

CIVIL REPORT

IKEA MFLU – MARSDEN PARK

80215051



Prepared for
IKEA / FDC

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1 Introduction

Cardno has been engaged by IKEA to prepare civil engineering documentation in support of a Development Application for a proposed MFLU warehouse located within the Marsden Park Industrial Precinct (MPIP). The MPIP is being developed by Sydney Business Park (SBP).

The IKEA MFLU site covers an area of approximately 12 hectares and will be bound by Road 4 and Road 5 of the future MPIP development. A site locality plan is shown in **Figure 1-1** below.

Figure 1-1 IKEA MFLU Site Locality Plan



In preparing the relevant supporting documentation, Cardno has taken into account the Secretariat's Environmental Assessment Required and addressed the following key areas:

- Site grading
- Drainage
- Stormwater quality
- Stormwater reuse.

It is important to note that SBP will be submitting a Development Application for a portion of the MPIP that includes the IKEA MFLU site. As such, collaboration has occurred between IKEA, SBP and relevant consultants to ensure an integrated design approach occurs.

2 Earthworks & Grading

2.1 Site Grading

The site grading has largely been dictated by the requirement to tie into the proposed road levels surrounding the site and grading out the hardstand areas to suitably located low points along the western boundary of the site whilst providing a suitable finished floor level across the warehouse.

Based on advice provided by SBP, it is understood that the IKEA MFLU is located above the regional 100 year ARI peak water surface level.

A site grading plan has been documented within the civil drawings, refer **Appendix A**.

2.2 Earthworks Quantities

SBP will prepare a benched site prior to IKEA commencing works on site. These works will be subject to a separate Development Application submitted by SBP. Notwithstanding, the bulk earthworks volumes are estimated as follows:

- 34,800 m³ cut
- 163,400 m³ fill
- 128,600 m³ balance (to be imported).

2.3 Retaining Walls

A retaining wall will be required along the northern property boundary of the site to suitably transition from the proposed surface levels within the IKEA MFLU site to the future road reserve. The retaining wall is identified as Retaining Wall 5 (refer civil drawings in **Appendix A**) and is approximately 190 metres in length and has a maximum height of approximately 2.2 metres.

A series of internal retaining walls are required to manage level differences between the hardstand areas and the building footprint. The details of these retaining walls are included within the civil drawing set (refer **Appendix A**).

3 Stormwater Drainage

3.1 Drainage Standards

The drainage of the hardstand area has been designed to comply with Blacktown City Council's *'Engineering Guide for Development'*, 2005 and *'Australian Rainfall and Runoff, Volume 1'*, Institute of Engineers, 1987.

The proposed drainage network is designed to safely convey major and minor flows to low points along the western boundary of the site before being discharged in a controlled manner into Basin B which will be constructed by others as part of the MPIP development. Design rainfall intensities have been adopted from Council's Guidelines as follows:

- Minor system – 20 year ARI
- Major System – 100 year ARI.

3.2 Catchment Area

Catchments within the IKEA MFLU have been delineated based on watershed boundaries occurring due to the proposed hardstand grading and roof pitching. Conservative assumptions have been made at the DA stage to accommodate for the future syphonic drainage system that will be designed prior to the Construction Certificate approval submission.

The catchment breakdown is included within the civil drawings, refer **Appendix A**.

The drainage network has been designed to ensure that no stormwater runoff will discharge from the IKEA MFLU site into adjoining private properties for events up to the 1% Annual Exceedance Probability (AEP).

No provision for existing or future external catchments has been incorporated into the design. This is due to advice provided by SBP that suitable temporary and permanent measures will be put in place to divert stormwater runoff from external catchments around the IKEA MFLU site.

3.3 Hydrology Calculation

Detailed catchment modelling was undertaken to calculate flows generated by the site using the DRAINS software package. This software uses the industry standard hydrology calculation, ILSAX. The following parameters were used within the model:

- IFD data from Blacktown City Council's *'Engineering Guide for Development'*, 2005
- Depression storage:
 - o 1 mm for paved areas
 - o 5 mm for grassed areas
- Antecedent moisture condition 3
- Time of Concentration of 1 minute and 3 minutes for paved and grassed areas respectively.

3.4 Hydraulic Calculations

The hydraulic calculation was undertaken using the DRAINS software package.

The model represents all catchments collected via a pit and pipe network design to accommodate the minor flows with considerations to major design storms. All areas are gravity drained with overland flow in excess of pipe capacity safely directed to the bio-filtration swale or Basin B (constructed by others).

The site is constrained by the broader MPIP fill pad and associated drainage constraints. As such, there has been an emphasis on minimising the extent of fill within the IKEA MFLU site. This has resulted in a minimum pipe grade of 0.5% being adopted. For pipes with a grade less than 1% (i.e., Council's guideline) a minimum velocity of 0.6 m/s has been provided in the design storm event (i.e., 5% AEP). The adopted approach is similar to those provided for similar developments within the Council LGA where the need to minimise fill is a significant site constraint.

On grade pits have been assumed to be 20% blocked whilst sag pits have been assumed to be 50% blocked. Ku factors for all pits have been calculated by utilising the automated function within the DRAINS software package and have been subject to review based on pipe diameter, design flows and pipe angles.

Freeboard has generally been maintained to the top of grate levels for the design storm in accordance with Blacktown City Council's *'Engineering Design Guide for Development'*, 2005.

Detailed modelling data input parameters are presented in **Appendix B**.

3.5 Results

Preliminary results are presented within the civil drawings, refer **Appendix A**. Final results will be confirmed prior to the Construction Certificate approval submission.

4 Stormwater Quality

4.1 Strategy Objectives

The IKEA MFLU site forms part of the wider MPIP which is being delivered by SBP.

The delivery of the MPIP will result in the construction of stormwater quality improvement devices throughout the development. One of these devices is a bio-filtration basin located immediately to the west of the IKEA MFLU site. Stormwater runoff from the IKEA MFLU site will discharge into this bio-filtration basin.

Through consultation with SBP, it is understood that the aforementioned bio-filtration basin will manage discharge from the MPIP development into existing watercourses. As such, the analysis of the waterway controls and Stream Erosivity Indices are being assessed as part of the MPIP approval pathway and does not form part of the IKEA MFLU documentation.

In delivering the MPIP, SBP has included some allowances for stormwater quality improvement devices located at strategic locations throughout catchments. One of these devices is a bio-filtration basin located immediately to the west of the IKEA MFLU site. This bio-filtration basin will assist in improving stormwater quality and managing discharges into existing watercourses.

In developing the IKEA MFLU, stormwater quality improvement measures are required to meet the stormwater pollutant reduction targets set out in the *Blacktown City Council Growth Centre Precincts Development Control Plan 2010*, NSW Department of Planning and Environment, 2010. The required stormwater pollutant reduction targets are included in **Table 4-1**.

Table 4-1 Stormwater Pollutant Reduction Targets

	Water Quality % Reduction in Pollutant Loads			
	Gross Pollutants	Total Suspended Solids	Total Phosphorus	Total Nitrogen
Stormwater Management Objective	90	85	65	45
Ideal Stormwater Outcome	100	95	95	85

It is noted that as part of the SEARs, BCC suggested that the IKEA MFLU site should seek to match the ideal stormwater outcomes nominated within **Table 4-1** to preserve receiving waters.

The implications of meeting the nominated stormwater objectives against the ideal stormwater outcome has been assessed using the MUSIC software package.

In order to meet the ideal stormwater outcomes, approximately half of the IKEA MFLU site would need to be dedicated to stormwater quality improvement. Meeting the ideal stormwater outcomes represents a significant adverse impact on the viability of the IKEA MFLU development. As such, the assessment considered the impact of the IKEA MFLU development relative to existing conditions and estimated average annual pollutant loads were assessed across three scenarios:

1. Existing
2. Proposed (without treatment)
3. Proposed (with treatment).

The estimated average annual pollutant loads are summarised in **Table 4-2**.

Table 4-2 Estimated Average Annual Pollutant Loads

Estimated Average Annual Pollutant Load (kg/year)				
	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Gross Pollutants
Existing	4,750	20	98	0
Proposed (Without Treatment)	14,300	29	202	2,320
Proposed (With Treatment)	1,860	10	103	13

The pollutant reduction percentages are included in **Table 4-3**.

Table 4-3 Pollutant Reduction Percentages

	Stormwater Management Reduction Target	Proposed Reduction	Reduction Relative to Existing
Gross Pollutants	90%	99%	0%
Total Suspended Solids	85%	87%	61%
Total Phosphorus	65%	67%	50%
Total Nitrogen	45%	49%	-5%

Based on the reported reduction targets within **Table 4-3**, it is reasonable to adopt the standard stormwater management objectives from the *Blacktown City Council Growth Centre Precincts Development Control Plan 2010*, NSW Department of Planning and Environment, 2010. By doing so, the IKEA MFLU site would contribute a minor increase in Total Nitrogen discharging from the site but would contribute to improving water quality in downstream watercourses for Total Suspended Solids and Total Phosphorus.

4.2 MUSIC Modelling

Water quality assessment has been undertaken using MUSIC computer software (Version 6.0.1) and in accordance with Blacktown City Council's *Developer Handbook for Water Sensitive Urban Design*, 2013.

4.2.1 Input Data

Catchments have been estimated based on the proposed bulk earthworks plans and architectural plans for the IKEA MFLU warehouse. Catchments have been broken down into roof and road areas. Both catchment types have been modelled as 100% impervious.

The stormwater quality treatment train will consist of:

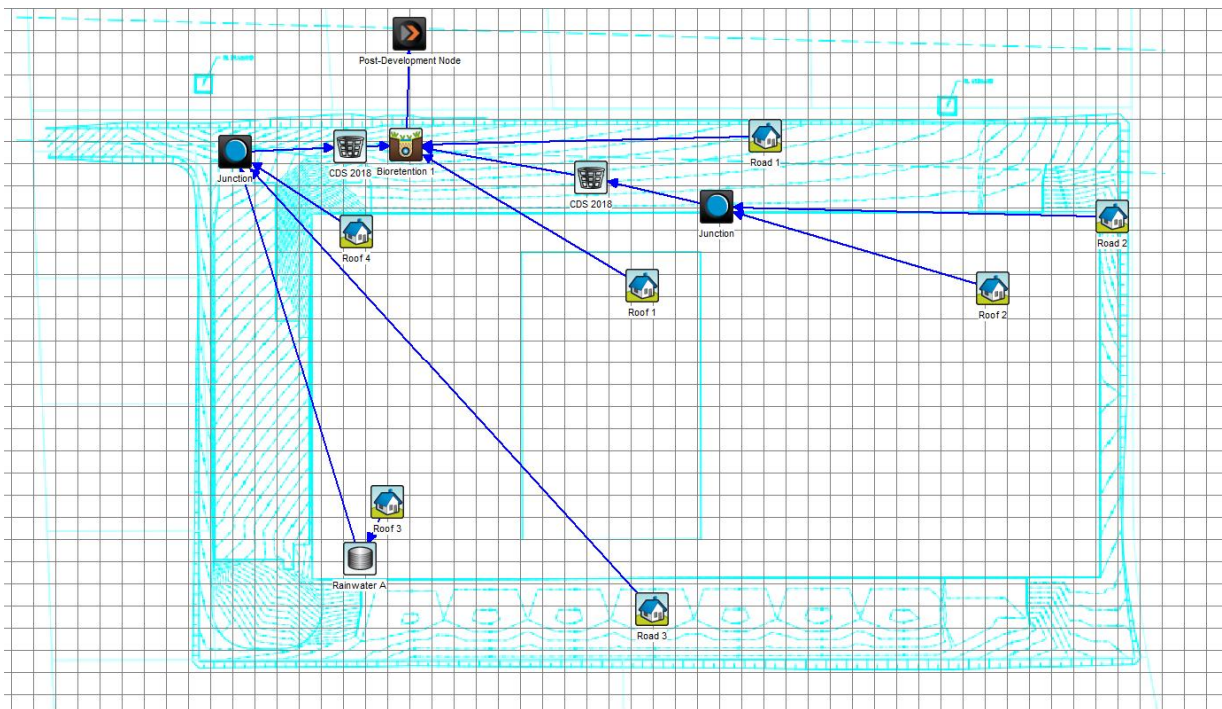
- Rainwater tank
 - o Approximately 1 hectare of a roof area will discharge to a rainwater tank. A 440 kL rainwater tank has been included to achieve a minimum of 80% of the non-potable water uses on-site being met using rainwater. The rainwater tank has been sized using the MUSIC software package and includes a 20% provision for anaerobic zones, mains water top up levels and overflow levels. The following re-use volumes have been adopted:
 - 0.1 kL/day/toilet or urinal
 - 0.5 kL/year/m² as PET-Rain

- 2.0 kL/year/m² as PET-Rain.
- Bio-filtration swale
 - o A bio-filtration swale is proposed along the western boundary of the site. The bio-filtration swale has a filter area of 1,400 m² and consists of the following properties:
 - 200 mm extended detention depth
 - 500 mm filter media depth.
- Gross Pollutant Trap
 - o A proprietary Gross Pollutant Trap (GPT) will be installed immediately downstream of the bio-filtration swale and immediately prior to stormwater runoff discharging into Basin B (constructed by others). For modelling purposes, a CDS unit has been assumed based on its removal efficiencies.

Detailed modelling data is provided in **Appendix C**.

The proposed treatment train is included in **Figure 4-1**.

Figure 4-1 MUSIC Model Layout



4.3 Proposed Treatment Train Effectiveness

Table 4-4 presents a summary of the achieved stormwater pollutant reductions against the targets set forward in the DCP.

Table 4-4 Treatment Train Effectiveness

Pollutant	Stormwater Management Reduction Target	Achieved Reduction
Gross Pollutants	90%	99%
Total Suspended Solids	85%	87%
Total Suspended Solids	65%	67%
Total Nitrogen	45%	49%

5 Stormwater Quantity

There is no provision for stormwater quantity management within the IKEA MFLU site. This is because the IKEA MFLU site forms part of the broader MPIP development which provides adequate stormwater quantity management provisions as part of the precinct works.

Initial advice provided by SBP indicates that the basin immediately to the west of the IKEA MFLU site will be constructed as part of the bulk earthworks activities associated with the IKEA MFLU development. As such, it is anticipated that this basin will be available for use as a temporary sediment basin during construction activities and a detention basin once hardstand areas are constructed within the IKEA MFLU site.

6 Sediment and Erosion Control

Construction activities generate the potential for erosion and sediment moving during and after storm events. To control the potential for erosion and sediment movement the following measures will be utilised within the IKEA MFLU site:

- Preparation of a comprehensive Erosion and Sedimentation Control plan for the site taking into account soil characteristics
- Staging of construction activities to ensure that the works program takes account of all measures necessary to control erosion on the site
- Minimisation of disturbed areas, only those areas directly required for construction will be disturbed
- Installation of temporary sediment and erosion control measures prior to commencement of construction operations
- Diversion of clean water from undisturbed areas around working areas
- Maintenance of sediment control structures, particularly after rainfall to ensure their efficiency until their catchment areas are fully stabilised.

A wide range of stormwater management and erosion and sediment control measures are available for the site. A selection of measures considered suitable are described below.

Site Entry and Exit. A temporary construction entry/exit point off Road 4 will be used during construction to prevent the most heavily travelled routes from becoming a source of sediment and dust. This will be the only site access permitted to be used during construction.

Temporary Drains. Temporary drains and diversion banks will be designed to maintain non-erosive velocities and direct runoff to temporary sediment trapping structures or divert clean runoff to stabilised outlets. Temporary drains are generally short-term controls and require alterations on a frequent basis during construction. Where required, catch and diversion drains will be located upstream of working areas to divert clean runoff around the construction site.

Sediment Filters. Sediment filters will be located at all downstream locations of disturbed areas. Typical sediment filters include silt fences and straw bales.

Sediment Basins. Runoff from disturbed areas will be diverted to temporary sediment basins located at the lowest area within the site. The sediments will settle to the basin invert before controlled release of sediment free water to receiving water courses. Sediment basins will consist of a dam or barrier designed to intercept sediment laden runoff and to retain sediment. They will be located on drainage lines downstream of disturbed areas.

Re-vegetation. The staging of construction works will allow for progressive re-vegetation and hence minimisation of disturbed areas. Specific grasses, mulches and mats for rapid re-vegetation and stabilisation of disturbed areas will be used when and if required at strategic locations such as batters.

Stockpiles. Stockpiles of material will be stored at strategic locations across the site. Diversion banks will be placed upstream of stockpiles to prevent the stockpiled material being washed away. Sediment fences will be placed downstream of all stockpiles.

Erosion and sediment control measures will be designed in accordance with the NSW Department of Housing Publication, *Managing Urban Stormwater – Soils and Construction*, March 2004 (i.e., the Blue Book).

7 Stormwater Re-use

To reduce the potable water demand of the proposed development, a stormwater re-use strategy has been prepared. The stormwater re-use strategy will capture, retain and re-use stormwater runoff for non-potable uses including toilet flushing as well as irrigating landscape areas and bio-filtration areas.

The target for the stormwater re-use strategy is to meet the demands for the aforementioned non-potable water uses a minimum of 80% of the time.

7.1 Non-Potable Water Daily Demands

Blacktown City Council nominates the key assumptions regarding non-potable water daily demands for the site. **Table 7-1** nominates the annual and daily demands for the three non-potable water sources included as part of the stormwater re-use assessment.

Table 7-1 Non-Potable Water Sources & Daily Demands

Non-Potable Water Source	Stipulated Usage Rate
Toilet / Urinal Flushing	0.1 kL / day / toilet or urinal
Landscape Area Irrigation	0.5 kL / year / m ² (as PET-Rain)
Bio-filtration Area Irrigation	2.0 kL / year / m ² (as PET-Rain)

The anticipated non-potable water demands for the development are summarised in **Table 7-2**.

Table 7-2 Non-Potable Water Demands

Source	Usage Rate	Demand	Total
Toilet / Urinal Flushing	0.1 kL / day / toilet or urinal	11 toilets or urinals	1.1 kL / day
Landscape Area Irrigation	0.5 kL / year / m ² (PET-Rain)	1,000 m ²	500 kL / year (PET-Rain)
Bio-filtration Area Irrigation	2.0 kL / year / m ² (PET-Rain)	1,400 m ²	2,800 kL / year (PET-Rain)

7.2 Roof Catchment Area

The warehouse roof will cover in excess of 7 hectares. Regardless, only a portion of the roof catchment will discharge into the proposed rainwater tank.

For the purpose of the water balance simulation, it has been assumed that 1 hectare of roof area discharges into the rainwater tank.

7.3 Water Balance Simulation

As part of the SEARs, Blacktown City Council stipulate that the capacity for the calculated retention volume to meet to the non-potable water requirements of the site a minimum of 80% of the time should be assessed within the MUSIC software package.

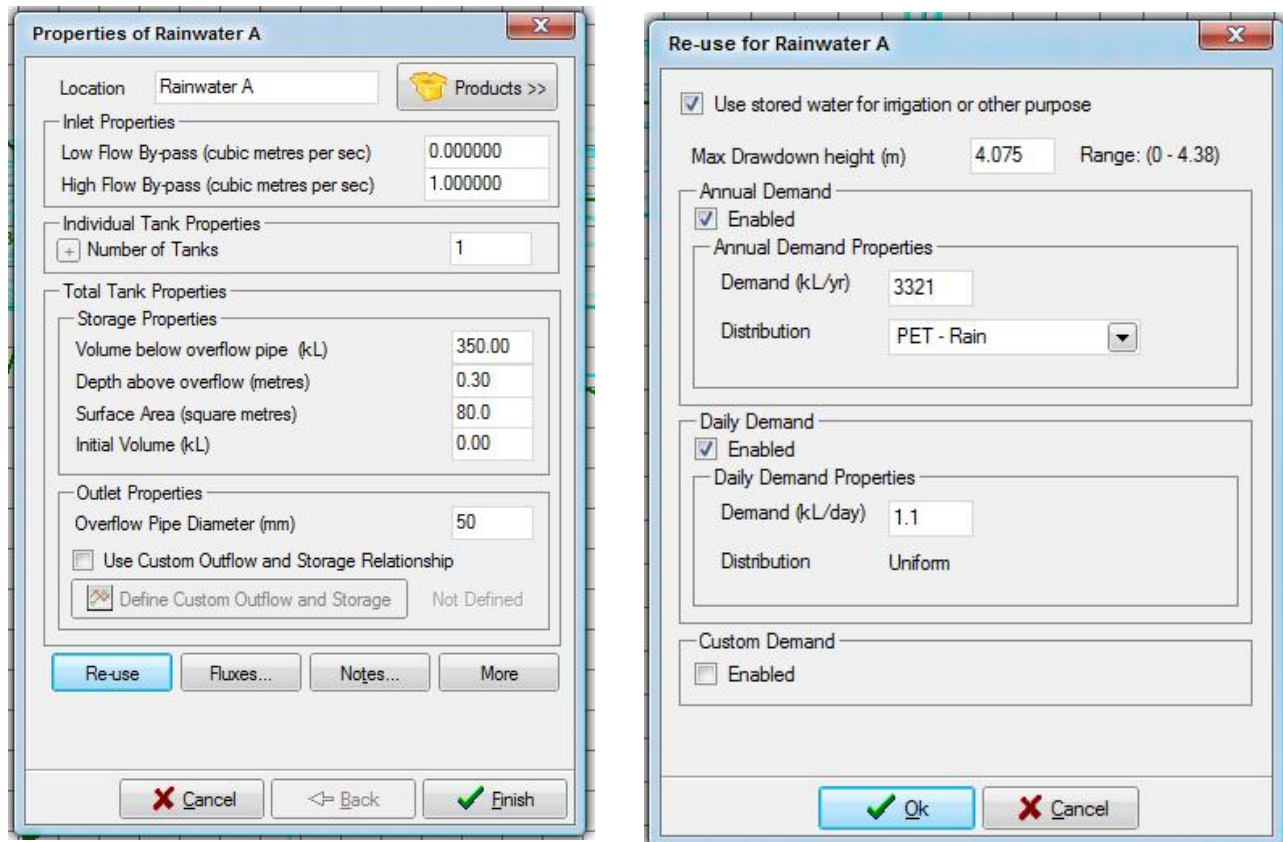
Within the SEARs, Blacktown City Council nominate that the volume determined within MUSIC should be increased 25% to accommodate for various infrastructure components associated with the operation of the rainwater tank.

7.3.1 MUSIC Modelling

The MUSIC model described in **Section 4** was used to calculate an appropriately sized rainwater tank. The MUSIC model determines that a retention volume of approximately 350 kL would be sufficient to meet the daily non-potable water demands of the site 80% of the time.

The parameters adopted for the Rainwater Tank node within MUSIC are shown in **Figure 7-1**.

Figure 7-1 Rainwater Tank & Re-use MUSIC Node Properties



Properties of Rainwater A

Location: Rainwater A

Inlet Properties

Low Flow By-pass (cubic metres per sec)	0.000000
High Flow By-pass (cubic metres per sec)	1.000000

Individual Tank Properties

+ Number of Tanks: 1

Total Tank Properties

Storage Properties

Volume below overflow pipe (kL)	350.00
Depth above overflow (metres)	0.30
Surface Area (square metres)	80.0
Initial Volume (kL)	0.00

Outlet Properties

Overflow Pipe Diameter (mm): 50

☐ Use Custom Outflow and Storage Relationship

☐ Define Custom Outflow and Storage: Not Defined

Buttons: Re-use, Fluxes..., Notes..., More

Buttons: Cancel, Back, Finish

Re-use for Rainwater A

☒ Use stored water for irrigation or other purpose

Max Drawdown height (m): 4.075 Range: (0 - 4.38)

Annual Demand

☒ Enabled

Annual Demand Properties

Demand (kL/yr): 3321

Distribution: PET - Rain

Daily Demand

☒ Enabled

Daily Demand Properties

Demand (kL/day): 1.1

Distribution: Uniform

Custom Demand

☐ Enabled

Buttons: Ok, Cancel

7.4 Required Retention Volume

As an outcome of the water balance simulations, it was determined that a rainwater tank with 350 kL of storage volume would be required to meet the non-potable water demands of the site 80% of the time.

Applying Blacktown City Council's stipulated size increase of 25% to accommodate infrastructure associated with the operation of the tank concludes that a rainwater tank containing 440 kL of storage volume is required.

The Development Application documentation includes a "Rhino Tank" RCT 200 with a base diameter of 10.7 metres and a height of 5.0 metres.

8 Conclusion

In preparing supporting documentation for the IKEA MFLU project, the following can be concluded:

- A consolidated bulk earthworks and grading strategy has been prepared for the IKEA MFLU site and coordinated with the SBP Development Application
- Bulk earthworks activities will be undertaken by SBP prior to the site being occupied by IKEA
- Filling activities within the IKEA MFLU are constrained due to the future interface requirements of the MPIP
- The limited capacity to fill the IKEA MFLU site has resulted in some drainage lines needing to be constructed at a minimum grade of less than 1%
- The minimum longitudinal grade of the proposed drainage lines is 0.5%
- All drainage lines with a longitudinal grade of less than 0.5% have a minimum velocity of 0.6 m/s for design storm events and are considered to be self-cleansing
- A stormwater drainage network has been prepared for the IKEA MFLU site generally in accordance with relevant Blacktown City Council guidelines
- No allowance has been made for external catchments, SBP has indicated that temporary and permanent measures will be put in place to divert stormwater runoff around the IKEA MFLU site
- The stormwater drainage design will result in no discharge from the IKEA MFLU site onto adjoining private properties for events up to the 1% AEP
- The proposed development incorporates a stormwater treatment train that will assist in improving stormwater quality in water bodies downstream of the site
- The MUSIC model prepared for the site has been made available for review by Blacktown City Council as part of the Development Application assessment process
- As part of the precinct works being undertaken by SBP, a bio-filtration basin will be constructed immediately west of the IKEA MFLU site
- The bio-filtration basin immediately to the west of the IKEA MFLU site will be installed to meet the water quality objectives associated with the downstream watercourse and is addressed by SBP in its Development Application
- Sediment and erosion control measures will be included throughout the construction period to mitigate the potential impacts on downstream water bodies
- A 450 kL rainwater tank will be installed on-site to maximise the potential for non-potable water demands for the site to be met a minimum of 80% of the time.

9 References

- *Engineering Guide for Development*, Blacktown City Council, 2005
- *Australian Rainfall and Runoff, Volume 1*, Institute of Engineers, 1987
- *Blacktown City Council Growth Centre Precincts Development Control Plan 2010*, NSW Department of Planning and Environment, 2010
- *Developer Handbook for Water Sensitive Urban Design*, Blacktown City Council, 2013
- *Managing Urban Stormwater – Soils and Construction*, NSW Department of Housing, 2004

IKEA MFLU – MARSDEN PARK

APPENDIX

A

CIVIL DRAWINGS

DATE PLOTTED: 6 July 2015 3:21 PM BY: BRITTANY HOLZHEIMER



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FDC BUILDING IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION



DRAWING SCHEDULE

80215051-01-1001	COVER SHEET AND DRAWING LIST
80215051-01-1002	GENERAL NOTES AND LEGENDS
80215051-01-1011	GENERAL ARRANGEMENT PLAN
80215051-01-1101	BULK EARTHWORKS PLAN SHEET 1
80215051-01-1102	BULK EARTHWORKS PLAN SHEET 2
80215051-01-1103	BULK EARTHWORKS PLAN SHEET 3
80215051-01-1104	BULK EARTHWORKS PLAN SHEET 4
80215051-01-1201	CIVIL WORKS PLAN SHEET 1
80215051-01-1202	CIVIL WORKS PLAN SHEET 2
80215051-01-1203	CIVIL WORKS PLAN SHEET 3
80215051-01-1204	CIVIL WORKS PLAN SHEET 4
80215051-01-1321	PAVEMENT, SIGNAGE & LINEMARKING PLAN - SHEET 1
80215051-01-1322	PAVEMENT, SIGNAGE & LINEMARKING PLAN - SHEET 2
80215051-01-1323	PAVEMENT, SIGNAGE & LINEMARKING PLAN - SHEET 3
80215051-01-1324	PAVEMENT, SIGNAGE & LINEMARKING PLAN - SHEET 4
80215051-01-1341	CIVIL WORKS DETAILS
80215051-01-1351	SITE SECTIONS - SHEET 1
80215051-01-1352	SITE SECTIONS - SHEET 2
80215051-01-1360	RETAINING WALL LOCALITY PLAN
80215051-01-1361	RETAINING WALL ELEVATIONS - SHEET 1
80215051-01-1362	RETAINING WALL ELEVATIONS - SHEET 2
80215051-01-1363	RETAINING WALL ELEVATIONS - SHEET 3
80215051-01-1364	RETAINING WALL ELEVATIONS - SHEET 4
80215051-01-1365	RETAINING WALL ELEVATIONS - SHEET 5
80215051-01-1366	RETAINING WALL ELEVATIONS - SHEET 6
80215051-01-1401	STORMWATER CATCHMENT PLAN
80215051-01-1421	STORMWATER DRAINAGE DETAILS - SHEET 1
80215051-01-1422	STORMWATER DRAINAGE DETAILS - SHEET 2
80215051-01-1423	STORMWATER DRAINAGE DETAILS - SHEET 3
80215051-01-1461	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 1
80215051-01-1462	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 2
80215051-01-1463	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 3
80215051-01-1464	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 4
80215051-01-1465	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 5
80215051-01-1466	STORMWATER DRAINAGE LONGITUDINAL SECTIONS - SHEET 6
80215051-01-1521	EROSION & SEDIMENT CONTROL PLAN
80215051-01-1531	EROSION & SEDIMENT CONTROL DETAILS

XREFs: CAD File: \\cardno.corp\global\AU\NSW\Drawings\Structure\Projects\80215051_IKEA MFLU\Drawings\Build\80215051-01-1001-DWG(7).dwg

Rev.	Date	Description	Des.	Verif.	Appd.
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		

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Drawn BJH	Date 06.07.15	Status			
Checked DAC	Date 06.07.15	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Designed AS	Date 06.07.15				
Verified DAC	Date 06.07.15	Datum AHD	Scale	Size A1	
Approved		Drawing Number 80215051-01-1001			Revision 7
SCP	06.07.15				

GENERAL

- 1. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH BLACKTOWN CITY COUNCIL GUIDELINES.
- 2. BLACKTOWN CITY COUNCIL STANDARD DETAILS TO BE USED WHERE POSSIBLE.

SITEWORKS NOTES

- 1. ORIGIN OF LEVELS-- REFER SURVEY NOTES.
- 2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO CARDNO.
- 3. MAKE SMOOTH CONNECTION WITH EXISTING WORKS AND SURFACES.
- 4. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
- 5. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
- 6. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
- 7. ASPHALTIC CONCRETE SHALL CONFORM TO R.M.S. SPECIFICATION R116.
- 8. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.M.S. FORM 3051, COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m³ OF BASECOURSE MATERIAL PLACED.
- 9. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH R.M.S. FORM 3051, AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1 FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 100m³ OF SUB-BASE COURSE MATERIAL PLACED.
- 10. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN [9] A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH R.M.S. FORM 3051 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF CARDNO AND THE SUPERINTENDENT.

