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Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

- May 2017

Pacifico Project Number: WC2NH

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

Contents

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 L2.5; and
c) details of results of any acoustic investigation made in relation to Condition L4.2d); 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 May 2017 included the following:

- Bitumen sealing work
- Earthworks including crushing
- Continuing bridge works including girder placement, deck unit installation and deck concrete pours
- Continuing works in the Pergola area near Upper Warrell Creek
- Continuing long drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering
- Installation of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Line marking
- Decommissioning of the Precast Facility
- Concrete Lined Drains
- Verge / Median Placement
- Operation of concrete and asphalt batch plants
- Removal of rock platforms underneath Nambucca Bridge

Works scheduled for next month include

- Earthworks including crushing
- Continuing bridge works including girder placement, deck unit installation and deck concrete pours

- Continuing long drainage works
- Scour rock installation
- Bitumen sealing work
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering and desilting
- Permanent Basin Fit-out
- Installation of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Verge / Median Placement
- Continue removing rock platforms at Nambucca River
- Decommissioning of the Precast Facility

1.2 Consultation Activities

The project's consultation activities during May 2017 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Environmental Review Group	May 9	Construction Progress, Design Update, Upcoming Works, Environmental Update, Monitoring Update, Out of Hours Works, Incidents and Community Complaints
Toolboxes	Wednesday each week	Workforce behavioural issues examined and impact management tips provided, as appropriate. Very targeted local road safety messages throughout May including local traffic switches, intersections, general driver safety. Also an educational presentation on tick season.
North Facing Ramps group	May 15	Three week look-ahead for construction activities and general project discussion.

Other Consultation Activities:

- A Project presentation was delivered to the Rotary Club of Macksville
- Browns Crossing Road flood modelling information distributed to local community and an invitation to a community meeting on the 11 May
- Browns Crossing Road follow-up information after community meeting distributed to local community
- Notification about night time girder movements impacting south of Macksville in May and June
- Updated traffic alert about night time girder movements impacting south of Macksville in May and June
- Daily texts about night time girder movements on each day of these movements, to distribution list
- Weekly email about night time girder movements at the start of each week of these movements, to distribution list
- Obtained four agreements for Out of Hours asphalting for Williamson Creek to Rosewood Road
- Obtained one agreement for Out of Hours asphalting for Letitia Close to Mattick Road
- Obtained one agreement for Out of Hours asphalting for Bald Hill Road to Floodplain Bridge One
- Obtained nine agreements for Out of Hours paving and saw-cutting at Bald Hill Road roundabout
- Obtained eight agreements for Out of Hours paving and saw-cutting at Letitia Close
- Obtained seven agreements for Upper Warrell Creek Out of Hours work in the pergola and bridgeworks
- Ongoing notifications to various stakeholders impacted by paving and saw-cutting activities north of Mattick Road, and near Bald Hill works.

At House Noise Treatments

The at house noise treatment program is currently being managed by RMS and is not part of the ACCIONA (Pacifico) Scope of Works and Technical Criteria.

Upcoming Community and stakeholder activities:

- Conduct next Nambucca Shire Council liaison meeting 13 June 2017 focusing on signposting;
- Conduct next North Facing Ramps tri-weekly roadside community meeting scheduled for Monday 5 June;
- Distribute approved June to August construction quarterly Project Update;
- Distribute notification for Rosewood Road bridge opening to traffic;
- Issue fourth three-monthly North Facing Ramps look-ahead;
- Seek 3 agreements for Out of Hours line-marking activity on existing Pacific Highway;
- Continue to consult stakeholders impacted by visual mounds along the entire alignment;
- Co-deliver content of RMS signposting Communications Implementation Plan (when issued by RMS) including conducting shopping centre displays, setting up local government displays, and holding two specific Community Information Sessions rescheduled to July 26 and 27.

2. Weather

2.1 Discussion

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

Table 2 – Rainfall recorded at the two weather stations operated by Pacifico

Month	Total monthly rainfall	Location
1/05/2017 – 31/05/2017	79.2 mm	Northern Compound
1/05/2017 – 31/05/2017	53.6 mm	Albert Drive Compound

The site experienced a total of 16 rain days throughout the month of May 2017.

During May, rainfall received on site was lower than the May monthly average of 131.4 mm. 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 May 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 Southern Compound Automated Weather Station

May **2017**

Date	Time	TOTAL Rain Gauge (mm)
1/05/2017	9:00:00	0
2/05/2017	9:00:00	0
3/05/2017	9:00:00	0
4/05/2017	9:00:00	1
5/05/2017	9:00:00	1
6/05/2017	9:00:00	0
7/05/2017	9:00:00	0.2
8/05/2017	9:00:00	0.2
9/05/2017	9:00:00	0
10/05/2017	9:00:00	0
11/05/2017	9:00:00	0
12/05/2017	9:00:00	0
13/05/2017	9:00:00	7
14/05/2017	9:00:00	19.2
15/05/2017	9:00:00	5
16/05/2017	9:00:00	0

