RobertBirdGroup

EXALLOS GROUP

SPECIALIST ENGINEERING

Integrated Stormwater Management Report for

Blacktown Hospital
Blacktown Road, Blacktown

Prepared For: Health Infrastructure

3rd July 2012

Job No.: 10684

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FS 520893

Report Amendment Register

Rev. No.	Section & Page No.	Issue/Amendment	Author/ Initials		Project Engineer	Reviewer/ Initials		Date
1	All	Original	LM		LM	JH		02.0712
2	1.0, 4.4		LM		LM	JH		03.0712

FINAL DRAFT ACCEPTED BY: AUTHOR: REVIEWER:

…….. ……..
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Date: 3rd July 2012

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Signing for and on behalf of
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Date: 3rd July 2012

Executive Summary

Robert Bird Group (RBG) has been engaged by Health Infrastructure NSW to undertake the civil infrastructure design documentation for the Stage 1 Expansion of the Blacktown Hospital.

This integrated water management report is in support of the Clinical Services Building Part 4 Application addresses the design basis of the stormwater management that includes issues of flooding, piped and overland flows, levels, and detention and water quality.

Table of Contents

References

1. Australian Rainfall and Runoff – A Guide to Flood Estimation, Volumes 1 and 2 (1987) – The Institution of Engineers, Australia.

2. On-Site Stormwater Detention Handbook (Fourth Edition, December 2005) – Upper Parramatta River Catchment Trust.

3. Managing Urban Stormwater – Soils and Construction Volume 1 (4th Edition, March 2004) – NSW Department of Housing.

4. Blacktown City Council Drainage Design Manual – revised 2005

5. AS/NZS 3500.3.2 National Plumbing and Drainage Part 3.2: Stormwater Drainage – Acceptable Solutions.

6. Blacktown City Council Development Control Plan 2006 Part R Water Sensitive Urban Design and Integrated Water Cycle Management

7. Blacktown City Council Engineering Guide for Development 2005

8. Blacktown City Council Works Specification – Civil 2005

1.0 Introduction

Robert Bird Group (RBG) has been engaged by Health Infrastructure NSW to undertake the civil infrastructure design for the expansion of the Blacktown Hospital. This report addresses the stormwater management for the new main building in the context of the stormwater management strategy for the whole site.

In addition to this report, the hydraulic design of the Clinical Services Building including the collection and storage of roof runoff for rainwater harvesting is being designed by Warren Smith & Partners and this is addressed in their report Scheme design Report - Hydraulic and Fire Services Blacktown Stage 1 Issue 02 dated 27th June 2012

Scope of the Overall Project – Stage 1 Expansion of Blacktown Hospital

In broad terms, the project is described as –

- A new Clinical Services Building (CSB) extending across the eastern and western portions of the existing P3 visitor car park. The building is to comprise Admissions and Discharge, Oncology Treatment and Comprehensive Cancer Centre on Level 03 (approximately level with the existing Main Hospital Entry), and a combination of uses over Levels 04 to 07, with rooftop plant areas.

- A “Hospital Street” being an enclosed space between the new clinical services building and the existing hospital

- A new Hospital Entry and car park to the east of the new building and an Emergency and Oncology Drop Off to the west of the new building.

- A proposed at-grade car park west of the Oncology Drop Off and directly to the south of UWS Clinical School

- A new multi-storey car park (MSCP) for 600 cars on the P2 staff car park to the south of the new building.

- A New Main Entry Road connection to Blacktown Road to the east of the Existing Hospital.

- Extension of the new Main Entry Road south to the Administration Building and west to Bungarribee House between the MSCP and CSB.

- A proposed multi-level services tunnel that connects the existing hospital and the new building under the existing access road and south to the MSCP.

- Refurbishment of internal areas of the existing Main Hospital Building, in order to expand or relocate existing departments.

Sources of Information

The surveys that have been used in the preparation of the report include;

- Untitled survey received on 28.09.10 of the site prior to the existing Main Building being reconstructed and from the Department of Services. This survey has been used to identify the depths and sizes of major stormwater pipes not addressed in subsequent surveys.

