METROPOLITAN COAL

METROPOLITAN COAL
CONSTRUCTION MANAGEMENT PLAN

SURFACE WORKS ASSESSMENT FORMS

EASTERN TRIBUTARY AND HONEYSUCKLE CREEK GAUGING STATIONS

July 2011

EASTERN TRIBUTARY AND HONEYSUCKLE CREEK

GAUGING STATION CONSTRUCTION

In accordance with the Metropolitan Coal Catchment Monitoring Program, one gauging station will be installed on the Eastern Tributary and one gauging station will be installed on Honeysuckle Creek. The gauging stations will provide baseline data for the development of catchment models that will be used during the mining of Longwalls 23-27. The locations of the gauging stations are shown on Figure 1-1.

A gauging station will be located on the Eastern Tributary near the full supply level of the Woronora Reservoir, upstream of a waterfall which marks the limit of inundation (Figure 1-1). Plates 1 and 2 show views of the gauging station site looking upstream and downstream, respectively. An approximate cross-section of the gauging station location is shown on Figure 1-2.

A gauging station will also be located on Honeysuckle Creek on a rock bar upstream of a small waterfall (Figure 1-1). Plate 3 shows the view looking upstream from the site, and Plate 4 shows the rock bar the gauging station will be installed upon, looking downstream. An approximate cross section of the gauging station location is shown on Figure 1-2.

Gauging Station Design

At each site, a low, reinforced concrete weir will be constructed across the rock bar. A self rated flume within the weir (near the low point of the cross section) will be installed at each gauging station site. The flumes will be fabricated to accurate tolerances from either sheet aluminium or stainless steel.

The gauging stations will be designed to accurately record high and low flows. The flume will provide accurate flow measurements over the flow range of 1 to 100 litres per second which is expected to cover the 10% to 90% exceedance flows at the two gauging station locations. Water level sensors will be installed in the upstream pool at both sites, where approach velocities will be low and velocity head will have negligible effect on water level measurements over the range of gauged flows. Two sensors (i.e. one submersible pressure transducer and one gas bubbler) and two loggers will be used (independent systems, one as a back-up to the other), to reduce the potential for data loss due to sensor malfunction. The dimensions and details of the flume and weir are shown on Figures 1-2 to 1-6.

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 this is higher in sections closer to the downstream waterfalls where there are more scour holes which may provide pathways for underflow and where there is a steeper gradient driving subsurface flow between these holes and the toe of the waterfall. An example of the of circular scour holes in the bed of a rock bar is shown in Plate 5.

These holes are thought to be formed by the abrasive action of sediment caught in high velocity turbulent vortices carving self perpetuating holes. Over time they will continue to erode the rock and provide linkages to subsurface fracture systems. Where possible, the weir sites have been selected away from scour-holes and flow paths in the bedrock. Scour holes and openings exposed in the bed upstream of the weir will be grouted with concrete during construction.

Flow velocities on the rock shelf between the waterfall and the upstream pool will be high under most flow conditions. If not for the presence of durable rock on the rock shelf, these high velocities would represent a high potential for bed erosion. Construction of a low weir will to some degree increase velocities immediately downstream of the weir and around the sides of the weir. The presence of massive durable rock outcrop on the stream bed and on both weir abutments at the chosen sites, however, means that the presence of the proposed low weir is unlikely to cause any additional erosion. Notwithstanding, concrete will be used to infill any susceptible joints/fractures exposed in the bed and abutment areas.

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. Access is such that the only practical way of achieving this with minimal disturbance to vegetation is by helicopter. Equipment delivered to site by helicopter will either be lowered directly into bunded enclosures located on elevated areas on the banks of the streams, or onto exposed rock shelves or rock bars. Equipment brought in by helicopter will include: portable generator and fuel; concrete formwork including plywood sheets and timber; the prefabricated flume and associated bracing; pre-mixed concrete and concrete mixer; reinforcing steel; pump and pipeline; motor; bunding; sandbags and other sediment controls; and a range of building tools including a circular saw, hammer drill, grinder and rock saw.

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 (refer Figure 1-5).

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.

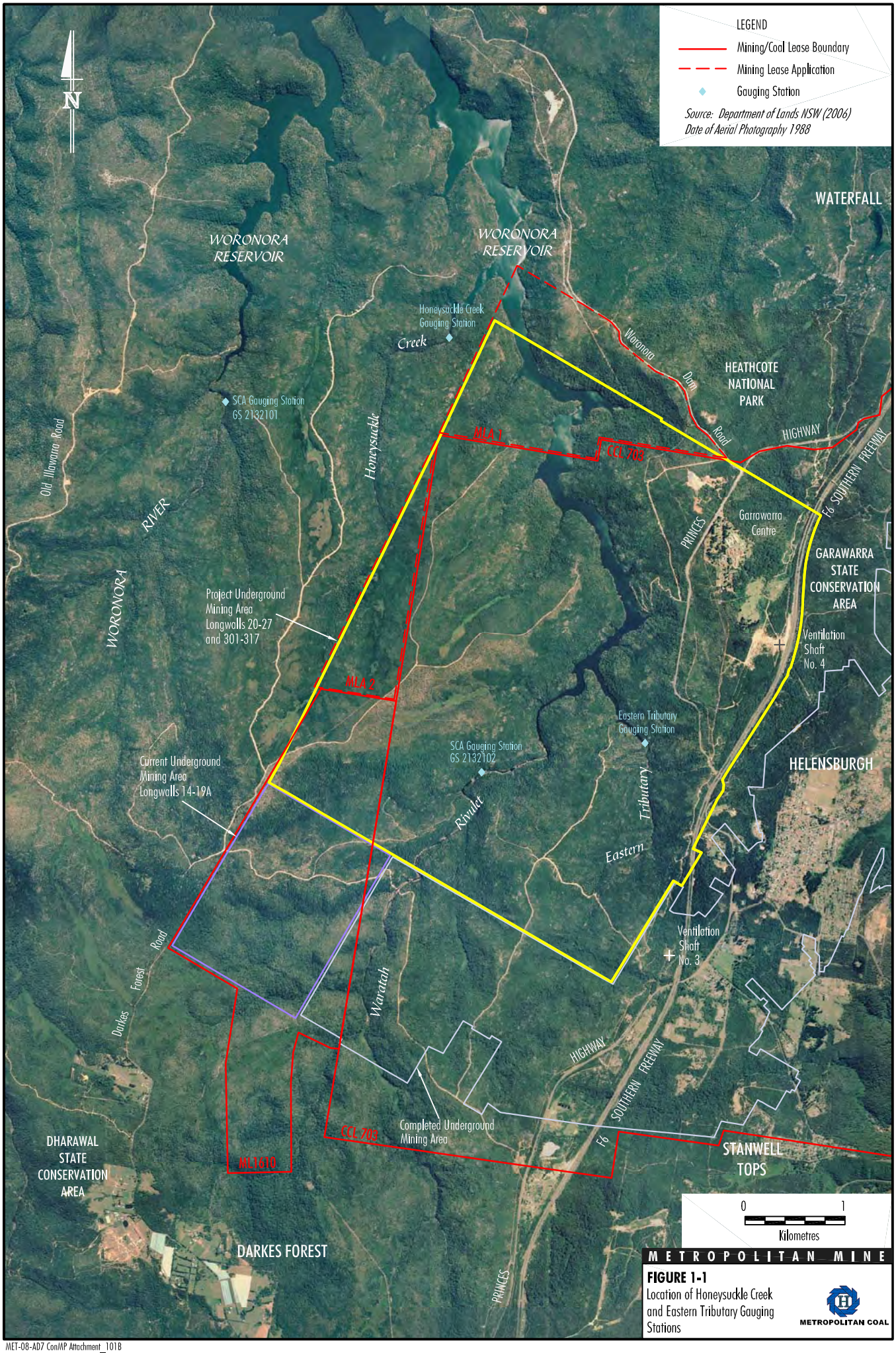
In summary, installation of the gauging stations will include the:

- placement of construction materials and equipment (e.g. 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 rock bar and stream bank;
- construction of the weir and plinth formwork;
- pouring of 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.

