METROPOLITAN COAL
CONSTRUCTION MANAGEMENT PLAN

SURFACE WORKS ASSESSMENT FORM

CATCHMENT I AND K FLOW GAUGING STATIONS

NOVEMBER 2017

Metropolitan Coal

Proposed Installation of Flow Gauging Stations

Background

The Longwalls 301 – 303 Extraction Plan was approved by the NSW Department of Planning and Environment (DP&E) on 11 May 2017 (the Extraction Plan Approval). The Extraction Plan Approval permits the mining of Longwalls 301 and 302 subject to a range of specific conditions.

Condition 2 of the Extraction Plan Approval requires Metropolitan Coal to engage independent experts to prepare a Woronora Reservoir Impact Strategy, which will provide a staged plan of action for further investigations (e.g. additional monitoring).

As a component of the strategy, Emeritus Professor Thomas McMahon proposed to install two low flow flumes on two small tributaries which flow into the Woronora Reservoir (Figure 1). A rain gauge will also be installed on the road verge of Fireroad 9I (no vegetation clearing required).

Consistent with E. Prof. McMahon's recommendation, Metropolitan Coal intend to install the gauging stations by January 2018. However, the planned timing of the flow gauging station installation is subject to approval of this Surface Works Assessment Form.

The proposed construction and environmental management works outlined in this Surface Works Assessment Form append the general management measures as outlined in Metropolitan Coal's Construction Management Plan as approved by DP&E on 25 August 2015.

These sites are located within the Woronora Special Area in the local government area (LGA) of Wollongong City Council. The Woronora Special Area covers a region of approximately 75 square kilometres (km^2) and includes the catchment of Woronora Dam. Water NSW manages the Woronora Special Area and public access is restricted.

The proposed activities are situated within the Metropolitan Coal mining lease (Consolidated Coal Lease (CCL) 703). The township of Helensburgh is located approximately 5 km to the east.

Gauging Station Design

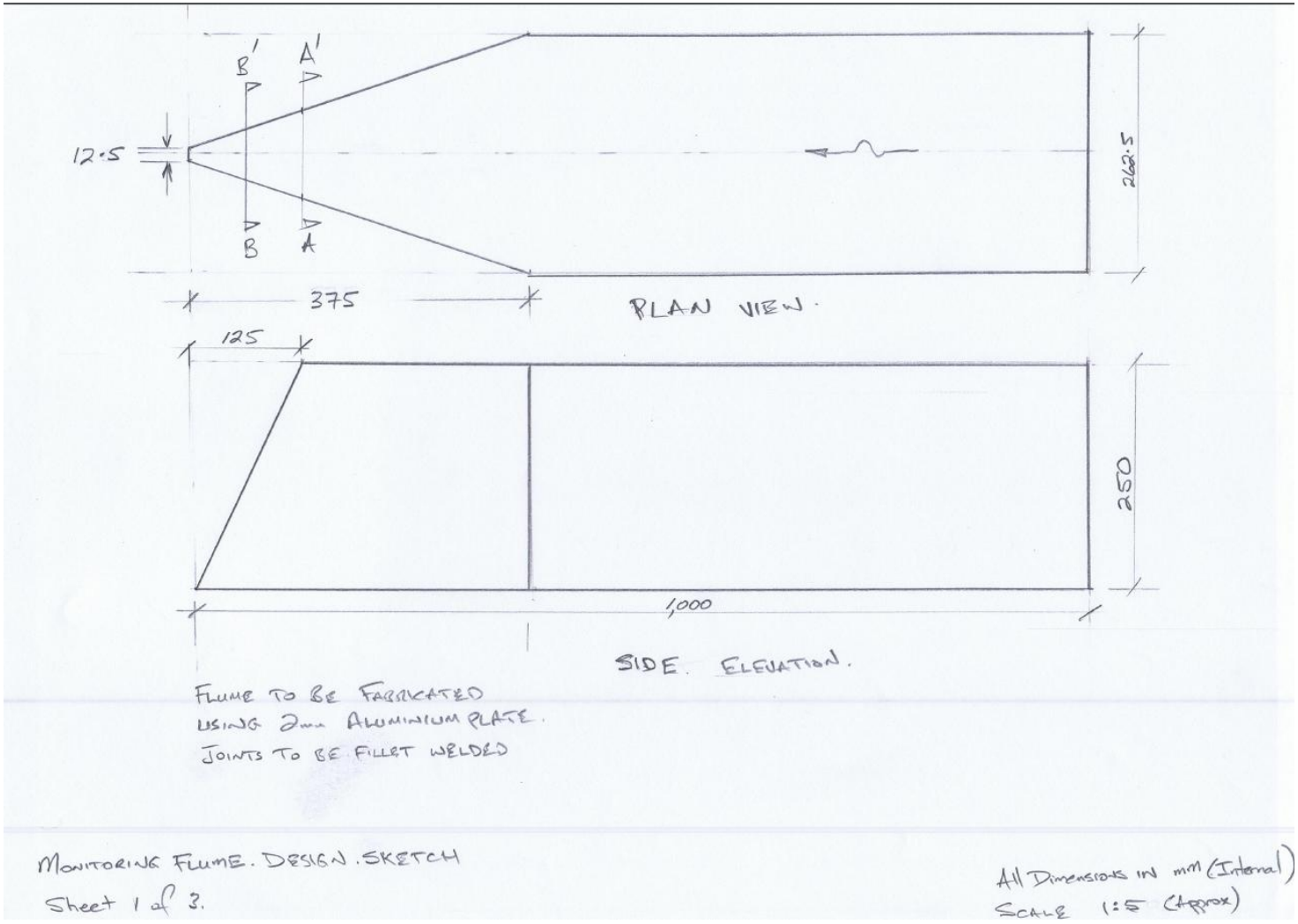
The flumes would intersect catchments of between 0.2 square kilometres (km^2) and 0.3 km^2. The sites are characterised by confined sections where runoff flows over competent rock bars (refer Plates 1 and 2). The catchment flows are expected to be similar (on a per-area basis) to the nearby gauging station on the Eastern Tributary.

