



Smithfield Regeneration Code Amendment

Acoustic Assessment

10 November 2025
Reference ID: 482-7

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Abbreviations

Affected Area	The Smithfield Regeneration land area subject to the Code Amendment
Australian Standard	<i>AS/NZS 2107:2016 Australian/New Zealand Standard™ Acoustics—Recommended design sound levels and reverberation times for building interiors</i>
Code	<i>Planning and Design Code</i> Version 2025.20 dated 23 October 2025, PlanSA
Code Amendment	The amendment to the <i>Planning and Design Code</i> to support urban infill and regeneration for approximately 3000 to 5000 medium and high-density dwellings in Smithfield
C_{tr}	Spectrum adaptation
dB	Decibel
dB(A)	An A-weighted Decibel
DO	Desired Outcome of the Code
DTS / DPF	Deemed-to-Satisfy Criteria / Designated Performance Feature of the Code
EP Act	<i>Environment Protection Act 1993</i>
EPA	South Australian Environment Protection Authority
Future Dwellings	The 3000 to 5000 dwellings within the affected area, including medium and high-density accommodation such as row townhouses, semi-detached houses, social housing, aged care, and private apartments.
L_{A90}	The A-weighted background noise level
L_{A90,15min}	The A-weighted background noise level over a 15-minute period
L_{Aeq}	The A-weighted equivalent time-averaged noise level
L_{Aeq,15min}	The A-weighted equivalent time-averaged noise level over a 15-minute period
MBS 010	<i>Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound</i>
Mixed Land Uses	Existing mixed land uses including the Munno Para Shopping Centre retail and supermarket area fronting Main North Road, and the park 'n' ride, child care and aged care facility to the north of the affected area
Overlay	Noise and Air Emissions Overlay
PO	Performance Outcome of the Code
Policy	The <i>Environment Protection (Commercial and Industrial Noise) Policy 2023</i>
Rail Line	Suburban Gawler to City passenger rail line
R_w	Weighted sound reduction index - A method of measuring the noise reduction through a material
R_w + C_{tr}	Weighted sound reduction index with spectrum adaptation. The spectrum adaptation is a method of adjusting the noise reduction performance through a material for the influence of low frequency noise
SEC	Sound Exposure Category

Glossary

Assessment Criteria	The noise levels derived to represent an unreasonable impact on the acoustic amenity of future dwellings for a specific noise generating activity
A-Weighting	A mathematical adjustment to the measured noise levels to represent the human response to sound. An A-weighted noise level is presented as dB(A)
Ambient Environment	The existing acoustic environment in the absence of the Code Amendment
Characteristic	A characteristic determined in accordance with the Policy to be fundamental to the nature and impact of the noise. For example, a noise source is deemed to exhibit a characteristic if it produces distinctive tonal, impulsive, low frequency, intermittent or modulating features
Day	A period defined by the Policy as between 7.00am and 10.00pm
Decibel	The logarithmic unit of measurement to define the magnitude of a fluctuating air pressure wave. Used as the unit for sound or noise level
Equivalent Noise Level	The A-weighted noise level that is equivalent to a noise level which varies over time. The descriptor is L_{Aeq} and it is the A-weighted source noise level (continuous) referenced in the Policy
Frequency	Represents the number of fluctuating air pressure waves in one second. High frequency sound (high pitch or squeal) will generate many waves and low frequency sound (bass or rumble) will generate a small number of waves. The unit of frequency is Hertz (Hz)
Habitable room	The same definition as under the Building Code of Australia, being a room used for normal domestic activities. It includes <i>a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods</i>
Indicative Noise Level	The noise level assigned by the Policy at a location to represent an impact on the acoustic amenity at that location. The indicative noise level is adjusted to develop assessment criteria
Night	A period defined by the Policy as between 10.00pm and 7.00am
Noise	An interchangeable term with sound but which is most often described as unwanted sound
Sensitive Receiver	The same meaning as under <i>Part 8 Administrative Terms and Definitions</i> of the Code. Defined as: a. <i>any use for residential purposes or land zoned primarily for residential purposes</i> b. <i>child care facility</i> c. <i>educational facility</i> d. <i>hospital</i> e. <i>supported accommodation</i> f. <i>tourist accommodation</i>

Sound	An activity or operation which generates a fluctuating air pressure wave. The ear drum can perceive both the frequency (pitch) and the magnitude (loudness) of the fluctuations to convert those waves to sound
Sound Pressure Level	The magnitude of sound (or noise) at a position. The sound pressure level can vary according to distance to the noise source, and operational, meteorological and topographical influences. The terms Sound Pressure Level and Noise Level are used interchangeably in this assessment

Summary

The Smithfield Regeneration amendment to the *Planning and Design Code* (the **Code Amendment**) is proposed to support urban infill of Renewal SA land and regeneration of surrounding suburban areas at Smithfield (the **affected area**). The Code Amendment will result in approximately 3000 to 5000 dwellings, including medium and high-density accommodation such as row townhouses, semi-detached houses, social housing, aged care, and private apartments (**future dwellings**). The affected area includes recreational open space, the Gawler railway line, the Smithfield and Broadmeadows Railway Stations, as well as the Munno Para Shopping City complex.

Noise level measurements of the ambient environment have been conducted at strategic locations throughout the affected area. The noise level results are typical of metropolitan residential areas, near roads and passenger rail corridors. That is, the ambient environment at the measurement locations does not impede the introduction of future dwellings in the affected area, subject to consideration of localised effects near existing mixed land uses.

Portions of the affected area are adjacent the Gawler to City suburban passenger rail line and Main North Road. These interfaces can be reasonably and practicably addressed utilising existing mechanisms in the *Planning and Design Code* (the **Code**), being the Noise and Air Emissions Overlay (the **Overlay**) and the *Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound* (**MBS 010**).

Existing mixed land uses have been inspected and identified including the Munno Para Shopping Centre retail and supermarket area fronting Main North Road, and more particularly, their loading docks facing the affected area, and the park 'n' ride, child care, and aged care facility to the north (the **mixed land uses**).

Noise modelling of the mixed land uses has been conducted to consider the impact on the affected area. The acoustic assessment determines that the interface with the mixed land uses can be addressed by incorporating reasonable and practicable noise reduction measures into a specific area of future dwellings utilising the Overlay and MBS 010. Preliminary code amendment and structure planning input also contributed to the Concept Plan layout, and the proposal for *Interface Treatment* that will provide a buffer between the loading docks and the future dwellings.

Based on this acoustic assessment, the impacts of the road, rail, and mixed land use interfaces with future dwellings will be addressed by placing a specific extent of the affected area in the Overlay.

It is recommended that mechanisms continue to be explored to assist with the pragmatic adaptation of reasonable and practicable noise reduction measures to future dwellings located in the overlay to ensure:

1. the acoustic amenity of future dwellings is not adversely impacted by mixed land uses and the road and rail corridors, in accordance with the interface provisions of the Code
2. the Code Amendment does not unreasonably constrain the operation of mixed land uses.

