

PRECINCT 16 REZONING APPLICATION AND DEVELOPMENT PLAN

Noise and Vibration Assessment

Prepared for:

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Alceon Group No. 67 Pty Ltd ATF South Kingsville Trust (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd have undertaken an assessment of noise and vibration impacts to the proposed development of the balance of Precinct 16, comprising 41-59 Stephenson Street, 5, 9 and 9A Sutton Street, South Kingsville, has been undertaken.

The findings of our assessment indicate that the Subject Site is impacted by rail noise and vibration, and from commercial / industrial noise at the SMC facility.

Industrial noise (from SMC) modelling provided in this report suggest that with appropriate construction of northern boundary barriers and shielding structures, an appropriate amenity outcome can be achieved on the site. The proposed development of both this and the adjacent Former Caltex Site provides for an ultimate SEPP N-1 compliant outcome across both sites, and significantly reduced noise levels to the existing community to the south and south-west of the SMC site.

The noise and vibration impacts from the nearby freight rail system are anticipated to be reasonable to the Subject Site, and amenity targets (either BADS or other regularly applied criteria as per DDO for adjacent site) could be readily met.

Based on the above assessment, the site is considered appropriate to rezone for residential use, and reasonable amenity outcomes can be achieved with the implementation of acoustic design treatments.

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1 Introduction

SLR Consulting Australia Pty Ltd (SLR) was retained to provide a noise and vibration assessment of the proposed rezoning of the balance of Precinct 16, South Kingsville. The Subject Site comprises 41-59 Stephenson Street, 5, 9 and 9A Sutton Street, South Kingsville, with three associated land owners; Newport Townhomes Pty Ltd (41-59 Stephenson St), Alceon Group No. 67 Pty Ltd ATF South Kingsville Trust (9 and 9A Sutton Street), Brymart Pty Ltd (5 Sutton Street).

The proposal is to rezone the Subject Site from the existing Industrial 3 Zone to a residential zone. This assessment considers the acoustic and vibration matters in the context of the proposed residential zone and future use and development.

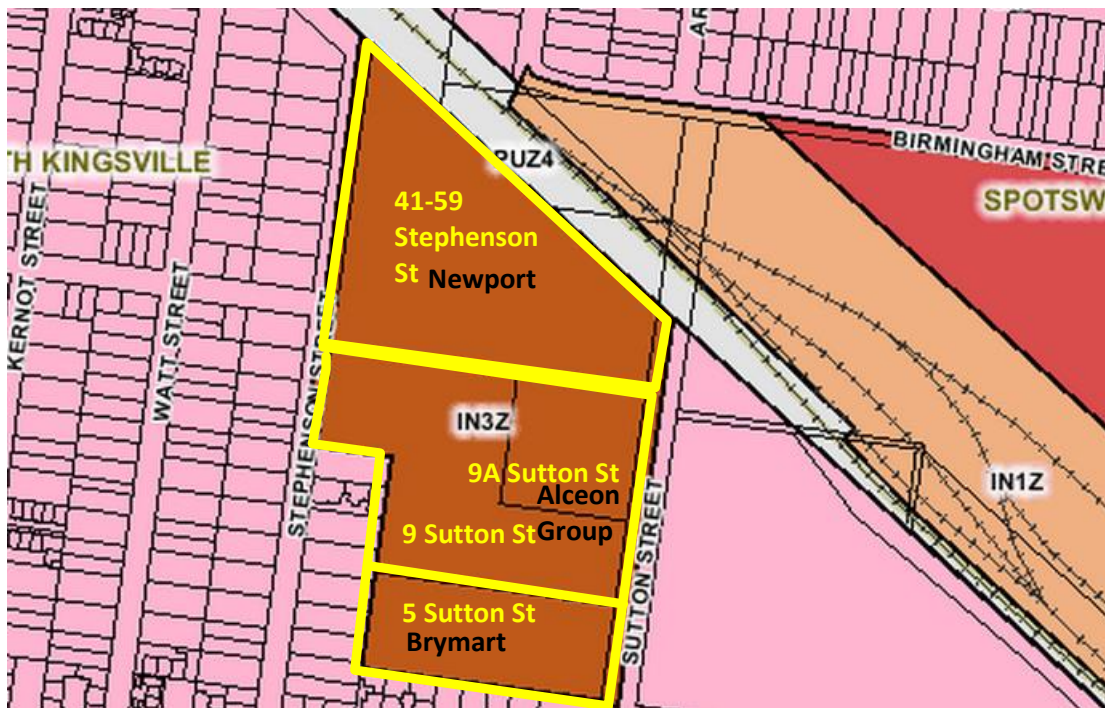
This report focuses on the potential noise and vibration impacts to the Subject Site from the existing surrounding uses, and includes:

- Assessment of potential noise impacts from nearby industrial uses.
- Assessment of potential train noise.
- Assessment of potential train vibration impacts.

1.1 Site Description

The Subject Site is bounded by Sutton Street to the east, Stephenson Street to the west, and the Newport to Tottenham rail corridor to the north. The entire site is currently zoned Industrial 3 and has General Residential 1 zoned land directly to the west, and also to the east (being the rezoned precinct 16 Former Caltex Site, 38-48 Blackshaws Road). Land to the south and west is zoned residential. The Subject Site and surrounding zones are shown in **Figure 1**.

Figure 1 Site and surrounding land use zonings (existing)



To the north of the railway line, Pacific National Rail operates the Spotswood Locomotive Maintenance Centre (SMC) which is located in an Industrial 1 Zone.

The surrounding uses with potential to cause noise and vibration impacts are:

- SMC facility to the north / north-east. The facility operates 24 hour a day. The facility primarily provides maintenance services for the intermodal locomotives.
- Train operations along the freight train lines to the north of the Subject Site. Both a standard (north side) and broad gauge (southern side) line are located in the rail corridor. There is a proposal for future expansion (duplication) of the standard gauge lines which could bring the nearest line closer to the Subject Site. Both noise and vibration impacts require consideration.

Figure 2 provides an aerial photograph of the Subject Site and surrounding uses.

Figure 2 Aerial Photograph of site and surrounding areas. Image courtesy Google Maps.



2 Environmental Noise Requirements

A Panel Hearing in relation to the Former Caltex Site at 38-48 Blackshaws Road involved development of relevant assessment standards and criteria for that site. An expert witness caucus was held on 23 March 2012 as part of this process.

At the time of the Former Caltex Site application, there were minimal Victorian guidelines or standards available in relation to train noise assessment, however, since that time further guidance has been provided in the Victorian Governments' *Passenger Rail Infrastructure Noise Policy (2013)* and the *Better Apartment Design Standards (2017)*.

The following is a summary of applicable assessment standards, policies and guidelines relevant to the Subject Site.

2.1 Industrial Noise

Noise emissions from commercial and industrial operations in Victoria are subject to the provisions of State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No N-1 (SEPP N-1).

Compliance with SEPP N-1 is normally the responsibility of commercial / industrial operators. However in the instance that a new residential development encroaches on an existing use, it is appropriate for the development to take some responsibility in controlling noise impacts, and to assist in ensuring that no additional obligations are put on the existing industry in terms of its compliance status.

This was the approach implemented at the adjacent Former Caltex Site, and the DDO requirements reflected this. The Former Caltex Site introduced a significant encroachment on the SMC site (i.e. it effectively became the closest sensitive receiver).

The Subject Site does not represent the same extent of encroachment and the vast majority of the site is no closer to SMC activities than existing residential uses in the area. As such, the same approach may not necessarily be warranted for this site. However, it is still appropriate for the development to include some form of amenity protection given the noise generating sources nearby.

In addition to SEPP N-1, the new Better Apartment Design Standards (BADs) have now been formally adopted in the planning scheme Clauses 55 and 58. The BADs nominate internal design levels for apartments that are impacted by transportation or industrial / commercial noise. There are no external amenity targets provided.

2.1.1 SEPP N-1 Noise Limits

The SEPP N-1 noise limits are required to be met external to a dwelling when that dwelling has outdoor areas within its boundaries, or when the dwelling has openable windows. An internal assessment can however be conducted in circumstances where there are no openable windows in a particular room.

SEPP N-1 noise limits are prescribed for residential premises for the Day, Evening and Night periods, as defined in **Table 1**.

Table 1 SEPP N-1 Definitions of Day, Evening and Night period

Period	Day	Time
Day	Monday to Friday Saturday	0700h to 1800h 0700h to 1300h
Evening	Monday to Friday Saturday Sunday and public holidays	1800h to 2200h 1300h to 2200h 0700h to 2200h
Night	Monday to Sunday	2200h to 24:00h 0000h to 0700h

Noise limits are based on the land-use zoning of the area surrounding the residence, as defined by the relevant authority, and on the measured background noise levels when background levels are especially high or low.

For the Subject Site, the applicable zoning based noise limits need to be based on the proposed rezoning. From the procedure presented in SEPP N-1, we have determined zoning levels at four representative locations within the Subject Site. **Appendix B** provides the zoning circles used to derive the zoning levels.

The results of the zoning level calculations are summarised in **Table 2**.

Table 2 Summary of SEPP N-1 Zoning Levels for Site (Adopted as Noise Limits)

Period	East end	North boundary central position	Central
Day	57	55	52
Evening	50	49	46
Night	45	44	41

Under SEPP N-1, the final noise limits are determined by comparing the above zoning levels to the background noise levels and classifying them as 'high', 'neutral' or 'low' (as defined in schedule B1 and B3 of SEPP N-1).

Long term background noise monitoring was undertaken at numerous locations as part of the application for the adjacent Forme Caltex Site in March and April 2012. It was deemed that the background noise levels were 'neutral' under SEPP N-1 on that site. It would be reasonable to assume that the background levels would also be neutral at the Subject Site, which is directly next to it.

As such, the above zoning levels can be adopted as the indicative noise limits for industrial noise impacting the Subject Site.

2.1.2 Better Apartment Design Standards

The BADS nominates internal design targets for apartments within 300 m of an Industrial 1, 2 or 3 Zone as follows:

- 35 dBA, Leq 8 hour during the night in bedrooms (10 pm to 6 am)
- 40 dBA, Leq 16 hour during the day in living rooms (6 am to 10 pm)

The BADS targets are long term average noise levels (i.e. 8 hour and 16 hour).

The above provides a different planning approach to addressing noise impacts to new developments, placing the onus on the developer to achieve internal amenity levels. There is no requirement for achieving external noise levels.

2.2 Train Noise

A number of relevant reference standards are provided below in relation to rail noise.

2.2.1 Passenger Rail Infrastructure Noise Policy

The Victorian State Government *"Passenger Rail Infrastructure Noise Policy (April 2013) (PRINP)* provides rail noise investigation thresholds that should be considered when statutory approval is required for either:

- A proposed change to land use near an existing or future rail corridor, or
- A planned change to passenger rail infrastructure.

The policy technically only applies to passenger rail lines, but can be applied in instances where there is a shared corridor.

The policy provides investigation thresholds. **Table 3** shows the applicable criteria for changes to land use near an existing rail corridor. If exceeded, the threshold levels trigger the requirement to consider feasible mitigation measures for the proposed development.

Table 3 Investigation thresholds for change in land use near an existing rail corridor (Victorian Passenger Rail Infrastructure Noise Policy)

Time	Type of Receiver	Investigation thresholds (measured externally), dBA	
DAY (6am – 10pm)	Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks. Noise sensitive community buildings including schools, kindergartens and libraries.	65 LAeq	85 L _{Amax}
NIGHT (10pm – 6am)	Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks.	60 LAeq	85 L _{Amax}

While the PRINP may not technically apply to the Subject Site (as the rail corridor is only used for freight), consideration of the above threshold targets provides an indicative first-pass assessment and consideration.

2.2.2 Better Apartments Design Standards

The BADS nominates internal design targets for apartments within 135 m of a freight rail line as follows:

- 35 dBA, Leq 8 hour during the night in bedrooms (10 pm to 6 am)
- 40 dBA, Leq 16 hour during the day in living rooms (6 am to 10 pm)

The BADS targets are long term average noise levels (i.e. 8 hour and 16 hour).

2.2.3 Former Caltex Site Rail Criteria

The train noise criteria applied to the Former Caltex Site (DDO) are as follows:

- 55 dBA, L_{max} in bedrooms
- 60 dBA, L_{max} in living areas

These design levels are to be assessed as follows:

- measured with windows and ventilation openings closed,
- measured internally, at the centre of the room,
- using 'fast' time weighting on a sound level meter,
- must be achieved for 95% of train pass-bys (i.e. 1 in 20 trains can exceed).

2.3 Train Noise – Groundborne

Groundborne or 'regenerated' noise is caused from ground vibration inducing sound within a building. This is normally only considered when a receptor cannot 'see' the source of noise / vibration, such as when a tunnel passes underneath dwellings. A groundborne criterion can only be used where the airborne noise is not the dominant path, as it is not ultimately possible to measure groundborne noise levels separately when airborne noise is dominant. This would effectively only apply to receptors that:

- Do not have any glazing exposed to train passbys.

- b. Do not have other significant paths (e.g. roof) of airborne train ingress.

The groundborne noise criteria determined for the adjacent Former Caltex Site were as follows:

- c. 35 dBA, Lmax (slow) during the night.
d. 40 dBA, Lmax (slow) during the day.

It should be noted that we would expect most dwellings that are near the railway line on the Subject Site would be subject to airborne noise levels that would be above groundborne noise levels. As such, applying the groundborne criteria is unlikely to be practical or necessary to most areas of the Subject Site.

As a general comment, we are not in agreement with application of groundborne noise criteria for a site that is adjacent to above-ground rail. Groundborne noise criteria were originally developed and intended for use in underground train tunnels, where residents have no obvious indication or expectation of being exposed to rail noise impacts. The groundborne noise criteria are therefore significantly lower (i.e. more stringent) than airborne noise criteria (by 20 dBA).

In addition, it should be noted that:

- There are existing residential uses directly to the west of the Subject Site and the north (on the other side of the railway line) that are equally exposed and impacted by rail groundborne noise.
- Application of any groundborne noise criteria in any development in Melbourne is rare. Only the underground tunnel projects (Melbourne Metro) have such criteria applied.

2.4 Train Vibration

There are no enforceable train vibration policies or criteria in Victoria.

The agreed train noise vibration assessment methodology from the experts' caucus for the Former Caltex Site is based on Australian Standard AS2670.2-1990 *Evaluation of human exposure to whole body vibration Part 2: Continuous and shock induced vibration in buildings (1 to 80 Hz)*.

The approach, taken from the DDO, is reproduced below:

"vibration from operation of the railway should comply with the combined direction Curve 20, adjusted by the number of events 'trade-off' given by Note 5 to the table based on the number of railway movements, but in any case, not lower than Curve 4.

Again this was accepted as being a 95% compliance level (i.e. 5%, or 1 in 20 trains could exceed).

Vibration would be measured in at least one-third octave bands between 4–80 Hz using an accelerometer fixed to the floor near the centre of any habitable room of the residential development.

It was agreed that a dose-based measure (such as the Vibration Dose Value VDV provided in BS6472, and advocated in the NSW guidance) would be better able to account for the intermittent nature of railway vibration. However, as VDV is more difficult to measure in practice, and AS2670.2 provisions would be more practical, the AS2670.2 guidance should therefore be used.

In relation to the final comment above, it should be noted that VDV is more readily measurable with modern instrumentation, and is considered an appropriate approach based on the current International Standard. It would be reasonable to undertake either a VDV based assessment or the previous AS2670.2 approach.

2.5 Other Noise Sources and Assessment Criteria - Traffic

The Subject Site is not exposed to noise from a nearby major road. The M80 is located more than 600 m to the north, and Melbourne Road is approximately 400 m east of the Subject Site. We would not expect there would be any need for the building to be designed specifically for traffic noise impacts. The rail noise impacts and SMC noise impacts will be the critical and dominant sources of noise that would require any assessment and would drive the building façade design.

3 Site Measurements

A combination of data collected as part of our detailed works for the Former Caltex Site and additional vibration testing conducted on the Subject Site, has been used for the purposes of the assessment. The data collected included:

- Long term (unattended) measurements from 28 March to 3 April 2012 at 4 locations on the Former Caltex Site.
- Long term measurements from 28 March to 3 of April 2012 of vibration in close proximity to the train line, and at different distances from the train tracks, on the Former Caltex Site
- Attended inspections and noise testing of the SMC facility conducted on 28 March, 31 March and 3 April 2012, and additional testing conducted at the SMC facility to confirm and update the data set on 26 May 2015 (as part of VCAT hearing). The findings of these noise tests were used to develop a noise model which has been used for the assessment.
- Supplementary vibration monitoring was undertaken on the Subject Site from 8 to 14 October 2014 at two reference locations to further confirm and validate existing vibration levels at the Subject Site.

The vibration locations tested were 25 m and 35 m from the existing nearest railway track, and are approximately indicated in the image below. It should be noted that the rail track in this area is further from the proposed development buildings than for those at the Former Caltex Site.

Figure 3 Vibration Monitoring Locations (Source: Google Maps)



The results of this vibration testing are summarised below:

3.1 Vibration Measurement Results

Table 4 provides a summary of the vibration monitoring locations and equipment.

Table 4 Vibration Logger Locations and Details

Logger No.	Locations Description	Logger Type / Serial Number
V1	NE Site Boundary, approx . 25 m from nearest rail line (broad gauge)	Instantel Minimate Plus / BE17410
V2	NE Site Boundary, approx . 35 m from nearest rail line (broad gauge)	Instantel Minimate Plus / BE13666

All vibration loggers were within NATA calibration. The loggers were set to record the maximum peak particle velocity vibration levels in the 3 orthogonal directions (vertical, horizontal and lateral) every minute, from 1 Hz to 80 Hz. All geophones were rigidly fixed and coupled to the ground via large spikes. The loggers were only installed on ground that had not been remediated on the Subject Site (i.e. where the ground surface was still compacted).

The full results for all test locations are shown in **Appendix C** in the form of the vector sum of the 3-directional peak particle velocity (PPV) vibration versus time.

A summary of the results is as follows.

- Location V1 (25m from BG Track): Vibration levels typically ranged from 0.3 to 0.8 mm/s. The highest measured 24 hour 'L5' was observed on 9 October 2014, with a level of 0.84 mm/s
- Location V2 (35m from BG Track): Vibration levels typically ranged from 0.1 to 0.3 mm/s. The highest measured 24 hour 'L5' was observed on 9 October 2014, with a level of 0.23 mm/s

The dominant frequency range of the train passbys ranged from 16 Hz to 32 Hz.

