

# STANDARD OPERATING PROCEDURES

## Environmental

<b>SOP</b>	BBS-PC-BU-701	Weed Control
<b>SOP</b>	BBS-PC-BU-702	Noise monitoring and reporting
<b>SOP</b>	BBS-PC-BU-703	Environmental Management of Storage areas
<b>SOP</b>	BBS-PC-BU-705	Threatened plants
<b>SOP</b>	BBS-PC-BU-706	Management of Spill Basins
<b>SOP</b>	BBS-PC-BU-708	Monitoring of Road Kill (record daily, report monthly)
<b>SOP</b>	BBS-PC-BU-709	Monitoring Fauna structures
<b>SOP</b>	BBS-PC-BU-711	Water Quality Monitoring (Year 1)
<b>SOP</b>	BBS-PC-BU-712	Managing Acid Sulfate Soils
<b>SOP</b>	BBS-PC-BU-713	Maintenance at Waterways
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	<h1 style="margin: 0;">WEED CONTROL</h1>	<h1 style="margin: 0;">701</h1>
		<b>ENVIRONMENTAL</b>

Revision No.	Drafted	Author	Approved	Date
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		
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### PURPOSE

To provide guidance to the Leading Hand and maintenance personnel on managing weeds and handling of the suitable herbicide.

### SCOPE

This SOP covers the issues associated with choosing a weed management method, using a recommended herbicide and lists the requirements of good application practice.

### MAIN SPECIES OF CONCERN

The noxious weeds on this Project site are:

Common Name	Scientific Name	Weed Category
Groundsel Bush	<i>Baccharis halimifolia</i>	3
Canna Lily	<i>Canna indica</i>	Env. weed
Camphor Laurel	<i>Cinnamomum camphora</i>	Env. Weed
Lantana	<i>Lantana camara</i>	5
Small-leafed Privet	<i>Ligustrum sinense</i>	4
Mickey Mouse plant	<i>Ochna serrulata</i>	Env. weed
Passionfruit	<i>Passiflora edulis</i>	Env. weed
Pine	<i>Pinus sp.</i>	-
Smooth Senna	<i>Senna X florubunda</i>	Env. weed
Setaria	<i>Setaria sphacelata</i>	-
Wild Tobacco	<i>Solanum mauritianum</i>	-
Wandering Jew	<i>Tradescantia albiflora</i>	-

### REQUIREMENTS

Noxious weeds are required to be controlled, as required by Noxious Weeds Act.

Further information can be gained for the DPI website:

[www.dpi.nsw.gov.au/agriculture/noxweed/](http://www.dpi.nsw.gov.au/agriculture/noxweed/)

**STAFF INVOLVED**

**DISTRIBUTION**

<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• MMS Representative</li> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input checked="" type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input type="checkbox"/></li> </ul>
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**STEP 1 – Weed Management Planning**

1. On an annual basis inspect the project site to examine and identify weed infestation.
2. Refer to the "Noxious and Environmental Weed Control Handbook 2004-2005". (Copies of this handbook can be downloaded for free from: <http://www.agric.nsw.gov.au/reader/weed-pubs/nox-weeds-splash.htm>). The control techniques for each weed species identified will be consistent with the practices outlined in the handbook.
3. Weed control will be carried out to prevent the build up of invasive weeds in landscape areas and to remove noxious weeds as they are identified within the project site. An integrated weed management approach involving both targeted herbicide and non-herbicide controls will be used.
4. There will be no weed control in adjacent areas, including Bongil Bongil National Park.
5. Weed control will no occur within the three translocation sites, this will be undertaken by the ecologist in accordance with the Translocation Plan.

**STEP 2 – Herbicide**

1. In reference to the "Noxious and Environmental Weed Control Handbook 2004-2005" and site conditions, determine if the use of herbicide is the preferred control measure.
2. If using herbicide, the recommended herbicide is 'Roundup' (glyphosate based).
3. Due to its short residual life, it is the safest product for people and the environment. It works on a 'systematic' basis, i.e. if one sprays a leaf, it will kill the plant.
4. It must be mixed in accordance with the manufacturer's instructions.

### **STEP 3 – Herbicide Application**

1. There are two methods of herbicide application, viz direct spray on leaves or cut and paint the stem of the weed near the roots and spray or paint the herbicide on the cut section. This is most appropriate for woody and more hardy weeds.
2. Equipment may include a spray pack or back-pack sprayer with an adjustable nozzle.
3. Application should be targeted and restricted to the weed being controlled.
4. Avoid spray drift, i.e. do not apply in windy conditions.
5. Do not apply to expected rain, during rain or in the wet season generally.
6. Avoid excess application as this can allow root absorption by other plants.
7. Avoid herbicides in or near waterways or spill basins.
8. Transport only small quantities at the time to the site.
9. Only trained applicators should use herbicides. Complete and file a standard Pesticides Application Form for each day's usage.
10. The spray containers should be rinsed with water at the end of a day's work.
11. The water should be sprayed out and not tipped on the ground as the latter can create contamination of the ground.

### **STEP 4 – Non-herbicide Weed Management**

1. In reference to the "Noxious and Environmental Weed Control Handbook 2004-2005" and site conditions, consider non-herbicide control measures.
2. Cultivation, hand picking, reforestation and the provision of good clean mulch cover are some of the weed management techniques that can be adopted in this project.
3. Undertake the targeted weed management action, and record the extent of works.

### **STEP 5 – Record Details**

1. Record details of weed management undertaken on site. Report annually.

## Pesticides Application Record

Pesticides will be used in accordance with relevant legislation, label directions and relevant industry codes. Application records will be completed within 24 hours of applying the pesticide and a copy submitted to RTA's Representative.

<b>Pesticide Application Record Sheet</b>	
Date and time	Start date and time:  Finish date and time:
Who applied the pesticide?	Full operator name:  Operator contact address:  Operator contact phone:
Who owns/occupies the land?	Full owner/occupiers name:  Owner/occupiers contact address:  Owner/occupiers contact phone:
Boundaries of treated area and order of treatment	List treated areas:(include a map)  List order of treatment:
Problem treated	Identify the pest or problem treated:
Product used	Full name and product code:
Equipment used	Describe the equipment used:
Quantity applied and dilution	Total amount of pesticide product mix used:  Was the mix concentrated product or a diluted mixture?  Rate of dilution:
Area covered by application	Area of application (in square metres or hectares):
Wind speed and direction	Estimate wind speed and direction (if pesticide was applied through the air):  Record any changes to the weather during application:
Other weather details	Record weather details including temperature, humidity and rainfall (where the product label requires these to be assessed):

The Record Sheet does not need to be completed where the following are satisfied:

- the pesticide is only applied by hand or by using hand held equipment; AND
- if applied outdoors on any one occasion is not more than 5 litres/5 kilograms of concentrated product or 20 litres/20kilograms of the ready to use product, or if applied indoors in quantities of no more than 1 litre/1kilogram of concentrated product or 5 litres/5kilograms of the ready to use product.

All personnel managing and using pesticides will be given appropriate training prior to commencing work. Only pesticides registered for use near water may be used near water.

Application will be avoided:

- On hot days when plants are stressed;
- After seed has set;
- Within 24 hours of rain or when rain is imminent;
- When wind will cause drift into non-target areas.

	<h1 style="margin: 0;">NOISE MONITORING</h1>	<h1 style="margin: 0;">702</h1>
		<b>ENVIRONMENTAL</b>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
1	13 March 2008	R Walker-Edwards		
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<b>PURPOSE</b>
To provide a procedure for the coordination of noise monitoring and the possible provision of noise mitigation measures following the opening of the Highway.

<b>SCOPE</b>
Monitoring of operational noise shall be undertaken in accordance with the Operational Noise Management Plan (ONMP).
Within two months of road opening, noise monitoring shall be conducted at locations along the Project route to give updated noise data (excluded adverse weather).
The proposed monitoring locations are identified in Table 13 of the Operational Noise Management Plan prepared by Bassetts.