BULK EARTHWORKS NOTES

- 1. ORIGIN OF LEVELS- REFER SURVEY NOTES
- 2. STRIP ALL TOPSOIL/ORGANIC MATERIAL FROM CONSTRUCTION AREA AND STOCK PILE AS DIRECTED BY SUPERINTENDENT FOR FUTURE REUSE.
- 3. EXCAVATED MATERIAL TO BE USED AS STRUCTURAL FILL PROVIDED THE PLACEMENT MOISTURE CONTENT OF THE MATERIAL IS +/- 2% OF THE OPTIMUM MOISTURE CONTENT.
- 4. COMPACT FILL AREAS AND SUBGRADE TO NOT LESS THAN:

LOCATION	STANDARD DRY DENSITY (AS 1289 E 5.1.1)
UNDER BUILDING SLABS ON GROUND	98%
UNDER ROADS AND CARPARKS	98%
LANDSCAPED AREAS UNLESS NOTED OTHERWISE	98%
- 5. FOR NON COHESIVE MATERIAL, COMPACT TO 75% DENSITY INDEX.
- 6. BEFORE PLACING FILL, PROOF ROLL EXPOSED SUBGRADE WITH AN 8 TONNE (MIN) DEADWEIGHT SMOOTH DRUM VIBRATORY ROLLER TO DETECT THEN REMOVE SOFT SPOTS (AREAS WITH MORE THAN 2mm MOVEMENT UNDER ROLLER).
- 7. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN--
 - (A) 1 TEST PER 1,000m³ OF FILL PLACED PER LAYER OF FILL.
 - (B) 3 TESTS PER VISIT
 - (C) 1 TEST PER 1000m² OF EXPOSED SUBGRADE "LEVEL 1" TESTING SHALL BE TESTING IN ACCORDANCE WITH AS 3798 (1996).
- 8. FILLING TO BE PLACED IN MAXIMUM 500mm - LOOSE LAYERS AND COMPACTED AS SPECIFIED
- 9. NO FILLING SHALL TAKE PLACE TO EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

- 1. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONTROL OF EROSION AND SEDIMENTATION TO THE SATISFACTION OF COUNCIL, NSW OFFICE OF WATER, SYDNEY WATER, THE OFFICE OF ENVIRONMENT AND HERITAGE, AND LEND LEASE'S REPRESENTATIVE. TO THIS END, THE EROSION AND SEDIMENTATION CONTROLS SHOWN ON THE DRAWINGS SHALL ONLY BE USED AS A GUIDE BY THE CONTRACTOR, AND REPRESENT THE MINIMUM REQUIREMENT ONLY.
- 2. THE CONTRACTOR SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED OR AS OTHERWISE DIRECTED BY THE SUPERINTENDENT. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
 - a. LOCAL AUTHORITY REQUIREMENTS
 - b. EPA REQUIREMENTS
 - c. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
- 3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
- 4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
- 5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.
- 6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE
 - a. INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
 - b. CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
 - c. INSTALL SEDIMENT BASIN AS SHOWN ON PLAN (D). INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
 - d. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

LAND DISTURBANCE

EROSION CONTROL

- 7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
- 8. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS IS PRACTICABLE AFTER THE COMPLETION OF CONSTRUCTION ACTIVITIES.

SEDIMENT CONTROL

- 9. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
- 10. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
- 11. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
- 12. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.
- 13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
- 14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
 - a. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
 - b. ENSURING THAT NOTHING IS NAILED TO THEM
 - c. PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
 - (i) ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
 - (ii) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
 - (iii) CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

NOISE

EPA AND COUNCIL REQUIREMENTS MUST BE ADHERED TO REGARDING LEVEL OF NOISE AND WORKING HOURS TO ENSURE THAT RESIDENTS AND OTHER APPLICABLE NEIGHBORS TO THE SITE ARE NOT DISTURBED UNREASONABLY. THE GENERATION OF NOISE MUST BE MINIMISED.

DUST

DUST MUST BE MINIMISED TO ENSURE THERE IS NO HEALTH RISK OR LOSS OF AMENITY.

STAGING OF WORKS

STRIPPING WORKS ARE TO BE STAGED TO MINIMISE EXTENT OF EXPOSED AREA. WEATHER CONDITIONS TO BE ASSESSED PRIOR TO UNDERTAKING STRIPPING.

STOCKPILE PROTECTION

SEDIMENT RETENTION STRUCTURES TO BE PLACED DOWNSLOPE OF ANY STOCKPILES. STOCKPILE IN PLACE > 28 DAYS TO BE TEMPORARILY GRASSED.

VEHICLE AND ROAD MANAGEMENT

SITE ACCESS TO BE RESTRICTED TO ALLOCATED TRUCK ROUTES. EXTERNAL ROADS TO BE SWEEPED REGULARLY FOR DURATION OF WORKS.

EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE. CARDNO CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS. CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

STORMWATER DRAINAGE NOTES

- 1. STORMWATER DESIGN CRITERIA: AVERAGE RECURRENCE INTERVAL: 20 YEAR ARI
- 2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS, U.N.O.
- 3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
- 4. EQUIVALENT STRENGTH FRC PIPES MAY BE USED. SHOULD THE CONTRACTOR WISH TO USE FRC PIPES.
- 5. PIPES TO BE INSTALLED TO TYPE HS2 SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
- 6. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (1998) AND AS/NZS 3500 3.2 (2000).
- 7. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
- 8. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
- 9. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
- 10. GRATES AND COVERS SHALL CONFORM TO AS 3996.
- 11. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
- 12. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

TELSTRA - DUTY OF CARE NOTE

TELSTRA'S PLANS SHOW ONLY THE PRESENCE OF CABLES AND PLANT. THEY ONLY SHOW THEIR POSITION RELATIVE TO ROAD BOUNDARIES, PROPERTY FENCES ETC. AT THE TIME OF INSTALLATION AND TELSTRA DOES NOT WARRANT OR HOLD OUT THAT SUCH PLANS ARE ACCURATE THEREAFTER DUE TO CHANGES THAT MAY OCCUR OVER TIME. DO NOT ASSUME DEPTH OR ALIGNMENT OF CABLES OR PLANT AS THESE VARY SIGNIFICANTLY. THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR TELSTRA CABLES AND PLANT. BEFORE USING MACHINE EXCAVATORS TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG POTHOLING TO IDENTIFY IT'S LOCATION TELSTRA WILL SEEK COMPENSATION FOR DAMAGES CAUSED TO IT'S PROPERTY AND LOSSES CAUSED TO TELSTRA AND IT'S CUSTOMERS.

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY WHELANS INSITES, BEING REGISTERED SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. CARDNO DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR IT'S SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT CARDNO THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM THE ORIGINAL SURVEY DOCUMENTS.

PROPOSED WORKS LEGEND

PROPOSED

- 100.0 PROPOSED CONTOUR
- 100.0 EXISTING CONTOURS
- SITE BOUNDARY
- BATTER SLOPE
- EXTENT OF WORKS
- TREES TO BE REMOVED AS PART OF BULK EARTHWORKS PACKAGE.
- TREES TO BE RETAINED
- BATTERS
- KERB & GUTTER REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- MEDIAN KERB REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- KERB ONLY REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- INTEGRAL KERB WITH THICKENED EDGE REFER DRG No 80215051-01-134.1 FOR DETAILS
- INTEGRAL KERB REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- DISH DRAIN REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- VEHICULAR CROSSING REFER BLACKTOWN CITY COUNCIL STANDARD DETAIL.
- PRAM RAMP REFER BLACKTOWN CITY COUNCIL FOR DETAIL.
- PRAM CROSSING
- CONCRETE HEADWALL
- DRAINAGE LINE No. DRAINAGE PIT No.
- STORMWATER PIPELINE
- DRAINAGE CAP
- STORMWATER DRAINAGE PITS
- SYPHONIC DRAINAGE PIPE (BY OTHERS)
- DOWNPIPE CONNECTION PIT
- RETAINING WALL
- SCOUR PROTECTION

PROPOSED WORKS LEGEND CONTINUED

- SUBSOIL DRAINAGE LINE TO BLACKTOWN CITY COUNCIL STANDARD DETAIL. FLUSHING POINTS NOT SHOWN ON PLANS FOR CLARITY. PROVIDE FLUSHING POINTS AT END OF LINE AND 50m SPACINGS WHERE REQUIRED.
- BIO-RETENTION PLANTING TO LANDSCAPE ARCHITECTS DETAILS.
- ARMCO GUARDRAIL AND PEDESTRIAN BALUSTRADE. REFER ARCHITECT'S DETAILS.
- SPRINKLER SYSTEM STORAGE TANK
- RAINWATER TANK
- FINISHED FLOOR LEVEL

EXISTING WORKS LEGEND

- TRANSGRID PYLON
- TRANSGRID EASEMENT
- TRANSGRID OVERHEAD ELECTRICAL
- EXISTING SEWER
- EXISTING RECYCLED WATER

Rev.	Date	Description	Des.	Verif.	Appd.
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		



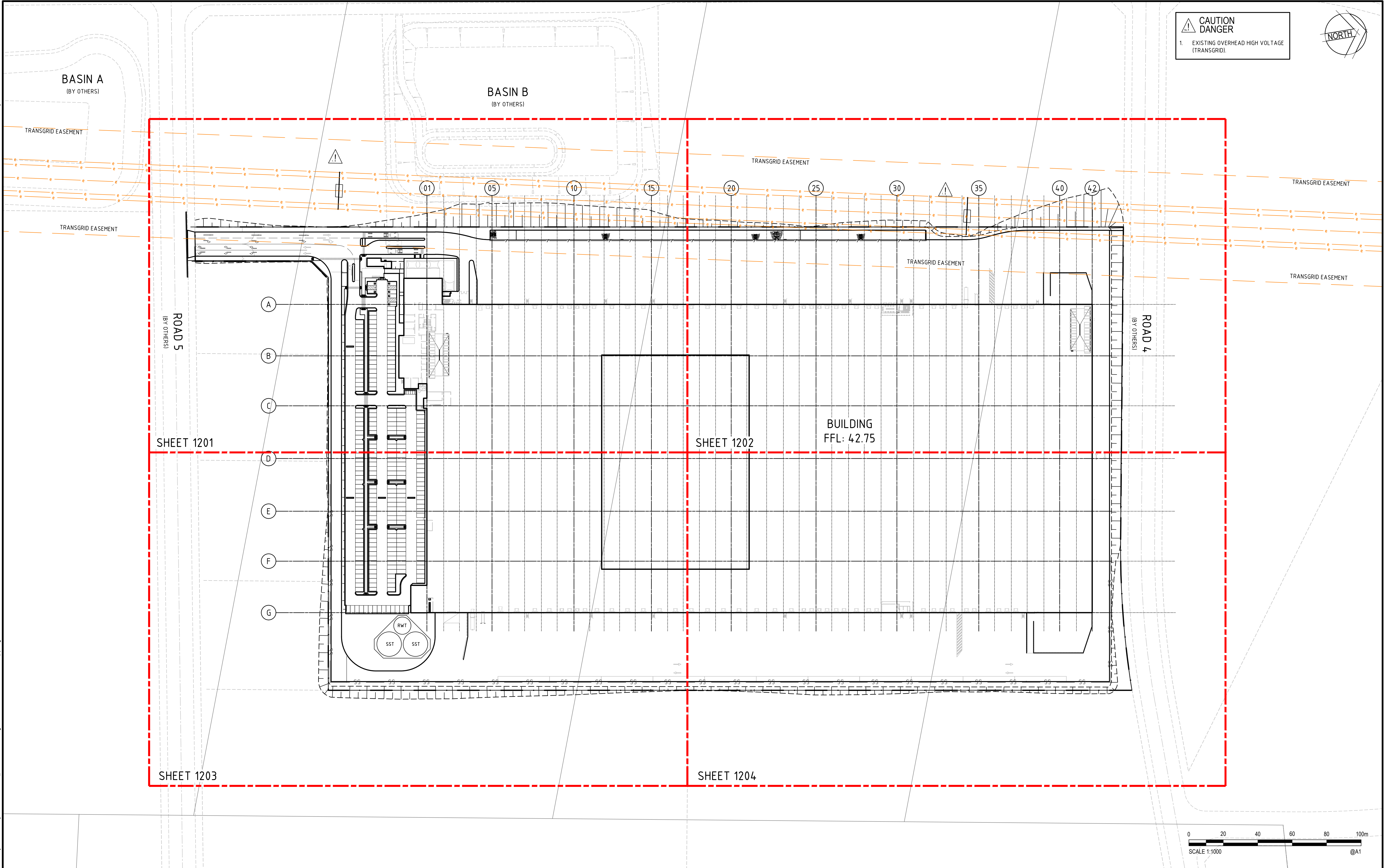
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Drawn BJH Checked DAC Designed AS Verified DAC Approved SCP	Date 06.07.15 Date 06.07.15 Date 06.07.15 Date 06.07.15 Date 06.07.15	Client FDC BUILDING Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION Title GENERAL NOTES AND LEGENDS	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES Datum AHD Scale Size A1 Drawing Number 80215051-01-1002 Revision 7
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DATE PLOTTED 6 July 2015 3:22 PM BY: BRITTANY HOLZHEIMER
XREFs: Xref-80215051-01-Site Boundary, Xref-80215051-01-Existing Services, Xref-80215051-01-Design, Xref-80215051-01-Architect, Xref-80215051-01-Sydney Business Park, Xref-80215051-01-Client Logos, Xref-80215051-01-Sheet Layout
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Rev.	Date	Description	Des.	Verif.	Appd.
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		



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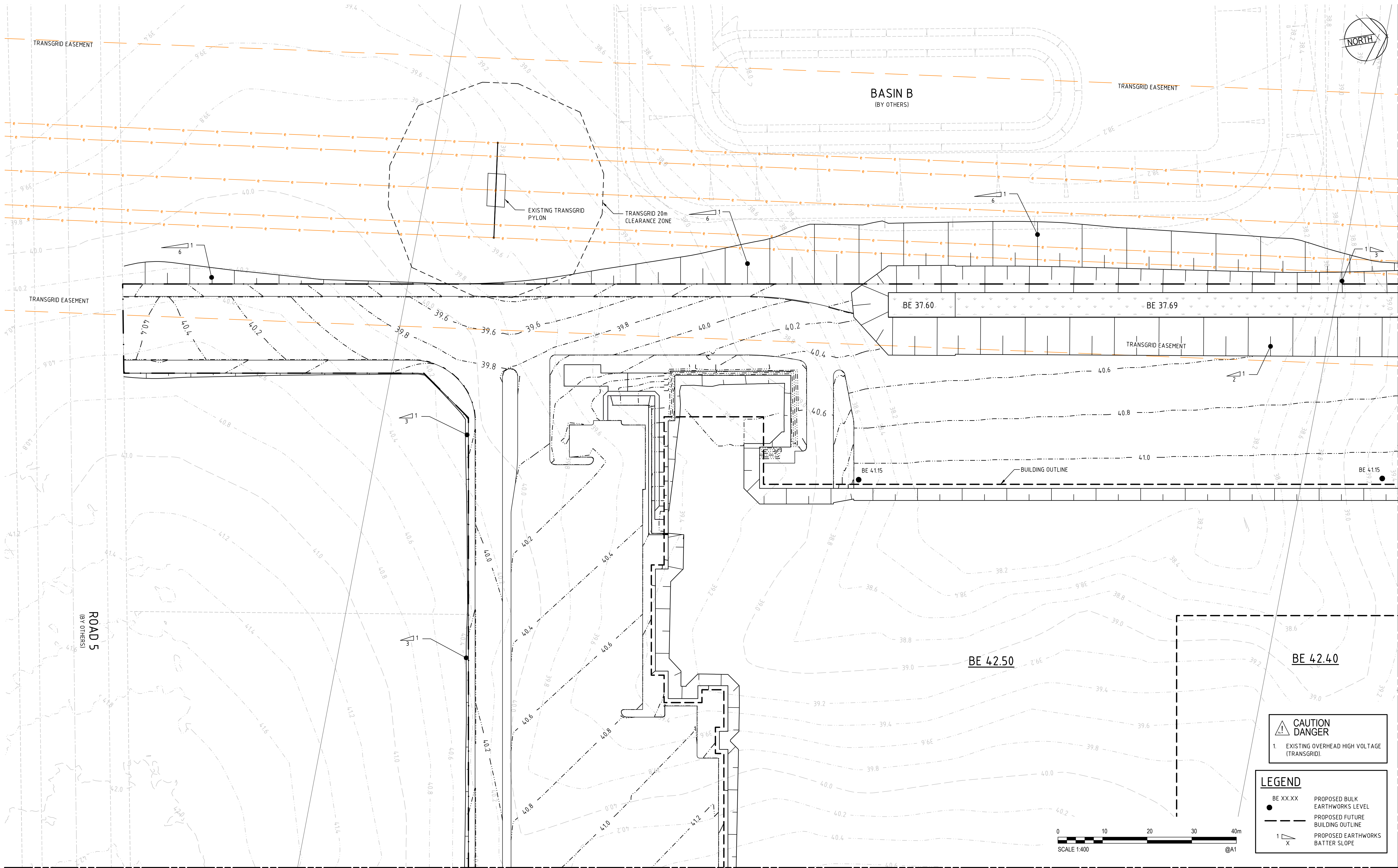
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Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	GENERAL ARRANGEMENT PLAN

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:1000	A1
Drawing Number			Revision
80215051-01-1011			7

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XREFs: Xref-80215051-01-Existing Services, Xref-80215051-01-Sheet Layout, X-CONT-exst-500, Xref-80215051-01-Sydney Business Park, Xref-80215051-01-Client Logos, Xref-80215051-01-Bulk Earthworks, Xref-80215051-01-BE Design Contours, X-CONT-DESIGN-BE
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ADJOINS DRAWING 80215051-01-1103

Rev.	Date	Description	Des.	Verif.	Appd.
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1	01.07.15	ISSUED FOR INFORMATION	DAC	SCP	SCP



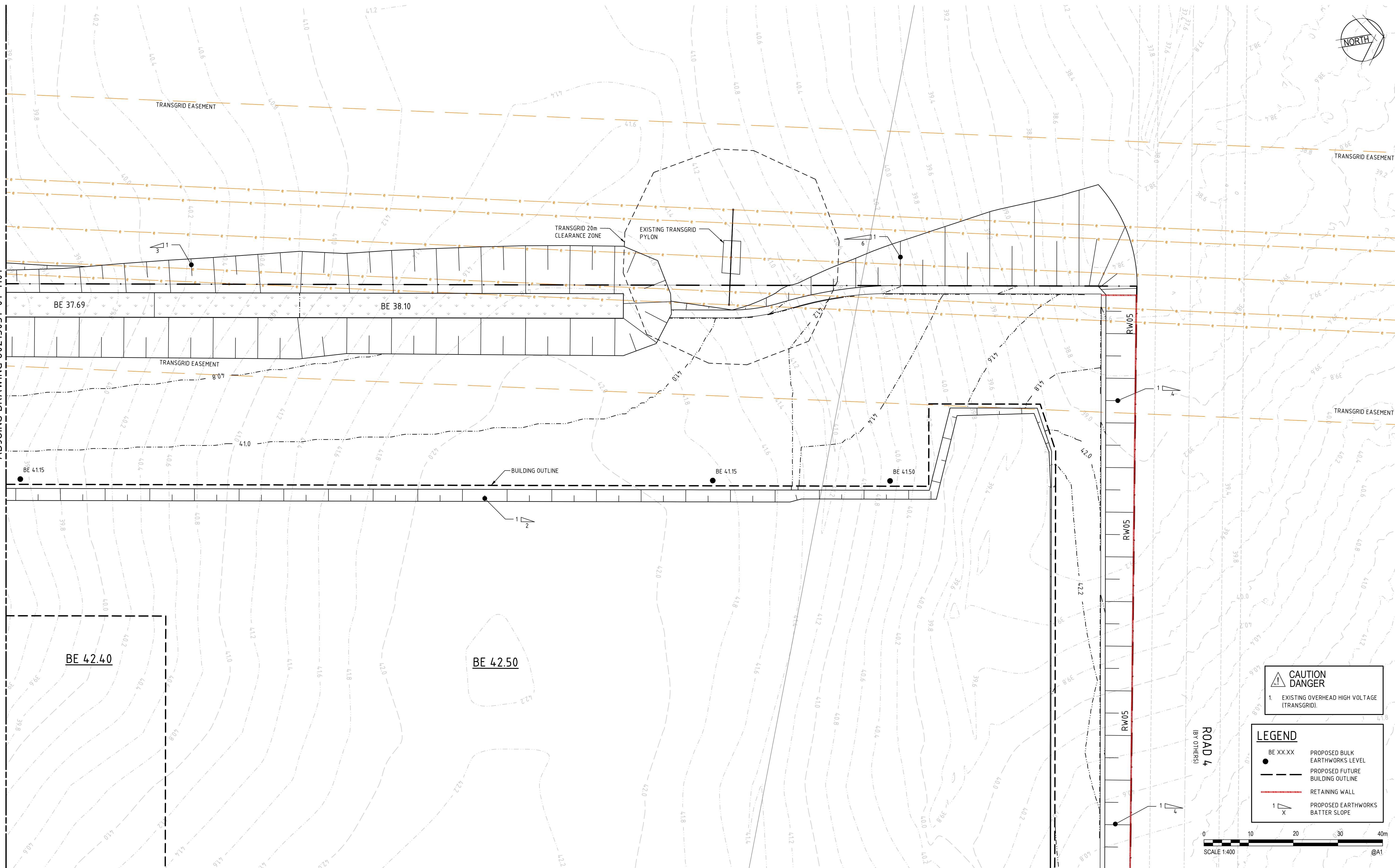
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Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	BULK EARTHWORKS PLAN SHEET 1

Status		FOR APPROVAL	
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1101			2



ADJOINS DRAWING 80215051-01-1104

2	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION			AS	DAC SCP
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Rev.	Date	Description	Des.	Verif.	Appd.	



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Checked	Date
DAC	06.07.15
Designed	Date
AS	06.07.15
Verified	Date
DAC	06.07.15
Approved	
SCP	06.07.15

Client	FDC BUILDING
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Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
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BULK EARTHWORKS PLAN
SHEET 2

Status	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
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Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1102			2



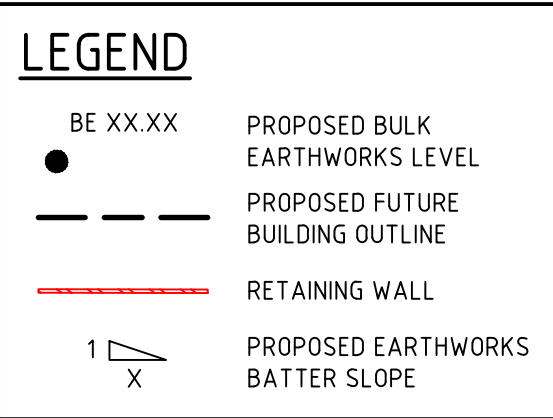
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Client	FDC BUILDING
Project	KEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	BULK EARTHWORKS PLAN SHEET 3

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1103			2

ADJOINS DRAWING 80215051-01-1103



2	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
1	01.07.15	ISSUED FOR INFORMATION	DAC	SCP	SCP
Rev.	Date	Description	Des.	Verif.	Appd.



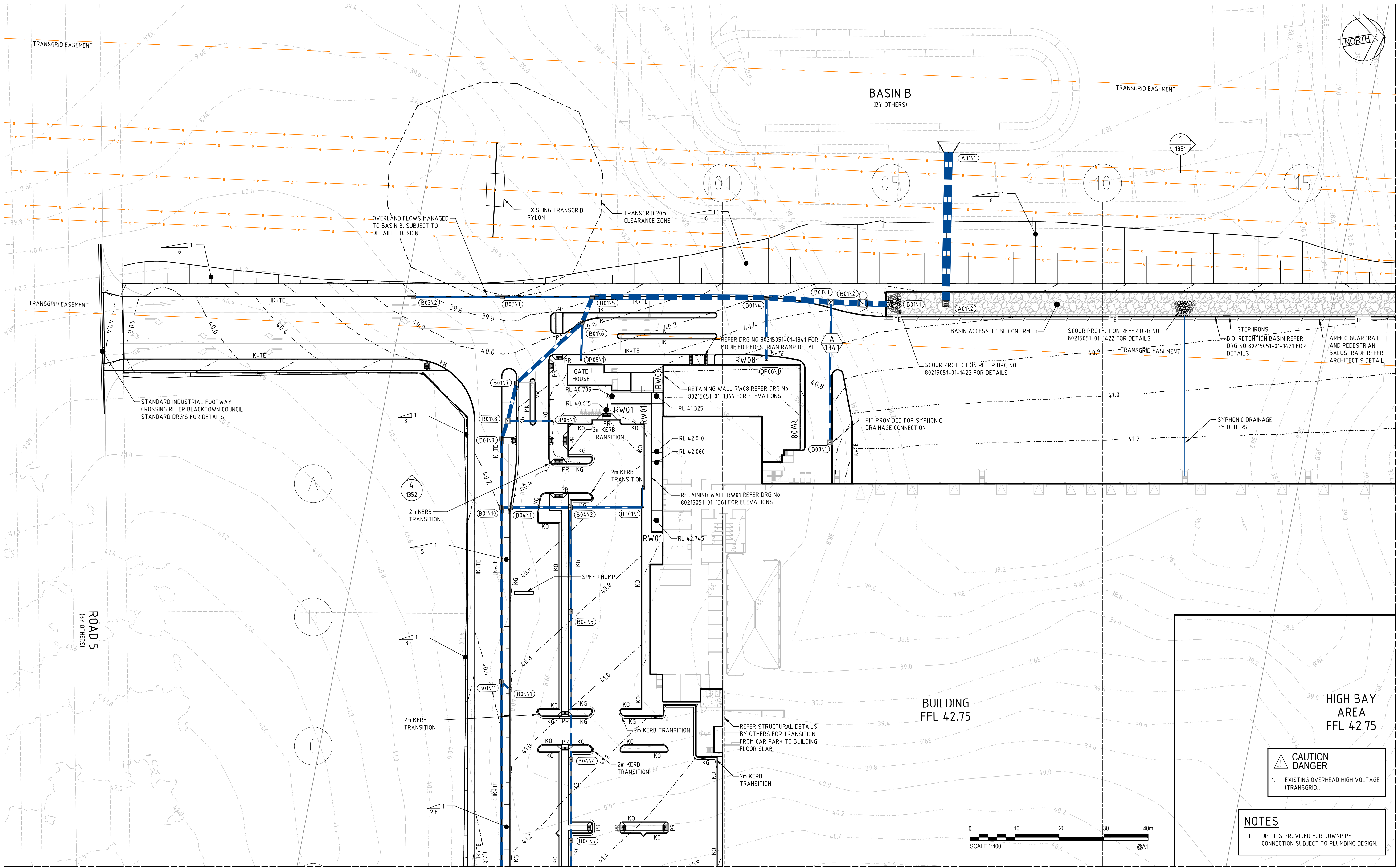
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Checked	Date
DAC	06.07.15
Designed	Date
AS	06.07.15
Verified	Date
DAC	06.07.15
Approved	
SCP	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	BULK EARTHWORKS PLAN SHEET 4

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum	Scale	Size	
AHD	1:400	A1	
Drawing Number			Revision
80215051-01-1104			2



ADJOINS DRAWING 802150511-01-1203

Rev.	Date	Description	Des.	Verif.	Appd.
8	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		



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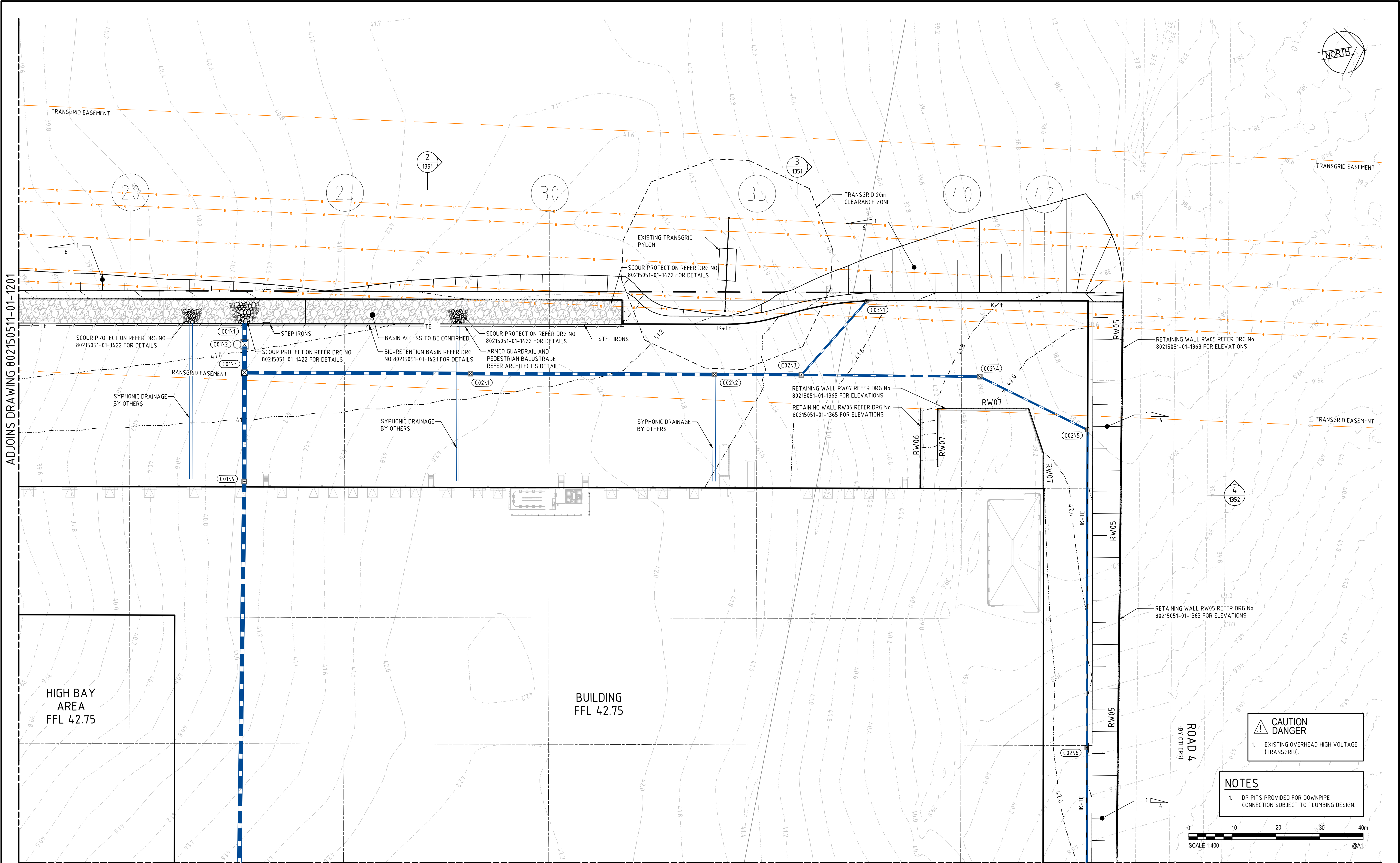


Drawn	BJH	Date	09.07.15
Checked	DAC	Date	09.07.15
Designed	AS	Date	09.07.15
Verified	DAC	Date	09.07.15
Approved	SCP	Date	09.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	CIVIL WORKS PLAN SHEET 1

Status	FOR APPROVAL
Datum	AHD
Scale	1:400
Size	A1
Drawing Number	80215051-01-1201
Revision	8

XREFs: Xref-80215051-01-Design, Xref-80215051-01-Sheet Layout, X-CONT-exa-500, Xref-80215051-01-Sydney Business Park, Xref-80215051-01-Architect, Xref-80215051-01-Client Logos, Xref-80215051-01-1201-1204-DWG(0) .dwg
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DATE PLOTTED: 9 July 2015 10:39 AM BY: BRITTANY HOLZHEIMER



ADJOINS DRAWING 802150511-01-1204

Rev.	Date	Description	Des.	Verif.	Appd.
8	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		



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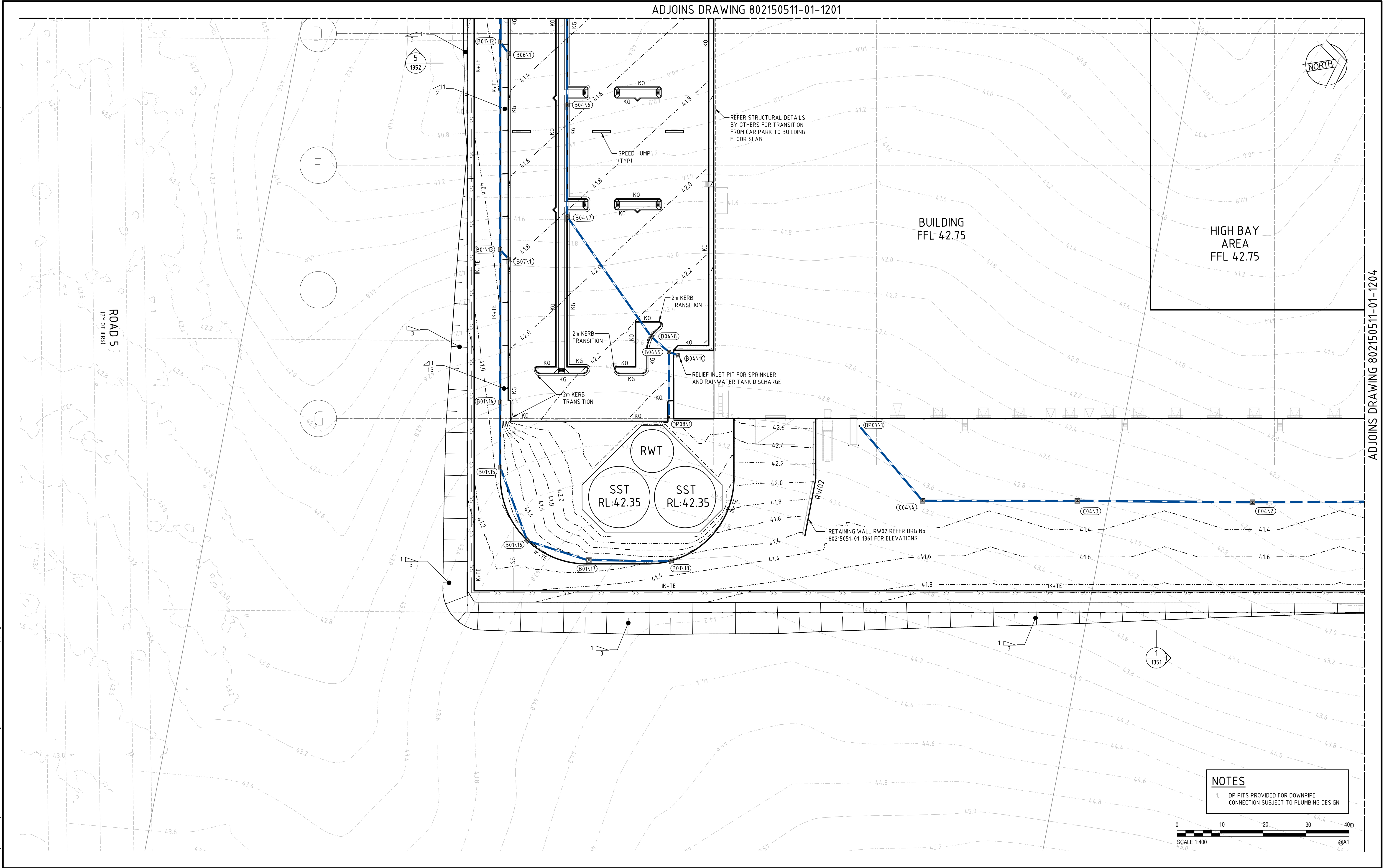
Drawn	BJH	Date	09.07.15
Checked	DAC	Date	09.07.15
Designed	AS	Date	09.07.15
Verified	DAC	Date	09.07.15
Approved	SCP	Date	09.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	CIVIL WORKS PLAN SHEET 2

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1202			8

DATE PLOTTED: 9 July 2015 10:39 AM BY: BRITTANY HOLZHEIMER

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7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		
Rev.	Date	Description	Des.	Verif.	Appd.



