A585 Windy Harbour to Skippool Improvement Scheme

TR010035

6.11.2 ES Appendix 11.2: Construction Noise Assessment

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009

A585 Windy Harbour to Skippool Improvement Scheme

Development Consent Order 201[ ]

ES APPENDIX 11.2: CONSTRUCTION NOISE ASSESSMENT

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010035
Application Document Reference	TR010035/APP/6.11.2
Author:	A585 Windy Harbour to Skippool Improvement Scheme Project Team, Highways England

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Rev 0	October 2018	DCO submission

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CONTENTS

LIST OF TABLES

LIST OF INSERTS

1 CONSTRUCTION NOISE ASSESSMENT

1.1 Introduction

1.1.1 This Appendix assesses the construction noise impacts upon identified sensitive receptors during the construction phase of the proposed A585 Windy Harbour to Skippool Improvement Scheme (hereinafter referred to as the Scheme).

1.1.2 The assessment has been based upon assumptions contained the methodology to be used to construct the Scheme from the Appendix 2.1: Construction Information (document reference TR010035/APP/6.2.1) and is based on typical methods that a competent contractor would have the capability and experience to adopt during the construction of the Scheme.

Scheme Description

1.1.3 The Scheme is to provide an improvement to 4.85km of the existing single carriageway A585 trunk road route that extends in a generally north-west direction for about 19km between M55 Junction 3 and the Port of Fleetwood at the northern end of the Fylde Peninsula.

1.1.4 It is anticipated that the construction of the Scheme would last for approximately 25 months based upon the envisaged construction programme provided in Appendix 2.1: Construction Information (document reference TR010035/APP/6.2.1).

Working Hours

1.1.5 Working hour constraints are specified in the Record of Environmental Actions and Commitments (REAC) (document reference TR010035/APP/7.3).

1.1.6 In summary, the typical core working hours for the Scheme are expected to be between 08:00 and 18:00 on weekdays (excluding bank holidays) and from 08:00 to 16:00 on Saturdays. In addition, there would be a start-up and close down period of 1 hour either side of these times to maximise efficiency of the core hours. This would include activities such as deliveries, staff travel to work, maintenance and general preparation works, but not include running plant and machinery that are likely to cause a disturbance to local residents or businesses.

1.1.7 It is expected that some works would need to be carried out at night, road crossings and final surfacing tie ins for example. Night working would be agreed in advance with the local authority.

1.2 Methodology

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites.

1.2.1 The method of assessing and calculating construction noise impacts has been undertaken using the guidance contained in British Standard 5228: 2009+A1: 2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’ Part 1 (BS5228-1).

1.2.2 The method of predicting construction noise contained within BS5228-1 accounts for the following parameters:

- The type and number of plant and equipment on site

- The sound power of the construction plant
- The relative full power operating time (on-time) of plant, as a percentage of the working day/assessment period
- The distance to receptors
- The intervening ground type
- Acoustic screening by barriers or terrain

1.2.3 The assessment has been undertaken based upon the envisaged type, sound power level and number of plant for each phase during the construction of the Scheme as set out in Annex A – Typical Plant and Machinery – Worst Case from a Noise and Vibration Perspective of Appendix 2.1: Construction Information (document reference TR010035/APP/6.2.1).

1.2.4 All predicted construction noise levels are presumed to be façade noise levels with a 3dB correction added to the resultant noise level in accordance with BS5228.

Identified residential sensitive receptors

1.2.5 The study area for the construction noise assessment comprises an area up to 300m from the draft order limits. This was determined in accordance with guidance provided in BS5228-1. BS 5228-1 states that at distances over 300m noise predictions should be treated with caution because of the increasing importance of meteorological effects. As such the prediction of construction noise levels has been limited to within 300m.

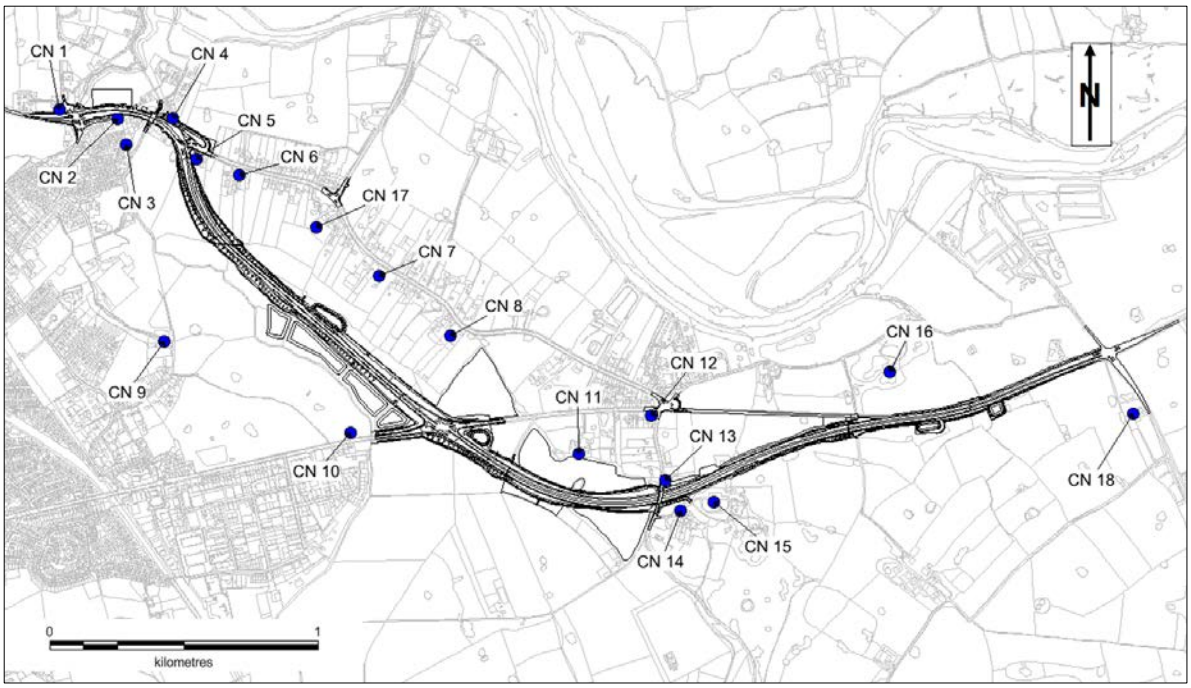
1.2.6 Noise impacts from the construction of the Scheme have been assessed at 18 selected worst-case sensitive receptors which are considered to be representative of all noise sensitive receptors within the immediate vicinity of the scheme. These receptors were agreed with the Environmental Health Departments of Wyre Council and Fylde Council, and are presented in Table 1-1 and on Insert 1-1.

Table 1-1: Construction Noise Sensitive Receptors

Sensitive receptor	Receptor ID
Barton House, Skippool Road	CN1
198 Breck Road	CN2
36 Kevin Avenue	CN3
The Cottage, Old Mains Lane	CN4
Meadow View Barn, 195 Mains Lane	CN5
183 Mains Lane	CN6
103 Mains Lane	CN7
71 Mains Lane	CN8
36 Little Poulton Lane	CN9
New Development	CN10

Sensitive receptor	Receptor ID
Springfield, Garstang Road	CN11
Silver Ridge, Garstang Road	CN12
North Lodge, Lodge Lane	CN13
1 Barnfield Man, Lodge Lane	CN14
The Manor, Singleton Hall, Lodge Lane	CN15
Bankfield Manor, Poolfoot Lane	CN16
133 Mains Lane	CN17
Kirkham I'th' Fields Farm, Fleetwood Road	CN18

Insert 1-1: Construction Noise Sensitive Receptors



1.3 Construction Noise Impact Criteria

1.3.1 BS 5228-1 Annex E provides examples of a number of methods for establishing significance criteria for construction noise effects. Of these methods a precedent has been set through numerous significant infrastructure projects, taken through both public enquiry and DCO, for the use of the ABC method as the most appropriate way to establish construction noise limits for large infrastructure projects. Within the 'ABC method' the change in the ambient noise level with construction noise is assessed against defined threshold values. Example threshold values from within BS 5228 are reproduced below in Table 1-2.

Table 1-2: Construction Noise Sensitive Receptors

Assessment category and threshold value period	Threshold level dB L_{Aeq}		
	Category A	Category B	Category C
Night-time (23.00 – 07.00)	45 dB L_{Aeq}	50 dB L_{Aeq}	55 dB L_{Aeq}
Evenings & weekends[1]	55 dB L_{Aeq}	60 dB L_{Aeq}	65 dB L_{Aeq}
Daytime (07.00 – 19.00) and Saturday mornings[2]	65 dB L_{Aeq}	70 dB L_{Aeq}	75 dB L_{Aeq}
[1] 19.00 - 23.00 weekdays, 13.00 - 23.00 Saturdays and 07.00 – 23.00 Sundays [2] 07.00 – 13.00 Saturdays			
A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			

