



# Concept Stormwater / WSUD Report

Proposed Residential Subdivision – Precinct 6,  
Cnr Doonside Road & Eastern Road, Doonside

Job Number: 600300

Prepared for Landcom

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## Document Control

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## **1 Introduction**

Cardno has been commissioned by Landcom to prepare concept documentation for the civil works associated with the proposed Bunya residential subdivision – Precinct 6 at Doonside & Eastern Road, Doonside.

This report relates to subdivision of Precinct 6 forming part of the Bunya residential development. The site Master Plan was adopted by the Minister for Planning in March 2009. This report has been prepared to support an application to the Minister for Planning to modify the existing site Master Plan and approval.

This report outlines strategies associated with the provision for civil infrastructure including storm water drainage and water sensitive urban design (WSUD).

This report and supporting engineering plans and documentation have been prepared on the assumption that construction works associated with the remainder of the Collector Road and bulk earthworks over the Precinct 3 and 4 site (DA-11-355) along with the intersection upgrade to Doonside Road and Bungarribee Road (DA-11-369) have been completed.

The site is located within the Blacktown City Council Local Government Area (LGA).

## **2 Reference Documents**

This report is to be read in conjunction with the following documents related to Precinct 6:

- Cardno Drawings 600300-C-6000 series dated October 2011;
- Landscape drawings as prepared by Cloustons dated April 2011 and;
- Other reports, plans and documentation prepared by specialist consultants (as applicable).

This report should also be read in conjunction with the following documents related to works adjoining the Precinct 6 site:

- Documentation submitted as part of DA-11-355 related to the construction of the remainder of the Collector Road (Steel Trap Drive) and bulk earthworks over the site. Documents include Cardno drawings 600300-1000 series and supporting reports and studies; and
- Documentation submitted as part of DA-11-369 related to the signalisation and upgrade to the Bungarribee Road and Doonside Road intersection. Documents include Cardno drawings 600300-2000 series and supporting reports and studies.

## 3 Site of Works

### 3.1 Definitions

The following definitions have been adopted in this report:

**‘Development Precinct’** means the wider Bunya Residential Development located west of and including the intersection of Bungarribee and Doonside Roads, Doonside. It includes the entire length of the Collector Road and residential development Precincts 1 to 6. The Development Precinct is presented on Cardno Drawing 600300-3010.

**‘Site’** is the part of the Development Precinct that will be the subject of drainage and general subdivision construction works that form part of this Concept Report. The Site includes Precinct 6 between Collector Road, Doonside Road and Eastern Road. The Site is presented on Cardno Drawing 600300-C-6010.

**‘Intersection Upgrade’** is the signalisation and upgrade of the Doonside Road and Bungarribee Road intersection. Refer to Cardno drawing 600300-2000 series for details.

### 3.2 Site Description

The Precinct 6 site is presented on Cardno Drawing 600300-C-6010 and is bound by:

- Doonside Road to the east;
- Eastern Road to the north;
- An unnamed ephemeral waterway to the south known as ‘Northern Creek’;

The Site occupies an area of approximately 13.7ha. The Site is currently unoccupied and is covered by grassland and pockets of other vegetation. The Site is characterised by gently undulating land with a gentle overall fall from a crest on Doonside Rd falling to both ‘Northern Creek’ and Eastern Creek.

## 4 Stormwater Network

### 4.1 Diversion of Existing Stormwater Outlets

There is one existing stormwater outlet that currently discharges from underneath Eastern Road across the Precinct 6 site. This will be diverted around the Precinct 6 site via a grassed channel and a level spreader towards Eastern Creek. The channel will be designed to divert the 100yr design flow.

### 4.2 Proposed Road Stormwater Drainage Network

The concept road stormwater drainage network has been designed generally in accordance with Blacktown City Council's 'Engineering Guide for Development, 2005' and 'Australian Rainfall and Runoff, Volume 1, 1987'.

A concept stormwater layout has been prepared to support the current application. Further details will be developed as part of the Development Application and Construction Certificate works based upon the assumptions and details noted below.

The majority of road drainage from Precinct 6 will discharge to Concept Basin X; some of the road drainage catchment will bypass Concept Basin X and will discharge directly to 'Northern Creek.'

The Precinct 6 pit and pipe network will be designed for the 10yr design storm event with overland flows designed to cater for the 100yr storm event and maintain a velocity-depth product of 0.4 or less.

Design rainfall intensities will be adopted from Blacktown Council's Engineering Guide. Stormwater pits will be positioned to suit the proposed road geometry and maintain a maximum flow width of 2.5m from face of kerb during the 10yr design storm event.

Residential lot catchments will be assumed 85% impervious while road reserve catchments will be assumed 95% impervious.

Please note that recent changes to the Precinct 3,4,5 and 6 lot layout involving an increase in development density will not affect current precinct drainage designs. The current increase in lot density will not increase site flows as the drainage is designed based on fixed levels of catchment impervious area as set by Blacktown Council as noted above. Further, overall magnitude of flow from catchments will not increase as the development overall footprint Precincts remains unaltered following the recent lot mix changes.

