



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ July 2015

Pacifico Project Number: WC2NH



A team consisting of RMS and Pacifico (ACCIONA Ferrovia JV) to upgrade the Pacific Highway at Warrell Creek to Nambucca Heads

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1. Introduction

Environmental Protection Licence (EPL) 20533 was issued to ACCIONA Infrastructure for the Warrell Creek to Nambucca Heads Pacific Highway Upgrade project on the 16th December 2014. Condition R1.8 of the EPL requires the licensee to provide the EPA with a monthly report containing the following information:

- a) details of all non-compliances with the conditions of this licence and measures taken, or proposed, to prevent a recurrence of such a non-compliance; and
- b) details of all discharges from the sediment basins where the water quality results exceed the limits prescribed by Condition L2.4 including the results of rainfall measurements to demonstrate compliance with Condition M4.1; and

The report referred to in this condition must be received by the EPA within 10 working days of the end of each month.

This document has been prepared to fulfil the requirements of Condition R1.8.

1.1 Description of Works

The project's construction activities during July 2015 were limited to the following:

- PCY Earthworks and PC formwork;
- Clearing in the State Forest;
- Installation of erosion and sediment controls;
- Installation of permanent fauna fencing;
- Earthworks including crushing;
- Production blasting;
- Foundation treatments
- Concrete crushing
- Road maintenance
- Pacific Highway Diversion road construction
- Access and haul road construction;
- Sediment basin construction
- Rural fencing installation
- Continuation of topsoil stripping;
- Installation of temporary waterway crossings;
- Bridge works including temporary work platforms;
- Commencement of piling, including driven piling;
- Clearing through Flying Fox area;
- Drainage culvert installation;
- Shotcreting of permanent drains;
- Site compound establishment;
- Installation of Frog Fencing;
- Geotechnical Investigations;
- Utilities relocation; and
- Site Survey

The works scheduled for next month include:

- PCY Earthworks and PC formwork;
- Topsoil stripping;
- Installation of temporary waterway crossings;
- Installation of permanent fauna and rural fencing
- Earthworks including crushing;
- Production blasting;
- Continuing of piling including driven piling;
- Continuing bridge works including wick rock and temporary work platforms;
- Earthworks through the flying fox area;
- Drainage works, including shotcreting permanent drains;
- Installation of erosion and sediment controls;
- Installation of permanent boundary fencing;
- Continuing culvert installation;
- Site compound establishment (Northern Compound);
- Geotechnical Investigations;
- Utilities relocation;
- Foundation treatment;
- Concrete crushing;
- Road maintenance;
- Pacific Highway Diversion road construction;
- Access and haul road construction;
- Sediment basin construction;
- Installation of temporary waterway crossings; and
- Site Survey.

1.2 Consultation Activities

The project's consultation activities during July 2015 included various community letterbox drop notifications and the following:

Groups	Date	Key Topics
Environmental Review Group	21/07/15	Construction Progress, Design Update, Upcoming works, EWMS discussion, Environmental Update, Monitoring update.
Local community	01/07/15	Controlled blasting – Community Briefing Session

The information provided during the blasting community information session held on 1 July can be summarised as follow:

- Planned blasting activities for the WC2NH Pacific Highway upgrade
- Current environmental constraints linked to the activity
- Minister's Conditions of Approval and Environmental Protection Licence for blasting

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- Consultation processes and procedures
 - Presentation of the potential impacts and how they are monitored and managed
 - Video showing an actual blast engineered with sought increased blasting limits
 - Communication lines for sensitive receivers

Other consultation activities:

- Consultation with residents regarding increasing the blast limits
- Ongoing consultation with property owners regarding property works
- Consultation with affected residents regarding temporary stockpiles
- Consultation with affected residents regarding First Flush Systems
- Letterbox drop of Quarterly Project update
- Notification of the planned closure of the Nursery Road pedestrian bridge
- Notification documentation for drive piling were made available at display centres and Nambucca River Tourist Park, as well as electronically distributed to Council. Other sensitive residents were notified via phone and invited to contact the community team should they have any further questions
- Nambucca bridge fact sheet at display centres which will also be distributed at the drop-in session on August 22
- Blasting fact sheets at display centres which were also distributed at the July blasting CIS
- Piling fact sheet at the display centres which will also be distributed during the planned drop-in session on August 22nd

At House Noise Treatments

The At House noise treatment program is currently being managed by RMS and is not part of the ACCIONA (Pacífico) Scope of Works and Technical Criteria.