Date	Time	TOTAL Rain Gauge (mm)
17/05/2017	9:00:00	0.2
18/05/2017	9:00:00	0
19/05/2017	9:00:00	8.8
20/05/2017	9:00:00	7.2
21/05/2017	9:00:00	0
22/05/2017	9:00:00	0.2
23/05/2017	9:00:00	0.6
24/05/2017	9:00:00	0.2
25/05/2017	9:00:00	0
26/05/2017	9:00:00	0.2
27/05/2017	9:00:00	0.2
28/05/2017	9:00:00	0
29/05/2017	9:00:00	2.4
30/05/2017	9:00:00	0
31/05/2017	9:00:00	0

Table 2.2 – Rainfall recorded at the Northern Compound Automated Weather Station

May 2017

Date	Time	TOTAL Rain Gauge (mm)
1/05/2017	9:00:00	0
2/05/2017	9:00:00	0
3/05/2017	9:00:00	0
4/05/2017	9:00:00	11.2
5/05/2017	9:00:00	0.4
6/05/2017	9:00:00	0.2
7/05/2017	9:00:00	0.2
8/05/2017	9:00:00	0
9/05/2017	9:00:00	0
10/05/2017	9:00:00	0.4
11/05/2017	9:00:00	0
12/05/2017	9:00:00	0
13/05/2017	9:00:00	4.6
14/05/2017	9:00:00	32.4
15/05/2017	9:00:00	10.2
16/05/2017	9:00:00	0
17/05/2017	9:00:00	0.2
18/05/2017	9:00:00	0
19/05/2017	9:00:00	6.4
20/05/2017	9:00:00	8.4
21/05/2017	9:00:00	0.4

22/05/2017	9:00:00	0
23/05/2017	9:00:00	0.6
24/05/2017	9:00:00	0.2
25/05/2017	9:00:00	0
26/05/2017	9:00:00	0
27/05/2017	9:00:00	0.2
28/05/2017	9:00:00	0
29/05/2017	9:00:00	3
30/05/2017	9:00:00	0.2
31/05/2017	9:00:00	0

Table 2.3: Weather conditions recorded in May 2017 at Smoky Cape by the Bureau of Meteorology.

May 2017

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/05/2017	16.8	26.1	0
2/05/2017	17.8	25.9	0
3/05/2017	17	22.6	0
4/05/2017	14.5	21.4	5.6
5/05/2017	14.5	23.2	1
6/05/2017	15.5	24.2	0
7/05/2017	15.7	25.7	0
8/05/2017	15	23.5	0
9/05/2017	14.2	23	0
10/05/2017	13.4	22	1.2
11/05/2017	14.6	23.3	0.6
12/05/2017	15	22	1.2
13/05/2017	15.5		1
14/05/2017		21.4	
15/05/2017	14	21.8	39
16/05/2017	14.4	23	0
17/05/2017	15	23	0
18/05/2017	15	24.7	0
19/05/2017	16.5	19	19.4
20/05/2017	16.3	22.5	17.4
21/05/2017	16.2	24.1	0
22/05/2017	17	24.4	0
23/05/2017	16.2	24.5	0
24/05/2017	17	24	0
25/05/2017	13.3	22	0
26/05/2017	14.7	23.1	0
27/05/2017	14.2	23.1	0
28/05/2017	16.5	20	0

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
29/05/2017	14.3		2.4
30/05/2017		21	0
31/05/2017	10.8	19.5	0

3. Surface Water Monitoring

Pacifico have been provided trigger levels for baseline monitoring from RMS, these will be compared against monthly data as well as between upstream and downstream sites to determine works impact.

Monthly sampling was undertaken by ACCIONA (Pacifico):

Dry Sampling Event

A "dry" sampling event was undertaken on the 10th May 2017, field testing and lab sampling was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Nambucca River recorded elevated pH levels upstream (7.70) and downstream (7.58). It is noted that the trigger levels for Nambucca River are pH 7, with anything outside of this result being outside of trigger levels.

Turbidity (NTU) levels noted to be above trigger levels at:

Upper Warrell Creek recorded elevated NTU levels downstream (12.4 NTU). It is noted that this was only a minor increase from upstream levels (9.7 NTU). All controls were verified to be in place for the site.. It is noted that at both sites lab sampling was undertaken to test for Total Suspended solids, levels for both upstream and downstream were <5mg/L, well within ANZECC criteria of 40mg/L.

Stony Creek recorded elevated NTU levels downstream (11.5 NTU). All controls were verified to be in place for the site, with no construction activities being undertaken within the waterway. It is noted that at both sites lab sampling was undertaken to test for Total Suspended solids, levels for both upstream and downstream were <5mg/L, well within ANZECC criteria of 40mg/L.

Lower Warrell Creek recorded elevated NTU levels upstream (15.4 NTU) and downstream (15.5 NTU). All controls were verified to be in place for the site with no construction activities undertaken within the waterway. It is noted that levels were consistent between upstream and downstream sites and therefore are unlikely to be due to construction impacts. It is also noted that at both sites lab sampling was undertaken to test for Total Suspended solids, levels decreased from upstream (6mg/L) to downstream (<5mg/L) sites, indicating levels were not impacted due to construction activities. Both sites recorded Total Suspended Solids levels were well within ANZECC criteria of 40mg/L.

