Attachment 2

Engineering Services Report

PLANNING PROPOSAL

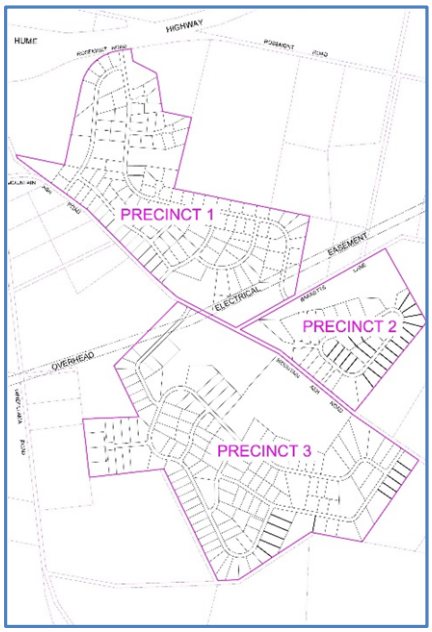
THE HUB
MOUNTAIN ASH ROAD, GOULBURN
ENGINEERING SERVICES REPORT

Contents

1. Roads and Lot layout

1.1. Site Features

The site is characterized by gently to moderately sloped hillsides generally falling towards Mountain Ash Road with gradients between 2% to 12%. These hillsides contain predominantly 1st and 2nd order drainage depressions and these contain a number of farm dams. Topographical data was obtained from the ELVIS – Elevation & Depth – foundation spatial data. The aerial photo was obtained from Nearmap's Mapbrowser and is dated April 2021.



PRECINCT PLAN

On the western side of Mountain Ash Road two watercourses run parallel through Precinct 3 before converging just prior to the northern boundary of this precinct with an average slope of less than 1%. The watercourse to the east originates on the eastern side of Mountain Ash Road which it crosses by a series of culverts and would be classified as a 3rd order watercourse. The other enters the southern boundary of Precinct 3 as a 1st order depression where it joins with a number of other 1st order depressions.

There is another 3rd order watercourse that crosses Precinct 2 which enters from the eastern boundary near Barretts Lane and then crosses Barretts Lane by culverts near the intersection with Mountain Ash Road and enters Precinct 1. The watercourse then crosses Mountain Ash Road some 400m north of Barretts Lane by multiple box culverts past the northern boundary of Precinct 3.

There is a 45m wide easement for electricity which contains overhead transmission lines that passes through the southern portion of Precinct 1, crosses Mountain Ash Road before cutting through the northern corner of Precinct 3.

There are two existing dwellings on the site, one near the northern boundary of Precinct 1 and the other near the southern boundary of Precinct 3. Both these dwellings have a driveway access onto Mountain Ash Road. These are also a number of other driveway entrances onto Mountain Ash Road to serve other existing lots.

An investigation of the site including site inspections has not identified any areas of salinity within the site itself.

The existing roads that the development site has frontages to are Mountain Ash Road, Rosemont Road and Barretts Lane. All these roads are 20.115m wide sealed roads with 80kph speed zones.

1.2. Considerations

The following items were considered as part of the preparation of the road and lot layout:

- Minimal number of intersections with the existing roads
- Roads and common lot boundaries to avoid crossing an incised watercourse
- The proposed lots will have access from the new roads only
- Water NSW's guidelines 'Water Sensitive Design Guide for Rural Residential Subdivisions'
- A minimum lot size of 4,000m² to allow for a sufficient area for dwellings to be separate to an effluent management area (EMA)
- Sufficient area for dwellings which is separate to an allowance for an EMA located above the 100yr ARI flood level
- A 20m front setback for dwellings to comply with the DCP
- EMA's to be setback a minimum 40m upslope from drainage depressions and 100m setback for an incised watercourse

1.3. Road Layout

The proposed road reserve widths are 20m in accordance with Council's Standards for Engineering Works Design Specification 2013. The new roads will incorporate table drains in accordance with Council's standard drawing SD-R 01 A. The table drains can incorporate mitre drains at regular intervals. It is expected that the any intersections with an existing road will incorporate BAR/BAL treatment.

Precinct 1 has two proposed intersections with Mountain Ash Road and one intersection with Barretts Lane. Precinct 2 has the single access with Mountain Ash Road whilst Precinct 3 has just the two intersections with Mountain Ash Road. This reflects the current number of driveway accesses to the existing lots. All of the proposed intersections have suitable separation from any other intersection whether it be existing or proposed.

