Chaffey Dam Safety Upgrade and Augmentation

Construction Noise and Vibration Plan

Document No. JH/C680/10

Rev	Date	Prepared by	Reviewed by	Approved	Remarks
A	10/07/2014	Krissy Vajda			Draft for Principal Review
B	04/08/2014	Krissy Vajda			Draft addressing ER comments
C	22/08/2014	Krissy Vajda			Draft addressing WP comments
1	01/09/2014	Peter Sheehan			For Approval
2	23/09/2014	Peter Sheehan	Brandon Perrin	Tony O'Reilly	Response to comments

Terms and Definitions

Term	Definition
AMS	Activity Method Statement
CEMP	Construction Environmental Management Plan
CNVMP	Construction Noise and Vibration Management Sub Plan
CoA	Conditions of Approval
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection Licence
JH	John Holland
Project Infrastructure Approval	Infrastructure Approval SSI-5039 and accompanying Conditions of Approval (CoA), dated 27 February 2014
Project EIS	Environmental Impact Statement (EIS) for the Chaffey Dam Augmentation and Safety Upgrade prepared by WorleyParsons, dated 07 December 2012 and Preferred Infrastructure Report (PIR) for the Chaffey Dam Augmentation and Safety Upgrade prepared by WorleyParsons, dated 15 March 2013
The Project	Chaffey Dam Safety Upgrade and Augmentation
The Proponent	State Water Corporation

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1. Introduction

1.1 Purpose and application

This Construction Noise and Vibration Management Sub Plan (CNVMP) is a key element of the overall Construction Environmental Management Plan (CEMP) for the Project.

John Holland (JH) recognises that the effective management of construction noise and vibration on the Chaffey Dam Safety Upgrade and Augmentation (the Project) is vital to the overall success of the Project. The purpose of the CNVMP is to describe how JH will manage construction noise and vibration during the construction phase of the Project.

This CNVMP has been developed to ensure the requirements of the Project Infrastructure Approval, associated environmental documentation and contract requirements are satisfied to ensure the successfully delivery of the Project . This plan is applicable to the construction phase of the Project.

1.2 Background

This CNVMP has been developed based on the Environmental Impact Statement (EIS) for the Project prepared by WorleyParsons, dated 07 December 2012, which takes into consideration a comprehensive assessment and analysis of noise and vibration risks for the Project and identifies methods to manage, mitigate or minimise the potential impacts.

1.3 Noise and Vibration Objectives

The following noise and vibration objectives apply to the construction phase of the Project

- Minimise unreasonable noise and vibration impacts on sensitive receivers
- Avoid structural damage to building or items of heritage significance as a result of construction vibration
- Undertake active community consultation and maintain positive working relationships

1.4 Environmental Management Documentation

The CNVMP forms a key element of the environmental management documents that will be implemented for the Project.