Nambucca River recorded elevated NTU levels downstream (42.7 NTU). All controls were verified to be in place for the site. A potential cause for the elevated levels downstream is due to wind chop stirring fine sediment from the river bank into the waterway. It is noted

that at both sites lab sampling was undertaken to test for Total Suspended solids, levels for both upstream and downstream were <5mg/L, well within ANZECC criteria of 40mg/L.

Dissolved Oxygen (DO) noted to be below trigger levels at:

Lower Warrell Creek upstream (3.39mg/L) and downstream (4.12mg/L). All controls were verified to be in place for the site. It is noted that levels increased from upstream to downstream sites and therefore are unlikely to be due to construction impacts. A potential cause for the lower levels is decaying vegetation within the waterway.

Nambucca River upstream (4.42mg/L) and downstream (4.98mg/L). All controls were verified to be in place for the site. It is noted that levels increased from upstream to downstream sites and therefore are unlikely to be due to construction impacts. A potential cause for the lower levels is decaying vegetation within the waterway.

Metals noted to be above trigger levels at:

Stony Creek downstream recorded elevated levels of manganese (0.055mg/L). It is noted that this was only a minor exceedance of trigger levels (0.052mg/L). It is also noted that this level is well within ANZECC criteria (1.9mg/L). All controls were in place for the site, with no construction activities being undertaken within the waterway.

Lower Warrell Creek recorded elevated levels of nickel (0.002mg/L) and zinc (0.01mg/L). It is noted that nickel levels are well within ANZECC criteria (0.011mg/L). All controls were in place for the site.

Nambucca River recorded elevated levels of manganese upstream (0.067mg/L) and downstream (0.049mg/L). It is noted that these levels are well within ANZECC criteria (1.9mg/L).

Nutrients noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of nitrate upstream (0.07mg/L) and downstream (0.07mg/L). Levels were the same at both upstream and downstream sites and are unlikely therefore to be as a result of construction activities. It is also noted that these levels were well within ANZECC criteria (0.7mg/L). All controls were in place for the site.

Lower Warrell Creek recorded elevated levels upstream and downstream of nitrogen (1.2mg/L upstream. 0.6mg/L downstream) and nitrate (0.05mg/L upstream. 0.06mg/L downstream). Levels were consistent or decreased from upstream to downstream sites and are thus unlikely to be attributable to construction impacts. It is also noted that nitrate levels were well within ANZECC criteria (0.7mg/L). All controls were in place for the site.

Nambucca River recorded elevated levels of ammonia upstream (0.08mg/L) and downstream (0.05mg/L). It is noted that levels decreased from upstream to downstream sites and are thus unlikely to be attributable to construction impacts. All controls were in place for the site.

Wet Sampling Event

A “wet” sampling event (>10mm in 24 hours period) was undertaken on the 15th May 2017, field testing and lab sampling was undertaken. Results are attached in Appendix A

Turbidity (NTU) noted to be above trigger levels at:

Nambucca River upstream (26.1 NTU) and downstream (43.6 NTU) both recorded elevated NTU levels. All controls were in place for the site. It is noted that wind chop was stirring sediment on the river bank, which may have contributed to the elevated readings. It is also noted that samples were taken for Total Suspended Solids, which recorded <5mg/L for both upstream and downstream sites.

Dissolved Oxygen (DO) noted to be below trigger levels at:

Lower Warrell Creek upstream (2.58mg/L) and downstream (1.94mg/L) both recorded low DO levels. All controls were in place for the site. Decaying vegetation within the waterway may have contributed to the reduced DO levels.

Nambucca River upstream (4.16mg/L) and downstream (4.66mg/L) both recorded low DO levels. All controls were in place for the site, with no construction activities being undertaken within the waterway. Decaying vegetation within the waterway may have contributed to the reduced DO levels.

Metals noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels downstream of manganese (0.159mg/L) and zinc (0.007mg/L). All controls were verified to be in place for the site. It is also noted that both are within ANZECC criteria (1.9mg/L for manganese, 0.008mg/L for zinc).

Nutrients noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of nitrate upstream (0.11mg/L) and downstream (0.14mg/L), ammonia upstream (0.04mg/L) and downstream (0.04mg/L) and nitrogen upstream (0.7mg/L). All controls were verified to be in place for the site. It is noted that levels were within ANZECC criteria for nitrate (0.7mg/L) and ammonia (0.06mg/L).

Stony Creek recorded elevated levels of phosphorus downstream (0.09mg/L). All controls were verified to be in place for the site It is noted that the mound adjacent to the creek was hydromulched several weeks before the wet weather event and this may have contributed to minor increases in nutrients in the waterway temporarily.

Lower Warrell Creek recorded elevated levels of nitrate upstream (0.11mg/L) and downstream (0.13mg/L) as well as phosphorus downstream (0.39mg/L). All controls were verified to be in place for the site. It is noted that nitrate levels were well within ANZECC criteria (0.7mg/L). A potential source for the elevated nutrients may be decaying vegetation within the waterway or nearby run-off from agricultural land.