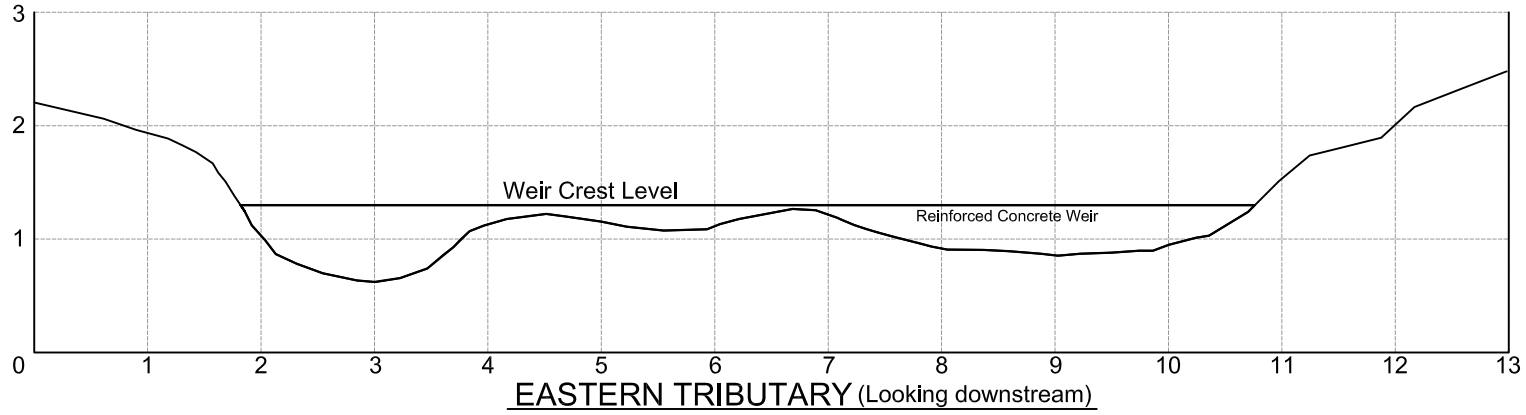
The gauging stations will be subject to regular inspections and maintenance as required (e.g. removal of any debris lodged in the flume).



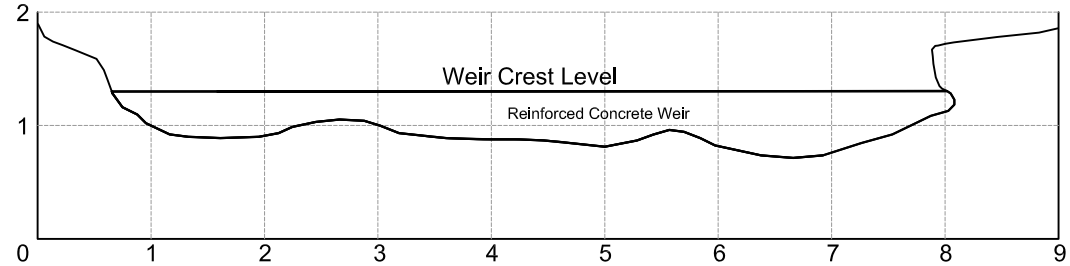
METROPOLITAN MINE

FIGURE 1-1
Location of Honeysuckle Creek and Eastern Tributary Gauging Stations

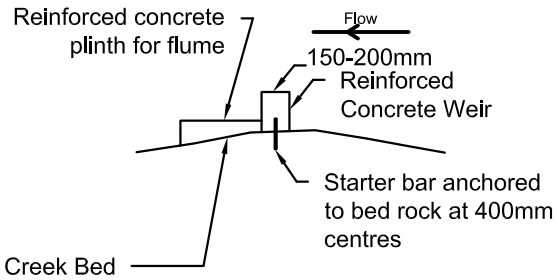
METROPOLITAN COAL



EASTERN TRIBUTARY (Looking downstream)



HONEYSUCKLE CREEK (Looking downstream)



Note: All Figure dimensions in metres

DESIGNED LG	SCALE NTS
DRAWN SK	LEVEL DATUM
CHECKED LG	SHEET SIZE A4
APPROVED LG	CAD FILE Fig_1-2_Eastern_Honey.dwg
DATE 26/6/2010	ISSUE

Gilbert & Associates
Hydrology & Water Management Consultants

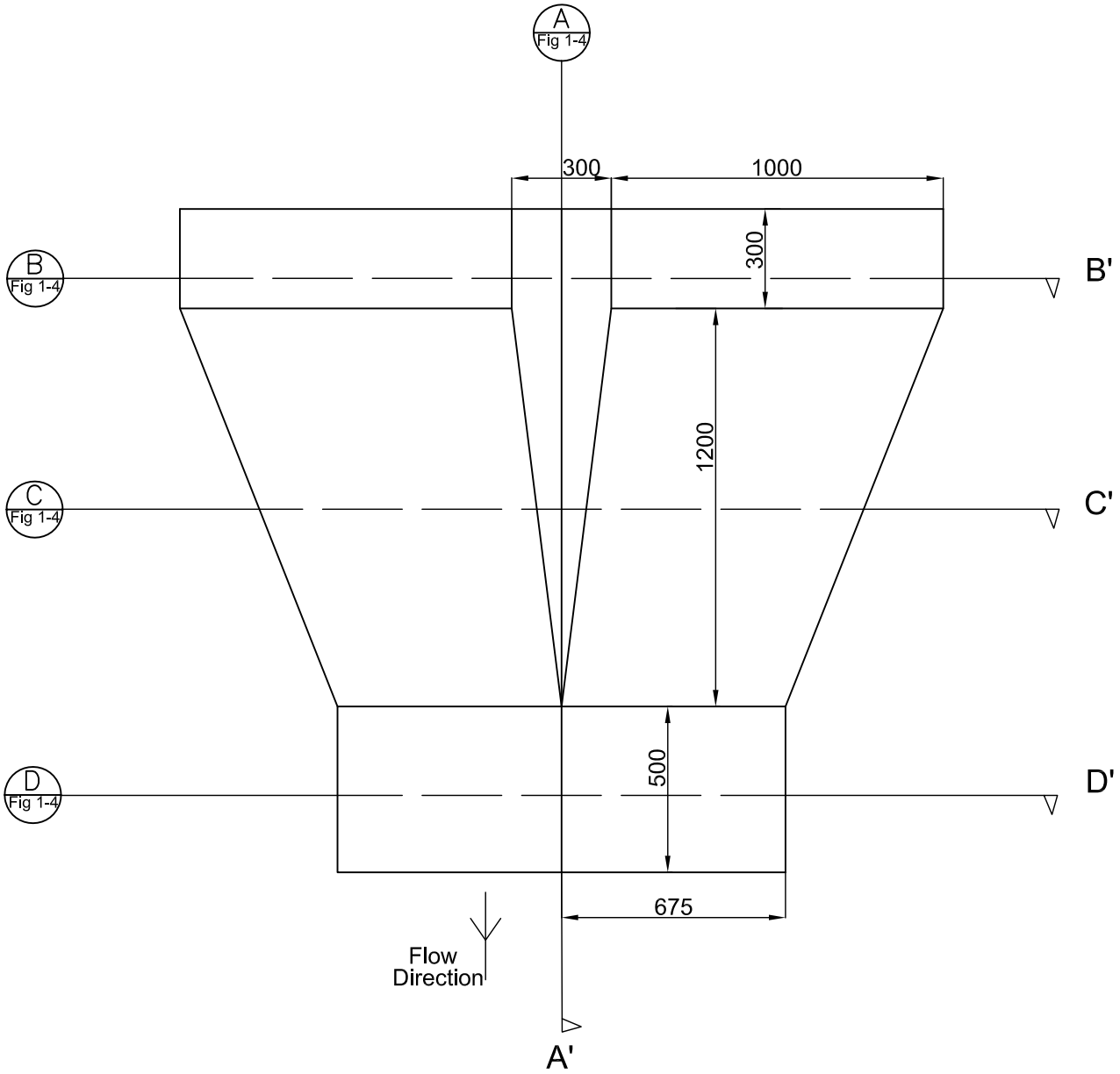
PO Box 2057 PH (07) 3367 2388
Milton QLD 4064 FAX (07) 3367 2833
gaconslt@bigpond.net.au