- Craig & Rhodes Detail Survey and Underground Service Location over Blacktown District Hospital Issue 06 dated 06.06.2

2.0 Site Description

The site is described as Lots 300, 301, 306, 308 DP15914, Lot 1 DP 128344, Lot 3 in DP71010 and Lot 1 in DP730307 at Blacktown Road, Blacktown and has an overall area of 12.335 hectares.

The site has frontage to Blacktown Road to the North and abuts residences on the other boundaries.

The site is currently occupied by the existing hospital, out patient buildings and car parking areas. It falls generally from south to north with an overall fall from approximately RL 72.50 AHD at the highest point on the southern boundary, to approximately RL 46.00m AHD at the lowest point on at the northern boundary adjacent to Blacktown Road.

3.0 Flooding

Due to its elevation the hospital site is not within a flood affected zone as confirmed by reference to Council flood maps, a copy of which is included in Appendix A

Internally road and car park levels and grades have been set to ensure no localised flooding of the existing and new buildings and also not to impact adversely on the adjoining properties

4.0 Stormwater Drainage

4.1 *Rainfall Data*

Blacktown City Council has adopted a standard rainfall chart for use within the council area. This chart was prepared by the Bureau of Meteorology based on accumulated rainfall data for the Blacktown area. This rainfall data has been used in the design of the stormwater drainage on this project.

4.2 *Catchments*

Pre-development

The existing site internal catchments have been sub-divided into 3 main catchments based on the land falls and nature of the stormwater drainage system which conveys the stormwater flows through the site.

Two of the catchments drain straight into the council drainage infrastructure without any detention and the third central catchment drains towards an existing stormwater detention basin prior to discharge into council's drainage system. The arrangement of these catchments is indicated in the Existing Catchment Plan Drawing No BIN-CV-DG-0021 that is included in Appendix B of the report

The central 6.309 ha Catchment B that drains to the detention basin takes in the MSCP and the Clinical Services Building sites.

Post Development

Although as stated above the MSCP and CSB sites fall within the existing central detention basin catchment, it is proposed that in light of the future development of the hospital and to meet water quality measures set out in the DCP Part R, the stormwater from the MSCP and CSB will be redirected in the opposite direction to a detention tank within a proposed on-grade P12 car park adjacent to the existing Child Care Centre. Stormwater quality measures that will be provided upstream and downstream of the tank are addressed in Section 7.0.

The estimated area of this Treated Catchment D as presented on Proposed Catchment Plan Drawing No BIN-CV-DG-0022 is 3.208 ha. It will take in 2.043 ha of the Stage 1 expansion buildings (MSCP and CSB) and roadworks as well as 1.165 ha area of existing car parks and buildings in the south east corner of the site.

Runoff and piped stormwater from this latter 1.165 ha catchment flows to the Council system without quantity or quality control at the moment and therefore will be improved by brought into the controls for the broader area.

The Proposed Catchment Plan Drawing No BIN-CV-DG-022 is included in Appendix B of this report and in summary the changes are as set out in the following table

Catchment	Existing Area (ha)	Proposed Area (ha)	Treatment Measures
A	3.331	3.205	No stormwater quantity nor quality controls
B	6.309	4.860	Stormwater Detention control. No stormwater quality control
C	2.695	1.059	No stormwater quantity nor quality controls
D		3.211	Stormwater quantity and quality controlled catchment
Totals	**12.335**	**12.335**	

4.3 *Piped and Surface Drainage*

As the proposed MSCP and CSB syphonic systems are to be designed for the 1-in-100 year rainfall event, the adjacent street or car park piped stormwater systems are to be similarly sized with some reduction down to the 1-in-20 year rainfall event where the road corridors can address the difference up to the 1-in-100 year event and convey all flows the detention tank via overland flow.