Plate 1 Proposed Weir/Flume Monitoring Site Catchment I

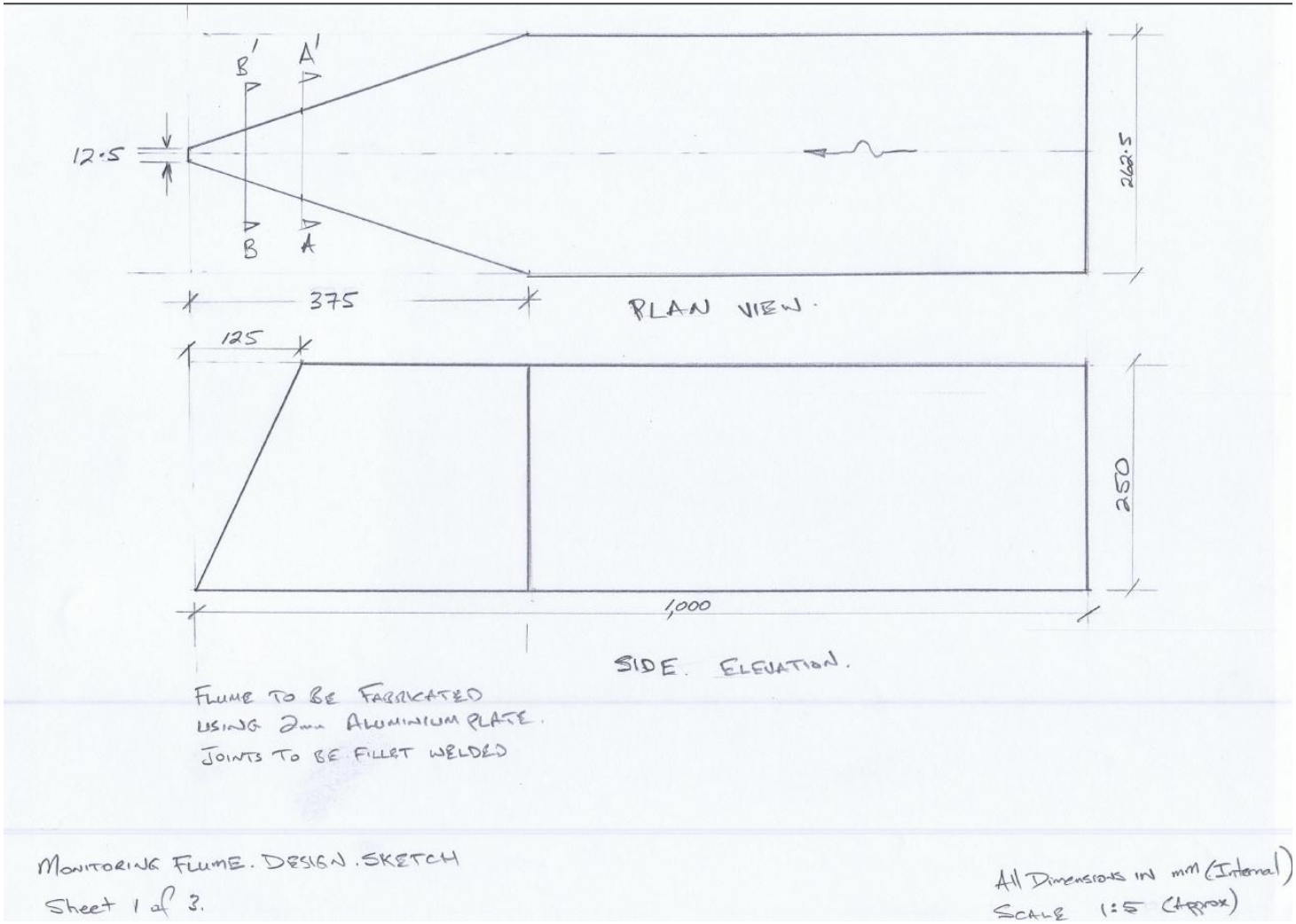
Plate 2 Proposed Weir/Flume Monitoring Site Catchment K

The proposed flume design is based on the “H flume” as developed by the United States Department of the Interior Geological Survey. A photograph of a similar flume is shown on Plate 3. The proposed flume design for both sites is shown on Sketches 1 to 3.

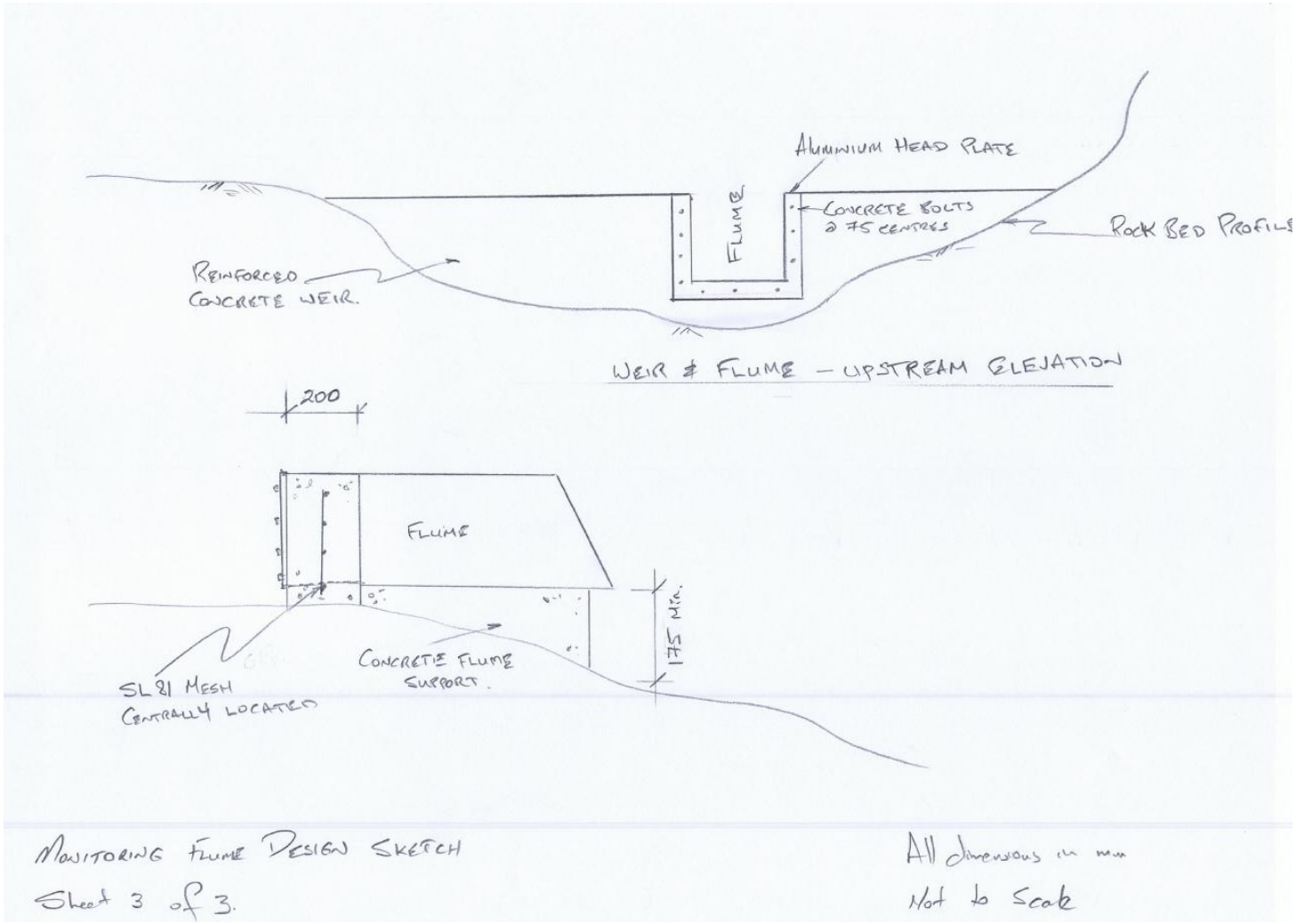
Plate 3 Typical H Flume Installation



Sketch 1 Flume Design: Plan and Side Elevation



Sketch 2 Flume Design: Sections



Sketch 3 Weir Design and Installation Details

Site Preparation

Whilst the presence of the rock bar provides a stable platform for weir construction and is conducive to forming a water tight seal at the interface between the weir and the creek bed, there is potential for underflow to occur via natural rock crevices and scour holes that form in the rock. The potential for underflow bypassing the structures has been mitigated by the selection of areas that are located on a competent sandstone block. If underflow is detected in future, Metropolitan Coal will investigate potential mitigation measures (e.g. small PUR injections).

Gauging Station Construction

The gauging stations will be installed during forecast dry weather. During gauging station construction, stream flow will be diverted around the construction site. This will involve the pumping of stream flows around the construction area and will involve the placement of sandbags to form temporary coffer dams upstream and downstream of the works area. A pump may also be required to remove water from between the coffer dams if underflow into the construction area occurs (i.e. between the two coffer dams).The diversion pump will be operated as required, up to 24 hours per day, to divert the natural stream flow around the construction site. The construction site will be manned at all times while the pump is operating.

Construction will require the mobilisation of a range of building materials and equipment to each site. Limited vegetation clearing is required to establish suitable access tracks to each site.

Fuel management measures (including spill kits) and erosion and sediment control measures will be implemented in accordance with Sections 6.3 and 6.4 of the Construction Management Plan.

The first construction task will involve marking out the weir centreline, followed by foundation and abutment preparation. Any loose material on the foundation of the weir will be removed and its surface roughened using a powered rock chisel (jackhammer blade). All loose material and vegetation on the abutments will be removed. Vegetation adjacent to the abutments will be slashed to provide a safe work environment. It is estimated that the maximum area of vegetation that is required to be removed on each abutment would be less than 2 m^2. An additional 2 m^2 of vegetation may be required to be slashed on each abutment to provide a safe work environment. Slots will be cut into the rock abutments so that a solid, water tight seal can be formed at the weir abutments. Reinforcing starter bars will be drilled and grouted into the foundation and abutment slots at the required spacing and cut to length.