CLIENT Helensburgh Coal Pty Ltd

PROJECT Eastern Tributary and Honeysuckle Creek Gauging Station Design

TITLE Indicative Creek Cross Sections at Proposed Gauging Station Sites

DRAWING NO.	REV NO.
Figure 1-2	B



FLUME PLAN

(Refer Figures 1-5 & 1-6 for Bracing Details)

Note: Dimensions in millimetres

Preliminary- Not for Construction

DESIGNED LG	SCALE 1:20
DRAWN SK	LEVEL DATUM
CHECKED LG	SHEET SIZE A4
APPROVED LG	CAD FILE Fig_1-3_Flume_Plan.dwg
DATE 26/6/2010	ISSUE

Gilbert & Associates Pty Ltd
Hydrology & Water Management Consultants

PO Box 2057 PH (07) 3367 2388
Milton QLD 4064 FAX (07) 3367 2833
gaconsit@bigpond.net.au

CLIENT

Helensburgh Coal Pty Ltd

PROJECT

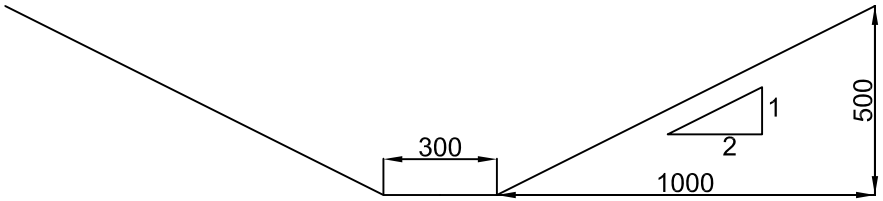
Eastern Tributary and Honeysuckle Creek Gauging Station Design

TITLE

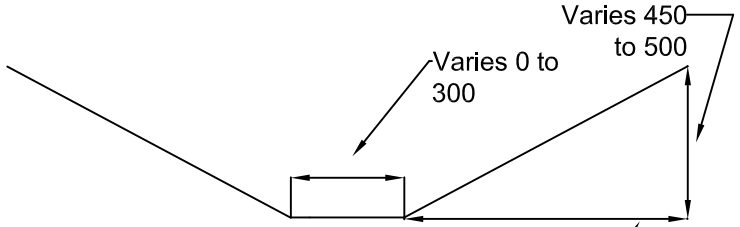
Indicative Flume Design Dimensions

JOB NO. J0604/22

DRAWING NO. Figure 1-3 REV. B

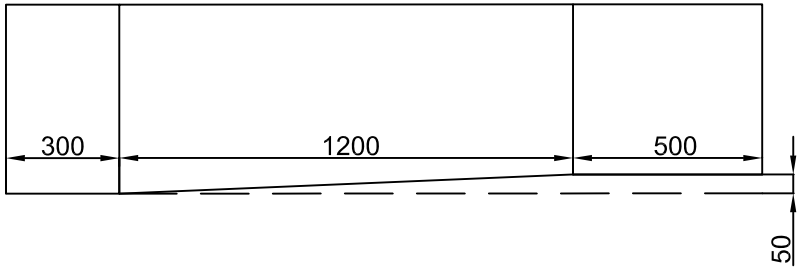


Section BB'

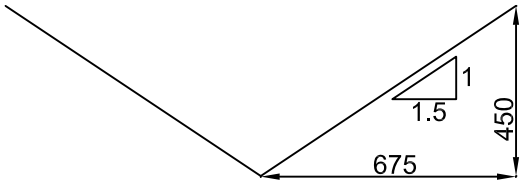


Section CC'

Varies 675
to 1000



Section AA'
(Internal Dimension)



Section DD'

Note: Dimensions in Millimetres

Preliminary – Not for Construction

DESIGNED LG	SCALE 1:20
DRAWN SK	LEVEL DATUM
CHECKED LG	SHEET SIZE A4
APPROVED LG	CAD FILE Fig_1-4_Flume_Section_Details.dwg
DATE 26/6/2010	ISSUE

Gilbert & Associates
Hydrology & Water Management Consultants

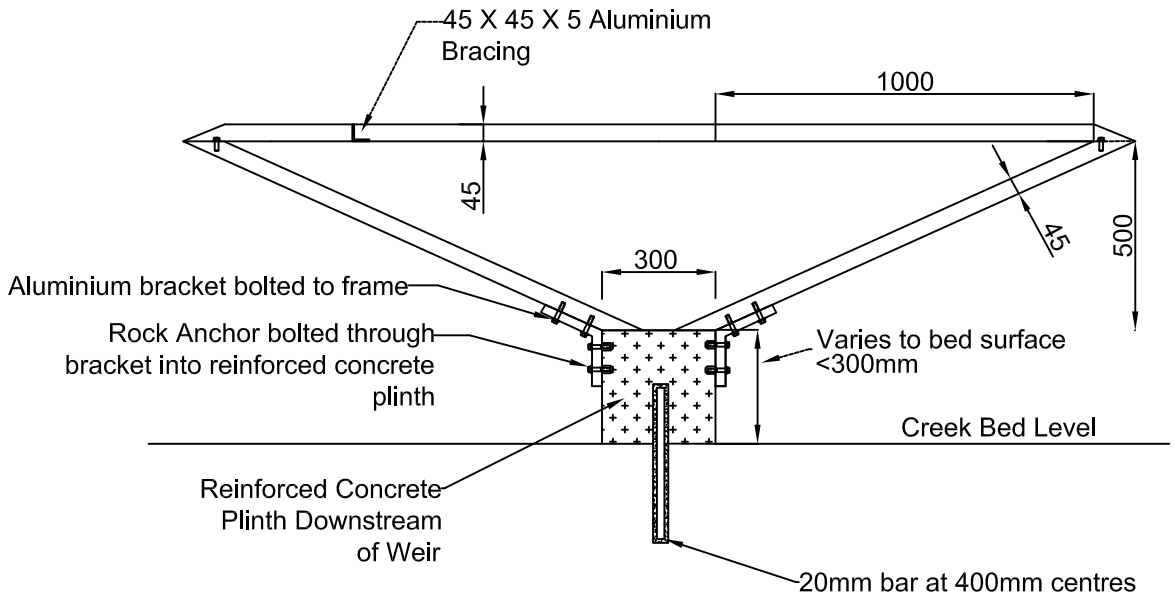
PO Box 2057 PH (07) 3367 2388
Milton QLD 4064 FAX (07) 3367 2833
gaconsult@bigpond.net.au

CLIENT Helensburgh Coal Pty Ltd

PROJECT Eastern Tributary and Honeysuckle Creek Gauging Station Design

TITLE Indicative Flume Section Dimensions

DRAWING NO.	REV NO.
Figure 1-4	B



TYPICAL FLUME BRACING FRAME & ANCHOR PLINTH ARRANGEMENT

Note: Dimensions in Millimetres

Preliminary – Not for Construction

DESIGNED LG	SCALE 1:20
DRAWN SK	LEVEL DATUM
CHECKED LG	SHEET SIZE A4
APPROVED LG	CAD FILE Fig_1-5_Flume Bracket.dwg
DATE 26/6/2010	ISSUE

Gilbert & Associates Pty Ltd
Hydrology & Water Management Consultants

PO Box 2057 PH (07) 3367 2388
Milton QLD 4064 FAX (07) 3367 2833
gaconslt@bigpond.net.au

