TRANSPORT AND WORKS ACT 1992

Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006

THE NETWORK RAIL (STALYBRIDGE TO DIGGLE (SADDLEWORTH) ENHANCEMENTS) ORDER

DOCUMENT: NR14 ENVIRONMENTAL REPORT

APPENDIX 9A – NOISE AND VIBRATION TECHNICAL APPENDIX

Rule 10(6)(d)

Document Reference	167037-NWR-2BC-MVL3-REP-W-EN-000033
Author	Network Rail
Date	November 2025
Revision Number	Rev 1

[this page is left intentionally blank]

CONTENTS

1 INTRODUCTION 1
2 LEGISLATION, POLICY AND GUIDANCE 2
3 APPRAISAL OF IMPACTS AND THEIR EFFECTS 9
4 MITIGATION MEASURES 21
5 CUMULATIVE EFFECTS 24

1. INTRODUCTION

1.1.1 The Network Rail (Stalybridge to Diggle (Saddleworth) Enhancements Order) (the Order Scheme) is that section of the Transpennine Route Upgrade programme for the works required between Stalybridge and the western portal of Standedge Tunnel in Diggle. This Noise and Vibration Technical Note presents an appraisal of the predicted noise and vibration related impacts from the Order Scheme.

1.1.2 The full extent of the Scheme (both works in the Order Scheme and works undertaken using permitted development rights PDR) is provided in section 1.2.4 of the Planning Statement [**NR12**] and include installation of Overhead Line Equipment (OLE), track renewal, the relocation of Mossley Station and upgrades to Greenfield Station, upgrades to Stalybridge and Scout tunnels; and associated construction works.

1.1.3 This appraisal considers the noise and vibration impact from construction activities associated with the Order Scheme as defined in Volume 1, Chapter 1 of this Environmental Report [**NR14**]. The structure of this Appendix is as follows:

- Summary of the relevant legislation and establishment of the assessment criteria;
- Description of the baseline noise conditions;
- Identification of noise and vibration sensitive receptors (NSRs); and
- Identification of suitable mitigation measures if needed.

1.1.4 Operational noise impacts from trains travelling at speed and idling are likely to be similar to, or lower than, the current situation due to the introduction of electric trains. Any potential future increase of rail movements may be classified as permitted intensification. The Order Scheme itself is not intended to permit increased capacity and therefore utilisation of the railway. As such the frequency of rail movements (passenger and freight) between various origins and destinations through the Order Scheme are expected to be similar as current situation. Therefore, the operational noise impact from rail movements is scoped out.

2. LEGISLATION, POLICY AND GUIDANCE

2.1 Legislation

Control of Pollution Act 1974

2.1.1 The Control of Pollution Act set out the framework to control noise impact from construction activities. Contractors will be required to follow good construction practices (referred to as Best Practicable Means (BPM)) as outlined in BS 5228:2009+A1:2014 'Code of practice for noise and vibration on construction and open sites. Part 1 – Noise' (BS 5228-1) and BS 5228:2009+A1:2014 'Code of practice for noise and vibration on construction and open sites. Part 2 – Vibration' (BS 5228-2) to control noise and vibration respectively. BS 5228-1 and BS 5228-2 have Approved Code of Practice status (in England) under the powers conferred by Sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974, as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. Compliance with the good practice noise and vibration requirements stated therein became a statutory obligation under the Act.

Environmental Protection Act 1990

2.1.2 Under Part III of the Environmental Protection Act 1990 as amended by the Noise and Statutory Nuisance Act 1993, local authorities have a duty to investigate noise complaints relating to a variety of sources such as construction noise but excluding traffic noise. If the local authority is satisfied that the noise amounts to a statutory nuisance it shall serve an Abatement Notice which may require that the noise be stopped altogether or limited to certain times.

Permitted Development Rights

Construction

2.1.3 In addition to the Order Scheme and works to be consented under the Deemed Planning Permission (DPP) for those works, electrification of the railway involves other activities with the potential to cause disturbance to residents. It is considered these standard activities with this potential include track relaying and ballast tamping and piling for gantry bases. NR's contractor will produce a Noise and Vibration Management Plan (NVMP), secured via planning condition included in the 'Request for deemed planning permission and statement of proposed conditions' [**NR11].** The NVMP will outline how the impacts of construction noise and vibration will be reduced to the lowest practicable levels. This will reflect similar control measures for works being undertaken by PDRs which will be managed in accordance with the relevant clauses included within Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015).

Operation

2.1.4 The slab track through the tunnels has the potential to propagate vibration when trains pass over. In compliance with Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV015), the design has sought to assess this potential to provide the best solution to avoid impacts where possible. NR has information on current tunnel vibration levels and commits to acquiring further vibration levels when the Scheme is operational to validate the predictions.