Upcoming community and stakeholder activities for August 2015:

- Drop in session to notify residents and river user groups of the change to the navigation rules during the construction of the new Nambucca River Bridge
- Consultation for the construction of crib sheds on Bald Hill and Gumma roads.
- Consultation with Old Coast Road residents re: the new alignment of Old Coast Road
- Ongoing weekly consultation with sensitive receivers in Cut 11 re: blasting and any feedback.

2. Weather

2.1 Discussion

The automatic recording weather station at the main site compounds (north and south) records rainfall totals daily at 9AM. The total rainfall received for the month is as follows: -

Month	Total monthly rainfall	Location
01/07/15 – 31/07/15	16mm	Northern Compound
01/07/15 – 31/07/15	16.2mm	Albert Drive Compound

The site experienced a total of 11 rain days throughout the month of July 2015.

During July, rainfall received on site was lower than the July monthly average of 77.4mm. A summary of weather conditions recorded over the month for Smoky Cape by the Bureau of Meteorology is detailed below in Table 2.3.

The daily summaries for rainfall received in July at the Albert Drive compound and Northern Compound are shown below in Table 2.1 and 2.2.

Table 2.1 – Rainfall recorded at Albert Drive compound automated weather station

SiteName: Southern Compound		
Date	Time	TOTAL Rain Gauge
1/07/2015	9:00:00	1.2
2/07/2015	9:00:00	3.4
3/07/2015	9:00:00	0.2
4/07/2015	9:00:00	0
5/07/2015	9:00:00	0
6/07/2015	9:00:00	0
7/07/2015	9:00:00	0
8/07/2015	9:00:00	0
9/07/2015	9:00:00	0
10/07/2015	9:00:00	0
11/07/2015	9:00:00	0
12/07/2015	9:00:00	0.2
13/07/2015	9:00:00	0.2
14/07/2015	9:00:00	0
15/07/2015	9:00:00	0

16/07/2015	9:00:00	0
17/07/2015	9:00:00	0
18/07/2015	9:00:00	0
19/07/2015	9:00:00	0
20/07/2015	9:00:00	0
21/07/2015	9:00:00	1.2
22/07/2015	9:00:00	5.2
23/07/2015	9:00:00	0.6
24/07/2015	9:00:00	0.8
25/07/2015	9:00:00	3
26/07/2015	9:00:00	0.2
27/07/2015	9:00:00	0
28/07/2015	9:00:00	0
29/07/2015	9:00:00	0
30/07/2015	9:00:00	0
31/07/2015	9:00:00	0

Table 2.2 – Rainfall recorded at the Northern compound automated weather station

SiteName: Northern Compound		
Date	Time	TOTAL Rain Gauge
1/07/2015	9:00:00	0.4
2/07/2015	9:00:00	1
3/07/2015	9:00:00	0
4/07/2015	9:00:00	0
5/07/2015	9:00:00	0
6/07/2015	9:00:00	0
7/07/2015	9:00:00	0
8/07/2015	9:00:00	0
9/07/2015	9:00:00	0.6
10/07/2015	9:00:00	0.2
11/07/2015	9:00:00	0
12/07/2015	9:00:00	2.2
13/07/2015	9:00:00	0
14/07/2015	9:00:00	0
15/07/2015	9:00:00	0
16/07/2015	9:00:00	0
17/07/2015	9:00:00	0
18/07/2015	9:00:00	0
19/07/2015	9:00:00	0
20/07/2015	9:00:00	0.4
21/07/2015	9:00:00	4

22/07/2015	9:00:00	2.2
23/07/2015	9:00:00	0.2
24/07/2015	9:00:00	0.8
25/07/2015	9:00:00	3.8
26/07/2015	9:00:00	0.2
27/07/2015	9:00:00	0
28/07/2015	9:00:00	0
29/07/2015	9:00:00	0
30/07/2015	9:00:00	0
31/07/2015	9:00:00	0

Table 2.3: Weather conditions recorded in June 2015 at Smoky Cape by the Bureau of Meteorology.

Observations from Smoky Cape Lighthouse.