4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins after rainfall events on the 4th-7th, 13th-15th, 19th-20th May 2017. A statistical correlation has been developed which identified the relationship between Turbidity (NTU) and Total Suspended Solids (TSS) for water quality in the WC2NH Project sediment basins in order to determine the NTU equivalent of 50mg/L TSS. This statistical correlation has been developed to meet EPL

Licence No 20533 Condition L2.7 to determine compliance with the Water and/or Land Concentration Limits Condition L2.4. A positive correlation has been calculated between Total Suspended Solids (TSS) and Turbidity (NTU) (R^2 = 0.5953, p< 0.00001, n=184). The regression equation for the analytical results calculates a turbidity (NTU) value of 124.776 for a TSS value of 50mg/L. A safety factor of 30% has been applied to the NTU result of the correlation, providing a turbidity (NTU) value of 87.3432, rounded to an NTU value of 85. To measure NTU in the field a Horiba U-52G multi-parameter water quality meter has been utilised, which is maintained and calibrated in accordance with manufacturer's specifications. TSS sampling is being undertaken to ensure compliance with 1 in 10 sampling to validate the correlation.

Table 3 below has the water quality results recorded for the water release events:

Table 3 – Water Release Register May 2017

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	pH (6.5-8.5)	Turbidity (NTU) (Limit <85 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
8/05/2017	B42.80	N	7.37	57.5		100	
12/05/2017	B45.64	N	8.34	12.6		100	
15/05/2017	B49.67	N	6.5	5.2	12	650	
16/05/2017	B48.30	N	6.64	3.6		80	
16/05/2017	B49.67	N	6.63	14.4		500	
16/05/2017	B48.46	N	6.77	15.9		350	
16/05/2017	B42.80	N	6.62	18.2		300	
16/05/2017	B53.03	N	7.66	23.6	14	250	
16/05/2017	B53.8	N	7.72	32.9	8	1000	
16/05/2017	B53.9	N	7.72	66.5	16	600	
16/05/2017	B47.14	N	6.67	72.2		200	
17/05/2017	B45.64	N	7.38	7.4		400	
17/05/2017	B48.46	N	6.77	19.1		600	
17/05/2017	B58.45	N	7.93	21.9		900	
17/05/2017	B47.96	N	6.59	22.4		350	
17/05/2017	B58.10	N	7.66	31		700	
17/05/2017	B58.6	N	7.71	35.6		650	
17/05/2017	B53.9	N	7.58	54.6		1900	
17/05/2017	B53.5	N	7.58	54.9		1900	
17/05/2017	B55.5	N	7.49	64.3		450	
18/05/2017	B48.46	N	6.58	0.8		150	
18/05/2017	B47.96	N	6.62	14.8		100	
18/05/2017	B61.25	N	7.81	37		500	
18/05/2017	B42.80	N	6.95	80.1		100	
18/05/2017	B60.87	N	7.51	81	23	300	
22/05/2017	B49.67	N	6.55	5.5		300	
22/05/2017	B45.64	N	6.95	9.9		300	
22/05/2017	B53.03	N	7.99	30.1	<5	100	
22/05/2017	B58.45	N	7.67	31.4		900	

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	pH (6.5-8.5)	Turbidity (NTU) (Limit <85 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
23/05/2017	B60.87	N	7.81	21.6		50	
26/05/2017	B42.80	N	7.36	11.8		50	Released for desilting
26/05/2017	B48.46	N	6.75	14.8		50	Released for desilting
27/05/2017	B47.96	N	6.79	11.2		300	Released for height marker installation

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 22nd and 25th May 2017 at eight locations near to construction works. Monitoring results are available in Appendix A, Table 2.

All sites were within predicted levels for the activity being undertaken or were not the dominant noise source at the nearest residence.

6. Vibration Monitoring

No vibration monitoring was undertaken during the month of May 2017.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from 3rd and 4th April 2017 to 4th May 2017. DDG results are available in Appendix A.

All dust deposition gauges were below the level of concern for Total Insoluble Matter (TIM) and Ash Content (AC) (4g/m2.month or increase of 2g/m2/month) during the monitoring period.

Surfactant additives have been, and will continue to be utilised on site in water carts to assist with dust mitigation. Dust mitigation measures including water carts and wetting of quarry material before arrival to site will continue.

8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on 12th of May 2017. Field testing and lab sampling was undertaken. The results from the groundwater monitoring is available in Table 4 of Appendix A.

<u>pH levels noted to be outside of trigger levels at:</u>

4BH010 – Cut 6 recorded elevated pH of 6.76 (trigger level 4.74 - 6.26). It is noted that these levels are within ANZECC criteria (6.5-8.0).

4BH022c – Cut 11 recorded low pH of 5.59 (trigger level 5.93-7.09). It is noted that there is no unusual construction activities taking place in the area and there is no sign of groundwater ingress onto the Cut face. It is also noted that this bore has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

4BH025 – Cut 12 recorded low pH of 6.02 (trigger level 6.21-6.78). It is noted that there is no unusual construction activities taking place in the area and there is no sign of groundwater ingress onto the Cut face. It is also noted that this bore has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

4BH037a – Fill 15 recorded elevated pH of 7.28 (trigger value 5.92-6.5). It is noted that this bore has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

4BH038 – Fill 15 recorded low pH of 6.33 (trigger value 6.77-7.3). It is noted that these levels are within ANZECC criteria (6.5-8.0).

Conductivity noted to be outside of trigger levels at:

4BH037a – Fill 15 of 10.5mS/cm (trigger value 5.55mS/cm). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

Water depth noted to be outside of trigger levels at:

4BH058c – Cut 17 of 14.80m (trigger value of 13.8m). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint.

