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Detailed Noise and Vibration Impact Statement (DNVIS)

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GLOSSARY

(A)- A-weighted sound level. The 'A' frequency weighting is based on the 'pure tone' equal loudness contour which is intended to account for the loudness perceived by the human ear across different frequencies.

dB – Decibel

DNVIS – Detailed Noise and Vibration Impact Statement

EPL - Environment Protection Licence under the POEO Act

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources.

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

L_{max} is the highest noise level produced during a noise event and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

NML – Noise Management Level

NCA – Noise Catchment Area

RMS – Root Mean Square

SPL – Sound Pressure Level. The pressure level of a sound, in decibels, when measured at any distance from the sound source.

SWL – Sound Power Level. The total acoustic energy emitted by a sound source.

1 INTRODUCTION

Acoustic Logic have been engaged to provide Noise and Vibration Management Plan for the construction works associated with the commercial building proposed for 30 Harris Street, St Mary's to satisfy Condition of Consent (SSI 10051) that will be used to manage noise and vibration emissions associated with the proposed works.

The Plan:

- Review noise /vibration requirements of EIS Sydney Metro Construction Noise and Vibration Standard dated 08/09/2020 for Sydney Metro Western Sydney Airport.
- Identifies sensitive receivers that are likely to be impacted by the proposed works.
- Develops project specific noise and vibration management levels. These will be used to indicate whether additional mitigation of impacts, beyond normal "good practice", is indicated.
- Identifies the major noise and vibration sources that will be present on the construction site, and additional construction-related traffic generated by the development.
- Predicts the likely noise and vibration levels during the phases of construction and assesses these against the established management levels. Where the predicted impacts exceed the management levels, the Plan identifies and assesses potential measures to minimise these impacts using the methodology in the IGNG.
- Makes project specific recommendations.
- Provides general recommendations for the ongoing monitoring, assessment and management of noise and vibration emissions as the works progress in response to additional information and site conditions, and the updating of the Plan to reflect additional information obtained during the construction period.

The subject site and local context are indicated in Section 2.

Where the term "construction" is used in this Plan, it includes excavation and any other site activity related to the construction of the development being assessed.

This Plan has been prepared for the sole purpose as stated above and should not be used or relied on for any other purpose.

2 SITE DESCRIPTION

The aim of the St Marys SSTOM Project office (SPO) is to establish a building to accommodate the integrated project teams for SM-WSA at Harris Street St Marys, near St Marys station, during construction of the Project.

This building will seat around 200 people to support Sydney Metro and Stations, Systems, Trains, Operations, Maintenance (SSTOM) contractor staff. The building has planning approval as an ancillary facility used for the construction of the Critical State Significant Infrastructure (CSSI) 10051. Car parking for the building is expected to be located around 120m to the east of the building at a site identified on Harris Street.

The building will accommodate SSTOM contractor staff, SSTOM Independent Certifier staff, and Sydney Metro staff who will have separate tenancies with workstations and meeting rooms. The three parties will also share a large common area on the ground floor comprising of a reception, lunch area and additional meeting rooms.

The SPO is planned to be operational in early 2023.

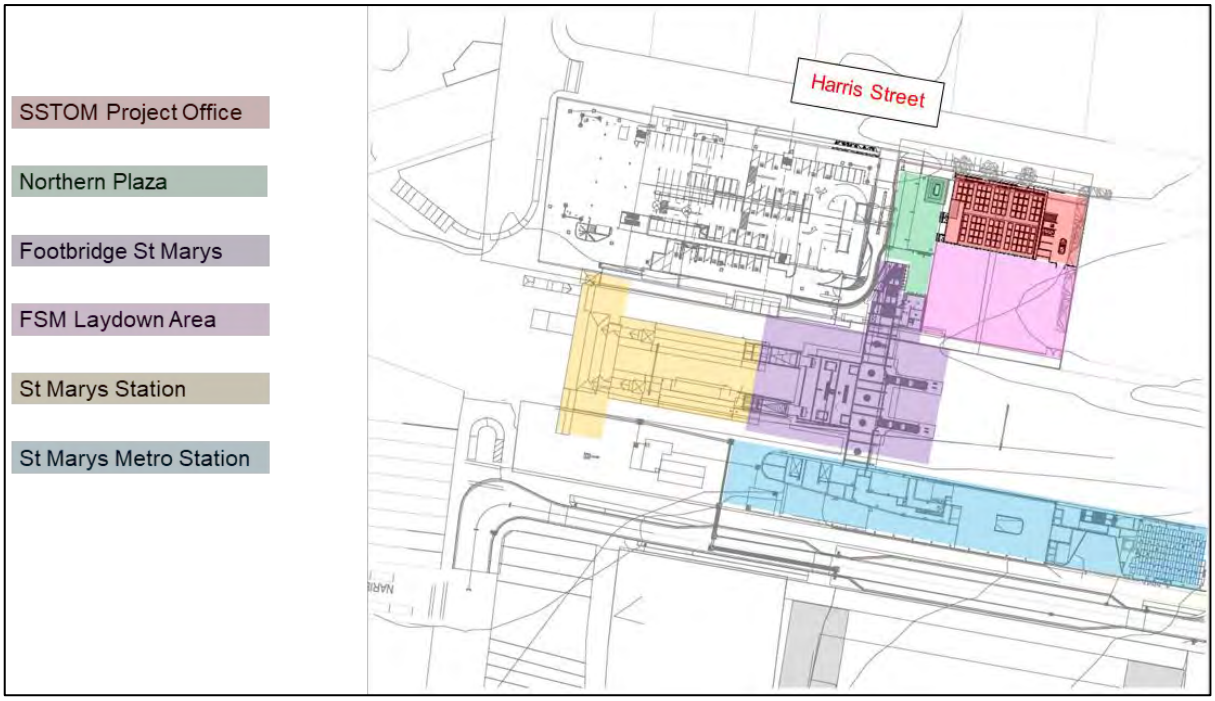


Figure 1 Project Site

The project site is located at 30 Harris Street, North St Marys. A site investigation has been carried out by this office which indicates that the existing ambient environment is dominated by rail and traffic noise from the nearby rail and public roads. It is also noticed that the construction noise from a nearby work site across the rail corridor to the south.

The nearest noise and vibration receivers are found as below, other receivers are further distance away from the project site and our review indicates that the noise /vibration impact to other receivers are less than the main receivers below.

- **R1**: 24 Harris Street, neighbouring industrial receiver to the east, approximately 10m away:
- **R2**: 25 Harris Street, industrial receiver across Harris St to the north, approximately 25m away.
- **R3**: Residential flat buildings along Station Street approximately 130m to the southeast.

An aerial photo of the site, monitoring locations and surrounding receivers is shown in Figure 2 below**.**

Figure 2 - Site Map and The Nearest Receiver Locations

3 DEVELOPMENT CONSENT CONDITIONS (SSI-10051)

Approved Construction Hours

Construction Hours

E38 Work must only be undertaken during the following hours:

(a) 7:00am to 6:00pm Mondays to Fridays, inclusive;
(b) 8:00am to 1:00pm Saturdays; and
(c) at no time on Sundays or public holidays.

This detailed noise and vibration impact statement has been prepared to satisfy condition E47 below:

E47 **Detailed Noise and Vibration Impact Statements (DNVIS)** must be prepared for any work that may exceed the NMLs, vibration criteria and / or ground-borne noise levels specified in Conditions E43 and E44 at any residence outside construction hours identified in Condition E38, or where receivers will be highly noise affected or subject to vibration levels above those otherwise determined as appropriate by a suitably qualified structural engineer under Condition E87. The DNVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the works. A copy of the DNVIS must be provided to the ER before the commencement of the associated works. The Planning Secretary and the EPA may request a copy (ies) of the DNVIS.

Other relevant conditions relating to construction noise and vibration are summarised below:

Land Use Survey

E37 A detailed land use survey must be undertaken to confirm sensitive land use(s) (including critical working areas such as operating theatres and precision laboratories) potentially exposed to construction noise and vibration and construction ground-borne noise. The survey may be undertaken on a progressive basis but must be undertaken in any one area before the commencement of work which generates construction noise, vibration or ground-borne noise in that area. The results of the survey must be included in the Detailed Noise and Vibration Impact Statements required under Condition E47.

Highly Noise Intensive Work

E39 Except as permitted by an EPL or approved in accordance with the Out-of-Hours Works Protocol required by Condition E42, highly noise intensive work that result in an exceedance of the applicable NML at the same receiver must only be undertaken:

(a) between the hours of 8:00 am to 6:00 pm Monday to Friday;
(b) between the hours of 8:00 am to 1:00 pm Saturday; and
(c) if continuously, then not exceeding three (3) hours, with a minimum cessation of work of not less than one (1) hour.

For the purposes of this condition, 'continuously' includes any period during which there is less than one (1) hour between ceasing and recommencing any of the work.

E40 This approval does not permit blasting.

Variation to Work Hours

E41 Notwithstanding Conditions E38 and E39 work may be undertaken outside the hours specified in the following circumstances:

(a) Safety and Emergencies, including:
(i) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or

(ii) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or

(b) Low impact, including:

(i) construction that causes LAeq(15 minute) noise levels:

- *no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and*
- *no more than the 'Noise affected' NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and*

(ii) construction that causes:

- *continuous or impulsive vibration values, measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), or*
- *intermittent vibration values measured at the most affected residence are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006); or*

(c) By Approval, including:

(i) where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or

(ii) works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition E42; or

(iii) negotiated agreements with directly affected residents and sensitive land user(s); or

(d) By Prescribed Activity, including:

(i) tunnelling and ancillary support activities (excluding cut and cover tunnelling and surface works not directly supporting tunneling) are permitted 24 hours a day, seven days a week; or

(ii) grout batching at the Orchard Hills construction site is permitted 24 hours per day, seven days per week; or

(iii) delivery of material that is required to be delivered outside of standard construction hours in Condition E38 to directly support tunnelling activities, except between the hours 10:00 pm and 7:00 am to / from the Orchard Hills ancillary facility; or

(iv) haulage of spoil generated through tunnelling is permitted 24 hours per day, seven days per week except between the hours of 10:00 pm and 7:00 am to / from the Orchard Hills construction site; or

(v) works within an acoustic enclosure are permitted 24 hours a day, seven days a week where there is no exceedance of noise levels or intermittent vibration levels under Low impact circumstances identified in Condition E41(b), unless otherwise agreed with the Planning Secretary; or

(vi) tunnel and underground station box fit out works are permitted 24 hours per day, seven days per week.

Out-of-Hours Work Protocol – Work not subject to an EPL

E42 An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of work (not subject to an EPL) that is outside the hours defined in Conditions E38 and E39. The Protocol must be approved by the Planning Secretary before commencement of the out-of-hours work. The Protocol must be prepared in consultation with the ER. The Protocol must provide:

(a) justification for why out-of-hours work need to occur;

(b) identification of low and high-risk activities and an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where:

(i) the ER reviews all proposed out-of-hours activities and confirms their risk levels;

(ii) low risk activities that can be approved by the ER; and

(iii) high risk activities that are approved by the Planning Secretary;

(c) a process for the consideration of out-of-hours work against the relevant NML and vibration criteria;

(d) a process for selecting and implementing mitigation measures for residual impacts in consultation with the community at each affected location, including respite periods consistent with the requirements of Condition E56. The measures must take into account the predicted noise levels and the likely frequency and duration of the out-of-hours works that sensitive land user(s) would be exposed to, including the number of noise awakening events;

(e) procedures to facilitate the coordination of out-of-hours work including those approved by an EPL or undertaken by a third party, to ensure appropriate respite is provided; and

(f) notification arrangements for affected receivers for all approved out-of-hours works and notification to the Planning Secretary of approved low risk out-of-hours works.

This condition does not apply if the requirements of Condition E41 are met.

Note: Out-of-hours work is any work that occurs outside the construction hours identified in Condition E38 and E39.

Construction Noise Management Levels and Vibration Criteria

E43 Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration criteria:

(a) construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009);
(b) preferred vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure);
(c) Australian Standard AS 2187.2 - 2006 "Explosives - Storage and Use - Use of Explosives" (for human exposure);
(d) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and
(e) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage).

Any work identified as exceeding the noise management levels and / or vibration criteria must be managed in accordance with the Noise and Vibration CEMP Sub-plan.

Note: The ICNG identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction Noise Management Level.

E45 Noise generating work in the vicinity of potentially-affected community, religious, educational institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the NMLs must not be timetabled within sensitive periods, unless other reasonable arrangements with the affected institutions are made at no cost to the affected institution.

Construction Noise and Vibration Mitigation and Management

E46 Industry best practice construction methods must be implemented where reasonably practicable to ensure that noise and vibration levels are minimised around sensitive land use(s). Practices may include, but are not limited to:

(a) use of regularly serviced low sound power equipment;
(b) at source control, temporary noise barriers (including the arrangement of plant and equipment) around noisy equipment and activities such as rock hammering and concrete cutting;
(c) use of non-tonal reversing alarms; and
(d) use of alternative construction and demolition techniques.

E48 Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before works that generate vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers must be provided a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Sub-plan.

Out-of-Hours Works – Community Consultation on Respite

E57 *In order to undertake out-of-hours work outside the work hours specified under Condition E38, appropriate respite periods for the out-of-hours work must be identified in consultation with the community at each affected location on a regular basis. This consultation must include (but not be limited to) providing the community with:*

(a) a progressive schedule for periods no less than three (3) months, of likely out-of-hours work;
(b) a description of the potential work, location and duration of the out-of-hours work;
(c) the noise characteristics and likely noise levels of the work; and
(d) likely mitigation and management measures which aim to achieve the relevant NMLs under Condition E43 (including the circumstances of when respite or relocation offers will be available and details about how the affected community can access these offers).

The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour work must be provided to the ER, EPA and the Planning Secretary prior to the out-of-hours work commencing.

Note: *Respite periods can be any combination of days or hours where out-of-hours work would not be more than 5 dB(A) above the RBL at any residence.*

4 REFERENCED DOCUMENTS

- EIS Sydney Metro Construction Noise and Vibration Standard dated 08/09/2020 for Sydney Metro Western Sydney Airport.
- NSW EPA – 'Interim Construction Noise Guideline' ("**IGNG**") July 2009

4.1 BACKGROUND INFORMATION USED

Sydney Metro- Western Sydney Airport Technical Paper 2: Noise and vibration dated October 2020 provides background noise data at amenity of the project site. The noise catchment areas are groups of receivers expected to experience similar ambient and background noise levels. Figure 3-1 from the report details all NCAs and their respective noise monitoring locations and is shown in this report.

The project site and its nearest industrial/commercial receivers (R1 & R2) are located within NCA01. The nearest residential receivers (R3) are located within NCA03. The representative noise monitoring locations for these NCAs are NM01 and NM03 respectively.