Smoky Cape Daily Summaries**July 2015**

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/07/2015	14.2	21.4	0.8
2/07/2015	12.5	18.9	0.2
3/07/2015	9.1	18.4	0
4/07/2015	11.9	20.7	0
5/07/2015	12.3	19.7	0
6/07/2015	13	21.9	0
7/07/2015	9	18.6	0
8/07/2015	10.1	14.9	0
9/07/2015	10.7	18.9	2
10/07/2015	12.1	19.2	0.4
11/07/2015	13.9	20.9	0
12/07/2015	10.3	14.9	2.2
13/07/2015	8.6	17.8	0
14/07/2015	9.7	18.2	0
15/07/2015	9.3	17.2	0
16/07/2015	10.2	19.4	0
17/07/2015	6.6	15.4	0
18/07/2015	7.5	17.5	0
19/07/2015	10.1	19	0
20/07/2015	10.1	19.3	26.2
21/07/2015		16.2	13
22/07/2015		18.2	30.6
23/07/2015	14.9	19.4	0.2
24/07/2015	14.9	19.1	0.6
25/07/2015	15.7	23.4	2.8
26/07/2015	16.2	22.8	0
27/07/2015	12.5	17	0
28/07/2015	9.9	18.6	0
29/07/2015	10.5	19.4	0
30/07/2015	12.2	20.9	0
31/07/2015	15.2	23	0

3. Surface Water Monitoring

Monthly sampling was undertaken by ACCIONA (Pacifico) on the 27th July during a dry period, field tests and lab samples were taken. The results are available in Appendix A.

No wet events were recorded in July as there was no 24hr period where rainfall exceeded 10mm hence no post rainfall monitoring was triggered.

Pacifico are awaiting trigger levels for baseline monitoring from RMS, so comparisons will be made to ANZECC guidelines and between upstream and downstream levels to determine site works impact.

Dissolved oxygen (DO) levels noted to be below ANZECC criteria at:

- Upper Warrell Creek upstream and downstream but are within background pre-construction ranges from 0.9mg/L to 9.6mg/L. DO levels decreased by less than 10% from upstream (3.85mg/L) to downstream (3.58mg/L).
- Stoney Creek downstream but are within background pre-construction ranges from 1.5mg/L to 8.4mg/L. DO levels decreased by more than 10% from upstream (5.09mg/L) to downstream (3.82mg/L).
- Lower Warrell Creek upstream and downstream but are not within background pre-construction ranges from 5 to 9.4mg/L. DO levels decreased by less than 10% from upstream (3.93mg/L) to downstream (3.71mg/L).
- Gumma Wetlands upstream and downstream but are within background pre-construction ranges from 0.6 – 13.6mg/L) with the exception of Unnamed Channel Gumma Wetland Upstream (0mg/L)
- Nambucca River upstream and downstream were below ANZECC criteria with the exception of Nambucca River South downstream.

A decrease in DO at Stoney Creek from upstream and downstream of > 10% prompted an inspection which revealed no vegetative matter had been left in the waterway which is known to contribute to low DO.

The low dissolved oxygen levels are consistent with baseline water quality data collected by RMS prior to the commencement of construction activities at the locations noted above.

A possible reason is due to the current dry weather this may have resulted in a lower reading of dissolved oxygen.

pH levels noted to be outside of ANZECC criteria at:

A low pH level was also recorded at Upper Warrell Creek (6.46 & 6.46pH units) and at Gumma Wetlands upstream (6.85pH units). The low pH levels recorded are within background pre-construction pH levels, which range from pH 5.1 to pH 7.9.

Turbidity levels noted to be outside of ANZECC criteria at:

A high turbidity reading was recorded at Unnamed Creek Gumma West (75NTU) and Nambucca River South (10.4 NTU). Gumma wetlands has variable background readings ranging from 2.4 – 951 NTUs, while Nambucca River has background turbidity readings from 3.8 – 98 NTUs.

Metals levels noted to be outside of ANZECC criteria at:

All Gumma Wetland monitoring locations excluding Gumma Wetland upstream for aluminium. It is noted that aluminium levels were not measured during baseline monitoring. One site at Gumma (unnamed creek Gumma West) also had elevated Copper (0.002mg/L), which is within with baseline monitoring results which ranged from <0.001mg/L to 0.022mg/L.

