



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ March 2018

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 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 March 2018 included the following:

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck pours, stitch pours and parapet installation
- Continuing drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains and turnouts
- Basin Maintenance including dewatering and desilting
- Installation and maintenance of Erosion and Sediment Controls
- Pavement (Concrete)
- Decommissioning of the Precast Facility
- Decommissioning of the Northern Earthworks Office
- Verge / Median Placement including median Topsoil Placement
- Operation of concrete batch plant

Works scheduled for next month include the following:

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck pours, stitch pours and parapet installation
- Continuing drainage works

- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains and turnouts
- Basin Maintenance including dewatering and desilting
- Permanent Basin Fit-out
- Installation and maintenance of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Line marking
- Decommissioning of the Precast Facility
- Verge / Median Placement including median Topsoil Placement
- Operation of concrete and asphalt batch plants
- Landscape Planting Works

1.2 Consultation Activities

The project’s consultation activities during March 2018 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Toolboxes	Wednesday each week	Environmental and community issues communicated to the workforce.
RMS	Fortnightly	Communications look ahead, stakeholder issues.
Nambucca Council meeting	Monthly	Project progress and completion issues.

Other Consultation Activities:

- Followed up light spill and operational noise issues in conjunction with RMS;
- Coordinated vegetation removal and revegetation activities with stakeholders;
- Appropriate notification about out of hours work at the southern interchange;
- Appropriate notification about out of hours work at Warrell Creek; and
- Notification about the southern traffic switch;

At House Noise Treatments

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

Upcoming Community and stakeholder activities:

- Several OOH agreements due to expire at the end of March have been updated and submitted to RMS for approval. These were approved on 21 March by RMS;

- Nambucca Shire Council liaison meeting – 17 April 2018; and
- Continue to seek project wide agreements with potentially impacted residents for all anticipated Out of Hours construction works through to Project Completion;

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
1/03/2018 – 31/03/2018	297.00 mm	Northern Compound
1/03/2018 –31/03/2018	323.60 mm	Albert Drive Compound

The site experienced a total of twelve (12) rain days throughout the month of March 2018.

During March 2018, rainfall received on site was higher than the March monthly average of 183.0 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 March 2018 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

March 2018

Date	Time	TOTAL Rain Gauge (mm)
1/03/2018	9:00 AM	0
2/03/2018	9:00 AM	0
3/03/2018	9:00 AM	0
4/03/2018	9:00 AM	0
5/03/2018	9:00 AM	6
6/03/2018	9:00 AM	49.8
7/03/2018	9:00 AM	83.8
8/03/2018	9:00 AM	4.2
9/03/2018	9:00 AM	0.8
10/03/2018	9:00 AM	4
11/03/2018	9:00 AM	0
12/03/2018	9:00 AM	0.2
13/03/2018	9:00 AM	0
14/03/2018	9:00 AM	0
15/03/2018	9:00 AM	0.2
16/03/2018	9:00 AM	0
17/03/2018	9:00 AM	0
18/03/2018	9:00 AM	0
19/03/2018	9:00 AM	0
20/03/2018	9:00 AM	0
21/03/2018	9:00 AM	0
22/03/2018	9:00 AM	21.8
23/03/2018	9:00 AM	73
24/03/2018	9:00 AM	79.6
25/03/2018	9:00 AM	0
26/03/2018	9:00 AM	0
27/03/2018	9:00 AM	0
28/03/2018	9:00 AM	0
29/03/2018	9:00 AM	0
30/03/2018	9:00 AM	0.2
31/03/2018	9:00 AM	0

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

March 2018

Date	Time	TOTAL Rain Gauge (mm)
1/03/2018	9:00 AM	0
2/03/2018	9:00 AM	0

3/03/2018	9:00 AM	0.2
4/03/2018	9:00 AM	0.2
5/03/2018	9:00 AM	20.6
6/03/2018	9:00 AM	11.2
7/03/2018	9:00 AM	88.6
8/03/2018	9:00 AM	12.6
9/03/2018	9:00 AM	2.8
10/03/2018	9:00 AM	5
11/03/2018	9:00 AM	0.4
12/03/2018	9:00 AM	0
13/03/2018	9:00 AM	0
14/03/2018	9:00 AM	0
15/03/2018	9:00 AM	0
16/03/2018	9:00 AM	0
17/03/2018	9:00 AM	0
18/03/2018	9:00 AM	0
19/03/2018	9:00 AM	0
20/03/2018	9:00 AM	0
21/03/2018	9:00 AM	2.2
22/03/2018	9:00 AM	44.2
23/03/2018	9:00 AM	58.4
24/03/2018	9:00 AM	50.4
25/03/2018	9:00 AM	0.2
26/03/2018	9:00 AM	0
27/03/2018	9:00 AM	0
28/03/2018	9:00 AM	0
29/03/2018	9:00 AM	0
30/03/2018	9:00 AM	0
31/03/2018	9:00 AM	0

Table 2.3: Weather conditions recorded in March 2018 at Smoky Cape by the Bureau of Meteorology.

