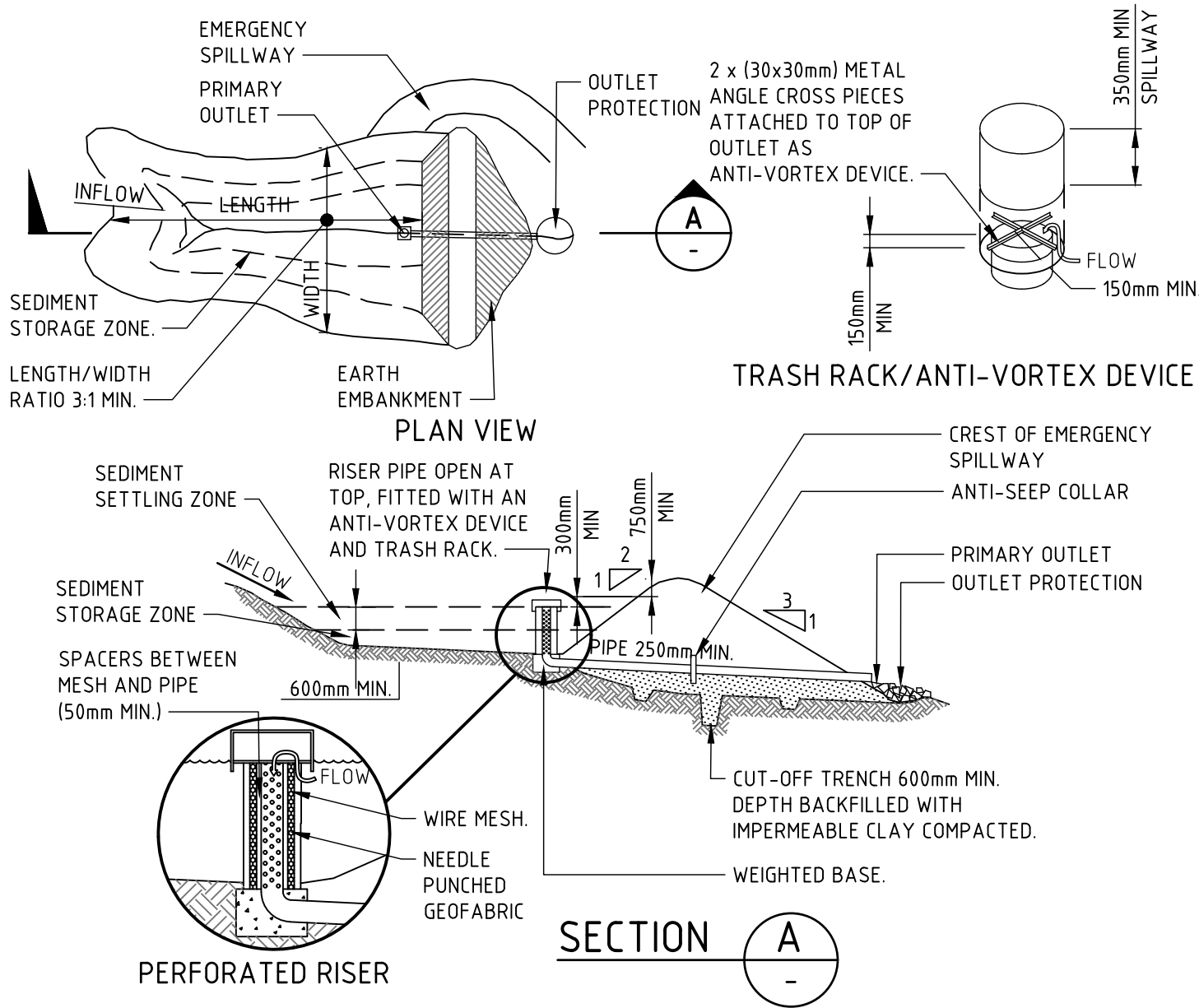
STOCKPILE



CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

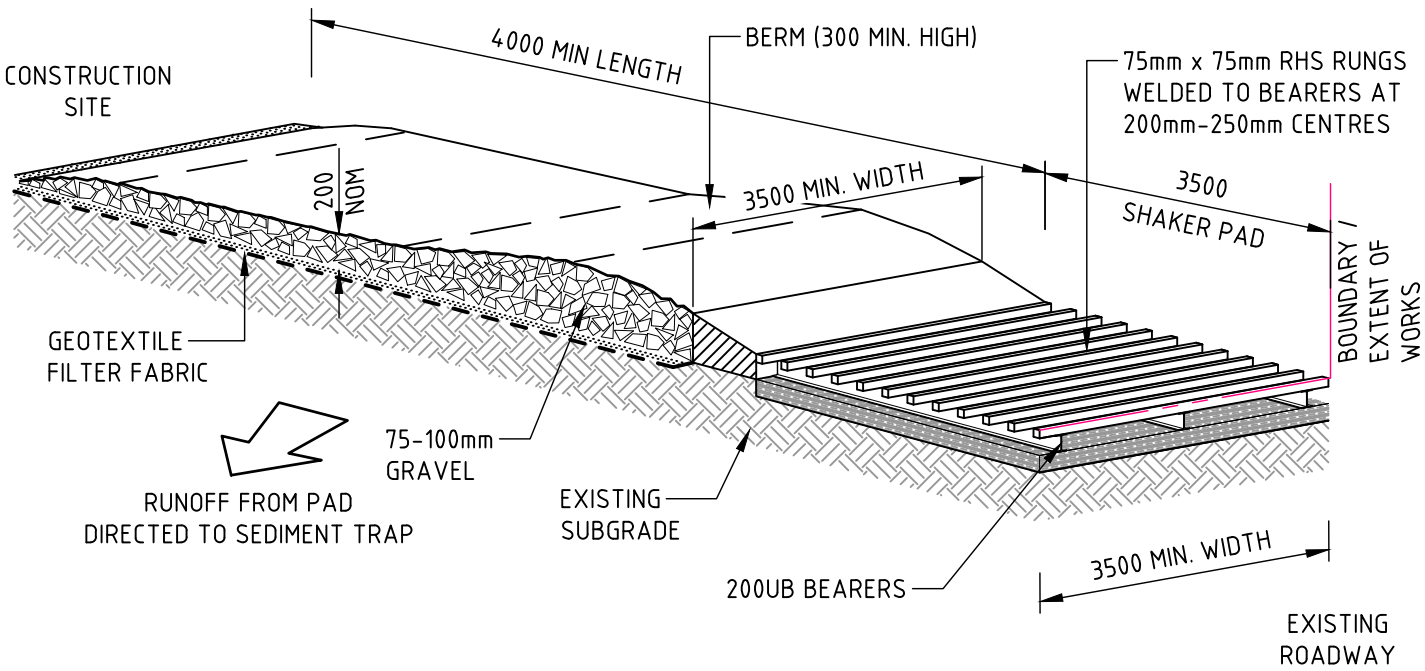
NOTE: ONLY TO BE USED AS TEMPORARY BANK
 WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.
 DRAINAGE SWALE - LOW FLOW



CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. FORM A CUT OFF TRENCH UNDER THE CENTRELINE OF THE EMBANKMENT 600mm DEEP AND 1200mm WIDE, EXTENDING TO A POINT ON THE WATERCOURSE WALL ABOVE THE RISER SILL LEVEL.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL ACCORDING TO THE SWMP THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND THE 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. INSTALL THE PIPE OUTLET WITH SEEPAGE COLLARS AS SPECIFIED IN THE SWMP AND STANDARD DRAWING 6-3B.
8. FORM BATTER GRADES AT 2(H):1(V) UPSTREAM AND 3(H):1(V) DOWNSTREAM OR AS SPECIFIED IN THE SWMP.

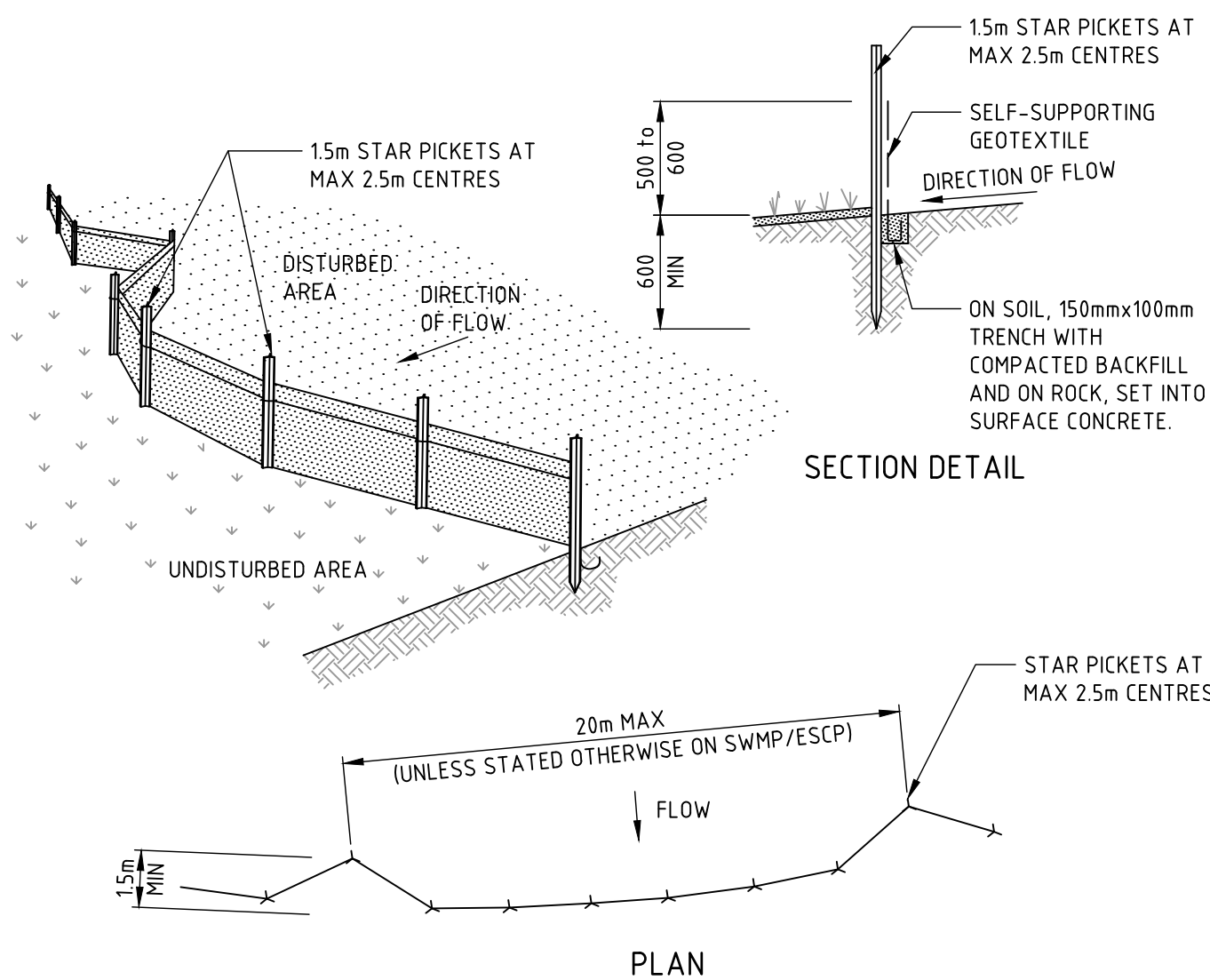
(APPLIES TO 'TYPE C' SOILS ONLY)
 EARTH BASIN - DRY



CONSTRUCTION NOTES

1. 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.
2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
3. INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD. TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
4. INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

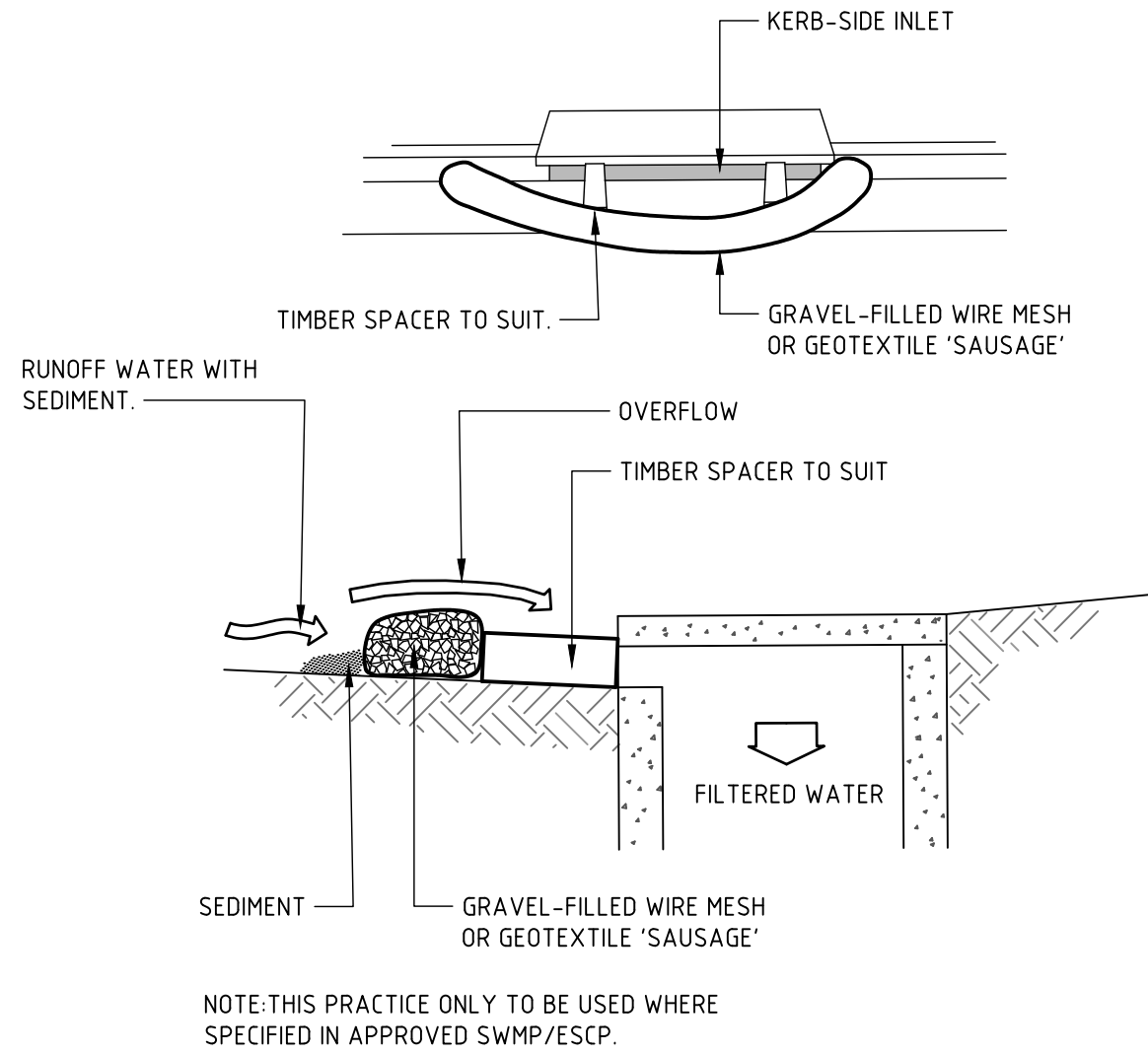
STABILISED SITE ACCESS



CONSTRUCTION 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 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE 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.

