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Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

- April 2018

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 April 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 (Asphalt and Concrete)
- Decommissioning of the Precast Facility
- Verge / Median Placement including median Topsoil Placement
- Operation of asphalt batch plant
- Landscape Planting Works

Works scheduled for next month include the following:

- Installation of Flood Alleviation Channel – Upper Warrell Creek
- Removal of temporary crossing at Upper Warrell Creek
- Landscape Planting Works including Upper Warrell Creek

- 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 asphalt batch plant

1.2 Consultation Activities

The project's consultation activities during April 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:

The following notifications were made to the community during April 2018.

- Appropriate notification about out of hours work at the southern interchange
- Appropriate notification about out of hours work at Williamson Creek
- Appropriate notification about out of hours work at Rosewood Rd bridge area

On-site meetings:

- 40 onsite meetings were held with community members in April 2018 regarding proposed property adjustments, boundary fencing, out of hours work, construction impacts, vegetation, flooding and other various matters.

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:

- Several OOH agreements expired at the end of March have been updated and submitted to RMS for approval. These were approved on 21 March by RMS and all necessary agreements have been signed.;
- Preparation of material regarding the final highway opening, to be submitted to RMS for approval

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
1/04/2018 – 30/04/2018	112.00 mm	Northern Compound
1/04/2018 – 30/04/2018	66.60 mm	Albert Drive Compound

The site experienced a total of sixteen (16) rain days throughout the month of April 2018.

During April 2018, rainfall received on site was lower than the April monthly average of 169.3mm. 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 April 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

April 2018

Date	Time	TOTAL Rain Gauge (mm)
1/04/2018	9:00 AM	0.2
2/04/2018	9:00 AM	0
3/04/2018	9:00 AM	0.2
4/04/2018	9:00 AM	10
5/04/2018	9:00 AM	3.4
6/04/2018	9:00 AM	0.2
7/04/2018	9:00 AM	0
8/04/2018	9:00 AM	0
9/04/2018	9:00 AM	0
10/04/2018	9:00 AM	0
11/04/2018	9:00 AM	0
12/04/2018	9:00 AM	0
13/04/2018	9:00 AM	0
14/04/2018	9:00 AM	0.2
15/04/2018	9:00 AM	1.2
16/04/2018	9:00 AM	0
17/04/2018	9:00 AM	0
18/04/2018	9:00 AM	0
19/04/2018	9:00 AM	0
20/04/2018	9:00 AM	0.2
21/04/2018	9:00 AM	6
22/04/2018	9:00 AM	3.6
23/04/2018	9:00 AM	0.6
24/04/2018	9:00 AM	3.6
25/04/2018	9:00 AM	29.4
26/04/2018	9:00 AM	0
27/04/2018	9:00 AM	0.8
28/04/2018	9:00 AM	3.2
29/04/2018	9:00 AM	3.8
30/04/2018	9:00 AM	0

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

April 2018

Date	Time	TOTAL Rain Gauge (mm)
1/04/2018	9:00 AM	0
2/04/2018	9:00 AM	0
3/04/2018	9:00 AM	0
4/04/2018	9:00 AM	34.6
5/04/2018	9:00 AM	1.4
6/04/2018	9:00 AM	0
7/04/2018	9:00 AM	0.2
8/04/2018	9:00 AM	0
9/04/2018	9:00 AM	0
10/04/2018	9:00 AM	0
11/04/2018	9:00 AM	1.2
12/04/2018	9:00 AM	0
13/04/2018	9:00 AM	0
14/04/2018	9:00 AM	0
15/04/2018	9:00 AM	1.6
16/04/2018	9:00 AM	0
17/04/2018	9:00 AM	0
18/04/2018	9:00 AM	3.6
19/04/2018	9:00 AM	6.2
20/04/2018	9:00 AM	0.2
21/04/2018	9:00 AM	0.6
22/04/2018	9:00 AM	0.6
23/04/2018	9:00 AM	10.6
24/04/2018	9:00 AM	13.6
25/04/2018	9:00 AM	30.8
26/04/2018	9:00 AM	3
27/04/2018	9:00 AM	0
28/04/2018	9:00 AM	1
29/04/2018	9:00 AM	2.8
30/04/2018	9:00 AM	0

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

April 2018

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/04/2018	20.1	29	0
2/04/2018	21.9	28	0
3/04/2018	20.5	29.5	0
4/04/2018	19.5	27.2	14.2
5/04/2018	19	27.8	0
6/04/2018	19.1	28.4	0
7/04/2018	19.6	29	0
8/04/2018	21.4	28	0
9/04/2018	19.8	28	0
10/04/2018	19.5	27	0
11/04/2018	20	27.8	1
12/04/2018	19.7	26	0
13/04/2018	19.4	27	0
14/04/2018	21.8	26	0.6
15/04/2018	18.4	29.1	3.4
16/04/2018	20.6	28.8	0
17/04/2018	18.9	27	0
18/04/2018	17	22.7	5.6
19/04/2018	17	26.9	1.2
20/04/2018	18.8	27	0
21/04/2018	18	25.2	2
22/04/2018	16.4	26.1	1.4
23/04/2018	16	20.8	17
24/04/2018	16.2	19.1	6.6
25/04/2018	15.5	24.1	28.5
26/04/2018	17.6	26.2	0.6
27/04/2018	15.8	23	6.2
28/04/2018	14.5	*	14.6
29/04/2018	*	21.8	*
30/04/2018	13.9	22.1	19.6

*No data recorded on BOM Daily weather observation for Smoky Cape

3. Surface Water Monitoring

Pacifico have been provided trigger levels from 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

1. 4th April 2018

Field and laboratory testing - results are attached in Appendix A – Table 1a.

pH levels noted to be outside of trigger levels at:

Stony Creek recorded low pH levels upstream (pH 6.56 recorded, pH 6.61 20th %ile trigger). It is noted pH decreased from upstream to downstream (6.49 recorded), with downstream values within trigger levels (6.21 – 6.98) therefore it is noted that this low pH reading upstream is unlikely to be due to construction impacts.

Lower Warrell Creek recorded elevated pH levels upstream and downstream (pH 7.16 upstream, pH 7.35 downstream, 6.86 trigger level upstream and downstream). It is noted that these levels are within ANZECC criteria (pH 6.5-8.0). These results are consistent with previous results for the site (pH 7.33 upstream, pH 7.3 downstream recorded, February 2017 and pH 7.18 upstream, pH 7.35 downstream recorded, October 2017). No construction works were completed at this location during April which may have contributed to elevated pH levels. This section of the roadway was opened as part of the partial opening of the WC2NH Project in December 2017.

Nambucca River South recorded elevated pH levels (pH 8.24 upstream, pH 8.21 downstream, pH 7.56 trigger). It is noted that pH levels decreased from upstream to downstream. It should be noted that this section of the alignment is now operational with no major construction activities being undertaken at this location.

