

# Water Cycle Management Plan – Proposed Childcare Development

Proposed Lot 4, 3 Memory Avenue, Crookwell, NSW 2583

## **Final Report**

P2410601JR04V02 April 2025 Prepared for Blue Sox Developments

environmental science & engineering



## **Project Details**

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|-------------------------|---|
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## Contents

| 1  | Introdu  | ction5                                     |
|----|----------|--|
|    | 1.1      | Overview and Scope5                        |
|    | 1.2      | Site Description5                          |
|    | 1.3      | Development Overview5                      |
|    | 1.3.1    | Proposed Childcare Overview                |
|    | 1.4      | Relevant Guidelines6                       |
| 2  | Stormw   | ater Quantity Assessment                   |
|    | 2.1      | Stormwater Quantity Requirements7          |
|    | 2.2      | Stormwater Quantity Modelling Methodology7 |
|    | 2.2.1    | Overview7                                  |
|    | 2.2.2    | Approach7                                  |
|    | 2.2.3    | Rainfall data7                             |
|    | 2.2.4    | Input Parameters                           |
|    | 2.2.5    | Catchments Area                            |
|    | 2.2.5.1  | Pre development catchment8                 |
|    | 2.2.5.2  | Post development catchment                 |
|    | 2.3      | Water Quantity Results                     |
| 3  | Stormw   | ater Quality Assessment                    |
|    | 3.1      | Stormwater Quality Requirements9           |
| Ap | pendix A | - Concept Drainage and Earthworks Plans    |
| Ap | pendix B | – Site Layout                              |



## **Tables**

| Table 1: Site description summary.    | . 5 |
|---------------------------------------|-----|
| Table 2: DRAINS hydrologic parameters | .8  |
| Table 3: DRAINS modelling results     | 8   |



## 1 Introduction

## **1.1 Overview and Scope**

Martens & Associates Pty Ltd (**MA**) have prepared this Water Cycle Management Plan (**WCMP**) to support a Development Application (**DA**) for the proposed childcare development at proposed Lot 4, 3 Memory Avenue, Crookwell, NSW 2583 (the **Site**) located within the Upper Lachlan Shire Council (**ULSC**) Local Government Area (**LGA**).

MA was engaged to provide an assessment of the effects of the proposed development in relation to stormwater and to prepare a stormwater management plan to mitigate potential adverse impacts.

This report should be read in conjunction with the concept drainage and earthwork plans in Appendix A.

## **1.2** Site Description

A brief description of the site if provided in Table 1 below.

| ltem                  | Description  |
|-----------------------|--|
| Address               | Proposed Lot 4, 3 Memory Avenue, Crookwell, NSW 2583   |
| Lot / DP              | Lot 2/DP 1283619   |
| Site Area             | Approximately 0.205 ha   |
| Local Government Area | Upper Lachlan Shire Council  |
| Current Zoning        | R2 - Low Density Residential (NSW ePlanning Spatial Viewer)  |
| Current Land Use      | The site is currently used for residential purposes. A single dwelling and a detached garage are situated on the eastern portion of the site. Vehicle access to the garage is via an unsealed driveway connected to Memory Avenue. |
| Surrounding Land Use  | General residential sites to the north, south and west. Crookwell Cemetery to the east.  |
| Topography            | The site generally drains towards residential properties in the east. Grades vary between 0 – $15\%$   |
|                       | Site elevation ranges between approximately 922 mAHD (eastern boundary) to approximately 911 mAHD (western boundary).  |

Table 1: Site description summary.

## **1.3 Development Overview**

The site is a single lot to be created as part of a proposed 20 lot subdivision located at 3 Memory Avenue, Crookwell, NSW 2583. At the time of writing, a DA for the proposed subdivision has been prepared for submission to ULSC.



The subdivision is proposed to occur in two stages, with stage one required to be completed prior to the proposed childcare centre. The proposed childcare centre development has been completed independently to the subdivision assessment.

## **1.3.1 Proposed Childcare Overview**

- Construction of a ground level carparking space and external landscape area fronting Memory Avenue.
- Construction of a structure to accommodate staff and up to 94 children.
- Provision of a stormwater conveyance network by way of a pit and pipe system.

## 1.4 Relevant Guidelines

This report has been prepared in accordance with the following guidelines:

- 1. Upper Lachlan Shire Council (2010) Development Control Plan 2010.
- 2. Upper Lachlan Shire Council (2010) Local Environmental Plan 2010.



## 2 Stormwater Quantity Assessment

## 2.1 Stormwater Quantity Requirements

The stormwater quantity requirements for the site are to ensure that post-development flows do not exceed pre-development levels.

## 2.2 Stormwater Quantity Modelling Methodology

## 2.2.1 Overview

A water quantity model was developed for the site to assess the proposed OSD system. The DRAINS hydrological and hydrological modelling package was used with the ILSAX engine to determine the requirements to satisfy the requirements.

## 2.2.2 Approach

Sizing of the OSD was completed through iterative modelling to achieve compliance with site requirements. Modelling was undertaken for the following storms to ensure the critical discharge for each storm did not exceed the pre development site discharge, for durations ranging from 5 minutes to 2 hours:

- 0.2 EY
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP

## 2.2.3 Rainfall data

Intensity Frequency Duration (**IFD**) data that was used for the model was sourced from the Bureau of Meteorology (**BoM**), for the storm events mentioned above.

## 2.2.4 Input Parameters

ILSAX parameters for all catchments as shown in Table 2.



#### Table 2: DRAINS hydrologic parameters.

| Parameter        | Element                                    | Value |
|------------------|--|-------|
|                  | Impervious area depression storage (mm)    | 1.0   |
|                  | Supplementary area depression storage (mm) | 1.0   |
| ILSAX parameters | Grassed area depression storage (mm)       | 5.0   |
|                  | Soil Type                                  | 3     |
|                  | Antecedent Moisture Condition (AMC)        | 3     |

## 2.2.5 Catchments Area

### 2.2.5.1 Pre development catchment

The existing catchment for the site was assumed to be 0% impervious.

### 2.2.5.2 Post development catchment

The post development catchment breakdown was delineated using the site layout produced by Faubourg 24 (Appendix B).

The catchment areas are summarised in the concept drainage and earthwork plans (Appendix A).

## 2.3 Water Quantity Results

A below ground OSD tank (approximately 35 m<sup>3</sup>) is proposed below the carpark area. Refer to the DRAINS modelling results (Table 3) to demonstrate that the proposed OSD is sufficient to detain peak post development flows, such that they are less than peak pre development flows.

| Storm<br>Event | Pre Development<br>Flow Rate (m³/sec) | Post Development<br>Flow Rate (m³/sec) | Difference<br>(Post – Pre) | Complies<br>(Y/N) |
|----------------|---------------------------------------|--|----------------------------|-------------------|
| 1%             | 0.027                                 | 0.023                                  | -0.004                     | yes               |
| 2%             | 0.021                                 | 0.019                                  | -0.002                     | yes               |
| 5%             | 0.016                                 | 0.008                                  | -0.008                     | yes               |
| 10%            | 0.010                                 | 0.007                                  | -0.003                     | yes               |
| 0.2EY          | 0.005                                 | 0.005                                  | 0.000                      | yes               |

Table 3: DRAINS modelling results

Further refinement of the model at the detailed design stage may alter the size and configuration of the proposed OSD system. However, the objectives outlined in this report will need to be achieved.