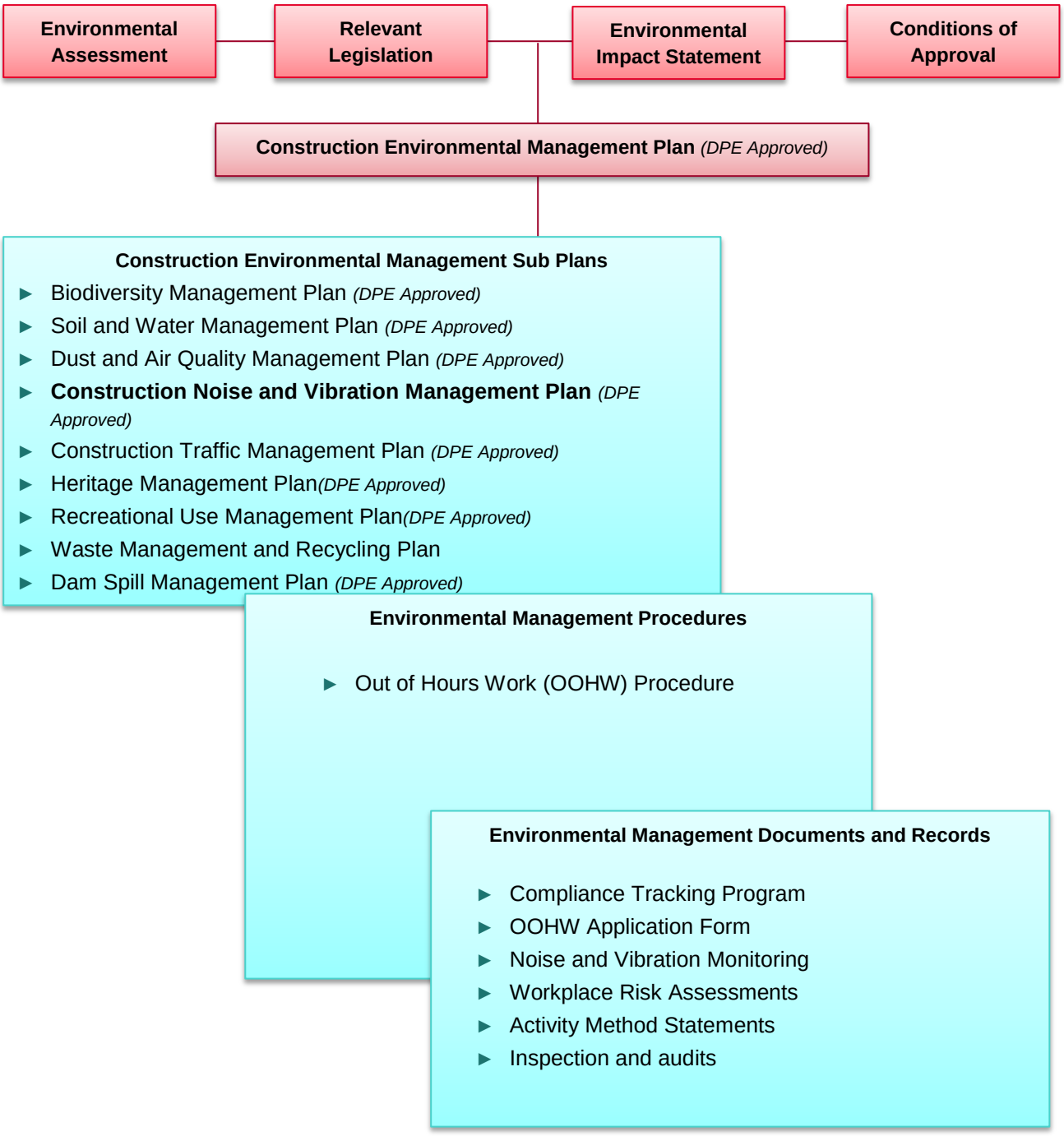


Figure 1 – Environmental Management Documentation

1.5 Review and Ongoing Development

The CNVMP will be reviewed annually and/or under the following conditions –

- Significant change to the Scope of Works
- If required as a result of an audit or incident
- If State Water or the Environmental Representative formally requests the change
- If the Project Manager determines that it is appropriate

1.6 Consultation

Consultation has been undertaken with the Environment Protection Authority (EPA) with regard to the potential impacts associated with the construction phase of the Project. A summary is provided in the Appendix of the CEMP.

2. Legal and Other Requirements

2.1 Legislation

The following legislation is applicable to the management of noise and vibration for the Project:

- Environmental Planning and Assessment Act 1979
- Protection of the Environment and Operations Act 1997
- Protection of the Environment and Operations (Noise Control) Regulations 2008 (NSW)

2.2 Guidelines and Standards

Additional guidelines and standards relating to the management of noise and vibration that are applicable for the Project include:

- *Interim Construction Noise Guideline* (DECC, 2009);
- *Assessing Vibration: a technical guideline*, (NSW OEH, 2006);
- Australian Standard AS2436:1981 *Guide to Noise Control on Construction, Maintenance and Demolition Sites;*
- Australian Standard AS1055:1997 *Acoustics - Description and Measurement of Environmental Noise;*
- German Standard DIN 4150-Part 3:1999 *Structural vibration - Effects of vibration on structures;*

2.3 Licensing and Approvals

The Environment Protection Licence (EPL) issued by the EPA for scheduled activities as outlined under the *Protection of the Environment Operations Act 1997* will detail the compliance conditions to manage noise and vibration throughout the Project.

3. Roles and Responsibilities

All project personnel including subcontractors have a role in ensuring that the strategies and procedures set out in this CNVMP are implemented. Key roles and responsibilities have been outlined below –

Table 1 - Roles and Responsibilities

Role	Responsibilities
Project Manager	► Managing the delivery of the project including overseeing the implementation of noise and vibration control measures ► Ensuring appropriate resources are available for the implementation and maintenance of appropriate noise and vibration management measures
Environment Manager	► Providing assistance and advice to all Project personnel to fulfil the requirements of this CNVMP ► Undertaking and assessing data from inspections, monitoring and reporting ► Ensuring appropriate training and awareness programs are developed and implemented ► Liaising with relevant authorities and organisations as necessary ► Preparing and submitting applications for Out of Hours Work (OOHW) in accordance with the Out of Hours Work Protocol
Senior Project Engineer	► Liaising with the Environmental Manager to ensure appropriate corrective and preventative actions are developed and implemented ► Provide EM approval to submit applications for OOHW
Community Liaison Officer	► Liaison and notification of construction activities including timeline, out of hours work and traffic management issues such as changes to access and property issues
Superintendent and Supervisors	► Ensuring personnel are fully briefed on the relevant noise and vibration management requirements prior to work commencing ► Managing and / or minimising impacts on noise and vibration sensitive land uses as a result of construction activities
Project and Site Engineers	► Ensuring that appropriate noise and vibration management measures are implemented and maintained on site ► Developing Activity Method Statements and Task Risk Assessments in consultation with the EM
Construction Personnel	► Responsible for following mitigation measures when undertaking site work ► Informing the supervisor of any noise and vibration management issues

4. Indicative Construction Program

An indicative construction program is provided in Section 1.4 of the CEMP.

4.1 Construction Hours of Work

The construction hours for the Project are defined by the conditions outlined in Project Infrastructure Approval. All construction works will be carried out within the approved hours or as otherwise approved as part of the Environmental Protection Licence (EPL).

The standard construction hours of work are detailed in the table below.

