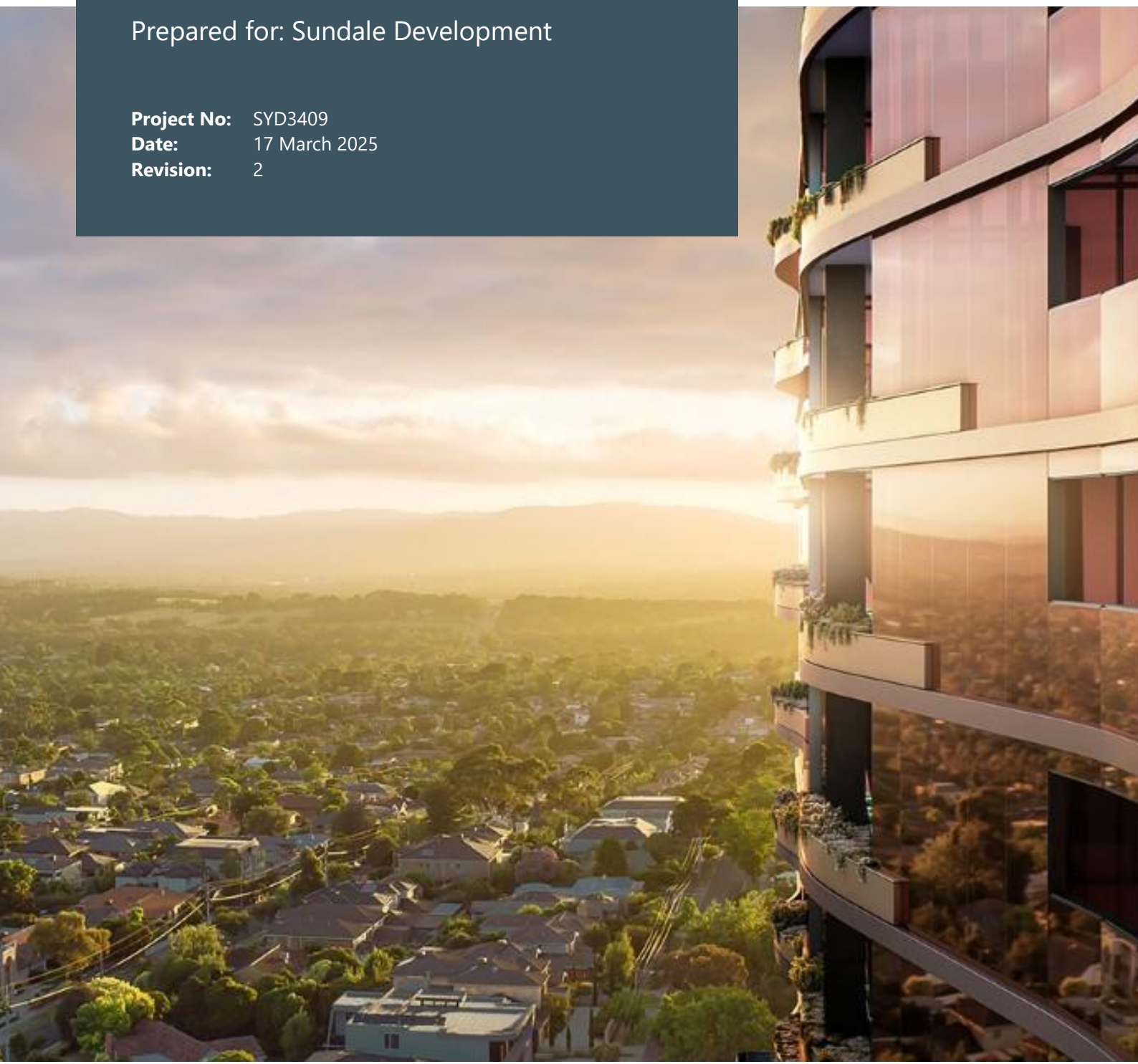
ADP Consulting : Engineering

12-16 Bent Street, Lindfield

Flood Report

Prepared for: Sundale Development

Project No: SYD3409
Date: 17 March 2025
Revision: 2



Project:	12-16 Bent Street, Lindfield
Location:	12-16 Bent Street Lindfield NSW 2070
Prepared by:	ADP Consulting Pty Ltd Level 6, 33 Erskine Street Sydney NSW 2000
Project No:	SYD3409
Revision:	2
Date:	17 March 2025

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisation & QA	Signature
1	28/02/25		AA		SS		SS	
2	17/03/25		AA		SS		SS	

Project Team	
Client / Principal	Sundale Development ABN 89 609 519 128
Architect	PTW Architects

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1. Introduction

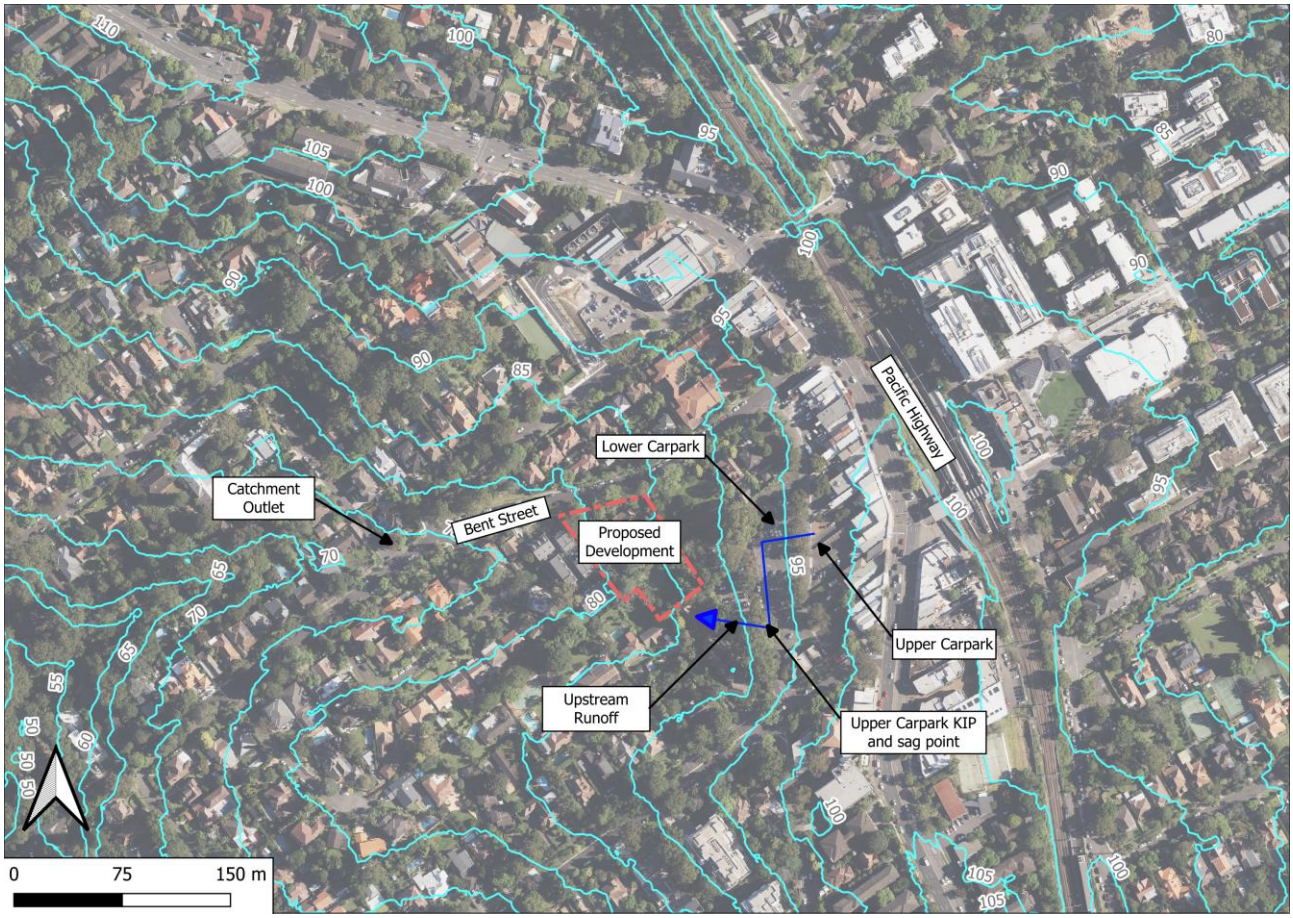
This report has been prepared to support the State Significant Development Application for the development known as 12-16 Bent Street, Lindfield. This report addresses Item 15 of the Planning Secretary's Environmental Assessment Requirements (SEARs) and maps the 1% AEP flood behaviour in both existing and proposed scenarios.

1.1 Site Context

The proposed building footprint will cover 5 existing lots, currently containing two single storey houses and a tennis court. The proposed site is bordered by Bent Street to the North and by residential developments to the West and South. The lot bounding the site to the East is currently vacant, but it is understood that Council intends to construct the new "Drovers Way" there. See Appendix A for the site survey prepared by Mitch Ayres Surveying, Ref. 220415 Dated 08/07/2023. KRG council Dial Before You Dig (DBYD) mapping confirm Council stormwater assets running adjacent to the southwest corner of the development and through the neighbouring properties 18-20 Bent Street as shown on Appendix B.

DA documents for the neighbouring development (18-20 Bent Street) have been obtained from Council and have been used to develop the flood mitigation measures for this development.

Figure 1 Site Context



1.2 Existing Flood Studies

A flood study has been prepared by Dawes Consulting Engineers, Job No. 13003 Dated 22/02/15 (See Appendix C) to analyse and address the overland flow path running through the neighbouring site on 18-20 Bent Street. The study indicated that an overland flow path approaches the site from the south eastern corner following the alignment of Council's stormwater system. The above-mentioned report has recommended the construction of an overland flow path along the southern and western setbacks of 18-20 Bent St to collect the entire overland runoff approaching that site and to redirect the runoff around the building and back towards Bent Street.

There are no current Council flood studies that cover the proposed site. However, it is understood that Ku-Ring-Gai Council is currently developing a flood study for the Lane Cove southern catchments that will cover the subject area.

1.3 Proposed Development

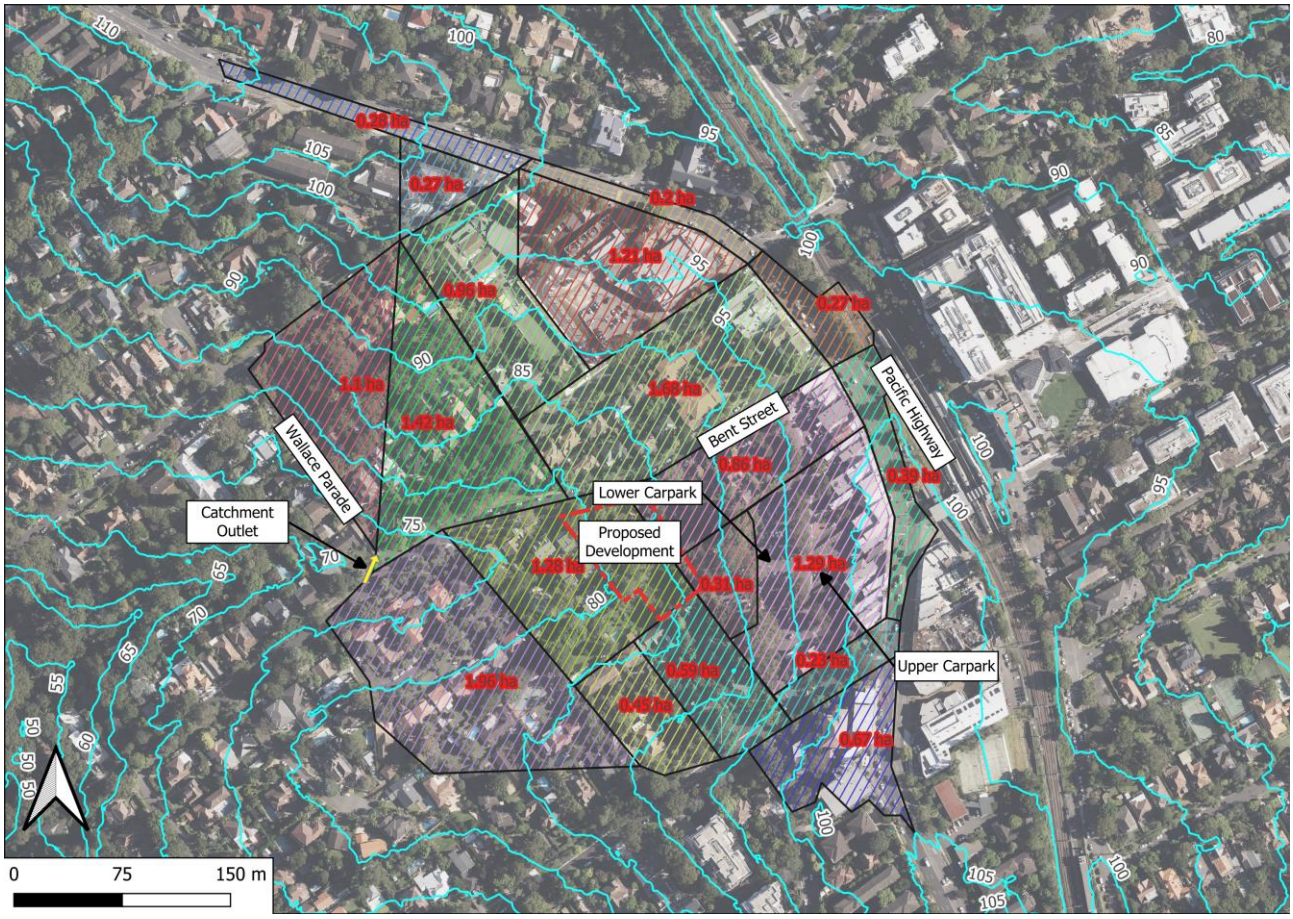
The existing residential developments will be demolished and replaced with a new 10 level residential building with a 3-level basement. A proposed driveway off Bent Street provides access to the basement while significant setbacks on all sides of the development provides space for landscaping and footpaths. Refer to Appendix D for Architectural Plans.

2. Flood Modelling

2.1 Catchment Area

LiDAR data with 1m resolution has been obtained from NSW Spatial Services in order to determine the topography of the area surrounding the site and delineate catchments affecting the development. For the purpose of this report, the catchment outlet was chosen at the corner of the intersection of Bent Street with Wallace Parade, approximately 135m west of the site.

Figure 2 Catchment Map



The upstream catchments directly affecting the site lie to the east and south of the development with contours falling from high points on Pacific Highway towards Bent Street. To the east of the site, much of the catchment is comprised of impervious commercial developments as well as two paved car parks. The two car parking areas were investigated in Google Street View and it was found that the larger "Upper Carpark" area is elevated over smaller "Lower Carpark" area, with a kerb separating both, preventing any runoff from flowing directly from the Upper Carpark to the Lower Carpark as shown in Figure 3 below. An exiting kerb inlet pit (KIP) was identified at the Upper Carpark low point as shown in Figure 4 below. During a major event, it is expected that runoff from the upper car park will collect at the KIP location then overtop the kerb and continue flowing northwest between the residential developments and is expected to follow the alignment of Council's underground drainage system as shown in Figure 1 and Appendix B.

Figure 3 Upper and Lower Carpark



Figure 4 Sag Point Kerb Inlet Pit



2.2 Hydrological Model

A DRAINS model was developed for the 19 sub-catchments and an ILSAX analysis was run to generate 19 hydrographs which were then input into the TUFLOW model.

2.2.1 Rainfall Intensity

Site specific Infiltration-Frequency-Duration (IFD) data and 10 ensemble temporal patterns have been obtained from the Bureau of Meteorology and AR&R Datahub in accordance with ARR 2019. This data was used to generate flows from each sub-catchment.

2.3 Hydraulic Modelling

2.3.1 Digital Elevation Model

A 1 metre DEM obtained from NSW Spatial Services was used to represent the existing ground surface for the hydraulic model. This resolution is fine enough to represent roads and overland flow paths and did not result in excessive run time.

2.3.2 Land Use

Land use throughout the site has been determined through satellite imagery. The following land use roughness coefficients have been adopted in accordance with ARR 2019.

Table 1 Manning's Roughness Coefficient 'n'

Land Use Type	
Residential areas	0.04
Paved roads	0.02
Vegetated Areas	0.07
Proposed open channel (vegetated)	0.08

2.3.3 Buildings

Building footprints have been determined using satellite imagery and modelled as inactive areas within the TUFLOW model.

2.3.4 Existing Stormwater Drainage

Existing stormwater drainage infrastructure has not been modelled in TUFLOW, resulting in more conservative flood estimates.

2.3.5 Upstream Boundary Condition

The stormwater hydrographs extracted from the Hydrologic Model were used as inputs for the TUFLOW model. The hydrographs were applied using 2d QT (Flow vs. Time) boundaries at the sub-catchment outlets to represent the overland flow paths affecting the site.

2.3.6 Downstream Boundary Condition

2d HQ (Stage vs. Discharge) boundaries were digitised on the corner of the intersection of Bent Street with Wallace Parade approximately 135m west of the site as shown in Figure 1. The HQ boundary utilizes a stage-discharge curve that TUFLOW automatically creates based on the underlying topography.

2.4 Design Approach

The approved flood study (Appendix C) for the neighbouring development at 18-20 Bent Street (DA0523/13) includes a diversion channel to redirect all runoff approaching the site from the southeast. The catchment delineation presented in this neighbouring study, as shown on Drawing 13003_SK-001, aligns with the assessment in Section 2.1 of this report. This assessment confirms that runoff originating from the existing carpark and commercial development to the east will approach the proposed development from the southeast.

In order to maintain the existing flood behaviour used to design this diversion channel within 18-20 Bent St, it is proposed to construct a similar overland flow path to divert flows entering the proposed site and divert them along the southern and western setbacks towards the existing channel on 18-20 Bent St.

A flood depth afflux map is not included in this report. The design approach is intended to uphold the approved flood management strategy for 18-20 Bent Street, which already accommodates runoff from 12-16 Bent Street through its overland flow path. Including an afflux map could incorrectly suggest that the redirected flows increase flood depths at 18-20 Bent Street, despite the existing infrastructure already being designed to handle these conditions.

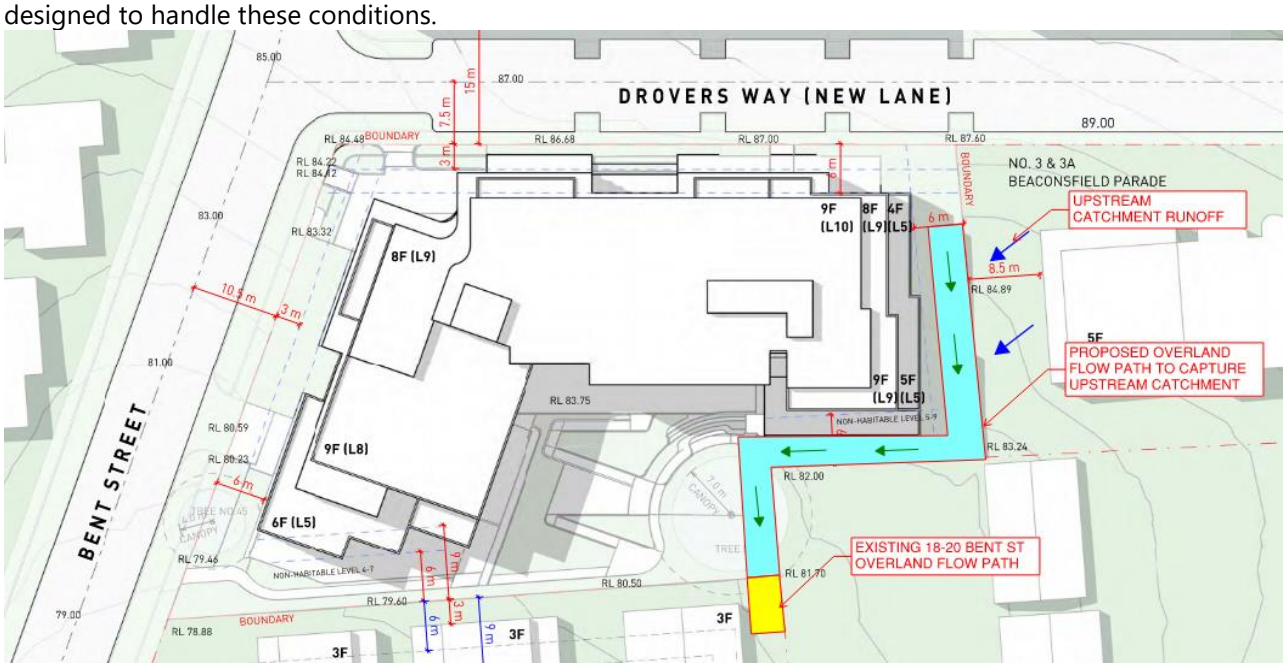


Figure 5 Proposed Mitigation Measures

2.5 Results

TUFLOW output maps can be found in Appendix E.

2.5.1 Existing Flood Behaviour

Flood modelling of the current scenario indicates that runoff approaches 12-16 Bent Street from the southeast and traverses the site before flowing west towards the eastern boundary of 18-20 Bent Street. As previously discussed, the diversion channel at 18-20 Bent Street is designed to capture all runoff from the southeast. At the northern frontage of 12-16 Bent Street, runoff is contained within Bent Street, except for an isolated area at the western corner that experiences minimal nuisance runoff with depths below 60 mm. Consequently, the northern portion of the site is classified as flood-free.

2.5.2 Proposed Flood Behaviour

Under the proposed scenario, the proposed building footprint will block the upstream catchment runoff from running west through the development. Instead, floodwaters entering 12-16 Bent Street from the southeast will be diverted along the southern and western setbacks of the proposed site before discharging into the established channel at 18-20 Bent Street. This proposed channel preserves the design intent of the existing diversion swale on 18-20 Bent St. Nuisance runoff at the northern portion of the site will remain unchanged. The proposed extent of the overland flow path, along with the calculated water levels and flows, is detailed in Appendices D and E. Flood mapping illustrates that floodwaters will be captured by the proposed open channel and conveyed to the existing channel at 18-20 Bent Street.

Drawings CE201 and CE202 provide sectional views of the proposed overland flow path, including dimensions and water levels. As indicated in Drawing CE103, tree protection zones (TPZs) within the flow path make re-grading works impractical. Instead, it has been proposed for walls to be constructed to contain the runoff, with footings constructed to span over the TPZ.

Sections 1 and 2 demonstrate the existing ground sloping from the boundary towards the proposed building. A retaining wall for the proposed building is designed to act as a flood barrier, preventing water ingress. The retaining wall is to be waterproofed at least 300 mm above the Top Water Level (TWL) in compliance with KRG DCP Section 24D.3 for flows below 20 m^3/s. As floodwaters are effectively diverted away from the building, the nominated habitable floor levels (FFL) of 80.60 and 84.05, as shown in the architectural plans, are deemed acceptable.

At Sections 4, 5, 6, and 7, the ground slopes away from the building. To manage runoff, a wall has been proposed to contain flows within the designated overland flow path. Flood mapping in Appendix E identifies a high hazard category for flows through these sections, attributed to the depth and velocity of water resulting from site topography and slope. To mitigate risks during major flood events, it is proposed to install fencing along the overland flow path as a safety measure.

The proposed overland flow path was modelled in TUFLOW using a 1D analysis of typical channel cross-sections.

3. Conclusion

ADP Consulting has prepared this report to support the State Significant Development Application for 12-16 Bent Street, Lindfield.

The proposed development was assessed to be impacted by upstream runoff approaching from the southeast. The Council approved flood study report for the neighbouring site at 18-20 Bent Street agrees with this assessment. With the design intent for that development to collect all runoff approaching from the southeast, including runoff passing through 12-16 Bent Street, and channel it through an overland flow path toward Bent Street. The flood mitigation measures proposed as part of this report aim to preserve this behaviour.

The 1% AEP flood extents for the existing scenario were determined using TUFLOW. It was found that upstream catchment flow affects the southern boundary of the site, while the northern portion remains flood-free.

Due to the presence of TPZs along the proposed overland flow path, excavation to create channels was avoided. Instead, walls are proposed to contain runoff within the flow path. Wall footings will be designed to span over the TPZs, with all works within TPZs to be supported by the project arborist.

The proposed building's retaining walls will prevent floodwaters from entering the structure, making the nominated habitable floor level (FFL) of 80.60 and 84.05 acceptable. The tops of the retaining walls adjacent to the overland flow paths are to be waterproofed at least 300 mm above the top water level (TWL) to comply with KRG DCP Section 24D.3 for flows below 20 m^3/s.

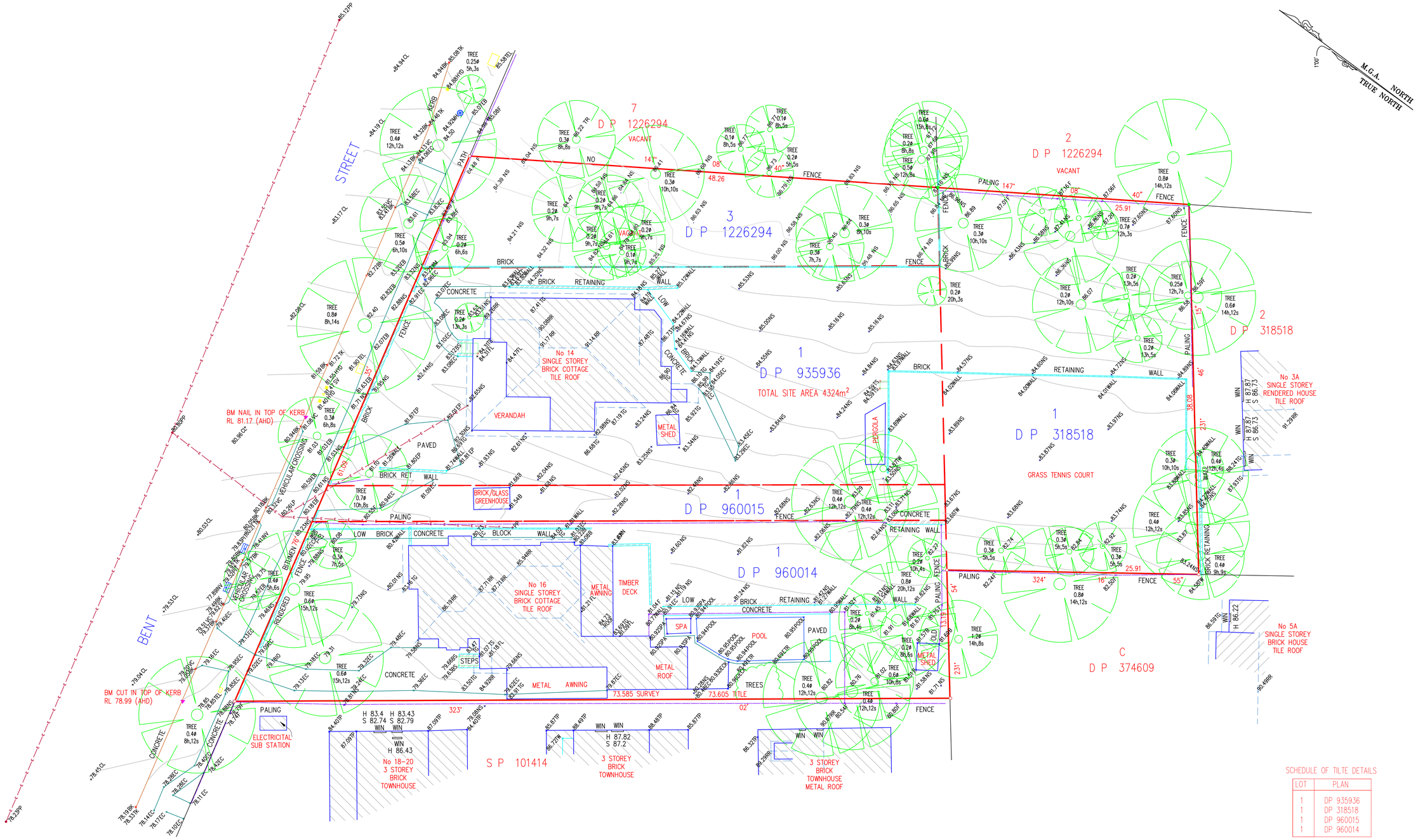
Flood mapping indicates that the channel exhibits a high hazard category due to site topography. Since re-grading the overland flow path is not feasible, it is recommended to install safety fencing along the edges of the flow path to mitigate risks during major flood events.

I have examined the site, existing improvements and proposed development. In accordance with accepted engineering practice, I have undertaken a flood study of the adjacent drainage system and can confirm the accuracy of my calculated results. I declare that the proposed development will be safeguarded from flooding and flood damage associated with the design flood standard as defined in Part 24 of the Ku-ring-gai DCP and will not adversely affect any other structures or properties

This report was prepared for and on behalf of the ADP Consulting team.

ADP
Consulting : Engineering

Appendix A
Survey



SCHEDULE OF TILTE DETAILS

LOT	PLAN
1	DP 935936
1	DP 318518
1	DP 960015
1	DP 960014

SURVEY ON MGA 2020 COORDINATES

LEGEND

AWN – AWNING
BALC – BALCONY
BK – BOTTOM OF KERB
BLD – BUILDING
BOL – BOLLARD
BM – BENCH MARK
BS – BOTTOM OF STEPS
BRK – BOTTOM OF ROCK
CL – CENTRELINE
DO – DISH DRAIN
E – ELECTRICAL BOX
EB – EDGE OF BITUMEN
EC – EDGE OF CONCRETE
EG – EDGE OF GARDEN
F – FENCE
FL – FLOOR LEVEL
HYD – HYDRANT
H – HEAD
INV – INVERT LEVEL
IO – SEWER INSPECTION PIT
MH – MANHOLE
NS – NATURAL SURFACE
PC – PRAM CROSSING
RR – ROOF RIDGE
SIGN – SIGN POST
S – SILL
SOL – SOLAR PANEL
TEL – TELSTRA PIT
TF – TOP OF FENCE
TRK – TOP OF ROCK
TG – TOP OF GUTTER
THR – TOP OF HANDRAIL
TI – TRAFFIC ISLAND
TK – TOP OF KERB
THEDGE– TOP OF HEDGE
TP – TOP OF PARAPET
TR – TREE
TS – TOP OF STEPS
TW – TOP OF WALL
US – UNDERSIDE
WIN – WINDOW
WM – WATER METER

TYPICAL NOTES:

1. ORIGIN OF LEVELS SSM 163244 RL 87.02 (AHD)
2. BEARINGS ARE ON MGA NORTH
3. A SUITABLE BOUNDARY SURVEY HAS BEEN UNDERTAKEN.
4. BOUNDARY SHOULD BE MARKED PRIOR TO CONSTRUCTION OCCURRING ON OR NEAR THE BOUNDARY
5. SERVICES SHOWN ARE BASED ON VISIBLE SURFACE INDICATORS EVIDENT AT THE DATE OF SURVEY AND THE RELEVANT SERVICE DIAGRAMS OF THE VARIOUS AUTHORITIES. ALL SERVICE MUST BE VERIFIED ON SITE PRIOR TO ANY WORK BEING UNDERTAKEN. MITCH AYRES SURVEYING PTY LTD BEAR NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE SERVICES SHOWN HEREON.
6. RIDGE, EAVE & GUTTER HEIGHTS HAVE BEEN OBTAINED BY AN INDIRECT METHOD AND ARE ACCURATE FOR PLANNING PURPOSES ONLY.
7. ADJOINING BUILDINGS AND DWELLINGS HAVE BEEN PLOTTED FOR DIAGRAMMATIC PURPOSES ONLY AND SPECIFIC DETAILS, IF CRITICAL, WILL REQUIRE FURTHER SURVEY.
8. THE DIAMETER (Ø), SPREAD (S) & HEIGHT (H) OF EACH TREE IS INDICATIVE ONLY AND SPECIFIC DETAILS, IF CRITICAL, WILL REQUIRE FURTHER SURVEY.
9. CONTOURS ARE AN INDICATION OF THE TOPOGRAPHY ONLY. SPOT LEVELS SHOULD BE USED IF DETAILED DESIGN IS TO BE UNDERTAKEN.
10. CONTOUR INTERVAL 0.5 METRE MINOR & 1 METER MAJOR INTERVAL

SERVICES NOTES

1. ALL UNDERGROUND SERVICE INFORMATION INCLUSIVE OF GENERAL POSITION AND SURFACE COVER DEPTHS NOTED ON THE PLAN ARE APPROXIMATELY ONLY.
2. ALL UNDERGROUND SERVICE INFORMATION HAS BEEN COMPILED FROM SERVICE AUTHORITY PLANS PROVIDED BY THE AUTHORITIES.
3. THE LOCATION OF SERVICES BETWEEN SURVEYED POINTS (AS INDICATED) HAVE BEEN SHOWN DIAGRAMMATICALLY ONLY USING THE SERVICE DIAGRAMS AS PROVIDED. THE EXACT LOCATION OF THESE SERVICES BETWEEN THE SURVEYED POINTS MUST BE VERIFIED PRIOR TO ANY EXCAVATION OR PILING. NO WARRANTY IS GIVEN AGAINST THE POSSIBILITY OF THE EXISTENCE OF FURTHER UNCHARTED SERVICES.
4. ALL CONTRACTORS, TRADESMEN, BUILDING & PROJECT CONSULTANTS MUST CONTACT THE VARIOUS AUTHORITIES, IN ACCORDANCE WITH STANDARD "DIAL BEFORE YOU DIG" PROCEDURES PRIOR TO UNDERTAKING ANY WORKS WITHIN THE WIDNITY OF THE SERVICE LINES TO VERIFY THE POSITION OF THE SERVICE LINES.

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step

CLIENT:
SUNDALE NORTHLAND DEVELOPMENT PTY LTD

TITLE No: SEE SCHEDULE
DATUM: AHD
DATE OF SURVEY: 26/04/2022
SURVEYOR:M.A.
DRAFTER:PH
REF:220415
ISSUE:1
ISSUE DATE: 3/05/2022
SHEET SIZE:A1
SHEET 1 OF 1 SHEETS

ISSUE	DATE	AMENDMENT	BY
2	22/06/2022	MGA 2020 COORDINATES	CG
3	8/07/2023	SURVEY OF NO. 12 ADDED	MKA

REDUCTION RATIO 1 : 200
0 2 4 6 8 10 12 14 16 18 20
LENGTHS ARE IN METRES

BOUNDARY DETAIL & LEVEL SURVEY AT No 12-16 BENT STREET LINDFIELD

MITCH AYRES SURVEYING PTY LTD
PO BOX 4226 LUGARNO NSW 2210
t: 0403 277 685
email: mitch@mitchayressurveying.com.au
web site: www.mitchayressurveying.com.au

ADP
Consulting : Engineering

Appendix B
BYDA Map

Sequence No: 216643644
Job No: 32840225
Location: 16 Bent Street, Lindfield, NSW 2070

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step.



Legend | Scale: 1:1000

N

- Recycled Main
- Stormwater Main
- Stormwater Pit
- Sewer Main
- Irrigation Power
- House Service Connection
- Communication Cable
- Electrical (Lighting) Cable
- Rock Anchor
- Survey Marker
- Easement
- Land Parcel

DISCLAIMER: While reasonable measures has been taken to ensure the accuracy of the information contained in this plan response, neither Ku-ring-gai Council or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

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Appendix C
18-20 Bent Street Civil Plans

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FLOOD STUDY REPORT

18-20 BENT STREET, LINDFIELD

DEVELOPMENT APPLICATION

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Project Name:	18-20 Bent Street, Lindfield
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Revision	Date	Author
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2	22/02/15	Andrew Dawes

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Appendices

Appendix A	Civil Engineering Plans prepared by Dawes Consulting Engineers drawings DA-C1.01 – DA-C8.01;
Appendix B	Survey plan by Geographic Solutions Surveyors, reference 2143, dated 03/09/13;
Appendix C	Architectural plans prepared by Mackenzie Architects International;
Appendix D	Stormwater drainage infrastructure survey plan by Stutchbury Jacques Surveyors, reference 8720/14, dated 20/08/14
Appendix E	Ku Ring Gai Council drainage diagrams;
Appendix F	Upstream catchment plan prepared by Dawes Consulting Engineers, reference 13003-DA-SK01;
Appendix G	Pre-developed DRAINS model Data and Results;
Appendix H	Post-developed DRAINS model Data and Results;
Appendix I	Pre-developed HEC-RAS results prepared by Dawes Consulting Engineers, reference 13003-DA-SK02;
Appendix J	Post-developed HEC-RAS results prepared by Dawes Consulting Engineers, reference 13003-DA-SK03.

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1.0 Introduction

Dawes Consulting Engineers (DCE) has been commissioned by Dugald Mackenzie Architects to undertake a flood analysis for the proposed residential development at 18-20 Bent Street, Lindfield to support the Development Application.

The development will comprise of five (5) multi-storey residential buildings containing 16 units connected by a basement carpark.

This report is intended to provide information to Ku-ring-gai Council on the results of the flood analysis as the development will require a diversion of the existing Council trunk stormwater pipe any existing overland flow around the proposed buildings. In particular the report addresses:

- the upstream catchment extent;
- the upstream catchment runoff affecting the development site;
- the pre and post developed pipe and overland flow through the site;
- the pre and post developed overland flow level and extent through the site.

2.0 Related Documents

This report is to be read in conjunction with the following documents:

1. Development Application documentation prepared by Dawes Consulting Engineers, presented in **Appendix A**:
    - DA-C1.01 Cover Sheet, Locality Plan and Drawing List;
    - DA-C1.02 General Arrangement Plan;
    - DA-C1.03 Existing Trunk Drainage Easement Plan;
    - DA-C2.01 Concept Sediment and Erosion Control Plan;
    - DA-C2.02 Sediment and Erosion Control Details;
    - DA-C3.01 Concept Stormwater Management Plan – Sheet 1;
    - DA-C3.02 Concept Stormwater Management Plan – Sheet 2;
    - DA-C3.03 Concept Stormwater Management Plan – Sheet 3;
    - DA-C4.01 Basement Plan – Sheet 1;
    - DA-C4.02 Basement Plan – Sheet 2;
    - DA-C5.01 Driveway Longsections;
    - DA-C6.01 Details Sheet;
    - DA-C7.01 Stormwater Drainage Longsection;
    - DA-8.01 Catchment Plan.
2. Ku-ring-gai Council's Local Centres Development Control Plan (DCP), 2010.

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3.0 Site Description

The site is located at 18-20 Bent Street, Lindfield within the Ku-ring-gai Council Local Government Area (LGA). The subject site is approximately 2719.4m² in area and is bound by Bent Street to the north and existing single residential dwellings to the south, east and west.

