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HARWOOD ENVIRONMENTAL CONSULTANTS

REVIEW OF ENVIRONMENTAL FACTORS

URALLA GROUNDWATER PROJECT

Prepared for Uralla Shire Council | 24 February 2022

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Version	Date	Author	Signature	Approver	Signature
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APPENDICES

GLOSSARY OF ACRONYMS

AHIMS	Aboriginal Heritage Information Management System
CEMP	Construction Environmental Management Plan
DCP	Development Control Plan
DECC	Department of Environment and Climate Change
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPI	Environmental Planning Instrument
ESCP	Erosion and Sediment Control Plan
FM Act	Fisheries Management Act 1994
ICNG	Interim Construction Noise Guidelines (prepared by DECC)
KTP	Key Threatening Process
LGA	Local Government Area
OEH	Office of Environment and Heritage
POEO Act	Protection of the Environment Operations Act 1997
NOHSC	National Occupational Health and Safety Commission
REF	Review of Environmental Factors
RMS	Roads and Maritime Service
SEPP	State Environmental Planning Policy
TCP	Traffic Control Plan
TMP	Traffic Management Plan
TSC Act	Threatened Species Conservation Act 1995
USC	Uralla Shire Council

1. INTRODUCTION

This Review of Environmental Factors (REF) has been prepared to assess the potential environmental impacts of the proposal to construct test bores in the vicinity of the township of Uralla, NSW. Part 5 of the Environmental Planning and Assessment Act 1979 requires a determining authority to "examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity". This REF documents the outcomes of the assessment of environmental impacts and identifies environmental safeguards that must be implemented as part of the proposal.

2. PROJECT AND PROPONENT DETAILS

Item	Details
Project name	Uralla Town Water Supply Project
Project Manager	Luke Finnegan
Project location and land tenure	The test bore locations are as follows: • Lookout Road, Uralla (Mount Mutton, near water reservoir). • Rocky River Road near Sawpit Gully Road, Uralla. • Goodes Road, Uralla (near Tipperary Gully) • Adjacent to 270 Goodes Road, Uralla • Williams Road, Uralla (near Rocky Cliff Road) • End of Andersons Road, Uralla • Corner of Thunderbolts Way and Williams Road, Uralla • Bullens Road, Uralla • End of Sawpit Gully Road, Uralla • Gostwyck Road, Uralla • Uralla Water Treatment Plant, Waterworks Rd, Uralla • North of Uralla Water Treatment Plant, Waterworks Rd, Uralla.
Land Owner	Uralla Shire Council
Local Government Area	All land is located in the Uralla LGA owned and maintained by Uralla Shire Council.
Proposed Works	The new bores are being constructed to assess the potential for water for drought security for town water supply. The approx. total depth of the bores is 100m The test bores will be 208mm with machine slotted PVC casing located in designated areas
Reason for Works	The bores will provide drought security for town water supply.
Scope of work activities	The main activities of the project include- • Investigation and design • NRAR Application for works • Project risk assessment • Contractor inductions • Utility services identification and location (DBYD enquires) • Drill pilot hole • Install casing and screens • Develop bore • Form A documentation
Work equipment and machinery	Equipment to be used include Crew vehicles Bore drilling equipment Air compressor

Item	Details
Proposed start date and work duration	Commencement of the project is expected to be in March 2022 andthe project is expected to be completed in 8 weeks
Proposed work days and hours	Standard working hours will be Monday to Saturday 7.15 am to 5:00 pm Noise is not expected to be an issue on the project.

3. EXISTING ENVIRONMENT

Nature of existing environment within work area	The project is not expected to have any adverse environmental effects as the work areas are in road reserved that are already highly disturbed.
Nature of existing environment adjacent to the work area	The existing environment is made up of rural properties used for grazing/hobby farms (i.e., already disturbed). There are no known heritage items or threatened species in the area.

4. PLANNING PATHWAY ANALYSIS, LEGISLATIVE REQUIREMENTS AND APPROVALS

Item	Discussion
Applicable Environmental Planning Instruments (EPIs)	EPIs that are relevant to the Uralla LGA are: • Uralla Local Environmental Plan 2011 • State Environmental Planning Policy (Infrastructure) 2007
Land zoning	All sites are located on land zoned as RU2 – Rural Landscape under the Uralla Local Environment Plan (2012). This zoning allows for water supply systems without the requirement for consent.
Does any other aspect of the proposal require Development Consent under Part 4 of the EPA&A Act 1979?	Consult SEPP Infrastructure for the applicable division and the development controls for the activity being assessed. The SEPP Infrastructure outlines development which is permitted with or without consent. An example of an activity that may require development consent is a public administration building. Yes ☐ No ☑
Infrastructure SEPP 2007	The project is for 'groundwater investigation works' which is Exempt Development under SEPP (Infrastructure) 2007 Part 2 General Division 24(125)
Is the project a Scheduled Activity under the Protection ofthe Environment Operations Act 1997 (POEO Act)?	No
The following approvals, permits or licences may apply *If unsure please proceed to Section 5 – Environmental Issues Identification Checklist in order to identify any relevant approvals, permits or licenses	[Other approvals, permits or licenses may be relevant. It is the responsibility of the author of this REF to determine all necessary approvals, permits and licences relevant to the proposed activity.] Checkbox "Yes" or "No". If yes, provide details.

Licences and approvals relevant to the project/ Uralla Shire Council Required to beObtained for the Activity	No	Yes	Comment
1. *Water Act* 1912 - groundwater licensing		√	
2. *Water Management Act* 2000 - groundwater licensing /water supply works approval		√	
3. *Fisheries Management Act* 1994 - Approval to dredge or reclaim a waterway (s200) or to block fish passage	√		

Item	Discussion	
	4. *National Parks and Wildlife Act* 1974 - s90 Approval to disturb or destroy Aboriginal site/s	√
	5. *Local Government Act* 1993 - s60 (approval for dam construction, water treatment, sewage treatment/supply and flood retardation basins)	√
	6. *Roads Act* 1993 – works within RMS corridors	√
	7. *Rural Fires Act* 1997 – bush fire safety authority where applicable.	√
	8. *Crown Lands Act* 1989 – authorisation to undertake work on Crown land	√
	9. *Heritage Act* 1977 – approval to undertake works on state heritage listed items	√
	10. Protection of the Environment Operations (Waste) Regulation 2014	√

5. ENVIRONMENTAL ISSUES IDENTIFICATION CHECKLIST

In this section: If Yes or Uncertain, give details of the impact. If No, provide justification as appropriate or state “N/A” if the information provided in the next column provides sufficient justification. Attach any supporting documentation in Appendices D-I as appropriate (e.g. results of Seven Part Tests) and make reference to the relevant Appendix within the appropriate cell of this table.

Environmental factors	Risk checks	Yes/No	Details
Topography, geology & soils	Do the works require excavation?	Yes	New bores to be drilled to approximately 100m below ground.
	Will the works result in permanent changes in surface slope ortopography?	No	
	Are the works located in an area of high erosion risk?	No	
	Could the works disturb any natural cliffs/ rock shelves/ rock outcrops?	No	
	Are the works within a landslip area?	No	
	Are the works within an area affected by salinity?	No	N.B: Issues associated with saline soils include corrosion of underground structures and saline ground water.
Hydrology & drainage	Are the works located on the bank or bed of a natural water course?	No	
	Do the works involve a water course crossing?	No	[N.B Consultation and approval from the NSW Department of Primary Industries - Fisheries, is required for dredging/ reclamation activities or whereblocking of fish passage is proposed within a certainclassification of a water course.
	Could any new infrastructure be impacted by flooding?	No	
	Are the works likely to result in the generation of groundwater discharges (e.g. as a result of boring, drilling or deep excavation orinterception)?	Yes	Groundwater will be discharged from the new boreduring development and testing stages of the project.