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<i>Always</i> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> </ul>
<i>Possibly</i> <ul style="list-style-type: none"> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input checked="" type="checkbox"/></li> </ul>

## **BACKGROUND**

1. An Operational Noise Management Plan has been prepared by Bassett Consulting Engineers and details the operational noise management issues associated with the Project.
2. Within two months of road opening, noise monitoring shall commence at selected representative locations along the Project route. Classified traffic monitoring shall be conducted simultaneously with the noise monitoring to identify traffic flows and mixes. The proposed monitoring locations are identified in Table 7.1 of the Operational Noise Management Plan prepared by Bassett Consulting Engineers.
3. Noise monitoring results shall be reviewed and the adequacy of the traffic noise mitigation measures shall be assessed in consultation with the RTA and the relevant state government agencies.

## **DEFINITIONS**

**Attended monitoring** is monitoring that is undertaken by the Consultant using a noise meter while he / she remains on site.

**Noise mitigation** refers to any measure taken to reduce noise levels at or inside a private residence or other facility.

**Environmental Impact Statement** refers to the environmental assessment document prepared during the planning stage of the project to address the potential impacts of the Highway on the environment and community.

## **STEP 1 – Planning Monitoring Activities**

1. Within two months of construction completion, schedule dates with the RTA and the Noise Consultant (Bassett Consulting Engineers on 02 8295 7555) to undertake the noise monitoring as detailed in the Operational Noise Management Plan.
2. Contact the residents at the addresses identified for monitoring, to confirm access.
3. Arrange for classified traffic monitoring to be conducted simultaneously with the noise monitoring to identify traffic flows and traffic mixes.

## **STEP 2 – Undertake Monitoring at Residences**

The consultant set up and conduct the noise monitoring at each of the residences nominated in the Operational Noise Management Plan.

## **STEP 3 – Initial Review**

A review of the noise monitoring results will be undertaken by Bassett Consulting Engineers and discussed with the BBSA Maintenance Manager and the RTA.

**STEP 4 – Consultation**

Noise monitoring results shall be reviewed and the adequacy of the traffic noise mitigation measures shall be assessed in consultation with the RTA, DECC (EPA & NPWS) and the Planning Director-General.

Practice Note VIII of the ENMM requires that if post construction noise monitoring indicates operational noise levels exceed the design noise level for Year 1 then certain follow-up actions will be taken.

Refer to the Operational Noise Management Report for more details on consultation process with the community.

**STEP 5 – Final Report**

A final operational noise report will be prepared to assess the adequacy of the traffic noise mitigation measures. This is detailed in the Operational Noise Management Plan.

	<h2 style="margin: 0;">ENVIRONMENTAL MANAGEMENT OF STORAGE AREAS</h2>	<h1 style="margin: 0;">703</h1>
		<h3 style="margin: 0;">ENVIRONMENTAL</h3>

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**PURPOSE**

To provide a procedure for the inspection and environmental management of maintenance yards including storage bunds, pollution control devices and waste management facilities.

**SCOPE/BACKGROUND**

Workshop and maintenance areas have the potential to become an environmental problem if they are not managed properly. Regular inspections and maintenance are required to detect potential problems and to ensure that environmental controls are operating effectively.

The Waste and Reuse Management Sub Plan and the Soil and Water Management Sub Plan provide information about the management of fuel and chemical stores, workshop wastes, and the prevention of spillages and soil contamination. The inspection procedure outlined in this SOP should be implemented **quarterly** to help prevent environmental pollution and avoid costly clean up operations.

**DEFINITIONS**

**A bund** is an impervious area of earth, concrete or other material which is used to store liquid materials. They may also be used around vehicle maintenance areas and pumps. Bunding helps to contain spillages and leaks from containers that would otherwise cause environmental pollution. A bund consists of a wall or embankment, a floor and facilities designed to remove liquids or rainwater (e.g. a blind sump). As a general rule, a bund should be capable of holding at least 110% of the largest container stored therein.

**Pollution control device** means any equipment or structure designed to capture pollutants and prevent them from entering the environment e.g. a sump, wash bay, oil/water separator, clean water diversion drains.

**Significant rainfall event** is one which is over 100mm in any one given day.

**Soil contamination** means an area of earth or vegetation that has been polluted as a result of a spillage, leak or incident resulting in the loss of a chemical or fuel.

**Waste management facility** refers to a compound or area designated for the collection of waste materials and recyclables.

**Waste Register** means a folder or register of the quantity of waste and recyclables collected from the site, the destination of the waste and name of waste contractor.

STAFF INVOLVED	DISTRIBUTION
<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input checked="" type="checkbox"/></li> </ul>

	<ul style="list-style-type: none"><li>• RTA <input type="checkbox"/></li><li>• Sub-contractor/Consultant <input type="checkbox"/></li></ul>
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**STEP 1 – Inspecting Workshop Areas and Maintenance Yards**

1. Check all areas of the workshop and maintenance yards to identify any containers or drums that should be stored within the bund. All liquid chemicals, fuels and oils must be stored in a bunded area - concrete bunds are easier to maintain in the long term.
2. Empty chemical containers should also be stored within the bunded area until they can be collected by a licensed recycling or waste contractor.
3. Check that 'dangerous goods' are stored appropriately and with compatible materials.
4. Check all pollution control devices (see definition) and ensure they are not blocked, scoured or damaged. Arrange maintenance if required.

**STEP 2 – Inspecting and Maintaining Storage Areas (Bunds)**

1. Bunds must be inspected regularly and after every significant rain event.
2. Check the walls and floor of the bund for cracking or damage. If evident, arrange for immediate maintenance. (The bund must be impervious or contamination of soil and groundwater may occur)
3. Identify any spillage or contamination within the bund. (See Step 3 if contamination is evident)
4. Check all containers for signs of leakage or spillage.
5. Remove any residue left on the top of drums (e.g. after decanting).
6. Check that all drums and containers are stored in an upright position and they are fully within the bunded area - not laying against the walls or outside edges of the bund.
7. Ensure all drums and containers have tight fitting lids to prevent them filling with water and overflowing. Place a cover all 'half drums' or open containers.
8. Remove any litter, oily rags or other waste from within the bund and recycle or dispose.
9. Assess any water (potentially contaminated stormwater) captured within the bunded area. If surface contamination is observed (e.g. a rainbow sheen or other discolouration) then remove it using an appropriate absorbent product. If pumping water out of the bund, remove contamination and select a discharge location away from any drain or watercourse.

**STEP 3 – Preventing Spillage and Managing Minor Soil Contamination**

1. Check to make sure that all decanting of liquids is undertaken within the bunded area and that only minimal spillage has occurred (if any).
2. Inspect the workshop (e.g. plant maintenance areas) and bunded areas for signs of contamination (e.g. from spillage or leaks or decanting).
3. If contamination is observed, identify the source and cause of the spill/contamination.
4. Clean up the spill immediately and treat the area of contaminated soil using appropriate absorbent and soil remediation products.

**STEP 4 – Managing Workshop Wastes and Recyclables**

1. Check to ensure that waste storage areas have not been located or moved close to any drain, watercourse or residential property.
2. Check to ensure that waste and recyclable materials are being stored neatly and that they are separated into the different waste types for ease of collection (e.g. cardboard - metal - general)
3. Check that signage on waste and recycling bins is in good condition. Replace if missing or damaged.
4. Arrange for the collection of waste or recycling bins if they are overflowing. Only licensed waste contractors will be used. Obtain a docket for all collections.
5. Place the docket/record of collection in the 'waste register'. The register should record the volume/quantity of materials disposed, recycled or reused, the date of collection, the destination of the waste and the name of the transport company.

	<h1 style="margin: 0;">MONITORING THREATENED PLANTS</h1>	<h1 style="margin: 0;">705</h1>
		<b>ENVIRONMENTAL</b>

Revision No.	Drafted	Author	Approved	Date
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### PURPOSE

To provide guidance to the Maintenance Supervisor and Leading Hand on the coordination and implementation of monitoring for Threatened vegetation species roadside communities.