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

All monitoring location did not fall outside of the 20th and 80th percentile levels except for Upper Warrell Creek downstream. At this location recorded DO levels above trigger levels downstream (7.04mg/L recorded, 6.88mg/L trigger). It is noted that the level of DO increased from upstream to downstream with downstream levels only exceeding trigger value by approximately 2%.

Conductivity noted to be outside trigger levels at:

Unnamed Creek Gumma (West, East and North) recorded low conductivity (0.288 mS/cm upstream (West), 0.31 mS/cm upstream (East) and 0.301 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 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 above trigger levels at:

Upper Warrell Creek recorded low levels of iron upstream (0.08mg/L recorded, 0.48mg/L trigger) and downstream (0.11mg/L recorded, 0.366mg/L trigger). It should be noted that results increased from upstream to downstream and therefore are unlikely to be impacted by construction works.

Low levels of Iron were also recorded at Stony Creek at both upstream (0.06mg/L recorded, 0.41mg/L trigger) and downstream (<0.05mg/L recorded, 0.35mg/L trigger). This is consistent with low levels recorded in March wet event (0.1mg/L upstream, 0.11mg/L downstream). Stony Creek recorded low level of Aluminium upstream (<0.01mg/L recorded, 0.02mg/L trigger level). The downstream result was within trigger levels and therefore results are unlikely to be impacted by construction works. Stony creek also returned elevated levels of Manganese at upstream (0.094mg/L recorded, 0.0218mg/L trigger level) and downstream (0.09mg/L recorded, 0.0164mg/L trigger level). Results decreased from upstream to downstream which is consistent with trigger levels. It is unlikely these results have been impacted by construction work.

Unnamed Creek Gumma (West and North) recorded elevated Arsenic levels (0.003 upstream, 0.003mg/L downstream, 0.002 trigger). It should be noted that results were consistent between upstream and downstream monitoring locations and therefore this elevated level of Arsenic is unlikely to be due to construction impacts. Elevated levels of Copper upstream (0.003mg/L recorded (East), 0.001mg/L trigger) and downstream (0.002mg/L recorded (North), 0.001mg/L trigger) were also observed at Unnamed Creek Gumma (East and North). This is consistent with elevated results recorded in March 2018 (0.003mg/L recorded East, 0.003mg/L recorded North).

Nambucca River recorded an elevated level of Manganese upstream and downstream (0.13 mg/L upstream, 0.12mg/L downstream, 0.076mg/L trigger). It should be noted that results decreased from upstream to downstream it is unlikely that this elevated level upstream and downstream was due to construction impacts.

Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of total nitrogen upstream (0.6mg/L recorded, 0.3mg/L trigger) and downstream (0.7mg/L recorded, 0.2mg/L trigger), elevated levels of Nitrate upstream (0.18mg/L recorded, 0.102mg/L trigger) and downstream (0.24mg/L recorded, 0.01mg/L trigger) and elevated Ammonia downstream (0.04mg/L recorded, 0.01mg/L trigger). All controls were verified to be in place for the site. A possible source of elevated downstream results for Nitrogen, Nitrate and Ammonia is surrounding agricultural activities. These results are consistent with previous results for the site (elevated Nitrogen, Nitrate and Ammonia) recorded March 2018.

Stony Creek recorded low level of Phosphorus upstream (0.01 mg/L recorded upstream, 0.016 mg/L trigger) however downstream results were within trigger levels. Stony Creek also recorded elevated levels of Ammonia upstream (0.09 mg/L recorded upstream, 0.046 mg/L trigger) however downstream results were within trigger levels. Due to the decrease from upstream to downstream, elevated Phosphorus and Ammonia levels are re unlikely to be due to construction impacts. A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Lower Warrell Creek recorded elevated levels of Nitrogen downstream (0.6 mg/L recorded 0.54 mg/L trigger) and Nitrate downstream (0.07 mg/L recorded, 0.05 mg/L trigger

value). This is consistent with elevated downstream results for nitrogen and nitrate recorded March 2018. Ammonia was below trigger values at upstream and downstream locations (<0.01mg/L recorded upstream and downstream, 0.022mg/L trigger). This is consistent with January 2018 results (<0.01mg/L recorded upstream and downstream). A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Unnamed Creek Gumma recorded low levels of Nitrogen upstream (0.6mg/L recorded West, 0.9mg/L trigger) and downstream (0.6mg/L recorded North, 0.9mg/L trigger) as well as low levels TKN upstream (0.6mg/L recorded West, 0.8mg/L trigger) and downstream (0.6mg/L recorded North, 0.8mg/L trigger). Upstream and downstream results are consistent and therefore unlikely to be impacted by construction works. Unnamed Creek Gumma East recorded low level of Phosphorus upstream (0.02mg/L recorded East, 0.03mg/L trigger) however downstream results were within trigger values and therefore are unlikely to be impacted by construction works. No major construction works occurred at this location during April 2018 and that this section of the roadway was opened to traffic in December 2017.

Nambucca River recorded elevated levels of Nitrogen upstream and downstream (1.3 mg/L recorded upstream, 0.6 mg/L recorded downstream, 0.46 mg/L trigger). Nambucca River also recorded an elevated level of Phosphorus upstream (1.17 mg/L recorded upstream, 0.07 mg/L trigger) and Nitrate downstream (0.08 mg/L recorded, 0.04 mg/L trigger). It should be noted that for Phosphorus levels decreased from upstream to downstream where downstream values were within trigger values. Therefore it is unlikely elevated upstream results are due to construction impacts. It should also be noted that construction works at this location have been completed with no major construction work occurring within the area. A possible source of these elevated results is the adjacent and upstream agricultural properties.

2. 24th April 2018

Field testing was undertaken - results are attached in Appendix A – Table 1b.

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

Stony Creek recorded a low pH results upstream (pH 6.58 recorded upstream, pH 6.61 trigger) however downstream results were within trigger values. It is noted that the upstream result is within ANZECC criteria (pH 6.5 – 8.0). It is unlikely that low pH value upstream is from construction impacts.

Unnamed Creek Gumma recorded a high pH result upstream and downstream (pH 6.99 recorded upstream West, pH 6.91 recorded upstream east, pH 7 recorded downstream, pH 6.9 trigger). It should be noted that pH was generally consistent between upstream and downstream (1.3% change) and was only marginally above the nominated trigger values at this location. These results are consistent with results obtained in March 2018. 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 April 2018.

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

Stony Creek recorded elevated turbidity level upstream (17.8NTU recorded upstream, 14.98NTU trigger) downstream result was within trigger levels and therefore the elevated upstream result is unlikely to be due to construction impacts.

Unnammed Creek Gumma recorded low turbidity levels upstream and downstream (7NTU recorded upstream, 9.8NTU recorded downstream, 11.6NTU trigger value). It is noted that downstream results were greater than upstream however all turbidity results are considered positive as were below the lower trigger value.

Dissolved Oxygen levels noted to be outside trigger levels at:

Nambucca River recorded low Dissolved Oxygen values upstream and downstream (6.35 mg/L recorded upstream, 6.59 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. These low DO values are consistent with results recorded March 2018.