March 2018			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/03/2018	21.1	28.8	0
2/03/2018	20.9	27.4	0
3/03/2018	21.1	28.7	0.6
4/03/2018	23	29.9	0
5/03/2018	20.1	25	1.6
6/03/2018	18.5	22.3	45
7/03/2018	18.6	27	35.6
8/03/2018	19	27.5	0.8
9/03/2018	18	27.2	2

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
10/03/2018	18.6	27.6	3.6
11/03/2018	17.8	28	1
12/03/2018	18.4	29	0
13/03/2018	19	29.1	0
14/03/2018	21	28.6	0
15/03/2018	20	29	1.4
16/03/2018	19.6	30.8	0
17/03/2018	21.5	28	0
18/03/2018	22.3	28.7	0
19/03/2018	23.2	30.3	0
20/03/2018	23.1	29.5	0
21/03/2018	20.5	27.3	40
22/03/2018	19		27.8
23/03/2018		23.2	
24/03/2018	18	25.5	158
25/03/2018	19	26.4	0
26/03/2018	21.8	27	0
27/03/2018	21.3	23.9	0
28/03/2018	19	29	0
29/03/2018	20	27.2	0
30/03/2018	20.5	29.1	0
31/03/2018	19.7	29	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):

Wet Sampling Event

A "wet" sampling event was undertaken on the 7th March 2018 after an event was triggered (>10mm of rain in 24 hour period). Field testing and lab sampling was undertaken. Results are attached in Appendix A.

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

Lower Warrell Creek recorded low DO levels upstream (3.48mg/L recorded, 5.02mg/L trigger). It is noted that the level of DO increased from upstream to downstream and therefore this low DO reading upstream is unlikely to be due to construction impacts. It should also be noted that downstream returned a result of 5.35mg/L which is within the

trigger value of 5.02mg/L. No works occurred within or adjacent to this waterway in March 2018.

Conductivity noted to be outside trigger levels at:

Unnamed Creek Gumma (West, East and North) recorded low conductivity (0.326 mS/cm upstream (West), 0.287 mS/cm upstream (East) and 0.316 mS/cm (North) downstream. Unnamed Creek Gumma has a trigger level of 0.334 mS/cm for Conductivity. It should be noted that upstream and downstream results were consistent and conductivity increased from upstream to downstream and these results are therefore unlikely to be due to construction impacts. It should also be noted that this section of the roadway was opened to traffic in December 2017 with only minor finishing and defect works being undertaken at this location during March 2018.

Metals noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of Manganese (0.228 mg/L downstream, 0.158 mg/L trigger level). This result is consistent with previous results for the site (e.g. 0.441 mg/L recorded, February 2018. It should be noted that these levels are within ANZECC criteria for freshwater (1.9 mg/L).

Lower Warrell Creek recorded elevated level of Cadmium upstream (0.0005 mg/L recorded upstream, 0.0002 mg/L trigger). It should be noted that levels decreased from upstream to downstream with a downstream result of <0.0001 mg/L recorded (within trigger values). Lower Warrell Creek also recorded an elevated level of Manganese upstream (0.783 mg/L recorded upstream, 0.35 mg/L trigger). It should be noted that levels decreased from upstream to downstream with a downstream result of 0.286 mg/L recorded (within trigger values). Lower Warrell Creek also returned an elevated level of Nickle upstream and downstream (0.02 mg/L recorded upstream, 0.004 mg/L recorded downstream, 0.0034 mg/L trigger). It should be noted that results decreased from upstream to downstream and are therefore unlikely to be due to construction impacts. Lower Warrell Creek also returned an elevated level of Zinc upstream (0.08 mg/L recorded upstream, 0.018 mg/L trigger). It should be noted that Lower Warrell Creek recorded a result downstream within trigger values (<0.0005 mg/L recorded downstream) and that levels of Zinc decreased from upstream to downstream and this elevated result is therefore unlikely to be due to construction impacts.

Unnamed Creek Gumma (West and East) recorded elevated levels of Copper upstream (0.005 mg/L recorded (West), 0.003 mg/L (East) and 0.001 mg/L trigger) and downstream (0.003 mg/L (North) and 0.001 mg/L trigger). It should be noted that results were consistent between upstream and downstream monitoring locations and therefore this elevated level of Copper is unlikely to be due to construction impacts.

