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The General Manager
Queanbeyan-Palerang Regional Council
PO Box 90
QUEANBEYAN NSW 2620

Your Ref: SF170402
Our Ref: R18/685
DA18071814052 DD

ATTENTION: Arthean McBride

8 August 2018

Dear Sir / Madam

Planning Proposal - Planning Proposal - Queanbeyan LEP 2012 -2//112382 & 126//754881 Old Cooma Road, Queanbeyan

I refer to your correspondence dated 13 July 2018 seeking advice for the above Planning Proposal in accordance with the 'Environmental Planning and Assessment Act 1979'.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted and has no specific recommendations in relation to bush fire protection.

Should you wish to discuss this matter please contact Deborah Dawson on 1300 NSW RFS.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Bradley Bourke'. The signature is stylized with a large 'B' and a cursive 'Bourke'.

Bradley Bourke
A/Team Leader Development Assessment & Planning

For general information on bush fire protection please visit www.rfs.nsw.gov.au



Office of
Environment
& Heritage

DOC18/492556

Ms Arthean McBride
Senior Strategic Planner
Queanbeyan Palerang Regional Council
arthean.mcbride@qprc.nsw.gov.au

Dear Ms McBride

RE: Planning Proposal to allow Cemetery and Crematorium in E4 land at Old Cooma Road.

Thank you for providing the Office of Environment and Heritage (OEH), with a copy of the planning proposal. Over all we do not object to the addition of a cemetery and crematorium to be permitted under Schedule 1 for Lot 2 DP 112382 and Lot 126 DP 754881. However, there may be constraints that will need to be considered prior to the development application (DA) being lodged. We have provided detailed comments in Attachment 1 regarding, additional work that will need to be done prior to lodging a DA. These comments relate to the following topics:

Flooding

As this proposal is affected by flooding, OEH recommends that Council obtains a suitable flood risk assessment to inform its determination.

Flood risk management is a key issue for land-use planning. To support a strategic approach to floodplain risk management, the OEH remains available to provide council with guidance to identify and prioritise areas for preparing Floodplain Risk Management Plans for its existing and future flood liable communities.

Aboriginal cultural heritage

Further Aboriginal cultural heritage assessment will be required if the proposal proceeds to a development application stage.

The planning proposal includes an Aboriginal Archaeological Due Diligence Assessment prepared by Eco Logical Australia (ELA). This assessment identified 11 new Aboriginal sites, including seven isolated artefacts and four artefact scatters. The identified sites are all within 100 metres of Church Creek and ELA have subsequently mapped an area of archaeological sensitivity along Church Creek.

OEH supports the recommendation from ELA (2018) that a more detailed investigation, including subsurface archaeological testing would be required. OEH advises that conservation outcomes for Aboriginal cultural heritage should also be considered.

Council is reminded that if Aboriginal objects will be subject to harm, an Aboriginal Heritage Impact Permit (AHIP), issued by OEH under the National Parks and Wildlife Act 1974 will be required. More detail comments on Aboriginal cultural heritage matters have been included in Attachment One.

Biodiversity

The total area of the site is 34 hectares. There appears to be sufficient area on the site for the placement of a crematorium and a cemetery without the need to clear the Box Gum Woodland identified on site. Please also be aware that there will be a review of the Biodiversity Assessment Method (BAM) between the finalisation of this planning proposal and the development application that may result. While we note that the BAM appears to have been applied to inform this planning proposal. Any changes to the BAM will need to be considered at the DA stage.

Please contact Tobi Edmonds on (02) 6229 7094 or at tobi.edmonds@environment.nsw.gov.au if you would like to discuss these comments further.

Yours sincerely


6/8/18
ALLISON TREWEEK
Senior Team Leader - Planning
Regional Operations - South East

ATTACHMENT 1 – Detailed Comments on Planning Proposal

Flooding

The hydrological assessment for the proposed development covered by the planning proposal indicates that Church Creek is fed by tributaries on the site, that there are areas not draining to Church Creek and that there are several existing dams on the site. The hydrological assessment indicates that parts of the site are subject to flooding and will therefore need to be considered by council in accordance with the NSW Government's Flood Prone Land Policy as set out in the NSW Floodplain Development Manual (2005). The primary objective of the policy is to reduce the impact of flooding and flood liability on individual owners and occupiers, and to reduce the private and public losses resulting from flooding, utilising environmentally positive methods wherever possible.

