

Parkes to Narromine Project
Environmental Impact Statement
Technical Report 5: *Noise & Vibration Assessment*



**TECHNICAL REPORT 5:
Noise & Vibration Assessment**





Australian Rail Track Corporation

Inland Rail - Parkes to Narromine Noise and Vibration Assessment

June 2017

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Glossary

Absolute rail noise	The absolute rail noise refers to noise levels emitted by rail only, that is without the contribution of any other noise source.
Ambient noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise is removed. This is described using the L_{A90} descriptor. (see also Rating background level).
dB	Decibel, which is 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference pressure; used as a unit of sound.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels.
EPA	Environmental Protection Authority of New South Wales
Feasibility	Relates to engineering considerations (what can be practically built). These engineering considerations may include: <ul style="list-style-type: none"> • the inherent limitations of different techniques to reduce noise emissions from road traffic noise sources • safety issues such as restrictions on road vision • road or rail corridor site constraints such as space limitations • floodway and stormwater flow obstruction • access requirements • maintenance requirements • the suitability of building conditions for at property treatments.
Groundborne vibration	Groundborne vibration is vibration transmitted from source to receiver via the medium of the ground.
L_{A90} (Time)	The A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured. This is considered to represent the background noise e.g. L_{A90} (15 min).
L_{Aeq} (Time)	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
L_{Aeq} (15 hr)	The L_{Aeq} noise level for the period 7.00 to 22.00 hours.
L_{Aeq} (9 hr)	The L_{Aeq} noise level for the period 22.00 to 7.00 hours.
L_{Aeq} (1hr)	The highest hourly L_{Aeq} noise level during the day and night periods.
L_{A90} (period)	The sound pressure level exceeded for 90% of the measurement period.
L_{Amax}	The maximum sound level recorded during the measurement period.
L_{AFmax}	The maximum sound level recorded during the measurement period using a fast time response.
Mitigation	Reduction in severity
Noise sensitive receiver	An area or place potentially affected by noise including residential dwellings, schools, child care centres, places of worship, health care institutions and active or passive recreational areas.
OEH	The Office of Environment and Heritage (OEH). Formerly the Department of Environment and Climate Change (DECC), later known as the Department of Environment Climate Change and Water (DECCW).
Operation	Operation of trains between Melbourne and Brisbane on the completed Inland Rail alignment.

Out of Hours Works (OOHW)	(Proposal definition) Out of hours works includes times of day outside of the primary proposal construction hours. Noise sensitive receivers are expected to be more sensitive to noise during the out of hours work period as they are typically used for rest and sleep. The out of hours work period for the proposal has been defined as 6 pm to 6 am.
Peak Particle Velocity (PPV)	Current practices for assessments of the risk of structural damage to buildings use measurements of Peak Particle Velocity (PPV) in millimetres per second. The PPV is the maximum speed, in mm/s, that occurs from a vibration at the mid point between maximum displacements in each direction", the existing statement could be added after the definition to provide context of typical use.
Project	For the purposes of the noise and vibration assessment, the term 'Project' is synonymous with 'Proposal'.
Proposal	The construction and operation of the Parkes to Narromine section of Inland Rail. This is the 'Project' for the purposes of the Rail Infrastructure Noise Guideline.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period. This is the level used for assessment purposes.
Reasonable	<p>Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make such a judgement, the following should be considered:</p> <ul style="list-style-type: none"> • Noise impacts: <ul style="list-style-type: none"> - Existing and future levels, and projected changes in noise levels. - Level of amenity before the project, e.g. the number of people affected or annoyed. - Any noise performance criteria for the development, e.g. internal noise levels for certain rooms. - The amount by which the triggers are exceeded. • Noise mitigation benefits: <ul style="list-style-type: none"> - The amount of noise reduction expected, including the cumulative effectiveness of proposed mitigation measures - ideally, a noise wall/mound should be able to reduce noise levels by at least 5 dB. - The number of people protected. • Cost effectiveness of noise mitigation: <ul style="list-style-type: none"> - The total cost of mitigation measures, taking into account the physical attributes of the site, e.g. topography, geology, and the cost variation to the project given the expected benefit. - Noise mitigation costs compared with total project costs, taking into account capital and maintenance costs. - Ongoing operational and maintenance cost borne by the community, e.g. running air conditioners or mechanical ventilation. • Community views: <ul style="list-style-type: none"> - Engage with affected land users when deciding about aesthetic and other impacts of noise mitigation measures. - Determine the views of all affected land users, not just those making representations, through early community consultation. - Consider noise mitigation measures that have majority support from the affected community.
Receiver	A noise modelling term used to describe a map reference point where noise is predicted. A sensitive receiver would be a home, work place, church, school or other place where people spend time.

RMS or Vrms	Root Mean Square (velocity)
Short-term vibration	Vibration that occurs so infrequently that it does not cause structural fatigue nor does it produce resonance in the structure.
Sound Pressure Level (SPL)	20 times the logarithm to the base 10 of the ratio of the RMS sound pressure level to the reference sound pressure level of 20 micro Pascals.
Tonality	Noise containing a prominent frequency or frequencies characterised by a definite pitch.
Vibration dose value (VDV)	As defined in BS6472 – 1992, the vibration dose value is given by the fourth root of the integral of the fourth power of the frequency weighted acceleration.
Vibration	The variation of the magnitude of a quantity which is descriptive of the motion or position of a mechanical system, when the magnitude is alternately greater and smaller than some average value or reference. Vibration can be measured in terms of its displacement, velocity or acceleration. The common units for velocity are millimetres per second (mm/s).

List of abbreviations

AVTG	Assessing Vibration: A Technical Guideline (DEC 2006)
ARTC	Australian Rail Track Corporation
CNS (Rail Projects)	Construction Noise Strategy (Transport for NSW, 2012)
CNVIS	Construction Noise and Vibration Impact Statement
CoRTN	Calculation of Road Traffic Noise (UK Department of Transport Welsh Office 1988)
EPA	Environment Protection Authority
EIS	Environmental impact statement
ICNG	<i>Interim Construction Noise Guideline</i> (DECC 2009)
km/h	kilometres per hour
INP	<i>Industrial Noise Policy</i> (EPA 2000)
mm/s	millimetres per second
m/s	metres per second
NMT	Nordic Prediction Method for Train Noise (TemaNord 1996:524).
NVRF	Sydney Trains Environmental Management System Guide for Noise and Vibration from Rail Facilities
RING	<i>Rail Infrastructure Noise Guideline</i>
RNP	<i>Road Noise Policy</i> (DECCW 2011)
SEARs	Secretary's Environmental Assessment Requirements
SEL	Sound exposure level
TfNSW	Transport for NSW

Executive summary

The proposal

Australian Rail Track Corporation Ltd (ARTC) is seeking approval to construct and operate the Parkes to Narromine section of Inland Rail ('the proposal').

The proposal would involve upgrading the existing rail line between Parkes and Narromine, including new crossing loops, some track realignment and replacement of culverts. The proposal also includes a new north to west connection between Inland Rail and the Broken Hill line (Parkes north west connection). Ancillary works will include upgrading, closing or consolidating level crossings, upgrading signalling and communications, establishing new fencing or upgrading existing fencing along the rail corridor, and relocating/protecting services and utilities.

This report

This report provides an assessment of the potential noise and vibration impacts of the proposal. The scope of the assessment has been undertaken in response to the Secretary's Environmental Assessment Requirements (SEARs) issued on 8 November 2016 and guided by relevant legislation and various industry guidelines and standards.

Operational noise

Operational noise has been assessed having regard to the NSW *Rail Infrastructure Noise Guideline* (RING) and included modelled operational scenarios at current and future horizon timeframes for both the 'no-build' case that assumes the proposal does not proceed and the 'build' case that incorporates the proposal and corresponding growth in train movements.

The RING criteria for redeveloped rail lines provide trigger levels for noise at residential receivers (L_{Aeq} and L_{Amax}), as well as an increase in noise levels resulting from the project. To qualify for mitigation consideration, the proposal must both increase noise levels at a receiver and exceed the noise trigger levels set out in the guideline.

A total of 28 residential receivers were found to exceed the criteria established by the RING. These included:

- 1 receiver in Parkes
- 16 receivers in Peak Hill
- 3 receivers in Tomingley
- 8 receivers in Narromine

A number of potential mitigation options have been reviewed and may be effective, subject to being shown to be reasonable and feasible for this project. Details of potential mitigation options can be found in Section 6.1 of this report.

Operational vibration

Operational vibration impacts with consideration to structural damage are not considered likely to result from the proposal. While a proportional increase in vibration due to increased axle loads is likely, vibration is predicted to remain within acceptable levels considering the distance to nearby receivers. Additionally, improved ballast/sleeper heterogeneity and rail surface smoothness may also reduce transmitted vibration and assist to offset increases in vibration due to axle loading and speed.

Daytime vibration levels are predicted to be within the acceptable range for human comfort impacts at distances of more than 11 metres from the track, while night time levels are predicted to be acceptable at distances of more than 17 metres from the track.

The nearest vibration sensitive receiver is located approximately 45 metres from the track. Therefore, no receivers are expected to trigger the day or night criteria. Adverse reaction from operational vibration of the proposal are thus considered unlikely.

Construction noise

Noise emissions from construction have been assessed during standard construction hours and outside the standard construction hours. An assessment has been carried out in accordance with the *Interim Construction Noise Guideline* (ICNG).

- In relation to construction activities:
 - Activities such as pre-possession works (construction scenario S1), skim track reconditioning (construction scenario S2), full depth reconditioning (construction scenario S3), and drainage construction, are likely to produce the greatest level of impacts due to the closest proximity to receivers and high predicted noise activities.
- In relation to working hours and construction noise management levels:
 - The highly affected level of 75 dB(A) L_{Aeq} is not likely to be exceeded.
 - Rail line redevelopment construction activities carried out during standard hours are predicted to exceed the noise management level at receivers nearest to the construction footprint. Impacted receivers are within about 400 metres of the works and include up to 89 identified residential receiver locations. Noise levels are predicted to exceed the standard hours criteria by up to 28 dB.
 - New rail line construction works undertaken during standard construction hours at the Parkes north west connection are predicted to exceed the noise management level by up to 13 dB at eight residential receivers.
 - Brolgan road overbridge construction is predicted to exceed the noise management level by about 13 dB at one residential receiver during standard construction hours.
 - Construction activities during standard hours are not expected to exceed the noise management level at non-residential receivers including educational, child care and hospital facilities. Construction noise management levels are applicable as an internal level only when the facilities are in use.
 - Construction activities are not expected to exceed the noise management level at recreational areas when these areas are in use. Note that non-residential criteria apply only when the properties are being used.
 - Rail line redevelopment construction activities undertaken outside of standard working hours are predicted to exceed the noise management level at receivers nearest to the construction footprint. Impacted receivers are within about 700 metres of the works and include up to 228 identified residential receiver locations. Noise levels are predicted to exceed the out of hours criteria by up to 33 dB.
 - New rail line construction works undertaken outside standard construction hours at the Parkes north west connection are predicted to exceed the noise management level by up to 18 dB at 23 residential receivers.
 - Brolgan road overbridge construction is predicted to exceed the noise management level by about 18 dB at two residential receivers for works undertaken outside standard construction hours.

The noise and vibration mitigation measures detailed in Section 6.3.2 should be implemented where feasible and reasonable and all potentially affected receivers should be informed of the nature of the works, expected noise levels, duration of works and a method of contacting site management.

Construction vibration

General construction activities

In relation to vibration from general construction activities, the expected magnitude of ground vibration is not expected to be sufficient to cause damage if the equipment operates at distances greater than 18 metres from standard residential buildings or structures of similar construction.

Many heritage structures near to the proposal consist of station buildings, sidings and silos which are directly adjacent to the track and bridges that are on the actual alignment. The expected magnitude of ground vibration is not expected to be sufficient to cause damage if the equipment operates at distances greater than 35 metres from heritage buildings and structures. However, many items are potentially within this distance from the works and may therefore be affected.

The noise and vibration mitigation measures detailed in Section 6.3 should therefore be implemented to manage potential construction vibration impacts.

Piling

Vibration impacts due to piling activities have the potential to exceed structural vibration values for standard dwellings at distances of 100 metres from the activity for impact piling, 30 metres for vibratory piling and 17 metres for bored piling.

Piling activities have the potential to exceed structural vibration values for heritage structures at distances of 180 metres from the activity for impact piling, 50 metres for vibratory piling and 35 metres for bored piling.

In the event that sensitive receivers fall within these buffer distances, other methods may need to be investigated such as press-in hydraulic piling or jacked-in piling to reduce the potential for impact. These methods generally exhibit much lower vibration levels compared to impact, vibratory and bored piling.

Human comfort

Humans are capable of detecting vibration at levels well below those causing risk of damage to buildings. Based on a conservative assessment, it is possible that construction vibration for general construction activities may be perceptible at distances up to 140 metres from the works. The mitigation measures detailed in Section 6.3 should therefore be considered where feasible and reasonable to reduce the potential for impact.

1. Introduction

1.1 Overview

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor. The Inland Rail programme (Inland Rail) involves the design and construction of a new inland rail connection, about 1,700 kilometres long, between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail would enhance Australia's existing national rail network and serve the interstate freight market.

Australian Rail Track Corporation Ltd (ARTC) has sought approval to construct and operate the proposal.

The proposal requires approval from the NSW Minister for Planning under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impact statement (EIS) for the proposal. The EIS has been prepared to accompany the application for approval of the proposal, and address the environmental assessment requirements of the Secretary of the Department of Planning and Environment (the SEARs), issued on 8 November 2016 and the terms of the assessment bilateral agreement between the Commonwealth and the State of New South Wales under the EPBC Act.

1.2 The proposal

1.2.1 Location

The proposal is generally located in the existing rail corridor between the towns of Parkes and Narromine, via Peak Hill. In addition, a new connection to the Broken Hill rail line ('the Parkes north west connection') is proposed outside the existing rail corridor at the southern end of the proposal site near Parkes. The location of the proposal is shown in Figure 1-1.

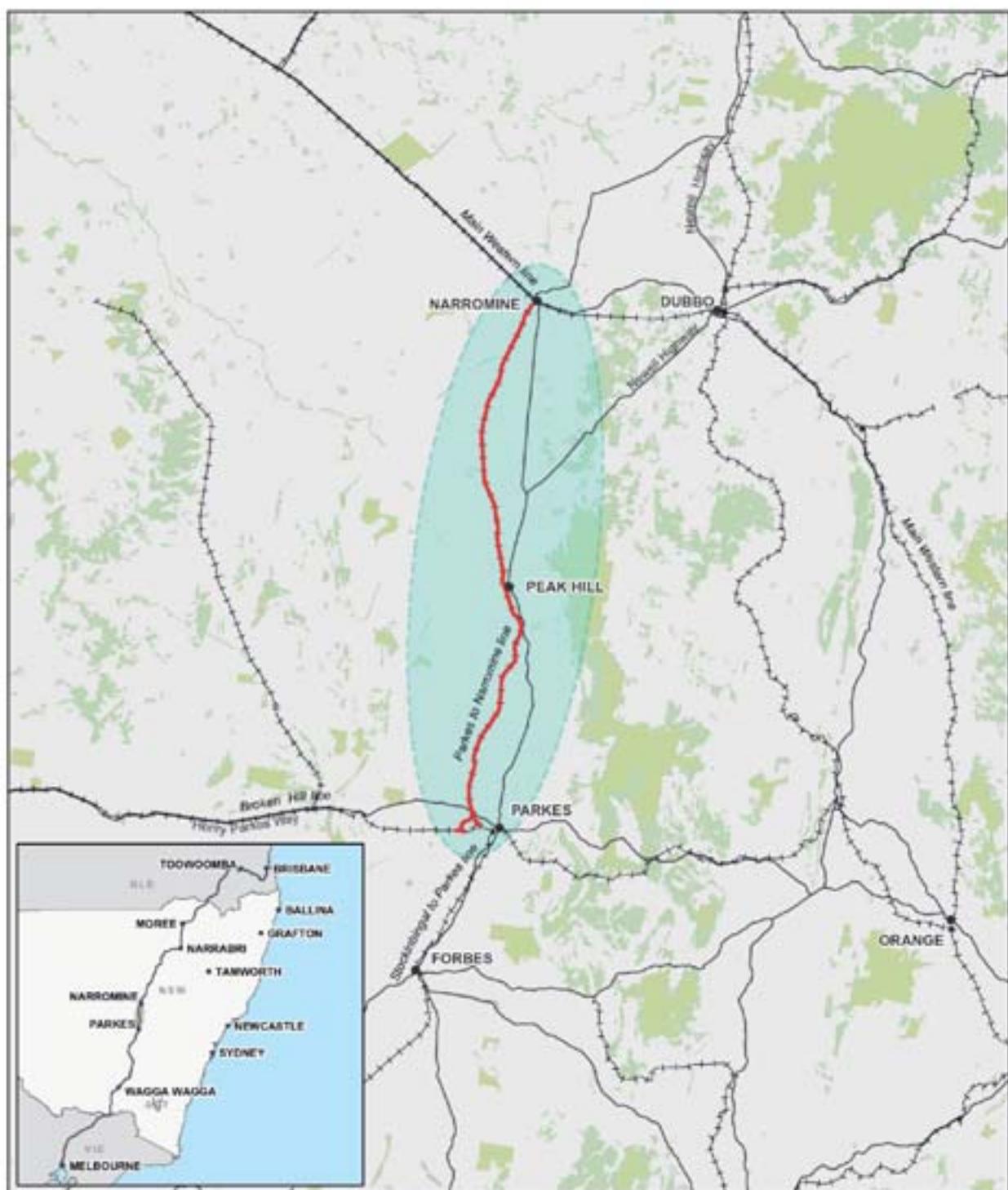
1.2.2 Key features

The key features of the proposal involve:

- Upgrading the track, track formation, and culverts within the existing rail corridor for a distance of 106 kilometres between Parkes and Narromine.
- Realigning the track where required within the existing rail corridor to minimise the radius of tight curves.
- Providing three new crossing loops within the existing rail corridor, at Goonumbla, Peak Hill, and Timjelly.
- Providing a new 5.3 kilometre long rail connection to the Broken Hill Line to the west of Parkes ('the Parkes north west connection'), including a road bridge over the existing rail corridor at Brolgan Road ('the Brolgan Road overbridge').

The key features of the proposal are shown in Figure 1-2.

Ancillary work would include works to level crossings, signalling and communications, signage and fencing, and services and utilities.



LEGEND

- Proposal site
- Proposal location
- Rail lines
- Main roads

Paper Size A4
0 5 10 20 30
Kilometres
Map Projected: Transverse Mercator
Northing Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 55



Australian Rail Track Corporation
Inland Rail Track Alignment

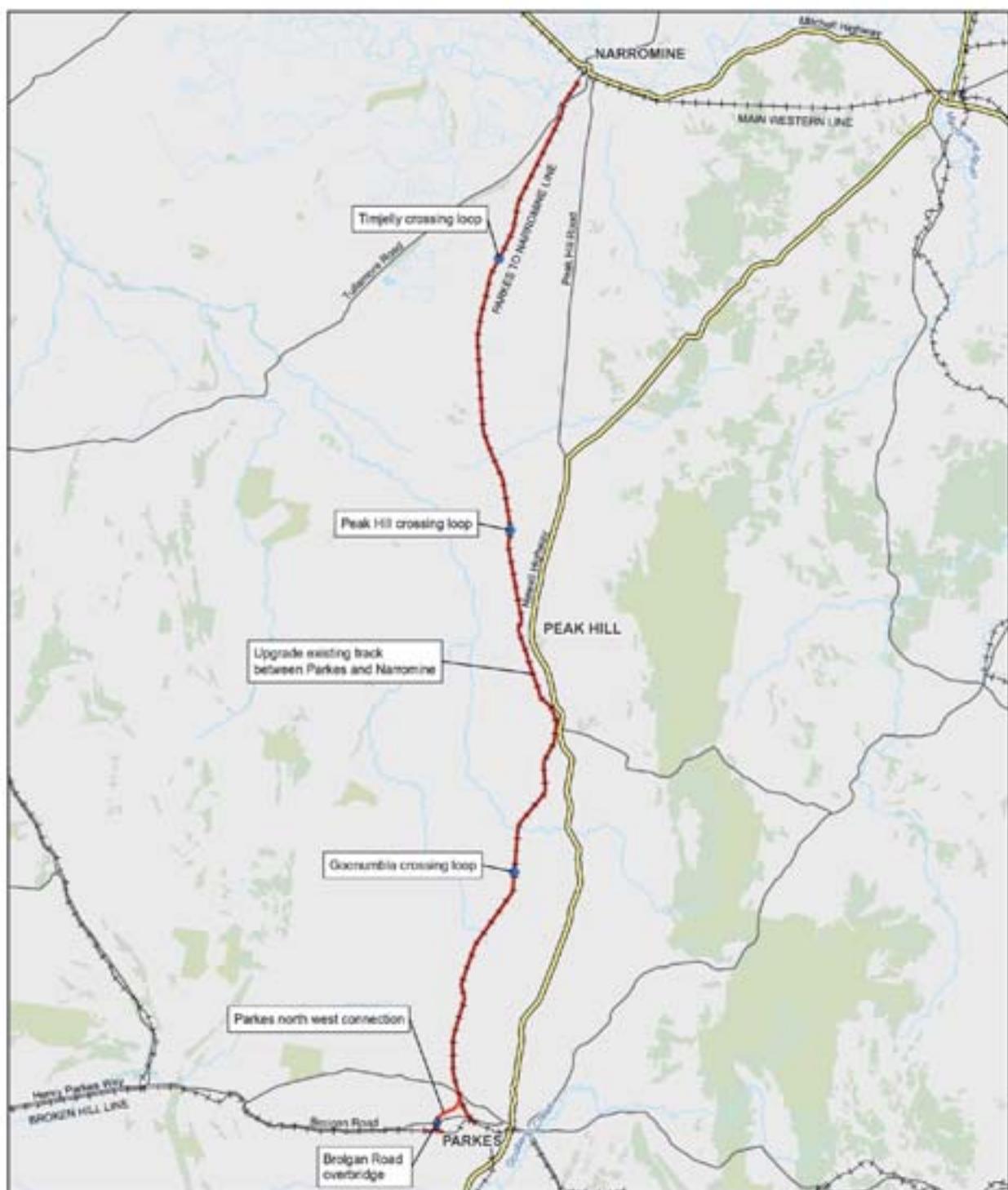
Job Number | 2217016
Revision | 0
Date | 30 Nov 2016

Location of the proposal

Figure 1-1

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Data source: Commonwealth of Australia (Commonwealth Australia), 1996, Topographic Data Series 1, 2006.



LEGEND

- ◆ New bridge
- Highway
- Crossing loop
- Road
- The proposal
- Railway

Paper Size A4
Scale 1:250,000
0 2.5 5 10 10 Kilometres
Map Projected Transverse Mercator
Northing Datum: 1954-1994
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail Track Alignment

Job Number | 2217016
Revision | 0
Date | 19 Jul 2017

Key features of the proposal

Figure 1-2

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Data source: Commonwealth of Australia (Geoscience Australia), 1996; Topographic Data Series 2, 2006.

Further information on the proposal is provided in the EIS.

1.2.1 Timing

Subject to approval of the proposal, construction is planned to start in early to mid 2018, and is expected to take about 18 months. Existing train operations along the Parkes to Narromine line would continue prior to, during, and following construction. Inland Rail as a whole would be operational once all 13 sections are complete, which is estimated to be in 2025.

1.2.2 Operation

Prior to the opening of Inland Rail as a whole, the proposal would be used by existing rail traffic, which includes trains carrying grain and ore at an average rate of about four trains per day. It is estimated that the operation of Inland Rail would involve an annual average of about 8.5 trains per day in 2025, increasing to 15 trains per day in 2040. The trains would be a mix of grain, intermodal (freight), and other general transport trains.

1.3 Purpose and scope of this report

The purpose of this report is to assess potential noise and vibration issues from the operation and construction of the proposal, and where required, identify feasible and reasonable mitigation measures.

This noise and vibration assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs). Table 1-1 outlines the requirements relevant to this assessment.

Table 1-1 Relevant SEARs

Requirements for Noise and Vibration	
Noise and vibration – Amenity Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity. Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.	<ol style="list-style-type: none">1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers including small businesses, and include consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (for example, low frequency noise).2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.
Noise and vibration – Structural Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings, items including Aboriginal places and environmental heritage, and nearby road infrastructure. Increases in noise emissions and vibration affecting environmental heritage as defined in the Heritage Act 1977 during operation of the project are effectively managed.	<ol style="list-style-type: none">1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage).2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.

The scope of the noise and vibration assessment involved:

- Identification of key noise and vibration sensitive receivers.
- Measurement and presentation of existing noise and vibration levels in the subject area.
- Identification of the likely principal noise sources during operation of the proposal.
- Identification and derivation of the applicable construction noise and vibration criteria from relevant guidelines and existing background noise levels.
- Identification of applicable operational rail noise criteria.
- Assessment of the potential construction noise and vibration impacts of the proposal on the surrounding environment based on indicative construction methodology and equipment.
- Assessment of the potential operational noise and vibration impacts of the proposal on the surrounding environment.
- Identification and discussion of potential noise and vibration mitigation measures with consideration to the proposal noise and vibration criteria.

Operational road traffic noise was not assessed for the proposed Brogian Road overbridge as it is anticipated that road traffic volumes and associated road traffic noise levels would remain unchanged due to the proposal.

1.4 Study area

The study area subject to this assessment is the rail corridor and adjacent land between Parkes and Narromine. The study area encompasses the operational and construction footprints, including areas which could be indirectly impacted by the proposal. The study area including sensitive receiver locations is shown in Appendix C and described further in Section 2.2.

1.5 Structure of this report

The structure of the report is provided in Table 1-2.

Table 1-2 Report structure

Section	Details
1	Provides an introduction to the report
2	Describes the existing ambient and background noise environment
3	Details the relevant noise and vibration criteria
4	Describes the operational rail noise and vibration assessment
5	Describes the construction noise and vibration assessment
6	Describes the mitigation measures
7	The report conclusion summarising key outcomes from the assessment

2. Existing environment

2.1 Existing operations

Parkes is located on the Broken Hill line, which forms part of the trans-continental railway from Sydney to Perth. The Broken Hill line extends from the Main Western line at Orange, travels to Broken Hill, and then to Adelaide. The Broken Hill line carries transcontinental freight and is used by the Indian Pacific passenger train, and a weekly passenger train.

Narromine is located on the Main Western line. Narromine Station is now closed to passenger services.

The Parkes to Narromine line forms a cross-country link between the Main Western and the Broken Hill lines. The Parkes to Narromine line, which connects to the Broken Hill line at Goobang Junction (about 3.5 kilometres west of Parkes Station), is closed to passenger services and serves freight only.

Physical characteristics

The track between Parkes and Narromine was originally constructed for light traffic but while it has been re-ballasted and maintained over time, no significant improvements have been made to the track formation. Sections of track pass through low lying, flood prone areas and the maintenance access track is not continuous and can be impassable by two wheel drive vehicles following wet weather.

The rail track was built with minimal earthworks and includes a number of 1:100 grades in short lengths between Peak Hill and Parkes. In some locations, the original timber sleepers have been replaced with steel, new ballast has been laid, and damaged culverts replaced.

There are about 16 sidings between Parkes and Narromine that provide access to and from the main line for private operations.

Existing use

The Parkes to Narromine line is used by minerals, general freight and grain trains at an average rate of two to three trains per day. These trains carry about two million tonnes of grain per year. The line has a capacity for trains up to lengths of 1,800 metres, however typical existing scheduled trains are between 400 and 600 metres long¹. Train speeds are limited to a maximum of 100 km/h, with local speed restrictions due to limitations associated with the existing track. Train speeds are described further in Section 4.1.4.

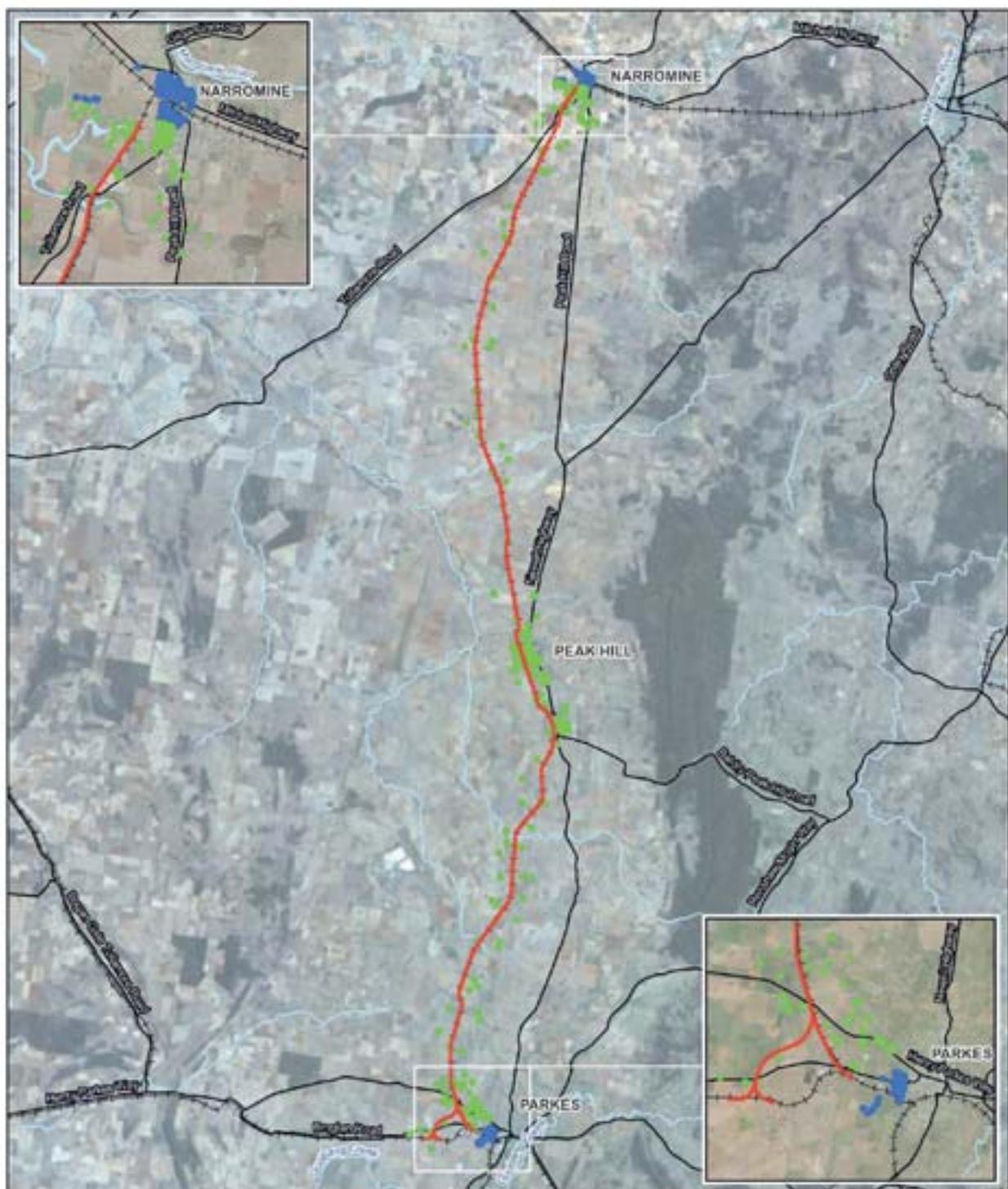
2.2 Location of the study area

The area surrounding the proposal consists of open space, rural land, residential land and commercial land. The proposal passes through several small rural towns.

For the operational rail noise assessment, the study area was defined as the area that extends about 2 kilometres either side of the rail corridor and bounded by the extent of works. Noise and vibration sensitive receiver receivers were identified within the operational assessment study area and are shown in Figure 2-1.

For the construction noise and vibration assessment study area, a 2 kilometre buffer from the proposal in all directions was used to identify sensitive receiver locations. The construction assessment study area therefore extends beyond the northern end of the proposal to include some receiver locations within Narromine and at the southern end includes some receivers within Parkes. The construction noise and vibration study area is shown in Figure 2-1.

¹ ARTC Master Train Plan, NSW HVR 600 Parkes-Gulgong-Werris Creek / NSW HVR 600 Werris Creek-Gulgong-Parkes, effective 12th June 2016



LEGEND

- Construction receiver
- Construction and operational receiver
- The proposal
- Road
- +--- Railway
- Watercourse

Paper Size A4
0 2.5 5 10 15 Kilometres

Map Projected: The Geocentric Mercator
Northing Datum: 1004 1994
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narromine

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Construction and operational
sensitive receiver locations

Figure 2-1

G 20-17916-0-0 Major Deliverable P.Dwg.R001-201701-E-N008_PDN_Construction_Operational_2_Section 2_GHD Group 24 Horizons Drive, Narrabri NSW 2350 1312 4376 0000 F 012 4375 0100 & info@ghd.com.au www.ghd.com.au
© 2014. While every care has been taken to prepare this map, GHD, Commonwealth of Australia (Geoscience Australia) and GPT make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose or of its content except that it is only used for any purpose.

Data source: LPI - Imagery, 2012. Commonwealth of Australia (Geoscience Australia) 2010 Topographic Data Series 3, 2000. Created by Inveron, Inverley, Kyabram.

The noise and vibration assessment study areas are able to be reduced where receivers are not present for a given section of the proposal, but may also need to be extended where impacts may occur beyond two kilometres, for instance where construction traffic may extend beyond these bounds.

The extent of both the operational and construction assessment study areas have been reviewed and confirmed following noise and vibration modelling to ensure that they are sufficient to include all potentially affected receiver locations.

2.3 Identification of sensitive receivers

Within the study area, residential sensitive receivers include dwellings located within towns such as Parkes, Peak Hill and Narromine, or are scattered across large areas between the major towns. Noise sensitive receiver locations were identified using aerial imagery and geospatial information.

For the operational noise and vibration assessment (section 4), 662 residential receivers were identified within the operational assessment study area. 14 non residential noise receivers were also identified including: two places of worship, three educational facilities, one medical facility, six active and two passive recreation areas. For the operational noise assessment all residential receivers will have their own specific noise criteria based on their exposure to noise from the proposal and existing exposure to rail noise. This is discussed in more detail in Section 3.1. The receivers are individually identified in Appendix C.

Non-residential receivers including schools, places of worship (churches) and outdoor recreation areas are summarised in Table 2-1.

For the construction noise and vibration assessment (section 5), a total of 1,122 residential receivers and 14 non residential receivers were identified. This differs from the operational noise assessment because some construction activities have the potential to impact a wider area than rail operation. The non residential noise receivers are the same as those identified within the operational assessment study area. A number of commercial and industrial facilities are also located adjacent to the rail corridor and are subject to assessment for construction noise only.

Identification of receivers in this assessment was based principally on inspection of aerial imagery. Where receivers have been identified as qualifying for noise mitigation from this proposal, a more detailed review will be undertaken when further information is available to verify the number of receivers affected and which should be considered for mitigation. Similarly, for non-residential receivers, qualification for noise mitigation will be dependent upon the results of façade testing to determine if the internal noise criteria are exceeded.

Table 2-1 Non-residential receivers

Receiver ID	Description	Receiver Type	Easting	Northing
P2N_REA_0001	Peak hill war memorial pool	Open Space- Active	611346	6378430
P2N_REA_0002	Tennis courts	Open Space- Active	611300	6378535
P2N_REA_0003	Peak hill paceway	Open Space- Active	610416	6378088
P2N_REA_0004	Peak hill showground	Open Space- Active	610279	6377995
P2N_REA_0005	Bowling greens	Open Space- Active	616569	6432186
P2N_REA_0006	Peak hill bowling club	Open Space- Active	611481	6378802
P2N_REA_0007	Lindner oval	Open Space- Active	611356	6378274
P2N REP_0001	Memorial park	Open Space- Passive	611454	6378883
P2N_EDU_0001	St Joseph's school	School	611919	6377926
P2N_EDU_0002	Peak hill central school	School	611638	6378217
P2N_EDU_0003	Peak hill central school	School	611742	6378144
P2N_HOS_0001	Narramine hospital and community health	Hospital Ward	616743	6431996
P2N_WOR_0001	Place of worship	Worship	611631	6378275
P2N_WOR_0001	Catholic church	Worship	611854	6378051

2.4 Baseline monitoring

2.4.1 Unattended noise monitoring

Baseline unattended noise monitoring took place at nine residential locations and eight locations within the rail corridor between 2 September 2015 and 6 April 2016 in accordance with procedures in the *Industrial Noise Policy* (INP) guideline. Logger locations were selected to capture noise characteristics at a variety of locations throughout the study area. Selection considerations included land topography, distance from rail activities and contribution from other noise activities, such as road noise. The logger locations used for the assessment were considered to be representative of the existing background and ambient noise environment in the study area and can be seen in Appendix B.

Noise monitoring locations were constrained to locations where access was possible on the day of deployment. Access constraints included train schedules precluding track access by HiRail. Security against theft and vandalism were also important considerations when choosing noise monitoring locations.

The objectives of the monitoring were to measure the existing background noise levels in the areas surrounding the proposal site and to measure rail noise from train pass-bys.

The noise loggers were programmed to accumulate L_{A90} , L_{A10} , L_{Aeq} and L_{Amax} noise descriptors continuously over sampling periods of 15 minutes for the entire monitoring period. Two attended noise measurements were also conducted at each logger location for 15 minute durations in order to identify ambient noise sources and validate logger data. Instantaneous noise levels for operator-identified noise sources were observed and noted during the measurements.

Several of the noise loggers were programmed to record the noise descriptors at more frequent time intervals. The more frequent time intervals were used to enable recording of individual train pass-bys and for determination of the relevant rail noise descriptors.

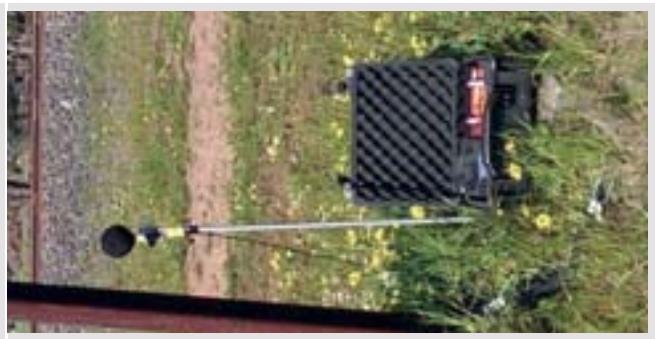
Prior to deployment, a calibration check was performed on the noise monitoring equipment using a Brüel and Kjaer Type 4231 sound level calibrator (serial number 2542101). At completion of the measurements, the equipment was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The noise loggers were found to be within the acceptable tolerance of ± 0.5 dB(A).

The data collected by the loggers was downloaded and analysed, and any invalid data removed. Invalid data generally refers to periods of time where average wind speeds were greater than 5 metre per second, or when rainfall occurred in accordance with the INP. Concurrent half hourly weather data was sourced from the Bureau of Meteorology's (BoM) Dubbo automatic weather station (AWS) and Parkes automatic weather station to identify any periods of weather which may have affected the monitoring results.

All sampling activities were undertaken with consideration to the specifications outlined in AS 1055 (1997) *Acoustics - Description and Measurement of Environmental Noise* and the *Industrial Noise Policy* (INP). Table 2-2 provides details of the noise loggers utilised for unattended monitoring.

Table 2-2 Unattended noise logger locations and details

Noise Logger	L01P2N	L02P2N	L03P2N	L04P2N	L05P2N
Location	80 Backwater Rd, Narramine, approximate chainage 555.4 km	53 Wright St, Narramine, approximate chainage 554.5 km	Approximate chainage 546.6 km	380 Tullamore Rd, Narramine, approximate chainage 553.1 km	Approximate chainage 528.5 km
Equipment type (serial)	SVAN 955 (27621)	SVAN 955 (27615)	SVAN 955 (27623)	SVAN 955 (27625)	SVAN 955 (27622)
Measurement started	21/3/2016, 18:15	21/3/2016, 19.00	2/9/2015, 13:45	21/3/2016, 17:15	2/9/2015, 16.00
Measurement ceased	6/4/2016, 11:30	6/4/2016, 11:45	16/9/2015, 12:20	6/4/2016, 11:20	16/9/2015, 12:30
Frequency weighting	A	A	A	A	A
Time Response	Fast	Fast	Fast	Fast	Fast
Photo					



Noise Logger	L06P2N	L07P2N	L08P2N	L09P2N	L10P2N
Location	Approximate chainage 515.6 km	37 Station Lane, Peak Hill, approximate chainage 498.3 km	1 Jackson St, Peak Hill, approximate chainage 497.4 km	60 Trewilga Rd, Peak Hill, approximate chainage 490.8 km	Chainage 486 km, off Mickibri Rd
Equipment type (serial)	SVAN 955 (36821)	Rion NL-21 (00852196)	SVAN 955 (27623)	SVAN 955 (27612)	SVAN 955 (27624)
Measurement started	2/9/2015, 15:30	22/3/2016, 18:15	22/3/2016, 17:30	22/3/2016, 17:00	3/9/2015, 9:15
Measurement ceased	16/9/2015, 13:00	5/4/2016, 13:30	5/4/2016, 14:15	5/4/2016, 15:15	16/9/2015, 14:00
Frequency weighting	A	A	A	A	A
Time Response	Fast	Fast	Fast	Fast	Fast
Photo					







Noise Logger	L11P2N	L12P2N	L13P2N	L14P2N	L15P2N
Location	Approximate chainage 478.150 km	Approximate chainage 468.500 km	503 Nannardine Ln, Parkes, approximate chainage 457.7 km	Candobolin Rd, Parkes, approximate chainage 452.5 km	Approximate chainage 454.7 km
Equipment type (serial)	SVAN 977 (36819)	SVAN 977 (36820)	SVAN 977 (36820)	SVAN 955 (27613)	SVAN 955 (27625)
Measurement started	3/9/2015, 15:30	3/9/2015, 15:15	22/3/2016, 15:30	22/3/2016, 14:15	3/9/2015, 13:45
Measurement ceased	16/9/2015, 15:15	16/9/2015, 15:45	5/4/2016, 11:15	5/4/2016, 13:45	16/9/2015, 16:45
Frequency weighting	A	A	A	A	A
Time Response	Fast	Fast	Fast	Fast	Fast
Photo					

Noise Logger	L16P2N	L17P2N
Location	Goobang Junction, Parkes, approximate chainage 449 km	Approximate chainage 457 km, Parkes
Equipment type (serial)	SVAN 977 (36821)	SVAN 955 (27624)
Measurement started	22/3/2016, 11.00	22/3/2016, 12:05
Measurement ceased	5/4/2016, 11.00	05/04/2016, 10:45
Frequency weighting	A	A
Time Response	Fast	Fast
Photo		
		

2.4.2 Attended noise monitoring

Baseline attended noise measurements were conducted at the above monitoring locations to supplement the unattended noise monitoring data and assist with noise source identification. Attended noise measurements were conducted between 21 March 2016 and 6 April 2016 using a B&K 2250 Sound Level Meter (SLM). This SLM is capable of measuring continuous sound pressure levels and is able to record L_{A90} , L_{A10} , L_{Aeq} and the maximum sound level recorded during the measurement period (L_{Amax}) noise descriptors.

Prior to deployment, the meter was calibrated using a B&K Type 4231 Class 1 acoustic calibrator (serial number 2542101) with a sound pressure level of 94 dB at one kilohertz. Calibration was checked prior to the commencement and at completion of the measurements. The difference was less than the acceptable tolerance of +/- 0.5 dB.

All sampling activities were undertaken with consideration to the specifications outlined in AS1055 (1997) *Acoustics - Description and Measurement of Environmental Noise* and the NSW *Industrial Noise Policy* (EPA, 2000).

2.4.3 Ground vibration monitoring

Long term vibration measurements were undertaken at one monitoring location in the vicinity of the proposal as shown in Appendix B. Vibration measurements were conducted using a Instantel Minimate Plus (serial number BE12721) vibration logger with tri-axial geophones to monitor ground vibration peak particle velocity (PPV) in each axial direction. The Instantel Minimate Plus has a range of 31.7 millimetres per second and a sample rate of 2048 samples per second. The Minimate unit has an inbuilt data logger, downloadable to PC where analysis can be performed using Blastware software. The vibration monitor was set up approximately 15 metres from the nearest track. Details of the vibration logger are provided in Table 2-3.

Table 2-3 Unattended ground vibration logger details

Vibration Logger	V01P2N
Location	Approximate chainage 450 km, Parkes
Model (Serial Number)	Instantel Minimate (BE12721)
Photo	

2.4.4 Ambient noise monitoring results

Unattended monitoring

A summary of the calculated rating background level (RBL) $L_{A90(\text{period})}$ and $L_{Aeq(\text{period})}$ noise monitoring results are shown in Table 2-4. The RBL represents the existing background noise environment in the area of the proposal. Detailed noise monitoring charts are provided in Appendix A.

Table 2-4 RBL $L_{A90(\text{period})}$ and $L_{Aeq(\text{period})}$ noise monitoring results, dB(A)^{2,3}

Location	L_{A90} RBL noise levels			L_{Aeq} ambient noise levels		
	Day	Evening	Night	Day	Evening	Night
L01P2N	27	29	25	53	49	49
L02P2N	29	27	27	48	44	43
L03P2N	26	30	20	53	49	51
L04P2N	29	30	32	51	52	45
L05P2N	20	20	19	53	47	48
L06P2N	22	19	18	56	44	53
L07P2N	26	26	21	58	45	42
L08P2N	27	24	20	49	44	42
L09P2N	28	23	20	47	48	46
L10P2N	22	22	21	56	56	54
L11P2N	24	21	18	52	51	52
L12P2N	25	27	20	57	50	51
L13P2N	25	19	18	53	49	50
L14P2N	27	18	18	48	49	46
L15P2N	23	20	20	59	54	50
L16P2N	30	31	28	53	54	55
L17P2N	25	20	20	59	56	55

² The NSW INP states that where the RBL is less than 30 dB(A), then it is set to 30 dB(A). The INP also states that the evening RBL should not be higher than the day time RBL, and that the night time RBL should not be higher than the evening RBL.

³ The NSW INP defines day as the period from 7 am to 6 pm Monday to Saturday; or 8 am to 6 pm on Sundays and Public Holidays. Evening is defined as the period from 6 pm to 10 pm. Night time is defined as the remaining period.

Attended monitoring

A summary of the attended noise monitoring results are listed in Table 2-5.

Table 2-5 Attended monitoring results

Location and date	Measurement Time		Measured noise levels dB(A)			Identified noise sources and instantaneous noise levels dB(A)
	Start	Stop	L ₉₀	L ₁₀	L _{eq}	
L01P2N, 21-03-16	18:05	18:20	41	50	47	Wind, 42-50 Birds, 45-55 Banging/hammering, 41-44 Aircraft, 40-45 Dog (barking), 40-45 Road noise, 42-61
	18:21	18:36	37	43	42	Wind, 38-46 Road noise, 35-40 Dog (barking), 38-42 Insects, <30 Birds, 36-45 Road noise, 42-47
L02P2N, 21-03-16	18:52	19:07	35	44	44	Birds, 40-65 Road noise, 38-43 Horses, 50-60 Sheep, 47-51 Dog (barking), 45-50
	19:08	19:23	31	42	41	Birds, 35-40 Road noise, 32-38 Horses, 55-56 Conversations, 32-36 Insects, 40-45 Sheep, 45-50
L03P2N 2-9-2015	13:38	13:53	43	52	49	Wind through trees dominant Birds audible
L04P2N, 21-03-16	17:10	17:25	41	51	48	Road noise, 40-52 Birds, 40-45 Insects, 30 Wind, 40-55 Nearby silo, 45-51
	17:26	17:41	40	50	47	Road noise, 45-50 Birds, 40-47 Silo fan, 42-48 Wind, 42-55 Dog (barking), 47-49
L05P2N, 2-9-2015	16:00	16:15	25	37	34	Wind through grass and fields dominant. Distant voices briefly audible. Distant motorbike and truck on local road.
L06P2N, 2-9-2015	15:02	15:17	31	43	42	Wind through trees dominant. Birds occasionally audible. Car tyres on nearby gravel road.
L07P2N, 5-04-16	12:55	13:10	40	51	48	Wind noise, 45-55 Insects, <35 Road noise, 35-41 Birds, <35
	13:15	13:30	40	54	49	Wind noise, 45-58 Insects, 40-50 Banging/hammering, 43 Road noise, 40- 47 Birds, 36-38

Location and date	Measurement Time		Measured noise levels dB(A)			Identified noise sources and instantaneous noise levels dB(A)
	Start	Stop	L ₉₀	L ₁₀	L _{eq}	
L08P2N, 5-04-16	13:47	14:02	37	48	44	Wind noise, 45-53 Road noise, 40-46 Dog (barking), 38-40 Birds, <35 Insects, <35
	14:04	14:19	34	46	43	Wind noise, 42-47 Dog (barking), 38-40 Road traffic, 39-42 Insects, 35-44 Insects, 35-37
L09P2N, 5-04-16	14:42	14:57	38	48	44	Road noise, 38-50 Wind noise, 43-50 Pig, 38-40
	14:59	15:14	40	47	46	Animals, 38-40 Road noise, 42-52 Wind noise, 43-47
L10P2N, 16-9-2015	13:53	14:08	25	34	34	Wind through trees dominant Distant small plane audible Birds occasionally audible
L11P2N, 16-9-2015	15:06	15:21	28	40	39	Wind through trees dominant Distant small plane audible Birds occasionally audible
L12P2N, 16-09-2015	15:42	15:57	30	41	39	Wind noise, 35-40 Birds, 38-48
L13P2N, 22-03-16	15:18	15:33	34	51	48	Wind noise, 50-56 Front end loader, 30-40
	15:34	15:49	33	58	48	Wind noise, 45-52
L14P2N, 22-03-16	14:10	14:25	38	50	50	Wind noise, 40-45 Road noise, 48-57 Birds, 30-40
	14:30	14:45	36	50	47	Wind noise, 42-50 Road noise, 45-58
L15P2N, 3-9-2015	13:33	13:48	33	44	41	Wind through grass/trees dominant. Sheep occasionally audible. Two cars passed on nearby local road during measurement.
L16P2N, 22-03-16	10:47	11:02	42	50	47	Bob cat, 40-55 Birds, 40-50 Road noise, 35-40 Radio, 38-40
	11:06	11:21	38	48	45	Bobcat, 40-55 Bird noise, 40-50 Road noise, 35-40 Radio, 38-40
L17P2N, 22-03-16	12:01	12:16	26	40	47	Birds, 25-47 Road noise, 40-62
	12:18	12:33	26	36	40	Aircraft, 30-33 Birds, 30-48

The background noise monitoring and site observations indicate that the background noise levels are dominated by natural sounds, usually wind through long grass or trees. When they occur, the occasional train pass-by is expected to be the dominant influence on the L_{Aeq} level due to the close proximity of the loggers to the track.

2.4.5 Train pass-by noise levels

Data from the unattended noise loggers located adjacent to existing rail lines were reviewed and analysed to identify train pass-by events which occurred during the monitoring period. The relevant train noise parameters were calculated and are summarised in Table 2-6.

Table 2-6 Identified train pass-by summary

Monitoring Location	Approximate distance to nearest rail track (m)	Train type	Average noise level SEL dB(A)	Maximum noise level L _{Amax} dB(A)	Average duration (s)
L01P2N- 80 Old Backwater Rd	35	Freight	97	81	33
L02P2N- 53 Wright Rd	420	Freight	80	80	53
L03P2N- Chainage 546.6 km	15	Freight	93	91	74
L04P2N- 380 Tullamore Rd	125	Freight	82	78	69
L05P2N- Chainage 528.5 km	15	Freight	91	88	56
L08P2N- 1 Jackson St	95	Freight	90	89	58
L09P2N- 60 Trewilga Rd	75	Freight	84	81	60
L10P2N- Chainage 486 km	10	Freight	97	96	41
L11P2N- Chainage 478.150 km	15	Freight	95	94	59
L12P2N- Chainage 468.5 km	17	Freight	93	94	24
L13P2N- 503 Nanardine Lane	50	Freight	92	85	24

The results from the noise monitoring were used to determine the L_{Aeq} over the relevant time period (day and night) for rail pass-by noise during the monitoring period and is further discussed in Section 4.2.

2.4.6 Unattended vibration levels

Vibration logger V01P2N was set up approximately 15 metres from the existing rail line. No construction or industry was noted in the vicinity of the vibration logger. Site observations indicated road traffic was unlikely to have a significant contribution to the ground vibration levels in the area. Existing rail movements were therefore most likely to be the dominant source of vibration levels in the area. Comparison with the identified train pass-bys (detailed in Section 2.4.5) indicated that elevated vibration levels of approximately 1.0-1.3 millimetres per second corresponded to freight train pass-bys. A summary of the vibration levels logged from 22 March 2016-23 March 2016 is shown in Figure 2-2.

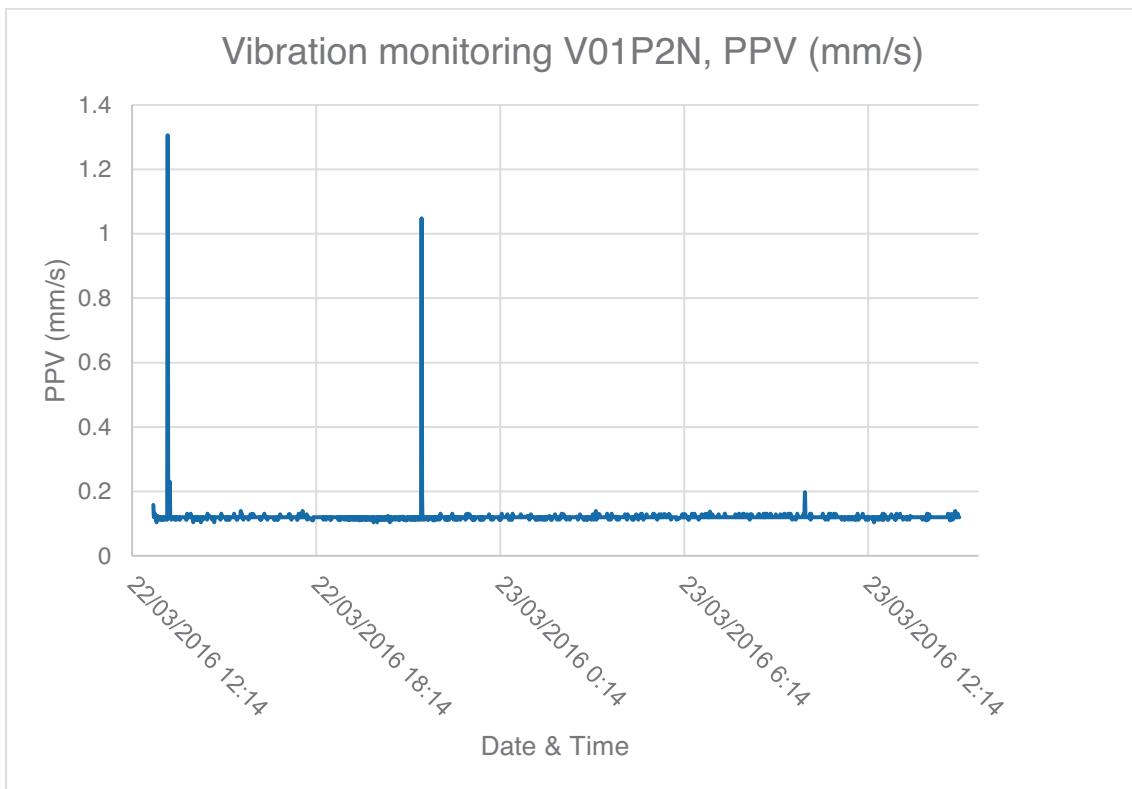


Figure 2-2 Vibration monitoring at location V01P2N- PPV

While long-term vibration monitoring was undertaken to capture PPV vibration velocities, train event vibration levels expressed in terms of Vrms allows calculation of Vibration Dose Value (VDV) which is more appropriate for evaluation of human comfort vibration impacts from intermittent events typical of railway operations. These results and discussion are presented in Section 4.5.2 and 4.5.3 in the context of operational vibration targets.

3. Relevant legislation and guidelines

3.1 Operational rail noise criteria

Operational rail noise criteria are derived from the *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013).

This guideline presents non-mandatory noise criteria for receivers affected by the proposal. Where receivers are predicted to exceed the relevant noise criteria, an assessment of possible mitigation measures to ameliorate these impacts would be conducted. These mitigation measures would be considered if they can be reasonably and feasibly implemented.

The RING applies to both light and heavy rail infrastructure proposals and distinguishes between ‘new’ or ‘redeveloped’ heavy rail lines in terms of the criteria which apply.

Heavy rail is considered to be rail infrastructure and its associated rolling stock which may be electrified or hauled by diesel locomotives that operates in dedicated rail corridors for either passenger and/ or freight transportation.

A ‘new’ heavy rail line development is one where rail infrastructure is to be developed on land that is not currently an operational rail corridor and where more stringent noise criteria apply. According to the RING, a ‘redevelopment’ of a heavy rail line occurs where a rail infrastructure proposal is to be developed on land that is either:

- Located within an existing and operational corridor, where a rail line is or has been operational.
- Immediately adjacent to an existing operational rail line which may result in widening of an existing corridor.

Typically, the works associated with the ‘redevelopment’ of an existing rail line will increase its capacity to carry rail traffic or alter the alignment through design changes. In such cases, the ‘redevelopment of existing rail line’ noise criteria apply.

For this assessment, ARTC considers the Inland Rail proposal to be a ‘redevelopment of an existing heavy rail line’ as the proposal will be developed on land within an existing operational rail corridor. Therefore the ‘redevelopment of existing rail line’ criteria listed in Table 3-1 apply to this assessment.

The additional Parkes north west connection consists of a five kilometre section of new track between Inland Rail and the Broken Hill line. This section of track is considered a ‘new rail line development’ for the purposes of the operational noise assessment and the corresponding criteria listed in Table 3-1 apply.

For residential receivers, the noise trigger levels for absolute levels of rail noise have two components, L_{Aeq} and L_{Amax} . The L_{Aeq} contribution level of rail noise is assessed over the day or night period and the maximum noise level (L_{Amax}) from pass-by events. The trigger values listed in Table 3-1 need to be exceeded to initiate an assessment of rail noise impacts and investigate potential mitigation measures.

Table 3-1 Airborne rail traffic noise trigger levels for residential land uses

Type of Development	Noise Trigger Levels dB(A) (External)	
	Day (7.00–22.00)	Night (22.00–7.00)
Redevelopment of existing rail line	Development increases existing $L_{Aeq(period)}$ rail noise levels by 2 dB or more, or existing L_{Amax} rail noise levels by 3 dB or more and predicted rail noise levels exceed:	
	65 $L_{Aeq(15h)}$ OR 85 L_{AFmax}	60 $L_{Aeq(9h)}$ OR 85 L_{AFmax}
New rail line development	Predicted rail noise levels exceed:	
	60 $L_{Aeq(15h)}$ OR 80 L_{AFmax} ⁴	55 $L_{Aeq(9h)}$ OR 80 L_{AFmax}

Source: *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013).

In accordance with the RING, other non-residential sensitive land uses including hospitals, schools and outdoor recreational areas have their own specific noise trigger levels for heavy rail redevelopments that are applicable when the facility or space is in use. Noise trigger levels for these receivers are applicable as internal or external levels depending on the land use. For internal noise criteria, the acoustic performance of the building façade affects the transmission of noise into the premises. As construction materials and the façade acoustic performance of these buildings is unknown and may vary, a conservative 10 dB reduction in noise between the external level and internal level has been assumed⁵. The RING criteria for non-residential land uses are shown Table 3-2.

Table 3-2 Airborne rail traffic noise trigger levels for non-residential land uses

Land use type	Noise Trigger Levels dB(A) (When in use)	
	New rail line development	Redevelopment of existing rail line
	Resulting rail noise levels exceed:	Development increases existing $L_{Aeq(period)}$ rail noise levels by 2 dB or more and resulting rail noise levels exceed:
Schools, educational institutions and child care centres	40 $L_{Aeq(1h)}$ Internal	45 $L_{Aeq(1h)}$ Internal
Places of worship	40 $L_{Aeq(1h)}$ Internal	45 $L_{Aeq(1h)}$ Internal
Hospital wards	35 $L_{Aeq(1h)}$ Internal	40 $L_{Aeq(1h)}$ Internal
Hospitals – other uses	60 $L_{Aeq(1h)}$ External	65 $L_{Aeq(1h)}$ External
Open space – Passive use	60 $L_{Aeq(15h)}$ External	65 $L_{Aeq(15h)}$ External
Open space – Active use	65 $L_{Aeq(15h)}$ External	65 $L_{Aeq(15h)}$ External

Source: *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013).

⁴ The L_{AFMAX} level is the L_{Amax} level using a fast time response

⁵ See RING - Technical notes to tables 1,2 and 3 – Technical note 6. Allows that a window may be opened to provide adequate ventilation.

3.2 Construction noise criteria

The ICNG (DECC 2009) provides recommended standard hours for construction activities as follows:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No work on Sundays or Public Holidays

ARTC operates its rail network in accordance with an Environmental Protection Licence (EPL) administered by the EPA. The licence sets out performance standards and criteria for discharges to air, water and land, including noise from construction and operation of the network.

In accordance with EPL 3142, the upgrade of existing rail infrastructure is classified as “maintenance”. EPL 3142 condition O4.1 states maintenance work should be undertaken within recommended standard hours “where to do so would not adversely affect ARTC’s ability to provide safe and reliable services or a safe working environment”. EPL 3142 condition O4.1 defines the same standard working hours as the ICNG.

EPL 3142 condition O4.3 states:

Where maintenance activities are undertaken, including outside of the hours specified in condition O4.1, noise impacts must be managed in accordance with those provisions of the Interim Construction Noise Guideline (DECCW, 2009) which require the licensee to:

- *identify noise sensitive receivers that may be affected at least 7 days prior to the proposed commencement date; except where the licensee first becomes aware of the need to undertake the railway maintenance activities less than 7 days prior to the proposed commencement date, in which case the identification must be undertaken as soon as practicable after becoming aware of the need to undertake the railway maintenance activities;*
- *identify hours for the proposed activities;*
- *identify noise impacts at noise sensitive receivers;*
- *select and apply reasonable and feasible work practices to minimise noise impacts; and*
- *notify the noise sensitive receivers at least 5 days prior to the commencement of railway maintenance activities undertaken outside of the hours specified in Condition O4.1, except where the licensee first becomes aware of the need to undertake those railway maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the railway maintenance activities.*

The construction of new track on the Parkes north west connection segment of the proposal and construction of crossing loops is considered a ‘construction’ activity under EPL 3142. The EPL states that:

O4.6 So far as is reasonably practicable and where to do so would not adversely affect ARTC’s ability to provide safe and reliable services or a safe working environment, construction activities must be undertaken: a) between the hours of 7.00 am and 6.00 pm Mondays to Friday b) between the hours of 8.00 am and 1.00 pm Saturday; and c) not on Sundays or public holidays.

O4.9: When construction activities are required to be undertaken outside of the hours specified in Condition O4.6, any high noise generating works must only be undertaken: a) between the hours of 8.00 am and 10.00 pm Monday to Friday; b) between the hours of 8.00 am and 6.00 pm Saturdays and Sundays; and c) where the high noise impact generating works are likely to impact the same noise sensitive receivers, in blocks of no more than 3 hours, with at least a 1 hour respite between each block of work.

O4.10: Where construction activities are undertaken, including outside of the hours specified in Condition O4.6, noise impacts must be managed in accordance with those provisions of the Interim Construction Noise Guideline (DECCW, 2009) which require the licensee to: a) identify noise sensitive receivers that may be affected at least 7 days prior to the proposed commencement date; b) identify hours for the proposed activities; c) identify noise impacts at noise sensitive receivers; d) select and apply reasonable and feasible work practices to minimise noise impacts; and e) notify the noise sensitive receivers as per Condition O4.11.

Table 3-3 and Table 3-4 list the ICNG (DECC 2009) construction noise criteria at surrounding residential and industrial receivers.

The ‘noise affected’ management level represents the point above which there may be some community reaction to noise. Where the noise affected management level is exceeded, all feasible and reasonable work practices to minimise noise need to be applied and all potentially affected receivers informed of the nature of the works, expected noise levels, duration of works and a method of contact. The noise affected management level is the background noise level plus 10 dB(A) during recommended standard hours and the background noise level plus 5 dB(A) outside of recommended standard hours.

The ‘highly noise affected’ management level represents the point above which there may be strong community reaction to noise. Where noise is above this management level, any feasible and reasonable ways to reduce noise below this level would be applied. If no quieter work method is feasible and reasonable, the affected residence would be advised of the duration and noise levels of the works and any respite periods that will be provided. The highly noise affected management level for standard working hours is 75 dB(A).

The ICNG defines what is considered to be feasible and reasonable as follows:

‘Feasible - A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.

‘Reasonable - Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.’

Table 3-3 ICNG construction noise criteria for residential receivers, dB(A)

Time Period	Background Level $L_{A90(\text{period})}$	ICNG Management Level $L_{Aeq(15 \text{ min})}$
Recommended standard hours: Day	30 dB(A)	Noise affected level: 40 dB(A)
Mon-Fri (7 am – 6 pm) Sat (8 am – 1 pm) Sun/Pub Hol. (Nil)		Highly noise affected level (all residential receivers) - 75 dB(A).

Time Period	Background Level $L_{A90(\text{period})}$	ICNG Management Level $L_{Aeq(15 \text{ min})}$
Outside of standard hours: Evening Mon-Fri (6 pm – 10 pm) Sat (1 pm – 10 pm) Sun/Pub Hol (8 am – 6 pm)	30 dB(A)	Noise affected level – 35 dB(A)
Outside of standard hours: Night Mon-Fri (10 pm – 7 am) Sat (10 pm – 8 am) Sun/Pub Hol (6 pm – 7 am)	30 dB(A)	Noise affected level – 35 dB(A)

Source: Interim Construction Noise Guideline (DECC 2009)

Note 1: The INP states that where the RBL is less than 30 dB(A), then it is set to 30 dB(A)

Table 3-4 ICNG construction noise criteria for industrial premises, dB(A)

Time period	Background level $L_{A90(\text{period})}$	ICNG management level $L_{Aeq(15 \text{ min})}$
When in use	NA	75 dB(A)

Source: Interim Construction Noise Guideline (DECC 2009)

3.2.1 Proposal specific construction noise management level

Construction of the proposal is expected to be undertaken during and outside standard construction hours and individual activities may span across time periods. The preferred approach for the proposal is that the more stringent level of 35dB(A) will be adopted as the proposal specific construction management level.

Table 3-5 ICNG construction noise criteria for residential receivers, dB(A)

Time Period	Proposal specific construction noise management level $L_{Aeq(15 \text{ min})}$
All periods	35dB(A)

The EIS provides further details on the anticipated work hours and construction methodology.

3.3 Construction traffic noise criteria

The *Road Noise Policy* (RNP) (OEH 2011) provides non-mandatory traffic noise assessment criteria for land use developments with the potential to create additional traffic on existing freeways, arterial, subarterial and local roads.

The relevant construction traffic noise criteria are listed in Table 3-6.

Table 3-6 Construction traffic noise criteria for residential land uses

Road Category	Type of proposal / Land Use	Assessment Criteria – external dB(A)	
		Day (7 am–10 pm)	Night (10 pm–7 am)
Freeway/ arterial road/ sub- arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L_{Aeq} (15 hour) (external) 60	L_{Aeq} (9 hour) 55 (external)
Local road	Existing residences affected by additional traffic on existing local roads generated by land use developments	L_{Aeq} (1 hour) 55 (external)	L_{Aeq} (1 hour) 50 (external)

Source: Road Noise Policy (OEH 2011)

Note: Section 2.4 of the RNP indicates that where existing road traffic noise levels already exceed the assessment criteria, an increase of less than 2 dB represents a minor impact that is barely perceptible to the average person.

The accepted application of Section 2.4 of the RNP is that where existing road traffic noise levels already exceed the assessment criteria, an increase of less than 2 dB represents a minor impact that is barely perceptible to the average person.

3.4 Vibration criteria

3.4.1 Human comfort criteria

The OEH's publication, *Assessing vibration: A technical guideline* 2006 outlines methods of assessing potential impacts and ways to manage vibration from construction activities as well as rail operations such as ground-induced vibration created by rolling stock movements.

Assessing vibration: a technical guideline is based on guidelines contained in British Standard BS 6472:1992 *Evaluation of human exposure to vibration in buildings* (1–80 Hz).

Typically, construction works generate ground vibration of an intermittent nature. In accordance with BS 6472–1992, intermittent vibration is assessed using the Vibration Dose Value (VDV). Further, operational vibration produced by train pass-bys are classified as intermittent vibration. Acceptable VDV's, as outlined in *Assessing vibration: A technical guideline*, are listed in Table 3-7.

Table 3-7 Acceptable vibration dose values for intermittent vibration

Location	Daytime ¹ (m/s ^{1.75})		Night-time ¹ (m/s ^{1.75})	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas ²	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Source: Table 2.4 Assessing vibration: A technical guideline (OEH 2006)

Notes:

1. Daytime is 7.00 to 22.00 and night-time is 22.00 to 7.00.
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be need to assess intermittent values against the continuous or impulsive criteria for critical areas.

Whilst the assessment of response to vibration in BS 6472-1:1992 is based on VDV and weighted acceleration, for construction-related vibration, it is considered more appropriate to provide guidance in terms of PPV, since this parameter is more likely to be routinely measured based on the more usual concern over potential building damage.

Humans are capable of detecting vibration at levels well below those that risk causing damage to a building. The degrees of perception for humans are suggested by the vibration level categories given in British Standard BS 5228-2:2009 *Code of practice for noise and vibration on construction and open sites – Part 2: Vibration* as listed below in Table 3-8.

Table 3-8 Guidance on the effects of vibration levels

Approximate Vibration Level	Degree of Perception
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30 mm/s	Vibration might be just perceptible in residential environments.
1.00 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.00 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Source: BS 5228-2:2009 Code of practice for noise and vibration on construction and open sites – Part 2: Vibration

3.4.2 Structural damage criteria

Currently, there is no Australian Standard that sets criteria for the assessment of building damage caused by vibration. Consistent with other major projects of a similar type, guidance on limiting vibration values has been obtained by reference to German Standard DIN 4150-3: 1999-02 *Structural Vibration – Part 3: Effects of vibration on structures*. Short-term vibration guideline values are listed in Table 3-9.

Table 3-9 Guideline values for short term vibration on structures

Line	Type of Structure	Guideline Values for Velocity, $v_i(t)^1$ [mm/s]		
		1 Hz to 10 Hz	10 Hz to 50 Hz	50Hz to 100Hz ²
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design.	20	20 to 40	40 to 50
2	Dwellings and buildings of similar design and/or occupancy.	5	5 to 15	15 to 20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (such as heritage listed buildings under preservation order).	3	3 to 8	8 to 10

Source: German Standard DIN 4150-3: 1999-02 *Structural Vibration – Part 3: Effects of vibration on structures*
Notes:

1. The term v_i refers to vibration levels in any of the x, y or z axes
2. At frequencies above 100 Hz the values given in this column may be used as minimum values

3.5 Other standards and guidelines

The following additional standards and guidelines have been referenced in this assessment:

- Environmental Noise Management Manual (ENMM) (RTA 2001).
- *Industrial Noise Policy* (INP) and Application Notes, EPA, 2000.
- Construction Noise Strategy (CNS), TfNSW, 2012.
- Environmental Management System Guide: Noise and Vibration from Rail Facilities (NVRF), Sydney Trains, 2013.
- Development near rail corridors and busy roads – interim guideline, Department of Planning, 2008.
- Australian Standard AS 1055 - 1997 Acoustics – Description and Measurement of Environmental Noise.
- Australian Standard AS 2436 – 2010 Guide to noise and vibration control on construction, demolition and maintenance sites.
- *Transit noise and vibration impact assessment*, US Department of Transportation Federal Transit Administration (FTA), 2006.

4. Operational rail noise and vibration assessment

4.1 Methodology

4.1.1 Overview

The approach to assessing operational rail noise can be summarised as follows:

- Identify the existing and proposed rail traffic volumes and speeds for the study area (provided by ARTC).
- Calculate L_{Aeq} and L_{Amax} using noise logger data obtained at the monitoring locations.
- Validate noise model using the calculated noise levels from noise loggers.
- Model operational rail (L_{Aeq} and L_{Amax}) noise for the agreed scenarios.
- Assess operational rail noise predictions (L_{Aeq} and L_{Amax}) against the relevant RING trigger levels.
- Consider noise mitigation options where exceedances of the trigger levels are predicted.

Note that the predicted rail noise levels (termed the ‘absolute rail noise levels’) refers to noise levels emitted by rail only, that is without the contribution of any other noise source.

4.1.2 Noise modelling scenarios

The operational rail noise scenarios used in the assessment were developed to clearly identify noise levels resulting from existing operations and future rail operations with the inclusion of the proposal. A scenario was also developed which identifies the likely future rail operations noise without the proposal so that the effect of the proposal can be clearly identified.

The RING states that noise trigger levels are to be evaluated at two points in time: Immediately after operations commence and for a design year, typically 10 years later. The Inland Rail project is composed of a number of individual brownfield and greenfield proposals, each with their own planning conditions. Therefore, for the proposal, assessment timeframes should consider changes in operations within the study area that are enabled by the Inland Rail project as a whole.

Inland Rail through connection operation will occur once all component proposals are completed, therefore completion of a single brownfield proposal will have minor impact on train numbers and speeds in the years immediately after completion other than improvements in local operating conditions. After through connection is established in 2025 by completion of the remaining brownfield and greenfield proposals, through connection will commence, generating an overall increase in train volumes on each proposal. Because each proposal is subject to individual approval conditions, the impacts of both the individual proposal in isolation and the overall Inland Rail programme need to be assessed against the RING trigger levels.

Consequently, the following three assessment timeframes have been evaluated within the proposal's operational assessment study area for both build and no build scenarios:

1. Proposal: the individual proposal to which the planning conditions apply
 - No build and build scenarios at the proposal opening year, 2020.
2. Through connection: the estimated time at which Inland Rail through connection between Brisbane and Melbourne is anticipated
 - No build and build scenarios within the proposal's operational assessment study area at the through connection year, 2025.
3. Design year: a future scenario that reflects the normal operation of the Inland Rail project
 - No build and build scenarios within the proposal's operational assessment area at the design year, 2040.

Rail operational volumes and speeds are not expected to change within the operational assessment study area if the proposal is not implemented (no build scenario), therefore only one no build model is needed, which represents the no build assessment scenarios at 2020 proposal opening year, 2025 Inland Rail through connection year and 2040 Inland Rail design year.

For the proposal opening year, the primary difference in operating conditions between the 2020 no build and 2020 build scenarios are the speed increases enabled through track improvements, while train volumes remain unchanged. For through connection and design years, operating volumes increase at 2025 when through connection is established, then gradually grow through to 2040.

Noise modelling was also completed to demonstrate the existing noise environment and validate predictions. For this proposal, the existing operations were modelled for the year 2016.

The noise modelling scenarios used for the assessment are described in Table 4-1.

Table 4-1 Noise modelling scenarios

Time Frame:	Proposal build	Proposal no build
	Includes: - Higher growth in projected volumes due to the proposal - Increases in train speeds due to the proposal	Includes: - Lower growth in projected volumes due to natural growth only without the proposal - No increases in train speeds
2016 – model for calibration against noise logger data		L_{Aeq}
2020 – Proposal opening year	L_{Aeq}	L_{Aeq}
2025 – Through connection opening year	L_{Aeq} and L_{Amax}	L_{Aeq} and L_{Amax}
2040 – Proposal design year ¹	L_{Aeq}	L_{Aeq}

Notes:

1. L_{Amax} levels are unrelated to volumes, therefore equivalent at 2025 and 2040 assessment timeframes.

4.1.3 Existing and future rail capacity

Rail volumes have been provided by ARTC for the current conditions as well as for the future conditions. Note that the volumes used in this assessment are different from those provided in the EIS Chapter 7. The noise assessment has been based on a more conservative estimate (greater numbers) of projected train volumes.

An equal split of day/night train movements was assumed over each 1-hour period. The data used for noise modelling inputs are listed in Table 4-2, Table 4-3 and Table 4-4 below.

Table 4-2 Proposal rail volumes - Redeveloped line (trains per 24 hours)

Train type	2020 - Proposal opening year		2025 - Through Connection		2040 - Design Year	
	no build	build	no build	build	no build	build
Link	0.43	0.43	0.43	0.43	0.43	0.43
Grain	2.12	2.12	2.12	2.12	2.12	2.12
Intercapital	-	-	-	8.42	-	18.02
Mineral	0.43	0.43	0.43	0.43	0.43	0.43

Source: ARTC

Table 4-3 Proposal rail volumes - Parkes north west connection (trains per 24 hours)

Train type	2020 - Proposal opening year		2025 - Through Connection		2040 - Design Year	
	no build	build	no build	build	no build	build
Link	-	-	-	-	-	-
Grain	-	-	-	-	-	-
Intercapital	-	-	-	2.86	-	4.57
Mineral	-	-	-	-	-	-

Source: ARTC

Table 4-4 Proposal train lengths (metres)

Train type	2020 - Proposal opening year		2025 - Through Connection		2040 - Design Year	
	no build	build	no build	build	no build	build
Link	450	830.6	450	830.6	450	830.6
Grain	710	710	710	710	710	710
Intercapital	-	-	-	1800	-	1800
Mineral	450	830.6	450	830.6	450	830.6

Source: ARTC

4.1.4 Train speeds

For the purposes of this assessment, train speeds have been taken from ARTC's Route Access Standard for Dubbo to Goobang Junction (RAS I5, version 1.5, February 2016). Train speed graphs along the proposal track section are shown in Figure 4-1 and Figure 4-2. These speed profiles have been used in the noise model.

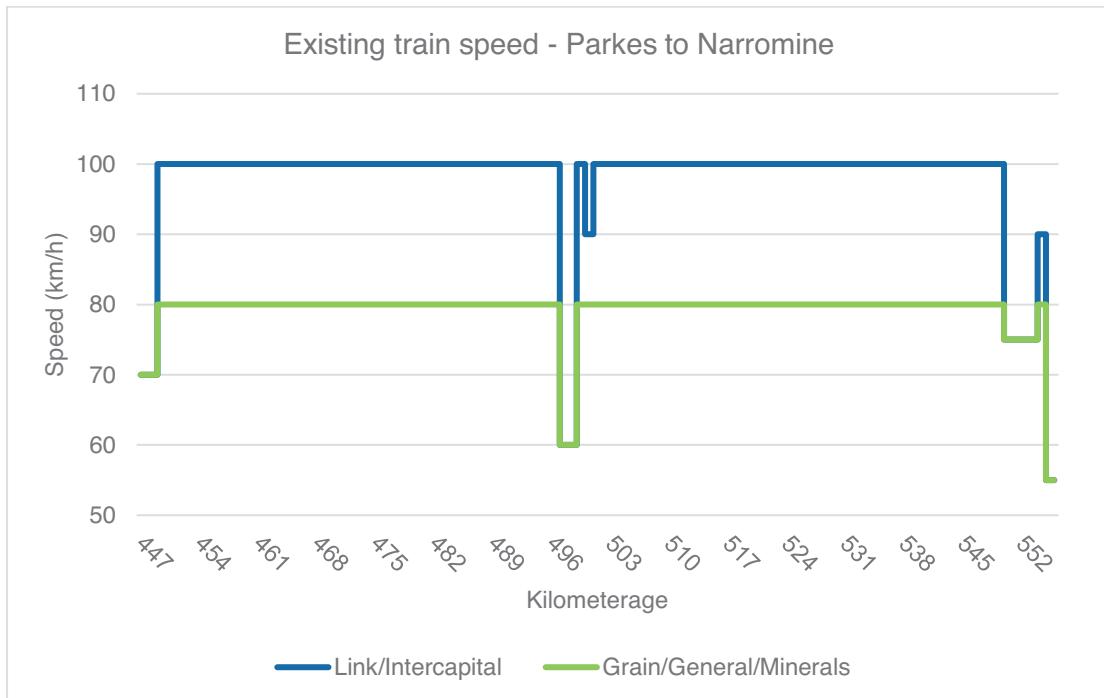


Figure 4-1 Train speeds in the down direction (Parkes to Narromine)

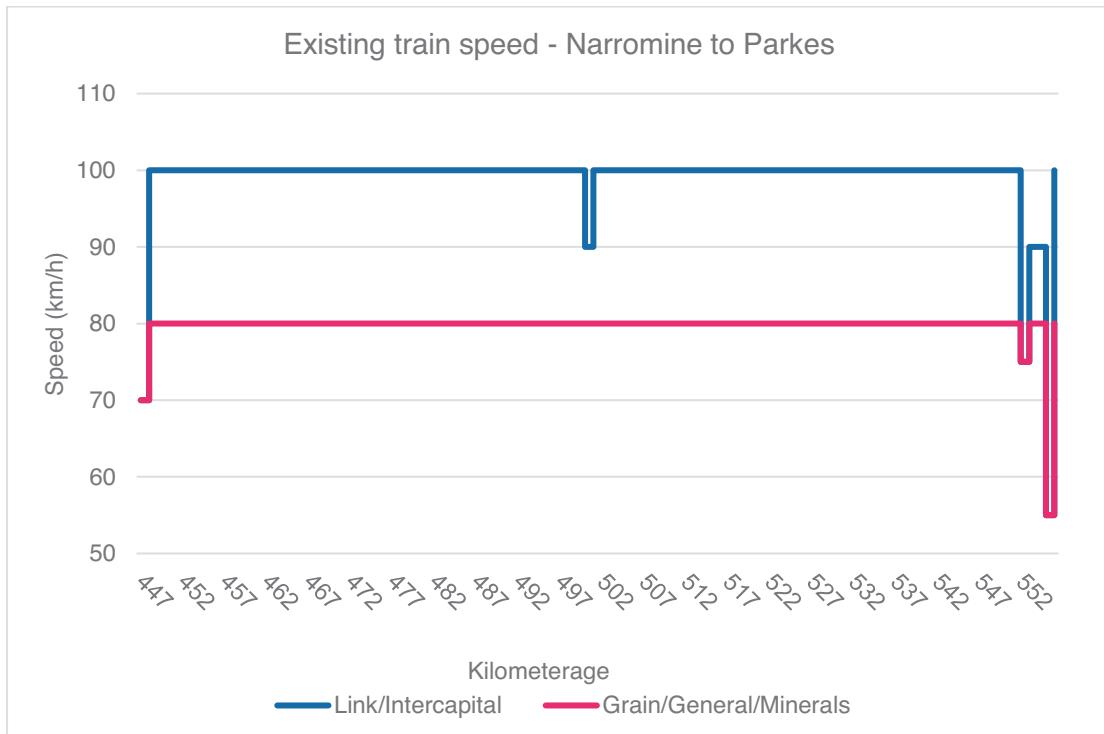


Figure 4-2 Train speeds in the up direction (Narromine to Parkes)

4.1.5 Proposal design speeds

The proposal will allow for an increase of train speeds up to 115 kilometres per hour. For some sections of track, speed will be limited due to curves, turnouts, crossings, crossing loops and sidings. As details of speed board locations were not available at the time of this assessment, the noise modelling adopts the track design speed which is limited by track geometry only and this will result in the assessment being conservative and over-predicting future noise levels. For each train type, the modelled speed is the lower of the design speed at a given location on the track and the train type speed limitations shown in Table 4-5. Track design speeds are shown in Figure 4-3 and apply to both up and down directions.

Table 4-5 Train type maximum speeds

Train type	Link	Grain	InterCap	Minerals
Type speed	110	80	115	80

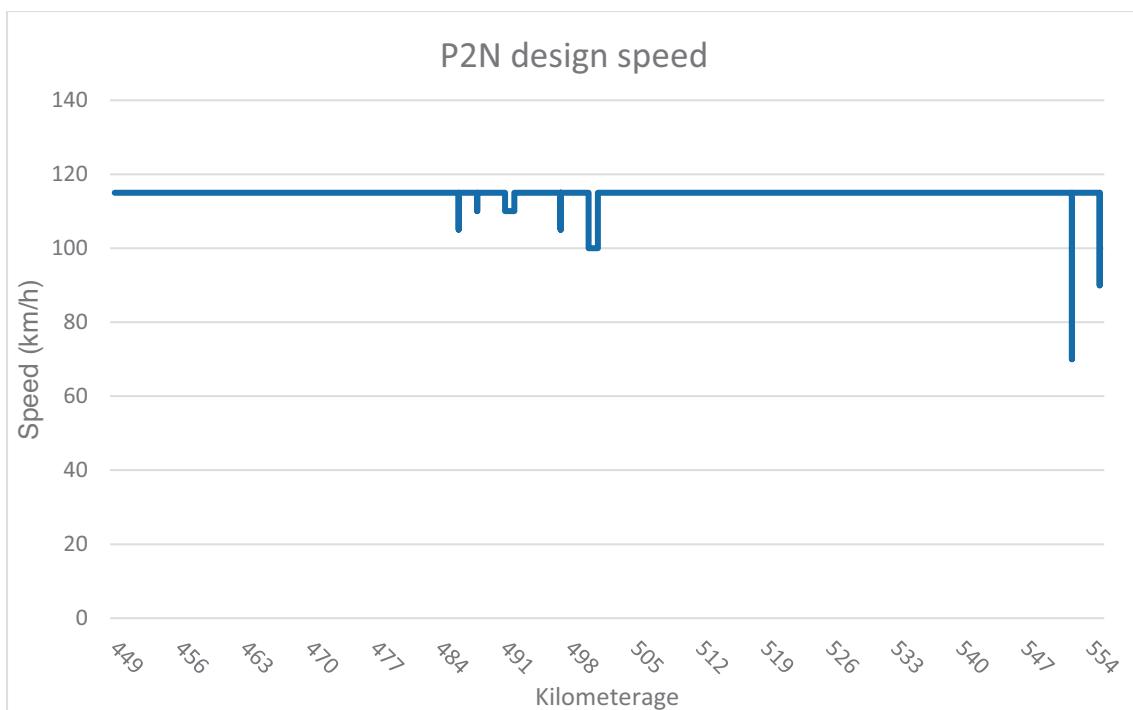


Figure 4-3 Proposal Design Speeds

4.1.6 Rail noise model setup

Acoustic modelling was undertaken using the computer prediction software Computer Aided Noise Abatement (CadnaA) version 4.6 to predict the effects of rail traffic noise from the proposal. The Nordic prediction method (ThemaNord 1996:524) was used for modelling as this is able to produce L_{Aeq} and L_{AmaxF} levels.

The proposed development has been modelled based on available data at the time of the assessment, and as such, should be used for comparison purposes only. In particular, the model reflects the status of the design at the time of the assessment.

Model configuration

The following assumptions were made with regard to the model configuration:

- A general ground absorption coefficient of 1.0 was used.
- Atmospheric conditions of 15°C and 70 per cent humidity were adopted.
- Neutral weather and atmospheric conditions were assumed.
- Topographical information was based on Lidar data provided by ARTC.
- Only single storey receivers were modelled at a height of 1.5 metres above ground.
- Buildings close to the rail line have been modelled as single storey buildings at a height of 4.5 metres. Building geometry was estimated based on aerial imagery.
- Existing rail alignments were based on data provided by ARTC.

Rail traffic assumptions

The following rail traffic assumptions have been made in the model:

- Rail capacity and speeds are as described in Section 4.1.3 and 4.1.4 and represent a conservative operational rail scenario for predicting noise impacts.

Track corrections

The following track corrections have been made in the model:

- +3 dB correction for partial track length on bridges with ballast (ThemaNord 1996:524).
- +6 dB correction for partial track length on bridges without ballast (ThemaNord 1996:524).
- +6 dB correction per 10 metres track length for each unit of switches and crossings (ThemaNord 1996:524).
- +3 dB correction for track curves with radius of 300-500 metres (Schall 03, 2006).

Based on information provided by ARTC, the following assumptions have been made for noise produced in crossing loops:

- 25 per cent of the total trains will utilise each crossing loop.
- All loops were modelled as being utilised equally.
- An indicative source level of 90 dB(A) at 15 metres from the rail source has been assumed for bunching noise.
- Bunching noise events have been modelled as 1 second duration events between each wagon.
- An indicative source level of 70 dB(A) at 15 metres from the rail source has been assumed for idling noise.
- Train idling durations have been assumed to be 20 minutes.

4.2 Existing rail noise levels and model validation

Existing rail noise levels were calculated using the results from the baseline monitoring described in Section 2.4. With consideration to the RING, the existing rail noise L_{Aeq}'s at the monitoring locations are determined as follows:

$$L_{Aeq(T)} = 10 \times \log_{10}(1/T \times (\sum (n_i \times t_i \times 10^{0.1L_{Aeq}(i)})))$$

Where:

- T is the total time in the relevant period (day or night) in seconds
- t_i is the average time of each type of event in seconds
- n_i is the number of each type of event

$L_{Aeq(i)}$ is the representative L_{Aeq} level for each type of event as measured at the receiver and is summed over the different types of events.

Noise modelling was undertaken for the existing 2016 scenario for comparison to measured existing rail noise levels to confirm the model's accuracy and validity for assessing the subsequent modelling scenarios.

Table 4-6 presents the measured 2016 rail noise levels and modelling results for the existing 2016 scenario to demonstrate the calibration of the noise model achieved.

Table 4-6 Measured existing rail noise levels and model validation

Location	Measured 2016 rail noise levels (dB)		Noise model predicted levels, 2016 existing scenario (dB)		Difference (dB)
	Day L_{Aeq} (15hr)	Night L_{Aeq} (9hr)	Day L_{Aeq} (15hr)	Night L_{Aeq} (9hr)	
L01P2N	48.2	48.2	48.8	48.8	+0.6
L02P2N	36.7	36.7	35.3	35.3	-1.4
L03P2N	48.4	48.4	50.0	50.0	+1.6
L04P2N	37.6	37.6	38.6	38.6	+1.0
L05P2N	46.6	46.6	47.8	47.8	+1.2
L08P2N	45.2	45.2	44.3	44.3	-0.9
L09P2N	39.7	39.7	40.2	40.2	+0.5
L10P2N	52.8	52.8	53.7	53.7	+0.9
L11P2N	50.3	50.3	51.1	51.1	+0.8
L12P2N	48.7	48.7	50.3	50.3	+1.6
L13P2N	47.2	47.2	47.3	47.3	+0.1

Note: Due to the proportional day/night split of train movements assumed (i.e. the same number of trains per each 1-hour period), the $L_{Aeq}(15hr)$ and $L_{Aeq}(9hr)$ model noise levels are equal.

As indicated by the above table, the predicted 2016 noise levels are within 2 dB of the measured rail noise levels with the difference ranging between -1.4 to +1.6 dB. Therefore, the model is considered to be validated.

4.3 Operational rail noise model results

4.3.1 Redeveloped rail line

Table 4-7 presents a summary of the modelling results where the RING trigger levels are predicted to be exceeded. In order to qualify for mitigation, L_{Aeq} noise levels must exceed the relevant day/night criteria and the level at receivers must also increase by 2 dB or more from the no build scenario. Receivers also qualify for mitigation where there is a predicted increase of 3 dB or more due to the proposal at an assessment timeframe and L_{max} levels are predicted to exceed 85 dBA.

Note that due to the proportional day/night split of train movements assumed (i.e. the same number of trains per each 1-hour period), the $L_{Aeq(15hr)}$ and $L_{Aeq(9hr)}$ model noise levels were equal. The RING night time trigger levels are 5 dB lower than daytime and therefore provides the controlling criteria for identification of receivers that qualify for consideration of noise mitigation measures.

Non-residential receivers including schools, places of worship (churches) and outdoor recreation areas have different RING noise criteria for operational noise. Despite this, none of the non-residential receivers identified in Section 2.3 were found to exceed the RING criteria.

For the year 2040 scenario, the following number of residential receivers were found to have qualified for mitigation consideration under the RING:

- 1 receiver in Parkes
- 16 receivers in Peak Hill
- 3 receivers in Tomingley
- 8 receivers in Narromine

Table 4-7 Predicted rail noise levels for residential receivers exceeding RING trigger levels - Parkes to Narrabri (dBA)

Receiver ID	Easting	Northing	Locality	L _{Aeq} No Build	L _{Aeq} 2025 Build	L _{Aeq} 2040 Build	L _{Amax} Existing	L _{Amax} Design	L _{Amax} increase	L _{Aeq} RING Triggered-2025	L _{Aeq} RING Triggered-2040	L _{Amax} RING Triggered
P2N_Rx0213	603861	6341031	Parkes	51	62	66	86	88	2.2	Y	Y	
P2N_Rx0248	613680	6371376	Peak Hill	50	62	66	85	88	2.6	Y	Y	
P2N_Rx0260	612090	6374070	Peak Hill	53	64	67	88	91	2.5	Y	Y	
P2N_Rx0272	611077	6377096	Peak Hill	54	65	68	90	92	2.3	Y	Y	
P2N_Rx0281	611198	6377287	Peak Hill	48	59	62	82	84	2.5		Y	
P2N_Rx0283	611167	6377310	Peak Hill	50	61	65	85	87	2.5	Y	Y	
P2N_Rx0285	611222	6377410	Peak Hill	46	58	61	79	81	2.7		Y	
P2N_Rx0297	610871	6377720	Peak Hill	50	62	65	86	88	2.3	Y	Y	
P2N_Rx0323	610790	6377918	Peak Hill	47	60	64	83	86	2.9		Y	
P2N_Rx0373	610945	6378052	Peak Hill	48	61	65	84	87	2.9	Y	Y	
P2N_Rx0380	610781	6378068	Peak Hill	52	65	68	89	92	3.0	Y	Y	
P2N_Rx0424	610935	6378282	Peak Hill	46	59	62	79	82	2.9		Y	
P2N_Rx0462	610869	6378513	Peak Hill	45	58	61	77	80	2.8		Y	
P2N_Rx0464	610751	6378523	Peak Hill	51	63	67	87	90	2.3	Y	Y	
P2N_Rx0517	610469	6378788	Peak Hill	48	61	64	83	85	2.5	Y	Y	
P2N_Rx0527	610429	6378859	Peak Hill	46	59	62	81	83	2.3		Y	
P2N_Rx0600	610229	6381700	Peak Hill	49	61	64	83	86	2.4	Y	Y	
P2N_Rx0608	607948	6395686	Tomingley	47	58	62	79	81	2.5		Y	
P2N_Rx0613	606477	6401469	Tomingley	45	57	61	77	80	2.6		Y	
P2N_Rx0630	612699	6426394	Narramine	47	59	62	80	82	2.8		Y	
P2N_Rx0644	614475	6430567	Narramine	47	59	62	78	83	5.4		Y	
P2N_Rx0651	615161	6431074	Narramine	47	59	62	80	83	3.3		Y	
P2N_Rx0702	615518	6431910	Narramine	55	66	69	91	93	2.3	Y	Y	
P2N_Rx0747	615523	6432090	Narramine	47	58	61	80	82	2.6		Y	

Receiver ID	Easting	Northing	Locality	L_{Aeq} No Build	L_{Aeq} 2025 Build	L_{Aeq} 2040 Build	L_{Amax} Existing	L_{Amax} Design	L_{Amax} increase	L_{Aeq} RING Triggered- 2025	L_{Aeq} RING Triggered- 2040	L_{Amax} RING Triggered
P2N_Rx0752	615657	6432115	Narramine	55	66	69	91	93	2.4	Y	Y	
P2N_Rx0762	615611	6432191	Narramine	48	58	61	81	84	2.6		Y	
P2N_Rx0804	615795	6432424	Narramine	54	65	68	89	92	2.9	Y	Y	
P2N_Rx1309	606476	6401590	Tomingley	46	58	61	78	80	2.6		Y	

Notes:

$L_{Aeq(15m)}$ and $L_{Aeq(9m)}$ model predictions were equal. The results are provided as one value for L_{Aeq} which represents both $L_{Aeq(15m)}$ and $L_{Aeq(9m)}$. The ‘increase’ in noise should be calculated to a single decimal place before comparing it with the 2 dB and 3 dB noise-increase trigger levels. However, the absolute noise levels should be calculated to the nearest whole decibel number before comparing them with the absolute trigger (RING). The L_{Amax} levels do not depend on train volumes. Therefore, the L_{Amax} levels for design years 2025 and 2040 will be equal.

4.3.2 New rail line

For a new rail line development, the noise trigger levels 60 dB(A) $L_{Aeq, 15\text{ hour}}$, 55 dB(A) $L_{Aeq, 9\text{ hour}}$ and 80 dB(A) L_{Amax} . These levels are 5 dB lower for each period than those for redevelopment, however as there is no existing rail line there is no check for an increase in rail noise due to the new rail proposal. Based on the rail volumes, no trains are expected to operate on the Parkes north west connection until 2025, therefore no 2020 scenario was assessed.

Table 4-8 presents a summary of the affected receivers for the Parkes north west connection rail line. None of these receivers were found to exceed RING criteria for a new rail development.

Table 4-8 Predicted rail noise levels for residential receivers - Parkes north west connection (dBA)

Receiver	Easting	Northing	L_{Aeq} 2025 Build	L_{Aeq} 2040 Design	L_{Amax} 2025/2040
P2N_Rx0181	605642	6334456	35	37	61
P2N_Rx0183	605417	6334604	37	39	63
P2N_Rx0185	605390	6334678	38	40	64
P2N_Rx0187	606439	6334927	30	32	52
P2N_Rx0188	605085	6335096	43	45	70
P2N_Rx0189	605855	6335140	34	36	61
P2N_Rx0192	606037	6335405	33	35	59
P2N_Rx0193	606091	6335446	33	35	59
P2N_Rx0194	603678	6335637	40	42	67
P2N_Rx0195	603391	6335737	38	40	64
P2N_Rx0196	604200	6335810	50	52	77
P2N_Rx0197	604109	6335849	48	50	75
P2N_Rx0198	606166	6335910	32	34	58
P2N_Rx0199	603613	6335917	40	42	67
P2N_Rx0200	606348	6336046	30	32	55
P2N_Rx0201	603442	6336202	37	39	65
P2N_Rx0202	605719	6336662	33	35	60
P2N_Rx0203	603335	6336953	32	34	62
P2N_Rx0204	605018	6337152	34	36	63
P2N_Rx0205	604431	6337320	33	35	65
P2N_Rx0206	602580	6337450	26	28	51
P2N_Rx0207	605121	6337526	30	32	59
P2N_Rx0208	606000	6337667	26	28	50
P2N_Rx0209	604305	6337785	29	31	59
P2N_Rx0210	603315	6337945	26	28	54
P2N_Rx0211	605270	6338406	24	26	49
P2N_Rx1301	602007	6332895	50	52	76
P2N_Rx1302	601053	6333120	39	41	65
P2N_Rx1303	600081	6332659	32	34	62
P2N_Rx1304	602135	6331333	40	42	65
P2N_Rx1305	603288	6333817	47	49	74

Note: The L_{Amax} levels do not depend on train volumes. Therefore, the L_{Amax} levels for years 2025 and 2040 will be the same.

4.3.3 Discussion

In general, for a largely homogeneous rail line with consistent volumes, constant speeds and few tight radius curves, the level of rail noise exposure for any given receiver is a function of the distance to the track, the angle of view and the presence or absence of any shielding terrain or objects.

Most of the RING exceedances for the redeveloped track were around the Peak Hill area, with the remainder scattered throughout the proposal area. This is due to the higher density of receivers in the Peak Hill area that are located in close proximity to the rail line. Section 6.1 provides an assessment of reasonable and feasible mitigation measures to reduce noise levels at receivers found to exceed RING criteria.

The accuracy of noise predictions depends on a variety of factors. It is important to note that the modelling is largely dependent on the model inputs and assumptions detailed in Section 4.1.

Full operational noise results are presented in Appendix D. Noise contour plots showing receiver locations are presented in Appendix E for L_{Aeq} levels and Appendix F for L_{Amax} levels.

4.4 Horn noise

Horns are an important safety device and are a normal part of train operation. Trains are generally required to sound their horns as they pass through level crossings and additionally at other times. ARTC's *Locomotive Specific Interface Requirements* (WOS 01.300) provides minimum and maximum levels for horn noise. The purpose of these prescribed noise levels is to provide safe operating conditions for people close to the rail line. It is acknowledged that noise emitted by train horns can be a source of annoyance for the general public.

For a rail redevelopment project to trigger the RING's L_{Amax} level of 85 dB(A) at a noise sensitive receiver, a 3 dB or greater increase in L_{Amax} level is required. The minimum distance from the horn source to be below this level has been estimated in Table 4-9. The minimum distance has been estimated using basic distance attenuation calculations for a point source. Note that horns generally propagate sound in a particular direction and sound will not radiate equally in all directions. Therefore, the minimum distance calculation is expected to provide a conservative estimate.

Table 4-9 Estimated distance from train horn to achieve RING L_{Amax} criteria

	High Noise Level Horn	Low Noise Level Horn	
Speed	Stationary	Stationary	Stationary
External noise limit ⁶	88 dB(A) minimum, measured 200 m in front	85 dB(A) minimum, measured 100 m in front	90 dB(A) maximum, measured 100 m in front
Minimum distance to achieve L_{Amax} 85 dB(A)	282 m	100 m	180 m

⁶ Minimum and maximum required levels for horn noise according to ARTC's Locomotive Specific Interface Requirements (WOS 01.300). Note that high noise level horns have minimum requirements, while the low noise level horns have minimum and maximum levels.

An appreciable difference in the number of horn events is expected due to the projected volume growth. For example, in the year 2040, there is expected to be approximately 21 trains per 24 period, increasing from the existing approximately 3 trains per 24 hour period. It is expected that the number of horn noise events would be comparable to the increase in trains per day (i.e. a location experiencing 3 train horn events per 24 hour period may experience 21 horn events per 24 hour period in the design year). It should be noted that a number of existing level crossings would potentially be closed as a result of the proposal. Therefore, the number of locations requiring horn usage would potentially decrease overall along the total length of the line. Additionally, no level crossings are expected to be constructed on the Parkes north west connection line. Thus, there are not expected to be frequent mandatory horn events on this new section of track.

While receivers within 282 metres from horn usage locations may exceed 85dB(A) L_{Amax} noise levels, there are no additional proposed locations of horn usage in the proposal and the RING redevelopment trigger of 3dB increase in L_{Amax} levels is not expected to be achieved by horns. Therefore mitigation of horn noise is not required under RING.

4.5 Vibration prediction

4.5.1 Methodology

Vibration from the operation of heavy rail infrastructure can adversely affect sensitive receivers located near a rail line. Vibration can cause buildings, windows and other fixtures to shake; contribute to annoyance and impacts on residents and other land uses; and interfere with vibration-sensitive equipment. Building damage is not usually likely for operation of rail infrastructure, however annoyance can occur at significantly lower vibration levels which are often only slightly higher than the limits of human perception. Therefore, human comfort goals provide the controlling criteria for operational vibration for the proposal.

The level of vibration at a receiver is generally a function of the energy of the vibration source, the propagation through the ground and the coupling of the ground to the receiver, structure or building.

Vibration generation from rail traffic is generally a function of the following:

- Wheel-rail interface including wheel defects, acceleration and braking
- The quality of the rail
- Track geometry
- Variations in sleepers and ballast
- Axle load
- Geometry and composition of the train
- Speed

Propagation and perception of vibration is further influenced by the soil, geological conditions and building characteristics such as:

- Soil stiffness
- Ground internal damping
- Depth of bedrock
- Depth of water table
- Building mass

- Building coupling to the ground
- Propagation of vibration through the building

4.5.2 Operational vibration assessment

Axle loading

The increase to 30 tonne axle load capacity from an existing 23 tonnes is not expected to result in substantially increased vibration levels as the proposed intercapital trains have axle loads of 21 tonnes while bulk freight is expected to have 25 tonne axle loads. Typically, a doubling of axle load can be expected to double vibration, and a proportional increase in vibration due to increased axle loading is likely.

Track condition

For the main alignment, vibration levels may decrease (or possibly offset any increase) as a result of the proposal due to improved ballast/sleeper heterogeneity and rail surface smoothness, both features which have greater potential to influence rail-induced vibration levels than axle loading or speed alone. Additional reductions in vibration may also be realised by reducing the need for acceleration and braking as more constant speeds would be achieved through a removal of some level crossings and lifting of existing temporary speed restrictions at sections of track, for instance dilapidated bridges being replaced as part of the proposal.

Speed

The US Federal Transition Administration’s “Transit Noise and Vibration Impact Assessment” report provides a method for estimating the ground surface vibration levels near rail lines. The process involves selecting a base curve for typical ground-surface vibration levels. The base curve assumes rail equipment is in good condition and operating at speeds of 80 kilometres per hour. Correction factors are then applied to account for different speeds, geological conditions, etc.

The report notes that vibration levels are approximately proportional to $20 \log_{10}(\text{speed}/\text{speed}_{\text{ref}})$, although the relationship can be as low as 10 to $15 \log_{10}(\text{speed}/\text{speed}_{\text{ref}})$. A speed relationship of $20 \log_{10}(\text{speed}/\text{speed}_{\text{ref}})$ has been adopted for this assessment.

Distance attenuation

Vibration measurements for train pass-bys along the existing line were undertaken on 16 September 2015 and 21-23 March 2016.

These measurements were compared with GHD’s internal vibration database from similar rail projects. For example, monitoring undertaken for the Maitland to Minimbah project in the Hunter Valley recorded loaded coal trains travelling at 60 kilometres per hour and unloaded coal trains at 80 kilometres per hour past residences at 30 and 35 metres from the track.

The distance attenuation relationship of ground vibration measurements was derived from the FTA base curve for locomotive-powered freight/passenger trains. Vibration measurements for this proposal, as well as measurements from similar rail proposals undertaken by GHD, can be seen in Figure 4-4. Note that these values have been adjusted to the reference speed of 80 kilometres per hour, using the $20 \log_{10}(\text{speed}/\text{speed}_{\text{ref}})$ relationship.

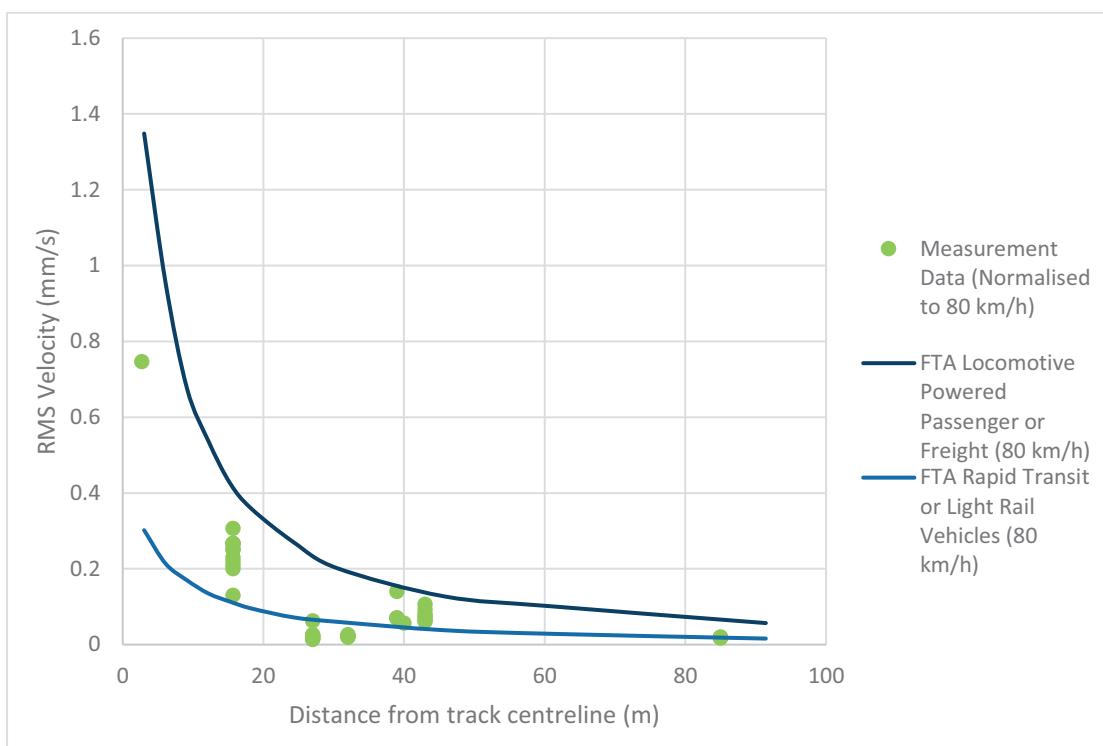


Figure 4-4 Ground vibration levels

Vibration measurements are highly variable and are largely dependent on local geological conditions. Further, track irregularities may significantly increase vibration levels (for example, at crossovers and joints). A significant variation in vibration levels for similar systems are not uncommon and the FTA curves represent the upper range of measurement data for well-maintained systems. The measured vibration data presented in Figure 4-4 are consistently lower than that upper-range vibration curve from the FTA guideline. Therefore, the use of levels from the FTA locomotive curve are expected to provide a conservative estimate of vibration levels.

For the purposes of this assessment, the track has been assumed to be in good condition and track irregularities such as joints or crossovers have not been assessed due to the current lack of design detail. An assessment of these factors should be completed once the detailed design has been finalised.

4.5.3 Human comfort assessment

Human comfort for operational vibration has been assessed in accordance with British Standard BS 6742-1:1992. The Vibration Dose Value (VDV) provides a cumulative descriptor of the vibration level received for a given period.

British Standard BS 6472 provides a method to calculate the estimated VDV using RMS vibration velocity. The estimated VDV is calculated as:

$$eVDV = 0.07 \times V_{rms} \times t^{0.25} (\text{m/s}^{1.75})$$

Where t = duration of the event.

The eVDV's for this proposal have been estimated by adjusting vibration levels for speed, duration and distance from the track.

The following assumptions have been made:

- Maximum train lengths as specified in Table 4-4
- Maximum train speeds as specified in Table 4-5

- Track in good condition with no track irregularities
- Train volumes specified in Section 4.1.3
- Proportional day/night splits of trains

These assumptions are expected to provide a conservative estimate of future vibration levels. The predicted future eVDV values for day and night-time, as well as the respective residential criteria, can be seen in Figure 4-5 and Figure 4-6.

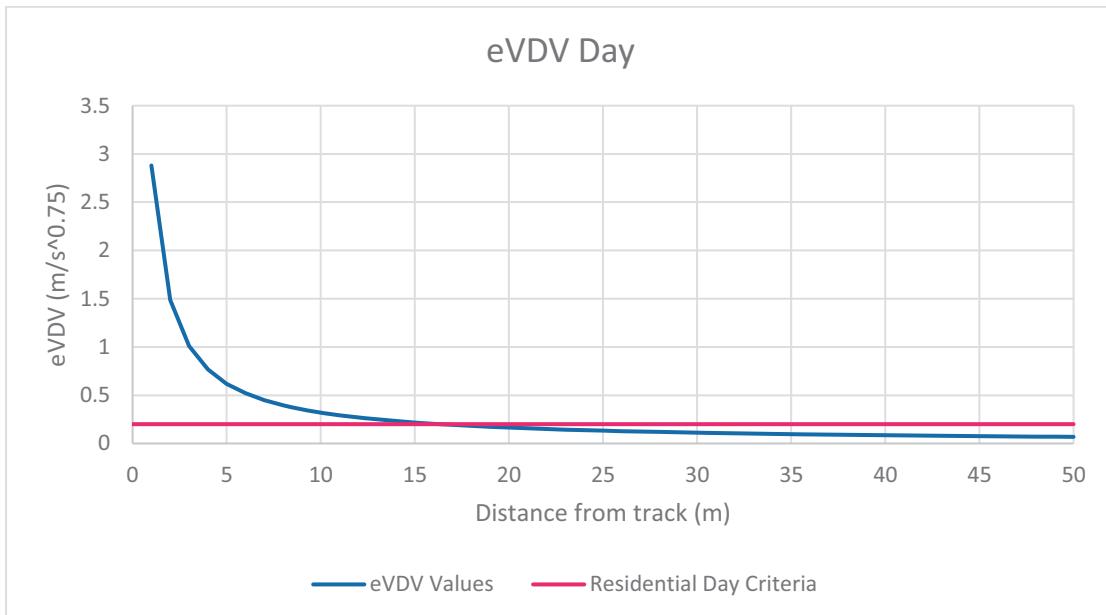


Figure 4-5 Daytime VDV levels (2040)

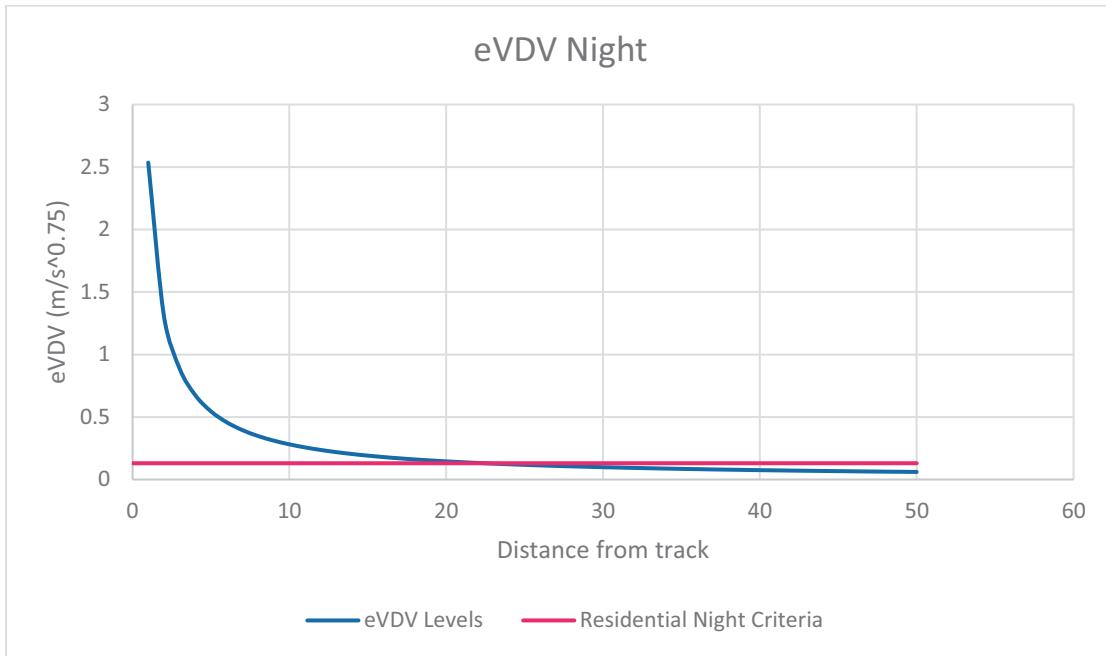


Figure 4-6 Night-time VDV levels (2040)

The nearest receiver is located approximately 45 metres from the track. Therefore, estimated vibration levels are not expected to trigger the day or night-time human comfort criteria. Adverse reactions from operational vibration of the proposal are thus considered unlikely.

5. Construction noise and vibration assessment

5.1 Construction methodology

5.1.1 Construction timing and duration

Construction staging

Construction of the proposal would commence once all necessary approvals are obtained, and the detailed design is complete. It is anticipated that construction would take about 18 months, commencing in early to mid 2018, and concluding in late 2019.

Construction along the existing rail corridor would depend on the possession strategy however it is anticipated that progress would be from south to north, and involve three main stages:

- Stage 1 – Parkes to Goonumbla
- Stage 2 – Goonumbla to Narwonah
- Stage 3 – Narwonah to Narromine

Construction of the Parkes north west connection and the Brolgan Road overbridge would be undertaken in parallel with the above stages.

Proposal construction hours

Construction work would be undertaken during the following primary proposal construction hours:

- Monday to Friday: 6.00 am to 6.00 pm
- Saturday: 6.00 am to 6.00 pm
- Sundays and public holidays: 6.00 am to 6.00 pm

Some minor works may also be undertaken during scheduled rail corridor possession (that is, the times that the movement of trains along the rail corridor are stopped for maintenance or construction). This could include, for example, the connection of the tracks at either end of each stage, and some finishing works. During possessions, works may need to be undertaken on a 24 hour basis.

Out of hours works protocol

An out-of-hours work protocol would be developed to guide the assessment and management of works outside the primary proposal construction hours. The out of hours works protocol would:

- Address the requirements of consent conditions allocated to the proposal relating to works outside of standard construction hours.
- Provide details on what would need to be considered to justify works being undertaken outside standard work hours.
- Describe the assessment process for out of hours works against relevant noise and vibration criteria.
- Provide specific mitigation measures for any residual impacts (in addition to general mitigation measures).

- Describe the communication plan including notification arrangements for potentially impacted receivers.
- Detail how exceedances or non-conformances would be handled.

5.1.2 Construction activities

The proposed track formation works and structure renewals are located between Parkes and Narromine. Temporary works include access into and out of the construction impact zone (CIZ). Table 5-1 lists the site establishment activities, Table 5-2 lists the main upgrading construction activities and Table 5-3 lists the post-construction activities. The construction hours are also provided in these tables to indicate the activities that are generally expected to occur during proposal construction hours and the activities that are expected to occur during possessions.

Table 5-1 Site establishment activities

Activity	Works to be undertaken	Construction Hours
Site establishment	<ul style="list-style-type: none"> • consult land owners/occupants where required • install site environment management and traffic controls in accordance with the Inland Rail NSW Construction Noise and Vibration Framework and the CEMP • establish site compounds and facilities • clear vegetation • erect temporary fencing • establish site access roads where required • utility relocations as required • deliver and stockpile materials including rail, sleepers, ballast, culverts and structural fill. 	<ul style="list-style-type: none"> • Proposal construction hours

Table 5-2 Main upgrading construction activities

Activity	Works to be undertaken	Construction Hours
Track upgrading - skim reconditioning	<ul style="list-style-type: none"> • remove fastenings, rail and sleepers and stockpile to one side of the rail corridor • trim and level the existing ballast bed and compact • place concrete sleepers and rail track on prepared ballast bed and weld up rails • place new ballast on top of the sleepers • tamp and profile the ballast around the sleepers and line to a smooth alignment. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections

Activity	Works to be undertaken	Construction Hours
Track upgrading - track reconstruction	<ul style="list-style-type: none"> • remove fastenings, rail and sleepers and stockpile to one side of the rail corridor • excavate the existing ballast and earth formation • place new earth and recycled ballast into the excavated area and compact • place new ballast on top of the earth formation and compact • place concrete sleepers and rail tracks on prepared ballast bed and weld up rails • place new ballast on top of the sleepers • tamp and profile the ballast around the sleepers and line to a smooth alignment. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections
Drainage construction	<ul style="list-style-type: none"> • prepare survey control points for planned excavation of cess drains • excavate earth material from the side of the existing track formation, and trim and compact base and sides of the drain • form spoil mounds. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections
Level crossings - upgrade to Signalised Level Crossing	<ul style="list-style-type: none"> • remove existing controls, excavate to a suitable depth as required, place new formation material and ballast, replace track and surface panel as required • install new controls • provide standard road signs and road markings. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections
Level crossings - upgrade passive protection (give way signs to stop signs)	<ul style="list-style-type: none"> • Remove give way signs • Install stop signs either side of track • Install road markings for upgrade. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections

Activity	Works to be undertaken	Construction Hours
Level crossing - closure/removal	<ul style="list-style-type: none"> • remove fastenings, rail and sleepers to one side of the rail corridor • excavate the existing ballast and earth formation to a depth determined by geotechnical investigations and design • place new earth and recycled earth formation into the excavated area and compact using vibratory compaction rollers • place new and recycled ballast on top of the earth formation and compact • place concrete sleepers and rail on prepared ballast bed and weld up rails • place new ballast on top of the sleepers • tamp and profile the ballast around the sleepers and line to a smooth alignment • remove all level crossing signs and road markings. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections
Culvert removal and replacement	<ul style="list-style-type: none"> • remove existing culvert structure (either concrete or steel pipes) • excavate to the required depth • place and compact bedding material • install substructure as required • place pre-fabricated culvert structures on the new formation area and fasten together • place ballast, sleepers and rail on top of the culverts and tamp and profile the ballast under and around the sleepers and weld up tracks. 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions when connecting stage sections
Crossing loop constructions	<p>• excavate beside the existing track for the length of the crossing loop</p> <p>• place and compact formation material</p> <p>• place ballast, sleepers and rail tracks on top of the new formation</p> <p>• install signal equipment and associated equipment</p> <p>• testing and commissioning.</p> <p>Turnouts:</p> <ul style="list-style-type: none"> • cut existing track, remove and dispose of existing turnout (at existing sidings only) • undertake formation improvement works as required • install ballast and rails • install control mechanisms (points motor, power supply etc) • testing and commissioning. 	<ul style="list-style-type: none"> • Proposal construction hours

Activity	Works to be undertaken	Construction Hours
Parkes north west connection	<ul style="list-style-type: none"> • excavate to the required depth • place imported formation material into the excavated area and compact • place bottom ballast • place track consisting of fastenings, rail and sleepers on bottom ballast • place ballast on top of the track • tamp and profile the ballast around the sleepers and tracks • construct cess drainage. 	<ul style="list-style-type: none"> • Proposal construction hours
Brolgan Road rail overbridge	<p>Bridge works:</p> <ul style="list-style-type: none"> • construct cast-in-place piles at abutments and piers • construct reinforced soil wall abutment on the northern and southern side of the bridge • construct column extensions and pier headstocks • install super T girders and construct reinforced concrete deck including end diaphragms • construct triangular cast in-situ segments on the four corners of the bridge structure • place precast barriers and complete in-situ pour • construct reinforced concrete approach slabs • install throw screens • install expansion joints and steel traffic barrier railing • install waterproof membrane and asphalt. <p>Embankment and pavement works:</p> <ul style="list-style-type: none"> • place bulk general fill to construct approach embankments • construct new pavement, including placing and compacting select fill, sub base and asphalt wearing surface • tie into existing Brolgan Road. <p>Finishing and landscaping:</p> <ul style="list-style-type: none"> • rehabilitate disturbed areas in accordance with the rehabilitation plan • line marking and sign posting • final site clean-up. 	<ul style="list-style-type: none"> • Proposal construction hours

Table 5-3 Post-construction activities

Activity	Works to be undertaken	
Finishing works/reinstatement	<ul style="list-style-type: none"> • demobilise site compounds and facilities • remove all materials, waste and redundant structures from the works sites • forming, and stabilising of spoil mounds • decommission all temporary work site signs • remove temporary fencing 	<ul style="list-style-type: none"> • Proposal construction hours • During possessions

Activity	Works to be undertaken
	<ul style="list-style-type: none"> • establish permanent fencing • decommission site access roads that are no longer required • restoration of disturbed areas as required, including revegetation where required.

5.1.3 Construction compounds

Minor compounds/storage areas are areas that would be used temporarily for the assembly of adjacent infrastructure such as culverts and turnouts. These compounds would be located within the rail corridor.

Larger compound sites would be established for general construction activities associated with each stage of work. For the purposes of the EIS, it is assumed that temporary compounds would be sited outside the existing rail corridor every 4.5 to five kilometres. Indicative compound locations are provided in the EIS and would be confirmed by the contractor prior to works commencing.

Each larger compound site would contain:

- Stockpiles
- Track infrastructure laydown area
- Bunded refuelling area
- Fencing as required
- Office area including parking, offices and ablutions
- Hazardous material storage.

Activities undertaken at compound sites would include the following:

- Site office operations
- Delivery and stockpiling of various construction materials including rail, sleepers, ballast, culverts and structural fill
- Movement of plant and equipment
- Maintenance of site environmental management controls.

Not all of the above activities would be undertaken at every compound site.

As locations for construction compounds have not yet been finalised, specific impacts could not be assessed on an individual basis. Instead the above compound activities have been accounted for within the modelled construction scenario S1 (site establishment) and impacts have been modelled for the entire alignment. Compounds would be located at least one kilometre from the nearest residence or other noise sensitive receiver where possible, and if required, compounds would be further assessed once locations are finalised.

5.1.4 Haul roads

While a detailed haulage program has not yet been developed, it is expected that the majority of the proposal's components would be delivered by rail from various locations. Other transport would be undertaken by heavy vehicles using the Newell Highway, Gwydir Highway/Alice Street and Kamilaroi Highway and then local roads and existing access roads along the rail corridor.

It is likely that rail components, including sleepers, ballast, and track, would be transported to the work areas via dedicated rail trains; while pre-fabricated concrete units, fill and equipment deliveries would most likely be via road from suppliers or town centres.

5.1.5 Construction noise assessment methodology

The methodology for the construction noise and vibration assessment included:

- The rating background levels (RBL) for the proposal were calculated from the baseline noise monitoring data. The RBLs were used to establish the construction noise management levels in accordance with the ICNG. The proposal construction hours incorporate working hours that are outside of standard construction hours (as defined in the ICNG). The assessment has therefore adopted the construction management level for out of hours works as the proposal specific construction noise management level.
- A list of likely construction activities and machinery was provided. Representative sound power levels for the selected equipment were obtained from the TfNSW CNS and AS 2436 – 2010 *Guide to noise and vibration control on construction, demolition and maintenance sites* and British Standard BS 5228.1 *Code of Practice for noise and vibration control on construction and open sites: Part 1 Noise*.
- Noise propagation calculations were carried out for the anticipated equipment.
- Vibration from construction plant and equipment was predicted and assessed with consideration to Assessing Vibration: A Technical Guideline and German Standard DIN 4150, Part 3: Structural Vibration in Buildings: Effects on Structures.
- Where noise and vibration levels were predicted to exceed the construction management levels, appropriate construction noise and vibration mitigation measures were provided to reduce potential impacts.

5.1.6 Construction plant and equipment

Noise emissions from construction activities have been assessed at identified sensitive receivers in the study area. A quantitative assessment has been carried out with consideration to the ICNG.

Plant and equipment to be used to construct the proposal would be confirmed by the construction contractor once appointed. At this stage of development, the plant and equipment have been selected using professional judgement. Construction equipment will move about the project site and will operate at maximum power for only brief periods. At other times, noise levels will be reduced as the machinery may not require full power or will operate in a different location. It is highly unlikely that all assumed construction equipment would be operating at maximum power simultaneously. For the purposes of this assessment, the two loudest construction plant are assumed to operate concurrently and used to predict the expected construction noise levels. A number of these assumptions therefore provide a degree of conservatism in the predicted results.

The predicted construction sound power levels are shown in Table 5-4 for the construction activities and the plant and equipment expected to be used for the proposal.

Table 5-4 Construction activities and corresponding equipment

Modelling scenario	General tasks	Representative equipment ¹	Equipment individual sound power level, L _w dB(A)	Adopted activity sound power level, L _w dB(A) ¹	Location
S1	Site establishment works	Hand tools	102		
		Road truck	108		
		Excavator	110		
		Water cart	107		
		Grader	110		
		Dump truck	117		
		Dump truck	117		
S2	Track upgrading - skim reconditioning	Rail saw	107		
		Vibratory roller	113		
		Front end loader	111		
		Grader	110		
		Tamper and regulator	112		
		Dump truck	117		
		Rail saw	107		
S3	Track upgrading –track reconstruction	Vibratory roller	113		
		Front end loader	111		
		Grader	110		
		Tamper and regulator	112		
		Excavator	110		
		Dump truck	117		
		Franna crane	98		
S4	Drainage construction	Vibratory roller	113		
		Asphalt paver	108		
		Franna crane	98		
		Excavator	110		
		Vibratory roller	113		
S5	Level crossings - upgrade to signalised level crossing	Hand tools	102		
					Signalised level crossings
				115	

Modelling scenario	General tasks	Representative equipment ¹	Equipment individual sound power level, L _w dB(A)	Adopted activity sound power level, L _w dB(A) ¹	Location
S6	Level crossing - upgrade passive protection (give way signs to stop signs)	Hand tools Road truck	102 108	109	
S7	Level crossing - closure/removal	Hand tools Excavator Front end loader Vibratory roller Road truck Tamper and regulator Franna crane Crane Excavator Dump truck Road truck Vibratory roller Tamper and regulator Concrete truck Excavator Dump truck Vibratory roller Front end loader Road truck Hand tools Crane Excavator	102 102 110 111 113 108 112 98 110 110 117 108 113 112 112 110 117 113 111 108 102 110 110 110 103	109 108 110 111 113 108 112 98 110 110 117 108 113 112 112 110 117 113 111 108 102 110 110 110 103	Level crossings for removal
S8	Culvert removal and replacement			118	Culverts
S9	Crossing loop construction			118	Crossing loops
S10	Post construction works (finishing works/reinstatement)			113	Full alignment
S11	Parkes north west connection – site establishment	Truck (medium rigid) Crane Chainsaw Chipper	110 114 111	116	Parkes north west connection

Modelling scenario	General tasks	Representative equipment ¹	Equipment individual sound power level, L _w dB(A)	Adopted activity sound power level, L _w dB(A) ¹	Location
S12	Parkes north west connection – earthworks	Jackhammer Dozer Compactor Vibratory roller Vibratory roller Compactor Front End loader Excavator	118 116 113 113 113 113 111 110	120	Parkes north west connection
S13	Parkes north west connection – track works	Pavement laying machine Compactor Vibratory roller Concrete truck	114 113 113 112	116	Parkes north west connection
S14	Brolgan Road rail overbridge construction			117	Brolgan Road over Parkes north west connection

Note 1: the adopted sound power level is calculated using the loudest two items of equipment

5.1.7 Construction noise prediction method

The noise emissions generated by construction activities have been determined using a computer software model Computer Aided Noise Abatement (CadnaA v4.6) to predict noise levels at the nearest sensitive receivers.