Table 2 - Construction Hours

Construction Activity	Monday to Friday	Saturday	Sunday/Public Holidays
Construction Activities	7.00am to 6.00pm	8.00am to 1.00pm	No works unless in accordance with 4.1.2 of this plan

4.1.1 Noise Intensive Activities

Noise intensive activities are construction works with impulsive, tonal or low frequency characteristics such as jack hammering, rock hammering, pile driving, vibratory rolling, cutting of pavement and shall, in accordance with Project Infrastructure Approval only be undertaken–

- Between the hours of 8.00am to 5.00pm Monday to Friday
- Between the hours of 8.00am to 1.00pm Saturday
- In continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, except as expressly permitted by the EPL (to be issued).

4.1.2 Out of Hours Work

All construction works are to be carried out within the construction hours outlined in Table 3, except under the following circumstances –

- Construction work that generates air-borne noise that is
  - No more than 5dB(A) above rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009)
  - No more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009) at other sensitive receivers.
- For the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons
- Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm
- Works approved through an EPL
- Works as approved through the out of hours protocol outlined in Appendix 1

If works are undertaken OOWH a Construction Noise and Vibration Impact Statement (CNVIS) will be prepared to document potential impacts associated with the work. A protocol for the assessment of OOWH activities is provided in Appendix 1.

4.1.3 Out of Hours Delivery

Delivery of most plant and equipment to the project will occur during standard construction hours. On occasion however oversized deliveries will be necessary. Oversized movements will be scheduled to occur off-peak, where possible, when traffic volumes are typically at a minimum, thereby ensuring road user and public safety and minimising disruption to the road network.

5. Construction Noise and Vibration Management Objectives

5.1 Airborne Construction Noise Management Levels

Noise management levels have been determined using the NSW Interim Construction Noise Guideline (ICNG).

Table 3 – Residential Receivers Noise Goals

Location	Receiver	Background Level	Inaudible Works Background + 5dBA (Out of Hours)	NML Background +10dBA (Std Construction Hours)	Highly Noise Affected (Std Construction Hours)
R4 – R11	Residential	30	35	40	75

The noise management levels are applicable when the following premises are in use –

Table 4 – Sensitive Receivers Noise Goals

Location	Receiver	NML LAeq (15minute) dB(A) (Std Construction Hours)	Highly Noise Affected
R1, R2	Passive recreational areas (characterised by contemplative activities that generate and where benefits are compromised by external noise intrusion e.g. Reading, meditation	60	75
R3, R12	Active recreation areas (characterised by sporting activities and other activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	65	75

5.1.1 Maximum noise levels for plant and equipment

All plant and equipment used throughout the works should have an operating Sound Power or Sound Pressure Levels less than or equal to those in Table 6. The LAmax levels in the table below can be used as a guide in the prediction of LAeq15min construction noise.

For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted in the EIS at the most-exposed receptor as the noise levels below are based on realistic worst-case assessment.

Table 5 - Sound Power Levels of Equipment

Equipment	Noise Level – Lamax (dBA) without noise mitigation	
	Sound Pressure Level	Sound Pressure Level @7m
Bitumen Spray Truck	108	83

Equipment	Noise Level – Lamax (dBA) without noise mitigation	
	Sound Pressure Level	Sound Pressure Level @7m
Bobcat	110	85
Concrete Pump	109	84
Concrete Saw	111	86
Concrete Truck	112	87
Crane(small)	108	83
Crane Truck	108	81
Dozer	118	93
Elevated Work Platform	102	77
Excavator (approx. 12 tonne)	100	75
Excavator (approx. 15 tonne	102	77
Excavator (approx. 30 tonne)	110	85
Excavator (approx. 40 tonne)	115	90
Excavator (approx. 7.5 tonne)	98	73
Excavator (Breaker)	124	99
Flatbed Truck	106	81
Franna Crane	107	82
Front End Loader	111	86
Generator	104	79
Grader	113	88
Hand Tools	100	75
Jackhammer	113	88
Mobile Crane (100 tonne)	107	82
Mobile Crane (25 tonne)	105	80
Mobile Crane (300 tonne)	110	85
Mobile Crane (50 tonne)	106	81
Paving Machine	112	87
Piling Rig (Vibratory)	121	96
Road Profiler	113	88
Slip Form Machine	110	85
Sucker Truck	109	84
Tipper Truck	107	82
Truck (12-15 tonne)	108	83
Vibratory Roller	117	92
Water Tanker	103	78
Welding Equipment	100	75

5.2 Construction Vibration Goals

Vibration from plant will be site specific with the level of vibration potentially experienced at a receptor dependent upon the vibration energy generated by the source, the predominate frequencies of vibration, the local geotechnical conditions and the interaction of structures and features which can dampen vibration.

German Standard *DIN 4150-3 1999 Structural Vibration Part 3: Effects of Vibration on Structures* provides guideline criteria for evaluating the short and long-term effects of vibration on structures. The interim guideline *Assessing Vibration: A Technical Guideline* (DEC 2006) provides guideline building vibration levels associated with a low probability of annoyance from occupants.