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Drawn	BJH	Date	09.07.15
Checked	DAC	Date	09.07.15
Designed	AS	Date	09.07.15
Verified	DAC	Date	09.07.15
Approved	SCP	Date	09.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	CIVIL WORKS PLAN SHEET 3

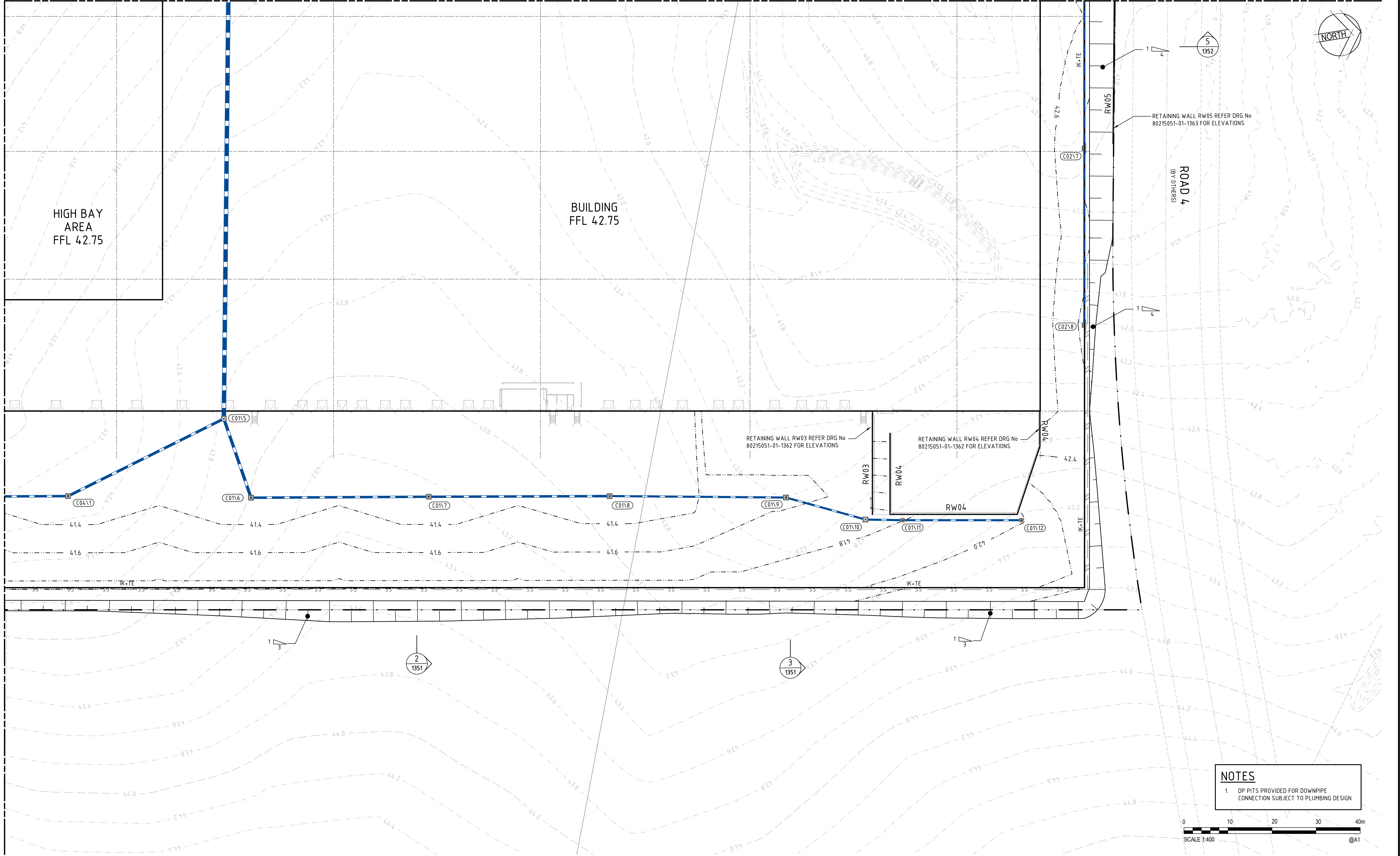
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FOR APPROVAL				
NOT TO BE USED FOR CONSTRUCTION PURPOSES				
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80215051-01-1203				8

DATE PLOTTED: 9 July 2015 10:39 AM BY: BRITTANY HOLZHEIMER

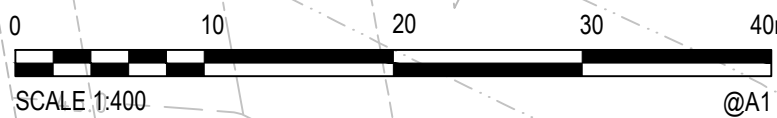
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ADJOINS DRAWING 802150511-01-1203

ADJOINS DRAWING 802150511-01-1202



NOTES
1. DP PITS PROVIDED FOR DOWNPIPE CONNECTION SUBJECT TO PLUMBING DESIGN.



Rev.	Date	Description	Des.	Verif.	Appd.
8	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
7	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
5	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
4	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
3	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
2	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
1	27.03.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	DAC		



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Web: www.cardno.com.au

Drawn BJH	Date 09.07.15
Checked DAC	Date 09.07.15
Designed AS	Date 09.07.15
Verified DAC	Date 09.07.15
Approved SCP	Date 09.07.15

Client FDC BUILDING
Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title CIVIL WORKS PLAN SHEET 4

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1204			8



ADJOINS DRAWING 80215051-01-1323

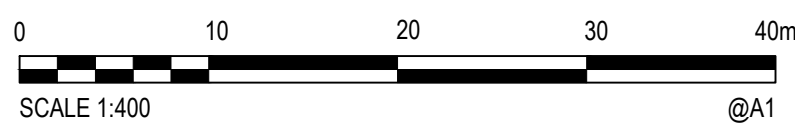
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4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	DAC	SCP
Rev.	Date	Description	Des.	Verif.	Appd.



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Drawn BJH	Date 09.07.15	Client FDC BUILDING			
Checked DAC	Date 09.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION	Status FOR APPROVAL		
Designed AS	Date 09.07.15		NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Verified DAC	Date 09.07.15		Datum AHD		
Approved		Title PAVEMENT, SIGNAGE & LINEMARKING PLAN SHEET 1	Scale 1:400	Size A1	Revision
SCP	09.07.15		Drawing Number 80215051-01-1321		7



7	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS			
Rev.	Date	Description	Des.	Verif.	Appd.



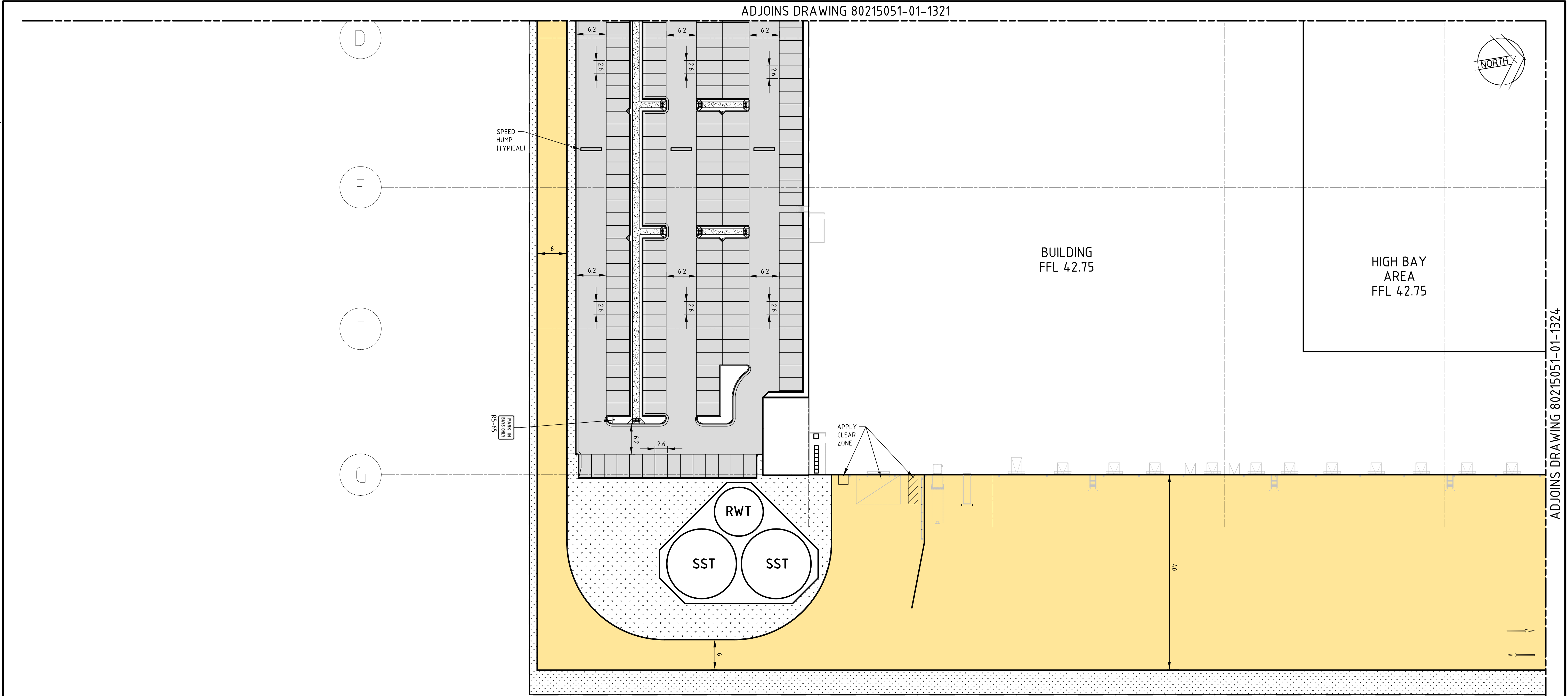
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Drawn BJH	Date 09.07.15	Client FDC BUILDING		
Checked DAC	Date 09.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION		Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
Designed AS	Date 09.07.15	Title PAVEMENT, SIGNAGE & LINEMARKING PLAN SHEET 2		Datum AHD
Verified DAC	Date 09.07.15			Scale 1:400
Approved				Size A1
SCP	09.07.15			Drawing Number 80215051-01-1322
				Revision 7

DATE PLOTTED: 9 July 2015 10:40 AM BY: BRITTANY HOLZHEIMER

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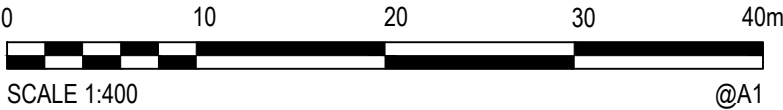


LEGEND

	PAVEMENT TYPE 1
	PAVEMENT TYPE 2
	PAVEMENT TYPE 3
	LANDSCAPE ZONE

NOTES

- ALL SIGNS AND POSTS LOCATED WITHIN TRANSGRID EASEMENT ARE TO EARTHED IN ACCORDANCE WITH TRANSGRID REQUIREMENTS.
- REFER DRG 80215051-01-1341 FOR PAVEMENT NOTES AND DETAILS.
- LINEMARKING SHALL BE IN ACCORDANCE WITH THE ROADS AND MARITIME SERVICES (RMS) DELINEATION GUIDELINES.
- ALL SIGNAGE SHALL BE IN ACCORDANCE WITH AS1742.
- TACTILE SURFACE GROUND INDICATORS (TSGI) TO ALL PRAM CROSSINGS AND PRAM RAMPS IN ACCORDANCE WITH AS 1428.4.1
- WG = WHITE GORE



Rev.	Date	Description	Des.	Verif.	Appd.
7	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	



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Drawn	Date	Client
BJH	09.07.15	FDC BUILDING
Checked	Date	
DAC	09.07.15	
Designed	Date	
AS	09.07.15	
Verified	Date	
DAC	09.07.15	
Approved		
SCP	09.07.15	

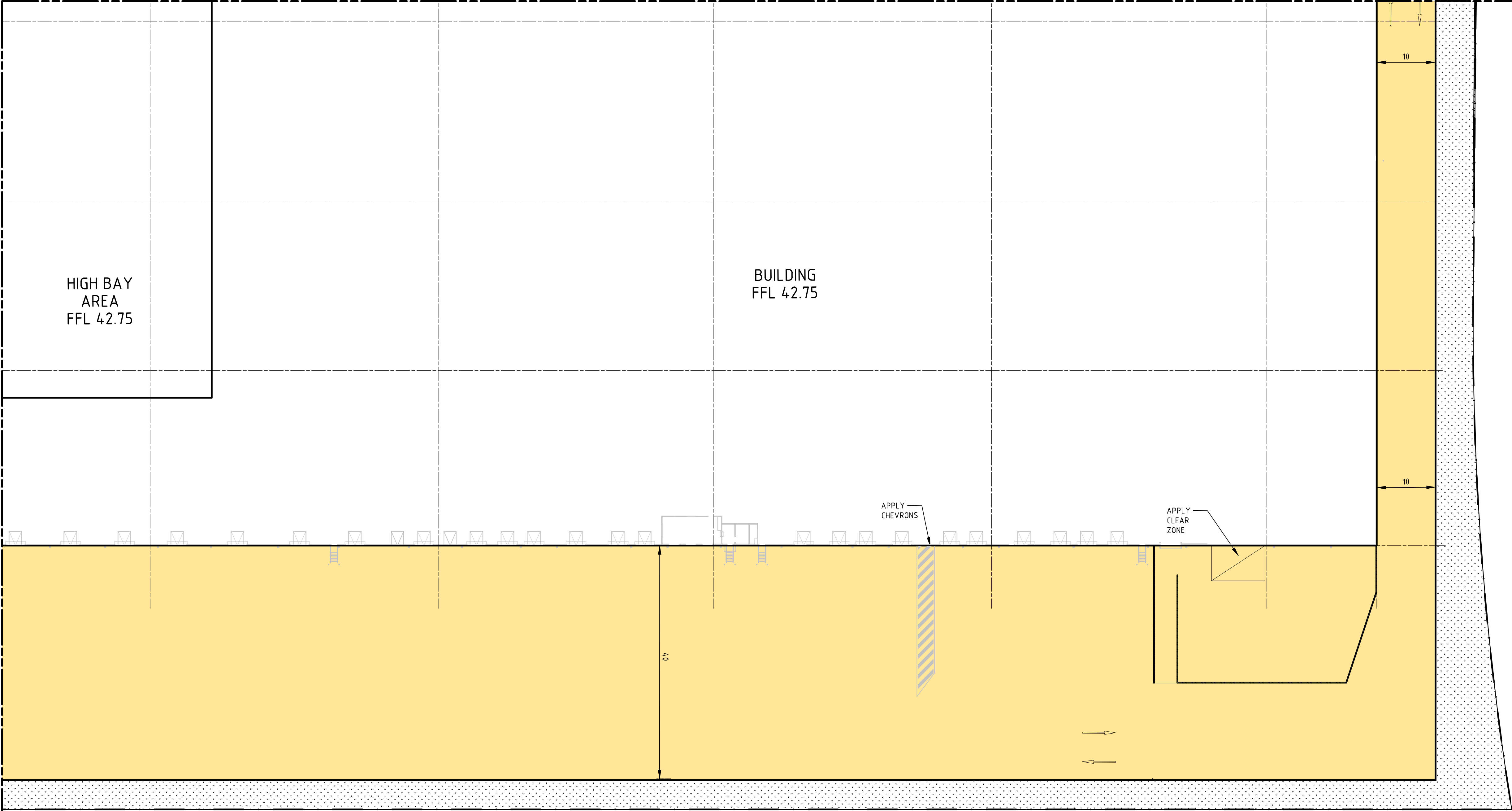
Project	IKEA MFLU
	MARSDEN PARK INDUSTRIAL PRECINCT
	DEVELOPMENT APPLICATION
Title	PAVEMENT, SIGNAGE & LINEMARKING PLAN
	SHEET 3

Status		FOR APPROVAL	
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:400	A1
Drawing Number			Revision
80215051-01-1323			7

DATE PLOTTED: 9 July 2015 10:40 AM BY: BRITTANY HOLZHEIMER

ADJOINS DRAWING 80215051-01-1323

ADJOINS DRAWING 80215051-01-1322

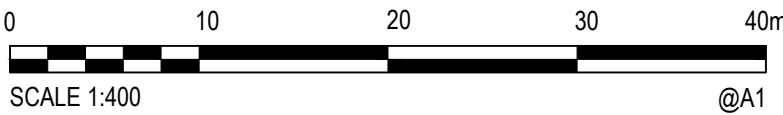


LEGEND

- PAVEMENT TYPE 1
- PAVEMENT TYPE 2
- PAVEMENT TYPE 3
- LANDSCAPE ZONE

NOTES

- ALL SIGNS AND POSTS LOCATED WITHIN TRANSGRID EASEMENT ARE TO EARTHED IN ACCORDANCE WITH TRANSGRID REQUIREMENTS.
- REFER DRG 80215051-01-1341 FOR PAVEMENT NOTES AND DETAILS.
- LINEMARKING SHALL BE IN ACCORDANCE WITH THE ROADS AND MARITIME SERVICES (RMS) DELINEATION GUIDELINES.
- ALL SIGNAGE SHALL BE IN ACCORDANCE WITH AS1742.
- TACTILE SURFACE GROUND INDICATORS (TSGI) TO ALL PRAM CROSSINGS AND PRAM RAMPS IN ACCORDANCE WITH AS 1428.4.1
- WG = WHITE GORE



Rev.	Date	Description	Des.	Verif.	Appd.
7	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	



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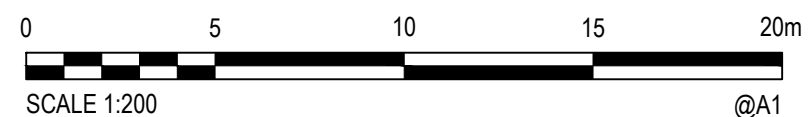
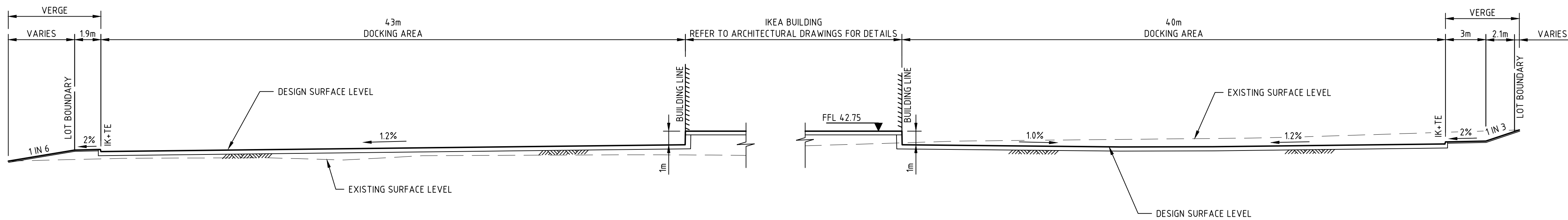
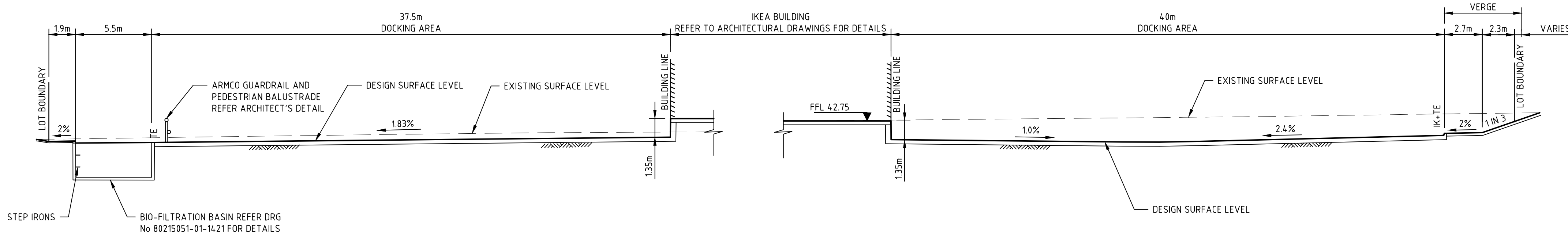
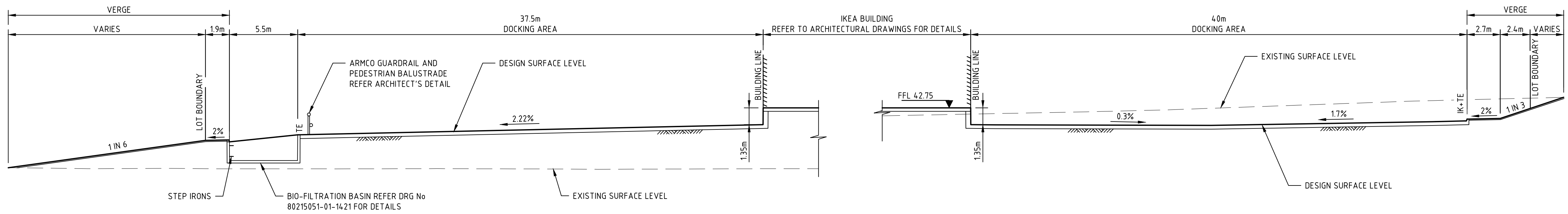
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BJH	09.07.15	FDC BUILDING
Checked	Date	Project
DAC	09.07.15	IKEA MFLU
Designed	Date	MARSDEN PARK INDUSTRIAL PRECINCT
AS	09.07.15	DEVELOPMENT APPLICATION
Verified	Date	Title
DAC	09.07.15	PAVEMENT, SIGNAGE & LINEMARKING PLAN
Approved		SHEET 4
SCP	09.07.15	

Date	Client	Project
09.07.15	FDC BUILDING	IKEA MFLU
Date	Project	MARSDEN PARK INDUSTRIAL PRECINCT
09.07.15	DEVELOPMENT APPLICATION	
Date	Title	
09.07.15	PAVEMENT, SIGNAGE & LINEMARKING PLAN	
	SHEET 4	

Status	FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES	
Datum	AHD
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Drawing Number	80215051-01-1324
Revision	7

Drawn BJH	Date 06.07.15	Client FDC BUILDING			
Checked DAC	Date 06.07.15	Project IKEA MFLU MARDSEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Designed AS	Date 06.07.15		Datum AHD	Scale AS SHOWN	Size A1
Verified DAC	Date 06.07.15		Drawing Number 80215051-01-1341		Revision 6
Approved		Title			
SCP	06.07.15	CIVIL WORKS DETAILS			

DATE PLOTTED 6 July 2015 3:24 PM BY: BRITTANY HOLZHEIMER



Rev.	Date	Description	Des.	Verif.	Appd.
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	



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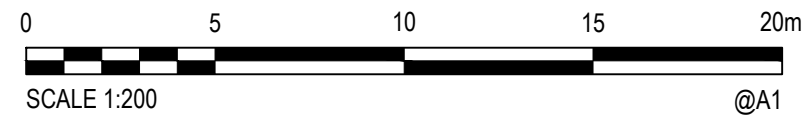
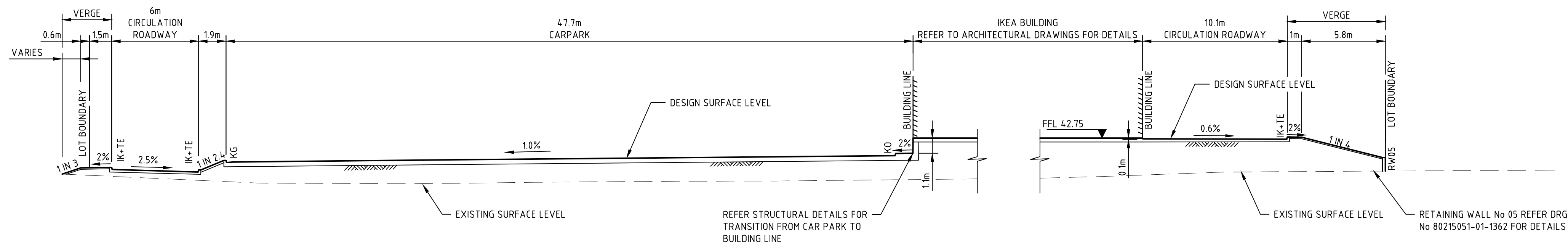
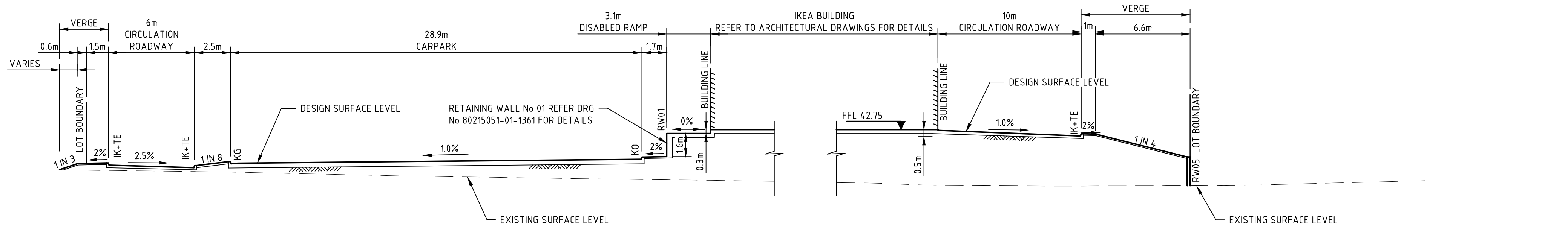


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Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	SITE SECTIONS SHEET 1

Status	FOR APPROVAL
Datum	AHD
Scale	1:200
Size	A1
Drawing Number	80215051-01-1351
Revision	6

DATE PLOTTED: 6 July 2015 3:24 PM BY: BRITTANY HOLZHEIMER



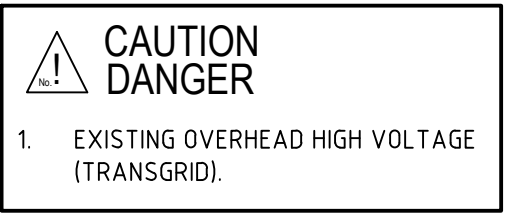
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4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	SCP



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Drawn BJH 06.07.15	Date 06.07.15	Client FDC BUILDING
Checked DAC 06.07.15	Date 06.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Designed AS 06.07.15	Date 06.07.15	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
Verified DAC 06.07.15	Date 06.07.15	Datum AHD
Approved SCP 06.07.15	Title SITE SECTIONS SHEET 2	Scale 1:200
		Size A1
		Drawing Number 80215051-01-1352
		Revision 6

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Drawn	Date
B/JH	06.07.15
Checked	Date
DAC	06.07.15
Designed	Date
AS	06.07.15
Verified	Date
DAC	06.07.15
Approved	
SCP	06.07.15

Client	FDC BUILDING
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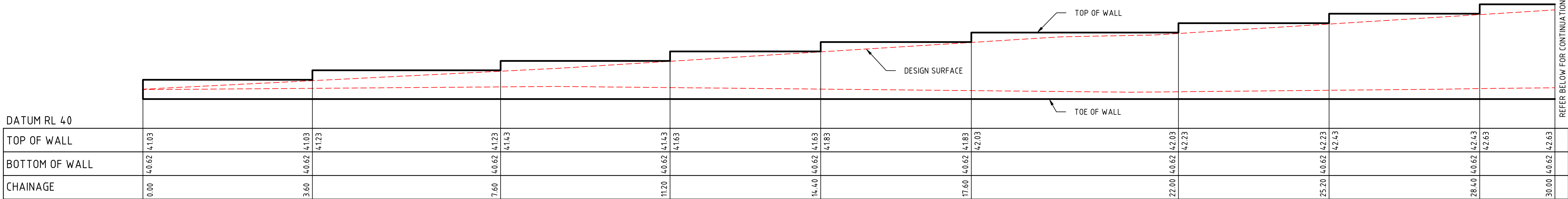
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Title	RETAINING WALL LOCALITY PLAN
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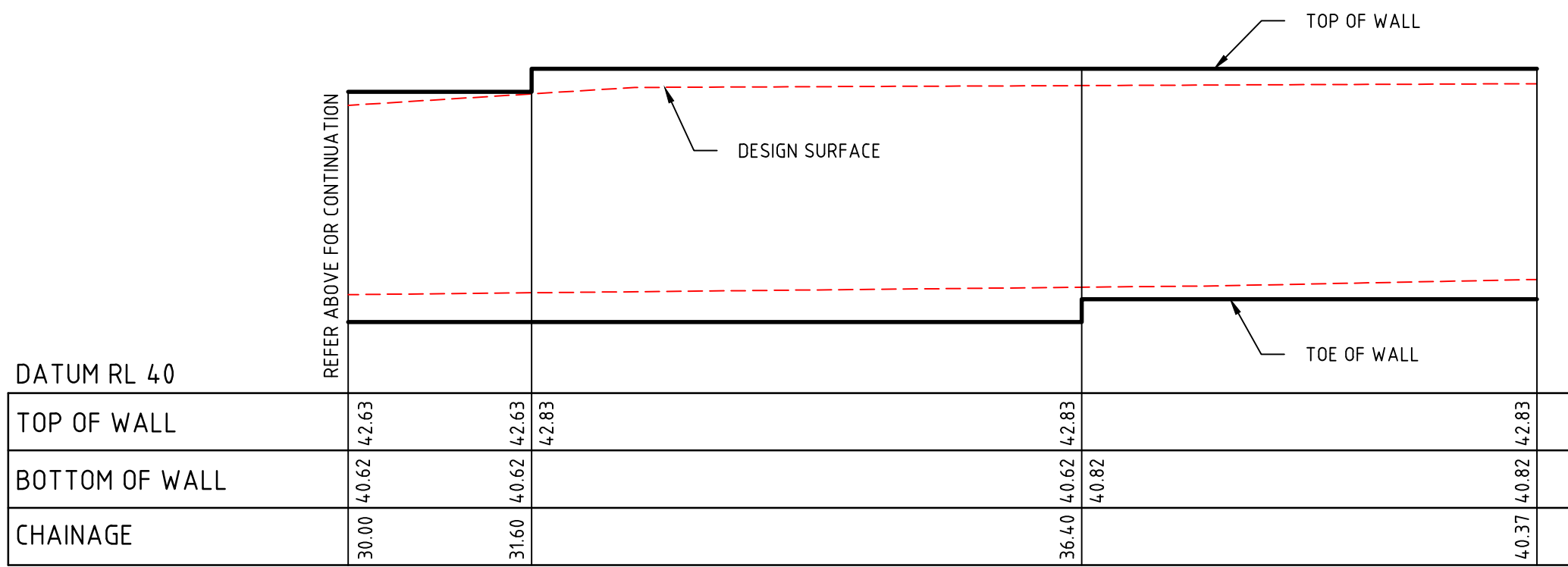
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Drawing Number						Revision	
80215051-01-1360						3	