CadnaA is a computer program for the calculation, assessment and prognosis of noise propagation. CadnaA calculates sound propagation according to ISO 9613-2, “*Acoustics – Attenuation of sound during propagation outdoors*”. The ISO 9613-2 algorithm also takes into account the presence of a well-developed moderate ground based temperature inversion, such as commonly occurs on clear, calm nights or ‘downwind’ conditions which are favourable to sound propagation.

Ground absorption, reflection, terrain and relevant shielding objects are taken into account in the calculations.

Model configuration

The noise model inputs and assumptions for the construction assessment are provided in Table 5-5.

Table 5-5 Construction noise modelling assumptions

Modelling component	Assumption
Prediction algorithm	<i>ISO 9613 – 2 Acoustics – Attenuation of sound during propagation outdoors</i>
Modelling period	Typical worst case 15 minute period of operation where the two loudest items of equipment are running at full power
Meteorology	ISO 9613 considers the presence of a well-developed moderate ground based temperature inversion, such as commonly occurs on clear, calm nights or ‘downwind’ conditions which are favourable to sound propagation
Ground absorption coefficient	$G = 1.0$ for rural areas
Atmospheric absorption	Based on an average temperature of 10 °C and an average humidity of 70 %
Receiver heights	1.5 m above building ground level (ground floor)
Operating intensity	Construction scenario sound power levels have been adopted

The magnitude of the noise levels associated with construction activities would be dependent upon a number of factors:

- The intensity and location of construction activities
- The type of equipment used
- Existing local noise sources
- Intervening terrain
- The prevailing weather conditions

5.2 Construction noise level prediction

Sound power levels presented in Table 5-4 were grouped into activity based noise levels for input into the noise model. Using the sound power level from the two loudest pieces of equipment operating simultaneously is considered a conservative approach. The predicted noise management level exceedances for each activity scenario are shown in Table 5-6 while the numbers of receivers exceeding each management level are presented in Table 5-7.

Table 5-6 Activity-based construction management level exceedances for residential receivers

Construction management level (CML)	CML L _{Aeq} 15min	Maximum predicted exceedance of construction management level (dBA)									
		Full alignment works: S1, S2, S3, S4, S12		S5: Signalised Crossing		S6: Give Way Crossing		S7: Level Crossing removal		S8: Culvert works	
Highly Affected	75	-	-	-	-	-	-	-	-	-	-
Proposal specific CML (all periods)	35	33	24	21	13	25	18	28	14	18	14
Highly Affected	75	-	-	-	-	-	-	-	-	-	-
Proposal specific CML (all periods)	35	294	59	20	9	264	135	99	9	23	9
Highly Affected	75	-	-	-	-	-	-	-	-	-	-
Proposal specific CML (all periods)	35	9	2	-	-	-	-	-	-	-	-

Table 5-7 Activity-based construction management level, number of exceedances

Construction management level (CML)	CML L _{Aeq} 15min	Number of predicted exceedances of construction management level									
		Full alignment works: S1, S2, S3, S4, S12		S5: Signalised Crossing		S6: Give Way Crossing		S7: Level Crossing removal		S8: Culvert works	
Highly Affected	75	-	-	-	-	-	-	-	-	-	-
Proposal specific CML (all periods)	35	294	59	20	9	264	135	99	9	23	9
Highly Affected	75	-	-	-	-	-	-	-	-	-	-
Proposal specific CML (all periods)	35	9	2	-	-	-	-	-	-	-	-

The construction impacts at the identified non-residential receivers were assessed. None of these receivers were found to exceed the relevant ICNG criteria.

5.2.1 Impacts of construction activities for the key proposal features

Based on the results listed in Table 5-6 and Table 5-7 the findings of the construction noise assessment in relation to the key features of the proposal are discussed below.

Track works

Activities that encompass the entire proposal site (ie the full alignment), such as pre possession works (S1), skim track reconditioning (S2), full depth reconditioning (S3), and drainage construction (S4), are predicted to exceed the construction noise management levels:

- Between Parkes and Peak Hill at 29 receivers with impacts up to 27 dB for works undertaken during proposal construction hours.
- Within Peak Hill at 123 receivers with impacts up to 30 dB for works undertaken during proposal construction hours.
- Between Peak Hill and Narromine at 76 receivers with impacts up to 33 dB for works undertaken during proposal construction hours.

Construction would progress along the route, therefore, noise impacts would be experienced for a relatively short time at most locations.

Level crossing upgrades and removals

Construction activities of crossing signalisation (S5), give way crossing upgrades (S6), and level crossing removal (S7) are predicted to exceed the construction noise management levels:

- Between Parkes and Peak Hill at 9 receivers with impacts up to 13 dB for works during proposal construction hours.
- Within Peak Hill at 37 receivers with impacts up to 24 dB for works undertaken during proposal construction hours.
- Between Peak Hill and Narromine at 14 receivers with impacts up to 19 dB for works undertaken during proposal construction hours.

Culvert works

Replacement and upgrade of existing culverts and bridges (culvert works, S8) are predicted to exceed the construction noise management levels:

- Between Parkes and Peak Hill at 23 receivers with impacts up to 10 dB for works undertaken during proposal construction hours.
- Within Peak Hill at 119 receivers with impacts up to 18 dB for works undertaken during proposal construction hours.
- Between Peak Hill and Narromine at 67 receivers with impacts up to 25 dB for works undertaken during proposal construction hours.

Crossing loops

Construction of crossing loops (S9) is predicted to exceed the construction noise management levels:

- Between Parkes and Peak Hill, 1 receiver with impacts up to 2 dB for works undertaken during proposal construction hours.
- Within Peak Hill at 105 receivers with impacts up to 17 dB for works undertaken during proposal construction hours.
- Between Peak Hill and Narromine at 7 receivers with impacts up to 18 dB for works undertaken during proposal construction hours.

Construction of the crossing loops would take around eight weeks to complete.

Parkes north west connection

Construction of the new track at the Parkes north west connection including site establishment (S11), earthworks (S12) and trackworks (S13) are predicted to exceed the construction noise management levels at 18 receivers with impacts up to 18 dB for works undertaken during proposal construction hours.

Parkes north west connection - Brolgan Road overbridge

Construction of the Brolgan Road overbridge is predicted to exceed the construction noise management levels at 2 receivers with impacts up to 18 dB for works undertaken during proposal construction hours.

5.2.2 Impacts of construction activities in relation to working hours

Works during proposal construction hours

The assessment indicates that:

- Rail line redevelopment construction activities are predicted to exceed the noise management level at receivers nearest to the construction footprint. Impacted receivers are within about 700 metres of the works and includes up to 228 identified noise sensitive residential receiver locations. Noise levels are predicted to exceed the proposal specific construction management level by up to 33 dB.
- New rail line construction works at the Parkes north west connection are predicted to exceed the proposal specific construction management level by up to 18 dB at 23 noise sensitive receivers.
- Brolgan road overbridge construction is predicted to exceed the proposal specific construction management level by about 18 dB at two residential receivers.

The noise and vibration mitigation measures detailed in Section 6.3 would be implemented where feasible and reasonable to protect the environment and reduce the potential for noise exceedances at receivers. All potentially affected receivers should be informed of the nature of the works, expected noise levels, duration of works and a method of contact.

5.3 Construction traffic noise

It is expected that vehicles will access working sites via arterial, subarterial and local roads.

Limited existing traffic volume data is available for most roads in and around the study area, although in most cases, volumes are expected to range between 50 vehicles per day for lower order roads, up to 2,000 vehicles per day on some of the more significant roads radiating from Parkes. The busiest road to be utilised by construction traffic from the proposal is the Newell Highway, which is discussed below.

The proposed works will temporarily increase truck movements on the roads mentioned above during construction. Predictions of the change in traffic noise level due to the addition of construction traffic were undertaken using the United Kingdom Department of Transport's 'Calculation of Road Traffic Noise' CoRTN algorithm.

The exact number of construction vehicles will vary at different stages of the construction works and will be confirmed when the construction contractor is appointed. However, it is estimated that during the busiest construction period, there will be approximately 400 vehicle movements, including 230 heavy vehicle movements and this peak volume has been used to provide a conservative analysis of the likely level of noise levels.

The traffic information and expected noise level increase from additional traffic on the Newell Highway is summarised in Table 5-8. It is anticipated that the contribution of additional construction traffic will have a minimal impact on the noise levels along the highway. The increase in noise levels due to construction traffic is estimated to be less than 1 dB which will not be noticeable at receivers.

Table 5-8 Construction traffic noise increase

Road	AADT	Existing heavy vehicle percentage	Approximate noise level increase (dBA)
Newell Highway-Tomingley (2015)	2,800	33%	0.9
Newell Highway-Peak Hill (2009)	6,100	31% ⁷	0.5
Newell Highway-Parkes (2009)	2,800	31%	0.9

5.4 Sleep disturbance

The *Interim Construction Noise Guideline* (DECC, 2009) states that '*where construction works are planned to extend over more than two consecutive nights, the impact assessment should cover the maximum noise level from the proposed works*'.

Typically, $L_{A1(1\text{minute})}$ or, $L_{A\text{max}}$ noise levels are around 5 dB to 10 dB greater than the $L_{A\text{eq}(15\text{minute})}$ noise levels. Typically, a standard window will provide a 10 dB reduction when partially open and a 20 dB reduction when closed. To be conservative, it is assumed that windows would be kept partially open during night-time construction activities.

The *Environmental Criteria for Road Traffic Noise* (OEH, 1999) acknowledges that based on the current level of understanding, no absolute noise level criteria have been established that correlate to an acceptable level of sleep disturbance. However, the RNP suggests that internal noise levels below 50 dB(A) $L_{A\text{max}}$ to 55 dB(A) $L_{A\text{max}}$ are unlikely to cause awakening reactions and one or two events per night, with internal noise levels of 65 dB(A) $L_{A\text{max}}$ to 70 dB(A) $L_{A\text{max}}$ (inside dwellings) are not likely to significantly affect health and wellbeing.

⁷ Heavy vehicle percentage not available. An estimate of 31% has been adopted for this assessment based on traffic volumes at Parkes.

There is the potential for sleep disturbance impacts, with consideration to the RNP sleep disturbance levels, if construction activities occur during the night-time period. Table 5-9 lists each construction scenario and estimates the number of receivers where sleep disturbance could result.

Table 5-9 Sleep disturbance, number of exceedances

$L_{A\text{Max}}$ internal level ⁸	Number of predicted exceedances of sleep disturbance criteria											
	Full alignment works: S1, S2, S3, S4, S12	S5: Signalled Crossing	S6: Give Way Crossing	S7: Level Crossing removal	S8: Culvert works	S9: Crossing loops	S10: Post construction	S11: NW Connection Establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge	
55 dB(A)	13	1	1	0	2	0	7	0	0	0	0	0

Given the potential for sleep disturbance impacts, construction activities likely to generate the highest levels of noise should be scheduled to occur at the beginning of the shift (before 11 pm) to minimise the potential for sleep disturbance. All workers should be briefed on the need to minimise noise as a result of their activities.

The noise and vibration mitigation measures detailed in Section 6.3 would be implemented to manage potential sleep disturbance impacts during construction.

5.5 Construction vibration assessment

5.5.1 Typical equipment levels

Energy from equipment is transmitted into the ground and transformed into vibration, which attenuates with distance. The magnitude and attenuation of ground vibration is dependent on the following:

- The efficiency of the energy transfer mechanism of the equipment (i.e. impulsive, reciprocating, rolling or rotating equipment).
- The frequency content.
- The impact medium stiffness.
- The type of wave (surface or body).
- The ground type and topography.

Table 5-10 outlines typical vibration levels for different plant activities sourced from the RMS *Environmental Noise Management Manual* (ENMM) (2001), British Standard BS 5228.1 *Code of Practice for noise and vibration control on construction and open sites: Part 2 Vibration and the Construction Noise Strategy* (Transport for NSW 2012).

As stated in the ENMM (RMS 2001), it can be assumed that the vibration level of a source is inversely proportional to the distance source-receiver. Field variations show that the distance relationship generally varies between $d^{-0.8}$ and $d^{-1.6}$, rather than d^{-1} .

⁸ 55 dB(A) internal level from the RNP. $L_{A\text{Max}}$ levels were estimated as 10 dB greater than the LAeq(15minute) levels and external noise levels were assessed as 10 dB above internal levels.

Table 5-10 Typical vibration levels for construction equipment

Item	PPV at 10 m (mm/s)
Roller	5 - 6
15 tonne roller	7 - 8
7 tonne compactor	5 - 7
Dozer	2.5 - 4
Backhoe	1
Excavators, Scrapers, Graders etc	2.5 ¹
Piling (impact)	30
Piling (vibratory) ²	16.8
Piling (bored) ²	7.4

Note 1: Based on levels derived at 8 m from: Tyan, A. E. *Ground Vibrations. Damaging effects to Buildings*. Road Research Board 1973

Note 2: Based on levels derived from BS5228-2. *Bored piling through stones or other obstruction*. Vibratory piling based on relationship provided in Table E.1

5.5.2 Construction vibration predictions

Based on the typical vibration levels listed in Table 5-10, the potential vibration levels due to the construction works at various distances are shown in Table 5-11.

Table 5-11 Predicted construction vibration levels

Vibration source	Distance to Source/ Peak Particle Velocity (mm/s)			
	10 m	20 m	50 m	100 m
Roller	6.0	3.4	1.7	1.0
15 tonne vibratory roller	8.0	4.6	2.2	1.3
7 tonne compactor	6.0	3.4	1.7	1.0
Dozer	4.0	2.3	1.1	0.6
Backhoe	1.0	0.6	0.3	0.2
Excavator	2.1	1.2	0.6	0.3
Piling (impact)	30	17.2	8.3	4.8
Piling (vibratory) ¹	16.8	7.3	2.4	1.1
Piling (bored) ¹	7.4	4.3	2.1	1.2

Note 1: Based on levels derived from BS5228-2. *Bored piling through stones or other obstruction*. Vibratory piling based on relationship provided in Table E.1

Construction vibration buffer distances

Predicted safe working buffer distances to comply with the human comfort, cosmetic damage, standard dwelling and heritage building structural damage criteria were calculated for typical vibration values and listed in Table 5-12. This table is based on advice given in British Standard BS 7385:1993 – *Evaluation and measurement of vibration in buildings*.

Vibration may be amplified in multi-level buildings through the structure to the upper floors. A doubling of the buffer distances provided in Table 5-12 would provide a conservative allowance for this possible effect.

Table 5-12 Vibration buffer distances

Activity	Human comfort BS 5228-2 criteria (1.0mm/s)	Structural damage	
		Heritage building/structure DIN 4150-3 criteria (3.0mm/s)	Standard dwellings DIN 4150-3 criteria (5.0mm/s)
General construction activities			
Roller	90 m	24 m	13 m
15 tonne vibratory roller	140 m	35 m	18 m
7 tonne compactor	90 m	24 m	13 m
Dozer	60 m	15 m	8 m
Backhoe	10 m	3 m	2 m
Excavator	25 m	7 m	4 m
Piling			
Piling (impact)	700 m	180 m	100 m
Piling (vibratory) ²	110 m	50 m	30 m
Piling (bored) ²	120 m	35 m	17 m

Note 1: Based on advice given in British Standard BS 7385:1993 – Evaluation and measurement of vibration in buildings.

Note 2: Based on levels derived from BS 5228-2. *Bored piling through stones or other obstruction*. Vibratory piling based on relationship provided in Table E.1

General construction activities

With consideration to structural damage vibration impacts from general construction activities, the expected magnitude of ground vibration should not be sufficient to cause damage if the equipment operates at distances greater than 18 metres from standard residential buildings or 35 metres from heritage structures.

The noise and vibration mitigation measures detailed in Section 6.3 should be implemented to reduce the potential for construction vibration impacts to occur.

Piling

Vibration impacts due to piling activities have the potential to exceed structural vibration values for standard dwellings at distances from the activity of 100 metres for impact piling, 30 metres for vibratory piling and 17 metres for bored piling.

In the event that these buffer distances are not possible to achieve, other methods may be investigated such as CFA piling, press-in hydraulic piling or jacked-in piling. These methods generally exhibit much lower vibration levels compared to impact, vibratory and bored piling.

5.5.3 Construction vibration impacts on heritage structures

Potentially sensitive heritage structures were identified as part of the heritage report undertaken for the EIS (refer Umwelt, 2017, *ARTC Inland Rail – Parkes to Narromine Non-Aboriginal Heritage Impact Statement*). These items are listed in Table 5-13 including their location and approximate distance to the proposal site for comparison to the structural damage buffer distances stated in Table 5-12.

Table 5-13 Heritage structures

Item name	Location	Distance to corridor/track
Narromine District Hospital	Bound by Dandaloo, Cathundral and Temain Streets Narromine	Approximately 900 m east
Peak Hill Courthouse	Derribong Street	Approximately 775 m east
Peak Hill Fire Station	130 Caswell Street	Approximately 975 m east
Peak Hill Police Station and Official Residence	80 Derribong Street	Approximately 750 m east
St. James Roman Catholic Church	Narra Street, Lots 17-20 DP 758832	Approximately 950 m east
Station – Goonumbla and grain siding and silos	Chainage 465.600	On alignment / Immediately adjacent
Station – Alectown West and Grain siding and Silo	Chainage 473.600	On alignment / Immediately adjacent
Station – Mickibri and Grain siding and Silo	Chainage 482.362	On alignment / Immediately adjacent
Station – Peak Hill	Chainage 498.400	On alignment / Immediately adjacent
Station – Tomingley West and Grain siding and Silo	Chainage 516.100	On alignment / Immediately adjacent
Tomingley West Cottage	Tomingley West Road	100 m west of main rail line
Station – Wyanga and Grain siding and Silo	Chainage 528.990	On alignment / Immediately adjacent
Wyanga Cottage	Chainage 528.990	On alignment / Immediately adjacent
Station – Narwonah and Grain siding and Silo	Chainage 547.050	On alignment / Immediately adjacent

General construction activities

Heritage structures in the proposal area include station buildings, sidings and silos. Many of these structures are directly adjacent to the track alignment. With consideration to structural damage, vibration impacts for general construction activities, the expected magnitude of ground vibration should not be sufficient to cause damage if the equipment operates at distances greater than 35 metres from heritage buildings and structures. Many items are potentially within this buffer distance. However, measured vibration levels by GHD on other projects in the Hunter Valley during removal and excavation of old track indicated a maximum recorded PVS of 2.87 millimetres per second. Tamping and ballast regulation generated a maximum PVS of 0.98 millimetres per second at the floor of the station building. These vibration velocities are within the DIN 4150-3 criteria for heritage structures of 3 millimetres per second. As identical works are proposed to be undertaken for the proposal, vibration damage for adjacent station structures is not anticipated, however it is recommended that the mitigation measures detailed in Section 6.3 be considered and implemented where feasible and reasonable.

Piling

Vibration impacts due to piling activities have the potential to exceed structural vibration criteria for heritage structures at distances from the activity of 180 metres for impact piling, 50 metres for vibratory piling and 35 metres for bored piling.

In the event that these buffer distances are not achievable, other methods may be investigated such as CFA piling, press-in hydraulic piling or jacked-in piling. These methods generally exhibit much lower vibration levels compared to impact, vibratory and bored piling.

5.5.4 Human comfort impacts

Humans are capable of detecting vibration at levels well below those causing risk of damage to buildings. The degree of perception for humans and sensitive areas are suggested by the vibration level categories given in British Standard BS 5228:2009 and shown in Table 3-8 and Table 3-9.

Based on the conservative estimates detailed in Table 5-12, it is possible that construction vibration from general construction work and at crossing loops may be perceptible at distances of up to 140 metres from the works. There are 20 residential receivers identified within this buffer distance including six near Narromine, ten near Peak Hill and the remaining four scattered along the alignment. Therefore it is recommended that the mitigation measures detailed in Section 6.3 be considered and implemented where feasible and reasonable.

Piling works are required to construct the Brolgan Road overbridge. Vibration impacts due to boring of the cast in-situ piles has the potential to impact receivers up to 120 metres from the work area. The piling activities are anticipated near the bridge span, which is more than 400 metres from the nearest vibration sensitive receiver, therefore human comfort impacts are not anticipated from these works.

6. Mitigation measures

6.1 Approach to mitigation

An operational noise and vibration review (ONVR) would be prepared to detail how the predicted operation impacts would be mitigated.

A Construction Environment Management Plan (CEMP) and activity specific Construction Noise and Vibration Impact Statements (CNVIS) would be developed based on the requirements and methodologies presented in the Inland Rail NSW Construction Noise and Vibration Framework. These documents provide the approach to managing noise and vibration during construction.

The proposal would be designed, constructed, and operated in accordance with the CEMP, the noise and vibration control strategy, the Inland Rail NSW Construction Noise and Vibration Management Framework (provided in the EIS), the conditions of approval for the proposal, and the environment protection licence for Inland Rail.

6.2 Operational noise and vibration

6.2.1 Noise control strategy

A noise and vibration impact assessment has been completed on the basis of the existing design and other information available for the proposal. While the assessment has been limited due to the preliminary nature and availability of design information, exceedances of the RING criteria are predicted and mitigation measures are therefore necessary to reduce the potential for impacts.

Identification of specific noise abatement measures is not possible during this stage of the project; however a range of abatement measures have been identified to reduce noise levels to below the RING trigger levels. Potential noise control options are listed in Table 6-1. The effectiveness and appropriateness of these measures will be considered following detailed design and community consultation.

Table 6-1 Potential noise control options

Noise control strategy	Mitigation option	Description
Controlling noise at source	Rail dampers	<p>Rail dampers are preformed elements made of an elastic material containing steel strips. Dampers are placed on the sides of the rail, dampening the vibration of the rails as the train passes over them and thereby reducing noise emissions.</p> <p>Noise reduction in the order of 2 to 5 dBA is possible, depending on the rail roughness (the smoother the rail, the less attenuation). However, this is only valid when the wheel-rail interface is the main noise source.</p> <p>In the context of coal or freight train pass-bys, rail dampers would not attenuate L_{Amax} levels, which are normally dominated by locomotive noise, but would reduce wagon noise.</p> <p>This option could be considered for the proposal where small noise reductions are needed.</p>

Noise control strategy	Mitigation option	Description
	Track lubrication	<p>Trackside lubrication strategies can be employed to improve the performance of the rail track and reduce noise generated, particularly from rail squeal and flanging on tight curves. These strategies are as follows:</p> <ul style="list-style-type: none"> • Improvements in grease transfer by placing trackside lubricators on moderate curves in advance of the sharp curves which are the main target • Improvements in the lubricant used by choosing a high performance product <p>Track lubrication improves the rail/track interface and can reduce/eliminate curve squeal and flanging at affected locations. This can result in a substantial noise reduction in L_{Aeq}, L_{Amax} levels.</p> <p>Note that there are very few tight radius curves in the proposal, so track lubrication would have limited application.</p>
Controlling noise on the transmission pathway	Noise barriers	<p>Noise barriers are typically constructed on the edge of the rail corridor to shield sensitive receivers from rail vehicles. Depending on the situation, noise barriers can achieve 10 to 15 dBA attenuation.</p> <p>Noise barriers often result in significant costs and visual impacts. They are generally considered preferable where noise attenuation at a larger number of receivers is required and typically not cost-effective for small number of receivers.</p>
	Earth mounds	<p>Earth mounds are generally constructed at a distance from the near rail to shield sensitive receivers from rail vehicles. Earth mounds can provide effective mitigation of noise if sufficient spoil and space is available. However, earth mounds generally provide less attenuation of noise than noise barriers and require a larger area also.</p> <p>During detailed design the potential to utilise the proposed spoil mounds (described in the EIS) as noise barriers would be investigated.</p>
Controlling noise at the receiver	Architectural treatment	<p>Architectural treatment consists of reducing noise levels at affected residences in order to meet internal noise levels. Treatment could include retrofitting thicker window glazing, roof insulation, door and windows acoustic seals and the like. It could also include boundary fences if it would be effective in reducing external noise levels.</p> <p>Noise attenuation is substantially dependant on the condition and design of the existing residence. Note that architectural treatment may also include fitting of mechanical/forced ventilation so that windows can be kept closed if the occupant desires.</p> <p>Architectural treatment is often the most practical option where individual receivers require noise mitigation and where other mitigation options have been considered and exhausted.</p>

An Operational Noise and Vibration Review (ONVR) shall be prepared for the project to confirm noise and vibration control measures based on the final proposal design and operation. The ONVR shall:

- Confirm predicted project noise and vibration levels at sensitive receivers. This may include the results of façade testing for non-residential receivers.

- Assess feasible and reasonable noise and vibration measures consistent with RING and in a hierarchical manner.
- Specify noise and vibration abatement measures for all relevant sensitive receivers.
- Include a consultation strategy to seek feedback from directly affected property owners on the proposed noise and vibration abatement measures.
- Include a timetable for delivery of abatement prior to operation of the Inland Rail.
- Outline post-operational monitoring to verify noise and vibration predictions.

Typically, a post construction noise and vibration assessment including monitoring would be undertaken to validate predicted noise levels and identify any unforeseen impacts, however as noise and vibration levels are not expected to appreciably change until Inland Rail through connection in 2025, it is considered appropriate to undertake the post construction noise and vibration assessment within three months following through connection. The assessment would be undertaken to confirm compliance with the predicted levels, or as modified by the reasonable and feasible review. If the results of modelling indicated that the predicted noise and vibration levels are exceeded, then additional reasonable and feasible mitigation measures would be implemented in consultation with the affected property owners.

Given the preliminary nature of information about the proposal, it is not possible to be definitive about the mitigation measures required. However, in broad terms there are three main strategies for reducing operational noise and vibration impacts:

- Controlling noise and vibration at the source
- Controlling noise and vibration along the transmission pathway
- Controlling noise and vibration at the receiver

The RING recommends that these control strategies are considered in this order so that all measures to reduce noise are exhausted before localised ‘at source’ mitigation measures are considered.

The RING also requires that feasible and reasonable mitigation measures are implemented. A feasible mitigation measure is a measure that can be engineered and is practical to build, given constraints such as safety, maintenance and reliability requirements. It may also include options such as amending operational practices (e.g. reviewing idling times or speeds) to achieve noise reduction.

Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make such a judgement, the following aspects are typically considered:

- Noise impacts:
 - Existing and future levels, and projected changes in noise levels.
 - Level of amenity before the proposal, e.g. the number of people affected or annoyed.
 - Any noise performance criteria for the development, e.g. internal noise levels for certain rooms.
 - The amount by which the trigger levels are exceeded.
- Noise mitigation benefits:
 - The amount of noise reduction expected, including the cumulative effectiveness of proposed mitigation measures.
 - The number of people protected.

- Cost-effectiveness of noise mitigation:
 - The total cost of mitigation measures, taking into account the physical attributes of the site, e.g. topography, geology, and the cost variation to the proposal given the expected benefit.
 - Noise mitigation costs compared with total proposal costs, taking into account capital and maintenance costs.
 - Ongoing operational and maintenance cost borne by the community, e.g. running air conditioners or mechanical ventilation.
- Community views:
 - Aesthetic and other impacts of noise mitigation measures with consideration to the affected land users.
 - Consider the views of all affected land users, not just those making representations, through early community consultation.
 - Consider noise mitigation measures that have majority support from the affected community.

Based on these considerations, the aim of the mitigation strategy is to strike a balance between the proposal's benefits for the wider community and the costs and benefits of mitigation measures.

6.3 Construction noise and vibration

The Inland Rail NSW Construction Noise and Vibration Management Framework (provided in the EIS) has been developed to show how construction noise and vibration will be managed for Inland Rail in NSW. It provides a framework for managing construction noise and vibration impacts in accordance with the ICNG, to provide a consistent approach to management and mitigation across Inland Rail.

Specifically the NSW Construction Noise and Vibration Management Framework identifies the requirements and methodology to develop Construction Noise and Vibration Impact Statements. These would be prepared prior to specific construction activities and based on a more detailed understanding of the construction methods, including the size and type of construction equipment, duration and timing of works, and detailed reviews of local receivers if required. A Construction Noise Impact Statement would include:

- A more detailed understanding of surrounding receivers, including particularly sensitive receivers such as education and child care, and vibration sensitive medical, imaging, and scientific equipment.
- Application of appropriate noise and vibration criteria for each receiver type.
- An assessment of the potential noise and vibration impacts as a result of different construction activities.
- Minimum requirements in relation to standard noise and vibration mitigation measures.
- Noise and vibration auditing and monitoring requirements.
- Additional mitigation measures to be implemented when exceedances to the noise management levels are likely to occur - these measures are aimed at pro-active engagement with potentially affected receivers, provision of respite periods, and alternative accommodation for defined exceedance levels.

The proposal would be constructed in accordance with the Construction Noise and Vibration Management Framework, the CEMP, site-specific Construction Noise and Vibration Impact Statements, the conditions of approval for the proposal, and the construction EPL.

Practical and reasonable measures would be implemented to reduce the noise and vibration levels at sensitive receivers. Section 6.3.1 outlines additional measures to manage noise where the construction noise assessment identified exceedances of the relevant management levels.

6.3.1 Management of construction noise and vibration exceedances

The approach to managing exceedances of noise management levels will be undertaken in accordance with ARTC's communication strategy for the Inland rail project.

Mitigation management practices are listed below and the contexts in which they should be implemented are described in Table 6-2 and Table 6-3.

Communication (CO)

Communication with affected stakeholders will be undertaken in accordance with the proposal's communication strategy. Communication measures are expected to include notification of affected stakeholders with appropriate lead time, level of personalization, and opportunity for feedback as appropriate for the specific situation.

Respite Offer (RO)

Residents subjected to lengthy periods of noise or vibration may be eligible for a respite offer. The purpose of such an offer is to provide residents with respite from an ongoing impact. Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur noise levels significantly above the applicable level across two or more consecutive sleep periods.

The implementation of the above measures is determined by matching the predicted exceedance to the appropriate mitigation measures as detailed in Table 6-3 below. The specific details of communication are to be outlined in the communication strategy for the proposal.

Table 6-2 Additional mitigation measures – Airborne construction noise

Time Period		NML, dB(A)	Perception	Exceedance of NML, dB(A)	Mitigation Measures
All hours		-	Highly affected, >75 dB(A)	-	RO, CO
Proposal construction hours	6am – 6pm	35	Noticeable	<5	-
			Clearly audible	5-15	CO
			Moderately intrusive	15-25	CO
			Highly intrusive	>25	RO, CO
OOHW	6pm – 6am	35	Noticeable	<5	CO
			Clearly audible	5-15	CO
			Moderately intrusive	15-25	RO, CO
			Highly intrusive	>25	RO, CO

Notes: OOHW: Out Of Hours Work – Period 1 includes times of day typically used for rest including weekday evenings, Saturday afternoons and daytime during Sundays/public holidays. Period 2 includes times typically used for sleep and where the greatest sensitivity to noise exists including night times during weekdays/Saturdays and both evening and night times for Sundays/public holidays.

CO – Communication. RO – Respite Offer

Table 6-3 Additional mitigation measures – Construction vibration

Time Period		Mitigation Measures Predicted vibration levels exceed maximum levels
Proposal construction hours	6am – 6pm	RO, CO
OOHW Period 2	Mon –Fri (10 pm–7 am) Sat (10 pm–8 am) Sun/Pub Hol (6 pm-7 am)	RO, CO

Note 1: OOHW= Out-of-hours Work
CO – Communication. RO – Respite Offer

6.3.2 Standard construction noise and vibration mitigation measures

Table 6-4 lists the standard mitigation measures which would be implemented for the proposal.

Table 6-4 Standard construction noise and vibration management controls

No	Environmental Management Controls
1.1	All construction vehicles and machinery would be fitted with manufacturer supplied noise suppression devices and maintained.
1.2	All site workers would be informed of the potential for noise and vibration impacts upon local residents and encouraged to take practical and reasonable measures to minimise noise during the course of their activities.
1.3	Contact will be established with the local residents and the construction program and progress communicated on a regular basis, particularly when noisy or vibration-generating activities are planned. Affected receivers will be notified of the intended work, its duration and times of occurrence. This may include: <ul style="list-style-type: none"> • Website featuring updates on construction activities and consultation events • Community update newsletters • Community update newspaper advertisements • Local community update letters for specific construction activities.
1.4	A community liaison phone number and permanent site contact will be provided so that noise and/or vibration related complaints, if any, can be received and addressed in a timely manner.
1.5	For any work that will take place outside of proposed construction hours, such as track possessions, residents potentially affected by such activities will be notified at least seven days before hand.
1.6	Work methods would be reviewed with a preference for quieter and non-vibration generating methods wherever possible. This is particularly important for any out-of-hours and night-time activities.
1.7	Material dumps would be located as far as possible from the nearest residences, and whenever possible, loading and unloading areas would be located as far as possible from the nearest residences.
1.8	Where possible, materials dropped from heights into or out of trucks will be minimised.
1.9	Fixed equipment (pumps, generators, compressors) will be located as far as possible from the nearest residences.
1.10	Where possible, no plant or equipment will be left idling when operating in the vicinity of residential properties.
1.11	All vehicular movements to and from the site will comply with the requirements of the appropriate regulatory authority requirements for such activities.

No	Environmental Management Controls
1.12	Where practicable, all typically noisy construction activities will be kept within the daytime working hours.
1.13	Any noise and vibration monitoring will be undertaken by a qualified professional and with consideration to the relevant standards and guidelines.
1.14	Any complaints received would be responded to in accordance with a formalised complaint handling process.
1.15	If vibration-generating activities are conducted within 25 m of a residence alternative work methods will be implemented so the vibration impacts are reduced to acceptable levels.
1.16	If vibration generating activities (non-piling) are being undertaken within 35 m of the heritage listed structures, alternative work methods will be implemented so the vibration impacts are reduced to acceptable levels. For piling, this distance is increased to 180 m.
1.17	Dilapidation surveys - Prior to commencement of construction a dilapidation survey of the nearby heritage structures (within 35 m of the works) would be undertaken. These items must be protected from accidental damage for the duration of the works.
1.18	Based on the conservative estimate it is possible that construction vibration may exceed the guidance limits for critical and sensitive areas. The predictions do not account for possible reduced internal vibration levels which may be realised due to the structure of the buildings. It is not known how the structure will respond to external ground vibration sources. Specific consultation would be undertaken with potentially impacted receivers with sensitive equipment prior to commencement of vibration generating activities, and as required throughout the construction phase, with regards to potential detectable vibration levels and possible impacts on critical activities at the facility. Where required specific work practices or scheduling arrangements would be considered to minimise potential impacts on the facility.

6.3.3 Heritage Structures

A potential heritage item, Wyanga cottage, is located about 15 metres to the west of the existing tracks. Further information on heritage items in the study area is provided in the EIS. The heritage assessment notes that Wyanga cottage is in disrepair and at risk of collapse. If inadequately managed, vibration as a result of construction may impact the structure, particularly the movement of dozers, backhoes or excavators, as the cottage is located nearer to potential activities than the safe working distance for heritage buildings listed in Table 5-12. A dilapidation survey at Wyanga cottage would be undertaken prior to commencement of construction. Less vibration emitting construction methods would be used in the vicinity of the cottage where feasible and reasonable. Although the potential for indirect impacts on the cottage would be minimised as far as practicable, given the dilapidated state of the cottage, there remains the risk that it could collapse. As such, heritage mitigation measures are discussed in the EIS.

7. Summary and conclusion

Based on the modelling results and findings of this noise and vibration assessment, the following conclusions are made with consideration to the assumptions detailed in this report.

7.1 Operational noise and vibration

Operational noise modelling indicates that the RING $L_{Aeq\ day}$ and $L_{Aeq\ Night}$ rail noise trigger levels are predicted to be exceeded at a number of receivers near to the rail corridor and that increases in noise due to the proposal are more than 2 dB for a number of receivers. This indicates that the conditions for the consideration of noise mitigation have been triggered at these receivers with regards to the RING.

Further, noise modelling indicates that a number of receivers are expected to exceed the RING L_{Amax} trigger levels and that increases in noise due to the proposal are more than 3 dB for a number of receivers. Therefore, mitigation measures will be required for operational noise at the nearest identified receivers with consideration to L_{Amax} levels.

Based on train volumes and speeds provided by ARTC, a total of 28 residential receivers were found to exceed the redeveloped rail line RING criteria. Noise modelling indicated that no receivers in the vicinity of the proposed Parkes north west connection will exceed the RING trigger levels for a new rail development. The operational noise model is based on a number of conservative assumptions and the information available at the time of the assessment in relation to proposed operations, design and receiver locations and an updated assessment will be undertaken at subsequent stages of the proposal where additional detail is available.

A number of potential mitigation measures have been identified to address exceedances of the RING trigger levels. A feasible and reasonable assessment of these measures will be undertaken in consultation with the affected community, following completion of detailed design.

The proposal is not expected to increase operational vibration levels noticeably and is not expected to exceed structural damage or human comfort criteria. Therefore, no specific mitigation measures are considered necessary.

Post construction noise monitoring is to be undertaken at representative locations to verify the effectiveness of the applied mitigation measures with respect to the RING trigger levels.

7.2 Construction noise

During construction there is the potential for noise impacts to the surrounding community.

- In relation to construction activities:
 - Activities such as pre-possession works (S1), skim track reconditioning (S2), full depth reconditioning (S3), and drainage construction, are likely to produce the greatest level of impacts due to the closest proximity to receivers and high predicted noise activities.
- In relation to working hours and construction noise management levels:
 - The highly affected level of 75 dB(A) L_{Aeq} is not likely to be exceeded.
 - Construction activities are not expected to exceed the noise management level at non-residential sensitive receivers including educational, child care and hospital facilities. Construction noise management levels are applicable as an internal level only when the facilities are in use.
 - Construction activities are not expected to exceed the noise management level at recreational areas when these areas are in use.

- Rail line redevelopment construction activities undertaken during proposal construction hours are predicted to exceed the noise management level at receivers nearest to the construction footprint. Impacted receivers are within about 700 metres of the works and includes up to 228 identified noise sensitive residential receiver locations. Noise levels are predicted to exceed the proposal specific construction management level by up to 33 dB.
- New rail line construction works undertaken during proposal construction hours at the Parkes north west connection are predicted to exceed the noise management level by up to 18 dB at 23 noise sensitive receivers.
- Brolgan road overbridge construction is predicted to exceed the noise management level by about 18 dB at two residential receiver for works undertaken during proposal construction hours.

It is recommended that the mitigation measures detailed in Section 6.3 be considered and implemented where feasible and reasonable to reduce construction noise impacts.

7.3 Construction vibration

General construction activities

In relation to vibration from general construction activities, the expected magnitude of ground vibration is not expected to be sufficient to cause damage if the equipment operates at distances greater than 18 metres from standard residential buildings or structures of similar construction.

Heritage structures in the proposal area include station buildings, sidings and silos. Many of these structures are directly adjacent to the track alignment. The expected magnitude of ground vibration is not expected to be sufficient to cause damage if the equipment operates at distances greater than 35 metres from heritage buildings and structures. However, many items are potentially within this distance from the works and may therefore be affected.

The noise and vibration mitigation measures detailed in Section 6.3 should therefore be implemented to manage potential construction vibration impacts.

Piling

Vibration impacts due to piling activities have the potential to exceed structural vibration values for standard dwellings at distances of 100 metres from the activity for impact piling, 30 metres for vibratory piling and 17 metres for bored piling.

Piling activities have the potential to exceed structural vibration values for heritage structures at distances of 180 metres from the activity for impact piling, 50 metres for vibratory piling and 35 metres for bored piling.

In the event that sensitive receivers fall within these buffer distances, other methods may need to be investigated such as press-in hydraulic piling or jacked-in piling to reduce the potential for impact. These methods generally exhibit much lower vibration levels compared to impact, vibratory and bored piling.

Human comfort

Humans are capable of detecting vibration at levels well below those causing risk of damage to buildings. Based on a conservative assessment, it is possible that construction vibration from general construction activities may be perceptible at distances up to 140 metres from the works. The mitigation measures detailed in Section 6.3 should therefore be considered where feasible and reasonable to reduce the potential for impact.

7.4 Conclusion

The Australian Rail Track Corporation (ARTC) has engaged GHD Pty Ltd (GHD) to prepare a Noise and Vibration assessment for the proposed upgrade of the Parkes to Narromine section of the inland rail proposal. This upgrade is located in between Parkes and Narromine, New South Wales.

Based on the findings of this assessment, it is considered that the noise and vibration impacts associated with the proposal can be satisfactorily managed from both the construction and operation of the infrastructure provided that the mitigation measures outlined in this report are implemented.

7.5 Limitations

This report has been prepared by GHD for Australian Rail Track Corporation and may only be used and relied on by Australian Rail Track Corporation for the purpose agreed between GHD and the Australian Rail Track Corporation as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Australian Rail Track Corporation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (Sections 1.1, 4 and 5). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Australian Rail Track Corporation and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

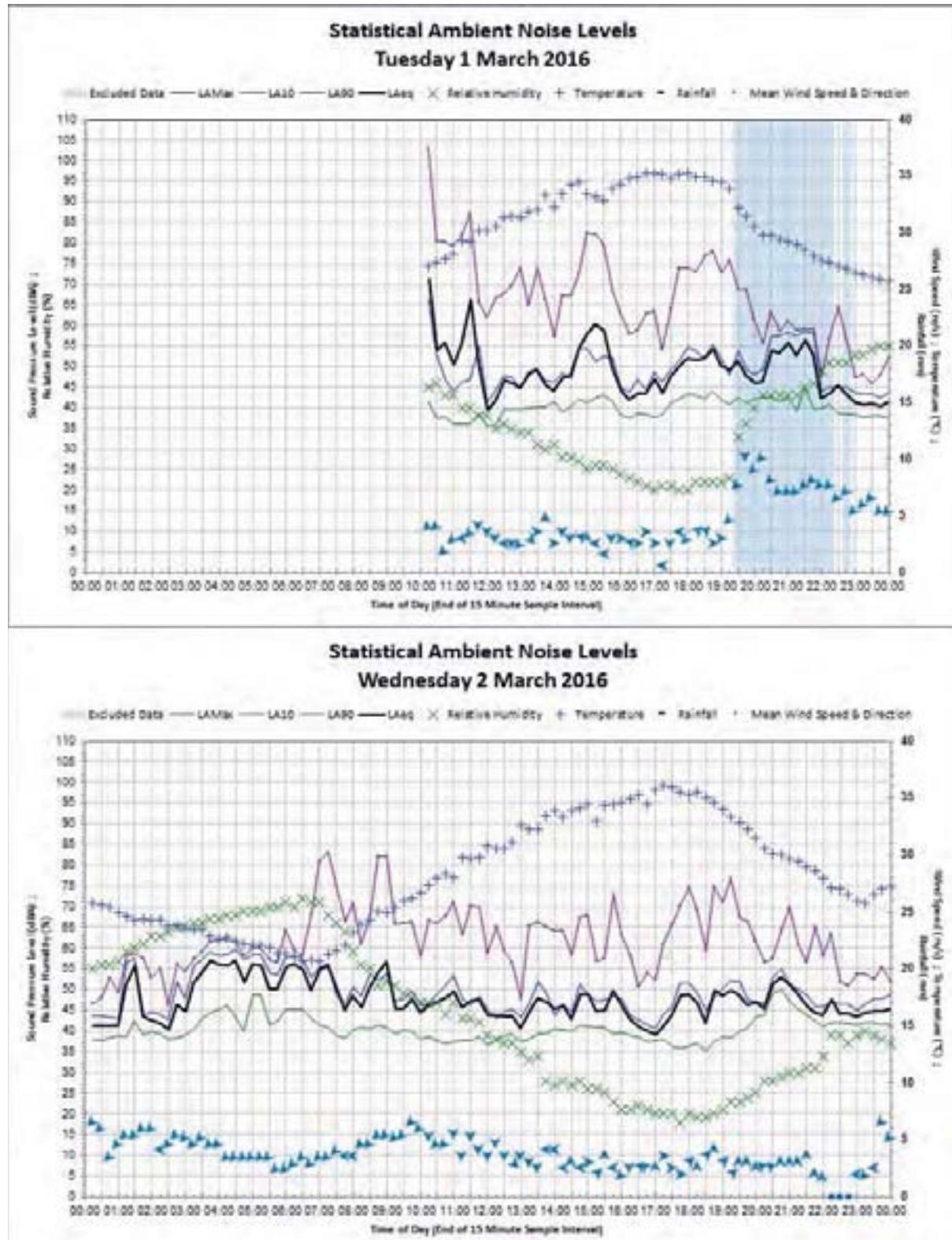
It is not the intention of the assessment to cover every element of the acoustical environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the acoustic assessment represent the findings apparent at the date and time of the monitoring and the conditions of the area at that time. It is the nature of environmental monitoring that not all variations in environmental conditions can be accessed and all uncertainty concerning the conditions of the ambient noise environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

Appendices

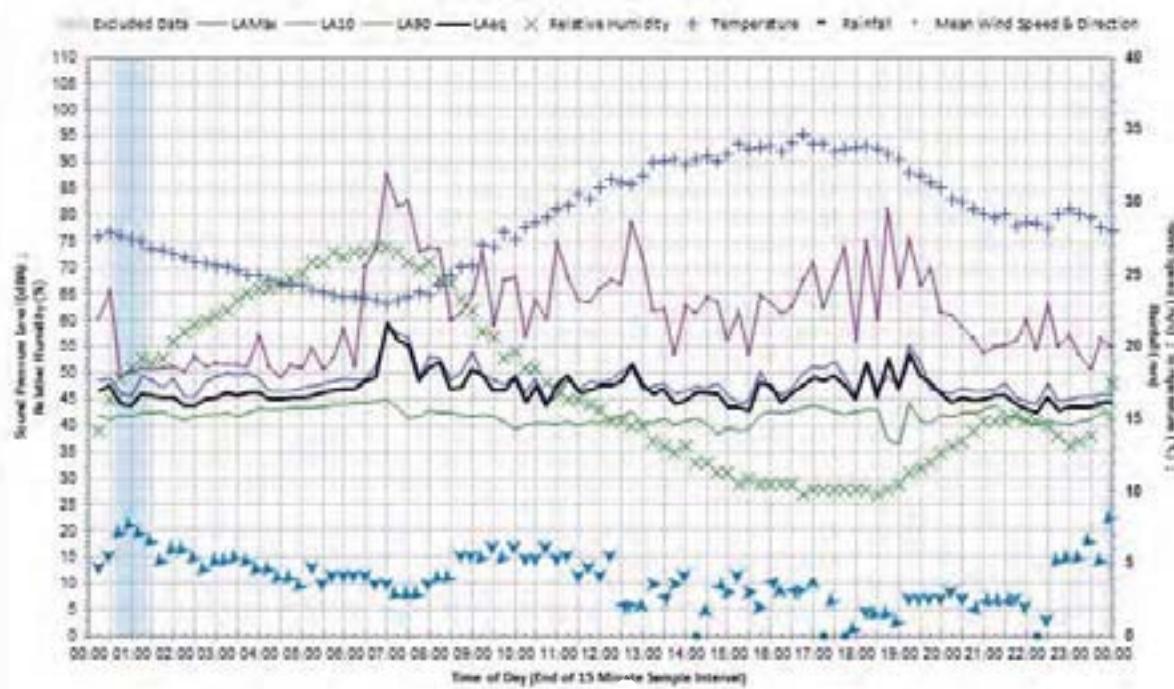
Appendix A – Unattended noise logger results

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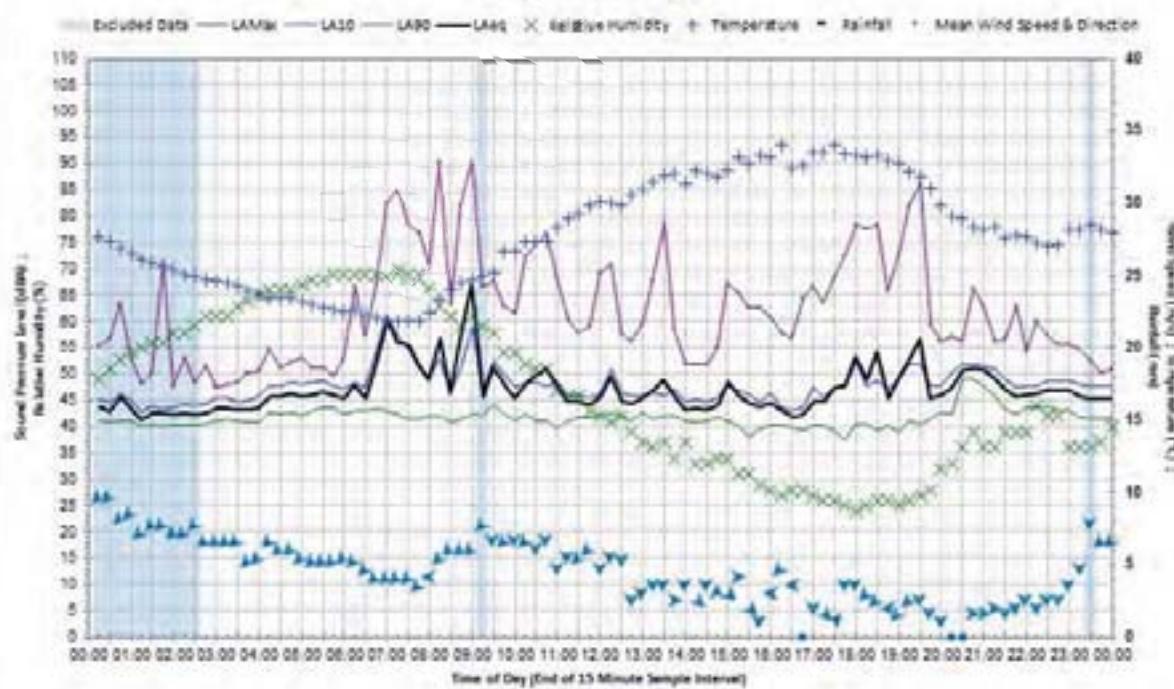
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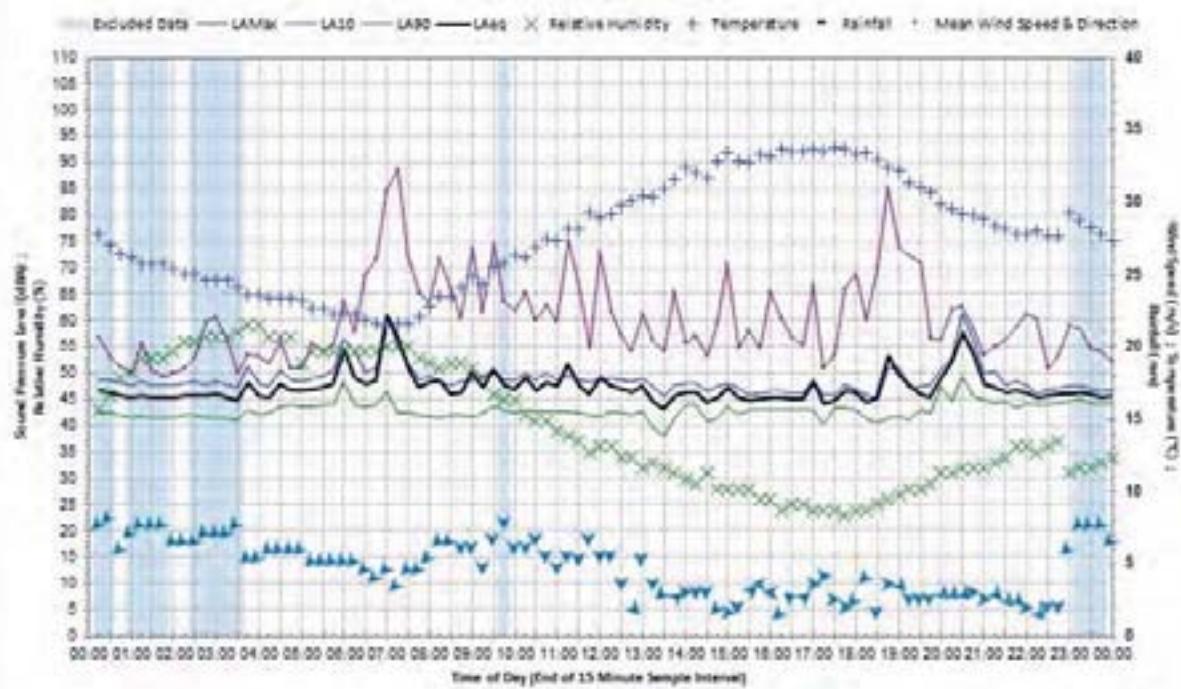


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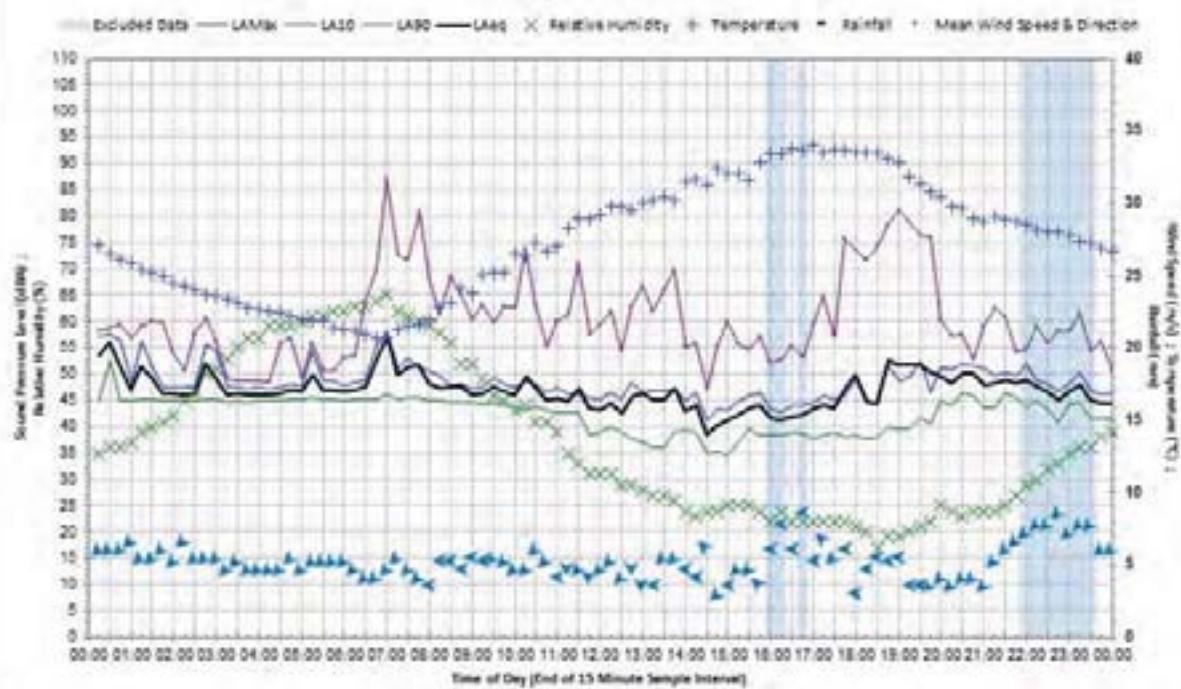
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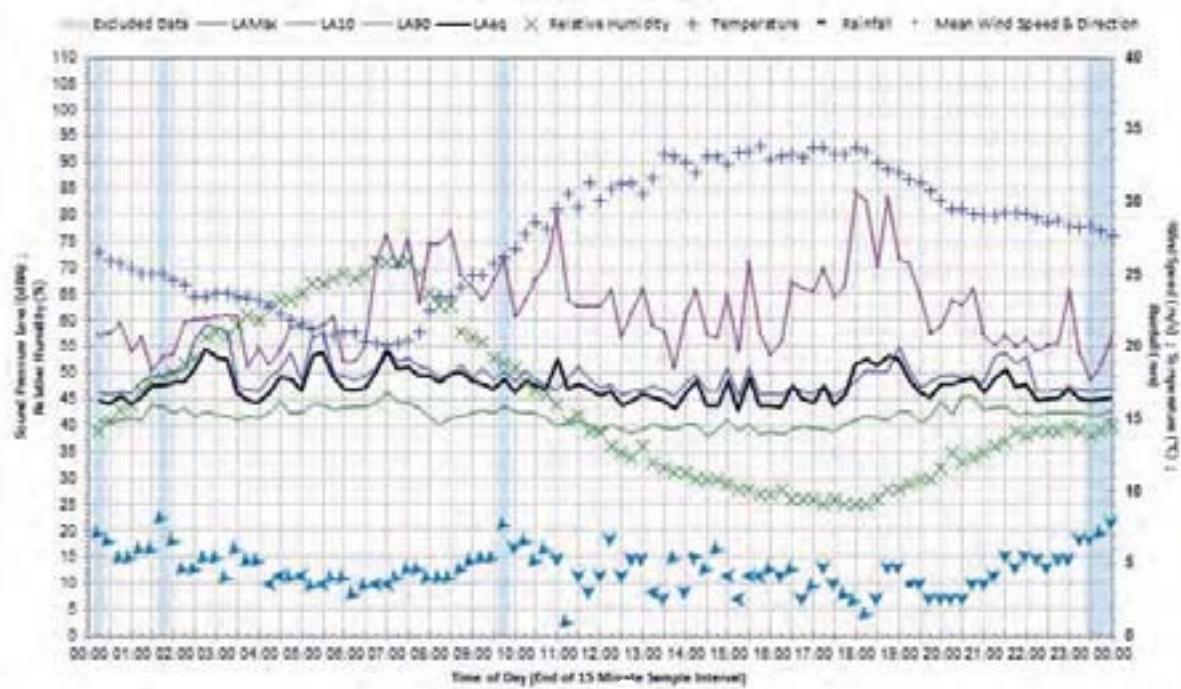
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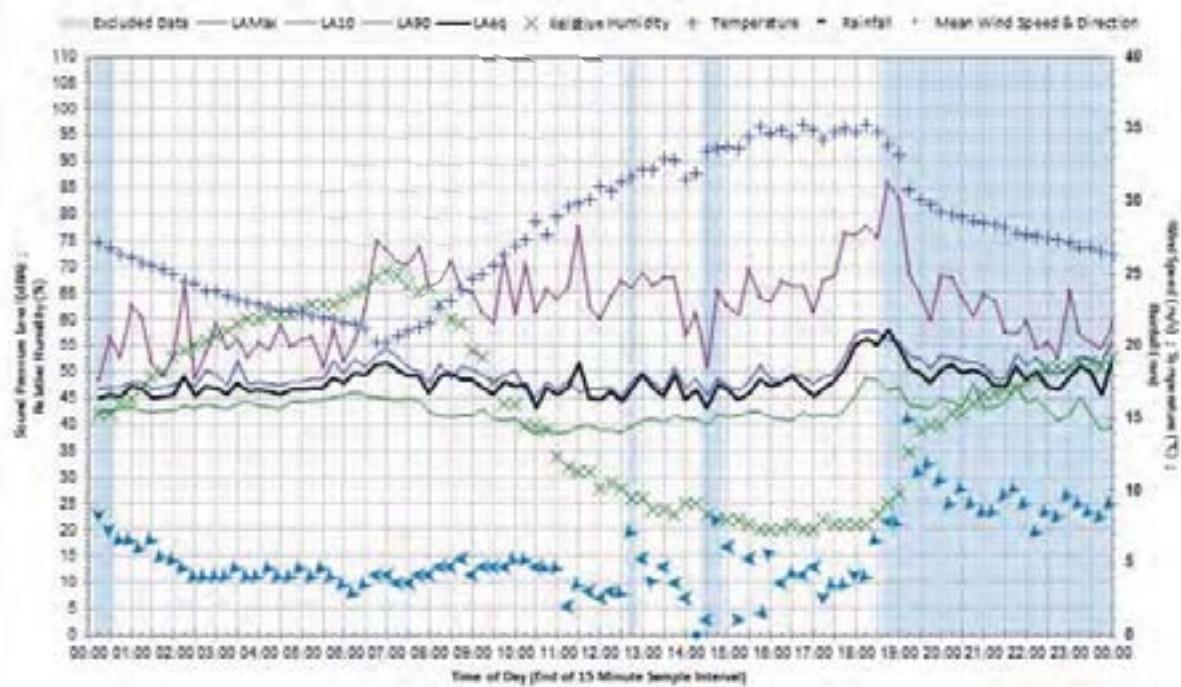
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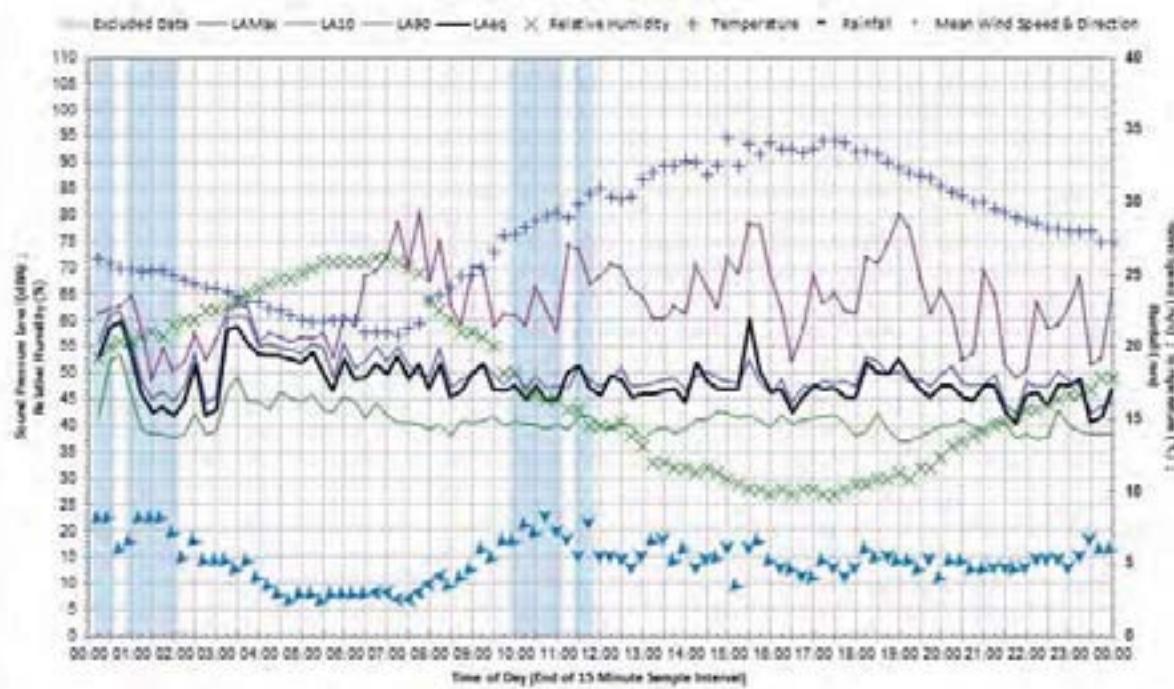
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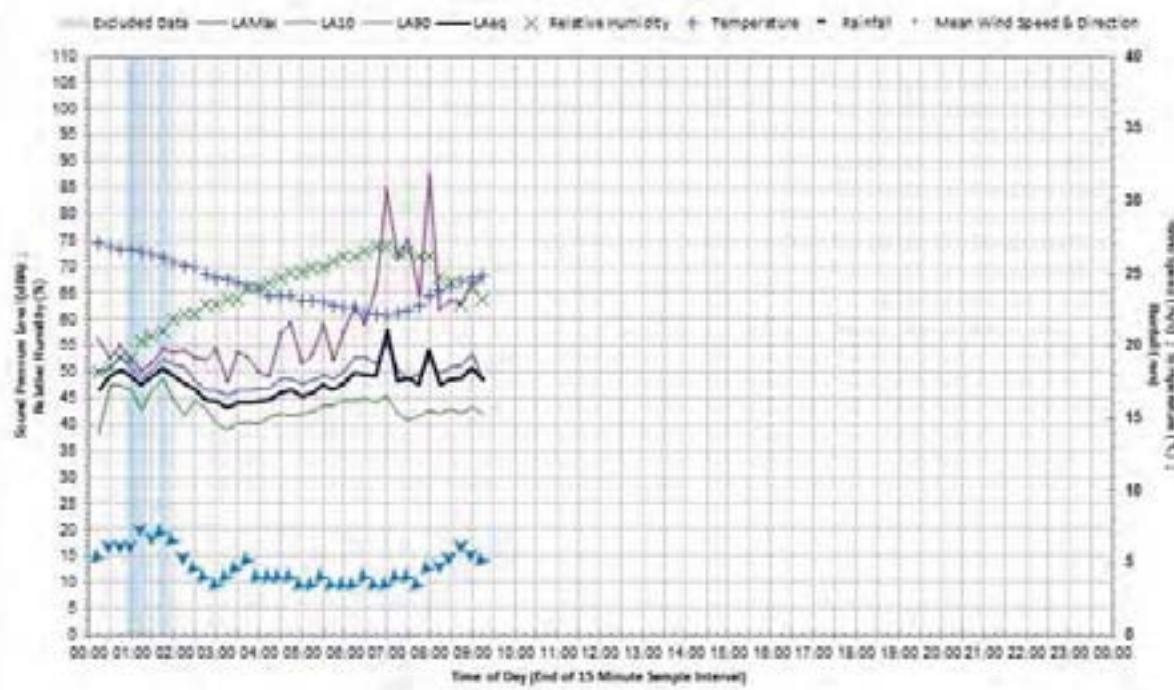
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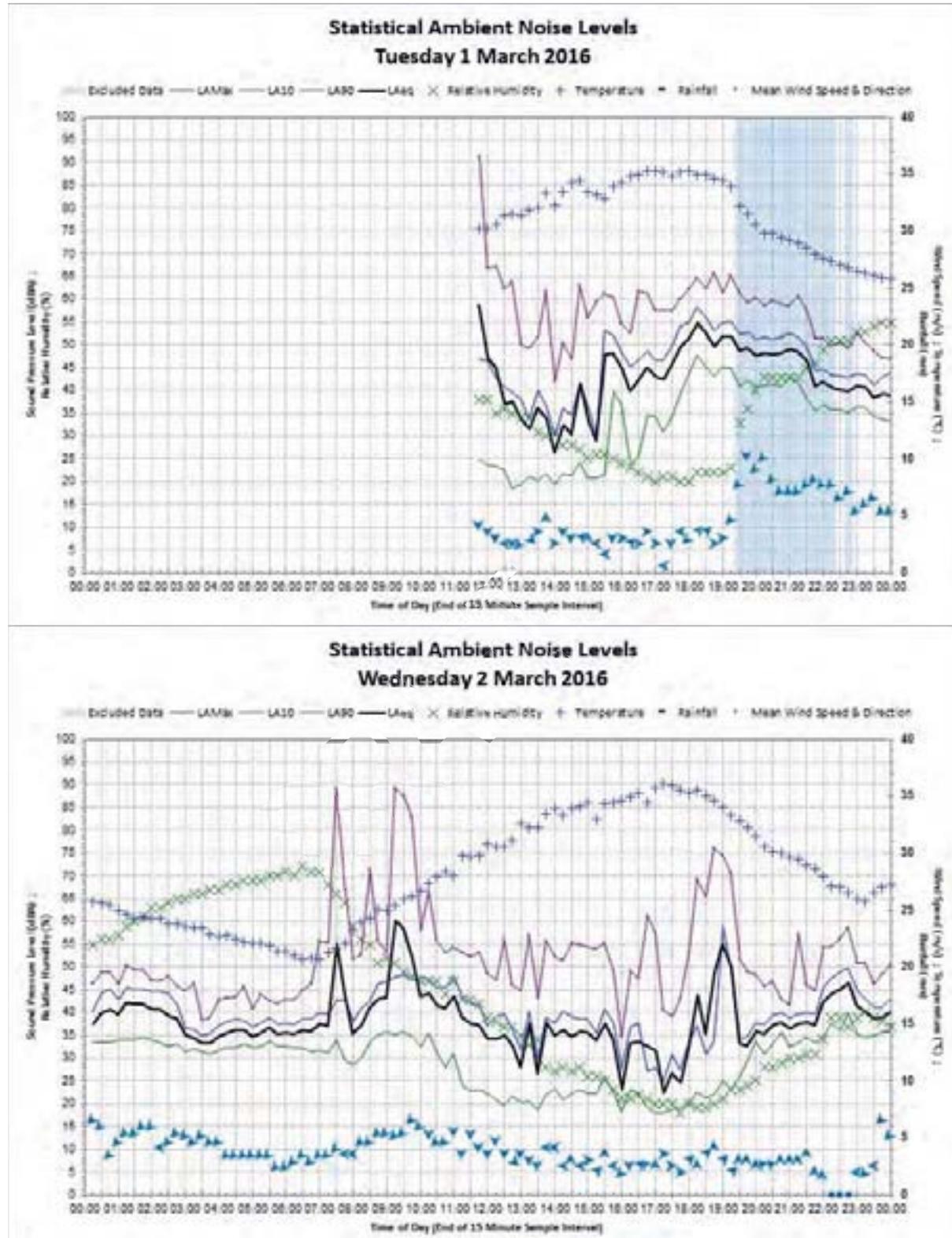
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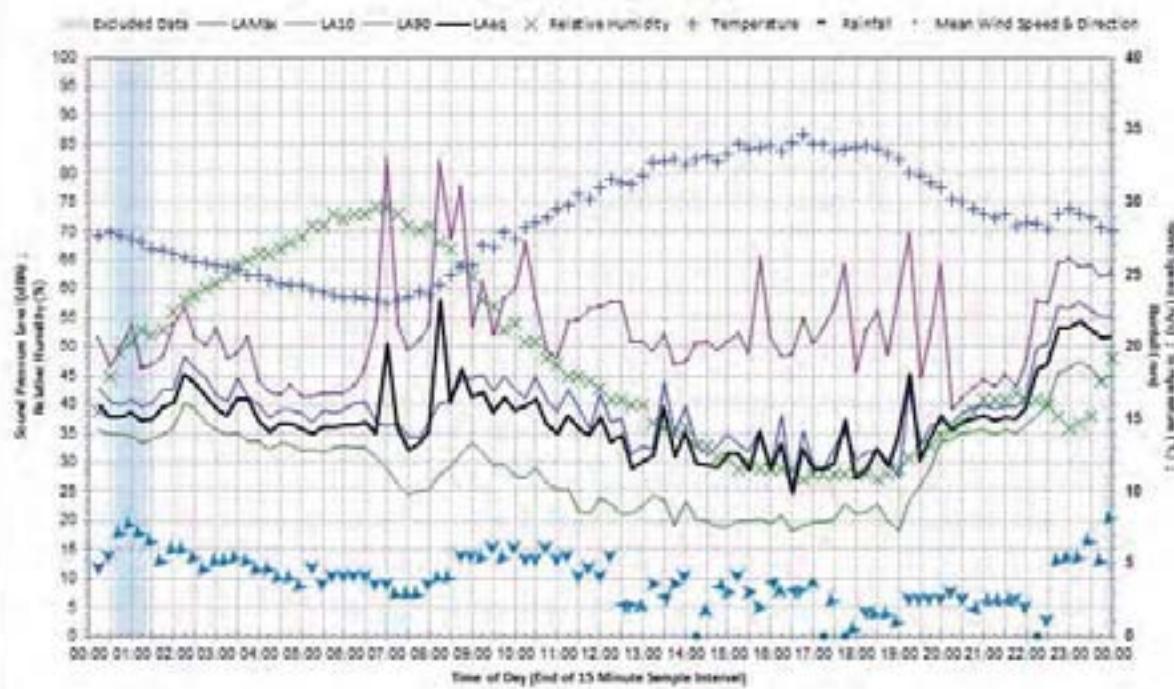


Logger L02NNS



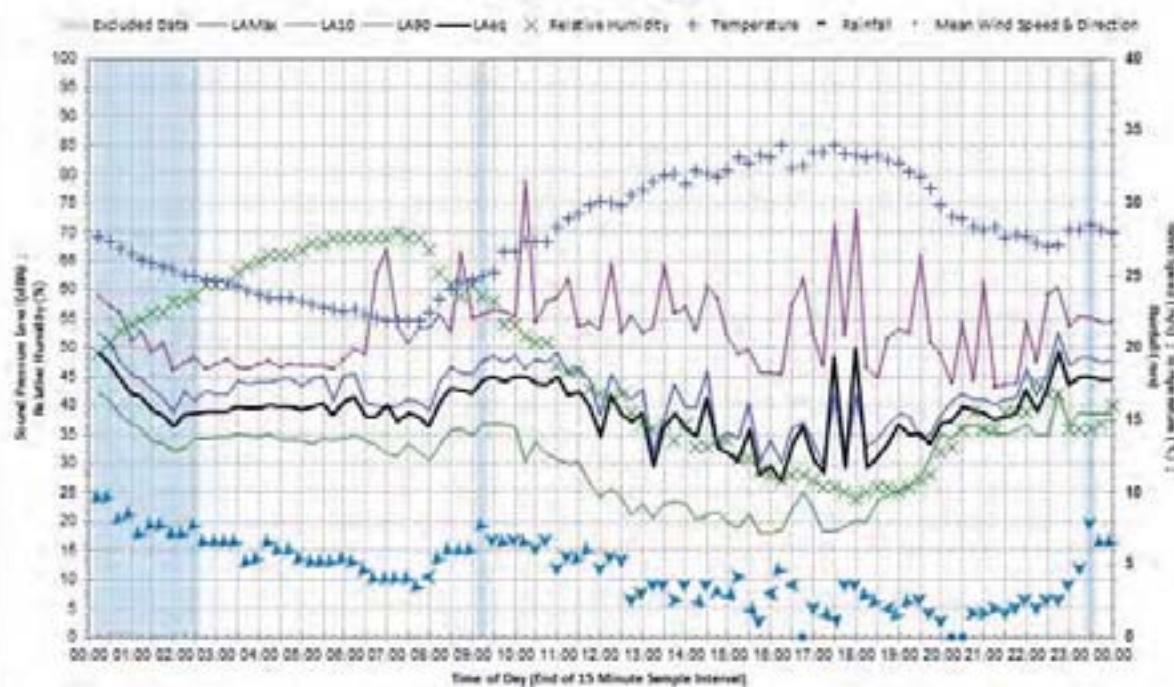
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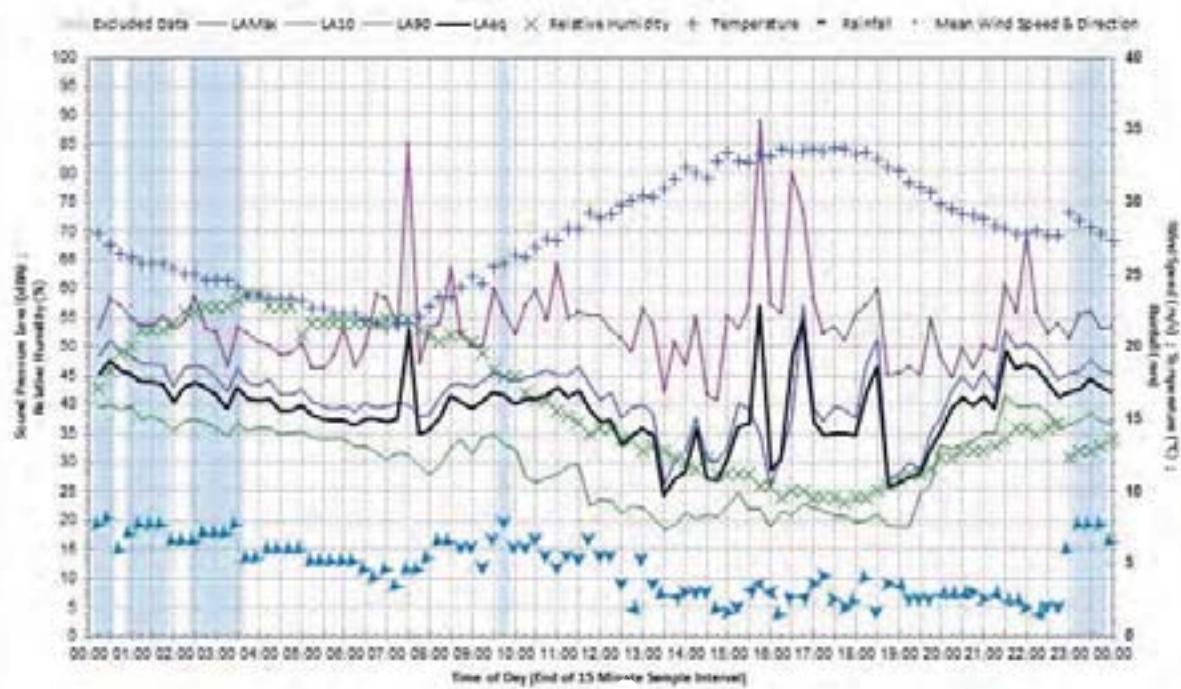


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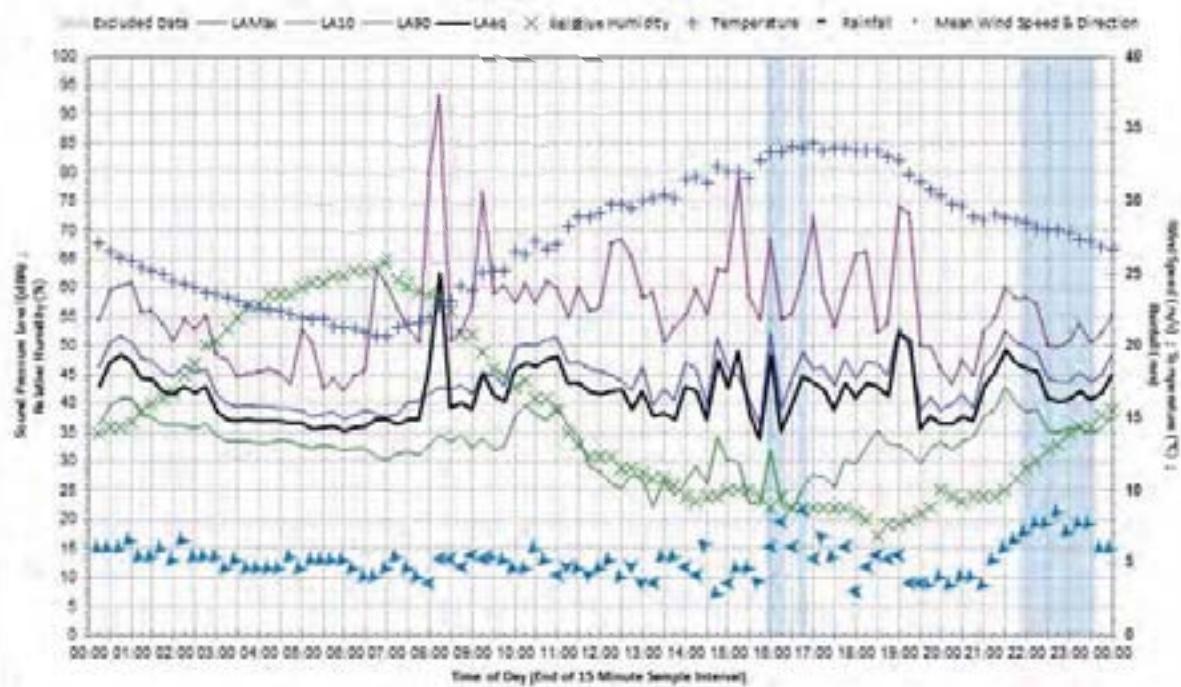
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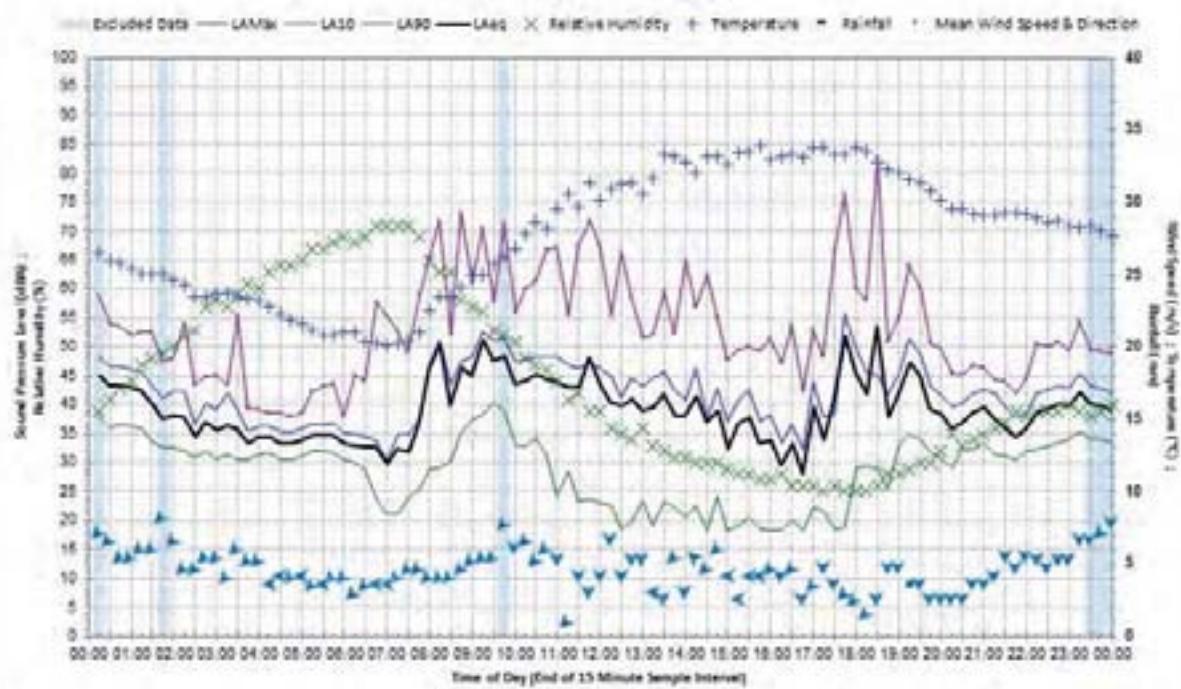
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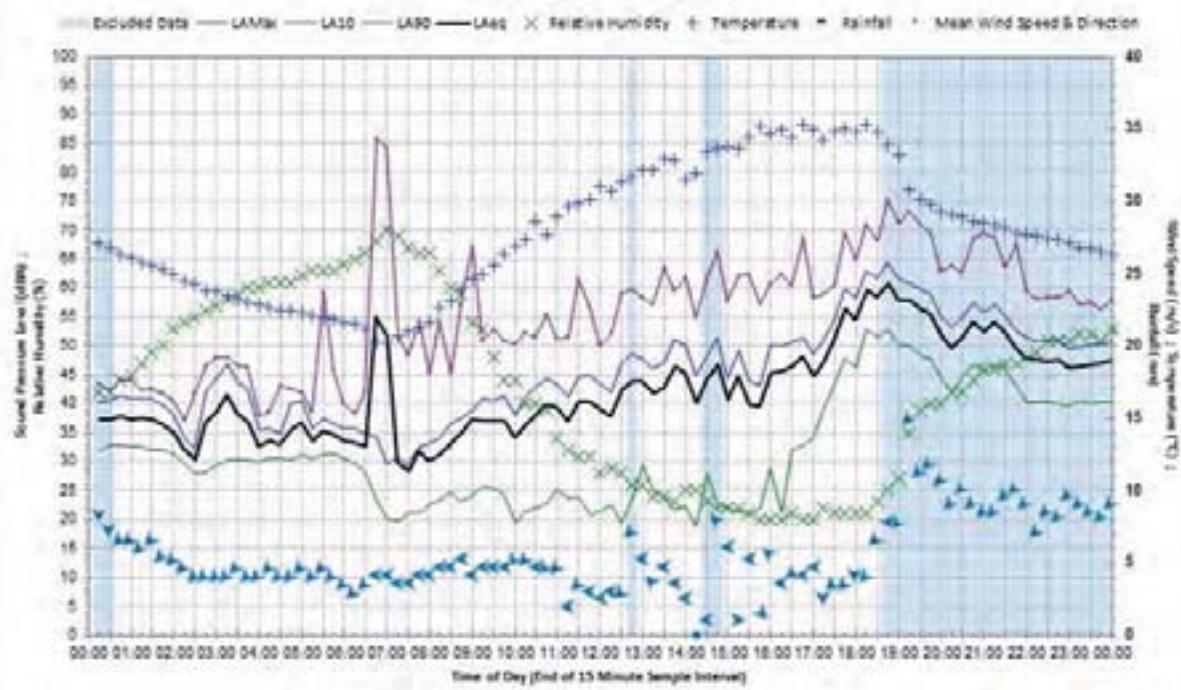
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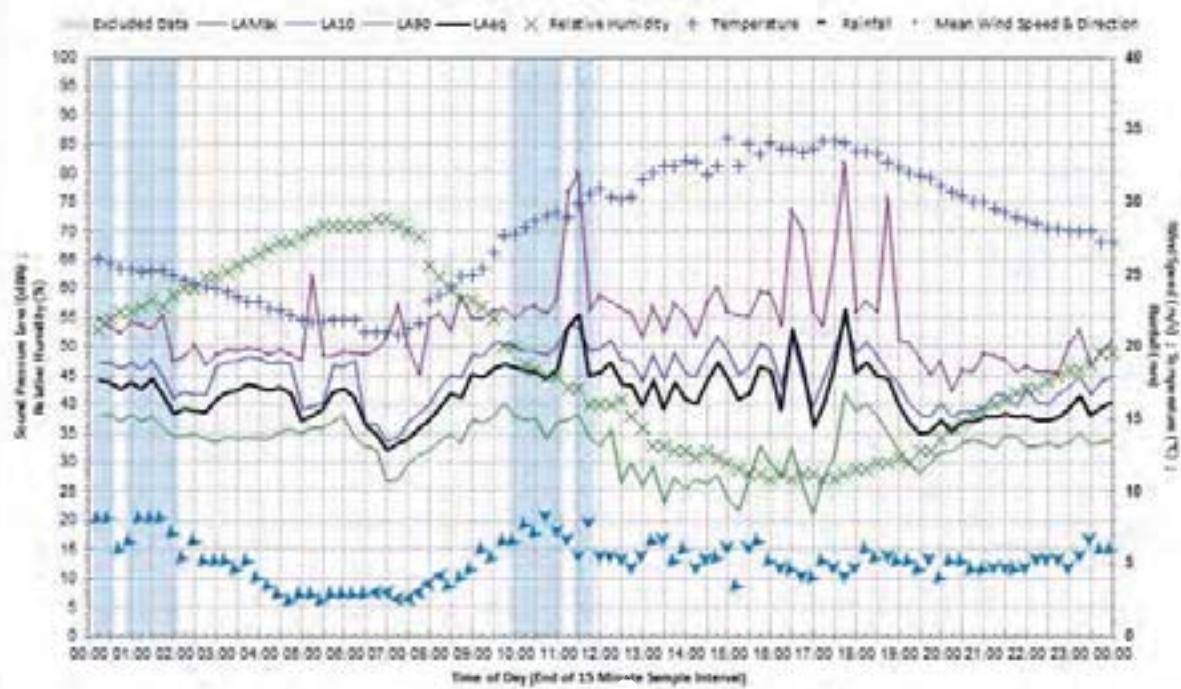
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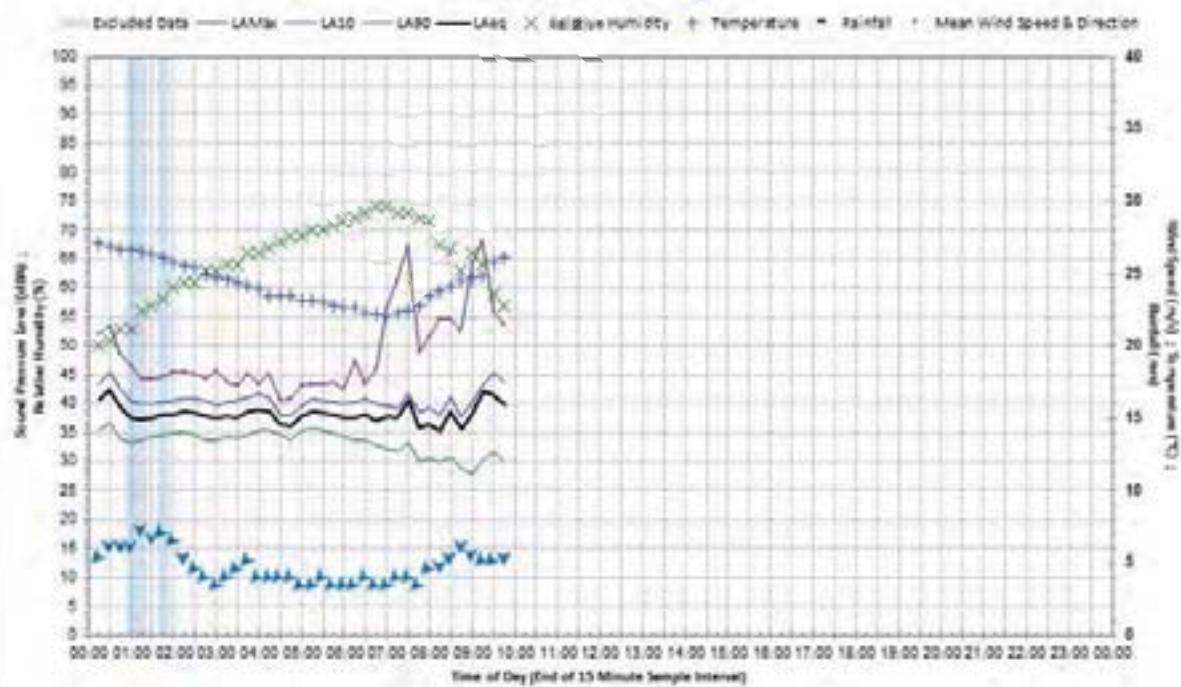
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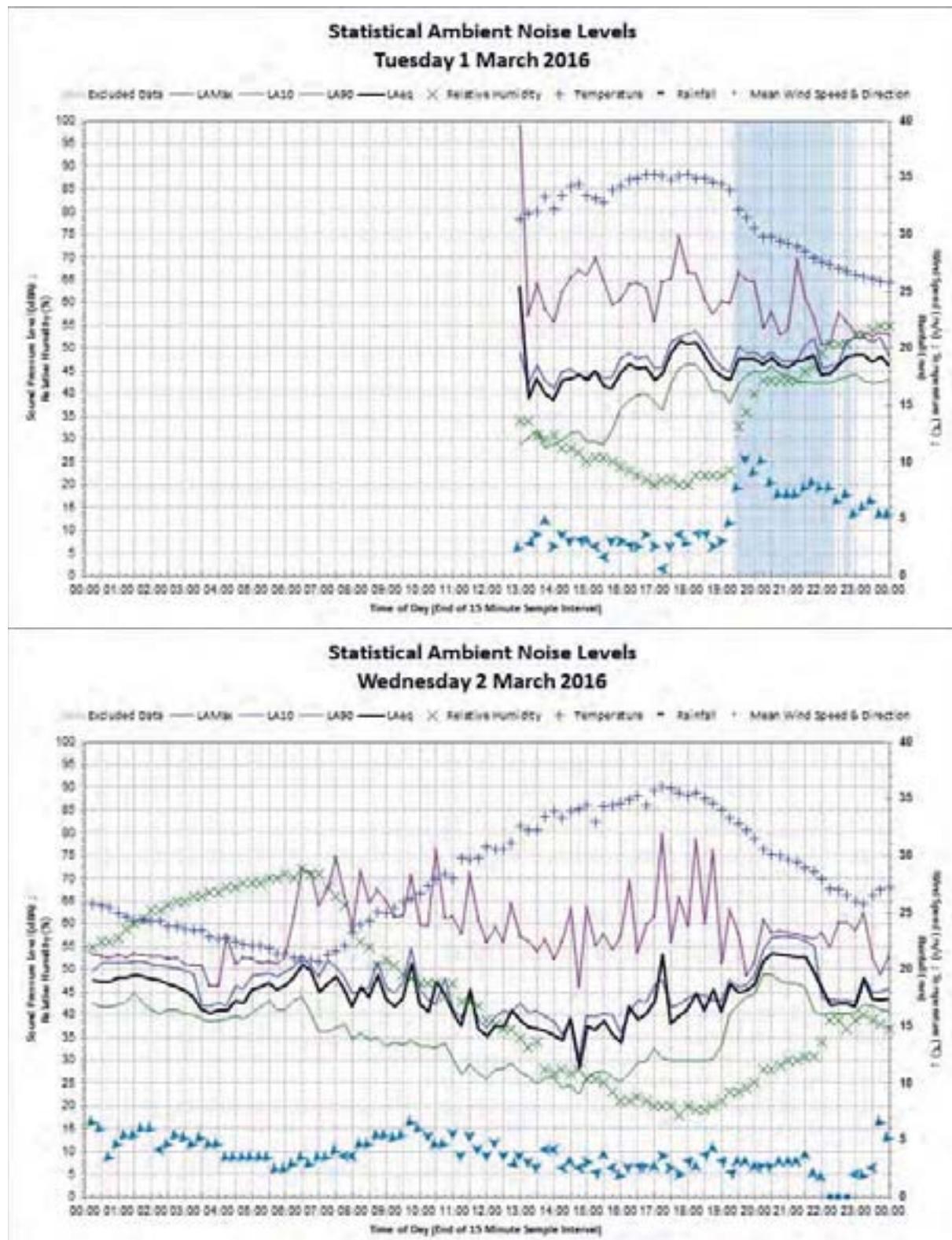
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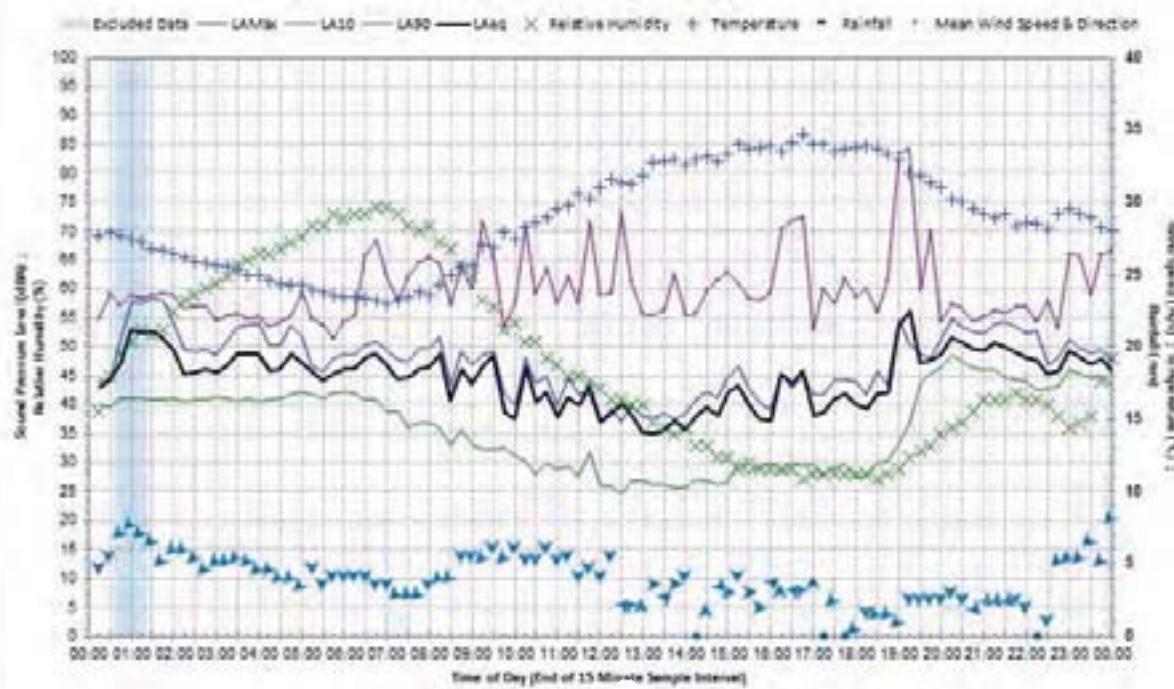


Logger L03NNS



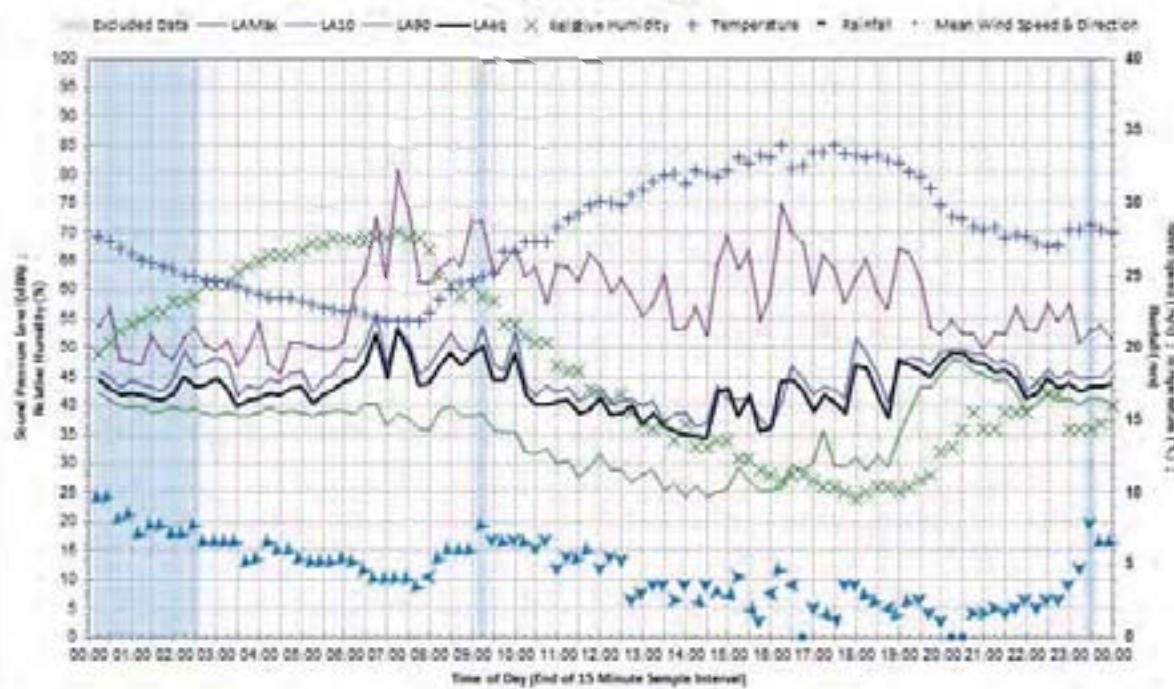
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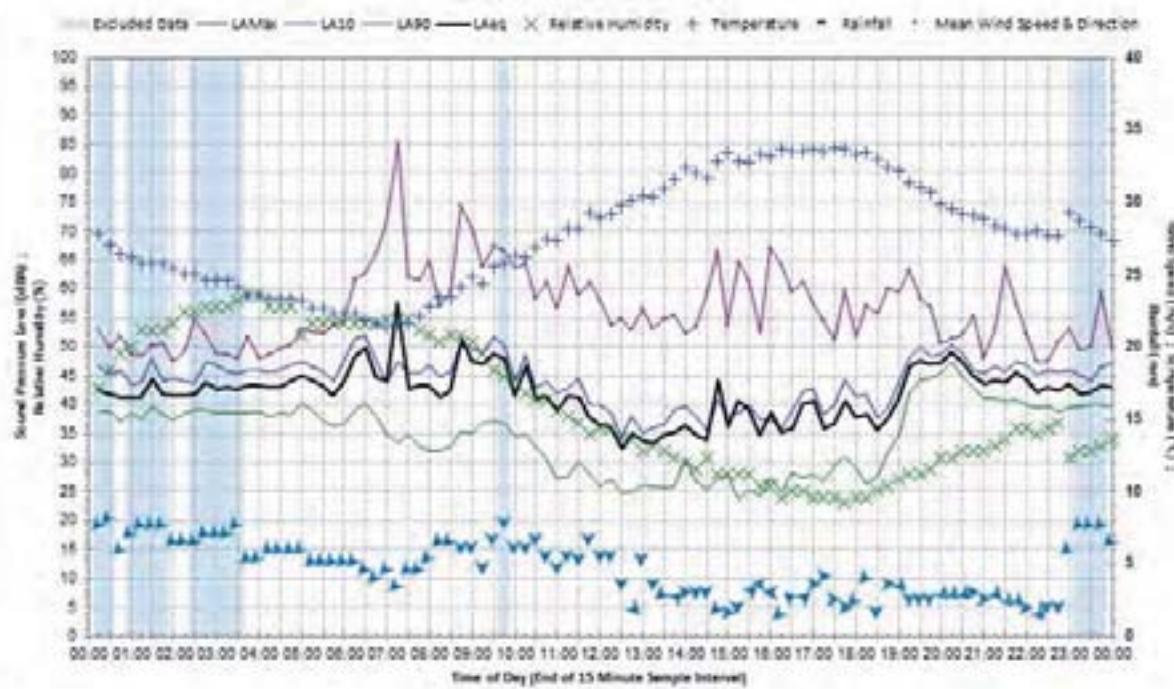
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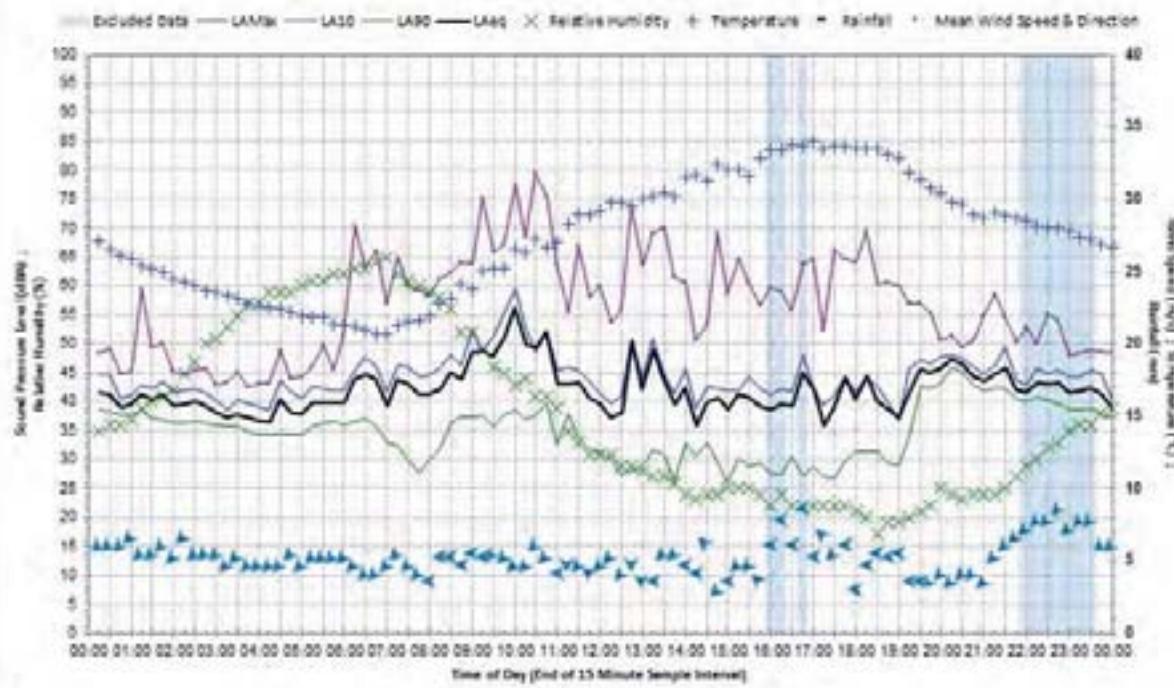
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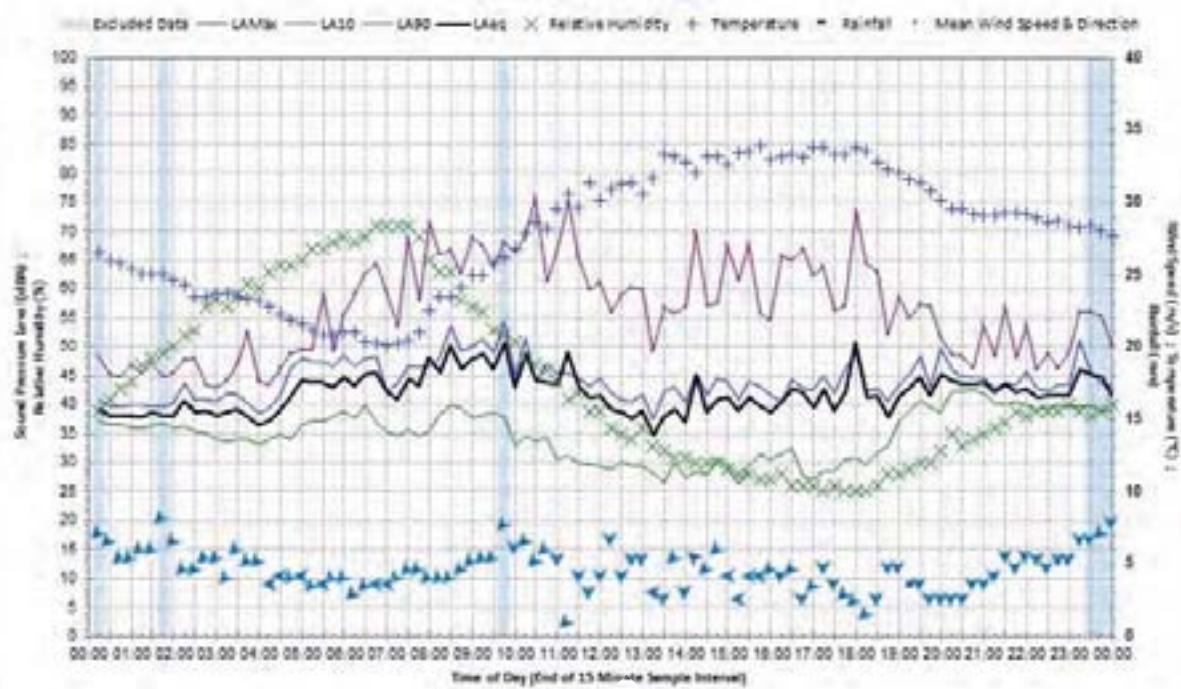


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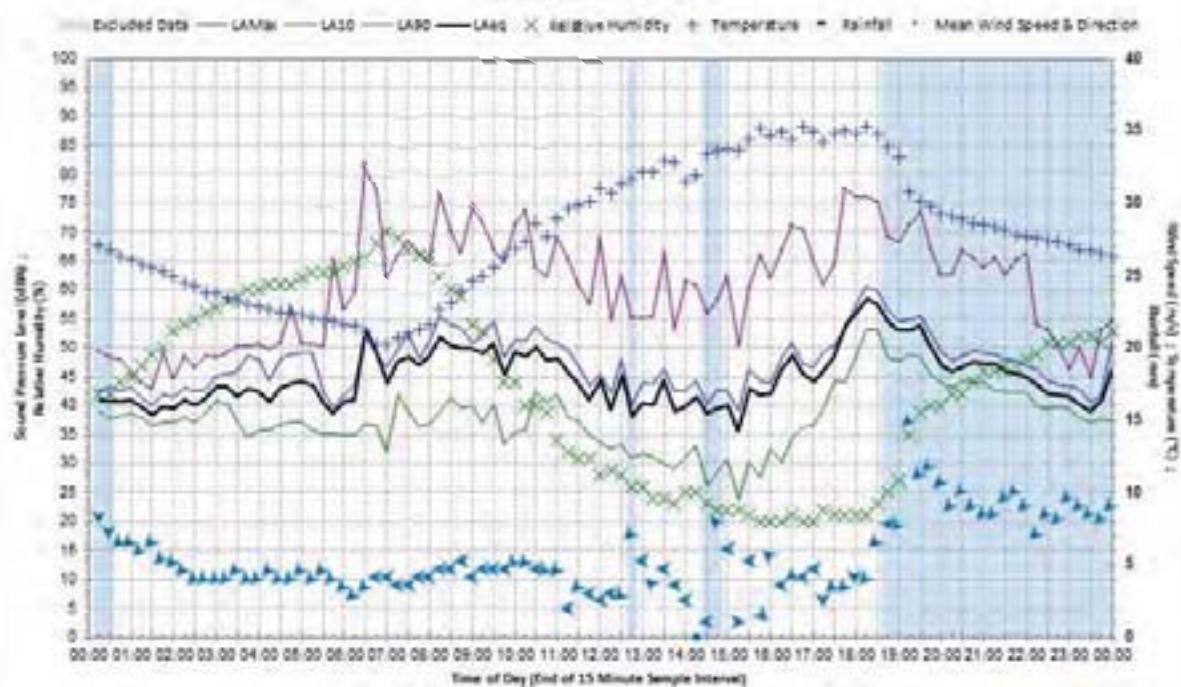
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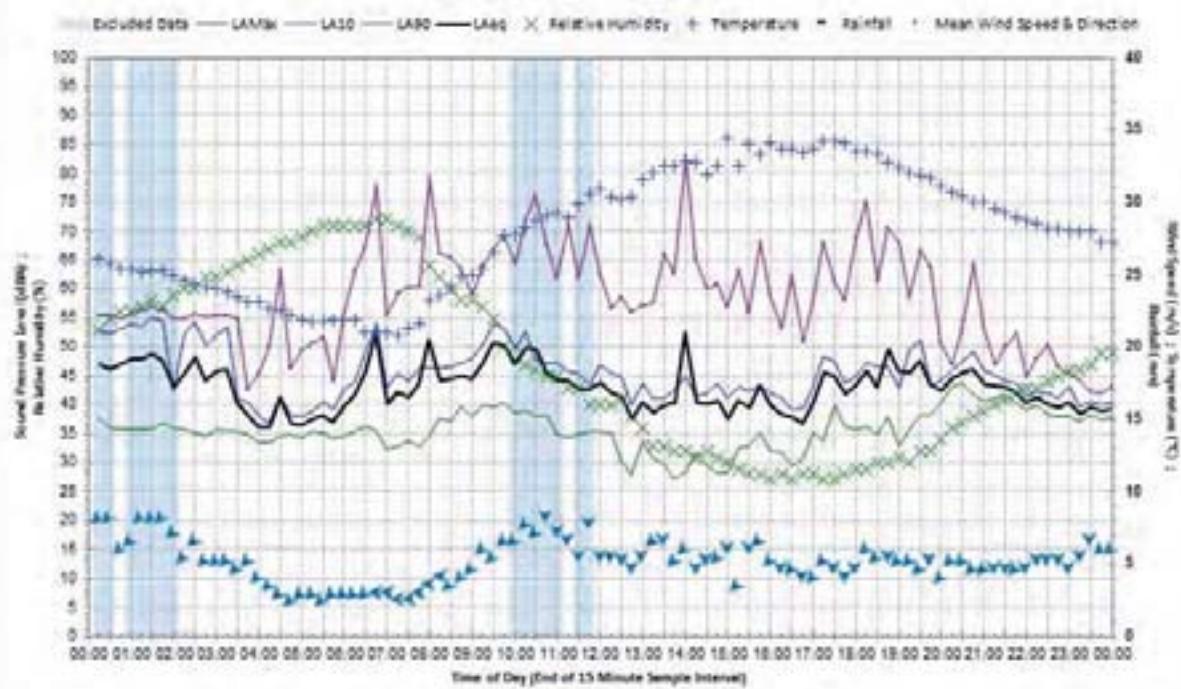
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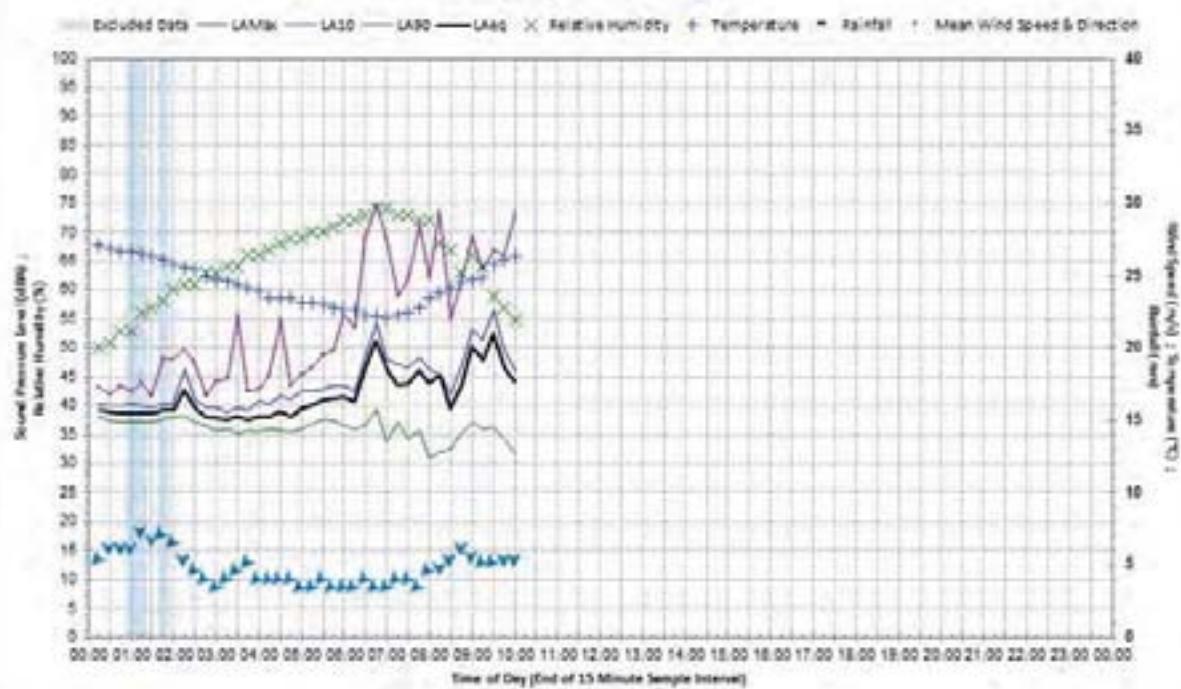
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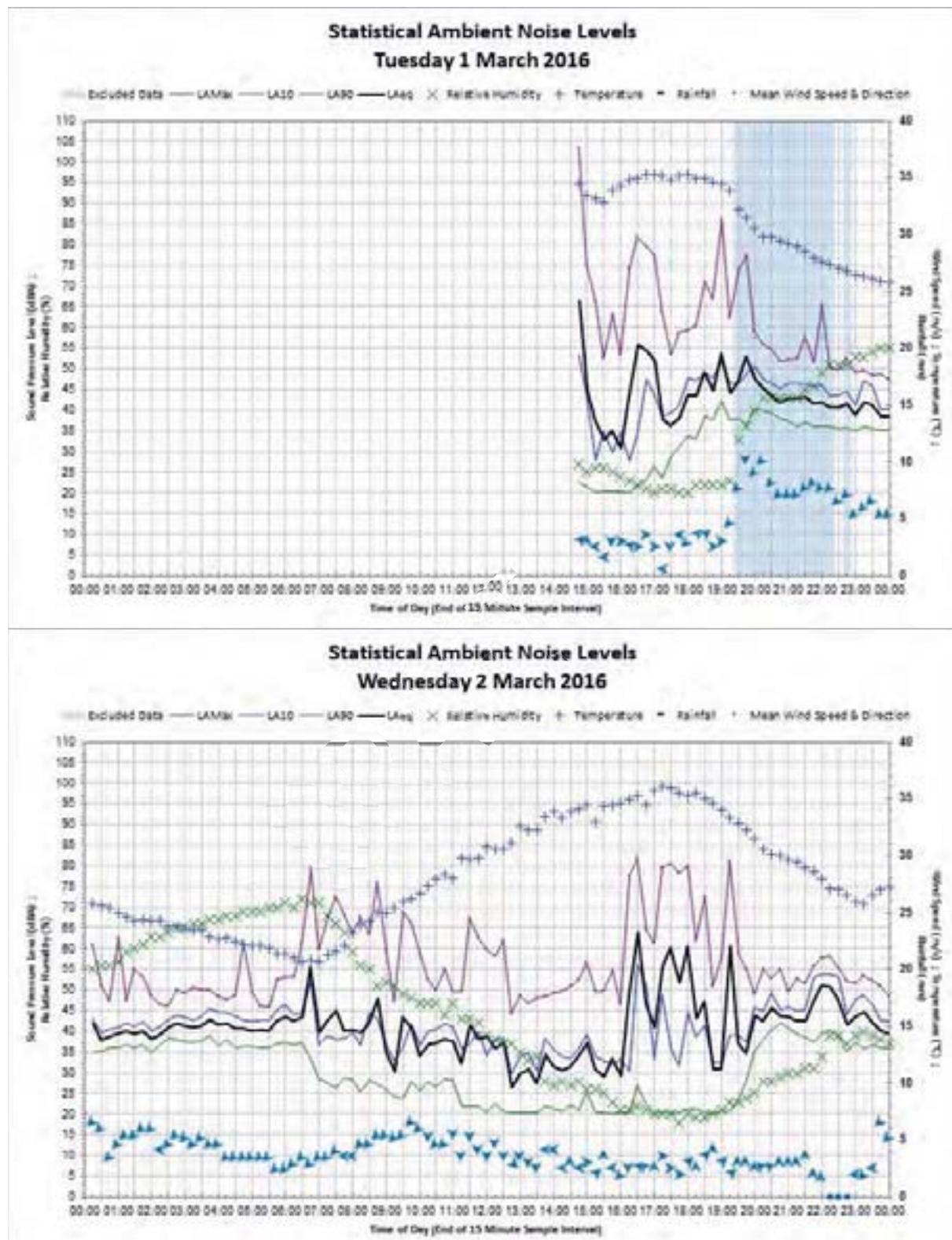
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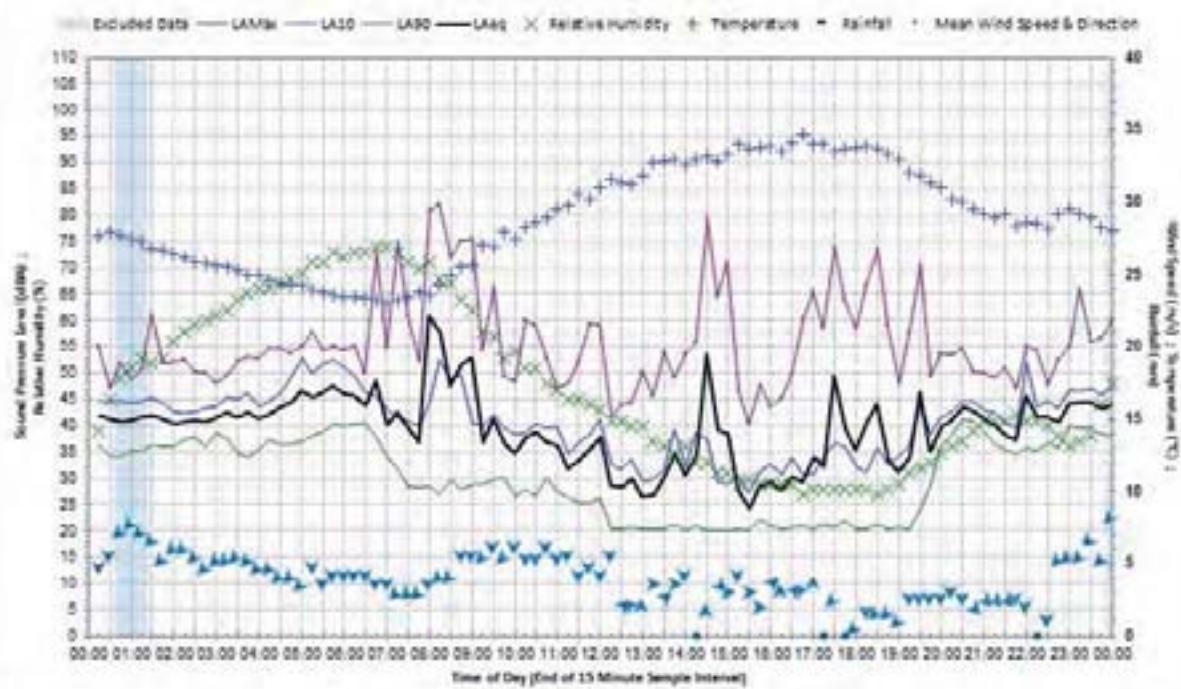


Logger L04NNS



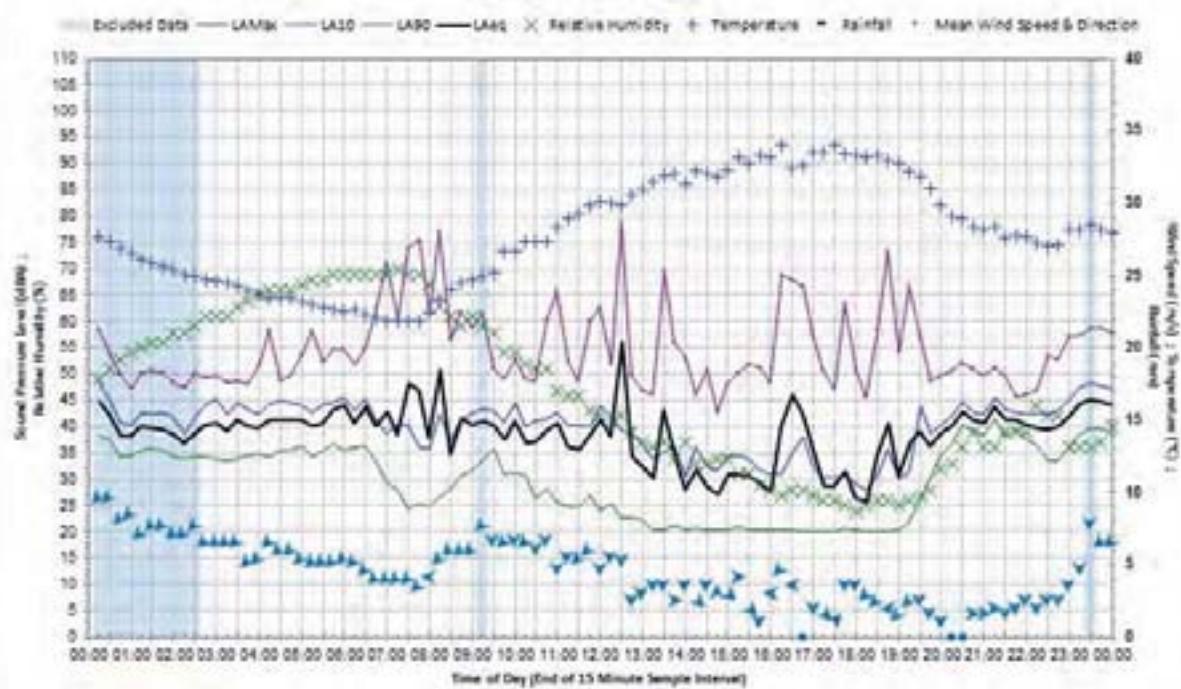
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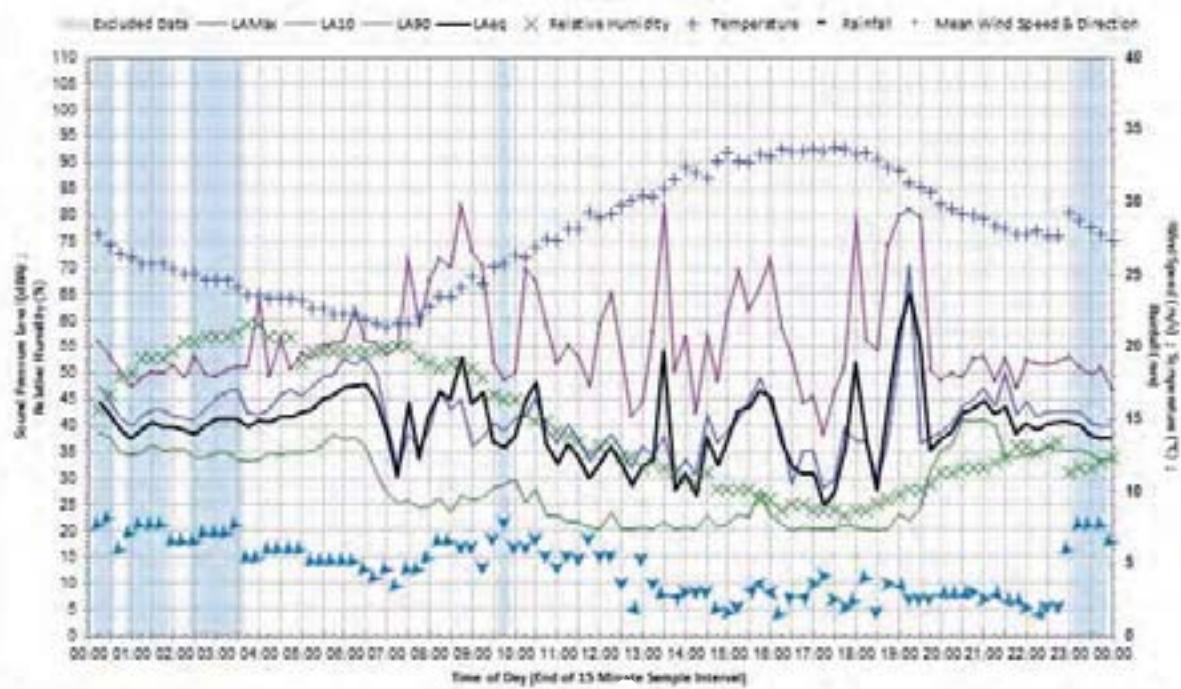