CLIENT

Helensburgh Coal Pty Ltd

PROJECT

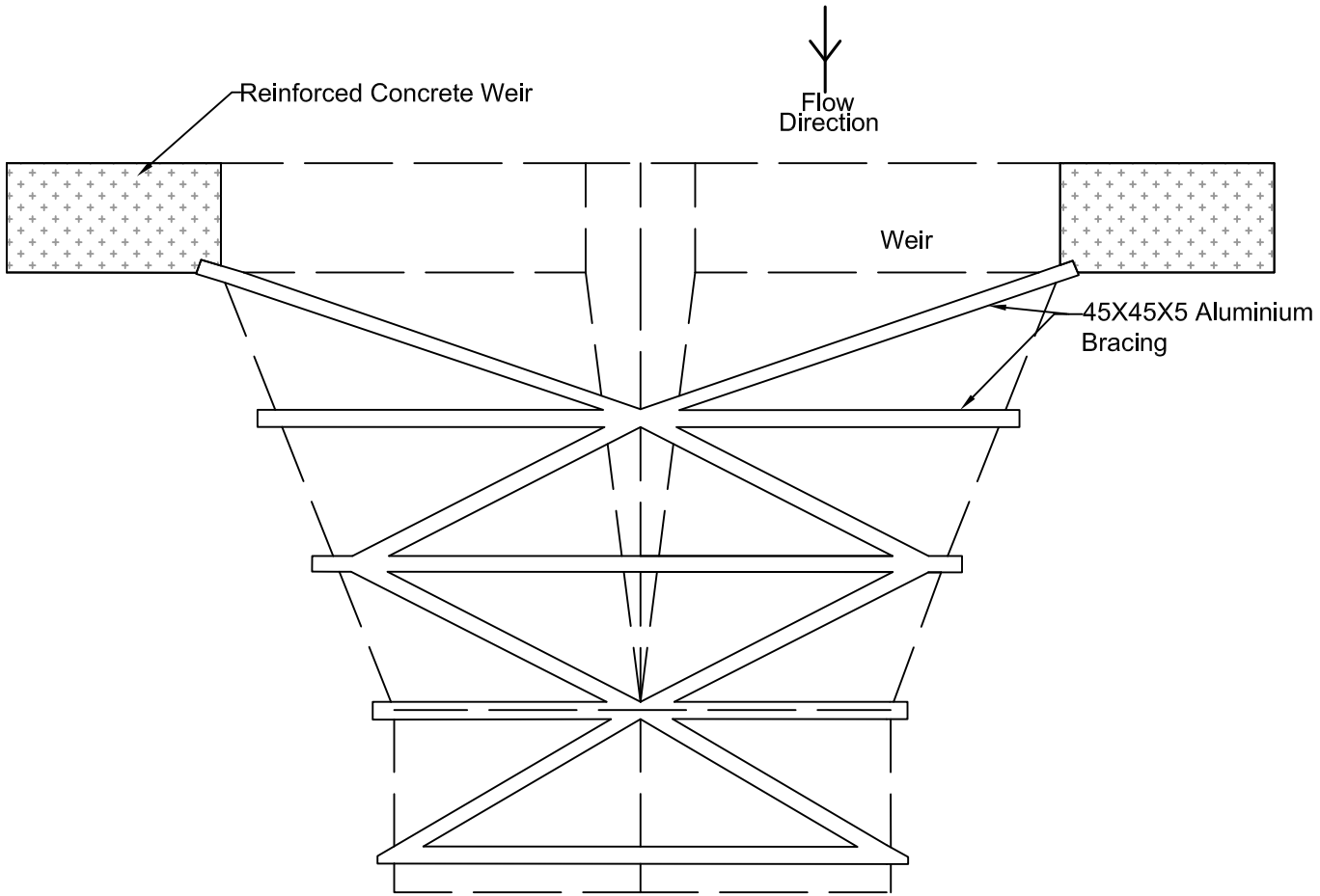
Eastern Tributary and Honeysuckle Creek Gauging Station Design

TITLE

Typical Flume Bracket Arrangement

JOB NO. J0604/22

DRAWING NO. Figure 1-5 REV. B



FLUME DETAIL

(Plan View with lattice brackets shown)

Note: Dimensions in millimetres

Preliminary - Not for Construction

DESIGNED LG	SCALE 1:20
DRAWN SK	LEVEL DATUM
CHECKED LG	SHEET SIZE A4
APPROVED LG	CAD FILE Fig_1-6_Flume_Plan_Bracket.dwg
DATE 26/6/2010	ISSUE

Gilbert & Associates Pty Ltd
Hydrology & Water Management Consultants

PO Box 2057 PH (07) 3367 2388
Milton QLD 4064 FAX (07) 3367 2833
gaconsit@bigpond.net.au

CLIENT

Helensburgh Coal Pty Ltd

PROJECT

Eastern Tributary and Honeysuckle Creek Gauging Station Design

TITLE

Indicative Bracing Details

JOB NO. J0604/22

DRAWING NO. Figure 1-6 REV. B

Plate 1 **View of Eastern Tributary looking upstream towards the gauging station site with rock bar constrictions in foreground and the upstream pool in background**

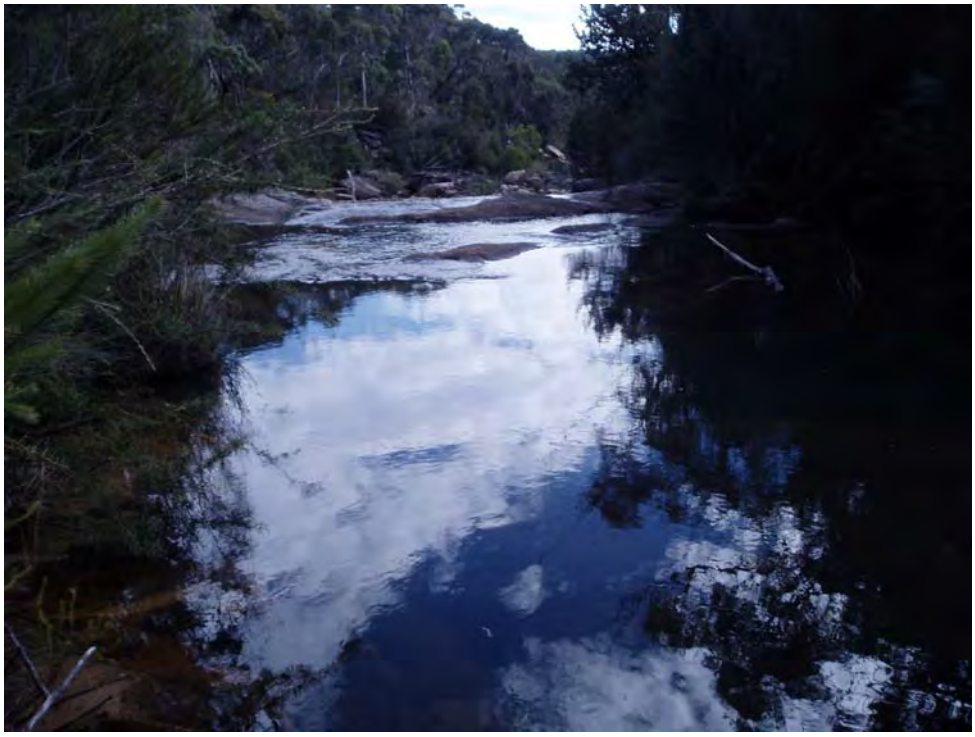


Plate 2 **View of Eastern Tributary looking downstream from the gauging station site with the top of the downstream waterfall in background**