The next stage of construction involves the fabrication and securing of the weir formwork on both weir faces. The formwork will be anchored in place using temporary timber frames bolted to the rock shelf on both sides of the weir. Downstream of the weir itself, the flume will be supported on a reinforced concrete plinth which will be formed as an integral part of the weir itself. The formwork for the plinth will be erected as an integral part of the weir.

Once the formwork is in place, the concrete will be poured and the surfaces levelled and smoothed. The formwork will be left in place for 24 hours before being removed. A bed of slow setting epoxy grout will be applied to the contact faces for the flume on the weir and concrete plinth. The flume will be positioned, levelled and secured using flange bolts to the front face of the weir and via anchor strips onto the downstream plinth. Any excess grout will be removed from the contact areas.

A gauge board will be installed onto a steel pipe concreted and bolted to the edge of the pool upstream of the weir. The board level will be adjusted to read zero at the sill level of the flume.

A gas purge water level monitor will be installed in the pool upstream of the weir to measure the pool water level. The logger will be located on the bank of the stream, on a steel pole above flood levels. A cable from the sensor to the logger will be laid in a pipe from along the ground and anchored to the stream bed. In addition, a submersible sensor and logger will be installed as a back-up to the gas purge system.

The water level sensors, gauge board, weir crest and flume will be levelled to a permanent benchmark established on stable ground near the site.

All construction equipment will be removed upon completion of the works, and any required erosion and sediment controls will be left in place until such time as the ground has stabilised.

In summary, installation of the gauging stations will include the:

- placement of construction materials and equipment (i.e. generator, pump, concrete, power tools) at the construction site;
- diversion of the natural stream flow around the construction site;
- clearing and slashing of a small amount of bank vegetation;
- drilling and grouting of reinforcing bars on the rocks bar and stream bank;
- construction of the weir and plinth formwork;
- pouring concrete into the formwork;
- removal of the formwork and installation of the prefabricated flume; and
- installation of the gauge board and water level sensors.

Monitoring and Maintenance

During the construction works, visual inspections of erosion and sediment controls and fuel containment controls will be conducted to ensure the controls are installed and operating correctly. At the completion of daily works all tools and equipment will be securely stored within the bunded enclosure located on an elevated position on the stream bank.

The gauging stations will be subject to regular inspections and maintenance as required (e.g. removal of any debris lodged in the flume).

Construction Management Plan

Surface Works Assessment Form

Note, this form must be completed in full prior to the commencement of surface disturbance works

Date: 1 November 2017

Name and position: Stephen Love (Environment and Community Superintendent)

Register number (i.e. Number 1, 2, etc.): 9

RMP register number:

Site name:

Catchment I (Flow Gauging Station 1)
Catchment K (Flow Gauging Station 2)

Site type: Flow Gauging Station

Site co-ordinates (easting/northing):

	Easting	Northing
Catchment I	312197	6216937
Catchment K	312004	6217414

Expected duration of works: 4 – 5 days (weather permitting)

Works schedule:

- Describe the activities (including timing) to be conducted during construction works.

- Personnel training and awareness – prior to commencement of activities
- Establishment and implementation of pre-construction management measures (e.g. erosion and sediment controls, vegetation clearance) - approximately one day.
- Commencement of water diversion – ongoing during construction works.
- Site set-up (e.g. establishment of rubber lattice matting, establishment of hazardous materials controls) – prior to daily construction activities.
- Gauging station construction - approximately 2-3 days.
- Monitoring during construction – prior to, and following daily construction activities.
- Site clean-up (e.g. removal of equipment, materials and waste) – approximately half a day.
- Monitoring at completion of construction.

Review of baseline information - site features (refer Section 5 of the ConMP)

Are any of the following features located within the proposed disturbance area or immediate surrounds?

Are there occurrences of the Southern Sydney Sheltered Forest on Transitional Sandstone Soils EEC in the general area?	**No**
Are there occurrences of the O'Hares Creek Shale Forest EEC in the general area?	**No**
Are upland swamps located in the general area?	**No**
Are there records of known threatened flora species in the general area?	**Yes**
Are there records of known threatened fauna species in the general area?	**No**
Are existing (or proposed) monitoring sites located nearby?	**No**

What vegetation type is present?

The flow gauging stations are proposed to be positioned on large rock outcrops above creek lines, where limited vegetation is present.

The proposed establishment of Gauging Station One will comprise the construction of the gauging station itself and creation of an access trail for staff and equipment. One flora species listed in the Rare or Threatened Australian Plants (RoTAP) database (Briggs and Leigh, 1995) was recorded along the proposed gauging station access track (Hibbertia nitida, which is not listed in the former TSC Act or EPBC Act). Approximately 20 individuals were recorded and marked for ease of identification in the field in order to minimise impacts during track preparation.

The proposed establishment of Gauging Station Two will comprise the construction of the gauging station itself and creation of an access trail for staff and equipment. The proposed access track loosely follows the bank of the Woronora Reservoir and will require the removal and trimming of some vegetation to allow for staff and equipment access. One threatened flora species, Astrotricha crassifolia, was recorded adjacent to the proposed access track. Three individuals were recorded and were marked for ease of identification in the field in order to avoid impacts during track preparation.

Are known Aboriginal heritage sites present?	**No**
Is this an area in which disturbance is to be avoided and/or limited? (refer Sections 6.1.1 and 6.1.2 of the ConMP)	**No**

- Southern Sydney Sheltered Forest on Transitional Sandstone Soils EEC
- O'Hares Creek Shale Forest EEC
- Upland swamps
- Environmental monitoring sites

If the proposed disturbance area is located in an area to be avoided or limited, relocate site where appropriate in accordance with the requirements of the ConMP

Threatened flora survey (refer Section 6.1.3 of the ConMP)

Date of survey for threatened flora. 21 September 2017

Name of suitably qualified ecologist conducting survey.

Suzanne Eacott (Eco Logical Australia)

Have any threatened flora been identified within the proposed disturbance area or immediate surrounds. **Yes**

Scientific names of threatened flora species recorded. ***Astrotricha crassifolia***

Will works be relocated to avoid or minimise impacts on the threatened flora species?

Three individuals were recorded and were marked for ease of identification in the field in order to avoid impacts during track preparation.

If it is not feasible to relocate the works, have the impacts of the proposed works on the population of the threatened flora species been assessed by a suitably qualified and experienced ecologist? **NA**

If No, do not proceed

Has the assessment concluded that the proposed surface activities are likely to have a significant impact on a population of the threatened flora species? **No**

If Yes, the proposed works are to be modified to avoid such an outcome

Vegetation clearance and site access (refer Section 6.1.6 of ConMP)

Is vegetation clearing required for the construction works? If yes, describe extent (e.g. m^2) and method of clearing (e.g. slashing/lopping branches/removal)? **Yes**

The gauging stations are proposed to be positioned on a large rock outcrop above a creek line, where vegetation clearance will be minimal and limited to trimming or small areas of removal.

Describe the access requirements for the construction site (e.g. vehicle/pedestrian/helicopter) and where the access will be from (e.g. which fire road).

The access track for Gauging Station One will generally follow an existing informal access track to minimise clearing of vegetation and minimise removal of *Hibbertia nitida*.

The access track for Gauging Station Two generally follows the bank of the Woronora Reservoir and will require the removal and trimming of some vegetation to allow for staff and equipment access. One threatened flora species, *Astrotricha crassifolia*, was recorded adjacent to the proposed access track. Three individuals were recorded and were marked for ease of identification in the field in order and will be avoided.

