

Central Station Main Works

Construction Noise and Vibration Monitoring Program Report

3 August 2018 to 3 August 2019

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1. Introduction

1.1 Background

Sydney Metro City & Southwest – Chatswood to Sydenham Project is a new 30km metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the capacity to run a metro train every two minutes each way through the centre of Sydney. The Central Station Main Works Project (CSMW) forms part of the Sydney Metro City & Southwest – Chatswood to Sydenham Project. The works are undertaken by Laing O'Rourke.

The CSMW include the installation of new platforms that will be constructed using sophisticated excavation techniques to create a cavern with an island platform, beneath Central Station's existing heavy-rail platforms 13, 14 and 15. The works include new infrastructure and the adjustments to existing infrastructure at Central Station to construct, operate and maintain the Metro Station Works. The key features of the Central Station works include:

- a new north-south concourse for Central Station which will link the new metro station with the existing northern entrance and north concourse, a new east concourse, and the existing southern baggage tunnel; and
- adjustments to the existing Grand Concourse, Olympic Tunnel, north concourse and northern entrance to Central Station.

The Central Walk works include the provision of infrastructure to provide improved connectivity and other operational enhancements throughout Central Station. The key features of the Central Walk works include:

- a new eastern entrance for Central Station;
- a new east concourse for Central Station beneath existing platforms 16 to 23, which will link the new eastern entrance, the new north south concourse, existing platforms 16 to 23 and the existing Eastern Suburbs Railway (ESR) concourse; and
- provisions to enable the future construction (by others) of an extension of the Central Walk through a new west concourse and a new western entrance for Central Station.

1.2 Planning Requirements

In accordance with Minister's Condition of Approval (MCoA) - C9, the Construction Monitoring Program was developed in consultation with the City of Sydney Council and the Environmental Protection Authority during the Construction Environmental Management Plan (CEMP) consultation and approval phase. Each construction monitoring program has been incorporated into the relevant CEMP sub-plan. The results of the Construction Monitoring Program will be submitted to the Secretary and relevant regulatory agencies for information. This Construction Noise and Vibration Monitoring Report covers the monitoring period from 3 August 2018 to 3 August 2019. The applicable MCoA are shown below in Table 1-1.

Table 1-1: SSI 7400 Conditions relating to the Construction Monitoring Program

Condition	Requirement	Reference
C9	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each Construction Monitoring Program to compare actual performance of construction of the CSSI against predicted performance.</p> <p>Required Construction Monitoring Programs Relevant government agencies to be consulted for each Construction Monitoring Program</p> <ul style="list-style-type: none"> a) Noise and Vibration - EPA and Relevant Council(s) b) Blasting - EPA and Relevant Council(s) c) Water Quality - EPA and Relevant Council(s) d) Groundwater - DPI Water/NRAR 	<ul style="list-style-type: none"> a) Noise and Vibration – refer to the Construction Noise and Vibration Management Plan b) Blasting – Not applicable c) Water Quality – refer to the Construction Soil and Water Management Plan d) Groundwater - refer to the Construction Groundwater Management Plan
C16	<p>The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.</p>	<p>The Construction Groundwater and Water Quality Monitoring Report will be submitted separately.</p> <p>The results of the Construction Noise and Vibration Monitoring Program are discussed in Section 1.3.</p> <p>In accordance with CoA C16, this report will be submitted to the following agencies for information:</p> <ul style="list-style-type: none"> • DPIE • NSW EPA • City of Sydney Council <p>The Independent Environmental Representative will review the reports prior to submission.</p>

Table 1-2: EPL 21148 Monitoring and reporting requirements

Condition	Requirement	Reference
M7.1	<p>Any noise monitoring must be undertaken in accordance with Australian Standard AS 2659.1 – 1998:</p> <p>Guide to the use of sound measuring equipment – portable sound level meters, or any revisions of that standard which may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.</p>	<p>Refer to the Construction Noise and Vibration Management Plan.</p> <p>Refer to S 2 for methodology and Appendix A of this report for Noise monitoring result summary.</p>
M7.2	<p>Any vibration monitoring must be undertaken in accordance with the technical guidance provided in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DECC, 2006). All vibration monitoring results may be assessed and reported against the acceptable values of human exposure to vibration set out in Tables 2.2 and 2.4 of the guideline.</p>	<p>Refer to the Construction Noise and Vibration Management Plan.</p> <p>Refer to S 2 for methodology and Appendix B of this report for Vibration monitoring result summary.</p>

1.3 Submission Requirements

In accordance with condition C16, this report will be submitted to the following agencies for information:

- NSW Environmental Protection Authority
- City of Sydney Council
- Department of Planning Industry and Environment

The Independent Environmental Representative will be provided with the report for information prior to submission.

2. Methodology

The Construction Noise and Vibration Monitoring Program is designed to compare actual performance of construction of the CSSI against predicted performance and to assess the effectiveness of the mitigation measures applied during construction of the CSMW Project. The program has been executed in accordance with Section 10 of the Construction Noise and Vibration Management Plan (CNVMP) and recording requirements as specified in Section 10.2. The Construction Monitoring Program commenced in 3 August 2018 and will continue for the duration of the project. The CSMW Construction Noise and Vibration Impact Statement (CNVIS) assessed 50 potentially sensitive receiver locations potentially affected by construction noise. The receiver locations are seen in the figure below.

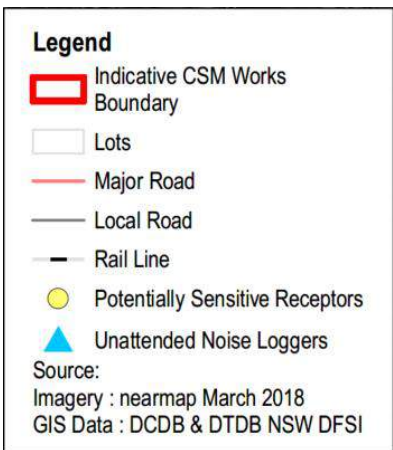


Figure 2-1: Location of Sensitive Receivers

In accordance with MCoA – E33, ongoing consultation with sensitive receivers is undertaken as the project progresses once sensitive periods can be refined based on the type of activities, expected impacts and the particular circumstances of the receptor at that time. All consultation with potentially affected receivers is undertaken prior to the start of the relevant portion of works. Mitigation measures are then tailored based on the consultation feedback.

In accordance with CoA - C11 unattended real-time noise and vibration monitoring will be the focus of monitoring however attended noise and vibration monitoring may be undertaken where

specific circumstances warrant. During the reporting period, real-time noise loggers were installed at the rear of 54 Regent Street on 12 December 2018 (the closest to traffic movements on Sydney Yard Access Bridge and activities in Sydney Yard) and on the hoarding at the Bounce Hotel site at 20-28 Chalmers Street on 11 January 2019 (being the closest to the proximity of the Hotel demolition works and Central Walk works) and a vibration logger was located within Central Station at the State Significant Heritage listed Train Crew Assignment Centre (previously titled the Central Electric building) on 10 January 2019. As per CoA - C11 real time monitoring data was available to the construction team, LOR, Sydney Metro, the Environmental Representative (ER), the Acoustic Advisor, the Department of Planning, Industry and Environment (DPIE) and the Environment Protection Authority (EPA) in real time.

Impacts from vibration are considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (structural / cosmetic damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives. In accordance with CoA – E28 and the requirements of the CNVIS, the vibration limits have been set in accordance with the British Standard BS 7385-2:1993.

Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals (as is the case for select project works), noise or vibration monitoring is conducted at a nominated representative location (typically the nearest receptor where more than one receptor have been identified). Monitoring is also conducted in the event of a complaint being received or during OOHV where the AMMM has identified monitoring. In addition to monitoring required by the CoA and CNVMP, monitoring is conducted throughout Central Railway Station to assess the impact of construction activities on commuters and station staff with the results reported through separate stakeholder management processes.

The results of the monitoring are communicated to relevant personnel when the noise or vibration goal is being approached so that work methodology or equipment being used can be altered, and / or additional management measures may be implemented.

Table 2-1: Monitoring Equipment

Unit	Serial	Calibration Type	Frequency	Last Calibration Date*
Svantek 977 (roaming noise logger)	36834	NATA	Biennial	20/09/2018
Svantek SV33 (calibration unit)	43175	NATA	Biennial	27/06/2019
Svantek 977 (noise logger 54 Regent St)	59644	NATA	Biennial	6/10/2017
Svantek 977 (noise logger Chalmers St)	59643	NATA	Biennial	6/10/2017
Svantek 958 (vibration logger)	7273	NATA	Biennial	19/07/2019
Texcel ETM (vibration logger Central Electric Building)	E3496	NATA	Biennial	29/11/2018

*NATA calibration every two years in accordance with manufacturer's specifications.



Figure 2-2: Unattended vibration Logger set up at the Dental Hospital southern stairwell



Figure 2-3: Attended noise logger setup on Chalmers St

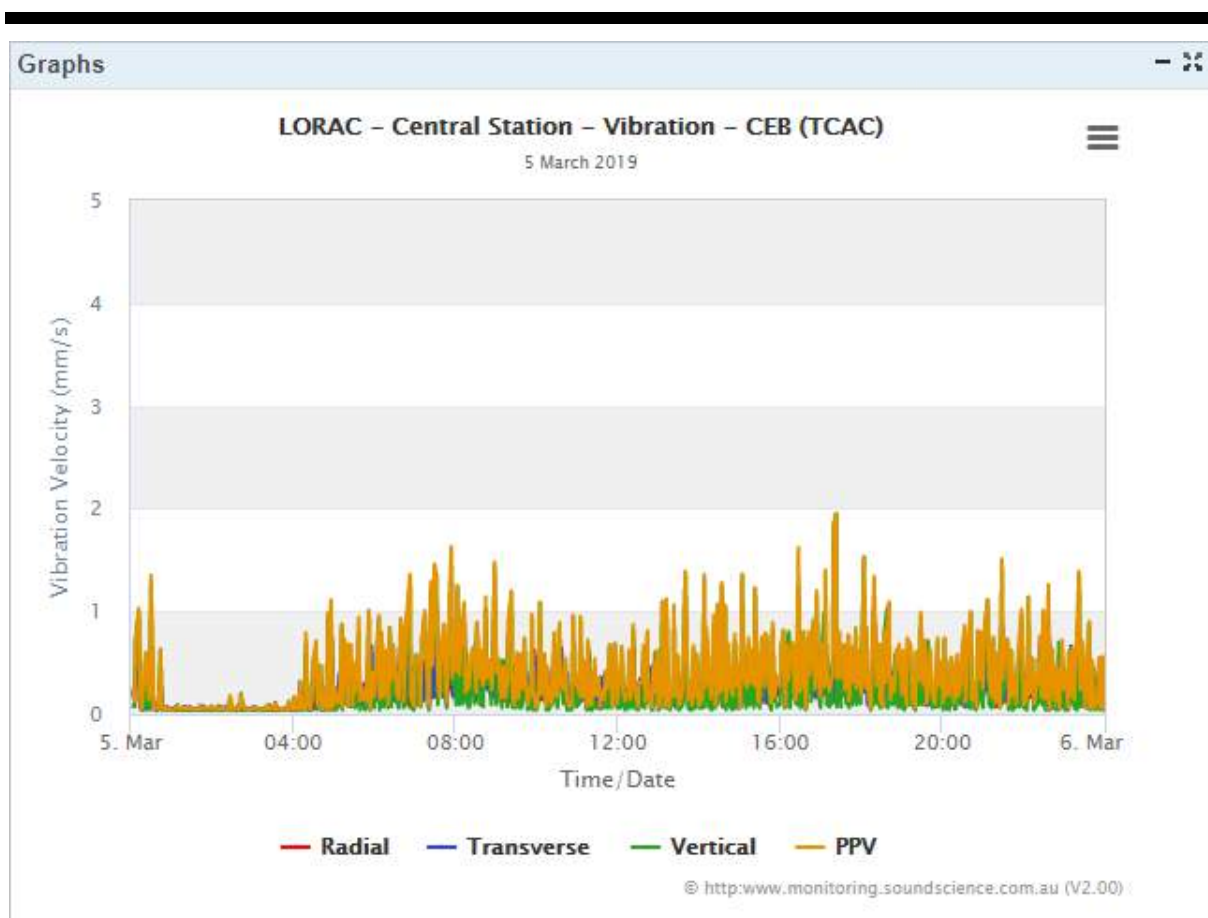


Figure 2-4: Example of real time vibration data.

Graph showing general background vibration levels. No CSM works occurring on this day.



Figure 2-5: Real time noise logger setup at 54 Regent St (in the process of being serviced)



Figure 2-6: Real time noise logger Chalmers St

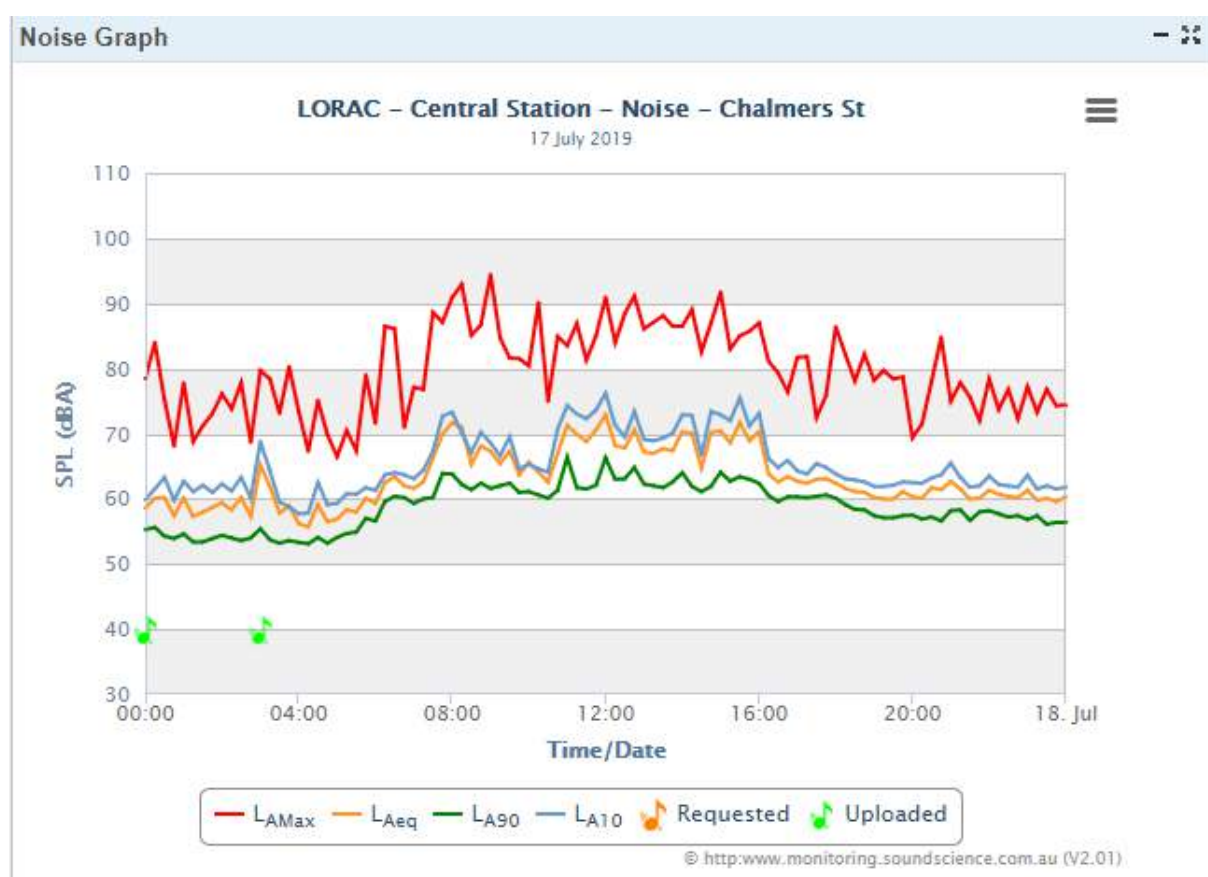


Figure 2-7: Example of real time noise monitoring data



Figure 2-8: Real time vibration logger Central Electric Building

2.1.1 [Key Noise Monitoring Locations](#)

Based on planned construction work, the area's most regularly impacted by construction noise and vibration during the reporting period are shown in Table 2-2-1 below:

Table 2-2: RBLs for Residential Receivers and NMLs for Non-Residential Receiver

Sensitive Receiver Category	RBLs (dBA)		
	Daytime	Evening	Night Time
Residential			
38 Chalmers St (R29)	56	53	45
YHA (R17)	54	52	49
54 Regent St (R43)	50	50	44
30 Chalmers St (R24)	56	53	45
Non- Residential	Daytime	Evening	Night Time
Dental Hospital _ A (north) - 2 Chalmers St (R18)	55	55	55

2.1.2 Noise Monitoring Frequency

Activities were assessed in the CNVIS under the following scenarios. During detailed planning of the activities to be conducted around rail possessions some of the activities were conducted concurrently. The potential noise impacts were reassessed in Out of Hours Work Approvals conducted in accordance with the Sydney Metro Out of Hours Work Protocol.

Table 2-3: Monitoring requirements for construction scenarios

ID	Description	Frequency (as per AMMM)
SCN 01	Platforms & Sydney Yard: Stage 6 – Installing Services/Wiring	During OOH works.
SCN 02	Platforms & Sydney Yard: Stage 7 – Installing Services / Hoarding / Offices	Daytime standard construction hours. During OOH works.
SCN 04	Platforms & Sydney Yard: Stage 8 & 10 - OHW on Platform 11/12 / Replace Track Country End 12/13 / Installing CSR	During OOH works.
SCN 05	Stage 12 - Piling Works / Removing Track	During OOH works.
SCN 12	Metro Box: FRP Platform and Intercity slab	Daytime standard construction hours.
SCN 13	Metro Box: Excavation to underside of Metro Concourse	During OOH works.
SCN 14	Metro Box: Ongoing Logistical support of Box Construction	During OOH works.
SCN 16A	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	During OOH works.
SCN 16B		
SCN 16C		
SCN 16D		
SCN 17	Central Walk: Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms	Daytime standard construction hours.
		During OOH works.
SCN 18	Central Walk: Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	During OOH works.
SCN 19	Central Walk: Platform works including works below the top slab	During OOH works.
SCN 20	Central Walk: Platform Remodelling works including platform canopy modifications	During OOH works.
SCN 22	ESR: Surface Works and Underground works	During OOH works.
SCN 23	East Entrance: Demolition of the Bounce Hotel	Daytime standard construction hours.
SCN 24	East Entrance: Piling for East Entrance	Daytime standard construction hours.
SCN 25	East Entrance: Excavation of East Entrance	Daytime standard construction hours.
SCN 26	East Entrance: Excavation of Adit to ESR Concourse including Canopy Tube installation	Daytime standard construction hours.
SCN 27	East Entrance: FRP works to East Entrance	Daytime standard construction hours.
SCN 28	East Entrance: East Entrance Works and Underground Works	Daytime standard construction hours.
SCN 29	Grand Concourse: Piling in Grand Concourse	During OOH works.

SCN 30	Grand Concourse: FRP Pile caps	Daytime standard construction hours.
		During OOH works.
SCN 31	Grand Concourse: Removal of Existing Canopies	During OOH work.
SCN 32	Grand Concourse: Installation of precast / insitu columns and arches	Daytime standard construction hours.
		During OOH works.
SCN 34	Northern Concourse & North Entry: Demolition Southern Half	Daytime standard construction hours.
SCN 35	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	Daytime standard construction hours.
SCN 36	Northern Concourse & North Entry: Demolition Northern Half	Daytime standard construction hours.
SCN 37	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	Daytime standard construction hours.
SCN 38	Northern Concourse & North Entry: Installation of remaining precast columns and Arches	Daytime standard construction hours.
SCN 39	Sydney Yard Access Bridge: Heavy Vehicle Traffic on the SYAB	Daytime standard construction hours.
		During OOH works.

The activities in Table 2-3 below were assessed against the scenarios in the CNVIS as show in Table 2-2 above through the OOH assessment process.

2.1.3 Out of Hours Works Approvals Summary

Approval of OOHW is sought so as to provide safe mechanical and personal access to the rail corridor to complete the required works as required by CoA E47. Additional Mitigation and Management Measures (AMMM) are adopted as required. OOHW are governed by the MCoA and an Environmental Protection Licence (EPL). An EPL (EPL 21148) was issued for the Project on 28 November 2018. Works prior to this date were delivered in accordance with the MCoA and the Sydney Trains Environment Protection Licence (EPL) 12208. The project obtained endorsement from Sydney Metro and the Acoustic Adviser, and approval from the Environmental Representative for OOHW conducted under the Sydney Trains EPL. Sydney Metro, the Acoustic Adviser, and the Environmental Representative review the OOH. The LOR Environmental Manager approves the OOHW for works under the project EPL21148 in accordance with the Sydney Metro Out of Hours Work Protocol on the following occasions.

