



Preliminary  
Wastewater Disposal Report  
  
Proposed Re-zoning

136 Longleat Lane  
Kurmond

Our Ref: 20130174  
August 2013

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|             |          |
|-------------|----------|
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**Appendix A - Proposed Rezoning Layout & Effluent Disposal Areas**

**Appendix B - Calculations**

# 1 Introduction

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This report has been prepared to detail the results of an investigation and analysis to determine the requirements of an on-site effluent disposal area for the proposed re-zoning at 136 Longleat Lane, Kurmond.

The report assesses the suitability and provides basic details of the requirements necessary to provide for an On-Site Sewerage Management (OSSM) system for the development of the site.

The OSSM system is to be designed in accordance with:

- Treat effluent on-site using a certified method in accordance with Environmental Health Protection Guidelines (DLG 1998) and AS/NZS 1547:2012 (SAI & NZS 2012).
- Comply with the requirements/objectives of the Environmental Health Protection Guidelines (DLG 1998).
- *“Hawkesbury City Council Development Control Plan Part C, Section 7 – Effluent Disposal”* policy.

## 2 Site Location and Development Proposal

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### 2.1 General

The site is located at 136 Longleat Lane, Kurmond (Lot 8 DP7565) to the East of Longleat Lane.

There is currently an existing dwelling on the site in the north western corner of the site with a shed to the south and a small dam located in the central section of the site.

A natural watercourse toward the eastern section of the site coincides with dense vegetation.



Figure 1: Aerial Photo of Site

### 2.2 The Locality

The site is located to the south of the main route between North Richmond and Kurrajong, towards the southern portion of Hawkesbury City Council LGA.

The areas surrounding the site are mainly developed with rural residential style development.

## 2.3 Infrastructure

The site is currently undeveloped with sewer provisions servicing the existing dwelling and no sewer system servicing the proposed lots.

The site is serviced by water, telecommunication and power services.

## 2.4 Proposed Development

The proposed development consists of four (4) lot subdivision. Proposed Lot 401 is to retain the existing dwelling, Lot 402 is to retain the existing shed while proposed Lot 403 and Lot 404 are proposed as vacant lots.

Further investigation of a suitable existing sewerage system for Lot 401 will be required to be undertaken as part of the future subdivision DA. To dispose of the effluent generated from the additional lots being Lot 402 to Lot 404, it is proposed to utilise three separate parcels of land positioned toward the west of each lot with appropriate setbacks provided from boundaries and dense vegetation. The irrigation areas will comprise:

- Lot 402 – 453m<sup>2</sup>.
- Lot 403 – 453m<sup>2</sup>, and;
- Lot 404 – 453m<sup>2</sup>.

The proposed re-zoning and effluent disposal areas are shown on the plan contained in Appendix A.

## 2.5 Site Assessment

A preliminary site assessment revealed the characteristic soil conditions and general form of the site.

An inspection found that the generalised soil characteristic included topsoil typically 300mm thick with clayey sand at depth 300-450mm, and a clayey ironstone below this depth. These results give a soil profile indication, however, testing will need to be carried out by suitably qualified geotechnical consultant at the Subdivision DA stage.

### 3 Effluent Disposal Concept

#### 3.1 Effluent Generation

To estimate the effluent generation from the proposed subdivision the following general assumptions have been made;

- 2 persons per main bedroom and 1 person for each additional room
- 150L of effluent per person per day

Assuming a future 3 main bedroom dwelling these figures equate to an effluent generation of 900 litres per day.

#### 3.2 Site Assessment

A Site assessment rating for the on-site system has been undertaken and is shown below in Table 3.1.