Elevated zinc levels were also recorded at Upper Warrell Creek downstream (0.011mg/L) and unnamed creek Gumma north (0.008mg/L), which is within baseline monitoring results of <0.005mg/L to 0.1mg/L.

Nutrient levels noted to be outside of ANZECC criteria at:

Elevated total phosphorus levels were recorded at Unnamed Creek Gumma West upstream (0.18 mg/L), Unnamed Creek Gumma East upstream (0.14mg/L), Unnamed Creek Gumma North downstream (0.25mg/L) as well as Nambucca River South upstream (0.04mg/L) (using trigger values from Table 8.2.2.1 Volume 2 of ANZECC water quality guidelines, as there is no value provided in the standard ANZECC 95% trigger levels for Total Phosphorus). These results are within baseline monitoring results of < LOR to 1.9mg/L.

4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins between the 17th of July and 30th July after water was transferred into them from works in nearby waterways. Water pumped into basins was treated and released as soon as possible, especially if rainfall is predicted in the 5 day forecast. Table 4 below has the water quality results recorded for the water release events:

Table 4 – Water Release Register

Water Release Register

Date	Basin ID	Oil and Grease (visible)	pH	Turbidity (NTU)	TSS* (mg/L)	Approx Volume Discharged (kL)	Comments
17/07/2015	B55.5	N	7.28	64.5		493	Water released pumped into basin from waterway works during extended dry period
20/07/2015	B44.44	N	7.54	31		350	Water released pumped into basin from waterway works during extended dry period
30/07/2015	B44.44	N	7.49	8.7		400	Water released pumped into basin from waterway works during extended dry period

- TSS is taken every third discharge on average

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 27th and 28th July at eight locations near to the construction works.

No noise complaints were received this month. The Noise monitoring results are available in Appendix A.

The noise levels recorded at Cockburns Lane, Bald Hill Road, Mattick Rd and Albert Drive were marginally elevated above the Noise Management Levels. At Cockburns Lane a piece of equipment causing excess noise (squeaking) was identified and placed out of service until necessary maintenance could be carried out to reduce the noise levels. Levels were consistent with background noise levels before the commencement of construction at the sensitive receiver from the nearby mill and highway traffic.

Simultaneous activities were identified as contributing to the exceedance at Albert Drive, mitigation for this including minimisation of simultaneous activities at the one location. Levels were consistent with background noise levels before the commencement of construction at the sensitive receiver from private traffic, dogs, birds and highway traffic. Noise monitoring is planned to be undertaken in August to verify the success of this mitigation measure.

Mattick Road LAeq levels monitored are consistent with the predicted modelled levels for dozer works, however exceeds the NML level for area. This measured level is consistent with Background levels prior to construction.

6. Vibration Monitoring

Vibration monitoring was undertaken on July 27 2015 at a sensitive receiver after concerns were raised about piling for the Nambucca Bridge. Piling with a 28T impact hammer triggered the monitoring equipment, with the peak vector sum being below the 2mm/s limit (0.225m/s at 4.857 seconds was the recorded level).

6.1 Blasting

Two blasting events occurred in July 2015, 7th and 27th July 2015.

One exceedance occurred on the 7th July prior to the blasting limits being approved from 5mm/s to 25mm/s for peak particle velocity. A reading of 5.773mm/s was recorded at the closest sensitive receiver to Cut 11.

There have been no exceedances for Overpressure from these two blasts, the highest recorded was 108dB on the 7th July.

We are required to achieve less than 5% exceedance (of 5mm/s limit) within a 12month period for those sensitive receptors that have not agreed to the 25mm/s limit. We have anticipated a total of 49 blasts. At the end of July our percentage is 66.66% which is expected to drop to 4.1% at the end of the blast program.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 9/6/2015 to 10/7/2015. DDG results are available in Appendix A.

An elevated level of 6.6mg/m²/month was recorded at dust deposition gauge DDG3 for total insoluble matter (TIM), which is located at a sensitive receiver near the vicinity of Scotts Head Road and the Pacific Motorway. TIM = Combustible Matter +Ash content. Ash content can be attributable to construction works. We have modified our analysis for the next round of monitoring to include ash content.