Currently there exists a single residential dwelling on each lot, a tennis court at the rear of both lots and associated garages, driveways, paved and landscaped areas which will all be demolished as part of the proposed development works. The site generally falls from the rear of the property at RL80.5 to the front at RL76.91.

The existing site can be viewed on the survey plan by Geographic Solutions Surveyors, reference 2143, dated 03/09/13 which is presented in **Appendix B**.



Source: Google Earth Image 04/12/13

Figure 1: Site Aerial Image

4.0 Methodology

To determine the pre and post developed flooding extent the following methodology was undertaken:

- An upstream catchment plan to the subject site was generated using existing survey, aerial imagery and topographic contours;
- A computer based hydrological model of the catchment and existing drainage network was constructed using DRAINS. Design storms were applied to the model to provide estimates of the 100 year ARI pipe flow and overland flow discharges at the subject site in the pre-development condition;
- A second DRAINS model was constructed to assess the post-developed condition by amending the pre-developed model with the proposed drainage infrastructure;

- A computer based, one-dimensional, steady flow hydraulic model was then constructed using HEC-RAS to determine by inputting the 100 year ARI discharges calculated form the DRAINS model;
- A second HEC-RAS model was constructed to determine the overland flow path through the site in its post-developed condition;
- The proposed stormwater drainage system was designed and amendments made to the post-developed model to ensure no adverse impacts on the downstream properties;
- Finished floor levels and protection to building openings were assessed, including freeboard, within the development to ensure no internal inundation from flood waters.

5.0 Proposed Development

As a result of the proposed development, the existing Council trunk stormwater pipe will need to be diverted along the southern and western boundaries to avoid the development. The overland flow will also be diverted along the same alignment. As the upstream pipe is a 600mm dia. and the downstream a 450mm dia. a 600mm dia. is proposed through the site with an associated overland flow path that will cater for any surcharge downstream of the pipe reduction. An easement will be created over the new overland flow path. The proposed development plans prepared by Mackenzie International Architects are presented in Appendix C.

6.0 Hydrological Analysis and Modelling

To determine the amount of upstream runoff affecting the site an upstream catchment analysis was undertaken and modelled using DRAINS computer software.

6.1 Catchment Analysis

The upstream catchment is approximately 3.16ha commencing from the Pacific Highway and generally falling towards the rear of the subject site consisting of existing commercial and residential sites, car parks and roads. The upstream catchment can be divided into three sub-catchments. The catchment contains a Council stormwater drainage system from the Woodford Lane car park through the subject site to Newark Crescent and beyond.

The stormwater drainage infrastructure can be viewed on the survey plan by Stutchbury Jacques Surveyors, reference 8720/14, dated 20/08/14 which is presented in **Appendix D**. As not all pipes were accessible during the survey, the unknown pipes were determined through review of Council drainage diagrams. For any discrepancies in pipe sizes, the smaller pipe size has been adopted. Council drainage diagrams are presented in **Appendix E**. It is noted that the pipe downstream of the site is smaller than the upstream being 450mm dia. and 600mm dia. respectively.

The upstream catchment plan, 13003-DA-SK01 is plan is presented in **Appendix F**.

6.2 Data Input

A DRAINS model was developed to determine the pipe and overland flow rates. The following data was input into the model:

- Rainfall Data - Rainfall data was determined from Ku Ring Gai Councils Water Management DCP 47 - Appendix 10 - Intensity Frequency Duration Data;
- Minor Storm Event (ARI) - 5 years;
- Major Storm Event (ARI) - 100 years;

- Design Storm - It is noted that the 5 year ARI storm was run with 100% blockage however the 100 year ARI storm with 50% blockage was the worst case;
- Inlet pit blockage – 50% was adopted as the design storm as it was the worst case;
- Soil Type - 3;
- Antecedent Moisture Condition - 3;
- Paved and grassed storage area depressions of 1mm and 5mm respectively;
- Pipe friction - The pipe roughness value used was 0.3mm (Colebrook-White formula);
- Pit pressure head coefficient (k) - The k values have been calculated using the QUDM method in DRAINS;
- An impervious percentage of 90% has been calculated for the upstream catchment based on aerial imagery and site inspections.

Table 1 – DRAINS Catchment Data

Catchment	Area (ha)	Impervious %	Flow Path Length (m)	Flow Path Slope (%)	Flow Path Roughness (n*)	
					Imp	Per
C1	1.20	90	130	8.5	0.013	0.1
C2	0.16	90	80	5	0.013	0.1
C3	1.80	90	308	7.8	0.013	0.1

Note: (IMP – Impervious, PER – Pervious)

6.3 Pre-Developed Model Results

The results of the pre-developed model are presented in *Figure 2* below.

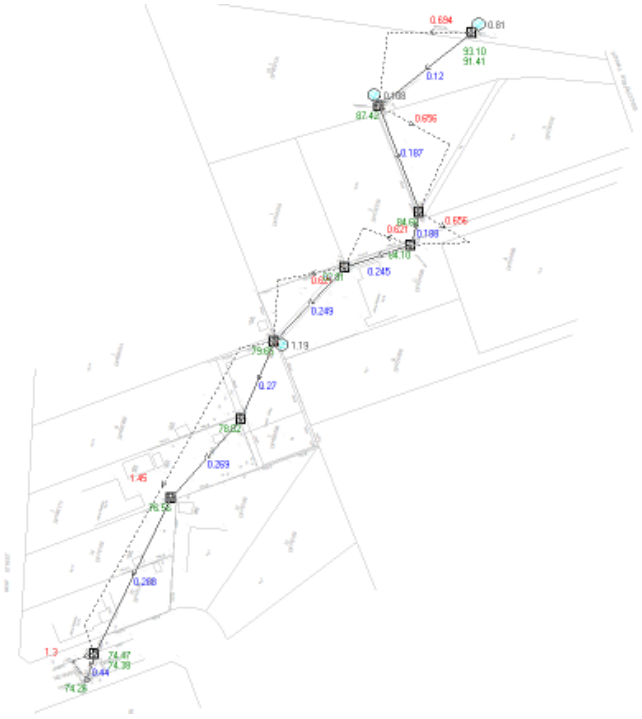


Figure 2 – Pre-Developed Model Results

The results show the following pipe and overland flows affecting the site:

Table 2 – DRAINS Pre-developed Model Results

	Flow (m^3/s)
Pipe	0.27
Overland	1.45

Due to existing site grades and fence alignments, it is most likely that overland flow will be directed along the western boundary of the site and towards Bent Street. The pre-developed data and results are presented in **Appendix G**.

6.4 Post-Developed Model Results

The results of the pre-developed model are presented in *Figure 3* below.

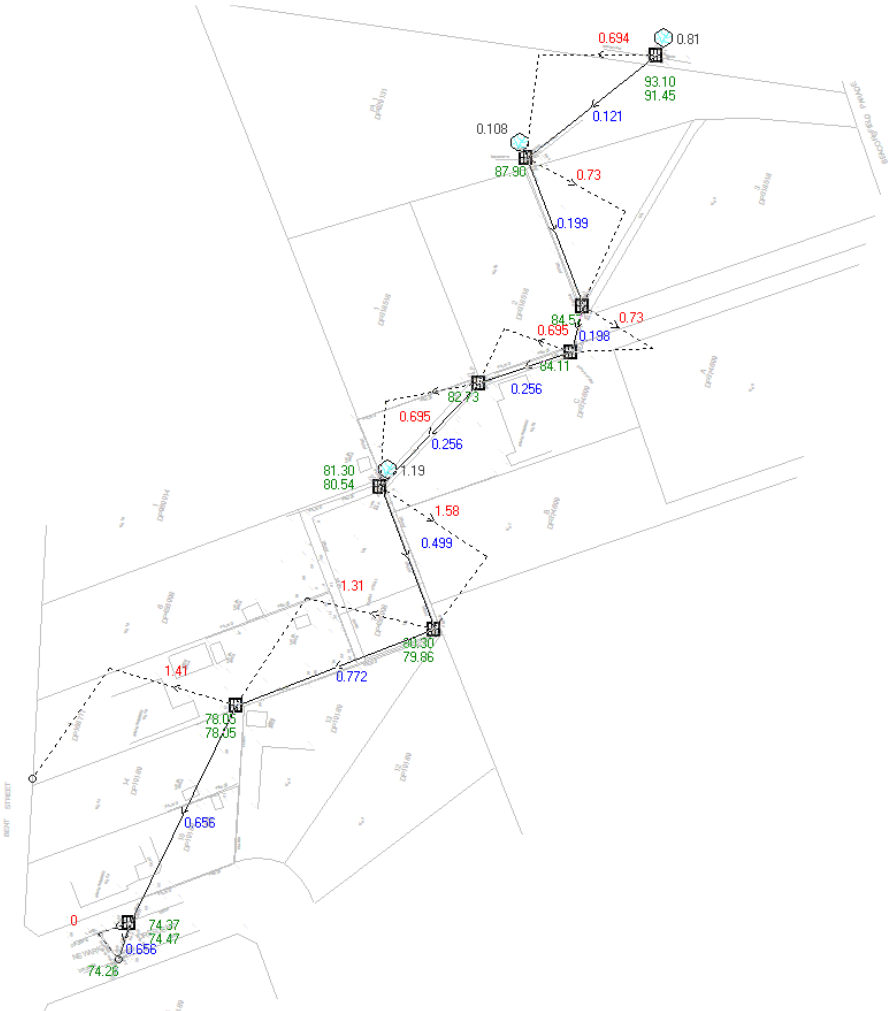


Figure 3 – Post-Developed Model Results

The results show an increase in the pipe capacity due to the inclusion of inlets pits within the site. Although there is a slight increase in the overland flow along the southern boundary, this is reduced for the majority of the site. The results show the following pipe and overland flows affecting the site:

Table 3 – DRAINS Post-developed Model Results

	Boundary	Flow (m^3/s)
Pipe	Southern	0.572
	Western	0.699
Overland	Southern	1.58
	Western (upstream)	1.31
	Western (downstream)	1.41

Due to proposed site grades and fence alignments, overland flow will continue to be directed along the western boundary of the site and towards Bent Street. The pre-developed data and results are presented in **Appendix H**.

6.5 Model Comparison

The DRAINS results show a "worst case" flow and does not necessarily represent a single storm event which explains the total increase of water through the site in the pre and post developed conditions. What the results demonstrate is a reduction in overland flow through the site and onto Bent Street. The results are summarised in *Table 4* below:

Table 4 – DRAINS Pre and Post Model Results

Catchment	Pre	Boundary	Post
Pipe Flow	0.27	Southern	0.572
		Western	0.699
Overland Flow	1.45	Southern	1.58
		Western	1.31
		Western	1.41

7.0 Hydraulic Analysis and Modelling

Hydraulic modelling software, HEC-RAS, was used to analyse the flood levels along the proposed overland flowpath. The critical design criteria for the proposed overland flow path was ensuring minimum 300mm freeboard to adjacent buildings and limiting velocity-depth product to less than $0.4m^2/s$ for pedestrian areas (Bent Street) and $0.6\ m^2/s$ for non-pedestrian areas in accordance with safety recommendation outlined in Australian Rainfall and Runoff (AR&R), Volume 1.

7.1 Data Input

- Cross sections have been created at critical sections along the proposed overland flow path. These sections were input directly into HEC-RAS design software;
- The manning's n used in the analysis was 0.035 (short grass);
- The upstream and downstream boundary condition for the analysis was assumed to be at normal depth, which was calculated based on the survey data;

- Design Storm - 100 year ARI;
- Flow regime - Mixed.
- Flowrates - Input from the results of the hydrological modelling.
    - Pre-developed - 1.45m^3/s;
    - Post-developed - Southern boundary - 1.58m^3/s.
      - Western boundary (upstream) - 1.31m^3/s.
      - Western boundary (downstream) - 1.41m^3/s.

7.2 Pre-Developed Model Results

The pre-developed flood results are summarised below:

Table 5 – Pre-developed HEC-RAS Results

River Station	Chainage (m)	Surface Level (RL)	Flood Level (RL)	Flowpath Depth (m)	Flowpath Width (m)
1	2.8	77.24	77.41	0.17	9.08
2	7.85	77.62	77.76	0.14	9.75
3	16.45	78.15	78.31	0.16	9.37
4	25.75	78.71	78.89	0.18	5.05
5	45.05	80.34	80.50	0.16	22.73

As the alignment of the overland flow was diverted a pre-developed model was assessed to inform the existing condition however was not directly compared with the proposed development. The pre-developed flooding plan is presented on 13003-DA-SK02 in **Appendix I** and the HEC-RAS profile plot presented in *Figure 4* below.

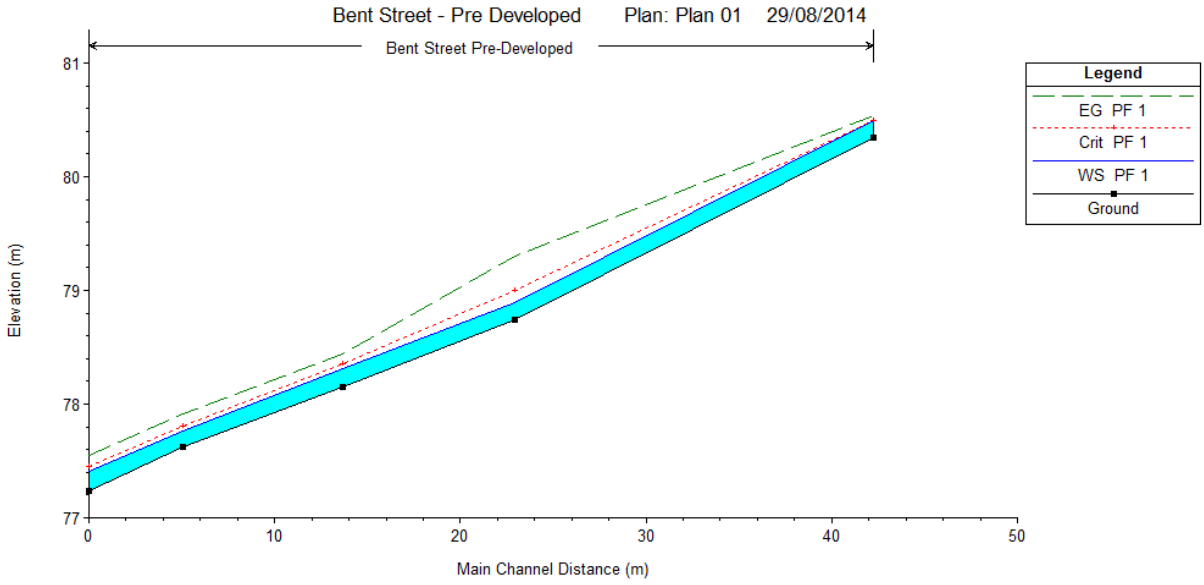


Figure 4 – HEC-RAS Pre-developed Model Results

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7.3 Post-Developed Model Results

The post-developed flood results are summarised below:

Table 6 – Post-developed HEC-RAS Results

River Station	Chainage (m)	Proposed Surface Level (RL)	Proposed Surface Level (RL)	Flood Level (RL)	Adjacent Floor/Top of Wall Level (RL)	Freeboard (m)	Flowpath Depth (m)	Flowpath Width (m)	Velocity (m/s)	VxD (m^2/s)
1	6	76.61	77.23	77.48	77.80	0.3	0.25	3.6	1.57	0.39
2	21	76.49	77.31	77.69	78.00	0.31	0.38	2.9	1.28	0.49
3	32.5	76.86	77.37	77.60	78.00	0.40	0.23	2.5	2.45	0.56
4	45.5	77.44	77.88	78.17	78.57	0.40	0.29	2.9	1.68	0.49
5	61.5	78.95	78.05	78.24	78.57	0.33	0.19	2.9	2.38	0.45
6	71.5	80.58	78.95	79.08	79.40	0.32	0.13	2.9	3.47	0.45
7	78.5	80.9	80.0	80.21	81.25	1.04	0.21	2.9	2.15	0.45
8	101.5	81.2	80.7	80.95	81.25	0.3	0.25	4	1.58	0.4

The post-developed flooding plan is presented on 13003-DA-SK03 in **Appendix J** and the HEC-RAS profile plot presented in *Figure 5* below.

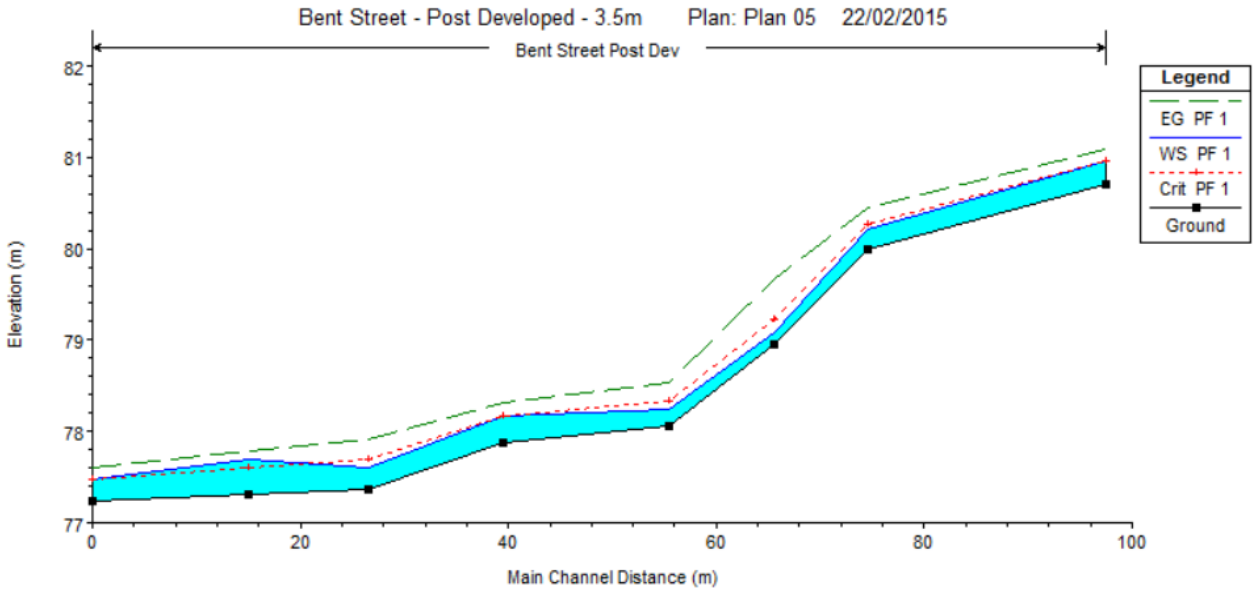


Figure 5 – HEC-RAS Post-developed Model Results

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8.0 Conclusion

Dawes Consulting Engineers has prepared this report to demonstrate the results of the flood analysis for 18-20 Bent Street, Lindfield to assist Council in assessing the Development Application.

The findings of this report demonstrate the following:

- A reduction in overland flow through the development site;
- An increase in pipe inlet capacity through and downstream of the site;
- A designated overland flow path;
- Overland flow less than 0.4m^2/s at the Bent Street discharge and less than 0.6 m^2/s through the site;
- Minimum 300mm freeboard to proposed adjacent floor levels or flood protection wall.

Based on the above results, there is are no adverse effects on the proposed development or neighbouring properties as a result of the pipe and overland flow deviation or development.

The above findings have been undertaken in relation to the Development Application design and are subject to detailed evaluation in the construction certificate detailed design phase.

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APPENDIX A

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Chartered Professional Engineer
MEMBER

18-20 BENT STREET, LINDFIELD

STORMWATER MANAGEMENT AND

CIVIL ENGINEERING PLAN

DEVELOPMENT APPLICATION



SOURCE : NEARMAP.COM (©2013)

LOCALITY MAP

NOT TO SCALE

DRAWING SCHEDULE

DA-C1.01	COVER SHEET
DA-C1.02	GENERAL ARRANGEMENT
DA-C1.03	EXISTING DRAINAGE EASEMENT PLAN
DA-C2.01	CONCEPT SEDIMENT & EROSION CONTROL PLAN
DA-C2.02	SEDIMENT & EROSION DETAILS
DA-C3.01	CONCEPT STORMWATER MANAGEMENT PLAN SHEET 1
DA-C3.02	CONCEPT STORMWATER MANAGEMENT PLAN SHEET 2
DA-C3.03	CONCEPT STORMWATER MANAGEMENT PLAN SHEET 3
DA-C4.01	BASEMENT PLAN SHEET 1
DA-C4.02	BASMENT PLAN SHEET 2
DA-C5.01	DRIVEWAY LONGSECTIONS
DA-C6.01	DETAILS SHEET
DA-C7.01	STORMWATER LONGSECTION SHEET
DA-C8.01	CATCHMENT PLAN

REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
3	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
2	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	26.08.14	ISSUED FOR COORDINATION	AD	AD	AD

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MEMBER

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SCALE:

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: COVER SHEET

NORTH

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1

DRAWING NUMBER: 13003_DA-C1.01

REVISION: 03

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REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
3	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
2	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	26.08.14	ISSUED FOR COORDINATION	AD	AD	AD

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SCALE:
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SCALE 1: 400 @

PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: GENERAL ARRANGEMENT

NORTH

CLIENT: MATTIUSSI AND WU
ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL
STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION
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REVISION: 03

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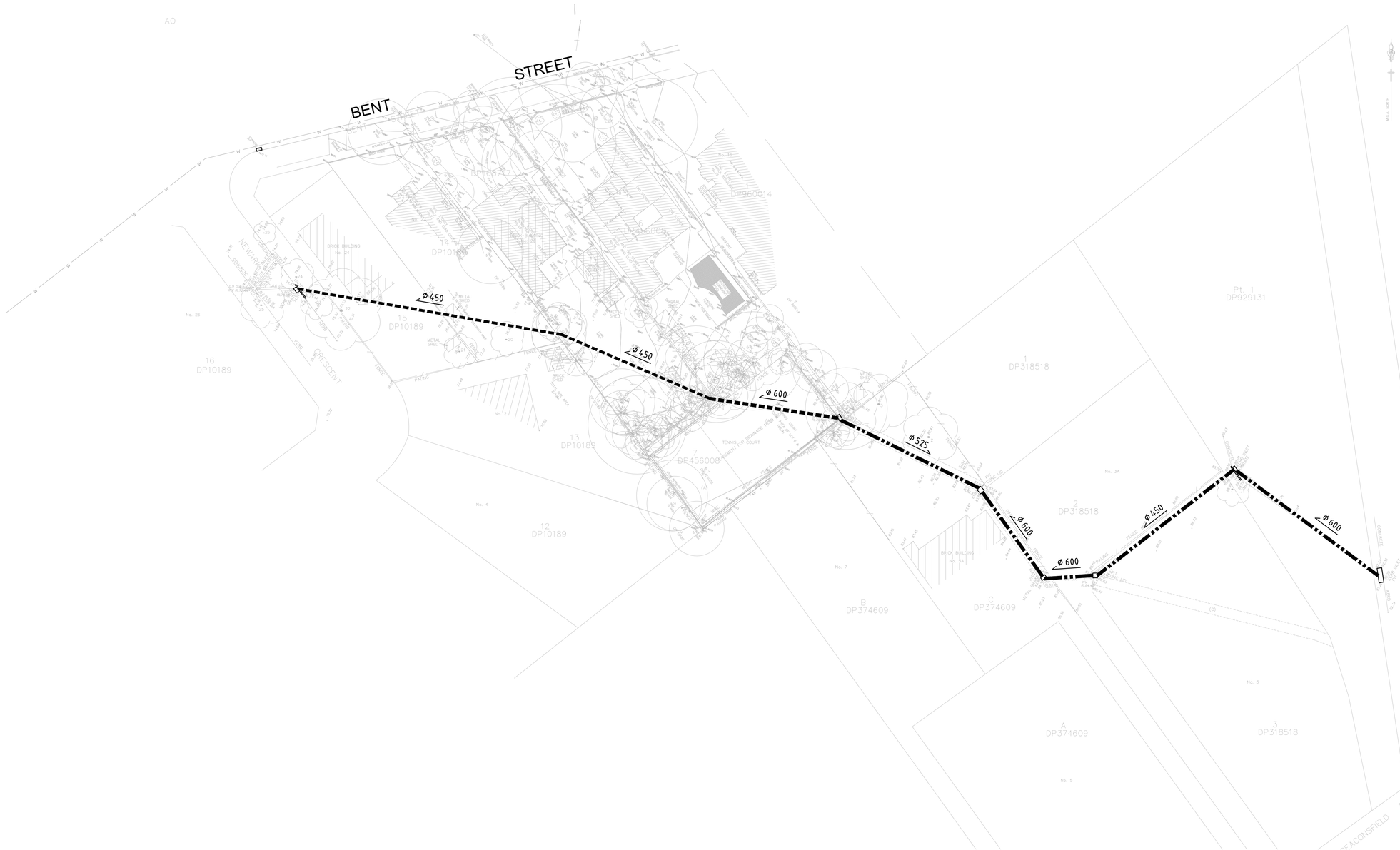
LEGEND

EXISTING STORMWATER PIPE

EXISTING STORMWATER PIPE (ASSUMED ALIGNMENT)

NOTE

WHERE DISCREPANCIES PRESENT IN SURVEY INFORMATION THE SMALLER IN PIPE SIZE HAS BEEN ADOPTED



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2	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD

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SCALE: 0 10 20 30 40m
SCALE 1:400 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: EXISTING DRAINAGE EASEMENT PLAN

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
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SEDIMENT & EROSION

1. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND MAINTENANCE OF EROSION AND SEDIMENTATION THROUGHOUT THE CONTRACT 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 ("THE BLUE BOOK".)

2. THE EROSION AND SEDIMENTATION CONTROLS SHOWN ON THE DRAWINGS REPRESENT CONCEPTS ONLY TO DEMONSTRATE THE MINIMUM REQUIREMENTS.

3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.

4. AS STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.

5. 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.

6. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. DUST CONTROL HESSIAN SHALL BE INSTALLED TO SITE FENCES AS REQUIRED.

7. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

8. THE **CONTRACTOR** IS TO INFORM ALL SUB-CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.

9. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   - A. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ARE ADJACENT TO EACH OTHER THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE;
   - B. CONSTRUCT TEMPORARY STABILISED SITE ACCESS. INCLUDING SHAKE DOWN AND WASH PAD;
   - C. CONSTRUCT TEMPORARY SEDIMENT BASIN AND DIVERSION SWALES;
   - D. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS;
   - E. 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.

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

11. 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.

12. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

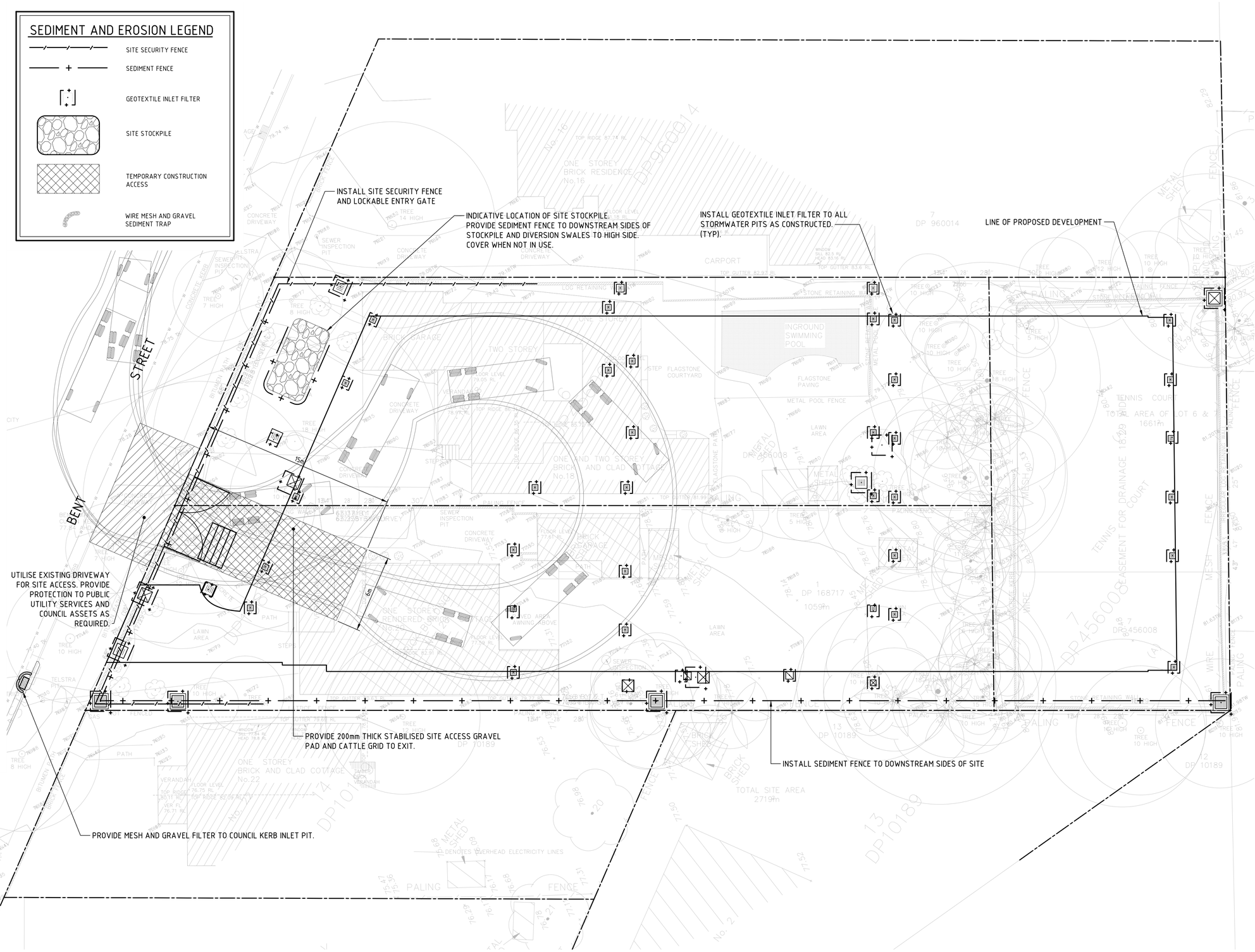
13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER AND SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.

14. STRIPPING WORKS ARE TO BE STAGED TO MINIMISE EXTENTS OF EXPOSED AREAS AT ONE TIME. WEATHER CONDITIONS TO BE ASSESSED PRIOR TO UNDERTAKING STRIPPING.

15. SITE ACCESS TO BE RESTRICTED TO ALLCOATED TRUCK ROUTES. EXTERNAL ROADS TO BE SWEPT REGULARLY FOR DURATION OR WORKS.

SEDIMENT AND EROSION LEGEND

- SITE SECURITY FENCE
- SEDIMENT FENCE
- GEOTEXTILE INLET FILTER
- SITE STOCKPILE
- TEMPORARY CONSTRUCTION ACCESS
- WIRE MESH AND GRAVEL SEDIMENT TRAP



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
2	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD

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PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: CONCEPT SEDIMENT & EROSION CONTROL PLAN

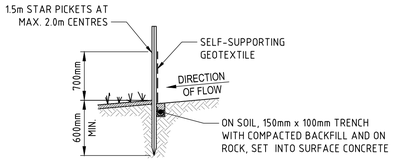
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ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

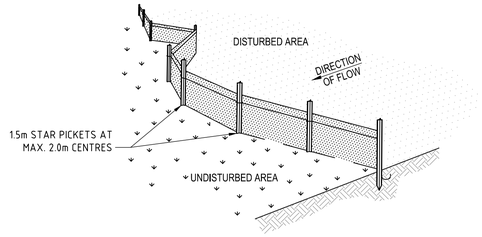
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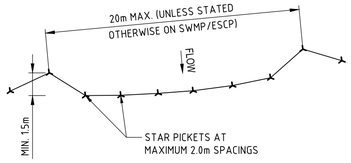
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SECTION DETAIL





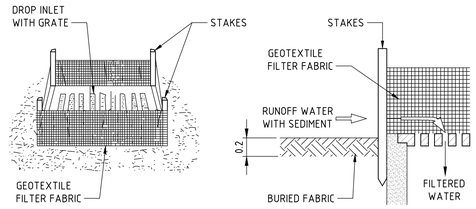
PLAN

NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

NOT TO SCALE

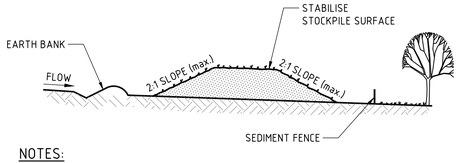


NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.0m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

GEOTEXTILE INLET FILTER

NOT TO SCALE

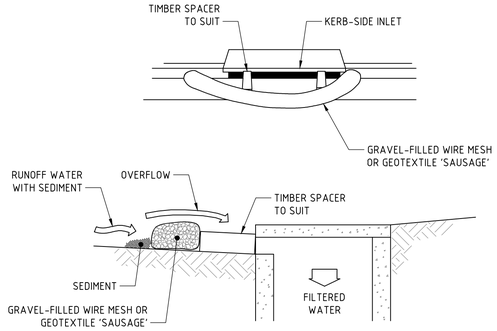


NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT. 4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILE

NOT TO SCALE

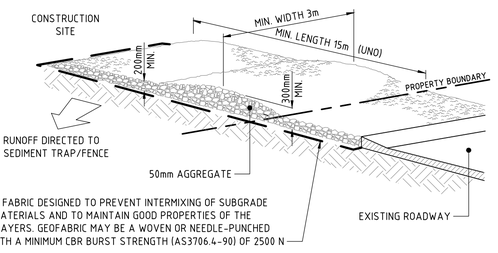


MESH AND GRAVEL INLET FILTER

NOT TO SCALE

NOTES:

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



GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS. GEOFABRIC MAY BE A WOVEN OR NEEDLE-PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N

NOTES:

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING 50mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

TEMPORARY CONSTRUCTION ENTRY/EXIT

NOT TO SCALE

REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
2	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD

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SCALE:

PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: SEDIMENT & EROSION DETAILS

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1

DRAWING NUMBER: 13003_DA-C2.02

REVISION: 02

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

LEGEND

- JUNCTION PIT
- GRATED PIT
- CDS UNIT
- KERB INLET PIT
- EXISTING KERB INLET PIT
- EX 1 — PIT LABEL
- Ø 100 — PIPE SIZE / FLOW DIRECTION
- SURFACE DRAINAGE STORMWATER PIPE
- EXISTING STORMWATER PIPE
- ROOF DRAINAGE STORMWATER PIPE
- GRASS SWALE
- VC — VEHICULAR CROSSING
- RW — RETAINING WALL
- DP — DOWNPIPE
- F 98.65 — FINISHED SURFACE LEVEL
- IL98.65 — INVERT LEVEL
- 5% — SURFACE FALL

NOTES

1. THESE PLANS HAVE BEEN DESIGN IN ACCORDANCE WITH RELEVANT LOCAL AUTHORITY GUIDELINES FOR DEVELOPMENT APPLICATION PURPOSES TO DEMONSTRATE FEASIBILITY AND ARE SUBJECT TO COUNCIL APPROVAL AND DETAILED DESIGN AT CONSTRUCTION CERTIFICATE STAGE.
2. DO NOT OBTAIN DIMENSIONS BY SCALING THE DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETERS (mm) AND ALL LEVELS ARE IN METERS (m), UNO. ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
3. PROVIDE 100 YEAR PIPE CAPACITY TO TRAPPED COURTYARDS.
4. STORMWATER PIPES SHOWN INDICATIVELY. PIPES ADJACENT TO BUILDINGS AND RETAINING WALLS ARE TO BE LOCATED IMMEDIATELY ADJACENT TO OR GREATER THAN 2m FROM THE STRUCTURE.
5. ALL COURTYARD STORMWATER PITS TO BE 300x300mm POLYPROPYLENE, UNO.
6. LANDSCAPING SWALES TO BE USED TO DIRECT ALL SURFACE RUNOFF TO INLET PITS.