Environmental factors	Risk checks	Yes/No	Details
	Does the proposal involve temporary diversion of a creek orwatercourse during the construction phase?	No	
	Will the works result in permanent changes to existing surfacedrainage or flooding patterns?	No	
	Are there any natural waterways immediately downslope, or in close proximity downslope, of any of the work areas? Erosion control measures must put in place to prevent polluted watersentering stormwater system.	Yes	Tipperary Creek is located approximately 100m down-gradient of one proposed bore (TB03).
	Could the works result in a discharge/overflow of sewage?	No	
	Will pipe flushing activities result in the risk that potable water isdischarged to a waterway?	Yes	Bore development and testing will result in significant discharges and will be diverted from the nearby watercourse
	Will a sewage diversion/bypass be required as part of the work?	No	
	Do the works involve the use or storage within the work areas of fuelsor other chemicals (other than fuels contained within work vehicles)?	Yes	Bentonite will be used to stabilise drill hole duringconstruction
Flora, fauna & ecosystems	Will clearing of native vegetation be required?	No	
	Will the works result in removal of standing dead trees or woody debrisfrom the ground?	No	
	Will the works require removal of bushrock?	No	
	Do any noxious or environmental weeds infest the work areas?	No	
	Will clearing of weeds or other exotic vegetation be required?	No	
	Could the works affect any aquatic flora, fauna or habitat?	No	
	Could the works affect any USC listed threatened species, populations,or ecological communities (or critical habitat thereof)?	No	
	Is there any important vegetation or habitat (e.g. riparian vegetation)within or immediately adjacent to the work areas?	No	
	Could the works affect any important vegetation or habitat?	No	
	Is there any important aquatic flora or habitat (e.g. wetlands of regional significance) within or immediately adjacent to the work areas?	No	
	Could the works affect a declared World Heritage property works orimpact on a declared Ramsar wetland?	No	

Environmental factors	Risk checks	Yes/No	Details
Air quality & energy	Are the works located within an area or adjacent to land uses that maybe highly sensitive to dust, odours or work machinery emissions?	No	
	Could the works result in the generation of dust?	No	
	Could the works result in the generation of odours?	No	
	Do the works involve the use of fuel-driven machinery or equipment(other than vehicles used to transport work staff to the work site)?	Yes	Plant involved listed in 2 above
	Have energy use considerations been included in the project design?	No	Not applicable
Heritage	Are there any registered Aboriginal heritage items or places within, orin the immediate vicinity of, the work areas?	No	
	Could the works affect any Aboriginal heritage items or places?	No	
	Are there any items listed on the State Heritage Register within orimmediately adjacent to the work areas?	No	
	Could the works affect an item listed on the State Heritage Register?	No	
	Are there any other heritage items or areas?	No	
	Could the works affect any of these other heritage items?	No	
Visual environment	Are the work areas visible from residential properties or other landuses that may be sensitive to visual impacts?	Yes	Rural properties
	Are the works located within an area of high scenic value?	No	
	Will the works involve night work requiring use of lights?	No	
	Will the works result in permanent changes to the visual character of the environment (e.g. through installation of above-ground structures orconstruction of new access roads)?	No	
Noise & vibration	Will the works generate noise during the work period?	Yes	Minor noise – similar to rural/residential land use noise (e.g., tractors) Standard hours for normal construction: Monday to Saturday Friday 7.15 am to 5pm Works outside these hours would require prior notification to affected sensitive receivers.
	Will the works generate noise at night during the work period?	No	No night work planned
	Are the work areas in close proximity to land uses or areas that aresensitive to noise (such as schools, nursing homes, residential properties or important native fauna populations)?	Yes	Rural properties within the area some distance from work site. Not considered a major issue as all work will be performed during business hours.

Environmental factors	Risk checks	Yes/No	Details
	Will the works result in permanent changes to background noise?	No	
Traffic & access	Is the work site accessible by vehicles?	Yes	Work site located on Council land
	Are there likely to be any difficulties associated with site access?	No	
	Are the works located in an area that may be highly sensitive to movement of work vehicles to and from the work sites (e.g. close to aschool or within a quiet residential street)?	No	
	Will the works involve partial or complete road closures?	No	
	Will the works result in a significant increase in the volume of traffic onlocal roadways during the work period?	No	
	Will the works require construction of a new permanent vehicle accessroad that will be used periodically for asset or building maintenance?	No	
	Are the works located in an area where street parking space is scarce?	No	
	Will the availability of street parking spaces for residents, businesses,or popular recreation areas be reduced during the work period?	No	
Land use & services	Will the works require access to or disturbance of private property?	No	
	Are the works located within an area of high recreational value?	No	
	Are the works located within a busy commercial area?	No	
	Will the works result in permanent loss or permanent disruption of anexisting land use? E.g. impacts on agricultural land.	No	
	Will the works result in temporary loss or temporary disturbance of anexisting land use during the work period?	No	
	Do the works involve the installation of structures or facilities that maybe perceived as objectionable or nuisance (e.g. sewer vent shafts)?	No	
	Will the works require temporary disruption to essential services?	No	No major issues envisaged
Hazards and Risks	Will the works involve disturbance or removal of asbestos or leadpaint?	No	
	Are any of the work sites located on land that is known to becontaminated or is potentially contaminated?	No	
	Could the works result in disturbance of contaminated land orcontaminated material?	No	
	Is there a bushfire risk?	No	

Environmental factors	Risk checks	Yes/No	Details
Waste and Contamination	Will the waste generated by the works include hazardous substances (such as lead, asbestos or other substance designated as hazardous by the National Occupational Health and Safety Commission)	No	
	Will the works result in the generation of non-hazardous waste requiring disposal at a landfill or waste disposal facility?	Yes	Excess excavated material will be classified and disposed of appropriately.
	Will the works result in the generation of 'wastewater' that will require removal from site (e.g. process wastewater, hyper chlorinated water, sediment-laden water, drilling fluid, groundwater generated by drilling)?	No	
	Where substantial quantities of waste or wastewater will be generated, have opportunities for waste reduction or re-use been considered?	n/a	

6. STAKEHOLDER AND COMMUNITY CONSULTATION

Stakeholders/	Requirements	Responsibility
Uralla Shire Council	Customer Service Department Councillors	Dealing with customer complaints
Local residents	Notification by letter drop and in local newspaper	Uralla Council

7. ENVIRONMENTAL SAFEGUARDS

The following safeguards must be incorporated as conditions of contract in any contract or work specification for the project. They must also be incorporated into a project-specific Construction Environmental Management Plan (CEMP) which includes a map of the project site showing key environmental features identified inthis REF.

Safeguards
General
All contractors and machine operators will be inducted on the environmental sensitivities of the work site(s) and relevant safeguards.
Topography, geology & soils – See section 5 for issues identified
The Environmental Management Plan (EMP) prepared for the works will include an erosion and sediment control plan.
Erosion and sediment control measures will be consistent with those specified in the relevant guideline under the DECC Managing Urban Stormwater. Soils and Construction Volume 2 (DECC 2008). and where relevant Managing Urban Stormwater Soils and Construction (Landcom 2004)
All erosion and sediment control measures will be established before excavation, demolition or vegetation clearance begins and are to remain in place until all surfaces have been fully restored andstabilised.
Sandbags will be placed at the entry points to any culverts and stormwater channels to prevent sediment entering the stormwater system.