## **3 Stormwater Quality Assessment**

## 3.1 Stormwater Quality Requirements

Stormwater quality requirements were discussed with Council Officer Daniel on the 03/03/25 via phone call who confirmed there are no Council requirements for the proposed development.

The site is also not located within any regulated catchments (i.e. any drinking water catchments) under the SEPP (Biodiversity and Conservation) 2021, which would require any other water quality initiatives.



# Appendix A – Concept Drainage and Earthworks Plans

#### PROPOSED CHILDCARE DEVELOPMENT PROJECT:

#### CONCEPT DRAINAGE AND EARTHWORKS PLANS PLANSET:

#### CLIENT: **BLUE SOX DEVELOPMENTS**



LOCALITY PLAN NOT TO SCALE

## LGA: UPPER LACHLAN SHIRE COUNCIL

3 MEMORY AVE CROOKWELL NSW 2583 LOT 2/DP702788

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| PS02-B300                    | В            | SEDIMENT AND EROSION CONTROL PLAN     |  |  |  |  |  |  |  |
| PS02-B310                    | Α            | SEDIMENT AND EROSION CONTROL DETAILS  |  |  |  |  |  |  |  |
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| PS02-C100                    | В            | EARTHWORKS GRADING PLAN               |  |  |  |  |  |  |  |
| PS02-C500                    | В            | EARTHWORKS CUT-FILL PLAN              |  |  |  |  |  |  |  |
| PS02-C600                    | A            | EARTHWORKS SITE SECTIONS              |  |  |  |  |  |  |  |
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| PS02-DZ00                    | Α            | TYPICAL DRIVEWAY DETAILS              |  |  |  |  |  |  |  |
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| PS02-E200 A DRAINAGE DETAILS |              |                                       |  |  |  |  |  |  |  |
| PS02-E600                    | В            | OSD CATCHMENT PLAN, MODEL AND RESULTS |  |  |  |  |  |  |  |