### SCOPE/BACKGROUND

'Threatened' plant and animal species are protected under the Threatened Species Conservation Act and must not be harmed or picked. Prior to construction commencement, numerous threatened plant species were 'translocated' (moved) out of the road corridor into secure areas on RTA and NPWS owned land. There are three translocation sites in total.

**These plants will be monitored and maintained by the Project Ecologist for 3 years from the date of translocation.**

There are only two threatened plants which remained in the road reserve and not within the translocation sites. The first is the Floyd's grass which is located on the northern bank of Bonville Creek. The other is one individual – one *Macadamia tetraphylla* which was translocated to Chainage 98420. It was translocated from a residents backyard and does not occur locally in the area, though is still a protected species. These do not require monitoring.

### DEFINITIONS

**Threatened plant** refers to a plant which has been identified as being endangered or vulnerable because of its low numbers and/or a process which threatened its existence. It is an offence to harm or pick a threatened species.

**Translocated** means that a plant has been removed from its original location and replanted in an alternative location.

STAFF INVOLVED	DISTRIBUTION
<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input checked="" type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input checked="" type="checkbox"/></li> </ul>

## **REQUIREMENTS**

Provision of statistical information on growth and survival.

### **STEP 1 – Planning and Induction**

1. One month prior to the scheduled monitoring date (see scope), contact the Project Ecologist (Andrew Benwell on 02 6684 5496) and arrange a suitable time to undertake the monitoring / maintenance.
2. Discuss the scope of works required.
3. Arrange all necessary personal protective equipment, check that Consultant's insurance/workers compensation details are current, and provide a site induction addressing working near traffic.
4. If access is required into the National Park liaise with NPWS Ranger to advise of upcoming works.

### **STEP 2 – Undertake Monitoring and Maintenance at Translocation Sites**

1. The Ecologist is to visit the Translocation Sites identified for the project. These are listed in the Translocation Plan prepared for the project by Andrew Benwell (2006).
2. At each location, the Ecologist is to undertake maintenance (weeding) and monitoring of the translocation sites.
3. The monitoring results are to be collated and prepared as an annual report. They are to be provided to the Maintenance Manager within 3 weeks of completion. These will be provided electronically.
4. Maintenance Manager to file the results and provide to RTA.

	<h1 style="margin: 0;">MANAGEMENT OF SPILL BASINS</h1>	<h1 style="margin: 0;">706</h1>
		<b>ENVIRONMENTAL</b>

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<b>PURPOSE</b>
To provide guidance on the inspection, management and maintenance of Water Quality Spill Basins.

<b>SCOPE/BACKGROUND</b>
<p>Water Quality Spill Basins have been constructed along the length of the highway upgrade to capture road runoff and spillages occurring as a result of an incident or accident.</p> <p>Regular inspections and maintenance of the basins will be required to ensure they remain in good condition and continue to operate effectively, especially in an emergency situation.</p>

<b>DEFINITIONS</b>
<p><b>Water Quality Basin or Spill Basin</b> refers to the basins that have been installed along the project alignment to intercept runoff from the highway road surface prior to discharge off the site. Some basins have been converted from sediment basins that were used during the construction stage of the project.</p> <p>A list of basins is attached to this SOP. The basins provide at least 20,000L capacity for the capture of chemical spills and thus prevention of environmental pollution.</p>

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<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input checked="" type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input type="checkbox"/></li> </ul>

<b>REQUIREMENTS</b>
This procedure must be followed when inspecting a basin, or managing the basin after a spill.

**ACTION 1. – Undertaking a Condition Inspection**

1. Inspections will be undertaken following significant rainfall events (over 100mm in one day); and
2. An annual assessment will be undertaken to assess the condition and integrity of all spill and elongated basins. The following items will be checked and the details will be recorded on the 'Spill Basin Assessment Record' form attached to this SOP.
  - a. Assessment of baffle integrity and determine whether removal of captured material is required
  - b. The spillway
  - c. Spillway protection
  - d. Release pipes
  - e. Drainage
  - f. Wall stability
  - g. Sediment level
  - h. Scouring around inlet/outlet pipes
  - i. Access to the basin for spill management or maintenance

**ACTION 2. – Managing the Basin after a Spill or Incident**

1. When liquid chemicals or other pollutants have been spilled on the highway, the underground stormwater system will typically direct the chemical to a spill basin where it can be contained.
3. Where chemicals or other pollutants have been captured in a basin following a spill or incident, the following procedure will be implemented under the direction of the RTA and/or DECC/EPA:
  - a. Inspect the basin to assess its integrity (e.g. identify any breach or leaks)
  - b. Determine the type and quantity of chemical or fuel contained in the basin
  - c. Provide or re-instate access to the basin
  - d. If directed, arrange a suitable licensed contractor (licensed by the DECC/EPA) to remove and dispose of the chemical in the basin. Do not release the basin to the environment.
  - e. Arrange for the treatment or removal of contaminated soil and vegetation if any remains in the basin.
3. Record this information and any other observations or actions taken in a brief report.
4. Place a copy of the report on file.
5. The DECC/EPA has requirements for the notification of incidents where the incident threatens or causes environmental harm. Please refer to the EMP for more information.

### Water Quality and Wetland Basin Locations

Basin Number	Approx Chainage	East / West	Type of basin	Volume m <sup>3</sup>	AMG Coordinates <sup>1</sup>	
					Easting (m)	Northing (m)
B92.5	92530		B	470	501763.961	6633555.066
B92.7	92750		B	840	501831.962	6633780.068
B93.4	93370		B	1220	502126.964	6634313.073
B93.5	93520		B	420	502182.965	6634452.074
B93.8	93770		B	505	502230.966	6634682.076
B94.0	94000		B	1595	502346.967	6634944.079
B94.8	94780		B	1380	502525.969	6635626.085
B95.1	95100		B	650	502715.971	6635950.088
B95.2	95220		B	570	502763.972	6636017.089
B96.1	96100		W	1355	502976.975	6636868.096
B96.4	96380		W	760	503013.976	6637162.099
B96.8	96800		W	595	503174.977	6637534.103
B97.5	97450		W	1960	503609.981	6637970.107
B97.6	97800		W	745	503750.982	6638066.109
B98.4	98410		W	1610	504302.986	6638584.115
B98.6	98580		W	860	504556.987	6638741.117
B99.6	99620		W	2165	504994.991	6639609.125
B99.8	99840		B	150	504966.992	6639848.127
B99.9	99860		B	140	505027.992	6639846.127
B100.1	100090		W	385	505103.992	6640061.129
B100.4	100420		W	535	505221.993	6640406.132
B100.6	100620		W	190	505261.994	6640553.133
B100.8	100780		W	437	505307.994	6640683.134
B100.9	100950		W	760	505360.994	6640872.136
B101.3	101360		W	470	505569.995	6641221.139
B101.6	101610		B	285	505736.996	6641407.140

\* The Basin Number also refers to the approximate chainage location of the basin on the alignment.

<sup>1</sup> Note these co-ordinates have been converted from MGA and as such may have some minor inaccuracies

	<b>Bonville Pacific Highway Upgrade          SPILL BASIN ASSESSMENT RECORD</b>
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<b>G = Good            F = Fair            R = Repairs            Required</b>	Basin Number			
<b>Spillway</b>				
<b>Spillway Protection</b>				
<b>Release Pipes</b>				
<b>Drainage</b>				
<b>Wall Stability</b>				
<b>Sediment Level</b>				
<b>Scouring around Inlet/Outlet Pipes</b>				
<b>Access for Maintenance</b>				

<b>Date:</b>	<b>Inspection By:</b>
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	<h1 style="margin: 0;">MONITORING OF ROAD KILL</h1>	<h1 style="margin: 0;">708</h1>
		<b>ENVIRONMENTAL</b>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		
4	25 Nov 2008	R Walker-Edwards		

**PURPOSE**

To establish a procedure for recording the incidence of road kills.

