

# Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

## ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

March 2017

Pacifico Project Number: WC2NH



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

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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 16<sup>th</sup> 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 2017 included the following:

- Bitumen sealing work
- Topsoil stripping
- Earthworks
- Continuing bridge works including girder placement, deck unit installation and deck concrete pours
- Continuing drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Landscape Planting
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering
- Installation of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Line marking
- Operation of concrete and asphalt batch plants
- Removal of temporary jetty at Nambucca River Bridge

Works scheduled for next month include

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

- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering and desilting
- Installation of Erosion and Sediment Controls
- Paving operations including Asphalting and concreting
- Line marking Pavement (Asphalt and Concrete)
- Verge / Median Placement
- Commence removing rock platforms at Lower Warrell Creek and Nambucca River

## 1.2 Consultation Activities

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

Groups	Date	Key Topics
Environmental Review Group	7 <sup>th</sup> March 2017	Construction Progress, Design Update, Upcoming Works, Environmental Update, Monitoring Update, Out of Hours Works, Incidents and Community Complaints
Toolboxes	Wednesday each week	Workforce behavioural issues examined and impact management tips provided, as appropriate. eg. mud impacts on local roads and near private properties, spraying in high wind, public perception.
North Facing Ramps group	10am Monday tri-weekly – session held 27th March 2017	Three week look-ahead for construction activities and general project discussion.

#### Other Consultation Activities:

- Conducted second Nambucca Shire Council liaison meeting at Southern Compound 28<sup>th</sup> March2017;
- Invitation to 15<sup>th</sup> March 2017 Community Information Session emailed to database distribution list, along with phone and text invitations to those without email;
- Traffic Alert, letterbox drop and email notification to database distribution list for quarry access bridge girder lifts;
- Obtained 15 agreements for Out of Hours Work for temporary asphalt plant at Warrell Creek;
- Obtained one agreement for Out of Hours Work (Saturday afternoon) earthworks north of Mattick Road;

- Obtained one agreement for Out of Hours Work asphalting Bald Hill Road to Floodplain Two bridge;
- Obtained one agreement for Out of Hours Work asphalting Letitia Close to Mattick Road;
- Updated Acciona's project update on website;
- Distributed third edition of North Facing Ramps three-month look-ahead;
- Distributed RMS quarterly Project Update to email database and letterbox dropped to properties within 200m of alignment; and
- Ongoing and timely notifications and traffic alerts for night time girder deliveries through Macksville;

#### At House Noise Treatments

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

#### Upcoming Community and stakeholder activities:

- Conduct next Nambucca Shire Council liaison meeting 2 May 2017;
- Conduct next North Facing Ramps tri-weekly roadside community meetings scheduled for Monday 10 April 2017;
- Re-consult residents closest to Gate 3 stockpile in relation to future rock crushing activity
- Continue to consult stakeholders impacted by visual mounds along the entire alignment;
- Signposting communications plan (tie into mid-year Community Information Sessions); and
- Continue to identify community groups for specific presentation of key messages second half of 2017;

## 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
01/02/17 – 28/02/17	506.4mm	Northern Compound
01/02/17 – 28/02/17	483mm	Albert Drive Compound

The site experienced a total of 19 rain days throughout the month of March 2017.

During March, rainfall received on site was higher than the March monthly average of 183mm. 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 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 2017							
		TOTAL Rain					
Date	Time	Gauge (mm)					
1/03/2017	9:00:00	23.6					
2/03/2017	9:00:00	1					
3/03/2017	9:00:00	0.2					
4/03/2017	9:00:00	0					
5/03/2017	9:00:00	7.8					
6/03/2017	9:00:00	27.4					
7/03/2017	9:00:00	0					
8/03/2017	9:00:00	0					
9/03/2017	9:00:00	3.2					
10/03/2017	9:00:00	0.4					
11/03/2017	9:00:00	0					
12/03/2017	9:00:00	0					
13/03/2017	9:00:00	0					
14/03/2017	9:00:00	0.6					
15/03/2017	9:00:00	38.8					
16/03/2017	9:00:00	114.6					
17/03/2017	9:00:00	0					
18/03/2017	9:00:00	55.8					
19/03/2017	9:00:00	122.6					
20/03/2017	9:00:00	22.2					
21/03/2017	9:00:00	2.6					
22/03/2017	9:00:00	0					
23/03/2017	9:00:00	0					
24/03/2017	9:00:00	0					
25/03/2017	9:00:00	1.4					
26/03/2017	9:00:00	3.4					
27/03/2017	9:00:00	0.2					
28/03/2017	9:00:00	0					
29/03/2017	9:00:00	0					
30/03/2017	9:00:00	4.8					
31/03/2017	9:00:00	52.4					

March 2017						
Date	Time	TOTAL Rain Gauge (mm)				
1/03/2017	9:00:00	26.8				
2/03/2017	9:00:00	3.4				
3/03/2017	9:00:00	0				
4/03/2017	9:00:00	0				
5/03/2017	9:00:00	3				
6/03/2017	9:00:00	40.6				
7/03/2017	9:00:00	0				
8/03/2017	9:00:00	0				
9/03/2017	9:00:00	0.6				
10/03/2017	9:00:00	0				
11/03/2017	9:00:00	0				
12/03/2017	9:00:00	0				
13/03/2017	9:00:00	0				
14/03/2017	9:00:00	1.4				
15/03/2017	9:00:00	11				
16/03/2017	9:00:00	113.6				
17/03/2017	9:00:00	0.4				
18/03/2017	9:00:00	76.2				
19/03/2017	9:00:00	130.8				
20/03/2017	9:00:00	26				
21/03/2017	9:00:00	3.2				
22/03/2017	9:00:00	0				
23/03/2017	9:00:00	0				
24/03/2017	9:00:00	0				
25/03/2017	9:00:00	1.8				
26/03/2017	9:00:00	3.2				
27/03/2017	9:00:00	0.6				
28/03/2017	9:00:00	0				
29/03/2017	9:00:00	0				
30/03/2017	9:00:00	4				
31/03/2017	9:00:00	59.8				

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

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

March 2017						
Minimum Maximum						
	temperature	temperature	Rainfall			
Date	(°C)	(°C)	(mm)			
1/03/2017	19	26.5	21.8			
2/03/2017	19.4	29.8	6.4			
3/03/2017	19.9	30.8	0			
4/03/2017	20.5	29.4	0			
5/03/2017	19.7	29.1	21			
6/03/2017	19.6	27	6.8			
7/03/2017	18.2	25.9	0			
8/03/2017	17.3	26.5	0			
9/03/2017	16.2	24.8	13.4			
10/03/2017	16.9	25.3	0			
11/03/2017	18.5	27.8	0			
12/03/2017	18	28.4	0			
13/03/2017	18.6	25.9	0			
14/03/2017	20.4	23.3	1.6			
15/03/2017	20.5	23.4	6			
16/03/2017	20.8	26.8	180			
17/03/2017	21.5	24	0.8			
18/03/2017	19.6	24.1	58			
19/03/2017	21.5	25.4	41			
20/03/2017	21.3	24.8	29			
21/03/2017	21.5	26.8	4			
22/03/2017	21.5	26.8	0.4			
23/03/2017	21.6	23.5	0			
24/03/2017	20.5	21.2	2.4			
25/03/2017	18.8	26	9			
26/03/2017	19.4	28.2	16.2			
27/03/2017	20.8	29	0			
28/03/2017	21.2	28.4	0			
29/03/2017	22.8		0			
30/03/2017		28.4				
31/03/2017	17.4	23.8	42			

## 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 (>10mm in 24 hours) was undertaken on the 6<sup>th</sup> March 2017, field testing and lab sampling was undertaken. Results are attached in Appendix A.

#### pH levels noted to be outside of trigger levels at:

Upper Warrell Creek downstream recorded elevated pH levels downstream (7.54). It is noted that there was only a minor increase from upstream levels (7.34) and that these levels are within ANZECC criteria (6.5-8.0). All controls were in place for the site, with no additional activities undertaken within the waterway.

Stony Creek recorded elevated pH levels upstream (7.56) and downstream (8.18). All controls were in place for the site, with no additional activities undertaken within or adjacent to the waterway.

Nambucca River recorded elevated pH levels upstream (7.65) and downstream (7.71). It is noted that levels only increased very slightly from upstream to downstream and were also very close to 80<sup>th</sup> percentile trigger levels (7.56 for both sites). All controls were in place for the site, with no additional activities undertaken within the waterway.

#### Conductivity note to be above trigger levels at:

Stony Creek downstream (0.314mS/cm). It is noted that this is only slightly above 80<sup>th</sup> percentile trigger levels (0.309mS/cm). All controls were in place for the site with no construction activity being undertaken within the waterway. Lower Warrell Creek upstream (28.0mS/cm) and downstream (29.6mS/cm). All controls were verified to be in place for the site, with no construction activities undertaken within the waterway.

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

Stony Creek upstream (20.4 NTU) and downstream (61.7 NTU). All controls were in place for the site, with no activity being conducted within the waterway. It is noted that during the rainfall event, runoff from unsealed residential driveways on the downstream side of the site entered Stony Creek, which may have impacted the NTU levels downstream. The sediment basins adjacent to Stony Creek had also overtopped during the heavy rainfall events.

Nambucca River upstream (31.2 NTU) and downstream (43 NTU). All controls were in place for the site, with no additional activity being undertaken within the waterway. It was noted during sampling that wind chop was causing sediment to be disturbed along the banks of the Nambucca River, which may have resulted in elevated readings for both sites.

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

Nambucca River upstream (5.37mg/L) and downstream (5.58mg/L). All controls were verified to be in place for the site, with no construction activities undertaken within the waterway. It is noted that levels increased from upstream to downstream and are thus unlikely to be due to construction impacts. Additionally, these levels are within ANZECC criteria (>5mg/L).

#### Metals noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of arsenic upstream (0.006mg/L) and downstream (0.005mg/L), manganese downstream (0.16mg/L). It is noted that levels for both sites decreased from upstream to downstream sites and are thus unlikely to be attributable to construction impacts. It is also noted that both manganese and arsenic levels are within ANZECC criteria (1.9mg/L for manganese, 0.024mg/L for arsenic). All controls were in place for the site, with no additional construction activities being undertaken within the waterway.

Stony Creek recorded elevated levels of arsenic upstream (0.005mg/L) and downstream (0.003mg/L) and zinc downstream (0.007mg/L). All controls were verified to be in place for the site, with no additional construction activities undertaken within the waterway. It is noted that arsenic levels decreased from upstream to downstream and are thus unlikely to be due to construction impacts. Zinc levels were also noted to be within ANZECC criteria (0.008mg/L).

Lower Warrell Creek recorded elevated levels of arsenic upstream (0.008mg/L) and downstream (0.01mg/L). All controls were verified to be in place for the site with no construction activities undertaken within the waterway. It is also noted that these levels are within ANZECC criteria (0.024mg/L).

#### Nutrients noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of total phosphorus downstream (0.05mg/L). All controls were verified to be in place for the site with no additional construction activities undertaken within the waterway. It is noted that these levels are level with ANZECC criteria (0.05mg/L).