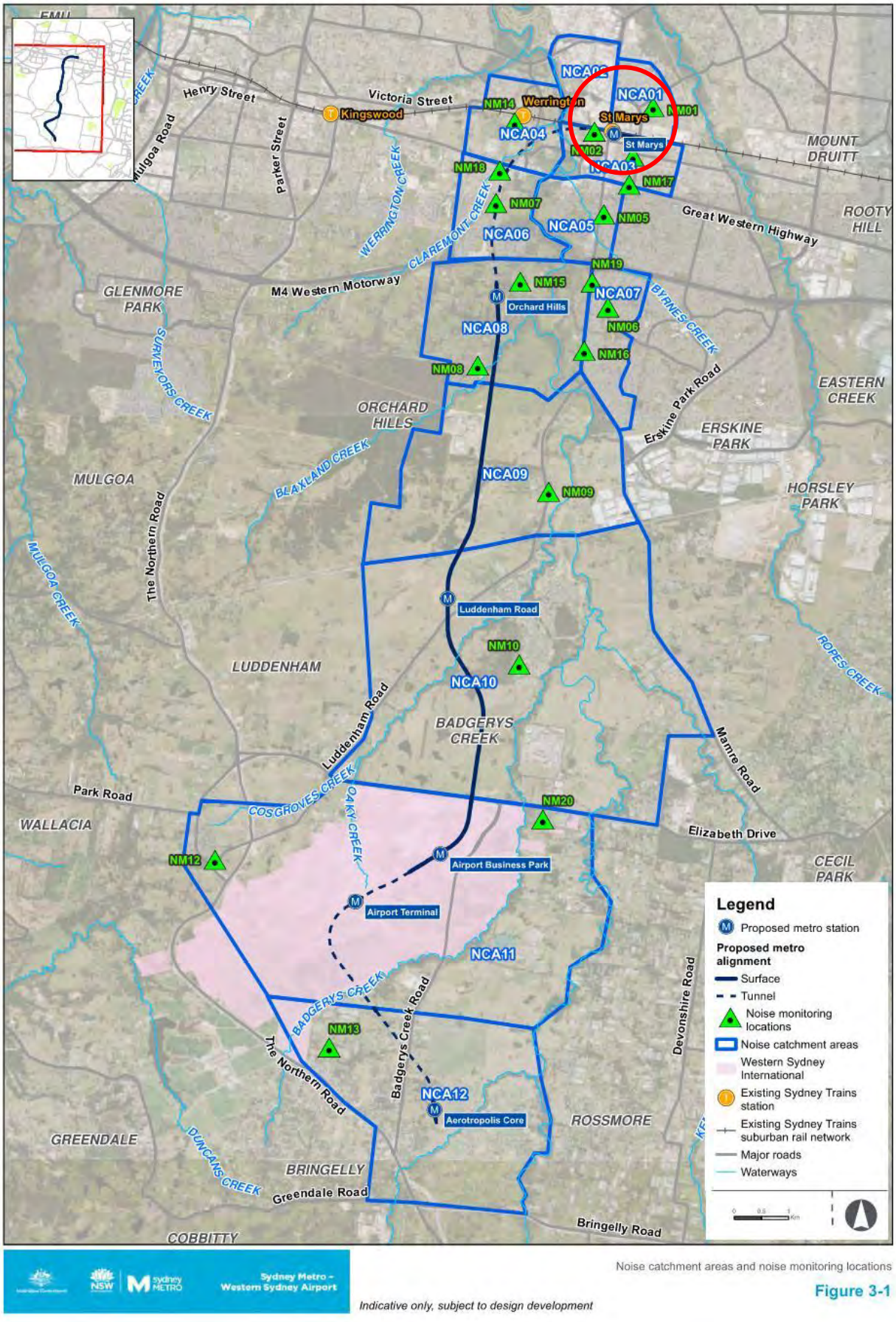


Figure 3 – Noise Catchment Areas

Location	Rating Background Level (RBL) dBA[1]			Ambient noise level dBA[1] $L_{eq\ 15\ minute}$		
	Day	Evening	Night	Day	Evening	Night
NM01	38	(41) 38[3]	(40) 38[3]	53	53	50
NM02	37	(40) 37[3]	36	55	59	51
NM03	38	32	31	50	41	46
NM04	-	-	-	-	-	-
NM05	40	(44) 40[3]	(44) 40[3]	54	51	50
NM06	42	(44) 42[3]	38	59	57	52
NM07	37	37	36	48	49	45
NM08	31	(32) 31[3]	30	52	48	40
NM09	40	39	34	61	57	54
NM10	(30) 35[2]	30	30	47	42	37
NM11	-	-	-	-	-	-
NM12	(34) 35[2]	32	(24) 30[2]	58	60	48
NM13	38	35	34	58	52	51
NM14	35	32	31	48	47	43
NM15	44	(47) 44[3]	40	55	53	50
NM16	47	42	(28) 30[2]	59	56	54
NM17	54	50	36	63	62	59
NM18	42	(43) 42[3]	39	55	53	52
NM19	53	48	36	62	59	57
NM20	39	37	(28) 30[2]	49	47	42

(1) Time periods defined as – Day: 7am to 6pm Monday to Saturday, 8am to 6pm Sunday; Evening, 6pm to 10pm; Night 10pm to 7am Monday to Saturday, 10pm to 8am Sunday

(2) Where background levels are below the minimum assumed rating background noise levels outlined in the NPfI, they have been adjusted to 35dBA during the day period, and 30 dBA during the evening and night periods in accordance with the NPfI

(3) Where evening or night background noise levels exceed that of the previous period, they have been set at the background noise level of the previous period, in line with the NPfI, to reflect community's expectation for greater noise control during more sensitive periods

Figure 4 – M2A Unattended Noise Monitoring Results

4.2 GUIDELINES

The primary guideline that will be used to formulate the Plan is the NSW EPA – 'Interim Construction Noise Guideline' ("**IGNG**") July 2009.

The ICNG recognises that development occurs close to sensitive receivers and the nature of construction means that it is not possible to prevent noise impacts. The ICNG is focused *"on applying a range of work practices most suited to minimise construction noise impacts, rather than focusing only on achieving numeric noise levels. While some noise from construction sites is inevitable, the aim of the Guideline is to protect the majority of residences and other sensitive land uses from noise pollution most of the time."*

The ICNG requires the identification of activities likely to exceed the noise/vibration management levels, and the implementation of feasible and reasonable mitigation strategies to minimise emissions.

These strategies include physical and management controls, liaising with the public and stakeholders, monitoring, etc. The ICNG recognises that each site will have a particular set of circumstances to be addressed, and that it is typically not possible to fully mitigate impacts. The guideline is intended as a pathway to determining a realistic compromise between construction sites and the surrounding receivers.

The following additional planning instruments and guidelines have also been used in the assessment:

- NSW Department of Environment and Conservation Assessing Vibration: A Technical Guideline" (Feb, 2006)
- NSW EPA – 'Noise Policy for Industry' ("**NPfI**") October 2017
- NSW EPA – 'Road Noise Policy" ("**RNP**") March 2011

5 PROPOSED CONSTRUCTION HOURS

5.1 APPROVED CONSTRUCTION HOURS

Conditions E38 and E39 outline the approved construction hours which are summarised in Table 1 below. Highly noise intensive works are classified as works which exceed the NML at the relevant receiver and are limited to the times summarised in the below table (except where permitted by an EPL).

Table 1 – Approved Construction Hours

Day	Typical Construction Works	Highly Noise Intensive Work
Monday – Friday	7am – 6pm	8am – 6pm
Saturday	8am – 1pm	8am – 1pm
Sunday & Public Holidays	No Work	No work

5.2 WORKS OUTSIDE OF APPROVED CONSTRUCTION HOURS

The proposed construction work hours for this site are summarised in the table below.

Table 2 - Proposed Construction Hours and Outside of Approved Hours

Day	Construction Works	Summarised Outside of Approved Hours
Monday – Friday	7am – 7pm	**6pm -7pm**
Saturday	7am – 5pm	**1pm -5pm**
Sunday & Public Holidays	7am - 2pm	**7am -2pm**

6 NOISE AND VIBRATION MANAGEMENT LEVEL

6.1 NOISE MANAGEMENT LEVEL

The noise management level for the proposed construction work should satisfy requirements below:

- NSW EPA Interim Construction Noise Guideline (ICNG).
- Appendix F of Environment Impact Statement (EIS) for Sydney Metro- Western Sydney Airport

Both documents require:

- Determination of noise management levels (based on ambient noise monitoring).
- Review of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels is not possible.

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)$L_{eq(15min)}$.
- "*Highly noise affected level*". Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

Detailed Noise Management Level requirements have been repeated below:

6.1.1 To Residential Receivers

Time of Day	Noise Management Level LAeq (15minute)[1]	Management Considerations
Recommended standard hours: Monday to Friday 7.00 am to 6.00 pm Saturday 8.00 am to 1.00 pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15minute) is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to minimise noise. The proponent would also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent would consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent would communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent would apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent would negotiate with the community. For guidance on negotiating agreements see Section 7.2.2 of the ICNG.

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence.

6.1.2 To Industrial Receivers

2.2.2. Commercial and Industrial Premises

Due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining Noise Management Levels is separated into three categories. The external noise levels would be assessed at the most-affected occupied point of the premises:

- Industrial premises (external): 75 dB $L_{Aeq(15minute)}$
- Offices, retail outlets (external): 70 dB $L_{Aeq(15minute)}$
- Other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.

6.1.3 Additional Noise Monitoring

Additional noise monitoring has been carried out by this office by setting up an unattended noise monitor on site for one day to measure existing background noise levels on site. See Figure one for noise monitoring location. The monitor was on site from 8th to 9th December 2022. As the location of noise monitor is open to public and not secure for long term operation, the monitor was retrieved on 9th December 2022.

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement period.

It was noted that daytime ambient noise levels were affected by construction noise from early works on site and nearby construction on the southern side of the rail. As a result, daytime background noise levels have conservatively been assumed to equal that of the evening period. Results of background noise monitoring are presented in the table below.

Table 3 – Measured Background Noise Levels, dB(A) L_{90}

Location	Period / Time	Background Noise Level dB(A) L_{90}
Project Site	Day (7am to 6pm)	39*
	Evening (6pm to 7pm)	39

*Note: measured background noise level during evening has been adopted for day time period because of construction noise interference from the existing site.

6.2 NOISE MANAGEMENT LEVEL FOR APPROVED CONSTRUCTION HOURS

A summary of the recommended noise management levels is presented in Table below.

Table 4 – Noise Management Levels - Residential

Location	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
Residential Receivers (Normal Hours)- R3	BG +10=49	75
Industrial Receivers- R1 & R2	75	

If noise levels exceed the management levels identified in the tables above, reasonable and feasible noise management techniques will be reviewed.

6.3 LOW IMPACT WORKS FOR OUTSIDE HOURS

Condition E41 allows work to occur outside of normal work hours where they are 'low impact'. The condition defines low impact as:

(i) construction that causes $L_{Aeq(15\ minute)}$ noise levels:

- no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and
- no more than the 'Noise affected' NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and

Table 5 – Condition E41: Low Impact Work Criteria

Location	Period / Time	Noise Management Level dB(A)$L_{eq(15min)}$
Residence- R3	6pm to 7pm Monday to Friday	**44**
	1pm to 5pm Saturday	**44**
	7am to 2pm Sunday	**44**
Industrial Receiver-R1 & R2	Anytime	**75**

6.4 VIBRATION

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- Appendix F of Environment Impact Statement (EIS) for Sydney Metro- Western Sydney Airport
- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures; and*
- Australian Standard AS 2187.2 - 2006 "Explosives - Storage and Use - Use of Explosives" (for human exposure,
- For human exposure to vibration, the evaluation criteria presented in the British Standard BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.
- BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2

6.4.1 Structure Borne Vibrations (Building Damage Criteria)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table below.

It is noted that the peak velocity is the value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 6 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

	TYPE OF STRUCTURE	PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			**Plane of Floor of Uppermost Storey**
		< 10Hz	**10Hz to 50Hz**	**50Hz to 100Hz**	**All Frequencies**
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Nearby residences would be classified as a type 2 structure.

Table 7 – BS 7385.2 Transient vibration guide values for cosmetic damage

Type of Building	Peak particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
NOTE 1 Values referred to are at the base of the building (see 6.3). NOTE 2 For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded		

Part 2 of the BS 7385 sets threshold values above which damage has been credibly demonstrated. It is noted that these guide values are greater than those outlined in DIN 4150-3. As such, the DIN 4150-3 will be utilised in this assessment to be conservative.

6.4.2 Assessing Amenity

The NSW EPA document "*Assessing Vibration: A Technical Guideline*" provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings and is used in the assessment of vibration impact on amenity.

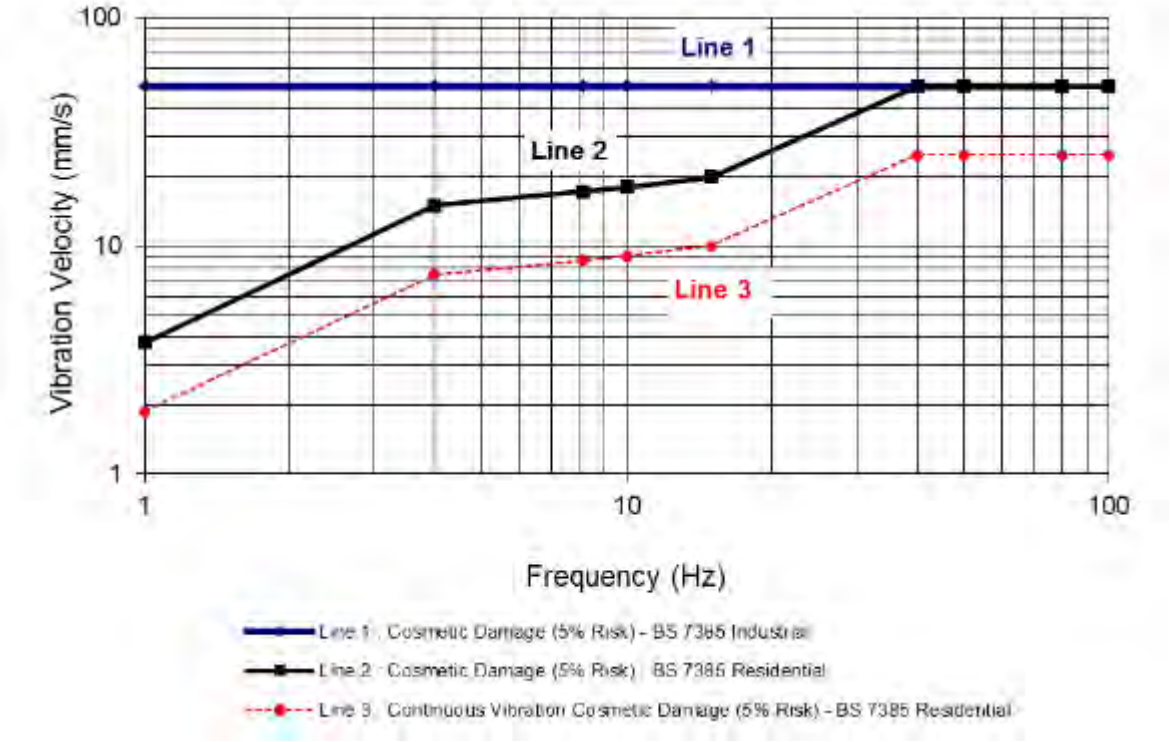
Relevant criteria are presented below.

Table 8 – EPA Recommended Vibration Criteria

		RMS acceleration (m/s^2)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	Time	Preferred	Maximum	Preferred	Maximum	Preferred	Maximum
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

6.4.3 Cosmetic Damage Vibration

EIS specified the following vibration limit for cosmetic damage vibration activities:



7 CONSTRUCTION NOISE ASSESSMENT

7.1 CONSTRUCTION ACTIVITIES

The proposed construction works include excavation for approximately 1m, screw piling, and the construction of 4 storey commercial building. Typical works anticipated are as follows:

- Detailed excavation.
- Screw piling of foundations.
- Use of one diesel powered tower crane, located towards the southern boundary of the construction zone.
- Erection of building structure (powered hand tools for formwork, steel grinders, concrete pump).
- Façade Installation (powered hand tools)
- Internal fit out.

7.2 PREDICTIONS

Construction noise emissions to nearby development depend on the activities being undertaken at the time, and where on the site the activities occur.

Construction noise levels at the surrounding receivers have been predicted using the Soundplan computer model based on the following inputs.

- ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation standard.
- Concawe Standard.

- Meteorological Conditions – 20°C , 70% RH, neutral wind conditions.
- The plant sound power levels indicated below. These have been corrected for estimated typical operation duty indicated in the table using 10 x log(% duty/100).
- Elevation data for the site and surrounds was obtained from the project architectural drawings, and obtained from Geoscape database.
- Source heights – 1.5m and 16m above the ground/building level of the noise source location, unless noted otherwise.
- Source locations are indicated in Figure of Sound Plan
- Noise contour maps have been calculated at:
    - 1.5m above ground level, representing recreation and other outdoor spaces, and the ground floor level of dwellings.
    - Where relevant, facade noise maps have been produced to indicate incident noise levels at multi-storey buildings.
- Ground absorption of 0.

7.2.1 Activities to be Conducted and the Associated Noise Levels

Typically, the most significant sources of noise generated during a construction project will be excavation, civil works and piling. A summary of sound power levels of major construction processes/equipment is detailed in Table below.

With respect to construction noise, the impact on nearby development will be dependent on the activity in question and where on the site the activity is undertaken. The primary construction equipment and sound power levels associated with the works are as follows:

Table 9 - Sound Power Levels of the Proposed Equipment

Equipment / Process	Sound Power Level – dB(A)
Steel Grinder	114*
Concrete Saw	114*
Pneumatic Hand Tools	111*
Truck / Concrete Truck	110
Concrete Pump	102*

***Noise levels take into account correction factors (for tonality, intermittency where necessary).**

The noise levels presented in the above table are derived from the following sources, namely:

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

Noise levels take into account correction factors (for tonality, intermittency where necessary).

SoundPLAN™ is a software program for acoustic simulation and noise mapping. It uses advanced algorithms and models to provide highly accurate simulations of sound propagation in various environments. SoundPLAN™ is used commonly in the field for a wide range of applications, including noise mapping, noise impact assessments, and noise reduction design.

Noise levels have been predicted at the closest receivers as shown in figure 1 above. Noise emission predictions have been carried out, using SoundPLAN™ 8.0 modelling software implementing the ISO 9613-2:1996 '*Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation*' noise propagation standard. The SoundPLAN software considers several elements when calculating noise emissions, including distance attenuation, barrier effects, air/ground absorption, time corrections etc.

Digital Ground Elevation data are sourced from the Intergovernmental Committee on Surveying and Mapping (ICSM) - Elvis - Elevation and Depth - Foundation Spatial Data website. Receiver building spatial data (heights and elevations) are sourced from Geoscape Australia.

Noise enhancing meteorological conditions have been adopted as recommended by the NPfI, noting that the ISO 9613 modelling approach assumes that all receivers are "downwind" (i.e., that noise enhancing wind conditions are always in effect).

