Noise and Vibration Management Plan

KERDIFFSTOWN LANDFILL REMEDIATION PROJECT

Wills Bros Ltd
CIVIL ENGINEERING CONTRACTORS

Revision and Amendment Status Sheet

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Further revisions since original issue date.

Page Number	Date of Amendment	Details of Amendment	Authorised by	Revision No.
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9,14,15,23,27,29, 30,31,33,36,37	05/01/2021	Revisions made based on ER and KCC comments	JS/KD	02
5, 6, 7, 9, 14, 15, 19, 23, 24, 30	02/02/2021	Revisions made based on ER comments	JS/KD	03
Chapter 2,8,9	25/06/2021	Updated to include revised measures for ongoing works	JS/KD	04
Chapter 3,8	16/07/2021	Revisions made based on RE comments	JS/KD	05

Contents

1.0 INTRODUCTION

This Noise and Vibration Management Plan (NVMP) has been prepared by Wills Bros to ensure appropriate environmental management measures are implemented during stages of the landfill remediation project.

This is a live document and the NVMP will be revised if required, to confirm/update the details of construction phases (e.g., actions and noise control measures).

1.1 Project Overview

The project involves the remediation of the Kerdiffstown Landfill site and development of the site as a multi-use public park. This is to be achieved by clearing and reprofiling the existing site, installing an engineered capping system, improving the management of landfill gas, leachate and surface water and provision of landscaped and recreational areas.

1.2 Objectives

The main objective of this plan is to ensure compliance with Industrial Emissions licence (IEL); Environmental Impact Assessment Report (EIAR); Construction Environmental Management Plan (CEMP) and associated BS standards for noise and vibration control, whilst maintaining positive relations with sensitive receptors (residents/businesses)

- This is to be achieved by the following:
- To minimise noise and vibration during the remediation phase
- Apply best practice noise and vibration management measures
- Avoid exceedances of noise and vibration limits
- Control any non-conformances within construction hours
- Manage complaints from sensitive receivers

1.3 Contract Overview

The Contract Overview (Scope of Work) for the Kerdiffstown Landfill Remediation Project includes the following:

- Reprofiling of waste mounds to ensure the capping system works effectively and to facilitate the use of the site as a public park;
- Preparation and placing of a regulation layer in areas to be capped
- Installation of a permanent capping system across all existing waste areas to prevent rainfall infiltration, to manage surface water runoff, to reduce the production of leachate and to capture landfill gas;

- Installation of new systems to manage and control leachate and landfill gas which will include the construction of a dedicated landfill infrastructure compound and landfill gas flares (where extracted landfill gas is burned off);
- Construction of a leachate pipeline from the site, which will cross under the Morell river and N7 into Johnstown Pumping Station;
- Construction of a foul/wastewater pipeline connecting the site with Johnstown Pumping Station. This pipeline will run parallel to the leachate pipeline and will carry foul/wastewater from the site office and changing room building;
- Installation of surface water drainage to manage water on, and draining from, the site including surface water ponds and a surface water outfall point to the Morell River;
- Decommissioning of existing services, in particular an underground storage tank approximately 20m3 in capacity. There are also a large number of concrete structures (walls of former buildings) to be demolished;
- Processing of demolished concrete and other waste materials on site to produce engineering grade materials for re use on site;
- Development of a public park with multi-use sports pitches, car parking, a changing room building, children's playground and a network of paths across the site;
- Landscaping works across the site including grass seeding, planting of trees and shrubs, and ongoing maintenance period of the works.

1.4 Document Review

The Noise and Vibration Management Plan will be regularly reviewed during the lifetime of this project and updated to reflect changing conditions on site. Changes will be made subject to review and monitoring of conditions on site, and the effectiveness of the mitigation measures implemented throughout the works. Any changes will be agreed with KCC and ER in advance through the normal communication channels.

2.0 CONTACT DETAILS

The Project Manager will be responsible for ensuring that this Noise and Vibration Management Plan is correctly implemented. The Environmental Manager and Site Environmental Engineer will assist site management with advice in implementation of best practices with regard to noise and vibration management. All community engagement is to be coordinated with KCC and is subject to their approval from works that are likely to affect noise and vibration management.