The reason for the upfront capacity within the street to the 1-in-100 year event is to match the capacity of the MSCP and CSB stormwater and also to address the fall of part of the street system immediately in front of the MSCP to the west away from Catchment D. This stormwater network that is still subject to further design development is presented on Stormwater Layout Plan BIN-CV-DG-0213.

The existing pipe network particularly within the eastern catchment is to a lower standard than the 1-in-20 year event and as part of the new road and car park work the stormwater system as indicated on the Stormwater Layout Plans will be brought up to that standard.

Stormwater runoff from paved areas will be directed by pavement falls towards kerbs and gutters and collected by inlet pits at regular intervals.

As defined in AS 3996 *Metal Access Covers, Road Grates and Frames*. Grates will be class B (Medium Duty) for on the on grade car parks and class D along the roads.

4.4 *On-Site Detention*

Blacktown City Council requires the peak storage from development sites to be limited using on-site detention. The design parameters and methodology for on-site detention are set out in the On-Site Stormwater Detention Handbook (Fourth Edition, December 2005) issued by the Upper Parramatta River Catchment Trust (UPRCT). These base parameters are summarised as follows:

Overall Site Storage Requirement (SSR)	455 cu.m./hectare
Primary Site Reference Discharge (SRD_L)	40 litres/second/hectare
Secondary Site Reference Discharge (SRD_U)	150 litres/second/hectare

In the tank, the storage volume is divided into an upper storage and a lower storage. The lower storage is controlled by a smaller sized orifice plate, so that peak discharges from the 1.5-year ARI storm are attenuated to acceptable levels. The upper storage is controlled by a second orifice

plate. The two orifice plates thereby attenuate flows from major storms (eg 100-year AR) to acceptable levels.

Using the Upper Parramatta River Catchment Trust OSD sizing spreadsheet the volume of detention required for the 3.211 ha catchment is estimated to be 1461 m^3.

The on site detention system and water quality control measures outlined below will be installed as part of separate works including civil works designed to enable the hospital to continue operating during the construction program and the construction of the multi-storey car park which is the subject of a separate development application to Blacktown Council. The proposed clinical services building will drain into this new system.

4.5 *Rainwater Drainage*

Warren Smith & Partners as part of their hydraulic documentation will design the internal rainwater drainage system of CSB collecting water from metal and concrete roofs that will gravitate by downpipes adjacent to building columns and horizontal stormwater drainage pipes to the Rainwater Reuse Tank located in Level 2. It is proposed that harvested rainwater may be reused for toilets flushing and landscape irrigation.

5.0 Water Quality

The stormwater runoff from the eastern catchment that takes in the CSB and MSCP is to be treated to remove pollutants through two sets of measures to the targets set out in Council's DCP 2006 Part R Table 4 that are as follows:

Pollutant	% post development average annual load reduction
Gross Pollutant	90
Total Suspended Solids	85
Total Phosphorus	65
Total Nitrogen	45
Total Hydrocarbons	90

The first is to remove gross pollutants such as litter upstream of the detention storage via the installation of either catchpit inserts within the street or car park stormwater inlet pits or a single gross pollutant trap. Removal of gross pollutants in GPTs will also remove a high proportion of hydrocarbons and fine sediments that are trapped by or adhering to larger particles.

The second treatment measure downstream of the detention system is to complete the capture of the pollutants to the targets set out in Part R. The options available include proprietary items such as Ecosol systems, Humeceptors and Stormwater 360 Stormfilters as well as bio retention basins. The decision on the options also will be determined based on the MUSIC modelling and maintenance considerations.