Ground absorption was conservatively calculated with a ground factor of 0 for all areas. All modelled equipment has been assumed to operate for 10 out of 15 minutes with the exception of trucks which have been assumed to operate for 15 out of 15 minutes.

Two typical scenarios have been modelled using SoundPLAN™:

- Scenario 1 – All works on ground:
    - Steel grinder at ground level (1.5m).
    - Concrete saw at ground level (1.5m).
    - Pneumatic hand tools working at ground level (1.5m)
    - One truck (concrete) idling at ground level (1.5m)
    - Concrete pump at ground level (1.5m).
    - Truck movement across site
- Scenario 2 – High and low level works:
    - Steel grinder at 16m high from ground.
    - Concrete saw at ground level (1.5m).
    - Pneumatic hand tools working at 16m from ground
    - One truck (concrete) idling at ground level (1.5m)
    - Concrete pump at ground level (1.5m).
    - Truck movement across site

Each noise source on the SoundPLAN model is represented by a purple asterisk (for fixed point sources) or a line (for a moving noise source). The closest noise source being the truck (represented as a line source) is approximately 10m from the nearest receiver (24 Harris Street).

7.2.2 Acoustic Fencing

The SoundPLAN model also assumes a 2.1m high perimeter acoustic fence is installed around the site perimeter as per figure below. The 2.1m fence height has been selected based on SoundPLAN modelling as it is high enough to provide a benefit for ground level works to nearby receivers. Temporary acoustic fencing (PVC curtains) is recommended during the ground works phase of construction i.e., concrete sawing, excavation, piling, concrete pumping etc. Following the completion of ground works, noise levels are expected to reduce due to the absence of several noise sources including concrete sawing and concrete trucks. As seen in the sound plan model, high level use of steel grinders and hand tools are able to comply without receiving any benefit from the low-level barrier. Subsequently, acoustic fencing is not required for higher level works following the completion of ground works. The proposed acoustic fence is to be reviewed by Acoustic Logic prior to installation on site.

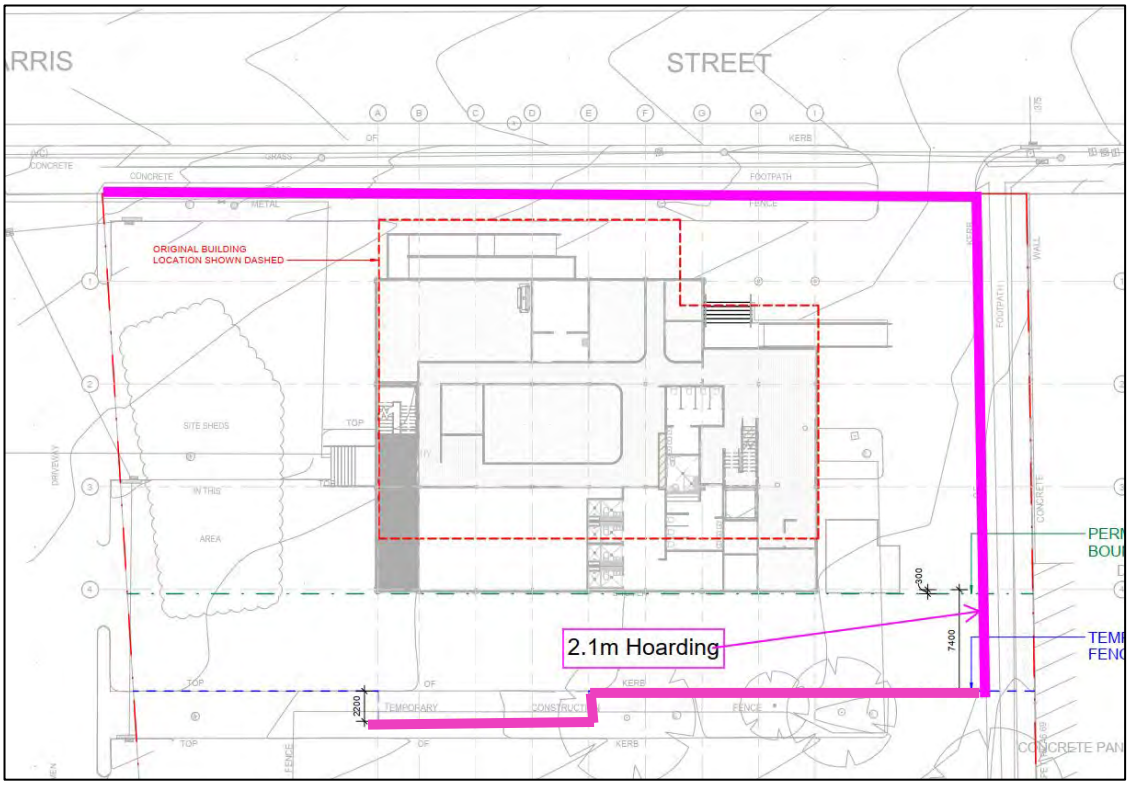


Figure 4 – Hoarding Markup

7.2.3 Predicted Noise Levels during Approved Hours

The figures in Appendix A detail computational noise modelling for the closest noise sensitive receivers and facades relating to noise from the construction activities on site through the presentation of a façade noise map onto the respective buildings. The following table details the maximum noise levels at the closest receivers as predicted in the model.

Table 10 – Predicted Noise Generation to Nearby Receivers (External)

Receiver	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Target Noise Management Level dB(A) $L_{eq(15min)}$	Comment
R1- 24 Harris Street, St Mary's North	75	75	Acceptable.
R2- 25 Harris Street, St Mary's North	72		
R3- Residential Building along Station St	51	49	Marginal*

*EPA Road Noise Policy States: *In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person*.

7.2.4 Predicted Noise Levels during Outside Hours

The equipment used for the proposed outside hours are below:

- Crane
- Truck
- Concrete Pump
- Hand tools.

The following equipment are not allowed to be used during the proposed outside hours work:

- Excavator, grinder, pneumatic tool.

The figures in Appendix A detail computational noise modelling for the closest noise sensitive receivers and facades relating to noise from the construction activities on site through the presentation of a façade noise map onto the respective buildings. The following table details the maximum noise levels at the closest receivers as predicted in the model.

Table 11 – Predicted Noise Generation to Nearby Receivers (External)

Receiver	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Target Noise Management Level dB(A) $L_{eq(15min)}$	Comment
R1- 24 Harris Street, St Mary's North	71	75	Acceptable.
R2- 25 Harris Street, St Mary's North	67		
R3- Residential Building along Station St	48	44	+4

7.3 CONSTRUCTION VIBRATION

7.3.1 Vibration Sources

The following sources have been identified as potentially producing significant ground vibration:

- Vibratory roller.

The remaining activities are not expected to produce significant ground vibration and/or are sufficiently separated from sensitive receivers. Vibration from these activities is expected to be significantly below amenity or damage risk management levels at all receivers.

7.4 TRAFFIC GENERATION ON EXISTING ROADS

The ICNG does not provide specific guidance in relation to acceptable noise levels associated with construction traffic. For assessment purposes, guidance is taken from the RNP. One of the objectives of the RNP is to apply relevant permissible noise increase criteria to protect sensitive receivers against excessive decreases in amenity as the result of a proposal.

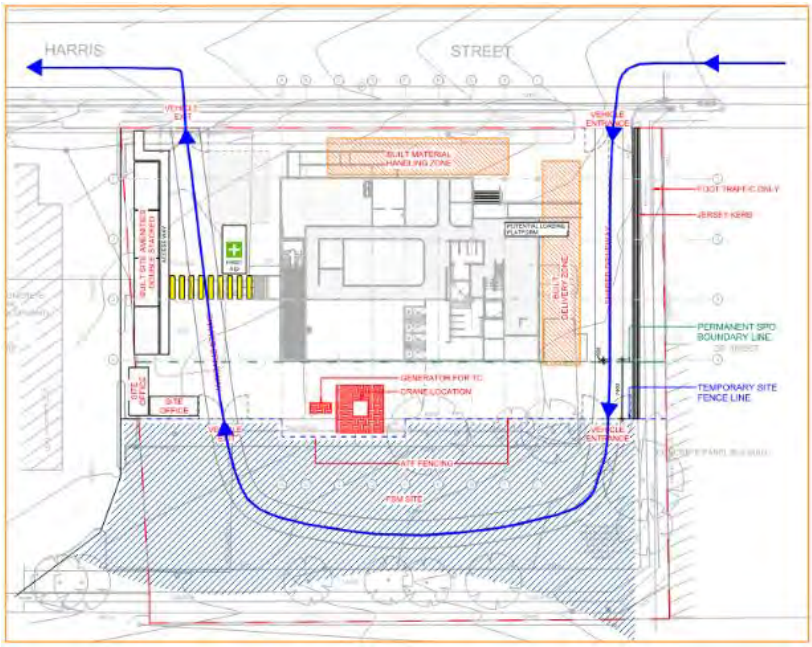
In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person. On this basis, construction traffic NMLs set at 2 dB above the existing road traffic noise levels during the daytime and night-time periods are considered appropriate to identify the onset of potential noise impacts. Where the road traffic noise levels are predicted to increase by more than 2 dB as a result of construction traffic, consideration would be given to applying feasible and reasonable noise mitigation measures to reduce the potential noise impacts and preserve acoustic amenity.

In considering feasible and reasonable mitigation measures where the relevant noise increase is greater than 2 dB, consideration would also be given to the actual noise levels associated with construction traffic and whether or not these levels comply with the following road traffic noise criteria in the RNP:

- 60 dB LAeq(15hour) day and 55 dB LAeq(9hour) night for existing freeway/ arterial/ sub-arterial roads.
- 55 dB LAeq(1hour) day and 50 dB LAeq(1hour) night for existing local roads.

7.4.1 Traffic Report

Construction Traffic Management Plan prepared by Taylor Thomson Whitting (NSW) Pty Ltd dated 13 January 2023 states:



With the exception of the final approaches on Harris Street and Forrester Road (which are the only available routes to site), all roads along the nominated construction access routes are within the classified road network (including state roads and classified regional roads). The classified road network is the nominated road network for high-volume vehicle movements and these areas are therefore already expected to experience heavy vehicle or construction traffic movements. Sensitive receivers along these routes will therefore not be subject to any unexpected impacts.

7.4.2 Findings

There are no known classified receivers along the local road network (Harris Street and Forrester Road) as this is an industrial area only.

As there are no noise sensitive receivers along Harris St and the nominated road network is already with high – volume vehicle movements, the traffic noise increase generated by the construction work of the project site is negligible and satisfy requirements of NSW EPA RNP.

8 RECOMMENDATIONS

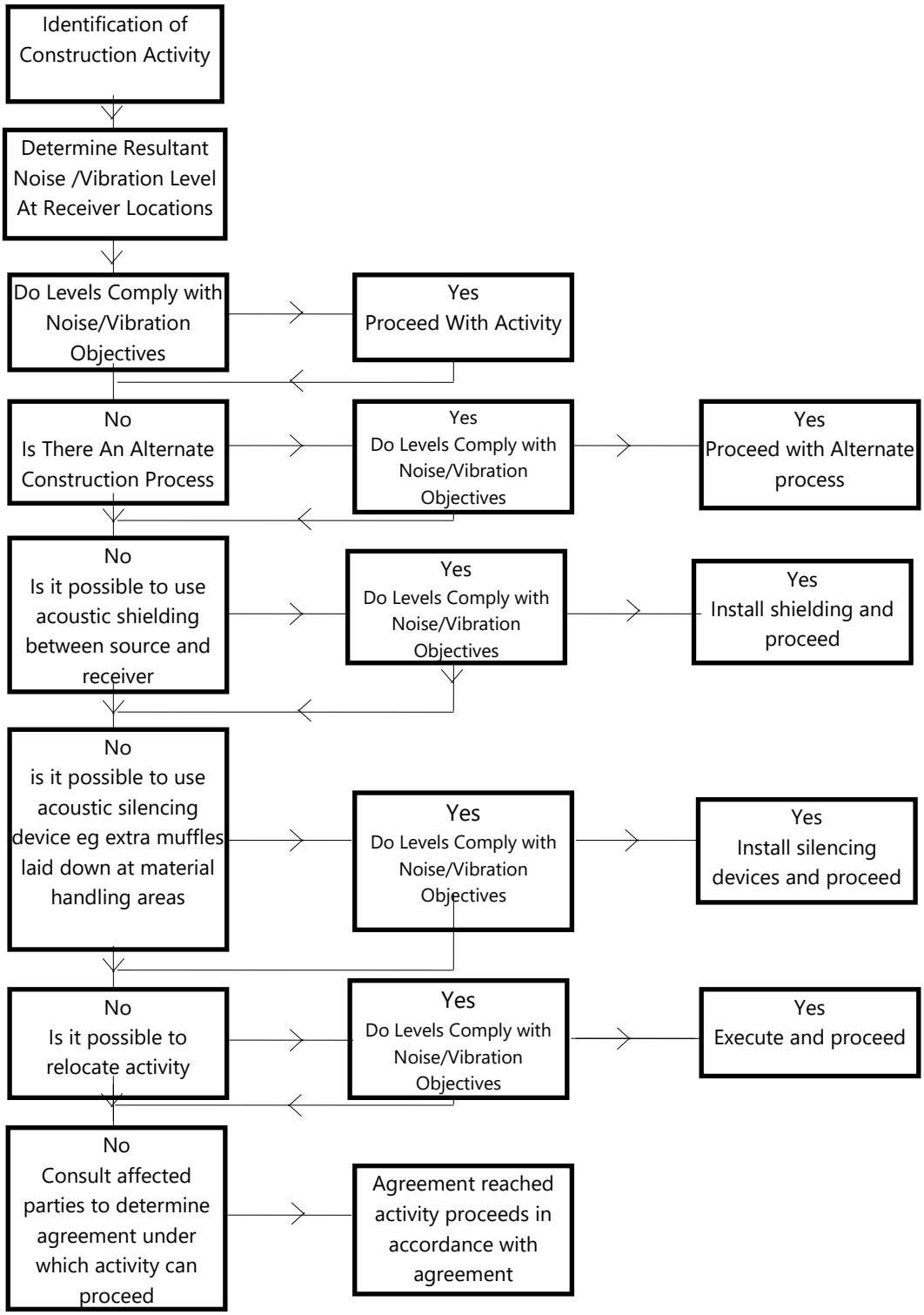
In light of the above assessment, and to mitigate any potential noise impacts from the development of 30 Harris Street, we recommend the following management controls be implemented:

- No rock hammering is allowed within the project site.
- The scheduling of construction activities should be undertaken to reasonably minimise noise impacts to all surrounding residents.
    - A respite period is to be implemented where concrete sawing works and steel grinding works are required and will generate noise levels exceeding those in Table 2. The recommended hours for the use of this equipment is:
        - Monday – Friday: 8am – 12pm
        - Monday – Friday: 2pm – 5pm
    - Outside of standard hours work:
        - Before erection of facades: Excavator/Grinder/concrete saw/piling/ pneumatic tools should be limited. Hand tools, concrete pump, truck movements, etc is acceptable.
        - After erection of facades: no restriction once facades are closed.
- Acoustic barriers:
    - A 2.1m high acoustic fence is to be installed around the perimeter of the site. The fencing material is to be approved by Acoustic Logic prior to installation on site.
- Community consultation is proposed be undertaken throughout the construction process. In this regard regular letterbox drops detailing site progress and scheduled works is proposed. In particular, these should detail the extent and times of noise intensive works which are planned to be undertaken.
- Quiet work methods/technologies:
    - The primary noise generating activity at the site will be the bulk excavation period. As much as practicable, use of quieter excavation methods is adopted.
    - Excavation is to be conducted using an excavator with bucket (quietest excavation method), then use of rock rippers (as opposed to hydraulic hammers and rock saws) when rock strength permits.
- Attended noise measurements at surrounding properties can be undertaken at the beginning of each construction stage to quantify the level of construction noise typically emitted from the site. This may be used to inform any mitigation strategies which could be implemented.
- Materials handling/vehicles:
    - Trucks and forklifts in general use on site are to use a non-tonal reversing beacon where possible (subject to OH&S requirements) to minimise potential disturbance of surrounding receivers;
    - Avoid careless dropping of construction materials into empty trucks.
    - Trucks, trailers and delivery vehicles are to turn off engines when idling to reduce noise impacts (unless required for concrete pumping or similar).
- Complaints handling:
    - An after hours contact number is displayed outside of the building site, so that in the event that surrounding development believes that a noise breach is occurring, they may contact the site.
    - In the event of complaint, the procedures outlined in Section 8 are adopted.
- Site Induction:
    - A copy of the Noise Management Plan is to be available to contractors. The location of the Noise Management Plan should be advised in any site induction.

- Site induction should also detail the site contact to be notified in the event of noise complaint.