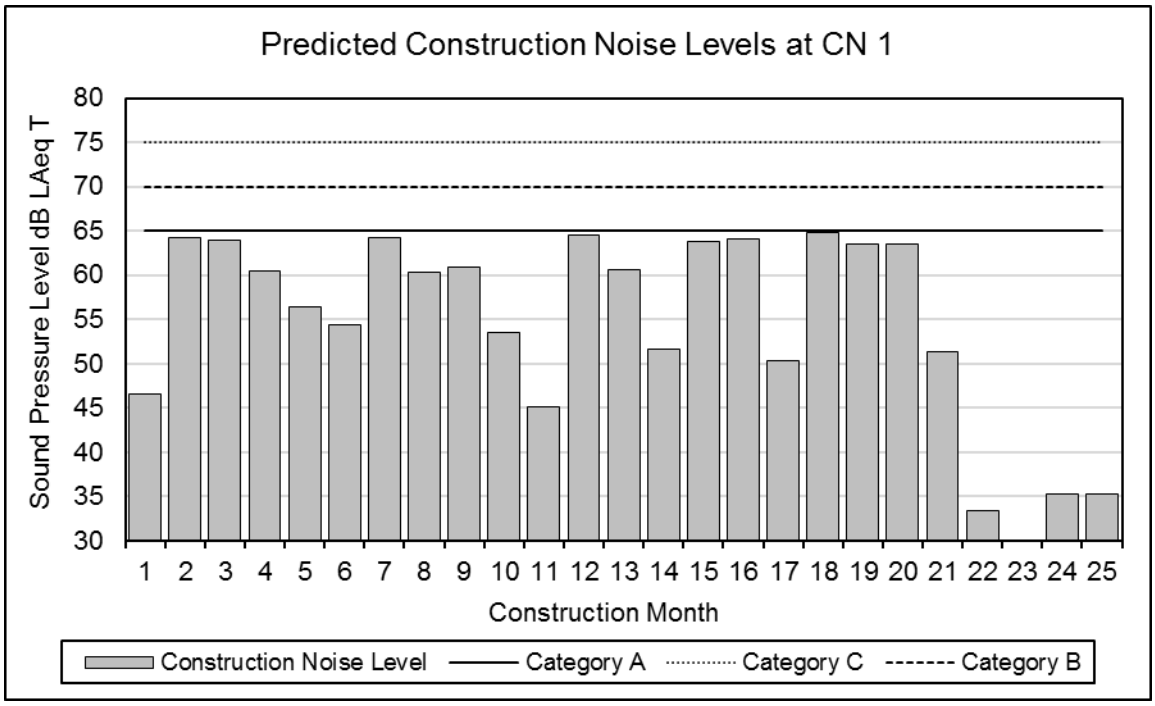
1.3.2 A significant effect is deemed to occur if the construction activity L_{Aeq} noise level exceeds the threshold level for the category appropriate to the ambient noise level.

1.3.3 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur as the total L_{Aeq} noise level for the period would increase by more than 3dB due to the construction activity. The significance criteria within Annex E of BS5228 apply to residential receptors only.

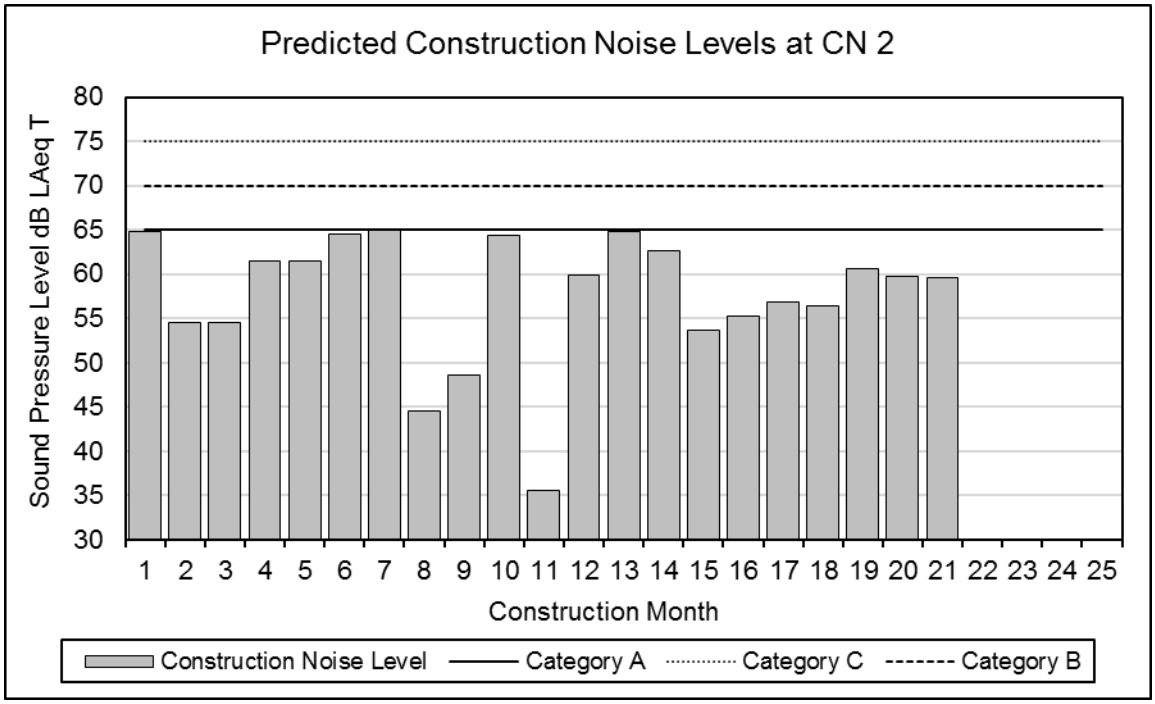
1.4 Predicted Daytime construction noise levels

1.4.1 Predicted construction noise levels for each selected receptor are set out in Inserts 1-2 to 1-19.

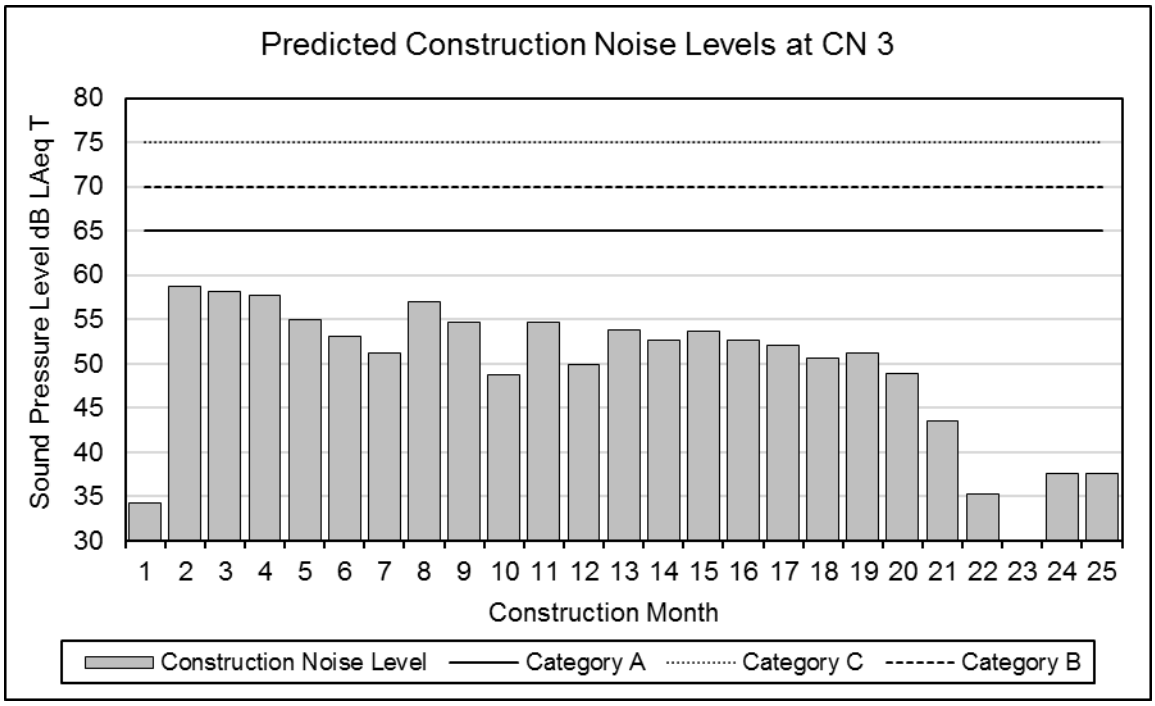
Insert 1-2: Predicted Daytime Construction Noise Levels at Receptor CN 1



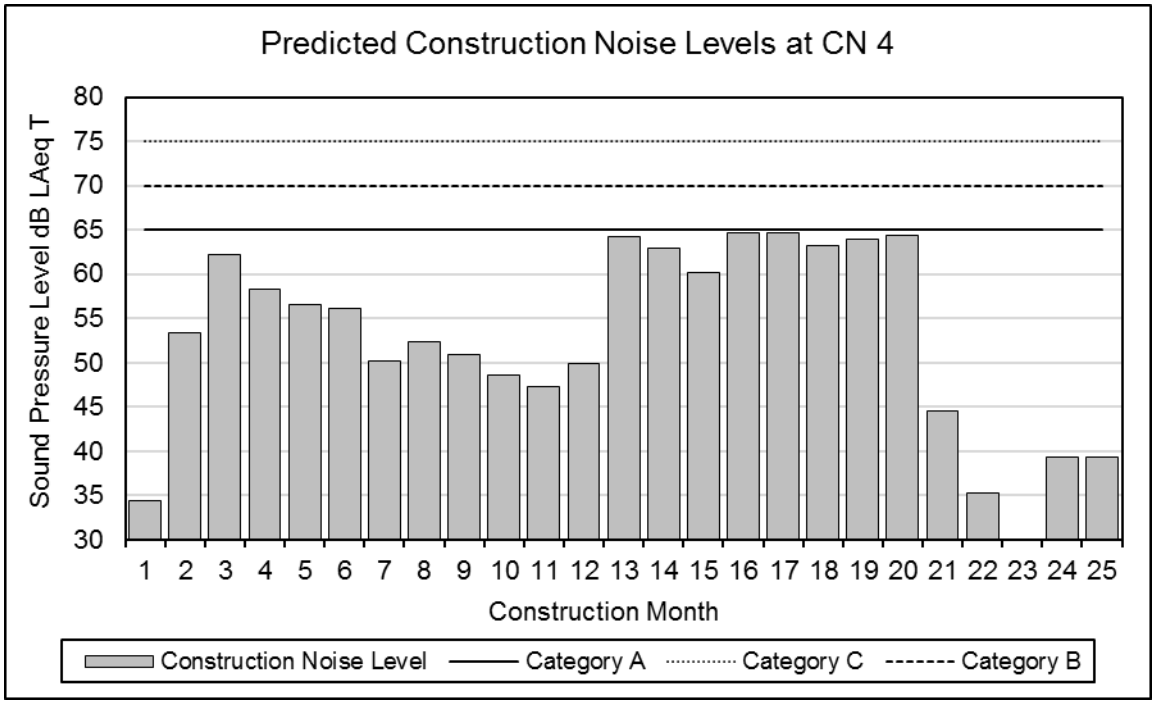
Insert 1-3: Predicted Daytime Construction Noise Levels at Receptor CN 2