The locations of the intersections enable suitable sight distance requirements in accordance with the Austroads guidelines.

Some of the roads follow depressions to avoid common boundaries crossing the flow paths. The roads incorporating a cul-de-sac are all less than 200m in length and suitable in terms of any bushfire risk and council's design specifications.

1.4. Earthworks

The proposal does not include any regrading of the site and hence the required earthworks will be restricted to that required for the roads. As the topography is characterized by gently to moderately sloped hillsides, then there will not be any significant cut and fill required. There may be some works relating to stabilizing the existing 3rd order watercourses but this will largely be limited to battering back of embankments which again will only require minimal earthworks and would not require any removal of spoil from the site nor require any additional material to be brought onsite.

1.5. Lot Layout

The plans in Attachment 'A' show a potential yield of 321 lots. The minimum lot size is 4,000m² where the lot is unencumbered. The area of the lots increases to allow for encroachments by watercourse

setbacks and the 100yr ARI flood extents and thereby retain sufficient areas for a dwelling and EMA. Some of the boundaries of the lots have been skewed to avoid boundary fencing across flow paths.

The two existing dwellings have been located within future allotments with allowances for the required minimum setbacks to the new boundaries. The existing effluent treatment systems will be augmented and relocated as necessary to be retained within the existing lot boundaries.

The proposed lots ARE also sized and shaped to enable future dwellings to be suitably orientated for solar access.

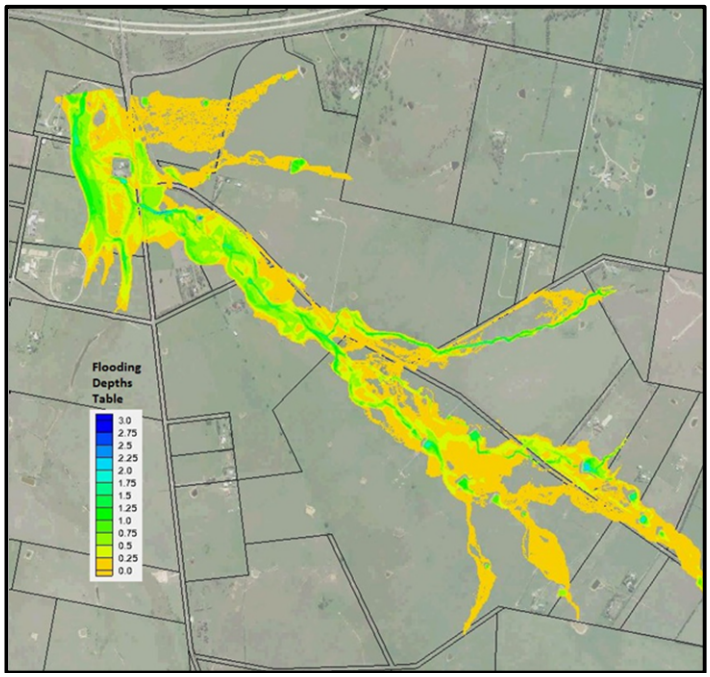
The three 3rd order watercourses are retained within large lots and are crossed by proposed property boundaries on only two occasions. This is to minimise impediments to the flows. Each of these lots contains an area suitable for a dwelling and EMA.

2. Flooding

The extent of the flooding shown on the plans was determined using Hydrological Modeling undertaken using WBNM ('Watershed Bounded Network Model' Boyd et al, 2007) which enables simulation of complex catchment behavior. TUFLOW was then used to model the hydrodynamic behavior in the watercourses and floodplains for the 100yr ARI applying a 120min critical duration.

An analysis was also undertaken of Gundary Creek applying a 720min critical duration. Gundary Creek is a large rural catchment the main channel of which is to the west of Windellama Road. The analysis determined that the rising waters from the Gundary Creek system have little impact on the site.

Below is an extract from the modelling showing the extent and depth of the 100yr ARI inundation. A significant extent of the area subject to flooding during the 100yr ARI is between 0 and 250mm.



A sensitivity analysis was also undertaken for the 50yr ARI which determined that the extent of inundation was largely similar to that determined for the 100yr ARI. The attached drawing T01405-HUB-SITE-FEATURES-SK102 shows 100yr ARI flood extents. The plan also shows the centerlines

of the drainage paths and setbacks of either 40m or 100m dependent upon whether the drainage path has caused an incision into the ground surfaces.

The analysis determined that the rising waters from the Gundary Creek system have little impact on the Planning Proposal site nor potential future layout.

