Southwest Metro Early Works Construction Monitoring Report – August 2020 to January 2021

SMCSWSSJ-JHL-WEC-EM-REP-000014

Document and Revision History

Document Details	
Title	Construction Monitoring Report
Client	Sydney Metro City & Southwest
Client reference no.	SMCSWSSJ-JHL-WEC-EM-REP-000014
JHLOR JV contract no.	K44

Revisions

Revision	Date	Description	Prepared by	Reviewed by
0	8/02/2021	Issued for comment	Dan Keegan	Paul Fields
1	15/04/2021	Updated for comments	Dan Keegan	Paul Fields

Management reviews

Review date	Details	Reviewed by

Controlled: NO Copy no.: Uncontrolled: YES

Table of Contents

Compliance Matrix

Condition	Requirement	Reference
C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 1.1

1. Introduction

The Construction Monitoring Program is being implemented to monitor impacts on surrounding surface water quality resources and impacts from noise and vibration on the surrounding areas during the construction phase. The surface water monitoring program and noise and vibration monitoring program are also both designed to assess the effectiveness of the mitigation measures applied as part of the Southwest Metro Early Works (SMEW).

1.1 Submission Requirements

In accordance with condition C14, this will be submitted to the following agencies for information:

- City of Canterbury Bankstown
- Inner West Council
- DPIE

The Independent Environmental Representative will review the report prior to submission.

1.2 Surface Water

The project site is located within the rail corridor on the T3 Bankstown line between Sydenham and Campsie, NSW.

The Project site forms part of the overall Cooks River catchment with water from the area discharging into the Cooks River via local stormwater drainage or overland flow. The catchment area is highly urbanised with mixed residential, commercial and industrial properties.

Project works occur adjacent to the Cooks River at the Canterbury (Cooks River) Underbridge. Project works occurring adjacent to the Cooks River include embankments stabilisation, combined service route installation and construction of security fencing.

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Office of Environment and Heritage as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. Water quality within the Cooks River catchment is influenced by stormwater, fertilisers, industrial discharges and sewage contamination.

Objectives for water quality management during construction are:

- Minimise pollution of surface water through appropriate erosion and sediment control
- Maintain existing water quality of surrounding surface watercourses

1.3 Noise and Vibration

The area surrounding the SMEW project contains a variety of land-use types and receivers, including residential receivers, commercial, industrial, sensitive non-residential receivers. These land-uses are mixed within the identified noise catchments, though in general there are clusters of industrial and commercial areas surrounding stations, and primarily residential areas between stations. The area surrounding the project is affected by rail noise and vibration.

The majority of works will occur within the rail corridor between stations, works will mainly occur adjacent to residential properties.

A number of sensitive non-residential receivers have been identified within the vicinity of the project works. These include;

- Casimir Catholic College
- St Maroun's College
- Dulwich Hill Childcare Centre
- Canterbury Family Day Care

To date, no noise or vibration intensive construction activities have taken place in in the vicinity of these facilities, with the exception of some short duration, concrete sawing in the vicinity of Dulwich Hill Childcare Centre during the reporting period.

Objectives for noise and vibration management on the project are:

- Minimise unreasonable noise and vibration impacts on residents and businesses
- Avoid structural damage to buildings or heritages items as a result of construction vibration
- Maintain positive, co-operative relationships with schools, childcare centres, local residents and building owners and undertake active community consultation

Construction noise levels for some SMEW activities are expected to exceed the external noise management level at times, particularly during works outside of standard hours, resulting in noise impacts to outdoor spaces. Internal and external noise levels will be assessed as part of the OOHW protocol and monitored accordingly.

Most construction works will not generate vibration which would be perceptible within the nearest residences, but some works, such as compaction by vibratory roller may generate vibration levels above the vibration criteria at the nearest residences on Garnet Street, Dulwich Hill and Charles Street, Canterbury.

2. Methodology

2.1 Surface Water

Surface water monitoring is undertaken at four points adjacent to the Canterbury Cooks River Underbridge, two upstream (Cooks River East 1 and Cooks River West 1) and two downstream (Cooks River East 2 and Cooks River West 2). All locations are located at the bank of the Cooks River as these are the locations that are generally accessible. Refer to Figure 1 for sampling locations.

The Cooks River is tidal at the test locations. During low tide events some sample locations are inaccessible.