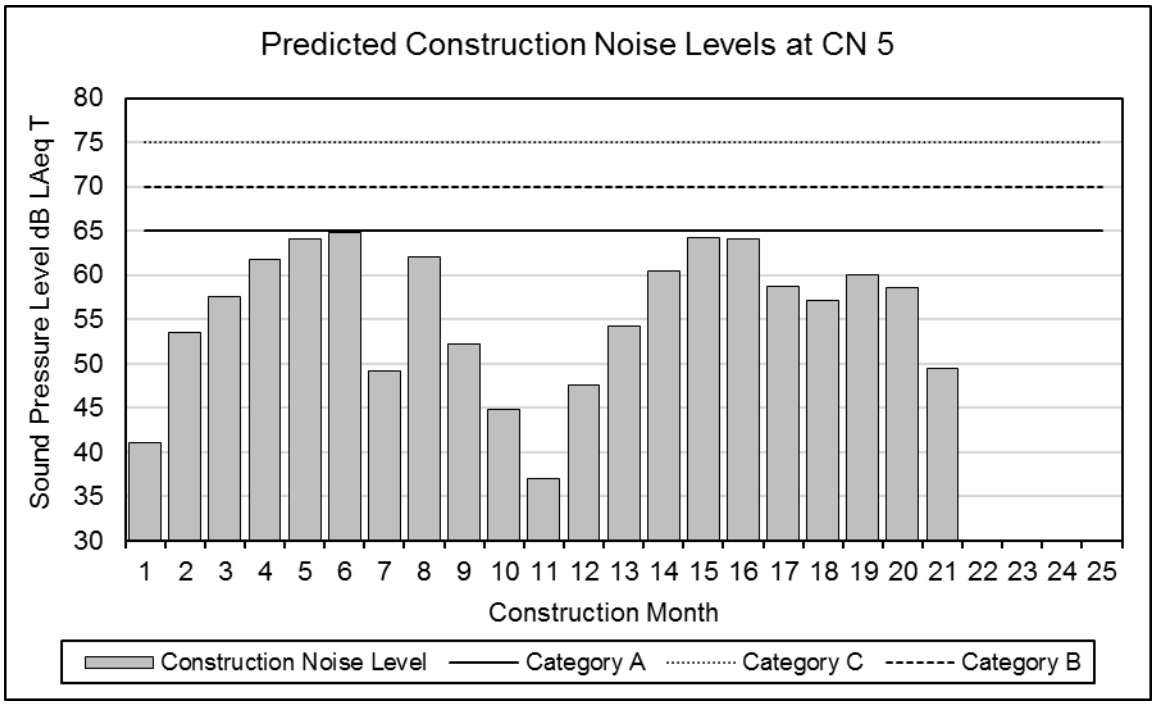
Insert 1-4: Predicted Daytime Construction Noise Levels at Receptor CN 3



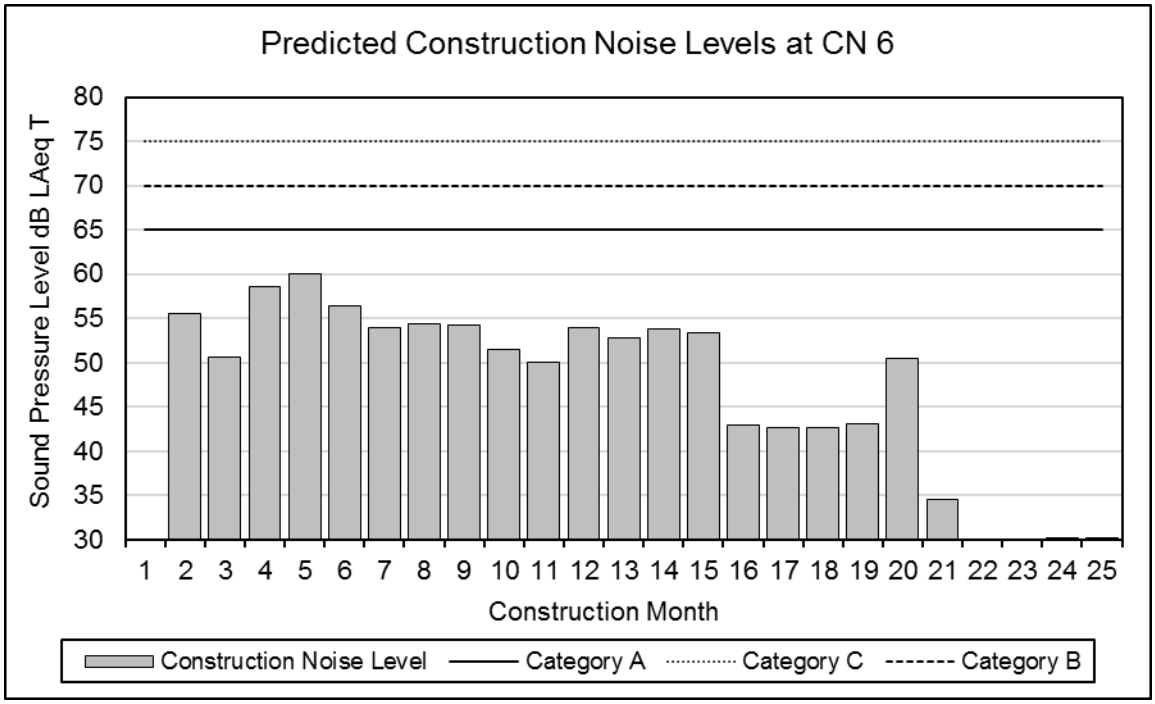
Insert 1-5: Predicted Daytime Construction Noise Levels at Receptor CN 4



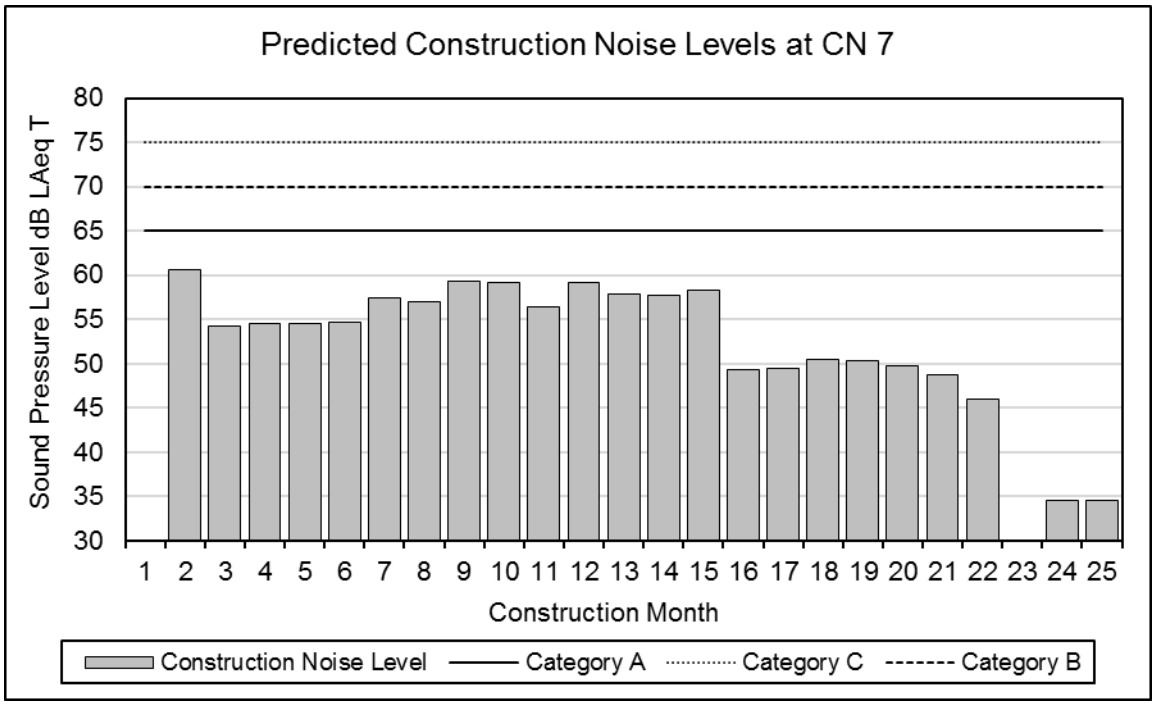
Insert 1-6: Predicted Daytime Construction Noise Levels at Receptor CN 5