The hydrological assessment will also need to analyse all other potential flow paths across all parts of the proposed development, for both existing and post development scenarios. For the determination of this matter to be consistent with the principles of the Floodplain Development Manual the implications of the full range of floods up to the Probable Maximum Flood (PMF) within the broader catchment should be considered by council. Consideration should be given to:

- The impact of flooding on the proposed development;
- The impact of the proposed development on flood behaviour (particularly any offsite flood impacts because of potential encroachment, land use and land form changes);
- The impact of flooding on the safety of people/users of the development for the full range of floods including issues linked with isolation and accessibility for emergency services; and
- The implications of climate change (particularly increased rainfall intensity) and estimated flood planning levels.

From the information available, more detailed analyses are required. Specifically:

- Flood hazard across the site and adjoining residential areas over the full range of potential floods;
- Suitability and ongoing ownership and management implications of the various dams on flooding and whether Dam Safety Committee requirements are met;
- Strategies to facilitate flood access and evacuation of employees, mourners and other visitors, if there is potential for isolation;
- Trafficability of the proposed road network both on and off site and any culvert structures across watercourses;
- Afflux associated with the proposed road and culvert structures over the watercourses, including potential implications for proposed lots upstream of the structures;
- Flood extents and the flood planning area overlayed with a cemetery & crematorium layout to allow informed consideration of the planning proposal.

Aboriginal cultural heritage

Due diligence assessment process

OEH does not have a role in certifying due diligence assessments. It is the responsibility of the proponent to ensure that they have made all reasonable attempts to determine whether Aboriginal objects will be harmed through the proposed works. However, in this instance OEH has reviewed the due diligence assessment prepared by ELA (2018).

Further assessment will be required at the development application stage

Further Aboriginal cultural heritage assessment will be required if the proposal proceeds to a development application stage.

OEH supports the recommendation from ELA that further investigation is required. ELA recommends that if any works are planned in the archaeologically sensitive area, detailed investigation including subsurface testing would be required. OEH notes that the area of sensitivity is based on landform only, with an arbitrary buffer from the creek channel. Any testing program undertaken should also explore the boundary of this area of sensitivity. A survey in accordance with the *Code of Practice for Archaeological Investigation* and the *Aboriginal cultural heritage consultation requirements for*

proponents must also be undertaken to support an Aboriginal Cultural Heritage Assessment Report (ACHAR).

Dependent on the survey and test excavation results Council should consider and fully explore options for conservation of Aboriginal objects if it is warranted. OEH is aware of a high density subsurface site (57-2-0958 - MPAS13) approximately 700 metres from the planning proposal area. The subsurface archaeological testing and the completion of an ACHAR in accordance with OEH guidelines should be undertaken prior to development approval. The timing of this approach provides the best opportunity to conserve Aboriginal heritage sites and gives certainty to all parties about the Aboriginal cultural heritage management requirements. If Aboriginal objects are identified and will be subject to harm an AHIP issued by OEH under the *National Parks and Wildlife Act 1974* will be required.

Biodiversity

EcoLogical Australia, has completed the vegetation assessment component of the Biodiversity Assessment Method (BAM), however the targeted species surveys that are needed to determine the presence of the species credit species (see Table 7 of the Flora and Fauna Assessment) have not been done. These would need to be completed if the future development application were to propose removing the remnant Box-Gum Woodland.

Council should also be aware that there is a requirement to review the BAM periodically. Any future development application would need to ensure that the latest version of the BAM has been applied.



**Natural Resources
Access Regulator**

Contact Tim Baker
Phone 02 6841 7403
Fax 02 6884 0096
Email Tim.Baker@nrar.nsw.gov.au

Arthean McBride
Queanbeyan-Palerang Regional Council
Senior Strategic Town Planner
PO Box 90
QUEANBEYAN NSW 2620

Our ref V15/3876-2#78

22 October 2018

Dear Arthean

RE: Planning Proposal for new cemetery in Queanbeyan

I refer to your letter dated 10 August 2018 requesting consideration of a proposed amendment to the Queanbeyan Local Environmental Plan 2012. It is understood the amendment purpose is to:

- Add the term 'cemetery' to Schedule 1 of the LEP to make this use permissible with consent within Lot 2 DP 112382 and Lot 126 DP 754881.