Introduction

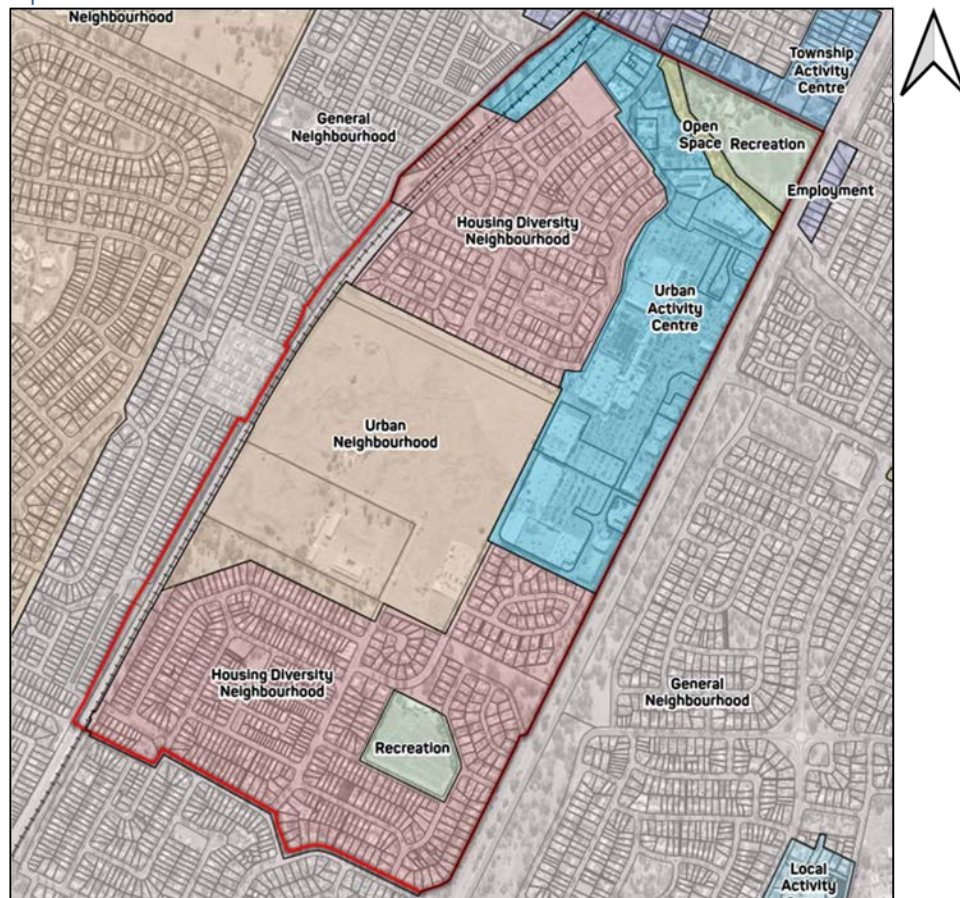
The Smithfield Regeneration amendment to the *Planning and Design Code* (the **Code Amendment**) is proposed to support urban infill of Renewal SA land and regeneration of surrounding suburban areas at Smithfield (the **affected area**). The Code Amendment will result in approximately 3000 to 5000 dwellings, including medium and high-density accommodation such as row townhouses, semi-detached houses, social housing, aged care, and private apartments (**future dwellings**). The affected area includes recreational open space, the Gawler railway line, the Smithfield and Broadmeadows Railway Stations, and the Munno Para Shopping City complex.

The Code Amendment includes the following:

- A General Neighbourhood Zone becoming a combination of Urban Neighbourhood, and Housing Diversity Neighbourhood Zones
- An area of Urban Activity Centre Zone becoming a Recreation Zone
- Areas of Urban Activity Centre Zone, Recreation Zone, and Open Space Zone being retained.

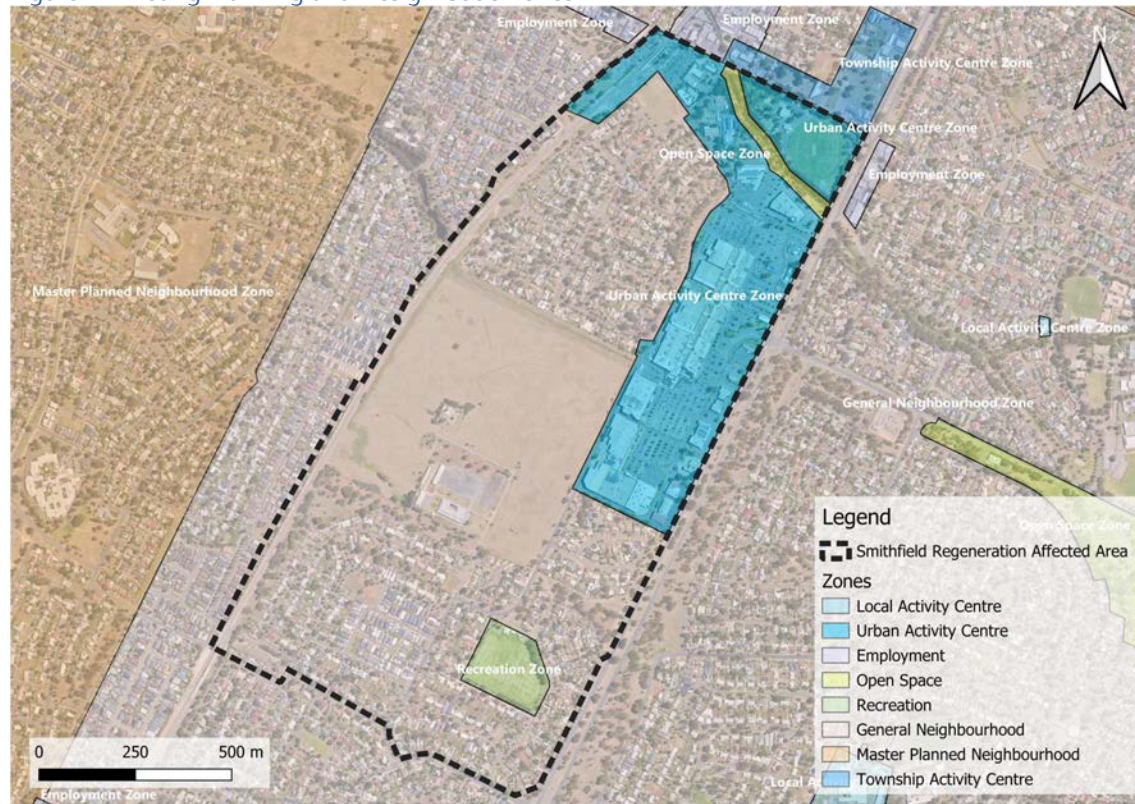
The mix of zones proposed by the Code Amendment is shown in Figure 1, and a Concept Plan showing the intended areas of residential development, potential open space, detention basins and recreational corridors is provided in Appendix A.

Figure 1 Proposed Code Amendment Zones



The existing *Planning and Design Code* zones in and around the affected area are shown in Figure 2 for reference.

Figure 2 Existing Planning and Design Code Zones



Source South Australian Property and Planning Atlas

The affected area is bounded by the Gawler to City passenger railway line to the northwest (the **rail line**), Main North Road to the southeast (the **road**), an existing residential area to the southwest, and various commercial land uses to the northeast.

In addition to these external interfaces, future dwellings will also internally interface with the Urban Activity Centre Zone commercial operations, including the Munno Para Shopping Centre retail and supermarket area fronting Main North Road, and more particularly, their loading docks facing the residential area, and the park 'n' ride, child care, and aged care facility to the north (the **mixed land uses**). The affected area and these interfaces are identified in Figure 3.

Figure 3 Affected Area and Interface Issues



Source South Australian Property and Planning Atlas

In broad terms, the Code Amendment does not introduce any new interfaces that do not already exist between residentially zoned land and noise sources such as the road, the rail line, recreational facilities and mixed land uses. The Code Amendment proposes to rezone land that already promotes residential development to other comparable zones that also promote residential development, albeit at higher densities.

Notwithstanding, this acoustic assessment (the **assessment**) considers the impact of each future residential land use interface created by the Code Amendment. The key objectives are to ensure that the Code Amendment policy response, including the mix of new zones, overlays and concept plans, achieve the following:

1. the acoustic amenity of future dwellings is not adversely impacted by mixed land uses and the road and rail corridors, in accordance with the interface provisions of the Code
2. the Code Amendment does not unreasonably constrain the operation of the mixed land uses in the Urban Activity Centre Zone.

The assessment is based on contemporary design standards for residential interfaces with road, rail and mixed land uses, and determines indicative noise control measures for future dwellings, to confirm that the outcomes will be reasonable and practicable to implement.

Ambient Environment

Noise level measurements of the ambient environment and site inspections have been conducted at specific locations within the affected area. Significant areas of infill and redevelopment are proposed in the vicinity of the rail line and the mixed land use loading docks as identified in Figure 3, where there is vacant land. Site investigations therefore focused on these areas, although all interface issues are considered in this assessment.

Rail Line

Noise levels were continuously measured from 9 to 14 August 2024, at the location shown in Figure 4. A Rion NL-43 sound level meter was used to measure noise levels using a microphone and wind shield at a height of approximately 1.5m above ground level.