Unnamed Creek Gumma (North) recorded elevated levels of Nickle (0.003 mg/L recorded, 0.002 mg/L trigger) and Zinc (0.024 mg/L recorded, 0.011 mg/L trigger) downstream. This is consistent with previous results for the site (e.g. Zinc 0.096 mg/L recorded downstream, October 2017 and Nickle 0.004 mg/L recorded downstream, January 2018).

Nambucca River recorded an elevated level of Zinc upstream (0.007 mg/L recorded, 0.005 trigger). It should be noted that downstream recorded a result within trigger values (<0.005 mg/L recorded). As the results for Zinc decreased from upstream to downstream, with the downstream result within trigger levels it is unlikely that this elevated level upstream was due to construction impacts.

Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of Ammonia upstream (0.05 mg/L recorded, 0.036 mg/L trigger) and downstream (0.03 mg/L recorded, 0.02 mg/L trigger), Nitrate downstream (0.12 mg/L recorded, 0.054 mg/L trigger), Nitrogen upstream and downstream (0.9 mg/L recorded upstream, 1.0 mg/L recorded downstream, 0.52 trigger) and Phosphorus downstream (0.08 mg/L recorded downstream, 0.044 mg/L trigger). All controls were verified to be in place for the site and it should be noted that Ammonia decreased from upstream to downstream. In terms of the elevated Nitrate and Phosphorus downstream and Nitrogen upstream and downstream a possible source of this elevated level is the surrounding agricultural activities. These results are inline with previous results for the site (i.e. Nitrogen 0.80 mg/L recorded upstream and downstream, January 2018. Nitrate 0.08 mg/L recorded downstream, July 2017 and Phosphorus 0.05 mg/L recorded downstream, March 2017).

Stony Creek recorded elevated levels of Phosphorus upstream and downstream (0.06 mg/L recorded upstream, 0.03 mg/L trigger and 0.05 mg/L recorded downstream, 0.034 mg/L trigger). Stony Creek also recorded elevated levels of Nitrogen upstream and downstream (0.6 mg/L recorded upstream, 0.34 mg/L trigger and 0.90 mg/L recorded downstream, 0.30 mg/L trigger). It should be noted that Phosphorus levels decreased from upstream to downstream and are therefore unlikely to be due to construction impacts. In terms of Nitrogen the results are in line with previous results for the site (i.e. 0.80 mg/L recorded upstream, 0.70mg/L recorded downstream, January 2018). A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Lower Warrell Creek recorded elevated levels of Phosphorus upstream and downstream (0.06mg/L downstream, 0.09 mg/L upstream, 0.04 mg/L trigger). Lower Warrell Creek also recorded elevated levels of Nitrogen upstream and downstream (0.8 mg/L recorded upstream, 0.7 mg/L recorded downstream, 0.054 mg/L trigger) and Nitrate upstream and downstream (0.18 mg/L recorded upstream, 0.07 mg/L recorded downstream, 0.005 mg/L trigger value). It should be noted that Nitrogen and Nitrate decreased from upstream to downstream and is it therefore unlikely to be due to construction impacts. A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Unnamed Creek Gumma recorded elevated levels of Nitrate upstream (0.07 mg/L and 0.04 mg/L recorded upstream 0.03 mg/L trigger) and Ammonia upstream and downstream (0.11 mg/L and 0.10 mg/L recorded upstream, 0.12 mg/L recorded downstream, 0.06 mg/L trigger). Unnamed Creek Gumma also recorded an elevated level of Phosphorus downstream (0.13 mg/L recorded, 0.11 mg/L trigger). It should be noted Nitrate decreased from upstream to downstream and is therefore unlikely to be due to construction impacts. It should also be noted that Ammonia was generally consistent between upstream and downstream sites. In terms of Phosphorus a potential cause of the elevated level downstream is runoff from the surrounding agricultural properties. It should be noted that no major construction works occurred at this location during March 2018 and that this section of the roadway was opened to traffic in December 2017 with only minor defect and finishing works being undertaken during the month of March 2018.

Nambucca River recorded elevated levels of Nitrogen upstream and downstream (0.7 mg/L recorded upstream, 0.9 mg/L recorded downstream, 0.46 mg/L trigger). Nambucca River also recorded an elevated level of Phosphorus upstream (0.08 mg/L recorded upstream,

0.07 mg/L trigger) and Ammonia downstream (0.18 mg/L recorded, 0.15 mg/L trigger). It should be noted that for Phosphorus levels decreased from upstream to downstream and are therefore unlikely to be due to construction impacts. It should also be noted that construction works at this location have been completed with no work occurring within or adjacent to the waterway during March 2018. A possible source of these elevated results is the adjacent and upstream agricultural properties.