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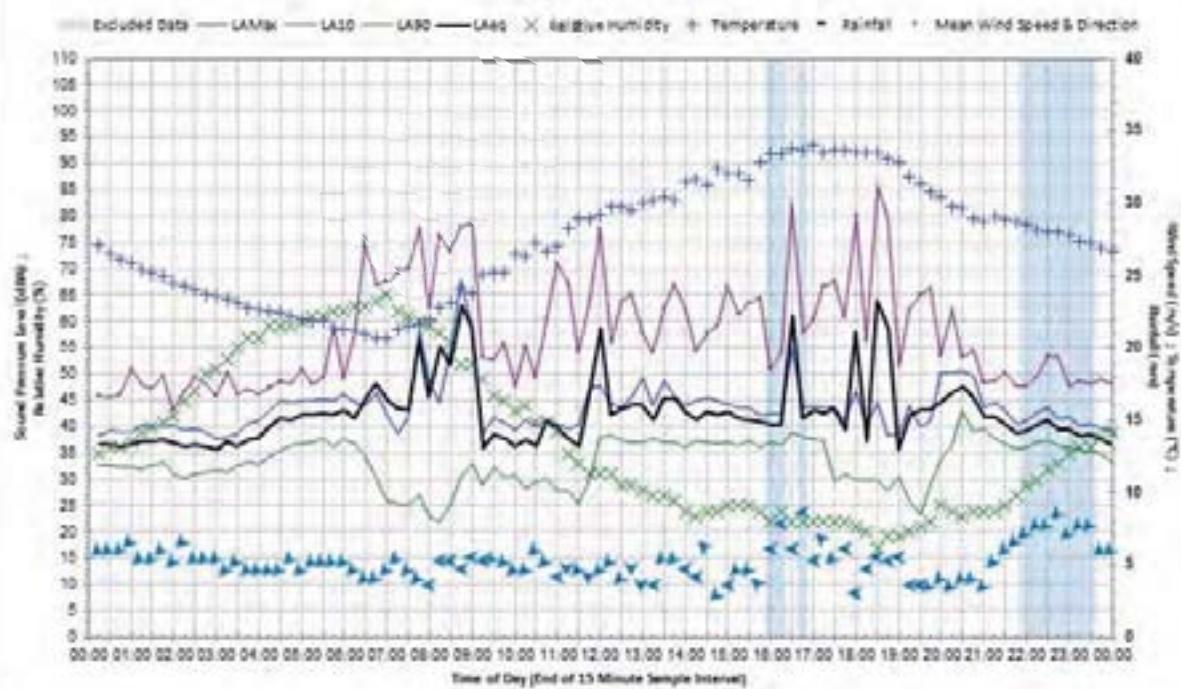
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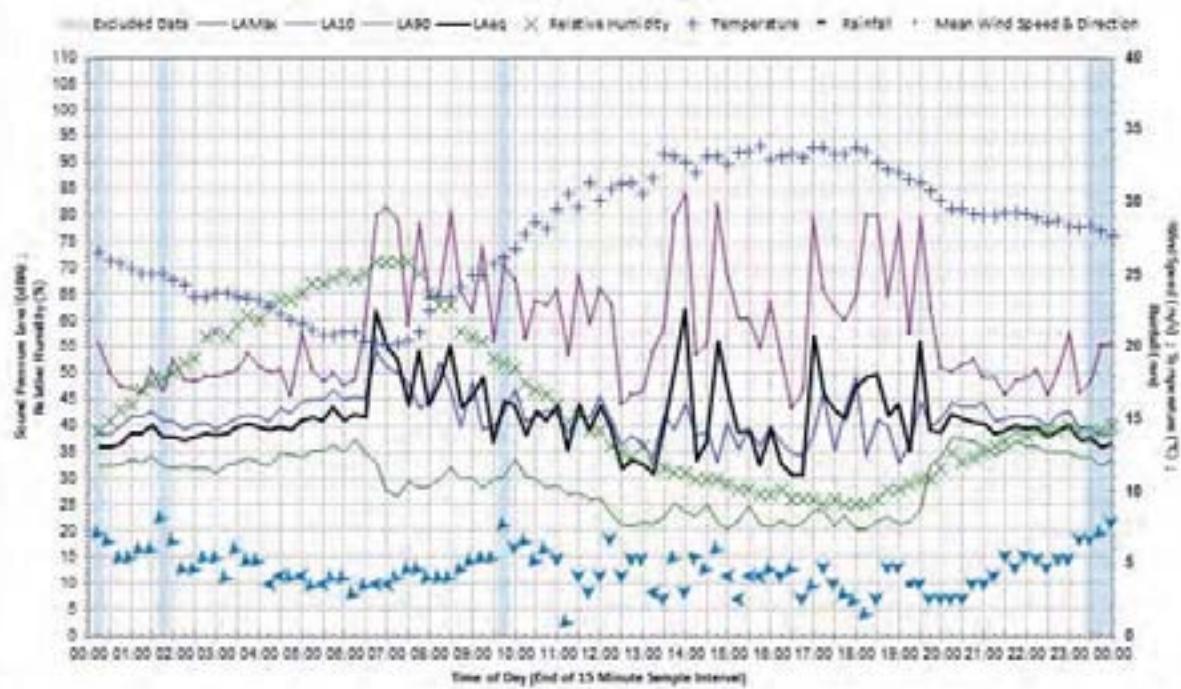
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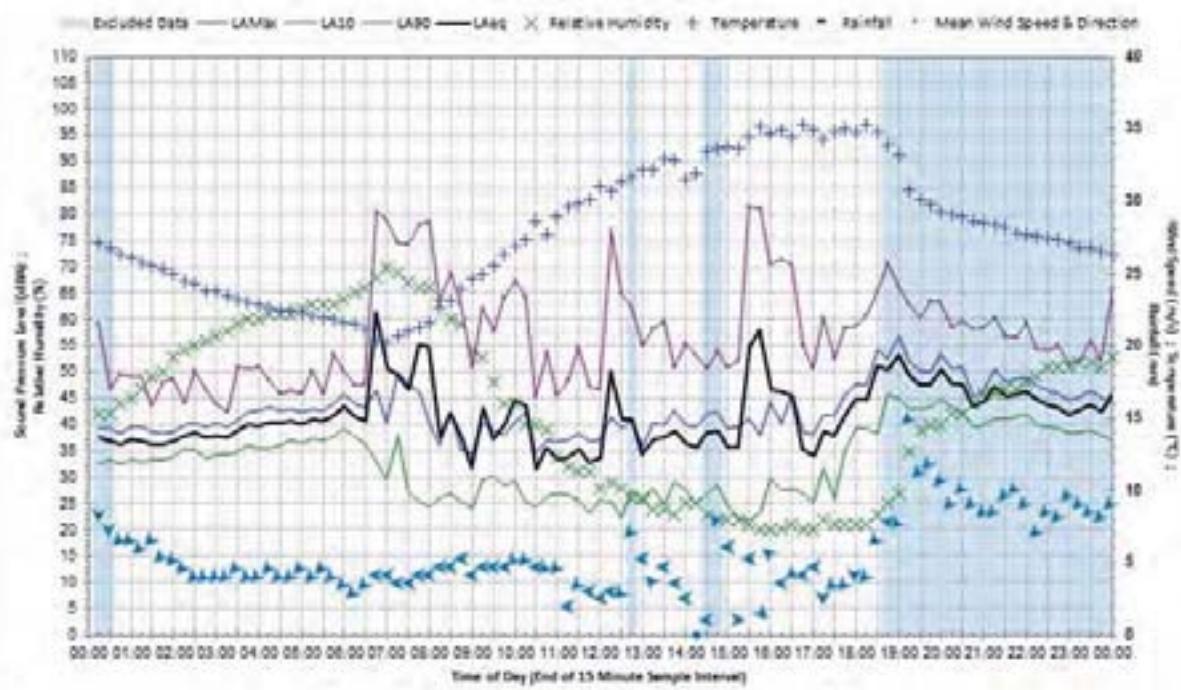
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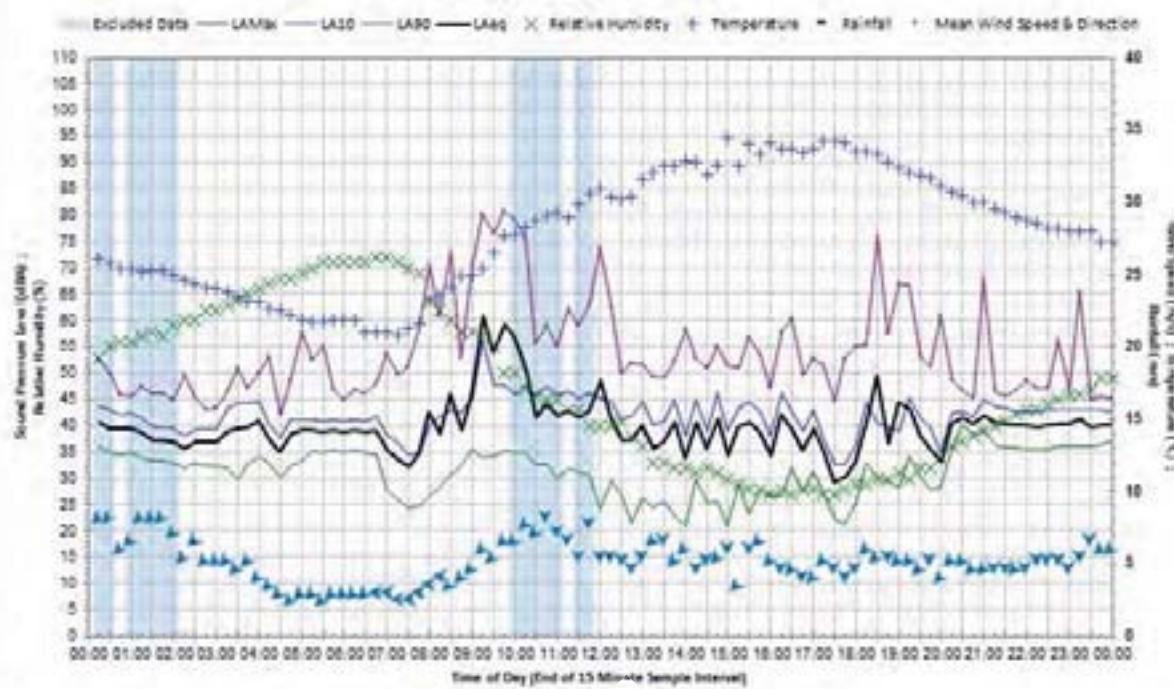
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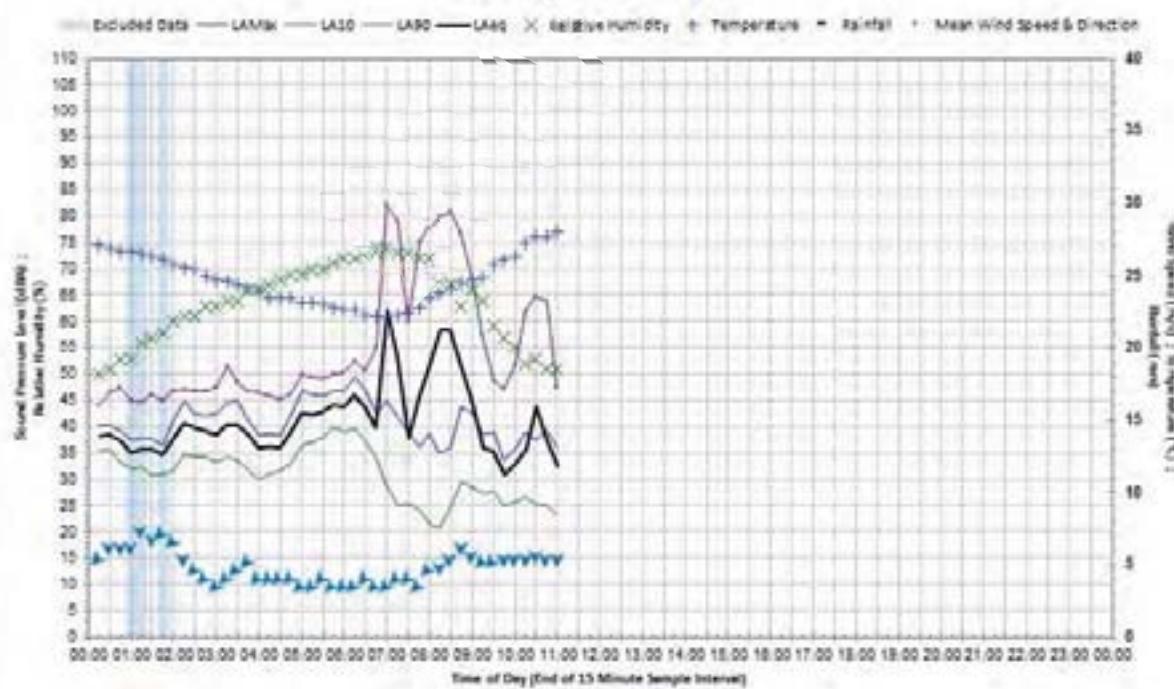
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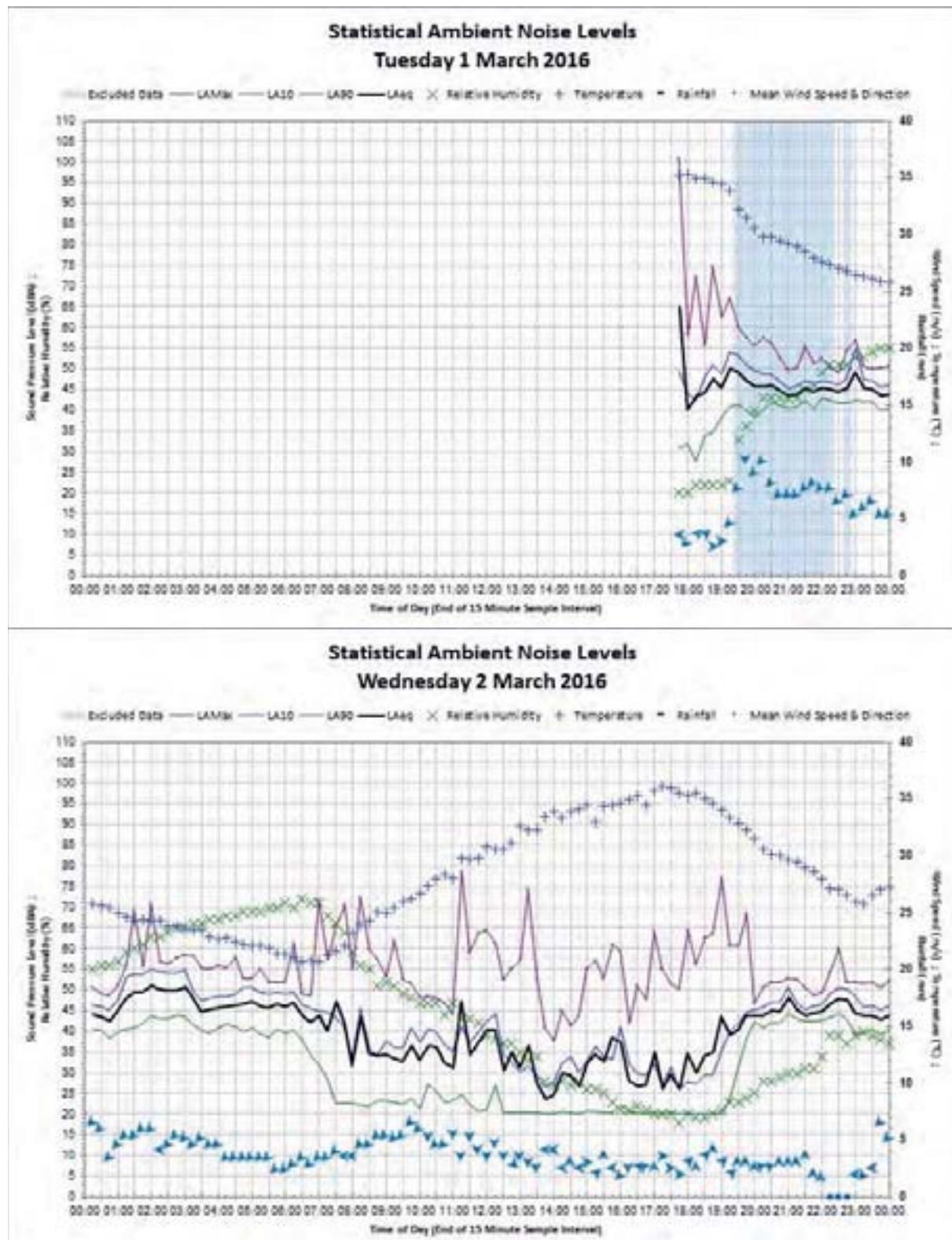
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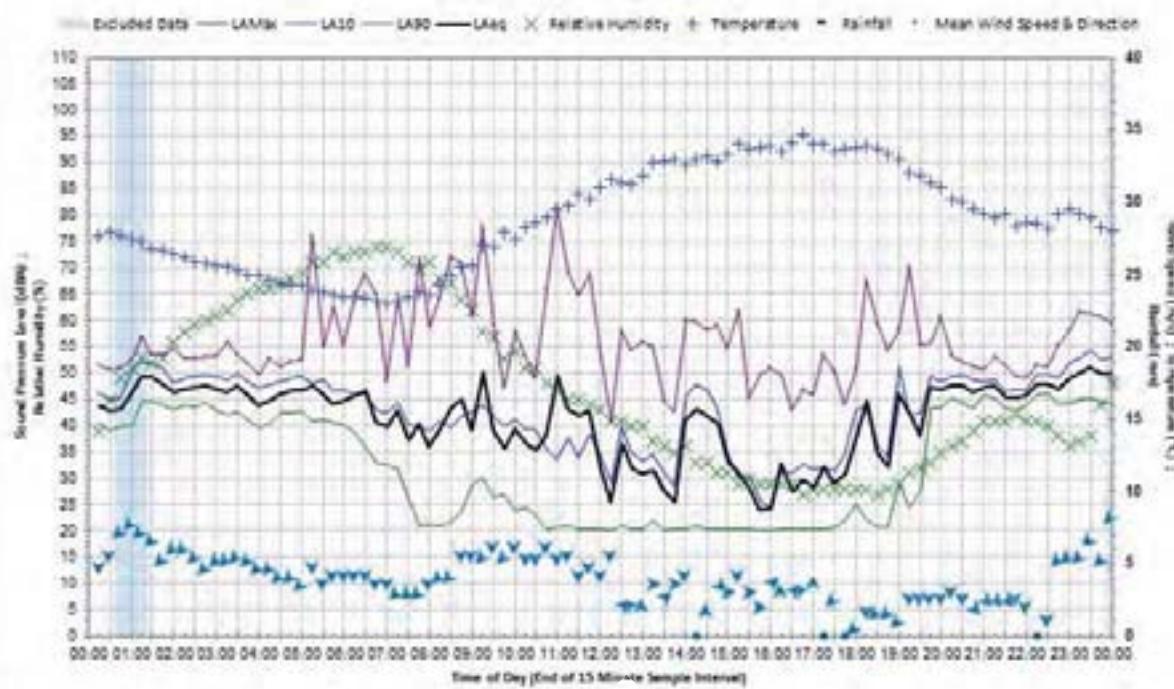


Logger L05NNS



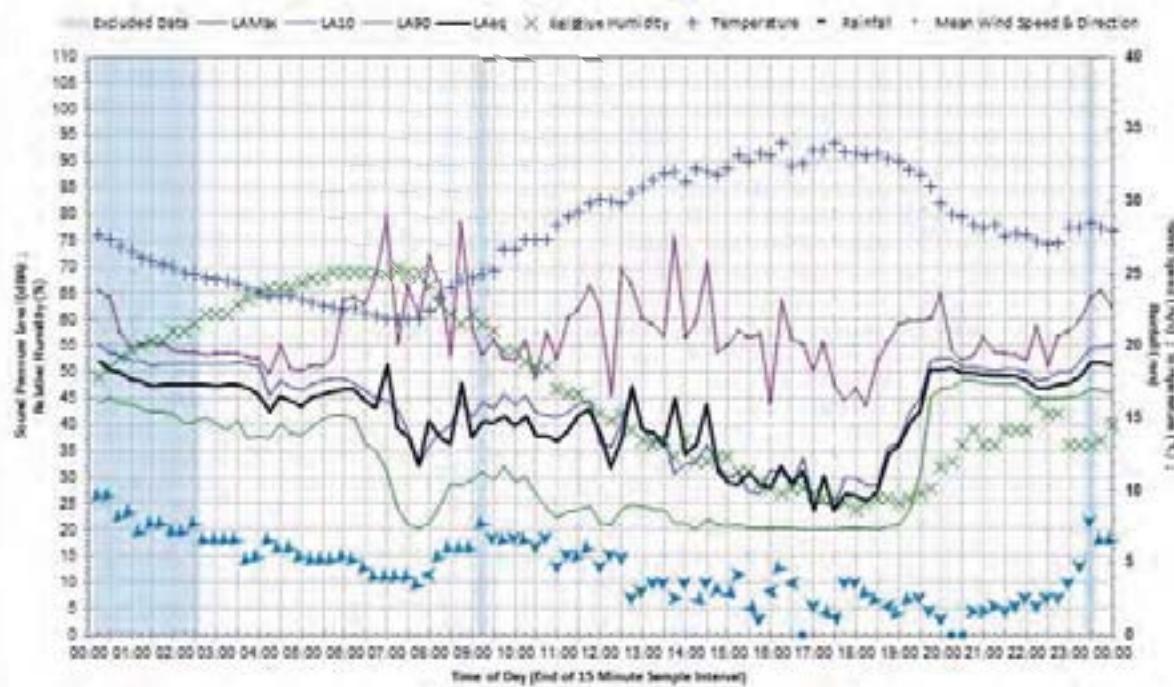
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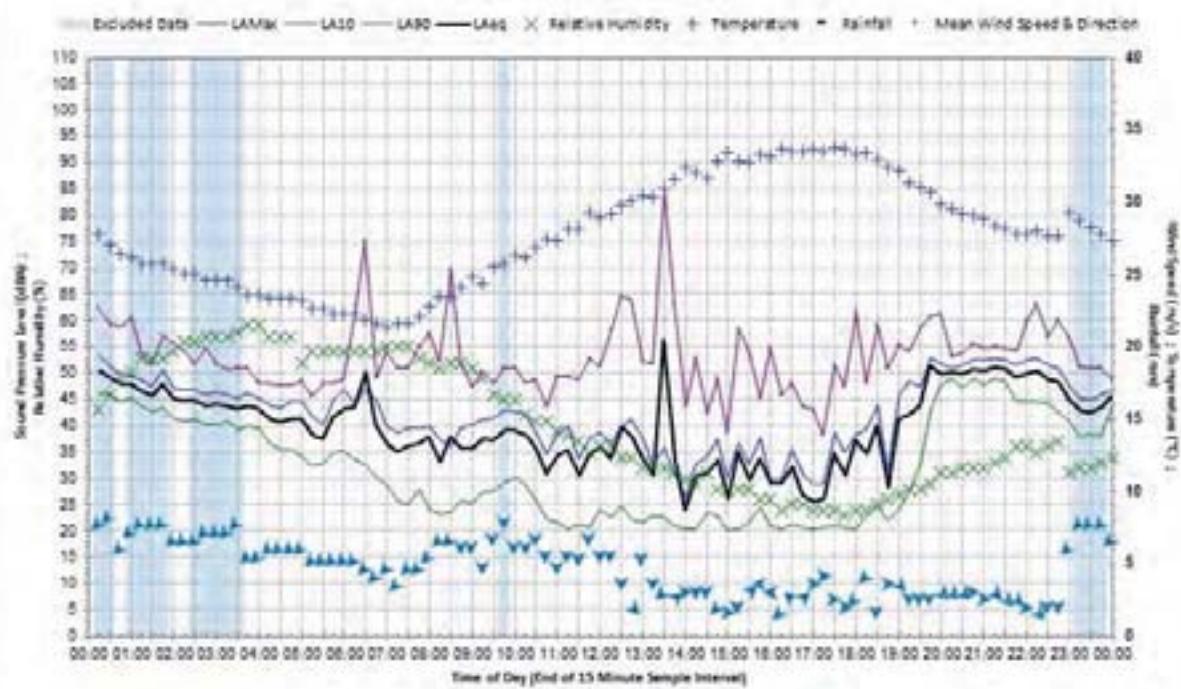


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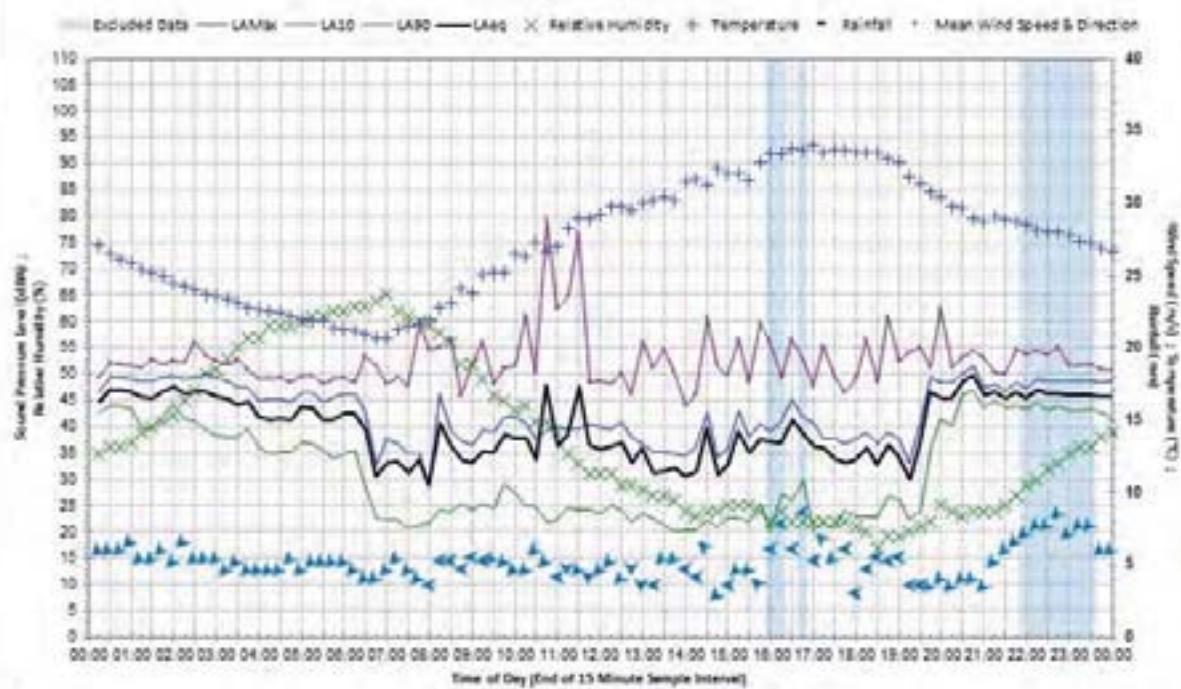
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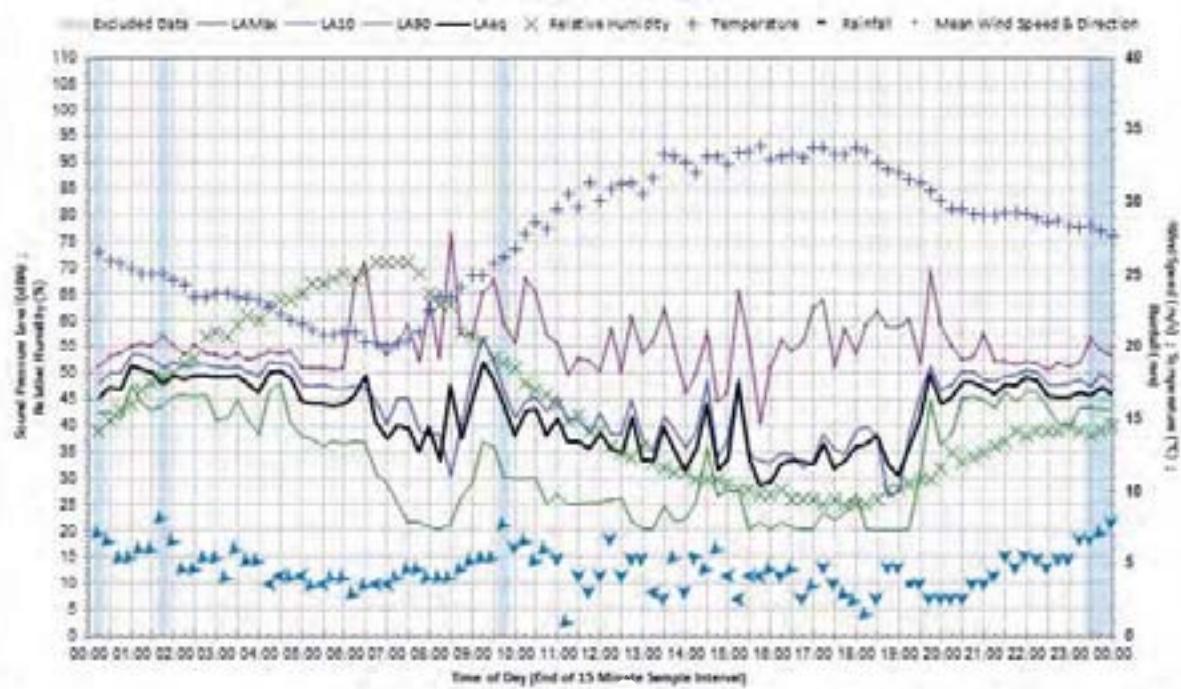
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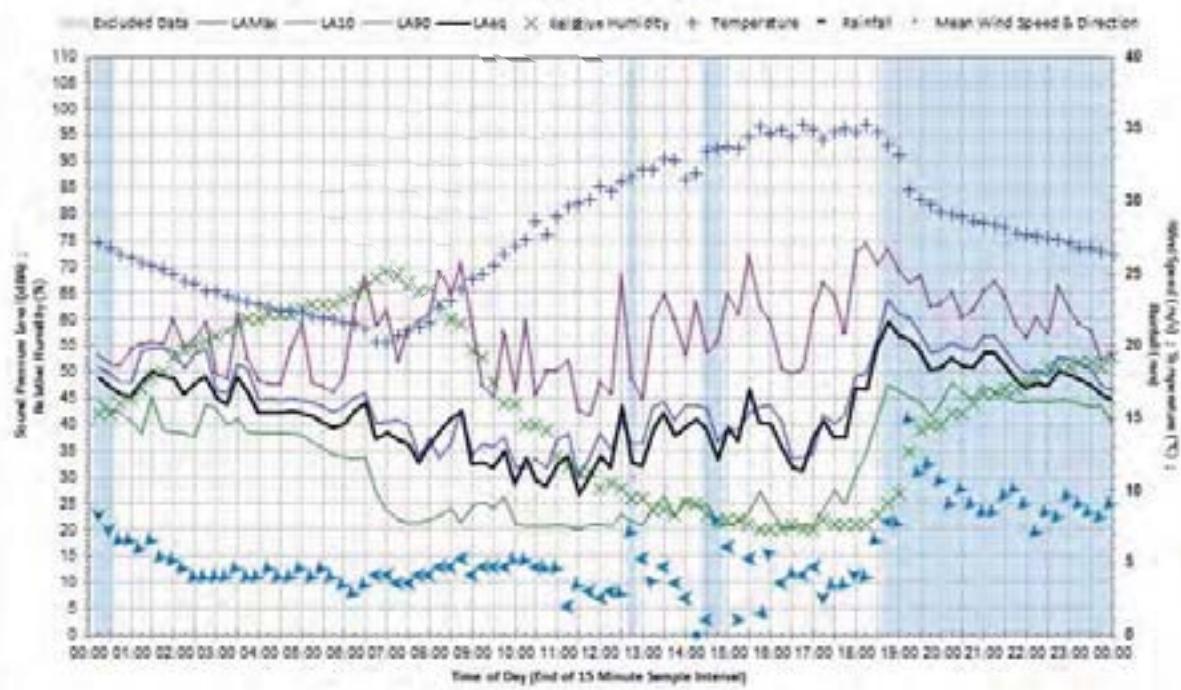
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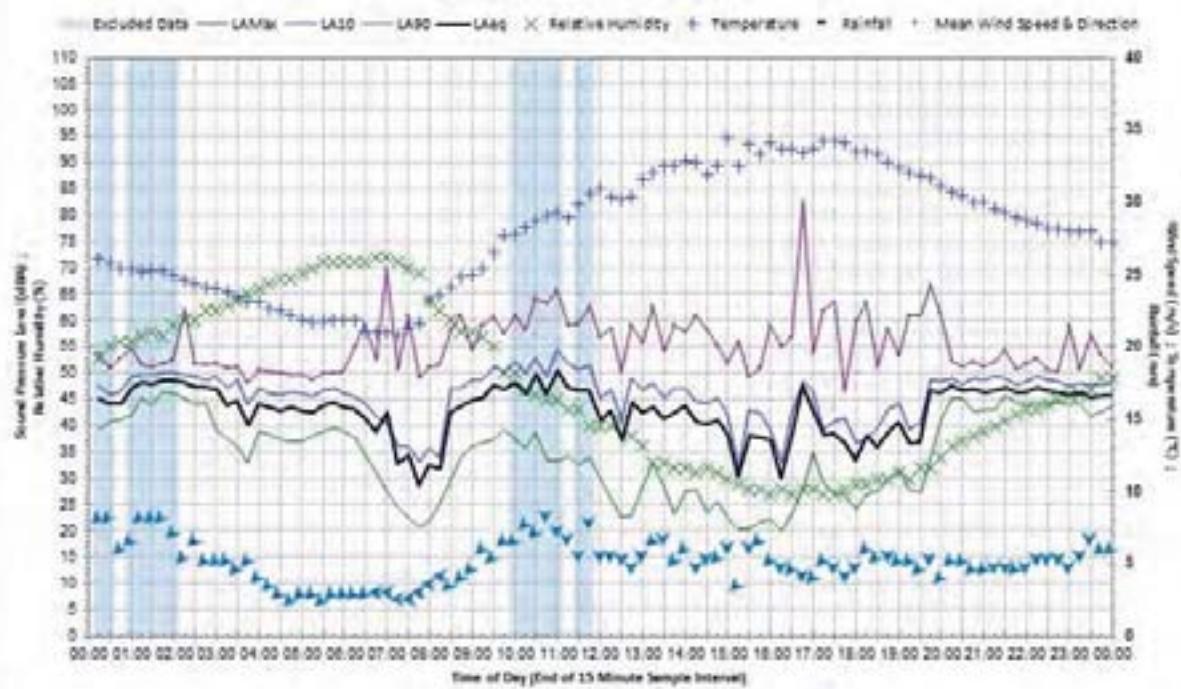
Statistical Ambient Noise Levels
Monday 7 March 2016



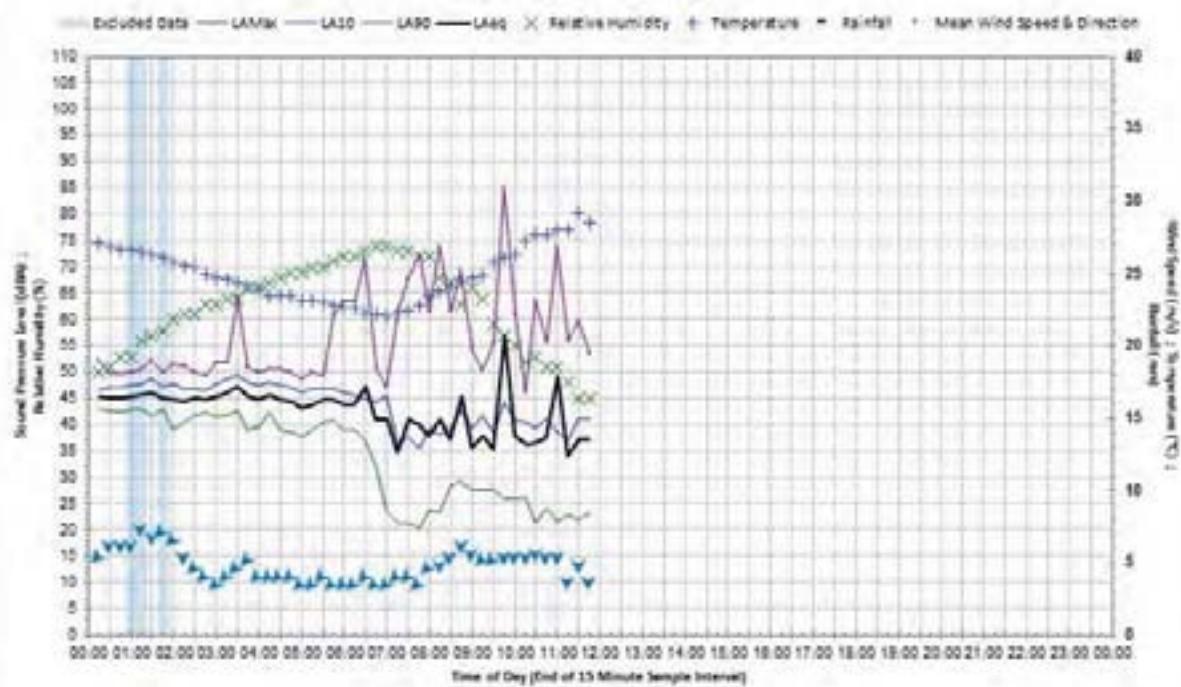
Statistical Ambient Noise Levels
Tuesday 8 March 2016



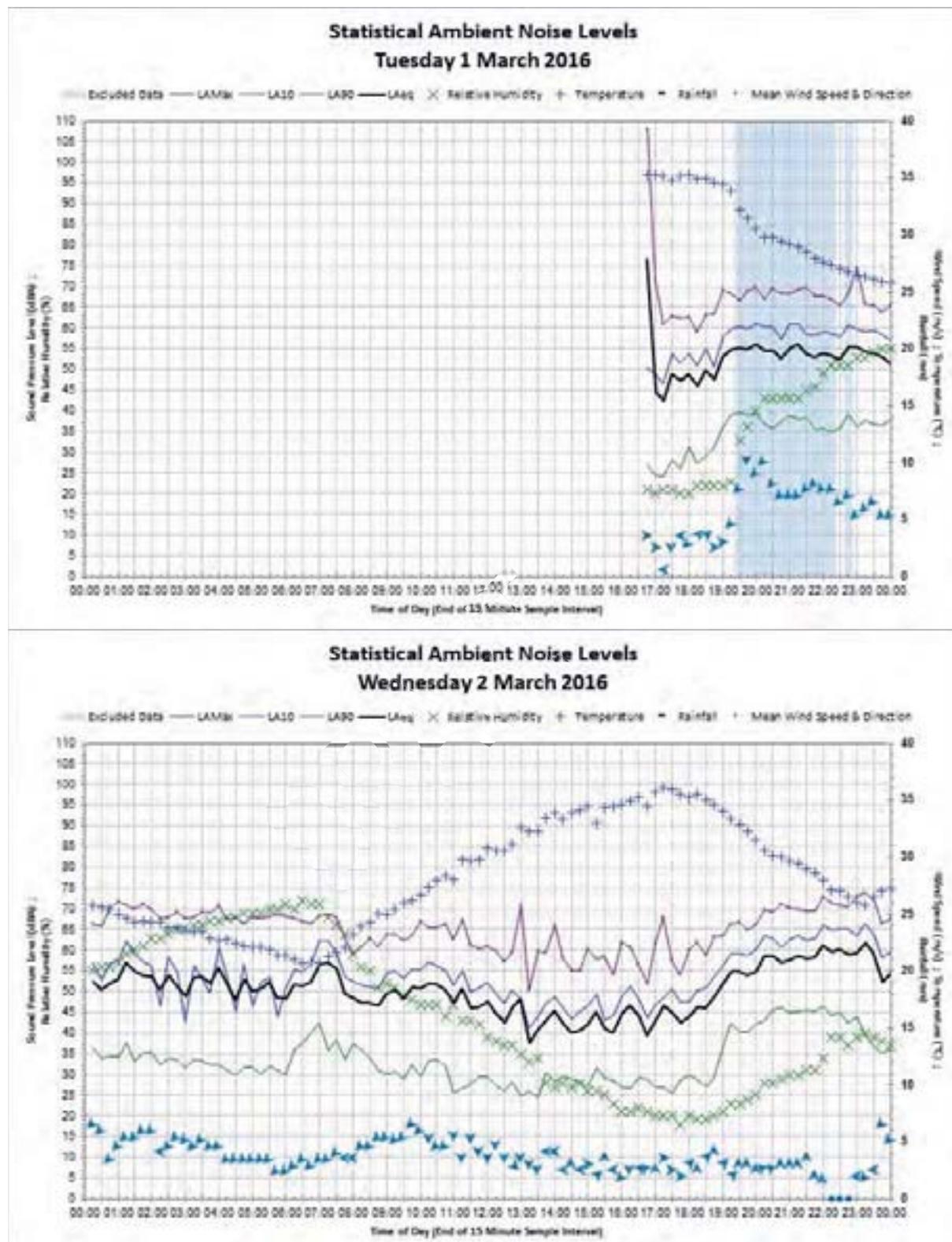
Statistical Ambient Noise Levels
Wednesday 9 March 2016



Statistical Ambient Noise Levels
Thursday 10 March 2016

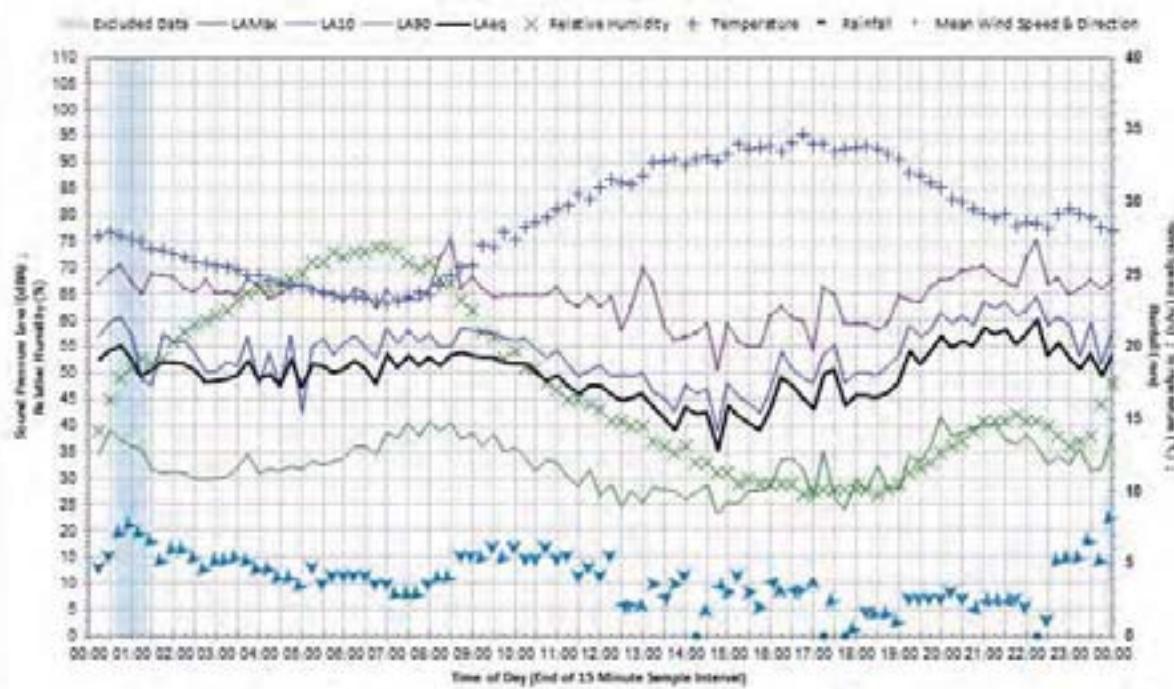


Logger L06NNS



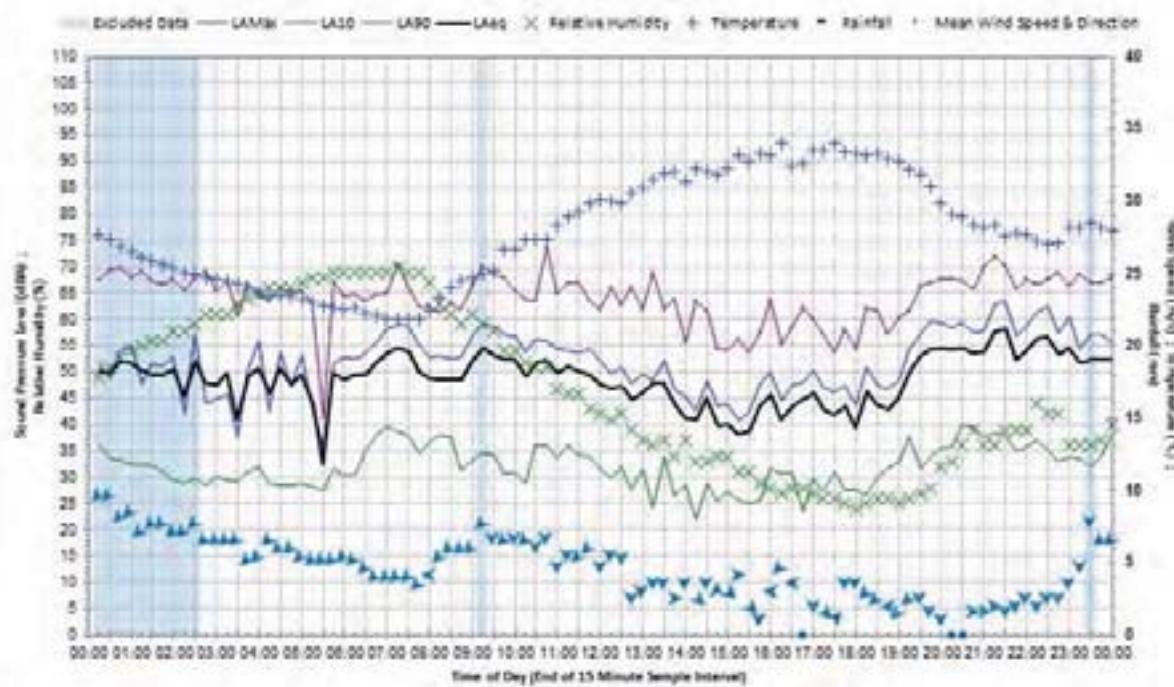
Statistical Ambient Noise Levels

Thursday 3 March 2016

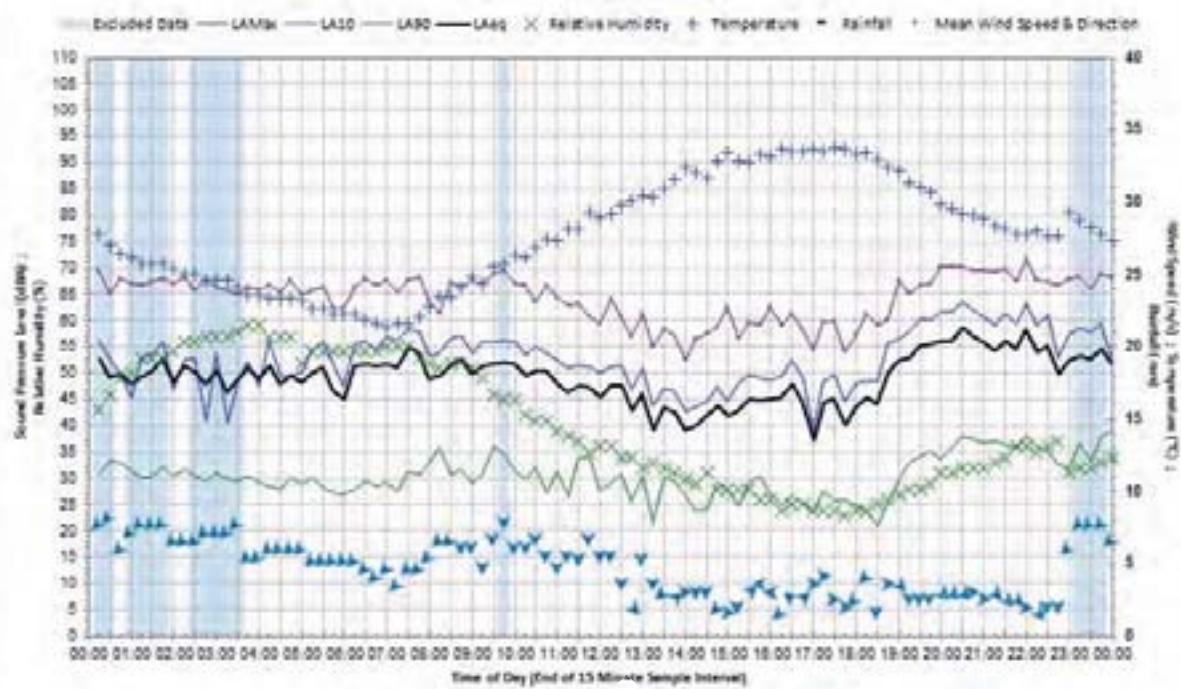


Statistical Ambient Noise Levels

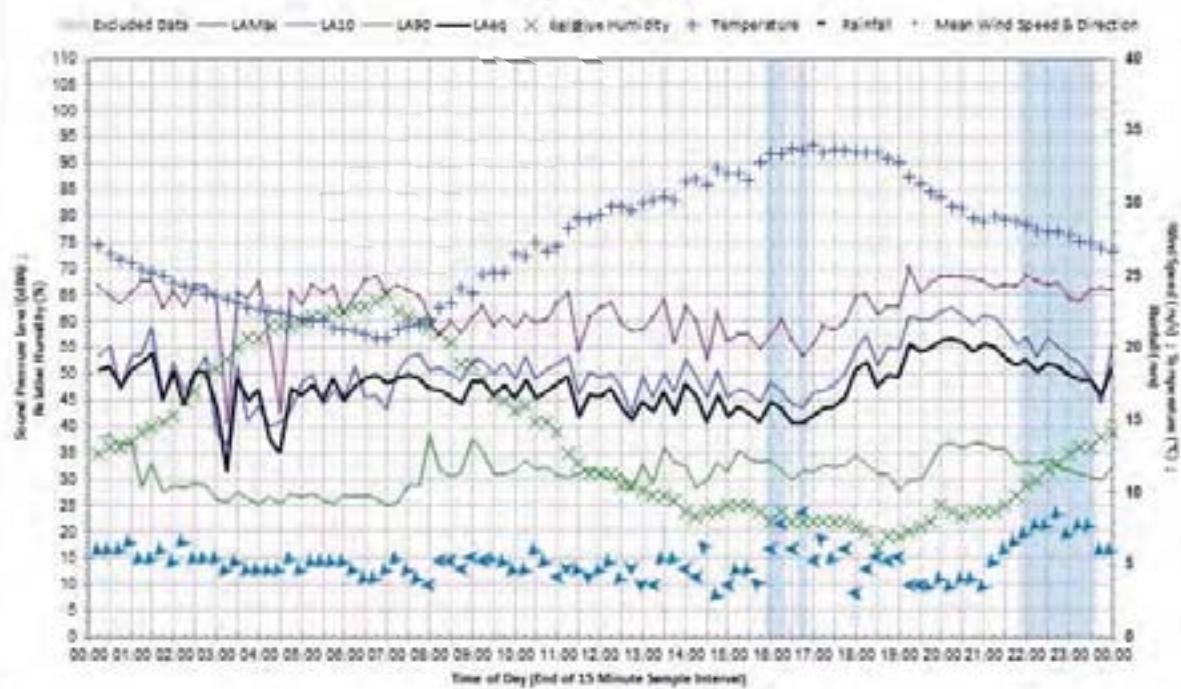
Friday 4 March 2016



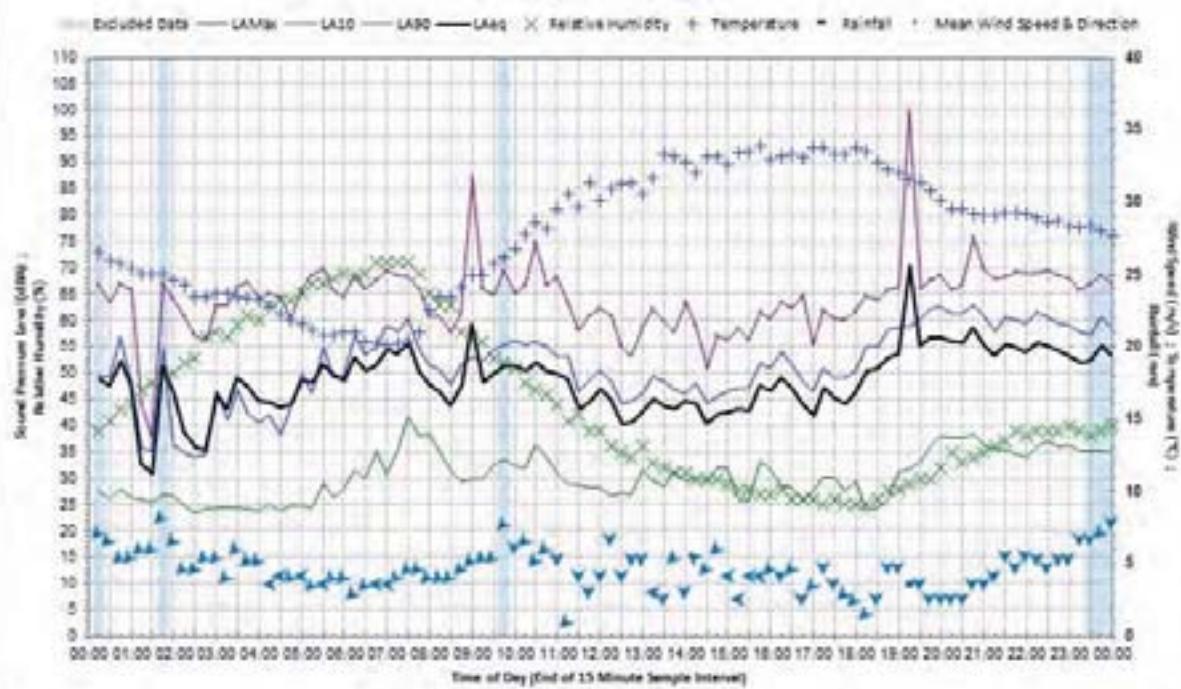
Statistical Ambient Noise Levels
Saturday 5 March 2016



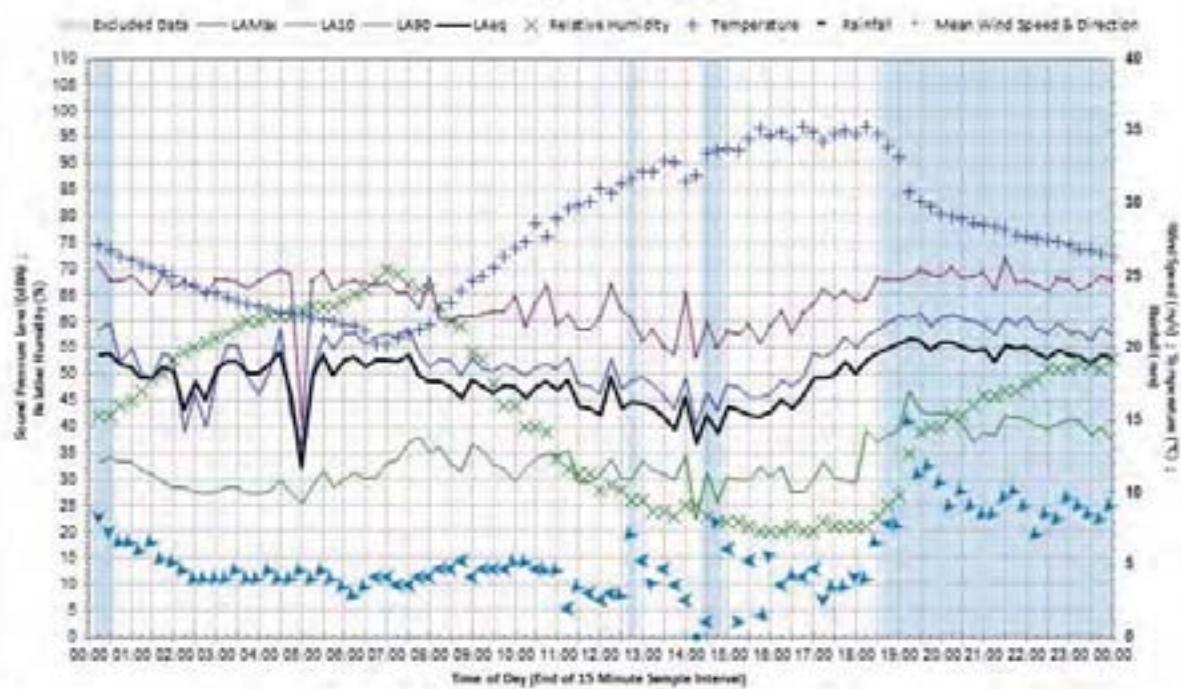
Statistical Ambient Noise Levels
Sunday 6 March 2016



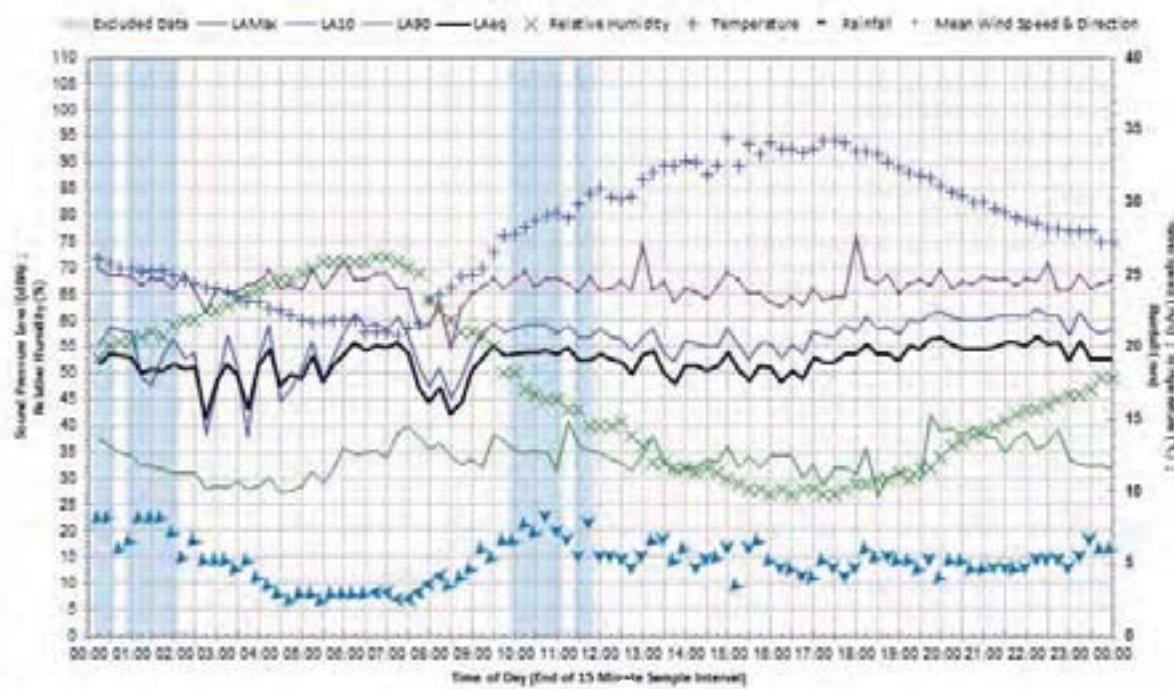
Statistical Ambient Noise Levels
Monday 7 March 2016



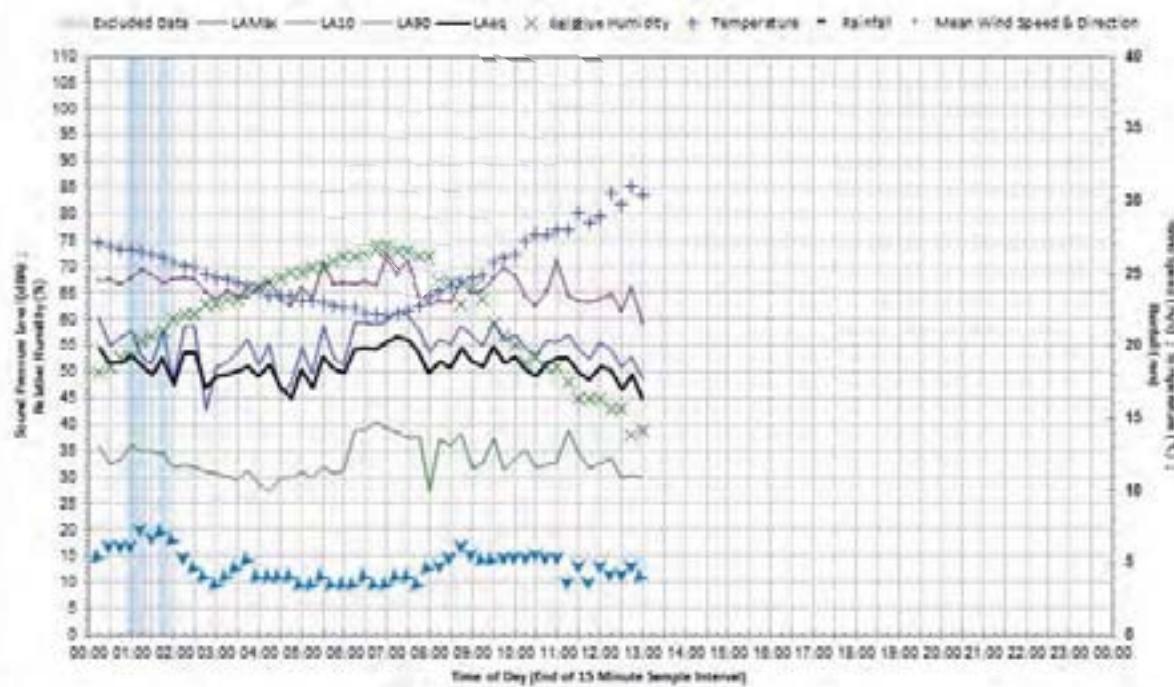
Statistical Ambient Noise Levels
Tuesday 8 March 2016



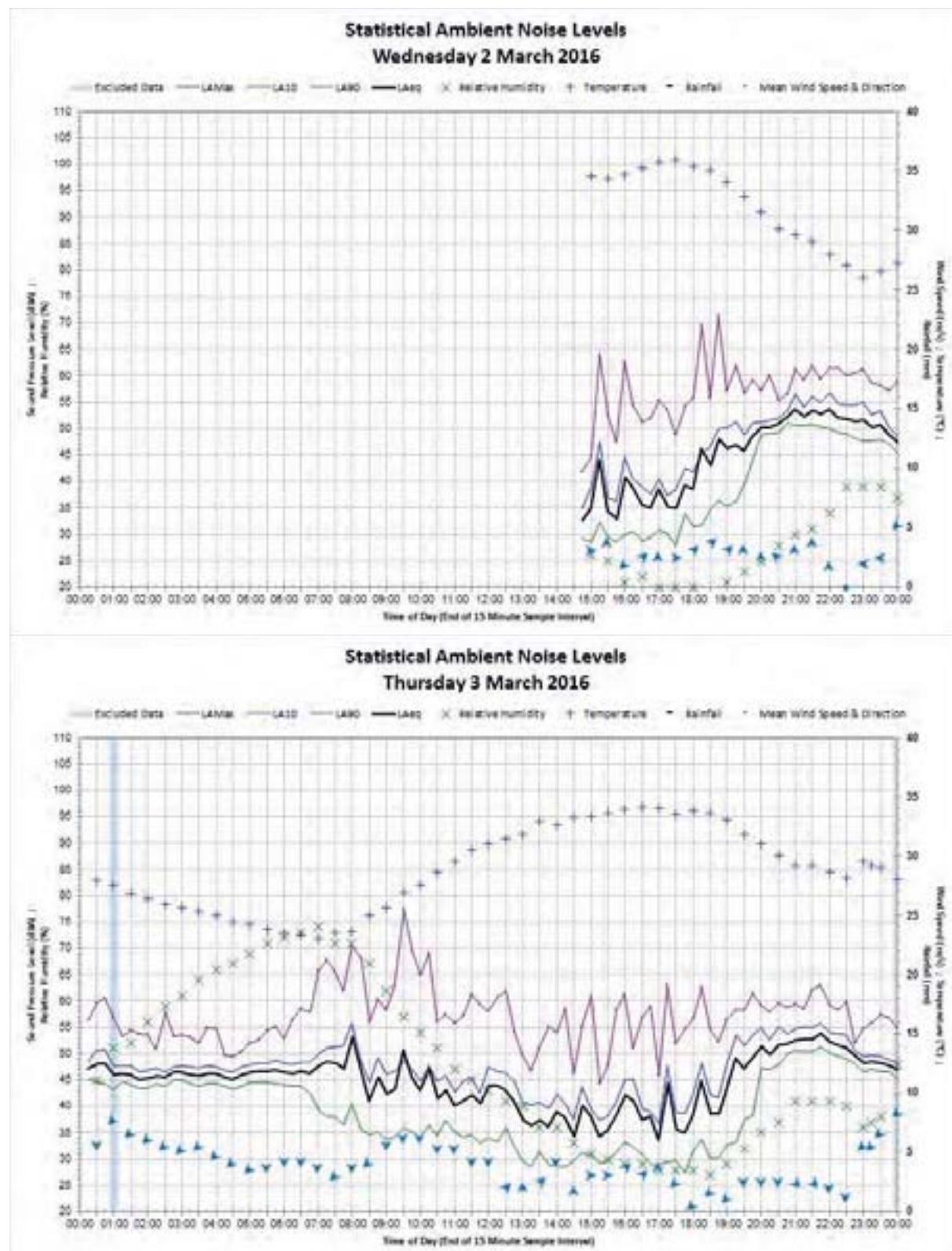
Statistical Ambient Noise Levels
Wednesday 9 March 2016



Statistical Ambient Noise Levels
Thursday 10 March 2016

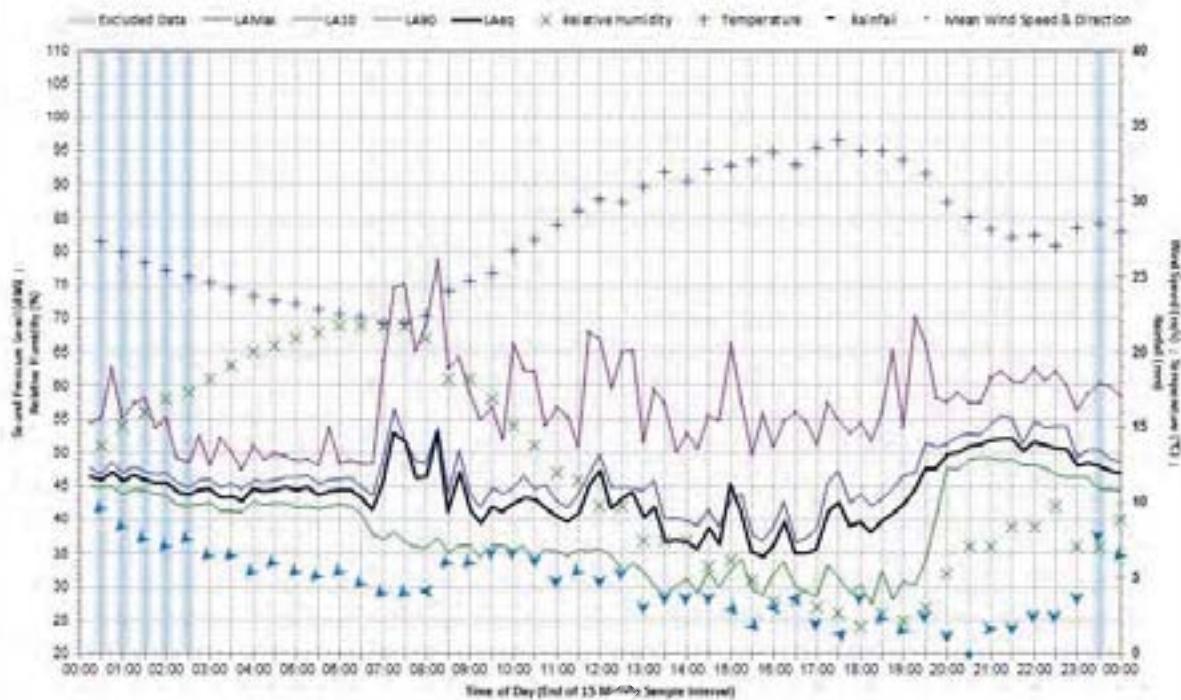


Logger L07NNS



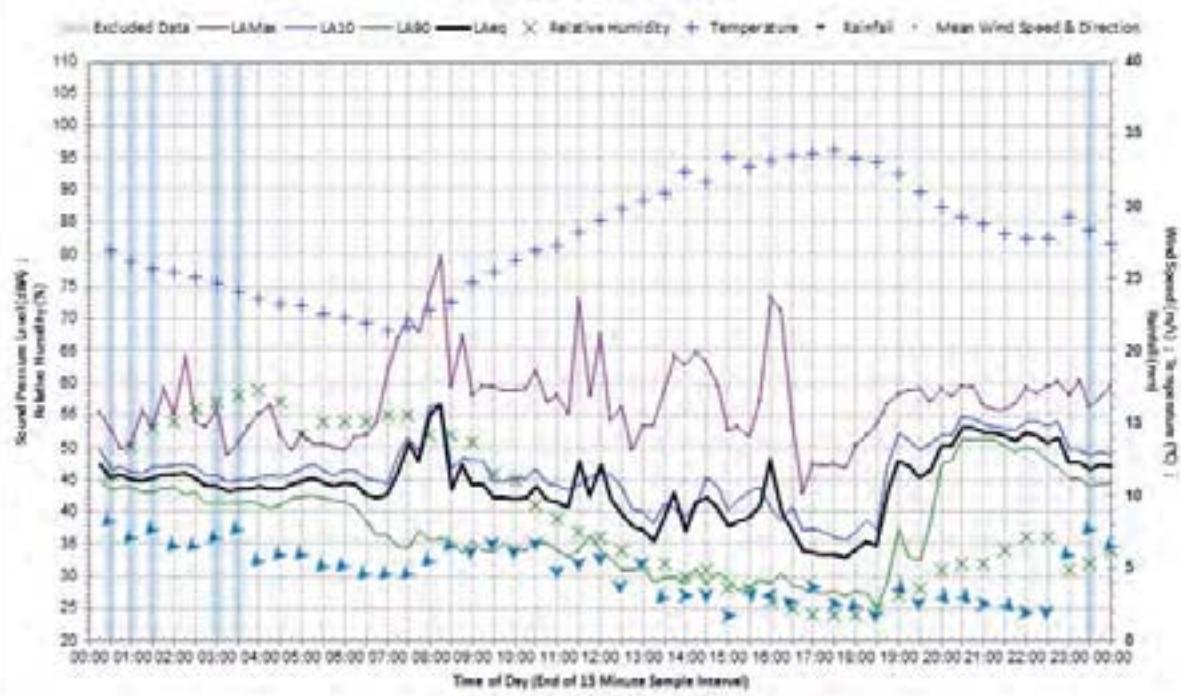
Statistical Ambient Noise Levels

Friday 4 March 2016

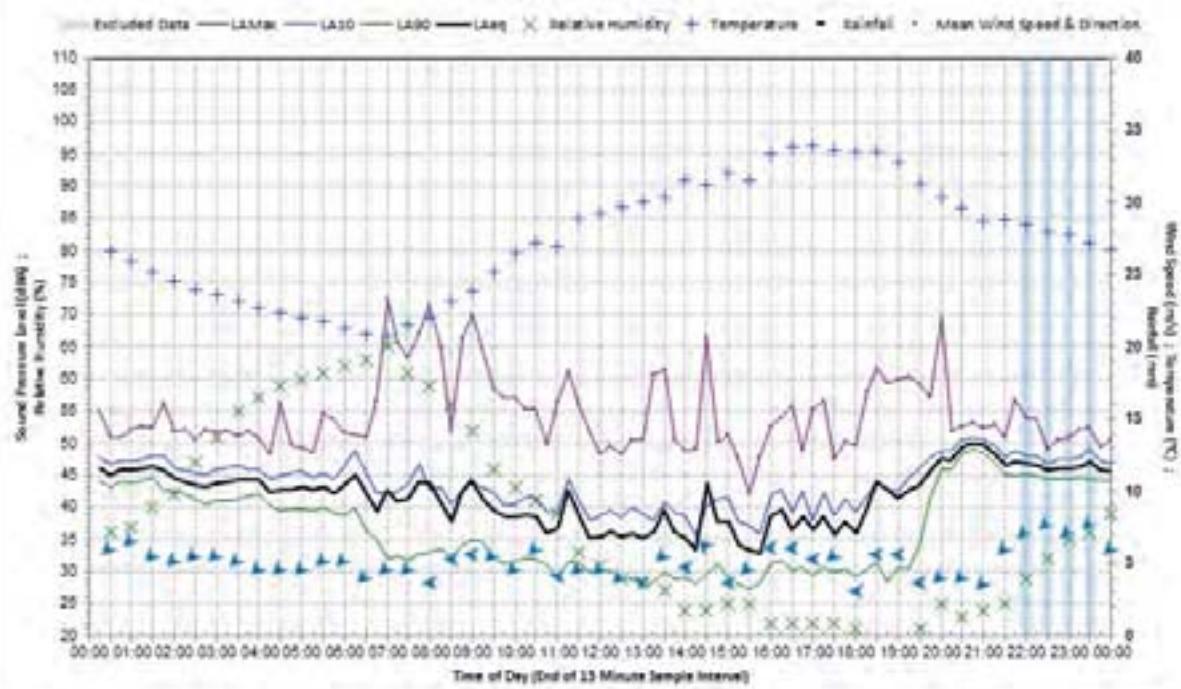


Statistical Ambient Noise Levels

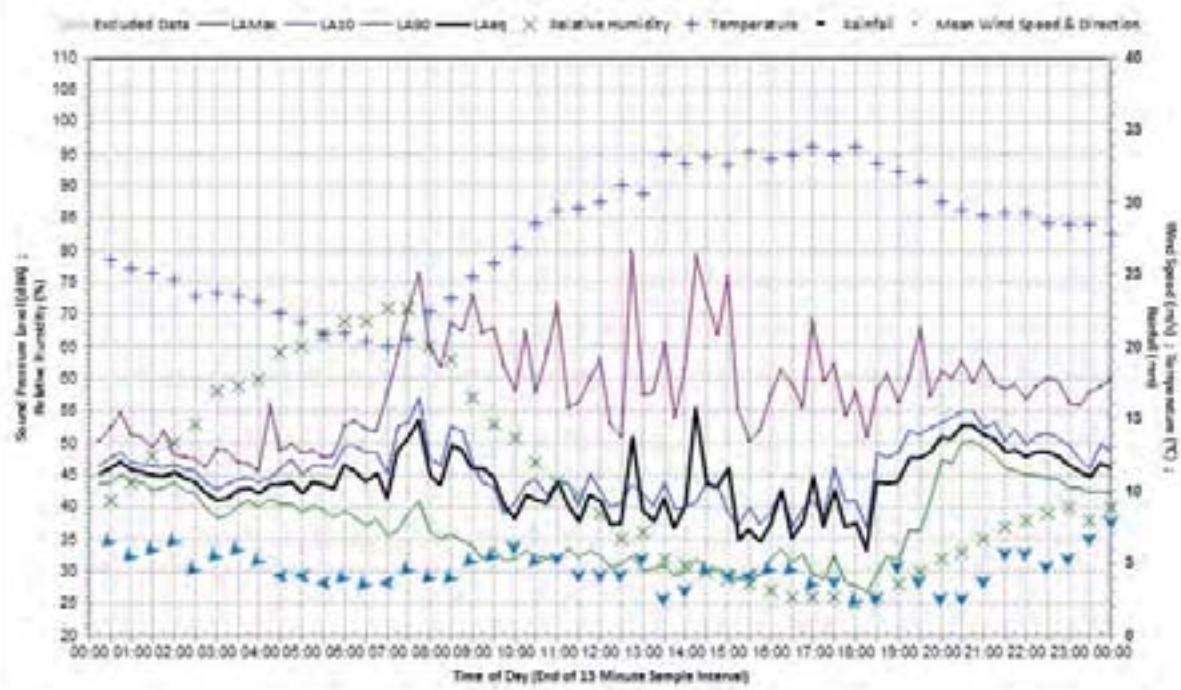
Saturday 5 March 2016



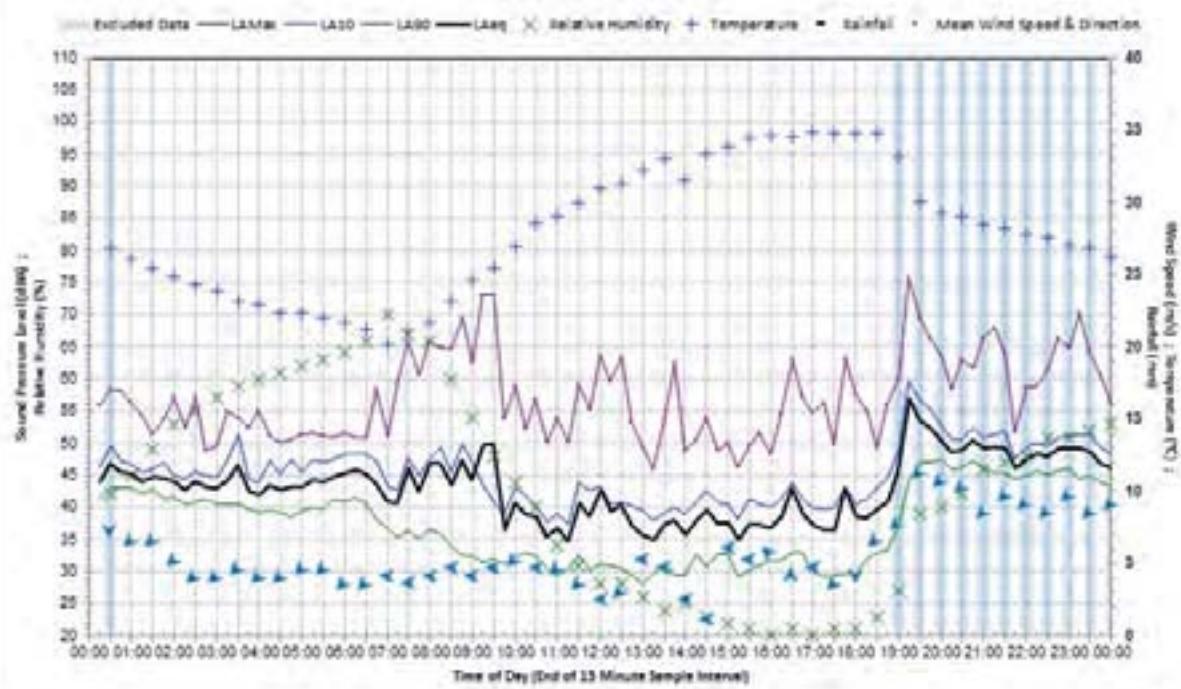
Statistical Ambient Noise Levels Sunday 6 March 2016



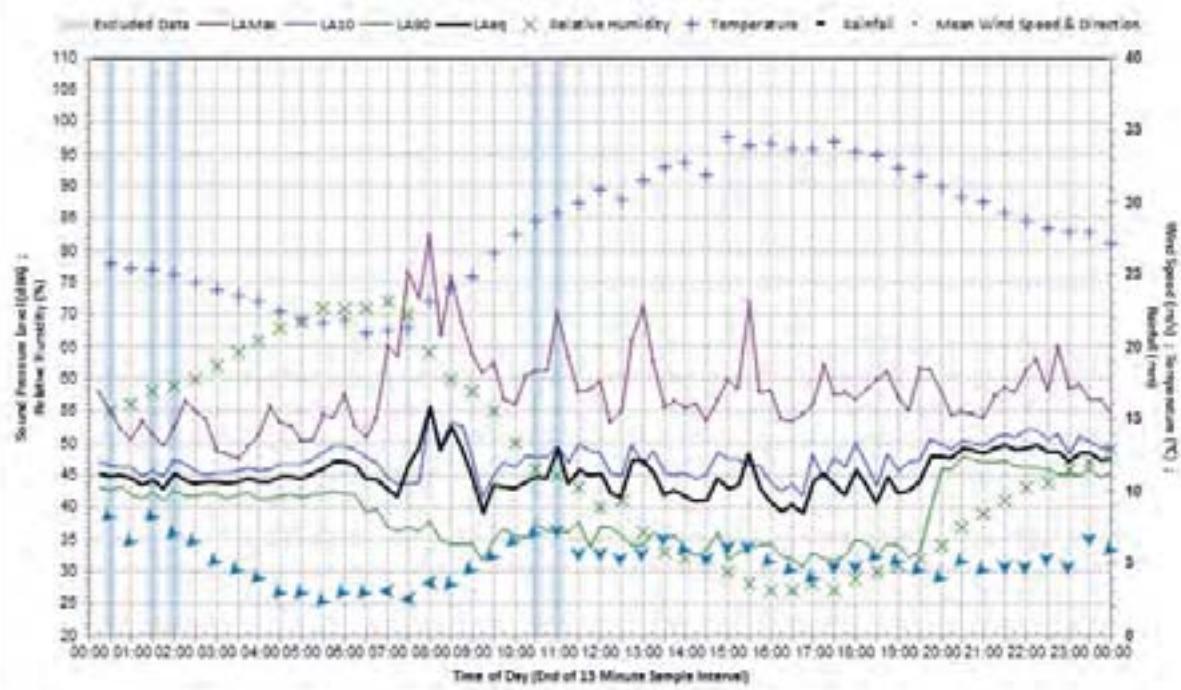
Statistical Ambient Noise Levels Monday 7 March 2016



Statistical Ambient Noise Levels Tuesday 8 March 2016

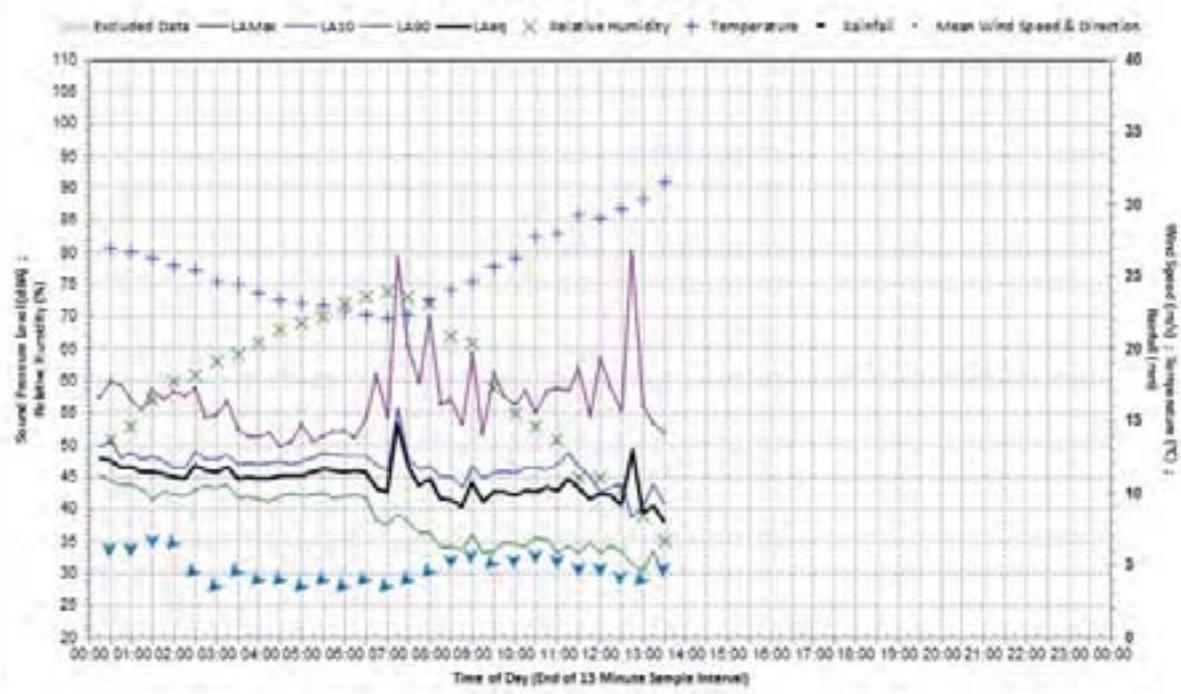


Statistical Ambient Noise Levels Wednesday 9 March 2016

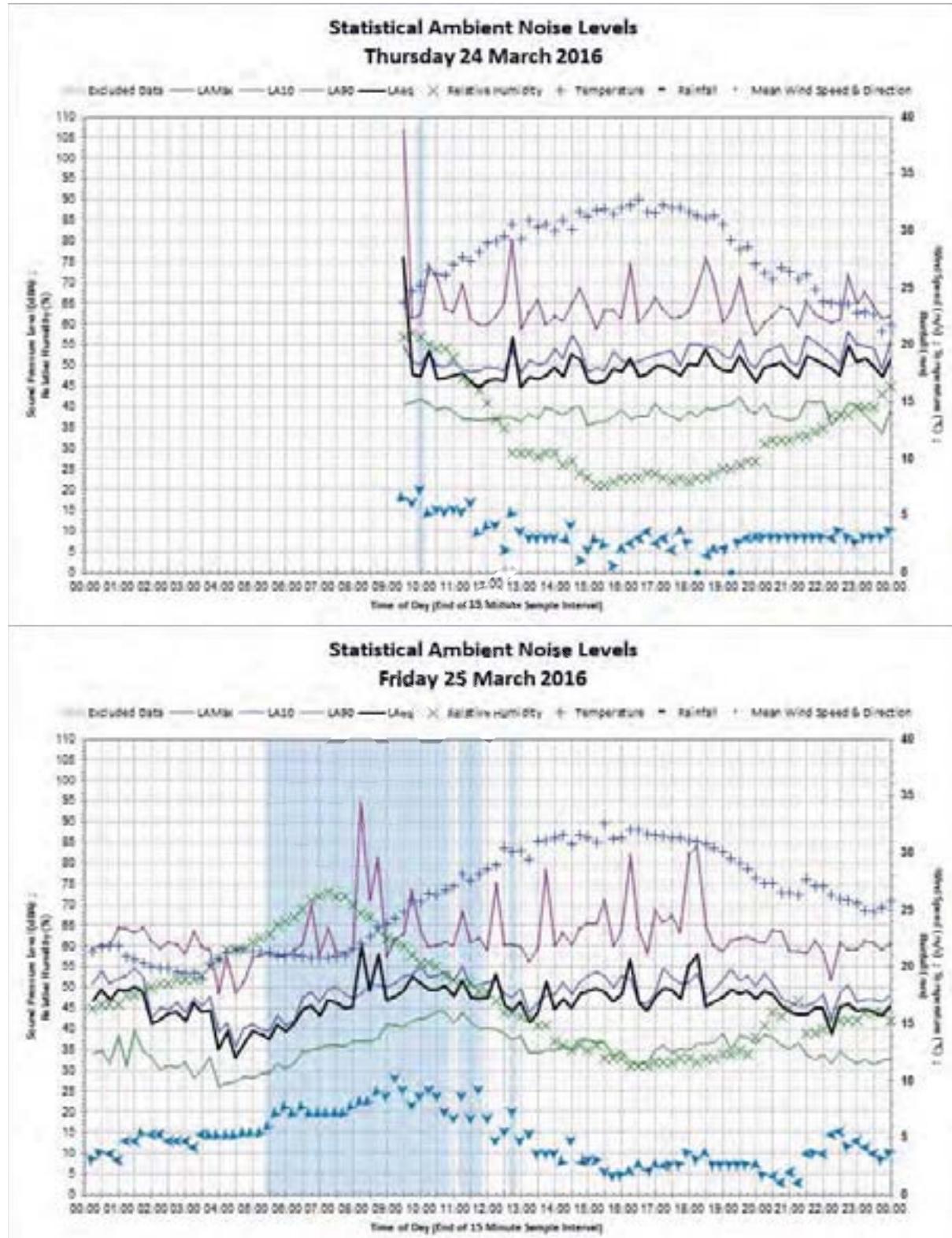


Statistical Ambient Noise Levels

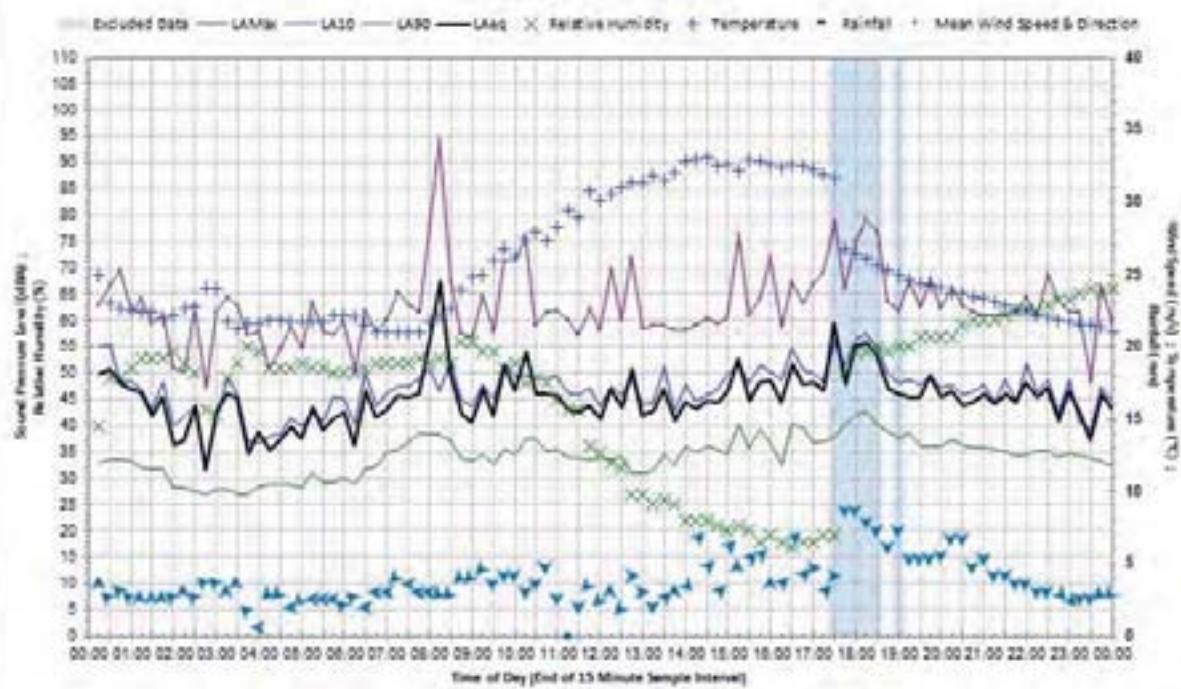
Thursday 10 March 2016



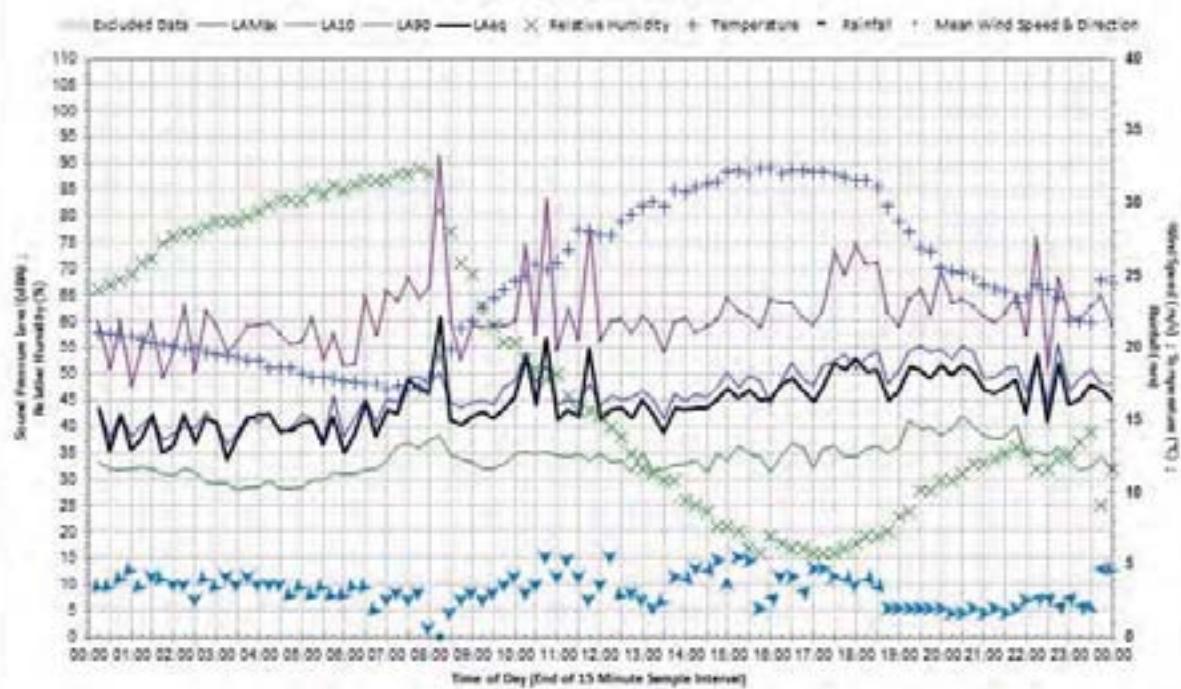
Logger L08NNS



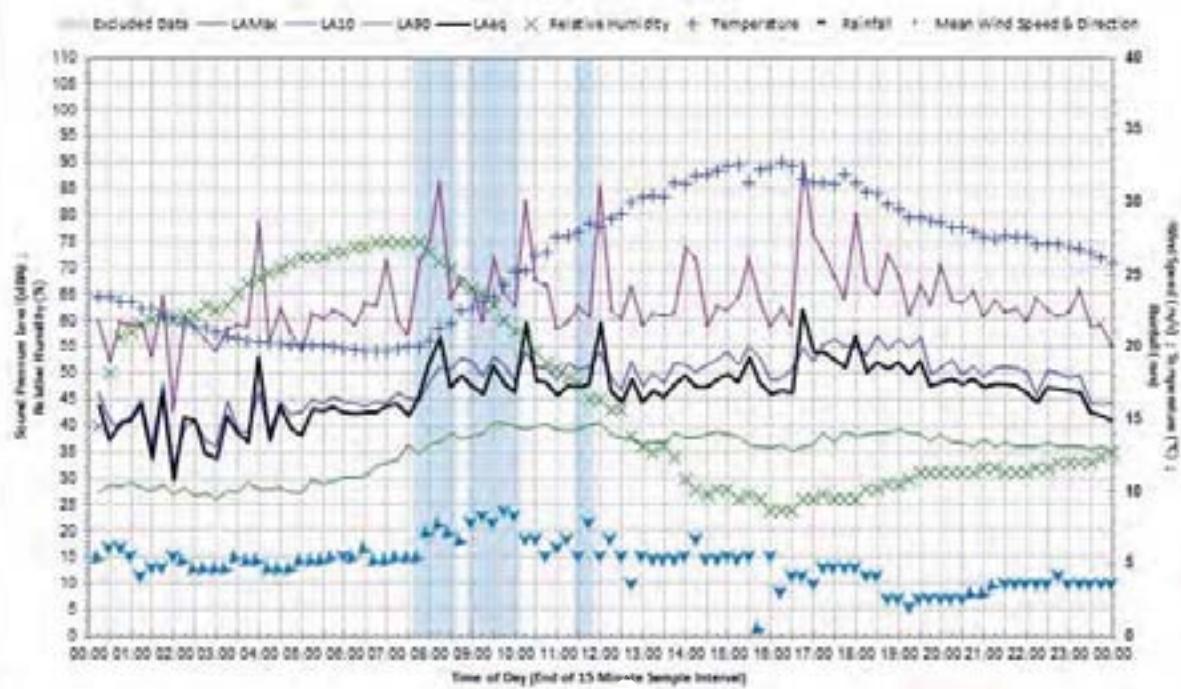
Statistical Ambient Noise Levels
Saturday 26 March 2016



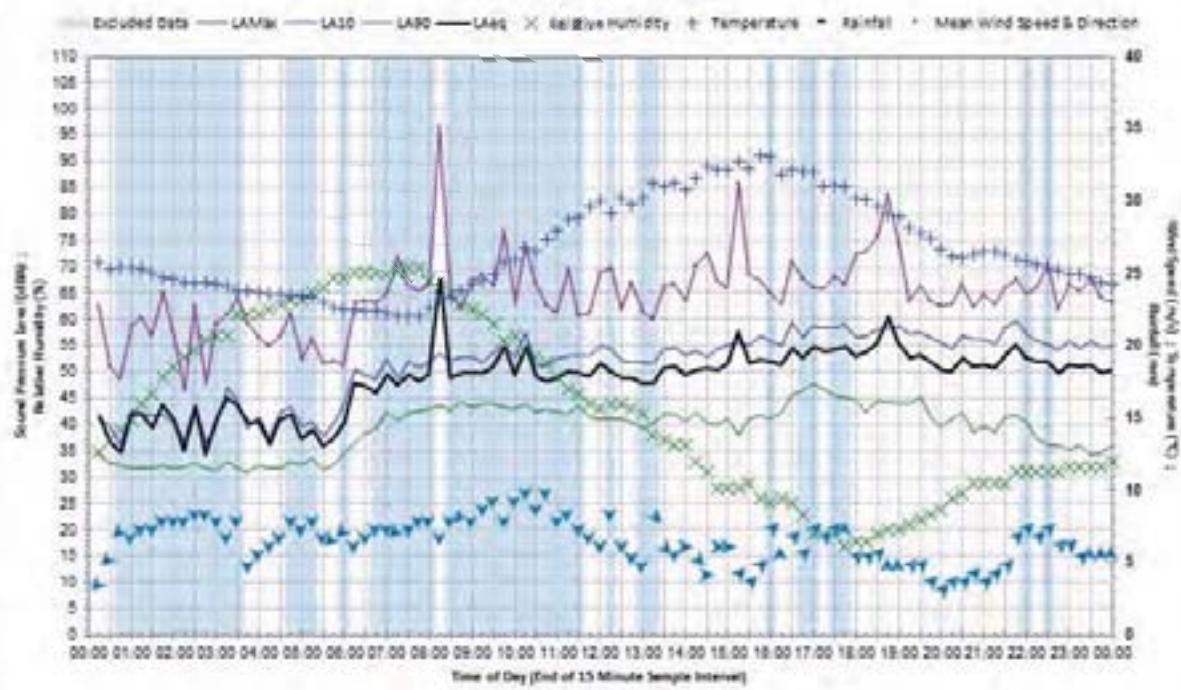
Statistical Ambient Noise Levels
Sunday 27 March 2016



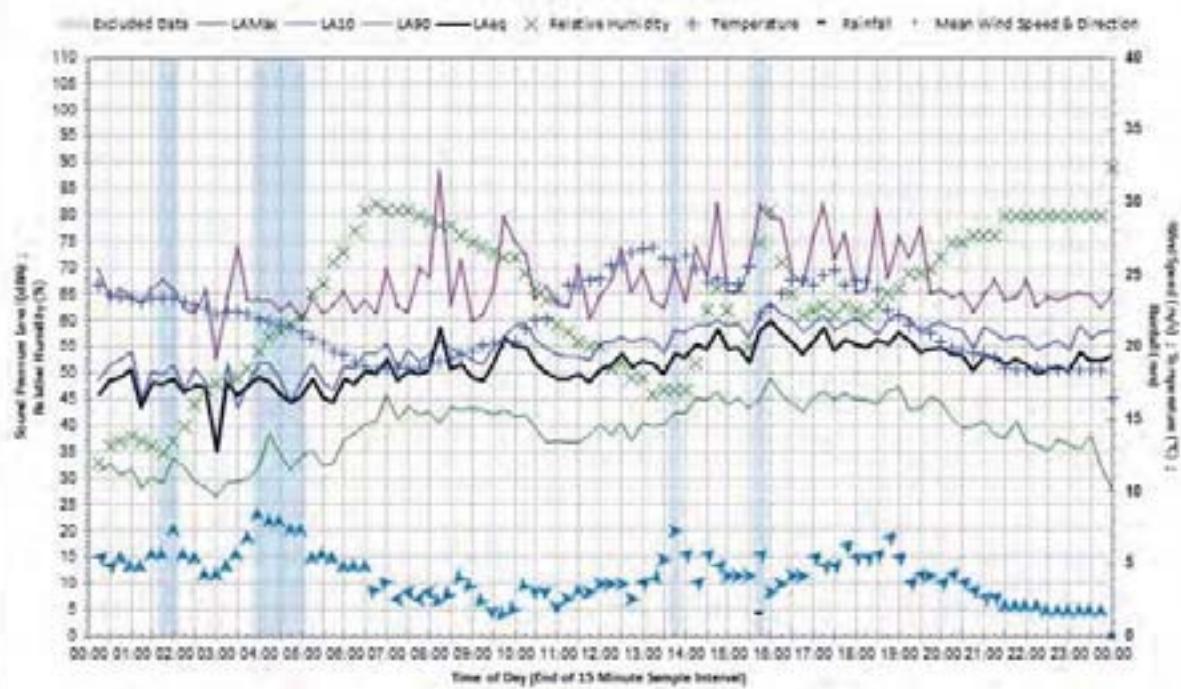
Statistical Ambient Noise Levels
Monday 28 March 2016



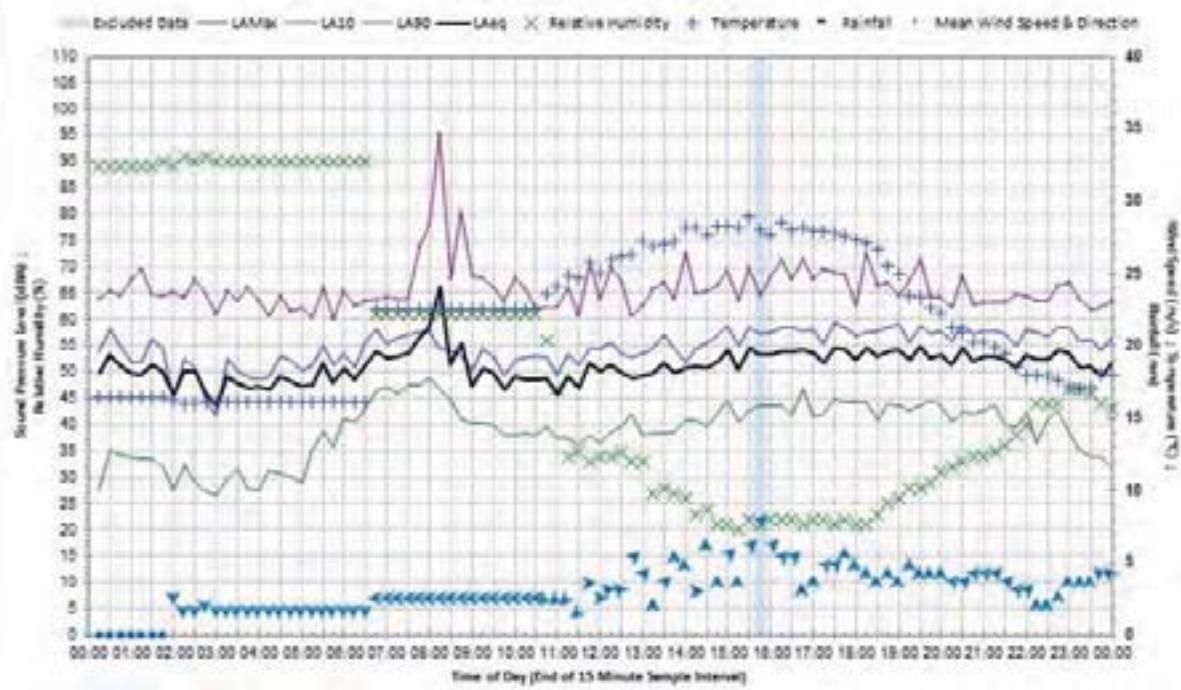
Statistical Ambient Noise Levels
Tuesday 29 March 2016



Statistical Ambient Noise Levels
Wednesday 30 March 2016

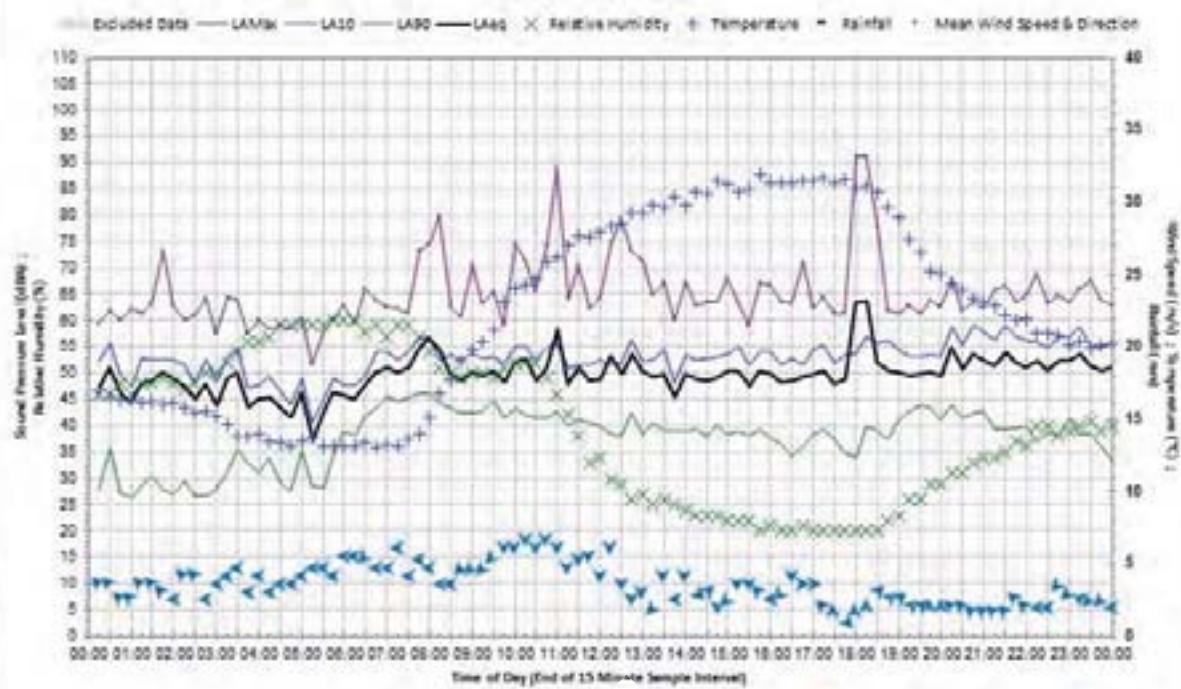


Statistical Ambient Noise Levels
Thursday 31 March 2016



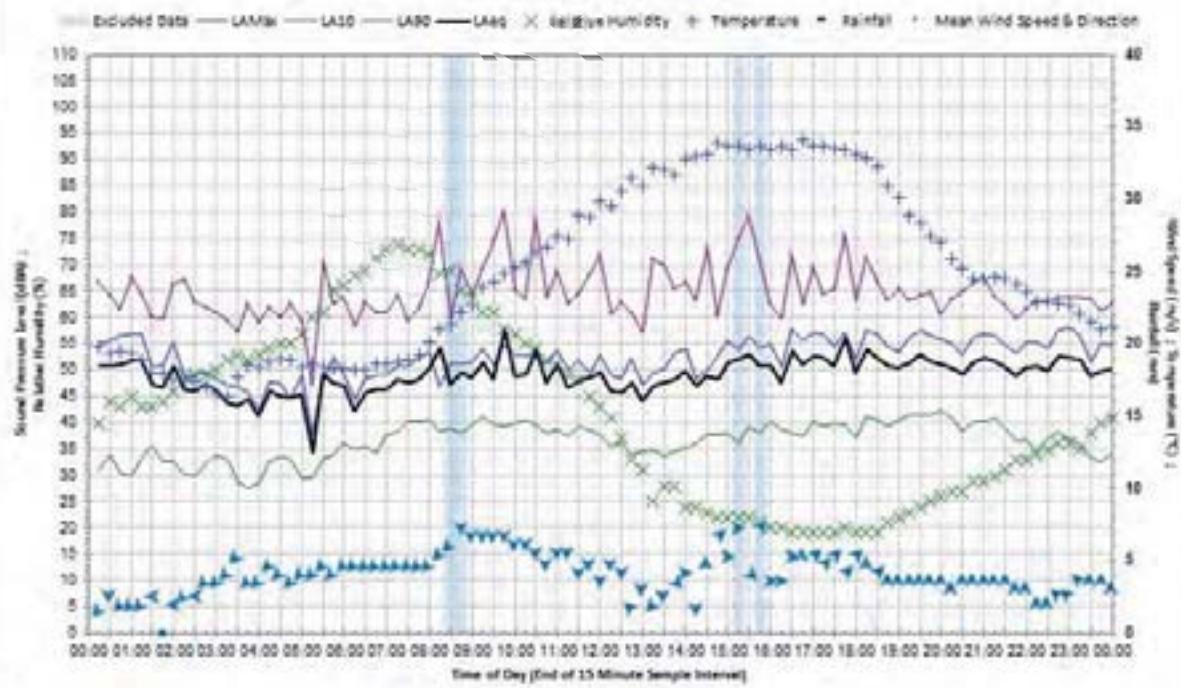
Statistical Ambient Noise Levels

Friday 1 April 2016

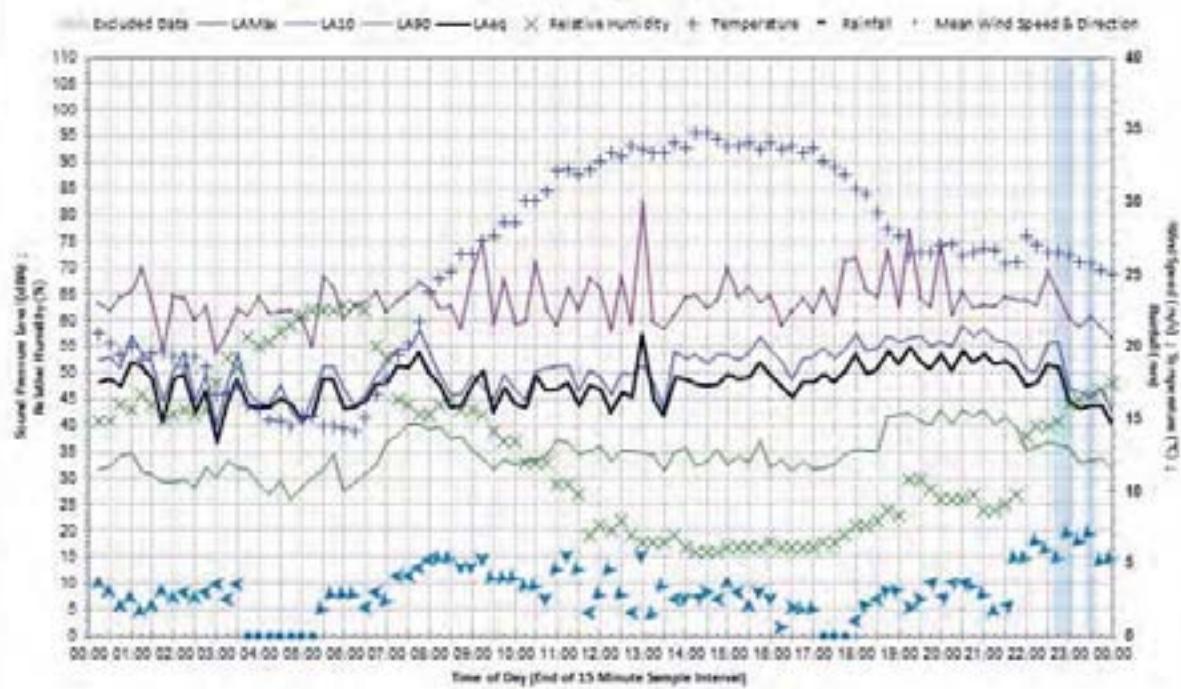


Statistical Ambient Noise Levels

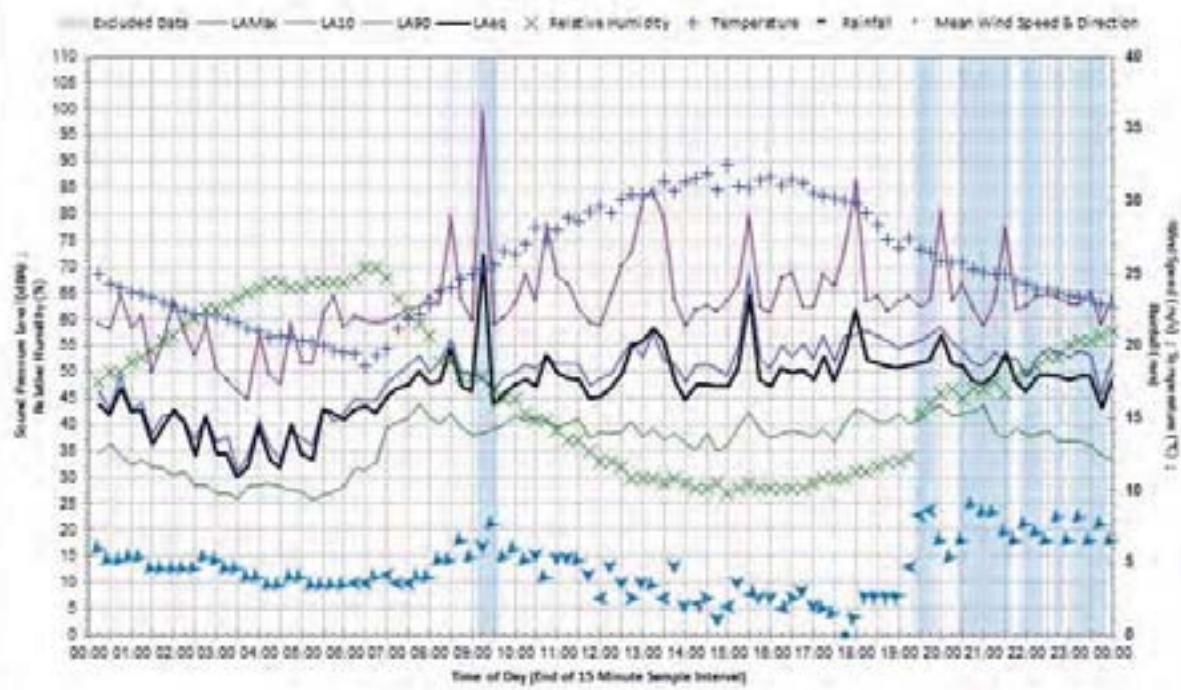
Saturday 2 April 2016



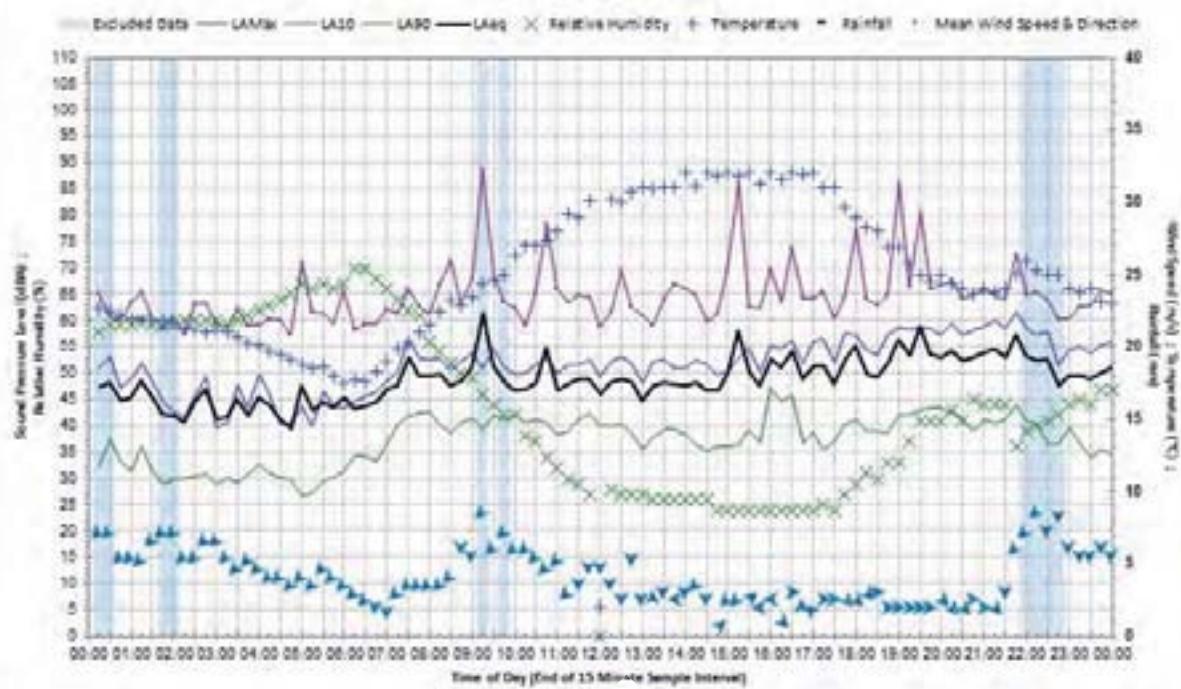
Statistical Ambient Noise Levels
Sunday 3 April 2016



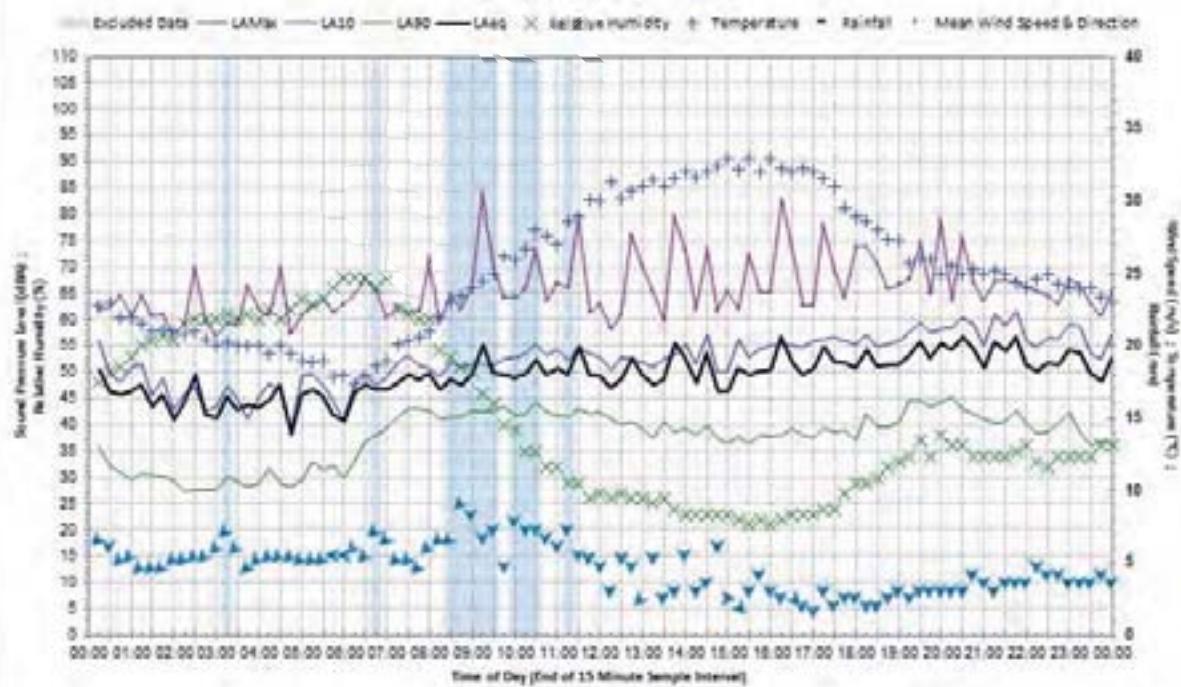
Statistical Ambient Noise Levels
Monday 4 April 2016



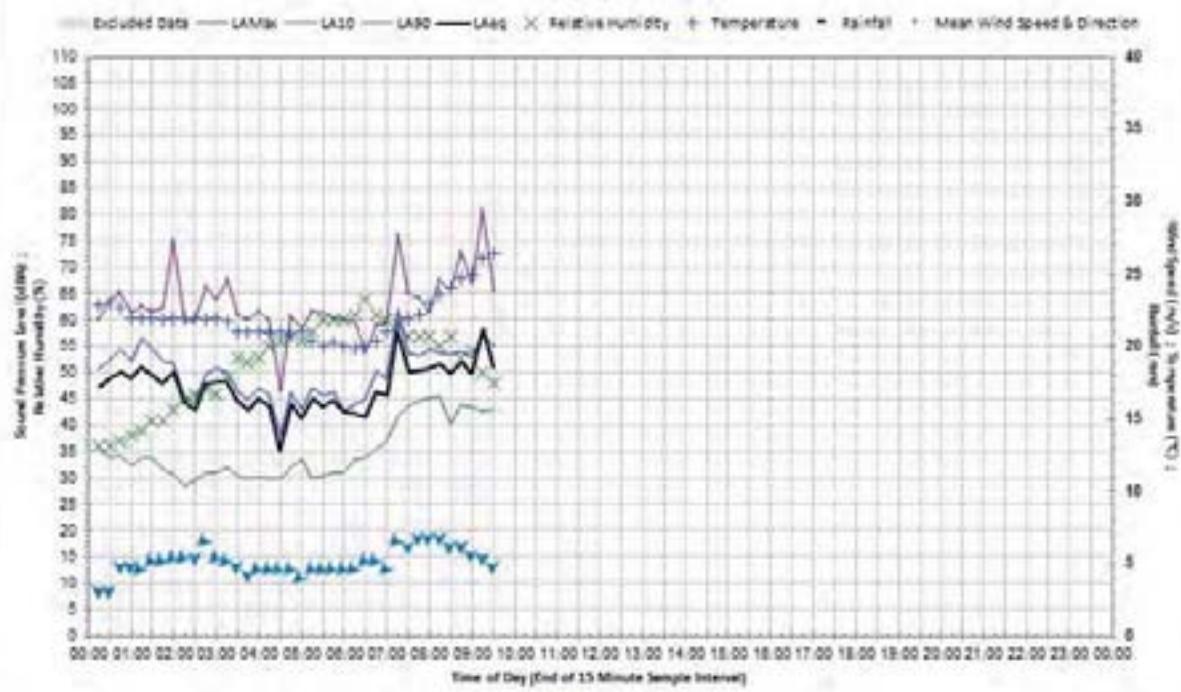
Statistical Ambient Noise Levels
Tuesday 5 April 2016



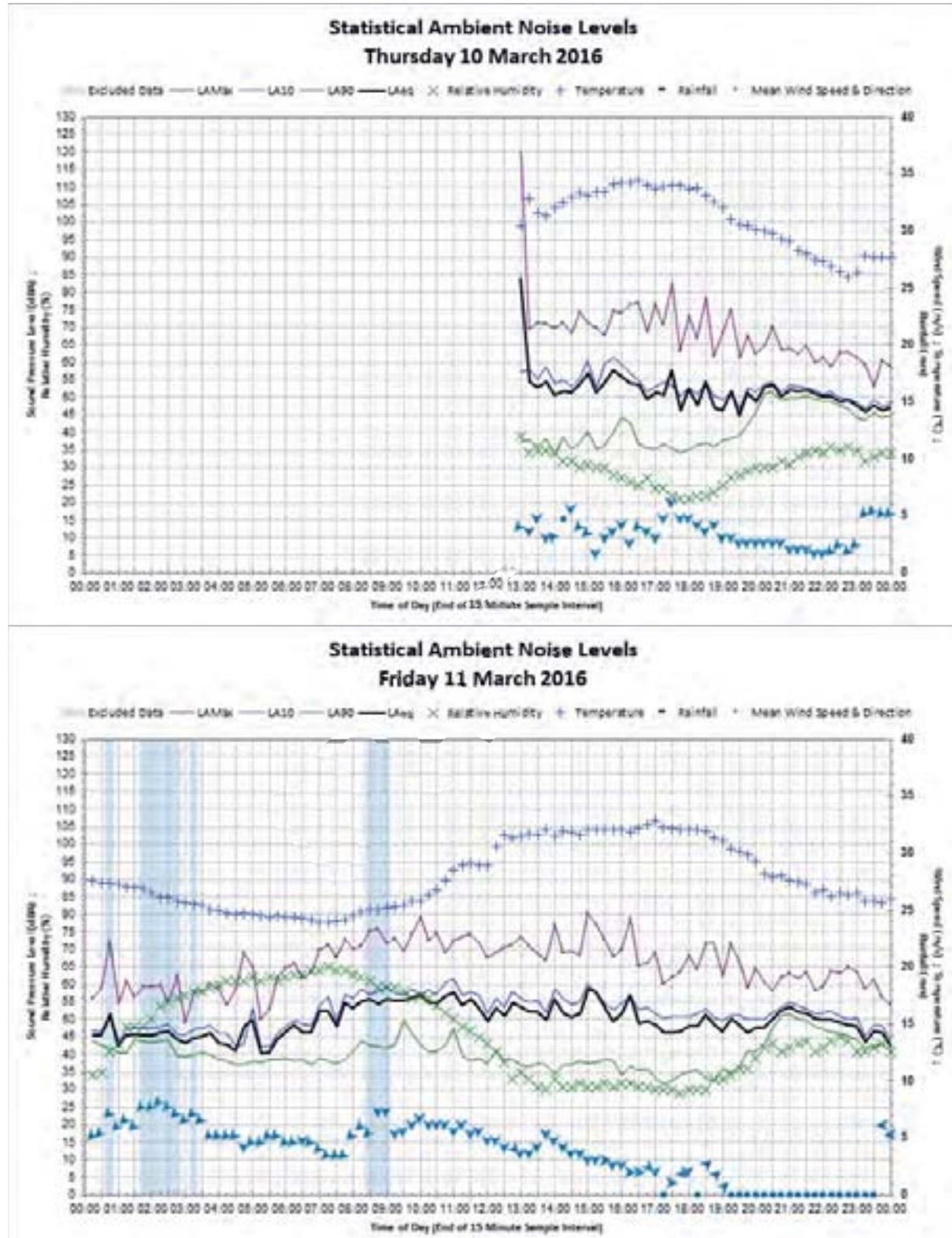
Statistical Ambient Noise Levels
Wednesday 6 April 2016



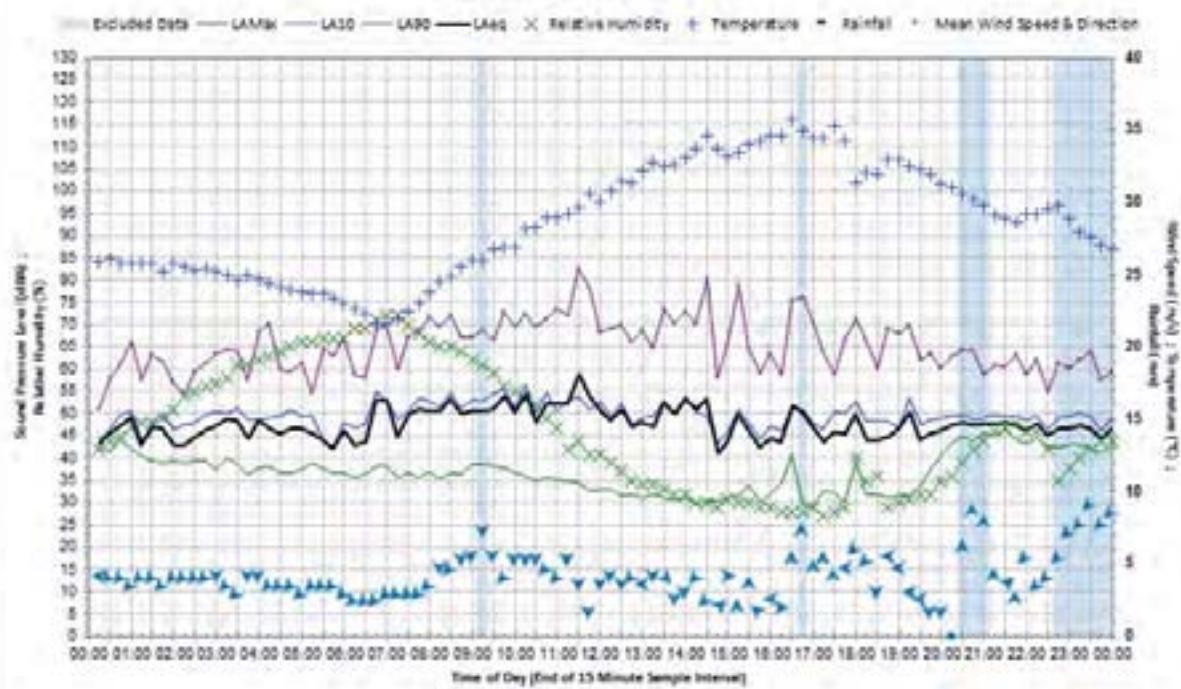
Statistical Ambient Noise Levels Thursday 7 April 2016