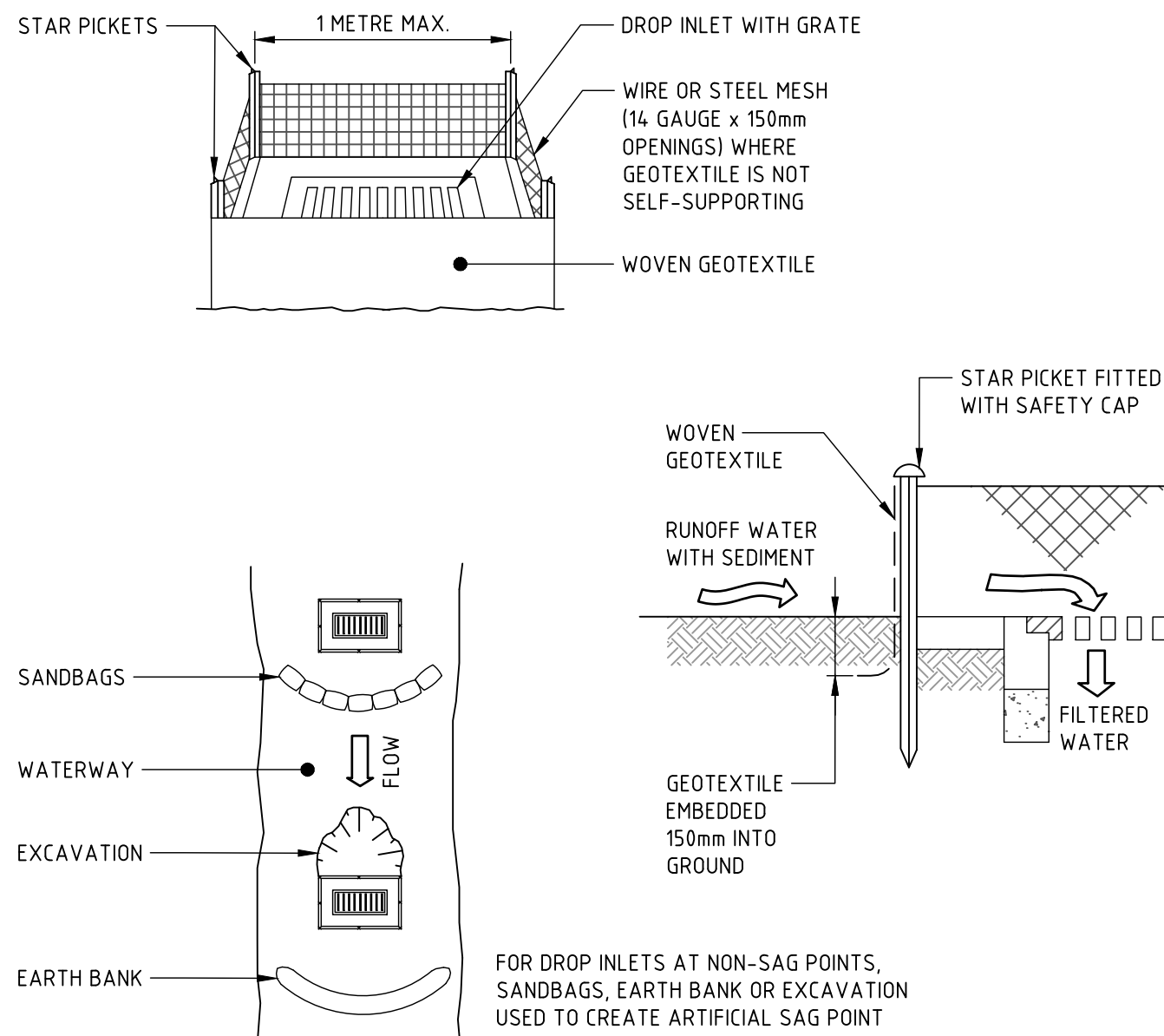
SEDIMENT FENCE



CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

WIRE MESH AND GRAVEL SEDIMENT FILTER



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER TRAPS

NOT FOR CONSTRUCTION

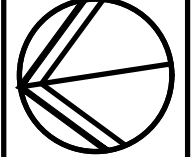
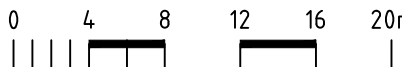
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01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23	MOON INVESTMENTS		 Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100	BROOMFIELD STREET CABRAMATTA	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SEDIMENT AND SOIL EROSION CONTROL DETAILS	183030-01
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23						DRAWING NUMBER
								DAC1101			02
								DRAWING SHEET SIZE = A1			
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD	NOT TO SCALE			

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DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

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01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

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MOON INVESTMENTS
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ARCHITECT
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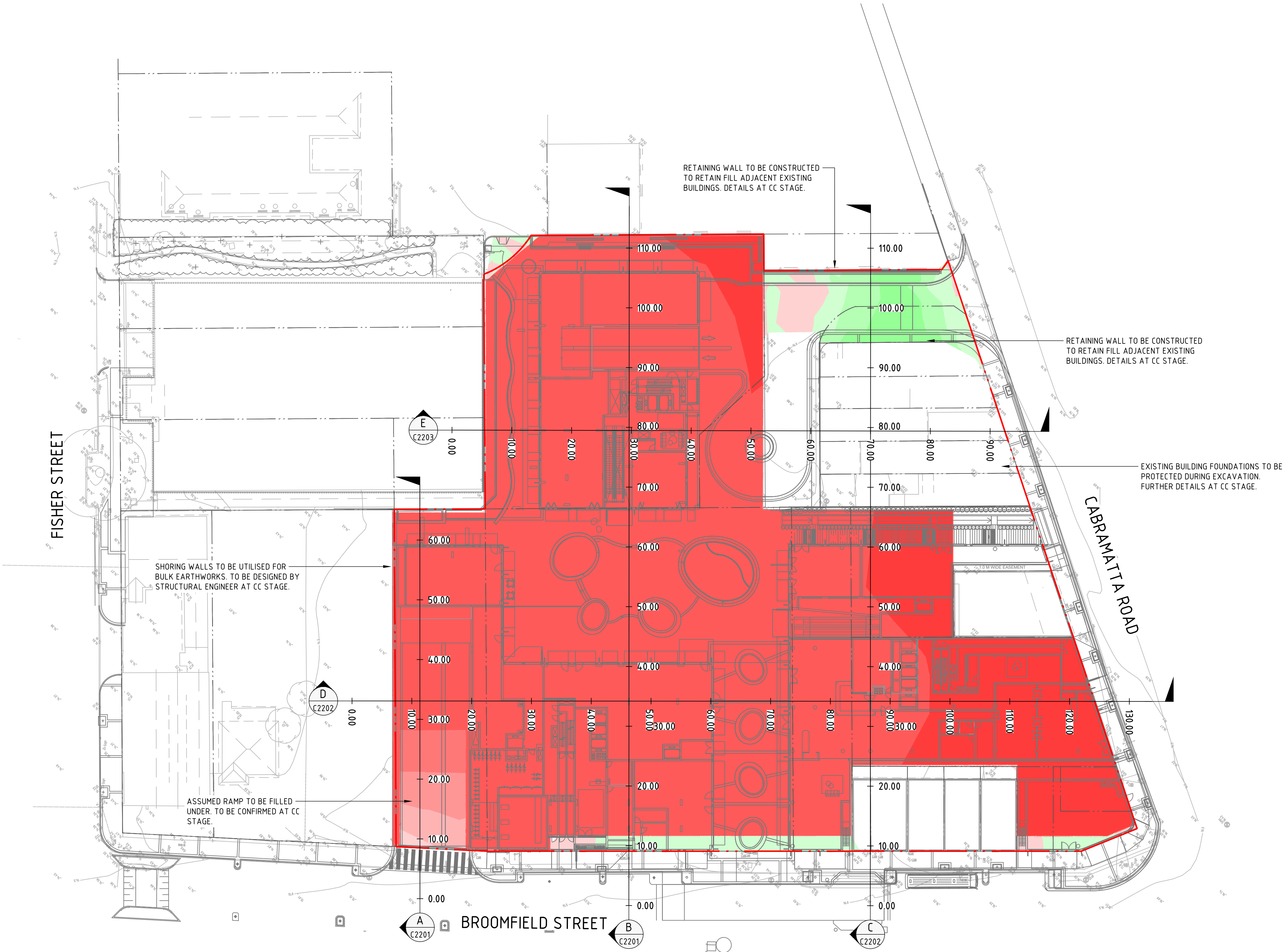
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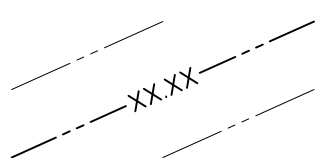
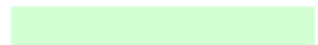
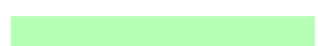
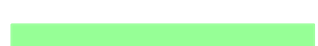
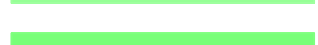
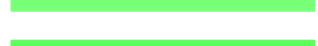
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION BULK EARTHWORKS CUT TO FILL PLAN

JOB NUMBER
183030-01
DRAWING NUMBER
DAC2001
REVISION
02
DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND	
	SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	PROPOSED CONTOURS
DEPTH OF CUT	
	- 999m TO - 15.0m
	- 15.0m TO - 10.0m
	- 10.0m TO - 5.0m
	- 5.0m TO - 2.0m
	- 2.0m TO - 1.0m
	- 1.0m TO - 0.5m
	- 0.5m TO - 0.25m
	- 0.25m TO - 0.0m
DEPTH OF FILL	
	0.0m TO 0.25m
	0.25m TO 0.5m
	0.5m TO 1.0m
	1.0m TO 2.0m
	2.0m TO 5.0m
	5.0m TO 10.0m
	10.0m TO 15.0m
	15.0m TO 999m

GENERAL NOTES:	
1.	REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL REQUIREMENTS.
2.	ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3.	CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).
4.	STRIP EXISTING TOPSOIL IN CONSULTATION WITH THE GEOTECHNICAL ENGINEER / REPORT. FOR THE PURPOSES OF EARTHWORKS CALCULATIONS, NO TOPSOIL STRIPPING DEPTH HAS BEEN ASSUMED. GROUND SLAB DEPTH OF 200mm HAS BEEN ASSUMED WHERE REQUIRED.
5.	NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
6.	NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS, ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE. CONTRACTOR IS TO ALLOW FOR REMOVAL OF ALL EXCESS MATERIAL GENERATED BY THE WORKS.
7.	THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
8.	APPROXIMATE BULK EARTHWORK VALUES AS FOLLOWS; 8.1 CUT 83,310 cu.m 8.2 FILL 119 cu.m 8.3 BALANCE 83,191 cu.m 8.4 NOTE: SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN ABOVE CALCULATIONS.
9.	SHEARING WALLS HAVE BEEN ASSUMED FOR ALL EXCAVATIONS. CONTRACTOR TO CONFIRM ADEQUACY WITH GEOTECHNICAL ENGINEER.

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Date : 16.04.2020 2:24 PM
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35	15 181	4.7	4.7
40	15 15	4.7	4.7
45	15 163	4.7	4.7
50	15 159	4.7	4.7
55	15 153	4.7	4.7
60	15 147	4.7	4.7
65	15 117	4.7	4.7
70	15 096	4.7	4.7
75	15 139	4.7	4.7
80	15 177	4.7	4.7
85	15 261	4.7	4.7
90	15 355	4.7	4.7
95	15 446	4.7	4.7
100	15 545	4.7	4.7
105	15 649	4.7	4.7
110	15 754	4.7	4.7

0	15 158		
5	15		
10	15 22	4.7	
15	15 216	4.7	
20	15 658	4.7	
25	14 994	4.7	
30	14 968	4.7	
35	14 976	4.7	
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50	14 833	4.7	
55	14 813	4.7	
60	14 707	4.7	
65	14 864		
69 245	14 706		

plus
architecture

 **NORTHROP**

Sydney

Level 11 345 George Street, Sydney NSW 2000

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Email sydney@northrop.com.au ABN 81 094 433 100

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

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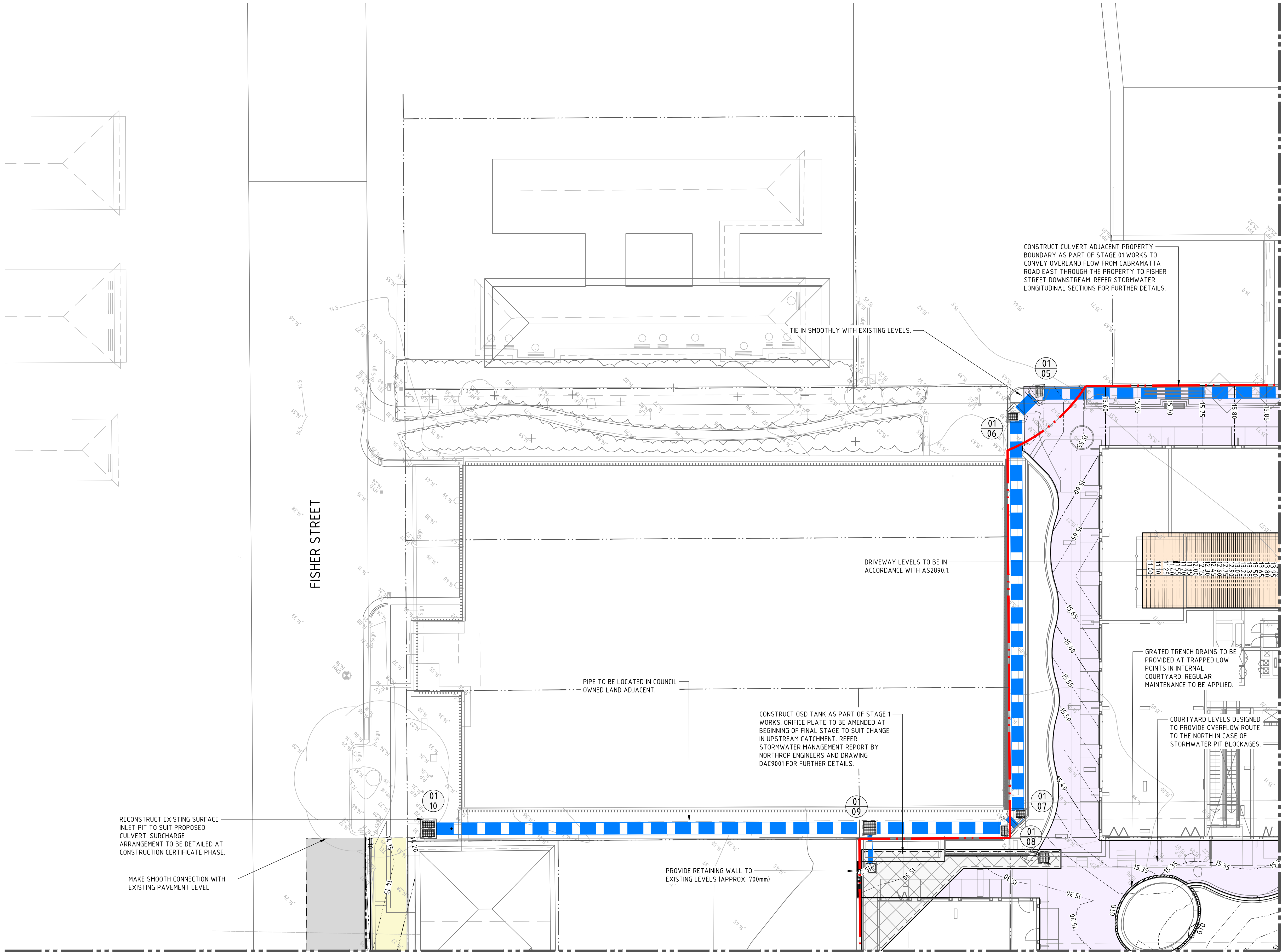
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 03