Dry Sampling Event

A “dry” sampling event was undertaken on 13th April 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 elevated pH results upstream and downstream (pH 7.13 recorded upstream, pH 7.17 recorded downstream, pH 7.02 trigger level). These results are consistent with March 2018 results for the site (e.g. (pH 7.48 recorded upstream, pH 7.50 recorded downstream). It is also noted that these levels are within ANZECC criteria (6.5-8.0).

Nambucca River recorded elevated levels upstream (pH 7.66 recorded) and downstream (pH 7.57 recorded). 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. These levels are within ANZECC criteria (6.5-8.0) and values decreased from upstream to downstream and are therefore unlikely to be due to construction impacts.

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

Stony creek recorded elevated turbidity values upstream (10.2NTU recorded, 9.9 trigger) however downstream values were within trigger values. Elevated turbidity reading upstream is unlikely to be impacted by construction works.

Lower Warrell creek recorded elevated turbidity values upstream and downstream (10.8NTU recorded upstream, 10.9NTU recorded downstream, 6.82NTU trigger). It is noted that NTU increased downstream however due to small variance between upstream and downstream values (0.9% increase) this increase is unlikely to be from construction works.

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

Stony Creek recorded high DO levels upstream (8.55mg/L recorded upstream, 4.8mg/L trigger) and downstream (7.79 mg/L recorded downstream, 6.34 mg/L trigger). Elevated DO results are consistent with results obtained in March 2018 (e.g. 8.17 mg/L recorded upstream, 4.8 mg/L trigger and 8.58 mg/L recorded downstream, 6.34 mg/L trigger).

Lower Warrell Creek recorded low DO reading upstream (4.82mg/L recorded, 5.07mg/L trigger) however downstream results increased to be within trigger values.

Unnamed Creek Gumma West and East recorded low DO values upstream (0.91mg/L recorded West, 0.75mg/L recorded East, 1.75mg/L trigger) however downstream results increased to be within trigger levels.

Nambucca River recorded low DO levels upstream and downstream (6.04 mg/L recorded upstream, 5.79 mg/L recorded downstream, 7.4 mg/L trigger).

4. Sediment Basin Water Monitoring

Water was released from commissioned basin B42.80 after rainfall on the 26th April 2018. A release event occurred on the 11th April for the installation of an oil baffle. 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 April 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
11/04/2018	B42.80	N	6.94	12.7		300	release for oil baffle install
26/04/2018	B42.80	N	8.31	31.5		900	No treatment required, syphon release, TSS sample taken

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on 11th of April 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 April 2018.

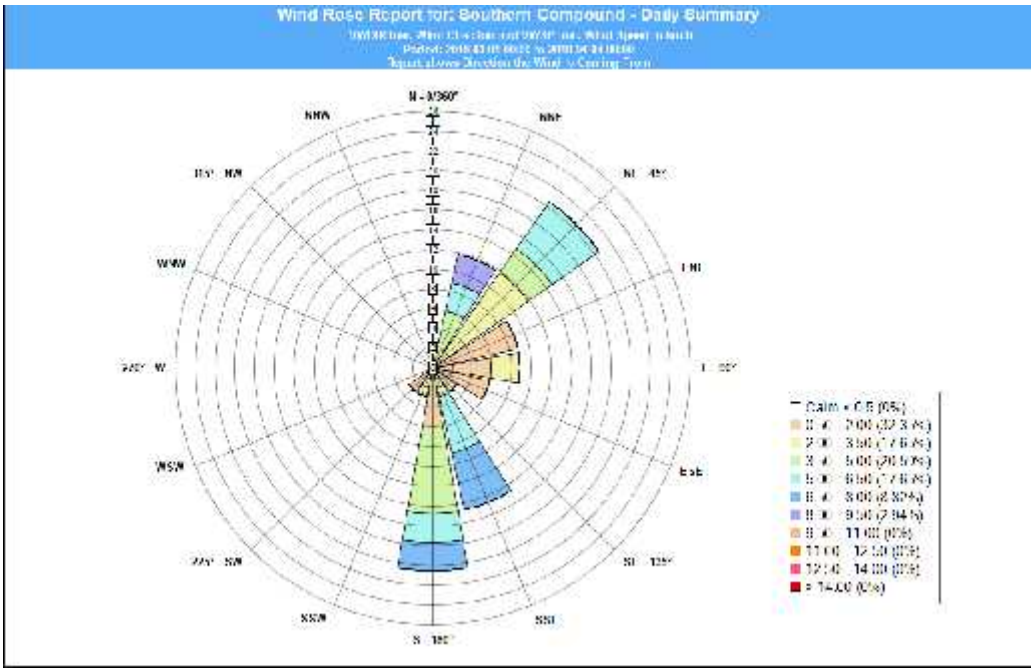
7. Dust Monitoring

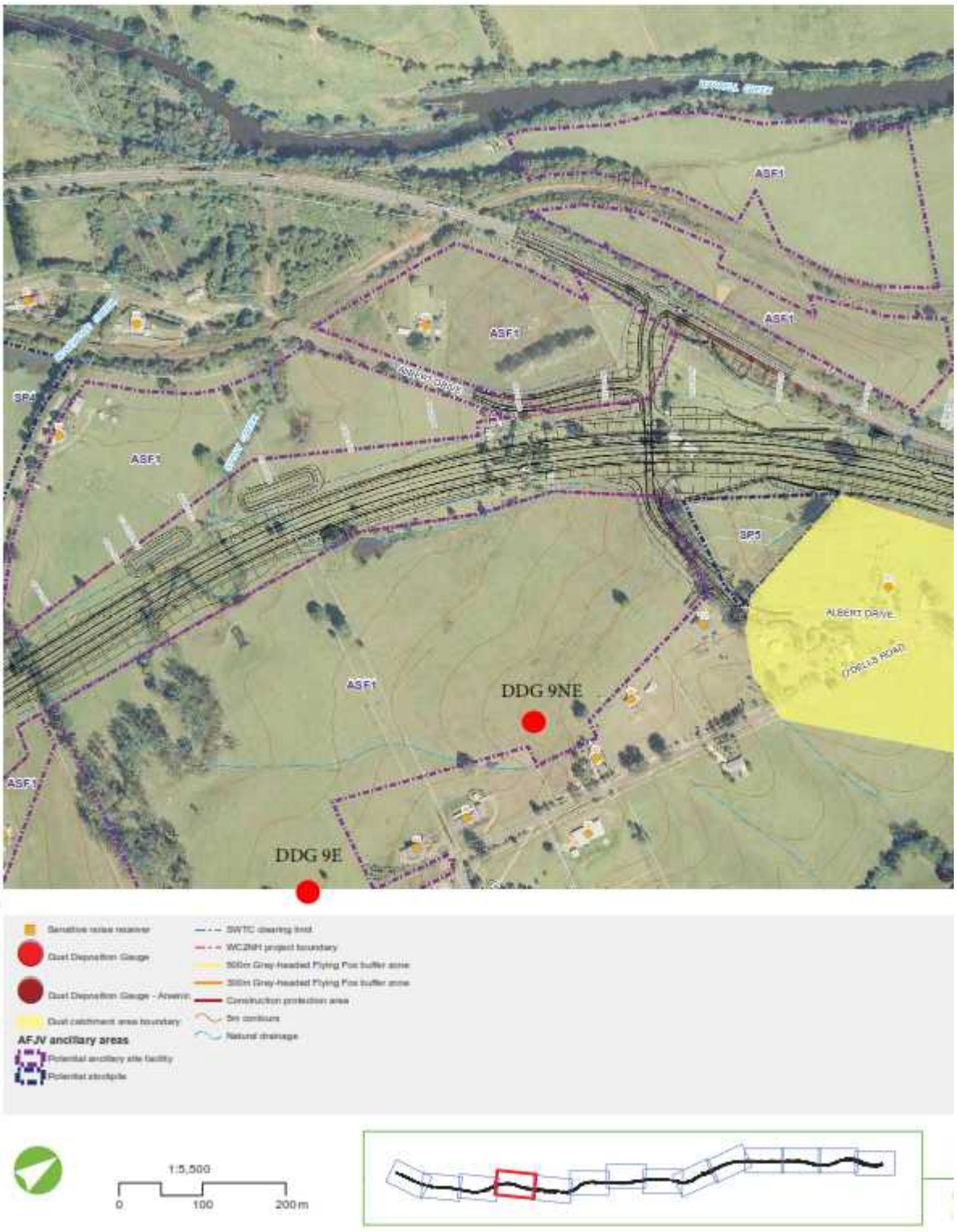
Dust deposition gauges (DDG) were collected at nearby sensitive receivers on 4th April 2018. DDG results are available in Appendix A, Table 3.