Total Suspended Solids noted to be outside trigger levels at:

Upper Warrell Creek downstream recorded an elevated Suspended Solids level (14mg/L recorded downstream, 12.8mg/L trigger). It should be noted that although this results was outside of trigger values that Suspended Solid levels decreased from upstream to downstream (18mg/L recorded upstream, 14mg/L recorded downstream) and therefore this elevated result is unlikely to be due to construction impacts. All controls were verified to be in place for the site as per the Progressive Erosion and Sediment Control Plan, with no uncontrolled discharges noted from site.

A second "wet" sampling event was undertaken on the 22nd March 2018. Field testing was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded a high pH result upstream and downstream (pH 6.95 recorded upstream, pH 6.89 recorded downstream, pH 6.86 trigger). It is noted that this result is within ANZECC criteria (pH 6.5 – 8.0). It should also be noted that pH decreased from upstream to downstream and is therefore unlikely to be due to construction impacts.

Unnamed Creek Gumma recorded a high pH result upstream and downstream (pH 7.0 recorded upstream, pH 7.05 recorded downstream, pH 6.9 trigger). It should be noted that pH was generally consistent between upstream and downstream and was only marginally above the nominated trigger values at this location. In addition, it should be noted that this section of the alignment was opened to traffic in December 2017 with no works occurring within the waterway during the month of March 2018.

Dissolved Oxygen levels noted to be outside trigger levels at:

Nambucca River upstream and downstream (5.47 mg/L recorded upstream, 6.4 mg/L recorded downstream, 6.88 mg/L trigger). It should be noted that dissolved oxygen levels increased from upstream to downstream and that therefore it is unlikely that this result is due to construction impacts.

Dry Sampling Event

A "dry" sampling event was undertaken on 16th March 2018. Field testing and lab sampling was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Stony Creek recorded low pH result upstream (pH 6.55 recorded upstream, pH 6.60 trigger). It is noted that this result is within ANZECC criteria (pH 6.5 – 8.0). It should also be noted that pH increased from upstream to downstream with the downstream pH result being within trigger levels (pH 6.68 recorded downstream, pH 6.26 trigger level). As results increased from upstream to downstream it is unlikely that the low pH recorded upstream is due to construction impacts.

Lower Warrell Creek recorded elevated pH results upstream and downstream (pH 7.48 recorded upstream, pH 7.50 recorded downstream, pH 7.02 trigger level). These results are consistent with previous results for the site (e.g. pH 7.39 upstream, pH 7.17 downstream, recorded December 2017). It is also noted that these levels are within ANZECC criteria (6.5-8.0).

Unnamed Creek Gumma recorded elevated pH results upstream and downstream (pH 7.13 recorded upstream (West), pH 7.55 recorded downstream (North), pH 7.0 trigger) It is also noted that these levels are within ANZECC criteria (6.5-8.0). These results are consistent with previous results recorded at this location (i.e. pH 7.21 recorded upstream and pH 7.20 recorded downstream, February 2018).

Nambucca River recorded elevated levels upstream (pH 8.08) and downstream (pH 8.06). It is noted that trigger levels are pH 7.00, with any value outside of this being outside of trigger levels. It is also noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken. It should also be noted the pH levels decreased from upstream to downstream and are therefore unlikely to be due to construction impacts.

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

Upper Warrell Creek recorded a high DO level upstream (8.95 mg/L recorded, 4.98 mg/L trigger) with a downstream result within trigger values (4.16 mg/L recorded downstream, 2.6 mg/L trigger).

Stony Creek recorded high DO levels upstream and downstream (8.17 mg/L recorded upstream, 4.8 mg/L trigger and 8.58 mg/L recorded downstream, 6.34 mg/L trigger).

Nambucca River recorded high DO levels upstream and downstream (9.67 mg/L recorded upstream, 10.0 mg/L recorded downstream, 9.1 mg/L trigger).

It should be noted that all results outside of trigger values for Dissolved Oxygen were higher than the 80th percentile trigger values and therefore had higher than expected dissolved oxygen during the monitoring event.

Conductivity noted to be outside of trigger levels at:

Unnamed Creek Gumma recorded a high conductivity result downstream (1.28 mS/cm recorded, 0.808 mS/cm trigger). This result is consistent with previous results at this location (i.e. 0.885 mS/cm recorded downstream, December 2017). It should be noted that this section of the alignment is now operational with no major construction activities being undertaken at this location.