JOB NUMBER	
183030-01	
DRAWING NUMBER	REVISION
DAC2203	02
DRAWING SHEET SIZE = A1	

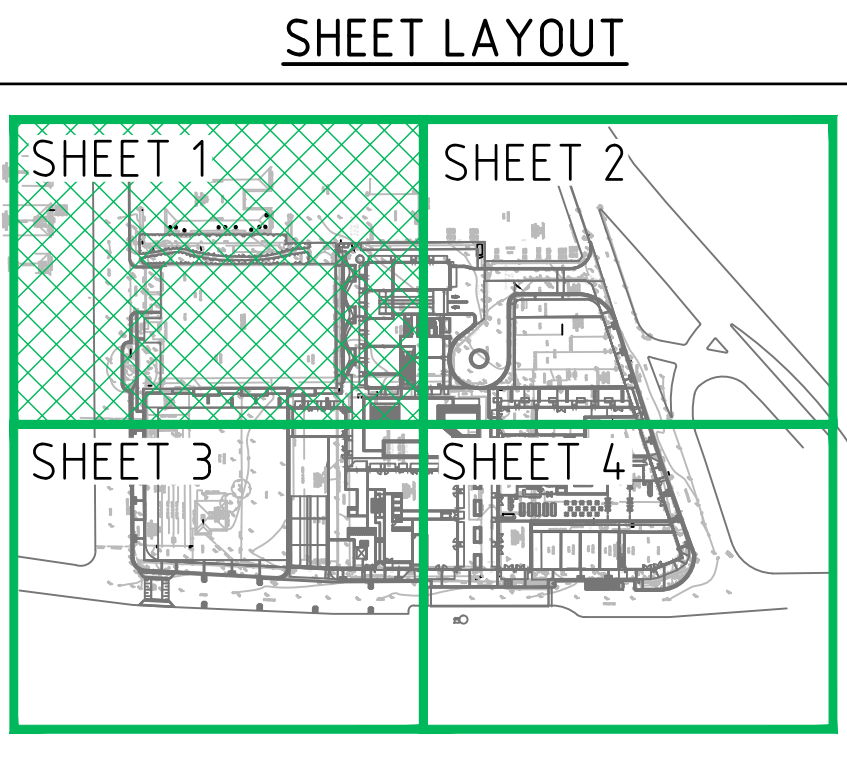
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DRAWN: U. MANDAL
DESIGNED: J. CARROLL
JOB MANAGER: B. LAWRENCE
VERIFIER:



LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- PROPOSED KERB
- SAWCUT AND PAVEMENT INFILL
- K0 KERB ONLY
- KG KERB AND GUTTER
- VC VEHICULAR CROSSING
- KR KERB RAMP
- PROPOSED CONTOURS
- EXISTING CONTOURS
- EXISTING DRAINAGE STRUCTURE
- NEW DRAINAGE STRUCTURE
- STORMWATER PIPE
- GRATED TRENCH DRAIN
- ON-SITE DETENTION TANK
- STORMWATER PIT TAG LINE ID / STRUCTURE No.
- PODIUM PAVEMENT
- PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
- FLEXIBLE PAVEMENT
- RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

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SCALE 1:200@A1	0 2 4 6 8 10m

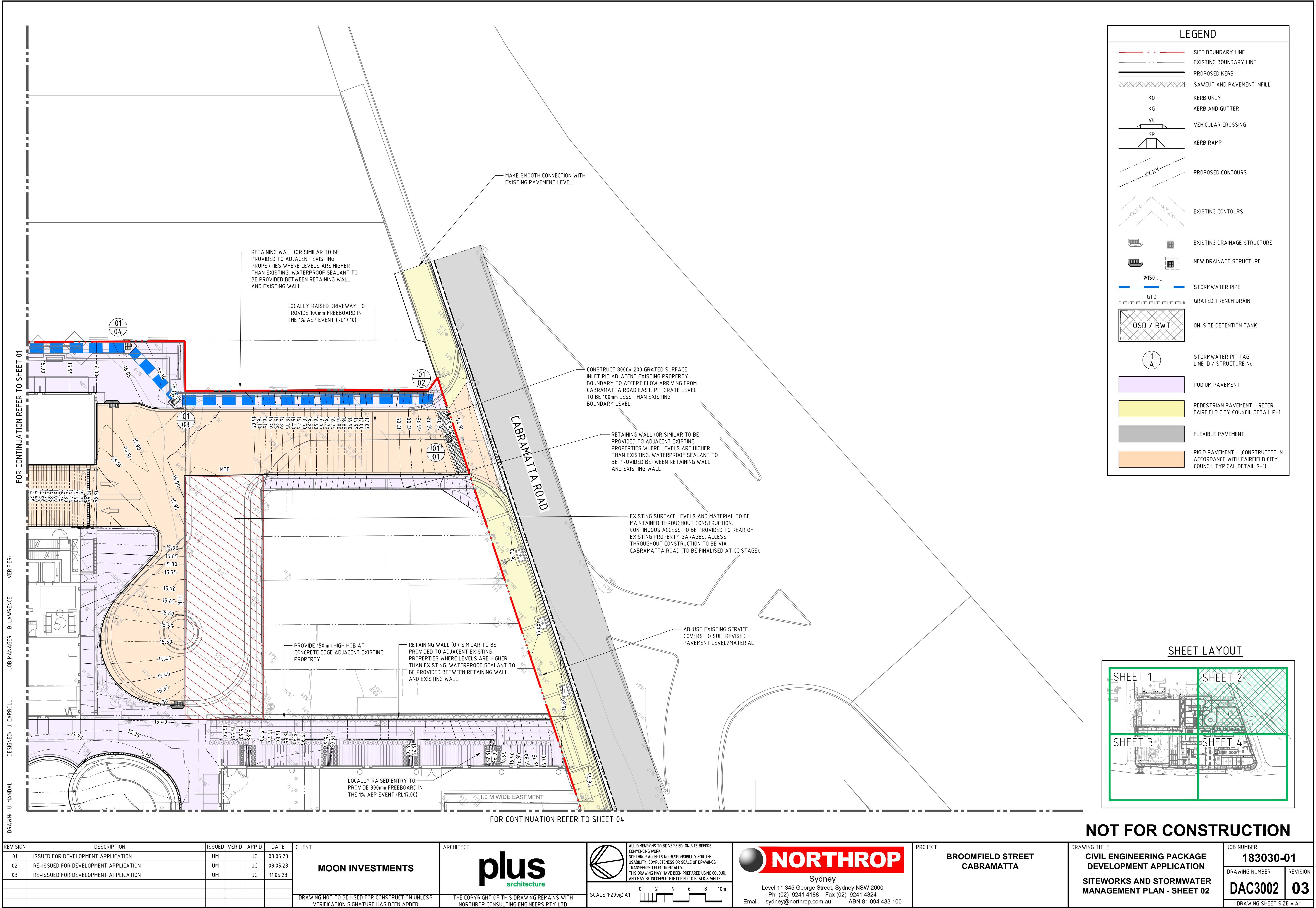
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PROJECT	BROOMFIELD STREET CABRAMATTA
---------	------------------------------

DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
SITeworks AND STORMWATER MANAGEMENT PLAN - SHEET 01	

JOB NUMBER	183030-01
DRAWING NUMBER	DAC3001
REVISION	03
DRAWING SHEET SIZE	A1

Printed By :ANGUS FALLINS
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Date :16.04.2020 2:24 PM



DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
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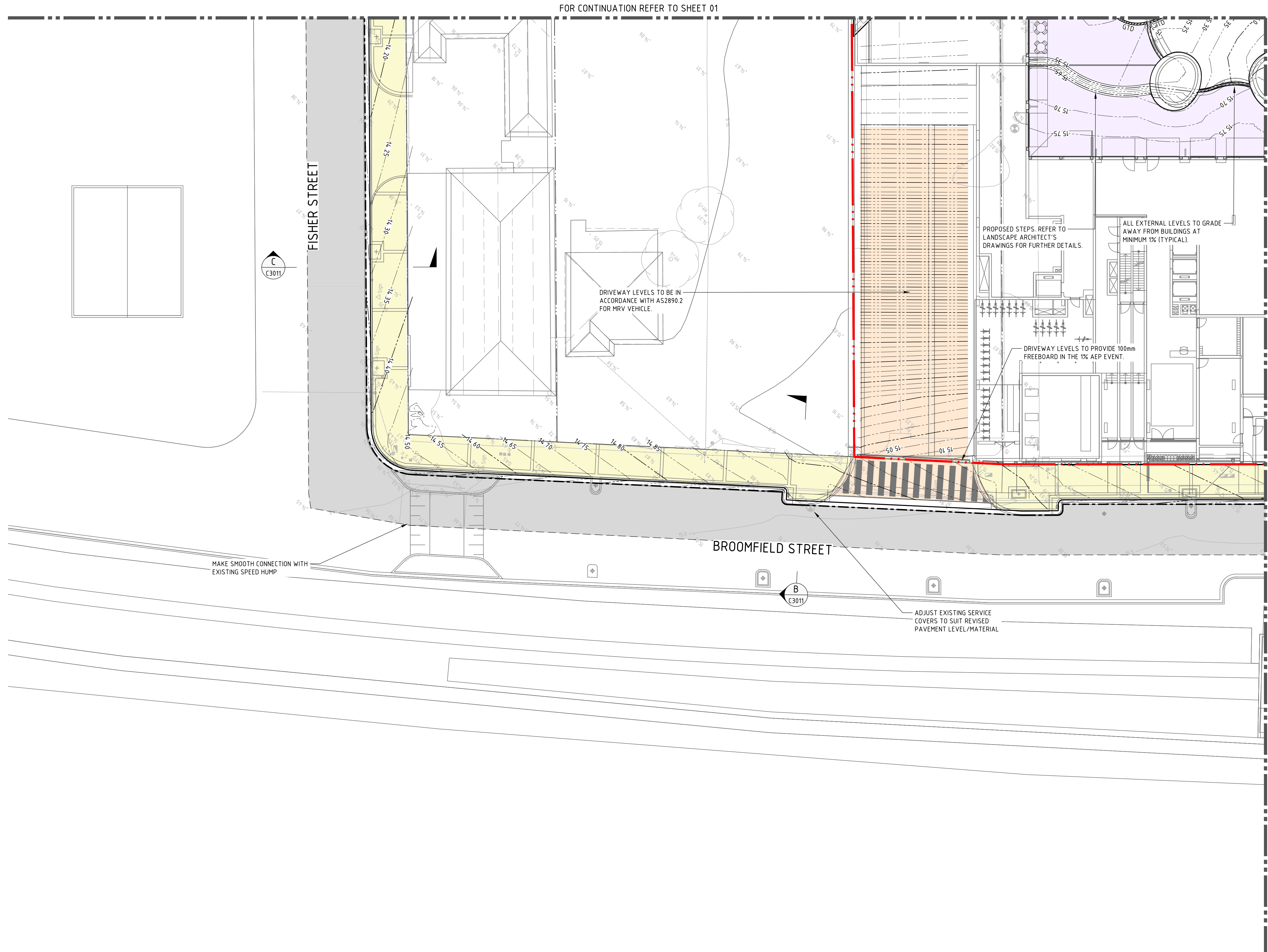
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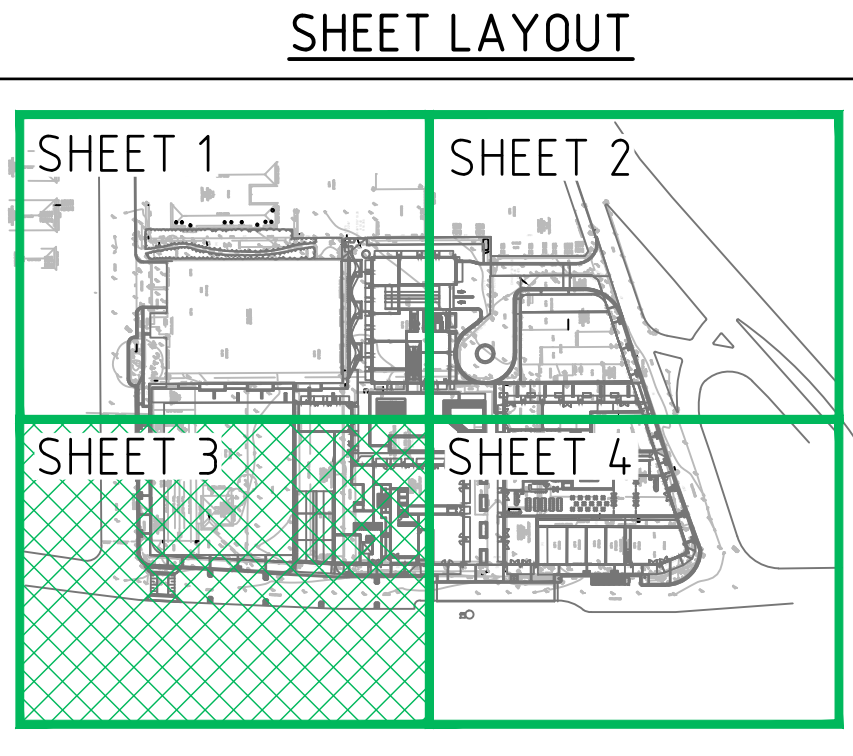
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03

JOB NUMBER	REVISION
183030-01	
DRAWING NUMBER	03
DAC3003	
DRAWING SHEET SIZE = A1	



LEGEND	
	SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	PROPOSED KERB
	SAWCUT AND PAVEMENT INFILL
K0	KERB ONLY
KG	KERB AND GUTTER
VC	VEHICULAR CROSSING
KR	KERB RAMP
	PROPOSED CONTOURS
	EXISTING CONTOURS
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	STORMWATER PIPE
	GRATED TRENCH DRAIN
	ON-SITE DETENTION TANK
	STORMWATER PIT TAG LINE ID / STRUCTURE No.
	PODIUM PAVEMENT
	PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
	FLEXIBLE PAVEMENT
	RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)



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Architectural site plan of a building complex, likely a school or institutional facility, showing flood management details. The plan includes a building footprint with various rooms, corridors, and outdoor areas. A yellow-shaded area along the perimeter indicates a flood-prone zone or a specific drainage catchment area. A red line traces a path along the building's edge, possibly representing a flood wall or a specific drainage boundary. A blue line segment is also visible near the bottom right corner of the building. The plan is annotated with several key features and instructions:

- ALL GRATED TRENCH DRAINS TO BE CONNECTED TO OSD TANK (BYPASS REUSE CHAMBER). REFER TO HYDRAULIC DRAWINGS FOR CONNECTION DETAILS.** (Pointing to a trench drain system within the building footprint)
- EXTENDED PRAM CROSSING FLUSH WITH WOMBAT CROSSING.** (Pointing to a crossing area at the bottom left)
- BROOMFIELD STREET** (Label for the street running horizontally across the middle of the plan)
- CABRANATA ROAD** (Label for the road running diagonally along the right side of the plan)
- FLOATING FLOOD GATE TO RL:17.17. DETAILS AT CC STAGE** (Two locations: one near the top right corner and one near the bottom right corner)
- PROVIDE GRATED TRENCH DRAIN AS PER EXISTING SCENARIO** (Pointing to a trench drain location near the bottom right corner)
- MAKE SMOOTH CONNECTION WITH EXISTING PAVEMENT LEVEL** (Pointing to a transition area near the bottom right corner)

The plan also includes numerous spot levels (e.g., 15.60, 15.55, 15.75, 16.20, 16.25, 16.30, 16.35, 16.40, 16.45, 16.50) and a north arrow pointing towards the top right. A scale bar is located in the bottom left corner.