4 Calculations and Assessment

Assessment of the various noise and vibration sources at the Subject Site is presented in the following sections. The assessments are based on the defined noise criteria in **Section 2** and the measurement results presented in **Section 3**.

4.1 Industrial Noise Impact Assessment

The dominant source of commercial / industrial noise to the future proposed development on the Subject Site is from SMC activities to the east / north-east.

The detailed study conducted during SLR's works associated with the Former Caltex Site at 38-48 Blackshaws Road identified that external loco notch 8 testing was the noisiest activity on the Subject Site that can occur during the day and evening. The notch 8 testing typically occurs for a 10 to 12 minute period, with the loco engine operated at high load. This test was observed to occur just to the south-east of the SMC maintenance building during our site surveys, however, SMC subsequently requested that future scenarios are also included in any assessment, which included additional loco test positions just south of the wash building and the loco test cell.

The loco test cell is a dedicated acoustic enclosure where the locos can be tested during the night.

Staging Aspects

There are a number of complications in relation to the potential impacts to the site, and the relevant scenarios that should be modelled. In particular, the staging of construction of different parts of the development as well as the adjacent Former Caltex Site development, will play a significant part in the exposure of the site to noise from SMC. The Former Caltex Site development has received planning permit and master plan approval. The design of the adjacent site includes a large continuous 6 and 4 storey construction along the northern interface of that site, and that will provide substantial shielding to most of the Subject Site.

Noise Modelling

A detailed noise model was developed for the application associated with Former Caltex Site in order to assess noise impacts for that site. This same noise model has been used to assess noise impacts to the Subject Site. The noise model includes numerous sources operating on the SMC site as well as the two additional asserted external loco notch 8 test positions as per the ruling of the VCAT hearing P2042 2014 (22 February 2016), and as per Mr Fays 13 July 2015 statement presented at VCAT (SMC former Operations Manager). The two additional 'future' external test locations were; to the south of the wash building, and to the south of the test cell.

The model was prepared within the SoundPLAN noise modelling package using the ISO9613 prediction algorithm. The input noise data was based on measurements and observation conducted during our SMC facility inspection (3 April 2012 and 26 May 2015). This included noise from outdoor testing of locos on notch 8 (full load), from activities within the maintenance building, from the loco test cell, from ventilation fans and from trains being shunted (and associated warning bells). An indicative sound power level was determined for each source / activity from the measurements. The model also includes the effects of shielding and / or reflections due to buildings. Dimensions for building heights, doorway openings etc. were derived from drawings received from Asciano on 2 May 2012.

Table 5 provides a summary of the SMC sound power data derived from all measurements and used within the noise modelling. Full octave band spectra were used in the modelling as measured on site for each source.

Table 5 Sound Power Levels for Noise Modelling – SMC Facility

Source	Sound Power Level, dBA Leq	Other Comments
Notch 8 Train Load Test (external)	117	Activity occurred for a maximum 12 minute period, so a -4dB adjustment appropriate. Locations as per noise model (3 used)
Test Cell – Loco notch 8 main vents north and south (per side)	101	
Test Cell – Loco notch 8 test with doors open – at each door opening	99	
Bells – entry to wash building	109	Operation 3 min. in every hour max. NOTE: A total of 6 bells were assumed to operate in any half hour (2 per building) in the model
Bells – entry to loco test cell (west bell)	100	
Maintenance Bldg internal levels grinding etc. – through large open doors (east and west, per side)	95	
Maintenance Building Roof Ventilation Fans	98	
Maintenance Bldg internal levels grinding etc. – sound transmitted through roof	91	
Train Shunting (including bells),	104	Assumed 10 min duration in any half hour period. 2 trains shunting along two tracks as per Mr Fays Statement
Washing Facility Compressor	102	Data from the Marshall Day Acoustics report no. 2006232 001 R05 from a measurement at 15 m (conducted for SMC). Not operating during our tests
Forklift	90	Operating to the north-east of the maintenance building

The noise model was run for existing ‘worst case’ operations for the Day/Evening period, which was the critical assessment period.

From our discussions with Alceon Group No. 67 Pty Ltd ATF South Kingsville Trust and Newport Townhomes Pty Ltd, the development of the Subject Site will generally be as follows:

- The vast majority of the Subject Site is to be developed into 2 to 3 storey townhouses.
- A larger multi storey residential building (currently proposed up to 6 storey) is proposed on the north-eastern corner of the Subject Site, in order to provide shielding to the remainder of the Subject Site (as per the concept from the Former Caltex Site).

- A north boundary barrier, with a preliminary height of 4 m, is proposed along the northern interface to provide some protection from freight traffic and SMC.

Indicative preliminary layout plans have been provided by the developers and are shown below for the two northern allotments of the Subject Site (none are available at this stage for the southernmost allotment).

Figure 4 Preliminary Site Layout Plans



The above has been adopted for indicative prediction and assessment purposes.

Noise contour plots have been prepared for a number of scenarios, and for all 3 external loco notch 8 test positions. The future scenarios are plotted at a height of 4.5 or 8 m above ground level to represent a 2nd or 3rd storey receptor (representative of the highest townhouse levels).

‘Loco Pos 3’ in the attached noise contours results in the highest noise impact to the Subject Site, and also results in increased noise to existing residential receivers in the area to the north-west and south-west of SMC. This has the loco being tested at notch 8 just to the south of SMC’s loco test cell and is effectively the closest loco test position to the Subject Site. This test position is a future scenario asserted by SMC and required to be considered as part of the Former Caltex Site application.

The noise contour plots for a number of selected scenarios are shown in **Appendix A**.

4.1.2 Assessment

With reference to the noise contour plots, the following assessment is provided.

4.1.2.1 Existing situation with no shielding to site

Plot 1 - Loco Pos 1

At the time of the former Caltex Site rezoning application, this was the main location of external loco notch 8 tests. This loco test position shows that noise levels to the Subject Site are in the order of 56 dBA at the most impacted locations, and reduce to 50 dBA to the western end of the site.

The predicted noise levels shown in the attached **Plot 1** are marginally compliant with the day period noise limits which range from 52 to 57 dBA across the site, but would exceed evening period noise limits (the loco testing is indicated to occur up to 8 pm).

It is noted that the noise levels at the Subject Site are significantly less than noise levels to existing residents to the south (in the order of 59-63 dBA), and similar to noise levels to the most impacted receivers to the north.

The subject redevelopment of the site provides no additional or more onerous obligation on SMC, and is generally well away from this loco test position.

The construction of buildings at the Former Caltex site will provide further significant shielding from this loco test position.

As such, this loco test position is not considered critical, and would not drive the noise control design at the Subject Site.

Plot 2 - Loco Pos 2

This was the 2nd asserted test location, just south of the wash building, provided by SMC.

The attached noise contour **Plot 2** shows:

- Noise levels ranging from 53 to 60 dBA typically across the Subject Site, with the noisiest location along the eastern most boundary centrally on the site (62 dBA). These noise levels exceed day period noise limits by a moderate amount (5 dBA typically) and evening period noise limits by approximately 10 dBA.
- Noise levels to the southern existing residents are similar (59 to 62 dBA) and to northern existing residents in the order of 53 to 56 dBA.

As for Loco Pos 1, noise to the Subject Site is not providing the highest obligation on SMC; numerous residents to the south are still exposed to similar or higher noise levels. The construction of buildings at the Former Caltex site will also provide further significant shielding from this loco test position (see below).

Plot 3 - Loco Pos 3

This was the 3rd asserted test location, just south of the test cell building, as provided by SMC. It is our understating that this is a future option to address increased capacity on the site.

The attached **Plot 3** shows this location provides the most impact to the Subject Site, with noise levels ranging from 59 to 65 dBA, well above day and evening period SEPP N-1 limits.

Noise levels to existing receivers to the south-west and north-west are significantly increased compared to the Loco 1 test position. Noise to the south-west existing receivers range from 59 to 63 dBA which is similar to noise levels at the subject development. Noise levels to existing northern receivers are up to 56 dBA. It is noted that these increased noise levels would exceed the SEPP N-1 noise limits at these existing receivers, which would not normally be an acceptable outcome for EPA or Council.

The Subject Site does not introduce significant further obligation re. SEPP N-1 compliance on the SMC operations.

The future redevelopment of the Former Caltex Site will provide significant shielding to the Subject Site.

4.1.2.2 Future situations

Future Ultimate Scenario Former Caltex Site – Plot 4

Based on the current application for the built form of the former Caltex Site, we have prepared **Plot 4** which shows the effect of the shielding offered by the 6 and 4 storey building form along the northern interface of that site. Loco Pos 3 has been used which is the highest noise generating location of the three (relative to the Subject Site).

The plot shows significantly reduced noise levels across the site and all residential uses to the south generally. Noise levels are generally compliant with SEPP N-1 noise limits throughout most of the site, apart from the northern most section which is relatively unshielded.

Future Ultimate Scenario Former Caltex Site with 6 Storey built structure on Subject Site – Plot 5

Plot 5 shows the effect of the proposed buildings on the Former Caltex Site together with an indicative concept of a 6 storey built structure on the north-east corner of the Subject Site, as well as a 4 m high northern boundary barrier. The plot also includes the indicative layout of townhouses to the west of the 6 storey building structure and to the immediate south.

The plot shows that this arrangement achieves compliance generally across the entire site for day and evening loco testing at Loco Pos 3. Loco Pos 2 and 1 would also be fully compliant. In addition, the development of both sites represents a significantly improved noise amenity outcome to all existing residential receivers to the south and south west of SMC.

The north and east facades of the 6 storey building structure (north-east corner) are highly impacted and it will not be possible to provide apartment windows or balconies at this interface. The provision of an 'acoustic corridor' in this location is proposed (as per the Former Caltex Site application) to provide the necessary noise attenuation and buffer to the apartments from the SMC facility and any loco pass-by noise.

Small excesses from the SEPP N-1 noise limits may occur along the northern most edge of the townhouses (upper floors) to the west of the proposed 6 storey built structure. This will need to be addressed via specific acoustic treatments along this area.

4.1.2.3 Staging - Future Acoustic Investigations

The developers of Precinct 16 are committed to providing temporary shielding structures or other acoustic protection measures as necessary to the Subject Site to address staging of the development. This will need to be developed on a case by case basis during the development of Precinct 16, accounting for what stages of the adjacent Former Caltex Site have been constructed.

Shielding structures could include shipping container-type boxes that could be stacked 4 high to provide a 10.4 m high shielding barrier.

4.1.2.4 Summary of SMC noise impacts

The above noise predictions and assessment suggest that overall, the Subject Site development will not provide any significant additional obligation on SMC current operations in that noise levels will generally not be higher than those to numerous existing receivers in the area.

The Subject Site is generally well away from the current loco test positions (Loco Pos 1 and 2) but will be more significantly impacted by the future proposed Loco Pos 3. As previously noted, this Loco test position would also increase noise levels to existing residents to the north-west and south-west of SMC.

The development of the Former Caltex Site will provide substantial shielding to the proposed subject redevelopment site, and the ultimate built form of that site, together with a similar built form on the north-east corner of the Subject Site, will provide for a good noise amenity outcome across the entire area (including existing residents to the south), and general compliance with SEPP N-1 noise limits.

4.2 Train Noise

Train noise levels were measured adjacent to the railway line at the adjacent 38-48 Blackshaws Road site as part of our works in 2012.

Based on the testing, and from detailed analysis of the busiest 48 hour period (Thursday 29 and Friday 30 March 2012) the 5th percentile of all train maximum pass-bys was determined. This provided a result of **92 dBA, L_{max} at 10 m** from the nearest train line.

With reference to **Section 2.2**, the agreed train noise criteria determined during the experts' caucus for the adjacent Former Caltex site are:

- 55 dBA, L_{max} in bedrooms
- 60 dBA, L_{max} in living areas

The above targets are likely to be the more onerous targets when compared to the BADS targets.

The design development plan for the Subject Site shows townhouse type development through most of the Subject Site, and a multi-level residential development proposed at the north-eastern end corner. The nearest townhouses are shown approximately 35 m from the existing nearest train line, and the multi-level building is approximately 24 m from the nearest train line.

The necessary noise reduction required at the north boundary of the Subject Site to achieve the above internal noise criteria will be in the order of 30-35 dBA to the multi residential development, and 25-30 dBA for the townhouses.

The above level of sound reduction is considered achievable via moderate acoustic treatments to the buildings. In addition, the proposed 4 m high north boundary barrier will provide further control of the loco pass-by noise levels.

4.3 Train Vibration

The results of vibration logging at the two distances are summarised below and assessed to the criteria as adopted on the adjacent Former Caltex Site.

Australian Standard AS AS2670.2-1990 Assessment

Annex A of AS2670.2 provides a method of determining 'satisfactory' magnitudes of building vibration criteria for occupants. As train vibration is intermittent in nature, it is necessary to consider the number of pass-bys as well as their magnitude. Note 5 of Annex A of AS2670.2 provides the methodology to account for the 'trade-off' between the number of events per day.

Based on the results of testing (both during our 2014 surveys, and those during our detailed works on the adjacent site), the following is a summary of the developed AS2670.2 vibration criteria. Note that during all our site testing campaigns, the highest number of events observed in a 24 hour period was 30 (measured in 2012).

The DoT had previously provided further information on potential future increases in number of trains in this train corridor as part of the Former Caltex Site rezoning Hearing. The information provided by DoT at the time was:

- Potentially up to 18 more SG train per week by 2015.
- Potentially up to 60 more trains per week by 2040 or 2050 based on current Government investigations.

It is our understanding that there is no certainty in any of the above occurring, particularly the long term forecasts. There is no clear indication of whether the long term (2040 to 2050) investigations relate to standard (SG) or broad gauge (BG) line trains; however it is understood that current trends are for using SG for interstate traffic and BG for regional Victoria traffic (this information was supplied by DoT in email correspondence received 1 May 2012).

We are not aware of the status of either of the above, but we have included the suggested 18 additional trains per week to allow for some expansion. We have assumed this would be up to 3 extra trains per day, with 2 at night and 1 during the day. There is no increase or change in the BG line. The summary of our assessment is provided in **Table 6**.

Table 6 AS2670.2 Vibration Criteria – Current Observed Operations on Busiest Day

Observed maximum number of pass-bys over a 24 hour period (30 March 2012) + 3 extra per day	33
Observed maximum number of pass-bys day only (7am to 10 pm) + 2 extra trains	21
Observed maximum number of pass-bys night only (10 pm to 7 am) + 1 extra train	12

AS2670 criteria based on above no. of events (day)	4.7 mm/s
AS2670 criteria based on above no. of events (night)	1.4 mm/s

With reference to the above, and from the measurement results provided in **Section 3.1**, an assessment can be made. The most stringent criteria are those developed for the night so only they need to be considered.

Note that the Average and L₀₅ (upper 5th percentile) of maximum passbys is based on the entire data set obtained at the measurement locations (i.e. not just those observed during the Night). This provides for a more robust data set for determining statistical and average vibration levels.

Both the average (as strictly required under AS2670.2) and the upper 5th percentile of the train vibration levels (as preferred by the acoustic experts, and which provides for a more conservative assessment) has been provided. The summary of my assessment is provided in **Table 7**.

Table 7 Assessment of Existing Vibration Levels to AS2670.2

Distance (to nearest track)	Average of Maximum Vibration PPV	L ₀₅ of Maximum Vibration Levels	AS2670 Night Criteria & Compliance or otherwise
25 m	0.6 mm/s	0.84 mm/s	1.4 mm/s for night period – COMPLIANT
35 m	0.13 mm/s	0.23 mm/s	1.4 mm/s for night period – COMPLIANT

The above suggests that at the approximate location of the nearest townhouses (29 m from nearest track), AS2670.2 satisfactory vibration levels are met with a significant margin.

For the multi storey building at the east corner, which is shown approximately 24 m from the nearest existing train line, the 25 m data is considered equivalent for an indication of vibration to this building. This also results in a likely compliant outcome when considering ground to footing decoupling as well as some building amplification. These findings are generally in line with the studies conducted at the adjacent 38-48 Blackshaws Road site, where the necessary buffer distance was determined to be 11 m to achieve the criteria.

It is considered premature to assess potential increases in year 2040-2050 given that this is based on preliminary options investigations, the long time frames involved, and the likelihood of new lines providing reduced vibration levels. Any such increases in traffic on the line will also impact existing residential receptors that are within close proximity (within 25 m) of the freight line and any increase in traffic of this magnitude will require further detailed consideration along the entire alignment.

4.4 Building Damage

Human comfort criteria (as assessed above) are normally significantly more stringent than any building damage criteria. Below is an example of building damage criteria obtained from British Standard BS 7382.2.

Table 8 Assessment of Predicted Vibration to BS 7385.2:1993

Measured dominant frequency of vibration	15Hz – 60 Hz
BS 7385.2:1993 Criteria for transient sources	20 mm/s PPV at 15 Hz rising to 50 mm/s PPV at 40 Hz and above

BS 7385.2:1993 Criteria for continuous sources	10 mm/s PPV at 15 Hz rising to 25 mm/s PPV at 40 Hz and above
Maximum measured level of vibration at nearest monitoring location to train line	< 1 mm/s PPV

The highest measured vibration level at the Subject Site from the existing BG line resulted in levels well below those which would result in cosmetic damage.

4.5 Train Groundborne Noise

The groundborne noise criteria determined for the adjacent Former Caltex Site were:

- 35 dBA, L_{max} (slow) during the night.
- 40 dBA, L_{max} (slow) during the day.

As per our discussion in **Section 2.3** it is not considered necessary to apply groundborne criteria to an above-ground rail line. Apart from the application of the above criteria to the Former Caltex Site, we are not aware of groundborne noise criteria being applied to any project in Victoria other than the Metro Tunnel project (i.e. an underground tunnel).

In any case, if it is deemed appropriate to consider groundborne noise to this site, the latest findings of testing on prototype test piles on the adjacent Former Caltex Site (conducted in November 2017) identified that groundborne noise levels could exceed the groundborne noise targets within a zone of approximately 30-35 m from the nearest train track. The nearest part of the development (corner 6 storey tower) would be likely the main impacted part of the development within this zone.

5 Discussion

5.1 Industrial Noise Impacts and Controls

The assessment indicates that there is a lower impact to the Subject Site from SMC operations compared to the adjacent Former Caltex Site. Noise impacts are typically similar, or less than those to existing residents in the area. As such, the development of this site would not appear to be presenting any additional obligations on the operations of SMC.