Table 6 – Vibration Goals

All Works

Location	Annoyance Risk (mms/s)		Damage Risk (mms/s)	
	Horizontal	Vertical	Horizontal	Vertical
Residential	15	5	1.2	0.45

Predicted Buffer Distance from Impact Piling (applicable road and bridge works only)

Location	Damage Risk (m)		Annoyance Risk (m)	
	50% Capacity	100% Capacity	50% Capacity	100% Capacity
Residential/Dwellings	80	100	150	180

Predicted Buffer Distance from Vibratory Rolling (applicable road and bridge works only)

Location	Damage Risk (m)	Annoyance Risk (m)
Residential/Dwellings	18	43

6. Noise Sensitive Receivers

6.1 Residential Receivers and Noise Management Levels

Chaffey Dam is located in a predominately rural setting. Background noise within the Project Site is considered to be 'rural' in nature, with little contributed noise from man-made sources. Existing sources of noise around the Project Site primarily comprise vehicle noise on local roads, recreational activities and farming practices.

A total of 13 potential sensitive receivers were found to occur within the Project Site, comprising active and passive recreational, rural residential land uses and the State Water Storage Custodian's residence (Table 7 and Figure 2).

The majority of these receivers are located within the Bowling Alley Point and Hydes Creek areas. It should be noted that as R13 is a State Water employee's residence and directly related to the operation of Chaffey Dam this receiver has not been considered as part of the noise and vibration assessment.

Table 7 – Sensitive Receivers

Receiver ID	Receiver	Receiver Type	Receiver Location	
			Easting	Northing
R1	Bowling Alley Point Recreation Area – Amenities Building	Passive Recreational	322503.0	6529076.8
R2	Bowling Alley Point Recreation Area – Camping Area	Passive	322307.9	6528947.5

Receiver ID	Receiver	Receiver Type	Receiver Location	
		Recreational		
R3	Nundle Fishing Clubhouse	Active Recreational	322467.7	6527028.9
R4	Bowling Alley Point Receiver	Rural Residential	323176.0	6526346.5
R5	Bowling Alley Point Receiver	Rural Residential	322754.2	6525856.8
R6	Bowling Alley Point Receiver	Rural Residential	322558.3	6526035.3
R7	Bowling Alley Point Receiver	Rural Residential	323055.3	6525258.0
R8	Western Foreshore Receiver	Rural Residential	320291.3	6528081.1
R9	Western Foreshore Receiver	Rural Residential	320119.0	6527971.6
R10	Western Foreshore Receiver	Rural Residential	320112.4	6527857.5
R11	Western Foreshore Receiver	Rural Residential	320057.2	6527758.5
R12	South Bowlo Fishing Club Clubhouse	Active Recreational	321675.8	6531119.5
R13	Storage Custodians Residence	Project-related	322825.2	6529325.5