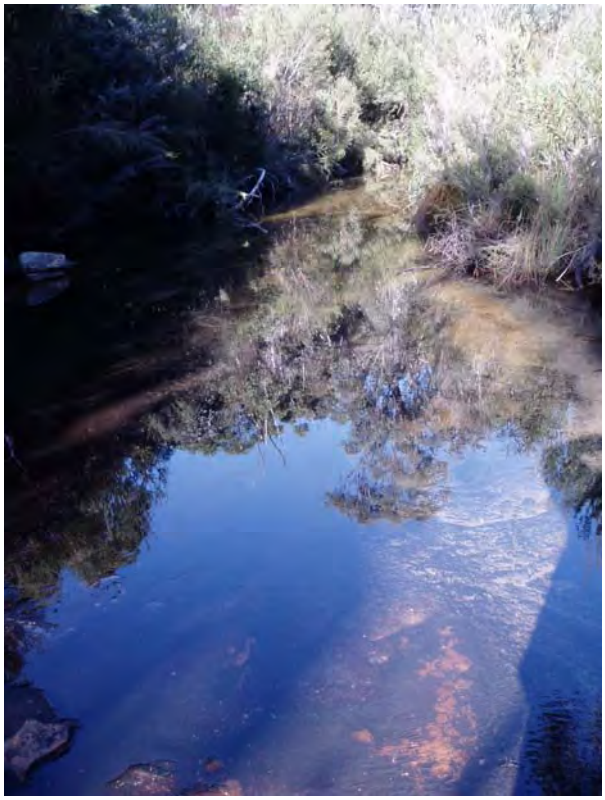


Plate 3 **View of pool upstream of gauging station site on Honeysuckle Creek**

Plate 4 **View of the rock bar at the gauging station site on Honeysuckle Creek looking downstream**

Plate 5 An example of circular scour holes in the bed of Woronora River

METROPOLITAN COAL

METROPOLITAN COAL
CONSTRUCTION MANAGEMENT PLAN

SURFACE WORKS ASSESSMENT FORM

HONEYSUCKLE CREEK GAUGING STATION

July 2011

Construction Management Plan

Surface Works Assessment Form

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

Date: *19 May 2011*

Name and position: *Josh Daniel (Environmental Consultant), Patrick Brienan (Principal Environmental and OHS Scientist - Brienan Environment and Safety)*

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

RMP register number: *1*

Site name: *Honeysuckle Creek Gauging Station*

Site type: *Gauging station*

Site co-ordinates (easting/northing): *310190 / 6219710*

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, coffer dams, 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? **Yes**

A small upland swamp was identified adjacent to the access track to the construction site. The access track is follows a terminal rock bar at the lower margin of the swamp and does not impact on any vegetation within the swamp.

Are there records of known threatened flora species in the general area? **No**

_____

_____

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?

Riparian scrub.

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) **Yes**

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

As described above, part of the access track follows the terminal rock bar of a small upland swamp and does not impact on any vegetation within the swamp.

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.

26 November 2010

Name of suitably qualified ecologist conducting survey.

Elizabeth Norris (Eco Logical Australia Pty Ltd)

Have any threatened flora been identified within the proposed disturbance area or immediate surrounds. **No**

No threatened flora species, populations or ecological communities listed under either NSW or Commonwealth legislation were identified at the gauging station site or along the access track.

One RoTAP species (Hibbertia nitida) was recorded at the gauging station site. Although having no legal status, RoTAP species are nevertheless considered significant due to their more restricted distribution, threat status and adequacy of conservation. Individuals have been flagged to assist with their identification during the construction works.

Scientific names of threatened flora species recorded. **N/A**

Will works be relocated to avoid or minimise impacts on the threatened flora species? **N/A**

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? **N/A**

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

[Attach any relevant ecological reports to this assessment form]

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**

Approximately 2 m^2 of vegetation at each abutment of the concrete weir will be required to be removed to construct the gauging station. An additional 2 m^2 of vegetation on each abutment may need to be slashed to provide a safe work environment. Some small plants on the rock shelf where the bunded enclosure will be located may need to be slashed to provide enough space for the bunded enclosure.

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).

Pedestrian access to the site will be through native bushland extending from Fire Road 9E to the construction site (see Site Layout Plan). A helicopter will be used to transport equipment unable to be carried to the construction site from the helicopter landing site on Fire Road 9H. Equipment will be lowered from the helicopter directly into the bunded enclosure, or onto exposed rock shelves.

Is vegetation clearing required for site access? If yes, describe the extent and method of clearing? **Yes**

Vegetation along the access track from Fire Road 9E to the construction site will be slashed approximately 1 m wide and some branches will be lopped to provide safe access to the site and prevent personnel straying from the track. Vegetation will not be removed as part of the vegetation clearance along the access track.

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

Disturbances would be appropriately limited by the following mitigation measures:

- *There will be no access through, or vegetation clearance within upland swamps.*
- *The access track will be located along the terminal rock bar along the lower edge of the upland swamp to prevent trampling impacts to swamp vegetation.*
- *Areas where RoTAP species have been identified will be avoided (individuals have been flagged to assist with their identification during construction works).*
- *Existing fire trails, tracks and exposed bedrock will be used for access and placement of equipment, where practicable.*
- *Equipment will be transported to the construction site by hand and helicopter to prevent impacts to vegetation from vehicles.*

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:

Plate 1 is a photograph looking upstream from the gauging station site.

Plate 2 shows the rock bar where the weir will be constructed, looking downstream.

Plate 3 shows the rock shelf on the eastern bank of the stream where the bunded enclosure will be located.

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

Date of pre-clearance survey for Aboriginal heritage sites.

19/10/2010

Name of survey attendees.

Iain Watt (Kayandel), Nathan Spooner (Kayandel), Ben Gunn (Kayandel), David Rankin (Metropolitan Colliery), Nathan Kennedy (ILALC), Daniela Reverberi (NIAC), Keith Ball (NIAC), Keith Sims Jr (NIAC), Daniel Chalker (Cubbitch Barta), James Davies (Wodi Wodi Elders Corporation)

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

No Aboriginal heritage items were located in the survey area. The fact that the construction site is a rock bar makes the possibility of subsurface archaeology highly unlikely. There are areas surrounding the survey area that have the potential to produce Aboriginal heritage items, but as they are outside the proposed construction area it is unlikely that the proposed construction works will have any impact on any potential archaeology.

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]

Known Aboriginal heritage sites located close to surface disturbance works

Details of demarcation (e.g. fencing, sign-posting or temporary flagging) implemented to avoid accidental damage to known Aboriginal heritage sites located close to surface disturbance works. **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 HCPL staff and contractors been provided with fire awareness and fire safety training?	**Yes**
-	Has a Hot Work Permit been obtained from the SCA if required?	**N/A**

MET-08-AD7 GS_104E

HONEYSUCKLE CREEK GAUGING STATION CONSTRUCTION EROSION AND SEDIMENT CONTROL PLAN

This Erosion and Sediment Control Plan (ESCP) has been developed for the construction of a gauging station on Honeysuckle Creek. The purpose of this ESCP is to minimise the risks of the gauging station construction activities adversely affecting the water quality of Honeysuckle Creek. 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 to Honeysuckle Creek 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 eastern bank on a rock shelf approximately 1.5 m 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 (Figure 1).

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 (Figure 2) will be constructed within Honeysuckle Creek 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 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 construction equipment, materials and erosion and sediment controls are shown on the Site Layout Plan.