The future asserted SMC external notch 8 testing at Loco Pos 3 (south of the Test Cell), represents the worst cast noise impacts to the Subject Site and also results in increased noise to existing residents to the north-west and south-west of SMC.

With the construction of the adjacent Former Caltex Site northern boundary buildings, together with the proposed north-eastern corner 6 storey building and northern interface barrier, SEPP N-1 noise compliant levels are generally achievable throughout the Subject Site area, with all Loco test positions and scenarios. BADS targets would also be readily achieved. In addition, noise to all existing residents to the south and south-west of SMC would be significantly reduced.

Site Controls and Treatments

Based on the findings of the noise assessment, the following general controls and treatments will need to be implemented in the development.

- The provision of a large structure (6 storey) on the north-east corner of the site is critical for the purposes of providing adequate noise control along the remainder of the site. This building will however also need to be constructed and designed appropriately to control noise levels to apartments internally. The building will need to incorporate the following:
 - No openable windows or apartment balconies on the north and east interface. It will be necessary to provide an 'acoustic corridor' in this area as per the proposal for the Former Caltex Site development. This will provide the necessary noise attenuation to the apartments so as to achieve the necessary internal SEPP N-1 noise limits.
 - The 'acoustic corridor' should generally incorporate the following construction principles:
 - Masonry external construction
 - Glazing to comprise heavy laminated glass (10-12 mm)
 - Apartment entry doors (from acoustic corridor) to be solid core doors with appropriate seals as per BCA compliance requirements.
- A 4 m high acoustic barrier is to be provided along the north boundary of the site opposite the townhouses, for the full extent of the northern boundary of the site (from the north-east 6 storey structure). This will provide noise control from both industrial noise from SMC and loco pass-by noise. The barrier is to be constructed from a material with density not less than 20 kg/m².
- The northern most interface of the townhouses (Newport Townhomes lot) will also require provision of specific treatments to the upper 2 floors (for a 3 level townhouse). Northern balconies, may not be appropriate however provision of non-openable north facing windows, or a winter-garden arrangement may provide sufficient noise attenuation.
- In considering any interim stages (where the Former Caltex Site northern boundary building may not be complete) provision of temporary barriers in the form of shipping container-type constructions along the north and eastern boundaries of the site, or provision of alternative acoustic protection measures such as building façade upgrades, can be implemented to provide improved amenity. These are considered a reasonable short term approach to minimising amenity impacts in the context of staging construction of the two sites.

Noise from 5 Sutton Street (Able Industries Engineering)

SLR have provided separate correspondence (dated 15 November 2019) in relation to potential management of noise from Able Industries Engineering to future dwellings, in the instance that this industry is still in operation when dwellings are completed on parts of the 9 Sutton Street allotment of Precinct 16. This is included in **Appendix D** of this report.

With reference to **Appendix D**, the primary solution will be a wall on the boundary to provide acoustic protection for future residents unless an alternative solution is proposed that has better amenity outcomes for residents. The listed options are summarised below:

- Installation of a 3 m high permanent noise barrier along the southern boundary of 9 Sutton Street. The barrier should be constructed of an impervious material with a surface density not less than 12 kg/m². Suitable products include: 9 mm thick fibre cement sheet and 25 mm thick plywood.

- Design of dwellings on interface to incorporate acoustic protection; homes could be specifically designed to create an acoustic barrier providing protection for the site and the occupants of the homes.
- Installation of a temporary barrier along the southern boundary of 9 Sutton Street. Temporary barriers may necessitate leaving the land closest to the industry undeveloped until such time as the industry ceases operation.
- Construction of temporary barrier on the land at 5 Sutton Street, if agreed / negotiated with Able Industries.
- Staged development of the site, with the land closest to the industrial interface developed later when the industry may ultimately cease operations.
- Upgrade the sound insulation properties of the buildings at 5 Sutton Street, if agreed / negotiated with Able Industries.
- Provide specific sound insulation and treatments to the critical sources within the building at 5 Sutton Street, if agreed / negotiated with Able Industries.

5.2 Train Noise and Vibration Impacts and Potential Controls

5.2.1 Train Pass-by Noise

Train noise levels can practically be controlled to satisfactory internal design levels with appropriate implementation of building siting, shielding and construction materials.

The provision of a 4 m high acoustic barrier along the northern boundary (as described above) will result in significant shielding to any ground and 1st floor receivers. Provision of additional acoustic treatments to the actual building facades can be provided to achieve the internal design levels where necessary. This can be implemented during permit application stage once the apartment design (and glazing areas and orientations) are available.

The BADS based train criteria, or the adjacent site DDO requirements (L_{max} of 55 dBA bedrooms, 60 dBA living rooms) would be readily achievable with commercially available façade upgrades and glazing design.

5.2.2 Train Vibration

The Subject Site preliminary plans show the closest townhouses approximately 35 m from the nearest rail track, and the east corner multi storey building approximately 24 m from the nearest train line. Vibration testing conducted at 25 m and 35 m on the Subject Site confirmed that there are acceptable vibration levels at these distances. Potential future train volume increases would also be adequately controlled.

If a future new track is to be provided, it is likely to be constructed using the latest track design and technology and so would be expected to generate less train vibration. The train line currently has existing residents within 25 m. Any significant increase in train traffic would affect those residents equally or more than occupants of buildings in the Subject Site. New train lines can be installed with better track isolation which would provide a benefit to existing and future residents.

Our investigations suggest that the Subject Site can be developed and achieve appropriate internal train vibration levels. Sufficient buffer distance is provided between the rail tracks and future dwellings to allow for an appropriate outcome with standard building constructions.

6 Conclusion

An assessment of noise and vibration impacts to the proposed development of the balance of Precinct 16, comprising 41-59 Stephenson Street, 5, 9 and 9A Sutton Street, South Kingsville, has been undertaken.

The findings of our assessment indicate that the Subject Site is impacted by rail noise and vibration, and from commercial / industrial noise at the SMC facility.

Industrial noise (from SMC) modelling provided in this report suggest that with appropriate construction of northern boundary barriers and shielding structures, an appropriate amenity outcome can be achieved on the site. The proposed development of both this and the adjacent Former Caltex Site, provides for an ultimate SEPP N-1 compliant outcome across both sites. To address staging of the development, provision of temporary shielding barriers (e.g. shipping container type barriers) or building façade upgrades, can be implemented as necessary. The extent of shielding or building upgrades will depend on what has been constructed prior to specific stages (on both this and the adjacent Former Caltex Site) and should be evaluated during planning permit stage to ensure the most up to date site scenarios can be considered.

The noise and vibration impacts from the nearby freight rail system are anticipated to be reasonable to the Subject Site, and amenity targets (either BADS or other regularly applied criteria as per DDO for adjacent site) could be readily met.

Based on the above assessment, the site is considered appropriate to rezone for residential use, and reasonable amenity outcomes can be achieved with the implementation of acoustic design treatments.

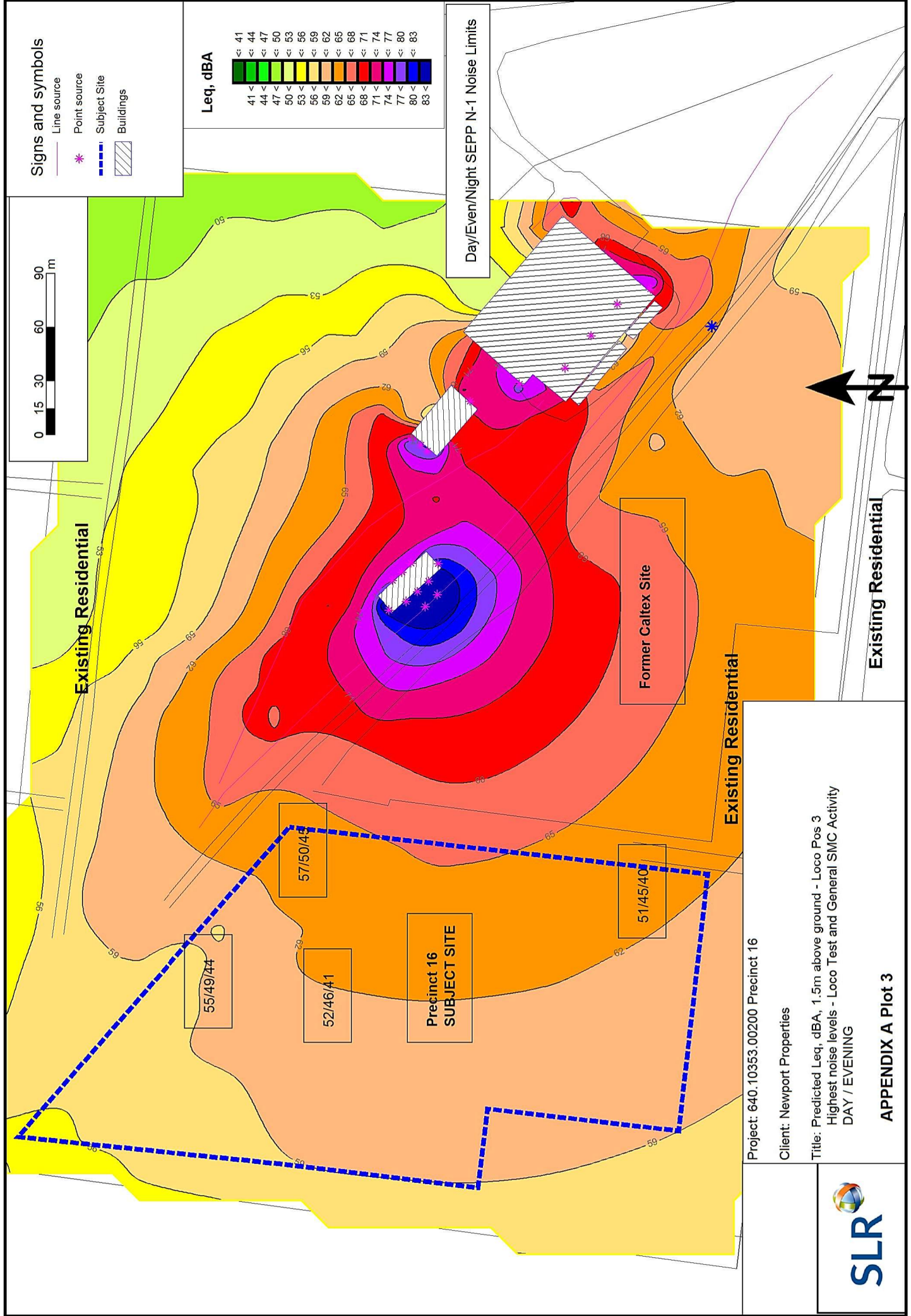
Prepared by,



JIM ANTONOPOULOS BAppSc MAAS
Principal - Acoustics

APPENDIX A

Noise Contour Plots



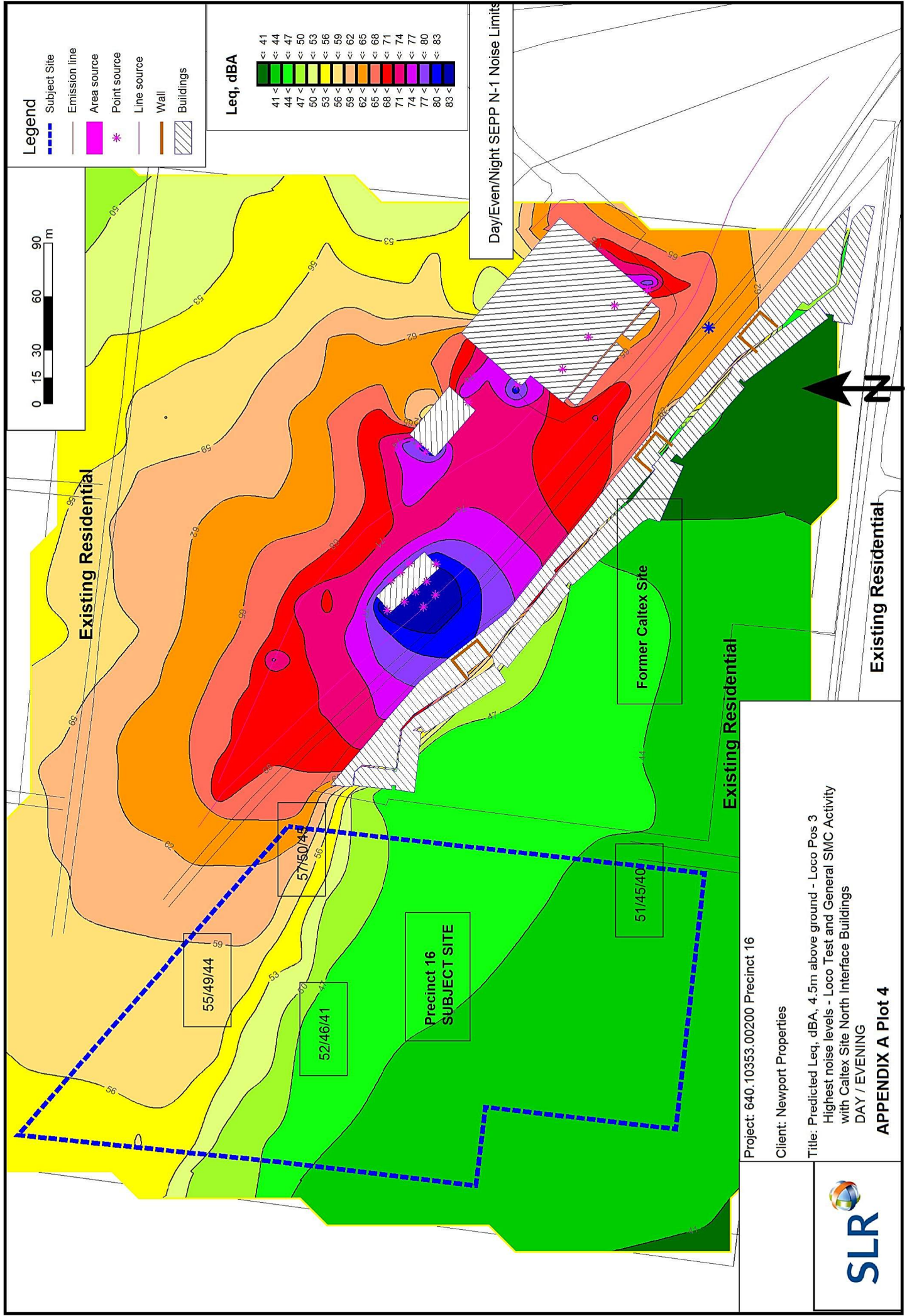
Project: 640.10353.00200 Precinct 16

Client: Newport Properties

Title: Predicted Leq, dBA, 1.5m above ground - Loco Pos 3
Highest noise levels - Loco Test and General SMC Activity
DAY / EVENING

APPENDIX A Plot 3





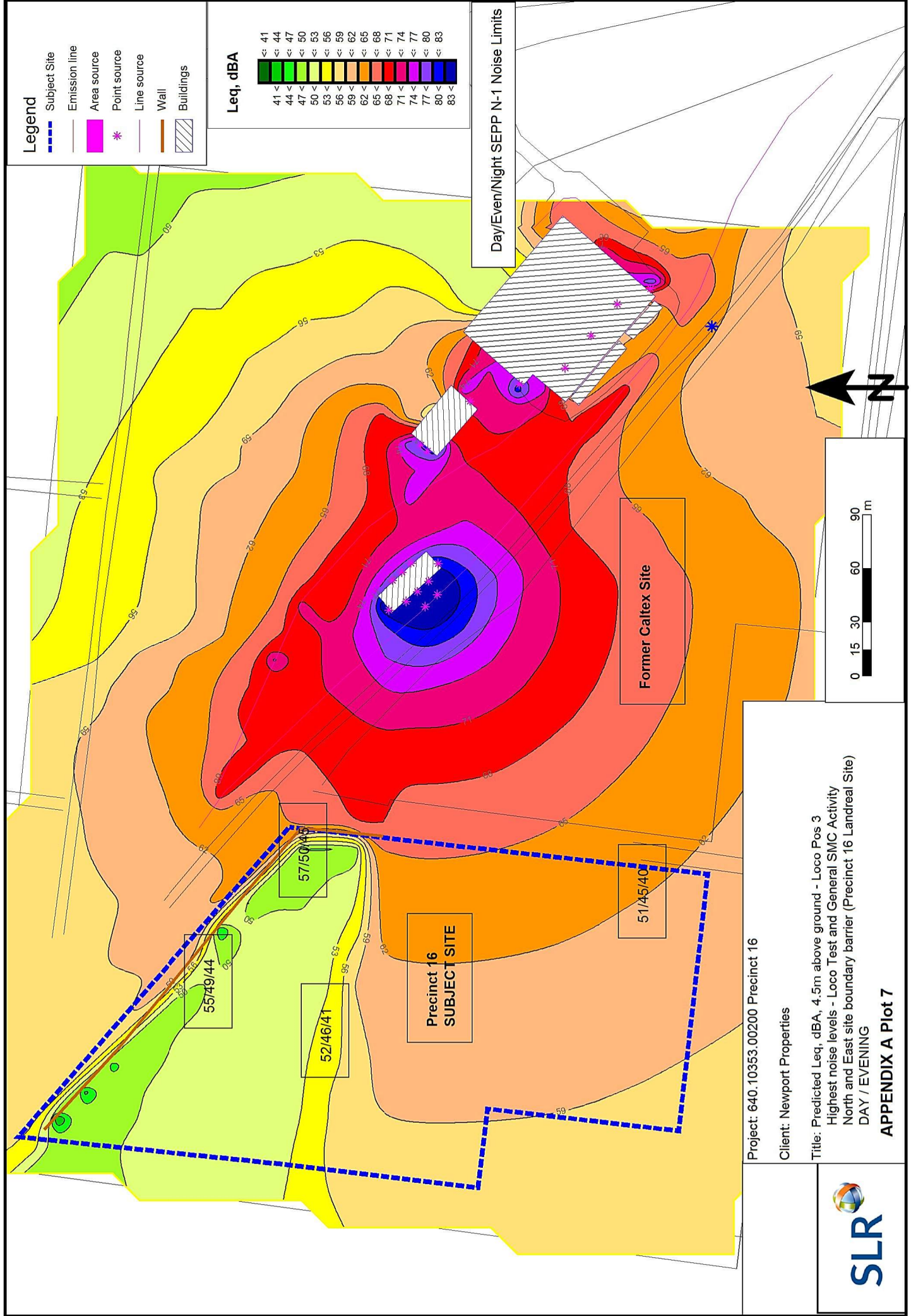
Project: 640.10353.00200 Precinct 16

Client: Newport Properties

Title: Predicted Leq, dBA, 4.5m above ground - Loco Pos 3
Highest noise levels - Loco Test and General SMC Activity
with Caltex Site North Interface Buildings
DAY / EVENING