Table 2-4: Monitoring requirements for construction scenarios

#	OOHW Application	Activity	AMMM required
4	WE02: 14 July (00:01 Saturday) to 15 July (Sunday 23:59) WK02 to WK03: 16 to 27 July WE04: 28 July (00:01 Saturday) to 29 July (Sunday 23:59) WK04: 30 July to 3 Aug WE05 : 4 Aug (08:00 to 18:00) & 5 Aug (08:00 to 18:00)	WE02 (14-15/07/18) and WE04 (28-29/07/18): <ul style="list-style-type: none"> Saw cut/coring to platform (not conducted OOH) Concrete breaking with hammer drill (not conducted OOH) Site investigation with super sucker Hoarding erection Mixing of grout and grouting of piles Survey Weekday from Wk02 to Wk04 (16/07/18 to 03/08/18) 10pm to 6am: <ul style="list-style-type: none"> Hoarding erection 	No

		<ul style="list-style-type: none"> • Use of small hand tools • Use of electric pallet jacks/positrack • Cleaning/housekeeping • Painting • Re-fuelling of plant/machinery • Augering • Delivery/removal of materials from platform utilising hi-rail <p>WE05 04/08/18 and 05/08/18 8am and 6pm</p> <ul style="list-style-type: none"> • Installation of delineation fencing (ATF) on platform 12/13 (location shown in Appendix 1: Map) • Truck with Hiab • Forklift/Telehandler • Pallet jack • Hand drills 	
5	WK05 to WE06 6-12/08/18	<p>Olympic stairs</p> <ul style="list-style-type: none"> • Removal and replacement of hoarding • Use of small hand tools • Use of electric pallet jacks/positrack • Cleaning/housekeeping • Re-fuelling of plant/machinery • Augering (behind noise blankets) • Delivery/removal of materials from platform utilising hi-rail 	Attended noise monitoring
		<p>WE06 Possession: Saturday 11 August 2018, 0200 – 2000</p> <ul style="list-style-type: none"> • Track strip with Front End Loader and 7t Excavator • Transportation of spoil by hydrema • OHW removal with hi-rail EWP • Installation of new OHW structures with multicrane • Signalling works – hand tools <p><u>Saturday 11 August 1800 – Sunday 12 August 0600</u></p> <ul style="list-style-type: none"> • Installation of reinforcing cages • Transportation of spoil by hydrema • Concrete line pump pouring footings • Concrete truck deliveries over SYAB • Track strip with Front End loader and 7t excavator • Cut finishes on platform 12/13 with road saw (Saturday midday) <p><u>Sunday 12 August 0600 – 0200 Monday</u></p> <ul style="list-style-type: none"> • Removal of 3 OHW structures with multicrane • Concrete line pump pouring footings • OHW redropping with hi-rail EWP • Spike and lock points in track – hand tools • Installation of ATF style fencing around Sydney Yard <p><u>Sunday 12 August 1800– 2359</u></p> <ul style="list-style-type: none"> • Strip formwork off footings • Clean and make good to platform finishes • Reinstate ballast around worksite 	Attended noise monitoring as required
6	WK06 to WK08 13-31/08/18	<p>Olympic stairs works</p> <ul style="list-style-type: none"> • Removal and replacement of hoarding • Use of small hand tools • Use of electric pallet jacks/positrack • Cleaning/housekeeping • Re-fuelling of plant/machinery 	Attended noise monitoring

		<ul style="list-style-type: none"> • Augering (behind noise blankets) • Delivery/removal of materials from platform utilising hi-rail 	
		WE08 Possession – Track 16 and Sydney Yard Weekend Day OOH only: 1300 to 1800 Saturdays and 0800 to 1800 Sundays. <ul style="list-style-type: none"> • NDD investigations of future CSR routes, OHW footings and pits using vacuum truck • Backfilling of above using stab sand transported by 6t Hi-Rail Excavator • Removal of OHW structures with EWP's and multi-crane • Tree Lopping in Sydney Yard • Installation of fencing with transportation of materials done with telehandler 	Not required
7	WE09 to WE11 1-16/09/18	Olympic stairs work <ul style="list-style-type: none"> • Removal and replacement of hoarding • Use of small hand tools • Use of electric pallet jacks/positrack • Cleaning/housekeeping • Re-fuelling of plant/machinery • Augering (behind noise blankets) • Delivery/removal of materials from platform utilising hi-rail 	Attended noise monitoring
		Platform 12 To be conducted during <u>Week Night Time OOH</u> : 10pm – 6am weekdays from 3-7 September 2018: <ul style="list-style-type: none"> • Saw cutting of platforms using a demo-saw • Breakout of existing tiles using hand tools • Cleaning/housekeeping • Removal of waste and deliveries 	Works not undertaken
		Platform 20/21 – WE09 Possession 0001 – 2359 Saturday and Sunday 1-2 September 2018: <ul style="list-style-type: none"> • Removal and reinstatement of sections of hoarding • Auguring on the platforms • Delivery and removal of materials from platform which includes utilising hi-rail and Back-of-House access • Adjustment of hoarding on platform 20/21 (now full height on north-east side) • Construction of a new 4m x 3m hoarding at the southern end of platform 20/21 above the old southern baggage tunnel lift shaft • Breakout of the southern baggage tunnel lift shaft cover 	Not required
		Platforms 9-15 – WE10 Possession 0001 – 2359 Saturday and Sunday 8-9 September 2018: <ul style="list-style-type: none"> • Supersucking of platforms in future auguring locations utilising a Vacuum Truck • Excavation of local routes, signal bases, pits, a footing, and a ULX utilising 13t Hi-Rail Excavators, Hi-Rail Hydremas, a Hi-Rail Flatbed, a Concrete Line Pump, and a Vacuum Truck • Erection of structures, removal of structures, removal of OHW, OHW transfers, adjustments and aligning utilising Hi-Rail EWP's, a Hi-Rail pantograph truck and a multi crane • Installation of signals, removal of signals, relocation of air lines, cable pulling, and signalling works associated with track and civil scopes utilising hand tools and a hi-rail flatbed 	Not required

		<ul style="list-style-type: none"> Oxy cutting and removal of rail utilising a FEL and a 7t Excavator <p>0001 – 2359 Saturday and Sunday 15-16 September 2018:</p> <ul style="list-style-type: none"> Auguring of hoarding piles and I-beam installation to platform 12 utilising a Hi-Rail Flatbed and 7t Excavators Excavation of local routes, signal bases, pits, a footing, and a ULX utilising 13t Hi-Rail Excavators, Hi-Rail Hydremas, a Hi-Rail Flatbed, and a Concrete Line Pump Erection of structures, removal of structures, removal of OHW, OHW transfers, adjustments and aligning utilising Hi-Rail EWP's, a Hi-Rail Pantograph Truck and a Multi Crane Adjustment of air lines, cable pulling, and distribution board relocation utilising a Hi-Rail Flatbed 	
8	Olympic Stairs WK11 to WE24	<p>Platforms 20/21 & 22/23</p> <p>To be conducted OOHW Monday to Saturday 1800 to 0700, Saturday 1300 to 1800 from Week 11 (17/09/18) then 24 hours per day from 01/10/18 until WE24 (16/12/18). Works will occur inside the hoarding between 0400 and 2200, and outside of the hoarding between 2200 and 0400 when the platform is free of commuters.</p> <ul style="list-style-type: none"> Removal and reinstatement of sections of hoarding Auguring on the platforms Delivery and removal of materials from platform which includes utilising hi-rail and Back-of-House access Removal of platform structures (including use of rock breakers and demo saws on pavement and lift shafts) Removal of lift shaft roof (22/23 only) 	Attended noise monitoring as required
9	OOHW October	<p>Throughout October</p> <p>Platforms 20/21 & 22/23</p> <p>Works will occur inside the hoarding between 0400 and 2200, and outside of the hoarding between 2200 and 0400 when the platform is free of commuters.</p> <ul style="list-style-type: none"> Removal and reinstatement of sections of hoarding Auguring on the platforms Delivery and removal of materials from platform which includes utilising hi-rail Deliver concrete to platform 23 from Chalmers Street during pedestrian path possession. Typically concrete pours would occur between Sunday 2359 to Friday 0400. Removal of platform structures (including use of rock breakers and demo saws on pavement and lift shafts 0800 until 1800) Removal of lift shaft roof (Platform 22/23 only) 	Attended noise monitoring as required
		<p>WE14</p> <p>Platform 20/21</p> <ul style="list-style-type: none"> Conducting slit trenching to platforms 20/21 using Road saw, Hi-rail supersucker, 5t excavator and trailer <p>Platform 16</p> <ul style="list-style-type: none"> Construction of overhead wire footing southern end of platform 16 <p>Platform 18/19</p> <ul style="list-style-type: none"> Service locating using NDD <p>Platform Zero 0600 – 1800 Saturday and Sunday</p> <ul style="list-style-type: none"> 130t crane set up, required for site compound set up following week and ground preparation & enabling works material delivery 	Attended noise monitoring as required

		<ul style="list-style-type: none"> Excavating for services and pit installation and sheet piling in Sydney Rail Yard between track 16 and 17 using 6t and 13t excavator and 10t dump truck 	
		<p><u>Intercity Tracks and Yard</u></p> <p>Platform Zero OOHW to be conducted between 0600-0800 and 1300- 1800 on Saturday- and 0600- 0600 Sunday WE 14 and WE 15 (6-7 and 13-14 Oct).</p> <p>Works on Platforms 9 through to 15 will be 48 hours continuous WE 16 and 17.</p> <p>Inaudible hazmat removal for the following:</p> <ul style="list-style-type: none"> Preparatory works to remove former newsagent at end of platform 9, 10 and 11. Preparatory works for demolishing 14-15, a cleaners building and office building in Sydney Yard Delivering materials using pedestrian tunnels in off peak hours. 	Attended noise monitoring as required
		<p>WK14, WK15 & WK16 contingency (Out of hours times are Monday to Friday 1800 to 0700)</p> <ul style="list-style-type: none"> Soft striping newsagent and removing materials between 2300 - 0400 <p>WK14</p> <ul style="list-style-type: none"> One night (subject to consultation with residents) is required to conduct noise impact trial for OOH truck movements on SYAB Demolishing cleaners building and preparatory works to demolish office building in Sydney Rail Yard Installing services and foundation for site offices in Sydney Rail Yard Temporary accommodation construction adjacent to Lee Street Substation Delivering materials using pedestrian tunnels in off peak hours WK16 Removing roof canopies platform 13, 14 and 15 	Attended noise monitoring as required
		<p>WE 15 (0600 to 1800 Saturday and Sunday)</p> <ul style="list-style-type: none"> Platform Zero Scope only-construction of temporary site compound using 130t crane Construction of buried CSR route between ORS and cleaners building from pit P01 to P02 using a 6t excavator and 10t dump truck Boarding up of windows at Bounce Hotel using hand tools. 	Attended noise monitoring as required
		<p>WK15 (2300 to 0500 one day between Monday and Friday)</p> <ul style="list-style-type: none"> Piling work required for OHW stanchions, southern end of Platform 12/13. Vibration monitoring will be conducted. 	Attended noise monitoring as required
		<p>WE15 (with WE 16 as contingency)</p> <p>Railway Institute Laneway - 0800 to 1800 Saturday and Sunday</p> <ul style="list-style-type: none"> Service Searching using non destructive digging on the Railway Institute Driveway outside Central Station South Entrance. 	Attended noise monitoring as required
		<p><u>Randall Street</u></p> <p>WK15- 16 October (17 October Contingency) Subject to ROL 2000-0500</p> <ul style="list-style-type: none"> Sewer investigation on Randall Street subject to ROL, Involves lifting lid and measuring invert. Works inaudible. 	Attended noise monitoring as required
		<p>WE 16 Possession (1201 Saturday to 2359 Sunday)</p> <ul style="list-style-type: none"> Relocating and installing services on southern end of Platforms 10-11 Backfill pits and compact using 12t roller platform 13 vicinity to allow plant movement 	Attended noise monitoring as required

		<ul style="list-style-type: none"> Removing OHW, structures and realigning tracks using tamper at Platform 11-12 Removing and relocating signalling and communications cabling between Platforms 9 and 15 and run new OHW between new tracks Hoarding, piles and I beam installation to Platform 12 Dismantling newsagent platform 9/10/11 Install service in Sydney Yard -Contingency WE for Platform Zero works -Demolishing southern end of Platform 14/15 	
		WE17 Possession 1201 Saturday to 2359 Sunday <ul style="list-style-type: none"> Excavating and demolition at the southern end of Platforms 12 Remove overhead wire support for realignment of roads 9, 9/10 and 10 (just south of Platform 9 and 10) and Construction of footings for platform 9,10 and 11 Hoarding piles and I beam installation to Platform 12 and remove remaining section of canopy 	Attended noise monitoring as required
		WK17 6pm to 5am 31/10/18 and 01/11/18 <ul style="list-style-type: none"> Excavate stormwater trench and lay pipes in Track 15 adjacent the rolling stock building. 	Attended noise monitoring as required
10	OOHW November	Front end loader on Platform demo throughout November at Chalmers. Ballast regulator on WE21 23-24/11/18. Sheet piling conducted during daytime OOH on WE20. Rail grinder throughout Nov. NDD on WE19 and 20 in Randle Lane.	Attended noise monitoring as required
		Suburban Track Platforms 20/21 & 22/23 To be conducted OOHW Monday to Saturday 1800 to 0700, Saturday 1300 to 1800 and 1800 to 0700 from Week 11 (17/09/18) then 24 hours per day from 01/10/18 until WE24 (16/12/18). Works will occur inside the hoarding between 0400 and 2200, and outside of the hoarding between 2200 and 0400 when the platform is free of commuters. <ul style="list-style-type: none"> Removal and reinstatement of sections of hoarding Auguring on the platforms Delivery and removal of materials from platform which includes utilising hirail and Back-of-House access Removal of platform structures (including use of rock breakers and demo saws on pavement and lift shafts 0800 until 1800) Removal of lift shaft roof (22/23 only) 	Attended noise monitoring as required
		Platform and Track 17-23 Slit trenching as part of the Metro Box site investigation works are required. This consists of transecting the centre of platforms and track 17 to 20 (west to east) using hi rail vac truck and 6t excavator. To reduce potential impact, where reasonable and feasible slit trenching will occur in the track area rather than platform between 2200-0700. Noise blankets will be used where it would be deemed safe to do so.	Attended noise monitoring as required
		WK18 (8/9 November 1900-0400) 600 feeder box out (excavation and breakout), platforms 20-23. Feeder to be placed on pallet, install steel trim. Loudest equipment would be power tools.	Attended noise monitoring as required
		WE19 Possession (Saturday 0001- Sunday 0059) <ul style="list-style-type: none"> Slit trenching Platform 16 and 17 and Track 17 and 18 over the 48 hour period. Sucker truck working from track 15. Other works include canopy footing base investigations, density test on platform concrete and wall thickness/arrangement. 	Attended noise monitoring as required

		WE20 Possession (Saturday 0001- Sunday 0059) Slit trenching Platform 18 and 19 and Track 19 and 20 over the 48hour period.	Attended noise monitoring as required
		<u>Intercity Tracks and Yard</u> WK 18 and 19 (Out of hours times are Monday to Friday 1800 to 0700) Typical works include; <ul style="list-style-type: none"> • Sydney Yard site services installation, foundation and hard standing for buildings. • General track works within Sydney Rail Yard 	Attended noise monitoring as required
		WE19 Possession (Saturday 0500-1500 and Sunday 0200-2200) The majority of the OHW scope will occur at the southern end of platform road 15/16 <ul style="list-style-type: none"> • Install two OHW Structures (including cut/splice to anchor), Remove four OHW Structures and adjust remaining OHW (cantilever adjustments, installation, redropping). Plant and equipment required consists of Hi-Rail Multicrane, Hi-Rail Nifty Lift, 2x Hi-Rail EWP, Welding/Oxy gear, Rattle gun, Lighting tower. • Sheet piling NE corner of box, between platforms 15 and 16 (require possession to undertake work) • Note: All plant required to be floated in will be during regular construction hours on the Friday. • GW monitoring borehole installation. 	Attended noise monitoring as required
		WE20/WK20 /WK21 (WE20 Possession Saturday 0001- Sunday 2359) (Out of hours times are Monday to Friday 1800 to 0700) <ul style="list-style-type: none"> • Continuation of Archaeological dig (southern end of platform 14/15) • Bored piling and piling platform for plunge columns Central and North (plat 13/14/15) • Building demolition rolling stock office and cleaners building • Track works in Yard area continue • Sheet piling NE corner of box, between platforms 15 and 16 (require possession to undertake work) • Demolition of platform 13, batter to support plat 12 (this work involves saw cutting, excavating and hammering activities). Where possible, noisier activities will be conducted in either Std construction hours or weekend OOH (Sat 1300-1800) and Sun 0800-1800) . • Contingency GW monitoring borehole installation. 	Attended noise monitoring as required
		<u>WE21 Possession</u> (Possession Saturday 0001- Sunday 2359) -Signal relocation between Rd 13 and 15 (Country end of platforms) -Install temp GLT diversion to facilitate signal relocation -FRP for base of plat 9/10/11 extension, concrete fed from road 16. turnout installation (rattle gun) -Remove cross over track 15, ULX install, GIJ install for signal 17. These works require a tamper and regulator, bogie and loader, hydremas. -Platform extension work for Platforms 8/9 and 10/11. -Spoil removal using either excavator or loader and trucks. -contingency for GW monitoring borehole installation.	Attended noise monitoring as required
		<u>Randle Lane</u> WE19 Subject to ROL 0800-1800, with contingency WE20 -Services investigation in Randle Lane using a vacuum truck	Attended noise monitoring as required

11	OOHW December	<p>Suburban Track</p> <p>Platforms 20/21 & 22/23 - Olympic Stairs</p> <p>To be conducted OOHW Monday to Saturday 1800 to 0700, Saturday 1300 to 1800 and 1800 to 0700 from Week 11 (17/09/18) then 24 hours per day from 01/10/18 until WE24 (16/12/18) in accordance with OOH App 008. The works are proposed to be extended until the end of WK26 in accordance with this OOH App 11.</p> <p>Works will occur inside the hoarding between 0400 and 2200, and outside of the hoarding between 2200 and 0400 when the platform is free of commuters.</p> <ul style="list-style-type: none"> - Removal and reinstatement of sections of hoarding - Auguring on the platforms (complete) - Delivery and removal of materials from platform which includes utilising hirail and Back-of-House access - Removal of platform and tunnel structures (including use of rock breakers and demo saws on pavement and lift shafts 0800 until 1800) - Removal of lift shaft roof (22/23 only) 	Attended noise monitoring as required
		<p>Intercity Tracks</p> <p>WE22/WK22 -& POSSESSION WE23/WK23- WE26/WK26 (01/12-31/12)</p> <p>Works include the demolition (WE22) and reinstatement (WK26) of the emergency access south end of Platform 12.</p>	Attended noise monitoring as required
		<p>WE22/WK22-WE23/WK23. Contingency includes WK24 (01/12-21/12)</p> <p>Typical plant equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema.</p> <ul style="list-style-type: none"> • Platform 12/13 and Platform 15 loft demo prep work for demo <ul style="list-style-type: none"> ○ Isolate and removal of services Platform 12/13 (24hr activity) ○ Isolate and removal of Guard Indicators Platform 12/13 (24hr activity) ○ HAZMAT removal (24hr activity) • Platform 12/13 Canopy & Platform 15 loft demo; <ul style="list-style-type: none"> ○ remove roof sheeting (24hr activity) ○ strip back canopy (24hr activity) ○ remove canopy and goal posts (columns) (24hr activity) • Platform 12/13 & 14/15 Demolition and service removal (rock breaking platform structure followed by excavation). Rock breaking would occur in section, typically in interval less than 1 hour at a time and would be restricted 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. • Site preparation for piling works- remove unsuitable material and replace with compacted material and compacted subgrade using a 6-12T excavator, hydrema or tipper truck, 1-6T vibratory roller (24 hr activity) 	Attended noise monitoring
		<p>WE22/WK22- WE24/WK24 (01/12-20/12)</p> <p>Piling works are subject to progress with demolition of the platform and site preparation works as listed above.</p>	Attended noise monitoring

		<p>Note: The area referred to as the Eastern Wall is the area where the piles area is in close proximity to the operation Sydney Trains Platform 16. The remainder of the site shall be known as the Western Wall.</p> <p>East piling (retaining wall piles and plunge columns) (4/12-18/12) <i>See description below for west piling.</i></p> <p>West piling (retaining wall piles and plunge columns) (10/12-20/12)</p> <p>Three Liebherr LB28 (750mm-900mm diameter) piling rigs working simultaneously (6dBA penalty used in calculations). Other support mobile plant include 40-70T hydraulic crawler cranes, EWP, excavator or bobcat to remove spoil from spin off</p> <ul style="list-style-type: none"> stockpile, drilling tools (various augers subject to ground condition). Piling and associated piling activities that do not constitute high noise impacts such as pile preparation, steel reinforcement or concreting would occur over the 24hr period,. High noise activities would only occur between 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. <p>(11/12-21/12)</p> <ul style="list-style-type: none"> Blasting and pile cropping include detailed excavation using smaller excavators with rock breakers (6-12t), hand held cutting grinding, welding equipment. Note: Pneumatic tools may be required in some rigging activities). High noise impact activities would be restricted to 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. 	
		<p>WE23/WK23- WE25/WK25 (13/12-24/12)</p> <ul style="list-style-type: none"> Capping Beam FRP using concrete mixer, tremmie pipe, concrete line pumps. Activities include placing back shutters, fixing reinforcements, slicing cages and cast ins, surveying, pouring, curing. These activities would be conducted in the 24hr period. Potential high noise impact activities would be restricted to 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. 	Attended noise monitoring
		<p>WE24/WK24- WE25/WK25 (17/12-27/12)</p> <p>Backfill to Platform 12 using 6-30T excavator, hydremas/tippers, 1-6T vibratory rollers. These activities would be conducted in the 24hr period. Potential high noise impact activities would be restricted to 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block.</p>	Attended noise monitoring
		<p>WE24/WK24- WE26/WK26 (19/12-31/12)</p>	Attended noise monitoring

		<ul style="list-style-type: none"> Prefabricating hoarding and canopy install, finishes to Platform 12 and service install using hand and power tools, generators, EWP's, scissor lifts, flatbed trucks for delivery, 6-25t excavator. Pneumatic tools would be avoided where possible. These activities would be conducted in the 24hr period. Potential high noise impact activities would be restricted to 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. 	
		<p><u>Sydney Yard</u> Typical plant/equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema, loader. Typical works that may occur in Sydney Yard in December</p> <ul style="list-style-type: none"> Demolishing office buildings Combined service route (CSR) installation Concrete and drainage work <p>These activities would be conducted in the 24hr period. Potential high noise impact activities would be restricted to 0600 to 2200 on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block.</p>	Attended noise monitoring
		<p><u>OHW</u> To allow for WE23-WK26 shutdown: Disconnecting jumper cable to Road 12 B0+210 for isolation (12/12-13/12, 2100-0200) Reconnecting jumper cable to Road 12 B0+210 for isolation (30/12, 1600-2100)</p>	No
		<p><u>Railway Institute Street</u> WE24 Contingency WE25 (15-16/12 Contingency 22-23/12) Saturday and Sunday 0800-1800. Service investigation using NDD at Railway Institute Driveway to facilitate access shaft to Ghost Platform.</p>	No
		<p><u>Chalmers Street</u> WE24 Contingency WE25 (15-16/12 Contingency 22-23/12) Saturday and Sunday 0800-1800. Subject to ROL, two slit trenches are required in front of the Bounce Hotel (to determine geotechnical condition for demolition) using a vac truck.</p>	Attended noise monitoring as required
		<p><u>Platform Zero</u> WK24 (17/12, contingency 18/12) Subject to ROL, Crane set up required to lift out over specified diesel generator. To occur between 0530 and 0730 to avoid impact to patrons of the car park.</p>	No
12	January 2019 OOHW	<p><u>Suburban Track</u> Throughout January Platforms 20/21 & 22/23 - Olympic Stairs Works will continue to occur inside the hoarding 24/7, and inaudible works outside of the hoarding will continue to occur between 2200 and 0400 when the platform is free of commuters. - Removal and reinstatement of sections of hoarding</p>	<p>Real time monitoring Attended noise monitoring as required</p>