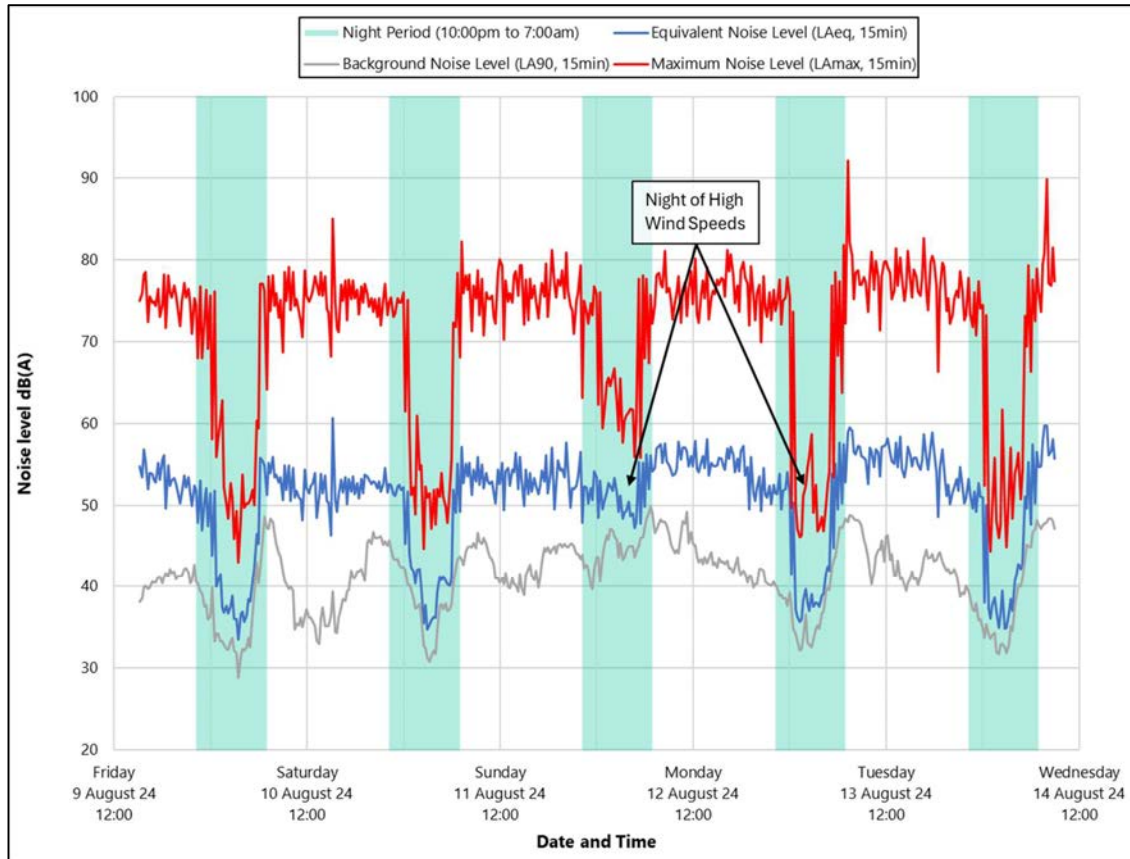
Figure 4 Noise Monitoring Locations within Affected Area



Source South Australian Property and Planning Atlas

The noise level measurement results are provided in Figure 5, noting that on two nights the data was affected by continuously high wind speeds (above 5m/s). The data outside of this period represents typical noise levels experienced within the ambient environment of the affected area, near the rail line. Lower noise levels should be expected with increased separation distance from the rail line, noting that at some point within the existing residential area, noise levels will start to increase again near the road.

Figure 5 Noise Monitoring Results



The noise level results are typical of metropolitan residential areas in the vicinity of a passenger rail line noting that the equivalent noise levels (L_{Aeq}) and the maximum noise levels (L_{Amax}) are reasonably constant during the period of rail corridor use. The background noise levels (L_{A90}) are relatively low, indicating the lulls which occur in between trains. Ultimately the results are indicative of an infrequent short term but regularly occurring high noise event (such as a train passing).

To maintain residential amenity, the noise level measurements indicate this interface will benefit from the application of specific mechanisms designed to address rail noise.

Mixed Land Uses

Site inspections were conducted on 9 and 14 August 2024 around the loading docks of the mixed land uses in the Urban Activity Centre Zone. The loading docks largely face the area proposed for urban infill development. To the northeast, the loading docks also face an area of existing dwellings and so the interface between mixed land uses and dwellings already exists in the affected area.

During the inspections, no trucks entered or exited the loading docks, and forklifts were not actively being used. A noise modelling approach that is based on established noise level data for similar activities has therefore been conducted to supplement the on-site observations. The noise modelling allows for worst case noise level scenarios to be considered, rather than simply measuring the level of activity that occurs when conducting a site inspection. The observations indicate that these loading docks are unlikely to regularly operate concurrently.

The noise modelling approach is described in the following sections of this assessment, noting that the observations and desk top review of publicly available imagery has confirmed that the following noise sources could operate within the loading docks:

- Gas, diesel and/or electric forklifts
- Trucks up to semi-trailer in size (unrefrigerated)
- Vans and rigid trucks (unrefrigerated)
- Isolated loading docks (supermarket) with refrigerated trucks
- Passenger and commercial vehicles (with or without trailers) for the collection of goods.

To maintain residential amenity, the observations and noise modelling approach indicate the mixed land use interfaces will benefit from the application of specific mechanisms designed to address loading dock activities.

Road

The Code Amendment does not introduce an interface between vacant residentially zoned land and the road. There are existing dwellings along this interface within the affected area.

Therefore, whilst specific mechanisms are available to maintain residential amenity at this interface, those mechanisms will only apply to future ad hoc residential infill rather than contemporary large scale new residential development.

Detailed Assessment Items

Based on the noise level data and on-site observations, the ambient environment does not impede the introduction of future dwellings. This reiterates the concept that the Code Amendment does not fundamentally altering the intended land uses through the affected area. There are specific mechanisms which can be designed to maintain residential amenity at the rail, mixed land use and road interfaces, as detailed in the following sections.

The assessment confirms those mechanisms result in measures which are reasonable and practicable to implement.

Policy Framework

The Planning and Design Code

The Code Amendment proposes the following zone changes will be made under the *Planning and Design Code* Version 2025.20 dated 23 October 2025 (the **Code**), as identified in Figure 1:

- A General Neighbourhood Zone will become a combination of Urban Neighbourhood, and Housing Diversity Neighbourhood Zones
- An area of Urban Activity Centre Zone becoming a Recreation Zone.

There will be areas of the existing zone arrangement that will be retained in the affected area. The proposed changes and areas of retention of the existing zone arrangement are depicted in Figures 1 and 2 of this assessment.

The provisions from the Code that are relevant to this assessment and/or assist in the consideration of the impacts of road, rail corridor and mixed land use interfaces are summarised in Appendix B.

In broad terms, the Interface Between Land Uses provisions (Part 4 - General Development Policies) seek development *to be located and designed to mitigate adverse effects on or from proximate land uses*, such that:

1. the acoustic amenity of future dwellings is not adversely impacted by mixed land uses and the road and rail corridors, in accordance with the interface provisions of the Code
2. the Code Amendment does not unreasonably constrain the operation of mixed land uses in the Urban Activity Centre Zone.

There are overlays in the Code which can be used to assist in the design of future dwellings *to mitigate adverse effects*, achieve acoustic amenity outcomes and result in existing land uses not being unreasonably constrained. These include the Noise and Air Emissions Overlay (the **Overlay**), which requires sensitive receivers to consider the impacts of road, rail, (aircraft), and mixed land uses.

Ministerial Building Standard MBS 010

The contemporary method of addressing the noise from transport corridors into future dwellings and mixed land use interfaces is provided by the *Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound (MBS 010)*. MBS 010 is established to *prevent loss of amenity for the occupants* of future dwellings and achieves this by specifying acoustic requirements for floors, external walls, windows, external doors, roof and ceilings, and mechanical ventilation systems for those dwellings.