## NOTES

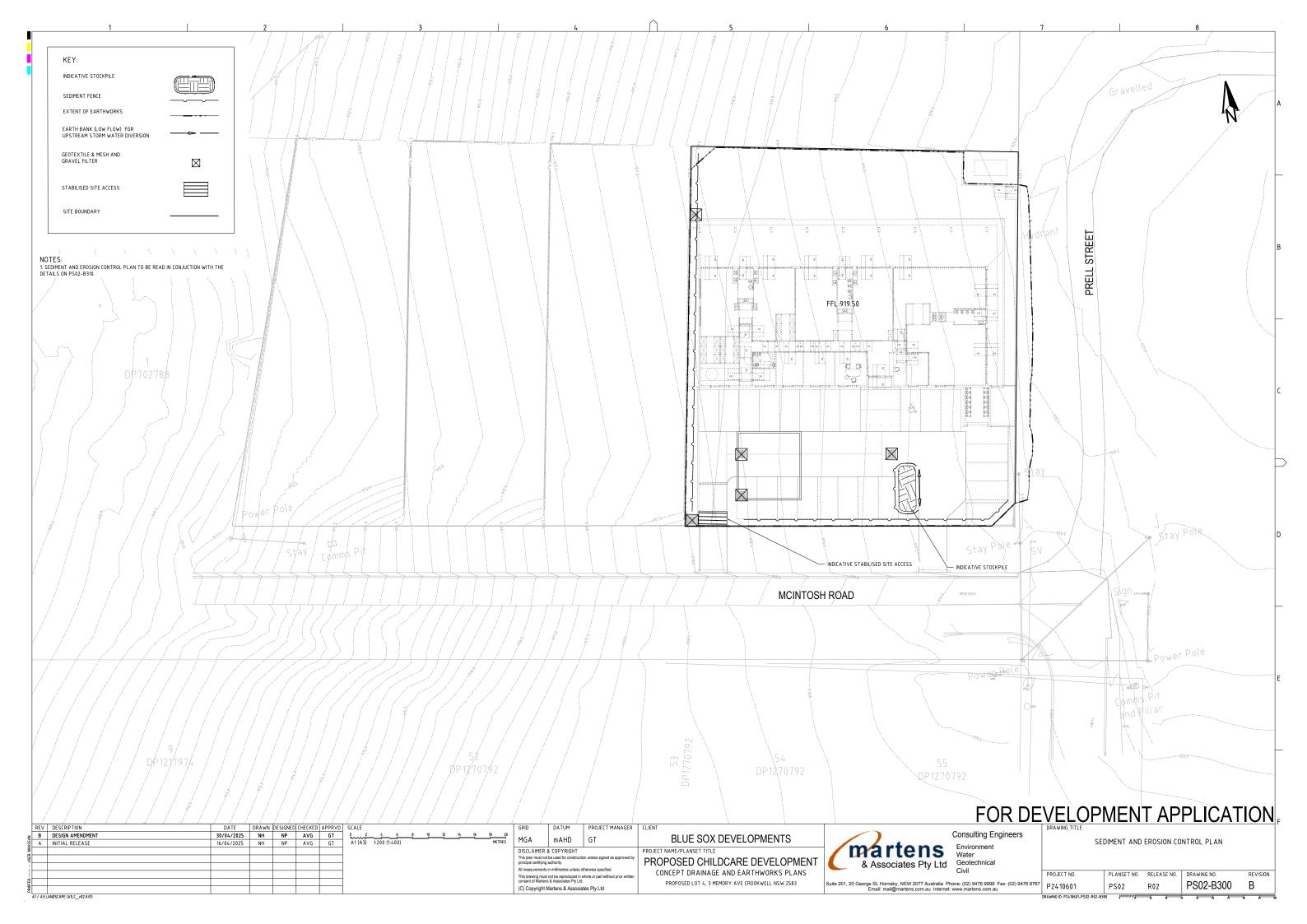
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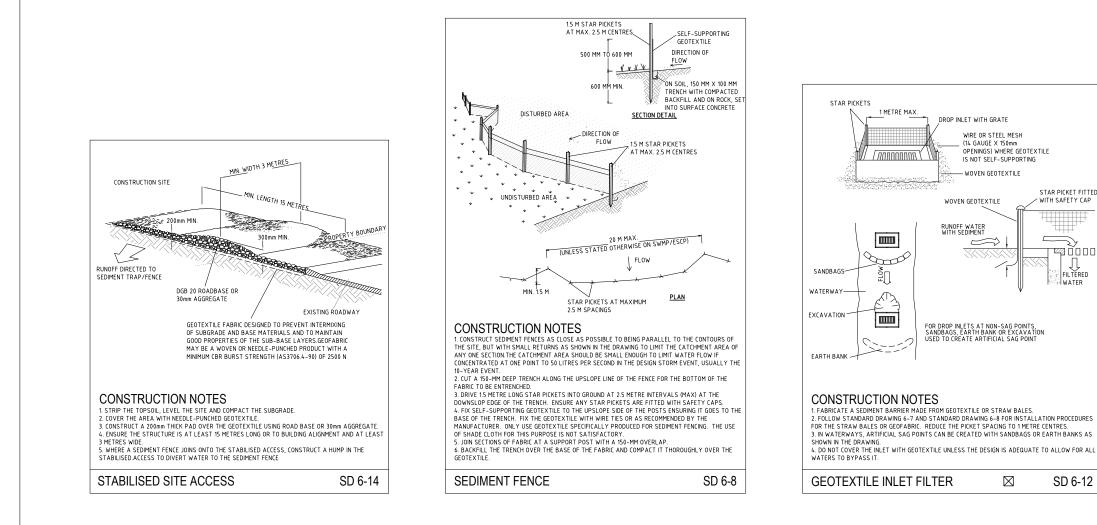
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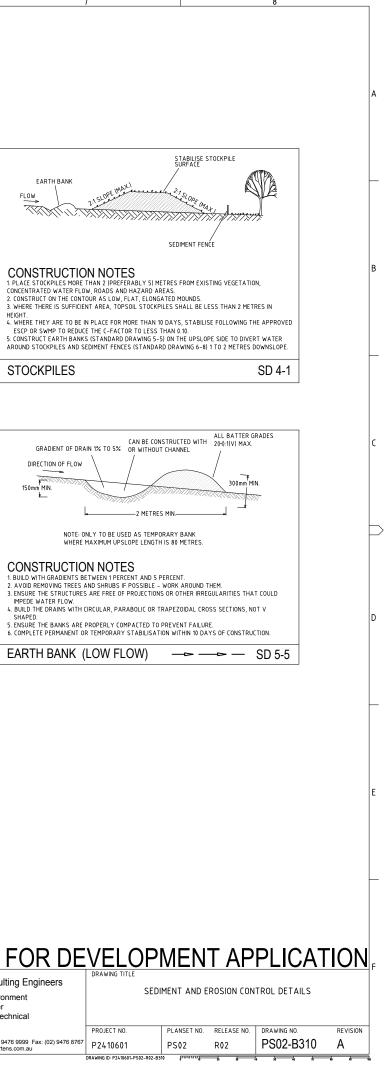