		<ul style="list-style-type: none"> - Delivery and removal of materials from platform which includes utilising hirail and Back-of-House access - Removal of platform and tunnel structures (including use of rock breakers and demo saws on pavement and lift shafts 0800 until 1800) 	
		Lower Northern Concourse Removal and lead dust cleaning of lower Northern Concourse ceiling <ul style="list-style-type: none"> - hand tools - vacuums 	No
		Metro Box Wk26-WK30 (02/01 to 31/01) <ul style="list-style-type: none"> • Contingency from December 2018-Backfill to Platform 12 Backfill to Platform 12 using 6-30T excavator, hydremas/tippers, 1-6T vibratory rollers. These activities would be conducted in the 24hr period. • Contingency from December 2018-Prefabricating hoarding and canopy install, finishes to Platform 12 and service install • Piling works along east perimeter and plunge column - Two (750mm-900mm diameter) piling rigs working simultaneously from time to time (6dBA penalty used in calculations). • Blinding and pile cropping- include detailed excavation using smaller excavators with rock breakers (6-12t), hand held cutting grinding, welding equipment. Capping Beam FRP- using concrete mixer, tremmie pipe, concrete line pumps. 	Real time monitoring Attended noise monitoring as required
		Intercity Tracks WE27 (05/01-06/01, 0500-1800) <ul style="list-style-type: none"> • Footing installation Platform 9 and 10/11 extensions • Platform 9 and 10/11 Combined Service Route (CSR) installation including service search, NDD, excavation, spoil removal • The typical plant and equipment for the above activities associated with the WE27 possession would include multiple excavators and hirail hydremas, king vac, high rail vac. • Rock breaking, saw cutting and any other high noise activity are restricted to between 0600 to 2200 in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block. 	Attended noise monitoring as required
		WE28 (13/01, 0600-0100) <ul style="list-style-type: none"> • Track works grinding 203 cross over at track 11/12 (12/01-14/01, Sat 0500-Mon 0100) • Footing installation Platform 9 and 10/11 extensions (contingency from WE27) • Combined Service Route (CSR) installation including service search, NDD, excavation, spoil removal works on Platform 8 	Real time monitoring Attended noise monitoring as required
		Sydney Yard Throughout January Typical plant/equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema, loader.	Real time monitoring

		<p>Typical works that may occur in Sydney Yard in January</p> <ul style="list-style-type: none"> • Combined service route (CSR) installation • Concrete and drainage and sewer works • Yard logistics 	
		<p><u>Chalmers Street</u> WE27 Contingency WE28 (05-06/01 Contingency 12-13/01) Saturday and Sunday 0800-1800. Subject to ROL, two slit trenches are required in front of the Bounce Hotel (to determine geotechnical condition for demolition) using a vac truck.</p>	Real time monitoring
13	<p>February 2019 Weekend 31-Week 34 – 02/02/19 to 28/02/19 Platforms and Sydney Yard Works as per CNVIS Rev 4, Annex B (Scenario 3, 9, 10 and 23).</p>	<p><u>Suburban Track</u> <u>Throughout February</u> Week night possessions Sunday night through to Thursday night (not Friday and Saturday nights) when trains stop running. Works associated with Guard Rooms on Suburban Platforms 18/19 and 20/21</p> <ul style="list-style-type: none"> • Removal and relocation of platform furniture • Break out slab (involve floor saw and break out by hand to reduce noise impact). 4x3m section near Olympic Stairs, to a depth of 500-600mm • Construction of temporary CSA Room foundation • 14 Platform wall cores required for investigation purposes. These need to occur when trains stop running between 0100 0400. 14 cores will be undertaken over two nights (18-19 February). Each core takes approximately 15mins to complete using a power coring drill. <p>Other works</p> <ul style="list-style-type: none"> • Use of highrail (Monday to Thursday) for delivery of precast • Hoarding erecting at the Bounce Hotel (Chalmers Street and Randle Lane) • ESR and Ghost Platforms (back of house) HAZMAT removal as well as service searches • Installing timber hoarding around stairs to upper and lower concourse 	Real time monitoring Attended noise monitoring as required
		<p>WE31 and WE33 (WE31 2-3rd of February and WE33 16-17th of February, 48hrs).</p> <ul style="list-style-type: none"> • Metro D and E possession: high noise works permitted 0600-2200 (3 hours on, 1 hour off). Multiple slit trenches required (not occurring simultaneously) on Platform 22/23 and Track 23 as well as Guard's Room Works on Platform 22/23. 	Real time monitoring Attended noise monitoring as required
		<p>WE33 (16-17th of February, 48hrs from 0500)</p> <ul style="list-style-type: none"> • Installing new overhead wiring structures and removing redundant structures at the end of Platform 16. This work will interface with piling works and cable slew/signal relocation, • S/E corner of Metro Box. Support mobile plant includes 40-70T cranes, 3xEWP, hi-rail plant, hand and electric tools, jack hammers to break out footings. Equipment for piling covered above. 	Real time monitoring Attended noise monitoring as required
		<p><u>Metro Box</u> <u>WE 31-WK 34</u> (02/02/19 to 28/02/19)</p>	Real time monitoring

		<ul style="list-style-type: none"> Piling works -hydraulic crawler cranes, EWP, excavator or bobcat to remove spoil from spin off stockpile, drilling tools (various augers subject to ground condition). Piling and associated piling activities do not constitute high noise impacts at the nearest sensitive receiver. Blinding and pile cropping- include detailed excavation using smaller excavators with rock breakers (6-12t), hand held cutting grinding, welding equipment. Note: Pneumatic tools maybe required in some rigging activities). Capping Beam FRP- using concrete mixer, tremmie pipe, concrete line pumps 	
		<p><u>WE31</u> (2-3rd of February, 48hr works intermittently) Installation of new compressed airline adjacent to road 16 by fixing to GST. Starting at water tunnel pit, working south approximately 100m. Hand tools, some power tools, cable feeder, thread machine and generator.</p>	No
		<p><u>Intercity Tracks and Platforms</u> Throughout February</p> <ul style="list-style-type: none"> Week night and weekend possessions when trains stop running to minimise impact on commuters and station operations. Service search and investigation Grand Concourse occasionally using hand/electric tools to help lift remove/reinstall pits. 	<p>Real time monitoring Attended noise monitoring as required</p>
		<p><u>WE32</u> (09/02, 0500-11/02, 0500) Buffer Stop end (north intercity platforms)</p> <ul style="list-style-type: none"> OHV footings and canopy columns install, including augering for anchors on roads 9-10 & 11-12. 3 pits/infill on road 12-11. 5 pits/infill on road 9-10. Concrete pours with concrete truck located behind platform 12 hoarding (behind noise barriers) CSR trench on platform using rock breaker, saw cut, excavator, hydremas Signalling works on Platform 9 including saw cutting to start from 6am (3hrs on 1 hr off) on Saturday morning and possible use of sucker truck. <p>The above work will require 1 Hydrema per crew (3 in total) and Hi-rail truck</p>	<p>Real time monitoring Attended noise monitoring as required</p>
		<p><u>Yard end (south intercity platforms)</u> Platform extension</p> <ul style="list-style-type: none"> Precast install Platform 9 and 10/11 (crane located in the yard) FRP for Platform 9 Platform 9 and 10/11 Combined Service Route (CSR) installation using 2.5t machine, including service search, NDD, excavation, spoil removal Pit work in Yard <p>The typical plant and equipment for the above activities associated with the WE32 possession (north and south end of intercity) would include multiple excavators (13-15t, with 6t support and telehandler), and multiple hydremas, king vac, high rail vac.</p> <p>Platform 9 requires the Completion of 9 foundations - Use of concrete truck + concrete pump located in our yard.</p> <p>Installation of new compressed airline adjacent to road 16. Hand tools, cable feeder and generator. 6am to 6pm.</p>	<p>Real time monitoring Attended noise monitoring as required</p>

		(WE33) Installing new overhead wiring structures and removing redundant structures at the end of Platform 16. Support mobile plant includes 40-70T cranes, EWP, hi-rail plant, hand and electric tools.	
		<p><u>Sydney Yard</u></p> <p>Throughout February</p> <p>Typical plant/equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema, loader.</p> <p>Typical works that may occur in Sydney Yard in January</p> <ul style="list-style-type: none"> • Combined service route (CSR) installation • Concrete and drainage and sewer works • Yard logistics 	Real time monitoring
		<p><u>Eddy Avenue and Ambulance Avenue</u></p> <p>(0600-1800 Saturday and Sunday)</p> <p>Eddy Avenue</p> <p>WE33 contingency WE34</p> <p>Ambulance Avenue</p> <p>WE34 contingency WE35 (March)</p> <p>One weekend and one contingency weekend is required for each location. The works require NDD and a drill rig.</p>	No
14	<p>March 2019</p> <p>Weekend 35-Weekend 39 – 02/03/19 to 31/03/19</p> <p>Platforms and Sydney Yard Works as per CNVIS Rev 4, Annex B (Scenario 3, 9, 10 and 23).</p>	<p><u>Suburban Track</u></p> <p>Throughout March</p> <p>Week night possessions Sunday night through to Thursday night (not Friday and Saturday nights) when trains stop running are required to minimise impact on commuters and station operations.</p> <p>Works associated with Guard Rooms on Suburban Platforms 18/19 and 20/21</p> <ul style="list-style-type: none"> • Removal and relocation of platform furniture • Break out slab (involve floor saw and break out by hand to reduce noise impact). 4x3m section near Olympic Stairs, to a depth of 500-600mm • Construction of temporary CSA Room foundation <p>Other works</p> <ul style="list-style-type: none"> • Use of highrail (Monday to Thursday) for delivery of precast • Hoarding erecting at the Bounce Hotel (Chalmers Street and Randle Lane not OOH) • ESR and Ghost Platforms (back of house) HAZMAT removal as well as service searches • Installing timber hoarding around stairs to upper and lower concourse 	Real time monitoring Attended noise monitoring as required
		<p><u>WK38 midweek possession</u></p> <p>(27/03-28 Between 0100-0400, when trains stop running)</p> <p>King Vac will be parked in the box to allow for trenching across tracks 16-22, removing ballast for concrete pump line. This will be consistent with impact on sensitive receivers as per App 4 for Yard works. Monitoring will occur</p>	Real time monitoring
		<p><u>WE37 Possession</u></p> <p>(16-18 March, Saturday 00:00-Monday 0400)</p> <p>Platform 20/21 CSA room works (including but not limited to):</p> <ul style="list-style-type: none"> • Relocating platform furniture. • Erecting ATF hoarding. • Breaking out section of platform for CSA room slab. • Pouring CSA room slab. • Cleaning platform and completing walkthrough with Duty Manager prior to handback. 	Real time monitoring Attended noise monitoring as required

		(Noise impact consistent with assessment throughout March).	
		<p><u>Metro Box</u> Throughout March (02/03/19 to 31/03/19)</p> <ul style="list-style-type: none"> Piling works along east perimeter and plunge column through centre of Box - Two (750mm-900mm diameter) Blinding and pile cropping- include detailed excavation using smaller excavators with rock breakers (6-12t), hand held cutting grinding, welding equipment. Note: Pneumatic tools maybe required in some rigging activities). Capping Beam FRP- using concrete mixer, tremmie pipe, concrete line pumps. Excavation and installing track slab within the box area using excavators and trucks, concrete trucks, tremmie pipe, concrete line pumps. Activities include form work, fixing reinforcements, surveying, pouring. The activities associated with track slab would be conducted in the 24hr period. 	<p>Real time monitoring Attended noise monitoring as required</p>
		<p>WK38 midweek (27/03-28, to avoid interface with public) Coring baggage tunnel from Metro Box to allow for fixing to track slab structure.</p>	No
		<p><u>Intercity Tracks and Platforms</u> Throughout March Week night and weekend possessions when trains stop running are required to minimise impact on commuters and station operations.</p> <ul style="list-style-type: none"> Service search and investigation Grand Concourse occasionally using hand/electric tools to help lift remove/reinstall pits. 	No
		<p>WE36 Possession (09-10 March, 48 hours) Buffer Stop end (north intercity platforms)</p> <ul style="list-style-type: none"> Piling roads 9-10 & 11-12. 3 pits/infill on road 12-11. 5 pits/infill on road 9-10. Concrete pours with concrete truck and NDD truck located behind platform <p>8/9 and 10/11 hoarding (behind noise barriers)</p> <ul style="list-style-type: none"> CSR trench on platform using rock breaker, saw cut, excavator, hydremas Signalling works, DB1/1 LOC install, cables in new route on Platform 9 <p>The above work will require 1 Hydrema per crew (3 in total) and Hi-rail truck</p> <p>Clear delineation between Platform 8 and 9 will be established noting small section of platform 8 will be under possession.</p> <p>Yard end (south intercity platforms)</p> <p>Platform extension</p> <ul style="list-style-type: none"> Precast install Platform 9 and 10/11 (hi rail crane located road 9/10) FRP for Platform 9 (boom pump located in Sydney Yard) Platform 9 and 10/11 Combined Service Route (CSR) installation using 2.5t machine, including service search, NDD, excavation, spoil removal and platform finishes and reinstatement Pit, and sewer work in Yard 	<p>Real time monitoring Attended noise monitoring as required</p>

		<p>The typical plant and equipment for the above activities associated with the WE36</p> <p>possession (north and south end of intercity) would include multiple excavators (13- 15t, with 6t support and telehandler), and multiple hydremas, king vac, high rail vac.</p> <p>Platform 9 requires the Completion of 9 foundations - Use of concrete truck + concrete pump located in Metro Box.</p> <p>Rock breaking, saw cutting and any other high noise activity are restricted to between</p>	
		<p>WE39 Possession (30-31 March, 2019 0600-1800, Saturday and Sunday)</p> <ul style="list-style-type: none"> NDD and potholing on Platform 1 using vacuum truck for the purpose of the CSR. 	Attended noise monitoring as required
		<p>Sydney Yard Throughout March</p> <p>Typical plant/equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema, loader.</p> <p>Typical works that may occur in Sydney Yard in March</p> <ul style="list-style-type: none"> Combined service route (CSR) installation Concrete and drainage and sewer works Yard logistics 	Real time monitoring
		<p><u>Northern Concourse</u> Midweek 35 and 36 Possession (works that cannot be conducted in standard construction hours will require to be conducted OOH between 1800-0700)</p> <p>Northern Concourse works are associated with the installation of the Pedestrian bridge down to the Northern Concourse. The pedestrian Bridge will be installed during standard construction hours.</p> <p>Inaudible work at P8/9 and P10/11 of the Northern Concourse include;</p> <ul style="list-style-type: none"> Hazmat assessment & remediation works Stairs Service location and relocation works. <p>Equipment used will include EWP (scissor lift), industrial vacuum, and hand tools.</p> <p>Stairs at P8/9 P10/11 of the Northern Concourse include</p> <ul style="list-style-type: none"> Column Removal & Beam strengthening Micro piling works (Drill, grout, cut off & Break back) Micro pile - Pile caps (FRP) <p>Equipment used will include chainsaw/ saw, handtools, EWP and excavator, Line pump and concrete agi.</p>	Real time monitoring
		<p>WE36 Possession</p> <ul style="list-style-type: none"> Hoarding install at stairs to northern concourse stairs Demo parapet wall using concrete saw and excavator Saw cut using slab Road saw and Demo saw Stairs at P8/9 and P10/11 Pile drill and install R11/12, R9/10 15t excavator with piling attachment x 2, Hydrema x 2 Excavation using vac truck and excavator (P8/9, P10/11, Stairs and Concourse) Contingency for works to be conducted during mid week possession 	Real time monitoring Attended noise monitoring as required
		<p><u>Ambulance Avenue</u> (0600-1800, Saturday and Sunday)</p> <p>WE36 NDD complete, WE37 drill rig to install groundwater monitoring well. Due to availability of drill rig, contingency is required for WE 38 and 39.</p>	No

15	April 2019 Week39-Week 43 – 01/04/19 to 30/04/19 Platforms and Sydney Yard Works as per CNVIS Rev 5, Annex B (Scenario 3, 9, 10 and 23).	<u>Suburban Track</u> Throughout April Week night possessions Sunday night through to Thursday night (not Friday and Saturday nights) when trains stop running are required to minimise impact on commuters and station operations. Works associated with Guard Rooms on Suburban Platforms 18/19 and 20/21 <ul style="list-style-type: none"> • Removal and relocation of platform furniture • Break out slab (involve floor saw and break out by hand to reduce noise impact). 4x3m section near Olympic Stairs, to a depth of 500-600mm • Construction of temporary CSA Room foundation • Installation of pods • Use of highrail (Monday to Thursday) for delivery of precast • Hoarding erecting at the Bounce Hotel (Chalmers Street and Randle Lane not OOH) • ESR and Ghost Platforms (back of house) HAZMAT removal as well as service searches • Installing timber hoarding around stairs to upper and lower concourse 	Real time monitoring Attended noise monitoring as required
		<u>WE41 Local Possession</u> (13/14 April, 2019 0800-1800, Saturday and Sunday) Hoarding installation <ul style="list-style-type: none"> • Pedestrian footpath in front of 20-28 Chalmers Street will be temporary closed during site establishment. Pedestrians and cyclists will be redirected to use the other footpath on the alternate side of the road. • Traffic control will be in place throughout the work to safely guide local traffic, pedestrians, and other road users around the work. • Hiab, forklift and flatbed will be required. • Install Bounce Site Welfare requiring 3x semi and 100t crane from Randle Lane These activities are required for site establishment purposes and require an ROL.	Real time monitoring
		<u>Metro Box</u> Throughout April <ul style="list-style-type: none"> • Piling works along east perimeter and plunge column through centre of Box - • Capping Beam FRP- using concrete mixer, tremmie pipe, concrete line pumps. • Excavation and installing track slab within the box area using excavators and trucks, concrete trucks, tremmie pipe, concrete line pumps. Activities include form work, fixing reinforcements, surveying, pouring. 	Real time monitoring Attended noise monitoring as required
		<u>Northern Concourse Intercity Tracks and Platforms</u> Throughout April Week night and weekend possessions when trains stop running are required to minimise impact on commuters and station operations. <ul style="list-style-type: none"> • Finishing Works to both platform extensions 9,10,11 • Platform 9 – 11 proposed under line concrete line (nights) • Cleaning of Grand/Northern Concourse canopy and services • Material deliveries Eddy Ave into Metro Box area (prep works for WE41) 	Real time monitoring
		<u>WE41 – King post wall</u> (13/04 and 14/04 Saturday and Sunday, 0600-1800)	Real time monitoring

		<ul style="list-style-type: none"> Targeted - Close stairs from lower northern concourse to upper northern concourse service searching on the Northern Concourse (potholing and service searching) remove parapet wall erect hoarding <p>WK41 (midweek)</p> <ul style="list-style-type: none"> remove slab and walls 3 no. piles (FRP) Concrete Pump and trucks Eddy Ave (Mid-week) Construction of permanent hoarding Materials/Plant via Eddy Ave Cleaning of canopy and services (nights) <p>The works will require generator, hand and occasional power tools for form work and hoarding establishment, EWP, scissor lifts, vac truck for service searching, small piling rig and concrete pump.</p>	Attended noise monitoring as required
		<p>Sydney Yard</p> <p>Throughout April</p> <p>Typical plant/equipment used for this scope of works is as follows unless otherwise stated below. Generator, hand and occasional power tools, industrial vacuum, EWP, scissor lifts, 6T excavator, small tipper, hydrema, loader.</p> <p>Typical works that may occur in Sydney Yard;</p> <ul style="list-style-type: none"> Combined service route (CSR) installation Concrete and drainage and sewer works Yard logistics <p>These activities may be conducted in the 24hr period.</p>	Real time monitoring
		<p>Institute Drive</p> <p>WE41 in April (0600-1800, Saturday)</p> <p>Institute Drive NDD and small drill rig to install groundwater monitoring well. 1 weekend required in April.</p>	Attended noise monitoring not required.
16	May 2019 Week44 –Week47– 04/05/19 to 31/05/19 Platforms and Sydney Yard Works as per CNVIS, Annex B (Scenario 3, 9, 10, 14, 15, 17, 19 and 35).	<p>Suburban Tracks (Central walk works)</p> <p>WE44 Possession (SAT 04/05/2019: 0600-1800, SUN 05/05/2019: 0600-1800)</p> <p>Concrete coring to the manhole (pit along track 23) to check for the presence of rebar.</p> <p>Note: Interface: Platforms 19, 20, 21, 22, and 23 are planned to be tamped on WE44 Config 15 by Sydney Trains, the tamper is lined up to work on these platforms on the following shift times where CSM signal support will be required: SAT 04/05/2019: 0200-1200, SUN 05/05/2019: 1200-2200.</p>	Real time monitoring Attended noise monitoring as required
		<p>WE45 Possession (Start at SAT 11/05/2019: 0400, end at MON 13/05/2019: 0000)</p> <ul style="list-style-type: none"> Edge beam construction on Platform 18, including excavation, form work installation, reinforcing installation, concrete pour and reinstatement of platform. Temporary platform deck will be in place following this weekend over a 40m length of platform (centrally) 2m wide. 	Real time monitoring Attended noise monitoring as required
		<p>WE46 Possession (Start at SAT 18/05/2019: 0400, end at MON 20/05/2019: 0000)</p> <ul style="list-style-type: none"> Edge beam construction on Platform 19, including excavation, form work installation, reinforcing installation, concrete pour and reinstatement of platform. Temporary platform deck will be in place following this weekend over a 40m length of platform (centrally) 2m wide. 	Real time monitoring Attended noise monitoring as required