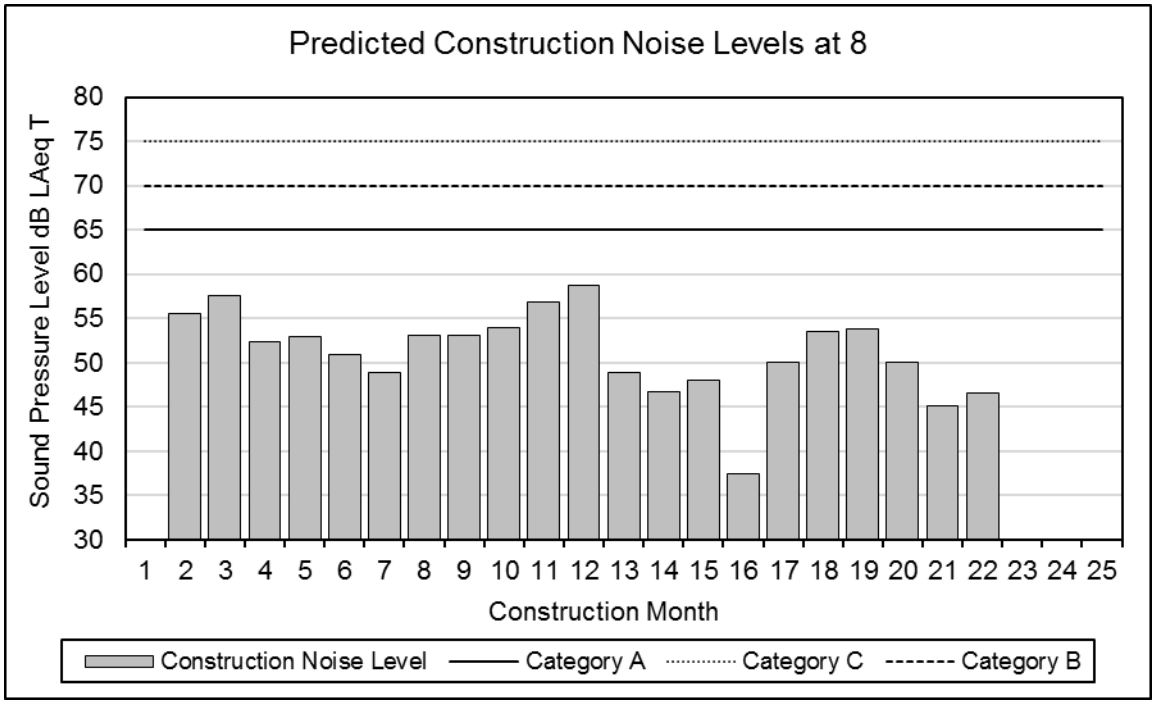
Insert 1-7: Predicted Daytime Construction Noise Levels at Receptor CN 6



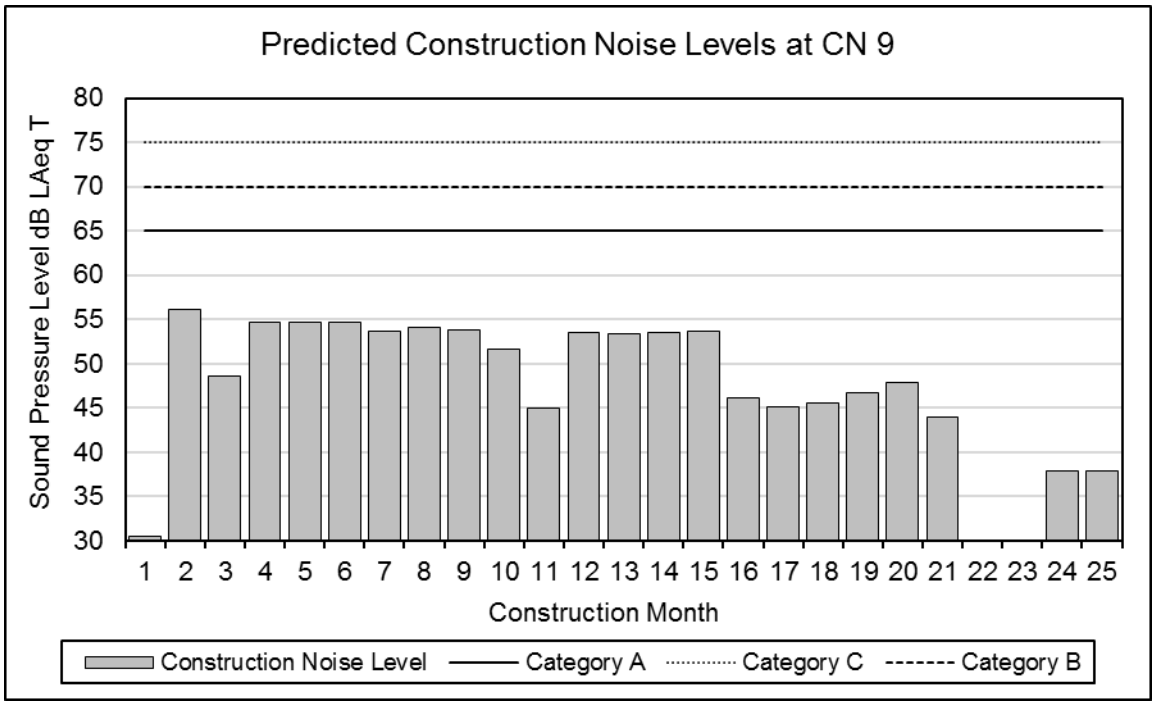
Insert 1-8: Predicted Daytime Construction Noise Levels at Receptor CN 7



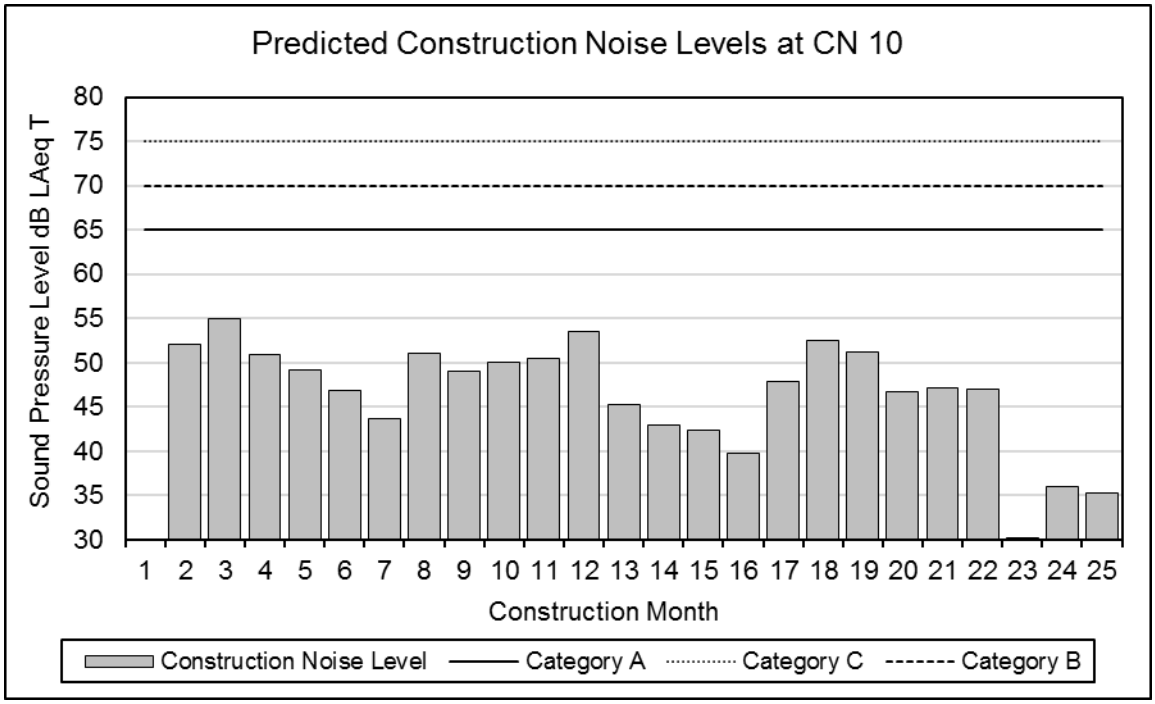
Insert 1-9: Predicted Daytime Construction Noise Levels at Receptor CN 8



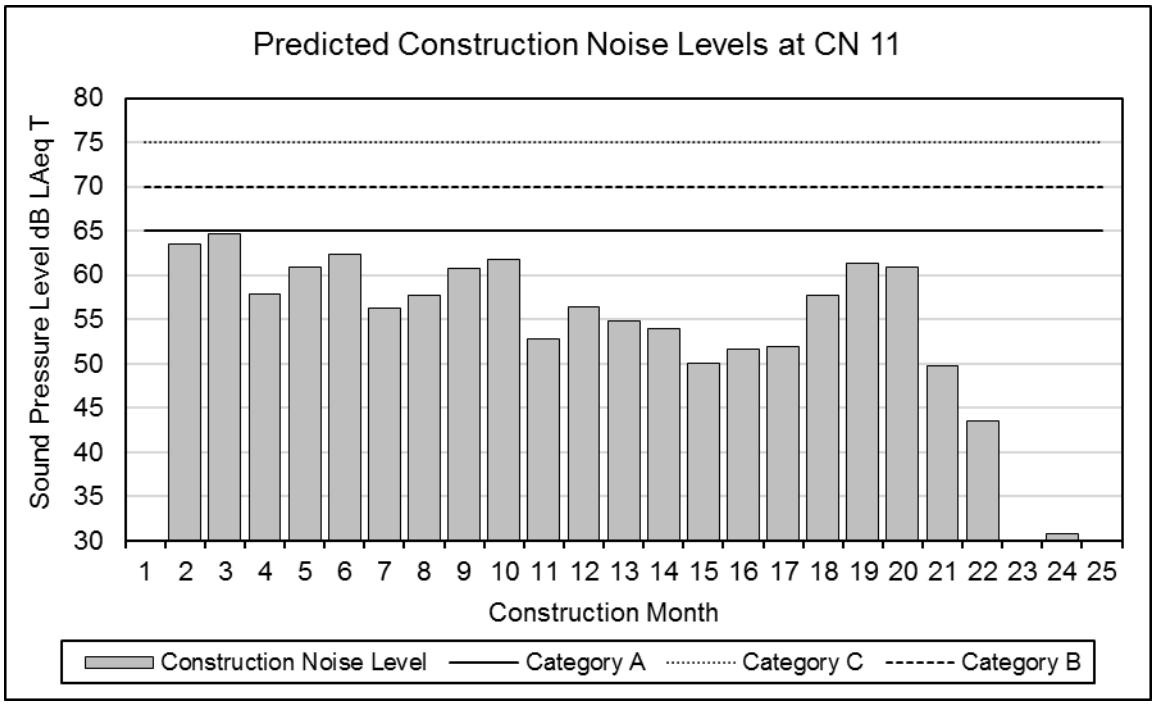
Insert 1-10: Predicted Daytime Construction Noise Levels at Receptor CN 9