APPENDIX A Plot 4





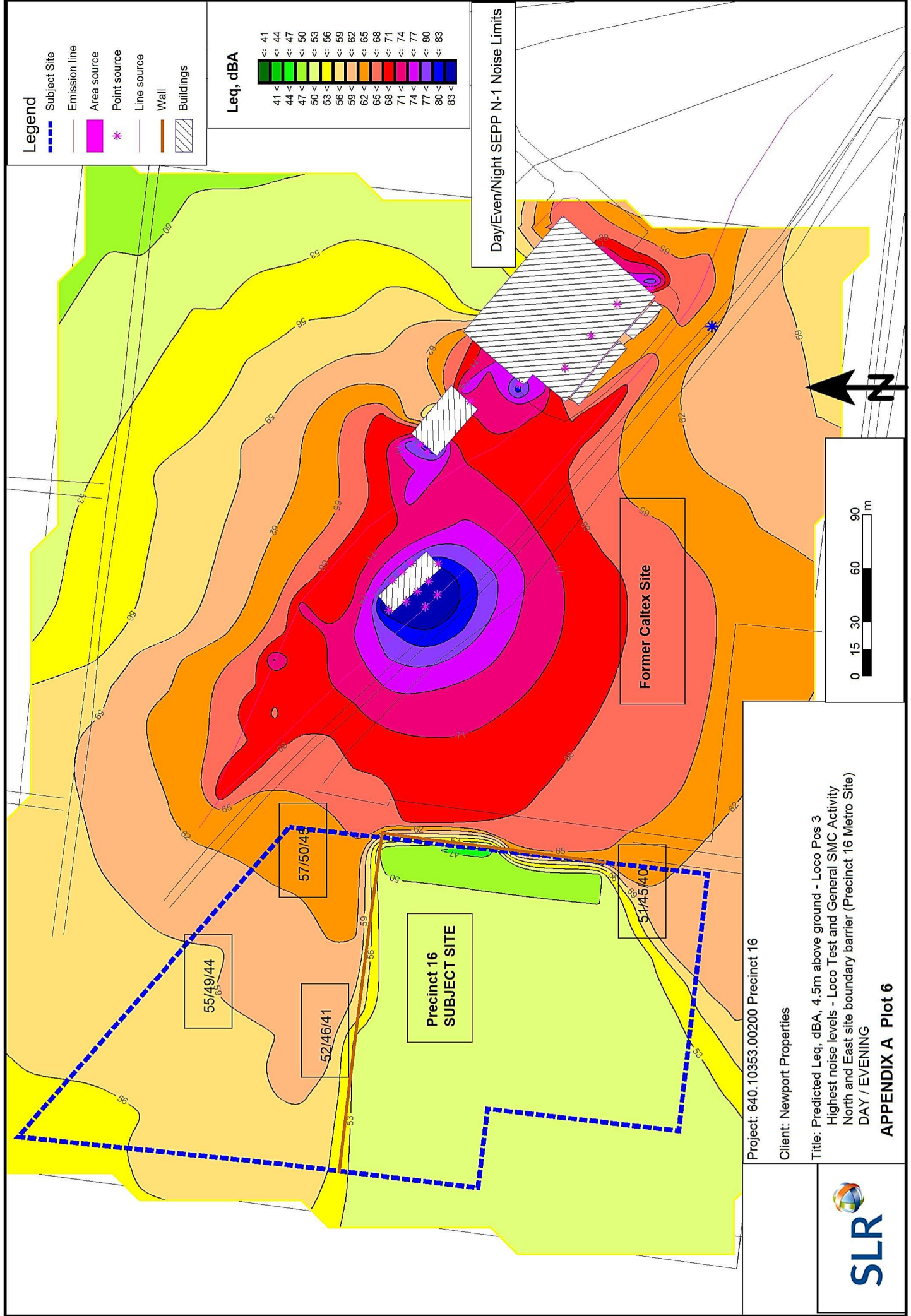
Project: 640.10353.00200 Precinct 16

Client: Newport Properties

Title: Predicted Leq, dBA, 4.5m above ground - Loco Pos 3
Highest noise levels - Loco Test and General SMC Activity
North and East site boundary barrier (Precinct 16 Landreal Site)
DAY / EVENING

APPENDIX A Plot 7





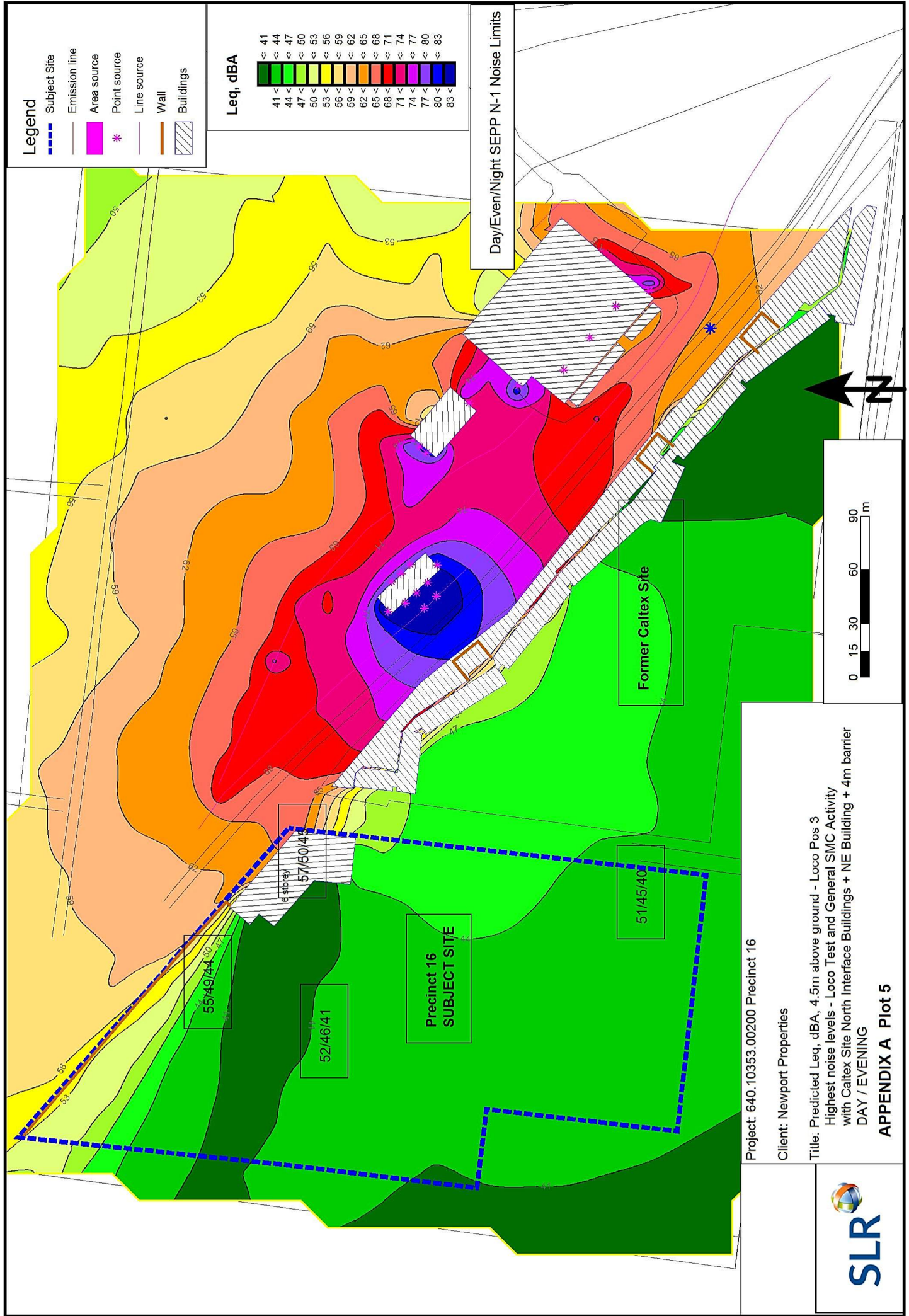
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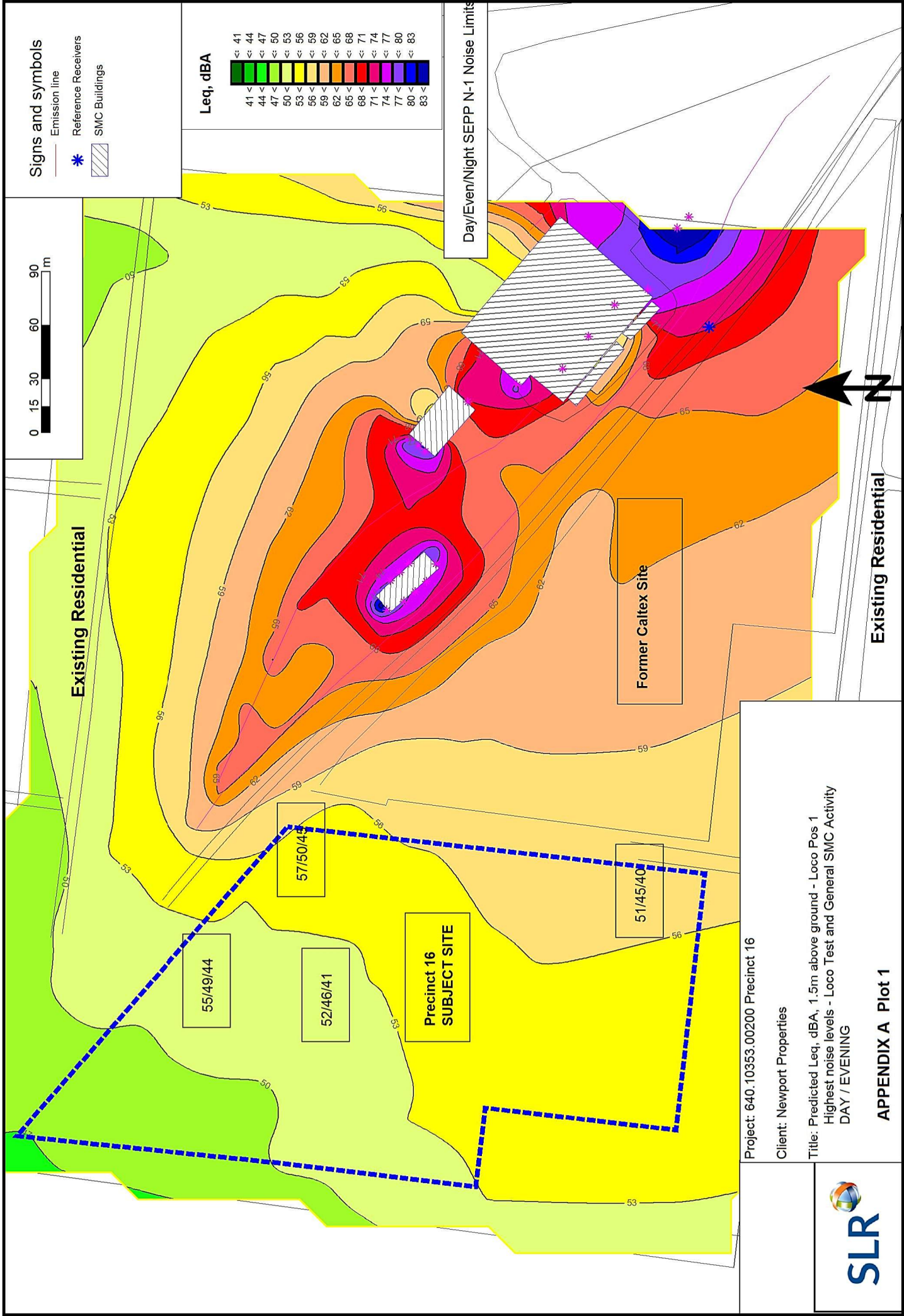
Client: Newport Properties

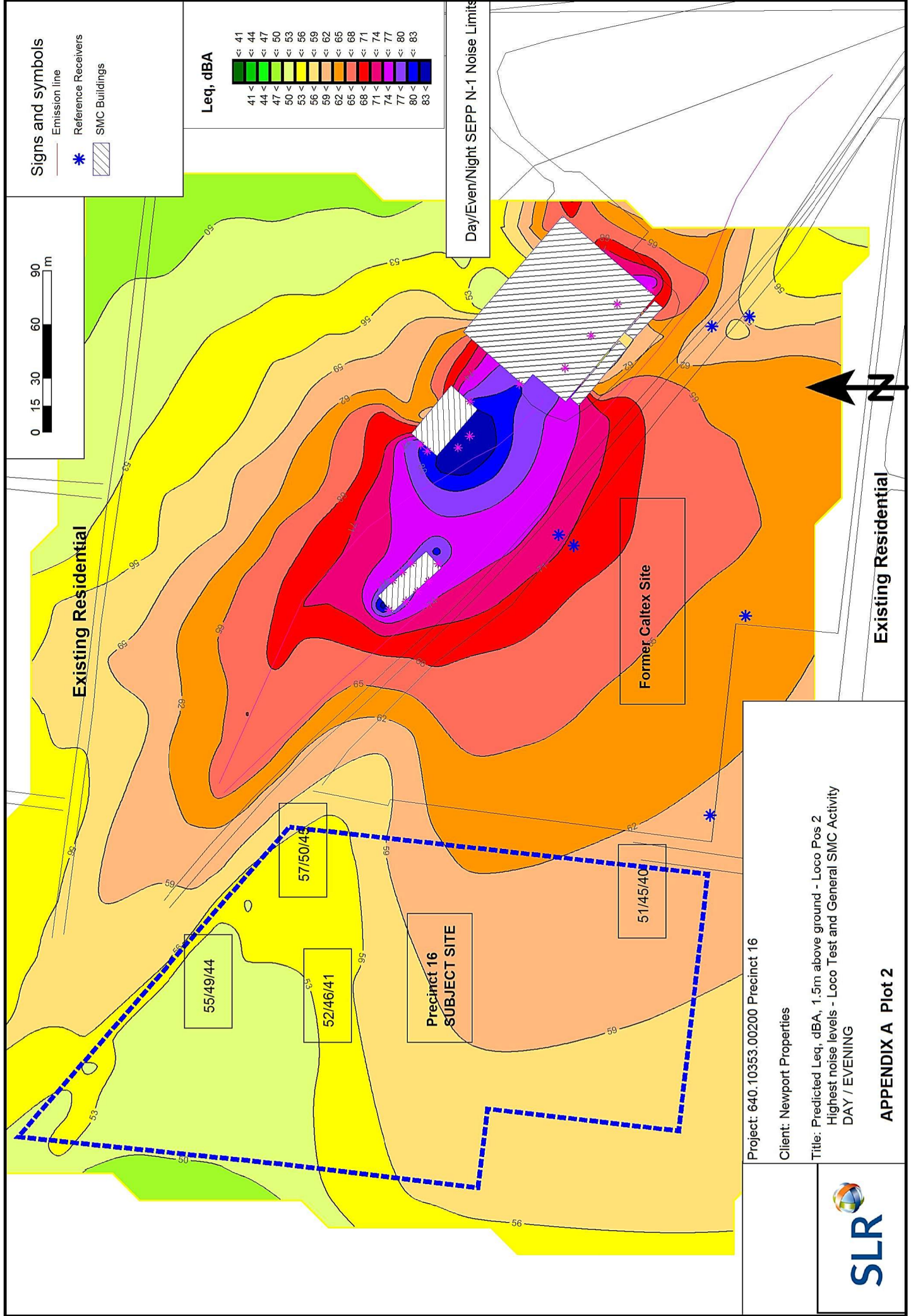
Title: Predicted Leq, dBA, 4.5m above ground - Loco Pos 3
Highest noise levels - Loco Test and General SMC Activity
North and East site boundary barrier (Precinct 16 Metro Site)
DAY / EVENING

APPENDIX A Plot 6



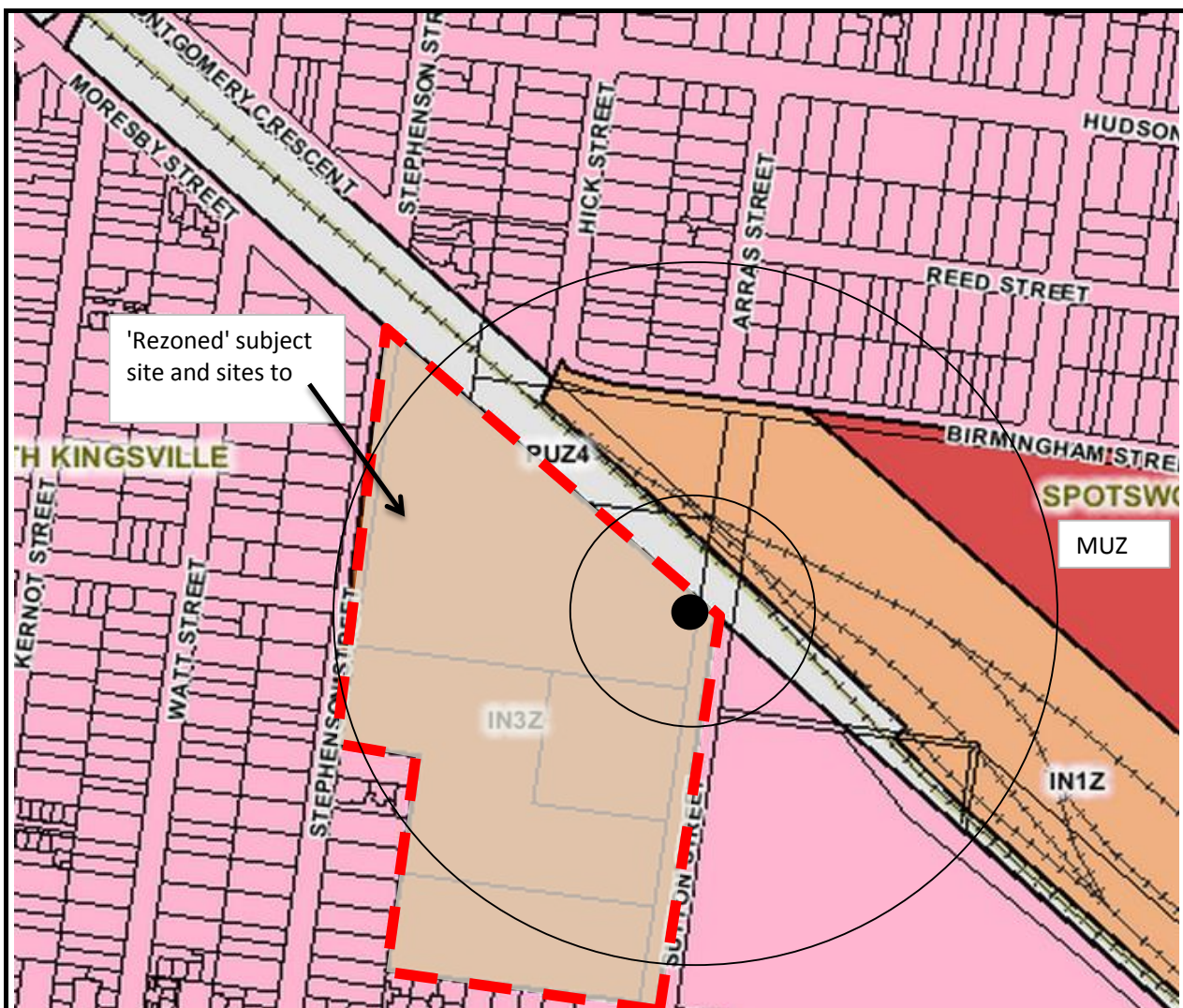






APPENDIX B

SEPP N-1 Zoning Level and Noise Limit Calculations



SEPP N-1 Zone Type

R1Z = Type 1 RCZ1 = Type 1 IN1Z = Type 3
 PUZ4 = Type 3 B1Z = Type 2 IN3Z = Type 2
 MUZ = Type 2

