

Contact Dennis Bagnall
Author Georg Eberl
Date 17 March 2010
Subject SEPP 59 EASTERN CREEK
ROPES CREEK TRIBUTARY CATCHMENT
File No 145-187-29
Follow up

☐ Telephone ☐ Conference ☐ Conversation with

Ropes Creek Tributary Design Summary

1. Background

The design of stormwater infrastructure for this catchment was awarded to Brown Consulting NSW. Detailed site investigations were undertaken including survey and geotechnical investigations except for the Hanson owned site where permission to enter was not granted. Some information relating to general site conditions was provided by Hanson.

It is noted that the existing watercourse has been realigned within the land currently owned by Dial a Dump. It is Council's understanding that the watercourse is to be reinstated to generally its original alignment. Therefore, to determine existing conditions and riparian corridor locations, survey information and Council's ALS data pre-dating the creek realignment were used.

Council's adopted Precinct Plan specified minimum Core Riparian Zones of 40m from top of bank both sides plus 10m vegetated buffers. The zoning map in the WSEA SEPP have zoned the section of the watercourse immediately downstream of the SEPP59 precinct boundary (transmission easement) as environmental conservation with a total width of approximately 65m. To be consistent with the current WSEA SEPP, the total riparian zone width for this design has been set at approximately 30m from top of bank both sides.

This Study has been undertaken to identify and address various measures to mitigate the impact of development on downstream catchments from a stormwater quantity and quality perspective.

2. Study Objectives

The key objectives of the Study required the determination of:

- The volume of stormwater storage required in an earth-formed detention basin to prevent an overall increase in peak flows due to development up to the 100 ARI storm.
- The area of bio-filtration treatment required to remove pollutants from stormwater discharge to acceptable levels.

3. Methodology

XPRAFTS hydrologic model was prepared to represent the site catchment in the existing and developed conditions. The model was used to derive peak flows at critical locations and for determining the detention storage required to not exceed existing state total catchment peak flows.

Basic design parameters are generally as per Council standards and a summary of the catchment data for existing and proposed conditions is provided in Appendix A. Noted that were no initial and continuing losses are listed, Council's standard ARBM loss model values have been used. The existing conditions flows are based on the assumed pre Quarry operations landform.

A MUSIC model was prepared for the site to model the developed state pollutant export from the catchment. The model was used to determine the areas of bio- filtration (vegetated swale and infiltration trench) required to reduce stormwater pollutants to acceptable levels as specified by Council's Stormwater Quality Control Policy.

4. Results

The table below shows the existing and developed peak flows together with mitigated peak flows due to detention basin at the outlet point for the site.

| PEAK FLOWS AT OUTLET TO ROPES CREEK | | |
|-------------------------------------|---------------------|---------------------|
| ARI | EXISTING | MITIGATED |
| Years | (m ³ /s) | (m ³ /s) |
| 2 | 5.86 | 4.67 |
| 5 | 8.55 | |
| 10 | 9.94 | |
| 20 | 11.69 | |
| 50 | 13.15 | |
| 100 | 15.48 | 12.8 |

(Final model results will vary slightly due to refinement of discharge control from basin. Modelling does not include climate change impacts)

The storage volume required to achieve the mitigated peak flows was design not to exceed predevelopment flows along the full length of the study area. The estimated detention storages are summarised in the table below.

Stormwater Quality modelling was conducted using MUSIC. The proposed bio-retention areas listed in the table below are required to treat runoff from proposed future public roads and assumes full on lot treatment in accordance with Council's Stormwater Quality Control Policy requirements