Construction Stage

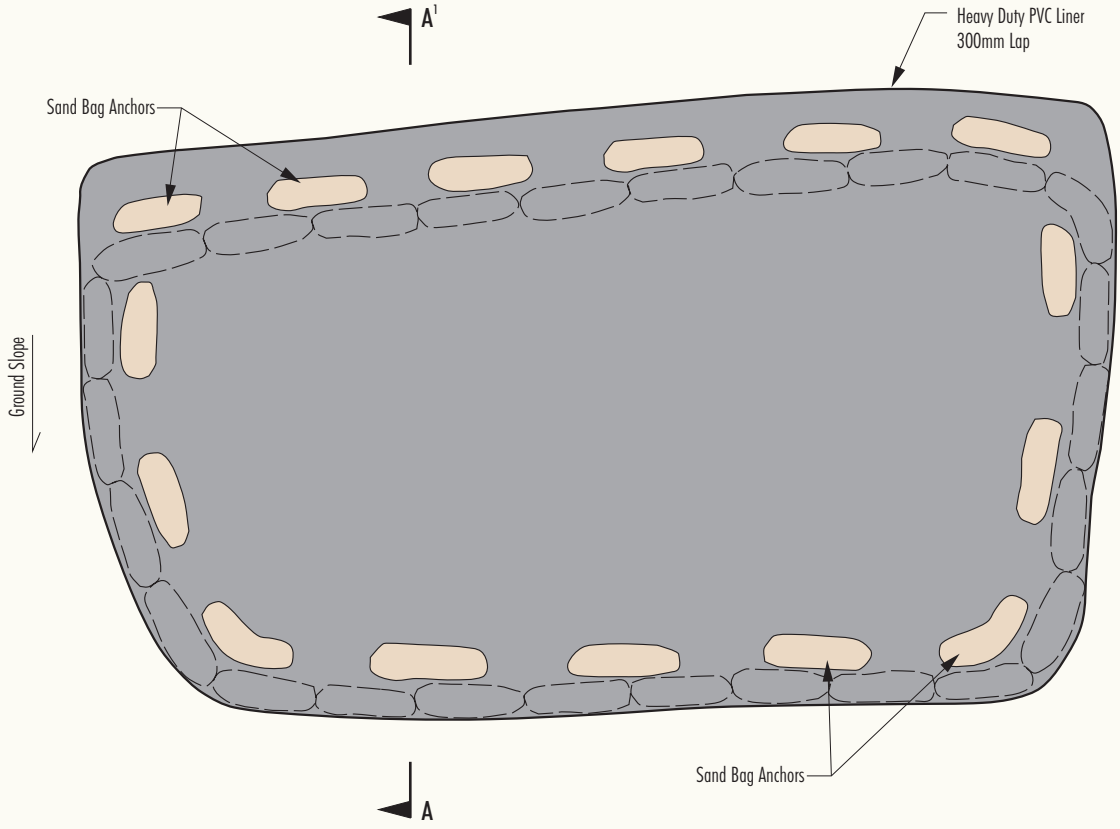
The gauging station will be located on the rock bar in a relatively shallow section of the creek (refer Site Layout Plan). This section of the creek will be isolated during construction such that all sediment generated during construction activities is contained by the downstream temporary coffer dam.

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.

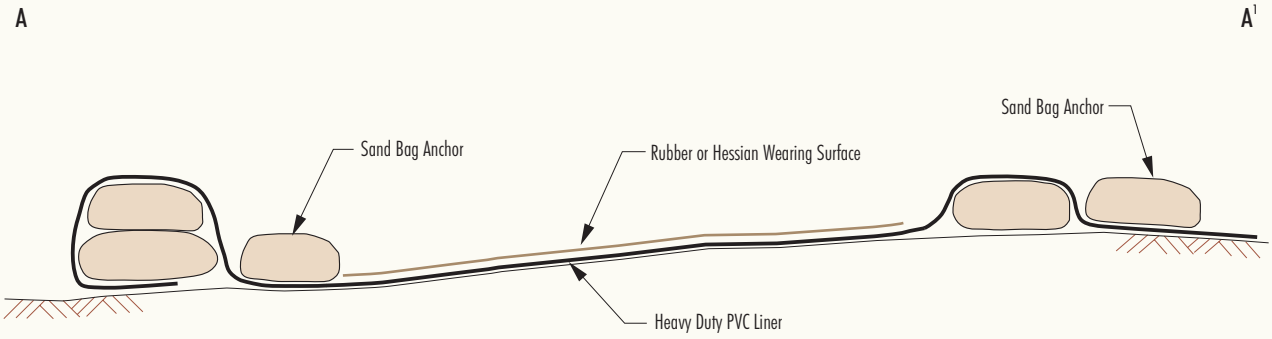
Construction works will cease in the event of heavy rain in the catchment and all equipment will be moved to the bunded equipment storage area located on an elevated area of the stream bank.

Daily inspections of erosion and sediment control structures for structural integrity and effectiveness will be conducted by the HCPL 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.



PLAN



SECTION A-A1

Source: Gilbert & Associates (2010)

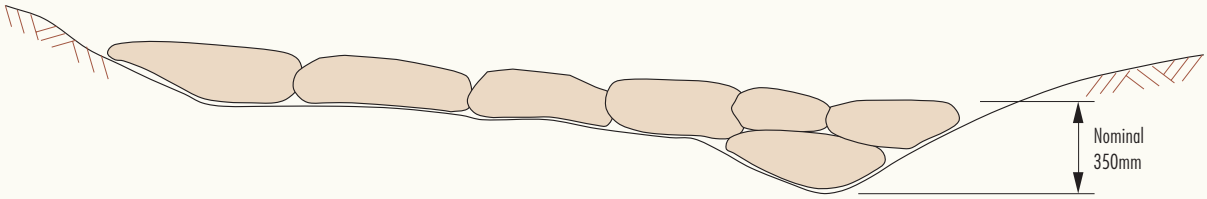
METROPOLITAN COAL

FIGURE 1
Bunded Enclosure Design

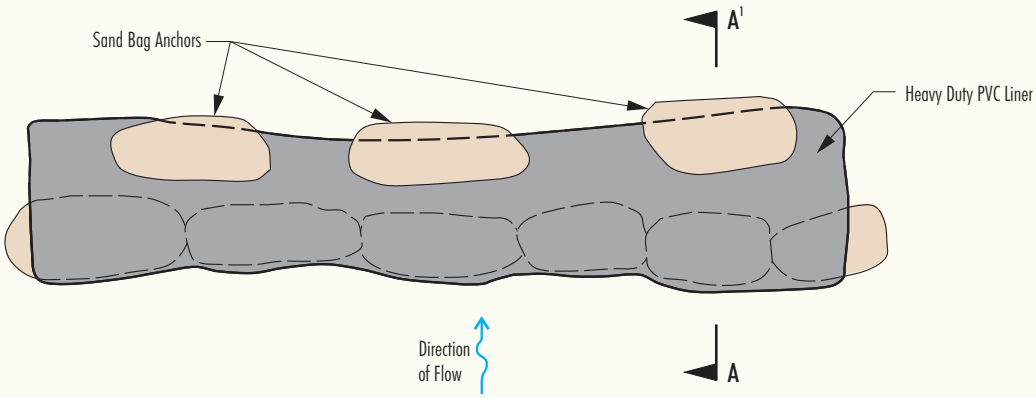
METROPOLITAN COAL

Not to Scale

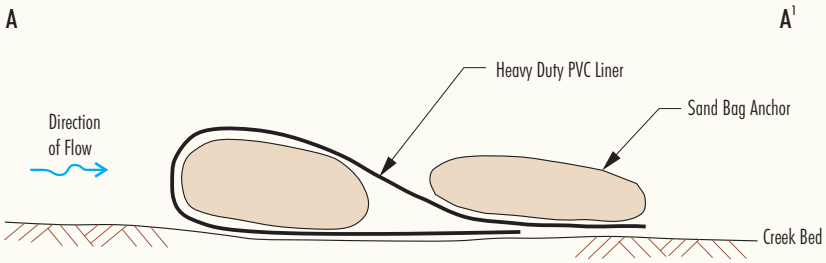
MET-08-AD7 GS_002A



PROFILE



PLAN



SECTION A-A1

Source: Gilbert & Associates (2010)