Contact Details:

Position	Name	Contact Details
Project Manager	[redacted]	[redacted]
Environmental Manager	[redacted]	[redacted]
Community Liaison Officer (CLO)	[redacted]	[redacted]
Site Environmental Engineer	[redacted]	[redacted]
Site Agent	[redacted]	[redacted]
Sub Agent	[redacted]	[redacted]
Site Engineer	[redacted]	[redacted]
Site Engineer	[redacted]	[redacted]
Site Engineer	[redacted]	[redacted]
Site Admin	[redacted]	[redacted]
EHS Advisor	[redacted]	[redacted]
Junior EHS Officer	[redacted]	[redacted]
Kildare County Council KCC Senior Executive Scientist	Ultan Downes	087 9559494 udownes@kildarecoco.ie
Kildare County Council KCC Senior Executive Engineer	James Mulligan	086 384 1655 jmulligan@kildarecoco.ie

RPS Senior Resident Engineer	[redacted]	[redacted]
RPS Resident Engineer	[redacted]	[redacted]
RPS Resident Engineer	[redacted]	[redacted]

3.0 COMPLIANCE CRITERIA

3.1 Noise Limits

As set out in the Works Requirements and under the EPA licence and the site's planning conditions, the construction hours are limited to:

- 07.00 to 19.00 Monday to Friday; and
- 08.00 to 14.00 on Saturdays

For the purposes of the control of noise and vibration 'night' is defined as 19:00 to 07:00. Works other than those involving pumping out excavations, security and emergency works shall not normally be permitted at night, on Sundays and on Public Holidays. Exceptionally, the Employer's Representative's approval for other work outside these hours may be given after any necessary consultations and written approval by the regulating body (EPA). A minimum of 14 days' notice is required from WBL when seeking such approval. WBL shall not undertake any works outside these hours without the prior written approval of the Employer's Representative. In advance of any construction works commencing WBL shall agree with Kildare County Council the Contractor's proposed hours of construction activities.

Table 3-1 below shows the noise limits for on-site remediation phase works.

Table 3-1 Noise limits for on-site remediation phase works and the operational phase

Daytime dB $L_{Ar, T}$ (30 minutes)	Evening time dB $L_{Ar, T}$ (30 minutes)	Night-time dB $L_{Aeq, T}$ (15-30 minutes)
55	50	45 Note i

Note i: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise-sensitive location.

Table 3-2 below shows the noise limits for off-site remediation phase works. In the unlikely event that works are to be carried out during these hours, the following noise limits will be adhered too.

Table 3-2 Noise limits for off-site remediation phase works

Days and Times	L_{Aeq} (1 hour) dB	$L_{pA(max)slow}$ dB
Monday – Friday (07:00 – 19:00)	70	80
Saturday (08:00 – 14:00)	65	75

3.2 Vibration Limits

Vibration limits for the project are set out in the Works Requirements Appendix 1/9, Item 1.2: Vibration Monitoring and Control. Table 3-3 below shows the vibration limits at the nearest receptors to the works.

Table 3-3 Vibration limits at the nearest receptors to the works

Building Type	Allowable PPV (mm/s) for each frequency range				
	Base of the structure in each orthogonal direction (x, y, z)			Roof of structure in horizontal orthogonal directions (x, y)	Roof of structure in vertical orthogonal direction (z).
	Up to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies	
Dwellings	5	15	20	15	20
Dwellings and sensitive receptors within 100m of the Licence Boundary	3	8	10	8	20
Dwellings/ buildings within 50m of the particularly sensitive vibration zone as shown on Drawing DG0113	1				
Industrial and commercial buildings	20	4	50	40	20

A drawing of the locations for monitoring is contained in Appendix A for Noise Sensitive Receptors

4.0 BASELINES

4.1 Noise

Prior to commencement of main works, a daytime and night-time baseline noise and vibration survey will be undertaken at the proposed Noise/Vibration Monitoring stations/nearest accessible noise sensitive locations to establish the existing baseline noise/vibration levels.