9 CONTROL OF CONSTRUCTION NOISE AND VIBRATION – PRECEDURAL STEPS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.



10 ADDITIONAL NOISE AND VIBRATION CONTROL METHODS

In the event of complaints, there are a number of noise mitigation strategies available which can be considered. The determination of appropriate noise control measures will be dependent on the particular activities and construction appliances. This section provides an outline of available methods.

10.1 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. Undertaking this activity using bulldozers, ripping and/or milling machines will result in lower noise levels.

10.2 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

10.3 TREATMENT OF SPECIFIC EQUIPMENT

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

10.4 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. A more detailed management plan will be developed for this project in accordance to the construction methodology outlining work procedures and methods for minimising noise.

10.5 COMBINATION OF METHODS

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

10.6 LETTER BOX DROPS

Letter box dropping to residential dwellings along Station Street is required based on Sydney Metro Construction Noise and Vibration Standard requires below:

Letter box drops	For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template.	LB

Time Period		Mitigation Measures Predicted $L_{Aeq\ (15minute)}$ noise level Above NML			
		0 to 10 dB	10 to 20 dB	20 to 30 dB	> 30 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	-	LB	LB, M, SN	LB, M, SN
	Sat (8.00 am - 1.00 pm)				
	Sun/Pub Hol (Nil)				
OOHW (Evening)	Mon-Fri (6.00 pm - 10.00 pm)	LB	LB, M	LB, M, SN, RO	LB, M, SN, IB, PC, RO
	Sat (1.00 pm - 10.00 pm)				
	Sun/Pub Hol (8.00 am - 6.00 pm)				
OOHW (Night)	Mon-Fri (10.00 pm - 7.00 am)	LB	LB, M, SN, RO	LB, M, SN, IB, PC, RO, AA	LB, M, SN, IB, PC, RO, AA
	Sat (10.00 pm - 8.00 am)				
	Sun/Pub Hol (6.00 pm - 7.00 am)				

10.7 NOISE AND VIBRAITON MONITORING DURING CONSTRUCTION

Section 6 of Sydney Metro Construction Noise and Vibration Standard requires below:

6.2. Noise Monitoring

Where a DNVIS or GNVIS has been prepared for a Sydney Metro construction site and it has been predicted that noise levels may be in excess of the nominated construction noise goals at a noise sensitive receiver, noise monitoring would be conducted at:

- *the affected receiver; or*
- *if more than one affected receiver has been identified, at the nearest affected receiver: or*
- *where the nearest affected receiver refuses noise monitoring on their property, at the near point to that receiver within the site boundary.*
- *If it can be demonstrated that direct measurement of noise from the construction site is impractical, alternative means of determining construction noise levels may be adopted in accordance with Chapter 7 of the Noise Policy for Industry.*

All noise monitoring results would be assessed against the nominated noise goals and compiled into a report to be forwarded to the construction contractor and project manager. Reporting would be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. All noise monitoring reports would also be made available to the public through a publicly accessible website.

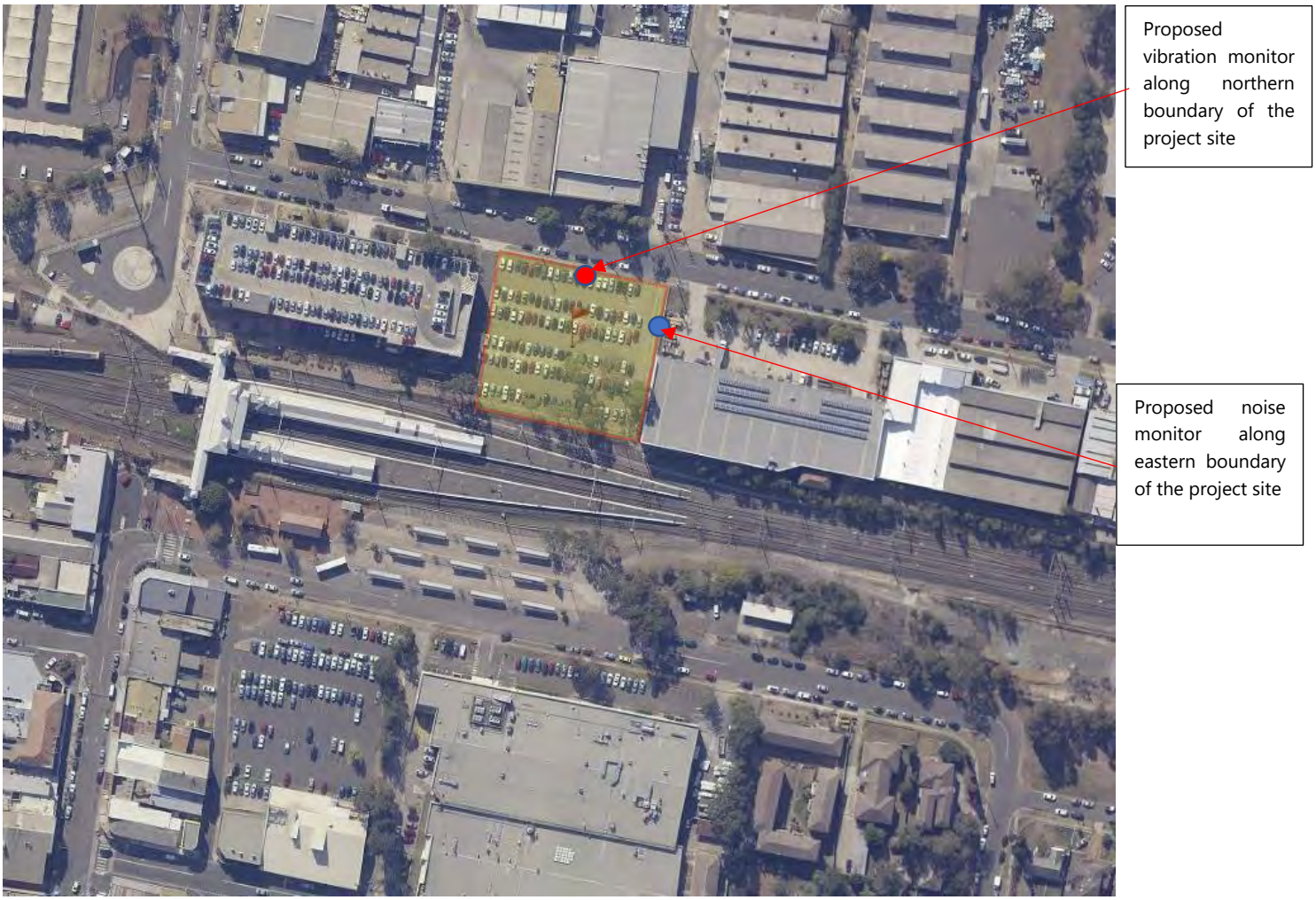
6.3. Vibration Monitoring

Where it is anticipated that an item of plant will exceed the cosmetic damage criteria given in Section 2.3.3, vibration monitoring would be required at the nearest affected receiver. Where it is anticipated that an item of plant will exceed the human response / ground borne noise criteria and concerns have been raised regarding vibration, vibration monitoring would also be required at the receiver(s) under question.

All vibration monitoring results would be assessed against the nominated vibration goals and compiled into a report to be forwarded to the construction contractor and project manager. Reporting would be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. All vibration monitoring reports would also be made available to the public through the publicly accessible website.

Noise and vibration monitoring may either consist of manned and/or unmanned measurements. It is recommended to install one long term noise monitor along eastern boundary and one long term vibration monitor along northern boundary of the project site before commencement of construction work, the long term monitors can be removed once the construction work of structure of ground levels is completed based on the study of actual measurement results. In addition, more monitoring may be undertaken during the construction work phase of the project if required in the event complaints are received from neighbours.

The proposed noise and vibration monitoring locations are indicated below:



In the event that complaints are received from neighbours the following process should be considered:

1. Assessing impacts and determining the offending plant/equipment/process and.
2. Locating the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implementing additional acoustic treatment in the form of localised barriers, silencers etc.
4. Selecting alternative equipment/processes

Where monitoring is required and indicates exceedances of the predicted noise impacts immediate action should be taken to identify any further controls as required to reduce noise emissions so that the noise limits are complied with. Monitoring of the activities following the implementation of these additional controls will be undertaken to confirm compliance.

10.7.1 Reporting Requirements

The following is an example of reporting which may be kept on site;

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed below.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including, the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented.
5. All monitoring and reporting shall be conducted in conjunction with the conditions of consent.

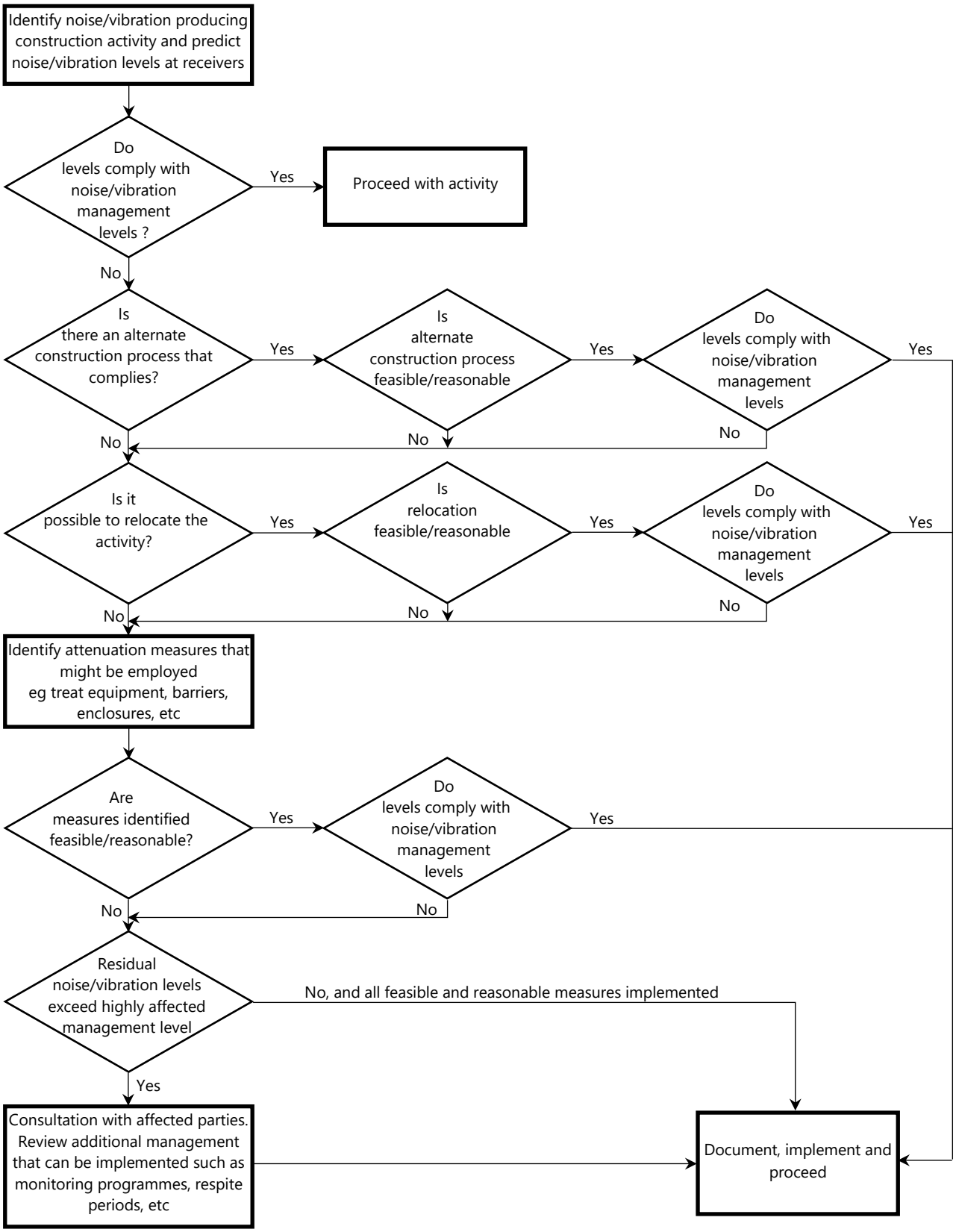
10.7.2 Response Procedures

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager and the general public and their contact telephone number

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form may list:

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Indicate what operations were occurring on site at the time of the complaint.
- Required remedial action, if required
- Validation of the remedial action.
- Summary of feedback to the complainant.

11 NOISE AND VIBRATION MANAGEMENT FLOW CHART



Noise and Vibration Management Flow Chart

12 CONCLUSION

An assessment of noise from construction works associated with 30 Harris Street, St Marys has been presented within this report to satisfy EIS Sydney Metro Construction Noise and Vibration Standard dated 08/09/2020 for Sydney Metro Western Sydney Airport and Condition E47 of SSI-10051 Consent of Approval.

The acoustic assessment of the proposed works has been made with reference to the existing consent conditions for the site (SSI-10051) and relevant policies & guidelines for construction noise – namely the *Interim Construction Noise Guideline*.

Based on the assessment, noise emission from construction activities can generally meet the relevant noise emission levels. Recommendations have been provided to minimise the noise impacts on surrounding receivers for out of hours work.

A Construction Noise and Vibration Plan has been developed that will be used to minimise impacts on the surrounding properties. Provided that the mitigation techniques as recommended in sections 10, 9 & 10 of this report are adopted, noise and vibration impact on the adjacent buildings are expected to be acceptable.

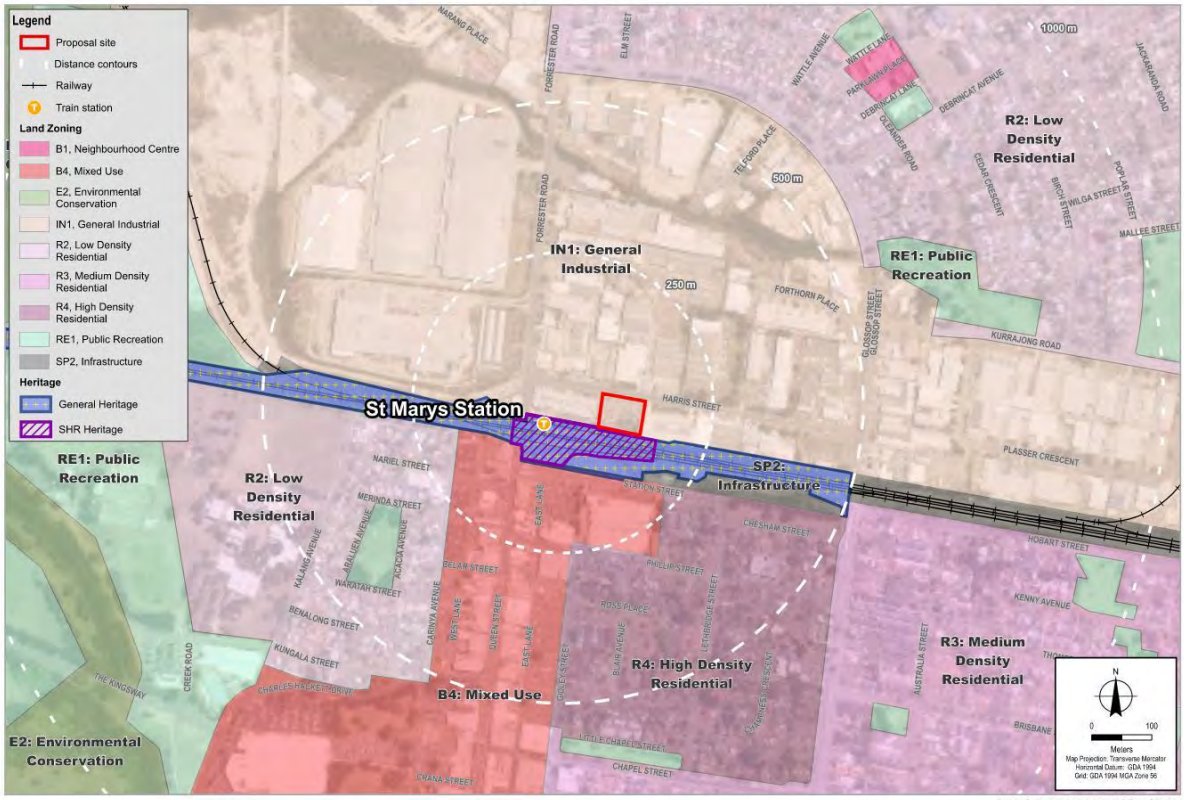
Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Ruben Ghannoum

13 APPENDIX A – LAND USE SURVEY

As part of the project and in conjunction with condition E37, Built have undertaken a Land Use survey which is shown in the figure below. The site is located within an area zoned as IN1, general industrial under the Penrith LEP. The broader area has been shown for greater context, however we have not been made aware of any sensitive land users such as operating theatres, Precision laboratories or the like.