METROPOLITAN COAL

FIGURE 2
Temporary Coffer Dam Details

METROPOLITAN COAL

Not to Scale

MET-08-AD7 GS_001A

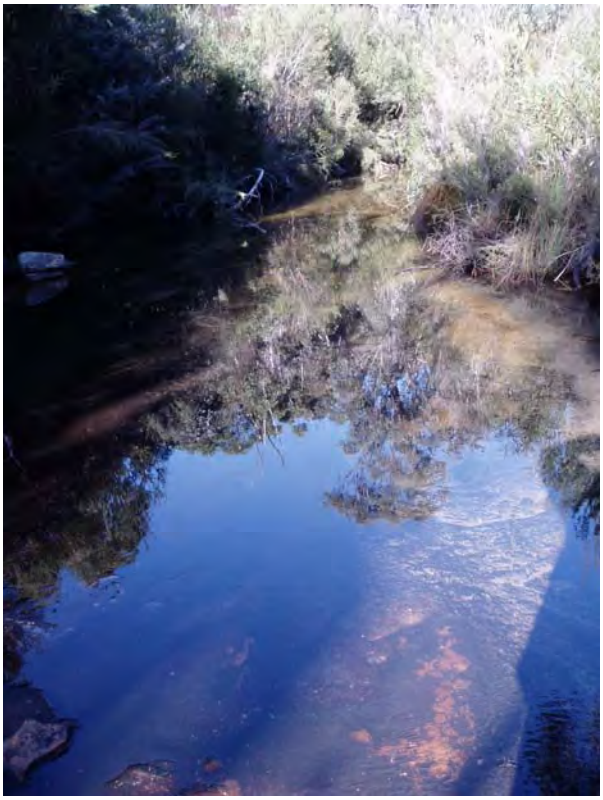


Plate 1 **View of pool upstream of gauging station site on Honeysuckle Creek**

Plate 2 **View of the rock bar at the gauging station site on Honeysuckle Creek looking at downstream**

Plate 3 **Rock shelf on eastern bank where bunded enclosure will be located**

METROPOLITAN COAL

METROPOLITAN COAL
CONSTRUCTION MANAGEMENT PLAN

SURFACE WORKS ASSESSMENT FORM

EASTERN TRIBUTARY GAUGING STATION

July 2011

Construction Management Plan

Surface Works Assessment Form

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

Date: *19 May 2011*

Name and position: *Josh Daniel (Environmental Consultant), Patrick Brienan (Principal Environmental and OHS Scientist - Brienan Environment and Safety)*

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

RMP register number: *2*

Site name: *Eastern Tributary Gauging Station*

Site type: *Gauging station*

Site co-ordinates (easting/northing): *312150 / 6215650*

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, coffer dams, 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**

Astrotricha crassifolia (however not in vicinity of works as discussed in the Threatened Flora Survey section of this form).

Are there records of known threatened fauna species in the general area? **No**

_____

_____

Are existing (or proposed) monitoring sites located nearby? **Yes**

Aquatic ecology monitoring site ET2.

What vegetation type is present?

Riparian scrub.

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) **Yes**

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

As described above, an aquatic ecology monitoring site (ET2) is located in the pool immediately upstream of the gauging station site. It is unlikely that the aquatic ecology monitoring site will be affected by the construction of the gauging station.

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.

26 November 2010

Name of suitably qualified ecologist conducting survey.

Elizabeth Norris (Eco Logical Australia Pty Ltd)

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

Individuals of the threatened species Astrotricha crassifolia were identified in the vicinity of the construction site however they are at such a distance that they will not be impacted by the construction of the gauging station. Individuals have been flagged to assist in their identification during construction works.

One RoTAP species (Hibbertia nitida) was recorded at the gauging station site. Although having no legal status, RoTAP species are nevertheless considered significant due to their more restricted distribution, threat status and adequacy of conservation. Individuals have been flagged to assist with their identification during the construction works.

Scientific names of threatened flora species recorded.

Astrotricha crassifolia

Will works be relocated to avoid or minimise impacts on the threatened flora species? **No**

The location of the threatened species is outside the disturbance area, and as such will not be impacted during the construction of the gauging station.

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? **Yes**

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

[Attach any relevant ecological reports to this assessment form]

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**

Approximately 2 m^2 of vegetation at each abutment of the concrete weir will be required to be removed to construct the gauging station. An additional 2 m^2 of vegetation on each abutment may need to be slashed to provide a safe work environment. Approximately 6 m^2 of vegetation will be slashed to provide enough space for a bunded enclosure. No threatened species were identified in the area where the bunded enclosure is to be located.

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).

An existing walking track is present at the site and extends along the Eastern Tributary from the end of Fire Road 9G (see Site Layout Plan). A helicopter will be used to transport equipment unable to be carried to the construction site from the helicopter landing site on Fire Road 9H. Equipment will be lowered from the helicopter directly into the bunded enclosure, or onto exposed rock shelves.

Is vegetation clearing required for site access? If yes, describe the extent and method of clearing? **No**

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

Dist*urbances would be appropriately limited by the recommended mitigation measures:*

- *Areas where RoTAP species have been identified will be avoided where practicable (individuals have been flagged to assist with their identification during construction works).*
- *Existing fire trails, tracks and exposed bedrock will be used for access and placement of equipment.*
- *No removal, lopping or slashing of vegetation for access to the construction site is required.*
- *Equipment will be transported to the construction site by hand and helicopter prevent impacts to vegetation from vehicles.*

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: See attached

Description of Photographs:

Plate 1 shows the rock bar at the top of the photo where the gauging station will be constructed, and the downstream rock bar constrictions in the foreground.

Plate 2 shows a photo taken from the gauging station site looking downstream towards the small waterfall at the end of the Eastern Tributary.

Plate 3 shows the rock bar that the weir will be constructed upon.

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

Date of pre-clearance survey for Aboriginal heritage sites.

19/10/2010

Name of survey attendees.

Iain Watt (Kayandel), Nathan Spooner (Kayandel), Ben Gunn (Kayandel), Patrick Brienen Metropolitan Colliery), Nathan Kennedy (ILALC), Daniela Reverberi (NIAC), Keith Ball (NIAC), Keith Sims Jr (NIAC), Daniel Chalker (Cubbitch Barta), James Davies (Wodi Wodi Elders Corporation)

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

No Aboriginal heritage items were located in the survey area. The fact that the location for the installation of the gauge is bedrock makes the possibility of subsurface archaeology highly unlikely. The surrounding area has a low potential to produce any Aboriginal heritage items. It is likely that any potential archaeological deposits are buried by sedimentary deposits or have been carried downstream in floodwaters.

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]

Known Aboriginal heritage sites located close to surface disturbance works

Details of demarcation (e.g. fencing, sign-posting or temporary flagging) implemented to avoid accidental damage to known Aboriginal heritage sites located close to surface disturbance works. **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 material 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 HCPL staff and contractors been provided with fire awareness and fire safety training?	**Yes**
-	Has a Hot Work Permit been obtained from the SCA if required?	**N/A**

MET-08-AD7 GS_102H

EASTERN TRIBUTARY GAUGING STATION CONSTRUCTION EROSION AND SEDIMENT CONTROL PLAN

This Erosion and Sediment Control Plan (ESCP) has been developed for the construction of a gauging station on the Eastern Tributary. The purpose of this ESCP is to minimise the risks of the gauging station construction activities adversely affecting the water quality of the Eastern Tributary. 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 to the Eastern Tributary 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 western bank approximately 1.5 m 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 (Figure 1).

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 (Figure 2) will be constructed within the Eastern Tributary 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 Site Layout Plan.