Period	Zoning Level dB(A)	Background Noise Level dB(A)	Noise Limit dB(A)
Day weekday (0700h-1800h)	57	Assume Neutral	57
Day Saturday (0700h-1300h)	57	Assume Neutral	57
Saturday (1300h-1800h)	50	Assume Neutral	50
Sunday (0700h-1800h)	50	Assume Neutral	50
Evening (1800h-2200h)	50	Assume Neutral	50
Night (2200h-0700h)	45	Assume Neutral	45

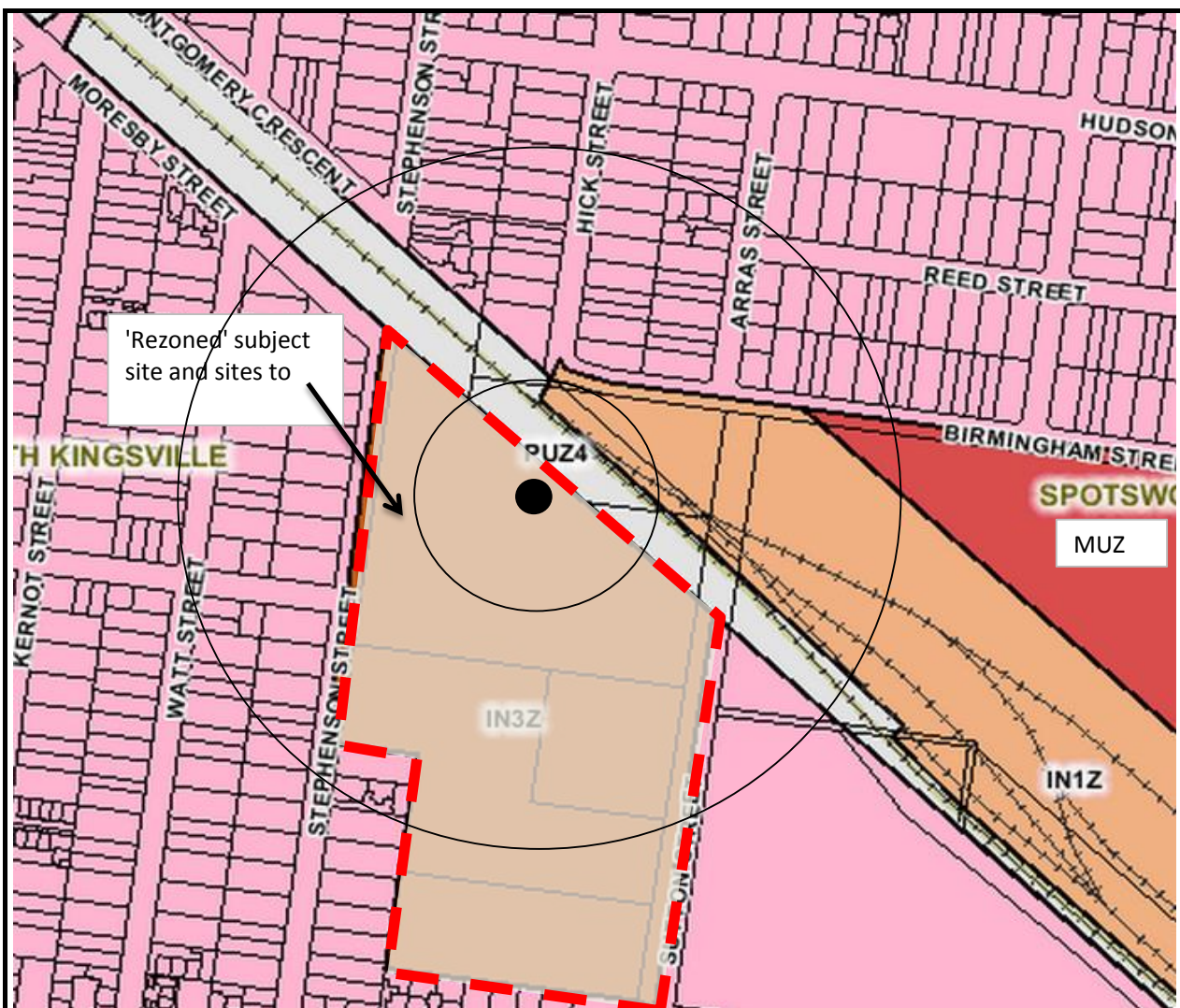


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TITLE Precinct 16 Rezoning Application
 APPENDIX B
 Zoning Circles For SEPP N-1 Zoning Level
 Calculation
 Location 1 - East end corner

DRAWN	DATE	SCALE	FILE	JOB No.	DRG. No.	REVISION
JA	2018-08-27	NTS	SEPP N-1 ZONING CIRCLE MAP3 BASIC VERSION JA.XLS	640.10353.00200	1	0



SEPP N-1 Zone Type

R1Z = Type 1 RCZ1 = Type 1 IN1Z = Type 3
 PUZ4 = Type 3 B1Z = Type 2 IN3Z = Type 2
 MUZ = Type 2

Period	Zoning Level dB(A)	Background Noise Level dB(A)	Noise Limit dB(A)
Day weekday (0700h-1800h)	55	Assume Neutral	55
Day Saturday (0700h-1300h)	55	Assume Neutral	55
Saturday (1300h-1800h)	49	Assume Neutral	49
Sunday (0700h-1800h)	49	Assume Neutral	49
Evening (1800h-2200h)	49	Assume Neutral	49
Night (2200h-0700h)	44	Assume Neutral	44

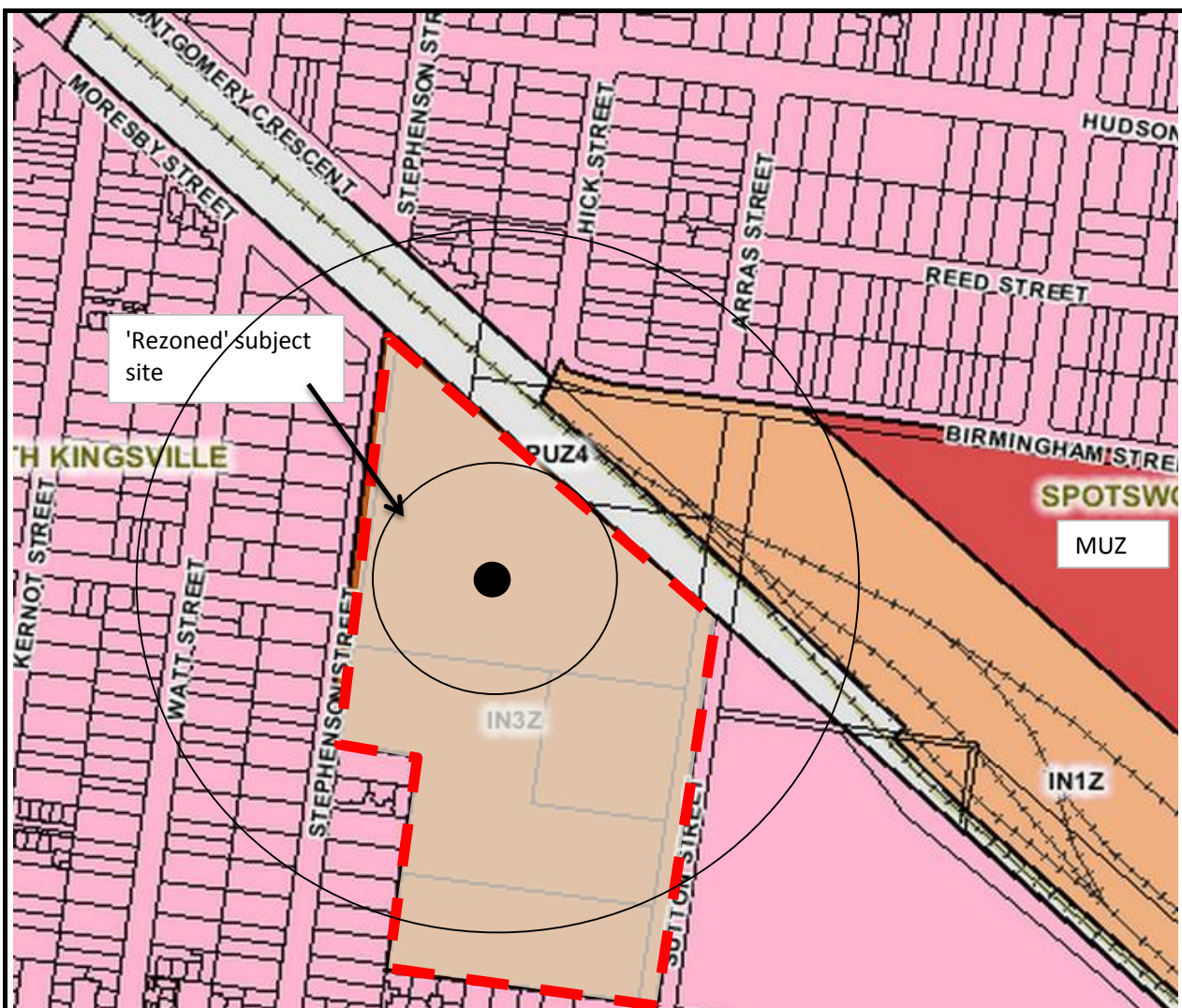


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TITLE Precinct 16 Rezoning Application
 APPENDIX B
 Zoning Circles For SEPP N-1 Zoning Level
 Calculation
 Location 2 - Near North Boundary Central
 Location

DRAWN	DATE	SCALE	FILE	JOB No.	DRG. No.	REVISION
JA	2018-08-27	NTS	SEPP N-1 ZONING CIRCLE MAP3 BASIC VERSION JA.XLS	640.10353.00200	2	0



SEPP N-1 Zone Type

R1Z = Type 1 RCZ1 = Type 1 IN1Z = Type 3
 PUZ4 = Type 3 B1Z = Type 2 IN3Z = Type 2
 MUZ = Type 2

Period	Zoning Level dB(A)	Background Noise Level dB(A)	Noise Limit dB(A)
Day weekday (0700h-1800h)	52	Assume Neutral	52
Day Saturday (0700h-1300h)	52	Assume Neutral	52
Saturday (1300h-1800h)	46	Assume Neutral	46
Sunday (0700h-1800h)	46	Assume Neutral	46
Evening (1800h-2200h)	46	Assume Neutral	46
Night (2200h-0700h)	41	Assume Neutral	41

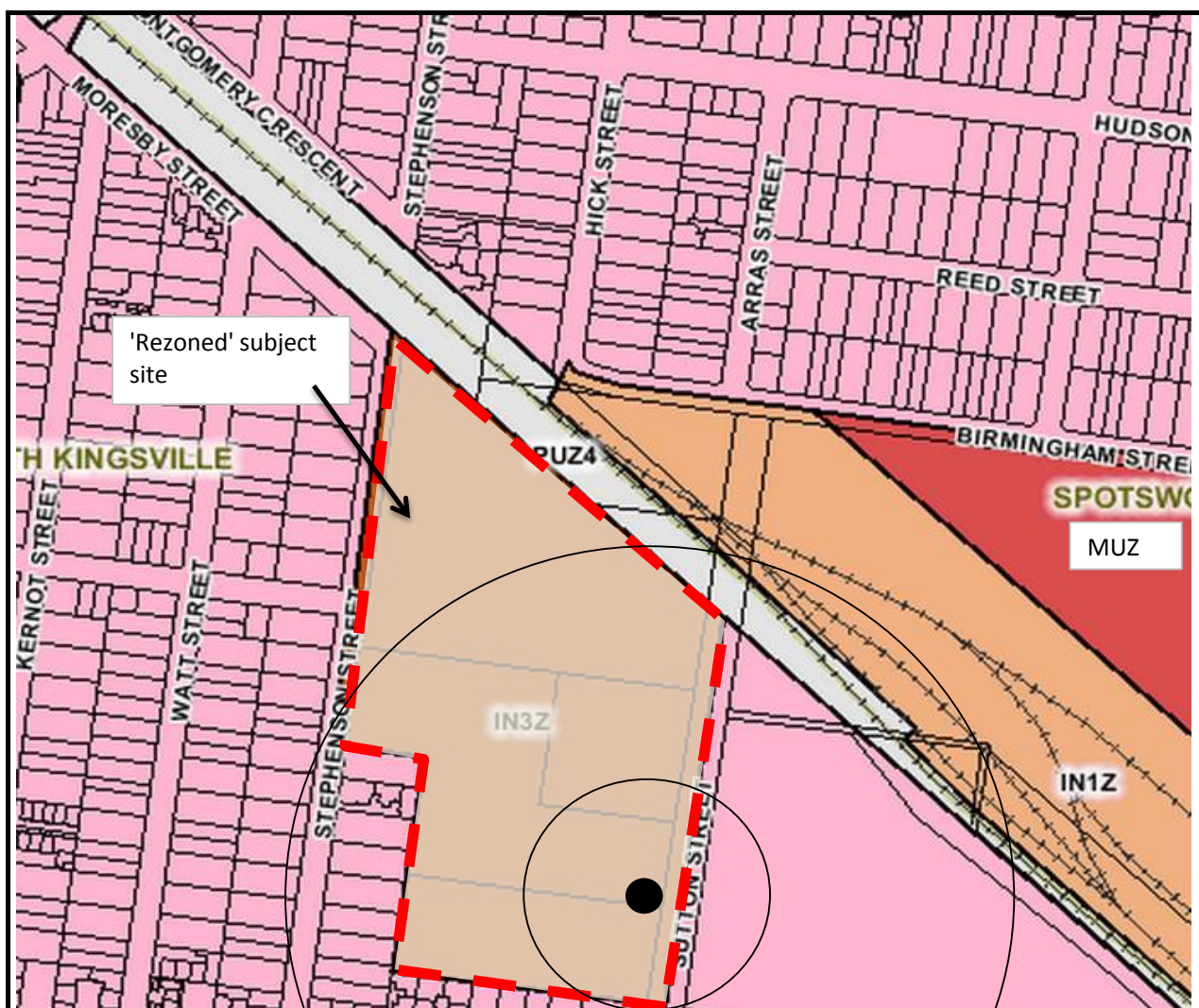


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TITLE Precinct 16 Rezoning Application
 APPENDIX B
 Zoning Circles For SEPP N-1 Zoning Level
 Calculation
 Location 3- Central Location

DRAWN	DATE	SCALE	FILE	JOB No.	DRG. No.	REVISION
JA	2018-08-27	NTS	SEPP N-1 ZONING CIRCLE MAP3 BASIC VERSION JA.XLS	640.10353.00200	3	0



SEPP N-1 Zone Type

R1Z = Type 1 RCZ1 = Type 1 IN1Z = Type 3
 PUZ4 = Type 3 B1Z = Type 2 IN3Z = Type 2
 MUZ = Type 2

Period	Zoning Level dB(A)	Background Noise Level dB(A)	Noise Limit dB(A)
Day weekday (0700h-1800h)	51	Assume Neutral	51
Day Saturday (0700h-1300h)	51	Assume Neutral	51
Saturday (1300h-1800h)	45	Assume Neutral	45
Sunday (0700h-1800h)	45	Assume Neutral	45
Evening (1800h-2200h)	45	Assume Neutral	45
Night (2200h-0700h)	40	Assume Neutral	40