3. State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The subject site is located within the Sydney Drinking Water Catchment Area. Therefore, concurrence will be required from Water NSW for any proposed development of the site relating to achieving a Neutral or Beneficial Effect (NorBE) in regards to stormwater runoff quality and effluent management.

Discussions were held with the local Water NSW officer regarding the site. The site assessment to achieve NorBE incorporated the application of the department's guidelines particularly the *Water Sensitive Design Guide for Rural Residential Subdivisions 2021*. The assessment included site inspections to classify the existing watercourses. Furthermore, there were no indications from the inspections of any areas of salinity and/or possible contamination and there was only the one localized area of rock outcrops.

The result of the assessment is that the development site would be able to support onsite effluent management areas within unencumbered lots of 4,000m².

3.1. Treatment of Stormwater Runoff

As discussed above, the proposed roads will incorporate table drains which will assist in treating the runoff from the roads. To offset any increase in pollutants in the runoff from the site, it is proposed that tree planting is undertaken along the main watercourses. The widths of planting would be in the order of 10-15m wide and will be fenced. This could also be applied in conjunction with modifying the two 3rd order watercourses within Precinct 3 to create one channel.

3.2. Effluent Management

For each lot, an area of up to approximately 2,000m² for an Effluent Management Area (EMA) has been considered in the determination of the proposed lot sizes & layout. A process in accordance with the Water NSW's guidelines 'Water Sensitive Design Guide for Rural Residential Subdivisions' was applied to support this area for an EMA to each lot.

A Site & Soil Evaluation was undertaken by ACT Geotechnical Engineers P/L which included 31 test holes across the proposed development site. The report is included in Attachment 'B'.

The data from the report was then entered into the WaterNSW's NorBE assessment tool for a number of test locations applying:

- Four bedrooms excluding a spa bath
- Rainwater water supply
- Standard Aerated Wastewater Treatment System (AWTS)
- Sub-surface irrigation for disposal
- Ground water generally >1m deep as none test holes encountered any ground water
- The calculated permeability applied where suitable
- Slope gradients were obtained from the terrain model

The AWTS system was trialed as this would be the most likely cost-effective methodology of wastewater treatment but other treatment systems would also be suitable. A spa bath was included for

one of the locations and the required area of treatment was less than 2,000m². The results of the test holes entered into the assessment tool would be indicative of the whole of the site and supported the area of 2,000m² for the EMA's. The proposed lot layout will require some additional refinement during the preparation of a Development Application including identifying the location of table drains to the proposed roads.

Attachment 'C' contains the NorBE assessment summaries with the test hole reference number shown on the top left corner.

4. Contamination

Currently a large area of the site is being used for agriculture which may require the use of fertilisers and possibly pesticides. The planning proposal has the potential to reduce the amount of contaminates that would currently be washed into the existing depressions and watercourses. The Site & Soil Evaluation undertaken by ACT Geotechnical Engineers P/L also included test results for the presence of organochlorine pesticides (OCP) and organophosphorus pesticides (OPP) in three locations. The results of these tests were assessed against the National Environmental Protection Measure (NEPM and were significantly below the required health-based investigation levels for residential development.

Given the results of soils testing, the proposal is considered to be in accordance with the requirements of *SEPP55 – Remediation of Land* and as the results presented are significantly below health requirements, remediation is unlikely to be required.

The site is therefore considered to be low in risk with regard to contamination and is unlikely to present any concerns for future residents.

5. Utility Services

5.1. Water Supply

The nearest Council water main is located on the other side of the Hume Highway approximately 1km away from the intersection of Rosemont Road and Windellama Road. It is understood that the pipe size is 100mm which is expected to have insufficient capacity to service the site.

There is potential for upgrading this reticulated service with provision o pump station and rising main extension, alternatively on site supply of water can be collected via rain water tanks. It is expected that in such circumstances future dwellings will be required to have not less than 46,000 litres of roof water storage for domestic purposes in accordance with the DCP.

5.2. Electrical

There is an overhead electrical service along Mountain Ash Drive from which it is expected that electrical power can be expanded through the proposed road layout to service the new lots.

5.3. Telecommunications

There are existing telecommunication services within Mountain Ash Road, Rosemont Road and Barretts Lane. Telecommunication services to the lots can be reticulated from these existing services.

5.4. Sewer

Connection of the site to an existing sewerage system is unavailable and therefore wastewater will be required to treated and disposed of onsite.