The channel is uncovered for the majority of its length along the project. The water level in the channel is generally fairly shallow outside of significant rain events (less than 20cm), with limited vegetation. Water sources are diverse urban run-off from collected stormwater.

The locations identified for surface water monitoring are the only locations that generally offer safe access. There are several drainage outlets between the upstream and downstream sampling points on both sides of the Cooks River.

Figure 1 - Surface Water Monitoring Locations

In accordance with the Monitoring Program, surface water quality monitoring is to be undertaken as follows for the parameters in Table 1:

- Pre-construction – monthly, pending safe access
- SMEW construction stage – every three months & following wet weather events (>20mm in 24hrs), pending safe access

Pre-construction monitoring was undertaken monthly prior to the start of Construction in August 2019. Surface water quality monitoring of the receiving environment prior to construction is highly unlikely to define suitable standards or benchmarks for water quality discharges from the SMEW site given that water quality from urban areas that contribute water to the Cooks River between upstream and downstream test locations are highly variable and change according to activities within the local catchment, prevailing weather patterns and day-to-day during rainfall.

Canterbury Racecourse BOM weather observations were used to report the amount of rainfall 24hrs prior to monitoring and to determine when reportable rain event occurs.

The Environment Protection Licence (#21147) provides the project with criteria to discharge off-site through approved discharge points. Discharge points are located within both SSJ and SMEW. These criteria must be met prior to discharge. A record of monitoring for dewatering on the project is maintained and made available on the Project website. Discharges into the local stormwater system occurred on one occasion during the reporting period. This discharge was related to the emptying of water filled barriers.

There are currently no active sediment basins on the project, and none have been identified during the construction phase of the project to date.

Table 1 - Water Monitoring Parameters

Parameter	Sampling Methods	Analytical Method	ANZECC Criteria* Freshwater	Proposed Trigger Values	Proposed Actions
Temperature (°C)	Probe	Field analysis	> 80%ile < 20%ile	Downstream results are > than upstream results in rainfall events up to and including the significant event threshold of >20mm in 24 hours.	Environment Manager (or delegate) to re-test to confirm results and undertake an inspection of the adjacent works and propose actions where required.
Dissolved Oxygen (DO)	Probe	Field analysis	Lower limit – 85 Upper limit – 110		
Turbidity (NTU)	Probe	Field analysis	6 – 50		
Oil and grease	Visual analysis, then grab sample if required	Visual assessment. Confirmed with lab analysis if required	-		
pH	Probe, grab sample if required	Field analysis, lab analysis if required	Lower limit – 6.5 Upper limit – 8.5		
Salinity (EC)	Probe	Field analysis	125 – 2200		
Total Suspended Solids (TSS)	Probe, grab sample if required	Field analysis, lab analysis if required	-		
Total phosphorus	Grab sample	Lab analysis	25ug/L		
Total nitrogen	Grab sample	Lab analysis	350ug/L		
Chlorophyll-a	Grab sample	Lab analysis	3ug/L		

2.2 Noise and Vibration monitoring

As part of the Noise and Vibration Assessment within the Sydney Metro Sydenham to Bankstown Upgrade Environmental Impact Statement, the area surrounding the entire Project site was divided into 13 Noise Catchment Areas (NCAs). SMEW works have predominately occurred between NCA1 and NCA6. During the period the work area was extended to include Lakemba Railway Station, for Sydney Train communications relocation works. Noise monitoring was undertaken in 2016 to determine the Rating Background Level for the 13 noise catchments. The Rating Background Levels for all NCAs are shown in Table 2.

Table 2 - RBLs for SSJ Noise Catchment Areas

NCA	Daytime RBL (7am to 6pm)	Evening RBL (6pm to 10pm)	Night RBL (10pm to 7am)
1	38	38	33
2	38	38	33
3	38	38	34
4	40	40	35
5	36	36	32
6	45	42	35
7	41	41	35
8	47	47	41
9	44	44	36
10	47	47	41
11	47	47	39
12	54	51	42
13	42	42	39

Based on planned work in the construction phase, the areas most regularly impacted by construction noise and vibration are expected to be NCA4 and NCA5, adjacent to embankment stabilisation works. These two catchments contain a number of residential properties – See Figure 2 below.