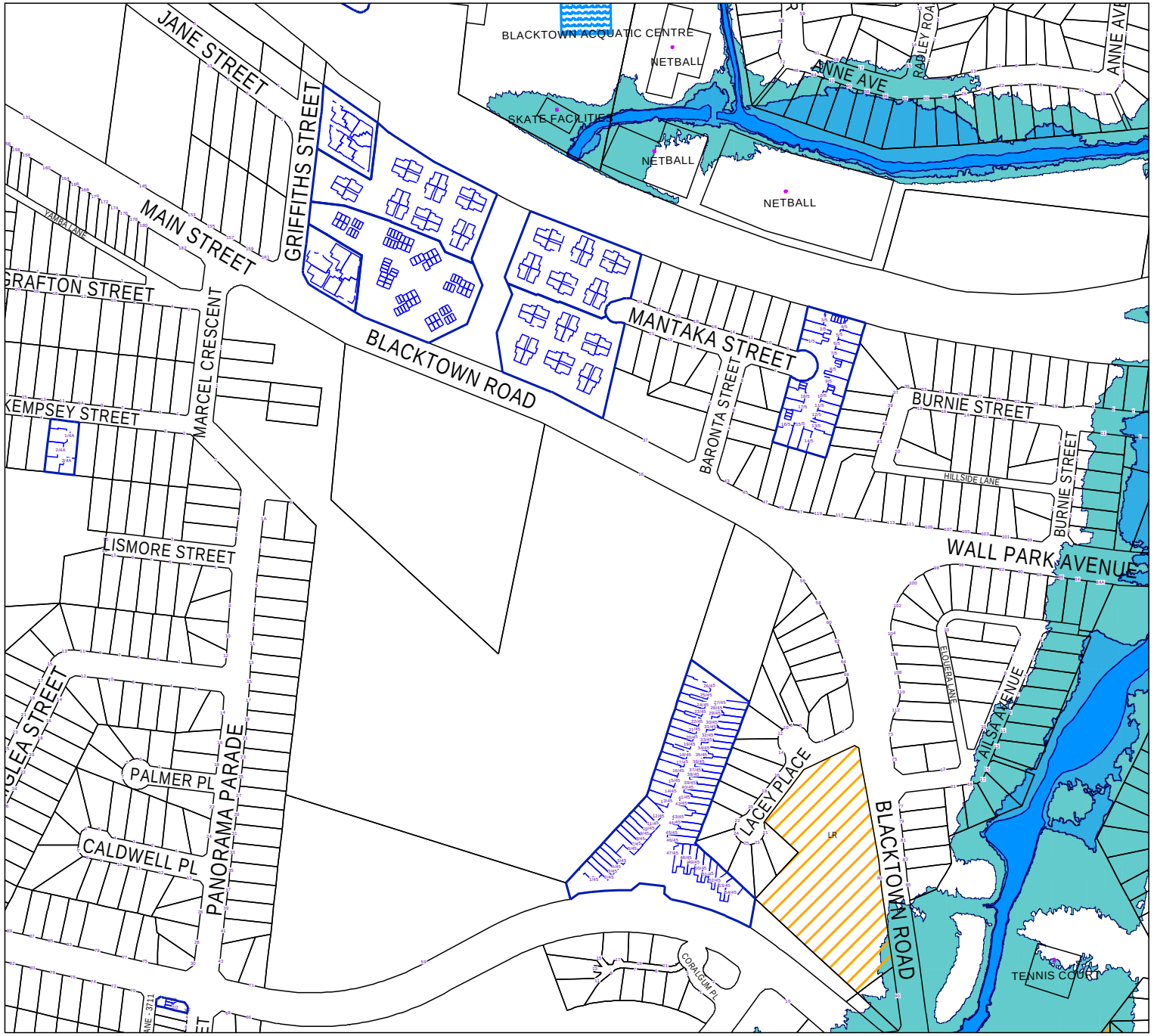
6.0 Erosion and Sediment Control

6.1 *During Construction*

Erosion and sediment controls will be provided during the construction phase in accordance with Blacktown City Council guidelines and will include measures such as sediment fences at the downstream edges of all disturbed areas, filters at all existing pits collecting stormwater runoff from disturbed areas, and a truck shaker tray at each point of access to the work area. Sedimentation basins have been provided, sized in accordance with the guidelines in the "Blue Book" - Managing Urban Stormwater - Soils and Construction (NSW Department of Housing 1998).