2.1.5 Ground Borne Noise (GBN) and Vibration measurements were taken (Arup March 2023) to establish baseline conditions. These measurements were taken in 4No key locations above Stalybridge Tunnel and 1No key location above Scout Tunnel.

2.1.6 The Arup report does not define acceptable thresholds. Whilst no acceptable thresholds are defined, previous projects such as Crossrail and High Speed 2 have set indicative thresholds for GBN:

- LOAEL (Lowest Observed Adverse Effect Level): 35 dB $L_{Amax,S}$ (effects on quality of life)
- SOAEL (Significant Observed Adverse Effect Level): 45 dB $L_{Amax,S}$ (effects on health)

2.1.7 These are values above which adverse or significant adverse effects may occur at nearby NSR, but those threshold values are not expected to be exceeded for the Scheme. The aim of this appraisal is to establish what the baseline levels currently are, what is generated by operational activity and how the interventions change the baseline.

2.1.8 The proposed slab track system includes a highly elastic rail fastening for flexible single support point for noise and vibration reduction. This is a type of under-slab resilient layer as recommended within the Arup report. This constitutes best practice, and these mitigations are reasonably practicable measures that can be incorporated into the design and components of the slab track system.

2.1.9 As part of the Scheme, new track alignment and intervention, the track roughness will be improved along the route and if this is accounted for, combined with an improved modern fastening system, the new system when installed can be expected to provide a vibration mitigation or reduction in the range of 10dB to 20dB to counter the forecast increase due to traffic speed and volume increase.

2.2 National Policy

National Planning Policy Framework

2.2.1 The National Planning Policy Framework (NPPF) 2024. The document sets out the Government's planning policies for England and how these are expected to be applied.

2.2.2 The NPPF includes statements relating to noise and the requirement to take it into account in the planning process. Section 187 of the NPPF indicates that the planning system should contribute to and enhance the natural and local environment by:

"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans..."

2.2.3 Section 198 is specifically related to noise and requires planning policy decisions to:

- "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life"; and
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".

2.2.4 The terms 'adverse impacts' and 'significant adverse impacts' are defined within the explanatory note of the Noise Policy Statement for England, 2010 (NPSE)[1].

2.2.5 The NPSE sets out the long-term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

2.2.6 The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- Avoid significant adverse impacts on health and quality of life;

[1] DEFRA. (2010). Noise Policy Statement for England. London.

- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life.

2.2.7 In its aims, the NPSE uses the key phrases 'significant adverse' and 'adverse'. The Explanatory Note to the NPSE assists in the definition of significant adverse and adverse with the following concepts:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected; and
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

2.2.8 The NPSE notes that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to vary for different noise sources, receptors and times. Relevant SOAELs have been identified for the Order Scheme taking account of the sources of exposure and receptors.

<u>Environment and Social Minimum Requirements for Projects – Design and Construction</u>

2.2.9 In Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV015), the designer / contractor shall comply with NR/L2/ENV/121 which includes that the designer / contract shall conduct a Noise and Vibration Risk Assessment and document this within the NVMP. BPM should be applied to control and reduce noise and vibration emissions to levels as low as reasonably practicable. A noise and vibration monitoring programme should be agreed with the Employer's Representative and where appropriate the local authority.

2.3 Local Policy

2.3.1 The Greater Manchester Combined Authority (GMCA) adopted the Places for Everyone Joint Development Plan in March 2024 to state the policies, vision and objectives for 9 of the 10 GMCA boroughs (excluding Stockport) for the period 2022-2039. Its policies and objectives are therefore relevant to Oldham Metropolitan Borough Council and Tameside Metropolitan Borough Council, which are the relevant authorities to this TWAO.

2.3.2 The following policies are relevant to noise impact:

- Policy LE1 of Joint Core Strategy and Development Management Policies (Oldham Metropolitan Borough Council) mandates that all new developments must ensure a high level of protection against light, noise pollution, and vibration for current and future users and occupants. This includes implementing effective measures to minimise disturbances and maintain a comfortable and quiet environment for everyone involved.

- Policy 1.3 of Unitary Development Plan (Tameside Metropolitan Borough Council) creating a cleaner and greener Environment aims to improve the borough's appearance for the benefit of current residents and to attract new investments. To this end, all developments must prioritise high-quality design that is in harmony with the local character.

2.4 Guidance

Construction Noise

2.4.1 The construction noise SOAEL is considered to be exceeded where the threshold values stated in Table 2-1 are exceeded based on the example criteria provided in Table E.2 of BS 5228-1, or where the ambient sound level is exceeded by 5 dB, whichever is higher.