The supporting documentation has been reviewed and the following key comments and recommendations are provided to address concerns raised by Council in regards to groundwater at the proposed site.

Comments

- The depth of the investigation holes are insufficient to define groundwater levels across the site and the timing ineffective to define the "wet weather" maximum groundwater levels across the site. Conclusions drawn from this data may cause errors in assessment of the site.
- The geotechnical investigation holes were drilled procedurally to a depth of 3.5m below ground level (bgl) and not designed to delineate groundwater levels across the site. In addition the investigation was conducted (6th April 2017) following a period of extreme low rainfall during January and February 2017. March 2017 had a single 3 day high rainfall event but this would not have been sufficient to add significantly to the water table levels with the majority of this high rainfall event reporting as surface runoff to the local streams.
- A groundwater level of less than 3m bgl within a cemetery site are insufficient to prevent potential groundwater impacts. A singular point measurement may be an anomaly however the investigation reports and data presented are insufficient to determine the groundwater level across the site. Further investigation is warranted to determine the maximum ('wet weather') groundwater levels as these are the level which will potentially be impacted the most.
- Concerns have been identified in relation to the suitability of the studies conducted to date and the potential impacts of the proposed cemetery to the groundwater source.

Recommendations prior to finalising the proposed amendment

1. Further investigation of the baseline groundwater levels and groundwater quality for a minimum 12 month period is undertaken prior to any further action to ensure there is sufficient depth to the water table. This should be performed by the installation of three monitoring bores to basement in a way to allow for determination of groundwater flow direction, i.e. not aligned), soil characterisation (logging during drilling) and water quality characterisation. The more significant information to obtain is the depth and variation of water levels. This can be obtained through the use of automated water level loggers placed in bores for the recommended 12 month period.
2. The further investigation is to include an assessment of the cover material type and depth to bedrock across the entire site to ensure that natural formations offer protection.
3. Using the data obtained under recommendation 1 and 2, conduct a hydrogeological assessment of present and future risks should groundwater levels be less than 3 m below the ground surface or occurs at, or less than, 1.5 m below the burial level; and
 - a. establish recommendations concerning appropriate management and treatment of leachates;
 - b. establish recommendations in order to prevent migration of decomposition products into the substrate and groundwater;
4. Allowance for potential rise in the water table, including climatic (drought versus non-drought), seasonal variations and extreme rainfall must be included in any further assessment.

Recommendation should the amendment be approved

- Before commencement of burials, best practices would require a minimum of three (3) groundwater monitoring bores are installed; constructed into bedrock to enable sufficient monitoring of groundwater levels, groundwater flow across the site and groundwater quality. These bores can be the same bores as those installed prior to determination. The risk assessment will inform the level of effort and frequency of monitoring requirements.

General Recommendations for any new cemetery site

1. The site should not have groundwater closer than 3m below ground level.
2. Burials should be at least 250 metres from any well, borehole or spring supplying water for human consumption or used in food production – for example at dairy farms, commercial vegetable gardens/farms, etc.
3. Burials should be at least 30 metres from any spring or watercourse not used for human consumption or not used in food production.
4. Burials should be at least 10 metres from any field drain, including dry ditches.
5. Burials should at least 1.5 metre clearance between the base of the grave and the top of the maximum groundwater level – burial sites should not have any standing water in them when dug
6. Burial sites should not be dug in unaltered or unweathered bedrock (i.e. bedrock areas are recommended to be excluded from all burials)
7. Burial sites should not be dug in areas susceptible to groundwater flooding (e.g. decomposed – weathered bedrock zones may be noteworthy groundwater sources, buried alluvial sand - gravel deposits along watercourse lines are highly susceptible to groundwater flooding).
8. Cemeteries are not recommended to be located in areas where:
 - a. The groundwater level is shallow

- b. Seasonal or ephemeral floods occur
- c. The substrate is very permeable (e.g., sands and gravels, fractured rocks, karst structures)

Should you have any further queries in relation to this submission please do not hesitate to contact Tim Baker 02 6841 7403.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Vickie Chatfield', enclosed within a large, loopy oval shape.