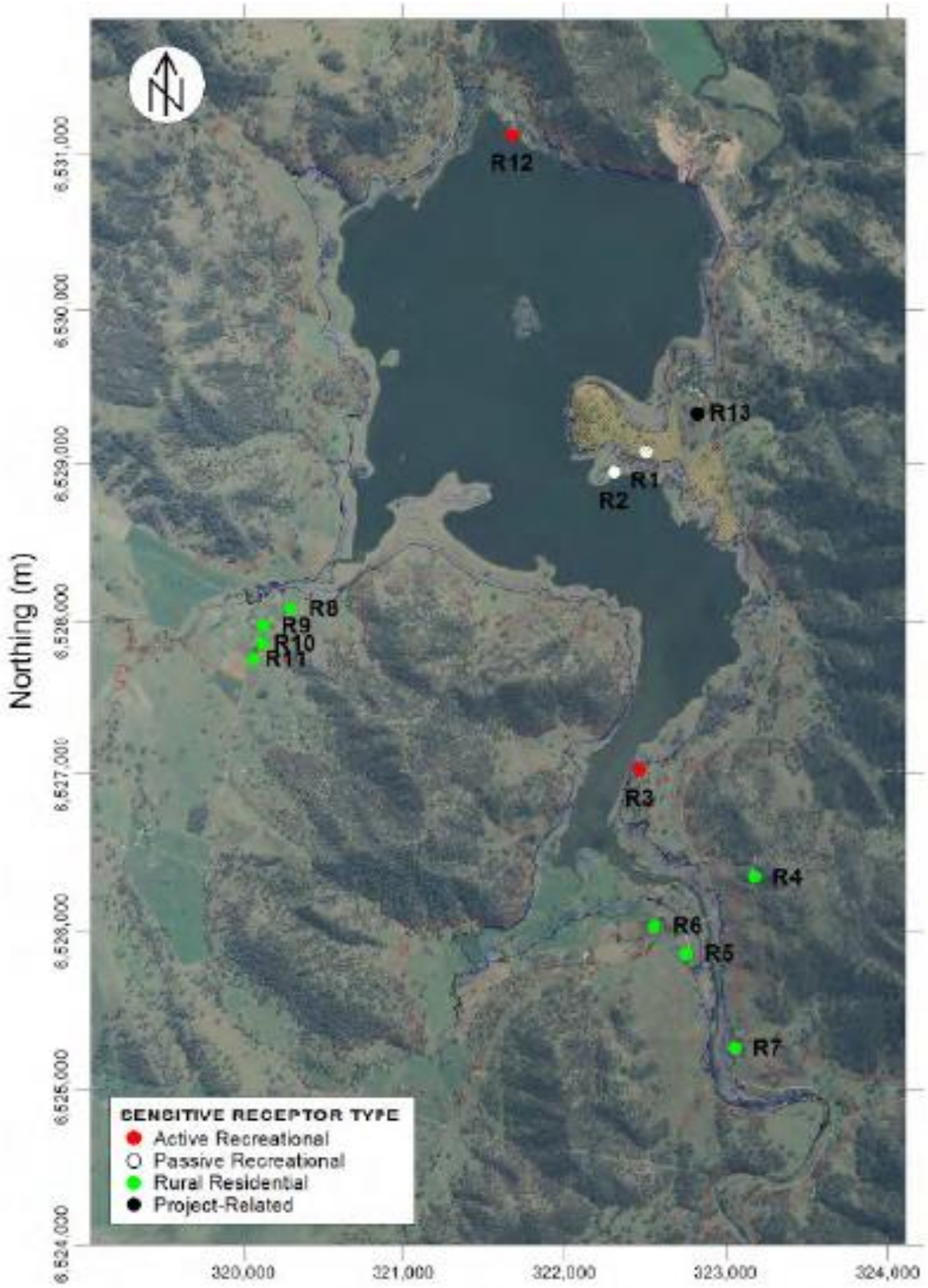


Figure 2 - Sensitive Receivers

7. Evaluation and Assessment of Construction Noise and Vibration Impacts

7.1.1 Airborne Noise Evaluation and Assessment

Construction noise management levels have been determined using the NSW ICNG and based on the EIS peak construction noise levels will not be exceeded at the passive or active recreational receivers.

Peak construction noise levels will be exceeded at all rural residential receivers (R4, R5, R6, R7, R8, R9, R10 and R11). However noise levels at rural residential receivers will be below the "Highly Noise Affected" level of 75 dB(A).

Table 8 – Predicted Noise Levels Sensitive Receivers

Receiver	Predicted Noise Levels LAeq (15minute) dB(A) Scenarios					Management Level LAeq (15minute) dB(A)
	Dam Wall Works	Morning Glory Spillway Works	Bowling Alley Point Bridge	Tamworth-Nundle Rivers and Western Foreshore Roads	All scenarios	
R1	39	34	32	33	41	60
R2	32	< 30	33	32	38	60
R3	< 30	< 30	< 30	36	40	65
R12	< 30	< 30	< 30	52	52	65

Receiver	Predicted Noise Levels LAeq (15minute) dB(A) Scenarios					Management Level LAeq (15minute) dB(A)	
	Dam Wall Works	Morning Glory Spillway Works	Bowling Alley Point Bridge	Tamworth-Nundle Rivers and Western Foreshore Roads	All scenarios	Noise Affected	Highly Noise Affected
R4	< 30	< 30	< 30	45	45	40	75
R5	< 30	< 30	< 30	66	66	40	75
R6	< 30	< 30	< 30	65	65	40	75
R7	< 30	< 30	< 30	71	71	40	75
R8	< 30	< 30	63	61	65	40	75
R9	< 30	< 30	48	48	51	40	75
R10	< 30	< 30	50	49	53	40	75
R11	< 30	< 30	47	46	50	40	75

7.1.2 Construction Vibration Assessment

The activity to generate the highest level of vibration is

- Vibratory rollers during the realignment of the roads

All residences in the study area are located outside the required buffer distance for vibratory rollers.

The closest residential receiver (R7) is located approximately 65 m from vibratory rolling activities associated with road construction, outside the maximum required buffer of 43 m for Annoyance Risk. As rollers represent the highest potential for vibration, the required buffer distances for all other road and bridge construction activities will also be met. Given the

significant distance from construction activities proposed at the dam wall, the risk of vibration related impacts is negligible.

7.1.3 Construction Road Traffic Noise

The ICNG does not provide specific guidance in relation to acceptable noise level associated with construction traffic; guidance is taken from the Road Noise Policy. Construction road traffic noise levels are predicted to meet the relevant NSW Road Noise Policy criteria on Lindsays Gap Road, Garoo Road and within the township of Woolomin. On the Tamworth- Nundle Road between Woolomin and Dungowan, existing noise levels are predicted to marginally exceed road traffic noise assessment criteria at the closest receiver to the roadway.

Noise impacts associated with the initial movement of construction vehicles to site at the commencement of each Project stage and the final movement of construction vehicles away from the Project Site at completion of each stage are expected to be minimal, given the limited number of vehicles required for this function and the intermittent scheduling of such movements. Following mobilisation to site, heavy vehicle movements will generally be restricted to within each of the designated works areas.

8. Management and Mitigation Measures

8.1 Noise and vibration management measures

Standard noise and vibration mitigation measures are to be implemented throughout the construction period to reduce and control potential construction noise impacts. These measures minimise potential for disturbance at receptors, preserve the acoustic amenity of the surrounding environment and aim to control noise levels within the construction NMLs.