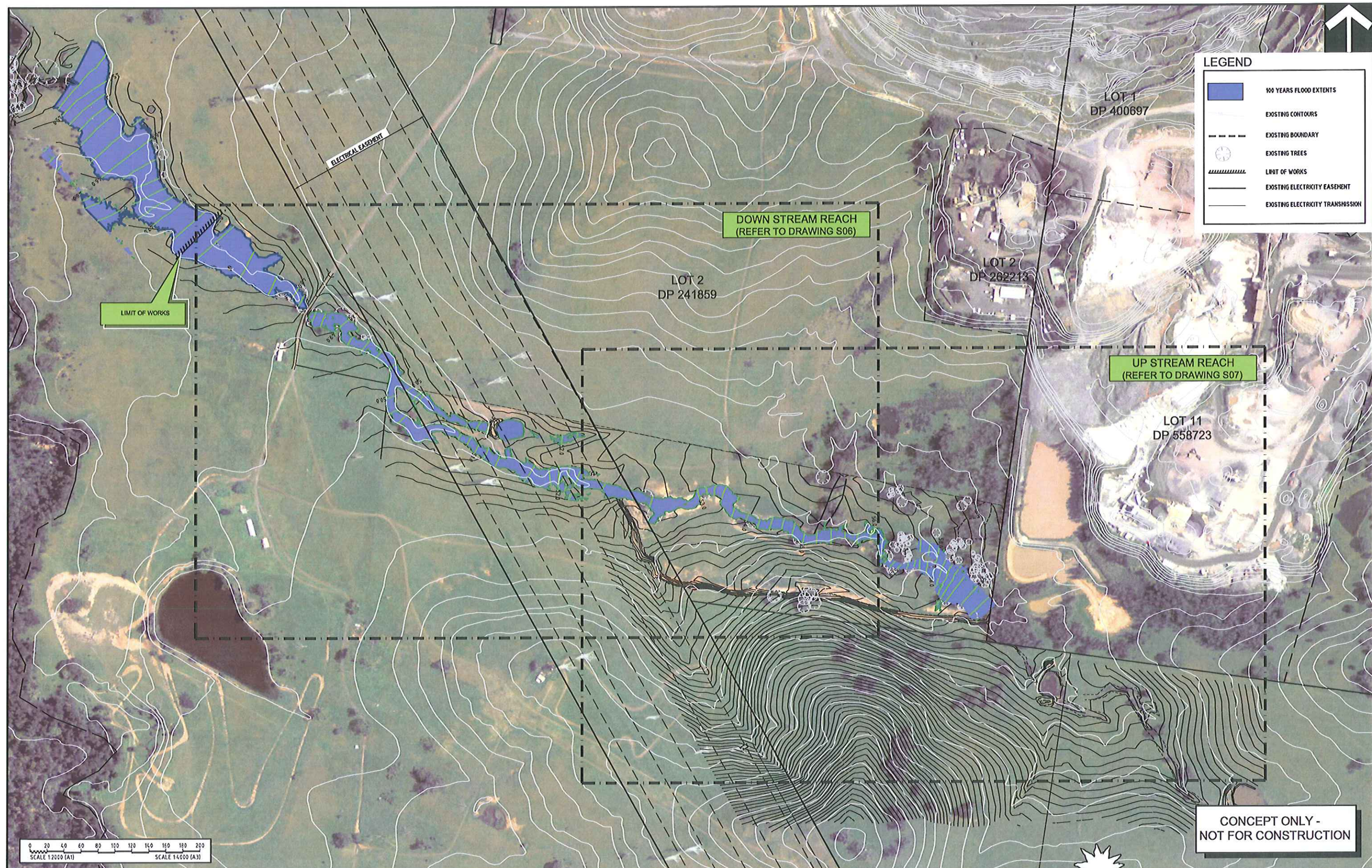
| BASIN SUMMARY | | | | |
|---------------|--------------|------------------|---------|---------------|
| BASIN NAME | XPRAFTS NODE | PRIMARY OUTLET | STORAGE | BIO-RETENTION |
| | | | (m3) | (m2) |
| RC1.1 | 5.03 B3 | 1m Weir RL56.3 | 13700 | 600 |
| RC2.1 | 4.02 B2 | 1.5m Weir RL58.3 | 20850 | 800 |
| RC3.1 | 2.03 B1 | 2.4m Weir RL62.3 | 17940 | 1000 |