Base line levels were taken in 2016 and 2017 at the receptors located in Appendix A and the report is available in Appendix A8.1 of the Environmental Impact Assessment Report (EIAR)

Evaluation of Results (Extracted from A8.1 Noise Monitoring Report from EIAR)

Daytime Noise Survey This survey was completed in order to assess the existing baseline noise environment in the vicinity of the project site, the former Kerdiffstown landfill. The baseline data collected can be used to identify the potential for impact that activities associated with the proposed Project could have on the local noise environment. The daytime noise measurements were carried out between the hours of 07.00 and 19.00 and ranged in value from 49dB LAeq,15mins at monitoring location N4 to 60dB LAeq,15mins at monitoring location N8. The background noise characterised by the LA90 measurements ranged from 43dB LA90 at monitoring location N2 to 58dB LA90 at monitoring location N8. It was generally observed that the main source of noise at all noise monitoring locations was anthropogenic in nature and was **predominantly passing traffic on the N7 dual carriageway and on the M7 motorway**. Non anthropogenic noise sources including birdsong and the breeze blowing through trees etc. had only a minor impact on the noise environment at the noise monitoring locations.

Evening Time Noise Survey The evening time noise measurements were carried out between the hours of 19.00 and 23.00 and ranged in value from 42dB LAeq,15mins at monitoring location N9 to 69dB LAeq,15mins at monitoring location N2. The background noise characterised by the LA90 measurements ranged from 48dB LA90 at monitoring location N1 to 61dB LA90 at monitoring location N7. Again, the main source of noise at all noise monitoring locations during the evening time period was anthropogenic in nature and was **predominantly passing traffic on the N7 dual carriageway and on the M7**. Non anthropogenic noise sources such as birdsong and the breeze blowing through trees etc had only a minor impact on the noise environment at the noise monitoring locations.

Night-time Noise Survey The night-time noise measurements were carried out between the hours of 23.00 and 07.00 and ranged in value from 42dB LAeq,15mins at monitoring location N1 to 58dB LAeq,15mins at monitoring location N7. The background noise characterised by the LA90 measurements ranged from 39dB LA90 at monitoring location N1 to 52dB LA90 at monitoring location N2. Again, the main source of noise at all noise monitoring locations during the night-time period was anthropogenic in nature and was **predominantly**

passing traffic on the N7 dual carriageway and on the M7. Non anthropogenic noise sources such as breeze blowing through trees etc had only a minor impact on the noise environment at the noise monitoring locations.

4.2 Vibration

With reference to the EIAR completed, there are no significant sources of vibration in the vicinity of the Project. "The main vibrations experienced at the nearest sensitive receptor locations relate to the passing traffic along the surrounding road network. Low-level, short-term vibrations may be experienced when fully loaded HGVs travelling at speeds in excess of 50km/hr pass in close proximity to private residences. There are no private residents close enough to any of the main remediation activities to be of concern in terms of vibration activity.

[redacted] Drawing no. DG0113-01 indicates the vibration sensitive zones and is appended to this report in Appendix B.

Baseline vibration monitoring was carried out in line with the noise monitoring locations:

N2 (on the footpath outside the residential receptor REC012)

N4 (on the footpath outside residential receptor REC001).

The measurement results are presented in Table 8.12. Table 8.12 extracted from EIAR.

The vibration measurement results are within the expected range for the monitoring locations and the maximum vibration levels recorded are consistent with moving vehicles in close proximity to the measurement location.

Table 8.12: Baseline Vibration Monitoring Summary Results

Monitoring Location	Measurement Interval	Maximum Resultant PPV (mm/sec)	Time of Maximum PPV
N2 (REC012)	17-11-2016 at 12:00 to 18-11-2016 at 14:00	0.70	17-11-2016 at 17:53
N4 (REC001)	08-11-2016 at 16:00 to 11-11-2016 at 14:00	1.15	08-11-2016 at 16:12

Source: EIAR Volume 2 of 4: Main Report August 2017.

4.3 Vibration Control Measures

As a vibration monitor will only measure vibrations. The following control measures will be carried out and accessed prior to works commencing in the vicinity of the [redacted] property:

a) An assessment of the methodologies to be used in the vicinity of the property to reduce their impact on the property.

b) An assessment of any additional measures that might be used before works commence to reduce the

impact of vibrations.

c) An undertaking to advise [redacted] of the proposed works, in advance of their commencement so that, at the very least [redacted] are warned of potential disturbance.