The acoustic requirements of MBS 010 for future dwellings are mandated for an area that is designated within the Overlay. The satisfaction of the mandated MBS 010 requirements relating to floors, external walls, windows, external doors, roof and ceilings, and mechanical ventilation systems is confirmed under Building Rules Certification.

The satisfaction of MBS 010 is considered to address the Overlay provisions.

The Environment Protection (Commercial and Industrial Noise) Policy 2023

Legislative noise limits which provide for the reasonable protection of acoustic amenity are established by the *Environment Protection (Commercial and Industrial Noise) Policy 2023* (the **Policy**). The Policy is referenced under the provisions of the Code. The Policy provides a method to assess noise from mixed land uses to future dwellings.

The Policy was developed under the *Environment Protection Act 1993* (the **EP Act**). The EP Act incorporates a requirement to ensure the acoustic amenity is not unreasonably interfered with by a noise generating activity. The Policy provides a quantitative approach, adjusted according to land use zone provisions, to satisfy this requirement.

The Policy acknowledges that new dwellings can occur adjacent lawfully existing noise generating activities by allowing those dwellings to incorporate noise control measures that provide adequate internal acoustic amenity for occupants.

Where the Policy is achieved, no further action against the existing noise generating activity can be taken under the EP Act. That is, if the future dwellings are designed to achieve the Policy when located adjacent an existing noise generating activity, then the Policy protects that existing noise generating activity against unreasonable constraint of their existing operations.

The mixed land uses within and adjoining the affected area will not be constrained if the future dwellings are designed to achieve the internal noise levels of the Policy. The internal noise levels of the Policy and an indication of the noise control measures to achieve them are summarised in the Mixed Land Use section of this assessment.

Road and Rail

The affected area is bounded by Main North Road (the **road**), which is a *designated Type A road* in the *SA Property and Planning Atlas*, and the Gawler to City passenger rail line (the **rail line**).

The application of the Overlay (and therefore MBS 010) will ensure there is no *loss of amenity for the occupants* of the future dwellings from the road and the rail line.

The following assessment demonstrates the MBS 010 methodology, determines the likely treatment for the affected area, and the extent of the affected area where the Overlay is recommended to apply.

Assessment Criteria

Performance Requirements

The MBS 010 *Performance Requirements* for noise levels inside **habitable rooms** of future dwellings are repeated in Table 1. The *Performance Requirements* establish an equivalent noise level (L_{Aeq}) to be achieved in habitable rooms during the night (10.00pm to 7.00am the following day):

Table 1 MBS 010 *Performance Requirements* for Traffic Noise

Type of Room	Internal sound criteria, $L_{Aeq,night}$ <i>Averaged over the relevant habitable rooms in the future dwelling</i>	Internal sound criteria, $L_{Aeq,night}$ <i>Maximum allowable for individual habitable rooms in the future dwelling</i>
Bedroom	30 dB(A)	35 dB(A)
Other habitable rooms	35 dB(A)	40 dB(A)

MBS 010 provides two assessment pathways to meet the *Performance Requirements*, being the *Deemed-to-Satisfy provisions* and a *Performance Solution*.

The *Deemed-to-Satisfy provisions* provide a standardised suite of noise reduction measures that are applicable to floors, external walls, windows, external doors, roof and ceilings, and mechanical ventilation systems for future dwelling designs and constructions.

A *Performance Solution* enables the noise reduction measures to be refined based on the actual level of noise in the ambient environment and specific future dwelling designs using an alternative assessment methodology. The *Performance Solution* methodology is well suited to consideration of individual dwelling designs, as it allows for customisation of the treatments with different materials and build-ups to suit that specific design. As noted in the Ambient Environment section of this assessment, an overnight noise level ($L_{Aeq,night}$) in the order of 50 dB(A) has been measured at the setback distance to the rail line envisaged for future dwellings under the Concept Plan. The level is lower than the threshold nominated under MBS 010 where treatments would be needed for future dwellings when applying a *Performance Solution* (whilst the *Deemed-to-Satisfy provisions* would still apply at this set back distance).

In the absence of individual dwelling designs at the Code Amendment stage, the standardised suite of noise control measures under the *Deemed-to-Satisfy provisions* is used in this assessment to demonstrate the practical ability to construct dwellings near both the rail line and the road.

This assessment method does not preclude a *Performance Solution* methodology being conducted in the future to refine (and potentially remove) the noise control measures subject to railway noise levels at the time.

Deemed-to-Satisfy

MBS 010 outlines a specific method to achieve the *Deemed-to-Satisfy Solution* based on the *Sound Exposure Category (SEC)* of each element of a future dwelling.

The SECs associated with a rail line are determined based on the *separation distance* to the future dwelling. The SECs associated with a designated road are determined based on the *road type*, the *speed limit* and the *separation distance* to the future dwelling.

Minimum acoustic ratings for each building element are then assigned according to the SEC. The higher the SEC, the higher the acoustic ratings for each building element. SEC 1 represents minor upgrades to a standard building construction, SEC 2 represents reasonable and practicable upgrades to a standard building construction, SEC 3 represents significant upgrades, and SEC 4 and 5 have extensive implications.

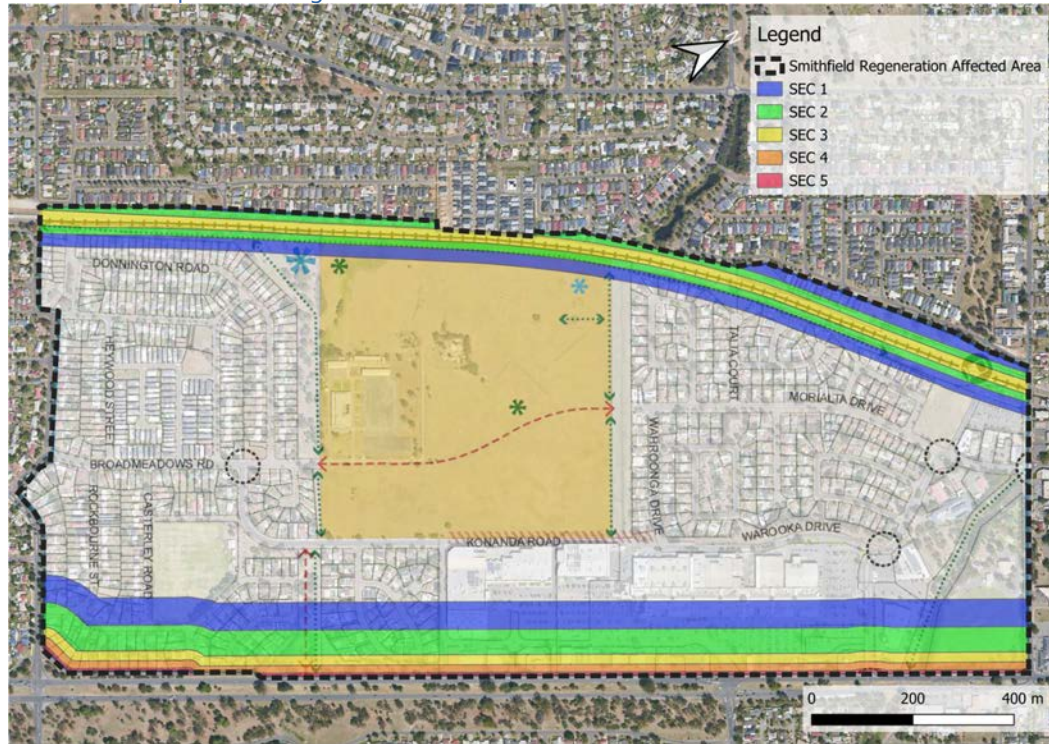
Where no SEC applies, “standard” building materials and techniques are sufficient to satisfy MBS 010.

Main North Road is a *Type-A* road with a posted speed limit of 80 km/hour through the affected area, resulting in a range of SECs over a prescribed distance of approximately 150m from the road corridor. The road corridor is as defined in the Code (as shown in Figure 6). At the southeast corner of the affected area, the designated road is wider than Main North Road itself resulting in an inconsistent distance of impact within the affected area near Rockbourne Street.