Safeguards
Any spoil storage areas or stockpiles will have appropriate erosion control devices installed to control runoff and prevent sedimentation.
Sediment and erosion control devices will be inspected regularly, maintained to ensure effectiveness over the entire duration of the project, and cleaned out before 30% capacity is reached.
Water quality / Hydrology Drainage - See section 5 for issues identified
The storage and handling of fuels and chemicals shall comply with Australian Standard AS1940.
No chemicals, fuels, and/or waste will be stored or collected for disposal within or adjacent to drainage lines or unsealed surfaces.
A 'spill kit' will be kept on site at all times for potential chemical or fuel spills.
Refuelling, fuel decanting and vehicle maintenance work will take place in a designated sealed and bunded area.
Appropriate containment measures will be used to ensure that all drilling fluids from directional drilling or boring activities are captured and contained.
Flora, fauna & ecosystems - See section 5 for issues identified
The full extent of any vegetation clearance will be clearly documented and mapped in site EMP(s).
Materials/equipment lay-down areas will be shown in the EMP(s) and located in cleared or degraded areas to prevent any damage to the surrounding plants or habitat.
Materials, plant and equipment will not be stored within the drip-lines of any trees at the site(s) or near the site(s).
The removal of large isolated canopy trees will be avoided - particularly those with tree-hollows.
Restoration Activities - See section 5 for issues identified
Disturbed areas will be stabilised as soon as possible and in a progressive manner as works are completed.
The natural landform of the site(s) will be restored as closely as possible to the pre-works condition.
All temporary erosion and sediment control devices such as silt-stop fencing will be removed from the site at the completion of the works or when the site(s) are fully revegetated/stabilised.
Rehabilitation of native vegetation areas will use brush matting or mulching or planting of appropriate local native tubestock.
Air quality & energy - See section 5 for issues identified
Machinery and vehicles will not be left running or idling when not in use.
Odour or air pollutant emission complaints will be dealt with promptly and the source will be eliminated wherever practicable.
All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the work site, reuse or disposal at the Uralla Waste Management Facility
All work sites, general work areas and stockpiles will be closely monitored for dust generation and watered down (with clean water) or covered (via seeding or tarpaulins) in the event of dry and/or windy conditions.
Heritage - See section 5 for issues identified
If Aboriginal objects are discovered during operations, all work will cease in the area and the Contractor will inform the Uralla Shire Council Contract Manager as soon as possible. USC will advise the preferred course of action & liaise with OEH and the relevant local Aboriginal stakeholders if required.
If Non-Aboriginal heritage items are discovered during the course of the project, the USC heritage officer and/or NSW Heritage Office will be notified.
All due care will be taken to ensure that heritage items listed in this report are not adversely affected by any works.
Hand digging or small machinery will be used in the close proximity of any heritage items to minimise impacts and preserve heritage values.
Protective barriers will be installed to prevent damage to heritage items either located within the site or adjacent to it.
Visual environment - See section 5 for issues identified
The site(s) will be maintained in an orderly manner.
On completion of the works, all vehicles, construction equipment, materials, and refuse relating to the works will be removed from the work site(s) and any adjacent affected areas
Work sites will be restored as close to their original condition as possible following the completion of the proposed works.

Safeguards
Noise & vibration - See section 5 for issues identified
Work and deliveries will only occur during the following times: Monday to Saturday 7.15am to 5:00pm. No construction work or deliveries will occur on Sundays or public holidays
The operation of noisy plant/equipment will be avoided during early morning and preferably only occur between 8.00 am and 4.00 pm.
All stationary and mobile equipment will be fitted with residential type silencers.
DECC Interim Construction Noise Guidelines includes examples of mitigation measures that can be considered for application for construction works.
Traffic & access - See section 5 for issues identified
The contractor will prepare a Traffic Management Plan in consultation with the relevant traffic authority(s).
Appropriate exclusion barriers, signage and site supervision will be employed at all times to ensure that the work site is controlled and that unauthorised vehicles and pedestrians are excluded from the works area.
All traffic control devices will be in accordance with AS 1742.3-1996 "Traffic control devices for works on roads".
Pedestrian and vehicle access will be maintained to buildings by alternate means, such as ramps, if the proposed works obstruct access to the buildings for an extended period of time. Residents/ occupiers to be notified in advance if obstruction to access is likely to occur.
Vehicle access routes to and within the site(s) are to be defined via clearly visible and robust fencing.
Land use, services & public amenity - See section 5 for issues identified
Surrounding residences directly affected by the works will be notified at least 7 days in advance of the proposed commencement of works, work methods and the duration of the construction period.
Where entry to private properties is required, a notice of entry letter will be provided at least 24 hours in advance.
Council staff will personally contact the occupant when they enter a private property to notify of their presence and what works are intended.
Any accidental damage to property occurred by the works must be repaired in consultation with the owner.
Council will maintain a complaints register. Any complaints received will be responded to as soon as possible.
All services in the vicinity of the works will be located in the field and 'pegged-out' and noted in the Environmental Management Plan and/or work plans prior to excavation works - "dial 1100 before you dig".
Work sites will be restored as close to their original condition as possible following the completion of the proposed works.
Accurate public information signs will be displayed while work is in progress and maintained in presentable manner.
Waste generation - See section 5 for issues identified
All waste generated during the course of the works will be reused or removed from the work areas as soon as practicable and disposed of in accordance with the waste disposal safeguards.
All vessels used for contaminated or hazardous waste should be sealed, labelled according to their contents, and stored within bunded areas until their removal from the work site.
Any fuel, lubricant or hydraulic fluid spillages will be collected using absorbent material and the contaminated material disposed of at an EPA licensed waste depot.
The work site(s) will be left clean and free of weeds, debris and other rubbish at the end of works.
All hazardous wastes on site will be removed and disposed of in accordance with the state and national regulations and guidelines and best practice for the removal of these materials.
Excess spoil material that cannot be reused or recycled will be removed from the site and disposed of at the Uralla Waste Management facility.

8. DETERMINATION AND CONCLUSION

Under section 111 of the *Environmental Planning and Assessment Act 1979* the determining authority has a duty to consider the following factors prior to approving an activity. Answer Yes or No to these questions and provide references or details.

Factors for Determination	Yes	No	Information Link
Are the works likely to have a significant impact on the environment?		No	Threatened Species Assessment Guidelines
Are the works likely to have a significant impact on a Matter of National Environmental Significance		No	Matters of National Significance
Do the works involve an action outside Commonwealth land that is likely to have a significant impact on the environment on Commonwealth land?		No	
Will the activity impact on any conservation agreement andplan of management entered into under the National Parksand Wildlife Act 1974?		No	National Parks and Wildlife Act 1974
Will the activity impact on any joint management agreement entered into under the Threatened Species Conservation Act 1995?		No	Threatened Species conservation Act 1995
Will the activity impact on any biobanking agreement entered into under Part 7A of the Threatened Species Conservation Act 1995?		No	
Will the activity impact on any wilderness area (within themeaning of the Wilderness Act 1987)?		No	
Will the activity impact on critical habitat?		No	Critical Habitats – DPIE & OEH
Will the activity likely to be a significant effect on threatened species, populations, ecological communitiesor their habitats and a species impact statement is required? (Refer to Section 5 of the REF)		No	
Will the activity impact on any other protected fauna or protected native plants within the meaning of the NationalParks and Wildlife Act 1974?(Refer to Section 5 of the REF		No	