**Table 3.1 – Site Assessment – Rating for On-Site Systems**

| Site Feature           | Limitation                          | Rating            | Comments                                                                    |
|------------------------|-------------------------------------|-------------------|-----------------------------------------------------------------------------|
| Flood Potential        | Above 1 in 100 year flood           | Minor             | Effluent Disposal areas are located above the 1 in 100 year ARI.            |
| Exposure               | Exposure – High sun and wind        | Minor             |                                                                             |
| Slope %                | Subsurface irrigation land 10-20%   | Moderate          | 12-15%                                                                      |
| Landform               | Plains and side slopes              | Minor - Moderate  |                                                                             |
| Run On and U/S Seepage | Non to Low                          | Minor to Moderate |                                                                             |
| Erosion Potential      | Sign of erosion                     | Moderate          | The proposed irrigation area will be set away from the erosion prone areas. |
| Site Drainage          | No visible sign of surface dampness | Minor             |                                                                             |
| Fill                   | None                                | Minor             |                                                                             |
| Buffer Distance        | Refer section 3.3                   | Minor             |                                                                             |
| Land Area              | Refer section 3.3                   | Minor             |                                                                             |
| Rock Outcrops          | None                                | Minor             |                                                                             |

A detailed soil assessment rating for on-site systems will be required to be undertaken at the Subdivision DA stage. However, based on preliminary site observations it is believed that an appropriate on-site disposal system for each lot will be possible for the proposed re-zoning layout.

Based on a preliminary assessment and our experience the site is considered to be suitable for onsite disposal of the effluent generated by future dwellings within the recommended disposal envelope as indicated in Appendix A. However a detailed soil assessment will be required to be undertaken at the subdivision DA stage to confirm the exact sizing and location of the effluent disposal envelopes.

### 3.3 Disposal System

The following parameters have been used in the calculations to determine the required disposal area:

- Concentration of total Nitrogen in effluent – 10mg/L
- Critical Loading rate of Nitrogen for pasture – 20mg/m<sup>2</sup>/day
- Concentration of Total Phosphorous in effluent – 5mg/L
- Critical Loading rate for Phosphorous – 5mg/m<sup>2</sup>/day
- Phosphorous Sorption Capacity – between 6,290kg/ha and 8,738kg/ha (Average of 7,514kg/ha)
- The 50<sup>th</sup> percentile rainfall figures and pan evaporation figures have been obtained from the Bureau of Meteorology's website for the station at the Richmond RAAF Base. They follow in Table 3.2 below.
- Evapotranspiration is the pan evaporation by a 0.7 crop factor
- Representative soil permeability – 0.06m/d
- Design Peculation Rate – 5mm/week

**Table 3.2 – Meteorological Data**

|                                           | Jan   | Feb   | Mar   | Apr  | May  | Jun  | Jul  | Aug  | Sep   | Oct   | Nov   | Dec   |
|-------------------------------------------|-------|-------|-------|------|------|------|------|------|-------|-------|-------|-------|
| <b>Temperature</b>                        |       |       |       |      |      |      |      |      |       |       |       |       |
| <b>Mean maximum temperature (°C)</b>      | 30.0  | 29.1  | 26.8  | 23.9 | 20.6 | 17.9 | 17.4 | 19.7 | 22.7  | 25.0  | 26.7  | 28.5  |
| <b>Mean minimum temperature (°C)</b>      | 17.6  | 17.7  | 15.6  | 11.4 | 7.6  | 4.9  | 3.6  | 4.4  | 8.0   | 11.0  | 14.1  | 16.0  |
| <b>Rainfall</b>                           |       |       |       |      |      |      |      |      |       |       |       |       |
| <b>Mean rainfall (mm)</b>                 | 78.5  | 125.8 | 74.2  | 48.9 | 52.4 | 48.0 | 31.2 | 30.7 | 49.7  | 52.8  | 83.5  | 61.6  |
| <b>50<sup>th</sup> Per Rain (mm/m)</b>    | 67.4  | 141.2 | 70.2  | 40.0 | 37.1 | 35.2 | 24.6 | 16.4 | 33.2  | 32.8  | 82.2  | 55.4  |
| <b>Mean number of days of rain ≥ 1 mm</b> | 7.6   | 8.5   | 7.6   | 5.8  | 5.7  | 5.4  | 4.2  | 3.4  | 4.7   | 5.9   | 8.1   | 6.5   |
| <b>Evaporation</b>                        |       |       |       |      |      |      |      |      |       |       |       |       |
| <b>Mean evaporation (mm)</b>              | 182.9 | 137.2 | 124.0 | 62.0 | 68.2 | 51.0 | 58.9 | 83.7 | 114.0 | 142.6 | 147.0 | 173.6 |