Is vegetation clearing required for site access? If yes, describe the extent and method of clearing? **Yes – refer above for description of clearing at each site.**

Vegetation management measures to be implemented (refer Section 6.1.4 of the ConMP)

The following mitigation measures would be implemented:

- the access track for Gauging Station One will be established along the existing informal access track to minimise clearing of vegetation and minimise removal of *Hibbertia nitida*;
- the access track for Gauging Station Two will follow the bank of the Woronora Reservoir to minimise clearing of vegetation, minimise removal *Hibbertia nitida* and prevent impacts to the threatened species Astrotricha crassifolia;
- construction works to be undertaken with all due diligence and care to avoid unnecessary impacts to adjacent vegetation;
- retain vegetative cover to avoid potential localised erosion of sediments;
- placement of equipment and materials to be kept to a minimal area, and on existing rocky outcrops around the proposed gauging station sites to avoid unnecessary impacts to adjacent vegetation;
- install sediment and erosion control barriers where appropriate (for example, to prevent erosion of top soil in the event of rainfall).

Site Layout Plan (refer Section 6.1.5 of ConMP)

Has a Site Layout Plan been prepared and attached to the Works Assessment Form?	**Yes**
Have the following been indicated on the Site Layout Plan?	**Yes**

- Site location
- Works design
- Management measures (e.g. erosion and sediment controls, spill kits)
- Access track/s (indicate type of access, e.g. pedestrian/vehicle. Also indicate location of nearest fire trail where access will be from)
- Areas of vegetation clearance
- Location of equipment (e.g. pump, generator, fuel storage, portable toilets)
- Equipment storage areas
- Safety equipment (e.g. fire extinguisher and first aid kit)

Attach photographs, where appropriate

Description of Photographs:

Refer Plates 1 to 3.

Aboriginal heritage pre-clearance survey (refer Section 6.2 of the ConMP)

Date of pre-clearance survey for Aboriginal heritage sites.

N/A – desktop assessment undertaken using photographs.

Name of survey attendees.

Renee Regal – Niche Environment and Heritage

Are any Aboriginal heritage sites identified within the proposed disturbance area or immediate surrounds?	**No**

Description of recorded Aboriginal heritage sites. **N/A**

Will works be relocated to avoid impacts on the Aboriginal heritage site? **N/A**

If it is not feasible to relocate the works to avoid impacts to the Aboriginal heritage site, management and/or mitigation measures to be implemented in accordance with the Metropolitan Mine Heritage Management Plan. Describe measures below.

N/A

Where avoidance is not practicable, has a comprehensive baseline record been obtained and salvage considered in consultation with Aboriginal stakeholders prior to disturbance.

N/A

[Attach any relevant archaeological reports to this assessment form]

Aboriginal heritage preclearance survey report attached.

Known Aboriginal heritage sites located close to surface disturbance works

No Aboriginal heritage sites have been identified in proximity to the proposed disturbance area.

N/A

Erosion or sediment control measures required?

- Is any erosion or sediment control required? **Yes**
- If yes, has an Erosion and Sediment Control Plan been prepared and attached to the Surface Works Assessment Form? **Yes**

Fuel and spill management measures required?

- Are compressors and pumps bunded and with sufficient capacity? **Yes**
- Where fuels are used, are spill kits available at the construction site? **Yes**
- Have personnel been trained in spill clean-up procedures? **Yes**

List Hazardous Materials and Storage Requirements

- What hazardous materials are required to be used and how will they be stored on site?

Fuel will be used to power the generator and will be stored within the bunded enclosure in accordance with Section 6.4 of the Construction Management Plan.

No other hazardous materials are required to be used at the construction site.

- Are Materials Safety Data Sheets (MSDS) for hazardous materials located at the construction site? **Yes**

Bushfire Preparedness and Management

- Have MCPL staff and contractors been provided with fire awareness and fire safety training? **Yes**
- Has a Hot Work Permit been obtained from the Water NSW if required? **N/A**

Not required - Items will be taken offsite for hot works. Metropolitan Coal will contact WaterNSW to obtain a Hot Work Permit if an item cannot be removed before working on it.

EROSION AND SEDIMENT CONTROL PLAN

This Erosion and Sediment Control Plan (ESCP) has been developed for the construction of a gauging stations on tributaries to the Woronora Reservoir. The purpose of this ESCP is to minimise the risks of the gauging station construction activities adversely affecting the water quality of the Woronora Reservoir. The construction activities will involve the use of a pump to divert the natural stream flow around the gauging station construction site during the construction works. Construction activities are anticipated to be conducted over a 4 to 5 day period selected to coincide with dry settled weather and low stream flows.

To minimise impacts during the construction of the gauging station, construction activities and materials will be isolated from flowing water, and disturbance to land and vegetation in the construction area and areas along access tracks will be limited. Rubber lattice matting will be used in high traffic areas to minimise impacts to land and vegetation from trampling.

Water will be diverted around the construction site while works are in progress by pumping water from the upstream pool around the gauging station construction site and back into the downstream pool. The pump, motor and fuel will be located in a bunded enclosure positioned on the stream banks above the level of the rock bar. The bunded enclosure will be lined with a heavy duty PVC liner and a rubber or hessian wearing surface held in place by sand bags which will trap any oil leaks or fuel spills.

Other construction materials and equipment that will be left on site during the construction period will also be located in the bunded enclosure when not in use.

Two coffer dams will be constructed within the streams on the upstream and downstream side of the construction area to isolate it from upstream pool and the diversion pump discharge. The downstream coffer dam will also trap any sediment or debris created from the construction activities. Any sediment trapped by the downstream coffer dam will be removed at the conclusion of each stage of construction.

A pump may also be required to remove any water that accumulates between the coffer dams as a result of underflow.

The erosion and sediment controls will be implemented in two stages: pre-construction and construction.

Pre-construction Stage

The selection of sites for locating construction equipment and materials is based on the following requirements:

- equipment must be located above a nominal flood level (taken to be generally 1 m above normal water level in the upstream pool);
- equipment must be situated such that minimal disturbance to existing vegetation is required;
- the equipment sites must be large enough to accommodate for all the required equipment and materials delivered to the site; and
- the equipment sites must be located close to the construction works area.

The locations of equipment, materials and erosion and sediment controls are shown on the Indicative Site Layout Plan.

Construction Stage

The gauging stations will be located on the rock bar in relatively shallow sections of the streams. These sections of the streams will be isolated during construction such that all sediment generated during construction activities is contained by the downstream temporary coffer dam.