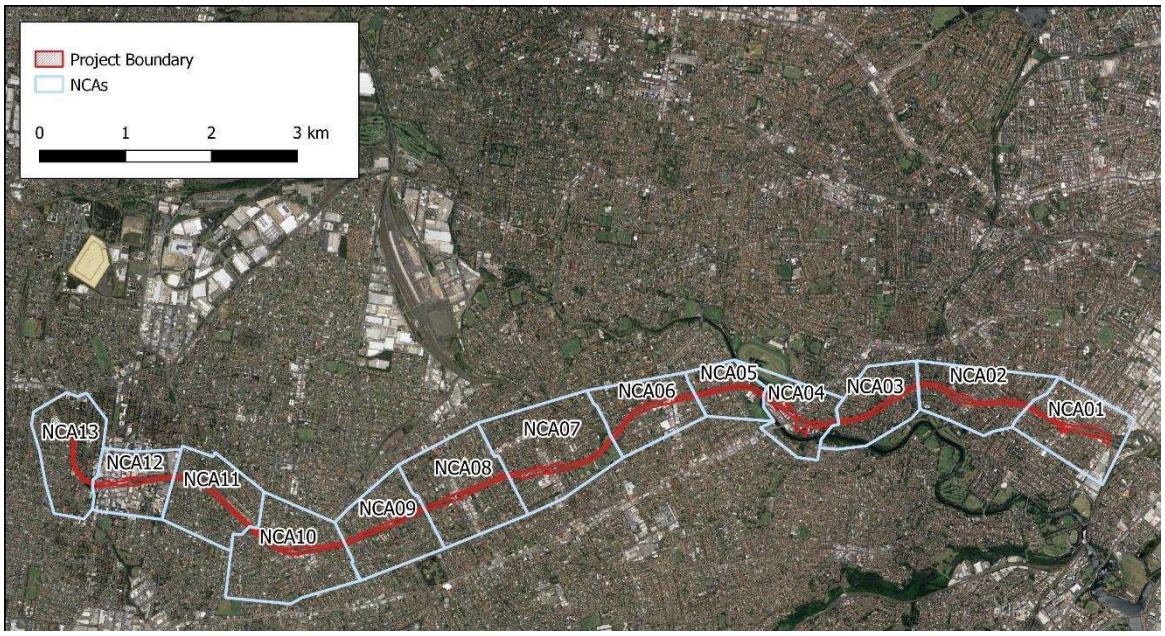

Figure 2 – Noise Catchment Areas

Monitoring is undertaken during construction activities (including out of hours works) where required in accordance with Section 8 of the CNVS and for validation purposes. Attended noise monitoring is undertaken in the event of a noise complaint. Where a complaint occurs, monitoring will be undertaken at the complainant's property, nearest to any work.

Vibration monitoring will be undertaken before and during works where buildings or structures exist within the safe work distances of vibratory plant. Monitoring will also be undertaken where vibration generating actives that have the potential to impact on heritage items. Monitoring will be undertaken for vibration causing "activities" at a structure and applied as indicative across the project area in similar circumstances (e.g. the methods and plant used for the compaction of batters is consistent across the site, as such the monitoring at one structure is representative of the impacts at other structures). Representative monitoring should be undertaken at the most sensitive structure for which it is to be applied. In accordance with the requirements of the CNVS, the vibration limits have been set out in the British Standard BS 7385-2:1993.

3. Results

3.1 Surface Water

Pre-construction monitoring took place over three months from May-July 2019, with four rounds of sampling collected from each of the four sampling points. Two rounds of sampling occurred during dry weather and two rounds of monitoring occurred during wet weather (i.e. greater than 20mm of rainfall in a 24 hour period). The results of the pre-construction monitoring are included within the previous SMEW Construction Monitoring Report (*SMCSWSSJ-JHL-WEC-EM-REP-000007 - Construction Monitoring Report 001 August 2019 - January 2020*).

Pre-construction monitoring indicated that in some instances the existing pH, turbidity, salinity, dissolved oxygen, total phosphorus, total nitrogen and chlorophyll levels exceed the ANZECC lowlands river criteria on a number of occasions.

Monitoring during construction phase took place once per quarter. In addition, one wet weather monitoring event was recorded during the reporting period as per Table 3.

During the monitoring period, there were three occasions where the monitoring sites could not be safely accessed after rain events; 10th August, 26th October & 22nd December.