Similarly, varying SECs apply to the western side of the affected area near the rail line over a prescribed distance of approximately 50m from the closest line. The current concept planning arrangement for the affected area, as shown in Appendix A, indicates that there will be a recreational corridor that buffers future dwellings from the rail line. As such, the practical outcome will be that only a small area of future dwellings will be within the prescribed distance of the Overlay and MBS 010.

The SECs applicable to the area adjacent the road and the rail line are shown in Figure 6.

Figure 6 Sound Exposure Categories for Road and Rail



Source South Australian Property and Planning Atlas

Preliminary Assessment

A Preliminary Assessment has been conducted to demonstrate that future dwellings can practically be developed within the affected area, should the Code Amendment proceed, using the methods of the Overlay and MBS 010.

The final treatments will be subject to individual dwelling designs and whether a *Deemed-to-Satisfy* methodology is used, or an alternate *Performance Solution*.

In broad terms, MBS 010 provides *Deemed-to-Satisfy* construction materials and methods to achieve SEC 1 through 4. An area falling within SEC 5 is required to be assessed against a *Performance Solution*.

The affected area includes allotments that are within a separation distance requiring SEC 1 through 5 (with SEC 4 and 5 representing a minor portion of the affected area near Main North Road). It is noted that the area applicable to SEC 5 is limited to the existing Urban Activity Centre Zone and the yards of existing dwellings along Main North Road. Provided a similar set back distance to Main North Road is maintained for new built form (being the actual dwelling) as is currently the case, then no future dwelling would be subject to SEC 5 (extreme) acoustic treatments.

The application of *Deemed-to-Satisfy* construction methods and materials in conjunction with the location and design of the future dwellings is considered reasonable and practicable in the vicinity of the road and the rail line. The acoustic ratings and example construction methods to achieve SEC 1 through 4 are summarised in Appendix C, and will be minimised through the recreational corridor that buffers future dwellings from the rail line and maintaining similar setback distances at the road as existing dwellings.

A *Performance Solution* based on the actual noise levels at future dwellings is likely to rationalise the *Deemed-to-Satisfy* construction methods and materials. It may be conducted at the time of individual development applications, the land subdivision, or as a more proactive coordinated approach using a mechanism like a land management agreement.

Recommendations

The application of the Overlay in accordance with Figure 7 will address the road and rail interface with future dwellings in the affected area. It should be noted that the Code Amendment does not introduce any new interface issues with the road or rail line given these areas already promote residential development (General Neighbourhood Zone). Rather, the implementation of the Overlay will ensure that the development of future dwellings is in line with contemporary design standards and will result in reasonable and practicable outcomes.

Figure 7 Noise and Air Emissions Overlay for Road and Rail



Source South Australian Property and Planning Atlas

Mixed Land Use Interface

Mixed land use interfaces are expected to occur where future dwellings are developed near the existing and future mixed land uses in the Urban Activity Centre Zone, as identified in Figure 3.

Mixed land uses have been observed and identified, and their activities considered. The mixed land use interfaces within the affected area are not modified by the Code Amendment. Rather, when urban infill occurs, a direct interface will be created between this activity and dwellings, where it previously only interfaced with vacant General Neighbourhood Zone land.

The Concept Plan shown in Appendix A includes *Interface Treatment* for the mixed land use to residential interface. The treatment may include a proposal to upgrade and/or widen Konanda Road to increase separation distance to future dwellings from the large format retail loading docks. Likewise, the existing area of open space between the supermarkets and existing dwellings will be retained, meaning future dwellings will not encroach on these existing mixed land use activities. These measures are considered in the assessment.

Assessment Criteria

The Policy Framework section of this assessment notes that the mixed land uses will not be constrained where future dwellings are designed to achieve the Policy indicative (external or internal) noise levels.

The Policy establishes the indicative noise levels based on:

1. the period of operation of the existing land use, being either the day (7.00am to 10.00pm) or night (10.00pm to 7.00am the following day)
2. the principal land uses promoted in the zones of the mixed land uses and the future dwellings
3. whether noise reduction measures have been applied to the future dwellings.

The noise levels in Table 2 are derived based on the average of the indicative noise levels using the principal land use/s in the respective zones of both the mixed land uses (being a Urban Activity Centre Zone) and the future dwellings (being the Urban Neighbourhood Zones, and the Housing Diversity Zone).

Based on the above, the Policy establishes the noise criteria in Table 2 at future dwellings in the affected area, for existing approved land uses and the current Code Amendment zone arrangement.

In determining the noise criteria in Table 2, it is important to note that the indicative noise levels are also adjusted according to whether the noise generating activity is an existing approved land use or a new development which did not previously exist. Less stringent noise levels are applied to future dwellings being developed near existing mixed land uses in acknowledgement of the reduced sensitivity of future dwellings to known existing activities in their ambient environment (amongst other factors).

Table 2 Policy Outdoor Indicative Noise Levels

Zone of Future Dwelling	Indicative Noise Levels Applicable to Existing Land Use in Urban Activity Centre Zone	
	Day LAeq dB(A) (7.00am to 10.00pm)	Night LAeq dB(A) (10.00pm to 7.00am)
Urban Neighbourhood	60	53
Housing Diversity Neighbourhood	57	50

As noted in the Policy Framework section of this assessment, the noise criteria under the Policy are adjusted to apply inside in the circumstance where a future dwelling incorporates noise reduction measures (for example, wall, window and roof noise reduction measures like those applied under MBS 010).

The Policy indoor noise levels are derived from the noise criteria in Table 2 minus the minimum noise reduction from outside to inside a typical dwelling with windows closed; or the recommended design sound level in *AS/NZS 2107:2016 Australian/New Zealand Standard™ Acoustics—Recommended design sound levels and reverberation times for building interiors* (the **Australian Standard**); whichever is the greater.

Based on the above, the Policy establishes the noise criteria in Table 3 for future dwellings with noise reduction measures in lieu of the Table 2 (outdoor) noise criteria.

Table 3 Policy Indoor Indicative Noise Levels – Future Dwellings with Construction Upgrades

Zone of Future Dwelling	Indicative Noise Levels Applicable to Existing Land Use in Urban Activity Centre Zone	
	Day L_{Aeq} dB(A) (7.00am to 10.00pm)	Night L_{Aeq} dB(A) (7.00am to 10.00pm)
Urban Neighbourhood	40	35 ¹
Housing Diversity Neighbourhood	37	35 ¹

When considering noise levels for comparison to the Policy noise criteria, both inside and outside, the noise levels are to be adjusted (increased) where the activities exhibit “annoying” characteristics (dominant tonal, impulsive, low frequency content, intermittency², or modulation characteristics) in comparison to the ambient environment.

Preliminary Assessment

Noise Sources

The mixed land uses in the Urban Activity Centre Zone include a range of large format retail tenancies, supermarkets, an aged care, a child care centre and the park ‘n’ ride car park for the Smithfield railway station. For clarity, the mixed land uses are identified again in Figure 8, with the proposed Code Amendment zones shown.