Stony Creek recorded elevated levels of nitrite downstream (0.09mg/L). All controls were in place for the site with no additional construction activities undertaken within the waterway. It is noted that Stony Creek has a "soft" treatment with plantings andhydromulching undertaken.

Lower Warrell Creek recorded elevated levels of total nitrogen downstream (0.6mg/L). All controls were in place for the site with no construction activities undertaken within the waterway. It was noted that detritus was present at the monitoring site, which may have contributed to the elevated levels.

#### 2<sup>nd</sup> Wet Sampling Event

An additional "wet" sampling event (>10mm in 24 hours) was undertaken on the 21<sup>st</sup> March 2017, field testing was undertaken. Results are attached in Appendix A.

#### pH levels noted to be outside trigger levels at:

Upper Warrell Creek recorded low pH levels upstream (5.93) and downstream (5.94). It is noted that levels were consistent between upstream and downstream sites, and are unlikely to be attributable to construction impacts.

Lower Warrell Creek recorded low pH levels upstream (6.20) and downstream (5.56). All controls were in place for the site with no additional construction activity undertaken within the waterway.

Gumma Wetlands recorded low pH level upstream (5.8, 5.52) and downstream (5.79). All controls were in place for the site with no construction activity undertaken within the waterway. It is noted that pH levels were consistent between upstream and downstream sites and are thus unlikely to be attributable to construction impacts.

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

Nambucca River upstream (71.3 NTU) and downstream (68.8 NTU). It is noted that levels decreased from upstream to downstream sites and are thus unlikely to be attributed to construction impacts. It is also noted that wind chop along the bank was stirring sediment from the bank up, which may have increased NTU levels to above trigger levels.

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

Upper Warrell Creek upstream (1.45mg/L) and downstream (1.38mg/L). A potential reason for this is the large amount of rainfall before this wet event (approximately 362mm in the 8 days preceding the monitoring), resulting in decaying vegetative matter being washed into the waterway and reducing the DO levels.

Stony Creek upstream (1.74mg/L) and downstream (1.56mg/L). A potential reason for the low levels is the large amount of rainfall before this wet event (approximately 362mm in the 8 days preceding the monitoring), resulting in decaying vegetative matter being washed into the waterway and reducing the DO levels.

Lower Warrell Creek upstream (0.41mg/L and downstream (0.41mg/L). It is noted that levels remained consistent form upstream to downstream sites and are thus unlikely to be attributable to construction impacts. A potential reason for the low levels is the large amount of rainfall before this wet event (approximately 362mm in the 8 days preceding the monitoring), resulting in decaying vegetative matter being washed into the waterway and reducing the DO levels.

Gumma Wetlands upstream (0.41mg/L, 0.04mg/L) and downstream (0.28mg/L). A potential reason for the low levels is the large amount of rainfall before this wet event (approximately 362mm in the 8 days preceding the monitoring), resulting in decaying vegetative matter being washed into the waterway and reducing the DO levels.

Nambucca River upstream (1.3mg/L) and downstream (1.31mg/L). Levels were consistent between upstream and downstream sites and are thus unlikely to be as a result of construction impacts. A potential reason for this is the large amount of rainfall before this wet event (approximately 362mm in the 8 days preceding the monitoring), resulting in decaying vegetative matter being washed into the waterway and reducing the DO levels.

#### Dry Sampling Event

A "dry" sampling event was undertaken on the 27<sup>th</sup> March 2017, field testing and lab sampling was undertaken. Results are attached in Appendix A.

#### pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded low pH levels downstream (6.44). All controls were in place for the site. These levels were also consistent with the upstream site (6.74) and thus unlikely to be attributable to construction impacts.

Nambucca River recorded elevated pH levels upstream (7.71) and downstream (7.52). It is noted that the trigger levels for Nambucca River are pH 7, with anything outside of this result being outside of trigger levels.

#### Conductivity was noted to be outside trigger levels at:

Nambucca River upstream (10.4mS/cm) and downstream (10.4mS/cm). Levels were consistent from upstream to downstream sites and are thus unlikely to be attributable to construction impacts. A potential cause for the low levels is the high amount of rainfall in March 2017 (442.6mm to the 27<sup>th</sup> March), resulting in lower salinity levels of the waterway due to freshwater run-off entering the waterway.

Unnamed Creek Gumma East upstream (0.248mS/cm). All controls were in place for the site. As the result is upstream of the construction site it is unlikely to be attributable to construction impacts.

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

Stony creek recorded elevated levels downstream (6.0 NTU). All controls were verified to be in place for the site Upstream recorded lower levels (1.2 NTU). It is noted that levels are only very slightly above trigger levels (5.97 NTU 80<sup>th</sup> percentile trigger level).

Lower Warrell Creek recorded elevated levels upstream (7.3 NTU) and downstream (12.9 NTU). All controls were verified to be in place for the site. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

Unnamed Creek Gumma West recorded elevated levels upstream (88.1NTU). All controls were verified to be in place for the site, with no active construction being undertaken within the waterway. As this location is upstream of the construction site it is unlikely that this elevated NTU reading is attributable to construction activities.

Nambucca River recorded elevated levels upstream (158 NTU) and downstream (85.2 NTU). All controls were verified to be in place for the site, with no activities

being undertaken within the waterway. It is noted that wind chop was stirring sediment up with the water along the edge of the Nambucca River, which may have contributed to the exceedance. It is also noted that levels decreased from upstream to downstream sites and are thus unlikely to be attributable to construction activities.

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

Stony Creek downstream (2.98mg/L). All controls were verified to be in place for the site, with no construction activities undertaken within the waterway. The reduced levels may be due to decaying vegetative matter within the waterway.

Lower Warrell Creek upstream (4.21mg/L) and downstream (3.19mg/L). All controls were verified to be in place for the site. The reduced levels may be due to decaying vegetative matter within the waterway.

Nambucca River upstream (5.53mg/L) and downstream (5.21mg/L). All controls were verified to be in place for the site, with no construction activities undertaken within the waterway. The reduced levels may be due to decaying vegetative matter within the waterway. It is noted that these levels are within ANZECC criteria (5mg/L).

Unnamed Creek Gumma East upstream (0.46mg/L) and Unnamed Creek Gumma West upstream (0.45mg/L). The reduced levels may be due to decaying vegetation matter within the waterway. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

#### Temperature noted to be above trigger levels at:

Lower Warrell Creek upstream (28.36°C) and Lower Warrell Creek downstream (28.62°C). This is outside of the 80<sup>th</sup> percentile trigger value of 27.9°C, however only slightly. As both upstream and downstream temperatures were above the trigger value it is unlikely that this is attributable to construction activities. In addition, it should be noted that the temperature for both upstream and downstream were comparable.

#### Metals noted to be above trigger levels at:

Stoney Creek recorded elevated levels of manganese upstream (0.069mg/l) and downstream (0.053mg/l). Manganese levels were also noted to be within ANZEEC criteria (1.9mg/l). It should also be noted that the level of manganese decreased from the upstream to downstream sample and therefore this elevated level of manganese is unlikely to be attributable to construction activities.

Lower Warrell Creek recorded elevated levels of Nickel (0.005mg/l) at both the upstream and downstream sample locations. As no change was found between upstream and downstream samples it is unlikely that this elevated level is attributable to construction activities. Zinc was also noted to be above trigger values (0.022mg/l) upstream and (0.02mg/l) downstream. It is noted that Zinc levels were within ANZECC criteria (0.008mg/l). Aluminium was also noted to be elevated downstream (0.1mg/l) which is above the 80<sup>th</sup> percentile trigger level of 0.06mg/l. It should be noted that this monitoring event occurred after a large

volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

Nambucca River recorded elevated levels of manganese upstream (0.147mg/l) and downstream (0.156mg/l). It should be noted that both upstream and downstream samples returned an elevated level of manganese above the 80<sup>th</sup> percentile trigger value of 0.03mg/l. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

Unnamed Creek Gumma West upstream returned elevated levels of Arsenic (0.007mg/l), Lead (0.929mg/l), Manganese (0.002mg/l), Zinc (0.01mg/l) and Iron (5.91mg/l). Unnamed Creek Gumma East upstream returned elevated levels of Aluminium (0.12mg/l), Arsenic (0.006mg/l), Lead (0.449mg/l), Manganese (0.004mg/l) and Zinc (0.007mg/l). All controls were verified to be in place for the site with no construction activities being undertaken attributable to these elevated readings. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to the adjacent agricultural and waste water treatment activities and associated runoff.

Nutrients noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of Total Nitrogen (0.7mg/l) and Nitrate (0.14mg/l) upstream. Upper Warrell Creek recorded elevated levels of Nitrate (0.09mg/l) downstream. It should be noted that although Nitrate was above the 80<sup>th</sup> percentile trigger level for Upper Warrell Creek that the level decreased from upstream to downstream and therefore is unlikely to be attributable to construction activities. It should also be noted that Total Nitrogen was also below trigger values at the downstream monitoring location.

Stoney Creek recorded elevated levels of Nitrate (0.17mg/l) upstream and (0.19mg/l) downstream. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

Lower Warrell Creek recorded elevated levels of Total Nitrogen (0.7mg/l) upstream and (0.8mg/l) downstream. Lower Warrell Creek also recorded elevated levels of Total Kjeldahl Nitrogen (0.6mg/l) upstream and (0.6mg/l) downstream. Lower Warrell Creek also recorded elevated levels of Nitrate (0.14mg/l) upstream and (0.19mg/l) downstream. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to this rain event.

Unnamed Creek Gumma East upstream recorded an elevated level of Total phosphorous upstream (0.15mg/l) which is slightly higher than the 80<sup>th</sup> percentile trigger level of 0.12mg/l. It should be noted that this monitoring event occurred after a large volume of rainfall (203.2mm from 18<sup>th</sup> to 21<sup>st</sup> March 2017) and these elevated results may be attributable to the adjacent agricultural and waste water treatment activities and associated runoff.

TSS noted to be above trigger levels at:

Stoney Creek downstream recorded an elevated TSS result of 6mg/l. This is just above the 80<sup>th</sup> percentile trigger value of 5.8mg/l. It should be noted that Stoney Creek upstream returned a TSS result of 8mg/l (within 80<sup>th</sup> percentile trigger level) and therefore as TSS has decreased from upstream to downstream it is therefore unlikely that this elevated level is attributable to construction activities.