DESIGN SUMMARY

ONSITE STORMWATER DETENTION CALCULATION SHEET

CATCHMENT NAME: LG1

CATCHMENT DISCHARGE RATE: 0.0147 (l/SEC/m²)

CATCHMENT STORAGE RATE: 0.0287 (m³/m²)

SITE DETAILS	OSD1	OSD2	
SITE AREA (m²)	1818.17	900.67	-
50% SITE AREA (m²)	909.37	450.30	C
AREA(S) NOT DRAINING TO DETENTION SYSTEM (m²)	205	205	-
TOTAL IMPERVIOUS AREA (m²)	969.85	532.05	D
IMPERVIOUS AREA BYPASSING DETENTION SYSTEM (m²)	62.66	62.66	E
PERMITTED SITE DISCHARGE			
CxA (l/SEC)	13.37	6.62	FLOW 1
UNCONTROLLED IMPERVIOUS FLOW (E/D) (=0.25)	0.06	0.12	F
FLOW 1 x F (l/SEC)	0.8	0.79	FLOW 2
FLOW 1 - FLOW 2 (l/SEC)	12.57	5.83	PSD
STORAGE REQUIREMENT			
C X B (m³)	26	13	SSR1
STORAGE IN LANDSCAPED BASIN, SSR1x1.2 (m³)	0	0	SSR2
OUTLET CONTROL			
HEIGHT DIFFERENCE BETWEEN TOP WATER SURFACE LEVEL AND THE CENTRE OF THE ORIFICE (m)	1.03	1.88	G
ORIFICE DIAMETER (mm) $21.8 \times \sqrt{\frac{PSD}{\sqrt{G}}}$	76	45	OD

MINIMUM RAINWATER TANK VOLUME = 16m³

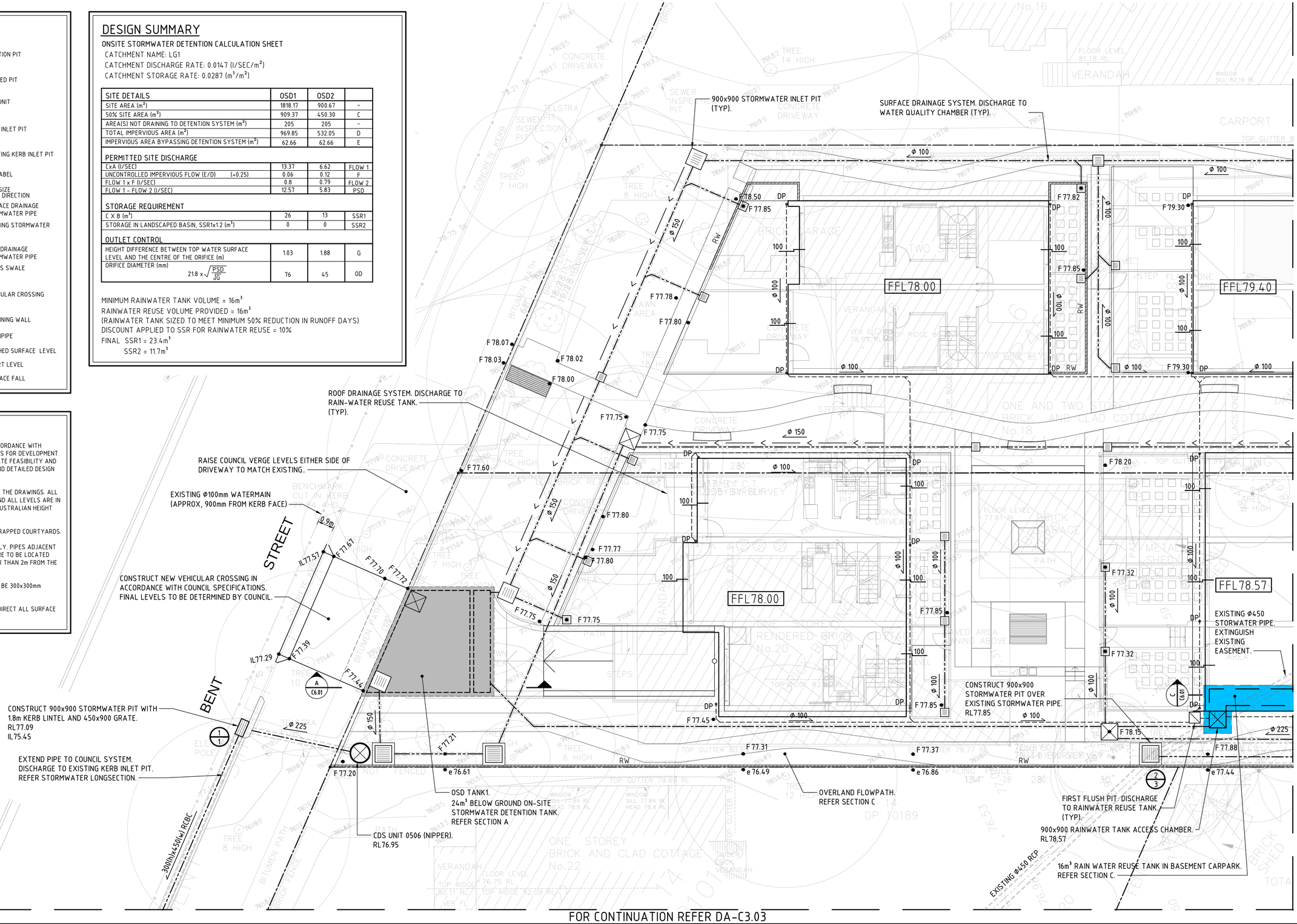
RAINWATER REUSE VOLUME PROVIDED = 16m³

(RAINWATER TANK SIZED TO MEET MINIMUM 50% REDUCTION IN RUNOFF DAYS)

DISCOUNT APPLIED TO SSR FOR RAINWATER REUSE = 10%

FINAL SSR1 = 23.4m³

SSR2 = 11.7m³



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1	26.08.14	ISSUED FOR COORDINATION	AD	AD	AD

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SCALE: 0 2 4 6 8 10m — SCALE 1:100 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: CONCEPT STORMWATER MANAGEMENT PLAN SHEET 1

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY — NOT TO BE USED FOR CONSTRUCTION

SIZE: A1 | DRAWING NUMBER: 13003_DA-C3.01 | REVISION: 03

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

FOR CONTINUATION REFER DA-C3.01

600x600 STORMWATER INLET PIT WITH ENVIROPOD FILTER BASKET. (TYP).

EXISTING Ø450 RCP

CONSTRUCT 900x900 STORMWATER PIT OVER EXISTING STORMWATER PIPE. RL81.10

SURFACE DRAINAGE SYSTEM. DISCHARGE TO ON-SITE STORMWATER DETENTION TANK. (TYP)

ILu 79.85
Ø600
3.6%
ILd 78.75
30.4m

RETAINING WALL
TOP OF WALL RL81.25

LANDSCAPE DIVERSION SWALE (TYP).

EXISTING Ø450 STORWATER PIPE. EXTINGUISH EXISTING EASEMENT.

OVERLAND FLOWPATH. REFER SECTION D.

PROPOSED Ø600 STORWATER PIPE. EXTINGUISH EXISTING EASEMENT AND CREATE NEW EASEMENT OVER.
REFER STORMWATER LONGSECTION.

ROOF DRAINAGE SYSTEM.
DISCHARGE TO RAIN-WATER REUSE TANK.
(TYP)

EASEMENT FOR STORMWATER PIPE

900x900 STORMWATER PIT
RL80.20

EASEMENT FOR STORMWATER PIPE

OVERLAND FLOWPATH.
REFER SECTION C

ILu 78.73
Ø600
6%
ILd 76.20
41.8m

FIRST FLUSH PIT. DISCHARGE TO RAINWATER REUSE TANK. (TYP).

16m³ RAIN WATER REUSE TANK IN BASEMENT CARPARK.
REFER SECTION.

OSD TANK 2.
~~12m³ BELOW GROUND ON-SITE~~
STORMWATER DETENTION TANK.
REFER SECTION B

FFL79.40

FFL78.57

EXISTING 450 RCP

SITE AREA
719m²

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SCALE: 0 2 4 6 8 10m
SCALE 1:100 @

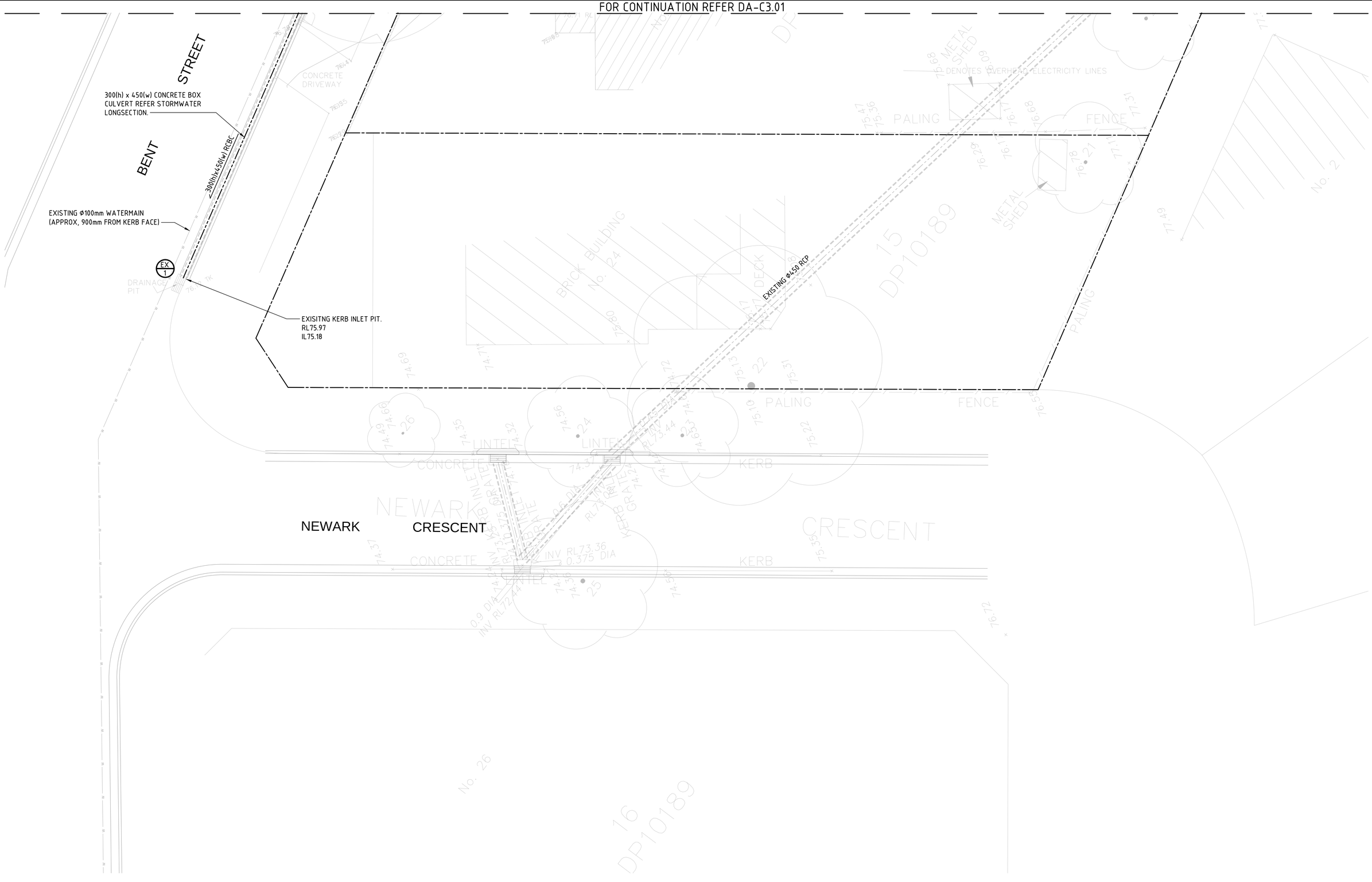
PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: CONCEPT STORMWATER MANAGEMENT PLAN SHEET 2

CLIENT: MATTIUSSI AND WU
ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL
STATUS: FOR INFORMATION ONLY
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SIZE: A1
DRAWING NUMBER: 13003_DA-C3.02
REVISION: 03

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FOR CONTINUATION REFER DA-C3.01



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
3	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
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SCALE: 0 2 4 6 8 10m
SCALE 1:100 @

PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: CONCEPT STORMWATER MANAGEMENT PLAN SHEET 3

NORTH

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1

DRAWING NUMBER: 13003_DA-C3.03

REVISION: 03

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

LEGEND

- JUNCTION PIT
- GRATED PIT
- ø 100 — PIPE SIZE, FLOW DIRECTION
- SURFACE DRAINAGE STORMWATER PIPE
- F 98.65 — FINISH LEVEL
- 5% — SURFACE FALL
- PUMP OUT SYSTEM CATCHMENT AREA

PUMP-OUT TANK DESIGN SUMMARY

1. PUMP-OUT STORAGE DESIGNED IN ACCORDANCE WITH AS3500.3:2003, SECTION 9.3.6

DESIGN STORM = 100 YEAR ARI, 120 MIN DURATION

CATCHMENT AREA = $72m^2$

RAINFALL INTENSITY = 62 mm/Hr

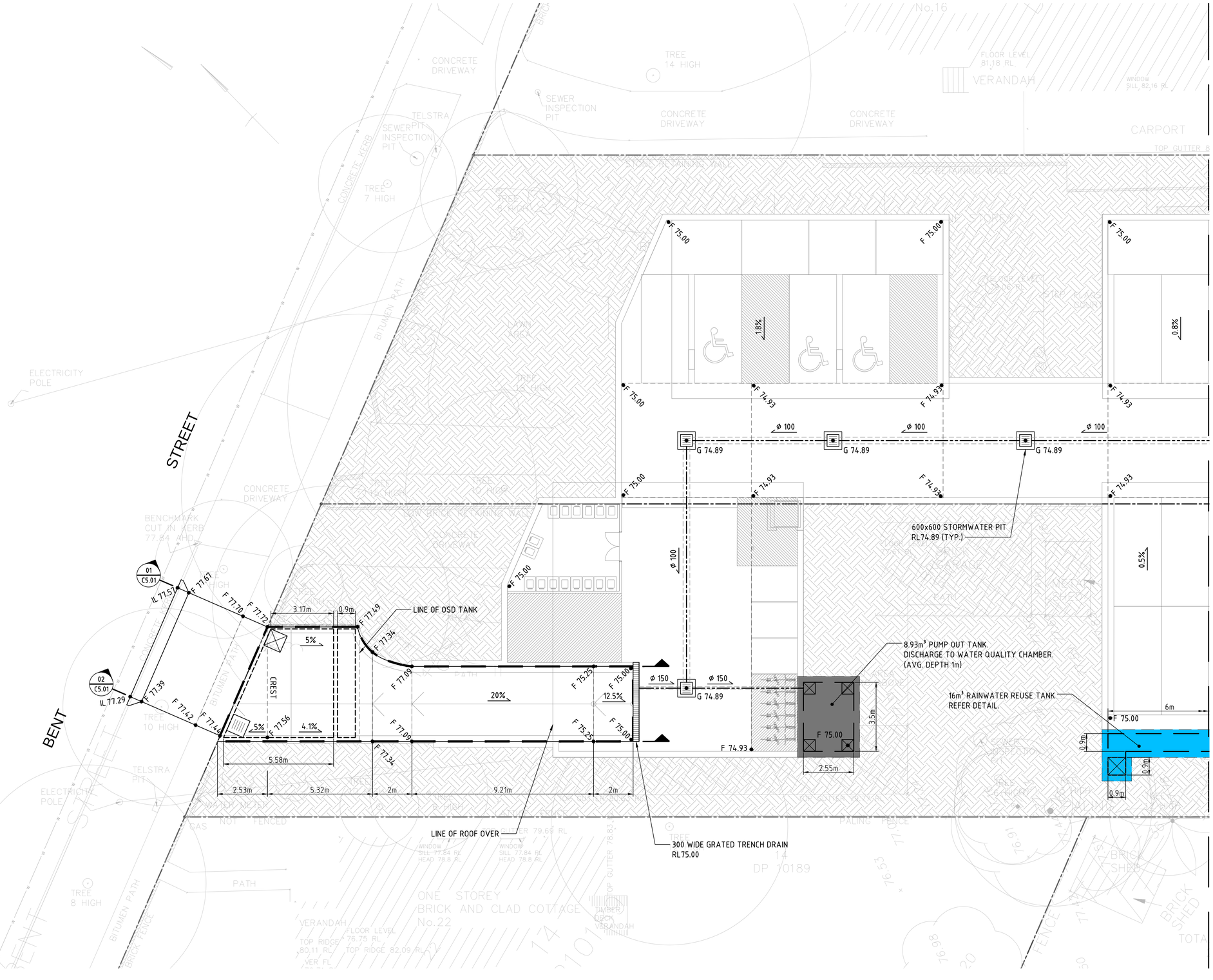
DESIGN RUNOFF = $\frac{C.I.A}{3600} = \frac{1x62x72}{3600}$ = 1.24 L/s

MINIMUM EFFECTIVE STORAGE VOLUME = 1.24 x 60 x 120
= 8928L
= $8.93m^3$

NO ALLOWANCE FOR PUMP CAPACITY

THEREFORE, MIN TANK STORAGE = $8.93m^3$

2. PUMP-OUT TANK INCLUDE:
- DUTY AND STANDBY PUMPS WITH ALTERNATING SWITCHES
- FUEL GENERATOR FOR BACK-UP POWER
- HIGH LEVEL ALARM
- CONTROL PANEL
- ASSOCIATED FLOAT VALVES



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PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: BASEMENT PLAN SHEET 1

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

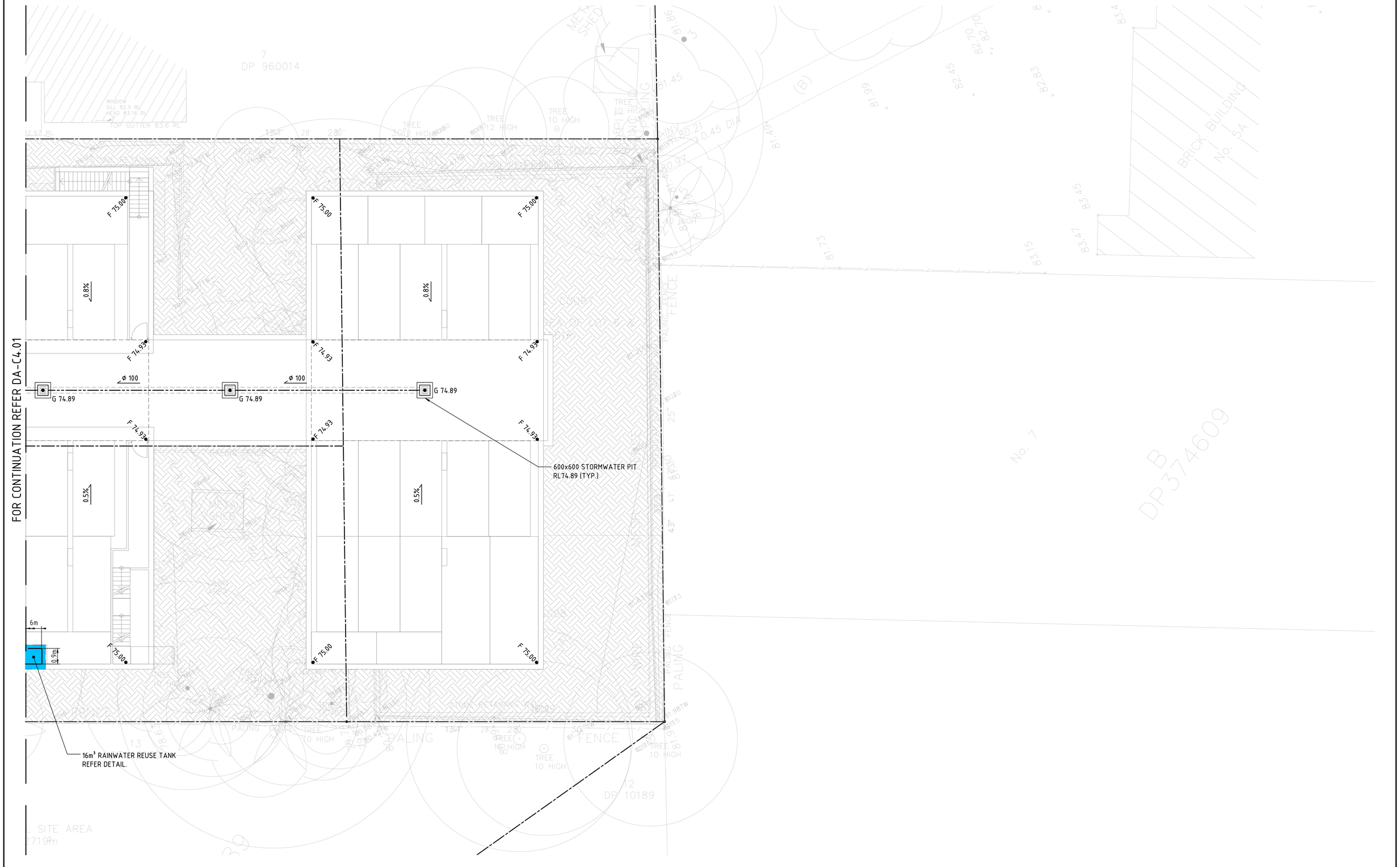
STATUS: FOR INFORMATION ONLY
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SIZE: A1

DRAWING NUMBER: 13003_DA-C4.01

REVISION: 03

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PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

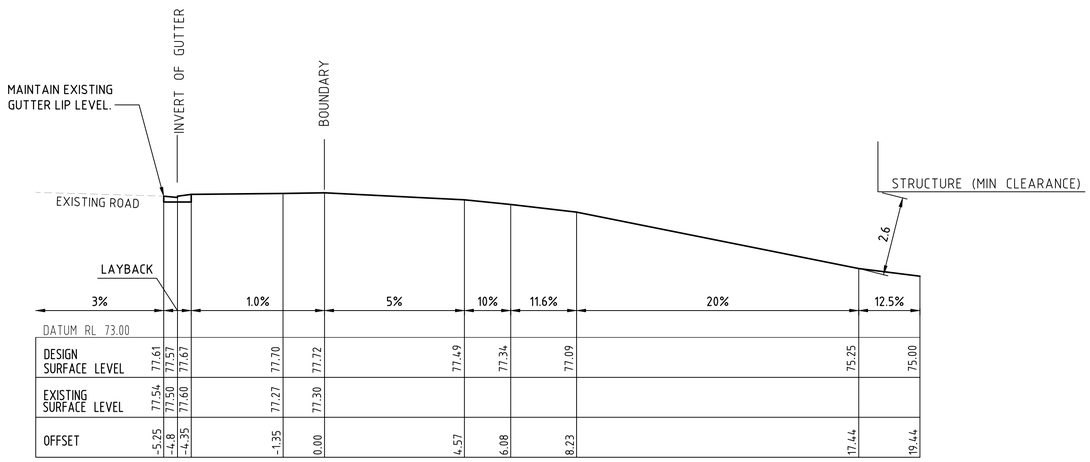
DRAWING: BASEMENT PLAN SHEET 2

CLIENT: MATTIUSSI AND WU
ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL
STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION
SIZE: A1
DRAWING NUMBER: 13003_DA-C4.02
REVISION: 03

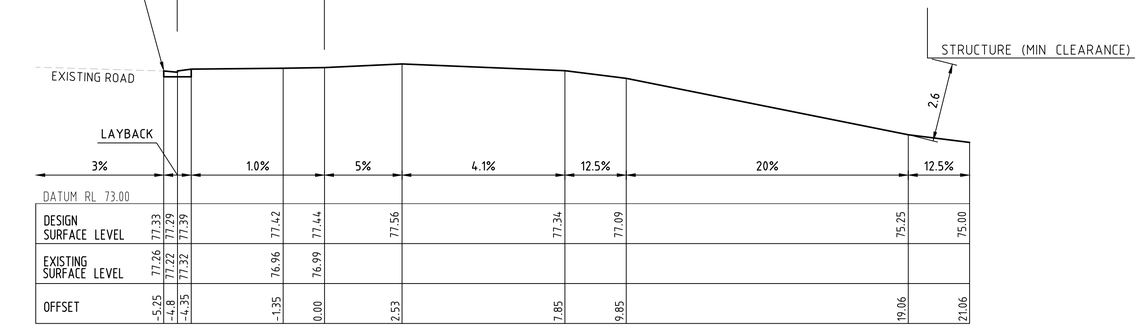
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

NOTES

1. FINAL VERGE LEVELS TO BE DETERMINED BY COUNCIL.



NORTHERN DRIVEWAY LONGITUDINAL SECTION (1/301)



SOUTHERN DRIVEWAY LONGITUDINAL SECTION (2/301)

REV	DATE	ISSUE DESCRIPTION	DRN	DES	VER
3	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
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SCALE: 0 2 4 6 8 10m
SCALE 1:100 @

PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: DRIVEWAY LONGSECTIONS

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

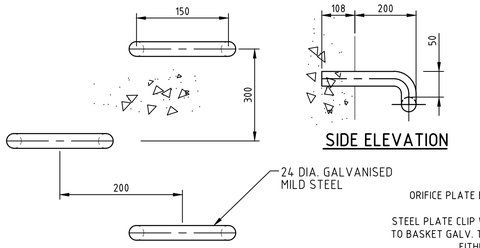
STATUS: FOR INFORMATION ONLY
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SIZE: A1

DRAWING NUMBER: 13003_DA-C5.01

REVISION: 03

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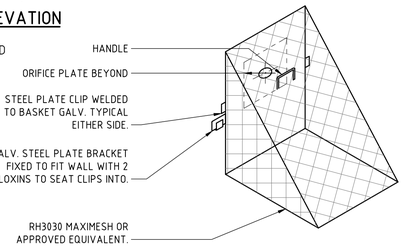


SIDE ELEVATION

FRONT ELEVATION

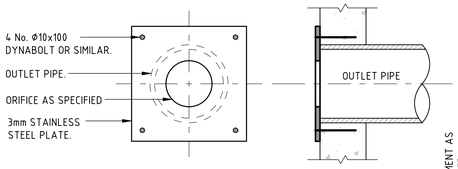
STEP IRON DETAIL

NOT TO SCALE



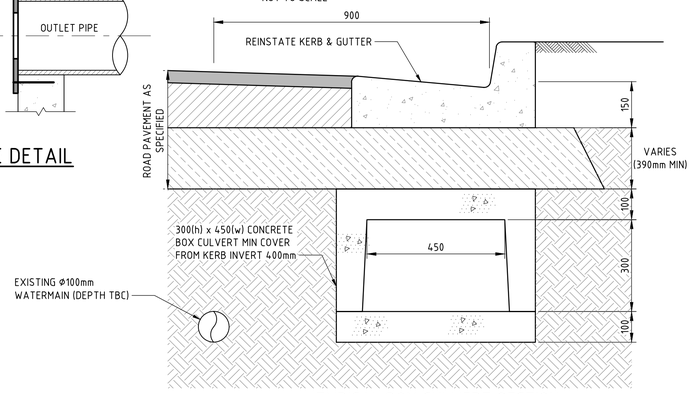
TRASH SCREEN DETAIL

NOT TO SCALE



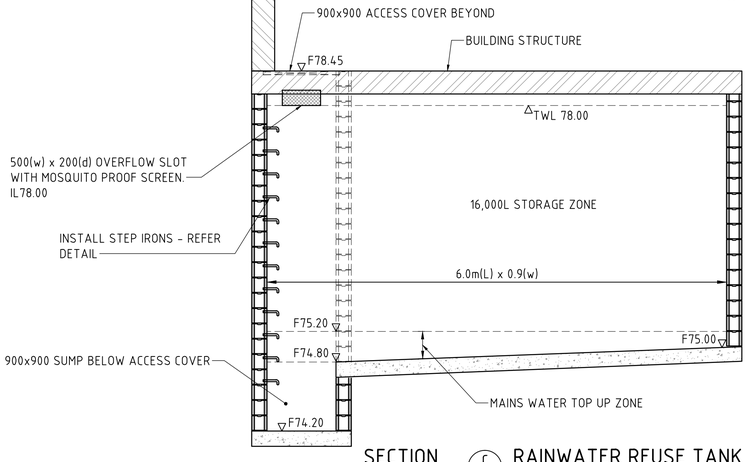
TYPICAL ORIFICE PLATE DETAIL

NOT TO SCALE



TYPICAL BOX CULVERT SECTION

SCALE 1:10



SECTION C3.01 NTS RAINWATER REUSE TANK

NOTE :

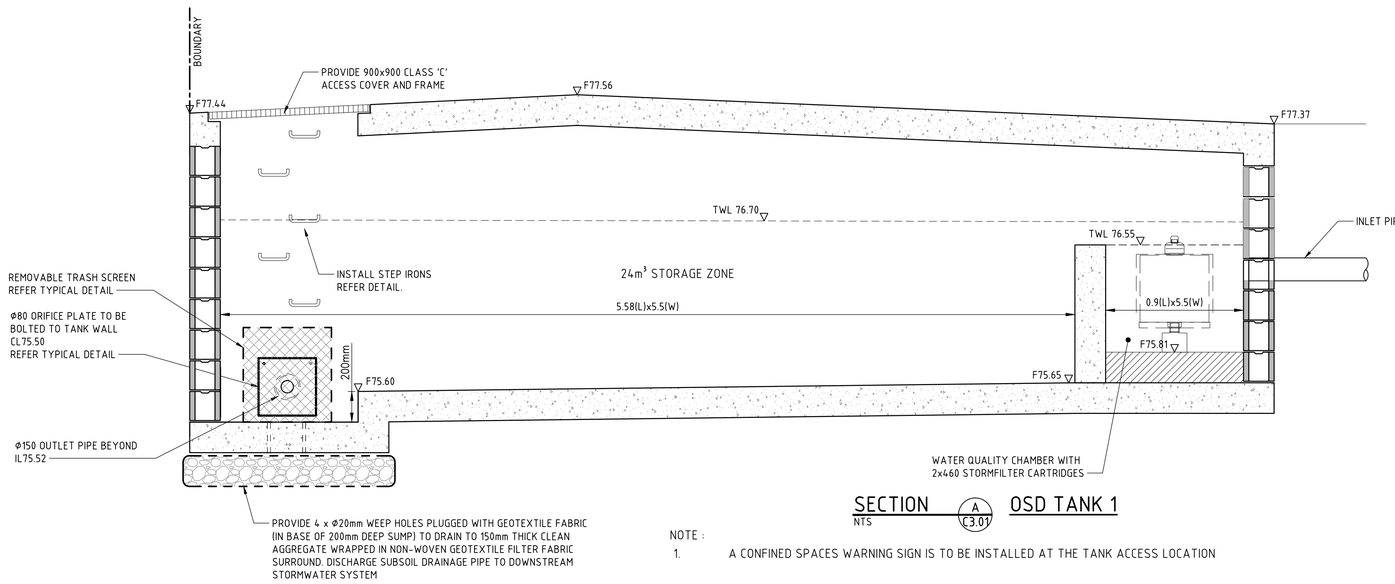
1. AN ALUMINUM PLAQUE MEASURING 400x200 IS TO BE PERMANENTLY ATTACHED AND DISPLAYED IN THE VICINITY OF THE RAINWATER TANK.

STAGE:

" THIS IS A RAINWATER REUSE SYSTEM, IT IS AN OFFENCE TO ALTER ANY PART OF THE SYSTEM WITHOUT WRITTEN CONSENT FROM COUNCIL. THE REGISTERED PROPRIETOR SHALL KEEP THE SYSTEM IN GOOD WORKING ORDER BY REGULAR MAINTENANCE INCLUDING REMOVAL FROM DEBRIS".

2. THE RAINWATER TANK SHALL BE CONNECTED TO MAINS WATER TOP-UP AND BE USED FOR TOILET FLUSHING, LAUNDRY AND IRRIGATION. INSTALL A 3-WAY SWITCHING DEVICE, STOP-VALVE AND BACKFLOW PREVENTION DEVICE.

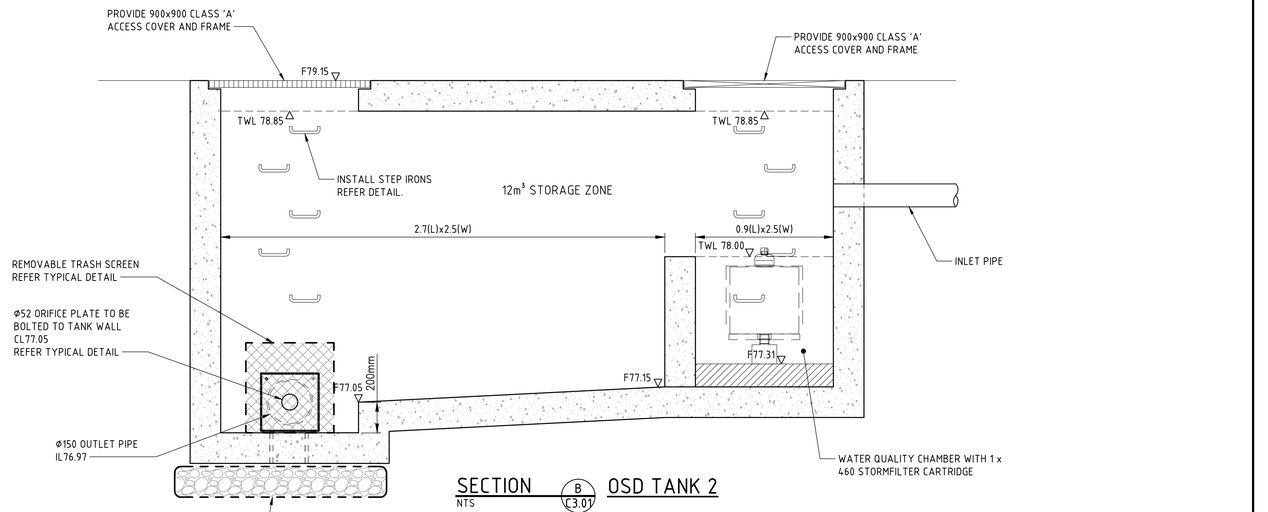
3. A CONFIRMED SPACES WARNING SIGN IS TO BE INSTALLED IN THE TANK AT THE ACCESS LOCATION.



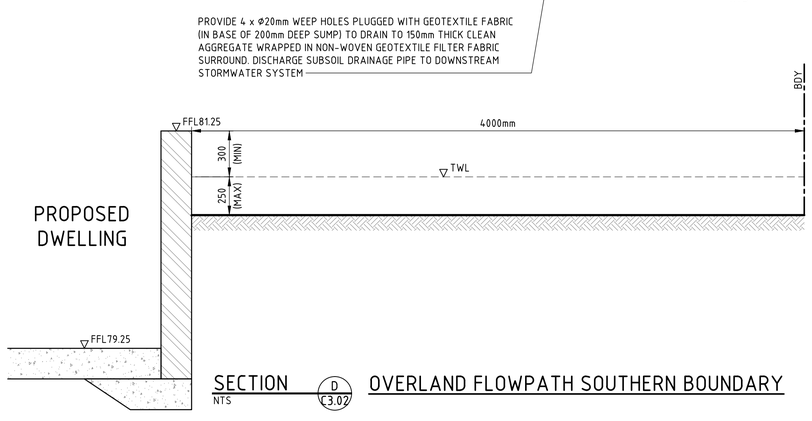
SECTION A C3.01 NTS OSD TANK 1

NOTE :

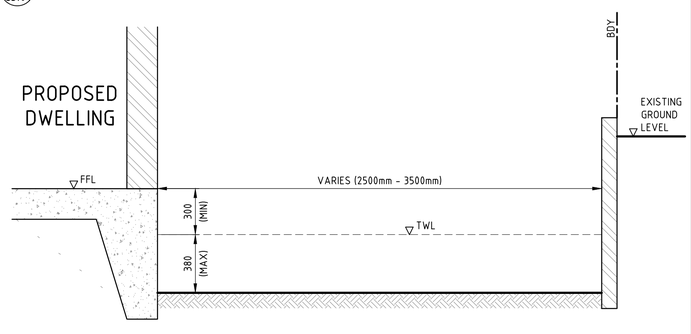
1. A CONFINED SPACES WARNING SIGN IS TO BE INSTALLED AT THE TANK ACCESS LOCATION



SECTION B C3.01 NTS OSD TANK 2



SECTION D C3.02 NTS OVERLAND FLOWPATH SOUTHERN BOUNDARY



SECTION E C3.02 SCALE 1:20 OVERLAND FLOWPATH WESTERN BOUNDARY

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SCALE:
0 0.2 0.4 0.6 0.8 1m SCALE 1:10 @
0 0.5 1 1.5 2m SCALE 1:20 @
0 1 2 3 4m SCALE 1:40 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: DETAILS SHEET

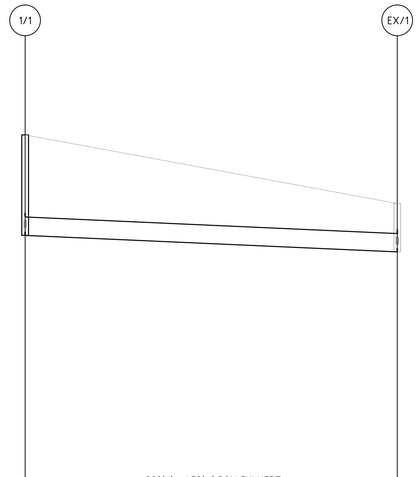
CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1 | DRAWING NUMBER: 13003_DA-C6.01 | REVISION: 02

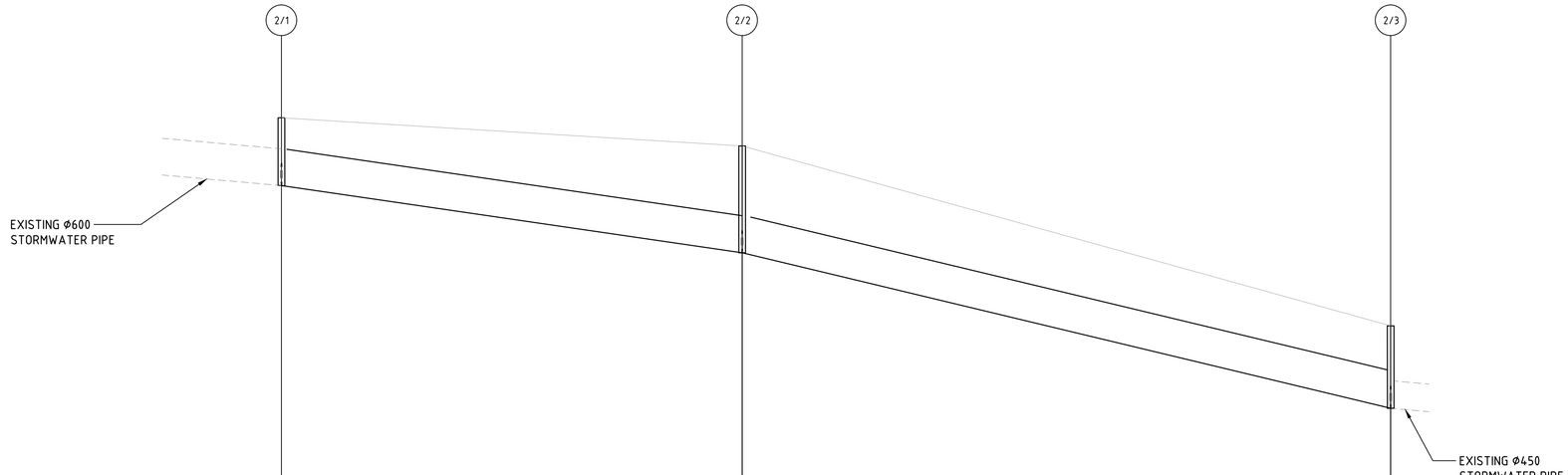
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL



DATUM 70.00		
EXISTING SURFACE LEVEL	77.09	75.97
PIPE COVER	0.6	0.39
INVERT LEVEL	75.45	75.18
CHAINAGE	0	24.3

VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:200

STORMWATER SECTION 1



DATUM 73.00			
SURFACE LEVEL	81.10	80.50	77.55
INVERT LEVEL	79.85	78.75	76.2
CHAINAGE	0	30.4	72.2

VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:200

STORMWATER SECTION 2

REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
2	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD

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m:0413 723 171 ABN 54 165 695 250
ENGINEERS AUSTRALIA
Chartered Professional Engineer
MEMBER

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SCALE:
0 5 10 15 20m
SCALE 1:200 A1
0 10 20 30 40 50m
SCALE 1:500 A1

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: STORMWATER LONGSECTION SHEET