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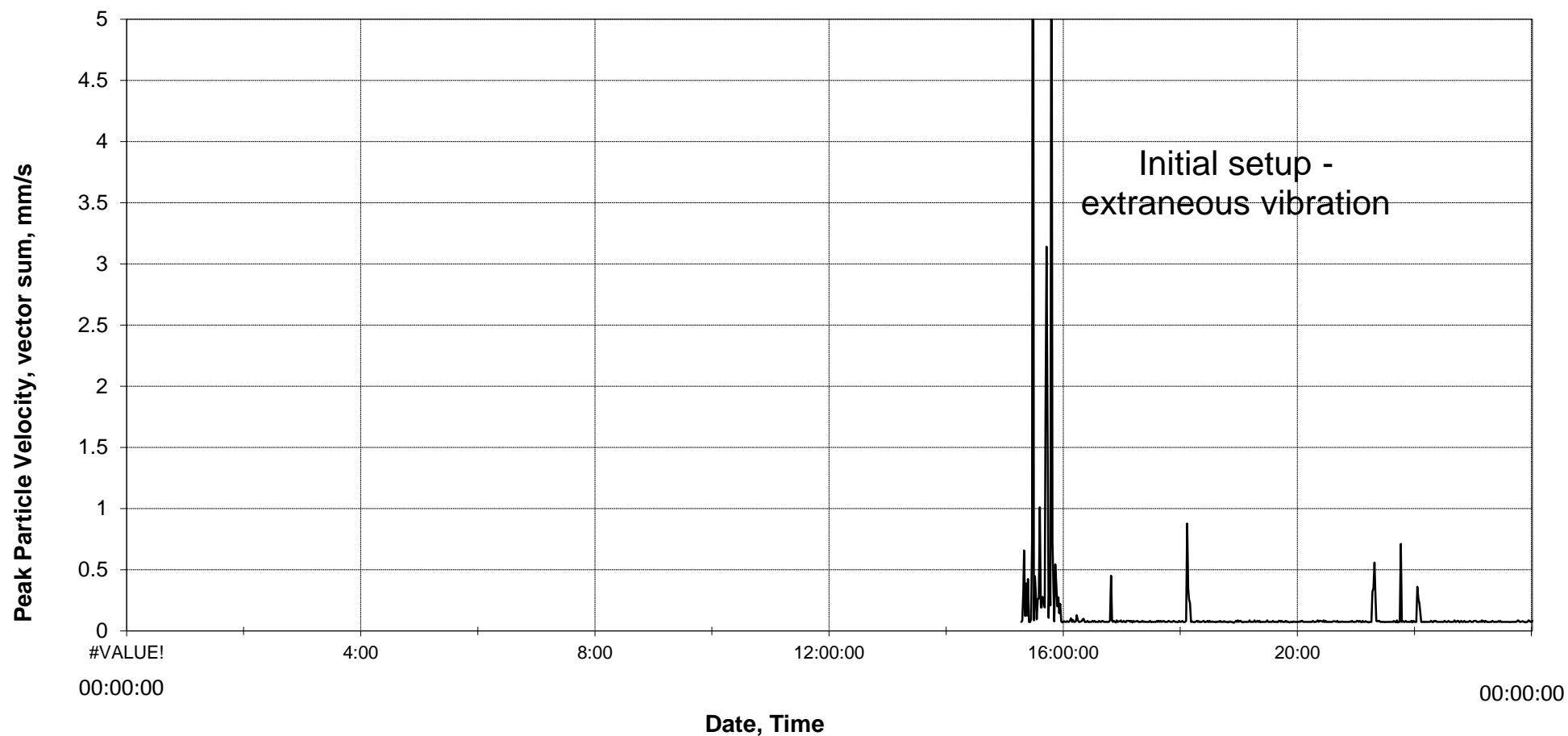
TITLE Precinct 16 Rezoning Application
 APPENDIX B
 Zoning Circles For SEPP N-1 Zoning Level
 Calculation
 Location 4- Southern Location

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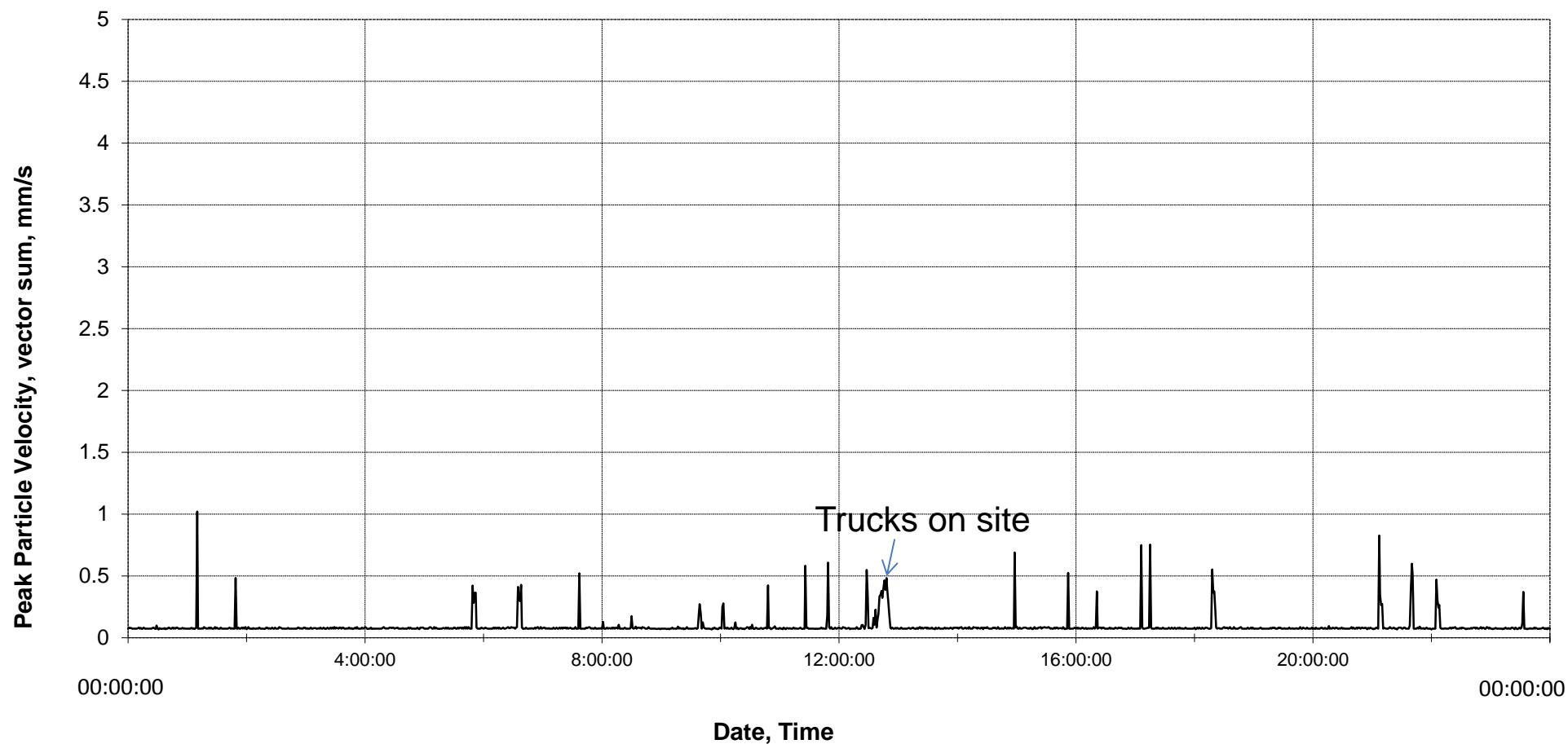
APPENDIX C

Vibration Monitoring Results

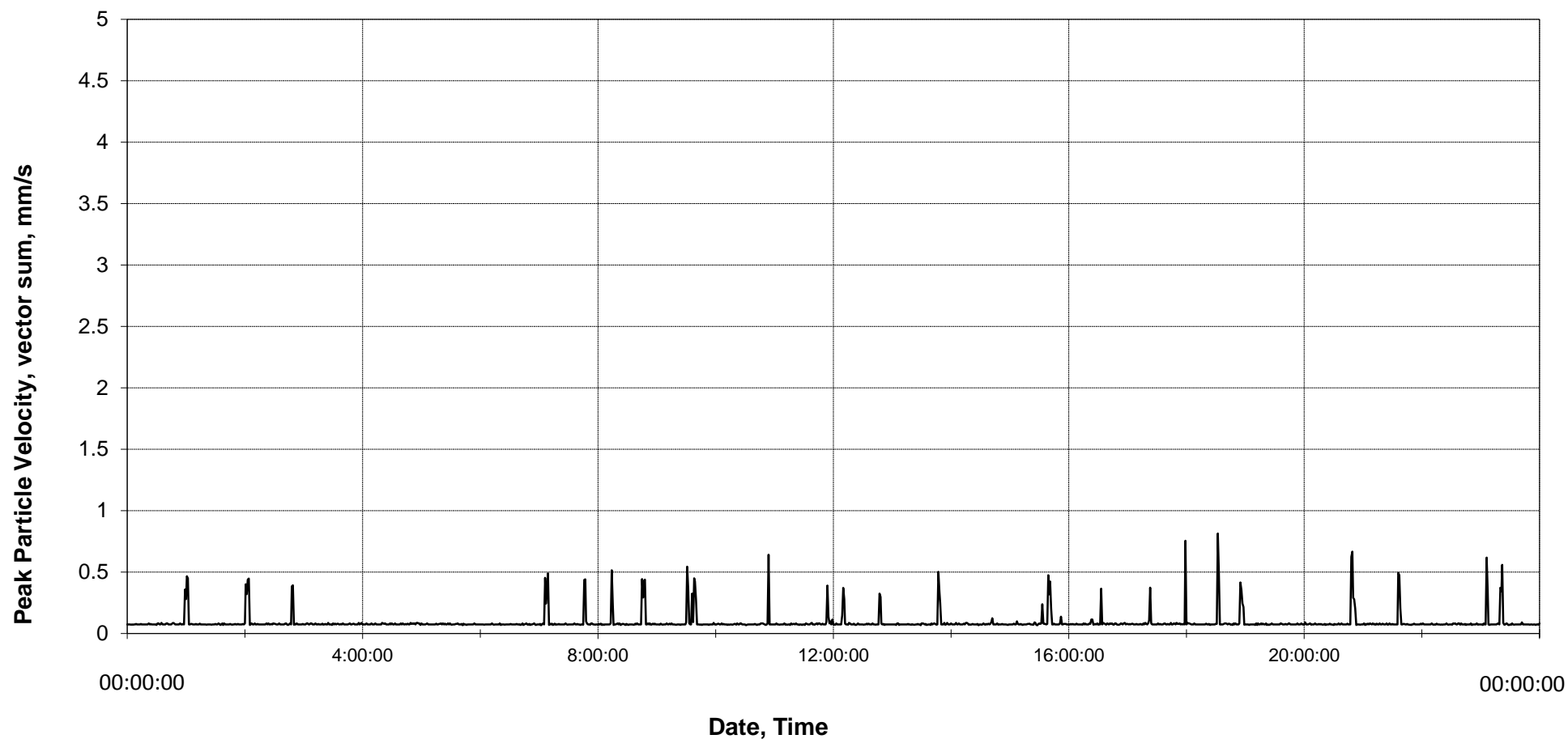
Precinct 16 - Pos1, 25m from nearest track 8 October 2014



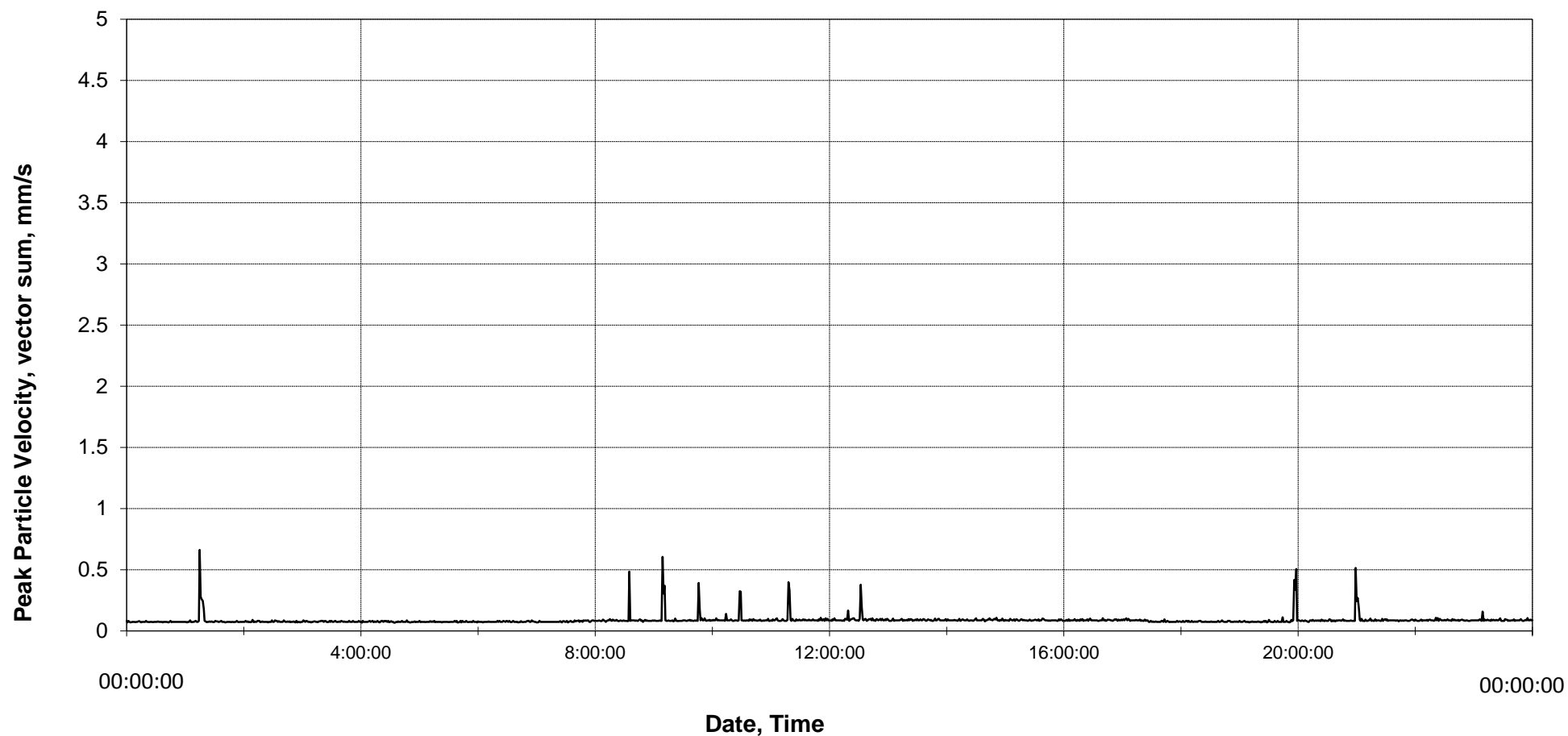
Precinct 16 - Pos1, 25m from nearest track 9 October 2014



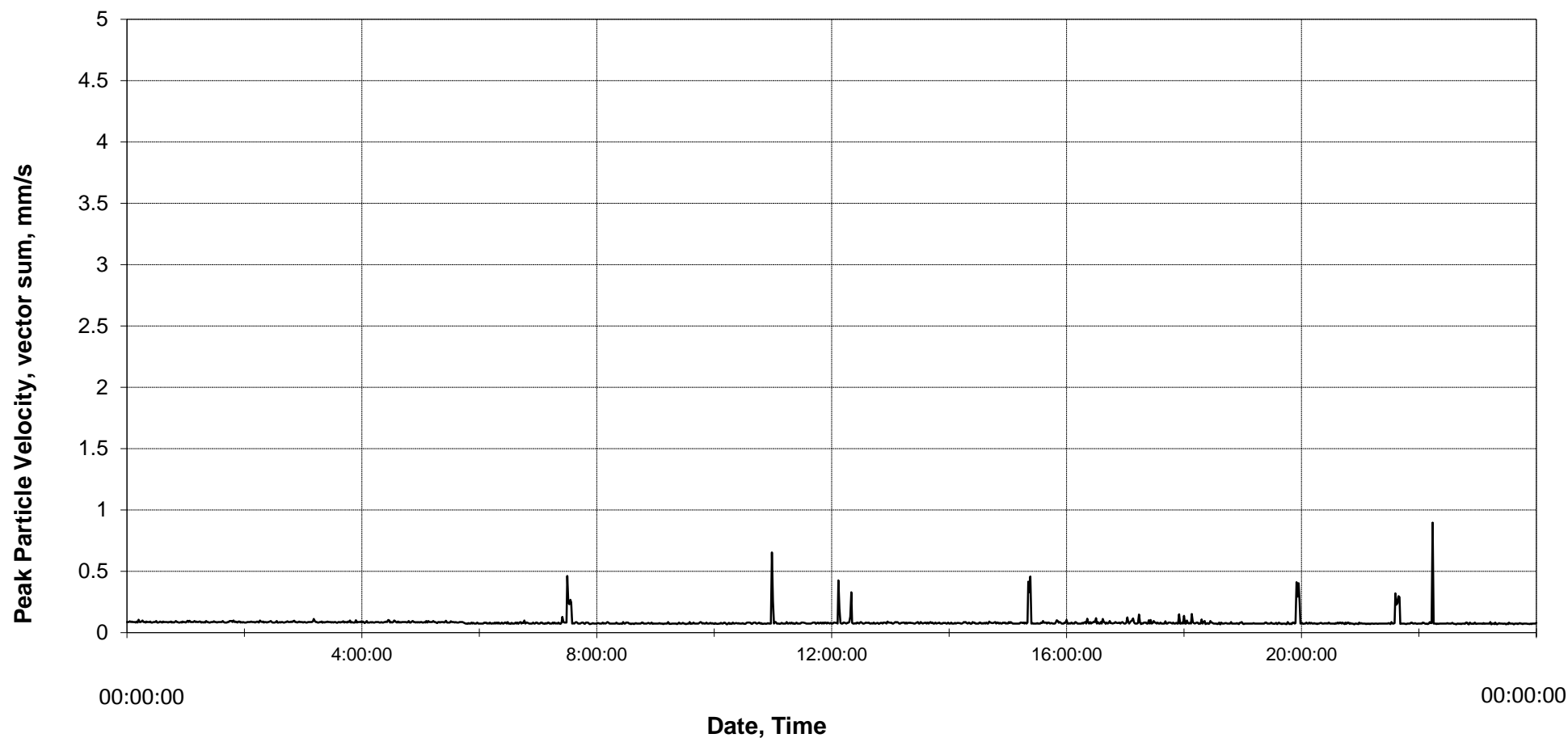
Precinct 16 - Pos1, 25m from nearest track 10 October 2014