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 except for DDG9E.

DDG9E recorded an elevated level of Total Insoluble Matter (TIM) of 7.4g/m2/month and ash content of 5.7g/m2/month. DDG9E is located at O'Dells Road, south east of the main stockpile area. As shown in the Wind Rose below, the prevailing wind direction during the reporting period was from the South and North Easterly directions.

In addition, during the monitoring period 343mm of rain fell with 15 rain days (as recorded by the Albert Drive weather station) and hence the gauge was observed to be overtopped at collection. It is therefore unlikely that the exceedance is a result of construction works. All major Earthworks south of DDG 9E have been completed and any contributions from the NE are outside of the project boundary.





Due to the significant amount of rainfall during the monitoring period, all gauges had overtopped.

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

8. Groundwater Monitoring

ACCIONA (Pacifico) undertook groundwater monitoring on the 18th of April 2018. Field and laboratory testing was undertaken. Groundwater monitoring results are available in Appendix A.

pH levels noted to be outside of trigger levels at:

4BH037a – Fill 15 west bore recorded an elevated pH reading (pH 7.15 recorded, pH 6.51 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.

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

4BH037a – Fill 15 west bore recorded elevated conductivity levels (9.36mS/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 (9.9 mS/cm recorded in March and February 2018).

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

4BH022c - Cut 11 bore east upgradient bore recorded elevated TDS levels (1.0g/L recorded, 0.1306 g/L trigger) however downgradient bore 4BH021 recorded TDS levels within trigger values. Therefore, it is unlikely that the elevated TDS values were due to construction works. It should also be noted that Cut 11 has had construction works completed and was included within the Partial Opening of the Project to traffic in December 2017.

4BH037A - Fill 15 west bore recorded an elevated TDS (5.90 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 (6.26g/L recorded March 2018 and 6.23 g/L in February 2018).

Water depth noted to be below trigger levels at:

4BH037A – Fill 15 west bore recorded low water depth (1.69 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 result is consistent with previous results for the bore (1.39m from top of casing recorded in March 2018).

4BH038 – Fill 15 East bore recorded low water depth (1.75m from top of casing recorded, 1.352m trigger). It is noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted. This result is consistent with previous results for the bore (1.6m from top of casing recorded in March 2018)

4BH058C – Cut 15 upslope bore recorded low water depth (15.21 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 result is consistent with previous results for the bore (15.63m from top of casing recorded March 2018, 15.63m recorded in February 2018).

Metals noted to be above trigger levels at:

4BH010 – Cut 6 downgradient bore recorded elevated levels of cadmium (0.001mg/L recorded, 0.0009mg/L trigger) and iron (21.3mg/L recorded, 6.58mg/L trigger). It is noted that bulk earthworks have completed in this area, with no groundwater seepage from any cut faces or groundwater ingress noted.

4BH022c – Cut 11 upgradient bore recorded elevated levels of aluminium (0.29mg/L recorded, 0.0122mg/L trigger), cadmium (0.0068mg/L recorded, 0.0001mg/L trigger), copper (0.008mg/L recorded, 0.003mg/L trigger), manganese (1.23mg/L recorded, 0.4856mg/L trigger), nickel (0.091mg/L recorded, 0.0036mg/L trigger) and zinc (0.367mg/L recorded, 0.0085 mg/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. These results are consistent with previous results for the new location of the bore (aluminium 0.400 mg/L, cadmium 0.0082 mg/L, copper 0.010 mg/L, manganese 1.480 mg/L, nickel 0.1140 mg/L and zinc 0.432 mg/L).

4BH021 – Cut 11 downgradient bore recorded elevated levels of Manganese (0.016mg/L recorded, 0.0139mg/L trigger) and zinc (0.121 mg/L recorded, 0.0176 mg/L trigger). Manganese and zinc levels decreased from Cut 11 upgradient bore (4BH022c) and therefore are unlikely to be impacted by construction works.

Fill 15 east and west bores 4BH038 and 4BH037a – Both bores recorded elevated levels of zinc (0.023 mg/L recorded 4BH037a, 0.0196 mg/L trigger 4BH037a, 0.065 mg/L recorded 4BH038, 0.0132 mg/L trigger 4BH038) and Nickel (0.01mg/L recorded 4BH037a, 0.0068mg/L trigger, 0.014mg/L recorded 4BH038, 0.006mg/L trigger). Bore 4BH038 East also recorded elevated level of copper (0.003mg/L recorded, 0.0026mg/L trigger). It is noted that bore 4BH037a 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. These results are consistent with previous results for the bores for zinc (0.1080mg/L 4BH037a and 0.0310mg/L 4BH038 recorded January 2018) and nickel (0.0140 mg/L 4BH037a recorded January 2018).

Nutrients were noted to be above trigger levels at:

4BH022c – Cut 11 upgradient bore recorded elevated levels of nitrogen (2.7 mg/L recorded, 0.5786 mg/L trigger), nitrate (2.38 mg/L recorded, 0.400 mg/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. These results are

consistent with previous results for this bore (nitrogen 3.6 mg/L, nitrate 2.98mg/L, recorded January 2018).

4BH021 – Cut 11 downgradient bore recorded elevated levels of nitrogen (0.5mg/L recorded, 0.38mg/L trigger) and ammonia (0.08mg/L recorded, 0.064mg/L trigger). It should also be noted that Cut 11 has had construction works completed and was included within the Partial Opening of the Project to traffic in December 2017.