**SCOPE/BACKGROUND**

The incidence and identity of road kills occurring along the Highway will be recorded on a daily basis by the Maintenance Supervisor and the Patrol gang if they come across the dead animals. The data will be used to:

- Identify areas where fauna regularly occur or attempt to cross the road corridor
- Assess the effectiveness of fauna mitigation measures
- Identify if any damage or 'breach' exists in the fauna fencing that may have permitted the animal to access the upgrade
- Identify if further mitigation may be required
- Identify if improved management of roadside vegetation should be considered (eg slashing or tree removal).

Data gathered on the incidence of road kills of predator species (eg dogs and foxes) may also help to indicate where these species occur in high densities and whether control measures are required.

**DEFINITIONS**

**Road kill** refers to any native animal, bird or introduced species such as a fox or dog that has been killed as a result of an injury caused by a collision with a vehicle.

**Fauna mitigation** refers to the measures or structures provided along the Highway to ensure that fauna can cross over or under the carriageway in a safe manner. It also refers to the fauna fencing that has been installed along the Highway. This fencing is designed to direct fauna to the over and underpasses and prevent them for gaining access onto the Highway.

**Habitat** refers to an area of vegetation which supports important plants or animals.

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input checked="" type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> </ul>

**APPENDIX 7**  
**STANDARD OPERATING PROCEDURE**  
**SOP BBS-PC-BU-708**

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	• Sub-contractor/Consultant <input type="checkbox"/>
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### **STEP 1 – Monitoring Road Kills**

1. If a road kill or injured animal is found on the Pacific Highway, the following details will be recorded on the 'Road Kill Monitoring' form attached to this SOP:
  - a. Date
  - b. Time
  - c. Species type or description of the animal (fur colour, tail details)
  - d. Location (station or other landmark, carriageway side)
  - e. Cause of injury (vehicle strike, predator attack)
  - f. Adult or juvenile animal
  - g. Nearby habitat (swamp, forest, floodplain)
  - h. Distance from the nearest section of fauna fencing
  - i. Distance from the nearest fauna crossing
  - j. Any comments (has the fence been burrowed under or is it 'breached' by an overhanging branch? If so, fix immediately)

If injured native wildlife is found during any inspection, contact WIRES immediately by phoning 0500 559 559. If the injured fauna needs to be moved to a safe location, carefully wrap the animal in a soft cloth and place it in a dark area or clean cardboard box. The Rescue service will collect the animal and take it to the vet for treatment.

If the road kill is identified to be a Koala, contact AMBS (koala specialists by phoning 6653 4077) to advise and seek instructions on whether the animal is required to be collected for research purposes.

A list of the major fauna crossings along the upgrade are listed in the EMP. Further details are provided in the SOP for the 'Maintenance of Fauna Structures' (M6).

2. Based on a review of previous road kill monitoring results, identify whether the road kill is a 'one-off' incident or whether there has been more than one in this 'general' location.
3. If there has been more than one in the 'general' location, discuss the results of the monitoring with the Maintenance Manager.
4. The Maintenance Manager will arrange an assessment of the effectiveness of the fauna mitigation measures in this location and will also determine whether any further measures are required to prevent future road kills (e.g. extending the fauna fence)
5. Place a copy of the monitoring record on file. Report results to the RTA on a monthly basis.

	<h2 style="margin: 0;">Bonville Pacific Highway Upgrade ROAD KILL MONITORING RECORD</h2>
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	Details
<b>Date found</b>	
<b>Time found</b>	
<b>Location</b> (station or other landmark, carriageway side)	
<b>Species or description of the animal</b> (fur colour, tail details)	
<b>Cause of injury</b> (e.g. vehicle strike, predator attack)	
<b>Adult or juvenile?</b>	
<b>Nearby habitat</b> (e.g. National Park, forest, floodplain)	
<b>Distance from nearest section of fauna fencing</b>	
<b>Distance from nearest fauna crossing</b>	
<b>Comments</b> (has the fence been burrowed under or breached by an overhanging branch?)	

<b>Date:</b>	<b>Recorded By:</b>
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	<h1 style="margin: 0;">FAUNA MOVEMENT MONITORING</h1>	<h1 style="margin: 0;">709</h1>
		<h2 style="margin: 0;">ENVIRONMENTAL</h2>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		
4	25 Nov 2008	R Walker-Edwards		

<b>PURPOSE</b>
To provide a procedure for the coordination and implementation of monitoring at selected fauna mitigation structures.

<b>SCOPE/BACKGROUND</b>
<p>Monitoring to assess the usage of mitigation structures by fauna will be undertaken at selected locations (Refer to Step 2 of this SOP for locations).</p> <p>The monitoring will be undertaken by specialist Consultants using techniques that will include the use of monitoring devices such as for example infra red cameras, sand pads, spotlighting, hair tubes, searches for scats and recorded sightings.</p> <p>Both RTA and BBS will be undertaking monitoring of fauna structures. RTA, through Australian Museum Business Services (AMBS) will continue investigations of the impacts of roads on koalas and this will include koala monitoring up to 2 years post construction. BBS will be monitoring use of fauna crossing structures for native mammals other than koalas. Monitoring will also include monitoring of retained median trees and the overpass by gliders.</p> <p>Monitoring devices (such as, for example, sand pads) will be established at the fauna passage in year 1 of the maintenance period. The monitoring devices will remain in place for at least 4 weeks at a time and will be checked every 7 days. Based on the results of the monitoring completed in year 1, monitoring will be conducted in year 2 at either the same locations or at alternative fauna passages. These locations will be recommended by the consultant and agreed with by RTA and BBSA.</p> <p>Monitoring times and frequencies will depend on seasonal variation and expected usage levels. Monitoring will commence at least following the next breeding season after commissioning. Maintenance personnel will be required to coordinate the monitoring activities and provide safe access for the consultant.</p>

<b>DEFINITIONS</b>
<p><b>Fauna mitigation structure</b> refers to the underpass and overpass crossings provided along the Highway for fauna movement.</p> <p><b>Sand tray / pad</b> refers to a method of monitoring that involves the placement of a 1-2m long section of soft soil or sand across the full width of an underpass or overpass or across 'tracks or pathways' provided under bridges for fauna movement, to collect track data that will show evidence of faunal use.</p>

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<i>Always</i> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input checked="" type="checkbox"/></li> </ul>
<i>Possibly</i> <ul style="list-style-type: none"> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input checked="" type="checkbox"/></li> </ul>

**STEP 1 – Planning and Induction**

1. Contact the Fauna Consultant (TBA) to identify the best time to undertake the monitoring. Monitoring times will need to take into account seasonal issues such as temperature and rainfall.
2. Confirm the scope of the monitoring program.
3. Arrange all necessary personal protective equipment, check that insurance/workers compensation details are current, and provide a site induction addressing working near traffic and in night time conditions (if this is required).

**STEP 2 – Establish Monitoring Locations and Times**

1. Visit the fauna mitigation structures identified in the OEMP with the consultant.
2. Identify whether any minor maintenance work such as the removal of excess vegetation growth is required prior to monitoring commencing.
3. Identify a suitable location for the placement of the monitoring devices (sand trays or the like) within the structure. In culverts, this is generally in a sheltered location at each end. If sand is used, clarify details such as the width (generally 1-2m) and depth of the sand (generally 2-3cm), the type of material required (soil/sand) and any surface preparation (smooth).
4. Make arrangements for follow up visits to be made to the mitigation structures by the Consultant. Confirm the start date for the monitoring.
5. In year 2, a selection of the above structures will be identified by the fauna consultant for round two monitoring. These locations will be agreed with the RTA prior to proceeding.

**STEP 3 – Undertake Monitoring**

1. As agreed with the Consultant, establish the monitoring devices (eg sand trays or the like) before the monitoring is due to commence. (If rain is expected and this may damage the sand trays, contact the consultant to discuss whether the monitoring should be postponed)
2. In year 1 and 2, the Consultant is to inspect the structures at the agreed times, to check the sand trays (or other monitoring devices) and identify fauna tracks / movement (monitoring will occur at a regularity described in the OEMP).
3. In year 2 the consultant and RTA / BBS will review structures used and recommended whether monitoring continues at the same fauna structures or at alternative fauna structures as may be recommended by the fauna consultant.