DATE PLOTTED 6 July 2015 3:25 PM BY : BRITTANY HOLZHEIMER

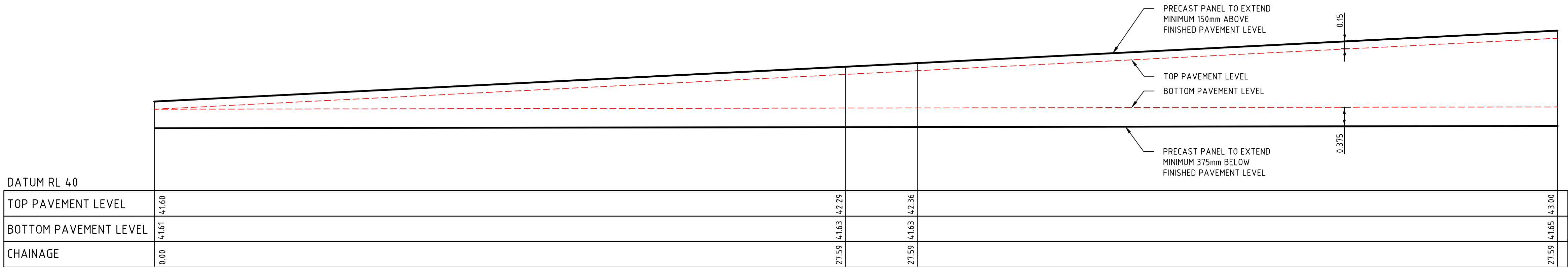
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CAD File: \\cardno-corp\global\AU\NSW\Drawings\Build\80215051-01-1361-1366-DWG(0).dwg



RETAINING WALL 1 (190 BLOCKWORK)
SCALE 1:50



RETAINING WALL 1 (190 BLOCKWORK)
SCALE 1:50



RETAINING WALL 2 (PRECAST PANEL)
SCALE 1:50

NOTE:
REFER STRUCTURAL ENGINEER'S
DRAWING FOR DETAILS



Rev.	Date	Description	Des.	Verif.	Appd.
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	



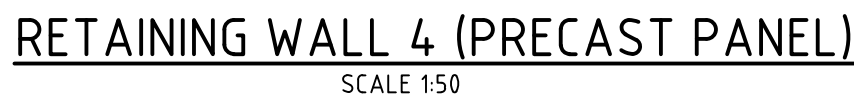
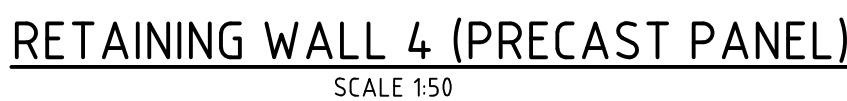
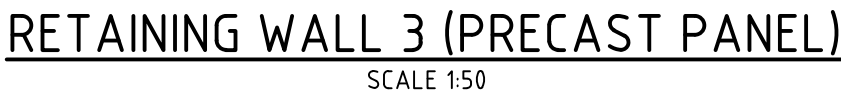
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Drawn	BJH	Date	06.07.15
Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	RETAINING WALL ELEVATIONS SHEET 1

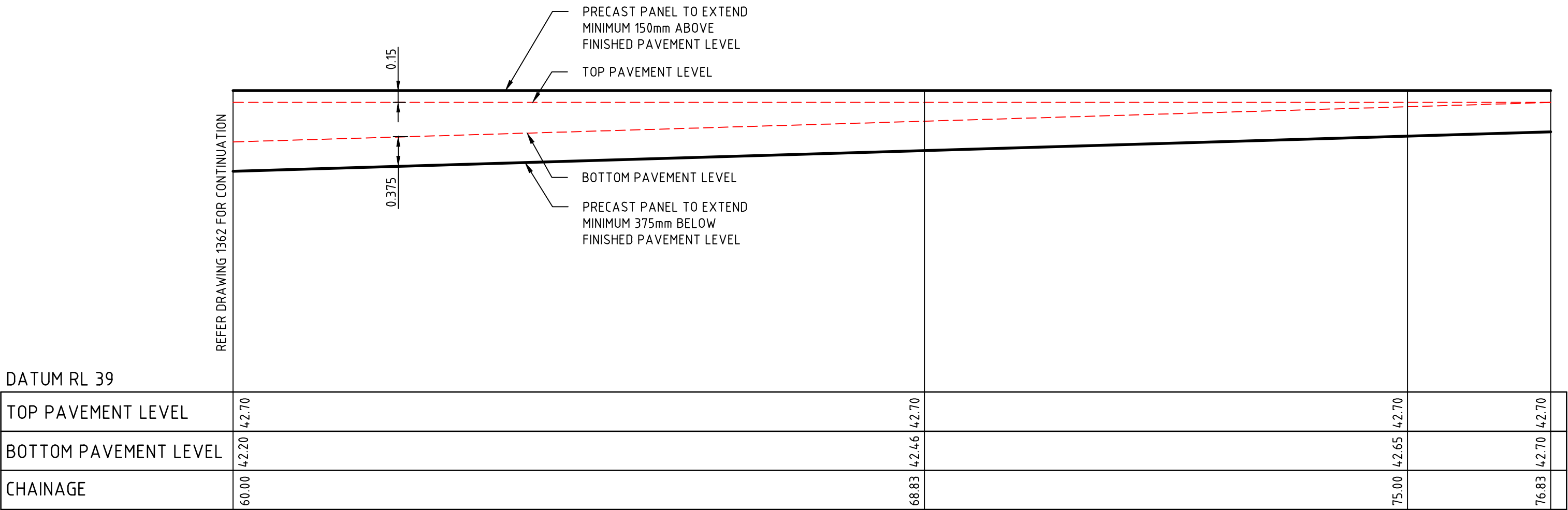
Status	FOR APPROVAL
Datum	AHD
Scale	1:50
Size	A1
Drawing Number	80215051-01-1361
Revision	6



Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum AHD		Scale 1:50	
		Size A1	
Drawing Number 80215051-01-1362			Revision 6

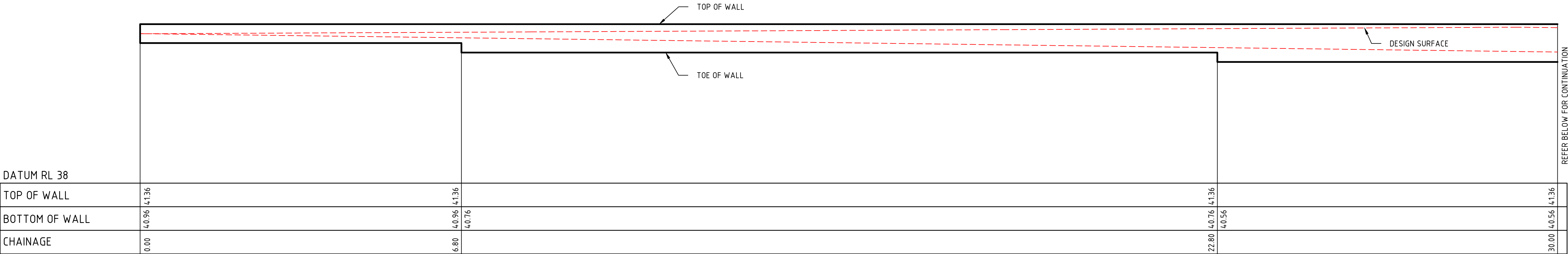
DATE PLOTTED 6 July 2015 3:25 PM BY : BRITTANY HOLZHEIMER

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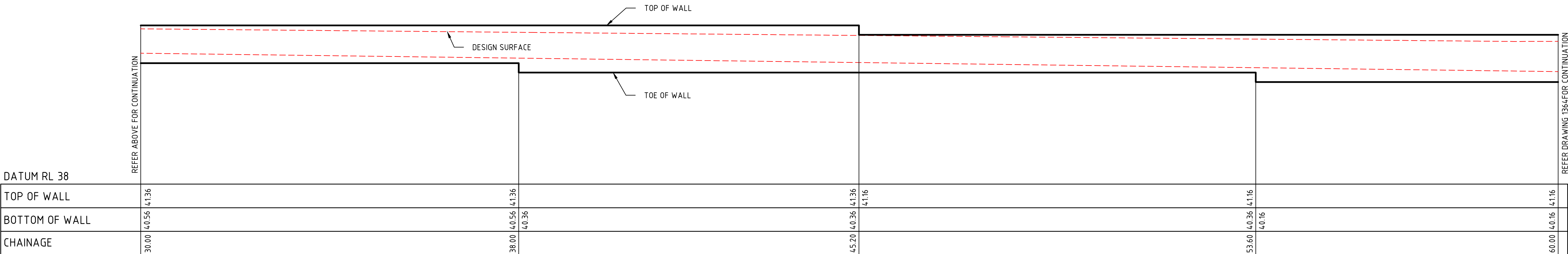
RETAINING WALL 4 (PRECAST PANEL)

SCALE 1:50



RETAINING WALL 5 (190 BLOCKWORK)

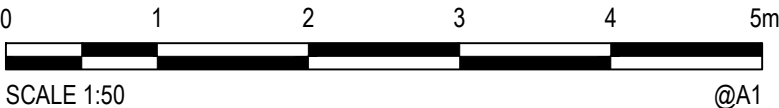
SCALE 1:50



RETAINING WALL 5 (190 BLOCKWORK)

SCALE 1:50

NOTE:
REFER STRUCTURAL ENGINEER'S
DRAWING FOR DETAILS



6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	
Rev.	Date	Description	Des.	Verif.	Appd.



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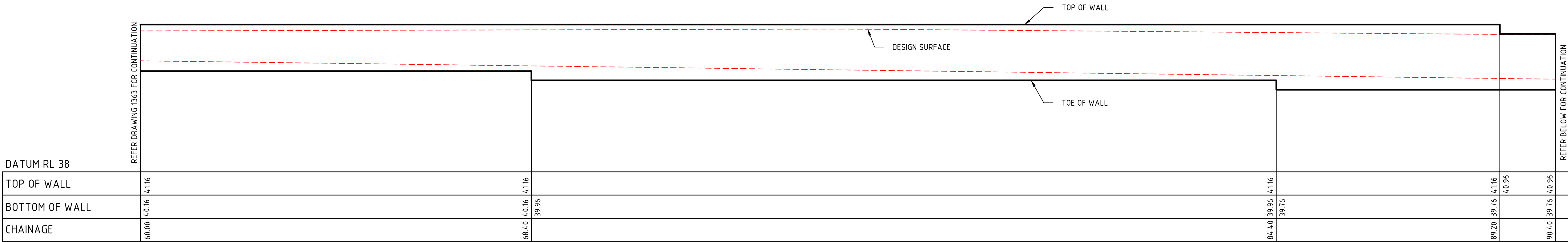
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BJH	06.07.15
Checked	Date
DAC	06.07.15
Designed	Date
AS	06.07.15
Verified	Date
DAC	06.07.15
Approved	
SCP	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	RETAINING WALL ELEVATIONS SHEET 3

Status	FOR APPROVAL
Datum	AHD
Scale	1:50
Size	A1
Drawing Number	80215051-01-1363
Revision	6

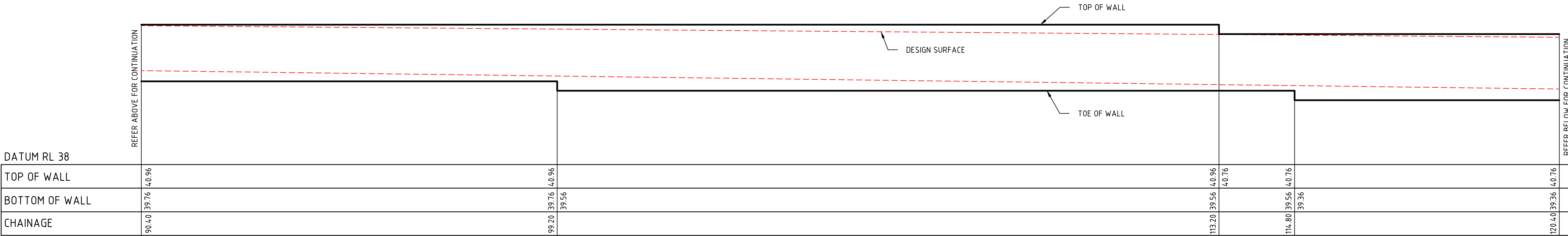
DATE PLOTTED 6 July 2015 3:25 PM BY : BRITTANY HOLZHEIMER

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CAD File : \\cardno-corp\global\AU\NSW\Drawings\Build\80215051-01-1361-1366-DWG(6).dwg



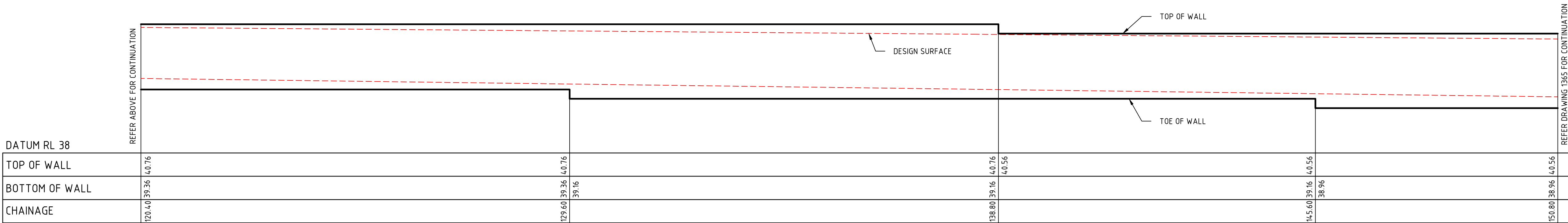
RETAINING WALL 5 (190 BLOCKWORK)

SCALE 1:50



RETAINING WALL 5 (190 BLOCKWORK)

SCALE 1:50



RETAINING WALL 5 (190 BLOCKWORK)

SCALE 1:50

NOTE:
REFER STRUCTURAL ENGINEER'S
DRAWING FOR DETAILS



Rev.	Date	Description	Des.	Verif.	Appd.
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	SCP



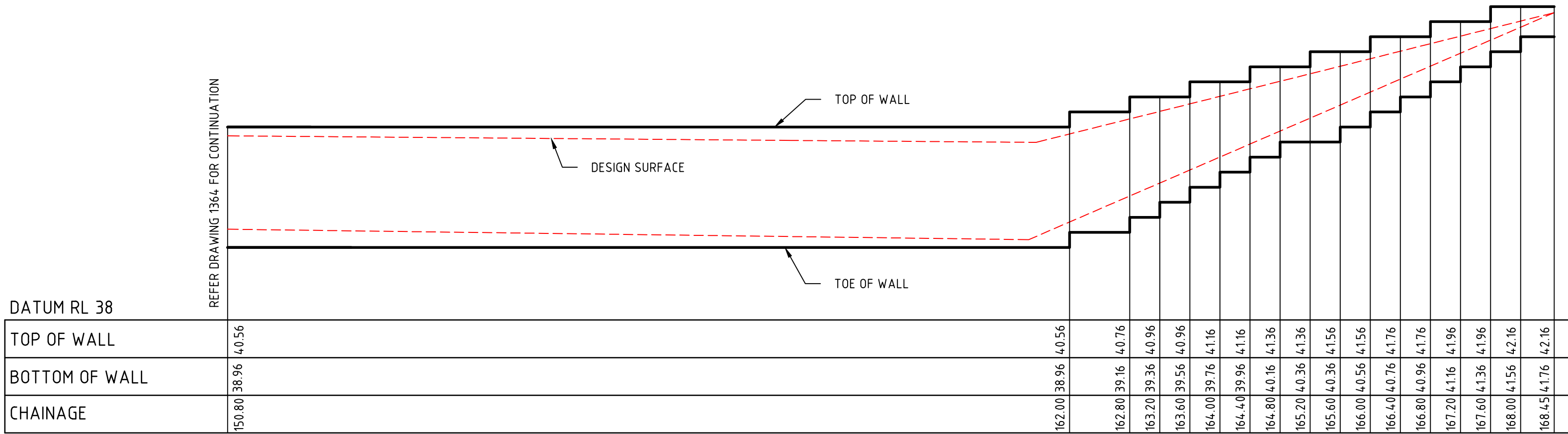
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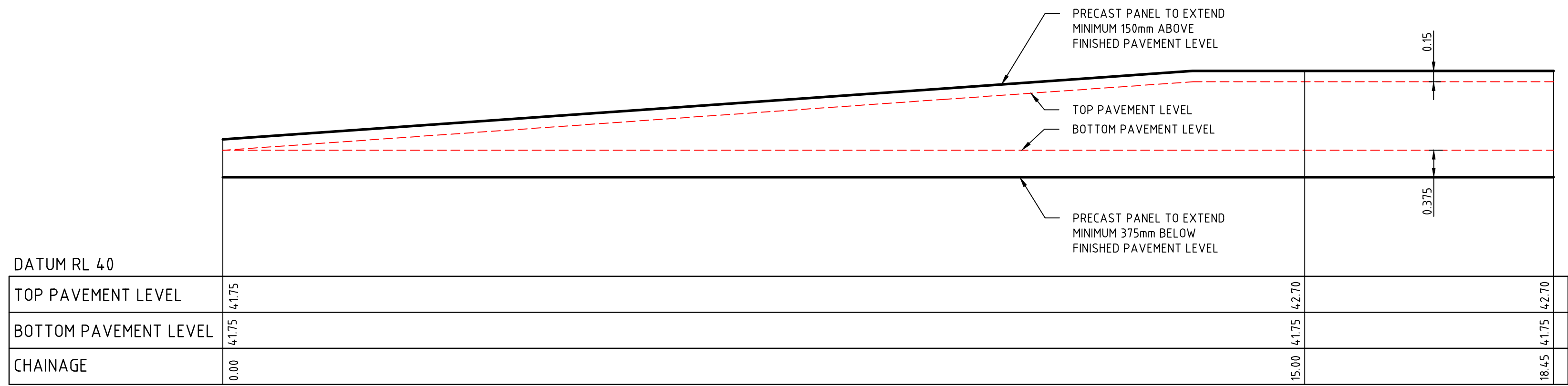
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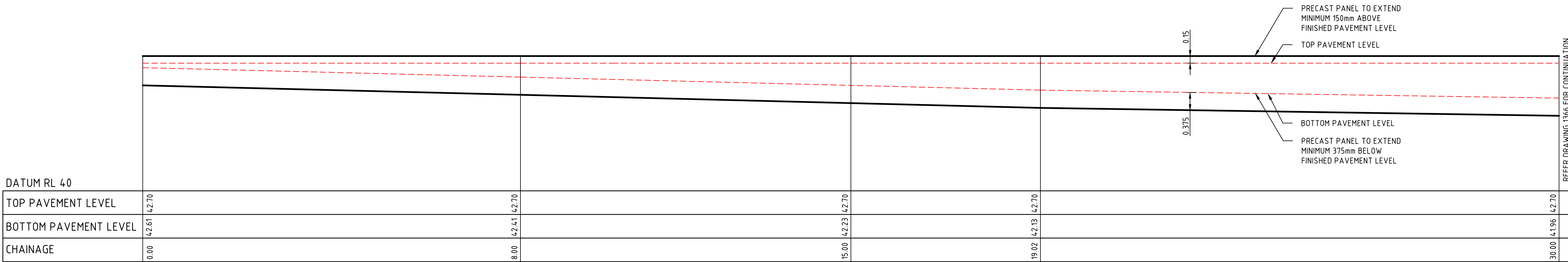
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Checked DAC 06.07.15	Date 06.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Designed AS 06.07.15	Date 06.07.15	Title RETAINING WALL ELEVATIONS SHEET 4
Verified DAC 06.07.15	Date 06.07.15	
Approved SCP 06.07.15		
Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES		Datum AHD
Scale 1:50		Size A1
Drawing Number 80215051-01-1364		Revision 6



RETAINING WALL 5 (190 BLOCKWORK)
SCALE 1:50



RETAINING WALL 6 (PRECAST PANEL)
SCALE 1:50



RETAINING WALL 7 (PRECAST PANEL)
SCALE 1:50

NOTE:

REFER STRUCTURAL ENGINEER'S
DRAWING FOR DETAILS



Rev.	Date	Description	Des.	Verif.	Appd.
6	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
4	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
3	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
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1	20.04.15	ISSUED FOR INFORMATION - WORK IN PROGRESS	AS	SCP	SCP



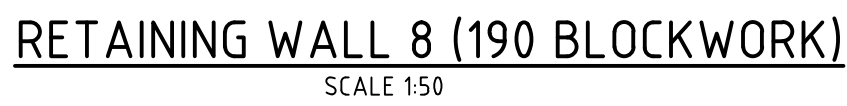
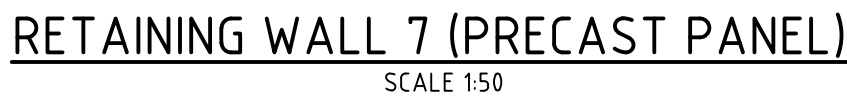
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Drawn BJH	Date 06.07.15	Client FDC BUILDING
Checked DAC	Date 06.07.15	Project IKEA MFLU
Designed AS	Date 06.07.15	MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Verified DAC	Date 06.07.15	Title RETAINING WALL ELEVATIONS SHEET 5
Approved SCP	Date 06.07.15	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
Drawing Number 80215051-01-1365		Revision 6



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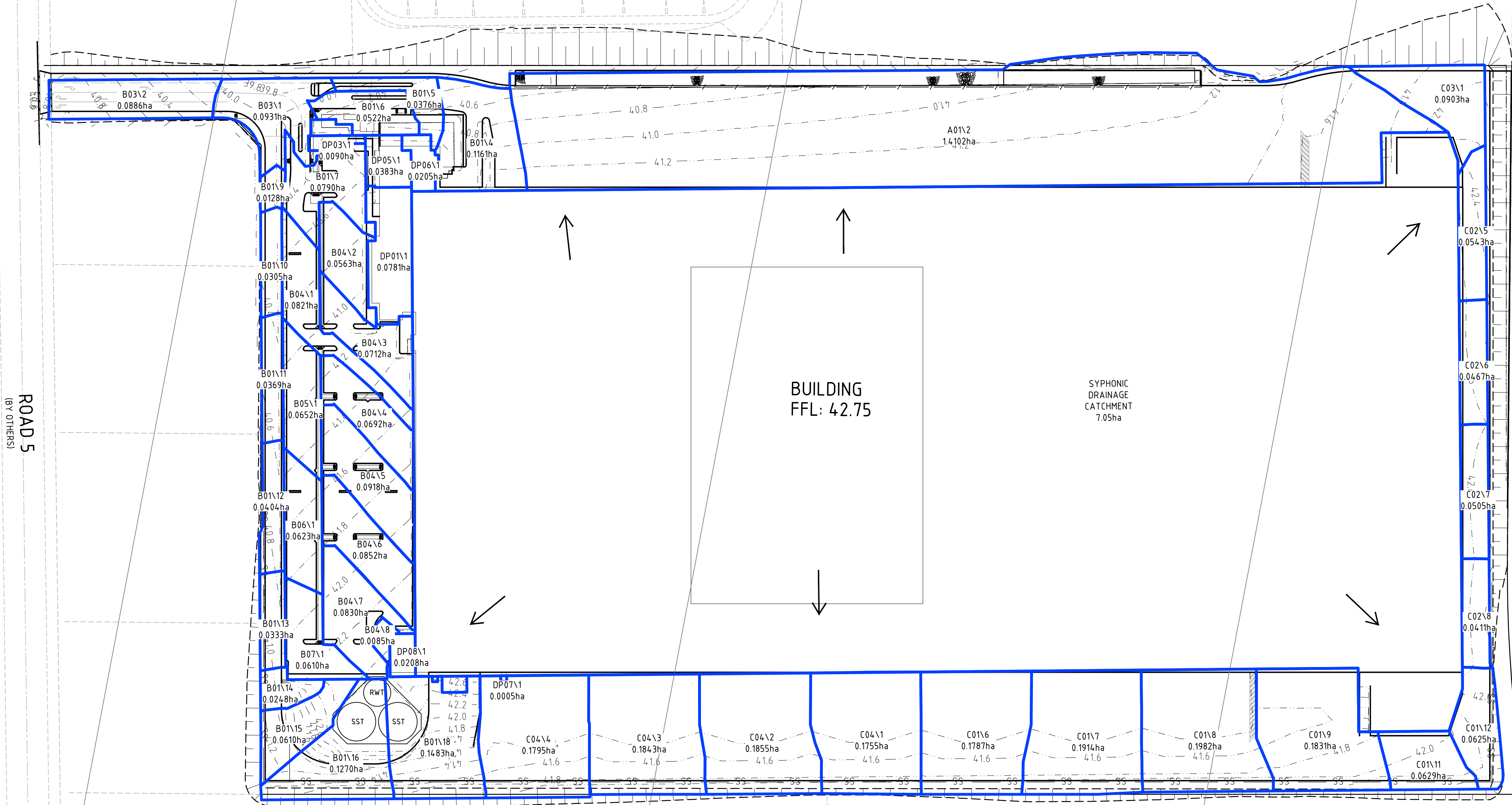
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Checked DAC 06.07.15	Date	Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION	Status	FOR APPROVAL
Designed AS 06.07.15	Date			NOT TO BE USED FOR CONSTRUCTION PURPOSES	
Verified DAC 06.07.15	Date	Title		AHD	A1
Approved				Scale	Size
SCP 06.07.15	Date	RETAINING WALL ELEVATIONS SHEET 6	Drawing Number	1:50	Revision
			80215051-01-1366		6

DATE PLOTTED 6 July 2015 3:25 PM BY: BRITTANY HOLZHEIMER



BASIN A
(BY OTHERS)

BASIN B
(BY OTHERS)



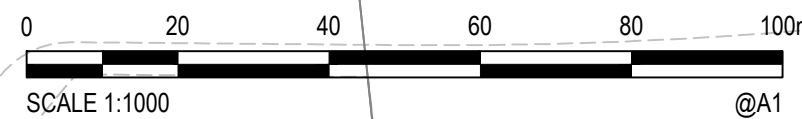
BUILDING
FFL: 42.75

SYPHONIC
DRAINAGE
CATCHMENT
7.05ha

ROAD 4
(BY OTHERS)

ROAD 5
(BY OTHERS)

LEGEND
CATCHMENT BOUNDARY
A01/1
0.0604ha CATCHMENT LABEL/AREA



Rev.	Date	Description	Des.	Verif.	Appd.
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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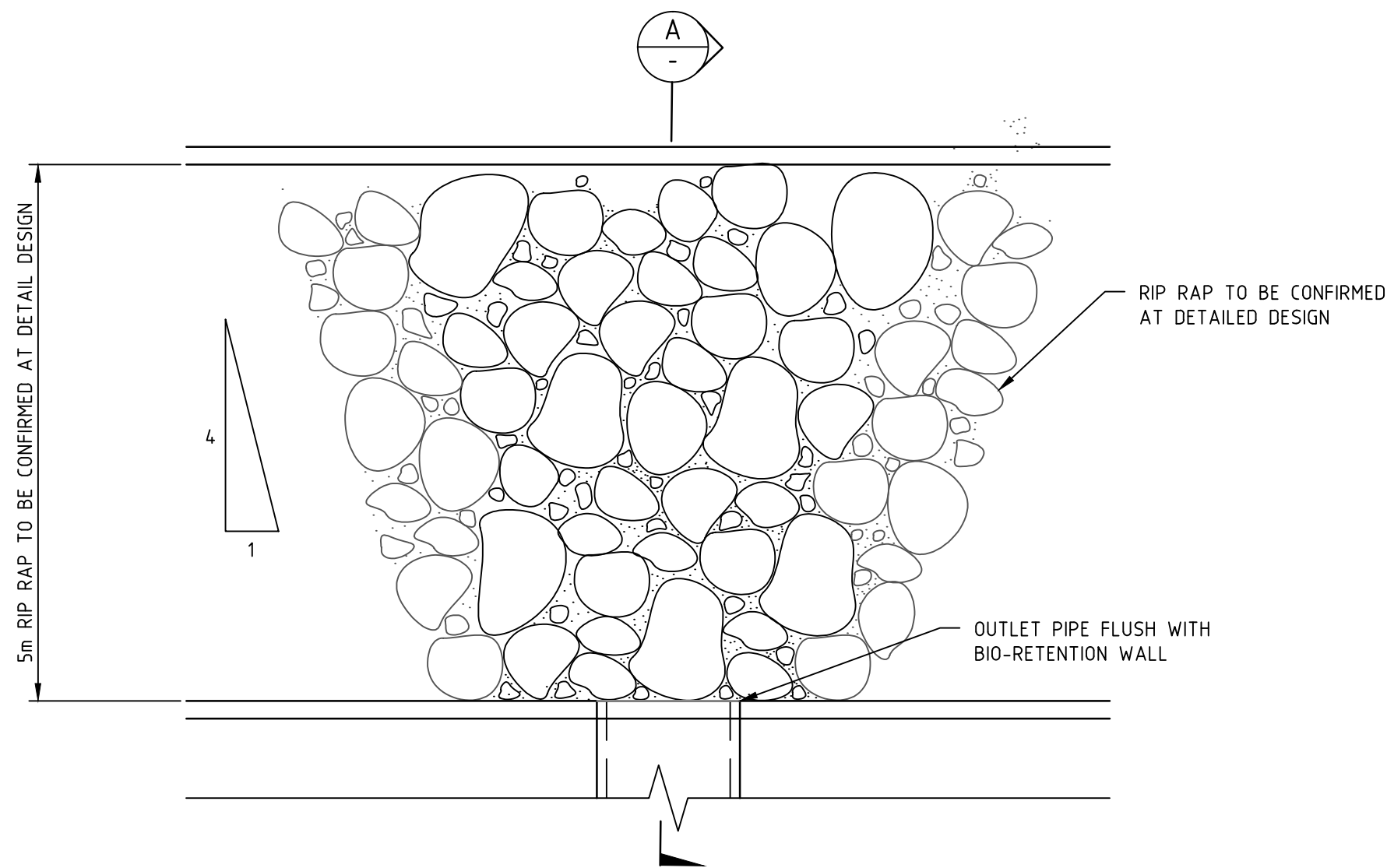
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Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