CLIENT: MATTIUSSI AND WU

ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1

DRAWING NUMBER: 13003_DA-C7.01

REVISION: 02

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

CATCHMENT SUMMARY

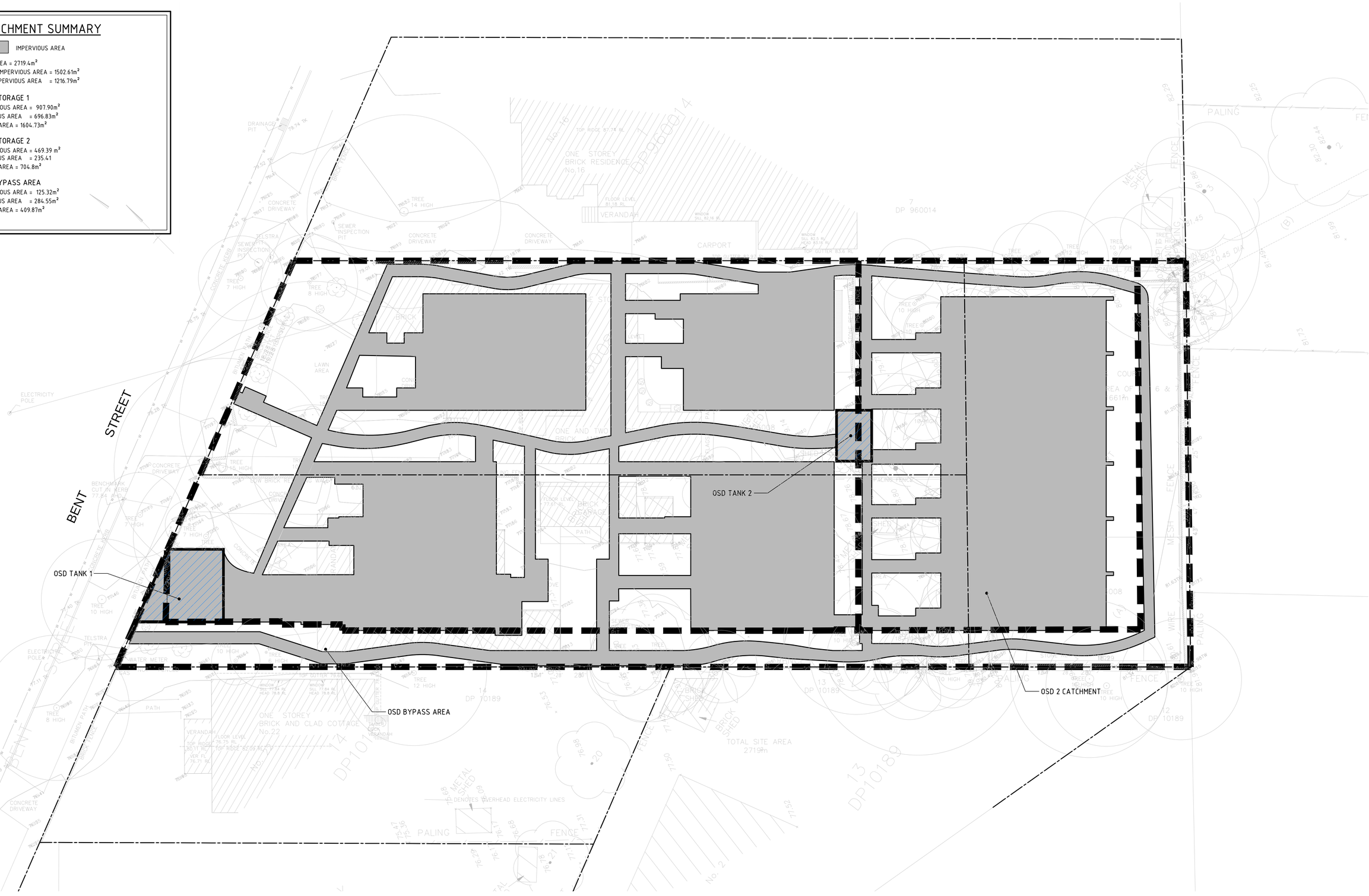
IMPERVIOUS AREA

SITE AREA = 2719.4m²
TOTAL IMPERVIOUS AREA = 1502.61m²
TOTAL PERVIOUS AREA = 1216.79m²

OSD STORAGE 1
IMPERVIOUS AREA = 907.90m²
PERVIOUS AREA = 696.83m²
TOTAL AREA = 1604.73m²

OSD STORAGE 2
IMPERVIOUS AREA = 469.39 m²
PERVIOUS AREA = 235.41
TOTAL AREA = 704.8m²

OSD BYPASS AREA
IMPERVIOUS AREA = 125.32m²
PERVIOUS AREA = 284.55m²
TOTAL AREA = 409.87m²



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
2	25.02.15	REISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD
1	02.09.14	ISSUED FOR DEVELOPMENT APPLICATION	AD	AD	AD

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SCALE: 0 5 10 15m
SCALE 1:150 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW
DRAWING: CATCHMENT PLAN

CLIENT: MATTIUSSI AND WU
ARCHITECT: MACKENZIE ARCHITECTS INTERNATIONAL
STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION
SIZE: A1
DRAWING NUMBER: 13003_DA-C8.01
REVISION: 02

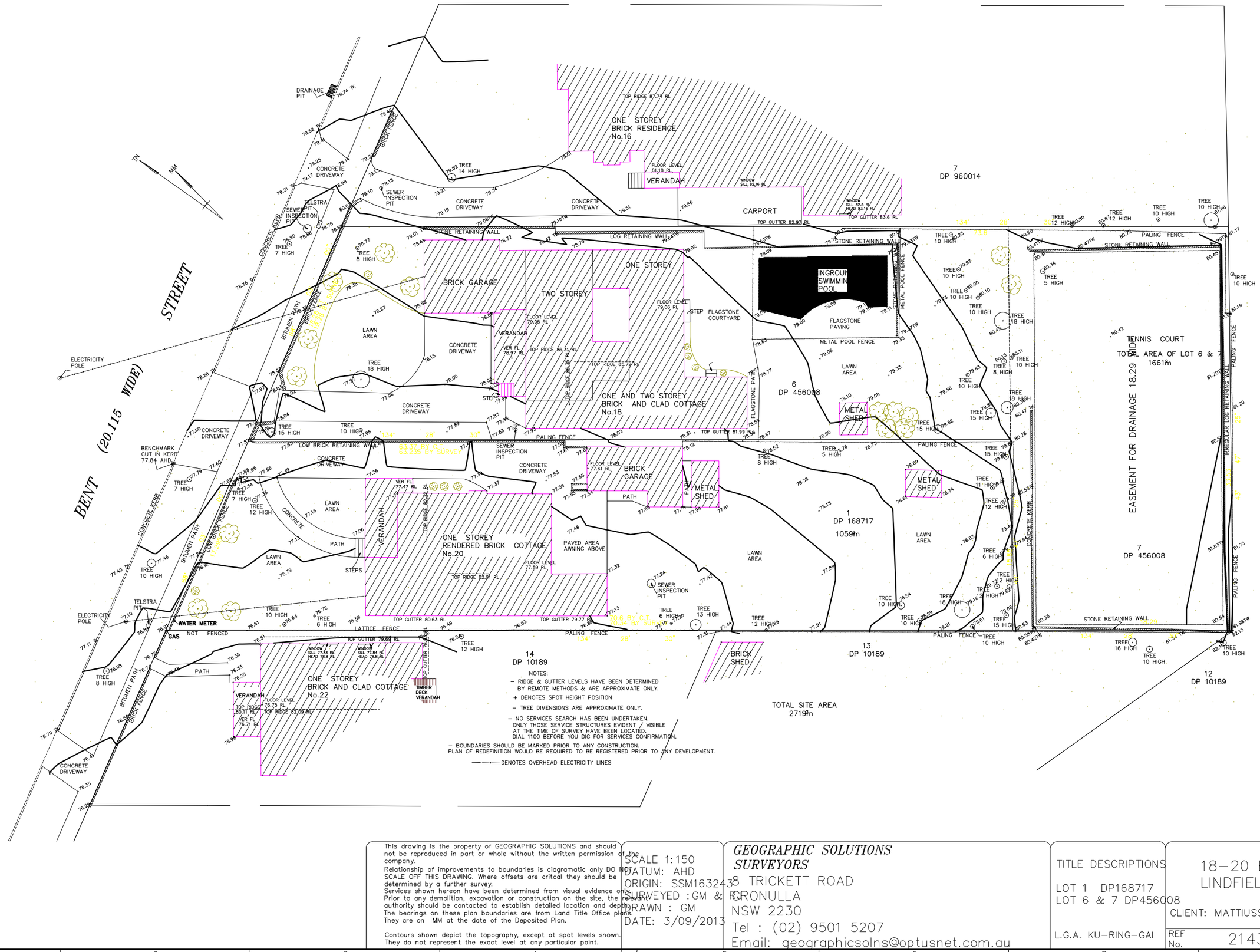
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

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APPENDIX B

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SITE PLAN



NOTES:
- RIDGE & GUTTER LEVELS HAVE BEEN DETERMINED BY REMOTE METHODS & ARE APPROXIMATE ONLY.
+ DENOTES SPOT HEIGHT POSITION
- TREE DIMENSIONS ARE APPROXIMATE ONLY.
- NO SERVICES SEARCH HAS BEEN UNDERTAKEN. ONLY THOSE SERVICE STRUCTURES EVIDENT / VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED. DIAL 1100 BEFORE YOU DIG FOR SERVICES CONFIRMATION.
- BOUNDARIES SHOULD BE MARKED PRIOR TO ANY CONSTRUCTION. PLAN OF REDEFINITION WOULD BE REQUIRED TO BE REGISTERED PRIOR TO ANY DEVELOPMENT.

——·——·—— DENOTES OVERHEAD ELECTRICITY LINES

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Relationship of improvements to boundaries is diagramatic only DO NOT SCALE OFF THIS DRAWING. Where offsets are critcal they should be determined by a further survey.
Services shown hereon have been determined from visual evidence only. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted to establish detailed location and depth.
The bearings on these plan boundaries are from Land Title Office plans. They are on MM at the date of the Deposited Plan.

Contours shown depict the topography, except at spot levels shown. They do not represent the exact level at any particular point.

SCALE 1:150
DATUM: AHD
ORIGIN: SSM163243
SURVEYED : GM & CR
DRAWN : GM
DATE: 3/09/2013

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TITLE DESCRIPTIONS
LOT 1 DP168717
LOT 6 & 7 DP456008
L.G.A. KU-RING-GAI

18-20 BENT STREET
LINDFIELD
CLIENT: MATTIUSSI AND WU

REF No. 2143
SHT 1

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DIMENSIONS IN

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APPENDIX C

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Chartered Professional Engineer
MEMBER

BASEMENT
A: 1,199.90 m²
28 CAR SPACES
+75.00

STORAGE V: 34.31 m³
STORAGE V: 26.42 m³
STORAGE V: 26.42 m³
STORAGE V: 26.42 m³
STORAGE V: 39.70 m³
STORAGE V: 45.45 m³
STORAGE V: 25.20 m³
STORAGE V: 25.39 m³
STORAGE V: 25.40 m³
STORAGE V: 25.21 m³
STORAGE V: 11.92 m³
STORAGE V: 11.92 m³
STORAGE V: 11.92 m³
STORAGE V: 10.69 m³
STORAGE V: 33.73 m³
STORAGE V: 21.58 m³
STORAGE V: 19.41 m³
STORAGE V: 19.41 m³
STORAGE V: 57.02 m³
STORAGE V: 57.02 m³
RWT

VISITOR 03
VISITOR 04
SHARE AREA
SHARE AREA
VISITOR 01
CAR WASH VISITOR 02

WASTE & RECYCLING ROOM
8 WASTE, 4 PAPER, 4 RECY
REMOVALIST
LIFT
FOYER
SPEED HUMP
wayfinding signage indicate: lifts/stair entries/ unit numbers
Bicycle spaces = 6
4 residents
2 visitors

+76.636
+75.25
20.00 %
+75.00
12.50 %

BOUNDARY 73.60 M
BOUNDARY 38.57 M
BOUNDARY 33.53 M
BOUNDARY 88.63 M

NOTES:
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DENOTES OVERHEAD ELECTRICITY LINES

TOTAL SITE AREA 2719m

01 CAR PARK 01
1:100

0 1 2 3 4 5 6 7 8 9 10

no.	revision	by	date
C	PRELIMINARY FOR REVIEW	F.A	2015.02.19
B	DA AMENDMENTS	F.A	2014.09.03

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Job:

MULTI-DWELLING HOUSING DEVELOPMENT

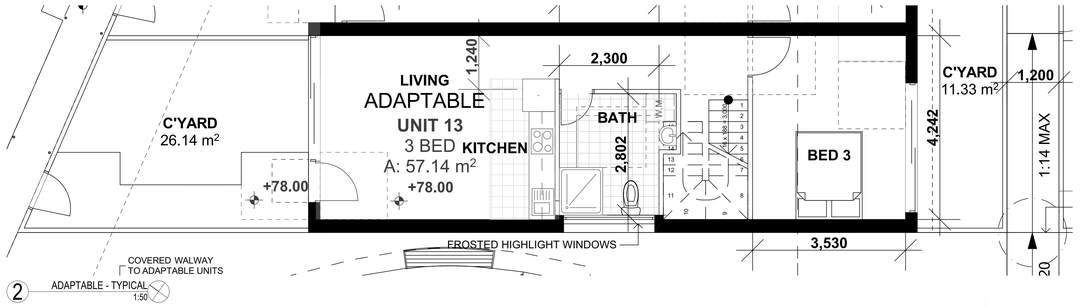
18-20 BENT STREET, LINDFIELD, NSW 2070

Drawing Title:
FLOOR PLAN -01
CAR PARK 01, Worksheet

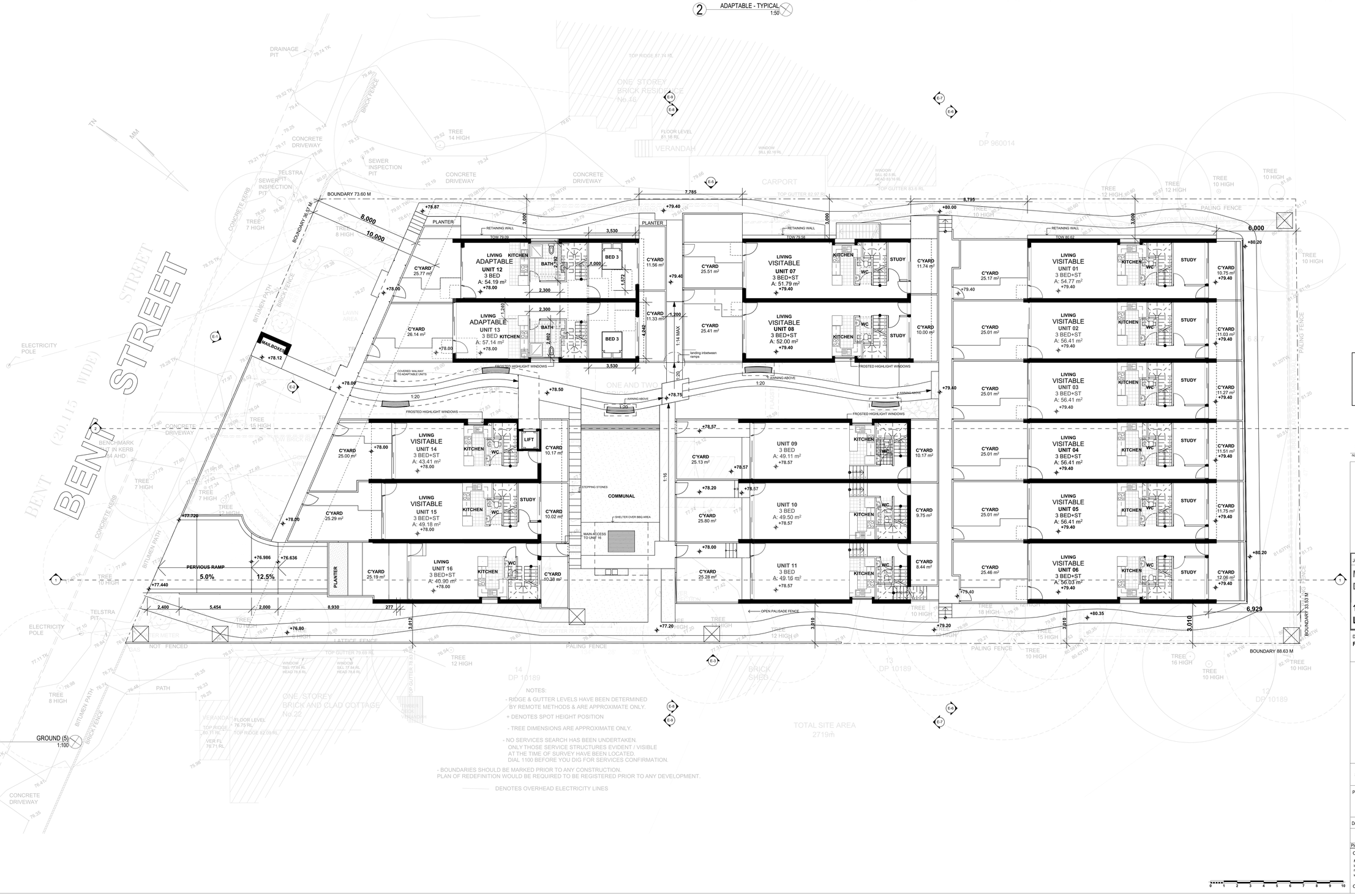
Scale: 1:100 @A0
Date: 4 October 2013
Project No: -
Drawing No.: A-101
Revision: B
Drawn: F.A
Checked By: DM
Plot Date: 20/02/2015

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2 ADAPTABLE - TYPICAL
1:50



3 GROUND (5)
1:100

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——— DENOTES OVERHEAD ELECTRICITY LINES

Building Sustainability Assessments
bdav
Certificate Number 14910571
Accreditation Number VIC BDAV-13/1491
Signature Date: 09/12/2013

no.	revision	by	date
C	PRELIMINARY FOR REVIEW	F.A	2015.02.19
B	DA AMENDMENTS	F.A	2014.09.03

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Job:
MULTI-DWELLING HOUSING DEVELOPMENT
18-20 BENT STREET, LINDFIELD, NSW 2070

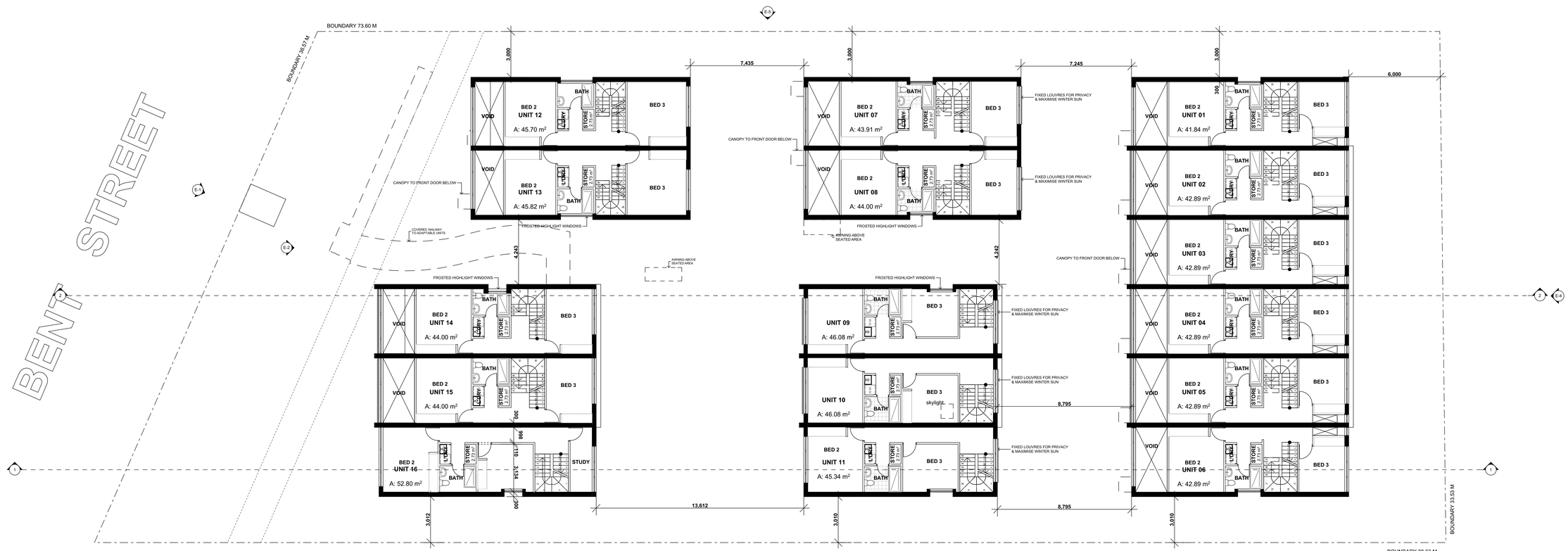
Drawing Title:
FLOOR PLAN 00
stamp, ADAPTABLE - TYPICAL, GROUND (5)

Scale: 1:100, 1:50 @ A1	Date: 4 October 2013
Project No: -	Drawing No.: A-102 Revision: B
Drawn: F.A	Checked By: DM
Plot Date: 20/02/2015	

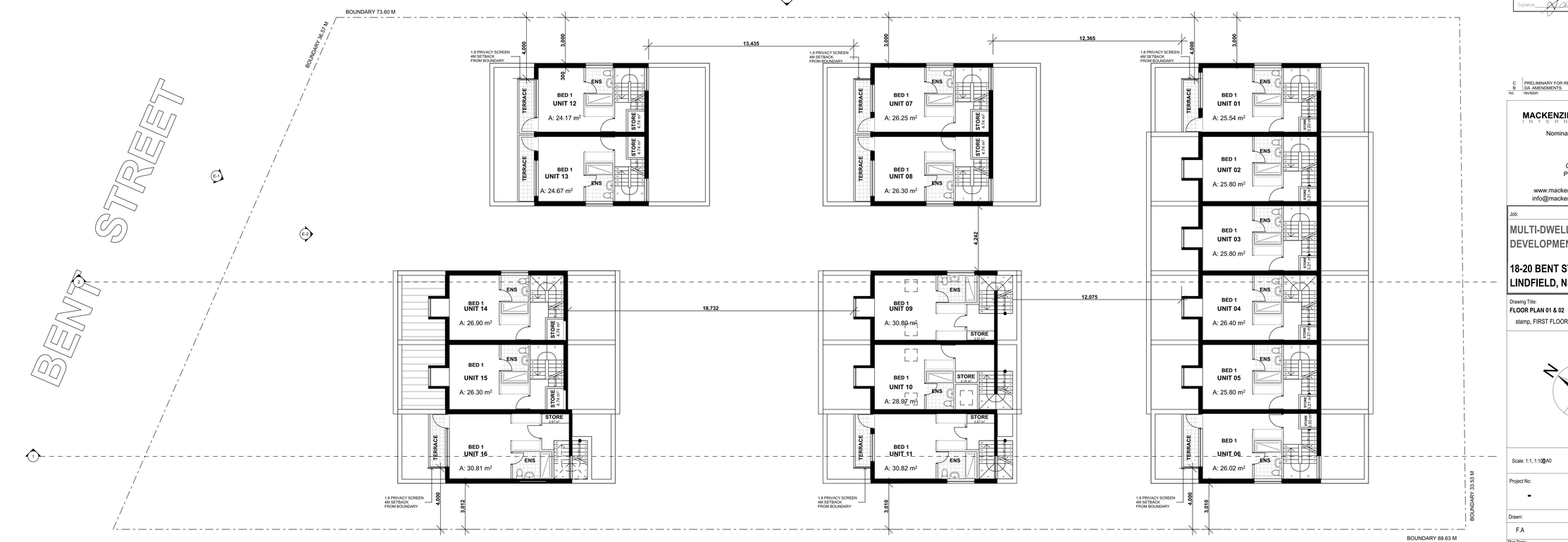
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0 1 2 3 4 5 6 7 8 9 10



2 FIRST FLOOR (1)
1:100



3 SECOND FLOOR (1)
1:100

0 1 2 3 4 5 6 7 8 9 10

Building Sustainability Assessments
Certificate Number 14910571
Accreditation Number VIC/BDAV/13/1491
Signature Date: 09/12/2013

no.	revision	by	date
C	PRELIMINARY FOR REVIEW	F.A	2015.02.19
B	DA AMENDMENTS	F.A	2014.09.03

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Job:

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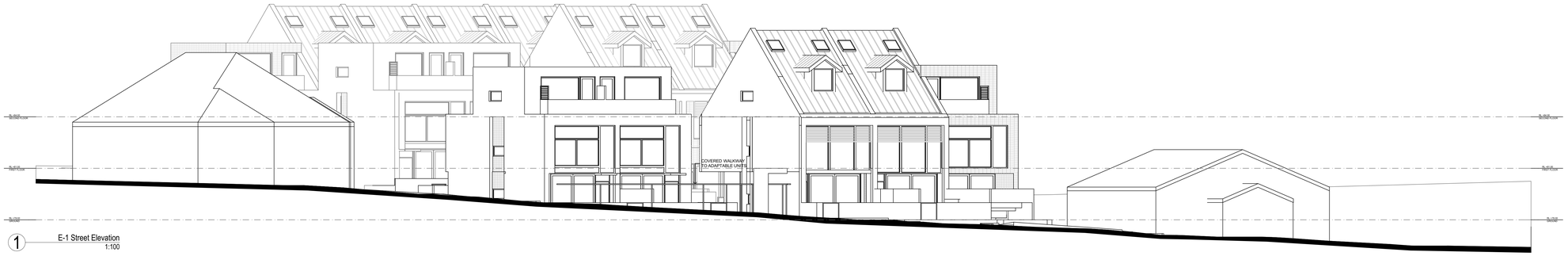
18-20 BENT STREET, LINDFIELD, NSW 2070

Drawing Title:
FLOOR PLAN 01 & 02
stamp, FIRST FLOOR (1), SECOND FLOOR (1)

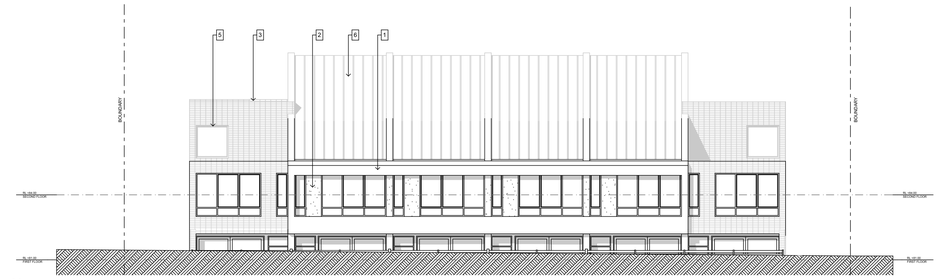
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Project No: - | Drawing No.: A-103 | Revision: B
Drawn: F.A | Checked By: DM
Plot Date: 20/02/2015

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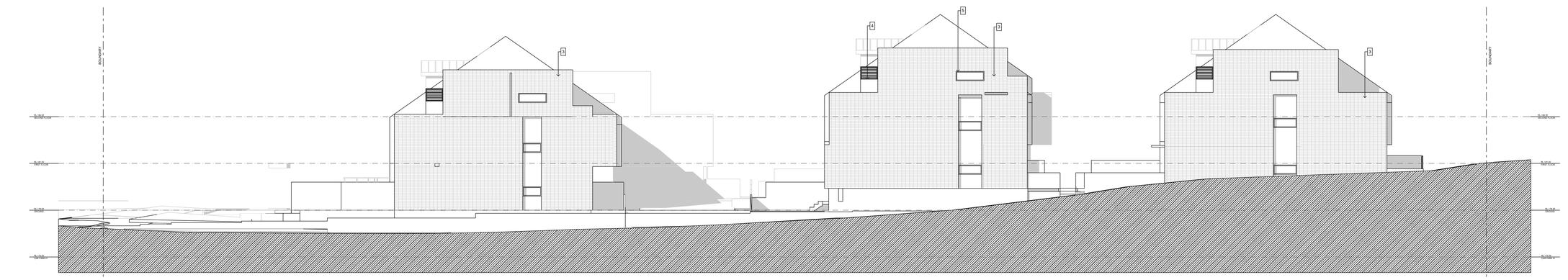
1 E-1 Street Elevation
1:100



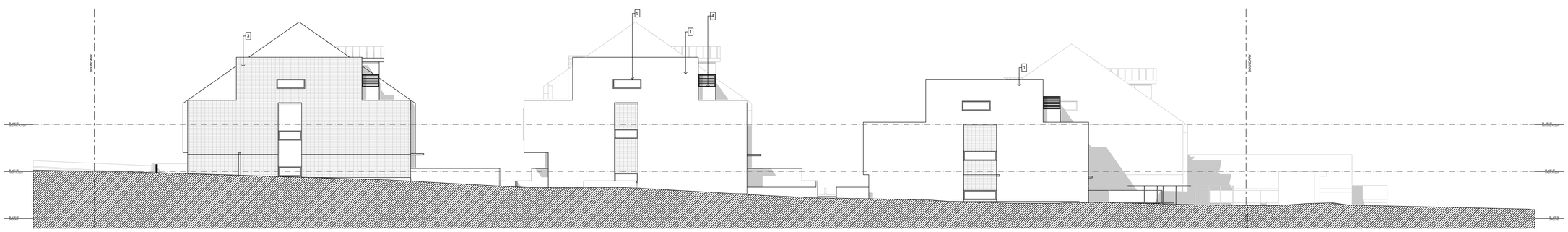
3 E-4
1:100



1 E-2
1:100



2 E-3
1:100



4 E-5
1:100

0 1 2 3 4 5 6 7 8 9 10

Building Sustainability Assessments

Certificate Number 14910571
Accreditation Number VIC/BDAV/13/1491
Signature Date 09/12/2013

LEGEND:

1. RENDER AND PAINT FINISH
2. RENDER AND PAINT FINISH
3. FACE BRICK
4. SOLID BALUSTRADE
5. ALUMINIUM FRAMED GLAZING
6. COLORBOND ROOFING
7. ALUMINIUM FRAMED LOUVRES
8. SKYLIGHTS

no.	revision	by	date
C	PRELIMINARY FOR REVIEW	F.A	2015.02.19
B	DA. AMENDMENTS	F.A.	2014.09.03

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Job:

MULTI-DWELLING HOUSING DEVELOPMENT

18-20 BENT STREET, LINDFIELD, NSW 2070

Drawing Title:

ELEVATIONS 1

E-1 Street Elevation, E-2 , E-3 , E-4 , E-5 , stamp

Scale: 1:100, 1@A0	Date: 4 October 2013
Project No: -	Drawing No.: A-200 Revison: B
Drawn: F.A	Checked By: DM

Plot Date: 20/02/2015

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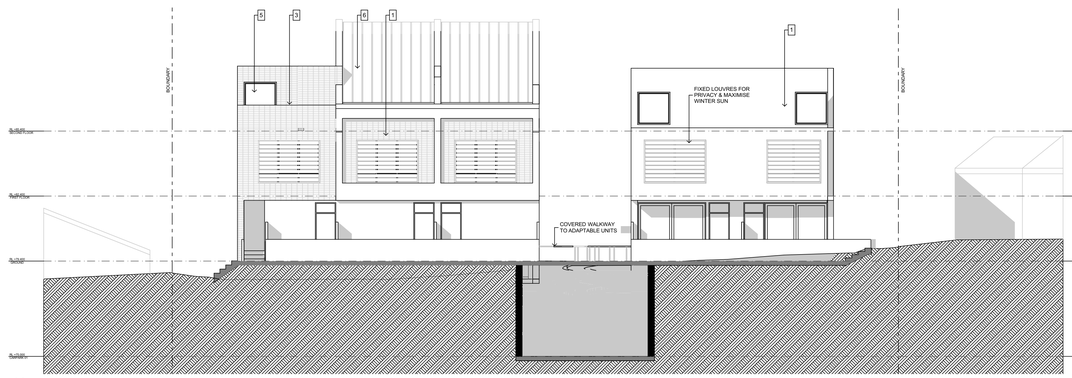
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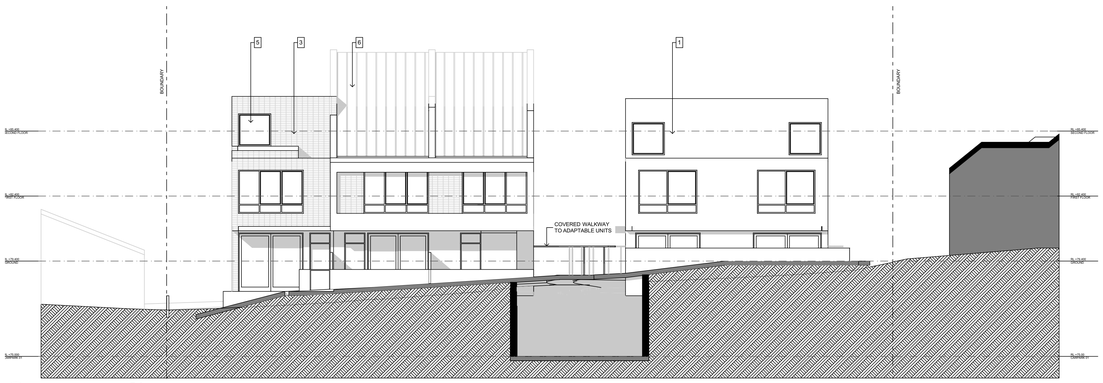
1 E-6
1:100



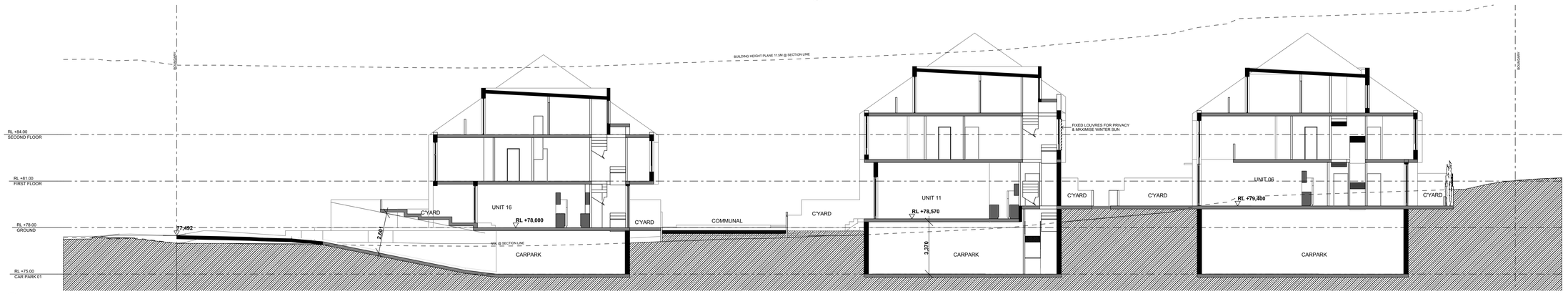
3 E-8
1:100



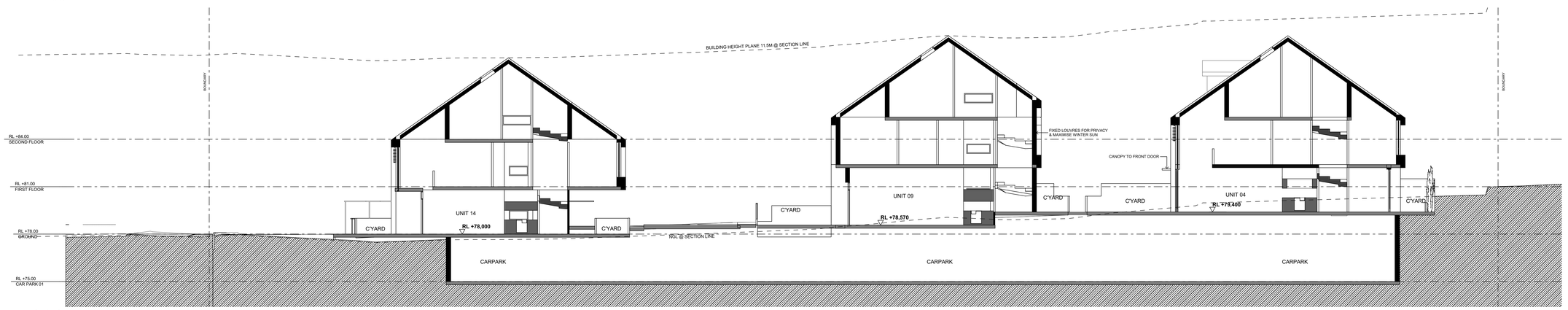
2 E-7
1:100



4 E-9
1:100



1 Section 1
1:100



5 Section 2
1:100

0 1 2 3 4 5 6 7 8 9 10

LEGEND:

1. RENDER AND PAINT FINISH
2. RENDER AND PAINT FINISH
3. FACE BRICK
4. SOLID BALUSTRADE
5. ALUMINIUM FRAMED GLAZING
6. COLORBOND ROOFING
7. ALUMINIUM FRAMED LOUVRES
8. SKYLIGHTS

no.	revision	by	date
C	PRELIMINARY FOR REVIEW	F.A	2015.02.19
B	DA. AMENDMENTS	F.A	2014.09.03

Building Sustainability Assessments

Certificate Number 14910571

Accreditation Number VIC/BDAV/13/1491

Signature Date 09/12/2013

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Job:

MULTI-DWELLING HOUSING DEVELOPMENT

18-20 BENT STREET, LINDFIELD, NSW 2070

Drawing Title:

ELEVATIONS 2 & SECTIONS

E-6 , E-7 , E-8 , E-9 , 1 Section 1, Section 2,

stamp

Scale: 1:100, 1:200 @ A0	Date: 4 October 2013
Project No: -	Drawing No.: A-201 Revision: B
Drawn: F.A	Checked By: DM
Plot Date: 20/02/2015	

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Job:

MULTI-DWELLING HOUSING DEVELOPMENT

18-20 BENT STREET, LINDFIELD, NSW 2070

Drawing Title:

COMPLIANCES 1

40% deep soil, GROUND, Trees Intrusions

Scale: 1:100 @A0	Date: 4 October 2013
Project No: -	Drawing No.: A-400 / Revision: B
Drawn: F.A	Checked By: DM
Plot Date: 20/02/2015	

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0 1 2 3 4 5 6 7 8 9 10

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m:0413 723 171 ABN 54 165 695 250

APPENDIX D

ENGINEERS
AUSTRALIA
Chartered Professional Engineer
MEMBER

A0

BENT STREET

NEWARK CRESCENT

BEACONSFIELD PARADE

M.G.A. NORTH

1 DP168717 | No. 16 | 1 DP960014 | Pt. 1 DP929131

No. 22 | 14 DP10189 | No. 18 | 6 DP456008 | 1 DP318518

No. 26 | 15 DP10189 | No. 24 | No. 20 | No. 3A

16 DP10189 | No. 2 | 13 DP10189 | 7 DP456008 | TENNIS COURT | 2 DP318518

No. 4 | 12 DP10189 | No. 7 | B DP374609 | C DP374609 | No. 5A | No. 3

A DP374609 | 3 DP318518

No. 5

BRICK BUILDING No. 24

BRICK BUILDING No. 20

BRICK SHED

BRICK BUILDING No. 5A

METAL SHED

DECK

PAVING

FENCE

WIRE

KERB

CONCRETE

CONC. LID

KERB INLET PIT

SCHEDULE OF TREES & PALMS

No.	DIAMETER	SPREAD	HEIGHT
1	0,4	6	5
2	1,2	10	15
3	0,8	10	12
4	1,5	10	13
5	0,3	6	10
6	0,4	4	5
7	1,1	10	15
8	1,2	10	17
9	0,8	10	15
10	0,6	12	15
11	0,3	6	10
12	0,3	6	10
13	0,4	6	13
14	0,4	6	13
15	0,8	12	17
16	0,6	8	13
17	0,3	6	7
18	0,8	10	15
19	0,3	6	5
20	0,3	6	7
21	0,65	10	12
22	1,1	14	13
23	0,3	6	7
24	0,4	6	7
25	0,4	8	8
26	0,2	4	4
27 *	0,3	6	10
28 *	0,3	6	8
29 *	0,3	6	6
30 *	0,3	6	10
31 *	0,5	4	4
32 *	0,35	6	12
33 *	0,4	6	10
34 *	0,3	6	10
35 *	0,3	6	10
36 *	0,35	6	8

* DENOTES PALM

(A) EASEMENT FOR DRAINAGE 18.29 WIDE (T858699)
(B) EASEMENT 1.83 WIDE (F782842)
(C) EASEMENT FOR DRAINAGE 1.83 WIDE (G993046)

NOTES:

1. THE POSITION OF IMPROVEMENTS TO BOUNDARIES ARE DIAGRAMATIC ONLY
2. POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE)
3. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. RELEVENT AUTHORITIES ARE TO BE NOTIFIED PRIOR TO ANY DEVELOPMENT.
4. ALL DIMENSIONS ARE BY TITLE ONLY & SUBJECT TO FINAL SURVEY
5. NO INVESTIGATIONS HAVE BEEN MADE OF BUILDING RESTRICTIONS WHICH MAY APPLY TO THIS LAND
6. ORIGIN OF LEVELS: SS 163246 RL 95.44 A.H.D
7. THE SPREAD AND HEIGHT OF TREES SHOWN ARE INDICATIVE ONLY AND CANNOT BE SHOWN ACCURATELY WITHOUT ADDITIONAL DETAILED SURVEY.
8. BEARINGS SHOWN ARE RELATED TO MAP GRID OF AUSTRALIA (M.G.A.) NORTH

DIAL 1100 BEFORE YOU DIG

LEGEND

AC	- AIR CONDITIONER	MH	- MANHOLE
DPC	- DAMP PROOF COURSE	PB	- POWER BOX
EBOX	- ELECTRICITY BOX	PC	- PRAM CROSSING
EP	- ELECTRICITY PIT	PP	- POWER POLE
FL	- FLOOR LEVEL	SMH	- SEWER MANHOLE
GM	- GAS METER	SO	- STORMWATER OUTLET
GS	- GAS SERVICE	SV	- STOP VALVE
GP	- GULLY PIT	S/W	- STORMWATER
HW	- HOT WATER HEATER	TEL	- TELECOMMUNICATIONS PIT
HYD	- HYDRANT	VC	- VEHICLE CROSSING
IC	- INSPECTION COVER	WM	- WATER METER
LM	- LAMP HOLE	WS	- WATER SERVICE
LP	- LIGHT POLE		

REFERENCE: 8720/14	STUTCHBURY JAQUES PTY LTD LAND SURVEYING CONSULTANTS P.O. BOX 7249 , BROOKVALE NSW 2100 PH: 8976 1600 FAX: 8976 1655 E-MAIL: info@stutchbury.net.au	DATE: 20/08/2014	CLIENT: DAWES CONSULTING ENGINEERS
		SCALE: 1:200	PROJECT: PLAN SHOWING STORMWATER DETAILS AND LEVELS BENT STREET, LINDFIELD
		DATUM: A.H.D	
		SITE AREA: N/A	
REG'D SURVEYOR		SHEET 1 OF 1 SHEETS	LGA: KU-RING-GAI

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APPENDIX E

ENGINEERS
AUSTRALIA
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NOTE
I.L.'s of RCP subject to location of services elec. cables etc.