Monitoring during the construction phase indicates that pH met the ANZECC criteria. Other parameters, including salinity, turbidity, dissolved oxygen, total phosphorus, total nitrogen and chlorophyll exceeded the ANZECC criteria, however the exceedances are comparable to those observed within the pre-Construction phase. Downstream and upstream readings are consistent.

It is noted that SMEW also monitors water quality prior to any planned discharges to ensure water quality is within the parameters listed within the Environmental Protection Licence (No.21147), to minimise any potential impacts to surrounding waterways. This data is published monthly on the project website.

Table 3 - Surface Water Monitoring Results for Pre-construction and Construction Phases – Eastern and Western side of Cooks River for all 7 monitoring events

				CRE 1												CRE 2											
Date	Site Activities	Total Rainfall in Previous 24hrs (mm)	Comments	Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil / Grease	TP(ug/L)	TN (ug/L)	Chlorophyll	Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil / Grease	TP(ug/L)	TN (ug/L)	Chlorophyll
ANZECC Criteria					N/A	>80% Percentile & <20% Percentile	6.5-8.5^	0.125-2.2*	6-50	Lower Limit - 85 Upper Limit - 110	N/A	N/A	25	350	3		N/A	>80% Percentile & <20% Percentile	6.5-8.5^	0.125-2.2*	6-50	Lower Limit - 85 Upper Limit - 110	N/A	N/A	25	350	3
8/08/2020	Wet weather	24mm	Mid Tide RW2 and RW3 earthworks	14:39	86	14.93	9.06	0.539	83.5	1.4	3.45	Yes	200	1800	3	14:41	60	14.56	8.77	0.528	58.2	128.2	0.338	Yes	220	1900	2
22/09/2020	Quarterly	0mm	Mid Tide Soil Nails @ Rip Rap	10:39	15	20.58	7.85	14.8	67.7	56.7	9.46	No	110	1200	10	10:48	16	20.2	7.92	18.5	54.9	87.6	11.5	No	60	800	<1
8/12/2020	Quarterly	0mm	Mid Tide Security Fencing @ RW2	13:28	65	23.64	7.54	17.8	28.2	83.9	11.1	Yes	350	1100	7	12:46	77	23.73	7.74	18.6	40	151.8	11.5	yes	200	800	5

				CRW 1												CRW 2											
Date	Site Activities	Total Rainfall in Previous 24hrs (mm)	Comments	Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil / Grease	TP(ug/L)	TN (ug/L)	Chlorophyll	Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil / Grease	TP(ug/L)	TN (ug/L)	Chlorophyll
ANZECC Criteria					N/A	>80% Percentile & <20% Percentile	6.5-8.5^	0.125-2.2*	6-50	Lower Limit - 85 Upper Limit - 110	N/A	N/A	25	350	3		N/A	>80% Percentile & <20% Percentile	6.5-8.5^	0.125-2.2*	6-50	Lower Limit - 85 Upper Limit - 110	N/A	N/A	25	350	3
8/08/2020	Wet weather	24mm	Mid Tide RW2 and RW3 earthworks	15:14	64	14.45	8.54	0.526	67.1	189.9	0.337	No	180	1600	2	14:53	58	14.7	8.52	0.662	62.3	122.3	0.423	No	180	1700	3
22/09/2020	Quarterly	0mm	Mid Tide Soil Nails @ Rip Rap	10:12	13	19.9	7.8	15.8	57.4	43.9	9.81	No	160	1200	4	10:24	14	19.89	7.7	16.6	53.2	43.2	10.3	No	150	1900	11
8/12/2020	Quarterly	0mm	Mid Tide Security Fencing @ RW2	13:29	58	23.62	7.69	18.2	43	193	11.4	Yes	230	600	12	13:24	67	23.44	7.68	18.5	31.3	271.9	11.5	Yes	250	900	4

- Black – no *ANZECC Australian and New Zealand guidelines for fresh and marine water quality* criteria applicable. Also note, there is insufficient historical data to make a meaningful analysis of water temperature – as such this has been colour coded as black.
- Green – Criteria under *ANZECC Australian and New Zealand guidelines for fresh and marine water quality* was met for the sample
- Red – Criteria under *ANZECC Australian and New Zealand guidelines for fresh and marine water quality* was not met for the sample