The Contractors for each element of the works will be responsible for the design and implementation of the Erosion and Sediment Control measures for their section of works taking into account the staging including the area of exposed or stripped area, upstream catchment controls around the works, preferred site access points, site shed locations and temporary stockpile locations.

Appendix A
Flood Map



Plot Date: 15/05/2012

LEGEND

- Lot Parcel.Coverage - Strata Unit
- Lot Parcel.Coverage - Torrens Title
- Strata Development Coverage.Coverage - Registered

Boundaries [Gis]

- Local Government Area.Boundary

Places Of Interest [Gis]

- Places Of Interest - Council.Coverage
- Places Of Interest - Council.Places Of Interest Location - Council
- Places Of Interest - Council.Swimming Pool Location

Flood Data [Gis]

- Flood Extents.High Flood Risk Precinct
- Flood Extents.Low Flood Risk Precinct
- Flood Extents.Medium Flood Risk Precinct
- Flood Local.Minor Coverage

0m 60m 120m 180m 240m

Information provided is indicative only and should not be relied on without further certification by Blacktown City Council.

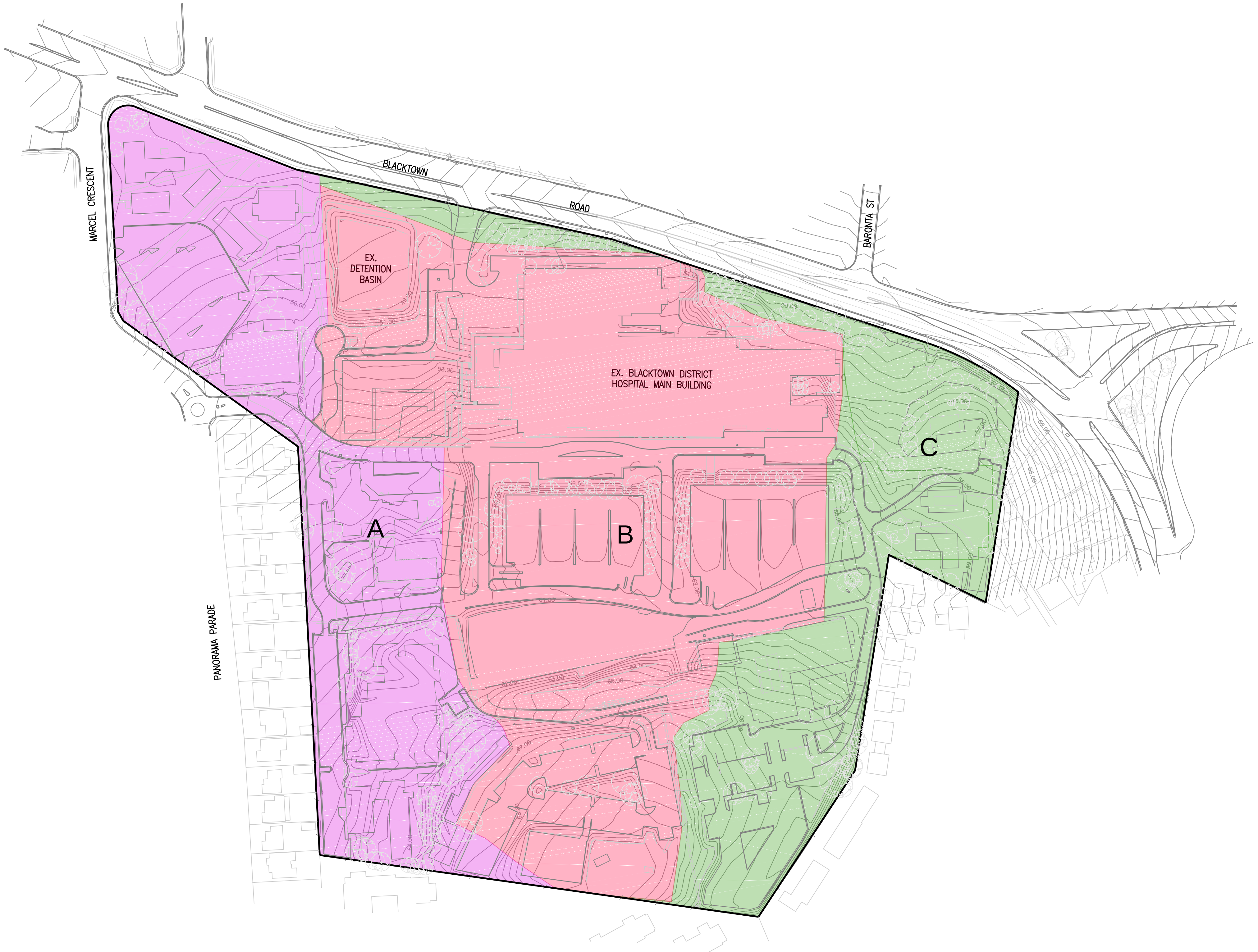
Blacktown City Council

Plotted by: admingis

NOTE: Do not scale from this map. Use D.P. information for accurate dimensions.

Appendix B