4BH037a – Fill 15 west bore recorded slightly elevated level of nitrate (0.75mg/L recorded, 0.4mg/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. This result is consistent with previous result for the bore (0.75mg/L recorded January 2018)

4BH038 – Fill 15 east bore recorded slightly elevated level of ammonia (0.6mg/L recorded, 0.23mg/L trigger). It is noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted.

4BH058c – Cut 15 upgradient bore recorded elevated levels of nitrogen (0.8mg/L recorded, 0.7mg/L trigger) and Nitrate (0.34mg/L recorded, 0.12mg/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. These results are consistent with previous results for the bore (0.80 mg/L nitrogen and 0.350 mg/L nitrate recorded January 2018).

Major anions and cations noted to be above trigger levels at:

4BH010 – Cut 6 West bore recorded elevated Potassium (5mg/L recorded, 2mg/L trigger) and calcium (6mg/L recorded, 5.99mg/L trigger). It is noted that bulk earthworks have completed in this area, with no groundwater seepage from any cut faces or groundwater ingress noted.

4BH022c – Cut 11 upgradient bore recorded elevated sodium (180mg/L recorded, 72mg/L trigger), Potassium (9mg/L recorded, 5mg/L trigger), calcium (80mg/L, 50.4mg/L trigger), Magnesium (74mg/L recorded, 11.8mg/L trigger). 4BH022c also recorded elevated chloride (202mg/L recorded, 78.8mg/L trigger) and sulfate (655mg/L recorded, 61.8mg/L trigger). It is noted that bore 4BH022c 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. These results are consistent with previous results for the bore (183mg/L sodium, 7mg/L potassium, 83mg/L calcium, 75mg/L Magnesium, 136mg/L Chloride, 690mg/L Sulfate).

4BH021 – Cut 11 downgradient bore recorded elevated levels of Potassium (4mg/L recorded, 0.96mg/L trigger) and Calcium (4mg/L recorded, 1.4797mg/L trigger). Potassium and Calcium levels decreased from Cut 11 upgradient bore (4BH022c) and therefore are unlikely to be impacted by construction works.

4BH037a - Fill 15 western bore recorded elevated levels for all major monitored anions and cations including chloride (1830mg/L recorded, 949mg/L trigger), sulfate (3400mg/L recorded, 2056mg/L trigger), Bicarbonate (727mg/L recorded,

61mg/L trigger), Sodium (1340mg/L recorded, 720mg/L trigger), potassium (75mg/L recorded, 41mg/L trigger), Calcium (391mg/L recorded, 190mg/L trigger) and magnesium (590mg/L recorded, 306mg/L trigger). It is noted that bore 4BH037a 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. These results are consistent with previous results for the bore (1970 mg/L chloride, 3350 mg/L sulfate, 722 mg/L bicarbonate, 1470 mg/L sodium, 79 mg/L potassium, 414 mg/L calcium, 636 mg/L magnesium recorded January 2018).

9. Acoustic Investigations

Out of Hours Works undertaken during the month of April 2018 under Condition L4.2(d) of the EPL are outlined in Table 4 below. Acoustic Investigations (field monitoring) have been conducted for Out of Hours Works during the month of April 2018, results are included in Appendix A, Table 5.

Table 4 – April 2018 Out of Hours Works approved under L4.2 (d)

Out of Hours Activity	> 5dB(A) above background	Complete? Y/N
OOHW Permit 298 - Shotcrete drain - Fill 5	N	Y

10. Complaints

10.1 Summary of Complaints for the month of April 2018

There were no complaints received during the month of April 2018.