Land use zones and heritage

14 SOUNDPLAN MODELLING FOR APPROVED HOURS WORK

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	110dB(A) SWL
Concrete Pump	102dB(A) SWL
Steel Grinder	114dB(A) SWL
Concrete Saw	114dB(A) SWL
Pneumatic Hand Tools	111dB(A) SWL

Prepared by: A.Zappia
Date: 27/02/2023

25 Harris Street
(Industrial receiver)

24 Harris Street
(Industrial receiver)

Noise Level
L_{eq}
in dB(A)

< 44	
44 - 48	
48 - 52	
52 - 56	
56 - 60	
60 - 64	
64 - 68	
68 - 72	
72 - 76	
76 - 80	
80 - 84	
>= 84	

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**

Above GFL
Sheet 1 of 4

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

	< 57
	57 - 59
	59 - 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	>= 77

25 Harris Street
(Industrial receiver)

Harris Street

24 Harris Street
(Industrial receiver)

Steel Grinder
16m above GFL

Pneumatic Hand Tools
16m above GFL

Concrete Saw
@ Ground

Truck
@ GFL

Concrete Pump
@ GFL

Truck Swept Path
(Transient Noise)

Rail Corridor
<- St Mary's Station

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**

Above GFL
Sheet 2 of 5

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

	< 57
	57 - 59
	59 - 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	>= 77

25 Harris Street
(Industrial receiver)

Harris Street

Steel Grinder
16m above GFL

Truck Swept Path
(Transient Noise)

Pneumatic Hand Tools
16m above GFL

Concrete Saw
@ GFL

Truck
@ GFL

Concrete Pump
@ GFL

24 Harris Street
(Industrial receiver)

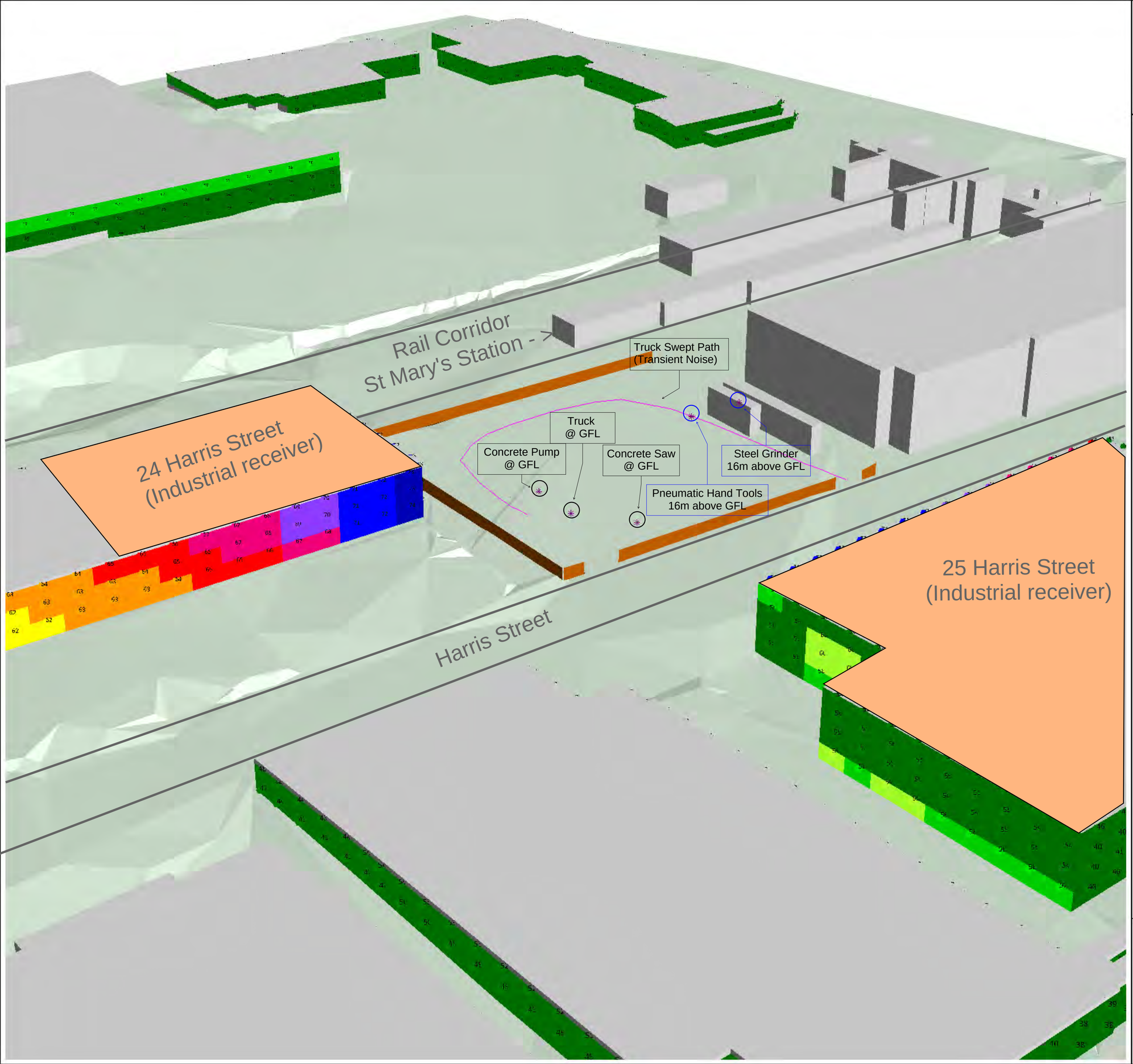
Rail Corridor
<- St Mary's Station

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**



Above GFL
Sheet 3 of 4

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

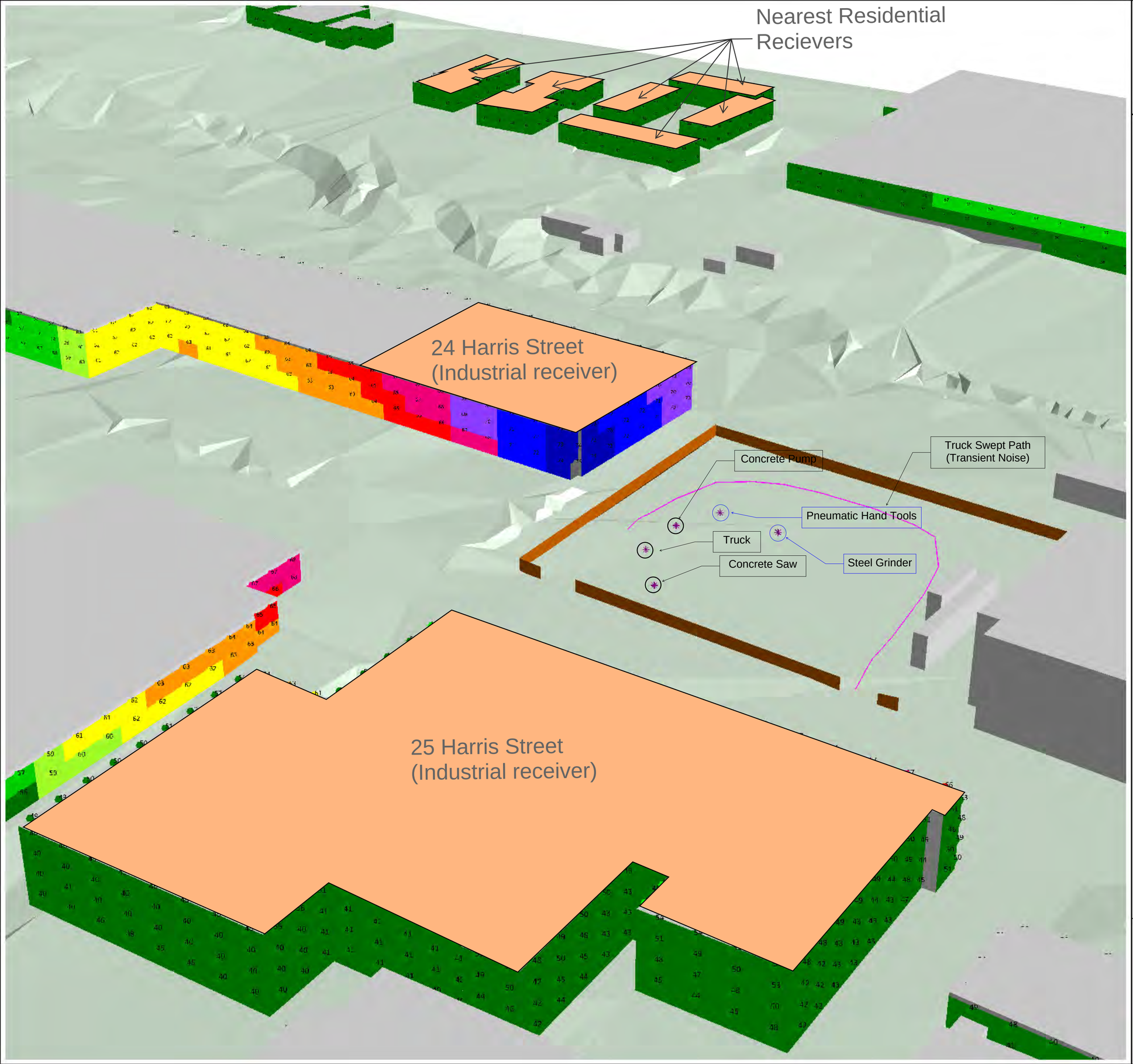
< 57
57 - 59
59 - 61
61 - 63
63 - 65
65 - 67
67 - 69
69 - 71
71 - 73
73 - 75
75 - 77
>= 77

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**



Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
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	< 57
	57 - 59
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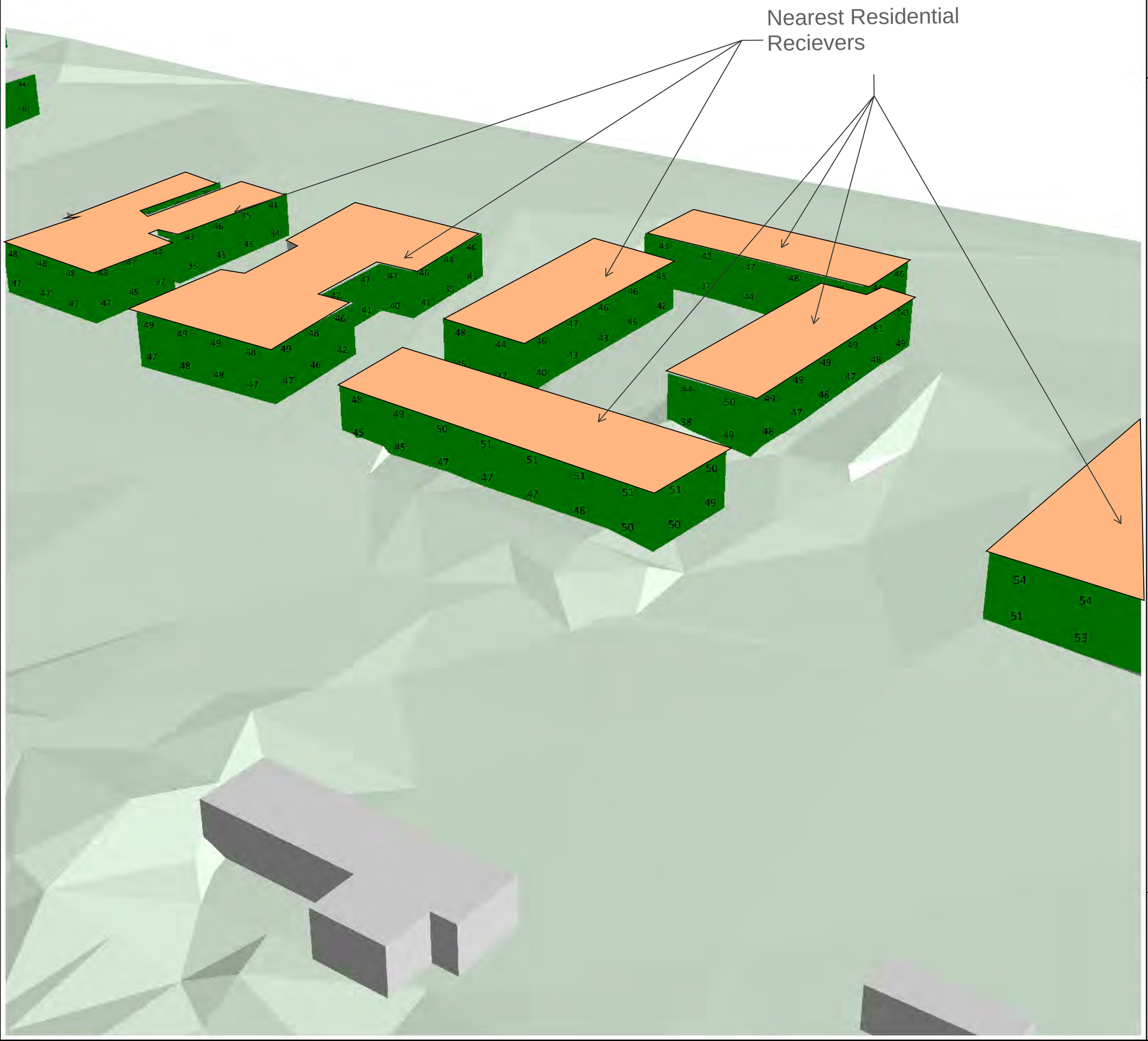
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	>= 77

ACOUSTIC LOGIC

St Marys SSTM Project Office



Construction Noise Prediction
16m above GFL Elevation

Truck	110dB(A) SWL
Concrete Pump	102dB(A) SWL
Steel Grinder	114dB(A) SWL
Concrete Saw	114dB(A) SWL
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Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

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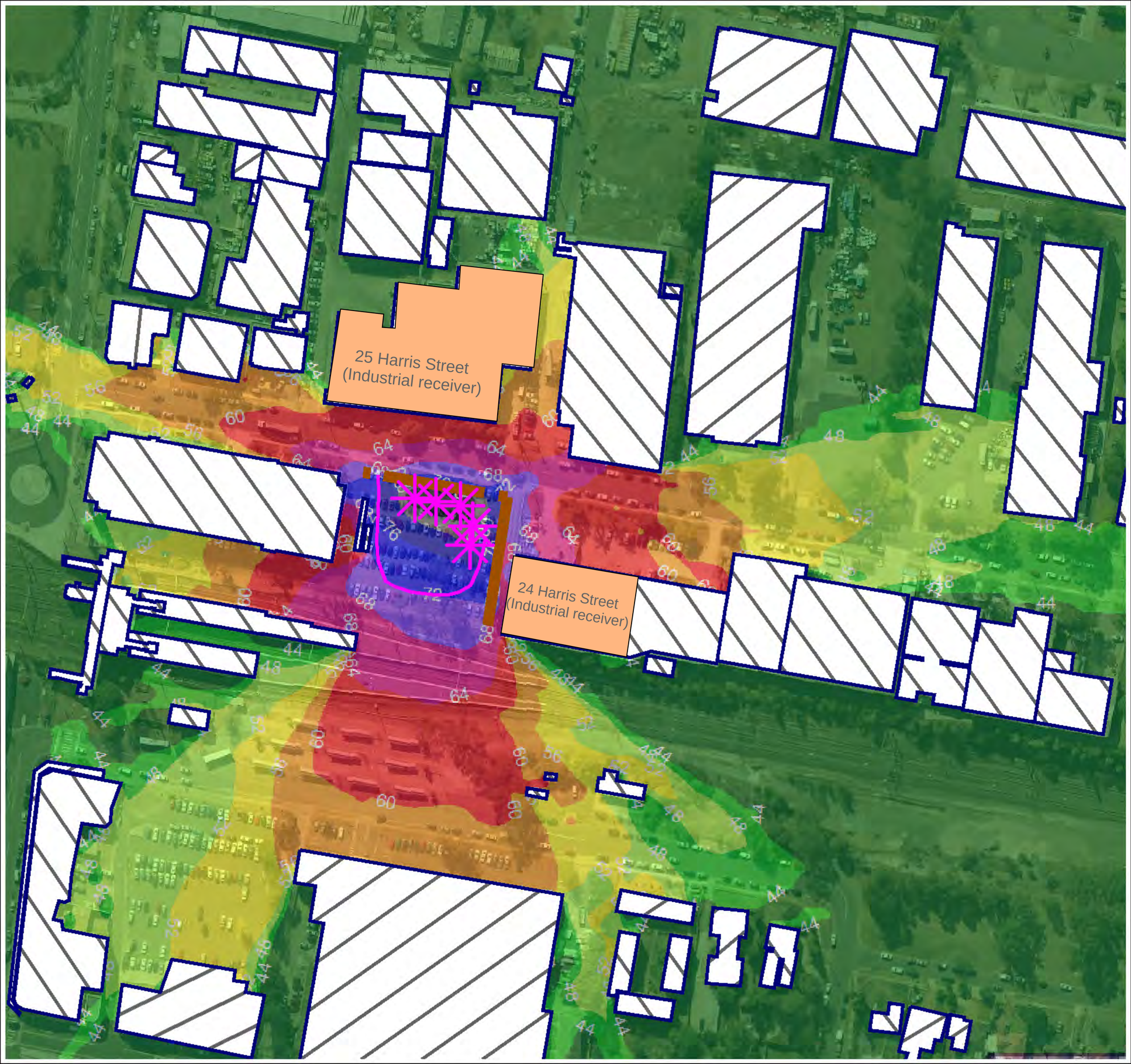
ACOUSTIC LOGIC