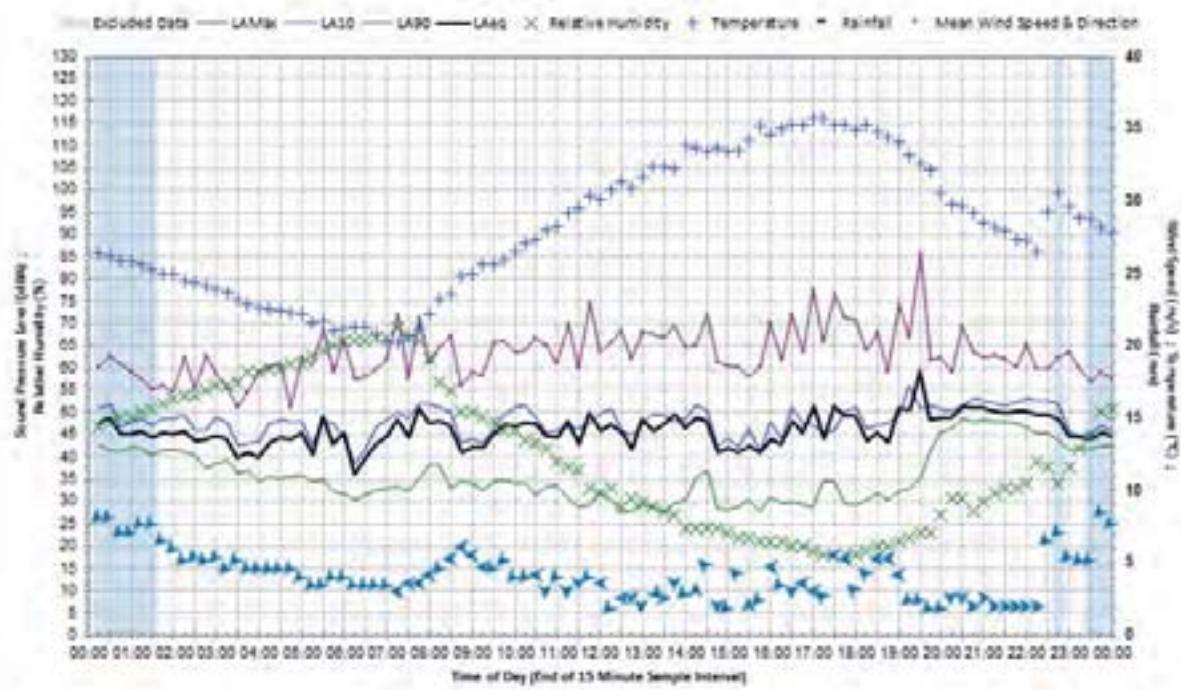
Logger L09NNS



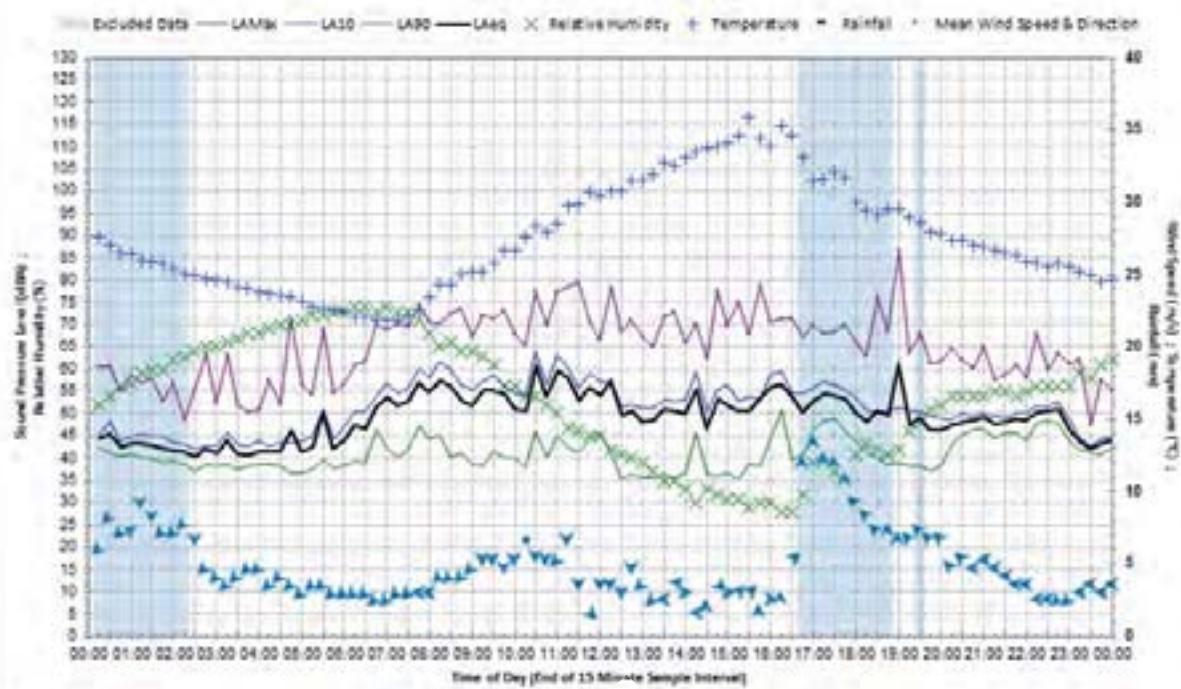
Statistical Ambient Noise Levels
Saturday 12 March 2016



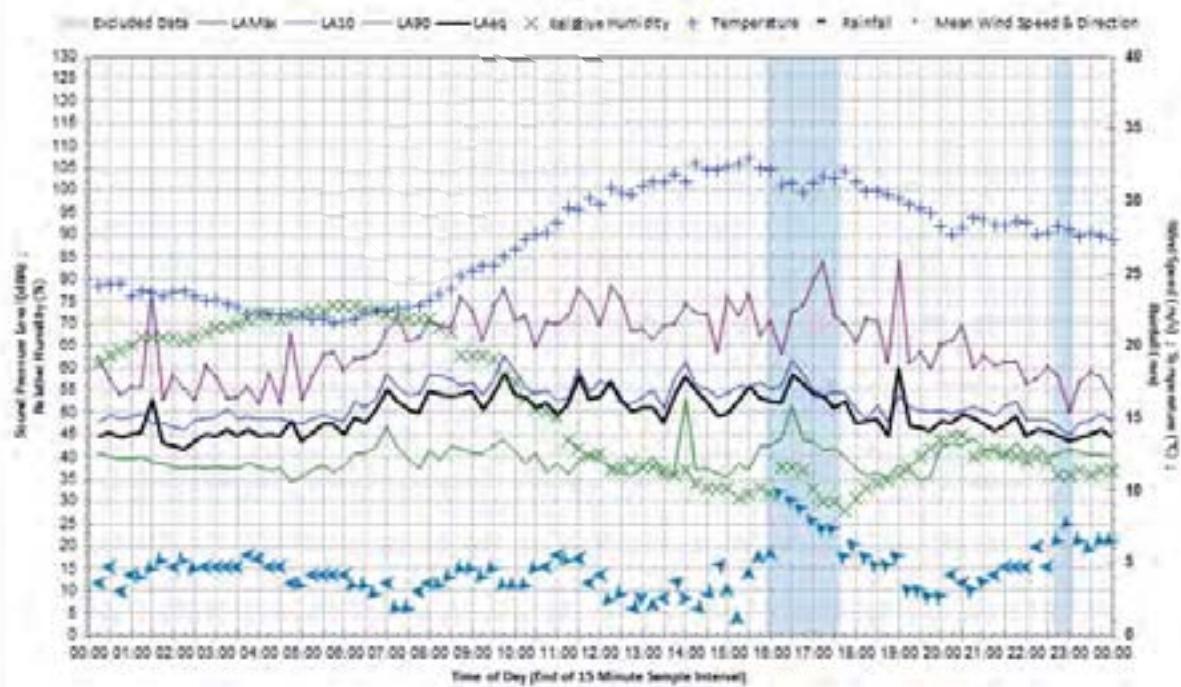
Statistical Ambient Noise Levels
Sunday 13 March 2016



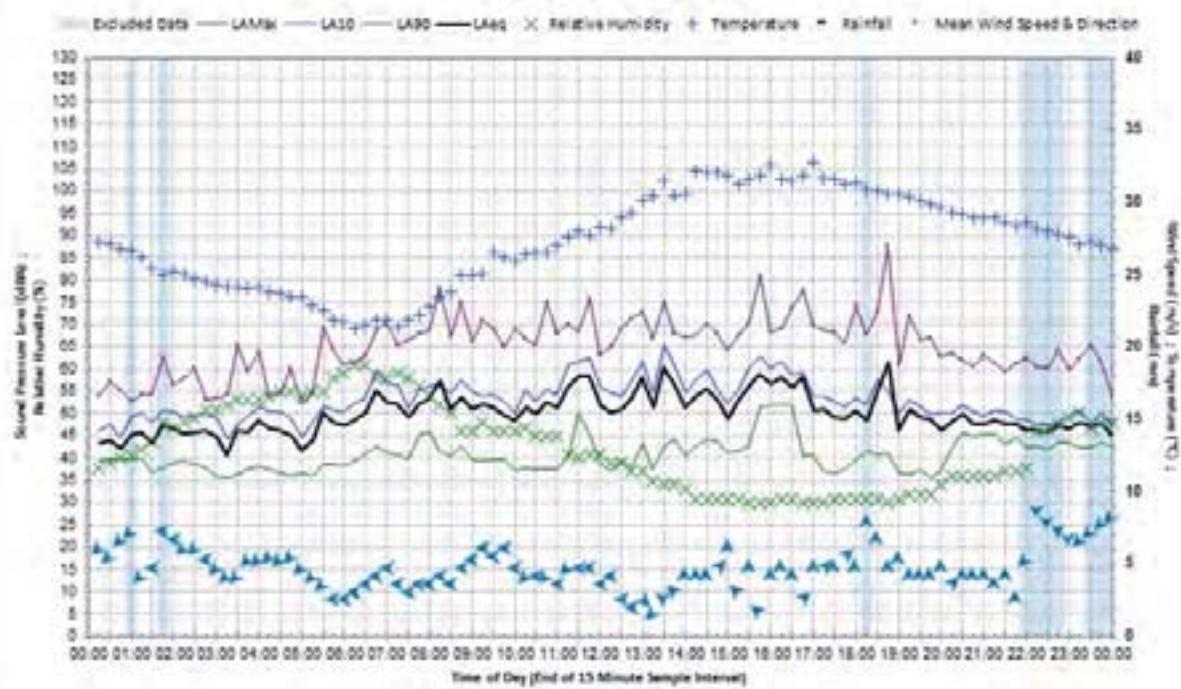
Statistical Ambient Noise Levels
Monday 14 March 2016



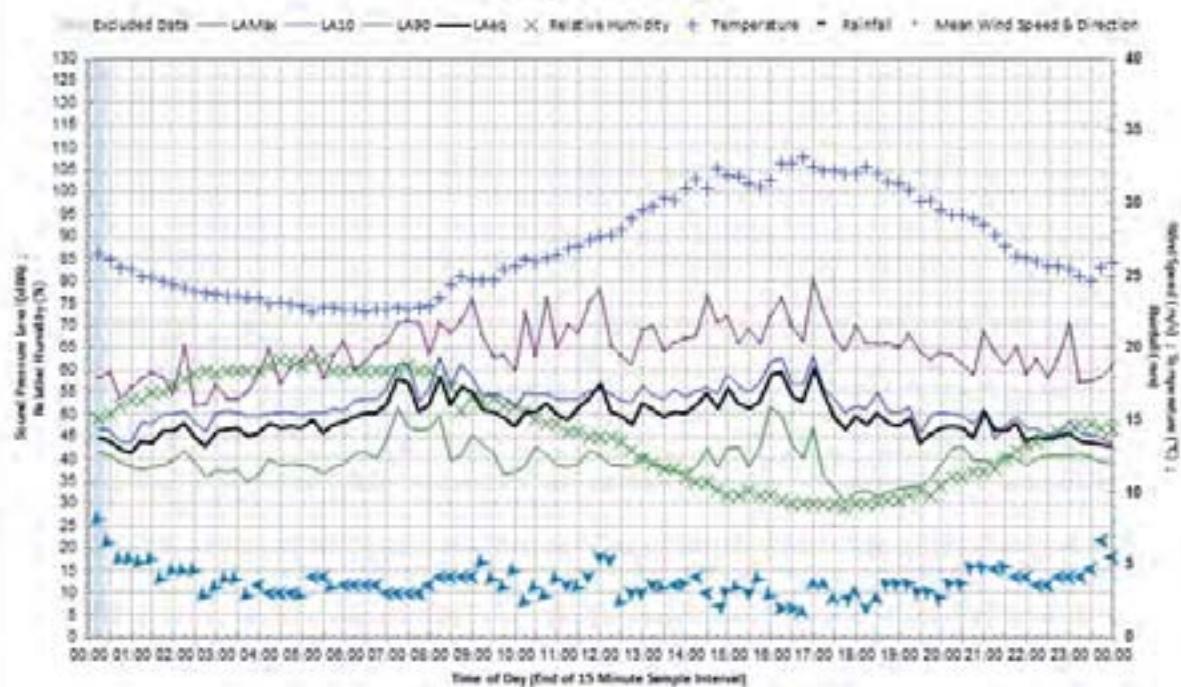
Statistical Ambient Noise Levels
Tuesday 15 March 2016



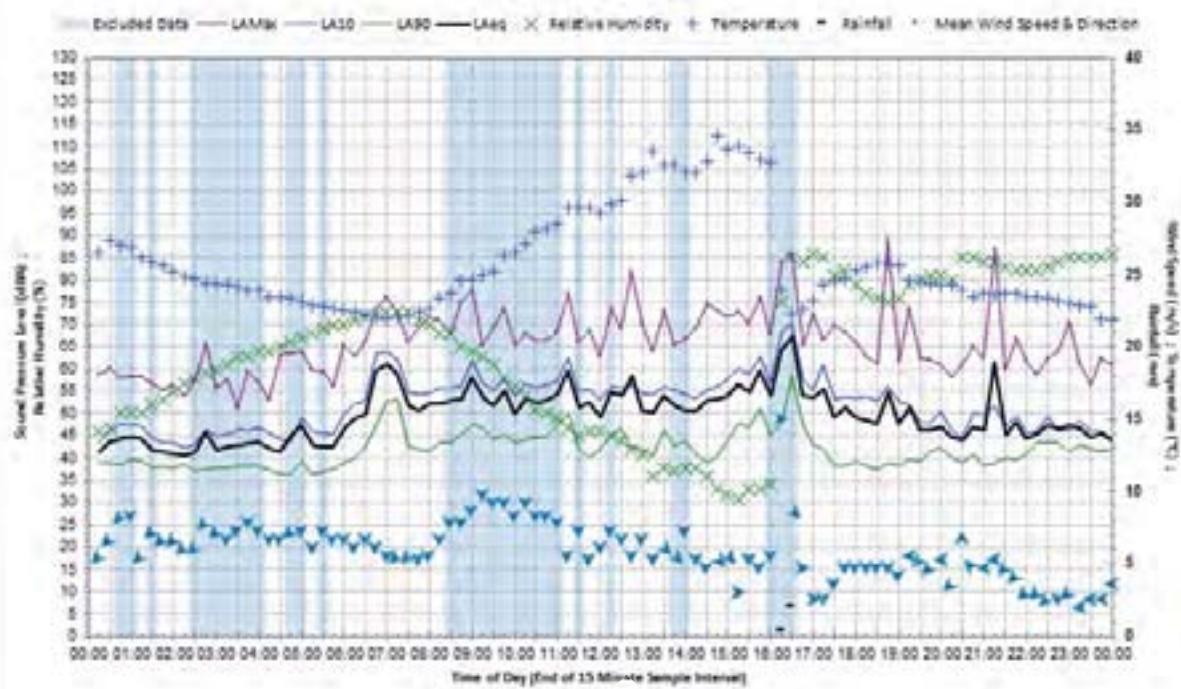
Statistical Ambient Noise Levels
Wednesday 16 March 2016



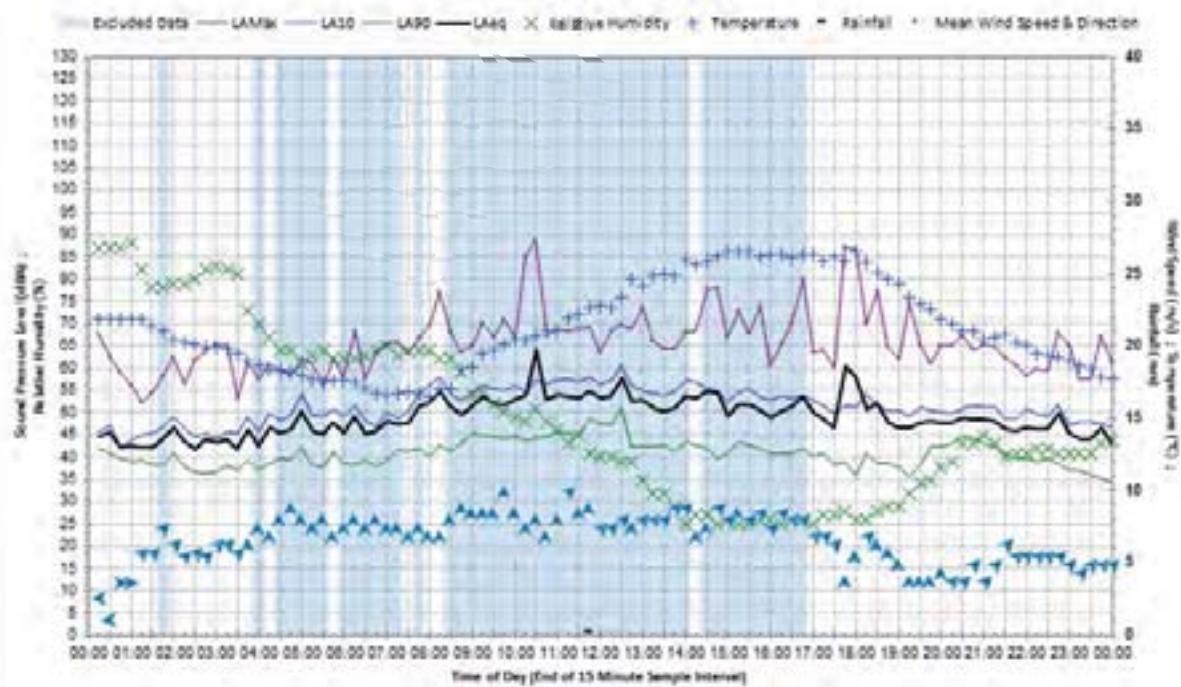
Statistical Ambient Noise Levels
Thursday 17 March 2016



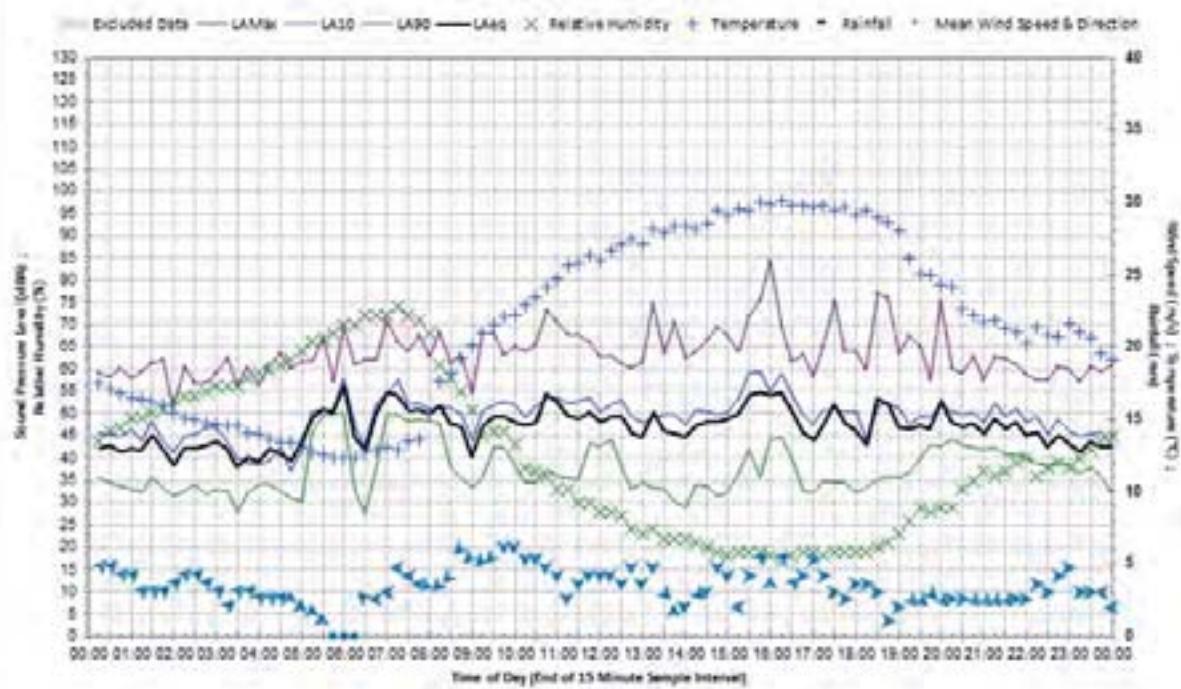
Statistical Ambient Noise Levels
Friday 18 March 2016



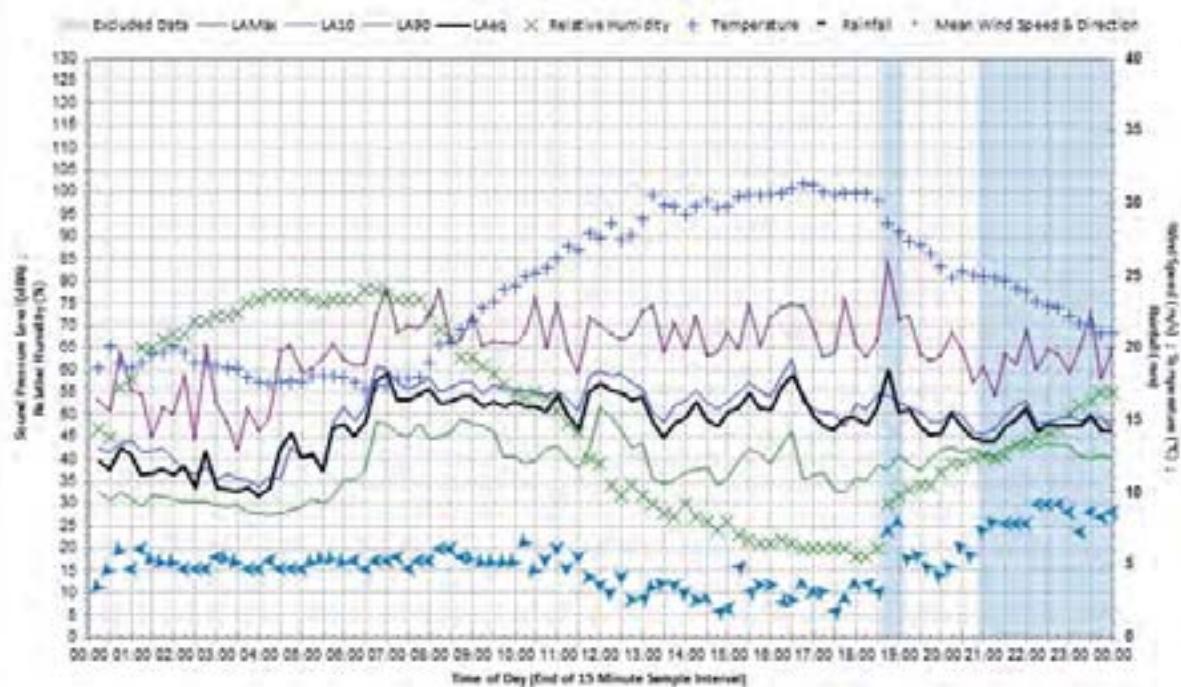
Statistical Ambient Noise Levels
Saturday 19 March 2016



Statistical Ambient Noise Levels
Sunday 20 March 2016



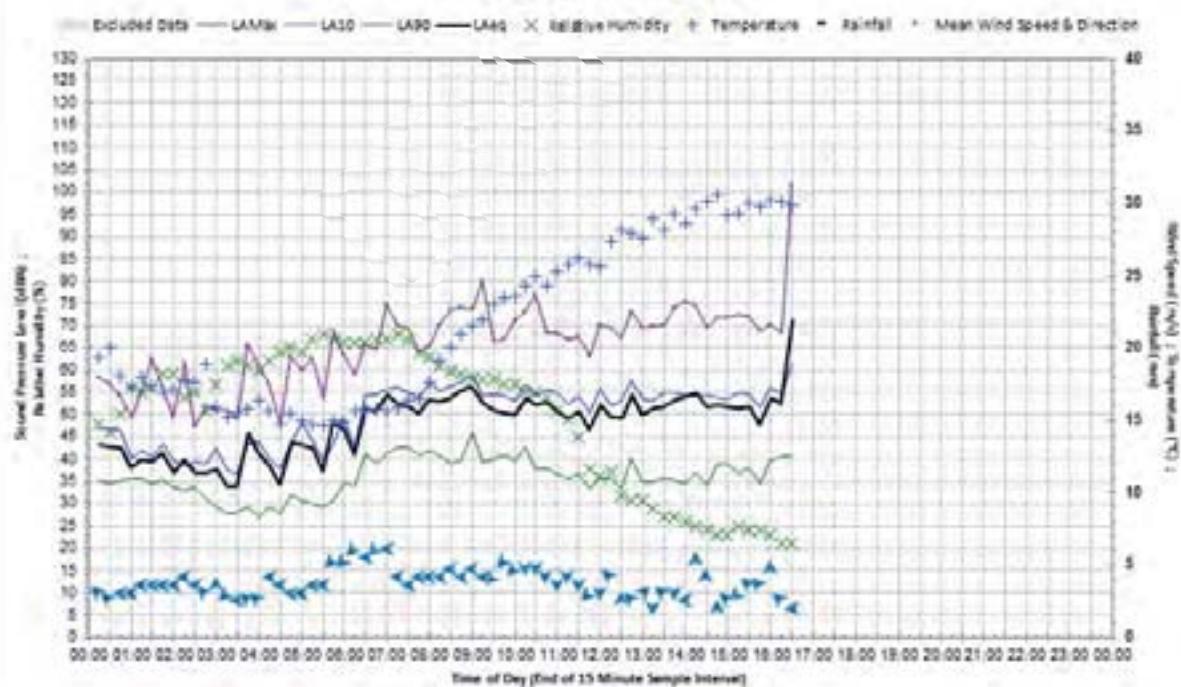
Statistical Ambient Noise Levels
Monday 21 March 2016



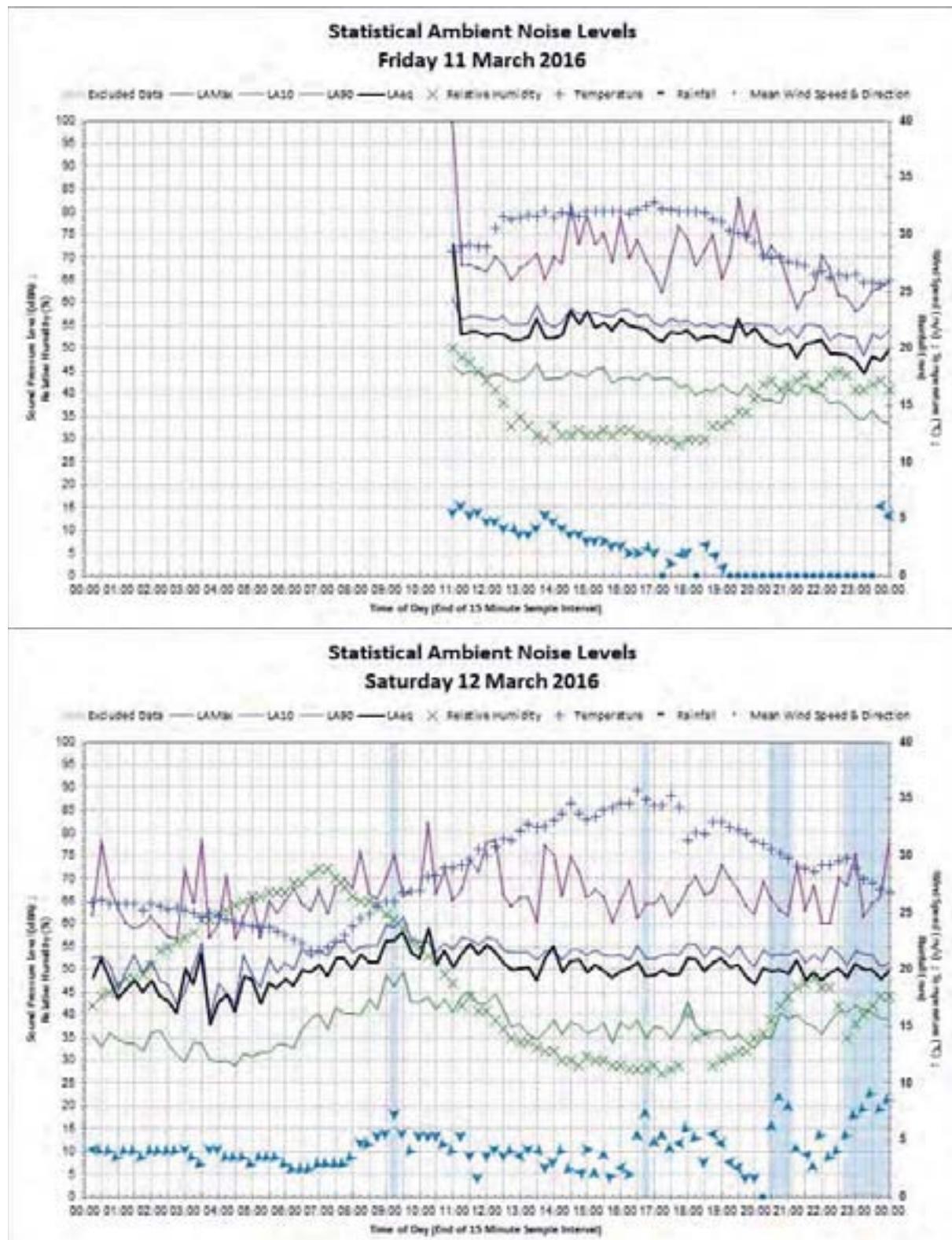
Statistical Ambient Noise Levels
Tuesday 22 March 2016



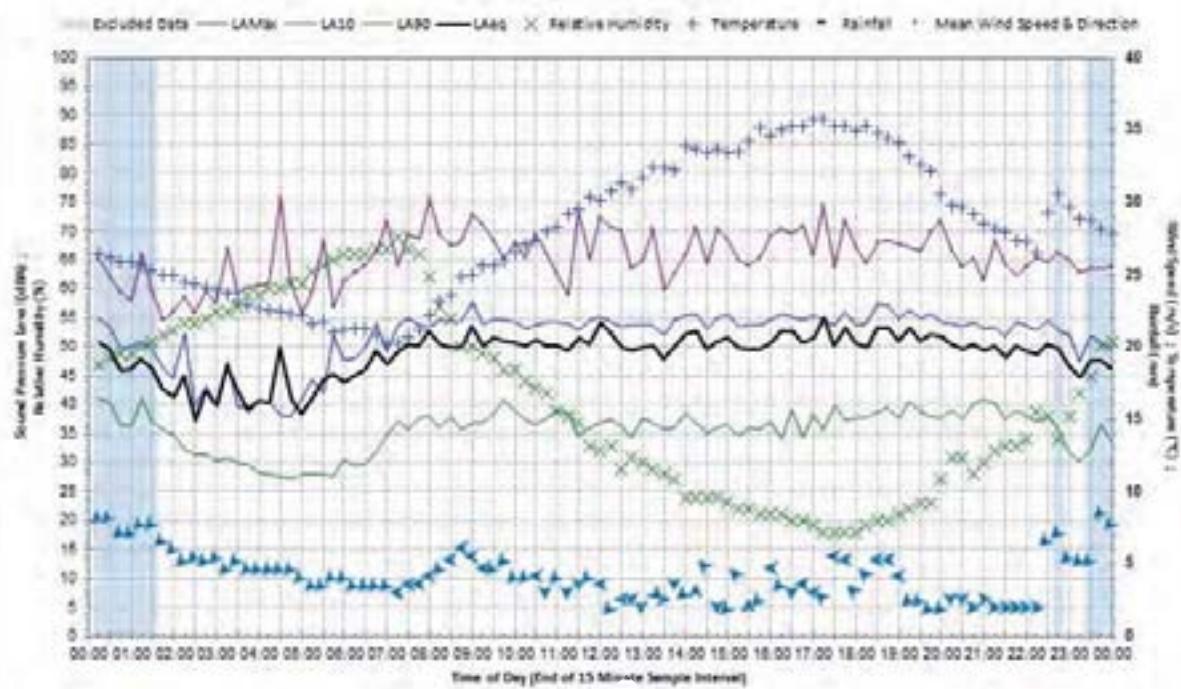
Statistical Ambient Noise Levels
Wednesday 23 March 2016



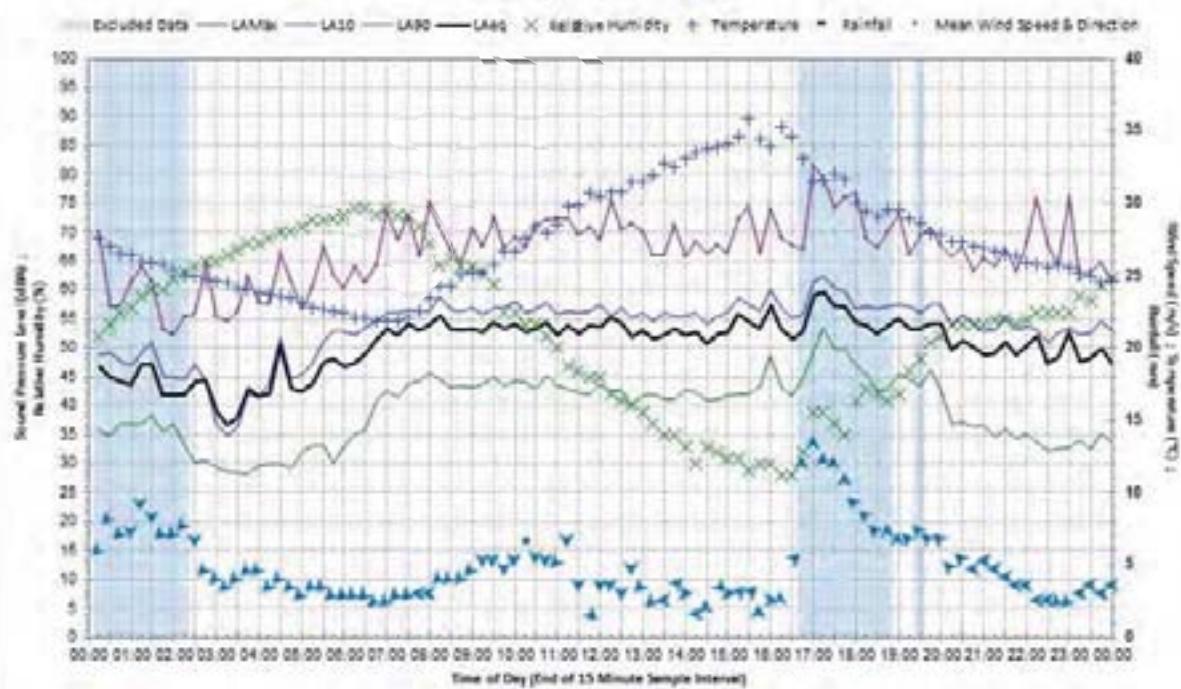
Logger L10NNS



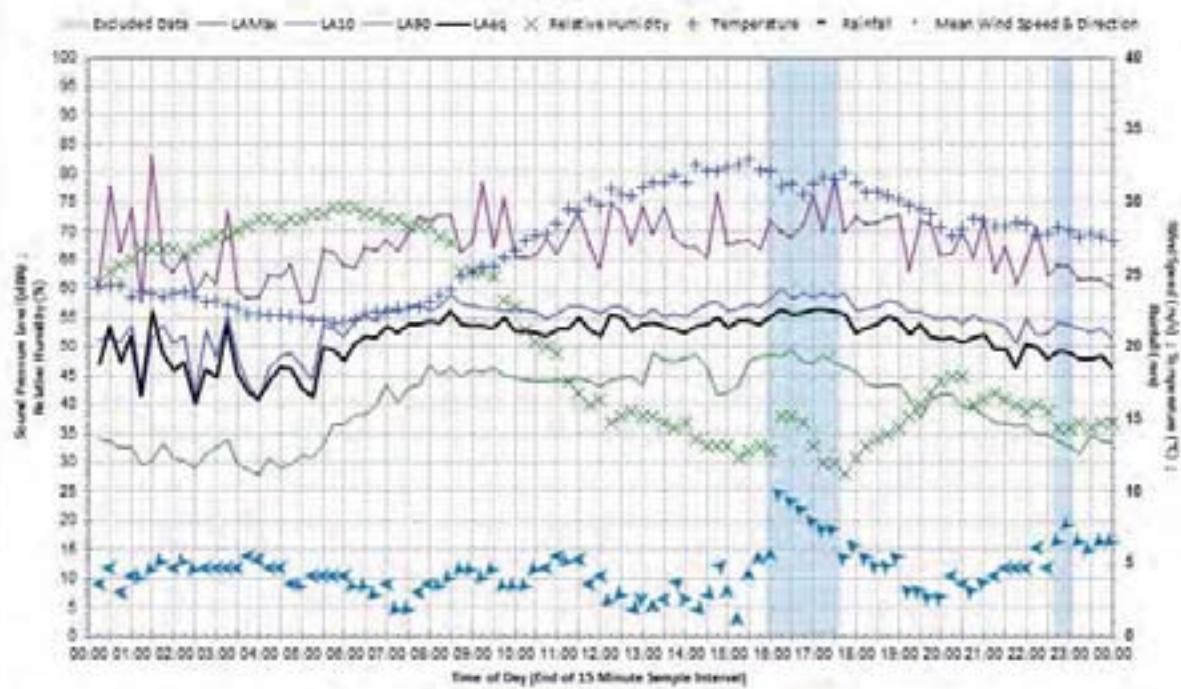
Statistical Ambient Noise Levels
Sunday 13 March 2016



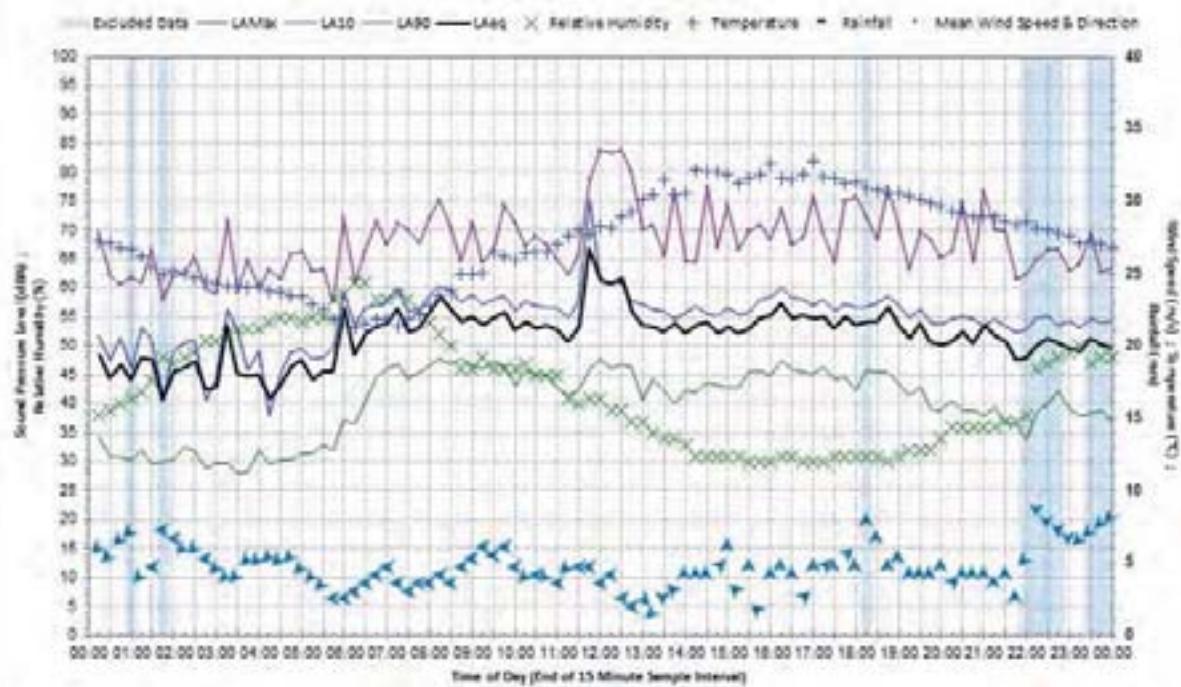
Statistical Ambient Noise Levels
Monday 14 March 2016

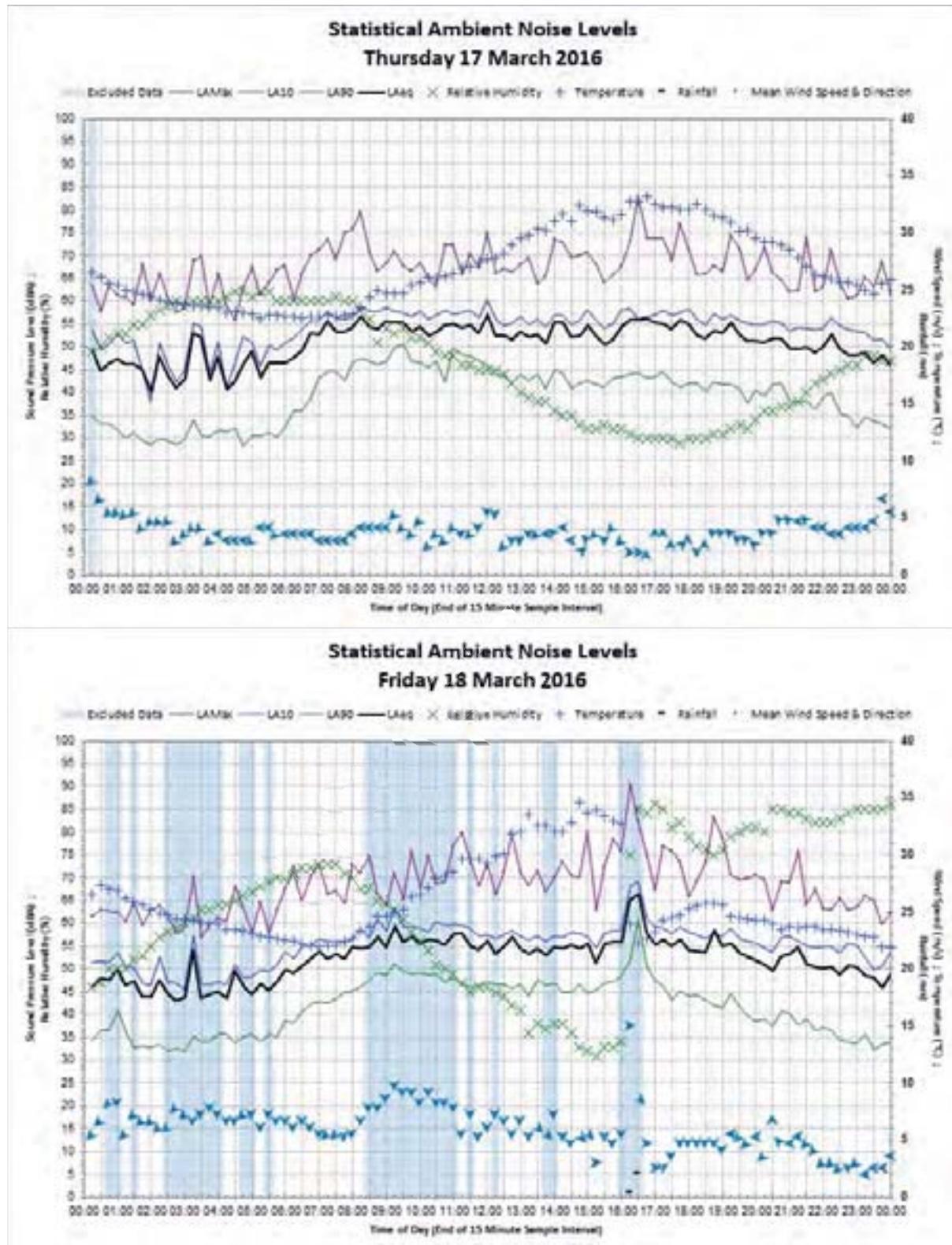


Statistical Ambient Noise Levels
Tuesday 15 March 2016

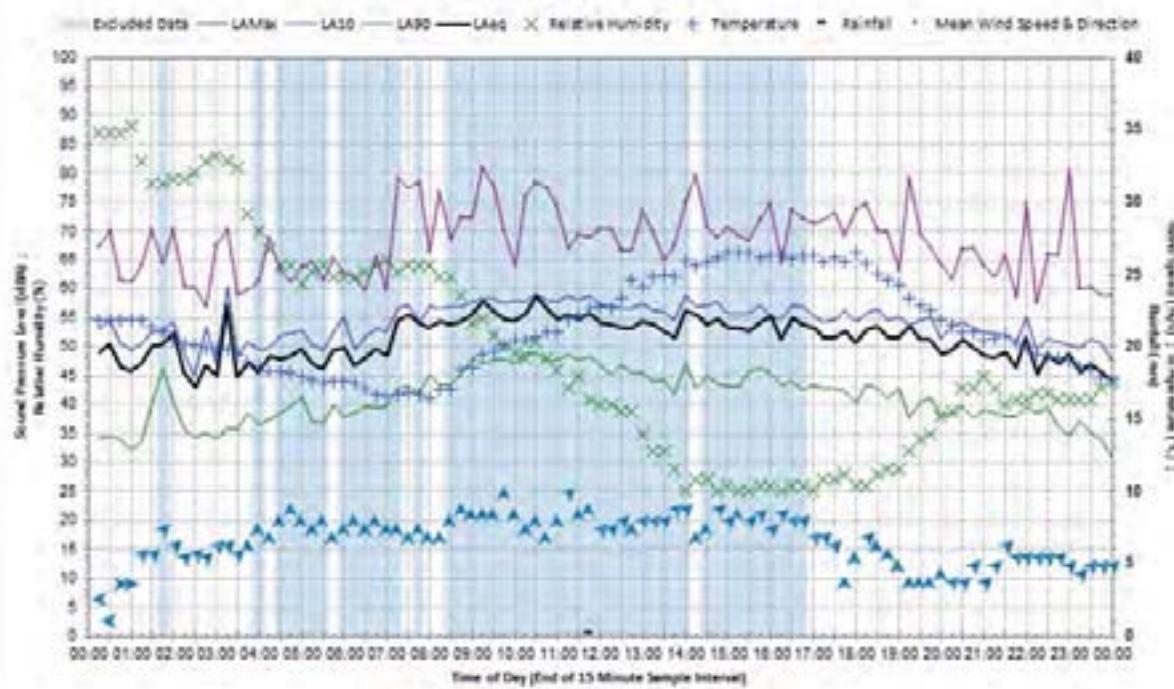


Statistical Ambient Noise Levels
Wednesday 16 March 2016

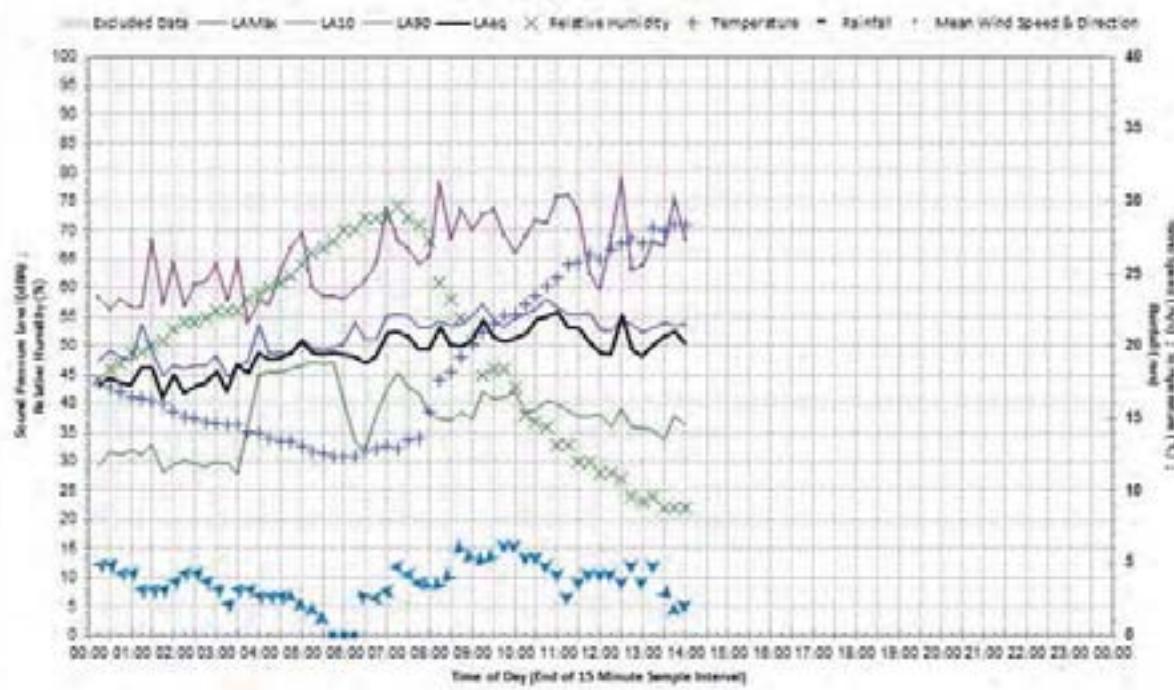




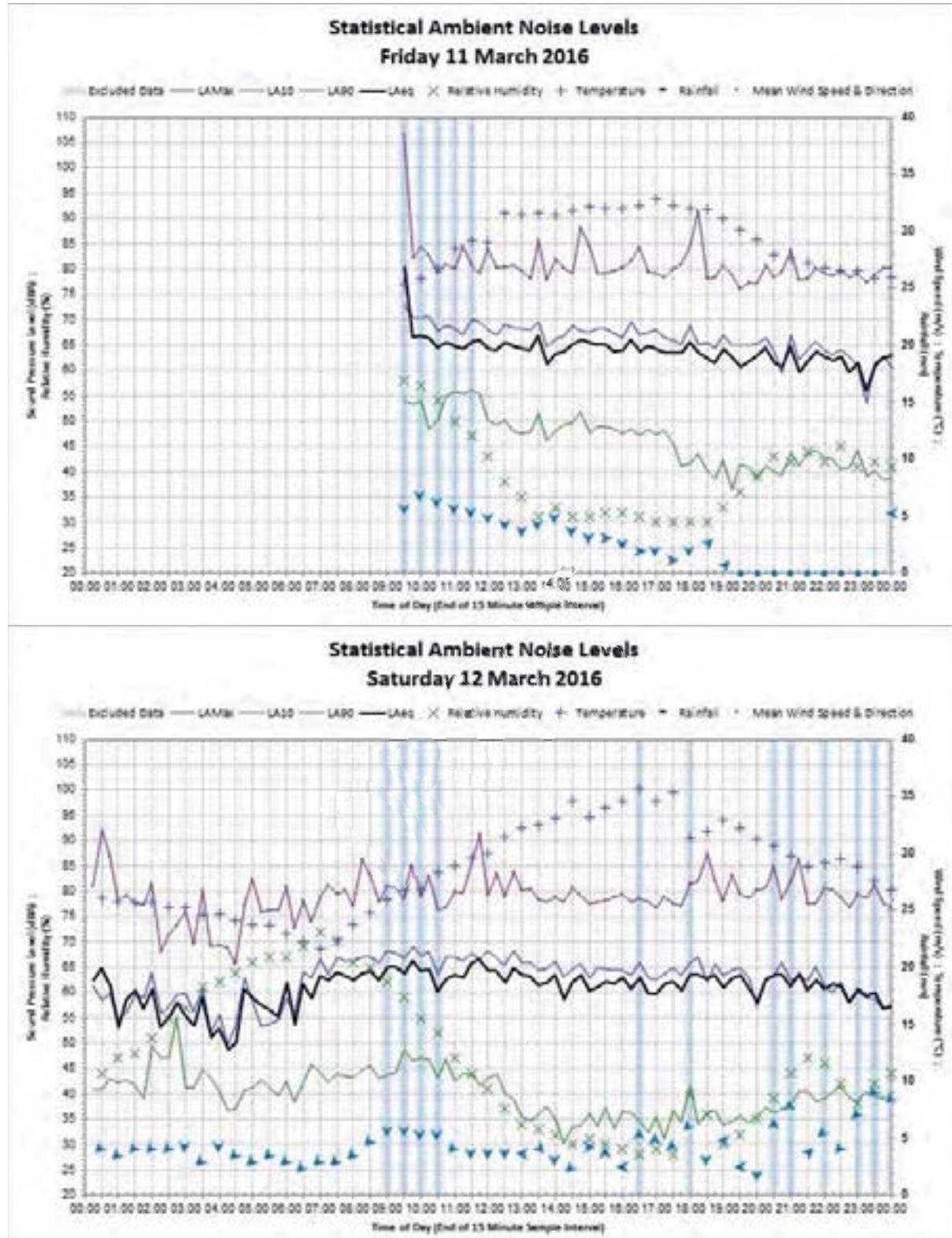
Statistical Ambient Noise Levels
Saturday 19 March 2016

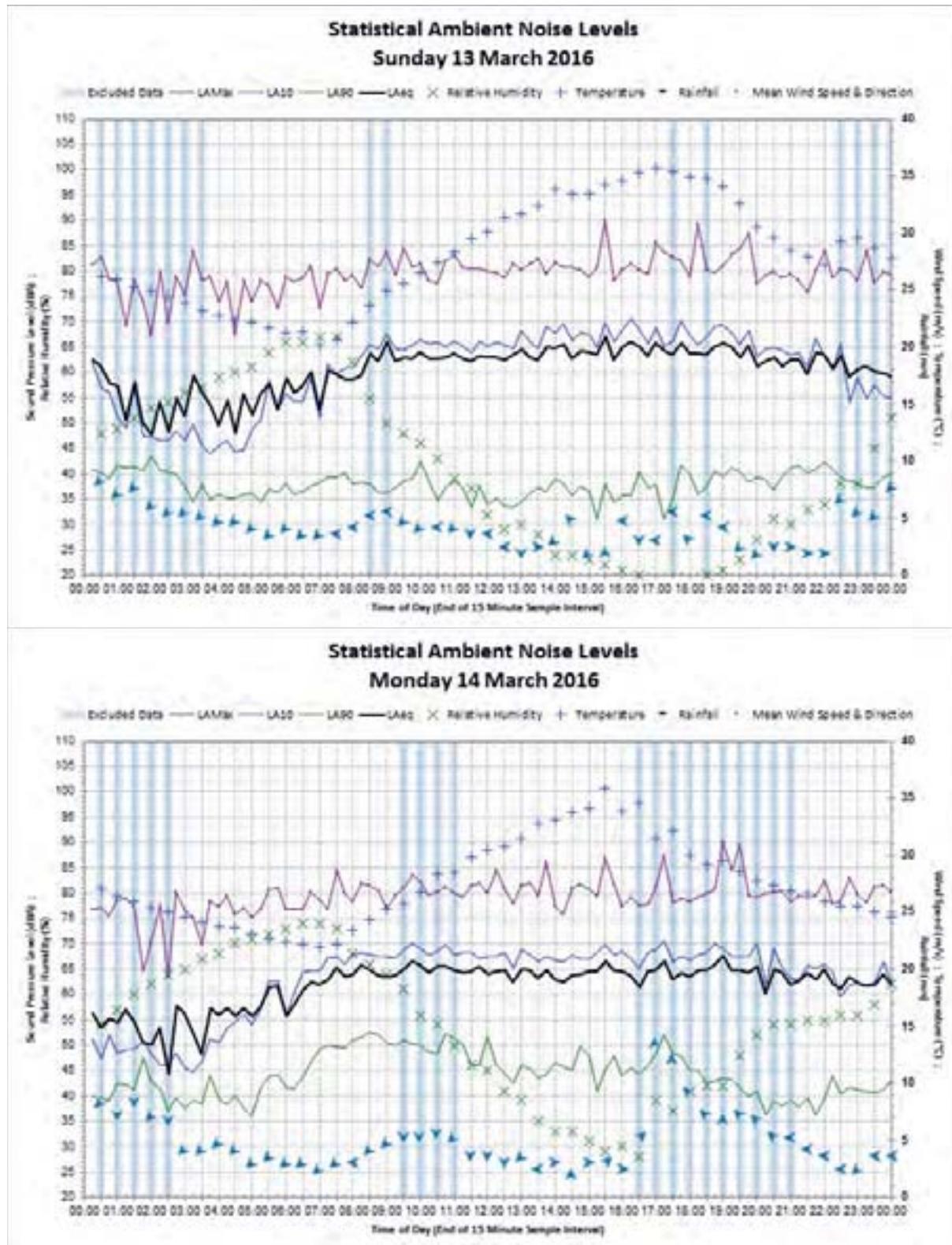


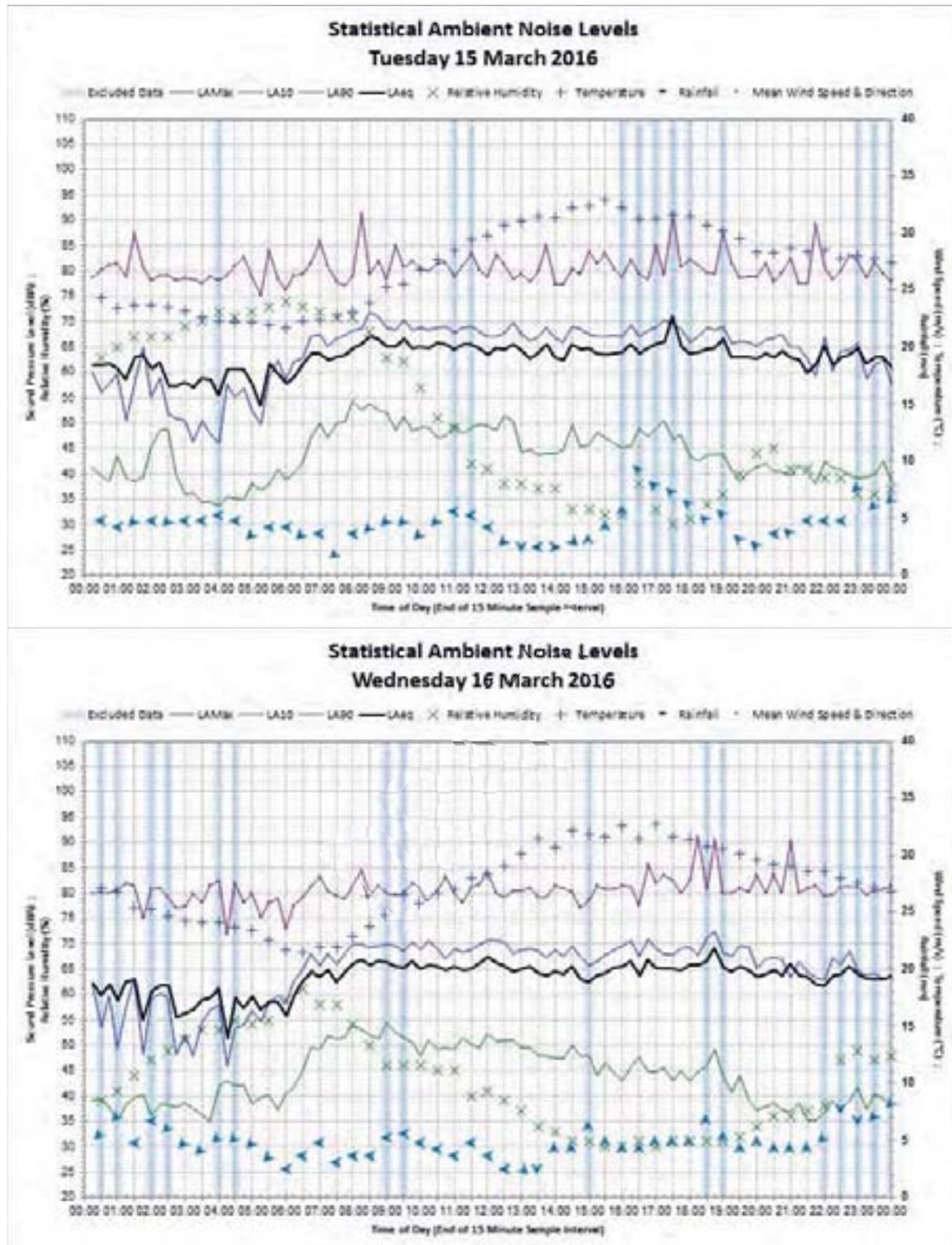
Statistical Ambient Noise Levels
Sunday 20 March 2016

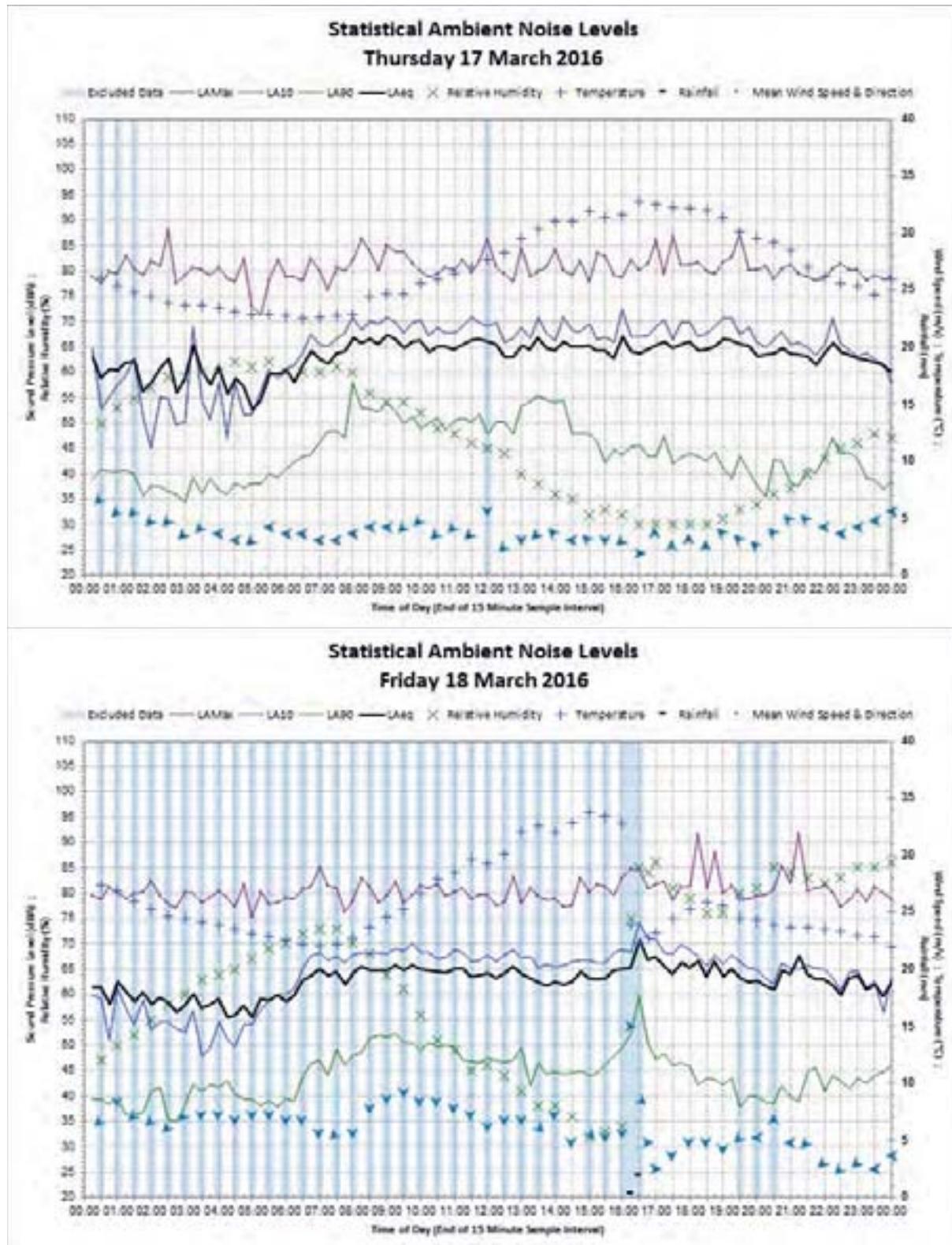


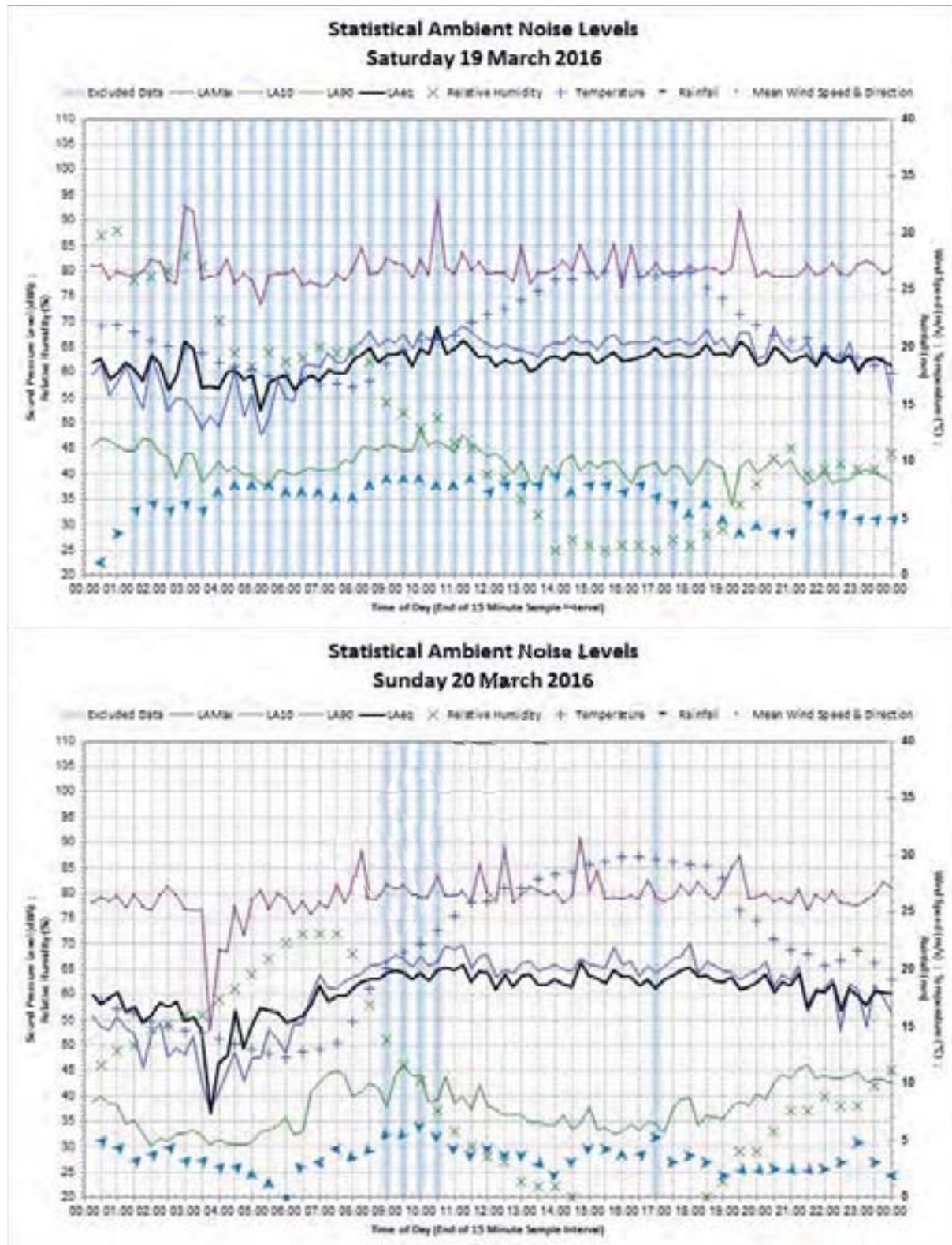
Logger L11NNS

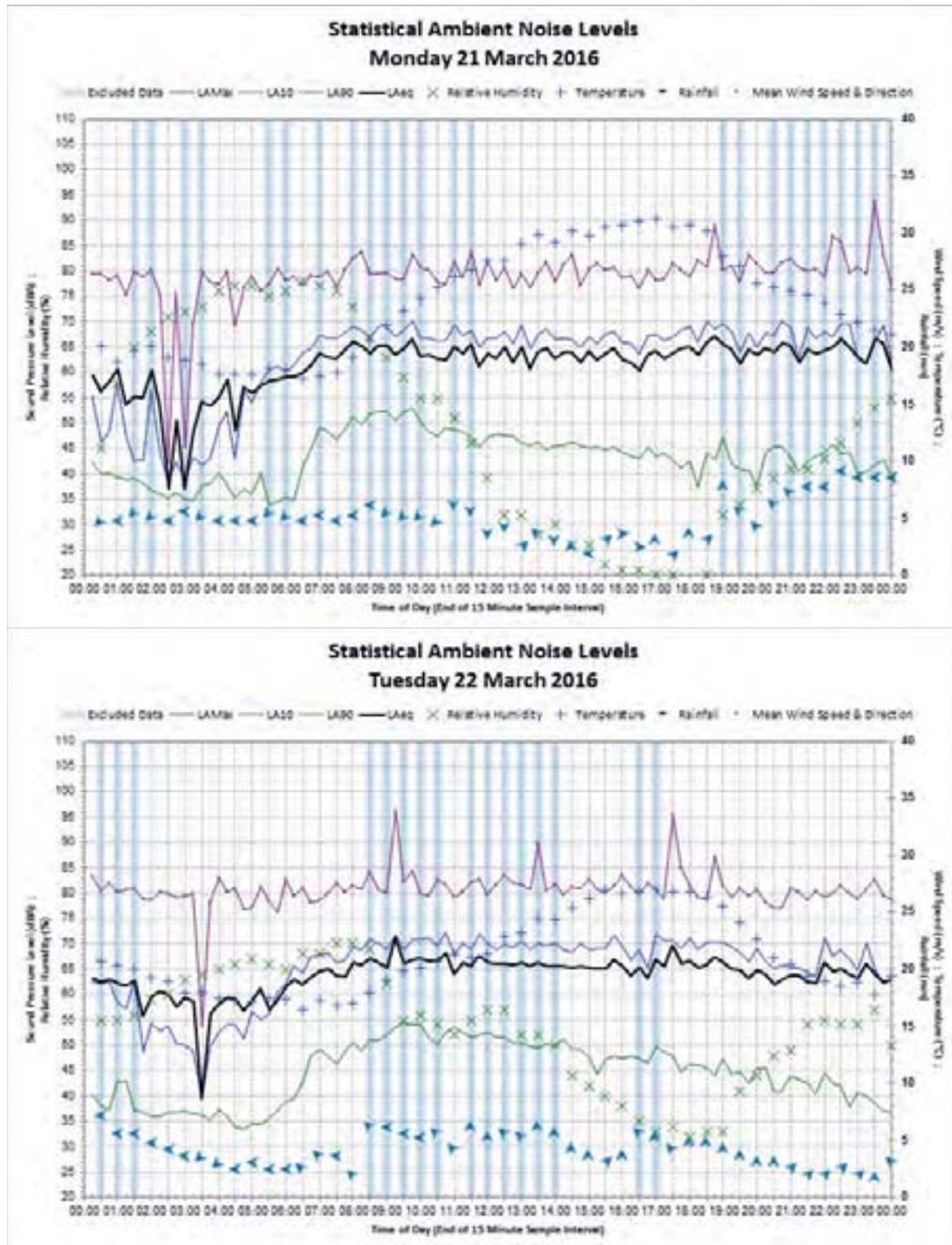




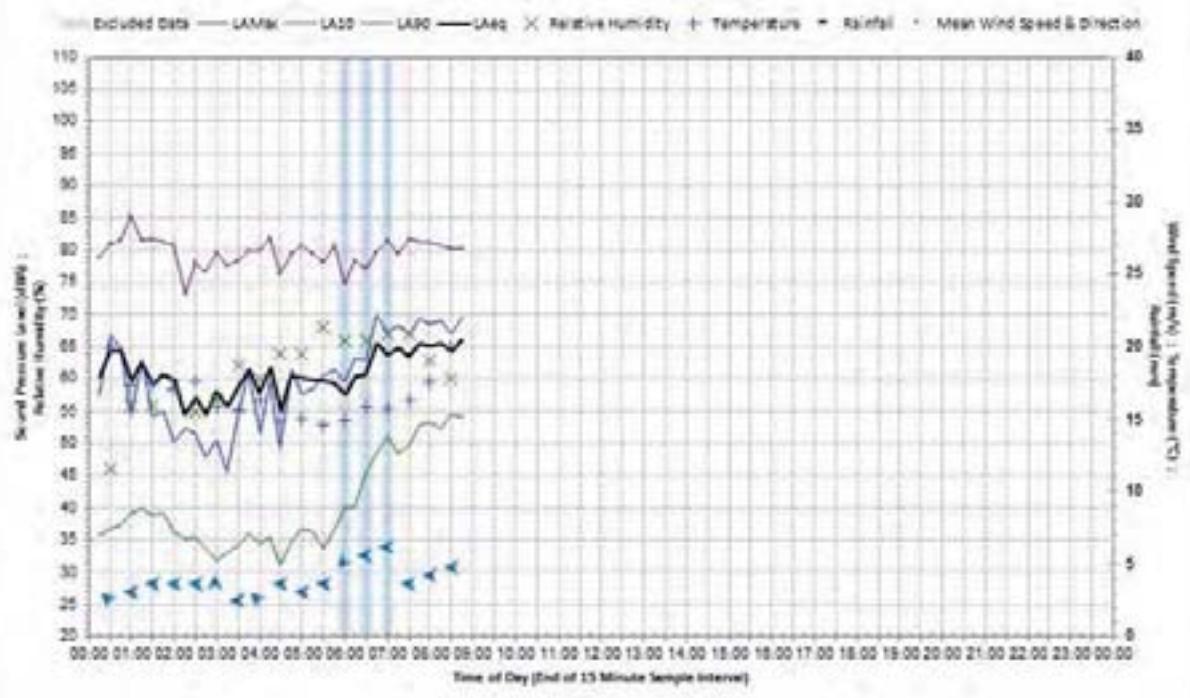




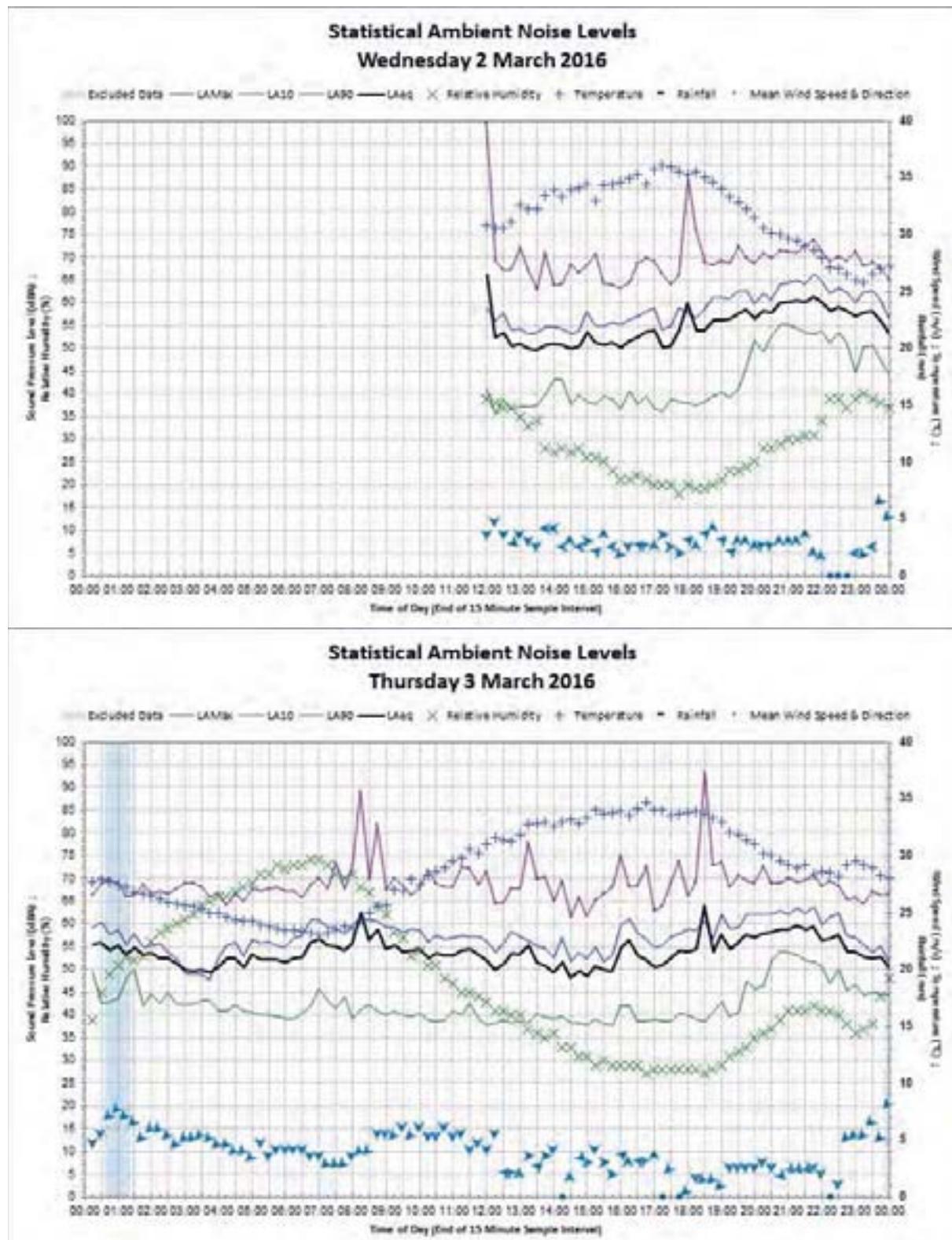


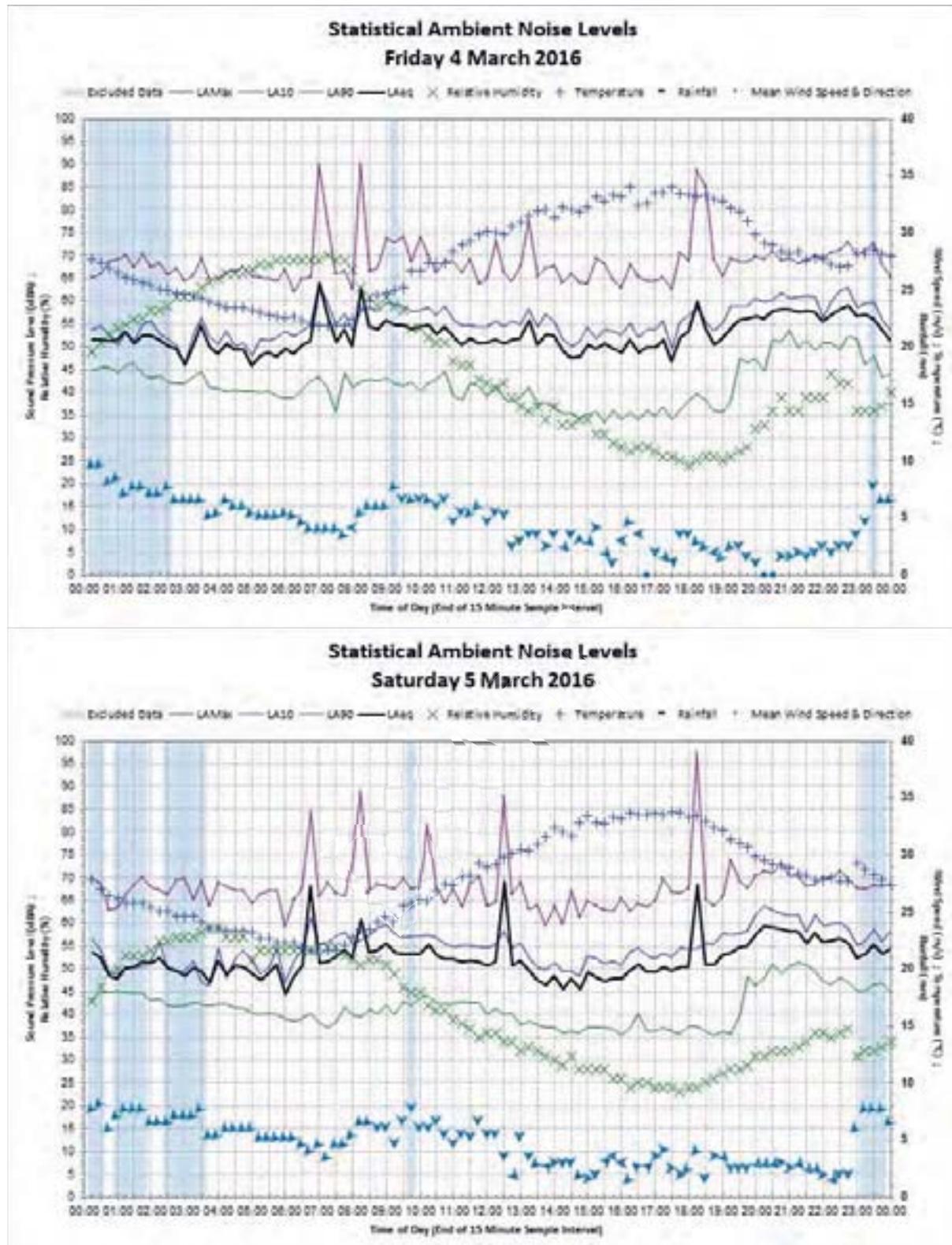


Statistical Ambient Noise Levels
Wednesday 23 March 2016

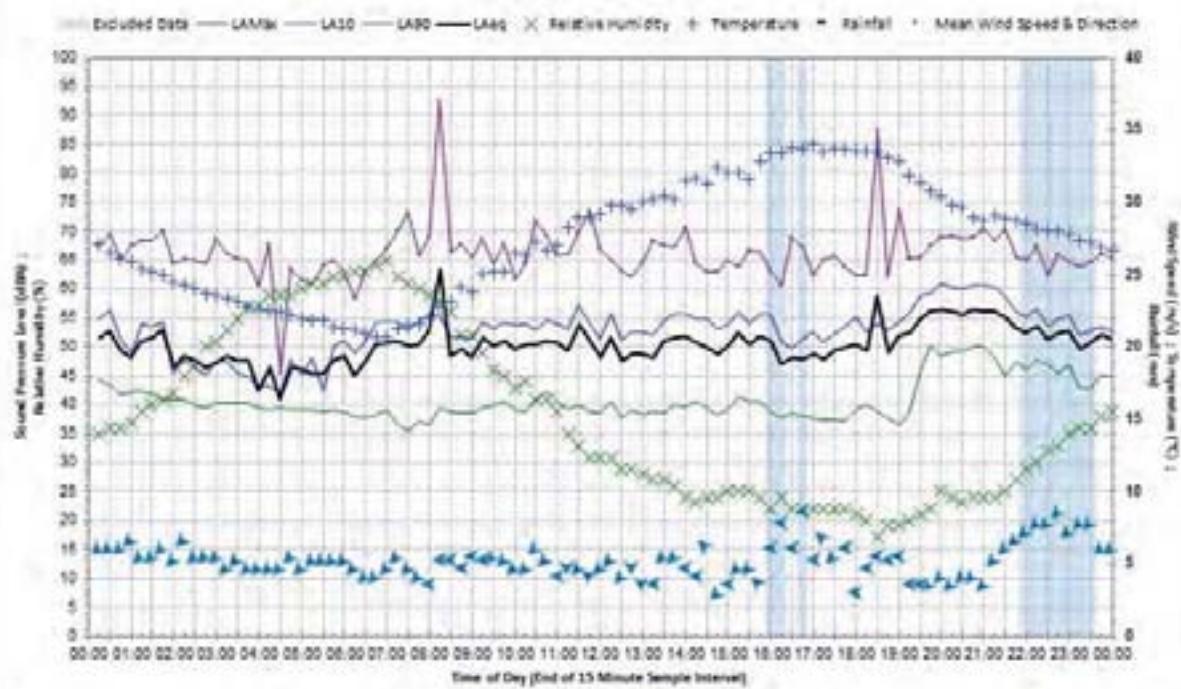


Logger L12NNS

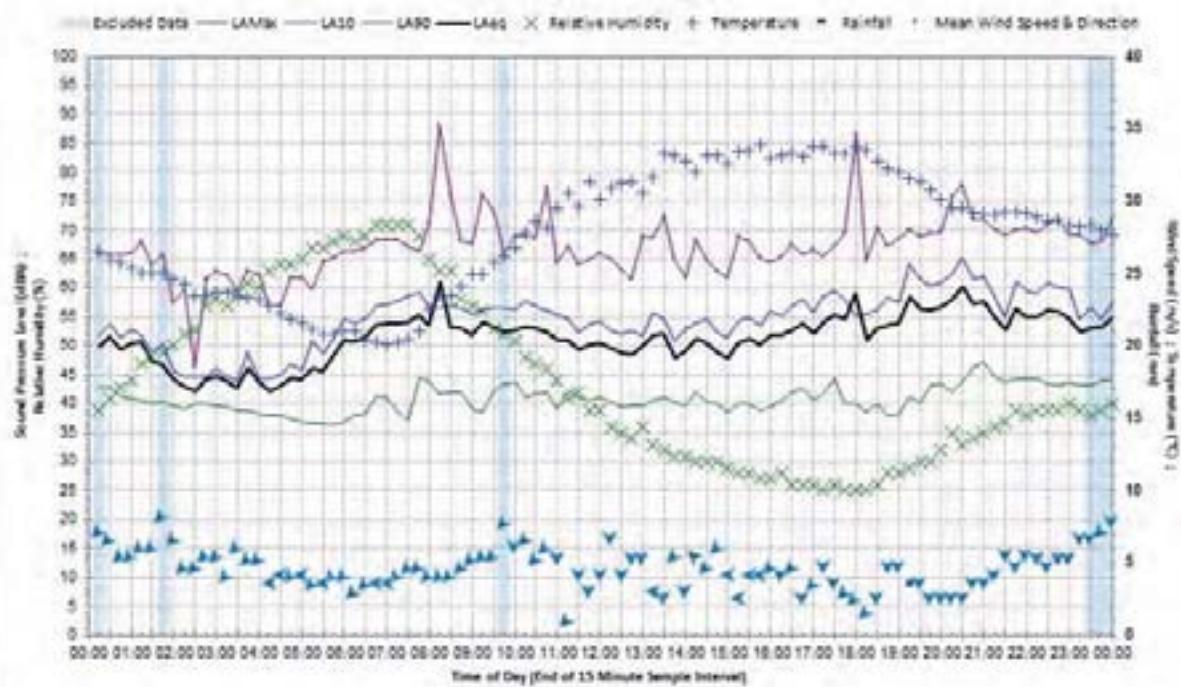




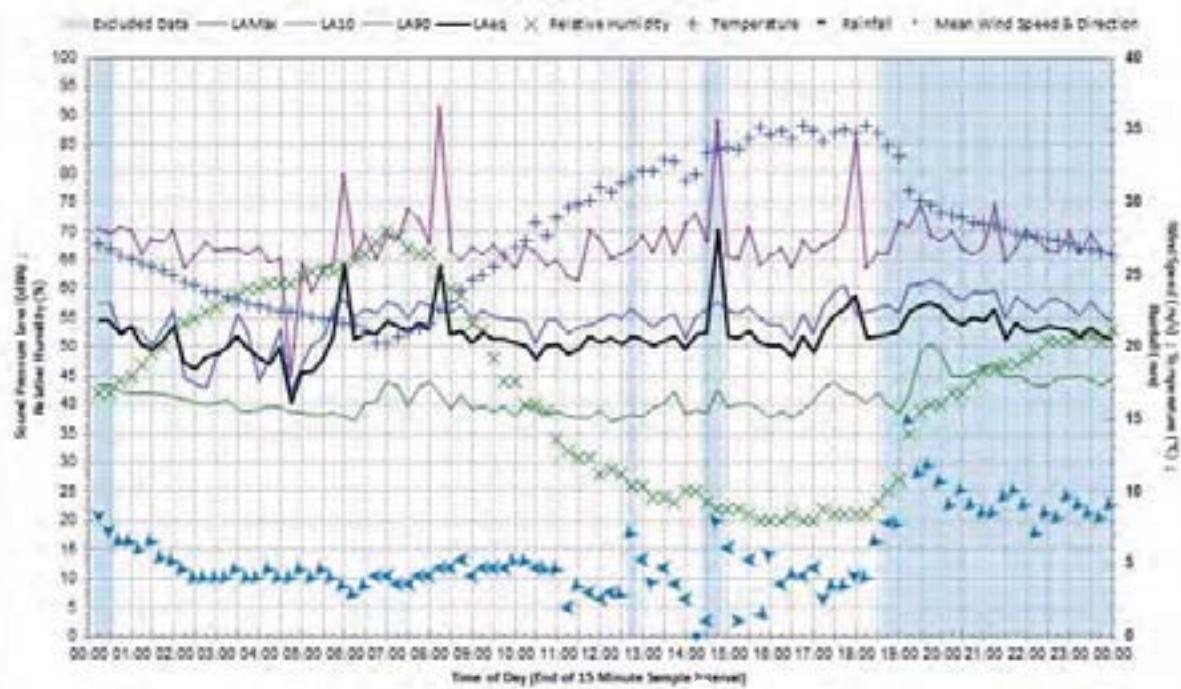
Statistical Ambient Noise Levels
Sunday 6 March 2016



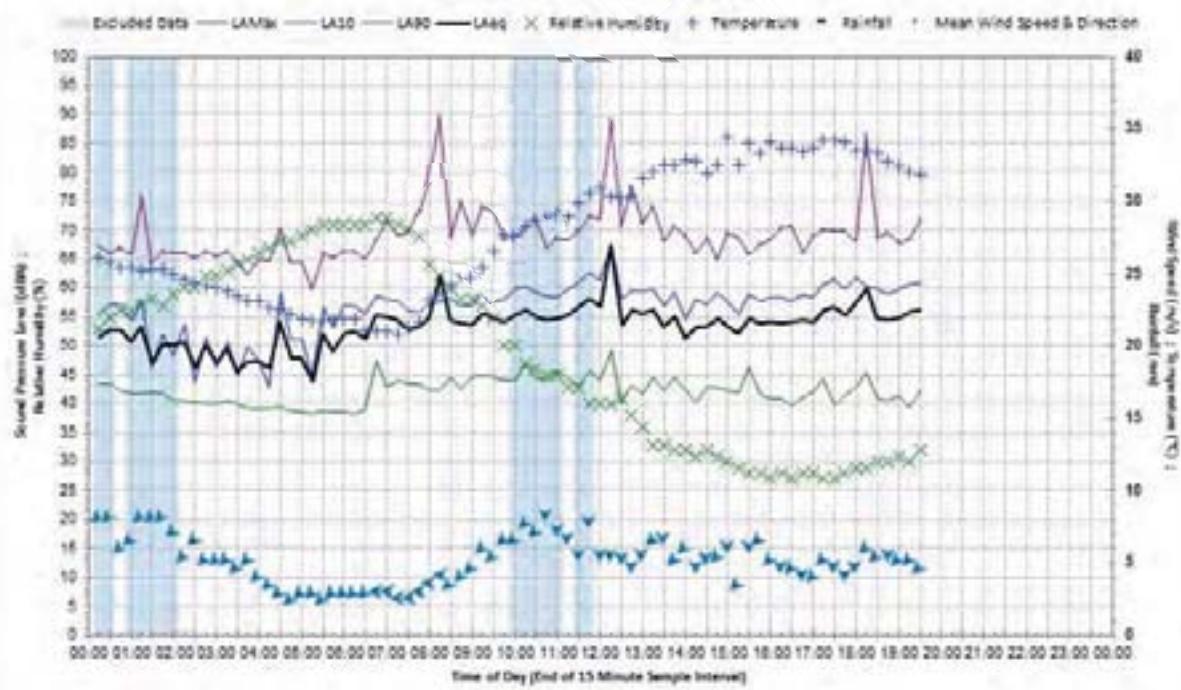
Statistical Ambient Noise Levels
Monday 7 March 2016



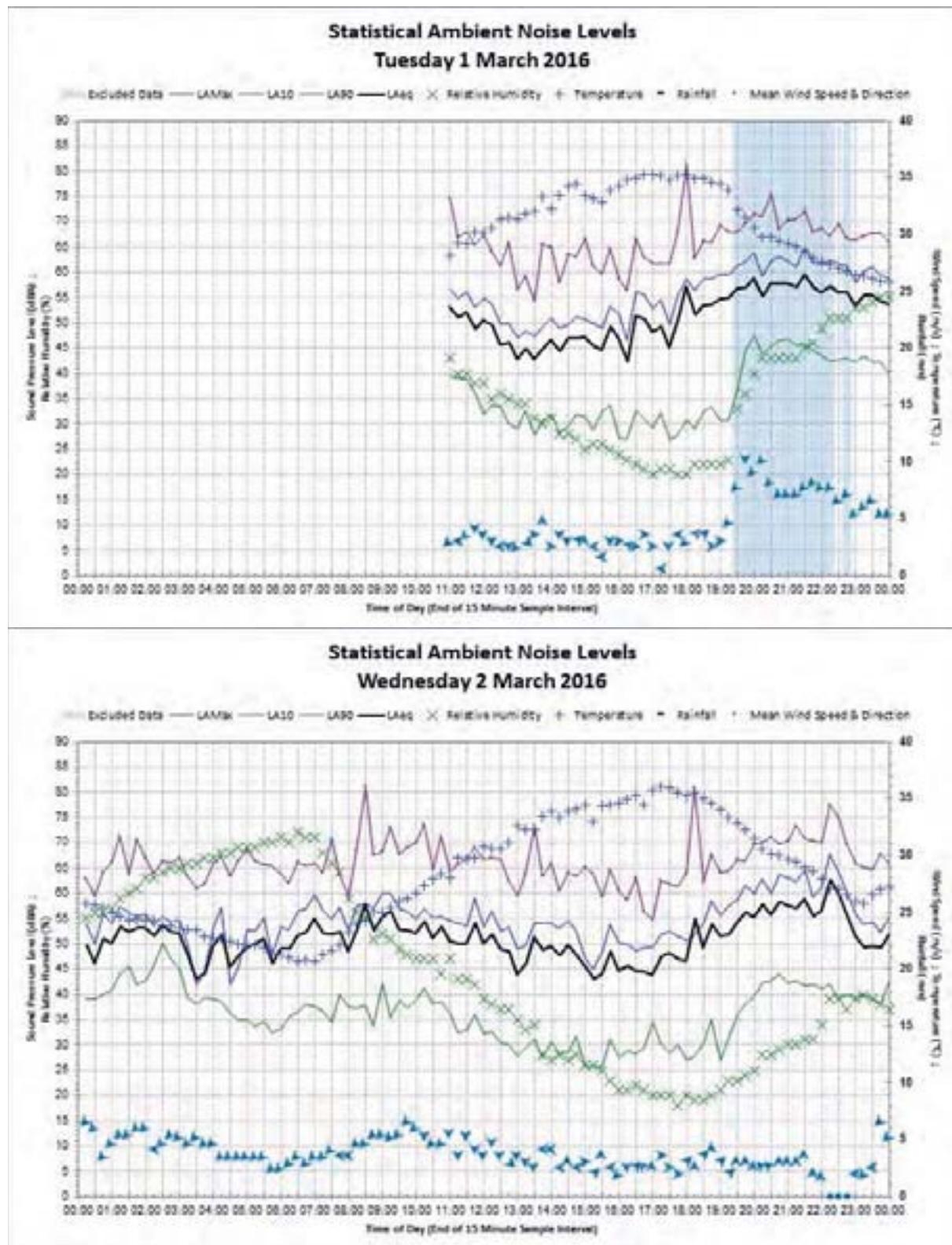
Statistical Ambient Noise Levels
Tuesday 8 March 2016



Statistical Ambient Noise Levels
Wednesday 9 March 2016

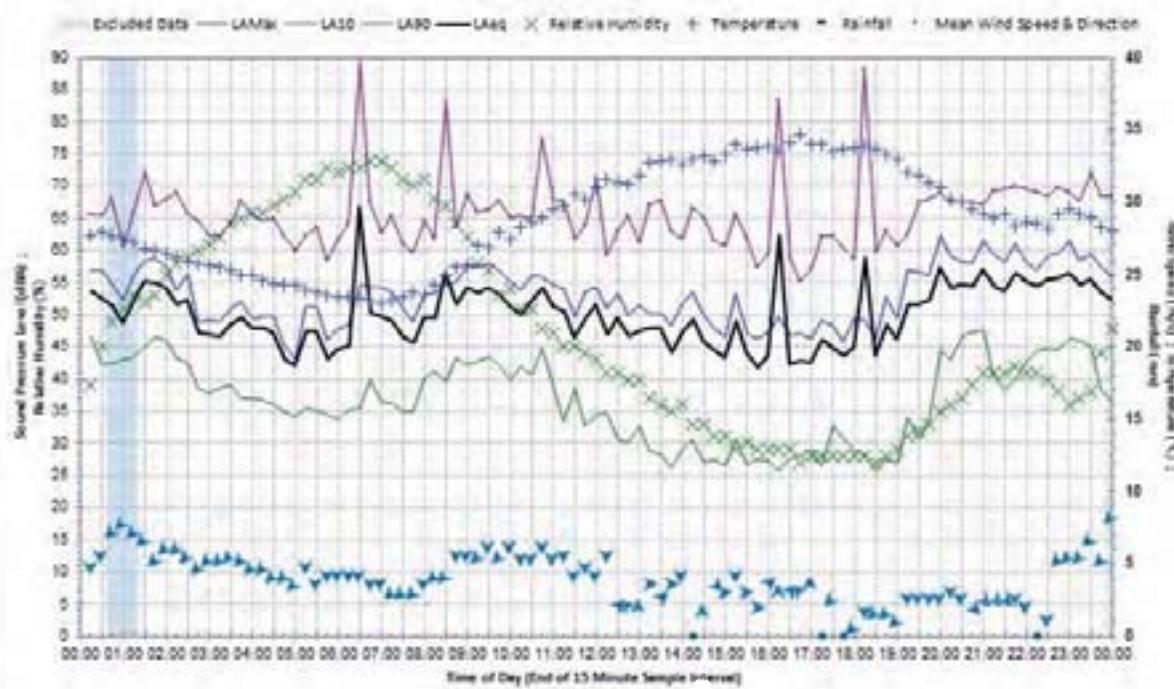


Logger L13NNS



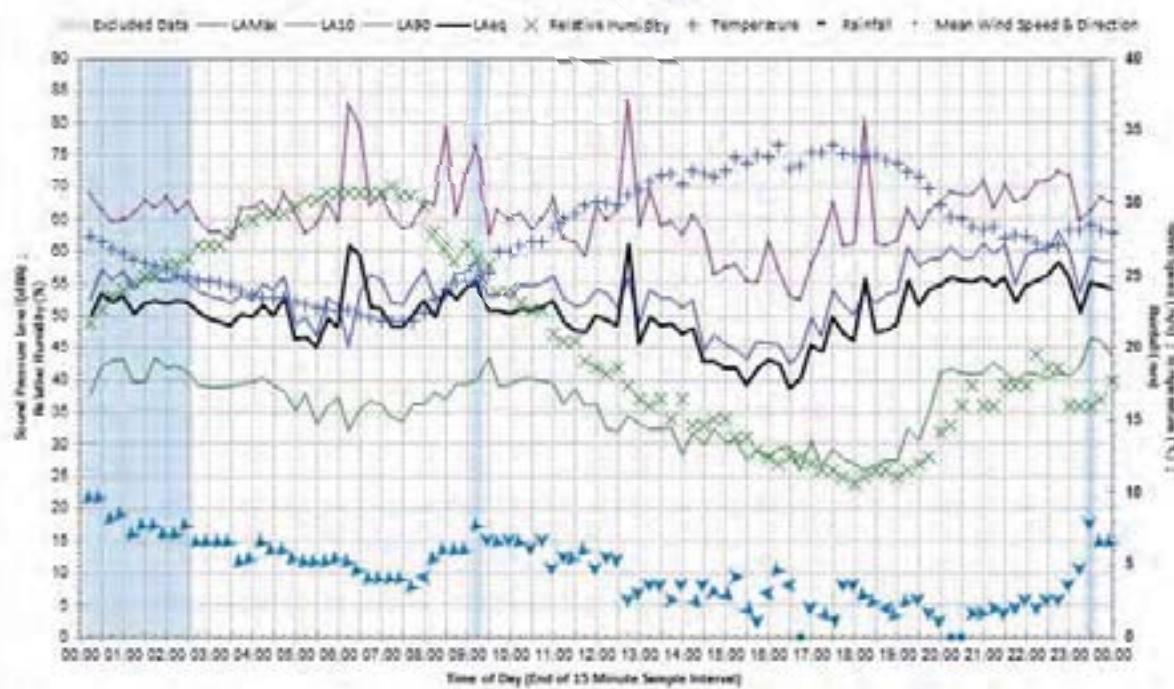
Statistical Ambient Noise Levels

Thursday 3 March 2016

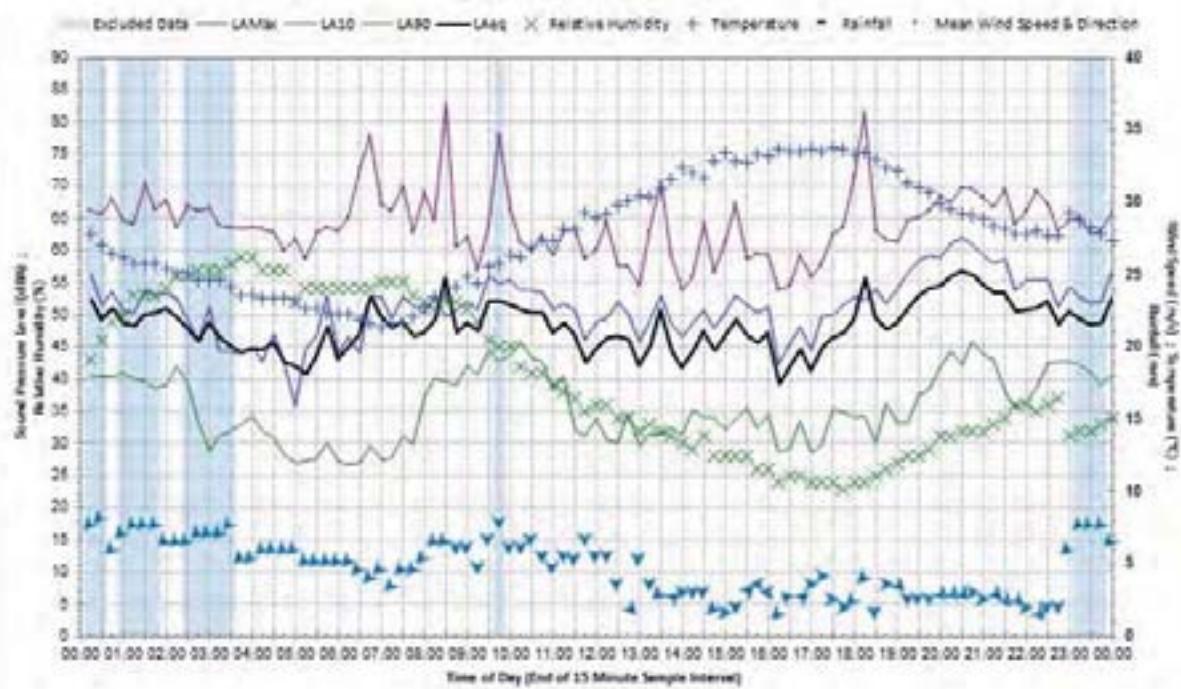


Statistical Ambient Noise Levels

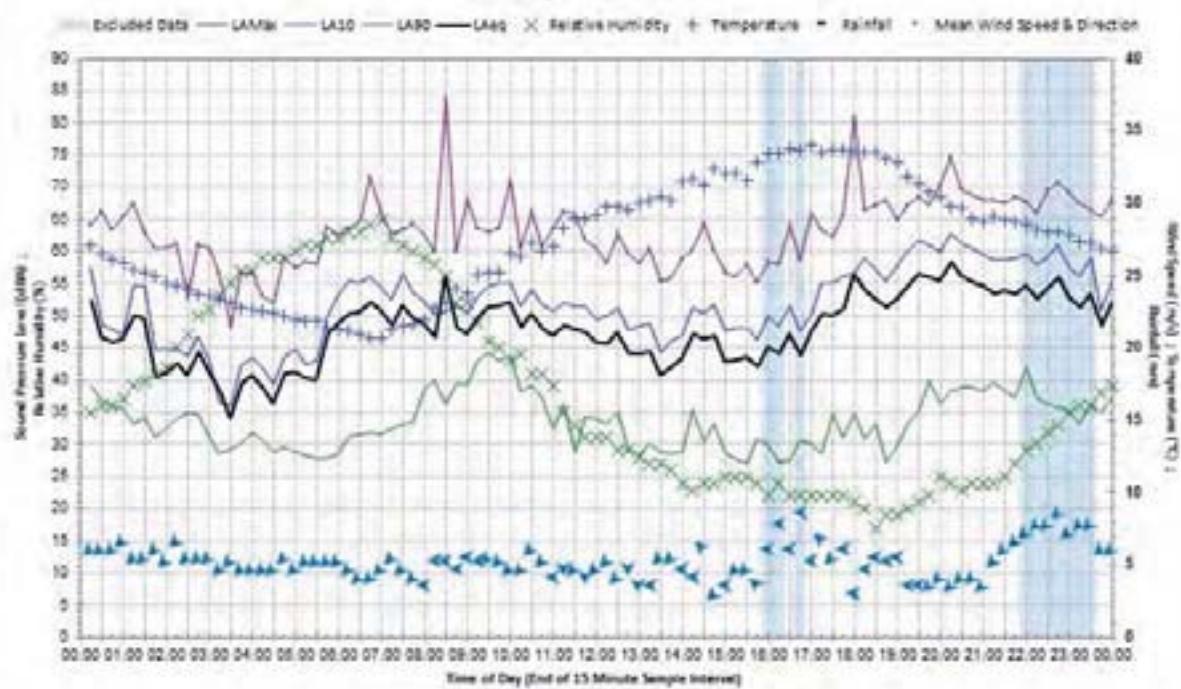
Friday 4 March 2016



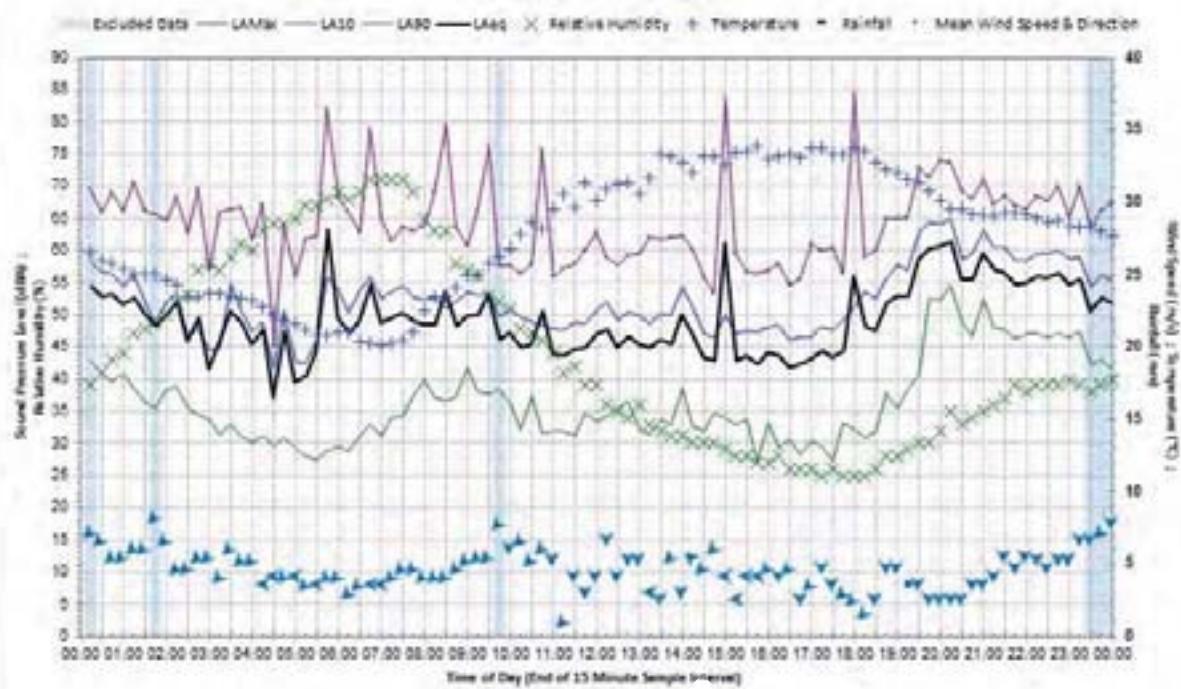
Statistical Ambient Noise Levels
Saturday 5 March 2016



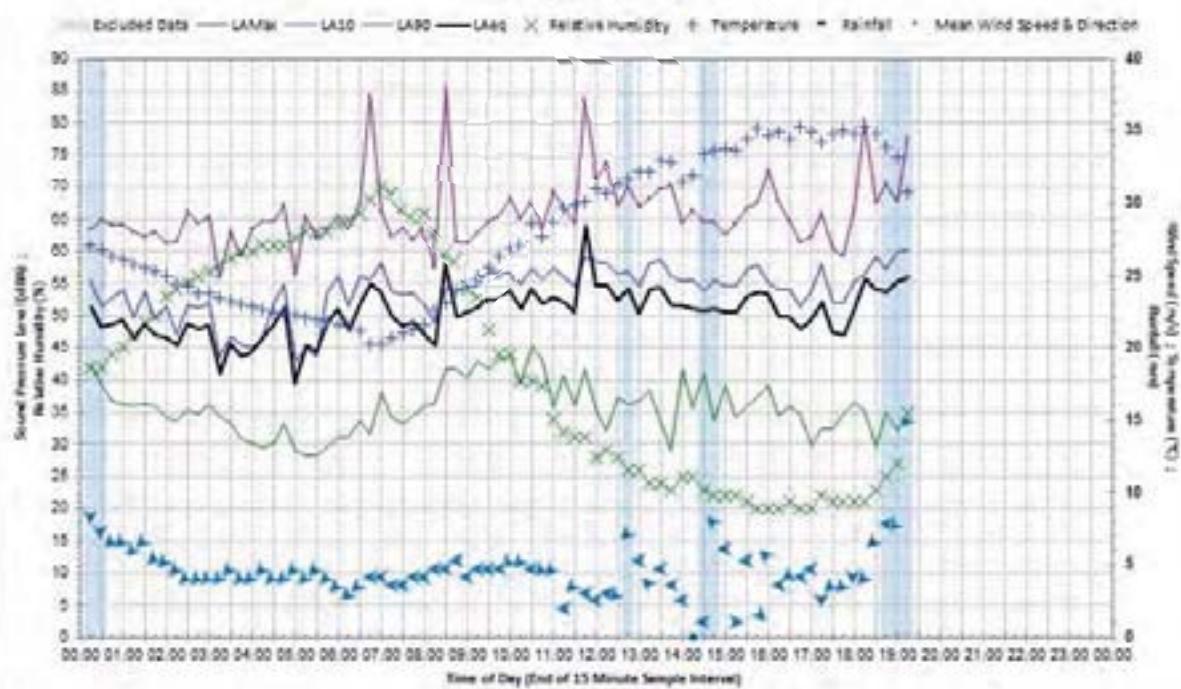
Statistical Ambient Noise Levels
Sunday 6 March 2016



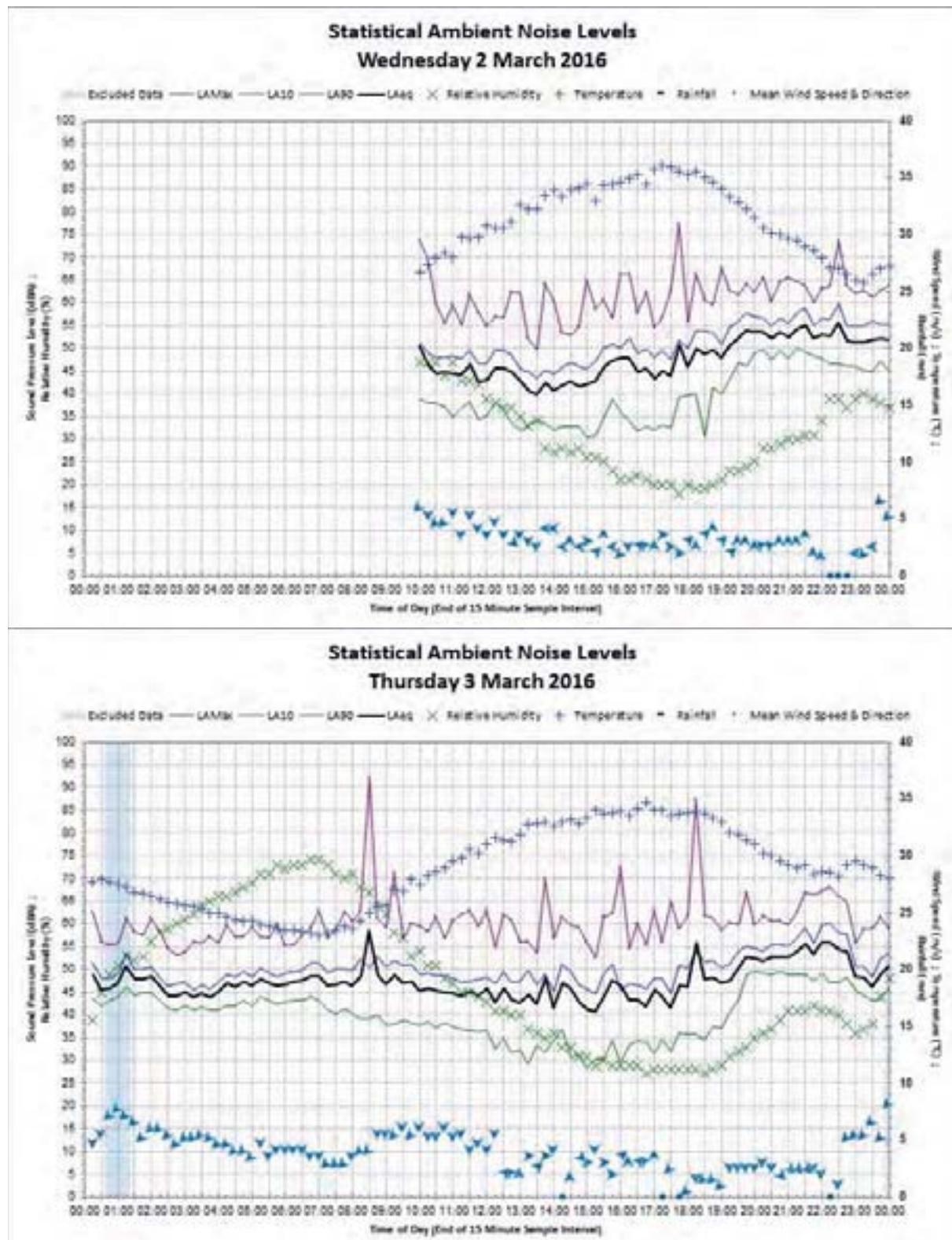
Statistical Ambient Noise Levels
Monday 7 March 2016



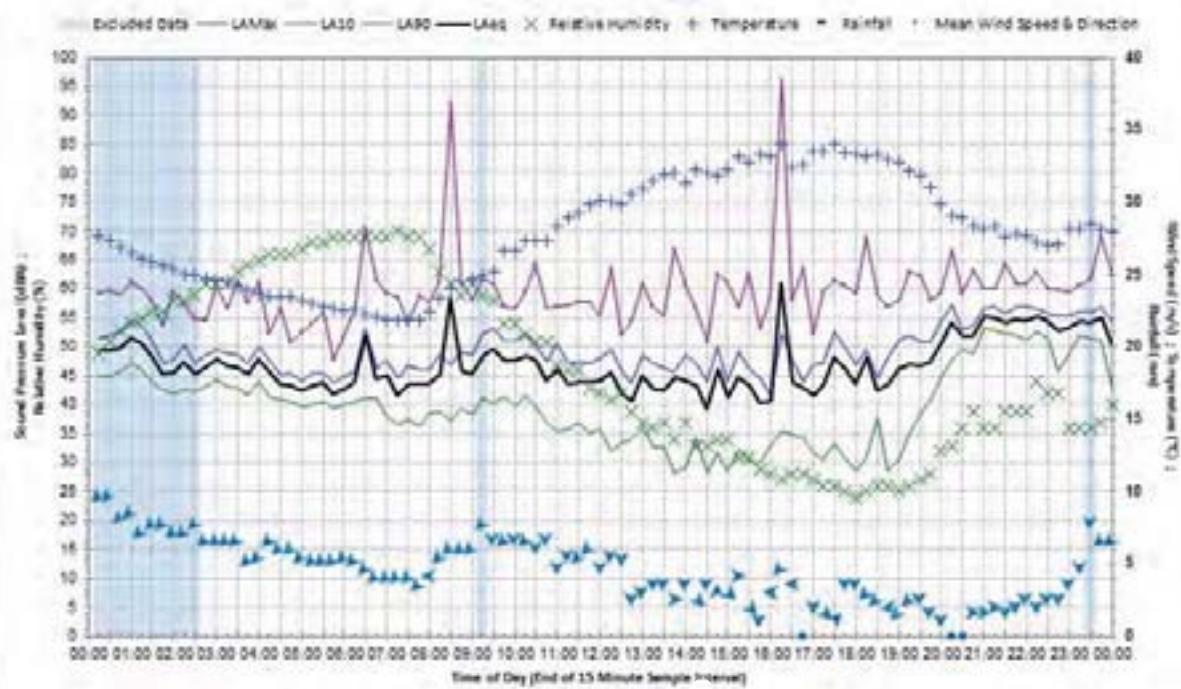
Statistical Ambient Noise Levels
Tuesday 8 March 2016



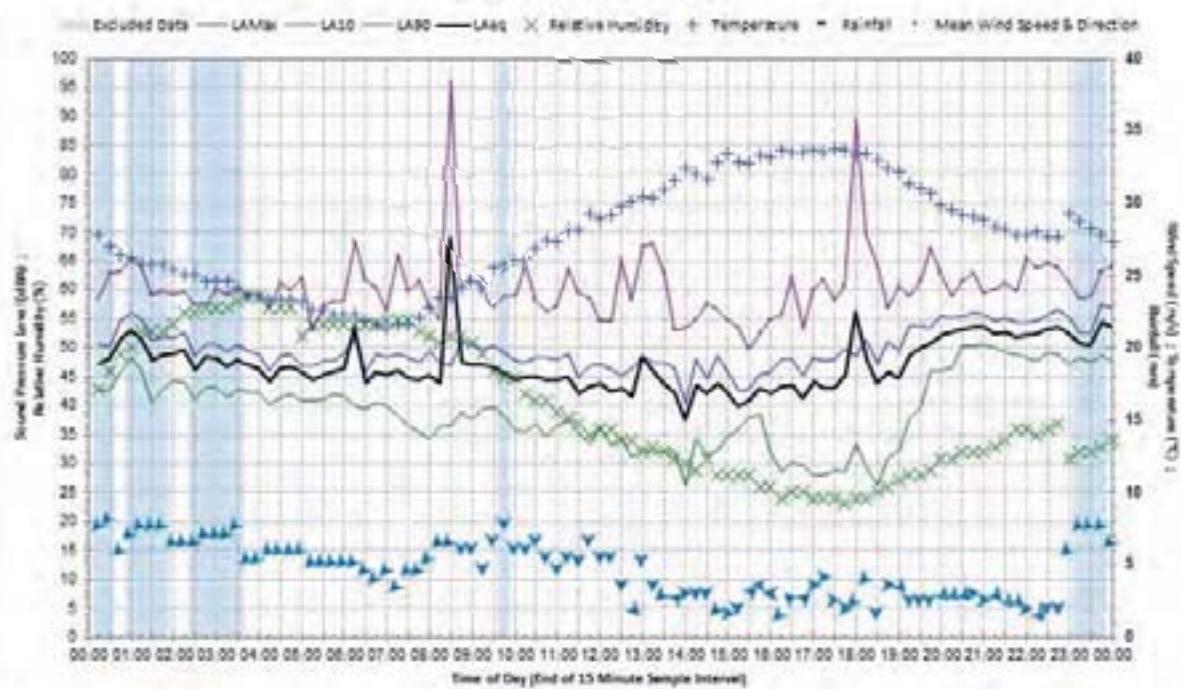
Logger L14NNS



Statistical Ambient Noise Levels
Friday 4 March 2016



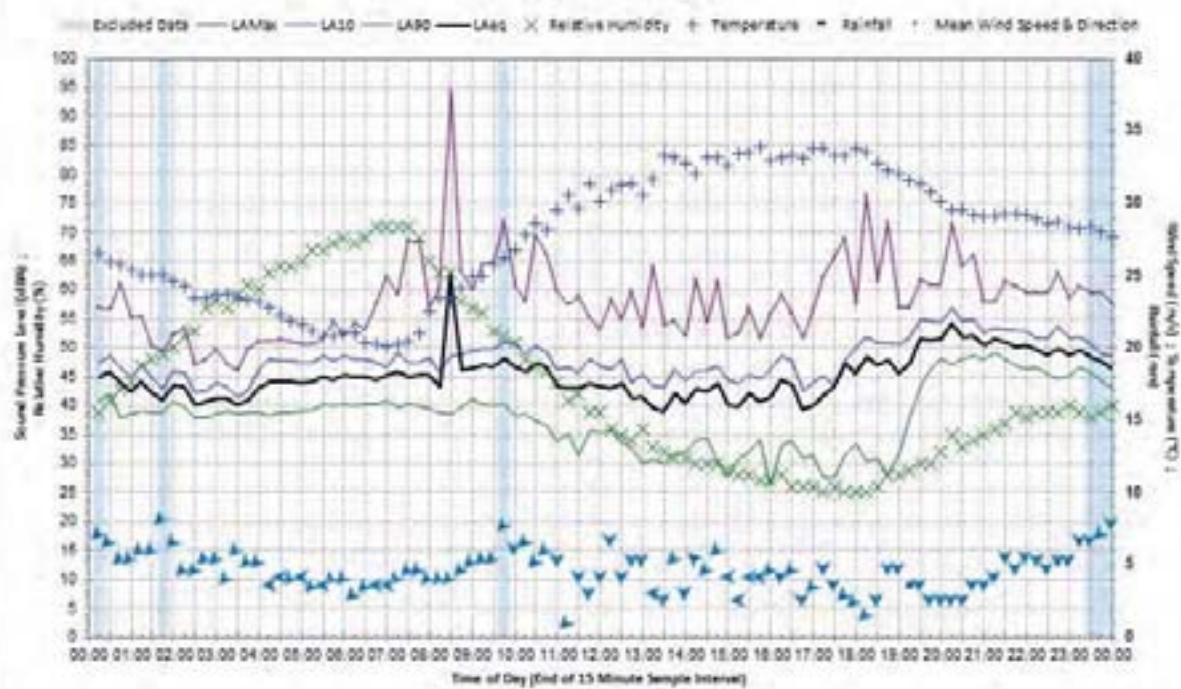
Statistical Ambient Noise Levels
Saturday 5 March 2016



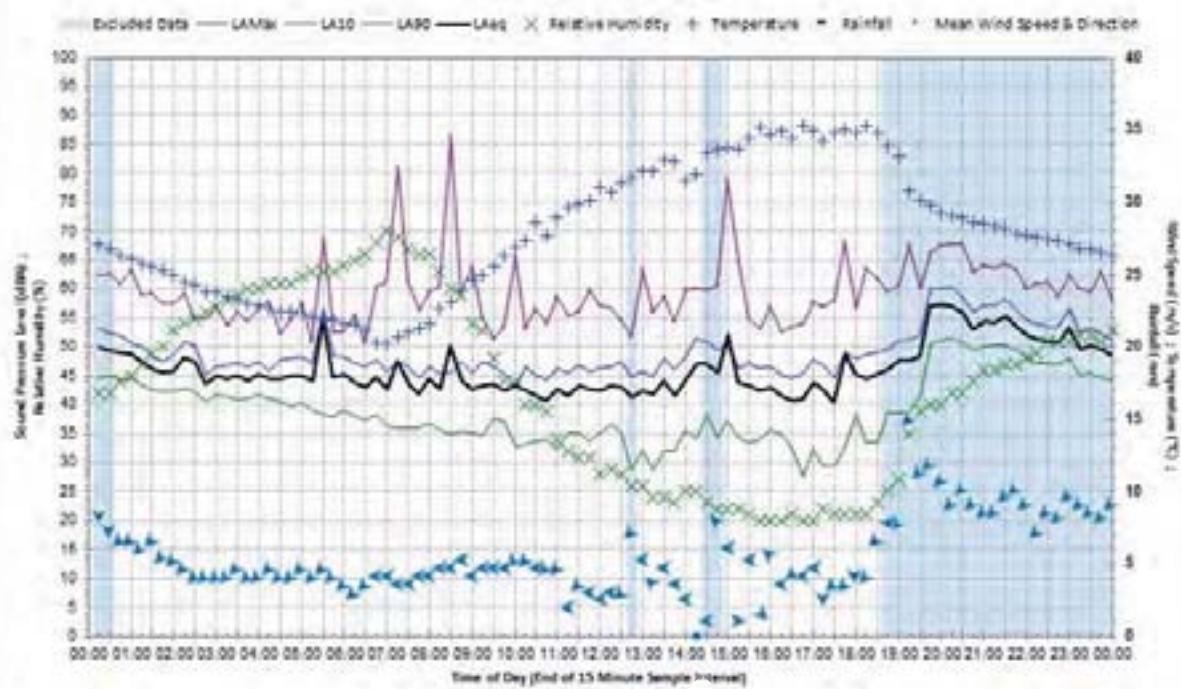
Statistical Ambient Noise Levels
Sunday 6 March 2016



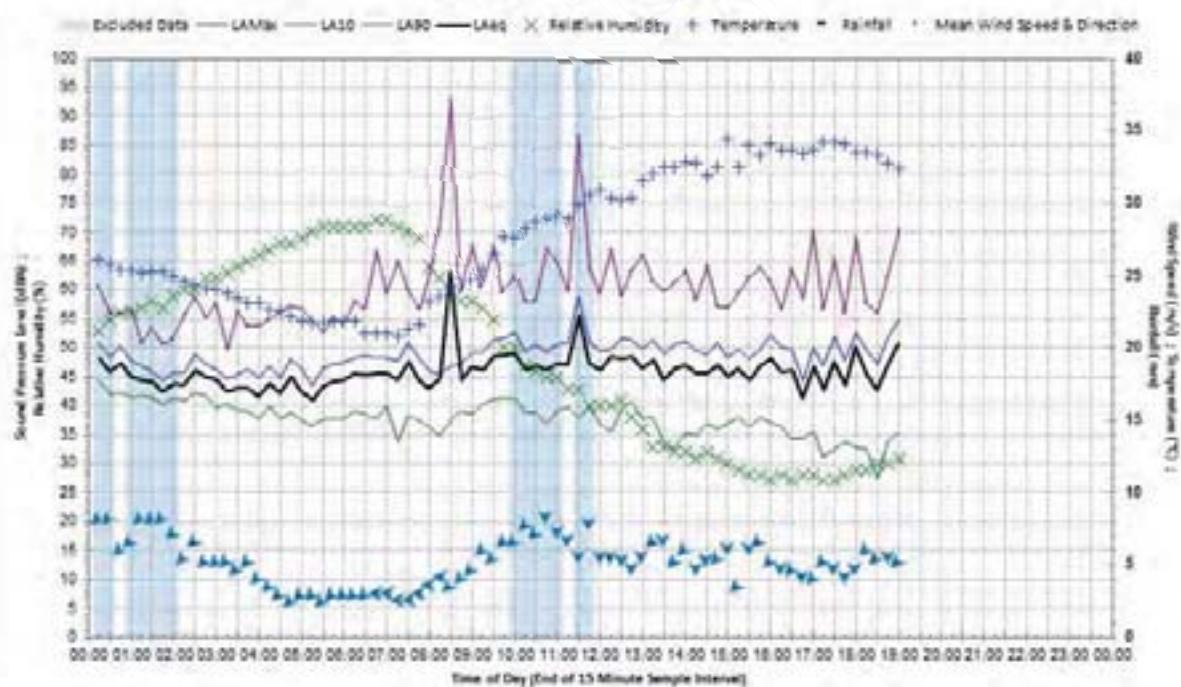
Statistical Ambient Noise Levels
Monday 7 March 2016