		Mid-week Night Possession <ul style="list-style-type: none"> Commencement of construction of new plant rooms on the ESR Ghost Platform and ESR Concourse. Movement of materials via Olympic Tunnel at Night time. ESR Concourse and Ghost Platforms HAZMAT removal (including hoarding install) Installation of hoist from ESR Concourse level to the ESR Ghost platform level. This will be installed behind the hoardings. Deliveries, material etc. via Olympic tunnel. P18/19 and P20/21 CSA Room – Relocation of ST CSA staff from (night) P18/19 and P20/21 Construction of the new Standby Guard Rooms and demolition of existing Standby Guard Rooms on suburban platforms Enabling works for edge beam construction on Platform 19, including preliminary saw cutting of platforms and temporary piles that clash with the permanent design. 	Real time monitoring Attended noise monitoring as required
		<u>Intercity Tracks, Northern Concourse and Grand Concourse works</u> <u>WE44 Possession</u> (SAT 04/05/2019: 0600-1800, SUN 05/05/2019: 0600-1800) Platform extension works on Platform 9,10 &11, including Concrete grinding, Concrete breakout, concrete cutting, concrete pouring	Real time monitoring Attended noise monitoring as required
		<u>WE47 Possession</u> (Start at SAT 25/05/2019: 0400, end at MON 27/05/2019: 0000) <ul style="list-style-type: none"> CSR route construction under platform 9 coping edge Installation of rail duct along platform 9,10,11,12 by a civil crew Platform 9,10,11 concrete topping slab for platform extension Track Reconditioning of Tracks 11 & 12 and tamping Removing 5 buffer stops for Roads 9-12 and installing 5 new friction buffer stops Track Lowering of Road 10 (approx. 25-30m) and tamping Signaling adjustments on Roads 9-12 i.e. re-run Signaling cable & 5 fixed train stops Commissioning new DB1/1 Location and Removing the existing DB1/1 location by Track Team Week night possessions Sunday night through to Thursday night (not Friday and Saturday nights) when trains stop running are required to minimise impact on commuters and station operations.	Real time monitoring Attended noise monitoring as required
		<u>WK45 Mid week</u> (MON 13/05/2019 – WED 15/5/2019 2300-0345) <ul style="list-style-type: none"> Painting of platform coping edges and other general inaudible works. 	No
		<u>Northern Concourse</u> Throughout May Inaudible <ul style="list-style-type: none"> Investigation works for mini piles on platform 9/8 for the Northern Concourse columns. Removal of Timber canopy supports on Platforms. Relocation of HUBs in Platforms 11,10 & 9,8 Completion of Pile Caps in Tracks 9/10 and 11/12 (this includes connection to MB Capping beam under Platform 12) Install scaffolding (days) and pedestrian tunnel in WK 43. 	Real time monitoring Attended noise monitoring as required

		<u>WE47 Possession</u> (Start at SAT 25/05/2019: 0400, end at MON 27/05/2019: 0000) <ul style="list-style-type: none"> Excavate Platform 12 and Pour Beams for Infill Install Beams and Pour Install Hoarding at End of Platforms Saw cutting and demolition part of platform 12 (access will be affected). Excavate for and install King Post Wall (North of Metro box) 	Real time monitoring
		<u>Week Night Possession throughout May</u> Week night possessions Sunday night through to Thursday night (not Friday and Saturday nights) when trains stop running are required to minimise impact on commuters and station operations. <ul style="list-style-type: none"> FRP and back fill to Capping Beams in Tracks 9/10 and 11/12 (Night Shift Works) Ongoing cleaning of canopy and services (nights) 	Real time monitoring
		<u>Grand Concourse</u> Throughout May The following works; week night and weekend possessions when trains stop running are required to minimise impact on commuters and station operations. <ul style="list-style-type: none"> Investigation works for mini pile foundations in Grand Concourse (Night Shift working) Cleaning of Canopy - Enabling works for services relocation 	No
		<u>Metro Box</u> <u>Throughout May</u> <ul style="list-style-type: none"> Construction of platform slabs to continue Shotcrete and ground support around Y Tunnel's and perimeter walls to continue. Survey monitoring Ground water well monitoring (3rd week in May) The following works; week night and weekend possessions when trains stop running are required to minimise impact on commuters and station operations. Piling works adjacent to Devonshire Street Tunnel Capping beam construction Eastern and Western Side adjacent to road 16 and 12 Excavation from North to south of the metro box and construction of track and upstand beams within the box area 	Real time monitoring Attended noise monitoring as required
		<u>WE45 Possession</u> (Start at SAT 11/05/2019: 0400, end at MON 13/05/2019: 0000) Steel hoarding installation in the Metro Box area along Road 16	No
		<u>WE46 Possession</u> (Start at SAT 18/05/2019: 0400, end at MON 20/05/2019: 0000) Steel hoarding installation in the Metro Box area along Road 16	No
		<u>Sydney Yard</u> <u>Throughout May</u> Typical works that may occur in Sydney Yard; <ul style="list-style-type: none"> Combined service route (CSR) installation Concrete and drainage and sewer works 	Real time monitoring

		<ul style="list-style-type: none"> Yard logistics 	
17	<p>June 2019</p> <p>Weekend49 –Weekend52– 01/06/19 to 30/06/19</p> <p>Platforms and Sydney Yard Works as per CNVIS Rev5 , Annex B (Scenario 3, 4, 9, 10, 17, 18, 29, 31, 34 and 35).</p>	<p>Suburban Tracks (Central Walk Works & ESR)</p> <p>24hr works throughout June (fit out)</p> <ul style="list-style-type: none"> Commencement and construction of new Back of house rooms on the ESR Concourse (inaudible) Ongoing service installation and commissioning for the CSA Pods, guard rooms Ghost platforms Service investigations and diversions Service diversions at Olympic and southern baggage tunnels Ongoing cut over of comms cables at tunnels Installation of new power and lighting circuits at tunnels Olympic Tunnel to be used to transport material at night from time to time (inaudible) P18/19 - Delivery of Guards Room Pod P18/19 - Store Room CCB P18/19 - Commencement of Crash deck install under suspended slab P20/21 - Deliver the Guards Room pod P22/23 - Install ATF for the CSA Pod Construction Temp Guards Rooms Platform 18/19 and Platform 20/21 Fibre installation Install temporary DB's and lighting Removal of redundant services Slab demolition for ESR concourse Installation of hoarding for store room after Adshell has been relocated P18/19 – Geotechnical investigation works (1st– 7th June night) 	Noise monitoring as required.
		<p>WE 48 OOH</p> <p>(Saturday and Sunday 0700-1700 both days)</p> <p>PA sidings: Complete core samples for shaft investigation – Ghost Platform at institute drive</p>	Real time monitoring
		<p>WE 51 OOH</p> <p>24hr works throughout June (fit out)</p> <p>Platform 16/17 - Install ATF for the CSA Pod Construction</p>	Real time monitoring
		<p><u>Intercity Platform and Track, Northern Concourse and Grand Concourse works</u></p> <p><u>Intercity Platform and Tracks</u></p> <ul style="list-style-type: none"> Tracks 9/10 and 11/12 in fill works - concrete line Infill works Platforms 11/12 and 10/9 Hoarding installation at the south end of Platforms 11/12 & fence at the termination end of Platforms 9/10 & 11/12 moved towards south Pilling on platforms 10 & 11 Finishing CSR works platform 9/10/11 Installation of cable trays and reroute cables for commissioning <ul style="list-style-type: none"> Construction of the Project Wide HV - CSR in the <ul style="list-style-type: none"> Western area, Platform 1, Darling Harbour Goods Line GST, Mortuary Station civil works and risers, Mortuary/Water tunnel – Cable Tray, Sydney Yard – Metro Box GST and Fencing Construction of the Project Wide CSR south of goods lift platform 1 CSR investigation various locations (inaudible) Mobilise Lee St and laydown areas Hazmat clearance 	Real time monitoring Attended noise monitoring as required
		<p><u>Mid-week 24hr works WK48-50</u></p> <ul style="list-style-type: none"> WK48 – WK50 in fill works - Tracks 9/10 and 11/12 (Days / Night Shift Works) concrete line at nights Midweek and WE48: GLT finishing works 10ft area between Road 10/11 (night) 	Real time monitoring

		<ul style="list-style-type: none"> Midweek and WE48: GST finishing works Roads 16 retaining wall (night) 	
		<p><u>WE49, 51, 52 OOH</u> (Start at SAT 8/06/2019: 0700-1700, end at MON 9/06/2019: 0700-1700)</p> <ul style="list-style-type: none"> non-disruptive preparatory work, repairs or maintenance Construction of the Project Wide HV - CSR in the Western area, Platform 1, Darling Harbour Goods Line GST, Mortuary Station civil works and risers, Mortuary/Water tunnel – Cable Tray, Sydney Yard – Metro Box GST and Fencing. (Typical plant/equipment as above). 	Real time monitoring
		<p><u>WE50 Possession</u> (Start at SAT 15/06/2019: 0000, end at MON 16/06/2019: 0000)</p> <ul style="list-style-type: none"> Finishing works on Platforms 9, 10/11 extensions WE50 – infill works Platforms 11/12 and 10/9 – commissioning Install new Overhead Wire Structures and transfer wires Remove / Demolition of Old Overhead Wire Structures Dismantle existing Old Overhead Wire Structures on Platform 11 and Track 11/12 Demolition of old Overhead Wire Structures Footings on Platform 9-12 Canopy cleaning and canopy removal Commissioning and opening of platform infills Install cable tray and move signal cables and commission permanent Route Commission signalling equipment and rectify any defects Place 10mm Aggregate on ballast for tracks 9,10,11,12 Take out the concrete line from under the track on the southern ends of Platforms 9/10 & 11/12. Permanent CSR installation at the North and south ends of Platforms 9, 10/11 back blinding along the footpath on the track side. Isolation panels installation on southern end of Platform 12 Track Lowering of Road 10 (approx. 25-30m) and tamping Construction of the Project Wide HV – <ul style="list-style-type: none"> o CSR in the Western area, o Platform 1, o Darling Harbour Goods Line GST, o Mortuary Station civil works and risers, o Mortuary/Water tunnel – Cable Tray, o Sydney Yard – Metro Box GST and Fencing. 	Real time monitoring
		<p><u>Grand Concourse and Northern Concourse</u> OOH throughout June</p> <ul style="list-style-type: none"> Hoarding erection for piling (inaudible) Piling in Grand Concourse Saw cutting & Potholing at various locations on Grand Concourse for footings (NDD) Service investigations (inaudible) Removal of redundant services Investigation works for mini pile foundations in Grand Concourse and Northern Concourse and hoarding erection. 	Real time monitoring
		<p><u>Grand Concourse</u> WE50 Possession (Start at SAT 15/06/2019: 0000, end at MON 16/06/2019: 0000)</p> <ul style="list-style-type: none"> King posts install Grand Concourse Saw cut and NDD Grand concourse 	Real time monitoring

		<ul style="list-style-type: none"> Piling in Grand Concourse for canopy foundation 	
		<p><u>Northern Concourse</u> WE50 Possession (Start at SAT 15/06/2019: 0000, end at MON 16/06/2019: 0000)</p> <ul style="list-style-type: none"> Topping slab installed & Commission infills (Concrete line pump through the box area) N. Concourse Service diversions and install new services to support staging works N. Concourse Piling on platforms for canopy foundation N. Concourse Removal of redundant services Hoarding installation at the south end of Platforms 11/12 & fence at the termination end of Platforms 9/10 & 11/12 moved towards south Slit trench / potholing outside of CENA68 for king post wall Slit trench / potholing on the Grand Concourse in front of the ticket gates after CENA68 potholing works 	Real time monitoring
		<p><u>Metro Box and Sydney Yard</u> OOH throughout June</p> <ul style="list-style-type: none"> Archaeological Investigation Excavation, shotcrete and installation of ground support Secant piles adjacent to DST Pile trimming and concrete works – Capping beam, track and platform Works Turret removals to the stairs from P12, P13 and P14 to platform level. General survey and monitoring Spoil removal by Truck & Dogs Weighbridge installation General Yard works and plant movement 	Real time monitoring
		<p><u>WE50 Possession</u> (Start at SAT 15/06/2019: 0000, end at MON 16/06/2019: 0000)</p> <ul style="list-style-type: none"> Sheet piling south west corner of box Concrete breaking of perimeter piles Concrete works 	Real time monitoring
1 8	<p>July 2019 Weekday52 –Weekday4– 01/07/19 to 31/07/19 Platforms and Sydney Yard Works as per CNVIS Rev5 , Annex B (Scenario 2, 3, 4, 9, 10, 15, 19, 22, 29, 31, 34 and 35).</p>	<p><u>Suburban Tracks (Central Walk & ESR and back of house and tunnel Works)</u> 24hr works throughout July ESR Concourse, back of house and tunnels (station fit out and largely inaudible)</p> <ul style="list-style-type: none"> Commencement and construction of new Back of house rooms on the ESR Concourse. Olympic Tunnel to be used to transport material at night time. Ongoing service installation and commissioning for the CSA Pods, guard rooms and Ghost platforms Service investigations and diversions and removal at ESR Concourse & back of house Platform strengthening in ESR Ghost platform (Access via Olympic Tunnel for deliveries) Service investigation, diversions and removals at Olympic tunnel Olympic tunnel – 11kv feeder 600 diversion Slew HV from OT and protect comms – WC 29th July 2019 ongoing cut over of comms cables at tunnels Installation of new power and lighting circuits at tunnels Olympic Tunnel to be used to transport material at night from time to time Hoarding installation 	Real time monitoring

		<ul style="list-style-type: none"> • slab demo – Starting from North to South 3 weeks on nights (BOH) and will commence on Nights and then move to Dayshift • hoist install, and platform Steelwork Install (Preparation Works) at the Ghost Platforms • CENA Room Steelwork Install (South End of BOH Area) <p>Platform 16/17</p> <ul style="list-style-type: none"> • Relocation of platform furniture Erection of hoarding • Removal of tiles and screed with demo saw 16/17 – 15th – 19th July • FRP CSA pod foundation for Platform 16/17 – 23rd – 26th July • Installation of pre-fabricated CSA pod to platform via hi-rail for Platform 16/17 – 31st July <p>Platform 18/19</p> <ul style="list-style-type: none"> • Installation of scaffolding/falsework within void above 18/19 staircase • Removal of old platform slab with demo saw 18/19 – 01st July • FRP works to new platform slab for Platform 18/19 – 17th July • Installation of pre-fabricated cleaners pod to platform via hi-rail (night works only) • Fit out and fixing works to cleaners pod • Services installation <p>Platform 20/21</p> <ul style="list-style-type: none"> • Fit out and fixing works to standby guards room • Erection of hoarding around old CSA room (night works only) • Decommissioning of old CSA room and removal of materials on hi-rail • Removal of hoarding around old CSA room (night works only) • Platform 22/23 • Survey work • Pit investigation • Installation of services in canopy 	
		<p><u>Intercity Platform and Track, Northern Concourse and Grand Concourse works</u></p> <p><u>Intercity Platform and Tracks</u></p> <p>24 Hour works throughout July (fit out, reduced scope or only certain elements of lower impact then from the weekend possessions)</p> <p>Construction of the Project Wide HV - CSR in the Phase A – Western Baggage Tunnel, Northern Baggage Tunnel, and Platform 1 works</p> <ul style="list-style-type: none"> • Platform 1 Trenching – Section B (south of the goods lift), Thursday 11 July – Tuesday 6 August road saw to start at 1800-2200. Any sections not complete will be completed the following day in Std construction hours and subject to monitoring. • Cable tray under the southern hollow portion of Platform 1 - July • Construction of riser/encasement for comms in Western Baggage Tunnel – July • Installation of service routes through Western and Northern Baggage Tunnel – July / August 2019 (inaudible) • Finishing Works to both platform extensions 9,10,11 <p>WK52-WK01 Platform 1 Six Day Shutdown Possession (Start WED 3rd July: 1800, finished Tue 9th July:1800)</p>	<p>Real time monitoring</p> <p>Attended noise monitoring as required</p>

		<ul style="list-style-type: none"> Platform 1 Trenching – Section A (north of the goods lift), Wednesday 3 July – Tuesday 9 July. Thursday 11 – Friday 12 July (contingency)- road saw to start at 1800-2200. Any sections not complete will be completed the following day in std construction hours. 	
		<p><u>WE02 Possession</u> (Start at SAT 13/07/2019: 0000, end at MON 15/07/2019: 0000)</p> <ul style="list-style-type: none"> Piling for new OHW mast B0+006 on Platform 8/9 	Real time monitoring
		<p><u>Grand Concourse and Northern Concourse</u> OOH throughout July</p> <ul style="list-style-type: none"> XD9 Mini piling rig, piling in Grand Concourse and Northern Concourse (nights and Weekends due to works occurring within pedestrian thoroughfare) Removal of redundant services, Canopy service diversion, Install new services NC Bridge extension FRP piling caps (nights and Weekends) Canopy cleaning upper and lower concourse Establish Hoarding for Platform 8/9 and 10/11 Piling Works (night shift works) Piling working on Platform 8/9 and 10/11 Establish Hoarding for Platform 8/9 and 10/11 Pile cap (night shift works) Package F stage 2 Works (additional bridge, excavation, demolition etc) <p><u>WE02 Possession</u> (Start at SAT 13/07/2019: 0000, end at MON 15/07/2019: 0000)</p> <ul style="list-style-type: none"> Piling on the North end of Platforms 8 & 9 for future Grand Concourse Canopy columns – DX9 mini rig. FRP / Pile caps on Platforms 10/11(north) Potholing 	Real time monitoring
		<p><u>Metro Box and Sydney Yard</u> <u>OOH throughout July</u></p> <ul style="list-style-type: none"> Archaeological Investigation Excavation (including rock breaking), shotcrete and installation of ground support Secant piles adjacent to DST Pile trimming and concrete works – Capping beam, track and platform slab Works Service diversions at southern baggage tunnels (inaudible) Turret removals to the stairs from P12, P13 and P14 to platform level, including rock sawing (2 weeks). Survey and monitoring of tunnels, track and ground wells – Nights Spoil removal by Truck & Dogs General Yard works and plant movement Southern Baggage tunnel – more cables to be moved to enable demo works Light Feeds for source lighting Installation of Olympic Tunnel Diversion Temp Weekend Closure of the Olympic Tunnel - <ul style="list-style-type: none"> WE03 20th / 21st July WE04 27th / 28th July WE05 3rd – 4th August (Final switchover Closure August) Install survey equipment in DST – remove tiles etc Delivery of crawler crane parts (day and night 9th July – 12th July) 	Real time monitoring

		WE02 Possession (Start at SAT 13/07/2019: 0000, end at MON 15/07/2019: 0000) <ul style="list-style-type: none"> Structural Inspection of SYAB i.e. checking the cross head and cross beam connections and the bearings Erection and installation of 135T crawler crane 	Real time monitoring
1 9	August Weekday 4 –Weekend 9– 01/08/19 to 31/08/19 Platforms and Sydney Yard Works as per CNVIS Rev5, Annex B and C	Suburban Tracks (Central Walk, ESR, back of house and tunnel Works) <i>24hr works throughout August</i> <i>ESR Concourse, back of house and tunnels (station fit out, excavation and largely inaudible)</i> <ul style="list-style-type: none"> Commencement and construction of new back of house (BOH) rooms on the Eastern Suburbs Railway (ESR) Concourse. Olympic Tunnel to be used to transport material at night time. Ongoing service installation and commissioning for the CSA Pods, guard rooms and Ghost platforms Service investigations and diversions and removal at ESR Concourse & BOH Commencement of installation of new services at ESR Concourse & BOH Platform strengthening in ESR Ghost platform (Access via Olympic Tunnel for deliveries) Service investigation, diversions and removals at Olympic tunnel Ongoing cut over of comms cables at tunnels Installation of new power and lighting circuits at tunnels Hoarding installation Demolition works at BOH area (day and night) Hoist install, and platform Steelwork Install (Preparation Works) at the Ghost Platforms CENA Room Steelwork Install (South End of BOH Area) Large plant delivery to Randle St/Lane under ROL Platform 16/17 <ul style="list-style-type: none"> CSA Pod works – including <ul style="list-style-type: none"> fixing and finishing works Fit outs, Duplication of services to new temp CSA Room Trial operation, testing and commissioning Standby Room works – including fit out of old CSA Room, place hoarding around the old Standby Room (night works only) 	Real time monitoring

		<p>WE08 Possession</p> <p><i>(Start at SAT 24/08/2019: 0000, end at MON 26/08/2019: 0000)</i></p> <ul style="list-style-type: none"> • Edge beam construction on Platform 16 - Excavation, Form Work Installation, Reinforcing Installation, Concrete Pour & Reinstatement of Platform • Drainage Service diversion works on Platform 17 to canopy level • Complete installation of the ULX concrete lines under Tracks 21-22 • CSA Pod Delivery to Platforms 22/23 • CSR work – Pit investigation: Silt trenching on track 23 <p><u>Bounce Hotel/Randle Lane</u></p> <p>Two OOH deliveries throughout the month are required for oversized plant is required for the delivery of a 20t excavator and generator. Specific notification will be issued in the appropriate timeframe.</p> <p><u>Intercity Platform and Track works</u></p> <p>Intercity Platform and Tracks</p> <p><i>24 Hour works throughout August (fit out, reduced scope)</i></p> <ul style="list-style-type: none"> • Construction of the Project Wide HV - CSR <ul style="list-style-type: none"> ◦ Phase A – Western Baggage Tunnel, Northern Baggage Tunnel, and Platform 1 works • Platform 1 Trenching – Section B (south of the goods lift), Thursday 11 July – Tuesday 6 August road saw to start at 1800-2200. Any sections not complete will be completed the following day in Std construction hours and subject to monitoring. • Installation of service routes through Western and Northern Baggage Tunnel – July / August 2019 (inaudible) • Finishing Works to both platform extensions 9,10,11 <p>WE09 Possession</p> <p>1900 Fri (after last train) to 1900 Sun P1 slit trenching south of YHA involving saw cutting and breaking. High noise to occur on Friday. Any high noise works not complete prior to 2200 will be continued the next morning. Discussions with YHA management has identified that the front carriages are unlikely to be booked out. Noise barriers will be established in an L shape at the source of breakout.</p> <p><u>Grand Concourse and Northern Concourse</u></p>	<p>Real time monitoring</p> <p>Real time monitoring</p> <p>Attended monitoring</p> <p>Attended monitoring</p>
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		<p><i>OOH throughout August</i></p> <ul style="list-style-type: none"> • XD9 Mini piling rig, piling in Grand Concourse and Northern Concourse (nights and Weekends due to works occurring within pedestrian thoroughfare) • Service investigations (inaudible) • Removal of redundant services, Canopy service diversion, Install new services • FRP piling caps (nights and Weekends) • Canopy cleaning upper and lower concourse • Piling working on Platform 8/9 and 10/11 • Package F stage 2 Works (additional bridge, excavation, demolition etc) • NC bridge extension • Saw cutting the column • Installation of temporary crash decks • Temporary Olympic Tunnel MEP reroutes works • New electrical DB Room works - Construction of new DB room on northern side of lower northern concourse, reinforce columns in lower northern concourse • Removal of existing services in existing roof – Grand Concourse and Northern Concourse <p><u>Metro Box and Sydney Yard</u></p> <p><i>OOH throughout August</i></p> <ul style="list-style-type: none"> • Archaeological Investigation • Excavation (including rock breaking), shotcrete and installation of ground support • Secant piles adjacent to DST • Pile trimming and concrete works – Capping beam, track and platform slab Works • Service diversions at southern baggage tunnels (inaudible) • Survey and monitoring of tunnels, track and ground wells – Nights • Spoil removal by Truck & Dogs • General Yard works and plant movement • Southern Baggage tunnel – more cables to be moved to enable demo works • Light Feeds for source lighting • Installation of Olympic Tunnel Diversion • Temp Weekend Closure of the Olympic Tunnel - WE05 3rd – 4th August • Install survey equipment in DST – remove tiles • Install 11kv 600 route through Metro Box 	<p>Attended monitoring</p> <p>Inaudible</p>
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		<p>WE05 Possession</p> <p><i>(Start at SAT 3/08/2019: 0000, end at MON 5/08/2019: 0000)</i></p> <ul style="list-style-type: none"> Site Lighting installation to full Perimeter of Metro Box (in accordance with design and light spill standards) <p>Typical plant/equipment used for this scope of works is as follows, EWP, hand and occasional power tools.</p>	Inaudible
		<p>WE08 Possession</p> <p><i>(Start at SAT 24/08/2019: 0000, end at MON 26/08/2019: 0000)</i></p> <p>Continue Site Lighting installation to full Perimeter of Metro Box (Road 16 Hoarding)</p>	Inaudible

3. Monitoring Results

3.1 Noise

Construction noise levels for some CSM work activities are predicted to exceed the external noise management level at times, particularly during works outside of standard hours. Attended and unattended real time noise monitoring was undertaken during the reporting period as required for OOHW, particularly during possessions where noise modelling predicted exceedance of noise management levels.