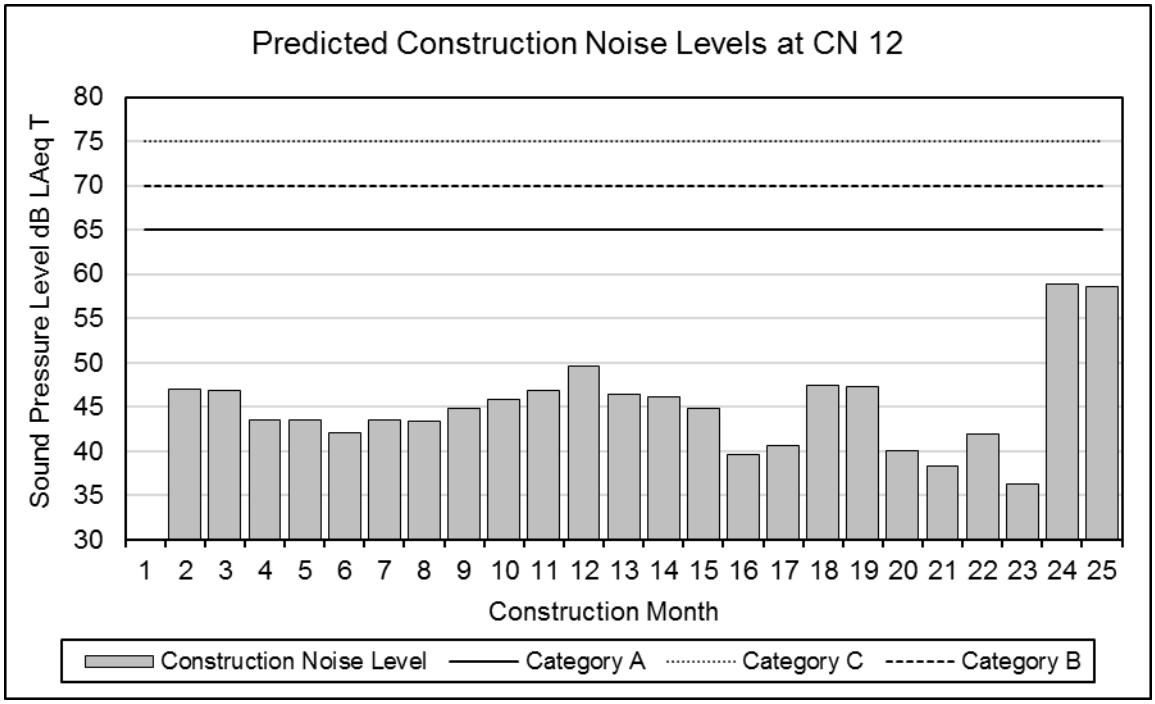
Insert 1-11: Predicted Daytime Construction Noise Levels at Receptor CN 10



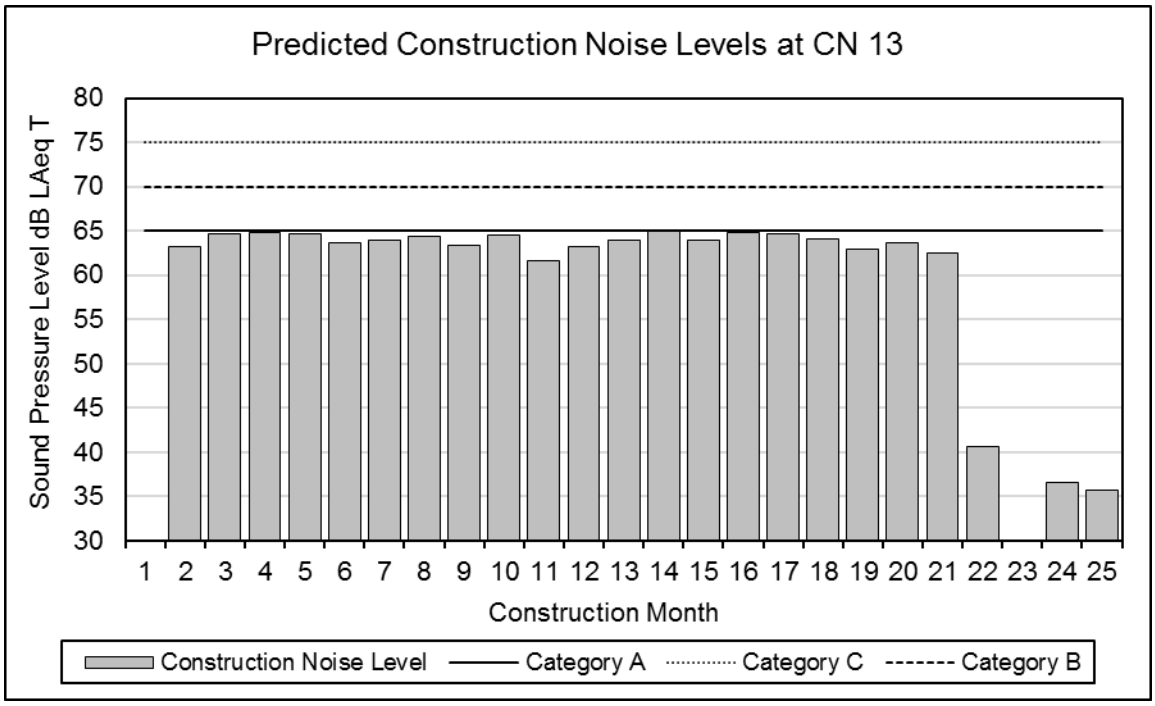
Insert 1-12: Predicted Daytime Construction Noise Levels at Receptor CN 11



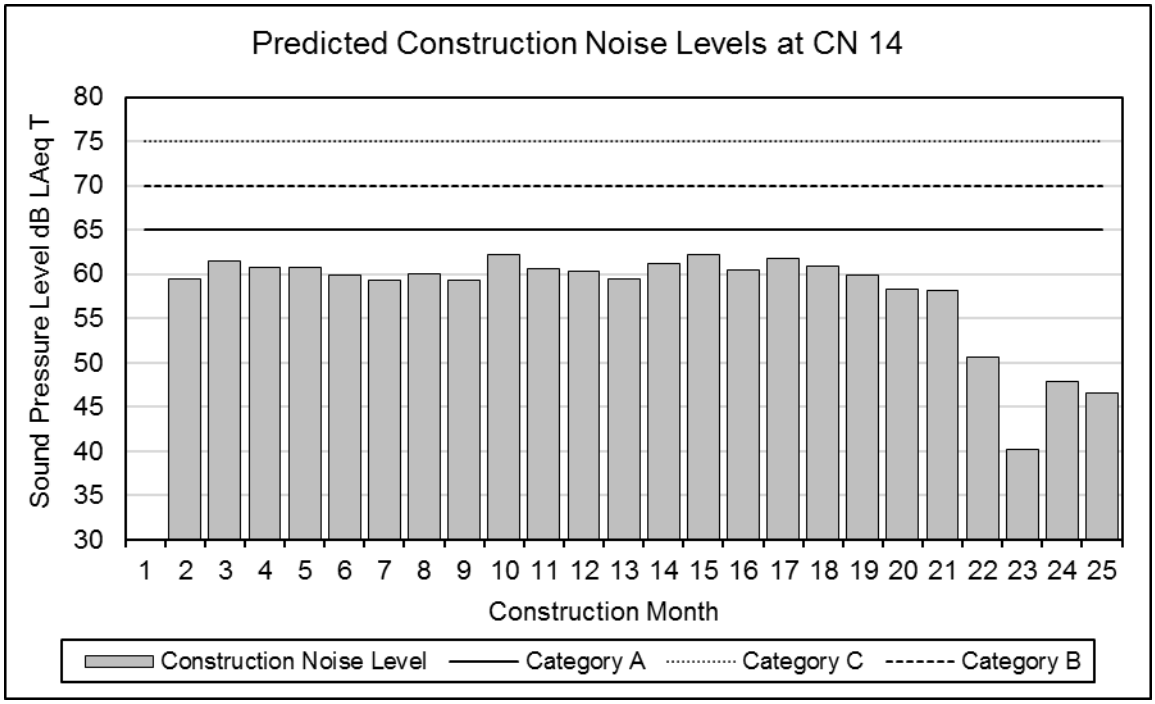
Insert 1-13: Predicted Daytime Construction Noise Levels at Receptor CN 12



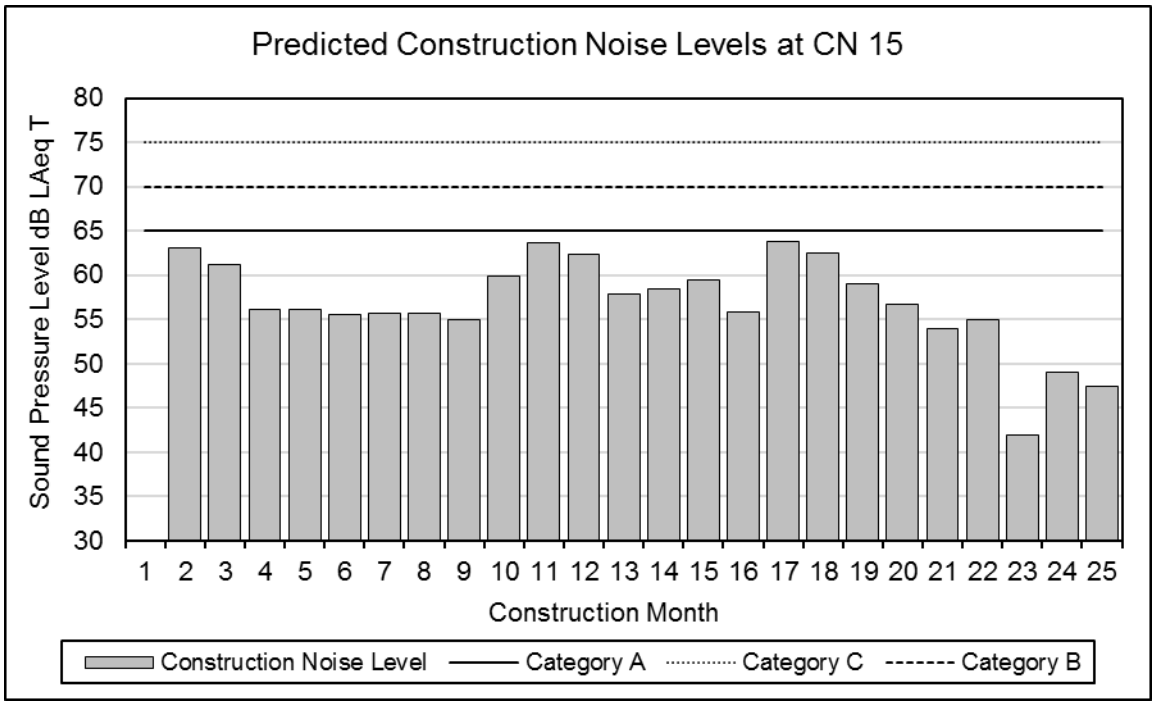
Insert 1-14: Predicted Daytime Construction Noise Levels at Receptor CN 13