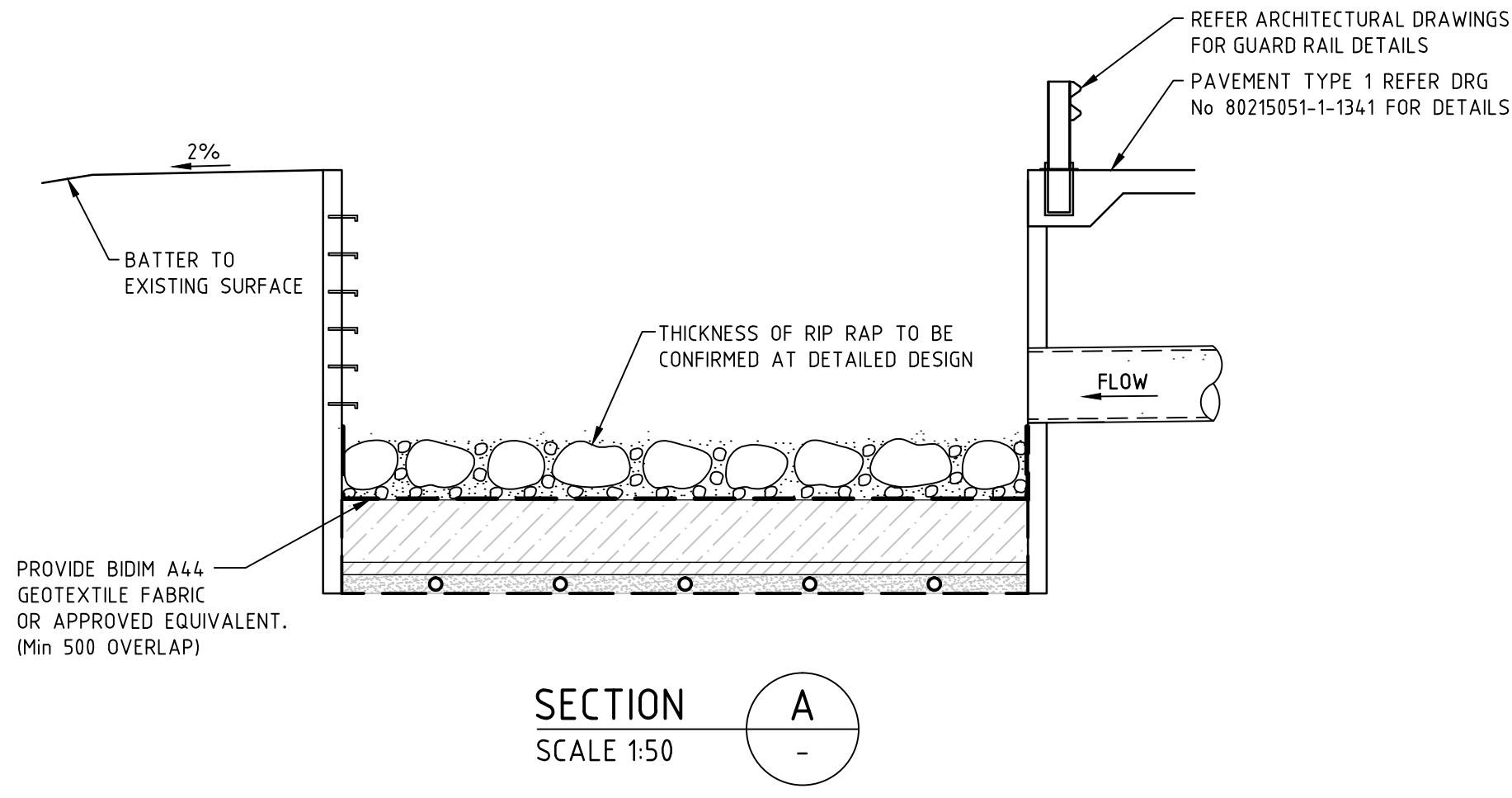
Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	STORMWATER CATCHMENT PLAN

Status	FOR APPROVAL
Datum	AHD
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Size	A1
Drawing Number	80215051-01-1401
Revision	5

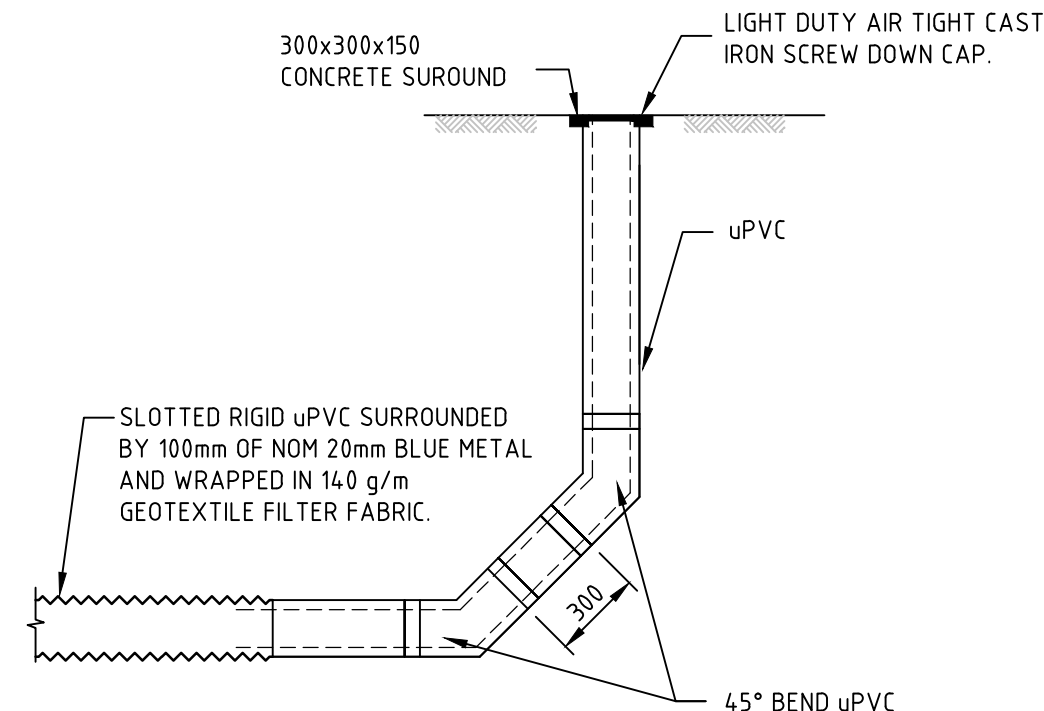
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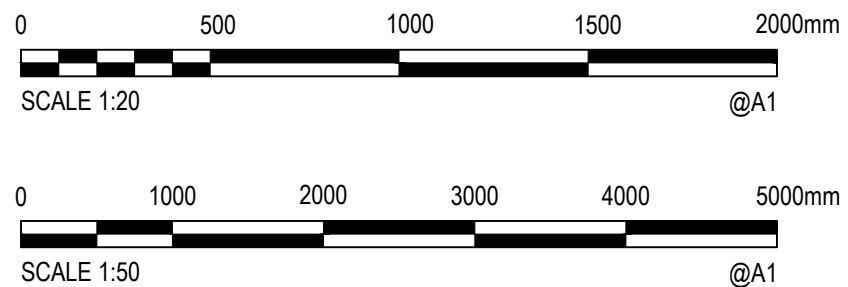
BIO-RETENTION BASIN OUTLET SCOUR PROTECTION PLAN
SCALE 1:50



BIO-RETENTION BASIN OUTLET SCOUR PROTECTION DETAIL
SCALE 1:50



FLUSHING POINT DETAIL
SCALE 1:20



XREFs: Xref:80215051-01-Design; Xref:80215051-01-Sydney Business Park; Xref:80215051-01-Existing Services; Xref:80215051-01-Client Logos; Xref:80215051-01-Design Contours 500
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Rev.	Date	Description	Des.	Verif.	Appd.
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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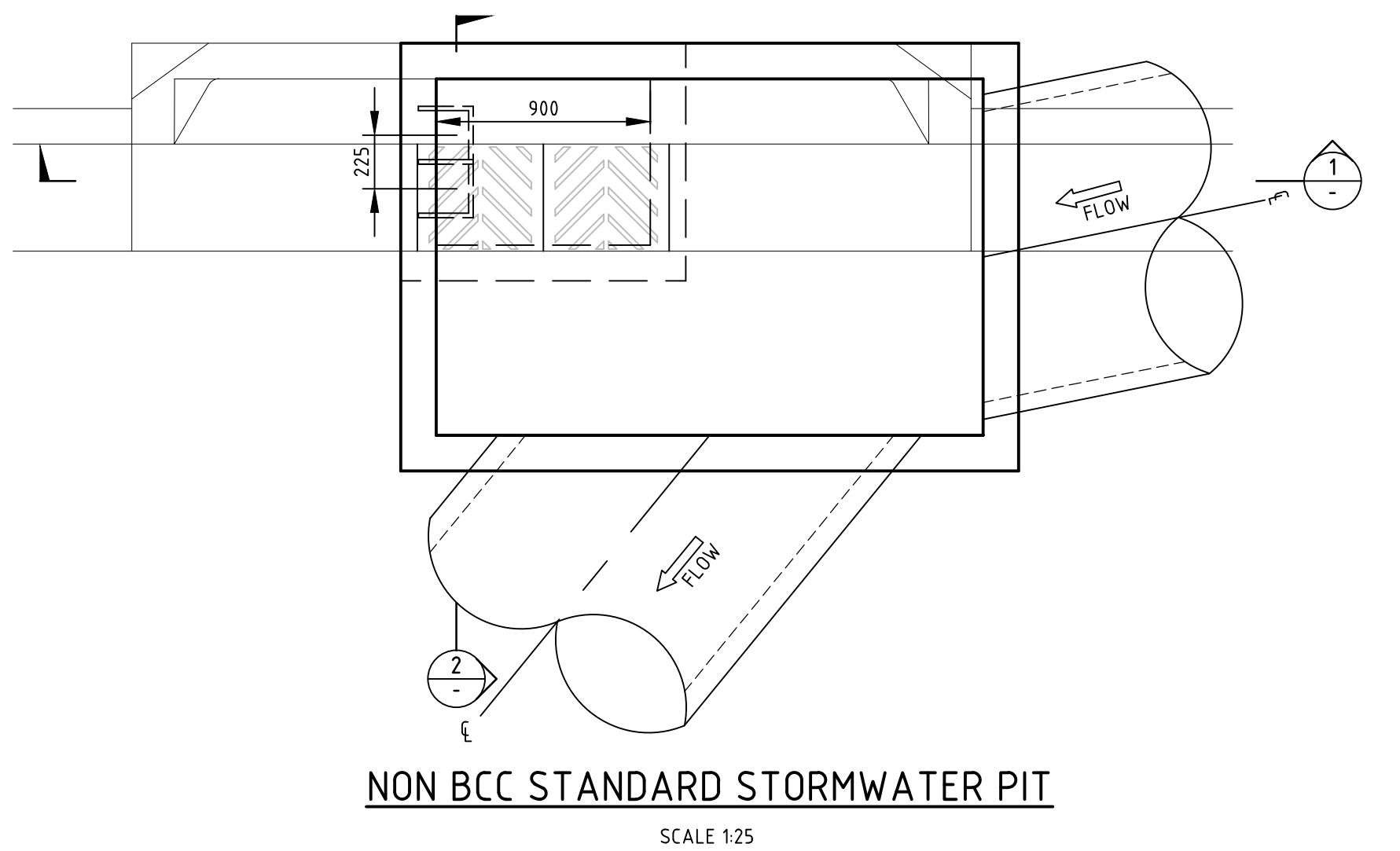
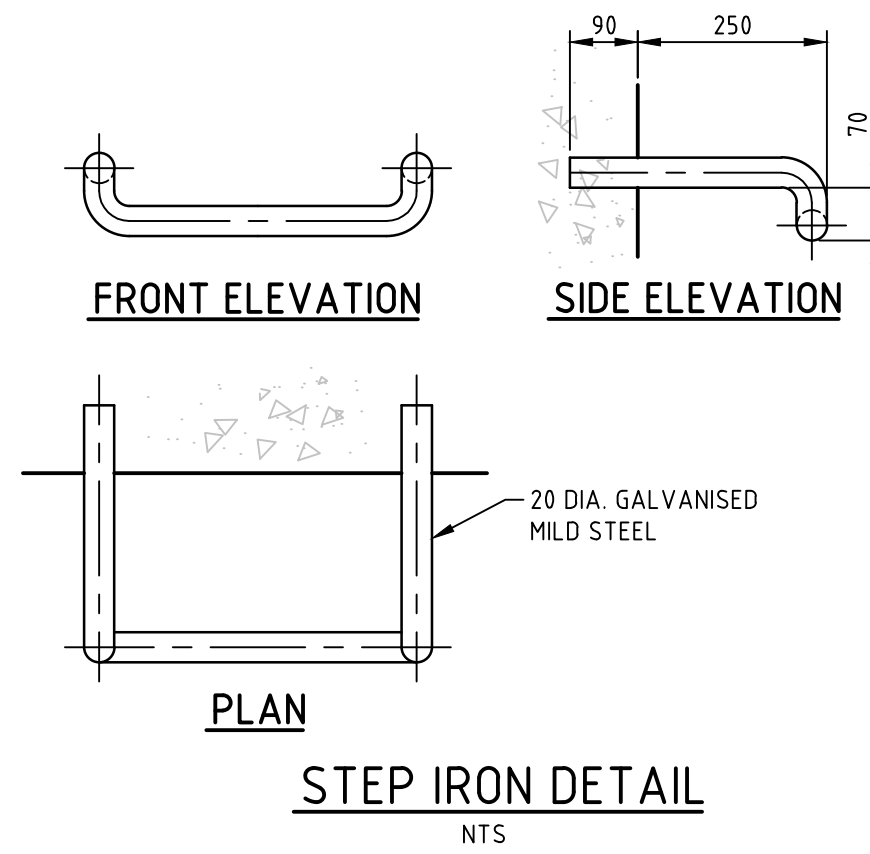
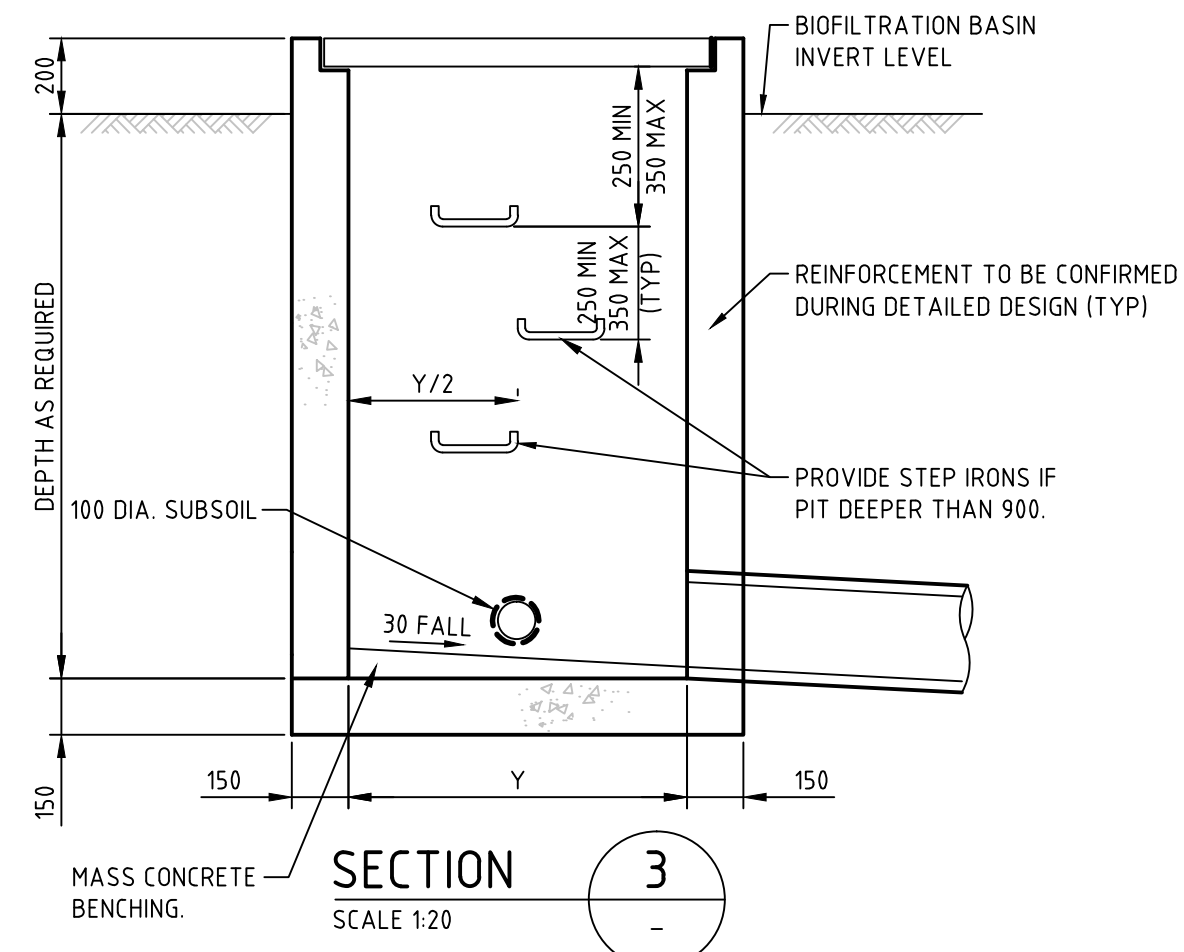
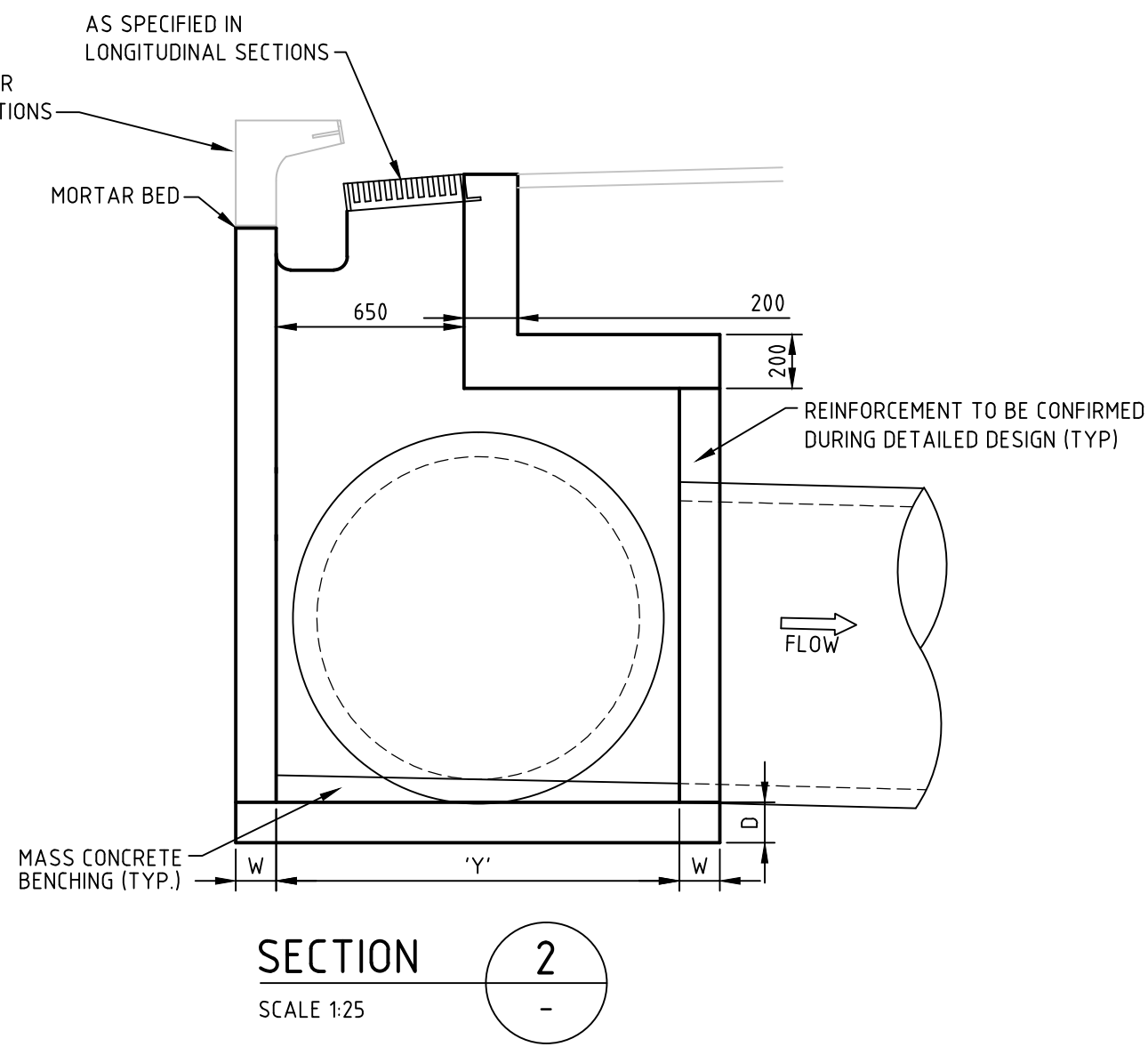
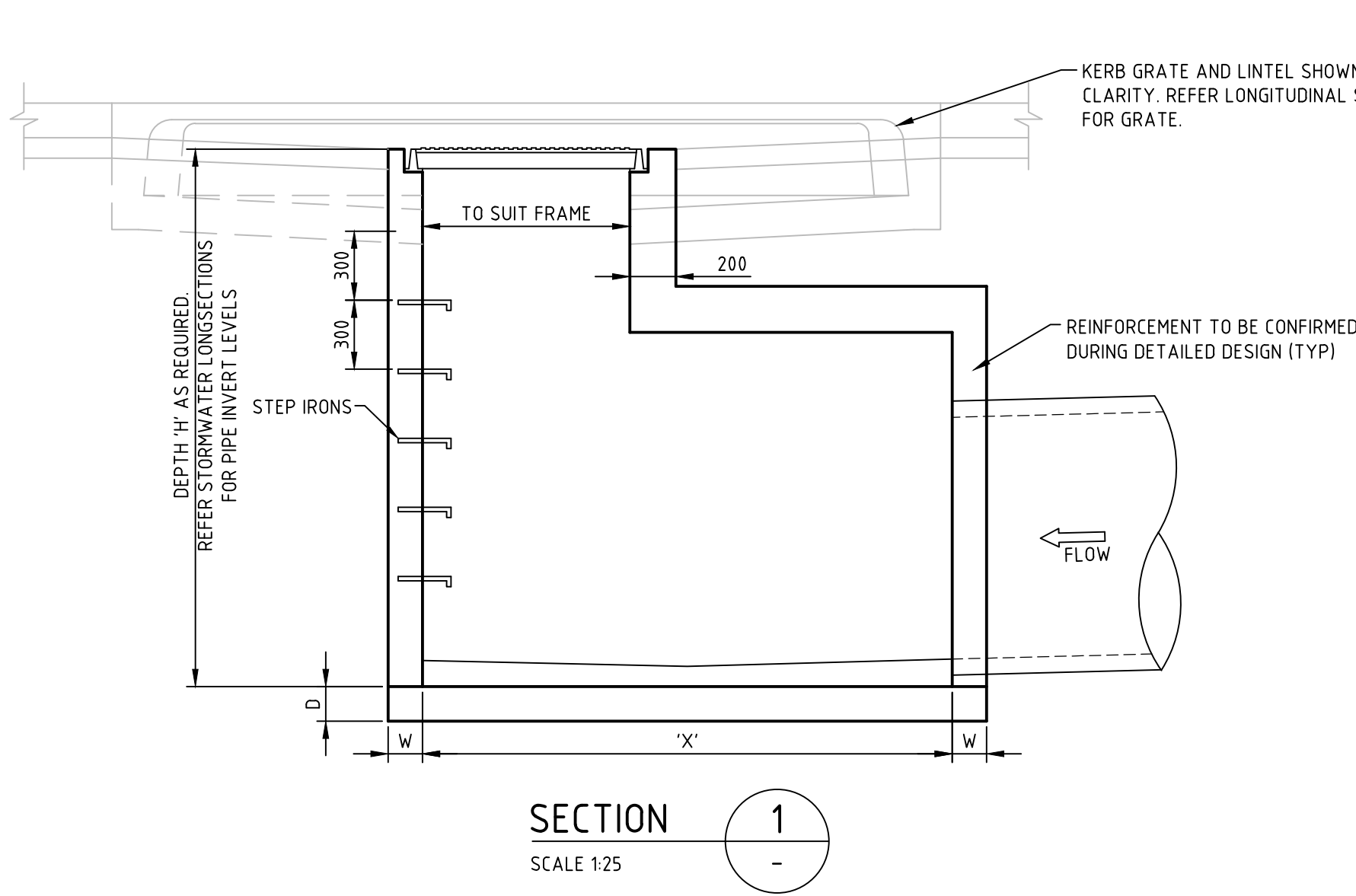
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Drawn	BJH	Date	06.07.15
Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved			
SCP		06.07.15	

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	STORMWATER DRAINAGE DETAILS SHEET 2

Status	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Datum	AHD	Scale	AS SHOWN
Size	A1		
Drawing Number	80215051-01-1422		Revision
			5

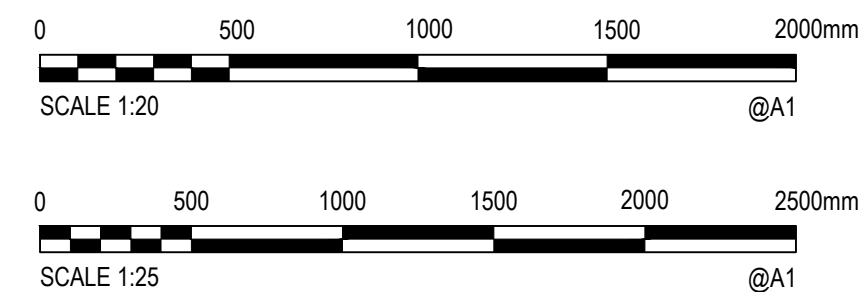
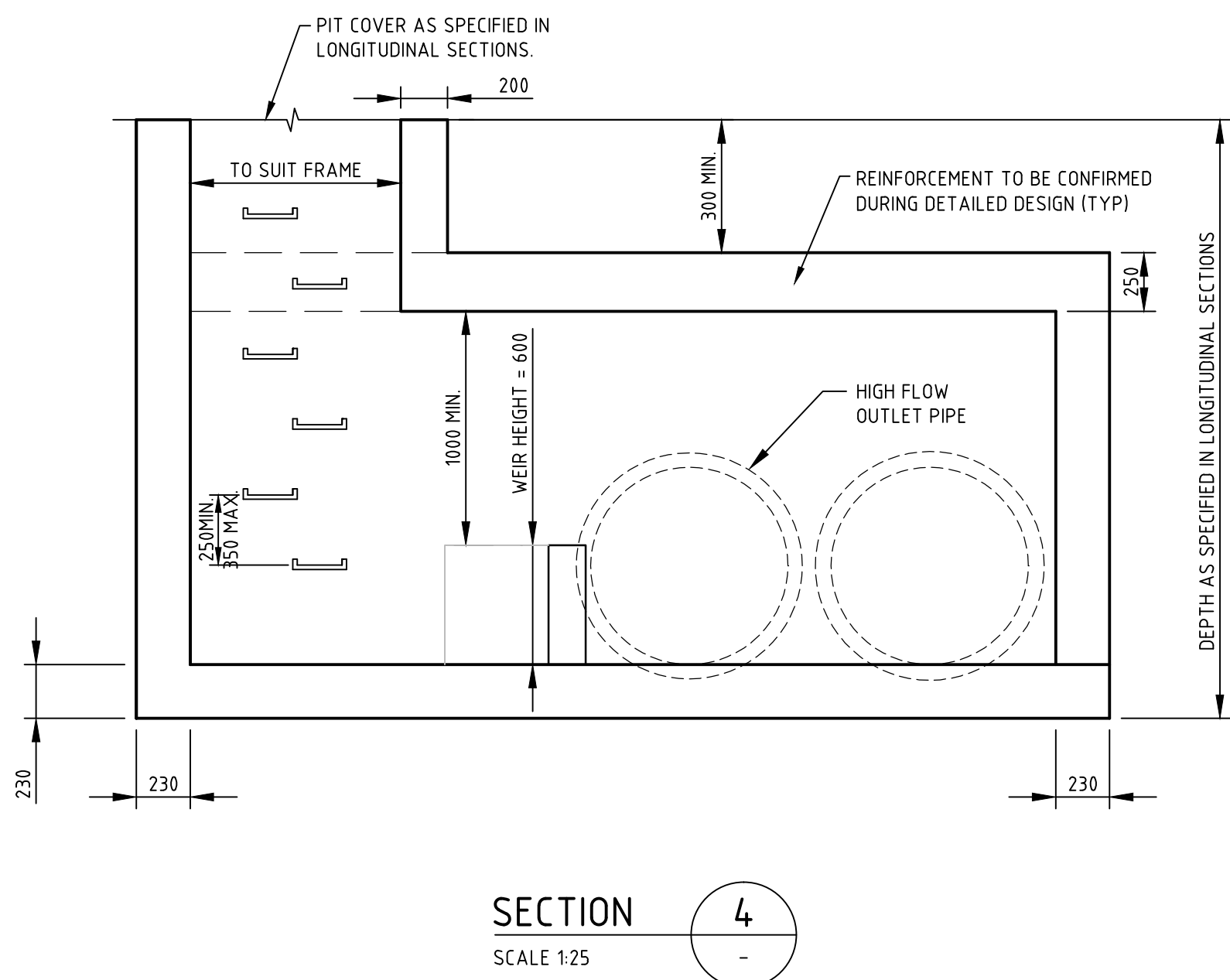
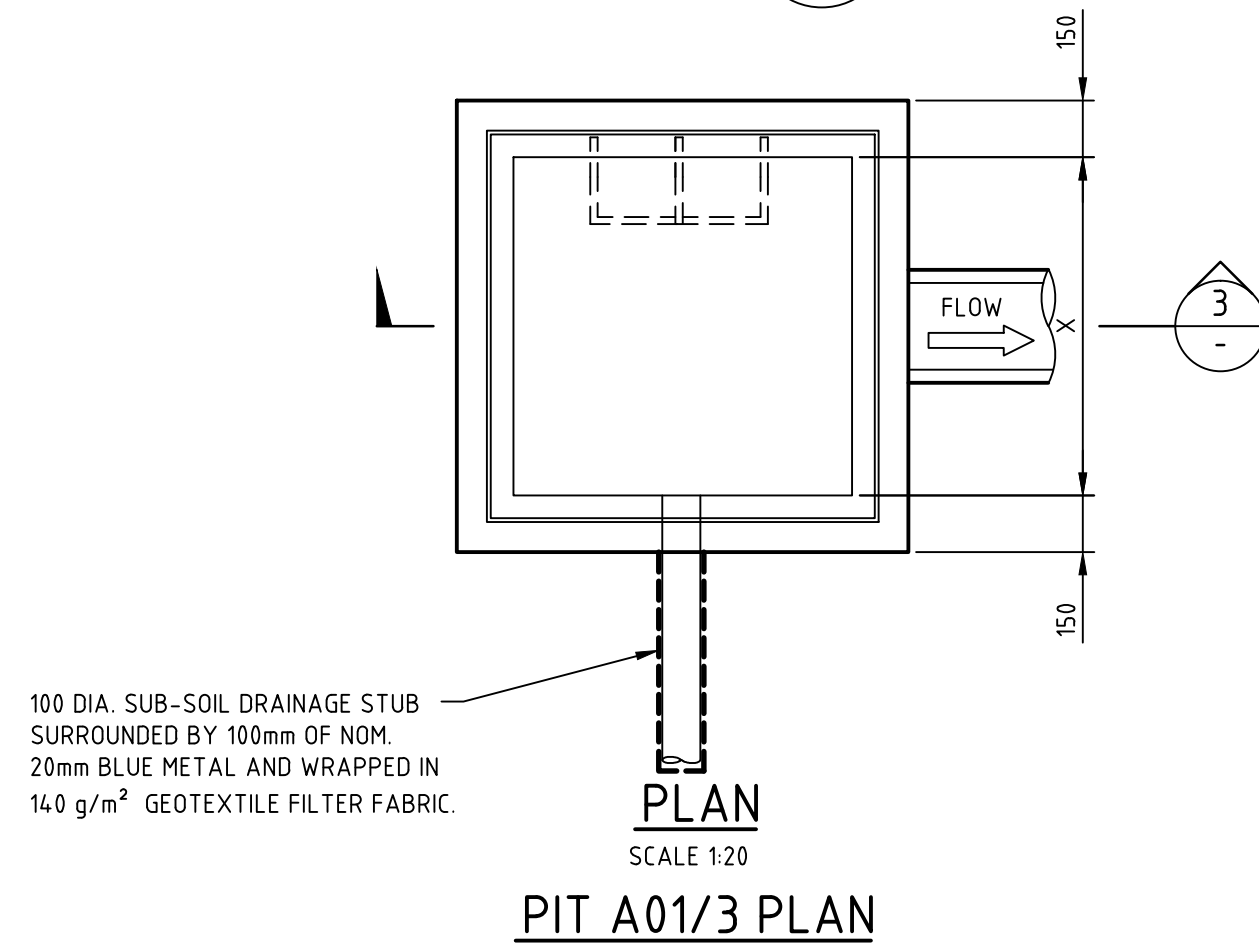
DATE PLOTTED 6 July 2015 3:28 PM BY: BRITTANY HOLZHEIMER
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CAD File: \\cardno.org\ba\AUNSW\Drawings\Build\80215051-01-1421-1422-DWG(6).dwg



IMPORTANT NOTE: PIT STANDARD DETAILS

BLACKTOWN COUNCIL STANDARD GRATED GULLY PIT, STANDARD SURFACE INLET PIT AND STANDARD JUNCTION PIT DETAILS A(BS)109M TO BE USED FOR PIT DETAILS WHERE:

- A. PIT INTERNAL WIDTH IN ANY DIRECTION IS LESS THAN OR EQUAL TO 1200mm, AND
- B. PIT DEPTH FROM SETOUT POINT TO INVERT IS LESS THAN OR EQUAL TO 2000mm.