As identified by modelling in the CNVIS, the majority of noise impacts have occurred at the closest sensitive receivers on Chalmers Street and the YHA on Platform Zero. Standard mitigation measures were implemented as per Section 8 of the CNVMP and Section 8 of the CNVIS. Additional mitigation and management measures were implemented as per the OOHW approvals. Additional respite periods during high noise activities were provided to Sydney Trains staff and commuters as required and included no high noise impact activities during peak hours and by working 45 minutes high noise works with 15 minutes respite with a total of 3 hours work and with one hour respite.

The real time noise data was reviewed at the time of potential high noise impact works by site supervisors. The playback function allowed for differentiation of construction noise from ambient noise levels. Notable high ambient noise levels were recorded during attended noise monitoring sessions and from playback recordings downloaded from the real time logger at Chalmers Street and the YHA. Common extraneous noise sources include:

- Other infrastructure works on Chalmers and Elizabeth Streets
- Residences or pedestrians near the measurement position;
- Wind-blown vegetation and insects;
- Road traffic on public roads, particularly at Regent Street;
- Noise from trains passing, diesel trains idling in the intercity platforms, announcements and train signalling horns.

Noise monitoring results are detailed in Appendix A. Generally exceedances of predicted noise levels were attributed to extraneous noise rather than construction activities. No non-conformances were raised during the reporting period. Where higher than predicted construction noise levels were recorded, the construction method and equipment were reviewed where feasible and reasonable. During scheduled rail possessions, options such as amending construction practices and schedules to reduce noise impacts by carrying out the works during less noise sensitive times is not feasible due to a large majority of complex works occurring in limited track and platform possession windows.

The most intensive period of OOHW occurred during December 2018. CSMW conducted 24 hour works starting from 10 December 2018 until 24 December 2018. Attended monitoring was conducted within Central Station and at sensitive receivers from 7pm to 3am every night to help form a more comprehensive understanding of the noise environment.

Noise monitoring summary for 10/12/18 to 14/12/18 is as follows;

- A total of 36 attended noise measurements were completed across the four shifts.
- Site noise was generally inaudible at the YHA platform 0 (R17) until the majority of trains had stopped for the night. When the site was audible at platform 0 the site noise L_{eq} , 15 min was around 50 - 55 dBA.
- Site noise generally remained inaudible at 34 Chalmers St (R25) as the dominant noise source at this location was the Sydney Light Rail (SLR) construction works.

- Noise from the piling rig was measured at platform 11 across from the rig (approx. 20m). Leq, 15 min was around 70 to 72 dBA.
- Site noise at the TCAC building was between 67 and 79 dBA (Leq, 15 min) during canopy removal above platform 12.
- Field note: even when the trains have stopped operating, there is quite a lot of incidental shielding provided by trains parked at platforms between the work site and the sensitive receptors.

Noise monitoring summary of CSM for works between 14th and 17th December 2018 is as follows;

- A total of 30 attended noise measurements were completed across the three shifts.
- Site noise was inaudible at YHA platform 0 (R17) until the majority of trains had stopped for the night. When the site was audible at platform 0 the site noise Leq, 15 min was around 50 - 55 dBA – with some short (5sec to 2min) events of piling noise reaching 60-65 dBA at around 11:30pm Sunday 16/12/2018. These were the highest site-related levels so far recorded in any of the night-time monitoring campaign at sensitive receivers.
- Site noise mostly remained inaudible at 34 Chalmers St (R25) due to noise levels at this location from SLR construction activity. Some short impacts (1-10sec) from piling activities were recorded at between 60 – 70 dBA, mostly from the rig emptying material.
- Noise from the piling rig was measured at platform 11 across from the rig (approx. 20m). Leq, 15 min was around 70 to 72 dBA.
- Site noise at the TCAC building was between 60 and 70 dBA (Leq, 15 min) on 14/12/2018 during platform demolition & breakup, with piling activities recording some events (10sec – 2min) of between 65-76 dBA on 16/12/2018.
- Rain didn't overly affect measurements during work times (generally between 22:30 and 02:30 at times of measurement).
- Field note: even when the trains have stopped operating, there continues to be quite a lot of incidental shielding provided by trains parked at platforms between the work site and the sensitive receptors.

Noise monitoring summary of CSM for works between 17 and 24 December 2018.

- A total of 27 attended noise measurements were completed across the three shifts.
- Site noise was inaudible at platform 0 (R17) until the majority of trains had stopped for the night. When the site was audible at platform 0 the site noise Leq, 15 min was around 50 - 55 dBA – with some short (10 seconds) events of auger 'clanging' during spoil removal reaching 55-64 dBA at around 12:15am Wednesday 19/12/2018.
- Site noise mostly remained inaudible at 34 Chalmers St (R25) as a result of nearby light rail construction activities. Some short impacts (1-10sec) from piling activities were recorded at between 58 – 68 dBA, mostly from the rig emptying material.
- Noise from the piling rig was measured at Platform 11 across from the rig (approx. 15-20m). Leq, 15 min was around 70 to 72 dBA.
- Site noise at the TCAC building was between 64 and 68 dBA (Leq, 15 min) on 18/12/2018 during nearby construction activities (platform 12 etc.), with piling activities recording some events (10sec – 2min) between 68-74 dBA on 18/12/2018.
- A few measurements were conducted on Platform 19 to capture noise from Platform 20/21 works (along with general Metro Box works in the background). Leq, 15 min was around 63 to 68 dBA. These works were also audible at Chalmers Street (R24/25/29) during attended measurements conducted on 18/12/18. Leq, 15 min was around 55 to 60 dBA, with some short events of louder construction activities (approx. 30 seconds) recorded at between 65-71 dBA.

- Heavy rain on Wednesday 19/12/18 resulted in fewer attended measurements than previous nights. No piling was undertaken on Wednesday night/Thursday morning and as such, overall noise levels were lower than previous nights.
- Field note: there continues to be incidental shielding provided by trains parked at platforms between the work site and the sensitive receptors.

The internal / external noise reductions from the building envelope have been conducted at the Dental Hospital, the YHA and 38 Chalmers Street. Internal noise management levels were not exceeded at any time during this reporting period.

3.2 Vibration

Attended and unattended vibration monitoring was undertaken before and during construction activities during the reporting period where buildings or structures exist within the safe work distances of vibratory plant. In accordance with CoA E31, the project heritage specialist was consulted on locations and methods for installing vibration monitoring equipment on heritage structures. A real time vibration logger was installed on the southern façade of the Train Crew Assignment Centre (TCAC) (formerly known as the Central Electric Building) located to the north of Platforms 12/13 and 14/15 on 11 January 2019. It was programmed to log the peak data point every minute.

The environmental team would review the program/schedule and attend progress meetings to ascertain which construction works may have a vibration impact on the heritage fabric of Central Station. Predictions of vibration levels based on the safe working distances of various plant as described in Table 8.3 of the CNVMP were made and monitored closely. A screening criteria of 5mm/s peak particle velocity (PPV) was also set (later changed to 7.5 due to excessive number of alerts). Alerts are sent to key project team members by the real time vibration logger when vibration management criteria are exceeded. The data would be reviewed and a determination made as to the risk of the exceedance. Isolated spikes that are spurious and most likely associated with transient events (e.g. footfall) near the vibration monitoring device would typically result in no action, a general increase in vibration levels would prompt further assessment. The results indicated relatively high ambient vibration levels from the movement of trains.

For ease of interpretation, the continuous vibration data has been divided into monthly intervals (refer to Appendix B). A logarithmic scale has also been applied to declutter and make sense of approximately 43,200 individual data points within any one month as the majority of data points fall below 2mm/s, however interest lies in the higher end of the scale. The major gridlines of the x-axis indicate a 24hr period from 12-midnight to 12 midnight. The minor gridlines of the x-axis indicate 6 hour intervals. The cluster shift can be observed forming a pattern increasing in the day with increase station operations and decreasing at night once trains either stop running or are reduced in frequency.

4. Complaints

There were 16 community complaints relating to noise, vibration or working hours received during this reporting period from sensitive receivers only, as required by LOR EPL 21148. A month by month break down of complaints is shown below.

Table 4-1: complaints breakdown.

Year	Month	Noise	Vibration	Working Hours	Total
2018	August	0	0	0	0
	September	0	0	0	0
	October	1	0	0	1
	November	0	0	0	0
	December	2	0	0	2
2019	January	5	0	0	5
	February	2	0	0	2
	March	1	0	0	1
	April	0	0	0	0
	May-19	2	0	0	2
	Jun-19	0	0	0	0
	Jul-19	1	0	2	3
Total		14	0	2	16

5. Conclusion

The requirements for noise and vibration monitoring are detailed in the CNVIS and CNVMP. A combination of both real time and attended monitoring has occurred at the closest sensitive receiver locations on Chalmers St, Platform 1 for YHA and 54 Regent St. These receivers are considered representative of the area and were used to validate the modelled construction noise.

Monitoring records have validated modelled noise and are generally consistent with the predicted impact of construction activities on noise sensitive receivers. As discussed in Section 4, there were 16 complaints in the reporting in relation to noise, vibration and OOH work. There has been no recorded noise exceedance of the predictions.

Real time noise and vibration monitoring is conducted 24/7. The data is checked for compliance during relevant periods of construction including for the duration of rail possessions. Both real-time and attended noise and vibration monitoring has observed no exceedances of noise predictions in the CNVIS related to construction noise from the project.

6. Appendix A – Noise Monitoring Summary

Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
23:15:00	6/08/2018	Olympic stairs - rock breaking	30-38 Chalmers St	45	50	69	63.5	18.5	Yes	High ambient noise levels on Chalmers Street
23:51:00	6/08/2018	Olympic stairs - rock breaking	30-38 Chalmers St	45	50	69	70.3	25.3	Yes	High ambient noise levels on Chalmers Street
22:30:00	16/08/2018	Olympic stairs - rock breaking	88 Chalmers St	45	60	69	67.5	22.5	Yes	High ambient noise levels on Chalmers Street
12:16:00	15/09/2018	WE11 - vehicle movements on SYAB	56 Regent Street	50	60	74	47.4	0	Yes	Noise dominated by road traffic noise. Logger micorphone damaged. Results considered too low. Logger sent for recalibration.
12:50:00	15/09/2018	WE11 - Rail and OHW works	88 Chalmers	56	60	56	45.8	0	Yes	Noise dominated by road traffic noise. Logger micorphone damaged. Results considered too low. Logger sent for recalibration.
13:22:00	15/09/2018	WE11 - NDD	YHA	54	59	65	43	0	Yes	Noise dominated by road traffic noise. Logger micorphone damaged. Results considered too low. Logger sent for recalibration.
17:43:00	15/09/2018	WE11 - NDD	YHA	54	59	65	42.4	0	Yes	Noise dominated by road traffic noise. Logger micorphone damaged. Results considered too low. Logger sent for recalibration.
8:14:00	27/09/2018	Truck movements SYAB	Abut. A SYAB	44	60	74	67.9	23.9	Yes	Road noise predominant noise
11:11:00	6/10/2018	WE14 - Jack hammer, NDD	Plat 22 extrapolated for 30-38 Chalmers St	56	66	64	67.7	11.7	Yes	Compliance monitoring for station staff and passengers
22:32:00	18/10/2018	Olympic stairs P20-23 - concrete agi	30-38 Chalmers St	45	50	64	58.8	19	Yes	Ambient street noise
1:25:00	19/10/2018	Olympic stairs P20-23 - concrete agi	30-38 Chalmers St	45	50	64	59.9	19	Yes	Ambient street noise
10:26:00	20/10/2018	WE16 - 6t excavator, hydrema, vac truck, 12t excavator	YHA	54	64	65	70.1	16.1	Yes	High ambient noise from railway activities. Noise blocked by train.
9:54:00	28/10/2018	WE17 - sawcutting,	YHA	54	54	65	61.5	7.5	Yes	Annoucements and train departures cotnrubted to ambient noise
11:02:00	28/10/2018	WE17 - Track 11&12 tamping , rail realignment	30-38 Chalmers St	56	61	63	61	6	Yes	High ambient street noise levels masked project noise.
13:23:00	10/11/2018	WE19 - sheet piling	Plat 18 for 30-38 Chalmers St	56	66	69	68.7	15.7	Yes	
20:51:00	17/11/2018	WE20 - NDD platform 19	Plat 22 extrapolated for 30-38 Chalmers St	53	58	69	72	21	Yes	
8:06:00	24/11/2018	WE21 - sawcutting, demo, canopy removal	YHA	54	64	65	61	7	Yes	High ambient noise - Train, plane
8:20:00	24/11/2018	WE21 - sawcutting, demo, canopy removal	YHA	54	64	65	61.7	7.7	Yes	High ambient noise trains
10:39:00	24/11/2018	WE21 - sawcutting, demo, canopy removal	30-38 Chalmers	56	66	63	65	9	Yes	Ambient noise dominant. CSMW noise not audible.
11:00:00	24/11/2018	WE21 - sawcutting, demo, Olympic stairs	30 - 38 Chalmers	56	66	63	71.6	15.6	Yes	Ambient noise dominant. CSMW noise not audible.
15:40:00	24/11/2018	WE21 - Plat 11/12 extension works	YHA	54	64	65	78.3	24.3	Yes	Deisel train at Platform 1 dominant noise
15:55:00	24/11/2018	WE21 - Plat 11/12 extension works	YHA	54	64	65	80.8	26.6	Yes	Deisel train at Platform 1 dominant noise
16:10:00	24/11/2018	WE21 - Plat 11/12 extension works	YHA	54	64	65	80.3	26.1	Yes	Deisel train at Platform 1 dominant noise
16:25:00	24/11/2018	WE21 - Plat 11/12 extension works	YHA	54	64	65	58.1	4.1	Yes	No CSMW audible.
1:15:00	29/11/2018	NDD at southern end of Plantform 9	YHA	1	60	65	64.9	20.1	Yes	
1:30:00	29/11/2018	NDD at southern end of Plantform 9	YHA	7	60	65	63.3	21.7	Yes	
1:23:00	2/12/2018	Tactile defects Platform 12 - sawcutter	30-38 Chalmers	45	50	63	58.8	13.8	Yes	High ambient street noise
20:22:00	10/12/2018	Canopy removal, platform removal, pile platform	YHA	52	57	69	75	23	Yes	Site inaudible. Non LOR train engines idle, trains PA etc
20:51:00	10/12/2018	Canopy removal, platform removal, pile platform	Chalmers	53	58	69	62	9	Yes	Site inaudible. Non LOR truck (Light rail), trains passing, pedestrians etc
21:09:00	10/12/2018	Canopy removal, platform removal, pile platform	Chalmers	53	58	69	66	13	Yes	Site inaudible. Non LOR Clangs/bangs (Light Rail), trains passing, pedestrians etc
22:15:00	10/12/2018	Canopy removal, platform removal, pile platform	YHA	49	54	69	61	12	Yes	Site inaudible. Non LOR train engine idle, train horn, distant trains etc

Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
0:15:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	60	15	Yes	Site inaudible. Non LOR Traffic, mobile plant (Light Rail), excavator (Light Rail), road work (Light Rail), etc
1:02:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	56	7	Yes	Motion alarm, mobile plant, reverse beeper
1:20:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	56	7	Yes	Mobile plant, motion alarms
2:32:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	58	13	Yes	General construction noise
20:20:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	52	57	69	71	19	Yes	Site inaudible. Non LOR trains engines idle, train horn, train PA etc
20:49:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	53	58	69	59	6	Yes	Site inaudible. Non LOR pedestrians, trains passing, traffic etc
22:20:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	66	17	Yes	Site inaudible. Non LOR trains screeching, trains idle, train passing etc
22:50:00	11/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	62	18	Yes	Site inaudible. Non LOR Road works (Light rail), general works (Light Rail), traffic, trains passing, etc
0:12:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	55	6	Yes	Piling rig, clangs/bangs, motion alarm
0:30:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	55	6	Yes	Motion Alarm, mobile plant, clangs/bangs, piling rig
1:32:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	61	16	Yes	Site inaudible. Non LOR Light Rail mobile plant, road works, generators, etc.
1:47:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	65	20	Yes	Site inaudible. Non LOR Traffic, light rail, pedestrians, etc
20:27:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	53	58	69	61	18	Yes	Site inaudible. Non LOR trucks idle (Light Rail), pedestrians, trains passing etc
20:55:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	52	57	69	62	10	Yes	Site inaudible. Non LOR Train idle, trains passing, etc
22:13:00	12/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	61	12	Yes	Clangs/bangs, power tools, mobile plant
1:53:00	13/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	70	25	Yes	Grinder, Clangs/bangs (<1% contribution)
2:18:00	13/12/2018	Canopy removal, platform removal, pile platform, piling	YHA	49	54	69	55	6	Yes	Clangs/bangs, grinder, mobile plant, motion alarm, piling rig
22:11:00	13/12/2018	Canopy removal, platform removal, pile platform, piling	Chalmers	45	50	69	64	19	Yes	Site inaudible. Non LOR mobile plant (Light Rail), pedestrians, trains passing, etc
0:42:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	55	6	Yes	Piling rig, motion alarm, clangs/bangs, mobile plant
1:00:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	55	6	Yes	Piling rig, Motion alarm, clangs/bangs, hand tools, mobile plant, trucks.
1:50:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	57	12	Yes	Clangs/Bangs <1% contribution. Non LOR Light Rail road works
20:44:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	52	57	69	64.9	12	Yes	Truck movements onsite, motion beeper
22:18:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	62.4	17.4	Yes	Site inaudible
23:30:00	14/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	60.9	15.9	Yes	Small piling rig manouvering, site inaudible for most of measurement

Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
0:39:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	55.3	6.3	Yes	Truck movements onsite
1:51:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	54.9	19.9	Yes	Piling rig, onsite truck movements
2:17:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	55.1	9	Yes	Truck movements, digger scraping, piling (no event duration given)
19:32:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	52	57	69	64.5	12.5	Yes	Site inaudible. Non LOR trainspassing, PA, etc
20:34:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	53	58	69	62.5	9.5	Yes	Site inaudible. Non LOR residents talking, PA (Sydney trains)
23:46:00	15/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	69.8	20.8	Yes	Band from site (drill rig?), drilling rig operating and dumping
0:30:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	58.1	13.1	Yes	Scraping from site, loud bang from rig
2:01:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	68.6	19.6	Yes	Bang from site
2:28:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	64.4	19.4	Yes	Site inaudible. Non LOR pedestrian yelling in microphone, traffic, pedestrian noise etc
20:46:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	52	57	69	67.7	15.7	Yes	Site inaudible
23:04:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	58.8	13.8	Yes	Bang from drill rig, scraping from digger
22:24:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	Chalmers	45	50	69	57.5	12.5	Yes	Site inaudible. Non LOR heavy vehicle noise, Sydney Trains PA
23:31:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	69.1	20.1	Yes	Scraping and loud bangs from drill rig
23:52:00	16/12/2018	Canopy removal, platform removal, pile platform, piling, capping beam	YHA	49	54	69	52.1	3.1	Yes	Noise from rig, yelling from site
2:05:00	17/12/2018	Pile platform, piling, capping beam	Chalmers	45	50	69	59.6	14.6	Yes	Bands from drill rig, scraping from drill rig
20:34:00	17/12/2018	Pile platform, piling, capping beam	Chalmers	53	58	69	59.1	6.1	Yes	Site inaudible. Non LOR loud pedestrians, idle truck (Light Rail), etc
21:46:00	17/12/2018	Pile platform, piling, capping beam	YHA	52	57	69	69.6	17.6	Yes	Site inaudible. Non LOR Idle train, distant train screech
22:55:00	17/12/2018	Pile platform, piling, capping beam	YHA	49	54	69	66.6	17.6	Yes	Site inaudible. Non LOR Idle train, distant train screech
1:08:00	18/12/2018	Pile platform, piling, capping beam	Chalmers	45	50	69	58.4	13.4	Yes	Auger clanging, motion alarm, clangs/bangs
1:24:00	18/12/2018	Pile platform, piling, capping beam	Chalmers	45	50	69	57.6	12.6	Yes	Auger motion alarm, auger clanging, clanging/banging, auger operating
1:51:00	18/12/2018	Pile platform, piling, capping beam	YHA	49	54	69	51.7	2.7	Yes	Distant site noise (auger operational), clanging auger, clanging/banging
20:28:00	18/12/2018	Pile platform, piling, capping beam	YHA	52	57	69	72.6	20.6	Yes	Site inaudible. Non LOR trains idling, PA etc
23:00:00	18/12/2018	Pile platform, piling, capping beam	Chalmers	45	50	69	58	13	Yes	Auger removing spoil, motion alarm