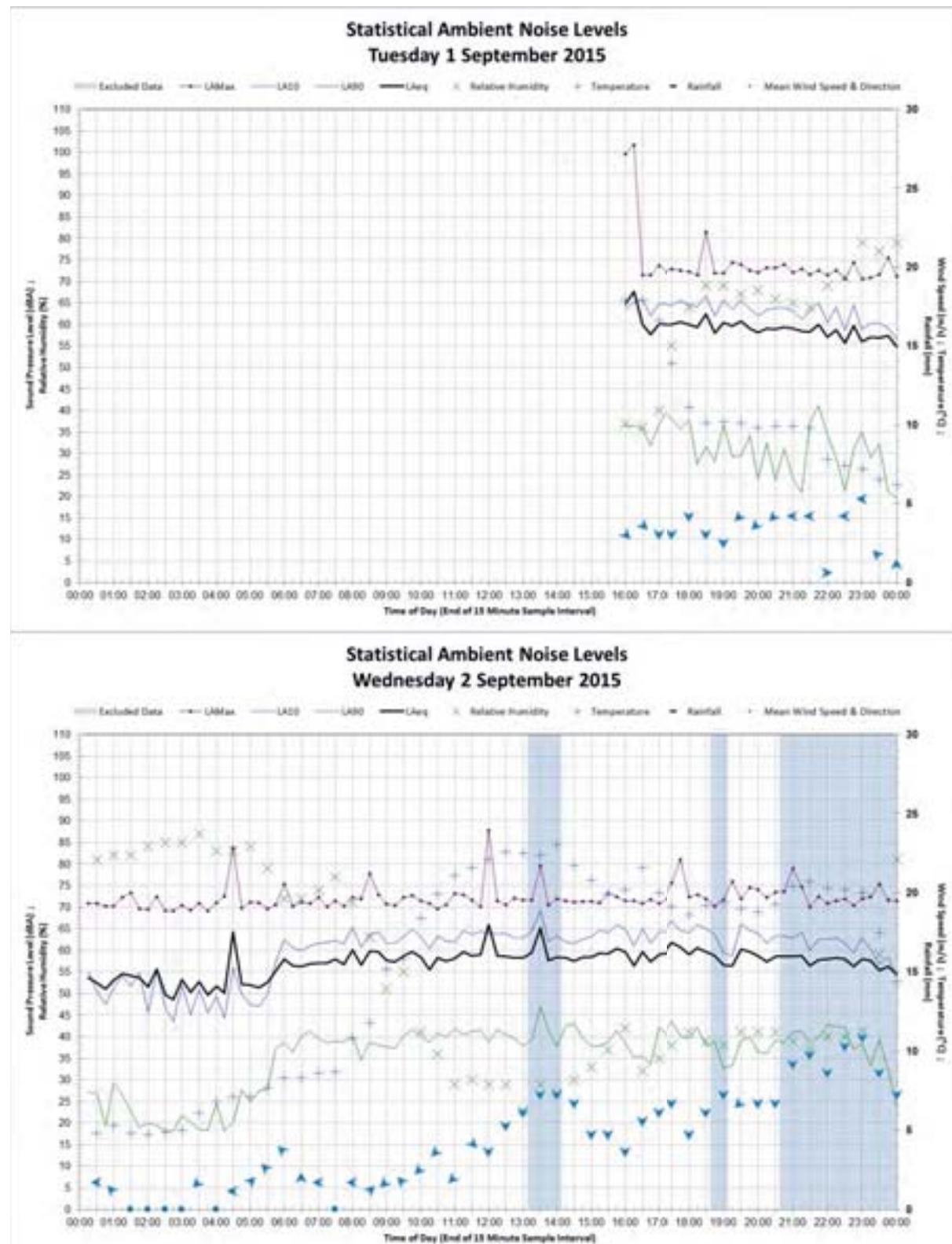
Statistical Ambient Noise Levels
Tuesday 8 March 2016



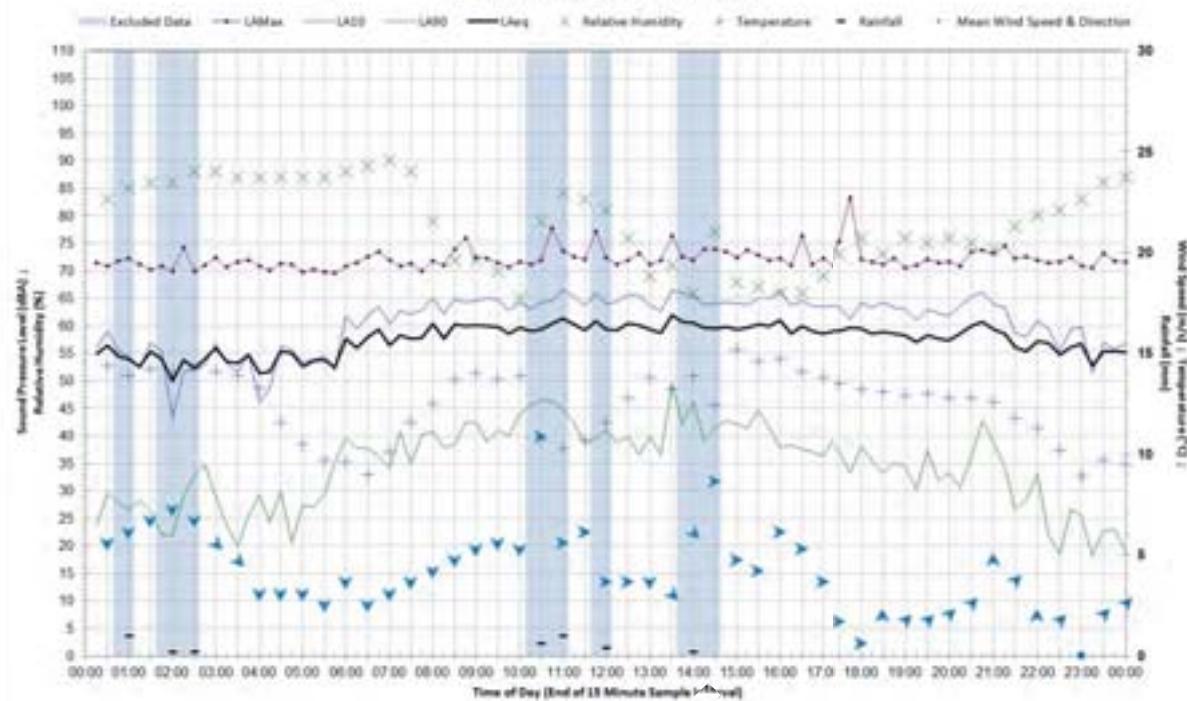
Statistical Ambient Noise Levels
Wednesday 9 March 2016



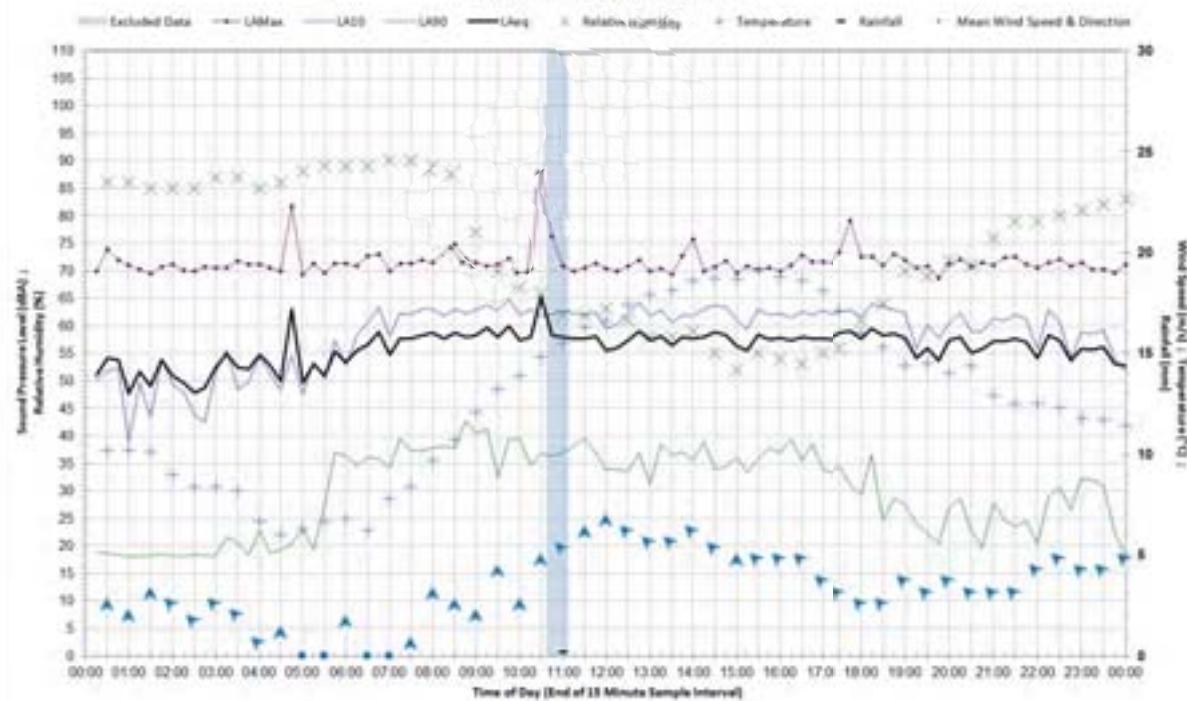
Logger L15NNS



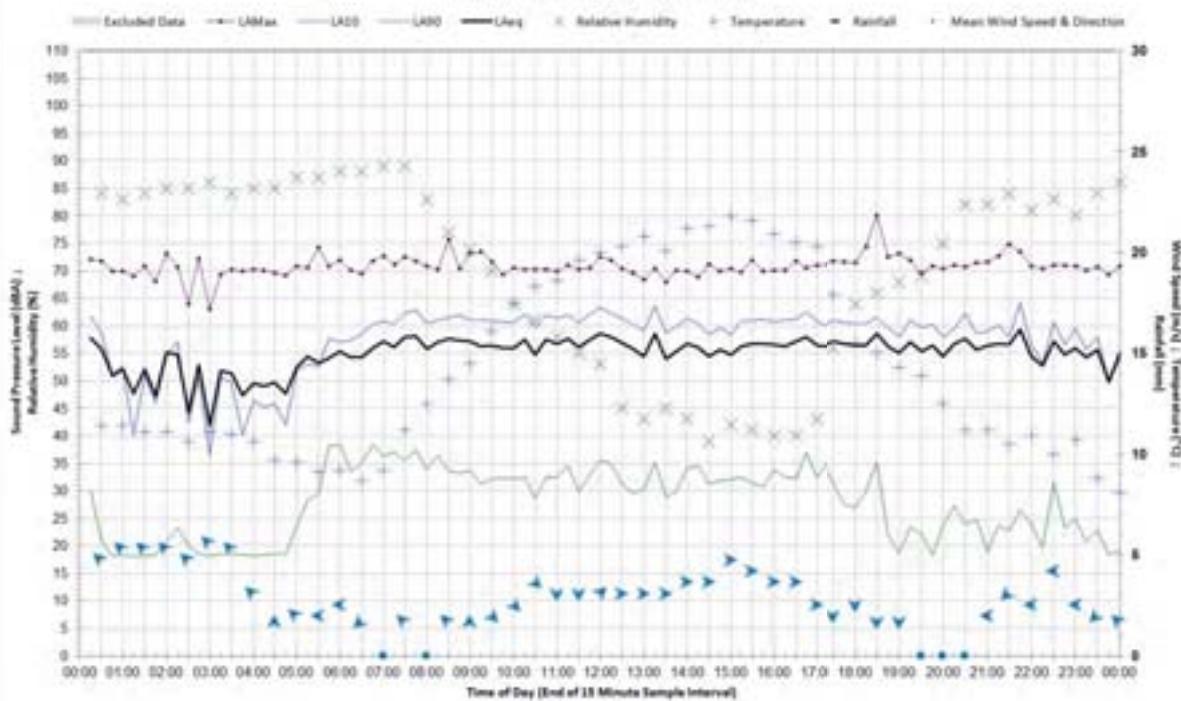
Statistical Ambient Noise Levels
Thursday 3 September 2015



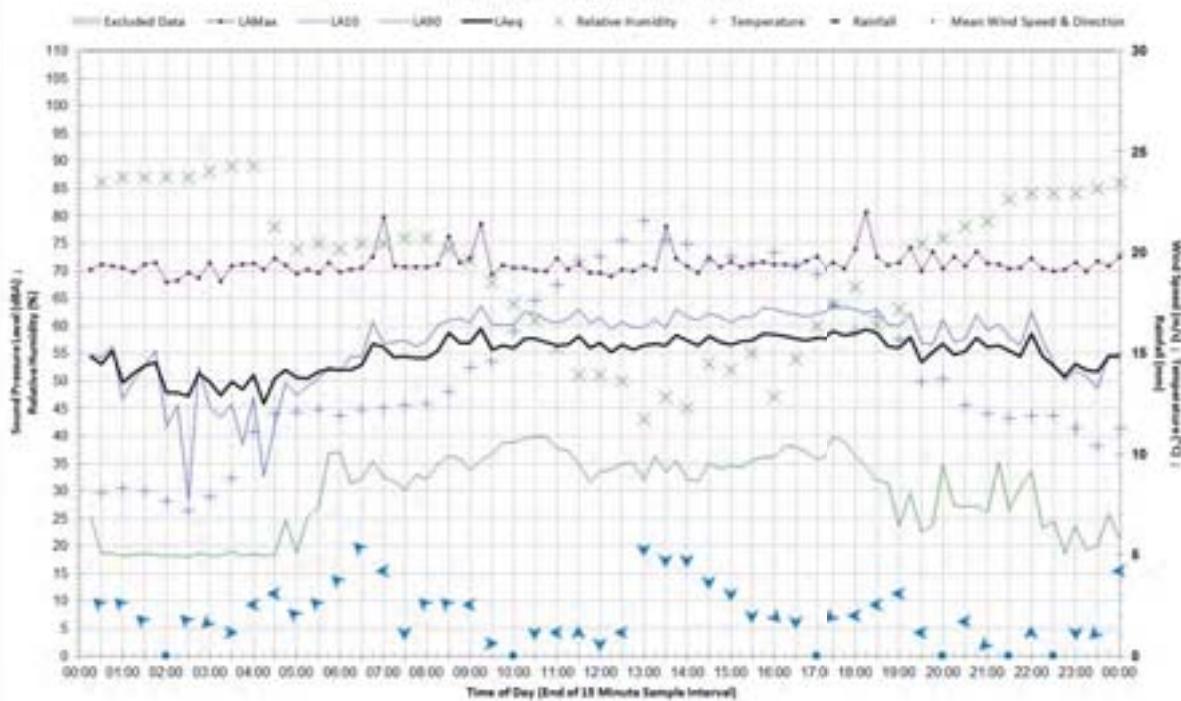
Statistical Ambient Noise Levels
Friday 4 September 2015



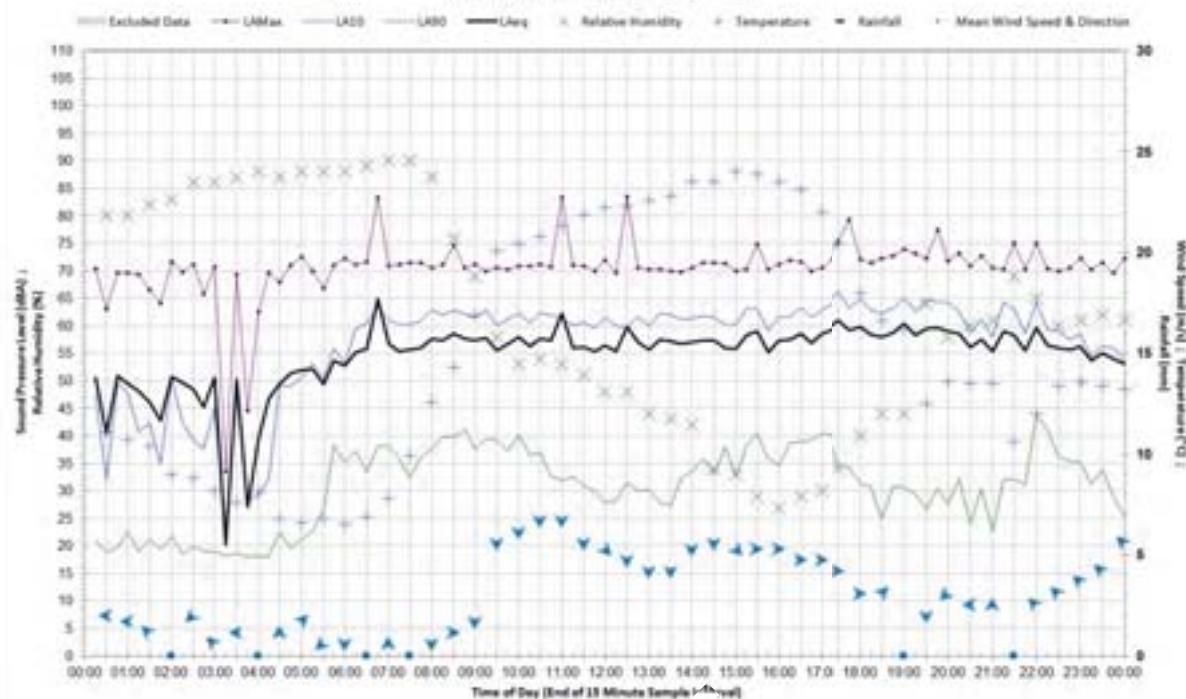
Statistical Ambient Noise Levels Saturday 5 September 2015



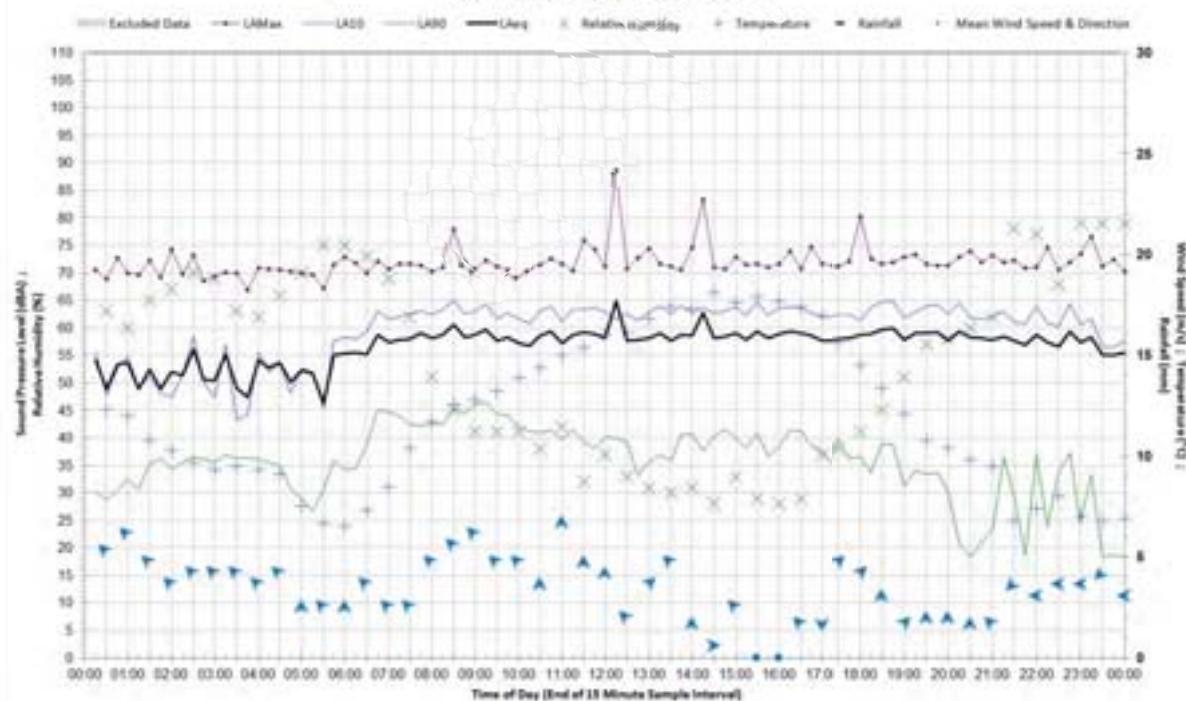
Statistical Ambient Noise Levels Sunday 6 September 2015



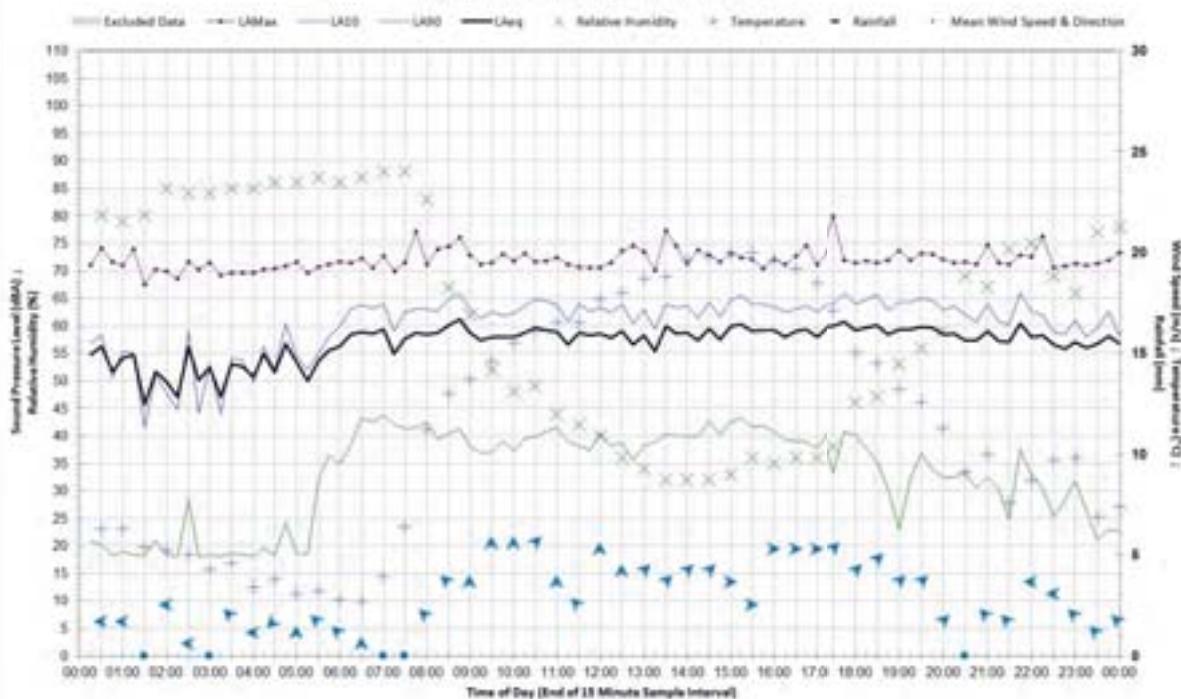
Statistical Ambient Noise Levels Monday 7 September 2015



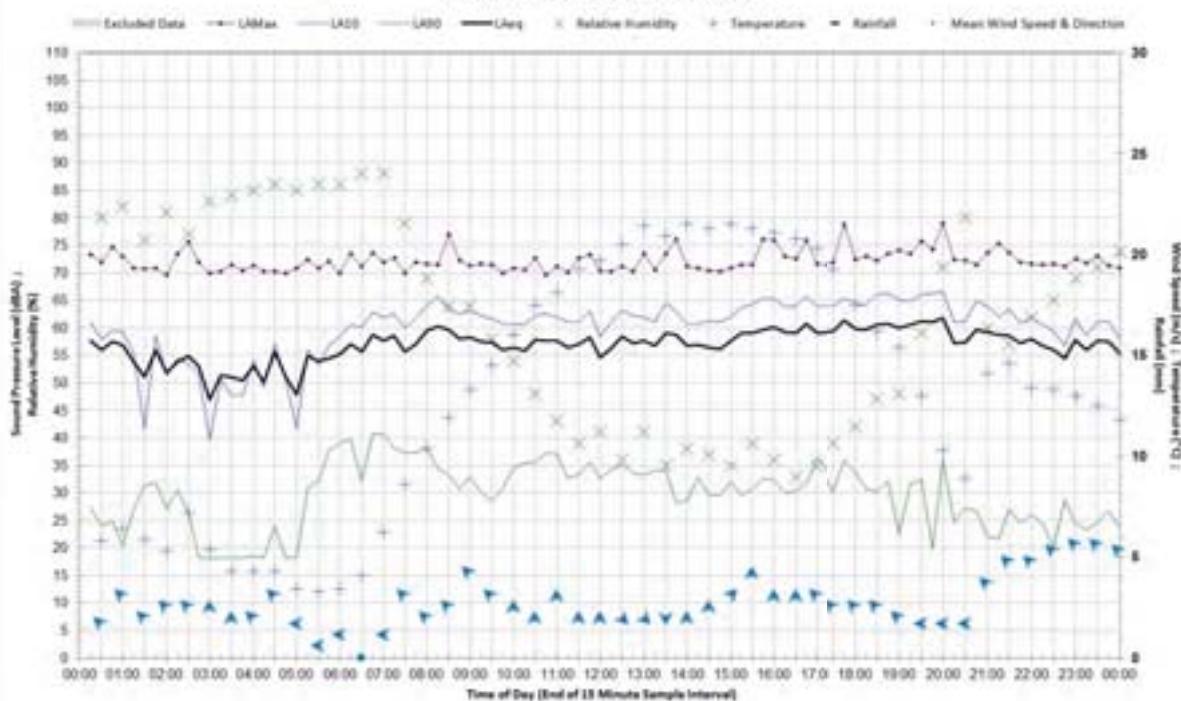
Statistical Ambient Noise Levels Tuesday 8 September 2015



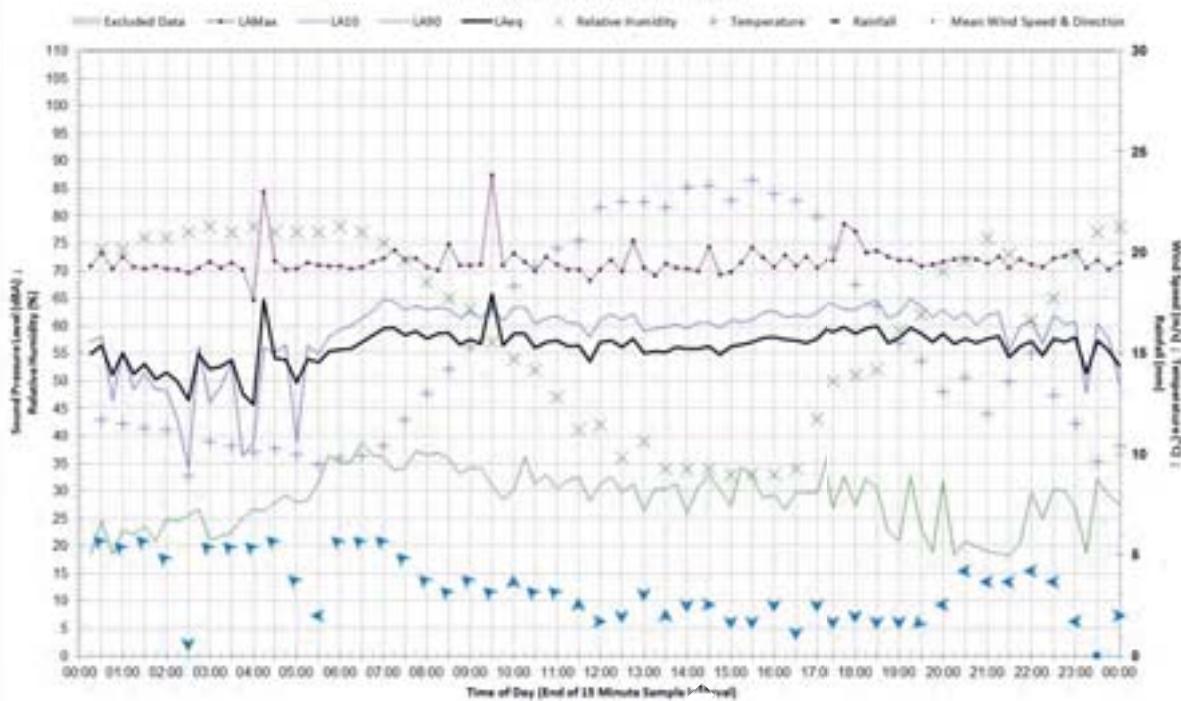
Statistical Ambient Noise Levels
Wednesday 9 September 2015



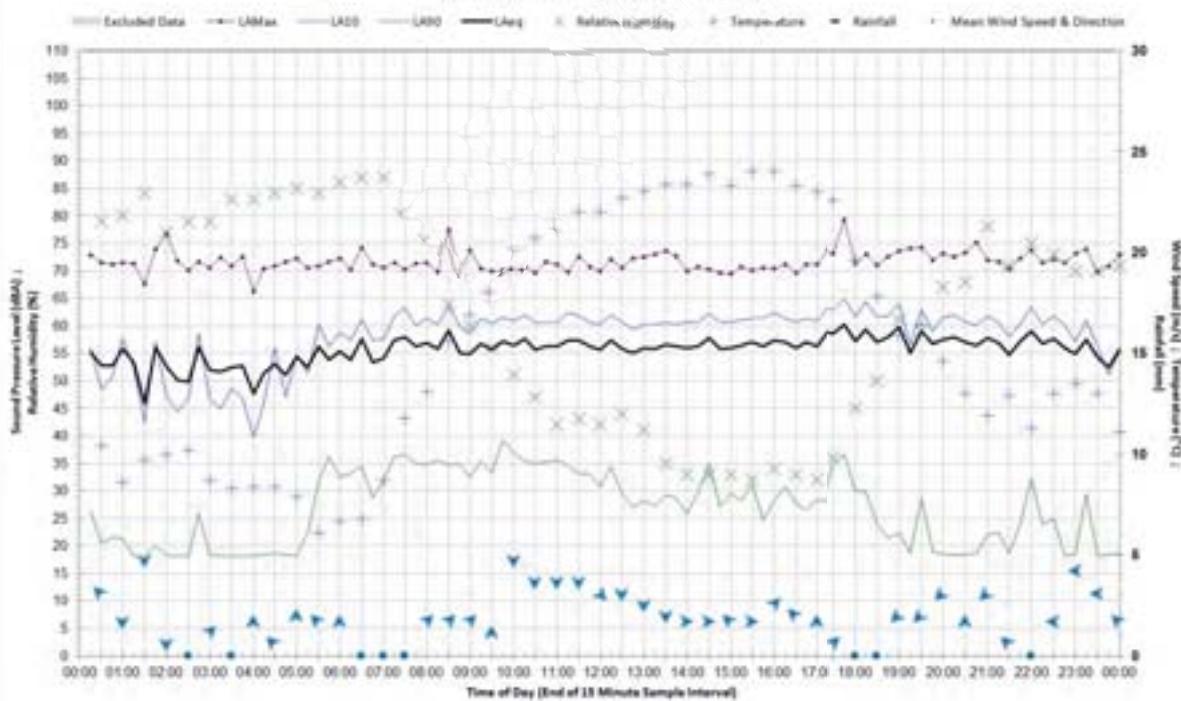
Statistical Ambient Noise Levels
Thursday 10 September 2015



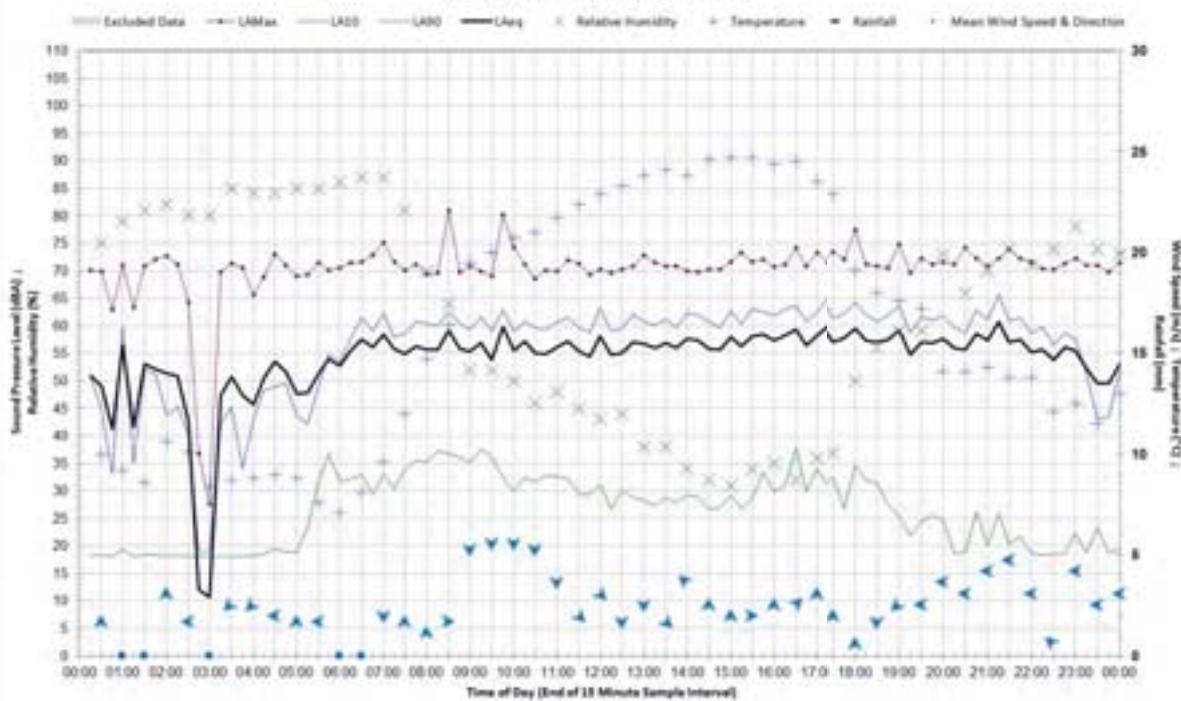
Statistical Ambient Noise Levels
Friday 11 September 2015



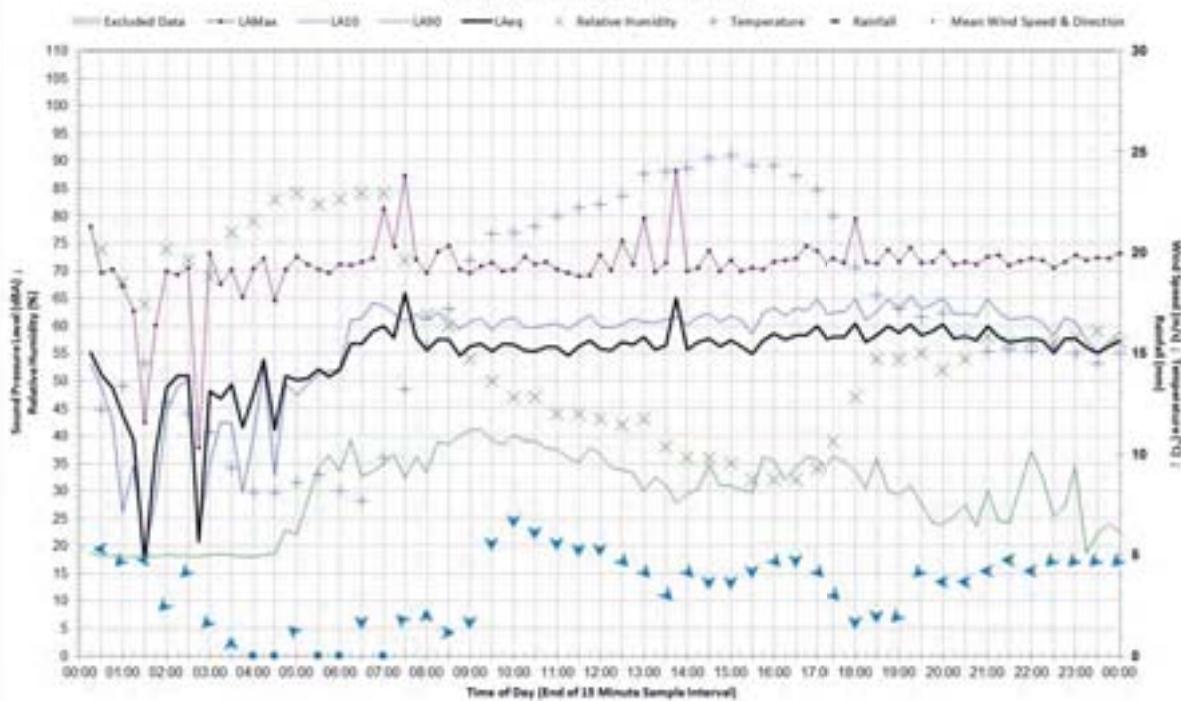
Statistical Ambient Noise Levels
Saturday 12 September 2015



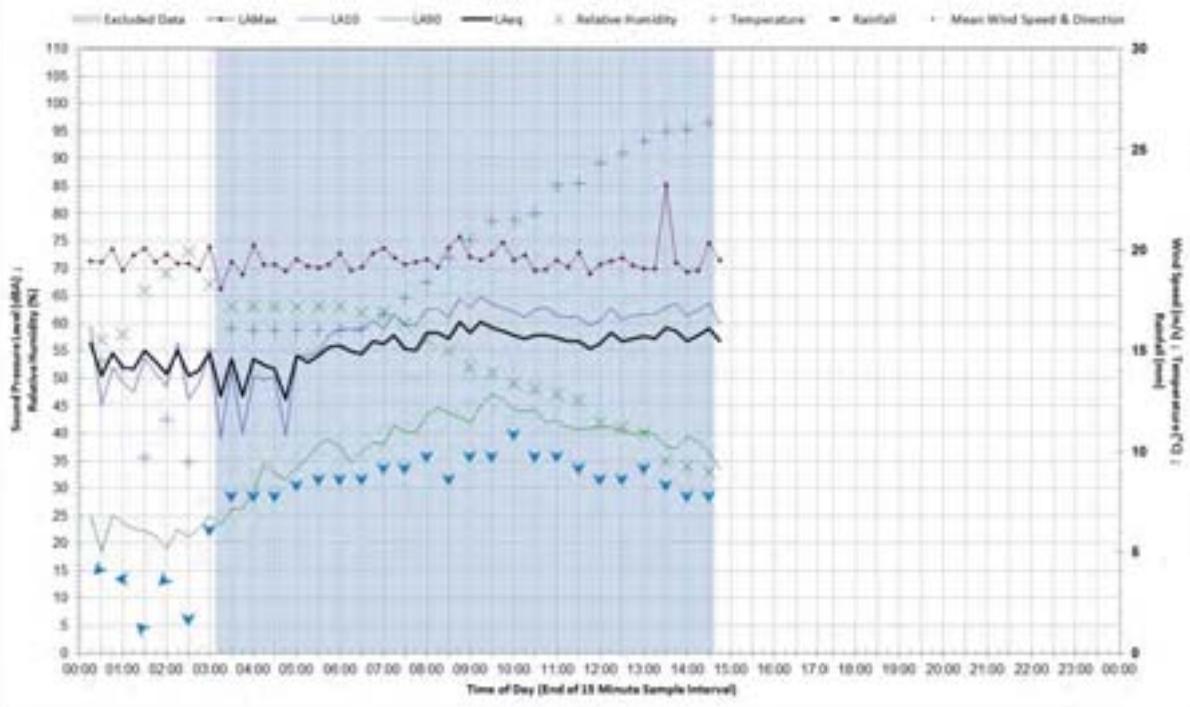
Statistical Ambient Noise Levels Sunday 13 September 2015



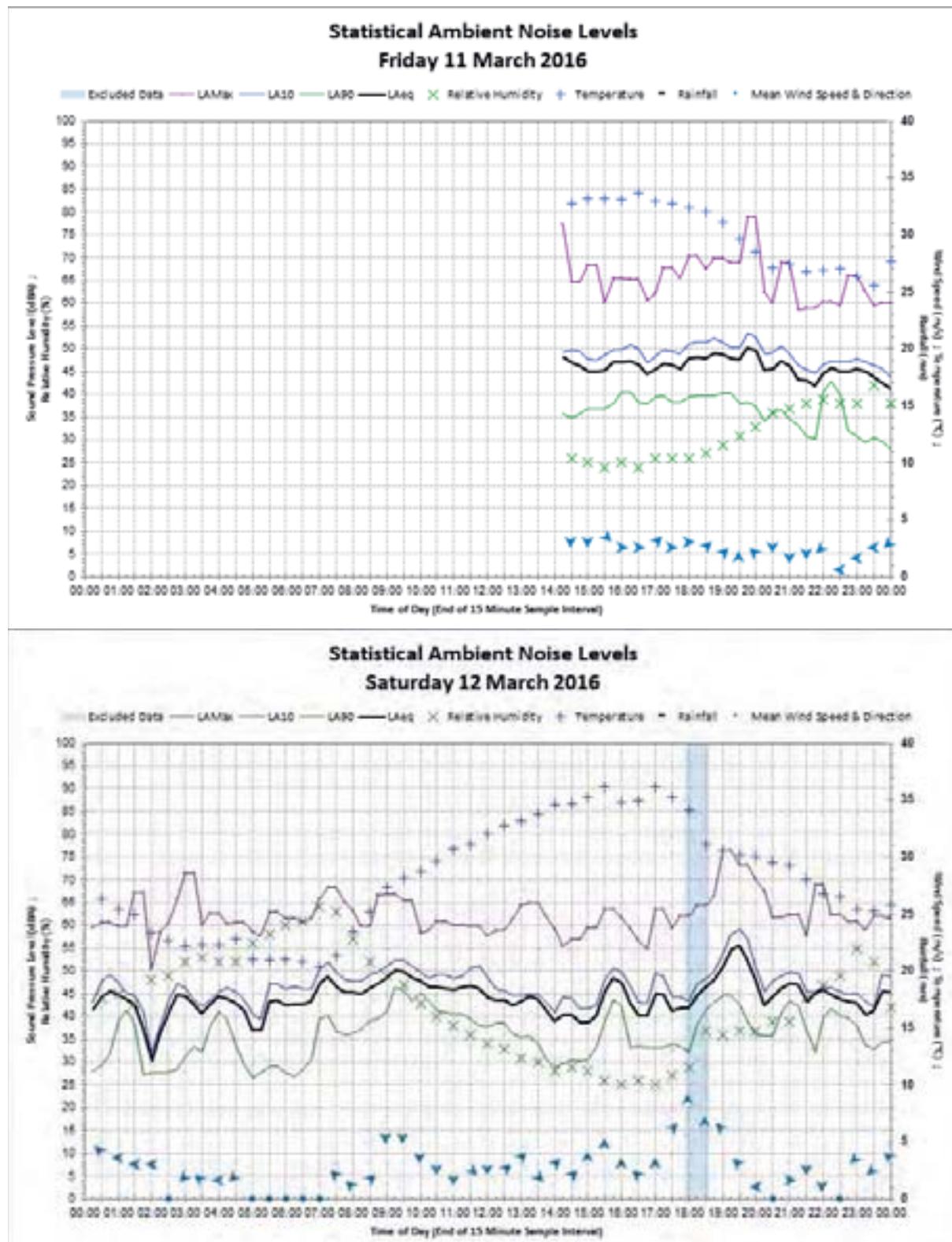
Statistical Ambient Noise Levels Monday 14 September 2015



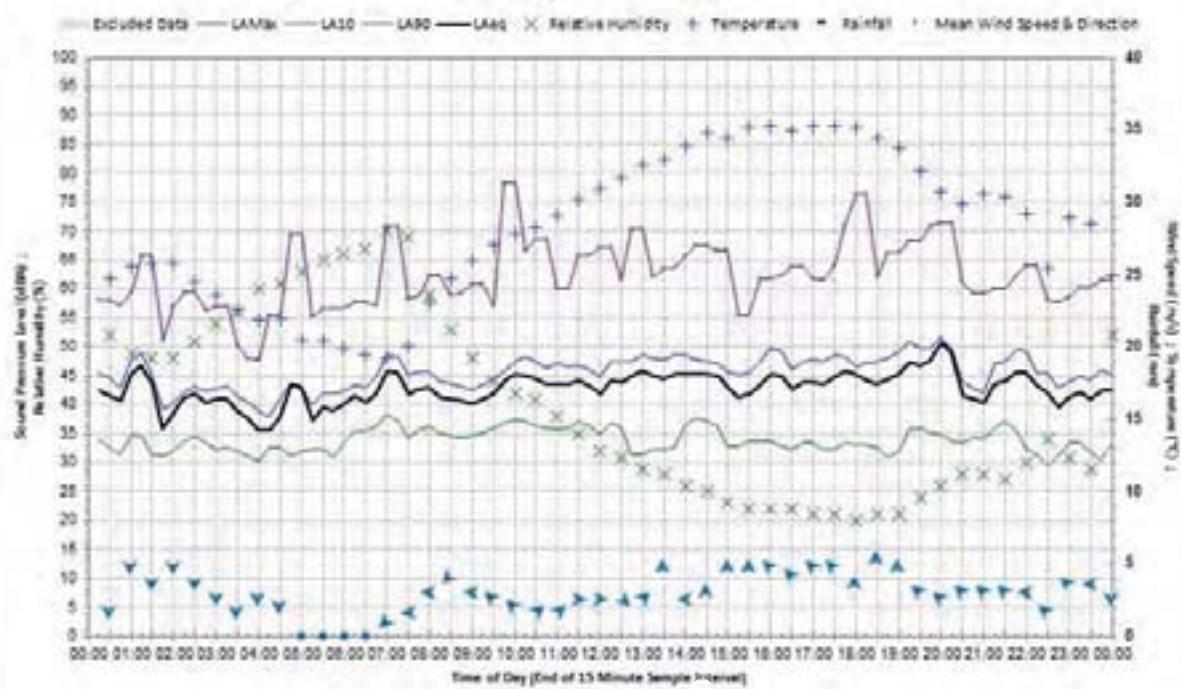
Statistical Ambient Noise Levels
Tuesday 15 September 2015



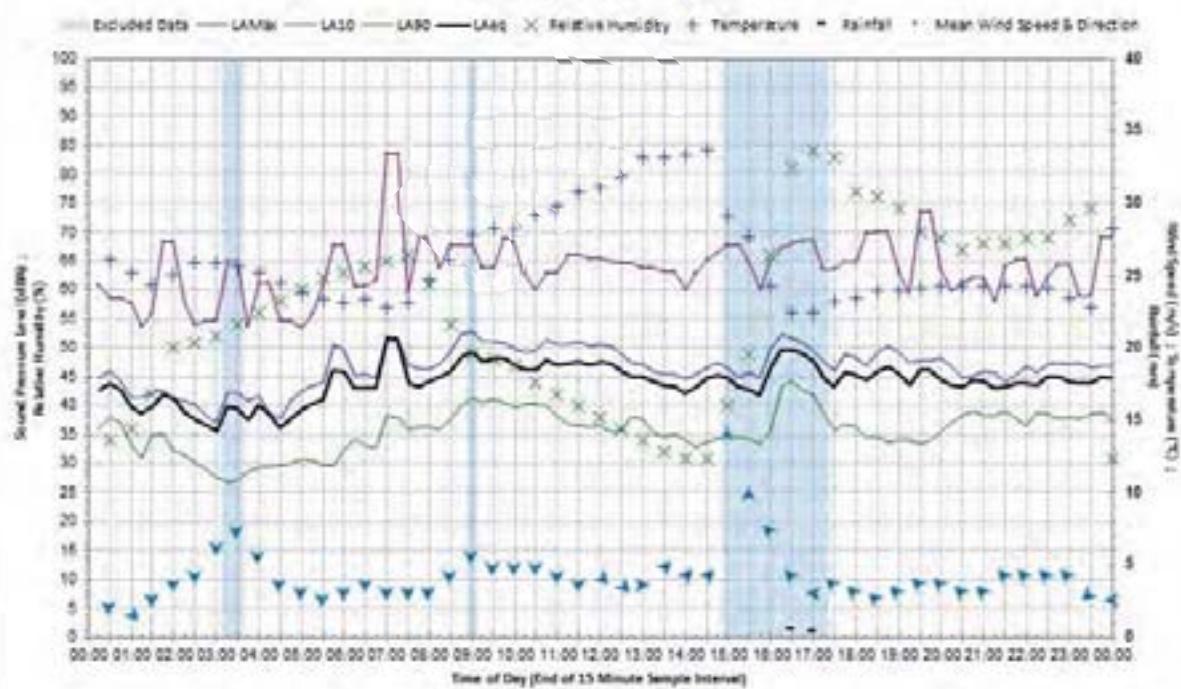
Logger L16NNS



Statistical Ambient Noise Levels Sunday 13 March 2016

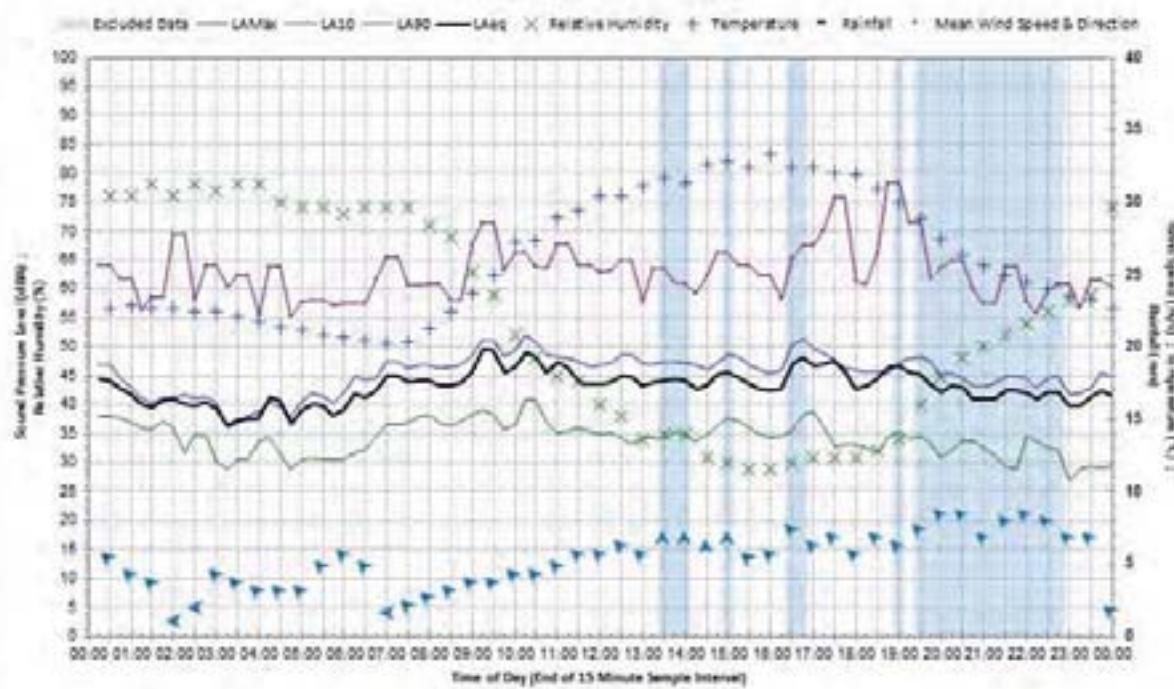


Statistical Ambient Noise Levels Monday 14 March 2016



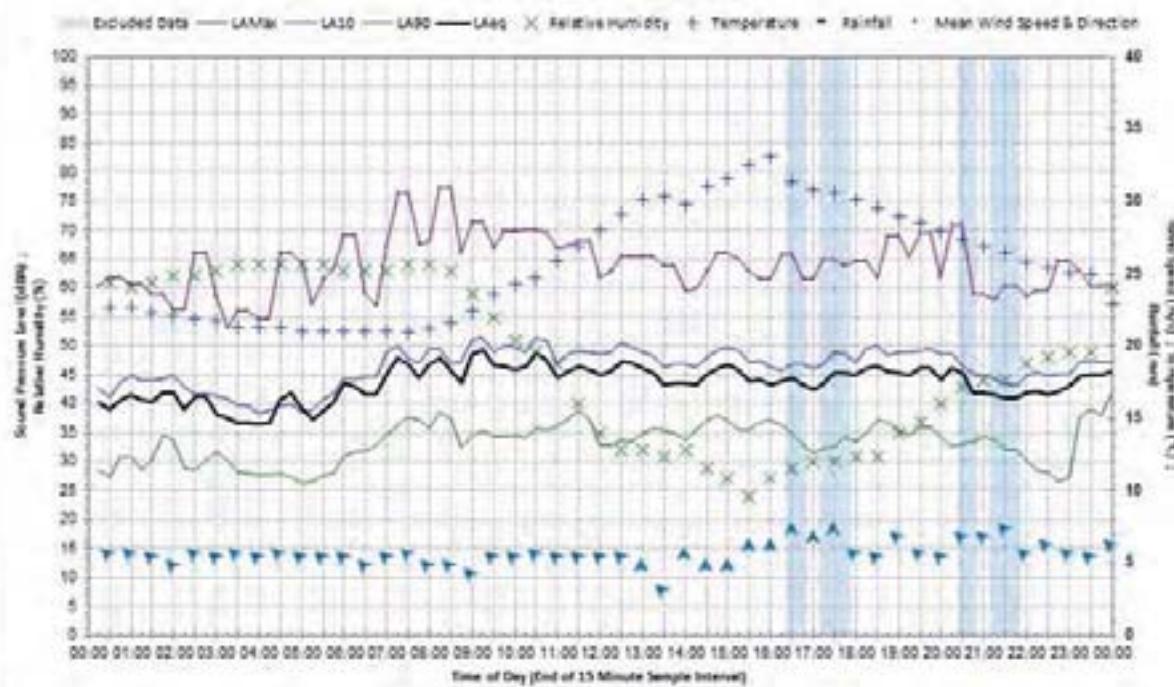
Statistical Ambient Noise Levels

Tuesday 15 March 2016

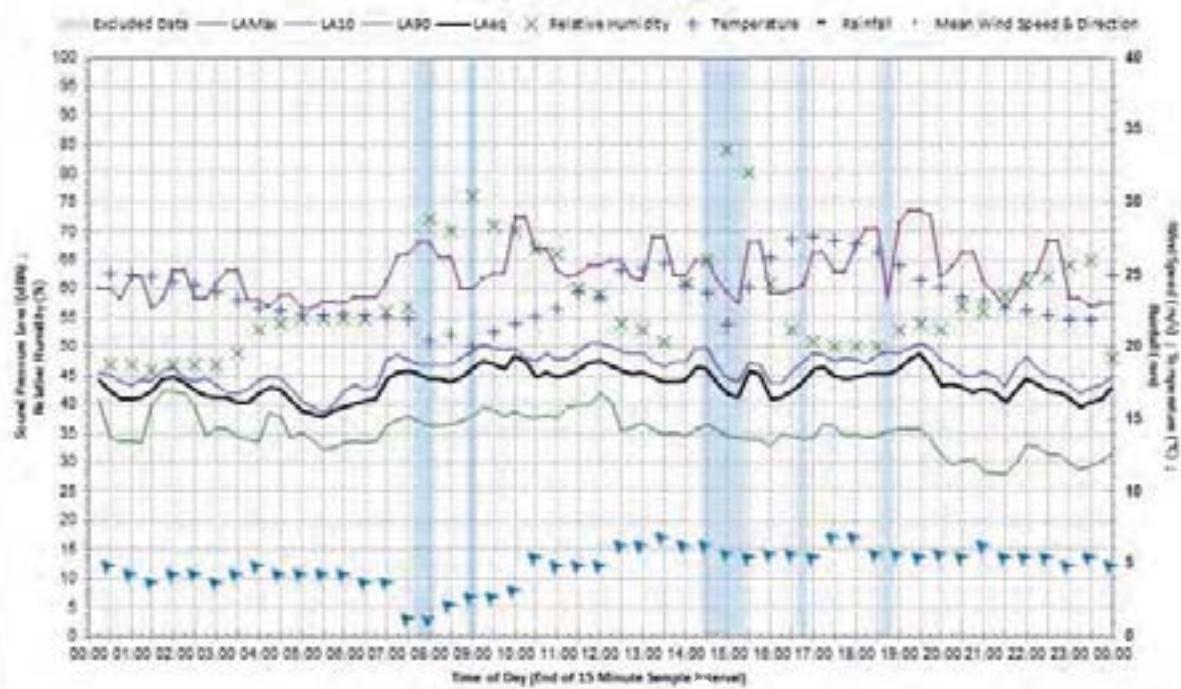


Statistical Ambient Noise Levels

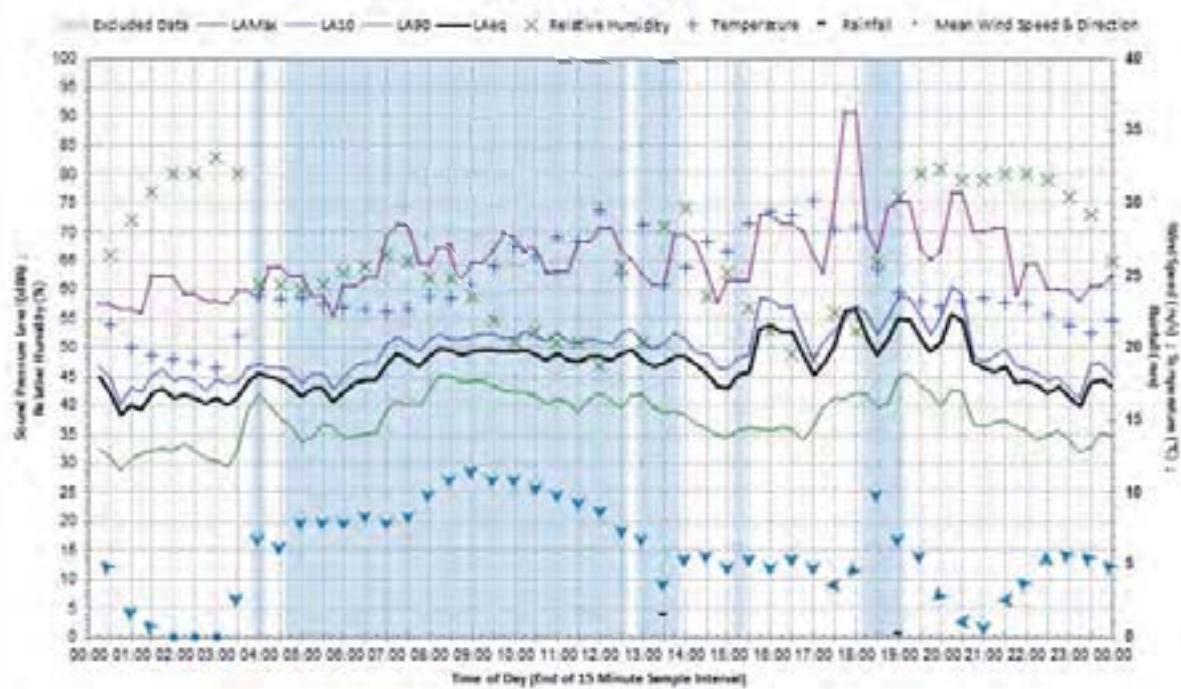
Wednesday 16 March 2016



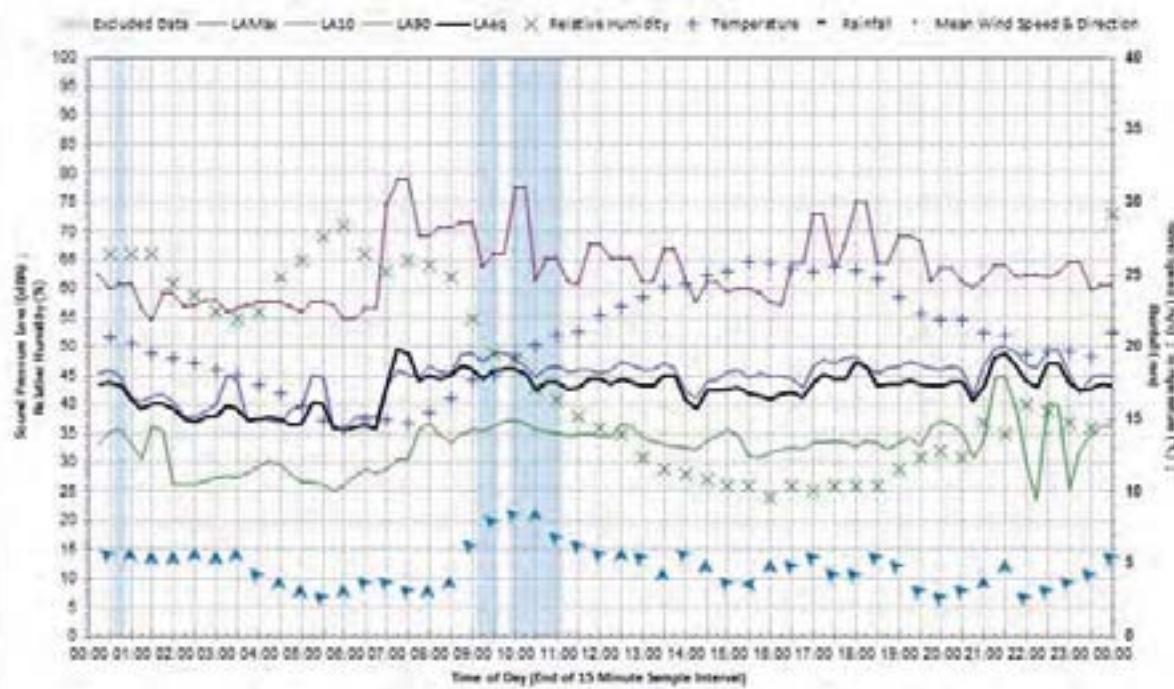
Statistical Ambient Noise Levels
Thursday 17 March 2016



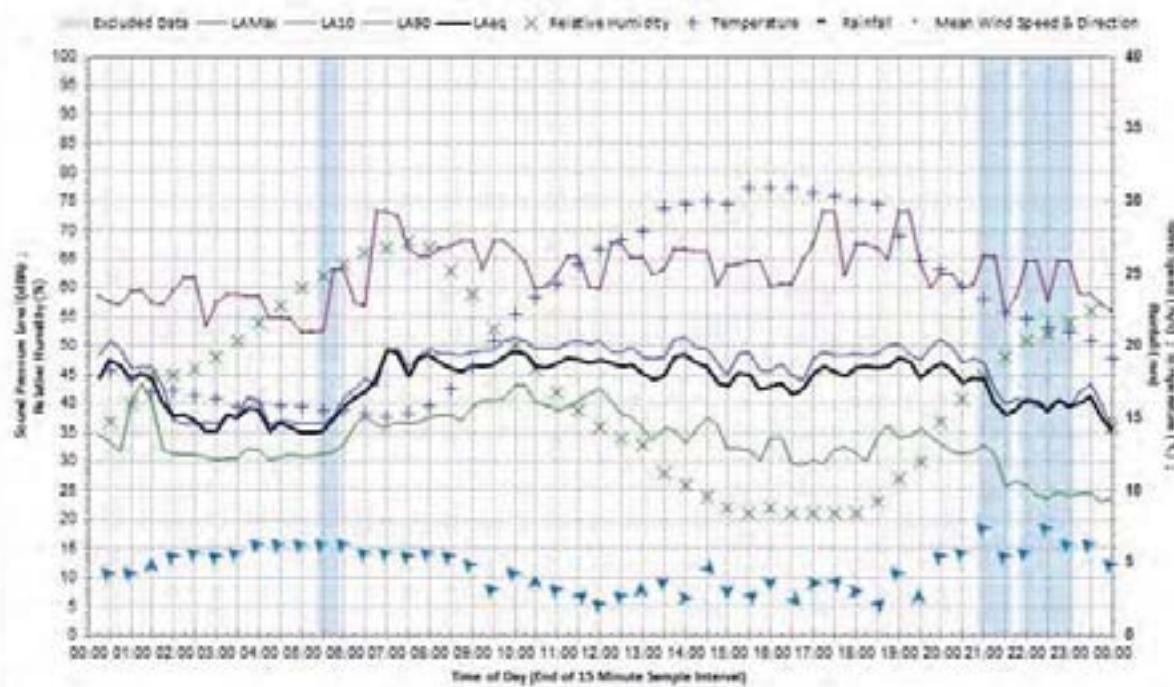
Statistical Ambient Noise Levels
Friday 18 March 2016



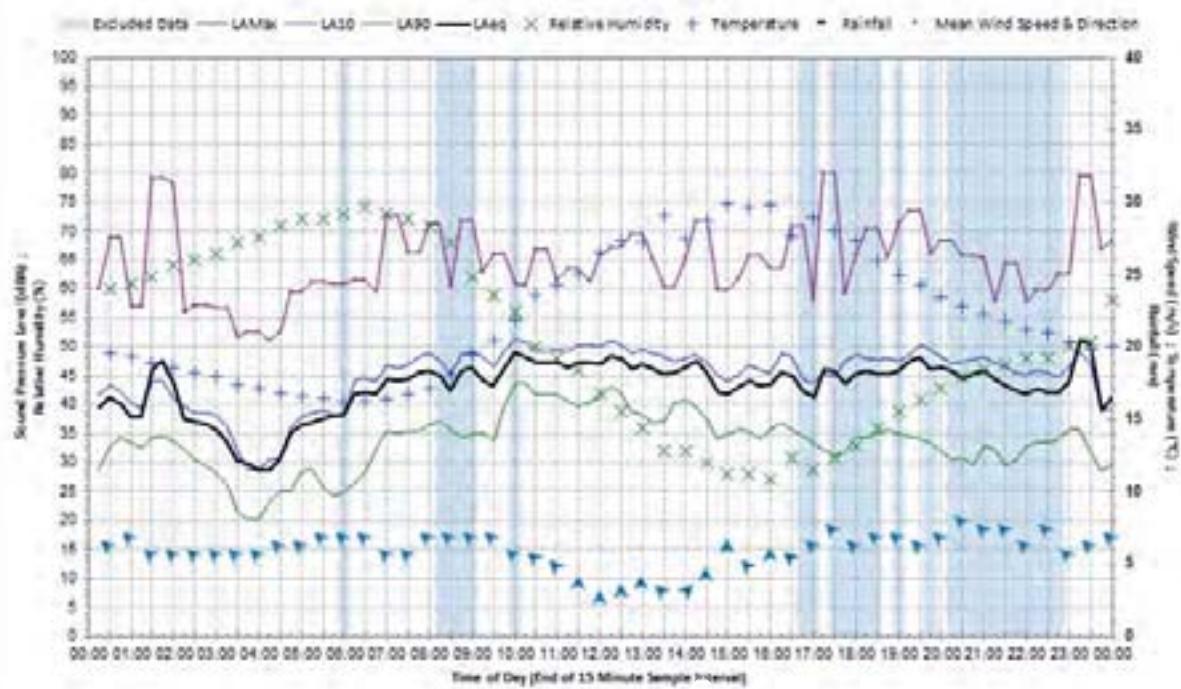
Statistical Ambient Noise Levels
Saturday 19 March 2016



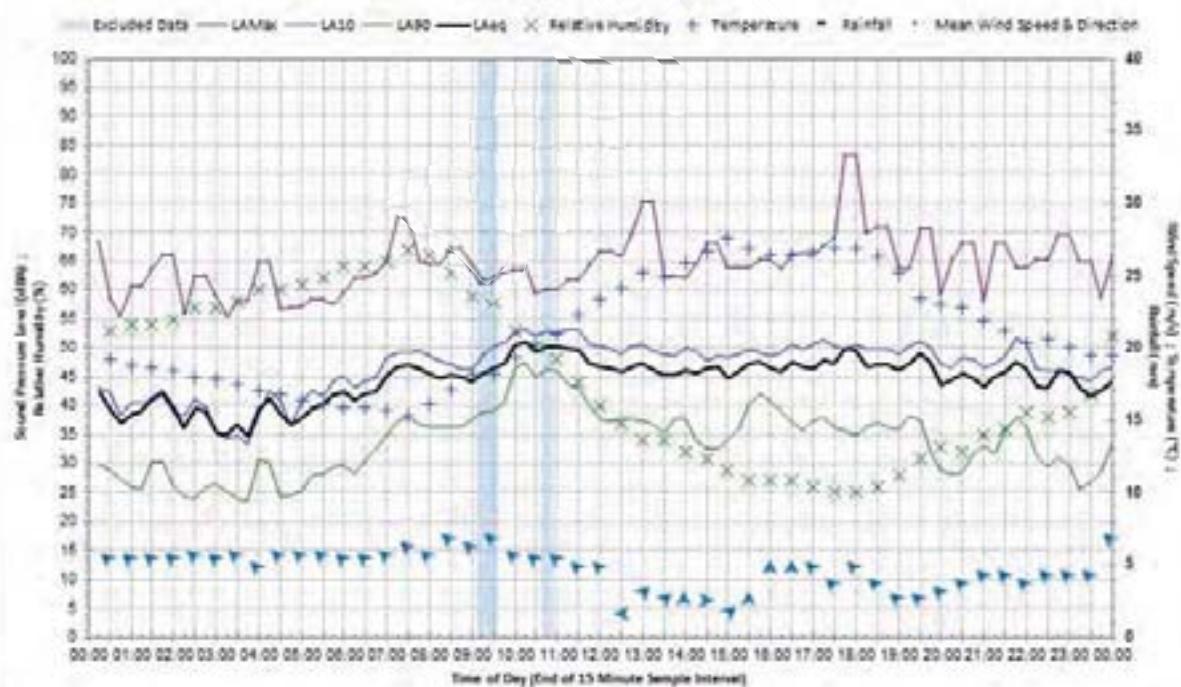
Statistical Ambient Noise Levels
Sunday 20 March 2016



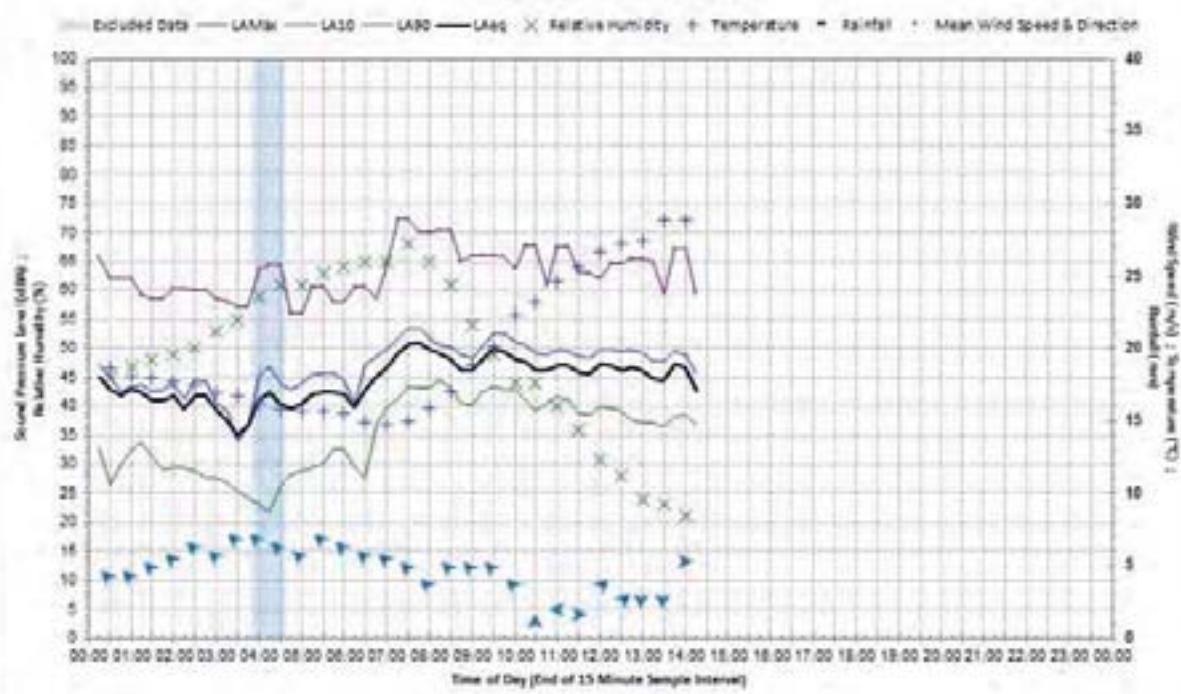
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Monday 21 March 2016



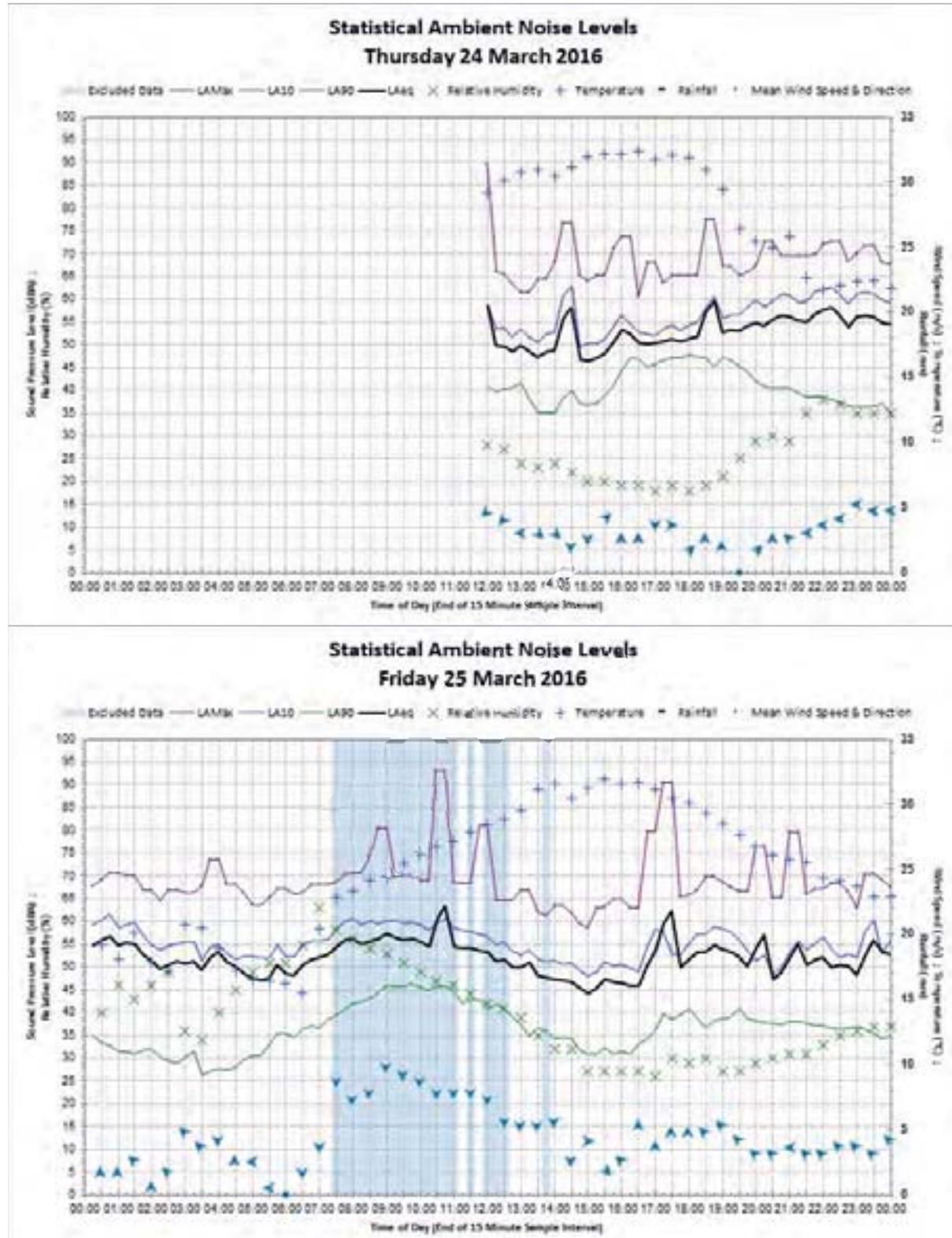
Statistical Ambient Noise Levels
Tuesday 22 March 2016



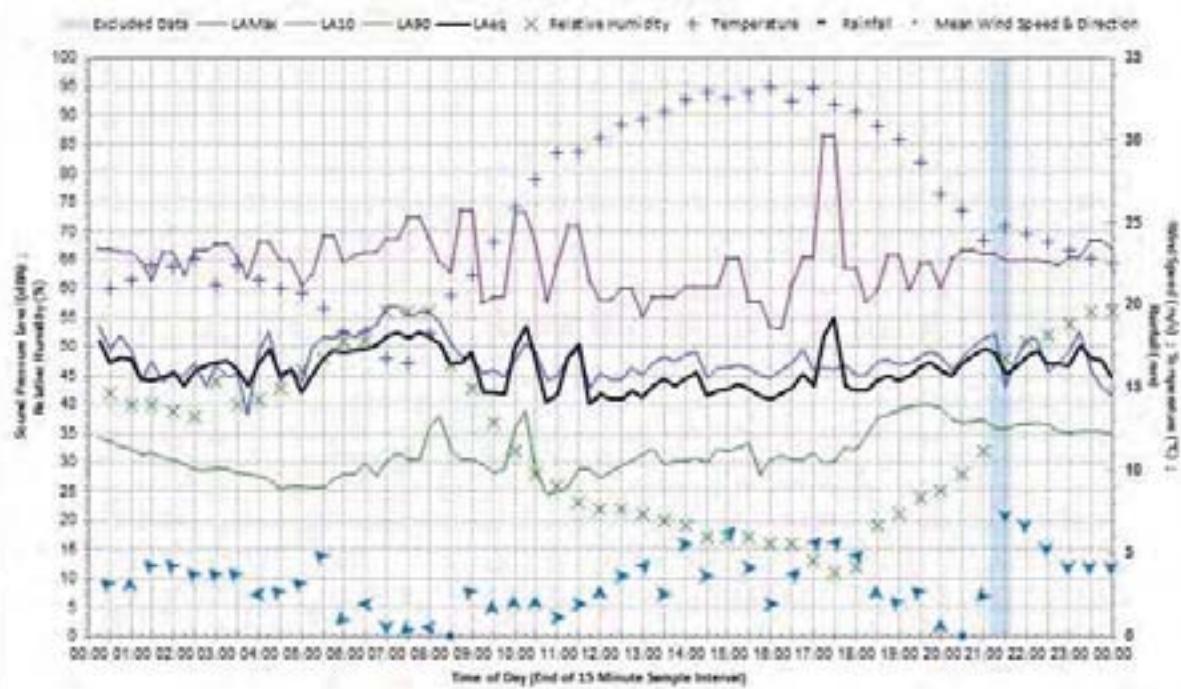
Statistical Ambient Noise Levels
Wednesday 23 March 2016



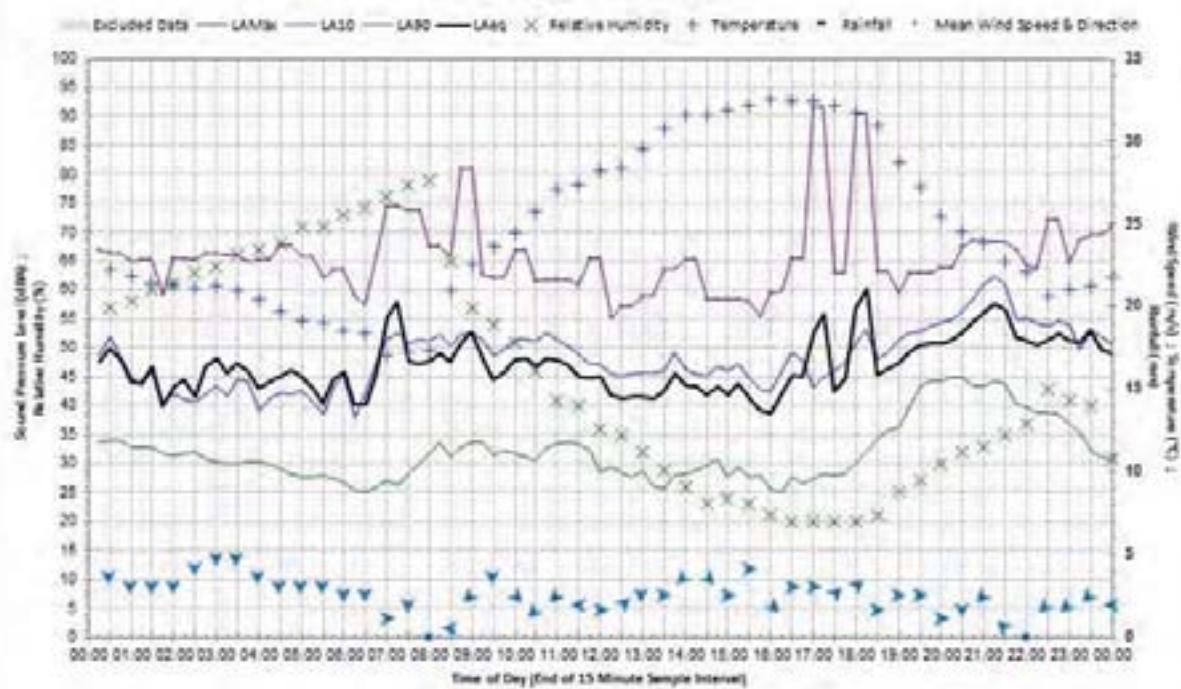
Logger L17NNS



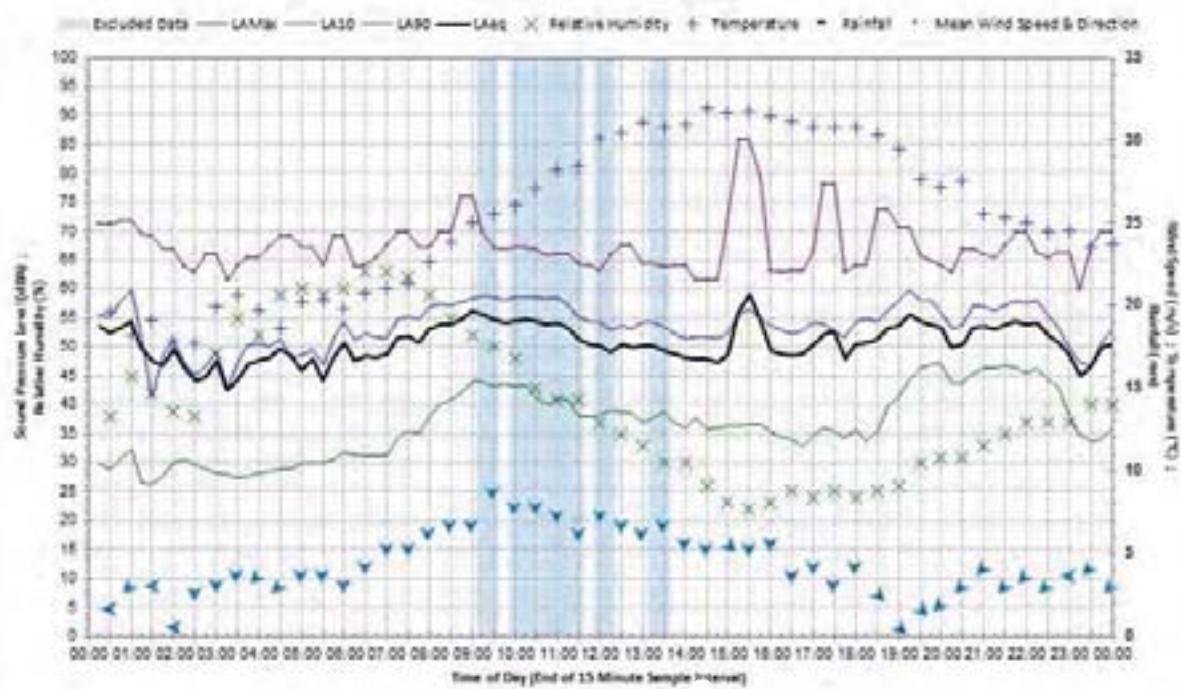
Statistical Ambient Noise Levels
Saturday 26 March 2016



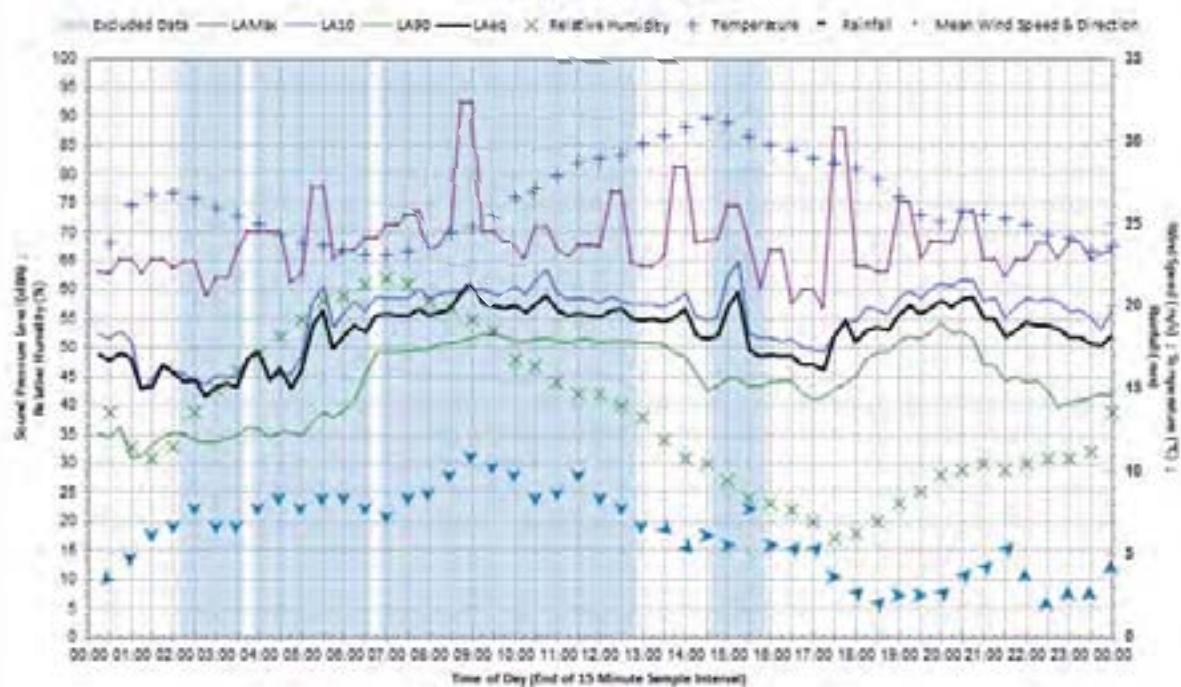
Statistical Ambient Noise Levels
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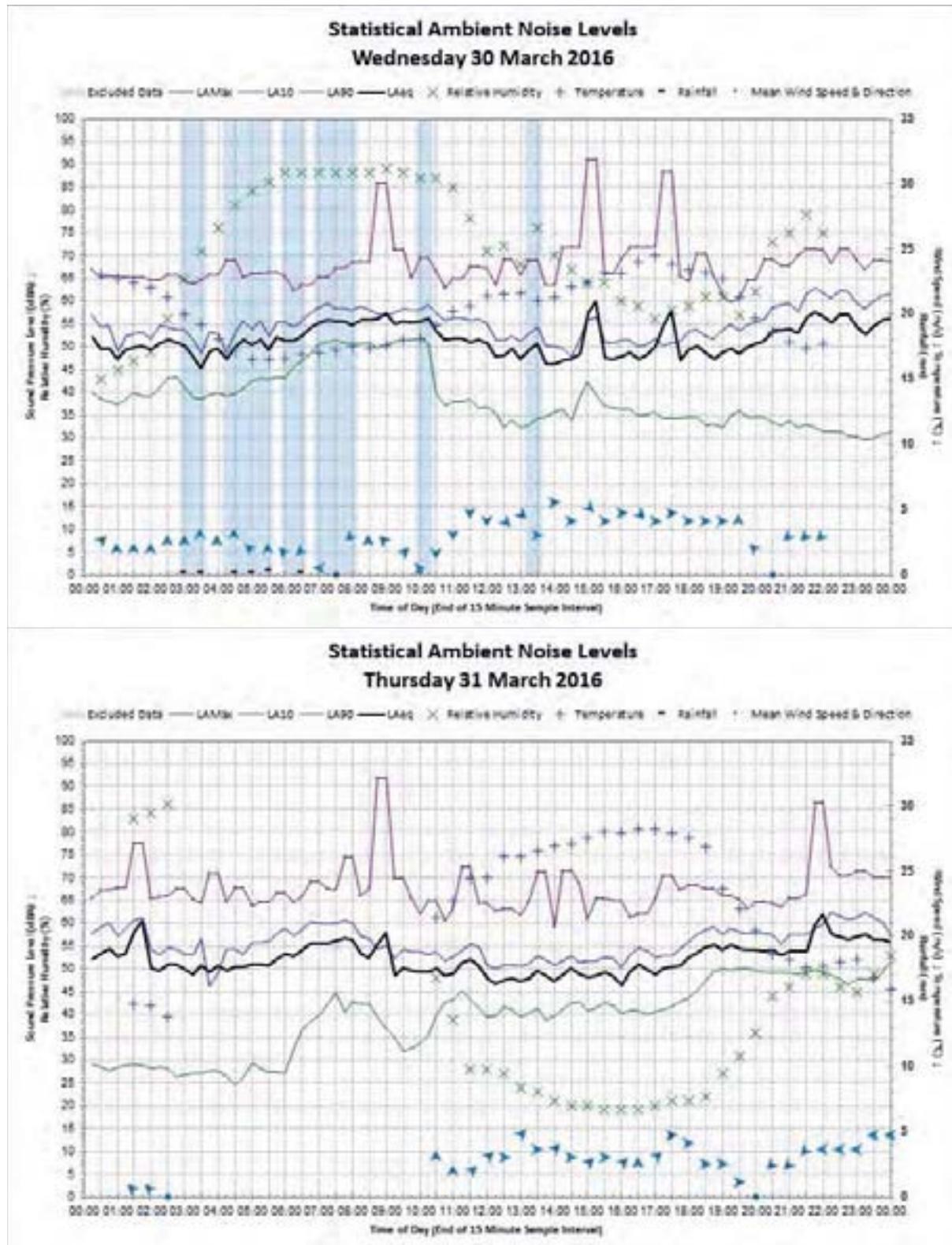


Statistical Ambient Noise Levels Monday 28 March 2016

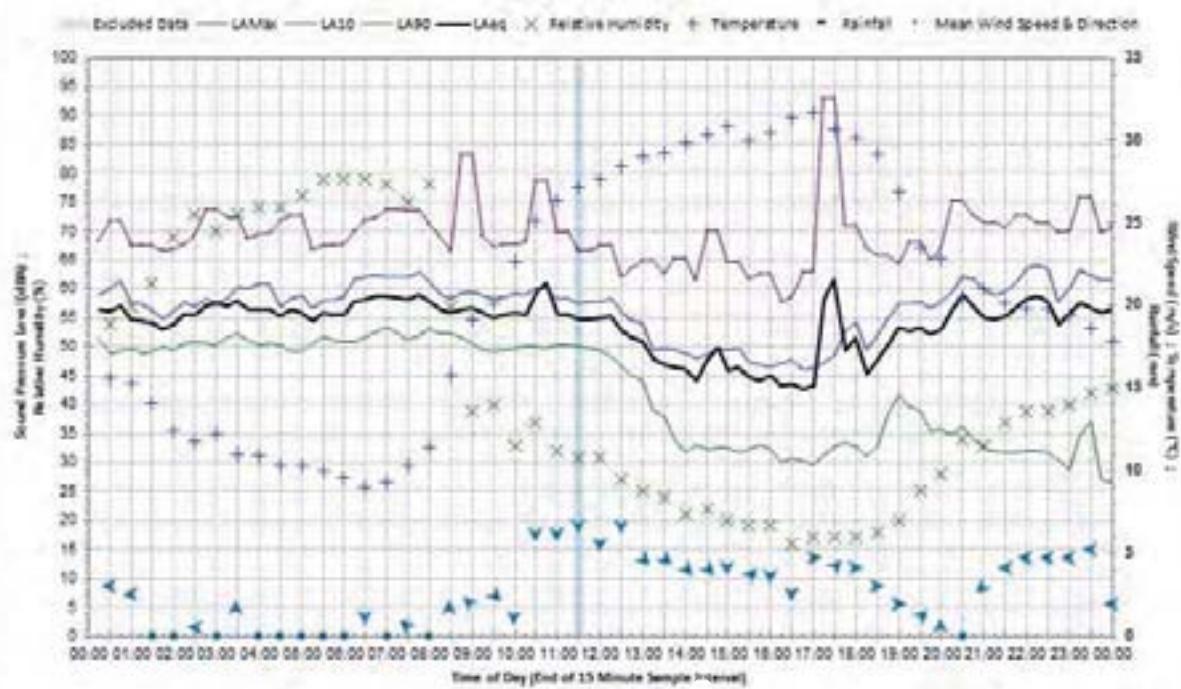


Statistical Ambient Noise Levels Tuesday 29 March 2016

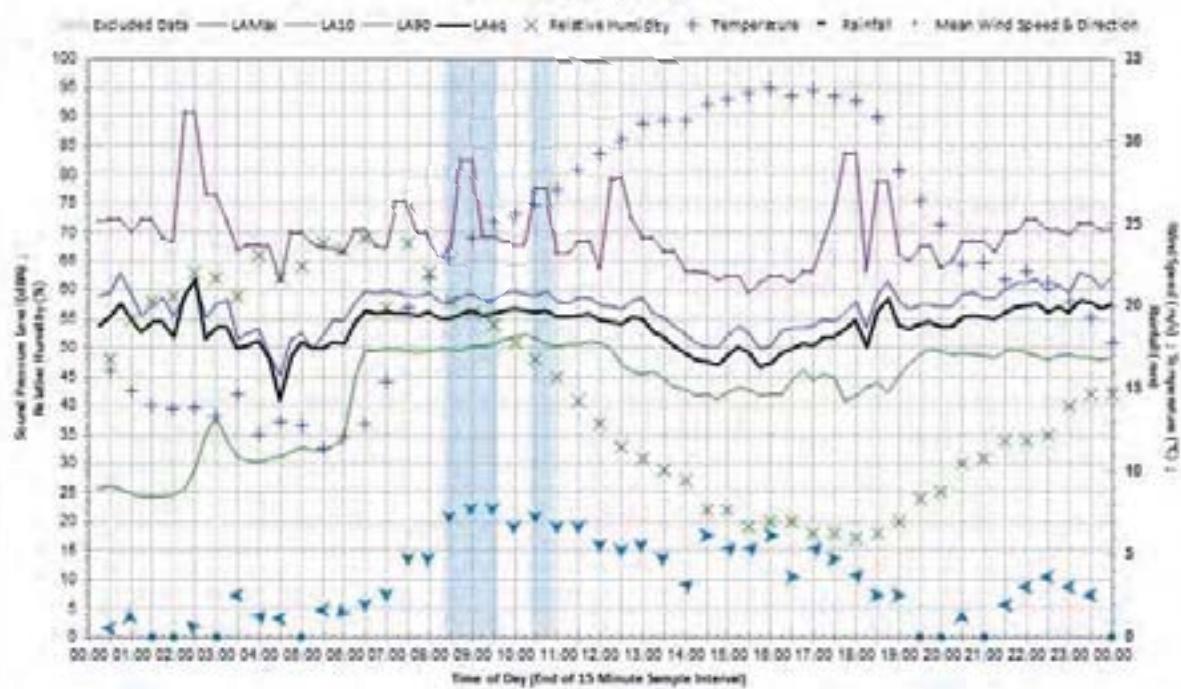




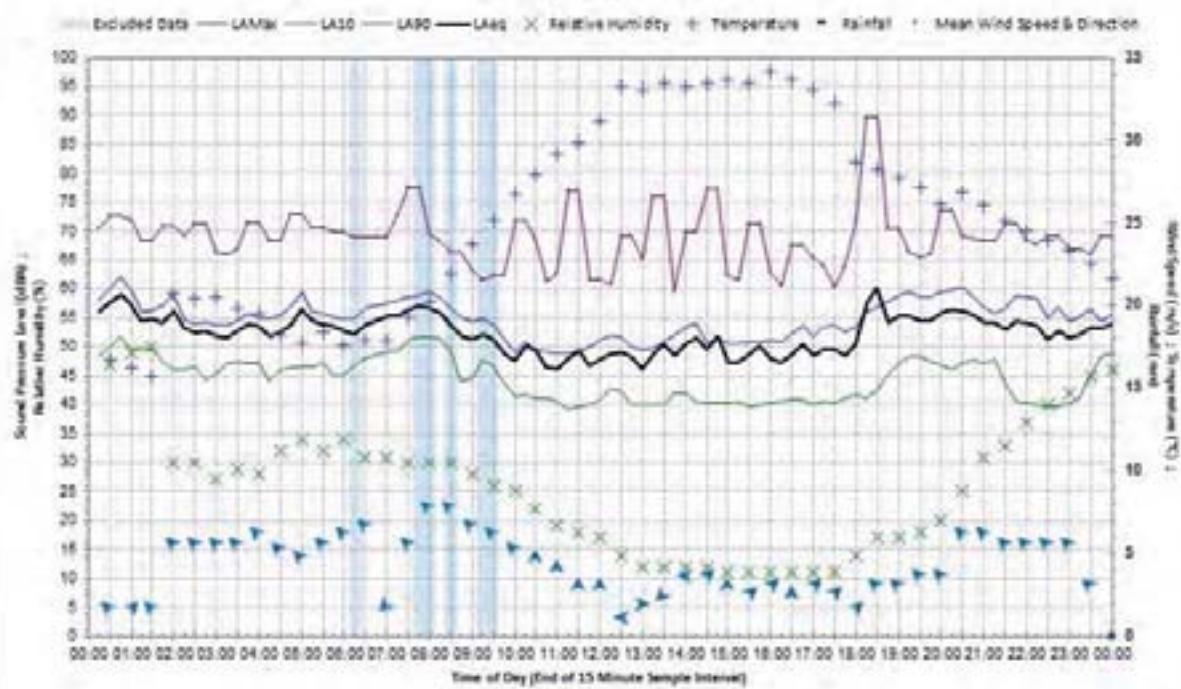
Statistical Ambient Noise Levels
Friday 1 April 2016



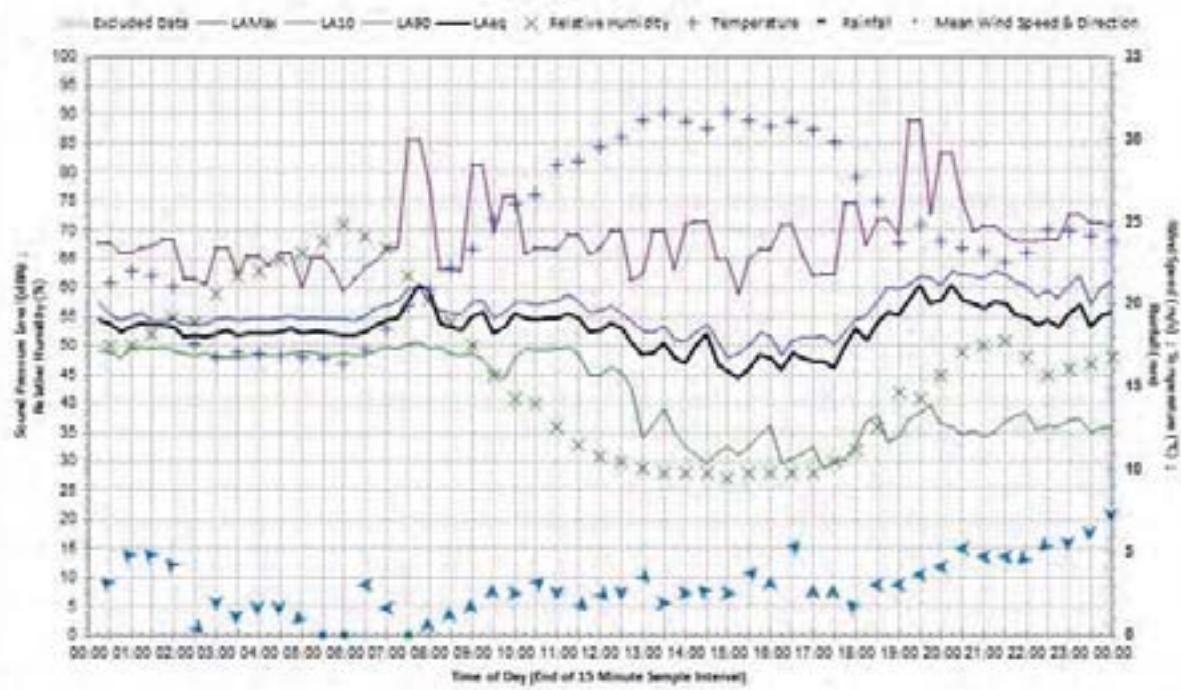
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Saturday 2 April 2016



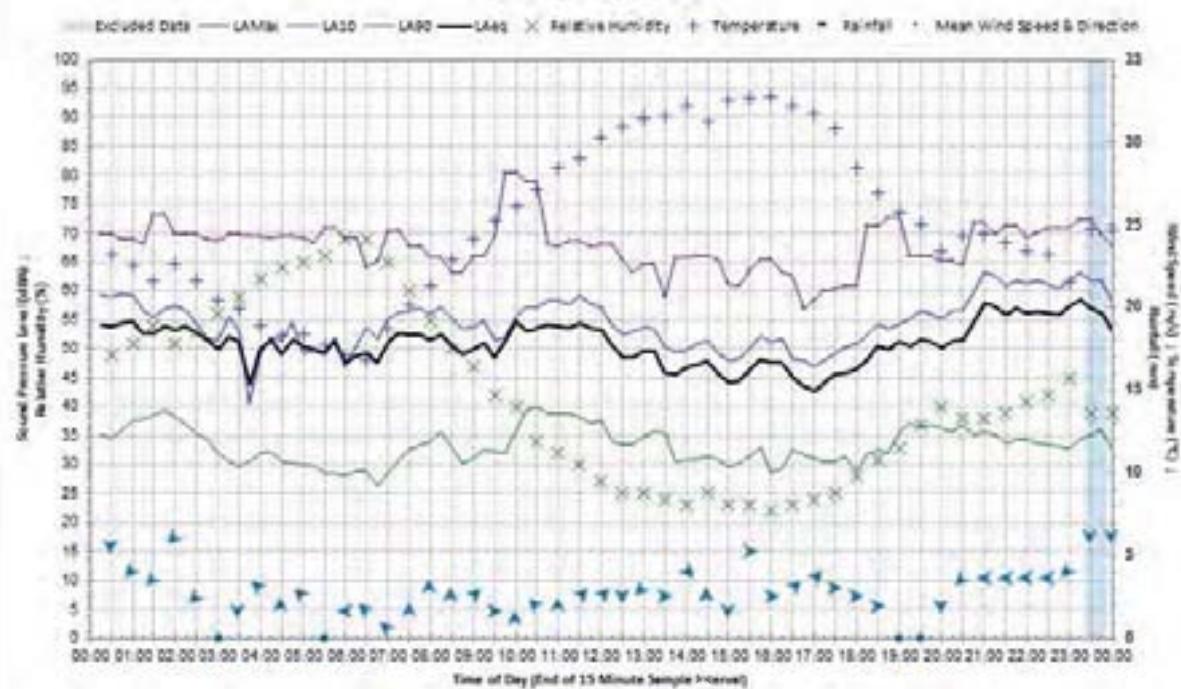
Statistical Ambient Noise Levels
Sunday 3 April 2016



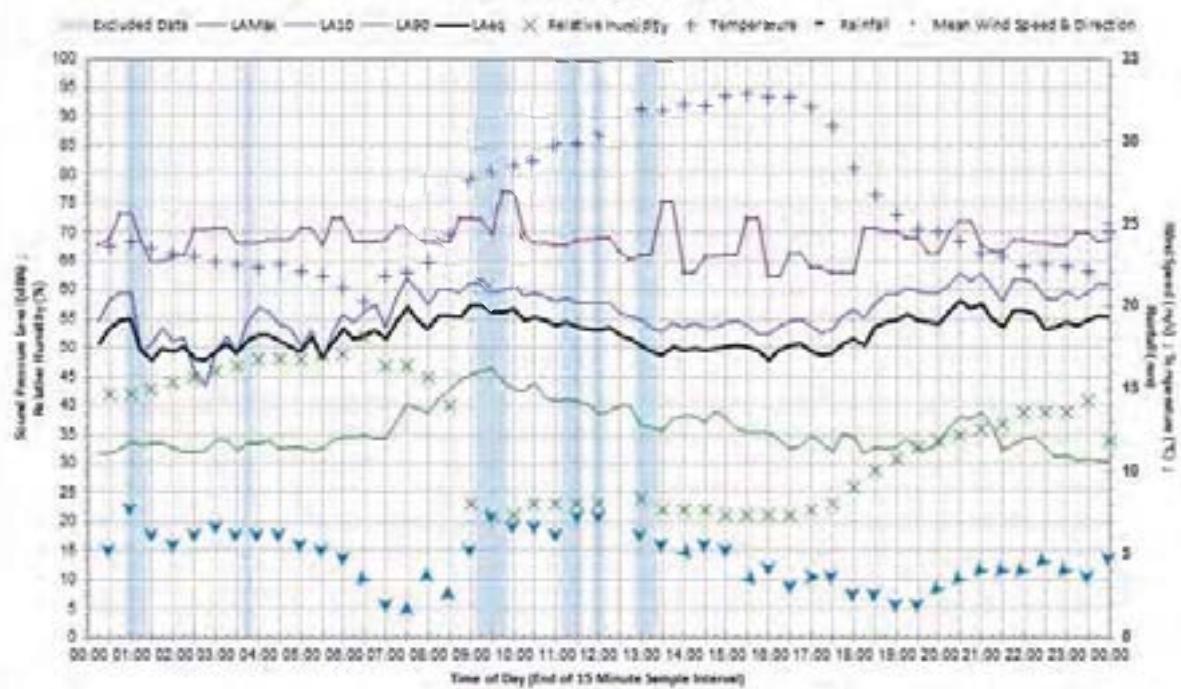
Statistical Ambient Noise Levels
Monday 4 April 2016



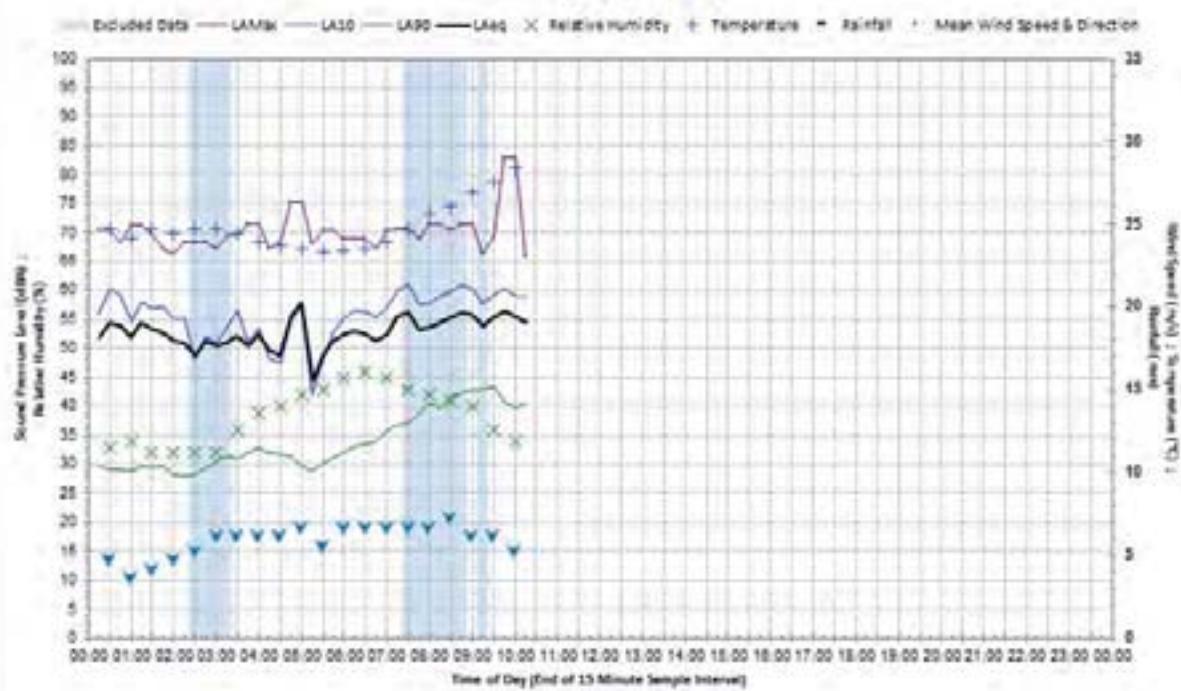
Statistical Ambient Noise Levels
Tuesday 5 April 2016



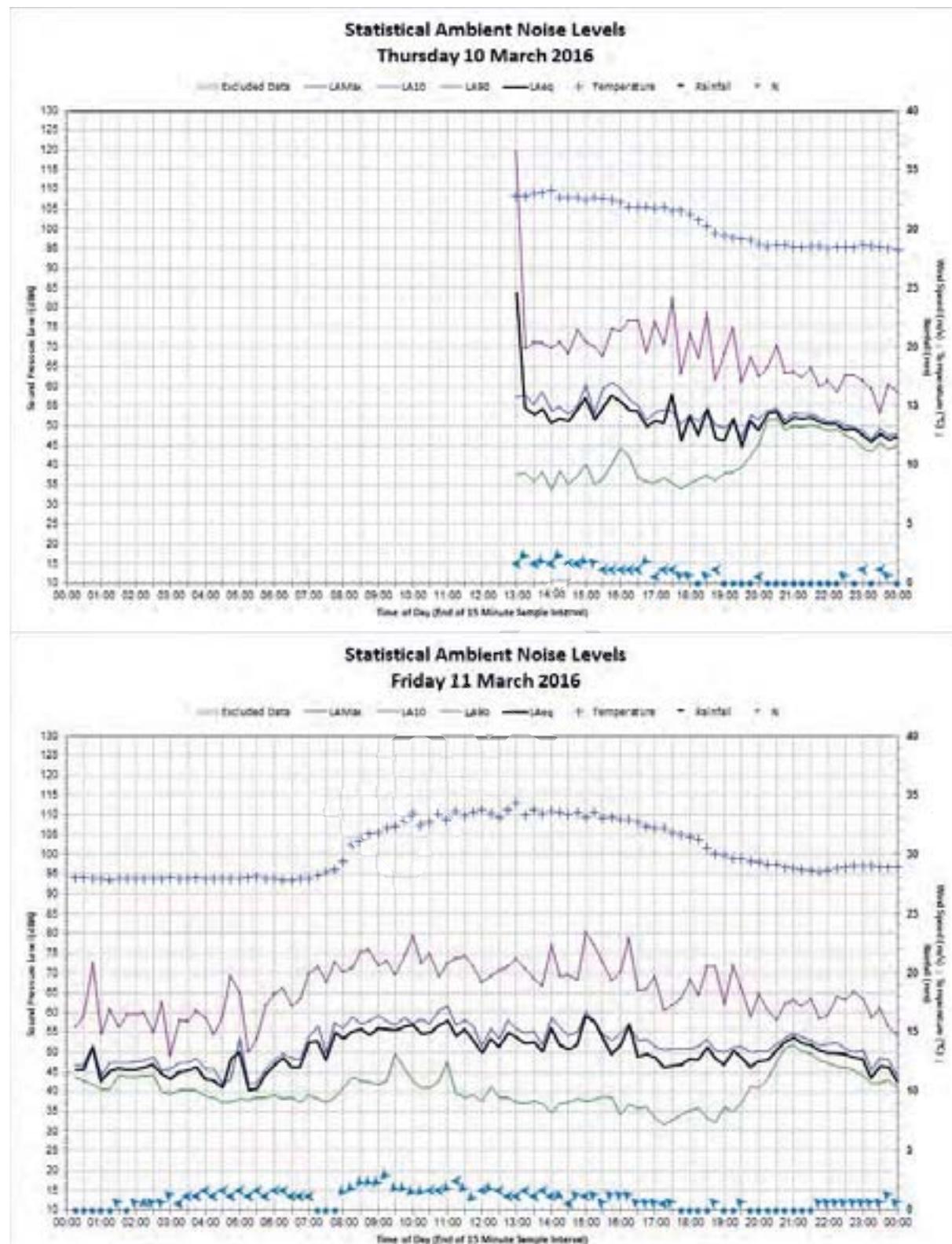
Statistical Ambient Noise Levels
Wednesday 6 April 2016



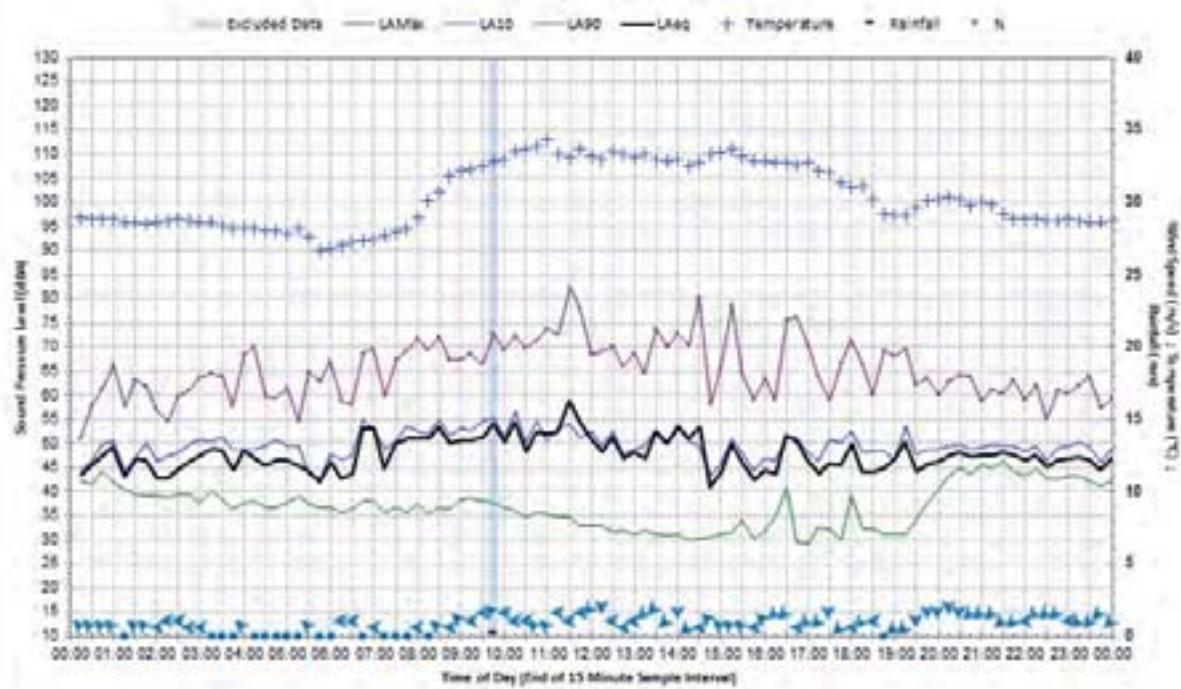
Statistical Ambient Noise Levels
Thursday 7 April 2016



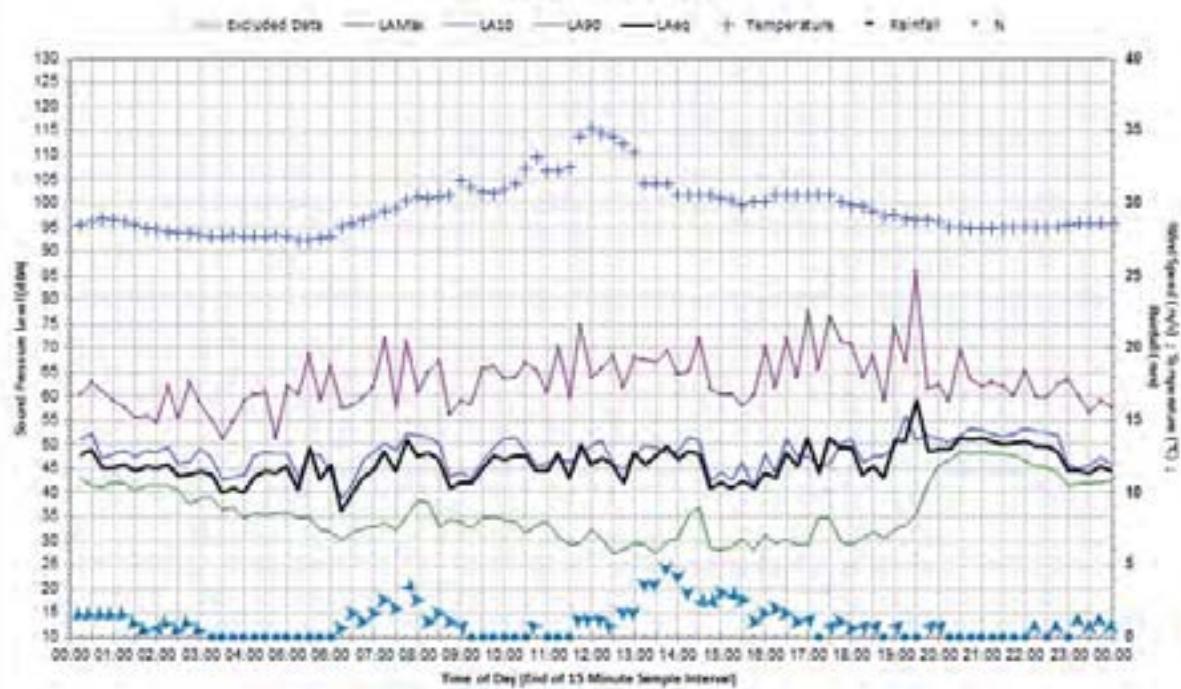
Logger L18NNS



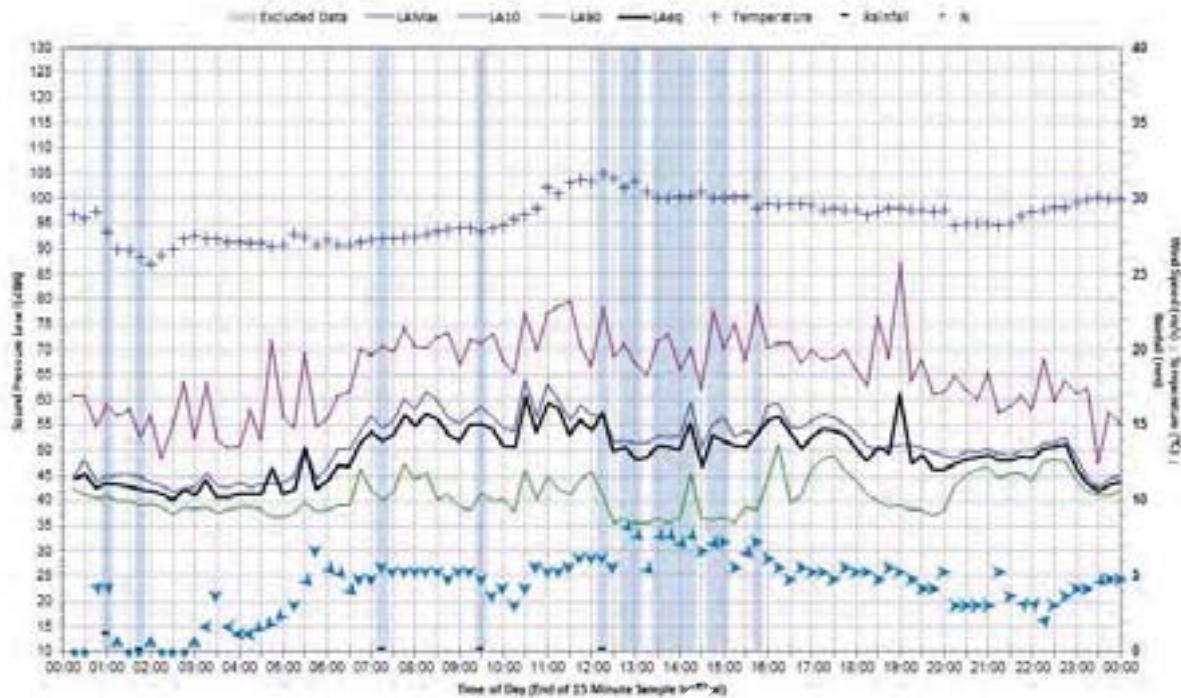
Statistical Ambient Noise Levels
Saturday 12 March 2016



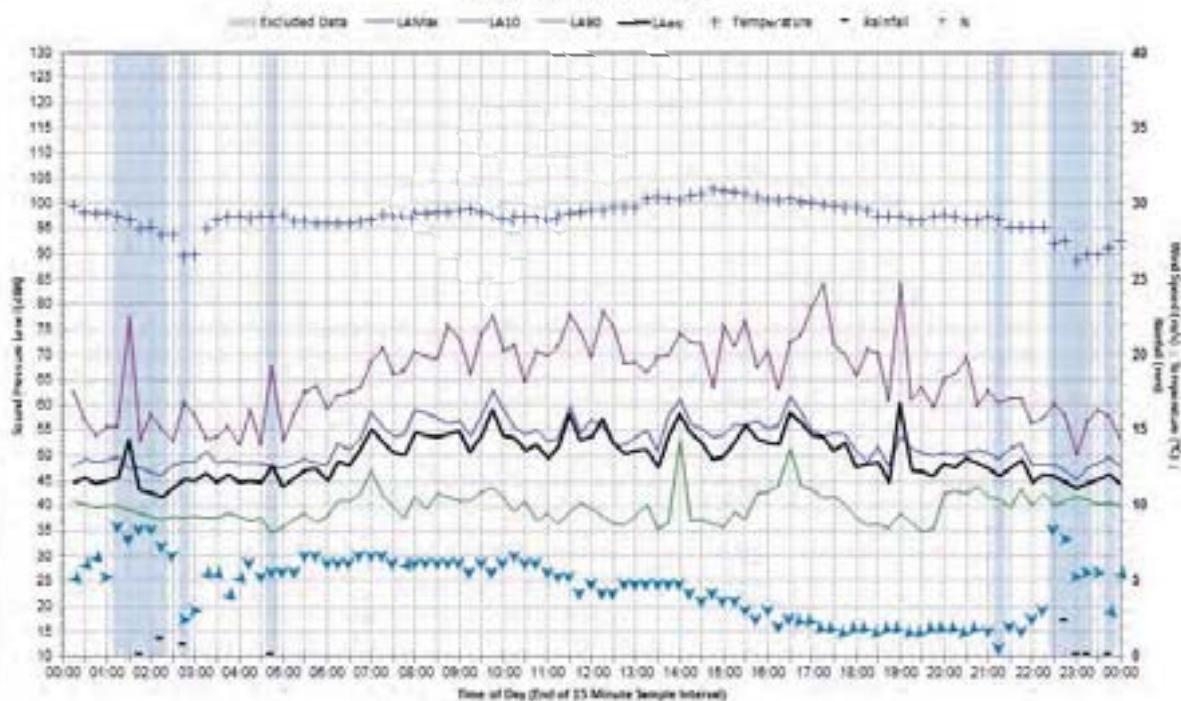
Statistical Ambient Noise Levels
Sunday 13 March 2016



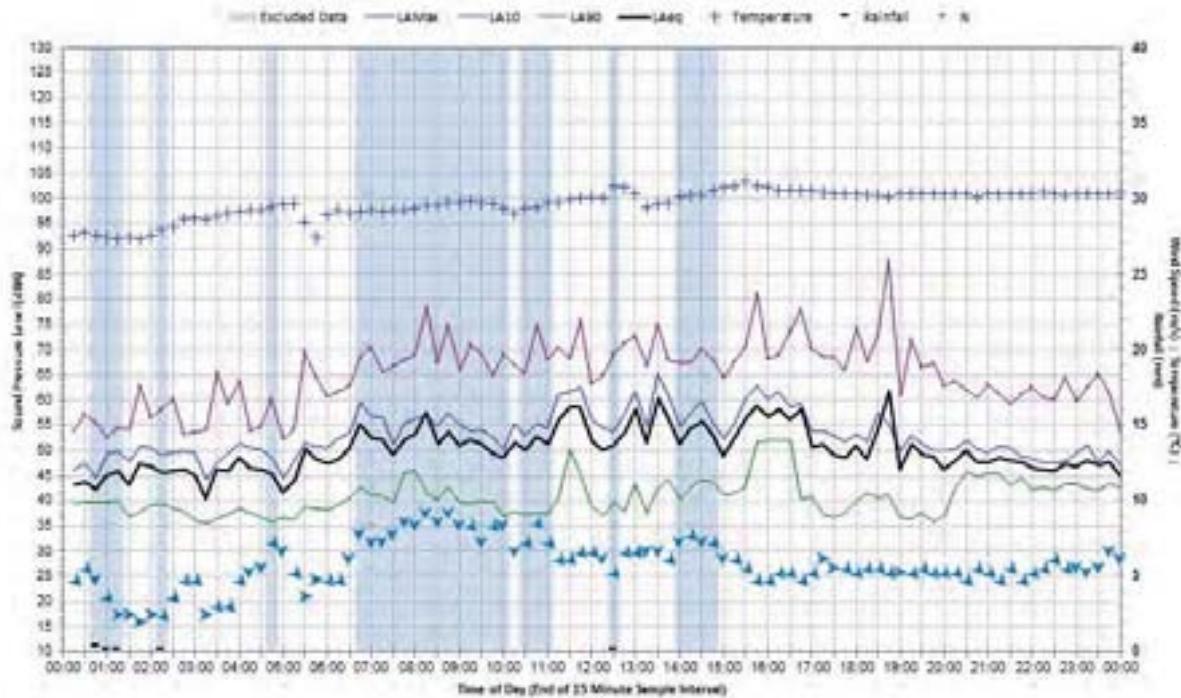
Statistical Ambient Noise Levels
Monday 14 March 2016



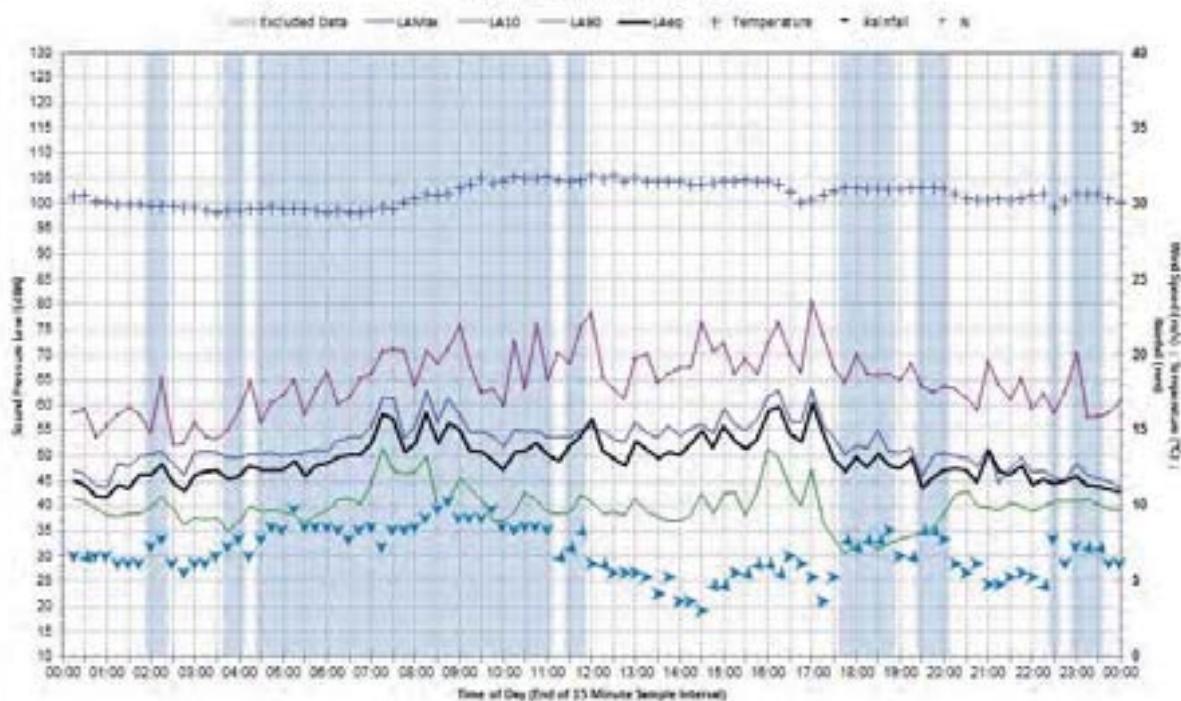
Statistical Ambient Noise Levels
Tuesday 15 March 2016