Table 2-1 - Examples of time periods, averaging times and noise levels associated with the determination of eligibility for noise insulation

Day	Time (hours)	Averaging period, T	Noise insulation trigger level[Note(1)], dB $L_{Aeq,T}$
Mondays to Fridays	0700 – 0800	1 hour	70
	0800 – 1800	10 hours	75
	1800 – 1900	1 hour	70
	1900 – 2200	1 hour	65
	2200 – 0700	1 hour	55
Saturdays	0700 – 0800	1 hour	70
	0800 – 1300	5 hours	75
	1300 – 1400	1 hour	70
	1400 – 2200	1 hour	65
	2200 – 0700	1 hour	55

Sundays and Public Holidays	0700 – 2100	1 hour	65
	2100 – 0700	1 hour	55
Note (1) All noise levels are predicted or measured at a point 1m in front of the most exposed of any windows and doors in any façade of any eligible dwelling			

2.4.2 The following are considered major time periods for SOAEL thresholds to be exceeded based on the guidance provided in BS 5228-1:

- A period of 10 or more days of working in any 15 consecutive days during construction; or
- For a total of 40 days or more in any 6 consecutive months during construction.

2.4.3 Major adverse effects are deemed to occur at NSRs where both the SOAEL, as detailed in Table 2-1, and temporal criteria stated above are exceeded.

2.4.4 Certain receptors may be eligible for noise insulation or temporary rehousing in certain circumstances where construction noise impacts at NSRs have been assessed in detail in advance of construction stage as per the NVMP. The NVMP will be submitted to and approved by the relevant local planning authority in accordance with the criteria detailed above, and all reasonable measures to reduce noise have been incorporated.

2.4.5 NSRs potentially considered for noise insulation or temporary rehousing may be regarded as ‘eligible’ NSRs. Those NSRs which are deemed to be eligible for noise insulation or temporary rehousing, will be regarded as ‘qualifying’ NSRs. Construction noise calculations will be conducted prior to construction to predict construction noise levels at all NSRs in the study area arising from the Order Scheme. NSRs that may experience major adverse effects and may qualify would be highlighted in the NVMP.

Construction Vibration on People in Buildings

2.4.6 BS 5228-2 gives guidance on vibration levels that could be used to assess the likely impacts of construction activities on the environment and people. It also provides empirical formulae for predicting likely vibration levels from activities such as vibratory and hammer driven piling.

2.4.7 Annex B of BS 5228-2 gives guidance on vibration levels in Peak Particle Velocity (PPV) and associated effects in terms of human and structural response. Tables providing these guideline values are reproduced below.

Table 2-2 - Guidance on effects of vibration levels

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

2.4.8 Based on the guidance provided in Table 2-2 the threshold level for the onset of potential major effects on humans at surrounding residential properties is typically taken to be 1.0 mm/s PPV.

Construction Vibration on People in Buildings

2.4.9 BS 5228-2 provides guidance for vibration level thresholds for potential damage to buildings and structures. Section B.3.2 of BS 5228-2 notes that the probability of damage tends towards zero at 12.5mm/s PPV.

2.4.10 For the purposes of assessment, buildings and structures where the construction vibration level is predicted to exceed or (for a margin of safety) approach 12.5 mm/s PPV will be highlighted such that further detailed assessment can be undertaken, and appropriate BPM will utilised to reduce potential effects.

