OPAL – AGED CARE

ENGINEERING REPORT
14-20 ELDRIDGE ROAD
BANKSTOWN, NSW

For DA Submission
December 2015
(DA)

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INTRODUCTION

1.1 General

This engineering report has been prepared to supplement the proposed Development Application to Bankstown City Council for an Aged Care development at 14-20 Eldridge Road, Bankstown.

The proposed site infrastructure works including hardstand pavement areas and stormwater drainage will be designed to comply with the principles outlined in Council's guidelines.

The following services have been addressed in this report;

- Site Works
- Stormwater Management

The main aim of the attached documentation is to demonstrate the intent of the proposed development in terms of design proposals.

A set of Civil drawings for DA approval are intended to be read in conjunction with this report to demonstrate the design intents outlined below.

1.2 Engineering Objectives

The engineering objectives are to provide an engineering design which is compliant with the operational requirements of the facility whilst maintaining adequate stormwater quantity and quality controls in accordance with Council's requirements.

1.3 The Site & its Context

The site is located at 14-20 Eldridge Road, Bankstown. Access to the site can be made from both Eldridge road and also to Calidore Lane which lies along the south-eastern boundary. The proposed development will have two vehicular entrances to the site along Eldridge road, including access to the basement and a one way access driveway that runs through the site and exits at Calidore Lane. The site is approximately 4400m^2 in size and is proposed to contain a basement of approximately 1700m^2 and a ground floor area of 2300m^2. The site consistently grades down from the south western corner (RL 20.90) to the north-eastern corner (RL 18.24). There is a stormwater easement that runs along the southern boundary of the site. According to the Stormwater System Report, this easement does not comply with council standards, and it to be increased to 2.5m in width at some point in the future.

During the Pre-DA meeting with Bankstown Council on the 6/11/15, it was advised by Steve Kuntz that based on the Stormwater System Report (Appendix B), the site flooding issues do not need to be further investigated for this proposed development. According to the SSR, The design 100yr ARI flood level is 19.2. The proposed floor level for the development is 20.60, 1.4m above the 100yr flood level.

There are no specific stormwater targets that are required to be met for this development; however the proposed stormwater system has been designed to best practice with regards to stormwater quality.

SITE WORKS

1.4 Bulk Earthworks

A bulk earthwork analysis has been undertaken based on the existing and proposed levels of the proposed development, which contains a basement car park, at RL 17.90, accounting for approximately 3600m^3 of cut from the site. There are sections of fill along the eastern boundary and in the southern part of the site, where the floor level is significantly higher than the existing ground levels. There is a gross cut volume of 3780m^3, a gross fill volume of 1350m^3 and a net excess of cut of 2430m^3.

Bulk Earthworks design and associated drawing documentation has been produced as part of this DA submission. These drawings (BE01 – BE05) can be found in Appendix A. Initial estimates and calculations have been made, however it is envisaged that the specifics will be finalised at the Construction Certificate stage.

Soil Erosion and Sediment Control measures including sedimentation basins are to be placed in accordance with submitted drawings and the Bankstown Development Control Plan 2005. The sediment basin volumes and control measures can also been seen on the DA drawings provided in Appendix A.

1.5 Embankment Stability

To assist in maintaining embankment stability (both temporary basin and permanent), batter slopes will be no steeper than 3 horizontal to 1 vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability. All vegetation and turfing is to the Landscape Architects details.

1.6 Supervision of Earthworks

All geotechnical testing and inspections performed during the earthworks operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

STORMWATER MANAGEMENT

1.7 Introduction

1.7.1 Background

In providing stormwater controls, it can be ensured that the proposed development does not adversely impact on the stormwater flows and water quality of waterways within, adjacent and downstream of the site.

1.8 Runoff Control

1.8.1 Catchment Description

The site is located within the residential district of Bankstown, and drains towards Salt Pan Creek. The pre-existing development, which defines approximately 30% of the site as impervious surfaces, has been demolished. The stormwater drainage for the proposed development has been modelled in DRAINS, with the pre-developed node consisting of 100% pervious surfaces.

1.8.2 Existing Drainage System

There is no existing drainage system for the pre-developed site. There are two council pits that are adjacent to the site. There is a kerb inlet lintel in Eldridge road, towards the north-eastern boundary and there is a kerb inlet lintel in Calidore Lane, towards the south-eastern boundary of the site. The proposed development will be connecting the majority of the stormwater runoff to Pit EX-1 in Eldridge road, with a small portion of the site draining to Pit EX-2 in Calidore Lane.