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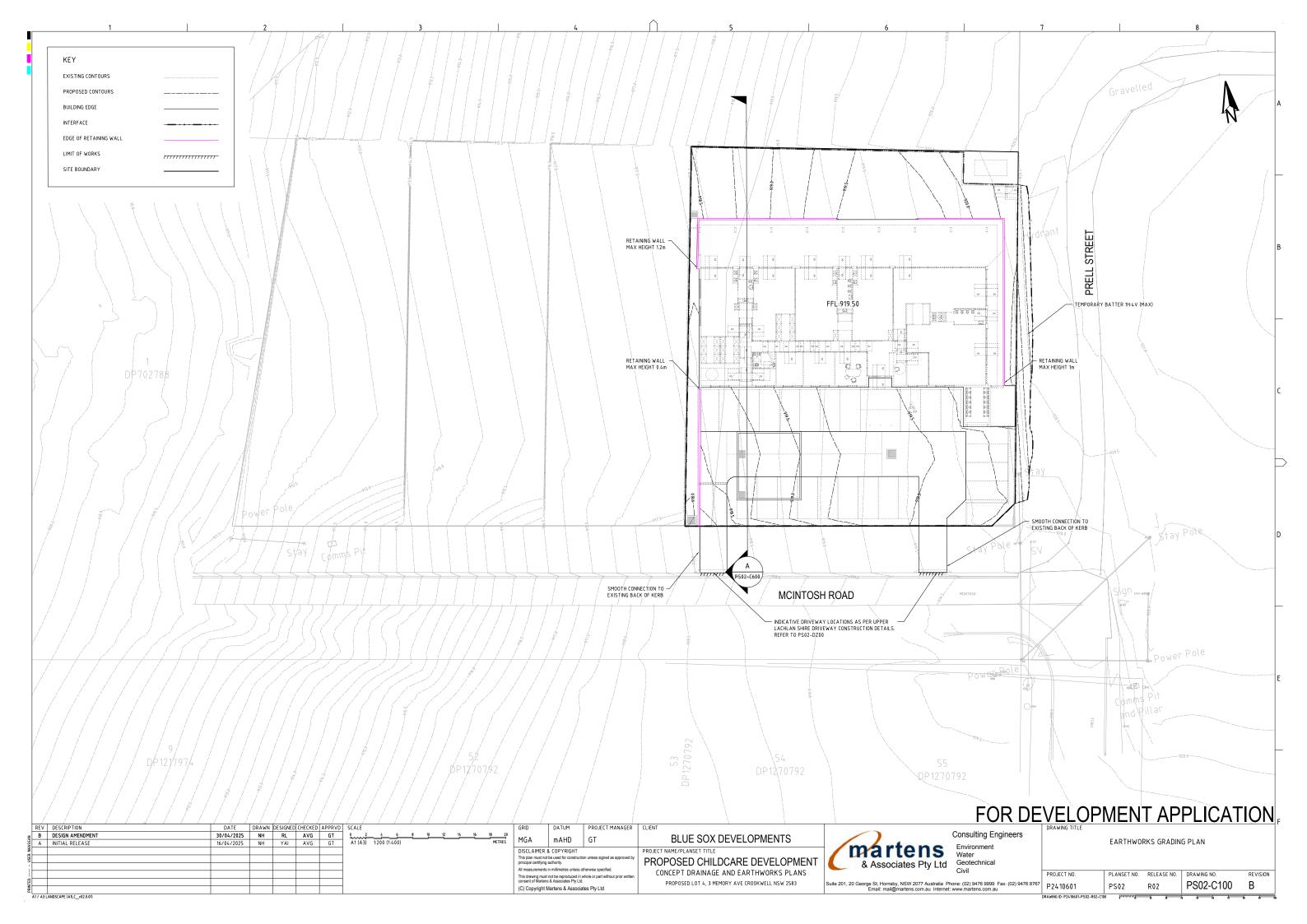
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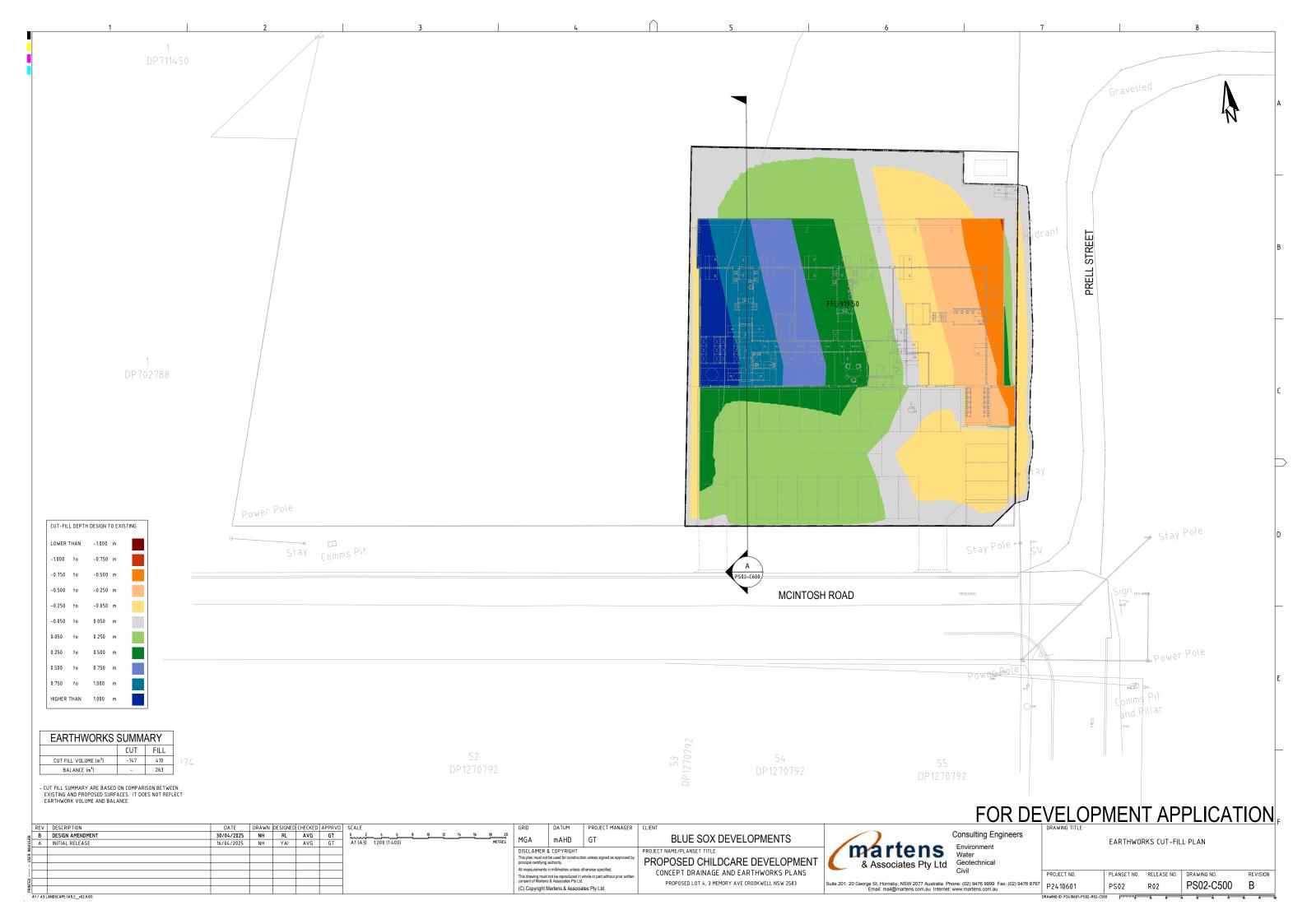