Construct sag gully pits to detail CC 103.

STREET

BENT

NEWARK

DROVERS WAY

CREEK

Nº24 Nº22 Nº20 Nº18 Nº30 Nº28 Nº26 Nº34 Nº5A Nº3 Nº5

Parking Area

BEACONSFIELD PARADE

Actual location of 450 ø RCP

Construct junction pit

Reconstruct junction pits

Proposed 525mm dia. pipeline diversion and drainage easement. 2m. wide

Take up existing 600mm dia. RCP and replace with 750mm dia. RCP

Construct 525mm dia. RCP

Take up existing 450mm dia. RCP and replace with 600mm dia. RCP

PLAN
Scale : 1:500

Ex. 450mm dia. RCP

Bdy. Nº18 Bdy. Nº34 Bdy. Nº16 Bdy. Nº20 Bdy. Nº22 Bdy. Nº24 Bdy. Newark Cres. Bdy. Nº26 Bdy. Bent St.

7.83% 2.71% 10.65% 33% 7.5% 7.18% 7.79% 5.33% 7.15% 5.0% 8.63% 5.3% 4.5% 20%

525mm dia. RCP

600mm dia. RCP

525mm dia & ex 450mm dia RCP's

750mm dia RCP

Pipe invert

Natural surface RL 25m

LONGITUDINAL SECTION PIPELINE 'A'–'B'

Scales : 1:500 hor.
1:125 vert

PROPOSED DRAINAGE IMPROVEMENTS – DROVERS WAY TO BENT STREET

102817

PLAN Nº E905

WARNING

Ku-ring-gai Municipal Council accepts no liability for the accuracy or otherwise of this plan.

DATE 25/7/2014 .... Signed RA

WARNING

Ku-ring-gai Municipal Council accepts no liability for the accuracy or otherwise of this plan.

DATE 25/7/2014 .... Signed

BENT STREET

NEWARK

No.24

No.22

No.20

No.18

P46

15

14

7

No.26

No.28

No.30

16

17

18

150

290.9m

Ex. K&G

Ex. 750mm dia. RCP

'B'

Prop. 750mm dia. RCP

Prop. 825mm dia. RCP

231.4m

Existing 450mm dia. Proposed

187.1m

Ex. K&G

CRESC.

RCP 525mm dia.

RCP

133.3m

Actual location of 450 ø RCP

Construct junction pit

Reconstruct junctic

C

No 54.

Take up existing 600mm dia. RCP and replace with 750mm dia RCP

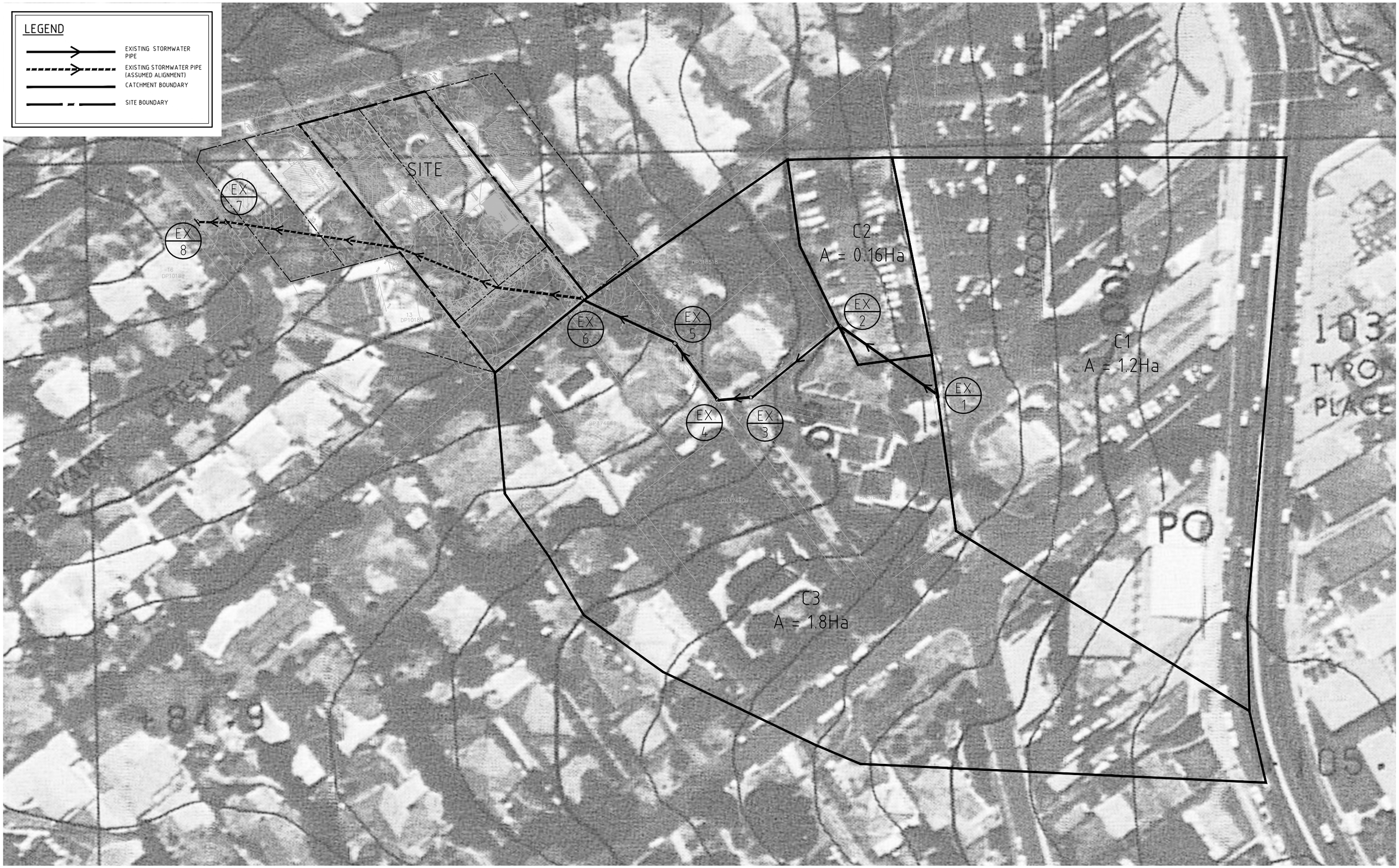
Construct 525mm dia. RCP

PROPOSED DRAINAGE IMPROVEMENTS

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APPENDIX F

ENGINEERS
AUSTRALIA
Chartered Professional Engineer
MEMBER



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
1	01.09.14	ISSUED FOR INFORMATION ONLY	AD	AD	AD

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SCALE: 0 10 20 30 40 50m
SCALE 1:500 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: UPSTREAM CATCHMENT PLAN

NORTH

CLIENT: ANDY & DAVID FREIMAN

ARCHITECT: MARSTON ARCHITECTS

STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1

DRAWING NUMBER: 13003_SK-001

REVISION: 01

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm ON A1 ORIGINAL

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APPENDIX G

ENGINEERS
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Project: 13003
2/09/2014

18-20 Bent Street, Lindfield
DRAINS - Upstream Catchment Assessment
Pre-Developed Input Data

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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
Pit4	Sag	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 2.4 m lintel	5	4	92.95	0.15	0	0.5	-5905694	2105590	No	4	1 x Ku	No	New
Pit3	OnGrade	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 3.0 m lintel		2.5	88.95		0	0.5	-5905721	2105569	No	3	1 x Ku	No	New
Pit1	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		0.5	85.61		0	0	-5905709	2105539	Yes	1	1 x Ku	No	New
Pit2	OnGrade	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 0.9 m lintel		1.9	84.8		0	0.5	-5905712	2105530	No	2	1 x Ku	No	New
Pit5	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		1.8	83.92		0	0	-5905730	2105524	No	5	1 x Ku	No	New
Pit6	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		4	81.17		0	0	-5905750	2105503	No	6	1 x Ku	No	New
Pit7	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		2	80.14		0	0	-5905760	2105481	No	7	1 x Ku	No	New
Pit8	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		1.6	77.44		0	0	-5905780	2105458	No	8	1 x Ku	No	New
Pit9	Sag	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 3.0 m lintel	5	0.4	74.37	0.1	0	0	-5905801	2105414	No	9	1 x Ku	No	New
N27	Node					74.11		0		-5905804	2105407		90			

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id

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)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Cat1	Pit4	1.2	90	10	0	0	0	0	130	130	0	8.5	8.5	0	0.013	0.1	0	0	0			1
Cat3	Pit3	0.16	90	10	0	0	0	0	80	80	0	5	5	0	0.013	0.1	0	0	0			1
Cat4	Pit6	1.8	90	10	0	0	0	0	308	308	0	7.8	7.8	0	0.013	0.1	0	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)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe9	Pit4	Pit3	32.5	91.05	87.95	9.54	Concrete, r	600	600	0.013	New	1	Pit4		0				
Pipe8	Pit3	Pit1	31.4	86.95	84.47	7.9	Concrete, r	450	450	0.013	New	1	Pit3		0				
Pipe7	Pit1	Pit2	8.8	84.43	83.78	7.39	Concrete, r	600	600	0.013	New	1	Pit1		0				
Pipe6	Pit2	Pit5	18.9	83.72	82.52	6.35	Concrete, r	600	600	0.013	New	1	Pit2		0				
Pipe5	Pit5	Pit6	28	82.32	80.21	7.54	Concrete, r	525	525	0.013	New	1	Pit5		0				
Pipe4	Pit6	Pit7	23.2	79.06	78	4.57	Concrete, r	600	600	0.013	New	1	Pit6		0				
Pipe3	Pit7	Pit8	28.3	77.98	75.94	7.21	Concrete, r	450	450	0.013	New	1	Pit7		0				
Pipe2	Pit8	Pit9	47.6	75.94	73.44	5.25	Concrete, r	450	450	0.013	New	1	Pit8		0				
Pipe1	Pit9	N27	7.74	73.08	72.8	3.62	Concrete, r	600	600	0.013	New	1	Pit9		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

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

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Pit4	Pit3		9.5			Overflow a	0.05	0	0.6	5	50	30
OF4	Pit3	Pit1		0.5			Overflow a	0.05	0	0.6	4.3	100	41
OF8	Pit1	Pit2		0.1			Overflow a	0.05	0	0.6	7.4	100	50
OF10	Pit2	Pit5		0.5			Overflow a	0.05	0	0.6	6.35	100	53
OF12	Pit5	Pit6		0.5			Overflow a	0.05	0	0.6	7.5	50	58
OF18	Pit6	Pit9		1			Overflow a	0.05	0	0.6	1	100	74
OF15	Pit9	N27		0.1			Overflow a	0.05	0	0.6	3.6	100	66

Project: 13003
2/09/2014

18-20 Bent Street, Lindfield
DRAINS - Upstream Catchment Assessment
Pre-Developed Results - 100 Year ARI

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DRAINS results prepared 02 September, 2014 from Version 2013.13

PIT / NODE DETAILS **Version 8**

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)		Overflow (cu.m/s)	Constraint
Pit4	91.41	93.1	0.81	4.3	1.54	0.694		Inlet Capacity
Pit3	87.42		0.803		1.53	0.656		Inlet Capacity
Pit1	84.66		0.656		0.95	0.656		Inlet Capacity
Pit2	84.1		0.656		0.7	0.621		Inlet Capacity
Pit5	82.81		0.621		1.11	0.621		Inlet Capacity
Pit6	79.65		1.456		1.52	1.453		Inlet Capacity
Pit7	78.52		0		1.62			None
Pit8	76.56		0		0.88			None
Pit9	74.38	74.47	1.453	4.3	-0.01	1.296		Outlet System
N27	74.26		1.296					

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)		Supp. Tc (min)	Due to Storm
Cat1	0.81	0.758	0.052	3.6	12.25	0		AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
Cat3	0.108	0.101	0.007	3.15	10.73	0		AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
Cat4	1.189	1.156	0.033	3.73	12.67	0		AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1

Outflow Volumes for Total Catchment (2.84 impervious + 0.32 pervious = 3.16 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1	676.77	617.61 (91.3%)	580.65 (95.3%)	36.96 (54.6%)
AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1	1069.13	1003.10 (93.8%)	933.78 (97.0%)	69.32 (64.8%)
AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	1366.7	1295.13 (94.8%)	1201.59 (97.7%)	93.54 (68.4%)
AR&R 100 year, 20 minutes storm, average 152 mm/h, Zone 1	1601.07	1524.86 (95.2%)	1412.52 (98.0%)	112.34 (70.2%)
AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	1817	1735.68 (95.5%)	1606.86 (98.3%)	128.81 (70.9%)
AR&R 100 year, 30 minutes storm, average 126 mm/h, Zone 1	1990.8	1905.31 (95.7%)	1763.28 (98.4%)	142.03 (71.3%)
AR&R 100 year, 45 minutes storm, average 104 mm/h, Zone 1	2464.77	2369.22 (96.1%)	2189.86 (98.7%)	179.36 (72.8%)
AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1	2812.4	2708.91 (96.3%)	2502.72 (98.9%)	206.18 (73.3%)
AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1	3412.8	3296.43 (96.6%)	3043.08 (99.1%)	253.35 (74.2%)
AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1	3918.35	3791.05 (96.8%)	3498.10 (99.2%)	292.96 (74.8%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe9	0.12	3.72	91.153	88.053	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe8	0.187	4.11	87.098	84.66	AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1
Pipe7	0.188	3.91	84.566	84.097	AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1
Pipe6	0.245	3.87	83.885	82.813	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe5	0.249	4.32	82.49	80.374	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe4	0.27	3.09	79.269	78.521	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe3	0.269	4.39	78.164	76.558	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe2	0.288	3.98	76.149	74.376	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe1	0.44	1.56	74.342	74.26	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV		Max Width	Max V	Due to Storm
OF1	0.694	0.71	0.644	0.052	0.09	11.91	1.7		AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1

OF4	0.656	0.656	0.597	0.052	0.08	11.91	1.57	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF8	0.656	0.656	0.783	0.046	0.09	11.27	1.91	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF10	0.621	0.621	0.726	0.047	0.08	11.33	1.77	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF12	0.621	0.932	0.789	0.054	0.12	12.09	2.12	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF18	1.453	1.453	0.288	0.106	0.13	17.3	1.21	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1
OF15	1.296	1.296	0.546	0.075	0.14	14.14	1.83	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

CONTINUITY CHECK for AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Pit4	1252.03	1253.11	0	-0.1
Pit3	1420.06	1420.23	0	0
Pit1	1420.23	1420.44	0	0
Pit2	1420.43	1420.65	0	0
Pit5	1420.65	1421.01	0	0
Pit6	3298.47	3298.66	0	0
Pit7	925.77	926.36	0	-0.1
Pit8	926.36	926.92	0	-0.1
Pit9	3299.84	3300.41	0	0
N27	3300.4	3300.4	0	0

Run Log for 14.08.24_Bent Street Flood Study_Pre Developed_Rev1.drn run at 22:46:36 on 2/9/2014

No water upwelling from any pit.
Freeboard was less than 0.15m at Pit9
The maximum flow exceeded the safe value in the following overflow routes: OF18, OF15, OF12, OF4, OF1

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APPENDIX H

ENGINEERS
AUSTRALIA
Chartered Professional Engineer
MEMBER

Project: 13003
22/02/2015

18-20 Bent Street, Lindfield
DRAINS - Upstream Catchment Assessment
Post-Developed Input Data

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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
Pit4	Sag	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 2.4 m lintel	5	5.9	92.95	0.15	0	0.5	-5905694	2105590	No	4	1 x Ku	No	New
Pit3	OnGrade	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 3.0 m lintel		5.1	88.95		0	0.5	-5905721	2105569	No	3	1 x Ku	No	New
Pit1	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		0	85.61		0	0	-5905709	2105539	Yes	1	1 x Ku	No	New
Pit2	OnGrade	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 0.9 m lintel		1.9	84.8		0	0.5	-5905712	2105530	No	2	1 x Ku	No	New
Pit5	OnGrade	Junction Pit or Manhole (sealed)	Junction Pit or Manhole		1.7	83.92		0	0	-5905730	2105524	No	5	1 x Ku	No	New
Pit6	Sag	900x900 Inlet	900x900	2	2.2	81.1	0.2	0	0.5	-5905750	2105503	No	6	1 x Ku	No	New
Pit7	Sag	900x900 Inlet	900x900	2	1.9	80.1	0.2	0	0.5	-5905739	2105474	No	7	1 x Ku	No	New
Pit8	Sag	Junction Pit or Manhole (sealed)	Junction Pit or Manhole	2	1.4	77.85	0.2	0	0.5	-5905780	2105458	No	8	1 x Ku	No	New
Pit9	Sag	Hornsby Council Inlets (Kl+grate), 3% crossfall, all grades	Hornsby 3.0 m lintel	5	0	74.37	0.1	0	0	-5905801	2105414	No	9	1 x Ku	No	New
N27	Node					74.11		0		-5905804	2105407		90			
N39	Node					76.95		0		-5905821	2105443		15895			

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

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)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Cat1	Pit4	1.2	90	10	0	0	0	0	130	130	0	8.5	8.5	0	0.013	0.1	0	0				1
Cat3	Pit3	0.16	90	10	0	0	0	0	80	80	0	5	5	0	0.013	0.1	0	0				1
Cat4	Pit6	1.8	90	10	0	0	0	0	308	308	0	7.8	7.8	0	0.013	0.1	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)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe9	Pit4	Pit3	32.5	91.05	87.95	9.54	Concrete, r	600	600	0.013	New	1	Pit4		0				
Pipe8	Pit3	Pit1	31.4	86.95	84.47	7.9	Concrete, r	450	450	0.013	New	1	Pit3		0				
Pipe7	Pit1	Pit2	8.8	84.43	83.78	7.39	Concrete, r	600	600	0.013	New	1	Pit1		0				
Pipe6	Pit2	Pit5	18.9	83.72	82.52	6.35	Concrete, r	600	600	0.013	New	1	Pit2		0				
Pipe5	Pit5	Pit6	28	82.32	80.21	7.54	Concrete, r	525	525	0.013	New	1	Pit5		0				
Pipe4	Pit6	Pit7	30.4	79.85	78.75	3.62	Concrete, r	600	600	0.013	New	1	Pit6		0				
Pipe3	Pit7	Pit8	41.8	78.73	76.2	6.05	Concrete, r	600	600	0.013	New	1	Pit7		0				
Pipe2	Pit8	Pit9	47.6	75.94	73.44	5.25	Concrete, r	450	450	0.013	New	1	Pit8		0				
Pipe1	Pit9	N27	7.74	73.08	72.8	3.62	Concrete, r	600	600	0.013	New	1	Pit9		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

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

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id
OF1	Pit4	Pit3		0.5			Overflow a	0.05	0	0.6	5	50	30
OF4	Pit3	Pit1		0.5			Overflow a	0.05	0	0.6	4.3	100	41
OF8	Pit1	Pit2		0.1			Overflow a	0.05	0	0.6	7.4	100	50
OF10	Pit2	Pit5		0.5			Overflow a	0.05	0	0.6	6.35	100	53
OF12	Pit5	Pit6		0.5			Overflow a	0.05	0	0.6	7.5	50	58
OF21	Pit6	Pit7		0.5			4 m wide p	0.3	0.15	0.4	1	100	15875
OF22	Pit7	Pit8		1			4 m wide p	0.3	0.15	0.4	5.7	100	15876
OF23	Pit8	N39		0.5			4 m wide p	0.3	0.15	0.4	5	100	15877
OF15	Pit9	N27		0.1			Overflow a	0.05	0	0.6	3.6	100	66

Project: 13003
22/02/2015

18-20 Bent Street, Lindfield
DRAINS - Upstream Catchment Assessment
Post-Developed Results - 100 Year ARI

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DRAINS results prepared 22 February, 2015 from Version 2014.11

PIT / NODE DETAILS **Version 8**

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)		Overflow (cu.m/s)	Constraint
Pit4	91.45	93.1	0.81	4.3		1.5	0.694	Inlet Capacity
Pit3	87.9		0.803			1.05	0.73	Inlet Capacity
Pit1	84.57		0.73			1.04	0.73	Inlet Capacity
Pit2	84.11		0.73			0.69	0.695	Inlet Capacity
Pit5	82.73		0.695			1.19	0.695	Inlet Capacity
Pit6	80.54	81.3	1.862	1.7		0.56	1.58	Inlet Capacity
Pit7	79.86	80.3	1.58	1.7		0.24	1.313	Inlet Capacity
Pit8	78.05	78.05	1.313	1.7		-0.2	1.413	Outlet System
Pit9	74.47	74.37	0	0.1		-0.1	0	Outlet System
N27	74.26		0					

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat1	0.81	0.758	0.052	3.6	12.25	0	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
Cat3	0.108	0.101	0.007	3.15	10.73	0	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
Cat4	1.189	1.156	0.033	3.73	12.67	0	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1

Outflow Volumes for Total Catchment (2.84 impervious + 0.32 pervious = 3.16 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1	676.77	617.61 (91.3%)	580.65 (95.3%)	36.96 (54.6%)
AR&R 100 year, 10 minutes storm, average 203 mm/h, Zone 1	1069.13	1003.10 (93.8%)	933.78 (97.0%)	69.32 (64.8%)
AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1	1366.7	1295.13 (94.8%)	1201.59 (97.7%)	93.54 (68.4%)
AR&R 100 year, 20 minutes storm, average 152 mm/h, Zone 1	1601.07	1524.86 (95.2%)	1412.52 (98.0%)	112.34 (70.2%)
AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1	1817	1735.68 (95.5%)	1606.86 (98.3%)	128.81 (70.9%)
AR&R 100 year, 30 minutes storm, average 126 mm/h, Zone 1	1990.8	1905.31 (95.7%)	1763.28 (98.4%)	142.03 (71.3%)
AR&R 100 year, 45 minutes storm, average 104 mm/h, Zone 1	2464.77	2369.22 (96.1%)	2189.86 (98.7%)	179.36 (72.8%)
AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1	2812.4	2708.91 (96.3%)	2502.72 (98.9%)	206.18 (73.3%)
AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1	3412.8	3296.43 (96.6%)	3043.08 (99.1%)	253.35 (74.2%)
AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1	3918.35	3791.05 (96.8%)	3498.10 (99.2%)	292.96 (74.8%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe9	0.121	3.74	91.153	88.053	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe8	0.199	4.18	87.104	84.623	AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1
Pipe7	0.198	3.96	84.57	84.107	AR&R 100 year, 2 hours storm, average 62 mm/h, Zone 1
Pipe6	0.256	3.92	83.889	82.728	AR&R 100 year, 1 hour storm, average 89 mm/h, Zone 1
Pipe5	0.256	4.37	82.486	80.541	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe4	0.499	3.97	80.124	79.859	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
Pipe3	0.772	5.25	79.04	78.05	AR&R 100 year, 25 minutes storm, average 138 mm/h, Zone 1
Pipe2	0.656	4.12	77.343	74.47	AR&R 100 year, 15 minutes storm, average 173 mm/h, Zone 1
Pipe1	0.656	2.32	74.47	74.26	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV		Max Width	Max V	Due to Storm
OF1	0.694	0.746	0.644	0.054	0.09	12.03	1.73	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1	

OF4	0.73	0.73	0.597	0.055	0.09	12.15	1.64	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF8	0.73	0.73	0.783	0.048	0.1	11.5	1.97	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF10	0.695	0.695	0.726	0.049	0.09	11.56	1.85	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF12	0.695	1.262	0.789	0.062	0.15	12.85	2.36	AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1
OF21	1.58	1.58	1.479	0.205	0.43	4	2.08	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
OF22	1.313	1.313	1.39	0.114	0.38	4	3.32	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
OF23	1.413	1.413	1.401	0.123	0.4	4	3.28	AR&R 100 year, 5 minutes storm, average 257 mm/h, Zone 1
OF15	0	0	0.546	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q **Total**	Max Q **Low Level**	Max Q **High Level**

CONTINUITY CHECK for AR&R 100 year, 1.5 hours storm, average 72 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Pit4	1252.03	1246.19	0	0.5
Pit3	1413.13	1413.3	0	0
Pit1	1413.3	1413.39	0	0
Pit2	1413.4	1413.4	0	0
Pit5	1413.4	1413.67	0	0
Pit6	3291.13	3291.75	0	0
Pit7	3291.71	3292.44	0	0
Pit8	3292.4	3280.58	1.71	0.3
Pit9	2411.5	2410.86	0	0
N27	2410.86	2410.86	0	0
N39	869.08	869.08	0	0

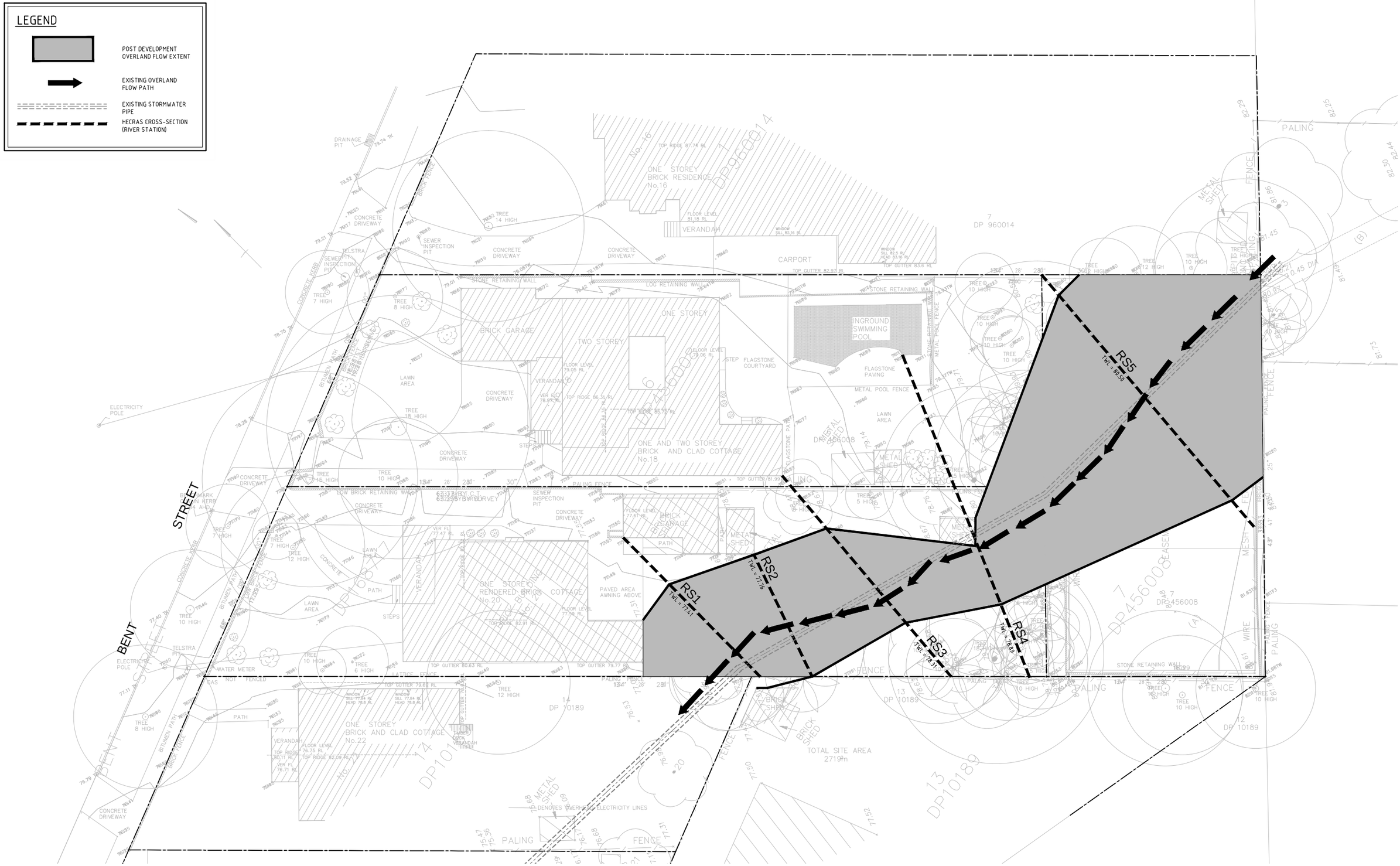
Run Log for 14.08.24_Bent Street Flood Study_Post Developed_Rev1.drn run at 19:46:14 on 22/2/2015

Upwelling occurred at Pit9, Pit8
The maximum flow exceeded the safe value in the following overflow routes: OF23, OF21, OF12, OF4, OF1

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APPENDIX I

ENGINEERS
AUSTRALIA
Chartered Professional Engineer
MEMBER



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
1	01.09.14	ISSUED FOR INFORMATION ONLY	AD	AD	AD

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ENGINEERS AUSTRALIA Chartered Professional Engineer MEMBER

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SCALE: 0 5 10 15m
SCALE 1:150 @

PROJECT: 18-20 BENT STREET
LINDFIELD, NSW

DRAWING: PRE-DEVELOPMENT FLOOD EXTENT

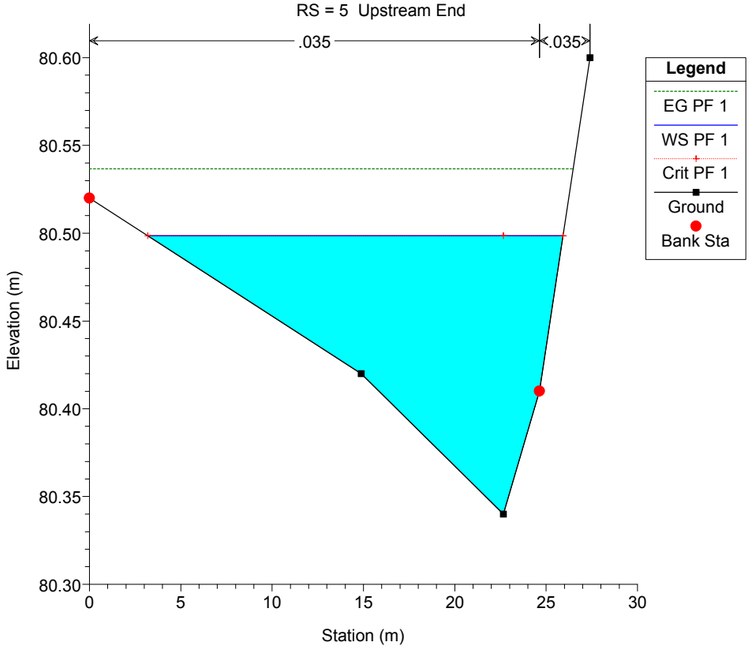
CLIENT: ANDY & DAVID FREIMAN
ARCHITECT: MARSTON ARCHITECTS
STATUS: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

SIZE: A1
DRAWING NUMBER: 13003_SK-002
REVISION: 01

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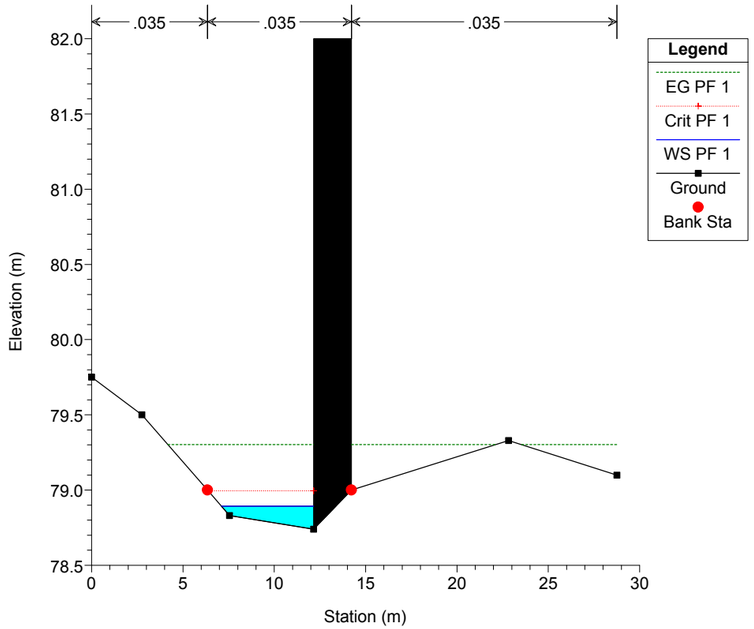
Bent Street - Pre Developed Plan: Plan 01 2/09/2014

RS = 5 Upstream End



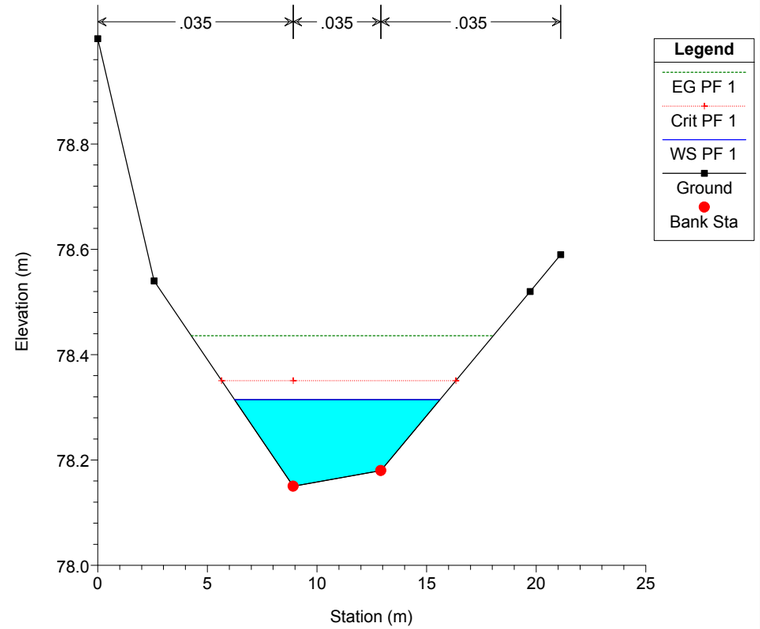
Bent Street - Pre Developed Plan: Plan 01 2/09/2014