Metals noted to be outside of trigger levels at:

Stony Creek recorded an elevated level of Manganese upstream and downstream (0.088 mg/L upstream, 0.06 mg/L trigger and 0.084 mg/L downstream, 0.052 mg/L trigger). Stony Creek also recorded an elevated level of Zinc upstream (0.007 mg/L recorded upstream, 0.005 mg/L trigger). In terms of Zinc although upstream was above trigger values a downstream result of <0.005 mg/L was obtained and was within trigger values. For Manganese and Zinc it should be noted that levels decreased from upstream to

downstream and it is therefore unlikely that this was due to construction impacts. It should also be noted that no works have occurred within the waterway during March 2018.

Lower Warrell Creek recorded an elevated level of Nickel upstream and downstream (0.002 mg/L recorded upstream, 0.002 mg/L recorded downstream, 0.001 mg/L trigger). Lower Warrell Creek also recorded an elevated level of Zinc upstream (0.01 mg/L upstream, 0.006 mg/L trigger). In terms of Nickel results were consistent upstream and downstream and therefore are unlikely to be due to construction impacts. It should also be noted that Zinc levels decreased from upstream to downstream with the downstream result within trigger levels (0.006 mg/L recorded, 0.006 mg/L trigger).

Unnamed Creek Gumma recorded elevated levels of Manganese upstream (0.307 mg/L Gumma West Upstream, 0.268 mg/L Gumma East Upstream, 0.23 mg/L trigger). It should be noted that for Manganese results decreased from upstream to downstream with downstream returning a result within trigger values (0.007 mg/L Gumma North downstream, 0.23 mg/L trigger). Unnamed Creek Gumma recorded elevated levels of Zinc upstream and downstream (0.007 mg/L recorded Gumma West upstream, 0.009 mg/L recorded Gumma East upstream, 0.016 mg/L recorded Gumma North downstream, 0.005 mg/L trigger). These results are consistent with previous results recorded at this location (i.e. 0.012 mg/L and 0.006 mg/L recorded upstream, 0.01 mg/L recorded downstream in January 2018). Unnamed Creek Gumma also recorded an elevated level of Nickel downstream (0.005 mg/L recorded Gumma North downstream, 0.001 mg/L trigger). It should be noted that this Nickel result is within ANZECC criteria for freshwater (0.011 mg/L). It should also be noted that this result is consistent with previous monitoring at this location (i.e. 0.004 mg/L recorded downstream in September 2017). In addition this section of the roadway was open to traffic in December 2017 with no construction works occurring within or adjacent to the waterway during March 2018.

Nambucca River recorded elevated levels of Manganese upstream and downstream (0.076 mg/L recorded upstream, 0.091 mg/L recorded downstream, 0.03 mg/L trigger). This result is consistent with previous monitoring undertaken at this location (i.e. 0.068 mg/L recorded upstream, 0.060 mg/L recorded downstream in November 2017). In addition, it should be noted that no works occurred within or adjacent to the waterway during March 2018 with this section of the Project open to traffic in December 2017.

Nutrients noted to be outside trigger levels at:

Unnamed Creek Gumma recorded elevated levels of Nitrate upstream (0.18 mg/L recorded Gumma West upstream, 0.07 mg/L recorded Gumma East upstream, 0.04 mg/L trigger). It should be noted that Gumma North (downstream) recorded a result within trigger values (0.01 mg/L recorded downstream, 0.04 mg/L trigger). As results decreased from upstream to downstream with the downstream result within trigger values it is unlikely that this elevated level upstream is due to construction impacts. It should be noted that this section of the roadway was opened to traffic in December 2017 with no works within the waterway occurring in March 2018.

Lower Warrell Creek recorded elevated levels of Nitrogen upstream and downstream (0.7 mg/L recorded upstream, 1.2 mg/L recorded downstream, 0.5 mg/L trigger). The result obtained for Nitrogen is consistent with previous results obtained at this location (i.e. 1.0 mg/L upstream, 0.7 mg/L recorded downstream in January 2018). Lower Warrell Creek recorded elevated levels of Nitrate upstream and downstream (0.16 mg/L recorded upstream, 0.65 mg/L recorded downstream, 0.04 mg/L trigger). It should be noted that this section of the roadway was opened to traffic in December 2017 with only finishing

works being undertaken at this location during March 2018 and no works occurring within the waterway. A potential source of this elevated levels of Nitrogen and Nitrate is the adjacent agricultural land.

Upper Warrell Creek recorded elevated levels of Nitrogen downstream (1 mg/L recorded downstream, 0.6 mg/L trigger) and Nitrate downstream (0.19 mg/L recorded downstream, 0.03 mg/L trigger). These results are consistent with previous results for the site (i.e. 0.2 mg/L Nitrate recorded downstream in July 2017 and 0.9 mg/L Nitrogen recorded downstream in October 2015). A potential source of this elevated level of Nitrogen and Nitrate is the adjacent agricultural land or contamination with organic matter during sample collection.