Table 3.3 – Calculations

| Summary of Disposal Area Calculations     |                   |
|-------------------------------------------|-------------------|
| Hydraulic Loading (Equivalent 3 Bedrooms) | 900L              |
| Areas                                     |                   |
| Minimum Area Method                       | 453m <sup>2</sup> |

The On-Site Sewerage Management System proposed at the subdivision DA stage will need to comply with the items outlined above.

It should also be noted that the Environment and Health Guidelines (1998) states that *“soils with a phosphorus sorption capacity of over 6000 kilograms per hectare (calculated to a depth of 1 metre) should not be limiting for irrigation areas.”* Geotechnical testing will be required to confirm soil absorption rates within in those stated in the guidelines.

Preliminary calculations carried out indicate an area of 453m<sup>2</sup> required for effluent disposal for each lot.

The various calculations were undertaken in accordance with the Environment and Health Guidelines (1998) and other relevant industry standards. Details of the calculations are included in Appendix E.

### 3.4 Available Effluent Disposal Area and Buffer Distances

The available disposal area for each of the proposed lots has been calculated as:

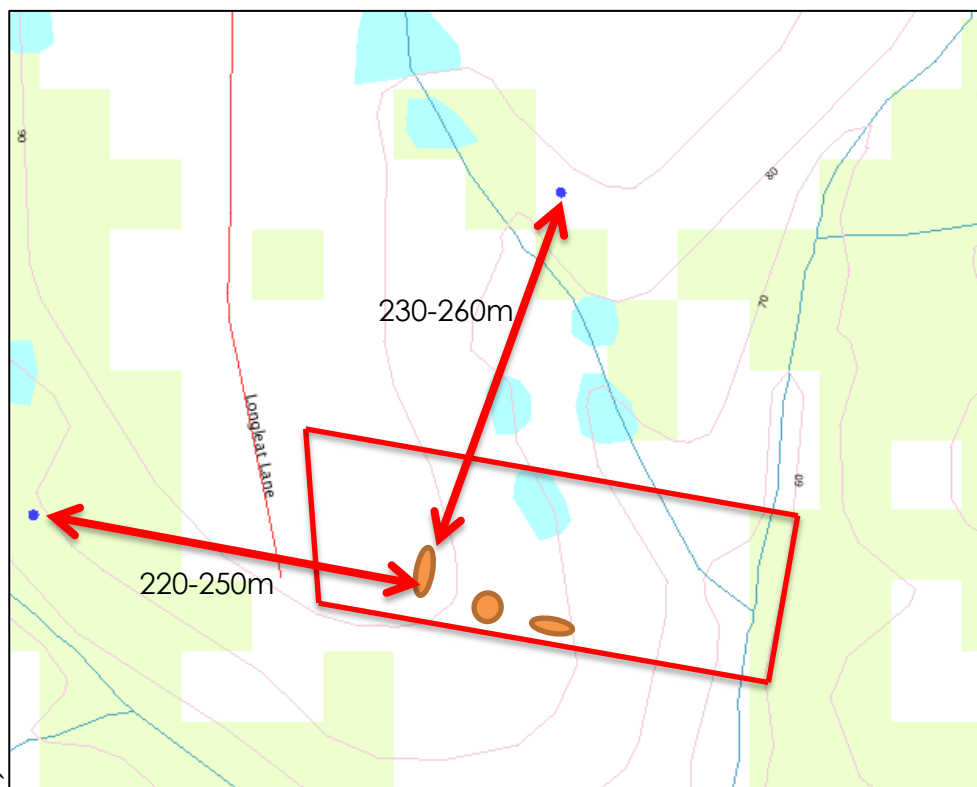
- Lot 402 – 453m<sup>2</sup>.
- Lot 403 – 453m<sup>2</sup>, and;
- Lot 404 – 453m<sup>2</sup>.