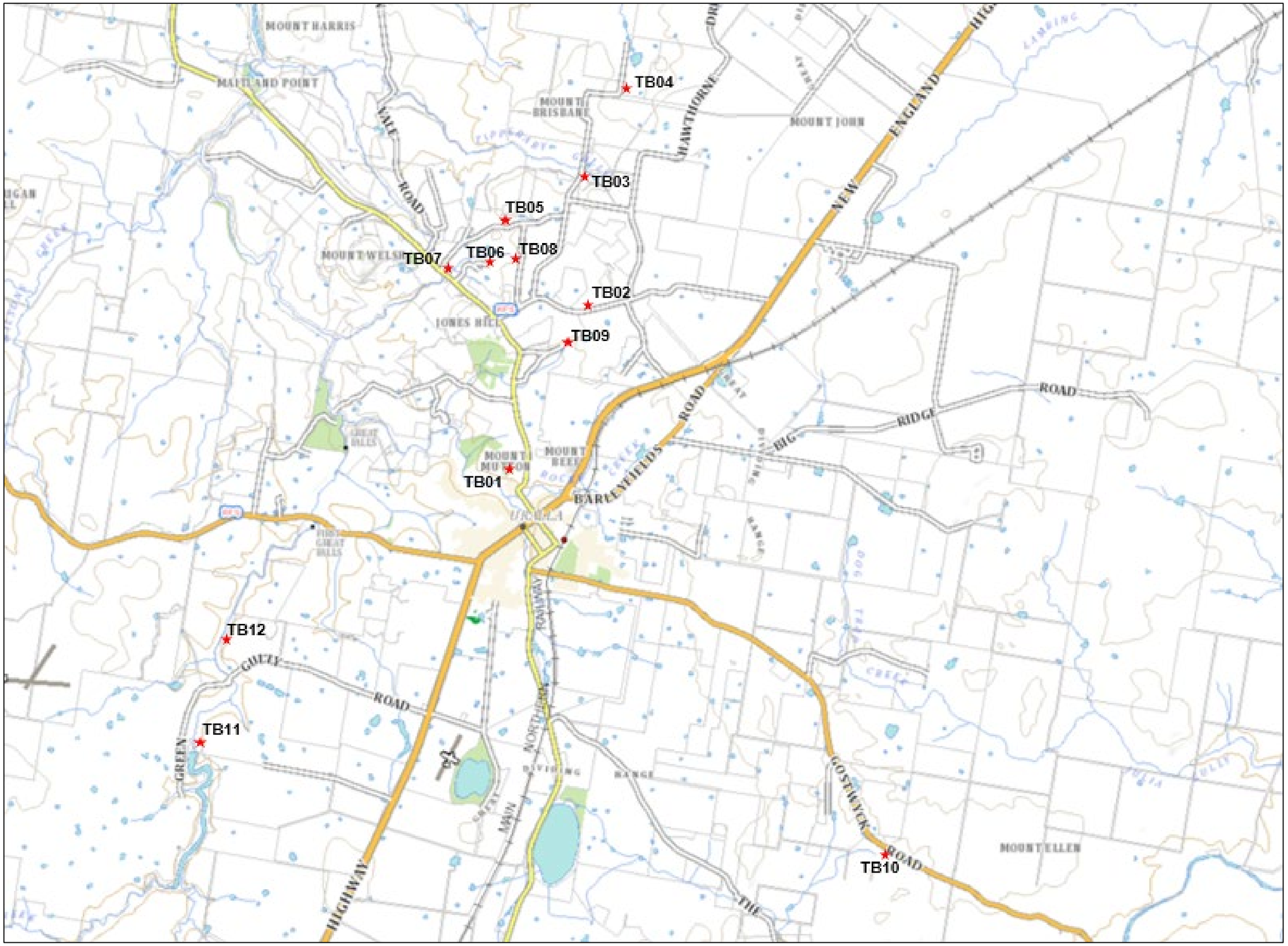
8.1. Conclusion

This REF has taken into account to the fullest extent possible all matters likely to affect the environment by reason of the activity and established that the activity is **not likely** to significantly affect the environment. An Environmental Impact Statement is not required to be prepared.

It is recommended that the activity can proceed subject to the implementation of all the safeguards identified in the REF and compliance with any statutory approvals that have been identified as being required.

APPENDIX A

PROJECT LOCATION MAPS, SITE PLANS AND PHOTOGRAPHS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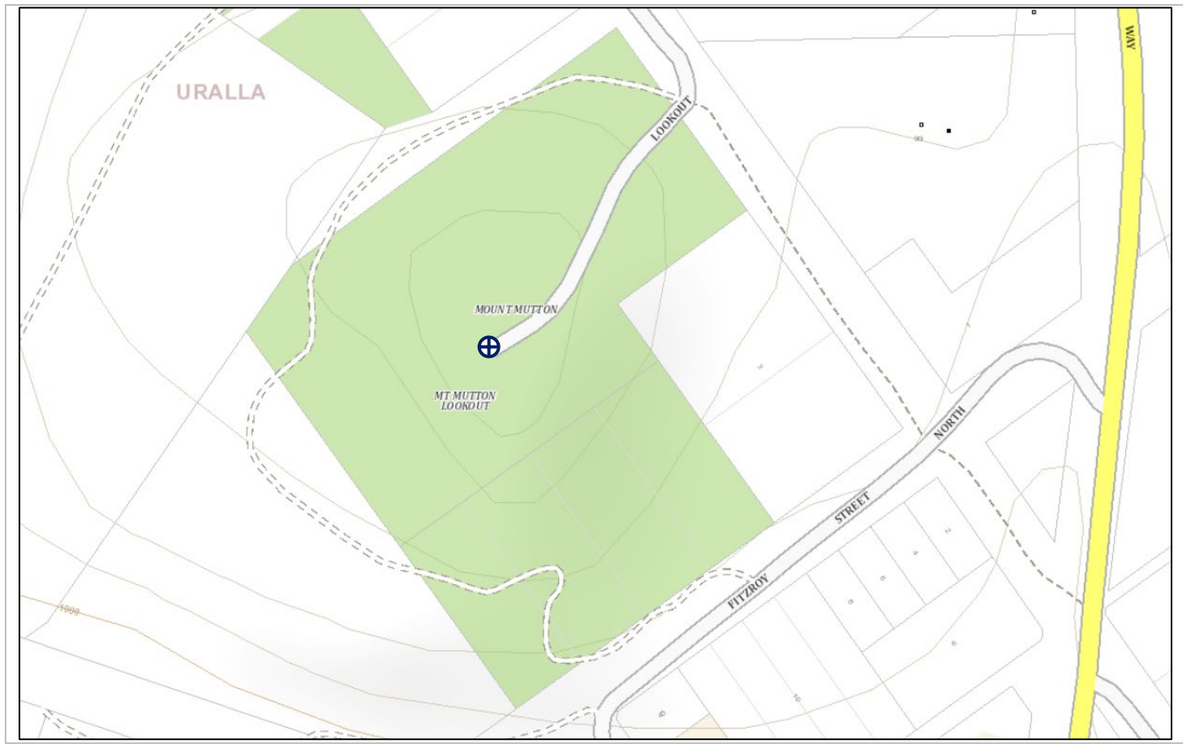
TB10
MOUNT HARRIS
MAITLAND POINT
MOUNT BRISBANE
MOUNT JOHN
HAWTHORNE
NEW ENGLAND
HIGHWAY
WHITE
ROAD
MOUNT WELSH
JONES HILL
BARLEYFIELDS
ROAD
RIDGE
BIG
GREAT
DIVIDING
RANGE
NORTHERN
RAILWAY
GOSTWYCK
ROAD
GREEN
GULLY
ROAD
HIGHWAY
MOUNT ELLEN

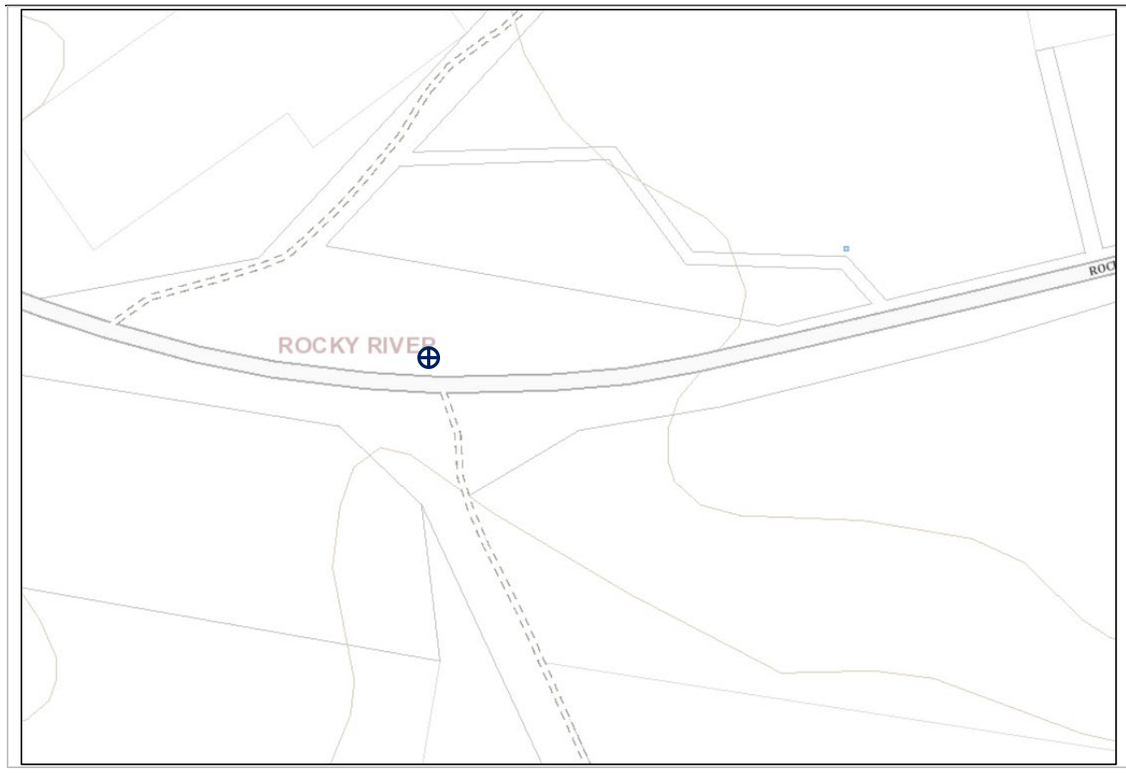
TB01

Item	Details
Location	• Lookout Road, Uralla (Mount Mutton, near water reservoir) • Lat: 30°38'4.97"S • Long: 151°29'45.63"E
Target Depth	• 0100m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within Tertiary gravel, possibly within fractured basalt