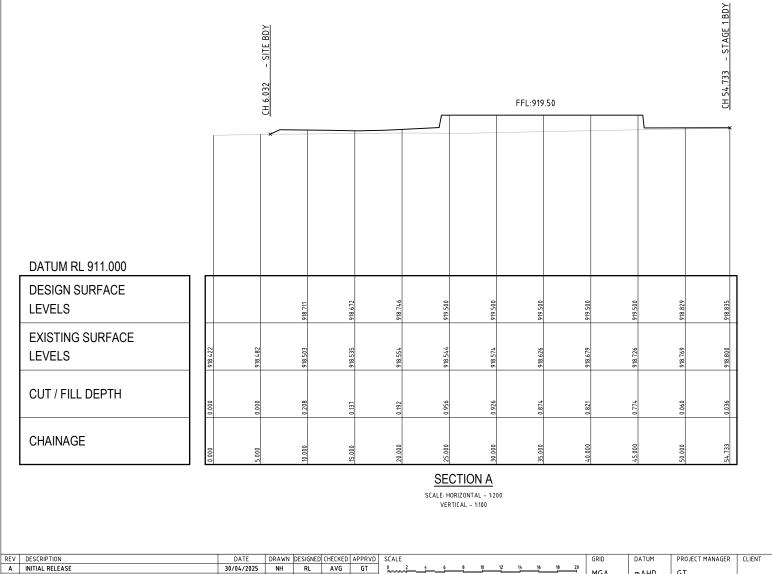


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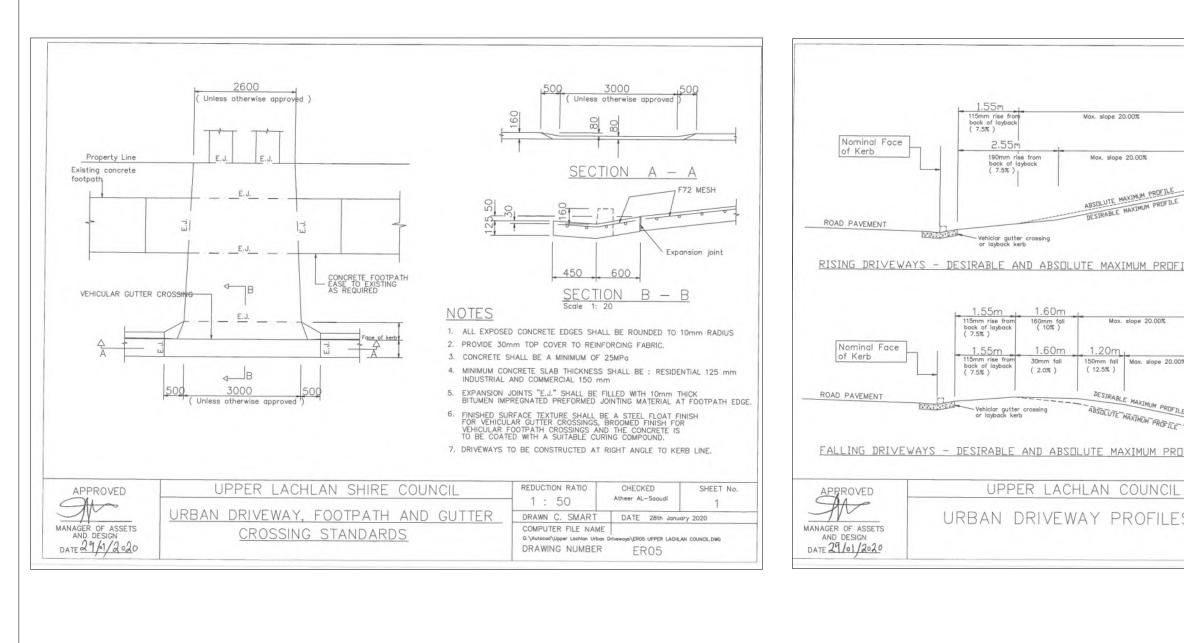
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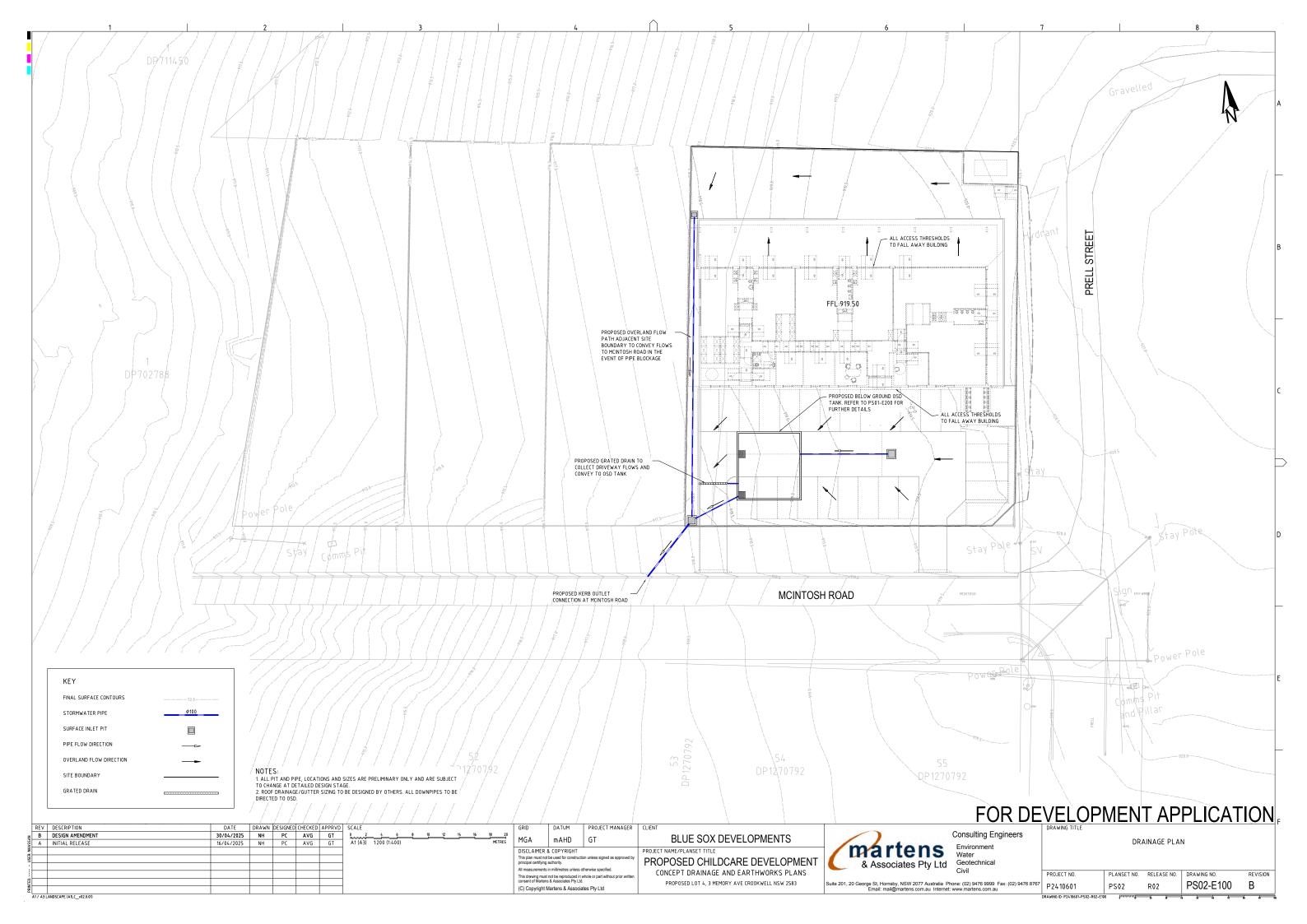
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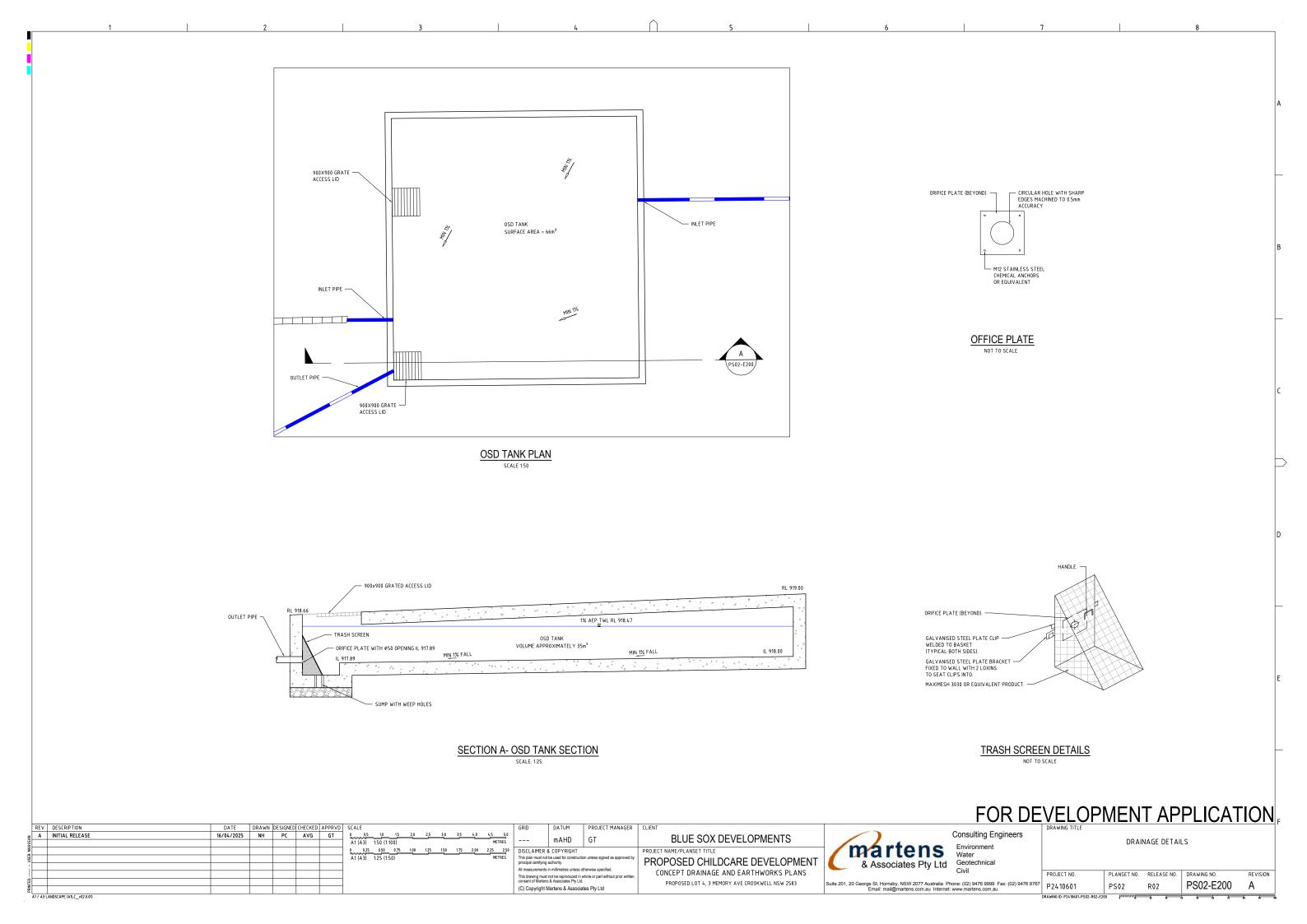
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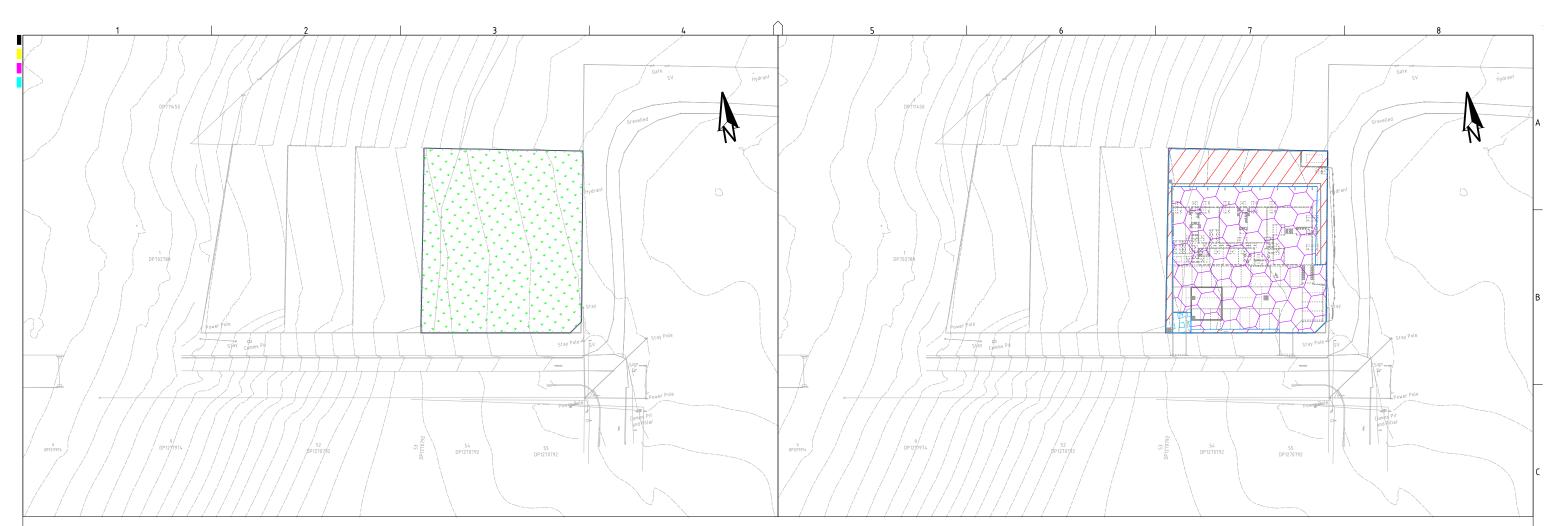