Construction Stage

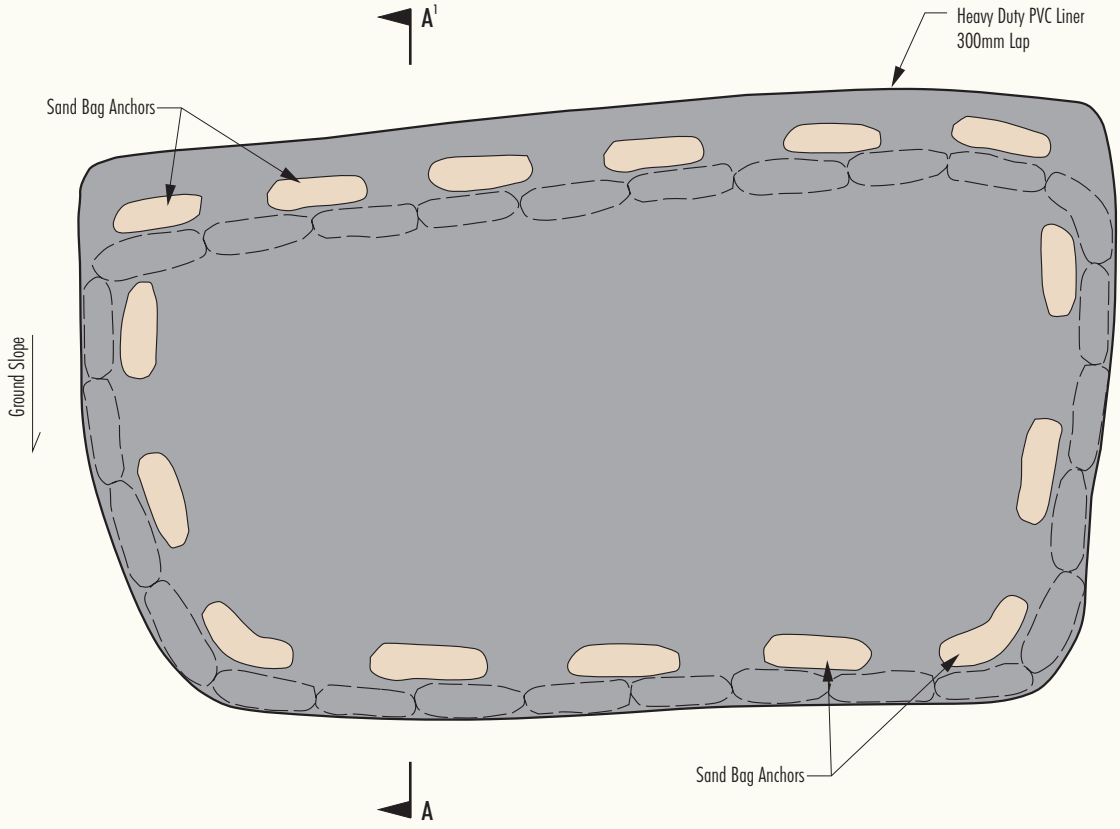
The gauging station will be located on the rock bar in a relatively shallow section of the creek (refer Site Layout Plan). This section of the creek will be isolated during construction such that all sediment generated during construction activities is contained by the downstream temporary coffer dam.

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.

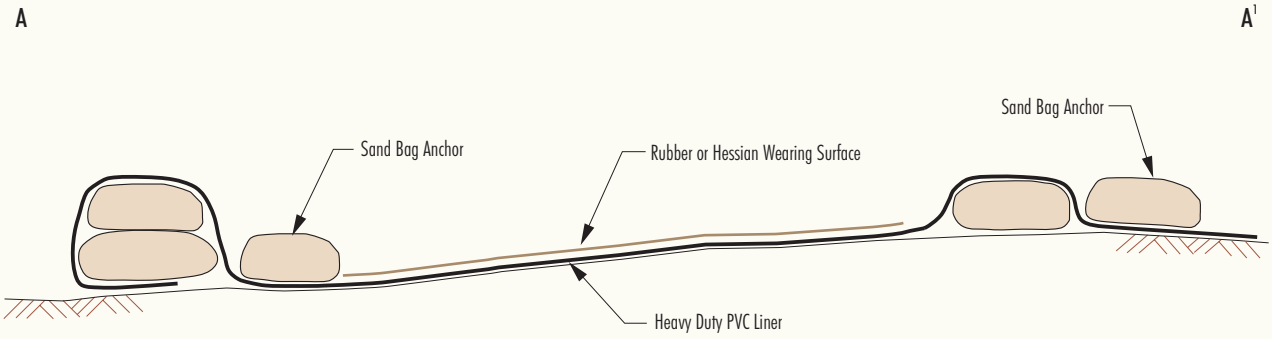
Construction works will cease in the event of heavy rain in the catchment and all equipment will be moved to the bunded equipment storage area located on an elevated area of the stream bank.

Daily inspections of erosion and sediment control structures for structural integrity and effectiveness will be conducted by the HCPL 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.



PLAN



SECTION A-A1

Source: Gilbert & Associates (2010)

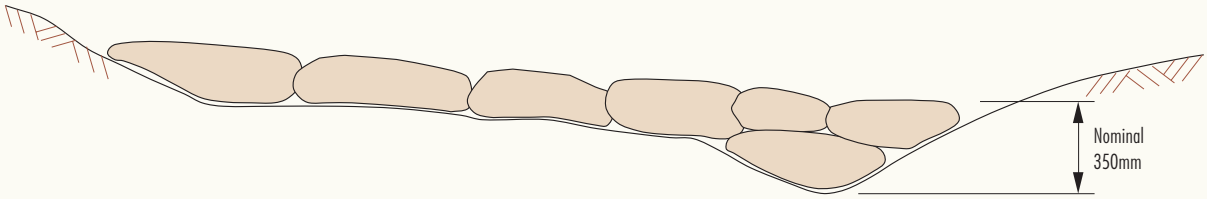
METROPOLITAN COAL

FIGURE 1
Bunded Enclosure Design

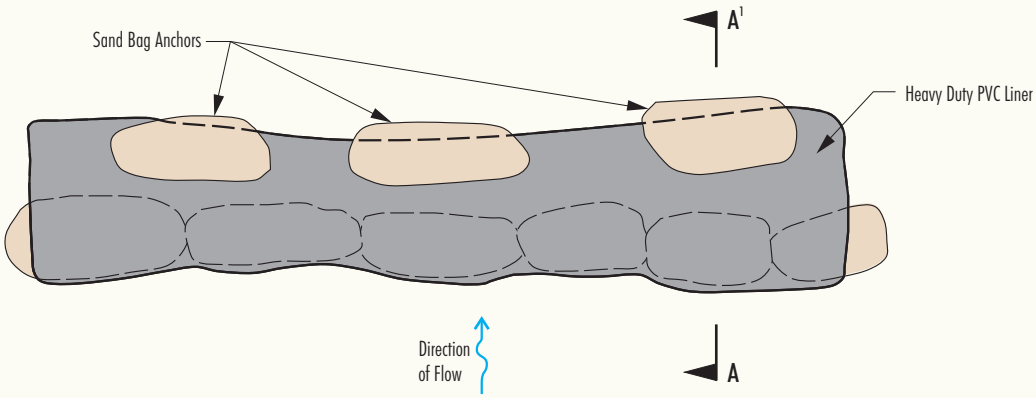
METROPOLITAN COAL

Not to Scale

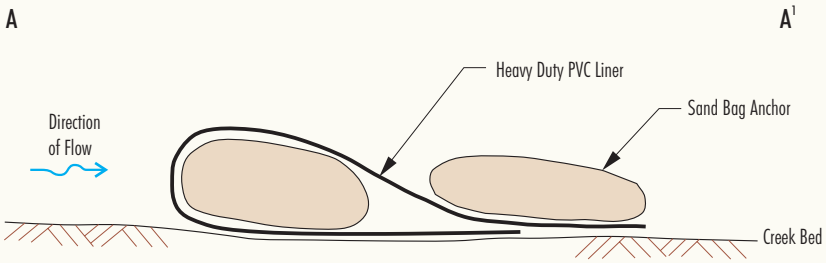
MET-08-AD7 GS_002A



PROFILE



PLAN



SECTION A-A1

Source: Gilbert & Associates (2010)

METROPOLITAN COAL

FIGURE 2
Temporary Coffer Dam Details

METROPOLITAN COAL

Not to Scale

MET-08-AD7 GS_001A

Plate 1 **View of Eastern Tributary looking upstream to gauging station site with rock bar constrictions in foreground and upstream pool in background**

Plate 2 **View of Eastern Tributary looking downstream from the gauging station site with the top of the downstream waterfall in background**

Plate 3 **Rock bar that the weir will be constructed upon, looking upstream and towards the eastern bank**