St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck	**110dB(A) SWL**
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Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
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Prepared by: A.Zappia
Date: 27/02/2023

Noise Level
L_{eq}
in dB(A)

	< 44
	44 - 48
	48 - 52
	52 - 56
	56 - 60
	60 - 64
	64 - 68
	68 - 72
	72 - 76
	76 - 80
	80 - 84
	>= 84

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck	**110dB(A) SWL**
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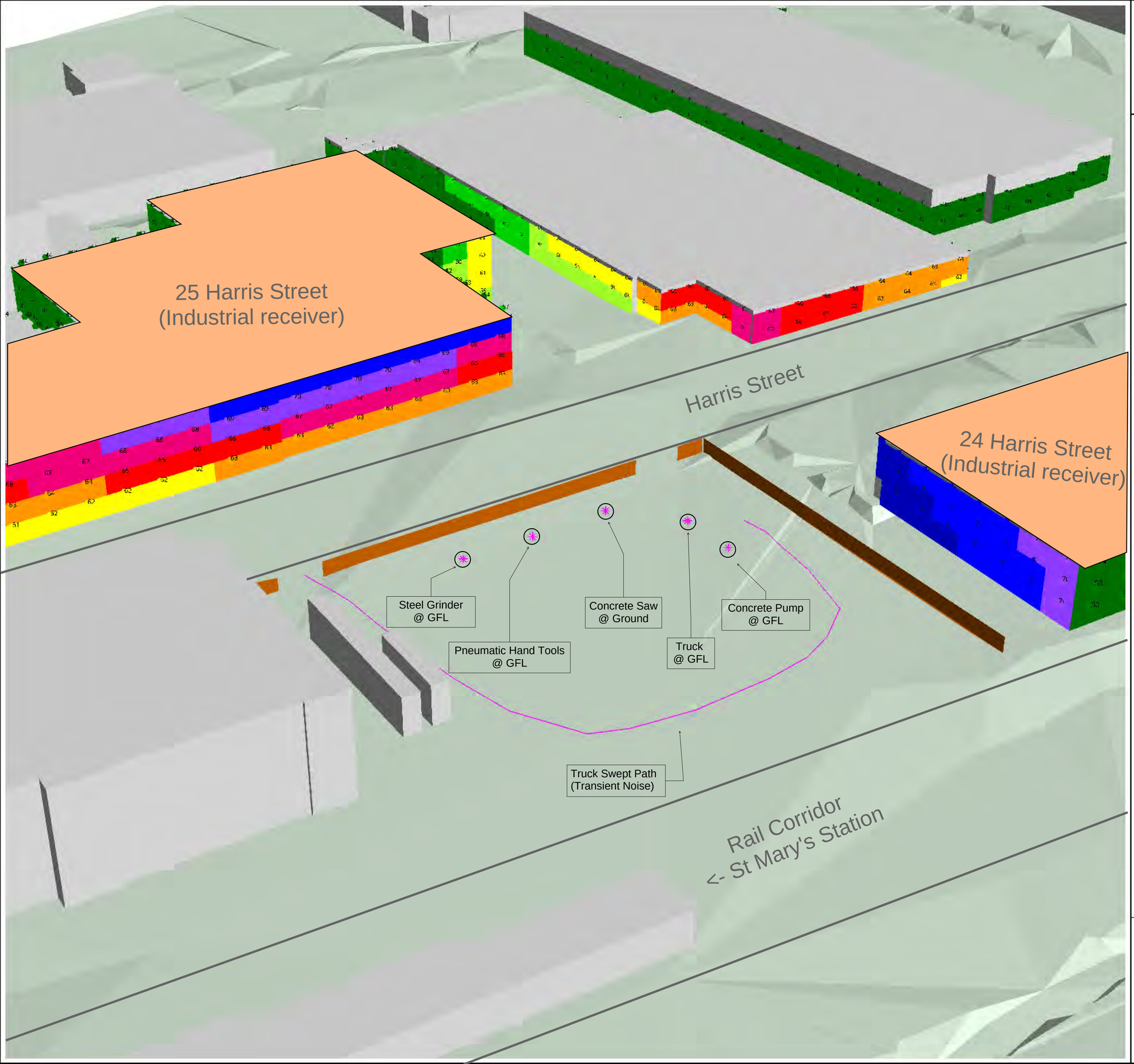

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

	< 57
	57 - 59
	59 - 61
	61 - 63
	63 - 65
	65 - 67
	67 - 69
	69 - 71
	71 - 73
	73 - 75
	75 - 77
	>= 77

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck	**110dB(A) SWL**
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Steel Grinder	**114dB(A) SWL**
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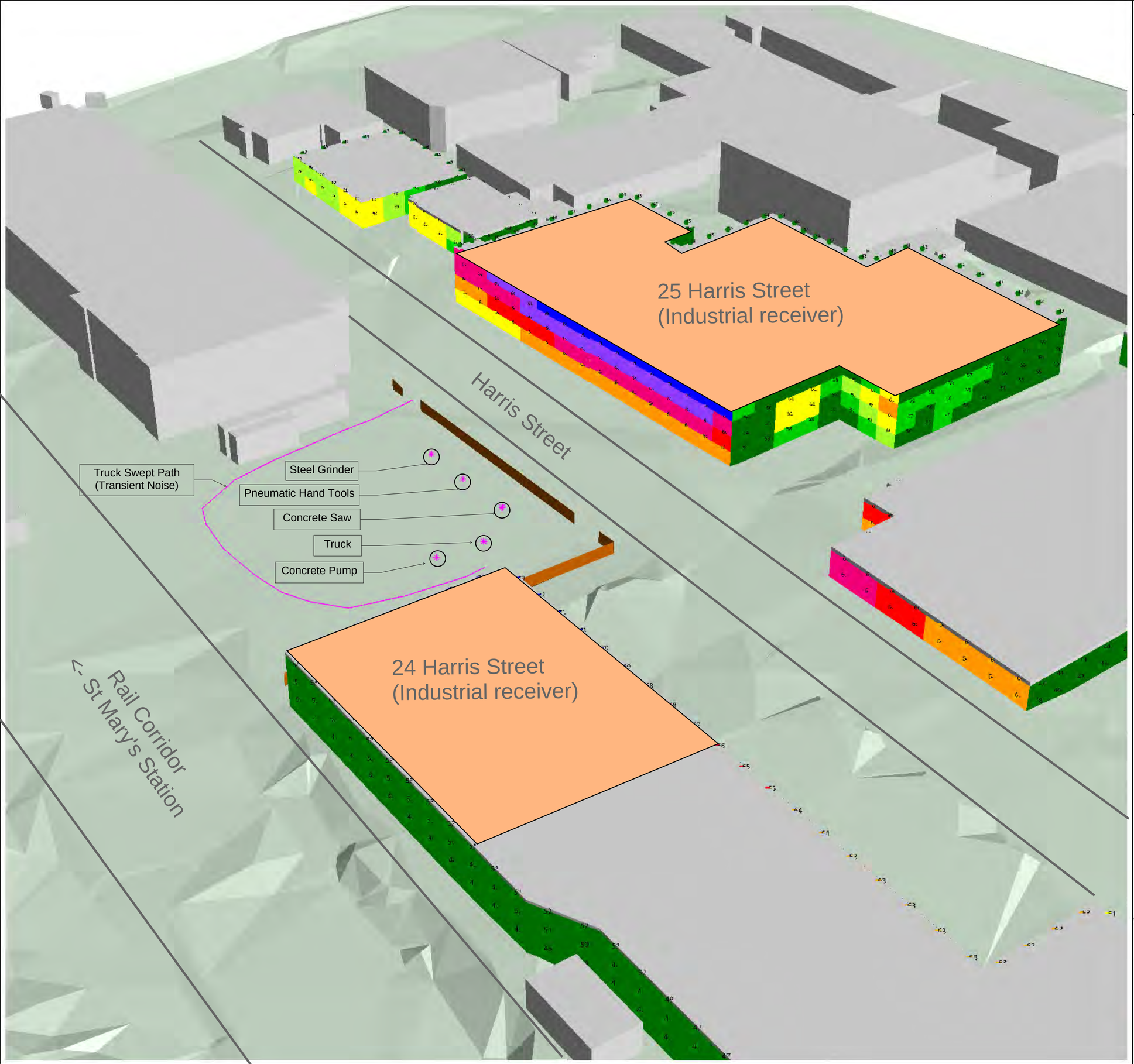

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

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ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

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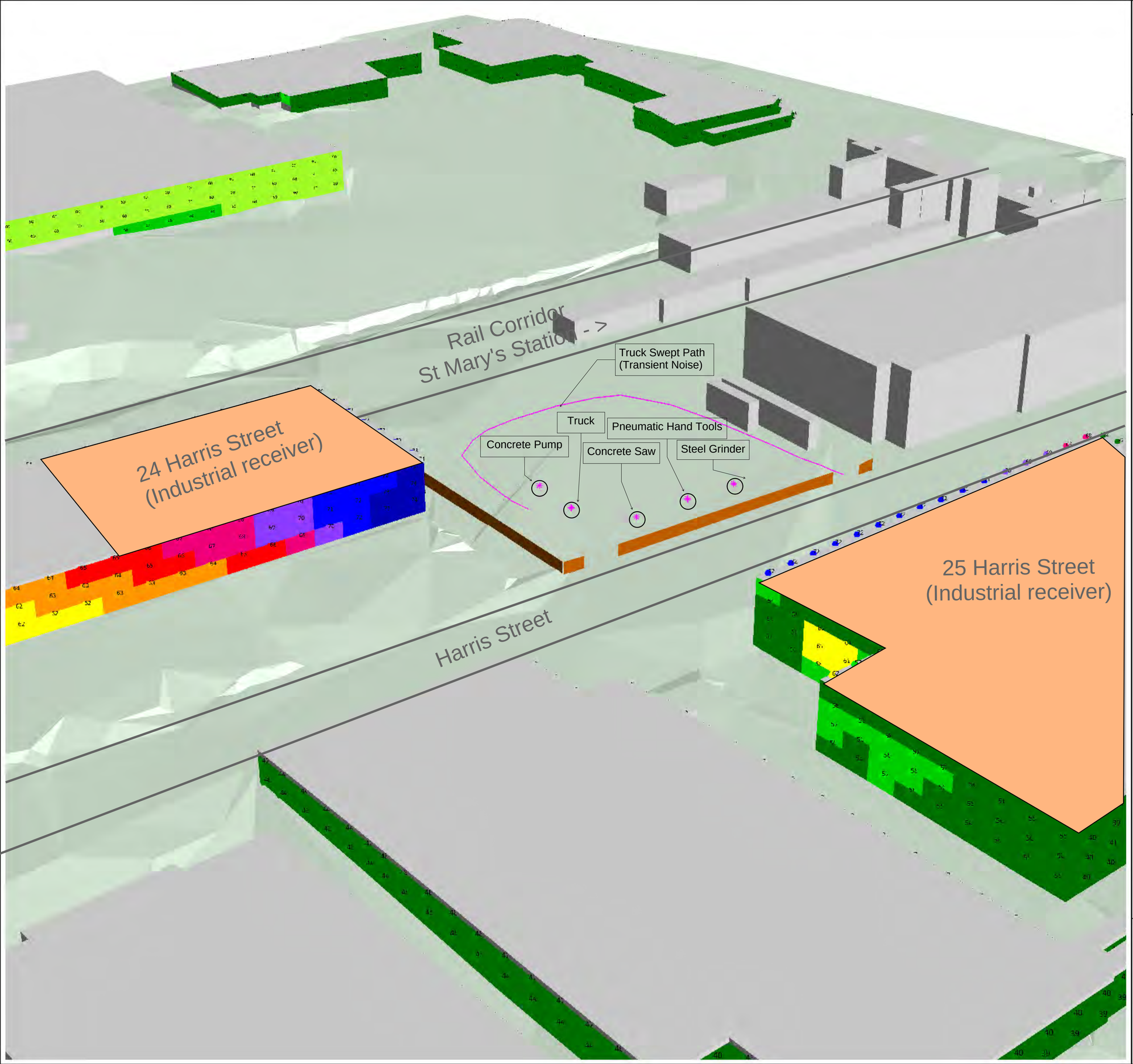

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
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ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Steel Grinder	**114dB(A) SWL**
Concrete Saw	**114dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**

Nearest Residential Recievers

24 Harris Street
(Industrial receiver)

Concrete Pump

Truck Swept Path
(Transient Noise)

Truck

Concrete Saw

Pneumatic Hand Tools

Steel Grinder

25 Harris Street
(Industrial receiver)

Prepared by: A.Zappia
Date: 27/02/2023

◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
in dB(A)

	< 57
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ACOUSTIC LOGIC

Nearest Residential
Recievers

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

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Prepared by: A.Zappia
Date: 27/02/2023

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ACOUSTIC LOGIC

15 SOUNDPLAN MODELLING FOR OUTSIDE HOURS WORK

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
Pneumatic Hand Tools	**111dB(A) SWL**

Prepared by: A.Zappia
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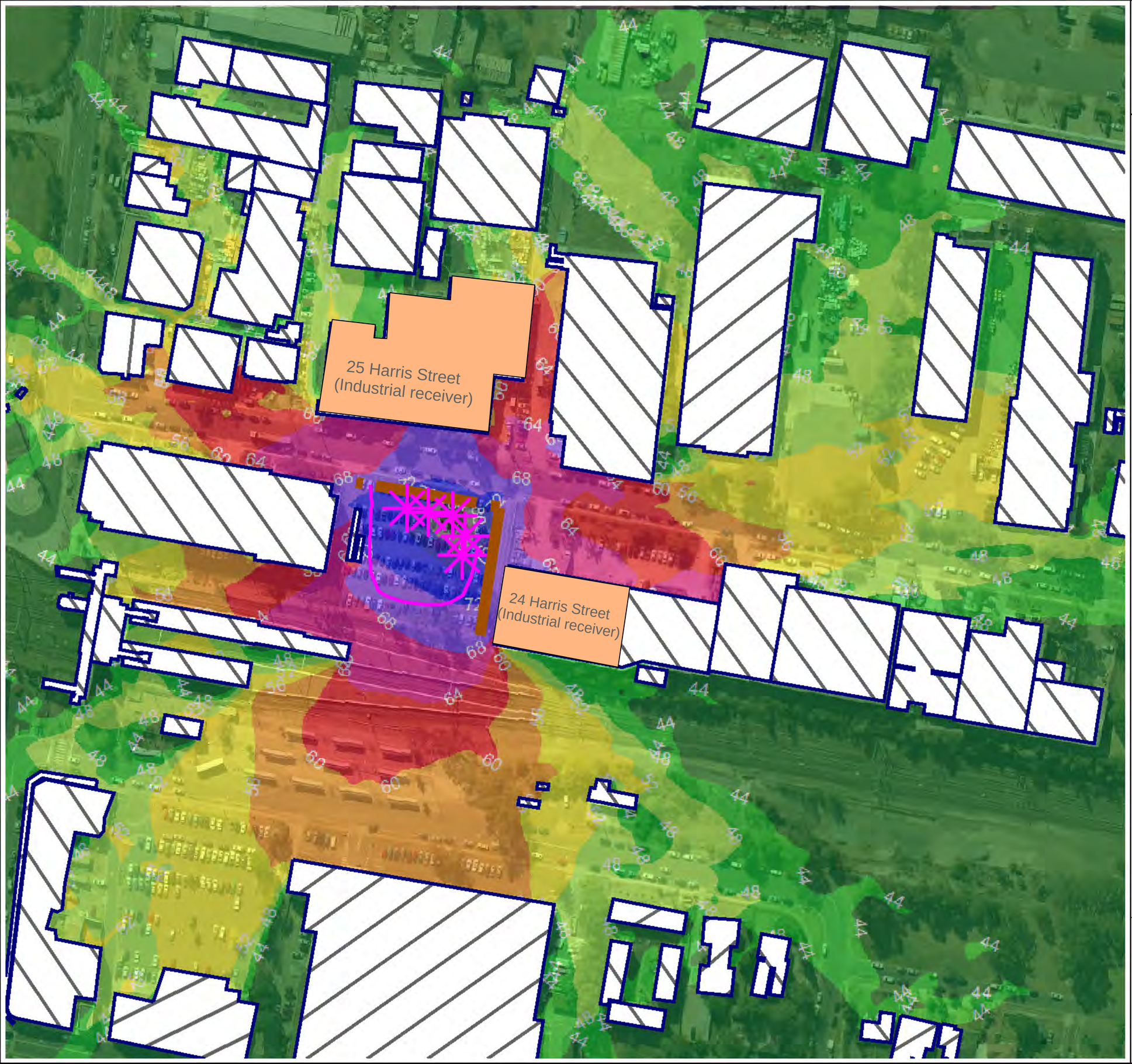