**STEP 4 – Review Results**

1. Request a report from the Consultant outlining the timing, method and results of the monitoring.
2. Refer a copy of the report to the Maintenance Manager and Group Environmental Manager for their information and review.
3. Provide a copy to the RTA.
4. The Maintenance Manager may consider improvements arising from the recommendations of the Consultant.

	<h1 style="margin: 0;">WATER QUALITY MONITORING</h1>	<h1 style="margin: 0;">711</h1>
		<b>ENVIRONMENTAL</b>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
1	13 March 2008	R Walker-Edwards		
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4	25 Nov 2008	R Walker-Edwards		

### **PURPOSE**

To provide guidance to the Maintenance Supervisor on the coordination and implementation of water quality monitoring activities.

### **SCOPE/BACKGROUND**

Water quality monitoring is required during the first 6 months of the contract maintenance period. The monitoring will be conducted on a monthly basis at six (6) sites along the highway alignment by BBSA. Maintenance personnel will be required to assist by providing safe access to the monitoring sites.

Further details about the monitoring program can be found in Section 5 of the Soil and Water Sub Plan of the Environmental Management Plan (Maintenance).

### **DEFINITIONS**

**Water quality creek assessment record** refers to the form attached to this SOP. This form will be used to record details of the waterway being monitored e.g. flow and approximate depth.

**Water quality monitoring** means assessing the characteristics of nominated surface waters.

**Water quality parameters** refers to the variables or different types of tests that are required to be undertaken. Some parameters can be tested in the field (e.g. pH and temperature) while others require a laboratory analysis (e.g. total suspended solids).

**Consultant** refers to a specialist contractor with the experience and resources (equipment) to undertake water quality monitoring and analysis.

### **REQUIREMENTS**

Water leaving the site should be better than or equal in quality to the water entering the site.

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input checked="" type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> </ul>

**PPENDIX 7  
STANDARD OPERATING PROCEDURE  
SOP BBS-PC-BU-711**

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	• Sub-contractor/Consultant <input checked="" type="checkbox"/>
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### **STEP 1 – Planning and Induction**

1. At least one week prior to the scheduled monitoring date, contact Abigroup's Environmental Scientist/Engineer (via the NSW Environmental Manager – Rebecca Walker-Edwards Phone 9499 0999) and arrange a suitable time to undertake the monitoring. Monitoring should target both dry periods or wet-weather events.
2. Discuss the scope of works required including the water quality parameters that will be assessed. This will allow staff to arrange the appropriate equipment and sample bottles and to calibrate the monitoring units.
3. The Environmental Scientist/Engineer will contact Coffs Harbour City Council Environmental Laboratory 02 6648 4460, to advise that samples will be provided on (date) for analysis.
4. Arrange all necessary personal protective equipment and provide a site induction addressing working near traffic.

### **STEP 2 – Undertake the Monitoring**

1. Visit each of the 6 sites identified below:
  - a) Bonville Creek upstream;
  - b) Bonville Creek downstream;
  - c) Pine Creek upstream;
  - d) Pine Creek downstream;
  - e) Reedy's Creek upstream;
  - f) Reedy's Creek downstream.
2. The Environmental Scientist/Engineer will assess water quality with a field probe and collect required samples in prepared bottles. The following parameters will be tested on a monthly basis (for the first 6 months) in the field:
  - pH;
  - salinity / conductivity;
  - dissolved oxygen;
  - turbidity/TSS;
  - temperature.
3. Using the 'Water Quality Creek Assessment Record' form attached, the Environmental Scientist/Engineer or accompanying maintenance person will record the following details *at the time of monitoring*:
  - tide (only Bonville Creek is tidal at monitoring locations);
  - direction of tidal movement (only Bonville Creek is tidal at monitoring locations);
  - any activities noted to be occurring within the catchment that could affect water quality;
  - any aspect of the immediate environment that could affect water quality eg scouring/stability of batters, drains etc.

The Environmental Scientist/Engineer will review the results of the water quality monitoring and compare the data for the up and downstream monitoring sites. A brief report including an analysis of the results, will be prepared and provided to maintenance personnel.
4. File the Water Quality Creek Assessment Record with a copy of the water quality results and report provided by the Environmental Scientist/Engineer. Results should be requested within 1 week of monitoring being undertaken.
5. If at the time of monitoring, a maintenance or environmental issue of concern is

identified (e.g. batter or drain scour), arrange an inspection and/or rectification work as soon as practical.

### **STEP 3 – Distributing and Reviewing the Results**

1. Within one (1) week of receiving the water quality results, copy and send them to the Maintenance Manager for review. A copy of the information recorded on the attached 'Water Quality Creek Assessment Record' should also be sent.
2. The Maintenance Manager, in conjunction with the Maintenance Supervisor, will assess and compare the up and downstream monitoring results and review the report provided by the Environmental Scientist/Engineer. Where a difference (significant) between the up and downstream results was observed and the reason for the difference was not identified or recorded at the time of monitoring, the Manager may require an inspection of the area to be undertaken to identify any possible source or cause of the water quality issue.
3. Record the outcome of the inspection and place the details on file. Where required, arrange rectification works.
4. Provide this information to RTA. RTA are to forward them to any relevant agency such as DECC as required.

	<h2 style="margin: 0;">Bonville Pacific Highway Upgrade          WATER QUALITY CREEK ASSESSMENT RECORD</h2>
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Creek	Tidal Flow Direction	Tide level	Observed Catchment Activities that may affect Water Quality	Other Possible Impacts on Water Quality (e.g. scouring of batters/drains)
Bonville Creek Upstream				
Bonville Creek Downstream				
Pine Creek Upstream	n/a	n/a		
Pine Creek Downstream	n/a	n/a		
Reedy's Creek Upstream	n/a	n/a		
Reedy's Creek Downstream	n/a	n/a		

<b>Date:</b>	<b>Assessment By:</b>
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	<h1 style="margin: 0;">MANAGING ACID SULFATE SOILS</h1>	<h1 style="margin: 0;">712</h1>
		<b>ENVIRONMENTAL</b>

Revision No.	Drafted	Author	Approved	Date
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		
4	25 Nov 2008	R Walker-Edwards		

**PURPOSE**

To provide guidance on the management of acid sulfate soils (ASS).

**SCOPE/BACKGROUND**

When exposed to the air, potential acid sulfate soil (PASS) has the potential to produce acid which can flow into drains and creek lines. This can result in a change in water quality and can result in fish kills.

Some PASS and ASS are located close to the surface but they can also extend several meters underground. They are generally dark grey, muddy clays, sands or peats and may have orange or red mottles in them. On exposure to air these muds dry to a pale grey with rust coloured root channels.

Maintenance activities such as minor earthworks in low lying areas or the maintenance of drains have the potential to disturb PASS and ASS and cause harm to the environment.

Maintenance activities will be planned and implemented so that they do not have an adverse impact on the environment as a result of ASS disturbance.

**DEFINITIONS**

**Acid Sulfate Soils (ASS)** formed naturally in geological timeframes. If deprived of oxygen they pose no environmental harm. If exposed to oxygen, the soil oxidises and can produce excess sulfuric acid. In general, land surface levels below RL 5m (AHD) could be ASS.

**Lime barrier system** means using agricultural lime, lime chip or cobbles as a barrier or neutralising agent for acid production. Fine aglime can be spread over the surface of a newly excavated area while lime chip and cobbles can be used as check structures or wrapped in geofabric and used as a groyne or sausage.

**REQUIREMENTS**

If potential ASS are encountered and disturbed, controls as detailed in Step 2 must be implemented.

STAFF INVOLVED	DISTRIBUTION
<i>Always</i> <ul style="list-style-type: none"> <li>• Maintenance Supervisor</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input checked="" type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> </ul>
<i>Possibly</i> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• QA, Env, OH&amp;S Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Leading Hand <input checked="" type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> </ul>

**APPENDIX 7  
STANDARD OPERATING PROCEDURE  
SOP BBS-PC-BU-712**

	• Sub-contractor/Consultant <input type="checkbox"/>
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### **STEP 1 – Adopt a minimal change philosophy to avoid disturbing ASS**

When planning maintenance works in an ASS area, consider current drainage and flow patterns and aim to:

- a) maintain wider, shallow drains instead of deeper, excavated drains;
- b) minimise excavation to shallow surface zones;
- c) avoid the over-excavation of drains during maintenance;
- d) ensure that drainage is effective in accommodating runoff;
- e) retain the storage capacity provided by natural soils;
- f) prevent surface water ponding;
- g) install appropriate lime barrier systems to reduce acid discharges.