Catchment Plans

Drawing No	Title
BIN-CV-DG-0021	Existing Stormwater Catchment Plan
BIN-CV-DG-0022	Proposed Stormwater Catchment Plan



EXISTING CATCHMENT PLAN

SCALE 1:1000

GENERAL NOTES:

1. EXISTING STORMWATER DRAINAGE ARRANGEMENT BASED ON FOLLOWING INFORMATION:

- ORIGINAL SITE SURVEY BY UNKNOWN SURVEYOR.
- CURRENT SITE SURVEY BY CRAIG & RHODES, REF 239–10
- BLACKTOWN HOSPITAL MATERPLAN, STORMWATER MANAGEMENT REPORT BY WOOLACOTTS, DATED 4 DECEMBER 2008.

2. EXISTING PIPE NETWORK IS INDICATIVE ONLY AND IS TO BE CONFIRMED ON SITE.
3. ON SITE DETENTION VOLUME SIZED FOR FINAL DEVELOPMENT & TO COMPLY WITH BLACKTOWN CITY COUNCILS DESIGN REQUIREMENTS.

CATCHMENT SUMMARY

CATCHMENT	AREA (Ha)
EXISTING A	3.331
EXISTING B	6.309
EXISTING C	2.695

CATCHMENT KEY

- EXISTING CATCHMENT A
- EXISTING CATCHMENT B
- EXISTING CATCHMENT C

SCALE 1:1000

0 10 20 30 40 50 m

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS

REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

REV.	DATE	REVW'D BY	APP'D BY	APP'D P.DIR	AMENDMENT
1	07.06.12	S.MANANDHAR	L.MELVILLE		ISEPP ISSUE

CONSULTANT

Date generated | Drawn L. DOAN/ | Design L. DOAN/ | Checked J. HILL/ | Approved L. MELVILLE

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NSW Government Health Western Sydney Local Health District