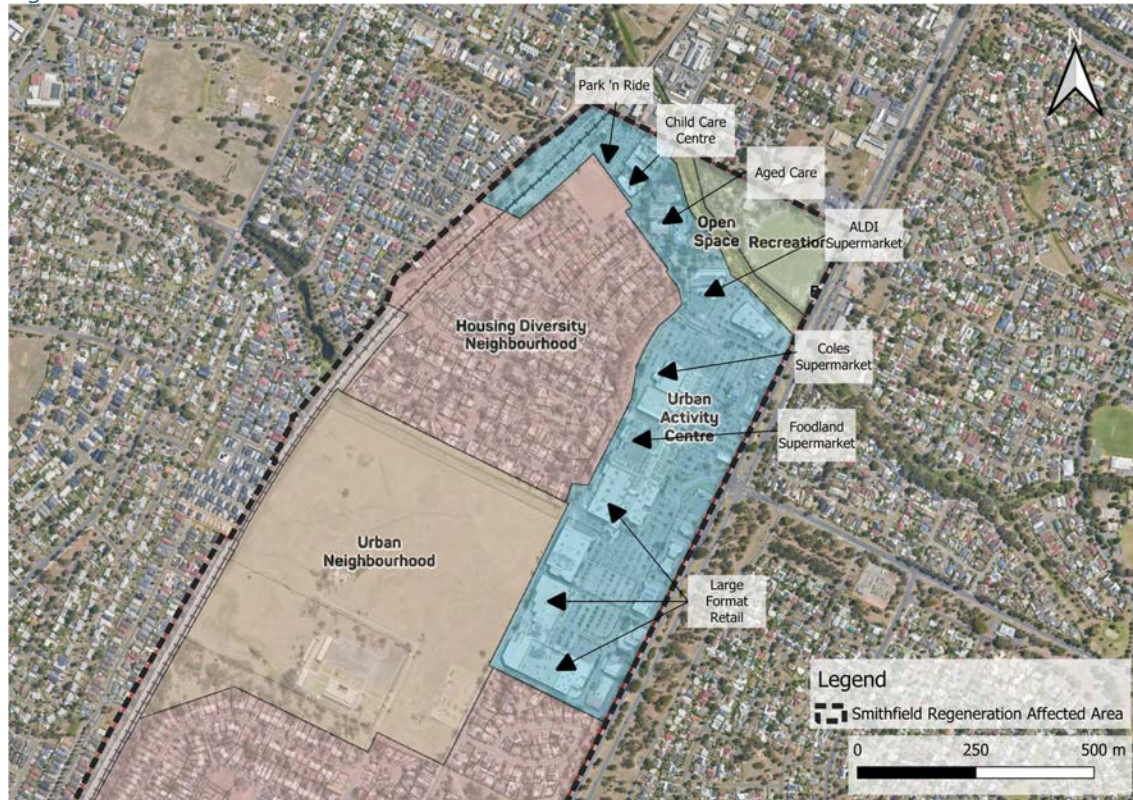
Based on the site inspections and observations, the following noise sources are expected across these existing land uses:

- Car parking
- Refrigerated and non-refrigerated trucks
- Forklift loading and unloading
- Air conditioning and refrigeration plant operation
- Children playing in outdoor areas.

¹ Determined with reference to the Australian Standard for a bedroom near an entertainment district or major road due to the proximity of Main North Road and future mixed land use interfaces that will be promoted.

² Intermittency is only applicable during the night.

Figure 8 Mixed Land Uses



The EP Act requires the mixed land uses to achieve legislative noise levels at nearby existing dwellings. The Code Amendment would not result in future dwellings being developed any closer to the aged care or supermarket mixed land uses than currently exists. Legislative limits will therefore be readily achieved, provided the (ongoing) operations comply with current requirements.

Noise level predictions have been conducted to the areas where future dwellings will be introduced and do not currently exist. These are around the large format retail loading docks, the child care centre and the park 'n' ride.

Large Format Retail

The noise levels from activity at the large format retail loading docks have been predicted based on noise level measurements at similar facilities and observations during the site inspections. The following activity has been modelled for each 15-minute period (default assessment period under the Policy):

- A truck entering and a truck exiting the loading dock, with a sound power level of 99 dB(A)
- Unloading or loading activity occurring for half of the assessment period, with a sound power level of 95 dB(A)
- Operation of air conditioning systems on the building roof, with a sound power level of 85 dB(A) each
- Car parking activity on the opposite side of the building, with a sound power level of 81 dB(A) per vehicle.

Noise levels have been predicted using the noise calculation method provided by the *International Standard ISO 9613-2:2024 "Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors"* (the **Standard**), in combination with the existing built form of the building and loading dock arrangements.

When predicting noise levels for comparison with the Policy, the noise levels are to be adjusted where the activities exhibit "annoying" characteristics in comparison to the ambient environment. An adjustment (increase) of 5 dB(A) has been applied to the predicted noise levels to account for characteristics which can occur with loading and unloading activities.

Noise levels outside of future dwellings are predicted to be up to 58 dB(A), which achieves the day time but not the night time outdoor indicative noise levels, as summarised in Table 2.

Based on existing approvals for the large format retail tenancies there is understood to be no restriction in the time loading and unloading can occur. Night time noise levels are therefore relevant to the assessment, and noise control measures are recommended to be incorporated into the future dwellings near the interface to ensure compliance with the internal indicative noise levels of the Policy.

The predicted noise levels near the loading dock activity result in an internal noise level of 34 dB(A) where basic acoustic treatments (such as SEC1 under MBS 010) are incorporated into a standard dwelling design. Provided these basic acoustic treatments are incorporated to future dwellings, then the Policy night time indicative noise level inside future dwellings will be achieved.

The noise modelling and results of the predictions indicate that while external noise levels will satisfy the Policy during the day period, noise control measures like those under SEC 1 are necessary to achieve the Policy inside for night time. It is therefore necessary that future dwellings incorporate noise control measures at the interface with loading docks, when considering the *Interface Treatments* as shown in Appendix A.

As discussed in the Policy Framework section, MBS 010 includes provisions for mixed land use areas and requires the implementation of SEC 1. The requirements will be mandated where the Overlay is implemented. The extent should include anywhere that the outdoor indicative noise levels are exceeded (which has been determined in this assessment).

Park 'n' Ride

The noise levels from activity at the park 'n' ride have been predicted based on noise level measurements at similar car park facilities. Noise levels have been predicted based on 45 vehicle movements with a sound power level of 81 dB(A) in a 15 minute period (default assessment period under the Policy).

Noise levels have been predicted using the Standard.

An adjustment (increase) of 5 dB(A) has been applied to the predicted noise levels to account for characteristics which can occur with vehicle parking when there are low ambient noise levels, as might occur overnight or during the early morning, with significant separation distance to Main North Road.

The predicted noise levels from the park 'n' ride on the opposite side of the road are 47 dB(A) outside and achieve the day and night Policy indicative noise levels under Table 2 by some margin.

Child Care Centre

The noise levels from full capacity operation of the child care centre have been predicted based on noise level measurements at similar facilities. Noise levels have been predicted based on 20 vehicle movements with a sound power level of 81 dB(A) in a 15-minute period (default assessment period under the Policy), and 80 children of various ages playing outside, with a sound power level of 77 dB(A).

Noise levels have been predicted using the Standard.

An adjustment (increase) of 5 dB(A) has been applied to the predicted noise levels to account for characteristics which can occur with vehicle parking and children playing.

The predicted noise levels from the child care centre on the opposite side of the road are 53 dB(A) outside, which achieves the Policy day time indicative noise levels under Table 2 by some margin.

Recommendations

It is recommended that to ensure adequate noise control measures to future dwellings to address the mixed land use interfaces, the Code Amendment include the application of the Overlay near the Urban Activity Centre Zone in conjunction with the *Interface Treatment* as shown in Appendix A.

Based on the noise level predictions, there is the potential for noise impacts that exceed the outdoor indicative noise levels under the Policy near loading docks.

It is recommended that the extent of the Overlay incorporate any areas where these levels are predicted to be exceeded, being a strip of land approximately 120m wide from the Urban Activity Centre Zone (without accounting for the shielding effect of future dwellings).

The implementation of the Overlay at a mixed land use interface will require minimum construction standards in accordance with MBS 010 at the development application stage. The MBS 010 requirements at the interface with a mixed land use area are that future dwelling designs incorporate at least SEC 1 noise control measures.