TB02

Item	Details
Location	• Rocky River Road near Sawpit Gully Road, Uralla. • Lat: 30°36'54.93"S • Long: 151°30'26.14"E
Target Depth	• 35m below ground
Anticipated geology	• 0-5m: Broken basalt • 5-20m: Basalt • 20-25m: Tertiary gravel and sand – rounded quartzose gravel and sand. • 25m+: Grey clay.
Water bearing zones	• Within Tertiary gravel, possibly within fractured basalt



TB03

Item	Details
Location	• Goodes Road, Uralla (near Tipperary Gully) • Lat: 30°35'51.52"S • Long: 151°30'28.13"E
Target Depth	• 50m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within tertiary gravel, possibly within fractured basalt
	•

TB04

Item	Details
Location	• 270 Goodes Road, Uralla • Lat: 30°35'15.47"S • Long: 151°30'48.72"E
Target Depth	• 60m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within tertiary gravel, possibly within fractured basalt
	•

TB05

Item	Details
Location	• Williams Road, Uralla (near Rocky Cliff Road) • Lat: 30°36'20.42"S • Long: 151°29'36.10"E
Target Depth	• 50m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within tertiary gravel, possibly within fractured basalt

TB06

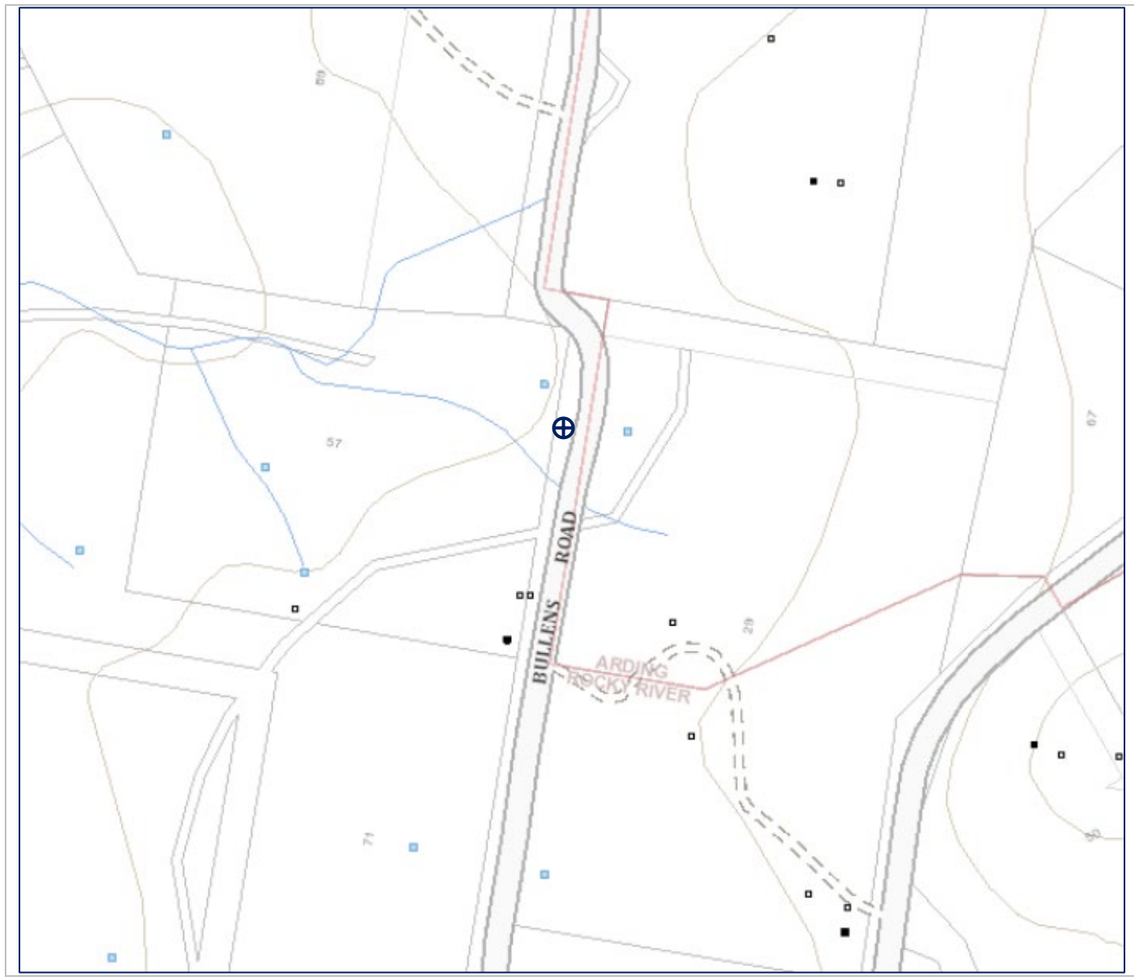
Item	Details
Location	• Eastern end of Andersons Road, Uralla • Lat: 30°36'34.83"S • Long: 151°29'38.95"E
Target Depth	• 50m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within Tertiary gravel, possibly within fractured basalt
	•

TB07

Item	Details
Location	• Corner of Thunderbolts Way and Williams Road, Uralla • Lat: 30°36'37.10"S • Long: 151°29'14.49"E
Target Depth	• 50m below ground
Anticipated geology	• 0-20m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within Tertiary gravel, possibly within fractured basalt

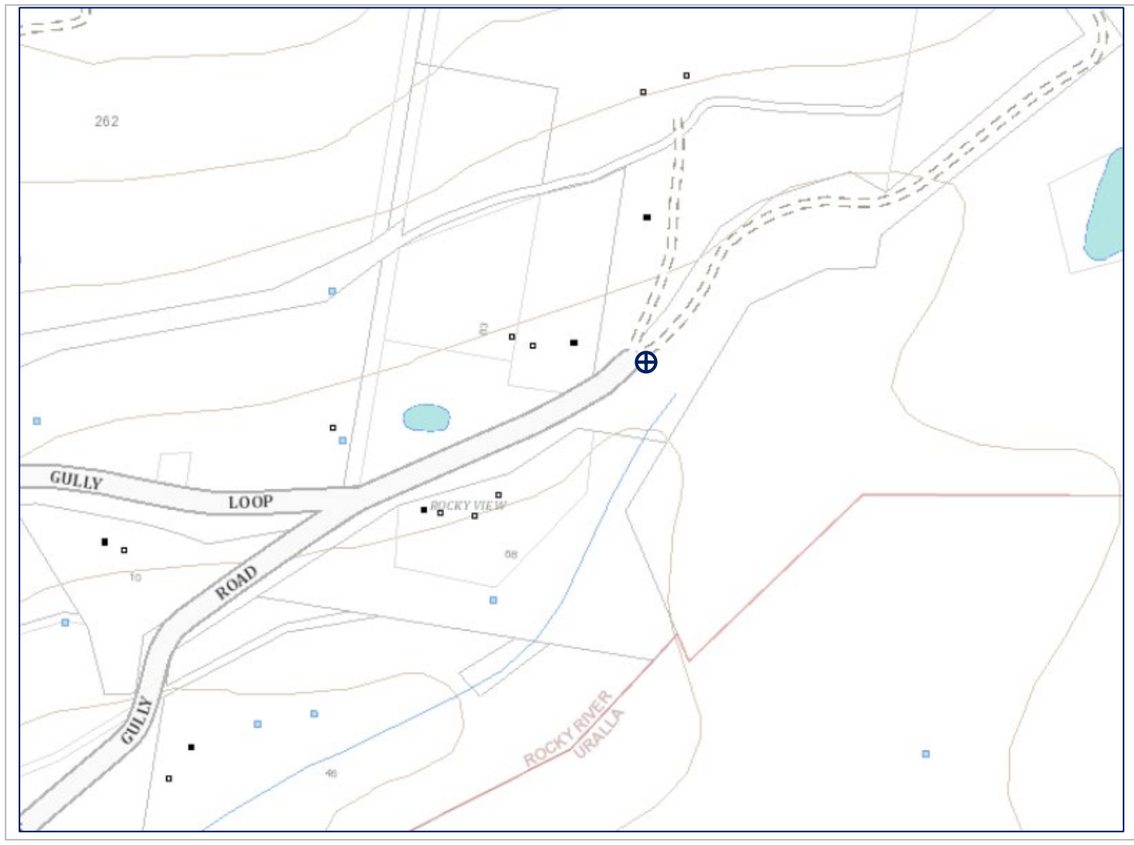
TB08

Item	Details
Location	• Bullens Road, Uralla • Lat: 30°36'30.97"S • Long: 151°29'56.18"E
Target Depth	• 50m below ground
Anticipated geology	• 0-15m: Basalt caprock • 20-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within tertiary gravel, possibly within fractured basalt