Statistical Ambient Noise Levels
Wednesday 16 March 2016

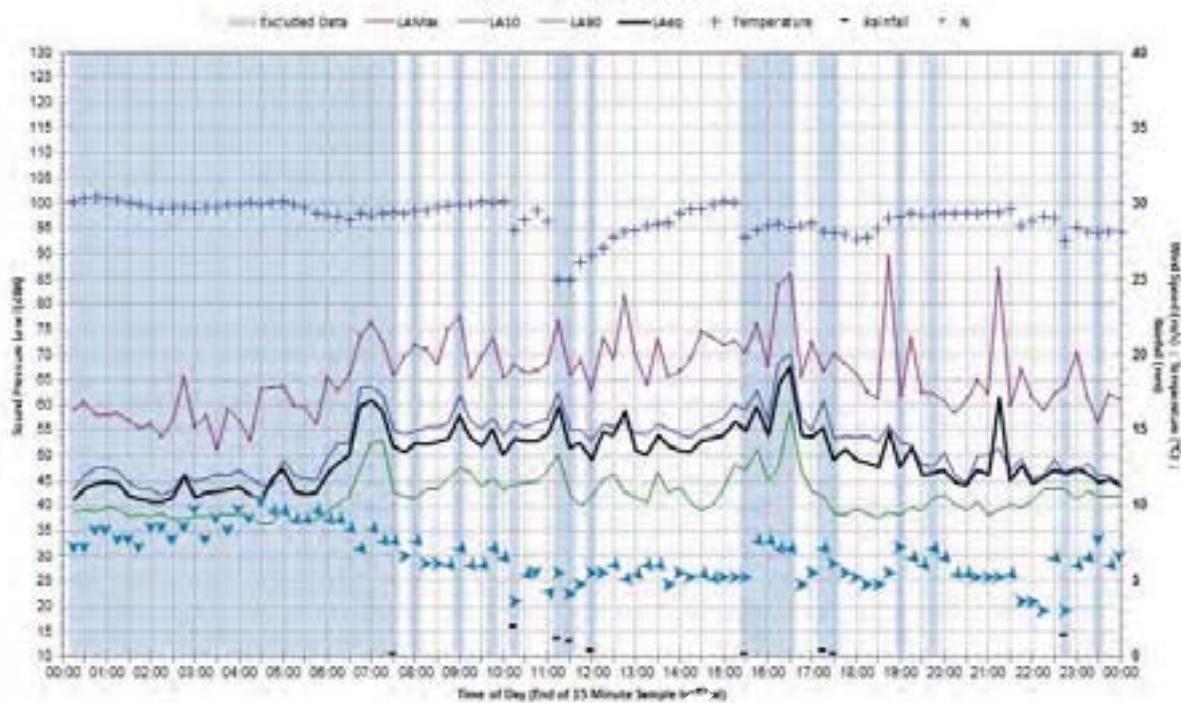


Statistical Ambient Noise Levels
Thursday 17 March 2016



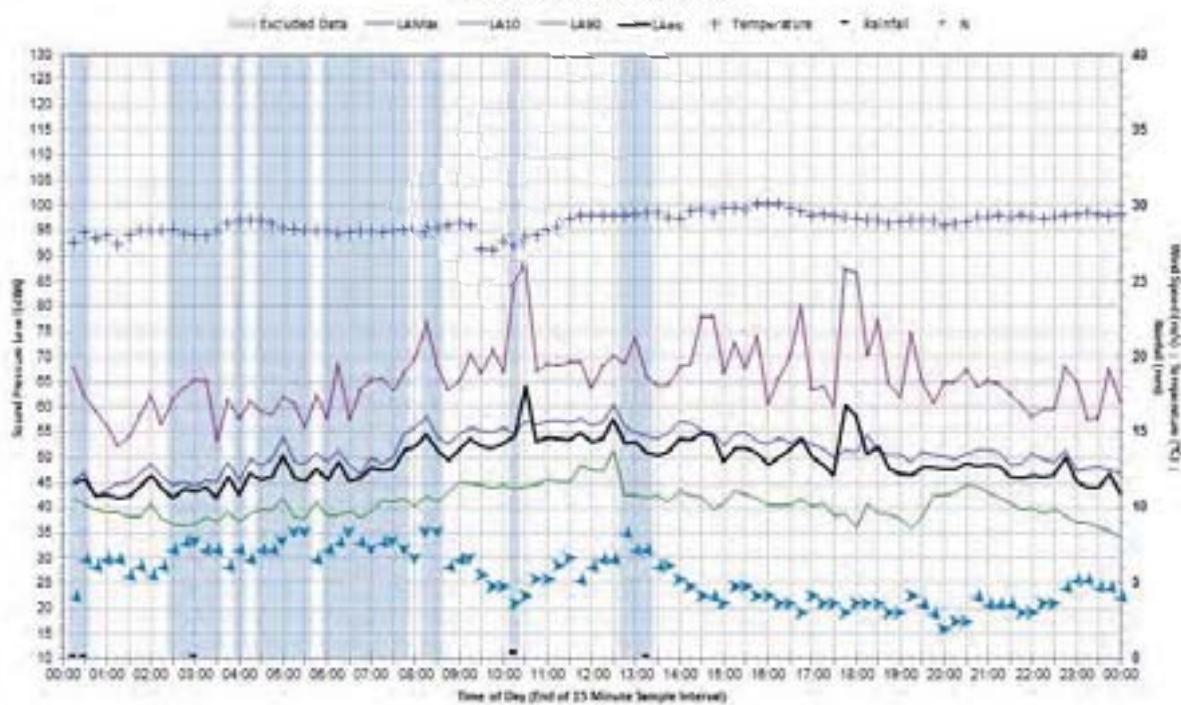
Statistical Ambient Noise Levels

Friday 18 March 2016

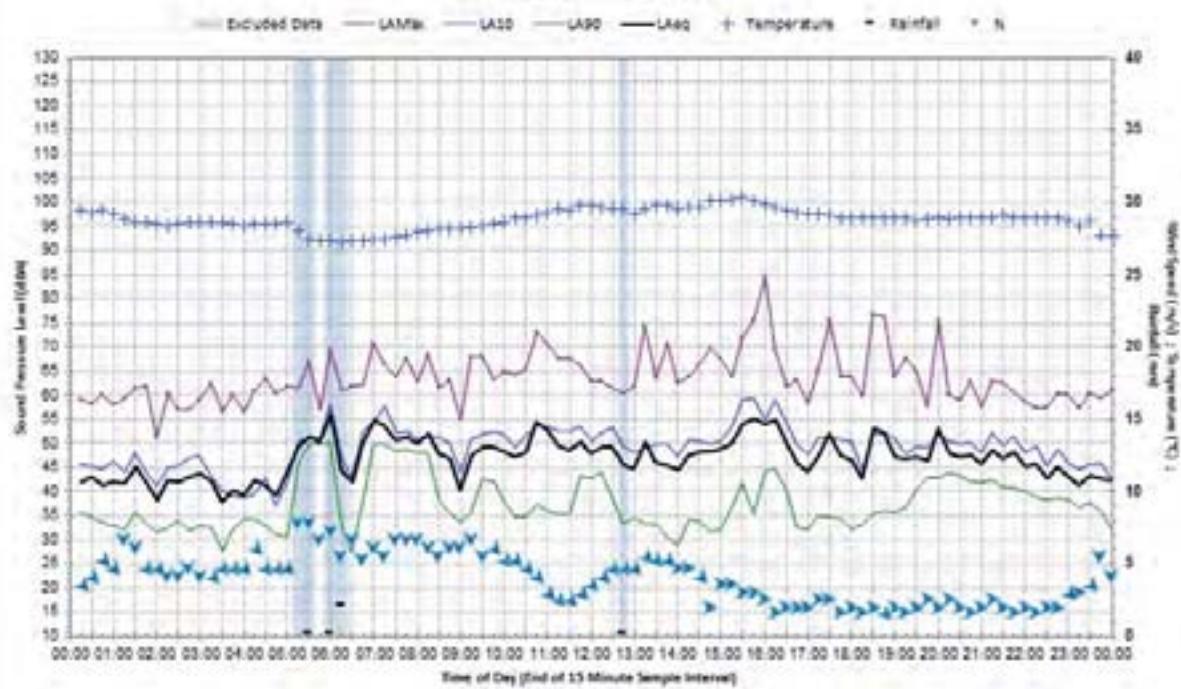


Statistical Ambient Noise Levels

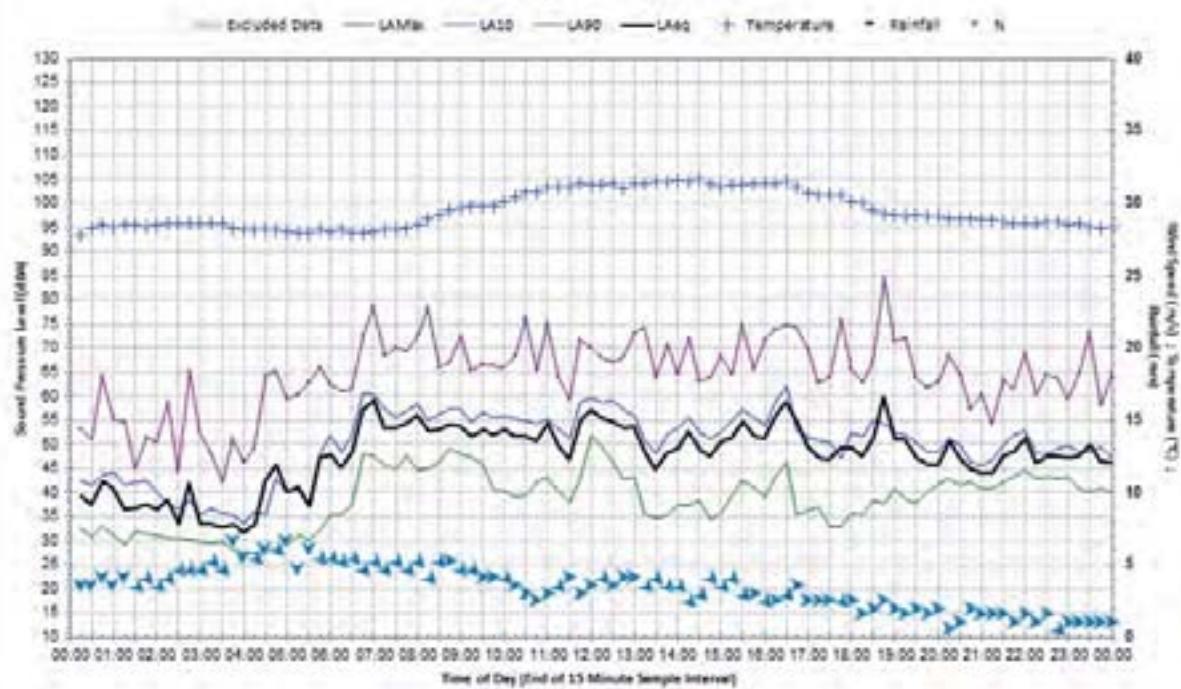
Saturday 19 March 2016



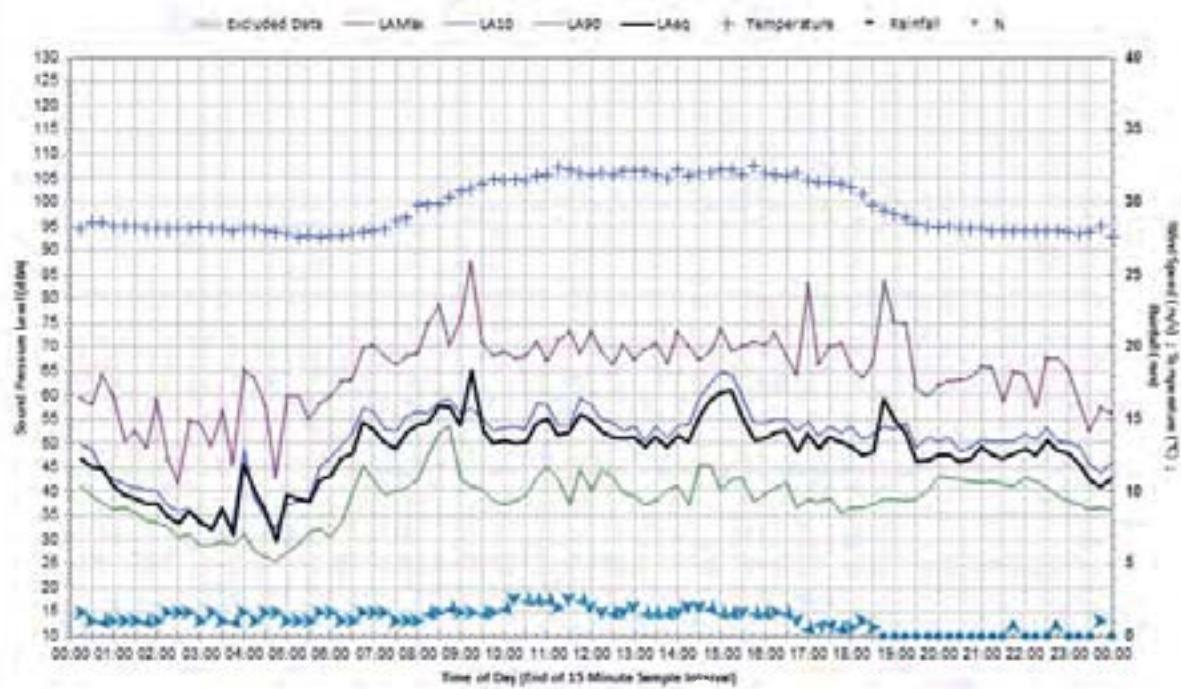
Statistical Ambient Noise Levels
Sunday 20 March 2016



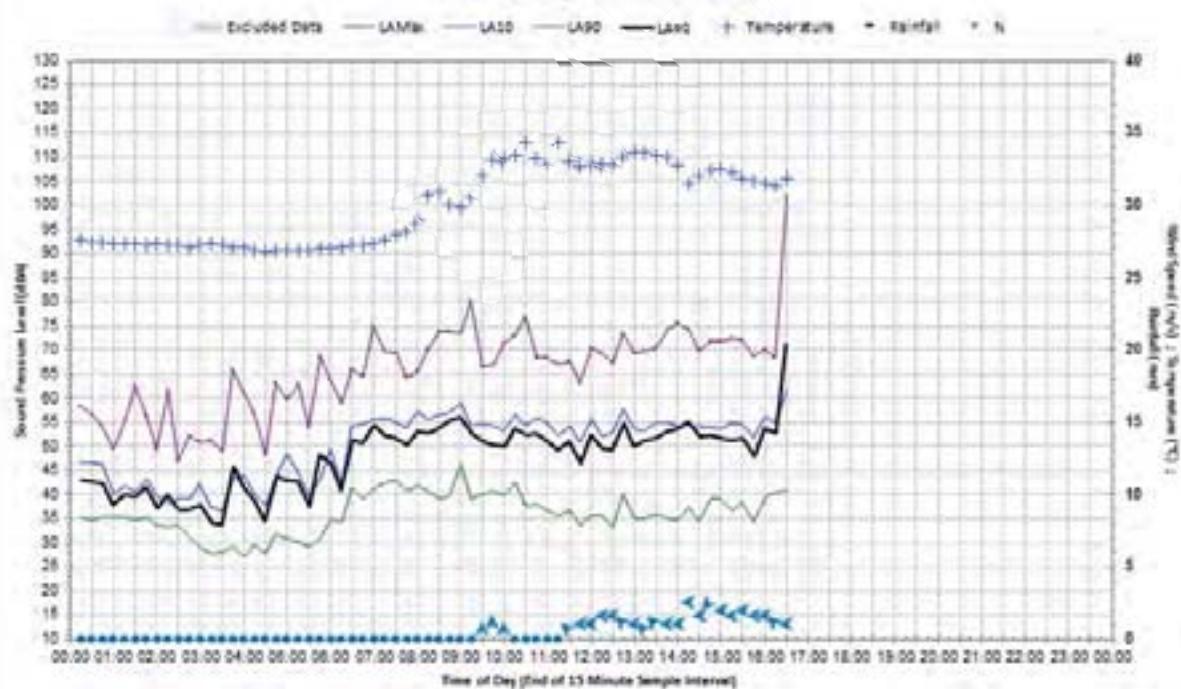
Statistical Ambient Noise Levels
Monday 21 March 2016



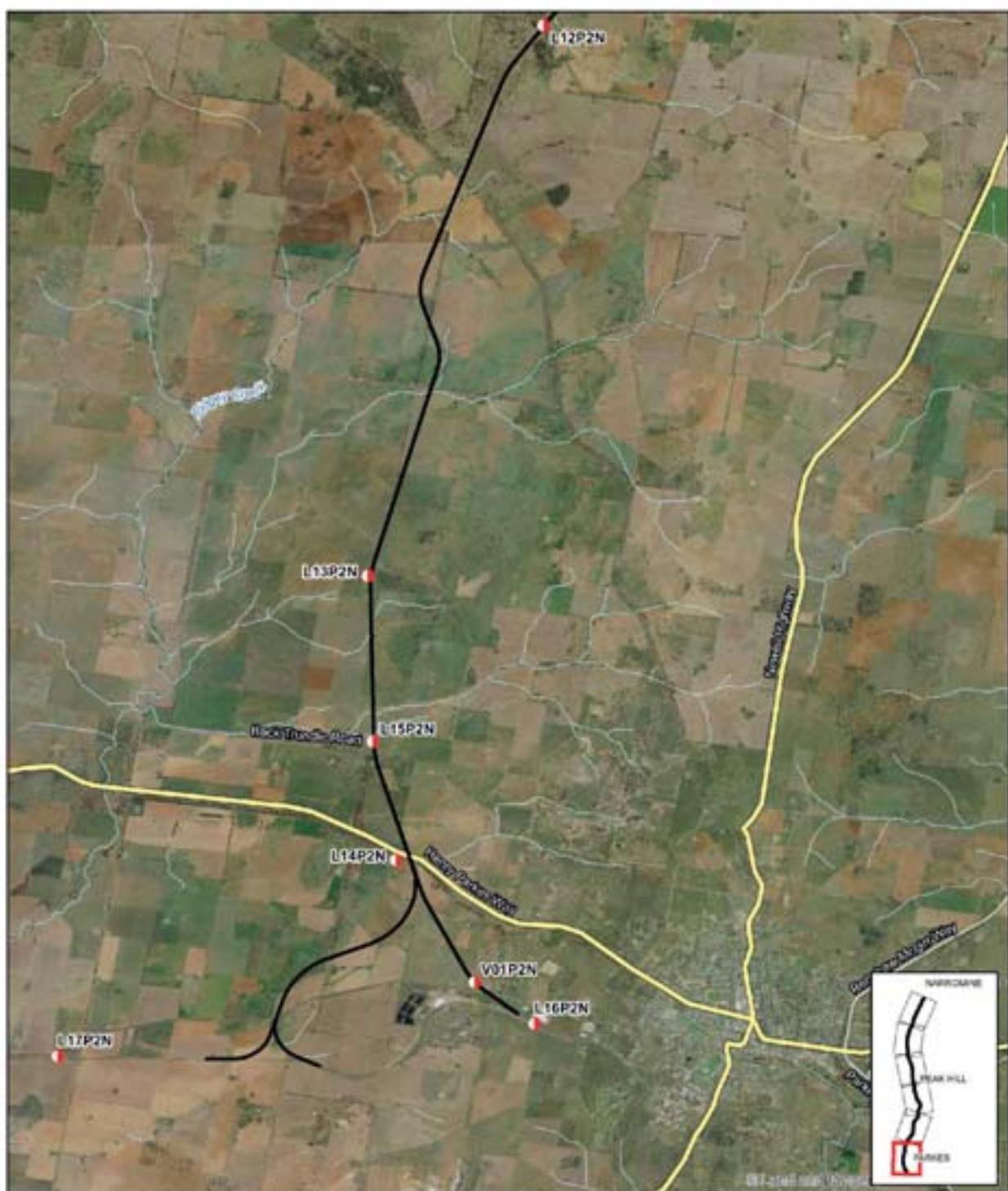
Statistical Ambient Noise Levels Tuesday 22 March 2016



Statistical Ambient Noise Levels Wednesday 23 March 2016



Appendix B – Monitoring locations



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
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Horizontal Datum: 100M 1994
Grid: GCS 2000



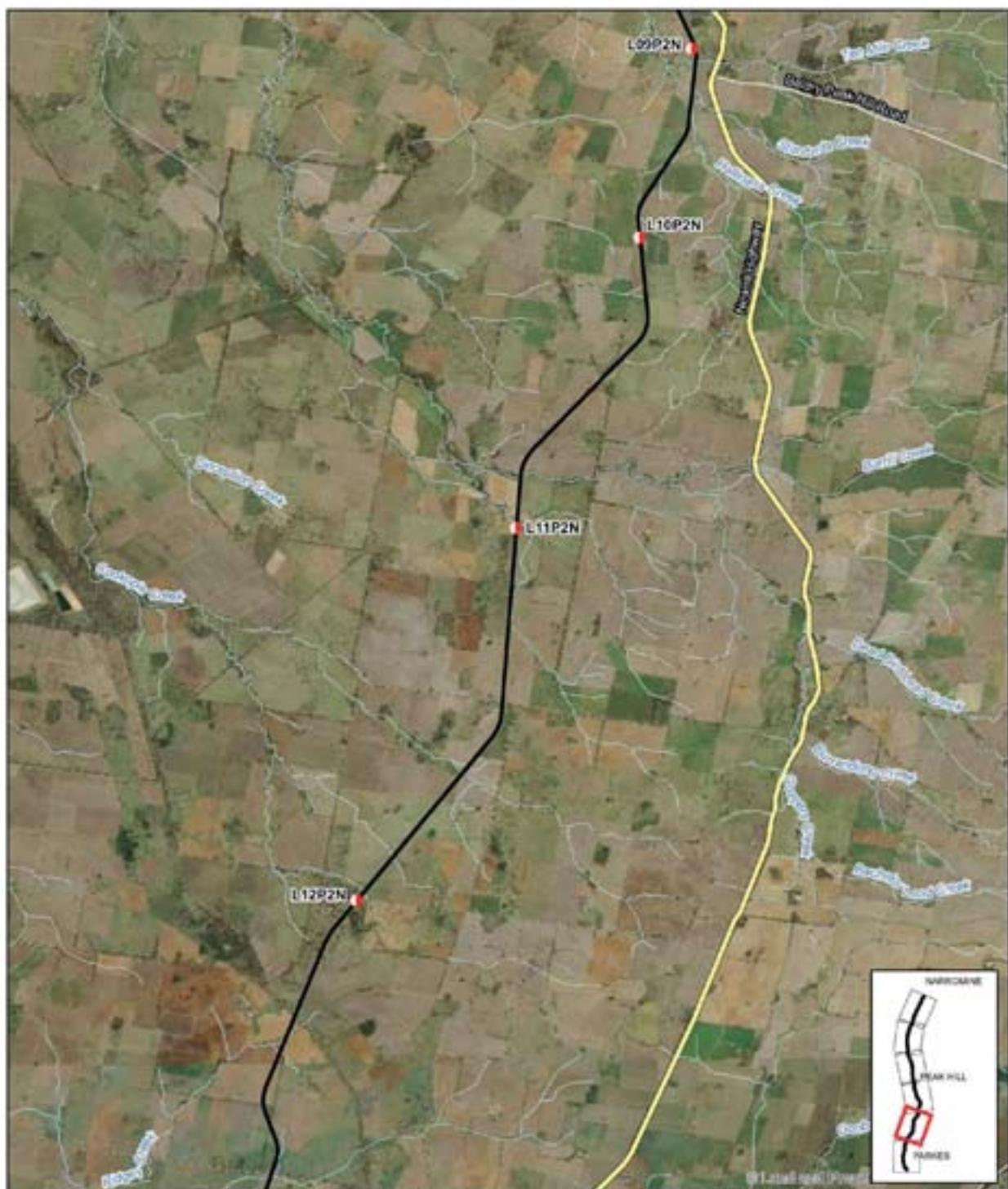
Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 1

© 2012 GHD. All rights reserved. P:\DR\Rock\221791\1\A01\1_P2N_LoggerLocations.Dwg
Level 3, GHD Tower, 24 Honeywood Drive, NSW 2320 1312 4379 0000 & 1312 4379 0100 | www.ghd.com.au
© 2012. While every care has been taken to construct this map, GHD, ARTC and LPI make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability or responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damages) which are or may be incurred by any party as a result of the mapping, inaccurate, incomplete or unavailable in any way and for any reason.
Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
0 400 800 1,200 1,600 2,000 2,400
Horizontal Datum: 1984 GDA
Grid: GCS GDA1984
Metres



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

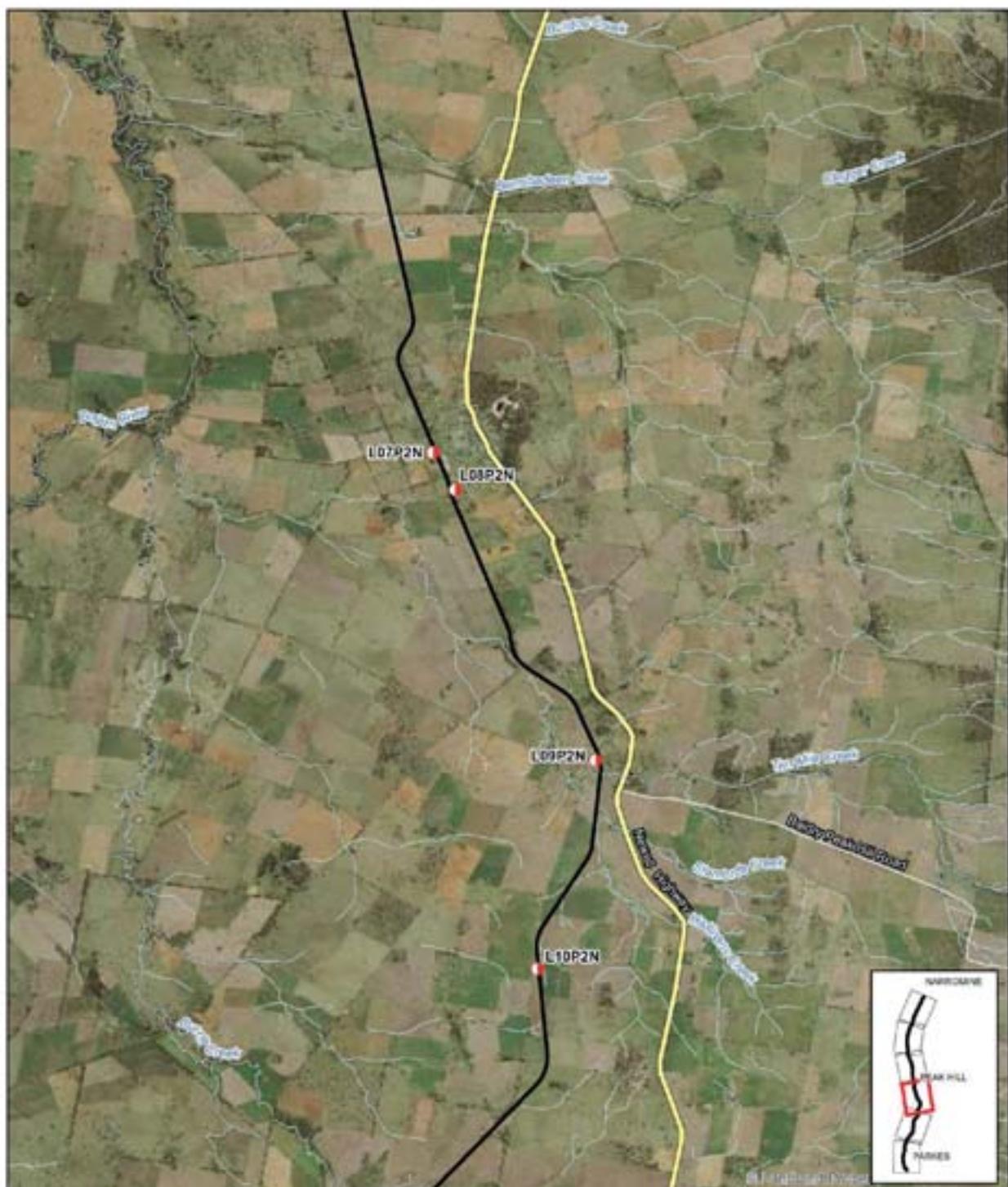
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 2

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
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Horizontal Datum: 100M 1994
Grid: GCS 2000



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

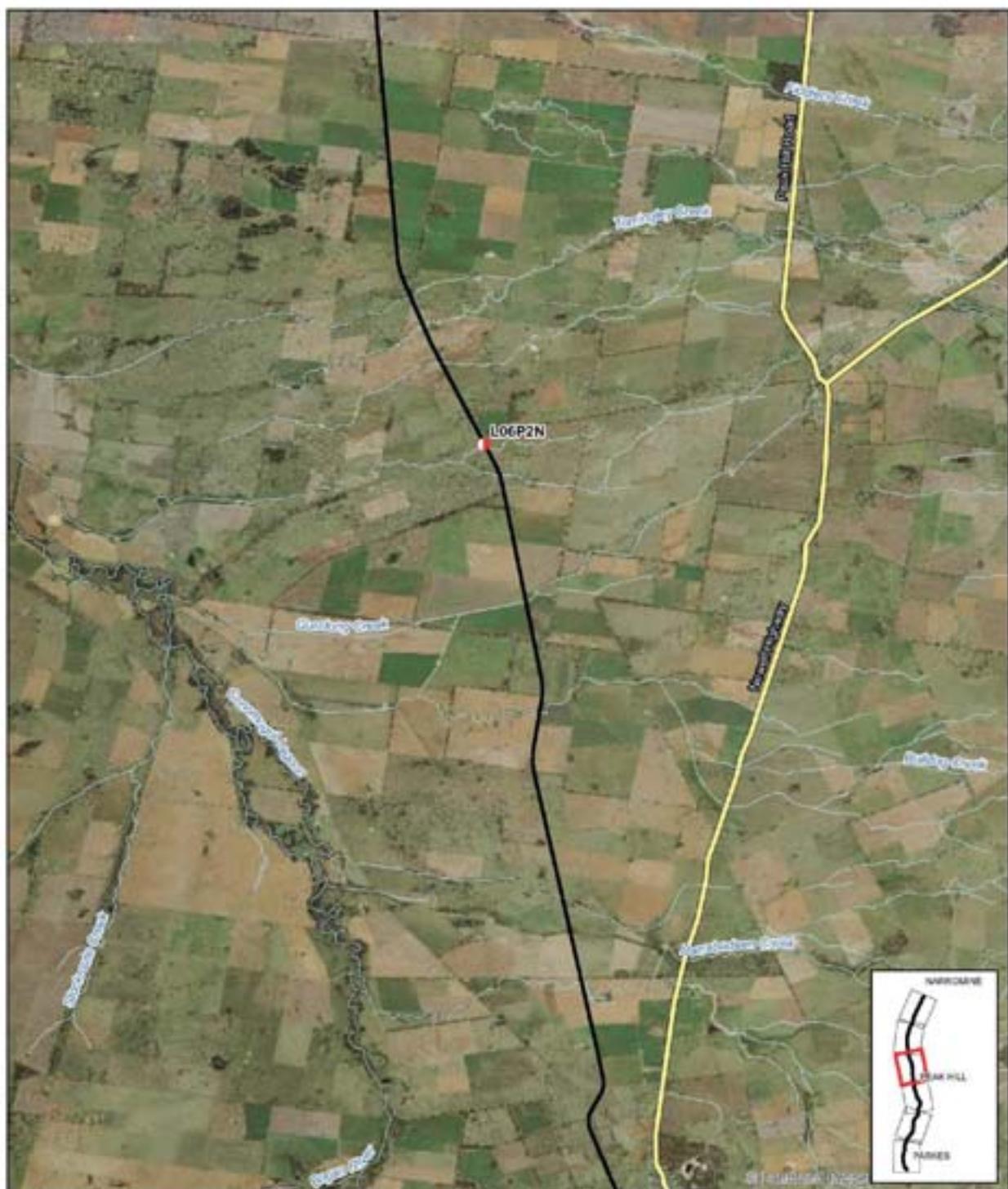
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 3

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
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Horizontal Datum: 1984 NSR
Grid: GCS 2000



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

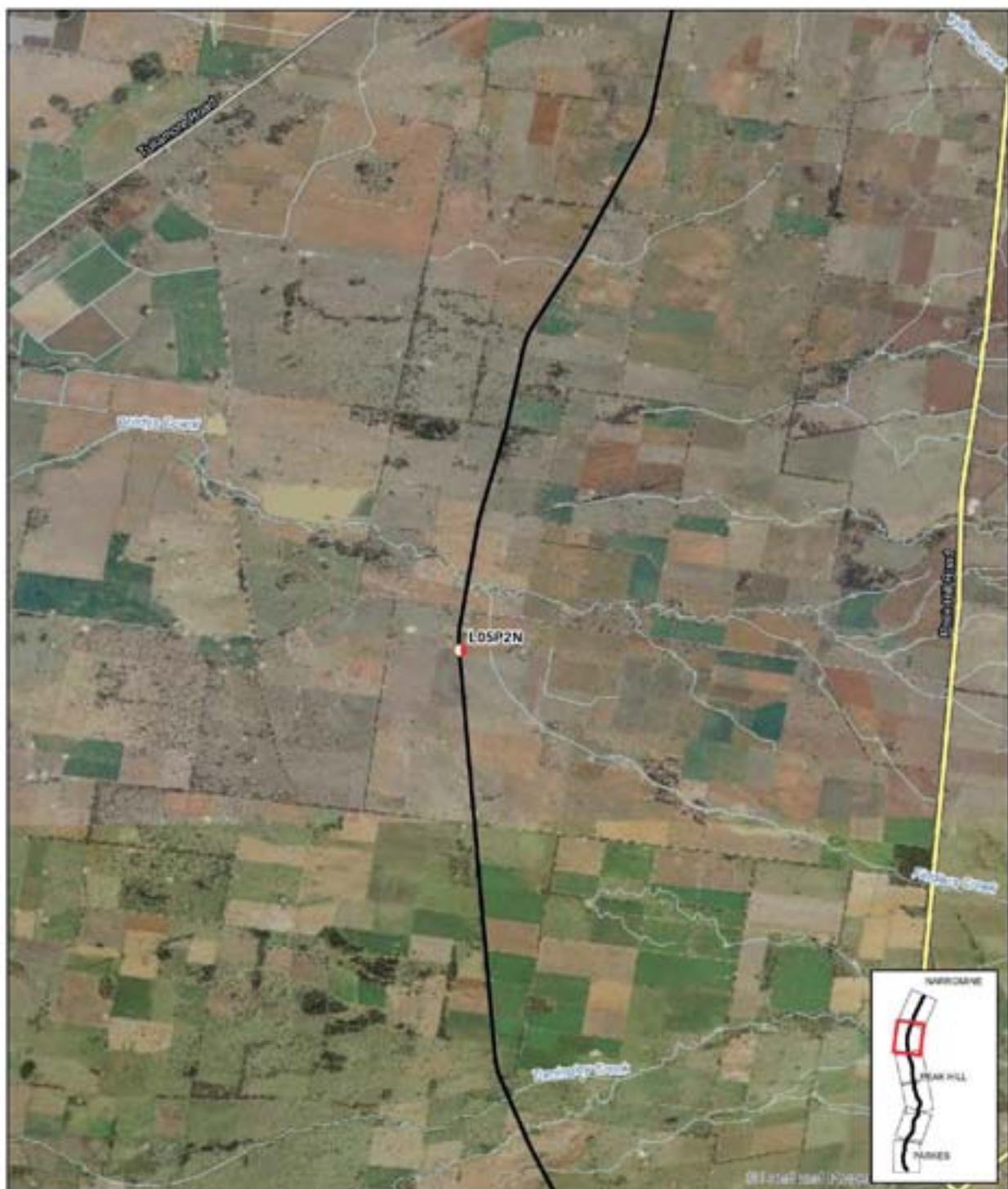
Job Number | J0-17016
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 4

L02217810105 Map Collection P021781_E_R01_P01_Logger_0.mxd
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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
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Horizontal Datum: 1954-1994
Grid: GCS GDA1994
Metres



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

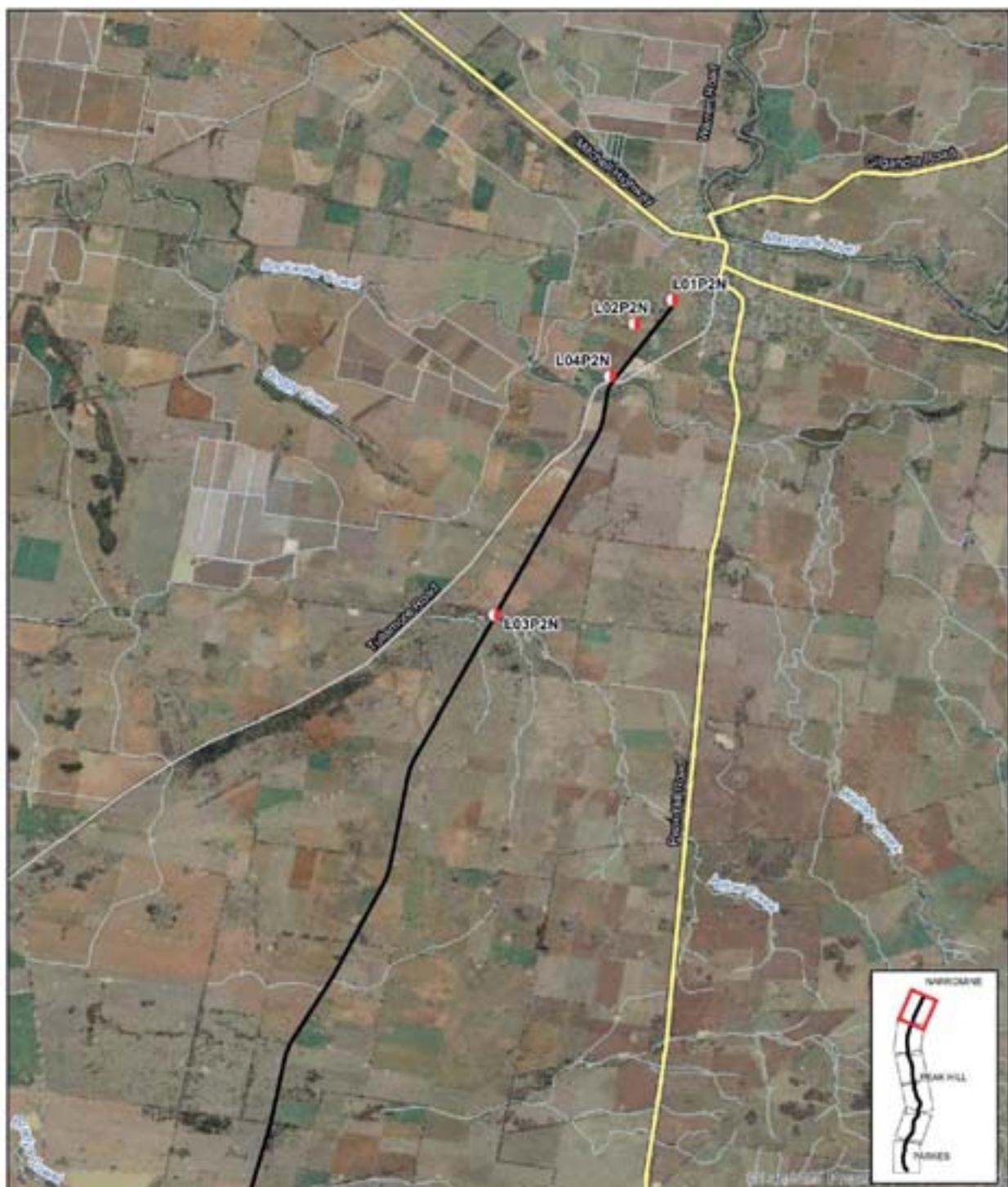
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 5

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Data source: LPI, DCOR, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Logger
- The proposal
- Watercourse

Paper Size A4
0 475 500 1,000 2,500 3,800
Metres

Horizontal Datum: 1984 TM94
Grid: GCS 2000



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Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

Logger locations

Figure B1- Sheet 6

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia

Appendix C – Study area and noise sensitive receivers



LEGEND

- Residential receiver
- Primary road
- Watercourse



Paper Size A4

0 5 10 20 30 40

Interstate
Map Project No: Narrabri-Monaro
Map Sheet Number: 1204 1994
GDA: GDA 1994 MSA-Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 1

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Data source: LPI: CTDB, 2012; LPI: Imagery, 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Residential receiver
- Watercourse
- Primary road
- Arterial road



Paper Size A4

20 30 40

Interim
Map Project No: Narrabri - Narrabri
Revised Edition: 2014-1994
GDA: GDA 1994 MSA: Zone 18



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations **Figure C2- Sheet 2**

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Data source: LPI: CTDB 2012; LPI: Imagery, 2012. Created by: Inerton, Boultbee, Appliance



LEGEND

- Residential receiver
- Primary road
- Watercourse



Paper Size A4
0 5 10 20 30 40
Metres
Map Projection Transverse Mercator
Projected UTM Zone: UTM 1004
GDA: GDA 1994 MGA-Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 3

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Data source: LPI: CTDB, 2012; LPI: Imagery, 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Residential receiver
- Sub arterial road
- Primary road
- Arterial road
- Watercourse



Paper Size A4
0 5 10 20 30 40
Metres
Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narramine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations **Figure C2- Sheet 4**

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Bourke, Australia



LEGEND

- Residential receiver
- Watercourse
- Primary road
- Arterial road

Paper Size A4

0 5 10 20 30 40

Interstate
Map Projection Transverse Mercator
Projected UTM Zone: UTM 58S
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations **Figure C2- Sheet 5**

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Baulkham, Sydney.



LEADER

- #### Residential receiver

WURZEN
PEAK HILL
WADDE

Paper Size A4
0 9 10 20 30 40

Meters
Map Projection Transverse Mercator
Horizontal Datum EDD 1950



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number: 22-179818
Revision: D
Date: 18 Jun 2017

Sensitive receiver locations Figure C2- Sheet 6

Data source: LPI CTDBZ_2012_LPI_Imagery_2012. Created by: Investor Readiness Australia



LEGEND

- Religious
- Sub arterial road
- Residential receiver
- Watercourse
- Arterial road

Paper Size A4
2 5 10 20 30 40

Interim
Map Project Name: Narramine Monitor
Map Version Number: L004 1994
GDA: GDA 1994 MSA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narramine

Job Number | 22-17916
Revision | 0
Date | 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 7

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Data source: LPI: CTDB, 2012; LPI: Imagery, 2012. Created by: Inconic, Baulkham, Australia



LEGEND

- Residential receiver
- Watercourse
- Primary road
- Arterial road



Paper Size A4

2 5 10 20 30 40

Interim

Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narramine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 8

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- Residential receiver
- The proposal
- Watercourse



Paper Size A4
Scale 1:10 000
Interim
Map Project Name: Tumutsewa Monitor
Last Updated Version: CDA 1994
Grid: GDA 1994 MGA-Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrowne

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations **Figure C2- Sheet 9**

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Data source: LPI; CTDB 2012; LPI; Imagery, 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Residential receiver
- The proposal
- Watercourse



Paper Size A4
2 5 10 20 30 40
Scale
Map Projection Transverse Mercator
Projected UTM Zone: UTM 58S
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narromine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 10

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Data source: LPI: CTDB 2012; LPI: Imagery 2012. Created by: Inerton, Boukay, Apapria



LEGEND

- Residential receiver
- Watercourse



Paper Size A4
Scales: 1:50000, 1:25000, 1:10000, 1:5000, 1:2500, 1:1000, 1:500
Intersections
Map Projection: Transverse Mercator
Projected UTM Zone: UTM 55S
Grid: GDA 1994 MGA Zone 55



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Inland Rail - Parkes to Narromine

Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations **Figure C2- Sheet 11**

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Data source: LPI: CTDB, 2012; LPI: Imagery, 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- Active recreation
- Arterial road
- Health
- Watercourse
- Residential receiver

Paper Size A4
2 5 10 20 30 40

Interim
Map Project No. Tumut-Narromine Monitor
Revised Edition: CDA 1994
GDA 1994 MSA Zone 58



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Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 12

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- | | | |
|---------------------|------------------------|---------------------|
| ● Active recreation | ● Residential receiver | — Sub arterial road |
| ● Health | — The proposal | — Watercourse |
| ● Religious | — Arterial road | |



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Inland Rail - Parkes to Narromine

Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 13



LEGEND

- | | | |
|---------------------|------------------------|---------------|
| ● Active recreation | ● Residential receiver | — Watercourse |
| ● Health | — Arterial road | |
| ● Religious | — Sub-arterial road | |

Paper Size A4
0 75 150 225 300 375 450 525

Metrics
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narromine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 14

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LEGEND

- Residential receiver
- Sub arterial road
- The proposal
- Arterial road
- Watercourse

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Sensitive receiver locations Figure C2- Sheet 15

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Mackay, Apemba



LEGEND

- Residential receiver
- Sub arterial road
- The proposal
- Arterial road
- Watercourse

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narromine

Job Number | 22-17916
Revision | 0
Date | 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 16

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-arterial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58



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Inland Rail - Parkes to Narromine

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Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 17

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boultbee, Apemba



LEADER

- Residential receiver
 - The proposal
 - Sub arterial road

Paper Size A4

Map Projection: Transverse Mercator
Horizontal Datum: EDDA 1984
Grid: ODA 1984 MGA Zone 15



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Inland Rail - Parkes to Narrabri

Job Number: 23-17876
Revision: D

Sensitive receiver locations Figure C2- Sheet 18

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whether it incurs, let or otherwise) for any expenses, losses, damages and/or costs (including legal



LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub arterial road



Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narramine

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Sensitive receiver locations Figure C2- Sheet 19

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Data source: LPI; CTDB 2012; LPI Imagery, 2012. Created by: Inerton, Boultbee, Appliance



LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub arterial road



Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58



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Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 20

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- Residential receptor
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58



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Inland Rail - Parkes to Narrabri

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Sensitive receiver locations Figure C2- Sheet 21

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Baulkham, Australia


LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub arterial road



Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Sensitive receiver locations Figure C2- Sheet 22

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Baulkham, Australia



LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58



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Inland Rail - Parkes to Narrabri

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Sensitive receiver locations Figure C2- Sheet 23

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Baulkham, Australia.



LEGEND

- The proposal
- Watercourse

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Sensitive receiver locations Figure C2- Sheet 24

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Data source: LPI; CTDB; 2012; LPI; Imagery; 2012. Created by: Inconic, Baulkham, Australia



LEGEND

- Residential receiver
- Sub arterial road
- The proposal
- Watercourse
- Primary road

Paper Size A4
0 75 150 200 250 300 350 400 450 500

Metres
Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narramine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

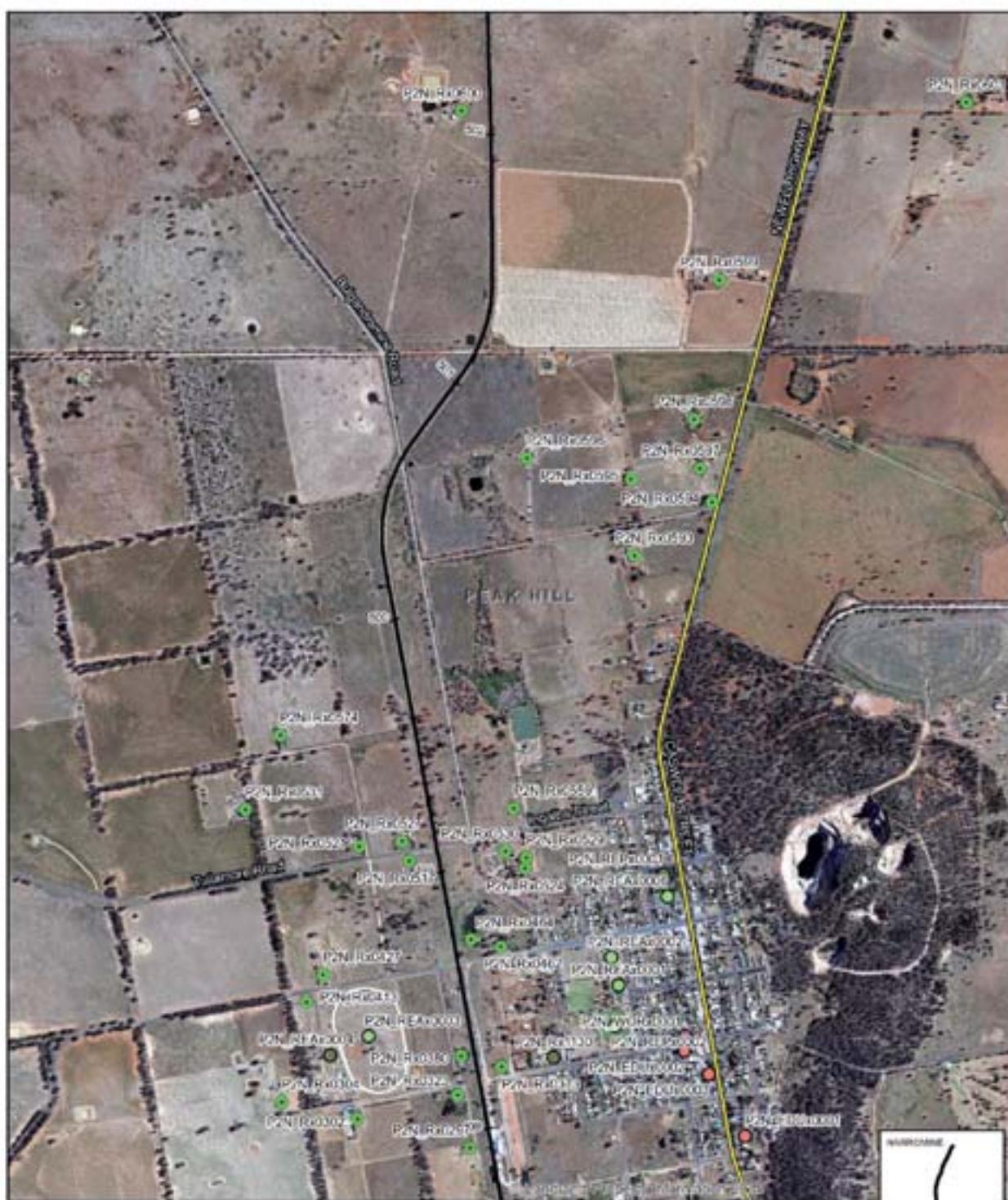
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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- | | | | |
|----------------------|------------------------|-----------------|---------------------|
| ● Active recreation | ● Religious | — Primary road | — Watercourse |
| ● Education | ● Residential receiver | — Arterial road | — Sub arterial road |
| ● Passive recreation | — The proposal | | |

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Data source: LPI: CTDB 2012; LPI: Imagery, 2012. Created by: Inconic, Bourke, Australia

Paper Size A4
0 75 150 225 300 375 450 525

Metrics
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58





LEGEND

- Residential receiver
- Primary road
- Watercourse



Paper Size A4
2 5 10 20 30 40
Scale
Map Projection Transverse Mercator
Projected UTM Zone: UTM 58S
Grid: GDA 1994 MGA Zone 58



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LEGEND

- Active recreation
- Primary road
- Passive recreation
- Arterial road
- Residential receiver
- Watercourse

Paper Size A4
2 5 10 20 30 40

Interim
Map Project Name: Transverse Monitor
Map Version Number: CDA 1994
Grid: GDA 1994 MGA-Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 22-17916
Revision | 0
Date | 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 28

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LEGEND

- Active recreation
- Residential receiver
- Watercourse

Paper Size A4
2 5 10 20 30 40

Interstate
Map Projection Transverse Mercator
Projected UTM Zone: UTM 1004
Grid: GDA 1994 MGA-Zone 58



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LEGEND

- Education
- Primary road
- Religious
- Watercourse
- Residential receiver



Paper Size A4
2 8 10 20 30 40

Interstate
Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narramine

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Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 30

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Passive recreation
- Residential receiver
- Watercourse

Paper Size A4

0 5 10 20 30 40

Interstate
Map Project No. 7 Transverse Mercator
Projected UTM Zone: UTM 58S
Grid: GDA 1994 MGA-Zone 58



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Sensitive receiver locations Figure C2- Sheet 31

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Data source: LPI; CTDB 2012; LPI; Imagery, 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- Education
- Watercourse
- Residential receiver
- Primary road



Paper Size A4
0 5 10 20 30 40

Interim
Map Project No. 7 Narrabri - Morven
Revised Edition: GDA 1994
GHD: GDA 1994 MSA: Zone 18



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Sensitive receiver locations Figure C2- Sheet 32

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Education
- Watercourse
- Residential receiver
- Primary road

Paper Size A4
2 5 10 20 30 40

Interim
Map Project Name: Narrabri-Narrabri
Map Version Number: CDA 1994
GDA: GDA 1994 MGA-Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri



Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 33

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Data source: LPI; CTDB; 2012; LPI; Imagery; 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Residential receiver
- Watercourse

Paper Size A4

Scale
1:50000

Interstate
Map Projection Transverse Mercator
Projected UTM Zone: UTM 58N
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 34

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LEGEND

- Residential receiver
- Primary road
- Watercourse



Paper Size A4

2 5 10 20 30 40

Interstate
Map Projection: Transverse Mercator
Projected UTM Zone: UTM 55S
Grid: GDA 1994 MGA Zone 55



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Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 35

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LEGEND

- Residential receiver
- Primary road
- Watercourse



Paper Size A4
2 5 10 20 30 40
Interim
Map Project No: Narrabri-Narramine
Revised Volume: CDA 1994
GDA 1994 MSA Zone 18



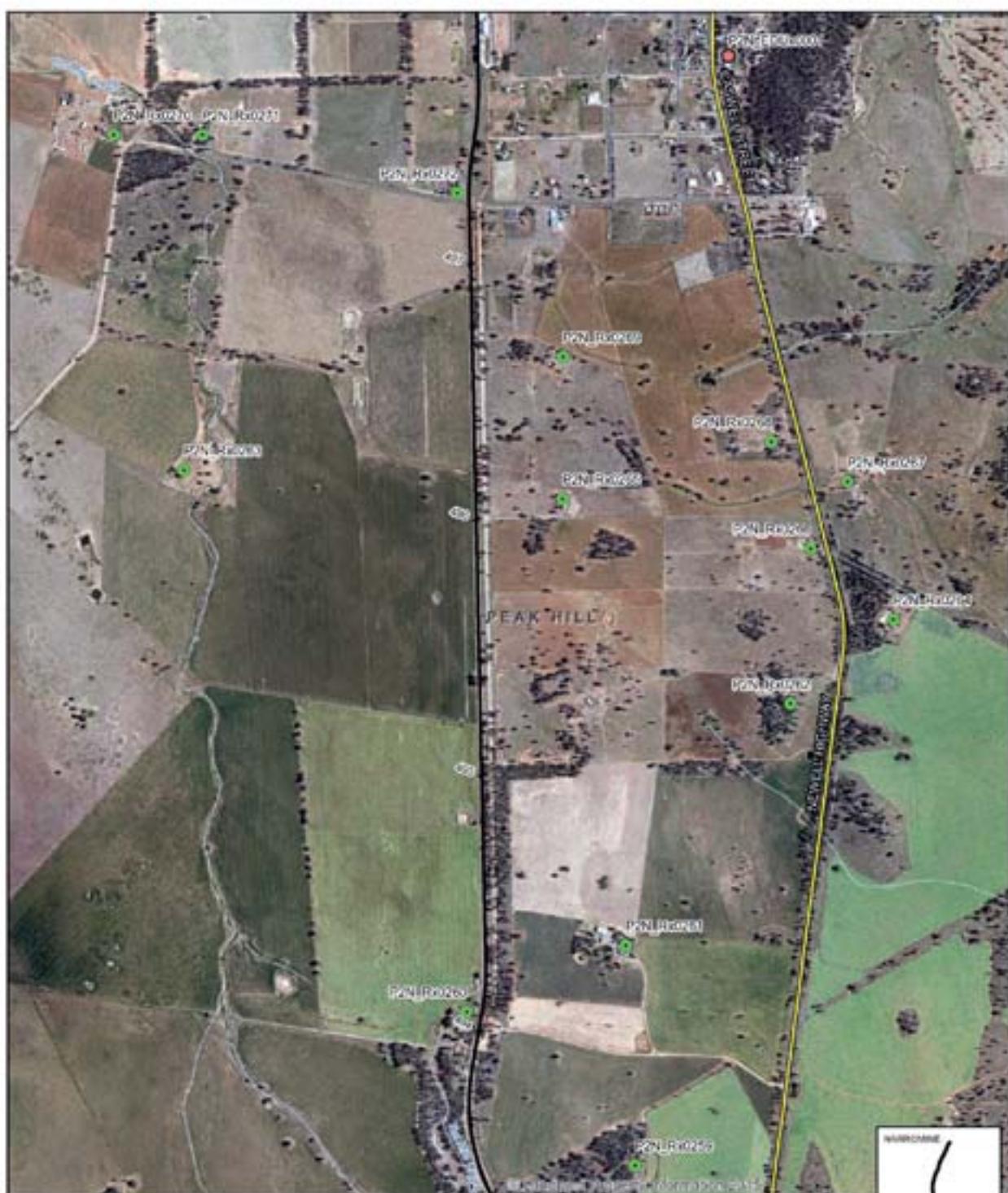
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Inland Rail - Parkes to Narramine

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 36

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Data source: LPI; CTDB 2012; LPI Imagery, 2012. Created by: Inconic, Bourke, Australia



LEGEND

- Education
- Primary road
- Residential receiver
- Watercourse
- The proposal

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 37

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LEGEND

- Residential receiver
- Arterial road
- The proposal
- Sub arterial road
- Primary road
- Watercourse

Paper Size A4
0 75 150 225 300 375 450 525 600

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 38

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Data source: LPI CTDB 2012; LPI Imagery 2012. Created by: Inerton, Boukay, Apapria



LEGEND

- Residential receiver
- Sub arterial road
- The proposal
- Watercourse
- Primary road

Paper Size A4
0 75 150 200 250 300 350 400 450 500

Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabine



Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 39

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA-Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 40

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Sensitive receiver locations Figure C2- Sheet 41

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Data source: LPI; CTDB; 2012; LPI; Imagery; 2012. Created by: Inconic, Baulkham, Australia



LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4

0 75 150 225 300 375 450 525 600

Metric
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 42

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 22-17916
Revision | 0
Date | 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 43

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub arterial road



Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 44

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narrabri

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Sensitive receiver locations Figure C2- Sheet 45

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Arterial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narrabri

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Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 46

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Data source: LPI: CTDB 2012; LPI: Imagery, 2012. Created by: Inerton, Boukay, Apemba



LEGEND

- Residential receiver
- Sub arterial road
- The proposal
- Arterial road
- Watercourse

Paper Size A4
0 75 150 200 250 300 350 400 450 500

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 47

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LEGEND

- Residential receiver
- Watercourse
- The proposal
- Sub-aerial road

Paper Size A4
0 75 150 225 300 375 450 525

Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 48

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LEGEND

- Residential receiver
- Watercourse
- Arterial road
- Sub arterial road



Paper Size A4
0 5 10 20 30 40

Interim
Map Production Team - Narrabri Monocentric
Metropolitan Region: LGA 1994
GDA 1994 MSA Zone 18



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Inland Rail - Parkes to Narrabri

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Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 49

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LEGEND

- Residential receiver
- Sub-arterial road
- - Watercourse

Paper Size A4

Scale
0 5 10 20 30 40

Interim
Map Project Name: Transverse Monitor
Revised Volume: CDA 1994
Grid: GDA 1994 MGA-Zone 58



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Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 50

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LEGEND

- Residential receiver
- Sub-artificial road
- Watercourse



Paper Size A4
0 5 10 20 30 40
Metres
Map Projection Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number 22-17916
Revision 0
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Sensitive receiver locations Figure C2- Sheet 51

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LEGEND

- Residential receiver
- Watercourse



Paper Size A4

0 5 10 20 30 40

Interstate
Map Projection: Transverse Mercator
Projected UTM: UTM 1004
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 22-17916
Revision | 0
Date | 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 52

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LEGEND

- Residential receiver
- Watercourse

Paper Size A4
2 5 10 20 30 40

Interim
Map Project Name: Transverse Monorail
Revised Edition: L204 1994
GDA: GDA 1994 MSA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number: 22-17916
Revision: 0
Date: 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 53

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LEGEND

- Residential receiver
- Sub arterial road
- Watercourse



Paper Size A4

2 5 10 20 30 40

Interim
Map Project Name: Narrabri-Narramaine
Map Version Number: CDA 1994
Grid: GDA 1994 MGA Zone 58



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Inland Rail - Parkes to Narramaine

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Date 19 Jun 2017

Sensitive receiver locations Figure C2- Sheet 54

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Data source: LPI: CTDB 2012; LPI: Imagery, 2012. Created by: Inconic, Bourke, Australia

Appendix D – Operational noise, table of results

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_EDUx0001	611919	6377926	32	32	34	34	32	32	44	44	32	32	47	47	60	65
P2N_EDUx0002	611638	6378217	33	33	36	36	33	33	46	46	33	33	49	49	63	67
P2N_EDUx0003	611742	6378144	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_HOSx0001	616743	6451996	30	30	30	30	30	30	40	40	30	30	44	44	61	65
P2N_RXAx0001	611346	6378430	34	36	36	38	34	36	46	49	34	36	49	49	66	70
P2N_RXAx0002	611300	6378535	34	36	36	38	34	36	46	49	34	36	50	50	66	71
P2N_RXAx0003	610416	6378088	37	40	39	42	37	40	50	52	37	40	53	53	71	74
P2N_RXAx0004	610279	6377995	34	37	37	39	34	37	47	50	34	37	50	50	67	71
P2N_RXAx0005	616569	6452186	30	32	30	33	30	32	40	43	30	32	43	43	64	68
P2N_RXAx0006	611481	6378802	31	33	35	31	33	43	45	31	33	46	46	62	67	
P2N_RXPx0001	611454	6378883	33	33	35	35	33	33	45	45	33	33	49	49	63	67
P2N_RXAx0007	611356	6378274	34	37	36	39	34	37	47	49	34	37	50	50	67	71
P2N_RX0173	606281	6333424	38	38	39	39	38	38	50	50	38	38	53	53	70	73
P2N_RX0174	606039	6333589	40	40	41	41	40	40	52	52	40	40	55	55	71	74
P2N_RX0175	607668	6334133	20	20	22	22	20	20	25	25	20	20	28	28	53	56
P2N_RX0176	607443	6334195	22	22	23	23	22	22	29	29	22	22	32	32	53	57
P2N_RX0177	607620	6334277	20	20	22	22	20	20	22	22	20	20	25	25	52	56
P2N_RX0178	606440	6334316	29	29	30	30	29	29	40	40	29	29	44	44	57	62
P2N_RX0179	607234	6334389	22	22	24	24	22	22	31	31	22	22	34	34	52	56
P2N_RX0180	606556	6334456	27	27	29	29	27	27	39	39	27	27	42	42	55	60
P2N_RX0181	605642	6334456	37	37	38	38	37	37	49	49	37	37	52	52	67	71
P2N_RX0182	607024	6334514	23	23	25	25	23	23	34	34	23	23	37	37	52	56
P2N_RX0183	605147	6334604	40	40	41	41	40	40	52	52	40	40	55	55	70	73
P2N_RX0184	607132	6334625	23	23	24	24	23	23	31	31	23	23	34	34	51	55
P2N_RX0185	605590	6334678	39	39	41	41	39	39	51	51	39	39	54	54	70	73
P2N_RX0186	606509	6334826	27	27	29	29	27	27	38	38	27	27	42	42	55	59
P2N_RX0187	606439	6334927	27	27	29	29	27	27	39	39	27	27	42	42	55	60
P2N_RX0188	605085	6335096	41	41	43	43	41	41	53	53	41	41	56	56	71	75
P2N_RX0189	605855	6335140	31	31	33	33	31	31	43	43	31	31	46	46	60	64
P2N_RX0190	606751	6335264	24	24	26	26	24	24	32	32	24	24	35	35	51	56
P2N_RX0191	606632	6335392	25	25	26	26	25	25	33	33	25	25	36	36	52	56
P2N_RX0192	606037	6335405	29	29	30	30	29	29	40	40	29	29	43	43	56	61
P2N_RX0193	606091	6335446	28	28	30	30	28	28	40	40	28	28	43	43	56	61
P2N_RX0194	603678	6335637	34	34	35	35	34	34	46	46	34	34	49	49	63	67
P2N_RX0195	603391	6335737	31	31	32	32	31	31	43	43	31	31	46	46	60	64
P2N_RX0196	604200	6335810	43	43	44	44	43	43	55	55	43	43	58	58	74	77
P2N_RX0197	604109	6335849	41	41	42	42	41	41	53	53	41	41	56	56	72	75
P2N_RX0198	606166	6335910	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_RX0199	603613	6335917	34	34	35	35	34	34	46	46	34	34	49	49	64	67
P2N_RX0200	606348	6336046	25	25	26	26	25	25	34	34	25	25	37	37	52	56

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040	
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0201	603442	6336202	33	33	34	34	33	33	45	45	33	33	48	48
P2N_Rx0202	605719	6336662	29	29	30	30	29	29	39	39	29	29	42	42
P2N_Rx0203	603335	6336953	35	35	35	35	35	35	46	46	35	35	49	49
P2N_Rx0204	605018	6337152	34	34	35	35	34	34	45	45	34	34	48	48
P2N_Rx0205	604431	6337320	42	42	43	43	42	42	53	53	42	42	56	56
P2N_Rx0206	602580	6337450	28	28	29	29	28	28	39	39	28	28	42	42
P2N_Rx0207	605121	6337526	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0208	606000	6337667	25	25	26	26	25	25	30	30	25	25	33	33
P2N_Rx0209	604305	6337785	43	43	43	43	43	43	54	54	43	43	57	57
P2N_Rx0210	603315	6337945	37	37	38	38	37	37	48	48	37	37	51	51
P2N_Rx0211	605270	6338406	30	30	31	31	30	30	41	41	30	30	44	44
P2N_Rx0212	604944	6340546	33	32	34	34	33	32	44	44	33	32	47	47
P2N_Rx0213	603861	6341031	51	51	52	52	51	51	62	62	51	51	66	66
P2N_Rx0214	602852	6342583	28	28	29	29	28	28	39	39	28	28	42	42
P2N_Rx0215	606651	6343542	25	25	26	26	25	25	32	32	25	25	35	35
P2N_Rx0216	606505	6344336	26	26	26	26	26	26	35	35	26	26	38	38
P2N_Rx0217	603830	6344706	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0218	605715	6346443	34	34	35	35	34	34	45	45	34	34	48	48
P2N_Rx0219	606441	6346807	29	29	30	30	29	29	39	39	29	29	42	42
P2N_Rx0220	606170	6347482	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0221	608548	6350610	25	25	26	26	25	25	35	35	25	25	38	38
P2N_Rx0222	608620	6350985	27	27	28	28	27	27	37	37	27	27	41	41
P2N_Rx0223	606554	6351255	44	44	45	45	44	44	55	55	44	44	58	58
P2N_Rx0224	610158	6353174	27	27	28	28	27	27	37	37	27	27	41	41
P2N_Rx0225	608310	6354624	35	35	36	36	35	35	46	46	35	35	49	49
P2N_Rx0226	607928	6355010	29	29	30	30	29	29	39	39	29	29	42	42
P2N_Rx0227	610796	6355250	30	30	31	31	30	30	41	41	30	30	44	44
P2N_Rx0228	608678	6357223	32	32	32	32	32	32	43	43	32	32	46	46
P2N_Rx0229	611639	6357281	26	26	27	27	26	26	34	34	26	26	37	37
P2N_Rx0230	610805	6357330	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0231	608524	6359518	27	27	28	28	27	27	38	38	27	27	41	41
P2N_Rx0232	610703	6360044	37	37	38	38	37	37	48	48	37	37	51	51
P2N_Rx0233	610606	6360125	38	38	39	39	38	38	50	50	38	38	53	53
P2N_Rx0234	609342	6360451	36	36	37	37	36	36	47	47	36	36	51	51
P2N_Rx0235	609240	6361599	32	32	33	33	32	32	44	44	32	32	47	47
P2N_Rx0236	611545	6361985	35	35	36	36	35	35	47	47	35	35	50	50
P2N_Rx0237	612965	6364201	39	39	40	40	39	39	51	51	39	39	54	54
P2N_Rx0238	610781	6364374	29	29	31	31	29	29	40	40	29	29	43	43
P2N_Rx0239	610715	6366575	25	25	26	26	25	25	32	32	25	25	36	36
P2N_Rx0240	612174	6368440	35	35	36	36	35	35	46	46	35	35	49	49

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0241	614115	6369946	40	40	40	40	40	40	51	51	40	40	54	54	69	73
P2N_Rx0242	613292	6371054	40	40	41	41	40	40	51	51	40	40	55	55	69	73
P2N_Rx0243	614688	6371091	33	33	34	34	33	33	44	44	33	33	47	47	61	66
P2N_Rx0244	614476	6371198	34	34	36	36	34	34	46	46	34	34	49	49	64	68
P2N_Rx0245	614564	6371224	34	34	35	35	34	34	45	45	34	34	49	49	63	67
P2N_Rx0246	615203	6371286	26	26	27	27	26	26	36	36	26	26	39	39	55	58
P2N_Rx0247	614555	6371337	33	33	34	34	33	33	45	45	33	33	48	48	63	67
P2N_Rx0248	613680	6371376	50	50	52	52	50	50	62	62	50	50	66	66	85	88
P2N_Rx0249	614439	6371440	36	36	37	37	36	36	47	47	36	36	50	50	65	69
P2N_Rx0250	614163	6371760	39	39	40	40	39	39	50	50	39	39	54	54	69	72
P2N_Rx0251	613931	6371790	43	43	44	44	43	43	55	55	43	43	58	58	74	77
P2N_Rx0252	614459	6371825	34	34	35	35	34	34	46	46	34	34	49	49	64	68
P2N_Rx0253	614993	6371877	29	29	30	30	29	29	40	40	29	29	43	43	57	61
P2N_Rx0254	614021	6371901	40	40	41	41	40	40	52	52	40	40	55	55	71	74
P2N_Rx0255	614088	6372224	37	37	38	38	37	37	48	48	37	37	51	51	67	70
P2N_Rx0256	614826	6372748	28	28	29	29	28	28	38	38	28	28	41	41	56	60
P2N_Rx0257	614819	6373310	26	26	27	27	26	26	35	35	26	26	38	38	54	58
P2N_Rx0258	612331	6373361	43	43	44	44	43	43	55	55	43	43	58	58	74	77
P2N_Rx0259	612899	6373701	34	34	35	35	34	34	46	46	34	34	49	49	62	66
P2N_Rx0260	612090	6374070	53	53	54	54	53	53	64	64	53	53	67	67	88	91
P2N_Rx0261	612600	6374506	38	38	39	39	38	38	50	50	38	38	53	53	68	71
P2N_Rx0262	612922	6375599	30	30	32	32	30	30	41	41	30	30	45	45	58	63
P2N_Rx0263	610395	6375742	31	31	32	32	31	31	42	42	31	31	45	45	59	63
P2N_Rx0264	613204	6376034	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_Rx0265	611833	6376087	42	42	43	43	42	42	53	53	42	42	57	57	73	75
P2N_Rx0266	612811	6376199	30	30	31	31	30	30	41	41	30	30	44	44	58	62
P2N_Rx0267	612869	6376491	28	28	29	29	28	28	39	39	28	28	42	42	56	60
P2N_Rx0268	612538	6376549	31	31	32	32	31	31	42	42	31	31	45	45	59	63
P2N_Rx0269	611665	6376614	42	41	43	43	42	41	53	53	42	41	56	56	72	75
P2N_Rx0270	609733	6376902	28	28	30	30	28	28	40	40	28	28	43	43	56	61
P2N_Rx0271	610063	6377008	31	31	33	33	31	31	43	43	31	31	46	46	60	65
P2N_Rx0272	611077	6377096	54	54	55	55	54	54	65	65	54	54	68	68	90	92
P2N_Rx0273	611498	6377145	41	41	42	42	41	41	53	53	41	41	56	56	72	75
P2N_Rx0274	611371	6377188	44	44	45	45	44	44	55	55	44	44	58	58	75	77
P2N_Rx0275	611434	6377225	42	42	43	43	42	42	53	53	42	42	57	57	73	76
P2N_Rx0276	611596	6377265	39	39	40	40	39	39	50	50	39	39	53	53	69	72
P2N_Rx0277	611804	6377268	36	36	37	37	36	36	47	47	36	36	51	51	65	69
P2N_Rx0278	611828	6377278	35	35	37	37	35	35	47	47	35	35	50	50	65	69
P2N_Rx0279	611849	6377284	35	35	36	36	35	35	47	47	35	35	50	50	65	68
P2N_Rx0280	611865	6377288	35	35	36	36	35	35	47	47	35	35	50	50	64	68

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0281	611198	6377287	48	48	49	49	48	48	59	59	48	48	62	62	82	84
P2N_Rx0282	6111899	6377300	34	34	36	34	34	34	46	46	34	34	49	49	64	68
P2N_Rx0283	611167	6377310	50	50	51	51	50	50	61	61	50	50	65	65	85	87
P2N_Rx0284	612085	6377361	32	32	34	34	32	32	44	44	32	32	47	47	61	65
P2N_Rx0285	611222	6377410	46	46	47	47	46	46	58	58	46	46	61	61	79	81
P2N_Rx0286	611803	6377544	34	34	36	36	34	34	46	46	34	34	49	49	64	68
P2N_Rx0287	611178	6377571	43	43	45	45	43	43	56	56	43	43	59	59	76	79
P2N_Rx0288	612000	6377578	32	32	34	34	32	32	44	44	32	32	47	47	61	65
P2N_Rx0289	611271	6377598	42	42	44	44	42	42	54	54	42	42	58	58	73	77
P2N_Rx0290	611788	6377605	34	34	36	36	34	34	46	46	34	34	49	49	64	68
P2N_Rx0291	612182	6377621	30	30	32	32	30	30	42	42	30	30	45	45	59	63
P2N_Rx0292	612292	6377631	29	29	31	31	29	29	41	41	29	29	44	44	58	62
P2N_Rx0293	611896	6377638	33	33	35	35	33	33	45	45	33	33	48	48	62	66
P2N_Rx0294	611328	6377680	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0295	611572	6377694	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0296	611756	6377698	34	34	36	36	34	34	46	46	34	34	49	49	64	68
P2N_Rx0297	610871	6377720	50	50	52	52	50	50	62	62	50	50	65	65	86	88
P2N_Rx0298	611926	6377724	32	32	34	34	32	32	44	44	32	32	47	47	61	66
P2N_Rx0299	611664	6377733	35	35	37	37	35	35	47	47	35	35	50	50	64	69
P2N_Rx0300	611748	6377737	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0301	611740	6377767	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0302	610420	6377767	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0303	611884	6377771	33	33	34	34	33	33	45	45	33	33	48	48	61	66
P2N_Rx0304	610121	6377787	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0305	611837	6377792	33	33	35	35	33	33	45	45	33	33	48	48	62	66
P2N_Rx0306	611716	6377818	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0307	611946	6377832	32	32	34	34	32	32	44	44	32	32	47	47	60	65
P2N_Rx0308	611771	6377832	33	33	35	35	33	33	46	46	33	33	49	49	62	67
P2N_Rx0309	611711	6377834	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0310	611416	6377844	38	38	40	40	38	38	50	50	38	38	53	53	68	72
P2N_Rx0311	611702	6377855	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0312	611766	6377855	33	33	35	35	33	33	46	46	33	33	49	49	62	67
P2N_Rx0313	611915	6377857	32	32	34	34	32	32	44	44	32	32	47	47	60	65
P2N_Rx0314	611851	6377866	33	33	34	34	33	33	45	45	33	33	48	48	61	66
P2N_Rx0315	611695	6377873	34	34	36	36	34	34	46	46	34	34	50	50	63	68
P2N_Rx0316	611770	6377874	33	33	35	35	33	33	45	45	33	33	49	49	62	67
P2N_Rx0317	611839	6377880	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_Rx0318	611685	6377890	34	34	36	36	34	34	46	46	34	34	50	50	63	68
P2N_Rx0319	611820	6377890	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_Rx0320	611752	6377894	33	33	35	35	33	33	46	46	33	33	49	49	62	67

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0321	612451	6377894	22	22	23	23	22	22	29	29	22	22	33	33	51	53
P2N_Rx0322	611251	6377908	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0323	610790	6377918	47	47	50	50	47	47	60	60	47	47	64	64	83	86
P2N_Rx0324	611748	6377912	33	33	35	35	33	33	46	46	33	33	49	49	62	67
P2N_Rx0325	611686	6377912	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0326	611310	6377917	39	39	41	41	39	39	52	52	39	39	55	55	70	74
P2N_Rx0327	611242	6377926	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0328	611822	6377934	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_Rx0329	611303	6377935	39	39	41	41	39	39	52	52	39	39	55	55	70	74
P2N_Rx0330	612027	6377941	31	31	33	33	31	31	42	42	31	31	46	46	59	64
P2N_Rx0331	611377	6377945	38	38	40	40	38	38	50	50	38	38	54	54	68	72
P2N_Rx0332	611237	6377948	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0333	611742	6377949	33	33	35	35	33	33	46	46	33	33	49	49	62	67
P2N_Rx0334	611805	6377955	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_Rx0335	611301	6377955	39	39	41	41	39	39	52	52	39	39	55	55	69	73
P2N_Rx0336	612029	6377963	31	30	32	32	31	30	42	42	31	30	46	46	59	64
P2N_Rx0337	611233	6377964	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0338	611379	6377967	38	38	40	40	38	38	50	50	38	38	53	53	68	72
P2N_Rx0339	611727	6377969	33	33	35	35	33	33	46	46	33	33	49	49	62	67
P2N_Rx0340	611462	6377972	36	36	39	39	36	36	49	49	36	36	52	52	66	71
P2N_Rx0341	611805	6377973	33	33	35	35	33	33	45	45	33	33	48	48	61	66
P2N_Rx0342	611375	6377981	38	38	40	40	38	38	50	50	38	38	53	53	68	72
P2N_Rx0343	612011	6377982	31	31	33	33	31	31	43	43	31	31	46	46	59	64
P2N_Rx0344	611300	6377984	39	39	41	41	39	39	51	51	39	39	55	55	69	73
P2N_Rx0345	611225	6377984	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0346	611513	6377990	36	36	38	38	36	36	48	48	36	36	51	51	65	70
P2N_Rx0347	611285	6377995	39	39	41	41	39	39	52	52	39	39	55	55	70	74
P2N_Rx0348	611422	6377996	37	37	39	39	37	37	49	49	37	37	53	53	67	71
P2N_Rx0349	612005	6377998	31	31	33	33	31	31	43	43	31	31	46	46	59	64
P2N_Rx0350	611942	6377999	31	31	33	33	31	31	43	43	31	31	46	46	59	64
P2N_Rx0351	611367	6378000	38	38	40	40	38	38	50	50	38	38	53	53	68	72
P2N_Rx0352	611219	6378002	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0353	611802	6378005	32	32	34	34	32	32	45	45	32	32	48	48	61	66
P2N_Rx0354	611566	6378005	35	35	37	37	35	35	47	47	35	35	51	51	64	69
P2N_Rx0355	611504	6378008	36	36	38	38	36	36	48	48	36	36	51	51	65	70
P2N_Rx0356	611274	6378013	39	39	41	41	39	39	52	52	39	39	55	55	70	74
P2N_Rx0357	612005	6378016	31	31	33	33	31	31	42	42	31	31	46	46	59	64
P2N_Rx0358	611938	6378019	31	31	33	33	31	31	43	43	31	31	46	46	59	64
P2N_Rx0359	611355	6378025	38	38	40	40	38	38	50	50	38	38	54	54	68	72
P2N_Rx0360	611502	6378027	36	36	38	38	36	36	48	48	36	36	51	51	65	70

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0361	611209	6378028	40	40	42	42	40	40	53	53	40	40	56	56	71	75
P2N_Rx0362	611787	6378030	33	32	35	33	32	45	45	33	32	48	48	61	66	
P2N_Rx0363	611561	6378030	35	35	37	37	35	47	47	35	35	51	51	64	69	
P2N_Rx0364	611270	6378034	39	41	41	39	39	52	52	39	39	55	55	70	74	
P2N_Rx0365	611640	6378036	34	34	36	34	34	46	46	34	34	50	50	63	68	
P2N_Rx0366	611996	6378036	31	31	33	33	31	42	42	31	31	46	46	59	64	
P2N_Rx0367	611934	6378039	31	31	33	33	31	43	43	31	31	46	46	59	64	
P2N_Rx0368	611348	6378039	38	38	40	40	38	50	50	38	38	54	54	68	72	
P2N_Rx0369	611416	6378041	37	37	39	39	37	49	49	37	37	53	53	67	71	
P2N_Rx0370	611134	6378045	42	42	44	44	42	42	55	55	42	42	58	58	73	77
P2N_Rx0371	611493	6378045	36	36	38	38	36	48	48	36	36	51	51	65	70	
P2N_Rx0372	611565	6378051	35	35	37	37	35	47	47	35	35	50	50	64	69	
P2N_Rx0373	610945	6378052	48	48	51	51	48	48	61	61	48	48	65	65	84	87
P2N_Rx0374	611991	6378058	31	30	33	33	31	42	42	31	30	46	46	59	64	
P2N_Rx0375	611342	6378058	38	38	40	40	38	50	50	38	38	54	54	68	72	
P2N_Rx0376	611405	6378059	37	37	39	39	37	49	49	37	37	53	53	67	71	
P2N_Rx0377	611924	6378059	31	31	33	33	31	43	43	31	31	46	46	59	64	
P2N_Rx0378	611486	6378064	36	36	38	38	36	48	48	36	36	51	51	65	70	
P2N_Rx0379	611550	6378065	35	35	37	37	35	47	47	35	35	51	51	64	69	
P2N_Rx0380	610781	6378068	52	52	55	55	52	65	65	52	52	68	68	89	92	
P2N_Rx0381	611195	6378067	40	40	43	43	40	53	53	40	40	56	56	72	75	
P2N_Rx0382	611333	6378072	38	38	40	40	38	51	51	38	38	54	54	68	72	
P2N_Rx0383	611402	6378079	37	37	39	39	37	49	49	37	37	53	53	67	71	
P2N_Rx0384	611247	6378084	39	39	41	41	39	52	52	39	39	55	55	70	74	
P2N_Rx0385	611479	6378085	36	36	38	38	36	48	48	36	36	51	51	65	70	
P2N_Rx0386	611260	6378090	39	39	41	41	39	52	52	39	39	55	55	70	74	
P2N_Rx0387	611279	6378090	39	39	41	41	39	51	51	39	39	55	55	69	73	
P2N_Rx0388	611992	6378091	30	30	32	32	30	42	42	30	30	45	45	58	64	
P2N_Rx0389	611392	6378095	37	37	39	39	37	50	50	37	37	53	53	67	71	
P2N_Rx0390	611331	6378098	38	38	40	40	38	50	50	38	38	54	54	68	72	
P2N_Rx0391	611533	6378104	35	35	37	37	35	48	48	35	35	51	51	65	69	
P2N_Rx0392	611478	6378106	36	36	38	38	36	48	48	36	36	51	51	65	70	
P2N_Rx0393	611616	6378110	34	34	36	36	34	46	46	34	34	50	50	63	68	
P2N_Rx0394	611137	6378115	41	41	44	44	41	54	54	41	41	57	57	73	76	
P2N_Rx0395	611465	6378116	36	36	38	38	36	48	48	36	36	52	52	66	70	
P2N_Rx0396	611323	6378116	38	38	40	40	38	51	51	38	38	54	54	68	72	
P2N_Rx0397	611176	6378117	40	40	43	43	40	53	53	40	40	56	56	72	75	
P2N_Rx0398	611526	6378120	35	35	37	37	35	48	48	35	35	51	51	65	69	
P2N_Rx0399	611607	6378129	34	34	36	36	34	46	46	34	34	50	50	63	68	
P2N_Rx0400	611171	6378132	40	40	43	43	40	53	53	40	40	56	56	72	75	

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040		LAmax Design No Build
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
P2N_Rx0401	611372	6378135	37	37	39	39	37	37	50	50	37	37	53	53	67
P2N_Rx0402	611407	6378137	36	36	39	39	36	36	49	49	36	36	52	52	67
P2N_Rx0403	611462	6378139	36	36	38	38	36	36	48	48	36	36	51	51	66
P2N_Rx0404	611084	6378143	42	42	45	45	42	42	55	55	42	42	58	58	74
P2N_Rx0405	611163	6378146	40	40	43	43	40	40	53	53	40	40	57	57	72
P2N_Rx0406	611603	6378147	34	34	36	36	34	34	46	46	34	34	50	50	63
P2N_Rx0407	611449	6378151	36	36	38	38	36	36	48	48	36	36	52	52	66
P2N_Rx0408	611517	6378160	35	35	37	37	35	35	48	48	35	35	51	51	65
P2N_Rx0409	611597	6378167	34	34	36	36	34	34	46	46	34	34	50	50	63
P2N_Rx0410	611510	6378178	35	35	37	37	35	35	48	48	35	35	51	51	65
P2N_Rx0411	611591	6378186	34	34	36	36	34	34	46	46	34	34	50	50	63
P2N_Rx0413	610158	6378187	36	36	38	38	36	36	49	49	36	36	52	52	66
P2N_Rx0414	611146	6378192	41	41	43	43	41	41	54	54	41	41	57	57	72
P2N_Rx0415	611582	6378203	34	34	36	36	34	34	47	47	34	34	50	50	64
P2N_Rx0416	611638	6378217	33	33	36	36	33	33	46	46	33	33	49	49	63
P2N_Rx0417	611488	6378229	35	35	37	37	35	35	48	48	35	35	51	51	65
P2N_Rx0418	611143	6378231	40	40	43	43	40	40	53	53	40	40	57	57	72
P2N_Rx0419	611563	6378254	34	34	36	36	34	34	47	47	34	34	50	50	64
P2N_Rx0420	611477	6378263	35	35	37	37	35	35	48	48	33	33	49	49	67
P2N_Rx0421	611561	6378271	34	34	36	36	34	34	47	47	34	34	50	50	69
P2N_Rx0422	611622	6378273	33	33	36	36	33	33	46	46	33	33	49	49	68
P2N_Rx0423	611469	6378283	35	35	37	37	35	35	48	48	35	35	51	51	68
P2N_Rx0424	610935	6378282	46	46	48	48	46	46	59	59	46	46	62	62	79
P2N_Rx0425	611556	6378292	34	34	36	36	34	34	47	47	34	34	50	50	68
P2N_Rx0426	611696	6378296	32	32	35	35	32	32	45	45	32	32	48	48	66
P2N_Rx0427	610204	6378300	38	38	40	40	38	38	50	50	38	38	53	53	69
P2N_Rx0428	611484	6378307	35	35	37	37	35	35	47	47	34	34	50	50	69
P2N_Rx0429	611548	6378308	34	34	36	36	34	34	47	47	34	34	50	50	68
P2N_Rx0430	611695	6378314	32	32	35	35	32	32	45	45	32	32	48	48	66
P2N_Rx0431	611463	6378324	35	35	37	37	35	35	48	48	35	35	51	51	69
P2N_Rx0432	611614	6378327	33	33	35	35	33	33	46	46	33	33	49	49	67
P2N_Rx0433	611541	6378328	34	34	36	36	34	34	47	47	34	34	50	50	68
P2N_Rx0434	611679	6378333	33	33	35	35	33	33	45	45	33	33	48	48	66
P2N_Rx0435	611101	6378338	41	41	43	43	41	41	54	54	41	41	57	57	75
P2N_Rx0436	611445	6378339	35	35	37	37	35	35	48	48	35	35	51	51	69
P2N_Rx0437	611593	6378343	33	33	36	36	33	33	46	46	33	33	49	49	67
P2N_Rx0438	611535	6378346	34	34	36	36	34	34	47	47	34	34	50	50	68
P2N_Rx0439	611670	6378355	33	33	35	35	33	33	45	45	33	33	48	48	66
P2N_Rx0440	611092	6378358	41	41	43	43	41	41	54	54	41	41	57	57	75
P2N_Rx0441	611449	6378364	35	35	37	37	35	35	48	48	35	35	51	51	69

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0442	611527	6378365	34	34	36	36	34	34	34	34	34	34	34	34	34	34
P2N_Rx0443	611594	6378366	33	33	35	35	33	33	46	46	33	33	49	49	63	63
P2N_Rx0444	611519	6378381	34	34	36	36	34	34	47	47	34	34	50	50	64	64
P2N_Rx0445	611581	6378385	33	33	36	36	33	33	46	46	33	33	49	49	63	67
P2N_Rx0446	611438	6378391	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0447	611080	6378393	41	41	43	43	41	41	54	54	41	41	57	57	72	75
P2N_Rx0448	611458	6378403	35	35	37	37	35	35	47	47	35	35	50	50	65	69
P2N_Rx0449	611575	6378410	33	33	36	36	33	33	46	46	33	33	49	49	63	67
P2N_Rx0450	611515	6378410	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0451	611070	6378417	41	41	43	43	41	41	54	54	41	41	57	57	72	75
P2N_Rx0452	611586	6378444	33	33	35	35	33	33	46	46	33	33	49	49	63	67
P2N_Rx0453	611415	6378448	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0454	610952	6378461	43	43	45	45	43	43	56	56	43	43	59	59	75	78
P2N_Rx0455	611409	6378467	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0456	611020	6378478	41	41	43	43	41	41	54	54	41	41	57	57	73	76
P2N_Rx0457	611540	6378479	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0458	611403	6378485	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0459	611395	6378501	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0460	611478	6378507	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0461	611537	6378511	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0462	610869	6378513	45	45	47	47	45	45	58	58	45	45	61	61	77	80
P2N_Rx0463	611385	6378525	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0464	610751	6378523	51	51	53	53	51	51	63	63	51	51	67	67	87	90
P2N_Rx0465	611465	6378531	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0466	611539	6378533	33	33	36	35	33	33	46	46	33	33	49	49	63	67
P2N_Rx0467	611383	6378541	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0468	611526	6378546	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0469	611372	6378564	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0470	611006	6378566	41	41	43	43	41	41	54	54	41	41	57	57	72	76
P2N_Rx0471	611076	6378578	40	40	42	42	40	40	52	52	40	40	55	55	71	74
P2N_Rx0472	611369	6378579	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0473	611514	6378584	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0474	611093	6378588	39	39	41	41	39	39	52	52	39	39	55	55	70	74
P2N_Rx0475	611446	6378588	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0476	611109	6378593	39	39	41	41	39	39	52	52	39	39	55	55	70	73
P2N_Rx0477	611361	6378602	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0478	611151	6378602	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0479	611507	6378603	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0480	611358	6378615	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0481	611213	6378619	37	37	39	39	37	37	50	50	37	37	53	53	68	71

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0482	611437	6378620	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0483	611148	6378621	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0484	611140	6378634	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0485	611205	6378637	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0486	611274	6378638	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0487	611138	6378651	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0488	611198	6378656	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0489	611335	6378664	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0490	611284	6378665	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0491	611136	6378667	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0492	611351	6378669	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0493	611366	6378676	35	35	37	37	35	35	47	47	35	35	51	51	65	69
P2N_Rx0494	611194	6378677	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0495	611127	6378679	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0496	611275	6378686	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0497	611180	6378695	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0498	611121	6378696	38	38	40	40	38	38	51	51	38	38	54	54	69	73
P2N_Rx0499	611268	6378699	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0500	611417	6378699	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0501	611331	6378706	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0502	611179	6378715	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0503	611316	6378715	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0504	611119	6378718	38	38	40	40	38	38	51	51	38	38	54	54	69	72
P2N_Rx0505	611466	6378723	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0506	611404	6378728	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0507	611172	6378732	37	37	39	39	37	37	50	50	37	37	53	53	68	72
P2N_Rx0508	611312	6378738	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0509	611401	6378746	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0510	611176	6378749	37	37	39	39	37	37	50	50	37	37	53	53	68	71
P2N_Rx0511	611311	6378762	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0512	611245	6378764	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0513	611388	6378765	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0514	611301	6378778	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0515	611245	6378779	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0516	611378	6378781	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0517	610469	6378788	48	48	50	50	48	48	61	61	48	48	64	64	83	85
P2N_Rx0518	611295	6378796	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0519	611232	6378798	36	36	38	38	36	36	49	49	36	36	52	52	66	70
P2N_Rx0520	611374	6378804	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0521	610268	6378813	42	42	44	44	42	42	54	54	42	42	58	58	74	77

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0522	611286	6378814	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0523	611372	6378823	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0524	610917	6378827	41	41	43	43	41	41	54	54	41	41	57	57	73	76
P2N_Rx0525	611281	6378839	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0526	611360	6378843	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0527	610429	6378859	46	46	48	48	46	46	59	59	46	46	62	62	81	83
P2N_Rx0528	611357	6378862	34	34	36	36	34	34	47	47	34	34	50	50	64	68
P2N_Rx0529	610916	6378869	41	41	43	43	41	41	53	53	41	41	57	57	72	75
P2N_Rx0530	610832	6378880	43	43	45	45	43	43	55	55	43	43	58	58	75	77
P2N_Rx0531	609810	6378889	35	35	37	37	35	35	47	47	35	35	51	51	65	69
P2N_Rx0532	611264	6378891	36	35	37	37	36	35	48	48	36	35	51	51	65	69
P2N_Rx0533	611300	6378899	35	35	37	37	35	35	47	47	35	35	50	50	65	69
P2N_Rx0534	611275	6378908	35	35	37	37	35	35	48	48	35	35	51	51	65	69
P2N_Rx0535	611332	6378908	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0536	611389	6378926	34	34	36	36	34	34	46	46	34	34	49	49	63	68
P2N_Rx0537	611405	6378932	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0538	611328	6378932	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0539	611422	6378937	33	33	35	35	33	33	46	46	33	33	49	49	63	67
P2N_Rx0540	611469	6378953	33	33	35	35	33	33	45	45	33	33	48	48	62	66
P2N_Rx0541	611315	6378959	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0542	611382	6378964	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0543	611464	6378972	33	33	35	35	33	33	45	45	33	33	48	48	62	66
P2N_Rx0544	611309	6378977	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0545	611376	6378984	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0547	611301	6378990	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0548	611373	6379004	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0549	611306	6379009	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0550	611227	6379011	36	36	37	37	36	36	48	48	36	36	51	51	65	69
P2N_Rx0551	611366	6379020	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0552	611297	6379020	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0553	611219	6379024	36	36	37	37	36	36	48	48	36	36	51	51	65	69
P2N_Rx0554	611445	6379025	33	33	35	35	33	33	45	45	33	33	48	48	62	66
P2N_Rx0555	611132	6379028	37	37	38	38	37	37	49	49	37	37	52	52	67	71
P2N_Rx0556	611295	6379039	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0557	611218	6379045	36	36	37	37	36	36	48	48	36	36	51	51	65	69
P2N_Rx0558	611285	6379050	35	35	36	36	35	35	47	47	35	35	50	50	64	68
P2N_Rx0559	610839	6379051	42	42	43	43	42	42	54	54	42	42	57	57	73	76
P2N_Rx0560	611210	6379056	36	36	37	37	36	36	48	48	36	36	51	51	65	69
P2N_Rx0561	611352	6379064	34	34	36	36	34	34	46	46	34	34	49	49	63	67
P2N_Rx0562	611428	6379065	33	33	35	35	33	33	45	45	33	33	48	48	62	66

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040	
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0563	611278	6379067	35	35	36	36	35	35	47	47	35	35	50	50
P2N_Rx0565	611342	6379078	34	34	36	36	34	34	46	46	34	34	49	49
P2N_Rx0566	611275	6379078	35	35	36	36	35	35	47	47	35	35	50	50
P2N_Rx0567	611425	6379085	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0568	611420	6379102	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0569	611336	6379102	34	34	36	36	34	34	46	46	34	34	49	49
P2N_Rx0570	611402	6379124	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0571	611135	6379152	36	36	38	38	36	36	48	48	36	36	51	51
P2N_Rx0572	6111315	6379154	34	34	36	36	34	34	46	46	34	34	49	49
P2N_Rx0573	611388	6379191	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0574	609900	6379196	38	38	40	40	38	38	50	50	38	38	53	53
P2N_Rx0575	611457	6379210	32	32	34	34	32	32	44	44	32	32	47	47
P2N_Rx0576	611379	6379227	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0577	611371	6379244	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0578	611430	6379247	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0579	611424	6379267	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0580	611364	6379269	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0581	611359	6379284	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0582	611419	6379287	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0583	611412	6379306	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0584	611404	6379325	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0585	611338	6379345	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0586	611397	6379347	33	33	34	34	33	33	45	45	33	33	48	48
P2N_Rx0587	611393	6379367	33	33	34	34	33	33	44	44	33	33	48	48
P2N_Rx0588	611256	6379493	34	34	35	35	34	34	46	46	34	34	49	49
P2N_Rx0589	611260	6379516	34	34	35	35	34	34	45	45	34	34	49	49
P2N_Rx0590	611290	6379624	33	33	35	35	33	33	45	45	33	33	48	48
P2N_Rx0591	611181	6379679	34	34	36	36	34	34	46	46	34	34	49	49
P2N_Rx0592	6111352	6379774	32	32	34	34	32	32	44	44	32	32	47	47
P2N_Rx0593	611154	6380093	34	34	35	35	34	34	45	45	34	34	48	48
P2N_Rx0594	6111420	6380344	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0595	6111095	6380384	35	35	36	36	35	35	46	46	35	35	49	49
P2N_Rx0596	610684	6380403	41	41	42	41	41	41	52	52	41	41	55	55
P2N_Rx0597	6111354	6380466	33	33	34	34	33	33	43	43	33	33	47	47
P2N_Rx0598	6111303	6380651	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0599	6111317	6381201	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0600	610229	6381700	49	49	50	50	49	49	61	61	49	49	64	64
P2N_Rx0601	612161	6382027	25	25	26	26	25	25	34	34	25	25	37	37
P2N_Rx0602	6111916	6383936	25	25	26	26	25	25	30	30	25	25	34	34
P2N_Rx0603	6111841	6383951	25	25	27	27	25	25	33	33	25	25	36	36

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0604	611920	6333983	25	25	26	26	25	25	30	30	25	25	33	33	52	55
P2N_Rx0605	608148	6384102	26	26	28	28	26	26	36	36	26	26	39	39	53	58
P2N_Rx0606	608078	6384221	26	26	27	27	26	26	35	35	26	26	38	38	53	57
P2N_Rx0607	609224	6394853	37	37	37	37	37	37	48	48	37	37	51	51	66	69
P2N_Rx0608	607948	6395686	47	47	48	48	47	47	58	58	47	47	62	62	79	81
P2N_Rx0609	609391	6396970	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_Rx0610	608802	6398274	27	27	29	29	27	27	38	38	27	27	41	41	54	59
P2N_Rx0611	606625	6399306	45	45	46	46	45	45	57	57	45	45	60	60	77	80
P2N_Rx0612	605497	6400546	30	30	31	31	30	30	41	41	30	30	44	44	59	62
P2N_Rx0613	606477	6401469	45	45	47	47	45	45	57	57	45	45	61	61	77	80
P2N_Rx0614	606248	6403536	43	43	44	44	43	43	55	55	43	43	58	58	74	77
P2N_Rx0615	607612	6407654	30	30	31	31	30	30	41	41	30	30	44	44	58	61
P2N_Rx0616	605265	6407730	32	32	33	33	32	32	44	44	32	32	47	47	61	65
P2N_Rx0617	607990	6408230	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_Rx0618	606075	6408465	44	44	44	44	44	44	55	55	44	44	58	58	74	77
P2N_Rx0619	606119	6408472	45	45	45	45	45	45	56	56	45	45	59	59	75	78
P2N_Rx0620	607956	6411559	33	33	34	34	33	33	45	45	33	33	48	48	62	66
P2N_Rx0621	608193	6414394	43	43	44	44	43	43	55	55	43	43	58	58	73	76
P2N_Rx0622	607120	6416701	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_Rx0623	607114	6416722	27	27	28	28	27	27	37	37	27	27	40	40	54	58
P2N_Rx0624	609127	6418194	40	40	41	41	40	40	51	51	40	40	54	54	69	73
P2N_Rx0625	608984	6419519	33	33	34	34	33	33	45	45	33	33	48	48	61	66
P2N_Rx0626	609555	6421155	36	36	37	37	36	36	48	48	36	36	51	51	66	69
P2N_Rx0627	613222	6424460	31	31	32	32	31	31	42	42	31	31	46	46	59	63
P2N_Rx0628	612755	6424474	36	36	37	37	36	36	47	47	36	36	50	50	65	68
P2N_Rx0629	612489	6424536	40	40	40	40	40	40	51	51	40	40	54	54	70	73
P2N_Rx0630	612699	6426394	47	47	48	48	47	47	59	59	47	47	62	62	80	82
P2N_Rx0631	612616	6426442	43	43	45	45	43	43	55	55	43	43	58	58	74	77
P2N_Rx0632	614230	6426739	32	32	33	33	32	32	43	43	32	32	46	46	60	64
P2N_Rx0633	615011	6427195	27	27	29	29	27	27	38	38	27	27	41	41	55	59
P2N_Rx0634	611844	6427566	28	28	30	30	28	28	39	39	28	28	42	42	56	60
P2N_Rx0635	612439	6429031	27	27	29	29	27	27	38	38	27	27	41	41	54	60
P2N_Rx0636	612182	6429067	25	25	27	27	25	25	35	35	25	25	38	38	52	57
P2N_Rx0637	616181	6429620	26	26	27	27	26	26	35	35	26	26	38	38	51	57
P2N_Rx0638	616364	6429773	25	25	26	26	25	25	33	33	25	25	37	37	51	56
P2N_Rx0639	612663	6429809	27	27	28	28	27	27	37	37	27	27	40	40	53	59
P2N_Rx0640	612590	6429812	26	26	28	28	26	26	37	37	26	26	40	40	52	58
P2N_Rx0641	614976	6450104	38	38	39	39	38	38	50	50	38	38	53	53	65	72
P2N_Rx0642	616425	6430318	26	26	28	28	26	26	37	37	26	26	40	40	53	58
P2N_Rx0643	613775	6430502	35	35	36	36	35	35	46	46	35	35	49	49	62	68

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0644	614475	6430567	47	47	49	49	47	47	59	59	47	47	62	62	78	83
P2N_Rx0645	615236	6430888	42	42	43	43	42	42	54	54	42	42	57	57	72	76
P2N_Rx0646	616780	6430895	26	26	27	27	26	26	37	37	26	26	40	40	54	59
P2N_Rx0647	617170	6430920	24	23	24	24	24	23	32	32	24	23	35	35	52	56
P2N_Rx0648	615318	6430927	41	41	42	42	41	41	53	53	41	41	56	56	71	75
P2N_Rx0649	617161	6430962	24	24	24	24	24	24	32	32	24	24	35	35	52	56
P2N_Rx0650	616795	6430966	26	26	27	27	26	26	37	37	26	26	40	40	54	59
P2N_Rx0651	615161	6431074	47	47	48	48	47	47	59	59	47	47	62	62	80	83
P2N_Rx0652	616859	6431133	27	27	27	27	27	27	37	37	27	27	40	40	55	59
P2N_Rx0653	616806	6431344	28	28	28	28	28	28	38	38	28	28	41	41	57	60
P2N_Rx0654	616292	6431595	34	34	35	35	34	34	45	45	34	34	48	48	63	67
P2N_Rx0655	615882	6431642	40	40	41	41	40	40	51	51	40	40	54	54	70	74
P2N_Rx0656	616320	6431705	34	34	35	35	34	34	45	45	34	34	48	48	64	68
P2N_Rx0657	616603	6431719	31	31	31	31	31	31	42	42	31	31	45	45	61	65
P2N_Rx0658	616534	6431767	32	32	32	32	32	32	43	43	32	32	46	46	62	66
P2N_Rx0659	616606	6431774	31	31	32	32	31	31	42	42	31	31	45	45	61	65
P2N_Rx0660	616535	6431791	32	32	32	32	32	32	43	43	32	32	46	46	62	66
P2N_Rx0661	616510	6431794	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0662	616492	6431795	33	33	33	33	33	33	43	43	32	32	46	46	62	66
P2N_Rx0663	616472	6431797	33	33	33	33	33	33	43	43	33	33	47	47	63	67
P2N_Rx0664	616451	6431798	33	33	34	34	33	33	44	44	33	33	47	47	63	67
P2N_Rx0665	616435	6431799	33	33	34	34	33	33	44	44	33	33	47	47	63	67
P2N_Rx0666	614994	6431802	40	40	41	41	40	40	52	52	40	40	55	55	70	74
P2N_Rx0667	616418	6431808	34	34	34	34	34	34	44	44	34	34	47	47	64	67
P2N_Rx0668	616382	6431810	34	34	34	34	34	34	45	45	34	34	48	48	64	68
P2N_Rx0669	616398	6431811	34	34	34	34	34	34	45	45	34	34	48	48	64	68
P2N_Rx0670	616367	6431811	34	34	35	35	34	34	45	45	34	34	48	48	64	68
P2N_Rx0671	616617	6431818	31	31	32	32	31	31	42	42	31	31	45	45	61	65
P2N_Rx0672	616347	6431820	35	35	35	35	35	35	45	45	35	35	48	48	65	68
P2N_Rx0673	616328	6431822	35	35	35	35	35	35	46	46	35	35	49	49	65	69
P2N_Rx0674	616308	6431826	35	36	36	36	35	35	46	46	35	35	49	49	65	69
P2N_Rx0675	616548	6431833	32	32	32	32	32	32	43	43	32	32	46	46	62	66
P2N_Rx0676	615002	6431838	40	40	41	41	40	40	52	52	40	40	55	55	69	74
P2N_Rx0677	616526	6431838	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0678	616504	6431843	33	33	33	33	33	33	43	43	33	33	46	46	63	67
P2N_Rx0679	616489	6431845	33	33	33	33	33	33	43	43	33	33	46	46	63	67
P2N_Rx0680	616669	6431845	31	31	31	31	31	31	41	41	31	31	44	44	61	65
P2N_Rx0681	616442	6431853	33	33	34	34	33	33	44	44	33	33	47	47	64	67
P2N_Rx0682	616424	6431857	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0683	616398	6431858	34	34	34	34	34	34	45	45	34	34	48	48	64	68

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040			
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0684	616546	6431860	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0685	616378	6431864	34	34	35	34	34	34	45	45	34	34	48	48	65	68
P2N_Rx0686	616622	6431865	31	31	32	32	31	31	42	42	31	31	45	45	61	65
P2N_Rx0687	616335	6431872	35	35	35	35	35	35	46	46	35	35	49	49	65	69
P2N_Rx0688	616316	6431872	35	35	36	36	35	35	46	46	35	35	49	49	65	69
P2N_Rx0689	616494	6431874	33	33	33	33	33	33	43	43	33	33	47	47	63	67
P2N_Rx0690	616548	6431878	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0691	615855	6431878	44	44	44	44	44	44	54	54	44	44	58	58	74	77
P2N_Rx0692	616669	6431881	31	31	31	31	31	31	41	41	31	31	44	44	61	65
P2N_Rx0693	616439	6431881	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0694	616385	6431886	34	34	35	35	34	34	45	45	34	34	48	48	65	68
P2N_Rx0695	616498	6431891	33	33	33	33	33	33	43	43	33	33	47	47	63	67
P2N_Rx0696	616338	6431897	35	35	35	35	35	35	46	46	35	35	49	49	65	69
P2N_Rx0697	616553	6431899	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0698	616442	6431903	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0699	616389	6431906	34	34	35	35	34	34	45	45	34	34	48	48	65	68
P2N_Rx0700	616500	6431907	33	33	33	33	33	33	43	43	33	33	47	47	63	67
P2N_Rx0701	616553	6431914	32	32	33	33	32	32	43	43	32	32	46	46	62	66
P2N_Rx0702	615518	6431910	55	55	55	55	55	55	66	66	55	55	69	69	91	93
P2N_Rx0703	616336	6431917	35	35	36	36	35	35	46	46	35	35	49	49	66	69
P2N_Rx0704	616389	6431920	34	34	35	35	34	34	45	45	34	34	48	48	65	68
P2N_Rx0705	616447	6431921	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0706	616506	6431923	33	33	33	33	33	33	43	43	33	33	46	46	63	67
P2N_Rx0707	616339	6431934	35	35	36	36	35	35	46	46	35	35	49	49	66	69
P2N_Rx0708	616396	6431935	34	34	35	35	34	34	45	45	34	34	48	48	65	69
P2N_Rx0709	616557	6431937	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0710	616453	6431941	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0711	616504	6431942	33	33	33	33	33	33	43	43	33	33	47	47	63	67
P2N_Rx0712	616560	6431950	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0713	616400	6431952	34	34	35	35	34	34	45	45	34	34	48	48	65	69
P2N_Rx0714	616449	6431955	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0715	616401	6431968	34	34	35	35	34	34	45	45	34	34	48	48	65	69
P2N_Rx0716	616562	6431970	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0717	616509	6431977	33	33	33	33	33	33	43	43	33	33	47	47	64	68
P2N_Rx0718	616462	6431977	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0719	616570	6431987	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0720	616401	6431987	35	35	35	35	35	35	45	45	35	35	48	48	65	69
P2N_Rx0721	616459	6431992	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0722	615104	6431994	40	40	41	41	40	40	51	51	40	40	54	54	69	73
P2N_Rx0723	616743	6431996	30	30	30	30	30	30	40	40	30	30	44	44	61	65

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	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0724	616403	6432000	35	35	35	35	35	35	45	45	35	35	48	48	48	48
P2N_Rx0725	616353	6432001	35	35	36	35	35	35	46	46	35	35	49	49	66	66
P2N_Rx0726	616567	6432005	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0727	616466	6432009	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0728	616519	6432013	33	33	33	33	33	33	43	43	33	33	47	47	64	67
P2N_Rx0729	616407	6432018	35	35	35	35	35	35	45	45	35	35	48	48	65	69
P2N_Rx0730	616355	6432019	35	35	36	36	35	35	46	46	35	35	49	49	66	70
P2N_Rx0731	616466	6432024	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0732	616576	6432024	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0733	616523	6432034	33	33	33	33	33	33	43	43	33	33	47	47	64	68
P2N_Rx0734	616359	6432034	35	35	36	36	35	35	46	46	35	35	49	49	66	70
P2N_Rx0735	616412	6432034	35	35	35	35	35	35	45	45	35	35	48	48	65	69
P2N_Rx0736	616472	6432043	34	34	34	34	34	34	44	44	34	34	47	47	64	68
P2N_Rx0737	616561	6432046	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0738	616581	6432050	32	32	32	32	32	32	43	43	32	32	46	46	63	67
P2N_Rx0739	616408	6432052	35	35	35	35	35	35	45	45	35	35	48	48	65	69
P2N_Rx0740	616363	6432052	35	35	36	36	35	35	46	46	35	35	49	49	66	70
P2N_Rx0741	616541	6432054	33	33	33	33	33	33	43	43	32	32	46	46	63	67
P2N_Rx0742	616518	6432058	33	33	33	33	33	33	44	44	33	33	47	47	64	68
P2N_Rx0743	616469	6432063	34	34	34	34	34	34	44	44	34	34	47	47	65	69
P2N_Rx0744	616452	6432070	34	34	34	34	34	34	45	45	34	34	48	48	65	69
P2N_Rx0745	616438	6432074	34	34	35	35	34	34	45	45	34	34	48	48	65	69
P2N_Rx0746	616417	6432078	35	35	35	35	35	35	45	45	35	35	48	48	65	69
P2N_Rx0747	615523	6432090	47	47	47	47	47	47	58	58	47	47	61	61	80	82
P2N_Rx0748	616583	6432106	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0749	616674	6432109	31	31	31	31	31	31	41	41	31	31	44	44	62	66
P2N_Rx0750	616751	6432112	30	30	30	30	30	30	40	40	30	30	43	43	61	66
P2N_Rx0751	616537	6432118	33	33	33	33	33	33	43	43	33	33	46	46	64	68
P2N_Rx0752	615657	6432115	55	55	55	55	55	55	66	66	55	55	69	69	91	93
P2N_Rx0753	616469	6432120	34	34	34	34	34	34	44	44	34	34	47	47	65	69
P2N_Rx0754	616516	6432124	33	33	33	33	33	33	44	44	33	33	47	47	64	68
P2N_Rx0755	616586	6432140	32	32	33	33	32	32	43	43	32	32	46	46	63	67
P2N_Rx0756	616469	6432144	34	34	34	34	34	34	44	44	34	34	47	47	65	69
P2N_Rx0757	616765	6432151	30	30	30	30	30	30	40	40	30	30	43	43	61	66
P2N_Rx0758	616521	6432156	33	33	33	33	33	33	44	44	33	33	47	47	64	68
P2N_Rx0759	616677	6432170	31	31	31	31	31	31	41	41	31	31	44	44	62	67
P2N_Rx0760	615193	6432189	39	39	39	39	39	39	50	50	39	39	53	53	68	72
P2N_Rx0762	615611	6432191	48	48	48	48	48	48	58	58	48	48	61	61	81	84
P2N_Rx0763	616770	6432197	30	30	30	30	30	30	40	40	30	30	43	43	61	66
P2N_Rx0764	616477	6432209	34	34	34	34	34	34	44	44	34	34	47	47	65	69

Receiver ID	Receiver Location		Laeq-No Build 2019		Laeq-Build 2019		Laeq-No Build 2025		Laeq-Build 2025		Laeq-No Build 2040		Laeq-Build 2040	
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx0765	616487	64332222	34	34	34	34	34	34	44	44	34	34	47	47
P2N_Rx0766	615405	6432232	42	42	42	42	42	42	53	53	42	42	56	56
P2N_Rx0767	616779	6432233	30	30	30	30	30	30	40	40	30	30	43	43
P2N_Rx0768	616490	6432246	34	34	34	34	34	34	44	44	34	34	47	47
P2N_Rx0769	616784	6432261	30	30	30	30	30	30	40	40	30	30	43	43
P2N_Rx0771	616494	6432270	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0772	616494	6432289	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0773	616624	6432295	32	32	32	32	32	32	42	42	32	32	45	45
P2N_Rx0774	616504	6432314	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0775	616779	6432315	30	30	30	30	30	30	40	40	30	30	43	43
P2N_Rx0776	616624	6432316	32	32	32	32	32	32	42	42	32	32	45	45
P2N_Rx0777	616605	6432321	32	32	32	32	32	32	42	42	32	32	45	45
P2N_Rx0778	616584	6432324	32	32	32	32	32	32	43	43	32	32	46	46
P2N_Rx0779	616567	6432328	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0780	616544	6432329	33	33	33	33	33	33	43	43	33	33	46	46
P2N_Rx0781	616699	6432335	31	30	31	31	31	30	41	41	31	30	44	44
P2N_Rx0782	616506	6432335	33	33	34	34	33	33	44	44	33	33	47	47
P2N_Rx0783	616483	6432336	34	34	34	34	34	34	44	44	34	34	47	47
P2N_Rx0784	616464	6432343	34	34	34	34	34	34	44	44	34	34	47	47
P2N_Rx0785	616438	6432345	34	34	35	35	34	34	45	45	34	34	48	48
P2N_Rx0786	616792	6432354	29	29	30	30	29	29	40	40	29	29	43	43
P2N_Rx0788	616704	6432373	30	30	31	31	30	30	41	41	30	30	44	44
P2N_Rx0789	615604	6432378	45	45	45	45	45	45	55	55	45	45	58	58
P2N_Rx0792	615116	6432391	36	36	36	36	36	36	47	47	36	36	50	50
P2N_Rx0794	616568	6432394	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0795	616506	6432403	33	33	33	33	33	33	44	44	33	33	47	47
P2N_Rx0800	616567	6432416	32	32	33	33	32	32	43	43	32	32	46	46
P2N_Rx0801	616450	6432419	34	34	34	34	34	34	44	44	34	34	48	48
P2N_Rx0802	616427	6432420	34	34	35	35	34	34	45	45	34	34	48	48
P2N_Rx0803	616499	6432421	33	33	33	33	33	33	44	44	33	33	47	47
P2N_Rx0804	615795	6432424	54	54	54	54	54	54	65	65	54	54	68	68
P2N_Rx0812	616437	6432453	34	34	34	34	34	34	45	45	34	34	48	48
P2N_Rx0824	615458	6432495	40	40	40	40	40	40	50	50	40	40	53	53
P2N_Rx0842	614626	6432578	30	31	30	31	30	30	41	41	30	30	44	44
P2N_Rx0860	613987	6432641	25	25	26	26	25	25	35	35	25	25	38	38
P2N_Rx0888	614524	6432759	28	28	29	29	28	28	38	38	28	28	42	42
P2N_Rx0899	614210	6432810	25	25	26	26	25	25	36	36	25	25	39	39
P2N_Rx0920	614328	6432946	25	25	26	26	25	25	35	35	25	25	39	39
P2N_Rx0929	613930	6433001	23	23	24	24	23	23	30	30	23	23	33	33
P2N_Rx1301	602007	6332895	-	-	-	-	-	-	-	-	-	-	-	-

Receiver ID	Receiver Location		L _{Aeq} - No Build 2019		L _{Aeq} - Build 2019		L _{Aeq} - No Build 2025		L _{Aeq} - Build 2025		L _{Aeq} - No Build 2040		L _{Aeq} - Build 2040	
	Easting	Northing	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
P2N_Rx1302	601053	6333120	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1303	600081	6332659	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1304	602135	6331333	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1305	603288	6333817	24	24	26	26	24	24	34	34	24	24	37	37
P2N_Rx1306	616579	6429153	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1307	617860	6429135	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1308	617307	6429464	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1309	606476	6401590	46	46	47	47	46	46	58	58	46	46	61	61
P2N_Rx1310	617054	6428745	-	-	-	-	-	-	-	-	-	-	-	-
P2N_Rx1317	611233	6375984	36	36	37	37	36	36	48	48	36	36	51	51
P2N_Rx1322	616474	6432189	34	34	34	34	34	34	44	44	34	34	47	47
P2N_Rx1323	616688	6432261	31	31	31	31	31	31	41	41	31	31	44	44
P2N_Rx1324	616628	6432390	31	31	32	32	31	31	42	42	31	31	45	45
P2N_WORx0001	611631	6378275	33	33	35	35	33	33	46	46	33	33	49	49
P2N_WORx0002	611854	6378051	32	32	34	34	32	32	44	44	32	32	47	47

Receiver ID	Receiver Location Easting	Northing		L _{Aeq} - 2025 Build		L _{Aeq} - 2040 Build		L _{Amax} Design
		Day	Night	Day	Night	Day	Night	
P2N_Rx0181	605642	6334456	35	35	37	37	37	61
P2N_Rx0183	605417	6334604	37	37	39	39	39	63
P2N_Rx0185	605390	6334678	38	38	40	40	40	64
P2N_Rx0187	606439	6334927	30	30	32	32	32	52
P2N_Rx0188	605085	6335096	43	43	45	45	45	70
P2N_Rx0189	605855	6335140	34	34	36	36	36	61
P2N_Rx0192	606037	6335405	33	33	35	35	35	59
P2N_Rx0193	606091	6335446	33	33	35	35	35	59
P2N_Rx0194	603678	6335637	40	40	42	42	42	67
P2N_Rx0195	603391	6335737	38	38	40	40	40	64
P2N_Rx0196	604200	6335810	50	50	52	52	52	77
P2N_Rx0197	604109	6335849	48	48	50	50	50	75
P2N_Rx0198	606166	6335910	32	32	34	34	34	58
P2N_Rx0199	603613	6335917	40	40	42	42	42	67
P2N_Rx0200	606348	6336046	30	30	32	32	32	55
P2N_Rx0201	603442	6336202	37	37	39	39	39	65
P2N_Rx0202	605719	6336662	33	33	35	35	35	60
P2N_Rx0203	603335	6336953	32	32	34	34	34	62
P2N_Rx0204	605018	6337152	34	34	36	36	36	63
P2N_Rx0205	604431	6337320	33	33	35	35	35	65
P2N_Rx0206	602580	6337450	26	26	28	28	28	51
P2N_Rx0207	605121	6337526	30	30	32	32	32	59
P2N_Rx0208	606000	6337667	26	26	28	28	28	50
P2N_Rx0209	604305	6337785	29	29	31	31	31	59
P2N_Rx0210	603315	6337945	26	26	28	28	28	54
P2N_Rx0211	605270	6338406	24	24	26	26	26	49
P2N_Rx1301	602007	6332895	50	50	52	52	52	76
P2N_Rx1302	601053	6333120	39	39	41	41	41	65
P2N_Rx1303	600081	6332659	32	32	34	34	34	62
P2N_Rx1304	602135	6331333	40	40	42	42	42	65
P2N_Rx1305	603288	6333817	47	47	49	49	49	74

Appendix E – Operational noise contours, LAeq


LEGEND

- | | | | |
|---|---|---|--|
| ● Sensitive receiver | ● Health | — The proposal | — 2020 Build 60dB(A) LAeq 9-hour |
| ● Active recreation | ● Religious | — Watercourse | — 2020 Build 65dB(A) LAeq 15-hour |

Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 1

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specila



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

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Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA94
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 2

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Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 55



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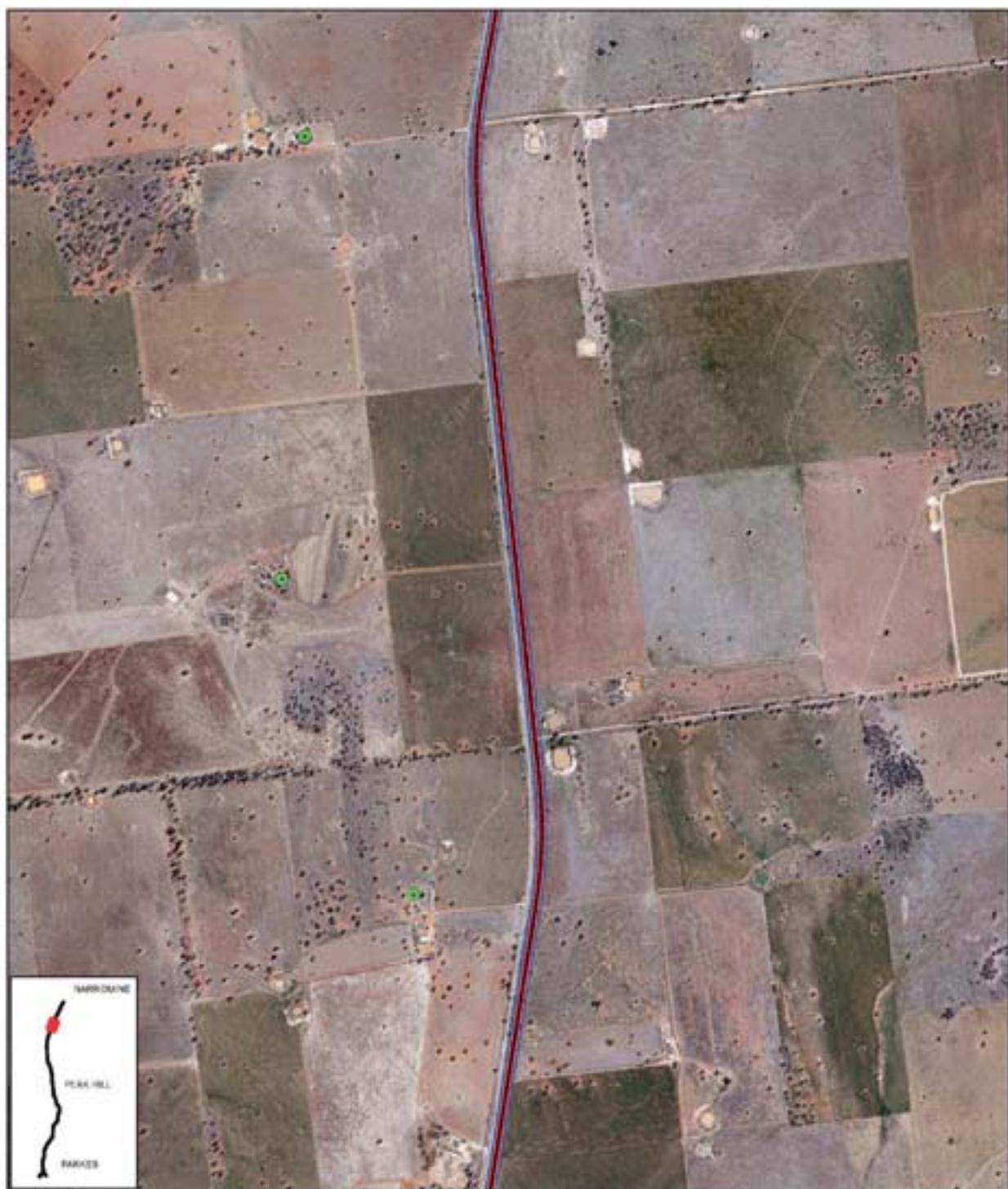
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Figure E1-Sheet 3

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Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 4

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LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

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Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 5



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

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Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 6

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LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58

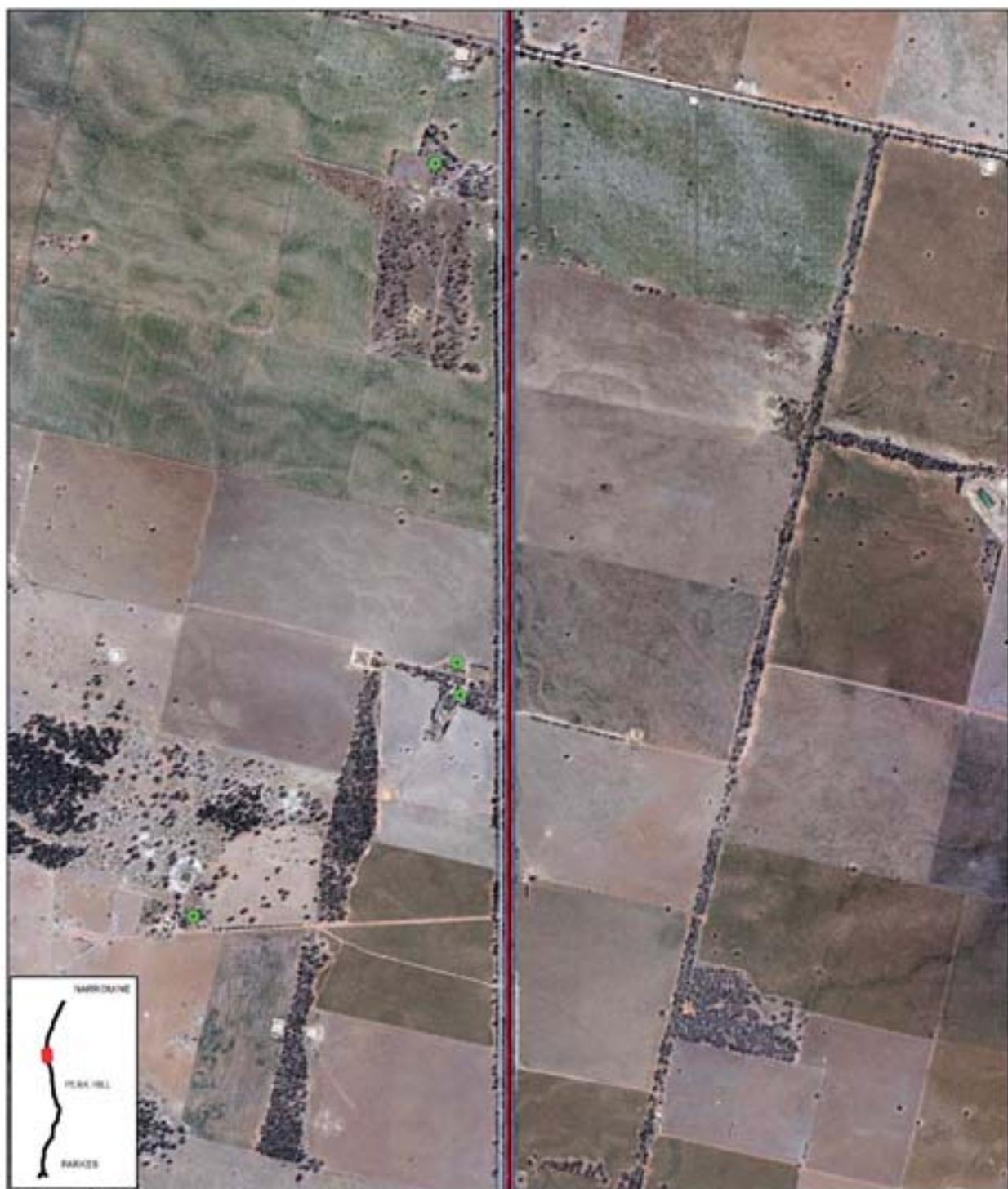


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Figure E1-Sheet 7



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Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