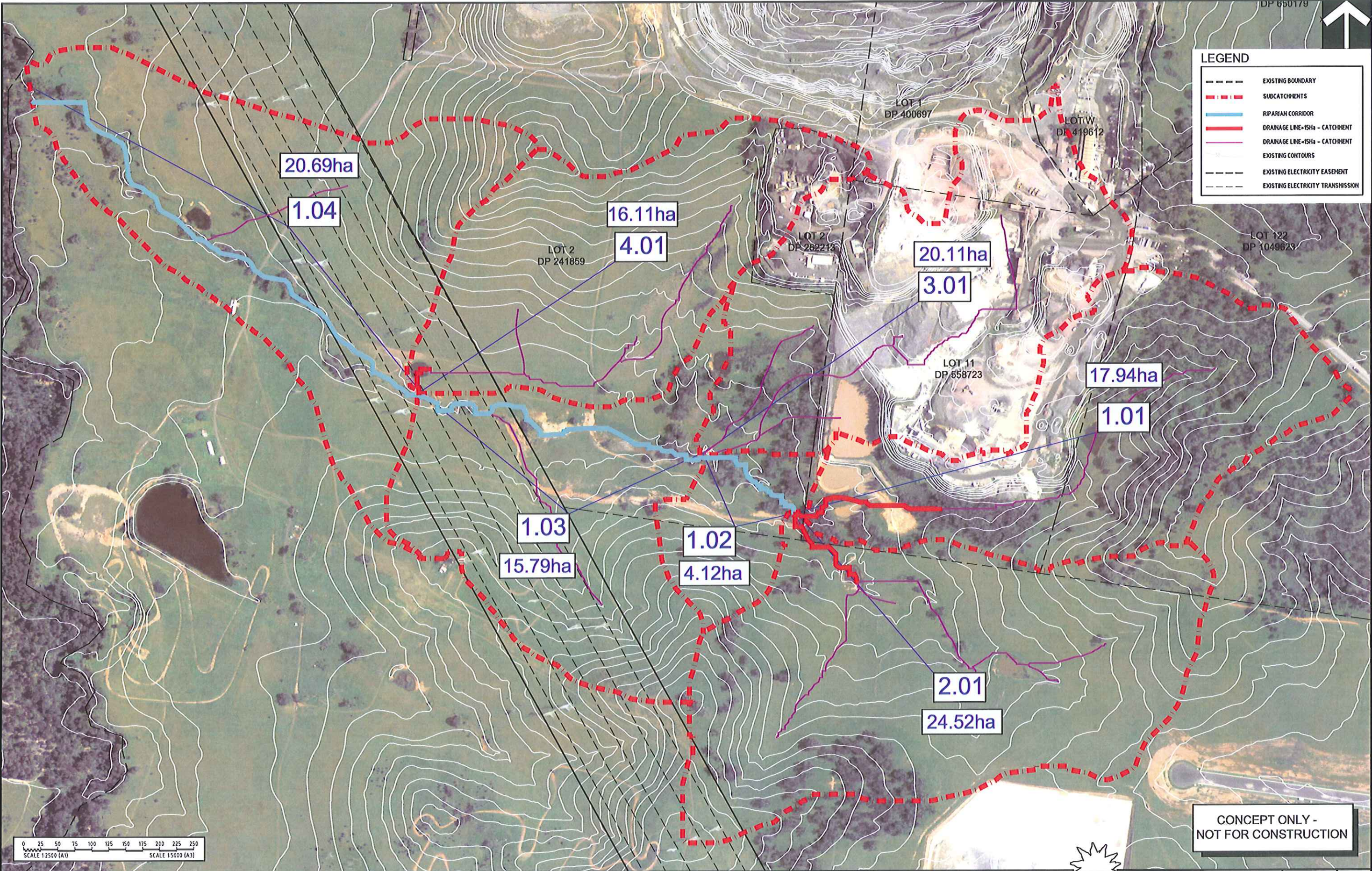
5. Conclusions

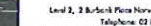
Results demonstrate that peak flows increase due to development but can be mitigated by detention basins with approximately 50,000 m³ of detention storage. The required detention storage has been achieved by the concept stage detention basins as shown on the Concept Plan.