Soil types and AMC will be adopted from Council's Engineering Guide. On grade pits will be assumed 20% blocked while sag pits will be assumed 50%. Minimum lintel size is generally 1.8m on grade and 2.4m in sags. There may be some locations where pits may be positioned on kerb returns to ensure the pipe alignment does not encroach the boundary. These pits shall be constructed with a short (0.9m) or curved lintel. Full details will be provided at the DA and detailed design stage.

The stormwater network discharges to a combined water quality and quantity (detention) basin (Concept Basin X) before discharging to the adjoining creeks.



## Basin Detention and Water Quality

The road stormwater drainage network (refer Section 4) discharges to a combined water quality and quantity (detention) basin (Concept Basin X). This will be a permanent basin positioned adjacent to low points in Road No. 32 and will discharge to the adjoining creeks. The basin is proposed with Table 1 presenting a summary.

**Table 1: Summary of water quality and quantity basin location**

Name	Location	Function
Basin X	South West of the South Western Corner of Road No. 32	Water quality and quantity control

### 4.1 Basin Detention

The detention component of the basin has been designed to restrict discharge to no more than from the site under existing conditions for the 1yr through to the 100yr design storm event. Discharge will be via a series of staged outlets. Full details will be provided at the DA and detailed design stage.

The invert of the basin will be set above the 100yr flood level of the receiving creek (refer Collector Road Engineering Report - Section 9 for discussion on creek flood levels) while ensuring that the invert of the water quality area is able to discharge above the existing creek bed level.

The top water level of the basin will be set to typically 300mm below the adjoining road gutter invert level. This will ensure that a minimum 500mm freeboard is maintained between the basin top water level and the future dwelling finished floor level.

Basin batters will be a maximum 1V:4H.

Table 2 below presents approximate concept basin volumes and approximate water quality treatment areas.

Concept basin sizing has been undertaken assuming 400m<sup>3</sup>/ha giving an approximate concept basin volume of 5,500m<sup>3</sup>. This storage volume per area is slightly higher than for other precincts where designs are more advanced.

**Table 2: Summary of water quality and quantity basin volumes**

Name	Proposed Treatment Area	Proposed Volume
Basin X	4,100 m <sup>2</sup>	5,500 m <sup>3</sup>

Note that basin configurations are indicative only and subject to further DA and detailed design.

## **4.2 Water Quality**

Water quality areas on the Site will be modelled and designed in accordance with Blacktown City Council's Draft Integrated Water Cycle Management Plan, June 2009.

Water quality assessment will be undertaken using MUSIC computer software (Version 4) utilising Version 3 bioretention treatment node.

Catchments will be estimated from CAD base drawings assuming 85% overall developed site imperviousness.

The water quality treatment chain consists of:

### **a. Residential rainwater tanks**

It has been assumed that rainwater reuse tanks will be installed on each residential lot as part of BASIX requirements and will be plumbed for toilet flushing and on-lot irrigation. It has been assumed that a minimum 2,000L rainwater tank will be provided on each lot as part of BASIX.

### **b. Gross Pollutant Traps**

It has been assumed that proprietary gross pollutant traps (GPTs) will be installed prior to stormwater discharge to the basin. For modelling purposes it has been assumed that a CDS or similar unit will be installed. Selection of the final GPT unit is subject to further design and discussions with Council.

### **c. Bioretention Areas**

Bioretention areas will be provided at the base of the basin. The bioretention will consist of filter media approximately 800mm deep and include macrophyte planting on the surface.

Initial concept design of Precinct 6 included the use of Eco-medians along Roads No. 33, 32 and 30. Eco-medians have been used on other Precincts within Bunya such as Precincts 1, 2 and 5.

As part of concept design development the original eco-medians have been removed from Precinct 6 in order to optimise land use and generate more uniform lots.

Water quality treatment for the Precinct 6 site will be located in the invert of Concept Basin X. Concept Basin X lies wholly within land owned by Blacktown City Council and will be transferred to Council upon completion.



## **5 Sediment and Erosion Control**

Erosion and sediment control will be installed and maintained in accordance with Council's requirements and Landcom's 'Blue Book'.

Due to the required extent of earthworks it will be necessary to utilise a temporary sediment basin to collect and settle site run off before discharge to the adjoining creek network.

The proposed combined water quality and quantity basin will be utilised as a sediment basin during earthworks and construction. Once the site has been stabilised this basin will be converted for use as water quality and quantity treatment.

Construction stockpile areas will be located near areas of minimal cut and fill. Stockpiles will be protected above by local diversion drains and below by sediment fence.

Access to the site will be restricted to a single point at the intersection of Doonside Road and Eastern Road. A second access may be sought joining to the Collector Rd to the south depending upon timing of the various construction works.