### **STEP 2 – Managing ASS**

Where ASS will be disturbed (or the potential for disturbance is identified) the following controls will be implemented:

- a) identify the potential for ASS disturbance (ASS maps were produced by SMEC for the construction stage of the project showing 'zones' of ASS levels and providing details on liming rates for the top 1m of soil disturbance);
- b) determine liming rates for any exposed excavation faces;
- c) spread lime onto the material being excavated to achieve mixing;
- d) remove the excavated material immediately and place it in a secure area for treatment and monitoring (e.g. a bund constructed of clean soil or a circumferential drain);
- e) lime the base of the stockpile area (e.g. at a rate of between 2.5-10kg/m<sup>2</sup>) depending on the ASS risk level);
- f) spread lime over the excavated material and at the base of the stockpile;
- g) mix thoroughly;
- h) cap limed soil with clean soil where possible;
- i) monitor and treat (with lime) any acid discharges.

### **STEP 3 – Distributing and Reviewing the Results**

1. Where ASS are disturbed by maintenance activities, record the following details:

- a) area/location of disturbance;
  - b) activity that resulted in disturbance;
  - c) estimated quantity of ASS disturbed or excavated;
  - d) treatment or disposal location;
  - e) quantity and type of lime applied;
  - f) method used to stabilise the excavated area and disposal site;
  - g) evidence of leachate production, monitoring and treatment.
2. Place all details on file. No further action unless requested by RTA.

	<h1 style="margin: 0;">MAINTENANCE AT WATERWAYS</h1>	<h1 style="margin: 0;">713</h1>
		<b>ENVIRONMENTAL</b>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		

**PURPOSE**

To provide guidance for the inspections and maintenance of assets at waterways.

**BACKGROUND**

The Bonville Pacific Highway Upgrade crosses a number of waterways including Pine Creek and Bonville Creek. Many other minor waterways are also tributaries of these.

During or after a large rainfall event, waterways can become obstructed with debris or sediment, particularly adjoining a structure.

The removal of obstructions (debris or sediment) from waterways can have an impact on the environment if not undertaken sensitively.

**DEFINITIONS**

**Waterway** refers to any watercourse. This could be major natural systems such as Pine Creek, or could be ephemeral drainage systems such as the flow paths at culverts along the Bonville upgrade.

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<i>Always</i> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> </ul>
<i>Possibly</i> <ul style="list-style-type: none"> <li>• MMS Representative</li> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input type="checkbox"/></li> </ul>

**REQUIREMENTS**

1. Check for obstructions or blockages within the waterway. This may include debris that impacts the integrity of the bridge structure over the waterway, or may prevent fish or other aquatic species from moving up or down the creek system.
2. The issues for inspection are:
  - a. sediment deposition and accumulation;
  - b. accumulation of debris such as vegetation, litter, grass, logs, fallen trees, carcasses and other material washed down in storms;
  - c. scouring or erosion of the banks that may be contributing to the sediment;
  - d. bank instability or collapse that may block crater flow;
  - e. loss or damage of vegetation that may be blocking water flow.
3. The frequency of the required inspections is following significant rain events (rain events in excess of 100mm in one day) and annually. This will also serve as the Bridge Waterway inspection (reference B-09 in Annexure P of the Maintenance Manual).
4. Mangroves are protected. Consult with NSW DPI Fisheries as they need to provide approval for works which affect them.

**STEP 1 – Action to be Taken**

1. Remove **debris** – if rubbish, litter or minor flood debris. Please ensure in flooding that flood waters have subsided and safety is a priority at all times.
2. **If a log** or a fallen tree – first contact NSW DPI Fisheries (Max Enklaar) as they need to provide approval for the removal of ‘snags’ such as a tree.
3. **If sediment** accumulation – contact NSW DPI Fisheries (Max Enklaar) to obtain approval for any works involving removal of sediment. Must also consider the possibility of acid sulfate soil disturbance as well.
4. **If creek bank instability** or collapse – if significant contact NSW DPI Fisheries for advice on re-establishing the bank to prevent further scour.
5. **If loss** or damage of **vegetation** – re-instate.

**Points to Note**

1. The removal of obstructions from waterway should be undertaken avoiding disturbance of the creek bed and bank vegetation.
2. There are mangroves in Bonville Creek that are protected and must not be damaged.
3. The flow in most waterways varies considerably during wet and dry periods. Inspections should be undertaken during normal flow conditions.

**DPI(Fisheries) nominated the following waterways as fish passage which must be maintained**

Station	Name	Comment
99700	Bonville Creek	Tidal creek – upper limits of tide
96150	Pine Creek	Freshwater creek.
96700	Reedy’s Creek	Freshwater creek – overflow for Pine Creek.
97500	Wetland 3	Constructed fish passage channel. Fresh water system.
98500	Wetland 6	Constructed fish passage channel. Fresh water system
100600	Wetland 7	Constructed fish passage channel. Fresh water system
100700	Wetland 8	Constructed fish passage channel. Fresh water system
101250	Infra 13	Constructed fish passage channel. Fresh water system

	<h1 style="margin: 0;">ENVIRONMENTAL RISK ASSESSMENT</h1>	<h1 style="margin: 0;">714</h1>
		<b>ENVIRONMENTAL</b>

Revision No.	Drafted	Author	Approved	Date
1	13 March 2008	R Walker-Edwards		
2	6 Oct 2008	R Walker-Edwards		
3	7 Nov 2008	R Walker-Edwards		
4	25 Nov 2008	R Walker-Edwards		

**PURPOSE**

To provide Abigroup Personnel and Contractors with a process enabling them to identify and assess actual and potential environmental hazards & risks associated with maintenance activities and to determine the controls required to prevent or control the identified hazards or risks.

**BACKGROUND**

Many of the tasks undertaken by Abigroup throughout the maintenance phase have the potential to impact on the surrounding environment unless proper controls are in place.

Forward planning of maintenance tasks are required to ensure that all environmental risks and hazards are appropriately identified prior to undertaking the maintenance activities. Once identified, controls can be developed and crews trained to prevent the works impacting on the environment.

Poor management of environmental risks can lead to extensive damage or impacts to the surrounding environment be it natural or domestic and a source of bad publicity to the Abigroup Maintenance Crews. It may also lead to substantial fines being imposed from the various environmental agencies.

STAFF INVOLVED	DISTRIBUTION
<i>Always</i> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input type="checkbox"/></li> <li>• Maintenance Manager <input type="checkbox"/></li> <li>• Maintenance Supervisor <input type="checkbox"/></li> </ul>
<i>Possibly</i> <ul style="list-style-type: none"> <li>• MMS Representative</li> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input type="checkbox"/></li> </ul>

## **SCOPE**

This SOP covers the procedures for identifying any features or conditions specific to the activity that either may be a hazard or may need protection from maintenance activities. This must also include consideration of such matters as specialised skills, resources, training, technological options, financial, business requirements, EMP's and ECP's and views of interested parties.

The following must be considered when undertaking the environmental risk assessment:

1. Hazardous & Dangerous Substances
2. Noise and Vibration
3. Excavations
4. Waste Management
5. Control of Air Quality
6. Control of Water Quality
7. Soil Conservation, Landscaping & Rehabilitation
8. Contaminated Soils
9. Flora & Fauna
10. Archaeology and Heritage
11. Other Items (e.g. Access, Traffic Management, Existing Conditions, Structures, Services, Adjoining Properties, Prior use of Site, etc.)

## **DEFINITIONS**

**Hazard** is a source of potential harm, injury, damage or loss.

**Risk** is the chance and consequence of a hazardous event occurring i.e. a combination of How Frequent and How Severe the hazard is likely to be.