11. Non-Compliance

11.1 Summary of Non-compliances

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

Appendix A – Monitoring Results

Table 1a – Surface Water Results April 2018 – Wet Event

Surface Water Results -APR 2018 - Wet | Weather: Fine | Low Tide: 5:30pm

Location	Units	Levels of Concern		SW01 Upper Warrell Creek Upstream			SW01 Upper Warrell Creek Upstream			SW03 Stony Creek Upstream			SW04 Stony Creek Downstream			SW05 Lower Warrell Creek Upstream			SW06 Lower Warrell Creek Downstream			SW07 Unnamed Creek Gumma West Upstream			SW08 Unnamed Creek Gumma East Upstream			SW09 Unnamed Creek Gumma North Downstream			SW10 Nambucca River South Upstream			SW11 Nambucca River South Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18			4-Apr-18		
Time of Sampling		Freshwater	Marine	12:15 PM			12:00 PM			12:45 PM			12:30 PM			3:45 PM			3:30 PM			2:30 PM			2:45 PM			2:15 PM			3:15 AM			3:00 PM		
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	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																					
Metals																																					
Aluminium	mg/L	0.055	-	0.244	0.0162	0.02	0.194	0.016	0.02	0.098	0.02	<0.01	0.114	0.01	<0.01	0.28	0.01	0.11	0.28	0.01	0.08	0.25	0.02	0.02	0.25	0.02	0.09	0.25	0.02	0.02	0.11	0.01	<0.01	0.11	0.01	0.01
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	<0.001	0.001	0.001	<0.001	0.002	0.001	0.002	0.002	0.001	0.003	0.002	0.001	0.003	0.002	0.001	0.001	0.002	0.001	0.001
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	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
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	0.003	0.001	0.001	0.002	0.001	0.001	<0.001	0.001	0.001	<0.001
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Manganese	mg/L	1.9	0.08	0.3	0.01	0.06	0.158	0.0178	0.061	0.0726	0.0218	0.094	0.083	0.0164	0.09	0.35	0.087	0.138	0.35	0.087	0.142	0.49	0.011	0.396	0.49	0.011	0.324	0.49	0.011	0.401	0.076	0.006	0.13	0.076	0.006	0.12
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.0034	0.001	0.003	0.0034	0.001	0.003	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.001	-	-	0.002	-	-	<0.001
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	<0.005	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	<0.005	0.018	0.005	0.009	0.011	0.005	<0.005	0.011	0.005	0.01	0.011	0.005	<0.005	0.005	0.005	<0.005	0.005	0.005	<0.0005
Iron	mg/L	-	-	1.38	0.48	0.08	0.99	0.366	0.11	1.4	0.41	0.06	1.48	0.35	<0.05	0.52	0.05	0.3	0.52	0.05	0.22	1.65	0.37	0.59	1.65	0.37	0.84	1.65	0.37	0.64	0.26	0.05	<0.05	0.26	0.05	<0.05
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
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		NA	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		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	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		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	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		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	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		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		NA	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		NA	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		NA	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		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		NA	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		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	-		NA
Nutrients																																					
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.03	0.044	0.016	0.02	0.03	0.016	0.01	0.034	0.01	<0.01	0.04	0.01	0.03	0.04	0.01	0.03	0.11	0.03	0.03	0.11	0.03	0.02	0.11	0.03	0.03	0.07	0.02	1.17	0.07	0.02	0.07
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	<0.01	0.029	0.01	<0.01	0.029	0.01	<0.01
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.6	0.52	0.2	0.7	0.48	0.2	0.3	0.63	0.2	0.6	0.54	0.31	0.4	0.54	0.31	0.6	3.1	0.9	0.6	3.1	0.9	0.8	3.1	0.9	0.6	0.46	0.2	1.3	0.46	0.2	0.6
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.4	0.5	0.2	0.5	0.34	0.2	0.2	0.6	0.2	0.4	0.5	0.2	0.4	0.5	0.2	0.5	2.8	0.8	0.6	2.8	0.8	0.8	2.8	0.8	0.6	0.3	0.2	1.3	0.3	0.2	0.5
Nitrate	mg/L	0.7	-	0.102	0.01	0.18	0.054	0.01	0.24	0.208	0.01	0.11	0.2	0.01	0.19	0.05	0.01	0.05	0.05	0.01	0.07	0.03	0.01	0.03	0.03	0.01	0.02	0.03	0.01	0.02	0.04	0.01	0.04	0.04	0.01	0.08
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	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.02	0.02	0.01	0.04	0.046	0.02	0.09	0.062	0.012	0.04	0.116	0.022	<0.01	0.116	0.022	<0.01	0.06	0.01	<0.01	0.06	0.01	0.02	0.06	0.01	0.01	0.15	0.024	0.05	0.15	0.024	<0.01
TSS																																					
TSS	mg/L	<40	<10	19	5	6	12.8	5	8	14.8	5	<5	8.7	5	<5	25	5.5	8	25	5.5	6	350	9	14	350	9	6	350	9	10			16			17
Field Physical data																																					
Temperature	°C	-	-	24.3	16.27	21.9	24.52	16.79	22.32	23.98	17.36	22.9	24.7	17.65	22.84	25.9	19.5	26.57	25.9	19.5	26.5	25.84	19.1	24.73	25.84	19.1	24.79	25.84	19.1	25.12	26.56	21.32	27.68	26.56	21.32	27.83
pH	pH	-	6.5-8	7.478	6.23	6.44	7.192	6.42	6.49	7.138	6.61	6.56	6.98	6.21	6.52	6.86	6.46	7.16	6.86	6.46	7.35	6.9	6.08	6.51	6.9	6.08	6.48	6.9	6.08	6.57	7.56	6.58	8.24	7.56	6.58	8.21
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.201	0.3242	0.19076	0.237	0.313	0.2024	0.174	0.309	0.20188	0.176	20.918	0.50928	0.398	20.918	0.50928	0.581	0.842	0.334	0.288	0.842	0.334	0.31	0.842	0.334	0.301	48.42	12.65	17.6	48.42	12.65	17.4
Turbidity	NTU	50	10	26.16	5.94	11.6	27.32	3.72	7.5	14.98	3.34	3.4	17.16	4.59	2.6	26.1	2.4	9.5	26.1	2.4	8.2	66.8	11.6	11.6	66.8	11.6	10.6	66.8	11.6	14.4	19.04	5.81	19	19.04	5.81	17.4
Dissolved Oxygen	mg/L	5	5	7.43	1.5	6.35	6.88	2.28	7.04	8.472	5.08	7.21	7.59	2.63	7.52	6.65	5.02	5.09	6.65	5.02	5.47	7.3	1.78	2.46	7.3	1.78	3.31	7.3	1.78	5.02	8.47	6.88	7.81	8.47	6.88	8.47
Dissolved Oxygen	%			-		74.4	-		83	-		85.8	-		89.5	-		64.3	-		69.1	-		30.2	-		40.3	-		62	-		100.9	-		101
TDS	g/L	-	-	-		0.131	-		0.154	-		0.113	-		0.114	-		0.26	-		0.372	-		0.187	-		0.201	-		0.195	-		10.8	-		10.8

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 April 2018 – Wet Event

Surface Water Results - April 2018 - Wet							Weather:	Showers									Low Tide:	11.43am																						
					SW01				SW03			SW04			SW05			SW06			SW07			SW08			SW09			SW10			SW11							
Location	Units	Levels of Concern			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				Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream							
Freshwater / Estuarine		ANZECC 2000 95% species protected			Freshwater				Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine							
Date of Sampling					24-Apr-18				24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18			24-Apr-18							
Time of Sampling		Freshwater	Marine		2:00pm				1:25PM			11:15 AM			1pm			12.45pm			2:50 PM			2:35 PM			2:25 PM			12:45 PM			12:10 PM							
Comments									cows active, clear						clear			clear												Clear			Clear							
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	19.01		24.52	16.79	19.24	23.98	17.36	18.79	24.7	17.65	20.65	25.9	19.5	19.33	25.9	19.5	19.46	25.84	19.1	20.41	25.84	19.1	19.51	25.84	19.1	19.51	26.56	21.32	20.36	26.56	21.32	21.41		
pH	pH	-	6.5-8		7.478	6.23	6.62		7.192	6.42	6.71	7.138	6.61	6.58	6.98	6.21	6.51	6.86	6.46	6.61	6.86	6.46	6.81	6.9	6.08	6.99	6.9	6.08	6.91	6.9	6.08	7	7.56	6.58	7.42	7.56	6.58	7.35		
Conductivity	mS/cm	0.125-2.2	-		0.3204	0.20184	0.243		0.3242	0.19076	0.269	0.313	0.2024	0.216	0.309	0.20188	0.176	20.918	0.50928	0.483	20.918	0.50928	0.481	0.842	0.334	0.441	0.842	0.334	0.386	0.842	0.334	0.5	48.42	12.65	20.3	48.42	12.65	20.5		
Turbidity	NTU	50	10		26.16	5.94	17.2		27.32	3.72	20.9	14.98	3.34	17.8	17.16	4.59	12.4	26.1	2.4	15.6	26.1	2.4	11.1	66.8	11.6	6.7	66.8	11.6	7	66.8	11.6	9.8	19.04	5.81	9.9	19.04	5.81	7.1		
Dissolved Oxygen	mg/L	5	5		7.43	1.5	6.55		6.88	2.28	4.83	8.472	5.08	6.79	7.59	2.63	7.66	6.65	5.02	5.59	6.65	5.02	5.36	7.3	1.78	6.36	7.3	1.78	3.57	7.3	1.78	8.08	8.47	6.88	6.35	8.47	6.88	6.59		
Dissolved Oxygen	%				-		71.3		-		34.9	-		77.1	-		95.2	-		62	-		59.3	-		72.7	-		40	-		90.9	-		68.4	-		69.7		
TDS	g/L	-	-		-		0.158		-		0.176	-		0.14	-		0.118	-		0.28	-		0.306	-		0.285	-		0.251	-		0.321	-		12.6	-		13.7		

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 1c – Surface Water Results April 2018 – Dry Event