9. Acoustic Investigations

Approved Out of Hours Works proposed during the month of May 2017 are outlined in Table 4.

Table 4 – May Out of Hours Works approved under L4.2 (d)

Out of Hours Activity	>5dB(A) above background	Approval Date	Complete? Y/N
Concrete Finishing Works (inc wet curing) – Letitia Bridge	N	3/05/2017	Y
Jacking Girders – Quarry Access Bridge	N	3/05/2017	Y
Concrete Paver Setup	N	11/05/2017	Y (not used)
RE Wall Construction – Upper Warrell Creek	N	11/05/2017	Y
Floodplain Bridge 2 Installation of Planks	N	17/05/2017	Y (not used)

Other works outside of standard construction hours already approved under section L4.2 (d) of the EPL that took place during May 2017 were:

- Old Coast Road North Bridge concreting, formworks, steel fixing; and
- SMZ and batter trimming – Williamsons Creek to Bald Hill Road.

Acoustic Investigations (field monitoring) have been conducted for Out of Hours Works during the month of May 2017, results are included in Appendix A.

10. Complaints

9.1 Summary of Complaints for the month of May 2017

1/05/2017 – Resident contacted Pacifico by phone regarding concerns around an out of hours concrete pour. Community Team had notified several nearby residents identified as being likely most impacted, unfortunately the concerned resident was not included in this group. Noise monitoring was conducted to verify that works complied with NML levels for the noise catchment area and the work was confirmed compliant with the EPL condition L4.2(d).

16/05/2017 – Resident contacted Pacifico by phone regarding concerns about nearby out of hours works. Scheduled OOH earthworks had occurred near property where agreement had previously been obtained for this work, verbal notification also occurred prior to the works occurring. Community 1800 number was contacted the day after the works occurred by daughter of the resident who had moved into the property to care for elderly father a few days prior to the works occurring. The works were subsequently cancelled.

11. Non-Compliance

11.1 Summary of Non-compliances

One (1) non-compliance against the ACCIONA Environmental Protection License occurred during May 2017.

Description of Non-conformance
Construction work occurred outside of standard construction hours on Monday the 1/5/17 between 6pm-7pm on the Letitia Close Overbridge. The Environment Team was notified at 4:30pm and confirmed via noise modelling that the activity would comply with the EPL Condition L4.2 (d) (work was <5dB(A) above RBL) at 5pm. However, notification was not made to the EPA which is a requirement of EPL Condition L4.2(d) as it was outside of the EPA's business hours. Notification was made to the EPA on the 2/5/17 to notify them of the breach.

Possible Causes:
No OoH Permit in place for work. Late notification to the Environment Team of works occurring past 6pm. Poor planning of the work to occur within standard construction hours.

Remedial Actions:

Noise monitoring was undertaken on the 2/5/17 to confirm that the work was within the criteria required by Condition L4.2 (d) of the EPL.

Description of Corrective Actions Required:
Ensure more information is provided regarding potential upcoming out of hours work during the ERG presentation. Ensure written notice is provided to the EPA regardless of the timing. Meeting held with RMS and the Structures team to discuss better planning of work to avoid incidental out of hours work occurring in the future.