4. Sediment Basin Water Monitoring

Water was released from commissioned basins after rainfall on the 6th to 9th and 22nd to 24th of March 2018. 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) ($R^2 = 0.4941$, $p < 0.00001$, $n=227$). The regression equation for the analytical results calculates a turbidity (NTU) value of 120.716 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 84.50, 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 March 2018

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
7/03/2018	B42.80	N	8.01	29.6		800	
9/03/2018	B49.45	N	7.73	67.1	14	2000	
26/03/2018	B42.80	N	7.01	28.4	<5	800	
26/03/2018	B49.45	N	6.83	50.5	28	2000	

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on 13th of March 2018 at five 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 March 2018.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 1st February 2018 to the 1st March 2018. DDG results are available in Appendix A, Table 3.

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 with the exception of DDG5.

DDG5 recorded an elevated level of Total Insoluble Matter (TIM) of 191g/m²/month and Ash Content (AC) of 175g/m²/month. It should also be noted that during gauge collection the grass adjacent to the gauge had been mown and there were also insects located within the gauge and this may have contributed to the elevated TIM result. The result at this gauge is unusual as the bulk earthworks at this location have been completed and the section of alignment closest to the gauge is sealed and paved and was opened to traffic in December 2017. The high reading from DDG5 in February 2018 is unlikely to be due to construction activities, with tampering of the gauge suspected. The Community team have contacted the resident and asked for any tampering with the gauge to be reported to ACCIONA.

Dust mitigation measures including water carts, surfactant additives and wetting of quarry material before arrival and during placement will continue.

8. Groundwater Monitoring

ACCIONA (Pacifco) undertook groundwater monitoring on the 8th of March 2018. Field testing was undertaken. The results from the groundwater monitoring is available in Appendix A.

pH levels noted to be outside of trigger levels at:

4BH022C – Cut 11 upgradient bore recorded a low pH reading (pH 5.21 recorded, pH 5.93 trigger). It is noted that Cut 11 downgradient bore (4BH021) recorded a pH reading within trigger values (pH 5.89 recorded, pH 5.81 trigger). As results for pH increased from upgradient to downgradient bores it is unlikely that this low pH reading upgradient is due to construction impacts.

Fill 15 bore recorded elevated pH at 4BH037a (pH 6.98 recorded, pH 6.51 trigger). It is noted that 4BH037a 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. These are consistent with previous results for 4BH037a e.g. pH 7.07 in April 2017

Cut 15 bore recorded elevated pH at 4BH058C (upslope bore) (pH 7.02 recorded, pH 6.396 trigger). This result is consistent with previous results for this location (i.e. pH 7.65 recorded in October 2017). 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.

Conductivity (mS/cm) noted to be above trigger levels at:

4BH037a – Fill 15 west bore recorded elevated conductivity levels (9.90 mS/cm recorded, 5.55 mS/cm trigger). 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. This result is consistent with previous results for the bore e.g. 9.9 mS/cm recorded in February 2018.

Total Dissolved Solids (TDS) noted to be above trigger levels at:

Cut 11 bore recorded elevated TDS levels at upgradient bore 4BH022C (1.05 g/L recorded, 0.1306 g/L trigger) and downgradient bore 4BH021 (0.145 g/L recorded, 0.0946 mg/L trigger). It is noted that TDS levels decreased from upgradient to downgradient bores and are unlikely to be due to construction impacts. It should also be noted that Cut 11 has had construction works completed and is included within the Partial Opening of the Project to traffic in December 2017.

Fill 15 west bore (4BH037A) recorded an elevated TDS (6.26 g/L recorded, 0.1326 g/L trigger level). 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. This is consistent with previous results for the bore e.g. 6.23 g/L in February 2018.

Cut 15 east bore (4BH058C) recorded an elevated TDS (0.183 g/L recorded, 0.111 g/L trigger). 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. It is also noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted. This result is also consistent with previous results for the site (i.e. 0.139 g/L recorded in November 2017).

Water depth noted to be below trigger levels at:

4BH058C – Cut 15 upslope bore recorded low water depth (15.63 m from top of casing recorded, 13.84 m trigger). 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. It is also noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted. This is consistent with previous results for the bore e.g. 15.63 m from top of casing recorded in February 2018.

4BH037A – Fill 15 West bore recorded low water depth (1.39 m from top of casing recorded, 1.2 m trigger). 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. It is also noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted. This is consistent with previous results for the bore e.g. 1.21 m from top of casing recorded in February 2018.