TB09

Item	Details
Location	• End of Sawpit Gully Road, Uralla • Lat: 30°37'10.86"S • Long: 151°30'17.73"E
Target Depth	• 40m below ground
Anticipated geology	• 0-4m: Topsoil/clay • 4-30m: Sand • 30m+: Granite.
Water bearing zones	• Within sand



TB10

Item	Details
Location	• Gostwyck Road, Uralla • Lat: 30°40'57.70"S • Long: 151°33'8.56"E
Target Depth	• 50m below ground
Anticipated geology	• 0-3m: Clay/topsoil • 4-30m: Fractured basalt • 30m-40m: Tertiary gravel – rounded quartzose gravel and sand • 40m+ sand and clay, possibly overlying granite.
Water bearing zones	• Within fractured basalt and tertiary gravels

TB11

Item	Details
Location	• Uralla Water Treatment Plant, Waterworks Rd, Uralla • Lat: 30°40'6.05"S • Long: 151°27'9.81"E
Target Depth	• 150m below ground
Anticipated geology	• 0-2m: Clay/weathered granite • 2-150m: Granite with possible clay lenses, fractures and weathered zones.
Water bearing zones	• Within fractured granite and on interface between granite and underlying formation – Sandon Beds or Uralla Granodiorite.

Photo not available

TB12

Item	Details
Location	• North of Uralla Water Treatment Plant, Waterworks Rd, Uralla • Lat: 30°39'20.38"S • Long: 151°27'22.28"E
Target Depth	• 100m below ground
Anticipated geology	• 0-2m: Clay/weathered granite • 2-100m: Granite with possible clay lenses, fractures and weathered zones.
Water bearing zones	• Within fractured granite

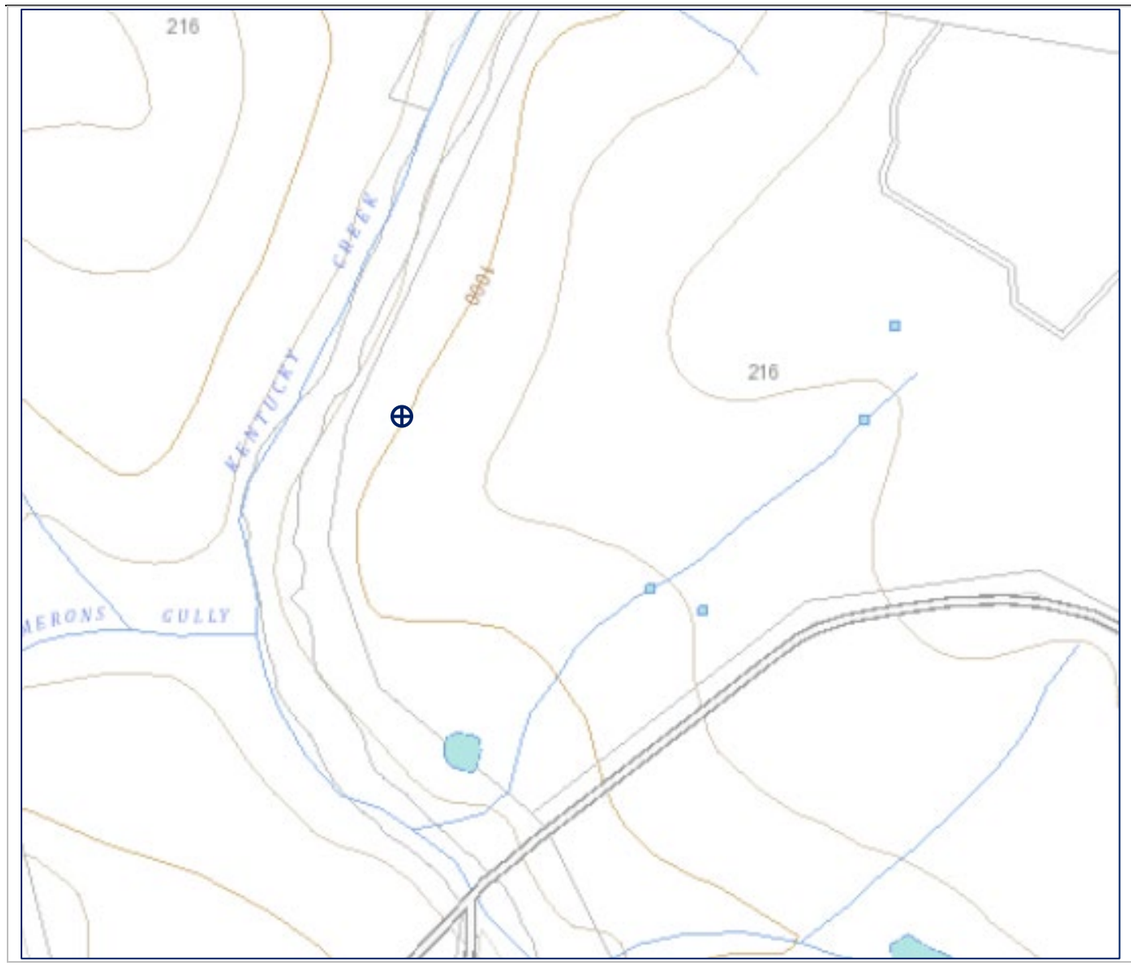


Photo not available

APPENDIX B

ADDITIONAL DETAILS ON THE SCOPE OF WORKS

The Scope of Works under the Contract is summarised below.

Advance test boreholes using a drilling rig at the nominated locations. The boreholes will be advanced to a maximum depth of 200m below ground level;

- The exact location of all boreholes will be determined in the field based on access, underground service locations and any other factors;
- The terminal depth and final bore design including screened or slotted interval will be determined in the field.
- The driller will be responsible for all drill water and fluid waste discharges from the works.

The test bores should include a nominal 350mm hole using the rotary air drilling method to a depth of approximately 6m below ground level and install 250mm diameter PVC surface control casing within this hole.

A pilot hole would then be continued within this hole to a depth of 200m or terminated at any depth at the direction of the Principal.

In the event that suitable groundwater is encountered within a test bore hole a decision to convert the test bore to a production bore would be made in consultation with the Principal.

The test bore would then be reamed out to allow for the installation of Class 18 PVC casing and screen.

In fractured rock, screens will not be required but an allowance for slotting of casing should be made. For decomposed granite water bearing zones an allowance for screen and gravel pack should be made. In the case of decomposed granite, the test bore would need to be reamed out to accommodate a hole diameter of 300mm to support both the stainless steel (Type 304) screen and artificial pack.

Bores in decomposed granite could still be drilled using air rotary methods, but may require conversion to a blade bit to allow insertion of screen and casing. Consideration of pre pack screen in such circumstances would be beneficial.

It is anticipated that the individual yields from converted test bores would not exceed 5 litres per second and the bore diameters will be sufficient to allow a pump of nominal diameter of 115mm to be installed inside a nominal 168mm cased bore hole.

For supplies within decomposed granite sequences (shallower than fractured rock) other drilling methods could be selected to allow conversion from a test bore to a production bore. For decomposed granite, consideration of other methods such as cable tool, could be considered.