## 4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins after rainfall events on the 1<sup>st</sup>-2<sup>nd</sup>, 5<sup>th</sup>-6<sup>th</sup>, 14<sup>th</sup>-21<sup>st</sup>, 25<sup>th</sup>-27<sup>th</sup>, and 30<sup>th</sup>-31<sup>st</sup> March 2017. A statistical correlation has been developed which identified the relationship between Turbidity (NTU) and Total Suspended Solids (TSS) for water quality in the WC2NH Project sediment basins in order to determine the NTU equivalent of 50mg/L TSS. This statistical correlation has been developed to meet EPL Licence No 20533 Condition L2.7 to determine compliance with the Water and/or Land Concentration Limits Condition L2.4. A positive correlation has been calculated between Total Suspended Solids (TSS) and Turbidity (NTU) ( $R^2 = 0.5953$ , p< 0.00001, n=184). The regression equation for the analytical results calculates a turbidity (NTU) value of 124.776 for a TSS value of 50mg/L. A safety factor of 30% has been applied to the NTU result of the correlation, providing a turbidity (NTU) value of 87.3432, rounded to an NTU value of 85. To measure NTU in the field a Horiba U-52G multiparameter 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:

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	рН (6.5- 8.5)	Turbidity (NTU) (Limit <90 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
2/03/2017	B42.80	Ν	6.81	25.2		600	
2/03/2017	B43.75	Ν	7.85	33.9		400	
2/03/2017	B44.44	Ν	7.77	66.4		600	
2/03/2017	B45.00	Ν	7.65	22.8		800	
2/03/2017	B45.64	Ν	7.46	41.7		300	
2/03/2017	B47.17	Ν	7.06	33.1	<5	200	
2/03/2017	B48.30	Ν	7.32	1.8		100	
2/03/2017	B49.20	Ν	7.54	19.7		300	
2/03/2017	B49.67	Ν	6.79	21.5	7	700	
2/03/2017	B60.87	Ν	7.96	49.3		300	
3/03/2017	B45.50	Ν	6.92	56.2		200	
3/03/2017	B47.96	Ν	6.75	33.2		300	
3/03/2017	B48.46	N	6.69	43.7		800	

#### Table 3 – Water Release Register March 2017

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	рН (6.5- 8.5)	Turbidity (NTU) (Limit <90 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
3/03/2017	B49.67	N	6.82	11.7		800	
3/03/2017	B53.03	N	8.14	22	12	300	
3/03/2017	B58.45	N	8.06	75.6		900	
3/03/2017	B60.5	N	7.70	43.2	20	450	
3/03/2017	B60.58	N	7.86	69.3		200	
4/03/2017	B48.46	N	6.6	26.3		500	
4/03/2017	B49.67	N	6.78	12.1		600	
4/03/2017	B53.5	N	7.92	33.5		1000	
4/03/2017	B55.17B	N	8.01	26.3		300	
4/03/2017	B55.5	N	7.03	54.6		400	
4/03/2017	B57.7	N	7.55	39.3		700	
4/03/2017	B58.10	N	8.01	31.7		900	
4/03/2017	B58.6	N	7.76	21.6		700	
4/03/2017	B60.3	N	7.82	31.6		300	
4/03/2017	B60.85	N	6.92	49.3		400	
4/03/2017	B61.25	N	7.16	29.6		800	
7/03/2017	B53.5	N	7.35	52.8	<5	1000	
7/03/2017	B47.96	N	6.93	19.6	<5	300	
7/03/2017	B48.30	Ν	6.63	35.2	<5	100	
7/03/2017	B49.67	N	6.8	10.1	<5	700	
7/03/2017	B53.03	Ν	6.96	19.2		200	
7/03/2017	B60.5	Ν	7.30	79.6		480	
7/03/2017	B60.58	Ν	7.21	43.1		200	
8/03/2017	B41.20	Ν	6.98	61.7		600	
8/03/2017	B42.30	Ν	7.12	25.5		450	
8/03/2017	B42.80	Ν	7.68	10.2		700	
8/03/2017	B43.75	Ν	7.95	48.6		400	
8/03/2017	B44.44	N	8.16	58.3		300	
8/03/2017	B45.00	N	7.75	38.5	8	450	
8/03/2017	B45.50	N	7.32	42	5	500	
8/03/2017	B45.64	Ν	7.33	20.2	<5	400	
8/03/2017	B47.14	N	7.29	7.5		400	
8/03/2017	B47.96	Ν	6.82	17.1		300	
8/03/2017	B48.46	Ν	6.59	30	<5	400	
8/03/2017	B49.20	Ν	6.98	61.7		600	
8/03/2017	B49.67	N	7.01	29.9		800	
8/03/2017	B53.8	Ν	8.41	11.6		1700	
8/03/2017	B53.9	N	7.21	10.2		1500	
9/03/2017	B42.30	N	6.82	27		100	
9/03/2017	B48.46	Ν	6.95	32.3		250	
9/03/2017	B49.67	Ν	6.57	41		500	

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	рН (6.5- 8.5)	Turbidity (NTU) (Limit <90 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
9/03/2017	B55.17B	N	7.00	17.3		300	
9/03/2017	B57.70	N	7.12	56.3		600	
9/03/2017	B58.10	N	7.51	62.9		900	
9/03/2017	B58.45	N	8.01	83		800	
9/03/2017	B60.3	N	7.02	64.6		300	
9/03/2017	B60.87	Ν	7.12	34.6		300	
9/03/2017	B61.25	N	7.94	21.1		800	
10/03/2017	B53.9	N	7.62	72.6		2000	
10/03/2017	B58.6	N	8.21	46.4		600	
10/03/2017	B59.78	N	7.82	31.3		700	
10/03/2017	B59.85	N	7.81	63.2		900	
10/03/2017	B55.5	Ν	7.86	79.6	9	400	
11/03/2017	B55.0	N	7.86	72.1		1000	Decommissioned - sump
11/03/2017	B55.8	N	7.56	59.3		900	Decommissioned - sump
13/03/2017	B55.0	Ν	7.45	49.6		1000	Decommissioned - sump
16/03/2017	B42.80	Ν	6.73	28.9		500	
17/03/2017	B49.67	N	7.17	12.7		800	
17/03/2017	B48.30	Ν	7.62	25.6		300	
17/03/2017	B53.00	Ν	7.56	58		500	
20/03/2017	B42.80	Ν	6.68	41.9		800	
20/03/2017	B48.30	Ν	7.01	30.6		400	
20/03/2017	B53.8	Ν	7.51	25.1		1500	
21/03/2017	B45.64	Ν	6.64	22.7		800	
21/03/2017	B48.30	Ν	6.86	47.2		500	
21/03/2017	B49.45	Ν	6.59	71.1		1400	
21/03/2017	B49.67	Ν	6.78	38.7		800	
21/03/2017	B53.03	Ν	7.77	26.3		280	
22/03/2017	B42.30	Ν	6.69	22.4		800	
22/03/2017	B47.14	Ν	6.67	59.9		600	
22/03/2017	B48.46	Ν	6.58	16.4		800	
22/03/2017	B49.20	Ν	7.56	47.2		600	
22/03/2017	B60.58	Ν	7.8	41.9		230	
22/03/2017	B60.5	Ν	7.58	81.6		470	
23/03/2017	B42.30	Ν	6.72	26.7		800	
23/03/2017	B47.96	Ν	6.66	25.8		500	
23/03/2017	B59.78	Ν	7.88	51.2		870	
23/03/2017	B59.85	Ν	6.9	83.4		1000	
23/03/2017	B57.7	Ν	8.19	43.9		780	

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	рН (6.5- 8.5)	Turbidity (NTU) (Limit <90 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
23/03/2017	B53.9	Ν	7.73	76.9		1500	
23/03/2017	B53.00	Ν	7.29	74.6		1300	
23/03/2017	B53.50	Ν	6.8	66.3		2030	
23/03/2017	B60.85	Ν	8.13	27.8		440	
24/03/2017	B58.10	Ν	7.11	37		1020	
24/03/2017	B55.5	Ν	7.82	71.8		480	
24/03/2017	B55.17B	Ν	7.63	47.3		370	
24/03/2017	B53.9	Ν	7.39	67.8		1000	
25/03/2017	B61.25	Ν	7.11	80.2		850	
25/03/2017	B60.3	Ν	7.41	56		355	
25/03/2017	B58.6	Ν	7.29	49.6		700	
25/03/2017	B57.25	Ν	8	61.3		760	
25/03/2017	B53.00	Ν	6.81	59.9		1000	
27/03/2017	B60.87	Ν	6.91	46.9		355	
27/03/2017	B55.8	N	7.29	59.4		1000	Decommissioned - sump
28/03/2017	B55.0	N	6.99	74.8		2000	Decommissioned - sump
31/03/2017	B42.8	Ν	6.66	37.2		800	

## 5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 13<sup>th</sup> and 29<sup>th</sup> of March 2017 at eight locations near to construction works. Monitoring results are available in Appendix A, Table 2.

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

## 6. Vibration Monitoring

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

## 7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from 2<sup>nd</sup> February 2017 to 6<sup>th</sup> March 2017. DDG results are available in Appendix A.

All dust deposition gauges were below the level of concern for Total Insoluble Matter (TIM) and Ash Content (AC) (4g/m2.month or increase of 2g/m2/month) during the monitoring period, with the exception of DDG5 (located at Gumma

Road). This gauge recorded a level of 25.1g/m2.month for Total Insoluble Matter (TIM) and 22.7g/m2.month for Ash Content (AC). It is noted that the result is very unusual for the area due to the high amount of rainfall received during the monitoring period (169.4mm from 2<sup>nd</sup> February 2017 to 6<sup>th</sup> March 2017), with minimal construction activities being undertaken in the area, as well as the nearby abutment being hydromulched in October 2015 and a high cover percentage achieved. It is therefore unlikely that the source of the exceedance is due to construction activities. This gauge has had similar issues in the past (very high readings despite minimal activities in the area). Pacifico will investigate installing an additional gauge if the issue continues. Surfactant additives have been, and will continue to be utilised on site in water carts to assist with dust mitigation Dust mitigation measures including water carts and wetting of quarry material before arrival to site will continue.

## 8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on 23<sup>rd</sup> of March 2017. Field testing and lab sampling was undertaken. The results from the groundwater monitoring is available in Table 4 of Appendix A.

pH levels noted to be outside of trigger levels at:

4BH037a – Cut 12 (7.26). It is noted that this bore has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

#### Conductivity noted to be outside of trigger levels at:

4BH037a – Fill 15 (10.10mS/cm). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint.

## 9. Acoustic Investigations

Acoustic Investigations (modelling) have been conducted and approved for several Out of Hours Works proposed to model impact on residents during the month of March 2017. A summary of these approvals is below in Table 4.

## Table 4 – February Out of Hours Works approved under L4.2 (d) Acoustic Investigation (Modelled)

OOH Request Title	>5dB(A) above background	Approval Date
Asphalt Batch Plant Night Deliveries	N	1/3/2017
Backfill Pergola	N	1/3/2017
Quarry Bridge Steelfixing and Formwork	N	1/3/2017
Installation of Bearing Pads at Floodplain		
Bridge 1	Ν	8/3/2017

OOH Request Title	>5dB(A) above background	Approval Date
Installation of Bearing Pads and Planks at		
Floodplain Bridge 1	N	8/3/2017
Crane Mobilisation Quarry Access Bridge	N	30/3/2017

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

- Water cart usage over the weekend;
- Running of various pumps and generators;
- Northern Earthworks extended hours in sparsely populated area in the northern zone;
- Nambucca River structures concreting works north of Pier 7 approved in previous months;
- SMZ conditioning through the northern portion of the Project;
- Concreting at Cut 2;
- Wet curing in the pergola at cut 2;
- Washout concrete paver CC05;
- Cut 21 long drainage, subsoil installation, SMZ trimming;
- Old Coast Road North Bridge concreting, formworks, steel fixing;
- Backfilling of Railway Pergola;
- Lower Warrell Creek Bridge deck pours;
- Washing out of tipper trucks;
- Refuelling in designated zones;
- Floodplain Bridge 2 concreting works; and
- Old Coast Road North Bridge concreting works;

## 10. Complaints

## 9.1 Summary of Complaints for the month of March 2017

06/03/2017 – Resident contacted Pacifico by email regarding two project vehicles used private driveway as a turn-around on the same day. Northern Superintendent and environment team counselled both vehicle drivers regarding inappropriate use of private driveways for the project activities. Project Wide reminder was also completed during the Toolbox on the same week. 15/03/2017 – Resident contacted Pacifico by phone regarding rainfall run-off is running into his dam from the alignment. Community attended site for inspection. Resident attended Community Information Session that evening to speak with construction managers and RMS personnel about the situation. Next day current drains were augmented to ensure flow re-directed away from property. Other mitigation measures applied to drains and vegetation. Water quality samples taken, results received with no water quality issues identified. Feed purchased for cattle. Permanent drain construction likely mid-April 2017.