4BH038 – Fill 15 East bore recorded low water depth (1.6 m from top of casing recorded, 1.352 m trigger). It is noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted.

9. Acoustic Investigations

No Out of Hours Works were undertaken during the month of March 2018 under Condition L4.2(d) or Condition L4.5 of the Environmental Protection Licence.

10. Complaints

10.1 Summary of Complaints for the month of March 2018

26/03/2018 – A resident from Upper Warrell Creek contacted Pacifico regarding flooding which occurred post rainfall received in late March 2018. The resident was concerned that a small number of items had washed from the construction site onto the property and also stated that there was more mud than usual on the property post flooding. Pacifico contacted the property owner and organised for the items to be collected by the site team and also contacted adjacent resident to enquire if any items had been noted post flooding. The community and environment team also met with the property owner to discuss the concerns raised regarding mud post flooding. Pacifico noted that an inspection of the construction site had occurred post rainfall with no issues being identified which would have resulted in additional material deposition on the Property. Contact details for the EPA were also supplied to the property owner to elevate his concerns as requested by the resident. A meeting was held at the property with Pacifico, the resident and the EPA as requested by the property owner.

27/03/2018 – A resident from Cockburn's Lane contacted Pacifico regarding dust generation from trucks associated with the Project on Cockburn's Lane. Pacifico Community Manager contacted the supervisor who organise a watercart to attend the location. No further dust complaints were received.

11. Non-Compliance

11.1 Summary of Non-compliances

No Non-compliances were raised against ACCIONA's Environmental Protection Licence during the month of March 2018.

Table 1b – Surface Water Results March 2018 – Wet Event

Surface Water Results - March 2018 - Wet			Weather: Fine		SW01			SW03			SW04			SW05			SW06			SW07			SW08			SW09			SW10			SW11						
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			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18			22-Mar-18					
Time of Sampling			8:45 AM			8:30AM			11:30 AM			11:15 AM			9:15 AM			9:05 AM			10:45 AM			11:00 AM			10:30 AM			9:45 AM			9:30 AM					
Comments																																						
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						
Field Physical data																																						
Temperature	C	-	24.3	16.27	22.14	24.52	16.79	21.94	23.98	17.36	21.52	24.7	17.65	21.74	25.9	19.5	25.6	25.9	19.5	25.51	25.84	19.1	22.92	25.84	19.1	22.56	25.84	19.1	23.21	26.56	21.32	26.33	26.56	21.32	26.12			
pH	pH	6.5-8	7.478	6.23	6.89	7.192	6.42	6.94	7.138	6.61	6.86	6.98	6.21	6.91	6.86	6.46	6.95	6.86	6.46	6.89	6.9	6.08	6.9	6.9	6.08	7	6.9	6.08	7.05	7.56	6.58	7.56	6.58	7.4				
Conductivity	mS/cm	0.125-2.2	0.3204	0.20184	0.228	0.3242	0.19076	0.271	0.313	0.2024	0.245	0.309	0.20188	0.222	20.918	0.50928	4.49	20.918	0.50928	4.3	0.842	0.334	0.579	0.842	0.334	0.577	0.842	0.334	0.748	48.42	12.65	35.9	48.42	12.65	35.4			
Turbidity	NTU	50	26.16	5.94	13.2	27.32	3.72	7.6	14.98	3.34	9.9	17.16	4.59	10.9	26.1	2.4	12.3	26.1	2.4	7.8	66.8	11.6	13.4	66.8	11.6	10.3	66.8	11.6	13	19.04	5.81	11.2	19.04	5.81	9.2			
Dissolved Oxygen	mg/L	5	7.43	1.5	3.86	6.88	2.28	3.58	8.472	5.08	6.74	7.59	2.63	6.89	6.65	5.02	5.71	6.65	5.02	5.9	7.3	1.78	4.09	7.3	1.78	3.17	7.3	1.78	6.17	8.47	6.88	5.47	8.47	6.88	6.4			
Dissolved Oxygen	%		-	-	45.3	-	-	42	-	-	78.3	-	-	80.4	-	-	71.9	-	-	74.2	-	-	48.8	-	-	37.6	-	-	73.9	-	-	78.3	-	-	91.2			
TDS	g/L	-	-	-	0.148	-	-	0.176	-	-	0.149	-	-	0.145	-	-	2.88	-	-	2.75	-	-	0.371	-	-	0.369	-	-	0.479	-	-	21.9	-	-	21.6			
			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 March 2018