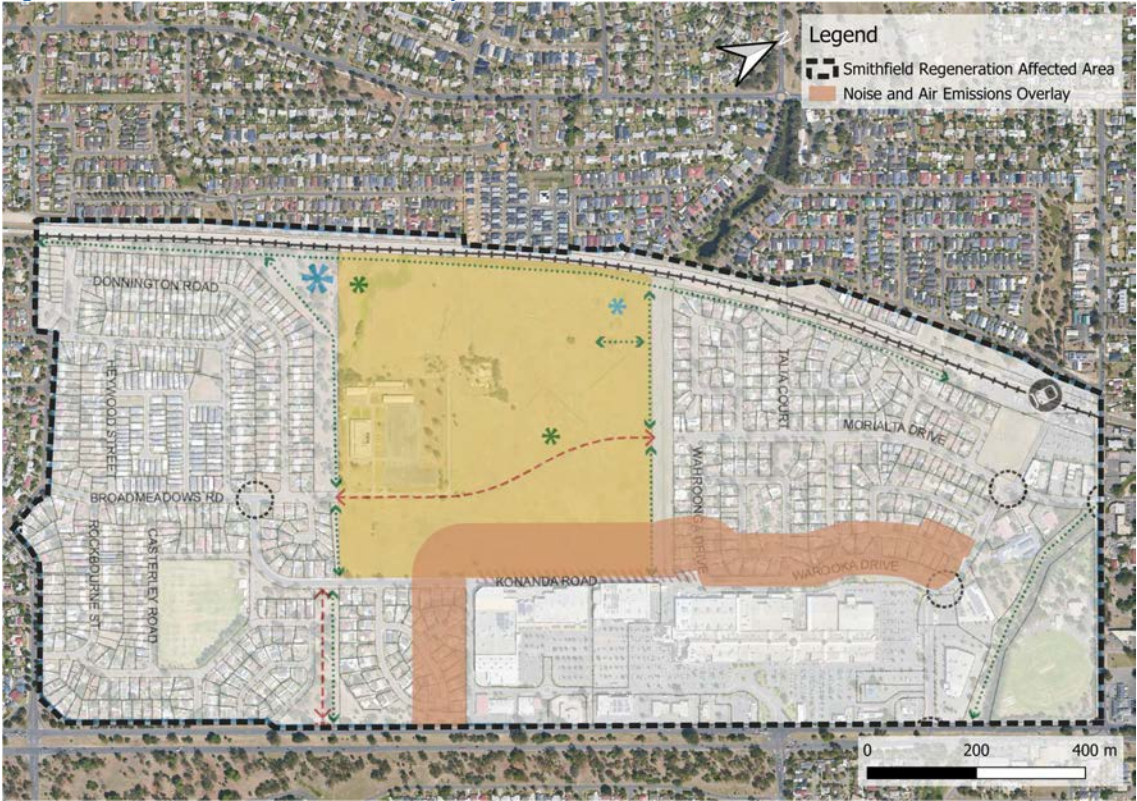
The requirements and examples of how the requirements can be satisfied for SEC 1 are summarised in Appendix C. The measures are reasonable and practicable for these interfaces and can be readily incorporated. The Concept Plan arrangement, including the proposal for *Interface Treatment*, such as Konanda Road being widened, and the retention of open space to the rear of supermarket loading docks will minimise the number of future dwellings subject to these requirements.

The extent of the affected area that is recommended to be incorporated in the Overlay to ensure reasonable outcomes with respect to mixed land use interfaces is shown in Figure 9. The area captures potential infill and redevelopment of existing dwellings near the loading docks of both large format retail and supermarket areas.

Noise levels from the park 'n' ride, child care centre and the aged care will satisfy the outdoor indicative noise levels and do not warrant the application of these mixed land use requirements in their vicinity.

The recommended policy response will protect the amenity of the occupants of future dwellings and the unreasonable constraint of existing mixed land uses.

Figure 9 Noise and Air Emissions Overlay for Mixed Land Uses



Source South Australian Property and Planning Atlas

Recommendations

The Smithfield Regeneration Code Amendment supports residential infill and regeneration at Smithfield.

Noise level measurements of the ambient environment have been conducted at strategic locations throughout the Code Amendment area, with results that are typical of metropolitan residential areas.

A portion of the affected area is adjacent Main North Road and the Gawler to City suburban passenger rail line. These interfaces can be reasonably and practicably addressed utilising existing mechanisms in the *Planning and Design Code*, being the Noise and Air Emissions Overlay and the *Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound*. The recommended extent of Overlay is shown in Figure 7 relating to the road and rail interfaces.

Existing mixed land uses have been inspected and identified, and their activities considered which include loading dock activity, Park 'n' Ride, and child care centre operations. The interface with existing mixed land uses can be addressed by incorporating reasonable and practicable noise reduction measures into a specific area of future dwellings, implemented through the Noise and Air Emissions Overlay and the *Ministerial Building Standard MBS 010 – Construction requirements for the control of external sound*. The recommended extent of Overlay is shown in Figure 9 relating to the mixed land use interfaces.

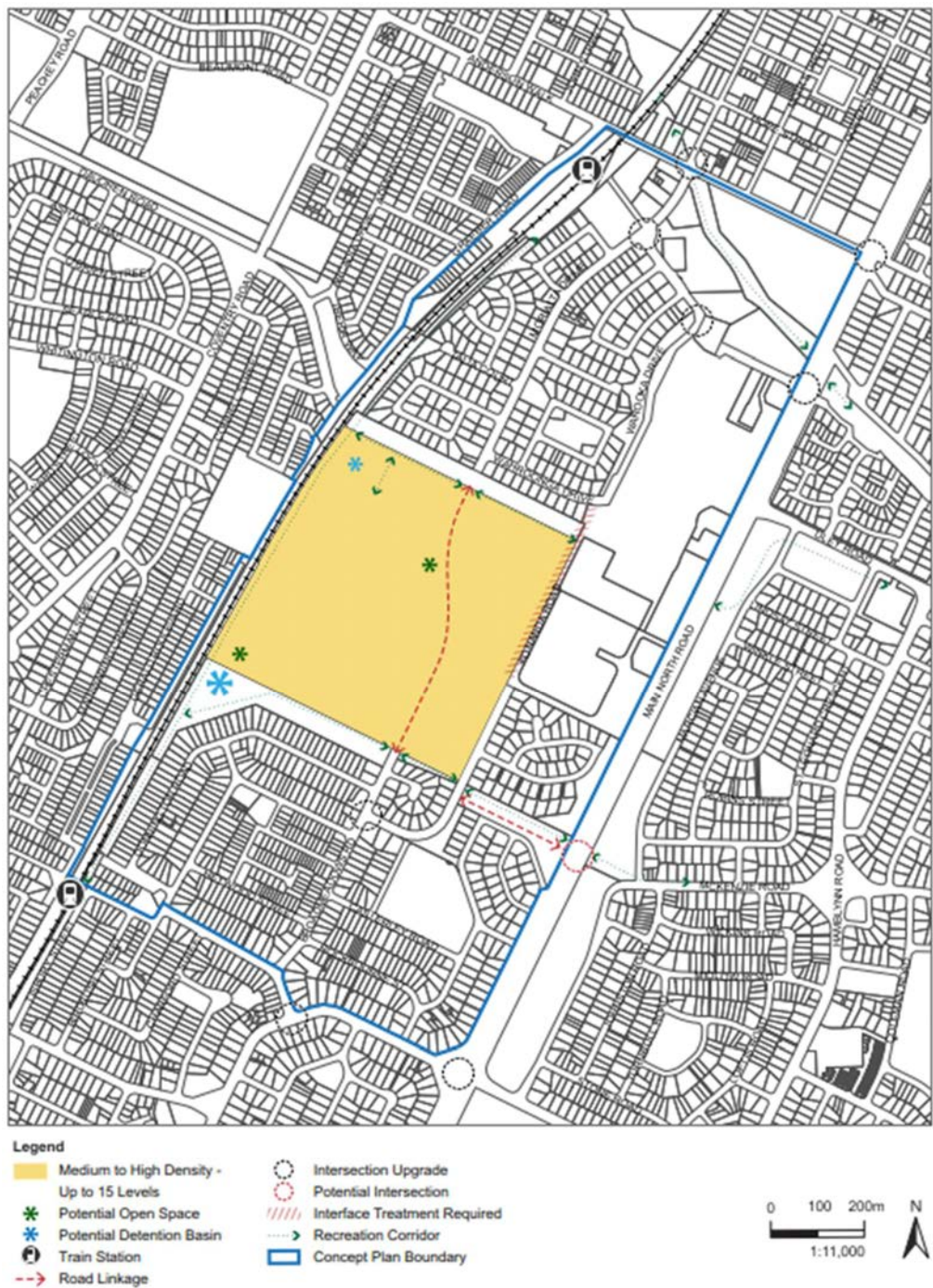
This assessment determines that the impacts of the road, rail, and existing mixed land use interfaces with future dwellings will be addressed placing a specific extent of the affected area and future dwellings in the Noise and Air Emissions Overlay. The specific extent is provided in Figure 7 and Figure 9.