APPENDIX C

SUPPORTING DOCUMENTATION – COMMUNITYAND STAKEHOLDER COMMUNICATION

APPENDIX D

CLAUSE 228 FACTORS OF THE EP&A REGULATION 2000

Clause 228 Factors	Temporary Impact Positive/Negative/Nil	Permanent Impact Positive/Negative/Nil	Comment
a) Any environmentalimpact on a community?	Nil	Nil	
b) Any transformationof a locality	Nil	Nil	
c) Any environmentalimpact on the ecosystems of the locality	Nil	Nil	
d) Any reduction of the aesthetic, recreational scientific or other environmental quality or value of a locality	Nil	Positive	increased scientific knowledge of hydrogeology
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or socialsignificance or other special value for present of future generations?	Nil	Nil	
f) Any impact on habitat of any protected fauna(within the meaning of the National Parks and Wildlife Act1974)	Nil	Nil	
g) Any endangering ofany species of animal, plant or other form of life whether living on land, in water or in the air?	Nil	Nil	
h) Any long term effects on the environment?	Nil	Positive	
i) Any degradation ofthe quality of theenvironment?	Nil	Nil	
j) Any risk to the safety of the environment?	Nil	Nil	
k) Any reduction inthe beneficial uses of the environment?	Nil	Nil	
l) Any pollution of theenvironment?	Nil	Nil	
m) Any environmental problems associated withthe disposal of waste?	Nil	Nil	
n) Any increased demands on resources (natural or otherwise) that are, or are likelyto become, in short supply?	Nil	Positive	Reduced reliance on surface water in Gwydir River catchment for town water supply
o) Any cumulative environmental effect with otherexisting or likely future activities?	Nil	Positive	
p) Any impact oncoastal processes and coastal hazards, including those under projected climate changeconditions.	Nil	Nil	

APPENDIX E

SUPPORTING DOCUMENTATION – ECOLOGICAL ASSESSMENT/SEVEN PART TEST UNDER THREATENED SPECIES ACT

Not required

APPENDIX F

OFFICE OF ENVIRONMENT AND HERITAGE 7 PART TEST – FACTORS OF ASSESSMENT

Taken from Office of Environment and Heritage NSW Threatened Species Assessment Guidelines

The factors of assessment

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Context

This factor refers only to those species listed on Part 1 and Part 4 of Schedule 1, Part 1 of Schedule 1A and Part 1 of Schedule 2 of the TSC Act, and Part 1 and Part 4 of Schedule 4 and Schedule 5 of the FM Act.

Interpretation of key terms used in this factor

Life cycle: the series or stages of reproduction, growth, development, ageing and death of an organism.

Viable: the capacity to successfully complete each stage of the life cycle under normal conditions. **Local population:** the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions.

- The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The local population of resident fauna species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.
- The local population of migratory or nomadic fauna species comprises those individuals that are likely to occur in the study area from time to time.

In cases where multiple populations occur in the study area, each population should be assessed separately.

Risk of extinction: the likelihood that the local population will become extinct either in the short- term or in the long-term as a result of direct or indirect impacts on the viability of that population.

Application

The key assessment is risk of extinction of the local population. The risk of extinction will increase if any factor operates to reduce population size or reproduction success. The components of the life cycle of a species are dependent on its habitat and affected by threats to the species. The removal or modification of habitat or changes to the nature of important periodic disturbances such as fire or flood may affect the survival of that species. Therefore, it is important that the applicant/proponent not only has an understanding of the species' life cycle, but also an understanding of the way in which a species makes use of its habitat, the way this may change at particular times or in certain seasonal conditions, and whether the life cycle is dependent on a particular disturbance.

Demonstrating that a population is not viable would require considerable effort and study. Thereforeany known or presumed local population should be assumed viable unless the contrary can be conclusively demonstrated through analysis of local ecological information, records, references and knowledge of species' behaviour and habitat or through a comprehensive on-site ecological study.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

Context

This factor is essentially identical to factor (a) except that it refers only to endangered populations listed in Part 2 of Schedule 1 of the TSC Act and Part 2 of Schedule 4 of the FM Act, whereas factor (a)refers to species.

The key assessment is risk of extinction of the local population. The risk of extinction will increase if any factor operates to reduce population size or reproduction success. The components of the life cycle of the individuals that comprise an endangered population of a species are dependent on its habitat and threats to the population. The removal or modification of habitat or changes to the nature of important periodic disturbances such as fire or flood may affect the survival of thatpopulation. Therefore, it is important that the applicant/proponent not only has an understanding of the life cycles of the species involved, but also an understanding of the way in which a species makes use of its habitat, the way this may change at particular times or in certain seasonal conditions, and whether the life cycle is dependent on particular disturbances.

Demonstrating that a population is not viable would require considerable effort and study. Thereforeany known or presumed local population should be assumed to be viable unless the contrary can be conclusively demonstrated through analysis of local ecological information, records, references and knowledge of species' behaviour and habitat, or through a comprehensive on-site ecological study.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. ***is likely to have an adverse effect on the extent of the ecological community such that its localoccurrence is likely to be placed at risk of extinction, or***
ii. ***is likely to substantially and adversely modify the composition of the ecological communitysuch that its local occurrence is likely to be placed at risk of extinction***

Context

This factor applies to endangered ecological communities listed under Part 3 of Schedule 1 of the TSCAct and Part 3 of Schedule 4 of the FM Act, and critically endangered ecological communities listed under Part 2 of Schedule 1A of the TSC Act and Part 2 of Schedule 4A of the FM Act. Endangered and critically endangered ecological communities are defined in determinations made by the respective Scientific Committees.

It is important to note that the size or age of a remnant are not determining factors as to whether that remnant constitutes a listed endangered or critically endangered ecological community.

Ecological communities are usually defined by two major components – the geographical distributionand the species composition which influences the physical structure and ecological function of the ecological community. The relative importance of the geographical distribution and the speciescomposition varies according to the specific listed ecological community. Hence this factor provides for consideration of two criteria:

i. local occurrence of the ecological community
ii. modification of the ecological community's composition.

Interpretation of key terms used in this factor

Local occurrence: the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.

Risk of extinction: similar to the meaning set out in factor (a), this is the likelihood that the local occurrence of the ecological community will become extinct either in the short-term or in the long- term as a result of direct or indirect impacts on the ecological community, and includes changes to ecological function.

Composition: both the plant and animal species present, and the physical structure of the ecological community. Note that while many ecological communities are identified primarily by their vascular plant composition, an ecological community consists of all plants and animals as defined under the TSC and FM Acts that occur in that ecological community.

Application

Determining the risk of extinction of an ecological community is difficult. Critical thresholds of remnant size, and species and structural composition required to maintain ecological functioning will vary from ecological community to ecological community.

When evaluating the significance of the impact, consideration must be given to whether the life cycles of the species which make up the ecological community will be disrupted in a similar manner to the consideration of individual species described in factor (a). Disproportionate impacts may occuron certain components of the community that may cause those components to be placed at agreater risk of extinction without explicitly placing the entire ecological community at risk. Loss of individual species from a community may simplify faunal, floristic or vegetation structure and have flow-on effects to other plant and animal species. This may increase its susceptibility to extreme events and decrease its resilience. An assessment of ecological functioning is critical to this factor.

(d) in relation to the habitat of a threatened species, population or ecological community:

- ***i. the extent to which habitat is likely to be removed or modified as a result of the actionproposed, and***
- ***ii. whether an area of habitat is likely to become fragmented or isolated from other areas ofhabitat as a result of the proposed action, and***
- ***iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality***

Interpretation of key terms used in this factor

Habitat: the area occupied, or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.

Extent: the physical area removed and/or to the compositional components of the habitat and the degree to which each is affected. Importance: related to the stages of the species' life cycles and how reproductive success may be affected.

Locality: the same meaning as ascribed to local population of a species or local occurrence of an ecological community.

Application

When applying this factor, consideration must be given to all short- and long-term impacts (direct and indirect) on habitat which are likely to support threatened species, populations and ecological communities regardless of whether the habitat occurs on the subject site. This applies to both occupied and unoccupied habitat because the recovery of threatened species, populations and ecological communities relies on them having access to suitable habitat to move into as numbers increase.

The extent to which habitat is likely to be removed or modified should be determined by estimating the total area of habitat to be directly and indirectly impacted by the proposed development, activityor action. This may be an estimation of the surface area of land to be affected, and/or in some cases the number of key habitat components to be affected.