1.8.3 Proposed Drainage System

The drainage system for the proposed development has been designed to collect all concentrated flows from the proposed impervious areas such as roof, road and footpath areas. The system has been designed in such a way that the 100yr ARI will be piped entirely prior to the discharge point of the site. In the event of a total system blockage/failure, site grading is such that overland flow will be directed to both Eldridge road and Calidore Lane. Therefore, ultimately, in this unlikely scenario, the flows will still be directed to the existing council pits in the event of a complete pipe blockage. The overland flow paths are shown on drawing C100 in appendix A.

As described, there are two existing and pre determined connection points for all of the site's stormwater. These connection points are pit EX-1 and EX-2 as shown on the detail plan C100. Pit EX-1 is the point at which the majority of the site's stormwater will be directed. The stormwater from 90% of the site will be directed to the On-Site Detention tank in the north-east corner of the site, and then to the council pit EX-1. Approximately 200m^2 of stormwater from the access road will bypass the OSD and discharge to Calidore Street.

In terms of stormwater conveyance for the site, stormwater will be drained via gravity and a pump-out pit for the basement. The basement drainage network is detailed in drawing C101. 180m^2 of stormwater from the basement driveway will drain into the pump out pit detailed in drawing C201, which will be pumped out to pit C-1 via twin 10L/s pumps. The 2500m^2 roof will

drain directly to the OSD tank. Swales are incorporated along the southern and western boundaries to ensure no stormwater bypasses the drainage network into private property. The in-ground drainage system (excluding roof drainage or subsoil drainage) has been designed using the DRAINS software. The model used and submitted for review is;

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The model ensures that the stormwater network has the capacity to completely contain the flow the flow from the 100yr ARI storm event. The DRAINS model is also used to size the OSD and orifice plate, to ensure that the proposed development does not increase the flow discharge for the 5yr storm event or larger. The pre-developed node has been modelled as completely pervious. K-factors in these pits were manually adjusted to simulate overflow conditions in each pit.

Although there is no overflow in the 100yr ARI storm event as modelled in DRAINS, should the pipe system become completely blocked, the overland flow paths would direct the flow towards the council pits in Eldridge Road and Calidore Lane.

The IFD rainfall data that was used for the modelling of the proposed development was taken from Appendix D - Australian rainfall intensity for Bankstown City Council area, from the Bankstown Engineering and Drainage Standards Policy 2005.

The standard parameters used in the DRAINS model are as follows;

Description	Value
Model for Design and Analysis Run	Rational Method
Rational Method Procedure	ARR87
Soil Type - Normal	3.0
Paved (Impervious) Are Depression Storage	1.0mm
Supplementary Area Depression Storage	1.0mm
Grassed (Pervious) Area Depression Storage	5.0mm
Antecedent Moisture Condition (ARI = 1-5 years)	3.0
Antecedent Moisture Condition (ARI = 10-20 years)	3.0
Antecedent Moisture Condition (ARI = 50-100 years)	3.0
Sag Pit Blocking Factor	0.5
On Grade Pit Blocking Factor	0.2

1.8.4 On-Site Detention

An On-Site Detention tank of 11.5m^3 has been incorporated into the DRAINS model. The tank incorporates a dual chamber pit, with a 248mm diameter orifice, and a 300mm diameter choking pipe for flows that pass over the weir. The tank reduces the stormwater discharge to below the pre-developed values for the 5yr – 100yr ARI storm events.

1.9 Drawing List

The Civil DA drawings provided for submission and to be read in conjunction with this report are;

Drawing No.	Drawing Name
15696_DA_C000	COVER SHEET, DRAWING SCHEDULE, & LOCALITY SKETCH
15696_DA_C100	DETAIL PLAN
15696_DA_C101	BASEMENT PLAN
15696_DA_C200	STORMWATER MISCELLANEOUS DETAILS
15696_DA_C201	OSD TANK DETIALS
13631_DA_C600	TURNING PATH PLAN
15696_DA_BE01	BULK EARTHWORKS PLAN
15696_DA_BE02	BULK EARTHWORKS SITE SECTIONS
15696_DA_BE03	BULK EARTHWORKS BASEMENT EXCAVATION
15696_DA_BE04	BULK EARTHWORKS BASEMENT SECTIONS
15696_DA_BE05	BULK EARTHWORKS EXCAVATINO INTO ROCK LAYER
13631_DA_SE01	SEDIMENT & EROSION CONTROL PLAN
13631_DA_SE02	SEDIMENT & EROSION CONTROL TYPICAL SECTIONS & DETAILS

References

- Bankstown City Council's Policies and Procedures - "Engineering and Drainage Standards Policy", dated December, 2005

- Bankstown Development Control Plan – Part B1 Residential Development, 2015

- Bankstown Development Control Plan – Part B4 Sustainable Development, 2015

- INSTITUTION OF ENGINEERS, AUSTRALIA - "Australian Rainfall and Runoff", 1987, 3rd Edition