LEGEND	
	SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	PROPOSED KERB
	SAWCUT AND PAVEMENT INFILL
KO	KERB ONLY
KG	KERB AND GUTTER
VC	VEHICULAR CROSSING
	VEHICULAR CROSSING
KR	KERB RAMP
	KERB RAMP
	PROPOSED CONTOURS
	EXISTING CONTOURS
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	STORMWATER PIPE
GTD	GRATED TRENCH DRAIN
	GRATED TRENCH DRAIN
	ON-SITE DETENTION TANK
	STORMWATER PIT TAG LINE ID / STRUCTURE No.
	PODIUM PAVEMENT
	PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
	FLEXIBLE PAVEMENT
	RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)

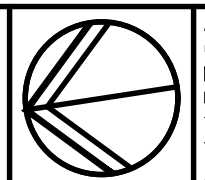
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	DRAWING NUMBER DAC3004	REVISION 03
	DRAWING SHEET SIZE = A1	
	(Empty space for notes or additional information)	

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

ARCHITECT

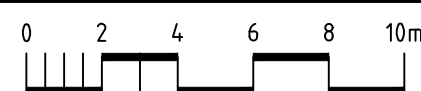
plus
architecture

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SCALE 1:200@ A1



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DRAWING TITLE

**CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION**

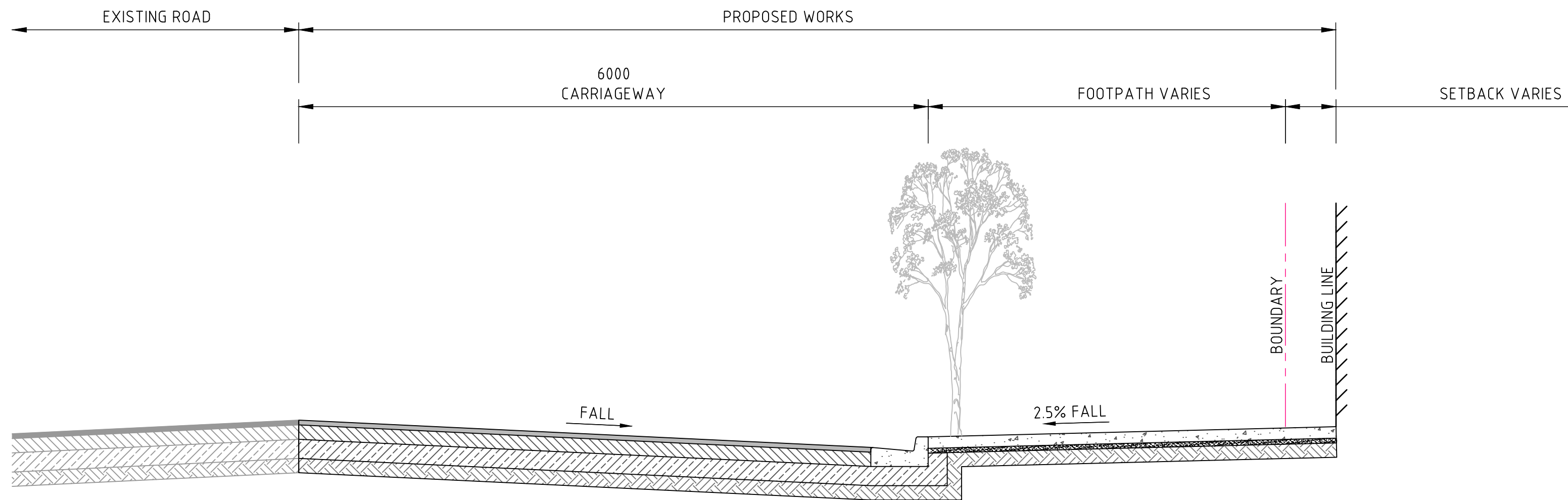
**SITeworks AND STORMWATER
MANAGEMENT PLAN - SHEET 04**

JOB NUMBER	
183030-01	
DRAWING NUMBER	REVISION
DAC3004	03
DRAWING SHEET SIZE = A1	

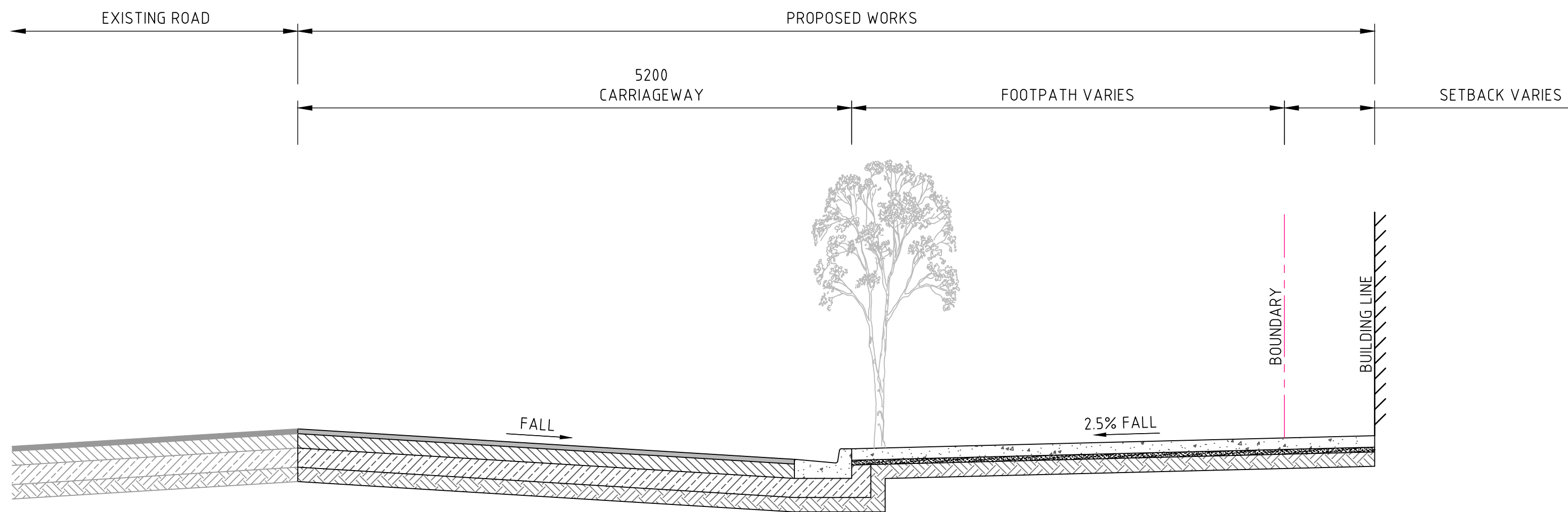
DRAWN: U. MANDAL

Plotted By : JAMIE CARROLL
Found : C:\12\data\Northrop\SYN183030 - 01 Broomfield St. Cabramatta 40\183030-01-CAD\01-DA\183030-01 DAC3001.dwg

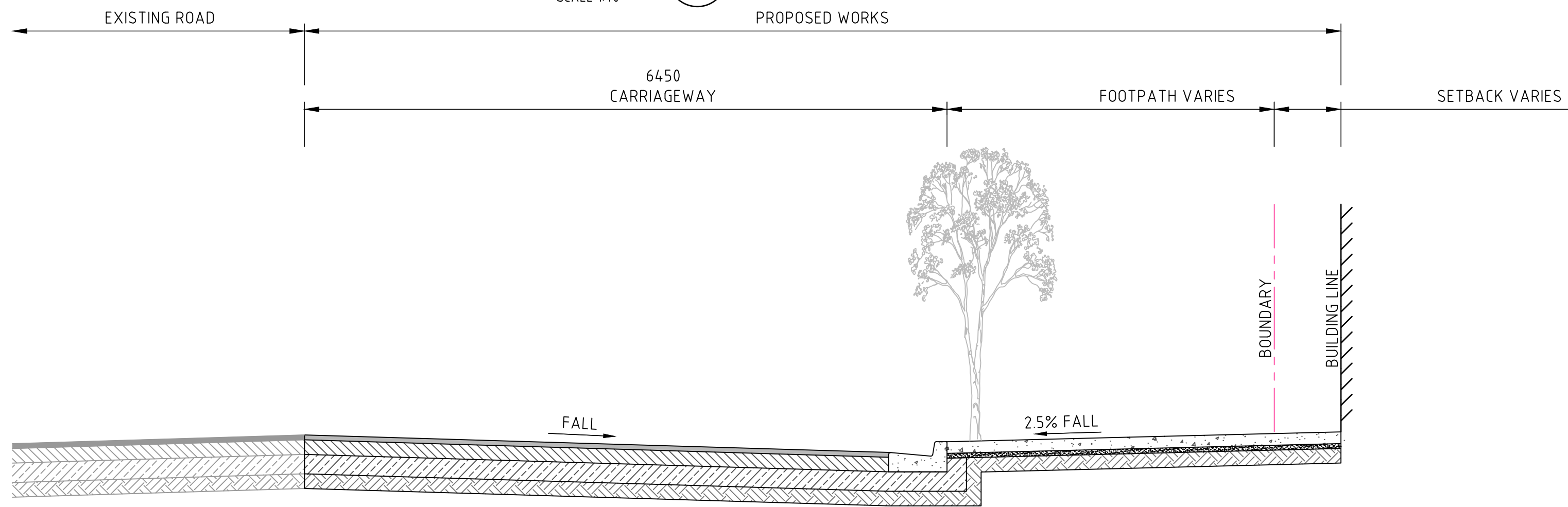
DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:



CABRAMATTA ROAD EAST TYPICAL SECTION
SECTION A
SCALE 1:40
C04.01



BROOMFIELD STREET TYPICAL SECTION
SECTION B
SCALE 1:40
C04.01



FISHER STREET TYPICAL SECTION
SECTION C
SCALE 1:40
C04.01

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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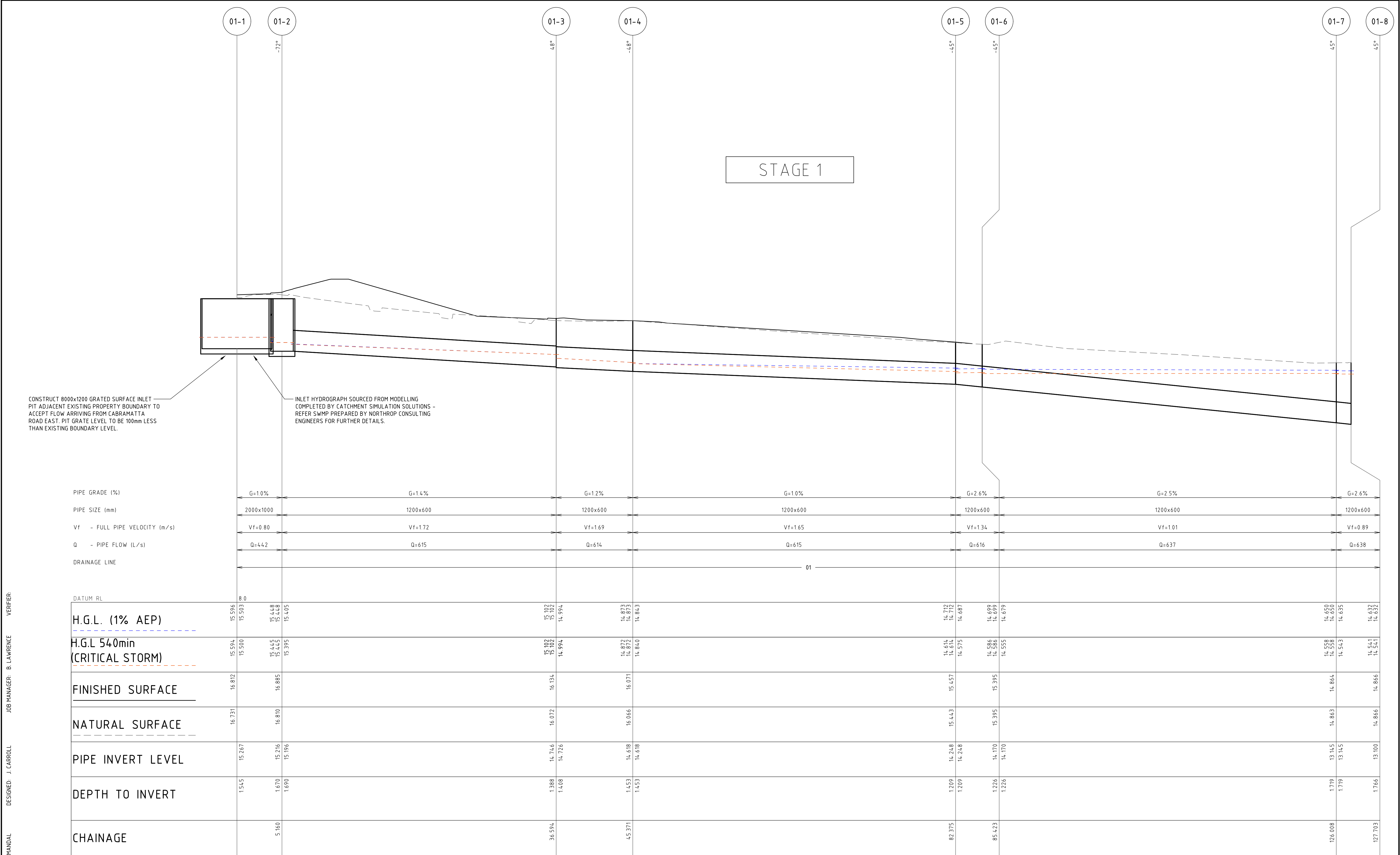
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Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT	BROOMFIELD STREET CABRAMATTA
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DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION TYPICAL SECTIONS
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JOB NUMBER	183030-01
DRAWING NUMBER	DAC3011
REVISION	02
DRAWING SHEET SIZE = A1	

DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



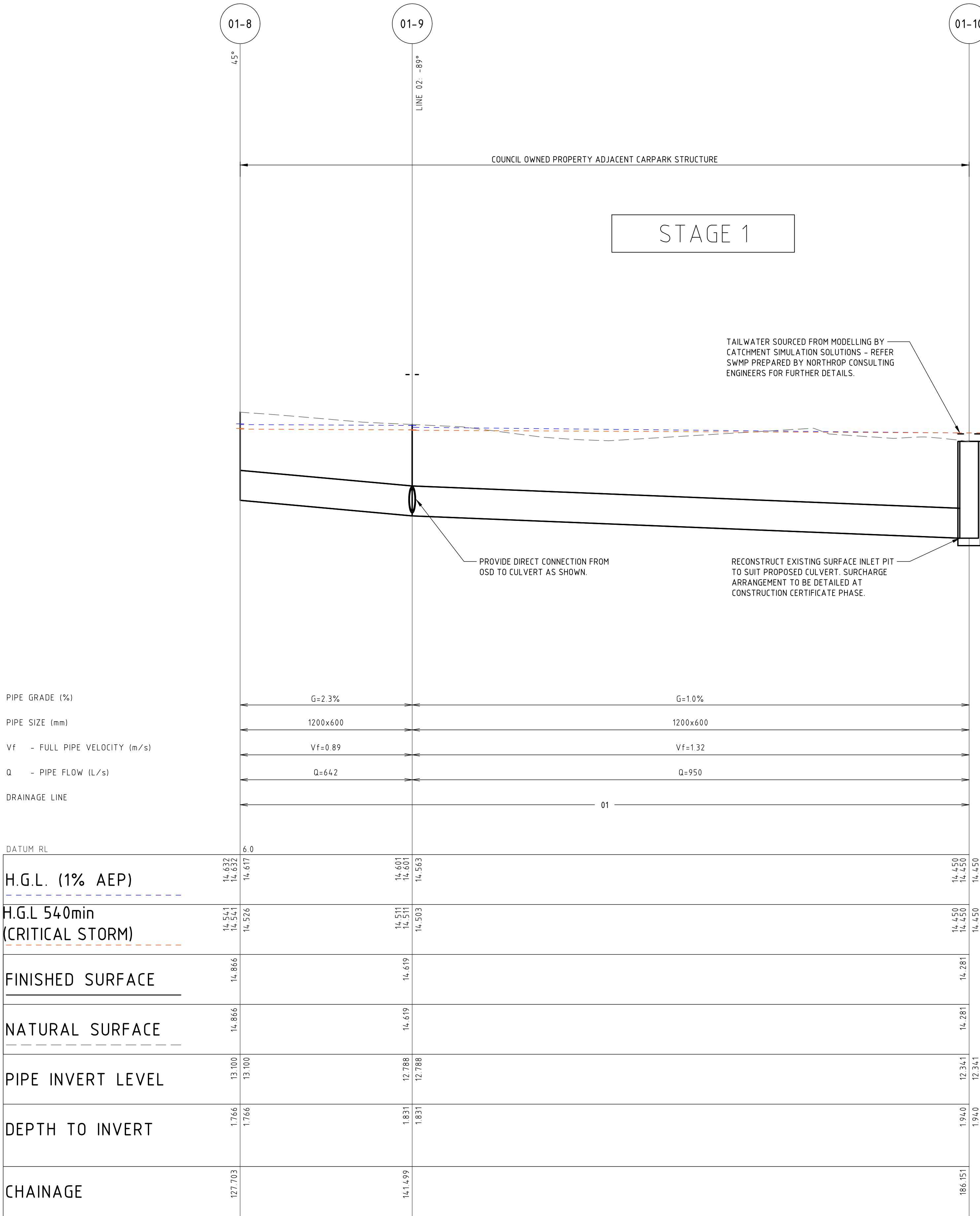
LINE 01

NOT FOR CONSTRUCTION

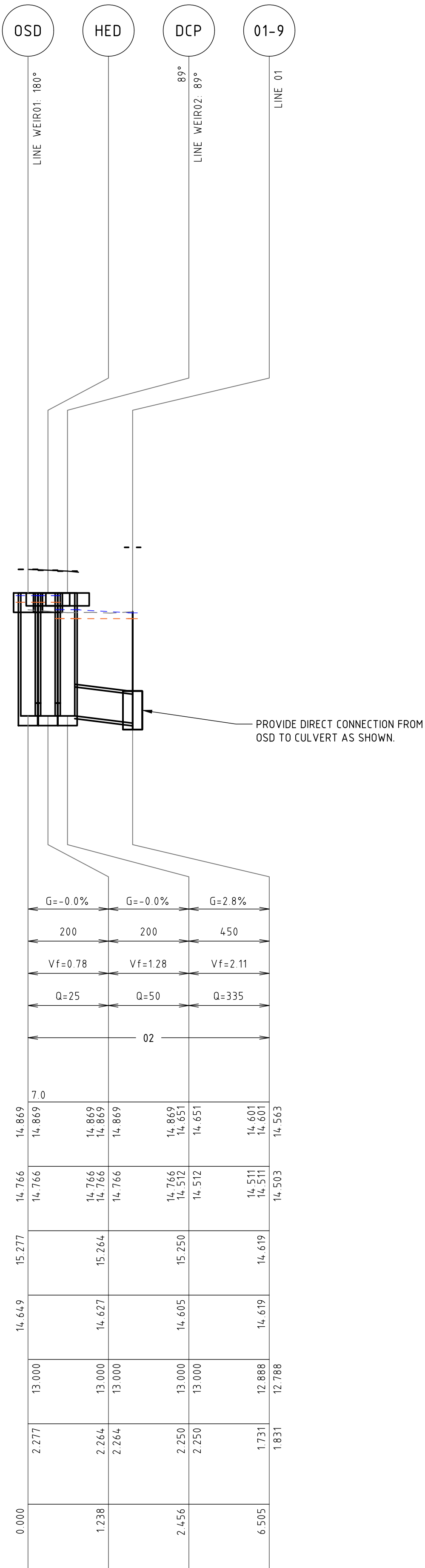
REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT		PROJECT	DRAWING TITLE	JOB NUMBER			
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23	MOON INVESTMENTS	plus architecture	ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE. SCALE 1:50@A1 SCALE 1:200@A1 0.00.51.01.52.02.5m 0246810m NORTHROP Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100 BROOMFIELD STREET CABRAMATTA CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION 183030-01						
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23									
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD			STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 01	DRAWING NUMBER DAC4101	REVISION 02		
											DRAWING SHEET SIZE = A1			

Found: c:\2626\2626\Northrop\SYN183030-01 Broomfield St Cabramatta_A01\183030-01-CAD\01-DAC4101.dwg Plotted By: JANGUS FALLINS Date: 16/04/2020 2:24 PM

DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



LINE 01



LINE 02

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
ARCHITECT	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

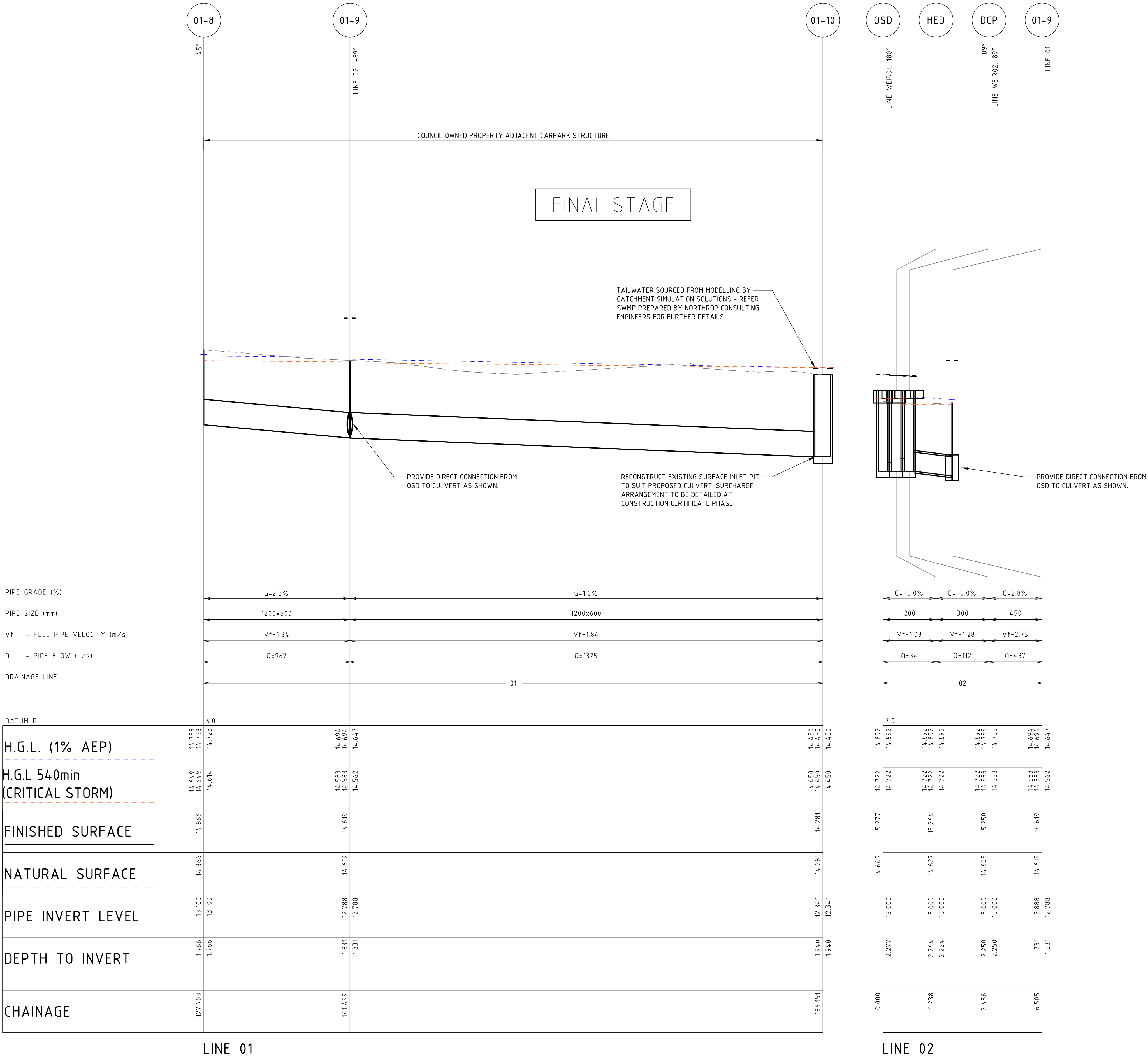
PROJECT	BROOMFIELD STREET CABRAMATTA
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DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 02	

JOB NUMBER	183030-01
DRAWING NUMBER	DAC4102
REVISION	02
DRAWING SHEET SIZE = A1	

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DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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SCALE 1:50@A1 SCALE 1:200@A1	The image shows two horizontal scale bars. The top bar is for a scale of 1:50 at A1 size, with markings at 0.0, 0.5, 1.0, 1.5, 2.0, and 2.5m. The bottom bar is for a scale of 1:200 at A1 size, with markings at 0, 2, 4, 6, 8, and 10m. Both bars are represented by a thick black line with vertical tick marks at the specified intervals.

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PROJECT	BROOMFIELD STREET CABRAMATTA
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DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
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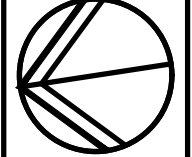
JOB NUMBER	183030-01
DRAWING NUMBER	DAC4104
REVISION	02
DRAWING SHEET SIZE	A1

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

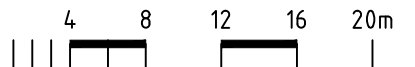
CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

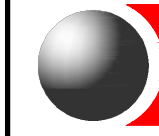
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AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.

SCALE 1:400@ A1



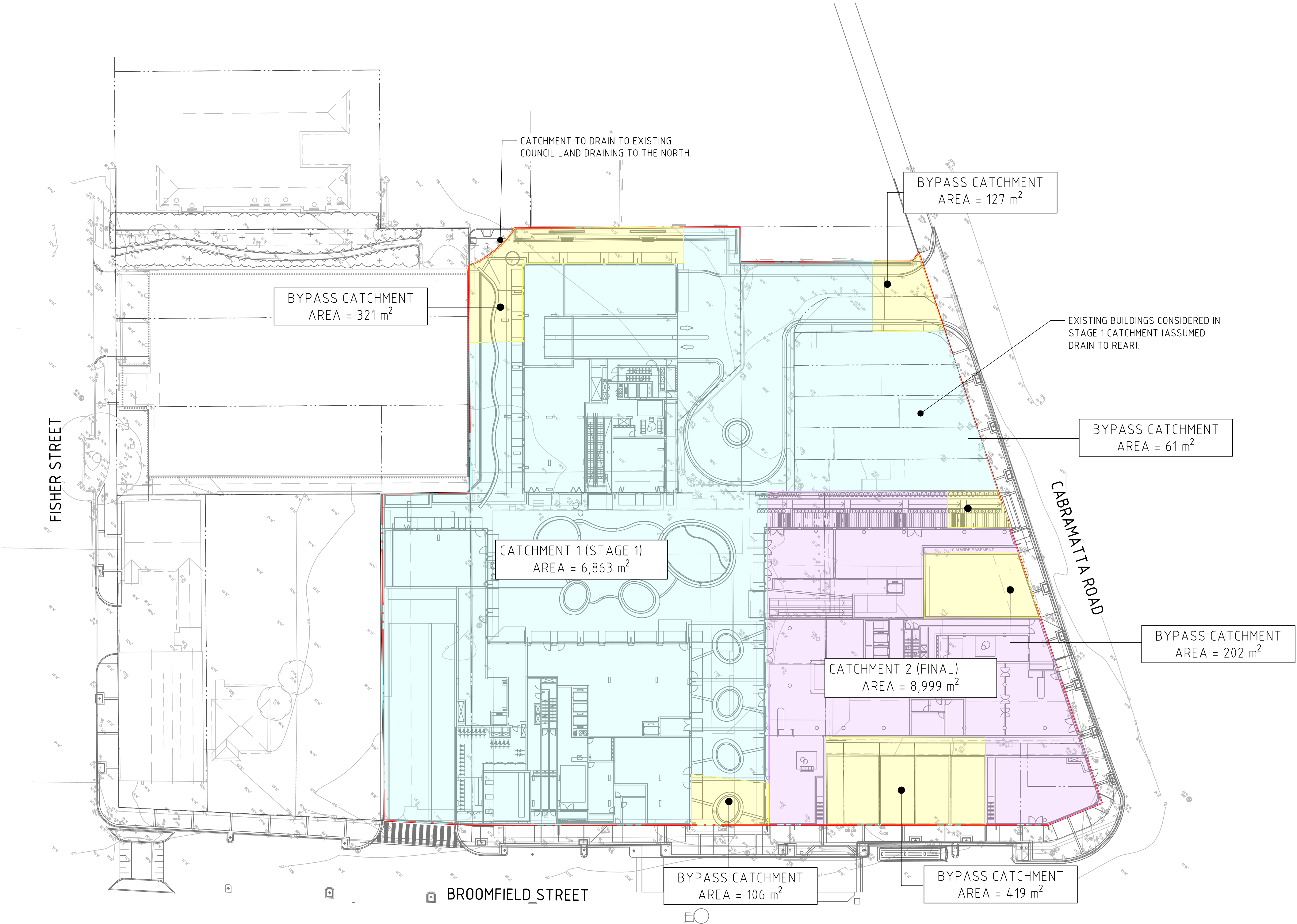
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Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION STORMWATER CATCHMENT PLAN

JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC4201	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