3. APPRAISAL OF IMPACTS AND THEIR EFFECTS

3.1 Baseline Noise Condition

Existing Ambient Noise Levels

3.1.1 The baseline noise and vibration survey locations are shown in Figure 2-1.

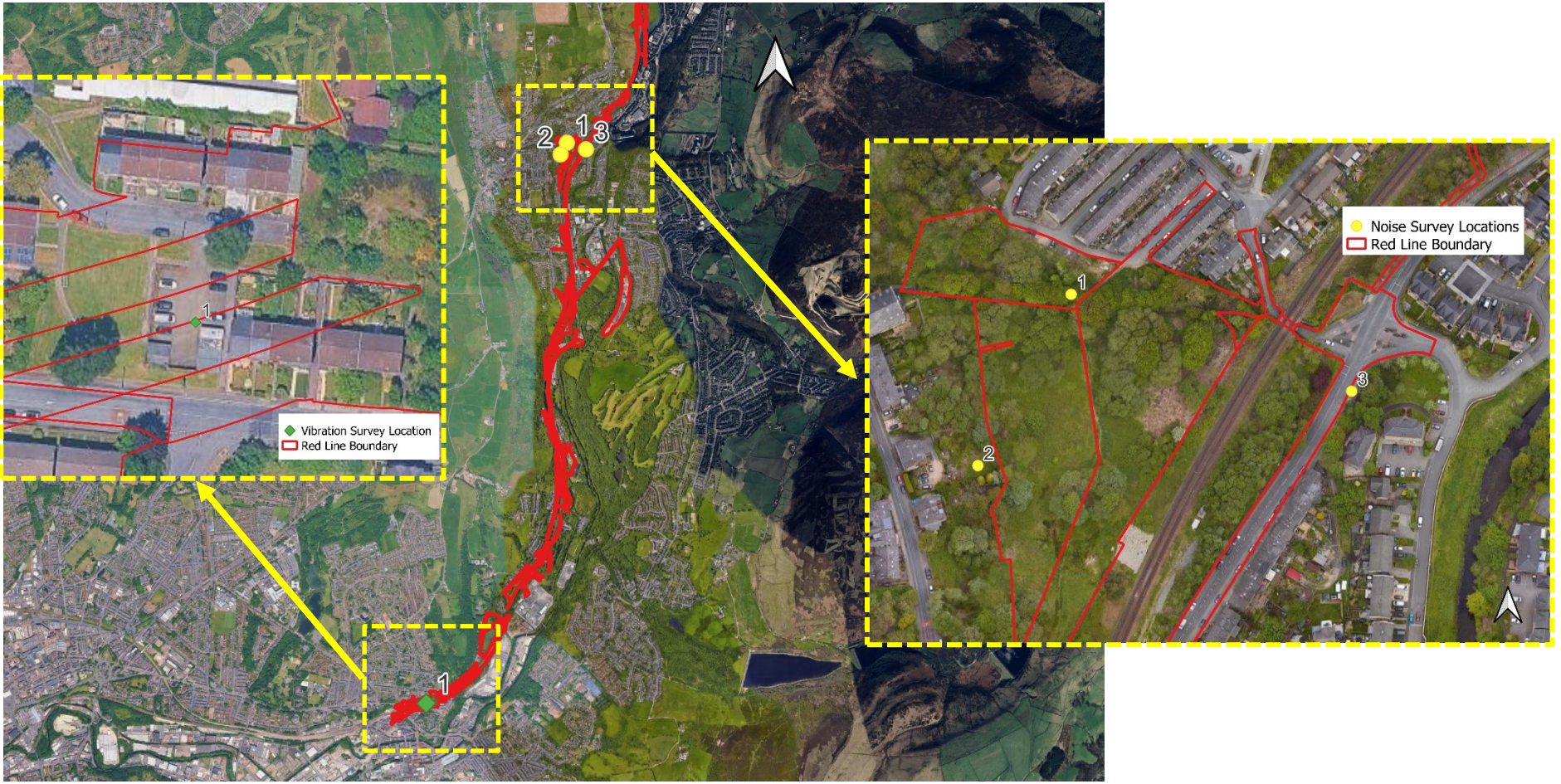

Figure 2-1 - Noise and vibration survey locations

3.1.2 Baseline noise monitoring was undertaken at the following locations representative of NSRs close to the proposed Mossley Station

- Position 1 is considered representative of receptors on Archer Street.
- Position 2 is representative of receptors on Stamford Road.
- Position 3 is representative of receptors on Manchester Road.

3.1.3 The principle purpose of the above surveys was to inform the assessment of operational noise from the proposed Mossley Station.

3.1.4 The groundborne noise levels are predicted from the vibration levels measured at the car park immediately to the west of 49 Wakefield Road and above the Stalybridge Tunnel by Arup in 2023[2] as shown in Table 2-6. The predicted baseline groundborne noise levels have been reproduced in this report with full details shown in Arup's report (Arup, 2023).

3.1.5 The measured baseline noise levels have been processed and analysed according to the Manchester City Council Planning and Noise Technical Guidance 2022 (Manchester City Council, 2022)[3]. The typical background sound levels have been established as shown in Table 2-4. The measured average A-weighted equivalent noise levels for each hour are shown in Table 2-5. The details are shown in the baseline survey report.

Table 2-4 - Measured background sound levels (free-field noise levels)

Description of survey location	Start date	Duration	Assessment period	Typical background sound level
Noise survey Position 1 Grid reference: 397368,402569	8th July 2024	7 days continuously	Daytime 07:00 to 23:00	34 dB L_{A90}
			Night-time 23:00 to 07:00	27 dB L_{A90}
Noise survey Position 2 Grid reference: 397325,402490	8th July 2024	7 days continuously	Daytime 07:00 to 23:00	35 dB L_{A90}
			Night-time 23:00 to 07:00	26 dB L_{A90}

[2] Arup. (2023). *Groundborne noise and trackform assessment for Stalybridge & Scout tunnels.* Manchester.

[3]Manchester City Council. (2022). *Manchester City Council Planning and Noise Technical Guidance 2022.* Greater Manchester.