4.4 Vibration Monitor

WBL will ensure that all necessary measures will be taken to reduce the vibration impact at the [redacted] property as outlined in section 4.2. As there is an existing vibration monitor at the [redacted] property, this will be used during the works. If there is an exceedance of the limit on the [redacted] property, an alert will be sent to KCC/ER. WBL will be immediately notified. WBL will set up a vibration monitor at the boundary during Zone 3 works to measure vibration during the works. If vibration limits are exceeded works will immediately cease, and a review will be carried out. Additional measures will be implemented following a review.

4.5 Pre-Construction Noise Monitoring Survey

TMS environmental LTD undertook a baseline environmental noise survey on 18th-19th of November 2020. The survey was taken at 8 noise sensitive receptor locations. The same locations from the 2016 and 2017 baseline noise survey were identified and each location used. **Error! Reference source not found.** below shows the n oise monitoring locations used for the noise monitoring survey.

4.6 Evaluation of Results

The following is extracted from TMS Baseline Noise Report 2020. It gives an evaluation of results from the survey.

"The baseline survey results demonstrate that the ambient noise environment surrounding the Kerdiffstown LRP is dominated by noise emanating from the N7 dual carriage-way / M7 motorway. This conclusion is reinforced by the observation that the highest noise levels were recorded at the location closest to the dual carriage-way (N7 - L_{Aeq} = 67 dB(A)), with the lowest levels recorded at the location farthest away (N4 - L_{Aeq} = 42 dB(A)).

Noises originating from vehicles passing on the nearby Kerdiffstown Road (L2005), also provide a significant amount of noise at the monitoring locations but are far less frequent compared to the constant noise of traffic passing on the N7 dual carriageway/ M7 motorway.

A 1/3 octave band analysis was also carried out at the monitoring locations and observations were made by TMS Environment personnel to identify the presence of any tonal or impulsive noise. There were no tonal components recorded in the spectra and no tonal or impulsive noise was noted."

Figure 4-1 Noise Monitoring Locations

5.0 NOISE AND VIBRATION SOURCES

The remediation of the site will be carried out in a phased basis as the remediation phases have been reviewed in the CEMP and EIAR.

Noise modelling as per TMS Environment Ltd undertook a baseline survey and a noise model to predict plant level noise for the demolition works. Further noise models will be carried out to ensure noise levels are not exceeded at the boundary during remediation works. WBL will implement all necessary measures for noise and vibration and these measures will be coordinated and approved by KCC and ER.

below shows Table 8.14 extracted from EIAR on page 13, presents the plant items and their associated sound power levels which have been assumed in the model for each of the key remediation activities associated with each Phase assessed.

“An on-time or operating time of 66% for plant items is presented in the assessment which assumes that plant will operate for a full eight hours over a twelve-hour daytime working period (07:00 to 19:00) or for forty minutes every hour.”

Sound power levels attributed to the various items of plant are included in the table C7.12 from BS5228
These sound power levels were used to predict noise levels in EIAR and predicted noise levels are referenced in section 6 with regard compliance with noise criteria for the project.

Table 5-1 On-Site Remediation Activity Assumed for Each Phase of the Remediation Programme

Environmental Impact Assessment Report (EIAR) Volume 2 of 4: Main Report

JACOBS

Table 8.14: On-Site Remediation Activity Assumed for Each Phase of the Remediation Programme

Plant Details	Number of Plant Items								Sound Power Level Lw, dB(A)	Operating Time %
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8		
Tracked Excavator [note 1]	5	5	5	5	3	3	2	0	110 & 102	66
Mounted Breaker	2	0	0	0	0	0	0	0	121	66
Mobile Crusher	1	1	1	1	0	0	0	0	112	66
Mobile Screen	1	1	1	1	0	0	0	0	109	66
Artic Dump Truck	4	8	8	4	5	4	2	1	108	66
Bulldozer	3	3	3	2	2	2	2	0	102	66
Waste Compactor	3	3	3	2	2	0	0	0	100	66
Dumper (6t)	1	1	1	1	1	1	1	0	91	66
Road Sweeper	1	1	1	1	1	1	1	0	109	66
Tractor & Bowser	1	1	1	1	1	1	1	0	108	66
Wheeled Loader	0	0	0	0	0	0	0	1	104	66
Mobile Crane	0	0	0	0	0	0	0	1	95	66
Generator	0	0	0	0	0	0	0	1	88	100
Angle Grinder	0	0	0	0	0	0	0	1	109	66
Cutting & Grinding	0	0	0	0	0	0	0	1	107	66
Total daily HGV movements into and out of the proposed Project	140	140	140	140	140	140	18	8	106	