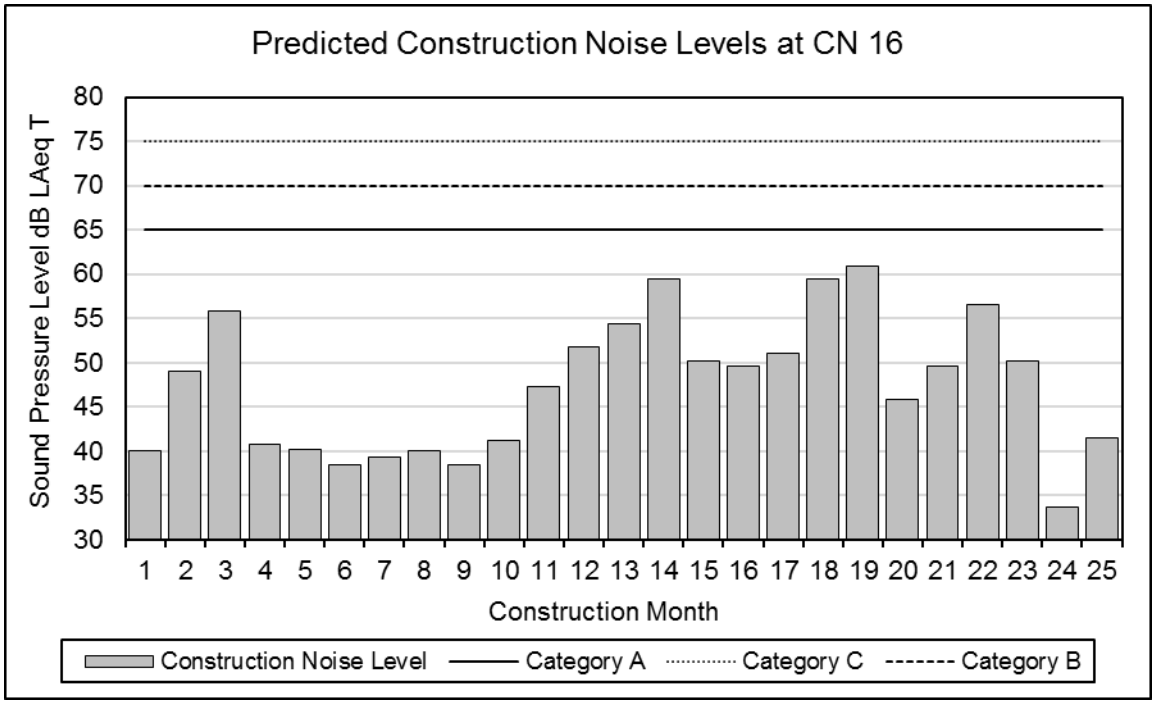
Insert 1-15: Predicted Daytime Construction Noise Levels at Receptor CN 14



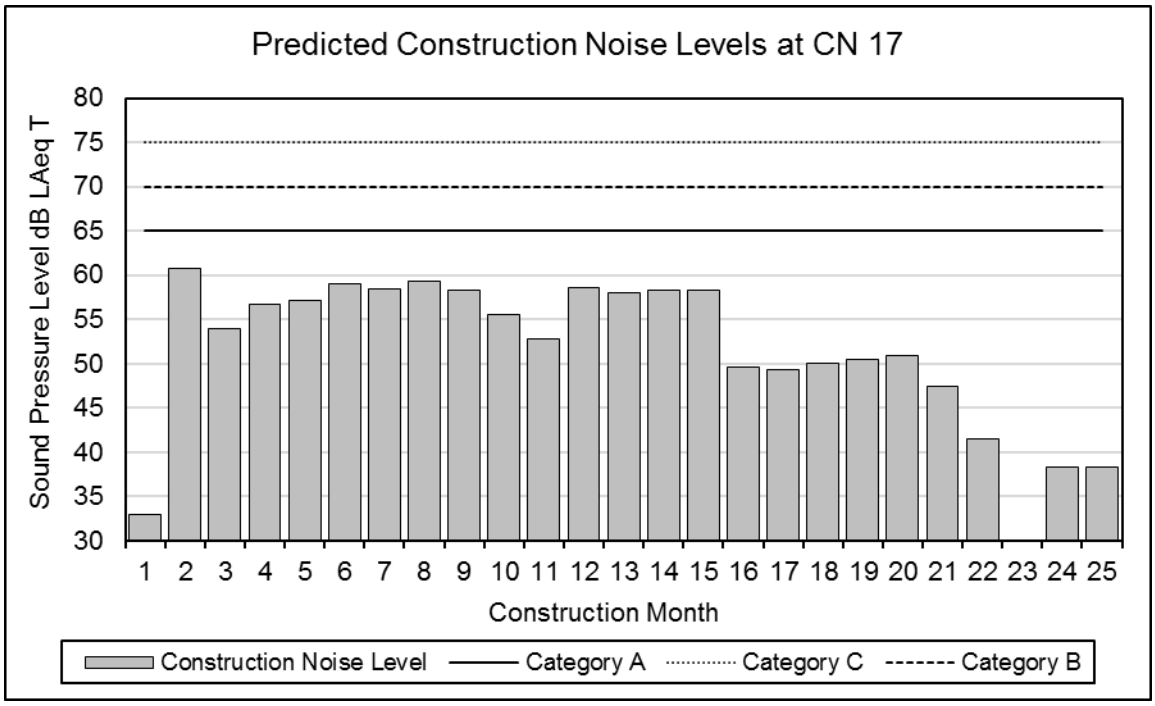
Insert 1-16: Predicted Daytime Construction Noise Levels at Receptor CN 15



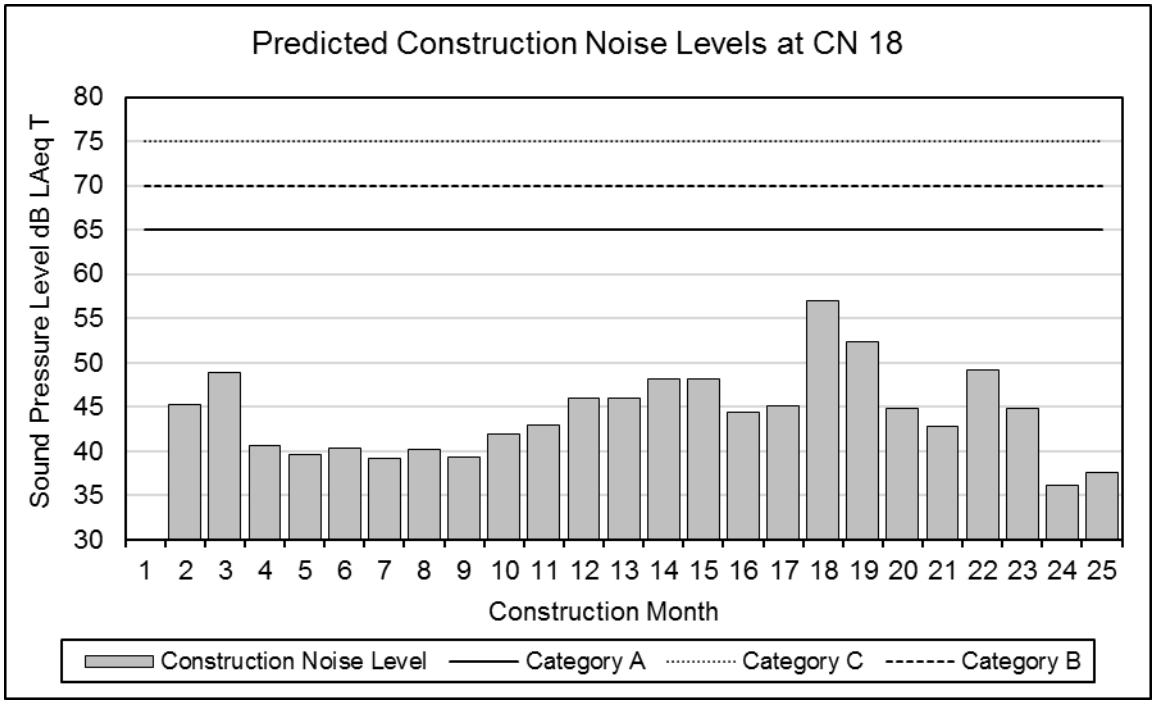
Insert 1-17: Predicted Daytime Construction Noise Levels at Receptor CN 16



Insert 1-18: Predicted Daytime Construction Noise Levels at Receptor CN 17



Insert 1-19: Predicted Daytime Construction Noise Levels at Receptor CN 18



1.4.2 A summary of the predicted range of construction noise levels during the daytime over the construction phase period of the Scheme is presented in Table 1-3.