Description of survey location	Start date	Duration	Assessment period	Typical background sound level
Noise survey Position 3 Grid reference: 397495,402524	8th July 2024	15 minutes	Daytime 12:35 to 12:50	44 dB L_{A90}
	15th July 2024	15 minutes	Daytime 11:57 to 12:13	42 dB L_{A90}

Table 2-5 - Measured $L_{Aeq,T}$ sound levels (free-field noise levels)

Hour	Average $L_{Aeq,1hr}$, dB		$L_{Aeq,15min}$, dB
	Position 1 Grid reference: 397368,402569	Position 2 Grid reference: 397325,402490	Position 3 Grid reference: 397495,402524
00:00 – 01:00	44	43	-
01:00 – 02:00	48	47	-
02:00 – 03:00	51	43	-
03:00 – 04:00	48	46	-
04:00 – 05:00	43	51	-
05:00 – 06:00	45	50	-
06:00 – 07:00	47	49	-
07:00 – 08:00	47	50	-
08:00 – 09:00	47	50	-
09:00 – 10:00	47	50	-
10:00 – 11:00	46	50	-
11:00 – 12:00	50	50	-
12:00 – 13:00	49	49	67 This is the average of two 15min measurements
13:00 – 14:00	49	50	-
14:00 – 15:00	48	49	-

Hour	Average $L_{Aeq,1hr}$, dB		$L_{Aeq,15min}$, dB
	Position 1 Grid reference: 397368,402569	Position 2 Grid reference: 397325,402490	Position 3 Grid reference: 397495,402524
15:00 – 16:00	51	50	-
16:00 – 17:00	50	49	-
17:00 – 18:00	54	50	-
18:00 – 19:00	51	49	-
19:00 – 20:00	50	49	-
20:00 – 21:00	49	48	-
21:00 – 22:00	46	46	-
22:00 – 23:00	44	46	-
23:00 – 00:00	46	47	-

Existing Groundborne Noise Levels

3.1.6 The groundborne noise levels in terms of L_{ASmax} were not directly measured but predicted based on the relationship between the measured vibration and the corresponding re-radiated noise levels. The brief summary is shown in Table 2-6. The full details are provided in Arup's report (Arup, 2023).

Table 2-6 – Measured groundborne noise levels

Description of survey location	Groundborne noise levels	Reference LOAEL and SOAEL
Vibration survey (for groundborne noise) Position 1	32 dB to 43 dB L_{ASmax}	LOAEL: 35 dB L_{ASmax} SOAEL: 45 dB L_{ASmax}

3.2 Noise and Vibration Sensitive Receptors

3.2.1 The Order Scheme is mainly in the existing railway corridor which passes through residential areas. As would be expected for railway works passing through such areas, a relatively large number of NSRs have been identified which may be potentially affected by the Order Scheme. Some receptors are within 5 m of the Order Scheme boundary (Network-Rail-Infrastructure-

Ltd, August 2024)[4]. Table 2-7 identifies the most affected receptors due to proximity to the Order Scheme.

Table 2-7 – Most affected noise and vibration sensitive receptors

Relevant works	Description of the receptor	Approximate distance to the Order Scheme boundary
Stalybridge Tunnel Temporary Ground Stabilisation Works Printworks Road Site Compounds, Access and Drainage Works	Residential properties on Waterloo Road	20m
	Residential properties on King Street	10m
	Residential properties on Church Street	Directly adjacent
	Residential properties on Wakefield Road	Directly adjacent
	Residential properties on Montague Way	Directly adjacent
	Residential properties on Cambridge Street	Directly adjacent
	Residential properties on George Street	Directly adjacent
Heyrod Hall Overbridge, Site Compound and Access Works (MVL3/07)	Residential properties on Wakefield Road	Directly adjacent
	Residential properties on Souracre Fold	15m
Works to Footbridge off Springbank Lane (MVL3/08)	Residential properties on Wakefield Road	Directly adjacent
	Residential property on Printworks Road	Directly adjacent

[4] Network-Rail-Infrastructure-Ltd. (August 2024). *Transpennine Route Upgrade.* Revision P01.1.

Relevant works	Description of the receptor	Approximate distance to the Order Scheme boundary
Wakefield Road Compound Works (MVL3/09)	Residential properties on Beechwood Avenue	15m
	Residential properties on Beechwood Lane	45m
Manchester Road Underbridge and Drainage Works (MVL3/10)	Residential properties on Wakefield Road	Directly adjacent
	Residential properties on John Street	15m
	Residential properties on Blackrock	2m
	Residential properties on Manchester Road	15m
Manchester Road Footbridge Reconstruction (MVL3/10A)	Residential properties on Manchester Road	15m
	Residential properties on Lower Beestow	Directly adjacent
	Residential properties on boundary Close	5m
Stamford Road Pipebridge Diversion Works (MVL3/13) Plevins Site Compound Works	Residential properties on Manchester Road / A635	Directly adjacent
	Residential properties to the east of Manchester Road / A635 (directly above rail tunnel)	Directly adjacent
	Residential properties on Andrew Street	10m
	Residential properties on Highfield Drive	Directly adjacent
	Residential properties on Stanhope Street	10m