Table 9 - Mitigation Measures

Mitigation Measure	*Project Phase*
All work will be carried out within the following hours: ► Monday to Friday 7:00am to 6:00pm ► Saturday 8:00am to 1:00pm ► No work on Sundays or public holidays	Construction
Residents adjacent to works areas will be informed prior to and during construction, as per EPL requirements of the nature, duration and expected overall noise and dust levels of construction activities. Relevant contact details for site personnel will also be provided.	Preconstruction Construction
Simultaneous operation of noisy plant will be avoided wherever practicable.	Construction
Maintenance work on construction plant and vehicles will be carried out away from identified sensitive receivers and confined to standard daytime construction hours, wherever practicable.	Construction
Wherever practicable, noisy equipment will be: ► Positioned behind structures that act as barriers to identified sensitive receivers ► Positioned at the greatest distance from identified sensitive receivers ► Oriented to directed noise emissions away from identified sensitive receivers	Construction
All vehicles and equipment will be regularly serviced, as per manufactures instructions and maintained in proper working order and turned off when not in use.	Construction
“Quiet” practices will be employed wherever practicable when operating equipment.	Construction
An effective Complaints Handling System, as outlined in the Community Communication Strategy will be developed and implemented throughout construction.	Construction

Mitigation Measure	*Project Phase*
Vibration monitoring will be carried out at the nearest sensitive receiver on commencement of significant construction activities, as follows: ▶ In the event that construction vibration is found to be significantly below construction vibration criteria, no subsequent monitoring of that activity is required ▶ If monitored vibration levels are considered to be high-risk or close to the vibration criteria, unattended vibration monitoring will be carried out on a continuous basis at the nearest vibration sensitive receiver.	Construction
Where feasible and reasonable, piling activities shall be undertaken using quieter alternative methods than impact or percussion piling. Bored piling will be used during the construction of Bowling Alley Bridge.	Construction

8.2 Monitoring and Reporting

8.2.1 Noise Monitoring

8.2.1.1 Plant and Equipment Noise Monitoring

A Plant Hazard Assessment will be prepared for each piece of plant prior to its operation on site. The PHA will require measurement of the sound power level and will confirm that actual plant noise levels are within those maximum noise levels in Table 6.

8.2.1.2 Airborne noise monitoring in the community

Attended noise monitoring will be carried out to verify construction noise levels against the Construction Noise and Vibration Impact Assessment and determine effectiveness of noise mitigation strategies. Attended noise monitoring of construction activities will be undertaken

- Within 14 days of commencement of significant construction activities, as follows:
  - In the event that construction noise is found to be significantly below construction noise criteria, no subsequent monitoring of that activity is required
  - If monitored noise levels are considered to be high-risk or close to the noise criteria, noise monitoring will be carried out on a fortnightly basis at the nearest noise sensitive receivers.
- During OOHW to confirm that the predictions in the noise and vibration assessment were accurate
- Where appropriate in response to a complaint(s)
- As otherwise directed by the EPL (to be issued)

Noise monitoring will be consistent with the distances/locations identified in the CNIS including

- Location of previous monitoring sites
- The proximity of the receiver to a worksite
- The sensitivity of the receiver to noise
- Background noise levels
- The expected duration of the impact

8.2.2 Vibration Monitoring

Attended vibration monitoring is to be undertaken as follows

- If monitored vibration levels are considered to be high-risk or close to the vibration criteria, unattended vibration monitoring will be carried out on a continuous basis at the nearest vibration sensitive receiver. Where attended vibration monitoring is not feasible, due to extended periods of vibration intensive works, a permanent vibration monitoring system is to be installed to warn plant operators whenever there is potential for cosmetic damage to buildings and structures.
- In the event that construction vibration is found to be significantly below construction vibration criteria, no subsequent monitoring of that activity is required

8.3 Reporting

The results of noise and vibration monitoring will be recorded and provided to the EPA in accordance with the EPL.

9. Non-Conformance and Corrective Action

Procedures for Non-conformance and Corrective Actions are addressed in the CEMP, Section 5.

10. Enquiries and Complaints Management

Complaints will be managed in accordance with Community Communication Strategy. In the event a complaint is received regarding noise and vibration, the Environment Manager will conduct an investigation to determine the potential parameters of influence that could have led to the complaint.

The response will confirm the action to be undertaken. All complaints will be managed as per the EPL requirements.

The State Water Corporation has set up a complaints and enquiry management system and they can be lodged with State Water through the following means.

- Phone 1300 662 077
- Email customer.helpdesk@statewater.com.au
- Post State Water PO Box 1018 Dubbo NSW 2830
- Website;
  http://www.statewater.com.au/current%20projects/Chaffey%20Dam%20augmentation

The project will install signs 1.5 m high and 2.4 m wide at each end of the project, the sign is in Appendix 2.

Appendix 1 – Out of Hours Protocol

This OOHW Protocol applies to all works to be undertaken outside the standard construction hours.

OOHW Noise and Vibration Assessment

A Construction Noise and Vibration Impact Statement (CNVIS) will be prepared to assess the extent of noise and/or vibration impact the OOWH construction activities will have upon the community/ residential receivers.

The level of assessment will be determined by the Project EPL requirements. The CNVIS will be prepared by an appropriately qualified person experienced in assessing the impacts of noise and vibration from civil engineering works.

As part of the assessment process:

- Any exceedance of the construction noise/ vibration objectives will be identified;
- The level of noise/vibration impact will be evaluated
- Appropriate noise/vibration management and mitigation measures will be determined
- An appropriate noise/vibration monitoring program will be developed to assist in the management of potential impacts.

For any other OOHW that may be required as the project progresses the level of assessment and approval route will be dependent on the level of environmental risk. For works that are considered inaudible, the following will apply

- Document why works are inaudible using the OOHW application form
- Seek approval from the Project Manager
- Notify the Community Liaison Officer prior to undertaking works, where not an emergency situation.
- Workforce to be tool boxed to reinforce works restrictions.