RS = 4



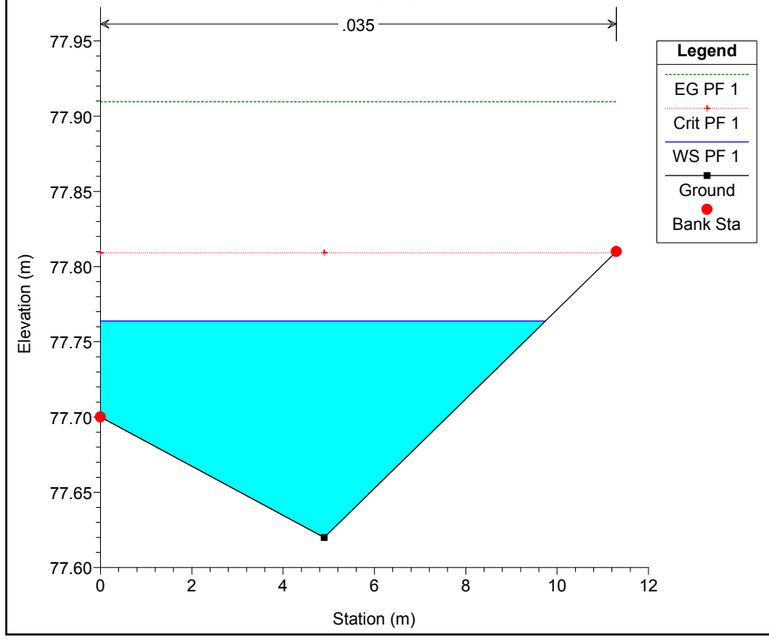
Bent Street - Pre Developed Plan: Plan 01 2/09/2014

RS = 3



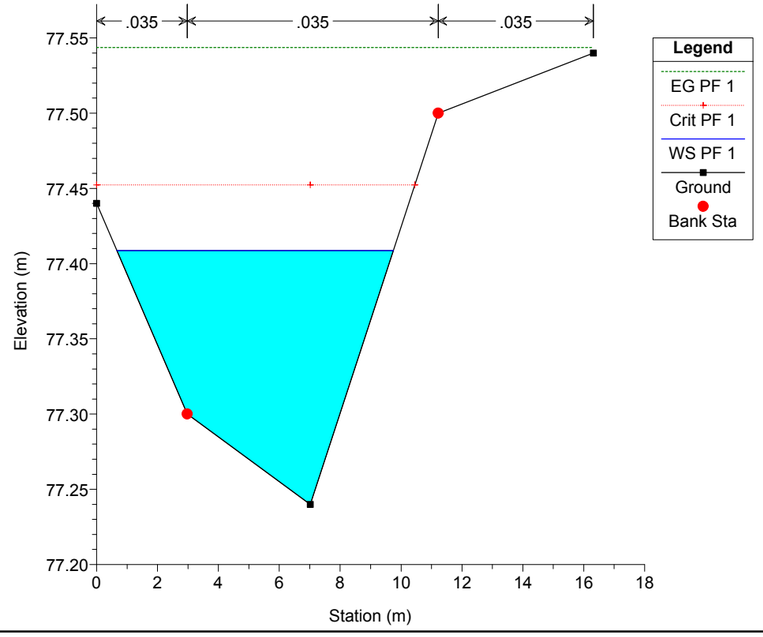
Bent Street - Pre Developed Plan: Plan 01 2/09/2014

RS = 2



Bent Street - Pre Developed Plan: Plan 01 2/09/2014

RS = 1



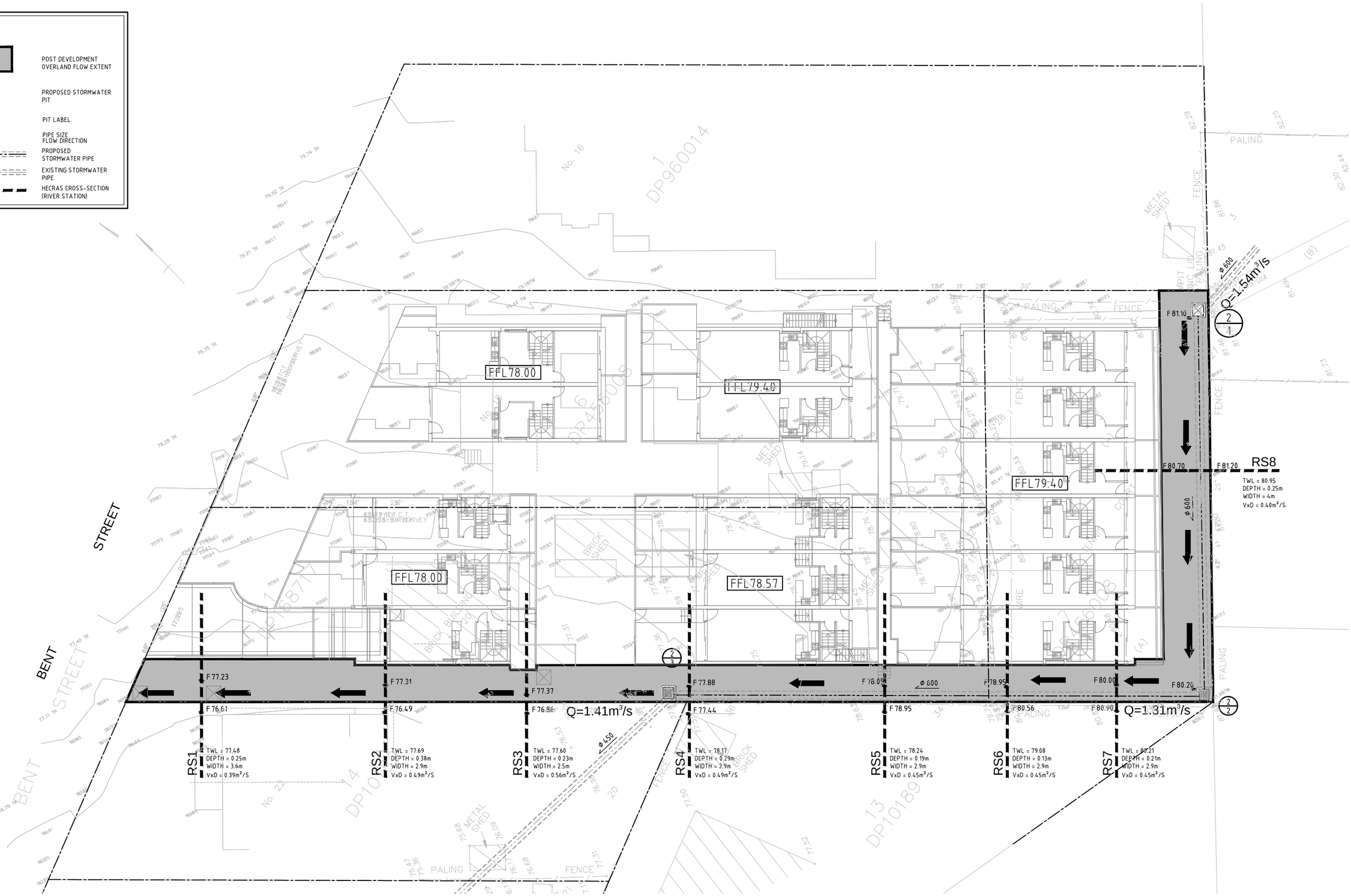
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APPENDIX J

ENGINEERS
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Chartered Professional Engineer
MEMBER

LEGEND

- POST DEVELOPMENT OVERLAND FLOW EXTENT
- PROPOSED STORMWATER PIT
- EX 1 — PIT LABEL
- ϕ 600 — PIPE SIZE FLOW DIRECTION
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- HECRAS CROSS-SECTION (RIVER STATION)



REV	DATE	ISSUE DESCRIPTION	DRN	DES.	VER
2	22.02.15	ISSUED FOR INFORMATION ONLY	AD	AD	AD
1	01.09.14	ISSUED FOR INFORMATION ONLY	AD	AD	AD

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SCALE: 0 5 10 15m — SCALE 1:150 @

PROJECT: 18-20 BENT STREET LINDFIELD, NSW

DRAWING: POST-DEVELOPMENT FLOOD EXTENT

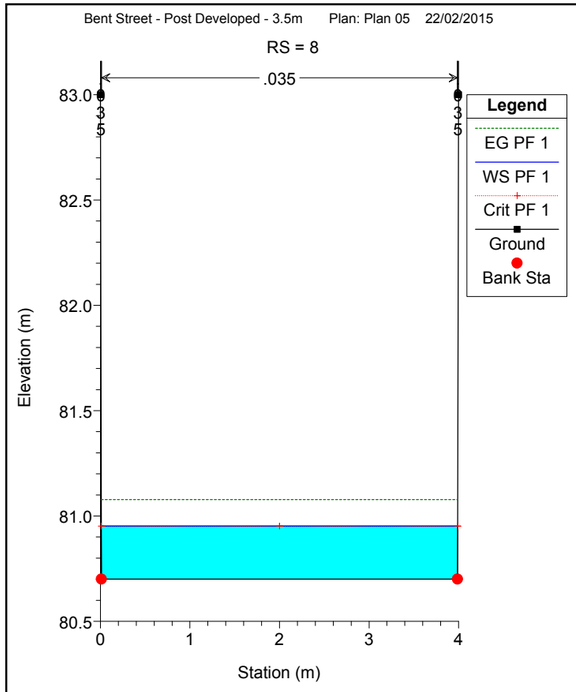
CLIENT: ANDY & DAVID FREIMAN

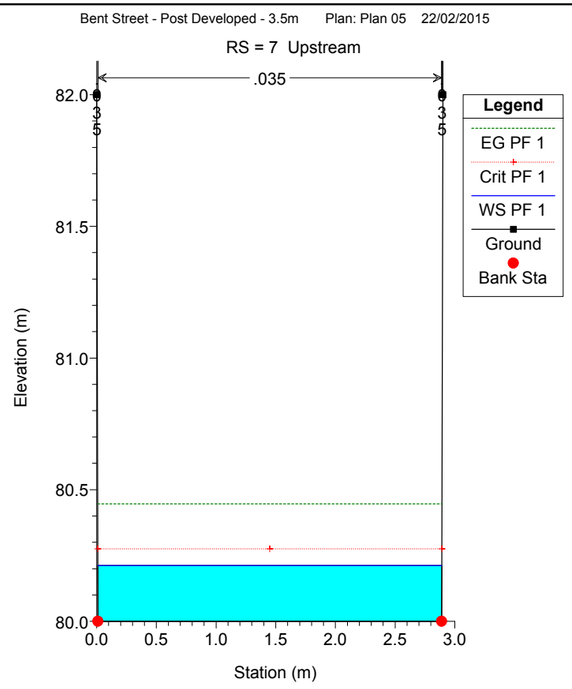
ARCHITECT: MARSTON ARCHITECTS

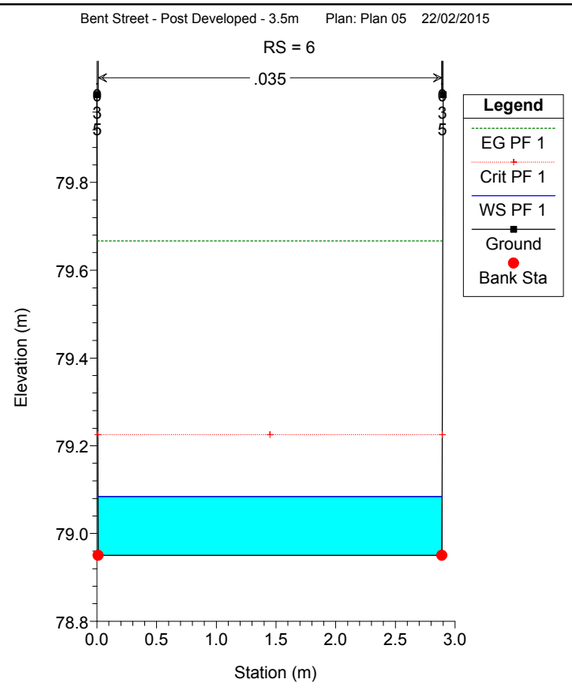
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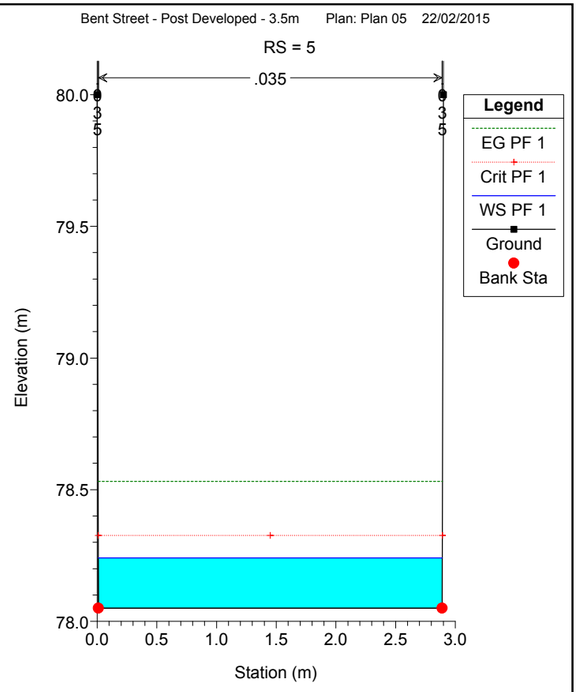
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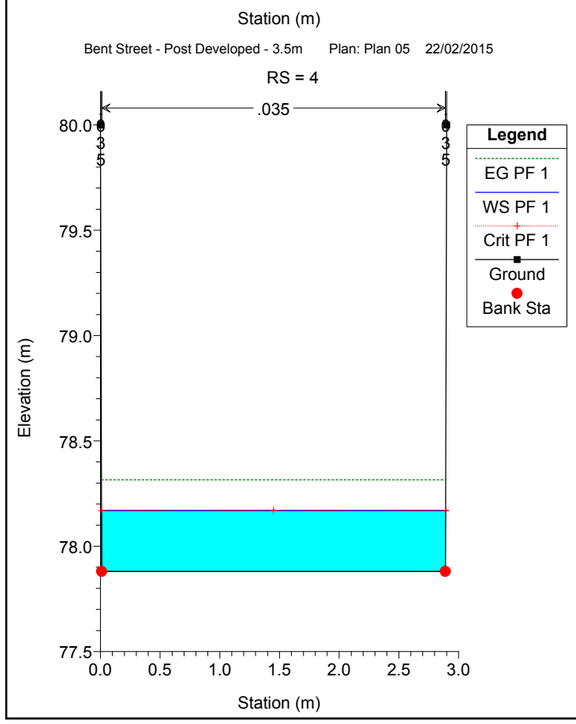
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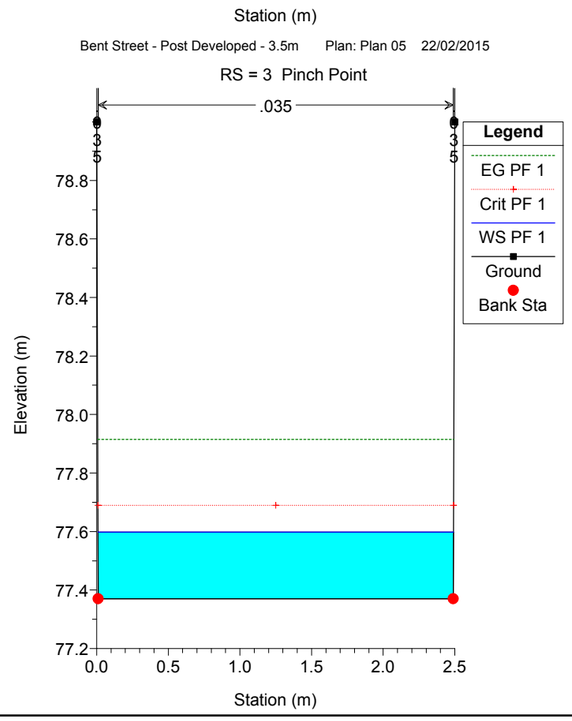

Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 8
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

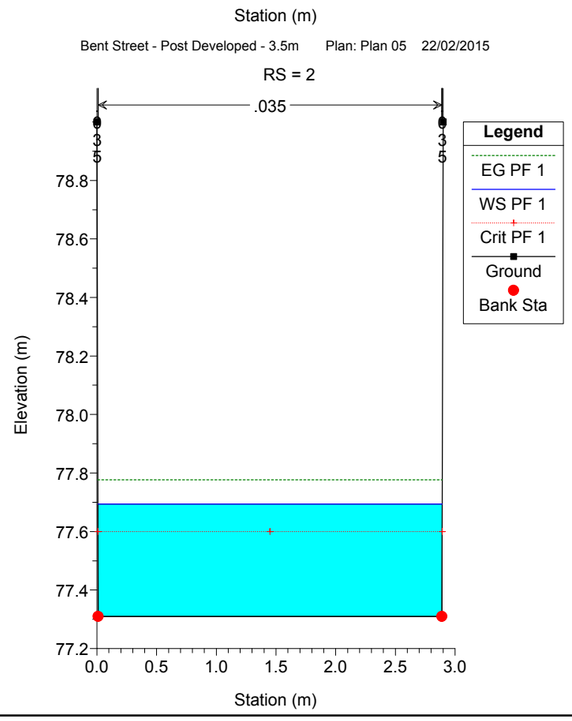

Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

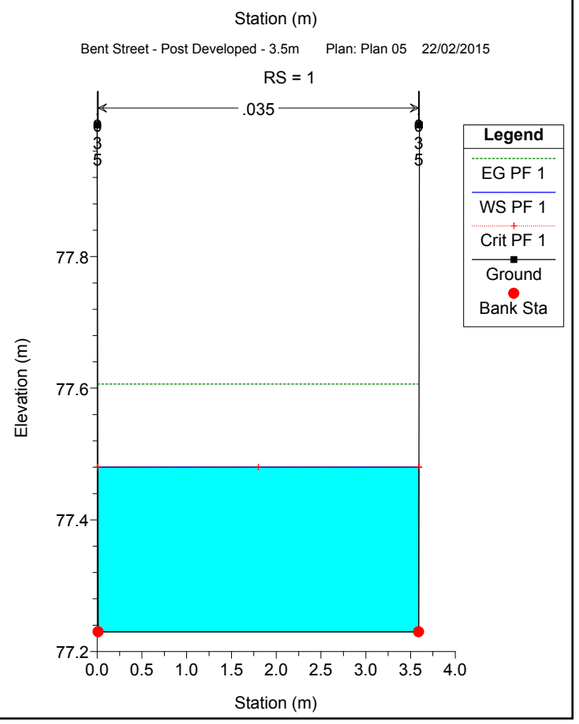

Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 6
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 5
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 4
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 3 Pinch Point
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 2
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Bent Street - Post Developed - 3.5m Plan: Plan 05 22/02/2015
RS = 1
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

ADP
Consulting : Engineering

Appendix D
Architectural Plans

Autodesk Docs://Bent Street Lindfield /PA030530Da-PTW-AR-ZZ-M-A-1000.rvt

DROVERS WAY (NEW LANE)

85.00 | 87.00 | 89.00

15 m

1 D10030

1 D10030

RL 84.48 BOUNDARY

RL 84.22

RL 84.12

RL 83.32

3 m

6 m

RL 86.68 | RL 86.73 | RL 86.83 | RL 87.05 | RL 87.00 | RL 87.16 | RL 87.60

BOUNDARY

NO. 3 & 3A
BEACONSFIELD PARADE

83.00

GARBAGE
122 m²

SRV

CAR WASH

GARBAGE
34 m²

1:8

1:4

1:8

2000

RL 84.89

6 m

81.00

FBV

RL 80.60

25 PARKING
RL. 80.60

FCR
13 m

RL 80.59

CAR PARK ENTRY

RL 80.23

BENT STREET

RL. 80.90 102 4B L 92 m²

RL. 80.90 103 4B L 117 m²

131 m²

TREE NO.45
4.0 m CANOPY

RL 79.46

3 m

COMMUNAL GARDEN

7.0 m CANOPY

TREE NO.51

RL 83.24

RL 82.00

RL 81.70

RL 80.50

1 D10020

SUB STATION

RL 79.60

79.00

BOUNDARY

RL 78.88

3F

3F

3F

GROUND LEVEL FLOOR PLAN 80.70M

PARKING SCHEDULE

LEVEL	RESIDENTIAL	ACCESSIBLE	CARWASH	VISITOR	VISITOR ACCESSIBLE	COUNT
L0	5	0	1	15	4	25
B01	35	6	0	0	0	41
B02	40	6	0	0	0	46
B03	42	6	0	0	0	48
: 160	122	18	1	15	4	160

Key Plan:

N

Drawing Disclaimer:
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Note
PTW takes no responsibility for external building elements. Anything connected with any design, materials selection, construction or installation of any cladding, facade or external building element must be checked by and remains the responsibility of others, including suitably qualified experts as may be required.

Rev	Amendment	By	Chk*	Date
2	BLOCK PLAN	TT	MS	20241115
1	BLOCK PLAN	MS	MS	20240911

***Registered Architect**

01	Megumi Sakaguchi	NSW Arch No.9391

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Peddle Thorp & Walker P/L
ABN 23 000 454 624
trading as PTW Architects

NSW Nominated Architects
S Parsons Architect No.6098
D Jones Architect No.4778
N Marojevic Architect No.11274

PTW

0 1 2 5 10 15m
1 : 200 @ A1

Project PA030530.01

BENT STREET LINFIELD
12-16 BENT STREET, LINDFIELD, NSW 2070

Status
SKETCH

Title
B1-PLAN
GROUND LEVEL FLOOR PLAN

Drawing Number AR-DA-B10030

Revision 2

14/02/2025 5:32:04 PM

A1



Key Plan:

N

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Rev	Amendment	By	Chk*	Date
2	BLOCK PLAN	TT	MS	20241115
1	BLOCK PLAN	MS	MS	20240911

*Registered Architect		
01	Megumi Sakaguchi	NSW Arch No.9391

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S Parsons Architect No.6098
D Jones Architect No.4778
N Marojevic Architect No.11274

PTW

0 | 1 | 2 | 5 | 10 | 15m
1 : 200 @ A1

Project PA030530.01
BENT STREET LINFIELD
12-16 BENT STREET, LINDFIELD, NSW 2070

Status
SKETCH

Title
B1-PLAN
LEVEL 01 FLOOR PLAN

Drawing Number AR-DA-B10040
Revision 2

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A1



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Key Plan:

N

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Rev	Amendment	By	Chk*	Date
2	BLOCK PLAN	TT	MS	20241115
1	BLOCK PLAN	MS	MS	20240911

*Registered Architect		
01	Megumi Sakaguchi	NSW Arch No.9391

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D Jones Architect No.4778
N Marojevic Architect No.11274

PTW

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1 : 200 @ A1

Project PA030530.01

BENT STREET LINFIELD
12-16 BENT STREET, LINDFIELD, NSW 2070

Status
SKETCH

Title
B1-PLAN
LEVEL 02 FLOOR PLAN

Drawing Number AR-DA-B10050

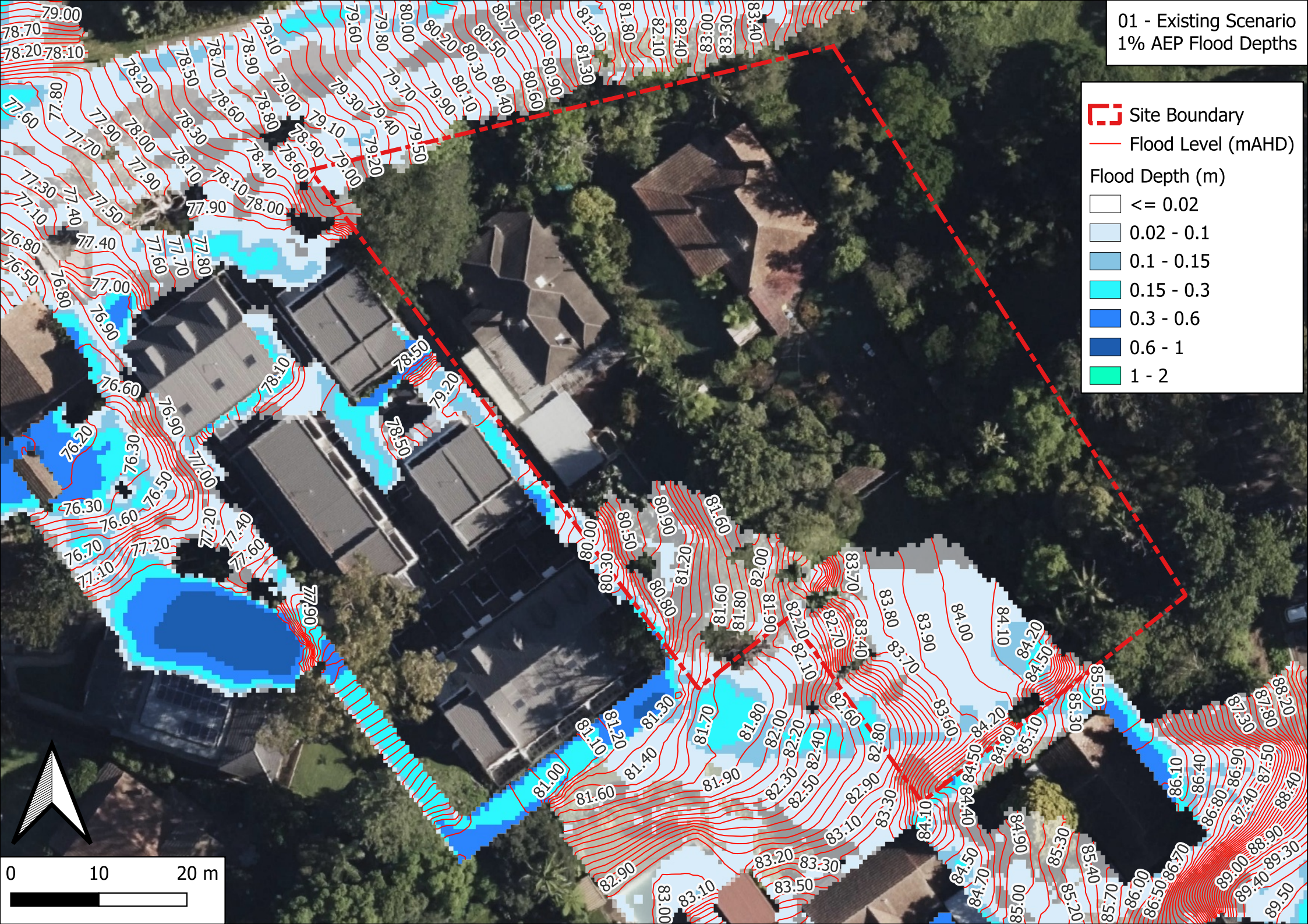
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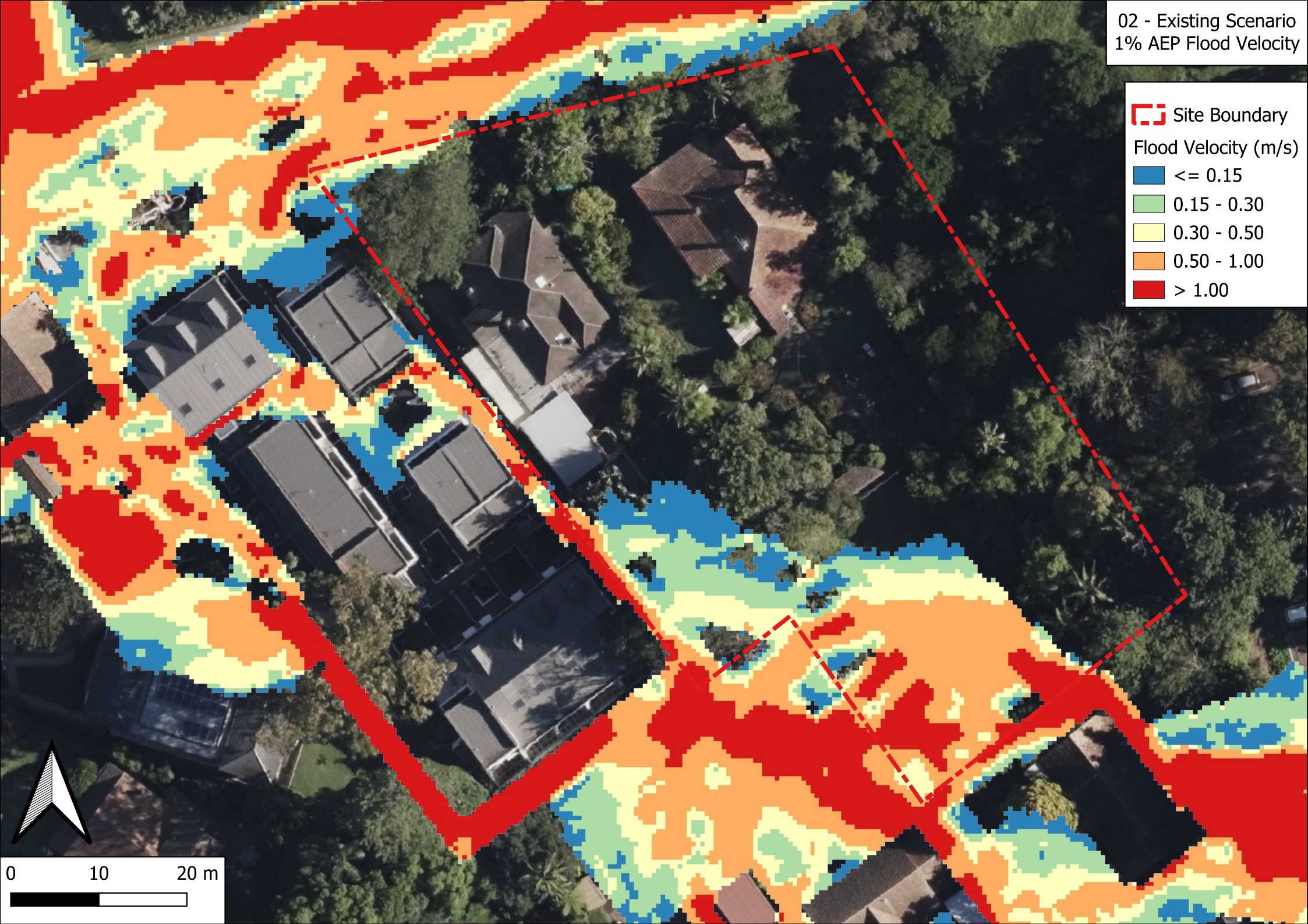
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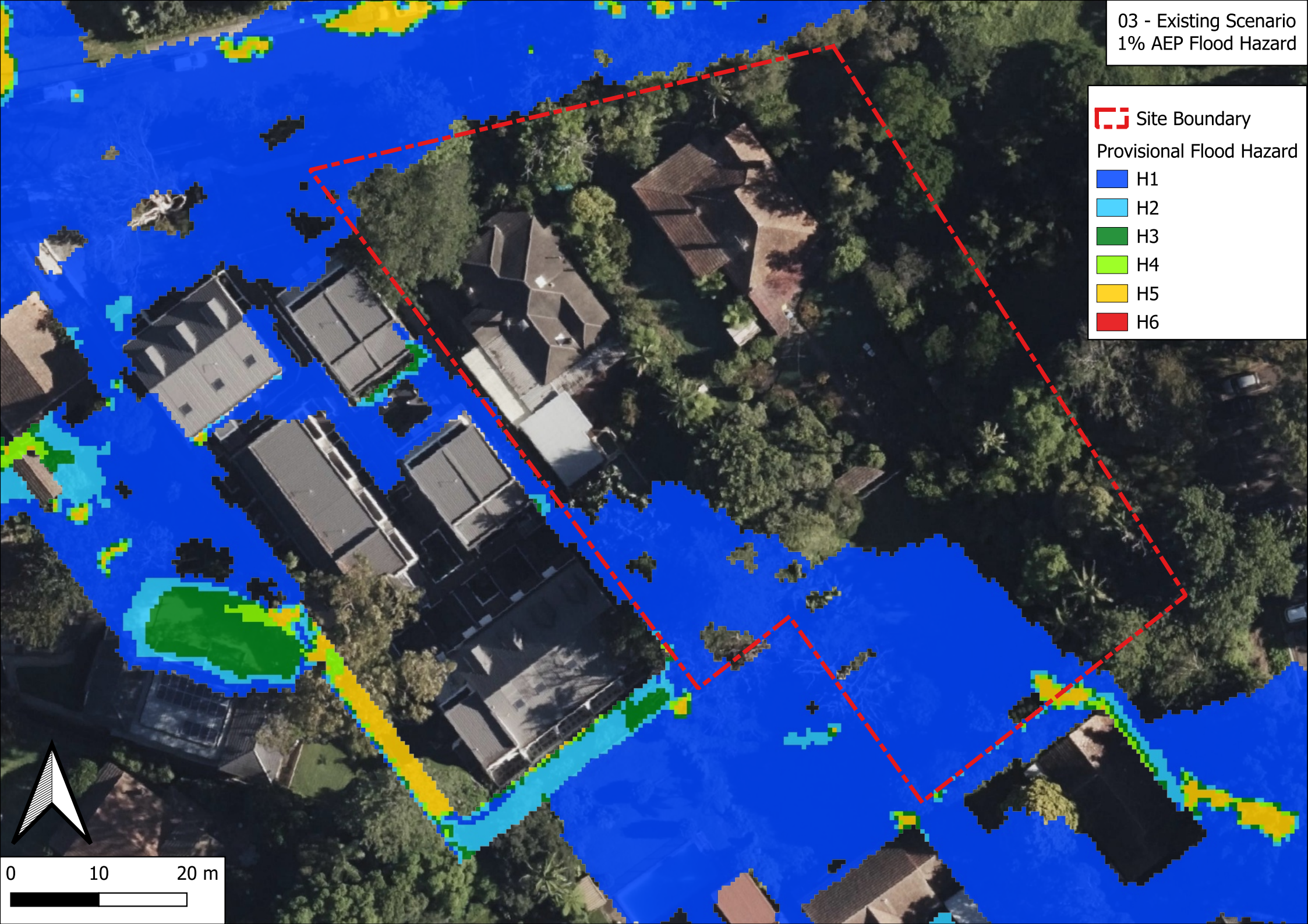
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ADP
Consulting : Engineering

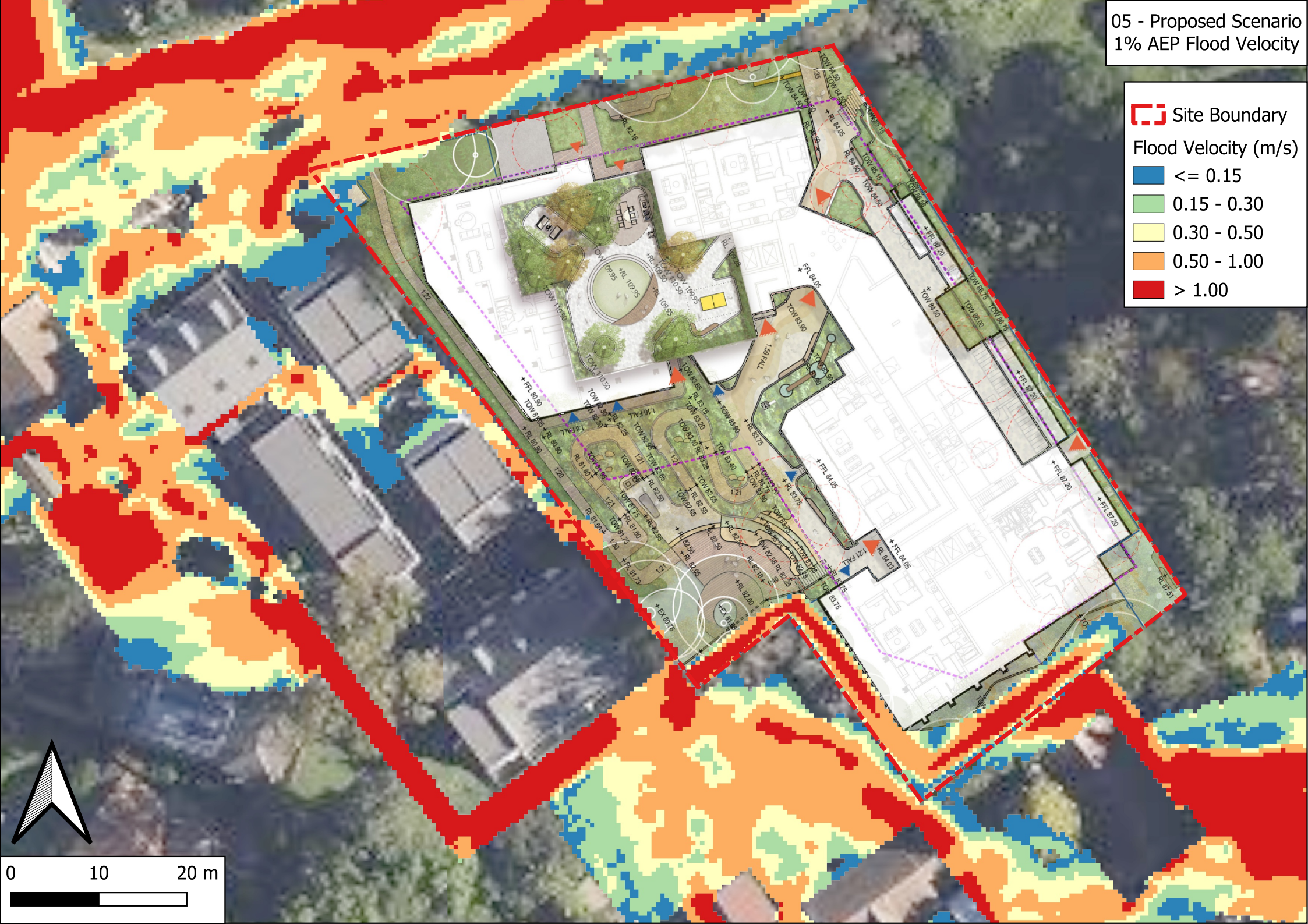
Appendix E
Flood Maps

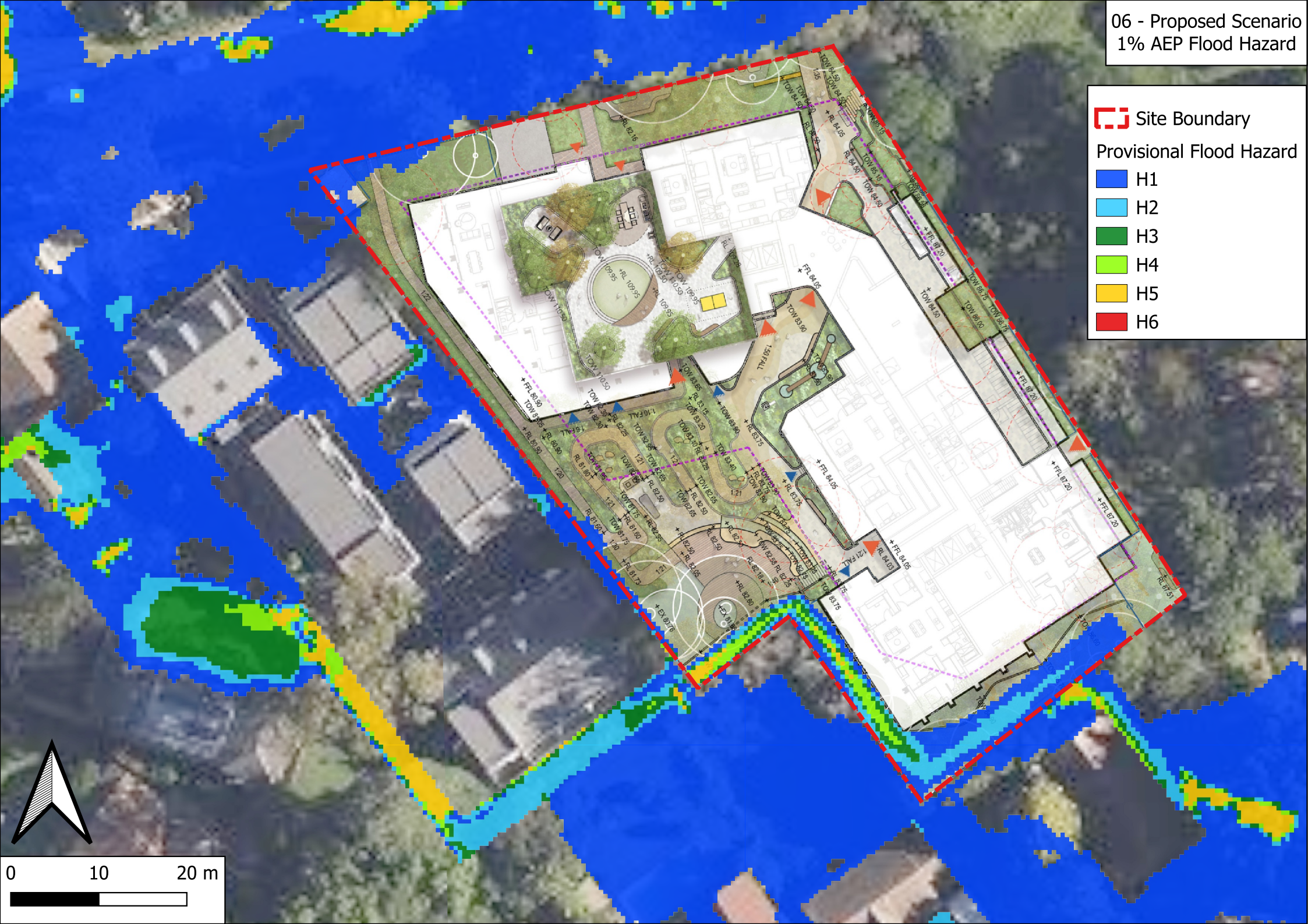

01 - Existing Scenario
1% AEP Flood Depths
Site Boundary
Flood Level (mAHD)
Flood Depth (m)
<= 0.02
0.02 - 0.1
0.1 - 0.15
0.15 - 0.3
0.3 - 0.6
0.6 - 1
1 - 2
0
10
20 m