It was noted numerous times during the monitoring period that sediment was being tracked by trucks exiting the Quarry on to the Motorway resulting in dust generation by passing traffic. This is considered to be a contributing factor to the elevated dust level at this location. EPA will be notified if noticeable dust continues to be produced from this source.

8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on the 15/7/2015 and 16/7/2015. The results from the groundwater monitoring is available in Table 4 of Appendix A.

The groundwater monitoring results have been provided to RMS to provide advice on the trigger levels determined during the baseline sampling. The finalised groundwater report from the baseline sampling have not been issued from RMS to Pacifico including groundwater triggers.

9. Acoustic Investigations

No acoustic investigations were undertaken in July 2015.

10. Complaints

9.1 Summary of Complaints for the month

The following is a brief summary of environmental complaints received in July 2015. On Monday 13 July 2015, a resident of Old Coast road contacted Bob Higgins and the EPA regarding concerns about the potential presence of asbestos in the recycled concrete used on a temporary access track leading to his property. Upon receipt of the complaint, the area containing the fill was cordoned off with safety fencing. The concern was communicated to the community team via RMS and the environmental team. The matter was treated as urgent and acted upon immediately. On Wednesday, 15 July 2015, Pacifico took the following actions:

- Testing was carried out on site this morning at 3 locations (Access in question, Stockpile at 54 Old Coast Road, Stockpile at OC6);
- An environmental representative of RMS was present for the testing of the main stockpile at 54 Old Coast Road;
- Both AADEMEX and Regional Geotechnical Solutions (the 3rd party soil testers engaged to do the testing) confirmed there was no visual evidence of the presence of asbestos at any location; and
- Tests were treated as a matter of urgency

Pacifico received the results on Fri 17 July 2015 which concluded that no asbestos was present in the recycled concrete used. The residents were advised in person and via email of the results. The recycled material has been replaced with road base to the satisfaction of the residents.

On Friday 31 July, two residents of River Street in Macksville called to complain about dust. One chose to remain anonymous. Both reported sighting the sweeper trucks driving past their respective house and not having their brushes in operation. They deemed the operations to be ineffective. The community team contacted the engineering team in charge of the area at 11:55pm to investigate the feedback. The sweeper trucks merely drove past the resident's houses to get to the area in need of sweeping. To address the situation effectively, the sweeping operations was extended to the whole street on Friday afternoon. The resident who asked for an update was contacted at 3:17pm of the actions taken and was invited to call back if need be.

11. Non-Compliance

10.1 Summary of Non-compliances

A level 1 incident and non-conformance occurred on the 30th July 2014 at Albert Drive connection south.

Early clearing of the southern end of the Northern Albert Drive and Pacific Highway intersection upgrade outside of Project Boundary. 206m² of roadside vegetation (predominately Camphor laurel, lantana and slash pines with some native regrowth she oaks and acacia species).

EPA were notified verbally on Friday 31st July following confirmation from survey that clearing had continued past the project and EPL boundary. Incident report form and tool box talk including initial corrective actions were sent to the EPA early the

following week. Pacifico are undertaking an investigation (Complyflow) into the incident and the report will be forwarded to EPA once complete.