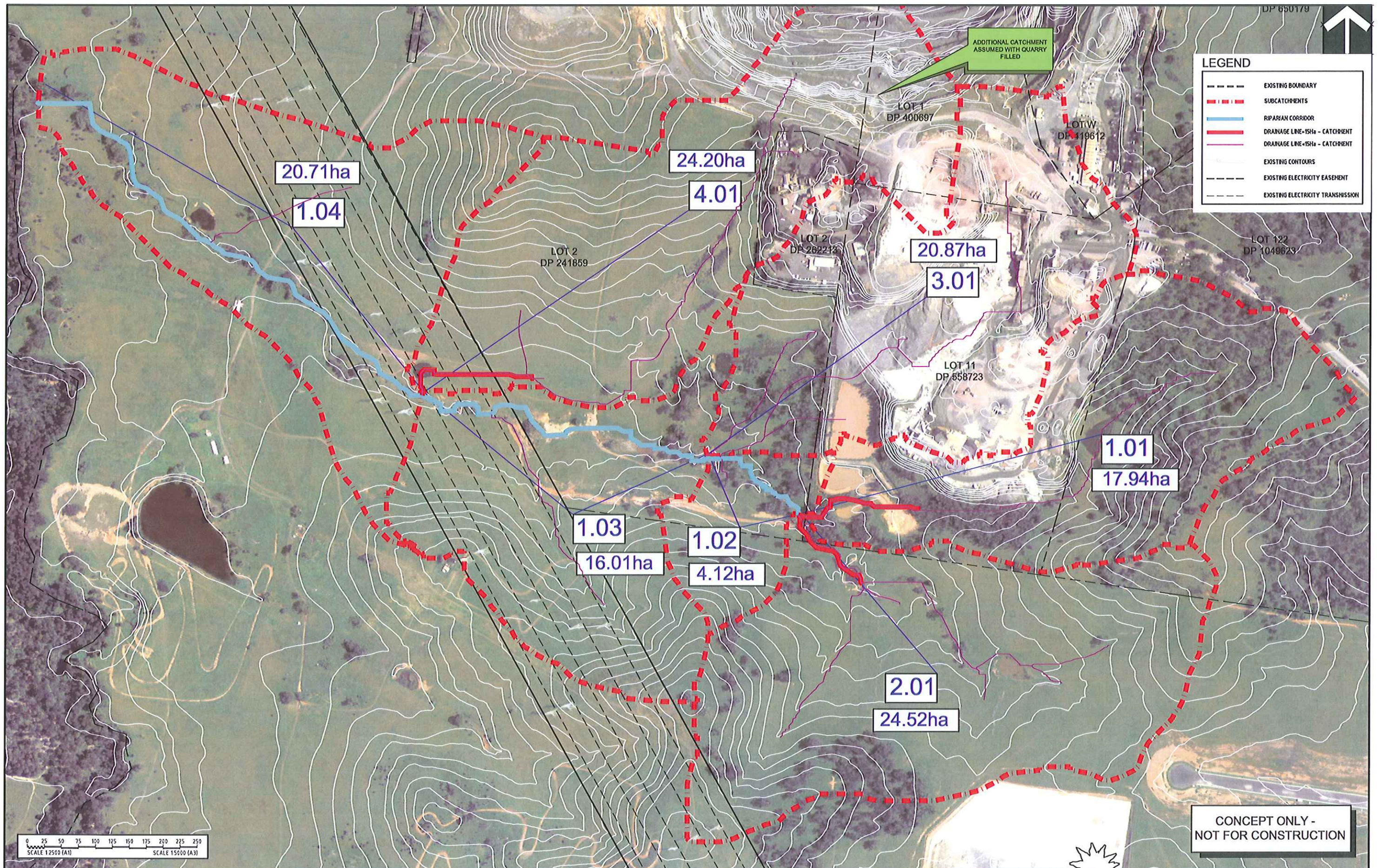
Water quality requirements have been achieved and a bio-retention rain garden area of 2400 m² will be incorporated in the detention basin during detail design.

Appendices – XPRAFTS output results





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| PREPARED BY: | | | | PUBLIC UTILITIES LEGEND | | | | | | | | | | DATUM | | SURVEYED | | APPROVED | | PROJECT TITLE: | | | | | | | | | | SHEET | |
| <div><p>Brown Consulting Pty Ltd Level 2, 2 Bickford Place Norwest Business Park NSW Australia 2153 Tel: 02 8308 5000 Fax: 02 8308 5079 John Brown John Brown John Brown</p></div> | | | | | | | | | | | | | | | | CONICS | | MANAGER INVESTIGATION AND DESIGN | | COUNCIL CHAMBERS 62 FLUSHCROFT ROAD, BLACKTOWN ALL MAIL: GENERAL MANAGER PO BOX 63, BLACKTOWN NSW 2148 TELEPHONE: (02) 9839 6009 FAX: (02) 9831 1961 DX: 8117 BLACKTOWN | | | | | | | | | | 2 | |
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| Brown Consulting Pty Ltd Level 2, 2 Bursfield Place Newcastle Business Park NSW Australia 2113 Telephone: (02) 8008 9000 Fax: (02) 8008 9009 www.brownconsulting.com.au | | | | WATER MAINS HYDRANT STOP VALVE WATER METER WATER TAP SEWER SEWER LAMP/POLE SEWER MANHOLE | | | | AHD | | CONICS | | MANAGER INVESTIGATION AND DESIGN | | SEPP 59 EASTERN CREEK ROPES CREEK TRIBUTARY | | EXISTING CATCHMENT AREA PLAN WITH ASSUMED ADDITIONAL CATCHMENT | | OF 3 | |
| BROWN | | | | GAS GAS VALVE ELECTRICITY ELECTRICITY PIT POWER POLE POWER LIGHT POLE LIGHT POLE STAY POLE | | | | GRD | | DESIGNED | | DATE | | COUNCIL CHAMBERS 62 FLUSHCROBE ROAD, BLACKTOWN ALL MAIL: GENERAL MANAGER PO BOX 63, BLACKTOWN NSW 2148 TELEPHONE: (02) 9839 4458 FAX: (02) 9831 1961 DX: 8117 BLACKTOWN | | CAD FILE: | | SHEETS | |
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