Appendix A – Monitoring Results

Table 1a – Surface Water Results May 2017 – Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17		
Time of Sampling		Freshwater	Marine	12:00 PM			11:50 AM			11:20 AM			11:00 AM			1:20 PM			1:10 PM			1:50 PM			2:00 PM			1:30 PM			2:40 PM			2:26 PM		
Comments																													Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.06	0.01	<0.01	0.05	0.01	0.02	0.05	0.01	<0.01	0.04	0.01	<0.01	0.06	0.01	0.01	0.06	0.01	0.02	0.1	0.01	0.03	0.1	0.01	<0.01	0.1	0.01	-	0.02	0.01	<0.10	0.02	0.01	<0.10
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	<0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
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	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	0.001	0.001	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.21	0.02	0.092	0.2	0.03	0.097	0.06	0.02	0.039	0.052	0.013	0.055	0.26	0.08	0.105	0.26	0.08	0.099	0.23	0.019	0.136	0.23	0.019	0.204	0.23	0.019	-	0.03	0.002	0.067	0.03	0.002	0.049
Nickel	mg/L	0.011	0.07	-	-	0.001	-	-	<0.001	-	-	0.001	-	-	<0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	-	-	<0.005	-	-	<0.005	0.005	0.005	<0.005	0.005	0.005	<0.005	0.006	0.005	0.007	0.006	0.005	0.01	0.005	0.005	0.013	0.005	0.005	<0.005	0.005	0.005	-	0.005	0.005	<0.050	0.005	0.005	<0.050
Iron	mg/L	-	-	0.99	0.46	0.07	0.93	0.31	<0.05	0.82	0.42	<0.05	0.78	0.37	<0.05	0.83	0.05	0.08	0.83	0.05	0.09	2.01	0.25	0.66	2.01	0.25	0.2	2.01	0.25	-	-	-	<0.50	-	-	<0.50
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
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.04	0.01	0.01	0.03	0.01	0.02	0.04	0.01	<0.01	0.02	0.01	<0.01	0.04	0.01	0.03	0.04	0.01	0.03	0.12	0.03	0.24	0.12	0.03	0.08	0.12	0.03	-	0.04	0.02	<0.05	0.04	0.02	<0.05
Phosphate (reactive phosphorus)	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.01	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.005	-	0.01	0.008	0.01	0.01	0.008	<0.01
																														-						
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.3	0.6	0.2	0.3	0.3	0.1	0.2	0.41	0.1	0.2	0.5	0.2	1.2	0.5	0.2	0.6	2.8	1.1	2.1	2.8	1.1	1.5	2.8	1.1	-	0.5	0.2	0.6	0.5	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.6	0.2	0.2	0.6	0.2	0.2	0.3	0.1	0.1	0.4	0.1	0.2	0.5	0.2	1.2	0.5	0.2	0.5	2.4	1	2.1	2.4	1	1.5	2.4	1	-	0.5	0.2	0.6	0.5	0.2	<0.5
																														-						
Nitrate	mg/L	0.7	-	0.04	0.01	0.07	0.03	0.01	0.07	0.03	0.01	0.05	0.03	0.01	0.02	0.04	0.01	0.05	0.04	0.01	0.06	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	-	0.02	0.01	0.01	0.02	0.01	<0.01
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	0.05	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	-	-	0.02	-	-	0.02	-	-	0.02	-	-	0.03	0.16	0.06	0.06	0.16	0.06	0.05	0.04	0.01	<0.01	0.04	0.01	0.01	0.04	0.01	-	0.03	0.01	0.08	0.03	0.01	0.05
TSS																																				
TSS	mg/L	<40	<10	14.8	5	<5	8	5	<5	9	5	<5	5.8	5	<5	17.6	5	6	17.6	5	<5	290	15	38	290	15	17	290	15	-	71	19	<5	71	19	<5
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	16.69	25.1	16.3	17.12	24.4	16	17.32	26.46	15.94	16.42	27.9	18.4	19.56	27.9	18.4	20.12	26.5	16.3	20.44	26.5	16.3	16.82	26.5	16.3	-	27.9	18.1	21.35	27.9	18.1	21.54
pH	pH	-	6.5-8	7.25	6.48	6.77	7.3	6.4	7.02	7.5	6.6	7.37	7.33	6.26	7.57	7.02	6.57	6.72	7.02	6.57	6.66	7	6.1	6.63	7	6.1	6.25	7	6.1	-	7	7	7.70	7	7	7.58
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.251	0.348	0.227	0.251	0.348	0.227	0.227	0.3338	0.2168	0.226	20.946	0.679	1.45	20.946	0.679	1.44	0.808	0.4234	0.621	0.808	0.4234	0.467	0.808	0.4234	-	47.32	29.44	39.0	47.32	29.44	38.8
Turbidity	NTU	50	10	10.96	4	9.7	9.9	3.5	12.4	9.9	3.5	3.3	5.97	3.74	11.5	6.82	1.83	15.4	6.82	1.83	15.5	52.78	11.3	79.2	52.78	11.3	14.3	52.78	11.3	-	19.3	6.7	13.1	19.3	6.7	42.7
Dissolved Oxygen	mg/L	5	5	4.98	1.91	4.56	4.8	2.6	4.17	4.8	2.6	8.1	6.34	3.52	6.93	7.98	5.07	3.39	7.98	5.07	4.12	6.4	1.75	3	6.4	1.75	0.82	6.4	1.75	-	9.1	7.4	4.42	9.1	7.4	4.98
Dissolved Oxygen	%			-	-	48.4	-	-	44.6	-	-	87.1	-	-	73..2	-	-	38.2	-	-	46.8	-	-	34.2	-	-	8.8	-	-	-	-	-	59.0	-	-	66.8
TDS	g/L	-	-	-		0.163	-		0.163	-		0.147	-		0.147	-		0.927	-		0.924	-		0.398	-		0.304	-		-	-		23.8	-		23.7