Relevant works	Description of the receptor	Approximate distance to the Order Scheme boundary
	Residential properties on Bury Street	10m
	Residential properties on Egmont Street	Directly adjacent
	Residential properties on Cheshire Street	Directly adjacent
	Residential properties on Stanley Road	50m
Mossley Cottages Works Mossley Station Relocation - Construction of New Station Works and Site Compounds	Residential properties on The Manse	5m
	Residential properties on Abney Road	2m
	Residential properties on Old Brow Court	Directly adjacent
	Residential properties on Manchester Road	Directly adjacent
	Residential properties on Stamford Road	15m
Roughtown Road Overbridge Works (MVL3/17) Roughtown Road Footbridge Works (MVL3/18)	Residential properties on Manchester Road	2m
	Residential properties on Spring Street	5m
	Residential properties on Archer Steet	Directly adjacent
	Residential properties on Milton View	Directly adjacent
	Residential properties on New Earth Street	Directly adjacent
	Residential properties on Roughtown Road	5m

Relevant works	Description of the receptor	Approximate distance to the Order Scheme boundary
Heron Lane Site Compound Works and Stockport Road Level Crossing Diversion	Residential properties on Roughtown Road	3m
	Residential properties southeast of Foxwood Drive	Directly adjacent
	Residential properties on Heron Lane	Directly adjacent
Wright Mill Overbridge Reconstruction (MVL3/20) Wrights Overbridge Works (MVL3/23)	Residential properties on Midge Hill	Directly adjacent
	Residential properties on Mossley Road	25m
Royal George Underbridge and Site Compound Works (MVL3/25) Oaklands Road Compound Works	Residential properties on Hollin Cres	Directly adjacent
	Residential properties on Armit Road	Directly adjacent
	Residential properties on Low Grove Lane	5m
	Residential properties on High Grove Lane	Directly adjacent
	Residential properties on Highbank Crescent	5m
Oldham Road Overbridge Reconstruction (MVL3/28) New Oldham Road Footbridge and Greenfield station Platform 2 Secondary Means of Escape Works (MVL3/28A)	Residential properties on Church Road	20m
	Christchurch Friezland C of E Church	Directly Adjacent
	Friezland Church hall	Directly adjacent
	Residential properties on Oaklands Road	5m
	Residential properties on Shaw Hall Bank Road	Directly adjacent

Relevant works	Description of the receptor	Approximate distance to the Order Scheme boundary
Moorgate Halt Alternative Footpath and Site Compound Works	Residential properties on Shaw Hall Bank Road	Directly adjacent
	Residential properties on Chew Valley Road	10m
	Residential properties on Herons Reach	50m
Oldham Road Access and Drainage Works	Residential properties on Oldham Road	Directly adjacent
	Residential properties on Ladcastle Road	35m
Ward Lane Overbridge Reconstruction and Utilities Bridge Works (MVL3/36)	Saddleworth School	40m
Diggle Road Overbridge and Utilities Bridge Works (MVL3/39)	Saddleworth School	40m
	Residential properties on Ravenstone Drive	Directly adjacent
	Residential properties on Ward Lane	Directly adjacent
	Residential properties on Kiln Green	5m
	Residential properties on Harrop Green Lane	5m
Standedge Canal Tunnel (MVL3/39A) Standedge Tunnel Bywash Underbridge Replacement (MVL3/39B)	Residential properties on Lee Side	Directly adjacent
	Residential properties on Station Road	Directly adjacent
	Residential properties on Harrop Court Road	Directly adjacent
Diggle Access and Diversion Works	Residential properties on Harrop Court Road	Directly adjacent

3.3 Identification of Impacts and Effects

Construction Noise and Vibration

3.3.1 The NPPF and NPSE set out the policy and guidance for the appraisal of the effect related to the Order Scheme. Greater Manchester City Council sets out the local policy and guidance. The local policy is consistent with the national policy in principle. These policies mandate that major adverse noise and vibration impacts should be avoided / minimised

3.3.2 The Control of Pollution Act 1974 (CoPA) sets out the framework for the legislative control of construction noise and vibration on any given site. It also sets out the principle of 'best practicable means' (as defined in Section 72 of the Act) and how that should be applied to construction activity noise. The Act refers to approved Codes of Practice, which include British BS 5228-1 and BS 5228-2, as being relevant for the purposes of determining the 'best practicable means'.

3.3.3 A Noise and Vibration Management Plan to control noise and vibration emission from the construction works will be prepared and submitted to the Local Authority.

3.3.4 There will be a number of sources of construction noise along the Order Scheme. The nature and duration of the works varies, with a combination of long-term and short-term stationary works, and short-term linear works (which would be short-term in any one location). Long-term construction activities are those that may affect any one receptor for at least ten days in any 15 consecutive days, or 40 days in any consecutive six months, based on the guidance of BS 5228-1.

3.3.5 Anticipated works that are likely to generate noise are listed below, together with an indication of their likely nature:

- Setup of site compounds (short-term stationary);
- Operation of site compounds (long-term stationary);
- Drainage and culverts (long-term and short-term stationary);
- Earthworks (long-term and short-term stationary);
- Retaining Walls (long-term and short-term stationary);
- Footpath and bridge reconstruction (long-term and short-term stationary);
- Stations (long-term stationary);
- Structures (long-term and short-term stationary);

- Utilities and electricals (long-term and short-term stationary);
- Diversion route construction (short-term linear).