It is recommended that mechanisms continue to be explored to assist with the pragmatic adaptation of reasonable and practicable noise reduction measures to future dwellings located in the overlay, which will ensure:

1. the acoustic amenity of future dwellings is not adversely impacted by existing mixed land uses and the road and rail corridor, in accordance with the interface provisions of the Code
2. the Code Amendment does not unreasonably constrain the operation of existing mixed land uses in the Urban Activity Centre Zone.

Appendix A

Concept Plan



Concept Plan X Smithfield Regeneration



Appendix B

Planning and Design Code Provisions

(emphasis added)

Noise and Air Emissions Overlay (Part 3 – Overlays)

Desired Outcome DO 1

Community health and *amenity* is *protected* from *adverse impacts of noise* and air emissions.

Performance Outcome PO 1.1

Sensitive receivers adjoining high noise and/or air pollution sources are *designed and sited to shield sensitive receivers from the emission source* using measures such as:

- (a) placing buildings containing non-sensitive receivers (such as retail and commercial) between the emission source and sensitive receivers
- (b) within individual buildings, placing rooms more sensitive to air quality and noise impacts (such as living rooms and bedrooms) further away from the emission source
- (c) providing appropriate separation or erecting noise attenuation barriers, provided the requirements for safety, urban design and access can be met
- (d) the use of building design elements such as podiums and jutting, deep or enclosed balconies (including with solid balustrades).

Performance Outcome PO 1.3

Development incorporating a sensitive receiver adjoining high noise and/or air pollution sources locates private open space (including ground level courtyards and balconies), common open space and outdoor play areas within educational establishments and pre-schools away from the emission source.

Interface between Land Uses (Part 4 – General Development Policies)

Desired Outcome DO 1

Development is located and designed to *mitigate adverse effects* on or from neighbouring and proximate land uses.

Performance Outcome PO 1.1

Sensitive receivers are designed and sited *to protect residents and occupants from adverse impacts generated by lawfully existing land uses (or lawfully approved land uses) and land uses desired in the zone.*

Performance Outcome PO 1.2

Development adjacent to a site containing a sensitive receiver (or lawfully approved sensitive receiver) or zone primarily intended to accommodate sensitive receivers is *designed to minimise adverse impacts.*

Performance Outcome PO 2.1

Non-residential development *does not unreasonably impact the amenity of sensitive receivers* (or lawfully approved sensitive receivers) or an adjacent zone primarily for sensitive receivers through its hours of operation having regard to:

- a) the nature of the development
- b) measures to mitigate off-site impacts
- c) the extent to which the development is desired in the zone
- d) measures that might be taken in an adjacent zone primarily for sensitive receivers that mitigate adverse impacts without unreasonably compromising the intended use of that land.

Performance Outcome PO 4.1

Development that emits noise (other than music) *does not unreasonably impact the amenity of sensitive receivers* (or lawfully approved sensitive receivers).

Deemed-to-Satisfy Criteria / Designated Performance Feature DTS/DPF 4.1

Noise that might affect sensitive receivers achieves the relevant Environment Protection (Commercial and Industrial Noise) Policy criteria.

Performance Outcome PO 4.2

Areas for the on-site manoeuvring of service and delivery vehicles, plant and equipment, outdoor work spaces (and the like) are designed and sited *to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers* due to noise and vibration by adopting techniques including:

- a) locating openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers
- b) when sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers
- c) housing plant and equipment within an enclosed structure or acoustic enclosure
- d) providing a suitable acoustic barrier between the plant and / or equipment and the adjacent sensitive receiver boundary or zone.

Performance Outcome PO 4.4

External noise into bedrooms is minimised by *separating or shielding* these rooms from service equipment areas and fixed noise sources located on the same or an adjoining allotment.

Appendix C

MBS 010 SEC Treatments

Table 4 MBS 010 Minimum Acoustic Ratings

Building Element	Minimum Acoustic Rating			
	SEC 1	SEC 2	SEC 3	SEC 4
Floor	No Requirement	$R_W + C_{tr}$ 45 for all habitable rooms	$R_W + C_{tr}$ 50 for all habitable rooms	$R_W + C_{tr}$ 50 for all habitable rooms
External Walls	$R_W + C_{tr}$ 40 for all habitable rooms	$R_W + C_{tr}$ 45 for all habitable rooms	$R_W + C_{tr}$ 50 for all habitable rooms	$R_W + C_{tr}$ 50 for all habitable rooms
Windows and External Glass Doors	As nominated in Table 5			
External Doors Other than External Glass Doors	No Requirement	R_W 27 for all habitable rooms	R_W 30 for all habitable rooms	R_W 30 for all habitable rooms other than bedrooms
Roof/Ceiling	No Requirement	$R_W + C_{tr}$ 35 for bedrooms	$R_W + C_{tr}$ 40 for bedrooms $R_W + C_{tr}$ 35 for all other habitable rooms	$R_W + C_{tr}$ 45 for bedrooms $R_W + C_{tr}$ 40 for all other habitable rooms
Mechanical Ventilation Systems	R_W 25	R_W 25	R_W 30	R_W 35

Table 5 MBS 010 Minimum Acoustic Ratings of Windows and External Glass Doors

Area of Window and External Glass Doors as a Percentage of the Floor Area of the Room		Minimum $R_W + C_{tr}$ for Closed Windows and External Glass Doors			
Bedroom and attached non-habitable room	Habitable room (other than a bedroom or an enclosed kitchen) and other attached non-habitable rooms	SEC 1	SEC 2	SEC 3	SEC 4
-	Not more than 20%	22	25	28	30
Not more than 20%	More than 20% but not more than 40%	25	28	30	32
More than 20% but not more than 40%	More than 40% but not more than 60%	28	30	32	34
More than 40% but not more than 60%	More than 60% but not more than 80%	30	32	34	35
More than 60% but not more than 80%	More than 80%	32	34	35	*
More than 80%	-	34	35	*	*

* Performance Solution methodology required to determine acoustic ratings for glazing

Table 6 Indicative SEC Construction Examples

Building Element	Indicative materials and methods to achieve the SEC			
	SEC 1	SEC 2	SEC 3	SEC 4
Floor	No Requirement	150mm concrete slab or a lightweight construction including 2 layers of particle board flooring, fibre cement sheet soffit and insulation in the cavity		
External Walls	9mm fibre cement cladding, 2 layers of 16mm plasterboard inside and wall insulation	9mm fibre cement cladding over 2 layers of 13mm thick plasterboard, 2 layers of 13mm plasterboard inside and wall insulation	Masonry (brick) outside, 10mm plasterboard inside and wall insulation	
Windows and External Glass Doors	6.38mm thick Laminated Glass	10.38mm thick Laminated Glass	12.5mm thick VLam Hush Glass in sliding opening 10.5mm thick VLam Hush Glass all other windows and doors	12.5mm thick VLam Hush Glass with limited opening arrangements (not sliding)
External Doors Other than External Glass Doors	No Requirement	40mm thick solid core timber doors with viewing panels being not less than 6mm thick glass		
Roof/Ceiling	No Requirement	Bedrooms with sheet metal roof and 10mm plasterboard All other habitable rooms no requirement	Bedrooms with sheet metal roof and 2 layers of 10mm plasterboard All other habitable rooms with sheet metal roof and 10mm plasterboard	Bedrooms with sheet metal roof and 2 layers of 13mm plasterboard All other habitable rooms with sheet metal roof and 2 layers of 10mm plasterboard
Mechanical Ventilation Systems	Outside air and exhausts ducted to habitable spaces using acoustically insulated ductwork		Outside air and exhausts ducted to habitable spaces with acoustically insulated ductwork and bends into the ductwork	

References

AS/NZS 2107:2000 Australian/New Zealand Standard™ Acoustics—Recommended design sound levels and reverberation times for building interiors

Guidelines For Community Noise Birgitta Berglund Thomas Lindvall Dietrich H Schwela London, United Kingdom, April 1999, World Health Organization

International Standard ISO 9613-2:1996 "Acoustics - Attenuation of sound during propagation outdoors - Part 2 General method of calculation"

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