Noise Level
L_{eq}
in dB(A)

<	44
44 -	48
48 -	52
52 -	56
56 -	60
60 -	64
64 -	68
68 -	72
72 -	76
76 -	80
80 -	84
>=	84

ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
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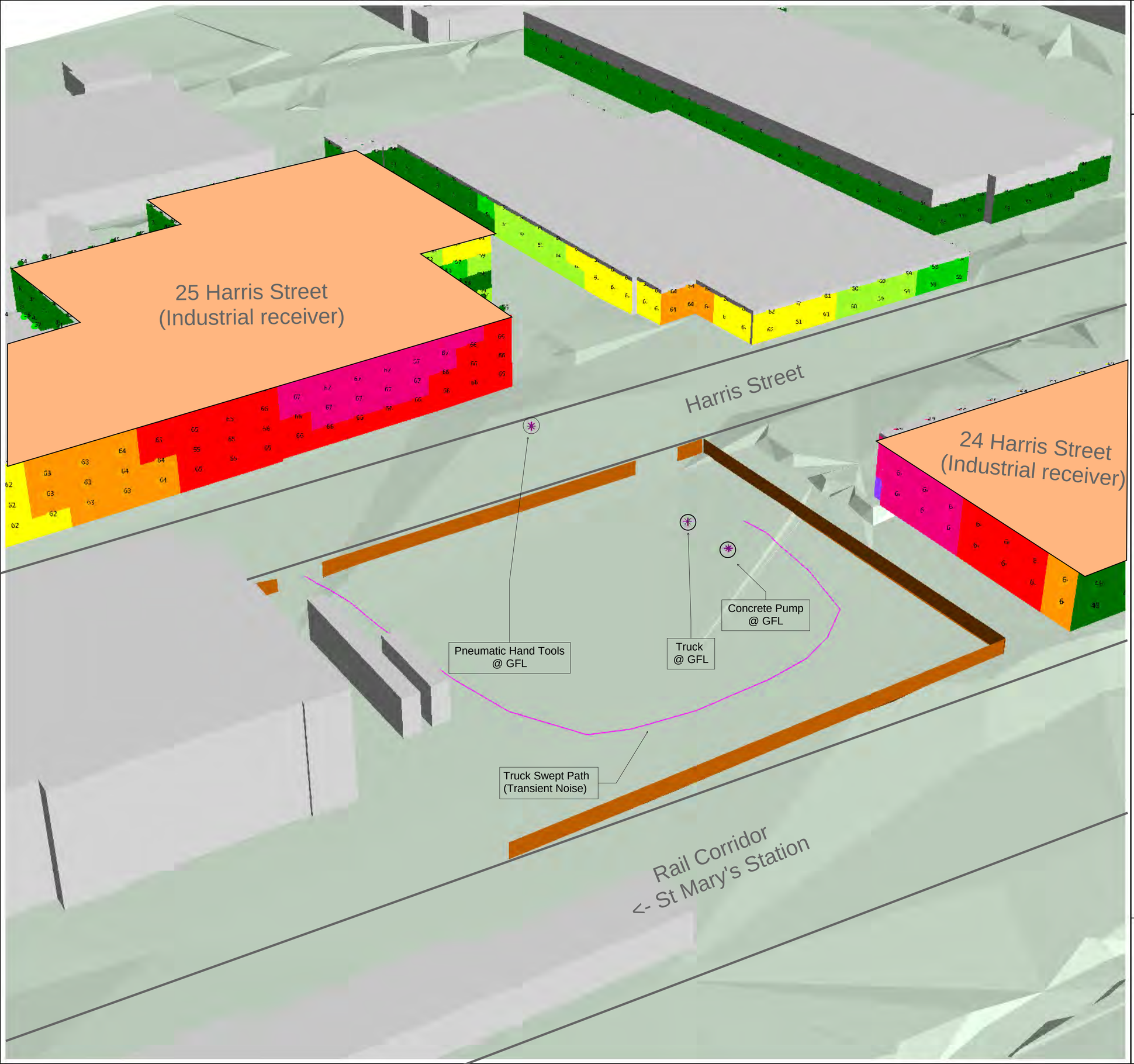

Prepared by: A.Zappia
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◯ At Ground Floor Level ◯ @ 16m above GFL

Noise Level
L_{eq}
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ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck 110dB(A) SWL
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Date: 27/02/2023

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ACOUSTIC LOGIC

St Marys SSTM Project Office

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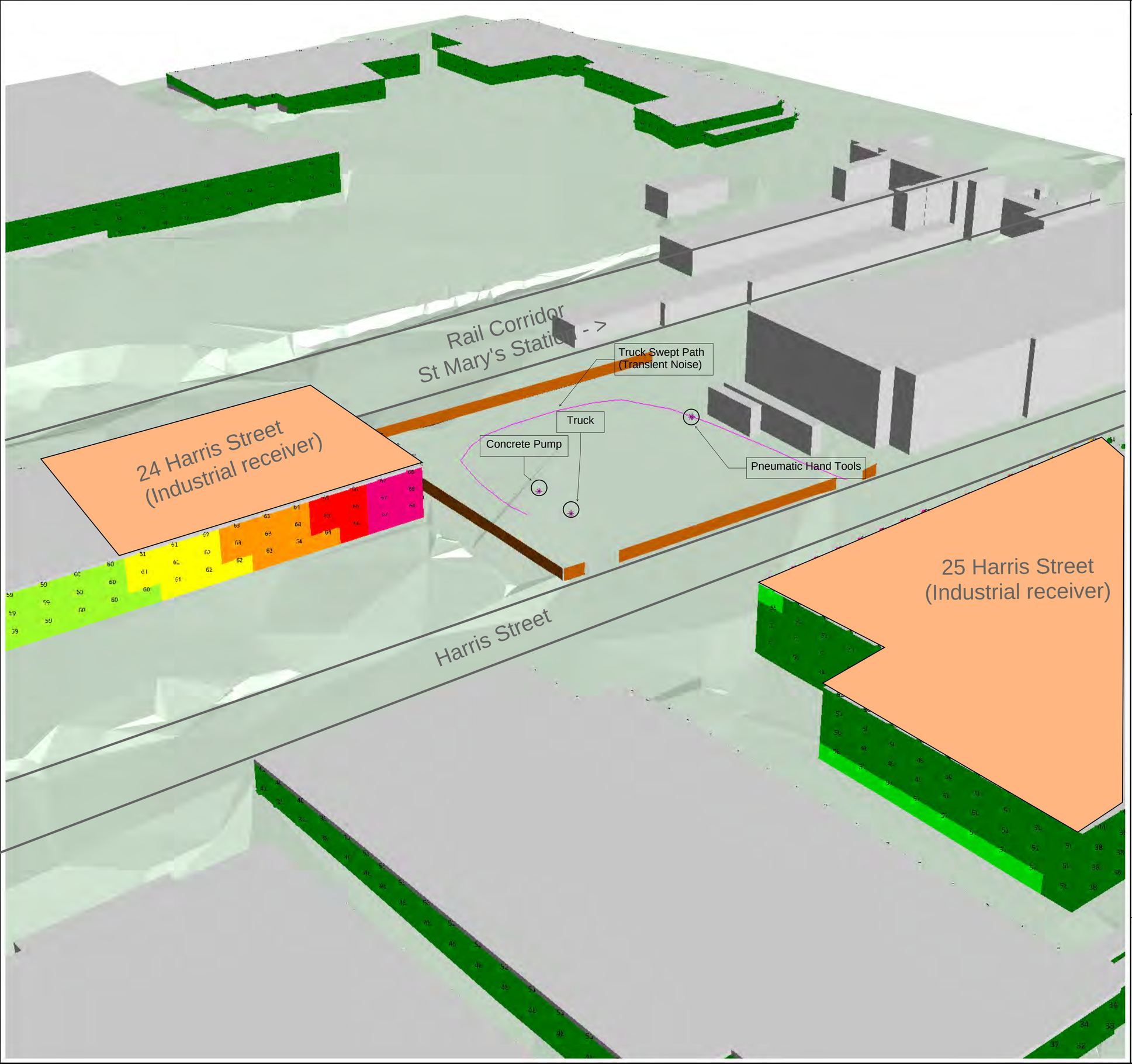

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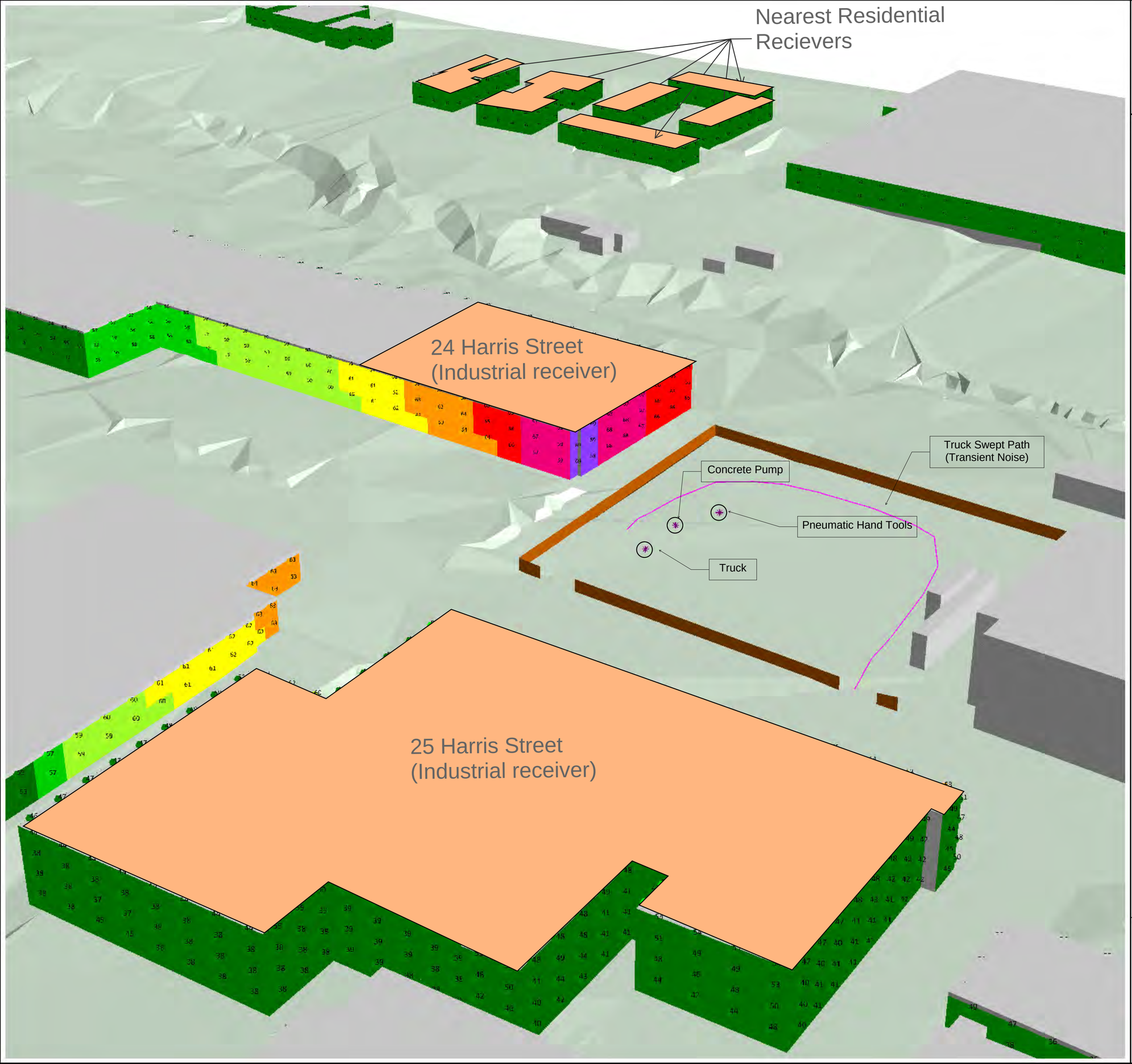

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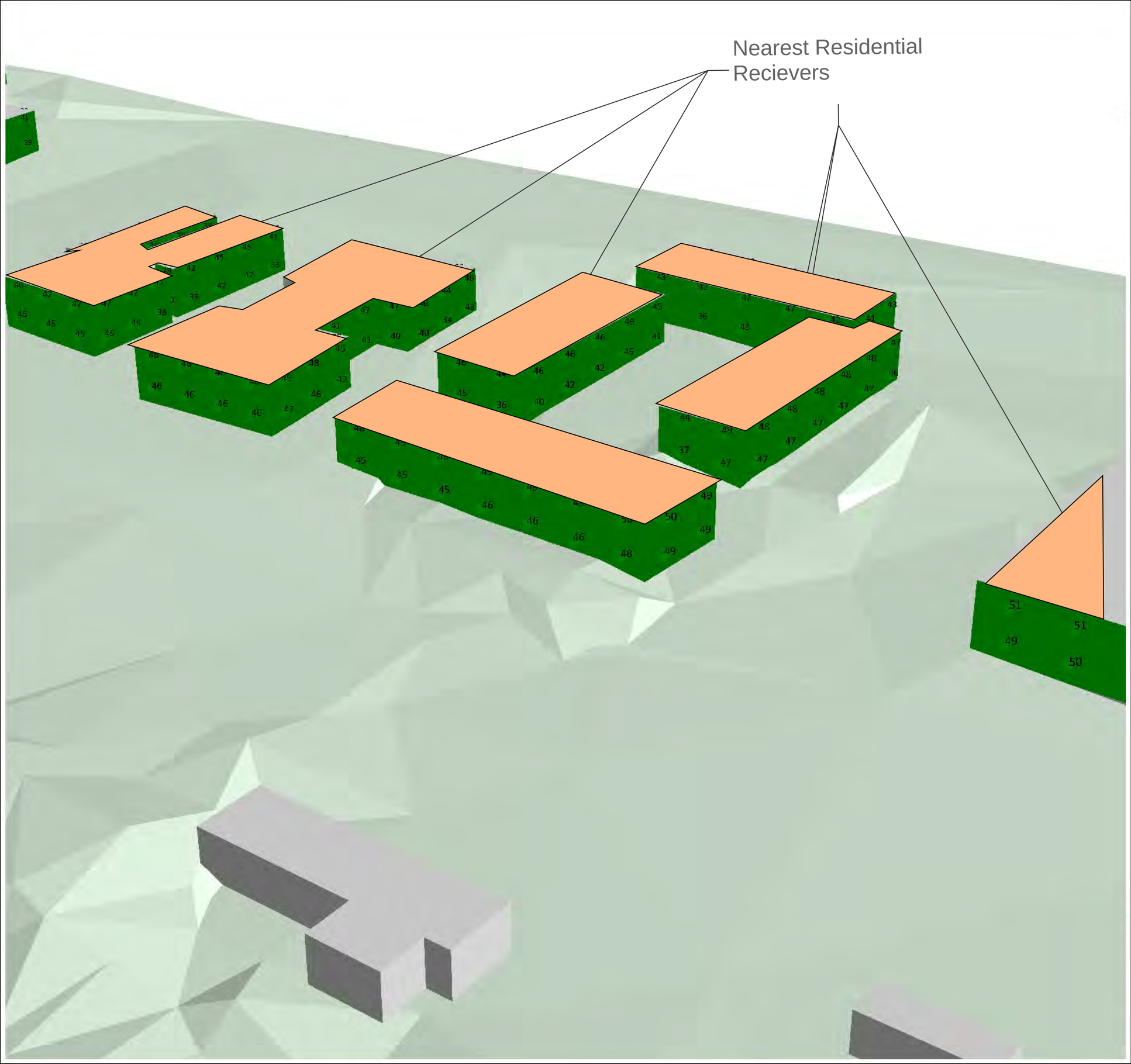
ACOUSTIC LOGIC



St Marys SSTM Project Office

Construction Noise Prediction
16m above GFL Elevation

Truck	**110dB(A) SWL**
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Prepared by: A.Zappia
Date: 27/02/2023

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ACOUSTIC LOGIC

St Marys SSTM Project Office

Construction Noise Prediction
Ground Level Elevation

Truck	**110dB(A) SWL**
Concrete Pump	**102dB(A) SWL**
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Prepared by: A.Zappia
Date: 27/02/2023

25 Harris Street
(Industrial receiver)

24 Harris Street
(Industrial receiver)

Noise Level
L_{eq}
in dB(A)

	< 44
	44 - 48
	48 - 52
	52 - 56
	56 - 60
	60 - 64
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	72 - 76
	76 - 80
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	>= 84