16/03/2017 – Resident contacted Pacifico by phone regarding Rainfall run-off flowing off embankment and from basin onto their property causing a hazard. Northern superintendent inspected site immediately and advised driveway entrance was clean of silt and mud, not in a condition that could cause a hazard. Basin inlet was functioning correctly and concentrated water had not been washing across the road. Water was tested and flocking occurred under the normal process. When the basin met water quality standards it was pumped over the alignment to the south. RMS readvised that the Northern Superintendent would call the resident to close the issue out later on the day of the complaint.

16/03/2017 – Resident contacted Pacifico by email believes project vehicle related damaged to Old Coast Road had caused drainage and run-off issues impacting his property. The location is a natural "sag-point" on Old Coast Road and near a Council water main. For safety reasons Pacifico placed road signage for motorists and then contacted Council to notify of this damage. CM Pacifico reiterated to Council a day later that it is Council's responsibility to clean culverts and maintain this type of issue. Resident advised of this outcome.

18/03/2017 – Resident contacted Pacifico by email regarding concerned about motorist's safety on Old Coast Road because of damage he alleges is due to project vehicle related damage and lack of appropriate maintenance. Pacifico placed road signage a day after the complaint was made. Pacifico notified Council the road and culvert repairs and maintenance at this location were Council's responsibility – it is a natural "sag-point" near Council culverts and water main. Resident was informed. A neighbourly gesture was also completed by AFJV and the nearby Council culvert was cleaned prior to large rainfall event, however, Resident was advised that Council see this as the property owners responsibility.

19/03/2017 – Resident contacted Pacifico by email regarding an ongoing matter requesting for repairs to be done inside property due to material placed by project June 2016. RMS requested Pacifico to place the material, No decision to repair has been made at this time, but options are being investigated and discussed by RMS and Pacifico. Community Team have inspected the site.

24/03/2017 – Resident contacted Pacifico by phone asked that the current syphon not be used as it was moving silt onto the rear of his property. He also asked why the nearby basin had not been emptied in the past eight days after the recent heavy rainfall event. Environmental Manager had inspected the site earlier on the day of the call from the resident. She noted several maintenance items such as the inlet that will be fixed in the next few weeks. The ground was wet after a significant rainfall event, but once safe to access the routine maintenance was carried out and a new syphon installed. Resident admitted to damaging the previous syphon.

At the time of his call the basin had been emptied but a small amount of water remained to ensure silt was not transferred to his property. Resident was called back and advised of this information two days later, after several attempts to contact him. Further issues were then discussed. 29/03/2017 – Resident contacted Pacifico by phone regarding dust. Requested a water truck to suppress dust near Albert Drive as they are currently selling their house and having buyer inspections. Superintendent immediately notified, truck dispatched to the location and dust suppressed.

## 11.Non-Compliance

## 11.1 Summary of Non-compliances

An incident was reported to ACCIONA by the EPA during the monthly ERG meeting on the 7<sup>th</sup> March 2017 in relation to a potential leak in a sediment basin B56.75. The basin was immediately dewatered to watercarts and the walls were shotcreted in an attempt to control the leak. However, after subsequent rainfall, it was noted that the basin was seeping into a nearby drainage line approximately 30m south of the basin. The basin was continuously dewatered to water carts. The catchment area entering the basin was stabilised with soil binder and hydromulch. A letter was provided by the Project Soil Conservationist so the basin could be decommissioned. The EPA have provided approval to decommission the basin in accordance with the EPL conditions. The basin is currently being decommissioned and backfilled. The basin will be replaced with local management area controls.

## Appendix A – Monitoring Results

Location	Units	Levels of	f Concern	ч	lpper Warrell Cro	eek	ч	lpper Warrell Cre	eek		Stony Creek			Stony Creek		Lo	w er Warrell Cre	eek	L	ow er Warrell C	reek	Unnam	ned Creek Gumma	West	Unnar	med Creek Gum	ma East	Unnam	ed Creek Gumma	a North	Na	mbucca River Sou	uth	Nan	nbucca River So	uth
					Upstream			Dow nstream			Upstream			Dow nstream			Upstream			Dow nstream	n		Upstream			Upstream			Dow nstream			Upstream			Dow nstream	
Freshwater / Estuarine		ANZECC 2000	0 95% species		Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater	,		Freshw ater			Freshw ater			Freshw ater			Estuarine			Estuarine	
Date of Sampling		prote	ected		6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17	
Time of Sampling		Freshw ater	Marine		4:20 PM			4:13 PM			3:40 PM			3:28 PM			2:22 PM			2:11 PM			4:52 PM			4:50 PM			4:40 PM			3:03 PM			2:44 PM	
Comments																				Flooded		Water	level too low to s	ample	Water	level too low to	sample	Water	level too low to s	sample						
Туре				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																																				1
Aluminium	mg/L	0.055	-	0.244	0.0162	0.03	0.194	0.016	< 0.01	0.098	0.02	< 0.01	0.114	0.01	< 0.01	0.28	0.01	< 0.01	0.28	0.01	0.01	0.25	0.02	-	0.25	0.02	-	0.25	0.02	-	0.11	0.01	0.24	0.11	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	0.001	0.001	0.006	0.001	0.001	0.005	0.002	0.001	0.005	0.002	0.001	0.003	0.001	0.001	0.008	0.001	0.001	0.01	0.002	0.001	-	0.002	0.001	-	0.002	0.001	-	0.002	0.001	< 0.010	0.002	0.001	< 0.010
Cadmium	mg/L	0.0002	0.0055	-	-	< 0.0001	-	-	< 0.0001	-	-	< 0.0001	-	-	< 0.0001	0.0002	0.0001	0.0001	0.0002	0.0001	0.0002	-	-	-	-	-	-	-	-	-	-	-	< 0.0010	-	-	< 0.0010
Chromium	mg/L	0.001	0.0044	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001			< 0.001			< 0.001	-	-	-	-	-	-	-	-	-	-	-	< 0.010	-	-	< 0.010
Copper	mg/L	0.0014	0.0013	-	-	0.02	-	-	0.012	-	-	0.007	-	-	0.006			0.042			0.044	0.001	0.001	-	0.001	0.001	-	0.001	0.001	-	0.001	0.001	<0.010	0.001	0.001	< 0.010
Lead	mg/L	0.0034	0.0044	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001			< 0.001			< 0.001	-	-	-	-	-	-	-	-	-	-	-	<0.010	-	-	< 0.010
Manganese	mg/L	1.9	0.08	0.3	0.01	0.29	0.158	0.0178	0.16	0.0726	0.0218	0.063	0.083	0.0164	0.054	0.35	0.087	0.234	0.35	0.087	0.217	0.49	0.011	-	0.49	0.011	-	0.49	0.011	-	0.076	0.006	0.041	0.076	0.006	< 0.010
Nickel	mg/L	0.011	0.07	-	-	< 0.001	-	-	0.002	-	-	< 0.001	-	-	0.003	0.0034	0.001	0.001	0.0034	0.001	0.002	0.002	0.001	-	0.002	0.001	-	0.002	0.001	-	-	-	< 0.010	-	-	< 0.010
Selenium	mg/L	11	•	-	-	< 0.01	-	-	<0.01	-	-	< 0.01	-	-	<0.01	-		<0.01	-	-	< 0.01	-	-	-	-	-	-	-	-	-		-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-		< 0.001	-	-	< 0.001	-	-	-	-	-	-	-	-	-		-	<0.010	-	-	< 0.010
Zinc	mg/L	0.008	0.015	0.007	0.005	< 0.005	0.0062	0.0042	< 0.005	0.0064	0.005	< 0.005	0.006	0.005	0.007	0.018	0.005	0.008	0.018	0.005	0.01	0.011	0.005	-	0.011	0.005	-	0.011	0.005	-	0.005	0.005	0.05	0.005	0.005	<0.050
Iron	mg/L	-	•	1.38	0.48	0.3	0.99	0.366	<0.05	1.4	0.41	0.31	1.48	0.35	<0.05	0.52	0.05	<0.05	0.52	0.05	0.12	1.65	0.37	-	1.65	0.37	-	1.65	0.37	-	0.26	0.05	<0.10	0.26	0.05	<0.10
Mercury	mg/L	0.0006	0.0004	-	-	< 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		-	16			16		-	50		NA	50		NA
C6 - C10 Fraction	μg/L	-	•	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	μg/L	-	•	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-	-		NA	-		NA
>C10 - C16 Fraction	μg/L	-		-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		•	-		-	-		-	-		NA	-		NA
>C16 - C34 Fraction	μg/L	-	•	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-			-		-	-		NA	-		NA
>C34 - C40 Fraction	μg/L	-	•	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-			-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	μg/L	-	•	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		•	-			-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	μg/L			-		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		-	950			950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180			180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80			80			80		-	5		NA	5		NA
o Yulopo	µg/L	-	250	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-			-		-	-		NA	-		NA
Yulanas - Total	µg/L	550	550	350		NA NA	350		NA NA	350		NA	300		NA	350		NA NA	300		NA	300		· ·	300			300		-	350		NA	350		NA
Sum of BTEX	µg/L			-		NA NA	-		NA			NA	-		NA NA	-		NA NA	-		NA	-			-			-		-	-		NA	-		NA NA
Nutrients	µg/L			-		NA	-		NA			NA	-		NA	-		NA	-		NA	-		-	-			-		-	-		NA	-		NA
Total Phosphorus	ma/l	0.05	0.03	0.05	0.02	0.02	0.044	0.016	0.05	0.02	0.016	0.02	0.024	0.01	<0.01	0.04	0.01	<0.0E	0.04	0.01	<0.05	0.11	0.02		0.11	0.02		0.11	0.02		0.07	0.02	<0.0E	0.07	0.02	<0.0E
Phosphate (reactive phosphorus)	mg/L			0.05	0.02	0.02	0.044	0.010	c0.05	0.05	0.0022	<0.02	0.034	0.002	<0.01	0.04	0.00	<0.03	0.04	0.00	<0.03	0.11	0.05	-	0.012	0.005		0.012	0.05	-	0.07	0.02	<0.03	0.07	0.02	<0.03
· · · · · · · · · · · · · · · · · · ·				0.01	0.0054	~U.UI	0.01	0.004	~U.UI	0.010	0.0022	~U.UI	0.01	0.005	~0.01	0.011	0.000	~0.01	0.011	0.000	NU.U1	0.015	0.005		0.015	0.005		0.015	0.005		0.029	0.01	~U.UI	0.029	0.01	~0.01
Total Nitrogen	ma/L	0.5	0.3	0.56	0.2	0.5	0.52	0.2	0.4	0.49	0.2	0.2	0.62	0.2	0.2	0.54	0.21	∠0.5	0.54	0.21	0.6	2.1	0.0		21	0.0		21	0.0		0.46	0.2	<0.5	0.46	0.2	<05
Total Kjeldahl Nitrogen	ma/L	-		0.50	0.3	0.5	0.52	0.2	0.4	0.40	0.2	0.3	0.05	0.2	0.3	0.54	0.31	<0.5	0.54	0.51	0.6	2.8	0.9	-	2.8	0.5		2.8	0.9		0.40	0.2	<0.5	0.40	0.2	<0.5
	3			0.5	0.5	0.5	0.5	0.2	0.4	0.34	0.2	0.5	0.0	0.2	0.2	0.5	0.2	~0.5	0.5	0.2	0.0	2.0	0.0		2.0	0.0		2.0	0.0		0.5	0.2	-0.5	0.5	0.2	-0.5
Nitrate	mg/L	0.7		0.102	0.01	<0.01	0.054	0.01	<0.01	0.208	0.01	<0.01	0.2	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.03	0.01		0.03	0.01		0.03	0.01	-	0.04	0.01	<0.01	0.04	0.01	<0.01
Nitrite	mg/L			-	-	<0.01	-	-	<0.01	-	-	0.01	0.02	0.01	0.09	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01		0.02	0.01		0.02	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9		0.036	0.01	0.01	0.02	0.01	<0.01	0.046	0.02	<0.01	0.062	0.012	0.02	0.116	0.022	<0.01	0.116	0.022	<0.05	0.06	0.01	-	0.06	0.01		0.06	0.01	-	0.15	0.024	<0.05	0.15	0.024	<0.01
TSS	-																																			
TSS	mg/L	<40	<10	19	5	9	12.8	5	<5	14.8	5	<5	8.7	5	6	25	5.5	<5	25	5.5	<5	350	9	-	350	9	-	350	9				<5			<5
Lab Physical data (no field data available)															-											-										
Temperature	С			24.3	16.27	24.96	24.52	16,79	25.37	23.98	17.36	22.99	24.7	17.65	23.19	25.9	19.5	27.56	25.9	19.5	28.87	25.84	19.1	-	25.84	19.1		25.84	19.1	-	26.56	21.32	28.79	26.56	21.32	28.83
pН	pН		6.5-8	7.478	6.23	7.34	7,192	6.42	7.54	7.138	6.61	7.56	6.98	6.21	8.18	6.86	6.46	6.98	6.86	6.46	6.82	6.9	6.08	-	6.9	6.08		6.9	6.08	-	7.56	6.58	7.65	7.56	6.58	7.71
Conductivity	mS/cm	0.125-2.2		0.3204	0.20184	0.187	0.3242	0.19076	0.228	0.313	0.2024	0.124	0.309	0.20188	0.314	20.918	0.50928	28	20.918	0.50928	29.6	0.842	0.334	-	0.842	0.334		0.842	0.334	-	48.42	12.65	45.9	48.42	12.65	45.9
Turbidity	NTU	50	10	26.16	5.94	32.9	27.32	3.72	15.9	14.98	3.34	20.4	17.16	4.59	61.7	26.1	2.4	5	26.1	2.4	5.5	66.8	11.6	-	66.8	11.6	-	66.8	11.6	-	19.04	5.81	31.2	19.04	5.81	43
Dissolved Oxygen	mg/L	5	5	7.43	1.5	3.18	6.88	2.28	2.52	8.472	5.08	5.09	7.59	2.63	5.83	6.65	5.02	5.49	6.65	5.02	5.61	7.3	1.78	-	7.3	1.78		7.3	1.78	-	8.47	6.88	5.37	8.47	6.88	5.58
Dissolved Oxygen	%			-		39.2	-		31.2	-		60.8	-		69.8	-		77.6	-		81.3	-		-	-		-	-		-	-		83.5	-		86.8
TDS	g/L	-	-	-		0.121	-		0.153	-		0.088	-		0.21	-		17.4	-		18.3	-		-	-		-	-		-	-		28.0	-		28
		Taken from	ANZECC gui	idelines 95%	protected si	pecies levels	s where no 80	0/20 trigger v	alues provid	led																										
		Taken from	alternative	trigger level	s provided in	n ANZECC W	/ater Guidelir	nes Volume :	1 and Volum	e 2 where insi	ufficient dat	a was availa	able for 95%																							
		Exceedance	es of trigger	values																																