3.2 Noise and Vibration Monitoring

Attended noise monitoring was undertaken as required for OOHW and possessions, where noise modelling predicted significant exceedance of Rating Background Levels or otherwise required validation using this method. Works during the period occurred predominately in the following noise catchment areas;

- NCA3 – Combined Service Route (CSR) works
- NCA4 – CSR works and embankment stabilisation works
- NCA5 – embankment stabilisation works
- NCA8 – CSR works

Results from attended noise monitoring are summarised in Table 4. Noise monitoring results from the reporting period indicated that works occurred at noise levels at or below predicted levels. It is noted that wind speeds exceeded the recommended maximum level for noise monitoring as described within "*AS1055-2018 Description and measurement of environmental noise*" on a number of occasions, leading to exceedances. Monitoring was undertaken during these periods to provide indicative noise monitoring results only.

As part of attended noise monitoring, significant extraneous noise has been recorded as impacting receivers and monitoring results, including throughout the night-time period, well above the given RBLs. Monitoring locations and timing has been adjusted where necessary to try to isolate construction impact, however this is often not feasible. Common extraneous noise sources include:

- Noise from passing freight trains on the ARTC line
- Road traffic, particularly rail replacement buses during rail possessions

Attended noise monitoring has been conducted for activities with significant predicted exceedances of noise management levels, mostly occurring where works are conducted in the evening or night-time periods. This occurred for four rail possessions within the reporting period. SMEW have committed to review impacts and mitigation of construction activity and document outcomes where an exceedance is recorded or a complaint is made related to project construction activities. To date there have been no exceedances of predicted construction related noise levels or complaints assessed as relating to ongoing construction activities on the project. All exceedances recorded by attended monitoring have been attributed to extraneous noise rather than construction activity. These are detailed in the results shown below in Table 4

To date, there have been no exceedances of vibration from construction activities, and recorded vibration (PPV in mm/s) has been well below cosmetic vibration limits for affected structures.

Table 4 - Attended Noise Monitoring Results

NCA	Date	Time (hrs)	Duration	Time Units	Construction Activities	Audible noise from SSJ construction activities	Main source of noise	LA(eq)	LA_{Max}	Period	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comments
NCA5	8/08/2020	5:02	15	Min	Crane, loading of materials	Crane	Crane	58.5	76.2	Night	67	Yes	
NCA4	8/08/2020	5:42	15	Min	Crane, Excavator GST route	Excavator	Crane/Traffic	53.7	82.8	Night	69	Yes	LAMAX from road traffic
NCA4	8/08/2020	5:59	15	Min	Piling at Retaining Wall	Excavator	Piling	59	79.1	Night	69	Yes	
NCA3	8/08/2020	6:38	15	Min	Crane	Crane	Crane/Traffic	65.7	82.8	Night	67	Yes	
NCA3	8/08/2020	16:58	15	Min	CSR	Generator	Generator	54.5	68	Day	67	Yes	
NCA2	8/08/2020	22:21	15	Min	EWP, Powertools	Powertools	EWP, Powertools, Buses	65.5	81	Night	67	Yes	
NCA1	24/10/2020	3:47	15	mins	Excavator/GST	Excavators tracking	Excavators tracking	53	78.3	Night	61	Yes	LaMax from passing truck
NCA4	24/10/2020	4:39	15	mins	Excavator/Dumpies, Lighting Towers	Consistant engine nosie	Excavator/Dumpies, Lighting Towers	56.4	73.5	Night	66	Yes	
NCA2	25/10/2020	0:06	15	mins	Excavator, EWP	Excavator Tracking, EWP, Lighting tower	Buses and Cars passing	56.7	80.4	Night	67	Yes	Wind above acceptable monitoring standards - LaMax from Bus
NCA4	6/11/2020	18:31	15	mins	URX construction	Vac truck	Vac truck	70.7	78.1	Evening	73	Yes	
NCA3	6/11/2020	18:48	15	mins	URX construction	Vac truck	Vac truck	64.1	79.7	Evening	73	Yes	
NCA4	9/11/2020	18:30	15	mins	URX construction	Excavator	Excavator	62.3	78.3	Evening	71	Yes	