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| -E                                | REDUCTION RATIO<br>1:50<br>DRAWN C SMART<br>COMPUTER FILE N  | O CHECKED<br>Atheer AL-Socudi<br>DATE 28th JAN<br>NAME C  | 1<br>NUARY 2020<br>ADNO                            | , |
| -E                                | REDUCTION RATIO<br>1:50<br>DRAWN C SMART<br>COMPUTER FILE N  | O CHECKED<br>Atheer AL-Socudi<br>DATE 28th JAN<br>NAME C  | 1<br>NUARY 2020<br>ADNO                            | , |
| JFILE.                            | REDUCTION RATIO<br>1:50<br>DRAWN C SMART<br>COMPUTER FILE N<br>G: \AUTOCADLT\Upper Li<br>SYELOPN                                 | ) CHECKED<br>Atheer AL-Saoudi<br>DATE 28th JAN<br>NAME C<br>achlan DrivewaysER06.DWG Up           | ADNO<br>per Lachian Council.dwg                    | E |
| DETLE.<br>S<br>OR DE<br>Engineers | REDUCTION RATIO<br>1:50<br>DRAWN C SMART<br>COMPUTER FILE N<br>G: \AUTOCADLT\Upper LI<br>G: \AUTOCADLT\Upper LI<br>DRAWING TITLE | ) CHECKED<br>Atheer AL-Saoudi<br>DATE 28th JAN<br>NAME C<br>achlan DrivewaysER06.DWG Up           | 1<br>NUARY 2020<br>ADNO<br>Per Lachian Council.dwg | E |
| DFILE.                            | REDUCTION RATIO<br>1:50<br>DRAWN C SMART<br>COMPUTER FILE N<br>G: \AUTOCADLT\Upper LI<br>G: \AUTOCADLT\Upper LI<br>DRAWING TITLE | CHECKED<br>Atheer AL-Sooudi<br>DATE 28th JAN<br>NAME C<br>achian DrivewaysER06.DWG Up<br>1ENT APF | 1<br>NUARY 2020<br>ADNO<br>Per Lachian Council.dwg | E |



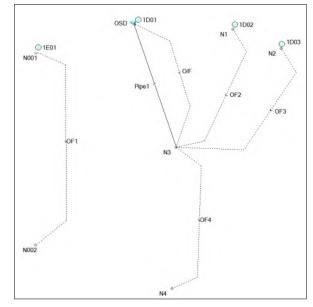




#### PRE DEVELOPMENT CATCHMENT PLAN SCALE 1:500

## PRE DEVELOPMENT CATCHMENT DETAILS (P2410601DRN03V02)

| KEY                     | DRAINS NODE           | DESCRIPTION | AREA (ha) | % PAVED              |
|-------------------------|-----------------------|-------------|-----------|----------------------|
| · · · · · · · · · · · · | 1E01                  | GRASS       | 0.205     | 0%                   |
|                         | TOTAL AREA            |             | 0.205     | = 100% OF TOTAL AREA |
|                         | TOTAL IMPERVIOUS AREA |             | 0.000     | = 0% OF TOTAL AREA   |
|                         | TOTAL PERVIOUS AREA   |             | 0.205     | = 100% OF TOTAL AREA |



## DRAINS LAYOUT PRE AND POST DEVELOPMENT (P2410601DRN03V02)

|      |        |                           |            |       |         |            |        |                         |            |       |   |                      |                                     |   |  | ΙU                     |
|------|--------|---------------------------|------------|-------|---------|------------|--------|-------------------------|------------|-------|---|----------------------|-------------------------------------|---|--|------------------------|
|      | REV    | DESCRIPTION               | DATE       | DRAWN | DESIGNE | ED CHECKED | APPRVD | SCALE                   |            | G     | GRID  | DATUM                | PROJECT MANAGER                     | CLIENT  |  |                        |
| z[   | В      | DESIGN AMENDMENT          | 30/04/2025 | NH    | PC      | AVG        | GT     | 0 5 10 15 20 25 30      | 0 35 40 45 | 50 N  | MGA   |                      | CT                                  | BLUE SOX DEVELOPMENTS                           |  | Consulting En          |
| ASS  | А      | INITIAL RELEASE           | 16/04/2025 | NH    | PC      | AVG        | GT     | A1 (A3) 1:500 (1:1,000) | ME         | ETRES | ADI   |                      | 61                                  | DLOL SOX DLVLLOF WILINTS                        | /ma h wha ma   | Environment            |
|      |        |                           |            |       |         |            |        |                         |            | D     | DISCLAIMER &                                    | COPYRIGHT            |                                     | PROJECT NAME/PLANSET TITLE                      | martens  | Water                  |
| ISEF |        |                           |            |       |         |            |        |                         |            |       | This plan must not b<br>principal certifying au |                      | ion unless signed as approved by    | PROPOSED CHILDCARE DEVELOPMENT                  |  |                        |
| - :E |        |                           |            |       |         |            |        |                         |            | · ·   |   |                      | otherwise specified.                |   | & Associates Pty Ltd                                     | Civil                  |
|      |        |                           |            |       |         |            |        |                         |            | T     | This drawing must n                             | ot be reproduced in  | whole or part without prior written | CONCEPT DRAINAGE AND EARTHWORKS PLANS           |  | Civii                  |
| B    |        |                           |            |       |         |            |        |                         |            |       |   | & Associates Pty Ltd |                                     | PROPOSED LOT 4, 3 MEMORY AVE CROOKWELL NSW 2583 | Suite 201, 20 George St, Hornsby, NSW 2077 Australia Pho | ione: (02) 9476 9999 F |
| ER S |        |                           |            |       |         |            |        |                         |            | (0    | C) Copyright Ma                                 | artens & Associa     | ates Pty Ltd                        |   | Email: mail@martens.com.au Internet:                     | www.martens.com.au     |
| 7    | 1/ 431 | ANDSCAPE (A1) C v02.0.01) |            |       |         |            |        |                         |            |       |   |                      |                                     |   |  |                        |