Appendix A – Monitoring Results

Table 1 - Surface Water Sampling Results – 1 dry

23 July 2015 - Dry Event

Weather: Overcast

Low Tide: 7:05am

Location	Units	Levels of Concern		SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW08	SW09	SW10	SW11	SW12	SW13	SW14	SW15	SW16
				Upper Warrell Creek	Upper Warrell Creek	Stony Creek	Stony Creek	Lower Warrell Creek	Lower Warrell Creek	Unnamed Channel Gumma Wetland	Gumma Wetland	Unnamed Creek Gumma West	Unnamed Creek Gumma East	Unnamed Creek Gumma North	Nambucca River South	Nambucca River South	Nambucca River North/ Newee Creek Junction	Nambucca River North	Newee Creek
Type		ANZECC 2000 95% species protected		Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Upstream	Upstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream
Freshwater / Estuarine				Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Estuarine	Estuarine	Estuarine	Estuarine	Estuarine
Date of Sampling				23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15	23-Jul-15
Time of Sampling		Freshwater	Marine	5:05 PM	4:40 PM	4:25 PM	4:05 PM	12:40 PM	12:50 PM	1:55 PM	2:10 PM	2:30 PM	3:15 PM	2:55 PM	12:10 PM	11:55 AM	11:33 AM	11:15 AM	3:39 PM
Laboratory data																			
Metals																			
Aluminium	mg/L	0.055	-	0.02	0.02	0.05	0.01	0.01	0.01	0.12	0.02	0.16	0.06	0.08	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/L	0.024	0.0023	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	0.002	0.001	0.002	0.001	0.003
Cadmium	mg/L	0.0002	0.0055	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	0.0044	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.0014	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.0034	0.0044	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	1.9	0.08	0.008	0.004	0.026	0.023	0.059	0.083	0.099	0.002	0.019	0.122	0.046	0.034	0.027	0.055	0.052	0.049
Nickel	mg/L	0.011	0.07	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.005	0.007	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	mg/L	11	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.03	0.03	<0.01
Silver	mg/L	0.00005	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.008	0.015	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	-	-	0.47	0.35	0.27	0.24	0.19	0.21	0.83	0.6	1.47	0.64	0.36	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	mg/L	0.0006	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Recoverable Hydrocarbons (dependant on visual insp.)																			
Naphthalene	µg/L	16	50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
C6 - C10 Fraction	µg/L	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	µg/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	µg/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	µg/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	µg/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
BTEX (dependent on visual insp.)																			
Benzene	µg/L	950	700	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	180	180	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	80	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
m&p-Xylenes	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	µg/L	350	350	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylenes - Total	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nutrients																			

Total Phosphorus	mg/L	0.05	0.03	0.01	0.01	<0.01	0.01	0.01	<0.01	0.03	0.03	0.18	0.14	0.25	0.04	0.03	0.03	0.03	0.03
Phosphate (reactive phosphorus)	mg/L	-	-	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01
Total Nitrogen	mg/L	0.5	0.3	0.3	0.4	0.2	0.7	0.3	0.3	1.4	1.5	2.7	3.3	2.4	<0.2	<0.2	<0.2	<0.2	1.5
Total Kjeldahl Nitrogen	mg/L			0.2	0.2	0.1	0.2	0.2	0.2	1.3	1.5	2.7	2.1	2.4	<0.2	<0.2	<0.2	<0.2	0.2
Nitrate	mg/L	0.7	-	0.13	0.15	0.12	0.5	0.06	0.07	0.1	0.03	0.04	1.16	0.02	0.04	0.04	0.03	0.03	1.3
Nitrite	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia	mg/L	0.9		0.03	0.03	0.02	0.04	0.03	0.04	0.02	0.11	0.06	0.14	0.04	0.04	0.02	0.03	0.02	0.02
TSS																			
Turbidity		50	10	5.3	5.8	3.6	2.9	2.1	2.2	13.1	9.9	43	17.4	102	3.7	2	2.9	0.5	10.5
TSS	mg/L	<40	<10	<5	<5	<5	<5	<5	<5	<5	<5	48	27	327	<5	<5	<5	<5	12
<i>Field Physical data</i>																			
Temperature	C	-	-	13.21	13.73	15.9	14.98	16.08	17.19	14.98	16.14	17.28	18.28	16.68	16.9	15.95	16.06	16.86	17.91
pH	pH	-	6.5-8	6.47	6.46	6.73	6.72	7.51	7.12	6.04	6.85	6.22	6.3	6.14	7.74	7.73	7.53	7.2	7.51
pHmV	pHmV	-	-	-29	-29	-44	-43	-88	-66	-5	-50	-15	-19	-10	-101	-100	-89	-70	-88
ORPmV	ORPmV	-	-	183	176	142	104	145	110	164	157	167	117	86	176	181	197	204	175
Conductivity	mS/cm	0.125-2.2	-	0.288	0.289	0.273	0.259	2.35	2.33	0.501	1.2	0.457	0.622	0.915	35.4	35.8	34.6	35.4	35.5
Turbidity	NTU	50	10	0	0.1	0	0	1.9	0.9	17.6	17.4	75.1	24.6	31.5	10.4	0	0	0	10.3
Dissolved Oxygen	mg/L	5	5	3.85	3.58	5.09	3.82	3.93	3.71	0	4.23	2.97	2.49	1.56	3.53	5.57	3.96	4.79	5.63
TDS	g/L	-	-	0.187	0.188	0.178	0.169	1.5	1.49	0.32	0.766	0.297	0.398	0.585	21.6	21.8	21.1	21.6	21.7