Rev.	Date	Description	Des.	Verif.	Appd.
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



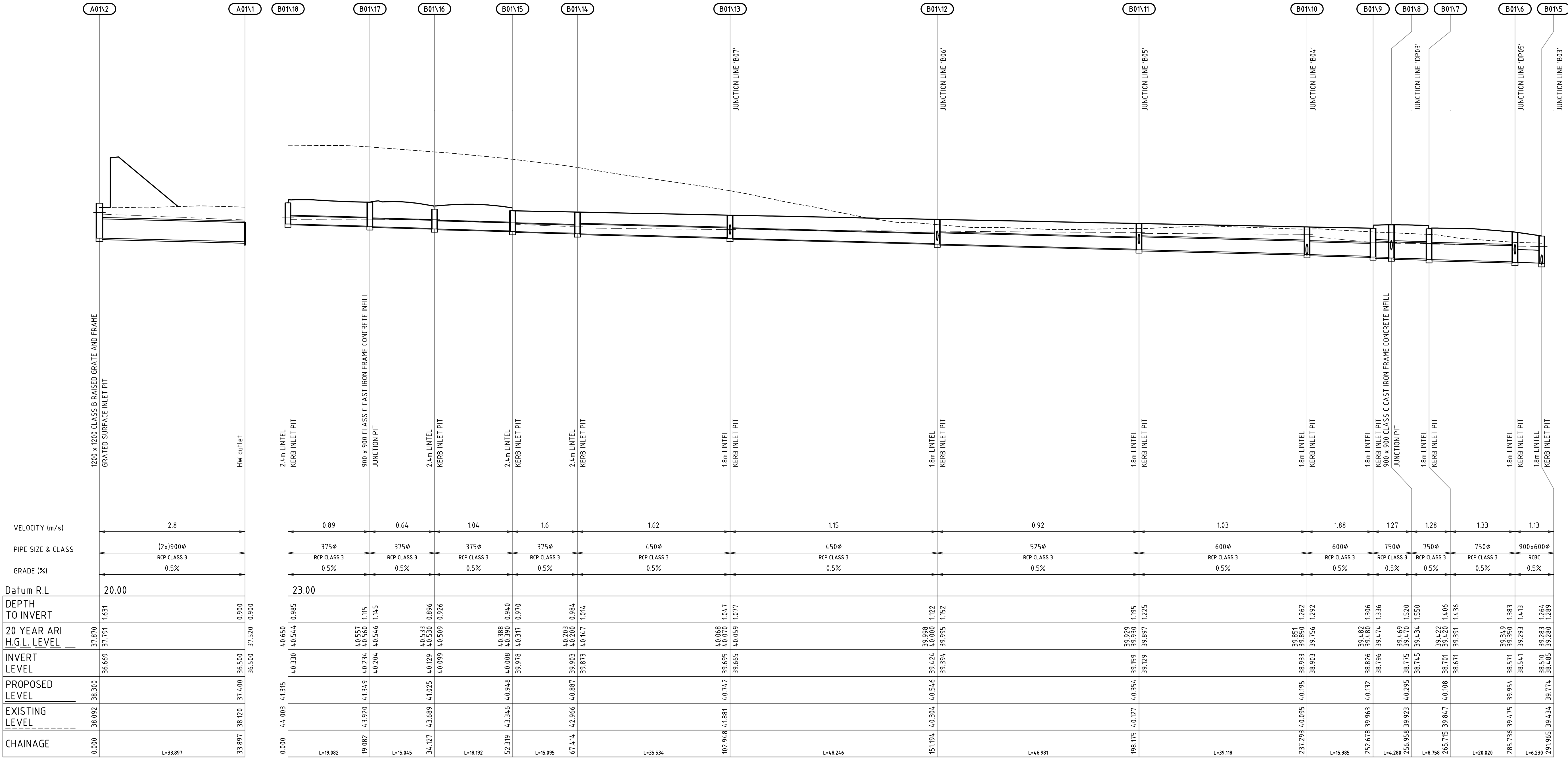
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Drawn	BJH	Date	06.07.15
Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

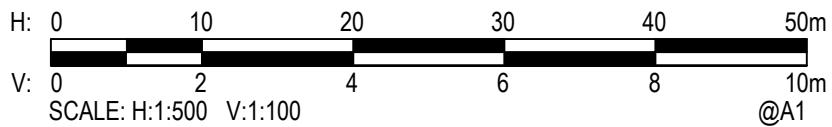
Client	FDC BUILDING
Project	IKEA MFLU
MARSDEN PARK INDUSTRIAL PRECINCT	
DEVELOPMENT APPLICATION	
Title	STORMWATER DRAINAGE DETAILS
SHEET 3	

Status	FOR APPROVAL		
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum	AHD	Scale	AS SHOWN
Drawing Number	80215051-01-1423		Revision
			5



LINE A01

LINE B01



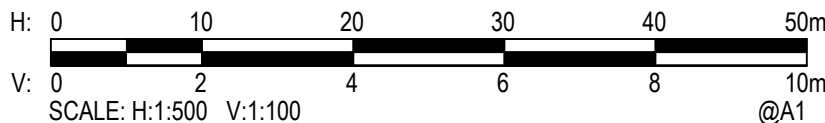
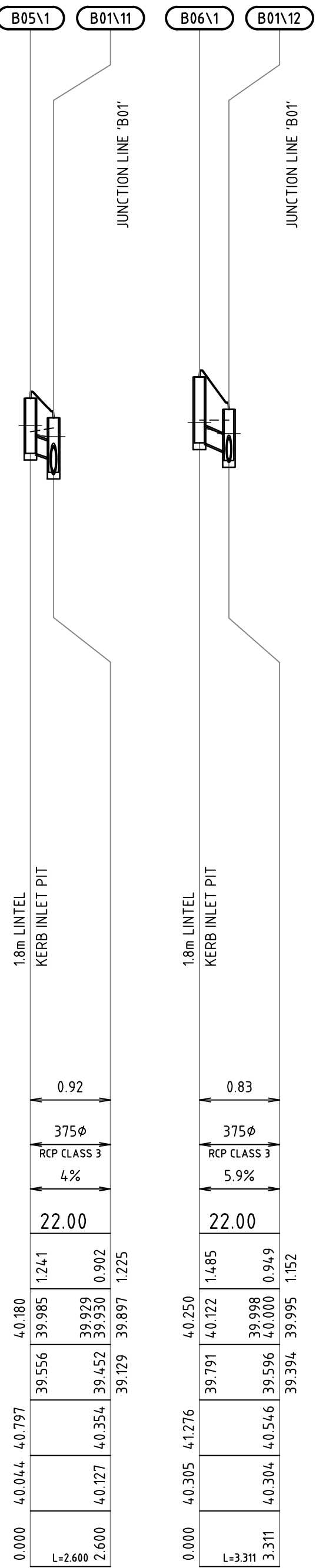
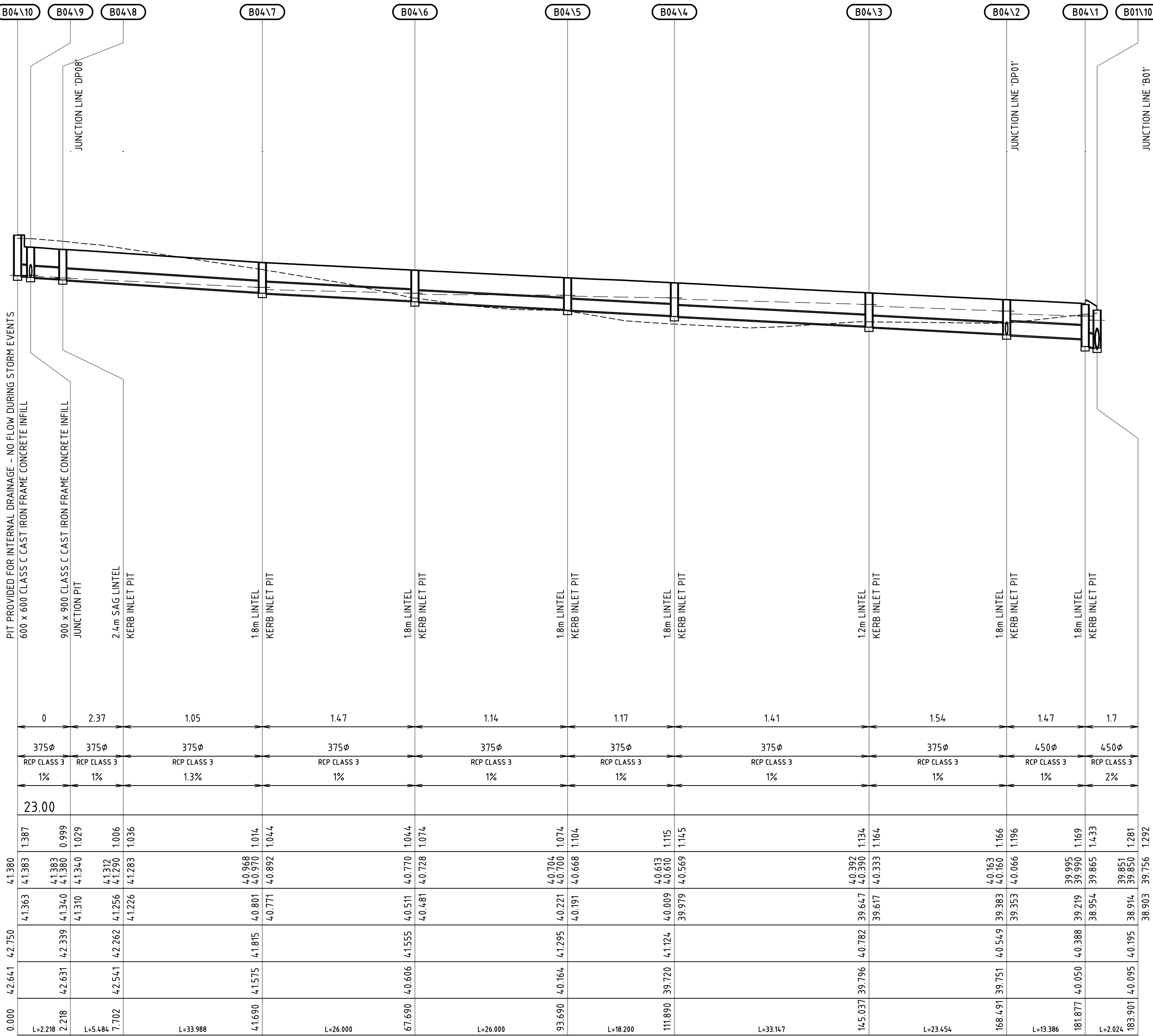
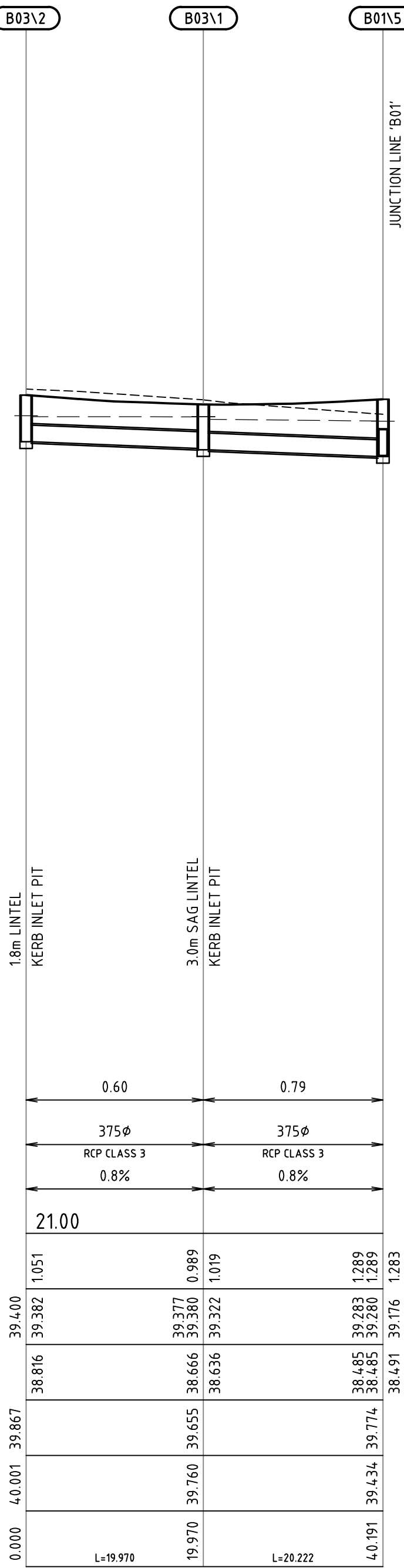
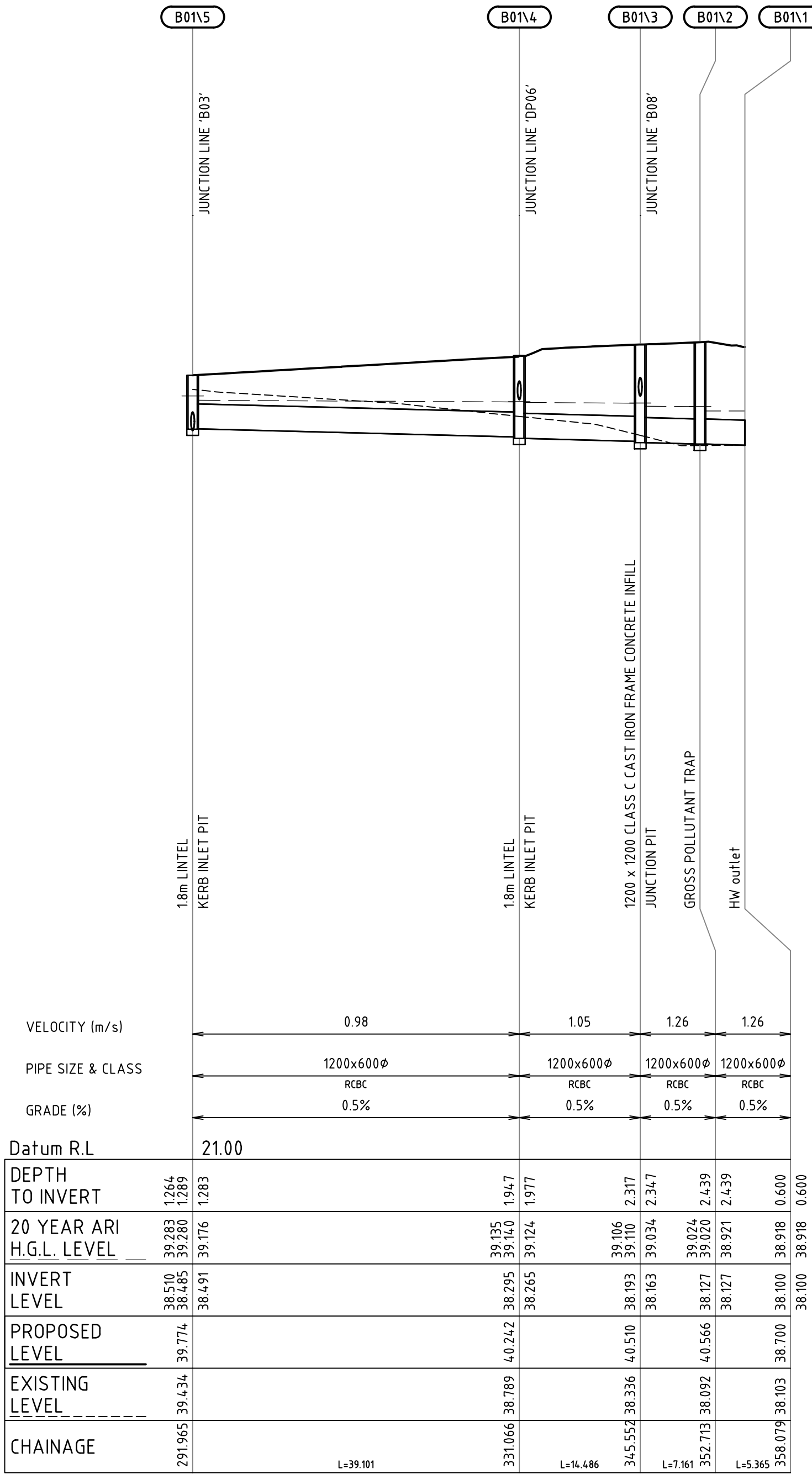
Rev.	Date	Description	Des.	Verif.	Appd.
6	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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Checked DAC 09.07.15	Date 09.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Designed AS 09.07.15	Date 09.07.15	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
Verified DAC 09.07.15	Date 09.07.15	Datum AHD
Approved SCP 09.07.15	Date 09.07.15	Scale AS SHOWN
		Size A1
		Drawing Number 80215051-01-1461
		Revision 6



6	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP
Rev.	Date	Description	Des.	Verif.	Appd.

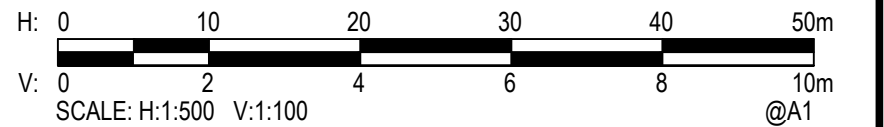


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Checked DAC 09.07.15	Date 09.07.15	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Designed AS 09.07.15	Date 09.07.15	Title STORMWATER DRAINAGE LONGITUDINAL SECTIONS SHEET 2
Verified DAC 09.07.15	Date 09.07.15	Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES
Approved SCP 09.07.15	Date 09.07.15	Datum AHD
		Scale AS SHOWN
		Size A1
		Drawing Number 80215051-01-1462
		Revision 6

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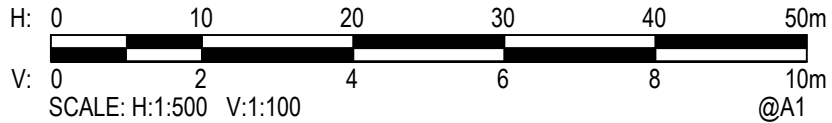
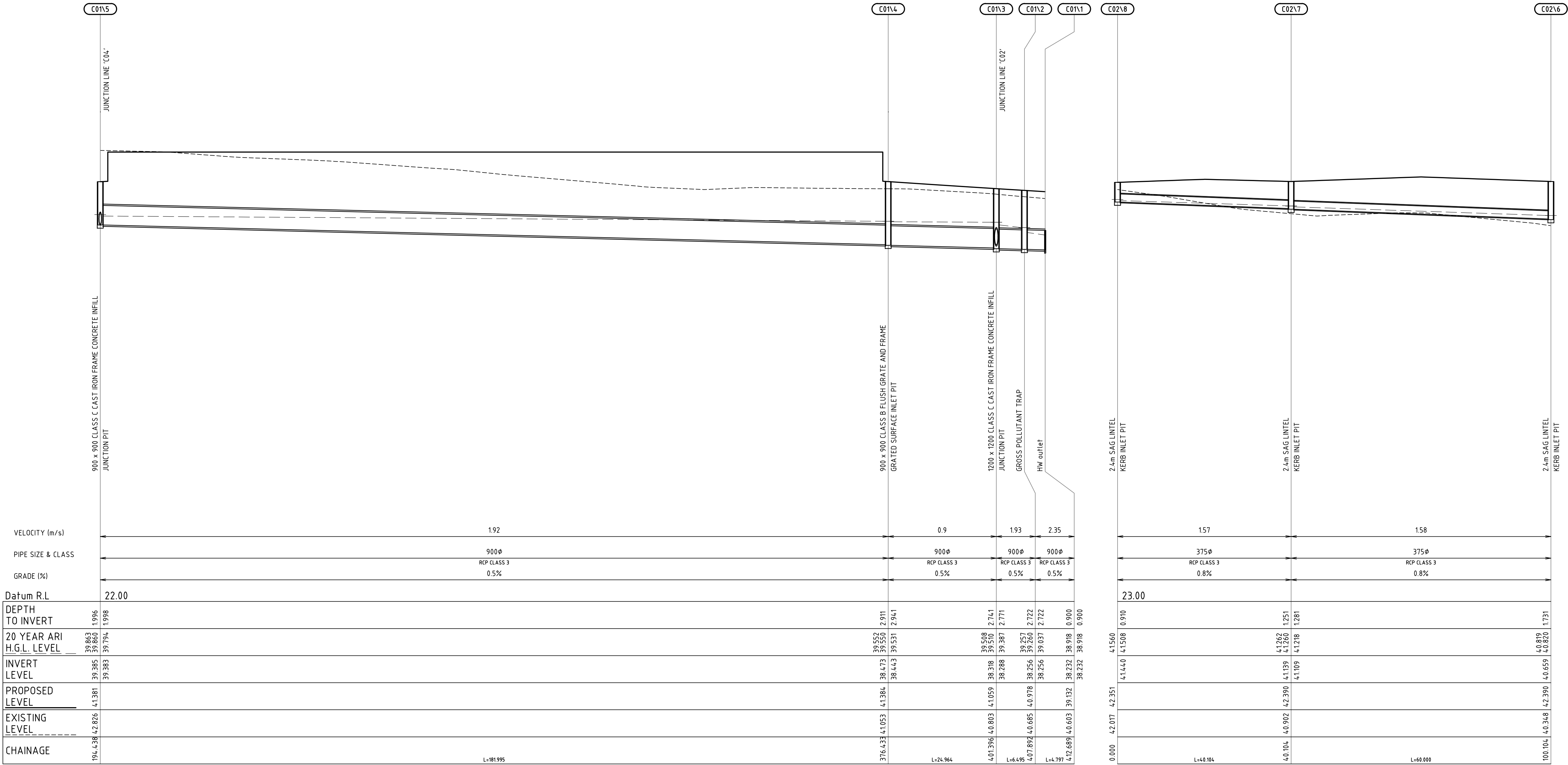
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Checked	Date
DAC	09.07.15
Designed	Date
AS	09.07.15
Verified	Date
DAC	09.07.15
Approved	
SCP	09.07.15

Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	STORMWATER DRAINAGE LONGITUDINAL SECTIONS SHEET 3

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		AS SHOWN	A1
Drawing Number			Revision
80215051-01-1463			6



Rev.	Date	Description	Des.	Verif.	Appd.
6	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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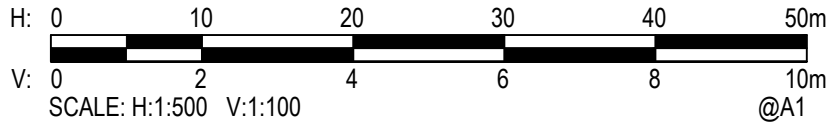
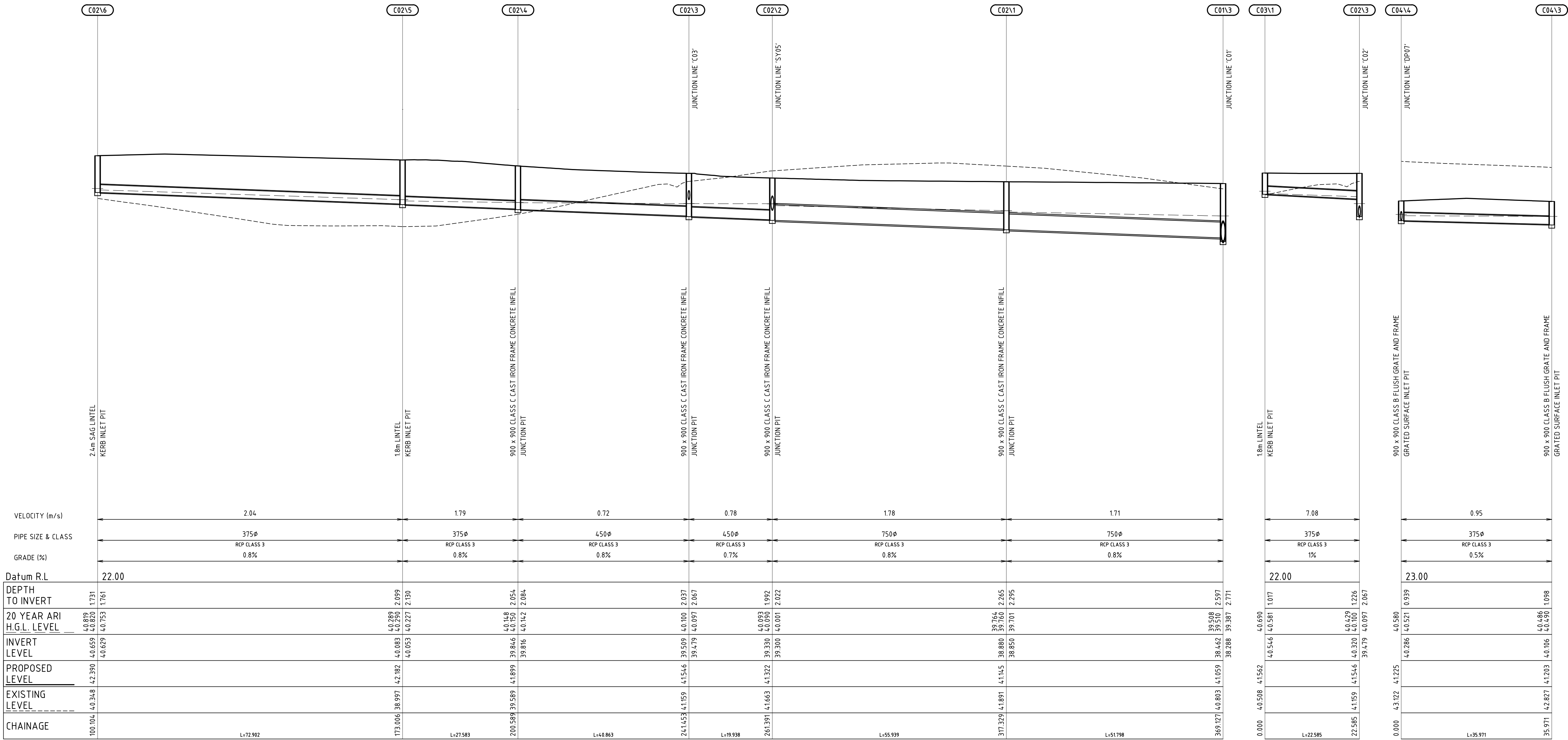
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Checked	DAC	Date	09.07.15
Designed	AS	Date	09.07.15
Verified	DAC	Date	09.07.15
Approved	SCP	Date	09.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	STORMWATER DRAINAGE LONGITUDINAL SECTIONS SHEET 4

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		AS SHOWN	A1
Drawing Number			Revision
80215051-01-1464			6



Rev.	Date	Description	Des.	Verif.	Appd.
6	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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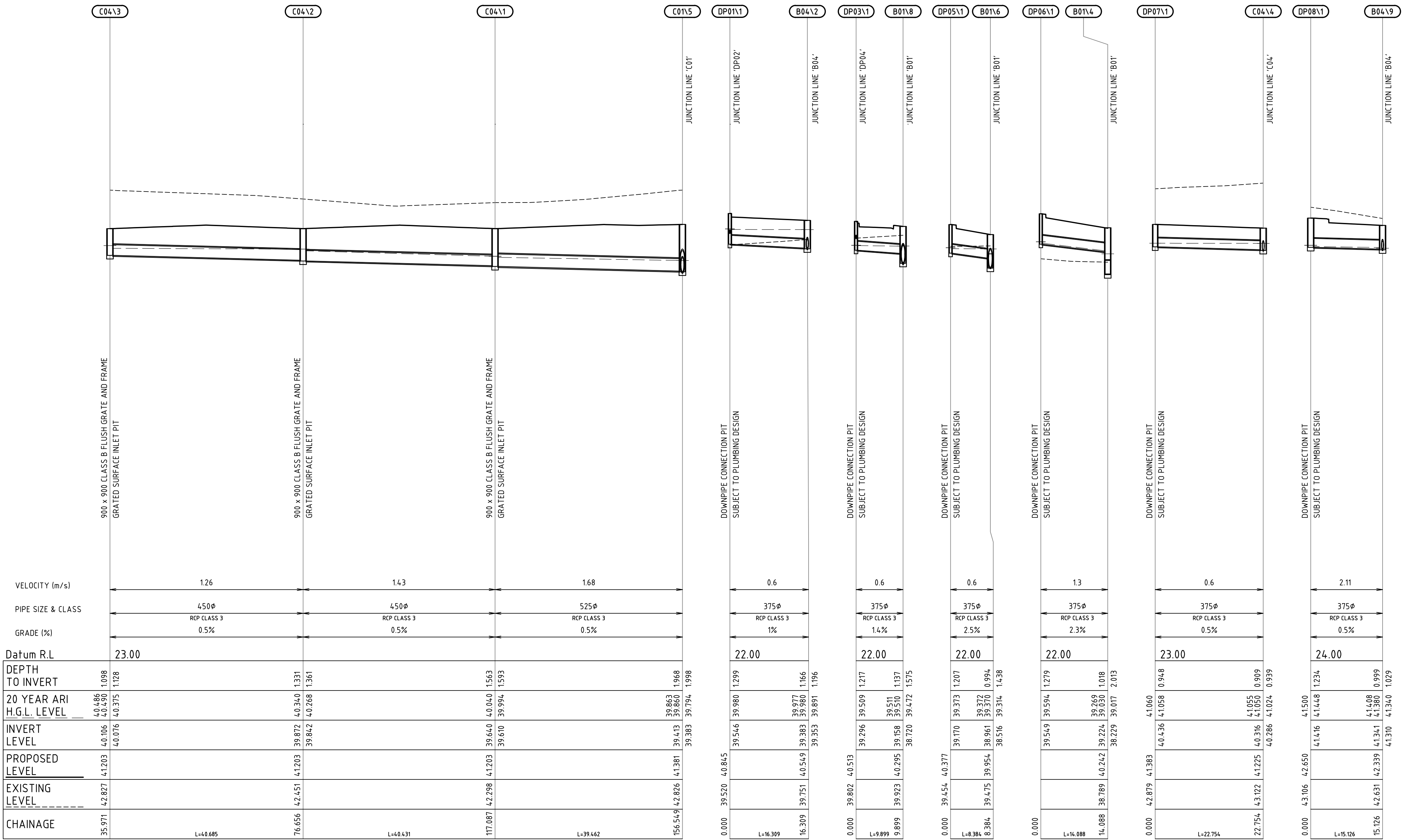
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Checked DAC	Date 09.07.15
Designed AS	Date 09.07.15
Verified DAC	Date 09.07.15
Approved SCP	Date 09.07.15

Client FDC BUILDING	Project IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title STORMWATER DRAINAGE LONGITUDINAL SECTIONS SHEET 5	

Status FOR APPROVAL	NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Datum AHD	Scale AS SHOWN	Size A1	Revision 6
Drawing Number 80215051-01-1465			



LINE C04

LINE DP01

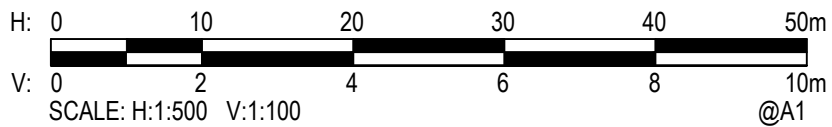
LINE DP03

LINE DP05

LINE DP06

LINE DP07

LINE DP08



Rev.	Date	Description	Des.	Verif.	Appd.
6	09.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
5	06.07.15	REISSUED FOR DEVELOPMENT APPLICATION	AS	DAC	SCP
4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