Note 1: Two of the tracked excavators used in Phase 1 have been assigned a higher sound power level due to their involvement in demolition works (Ref. Table C.1.12 of BS5882) while the sound power level from Table C7.12 of BS5228 has been used for the excavators for all other works at the proposed Project.
Note 2: The maximum number of HGV movements associated with the on-site remediation works will be 140 per day and this is only likely to occur during Phase 2 and Phase 3, however the worst-case of 140 movements per day has been modelled for Phases 1 to 6.

6.0 COMPLIANCE WITH NOISE CRITERIA

6.1 Planning Stage

Prior to commencement of the project WBL site management will collaborate and review the baseline information in section 4.0 for noise and vibration and establish the noise receptors and noise monitoring stations as per Appendix A. The data presented in table 8.14 of the EIAR with regard phasing and sound power levels attributed to the various items of plant will be considered when planning works for each of the phases. Any plant being sourced for the project will be reviewed against table 8.14 to ensure the sound power levels are equal or less than the sound power levels identified. Wills Bros will also take consideration of the noise modelling presented for the different phases of the project and use this data to ensure that the receptors identified for the different phases are protected by either acoustic screens or temporary noise barriers as identified in fig 8.2 of EIAR at project commencement stages.

This section describes a number of mitigation measures which will be implemented by WBL to reduce the generation of noise and vibration during the project works.

The table below summarises the activity, management measures and responsibilities assigned.

Activity	Management Measure	Responsibility
Induction/Training Programmes.	Contractor, Employee and Employer's Representative induction shall inform site personnel about noise and vibration management measures through online induction. No persons other than visitors under Management supervision will be permitted onto the site. WBL will ensure the CEMP induction will be signed and a copy be made available on site. Daily briefings and toolbox talks will be imperative to highlight noise and vibration issues on site.	Project Manager; Site Foremen; Environmental Engineer, ER
Working hours	Construction site working hours will be complied with on site as per section 3.	WBL/All contractors
Noise/Vibration Mitigations	Site Compound layout to be set up to eliminate noise breaches to noise sensitive receptors. Plant and equipment sourced with lowest noise and vibration characteristics as is	Project Manager; Quantity Surveyors; Plant department; Site Engineers; Environmental

Activity	Management Measure	Responsibility
	reasonably practicable. Broadband reverse alarms will be used rather than tonal alarms. Also, in addition to sound power levels noise will be managed by avoiding leaving plant and equipment idling for periods when not in active use. Phasing plan reviewed against predicted noise levels and mitigations included specific to each phase. Provision of acoustic screens and temporary acoustic barrier implemented in advance of phased works.	Engineer
Monitoring	Continuous noise monitoring will be undertaken when works are taking place within 100m of the noise sensitive receptors. These will be fixed noise monitors and will be set to 30min LAeq. Raw data from noise monitoring will be made available to KCC and ER. Vibration measurements where likelihood of sensitive receptors to vibration in order to confirm compliance.	Project Manager; Environmental Engineer; Foremen; Plant and Equipment operators.
Complaints/Communications	In tandem with KCC, letter drops completed with Community Liaison officer in advance of any particular noisy related works such as demolition of concrete walls. Provision of work programmes for upload to project website (as administered by KCC). Should complaints be made regarding the effect of noise/vibration from the	WBL Project Manager; Community Liaison Officer; Environmental Engineer; KCC Manager

Activity	Management Measure	Responsibility
	work, they will be treated by WBL agreed with KCC Protocol.	

Further details provided in the following subsections with regard the activities, management measures to be implemented.