ACOUSTIC LOGIC

St Marys SSTM Project Office

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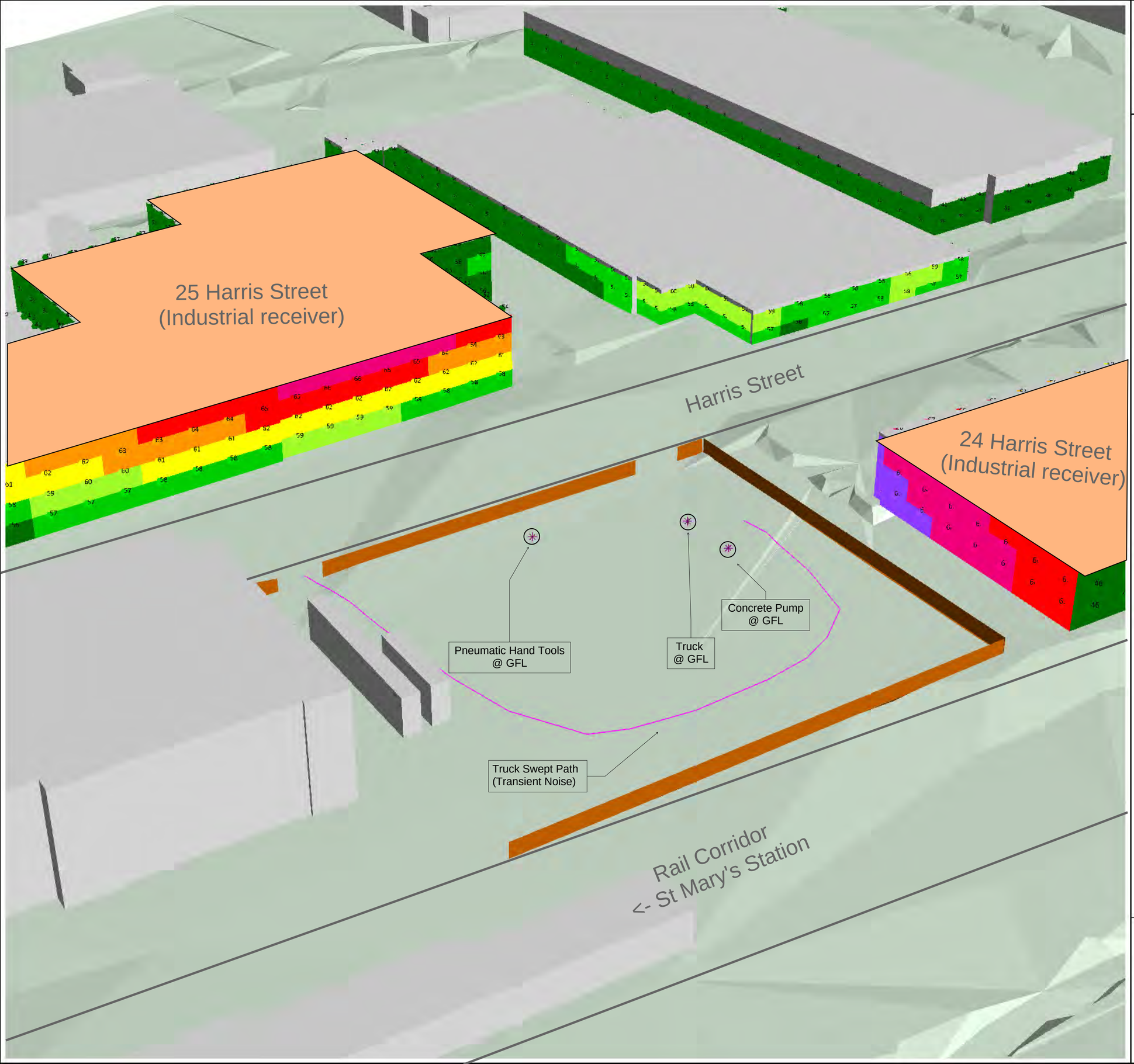

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ACOUSTIC LOGIC

St Marys SSTM Project Office

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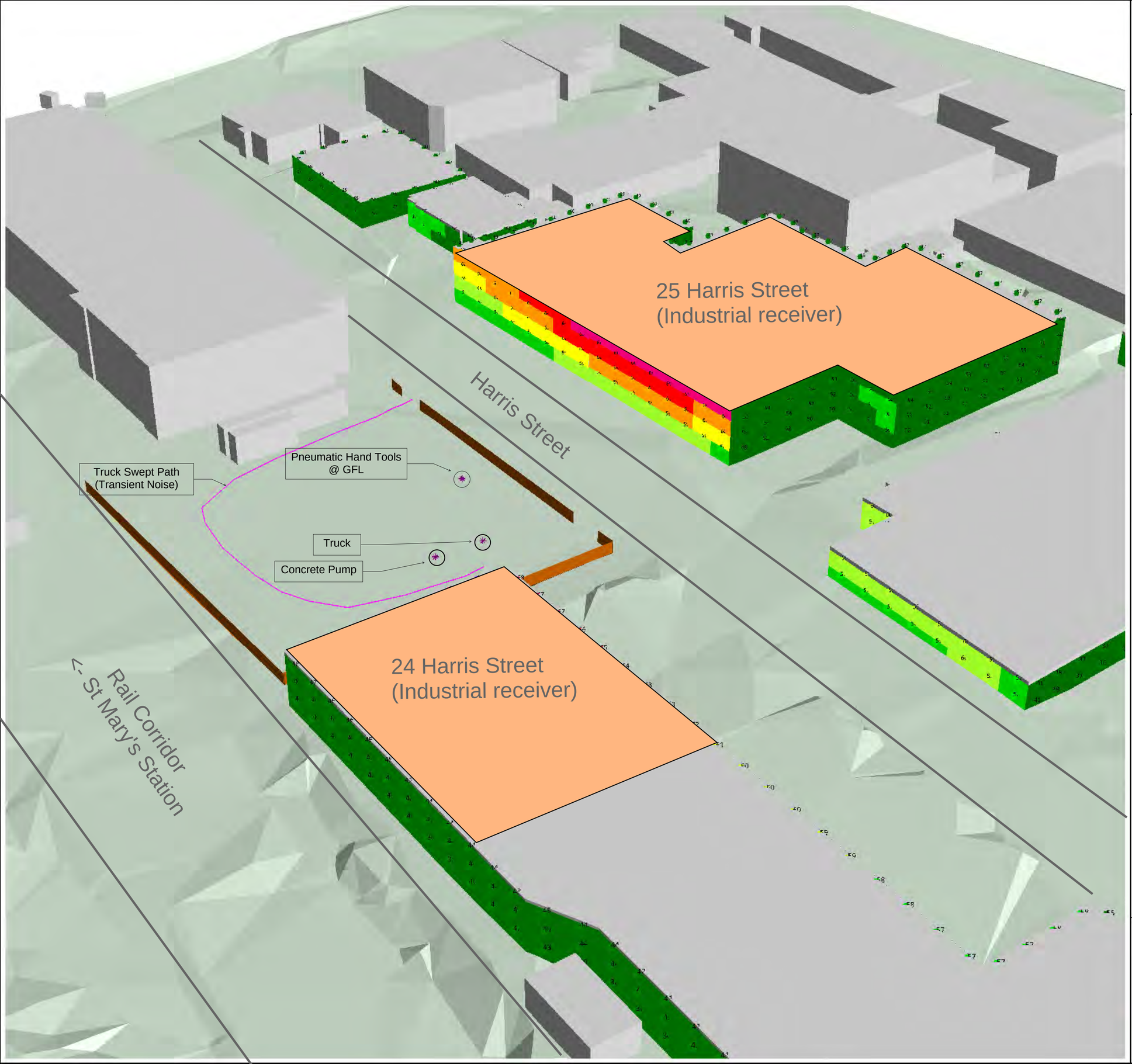

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ACOUSTIC LOGIC

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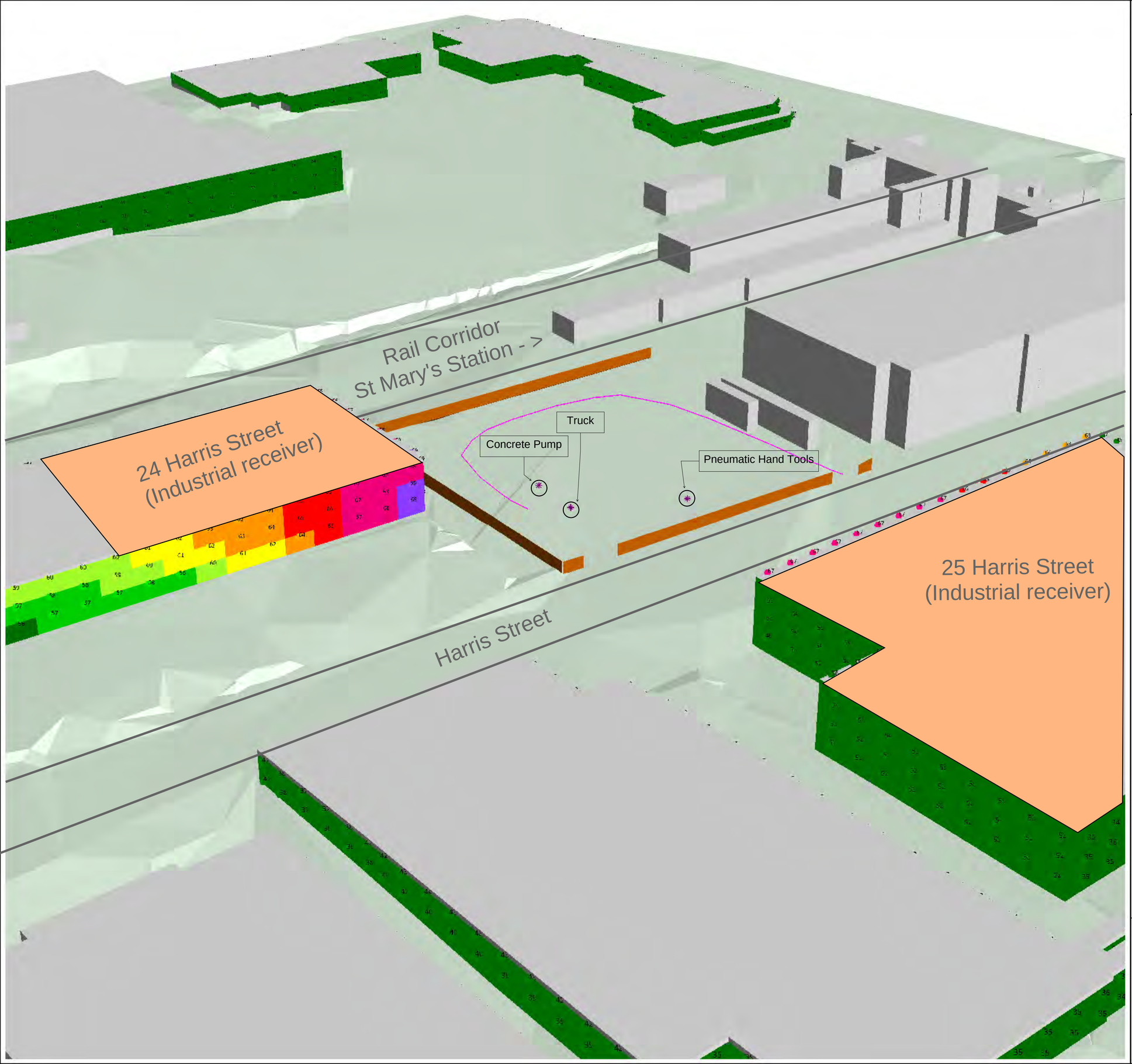

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ACOUSTIC LOGIC

Nearest Residential Recievers

24 Harris Street
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Truck Swept Path
(Transient Noise)

Concrete Pump

Truck

Pneumatic Hand Tools

25 Harris Street
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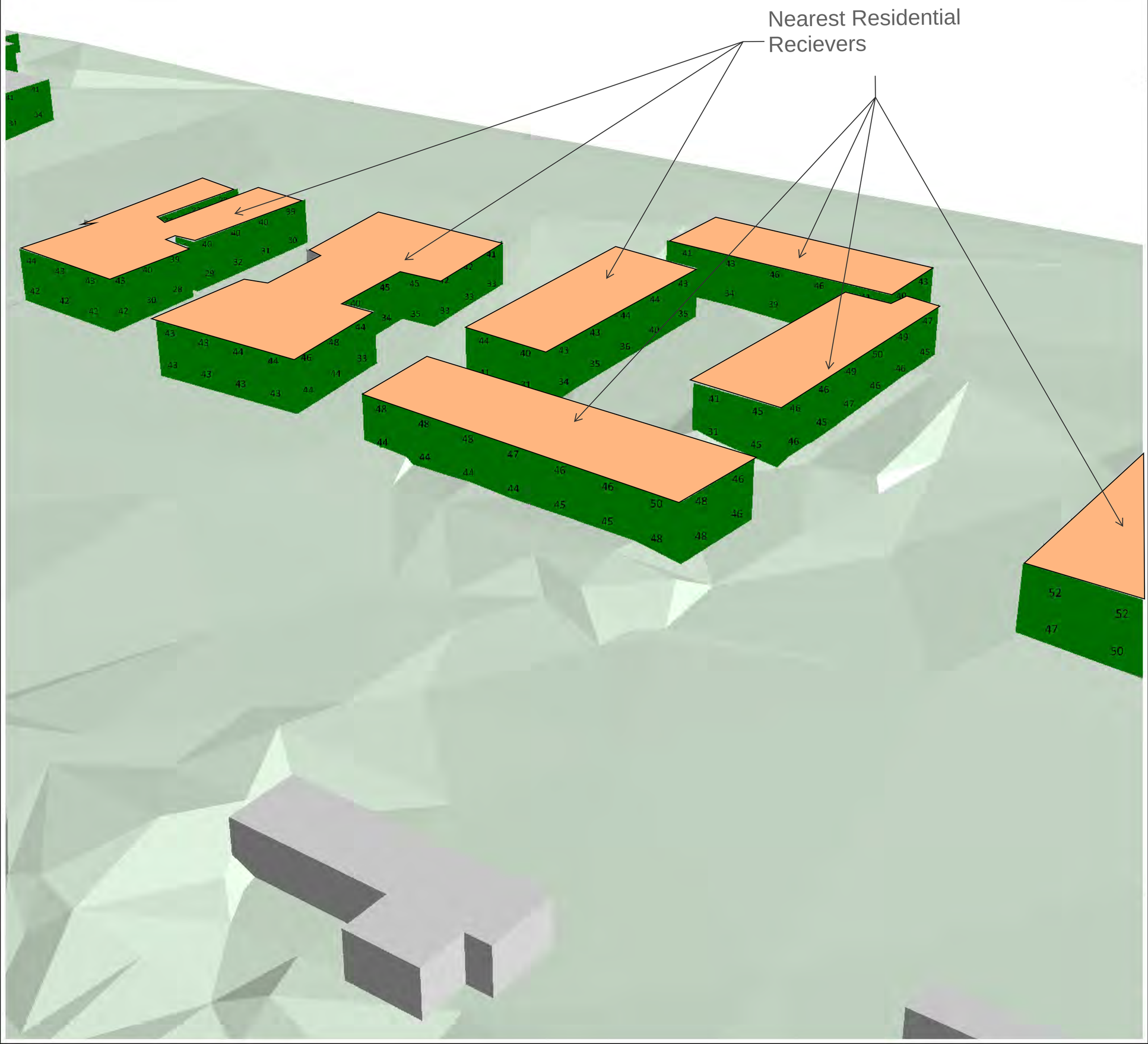
ACOUSTIC LOGIC

St Marys SSTM Project Office



Construction Noise Prediction
Ground Level Elevation

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ACOUSTIC LOGIC

HBI Healthy Buildings International Pty Ltd
A.C.N. 003 270 693 A.B.N. 39 003 270 693

Suite 2.06, Level 2
29-31 Solent Circuit
Norwest NSW 2153

Tel: 61 (02) 9659 5433
e-mail: hbi@hbi.com.au
Web: www.hbi.com.au

Hugh Chapman
Director Sustainability Environment & Planning SMWSA
Sydney Metro
Transport for NSW
PO Box K659
HAYMARKET NSW 1240

1 March 2023

Ref: 201209_DNVIS_SPO_1

Dear Hugh

RE: Approval of the Sydney Metro Western Sydney Airport, Advanced Enabling Works – St Mary's SSTOM Project Office- Detailed Noise and Vibration Impact Statement

Thank you for providing the Sydney Metro Western Sydney Airport – Advanced Enabling Works – St Mary's SSTOM Project Office Detailed Noise and Vibration Impact Statement (Rev 1), dated 23 February 2023 (the DNVIS) for Environmental Representative (ER) review and approval, as the Sydney Metro approved delegate pursuant the Construction Noise and Vibration Standard v4.3 (the CNVS), Section 1.4.4, approved as part of the submissions report under the Sydney Metro Western Sydney Airport project (SSI – 10051 July 23, 2021).

As the Sydney Metro approved delegate, I have reviewed the DNVIS and provided comment, and now consider the DNVIS consistent with the requirements and principles in or under the CNVS.

I remind you that pursuant the CNVS, should the scope of work or the timing of works change, the Principal contractor must update the DNVIS and seek subsequent approval by the ER for the new version.

Yours sincerely

Alex Gale
Environmental Representative – Sydney Metro Western Sydney Airport