OOHW Documentation

The Environment Manager will develop an OOHW Application Form for submission to EPA requesting a variation to the project working hours. The application is to provide all required detail about the OOHW including the CNIS, as detailed above.

OOHW Community Notification

Notification to specific impacted noise-sensitive receivers will be provided as required by the Project EPL (to be issued). Any additional notification requirements set by the EPA in the issuing of the EPL variation will also be undertaken.

Approval of OOHW and implementation of OOHW conditions

On receipt of the EPA variation, any specific conditions that relate to the OOHW are to be:

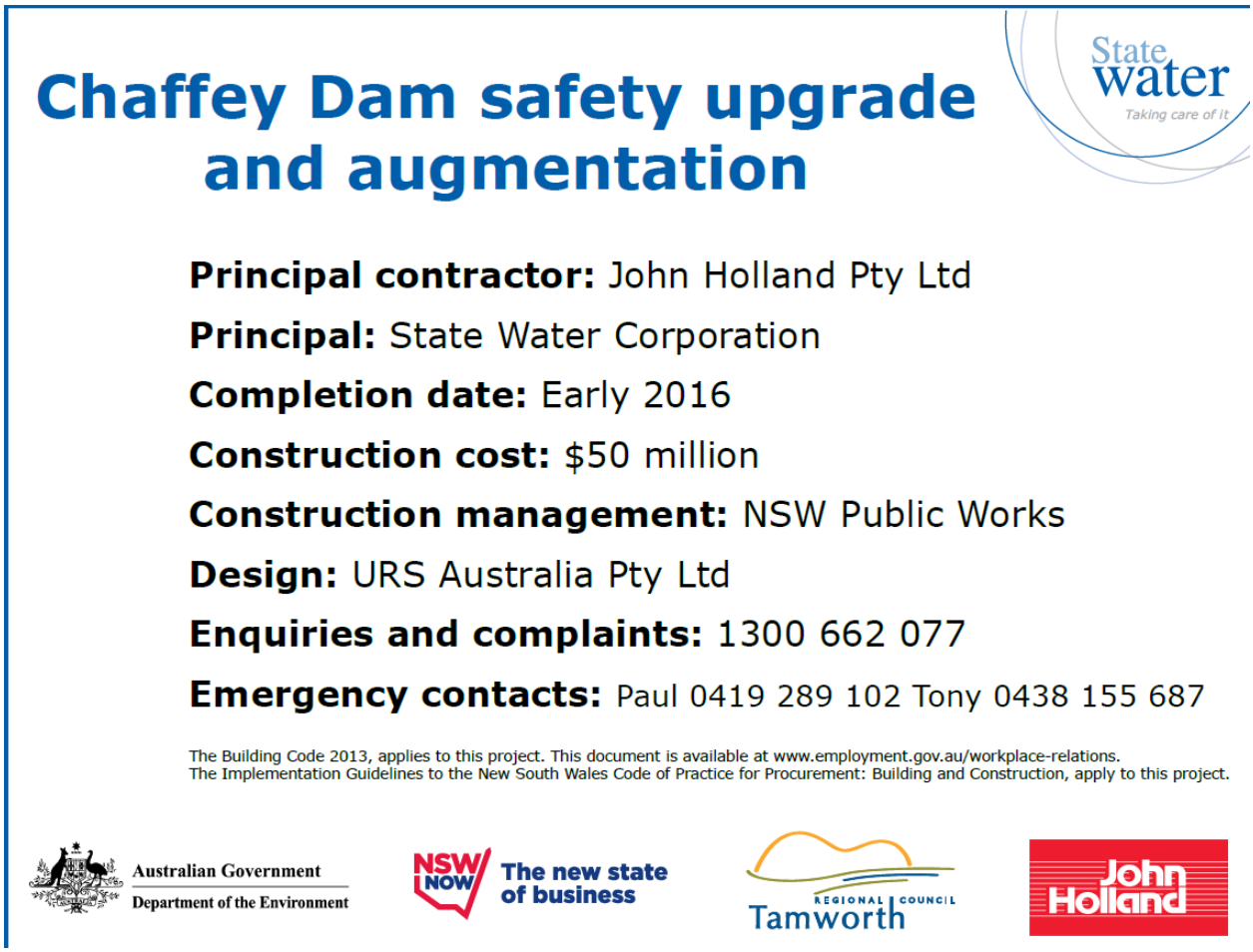
- Actioned for implementation (such as additional notification to community)

- Tool-boxed to relevant workforce on site personnel before each shift to introduce/reinforce work restrictions, management measures and expected workforce behaviour.
- Implemented during the works and monitored by JH

OOHW Monitoring

Attended noise and vibration monitoring will be undertaken at representative stages of the activity or work to verify that noise levels resulting from OOHW are in accordance with the levels predicted in the CNVIS.