LEGEND

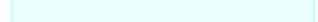
 SITE BOUNDARY LINE

 EXISTING CONTOURS

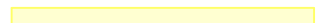
 CATCHMENT BOUNDARY

 EXISTING DRAINAGE STRUCTURE

 NEW DRAINAGE STRUCTURE

 STORMWATER CATCHMENT - STAGE 1

 STORMWATER CATCHMENT - STAGE 2

 BYPASS CATCHMENT

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

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SCALE 1:400@A1
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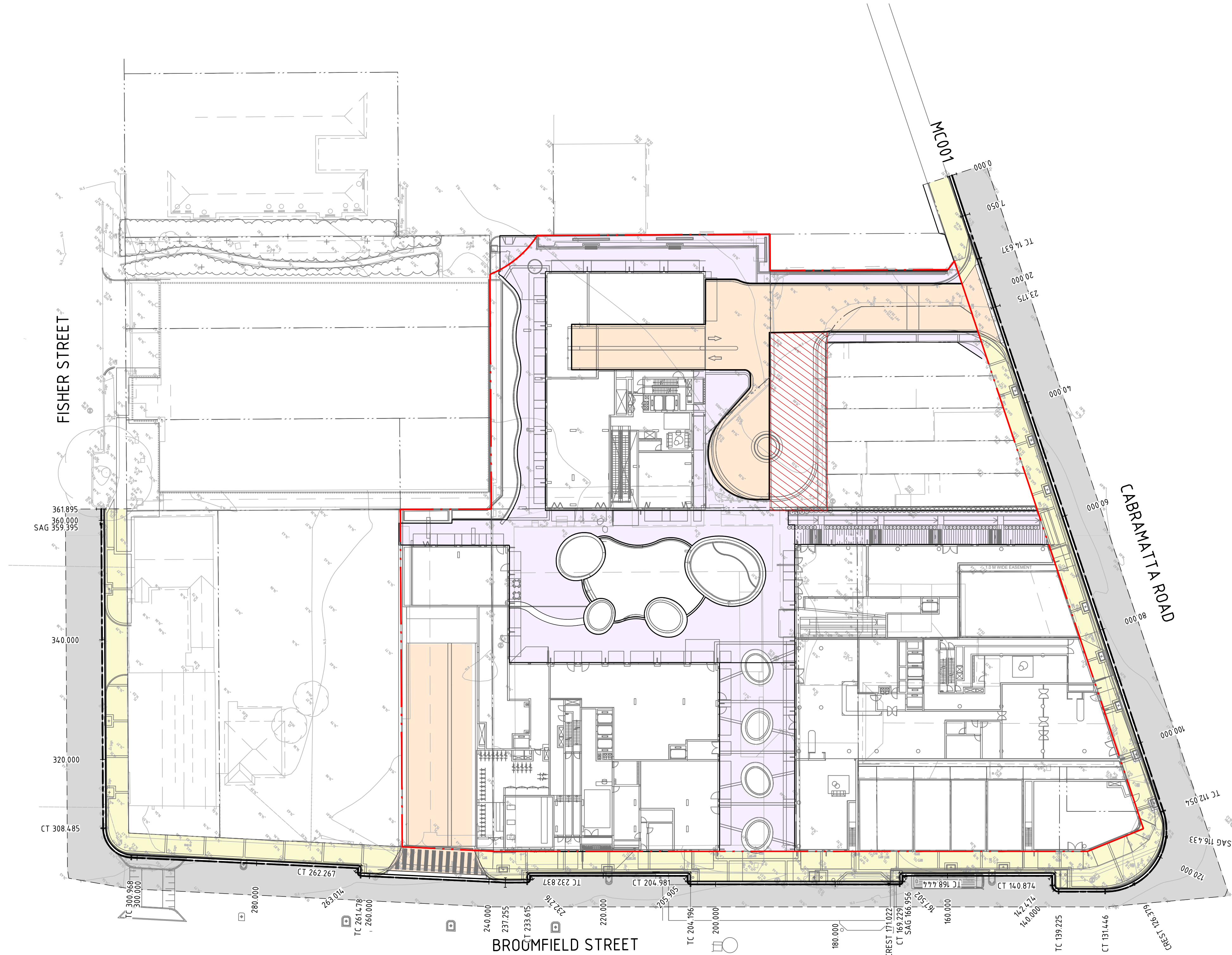
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PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION ALIGNMENT CONTROL PLAN

JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC5001	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



LEGEND	
	PROPOSED SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	CONTROL LINE
	CHAINAGE
	TANGENT POINT

Drawn: U MANDAL Designed: J CARROLL Job Manager: B LAWRENCE Verifier:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT
MOON INVESTMENTS
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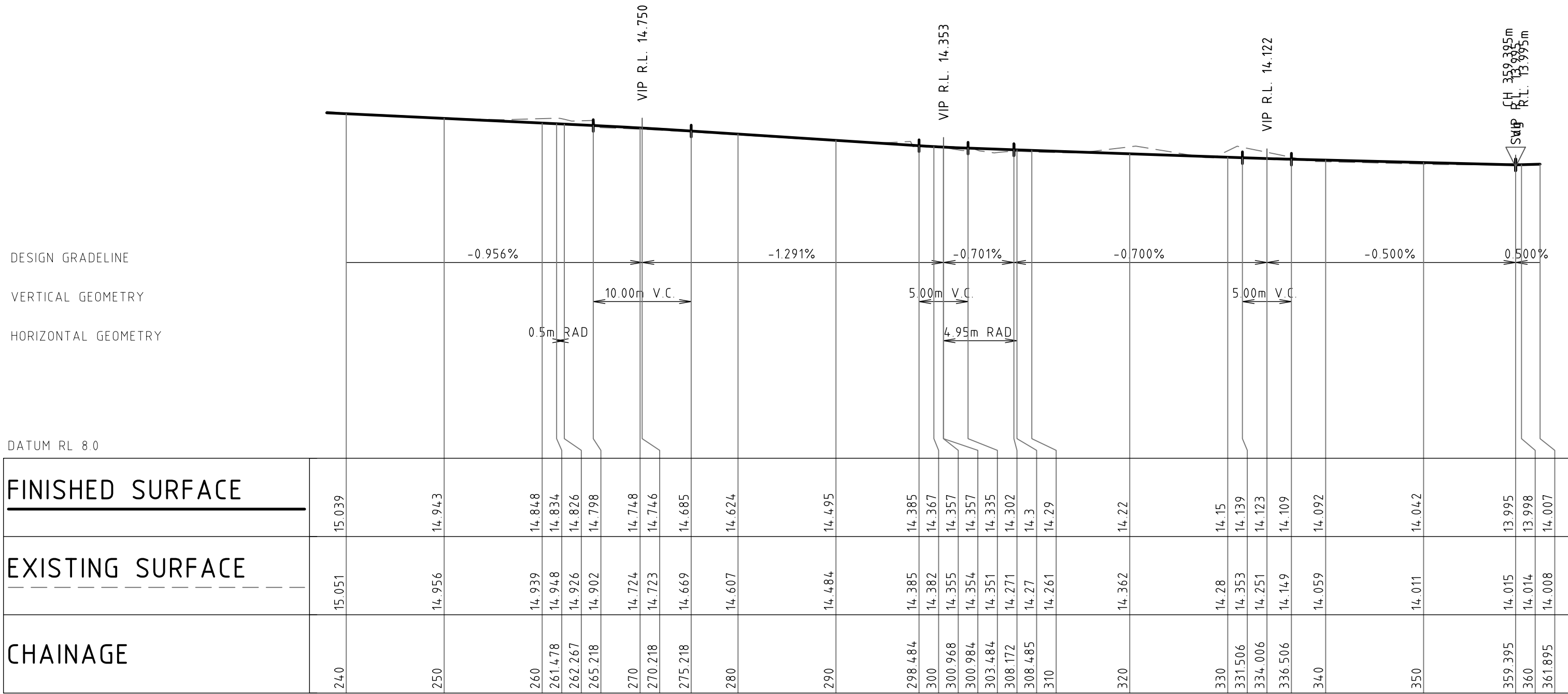
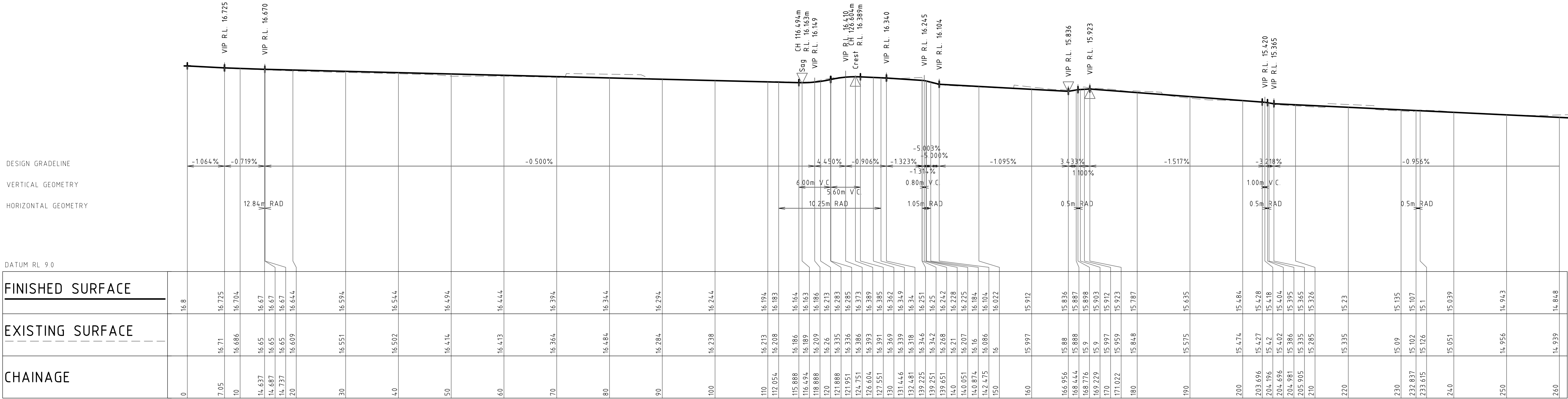
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PROJECT
BROOMFIELD STREET CABRAMATTA

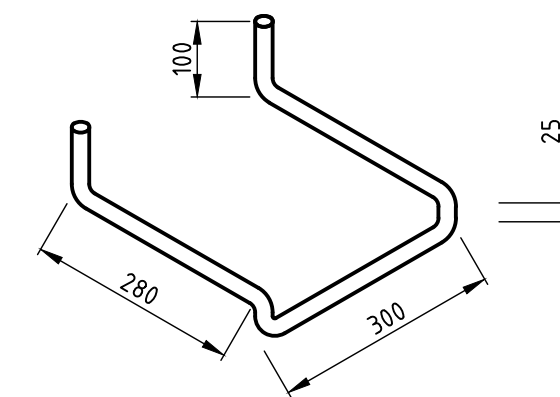
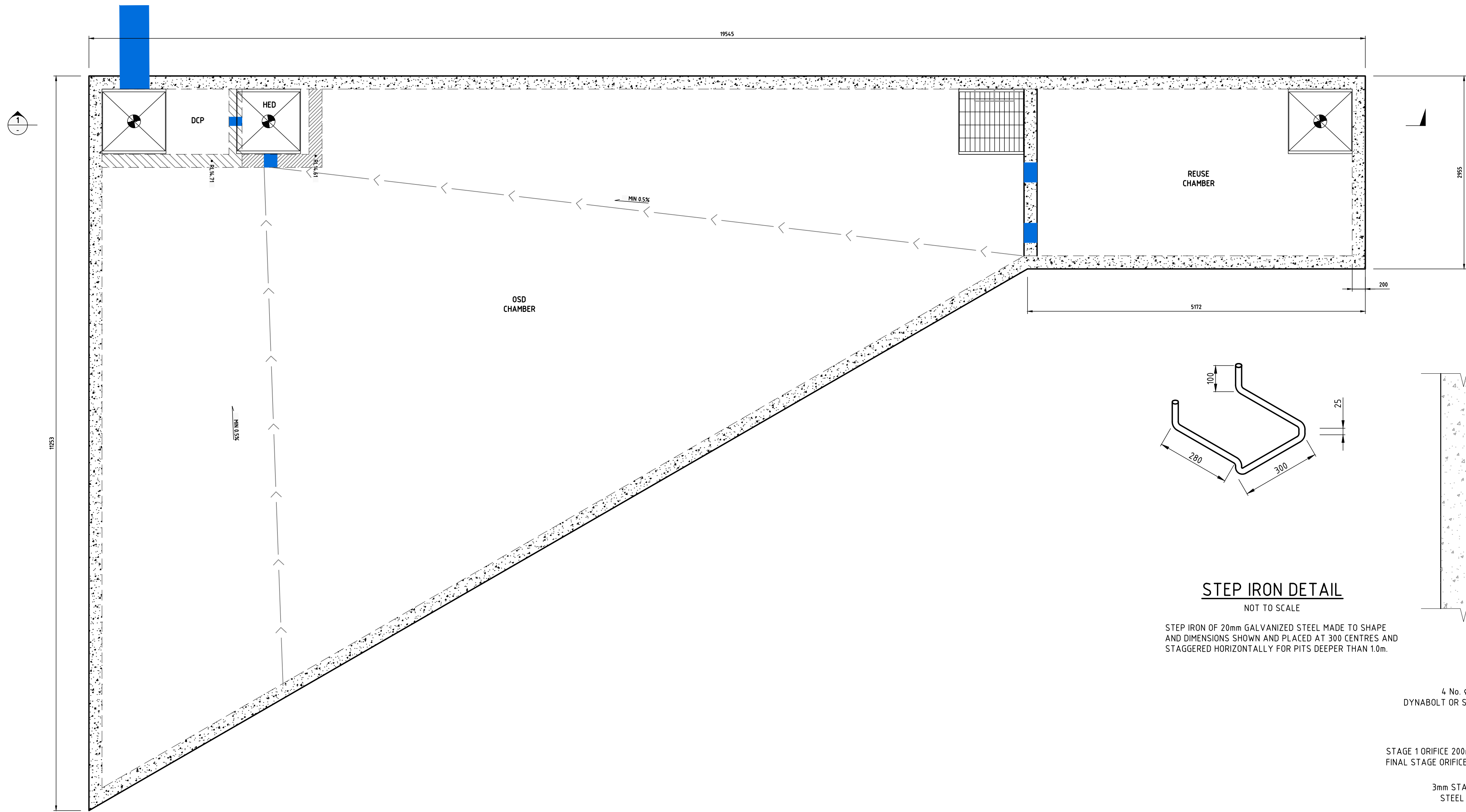
DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION LONGITUDINAL SECTIONS

JOB NUMBER	183030-01
DRAWING NUMBER	DAC5101
REVISION	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



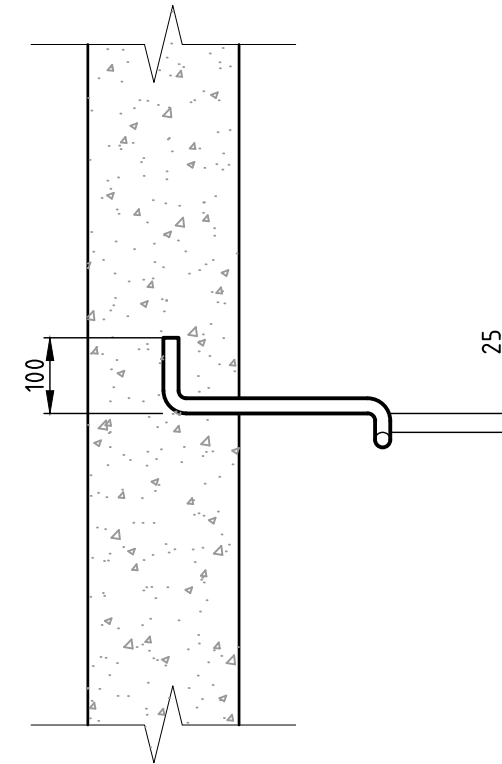
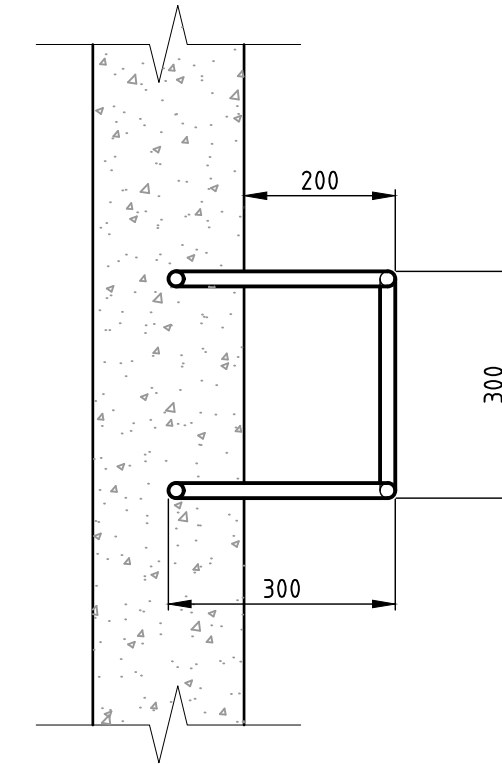
DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:



STEP IRON DETAIL

NOT TO SCALE

STEP IRON OF 20mm GALVANIZED STEEL MADE TO SHAPE AND DIMENSIONS SHOWN AND PLACED AT 300 CENTRES AND STAGGERED HORIZONTALLY FOR PITS DEEPER THAN 1.0m.