NCA	Date	Time (hrs)	Duration	Time Units	Construction Activities	Audible noise from SSJ construction activities	Main source of noise	LA(eq)	LA_{Max}	Period	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comments
NCA3	9/11/2020	18:49	15	mins	URX construction	Excavator	Excavator	60.4	75.7	Evening	62	Yes	
NCA4	19/11/2020	18:35	N/A	N/A	Concrete works on footpath completed	N/A	Traffic	N/A	N/A	N/A	N/A	N/A	Env Coordinator arrives on site at 18:25 and noted construction activities are completed. No noise monitoring conducted.
NCA3	19/11/2020	18:35	N/A	N/A	Concrete works on footpath completed	N/A	Traffic	N/A	N/A	N/A	N/A	N/A	Env Coordinator arrives on site at 18:25 and noted construction activities are completed. No noise monitoring conducted.
NCA1	19/12/2020	3:31	15	mins	CSR and fencing install	Lighting tower, occasional power tools	Construction	54.9	72.8	Night	61	Yes	Wind above monitoring standard
NCA6	19/12/2020	2:48	15	mins	GST Installation	Plant Tracking, Lighting Tower	Construction	52.2	76.1	Night	53	Yes	Wind above monitoring standard
NCA4	19/12/2020	22:47	15	mins	Cooks River Bridge CSR works	Power handtools	Construction	57	81.5	Evening	64	Yes	
NCA5	19/12/2020	23:33	15	mins	CSR transition works	Power handtools	Construction	62.3	76.2	Evening	64	Yes	
NCA2	20/12/2020	0:54	15	mins	CSR transition works	Power handtools	Construction	63.4	87.4	Evening	66	Yes	
NCA3	9/01/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	It is noted that works in NCA3 were planned during the WE28 Possession - these were completed during standard construction hours - no monitoring was required.
NCA1	9/01/2021	22:18	15	mins	In corridor, down track +-KM6 (on Bankstown Line) Sydenham Station ULX counrty side	Reversing quacker	Construction activities are barely audible	50.4	71.5	Night	58	Yes	Construction activities are barely audible

NCA	Date	Time (hrs)	Duration	Time Units	Construction Activities	Audible noise from SSJ construction activities	Main source of noise	LA(eq)	LA_{Max}	Period	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comments
NCA1	10/01/2021	11:54	15	mins	Fencing installation	None observed	Passing cars, planes and birds	54.8	73.3	Day	68	Yes	No major construction occuring works during noise monitoring, plant and equipment turned off when not in use
NCA8	WE28 10/01/21	0:05	15	mins	Backfilling to trench and around pits. Compaction	Construction noise 50% audible/50% barely audible	Generally the public/traffic in street was louder than the construction activities	54.9	77.9	1	65	Y	NCA8
NCA8	WE28 10/01/21	15:27	15	mins	Clean up	Construction not audible	Traffic	57.6	76.9	1	65	Y	NCA8

Note: Yellow highlighted boxes appear where an exceedance to the predicted noise levels have occurred due to extraneous sources but where compliance has still be achieved based on observations during attended monitoring.

3.3 Vibration

No vibratory works occurred within proximity to any sensitive receivers during the period.

4. Mitigation Measures

4.1 Noise and Vibration

Standard mitigation measure were implemented as per Section 7 of the Construction Noise and Vibration Management Plan, and Sections 6.2 and 6.4 of the Construction Noise and Vibration Impact Statement. These were effective during the reporting period.

4.2 Water

Standard mitigation measures were implemented as per Section 6 of the Construction Soil and Water Management Plan. Controls were repaired as required and were effective during the reporting period.

5. Conclusion

Pre-construction surface water monitoring began in May 2019, with results showing exceedances to a number of parameters under existing conditions. Construction monitoring results from the period at locations upstream and downstream of the Cooks River Bridge show all parameters have exceeded ANZECC criteria at some point, with readings varying between rain events and river conditions. However, upstream and downstream samples are consistent. Surface water data does not provide clear relation between construction activities and water quality.

Erosion-sediment control plans are maintained and reviewed regularly, and JHLOR conducts weekly and post rain environmental inspections. The Environment Representative also conducts bi-weekly inspections and any observations are closed out within agreed timeframes.

Monitoring records have validated modelled noise and are consistent with the predicted impact of construction activities on noise catchment areas, including sensitive receivers. There have not been any recorded exceedances or project-related complaints regarding noise and vibration impacts.