Appendix 2 Chaffey Dam Augmentation and Safety Upgrade Project Signage



Compliance Matrix

No.	SSI-5039 Infrastructure Approval Condition / Commitment	Implementation Stage Pre-Construction (P), Construction (C), Operation (O)			Implementation Plan	Document Reference OR Documents to be Produced	Responsibility
		P	C	O			
B14	Construction activities associated with the SSI shall be undertaken during the following standard construction hours: a) 7:00am to 6:00pm Mondays to Fridays, inclusive; and b) 8:00am to 1:00pm Saturdays; and c) at no time on Sundays or public holidays.		**C**		Incorporate requirements of condition into CEMP and Construction Noise and Vibration Management Plan	Section 4.1 Construction Hours of Work	JH
B15	Construction works outside of the standard construction hours identified in condition B14 may be undertaken in the following circumstances: a) construction works that generate noise that is: (i) no more than 5 dB(A() above rating background level at any residence in accordance with the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009); and (ii) no more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009) at other sensitive receivers; or b) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; d) works approved through an EPL, or e) works as approved through the out-of-hours work protocol outlined in the CEMP.		**C**		Incorporate requirements of condition into CEMP and Construction Noise and Vibration Management Plan	Section 4.1.2 – Out of Hours Work Section 4.1.3 – Out of Hours Delivery	JH

No.	SSI-5039 Infrastructure Approval Condition / Commitment	Implementation Stage Pre-Construction (P), Construction (C), Operation (O)			Implementation Plan	Document Reference OR Documents to be Produced	Responsibility
B16	Except as expressly permitted by an EPL, activities resulting in impulsive or tonal noise emission (such as rock breaking, rock hammering, pile driving) shall only be undertaken: a) between the hours of 8:00 am to 5:00 pm Monday to Friday; b) between the hours of 8:00 am to 1:00 pm Saturday; and c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block. For the purposes of this condition 'continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this condition.		**C**		Incorporate requirements of condition into CEMP and Construction Noise and Vibration Management Plan	Section 4.1.1 – Noise Intensive Activities	JH
B17	The SSI shall be constructed with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009). All feasible and reasonable noise mitigation measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the CEMP. *Note: The Interim Construction Noise Guideline identifies 'particularly annoying' activities that require the addition of 5dB(A) to the predicted level before comparing to the construction noise management level.*		**C**		Incorporate requirements of condition into Construction Noise and Vibration Management Plan	Section 5.1 – Airborne Construction Nominated Management Level Section 7.1.1 – Airborne Noise Evaluation & Assessment Section 8.1 – Standard Noise and Vibration Management Measures Section 8.2.1 – Noise Monitoring	JH
B18	The SSI shall be constructed with the aim of achieving the following construction vibration goals: a) for structural damage, the vibration limits set out in the *German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures*; and b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006).		**C**		Incorporate requirements of condition into Construction Noise and Vibration Management Plan	Section 2.2 Guidelines and Standards Section 5.2 – Construction Vibration Goals	State Water Construction Contractor

No.	SSI-5039 Infrastructure Approval Condition / Commitment	Implementation Stage Pre-Construction (P), Construction (C), Operation (O)			Implementation Plan	Document Reference OR Documents to be Produced	Responsibility
B21	Where feasible and reasonable, piling activities shall be undertaken using quieter alternative methods than impact or percussion piling, such as bored piles or vibrated piles.		**C**		Incorporate requirements of condition into Construction Noise and Vibration Management Plan	Section 8.1 –Noise and Vibration Management Measures	JH
B22	Where feasible and reasonable, operation noise mitigation measures shall be implemented at the start of construction (or at other times during construction) to minimise construction noise impacts.		**C**		Incorporate requirements of condition into Construction Noise and Vibration Management Plan	NA – There is no noise mitigation measures for the operation of the dam/road realignment.	
C2 c)	The Proponent shall ensure that the following specific requirements are considered in developing the sub-plans or procedures identified in condition C1, further to any guidelines contained within the Guideline for the Preparation of Environmental Management Plans (Department of Planning, Infrastructure and Natural Resources 2004): c) **Noise and Vibration** to be developed in accordance with the NSW Interim Construction Noise Guideline (DECC, July 2009) and in consultation with the EPA and include the following:	**P**	**C**		Incorporate requirements of condition into Construction Noise and Vibration Plan.	Section 1.6 – Consultation Section 2.2 – Guidelines and Standards	State Water JH

No.	SSI-5039 Infrastructure Approval Condition / Commitment	Implementation Stage Pre-Construction (P), Construction (C), Operation (O)			Implementation Plan	Document Reference OR Documents to be Produced	Responsibility
	(i) details of all potentially noise-generating activities (including vehicle activities on the SSI site and on the surrounding road network), and all potentially noise-affected receivers;		**C**		Incorporate requirements of condition into Construction Noise and Vibration Plan.	Section 5.1.1 – Airborne Noise Management levels Section 6 – Noise Sensitive Receivers	JH
	(ii) selection and application of feasible and reasonable mitigation measures to reduce construction noise and vibration impacts including the use of noise attenuation barriers, alternative construction methods (including alternative piling methods) and work practices where potential noise impacts exceed the relevant objectives; and		**C**		Incorporate requirements of condition into Construction Noise and Vibration Plan.	Section 8.1 – Standard Noise and Vibration Management Measures Section 10 – Complaints and Enquiries Management	JH
	(iii) procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity and receiving complaints.		**C**		Incorporate requirements of condition into Construction Noise and Vibration Plan.	Community Communications Strategy Section 10 – Complaints and Enquiries Management	State Water JH