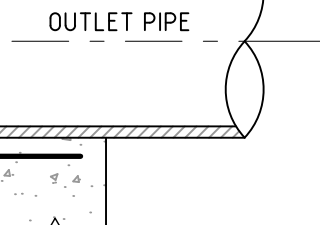


ORIFICE PLATE DETAIL

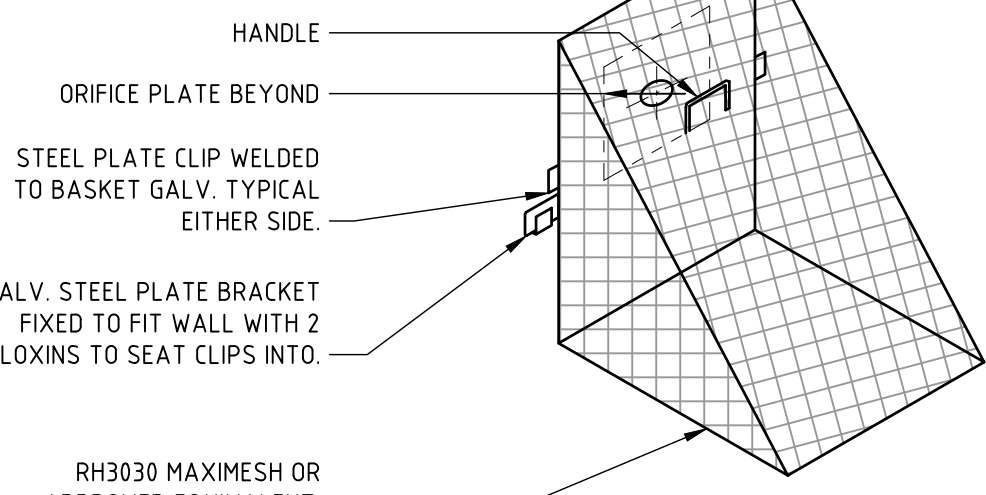
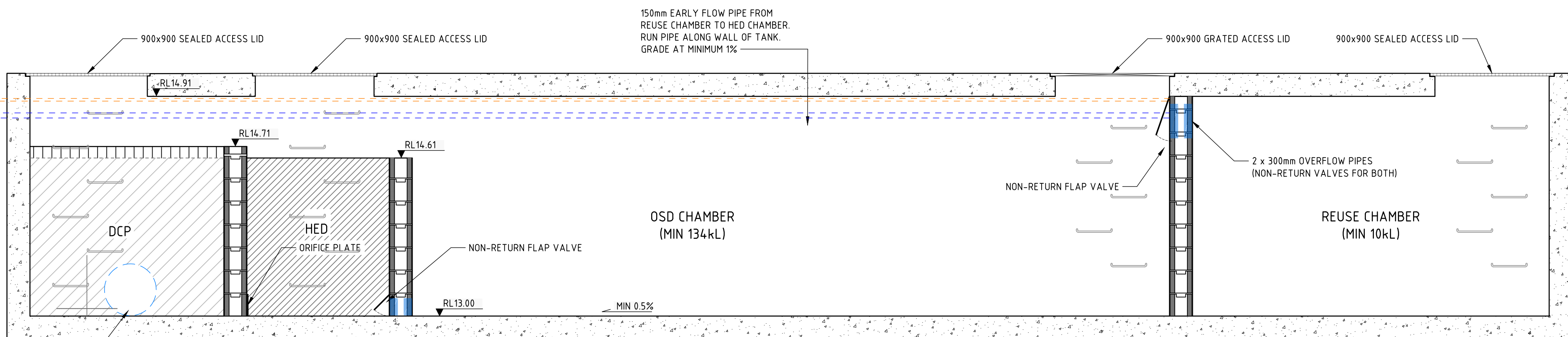
NOT TO SCALE

4 No. Ø10x100
DYNABOLT OR SIMILAR.

STAGE 1 ORIFICE 200mm
FINAL STAGE ORIFICE 300mm
3mm STAINLESS
STEEL PLATE.



TWL 14.892 - FINAL STAGE - CRITICAL STORM
TWL 14.869 - STAGE 1 - CRITICAL STORM
TWL 14.766 - STAGE 1 - 540min STORM
TWL 14.722 - FINAL STAGE - 540min STORM



TRASH SCREEN DETAIL

NOT TO SCALE

TO BE PROVIDED OVER ORIFICE PLATE SPECIFIED

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

ARCHITECT	plus architecture
THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD	

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0.0 0.2 0.4 0.6 0.8 1.0 1.2m	

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PROJECT	BROOMFIELD STREET CABRAMATTA
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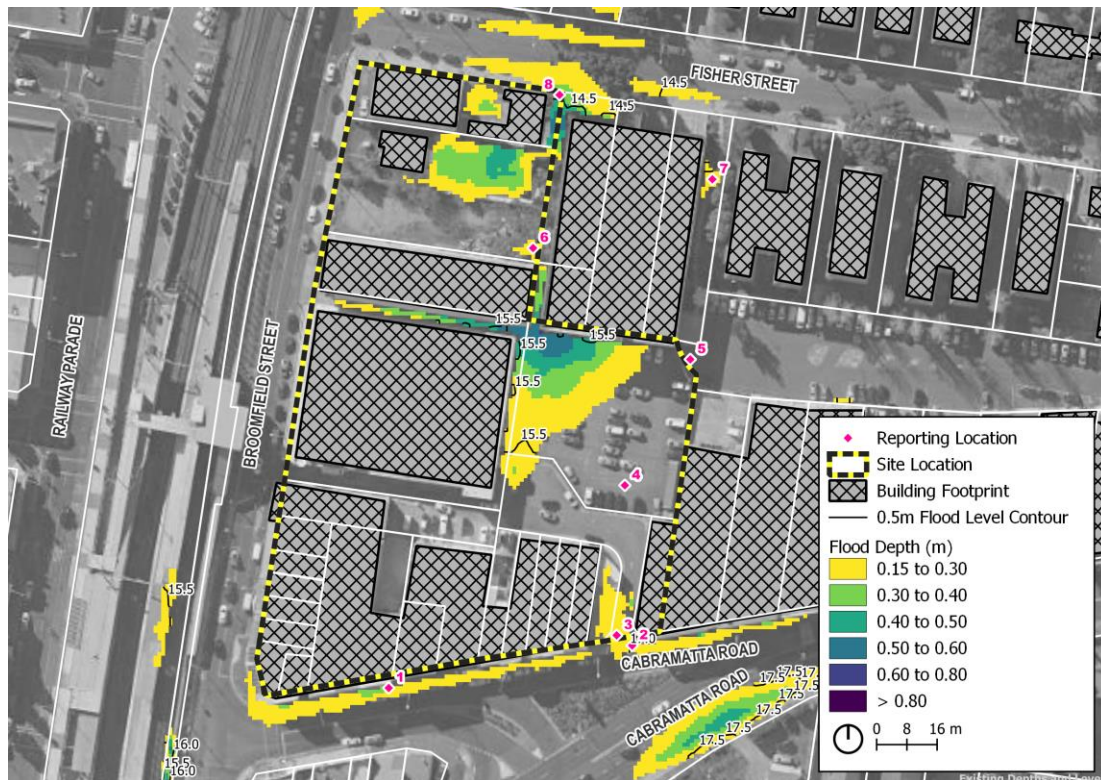
DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION DETAILS SHEET
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JOB NUMBER	183030-01
DRAWING NUMBER	DAC9001
REVISION	02
DRAWING SHEET SIZE	A1

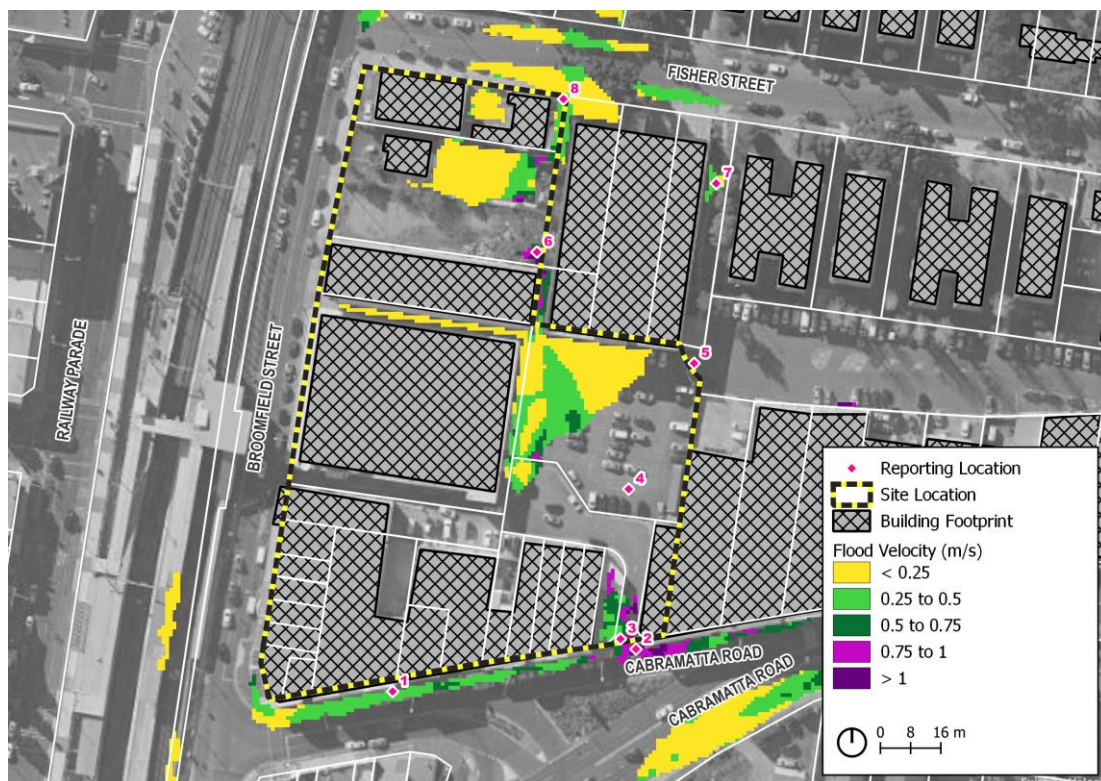
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Plotted By: ANGUS FALLINS
Date: 16/04/2020 2:24 PM

Appendix B - Flood Modelling Results

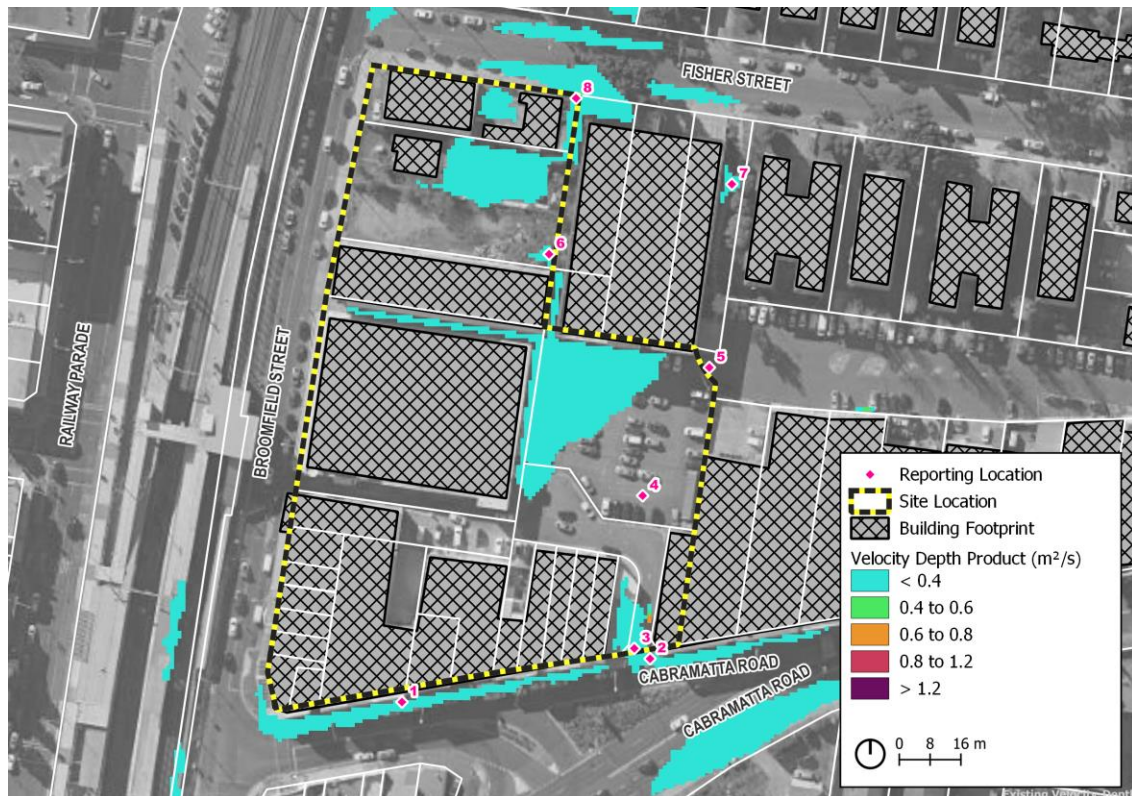
Flood Modelling Results provided by Catchment Simulation Solutions (CSS) can be seen below.