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

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

Exceedances of trigger values

Table 1b – Surface Water Results May 2017 – Wet Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17		
Time of Sampling		Freshwater	Marine	3:00 PM			2:40 PM			3:40 PM			3:25 PM			5:20 PM			5:10 PM			4:30 PM			4:45 PM			4:25 PM			5:50 PM			5:40 PM		
Comments																									Weed covering water surface			Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.244	0.0162	0.01	0.194	0.016	0.02	0.098	0.02	<0.01	0.114	0.01	<0.01	0.28	0.01	0.03	0.28	0.01	<0.01	0.25	0.02	0.02	0.25	0.02	0.06	0.25	0.02	-	0.11	0.01	<0.10	0.11	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	<0.001	0.001	0.001	0.002	0.001	0.001	<0.001	0.002	0.001	0.004	0.002	0.001	0.002	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	0.0002	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	<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	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.3	0.01	0.138	0.158	0.0178	0.159	0.0726	0.0218	0.034	0.083	0.0164	0.052	0.35	0.087	0.107	0.35	0.087	0.105	0.49	0.011	0.138	0.49	0.011	0.336	0.49	0.011	-	0.076	0.006	0.06	0.076	0.006	0.061
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.003	-	-	<0.001	-	-	<0.001	0.0034	0.001	0.002	0.0034	0.001	<0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.002	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	0.007	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	0.007	0.018	0.005	<0.005	0.011	0.005	0.006	0.011	0.005	<0.005	0.011	0.005	-	0.005	0.005	<0.050	0.005	0.005	<0.050
Iron	mg/L	-	-	1.38	0.48	0.17	0.99	0.366	0.53	1.4	0.41	<0.05	1.48	0.35	<0.05	0.52	0.05	0.17	0.52	0.05	<0.05	1.65	0.37	0.36	1.65	0.37	2.5	1.65	0.37	-	0.26	0.05	<0.50	0.26	0.05	<0.50
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
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.01	0.044	0.016	<0.01	0.03	0.016	<0.01	0.034	0.01	0.09	0.04	0.01	<0.01	0.04	0.01	0.39	0.11	0.03	0.03	0.11	0.03	0.09	0.11	0.03	-	0.07	0.02	<0.05	0.07	0.02	0.02
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	-	0.029	0.01	<0.01	0.029	0.01	<0.01
																														-						
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.4	0.52	0.2	0.7	0.48	0.2	0.3	0.63	0.2	0.2	0.54	0.31	0.4	0.54	0.31	0.5	3.1	0.9	1.6	3.1	0.9	1.6	3.1	0.9	-	0.46	0.2	<0.5	0.46	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.3	0.5	0.2	0.6	0.34	0.2	0.2	0.6	0.2	0.1	0.5	0.2	0.3	0.5	0.2	0.4	2.8	0.8	1.5	2.8	0.8	1.6	2.8	0.8	-	0.3	0.2	<0.5	0.3	0.2	<0.5
																														-						
Nitrate	mg/L	0.7	-	0.102	0.01	0.11	0.054	0.01	0.14	0.208	0.01	0.08	0.2	0.01	0.05	0.05	0.01	0.11	0.05	0.01	0.13	0.03	0.01	0.09	0.03	0.01	0.05	0.03	0.01	-	0.04	0.01	0.06	0.04	0.01	0.04
Nitrite	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.04	0.02	0.01	0.06	0.046	0.02	0.02	0.062	0.012	0.01	0.116	0.022	0.07	0.116	0.022	0.1	0.06	0.01	0.02	0.06	0.01	0.02	0.06	0.01	-	0.15	0.024	<0.05	0.15	0.024	<0.05
TSS																																				
TSS	mg/L	<40	<10	19	5	6	12.8	5	<5	14.8	5	<5	8.7	5	5	25	5.5	6	25	5.5	<5	350	9	16	350	9	26	350	9	-			<5			<5
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27	16.97	24.52	16.79	18.67	23.98	17.36	17.43	24.7	17.65	17.46	25.9	19.5	18.68	25.9	19.5	18.73	25.84	19.1	20.01	25.84	19.1	16.94	25.84	19.1	-	26.56	21.32	19.81	26.56	21.32	19.98
pH	pH	-	6.5-8	7.478	6.23	6.61	7.192	6.42	6.76	7.138	6.61	6.75	6.98	6.21	6.84	6.86	6.46	6.63	6.86	6.46	6.46	6.9	6.08	6.51	6.9	6.08	6.16	6.9	6.08	-	7.56	6.58	7.52	7.56	6.58	7.31
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.246	0.3242	0.19076	0.246	0.313	0.2024	0.216	0.309	0.20188	0.222	20.918	0.50928	1.65	20.918	0.50928	1.91	0.842	0.334	0.625	0.842	0.334	0.43	0.842	0.334	-	48.42	12.65	36	48.42	12.65	34.8
Turbidity	NTU	50	10	26.16	5.94	17.5	27.32	3.72	12.1	14.98	3.34	6.6	17.16	4.59	16.7	26.1	2.4	4.5	26.1	2.4	25.2	66.8	11.6	44.9	66.8	11.6	11.8	66.8	11.6	-	19.04	5.81	26.1	19.04	5.81	43.6
Dissolved Oxygen	mg/L	5	5	7.43	1.5	4	6.88	2.28	3.48	8.472	5.08	5.1	7.59	2.63	6.06	6.65	5.02	2.58	6.65	5.02	1.94	7.3	1.78	4.94	7.3	1.78	0.39	7.3	1.78	-	8.47	6.88	4.16	8.47	6.88	4.66
Dissolved Oxygen	%			-		42.7	-		38.4	-		54.8	-		65.3	-		28.6	-		21.6	-		56	-		4.1	-		-	-		53.4	-		59.7
TDS	g/L	-	-	-		0.160	-		0.16	-		0.14	-		0.144	-		1.1	-		22	-		0.4	-		0.28	-		-	-		22.0	-		21.2