#### Table 1a - Surface Water Sampling Results March 2017 – Wet Event

#### Table 1b – Surface Water Results March 2017 – 2<sup>nd</sup> Wet Event

Location	Units	Levels o	f Concern	L	Ipper Warrell Cr	eek	U	pper Warrell Cre	eek		Stony Creek			Stony Creek		Lo	w er Warrell Cre	eek	L	ow er Warrell C	reek	Unnarr	ed Creek Gumma	West	Unna	med Creek Gum	nma East	Unnar	ned Creek Gumma	a North	Na	mbucca River So	outh	Na	ambucca River So	uth
					Upstream			Dow nstream			Upstream			Dow nstream			Upstream			Dow nstream	n		Upstream			Upstream			Dow nstream			Upstream			Dow nstream	
Freshw ater / Estuarine		ANZECC 200	0 95% species		Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Estuarine			Estuarine	
Date of Sampling		prot	ected		21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17	
Time of Sampling		Freshw ater	Marine		12:22 PM			12:13 PM			12:43 PM			12:35 PM			10:45 AM			10:40 AM			11:41 AM			11:52 AM			11:35 AM			11:09 AM			11:03 AM	
Comments							Wa	ater above cros	sing								Flooded			Flooded																
Туре				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
Lab Physical data (no field data available)																																				
Temperature	С			24.3	16.27	22.09	24.52	16.79	22.45	23.98	17.36	22.02	24.7	17.65	22.96	25.9	19.5	22.81	25.9	19.5	22.69	25.84	19.1	23.72	25.84	19.1	23.07	25.84	19.1	23.6	26.56	21.32	23.23	26.56	21.32	23.46
pН	pH		6.5-8	7.478	6.23	5.93	7.192	6.42	5.94	7.138	6.61	6.62	6.98	6.21	6.55	6.86	6.46	6.20	6.86	6.46	5.56	6.9	6.08	5.8	6.9	6.08	5.52	6.9	6.08	5.79	7.56	6.58	6.78	7.56	6.58	6.69
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.12	0.3242	0.19076	0.121	0.313	0.2024	0.138	0.309	0.20188	0.159	20.918	0.50928	0.185	20.918	0.50928	0.419	0.842	0.334	0.345	0.842	0.334	0.389	0.842	0.334	0.257	48.42	12.65	0.877	48.42	12.65	0.776
Turbidity	NTU	50	10	26.16	5.94	25.4	27.32	3.72	24.7	14.98	3.34	11.5	17.16	4.59	12.7	26.1	2.4	39.9	26.1	2.4	23	66.8	11.6	20.2	66.8	11.6	26.8	66.8	11.6	24.3	19.04	5.81	71.3	19.04	5.81	68.8
Dissolved Oxygen	mg/L	5	5	7.43	1.5	1.45	6.88	2.28	1.38	8.472	5.08	1.74	7.59	2.63	1.56	6.65	5.02	0.7	6.65	5.02	0.01	7.3	1.78	0.41	7.3	1.78	0.04	7.3	1.78	0.28	8.47	6.88	1.3	8.47	6.88	1.31
Dissolved Oxygen	%			-		17	-		16.3	-		20.4	-		18.6	-		8.4	-		0.1	-		4.9	-		0.5	-		3.4	-		15.6	-		15.7
TDS	g/L		-	-		0.080	-		0.081	-		0.093	-		0.106	-		0.125	-		0.281	-		0.228	-		0.248	-		0.171	-		0.561	-		0.517
		Taken from	ANZECC gu	idelines 95%	protected s	pecies level	s where no 80	0/20 trigger v	alues provid	ded																										
		Taken from	alternative	trigger level	ls provided i	n ANZECC W	/ater Guidelii	nes Volume	1 and Volum	e 2 where in	sufficient da	ta was avail	able for 95	%																						
		Exceedanc	es of trigger	values																																