Table 1-3: Daytime Construction Noise Level Ranges

Receptor ID	Predicted Range		Exceeds Category A Noise Level	Exceeds Category B Noise Level	Exceeds Category C Noise Level
	Max	Min			
CN1	23.4	64.8	No	No	No
CN2	5.5	65.0	No	No	No
CN3	24.7	58.7	No	No	No
CN4	25.3	64.7	No	No	No
CN5	9.7	64.8	No	No	No
CN6	13.6	60.0	No	No	No
CN7	10.2	60.6	No	No	No
CN8	13.8	58.7	No	No	No
CN9	20.4	56.1	No	No	No
CN10	6.8	54.9	No	No	No
CN11	7.7	64.6	No	No	No
CN12	21.6	58.8	No	No	No
CN13	20.0	64.9	No	No	No
CN14	20.1	62.3	No	No	No
CN15	19.4	63.7	No	No	No
CN16	33.6	60.9	No	No	No
CN17	11.2	60.8	No	No	No
CN18	13.8	57.0	No	No	No

1.4.3 As indicated in Table 1-3 construction noise levels predicted at the closest receptors to the Scheme during the daytime would not breach any ABC construction noise daytime threshold level and therefore would not be considered to cause a significant environmental effectat any sensitive recptors.

1.5 Predicted Night-time Construction Noise Levels

1.5.1 A summary of the predicted construction noise levels during the night-time over the construction phase period of the Scheme is presented in Table 1-4 .

Table 1-4: Predicted Night-time Construction Noise Levels

Receptor ID	Predicted Level dB L_{Aeq}	Exceeds Category A Noise Level	Exceeds Category B Noise Level	Exceeds Category C Noise Level
CN1	54.1	Yes	Yes	No
CN2	52.1	Yes	Yes	No
CN3	48.1	Yes	No	No
CN4	39.1	No	No	No
CN5	42.3	No	No	No
CN6	27.9	No	No	No
CN7	39.3	No	No	No
CN8	42.9	No	No	No
CN9	35.5	No	No	No
CN10	48.0	Yes	No	No
CN11	38.2	No	No	No
CN12	26.0	No	No	No
CN13	34.2	No	No	No
CN14	37.2	No	No	No
CN15	38.1	No	No	No
CN16	49.8	Yes	No	No
CN17	37.6	No	No	No
CN18	37.1	No	No	No

1.5.2 The predicted construction noise levels presented in Table 1-4 indicate that:

- 5 of the identified residential receptors would exceed category A values, these are identified as:
- CN1, CN2, CN3, CN10 and CN16
- 5 of the identified residential receptors would exceed category B values, these are identified as:
- CN1 and CN2
- All receptors would be below category C threshold values

1.5.3 The significance of the predicted construction noise during the night time would be dependent upon the existing ambient noise climate at these receptors.

2 CONSTRUCTION VIBRATION ASSESSMENT

2.1 Introduction

2.1.1 This section of the appendix considers the vibration impacts upon sensitive receptors from vibratory sheet piling activities associated with the construction of the A585.

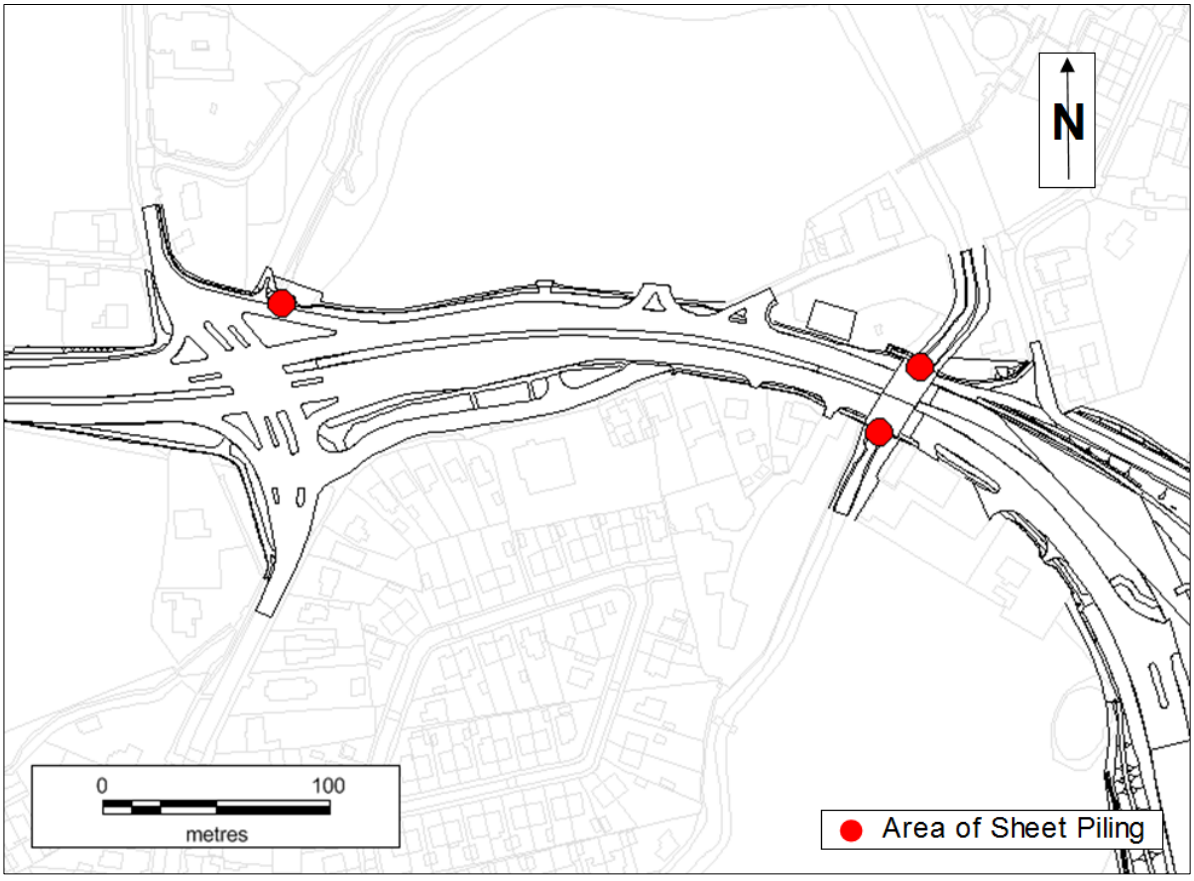
2.2 Methodology

2.2.1 The areas where vibratory sheet piling would be undertaken have been identified from Appendix 2.1: Construction Information (document reference TR010035/APP/6.2.1) as:

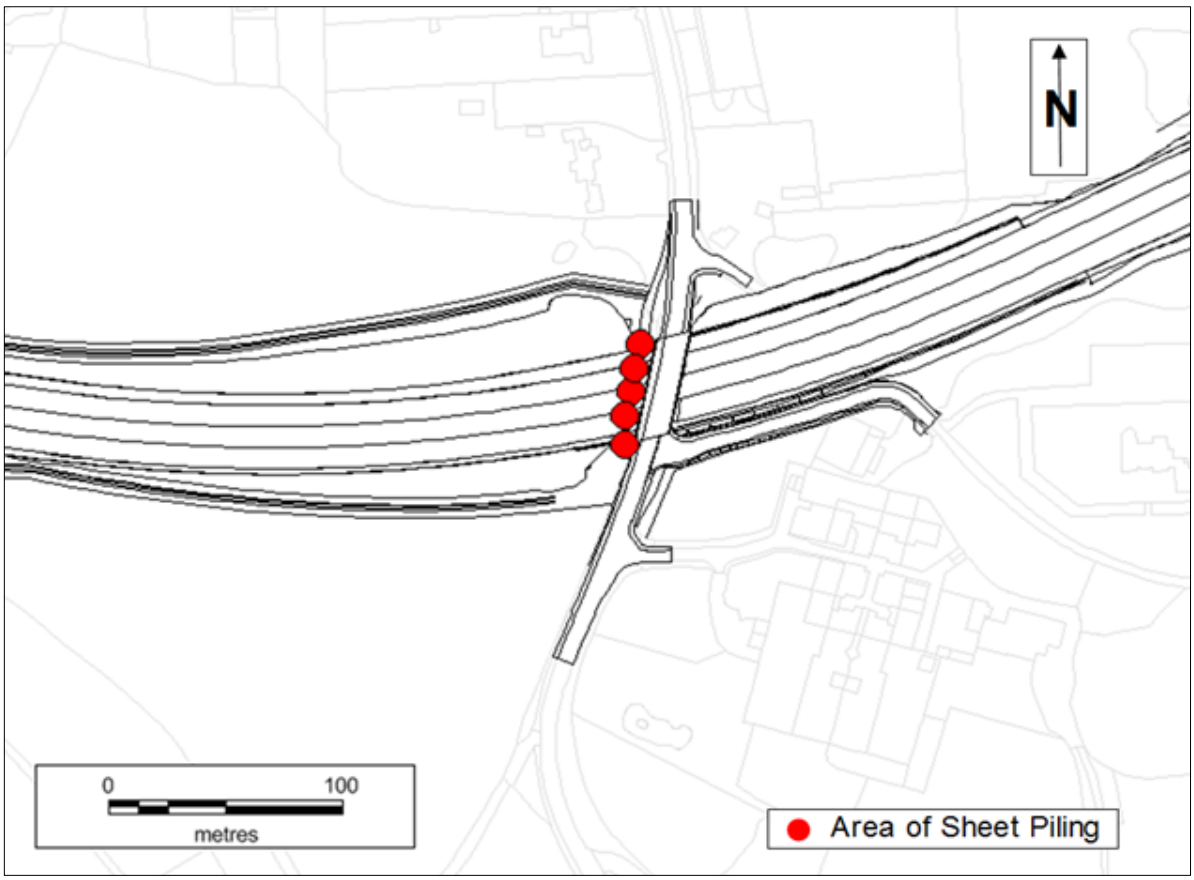
- Skippool Clough Culvert north end - temporary sheet piling coffer dam in tidal section of Horsebridge Dyke
- New Skippool Bridge - temporary sheet piling on both sides of Main Dyke forming piling platform for installation of piles for new bridge abutments and NE wing wall. Applies to north half of bridge and south half of bridge
- Lodge Lane diversion - possible temporary sheet piling on east side of temporary diversion

2.2.2 These areas where vibratory sheet piling would be undertaken is presented in Insert 2-1 and Insert 2-2.

Insert 2-1: Areas of Vibratory Sheet Piling - Skippool Clough Culvert and New Skippool Bridge



Insert 2-2: Areas of Vibratory Sheet Piling – Lodge Lane



BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites.