02 - Existing Scenario
1% AEP Flood Velocity
Site Boundary
Flood Velocity (m/s)
<= 0.15
0.15 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
0
10
20 m


03 - Existing Scenario
1% AEP Flood Hazard
Site Boundary
Provisional Flood Hazard
H1
H2
H3
H4
H5
H6
0
10
20 m


04 - Proposed Scenario
1% AEP Flood Depths
Site Boundary
Flood Contours (mAHD)
Channel Flow (m3/s)
Flood Depth (m)
<= 0.02
0.02 - 0.1
0.1 - 0.15
0.15 - 0.3
0.3 - 0.6
0.6 - 1
1 - 2
1.209
1.209
1.209
1.209
1.016
1.21
0
0
10
20 m


05 - Proposed Scenario
1% AEP Flood Velocity
Site Boundary
Flood Velocity (m/s)
<= 0.15
0.15 - 0.30
0.30 - 0.50
0.50 - 1.00
> 1.00
0
10
20 m


06 - Proposed Scenario
1% AEP Flood Hazard
Site Boundary
Provisional Flood Hazard
H1
H2
H3
H4
H5
H6
0
10
20 m

ADP
Consulting : Engineering

Appendix F
Civil Stormwater Plans

PROPOSED RESIDENTIAL FLAT DEVELOPMENT
12-16 BENT STREET, LINDFIELD NSW 2070



LOCALITY PLAN
SOURCE: [SIXMAPS] - 24.01.2025
NOT TO SCALE

DRAWING SCHEDULE	
DRAWING NO.	DRAWING TITLE
CE000	COVER SHEET
CE100	STORMWATER MANAGEMENT PLAN - BASEMENT 3
CE101	STORMWATER MANAGEMENT PLAN - BASEMENT 2
CE102	STORMWATER MANAGEMENT PLAN - BASEMENT 1
CE103	STORMWATER MANAGEMENT PLAN - GROUND FLOOR
CE104	STORMWATER MANAGEMENT PLAN - LEVEL 1
CE105	STORMWATER MANAGEMENT PLAN - LEVEL 2
CE150	MUSIC CATCHMENTS AND RESULTS
CE200	STORMWATER DETAILS - SHEET 1
CE201	STORMWATER DETAILS - SHEET 2
CE202	STORMWATER DETAILS - SHEET 3

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APPROVAL

Revision	Description	Initial	Date
B	ISSUE FOR SSDA APPROVAL	KC	14.03.2025
A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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12-16 BENT STREET, LINDFIELD NSW 2070

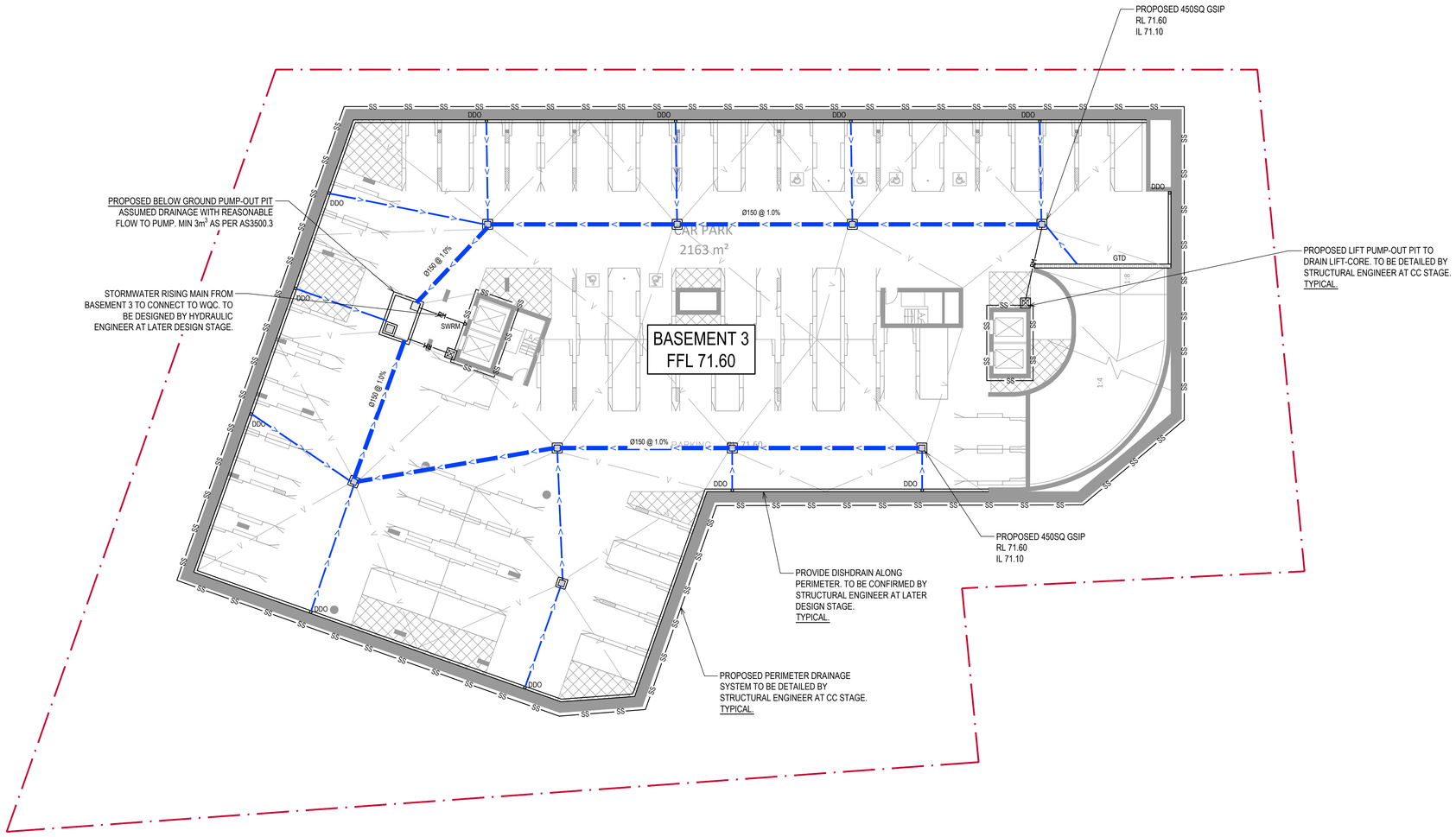
Drawing Title
CIVIL ENGINEERING SERVICES
COVER SHEET

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025		@ A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE000	B	

LEGEND

- SITE BOUNDARY
- PROPOSED STORMWATER PIPE
- RM — RM — SUBSOIL PIPE
- SS — SS — SS — SUBSOIL PIPE
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GTD — GRATED DRAIN
- PIT A02 — STORMWATER PIT NAME
- RL X.XX — FINISHED RL
- SWRM — STORMWATER RISING MAIN



NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
2. ALL REDUCED LEVELS ARE IN mAHD.
3. SURVEY INFORMATION OBTAINED FROM MITCH AYRES SURVEYING'S DRAWING TITLED 'BOUNDARY DETAIL AND LEVEL SURVEY AT NO 12-16 BENT STREET LINDFIELD', DATED 08/07/2023.
4. PROPOSED STORMWATER PIPES TO HAVE MINIMUM PIPE FALLS AS PER BELOW:
   A. DIAMETER ≤ 150mm: 1.0% FALL.
   B. DIAMETER ≥ 225mm: 0.5% FALL.
5. SLAB/PAVEMENT TO HAVE MINIMUM 1% FALL TOWARDS STORMWATER INLETS AS PER AS2890 REQUIREMENTS.

PRINTING NOTE:
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PRINTED IN COLOUR.

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APPROVAL

Revision	Description	Initial	Date
C	ISSUE FOR SSDA APPROVAL	KC	14.03.2025
B	ISSUE FOR SSDA APPROVAL	KC	18.02.2025
A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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Project
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12-16 BENT STREET, LINDFIELD NSW 2070

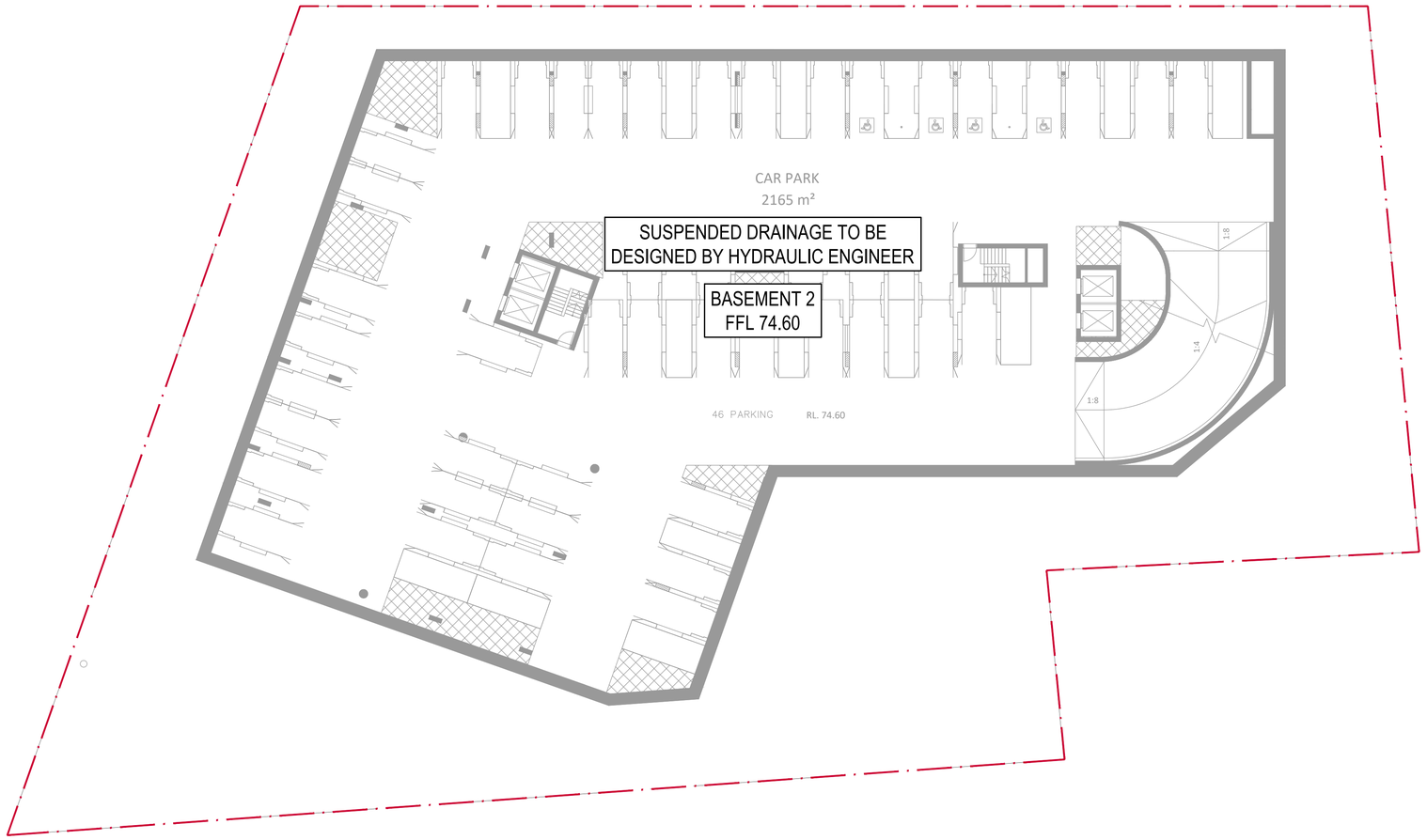
Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - BASEMENT 3

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025	1:200 @	A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE100	C	

LEGEND

- SITE BOUNDARY
- PROPOSED STORMWATER PIPE
- RM — RM — SUBSOIL PIPE
- SS — SS — SS — SUBSOIL PIPE
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GTD — GRATED DRAIN
- PIT A02 — STORMWATER PIT NAME
- RL X.XX — FINISHED RL
- SWRM — STORMWATER RISING MAIN



NOTES:
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2. ALL REDUCED LEVELS ARE IN mAHD.
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APPROVAL

Revision	Description	Initial	Date
B	ISSUE FOR SSDA APPROVAL	KC	18.02.2025
A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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Brisbane
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Project
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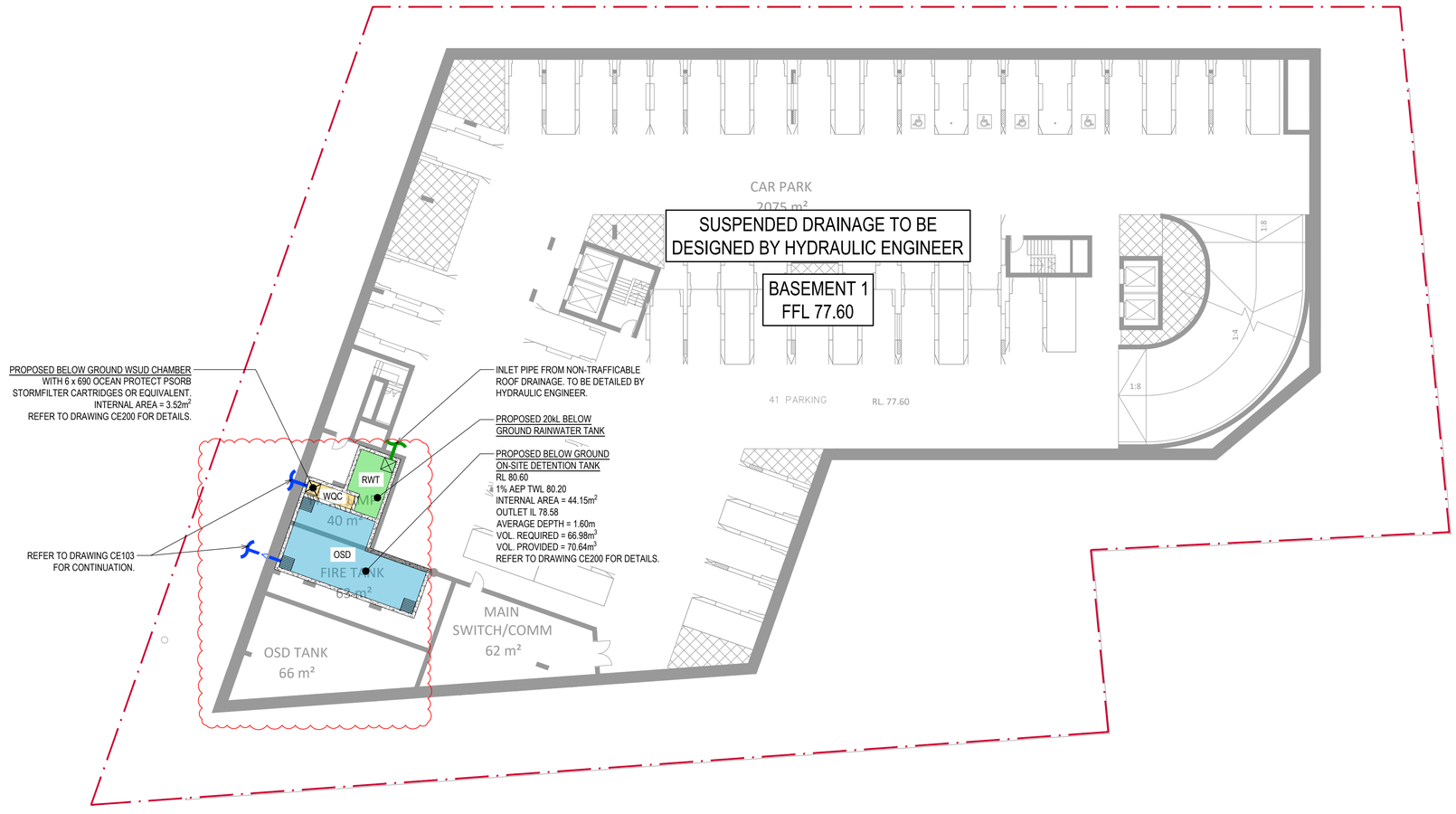
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CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - BASEMENT 2

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	FEB 2025	1:200	@ A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE101	B	

LEGEND

- SITE BOUNDARY
- PROPOSED STORMWATER PIPE
- RM — RM — SUBSOIL PIPE
- SS — SS — SS — SUBSOIL PIPE
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GTD — GRATED DRAIN
- PIT A02 — STORMWATER PIT NAME
- RL X.XX — FINISHED RL
- SWRM — STORMWATER RISING MAIN



NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
2. ALL REDUCED LEVELS ARE IN mAHD.
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Revision	Description	Initial	Date
C	ISSUE FOR SSDA APPROVAL	KC	14.03.2025
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A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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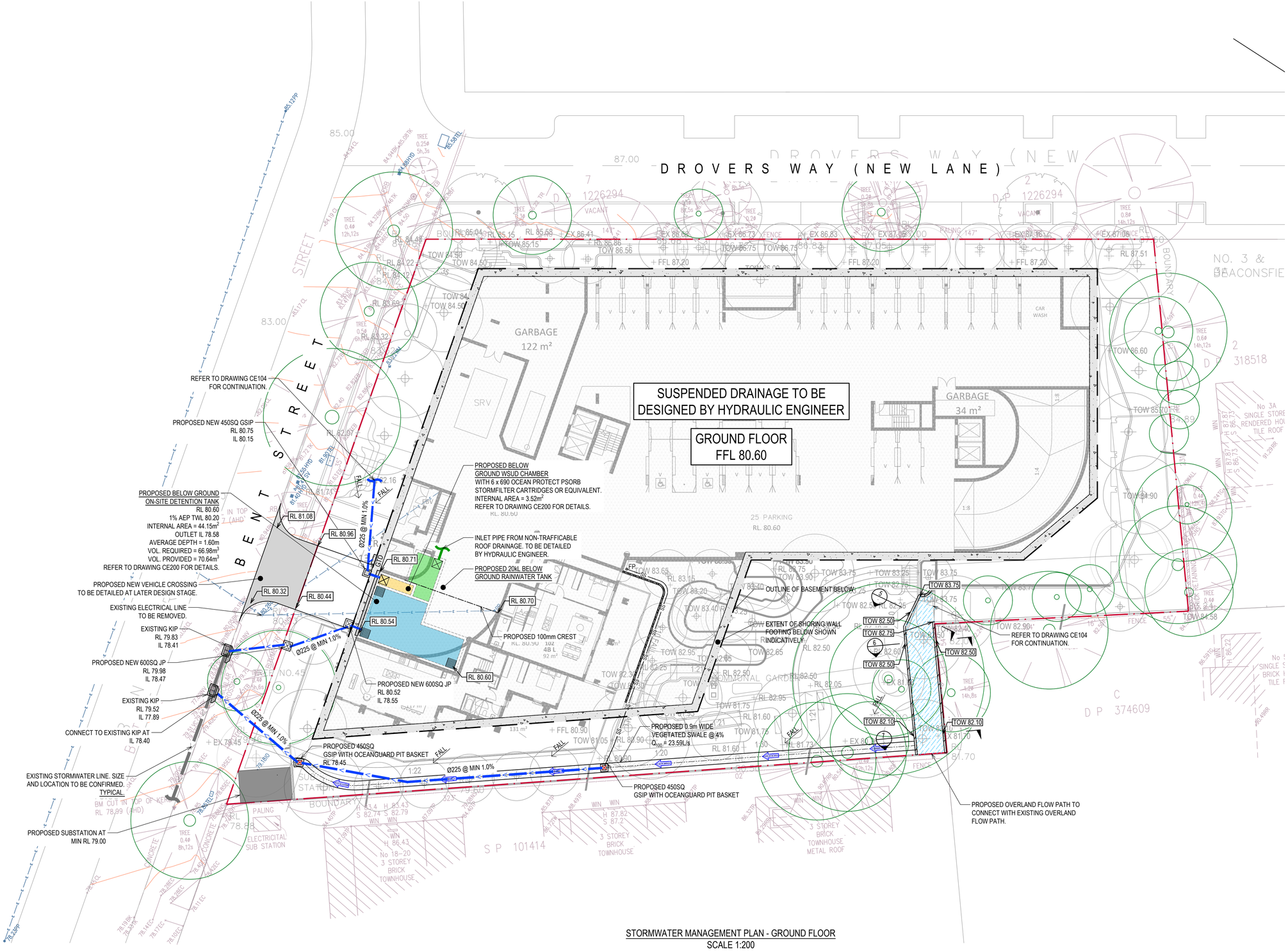
Project
12-16 BENT ST, LINDFIELD
12-16 BENT STREET, LINDFIELD NSW 2070

Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - BASEMENT 1

APPROVAL

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025	1:200	@ A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE102	C	



LEGEND

- SITE BOUNDARY
- EXISTING CONTOUR (0.Xm)
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- SUBSOIL PIPE
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GRATED DRAIN (GTD)
- STORMWATER PIT NAME (PIT A02)
- FINISHED RL (RL X.XX)
- OVERLAND FLOW DIRECTION
- EXISTING ELECTRICAL LINE
- EXISTING GAS LINE
- EXISTING TELECOMMUNICATION LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBRE OPTIC LINE
- EXISTING OVERHEAD POWER LINE
- RETAINING WALL
- FLUSHING POINT
- PROPOSED OVERLAND FLOW PATH

STORMWATER MANAGEMENT PLAN - GROUND FLOOR
SCALE 1:200

NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
2. ALL REDUCED LEVELS ARE IN mAHD.
3. SURVEY INFORMATION OBTAINED FROM MITCH AYRES SURVEYING'S DRAWING TITLED 'BOUNDARY DETAIL AND LEVEL SURVEY AT NO 12-16 BENT STREET LINDFIELD', DATED 08/07/2023.
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   B. DIAMETER ≥ 225mm: 0.5% FALL.
5. SLAB/PAVEMENT TO HAVE MINIMUM 1% FALL TOWARDS STORMWATER INLETS AS PER AS2890 REQUIREMENTS.

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C	ISSUE FOR SSDA APPROVAL	KC	14.03.2025
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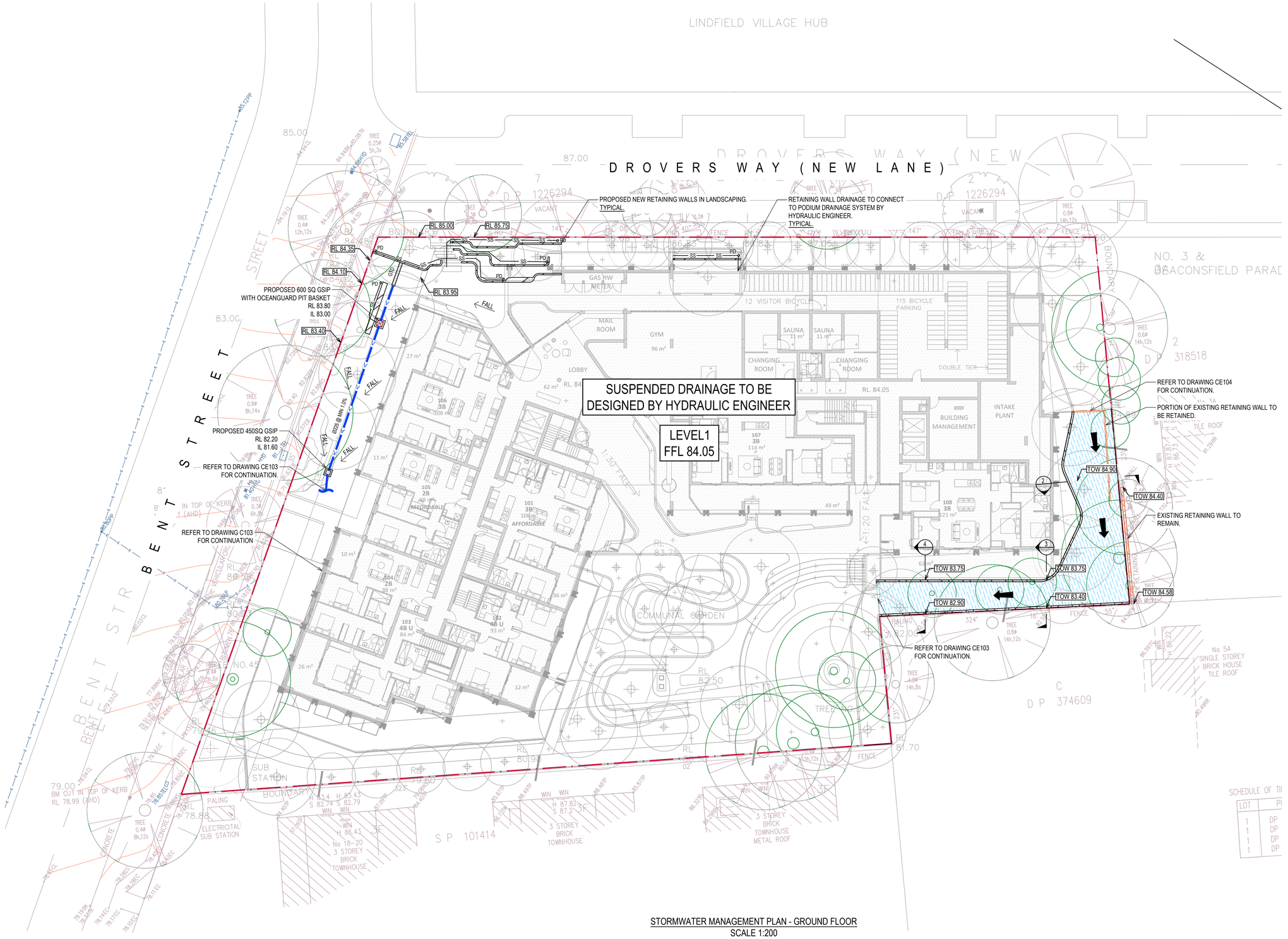
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Project
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Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - GROUND FLOOR

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	JAN 2025	1:200	@ A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE103	A	



STORMWATER MANAGEMENT PLAN - GROUND FLOOR
SCALE 1:200

LEGEND

- SITE BOUNDARY
- EXISTING CONTOUR (0.Xm) — 35.50
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- SUBSOIL PIPE — SS
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GRATED DRAIN — GTD
- STORMWATER PIT NAME — PIT A02
- FINISHED RL — RL X.XX
- OVERLAND FLOW DIRECTION
- EXISTING ELECTRICAL LINE — E
- EXISTING GAS LINE — G
- EXISTING TELECOMMUNICATION LINE — T
- EXISTING SEWER LINE — S
- EXISTING WATER LINE — W
- EXISTING FIBRE OPTIC LINE — FO
- EXISTING OVERHEAD POWER LINE — OH
- RETAINING WALL
- FLUSHING POINT — FP
- PROPOSED OVERLAND FLOW PATH

NOTES:
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   B. DIAMETER ≥ 225mm: 0.5% FALL.
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Revision	Description	Initial	Date
C	ISSUE FOR SSDA APPROVAL	KC	14.03.2025
B	ISSUE FOR SSDA APPROVAL	KC	18.02.2025
A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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12-16 BENT ST, LINDFIELD
12-16 BENT STREET, LINDFIELD NSW 2070

Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - LEVEL 1

APPROVAL

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	JAN 2025	1:200 @	A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE104	A	



LEGEND

- SITE BOUNDARY
- EXISTING CONTOUR (0.Xm)
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- SUBSOIL PIPE
- OUTLINE OF LEVEL BELOW
- GRATED SURFACE INLET PIT
- SEALED JUNCTION PIT
- GRATED DRAIN (GTD)
- STORMWATER PIT NAME (PIT A02)
- FINISHED RL (RL X.XX)
- OVERLAND FLOW DIRECTION
- EXISTING ELECTRICAL LINE
- EXISTING GAS LINE
- EXISTING TELECOMMUNICATION LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING FIBRE OPTIC LINE
- EXISTING OVERHEAD POWER LINE
- RETAINING WALL
- FLUSHING POINT (FP)
- PROPOSED OVERLAND FLOW PATH

SCHEDULE OF TI

LOT	PI
1	DP
1	DP
1	DP
1	DP

NOTES:
1. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
2. ALL REDUCED LEVELS ARE IN mAHD.
3. SURVEY INFORMATION OBTAINED FROM MITCH AYRES SURVEYING'S DRAWING TITLED 'BOUNDARY DETAIL AND LEVEL SURVEY AT NO 12-16 BENT STREET LINDFIELD', DATED 08/07/2023.
4. PROPOSED STORMWATER PIPES TO HAVE MINIMUM PIPE FALLS AS PER BELOW:
   A. DIAMETER ≤ 150mm: 1.0% FALL.
   B. DIAMETER ≥ 225mm: 0.5% FALL.
5. SLAB/PAVEMENT TO HAVE MINIMUM 1% FALL TOWARDS STORMWATER INLETS AS PER AS2890 REQUIREMENTS.

PRINTING NOTE:
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APPROVAL

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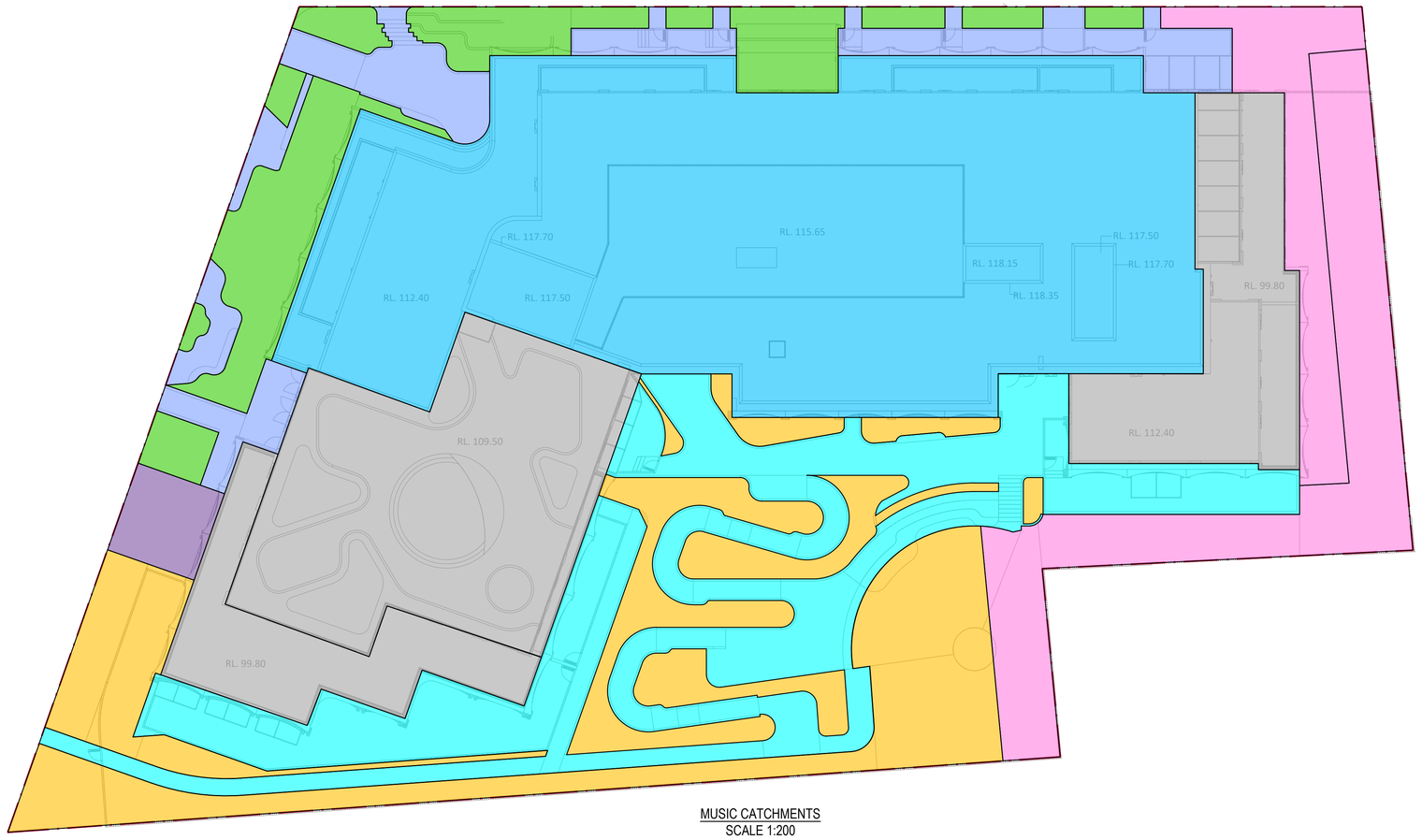
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Project
12-16 BENT ST, LINDFIELD
12-16 BENT STREET, LINDFIELD NSW 2070

Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER MANAGEMENT PLAN - LEVEL 2

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025	1:200 @	A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE105	C	



MUSIC CATCHMENTS
SCALE 1:200

LEGEND

	TRAFFICABLE ROOF AREA DRAINING TO WSUD	= 823 m^2
	NON-TRAFFICABLE ROOF AREA DRAINING TO RAINWATER TANK	= 1320 m^2
	IMPERVIOUS AREA DRAINING TO OCEANGUARD THEN WSUD	= 235 m^2
	DRIVEWAY AREA DRAINING TO WSUD	= 41 m^2
	IMPERVIOUS AREA DRAINING TO OCEANGUARD AND BYPASSING WSUD	= 647 m^2
	PERVIOUS AREA DRAINING TO OCEANGUARD AND BYPASSING WSUD	= 574 m^2
	PERVIOUS AREA BYPASSING WSUD	= 407 m^2
	PERVIOUS AREA DRAINING TO WSUD	= 275 m^2

WATER BALANCE MODEL SUMMARY

IN ACCORDANCE KU-RING-GAI COUNCIL DCP PART 24C.4 TABLE 24C.4-1 THE DEVELOPMENT FALLS UNDER TYPE 5 CATEGORY AND MINIMUM RAINWATER TANK STORAGE IS REQUIRED TO ACHIEVE 50% REDUCTION IN RUNOFF DAYS, OR COMPLIANCE WITH BASIX, WHICHEVER IS THE GREATER.

BASED ON KU-RING-GAI COUNCIL MUSIC LINK REPORT AND WATER BALANCE MODEL 20,000 L RAINWATER TANK IS REQUIRED TO ACHIEVE THE WATER QUALITY TARGET AND 50% REDUCTION IN RUNOFF DAYS. THE FOLLOWING RAINWATER TANK RE-USE VALUES HAVE BEEN ADOPTED:

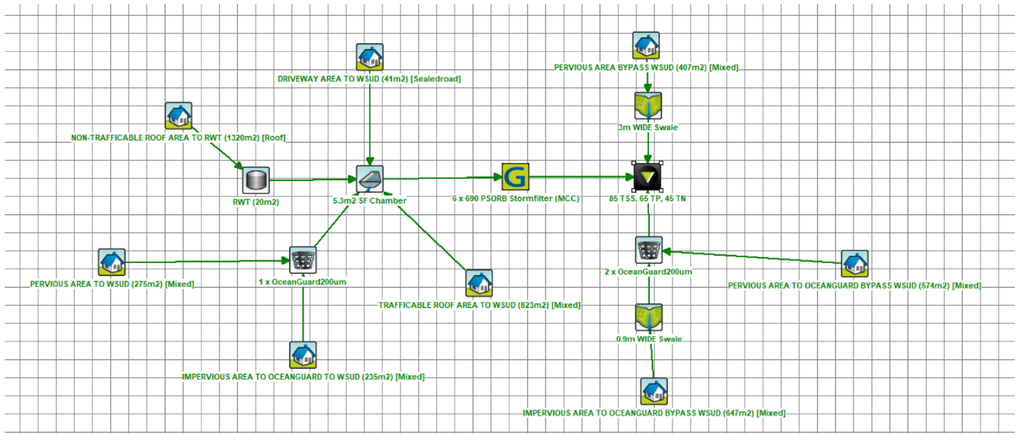
- ANNUAL DEMAND/OUTDOOR DEMAND FOR IRRIGATION PURPOSES = 300 KL/YEAR (BASED ON 100 KL/YEAR/LOT AS PER KU-RING-GAI COUNCIL'S MUSIC MODELLING GUIDELINES).
- DAILY DEMAND//INDOOR DEMAND ESTIMATED AS 208L/DAY (BASED ON 76 KL/YEAR/LOT AS PER KU-RING-GAI COUNCIL'S MUSIC MODELLING GUIDELINES) AND IS TO BE CONFIRMED BY ESD OR BASIX AT LATER DESIGN STAGE.