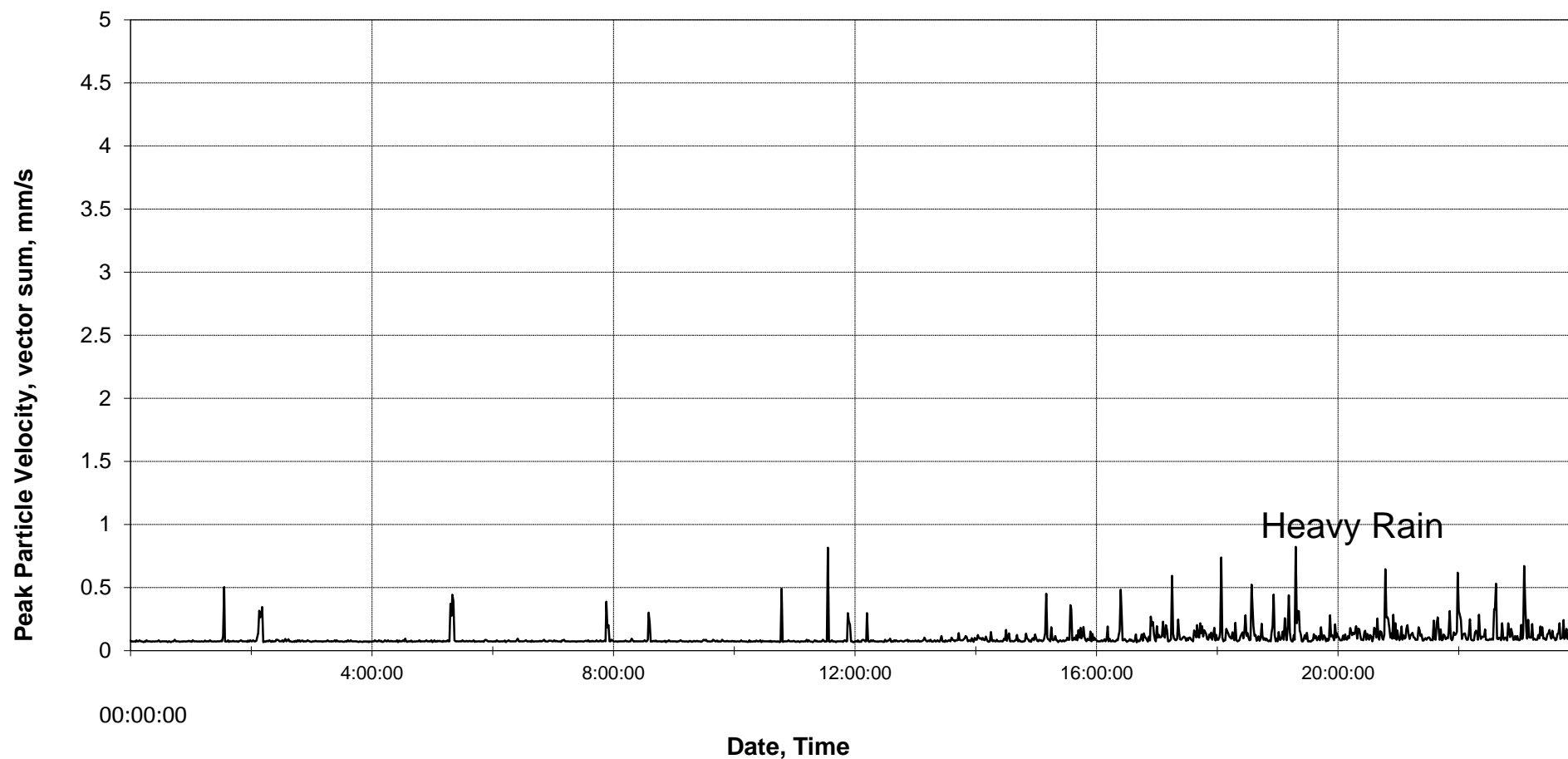
Precinct 16 - Pos1, 25m from nearest track 11 October 2014



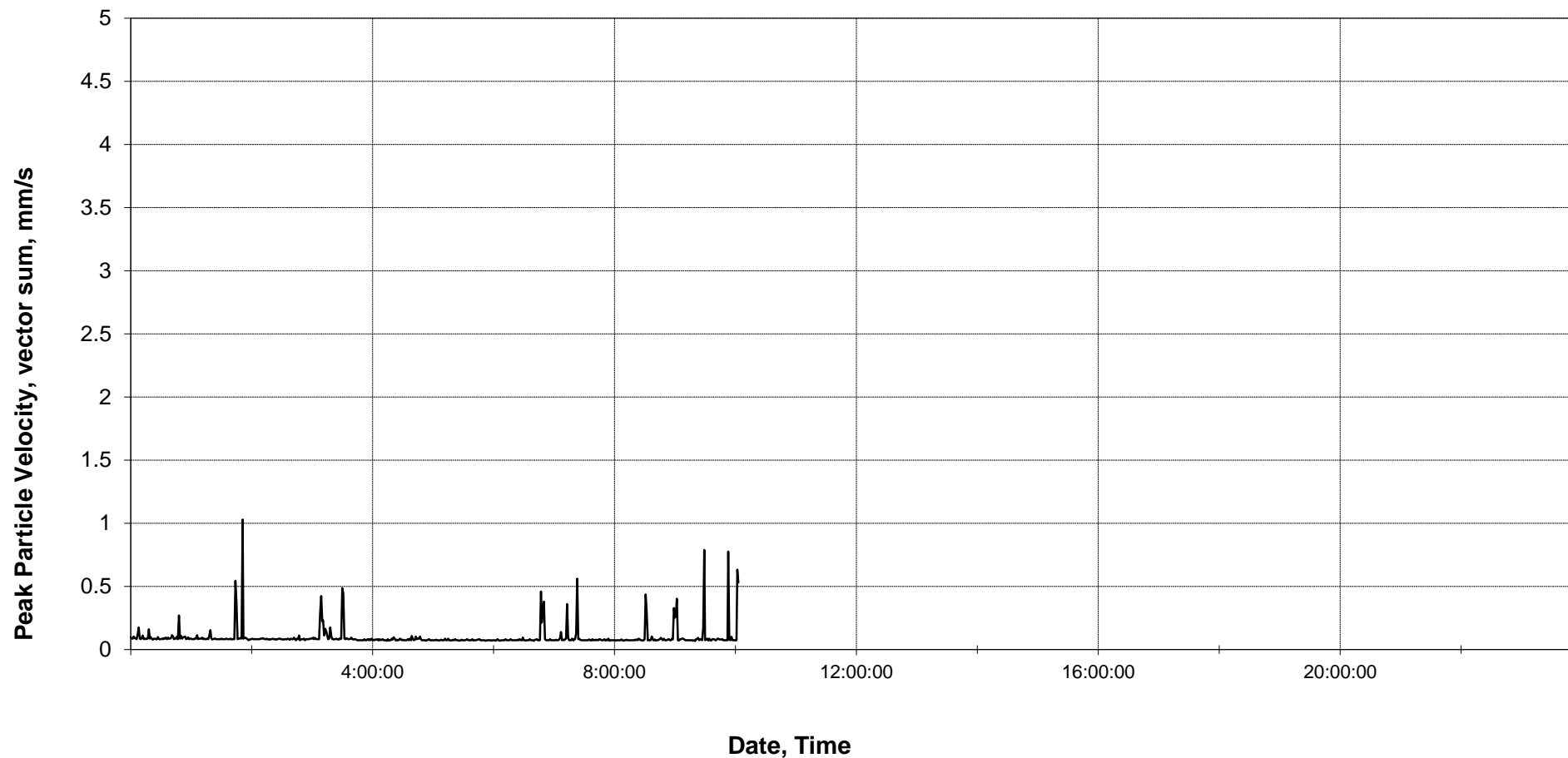
Precinct 16 - Pos1, 25m from nearest track 12 October 2014



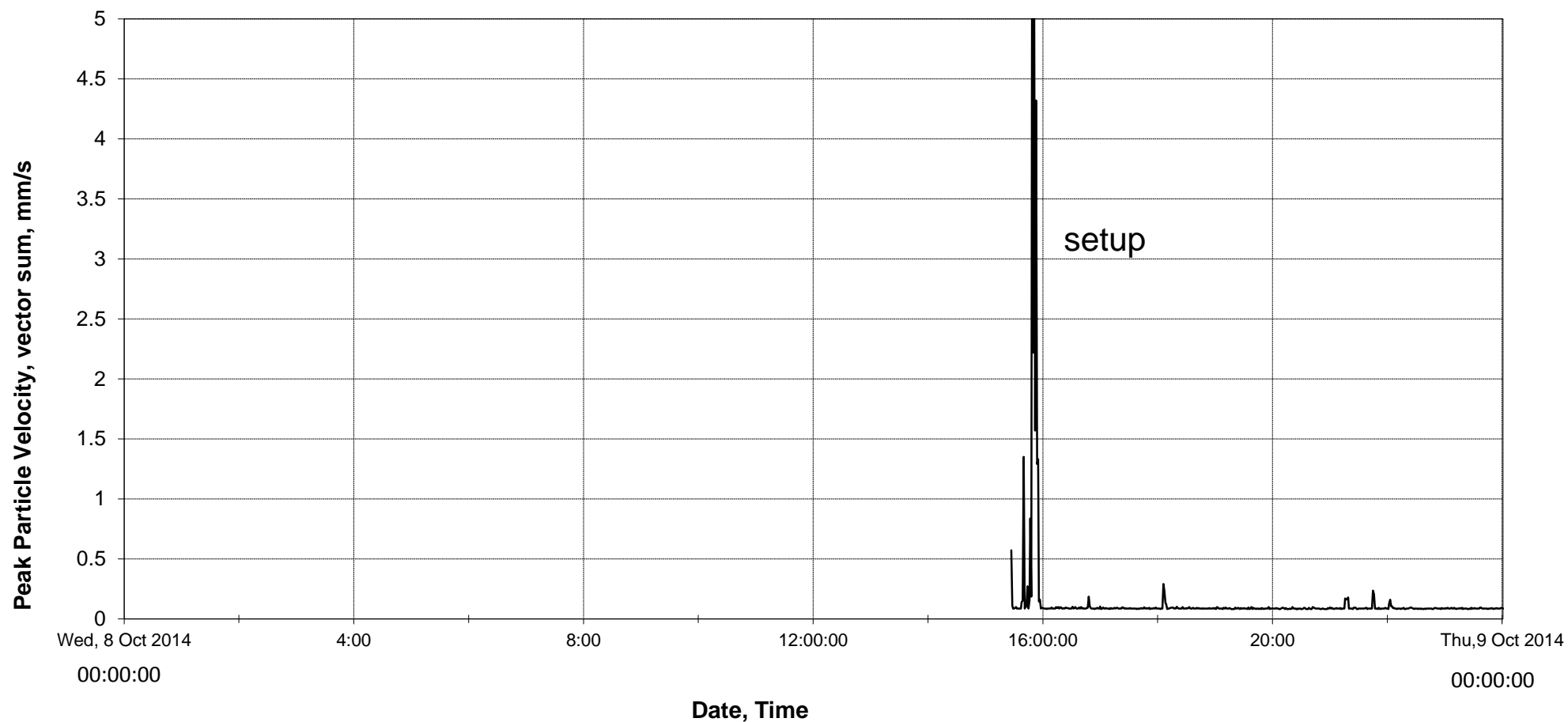
Precinct 16 - Pos1, 25m from nearest track 13 October 2014



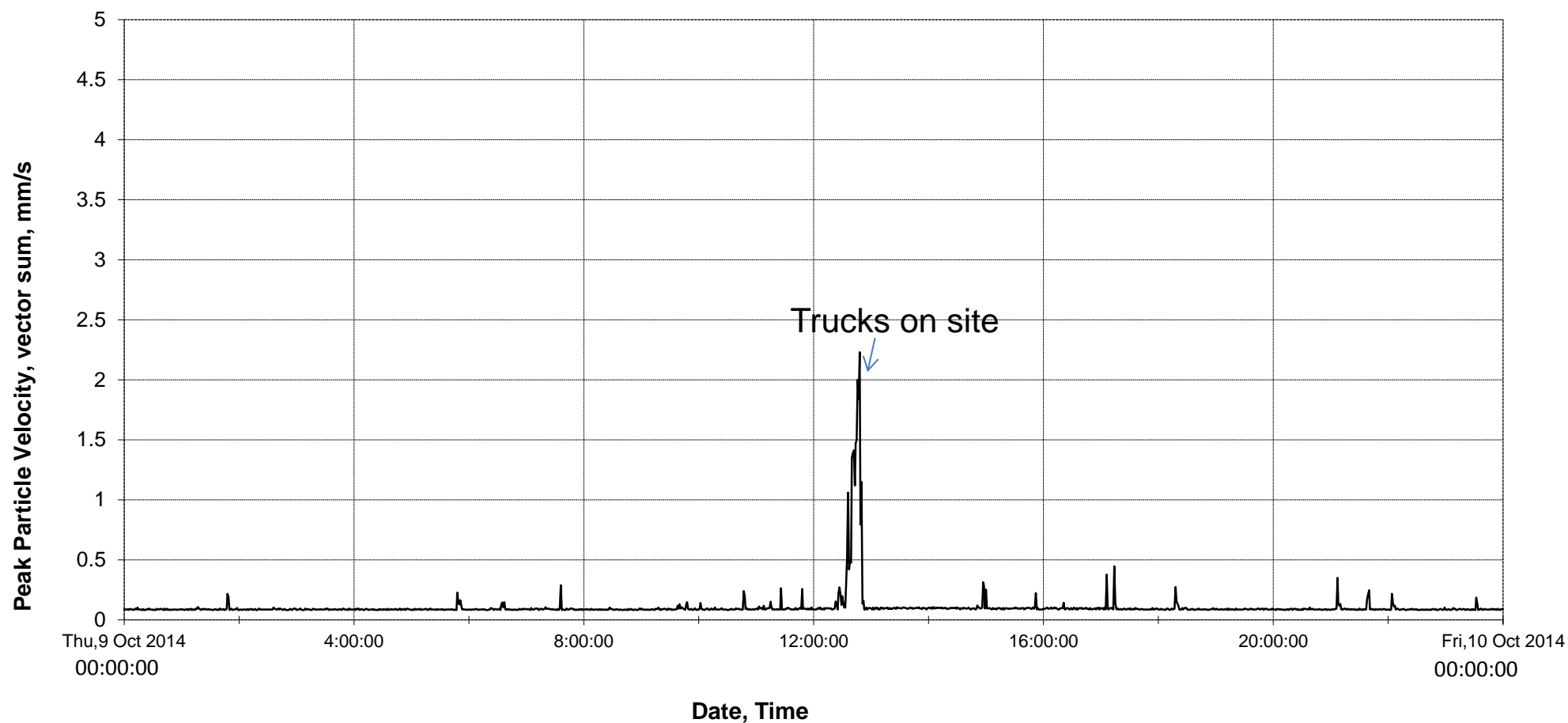
Precinct 16 - Pos1, 25m from nearest track 14 October 2014



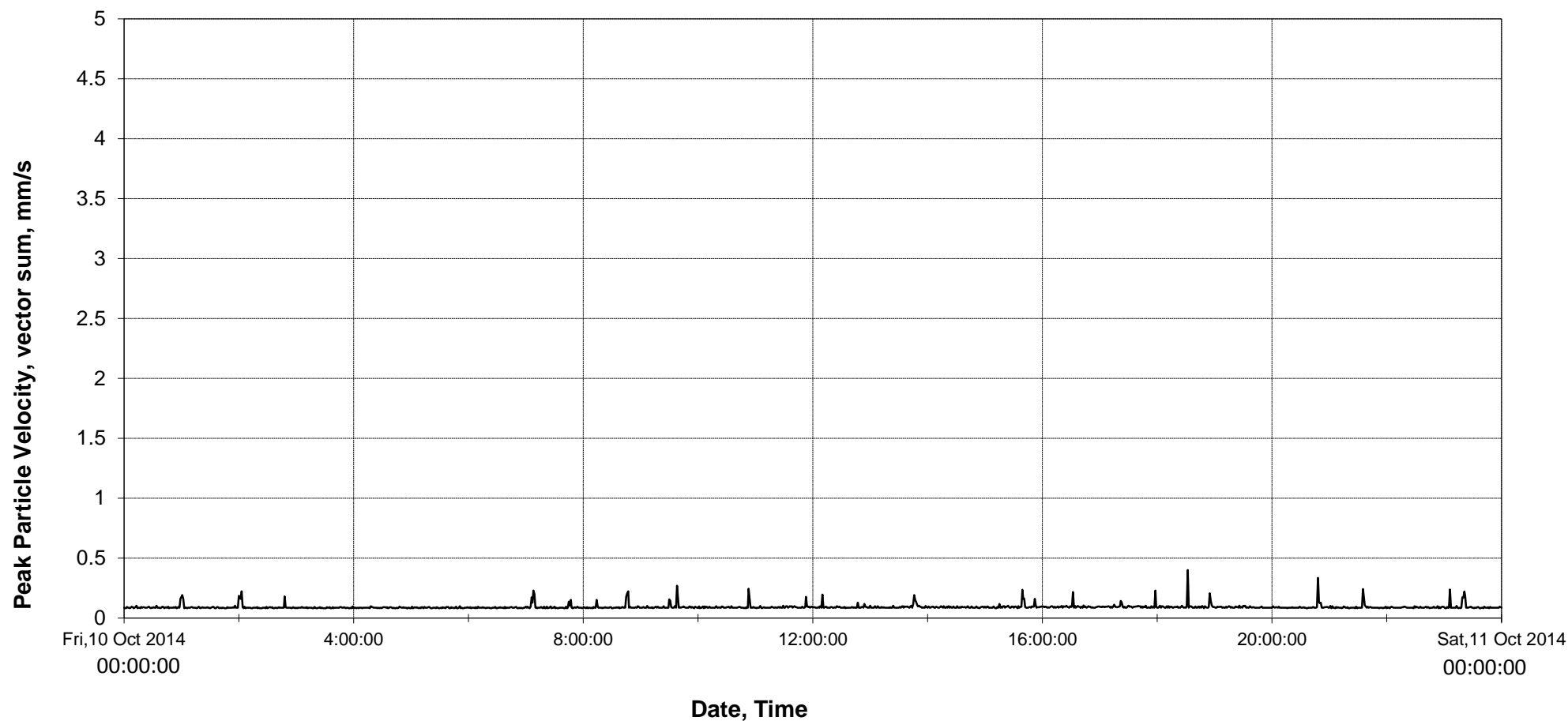
Precinct 16 - Pos2, 35m from nearest track