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22:43:00	18/12/2018	Pile platform, piling, capping beam	Chalmers	45	50	69	58.9	13.9	Yes	Auger clearing spoil, construction noise from platform 23
0:30:00	19/12/2018	Pile platform, piling, capping beam	YHA	49	54	69	52.9	3.9	Yes	Auger operating, clanging, motion alarm
0:14:00	19/12/2018	Pile platform, piling, capping beam	YHA	49	54	69	53.5	4.5	Yes	Auger clanging, rattling
23:45:00	19/12/2018	Pile platform, piling, capping beam	YHA	49	54	69	52.9	3.9	Yes	Distant plant movement
0:12:00	20/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	69.3	24.3	Yes	Site inaudible. Non LOR Light Rail vehicles, Sydney trains and PA, etc
1:45:00	20/12/2018	Capping beam, backfill, install canopies	YHA	49	54	69	56.1	17.1	Yes	Possible site noises, bangs
20:54:00	20/12/2018	Capping beam, backfill, install canopies	YHA	52	57	69	59.1	7.1	Yes	Digger on-site, hand toolds on-site, loud bang from site
22:22:00	20/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	75.5	30.5	Yes	Site inaudible. Non LOR pedestrians, vehicles, digger (Light Rail)
23:23:00	20/12/2018	Capping beam, backfill, install canopies	YHA	49	54	69	64.8	15.8	Yes	Machinery audible, generator audible
0:34:00	21/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	58.5	13.5	Yes	Site inaudible. Non LOR Sydney train PA, pedestrians etc
1:08:00	21/12/2018	Capping beam, backfill, install canopies	YHA	49	54	69	57	8	Yes	Site truck movement, faint site machinery high pitch
20:56:00	21/12/2018	Capping beam, backfill, install canopies	YHA	52	57	69	75.9	23.9	Yes	Site inaudible. Non LOR XPT train idle, PA, etc
22:01:00	21/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	58.7	13.7	Yes	Hand saw (platform 20)
0:02:00	22/12/2018	Capping beam, backfill, install canopies	YHA	49	54	69	50.8	1.8	Yes	Site inaudible. Non LOR rail screech, PA, sirens, etc
0:21:00	22/12/2018	Capping beam, backfill, install canopies	YHA	49	54	69	52.2	3.2	Yes	Site inaudible. Non LOR train takeoff, insects, guards whistle, girls singing, etc
0:44:00	22/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	56.9	11.9	Yes	Site inaudible. Non LOR trains moving, pedestrians etc
19:14:00	22/12/2018	Capping beam, backfill, install canopies	YHA	52	57	69	68.1	16.1	Yes	Site inaudible. Non LOR trains passing, idling, PA
23:56:00	22/12/2018	Capping beam, backfill, install canopies	Chalmers	45	50	69	57.4	12.4	Yes	Site inaudible.Non LOR Pedestrians, train movements, PA etc
0:45:00	23/12/2018	Backfill, install canopies	YHA	49	54	69	52.5	3.5	Yes	Motion sounder, hammering on-site, metal being struck, digger, plant
21:13:00	23/12/2018	Backfill, install canopies	Chalmers	53	58	69	58.3	5.3	Yes	Site inaudible. Non LOR train operations, pedestrians etc
21:29:00	23/12/2018	Backfill, install canopies	Chalmers	53	58	69	56.9	3.9	Yes	Site inaudible. Non LOR loud pedestrians, train movements, PA etc
22:13:00	23/12/2018	Backfill, install canopies	YHA	49	54	69	65.9	16.9	Yes	Site inaudible
22:47:00	23/12/2018	Backfill, install canopies	YHA	49	54	69	66.3	17.3	Yes	Site inaudible. Non LOR XPT train idling
0:30:00	24/12/2018	Backfill, install canopies	Chalmers	53	58	69	58	5	Yes	Hammering, hand toold on platform 20
0:51:00	24/12/2018	Backfill, install canopies	Chalmers	45	50	69	56.5	11.5	Yes	Jackhammer/tools on platform 22-23, plank of wood being dropped
1:10:00	24/12/2018	Backfill, install canopies	Chalmers	45	50	69	56.7	11.7	Yes	Tools on platform 22-23, hammering, loud bang from site
1:50:00	24/12/2018	Backfill, install canopies	Chalmers	45	50	69	59.8	14.8	Yes	Loud saw/band tools, loud metal dragging, bang from site, jack hammer
22:38:00	12/01/2019	WE28 - Platform extension 8/9	YHA	49	54	65	46.4	1.4	Yes	
23:08:00	12/01/2019	WE28 - Platform extension 8/9	30-38 Chalmers	45	59	65	49.8	4.8	Yes	Drunk pedestrians
17:53:00	2/02/2019	WE31 - NDD Track 23 & Guard room works Platform 22/23	30 - 38 Chalmers	53	58	71	65	12	Yes	Ambient noise from road and rail traffic.
18:10:00	2/02/2019	WE31 - NDD Track 23	30 - 38 Chalmers	53	58	71	74.1	21.1	Yes	Ambient noise from road and rail traffic.
18:32:00	2/02/2019	WE31 - NDD Track 23 & Guard room works Platform 22/23	Apartment interior / 30 - 38 Chalmers	53	58	71	54.2	1.2	Yes	Inside apartent. Works audible. Furiture moved during recording, typing on computer, fridge and air con also audible.

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18:48:00	2/02/2019	WE31 - NDD Track 23	Apartment balcony / 30 - 38 Chalmers	53	58	71	72.5	19.5	Yes	Balcony of 6th floor apartment.
23:29:00	2/02/2019	WE31 - NDD Track 23	30 - 38 Chalmers	45	59	71	68	23	Yes	Exceeds sleep disturbance / awakening criteria externally. Respite periods provided. Interior noise criteria not exceeded as 18.5dBA reduction in noise when balcony window is closed.
9:45:00	16/02/2019	WE33 NDD	38 Chalmers St	56	66	71	74.8	18.8	Yes	Dominant noise concrete agi from Light Rail about 6m away. Paving works happening outside city convenience
1:00:00	6/03/2019	Saw cutting P18/19	Chalmers St	45	50	72	56.3	11.3	Yes	train audible, no saw cutting audible, dominant noise source insects.
1:15:00	6/03/2019	Saw cutting P18/19	Chalmers St	45	50	72	56.4	11.4	Yes	saw cutting audible intermittently, insects dominant noise source
1:30:00	6/03/2019	Saw cutting P18/19	Chalmers St	45	50	72	55.8	10.8	Yes	saw cutting audible intermittently, insects dominant noise source
1:45:00	6/03/2019	Saw cutting P18/19	Chalmers St	45	50	72	53.9	8.9	Yes	saw cutting audible intermittently, insects dominant noise source
21:45:00	8/03/2019	WE36- Northern Concourse Works (CSR, signaling, piling)	Chalmers St	45	58	65	62.8 (max LAeq15min)	18	Yes	
1:15:00	9/03/2019	WE36- Northern Concourse Works (CSR, signaling, piling)	Chalmers St	45	50	65	56.80	11.8	Yes	
0:30:00	10/03/2019	WE36- Northern Concourse Works (CSR, signaling, piling)	Chalmers St	45	50	65	59.2	14.2	Yes	
23:00:00	15/03/2019	WE37- P20/21 CSA Pods (representative throughout March)	Chalmers St	45	50	69	62 (max LAeq15min)	17	Yes	
0:45:00	16/03/2019	WE37- P20/21 CSA Pods (representative throughout March)	Chalmers St	45	50	69	64.9	19.9	Yes	
Throughout Night Time Period	23/03/2019	WE38- P16-22 vac truck operations on track	Chalmers St	45	50	69	~55 all night period	10	Yes	Real time monitoring indicated noise was on average approximately 55dBA and less than 60dBA
0:00:00	26/03/2019	Rock breaking P18/19	Chalmers St	45	50	72	53	8	Yes	jack hammering audible intermittently
6:28:00	13/04/2019	WE41 Metro Box piling and work in the Yard, including saw cutting, NDD associated with CSR.	Platform 1 YHA	49	54	63	77.1	33.1	Yes	Train Idling on Platform 1 contributing to larger exceedance. Multiple station announcements. Birds. Aircraft. Work at the stairs and in the rail corridor were not audible. Slight Breeze, no rain.
6:59:00	13/04/2019	WE41 Site establishment Bounce from Chalmers St	38 Chalmers St	45	50	66	67	22	Yes	Adjecant to idling flat bed truck. Unloading activities occuring. Small excavator in use, works are audible. Hoarding works commenced. Slight breeze, no rain.
7:16:00	13/04/2019	WE41 Site establishment Bounce from Chalmers St	30 Chalmers St	56	66	66	62.9	6.9	Yes	Hoarding works commenced. Unloading activities underway. Pedestrians passing by. Calm weather conditions.
10:35:00	13/04/2019	WE41 Metro Box piling and work in the Yard, including saw cutting, NDD associated with CSR.	Platform 1 YHA	54	54	63	68.6	14.6	Yes	Saw cutting works underway on the stairs. A series of lound station announcement were audible. Saw cutting from Sydney Yard could faintly be heard in the background.Fair weather, radio playing music at YHA is audible through out. Train arrives after 10 mins.
11:04:00	13/04/2019	WE41 Site establishment Bounce from Chalmers St	38 Chalmers St	56	66	66	68.4	12.4	Yes	erection works underway. Flatbed truck in operation. Lots of pedestrians in the area. Loud bricks unloading at 10 mins 20 secs. Not associated to the Bounce Hotel works.

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11:24:00	13/04/2019	WE41 Site establishment Bounce from Chalmers St	30 Chalmers St	56	66	66	64	8	Yes	Helicopter passes by in first minute. Scaffold erection works in progress. Hand tools audible after 4 mins + 5 mins
11:45:00	29/04/2019	Jackhammering on grand concourse at , at midnight Brefni saw cutting on platform 18-19 . Nass concrete cutting service trench on grand concourse at 1am Rapid working on both pods on platforms 18-19-20-21 at 9pm. Light rail had heavy plant working on Pitt street and on charmers street.	30 Chalmers St	56	50	66	62	6	Yes	can hear the sound of train activities; truck/plant reversing noise from the road, not associated with LOR work; train safety horn; no obvious sound of construction working; jackhammering bearily audible at 8 mins, lasted less than 5 sec.
22:15:00	29/04/2019	Jackhammering on grand concourse at , at midnight Brefni saw cutting on platform 18-19 . Nass concrete cutting service trench on grand concourse at 1am Rapid working on both pods on platforms 18-19-20-21 at 9pm. Light rail had heavy plant working on Pitt street and on charmers street.	30 Chalmers St	45	50	66	62	17	Yes	can hear the sound of train activities and stdney train staff's whistling; no obvious sound of construction working
23:15:00	29/04/2019	Jackhammering on grand concourse at , at midnight Brefni saw cutting on platform 18-19 . Nass concrete cutting service trench on grand concourse at 1am Rapid working on both pods on platforms 18-19-20-21 at 9pm. Light rail had heavy plant working on Pitt street and on charmers street.	30 Chalmers St	45	50	66	61	16	Yes	can hear the sound of truck/plant reversing, which was not from our site (light rail); can hear the sound of train; concrete breaking activities audible from 4-5 mins. Note: File error- only 5mins long .
12:45:00	1/05/2019	P18 breakout: saw cutting activitites	30 Chalmers St	45	50	62	62	17	Yes	At Chalmers- audible (from 0-1mins, 1.5-2mins, 3-5mins, 5.25-7.5); can hear the sound of the train; rock breaking activities audible (from 11.25-12.25mins, 12.5-15mins); hammering activities audible, lasted less then 1min (around 11.5mis, 14.25-14.75)
2:15:00	1/05/2019	Platform 18/19 rock breaking OOH (0215-0230)	YHA	44	49	62	56	12	Yes	At YHA
0:30:00	4/05/2019	WE44- P23 coring	30 Chalmers St	45	50	72	61.8	16.8	Yes	coring works audible.
9:30:00	4/05/2019	WE44- Northern Concourse Saw cutting, breakout platform infill and platform extensions work	30 Chalmers St	56	61	72	78.4	22.4	Yes	NC Works inaudible
2:15:00	5/05/2019	WE44- Road saw P12	YHA	45	49	71	50	5	Yes	YHA (R17)- North end of Platform 12, near lift rock breaking OOH (0200-0215). Road saw was operating for the majority of the reading.
1:45:00	6/05/2019	Road saw in operation on Platform 18	30 Chalmers St	45	50	62	65	20	Yes	from 01:40 to 03:30. Noise measure at façade of SR at 0145 and 0200.
2:00:00	6/05/2019	Road saw in operation on Platform 18	30 Chalmers St	45	50	62	63	18	Yes	from 01:40 to 03:30. Noise measure at façade of SR at 0145 and 0200.
1:31:00	10/05/2019	Concrete breaking and piling at NC to GC stairs, No interruptions or loud noises	YHA	44	49	62	50	6	Yes	YHA- platform 1

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3:22:00	11/05/2019	WE45-Edge beams P18. Metro Box hoarding install	30 Chalmers St	45	50	62	62 & 62	17	Yes	Attended, Chalmers St- 3:24am Light Rail concrete coring 60% at 40m plus concrete sawcutting platform 18 @3:26 63.1dBa LR coring 62.4dba 3:31am LR generator for coring and generator for light tower 62.1dBa 3:32am LR jackhammer, 3:35 am CS sawcutter 62.1 then LR jackhammer starts
4:09:00	11/05/2019	WE45-Edge beams P18. Metro Box hoarding install	YHA	44	49	71	55	11	Yes	P1, YHA- 4:09am sawcutter 100% but just audible over station noise and announcements 51.8dba 4:13am station noise 51.3dBa 4:23am sawcutter 54:8dba
6:05:00	11/05/2019	WE45-Edge beams P18. Metro Box hoarding install	30 Chalmers St	45	50	62	63	18	Yes	Chalmers- 6:05 LR no works. Light timer generator in front of 38 Chalmers No audible noise from CS 57.3dba 6:10am talking 62.7dba 6:11am trucks for hoarding installation 63dba Unpacking trucks for rest of period
8:18:00	11/05/2019	WE45-Edge beams P18. Metro Box hoarding install	30 Chalmers St	56	50	62	73	17	Yes	8:18am drilling for hoarding construction 90% rail announcement 10% 65.7dba Saw cutter in quiet periods. Also LR paving of footpath 8:25am ewp 70dba 8:32am drilling 73.2dba
23:00:00	14/05/2019	Piling in Northern Concourse	YHA	44	49	72	64	20	Yes	YHA- train on P3 idling, piling works NC, top of stairs
23:34:00 AM	14/05/2019	Piling in Northern Concourse	30 Chalmers St	45	50	68	59	14	Yes	SLR, humming from light generator, CSM works inaudible.
2:03:00	17/05/2019	Saw cutting for edge beam construction P19	30 Chalmers St	45	50	75	62.3	17.3	Yes	suburban night
2:40:00	17/05/2019	Saw cutting for edge beam construction P19	30 Chalmers St	45	50	75	53.4	8.4	Yes	suburban night
8:31:00	18/05/2019	WE46- Edge beams P19, works in Metro Box	YHA		49	76	58	11	Yes	WE46- Suburban work – edge beam construction on Platform 19, YHA
9:17:00	18/05/2019	WE46- Edge beams P19, works in Metro Box	30 Chalmers St	56	50	76	65	9	Yes	WE46, Chalmers St- Suburban work – edge beam construction on Platform 19
22:03:00	20/05/2019	saw cutting Northern Concourse	YHA	44	50	76	64	20	Yes	Diesel train idling on platform 3, Saw cutting was not perceptible over background noises, Saw cutting completed at approx. 3am
1:46:00	25/05/2019	WE47- intercity works including tamping and regulating of tracks, CSR, platform extensions, P12 infill and king posts	YHA	44	50	76	54.4	10.4	Yes	0146: train idling plat 6/7, train leaves plat 5. Occasional announcement. CSM: audible from time to time <1% of measure. Works occurring prep for buffer stop removal, occasional hammer, ~13t exc working S/W corner of box dropping footpath.
2:11:00	25/05/2019	WE47- intercity works including tamping and regulating of tracks, CSR, platform extensions, P12 infill and king posts	Chalmers St	45	50	76	54.6	9.6	Yes	SLR Lighting tower audible, occasional pedestrians, d CSM WORKS: Drill suburbans? Clanking from metro box area, audible from time to time but not affecting LAeq.
3:49:00	25/05/2019	WE47- intercity works including tamping and regulating of tracks, CSR, platform extensions, P12 infill and king posts	YHA	44	50	76	67.8/81.3/67.8		Yes	0350: 2 TRAINS stabled P1 and P2. Announcements, train movement s on other platforms, signal horns increase LAMAX 94.9/116.1/92 pressure valve release. CSM WORKS INAUDIBLE. Tampa and regulator starts at 0435
1:15:00	2/06/2019	Chalmers St logger- Saw Cutting (no record in diary	Chalmers St	45	50	72	56	0	Yes	Faint saw sound on & off in background no evidence in night shift diaries, possibly not LOR works.
21:45:00	3/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	57	0	Yes	Background noise from trains & wind etc no evidence in diaries of major works happening

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20:45:00	4/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	60	2	Yes	Background noise from trains & station staff whistles no evidence of tool and machinery usage in diaries
21:00:00	5/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	59	1	Yes	Background noise from trains and tracks no evidence of works making major noise
1:45:00	6/06/2019	Chalmers St logger- Concrete truck, drilling (no record)	Chalmers St	45	50	72	55	0	Yes	Concrete truck arrival for concrete pour on P 18/19 and 20/21 near guard rooms, faint noise of drilling but no record in diaries to confirm its LOR Works
20:15:00	6/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	61	3	Yes	No noise from construction works only background noise from sirens passing and trains
2:30:00	7/06/2019	Chalmers St logger- Erection of Hoarding for ESR, potential saw cutting & noise due to moving materials	Chalmers St	45	50	72	56	0	Yes	Noise of saw in background may potentially be due to instlation of hoarding with evidence of further noise moving around timber and dropping them for hoarding.
9:10:00	7/06/2019	attended at dental hospital (internal noise compliance check)	Chalmers St	56	60	75	64	0	Yes	Demo of Bounce Hotel. Non project related noise includes aircon unit, general chatter from corridor. No CSM works occuring at time of measure.
10:45 PM	11/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	57	0	Yes	No sign of works going on at this time from sample and diary only background noise from trains and station intercom.
12:00 AM	12/06/2019	Chalmers St logger- Potential noise from Demolitions on P 18/19/20/21	Chalmers St	45	50	72	59	7	Yes	Potentially due to Demolitions on P 18/19/20/21 noises of cutting and hammering (banging) are evident
21:30:00	12/06/2019	Chalmers St logger- Background Noise, with an Undentified one off drilling noisone	Chalmers St	45	50	72	59	0	Yes	One of drilling noise (couldn't be matched up with any diary entries) which may potentially not be LOR works, other then that just background noise from train arrivals and departures
2:45:00	13/06/2019	Chalmers St logger- sucker truck operating on track 19 NDD	Chalmers St	45	50	72	64	18	Yes	Cutting noise which may be from cutting copper pipe or instalation of Pod or winching on P 18
2:15:00	14/06/2019	Chalmers St logger-Track 21 NDD	Chalmers St	45	50	72	68	23	Yes	sucker truck operating
10:48:00	15/06/2019	attended monitoring at the YHA, WE50 Possession	YHA	44	49	72	61.2	17.2	Yes	Dominant noise at first is train departing road 7, once departed jack hammer in metro Box becomes audible, but not dominant noise source.
23:45:00	17/06/2019	Chalmers St logger- Track 16 NDD	Chalmers St	45	50	72	58	13	Yes	sucker truck operating
1:15:00	18/06/2019	Chalmers St logger- Movement of Machinery and Cutting/Grinding noises potentially due Demo	Chalmers St	45	50	72	59	5	Yes	Beeping of Machinery unidentified (may be on track or metro box), Cutting/Grinding noises which may be due to NASS demo or cut out of hatches by NASS in the ESR ramp.
2:00:00	18/06/2019	Chalmers St logger- Track 17 NDD	Chalmers St	45	50	72	62	10	Yes	sucker truck operations
12:45 AM	19/06/2019	Chalmers St logger- Cutting, sucking noises, and hamering noises from a Jack Hammer	Chalmers St	45	50	72	63	16	Yes	CSucker truck for Central walk, and sawing and jack hamering noises likely to be from the Hoist demo by NASS in the ESR
10:00 PM	19/06/2019	Chalmers St logger- Background noise	Chalmers St	45	50	72	59	1	Yes	Background noise from trains no evidence of works at this time.
2:00:00	20/06/2019	Chalmers St logger- Background noise	Chalmers St	45	50	72	67	9	Yes	Background noise from trains arriving and departing, as well as noise from the public
2:15:00	20/06/2019	Chalmers St logger- NDD P23 on rd 23	Chalmers St	45	50	72	74	23	Yes	Due to night shift diary the breaking sound is most likely to be associated with the removal of ceiling pannels with winch, and machinery noise coming from sucker truck on track 16.