Surface Water Results -April 2018 - Dry							Weather:	Fine									Low Tide:	10:47 PM																						
					SW01				SW02			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					13-Apr-18				13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18			13-Apr-18					
Time of Sampling		Freshwater	Marine		12:00PM				11:45AM			11:30AM			11:15AM			1:15PM			1:00PM			12:30PM			12:40PM			12:15PM			2:15PM			2:00PM					
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	80th %ile	20th %ile	Result			
Field Physical data																																									
Temperature	°C	-	-		24.86	14.99	20.54		25.1	16.3	20.37	24.4	16	19.9	26.46	15.94	20.08	27.9	18.4	27.73	27.9	18.4	28.04	26.5	16.3	22.53	26.5	16.3	21.94	26.5	16.3	26.08	27.9	18.1	27.18	27.9	18.1	27.22		
pH	pH	-	6.5-8		7.25	6.48	6.49		7.3	6.4	6.87	7.5	6.6	6.85	7.33	6.26	6.46	7.02	6.57	7.13	7.02	6.57	7.17	7	6.1	6.54	7	6.1	6.47	7	6.1	6.51	7	7	7.66	7	7	7.57		
Conductivity	mS/cm	0.125-2.2	-		0.316	0.232	0.272		0.348	0.227	0.237	0.348	0.227	0.228	0.3338	0.2168	0.218	20.946	0.679	0.872	20.946	0.679	0.82	0.808	0.4234	0.812	0.808	0.4234	0.475	0.808	0.4234	0.516	47.32	29.44	31.9	47.32	29.44	32.3		
Turbidity	NTU	50	10		10.96	4	10		9.9	3.5	4.1	9.9	3.5	10.2	5.97	3.74	5.4	6.82	1.83	10.8	6.82	1.83	10.9	52.78	11.3	20.1	52.78	11.3	11.3	52.78	11.3	16.4	19.3	6.7	17.2	19.3	6.7	18.1		
Dissolved Oxygen	mg/L	5	5		4.98	1.91	4.81		4.8	2.6	4.15	4.8	2.6	8.55	6.34	3.52	7.79	7.98	5.07	4.82	7.98	5.07	6.19	6.4	1.75	0.91	6.4	1.75	0.75	6.4	1.75	3.97	9.1	7.4	6.04	9.1	7.4	5.79		
Dissolved Oxygen	%				-	-	54.9		-	-	47.3	-	-	96.6	-	-	88.2	-	-	62.1	-	-	80.1	-	-	10.7	-	-	8.8	-	-	49.8	-	-	81.4	-	-	76.9		
TDS	g/L	-	-		-		0.137		-		0.137	-		0.128	-		0.130	-		0.307	-		0.333	-		0.250	-		0.218	-		0.260	-		14.3	-		13.8		

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 April 2018

Monthly Noise Monitoring Results April 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
11/04/2018	1:02PM	Albert Drive	74	1	50	Cut	62	44.7	54.4	40.2	46.3	44.3	42.5	Construction	Y	N/A	Within predicted levels and NML. Construction dominant (42.5-50.2) Stockpile area behind cut to mitigate noise impacts.
11/04/2018	2:20PM	Bald Hill Rd	197	3	50	KCB	79	52.7	73.1	39	55.3	47.3	42.8	Bald Hill Road	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: BHR (50.9-70.1) Noise mound and noise wall in place to reduce impact.
11/04/2018	3:41PM	Letitia Rd	413	4	59	HTR	58	54.8	74.6	43.1	55.2	49.5	46.6	PAC HWY	N	N/A	Within predicted levels and NML. Regular consultation undertaken with residents impacted by NFR construction activities. HWY dominant (45.5-54.1)
11/04/2018	4:15PM	Mattick Rd	442	6	44	HTR	71	50.1	70.1	40.6	52	48.7	45.4	Birds	N	N/A	Within predicted levels. Permanent noise mounds in place to reduce construction noise at sensitive receivers. Birds dominant (44.1-55.6)
11/04/2018	3:00PM	Gumma Rd	383	3	50	Ser	59	59.7	77.8	44.7	62.3	55	48.9	PAC HWY	N	N/A	Construction noise not dominant. Dominant noise sources: highway (50.4-71.1).

Table 3 – Dust Monitoring Results March - April 2018

Monthly Dust Monitoring Results -March 2018 - April 2018

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8A	DDG9NE	DDG9E	DDG10	DDG A1	DDG A2
			Start 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
			Finish date of sampling		4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018	4/04/2018
Analyte	Time Period	Unit	Levels of Concern	LOR														
Ash Content	Current Month	g/m².month	4	0.1	0.7	0.3	1.5	0.4	1.4	1	0.4	0.5	0.2	0.6	5.8	1	----	----
		mg	N/A	1	14	7	30	8	28	20	9	10	4	13	117	21	----	----
	Previous Month	g/m².month			0.5	0.5	0.4	0.2	175	0.5	0.5	0.5	0.4	0.3	0.4	0.8	----	----
	Change	g/m².month	Increase of 2		0.2	-0.2	1.1	0.2	-173.6	0.5	-0.1	0	NA	0.3	5.4	0.2	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.5	1.5	0.2	1	1.4	0.2	0.7	0.6	0.6	0.3	1.6	0.3	----	----
		mg	N/A	1	11	29	5	20	28	5	13	12	12	5	31	5	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	1.2	1.8	1.7	1.4	2.8	1.2	1.1	1.1	0.8	0.9	7.4	1.3	----	----
		mg	N/A	1	25	36	35	28	56	25	22	22	16	18	148	26	----	----
	Previous Month	g/m².month		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	----	----
	Change	g/m².month	Increase of 2	0.1	0.3	0.5	0.2	1	-188.2	0.4	-0.5	0.2	NA	0.1	6.9	0.1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----		0.002	<0.001
Comments					overtopped with water	overtopped with water	overtopped with water	grass mown next to, overtopped with water	gras mown, overtopped with water	funnel brocken off inside, overtopped with water	hydromulch in funnel and gauge, overtopped with water	overtopped with water	overtopped with water	grass mown near, overtopped with water	overtopped with water	overtopped with water	insects in gauge, overtopped with water	overtopped with water