# POST DEVELOPMENT CATCHMENT PLAN SCALE 1500

| POST DEVELOPMENT CATCHMENT DETAILS (P2410601DRN03V02) |                       |                          |           |                      |  |  |  |  |  |  |
|---|-----------------------|--------------------------|-----------|----------------------|--|--|--|--|--|--|
| KEY   | DRAINS NODE           | DESCRIPTION              | AREA (ha) | % PAVED              |  |  |  |  |  |  |
|   | 1D01                  | CARPARK + ROOF TO OSD    | 0.147     | 100%                 |  |  |  |  |  |  |
|   | 1D02                  | LANDSCAPE + PATIO BYPASS | 0.055     | 11%                  |  |  |  |  |  |  |
|   | 1D03                  | CAR PARK BYPASS          | 0.003     | 100%                 |  |  |  |  |  |  |
|   | TOTAL AREA            |                          | 0.205     | = 100% OF TOTAL AREA |  |  |  |  |  |  |
|   | TOTAL IMPERVIOUS AREA |                          | 0.156     | = 76% OF TOTAL AREA  |  |  |  |  |  |  |
|   | TOTAL PERVIOUS AREA   |                          | 0.049     | = 24% OF TOTAL AREA  |  |  |  |  |  |  |

| DRAINS MODEL RESULTS (P2410601DRN03V02) |   |  |                     |                   |  |  |  |  |  |  |
|---|---|--|---------------------|-------------------|--|--|--|--|--|--|
| STORM EVENT                             | PRE-DEVELOPMENT PEAK FLOW (m <sup>3</sup> /s) | POST-DEVELOPMENT PEAK FLOW (m <sup>3</sup> /s) | POST < PRE (YES/NO) | DIFFERENCE (m3/s) |  |  |  |  |  |  |
| 1% AEP                                  | 0.027   | 0.023  | YES                 | -0.004            |  |  |  |  |  |  |
| 2% AEP                                  | 0.021   | 0.019  | YES                 | -0.002            |  |  |  |  |  |  |
| 5% AEP                                  | 0.016   | 0.008  | YES                 | -0.008            |  |  |  |  |  |  |
| 10% AEP                                 | 0.010   | 0.007  | YES                 | -0.003            |  |  |  |  |  |  |
| 0.2EY                                   | 0.005   | 0.005  | YES                 | -0.000            |  |  |  |  |  |  |

# FOR DEVELOPMENT APPLICATION

ulting Engineers onment

OSD CATCHMENT PLAN, MODEL AND RESULTS

| Ldi                             |                                   |             |             |             |              |
|---------------------------------|-----------------------------------|-------------|-------------|-------------|--------------|
|                                 | PROJECT NO.                       | PLANSET NO. | RELEASE NO. | DRAWING NO. | REVISION     |
| 999 Fax: (02) 9476 8767<br>m.au | P2410601                          | PS02        | R02         | PS02-E600   | В            |
|                                 | DRAWING ID: P2410601-PS02-R02-E60 | 00 haaaaf   | i si c      | * * *       | <u>i i i</u> |



Appendix B – Site Layout

# Proposed Childcare Development at 3 Memory Ave, Crookwell



2050m<sup>2</sup> Site Area: GFA: 592m<sup>2</sup> FSR: 28.9% 5.1m Height: 605m<sup>2</sup> (29%) Landscape Area: Parking: Employees 11 -Drop Off Spots 7 -

## Setbacks:

- \_
- -



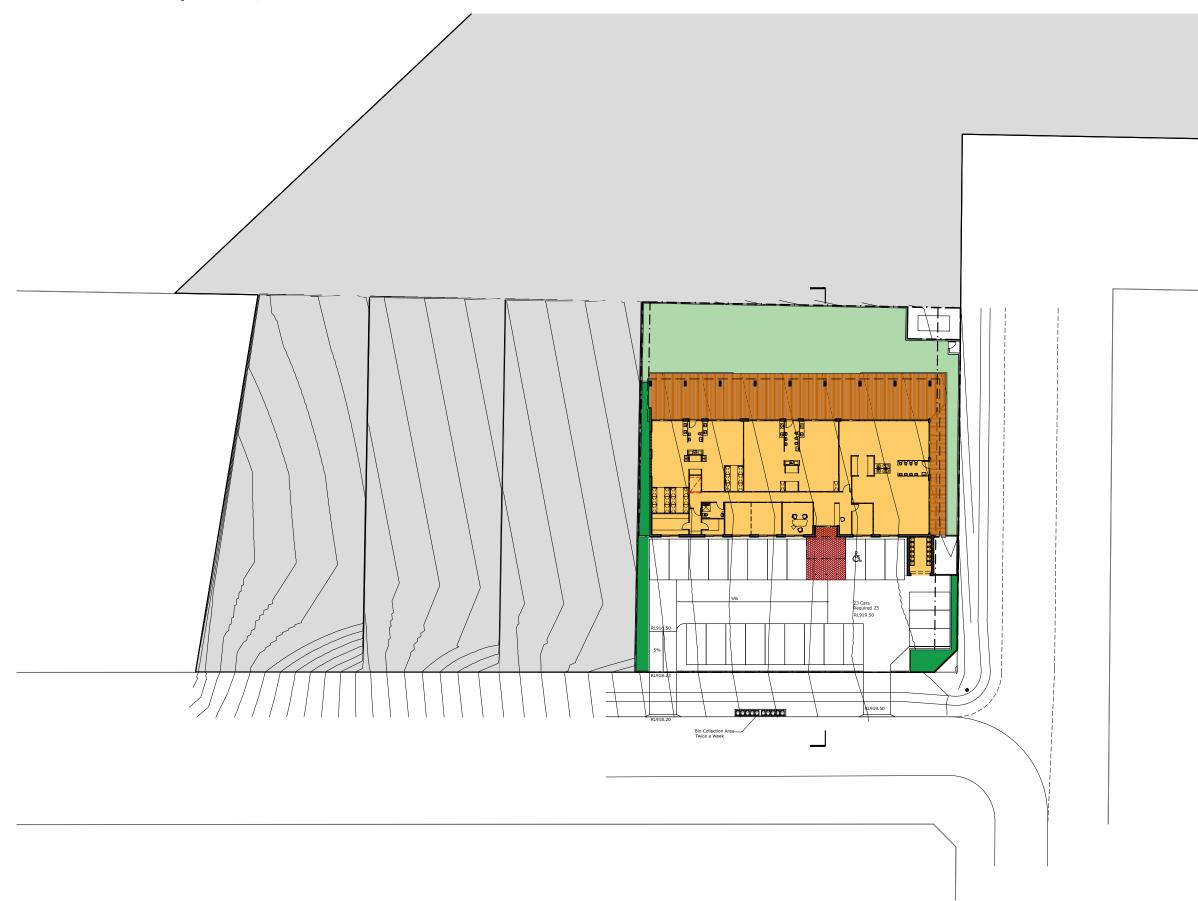
Design Facts:

Front: Secondary: Side: Rear:

13.4~18.5m 3~3.2m 1.5~1.75m 15.2~16m

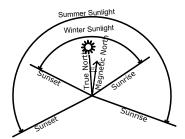
Cover Page 100330 SK00 Issue A

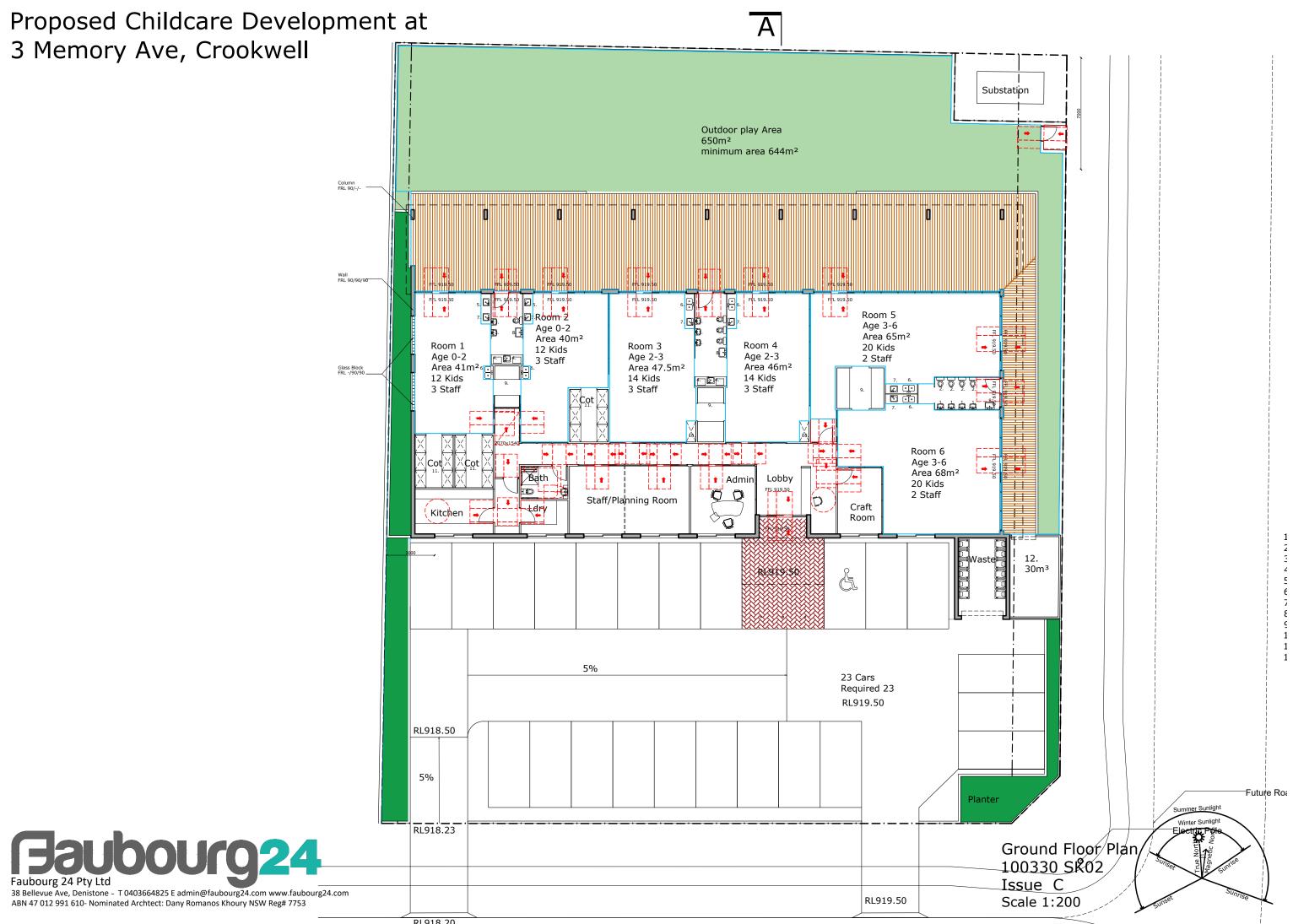
# Proposed Childcare Development at 3 Memory Ave, Crookwell



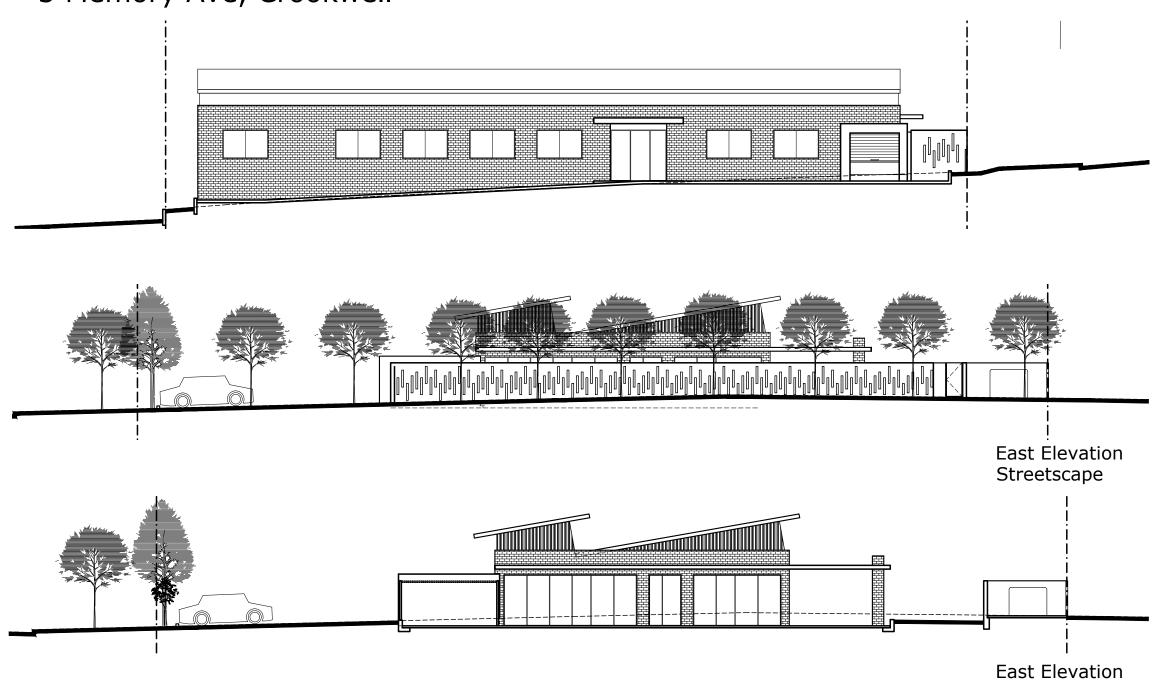


Site Plan 100330 SK01 Issue C Scale 1:500





# Proposed Childcare Development at 3 Memory Ave, Crookwell



East Elevation Building Line

**Faubourg 24 Pty Ltd** 38 Bellevue Ave, Denistone - T 0403664825 E admin@faubourg24.com www.faubourg24.com ABN 47 012 991 610- Nominated Archtect: Dany Romanos Khoury NSW Reg# 7753

Elevations & Section AA 100330 SK10 Issue A Scale 1:200 Section AA