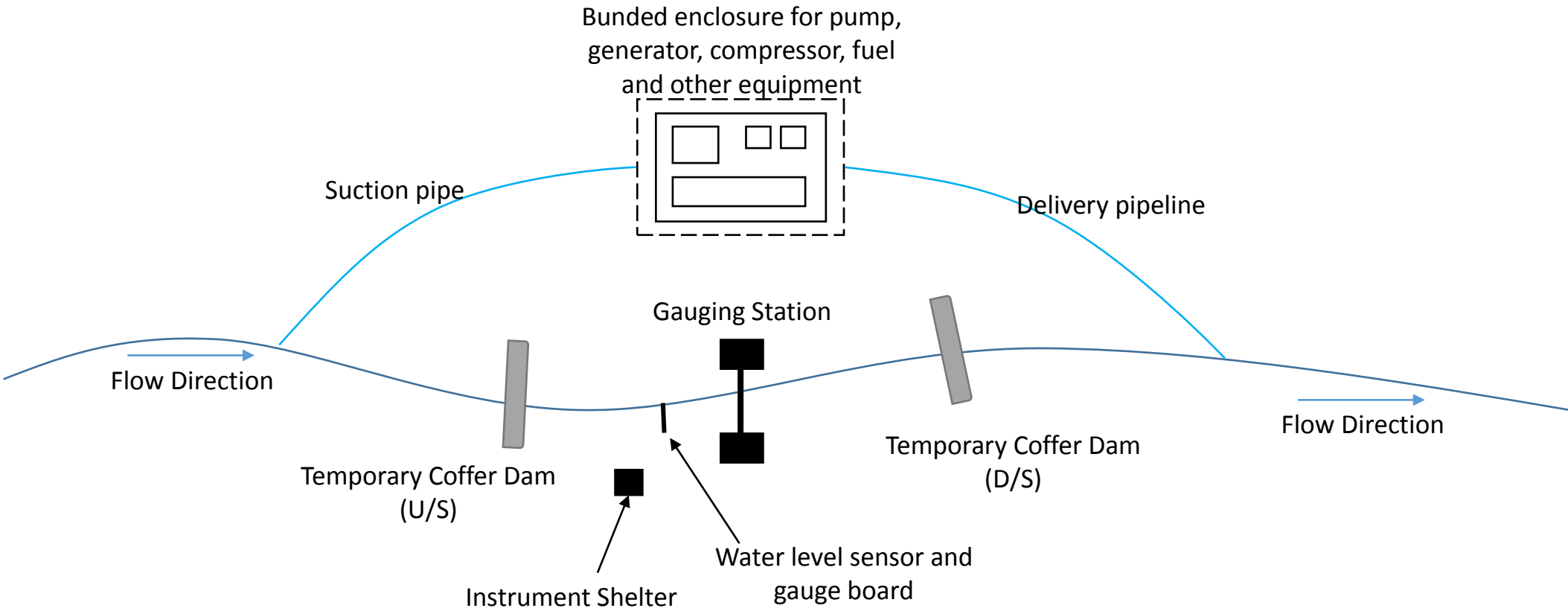
As construction is anticipated to take 4 to 5 days, any sediment collected by the downstream temporary coffer dam will be removed and placed in a holding tank in the bunded equipment storage area at the end of each day. The pump will be run constantly during construction activities (and manned at all times) to ensure the water level is kept below the cease to flow level of the upstream pool. Prior to leaving the site and at the end of each working day, all materials and equipment will be removed from the construction area and placed in the bunded equipment storage area.

Construction works will cease in the event of heavy rain in the catchment and all equipment will be moved to the bunded equipment storage area located on an elevated area of the stream bank.

Daily inspections of erosion and sediment control structures for structural integrity and effectiveness will be conducted by the MCPL Environmental Coordinator or their delegate.

At the conclusion of the construction works all construction equipment and materials will be removed from site including all waste materials and sediment recovered from the construction area. Oil adsorption materials would be used to clean and remove any spilt hydrocarbons in the bunded equipment storage area before it is dismantled. The bunded equipment storage area and the temporary coffer dams will then be dismantled and removed.

Indicative Site Layout Plan



Attachment 1

Ecology Assessment
(Eco Logical Australia)

ECO LOGICAL AUSTRALIA PTY LTD
ABN 87 096 512 088
www.ecoaus.com.au

Mr S. Love
Environment & Community Superintendent – Peabody Energy
Metropolitan Coal
GPO Box 402
Helensburgh NSW 2508

Job No: 17SUT-8057

2 November 2017

Dear Stephen,

Pre-Disturbance Vegetation Management for Access Tracks and Flow Gauge Stations

As requested, Eco Logical Australia undertook a pre-disturbance survey in accordance with the Metropolitan Coal Construction Management Plan 2015 (CMP). It is understood that Metropolitan Coal is currently undertaking preliminary planning for the construction of two flow gauging stations in small catchments below the Old Princes Highway, where it flows into the body of the Woronora Reservoir.

The following report presents the results of the site inspection in order to address the relevant points in the Surface Works Assessment of the CMP.

Yours sincerely,
Suzanne Eacott

Ecologist

Background

Works required

Vegetation clearance activities such as the removal, lopping or slashing of vegetation will be required to construct two small flow gauging stations and create access trails for staff and equipment.

Site inspection

A site inspection was undertaken by an ELA ecologist on 21 September 2017, accompanied by Hydrometric Consulting Services, to provide the following information:

- whether any flora species, populations or ecological communities listed as threatened under the NSW *Biodiversity Conservation Act 2016 (BC* Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act) are present within or adjacent to the proposed gauging stations and access trails;
- whether any threatened flora species listed under the BC Act or EPBC Act have potential to be impacted by trampling or mechanical damage as a result of accessing the proposed site or by placement of machinery and associated equipment on the vegetation during the installation process, and;
- make recommendations to avoid or minimise impacts if any listed flora species, populations or ecological communities were recorded within or adjacent to the proposed sites.

Methodology

Vegetation was inspected at the proposed sites for Gauging Station One and Gauging Station Two, both located in small catchments below the Old Princes Highway where it flows into the body of the Woronora Reservoir (**Figure 1**). The areas inspected included a 2 to 3 m wide corridor along the proposed access track associated with each gauging station. Individual plants of threatened or rare species were marked with green tape to identify areas where disturbance should be avoided or minimised.

Threatened populations

No threatened flora populations are listed under the TSC or EPBC Acts for the study area.

Threatened species

A search of the Atlas of NSW Wildlife and the EPBC Act Protected Matters Search Tool was performed for a radius of 5 km around the two gauging station sites. Species from the database searches were combined to produce a list of threatened flora species that may potentially occur within the study sites **Table 1**.

Threatened or rare plant species that may potentially occur on the study areas were targeted specifically during the inspections. Threatened flora species that are considered most likely to occur were those which have previously been recorded during baseline flora survey completed over the mining lease (Bangalay Botanical Surveys, 2008).

ROTAP species

Ten rare species listed in the Rare or Threatened Australian Plants (RoTAP) database (Briggs and Leigh, 1995) that may potentially occur on the study sites are listed in **Table 2**. All these species have potential to occur on the study sites as they have previously been recorded in surveys in the Metropolitan Colliery lease area (Bangalay Botanical Surveys, 2008).

Table 1 Potential threatened flora species within the study sites

Scientific Name	Common Name	Conservation Status		Likelihood
		TSC Act	EPBC Act	
Acacia baueri subsp. *aspera*	-	V[1]	-	Potential
Acacia bynoeana	Bynoe's Wattle	E[1]	V	Potential
Astrotricha crassifolia	Thick-leaf Star-hair	V	V	Potential
Caladenia tessellata	Tesselated Spider Orchid	E	V	Potential
Callistamon linifolius	Netted Bottle Brush	V	-	Unlikely
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Potential
Darwinia biflora	-	V	-	Unlikely
Eucalyptus camfieldii	Camfield's Stringybark	V	V	Potential
Genoplesium baueri	Bauer's Midge Orchid	V	-	Potential
Haloragis exalata subsp. *exalata*	Wingless Raspwort	-	V	Unlikely
Leucopogon exolasius	Woronora Beard-heath	V	V	Potential
Melaleuca biconvexa	Biconvex Paperbark	-	V	Unlikely
Melaleuca deanei	Deane's Paperbark	V	V	Potential
Pelargonium sp. Striatellum	OmeoStork's-bill	-	E	Unlikely
Persoonia mollis subsp. *maxima*	-	E	-	Potential
Pimelea curviflora var. *curviflora*	-	-	V	Unlikely
Prasophyllum affine	Jervis Bay Leek Orchid	E	E	Potential
Prostanthera densa	Villous Mintbush	-	V	Unlikely
Pterostylis saxicola	Sydney Plains Greenhood	-	E	Unlikely
Pultenaea aristata	Prickly Bush-pea	V	V	Potential
Syzygium paniculatum	Magenta Lilly PIlly	-	V	Unlikely
Thelymitra kangaloonica	Kangaloon Sun Orchid	-	CE	Unlikely
Thesium australe	Austral Toadflax	-	V	Unlikely

CE = Critically Endangered, E = Endangered, V = Vulnerable

Table 2 Potential ROTAP species within the study sites

Scientific Name	Common Name	Risk Code
Boronia serrulata	Native Rose	2RC-
Darwinia diminuta	Small-flower Darwinia	2RC-
Darwinia grandiflora	Prostrate Darwinia	2RC-
Eucalyptus apiculata	Narrow-leaved Mallee Ash	3RC-
Eucalyptus luehmanniana	Yellow Top Mallee Ash	2RCa
Grevillea longifolia	Long-leaved Grevillea	2RC-
Hibbertia nitida	Shining Guinea Flower	2RC-
Lomandra fluviatilis	Cascade Mat-rush	3RCa
Monotoca ledifolia	A Broom-heath	3RC-

Scientific Name	Common Name	Risk Code
Tetratheca neglecta	Neglected Tetratheca	3RC-

2 = Geographic range in Australia less than 100 km
3 = Geographic range in Australia greater than 100 km
R = Rare: Taxon which is rare in Australia, but which currently does not have any identifiable threat.
C = Conserved: The taxon is reserved in a conservation reserve.
- = Reserved population size is not accurately known.
a = 1000 or more plants are known to occur within a conservation reserve.