Taking setbacks and other site constraints into consideration, areas in excess of 500m<sup>2</sup> for each proposed lot are available. These areas are shown in Appendix A.

The buffer distances provided around the effluent disposal area (for a subsurface irrigation system) are listed below together with the provided distances.

- Permanent waters – 100m (recommended – 100m)
- Domestic groundwater well – 220 - 260m (TBC) (recommended – 250m)
- Intermittent waterways – 40m (recommended - 40m)
- Upstream and side boundaries – min 3m (recommended – 3m)
- Downstream boundaries – min 6m (recommended – 6m)

The location of the two bore holes identified will need to be confirmed. It is noted that the northern borehole is located upstream of proposed effluent treatment area while the western borehole is located beyond the crest of the hill to the west of the site.



## ■ Groundwater Bores

Figure 2: NSW Natural Resource Atlas

Clarification of the distances of boreholes from the effluent disposal areas will be required during further investigation and design of effluent disposal areas at the subdivision DA stage. This preliminary assessment suggests that the effluent disposal areas should be possible without negative impact subject to further investigation and design.

## 4 Conclusion

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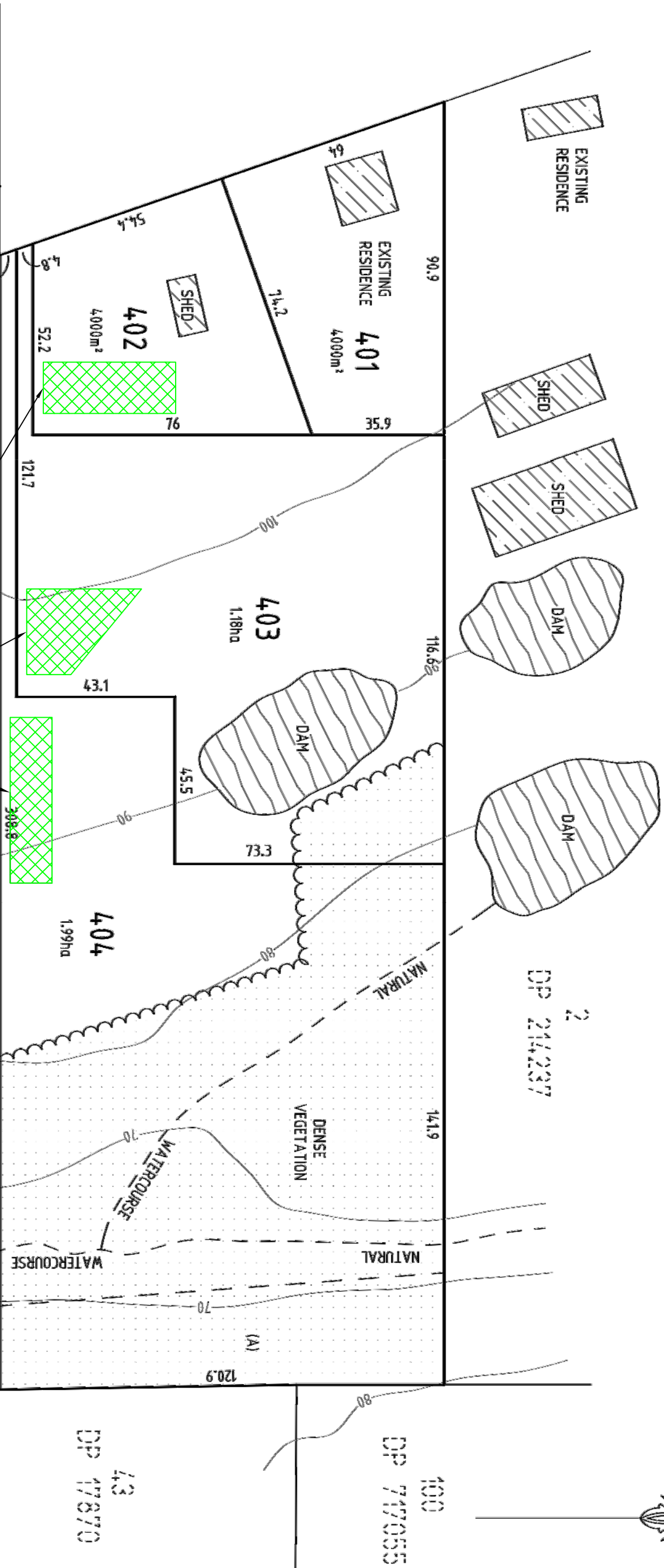
From the preliminary assessment for on-site effluent disposal for the proposed re-zoning, each lot is considered suitable to the effective dispose of effluent provided:

- The disposal area required for each proposed lot will be approximately 453m<sup>2</sup> while a provision of over 500m<sup>2</sup> has been allowed for.
- Buffers and setbacks have been checked and maintained generally in accordance with aforementioned on-site effluent disposal policies.
- Buffer distance to existing boreholes will need to be confirmed with the necessary measures taken during design to ensure necessary precautions are taken should the buffer distance fall short of the requirement.

The clarifications noted above will be required to be confirmed as part of a more detailed investigation at the Subdivision DA stage and can be conditioned for as part of any development application consent issued.

## **Appendix A**

### **Proposed Re-zoning Layout and Effluent Disposal Areas**



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(A) EASEMENT FOR TRANSMISSION LINE (L994.799)

|          |                                    |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
|----------|------------------------------------|---|----|----|----|----|-------------------|----|----|----|----|----|----|----|----|----|----|
| F        | 0                                  | 5 | 10 | 15 | 20 | 25 | MILLIMETRES AT A3 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| E        | DESIGN BY A.E.                     |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| D        | SURVEY BY NO SURVEY MADE           |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| C        | CALCS BY                           |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| B        | DRAWN BY A.DONALD                  |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| A        | CHECKED BY ASDWARDS                |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| REVISION |                                    |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
| Date     | REDUCTION RATIO AT A3 1:1250       |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
|          | CONTOUR INTERVAL 10m               |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
|          | ORIGIN OF LEVELS THERMOGRAPHIC MAP |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |
|          | DATUM APPROXIMATE A.M.D.           |   |    |    |    |    |                   |    |    |    |    |    |    |    |    |    |    |



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PLAN No. 93340044  
LGA HAWKESBURY  
C.FILE: 93340044.DWG