Table 4 – Groundwater Monitoring Results April 2018

April 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			18/04/2018			18/04/2018			18/04/2018			18/04/2018			18/04/2018			18/04/2018			18/04/2018			18/04/2018		
			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				
Laboratory data - awaiting results																										
Metals																										
Aluminium	mg/L	0.055	0.2740		0.04	0.0216		0.01	0.0122		0.29	0.0324		-	0.0264		0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Arsenic	mg/L	0.024	0.0009		0.001	I		<0.001	0.0001		<0.001	0.0005		-	0.0005		<0.001	0.0010		<0.001	0.0010		-	0.0005		<0.001
Cadmium	mg/L	<LOR	0.0005		<0.0001	0.0001		<0.0001	0.0001		0.0068	0.0002		-	0.0002		0.0002	0.0005		0.0004	0.0005		-	0.0005		<0.0001
Chromium	mg/L	0.001	0.0013		<0.001	0.0001		<0.001	0.0002		<0.001	0.0007		-	0.0010		<0.001	0.0007		<0.001	0.0005		-	0.0005		<0.001
Copper	mg/L	0.0014	0.1620		0.002	0.0108		0.003	0.0030		0.008	0.0139		-	0.0139		0.002	0.0026		0.003	0.0009		-	0.0082		0.002
Lead	mg/L	0.0034	0.0010		<0.001	0.0002		<0.001	0.0016		<0.001	0.0022		-	0.0005		<0.001	0.0005		<0.001	0.0009		-	0.0005		<0.001
Manganese	mg/L	-	0.2258		0.14	0.0139		0.016	0.4856		1.23	0.0124		-	5.2480		1.93	1.5084		0.843	0.4518		-	0.0800		0.013
Nickel	mg/L	0.011	0.0196		0.004	0.0058		0.001	0.0036		0.091	0.0007		-	0.0068		0.01	0.006		0.014	0.0030		-	0.0033		0.001
Selenium	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Silver	mg/L	<LOR	0.0005		<0.001	0.0001		<0.001	0.0001		<0.001	0.0005		-	0.0005		<0.001	0.0005		<0.001	0.0005		-	0.0005		<0.001
Zinc	mg/L	0.008	0.0532		0.026	0.0176		0.121	0.0085		0.367	0.0102		-	0.0196		0.023	0.0132		0.065	0.0090		-	0.0100		0.009
Iron	mg/L	-	6.5800		21.3	0.0354		<0.05	1.1600		0.1	0.0322		-	84.5600		3.05	1.7500		0.7	4.6344		-	0.0600		<0.05
Mercury	mg/L	0.0006	0.0003		<0.0001	0.0001		<0.0001	0.0001		<0.0001	0.0001		-	0.0001		<0.0001	0.0003		<0.0001	0.0003		-	0.0003		<0.0001
Total Petroleum Hydrocarbons		-																								
C6-C9 Fraction	µg/L or ppb	-	10		<20	16		<20	16		<20	10		-	10.0000		<20	10.0000		<20	10.0000		-	10.0000		<20
C10-C14 Fraction	µg/L or ppb	-	85		<50	25		<50	45		<50	25		-	219.0000		<50	25.0000		<50	25.0000		-	25.0000		<50
C15-C28 Fraction	µg/L or ppb	-	50		<100	50		<100	50		<100	50		-	190.0000		<100	50.0000		<100	25.0000		-	25.0000		<100
C29-C36 Fraction	µg/L or ppb	-	50		<50	50		<50	50		<50	35		-	35.0000		<50	50.0000		<50	25.0000		-	25.0000		<50
C10-C36 Fraction	µg/L or ppb	-	178		<50	35		<50	226		<50	25		-	556.0000		<50	25.0000		<50	1426.0000		-	149.0000		<50
BTEX		-																								
Benzene	µg/L or ppb	950	0.5		<1	0.5		<1	0.5		<1	0.5		-	0.5000		<1	0.5000		<1	0.5000		-	0.5000		<1
Toluene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Ethylbenzene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
m+p-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
o-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Naphthalene	µg/L or ppb	-	3		<5	2		<5	2		<5	2		-	2.5000		<5	2.5000		<5	2.0000		-	2.0000		<5
Nutrients		-																								
Total Phosphorus	mg/L	-	0.0284		0.02	0.0568		0.03	0.0480		<0.01	0.0680		-	0.1260		0.04	0.4064		0.1	0.0740		-	0.0300		0.16
Phosphate	mg/L	-	0.0110		<0.01	0.0142		<0.01	0.0126		<0.01	0.0070		-	0.0160		<0.01	0.0410		<0.01	0.0090		-	0.0070		<0.01
Total Nitrogen	mg/L	-	0.5800		0.3	0.3800		0.5	0.5786		2.7	0.7000		-	2.1600		1.2	1.1232		0.6	0.6600		-	0.7000		0.8
Total Kjeldahl Nitrogen	mg/L	-	0.5800		0.3	0.1936		0.3	0.2536		0.3	0.4000		-	2.1600		0.5	0.7752		0.6000	0.3678		-	0.7000		0.60
Nitrate	mg/L	-	0.0250		0.02	0.2460		0.23	0.4000		2.38	0.3840		-	0.4000		0.7500	0.4546		0.0400	0.2712		-	0.1200		0.34
Nitrite	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0130		<0.01	0.0160		<0.01	0.0050		-	0.0050		<0.01
Ammonia	mg/L	-	0.1148		<0.01	0.0640		0.08	0.0940		0.05	0.0440		-	0.7920		0.02	0.2300		0.60	0.0672		-	0.0310		0.1200
Major anions																										
Chloride	mg/L	-	1704.3		842	15.2		12	78.8		202	24.4		-	949			2340		1580	22.2000		-	39.1000		16
Sulfate	mg/L	-	53.000		25	10.392		5	61.8		655	10.6		-	2056		3400	2752		1620	22.9680		-	35.0000		12
Bicarbonate	mg/L	-	63.6		45	27.4		23	142.2		<1	18.4		-	61		727	942		684	34.4000		-	29.0000		11
Major cations																										
Sodium	mg/L	-	866		381	18		13	72.0000		180	29.0800		-	720		1340	1872		587	28.2000		-	52		18
Potassium	mg/L	-	2.00		5	0.96		4	5.0000		9	0.5000		-	41		75	97		35	1.5509		-	1		1
Calcium	mg/L	-	5.99		6	1.4797		4	50.4000		80	1.4000		-	190		391	266		128	2.7120		-	1		<1
Magnesium	mg/L	-	135		57	2		2	11.8000		74	0.9280		-	306		590	565		150	8.0077		-	3		2
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		16.46	8.7420		8.60	16.0140		1.93	8.4500		-	1.2000		1.69	1.3520		1.75	17.4120		-	13.84		15.21
pH	pH	-	6.26	4.74	6.12	6.78	5.81	6.27	7.09	5.93	6.81	6.78	6.21	-	6.51	5.92	7.15	7.30	6.77	7.18	6.98	5.24	-	6.3960	5.56	6.14
Conductivity	mS/cm	-	3630		2.04	111.3		0.124	231		1.57	0.342		-	5.550		9.36	8366		4.150	121.100		-	132.660		0.122
Temperature	○C	-	22.4420		21.99	22.3600		25.62	21.1500		22.90	22.6040		-	25.9820		22.62	22.5600		23.01	22.8200		-	23.1940		24.80
Total Dissolved Solids	g/L		3.5720		1.31	0.0946		0.080	0.1306		1.00	0.1326		-	0.1326		5.90	8.10		2.660	0.106		-	0.111		0.079

Exceedance of trigger level

Table 5 – Field Monitoring for Out of Hours Works April 2018 (Acoustic Investigation)

Description of Works	Date	Time	Location	NCA	NML (dB(A))	Laeq (dB(A))	Distance to receiver (m)	Compliant	Notes
Fill 5 concrete pump	20/4/2018	6:30am	Fill 5 West	1	45	52.5	380	Yes	Construction noise not audible. Highway (48-57dBA) dominant noise source.