Vickie Chatfield
Manager Water Regulatory Operations- West
Department of Industry- Natural Resources Access Regulator



Contact Tim Baker
Phone 0428162097
Email Tim.Baker@nrar.nsw.gov.au

Martin Brown
Queanbeyan-Palerang Regional Council
Program Coordinator Urban
PO Box 90
QUEANBEYAN NSW 2620

Our ref V15/3876-2#78

30 July 2020

Dear Martin

**RE: Planning Proposal for new cemetery in Queanbeyan at 1241 Old Cooma Rd,
Googong - additional groundwater report**

I refer to the additional groundwater report provided in an email dated 27 May 2020 submitted in response to the Natural Resources Access Regulator's (NRAR) letter dated 22 October 2018. Based on the additional information provided the planning proposal can be supported if the below recommendations are addressed. Detailed comments on the adequacy of the report in addressing NRAR's previous recommendations are included in Attachment 1.

Recommendations

- 1 Development and implementation of an ongoing groundwater monitoring program that includes:
 - a. Continuous water level monitoring of all shallow monitoring bores on site and periodic water level monitoring of the deeper bores i.e. quarterly and after rainfall events greater than 30 mm.
 - b. Identification of trigger water levels that will prompt the implementation of mitigation measures.
 - c. Periodic water quality sampling and reporting targeting potential contaminants associated with the use of the site as a cemetery/burial i.e. quarterly and after rainfall events greater than 30 mm.
 - d. Identification of trigger water quality levels that will prompt the implementation of mitigation measures.
- 2 Development and implementation of a mitigation procedure based on identified water level triggers to prevent the water level rising above 3.0 m bgl and/or 1.5 m below burial. Mitigation measures may include pumping. Council will need to ensure the appropriate water access licences to account for water take and water supply work approval to authorise the pumping infrastructure under the *Water Management Act 2000* are obtained prior to any pumping.
- 3 Development and implementation of a mitigation procedure based on the water quality triggers identified in the groundwater monitoring program. Groundwater quality must be maintained so that it is suitable for domestic and irrigation use on neighbouring properties. The procedure must also include:

- a. The development and implementation of a suitable containment structure to prevent migration of decomposition products into the substrate and groundwater i.e. bunding and sedimentation ponds.
 - b. How the existing clay aquitard will be preserved during burial activities and the operation of the site.
- 4 Inclusion of the "suitable", "not suitable" and "mitigation required" zones identified by Eco Logical Australia (2019) into the development plan for the site (Figure 4-8).
- 5 All areas identified as not suitable for development, i.e. prone to flooding, water table above 3.0 m bgl and bedrock within 3 m bgl, must not be used for gravesites.
- 6 All previous general recommendations included in NRAR's letter dated 22 October 2018 are met, including:
 - a. Burials must be 250 m from any well or spring used for human consumption.
 - b. Burials must be 30 m from any spring or watercourse not used for human consumption or food production.
 - c. Burials must be 10 m from any drain including swales/dry ditches.

Should you have any further queries in relation to this submission please do not hesitate to contact Tim Baker 0428162097.

Yours sincerely



Bryson Lashbrook
A/Manager Water Regulatory Operations- West
Natural Resources Access Regulator
Department of Planning, Industry and Environment

Detailed comments of report “Proposed cemetery site, Old Cooma Rd, Googong: Hydrogeological Assessment (Eco logical Australia 2019) to address the recommendations in NRAR’s letter dated 22 October 2018

Recommendation 1

Five new monitoring bores were installed between 18 and 20 December 2018 by Coffey Services Australia Pty Ltd (Coffey) on behalf of ELA. Three of the five bores were screened within the shallow alluvial aquifer (MW01A, MW02A and MW09A) and two were screened within the deeper dacite bedrock aquifer (MW02B & MW09B):

- MW01A 7.4 m bgl depth, screen interval 4.4 – 7.4 m bgl;
- MW02A 7.2 m bgl depth, screen interval 3.7 – 6.7 m bgl;
- MW02B 11.4 m bgl depth, screen interval 7.9 – 10.9 m bgl (target depth);
- MW09A 7.6 m bgl depth, screen interval 4 – 7 m bgl; and
- MW09B 12.2 m bgl depth, screen interval 9.2 – 12.2 m bgl (target depth).