Risks can be classified as follows:

**CLASS 1 (High Risk)** – Hazards which are highly likely/frequent and/or have potential for serious & widespread damage;

**CLASS 2 (Medium Risk)** – Hazards which are moderately likely/frequent and/or have a potential to cause major local damage;

**CLASS 3 (Low Risk)** – Hazards which are unlikely/infrequent and/or have a negligible effect on the environment.

**Risk Assessment** is a formal process used to determine and minimise the level of risk associated with work activity.

## **REFERENCES**

When undertaking the environmental risk assessments the following EMP documents (Annexure AB of the Maintenance Manual) must be referenced:

1. Environmental Management Plan for the Maintenance phase
2. Soil and Water Management sub plan
3. Heritage Management sub plan
4. Waste and Reuse Management sub plan

## **RESPONSIBILITIES**

### **Maintenance Manager**

1. Nominate Maintenance/Contractor/Consultant responsible for preparing & coordinating Site & Risk Assessments.
2. Nominate Maintenance Activities which require Risk Assessment.
3. Review & Approve Risk Assessments prepared by Abigroup/Contractors/Consultants.
4. Coordinate and Manage the Audit process of the implementation of Risk Assessment Controls.

### **Maintenance Supervisor**

1. Prepare Site & Risk Assessments for nominated Works Activities.
2. Assist with the preparation and review of Contractors/Consultants Assessments.
3. Coordinate and implement Risk Assessment Controls.

### **Subcontractors/Consultants**

1. Prepare and submit for approval Risk Assessments for nominated Works Activities.
2. Coordinate and implement Risk Assessments controls in their work activities.

## **STEP 1 – Identify Work Activities**

1. The Maintenance Manager must determine which specific Work Activities will require preparation of Risk Assessments PRIOR TO THE WORK STARTING. This should also be coordinated with the preparation of related Safety Risk Assessments. The following criteria should be considered:
  - a. Work activities & aspects identified above
  - b. Work activities that have a high frequency of environmental incidents/accidents
  - c. Work activities which have been responsible for serious or major damage
  - d. Work activities which are new or use new materials/equipment or with no previous history
2. For each identified Work Activity, the nominated personnel and/or Subcontractors/Consultants must prepare a Risk Assessment, as per the included form.
3. The Work Activity should be broken down into a logical sequence of steps covering actual methods, materials, equipment, etc that will be used.

### **STEP 2 – Identify & Classify Hazards/Risks**

1. For each Step of the Work Activity, the potential hazards should be identified and listed. This should be done with the personnel who will be performing the work and involve the following methods:
  - a. Discussion or consultation with supervisors, workers, designers
  - b. Inspection of the work area, equipment, tools, etc
  - c. Reviewing past records of incidents, accidents, etc
  - d. "What if ...?" analysis
  - e. Specialist advice from appropriate external organisations
2. The following list of common Maintenance and Construction Hazards should be used as a basis:
  - a. Air pollution
  - b. Contaminated materials
  - c. Acid Sulfate Soil disturbance
  - d. Archaeology/Heritage damage
  - e. Dust, fumes and lack of ventilation
  - f. Erosion, sedimentation
  - g. Interface with the Public
  - h. Water pollution
  - i. Fire/Hot Work
  - j. Flora/fauna damage
  - k. Hazardous substances, etc
3. All hazards that have been identified must be classified according to their Risk potential for serious damage or harm ie. (Class1 = HIGH, Class2 = MEDIUM, Class3 = LOW).

### **STEP 3 – Identify Hazard Controls**

1. For each hazard identified above, an appropriate Hazard Control Action must be developed with the personnel who will be performing the work. The following priority list (BEST to WORST) should be used as a guide:
  - a. **ELIMINATE** – remove the hazard completely
  - b. **SUBSTITUTE** – replace/reduce the hazard with a lower risk one
  - c. **ENGINEER** – redesign or rework the hazard and/or the work activity to reduce the risk
  - d. **DOCUMENT** – prepare Procedures, Instructions, etc to safely control the activity (as per Environmental Work Procedure form included in this SOP)
  - e. **PROTECT** – use protective equipment, environmental controls, signage, etc to reduce the risk
2. Appropriate personnel must be nominated for ensuring that each action is followed.

### **STEP 4 – Review and Approval**

1. The completed Risk Assessment must be submitted to the Maintenance Manager for review. On Approval, the Maintenance Manager must authorise the original and issue copies to all involved.

### **STEP 5 – Induction and Training**

1. Prior to the start of the work activity, the Maintenance Supervisor must ensure that all relevant personnel are inducted into the requirements of the Risk Assessment and its Controls. Where high-risk hazards are identified, detailed training must be arranged to ensure personnel fully understand the hazards and risks associated with the work activity.
2. Records must be kept of all Induction & Training. Induction / Training Attendance Form included in this SOP.

### **STEP 6 – Monitoring Implementation**

1. Maintenance Supervisors/Team Leaders and personnel nominated must undertake targeted Supervision &/or Inspection of the progressive implementation of each Risk Assessment. If problems are found with implementing the required controls, they must be recorded in site diaries and if appropriate, the Risk Assessment revised and formally reissued.

### **STEP 7 – Inspections and Audits**

#### **Inspections**

1. Formal Environmental Inspections of maintenance activities should be conducted regularly (normally monthly) as an "Environmental Walk". This frequency may vary depending on the nature, complexity and changing circumstances of each site – however it must not be greater than monthly.
2. Inspections should be RANDOM (i.e. different day/time each week) to ensure Environmental awareness.
3. Informal daily Environmental Inspections of maintenance activities should also be included as part of routine Supervision.

#### **Records**

4. Formal Environmental Inspections must be reported using the attached Environmental Inspection Report. The checklist prompt items must be customised to be project specific in both topics and level of detail. Outstanding or significant items from previous Inspections should also be added.
5. For each observation the "Action Required", "Priority (date by)" and "Action by" must be noted. The "Priority" of actions should be based on the type of Hazard & level of Risk observed.
6. The Inspection Report and any comments must be distributed to the Maintenance Manager and those noted as "Action by".
7. Equipment used to measure/test Target parameters (e.g. Air quality, Water pH, turbidity, etc.) must have current calibration records.

#### **Monitoring**

8. Required Actions must be monitored/followed-up to ensure they are promptly completed.

#### **ENVIRONMENTAL AUDITS**

9. Formal Audits must be planned and conducted on the Environmental Risk Assessment and Work Procedures of Abigroup Maintenance Crews/Subcontractors/Consultants when undertaking activities identified as having environmental risks.



**APPENDIX 7  
STANDARD OPERATING PROCEDURE  
SOP BBS-PC-BU-714**

ASS (ACID SULFATE SOIL) DISTURBANCE WATER POLLUTION OTHER				
	<b>PREPARED By:</b> Name (Role): Signature: Date:	<b>REVIEWED By (+Client where required):</b> Name (Role): Signature : Date:	<b>APPROVED By:</b> Name (Role): Signature: Date:	<b>DISTRIBUTION (to ALL Personnel involved):</b>
<b><i>NOTE: The attached Induction/Training Attendance List must be signed and dated by all personnel involved in this Work Activity and any revisions of this Risk Assessment.</i></b>				



**ENVIRONMENTAL RISK ASSESSMENT N°:** \_\_\_\_\_

**For** \_\_\_\_\_ **Delivered By:** \_\_\_\_\_

<b>INDUCTION/TRAINING ATTENDANCE LIST</b>				
<b>No</b>	<b>NAME (Please Print)</b>	<b>Signature</b>	<b>Company &amp; Position</b>	<b>Date</b>
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

**MAINTENANCE ACTIVITY:** \_\_\_\_\_

**ENVIRONMENTAL INSPECTION REPORT**

\*PRIORITY Key: 1 = IMMEDIATE; 2 = SAME DAY; 3 = DATE Nominated

**DATE:**

**INSPECTION**

.....