3.3.6 Anticipated works that are likely to generate the highest level of vibration is piling.

3.3.7 At this stage, detailed construction activities, programme and equipment to be used are not available until nearer the time of the actual works. Assessments of the noise and vibration impact will be carried out during the detailed design process following the guidance in BS 5228 Part 1 and Part 2.

Operational Noise and Vibration

3.3.8 The operation of the new Mossley Station has the potential to have adverse impact on the nearby receptors. The potential impact may be caused by fixed mechanical plant and idling trains. Noise from idling trains will be reduced compared to diesel trains as the line will be electrified by the wider works. The impact of fixed mechanical plant will be assessed in accordance with BS 4142:2014 and other relevant guidance when more detailed design information is available at later stage to ensure compliance with relevant standards.

4. MITIGATION MEASURES

4.1 Construction Mitigation Measures

4.1.1 This section provides outline guidance for reducing the impacts of construction noise and vibration from the Order Scheme.

Noise and Vibration Management Plan

4.1.2 Construction noise and vibration mitigation for relevant work elements will be managed by a Noise and Vibration Management Plan (NVMP). Noise and vibration impacts will be assessed and mitigated as part of the NVMP to minimise its impacts. The noise and vibration mitigation details will be described in the NVMP as part of the CoCP (Part B) to be submitted to and agreed with the relevant local planning authorities. Construction works will be manged in compliance with the NVMP.

General Construction Noise and Vibration Guidance

4.1.3 Contractors would be required to follow good construction practices as outlined in BS 5228-1 and BS 5228-2 to control noise and vibration, respectively.

4.1.4 BS 5228-1 and BS 5228-2 have Approved Code of Practice status (in England) under the powers conferred by sections 71(1)(b), (2) and (3) of the Control of Pollution Act (CoPA) 1974, as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. Compliance with the best practice noise and vibration requirements stated therein became a statutory obligation under the Act.

Community Liaison

4.1.5 Good relations with people living and working in the vicinity of site operations are of paramount importance. The CoCP Part B will include an “external communication programme” including a protocol for dealing with any complaints. Early establishment and maintenance of these relations throughout the carrying out of site operations will go some way towards allaying people’s concerns. Good relations can be developed by keeping people informed of progress and by treating complaints fairly and expeditiously.

4.1.6 It is well established that people’s attitudes to noise can be influenced by their attitudes to the source or activity itself. Noise from a site will tend to be accepted more readily by residents if they consider that the contractor is taking all possible measures to avoid unnecessary noise. The attitude to the contractor can also be improved through good community liaison (such as being pre-warned of works) and information distribution and the

provision of a helpline to respond to queries or complaints. The acceptability of the project itself can also be a factor in determining community reaction.

4.1.7 Local residents will be informed of the commencement and likely duration of the construction work activities through a letter drop at least 14 days in advance of the works. The letter will include a contact telephone number for the NR helpline which is manned 24 hours a day. In line with good practice the helpline team will be briefed on the project in advance of works.

Construction Vibration Mitigation

4.1.8 Where reasonably practicable, plant and/or methods of work causing severe levels of vibration at NSRs will be replaced by other less intrusive plant and/or methods of working. For example, rotary bored piling produces considerably less vibration than percussive or vibratory piling.

4.1.9 Stationary plant with the potential to generate vibration will be located away from NSRs or/and isolated using resilient mountings.

4.1.10 With regards to percussive or vibratory piling, the level of vibration generated at a receptor is proportional to the energy of the input of the equipment into the pile per blow/cycle. Reducing the energy input would therefore reduce the level of vibration at nearby NSR. However, the trade-off is that the duration for driving the piles to the required depth would be extended, which may cause a greater overall impact in terms of both vibration and noise. This will require consideration on a site-by-site basis.

4.1.11 Reducing the resistance to pile penetration can decrease the levels of vibration generated by piling. This can be achieved by pre-boring, which removes some of the soil that would otherwise be displaced during the early stages of pile driving.

4.1.12 In accordance with the NVMP, where practicable to do so, vibration levels will be monitored on a case-by-case basis at nearby locations during potential vibration generating activities where there is the potential for cosmetic building damage (i.e. vibration levels >12.5 mm/s PPV). Trigger levels will be set such that works will stop should severe levels occur. Works would only commence once BPM to reduce the level of vibration have been applied. As noted above, reducing the level of vibration may lead to an increased works duration, which may in some situations be more severe than a higher vibration level for a shorter duration. This would be assessed on a site-by-site basis. A proportionate vibration monitoring programme will be detailed in the NVMP and monitoring locations and reporting will be agreed with the local authority.