#### Table 1c – Surface Water Results March 2017 – Dry Event

Surface Water Results - Mar 2	2017 - Di	ſV				Weather: Fine												Low Tide:	3:47 PN	1										
		Í			SW01			SW02	1		SW03			SW04			SW05	1		SW06			SW07			SW08			SW09	
Location	Units	Levels c	of Concern	ι	Jpper Warrell Cr	eek	L	Jpper Warrell Cr	eek		Stony Creek			Stony Creek	τ.	Lo	w er Warrell Cre	ek	ı	.ow er Warrell Cr	eek	Unnam	ed Creek Gumma	West	Unna	med Creek Gun	nma East	Unnan	ned Creek Gumma	a North
					Upstream			Dow nstream			Upstream			Dow nstream	n		Upstream			Dow nstream			Upstream			Upstream			Dow nstream	
Freshw ater / Estuarine		ANZECC 200	0 95% species		Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater	
Date of Sampling		prot	tected		27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17	
Time of Sampling		Freshw ater	Marine		1:48 PM			1:33 PM			12:57 PM			12:30 PM			4:20 PM			4:07 PM			2:51 PM			3:07 PM			2:45 PM	
Comments																												Unable to s	ample - water le	vel too low
Туре				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data			-																											
Metals																														
Aluminium	mg/L	0.055	-	0.06	0.01	0.03	0.05	0.01	0.05	0.05	0.01	0.02	0.04	0.01	< 0.01	0.06	0.01	0.06	0.06	0.01	0.1	0.1	0.01	0.08	0.1	0.01	0.12	0.1	0.01	L
Arsenic	mg/L	0.024	0.0023	-	-	< 0.001	-	-	< 0.001	-	-	0.001	0.001	0.001	< 0.001	0.001	0.001	< 0.001	0.001	0.001	< 0.001	0.002	0.001	0.007	0.002	0.001	0.006	0.002	0.001	L
Cadmium	mg/L	0.0002	0.0055	-	-	< 0.0001	-	-	< 0.0001	-	-	< 0.0001	-	-	< 0.0001	0.0001	0.0001	< 0.0001	0.0001	0.0001	0.0001	-	-	< 0.0001	-	-	< 0.0001	-	-	L
Chromium	mg/L	0.001	0.0044	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	L
Copper	mg/L	0.0014	0.0013	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	I
Lead	mg/L	0.0034	0.0044	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	I
Manganese	mg/L	1.9	0.08	0.21	0.02	0.116	0.2	0.03	0.069	0.06	0.02	0.069	0.052	0.013	0.053	0.26	0.08	0.208	0.26	0.08	0.225	0.23	0.019	0.929	0.23	0.019	0.449	0.23	0.019	L
Nickel	mg/L	0.011	0.07	-	-	0.001	-	-	0.001	-	-	< 0.001	-	-	< 0.001	0.001	0.001	0.005	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.001	0.004	0.001	0.001	L
	mg/L	11	-	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	< 0.01	-	-	i
Silver	mg/L	0.00005	0.0014	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	L
kan	mg/L	0.008	0.015	-	-	0.005	-	-	<0.005	0.005	0.005	<0.005	0.005	0.005	<0.005	0.006	0.005	0.022	0.006	0.005	0.02	0.005	0.005	0.01	0.005	0.005	0.007	0.005	0.005	i
Marcuru	mg/∟	0.0006	-	0.99	0.46	0.22	0.93	0.31	0.26	0.82	0.42	0.09	0.78	0.37	<0.05	0.83	0.05	0.15	0.83	0.05	0.4	2.01	0.25	5.91	2.01	0.25	1.12	2.01	0.25	
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			<0.0001			< 0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<u> </u>
Nonhthelene		16	50	10			10			16			46			46			46			16			10			10		
C6 - C10 Eraction	µg/L	10	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		<u> </u>
C6 - C10 Fraction minus BTEX (E1)	µg/L			-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		<u> </u>
>C10 - C16 Eraction	μg/L μg/l			-		NA	-		NA NA	-		NA NA	-		NA NA	-		NA NA	-		NA	-		NA	-		NA NA	-		<u> </u>
>C16 - C34 Fraction	µв/с це/I			-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		
>C34 - C40 Fraction	µв/с це/I			-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		
>C10 - C40 Fraction (sum)	ug/l					NA			NA			NA			NA			NA			NA			NA			NA			<u> </u>
>C10 - C16 Fraction minus Naphthalene (F2)	на/- це/L					NΔ			NΔ	-		NΔ	-		NΔ			NΔ	-		NΔ			NΔ			NΔ			<u> </u>
BTEX	10					114			114						114			110			11/3			na.			11/4			
Benzene	μg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		· ·
Toluene	μg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		· ·
Ethylbenzene	μg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		· ·
m&p-Xylenes	μg/L	-	-	-		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		-
Xylenes - Total	μg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-
Sum of BTEX	μg/L			-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-
Nutrients																														
Total Phosphorus	mg/L	0.05	0.03	0.04	0.01	0.02	0.03	0.01	0.02	0.04	0.01	< 0.01	0.02	0.01	< 0.01	0.04	0.01	0.02	0.04	0.01	0.02	0.12	0.03	0.11	0.12	0.03	0.15	0.12	0.03	-
Phosphate (reactive phosphorus)	mg/L	-		-	-	< 0.01	-	-	< 0.01	-	-	<0.01	-	-	< 0.01	0.01	0.0044	< 0.01	0.01	0.0044	< 0.01	0.01	0.005	< 0.01	0.01	0.005	< 0.01	0.01	0.005	-
																														-
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.7	0.6	0.2	0.6	0.3	0.1	0.3	0.41	0.1	0.4	0.5	0.2	0.7	0.5	0.2	0.8	2.8	1.1	1.6	2.8	1.1	1.4	2.8	1.1	-
Total Kjeldahl Nitrogen	mg/L	-		0.6	0.2	0.6	0.6	0.2	0.5	0.3	0.1	0.1	0.4	0.1	0.2	0.5	0.2	0.6	0.5	0.2	0.6	2.4	1	1.6	2.4	1	1.4	2.4	1	-
														ļ																<u> </u>
Nitrate	mg/L	0.7	-	0.04	0.01	0.14	0.03	0.01	0.09	0.03	0.01	0.17	0.03	0.01	0.19	0.04	0.01	0.14	0.04	0.01	0.19	0.04	0.01	0.02	0.04	0.01	0.02	0.04	0.01	<u> </u>
Nitrite	mg/L	-	-	-	-	< 0.01	0.01	0.01	< 0.01	0.01	0.01	< 0.01	0.01	0.01	< 0.01	0.01	0.01	< 0.01	0.01	0.01	<0.01	0.05	0.01	< 0.01	0.05	0.01	< 0.01	0.05	0.01	
Ammonia	mg/L	0.9	· ·	-	-	0.1	-	-	0.02	-	-		-	-	< 0.01	0.16	0.06	0.1	0.16	0.06	0.16	0.04	0.01	0.02	0.04	0.01	0.01	0.04	0.01	<u> </u>
TSS																														<u> </u>
ISS	mg/L	<40	<10	14.8	5	7	8	5	<5	9	5	8	5.8	5	6	17.6	5	7	17.6	5	6	290	15	39	290	15	20	290	15	-
Field Physical data																														
remperature	C		-	24.86	14.99	22.24	25.1	16.3	22.38	24.4	16	22.29	26.46	15.94	22.83	27.9	18.4	28.36	27.9	18.4	28.62	26.5	16.3	25	26.5	16.3	25.17	26.5	16.3	<u> </u>
pn Conductivity	pH	-	6.5-8	7.25	6.48	6.55	7.3	6.4	6.63	7.5	6.6	6.97	7.33	6.26	7.06	7.02	6.57	6.74	7.02	6.57	6.44	7	6.1	6.58	7	6.1	6.58	7	6.1	<u> </u>
Conductivity	ms/cm	0.125-2.2	-	0.316	0.232	0.215	0.348	0.227	0.212	0.348	0.227	0.185	0.3338	0.2168	0.193	20.946	0.679	0.87	20.946	0.679	0.977	0.808	0.4234	0.481	0.808	0.4234	0.248	0.808	0.4234	-
Piecekied Owigen	NIU m=1	50	10	10.96	4	1	9.9	3.5	1.4	9.9	3.5	1.2	5.97	3.74	6	6.82	1.83	7.3	6.82	1.83	12.9	52.78	11.3	88.1	52.78	11.3	39.2	52.78	11.3	-
Dissolved Oxygen	mg/L	5	5	4.98	1.91	4.68	4.8	2.6	4.21	4.8	2.6	3.66	6.34	3.52	2.98	7.98	5.07	4.21	/.98	5.07	3.19	6.4	1.75	0.45	6.4	1.75	0.46	6.4	1.75	-
тре	76			-	-	55	-	-	54.8	-	-	43.1	-	-	35.5	-	-	54.8	-	-	41.6	-	-	5.6	-	-	5./	-	-	<u> </u>
100	g/L			-		0.14	-		0.554	-		6.43	-		0.125			0.554	-		0.625	-		0.312	-		0.161	-		-
		Talvan for a		delines 050	 	-		0/20 +	 	 		-		-	-		-	-								-				
		Taken from	ANZEUU gui	triggor low	• protected s	pecies levels	s wriere no 8	or zu trigger \	anues provid	eu Guubore :	sufficient de	to was over!!	lable for 050	/																
		Excoodor	atternative	values	is provided I	IT ANZECC W	ater Guidell	nes volume	i anu voium	e z where in	sunnenn da	ita was avall	aule für 95%	0																
		Exceedanc	es of trigger	values																										I

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
13/03/2017	4:35 PM	Albert Drive	74	1	50	Cut	62	52.4	74.6	38.7	53	47.3	42.9	Asphalt plant, excavator	Ν	NA	Within predicted levels. Dominant noise sources: local traffic, highway, birds
13/03/2017	4:55 PM	Cockburns Lane	16	1	50	Cut	65	46	65	42.3	47.3	45.8	44.2	Abutment works	Ν	NA	Construction not audible. Dominant noise sources: highway, birds, train
29/03/2017	3:23 PM	Bald Hill Rd	197	3	50	Cut	72	49.9	71	40.8	49.4	44.9	42.9	Excavator, street sweeper	N	NA	Dominant noise sources: birds, local traffic
29/03/2017	5:01 PM	Letitia Rd	406	4	59	Cut	74	57	74.2	48	60.6	53.4	50.7	Excavator, grader	Υ	NA	Within predicted levels
29/03/2017	11:43 AM	Mattick Rd	442	6	44	Cut	62	45.2	63.7	36.4	48.3	42.5	39.1	Excavator, scraper, tractor	Y	NA	Within predicted levels
29/03/2017	4:40 AM	Nursery Rd	415	4	59	Cut	53	58.4	75.6	49.2	60.3	54.9	51.8	3 Trucks, excavator	N	NA	Construction not audible. Dominant noise sources: highway, birds, local traffic
29/03/2017	3:47 PM	Wallace St	148	3	50	Cut	47	60.8	75.6	47.6	64.6	55.1	51	. Excavators	N	NA	Construciton not audible. Dominant noise sources: highway, local traffic
29/03/2017	4:17 PM	Gumma Rd	383	3	50	Hauling material	60	51.6	66.5	42.5	54	48.4	45.7	Trucks, franna	N	NA	Dominant noise sources: local traffic, highway, crickets

#### Table 2 - Noise Monitoring Results March 2017

#### Table 3 - Dust Monitoring Results February 2017 – March 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sam	npling	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017
			Finish date of san	npling	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
	Current Month	g/m².month	4	0.1	0.2	0.8	0.8	0.5	22.7	1.7	1.7	0.5	1	0.2	0.3		
Ach Contont		mg	N/A	1	4	16	16	9	428	32	32	9	19	4	6		
Asir content	<b>Previous Month</b>	g/m².month			0.3	0.6	0.6	0.5	0.5	1.8	1.2	0.5	0.9	0.3	0.2		
	Change	g/m².month	Increase of 2		-0.1	0.2	0.2	0	22.2	-0.1	0.5	0	0.1	-0.1	0.1		
Combustible	Current Month	g/m².month	N/A	0.1	0.4	0.5	1.1	0.4	2.4	0.6	0.4	0.2	0.6	0.2	0.2		
Matter	Current Month	mg	N/A	1	8	9	20	8	46	11	8	4	11	4	4		
Total	Current Month	g/m².month	4	0.1	0.6	1.3	1.9	0.9	25.1	2.3	2.1	0.7	1.6	0.4	0.5		
Iotal		mg	N/A	1	12	25	36	17	474	43	40	13	30	8	10		
	Previous Month	g/m².month		0.1	1	1.1	1	0.7	0.7	3.5	1.8	1	1.4	0.6	0.5		
	Change	g/m².month	Increase of 2	0.1	-0.4	0.2	0.9	0.2	24.4	-1.2	0.3	-0.3	0.2	-0.2	0		
Arsenic	Current Month	mg/L		0.001												<0.001	<0.001
Comments													Overtopped				

Location	Units	Groundwater	4	BH01	0	4	4BH021		4	BH022	c		4BH025	5	4	BH037	a		4BH038	3	4	BH057		4	BH058	C
Cut/Fill		Levels (GILs) from Interpretive	Cut 6	- West	t (DS)	Cut 1	1 - Wes	t (DS)	Cut 1	1 - Eas	t (US)	Cut 1	2 - Wes	t (DS)	Fill	15 - We	est	Fil	l 15 - Ea	ist	Cut 17	- West	(DS)	Cut 1	7 - East	(US)
Date of Sampling		Report	23	/03/201	17	23	3/03/201	7	23	3/03/201	7	2	3/03/201	7	2	3/03/201	7	2	3/03/201	7	23	/03/2017	,	2	3/03/201	7
			Trigger leve 20%ile	ls 80 /	Results	Trigger le 20%	vels 80 / ile	Results	Trigger lev 20%il	vels 80 / le	Results	Trigger le 20%	vels 80 / ile	Results	Trigger lev 20%il	rels 80 / e	Results	Trigger lev 20%il	rels 80 / e	Results	Trigger lev 20%i	vels 80 / le	Results	Trigger lev 20%i	vels 80 / le	Results
Comments																	Ants in casing						DRY			
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		16.50	8.7420		5.47	16.0140		1.15	8.4500		5.47	1.2000		0.58	1.3520		0.51	17.4120		-	13.8440		15.64
pН	pН	-	6.264	4.736	6.09	6.7800	5.8100	6.36	7.0900		5.01	6.7780	6.2080	6.36	6.5080	5.9220	7.26	7.3040	6.7680	7.00	6.9800	5.2400	-	6.3960	5.5620	7.25
Conductivity	mS/cm	-	3630.000		0.27	111.300		0.128	231.000		3.40	0.342		0.128	5.550		10.10	8366.000		11.3	121.100		-	132.660		0.210
Temperature	С	-	22.4420		22.39	22.3600		22.64	21.1500		25.10	22.6040		22.64	25.9820		22.82	22.5600		24.82	22.8200		-	23.1940		22.44
		Exceedance c	f trigger level																							

#### Table 4 – Groundwater Monitoring Results March 2017

#### Figure 1 – Acoustic Investigation (Modelling) Results March 2017

#### Southern batch plant - Noise assessment



Though night time noise compliance should and has been assessed by considering the predicted results against the night time NMLs, the key risk of impact during night time works is sleep disturbance.