**PLAN OF PROPOSED SUBDIVISION OF LOT 8 DP 7565  
LONGLEAF LANE, KURMOND**

DATE 28/8/2013  
FILE No. 93340  
COUNCIL REF

CLIENT NAME FUSON & ASSOCIATES PTY LTD  
LOCALITY KURMOND  
PLAN No. 93340044  
LGA HAWKESBURY  
C.FILE: 93340044.DWG

SHEET No. 1  
OF 1 SHEETS



## **Appendix B**

### **Calculations**

## MINIMUM AREA METHOD BALANCE & WET WEATHER STORAGE CALCULATIONS

|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
|------------------------------|--------|-----------------|----------------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Design Effluent Flow         | (Q)    | l/day           | 900            |       |       |       |      |      |       |       |       |       |       |       |       |
| Design Percolation Rate      | (R)    | mm/wk           | 5              |       |       |       |      |      |       |       |       |       |       |       |       |
|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Parameter                    | Symbol | Formula         | Units          | Jan   | Feb   | Mar   | Apr  | May  | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   |
| Days in Month                | (D)    |                 | days           | 31    | 28    | 31    | 30   | 31   | 30    | 31    | 31    | 30    | 31    | 30    | 31    |
| Precipitation                | (P)    | 50th Percentile | mm/month       | 67.4  | 141.2 | 70.2  | 40   | 37.1 | 35.2  | 24.6  | 16.4  | 33.2  | 32.8  | 82.2  | 55.4  |
| Evaporation                  | (E)    |                 | mm/month       | 182.9 | 137.2 | 124.0 | 62.0 | 68.2 | 51.0  | 58.9  | 83.7  | 114.0 | 142.6 | 147.0 | 173.6 |
| Crop Factor                  | (C)    |                 |                | 0.7   | 0.7   | 0.7   | 0.7  | 0.7  | 0.7   | 0.7   | 0.7   | 0.7   | 0.7   | 0.7   | 0.7   |
| Outputs                      |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Evaprtanspiration            | (ET)   | (E x C)         | mm/month       | 128.0 | 96.0  | 86.8  | 43.4 | 47.7 | 35.7  | 41.2  | 58.6  | 79.8  | 99.8  | 102.9 | 121.5 |
| Percolation                  | (B)    | (R / 7) x D     | mm/month       | 22.1  | 20.0  | 22.1  | 21.4 | 22.1 | 21.4  | 22.1  | 22.1  | 21.4  | 22.1  | 21.4  | 22.1  |
| Outputs                      |        | (ET + B)        | mm/month       | 150.2 | 116.0 | 108.9 | 64.8 | 69.9 | 57.1  | 63.4  | 80.7  | 101.2 | 122.0 | 124.3 | 143.7 |
| Inputs                       |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Retained Precipitation       |        | P*0.75          | mm/month       | 50.6  | 105.9 | 52.7  | 30.0 | 27.8 | 26.4  | 18.5  | 12.3  | 24.9  | 24.6  | 61.7  | 41.6  |
| Possible Effluent Irrigation | (W)    | (ET+B)-P        | mm/month       | 99.6  | 10.1  | 56.3  | 34.8 | 42.1 | 30.7  | 44.9  | 68.4  | 76.3  | 97.4  | 62.7  | 102.1 |
| Actual Effluent Production   | (I)    | H/12            | mm/month       | 60.5  | 60.5  | 60.5  | 60.5 | 60.5 | 60.5  | 60.5  | 60.5  | 60.5  | 60.5  | 60.5  | 60.5  |
| Inputs                       |        | (P + I)         | mm/month       | 111.0 | 166.4 | 113.1 | 90.5 | 88.3 | 86.9  | 78.9  | 72.8  | 85.4  | 85.1  | 122.1 | 102.0 |
|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Storage                      | (S)    | (P+I)-(ET+B)    | mm/month       | -39.2 | 50.3  | 4.2   | 25.6 | 18.4 | 29.7  | 15.5  | -8.0  | -15.9 | -36.9 | -2.2  | -41.7 |
| Cumulative Storage           | (M)    |                 | mm             | 0.0   | 50.3  | 54.5  | 80.1 | 98.5 | 128.2 | 143.8 | 135.8 | 119.9 | 83.0  | 80.8  | 39.2  |
|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Irrigation Area              | (L)    | 365 x Q / H     | m <sup>2</sup> | 453   |       |       |      |      |       |       |       |       |       |       |       |
|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |
| Wet Weather Storage          | (V)    | Largest M       | mm             | 143.8 |       |       |      |      |       |       |       |       |       |       |       |
|                              |        | (V x L) / 1000  | m <sup>3</sup> | 65.1  |       |       |      |      |       |       |       |       |       |       |       |
|                              |        |                 |                |       |       |       |      |      |       |       |       |       |       |       |       |