4.1.13 The vibration level at which cosmetic damage to buildings may occur is much higher than the level at which vibration may be perceptible. However, people's apprehension and perception of the possibility of damage occurs

at much lower levels. As such, at locations where there is a potential risk of damage (following the application of BPM to reduce vibration levels as far as practicable) building condition surveys could be conducted, subject to NVMP and CoCP requirements, at buildings close to vibration generating activities prior to and following construction works, detailing any existing damage and subsequently any damage that may have been caused by construction works. Continuous noise and vibration monitoring will be carried at the most affected buildings above Stalybridge tunnel and Standedge tunnel during the tunnel construction works.

4.1.14 In the event that any damage is considered to have been caused by the Order Scheme construction works, rectification works would be considered by NR.

Mitigation of Noise due to Construction Traffic and Temporary Diversions

4.1.15 Temporary traffic diversions and traffic routes will be managed in accordance with good practice following the CoCP and a CTMP (Construction Transport Management Plan) and in discussions with the local authority.

4.1.16 The Order Scheme aims to reduce the amount of material that needs to be removed, and thus, associated vehicle movements, through its policy of reusing or recycling as much of the excavated material as reasonably practicable.

4.1.17 Where it is necessary to move excavated material and it is reasonably practicable to do so, excavated material will be transported by public highway along designated lorry routes. Priority will be given to A roads and motorways to minimise the use of local roads.

Operational Mitigation Measures

Fixed Plant Noise Mitigation Measures

4.1.18 Details of proposed fixed plant items at the proposed Mossley Station are not known at this stage. However, considering the observed ambient noise levels and indicative proposals for the station it is considered that plant noise will be adequately controlled to suitable levels with standard mitigation measures, such as plant selection, placement, orientation and screening in accordance with BS 4142. However, further assessment in accordance with BS 4142 will be required at a future stage.

Public Address (PA) System Noise Mitigation

4.1.19 The details of the PA design are not currently available and will be developed at a later stage. Consideration will be given to reducing the impacts of noise from the PA systems at nearby NSRs as far as practical

whilst providing adequate coverage, in line with the requirements of NR in terms of safety and speech intelligibility.

4.1.20 The mitigation measures will include the specification of the system in terms of loudspeaker location, directivity and orientation. Electronic visual information displays may also be incorporated to complement the PA system, but not as a replacement. Further assessment in accordance with BS 4142 would be required at a future stage.

Groundborne noise (Tunnels)

4.1.21 The proposed slab track system includes a highly elastic rail fastening for flexible single support point for noise and vibration reduction. This is a type of under-slab resilient layer as recommended within the Arup report. This constitutes best practice, and these mitigations are reasonably practicable measures that can be incorporated into the design and components of the slab track system.

4.1.22 As part of the new track alignment and intervention the track roughness will be improved along the route and if this is accounted for, combined with an improved modern fastening system, the new system when installed can be expected to provide a vibration mitigation or reduction in the range of 10dB

5. CUMULATIVE EFFECTS

5.1 Cumulative Construction Effects

5.1.1 In addition to the relevant elements of the Order Scheme, it is acknowledged that additional works which are consented via Permitted Development Rights (PDRs) are being undertaken as part of the wider TRU W2B Project, as is routine. Construction of these works will likely be undertaken concurrently with the relevant works of the Order Scheme and therefore may give rise to cumulative effects both during the construction and operation phases of the Order Scheme.

5.1.2 Relevant works being undertaken under PDRs for Noise and Vibration include construction and operation of site compounds subject to PDR, and installation of overhead line gantries on Network Rail land.

5.1.3 The potential effects of the design, construction and operation of the works being undertaken by PDRs will be managed in accordance with the relevant clauses included within Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015). As per section 6.6 of those requirements, the Designer/Contractor shall design and implement measures to control noise and vibration emissions using BPM to levels as low as reasonably practicable. The Contractor shall agree an appropriate noise and vibration monitoring programme with the Employer's Representative and, where appropriate, the relevant local authority. Further mitigation in relation to

works being undertaken by PDR's will be secured via adherence to the control measures outlined with the CoCP (Part A) and compliance with relevant Environmental Management Plans.

Intra-project Cumulative Construction Effects

5.1.4 There are potential intra-project cumulative construction noise and/or vibration effects due to the multiple construction activities associated with the Order Scheme. A detailed timetable and concurrent activities of works are not available until nearer the time of the actual works.

5.1.5 Typically, construction noise impacts at individual receptors will be dominated by the closest, or noisiest activity. However, potential cumulative noise impacts will be assessed once the works programme is confirmed. BPM will be employed to reduce intra-project cumulative noise and vibration impacts.

Cumulative Operational Effects

5.1.6 There are potential cumulative effects at NSR due to the various sources of operational noise, including plant noise, and PA system noise. Further assessment would be required for receptors near the new Mossley Station at a future stage.