The ICNG does not provide a specific method for assessment of potential sleep disturbance noise impacts; and guidance on the acceptability of these events is taken from the NSW Road Noise Policy (RNP), (DECCW, 2011).

The RNP provides targets for considering sleep disturbance impacts:

- Sleep disturbance screening criterion used to identify situations where there is the potential for sleep disturbance
- Sleep disturbance awakening criterion levels below which awakening is unlikely to occur.

The sleep disturbance screening criterion recommends that where the L<sub>A1 (1 minute)</sub> does not exceed the L<sub>A90 (15</sub> minute) by 15 dB(A) or more, sleep disturbance impacts are likely to be maintained at an acceptable level. The L<sub>A11</sub> (1 minute) descriptor is meant to represent a typical maximum noise level when measured using a 'fast' time response.

The sleep disturbance awakening guideline is the threshold at which an awakening reaction is likely to occur. Research discussed in the RNP identified this threshold to be an internal bedroom noise level of around 50 to 55 dB(A).

Windows often allow the greatest amount of sound transmission from outside to inside across a building façade. Noting guidance presented in AS2436-2010, Where bedrooms are ventilated by an opened window, a sleep disturbance awakening criterion measured outside the bedroom window of 60 to 65 dB(A) less the conversion from L<sub>AEg 15 minute</sub> to an L<sub>A 1 minute</sub> (conservatively assumed to be 10 dB(A) would generally apply (i.e. 55 dB(A)).

Considering the predictions above in Table 3-3 against the L<sub>AEq 15 minute</sub> corrected 55 dB(A) external sleep disturbance awakening criteria, levels from the asphalt batch plant are not expected to result in sleep disturbance impacts at surrounding receivers.

Regarding potential impacts during the day, with the recommended mitigation measures applied noise levels up to around 6 dB(A) above day time NMLs were predicted at some receivers. This level of exceedance may be noticeable and clearly audible but as per the *Construction Noise and Vibration Guideline* (CNVG), (NSW Roads and Maritime Services, April 2016) which would require additional mitigation measures. That being said, specific measures to manage these exceedances are described below in Section 3.3.

#### Out of Hours deliveries and generator operations

The out of hours operational scenario was also considered whereby the was no activity at the asphalt batching plant except the delivery of materials (approximately 120 deliveries per night), the operation of two front end loaders to manage these materials and the continuous operation of a large generator. For these operations, the resulting noise levels were predicted to be 24 dB(A) or less; well below night time NMLs at surrounding receivers. As such it was concluded that impacts were unlikely as a result of this activity.

#### 3.3 Noise management and monitoring

#### At-source management measures

The source mitigation measures detailed above should be implemented (or equivalent) in addition to best practice measures including the lining of hopers and other surfaces which have the potential to generate 'contact noise', design of movements around the site to limit the need for reversing, reduced speed limits and fitting of alternative low noise alarm devices to the two Front end loaders.

As discussed in Section 3.2, noise management measures recommended for the asphalt plant are summarised below:

SoundAdv	ice-			an a
Noise Prediction and Management	Tool	4478		Pacific H Warrell C
Noise Impact Assessment Rep	ort			Chainage
Report Details				
Report Deter	1/03/201		Banart Bafaransar	Backfill Bassala
Company:	Pacific	0	Prepared by:	N.Rutherford
Proposed Works				
Date of Proposed Works:	06/03-21/04	Time of Proposed Works:	form-farm	Work Duration:
Description of Works		rone of cooperate rearies.	opin opin	
Noise Prediction Details				
Expected Meteorological Conditions				
Wind Speed	Strong (16 - 21)		Wind Direction	South West
Cloud Cover	Mostly Clear		Temperature (Degrees C)	20 - 30 ° C
Relative Humidity (%)	65 - 75%		Time of Day	Night (7pm-6am M-F, 4
Proposed Equipment				
Location	Number of Plant	Equipment	Usage Factor	Total Sound Power
Location 5	1	Water Cart	0.75	106
Location 5	1	Isteer 850kg-Bobcat 5185 Skid Steer Loader-Moving	0.75	112
Location 5	1	ad foot roller Vibratory 107 - 25T -Moving with alar	0.5	108
Location 5	2	9t Dumper	0.5	100
Location 5	1	Trench Rammer	0.5	105
Location 5	3	Daymakers (Tower lights)	1	93
Location 5	1	Excavator <10T - loading	0.5	96
Noise Predictions				
Receiver ID	Criterio	Predicted LAeg	Exceedance / Risk	Magnitude - dB(A)
1-760 UPPER WARRELL CREEK ROAD, CONGARINM	40.0	3,4	No / Type 1	
3-800 UPPER WARRELL CREEK ROAD, CONGARINN	40.0	3.5	No / Type 1	
4-4201 PACIFIC HIGHWAY, EUNGAI CREEK NSW 24	40.0	11.3	No / Type 1	
5-464 BROWNS CROSSING ROAD, WARRELL CREEK	40.0	11.3	No / Type 1	
6-4227 PACIFIC HIGHWAY, CONGARINNI NSW 244	40.0	12.5	No / Type 1	
10-4317 PAOIFIC HIGHWAY, WARRELL CREEK NSW	40.0	17.2	No / Type 1	
11-4263 PACIFIC HIGHWAY, CONGARINNI NSW 244	40.0	18.8	No / Type 1	
12-4371 PACIFIC HIGHWAY, WARRELL CREEK NSW	40.0	12.5	No / Type 1	
16-DP755562, COCKBURNS LANE, WARRELL CREEK	40.0	31.6	No / Type 1	
19-73 CUCKBURNS LANE, WARKELL CREEK NOW 24	40,0	25.4	No/Type1	
22-9411 PAOPIG HIGHWAY, WARRELL CREEK NOW 30_4476 DACIEIC HIGHWAY, WARRELL CREEK NOW	40.0	5.1	No/Type 1	
AS ABON DACIEIC MIGHWAY, WARRELL CREEK NOW	40.0	5.0	No / Type 1	
51-195 ALBERT DRIVE, WARRELL CREEK NSW 2447	40.0	3.7	No / Type 1	
55-4478 PACIFIC HIGHWAY, WARRELL CREEK NSW	40.0	5.9	No / Type 1	
59-46 ROSEWOOD ROAD, WARRELL CREEK NSW 24	40.0	4.6	No / Type 1	
50-180 ROSEWOOD ROAD, WARRELL CREEK NSW 2	36.0	16.9	No / Type 1	
64-69 ROSEWOOD ROAD, WARRELL CREEK NSW 24	36.0	3.1	No / Type 1	
66-174 ROSEWOOD ROAD, WARRELL CREEK NSW 2	36.0	9.8	No / Type 1	
68-91 ROSEWOOD ROAD, WARRELL CREEK NSW 24	36.0	20.6	No / Type 1	
Risk:				

Type 1 - Complies with assessment criteria

Type 2 - Low Risk - 0 to 2 dB(A) above assessment criteria

Type 3 - Moderate Risk - 2dB(A) to 5dB(A) above assessment criteria

Type 4 - High Risk - More than 5dB(A) above assessment criteria

Name:

Date:

Signature:

Position:

**Required Mitigation Measures:** 

SoundAdv	vice -			
Noise Prediction and Managemen	t Tool			Pi
				W
Noise Impact Assessment Repo	ort			Cr
Report Details				
Report Date:	1/03/251	7	Report Balarance	Quarty Reides formular
Company:	Pacific	0	Arepared by:	MRutherford
Proposed Works				
Proposed Works				and the manufacture of the
Date of Proposed Works Description of Works	04/03-26/3	Time of Propased Works:	7am-Opm	Work Duration:
Noise Prediction Details				
Expected Meteomiosical Conditions				
Wind Sared	Medium (10 - 16)		Wind Direction	South West
Cloud Cover	Mostly Clear		Temperature (Dearees C)	10 - 20 ° C
Relative Humidity (%)	75 - 85%		Time of Day	Night (7pm-6am M-F, 4
Proposed Equipment				
lacetina	Association of Street	fasternal	Distant Easter	Total Social Down
location 13	1	Commission	0.75	60
Location 13	1	Pressure Cleaner	0.75	10
location 13	3	l∀'s	<25%	75
Location 13	1	Franna - 25T	0.5	100
Location 13	1	Small Generator	0.75	93
Location 13	1	Welding machine (no sub arc welder)	0.5	98
Location 13	2	Grinder (4-7 inch)	0.75	107
Location 13	1	Handitools - Electric	0.75	53
Noise Predictions				
Noise Fredictions		A	and the second second	
Necessey ID	chiens	Predicted LArg	Exceedance / Kisk	Magnitude - dB(A)
275 UPPER WARRELL CREEK NOAD, CONSAUGNNI	40.0	2.6	No/Type1	
74-78 ALBERT DRIVE, WARKELL CREEK NOW 2447	40.0	8.6	No/Type1	
In the other is not a connect vite how 2017	40.0	10.5	No/ type 1	
03.8 MAIN CREET DOWNELLIVELE NEW 2447	40.0	2.0	No/Type 1	
97.4728 PACIFIC HIGHWAY, CONNELLYURI E NSW :	40.0	12.5	No / Type 1	
100-17 ALBERT DRIVE, DONNELLYVILLE NEW 2447	40.0	75	No / Tune 1	
101-DP1072289, HENRYS LANE, WARRELL CREEL N	35.0	17	No / Type 1	
109-11 ALBERT DRIVE, DONNELLYVILLE NSW 2447	40.0	7.5	No / Type 1	
163-4 SCOTTS HEAD ROAD, WAY WAY NSW 2647	40.0	26.3	No / Type 1	
115-35 MAIN STREET, DONNELLYVILLE NSW 2447	40.0	6.6	No / Type 1	
151-72 SCOTTS HEAD ROAD, WAY WAY NSW 2447	40.0	17.8	No / Type 1	
112-4 SCOTTS HEAD ROAD, WAY WAY NSW 2447	40.0	29.4	No / Type 1	
Risk		6008		
Type 1 - Complies with assessment criteria Type 2 - Low Risk - O to 2 46(A) above assessment	oritoria			