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of ANZECC Level of Concern ANZECC 2000 95% species protected

- WCU = Upper Warrell Creek Upstream
- WCD = Upper Warrell Creek Downstream
- SCU = Stony Creek Upstream
- SCD = Stony Creek Downstream
- LWCU = Lower Warrell Creek Upstream
- LWCD = Lower Warrell Creek Downstream
- NRU = Nambucca River Upstream
- NRD = Nambucca River Downstream

Table 2 - Noise Monitoring Results



Monthly Noise Monitoring Results July 2015

Date	Time	Location	Rec ID	NCA	NML	L _{aeq} (15mins)	L _{AFMAX}	L _{AFMIN}	L _{CEQ}	L _{AF05}	L _{AF10}	L _{AF50}	L _{AF90}	Principal sources/ operations	Measurements exceeding criteria, plant/ operations causing	Corrective actions	Notes
28/07/2015	8:49 AM	Albert Drive	74	1	50	57.2	75.7	47.8	72.5	61.3	59.5	54.6	51.5	Scrapers, moxy, compactor	Scrapers moxy + compactor together	Minimise simultaneous activities – hauling + compaction	Consistent with noise level predicted for cut works
28/07/2015	9:41 AM	Cockburns Lane	16	1	50	54.6	67.3	47.3	64.5	58.3	57	53.4	50.7	Dozer + excavator.	Dozer	Dozer with squeaky track - equipment was put out of service until track replaced	Consistent with noise level predicted for cut works
28/07/2015	12:30 PM	Bald Hill Rd	197	3	50	56.3	76.7	47.5	71.3	58.9	57.3	54.3	52.1	Dozer, scraper, compactor, moxy	Scraper, dozer, moxy,		Consistent with noise level predicted for cut works
27/07/2015	3:27 PM	Letitia Rd	410	4	59	55.8	80.3	34.5	66	55.7	49.8	40.3	37.2	Highway traffic, private traffic, birds	NA	NA	Background – no construction audible
28/07/2015	11:26 AM	Mattick Rd	442	6	44	51.4	69	41.2	62	56.4	54.6	47.6	44	Dozer tracking	Dozer		Consistent with noise level predicted for cut works
27/07/2015	2:37 PM	Nursery Rd	415	4	59	47.9	61.7	37.6	61.9	52.1	50	46.8	43.7	Pile vibration	NA	NA	
28/07/2015	10:30 AM	Wallace St	148	3	50	55.7	71.7	46	67.8	60.5	57	51.7	49	Private traffic, industrial estate	NA	NA	Background - construction visible not audible
28/07/2015	12:00 PM	Gumma Rd	383	3	50	61.3	82.1	37.8	68.1	67.7	62.1	47.4	42.8	Private construction: sawing in council building. Private traffic.	NA	NA	Background

Table 3 - Dust monitoring results



Monthly Dust Monitoring Results - June/July 2015

		Unit	Levels of Concern	LOR	DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG7	DDG8	DDG A1	DDG A2	
Jun-15	DDG ID				DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG7	DDG8	DDG A1	DDG A2	
	Start date of sampling				9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015	9/06/2015
	Finish date of sampling				10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015
	Total Soluble Matter	g/m ² .month	N/A	0.1	1.9	2	1.3	0.5	0.8	0.4	0.6	0.9	----	----	
		mg	N/A	1	35	37	24	9	14	8	11	16	----	----	
	Total Insoluble Matter	g/m ² .month	Ash Content > 4g/m ² .mth or increase of 2	0.1	0.9	0.5	6.6	0.8	0.8	0.8	0.2	2.4	----	----	
		mg	N/A	1	17	10	120	15	14	15	4	44	----	----	
	Total Solids	g/m ² .month	N/A	0.1	2.8	2.5	7.9	1.3	1.6	1.2	0.8	3.3	----	----	
	mg	N/A	1	52	47	144	24	28	23	15	60	----	----		
Arsenic	mg/L	0.001	0.001	----	----	----	----	----	----	----	----	----	<0.001	<0.001	
Comments						Exceedence - related to quarry traffic (unknown Ash Content)									