In-situ data loggers were installed on the 13 February 2019, in the three shallow monitoring bores (MW01A, MW02A and MW09A). Water level (WL) data was recorded every 15 minutes by the data loggers and manually downloaded each month (latest data was retrieved 21 April 2020). Manual WL readings were also recorded each month to validate the logger data.

It should be noted that a heavy rainfall event in February 2020 resulted in the failure of all three loggers, and approximately one month of data was lost. All loggers were replaced on 31 March 2020. Despite this malfunction, the Department is satisfied that enough data has been collected to satisfy this recommendation.

Recommendation 2

The bore log results from the geotechnical investigation conducted in 2017 were combined with the bore log results from the installation of the five new monitoring bores (in the southern portion of the site) to determine the subsurface soil and bedrock conditions across the site. The thickness of the soil profile varies across the site; thinner in the northern portion of the site and thicker in the southern portion of the site (thickest in the south west portion). The profile generally consists of top soil (silty clay/sand) to 0.2 m bgl, alluvial deposits (silty clay/sand) to 4 m bgl, weathered dacite bedrock to 7 m bgl, followed by dacite bedrock to 12.2 m bgl (depth of investigation). Note, air hammer drilling method was generally required for depths greater than 7 m bgl.

Depth to competent bedrock across the site can be divided into two; north and eastern portion of the site < 3 m bgl, south-south western portion of the site > 3.5 m bgl.

Recommendation 3

Groundwater levels recorded over the last 12 - 14 months from the five new monitoring bores are summarised in the table below.

Table 1 Groundwater level summaries 2019-2020

Monitoring Bore	Highest WL (excluding initial reading)		Lowest WL		Screen intervals (mbgl)	Bore Location
	~mbgl*	~Date* (mm/yy)	mbgl*	Date* (mm/yy)		

MW01A**	2.98	08/19	3.58	12/19	4.4 – 7.4	South west corner
MW02A	2.77	03/19	3.37	02/20	3.7 – 6.7	West
MW02B	2.77	03/19	3.23	02/20	7.9 – 10.9	West
MW09A	3.15	02/19	4.1	02/20	4.0 – 7.0	South east corner
MW09B	4.25	04/19	5.1	02/20	9.2 – 12.2	South east corner

* Indicates approximate records based on figures presented. Raw data was not provided.

** Data missing from December 2019 to April 2020.

Conclusions drawn from the water level and rainfall data include:

- Both MW01A and MW02A show an initial response to rainfall events however MW01A rapidly returns to an approximate equilibrium of 3.15 m bgl, whilst MW02A only significantly responds to rainfall events greater than 30 mm.
- MW09A and MW09B indicate a less significant response to rainfall, taking approximately 2 weeks to respond to rainfall events greater than 100 mm.
- MW02B recorded consistently higher water levels than the shallow bore MW02A. This is believed to be the result of a confining layer (aquitard) between the two aquifers and upward pressure.
- Off-site pumping is suspected to have influenced the water levels in MW02A and MW01A.
- Previous 2.0 m bgl standing water level (SWL), recorded in June 2018, could be attributed to the “wetting period” (higher, more frequent rainfall) that preceded the current “drying period” (low, less frequent rainfall).
- The rapid response of the water levels to rainfall events indicate low storativity and high transmissivity aquifer properties.

ELA has further characterised the proposed cemetery site into three zones; not suitable for burial (northern portion), requires mitigation (western portion), and suitable (southern portion).

Mitigation measures proposed by ELA include:

- Regular groundwater monitoring and pumping (as required) to assist in maintaining the water level;
- Preservation of the existing clay aquitard to restrict leaching; and
- Installation of bunding, sedimentation ponds and water quality monitoring to prevent migration of decomposition product into the substrate and groundwater.

Recommendation 4

The current “drying period” and severe storm events are projected to continue. It is likely that groundwater levels could rise above 3 m bgl during and after rainfall events that produce greater than 100 mm. Suggested mitigation measures for extreme climatic events are groundwater pumping and on-going monitoring.