When deciding whether an area of habitat is likely to become fragmented or isolated from other areas of habitat, it is necessary to identify and assess the patterns and extent of habitat connectivity. The affected habitat may form part of a habitat corridor, cul-de-sac or an isolated area. Recent Landsat imagery, aerial photographs, vegetation maps, topographic maps and data obtained from on-ground investigations are useful information sources for assessing this. The dispersal and genetic exchange mechanisms of individual species should be considered. For example, will the isolation of habitat for threatened species, populations or ecological communities that are currently connected or near to each other adversely affect the maintenance of gene flow and the ability to sustain viable populations. It should also be noted that isolation can occur through a variety of habitat modifications and is not confined to the clearing of vegetation.

When assessing the importance of the habitat likely to be removed, modified, fragmented or isolatedin the locality, a quantitative and qualitative approach should be adopted as follows:

- An assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality from recent Landsat imagery, vegetation mapping, topographic maps, air photos and in some cases data obtained from on-ground investigations
- An estimate of the area and quality that the habitat of the study area represents in relation to thearea and quality of that habitat within the locality
- An assessment of the role of the habitat to be affected in sustaining habitat connectivity in the locality
- An assessment of the ecological integrity of the habitat to be affected in the study area, in relationto the ecological integrity, tenure and security of the habitat which will remain both in the study area and in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

Application

This factor is aimed at assessing whether the proposal is likely to affect (directly or indirectly) areas of critical habitat present in the study area. Critical habitat refers only to those areas of land listed in the following registers:

- The Register of Critical Habitat kept by the Director General, OEH
- The Register of Critical Habitat kept by the Director General, DPI

These registers are open for public inspection during ordinary business hours and copies of, or extracts from, the register may be purchased on request.

Maps showing the location of critical habitat are kept by the Director General, OEH and the Director General, DPI.

Developments or activities which require consent or approval under Part 4 or Part 5 of EP&A Act which are proposed on land that is, or is part of, critical habitat, automatically require the preparation of a species impact statement and the concurrence of the Director General, OEH or the Director General, DPI, depending on the Act under which the critical habitat is declared. In some cases consultation with the Minister for Climate Change, Environment and Water or the Minister for Primary Industries is required.

In accordance with the EP&A Act, Local Environmental Plans and Regional Environmental Plans are required to identify any land that has been declared critical habitat. These plans are available for public inspection at the Department of Planning, the office of the council to which a Local Environmental Plan / Regional Environmental Plan applies or such other premises operated or controlled by the council.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan

Application

When deciding whether the proposal is consistent with the objectives or actions of a recovery plan orthreat abatement plan, applicants/proponents must consider all relevant approved recovery plans and threat abatement plans. In addition, it is recommended that they refer to draft recovery plans and draft threat abatement plans, and threatened species profiles and related guidelines, which are available through the OEH and DPI websites.

In 2004 amendments were made to the TSC Act and the FM Act that remove the mandatory requirement to prepare recovery plans and threat abatement plans, and instead requirespreparation of a threatened species priorities action statement (TSC Act s. 90A and FM Act s.220ZVA). The priorities action statements will set out the measures required to promote the recovery of each threatened species, population and ecological community to a position of viability in nature and for managing each key threatening process. In applying this factor, consideration should be given to measures outlined in the priorities action statements as well as existing recovery plans and threat abatement plans which will remain in place.

Once prepared, the priorities action statements will be available on the OEH and DPI websites. Further information can be obtained at OEH's threatened species website.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Context

This factor refers only to those key threatening processes (KTPs) listed in Schedule 3 of the TSC Act and Schedule 6 of the FM Act. The NSW legislation website [www.legislation.nsw.gov.au] provides the most up-to-date information on what is listed in the schedules.

Application

In addition to deciding whether the action/activity constitutes a KTP, consideration must also be given to whether the proposal is likely to exacerbate a KTP. Species listed in the determination as being 'at risk' warrant particular consideration if these species are known or likely to occur within thestudy area of the development or activity.

APPENDIX G

SUPPORTING DOCUMENTATION – EPBC ACT ASSESSMENT OF SIGNIFICANCE

EPBC Act 1999	Impacts Indicate whether positive or negative or nil impact
a) Any environmental impact on a World Heritageproperty	Nil
b) Any environmental impact on wetlands ofinternational importance?	Nil
c) Any environmental impact on Commonwealth listedmigratory species?	Nil
d) Any environmental impact on Commonwealth marinearea?	Nil
e) Any direct or indirect effect on Commonwealth land?	Nil
f) Listed threatened species and ecologicalcommunities?	Nil

APPENDIX H

SUPPORTING DOCUMENTATION – HERITAGE

Not required

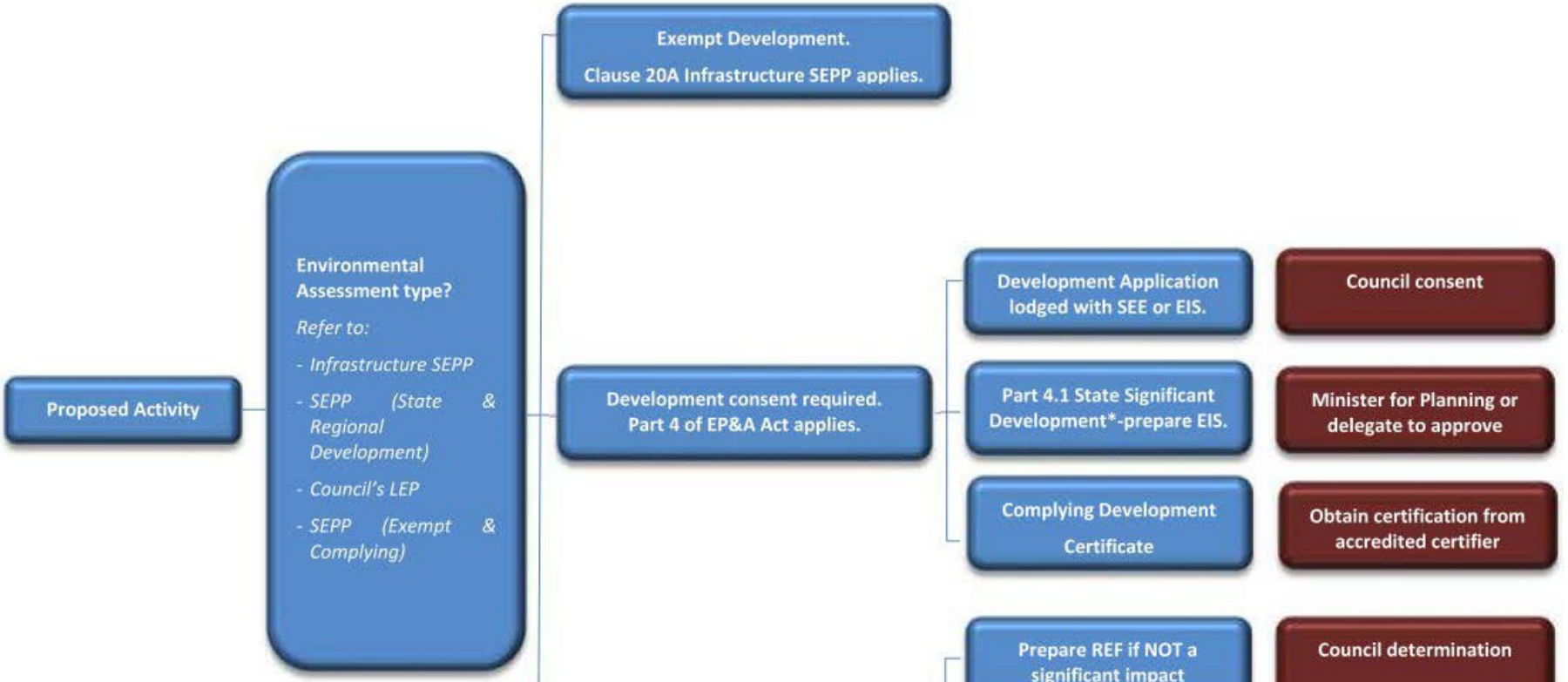
APPENDIX I

ADDITIONAL SUPPORTING DOCUMENTATION

None

APPENDIX J

ENVIRONMENTAL PLANNING APPROVAL FLOW CHART



GLOSSARY

EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act
LEP	Local Environmental Plan
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy

*State Significant Development/Infrastructure – activity categorised under SEPP (State and Regional Development)

HARWOOD ENVIRONMENTAL CONSULTANTS