**Weather Conditions:**

Item N <sup>o</sup>	OBSERVATION	ACTION REQUIRED & LOC'N	*PRIORITY (DATE by)	ACTION BY	DONE Check
1.	<b>NOISE</b> - Construction Plant & activities, On & Off Site, time & duration of work				
2.	<b>VIBRATION</b> - Construction Plant & activities, On & Off Site				
3.	<b>HAZARDOUS MATERIALS</b> - Storage, Protection, Signs, MSDS's, Decanting & Transport, etc				
4.	<b>TRAFFIC MANAGEMENT</b> - Public Roads cleanliness, access, controls, etc				
5.	<b>WASTE MANAGEMENT</b> - Housekeeping, bins, frequency, separation/recycling, etc				
6.	<b>AIR QUALITY</b> - Construction Dust, Debris, Odors, etc, On & Off Site				
7.	<b>AIR QUALITY</b> - Plant Smoke, Fumes, Gases, etc Emissions, On & Off Site				
8.	<b>WATER QUALITY</b> - Surface runoff, scouring, streams, discharge points, On/Off Site				
9.	<b>WATER QUALITY</b> - Stormwater Pits, Drains, Sediment Settling Pits, etc				
10.	<b>WATER QUALITY TESTING</b> - Turbidity, pH, Dissolved Oxygen, etc				
11.	<b>SOIL CONSERVATION</b> - Earthworks, Stockpiles, Silt fences, Haul roads, etc				
12.	<b>SOIL LANDSCAPING &amp; REHABILITATION</b> - as specified				
13.	<b>SOIL TESTING</b> - as specified in Environmental Work Methods Statements, or ECP's				
14.	<b>CONTAMINATED MATERIAL</b> - Stockpiles, Hauling, Rd cleaning, etc				
15.	<b>FLORA PROTECTION</b> - vegetation marked out, no stockpiling / parking in tree root zone				
16.	<b>FAUNA PROTECTION</b> - fencing,				





**PROJECT:** \_\_\_\_\_

## **ENVIRONMENTAL WORK PROCEDURE**

---

**WORK ACTIVITY:** ..... **EWP No:** .....

---

**1) Legislation, Codes of Practice, Standards applicable: (refer EMP, ECPs for details)**

.....

**2) Engineering details / certificates / EPA approvals:**

.....

**3) Personnel qualifications & experience required:**

.....

**4) Supervision and inspection to be provided:**

.....

**5) Training and instruction to be provided:**

.....

**6) Plant and equipment & Maintenance checks to be used:**

.....

.....

**7) Protective equipment, Warning Signs, etc to be used:**

.....

.....

**8) Control Methods/Instructions:**

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.....

.....

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**9) Details of emergency procedures / emergency contact numbers (e.g. injured fauna):**

.....

.....

**10) List of attachments (if any eg. sketches, diagrams etc)**

.....  
**Prepared By:** ..... **Reviewed By:** ..... **Approved By:** .....  
**Signature:** ..... **Signature:** ..... **Signature:** .....  
**Date:** ..... **Date:** ..... **Date:** .....

	<h2 style="margin: 0;">Groundwater Management</h2>	<h1 style="margin: 0;">715</h1>
		<b>ENVIRONMENTAL</b>

<i>Revision No.</i>	<i>Drafted</i>	<i>Author</i>	<i>Approved</i>	<i>Date</i>
2	6 Oct 2008	OC		
3	7 Nov 2008	R Walker-Edwards		
4	25 Nov 2008	R Walker-Edwards		

**PURPOSE**

To provide guidance to the Maintenance Supervisor and environmental monitoring personnel on the coordination and implementation of groundwater quality monitoring activities.

**SCOPE/BACKGROUND**

Groundwater quality monitoring will be conducted during the operation period. Maintenance personnel will be required to assist by organising access to the monitoring sites.

<b>STAFF INVOLVED</b>	<b>DISTRIBUTION</b>
<p><i>Always</i></p> <ul style="list-style-type: none"> <li>• Maintenance Manager</li> <li>• Maintenance Supervisor</li> </ul> <p><i>Possibly</i></p> <ul style="list-style-type: none"> <li>• MMS Representative</li> <li>• QA, Env, OH&amp;S Manager</li> <li>• Leading Hand</li> </ul>	<ul style="list-style-type: none"> <li>• MMS Representative <input checked="" type="checkbox"/></li> <li>• Maintenance Manager <input checked="" type="checkbox"/></li> <li>• Maintenance Supervisor <input checked="" type="checkbox"/></li> <li>• Leading Hand <input type="checkbox"/></li> <li>• RTA <input type="checkbox"/></li> <li>• Sub-contractor/Consultant <input checked="" type="checkbox"/></li> </ul>

**REQUIREMENTS**

**Monitoring Locations**

Ground water monitoring will be performed at three existing bores along the highway alignment. Details of groundwater borehole monitoring locations are provided in Table 1 below.

**Monitoring Frequency**

Sampling will be under taken at a frequency of every three months for 12 months after project construction completion.

### **STEP 1 – Planning and Preparation**

1. One week prior to the scheduled monitoring date, contact the Environmental Monitoring Officer/ consultant and arrange a suitable time to undertake the monitoring.
2. Discuss the scope of works required with the Environmental Monitoring Officer/consultant including the water quality parameters that will be assessed. This will allow arrangements to be made for equipment, sample bottles and the calibration of the monitoring units.
3. Ensure that monitoring equipment is calibrated and in working order.
4. Obtain relevant bottles, maps, forms, buckets, contaminant-free water (e.g. town water supply)

### **STEP 2 – Undertake the Monitoring**

Visit each of the groundwater monitoring bores identified in Table 1.

1. The Environmental Monitoring officer/consultant will sample groundwater bores in accordance with the Australian Standards (AS/NZS 5567:1998 Water Quality Sampling series).
2. Monitoring will assess:
  - Groundwater salinity and general chemistry (DO, Conductivity, pH, Temp); and
  - Groundwater levels.
3. To ensure the quality of samples collected and analysed, water quality monitoring equipment will be calibrated immediately prior to sampling. The Environmental Monitoring Officer/consultant will keep a calibration record.
4. Alternatively if monitoring equipment is unavailable samples will be collected and analysed at a NATA accredited laboratory
5. Record the above in-situ/field monitoring parameters on the Groundwater Field Assessment Record

### **Communication Procedure and Reporting**

1. Maintenance personnel will be Toolboxed on the content of this SOP.
2. Training will be provided to personnel involved in the monitoring. Only authorised personnel will be permitted to gain access to groundwater bores.
3. Monitoring results will be kept on file and discussed with key personnel in the project team if there is an exceedance which may be correlated to project related activities.
4. Within one (1) week of receiving any results from external sources (contractor or laboratory), they must be sent to the Maintenance Manager for review.
5. Any monitoring results will be made available to the RTA on request

	<b>Bonville Pacific Highway Upgrade          GROUNDWATER ASSESSMENT RECORD</b>
---	--

<b>Date:</b>	<b>Inspection By:</b>
<b>Time:</b>	
<b>Weather Conditions:</b>	

Groundwater Bore I.D.	Water Quality Parameter					
	Temp	pH	EC	NTU	Sal	DO
<b>Site 1A Basin 98.4</b>						
	<b>Water Height</b>					
<b>Site 1B Basin 98.4</b>						
	<b>Water Height</b>					
<b>Site 2A Reedys Creek</b>						
	<b>Water Height</b>					
<b>Site 2B Reedys Creek</b>						
	<b>Water Height</b>					
<b>Site 3 Site Compound</b>						
	<b>Water Height</b>					

**Table 1 Locations and Details of Groundwater Wells in Monitoring Program**

GW Well ID	Approximate Chainage	Location of Monitoring Well	Side of Alignment	Owner of well
1A	94800	Water quality basin 94.80	Eastern	Abigroup Contractors
1B	94800	Water quality basin 94.80	Eastern	Abigroup Contractors
2A	96850	Reedys Creek	Western	Abigroup Contractors
2B	96850	Reedys Creek	Western	Abigroup Contractors
3	99400	Site compound	Eastern	Abigroup Contractors