Threatened Ecological Communities

Two Endangered Ecological Communities (EECs) have been recorded in the region around the study sites (Bangalay Botanical Surveys, 2008):

- Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion EEC;
- O'Hares Creek Shale Forest EEC.

These communities have not been mapped for either of the study sites (Bangalay Botanical Surveys, 2008), however the dominant species at each site were recorded to confirm the absence of threatened ecological communities.

Critical flora habitat

No critical flora habitat has been declared under the TSC Act or the EPBC Act in the region of the study area.

Results

The results of the inspection are summarised in **Table 3**.

Gauging station one

The proposed establishment of Gauging Station One will comprise the construction of the gauging station itself and creation of an access trail for staff and equipment. The gauging station is proposed to be positioned on a large rock outcrop above a creek line. Vegetation clearance will be minimal and limited to trimming or small areas of removal. The approximate location of the proposed access track is provided in **Figure 2**Error! Reference source not found..

One flora species of significance was recorded along the proposed gauging station access track namely *Hibbertia nitida* (**Figure 2**). Approximately 20 individuals were recorded and marked (green flagging tape) for ease of identification in the field in order to minimise impacts during track preparation.

Gauging station two

The proposed establishment of Gauging Station Two will comprise the construction of the gauging station itself and creation of an access trail for staff and equipment. The gauging station is proposed to be positioned on a large rock outcrop above a creek line. Vegetation clearance will be minimal and limited to trimming.

The proposed access track loosely follows the bank of the Woronora Reservoir and will require the removal and trimming of some vegetation to allow for staff and equipment access. The approximate location of the proposed access track is provided **Figure 3**.

One threatened flora species, *Astrotricha crassifolia*, was recorded adjacent to the proposed access track (**Figure 3**). Three individuals were recorded and were marked (green flagging tape) for ease of identification in the field in order to avoid impacts during track preparation. One flora species of significance was recorded along the proposed gauging station access track namely *Hibbertia nitida* (not mapped). Approximately five individuals

were recorded and were marked (green flagging tape) for ease of identification in the field in order to minimise impacts during track preparation.

Table 3 Summary of the vegetation communities and threatened species detected during site inspection

Gauging station	Vegetation Community (NPWS 2003)		Threatened Species
	Map Unit No.	Community Name	
Gauging station one	MU25/MU4	Sandstone Gully Apple-Peppermint Forest / Sandstone Riparian Scrub	-
Gauging station two	MU25/MU4	Sandstone Gully Apple-Peppermint Forest / Sandstone Riparian Scrub	*Astrotricha crassifolia*

Conclusion and Recommendations

Threatened and Significant species

One threatened species listed in Schedule 1 of the TSC Act was located adjacent to the proposed access track for Gauging Station Two, namely *Astrotricha crassifolia.* Under the *NSW Threatened Species Conservation Act 1995* (TSC Act) *Astrotricha crassifolia* is recognised as a Vulnerable species. Three individuals were identified adjacent to the proposed access track for Gauging Station Two, however they will not be impacted by the proposed works. Individuals have been marked (green flagging tape) and shown to Hydrometric Consulting Services so that impacts during construction can be avoided.

One species of conservation significance was recorded, namely *Hibbertia nitida.* This species is recognised under the RoTAP listing (Briggs and Leigh 1995). Approximately 25 individuals of this species would be impacted by the clearing works, however, this species is found in abundance along Waratah Rivulet and other nearby watercourses. The loss of these plants at the two sites will not impact the local population within the Woronora Special Area. Although having no legal status, RoTAP species are nevertheless considered significant due to their more restricted distribution, threat status and adequacy of conservation. Minimising vegetation clearance will reduce the loss of individuals recorded within and adjacent to the gauging station access tracks.

Endangered Populations and Endangered Ecological Communities

No endangered populations or ecological communities were recorded along the proposed access tracks or gauging station sites.

Sandstone Apple-Peppermint Gully Forest and Sandstone Riparian Scrub are not listed as endangered ecological community in Schedules 1 (Part 3) of the NSW *TSC Act* or under the Commonwealth *EPBC Act*.

Although vegetation clearing and modification works will be required, the Sandstone Apple-Peppermint Gully Forest and Sandstone Riparian Scrub communities will not be fragmented during this process, and it is unlikely that the ecological function of this community will be impacted by the establishment of the gauging stations.

The following mitigation measures are recommended to minimise impacts to threatened species, species of conservation significance, the vegetation communities, and drainage lines during and following the completion of the construction works:

- establish the access track for Gauging Station One along the existing informal access track to minimise clearing of vegetation and removal of the significant species, *Hibbertia nitida;*

- establish the access track for Gauging Station Two along the bank of the Woronora Reservoir to minimise clearing of vegetation and removal of the significant species, *Hibbertia nitida,* and to prevent impacts to the Vulnerable species, *Astrotricha crassifolia*;
- construction works to be undertaken with all due diligence and care to avoid unnecessary impacts to adjacent vegetation;
- retain vegetative cover to avoid potential localised erosion of sediments;
- placement of equipment and materials to be kept to a minimal area, and on existing rocky outcrops around the proposed gauging station sites to avoid unnecessary impacts to adjacent vegetation;
- install sediment and erosion control barriers where appropriate (for example, to prevent erosion of top soil in the event of rainfall).

References

Bangalay Botanical Surveys (2008). *Metropolitan Coal Project Baseline Flora Survey -Proposed Longwall Mining Area*. Final Report to Helensburgh Coal Pty. Ltd.

Briggs, J. and Leigh, J. (1995) *Rare or Threatened Australian Plants*. CSIRO. Melbourne.

NPWS (2003). *The Native Vegetation of the Woronora, O'Hares and Metropolitan Catchments*. NSW National Parks and Wildlife Service, Sydney