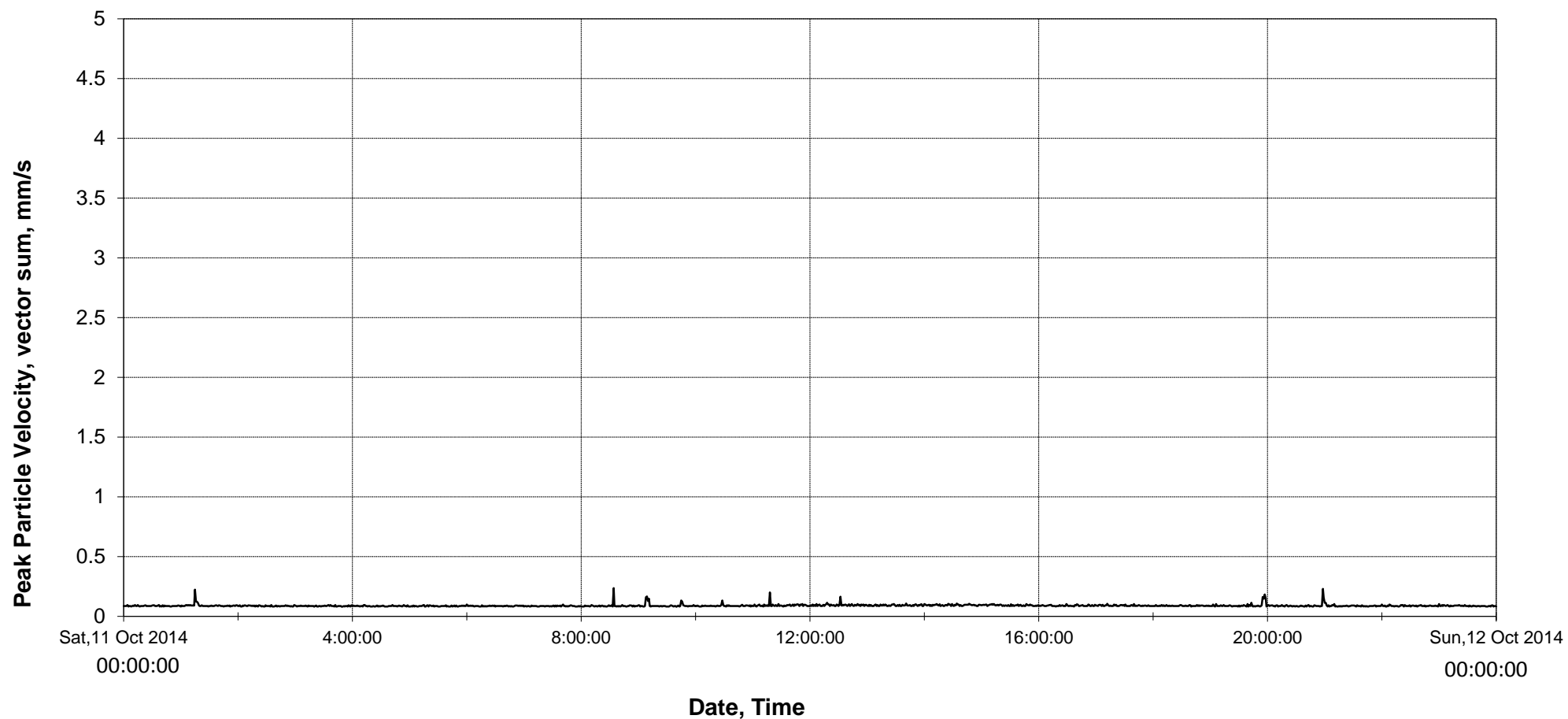
Precinct 16 - Pos2, 35m from nearest track



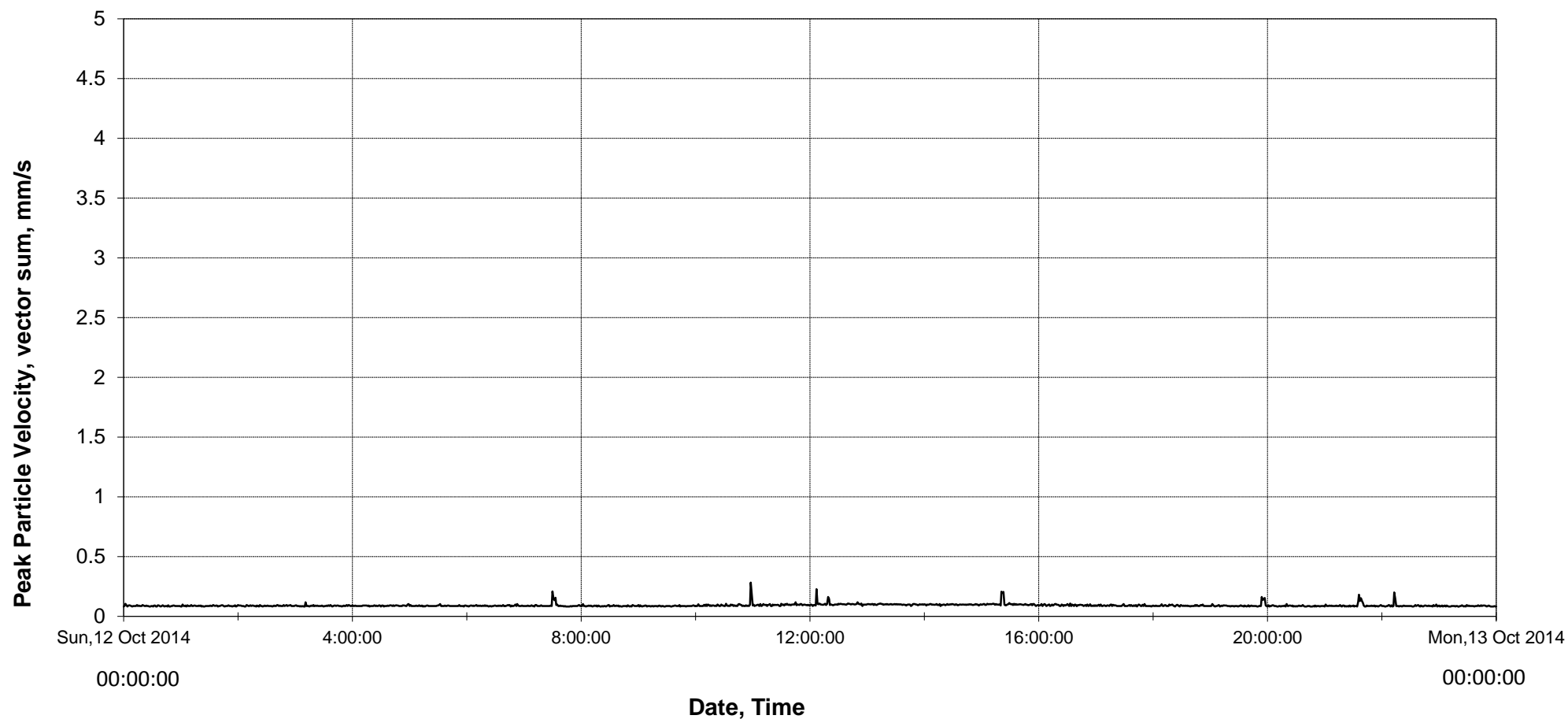
Precinct 16 - Pos2, 35m from nearest track



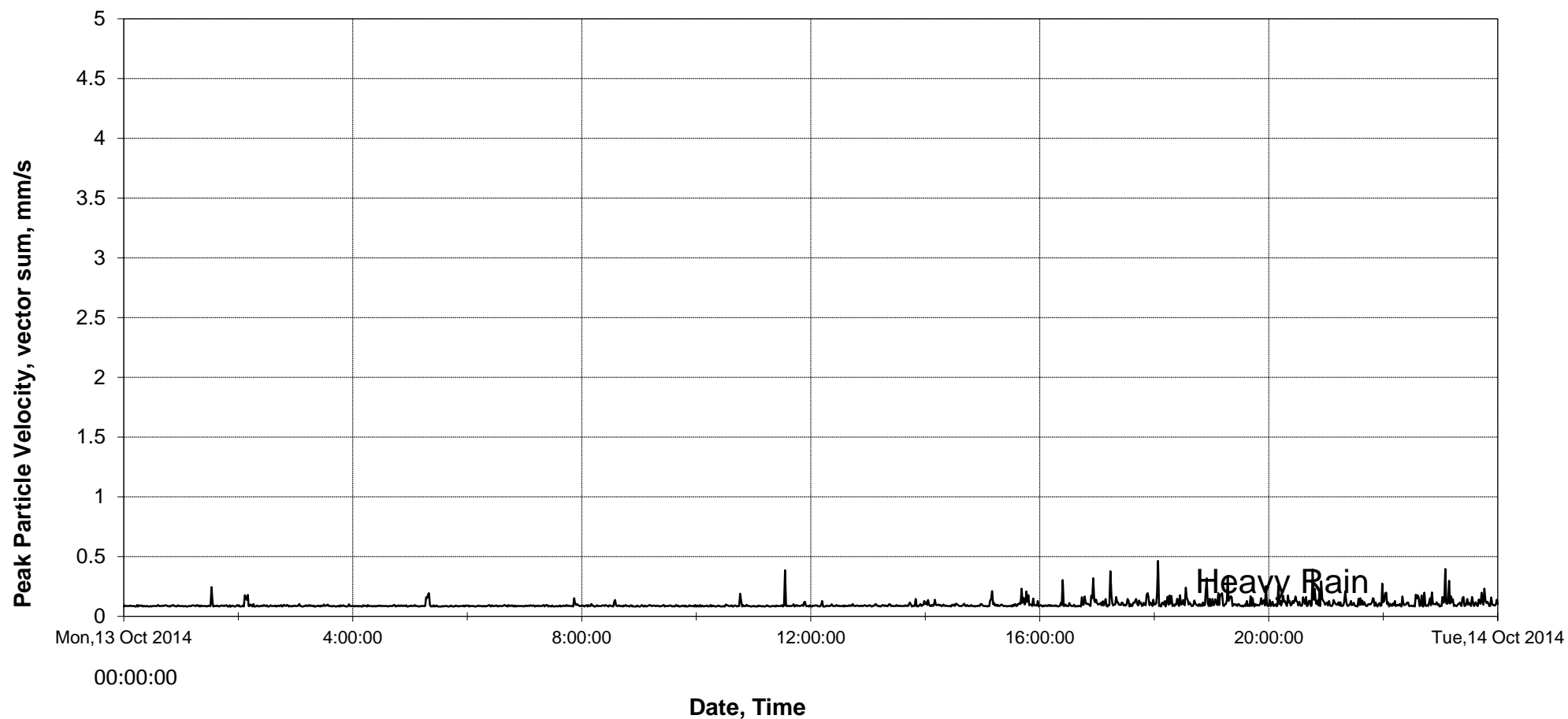
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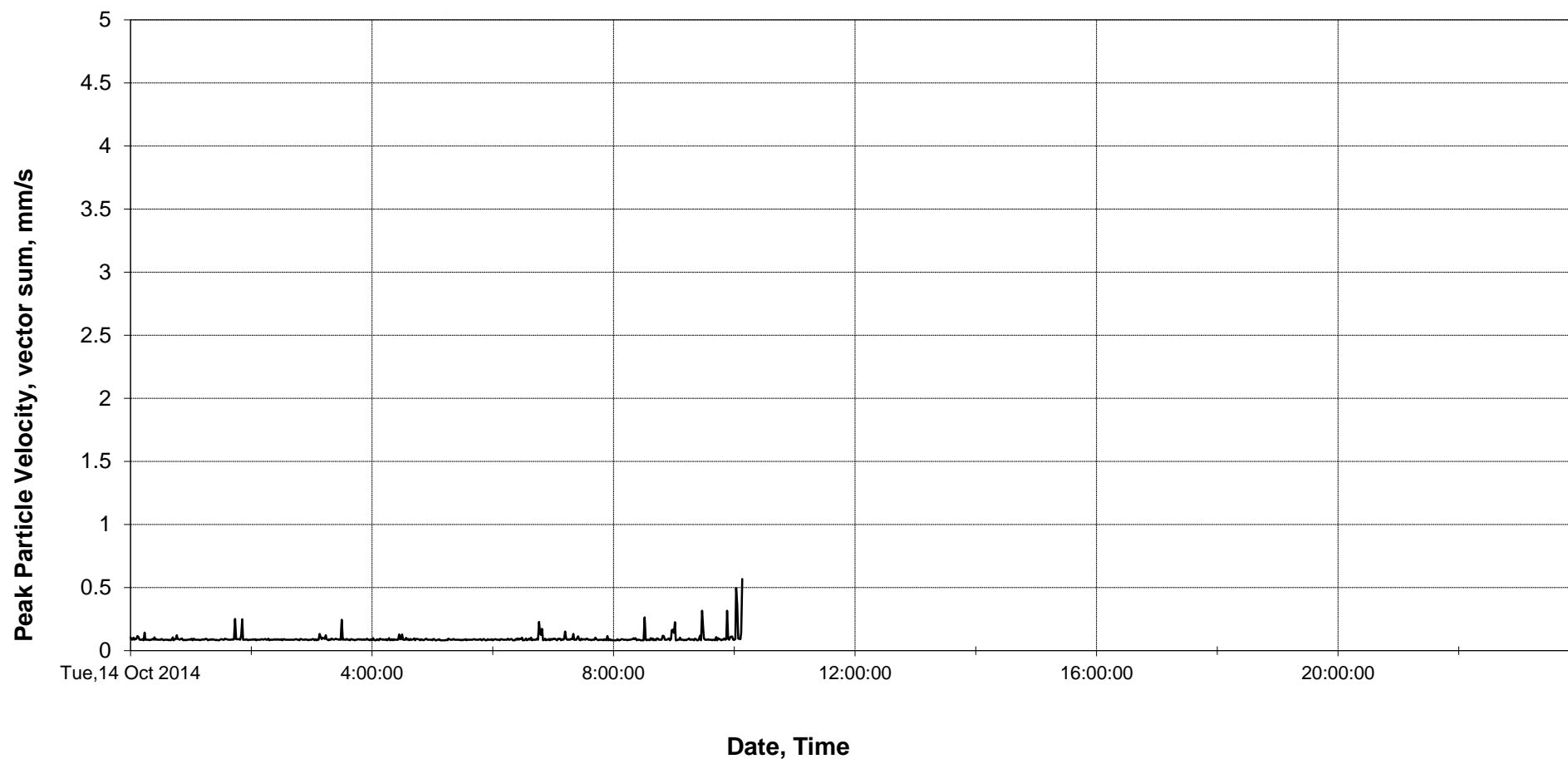
Precinct 16 - Pos2, 35m from nearest track



Precinct 16 - Pos2, 35m from nearest track



Precinct 16 - Pos2, 35m from nearest track



APPENDIX D

**SLR Memo 'Precinct 16 Rezoning application and development
plan, Able Industries preliminary assessment'**

15 November 2019

15 November 2019

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Alceon Group No. 67 Pty Ltd ATF South Kingsville Trust

Attention: Alex Kilpatrick

Dear Alex

Precinct 16 Rezoning Application and Development Plan Able Industries Preliminary Assessment

SLR Consulting Australia Pty Ltd (SLR) were retained to conduct a preliminary assessment of environmental noise from Able Industries Engineering at 5 Sutton Street, South Kingsville to quantify noise impacts to the land at 9 Sutton Street.

Attended measurements of noise were conducted along the southern boundary of 9 Sutton Street on Thursday 31 October 2019. Additionally, two unattended noise loggers with recording capabilities were deployed for the period Thursday 31 October to Thursday 7 November 2019.

1 Noise Limits

The industry is understood to operate during the SEPP N-1¹ 'day' period only. For the purpose of this preliminary assessment, the SEPP N-1 zoning levels are proposed to be used as interim noise limits.

The site is subject to rezoning, and the zoning levels will be lower if the current 'Industrial 1' zoning is replaced with residential zoning.

The relevant noise limit during the day period will depend on whether the land at 5 Sutton Street is rezoned at the same time as the re-zoning of 9 Sutton Street. The relevant limits are likely to be:

- 53 dBA, assuming the land at Able Industries Engineering retains its 'Industrial 1' zoning, and
- 51 dBA, assuming all land in Precinct 16 is rezoned 'residential' at the same time.

Given the proposed scenario, where 9 Sutton Street is residentially developed while 5 Sutton Street remains industrial, SLR have assumed that the higher noise limit of 53 dBA is likely to apply.

2 Site Observations and Measurement Results

All noise from Able Industries Engineering was observed to emanate from the northern façade of site building. The façade was constructed of sheet metal and had windows in the lower level of the façade (1 m to 3 m above ground level). The lower sections of some windows included louvres, which were open during the measurement and observation period.

¹ State Environment Protection Policy (Control of noise from commerce, industry and trade) No.N-1

The site has access roads along both the northern and southern sides of the building however only the southern access road was in use during our observations. The gate to the northern access road was shut and did not appear to have been used in recent times. Given this, there would appear to be a low level of risk of noise from truck movements along the northern access road.

Industry noise levels were in the order of 54 dBA L_{eq} during SLR's attended measurement period. The noise included both impulse and tonal characteristics, and would therefore incur corrections of approximately +4 dB, resulting in a SEPP N-1 Effective Noise Level of 58 dBA.

Analysis of selected sections of the logging data suggests that noise levels from the site were generally in the order of 54 dBA and characteristic, e.g. tonal or impulsive, consistent with our on-site observations.

The SEPP N-1 Effective Noise Level of 58 dBA is 5 dBA above the calculated SEPP N-1 daytime zoning level of 53 dBA.

3 Noise Control Options

Options for controlling noise from Able Industries to 9 Sutton Street include:

- Installation of a 3 m high permanent noise barrier along the southern boundary of 9 Sutton Street. The barrier should be constructed of an impervious material with a surface density not less than 12 kg/m². Suitable products include: 9 mm thick fibre cement sheet and 25 mm thick plywood.
- Design of dwellings on interface to incorporate acoustic protection; homes could be specifically designed to create an acoustic barrier providing protection for the site and the occupants of the homes.
- Installation of a temporary barrier along the southern boundary of 9 Sutton Street. Temporary barriers may necessitate leaving the land closest to the industry undeveloped until such time as the industry ceases operation.
- Construction of temporary barrier on the land at 5 Sutton Street, if agreed / negotiated with Able Industries.
- Staged development of the site, with the land closest to the industrial interface developed later when the industry may ultimately cease operations.
- Upgrade the sound insulation properties of the buildings at 5 Sutton Street, if agreed / negotiated with Able Industries.
- Provide specific sound insulation and treatments to the critical sources within the building at 5 Sutton Street, if agreed / negotiated with Able Industries.

In summary, there are a range of solutions that could be considered to address noise from Able Industries.

In addition it should be considered that it is possible that noise emissions from the industry could change between now and completion of the planning permit application; as such a detailed acoustic report should be prepared with the planning permit application which provides a more detailed assessment of noise from the industry and determines ultimate solutions for the site, in consultation with Able Industries.

4 Closure

A preliminary assessment of noise from Able Industries Engineering to 9 Sutton Street has been conducted. The assessment indicates that noise from the industry would be non-compliant with SEPP N-1 at the southern boundary of 9 Sutton Street unless noise control works are implemented.

A range of noise controls options have been provided for preliminary consideration. It is recommended that these should be further refined and developed as part of the planning permit application following more detailed assessment and consultation with Able Industries.

Yours sincerely



JIM ANTONOPOULOS BAPPSC MAAS
PRINCIPAL - ACOUSTICS

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