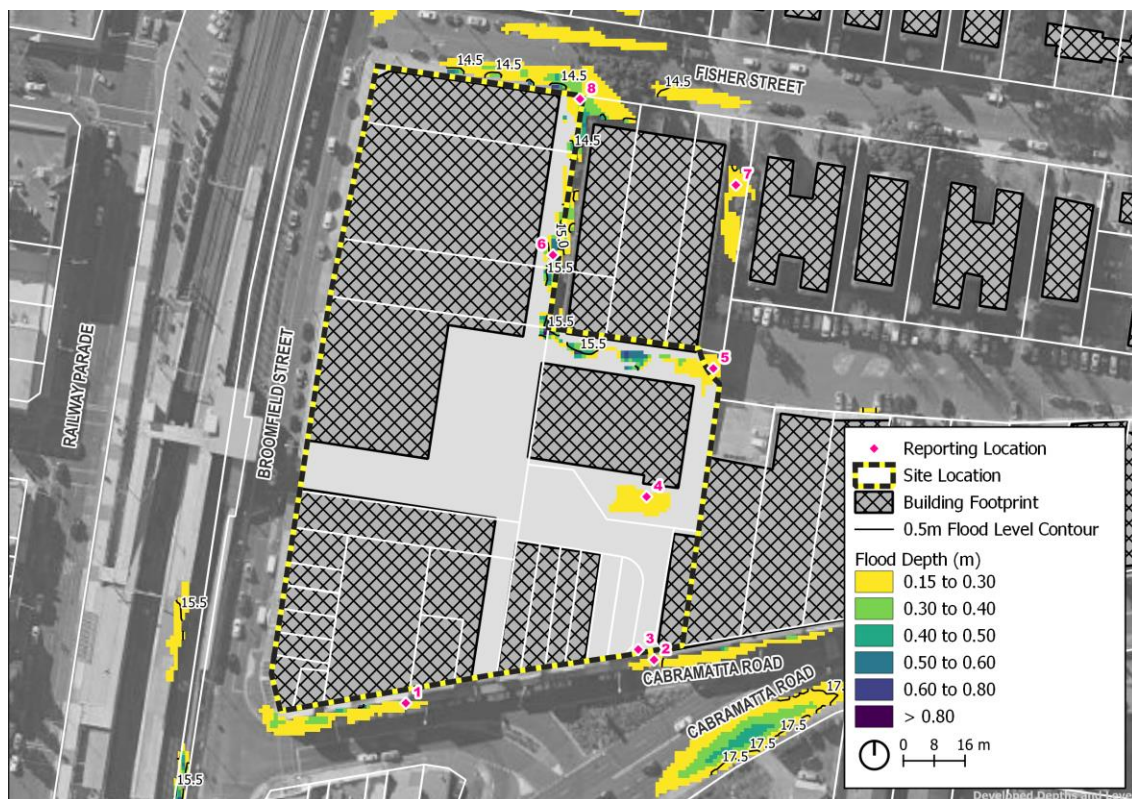
Existing Scenario – Flood Depths



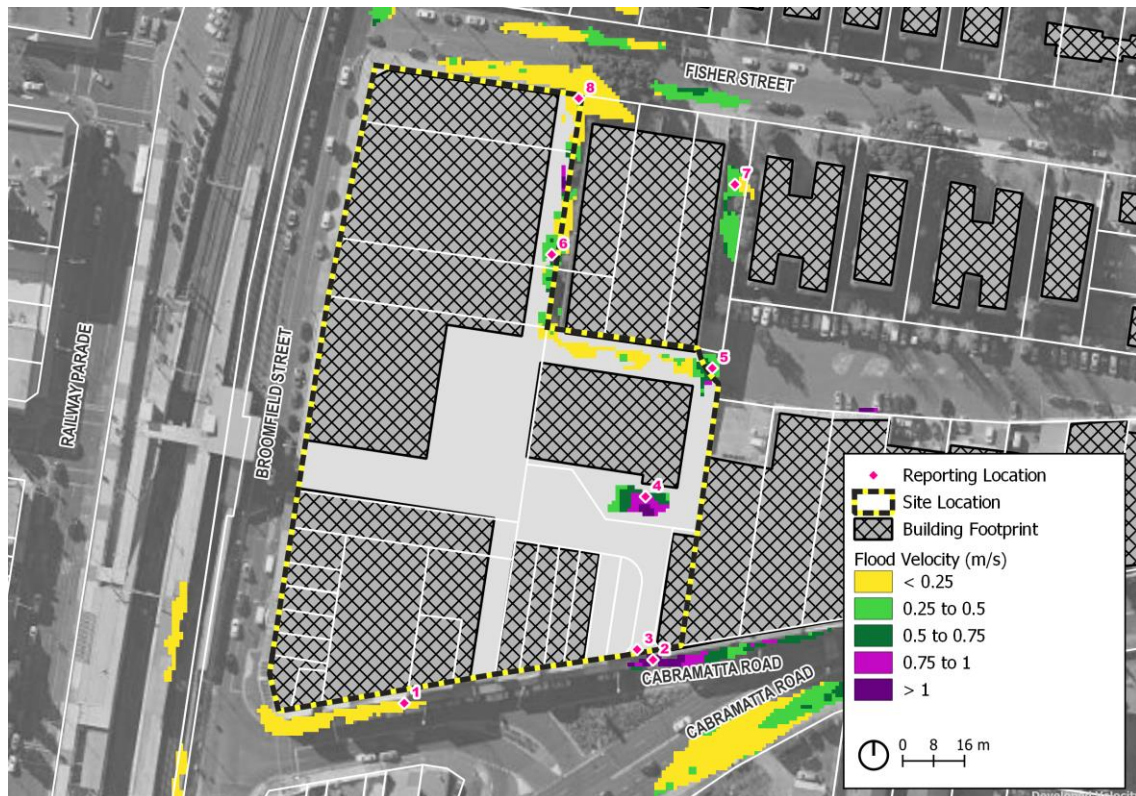
Existing Scenario – Flood Velocity



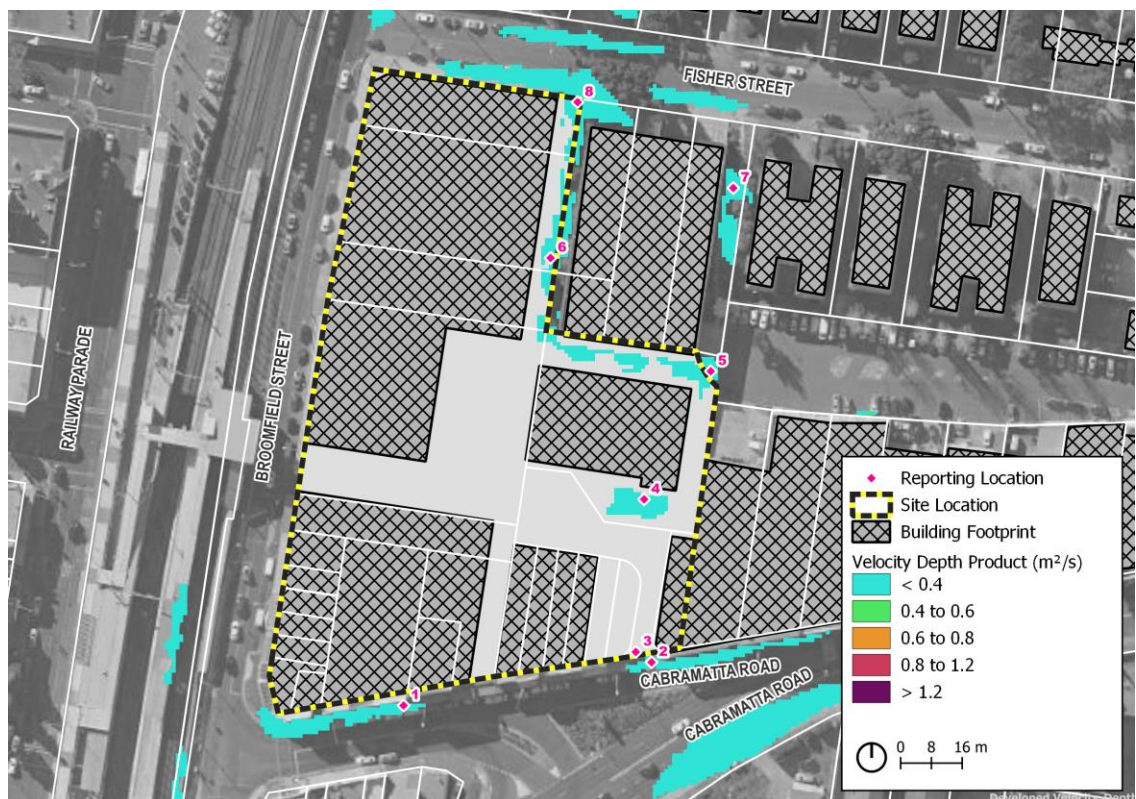
Existing Scenario – Flood Velocity-Depth Product



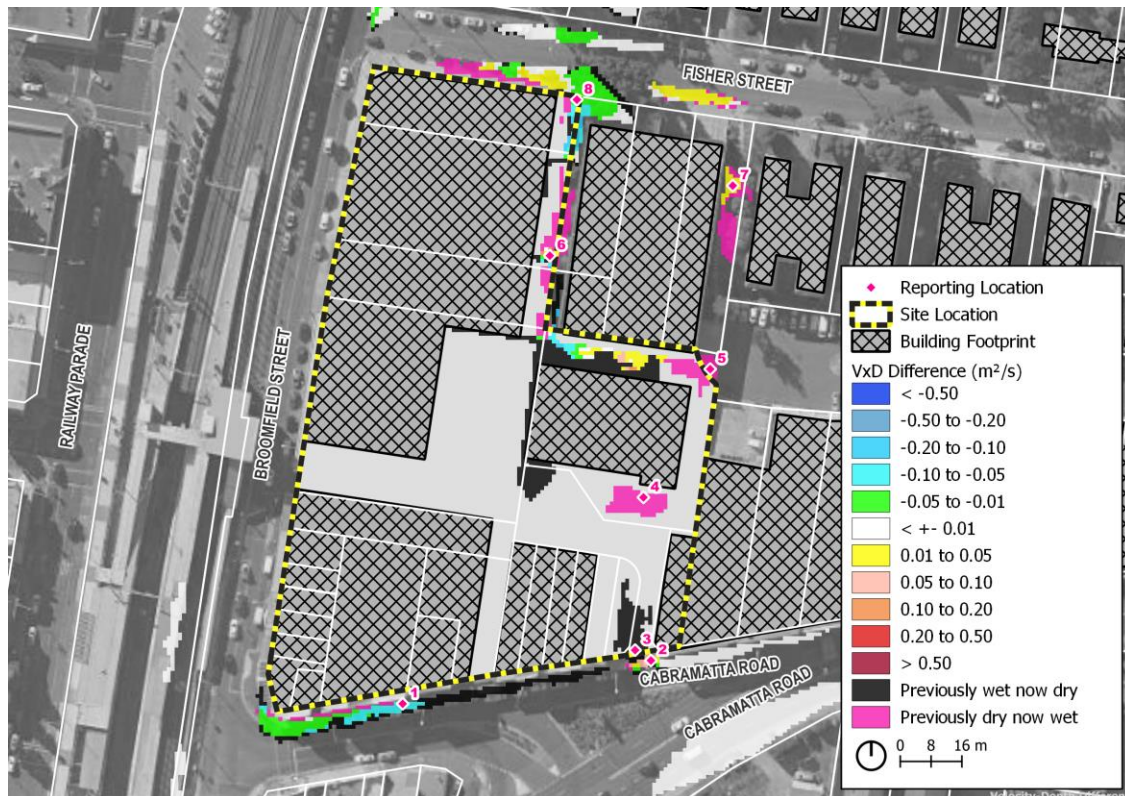
Developed Scenario – Flood Depths



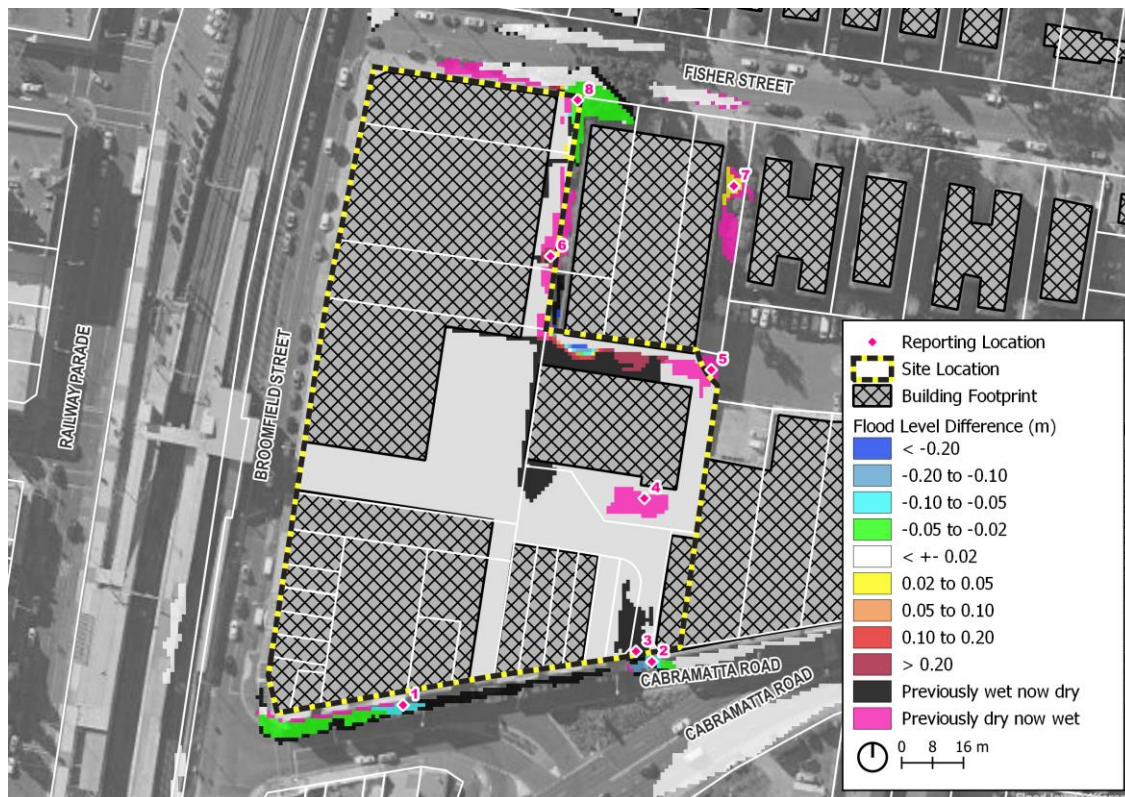
Developed Scenario – Flood Velocity



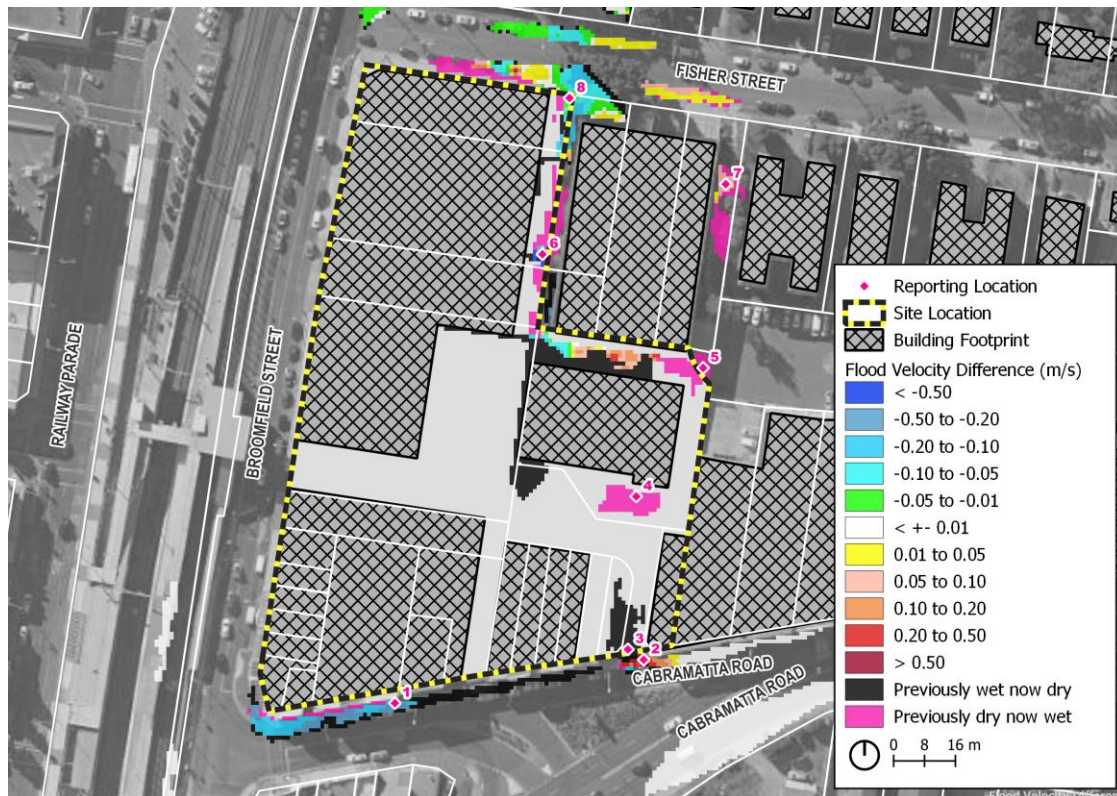
Developed Scenario – Flood Velocity-Depth Product



Differences (Existing to Developed) – Flood Depth



Differences (Existing to Developed) – Flood Level



Differences (Existing to Developed) – Flood Velocity