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

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

Exceedances of trigger values

Table 2 - Noise Monitoring Results May 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	LAeq	LAFMAX	LAFMIN	LAF10	LAF50	LAF90	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
25/05/2017	10:23 AM	Albert Drive	74	1	50	Cut	62	58.8	74.2	50.7	61	56.2	52.8	Excavator, crusher	Y	NA	Within predicted levels, crusher placed behind stockpile of material to reduce noise levels. Consultation also undertaken with nearby residents in relation to crushing activity
25/05/2017	10:59 AM	Cockburns Lane	16	1	50	Cut	65	45.2	65.7	39.1	47.7	44	41.8	Excavator, trucks	N	NA	Construction not audible. Dominant noise sources: highway, birds
25/05/2017	11:32 AM	Bald Hill Rd	197	3	50	Concreting	77	52.6	72.4	46	54.4	51.7	48.6	Concreting	N	NA	Dominant noise sources: local traffic, highway traffic
22/05/2017	2:40 PM	Letitia Rd	406	4	59	Cut	74	61.2	75.9	46.4	64.5	59.4	52.7	Northern ramps earthworks	Y	NA	Within predicted levels. Regular consultation undertaken with residents impacted by NFR construction activities.
22/05/2017	1:58 PM	Mattick Rd	442	6	44	Cut	62	51.8	71.1	40.9	54.9	50	43.4	Excavators removing material	Y	NA	Within predicted levels. Permanent noise mounds currently in place to reduce construction noise at sensitive receivers.
22/05/2017	3:02 PM	Nursery Rd	415	4	59	Cut	53	56.4	78	43.6	55.4	51.6	48.5	Excavator removing rock	N	NA	Construction not audible. Dominant noise sources: highway, birds.
22/05/2017	4:00 PM	Wallace St	148	3	50	Cut	47	60.4	70.8	47.7	64.3	56.4	50.1	Excavator, concreting	N	NA	Construction not audible. Dominant noise sources: local traffic, highway.
22/05/2017	3:30 PM	Gumma Rd	383	3	50	Hauling material	60	56.9	71	51.6	58.8	55.6	54.3	Trucks, roller, air compressor	N	NA	Within predicted levels. Equipment to be spread out on the fill as much as practical to reduce noise levels to nearby sensitive receiver.

Table 3 - Dust Monitoring Results April 2017 – May 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		3/04/2017	3/04/2017	3/04/2017	3/04/2017	3/04/2017	4/04/2017	4/04/2017	4/04/2017	4/04/2017	3/04/2017	4/03/2017	3/04/2017	3/04/2017
			Finish date of sampling		4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.1	0.8	1.9	0.7	0.8	0.8	0.8	2.2	1	0.7	0.3	----	----
		mg	N/A	1	2	14	34	12	14	14	14	38	18	12	6	----	----
	Previous Month	g/m².month			0.1	0.3	0.7	0.4	0.3	1.1	6.4	2.9	0.2	0.2	0.3	----	----
	Change	g/m².month	Increase of 2		0	0.5	1.2	0.3	0.5	-0.3	-5.6	-0.7	0.8	0.5	0	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.1	0.4	0.5	0.2	0.2	0.1	0.6	0.5	0.3	0.1	0.2	----	----
		mg	N/A	1	2	8	9	4	4	2	11	10	5	2	3	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.2	1.2	2.4	0.9	1	0.9	1.4	2.7	1.3	0.8	0.5	----	----
		mg	N/A	1	4	22	43	16	18	16	25	48	23	14	9	----	----
	Previous Month	g/m².month		0.1	0.8	0.5	1.1	0.7	0.6	1.5	7.7	3.7	0.4	0.2	0.4	----	----
	Change	g/m².month	Increase of 2	0.1	-0.6	0.7	1.3	0.2	0.4	-0.6	-6.3	-1	0.9	0.6	0.1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments																	

Table 4 – Groundwater Monitoring Results May 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025			4BH037a			4BH038			4BH057			4BH058c		
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)		
Date of Sampling			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017		
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments																							DRY			
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		15.50	8.7420		6.85	16.0140		1.97	8.4500		8.09	1.2000		0.69	1.3520		0.75	17.4120		-	13.8440		14.80
pH	pH	-	6.264	4.736	6.76	6.7800	5.8100	6.03	7.0900	5.9300	5.59	6.7780	6.2080	6.02	6.5080	5.9220	7.28	7.3040	6.7680	6.33	6.9800	5.2400	-	6.3960	5.5620	6.37
Conductivity	mS/cm	-	3630.000		2.05	111.300		0.143	231.000		2.24	0.342		0.254	5.550		10.50	8366.000		8.30	121.100		-	132.660		0.419
Temperature	oC	-	22.4420		21.26	22.3600		20.84	21.1500		22.29	22.6040		21.80	25.9820		20.54	22.5600		22.31	22.8200		-	23.1940		20.75
		Exceedance of trigger level																								

Table 5 – Field Monitoring for Out of Hours Works May 2017 (Acoustic Investigation)

Description of Works	Date	Time	Location	NCA	NML (dBA)	Laeq (dBA)	Distance to receiver (m)	Compliant	Notes
Letitia Bridge Concrete Finishing Works	2/5/2017	6:45pm	Letitia Close	5	46	45.7	220	Y	Compliant
RE Wall Backfill	15/5/2017	5:45pm	Upper Warrell Creek	1	40	42.0	136	Y	Compliant (2dB(A) difference not discernible)
Old Coast Road North Bridge Concrete Finishing Works	16/5/2017	5:27pm	OCR North Bridge	5	44	32.1	580	Y	Compliant
North Williamsons Creek to Lower Warrell Creek SMZ Trimming and Compaction	27/05/2017	10:30am	Cut 10/Fill 12	1	45	44.2	125	Y	Compliant