BASED ON RAINWATER TANK CAPACITY AND RE-USE VALUES ABOVE, 55% REDUCTION IN RUNOFF DAYS ARE ACHIEVED.

WATER QUALITY TARGETS

IN ACCORDANCE KU-RING-GAI COUNCIL DCP PART 24 - WATER MANAGEMENT, THE FOLLOWING POLLUTANT LOAD REDUCTION TARGETS WOULD NEED TO BE ACHIEVED:

- 85% TOTAL SUSPENDED SOLIDS
- 65% TOTAL PHOSPHORUS
- 45% TOTAL NITROGEN



	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.17	3.9	6.6
Total Suspended Solids (kg/yr)	479	69.6	85.5
Total Phosphorus (kg/yr)	0.98	0.313	68.1
Total Nitrogen (kg/yr)	8.84	4.79	45.8
Gross Pollutants (kg/yr)	85.5	0	100

MUSIC TREATMENT TRAIN AND RESULTS

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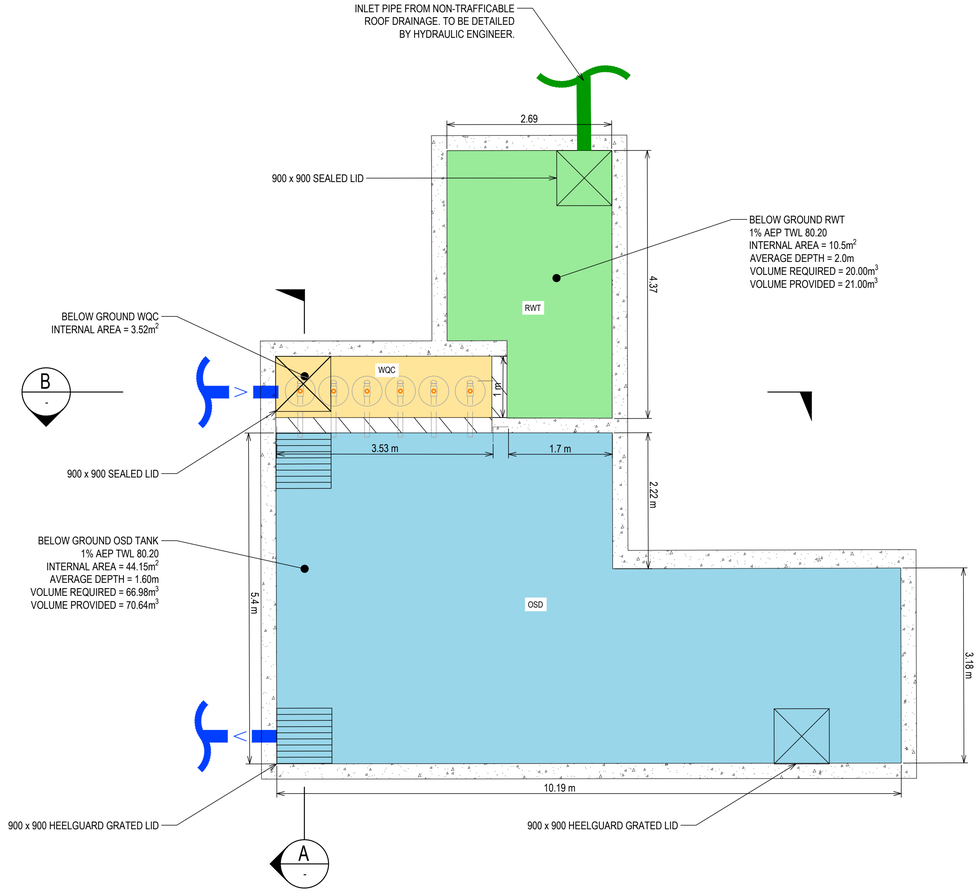
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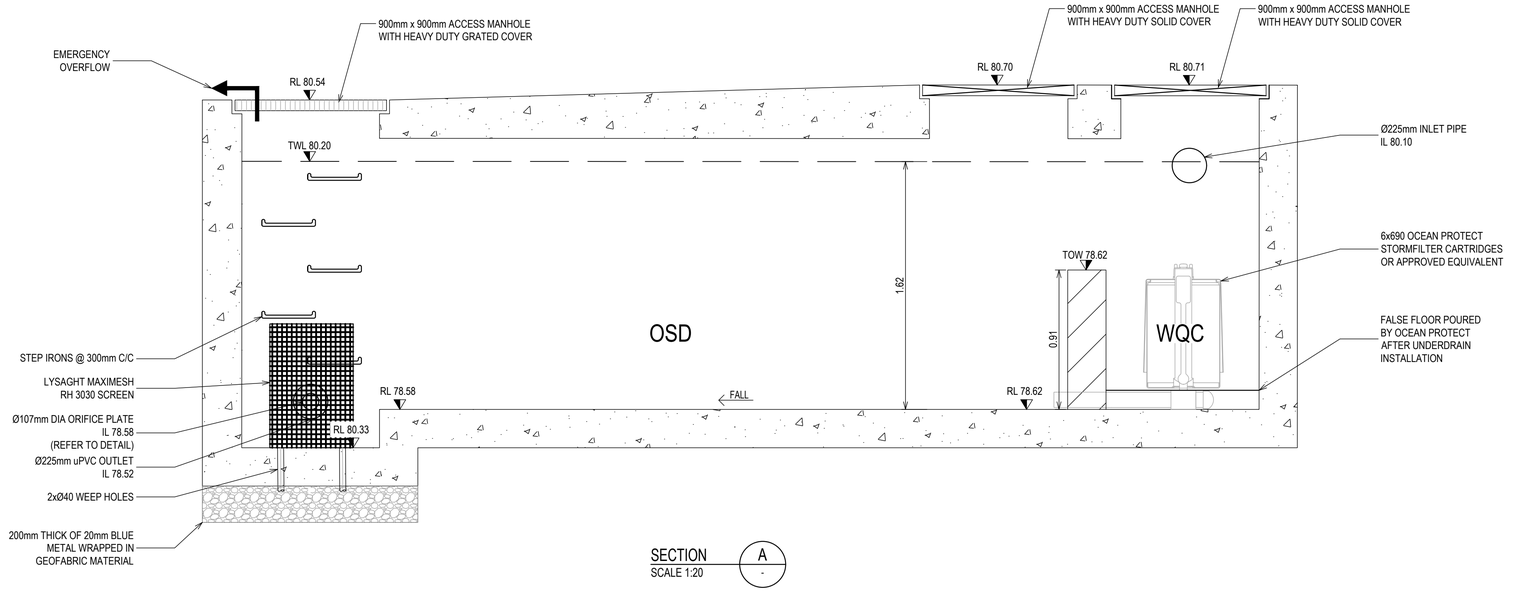
Project
12-16 BENT ST, LINDFIELD
12-16 BENT STREET, LINDFIELD NSW 2070

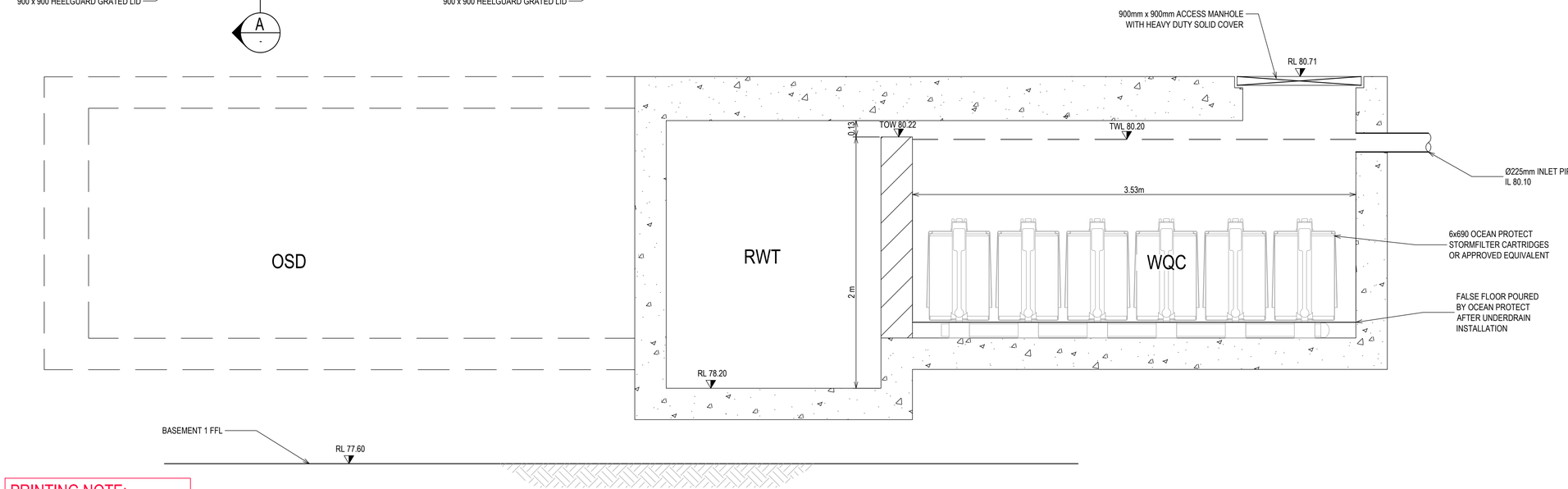
Drawing Title
CIVIL ENGINEERING SERVICES
MUSIC CATCHMENTS AND RESULTS

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025	1:200	@ A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE150	C	







KU-RING-GAI OSD CALCULATION							
ADDRESS: 12-16 BENT STREET, LINDFIELD							
CATCHMENT DETAILS							
1	CATCHMENT NAME:					LADY GAME CREEK	
2	CATCHMENT DISCHARGE RATE				=	0.0147 l/sec/m²	**A**
3	CATCHMENT STORAGE RATE				=	0.0287 m³/m²	**B**
SITE DETAILS							
4	SITE AREA = 4324 m²		60% OF SITE AREA		=	2593.2 m²	**C**
5	AREA(S) NOT DRAINING TO THE DETENTION SYSTEM				=	1815 m²	
6	TOTAL IMPERVIOUS AREA				=	3128 m²	**D**
7	IMPERVIOUS AREA BYPASSING DETENTION SYSTEM				=	601 m²	**E**
PERMITTED SITE DISCHARGE							
8	**C** [2593.2 m²]	x	**A** [0.0147 l/sec/m²]		=	38.12 l/sec	**FLOW 1**
9	ADJUSTMENT FOR ANY UNCONTROLLED IMPERVIOUS FLOW			**E/I**	=	0.1921355 <0.25	**F**
10	**FLOW 1** [38.12] l/sec	x	**F** [0.008]		=	7.32 l/sec	**FLOW 2**
11	**FLOW 1** [38.12] l/sec	-	**FLOW 2** [0.305] l/sec		=	30.80 l/sec	**PSD**
SITE STORAGE REQUIREMENT							
12	**C** [2593.2 m²]	x	**B** [0.0287 m³/m²]		=	74.42 m³	**SSR1**
13	IF STORAGE IS IN LANDSCAPED BASIN		**SS1** x 1.2		=	89.31 m³	**SSR2**
OUTLET CONTROL							
14	HEIGHT DIFFERENCE BETWEEN TOP WATER SURFACE LEVEL AND THE CENTRE OF ORIFICE				=	1.6 m	**G**
15	ORIFICE DIAMETER		$21.8 \times \sqrt{\frac{PSD}{\sqrt{[G]}}}$		=	107.57 mm	**OD**
RAINWATER TANK OFFSET							
UP TO 10% OF THE TOTAL SSR CAN BE OFFSET BY PROVIDED RWT VOLUME			0.9 x **SSR** [74.42]		=	66.982356 m³	**SSR**
PSD = PERMITTED SITE DISCHARGE							
SSR1 = SITE STORAGE REQUIREMENT (EXCEPT FOR LANDSCAPED BASINS)							
SSR2 = SITE STORAGE REQUIREMENT (LANDSCAPED BASINS)							
OD = ORIFICE DIAMETER							

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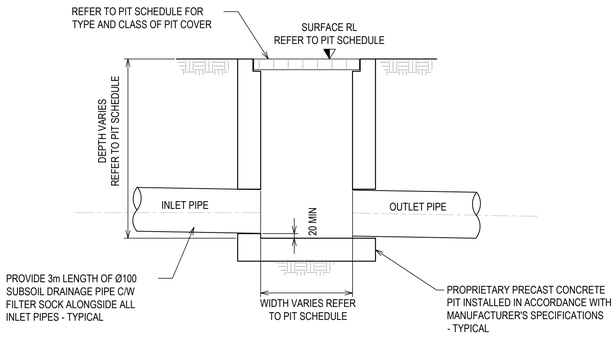
Project
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12-16 BENT STREET, LINDFIELD NSW 2070

Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER DETAILS - SHEET 1

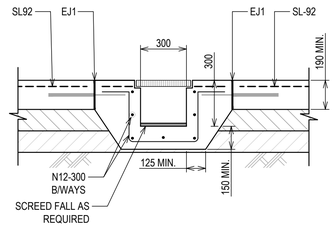
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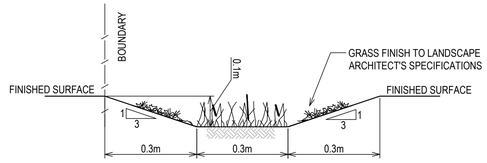
Job Number	Drawing Number	Revision	North Point
SYD3409	CE200	B	



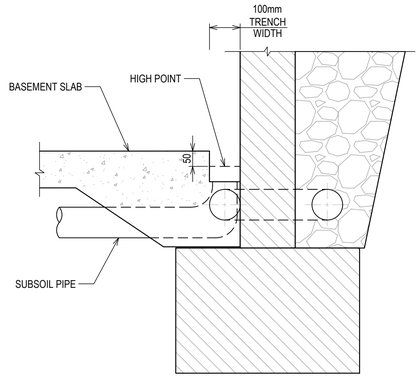
STORMWATER DRAINAGE PIT - PRECAST PIT
SCALE 1:20



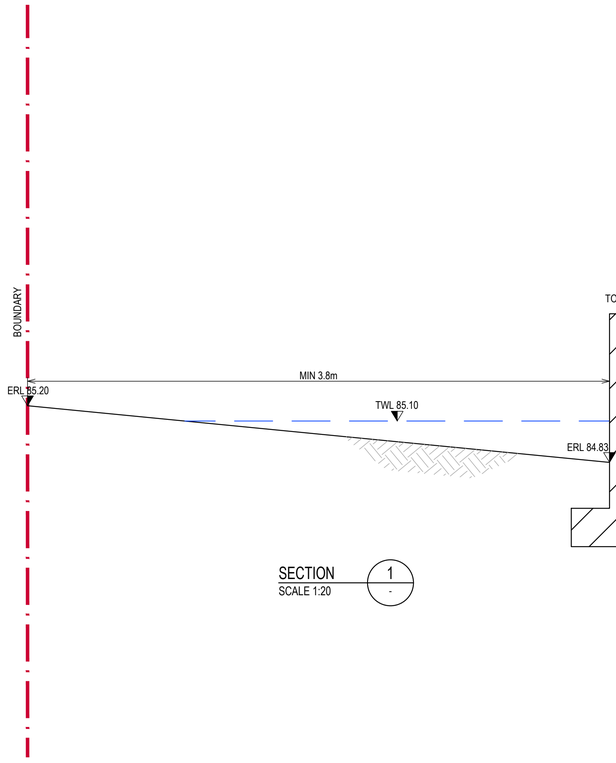
GRATED TRENCH DRAIN DETAIL
SCALE 1:20



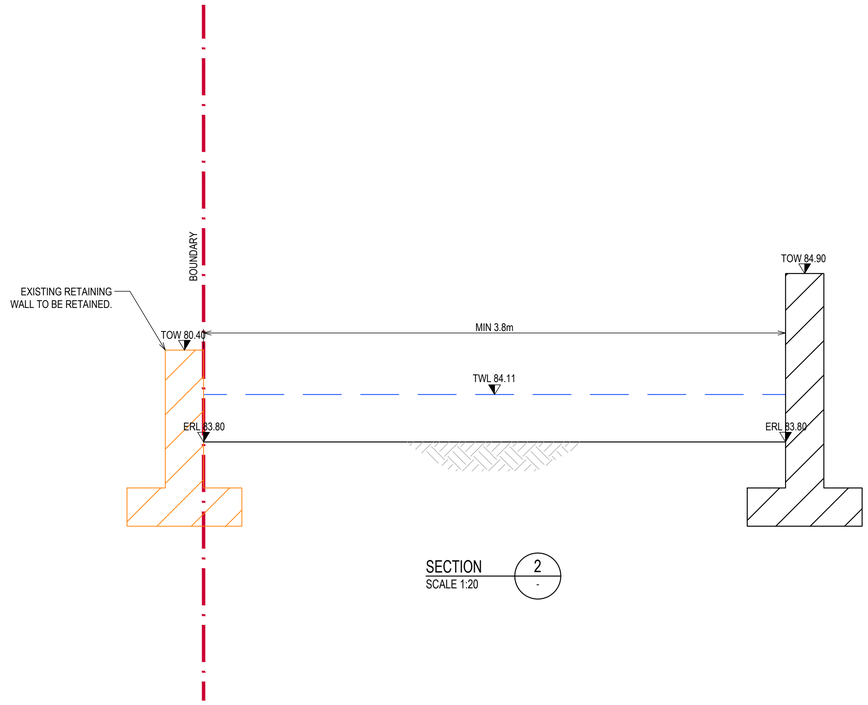
VEGETATED SWALE DETAIL
SCALE 1:10



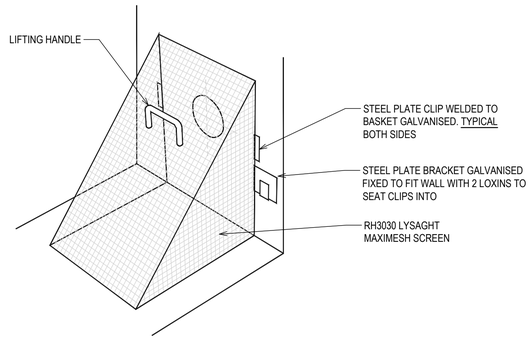
PERIMETER DRAIN DETAIL
SCALE 1:10



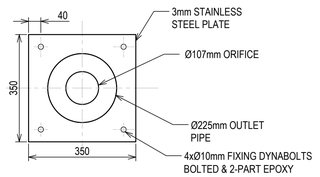
SECTION 1
SCALE 1:20



SECTION 2
SCALE 1:20



DEBRIS SCREEN
NOT TO SCALE



ORIFICE PLATE DETAIL
SCALE 1:10

NOTES:
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5. PROPOSED WALL FOOTINGS TO SPAN OVER THE TPZ AND SRZ. ALL WORKS WITHIN TPZ TO BE SUPPORTED BY PROJECT ARBORIST.

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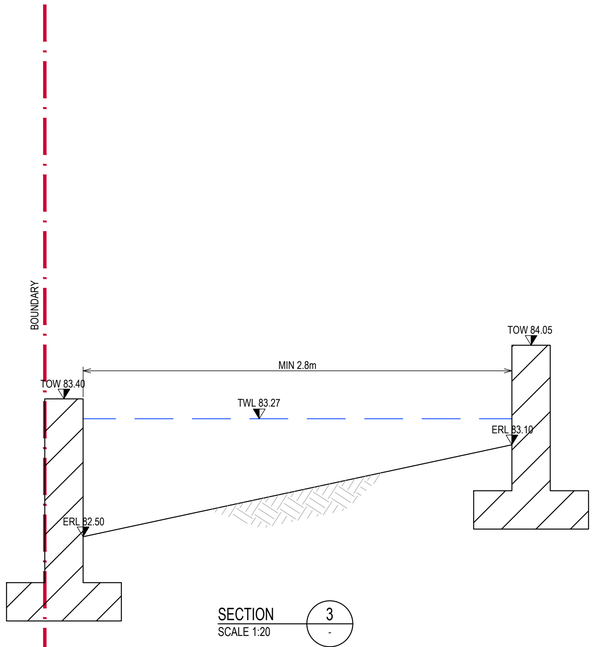
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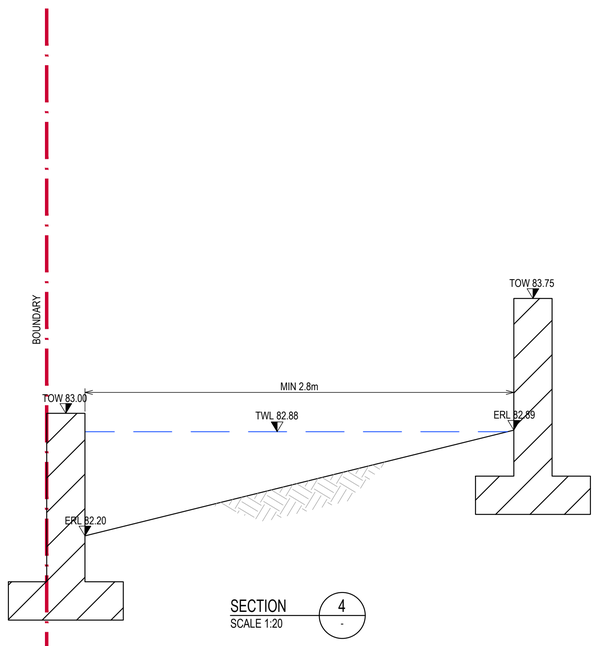
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CIVIL ENGINEERING SERVICES
STORMWATER DETAILS - SHEET 2

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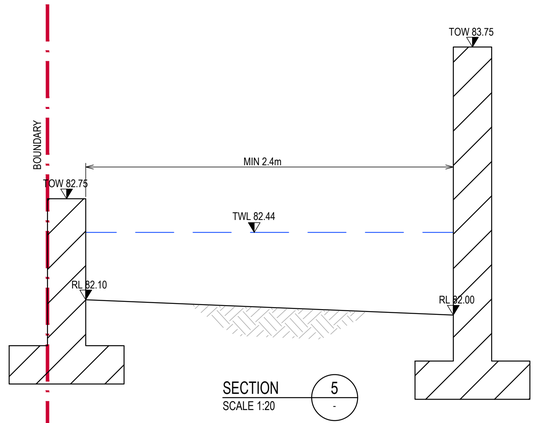
Job Number	Drawing Number	Revision	North Point
SYD3409	CE201	B	



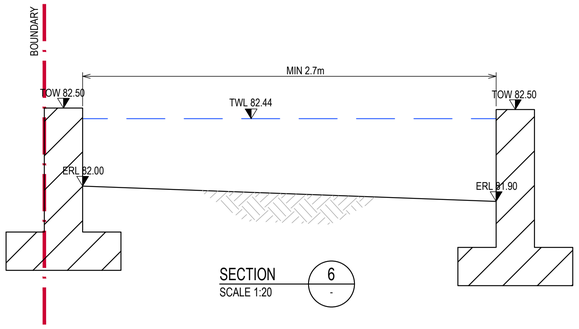
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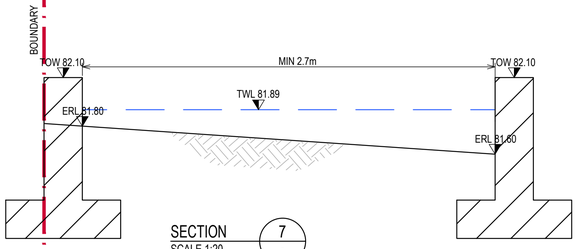
SECTION 4
SCALE 1:20



SECTION 5
SCALE 1:20



SECTION 6
SCALE 1:20



SECTION 7
SCALE 1:20

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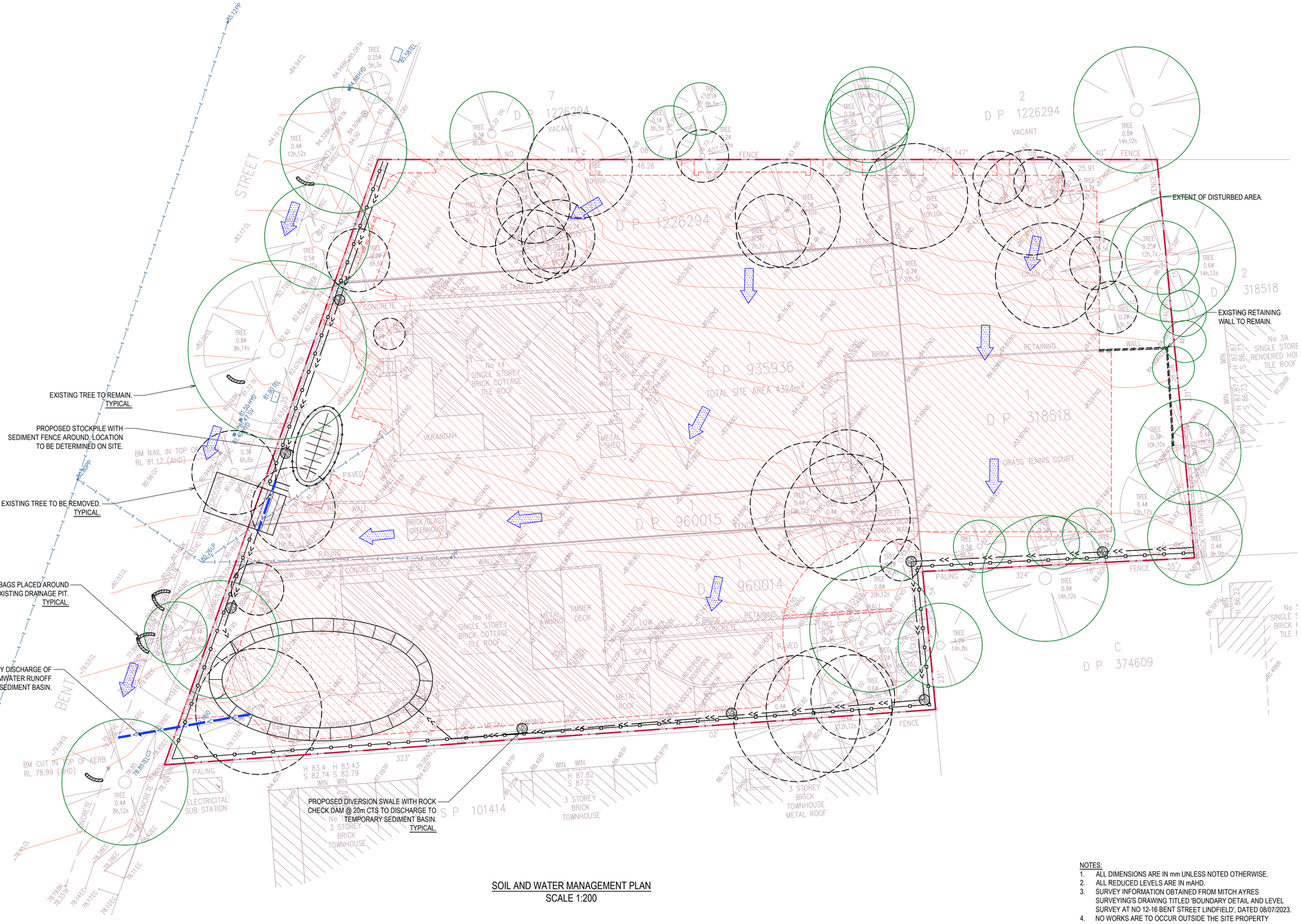
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Drawing Title
CIVIL ENGINEERING SERVICES
STORMWATER DETAILS - SHEET 3

APPROVAL

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Job Number	Drawing Number	Revision	North Point
SYD3409	CE202	B	



SOIL AND WATER MANAGEMENT PLAN
SCALE 1:200

LEGEND

- SITE BOUNDARY
- 34.5 EXISTING CONTOUR (0.XXm)
- EXISTING STRUCTURES TO BE DEMOLISHED
- SEDIMENT FENCE
- >> TEMPORARY CATCH DRAIN
- > TEMPORARY DRAINAGE PIPE
- SAND BAG
- FLOW DIRECTION
- ROCK CHECK DAM
- S S S EXISTING SEWER LINE
- W W W EXISTING WATER MAIN
- T T T EXISTING TELECOMMUNICATION LINE
- G G G EXISTING GAS MAIN
- E E E EXISTING ELECTRICAL MAIN
- PROPOSED STOCKPILE LOCATION WITH SEDIMENT FENCE
- SEDIMENT BASIN
- STABILISED SITE ACCESS
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED

RUSLE CALCULATION

REVISED UNIVERSAL SOIL LOSS EQUATION:
$R = 164.74 * (1.1177)^S * S^{0.6444}$
R = 2718
WHERE,
S = 11.2 mm/hr

A = R * K * LS * P * C(t/ha/yr)
A = 749.08 t/ha/yr
WHERE,
K = 0.08 (ASSUMED)
LS = 750 / (1.3 * R * K)
LS = 2.65
P = 1.3
C = 1

SITE AREA = 0.4324 ha
THEREFORE, AS PER TABLE 4.2 OF LANDCOM BLUE BOOK
EROSION HAZARD = HIGH HAZARD

SEDIMENT BASIN CALCULATION

SOIL TYPE ASSUMED TO BE TYPE D OR F

RAINFALL DEPTH = 67.4 mm (2yR ARI, 6hr EVENT)
CV = 0.79 (TABLE F.2)

A = 0.4324 ha
$R_{75\%,5DAY}$ = 23.4 mm (TABLE 6.3A)

SETTLING ZONE = 10 * CV * A * R
= 79.93 m^3
SEDIMENT STORAGE ZONE = 39.97 m^3
(50% OF SETTLING ZONE CAPACITY)

TOTAL SEDIMENT BASIN VOLUME = 119.90 m^3

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4. NO WORKS ARE TO OCCUR OUTSIDE THE SITE PROPERTY BOUNDARY UNLESS PRIOR APPROVAL IS PROVIDED BY COUNCIL.
5. REFER TO DRAWING CE350 FOR EROSION AND SEDIMENT CONTROL CONSTRUCTION SEQUENCE AND GENERAL INSTRUCTIONS NOTES.

NOTES:
THE EROSION AND SEDIMENT CONTROL PLAN IS A CONCEPT PLAN DEMONSTRATING AN APPROACH TO EROSION & SEDIMENTATION CONTROL FOR THE SITE. IT IS THE CONTRACTOR RESPONSIBILITY TO PROVIDE AN EROSION & SEDIMENT CONTROL PLAN (ESCP) AND A COMPLETED DESIGN CERTIFICATE FROM A CPESC PRIOR TO COMMENCEMENT OF WORK. CERTIFICATION MUST BE UNDERTAKEN BY A SUITABLY QUALIFIED, EXPERIENCE PROFESSIONAL NOT DIRECTLY EMPLOYED BY THE PRINCIPAL.

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Client
SUNDALE NORTHLAND DEVELOPMENT
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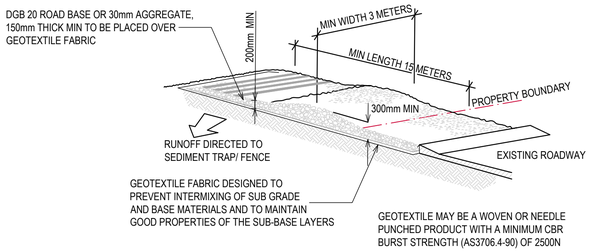
Project
12-16 BENT ST, LINDFIELD
12-16 BENT STREET, LINDFIELD NSW 2070

Drawing Title
CIVIL ENGINEERING SERVICES
SOIL AND WATER MANAGEMENT PLAN

Drafted	Designed	Approved	Date	Scale	Sheet Size
KC	KC	SS	MAR 2025	1:200 @	A1

Job Number	Drawing Number	Revision	North Point
SYD3409	CE300	B	

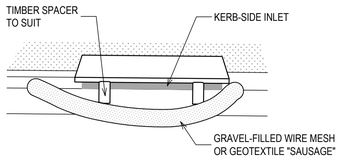
CONSTRUCTION SITE

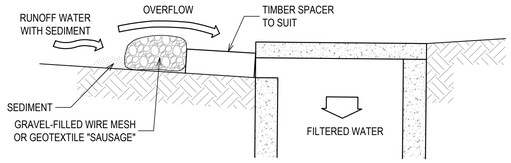


NOTES:
1. THIS DEVICE IS TO BE LOCATED AT ALL EXITS FROM CONSTRUCTION SITE.
2. THIS DEVICE IS TO BE REGULARLY CLEANED OF DEPOSITED MATERIAL SO AS TO MAINTAIN A 50mm DEEP SPACE BETWEEN PLANKS.
3. ANY UNSEALED ROAD BETWEEN THIS DEVICE AND NEAREST ROADWAY IS TO BE TOPPED WITH 100mm THICK 40-70mm SIZE AGGREGATE.
4. ALTERNATIVELY, THREE(3) PRECAST CONCRETE CATTLE GRIDS (AS MANUFACTURED BY "HUMES CONCRETE MAY BE USED. 1, 2 & 3 ABOVE ALSO APPLY.

STABILISED SITE ACCESS WITH SHAKER RAMP

SCALE N.T.S.

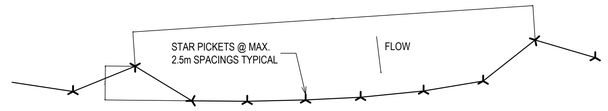




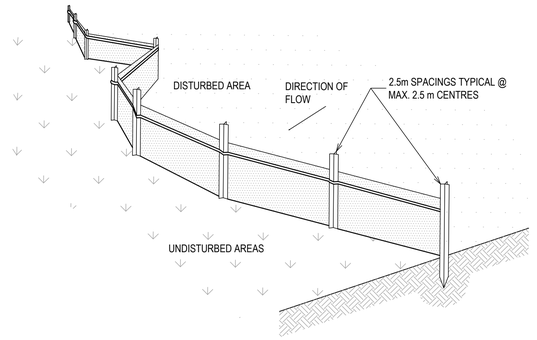
MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:
1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A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

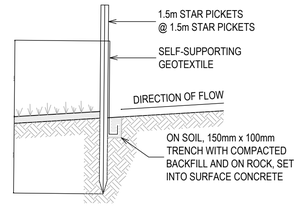
MESH & GRAVEL INLET FILTER

SCALE N.T.S.



PLAN

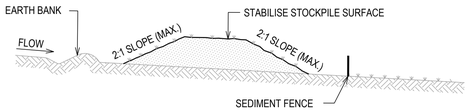




SECTION DETAIL

SEDIMENT FENCE

SCALE N.T.S.

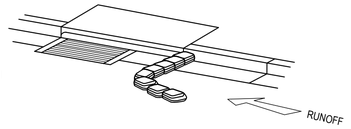


STOCKPILE CONSTRUCTION NOTES:
1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.M.P. TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILES

SCALE N.T.S.

NOTES:
1. PROVIDE THREE LAYERS OF SANDBAGS WITH THEIR ENDS OVERLAPPED AND ALSO OVERLAPPING ONTO THE KERB.
2. CREATE A GAP IN THE SANDBAGS TO ACT AS A SPILLWAY.
3. SANDBAG BARRIER TO BE MIN. 2m FROM THE INLET AND EXTEND MIN. 0.9m OUT FROM THE KERB.



GULLY INLET SANDBAG PROTECTION DETAIL

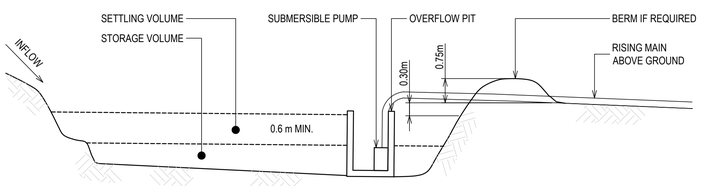
SCALE N.T.S.

SEDIMENT FENCE CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150 mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 m LONG STAR PICKETS INTO GROUND @ 2.5 m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

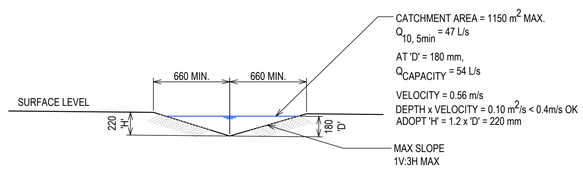
GENERAL INSTRUCTIONS:

1. THIS SEDIMENT AND EROSION CONTROL WORKS FOR THE SITE SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION, 4TH EDITION (2004)" BY LANDCOM.
2. AS REQUIRED BY COUNCIL, SEDIMENT CONTROL MEASURES WILL BE REQUIRED DURING THE CONSTRUCTION OF ALL DEVELOPMENTS/BUILDING WORKS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY THAT THE WORKS ARE CARRIED OUT IN ACCORDANCE WITH THE SEDIMENT AND EROSION CONTROL PLAN AND COUNCIL'S REQUIREMENTS.
3. THE CONTRACTOR SHALL ENSURE THAT ALL SUBCONTRACTORS ARE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE AREAS.
4. THE NON-DISTURBED PORTION OF THE CATCHMENT OUTSIDE OF OPERATING AREA IS TO BYPASS THE BASINS BY MEANS OF LINED CATCH DRAINS.
5. WHERE PRACTICABLE, THE SOIL EROSION HAZARD SHALL BE KEPT AS LOW AS POSSIBLE. LIMITATIONS TO ACCESS ARE TO BE VIA STANLEY LANE UNLESS OTHERWISE APPROVED BY COUNCIL.
6. ENSURE THAT ALL DRAINS ARE OPERATING EFFECTIVELY AND SHALL MAKE ANY NECESSARY REPAIRS. REMOVE TRAPPED SEDIMENT WHERE THE CAPACITY OF THE TRAPPING DEVICE FALLS BELOW 60%.
7. CONSTRUCT ADDITIONAL EROSION OR SEDIMENT CONTROL WORKS AS MAY BE APPROPRIATE TO ENSURE THE PROTECTION OF DOWNSLOPE LANDS AND WATERWAYS.
8. MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES IN A FULLY FUNCTIONING CONDITION AT ALL TIMES UNTIL THE SITE IS REHABILITATED.
9. REMOVE TEMPORARY SOIL CONSERVATION STRUCTURES AS THE LAST ACTIVITY IN THE REHABILITATION PROGRAM.



TYPICAL SEDIMENT BASIN

SCALE N.T.S.



CATCH DRAIN TYPICAL SECTION

SCALE N.T.S

PRINTING NOTE:
THIS DRAWING TO BE PRINTED IN COLOUR.

APPROVAL

Revision	Description	Initial	Date
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A	ISSUE FOR SSDA APPROVAL	KC	24.01.2025

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