2.2.3 Predictions of vibration levels in terms of Peak Particle Velocity (PPV) generated from the operation of piling equipment during the construction phase of the Scheme have been undertaken using the prediction formulae contained within Annex E of BS5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 2 - Vibration (5228-2).

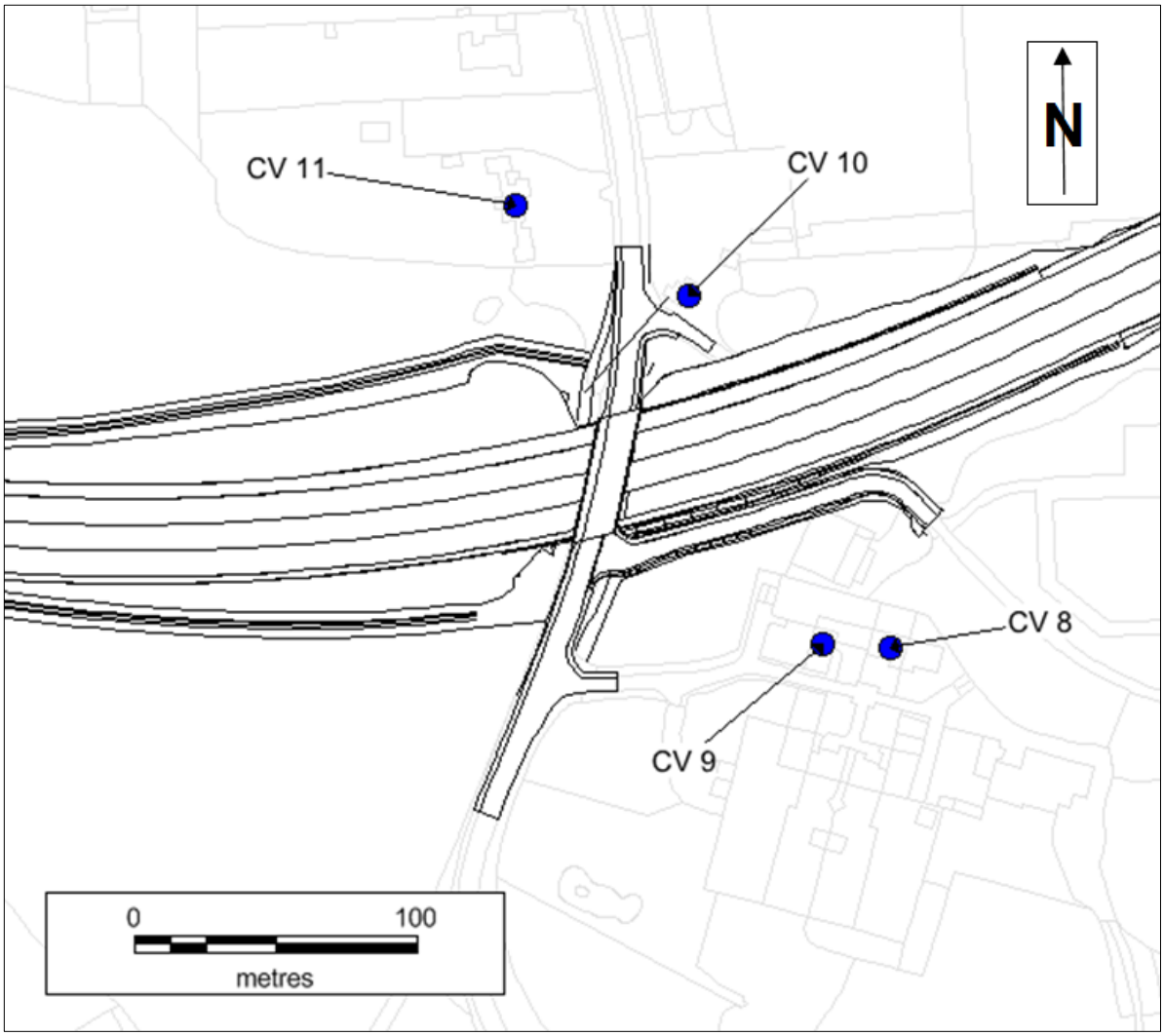
Identified Sensitive Receptors

2.2.4 Vibration impacts from the construction of the Scheme have been assessed to at 11 selected worst-case sensitive receptors which are considered to be representative of vibration sensitive receptors within the immediate vicinity of construction phase piling operations. These receptors are presented in Table 2-1 and on Insert 2-3.

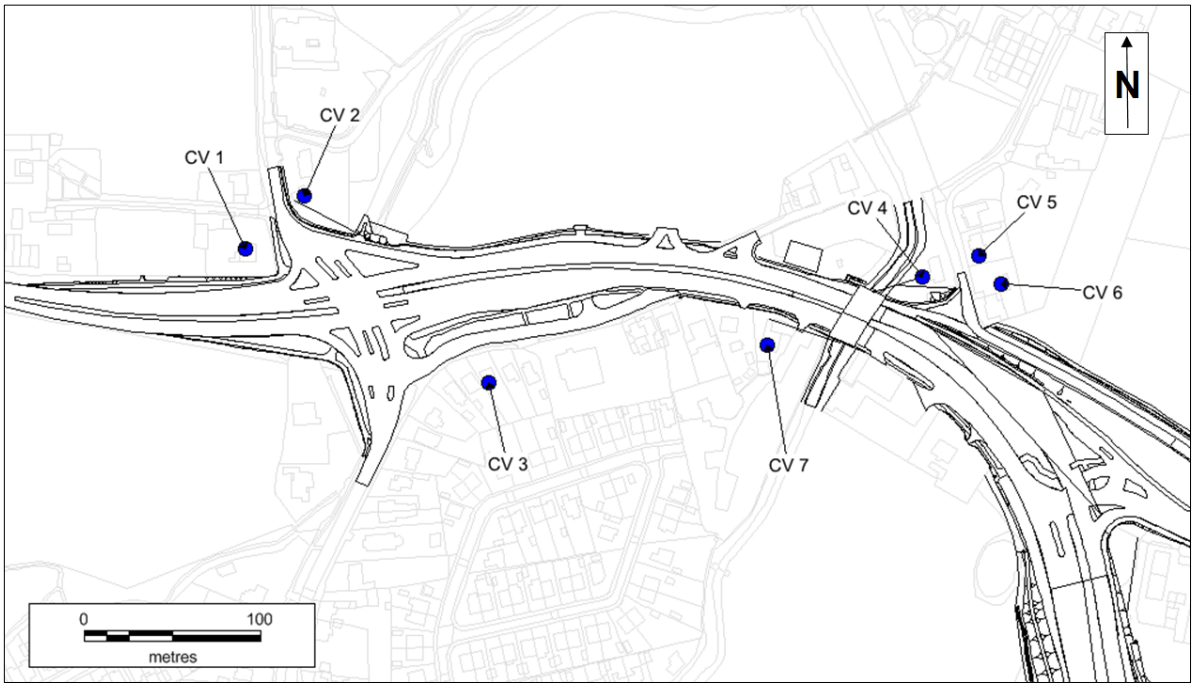
Table 2-1: Construction Vibration Receptors

Sensitive Receptor	Receptor ID	Sensitive Receptor	Receptor ID
Barton House	CV 1	210 Breck Road	CV 7
Throstles Nest	CV 2	3 The Hazels	CV 8
180 Breck Road	CV 3	1 Keepers Cottage	CV 9
Riverside	CV 4	North Lodge	CV 10
Wyre Lodge	CV 5	Larkfield	CV 11
The Cottage	CV 6		

Insert 2-3: Construction Vibration Sensitive Receptors



Insert 2-4: Construction Vibration Sensitive Receptors



2.2.5 Predictions of vibration levels in terms of PPV generated from the operation of piling equipment during the construction phase of the Scheme have been undertaken using the prediction formulae contained within Annex E of BS5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 2 - Vibration (5228-2).

2.3 Significance of Vibration Levels

2.3.1 BS 5228-2 Annex B provides guidance on effects of vibration levels on humans in terms of peak particle velocity (PPV). The guidance is based upon human response to vibration contained within British Standard 6472-1:2008 ‘Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting’.

2.3.2 Using the guidance provided in BS 5228-2, a significance of effect in terms of PPV for piling operations has been determined and is presented in Table 2-1.

Table 2-2: Construction Vibration Receptors

Vibration level (PPV)	Effect	Significance
0.14 mm·s^{-1}	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.	Neutral
0.3 mm·s^{-1}	Vibration might be just perceptible in residential environments.	Slight Adverse

Vibration level (PPV)	Effect	Significance
1.0 mm·s^{-1}	It is likely that vibration of this level in residential environments would cause complaint but can be tolerated if prior warning and explanation has been given to residents.	Moderate Adverse
10 mm·s^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Large Adverse

2.4 Predicted Construction Vibration Levels

2.4.1 A summary of the predicted vibration levels during the construction phase period of the Scheme is presented in Table 2-3 .

Table 2-3: Vibration effects from Vibratory Sheet Piling

Receptor ID	Predicted PPV	Magnitude of Impact
CV 1	0.22	Negligible
CV 2	0.38	Slight Adverse
CV 3	0.15	Negligible
CV 4	0.74	Slight Adverse
CV 5	0.27	Negligible
CV 6	0.23	Negligible
CV 7	0.47	Slight Adverse
CV 8	0.12	Negligible
CV 9	0.16	Negligible
CV 10	0.36	Slight Adverse
CV 11	0.24	Negligible

2.4.2 The predicted levels of PPV presented in Table 2-3 range from 0.12mm/s to 0.74mm/s. The worst case predicted levels would be above 0.3mm/s which is the level at which it is considered that vibration may just be perceptible in a residential environment and vibration levels of this magnitude would be considered to be a slight adverse impact.

2.4.3 These worst case slight adverse impacts would remain below a SOAEL (1mm) of vibration and would be temporary in nature for a short duration of time and as such would not be considered to be a significant effect.