Type B - Moderste Risk - 2dB(A) to 5dB(A) above assessment criteria Type 4 - Nigh Risk - More than 5dB(A) above assessment criteria Nates:

Nome: Date: Signature: Position: **Required Mitigation Measures:** 

SoundAdy	vice.			
e coenteratea	AND			
Noise Prediction and Managemer	ot Tool			
Noise Frediction and Managemen	in tool			
Noise Impact Assessment Rep	ort			
Report Details				
Report Date:	7/03/2017	,	Report Reference:	Floodolain Bridge 1 - C
Company:	Pacifico		Prepared by:	N.Rutherford
Proposed Works				
Date of Represent Works	07/03/17 - 05/03/17	Time of Broosend Washer	form from from Tom	Wheel Durations
Description of Works	07/05/17 05/05/15/17	Concrete prep work for grout pads	apin-opin, carry an	Work Darbtion.
Alata Badiata Basili				
Noise Prediction Details				
Expected Meteorological Conditions				
Wind Speed	Medium (10 - 16)		Wind Direction	South West
Cloud Cover	Mostly Clear		Temperature (Degrees C)	10 - 20 ° C
Relative Humidity (%)	75 - 85%		Time of Day	Night (7pm-6am M-F, 4
Proposed Equipment				
Location	Number of Plant	Equipment	Usage Factor	<b>Total Sound Power</b>
Location 7	2	Drills	0.5	107
Location 7	2	Compressor	0.75	92
Location 7	2	Scabbler	0.5	96
Noise Predictions				
Noise Fredictions	Collector	And in the second	Survey and America	transitude defai
117.15 DEID STREET MAACVENILLE NEW 3447	chteno	Predicted Lkeg	Exceedance / Hisk	songisitude - aB(A)
119-241 WALLACE STREET MACASVICE NOW 2447	39.0	3.8	No / Type 1	
148-1 REID STREET MACKSVILLE NSW 2447	39.0	2.4	No / Type 1	
155-26 HARRIMANS LANE MACKSVILLE NSW 2447	39.0	4.5	No / Type 1	
156-220 WALLACE STREET, MACKSVILLE NSW 2447	39.0	5.4	No / Type 1	
175-34 HARRIMANS LANE, NSW	39.0	6.4	No / Type 1	
180-58 HARRIMANS LANE, MACKSVILLE NSW 2447	39.0	11.6	No / Type 1	
184-21 WEDGEWOOD DRIVE, MACKSVILLE NSW 24	39.0	15.0	No / Type 1	
186-41 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	16.0	No / Type 1	
192-38 KERR DRIVE, MACKSVILLE NSW 2447	39.0	1.7	No / Type 1	
195-WEDGEWOOD DRIVE, MACKSVILLE NSW 2447	39.0	23.9	No / Type 1	
197-54 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	10.2	No / Type 1	
204-46 WALL STREET, MACKSVILLE NSW 2447	39.0	11.2	No / Type 1	
261-13 CONNORS CRESCENT, MACKSVILLE NSW 24	39.0	2.7	No / Type 1	
265-2 AINSWORTH CLOSE, MACKSVILLE NSW 2447	39.0	5.1	No / Type 1	
294-105 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	12.0	No / Type 1	
302-98 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	3.9	No / Type 1	
342-228 SCOTTS HEAD ROAD, WAY WAY NSW 244	36.0	4.3	No / Type 1	
353-117 BALD HILL ROAD, MACKSVILLE NSW 2447	36.0	20.8	No / Type 1	
356-122 BALD HILL ROAD, MACKSVILLE NSW 2447	36.0	8.0	No / Type 1	

#### Risk:

Type 1 - Complies with assessment criteria

Type 2 - Low Ritk - 0 to 2 dB(A) above assessment criteria Type 3 - Moderate Risk - 2dB(A) to 5dB(A) above assessment criteria

Type 4 - High Risk - More than 5dB(A) above assessment criteria

Notes:

Nome: Date: Signature: Position: **Required Mitigation Measures:** 

SoundAd	vice.	and the second		
Soundiada	MCE.		a de la terre a	
Noise Prediction and Manageme	nt Tool			
Noise Impact Assessment Pen	ort			
Noise impact Assessment Rep	ort			
Report Details				
Report Date:	8/03/201	7	Report Reference:	Floodplain Bridge 1 - In
Company:	Pacific	D	Prepared by:	N.Rutherford
Proposed Works				
Date of Proposed Works:	09/03/17-17/03/17	Time of Proposed Works:	6pm-7pm M-F, &am-7pm Set,	Sam Work Duration:
Description of Works				
Noise Prediction Details				
Expected Meteorological Conditions				
Wind Speed	Strong (16 - 21)		Wind Direction	South
Cloud Cover	Mostly Clear		Temperature (Degrees C)	20 - 30 ° C
Relative Humidity (%)	65 - 75%		Time of Day	Night (7pm-6am M-F,
Proposed Equipment				
Location	Number of Plant	Equipment	Usage Factor	Total Sound Power
Location 7	2	Drills	0.5	107
Location 7	1	Mobile Crane - 400t	0.75	105
Location 7	2	Prime Mover	0.5	110
Location 7	1	Grinder (4-7 inch)	0.5	105
Location 7	3	ιν	<25%	75
Noise Predictions				
Receiver ID	Criteria	Predicted LAca	Esceedance / Risk	Magnitude - dB(A)
117-15 REID STREET, MACKSVILLE NSW 2447	39.0	7.6	No / Type 1	
118-241 WALLACE STREET, MACKSVILLE NSW 244	7 39.0	5.2	No / Type 1	
148-1 REID STREET, MACKSVILLE NSW 2447	39.0	5.3	No / Type 1	
155-26 HARRIMANS LANE, MACKSVILLE NSW 2447	39.0	7.6	No / Type 1	
156-220 WALLACE STREET, MACKSVILLE NSW 244	7 39.0	12.3	No / Type 1	
175-34 HARRIMANS LANE, NSW	39.0	10,1	No / Type 1	
180-58 HARRIMANS LANE, MACKSVILLE NSW 2447	39.0	16.0	No / Type 1	
184-21 WEDGEWOOD DRIVE, MACKSVILLE NSW 2	4 39.0	21.6	No / Type 1	
186-41 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	20.6	No / Type 1	
192-38 KERK DRIVE, MALKSVILLE NSW 2447	39.0	2.9	No / Type 1	
103-SA BALD WILL BOAD MACKSVILLE NEW 2447	30.0	32.1	No / Type 1	
204-46 WALL STREET, MACKSVILLE NSW 2447	39.0	16.3	No / Type 1	
261-13 CONNORS CRESCENT, MACKSVILLE NSW 2/	1 39.0	19	No / Type 1	
266-2 AINSWORTH CLOSE, MACKSVILLE NSW 2447	39.0	7.1	No / Type 1	
294-105 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	14.7	No / Type 1	
302-98 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	5.5	No / Type 1	
342-228 SCOTTS HEAD ROAD, WAY WAY NSW 244	: 36.0	6.1	No / Type 1	
353-117 BALD HILL ROAD, MACKSVILLE NSW 2447	36.0	21.5	No / Type 1	
356-122 BALD HILL ROAD, MACKSVILLE NSW 2447	36.0	10.4	No / Type 1	

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Name: Date: Signature: Position: **Required Mitigation Measures:** 

SoundAd	dia			
SoundAd	vice -		and the second second	
Noise Prediction and Managemer	t Tool			
Noise Prediction and Managemen	1001			i
Noise Impact Assessment Rep	ort			1
Report Details				
Report Details	e /ne /non		Penart Paferance:	Electric Stides 1 - In
Company	Bacillor		Prenneed by:	N. Rutherford
company.	- Particular			
Proposed Works				
Date of Proposed Works:	09/03/17-17/03/17	Time of Proposed Works:	Spin-7pm M-F, &am-7pm Sat,	Sam Work Duration:
Description of Works				
Noise Prediction Details				
Noise Prediction Details				
Expected Meteorological Conditions	Freena 116 - 213		Wind Direction	South
Cloud Cover	Mostly flear		Temperature (Denrest C)	20 + 30 * C
Relative Humidity (%)	65 - 75%		Time of Day	Night (7pm-6am M-F, 4
Proposed Equipment				
Location	Number of Plant	Equipment	Usage Factor	Total Sound Fower
Location 7	2	Drills	0.5	107
Location 7	1	Mobile Crane - 400t	0.75	105
Location 7	2	Prime Mover	0.5	110
Location 7	1	Grinder (4-7 Inch)	0.5	105
Location 7	3	LV .	<25%	75
Noise Predictions				
Receiver 10	Criteria	Predicted LAca	Exceedance / Bisk	Magnitude - dB(A)
117-15 BEID STREET, MACKSVILLE NSW 2647	39.0	7.6	No / Type 1	
118-241 WALLACE STREET, MACKSVILLE NSW 2447	39.0	5.2	No / Type 1	
148-1 REID STREET, MACKSVILLE NSW 2447	39.0	5.3	No/Type 1	
155-26 HARRIMANS LANE, MACKSVILLE NSW 2447	39.0	7.5	No / Type 1	
156-220 WALLACE STREET, MACKSVILLE NSW 2447	39.0	12.3	No/Type 1	
175-34 HARRIMANS LANE, NSW	39.0	10.1	No / Type 1	
180-58 HARRIMANS LANE, MACKSVILLE NSW 2447	39.0	16.0	No / Type 1	
184-21 WEDGEWOOD DRIVE, MACKSVILLE NSW 24	39.0	21.6	No / Type 1	
186-41 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	20.6	No / Type 1	
192-38 KERR DRIVE, MACKSVILLE NSW 2447	39.0	2.9	No / Type 1	
195-WEDGEWOOD DRIVE, MACKSVILLE NSW 2447	39.0	32.1	No / Type 1	
197-54 BALD HILL ROAD, MACKSVILLE NSVV 2447	39.0	14.5	No / Type 1	
204-46 WALL STREET, MACKSVILLE NSW 2447	39.0	16.3	No / Type 1	
261-13 CONHORS CRESCENT, MACKSVILLE NSW 24	39.0	3.9	No/Type 1	
266-2 AINSWORTH CLOSE, MACKSVILLE NSW 2447	39.0	7.1	No/Type 1	
204-105 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	14.7	40/Type 1	
302-98 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	5.5	No/Type 1	
342-228 SCOTTS HEAD ROAD, WAY WAY NSW 244	36.0	0.1	No / Type 1	
353-317 BALD HILL ROAD, MACKSVILLE NSW 2447	36.0	21.5	NO/ Type 1	
356-122 BALD HILL ROAD, MACKSVILLE NSW 2447	39.0	10.4	ten i tába r	

#### Risk:

Type 1 - Compties with assessment criteria Type 2 - Low field - 0 to 2  $d\theta[A]$  above assessment criteria Type 3 - Moderate filst -  $2d\theta[A]$  to  $5d\theta[A]$  above assessment criteria Type 4 - High Risk - More than  $5d\theta[A]$  above assessment criteria Notes:

Name: Date: Signature: Position: **Required Mitigation Measures:**