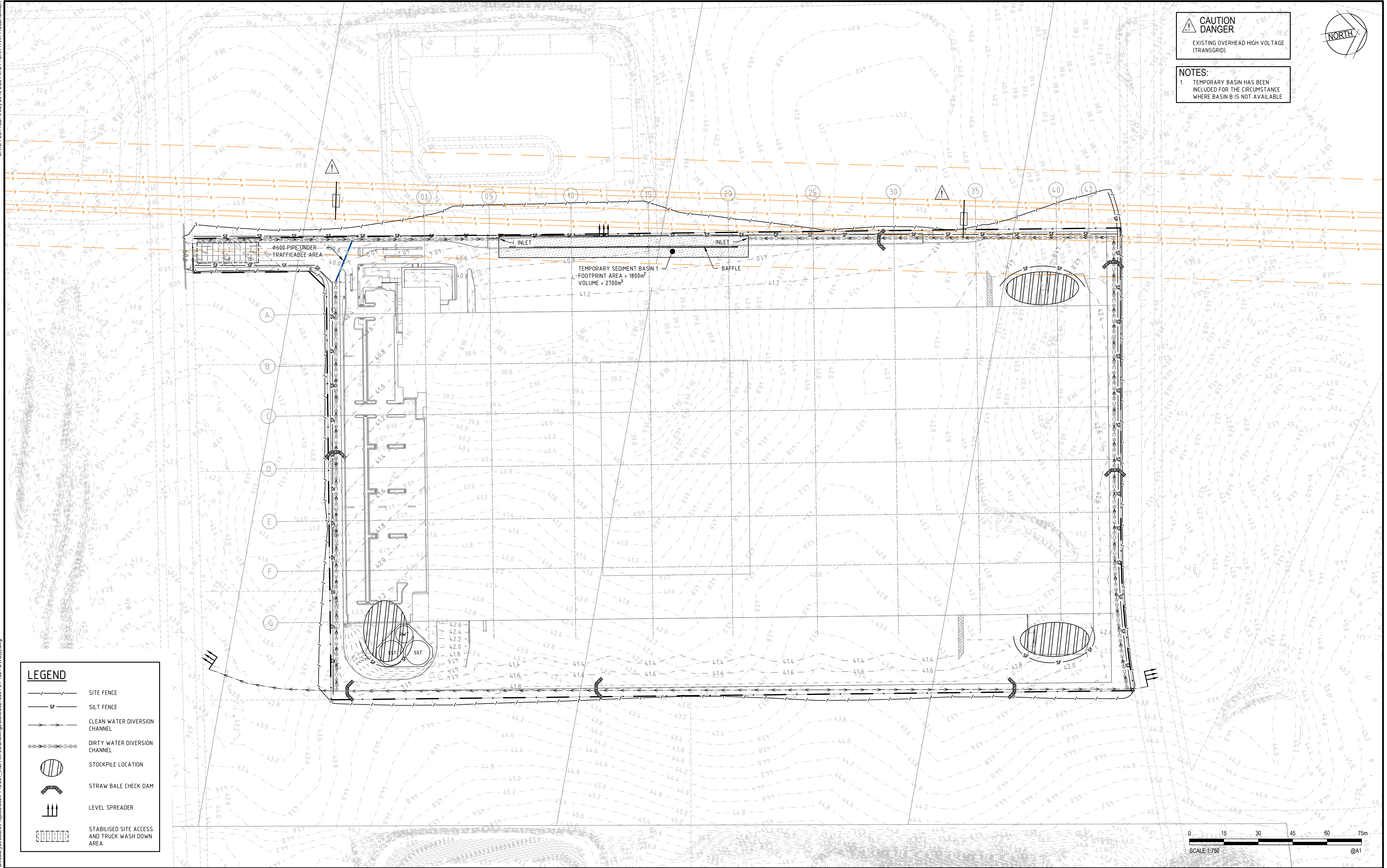
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Checked	DAC	Date	09.07.15
Designed	AS	Date	09.07.15
Verified	DAC	Date	09.07.15
Approved	SCP	Date	09.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	STORMWATER DRAINAGE LONGITUDINAL SECTIONS SHEET 6

Status	FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES	
Datum	AHD
Scale	AS SHOWN
Size	A1
Drawing Number	80215051-01-1466
Revision	6



LEGEND	
	SITE FENCE
	SILT FENCE
	CLEAN WATER DIVERSION CHANNEL
	DIRTY WATER DIVERSION CHANNEL
	STOCKPILE LOCATION
	STRAW BALE CHECK DAM
	LEVEL SPREADER
	STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA

Rev.	Date	Description	Des.	Verif.	Appd.
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4	10.06.15	REISSUED FOR TENDER	AS	DAC	SCP
3	29.05.15	ISSUED FOR TENDER	AS	DAC	SCP
2	04.05.15	FINAL DEVELOPMENT APPLICATION	AS	DAC	SCP
1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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Checked	DAC	Date	06.07.15
Designed	AS	Date	06.07.15
Verified	DAC	Date	06.07.15
Approved	SCP	Date	06.07.15

Client	FDC BUILDING
Project	IKEA MFLU MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Title	EROSION & SEDIMENT CONTROL PLAN

Status			
FOR APPROVAL			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum		Scale	Size
AHD		1:750	A1
Drawing Number			Revision
80215051-01-1521			5

DATE PLOTTED: 6 July 2015 3:26 PM BY: BRITTANY HOLZHEIMER

1. Site Data Sheet

Site name: Marsden Park Residential Stage 1

Site location: Blacktown LGA

Precinct: Marsden Park Industrial Precinct

Description of site: IKEA Warehouse

Site area	Site						Remarks
	1						
Total catchment area (ha)	12.56						
Disturbed catchment area (ha)	12.56						

Soil analysis							
Soil landscape							DIPNR mapping (if relevant)
Soil Texture Group	D						Sections 6.3.3(c), (d) and (e)

Rainfall data							
Design rainfall depth (days)	5						See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	80						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	27.4						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	10.1						See IFD chart for the site
Rainfall erosivity (R-factor)	2250						Automatic calculation from above data

3. Volume of Sediment Basins, Type D and Type F Soils

Basin volume = settling zone volume + sediment storage zone volume

Settling Zone Volume

The settling zone volume for *Type F* and *Type D* soils is calculated to provide capacity to contain all runoff expected from up to the y-percentile rainfall event. The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle and can be determined by the following equation:

$V = 10 \times C_v \times A \times R_{y-\%ile, x-day} \text{ (m}^3\text{)}$

where:

10 = a unit conversion factor

C_v = the volumetric runoff coefficient defined as that portion of rainfall that runs off as stormwater over the x-day period

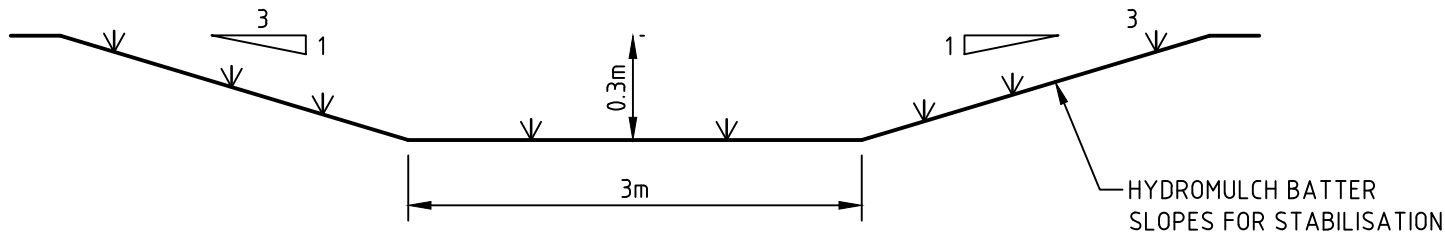
R = is the x-day total rainfall depth (mm) that is not exceeded in y percent of rainfall events. (See Sections 6.3.4(d), (e), (f), (g) and (h)).

A = total catchment area (ha)

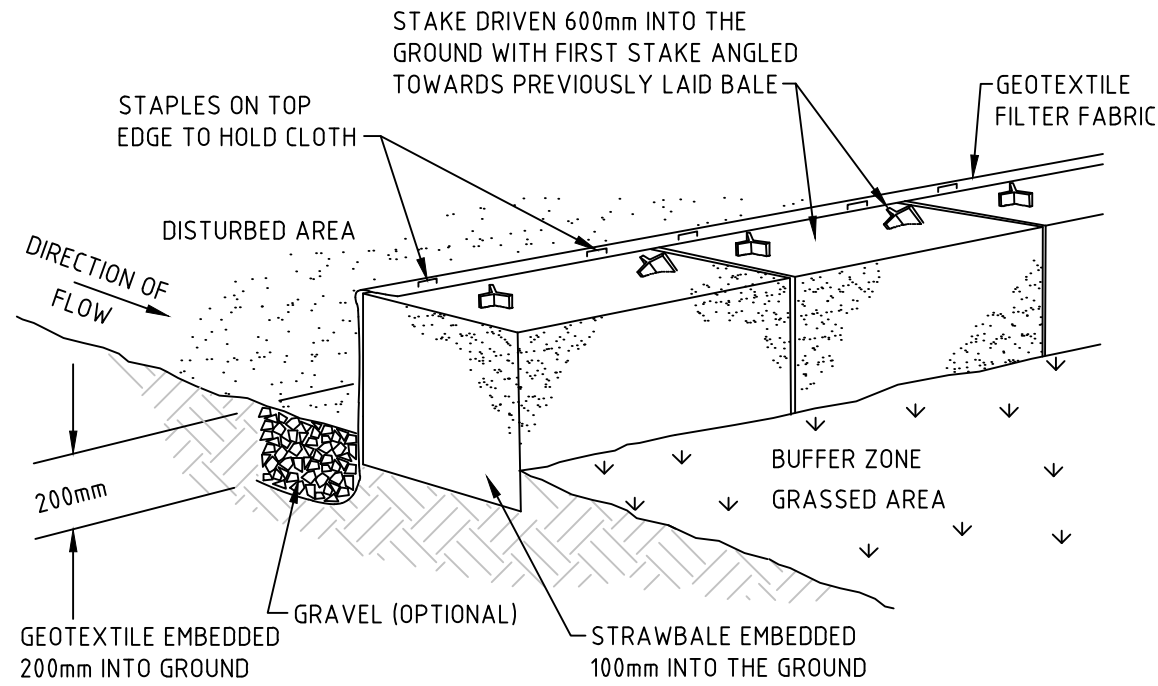
Sediment Storage Zone Volume

In the standard calculation, the sediment storage zone is 50 percent of the setting zone. However, designers can work to capture the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(ii)), in which case the "Detailed Calculation" spreadsheets should be used.

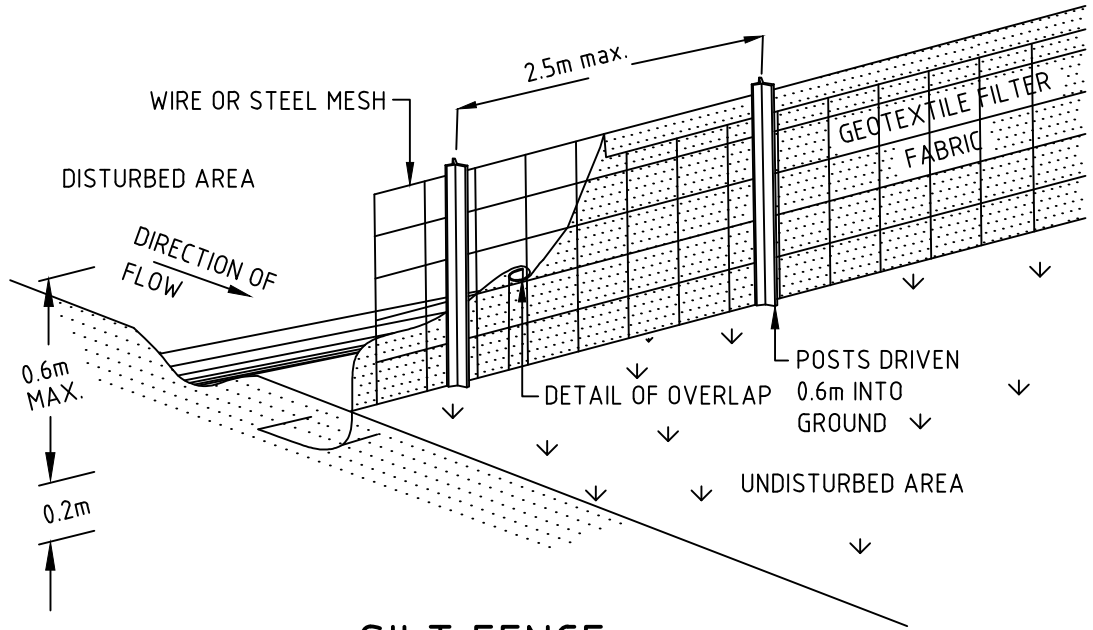
Total Basin Volume						
Site	C _v	R x-day y-%ile	Total catchment area (ha)	Settling zone volume (m ³)	Sediment storage volume (m ³)	Total basin volume (m ³)
1	0.51	27.4	12.6	1755	878	2633



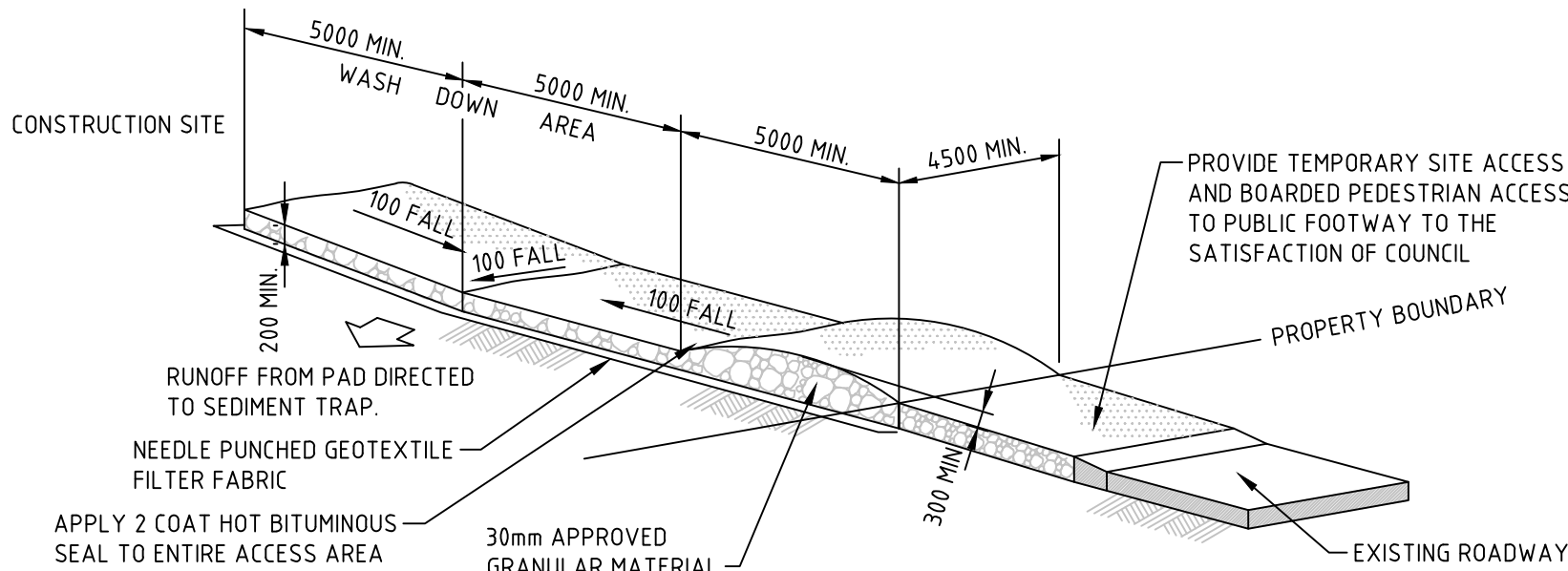
TYPICAL SECTION THROUGH CLEAN AND DIRTY DIVERSION DRAINS
NOT TO SCALE



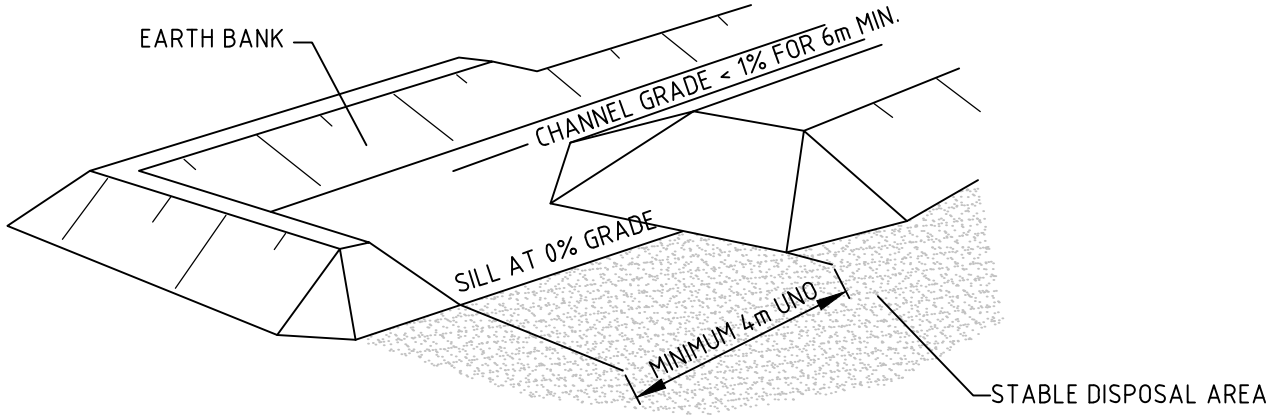
STRAWBALE CHECK DAM
NTS



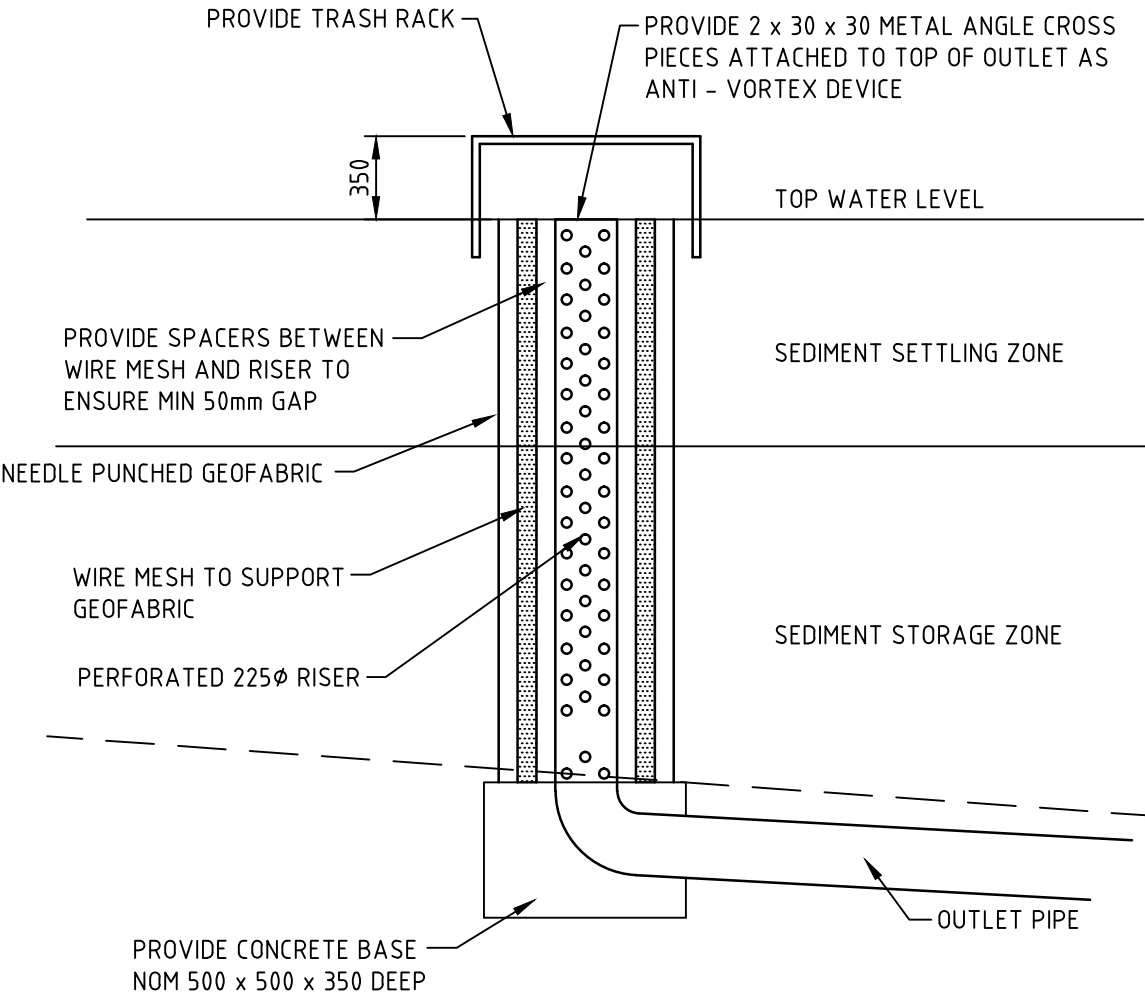
SILT FENCE
NTS



STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA
NTS



LEVEL SPREADER DETAIL
NOT TO SCALE



RISER PIPE DETAIL
1:20

NOTES

TEST ANY EXISTING STORED WATER AND FLOCCULATE AS REQUIRED TO ENSURE WATER QUALITY MEETS THE REQUIREMENTS OF COUNCIL PRIOR TO PUMPING FOR DUST CONTROL. REFER TO APPENDIX E OF 'BLUE BOOK' FOR FLOCCULATION DETAILS.

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1	23.04.15	DEVELOPMENT APPLICATION	AS	DAC	SCP



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Designed AS	Date 06.07.15	MARSDEN PARK INDUSTRIAL PRECINCT DEVELOPMENT APPLICATION
Verified DAC	Date 06.07.15	Title
Approved SCP	Date 06.07.15	EROSION & SEDIMENT CONTROL DETAILS

Status NOT TO BE USED FOR CONSTRUCTION PURPOSES	FOR APPROVAL
Datum AHD	Scale AS SHOWN
Drawing Number 80215051-01-1531	Size A1
Revision 5	

IKEA MFLU – MARSDEN PARK

APPENDIX

B

DRAINAGE DESIGN DETAILS

PIT / NODE DETAILS			Version 12														
Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	
B01\18	OnGrade	STANDARD GRATED GULLY PIT	2.4m LINTEL		4.5	41.315		0	0.2	298427.388	6267065.703	No	8794589	1 x Ku	No	New	
B01\17	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.8	41.349		0	0.2	298424.34	6267046.866	No	8794590	1 x Ku	No	New	
B01\16	OnGrade	STANDARD GRATED GULLY PIT	2.4m LINTEL		1.5	41.025		0	0.2	298417.695	6267033.369	No	8794591	1 x Ku	No	New	
B01\15	OnGrade	STANDARD GRATED GULLY PIT	2.4m LINTEL		1.1	40.948		0	0.2	298399.869	6267029.736	No	8794592	1 x Ku	No	New	
B01\14	OnGrade	STANDARD GRATED GULLY PIT	2.4m LINTEL		0.7	40.887		0	0.2	298384.944	6267031.998	No	8794593	1 x Ku	No	New	
B01\13	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.2	40.742		0	0.2	298349.812	6267037.323	No	8794594	1 x Ku	No	New	
B01\12	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.1	40.546		0	0.2	298302.11	6267044.554	No	8794595	1 x Ku	No	New	
B01\11	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.8	40.354		0	0.2	298255.66	6267051.595	No	8794596	1 x Ku	No	New	
B01\10	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		1.6	40.195		0	0.2	298216.984	6267057.457	No	8794597	1 x Ku	No	New	
B01\9	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.1	40.132		0	0.2	298201.773	6267059.763	No	8794598	1 x Ku	No	New	
B01\8	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.4	40.295		0	0.2	298195.126	6267066.697	No	8794599	1 x Ku	No	New	
B01\7	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.4	40.108		0	0.2	298186.452	6267069.931	No	8794600	1 x Ku	No	New	
B01\6	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.9	39.954		0	0.2	298178.636	6267081.593	No	8794601	1 x Ku	No	New	
B01\5	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		2.2	39.774		0	0.2	298173.241	6267084.71	No	29763669	1 x Ku	No	New	
B01\4	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.2	40.242		0	0.2	298179.271	6267123.343	No	8794603	1 x Ku	No	New	
B01\3	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.9	40.51		0	0.2	298182.458	6267137.474	No	8794604	1 x Ku	No	New	
B01\2	OnGrade	GPT	REFER NOTE		1.7	40.566		0	0.2	298183.804	6267144.507	No	71936350	1 x Ku	No	New	
A01\2	OnGrade	DUMMY	ACCEPT ALL		0.2	38		0	0	298183.104	6267163.461	No	8794605	1 x Ku	No	New	
A01\1	Node					37.4		0		298153.151	6267168.689		8794606		No		
B03\2	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		4.5	39.867		0	0.2	298167.218	6267044.972	No	8794607	1 x Ku	No	New	
B03\1	Sag	STANDARD GRATED GULLY PIT	3.0m SAG LINTEL	1	1.8	39.665	0.15	0	0.5	298170.211	6267064.717	No	29763674	1 x Ku	No	New	
B05\1	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		4.5	40.797		0	0.2	298257.701	6267053.207	No	8794608	1 x Ku	No	New	
B06\1	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		4.5	41.276		0	0.2	298305.076	6267046.026	No	8794609	1 x Ku	No	New	
B07\1	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		4.5	41.753		0	0.2	298352.337	6267038.862	No	8794610	1 x Ku	No	New	
DP07\1	OnGrade	DUMMY	ACCEPT ALL		4.5	41.383		0	0	298402.916	6267113.669	No	8794611	1 x Ku	No	New	
C04\4	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	2.5	41.225	0.124	0	0.5	298422.301	6267125.584	No	8794612	1 x Ku	No	New
C04\3	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	1.8	41.203	0.147	0	0.5	298427.709	6267161.146	No	8794613	1 x Ku	No	New
C04\2	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	1.3	41.203	0.147	0	0.5	298434.136	6267201.32	No	8794614	1 x Ku	No	New
C04\1	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	0.4	41.203	0.147	0	0.5	298440.011	6267241.322	No	8794615	1 x Ku	No	New
C01\5	OnGrade	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		0.6	41.381		0	0.2	298427.961	6267278.899	No	8794616	1 x Ku	No	New	
C01\4	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.6	41.384		0	0.2	298248.324	6267308.102	No	8794617	1 x Ku	No	New	
C01\3	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		1.2	41.06		0	0.2	298221.844	6267313.09	No	71936302	1 x Ku	No	New	
C01\2	OnGrade	GPT	REFER NOTE		1.7	40.978		0	0.2	298213.257	6267314.337	No	71936304	1 x Ku	No	New	
C01\12	OnGrade	STANDARD GSIP	600 x 600 CLASS B GALVANISED GRATE AND FRAME		4.5	41.99		0	0.2	298477.832	6267454.382	No	8794618	1 x Ku	No	New	
C01\11	OnGrade	STANDARD GSIP	600 x 600 CLASS B GALVANISED GRATE AND FRAME		1.1	41.796		0	0.2	298473.791	6267427.72	No	8794619	1 x Ku	No	New	
C01\10	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.3	41.735		0	0.2	298472.383	6267419.406	No	71936332	1 x Ku	No	New	
C01\9	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	0.7	41.552	0.01	0	0.5	298464.735	6267402.321	No	8794620	1 x Ku	No	New
C01\8	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	2.3	41.211	0.139	0	0.5	298458.426	6267362.818	No	8794621	1 x Ku	No	New
C01\7	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	1.2	41.203	0.148	0	0.5	298452.422	6267322.218	No	8794622	1 x Ku	No	New
C01\6	Sag	STANDARD GSIP	900 x 900 CLASS B GALVANISED GRATE AND FRAME		34	1.4	41.211	0.139	0	0.5	298446.595	6267282.31	No	8794623	1 x Ku	No	New
C02\8	Sag	STANDARD GRATED GULLY PIT	2.4m SAG LINTEL		1.8	4.5	42.351	0.099	0	0.5	298436.245	6267475.114	No	8794624	1 x Ku	No	New
C02\7	Sag	STANDARD GRATED GULLY PIT	2.4m SAG LINTEL		1.9	1.8	42.39	0.098	0	0.5	298396.594	6267481.124	No	8794625	1 x Ku	No	New
C02\6	Sag	STANDARD GRATED GULLY PIT	2.4m SAG LINTEL		1.2	1.6	42.39	0.08	0	0.5	298337.272	6267490.116	No	8794626	1 x Ku	No	New
C02\5	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		1.1	42.182		0	0.2	298265.193	6267501.042	No	8794627	1 x Ku	No	New	
C02\4	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.4	41.899		0	0.2	298249.451	6267478.392	No	8794628	1 x Ku	No	New	
C02\3	OnGrade	JUNCTION PIT	900 x 900 CLASS C CAST IRON FRAME CONCRETE INFILL		0.2	41.546		0	0.2	298243.012	6267438.039	No	8794629	1 x Ku	No	New	
C02\2	OnGrade	DUMMY	ACCEPT ALL		0.9	41.322		0	0.2	298239.987	6267418.332	No	8794630	1 x Ku	No	New	
C02\1	OnGrade	JUNCTION PIT	1200 x 1200 CLASS C CAST IRON FRAME CONCRETE INFILL		0.8	41.145		0	0.2	298229.135	6267358.416	No	43774520	1 x Ku	No	New	
O B03\1	Node					39.698		0		298161.439	6267066.513		8794632		No		
C03\1	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		4.5	41.562		0	0.2	298228.492	6267455.339	No	8794633	1 x Ku	No	New	
B08\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.973		0	0.2	298213.639	6267132.967	No	8794634	1 x Ku	No	New	
DP05\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.377		0	0	298191.895	6267098.048	No	8794635	1 x Ku	No	New	
DP06\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.828		0	0	298217.618	6267117.42	No	8794636	1 x Ku	No	New	
DP03\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.513		0	0	298199.503	6267071.501	No	8794637	1 x Ku	No	New	
DP01\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.845		0	0	298221.709	6267088.822	No	8794638	1 x Ku	No	New	
B04\2	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.9	40.549		0	0.2	298219.265	6267072.697	No	8794639	1 x Ku	No	New	
B04\1	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.9	40.388		0	0.2	298217.258	6267059.462	No	8794640	1 x Ku	No	New	
B04\10	OnGrade	STANDARD GSIP	600 x 600 CLASS B GALVANISED GRATE AND FRAME		4.5	42.75		0	0.2	298380.326	6267074.481	No	8794643	1 x Ku	No	New	
B04\9	OnGrade	JUNCTION PIT	600 x 600 CLASS C CAST IRON FRAME CONCRETE INFILL		2.3	42.339		0	0.2	298379.293	6267072.518	No	8794644	1 x Ku	No	New	