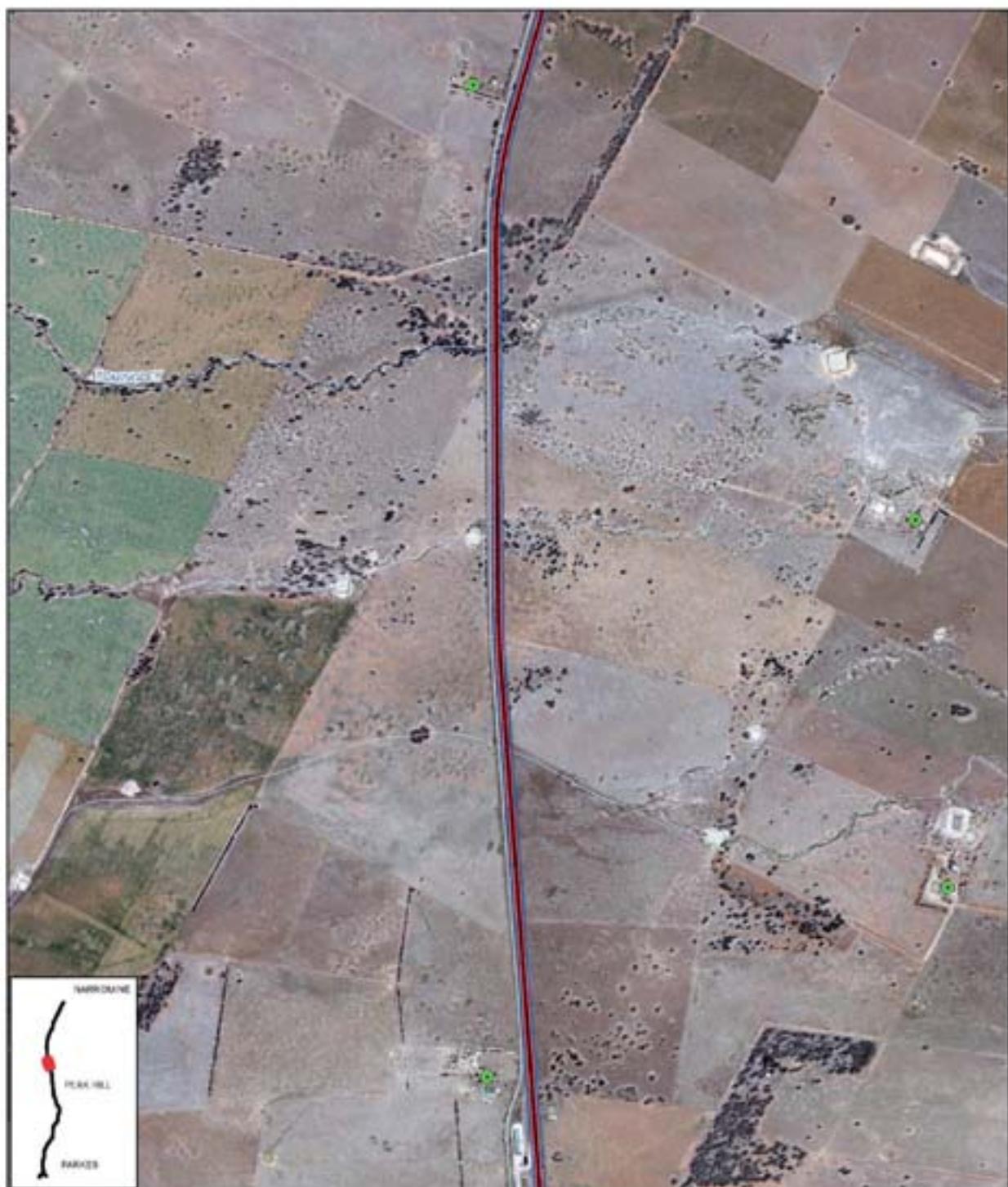
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Figure E1-Sheet 8

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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58

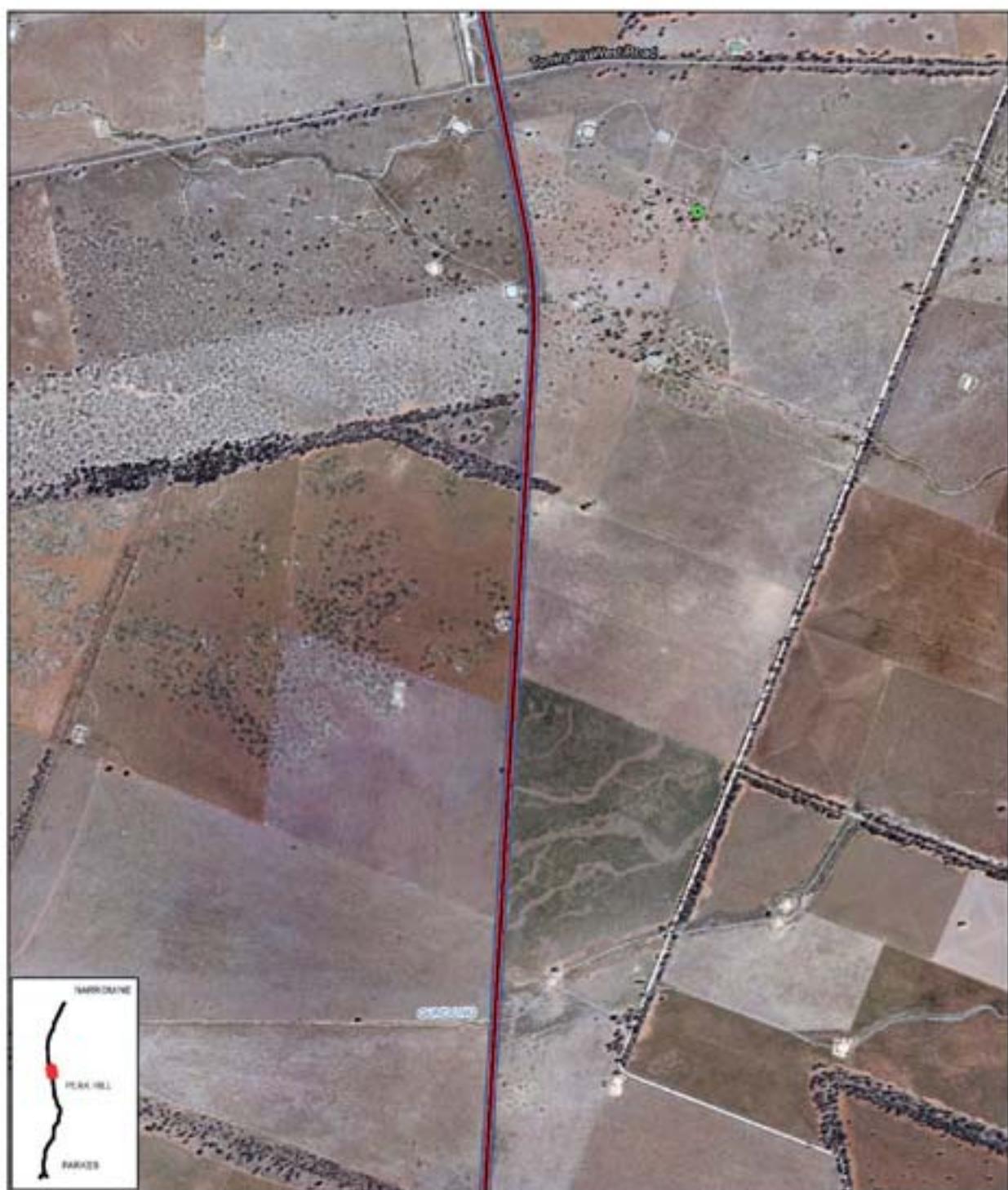


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Figure E1-Sheet 9



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 10



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 11

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Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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Figure E1-Sheet 12



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Meters
Map Projection: StatePlane New South Wales 2 - 1954 / GDA 1984 MGA Zone 58
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2020 build

Figure E1-Sheet 13

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 65dB(A) LAeq 5-hour
- Education
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 14

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Meters

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

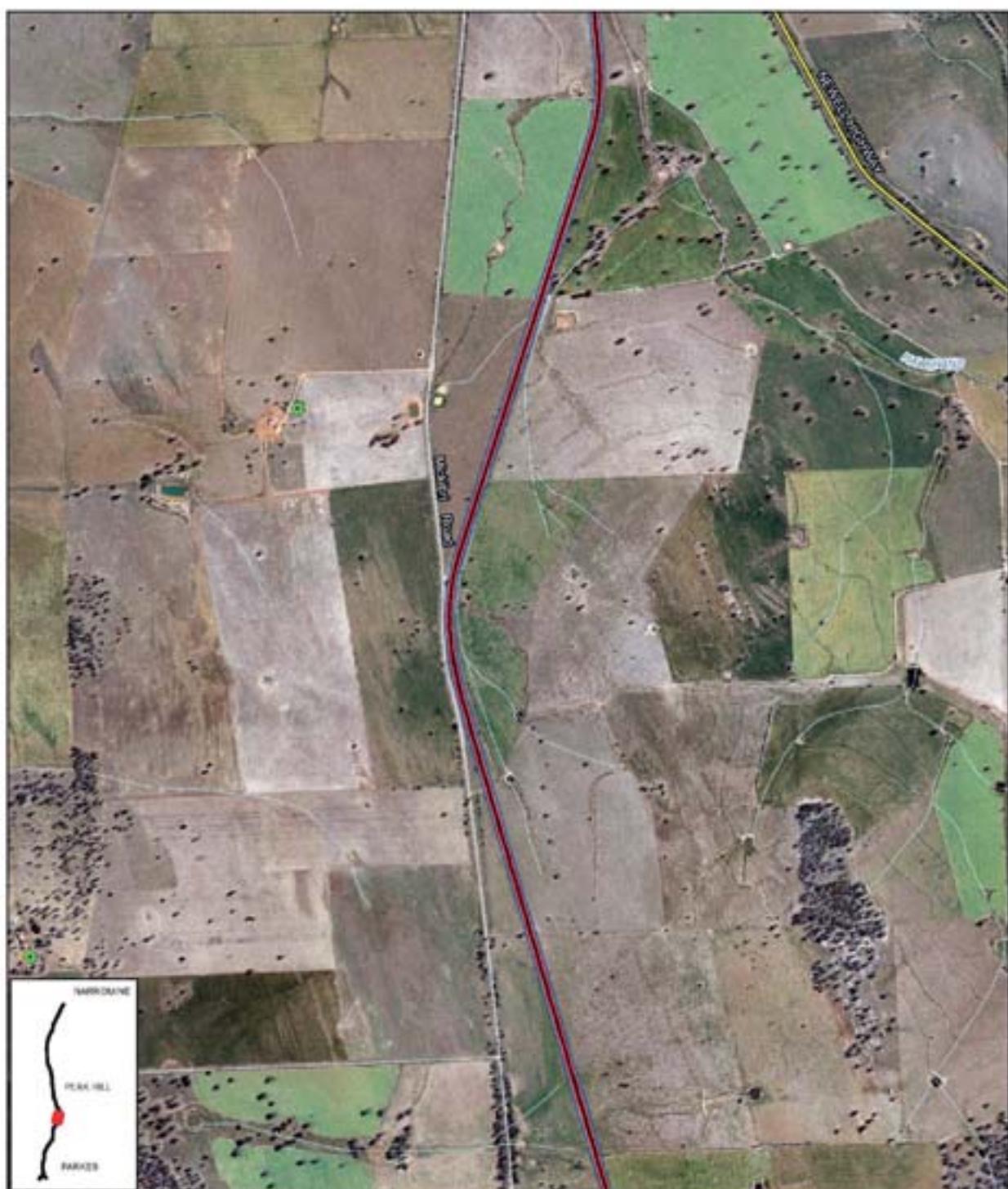
2020 build

Figure E1-Sheet 15

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 16

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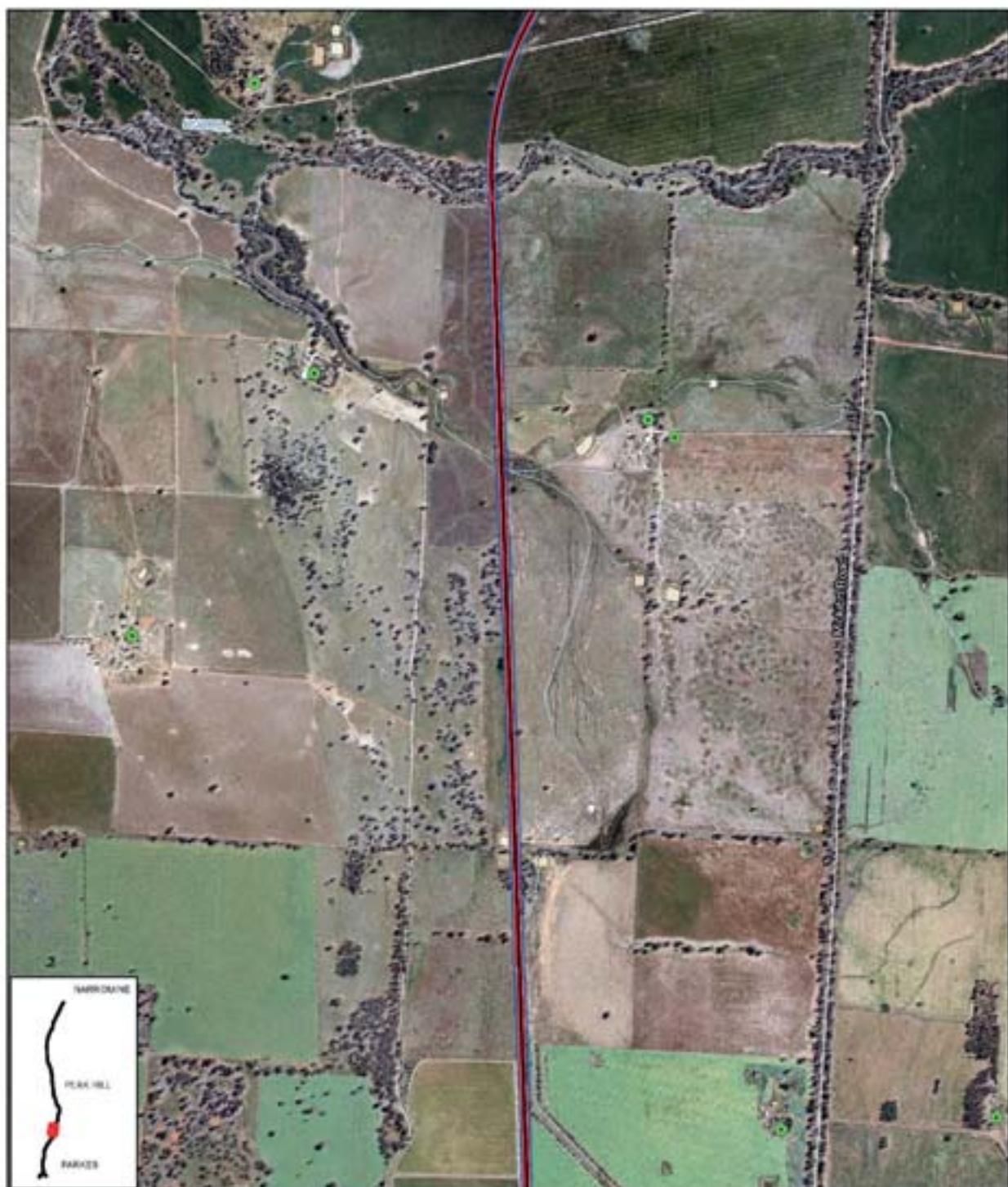
Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour





LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 18

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour





Paper Size A4
0 75 150 300 450 600

Latitude
Map Projection: Transverse Mercator
Horizontal Datum: 1994 TA94
Grid: GDA 1994 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 20

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 21

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2020 Build 60dB(A) LAeq 9-hour
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 22

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

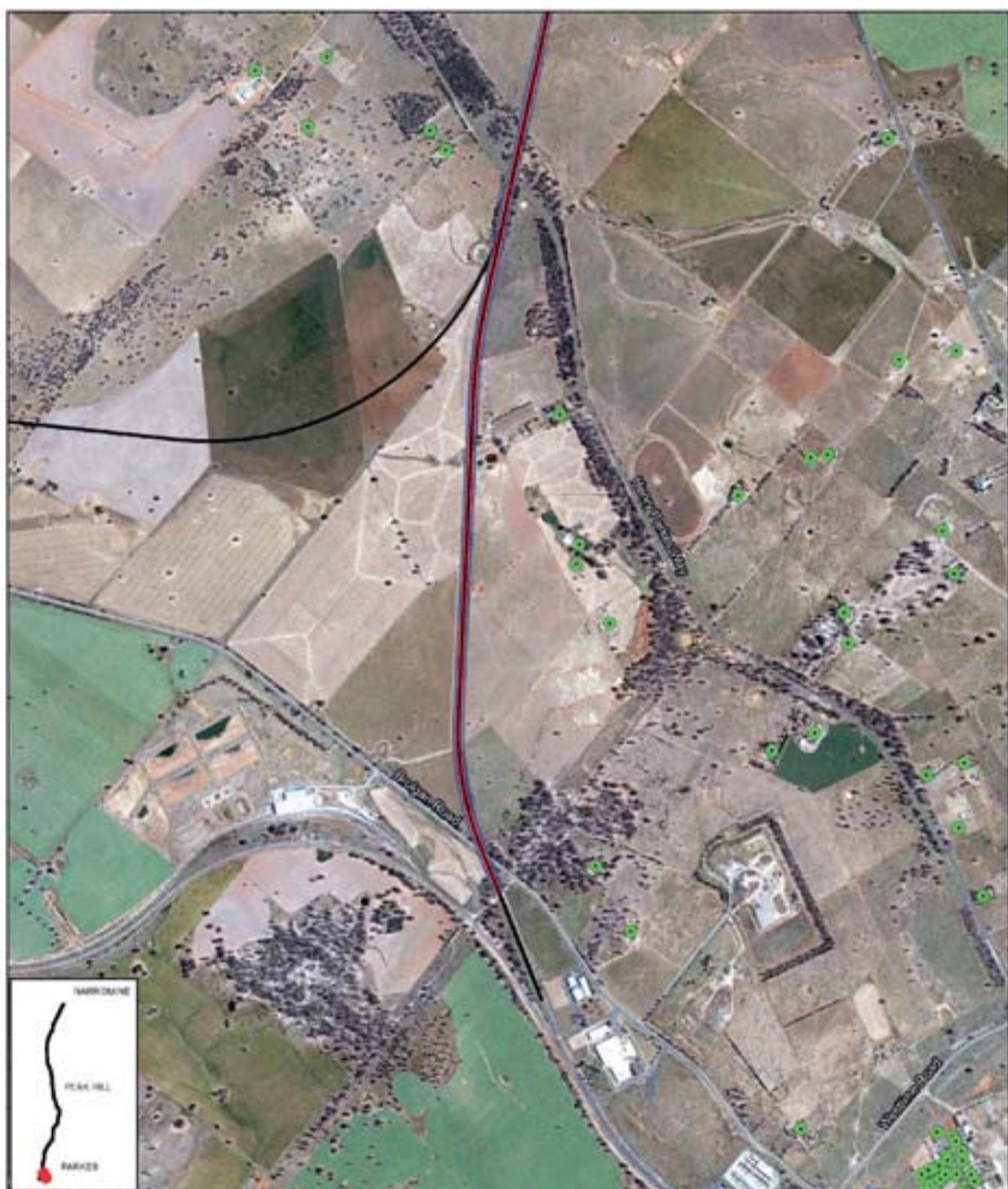
2020 build

Figure E1-Sheet 23

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 24



LEGEND

- Sensitive receiver
- The proposal
- 2020 Build 60dB(A) LAeq 9-hour
- Watercourse
- 2020 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 50 100 150 200 250 300 350 400 450
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Oct 2016

2020 build

Figure E1-Sheet 25

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 1

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 50dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 55dB(A) LAeq 15-hour
- Aged care
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- Watercourse
- 2025 No-Build 65dB(A) LAeq 15-hour
- The proposal

Paper Size A4
0 75 150 300 450 600

Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 2

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58



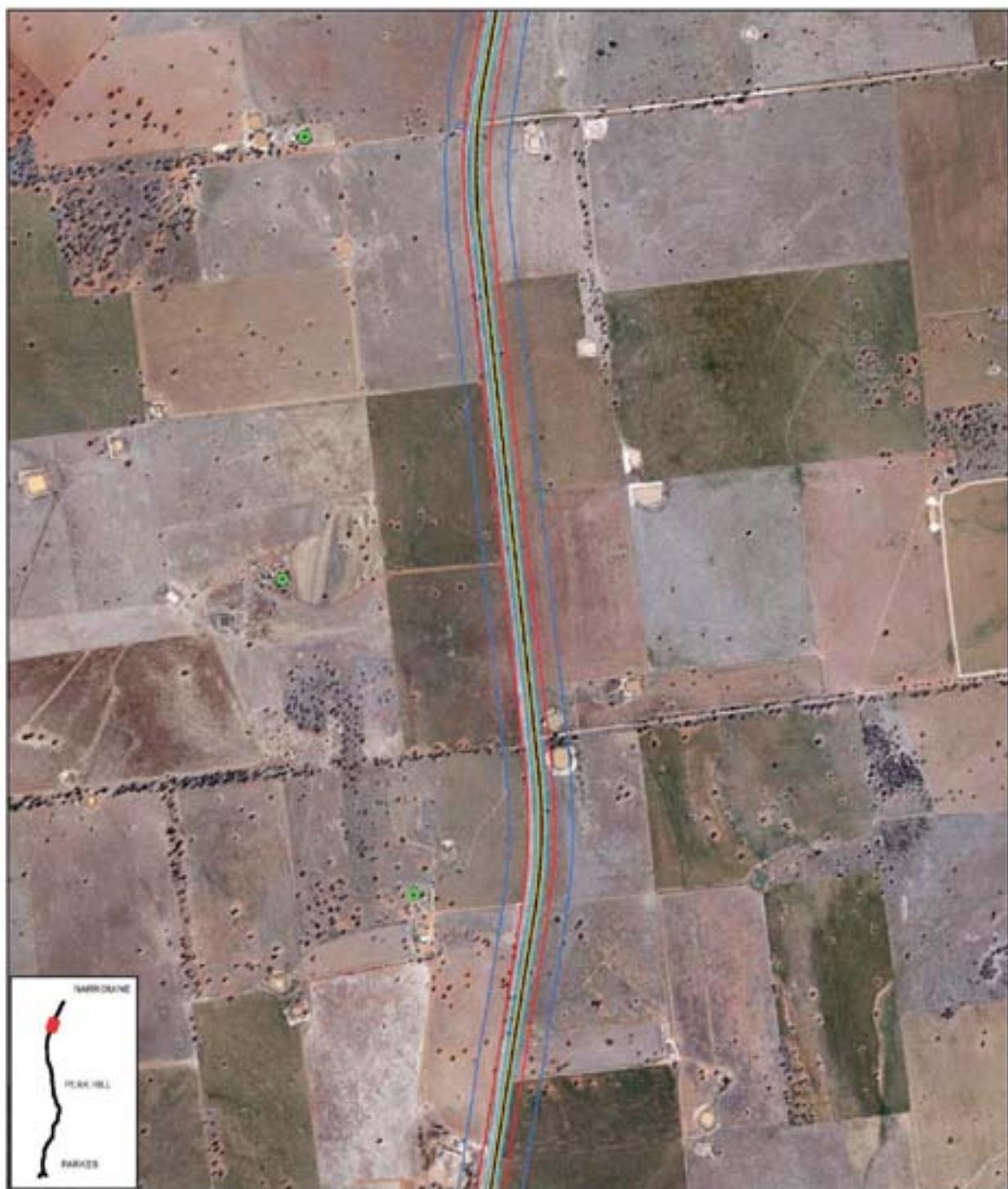
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Inland Rail - Parkes to Narrandera

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Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 3

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Aged care
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- Watercourse
- 2025 No-Build 65dB(A) LAeq 15-hour
- The proposal

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 4

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: sparcia



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2025 build vs 2025 no build Figure E2- Sheet 5

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 6

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Aged care
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- 2025 No-Build 65dB(A) LAeq 15-hour
- The proposal
- Watercourse

Paper Size A4
0 75 150 300 450 600

Coordinates
Map Projection: Transverse Mercator
Northing Datum: 1024 1024
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

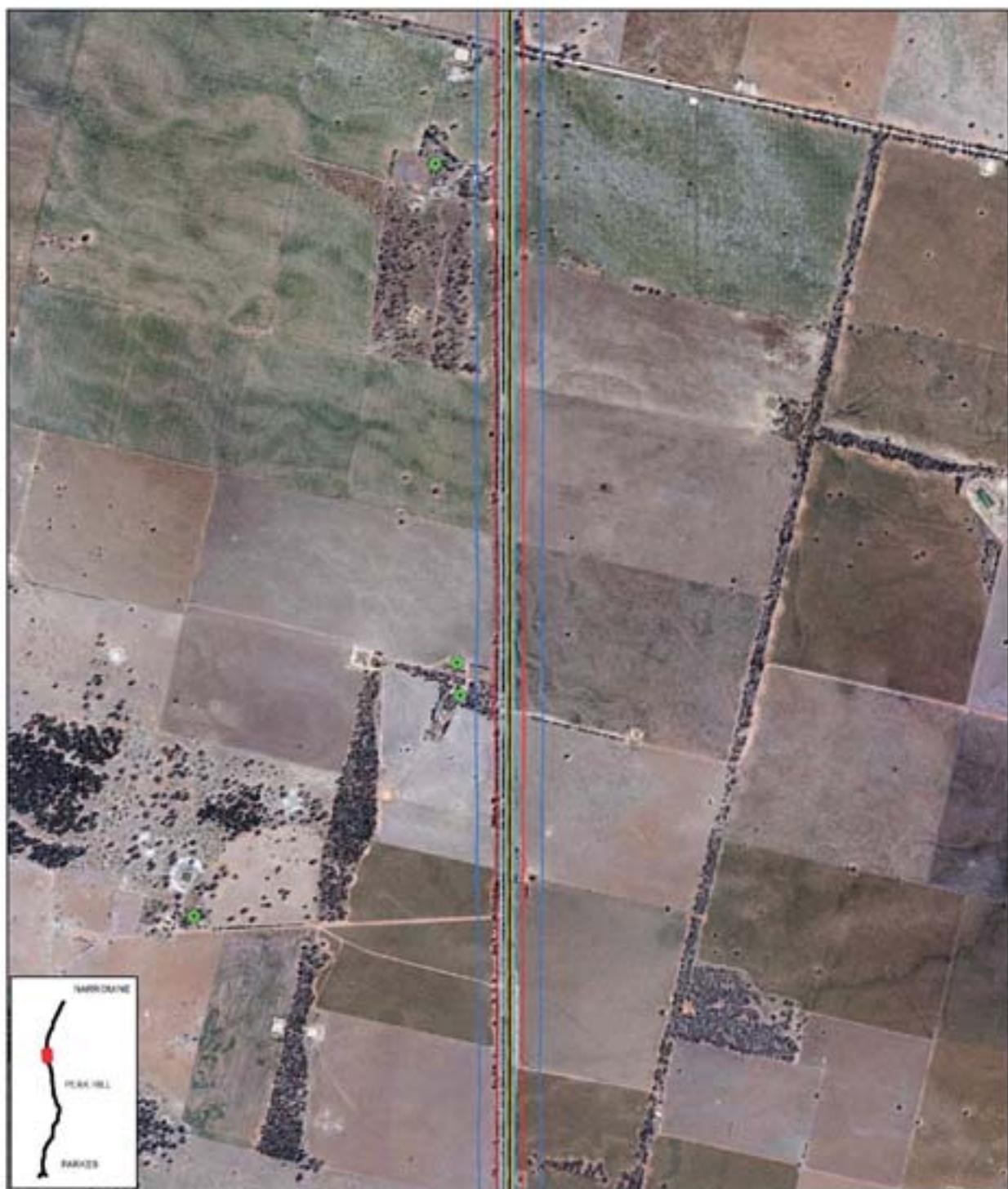
Job Number | 20-17916
Revision | 0
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2025 build vs 2025 no build Figure E2- Sheet 7

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia

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LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- The proposal
- 2025 No-Build 65dB(A) LAeq 15-hour
- Watercourse

Paper Size A4
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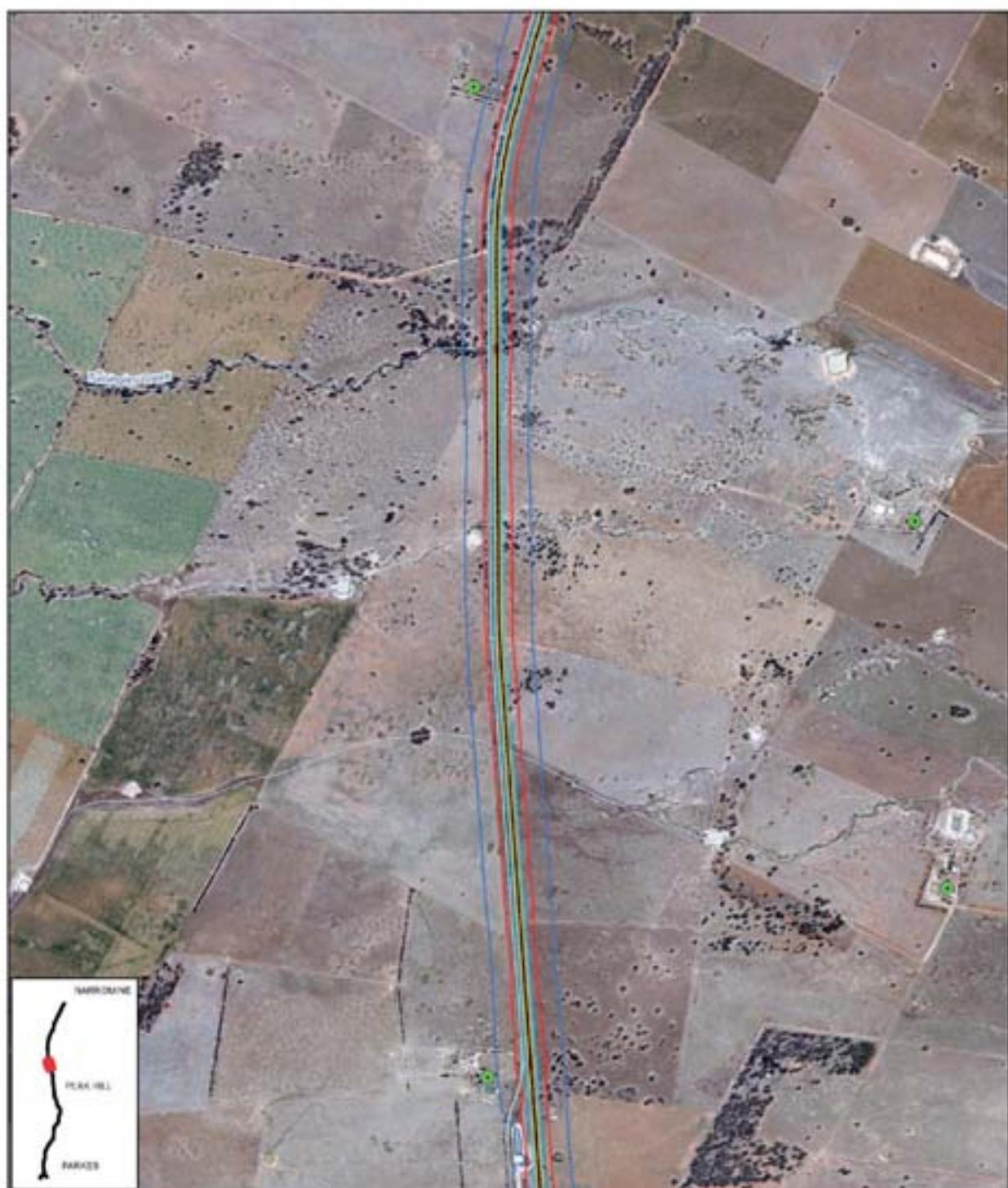
Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 8



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Possessive recreation
- Religious
- The proposal
- Watercourse

2025 Build 60dB(A) LAeq 9-hour

2025 Build 65dB(A) LAeq 15-hour

2025 No-Build 60dB(A) LAeq 9-hour

2025 No-Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1994 TA94
Grid: GDA 1984 MGA Zone 58



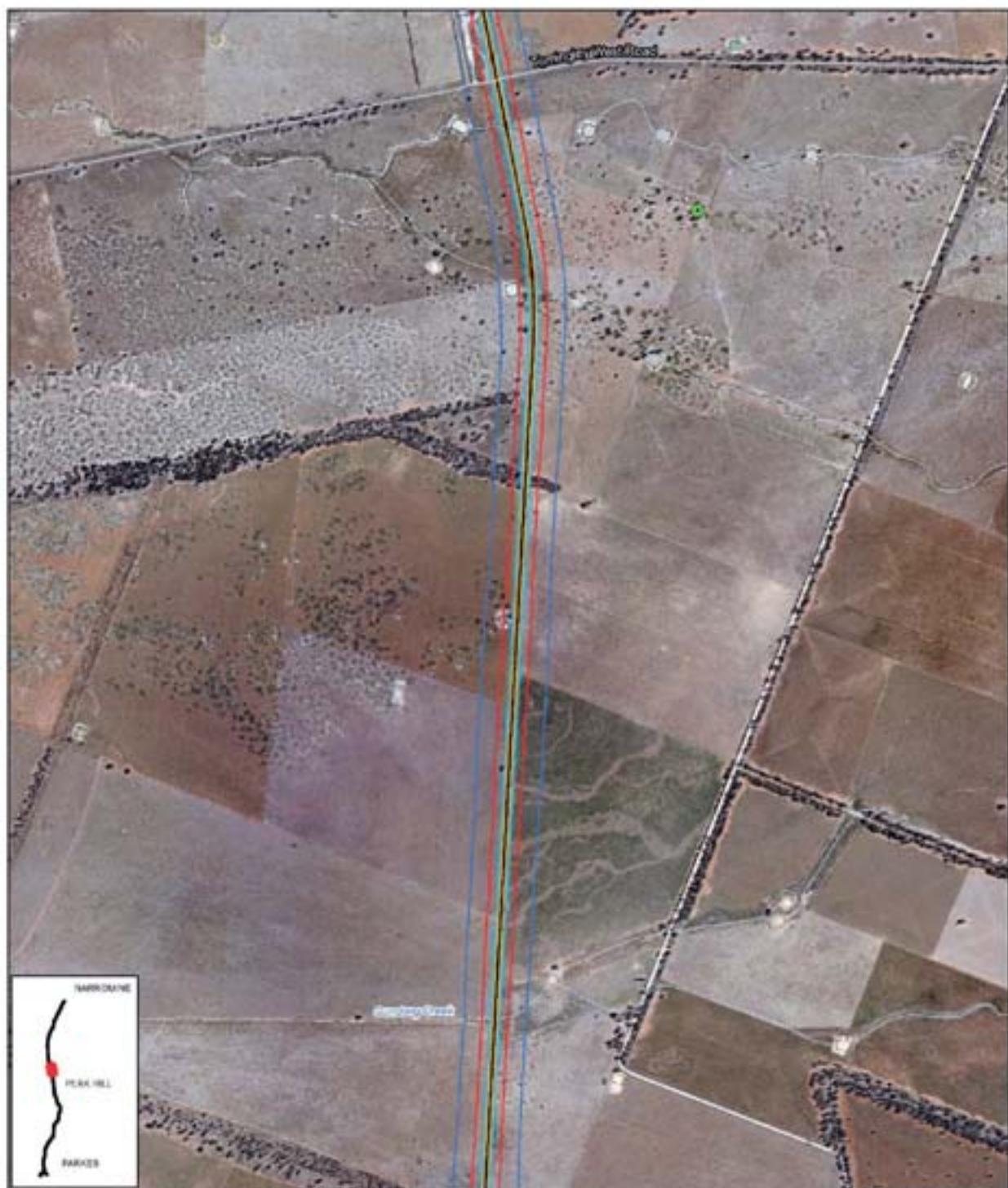
Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 9

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Passive recreation
- Religious
- The proposal
- Watercourse

2025 Build 60dB(A) LAeq 9-hour

2025 Build 65dB(A) LAeq 15-hour

2025 No-Build 60dB(A) LAeq 9-hour

2025 No-Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Latitude
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 10



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Passive recreation
- Religious
- The proposal
- Watercourse

2025 Build 50dB(A) LAeq 9-hour
2025 Build 65dB(A) LAeq 15-hour
2025 No-Build 60dB(A) LAeq 9-hour
2025 No-Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 11



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Passive recreation
- Religious
- The proposal
- Watercourse

— 2025 Build 60dB(A) LAeq 9-hour

— 2025 Build 65dB(A) LAeq 15-hour

— 2025 No-Build 60dB(A) LAeq 9-hour

— 2025 No-Build 65dB(A) LAeq 15-hour

Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 12

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 50dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 60dB(A) LAeq 9-hour
- Aged care
- Religious
- 2025 No-Build 55dB(A) LAeq 15-hour
- Education
- Religious
- 2025 No-Build 65dB(A) LAeq 15-hour
- The proposal
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 GDA
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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2025 build vs 2025 no build Figure E2- Sheet 13

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Aged care
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- Watercourse
- 2025 No-Build 65dB(A) LAeq 15-hour
- The proposal

Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58



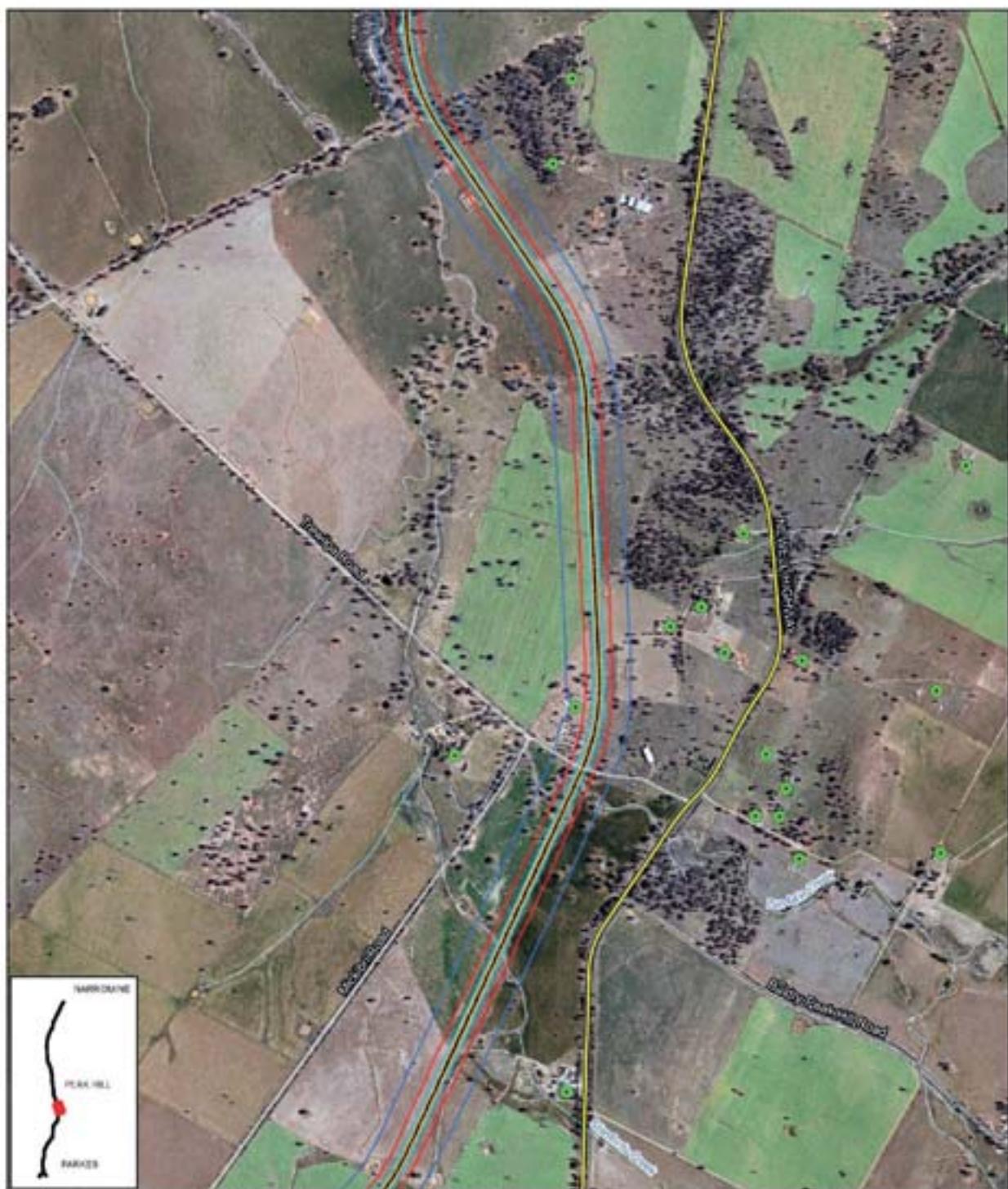
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Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 14

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600

Latitude
Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA94
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 15

E:\\2025\\17916-0\\Map Deliverables\\PDR\\Risks\\2025\\E_Risks_FPN_2025_Sec_Bound

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Possessive recreation
- Religious
- The proposal
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 16

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Passive recreation
- Religious
- The proposal
- Watercourse

2025 Build 60dB(A) LAeq 9-hour

2025 Build 65dB(A) LAeq 15-hour

2025 No-Build 60dB(A) LAeq 9-hour

2025 No-Build 65dB(A) LAeq 15-hour

Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
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Date | 01 Dec 2016

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1994 TA94
Grid: GDA 1984 MGA Zone 58



2025 build vs 2025 no build Figure E2- Sheet 17

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: sparcle

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LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Aged care
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- The proposal
- 2025 No-Build 65dB(A) LAeq 15-hour
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 18

E:\\2025\\17916-0\\Map Deliverables\\PDR\\Radar-2025\\E_Radar_FDR_2025_Sec_Bound

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
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2025 build vs 2025 no build Figure E2- Sheet 19

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: sparcia



LEGEND

- Sensitive receiver
- Active recreation
- Aged care
- Education
- Health
- Passive recreation
- Religious
- The proposal
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 20

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Health
- 2025 Build 60dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- The proposal
- 2025 No-Build 65dB(A) LAeq 15-hour
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA94
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrabri

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Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 21

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia


LEGEND

- Sensitive receiver
- Health
- 2025 Build 50dB(A) LAeq 9-hour
- Active recreation
- Passive recreation
- 2025 Build 65dB(A) LAeq 15-hour
- Religious
- 2025 No-Build 60dB(A) LAeq 9-hour
- Education
- The proposal
- 2025 No-Build 65dB(A) LAeq 15-hour
- Watercourse

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrandera

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2025 build vs 2025 no build Figure E2- Sheet 22

E:\\2025\\17916\\0\\Map Deliverables\\P2\\Radar\\2025\\E_Radar_PDF_2025_Sec_Bound

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia


LEGEND

- | | | |
|---|---|--|
| ● Sensitive receiver | ● Health | — 2025 Build 50dB(A) LAeq 9-hour |
| ● Active recreation | ● Passive recreation | — 2025 Build 55dB(A) LAeq 15-hour |
| ● Aged care | ● Religious | — 2025 No-Build 60dB(A) LAeq 9-hour |
| ● Education | — The proposal | — 2025 No-Build 65dB(A) LAeq 15-hour |
| | — Watercourse | — New rail line 2025 Build 55dB(A) LAeq 9-hour |

Paper Size A4

0 75 150 300 450 600

Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1994 TA94
Grid: GDA 1984 MGA Zone 58



New rail line 2025 Build 60dB(A) LAeq 15-hour

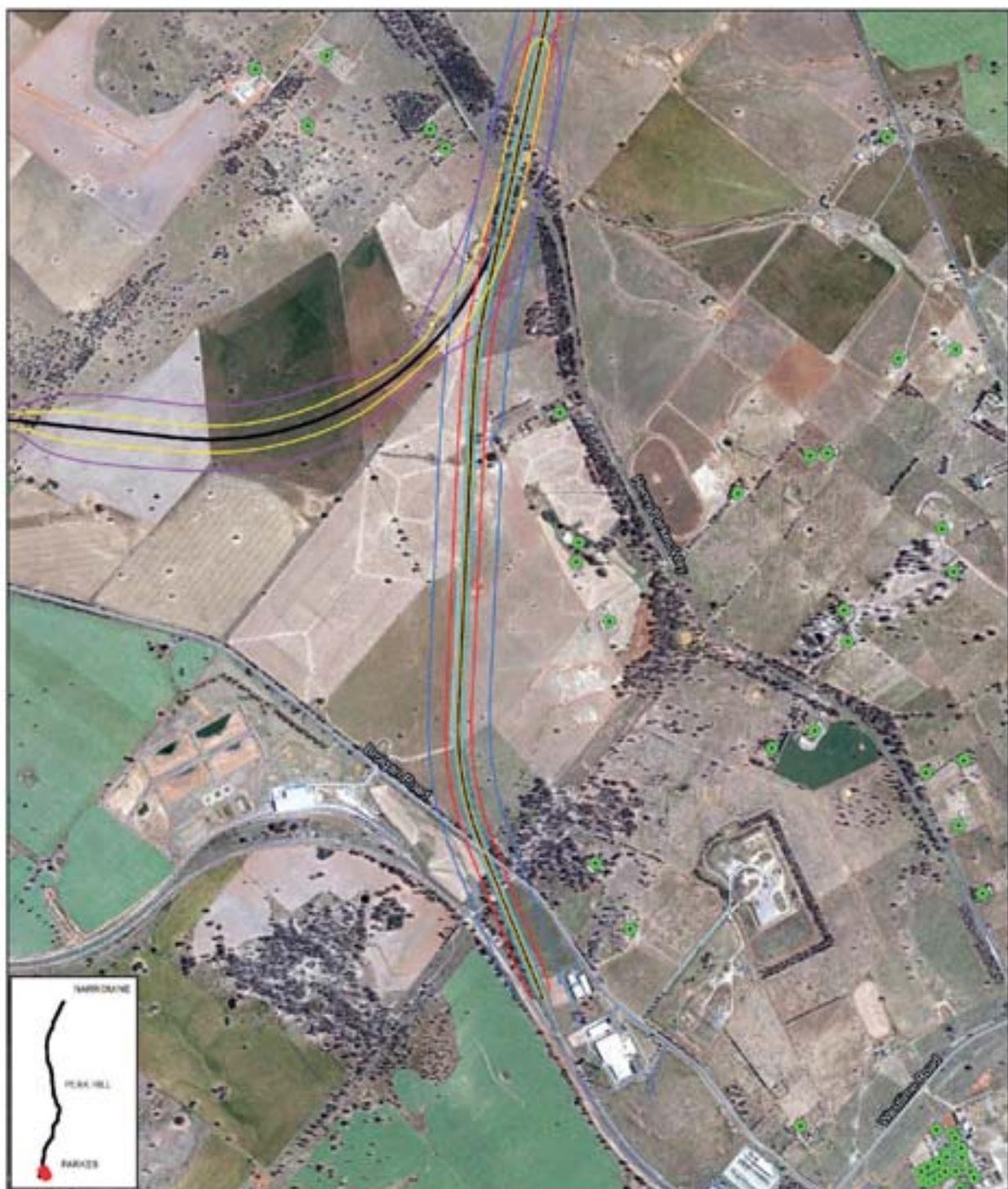
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Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2025 build vs 2025 no build Figure E2- Sheet 23

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- | | | |
|----------------------|----------------------|--|
| ● Sensitive receiver | ● Health | — 2025 Build 60dB(A) LAeq 9-hour |
| ● Active recreation | ● Passive recreation | — 2025 Build 65dB(A) LAeq 15-hour |
| ● Aged care | ● Religious | — 2025 No-Build 60dB(A) LAeq 9-hour |
| ● Education | — The proposal | — 2025 No-Build 65dB(A) LAeq 15-hour |
| | — Watercourse | — New rail line 2025 Build 55dB(A) LAeq 9-hour |

Paper Size A4

0 75 150 300 450 600

Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



New rail line 2025 Build 55dB(A) LAeq 9-hour
Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
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2025 build vs 2025 no build Figure E2- Sheet 24



- LEGEND**
- Sensitive receiver
 - Health
 - 2025 Build 50dB(A) LAeq 9-hour
 - Active recreation
 - Passive recreation
 - 2025 Build 65dB(A) LAeq 15-hour
 - Aged care
 - Religious
 - New rail line 2025 Build 55dB(A) LAeq 9-hour
 - Education
 - The proposal
 - New rail line 2025 Build 60dB(A) LAeq 15-hour
 - Watercourse

Paper Size A4
0 50 100 150 200 250 300 350 400 450
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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2025 build vs 2025 no build Figure E2- Sheet 25

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LEGEND

- | | | | |
|----------------------|-------------|----------------|--------------------------------------|
| ● Sensitive receiver | ● Health | — The proposal | — 2040 No-Build 60dB(A) LAeq 9-hour |
| ● Active recreation | ● Religious | — Watercourse | — 2040 No-Build 65dB(A) LAeq 15-hour |
| | | | — 2040 Build 60dB(A) LAeq 9-hour |
| | | | — 2040 Build 65dB(A) LAeq 15-hour |

Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



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Inland Rail - Parkes to Narrabri

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2040 design vs 2040 no build
configuration

Figure E3- Sheet 1



Paper Size A4
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Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58

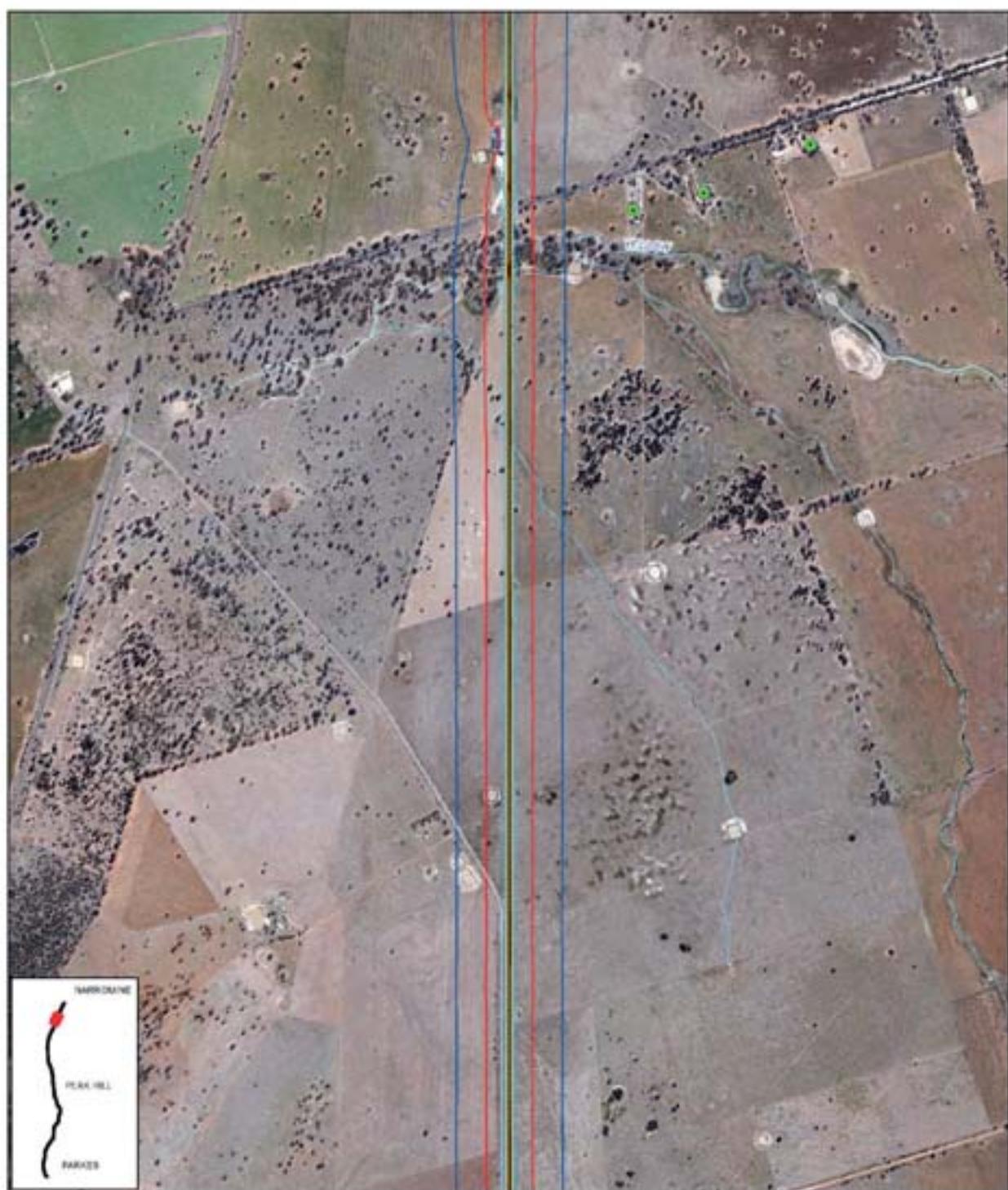


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2040 design vs 2040 no build
configuration

Figure E3- Sheet 2



Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

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Revision | 0
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 3



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



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2040 design vs 2040 no build
configuration

Figure E3- Sheet 4



LEGEND

- Sensitive receiver

— The proposal

— Watercourse

— 2040 No-Build 60dB(A) LAeq 9-hour

— 2040 No-Build 65dB(A) LAeq 15-hour

— 2040 Build 60dB(A) LAeq 9-hour

— 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



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Inland Rail - Parkes to Narrabri

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2040 design vs 2040 no build
configuration

Figure E3- Sheet 5



PARKES
PEAK HILL
NARRABRI

Paper Size A4
0 75 150 300 450 600
Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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2040 design vs 2040 no build
configuration

Figure E3- Sheet 6



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandine

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2040 design vs 2040 no build
configuration

Figure E3- Sheet 7



LEGEND

- Sensitive receiver
- The proposal
- Watercourse

- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Meters

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CS90
Grid: GDA 1984 MGA Zone 58



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2040 design vs 2040 no build
configuration

Figure E3- Sheet 8



Paper Size A4
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Coordinates
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58

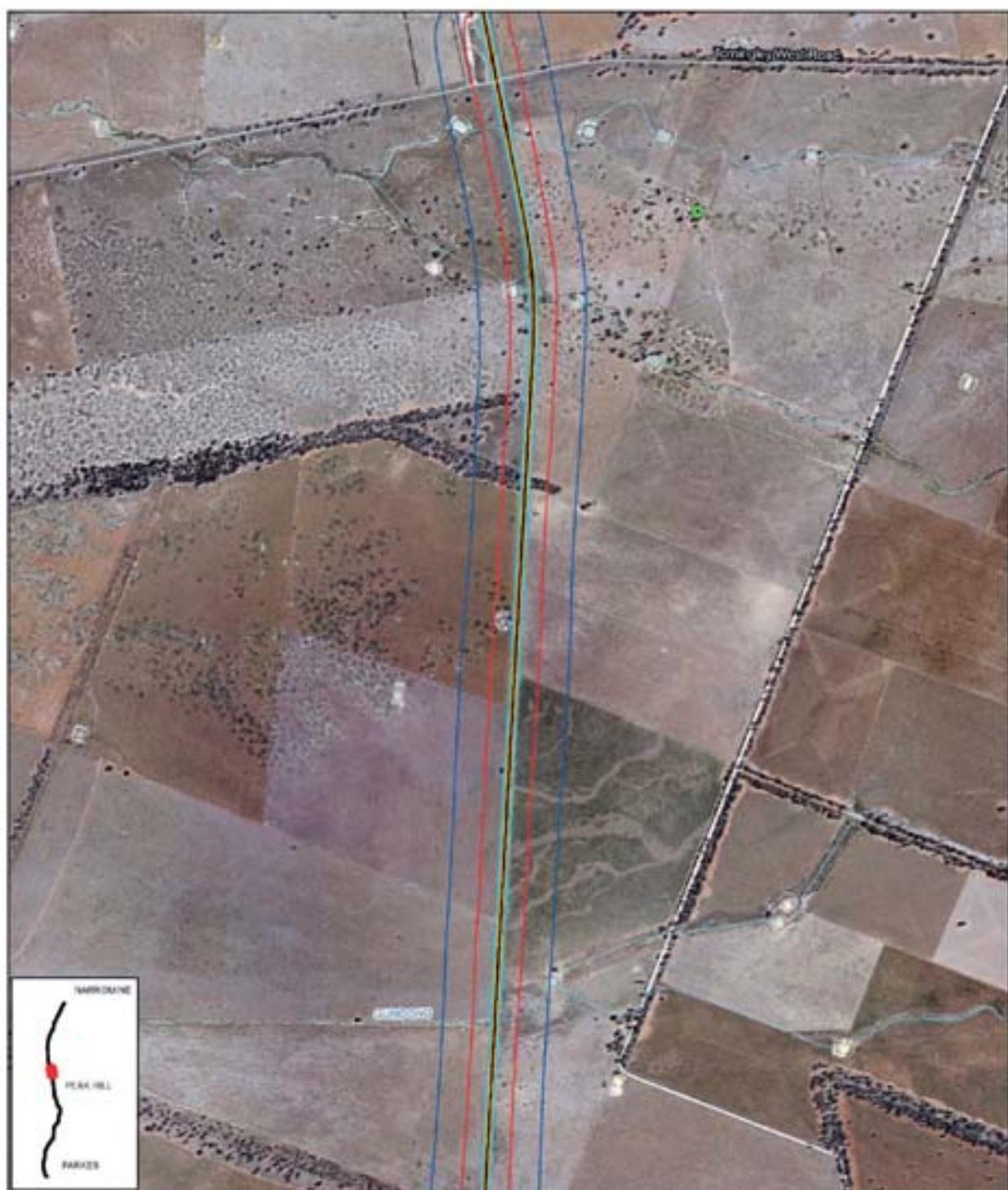


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2040 design vs 2040 no build
configuration

Figure E3- Sheet 9



PARKES
PEAK HILL
TARROOONIE

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58

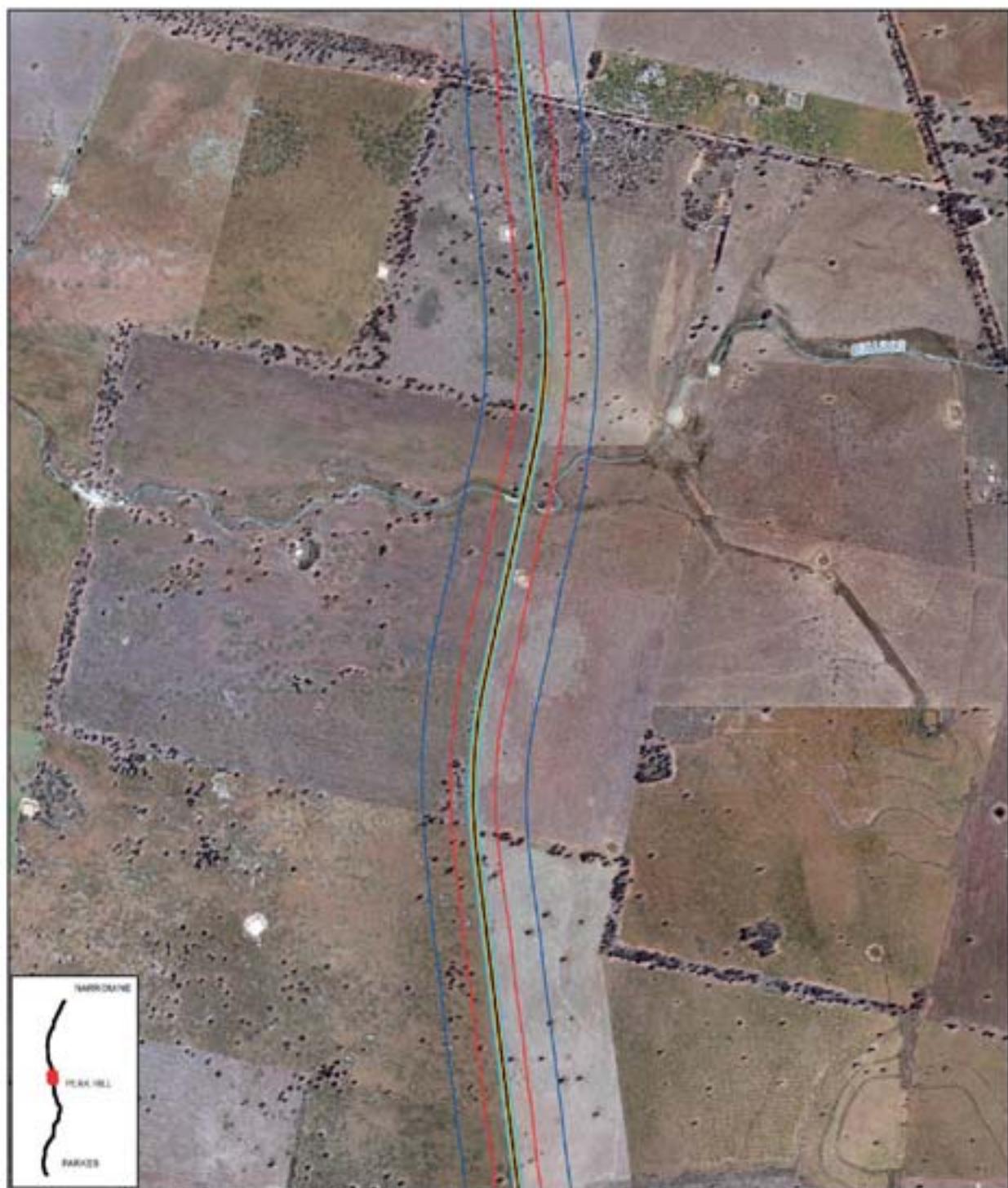


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Revision | 0
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 10



LEGEND

- The proposal
- Watercourse
- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 11



PARKES
PEAK HILL
MARRI DRANE

Paper Size A4
0 75 150 300 450 600
Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CS95
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 12



PAPER SIZE A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1954 GDA
Grid: GDA 1954 MGA Zone 58

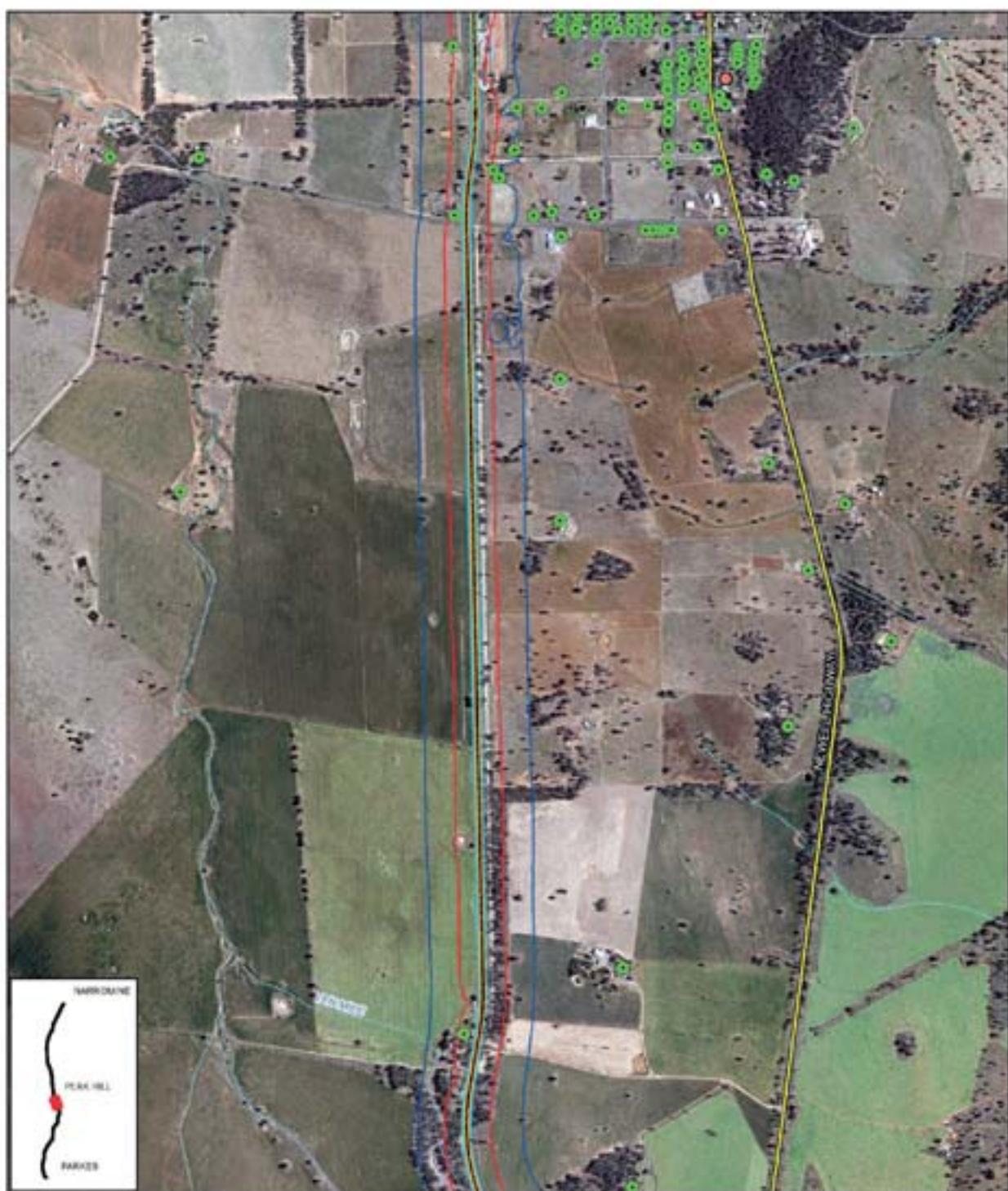


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Revision | 0
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 13


LEGEND

- Sensitive receiver
- The proposal
- Education
- Watercourse
- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58

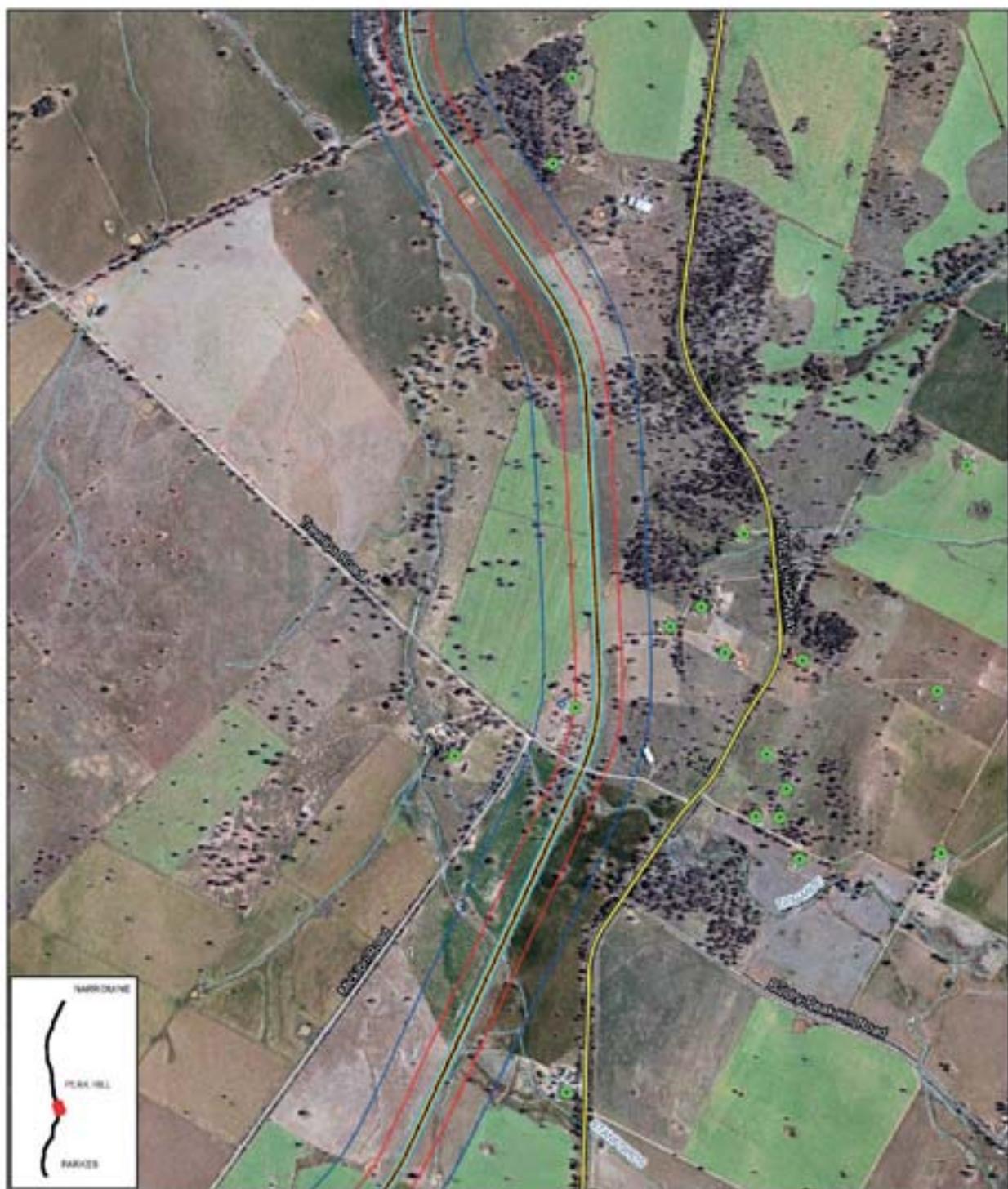


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Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 14



Paper Size A4
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Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58

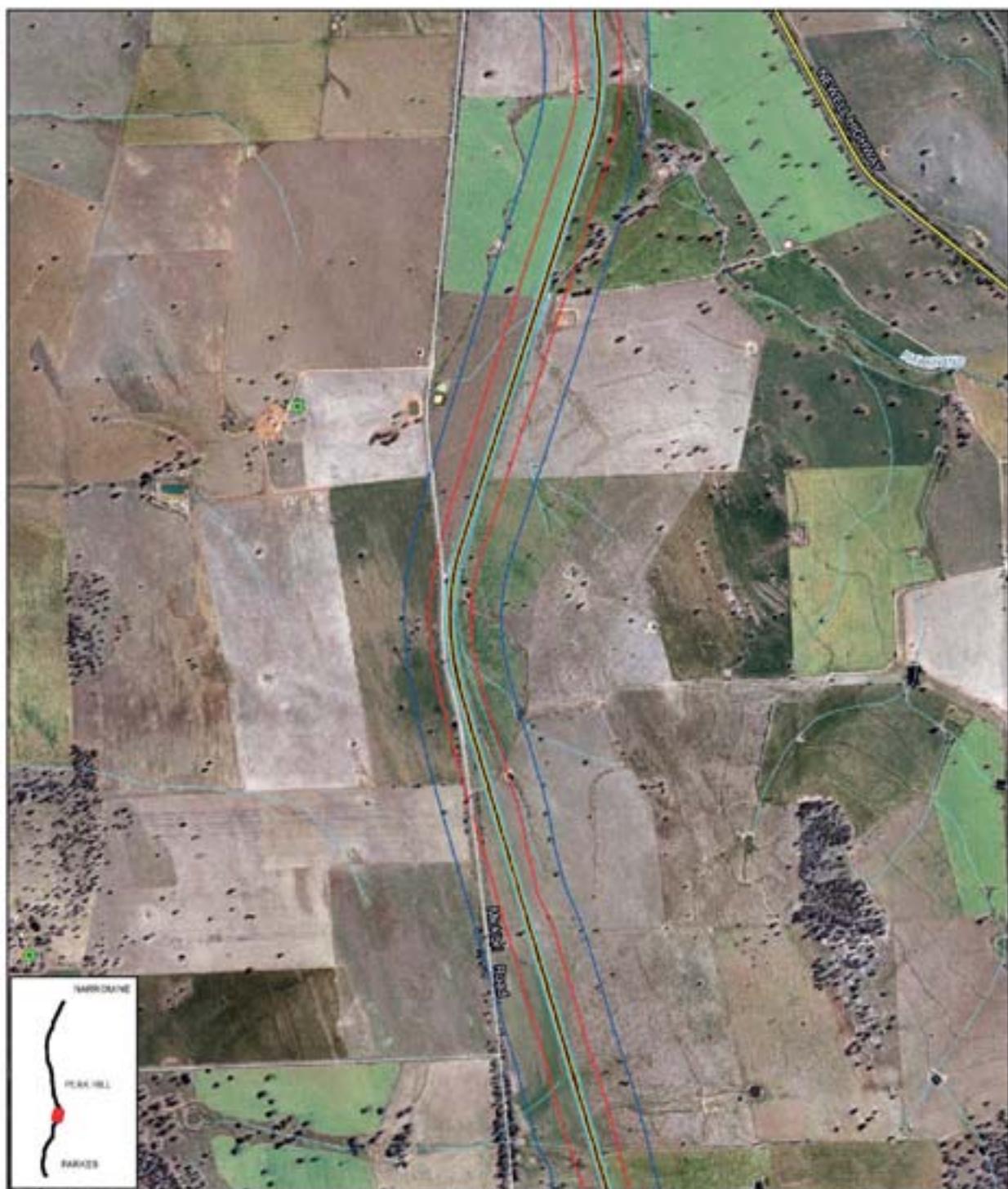


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Revision | 0
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 15



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

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Revision | 0
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2040 design vs 2040 no build
configuration

Figure E3- Sheet 16



PAPER SIZE A4

0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CSRS
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

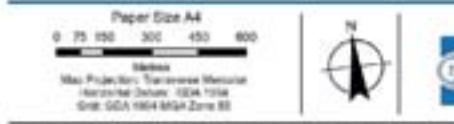
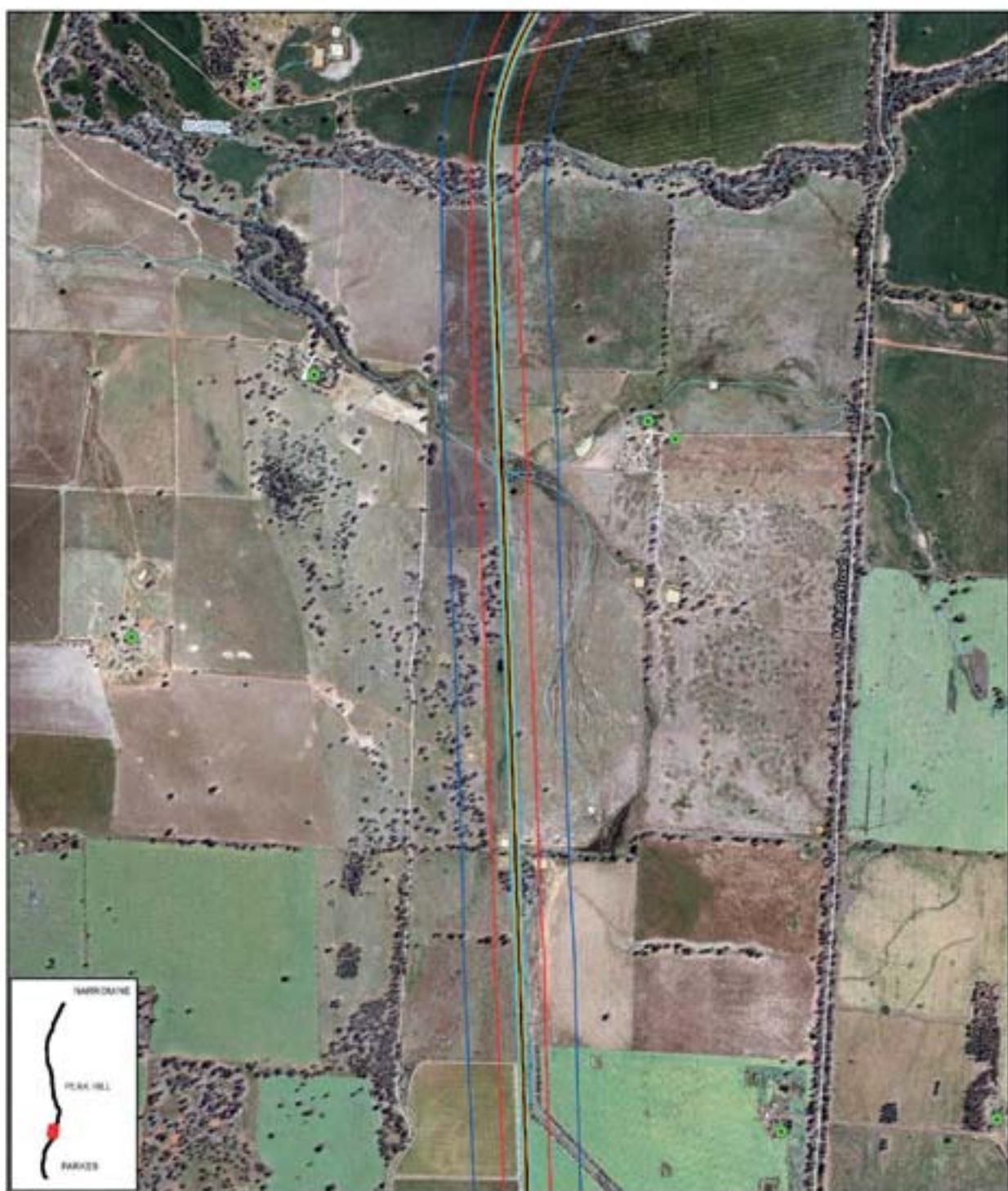
Figure E3- Sheet 17

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: spica



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Inland Rail - Parkes to Narrabri

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Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 18



LEGEND

- Sensitive receiver

— The proposal

— Watercourse

— 2040 No-Build 60dB(A) LAeq 9-hour

— 2040 No-Build 65dB(A) LAeq 15-hour

— 2040 Build 60dB(A) LAeq 9-hour

— 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 225 300 375 450 525 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CSRS
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
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Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 19



PARKES
PEAK HILL
NARRABRI

- The proposal
- Watercourse
- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CS90
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

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Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 20



PARKES
PEAK HILL
NARRABRI

Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58

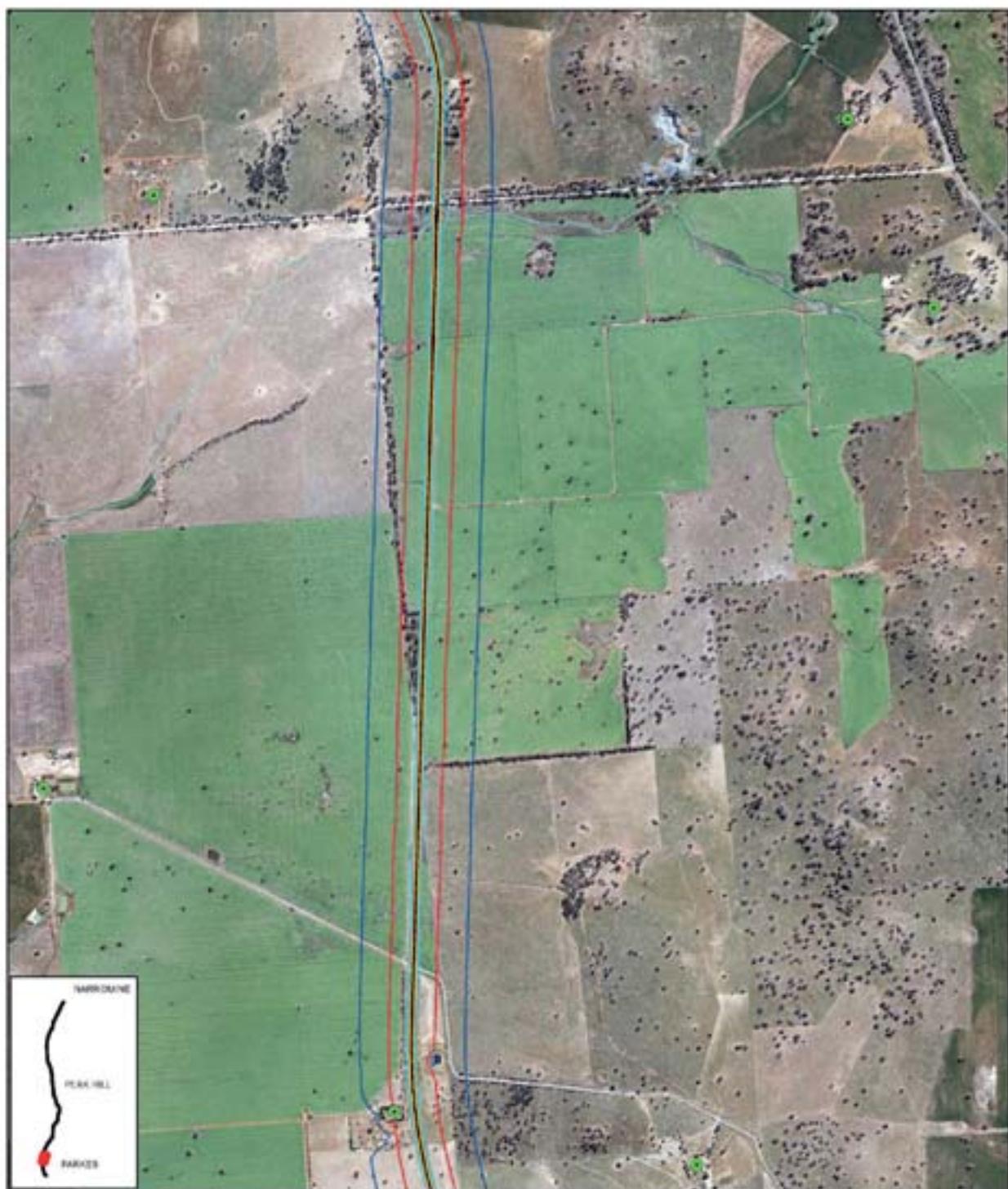


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Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 21



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58

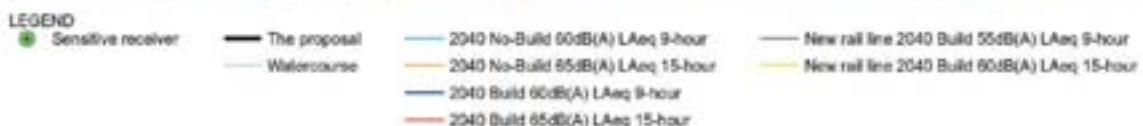
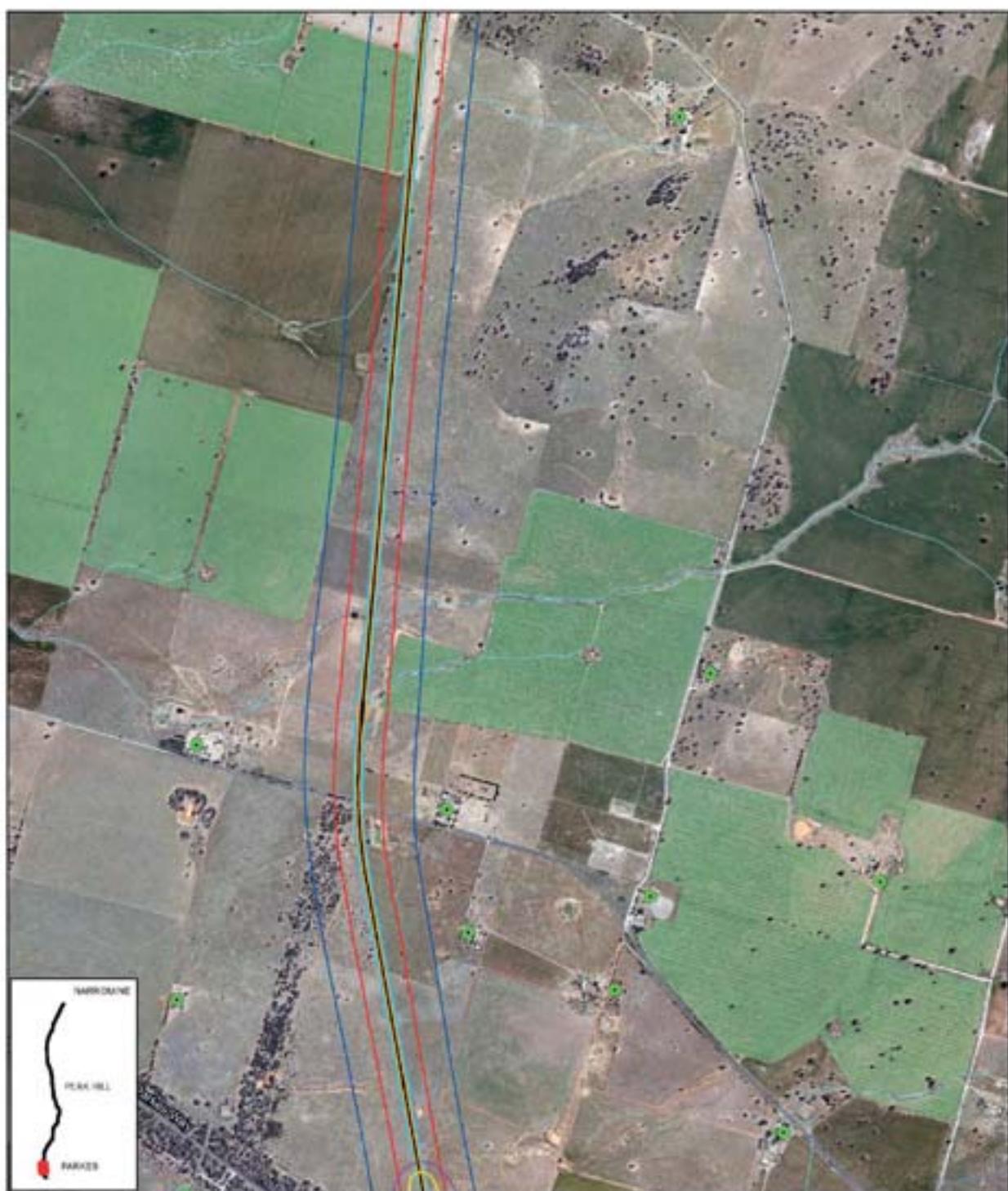


Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 22



Paper Size A4
0 75 150 300 450 600

Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58

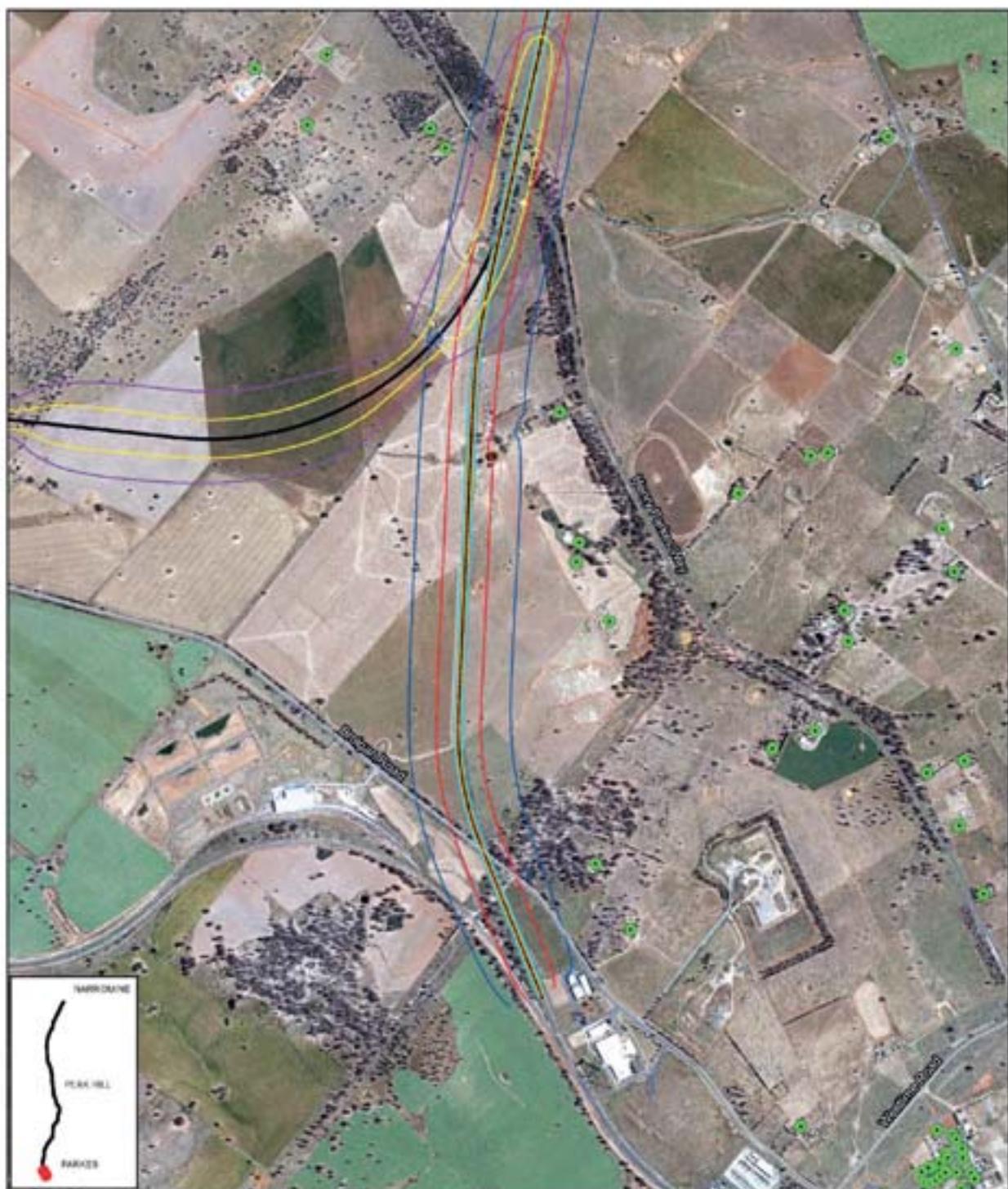


Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 23



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- 2040 No-Build 60dB(A) LAeq 9-hour
- 2040 No-Build 65dB(A) LAeq 15-hour
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour
- New rail line 2040 Build 55dB(A) LAeq 9-hour
- New rail line 2040 Build 60dB(A) LAeq 15-hour

Paper Size A4
0 75 150 300 450 600
Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1984 CSRS
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 24

E:\33\17916\0\Map Deliverables\J3\17916_A308_Plan_2040_Las_Errord

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- Watercourse
- 2040 Build 60dB(A) LAeq 9-hour
- 2040 Build 65dB(A) LAeq 15-hour
- New rail line 2040 Build 55dB(A) LAeq 9-hour
- New rail line 2040 Build 60dB(A) LAeq 15-hour

Paper Size A4
0 50 100 150 200 250 300 350 400 450
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1984 CS94
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

2040 design vs 2040 no build
configuration

Figure E3- Sheet 25

E:\2021\17916\0\Map Deliverables\20217916_A4008_PDF_2040_Site_Bound

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia

Appendix F – Operational noise contours, L_{Amax}



LEGEND

- Sensitive receiver
- Health
- The proposal
- LMax Build Design 85dB(A)
- Active recreation
- Religious
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | J3-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 1

G3217916-0 Major Deliverables P399402-2217916-A308_PDF_180x13mm

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
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LMax build

Figure F1- Sheet 2

F1-20170101-01-Major Deliverable P20170101-E_Rail_Narrabri_Parkes_03.mxd
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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- LMax Build Design 85dB(A)
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600

Utm95
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 55



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 3


LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- LMax Build Design 85dB(A)
- LMax Build Existing 85dB(A)

Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Paper Size A4
0 75 150 300 450 600

Latitude
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



LMax build

Figure F1- Sheet 4

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

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Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 5

GHD Group Pty Ltd | Major Deliverables P0217916_RAIL_NOM_F001_1800_0.mxd

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



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Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

GHD

LMax build

Figure F1- Sheet 6



Paper Size A4

0 75 150 300 450 600

Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1984 TA94
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 7

F12217916-02 Major Deliverable P2017916-A1008_P04_180x2mm

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 8



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 9

GHD 2017 F1-9 Map Deliverable P20170118_A008_P04_180x_0.mxd
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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 225 300 375 450 525 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 1954
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

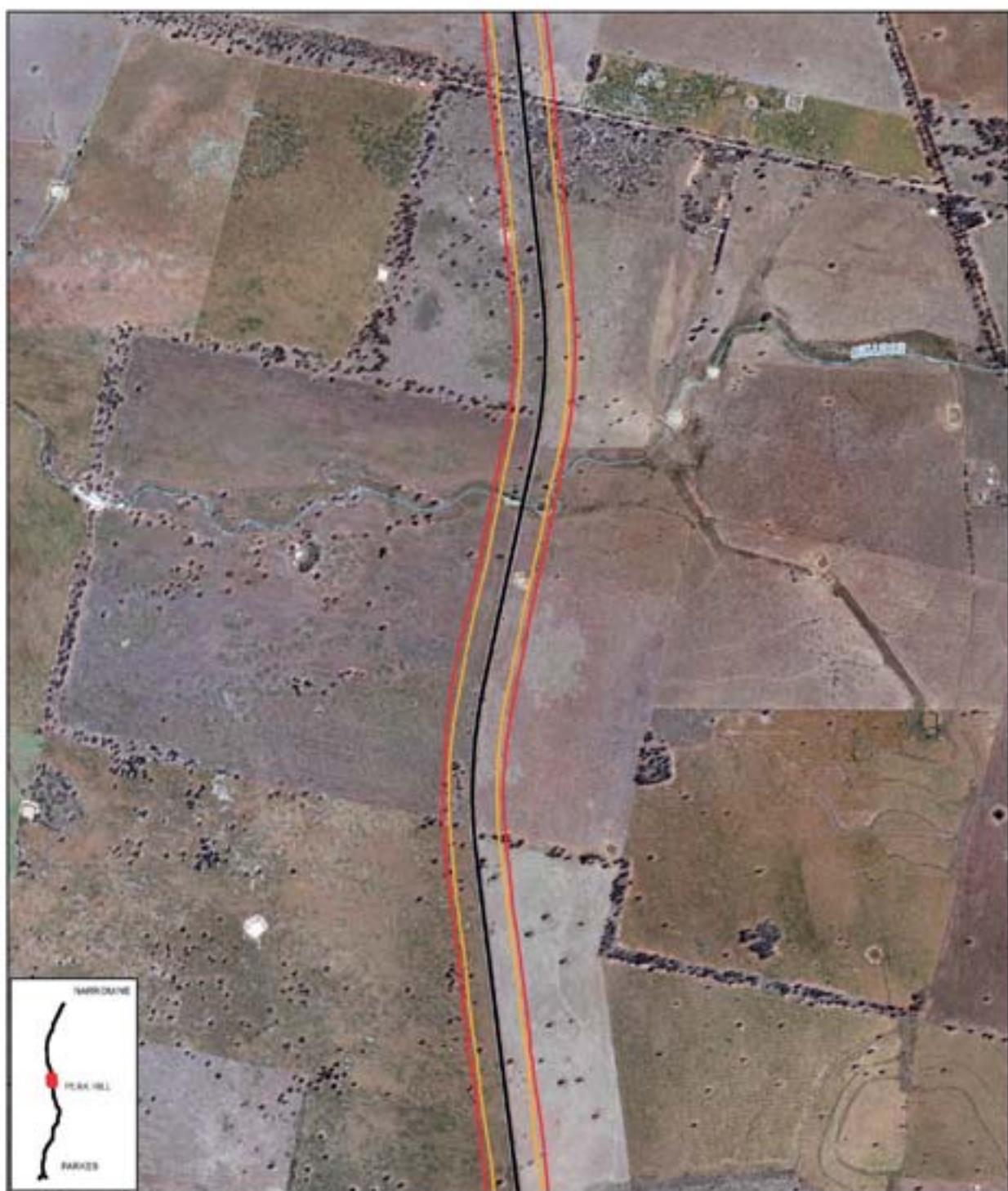
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 10

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 11

G12217916-0 Major Deliverables P.Dwg.Rvt-20170111-A008_P04_180x2mm
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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



PAPER SIZE A4

0 75 150 300 450 600
Metres

Map Projection: Transverse Mercator
Northing Datum: 1004 1004
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 12



LEGEND

- Sensitive receiver
- Passive recreation
- The proposal
- LMax Build Design 85dB(A)
- Active recreation
- Religious
- Watercourse
- LMax Build Existing 85dB(A)
- Education

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

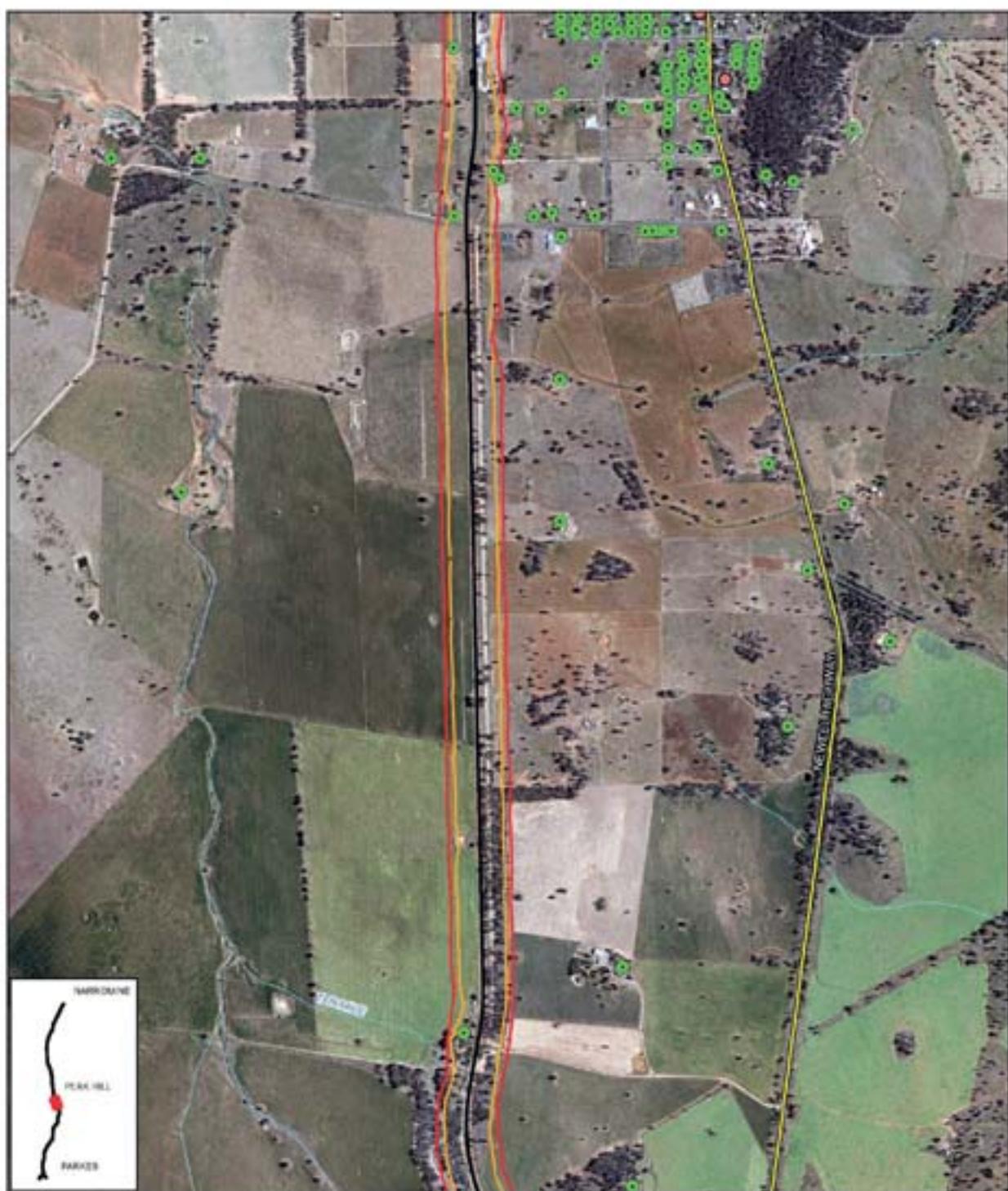
Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 13

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 300 450 600

Metric
Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1984 GDA
Grid: GDA 1984 MGA Zone 58

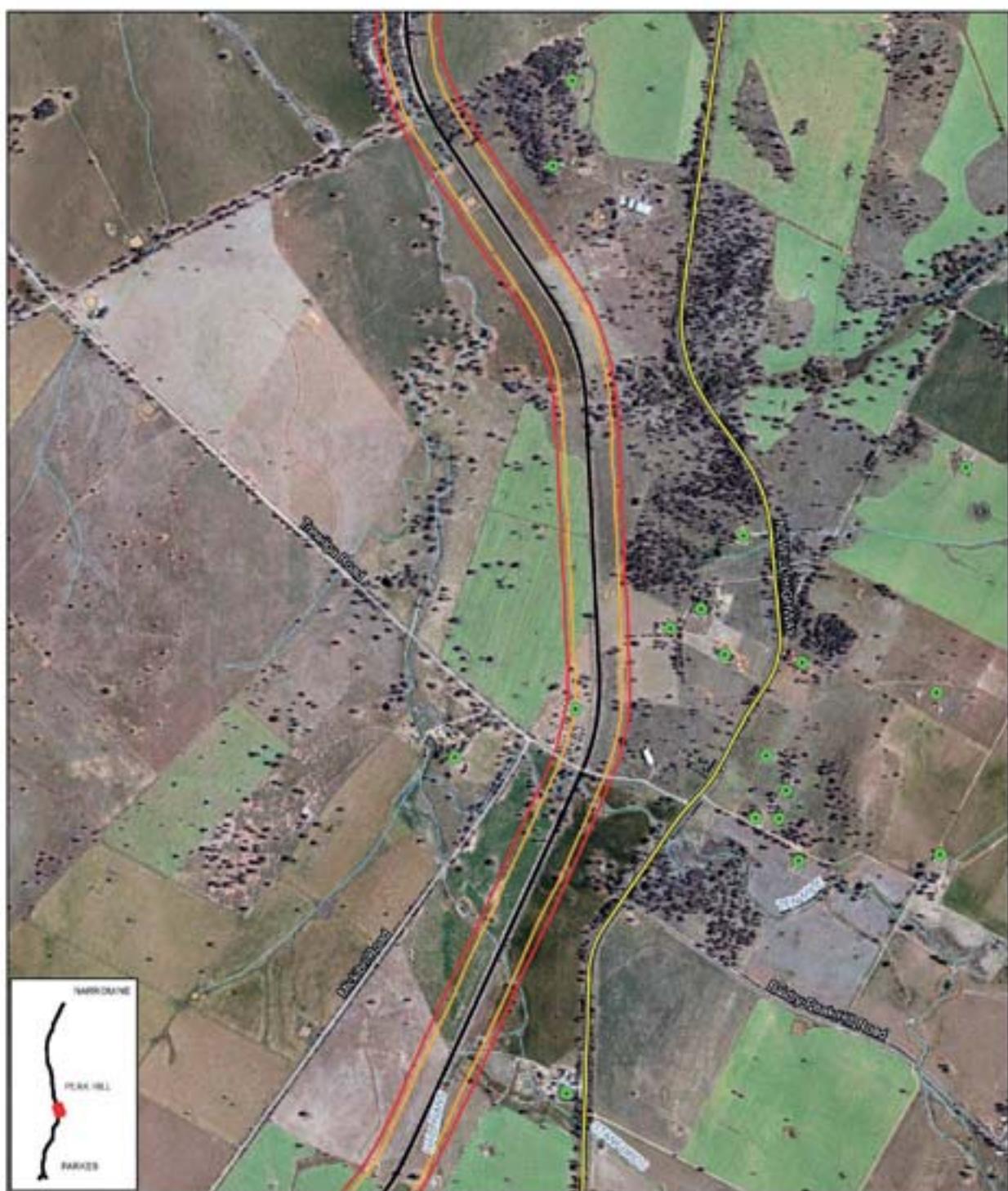


Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 14



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58

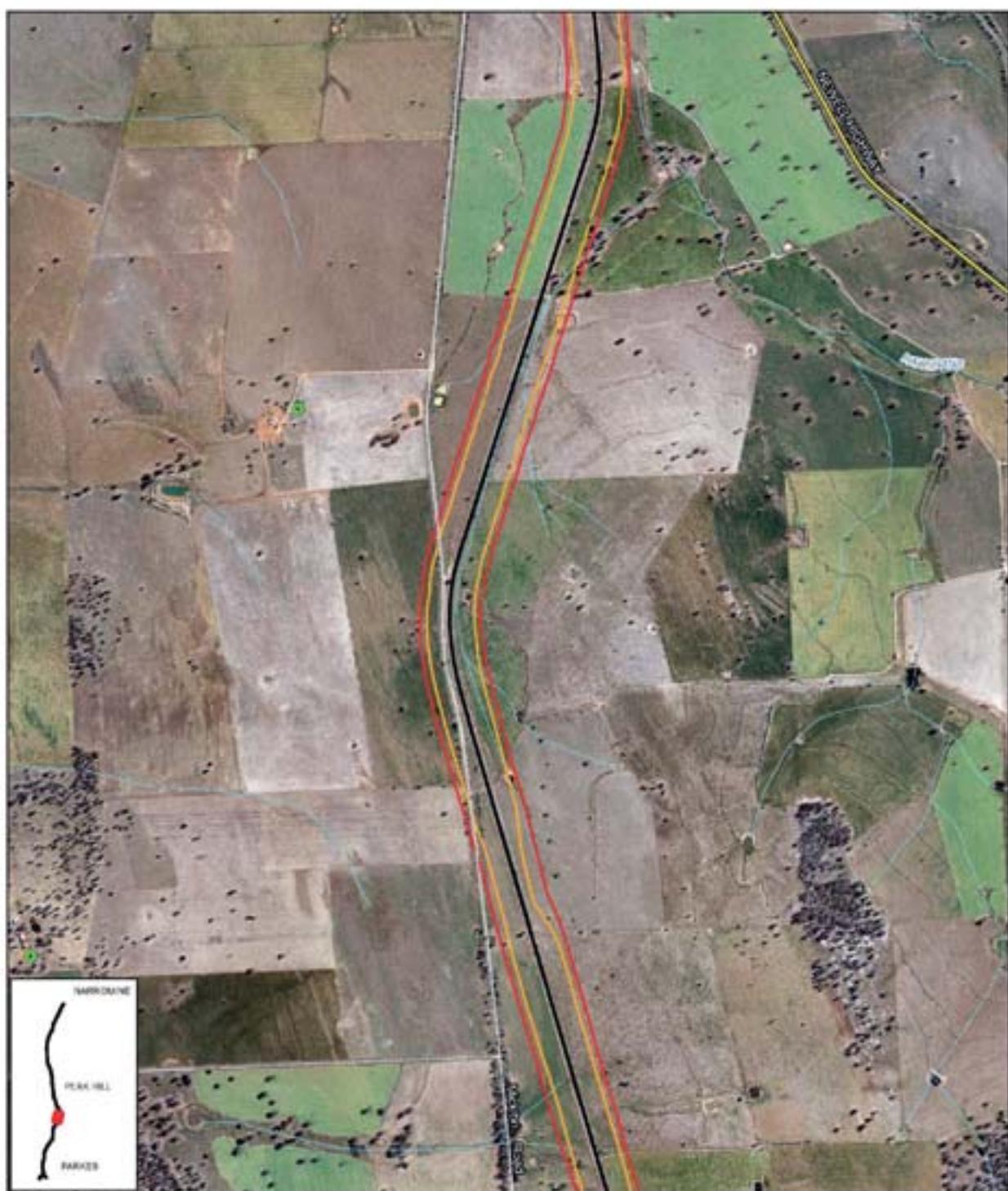


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Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 15



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58

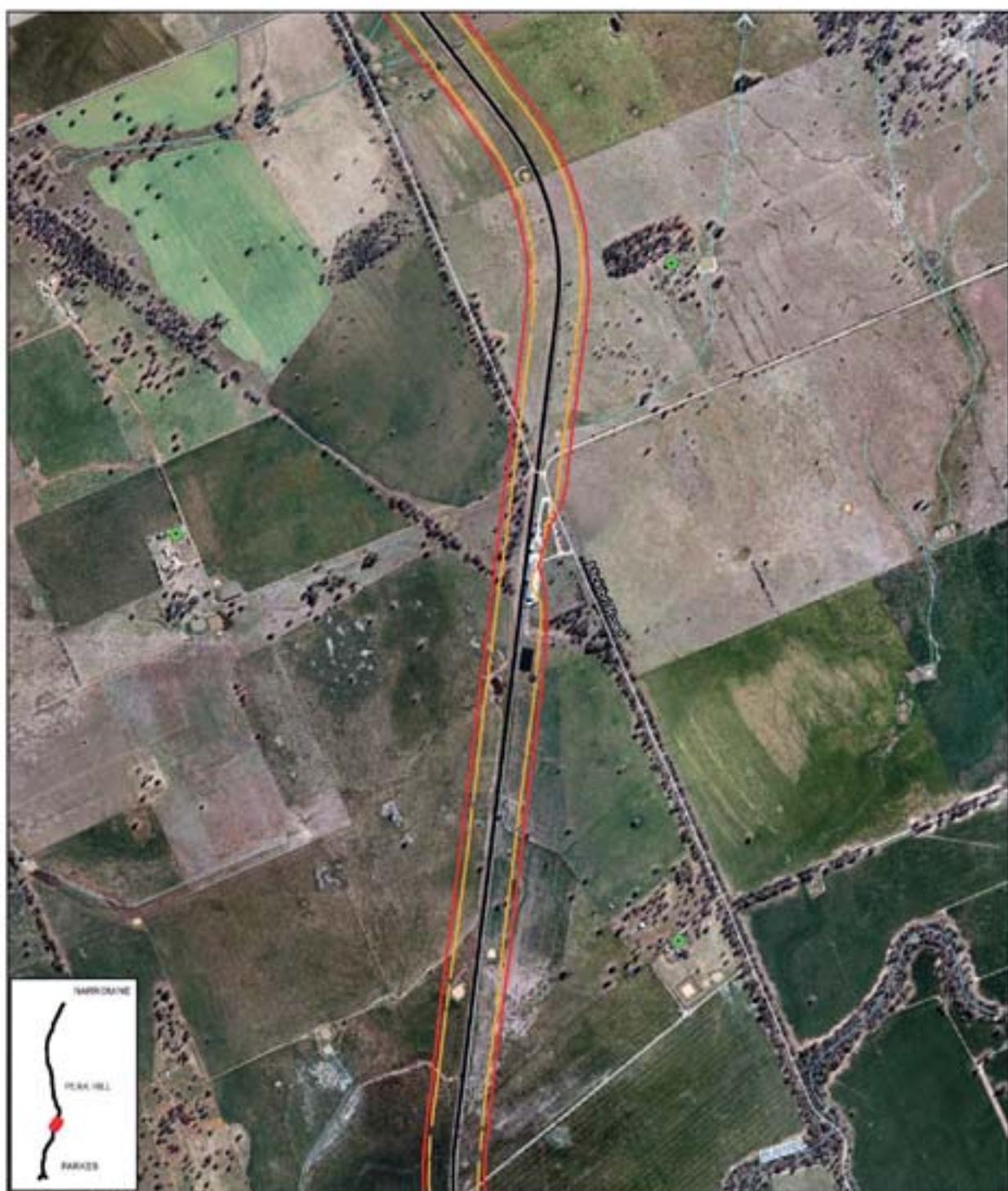


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Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 16



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

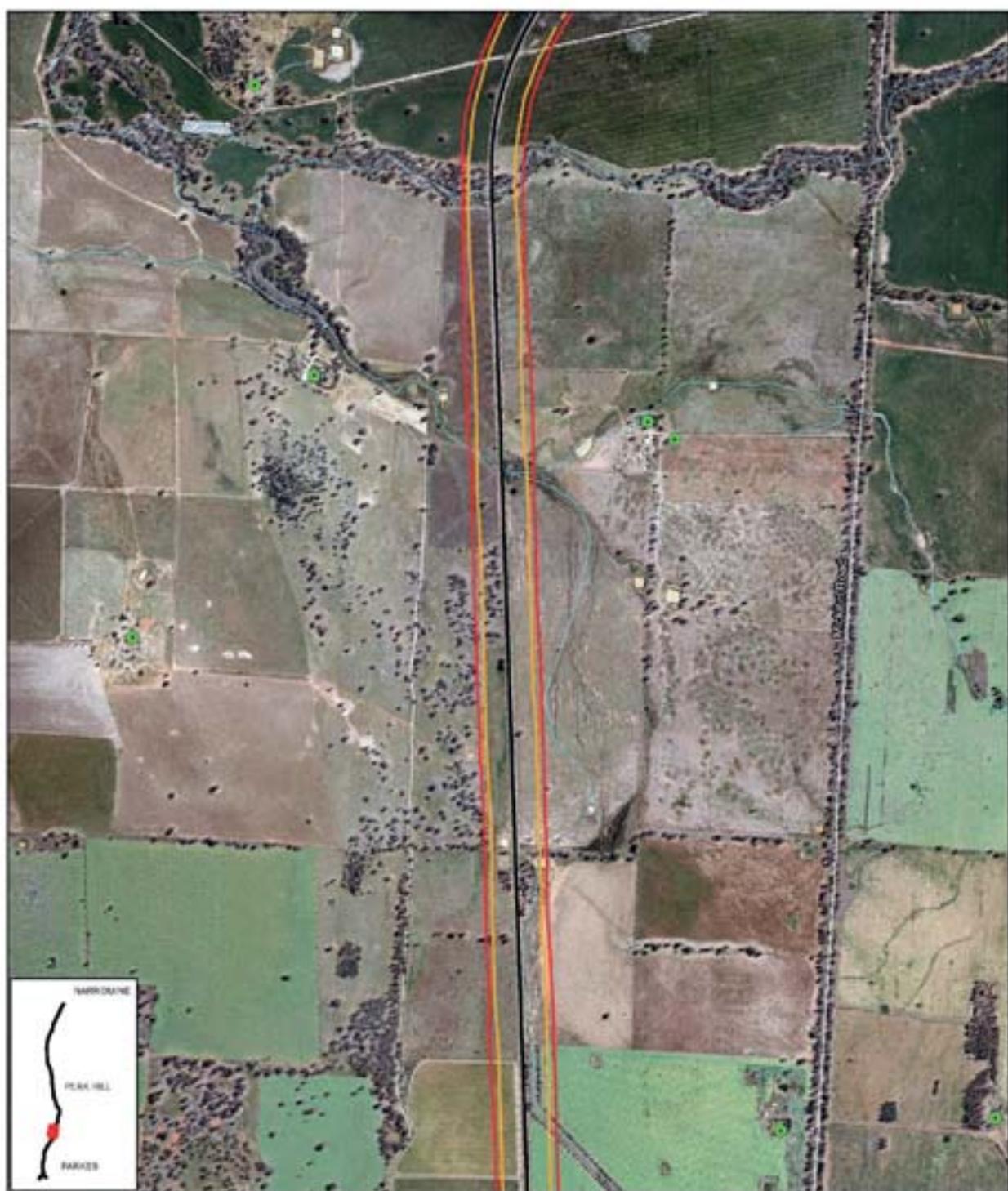
LMax build

Figure F1- Sheet 17

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia

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LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 18



Paper Size A4
0 75 150 300 450 600
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSRS
Grid: GDA 1954 MGA Zone 58

Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

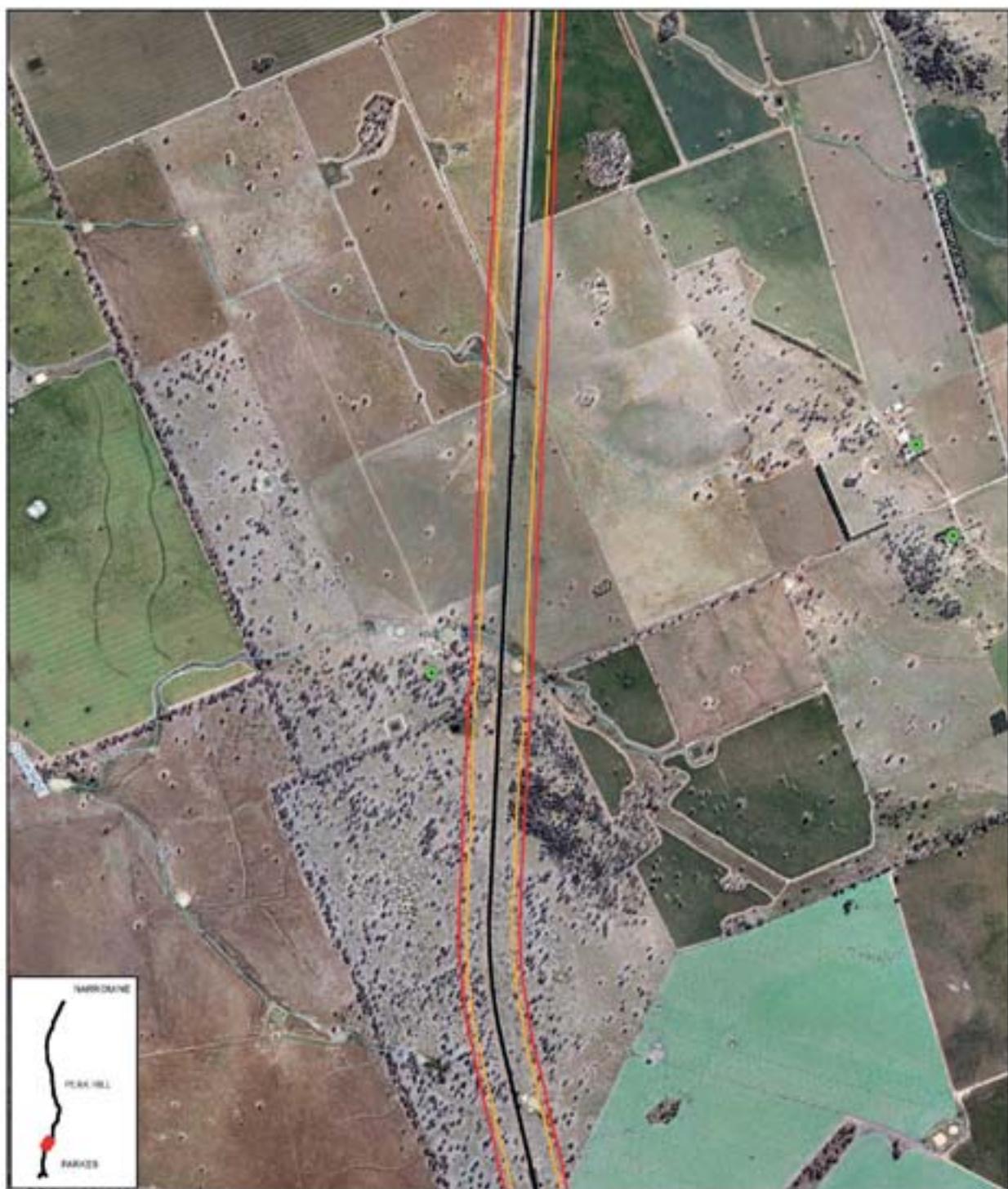


LMax build

Figure F1- Sheet 19

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- Watercourse
- LMax Build Design 85dB(A)
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



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Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 20

F1-2017916-0 Major Deliverable P0217916_A008_P0217916.mxd

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



Paper Size A4
0 75 150 225 300 375 450 525 600

Map Projection: Transverse Mercator
Horizontal Datum: 1954 TA54
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrandera

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 21

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Data source: LPI, DCDB, 2012, ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)

Paper Size A4
0 75 150 225 300 375 450 525 mm
Meters
Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58

11

GHD

S022179150-0 Major Deliverables P0217915_A008_P0217915.mxd

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Inland Rail - Parkes to Narrandera

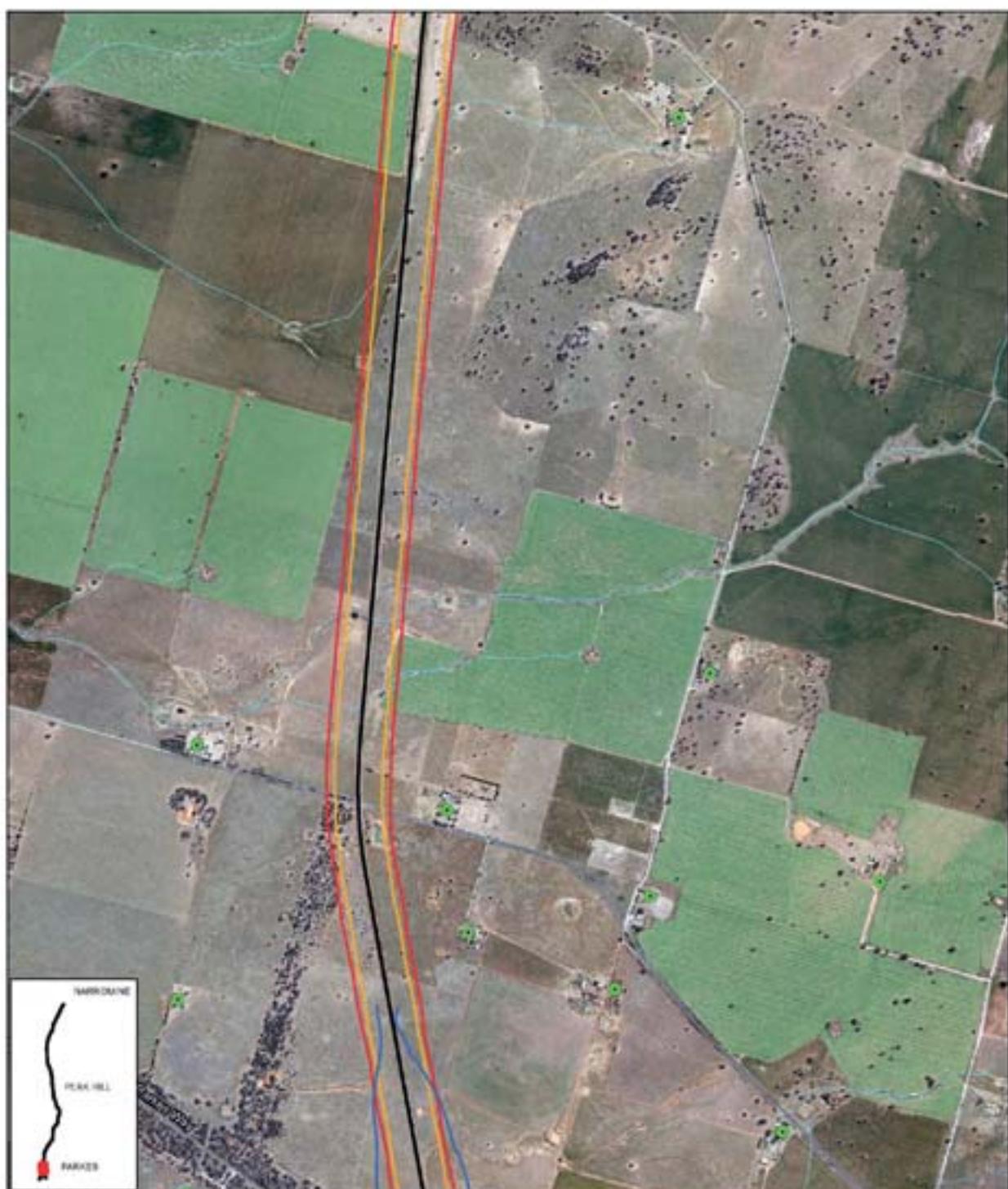
Job Number | J0-17016
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 22

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)
- LMax Build 80dB(A)

Paper Size A4
 0 75 150 225 300 375 450 525 600
 Miles
 Map Projection: Transverse Mercator
 Horizontal Datum: 1954 CSIRO
 Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
 Inland Rail - Parkes to Narrandera

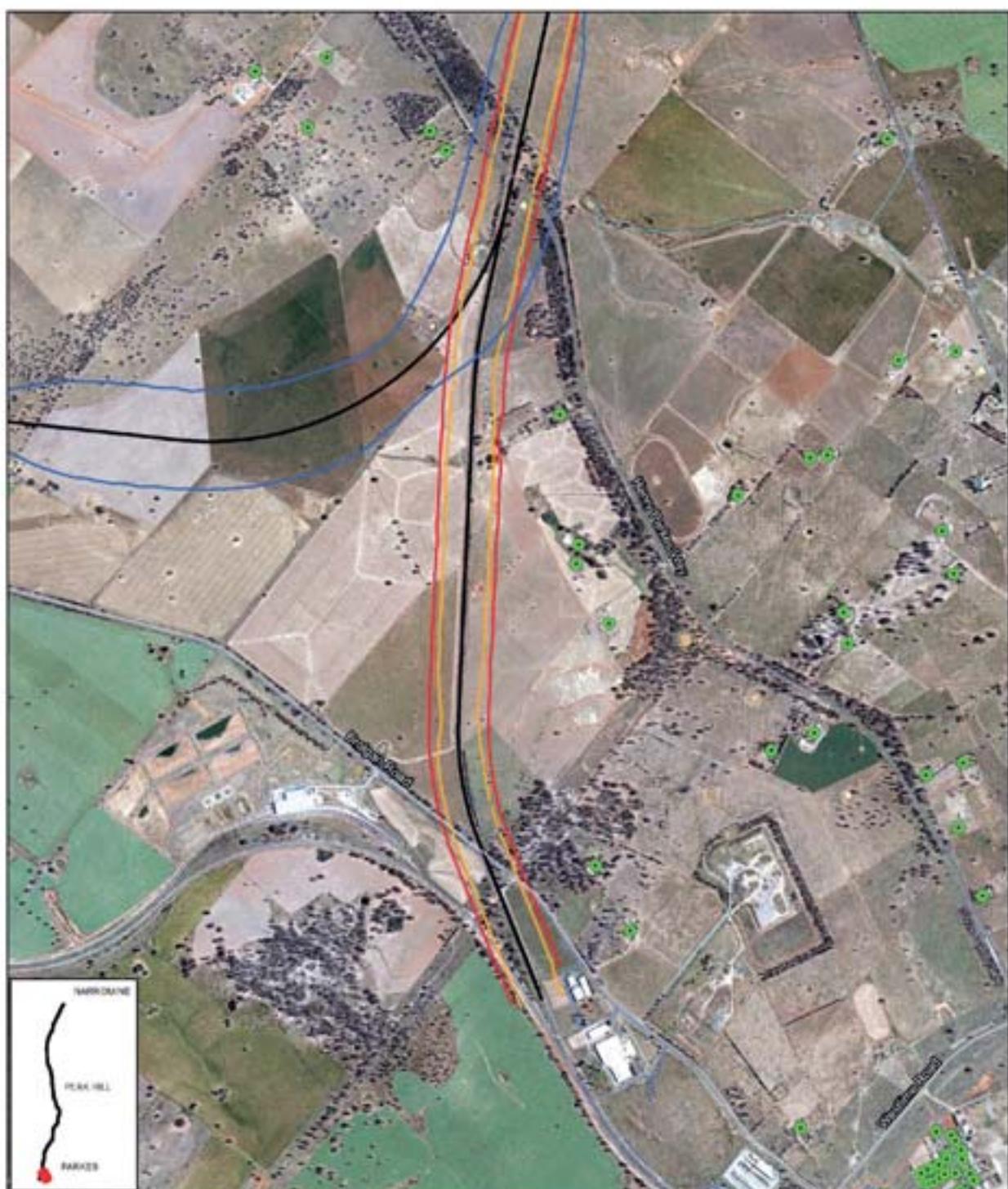
Job Number | 20-17916
 Revision | 0
 Date | 01 Dec 2016

LMax build

Figure F1- Sheet 23

F1-20170101-01 Major Deliverable P20170101-A008_P001_180x2mm
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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia



LEGEND

- Sensitive receiver
- The proposal
- LMax Build Design 85dB(A)
- Watercourse
- LMax Build Existing 85dB(A)
- LMax Build 80dB(A)

Paper Size A4
0 75 150 300 450 600
Metres
Map Projection: Transverse Mercator
Horizontal Datum: 1984_1994
Grid: GDA 1984 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 24

G 02217916-0 Major Deliverable P.Dwg.Ruler-2217916_R008_P04_136x2.mnw
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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: sparcia



LEGEND

- Sensitive receiver
- Watercourse
- LMax Build Design 85dB(A)
- LMax Build Existing 85dB(A)
- LMax Build 80dB(A)

Paper Size A4
0 80 160 320 480 640
Metres

Map Projection: Transverse Mercator
Horizontal Datum: 1954 CSIRO
Grid: GDA 1954 MGA Zone 58



Australian Rail Track Corporation
Inland Rail - Parkes to Narrabri

Job Number | 20-17916
Revision | 0
Date | 01 Dec 2016

LMax build

Figure F1- Sheet 25

03217916-0-0 Major Deliverable P0217916_A1008_PDF_180x2mm

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Data source: LPI, DCDB, 2012; ARTC, Imagery, 2015. Drawn by: Specia

Appendix G – Construction noise, table of results

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4						S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge	
			31.5	26.7	20.7	16.7	31.5	31.5											
P2N_EDUx0001	611919	6377926	31.5	26.7	20.7	16.7	31.5	31.5										0	0
P2N_EDUx0002	611638	6378217	33.5	28.9	22.9	19.8	33.5	32.4										28.5	0
P2N_EDUx0003	611742	6378144	32.6	27.6	21.7	18.7	32.6	31.8										27.6	0
P2N_HOSx0001	616743	6431996	31.4	28.2	22.3	0	31.3	0										26.4	0
P2N_RXAx0001	611346	6378430	36.5	33	27.1	23.5	36	36.4										31.5	0
P2N_RXAx0002	611300	6378535	36.6	33.5	27.6	24.5	36.6	36.7										31.6	0
P2N_RXAx0003	610416	6378088	40.6	36.4	30.3	24.8	39.5	40										35.6	0
P2N_RXAx0004	610279	6377995	37.3	33.3	27.3	23.3	36.4	36.8										32.3	0
P2N_RXAx0005	616569	6432186	34.1	31	25.1	0	34	0										29.1	0
P2N_RXAx0006	611481	6378802	33	29.9	23.9	23.2	32.9	32.9										28	0
P2N_RXPx0001	611454	6378883	33	29.7	23.7	23.5	33	32.6										28	0
P2N_RXPx0002	611356	6378274	37.2	32.6	26.7	22.4	36.4	36.3										32.2	0
P2N_RX0001	606647	6331731	27.5	20.5	15.5	22.5	26.2	0										22.5	0
P2N_RX0002	606824	6331821	27.5	20.4	15.4	22.4	26.2	0										22.5	0
P2N_RX0003	606509	6331922	29.9	22.1	17.2	24.2	28.1	0										24.5	0
P2N_RX0004	606894	6331933	27.9	20.6	15.7	22.7	26.6	0										22.9	0
P2N_RX0005	607021	6332094	28.3	20.8	15.9	22.9	26.8	0										23.3	0
P2N_RX0006	607856	6332157	23.5	0	0	0	0	0										18.5	0
P2N_RX0007	607872	6332204	23.6	0	0	0	0	0										18.6	0
P2N_RX0008	607071	6332296	29.1	21.5	16.6	23.6	27.6	0										24.1	0
P2N_RX0009	607923	6332320	23.6	0	0	0	0	0										18.6	0
P2N_RX0010	607907	6332332	23.7	0	0	0	0	0										18.7	0
P2N_RX0011	607943	6332368	23.6	0	0	0	0	0										18.6	0
P2N_RX0012	607953	6332425	23.6	0	0	0	0	0										18.6	0
P2N_RX0013	607919	6332448	23.9	0	0	0	0	0										18.9	0
P2N_RX0014	607899	6332458	24	0	0	0	0	0										19	0
P2N_RX0015	607882	6332474	24.1	0	0	0	0	0										19.1	0
P2N_RX0016	607953	6332486	23.7	0	0	0	0	0										18.7	0
P2N_RX0017	607576	6332497	26.2	0	14.4	21.4	25	0										21.2	0
P2N_RX0018	607886	6332497	24.2	0	0	0	0	0										19.2	0
P2N_RX0019	607966	6332502	23.7	0	0	0	0	0										18.7	0
P2N_RX0020	607843	6332515	24.5	0	0	0	0	0										19.5	0
P2N_RX0021	607891	6332518	24.2	0	0	0	0	0										19.2	0
P2N_RX0022	607979	6332519	23.6	0	0	0	0	0										18.6	0
P2N_RX0023	607989	6332534	23.6	0	0	0	0	0										18.6	0
P2N_RX0024	607846	6332536	24.5	0	0	0	0	0										19.5	0
P2N_RX0025	607889	6332542	24.2	0	0	0	0	0										19.2	0
P2N_RX0026	607805	6332554	24.8	0	0	0	0	0										19.8	0
P2N_RX0027	607852	6332556	24.5	0	0	0	0	0										19.5	0
P2N_RX0028	608001	6332557	23.5	0	0	0	0	0										18.5	0
P2N_RX0029	607926	6332557	24	0	0	0	0	0										0	0
																		19	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4	S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_RX030	607906	6332564	24.2	0	0	0	0	0	0	0	0	0	19.2
P2N_RX031	607994	6332571	23.6	0	0	0	0	0	0	0	0	0	18.6
P2N_RX033	607852	6332578	24.5	0	0	0	0	0	0	0	0	0	19.5
P2N_RX034	607975	6332584	23.8	0	0	0	0	0	0	0	0	0	18.8
P2N_RX035	607814	6332591	24.8	0	0	0	0	0	0	0	0	0	19.8
P2N_RX036	607955	6332593	23.9	0	0	0	0	0	0	0	0	0	18.9
P2N_RX037	607930	6332599	24	0	0	0	0	0	0	0	0	0	19
P2N_RX038	607896	6332604	24.3	0	0	0	0	0	0	0	0	0	19.3
P2N_RX039	607910	6332606	24.2	0	0	0	0	0	0	0	0	0	19.2
P2N_RX040	607858	6332613	24.5	0	0	0	0	0	0	0	0	0	19.5
P2N_RX042	608006	6332629	23.6	0	0	0	0	0	0	0	0	0	18.6
P2N_RX043	607950	6332640	24	0	0	0	0	0	0	0	0	0	19
P2N_RX044	608021	6332650	23.5	0	0	0	0	0	0	0	0	0	18.5
P2N_RX045	607886	6332652	24.4	0	0	0	0	0	0	0	0	0	19.4
P2N_RX046	607911	6332653	24.3	0	0	0	0	0	0	0	0	0	19.3
P2N_RX047	607870	6332655	24.5	0	0	0	0	0	0	0	0	0	19.5
P2N_RX048	607963	6332657	23.9	0	0	0	0	0	0	0	0	0	18.9
P2N_RX049	608029	6332660	23.5	0	0	0	0	0	0	0	0	0	18.5
P2N_RX050	607853	6332664	24.6	0	0	0	0	0	0	0	0	0	19.6
P2N_RX051	607830	6332666	24.8	0	0	0	0	0	0	0	0	0	19.8
P2N_RX052	607812	6332668	24.9	0	0	0	0	0	0	0	0	0	19.9
P2N_RX053	607970	6332669	23.9	0	0	0	0	0	0	0	0	0	18.9
P2N_RX054	607794	6332671	25.1	0	0	0	0	0	0	0	0	0	20.1
P2N_RX055	607779	6332675	25.2	0	0	0	0	0	0	0	0	0	20.2
P2N_RX056	607760	6332677	25.3	0	0	0	0	0	0	0	0	0	20.3
P2N_RX057	607723	6332683	25.6	0	0	0	0	0	0	0	0	0	20.6
P2N_RX058	607727	6332698	25.6	0	0	0	0	0	0	0	0	0	20.6
P2N_RX059	608000	6332701	23.7	0	0	0	0	0	0	0	0	0	18.7
P2N_RX060	607983	6332705	23.9	0	0	0	0	0	0	0	0	0	18.9
P2N_RX061	607968	6332708	24	0	0	0	0	0	0	0	0	0	19
P2N_RX062	607839	6332708	24.8	0	0	0	0	0	0	0	0	0	19.8
P2N_RX063	607819	6332709	24.9	0	0	0	0	0	0	0	0	0	19.9
P2N_RX064	607946	6332710	24.1	0	0	0	0	0	0	0	0	0	19.1
P2N_RX065	607934	6332710	24.2	0	0	0	0	0	0	0	0	0	18.9
P2N_RX066	607730	6332715	25.5	0	0	0	0	0	0	0	0	0	20.5
P2N_RX067	607803	6332716	25	0	0	0	0	0	0	0	0	0	20
P2N_RX068	607787	6332723	25.2	0	0	0	0	0	0	0	0	0	20.2
P2N_RX069	607772	6332724	25.3	0	0	0	0	0	0	0	0	0	20.3
P2N_RX070	607736	6332733	25.5	0	0	0	0	0	0	0	0	0	20.5
P2N_RX071	608021	6332734	23.6	0	0	0	0	0	0	0	0	0	18.6
P2N_RX072	607997	6332742	23.8	0	0	0	0	0	0	0	0	0	18.8

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4	S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_RX0073	608033	6332744	23.6	0	0	0	0	0	0	18.6	0	0	0
P2N_RX0074	607978	6332746	23.9	0	0	0	0	0	0	18.9	0	0	0
P2N_RX0075	607960	6332749	24	0	0	0	0	0	0	19	0	0	0
P2N_RX0076	607736	6332753	25.6	0	0	0	0	0	0	20.6	0	0	0
P2N_RX0077	607944	6332753	24.2	0	0	0	0	0	0	19.2	0	0	0
P2N_RX0078	608044	6332760	23.5	0	0	0	0	0	0	18.5	0	0	0
P2N_RX0080	607924	6332760	24.3	0	0	0	0	0	0	19.3	0	0	0
P2N_RX0081	607834	6332762	24.9	0	0	0	0	0	0	19.9	0	0	0
P2N_RX0082	607907	6332764	24.4	0	0	0	0	0	0	19.4	0	0	0
P2N_RX0083	607781	6332765	25.3	0	0	0	0	0	0	20.3	0	0	0
P2N_RX0084	607798	6332767	25.1	0	0	0	0	0	0	20.1	0	0	0
P2N_RX0085	607739	6332768	25.6	0	0	0	0	0	0	20.6	0	0	0
P2N_RX0086	607748	6332787	25.5	0	0	0	0	0	0	20.5	0	0	0
P2N_RX0087	608005	6332797	23.8	0	0	0	0	0	0	18.8	0	0	0
P2N_RX0088	607987	6332799	23.9	0	0	0	0	0	0	18.9	0	0	0
P2N_RX0089	607967	6332801	24	0	0	0	0	0	0	19	0	0	0
P2N_RX0090	607949	6332803	24.2	0	0	0	0	0	0	19.2	0	0	0
P2N_RX0091	608025	6332804	23.7	0	0	0	0	0	0	18.7	0	0	0
P2N_RX0092	607929	6332805	24.3	0	0	0	0	0	0	19.3	0	0	0
P2N_RX0093	607897	6332806	24.5	0	0	0	0	0	0	19.5	0	0	0
P2N_RX0094	607823	6332807	25	0	0	0	0	0	0	20	0	0	0
P2N_RX0095	607912	6332807	24.4	0	0	0	0	0	0	19.4	0	0	0
P2N_RX0097	607872	6332809	24.7	0	0	0	0	0	0	19.7	0	0	0
P2N_RX0098	607796	6332811	25.2	0	0	0	0	0	0	20.2	0	0	0
P2N_RX0099	607738	6332812	25.6	0	0	0	0	0	0	20.6	0	0	0
P2N_RX0100	608044	6332813	23.6	0	0	0	0	0	0	18.6	0	0	0
P2N_RX0101	607756	6332815	25.5	0	0	0	0	0	0	20.5	0	0	0
P2N_RX0102	608005	6332859	23.8	0	0	0	0	0	0	18.8	0	0	0
P2N_RX0103	607978	6332862	24	0	0	0	0	0	0	19	0	0	0
P2N_RX0104	607890	6332864	24.6	0	0	0	0	0	0	20	0	0	0
P2N_RX0105	608020	6332868	23.7	0	0	0	0	0	0	18.7	0	0	0
P2N_RX0106	607915	6332869	24.4	0	0	0	0	0	0	19.4	0	0	0
P2N_RX0107	607834	6332870	25	0	0	0	0	0	0	20	0	0	0
P2N_RX0108	607766	6332875	25.5	0	0	0	0	0	0	20.5	0	0	0
P2N_RX0109	607693	6332875	26	0	0	14.4	21.4	24.9	0	21	0	0	0
P2N_RX0110	607955	6332876	24.2	0	0	0	0	0	0	19.2	0	0	0
P2N_RX0113	607805	6332878	25.2	0	0	0	0	24.2	0	20.2	0	0	0
P2N_RX0114	607634	6332880	26.4	0	0	14.8	21.8	25.3	0	21.4	0	0	0
P2N_RX0115	608057	6332881	23.5	0	0	0	0	0	0	18.5	0	0	0
P2N_RX0116	607863	6332883	24.8	0	0	0	0	0	0	19.8	0	0	0
P2N_RX0117	607652	6332884	26.3	0	0	14.7	21.7	25.2	0	21.3	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			0	0	0	0	0	0	0										
P2N_RX0118	608002	6332894	23.9	0	0	0	0	0	0	14.4	21.4	24.9	0	0	18.9	0	0	0	
P2N_RX0119	607699	6332802	26	0	0	0	0	0	0	14.7	21.7	25.2	0	0	21	0	0	0	
P2N_RX0120	607656	6332810	26.3	0	0	0	0	0	0	14.7	21.7	25.2	0	0	21.3	0	0	0	
P2N_RX0121	608055	6332812	23.5	0	0	0	0	0	0	0	0	0	0	0	18.5	0	0	0	
P2N_RX0122	607708	6332822	25.9	0	0	0	0	0	0	14.4	21.4	24.9	0	0	20.9	0	0	0	
P2N_RX0123	607970	6332827	24.1	0	0	0	0	0	0	0	0	0	0	0	19.1	0	0	0	
P2N_RX0124	608012	6332829	23.8	0	0	0	0	0	0	0	0	0	0	0	18.8	0	0	0	
P2N_RX0125	607660	6332830	26.3	0	0	0	0	0	0	14.7	21.7	25.2	0	0	21.3	0	0	0	
P2N_RX0126	607948	6332837	24.2	0	0	0	0	0	0	0	0	0	0	0	19.2	0	0	0	
P2N_RX0127	607666	6332846	26.2	0	0	0	0	0	0	14.7	21.7	25.2	0	0	21.2	0	0	0	
P2N_RX0128	608021	6332849	23.8	0	0	0	0	0	0	0	0	0	0	0	18.8	0	0	0	
P2N_RX0130	607937	6332849	24.3	0	0	0	0	0	0	0	0	0	0	0	19.3	0	0	0	
P2N_RX0131	607709	6332857	25.9	0	0	0	0	0	0	14.4	21.4	24.9	0	0	20.9	0	0	0	
P2N_RX0132	608068	6332863	23.5	0	0	0	0	0	0	0	0	0	0	0	18.5	0	0	0	
P2N_RX0133	607660	6332864	26.3	0	0	0	0	0	0	14.8	21.8	25.2	0	0	21.3	0	0	0	
P2N_RX0134	608039	6332866	23.7	0	0	0	0	0	0	0	0	0	0	0	18.7	0	0	0	
P2N_RX0135	608001	6332867	23.9	0	0	0	0	0	0	0	0	0	0	0	18.9	0	0	0	
P2N_RX0136	607943	6332875	24.3	0	0	0	0	0	0	0	0	0	0	0	19.3	0	0	0	
P2N_RX0137	607959	6332891	24.2	0	0	0	0	0	0	0	0	0	0	0	19.2	0	0	0	
P2N_RX0138	608013	6332892	23.8	0	0	0	0	0	0	0	0	0	0	0	18.8	0	0	0	
P2N_RX0139	608027	6333005	23.7	0	0	0	0	0	0	0	0	0	0	0	18.7	0	0	0	
P2N_RX0140	607971	6333018	24.1	0	0	0	0	0	0	0	0	0	0	0	19.1	0	0	0	
P2N_RX0141	608066	6333019	23.5	0	0	0	0	0	0	0	0	0	0	0	18.5	0	0	0	
P2N_RX0142	608049	6333027	23.6	0	0	0	0	0	0	0	0	0	0	0	18.6	0	0	0	
P2N_RX0143	608033	6333047	23.7	0	0	0	0	0	0	0	0	0	0	0	18.7	0	0	0	
P2N_RX0144	607237	6333047	29.8	0	22.7	17.8	24.8	28.6	0	0	0	0	0	0	24.8	0	0	0	
P2N_RX0145	608003	6333061	23.9	0	0	0	0	0	0	0	0	0	0	0	18.9	0	0	0	
P2N_RX0146	607946	6333079	24.3	0	0	0	0	0	0	0	0	0	0	0	19.3	0	0	0	
P2N_RX0147	607770	6333079	25.5	0	0	0	0	0	0	0	0	0	0	0	20.5	0	0	0	
P2N_RX0148	607790	6333089	25.3	0	0	0	0	0	0	0	0	0	0	0	20.3	0	0	0	
P2N_RX0149	608055	6333092	23.6	0	0	0	0	0	0	0	0	0	0	0	18.6	0	0	0	
P2N_RX0150	607964	6333098	24.1	0	0	0	0	0	0	0	0	0	0	0	19.1	0	0	0	
P2N_RX0151	607805	6333106	25.2	0	0	0	0	0	0	0	0	0	0	0	20.2	0	0	0	
P2N_RX0152	608038	6333107	23.7	0	0	0	0	0	0	0	0	0	0	0	18.7	0	0	0	
P2N_RX0153	607741	6333111	25.7	0	0	0	0	0	0	0	0	0	0	0	20.7	0	0	0	
P2N_RX0154	607937	6333113	24.3	0	0	0	0	0	0	0	0	0	0	0	19.3	0	0	0	
P2N_RX0155	608017	6333119	23.8	0	0	0	0	0	0	0	0	0	0	0	18.8	0	0	0	
P2N_RX0156	607910	6333123	24.5	0	0	0	0	0	0	0	0	0	0	0	19.5	0	0	0	
P2N_RX0157	607816	6333129	25.1	0	0	0	0	0	0	0	0	0	0	0	20.1	0	0	0	
P2N_RX0158	607757	6333138	25.5	0	0	0	0	0	0	0	0	0	0	0	20.5	0	0	0	
P2N_RX0159	607769	6333148	25.5	0	0	0	0	0	0	0	0	0	0	0	24.5	0	0	0	

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			0	0										
P2N_RX0160	607825	6333152	25.1	0	0	0	0	24.2	0	20.1	0	0	0	0
P2N_RX0161	608060	6333156	23.5	0	0	0	0	0	0	18.5	0	0	0	0
P2N_RX0162	607787	6333174	25.3	0	0	0	0	24.4	0	20.3	0	0	0	0
P2N_RX0163	607862	6333174	24.8	0	0	0	0	23.9	0	19.8	0	0	0	0
P2N_RX0164	607938	6333184	24.3	0	0	0	0	23.4	0	19.3	0	0	0	0
P2N_RX0165	607914	6333199	24.4	0	0	0	0	23.6	0	19.4	0	0	0	0
P2N_RX0166	607805	6333207	25.2	0	0	0	0	24.3	0	20.2	0	0	0	0
P2N_RX0167	607795	6333223	25.2	0	0	0	0	24.4	0	20.2	0	0	0	0
P2N_RX0168	607858	6333235	24.8	0	0	0	0	23.9	0	19.8	0	0	0	0
P2N_RX0169	607838	6333265	24.9	0	0	0	0	24.1	0	19.9	0	0	0	0
P2N_RX0170	607718	6333285	25.7	0	14.6	21.6	24.8	0	20.7	0	0	0	0	0
P2N_RX0171	607800	6333288	25.1	0	0	0	0	24.3	0	20.1	0	0	0	0
P2N_RX0172	607778	6333298	25.3	0	0	0	0	24.4	0	20.3	0	0	0	0
P2N_RX0173	606213	6333424	39.8	32.8	28.7	35.6	39.7	0	34.8	0	0	0	0	0
P2N_RX0174	606039	6333589	40.5	36.5	31.6	38.5	39.6	0	35.5	0	0	0	0	0
P2N_RX0175	607668	6334133	23.8	0	0	0	0	23.5	0	18.8	0	0	0	0
P2N_RX0176	607443	6334195	24.7	20.5	15	21.9	24.5	0	19.7	0	0	0	0	0
P2N_RX0177	607620	6334277	23.5	0	0	0	0	18.5	0	0	0	0	0	0
P2N_RX0178	606440	6334316	29.3	26.3	20.2	27.2	29.2	0	24.3	0	0	0	0	0
P2N_RX0179	607234	6334389	24.8	21.2	15.5	22.4	24.7	0	19.8	0	0	0	0	0
P2N_RX0180	606556	6334456	27.7	24.7	18.6	25.6	27.7	0	22.7	0	0	0	0	0
P2N_RX0181	605642	6334456	36.9	29.5	20.8	27.7	33.9	0	31.9	29.6	33.6	0	0	0
P2N_RX0182	607024	6334514	25.1	21.8	16	23	25	0	20.1	0	0	0	0	0
P2N_RX0183	605417	6334604	39.6	33.1	19.1	26.1	37	0	34.6	31.2	35.2	0	0	0
P2N_RX0184	607132	6334625	24	20.8	15	21.9	24	0	19	0	0	0	0	0
P2N_RX0185	605390	6334678	39.4	33.8	18.5	25.4	37.7	0	34.4	31.8	35.8	0	0	0
P2N_RX0186	606509	6334826	26.6	22.6	16.4	23.4	26.1	0	21.6	0	0	0	0	0
P2N_RX0187	606439	6334927	26.8	22.9	16	22.9	26.1	0	21.8	20.8	24.8	0	0	0
P2N_RX0188	605085	6335096	41.8	38.1	14.9	21.9	40.2	0	36.8	36	40	0	0	0
P2N_RX0189	605855	6335140	30.6	27.5	15.4	22.4	30.6	0	25.6	31.6	35.6	0	0	0
P2N_RX0190	606751	6335264	23.8	20.5	0	0	23.6	0	18.8	0	0	0	0	0
P2N_RX0191	606632	6335392	24.1	21	0	0	24.1	0	19.1	0	0	0	0	0
P2N_RX0192	606037	6335405	28.1	25.1	0	0	28.1	0	23.1	31.3	35.3	0	0	0
P2N_RX0193	606091	6335446	27.5	24.5	0	0	27.5	0	22.5	31.1	35.1	0	0	0
P2N_RX0194	603678	6335637	33.2	30.3	0	0	33	0	28.2	39.2	43.2	0	0	0
P2N_RX0195	603391	6335737	30.7	27.3	0	0	30.5	0	25.7	36.7	40.7	0	0	0
P2N_RX0196	604200	6335810	43.8	40.8	0	0	42.6	0	38.8	48.7	52.7	0	0	0
P2N_RX0197	604109	6335849	41.5	38.2	0	0	41.2	0	36.5	47.4	51.4	0	0	0
P2N_RX0198	606166	6335910	25.7	22.4	0	0	25	0	20.7	31.2	35.2	0	0	0
P2N_RX0199	603613	6335917	33.5	29.8	0	0	33.3	0	28.5	39.5	43.5	0	0	0
P2N_RX0200	606348	6336046	24.3	21.1	0	0	23.8	0	19.3	34	30	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			0	0	0										
P2N_RX0201	603442	6336202	32.3	27.3	0	0	31.9	0	27.3	37.5	41.5	37.5	0	0	0
P2N_RX0202	605719	6336662	27.5	23.9	0	0	27.3	0	22.5	33.5	37.5	33.5	0	0	0
P2N_RX0203	603335	6336553	33.5	27.9	0	0	33.1	0	28.5	33.6	37.6	33.6	0	0	0
P2N_RX0204	605018	6337452	32.7	26.1	0	0	32.7	0	27.7	34.9	38.9	34.9	0	0	0
P2N_RX0205	604431	6337320	41.6	32.7	0	0	39	0	36.6	34.7	38.7	34.7	0	0	0
P2N_RX0206	602580	6337450	27.4	24.4	0	0	27.4	0	22.4	0	0	0	0	0	0
P2N_RX0207	605121	6337526	30.5	26.4	0	0	30.1	0	25.5	31.9	35.9	31.9	0	0	0
P2N_RX0208	606000	6337667	23.6	0	0	0	23.5	0	18.6	0	0	0	0	0	0
P2N_RX0209	604305	6337785	41.9	38.9	0	0	41.3	0	36.9	31.1	35.1	31.1	0	0	0
P2N_RX0210	603315	6337945	36	32.5	0	0	35.7	0	31	23.4	27.4	23.4	0	0	0
P2N_RX0211	605270	6338406	28.2	24.1	0	0	28.1	0	23.2	0	0	0	0	0	0
P2N_RX0212	604944	6340546	31.1	25.1	19.1	0	30.7	0	26.1	0	0	0	0	0	0
P2N_RX0213	603861	6341031	57.8	34	28.1	0	44.9	0	52.8	0	0	0	0	0	0
P2N_RX0214	602852	6342583	27.1	23.1	17.1	0	26.8	0	22.1	0	0	0	0	0	0
P2N_RX0215	606651	6343542	24.1	20.5	14.5	0	23.7	31.8	19.1	0	0	0	0	0	0
P2N_RX0216	606505	6344336	26.2	22.9	16.9	0	25.9	33.9	21.2	0	0	0	0	0	0
P2N_RX0217	603830	6344706	30.6	27.3	21.3	18.4	30.3	27.8	25.6	0	0	0	0	0	0
P2N_RX0218	605715	6346443	32.5	21.6	22.1	22	31.4	33.8	27.5	0	0	0	0	0	0
P2N_RX0219	606441	6346807	27.2	21.9	18.2	18.2	26.7	24.5	22.2	0	0	0	0	0	0
P2N_RX0220	606170	6347482	31.6	27.6	21.4	21.6	31.6	30.2	26.6	0	0	0	0	0	0
P2N_RX0221	608548	6350610	25.1	0	15.2	15.2	24.6	0	20.1	0	0	0	0	0	0
P2N_RX0222	608620	6350985	26.2	0	15	16	26.2	0	21.2	0	0	0	0	0	0
P2N_RX0223	606554	6351255	44.2	0	35.1	34.9	43.7	0	39.2	0	0	0	0	0	0
P2N_RX0224	610158	6353174	26.4	0	17	16.9	26.4	0	21.4	0	0	0	0	0	0
P2N_RX0225	608310	6354624	33.7	22.1	23.9	23.9	33.5	29.4	28.7	0	0	0	0	0	0
P2N_RX0226	607928	6355010	28.2	21.1	19	19	28	25.6	23.2	0	0	0	0	0	0
P2N_RX0227	610796	6355250	29.8	26.4	20.4	15.2	29.4	34.1	24.8	0	0	0	0	0	0
P2N_RX0228	608678	6357223	30.1	21.3	15.7	15.7	24.7	33.9	25.1	0	0	0	0	0	0
P2N_RX0229	611639	6357281	24.4	0	0	0	0	0	27.8	19.4	0	0	0	0	0
P2N_RX0230	610805	6357330	31.4	0	17.8	17.8	17.8	26.8	33.8	26.4	0	0	0	0	0
P2N_RX0231	608524	6359518	27.1	0	17.8	17.8	27.1	23.9	22.1	0	0	0	0	0	0
P2N_RX0232	610703	6360044	35.3	22.9	26.1	26.1	35.2	0	30.3	0	0	0	0	0	0
P2N_RX0233	610606	6360125	36.9	23.6	27.9	27.8	36.6	0	31.9	0	0	0	0	0	0
P2N_RX0234	609342	6360451	34.7	24	25.6	25.5	34.5	0	29.7	0	0	0	0	0	0
P2N_RX0235	609240	6361599	31.9	28.1	22.1	17.2	31	0	26.9	0	0	0	0	0	0
P2N_RX0236	611545	6361985	34	25	19	14.9	31.3	28.7	29	0	0	0	0	0	0
P2N_RX0237	612965	6364201	39.5	0	22.7	22.6	39.5	31.1	34.5	0	0	0	0	0	0
P2N_RX0238	610781	6364374	27.9	0	18.4	18.4	27.4	27.7	22.9	0	0	0	0	0	0
P2N_RX0239	610715	6366575	24	0	15	15	0	0	19	0	0	0	0	0	0
P2N_RX0240	612174	6368440	34	0	21.9	21.9	31	0	29	0	0	0	0	0	0
P2N_RX0241	614115	6369946	38.9	25.7	30	29.9	36.2	0	33.9	0	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			S1	S2	S3										
P2N_RX0242	613292	6371054	38.8	35.3	29.3	22.2	38.6	0	33.8	0	0	0	0	0	0
P2N_RX0243	614688	6371091	32.4	29.2	23.3	17.9	32.2	0	27.4	0	0	0	0	0	0
P2N_RX0244	614476	6371198	35	32	26	19.8	34.8	0	30	0	0	0	0	0	0
P2N_RX0245	614564	6371224	33.8	30.7	24.8	19.3	33.6	0	28.8	0	0	0	0	0	0
P2N_RX0246	615203	6371286	27.5	24.3	18.4	15.4	27.2	0	22.5	0	0	0	0	0	0
P2N_RX0247	614555	6371337	33.9	30.6	24.7	20	33.4	0	28.9	0	0	0	0	0	0
P2N_RX0248	613680	6371376	56.6	42.4	36.9	26.4	43.6	0	51.6	0	0	0	0	0	0
P2N_RX0249	614439	6371440	35.3	31.7	25.7	21.4	34.3	0	30.3	0	0	0	0	0	0
P2N_RX0250	614163	6371760	38.4	31.8	26.2	26.2	34.1	0	33.4	0	0	0	0	0	0
P2N_RX0251	613931	6371790	43.6	32.7	30	30	34.9	0	38.6	0	0	0	0	0	0
P2N_RX0252	614459	6371825	33.7	28.8	22.8	22.8	31.3	0	28.7	0	0	0	0	0	0
P2N_RX0253	614993	6371877	28.3	24.5	18.5	18	27.2	0	23.3	0	0	0	0	0	0
P2N_RX0254	614021	6371901	40.2	30.9	29.2	29.2	34.2	0	35.2	0	0	0	0	0	0
P2N_RX0255	614088	6372224	36.7	27.2	27.8	27.7	35.1	0	31.7	0	0	0	0	0	0
P2N_RX0256	614826	6372748	27.1	20.9	18	17.9	27	0	22.1	0	0	0	0	0	0
P2N_RX0257	614819	6373310	25.6	0	15.6	15.5	25.5	0	20.6	0	0	0	0	0	0
P2N_RX0258	612931	6373361	43.4	28.6	22.7	18.1	43.3	0	38.4	0	0	0	0	0	0
P2N_RX0259	612899	6373701	37.5	30.9	25	15.7	37.1	0	32.5	0	0	0	0	0	0
P2N_RX0260	612090	6374070	61.9	47.7	42.4	0	42.4	0	56.9	0	0	0	0	0	0
P2N_RX0261	612600	6374506	37.4	31.8	25.9	0	34.4	0	32.4	0	0	0	0	0	0
P2N_RX0262	612922	6375599	29.2	21.5	15.5	0	28.9	0	24.2	0	0	0	0	0	0
P2N_RX0263	610395	6375742	29.9	23.6	17.6	0	29.8	24.4	24.9	0	0	0	0	0	0
P2N_RX0264	613204	6376034	25.9	0	0	0	25.9	0	20.9	0	0	0	0	0	0
P2N_RX0265	611833	6376087	41.9	26.2	20.2	0	41.9	26.1	36.9	0	0	0	0	0	0
P2N_RX0266	612811	6376199	28.4	21	15	0	28.3	0	23.4	0	0	0	0	0	0
P2N_RX0267	612869	6376491	27.2	21.4	15.4	0	27.2	0	22.2	0	0	0	0	0	0
P2N_RX0268	612538	6376549	29.7	23.8	17.8	0	29.5	25	24.7	0	0	0	0	0	0
P2N_RX0269	611665	6376614	41.6	31.9	25.9	0	39.4	30.7	36.6	0	0	0	0	0	0
P2N_RX0270	609733	6376902	27.6	24.5	18.5	0	27.4	27.4	22.6	0	0	0	0	0	0
P2N_RX0271	610063	6377008	30.7	27.5	21.6	14.8	30.5	30.4	25.7	0	0	0	0	0	0
P2N_RX0272	611077	6377096	65.2	58.5	55.7	15.4	42.1	41.2	60.2	0	0	0	0	0	0
P2N_RX0273	611498	6377145	41.2	38.1	32.2	14.6	38.9	37.3	36.2	0	0	0	0	0	0
P2N_RX0274	611371	6377188	44.4	41.3	35.4	15.2	40.4	39.8	39.4	0	0	0	0	0	0
P2N_RX0275	611434	6377225	42.1	39	33.1	15.3	39.6	39.1	37.1	0	0	0	0	0	0
P2N_RX0276	611596	6377265	38.2	35.2	29.3	15	37	36.7	33.2	0	0	0	0	0	0
P2N_RX0277	611804	6377268	35	32	26	0	34.1	33.8	30	0	0	0	0	0	0
P2N_RX0278	611828	6377278	34.6	31.6	25.6	0	33.8	33.5	29.6	0	0	0	0	0	0
P2N_RX0279	611849	6377284	34.3	31.3	25.3	0	33.5	33.3	29.3	0	0	0	0	0	0
P2N_RX0280	611865	6377288	34.1	31.1	25.1	0	33.3	33.1	29.1	0	0	0	0	0	0
P2N_RX0281	611198	6377287	53	42.9	37.3	16.3	46.9	45.6	48	0	0	0	0	0	0
P2N_RX0282	611899	6377300	33.6	30.6	24.6	0	32.9	32.7	28.6	0	0	0	0	0	0

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P2N_RX0283	611167	6377310	56.2	42.2	36.7	16.6	49	47.3	51.2	0	0	0	0	0
P2N_RX0284	612085	6377361	31.3	28.3	22.4	0	30.9	30.8	26.3	0	0	0	0	0
P2N_RX0285	611222	6377410	49.3	38.7	32.9	17.1	48.7	47.9	44.3	0	0	0	0	0
P2N_RX0286	611803	6377544	34.1	30.3	24.4	15.6	34.1	34.1	29.1	0	0	0	0	0
P2N_RX0287	611178	6377571	49.4	35.2	29.5	18.4	48.8	49.5	44.4	0	0	0	0	0
P2N_RX0288	612000	6377578	31.7	28.2	22.3	14.8	31.7	31.7	26.7	0	0	0	0	0
P2N_RX0289	611271	6377598	44.6	34.4	28.6	18.2	44.3	44.7	39.6	0	0	0	0	0
P2N_RX0290	611788	6377605	34.2	30	24.1	15.9	34.2	34.1	29.2	0	0	0	0	0
P2N_RX0291	612182	6377621	29.8	26.4	20.5	0	29.8	29.8	24.8	0	0	0	0	0
P2N_RX0292	612292	6377631	28.8	25.5	19.6	0	28.8	28.8	23.8	0	0	0	0	0
P2N_RX0293	611896	6377638	32.7	28.8	22.8	15.6	32.7	32.7	27.7	0	0	0	0	0
P2N_RX0294	611328	6377680	42	32.9	27	18.5	42	41.9	37	0	0	0	0	0
P2N_RX0295	611572	6377694	36.9	31.1	25.2	17.5	36.9	37	31.9	0	0	0	0	0
P2N_RX0296	611756	6377698	34.3	29.6	23.6	16.6	34.2	34.3	29.3	0	0	0	0	0
P2N_RX0297	610871	6377720	57.5	32	26.2	20.5	49.2	44.3	52.5	0	0	0	0	0
P2N_RX0298	611926	6377724	32.1	28	22	15.8	32.1	32.2	27.1	0	0	0	0	0
P2N_RX0299	611664	6377733	35.3	30	24	17.2	35.3	35.4	30.3	0	0	0	0	0
P2N_RX0300	611748	6377737	34.2	29.3	23.3	16.8	34.1	34.2	29.2	0	0	0	0	0
P2N_RX0301	611740	6377767	34.2	29.1	23.2	17	34.1	34.2	29.2	0	0	0	0	0
P2N_RX0302	610420	6377767	38.4	31.7	25.7	21.2	38.3	35.6	33.4	0	0	0	0	0
P2N_RX0303	611884	6377771	32.4	28	22	16.2	32.4	32.5	27.4	0	0	0	0	0
P2N_RX0304	610121	6377787	34	29.8	23.7	20.7	33.8	33.2	29	0	0	0	0	0
P2N_RX0305	611837	6377792	32.9	28.2	22.2	16.6	32.9	32.9	27.9	0	0	0	0	0
P2N_RX0306	611716	6377818	34.3	28.8	22.9	17.4	34.2	34.2	29.3	0	0	0	0	0
P2N_RX0307	611946	6377832	31.6	27.1	21.2	16.2	31.5	31.6	26.6	0	0	0	0	0
P2N_RX0308	611771	6377832	33.5	28.3	22.4	17.1	33.5	33.5	28.5	0	0	0	0	0
P2N_RX0309	611915	6377834	34.2	28.7	22.8	17.5	34.2	34.2	29.2	0	0	0	0	0
P2N_RX0310	611416	6377844	38.8	30.3	24.4	19.2	38.4	38.1	33.8	0	0	0	0	0
P2N_RX0311	611702	6377855	34.3	28.6	22.7	17.6	34.3	34.2	29.3	0	0	0	0	0
P2N_RX0312	611766	6377855	33.5	28.2	22.2	17.3	33.5	33.5	28.5	0	0	0	0	0
P2N_RX0313	611915	6377857	31.8	27.2	21.2	16.4	31.8	31.8	26.8	0	0	0	0	0
P2N_RX0314	611851	6377866	32.5	27.5	21.6	16.8	32.4	32.4	27.5	0	0	0	0	0
P2N_RX0315	611695	6377873	34.3	28.5	22.6	17.8	34.2	34.2	29.3	0	0	0	0	0
P2N_RX0316	611770	6377874	33.3	28	22.1	17.3	33.3	33.3	28.3	0	0	0	0	0
P2N_RX0317	611839	6377880	32.5	27.5	21.5	17	32.5	32.5	27.5	0	0	0	0	0
P2N_RX0318	611685	6377890	34.3	28.4	22.5	17.9	34.3	34.2	29.3	0	0	0	0	0
P2N_RX0319	611820	6377890	32.7	27.6	21.6	17.1	32.7	32.7	27.7	0	0	0	0	0
P2N_RX0320	611752	6377894	33.5	28	22	17.5	33.4	33.4	28.5	0	0	0	0	0
P2N_RX0321	612451	6377894	27	23.4	17.4	0	27	27	22	0	0	0	0	0
P2N_RX0322	611251	6377908	41.9	31.4	25.4	20.6	41.6	39.1	36.9	0	0	0	0	0
P2N_RX0323	610790	6377918	55.7	35.2	29.2	22.6	52.8	39.9	30.7	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4						S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			S1: Excavation	S2: Piling	S3: Shoring	S4: Excavation	S5: Piling	S6: Shoring										
P2N_RX0324	611748	6377912	33.5	27.8	21.9	17.7	33.4	33.3							28.5	0	0	0
P2N_RX0325	611686	6377912	34.2	28.2	22.3	18	34.1	34							29.2	0	0	0
P2N_RX0326	611310	6377917	40.4	30.9	24.9	20.3	40.2	38.4							35.4	0	0	0
P2N_RX0327	611242	6377926	42	31.7	25.7	20.7	41.8	38.9							37	0	0	0
P2N_RX0328	611822	6377934	32.5	27.2	21.2	17.3	32.5	32.4							27.5	0	0	0
P2N_RX0329	611303	6377935	40.4	31.1	25.2	20.5	40.3	38.2							35.4	0	0	0
P2N_RX0330	612027	6377941	30.4	25.9	19.9	16.1	30.4	30.4							25.4	0	0	0
P2N_RX0331	611377	6377945	38.8	30.4	24.5	20.1	38.6	37.2							33.8	0	0	0
P2N_RX0332	611237	6377948	42	31.9	26	20.9	41.9	38.6							37	0	0	0
P2N_RX0333	611742	6377949	33.4	27.6	21.6	17.9	33.3	33.1							28.4	0	0	0
P2N_RX0334	611805	6377955	32.6	27.2	21.2	17.5	32.6	32.5							27.6	0	0	0
P2N_RX0335	611301	6377955	40.3	31.3	25.4	20.6	40.2	37.9							35.3	0	0	0
P2N_RX0336	612029	6377963	30.3	25.7	19.8	16.2	30.3	30.3							25.3	0	0	0
P2N_RX0337	611233	6377964	41.9	32.1	26.2	21.1	41.9	38.3							36.9	0	0	0
P2N_RX0338	611379	6377967	38.7	30.6	24.6	20.2	38.5	36.9							33.7	0	0	0
P2N_RX0339	611727	6377969	33.5	27.5	21.5	18.1	33.3	33.2							28.5	0	0	0
P2N_RX0340	611462	6377972	37.2	29.7	23.8	19.7	37	36							32.2	0	0	0
P2N_RX0341	611805	6377973	32.6	27	21.1	17.6	32.5	32.4							27.6	0	0	0
P2N_RX0342	611375	6377981	38.6	30.7	24.8	20.3	38.6	36.8							33.6	0	0	0
P2N_RX0343	612021	6377982	30.4	25.7	19.7	16.4	30.4	30.4							25.4	0	0	0
P2N_RX0344	611300	6377984	40.1	31.6	25.6	20.8	40.1	37.4							35.1	0	0	0
P2N_RX0345	611225	6377984	41.9	32.4	26.5	21.3	41.9	38							36.9	0	0	0
P2N_RX0346	611513	6377990	36.2	29.3	23.4	19.5	36.1	35.2							31.2	0	0	0
P2N_RX0347	611285	6377995	40.4	31.8	25.9	21	40.4	37.4							35.4	0	0	0
P2N_RX0348	611422	6377996	37.7	30.3	24.4	20.1	37.6	36.1							32.7	0	0	0
P2N_RX0349	612005	6377998	30.4	25.6	19.7	16.5	30.4	30.3							25.4	0	0	0
P2N_RX0350	611942	6377999	31	26	20	16.8	31	30.9							26	0	0	0
P2N_RX0351	611367	6378000	38.7	30.9	25	20.5	38.6	36.6							33.7	0	0	0
P2N_RX0352	611219	6378002	41.9	32.7	26.7	21.5	41.9	37.7							36.9	0	0	0
P2N_RX0353	611802	6378005	32.5	26.8	20.8	17.8	32.3	32.2							27.5	0	0	0
P2N_RX0354	611566	6378005	35.4	28.9	22.9	19.3	35.3	34.5							30.4	0	0	0
P2N_RX0355	611504	6378008	36.3	29.5	23.6	19.7	36.2	35.1							31.3	0	0	0
P2N_RX0356	611274	6378013	40.5	32.1	26.2	21.2	40.5	37.2							35.5	0	0	0
P2N_RX0357	612005	6378016	30.4	25.5	19.6	16.5	30.3	30.3							25.4	0	0	0
P2N_RX0358	611938	6378019	31	25.9	19.9	16.9	30.9	30.8							26	0	0	0
P2N_RX0359	611355	6378025	38.7	31.3	25.3	20.8	38.7	36.3							33.7	0	0	0
P2N_RX0360	611502	6378027	36.2	29.6	23.7	19.8	36.2	35							31.2	0	0	0
P2N_RX0361	611209	6378028	42	33	27.1	21.7	41.9	37.4							37	0	0	0
P2N_RX0362	611787	6378030	32.5	26.9	20.9	18	32.4	32.2							27.5	0	0	0
P2N_RX0363	611561	6378030	35.3	29	23.1	19.4	35.3	34.3							30.3	0	0	0
P2N_RX0364	611270	6378034	40.4	32.3	26.4	21.4	40.4	36.9							35.4	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4									
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P2N_RX0365	611640	6378036	34.3	28.3	22.3	18.9	34.2	33.5	29.3	0	0	0
P2N_RX0366	611996	6378036	30.4	25.5	19.5	16.7	30.3	30.3	25.4	0	0	0
P2N_RX0367	611934	6378039	31	25.8	19.8	17.1	30.9	30.8	26	0	0	0
P2N_RX0368	611348	6378039	38.8	31.4	25.5	20.9	38.8	36.2	33.8	0	0	0
P2N_RX0369	611416	6378041	37.5	30.7	24.7	20.5	37.5	35.6	32.5	0	0	0
P2N_RX0370	611134	6378045	44	34.2	28.2	22.3	43.6	38.6	39	0	0	0
P2N_RX0371	611493	6378045	36.3	29.8	23.9	20	36.2	34.8	31.3	0	0	0
P2N_RX0372	611565	6378051	35.2	29.1	23.1	19.5	35.2	34.1	30.2	0	0	0
P2N_RX0373	610945	6378052	55.3	36.7	30.7	23.5	48.2	41.8	50.3	0	0	0
P2N_RX0374	611199	6378053	30.4	25.3	19.4	16.8	30.3	30.2	25.4	0	0	0
P2N_RX0375	611342	6378053	38.8	31.6	25.7	21.1	38.7	36	33.8	0	0	0
P2N_RX0376	611405	6378059	37.6	30.9	24.9	20.7	37.6	35.5	32.6	0	0	0
P2N_RX0377	611924	6378059	31	25.8	19.8	17.2	30.9	30.8	26	0	0	0
P2N_RX0378	611486	6378064	36.3	30	24.1	20.1	36.3	34.7	31.3	0	0	0
P2N_RX0379	611550	6378065	35.3	29.3	23.4	19.7	35.3	34.1	30.3	0	0	0
P2N_RX0380	610781	6378068	63.4	38.5	32.5	24.3	45.9	44.1	58.4	0	0	0
P2N_RX0381	611195	6378067	42	33.6	27.6	22.1	41.7	37.8	37	0	0	0
P2N_RX0382	611333	6378072	38.8	31.8	25.9	21.2	38.8	35.9	33.8	0	0	0
P2N_RX0383	611402	6378079	37.5	31	25.1	20.8	37.5	35.2	32.5	0	0	0
P2N_RX0384	611247	6378084	40.6	33.1	27.1	21.9	40.3	37.2	35.6	0	0	0
P2N_RX0385	611479	6378085	36.3	30.2	24.2	20.3	36.3	34.5	31.3	0	0	0
P2N_RX0386	611260	6378090	40.2	32.9	27	21.9	40	37	35.2	0	0	0
P2N_RX0387	611279	6378090	39.8	32.7	26.7	21.8	39.6	36.7	34.8	0	0	0
P2N_RX0388	611992	6378091	30.2	25.3	19.3	16.9	30.1	30	25.2	0	0	0
P2N_RX0389	611392	6378095	37.6	31.3	25.3	21	37.6	35.1	32.6	0	0	0
P2N_RX0390	611331	6378098	38.7	32.1	26.1	21.4	38.6	36	33.7	0	0	0
P2N_RX0391	611533	6378104	35.4	29.7	23.7	20	35.4	33.9	30.4	0	0	0
P2N_RX0392	611478	6378106	36.2	30.3	24.3	20.4	36.2	34.3	31.2	0	0	0
P2N_RX0393	611616	6378110	34.2	28.8	22.8	19.5	34.2	33.1	29.2	0	0	0
P2N_RX0394	611137	6378115	43.1	34.9	29	22.9	42.1	39.3	38.1	0	0	0
P2N_RX0395	611465	6378116	36.3	30.5	24.5	20.6	36.3	34.3	31.3	0	0	0
P2N_RX0396	611323	6378116	38.7	32.3	26.3	21.6	38.6	36.2	33.7	0	0	0
P2N_RX0397	611176	6378117	42	34.3	28.4	22.7	41.3	38.6	37	0	0	0
P2N_RX0398	611526	6378120	35.4	29.8	23.9	20.2	35.4	33.8	30.4	0	0	0
P2N_RX0399	611607	6378129	34.3	29	23	19.6	34.3	33	29.3	0	0	0
P2N_RX0400	611171	6378132	42	34.6	28.6	22.8	41.1	38.9	37	0	0	0
P2N_RX0401	611372	6378135	37.7	31.8	25.8	21.4	37.6	35.6	32.7	0	0	0
P2N_RX0402	611407	6378137	37.1	31.3	25.4	21.2	37	35.1	32.1	0	0	0
P2N_RX0403	611462	6378139	36.2	30.6	24.7	20.8	36.2	34.4	31.2	0	0	0
P2N_RX0404	611084	6378143	44.5	36.1	30.2	23.6	42.5	40.7	39.5	0	0	0
P2N_RX0405	611163	6378146	42.1	34.8	28.9	23	41.1	39.1	37.1	0	0	0

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P2N_RX0406	611603	6378147	34.2	29.1	23.1	19.8	34.2	32.9	29.2	0
P2N_RX0407	611449	6378151	36.4	30.9	24.9	20.9	36.3	34.6	31.4	0
P2N_RX0408	611517	6378160	35.3	30.1	24.1	20.5	35.3	33.7	30.3	0
P2N_RX0409	611597	6378167	34.2	29.2	23.2	19.9	34.2	32.8	29.2	0
P2N_RX0410	611510	6378178	35.4	30.2	24.3	20.6	35.3	33.9	30.4	0
P2N_RX0411	611591	6378186	34.2	29.3	23.4	20	34.2	32.9	29.2	0
P2N_RX0413	610158	6378187	36.4	33.4	27.5	24.8	36.4	36.4	31.4	0
P2N_RX0414	611146	6378192	42.1	35.5	29.6	23.6	40.5	39.9	37.1	0
P2N_RX0415	611582	6378203	34.3	29.5	23.5	20.2	34.2	33	29.3	0
P2N_RX0416	611638	6378217	33.5	28.9	22.9	19.8	33.5	32.4	28.5	0
P2N_RX0417	611488	6378229	35.4	30.7	24.7	21.1	35.2	34.3	30.4	0
P2N_RX0418	611143	6378231	41.9	35.9	30	23.9	39.8	40.2	36.9	0
P2N_RX0419	611563	6378254	34.3	29.8	23.9	20.6	34.1	33.3	29.3	0
P2N_RX0420	611477	6378263	35.4	30.9	25	21.3	35.1	34.5	30.4	0
P2N_RX0421	611561	6378271	34.2	29.9	23.9	20.7	34	33.4	29.2	0
P2N_RX0422	611622	6378273	33.5	29.2	23.2	20.2	33.5	32.7	28.5	0
P2N_RX0423	611469	6378283	35.4	31	25.1	21.5	35	34.6	30.4	0
P2N_RX0424	610935	6378282	49.2	41.6	35.7	26.2	44.8	47.3	44.2	0
P2N_RX0425	611556	6378292	34.2	30	24	20.8	33.9	33.5	29.2	0
P2N_RX0426	611696	6378296	32.5	28.4	22.4	19.7	32.4	31.8	27.5	0
P2N_RX0427	610204	6378300	37.8	34.8	28.9	26.5	37.7	37.7	32.8	0
P2N_RX0428	611484	6378307	35.1	30.9	25	21.5	34.6	34.4	30.1	0
P2N_RX0429	611548	6378308	34.2	30.1	24.2	21	33.9	33.6	29.2	0
P2N_RX0430	611695	6378314	32.5	28.4	22.5	19.8	32.3	31.8	27.5	0
P2N_RX0431	611463	6378324	35.3	31.2	25.3	21.8	34.7	34.7	30.3	0
P2N_RX0432	611614	6378327	33.3	29.3	23.4	20.5	33.1	32.8	28.3	0
P2N_RX0433	611541	6378328	34.2	30.2	24.3	21	33.8	33.7	29.2	0
P2N_RX0434	611679	6378333	32.6	28.6	22.7	20	32.4	32	27.6	0
P2N_RX0435	611101	6378338	42	37.6	31.7	25.3	40.7	41.6	37	0
P2N_RX0436	611445	6378339	35.5	31.5	25.5	22	34.8	35	30.5	0
P2N_RX0437	611593	6378343	33.5	29.6	23.7	20.8	33.2	33	28.5	0
P2N_RX0438	611535	6378346	34.2	30.3	24.4	21.3	33.8	33.8	29.2	0
P2N_RX0439	611670	6378355	32.6	28.7	22.8	20.1	32.3	32.1	27.6	0
P2N_RX0440	611092	6378358	42	37.9	32	25.6	41	41.8	37	0
P2N_RX0441	611449	6378364	35.3	31.5	25.5	22.1	34.5	34.9	30.3	0
P2N_RX0442	611527	6378365	34.3	30.4	24.5	21.4	33.7	33.9	29.3	0
P2N_RX0443	611594	6378366	33.4	29.6	23.7	20.8	33	33	28.4	0
P2N_RX0444	611519	6378381	34.3	30.5	24.6	21.6	33.7	34	29.3	0
P2N_RX0445	611581	6378385	33.5	29.8	23.8	21	33	33.2	28.5	0
P2N_RX0446	611438	6378391	35.3	31.6	25.7	22.4	34.7	35.1	30.3	0
P2N_RX0447	611080	6378393	42	38.3	32.4	26	41.3	42	37	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			S1	S2	S3										
P2N_RX0448	611458	6378403	35	31.4	25.4	22.2	34.4	34.8	30	0	0	0	0	0	0
P2N_RX0449	611575	6378410	33.5	29.9	23.9	21.2	32.9	33.2	28.5	0	0	0	0	0	0
P2N_RX0450	611515	6378410	34.2	30.6	24.7	21.7	33.6	34	29.2	0	0	0	0	0	0
P2N_RX0451	611070	6378417	42.1	38.5	32.7	26.4	41.6	42.1	37.1	0	0	0	0	0	0
P2N_RX0452	611586	6378444	33.2	29.7	23.8	21.2	32.7	33	28.2	0	0	0	0	0	0
P2N_RX0453	611415	6378448	35.4	32	26	22.9	35	35.3	30.4	0	0	0	0	0	0
P2N_RX0454	610952	6378461	45.3	42.2	36.4	28.2	45.3	45.4	40.3	0	0	0	0	0	0
P2N_RX0455	611409	6378467	35.4	32	26.1	23	35.1	35.3	30.4	0	0	0	0	0	0
P2N_RX0456	611020	6378478	42.9	39.8	33.9	27.6	42.8	42.9	37.9	0	0	0	0	0	0
P2N_RX0457	611540	6378479	33.6	30.3	24.3	21.8	33.3	33.5	28.6	0	0	0	0	0	0
P2N_RX0458	611403	6378485	35.4	32.1	26.1	23.2	35.1	35.3	30.4	0	0	0	0	0	0
P2N_RX0459	611395	6378501	35.4	32.2	26.2	23.3	35.2	35.4	30.4	0	0	0	0	0	0
P2N_RX0460	611478	6378507	34.3	31	25.1	22.5	34	34.2	29.3	0	0	0	0	0	0
P2N_RX0461	611537	6378511	33.5	30.3	24.3	21.9	33.3	33.5	28.5	0	0	0	0	0	0
P2N_RX0462	610869	6378513	48.3	45.1	39.3	30	47.9	47.8	43.3	0	0	0	0	0	0
P2N_RX0463	611385	6378523	35.4	32.3	26.3	23.5	35.3	35.5	30.4	0	0	0	0	0	0
P2N_RX0464	610751	6378523	60.1	50.5	45.2	31.8	52.7	52.1	55.1	0	0	0	0	0	0
P2N_RX0465	611465	6378531	34.3	31.1	25.2	22.7	34.2	34.3	29.3	0	0	0	0	0	0
P2N_RX0466	611539	6378533	33.4	30.2	24.2	22	33.2	33.4	28.4	0	0	0	0	0	0
P2N_RX0467	611383	6378541	35.4	32.2	26.3	23.6	35.3	35.4	30.4	0	0	0	0	0	0
P2N_RX0468	611526	6378546	33.5	30.3	24.4	22.1	33.4	33.5	28.5	0	0	0	0	0	0
P2N_RX0469	611372	6378564	35.4	32.4	26.4	23.8	35.4	35.5	30.4	0	0	0	0	0	0
P2N_RX0470	611006	6378566	42.4	39.3	33.4	28.7	42.3	42.2	37.4	0	0	0	0	0	0
P2N_RX0471	611076	6378578	40.6	37.5	31.6	27.8	40.5	40.5	35.6	0	0	0	0	0	0
P2N_RX0472	611369	6378579	35.4	32.3	26.4	23.9	35.3	35.4	30.4	0	0	0	0	0	0
P2N_RX0473	611514	6378584	33.5	30.4	24.5	22.4	33.4	33.5	28.5	0	0	0	0	0	0
P2N_RX0474	611093	6378588	40.1	37.1	31.2	27.6	40	40	35.1	0	0	0	0	0	0
P2N_RX0475	611446	6378588	34.3	31.2	25.3	23.1	34.3	34.4	29.3	0	0	0	0	0	0
P2N_RX0476	611109	6378593	39.7	36.7	30.8	27.4	39.7	39.7	34.7	0	0	0	0	0	0
P2N_RX0477	611361	6378602	35.4	32.4	26.4	24.1	35.4	35.4	30.4	0	0	0	0	0	0
P2N_RX0478	611151	6378602	38.8	35.8	29.9	26.8	38.8	38.8	33.8	0	0	0	0	0	0
P2N_RX0479	611507	6378603	33.5	30.4	24.5	22.5	33.4	33.5	28.5	0	0	0	0	0	0
P2N_RX0480	611358	6378615	35.4	32.4	26.4	24.2	35.4	35.4	30.4	0	0	0	0	0	0
P2N_RX0481	611213	6378619	37.6	34.6	28.6	26.1	37.6	37.5	32.6	0	0	0	0	0	0
P2N_RX0482	611437	6378620	34.3	31.3	25.3	23.3	34.3	34.3	29.3	0	0	0	0	0	0
P2N_RX0483	611148	6378621	38.7	35.7	29.8	27	38.7	38.6	33.7	0	0	0	0	0	0
P2N_RX0484	611140	6378634	38.8	35.7	29.8	27.2	38.7	38.7	33.8	0	0	0	0	0	0
P2N_RX0485	611205	6378637	37.6	34.6	28.6	26.3	37.6	37.5	32.6	0	0	0	0	0	0
P2N_RX0486	611274	6378638	36.5	33.5	27.5	25.3	36.5	36.5	31.5	0	0	0	0	0	0
P2N_RX0487	611138	6378651	38.7	35.6	29.7	27.3	38.6	38.5	33.7	0	0	0	0	0	0
P2N_RX0488	611198	6378656	37.6	34.5	28.6	26.4	37.5	37.5	32.6	0	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S09: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			S1	S2	S3										
P2N_RX0489	611335	6378664	35.5	32.4	26.5	24.7	35.4	35.4	30.5	0	0	0	0	0	0
P2N_RX0490	611284	6378665	36.2	33.2	27.2	25.3	36.1	36.1	31.2	0	0	0	0	0	0
P2N_RX0491	611136	6378667	38.7	35.5	29.6	27.4	38.4	38.4	33.7	0	0	0	0	0	0
P2N_RX0492	611135	6378669	35.2	32.2	26.3	24.5	35.2	35.2	30.2	0	0	0	0	0	0
P2N_RX0493	611136	6378676	35	31.9	26	24.3	34.9	34.9	30	0	0	0	0	0	0
P2N_RX0494	611194	6378677	37.6	34.4	28.5	26.6	37.4	37.4	32.6	0	0	0	0	0	0
P2N_RX0495	611127	6378679	38.8	35.5	29.6	27.6	38.5	38.4	33.8	0	0	0	0	0	0
P2N_RX0496	611275	6378686	36.2	33.1	27.2	25.5	36.1	36.1	31.2	0	0	0	0	0	0
P2N_RX0497	611180	6378695	37.7	34.5	28.6	26.9	37.5	37.4	32.7	0	0	0	0	0	0
P2N_RX0498	611121	6378696	38.8	35.4	29.5	27.8	38.5	38.3	33.8	0	0	0	0	0	0
P2N_RX0499	611268	6378699	36.2	33.1	27.2	25.6	36.1	36.1	31.2	0	0	0	0	0	0
P2N_RX0500	611417	6378699	34.2	31.2	25.2	23.7	34.2	34.1	29.2	0	0	0	0	0	0
P2N_RX0501	611331	6378706	35.3	32.2	26.3	24.8	35.2	35.2	30.3	0	0	0	0	0	0
P2N_RX0502	611179	6378715	37.6	34.3	28.4	27	37.4	37.2	32.6	0	0	0	0	0	0
P2N_RX0503	611316	6378715	35.5	32.4	26.4	25	35.4	35.3	30.5	0	0	0	0	0	0
P2N_RX0504	611119	6378718	38.7	35.2	29.3	27.9	38.5	38.1	33.7	0	0	0	0	0	0
P2N_RX0505	611466	6378723	33.5	30.5	24.5	23.2	33.5	33.4	28.5	0	0	0	0	0	0
P2N_RX0506	611404	6378728	34.2	31.2	25.2	24	34.2	34.2	29.2	0	0	0	0	0	0
P2N_RX0507	611172	6378732	37.6	34.2	28.3	27.1	37.5	37.2	32.6	0	0	0	0	0	0
P2N_RX0508	611132	6378738	35.4	32.3	26.3	25.1	35.2	35.2	30.4	0	0	0	0	0	0
P2N_RX0509	611401	6378746	34.2	31.1	25.2	24	34.1	34.1	29.2	0	0	0	0	0	0
P2N_RX0510	611176	6378749	37.4	34	28.1	27.1	37.4	36.9	32.4	0	0	0	0	0	0
P2N_RX0511	611311	6378762	35.3	32.1	26.2	25.2	35.2	35.1	30.3	0	0	0	0	0	0
P2N_RX0512	611245	6378764	36.3	32.9	27	26.1	36.2	35.9	31.3	0	0	0	0	0	0
P2N_RX0513	611388	6378765	34.3	31.2	25.2	24.2	34.1	34.1	29.3	0	0	0	0	0	0
P2N_RX0514	611301	6378778	35.4	32.1	26.2	25.4	35.3	35.1	30.4	0	0	0	0	0	0
P2N_RX0515	611245	6378779	36.2	32.8	26.9	26.2	36.1	35.8	31.2	0	0	0	0	0	0
P2N_RX0516	611378	6378781	34.3	31.2	25.2	24.4	34.2	34.1	29.3	0	0	0	0	0	0
P2N_RX0517	610469	6378788	53.3	50	30.6	43.8	45.8	39	48.3	0	0	0	0	0	0
P2N_RX0518	611295	6378796	35.4	32	26.1	25.5	35.3	35	30.4	0	0	0	0	0	0
P2N_RX0519	611232	6378798	36.3	32.8	26.9	26.4	36.2	35.7	31.3	0	0	0	0	0	0
P2N_RX0520	611374	6378804	34.3	31.1	25.1	24.4	34.2	34	29.3	0	0	0	0	0	0
P2N_RX0521	610268	6378813	43.3	40.3	29.2	34.1	40.1	36.2	38.3	0	0	0	0	0	0
P2N_RX0522	611286	6378814	35.4	32	26.1	25.6	35.4	35	30.4	0	0	0	0	0	0
P2N_RX0523	611372	6378823	34.2	31	25	24.5	34.2	33.9	29.2	0	0	0	0	0	0
P2N_RX0524	610917	6378827	42.4	38.7	30.2	32.5	42	38.9	37.4	0	0	0	0	0	0
P2N_RX0525	611281	6378839	35.4	31.9	25.9	25.7	35.4	34.8	30.4	0	0	0	0	0	0
P2N_RX0526	611360	6378843	34.3	30.9	25	24.6	34.3	33.9	29.3	0	0	0	0	0	0
P2N_RX0527	610429	6378859	52	48.8	30.6	42.3	42.9	37.4	47	0	0	0	0	0	0
P2N_RX0528	611357	6378862	34.2	30.8	24.9	24.7	34.2	33.8	29.2	0	0	0	0	0	0
P2N_RX0529	610916	6378869	42	38.7	29.5	32.6	41.4	38.1	37	0	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
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P2N_RX0530	610832	6378880	44.5	41.3	29.8	35.2	42.8	38.4	39.5	0
P2N_RX0531	609810	6378889	34.9	31.3	25.6	25.6	34.6	30.9	29.9	0
P2N_RX0532	611264	6378891	35.3	32	25.6	25.9	35.3	34.5	30.3	0
P2N_RX0533	611300	6378899	34.8	31.5	25.2	25.4	34.8	34.1	29.8	0
P2N_RX0534	611275	6378908	35.1	31.8	25.4	25.8	35.1	34.2	30.1	0
P2N_RX0535	611332	6378908	34.4	31	24.8	25	34.3	33.7	29.4	0
P2N_RX0536	611389	6378926	33.6	30.3	24.1	24.2	33.6	33	28.6	0
P2N_RX0537	611405	6378932	33.3	30.1	23.9	24	33.3	32.8	28.3	0
P2N_RX0538	611328	6378932	34.3	31.1	24.6	25	34.3	33.5	29.3	0
P2N_RX0539	611422	6378937	33.1	29.9	23.7	23.8	33.1	32.6	28.1	0
P2N_RX0540	611469	6378953	32.5	29.3	23.1	23.3	32.5	32	27.5	0
P2N_RX0541	611315	6378959	34.3	31.2	24.5	25.1	34.3	33.4	29.3	0
P2N_RX0542	611382	6378964	33.5	30.3	23.9	24.3	33.4	32.7	28.5	0
P2N_RX0543	611464	6378972	32.5	29.3	23	23.3	32.5	31.9	27.5	0
P2N_RX0544	611309	6378977	34.3	31.2	24.4	25.2	34.2	33.3	29.3	0
P2N_RX0545	611376	6378984	33.5	30.4	23.8	24.3	33.4	32.6	28.5	0
P2N_RX0547	611301	6378990	34.4	31.3	24.4	25.3	34.3	33.3	29.4	0
P2N_RX0548	611373	6379004	33.4	30.4	23.6	24.3	33.3	32.5	28.4	0
P2N_RX0549	611306	6379009	34.2	31.2	24.2	25.1	34.1	33	29.2	0
P2N_RX0550	611227	6379011	35.3	32.3	24.8	26.2	35	33.7	30.3	0
P2N_RX0551	611366	6379020	33.4	30.4	23.6	24.4	33.3	32.4	28.4	0
P2N_RX0552	611297	6379020	34.3	31.3	24.2	25.2	34.1	33	29.3	0
P2N_RX0553	611219	6379024	35.3	32.3	24.8	26.3	35	33.6	30.3	0
P2N_RX0554	611445	6379025	32.5	29.5	22.9	23.4	32.5	31.7	27.5	0
P2N_RX0555	611132	6379028	36.6	33.6	25.4	27.6	36	34.3	31.6	0
P2N_RX0556	611295	6379039	34.2	31.3	24	25.2	34	32.9	29.2	0
P2N_RX0557	611218	6379045	35.2	32.3	24.6	26.2	34.8	33.4	30.2	0
P2N_RX0558	611285	6379050	34.3	31.3	24	25.3	34	32.8	29.3	0
P2N_RX0559	610839	6379051	42.4	39.1	29.5	33	39.1	35.5	37.4	0
P2N_RX0560	611210	6379056	35.3	32.4	24.5	26.3	34.8	33.4	30.3	0
P2N_RX0561	611352	6379064	33.4	30.4	23.3	24.4	33.2	32.2	28.4	0
P2N_RX0562	611428	6379065	32.5	29.5	22.7	23.5	32.4	31.6	27.5	0
P2N_RX0563	611278	6379067	34.3	31.4	23.9	25.3	34	32.7	29.3	0
P2N_RX0565	611342	6379078	33.5	30.5	23.3	24.5	33.2	32.2	28.5	0
P2N_RX0566	611275	6379078	34.3	31.4	23.8	25.3	33.9	32.7	29.3	0
P2N_RX0567	611425	6379085	32.5	29.5	22.6	23.5	32.3	31.5	27.5	0
P2N_RX0568	611420	6379102	32.5	29.5	22.5	23.5	32.3	31.4	27.5	0
P2N_RX0569	611336	6379102	33.5	30.5	23.1	24.5	33.1	32	28.5	0
P2N_RX0570	611402	6379124	32.6	29.7	22.5	23.6	32.3	31.3	27.6	0
P2N_RX0571	611135	6379152	35.9	32.8	25.5	26.8	34.7	32.9	30.9	0
P2N_RX0572	611315	6379154	33.5	30.5	23.3	24.5	33	31.7	28.5	0

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P2N_RX0573	611388	6379191	32.5	29.5	22.5	23.5	32	30.9	27.5	0
P2N_RX0574	609900	6379196	37.9	31.4	28.9	28.8	37.9	29.8	32.9	0
P2N_RX0575	611457	6379210	31.7	28.7	21.8	22.7	31.3	30.3	26.7	0
P2N_RX0576	611379	6379227	32.5	29.5	22.6	23.4	31.9	30.7	27.5	0
P2N_RX0577	611371	6379244	32.5	29.5	22.7	23.4	31.8	30.6	27.5	0
P2N_RX0578	611430	6379247	31.9	28.8	22.1	22.8	31.3	30.2	26.9	0
P2N_RX0579	611424	6379267	31.8	28.8	22.2	22.8	31.2	30.1	26.8	0
P2N_RX0580	611364	6379269	32.5	29.4	22.8	23.4	31.8	30.4	27.5	0
P2N_RX0581	611359	6379284	32.5	29.4	22.9	23.3	31.9	30.4	27.5	0
P2N_RX0582	611419	6379287	31.8	28.8	22.2	22.7	31.2	30	26.8	0
P2N_RX0583	611412	6379306	31.8	28.7	22.3	22.7	31.3	29.9	26.8	0
P2N_RX0584	611404	6379325	31.8	28.7	22.4	22.7	31.4	29.8	26.8	0
P2N_RX0585	611338	6379345	32.5	29.2	23.1	23.2	32.1	30	27.5	0
P2N_RX0586	611397	6379347	31.8	28.7	22.5	22.6	31.5	29.6	26.8	0
P2N_RX0587	611393	6379367	31.8	28.6	22.5	22.6	31.5	29.5	26.8	0
P2N_RX0588	611256	6379493	32.8	28.9	23.8	23.8	32.8	31	27.8	0
P2N_RX0589	611260	6379516	32.7	28.7	23.7	23.7	32.7	28.9	27.7	0
P2N_RX0590	611269	6379624	32	27.7	23	23	32	28	27	0
P2N_RX0591	611181	6379679	32.9	28	23.9	23.9	32.9	27.9	27.9	0
P2N_RX0592	611352	6379774	30.8	26.2	21.7	21.7	30.7	26.7	25.8	0
P2N_RX0593	611154	6380093	31.7	28.5	22.5	22.2	31.7	25	26.7	0
P2N_RX0594	611420	6380344	30.4	26.1	21.4	21.4	30.3	0	25.4	0
P2N_RX0595	611095	6380384	33.9	29.4	24.9	24.8	33.8	0	28.9	0
P2N_RX0596	610684	6380403	40.5	35.4	30.1	30.1	38.8	0	35.5	0
P2N_RX0597	611354	6380466	31.5	26.6	22.5	22.5	31.4	0	26.5	0
P2N_RX0598	611303	6380651	32.6	26.7	23.6	23.5	32.5	0	27.6	0
P2N_RX0599	611317	6381201	32.6	24.4	22.5	22.4	31.6	0	27.6	0
P2N_RX0600	610229	6381700	53.6	24.7	23.1	22.9	41.3	0	48.6	0
P2N_RX0601	612161	6382027	24.3	0	0	0	24.1	0	19.3	0
P2N_RX0602	611916	6383936	23.7	0	14.5	0	23.5	0	18.7	0
P2N_RX0603	611841	6383951	24.1	0	14.9	0	23.9	0	19.1	0
P2N_RX0604	611920	6383983	23.6	0	14.4	0	23.4	0	18.6	0
P2N_RX0605	608148	6384102	25.1	0	0	0	25.1	0	20.1	0
P2N_RX0606	608078	6384221	24.7	0	0	0	24.7	0	19.7	0
P2N_RX0607	609224	6394853	35.4	0	23	0	35.3	31.6	30.4	0
P2N_RX0608	607948	6395886	48.7	0	26.9	16.3	47.8	49.3	43.7	0
P2N_RX0609	609391	6396970	25.5	0	14.4	14.4	25.5	25	20.5	0
P2N_RX0610	608802	6398274	25.9	0	16.6	16.5	25.9	0	20.9	0
P2N_RX0611	606625	6399306	48	42.4	36.8	0	45.8	0	43	0
P2N_RX0612	605497	6400546	29	20.9	19.8	0	28.5	0	24	0
P2N_RX0613	606477	6401469	47.4	0	38.2	20.6	38.3	0	42.4	0

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P2N_RX0614	606248	6403536	43.5	0	28.5	22.6	40.3	0	38.5	0
P2N_RX0615	607612	6407554	28.1	0	19.1	19.1	28.1	28	23.1	0
P2N_RX0616	605265	6407730	31.2	0	21.9	21.8	31.2	31.1	26.2	0
P2N_RX0617	607990	6408230	25.7	0	16.7	15.2	25.7	25.7	20.7	0
P2N_RX0618	606075	6408465	43.6	0	34.7	22.4	43.3	43.3	38.6	0
P2N_RX0619	606119	6408472	45.1	0	36.1	22.4	44.6	44.6	40.1	0
P2N_RX0620	607956	6411559	32.1	0	21.4	0	31.4	0	27.1	0
P2N_RX0621	608093	6414394	43.1	0	33.7	33.6	35.8	52.6	38.1	0
P2N_RX0622	607120	6416701	25.6	21.8	15.8	0	25.5	38.1	20.6	0
P2N_RX0623	607114	6416722	25.5	21.7	15.8	0	25.4	37.9	20.5	0
P2N_RX0624	609127	6418194	38.7	31	24.9	24.4	38.1	29.9	33.7	0
P2N_RX0625	608984	6419519	32.2	26.6	20.7	0	29.7	0	27.2	0
P2N_RX0626	609555	6421155	35.4	32.3	26.3	0	35.3	0	30.4	0
P2N_RX0627	613222	6424460	29.5	0	20.3	14.8	29.4	29.4	24.5	0
P2N_RX0628	612765	6424474	34.1	0	25.1	15.1	34.1	34.1	29.1	0
P2N_RX0629	612489	6424536	38.6	0	29.6	15.3	38.6	38.5	33.6	0
P2N_RX0630	612699	6426394	49.9	0	41	40.7	49.6	28.4	44.9	0
P2N_RX0631	612616	6426442	44.9	0	36	35.9	44.8	28.3	39.9	0
P2N_RX0632	614230	6426739	30.6	0	20.6	18.3	29.7	29.3	25.6	0
P2N_RX0633	615011	6427195	26.3	0	14.4	16.9	25.6	26.2	21.3	0
P2N_RX0634	611844	6427566	27.3	0	18.2	17.2	27.2	25.5	22.3	0
P2N_RX0635	612439	6429031	26.4	0	15.1	17.3	26.4	26.3	21.4	0
P2N_RX0636	612182	6429067	24.6	0	0	15.6	24.6	24.6	19.6	0
P2N_RX0637	616181	6429520	25.4	21.4	15.5	22.4	24.4	0	20.4	0
P2N_RX0638	616364	6429773	24.5	20.6	14.8	21.7	23.5	0	19.5	0
P2N_RX0639	612663	6429809	25.9	20.8	16.4	21.4	25.3	23.8	20.9	0
P2N_RX0640	612590	6429812	25.4	20.3	15.9	15.9	24.9	23.5	20.4	0
P2N_RX0641	614976	6430104	38	34.6	28.5	35.5	37	0	33	0
P2N_RX0642	616425	6430318	25.9	20.8	16.2	22.1	25.8	0	20.9	0
P2N_RX0643	613775	6430502	34.9	31.4	24.9	31.9	33.9	0	29.9	0
P2N_RX0644	614475	6430567	51.2	44.6	41.6	47.9	38	0	46.2	0
P2N_RX0645	615236	6430588	42.8	29.5	24.4	31.2	37.3	0	37.8	0
P2N_RX0646	616780	6430895	26.2	21.4	17.2	0	25.8	0	21.2	0
P2N_RX0647	617170	6430920	24	0	14.9	0	24	0	19	0
P2N_RX0648	615318	6430927	41.5	28.5	24.9	30.2	37.9	0	36.5	0
P2N_RX0649	617161	6430962	24.2	20.3	15	0	24.2	0	19.2	0
P2N_RX0650	616795	6430966	26.4	21.8	17.4	0	26.1	0	21.4	0
P2N_RX0651	615161	6431074	50.6	28.7	26.3	30.5	41.1	0	45.6	0
P2N_RX0652	616859	6431133	26.7	22.5	17.4	0	26.6	0	21.7	0
P2N_RX0653	616806	6431344	28	24	18.3	0	28	0	23	0
P2N_RX0654	616292	6431595	33.8	28.5	23.7	0	33.7	0	28.8	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks
P2N_RX0655	615882	6431642	40	30.2	30	22.6	37.6	0	35	0
P2N_RX0656	616320	6431705	34.4	29.4	23.5	0	34.4	0	29.4	0
P2N_RX0657	616603	6431719	31.6	27.6	21.7	0	31.5	0	26.6	0
P2N_RX0658	616534	6431767	32.5	28.5	22.5	0	32.5	0	27.5	0
P2N_RX0659	616606	6431774	31.8	28	22.1	0	31.8	0	26.8	0
P2N_RX0660	616535	6431791	32.6	28.7	22.7	0	32.6	0	27.6	0
P2N_RX0661	616510	6431794	32.9	28.9	22.9	0	32.8	0	27.9	0
P2N_RX0662	616492	6431795	33.1	29	23.1	0	33.1	0	28.1	0
P2N_RX0663	616472	6431797	33.3	29.2	23.3	0	33.3	0	28.3	0
P2N_RX0664	616451	6431798	33.6	29.4	23.4	0	33.5	0	28.6	0
P2N_RX0665	616435	6431799	33.8	29.5	23.6	0	33.7	0	28.8	0
P2N_RX0666	614994	6431802	40.2	27.3	30.7	25.2	39.5	0	35.2	0
P2N_RX0667	616418	6431808	34	29.7	23.8	0	34	0	29	0
P2N_RX0668	616382	6431810	34.4	30	24.1	0	34.4	0	29.4	0
P2N_RX0669	616398	6431811	34.3	29.9	24	0	34.2	0	29.3	0
P2N_RX0670	616367	6431811	34.6	30.1	24.2	0	34.6	0	29.6	0
P2N_RX0671	616617	6431818	31.9	28.2	22.3	0	31.8	0	26.9	0
P2N_RX0672	616347	6431820	34.9	30.4	24.4	0	34.9	0	29.9	0
P2N_RX0673	616328	6431822	35.2	30.5	24.6	0	35.2	0	30.2	0
P2N_RX0674	616308	6431826	35.5	30.7	24.8	0	35.5	0	30.5	0
P2N_RX0675	616548	6431833	32.7	28.9	22.9	0	32.6	0	27.7	0
P2N_RX0676	615002	6431838	39.9	27.6	30.6	24.9	39	0	34.9	0
P2N_RX0677	616526	6431838	33	29.1	23.2	0	32.9	0	28	0
P2N_RX0678	616504	6431843	33.3	29.3	23.4	0	33.2	0	28.3	0
P2N_RX0679	616489	6431845	33.4	29.5	23.5	0	33.3	0	28.4	0
P2N_RX0680	616669	6431845	31.6	28	22	0	31.4	0	26.6	0
P2N_RX0681	616442	6431853	34	29.9	24	0	33.9	0	29	0
P2N_RX0682	616424	6431857	34.3	30.1	24.2	0	34.2	0	29.3	0
P2N_RX0683	616398	6431858	34.6	30.3	24.4	0	34.5	0	29.6	0
P2N_RX0684	616546	6431860	32.9	29.1	23.2	0	32.7	0	27.9	0
P2N_RX0685	616378	6431864	34.9	30.6	24.6	0	34.8	0	29.9	0
P2N_RX0686	616622	6431865	32.1	28.5	22.6	0	31.9	0	27.1	0
P2N_RX0687	616335	6431872	35.5	31	25.1	0	35.4	0	30.5	0
P2N_RX0688	616316	6431872	35.7	31.2	25.2	0	35.7	0	30.7	0
P2N_RX0689	616494	6431874	33.6	29.7	23.7	0	33.4	0	28.6	0
P2N_RX0690	616548	6431878	33	29.2	23.3	0	32.8	0	28	0
P2N_RX0691	615855	6431878	44.5	33.5	29.9	21.6	43	0	39.5	0
P2N_RX0692	616669	6431881	31.7	28.2	22.3	0	31.5	0	26.7	0
P2N_RX0693	616439	6431881	34.2	30.2	24.3	0	34.1	0	29.2	0
P2N_RX0694	616385	6431886	34.9	30.7	24.8	0	34.8	0	29.9	0
P2N_RX0695	616498	6431891	33.6	29.8	0	0	33.4	0	28.6	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks
P2N_RX0696	616338	6431897	35.6	31.2	25.3	0	35.5	0	30.6	0
P2N_RX0697	616553	6431899	33	29.4	23.4	0	32.8	0	28	0
P2N_RX0698	616442	6431903	34.3	30.4	24.4	0	34.2	0	29.3	0
P2N_RX0699	616389	6431906	35	30.9	24.9	0	34.9	0	30	0
P2N_RX0700	616500	6431907	33.7	29.9	23.9	0	33.5	0	28.7	0
P2N_RX0701	616553	6431914	33.1	29.5	23.5	0	32.9	0	28.1	0
P2N_RX0702	615518	6431910	68.4	32.5	36.7	22.8	42.4	0	63.4	0
P2N_RX0703	616336	6431917	35.8	31.5	25.5	0	35.7	0	30.8	0
P2N_RX0704	616389	6431920	35.1	31	25.1	0	34.9	0	30.1	0
P2N_RX0705	616447	6431921	34.4	30.5	24.5	0	34.2	0	29.4	0
P2N_RX0706	616506	6431923	33.7	30	24	0	33.5	0	28.7	0
P2N_RX0707	616339	6431934	35.9	31.6	25.7	0	35.7	0	30.9	0
P2N_RX0708	616396	6431935	35.1	31.1	25.2	0	34.9	0	30.1	0
P2N_RX0709	616557	6431937	33.2	29.6	23.6	0	32.9	0	28.2	0
P2N_RX0710	616453	6431941	34.4	30.6	24.7	0	34.2	0	29.4	0
P2N_RX0711	616504	6431942	33.8	30.1	24.2	0	33.6	0	28.8	0
P2N_RX0712	616560	6431950	33.2	29.7	23.7	0	32.9	0	28.2	0
P2N_RX0713	616400	6431952	35.2	31.2	25.3	0	34.9	0	30.2	0
P2N_RX0714	616449	6431955	34.6	30.8	24.8	0	34.3	0	29.6	0
P2N_RX0715	616401	6431968	35.3	31.4	25.4	0	35	0	30.3	0
P2N_RX0716	616562	6431970	33.3	29.8	23.8	0	32.9	0	28.3	0
P2N_RX0717	616509	6431977	33.9	30.3	24.4	0	33.6	0	28.9	0
P2N_RX0718	616462	6431977	34.5	30.8	24.9	0	34.2	0	29.5	0
P2N_RX0719	616570	6431987	33.3	29.8	23.9	0	32.9	0	28.3	0
P2N_RX0720	616401	6431987	35.4	31.5	25.6	0	35.1	0	30.4	0
P2N_RX0721	616459	6431992	34.6	31	25	0	34.3	0	29.6	0
P2N_RX0722	615104	6431994	39.8	29.4	30.8	23.6	36.9	0	34.8	0
P2N_RX0723	616743	6431996	31.4	28.2	22.3	0	31.3	0	26.4	0
P2N_RX0724	616403	6432000	35.4	31.6	25.7	0	35.1	0	30.4	0
P2N_RX0725	616353	6432001	36.1	32.2	26.2	0	35.8	0	31.1	0
P2N_RX0726	616567	6432005	33.4	30	24	0	33	0	28.4	0
P2N_RX0727	616466	6432009	34.6	31	25.1	0	34.2	0	29.6	0
P2N_RX0728	616519	6432013	34	30.5	24.6	0	33.6	0	29	0
P2N_RX0729	616407	6432018	35.5	31.7	25.8	0	35.1	0	30.5	0
P2N_RX0730	616355	6432019	36.2	32.3	26.4	0	35.8	0	31.2	0
P2N_RX0731	616466	6432024	34.7	31.2	25.2	0	34.3	0	29.7	0
P2N_RX0732	616576	6432024	33.4	30	24.1	0	33.1	0	28.4	0
P2N_RX0733	616523	6432034	34	30.6	24.7	0	33.7	0	29	0
P2N_RX0734	616359	6432034	36.3	32.4	26.5	0	35.8	0	31.3	0
P2N_RX0735	616412	6432034	35.5	31.8	25.9	0	35.1	0	30.5	0
P2N_RX0736	616472	6432043	34.7	31.2	25.3	0	34.3	0	29.7	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4						S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			33.6	30.3	24.4	0	33.4	0										
P2N_RX0737	616561	6432046	33.6	30.3	24.4	0	33.4	0	28.6	0	0	0	0	0	0	0	0	0
P2N_RX0738	616581	6432050	33.4	30.1	24.2	0	33.2	0	28.4	0	0	0	0	0	0	0	0	0
P2N_RX0739	616408	6432052	35.7	32	26.1	0	35.2	0	30.7	0	0	0	0	0	0	0	0	0
P2N_RX0740	616363	6432052	36.3	32.6	26.6	0	35.8	0	31.3	0	0	0	0	0	0	0	0	0
P2N_RX0741	616541	6432054	33.9	30.6	24.6	0	33.6	0	28.9	0	0	0	0	0	0	0	0	0
P2N_RX0742	616518	6432058	34.2	30.8	24.9	0	33.9	0	29.2	0	0	0	0	0	0	0	0	0
P2N_RX0743	616469	6432063	34.9	31.4	25.5	0	34.5	0	29.9	0	0	0	0	0	0	0	0	0
P2N_RX0744	616452	6432070	35.1	31.7	25.7	0	34.8	0	30.1	0	0	0	0	0	0	0	0	0
P2N_RX0745	616438	6432074	35.3	31.9	25.9	0	35	0	30.3	0	0	0	0	0	0	0	0	0
P2N_RX0746	616417	6432078	35.7	32.2	26.2	0	35.3	0	30.7	0	0	0	0	0	0	0	0	0
P2N_RX0747	615523	6432090	51.3	35	31.4	21.8	46.2	0	46.3	0	0	0	0	0	0	0	0	0
P2N_RX0748	616583	6432106	33.6	30.4	24.5	0	33.5	0	28.6	0	0	0	0	0	0	0	0	0
P2N_RX0749	616674	6432109	32.5	29.5	23.5	0	32.5	0	27.5	0	0	0	0	0	0	0	0	0
P2N_RX0750	616751	6432112	31.7	28.7	22.7	0	31.7	0	26.7	0	0	0	0	0	0	0	0	0
P2N_RX0751	616537	6432118	34.2	31	25.1	0	34.1	0	29.2	0	0	0	0	0	0	0	0	0
P2N_RX0752	615657	6432115	68	37.1	31.2	0	57.3	0	63	0	0	0	0	0	0	0	0	0
P2N_RX0753	616469	6432120	35.1	31.9	25.9	0	34.9	0	30.1	0	0	0	0	0	0	0	0	0
P2N_RX0754	616516	6432124	34.5	31.3	25.4	0	34.4	0	29.5	0	0	0	0	0	0	0	0	0
P2N_RX0755	616586	6432140	33.7	30.6	24.6	0	33.6	0	28.7	0	0	0	0	0	0	0	0	0
P2N_RX0756	616469	6432144	35.2	32	26.1	0	35.1	0	30.2	0	0	0	0	0	0	0	0	0
P2N_RX0757	616765	6432151	31.7	28.7	22.7	0	31.7	0	26.7	0	0	0	0	0	0	0	0	0
P2N_RX0758	616521	6432156	34.6	31.5	25.5	0	34.5	0	29.6	0	0	0	0	0	0	0	0	0
P2N_RX0759	616677	6432170	32.7	29.7	23.7	0	32.7	0	27.7	0	0	0	0	0	0	0	0	0
P2N_RX0760	615193	6432189	39	31.6	28.6	22.1	37.5	0	34	0	0	0	0	0	0	0	0	0
P2N_RX0762	615611	6432191	52.7	37.9	32	0	52.2	0	47.7	0	0	0	0	0	0	0	0	0
P2N_RX0763	616770	6432197	31.8	28.8	22.8	0	31.8	0	26.8	0	0	0	0	0	0	0	0	0
P2N_RX0764	616477	6432209	35.4	32.3	26.4	0	35.4	0	30.4	0	0	0	0	0	0	0	0	0
P2N_RX0765	616487	6432222	35.3	32.3	26.3	0	35.3	0	30.3	0	0	0	0	0	0	0	0	0
P2N_RX0766	615405	6432232	42.7	34.9	29	21.4	42.1	0	37.7	0	0	0	0	0	0	0	0	0
P2N_RX0767	616779	6432233	31.8	28.8	22.8	0	31.8	0	26.8	0	0	0	0	0	0	0	0	0
P2N_RX0768	616490	6432246	35.4	32.4	26.4	0	35.4	0	30.4	0	0	0	0	0	0	0	0	0
P2N_RX0769	616784	6432261	31.8	28.8	22.8	0	31.8	0	26.8	0	0	0	0	0	0	0	0	0
P2N_RX0771	616494	6432270	35.4	32.4	26.5	0	35.4	0	30.4	0	0	0	0	0	0	0	0	0
P2N_RX0772	616494	6432289	35.5	32.5	26.6	0	35.5	0	30.5	0	0	0	0	0	0	0	0	0
P2N_RX0773	616624	6432285	33.8	30.8	24.8	0	33.8	0	28.8	0	0	0	0	0	0	0	0	0
P2N_RX0774	616504	6432314	35.5	32.5	26.5	0	35.4	0	30.5	0	0	0	0	0	0	0	0	0
P2N_RX0775	616779	6432315	32	29	23	0	32	0	27	0	0	0	0	0	0	0	0	0
P2N_RX0776	616624	6432316	33.9	30.8	24.9	0	33.8	0	28.9	0	0	0	0	0	0	0	0	0
P2N_RX0777	616605	6432321	34.1	31.1	25.1	0	34.1	0	29.1	0	0	0	0	0	0	0	0	0
P2N_RX0778	616584	6432324	34.4	31.4	25.4	0	34.3	0	29.4	0	0	0	0	0	0	0	0	0
P2N_RX0779	616567	6432328	34.7	31.6	25.7	0	34.6	0	29.7	0	0	0	0	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks
P2N_RX0780	616544	6432229	35	31.9	26	0	34.9	0	30	0
P2N_RX0781	616699	6432335	33	30	24	0	32.9	0	28	0
P2N_RX0782	616506	6432335	35.5	32.5	26.5	0	35.5	0	30.5	0
P2N_RX0783	616483	6432336	35.9	32.9	26.9	0	35.8	0	30.9	0
P2N_RX0784	616464	6432343	36.2	33.2	27.2	0	36.1	0	31.2	0
P2N_RX0785	616438	6432345	36.6	33.6	27.6	0	36.6	0	31.6	0
P2N_RX0786	616792	6432354	32	28.9	22.9	0	31.9	0	27	0
P2N_RX0787	616869	6432362	31.2	28.1	22.1	0	31.1	0	26.2	0
P2N_RX0788	616704	6432373	33	30	24	0	32.9	0	28	0
P2N_RX0789	615604	6432378	46.2	41	35	0	44.6	0	41.2	0
P2N_RX0790	616795	6432390	32	28.9	22.9	0	31.9	0	27	0
P2N_RX0792	615116	6432391	35.8	31.3	25.3	0	35.6	0	30.8	0
P2N_RX0793	616944	6432392	30.4	27.4	21.4	0	30.3	0	25.4	0
P2N_RX0794	616568	6432394	34.8	31.8	25.8	0	34.7	0	29.8	0
P2N_RX0795	616506	6432403	35.8	32.7	26.7	0	35.6	0	30.8	0
P2N_RX0796	616869	6432406	31.2	28.1	22.2	0	31.1	0	26.2	0
P2N_RX0797	616963	6432414	30.3	27.2	21.2	0	30.1	0	25.3	0
P2N_RX0799	616632	6432415	34	30.9	24.9	0	33.9	0	29	0
P2N_RX0800	616567	6432416	34.9	31.8	25.8	0	34.7	0	29.9	0
P2N_RX0801	616450	6432419	36.7	33.6	27.6	0	36.5	0	31.7	0
P2N_RX0802	616427	6432420	37.1	34	28	0	36.9	0	32.1	0
P2N_RX0803	616499	6432421	35.9	32.8	26.8	0	35.7	0	30.9	0
P2N_RX0804	615795	6432424	64.9	54.3	48.6	0	60.3	0	59.9	0
P2N_RX0805	616801	6432434	32	28.9	22.9	0	31.8	0	27	0
P2N_RX0809	616872	6432442	31.2	28.1	22.1	0	31.1	0	26.2	0
P2N_RX0810	616501	6432446	35.9	32.8	26.8	0	35.7	0	30.9	0
P2N_RX0811	616974	6432450	30.2	27.1	21.1	0	30	0	25.2	0
P2N_RX0812	616437	6432453	37	33.8	27.9	0	36.7	0	32	0
P2N_RX0813	616575	6432454	34.9	31.7	25.7	0	34.6	0	29.9	0
P2N_RX0814	616636	6432455	34	30.9	24.9	0	33.8	0	29	0
P2N_RX0815	616510	6432465	35.8	32.7	26.7	0	35.6	0	30.8	0
P2N_RX0816	616878	6432472	31.2	28.1	22.1	0	31	0	26.2	0
P2N_RX0818	616812	6432475	31.9	28.8	22.8	0	31.7	0	26.9	0
P2N_RX0819	616444	6432477	36.9	33.7	27.8	0	36.6	0	31.9	0
P2N_RX0820	616578	6432480	34.8	31.7	25.7	0	34.6	0	29.8	0
P2N_RX0821	616634	6432481	34.1	30.9	24.9	0	33.8	0	29.1	0
P2N_RX0822	616512	6432481	35.8	32.6	26.7	0	35.5	0	30.8	0
P2N_RX0823	616444	6432493	36.9	33.7	27.8	0	36.6	0	31.9	0
P2N_RX0824	615458	6432495	40.6	37.3	31.4	0	40.4	0	35.6	0
P2N_RX0825	616578	6432497	34.8	31.7	25.7	0	34.6	0	29.8	0
P2N_RX0826	616517	6432503	35.7	32.6	26.6	0	35.5	0	30.7	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks
P2N_RX0827	617059	6432505	29.4	26.3	20.3	0	29.2	0	24.4	0
P2N_RX0828	616607	6432511	34.4	31.3	25.3	0	34.2	0	29.4	0
P2N_RX0829	616451	6432513	36.8	33.6	27.6	0	36.5	0	31.8	0
P2N_RX0830	616582	6432518	34.8	31.6	25.6	0	34.5	0	29.8	0
P2N_RX0831	616515	6432525	35.8	32.6	26.6	0	35.5	0	30.8	0
P2N_RX0832	616445	6432543	36.9	33.6	27.7	0	36.5	0	31.9	0
P2N_RX0833	616792	6432544	32.1	29	23	0	31.9	0	27.1	0
P2N_RX0834	616740	6432548	32.7	29.6	23.6	0	32.5	0	27.7	0
P2N_RX0835	616825	6432560	31.7	28.6	22.6	0	31.5	0	26.7	0
P2N_RX0836	616741	6432564	32.7	29.5	23.6	0	32.4	0	27.7	0
P2N_RX0837	616658	6432565	33.7	30.5	24.6	0	33.4	0	28.7	0
P2N_RX0838	616614	6432570	34.3	31.1	25.1	0	34	0	29.3	0
P2N_RX0839	617144	6432571	28.6	25.5	19.5	0	28.4	0	23.6	0
P2N_RX0841	616743	6432577	32.7	29.5	23.5	0	32.4	0	27.7	0
P2N_RX0842	614626	6432578	29.8	26	20.5	0	29.5	0	24.8	0
P2N_RX0843	616530	6432583	35.5	32.2	26.3	0	35.1	0	30.5	0
P2N_RX0844	616837	6432584	31.6	28.4	22.5	0	31.4	0	26.6	0
P2N_RX0845	616597	6432593	34.5	31.3	25.3	0	34.2	0	29.5	0
P2N_RX0846	616744	6432596	32.6	29.5	23.5	0	32.4	0	27.6	0
P2N_RX0847	616454	6432597	36.6	33.4	27.4	0	36.2	0	31.6	0
P2N_RX0848	616836	6432599	31.6	28.4	22.4	0	31.3	0	26.6	0
P2N_RX0849	616534	6432602	35.4	32.1	26.1	0	35	0	30.4	0
P2N_RX0850	616669	6432612	33.5	30.3	24.3	0	33.2	0	28.5	0
P2N_RX0851	617062	6432615	29.3	26.2	20.2	0	29.1	0	24.3	0
P2N_RX0852	616458	6432616	36.5	33.2	27.2	0	36.1	0	31.5	0
P2N_RX0853	616597	6432617	34.5	31.2	25.2	0	34.1	0	29.5	0
P2N_RX0854	616845	6432620	31.5	28.3	22.3	0	31.2	0	26.5	0
P2N_RX0855	616750	6432630	32.5	29.3	23.3	0	32.2	0	27.5	0
P2N_RX0856	616462	6432635	36.4	33.1	27.1	0	35.9	0	31.4	0
P2N_RX0857	616533	6432637	35.3	32	26.1	0	34.9	0	30.3	0
P2N_RX0858	616842	6432640	31.5	28.3	22.3	0	31.2	0	26.5	0
P2N_RX0859	616604	6432641	34.3	31.1	25.1	0	33.9	0	29.3	0
P2N_RX0860	613987	6432641	25.2	21.1	16.2	0	25.1	0	20.2	0
P2N_RX0861	616468	6432651	36.3	32.9	26.9	0	35.8	0	31.3	0
P2N_RX0862	616671	6432651	33.4	30.2	24.2	0	33.1	0	28.4	0
P2N_RX0863	616846	6432654	31.4	28.2	22.3	0	31.1	0	26.4	0
P2N_RX0864	616606	6432657	34.3	31	25	0	33.9	0	29.3	0
P2N_RX0865	616761	6432661	32.3	29.1	23.1	0	32	0	27.3	0
P2N_RX0866	616544	6432664	35.1	31.8	25.8	0	34.6	0	30.1	0
P2N_RX0867	616849	6432671	31.4	28.2	22.2	0	31.1	0	26.4	0
P2N_RX0868	616466	6432673	36.2	32.9	26.9	0	35.7	0	31.2	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4		S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_RX0869	616605	6432681	34.2	30.9	24.9	0	33.8	0	29.2	0	0	0	0	0
P2N_RX0870	616847	6432681	31.4	28.2	22.2	0	31.1	0	26.4	0	0	0	0	0
P2N_RX0871	616762	6432684	32.3	29.1	23.1	0	31.9	0	27.3	0	0	0	0	0
P2N_RX0872	616541	6432686	35	31.8	25.8	0	34.6	0	30	0	0	0	0	0
P2N_RX0873	616468	6432694	36.1	32.7	26.7	0	35.5	0	31.1	0	0	0	0	0
P2N_RX0874	616551	6432701	34.9	31.6	25.6	0	34.4	0	29.9	0	0	0	0	0
P2N_RX0875	616614	6432703	34	30.7	24.7	0	33.6	0	29	0	0	0	0	0
P2N_RX0876	616676	6432703	33.2	30	24	0	32.9	0	28.2	0	0	0	0	0
P2N_RX0877	616765	6432705	32.2	29	23	0	31.9	0	27.2	0	0	0	0	0
P2N_RX0878	616478	6432713	35.8	32.5	26.5	0	35.3	0	30.8	0	0	0	0	0
P2N_RX0879	616856	6432717	31.2	28	22	0	30.9	0	26.2	0	0	0	0	0
P2N_RX0880	616618	6432723	33.9	30.6	24.6	0	33.5	0	28.9	0	0	0	0	0
P2N_RX0881	616769	6432732	32.1	28.9	22.9	0	31.7	0	27.1	0	0	0	0	0
P2N_RX0882	616554	6432732	34.7	31.4	25.4	0	34.2	0	29.7	0	0	0	0	0
P2N_RX0883	616527	6432735	35	31.7	25.7	0	34.5	0	30	0	0	0	0	0
P2N_RX0884	616858	6432740	31.1	27.9	21.9	0	30.8	0	26.1	0	0	0	0	0
P2N_RX0885	616477	6432740	35.7	32.4	26.4	0	35.1	0	30.7	0	0	0	0	0
P2N_RX0886	616506	6432742	35.3	32	26	0	34.8	0	30.3	0	0	0	0	0
P2N_RX0887	616858	6432750	31.1	27.9	21.9	0	30.8	0	26.1	0	0	0	0	0
P2N_RX0888	614524	6432759	28.1	24.8	18.9	0	28	0	23.1	0	0	0	0	0
P2N_RX0889	616702	6432763	32.7	29.5	23.5	0	32.3	0	27.7	0	0	0	0	0
P2N_RX0890	616685	6432764	32.9	29.7	23.7	0	32.5	0	27.9	0	0	0	0	0
P2N_RX0891	616670	6432765	33.1	29.8	23.8	0	32.7	0	28.1	0	0	0	0	0
P2N_RX0892	616628	6432778	33.6	30.3	24.3	0	33.1	0	28.6	0	0	0	0	0
P2N_RX0893	616867	6432779	30.9	27.7	21.7	0	30.6	0	25.9	0	0	0	0	0
P2N_RX0894	616869	6432791	30.9	27.7	21.7	0	30.5	0	25.9	0	0	0	0	0
P2N_RX0895	616559	6432793	34.3	31	25	0	33.8	0	29.3	0	0	0	0	0
P2N_RX0896	616635	6432797	33.4	30.1	24.1	0	32.9	0	28.4	0	0	0	0	0
P2N_RX0897	616511	6432799	34.9	31.6	25.6	0	34.4	0	29.9	0	0	0	0	0
P2N_RX0898	616486	6432801	35.2	31.9	25.9	0	34.6	0	30.2	0	0	0	0	0
P2N_RX0899	614210	6432810	25.8	22.4	16.8	0	25.6	0	20.8	0	0	0	0	0
P2N_RX0900	616573	6432811	34.1	30.7	24.8	0	33.6	0	29.1	0	0	0	0	0
P2N_RX0901	616633	6432820	33.3	30	24	0	32.8	0	28.3	0	0	0	0	0
P2N_RX0902	616573	6432826	34	30.7	24.7	0	33.5	0	29	0	0	0	0	0
P2N_RX0903	616500	6432835	34.8	31.5	25.5	0	34.3	0	29.8	0	0	0	0	0
P2N_RX0904	616635	6432845	33.2	29.9	23.9	0	32.7	0	28.2	0	0	0	0	0
P2N_RX0905	616575	6432849	33.8	30.5	24.5	0	33.3	0	28.8	0	0	0	0	0
P2N_RX0906	616509	6432857	34.6	31.2	25.2	0	34	0	29.6	0	0	0	0	0
P2N_RX0907	616580	6432867	33.7	30.3	24.3	0	33.1	0	28.7	0	0	0	0	0
P2N_RX0908	616637	6432869	33	29.7	23.7	0	32.5	0	28	0	0	0	0	0
P2N_RX0909	616501	6432879	34.5	31.1	25.2	0	33.9	0	29.5	0	0	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4						S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
			24	18	0	26.9	0	22.2										
P2N_RX0910	617274	6432879	27.2	24	0	26.9	0	22.2										
P2N_RX0911	616577	6432891	33.6	30.2	24.2	0	0	28.6										
P2N_RX0912	616640	6432892	32.9	29.6	23.6	0	0	27.9										
P2N_RX0913	616507	6432897	34.3	30.9	25	0	0	29.3										
P2N_RX0914	616662	6432907	32.6	29.2	23.3	0	0	27.6										
P2N_RX0915	617334	6432912	26.7	23.5	17.5	0	0	21.7										
P2N_RX0916	616560	6432926	33.5	30.2	24.2	0	0	28.5										
P2N_RX0917	616592	6432926	33.2	29.8	23.9	0	0	28.2										
P2N_RX0918	616538	6432927	33.8	30.4	24.4	0	0	28.8										
P2N_RX0919	617271	6432931	27.1	23.9	17.9	0	0	26.8										
P2N_RX0920	614328	6432946	26	23	17	0	0	21										
P2N_RX0921	616515	6432949	33.9	30.5	24.5	0	0	28.9										
P2N_RX0922	617342	6432959	26.5	23.3	17.3	0	0	26.2										
P2N_RX0923	617274	6432967	27	23.8	17.8	0	0	26.7										
P2N_RX0924	616583	6432986	32.9	29.5	23.6	0	0	27.9										
P2N_RX0925	616600	6432986	32.7	29.4	23.4	0	0	27.7										
P2N_RX0926	616565	6432996	33	29.6	23.7	0	0	28										
P2N_RX0927	617279	6432997	26.9	23.7	17.7	0	0	26.6										
P2N_RX0928	616551	6433001	33.1	29.8	23.8	0	0	28.1										
P2N_RX0929	613930	6433001	23.5	0	14.5	0	0	18.5										
P2N_RX0930	617350	6433005	26.3	23.2	17.2	0	0	26.1										
P2N_RX0931	616527	6433031	33.1	29.7	23.8	0	0	32.5										
P2N_RX0932	617285	6433033	26.7	23.5	17.5	0	0	26.4										
P2N_RX0933	616966	6433063	29.1	25.8	19.8	0	0	28.7										
P2N_RX0934	617359	6433063	26.1	22.9	16.9	0	0	25.9										
P2N_RX0935	617296	6433071	26.5	23.4	17.4	0	0	26.3										
P2N_RX0936	616976	6433082	28.9	25.7	19.7	0	0	28.5										
P2N_RX0937	614391	6433102	26.1	23	17.1	0	0	26										
P2N_RX0938	616987	6433123	28.7	25.4	19.4	0	0	28.3										
P2N_RX0939	617370	6433129	25.9	22.7	16.7	0	0	25.6										
P2N_RX0940	616933	6433133	29	25.8	19.8	0	0	28.6										
P2N_RX0941	616915	6433136	29.1	25.9	19.9	0	0	28.7										
P2N_RX0942	616893	6433137	29.3	26.1	20.1	0	0	28.9										
P2N_RX0943	617309	6433137	26.3	23.1	17.1	0	0	26										
P2N_RX0944	614652	6433143	27.8	24.7	18.8	0	0	27.7										
P2N_RX0945	614294	6433150	25.3	22.3	16.3	0	0	25.2										
P2N_RX0946	614560	6433159	27.1	24	18.1	0	0	27										
P2N_RX0947	617370	6433159	25.8	22.6	16.6	0	0	25.5										
P2N_RX0948	617309	6433181	26.1	22.9	16.9	0	0	25.8										
P2N_RX0949	614058	6433191	23.7	20.7	14.7	0	0	23.7										
P2N_RX0950	617095	6433193	27.6	24.3	18.3	0	0	27.2										

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			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_RX0951	616927	6433203	28.7	25.5	19.5	0	28.3	0	23.7	0	0	0
P2N_RX0952	617097	6433208	27.5	24.3	18.3	0	27.1	0	22.5	0	0	0
P2N_RX0953	617317	6433212	26	22.8	16.8	0	25.7	0	21	0	0	0
P2N_RX0954	616933	6433215	28.6	25.4	19.4	0	28.2	0	23.6	0	0	0
P2N_RX0955	617375	6433220	25.6	22.4	16.4	0	25.3	0	20.6	0	0	0
P2N_RX0956	616995	6433224	28.1	24.9	18.9	0	27.8	0	23.1	0	0	0
P2N_RX0957	616937	6433230	28.5	25.3	19.3	0	28.1	0	23.5	0	0	0
P2N_RX0958	617094	6433237	27.4	24.2	18.2	0	27	0	22.4	0	0	0
P2N_RX0959	616641	6433239	30.7	27.3	21.3	0	30.1	0	25.7	0	0	0
P2N_RX0960	616562	6433242	31.2	27.9	21.9	0	30.7	0	26.2	0	0	0
P2N_RX0961	616996	6433244	28	24.8	18.8	0	27.7	0	23	0	0	0
P2N_RX0962	616945	6433246	28.4	25.1	19.2	0	28	0	23.4	0	0	0
P2N_RX0963	616696	6433247	30.2	26.9	20.9	0	29.7	0	25.2	0	0	0
P2N_RX0965	616999	6433256	28	24.7	18.7	0	27.6	0	23	0	0	0
P2N_RX0967	617378	6433258	25.4	22.2	16.3	0	25.1	0	20.4	0	0	0
P2N_RX0969	616642	6433260	30.5	27.2	21.2	0	30	0	25.5	0	0	0
P2N_RX0970	617103	6433261	27.2	24	18	0	26.9	0	22.2	0	0	0
P2N_RX0971	617323	6433264	25.8	22.6	16.6	0	25.5	0	20.8	0	0	0
P2N_RX0972	616501	6433269	31.4	28	22.1	0	30.8	0	26.4	0	0	0
P2N_RX0973	617003	6433272	27.9	24.6	18.6	0	27.5	0	22.9	0	0	0
P2N_RX0974	616567	6433272	30.9	27.6	21.6	0	30.4	0	25.9	0	0	0
P2N_RX0975	617107	6433275	27.2	23.9	17.9	0	26.8	0	22.2	0	0	0
P2N_RX0977	616564	6433282	30.9	27.5	21.6	0	30.3	0	25.9	0	0	0
P2N_RX0978	617106	6433286	27.1	23.9	17.9	0	26.8	0	22.1	0	0	0
P2N_RX0981	616949	6433289	28.2	24.9	18.9	0	27.8	0	23.2	0	0	0
P2N_RX0982	617010	6433289	27.7	24.5	18.5	0	27.4	0	22.7	0	0	0
P2N_RX0983	616657	6433296	30.1	26.8	20.8	0	29.6	0	25.1	0	0	0
P2N_RX0984	616952	6433297	28.1	24.8	18.9	0	27.7	0	23.1	0	0	0
P2N_RX0985	616573	6433300	30.7	27.3	21.4	0	30.2	0	25.7	0	0	0
P2N_RX0986	616507	6433305	31.1	27.7	21.8	0	30.5	0	26.1	0	0	0
P2N_RX0987	617015	6433308	27.6	24.4	18.4	0	27.2	0	22.6	0	0	0
P2N_RX0989	616659	6433311	30	26.7	20.7	0	29.5	0	25	0	0	0
P2N_RX0990	617111	6433313	27	23.7	17.7	0	26.6	0	22	0	0	0
P2N_RX0991	616506	6433316	31	27.6	21.7	0	30.4	0	26	0	0	0
P2N_RX0992	617328	6433316	25.6	22.4	16.4	0	25.2	0	20.6	0	0	0
P2N_RX0993	616952	6433319	28	24.7	18.8	0	27.6	0	23	0	0	0
P2N_RX0994	617010	6433321	27.6	24.3	18.4	0	27.2	0	22.6	0	0	0
P2N_RX0995	616574	6433322	30.5	27.2	21.2	0	30	0	25.5	0	0	0
P2N_RX0996	616430	6433324	31.4	28	22.1	0	30.8	0	26.4	0	0	0
P2N_RX0997	616713	6433330	29.5	26.2	20.3	0	29.1	0	24.5	0	0	0
P2N_RX0999	616652	6433333	29.9	26.6	20.6	0	29.4	0	24.9	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4									
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_Rx1001	616963	6433335	27.8	24.6	18.6	0	27.4	0	22.8	0	0	0
P2N_Rx1002	617015	6433337	27.5	24.2	18.3	0	27.1	0	22.5	0	0	0
P2N_Rx1003	616507	6433338	30.8	27.5	21.5	0	30.3	0	25.8	0	0	0
P2N_Rx1005	616444	6433345	31.2	27.8	21.8	0	30.6	0	26.2	0	0	0
P2N_Rx1006	617023	6433349	27.4	24.1	18.1	0	27	0	22.4	0	0	0
P2N_Rx1007	616518	6433353	30.6	27.3	21.3	0	30.1	0	25.6	0	0	0
P2N_Rx1008	616966	6433355	27.7	24.5	18.5	0	27.3	0	22.7	0	0	0
P2N_Rx1010	616717	6433361	29.3	26	20	0	28.8	0	24.3	0	0	0
P2N_Rx1011	616443	6433363	31	27.6	21.7	0	30.4	0	26	0	0	0
P2N_Rx1012	616518	6433370	30.5	27.1	21.2	0	29.9	0	25.5	0	0	0
P2N_Rx1013	616663	6433371	29.6	26.3	20.3	0	29.1	0	24.6	0	0	0
P2N_Rx1015	616380	6433377	31.2	27.8	21.9	0	30.6	0	26.2	0	0	0
P2N_Rx1016	616724	6433379	29.2	25.8	19.9	0	28.7	0	24.2	0	0	0
P2N_Rx1017	616518	6433381	30	26.7	20.7	0	29.5	0	25	0	0	0
P2N_Rx1018	617231	6433381	25.9	22.7	16.7	0	25.6	0	20.9	0	0	0
P2N_Rx1019	616792	6433382	28.7	25.4	19.4	0	28.2	0	23.7	0	0	0
P2N_Rx1020	616450	6433384	30.8	27.4	21.4	0	30.2	0	25.8	0	0	0
P2N_Rx1021	617345	6433385	25.2	22	16	0	24.9	0	20.2	0	0	0
P2N_Rx1022	616520	6433390	30.3	27	21	0	29.8	0	25.3	0	0	0
P2N_Rx1023	616383	6433397	31	27.6	21.7	0	30.4	0	26	0	0	0
P2N_Rx1024	616669	64333404	29.3	26	20	0	28.8	0	24.3	0	0	0
P2N_Rx1026	616454	64333405	30.6	27.2	21.3	0	30	0	25.6	0	0	0
P2N_Rx1027	616383	64333410	30.9	27.5	21.6	0	30.3	0	25.9	0	0	0
P2N_Rx1028	616976	64333416	27.4	24.1	18.1	0	27	0	22.4	0	0	0
P2N_Rx1029	616534	64333417	30	26.7	20.7	0	29.5	0	25	0	0	0
P2N_Rx1030	616647	64333417	29.4	26	20.1	0	28.9	0	24.4	0	0	0
P2N_Rx1031	616965	64333418	27.4	24.1	18.2	0	27	0	22.4	0	0	0
P2N_Rx1032	616608	64333419	29.6	26.3	20.3	0	29.1	0	24.6	0	0	0
P2N_Rx1033	616592	64333423	29.7	26.3	20.4	0	29.1	0	24.7	0	0	0
P2N_Rx1034	616931	64333425	27.6	24.3	18.3	0	27.2	0	22.6	0	0	0
P2N_Rx1035	616463	64333429	30.3	27	21	0	29.8	0	25.3	0	0	0
P2N_Rx1037	616511	64333434	30	26.7	20.7	0	29.5	0	25	0	0	0
P2N_Rx1038	616529	64333437	29.9	26.6	20.6	0	29.4	0	24.9	0	0	0
P2N_Rx1039	616453	64333438	30.3	26.9	21	0	29.7	0	25.3	0	0	0
P2N_Rx1040	616394	64333448	30.5	27.1	21.2	0	29.9	0	25.5	0	0	0
P2N_Rx1041	616733	64333455	28.6	25.3	19.3	0	28.1	0	23.6	0	0	0
P2N_Rx1042	617095	64333459	26.4	23.2	17.2	0	26.1	0	21.4	0	0	0
P2N_Rx1043	616803	64333462	28.1	24.9	18.9	0	27.7	0	23.1	0	0	0
P2N_Rx1044	616680	64333467	28.8	25.5	19.6	0	28.3	0	23.8	0	0	0
P2N_Rx1045	616606	64333476	29.2	25.9	19.9	0	28.7	0	24.2	0	0	0
P2N_Rx1046	616740	64333478	28.4	25.1	19.1	0	27.9	0	23.4	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4						S09: Crossing loop construction	S10: Post possession
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession		
P2N_Rx1048	616537	6433484	29.5	26.2	20.2	0	29	0	24.5	0
P2N_Rx1049	616397	6433492	30.1	26.8	20.8	0	29.6	0	25.1	0
P2N_Rx1050	616806	6433495	27.9	24.6	18.7	0	27.5	0	22.9	0
P2N_Rx1051	616740	6433495	28.3	25	19	0	27.8	0	23.3	0
P2N_Rx1052	616493	6433495	29.6	26.3	20.3	0	29.1	0	24.6	0
P2N_Rx1053	616542	6433500	29.4	26	20.1	0	28.8	0	24.4	0
P2N_Rx1054	616743	6433506	28.2	24.9	19	0	27.8	0	23.2	0
P2N_Rx1055	616458	6433506	29.7	26.4	20.4	0	29.2	0	24.7	0
P2N_Rx1056	617055	6433509	26.4	23.2	17.2	0	26	0	21.4	0
P2N_Rx1057	616683	6433517	28.5	25.2	19.2	0	28	0	23.5	0
P2N_Rx1060	616603	6433519	28.9	25.6	19.6	0	28.4	0	23.9	0
P2N_Rx1061	616405	6433521	29.8	26.5	20.5	0	29.3	0	24.8	0
P2N_Rx1062	616476	6433525	29.5	26.1	20.2	0	28.9	0	24.5	0
P2N_Rx1063	616751	6433533	28	24.7	18.7	0	27.5	0	23	0
P2N_Rx1064	616614	6433536	28.7	25.4	19.4	0	28.2	0	23.7	0
P2N_Rx1066	616550	6433536	29	25.7	19.7	0	28.5	0	24	0
P2N_Rx1067	616808	6433538	27.7	24.4	18.4	0	27.2	0	22.7	0
P2N_Rx1068	616693	6433539	28.3	25	19	0	27.8	0	23.3	0
P2N_Rx1069	616685	6433550	28.2	24.9	19	0	27.8	0	23.2	0
P2N_Rx1071	616550	6433552	28.9	25.6	19.6	0	28.4	0	23.9	0
P2N_Rx1072	616747	6433559	27.9	24.6	18.6	0	27.4	0	22.9	0
P2N_Rx1073	616609	6433560	28.6	25.3	19.3	0	28.1	0	23.6	0
P2N_Rx1074	616759	6433561	27.8	24.5	18.5	0	27.3	0	22.8	0
P2N_Rx1076	616693	6433566	28.1	24.8	18.8	0	27.6	0	23.1	0
P2N_Rx1077	616413	6433572	29.4	26	20.1	0	28.8	0	24.4	0
P2N_Rx1078	616548	6433574	28.8	25.4	19.5	0	28.3	0	23.8	0
P2N_Rx1079	616622	6433577	28.4	25.1	19.1	0	27.9	0	23.4	0
P2N_Rx1080	616476	6433579	29.1	25.7	19.8	0	28.5	0	24.1	0
P2N_Rx1081	616487	6433591	28.9	25.6	19.6	0	28.4	0	23.9	0
P2N_Rx1082	616419	6433591	29.2	25.9	19.9	0	28.7	0	24.2	0
P2N_Rx1083	616993	6433602	26.3	23	17.1	0	25.9	0	21.3	0
P2N_Rx1085	616419	6433612	29	25.7	19.7	0	28.5	0	24	0
P2N_Rx1086	616704	6433614	27.7	24.4	18.5	0	27.3	0	22.7	0
P2N_Rx1087	616647	6433628	27.9	24.6	18.6	0	27.4	0	22.9	0
P2N_Rx1088	616696	6433632	27.6	24.3	18.4	0	27.2	0	22.6	0
P2N_Rx1089	616562	6433640	28.2	24.9	18.9	0	27.7	0	23.2	0
P2N_Rx1090	616999	6433640	26.1	22.8	16.8	0	25.7	0	21.1	0
P2N_Rx1092	616830	6433646	26.9	23.6	17.7	0	26.5	0	21.9	0
P2N_Rx1093	616564	6433654	28.1	24.8	18.8	0	27.6	0	23.1	0
P2N_Rx1094	616496	6433662	28.3	25	19.1	0	27.8	0	23.3	0
P2N_Rx1096	616430	6433668	28.6	25.2	19.3	0	28	0	23.6	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4									
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks	S13: NW Connection Trackworks	S14: NW Connection Overbridge
P2N_Rx1097	616406	6433670	28.6	25.3	19.3	0	28.1	0	23.6	0	0	0
P2N_Rx1098	616699	6433671	27.4	24.1	18.1	0	26.9	0	22.4	0	0	0
P2N_Rx1101	617001	6433676	25.9	22.6	16.6	0	25.5	0	20.9	0	0	0
P2N_Rx1102	616487	6433684	28.2	24.9	18.9	0	27.7	0	23.2	0	0	0
P2N_Rx1103	616779	6433687	26.9	23.6	17.6	0	26.5	0	21.9	0	0	0
P2N_Rx1105	616493	6433697	28.1	24.8	18.8	0	27.6	0	23.1	0	0	0
P2N_Rx1106	616504	6433712	27.9	24.6	18.7	0	27.4	0	22.9	0	0	0
P2N_Rx1109	616573	6433717	27.6	24.3	18.3	0	27.1	0	22.6	0	0	0
P2N_Rx1110	616644	6433720	27.3	24	18	0	26.8	0	22.3	0	0	0
P2N_Rx1111	616787	6433731	26.6	23.3	17.3	0	26.2	0	21.6	0	0	0
P2N_Rx1113	616707	6433737	26.9	23.6	17.7	0	26.5	0	21.9	0	0	0
P2N_Rx1114	616512	6433745	27.7	24.3	18.4	0	27.2	0	22.7	0	0	0
P2N_Rx1115	616443	6433748	27.9	24.6	18.6	0	27.4	0	22.9	0	0	0
P2N_Rx1116	616652	6433753	27	23.7	17.8	0	26	0	22	0	0	0
P2N_Rx1117	616584	6433767	27.2	23.9	18	0	26.8	0	22.2	0	0	0
P2N_Rx1118	616715	6433778	26.6	23.3	17.4	0	26.2	0	21.6	0	0	0
P2N_Rx1119	616520	6433781	27.4	24.1	18.1	0	26.9	0	22.4	0	0	0
P2N_Rx1120	616452	6433786	27.6	24.3	18.3	0	27.1	0	22.6	0	0	0
P2N_Rx1121	616655	6433803	26.7	23.4	17.5	0	26.3	0	21.7	0	0	0
P2N_Rx1122	616721	6433808	26.4	23.1	17.2	0	26	0	21.4	0	0	0
P2N_Rx1124	616589	6433814	26.9	23.6	17.6	0	26.4	0	21.9	0	0	0
P2N_Rx1125	616529	6433816	27.1	23.8	17.8	0	26.6	0	22.1	0	0	0
P2N_Rx1126	616457	6433822	27.3	24	18	0	26.8	0	22.3	0	0	0
P2N_Rx1127	616661	6433841	26.4	23.1	17.2	0	26	0	21.4	0	0	0
P2N_Rx1129	615825	6434056	26.4	23.2	17.2	0	26	0	21.4	0	0	0
P2N_Rx1301	602007	6332895	0	0	0	0	0	-5	45	49	45	52.8
P2N_Rx1302	601053	6333120	0	0	0	0	0	-5	32.1	36.1	32.1	35.5
P2N_Rx1303	600081	6332659	0	0	0	0	0	-5	24.7	28.7	24.7	17.9
P2N_Rx1304	602135	6331333	0	0	0	0	0	-5	33	37	33	32.4
P2N_Rx1305	603288	6333817	24.4	21.3	0	0	24.4	0	19.4	46.3	50.3	46.3
P2N_Rx1306	616579	6429153	0	0	0	0	0	0	0	0	0	0
P2N_Rx1307	617860	6429135	0	0	0	0	0	0	0	0	0	0
P2N_Rx1308	617307	6429464	0	0	0	0	0	0	0	0	0	0
P2N_Rx1309	606476	6401590	47.8	0	35.7	21.8	36.3	0	42.8	0	0	0
P2N_Rx1310	617054	6428745	0	0	0	0	0	-5	0	0	0	0
P2N_Rx1311	607713	6332876	25.8	0	14.3	0	24.8	0	20.8	0	0	0
P2N_Rx1312	607809	6332571	24.8	0	0	0	23.7	0	19.8	0	0	0
P2N_Rx1313	607811	6332613	24.8	0	0	0	23.8	0	19.8	0	0	0
P2N_Rx1314	616402	6433536	29.7	26.4	20.4	0	29.2	0	24.7	0	0	0
P2N_Rx1315	607730	6332876	25.7	0	0	0	29.2	0	20.7	0	0	0
P2N_Rx1316	607989	6332949	24	0	0	0	0	0	19	0	0	0

Receiver ID	Easting	Northing	Full alignment works: S1, S2, S3, S4							
			S5: Signalised Crossing	S6: Give Way Crossing	S7: Level Xing removal	S8: Culvert works	S9: Crossing loop construction	S10: Post possession	S11: NW Connection Site establishment	S12: NW Connection Earthworks
P2N_Rx1317	611233	6378984	35.3	32.3	25	26.2	35.1	33.9	30.3	0
P2N_Rx1318	607817	6332760	25	0	0	0	24	0	20	0
P2N_Rx1319	607849	6332807	24.8	0	0	0	23.8	0	19.8	0
P2N_Rx1320	617054	6432571	29.4	26.3	20.3	0	29.2	0	24.4	0
P2N_Rx1321	616595	6433841	26.7	23.4	17.4	0	26.2	0	21.7	0
P2N_Rx1322	616474	6432189	35.4	32.3	26.3	0	35.3	0	30.4	0
P2N_Rx1323	616688	6432261	32.9	29.9	23.9	0	32.9	0	27.9	0
P2N_Rx1324	616628	6432390	34	30.9	25	0	33.9	0	29	0
P2N_Rx1325	616710	6432414	33	29.9	24	0	32.9	0	28	0
P2N_Rx1326	616570	6432434	34.9	31.8	25.8	0	34.7	0	29.9	0
P2N_Rx1327	616630	6432434	34.1	31	25	0	33.9	0	29.1	0
P2N_Rx1329	616710	6432472	33.1	30	24	0	32.9	0	28.1	0
P2N_Rx1330	616441	6433712	28.2	24.8	18.9	0	27.7	0	23.2	0
P2N_Rx1331	616941	6433258	28.4	25.1	19.1	0	28	0	23.4	0
P2N_Rx1332	616644	6433286	30.3	27	21	0	29.8	0	25.3	0
P2N_Rx1333	616644	6433687	27.5	24.2	18.3	0	27.1	0	22.5	0
P2N_Rx1334	616567	6433671	28	24.7	18.7	0	27.5	0	23	0
P2N_Rx1335	616578	6433333	30.4	27.1	21.1	0	29.9	0	25.4	0
P2N_Rx1336	616630	6433640	27.9	24.6	18.6	0	27.4	0	22.9	0
P2N_Rx1337	616698	6433275	30	26.7	20.7	0	29.5	0	25	0
P2N_Rx1338	616366	6433355	31.5	28.1	22.2	0	30.9	0	26.5	0
P2N_Rx1339	616586	6433371	30.1	26.7	20.8	0	29.5	0	25.1	0
P2N_Rx1340	616589	6433404	29.8	26.5	20.5	0	29.3	0	24.8	0
P2N_Rx1341	616551	6433602	28.5	25.2	19.3	0	28	0	23.5	0
P2N_Rx1342	616674	6433478	28.8	25.5	19.5	0	28.3	0	23.8	0
P2N_Rx1343	616540	6433517	29.2	25.9	19.9	0	28.7	0	24.2	0
P2N_Rx1344	616482	6433561	29.2	25.8	19.9	0	28.6	0	24.2	0
P2N_Rx1342	611631	6378275	33.4	29.1	23.1	20.1	33.2	32.5	28.4	0
P2N_Rx1343	611854	6378051	31.7	26.3	20.4	17.6	31.6	31.4	26.7	0

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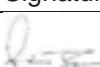
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