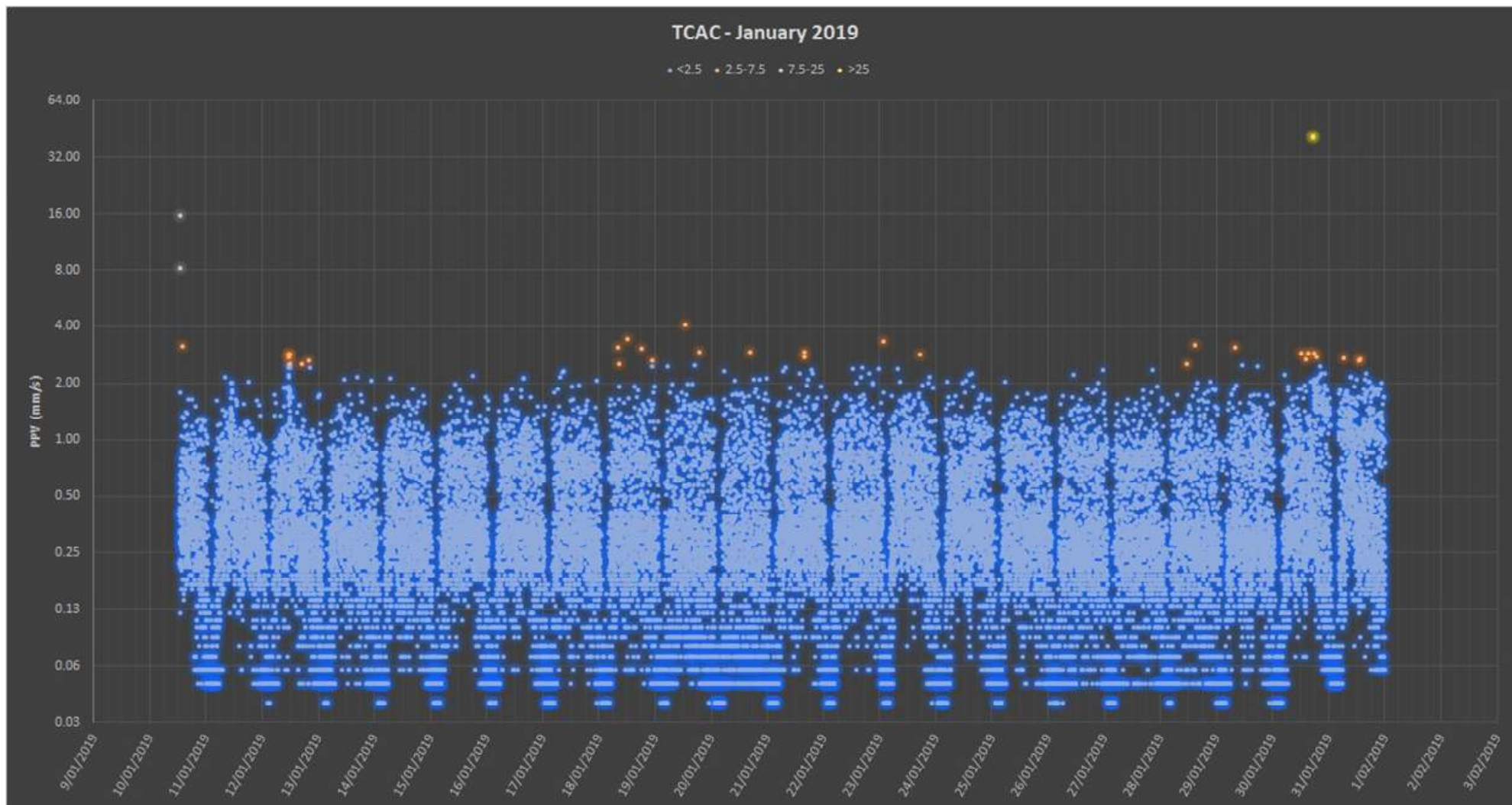
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2:15:00	21/06/2019	Chalmers St logger- Saw cutting sound and beeping of truck/machinery	Chalmers St	45	50	72	61	9	Yes	Saw cutting most likely due to NASS breaking out pit lid inside old CSA room on 20/21, beeping of truck/machinery due to drop off of hoarding on P 20/21 & 18/19 via truck on track.
1:45:00	23/06/2019	Chalmers St logger- Background noise	Chalmers St	45	50	72	57	0	Yes	Background noise from trains and intercom no signs of construction
3:15:00	24/06/2019	Chalmers St logger- Drilling, hammering, saw cutting	Chalmers St	45	50	72	59	0	Yes	No Diary entry but can here intances of drilling, hamering and cutting noises.
21:45:00	24/06/2019	Chalmers St logger- Background noise and plant moving	Chalmers St	45	50	72	59	1	Yes	No Diary entry but can only here background noise of trains and intercom.
1:00:00	25/06/2019	Chalmers St logger- Sawcutting in the distanace	Chalmers St	45	50	72	56	0	Yes	Saw cutting in the background but cannot be proven LOR works due to no Diary entry
22:15:00	25/06/2019	Chalmers St logger- Background Noise	Chalmers St	45	50	72	61	3	Yes	No evidence of construction and no Diary entry, only background noise from trains and intercom.
1:00:00	26/06/2019	Chalmers St logger- Sawcutting	Chalmers St	45	50	72	58	0	Yes	Sawcutting but cannot confirm LOR works due to know diary entry or photo proof
23:15:00	26/06/2019	Chalmers St logger- Jack hammering in background	Chalmers St	45	50	72	64	10	Yes	Sounds like jack hammering but cannot confirm due to no diary entry or photo proof
1:00:00	27/06/2019	Chalmers St logger- Sawcutting and Jack hammering	Chalmers St	45	50	72	58	2	Yes	Sawcutting and jack hammering but cannot confirm due to no diary entry or photo proof
21:45:00	27/06/2019	Chalmers St logger- Sawcutting	Chalmers St	45	50	72	64	5	Yes	Sawcutting but cannot confirm LOR works due to know diary entry or photo proof
12:45 AM	28/06/2019	Chalmers St logger- Jack hammering	Chalmers St	45	50	72	69	7	Yes	Jack hammering in background but cannot be proven as LOR work due to no diary entries or photo proof.
21:00:00	28/06/2019	Chalmers St logger- Drilling and machinery operating (beeping)	Chalmers St	45	50	72	61	2	Yes	Drilling and machinery operating but no evidence to prove LOR works due to no diary entries or photos
1:00:00	29/06/2019	Chalmers St logger- Background noise with plant moving in background	Chalmers St	45	50	72	58	0	Yes	No evidence of construction from sample taken only background noise from trains etc.
22:15:00	29/06/2019	Chalmers St logger- Jack hammering and drilling	Chalmers St	45	50	72	58	7	Yes	Jack hammering and drilling evident but no diary entries or photos to support it as LOR works.
20:30:00	30/06/2019	Chalmers St logger- Consistant drilling noise	Chalmers St	45	50	72	71	27	Yes	Possibly due to drilling for the pile cap investigation (pile driving) near the guards office or NASS drilling holes through pit lids.
01:45AM	1/07/2019	Chalmers St logger Hammering, faint sawcutting	Chalmers St	45	50	72	61		Yes	Mainly background noise from trains, drilling may be due to pile cap investigation by rapid on p18/19 or Nass drilling holes through pit lids
10:30PM	1/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	No sign of LOR works just background noise from train station
1:45AM	2/07/2019	Chalmers St logger Drilling and sawcutting	Chalmers St	45	50	72	59	16	Yes	Unlikely due to breaking out of slab on P18/19, most likely due to SLR as per site diary.
3:15AM	2/07/2019	Chalmers St logger Drilling and sawcutting	Chalmers St	45	50	72	57	11	Yes	Unlikely due to breaking out of slab on P18/19, most likely due to SLR as per site diary.
2:30AM	3/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	61	12	Yes	Rapid cutting tiles on p18/19
1:30AM	4/07/2019	Chalmers St logger Grinding, Sawcutting	Chalmers St	45	50	72	62	13	Yes	Possibly may be due to GRP Plate rectification works on p18/19
1:00AM	5/07/2019	Chalmers St loggerSawcutting	Chalmers St	45	50	72	61	10	Yes	May be due to rectification works on the GRP plates (central walk)
9:45PM	5/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	Background noise from trains etc

Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
1:45AM	6/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	70	12	Yes	No sign of LOR construction works just background noise from trains etc
2:00AM	6/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	70	12	Yes	No sign of LOR construction works just background noise from trains etc
12:30AM	7/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	64	15	Yes	No sign of LOR construction works just background noise from trains etc
1:00AM	8/07/2019	Chalmers St logger Background noise/plant moving, faint sawcutting	Chalmers St	45	50	72	60	6	Yes	Sawcutting likely associated with Rapid break out on p18/19 or commencement of facia frame on P20/21
9:00:00	9/07/2019	Internal noise compliance check with UPC against CoA E37/38	Chalmers St	56	60	75	61	5	Yes	Noise Monitoring at R22 - 1 Randle Street, Surry Hill (UPC). Bounce Hotel Demolition work – concrete breaking (jackhammering)using 5t excavator and 4.5t hammer. Only 1 LAwq15min exceeded 60dB (including 5dB penalty for annoying charecteristics).
1:15AM	9/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	61	2	Yes	p18/19 pod foundation breakout
9:15PM	9/07/2019	Chalmers St logger Grinding, Sawcutting	Chalmers St	45	50	72	61	10	Yes	NASS undertaking demo of tiles on p16/17 for future CSA pod
1:30AM	10/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	58	6	Yes	NASS undertaking demo of tiles on p16/17 for future CSA pod, p18/19 stair rectification for olyimpic tunnel
9:15PM	10/07/2019	Chalmers St logger Background noise, faint jack hammer	Chalmers St	45	50	72	65	3	Yes	Likely due to Rapid demo of the old CSA room on P20/21
2:00AM	11/07/2019	Chalmers St logger Sawcutting, Jackhammering	Chalmers St	45	50	72	62	17	Yes	Rapid removing platform bench or NASS undertaking Demo for future CSA room
9:15PM	11/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	Background noise from trains etc no sign of LOR works
1:15AM	12/07/2019	Chalmers St logger Sawcutting, Drilling	Chalmers St	45	50	72	63	14	Yes	Sawcutting and drilling likely due to NASS break out of Pit 4 on P16/17 or Demo Saw when demo works of p18/19 cleaners pod foundation were undertaken
9:15AM	12/07/2019	Chalmers St logger Jack hammering	Chalmers St	45	50	72	62	15	Yes	Evidence of hammering work but cannot confirm LOR works due to no site diary
2:45AM	13/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	60	14	Yes	Loud sawcutting, sounds close to logger, hence likely not associated with LOR
10:15PM	13/07/2019	Chalmers St loggerSawcutting, Drilling	Chalmers St	45	50	72	63	10	Yes	Evidence of sawcutting and drilling but cannot confirm LOR woks due to no site diary
1:30AM	14/07/2019	Chalmers St logger Sawcutting, Drilling	Chalmers St	45	50	72	64	21	Yes	Loud consistent Sawcutting/Drilling, close to logger, hence unlikely to be LOR works.
11:00PM	14/07/2019	Chalmers St logger Background noise, fait sawcutting	Chalmers St	45	50	72	61	1	Yes	Mainly background noise but evidence of slight sawcutting noises possibly due to NASS replacing pit on P20/21
1:30AM	15/07/2019	Chalmers St logger Sawcutting, faint drilling, and Hamering	Chalmers St	45	50	72	61	15	Yes	Rapid installing eaves on P20/21 and drilling holes to existing slab on P16/17 OR NASS replacment of Pit on P20/21
2:30AM	15/07/2019	Chalmers St logger Sawcutting, drilling	Chalmers St	45	50	72	62	15	Yes	Rapid installing eaves on P20/21 and drilling holes to existing slab on P16/17 OR NASS replacment of Pit on P20/22
1:15AM	16/07/2019	Chalmers St logger Sawcutting, Drilling	Chalmers St	45	50	72	63	17	Yes	Possibly may be due to Rapid works on P16-21 OR Pure P16/17 lead balustrades removal
3:45AM	16/07/2019	Chalmers St logger Drilling	Chalmers St	45	50	72	67	20	Yes	Heavy drilling noises due to drilling by Rapid on P16/17 and Rapid also drilling Dowel holes on P18/19

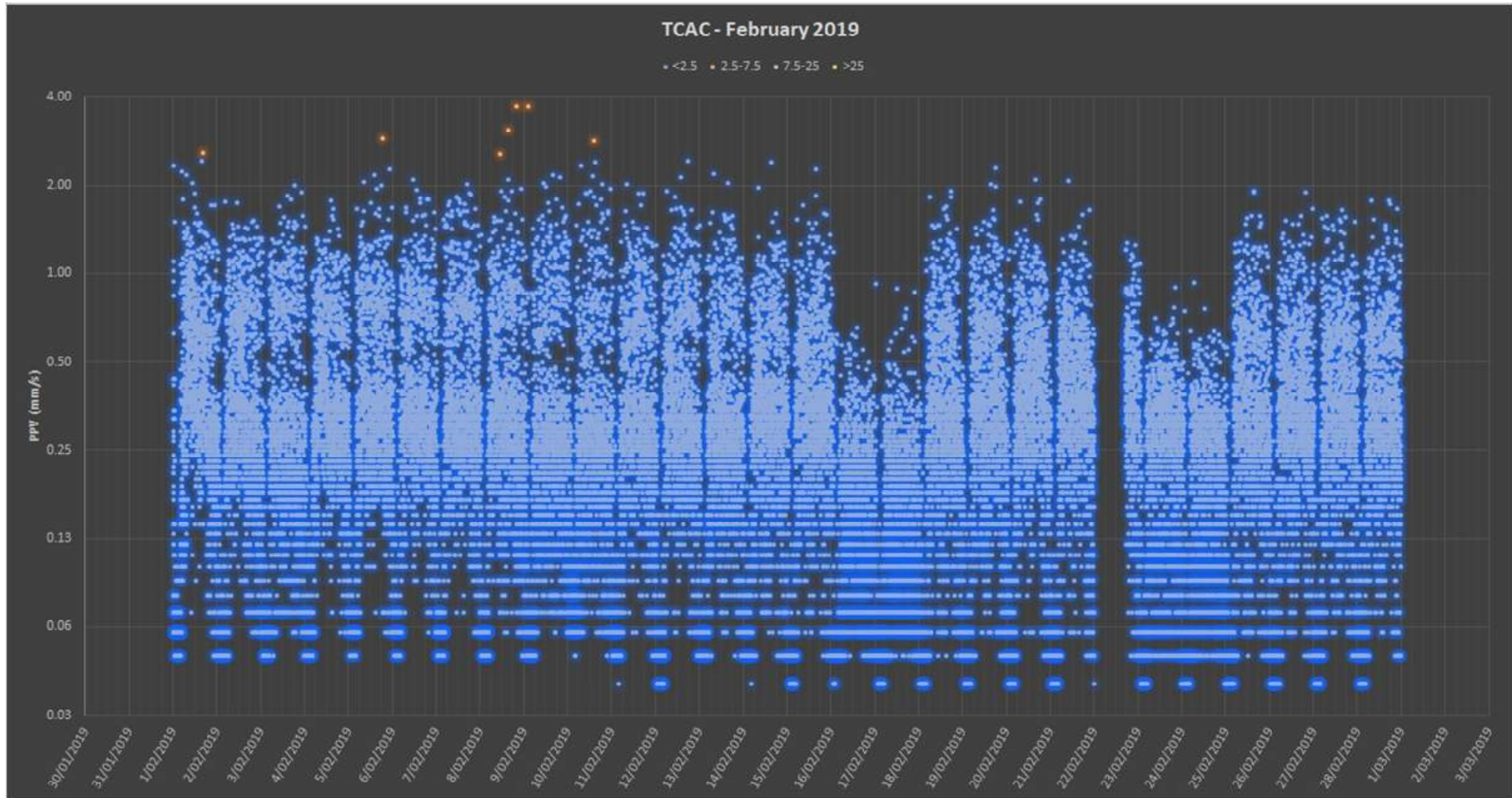
Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
12:00AM	17/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	59	1	Yes	Background noise only no sign of LOR works.
3:00AM	17/07/2019	Chalmers St logger Faint Sawcutting, Background noise	Chalmers St	45	50	72	65	1	Yes	Likely due to Rapid Demo on P20/21
11:41:00	17/07/2019	Dental Hospital – SW corner of building, office area next to stairs	Chalmers St	45	60	75	65	20	Yes	Bounce Hotel Demolition work – concrete breaking (jackhammering)using 5t excavator and 4.5t hammer. LAeq15min exceeded 60dB (plus 5dB penalty for annoying charecteristics), however < 6.5hrs.
8:30PM	18/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	No signs of LOR works
8:45PM	18/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	No signs of LOR works
12:30AM	19/07/2019	Chalmers St logger Hammering	Chalmers St	45	50	72	61	13	Yes	Likely due to Rapid defect works P20/21 and NASS P16/17 Storage deck works
1:15AM	19/07/2019	Chalmers St logger Hammering, Sawcutting	Chalmers St	45	50	72	63	15	Yes	Likely due to Rapid defect works P20/21 and NASS P16/17 Storage deck works
12:45AM	20/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	Background noise from trains etc no sign of LOR works (no site diary).
9:15PM	20/07/2019	Background noise, faint Sawcutting	Chalmers St	45	50	72	59	2	Yes	Predominatly Background noise with slight Sawcutting
2:30AM	21/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	56	0	Yes	No sign of LOR works at this time
8:15PM	21/07/2019	Background noise	Chalmers St	45	50	72	59	0	Yes	No sign of LOR works at this time
12:45AM	22/07/2019	Chalmers St logger Background noise, hammering	Chalmers St	45	50	72	60	0	Yes	Likely due to works on P16/17
11:00PM	22/07/2019	Chalmers St logger Hammering	Chalmers St	45	50	72	60	7	Yes	May be due to Rapid demolition on P20/21
1:45AM	23/07/2019	Chalmers St logger Hammering, faint sawcutting	Chalmers St	45	50	72	63	17	Yes	Either due to rapid demp works on P20/21 OR NASS storage deck works on P16/17
12:45AM	24/07/2019	Chalmers St logger Sawcutting, Hammering	Chalmers St	45	50	72	61	11	Yes	Most likely due to Rapid Demo on P16/17
12:00AM	25/07/2019	Chalmers St logger Hammering	Chalmers St	45	50	72	62	12	Yes	Rapid Jack hammering of hardened slurry on P18/19
1:00AM	25/07/2019	Chalmers St logger Hammering, Sawcutting in background	Chalmers St	45	50	72	61	14	Yes	Rapid Jack hammering of hardened slurry on P18/20, Sawcutting may be from NASS works on P16/17 storage deck and pit lid
1:15AM	26/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	59	3	Yes	Sawcutting noises likely due to be from Abyss oxy cutting scrap rail.
10:15PM	26/07/2019	Chalmers St logger Background noise, Hammering	Chalmers St	45	50	72	59	4	Yes	Slight hammering, not likely LOR works
1:00AM	27/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	57	0	Yes	Background trains etc No sign of LOR works
9:00PM	27/07/2019	Background noise, Sawcutting	Chalmers St	45	50	72	62	6	Yes	Likely due to installation of props and PFC on P16/17
3:15AM	28/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	56	3	Yes	Background noise from trains and trucks/plant no evidence of LOR work occuring
9:45PM	28/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	62	10	Yes	Majority of the sample is background noise but loud sawcutting is evident for a short period of time due to Rapid trimming of ground bed on P20/21
12:30AM	29/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	64	15	Yes	Sawcutting noise likely due to breaking out tiles of pit on P18/19
8:45PM	29/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	60	2	Yes	Background noise from train etc no sign of LOR works at this point in time

Time	Date	LOR Works	Monitoring location	RBL	Noise Management Level (CNVIS)	Scenario prediction	Measured LAeq15min	Exceedence to RBL	Compliant to EPL 21148 / SSI 15_7400	Comments
11:34:00	30/07/2019	YHA (platform 1)	YHA	49	54	72	53	4	Yes	Activities were breaking with a small excavator while breaking with a hand breaker on platform 8/9 in FT13.
12:45AM	30/07/2019	Chalmers St logger Drilling, Sawcutting	Chalmers St	45	50	72	59	9	Yes	Drilling may be due to drilling through concrete walls near Central walk/concourse, sawcutting may possibly be due to breaking out pit lid tiles on P18/19 by NASS
9:00PM	30/07/2019	Chalmers St logger Background noise	Chalmers St	45	50	72	61	3	Yes	Only background noise from trains etc no evidence of LOR works.
1:45AM	31/07/2019	Chalmers St logger Sawcutting, hammering	Chalmers St	45	50	72	61	9	Yes	Sawcutting likely due to rapid trimming the exiting slab and grouting low points on P20/21
10:00PM	31/07/2019	Chalmers St logger Sawcutting	Chalmers St	45	50	72	62	12	Yes	Sawcutting evident

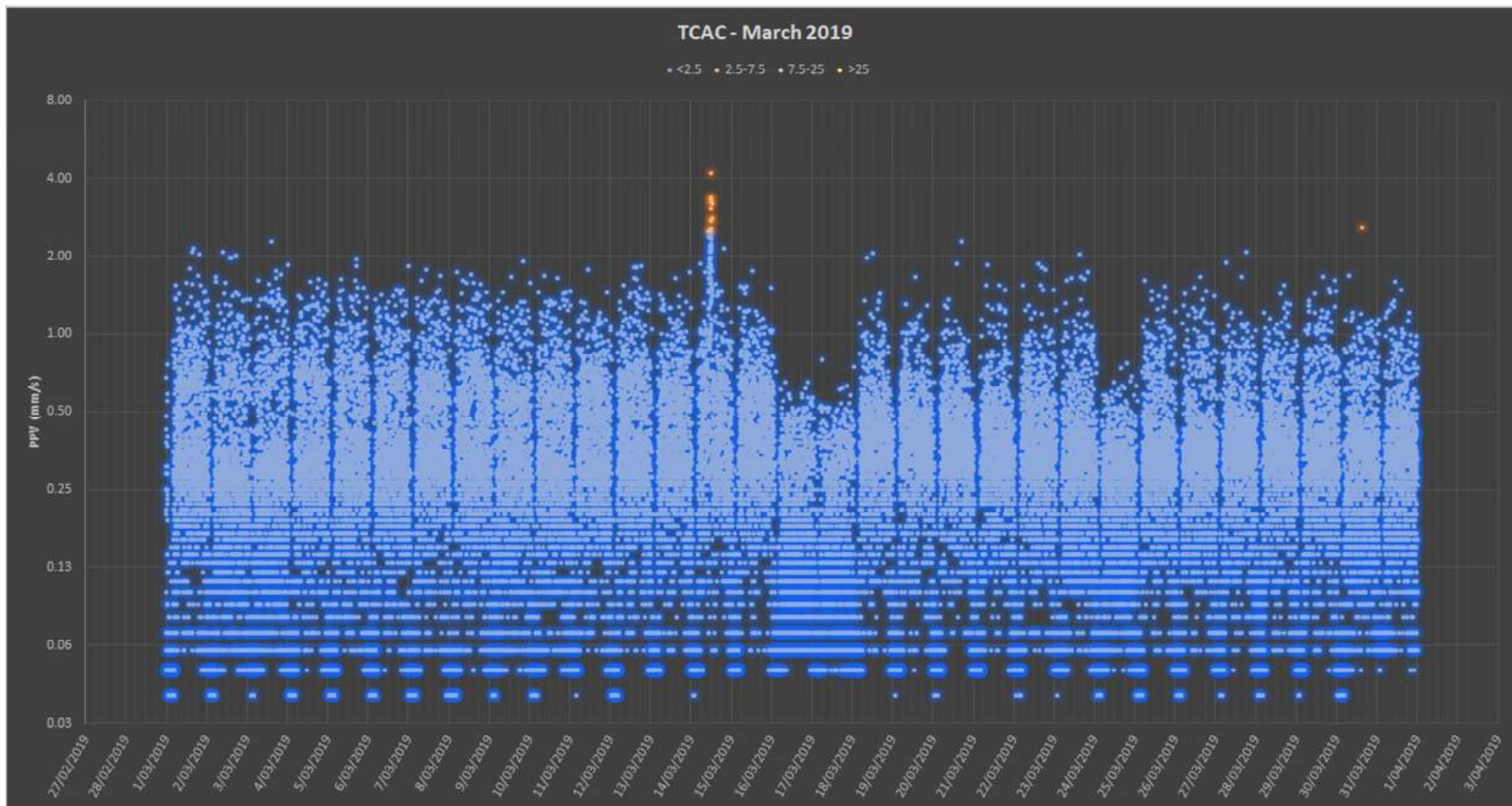
7. Appendix B – Vibration Monitoring Summary