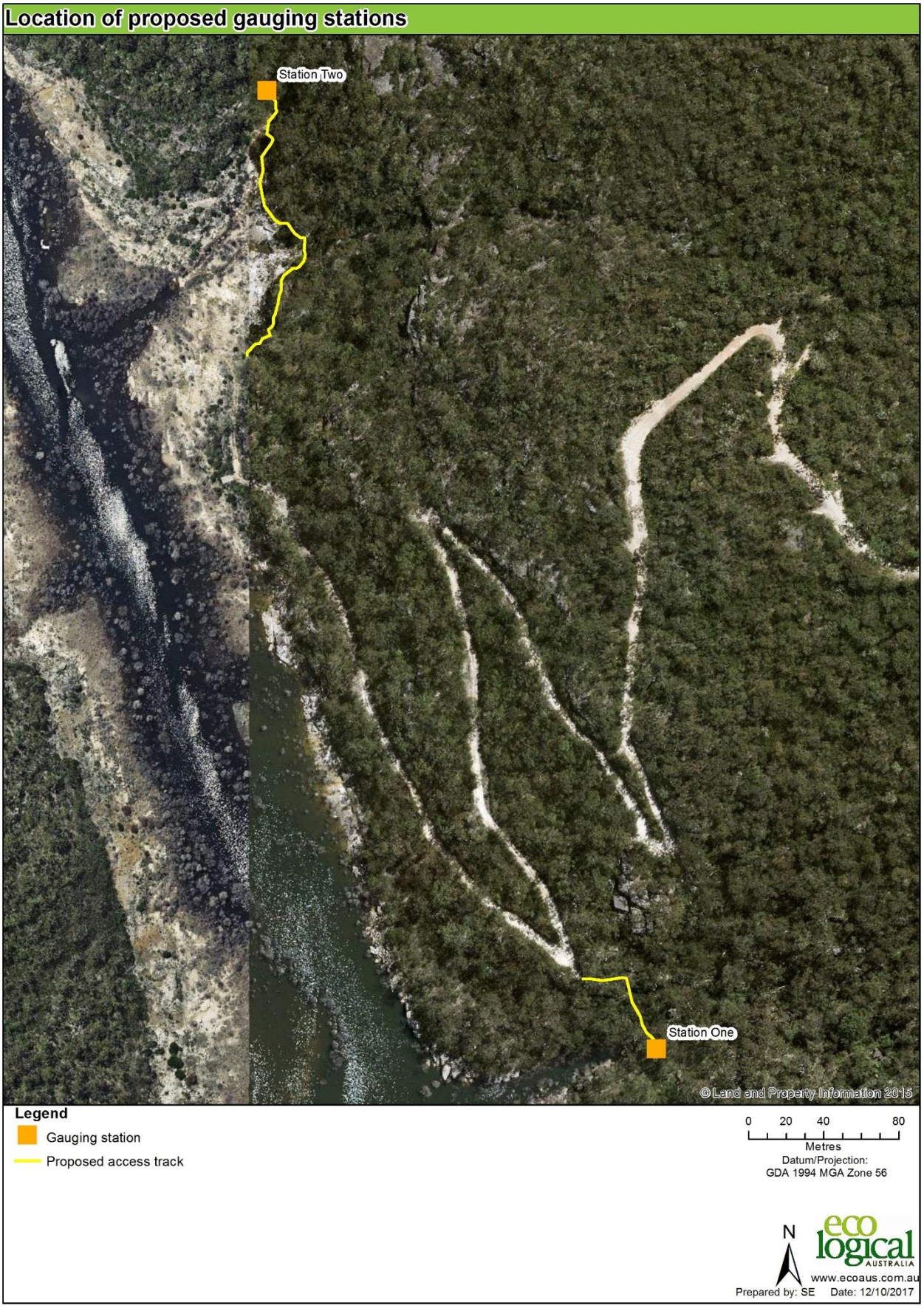


Figure 1 Proposed location of the two gauging stations

Figure 2 Proposed location of gauging station one

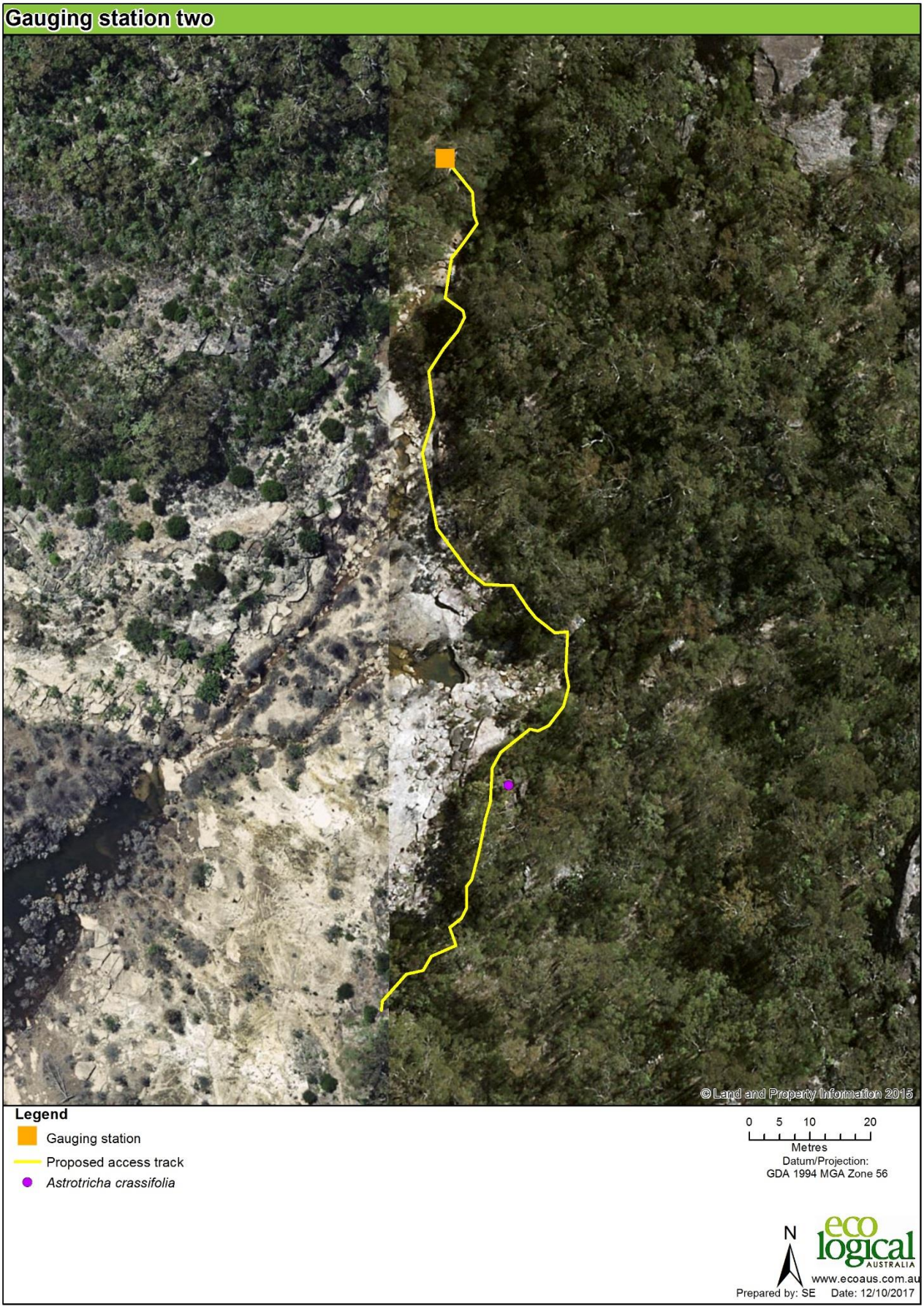


Figure 3 Proposed location of gauging station two

Attachment 2

Aboriginal Heritage Assessment
(Niche Environment and Heritage)

Niche Environment and Heritage
PO Box 2443 North Parramatta NSW 1750
T 02 9630 5658 F 02 4017 0071
E info@niche-eh.com ABN 19 137 111 721

29 September 2017

Mr Stephen Love
Metropolitan Coal - Peabody Energy Australia Pty Ltd
GPO Box 402
HELENSBURGH NSW 2508
via email: slove@peabodyenergy.com

Dear Mr Love,

Re: Proposed low flow flumes for small tributaries on the eastern side of Longwalls 301 and 302 and the tipping bucket rain gauge installation works – Desktop Aboriginal Due Diligence Assessment

Niche Environment and Heritage (Niche) was commissioned by Metropolitan Coal to determine the potential impact of the proposed low flow flume and tipping bucket rain gauge installation works on Aboriginal cultural heritage sites and objects.

We understand the scope of works is to undertake an Aboriginal heritage assessment for the proposed installation of low flow flumes on two small tributaries which flow into the Woronora Reservoir over the 301 and 302 longwall panel areas. The objectives of the proposed flumes is to provide accurate flow data, particularly for low to moderate flows, in support of a hydrological assessment of the potential hydrological impacts of mining longwall (LW) 301 and LW 302 on flows in small first and second order drainages. In addition to this, Metropolitan Colliery would like to install a tipping bucket rain gauge along Fire Road 9I (Figure 1 and Figure 2). This assessment has been undertaken in accordance with the *NSW Minerals Industry Due Diligence Code for the protection of Aboriginal Objects* (NSW Minerals Council 2010) and in accordance with the Metropolitan Colliery Surface Works Assessment Form process, which requires a desktop assessment prior to these types of surface works.