Monthly Noise Monitoring Results March 2018																	
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
13/03/2018	12:49PM	Albert Drive	74	1	50	Cut	62	41.9	64	33	43.6	37.3	35.4	Dogs	N	N/A	Within predicted levels and NML. Construction noise not dominant. Dogs dominant (41.9-52.4) Stockpile area behind cut to mitigate noise impacts.
13/03/2018	10:50AM	Bald Hill Rd	197	3	50	Fil	63	49.8	68.1	39.6	51.5	47.1	43.2	Bald Hill Road	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: BHR (50.9-67.6) Noise mound and noise wall in place to reduce impact.
13/03/2018	2:41PM	Letitia Rd	413	4	59	HTR	58	43.6	61	35.7	45.6	41.7	39.2	PAC HWY	N	N/A	Within predicted levels and NML. Regular consultation undertaken with residents impacted by NFR construction activities. HWY dominant (38.1-48.6)
13/03/2018	3:27PM	Mattick Rd	442	6	44	Cut	62	54.6	65.2	47.3	57.4	53.1	51	PAC HWY	N	N/A	Within predicted levels. Permanent noise mounds in place to reduce construction noise at sensitive receivers. PAC HWY dominant (53.5-61.8)
13/03/2018	11:40AM	Gumma Rd	383	3	50	Ser	59	57.4	77.5	35.8	60.4	51.8	45.3	PAC HWY	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: highway (50.3-77.7).

Table 3 – Dust Monitoring Results February - March 2018



Monthly Dust Monitoring Results - February 2018 - March 2018																						
Analyte	Time Period	Unit	Levels of Concern	LOR	DDG ID	DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8A	DDG9NE	DDG9E	DDG10	DDG A1	DDG A2			
					Start date of sampling	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018	1/02/2018
					Finish date of sampling	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018	1/03/2018
Ash Content	Current Month	g/m ² .month	4	0.1	0.5	0.5	0.4	0.2	175	0.5	0.5	0.5	0.4	0.3	0.4	0.8	----	----				
	Previous Month	g/m ² .month	N/A	1	8	8	7	4	2880	8	9	9	6	5	6	14	----	----				
	Change	g/m ² .month	Increase of 2		0	0.2	0.2	-0.2	171.2	0	-2.4	0	NA	-0.2	0	0	----	----				
Combustible Matter	Current Month	g/m ² .month	N/A	0.1	0.4	0.8	1.1	0.2	15.8	0.3	1.1	0.4	1.2	0.5	0.1	0.4	----	----				
		mg	N/A	1	7	14	17	3	260	5	18	6	20	8	3	6	----	----				
Total Insoluble Matter (TIM)	Current Month	g/m ² .month	4	0.1	0.9	1.3	1.5	0.4	191	0.8	1.6	0.9	1.6	0.8	0.5	1.2	----	----				
	Previous Month	g/m ² .month	N/A	1	15	22	24	7	3140	1.3	27	15	26	13	9	20	----	----				
	Change	g/m ² .month	Increase of 2	0.1	1.1	0.6	0.5	0.4	11.6	0.6	3.5	0.5	NA	2.9	0.4	1.1	----	----				
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001			
Comments		grass mown adjacent, raking and moving soil, insects in gauge grass mown next to gras mown, insects in gauge. insects in gauge hydromulch in funnel and gauge grass mown near, insects in gauge bird droppings in funnel insects in gauge insects in gauge																				

Table 4 – Groundwater Monitoring Results March 2018

March 2018 Groundwater Monitoring																								
Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010		4BH021		4BH022c		4BH025a		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 15 - West (DS)		Cut 15 - East (US)							
Date of Sampling			8/03/2018		8/03/2018		8/03/2018		8/03/2018		8/03/2018		8/03/2018		8/03/2018		8/03/2018							
			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																DRY					
Depth to standing water level from TOC	m	-	16.802	16.98	8.7420	7.71	16.0140	1.33	8.4500	-	1.2000	1.39	1.3520	1.60	17.4120	-	13.84	15.63						
pH	pH	-	6.26	4.74 6.22	6.78	5.81 5.89	7.09	5.93 5.21	6.78	6.21 -	6.51	5.92 6.98	7.30	6.77 6.87	6.98	5.24 -	6.3960	5.56 7.02						
Conductivity	mS/cm	-	3630	0.37	111.3	0.192	231	1.640	0.342	-	5.550	9.9	8366	4.0	121.100	-	132.660	0.282						
Temperature	C	-	22.4420	25.87	22.3600	25.03	21.1500	26.4600	22.6040	-	25.9820	27.66	22.5600	25.90	22.8200	-	23.1940	26.22						
Total Dissolved Solids	g/L	-	3.5720	0.24	0.0946	0.145	0.1306	1.05	0.1326	-	0.1326	6.26	8.10	3.320	0.106	-	0.111	0.183						
			Exceedance of trigger level																					