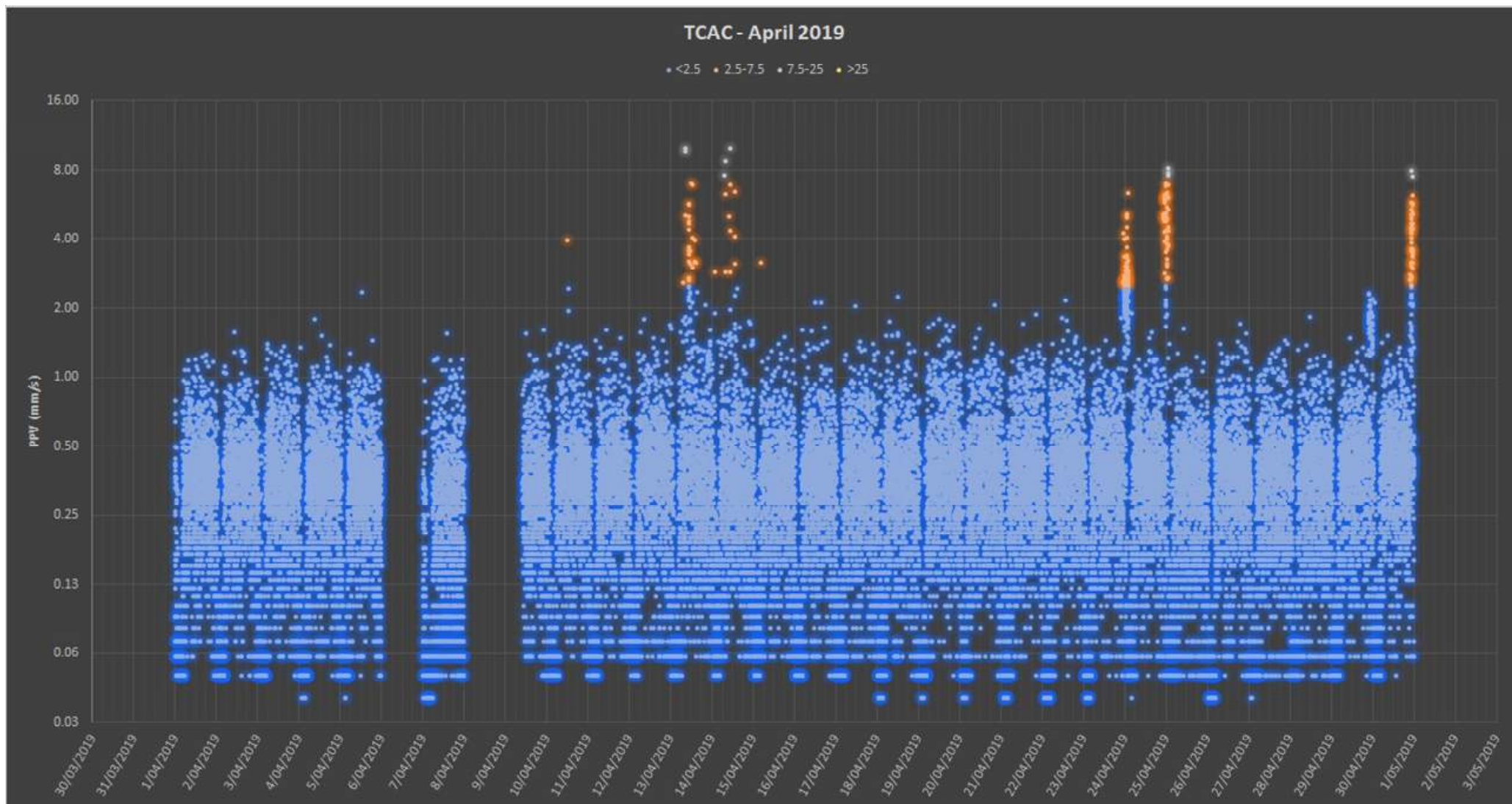
January 2019 real time data indicates a few data points above 2mm/s, most likely due to activity in close proximity to the geophone. There are two spike on the 30th of January, likely attributed to a localised bump.



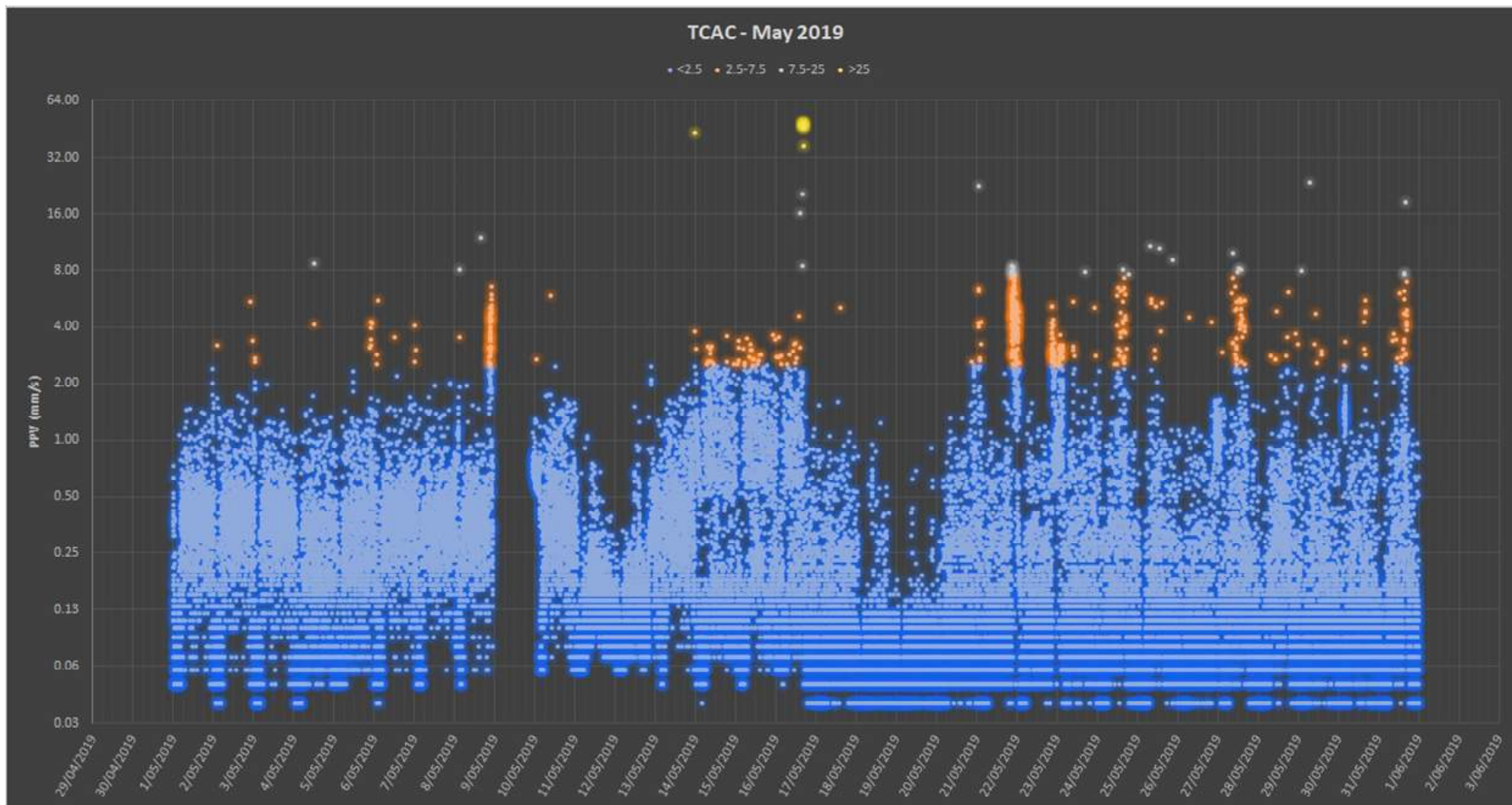
February 2019 real time data indicates all points are below 4mm/s.



March 2019 real time data indicates all points are below 8mm/s. On Thursday 14 March, data indicates that there is some site activity, however below the screening criteria.

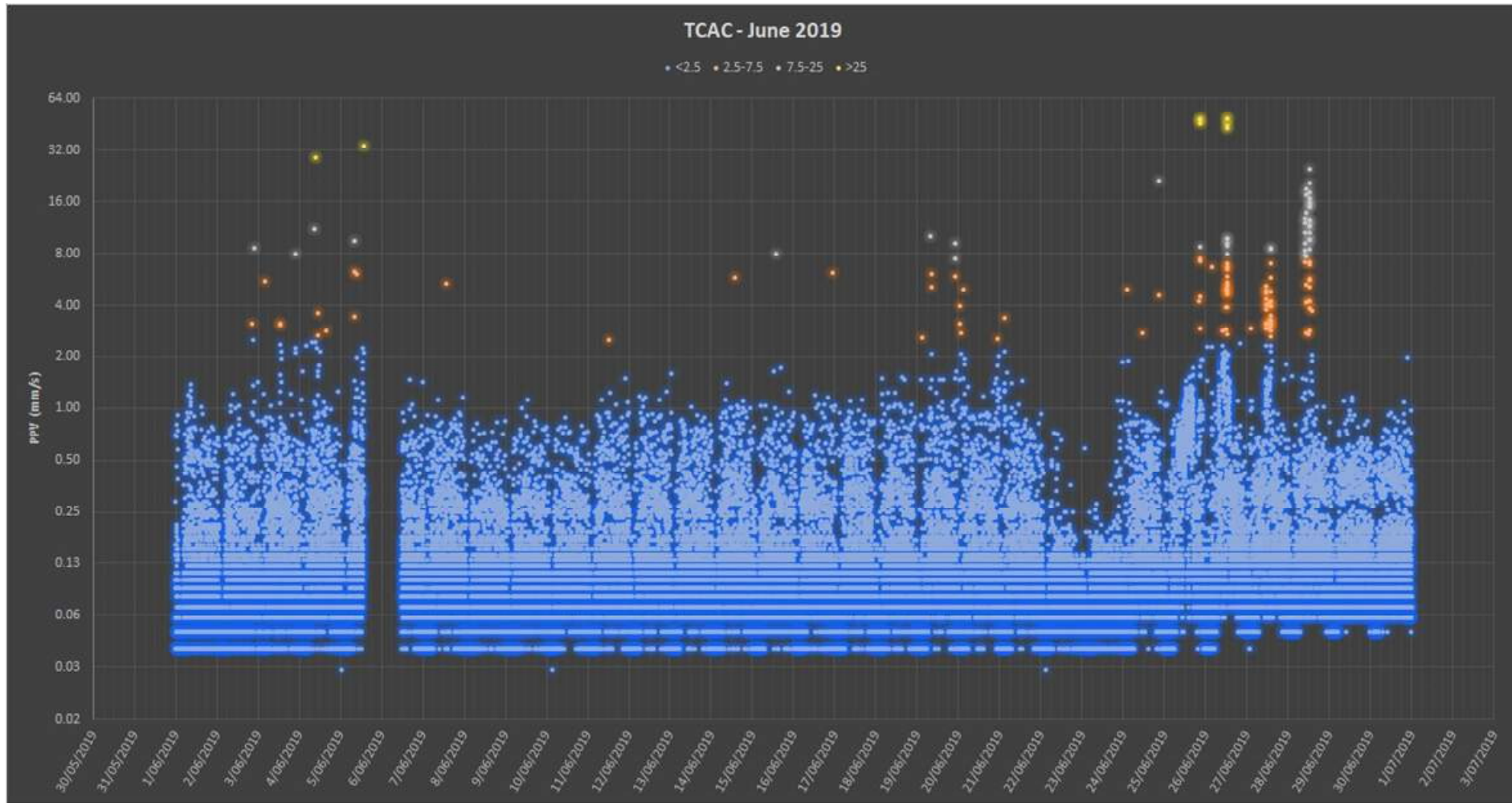


April 2019 real time data indicates a general increase in site activity on 5 occasions throughout the month. The screening criteria was exceeded on multiple occasions, however well below the conservative project vibration damage screening level for reinforced or framed structures of 25.0 mm/s. Typical works in the area consisted of hoarding installation.



May 2019 real time data indicates a general increase in site activity. Work activity consisted of stair demolition, 1st temporary bridge structure installation in front of lift, excavation of the lower Northern Concourse, king post installation, platform infills capping beam install P12, and buffer stop installation.

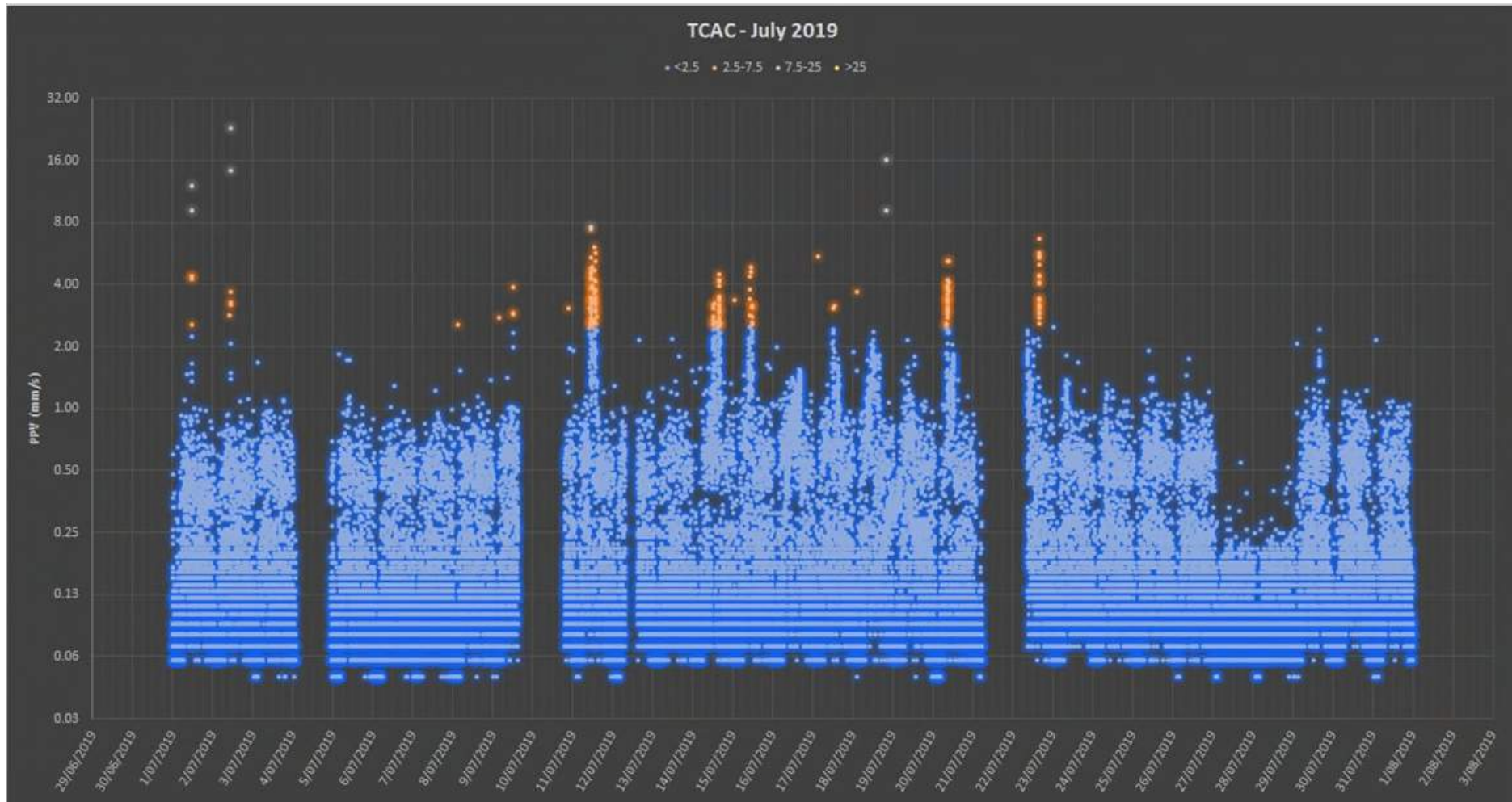
Data Point	PPV (mm/s)	Comment
2019-05-16 16:13 to 16:25	8.48-Max 48.7 (10 peaks above 45)	14t exc with 1.5t hammer breaking through slab under bridge structure for 12 minutes before works were stopped due to high vibration. All structures within the vicinity of the vibration intensive works are considered reinforced or framed structures. During this period works were monitored and the building damage management level (BS 7385) of 50mm/s at 4 Hz and above was not exceeded.



June 2019 King post install, temporary stair excavation, lift shaft excavation, demo slab and temporary deck install, pile and pile cap installation.

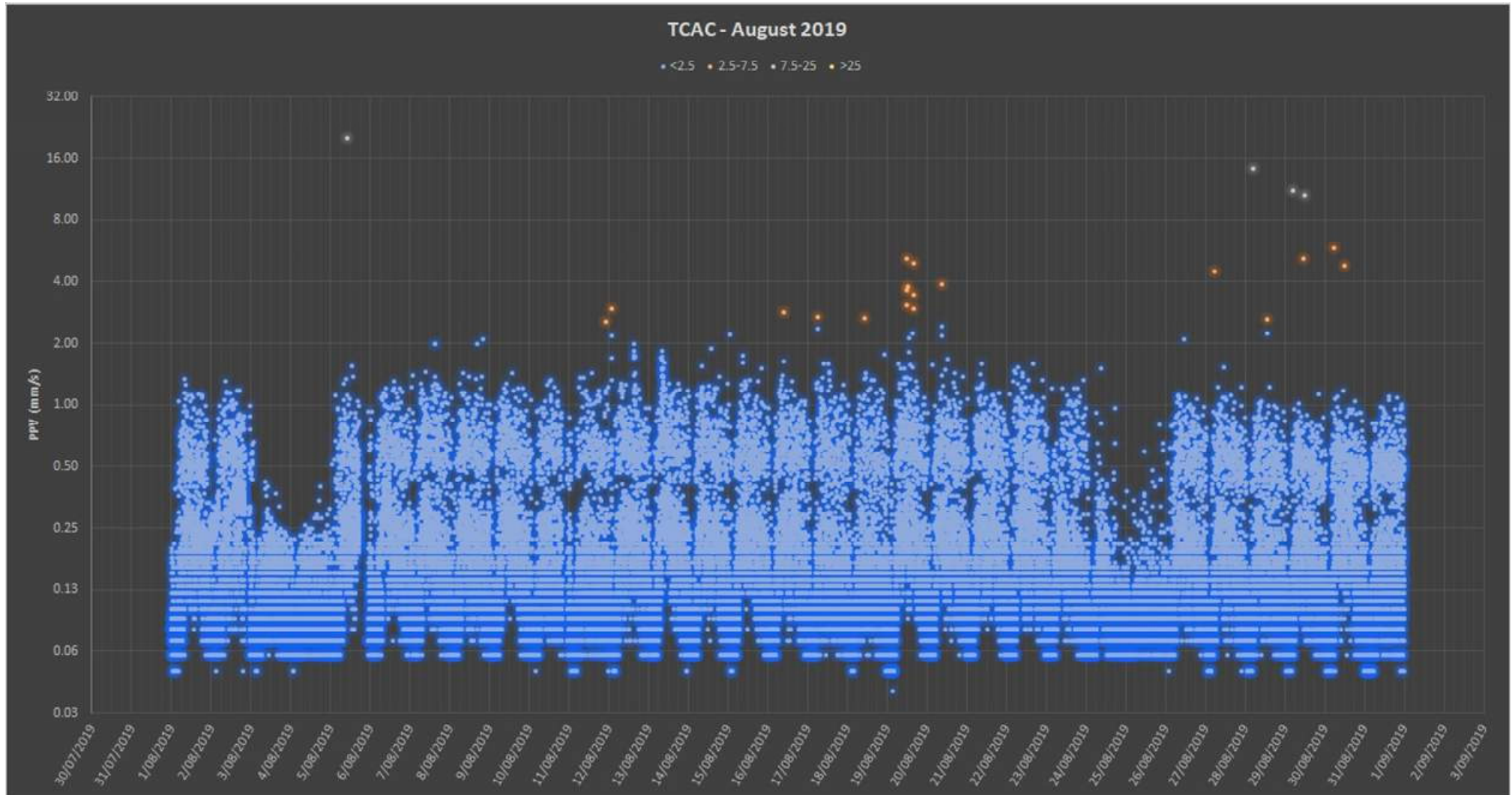
Data Point	PPV (mm/s)	Comment
2019-06-26 12:46 to 12:51	4 peaks above 43, max 48.7	Encountered mass fill concrete behind pedestrian bridge, believed to be part of train stop design. Breaking out behind pedestrian bridge restricted to between 9:30am and 2:30pm. 14t Excavator with 1.5t breaker. 4 peaks within 5mins. Works were temporarily stopped, and adjust to reduce vibration using same kit. All structures within the vicinity of the vibration intensive works are considered reinforced or framed structures. During this period works were monitored and the building damage management level (BS 7385) of 50mm/s at 4 Hz and above was not exceeded.

2019-06-25 20:30 to 20:31 and 20:39	3 peaks, Max 48.7	14t Excavator continuing breakout behind pedestrian bridge. In certain sections reached the existing staircase wall and exposed the eastern support beam for the crash deck. 4 peaks, works adjusted to reduce vibration using same kit. All structures within the vicinity of the vibration intensive works are considered reinforced or framed structures. During this period works were monitored and the building damage management level (BS 7385) of 50mm/s at 4 Hz and above was not exceeded.
2019-06-28	<16	14t Excavator continuing breakout behind pedestrian bridge. In certain sections reached the existing staircase wall and exposed the eastern support beam for the crash deck. Vibration levels increase due to proximity



July 2019- indicates data points associated with site activities as follows; soldier wall piling, excavation under bridge 2, cantilever bridge 2 install and excavation, Grand Concourse piling and footings skid Steer and 14t excavator undermining stairs at north of box and moving material underneath western platform slab.

Data Point	PPV (mm/s)	Comment
2019-07-11	<16	14t Excavator with 1.5t breaker, breaking staircase wall
2019-07-14	<16	NASS assisting with breakout within soldier pile trench and additional pothole in FT13, Continue moving material at north end of metro box under platform slab and breaking out staircase
2019-07-15	<16	6t excavator replaced 14t excavator, breaking out below cantilevered bridge
2019-07-20	<16	6t excavator replaced 14t excavator breaking out below cantilevered bridge
2019-07-22	<16	6t excavator replaced 14t excavator breaking out below cantilevered bridge



August 2019 indicates only a few point that may have been attributed to construction works. The 4 points that are between 7.5 and 25mm/s are considered localised bumps. Construction activities throughout August included, Cantilever Bridge 2 Installation and excavation including demolition of slab around lift shaft, underpinning escalator pit, piling soldier wall and capping beam, and opening of bridge 2 cantilever structure, Olympic tunnel diversion works. Bridge 3 installed end of August, early September.