Step 1. Check for records of Aboriginal Objects and Places in the area of the proposed activity

A search of the Aboriginal Heritage Information Management System (AHIMS) of the entire Metropolitan Colliery Mine lease area was conducted on 13 December 2016 (AHIMS Client ID: 258551, 2585583, 258556, 258557, 258558 and 258559). There was one registered site within close proximity to the proposed Catchment 'K' location area (Figure 1 and Figure 3). The site Flat Rock Creek 93 (AHIMS ID# 52-2-0872) comprises of a Shelter with Art and Deposit. This site has been recorded three times on AHIMS which means it has a further two AHIMS ID numbers 52-2-0346 and 52-2-0198. The site will not be adversely effected by the proposed works.

Step 2: Is the activity a 'low impact activity', as defined by the NPW Regulation?

No.

The proposed low flow flume works are not low impact activity as defined by the NPW Regulation.

Step 3. Are there any landscape features on undisturbed land that like likely to indicate the presence of Aboriginal Objects?

Yes.

NSW Minerals Council 2010 identifies a number of landscape features, which are of archaeological interest and require further consideration. Specifically areas that are:

- Within 200m of water, or
- Located within a sand dune system, or
- Located on a ridge top, ridge line or headland, or
- Located within 200 m below or above a cliff face, or
- Within 20 m of or in a cave, rock shelter , or a cave mouth
- And is on land that is not disturbed land.

The proposed low flow flume works (Catchment K and Catchment I) are located within undisturbed land located on the edge of the Woronora Dam.

The project area is situated on the Hawkesbury soil landscape. The Hawkesbury soil landscape is defined as comprising of steep, rugged slopes and ridges of the Woronora Plateau consisting of rolling to very steep hills with frequent sandstone outcrops and floaters. The soils of this landscape are extremely shallow, stony and highly permeable. The primary form of landscape development is mass movement. Overall this landscape is unsuitable for accumulating and preserving Aboriginal objects in open environments.

Due to the low impact nature of the proposed works, the only foreseeable harm would be to Axe grinding grooves and sandstone shelters with art and/ or deposit. During the desktop assessment there were none of the above Aboriginal site types are were identified to be in close proximity to the proposed works.

Step 4: Does a desktop assessment and visual inspection confirm that there are Aboriginal objects present or likely to be present?

No.

There was no visual inspection undertaken as part of this Aboriginal objects due diligence assessment. However assessment was made of photographs taken of the proposed low flow flume and tipping bucket gauge locations. There is low potential for any further Aboriginal objects or places to be present within, or in close proximity, to the proposed Catchment 'K' and Catchment 'I' low flow flume works or the proposed tipping bucket rain gauge location.

Step 5: Can the activity be relocated away from the known/likely area for Aboriginal objects.

No.

The proposed low flow flumes and tipping bucket rain guage cannot be moved. There is no compelling reason to relocate the proposed works.

Step 5. Further investigations and impact assessment

No further assessments are considered necessary and the proposed low flow flume and tipping bucket rain gauge development works can proceed. Access to the low flow flume locations should be made via the existing Fire Road 9I, so as to not disturb the vegetation and soil profile of the surrounding locations.

In the unlikely event that Aboriginal heritage objects and/or sites are discovered, all work should stop immediately and a suitably qualified Aboriginal heritage specialist be consulted.

Please do not hesitate to contact me should you have any questions or would like to discuss this assessment further.

Yours sincerely

Renée Regal
Heritage Team Leader
Niche Environment and Heritage

Attached: Figure 1. Location of Subject Area, Figure 2. Location of the proposed works and Figure 3. AHIMS results within close proximity to the proposed works

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Location map

Low Flow Flumes

FIGURE 1

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Subject Area

Low Flow Flumes

FIGURE 2

Imagery: (c) LPI 2013 - 2014

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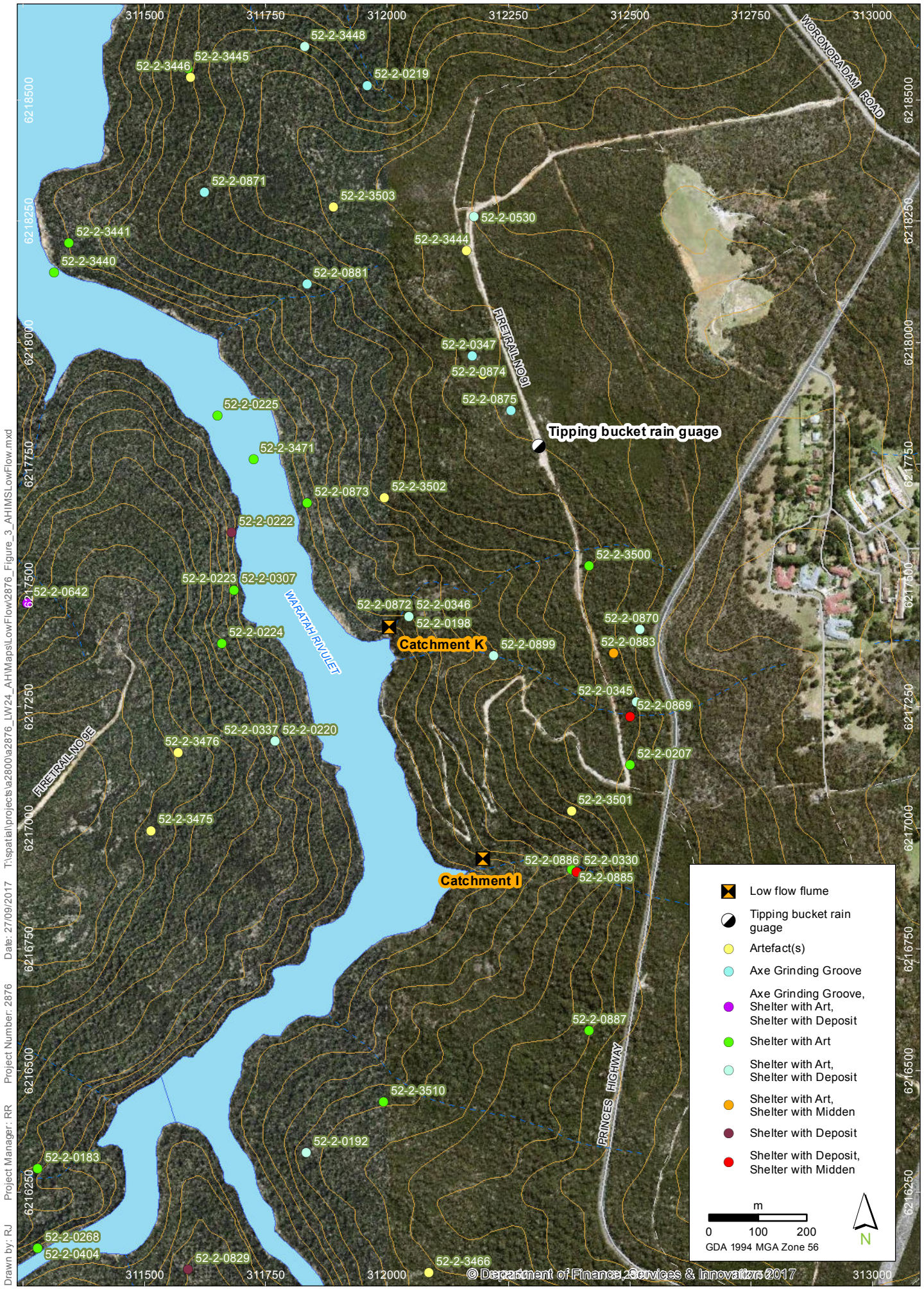

AHIMS within close proximity to the proposed works

Low Flow Flumes

FIGURE 3

Imagery: (c) LPI 2013 - 2014

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