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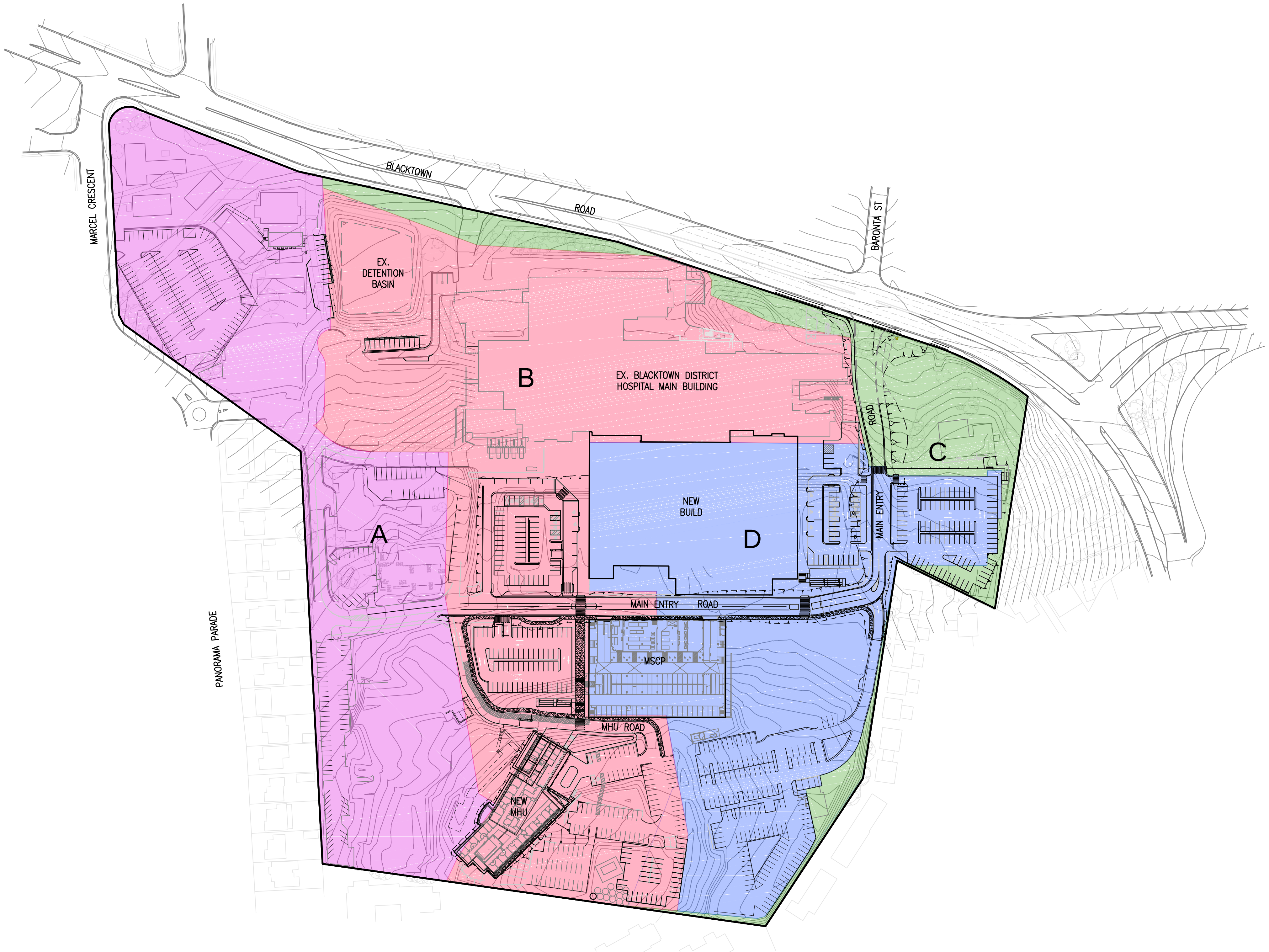
BLACKTOWN HOSPITAL

BLACKTOWN CAMPUS: BLACKTOWN ROAD, NSW2148

CIVIL

DRAWING TITLE
BIN-BLACKTOWN INFRASTRUCTURE
EXISTING CATCHMENT PLAN

SCALE (@B1)	DRAWING No.	REVISION
PROJECT No. NB11472	BIN-CV-DG-0021	1



PROPOSED CATCHMENT PLAN

SCALE 1:1000

GENERAL NOTES:

1. EXISTING STORMWATER DRAINAGE ARRANGEMENT BASED ON FOLLOWING INFORMATION:

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CATCHMENT SUMMARY	
CATCHMENT	AREA (Ha)
PROPOSED A	3.205
PROPOSED B	4.860
PROPOSED C	1.059
PROPOSED D	3.211

CATCHMENT KEY

- PROPOSED CATCHMENT A
- PROPOSED CATCHMENT B
- PROPOSED CATCHMENT C
- PROPOSED CATCHMENT D

SCALE 1:1000

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PROPOSED CATCHMENT PLAN

SCALE (@B1)

PROJECT No. NB11472

DRAWING No. BIN-CV-DG-0022

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