B04\8	Sag	STANDARD GRATED GULLY PIT	2.4m SAG LINTEL	1	0.3	42.262	0.01	0	0.5	298375.124	6267068.955	No	8794645	1 x Ku	No	New
B04\7	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		2.5	41.815		0	0.2	298344.661	6267053.882	No	8794646	1 x Ku	No	New
B04\6	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		1.2	41.555		0	0.2	298318.955	6267057.779	No	8794647	1 x Ku	No	New
B04\5	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.7	41.295		0	0.2	298293.248	6267061.675	No	8794648	1 x Ku	No	New
B04\4	OnGrade	STANDARD GRATED GULLY PIT	1.8m LINTEL		0.5	41.124		0	0.2	298275.254	6267064.403	No	8794649	1 x Ku	No	New
B04\3	OnGrade	STANDARD GRATED GULLY PIT	1.2m LINTEL		0.5	40.782		0	0.2	298242.481	6267069.37	No	8794650	1 x Ku	No	New
SY03\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.89		0	0	298213.278	6267301.507	No	30765757	1 x Ku	No	New
SY02\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.687		0	0	298202.477	6267212.398	No	30765758	1 x Ku	No	New
RT	Node					40		0		298403.547	6267063.454		30765794		No	
SY04\1	OnGrade	DUMMY	ACCEPT ALL		4.5	40.065		0	0	298243.546	6267357.43	No	75020962	1 x Ku	No	New
N121191	Node							0		298206.668	6267213.28		82959208		No	
N122108	Node							0		298217.512	6267300.978		83426522		No	
N122113	Node							0		298249.481	6267416.574		83426531		No	
100_C04\4	Node					42.75		0		298376.07	6267130.741		91536847		Yes	
N140889	Node							0		298392.566	6267130.211		92228564		No	
100_C04\3	Node					42.7		0		298378.835	6267167.557		92228565		Yes	
100_RT	Node					42.75		0		298395.417	6267053.545		92228567		Yes	
N140898	Node							0		298407.151	6267050.56		92228582		No	
100_C04\2	Node					42.7		0		298387.176	6267205.093		92228583		Yes	
100_C04\1	Node					42.7		0		298390.478	6267245.183		92228585		Yes	
100_C01\6	Node					42.7		0		298405.706	6267299.474		92228588		Yes	
100_C01\9	Node					42.7		0		298416.081	6267404.176		92228592		Yes	
100_C01\8	Node					42.7		0		298409.443	6267365.297		92228593		Yes	
100_SWALI	Node					41.3		0		298237.912	6267167.425		92228594		Yes	
100_C01\7	Node					42.7		0		298403.437	6267323.89		92228608		Yes	
N140932	Node							0		298400.434	6267162.684		92228620		No	
N140934	Node							0		298411.339	6267200.615		92228633		No	
N140936	Node							0		298417.661	6267239.178		92228635		No	
N140938	Node							0		298425.88	6267291.648		92228637		No	
N140940	Node							0		298430.621	6267321.361		92228639		No	
N140942	Node							0		298438.207	6267363.401		92228641		No	
N140944	Node							0		298442.632	6267405.125		92228643		No	
N140952	Node							0		298248.241	6267353.741		92228667		No	
N140954	Node							0		298214.644	6267166.02		92228679		No	
DP08\1	OnGrade	DUMMY	ACCEPT ALL		4.5	42.65		0	0	298394.25	6267070.26	No	96673649	1 x Ku	No	New
N157817	Node					47		0		298183.587	6267160.842		97640044		No	
N129639	Node					47		0		298181.177	6267161.491		87002291		No	

DETENTION BASIN DETAILS																
Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id	
Swale 1	38.1		82.5	None						298185.469	6267162.966	No			29763513	
	38.18		83.25													
	38.19		990													
	38.36		990													
	38.59		990													
	38.6		1400													
	39.705		1400													

SUB-CATCHMENT DETAILS																
Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Lag Time or Factor	Rainfall Multiplier						
C B01\18	B01\18		0.1483	100	0	0	2	6	0	0	1					
C B01\16	B01\16		0.127	100	0	0	1	3	0	0	1					
C B01\15	B01\15		0.061	100	0	0	1	3	0	0	1					
C B01\14	B01\14		0.0248	100	0	0	1	3	0	0	1					
C B01\13	B01\13		0.0333	100	0	0	1	3	0	0	1					
C B01\12	B01\12		0.0404	100	0	0	1	3	0	0	1					
C B01\11	B01\11		0.0369	100	0	0	1	3	0	0	1					
C B01\10	B01\10		0.0305	100	0	0	1	3	0	0	1					
C B01\9	B01\9		0.0128	100	0	0	1	3	0	0	1					
C B01\7	B01\7		0.079	100	0	0	1	3	0	0	1					
C B01\6	B01\6		0.0522	100	0	0	1	3	0	0	1					

C B01\5	B01\5	0.0376	100	0	0	1	3	0	0	1
C B01\4	B01\4	0.1161	100	0	0	1	3	0	0	1
C A01\3	Swale 1	1.4102	100	0	0	8	12	0	0	1
C B03\2	B03\2	0.0886	100	0	0	1.75	5.75	0	0	1
C B03\1	B03\1	0.0931	100	0	0	1	3	0	0	1
C B05\1	B05\1	0.0652	100	0	0	1	3	0	0	1
C B06\1	B06\1	0.0623	100	0	0	1	3	0	0	1
C B07\1	B07\1	0.061	100	0	0	1	3	0	0	1
C DP07\1	DP07\1	0.0005	100	0	0	1.5	3.5	0	0	1
C C04\4	C04\4	0.1795	100	0	0	0.75	4.75	0	0	1
C C04\3	C04\3	0.1843	100	0	0	0.75	4.75	0	0	1
C C04\2	C04\2	0.1855	100	0	0	0.75	4.75	0	0	1
C C04\1	C04\1	0.1755	100	0	0	0.75	4.75	0	0	1
C C01\12	C01\12	0.0625	100	0	0	1	3	0	0	1
C C01\11	C01\11	0.0629	100	0	0	1	3	0	0	1
C C01\9	C01\9	0.1831	100	0	0	1	3	0	0	1
C C01\8	C01\8	0.1982	100	0	0	1	3	0	0	1
C C01\7	C01\7	0.1914	100	0	0	1	3	0	0	1
C C01\6	C01\6	0.1787	100	0	0	1	3	0	0	1
C C02\8	C02\8	0.0411	100	0	0	1	3	0	0	1
C C02\7	C02\7	0.0505	100	0	0	1	3	0	0	1
C C02\6	C02\6	0.0467	100	0	0	1	3	0	0	1
C C02\5	C02\5	0.0543	100	0	0	1	3	0	0	1
C SY05\1	C02\2	1.683	100	0	0	7	11	0	0	1
C C03\1	C03\1	0.0903	100	0	0	1	3	0	0	1
C B08\1	B08\1	0.3377	100	0	0	4.5	8.5	0	0	1
C DP05\1	DP05\1	0.0383	100	0	0	3.5	5.5	0	0	1
C DP06\1	DP06\1	0.0205	100	0	0	2.5	4.5	0	0	1
C DP03\1	DP03\1	0.009	100	0	0	2.6	4.6	0	0	1
C DP01\1	DP01\1	0.0781	100	0	0	3.13	5.13	0	0	1
C B04\2	B04\2	0.0563	100	0	0	1	3	0	0	1
C B04\1	B04\1	0.0821	100	0	0	1	3	0	0	1
C B04\8	B04\8	0.0085	100	0	0	1	3	0	0	1
C B04\7	B04\7	0.083	100	0	0	1	3	0	0	1
C B04\6	B04\6	0.0852	100	0	0	1	3	0	0	1
C B04\5	B04\5	0.0918	100	0	0	1	3	0	0	1
C B04\4	B04\4	0.0692	100	0	0	1	3	0	0	1
C B04\3	B04\3	0.0712	100	0	0	1	3	0	0	1
C SY03\1	SY03\1	0.8045	100	0	0	7	11	0	0	1
C SY02\1	SY02\1	1.2673	100	0	0	7	11	0	0	1
C RT	RT	0.5482	100	0	0	6	10	0	0	1
C SY04\1	SY04\1	2.4077	100	0	0	13.25	17.25	0	0	1
C DP08\1	DP08\1	0.0208	100	0	0	1.5	3.5	0	0	1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	RI (m)	Chg (m)	RL (m)
P B01\18	B01\18	B01\17	19.082	40.33	40.234	0.5	RCP CLASS 3	375	375		0.6 New		1 B01\17		19.084	0 41.315	0.01	41.316
P B01\17	B01\17	B01\16	15.045	40.204	40.129	0.5	RCP CLASS 3	375	375		0.6 New		1 B01\16		0	0 41.349	0.034	41.35
P B01\16	B01\16	B01\15	18.192	40.099	40.008	0.5	RCP CLASS 3	375	375		0.6 New		1 B01\15		18.192	0 41.025	0.011	41.025
P B01\15	B01\15	B01\14	15.095	39.978	39.903	0.5	RCP CLASS 3	375	375		0.6 New		1 B01\14		15.095	0 40.948	0.427	40.947
P B01\14	B01\14	B01\13	35.534	39.873	39.695	0.5	RCP CLASS 3	450	450		0.6 New		1 B01\13		35.534	0 40.887	35.534	40.742
P B01\13	B01\13	B01\12	48.246	39.665	39.424	0.5	RCP CLASS 3	525	525		0.6 New		1 B01\12		48.246	0 40.742	48.246	40.546
P B01\12	B01\12	B01\11	46.981	39.394	39.159	0.5	RCP CLASS 3	600	600		0.6 New		1 B01\11		46.981	0 40.546	46.981	40.354
P B01\11	B01\11	B01\10	39.118	39.129	38.933	0.5	RCP CLASS 3	600	600		0.6 New		1 B01\10		39.118	0 40.354	39.118	40.195
P B01\10	B01\10	B01\9	15.385	38.903	38.826	0.5	RCP CLASS 3	600	600		0.6 New		1 B01\9		15.385	0 40.195	0.453	40.193
P B01\9	B01\9	B01\8	4.28	38.796	38.775	0.49	RCP CLASS 3	750	750		0.6 New		1 B01\8		4.28	0 40.132	0.002	40.132
P B01\8	B01\8	B01\7	8.758	38.745	38.701	0.5	RCP CLASS 3	750	750		0.6 New		1 B01\7		8.758	0 40.295	0.245	40.294
P B01\7	B01\7	B01\6	20.02	38.671	38.571	0.5	RCP CLASS 3	750	750		0.6 New		1 B01\6		20.02	0 40.108	0.001	40.106
P B01\6	B01\6	B01\5	6.23	38.541	38.51	0.5	RCBC	0.9W x 0.6H			0.6 Existing		1 B01\5		6.23	0 39.954	0.374	39.943
P B01\5	B01\5	B01\4	39.101	38.491	38.295	0.5	RCBC	1.2W x 0.6H			0.6 Existing		1 B01\4		39.101	0 39.774	38.998	40.218
P B01\4	B01\4	B01\3	14.486	38.265	38.193	0.5	RCBC	1.2W x 0.6H			0.6 Existing		1 B01\3		0	0 40.242	0.704	40.23
P B01\3	B01\3	B01\2	7.161	38.163	38.127	0.5	RCBC	1.2W x 0.6H			0.6 Existing		1 B01\2		0	0 40.51	0.402	40.512

P B01\2	B01\2	Swale 1	5.365	38.127	38.1	0.5 RCBC	1.2W x 0.6H		0.6 Existing	1 Swale 1	0	0	40.566	0.394	40.57
P A01\2	A01\2	A01\1	33.897	36.669	36.5	0.5 RCP CLASS 3	900	900	0.6 New	2 A01\1	30.316	0	40.436	0.87	40.454
P B03\2	B03\2	B03\1	19.97	38.816	38.666	0.75 RCP CLASS 3	375	375	0.6 New	1 B03\1	19.97	0	39.919	2	39.884
P B03\1	B03\1	B01\5	20.222	38.636	38.485	0.75 Concrete, unde	375	375	0.6 New	1 B01\5	20.222	0	39.665	0.03	39.665
P B05\1	B05\1	B01\11	2.6	39.556	39.452	4 RCP CLASS 3	375	375	0.6 New	1 B01\11	2.6	0	40.795	0.053	40.939
P B06\1	B06\1	B01\12	3.311	39.791	39.596	5.89 RCP CLASS 3	375	375	0.6 New	1 B01\12	3.311	0	41.274	0.06	41.404
P B07\1	B07\1	B01\13	2.958	40.035	39.887	5 RCP CLASS 3	375	375	0.6 New	1 B01\13	2.958	0	41.752	0.043	41.854
P DP07\1	DP07\1	C04\4	24.059	40.468	40.288	0.75 RCP CLASS 3	375	375	0.6 New	1 C04\4	24.059	0	41.384	0.564	41.38
P C04\4	C04\4	C04\3	35.971	40.286	40.106	0.5 RCP CLASS 3	375	375	0.6 New	1 C04\3	40.685	0	41.225	15.632	41.351
P C04\3	C04\3	C04\2	40.685	40.076	39.872	0.5 RCP CLASS 3	450	450	0.6 New	1 C04\2	40.431	0	41.203	20.34	41.351
P C04\2	C04\2	C04\1	40.431	39.842	39.64	0.5 RCP CLASS 3	450	450	0.6 New	1 C04\1	35.971	0	41.203	20.584	41.349
P C04\1	C04\1	C01\5	39.462	39.61	39.413	0.5 RCP CLASS 3	525	525	0.6 New	1 C01\5	39.462	0	41.203	0.067	41.203
P C01\5	C01\5	C01\4	181.995	39.383	38.473	0.5 RCP CLASS 3	900	900	0.6 New	1 C01\4	0	0	41.381	1.739	41.399
P C01\4	C01\4	C01\3	24.964	38.443	38.318	0.5 RCP CLASS 3	900	900	0.6 NewFixed	1 C01\3	36.256	0	41.384	10.163	41.252
P C01\3	C01\3	C01\2	6.495	38.288	38.256	0.49 RCP CLASS 3	900	900	0.6 NewFixed	1 C01\2	36.256	0	41.059	0.965	41.046
P C01\2	C01\2	Swale 1	4.797	38.256	38.232	0.5 RCP CLASS 3	900	900	0.6 NewFixed	1 Swale 1	36.256	0	40.978	4.797	40.918
P C01\12	C01\12	C01\11	26.966	41.074	40.805	1 RCP CLASS 3	375	375	0.6 New	1 C01\11	26.966	0	41.99	0.011	41.99
P C01\11	C01\11	C01\10	8.432	40.775	40.69	1.01 RCP CLASS 3	375	375	0.6 New	1 C01\10	26.966	0	41.796	0.253	41.794
P C01\10	C01\10	C01\9	18.719	40.66	40.473	1 RCP CLASS 3	375	375	0.6 New	1 C01\9	26.966	0	41.735	13.713	41.601
P C01\9	C01\9	C01\8	40.004	40.443	40.243	0.5 RCP CLASS 3	375	375	0.6 New	1 C01\8	40.004	0	41.552	0.008	41.552
P C01\8	C01\8	C01\7	41.041	40.213	40.008	0.5 RCP CLASS 3	375	375	0.6 New	1 C01\7	41.041	0	41.211	20.824	41.35
P C01\7	C01\7	C01\6	40.331	39.978	39.604	0.93 RCP CLASS 3	450	450	0.6 New	1 C01\6	40.331	0	41.203	20.522	41.354
P C01\6	C01\6	C01\5	18.944	39.574	39.385	1 RCP CLASS 3	600	600	0.6 New	1 C01\5	18.944	0	41.211	0.29	41.204
P C02\8	C02\8	C02\7	40.104	41.44	41.139	0.75 RCP CLASS 3	375	375	0.6 New	1 C02\7	60	0	42.351	0.104	42.35
P C02\7	C02\7	C02\6	60	41.109	40.659	0.75 RCP CLASS 3	375	375	0.6 New	1 C02\6	72.902	0	42.39	1.007	42.397
P C02\6	C02\6	C02\5	72.902	40.629	40.083	0.75 RCP CLASS 3	375	375	0.6 New	1 C02\5	22.585	0	42.39	1.007	42.395
P C02\5	C02\5	C02\4	27.583	40.053	39.846	0.75 RCP CLASS 3	375	375	0.6 New	1 C02\4	27.583	0	42.182	0.18	42.183
P C02\4	C02\4	C02\3	40.863	39.816	39.509	0.75 RCP CLASS 3	450	450	0.6 New	1 C02\3	0	0	41.899	1.162	41.882
P C02\3	C02\3	C02\2	19.938	39.479	39.33	0.75 RCP CLASS 3	450	450	0.6 New	1 C02\2	19.938	0	41.546	1.334	41.545
P C02\2	C02\2	C02\1	55.939	39.3	38.88	0.75 RCP CLASS 3	750	750	0.6 New	1 C02\1	23.975	0	41.322	2.492	41.307
P C02\1	C02\1	C01\3	51.798	38.85	38.462	0.75 RCP CLASS 3	750	750	0.6 New	1 C01\3	23.975	0	41.145	1.517	41.141
P C03\1	C03\1	C02\3	22.585	40.546	40.32	1 RCP CLASS 3	375	375	0.6 New	1 C02\3	0	0	42.351	0.104	42.35
P B08\1	B08\1	B01\3	32.055	39.952	39.31	2 RCP CLASS 3	375	375	0.6 New	1 B01\3	0	0	40.973	0.918	40.959
P DP05\1	DP05\1	B01\6	8.384	39.17	38.961	2.49 RCP CLASS 3	375	375	0.6 New	1 B01\6	8.384	0	40.377	0.075	40.375
P DP06\1	DP06\1	B01\4	13.016	39.549	39.224	2.5 RCP CLASS 3	375	375	0.6 New	1 B01\4	13.016	0	40.646	2.52	40.563
P DP03\1	DP03\1	B01\8	9.899	39.296	39.158	1.39 RCP CLASS 3	375	375	0.6 New	1 B01\8	9.899	0	40.461	0.476	40.431
P DP01\1	DP01\1	B04\2	16.309	39.546	39.383	1 RCP CLASS 3	375	375	0.6 New	1 B04\2	16.309	0	40.844	0.129	40.842
P B04\2	B04\2	B04\1	13.386	39.353	39.219	1 RCP CLASS 3	450	450	0.6 New	1 B04\1	13.386	0	40.549	0.667	40.543
P B04\1	B04\1	B01\10	2.024	38.954	38.914	1.98 RCP CLASS 3	450	450	0.6 New	1 B01\10	2.024	0	40.386	0.006	40.407
P B04\10	B04\10	B04\9	2.218	41.363	41.34	1.04 RCP CLASS 3	375	375	0.6 New	1 B04\9	2.218	0	42.75	0.252	42.75
P B04\9	B04\9	B04\8	5.484	41.31	41.256	0.98 RCP CLASS 3	375	375	0.6 New	1 B04\8	5.484	0	42.339	0.621	42.331
P B04\8	B04\8	B04\7	33.988	41.226	40.801	1.25 RCP CLASS 3	375	375	0.6 New	1 B04\7	33.988	0	42.262	6.344	42.185
P B04\7	B04\7	B04\6	26	40.771	40.511	1 RCP CLASS 3	375	375	0.6 New	1 B04\6	26	0	41.815	26	41.555
P B04\6	B04\6	B04\5	26	40.481	40.221	1 RCP CLASS 3	375	375	0.6 New	1 B04\5	26	0	41.555	26	41.295
P B04\5	B04\5	B04\4	18.2	40.191	40.009	1 RCP CLASS 3	375	375	0.6 New	1 B04\4	18.2	0	41.295	7.145	41.232
P B04\4	B04\4	B04\3	33.147	39.979	39.647	1 RCP CLASS 3	375	375	0.6 New	1 B04\3	33.147	0	41.124	33.147	40.782
P B04\3	B04\3	B04\2	23.454	39.617	39.383	1 RCP CLASS 3	375	375	0.6 New	1 B04\2	23.454	0	40.782	23.454	40.549
P SY03\1	SY03\1	Swale 1	140	39.5	38.1	1 RCP CLASS 3	900	900	0.6 NewFixed	1 Swale 1	36.256	0	41.384	11.954	41.228
P SY02\1	SY02\1	Swale 1	55	38.65	38.1	1 RCP CLASS 3	900	900	0.6 NewFixed	1 Swale 1	36.256	0	41.384	11.954	41.228
P SY04\1	SY04\1	Swale 1	20	38.5	38.1	2 RCP CLASS 3	900	900	0.6 NewFixed	1 Swale 1	36.256	0	41.384	11.954	41.228
P DP08\1	DP08\1	B04\9	15.126	41.416	41.341	0.5 RCP CLASS 3	375	375	0.6 New	1 B04\9	2.218	0	42.65	0.809	42.642
P A01\3	N157817	N129639	7	36.717	36.682	0.5 RCBC	2.1W x 0.6H		0.6 Existing	1 N129639	3.582	0	38.1	2.509	38.1

DETAILS of SERVICES CROSSING PIPES

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

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

Name	From	To	Travel	Spill	Crest	Weir	Cross	Safe Depth	SafeDepth	Safe	Bed	D/S Area	id
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			Time (min)	Level (m)	Length (m)	Coeff. C	Section	Major Stor (m)	Minor Stor (m)	DxV (sq.m/sec)	Slope (%)	Contributing %	
F B01\18	B01\18	B01\16		1			6m wide curve	0.2	0.15	0.4	0.6	100	25438756
F B01\16	B01\16	B01\15		1			6m wide curve	0.2	0.15	0.4	0.5	100	25438775
F B01\15	B01\15	B01\14		1			6m wide road 4	0.2	0.15	0.4	0.4	100	8794755
F B01\14	B01\14	B01\13		1			6m wide road 4	0.2	0.15	0.4	0.4	100	8794756
F B01\13	B01\13	B01\12		1			6m wide road 4	0.2	0.15	0.4	0.4	100	8794757
F B01\12	B01\12	B01\11		1			6m wide road 4	0.2	0.15	0.4	0.4	100	8794758
F B01\11	B01\11	B01\10		1			6m wide road 4	0.2	0.15	0.4	0.4	100	8794759
F B01\10	B01\10	B01\9		1			8 m wide road (	0.2	0.15	0.4	0.4	100	8794760
F B01\9	B01\9	B03\1		1			DUMMY FOR R	0.2	0.15	0.4	1	28	8794761
F B01\8	B01\8	B01\7		1			8 m wide road (	0.2	0.15	0.4	1	0	42719473
F B01\7	B01\7	B03\1		1			DUMMY FOR R	0.2	0.15	0.4	1	18	8794773
F B01\6	B01\6	B03\1		1			DUMMY FOR R	0.2	0.15	0.4	1	18	42719393
F B01\5	B01\5	B03\1		1			8 m wide road (	0.2	0.15	0.4	1	18	42719388
F B01\4	B01\4	B01\5		1			8 m wide road (	0.2	0.15	0.4	1	100	8794762
F B01\3	B01\3	B01\4		1			8 m wide road (	0.2	0.15	0.4	1	10	8794763
F B01\2	B01\2	B01\3		1			8 m wide road (	0.2	0.15	0.4	1	10	71936436
OF118619	Swale 1	A01\2		0.3	39.705	10	1.7 DUMMY FOR R	0.2	0.15	0.4	1	100	87002263
F A01\3	Swale 1	A01\2		0.3	38.3		DUMMY FOR R	0.05	0	0.6	1	100	33273237
F A01\2	A01\2	A01\1		0.3			DUMMY FOR R	0.2	0.15	0.4	1	100	91882696
F B03\2	B03\2	B03\1		1			8 m wide road (	0.2	0.15	0.4	1	18	8794838
F B03\1	B03\1	O B03\1		1			8 m wide road (	0.2	0.15	0.4	1	100	8794765
F B05\1	B05\1	B04\1		0.7			8 m wide road (	0.2	0.15	0.4	1	100	8794775
F B06\1	B06\1	B05\1		1.4			8 m wide road (	0.2	0.15	0.4	1	100	8794776
F B07\1	B07\1	B06\1		1.3			8 m wide road (	0.2	0.15	0.4	1	100	8794777
F DP07\1	DP07\1	B01\18		1			Dummy used tc	0.2	0.15	0.4	1	10	42719586
F C04\4	C04\4	B01\18		1.9			Loading dock cr	0.2	0.15	0.4	0.7	90	8794787
F C04\3	C04\3	C04\4		1			Loading dock cr	0.2	0.15	0.4	1	100	8794788
F C04\2	C04\2	C04\3		1			Loading dock cr	0.2	0.15	0.4	1	100	8794789
F C04\1	C04\1	C04\2		1			Loading dock cr	0.2	0.15	0.4	1	100	8794790
F C01\5	C01\5	C01\6		1			8 m wide road (	0.2	0.15	0.4	1	10	8794783
F C01\4	C01\4	C01\3		1.4			DUMMY FOR R	0.2	0.15	0.4	0.9	100	71936321
F C01\3	C01\3	C01\2		0.5			DUMMY FOR R	0.2	0.15	0.4	0.9	100	71936326
F C01\2	C01\2	Swale 1		4			DUMMY FOR R	0.2	0.15	0.4	1	20	8794784
F C01\12	C01\12	C01\11		1			16.5m wide 1.7	0.2	0.15	0.4	1	100	42719231
F C01\11	C01\11	C01\10		1			16.5m wide 1.7	0.2	0.15	0.4	1	100	8794791
F C01\10	C01\10	C01\9		1			16.5m wide 1.7	0.2	0.15	0.4	1	100	71936340
F C01\9	C01\9	C01\8		1			Loading dock cr	0.2	0.15	0.4	1	100	8794779
F C01\8	C01\8	C01\7		1			Loading dock cr	0.2	0.15	0.4	1	100	8794780
F C01\7	C01\7	C01\6		1			Loading dock cr	0.2	0.15	0.4	1	90	8794781
F C01\6	C01\6	C04\1		1			Loading dock cr	0.2	0.15	0.4	1	100	8794782
F C02\8	C02\8	C01\12		1			10m wide 1.5%	0.2	0.15	0.4	1	100	8794792
F C02\7	C02\7	C02\8		1.25			10m wide 1.5%	0.2	0.15	0.4	0.7	100	8794793
F C02\6	C02\6	C02\5		1.6			10m wide 1.5%	0.2	0.15	0.4	0.8	100	8794794
F C02\5	C02\5	C02\4		1.4			DUMMY FOR R	0.2	0.15	0.4	0.8	100	8794795
F C02\4	C02\4	C03\1		1.4			DUMMY FOR R	0.2	0.15	0.4	0.9	100	42719597
F C02\3	C02\3	C02\2		1.4			DUMMY FOR R	0.2	0.15	0.4	0.9	0	42719607
F C02\2	C02\2	C02\1		1.4			DUMMY FOR R	0.2	0.15	0.4	0.9	100	42719611
F C02\1	C02\1	C01\3		1.4			DUMMY FOR R	0.2	0.15	0.4	0.9	100	72262707
F C03\1	C03\1	Swale 1		8			DUMMY FOR R	0.2	0.15	0.4	1	20	8794796
F B08\1	B08\1	B01\3		1			DUMMY FOR R	0.2	0.15	0.4	1	100	42719331
F DP05\1	DP05\1	B01\6		1			DUMMY FOR R	0.2	0.15	0.4	1	100	42719412
F DP06\1	DP06\1	B01\4		1			DUMMY FOR R	0.2	0.15	0.4	1	90	42719427
F DP03\1	DP03\1	B01\7		0.5			8 m wide road (	0.2	0.15	0.4	1	60	42719534
F DP01\1	DP01\1	B04\2		1			8 m wide road (	0.2	0.15	0.4	1	100	42719503
F B04\2	B04\2	B01\8		0.5			8 m wide road (	0.2	0.15	0.4	1	100	8794772
F B04\1	B04\1	B01\7		0.6			8 m wide road (	0.2	0.15	0.4	1	40	8794774
F B04\10	B04\10	B04\9		1			Dummy used tc	0.2	0.15	0.4	1	100	42719781
F B04\9	B04\9	B04\8		1			Dummy used tc	0.2	0.15	0.4	1	100	8794816
F B04\8	B04\8	B04\7		0.8			DUMMY FOR R	0.2	0.15	0.4	1	100	8794766
F B04\7	B04\7	B04\6		0.7			8 m wide road (	0.2	0.15	0.4	1	100	8794767
F B04\6	B04\6	B04\5		0.7			8 m wide road (	0.2	0.15	0.4	1	100	8794768

F B04\5	B04\5	B04\4	0.5	8 m wide road (	0.2	0.15	0.4	0.9	100	8794769
F B04\4	B04\4	B05\1	0.7	DUMMY FOR R	0.2	0.15	0.4	1	100	8794770
F B04\3	B04\3	B04\2	0.6	8 m wide road (	0.2	0.15	0.4	0.8	100	8794771
F SY03\1	SY03\1	Swale 1	4	DUMMY FOR R	0.2	0.15	0.4	1	20	42719846
F SY02\1	SY02\1	Swale 1	1.75	DUMMY FOR R	0.2	0.15	0.4	1	20	42719636
F SY04\1	SY04\1	Swale 1	1.4	DUMMY FOR R	0.2	0.15	0.4	0.9	20	75020992
100_F C04\100_C04\4	N140889		4	DUMMY FOR R	0.2	0.15	0.4	1	0	91536848
100_F C04\100_C04\3	N140932		5	DUMMY FOR R	0.2	0.15	0.4	1	0	92228615
100_F Rain 100_RT	N140898		5	DUMMY FOR R	0.2	0.15	0.4	1	0	92228573
100_F C04\100_C04\2	N140934		2	DUMMY FOR R	0.2	0.15	0.4	1	0	92228623
100_F C04\100_C04\1	N140936		2	DUMMY FOR R	0.2	0.15	0.4	1	0	92228628
100_F C01\100_C01\6	N140938		5	DUMMY FOR R	0.2	0.15	0.4	1	0	92228649
100_F C01\100_C01\9	N140944		4	DUMMY FOR R	0.2	0.15	0.4	1	0	92228659
100_F C01\100_C01\8	N140942		4	DUMMY FOR R	0.2	0.15	0.4	1	0	92228656
100_F SWA 100_SWALE	N140954		11	DUMMY FOR R	0.2	0.15	0.4	1	0	92228671
100_F C01\100_C01\7	N140940		4	DUMMY FOR R	0.2	0.15	0.4	1	0	92228653
F DP08\1	DP08\1	B04\9	1	Dummy used tc	0.2	0.15	0.4	1	100	96673677

IKEA MFLU – MARSDEN PARK

APPENDIX

C

MUSIC MODELLING DATA

MUSIC-*link* Report

Project Details		Company Details	
Project:	IKEAMFLU	Company:	Cardno
Report Export Date:	9/07/2015	Contact:	Sean Porter
Catchment Name:	150703-PostDevelopment	Address:	Level 9, 203 Pacific Highway St Leonards NSW 2065
Catchment Area:	12.196ha	Phone:	+61 2 9496 7782
Impervious Area*:	100%	Email:	sean.porter@cardno.com.au
Rainfall Station:	67035 LIVERPOOL(WHITLAM		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1967 - 31/12/1976 11:54:00 PM		
Mean Annual Rainfall:	857mm		
Evapotranspiration:	1261mm		
MUSIC Version:	6.1.0		
MUSIC-link data Version:	5.6		
Study Area:	Blacktown		
Scenario:	Blacktown Development		

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

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Post-Development Node	Reduction	Node Type	Number	Node Type	Number
Flow	6.59%	Rain Water Tank Node	1	Urban Source Node	7
TSS	87%	Bio Retention Node	1		
TP	67.4%	GPT Node	2		
TN	50%				
GP	99.5%				

Comments

The error report relating to the reuse demand met for the rainwater tank is a rounding matter in MUSIC.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bioretention 1	Area (sqm)	None	None	1400
Bio	Bioretention 1	Filter area (sqm)	None	None	1400
Bio	Bioretention 1	Hi-flow bypass rate (cum/sec)	None	None	1.4
Bio	Bioretention 1	PET Scaling Factor	2.1	2.1	2.1
GPT	CDS 2018	Hi-flow bypass rate (cum/sec)	None	None	0.32
GPT	CDS 2018	Hi-flow bypass rate (cum/sec)	None	None	0.46
Post	Post-Development Node	% Load Reduction	None	None	6.59
Post	Post-Development Node	GP % Load Reduction	90	None	99.5
Post	Post-Development Node	TN % Load Reduction	45	None	50
Post	Post-Development Node	TP % Load Reduction	65	None	67.4
Post	Post-Development Node	TSS % Load Reduction	85	None	87
Urban	Road 1	Area Impervious (ha)	None	None	1.411
Urban	Road 1	Area Pervious (ha)	None	None	0
Urban	Road 1	Total Area (ha)	None	None	1.411
Urban	Road 2	Area Impervious (ha)	None	None	0.283
Urban	Road 2	Area Pervious (ha)	None	None	0
Urban	Road 2	Total Area (ha)	None	None	0.283
Urban	Road 3	Area Impervious (ha)	None	None	3.456
Urban	Road 3	Area Pervious (ha)	None	None	0
Urban	Road 3	Total Area (ha)	None	None	3.456
Urban	Roof 1	Area Impervious (ha)	None	None	4.077
Urban	Roof 1	Area Pervious (ha)	None	None	0
Urban	Roof 1	Total Area (ha)	None	None	4.077
Urban	Roof 2	Area Impervious (ha)	None	None	1.683
Urban	Roof 2	Area Pervious (ha)	None	None	0
Urban	Roof 2	Total Area (ha)	None	None	1.683
Urban	Roof 3	Area Impervious (ha)	None	None	0.948
Urban	Roof 3	Area Pervious (ha)	None	None	0
Urban	Roof 3	Total Area (ha)	None	None	0.948
Urban	Roof 4	Area Impervious (ha)	None	None	0.338
Urban	Roof 4	Area Pervious (ha)	None	None	0
Urban	Roof 4	Total Area (ha)	None	None	0.338

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	Rainwater A	% Reuse Demand Met	80	None	79.7918

Only certain parameters are reported when they pass validation