6.2 Induction – Training and Awareness

The on-line site induction, health and safety and environment training programmes will reinforce with WBL employees and subcontractors the need for controlling environmental performance at each works location/ phases. Noise and vibration will be specifically addressed during the site job safety plans and training and will include familiarisation with site noise and vibration compliance criteria and environmental objectives. All WBL employees and subcontractors shall be informed about the need to minimise noise and vibration and of the Industrial Emissions Licence (IEL) governing the site. Daily works briefings and toolbox talks will reinforce the importance of the noise issues on site.

All site personnel working on site will be required to sign the environmental inductions document. This will be made available online through an online portal. In the event, that the online service is not accessible, a copy of the inductions will be made available on site and all site personnel will be required to sign this induction sheet. WBL will ensure that this induction sheet is to be read and signed by all site personnel.

All site employees will have responsibility for managing noise and vibration from their work activities and working in a manner to minimise acoustic and vibratory emissions. Ensure that drivers are aware of the potential for noise to cause annoyance/disturbance to local residents – they shall show due regard to this, particularly when entering and leaving the proposed Project (e.g. no unnecessary horn blowing).
A copy of the Construction Noise and Vibration Induction is included as Appendix C to this Plan.

6.3 Working Hours

WBL and associated contractors shall comply with the working hours as set out in section 3 criteria and as defined by the contract documents.

As detailed in Section 3 any works outside of the working hours shall be referred to as ‘out of hours and will only be carried out in emergency situations and with approval of Employers Representative and KCC Landfill Site Management.

7.0 NOISE AND VIBRATION MITIGATIONS

WBL and associated contractors will adopt a range of noise control and mitigation measures aimed at minimising noise emissions during the project remediation phase(s) of the landfill. Best practicable means will be used to minimise construction noise and vibration through implementation of the recommendations set out in 5228-1:2009 Code of practice for Noise and Vibration Control on Construction and Open Sites.

The timing and implementation of the noise controls will be dependent on the phasing schedule. Construction noise controls and management measures will include:

7.1 Site Design

Work compound shall be laid out so that accesses and loading areas are located away from noise sensitive receptors as practicably possible and so that temporary structures (Cabins) screen noisy areas (Such as car park; lay down areas). Acoustic Screens and temporary noise barrier will be utilised as per fig 8.2 of EIAR to protect noise sensitive areas where required. Positioning of wheel wash units will be designed so as to be as far as is reasonably practicable from noise sensitive receptors.

7.2 Plant/Equipment

- Noisy vehicles to be parked as far as possible from noise sensitive areas.
- WBL shall require that each item of plant used on the project is operated in compliance with the noise limits quoted and will adopt the recommendations set out in BS 5228-1:2009 Code of practice for basic information and procedures with regard to noise mitigation options.
- Plant and equipment will be sourced by Plant and Procurement departments with the lowest noise and vibration characteristics as is reasonably practicable. Consider the use of alternative varieties of reversing alarm with reduced noise output, such as ambient noise sensing alarms with variable volume or directional modulated alarms – these must be evaluated on a case-by-case basis and regard must be had to any health and safety issues that may arise Selection of Quiet Plant. Tonal alarms will be best avoided, and the use of broadband reverse alarms will be installed on plant.
- Noisy stationary equipment such as generators and pumps will be sited away from sensitive site boundaries as far as practicable. Compressors, generators, and pumps will be silenced models fitted with properly lined and sealed acoustic covers or enclosures, which will be kept, closed whenever the machines are in use.
- Selected use of rubber-tyre equipment over track equipment where practicable to reduce resultant noise and vibration. (selection will include consideration of actual plant type, size, and operating hours)
- Plant and machinery to be serviced and in good working order to ensure no unnecessary rattling is occurring leading to nuisance noise (e.g. bushings/excavator buckets worn leading to bucket rattling/broken exhaust)

- All pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufactures.
- Vehicles and mechanical plant utilised on site for any activity associated with the construction works will be fitted with effective exhaust silencers and shall be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable.
- All plant, equipment, and noise control measures applied, shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable.
- Any plant, equipment, or items fitted with noise control equipment found to be defective in inspections and audits will not be operated until repaired. Maintain vehicles in good order and employ the principles of preventive maintenance and undertake reference vehicle noise measurements at defined intervals.
- Machines in intermittent use will be shut down in the intervening periods between works or throttled down to a minimum during periods when not in use. No unnecessary revving of engines. Start-up plant and vehicles will be started up sequentially rather than all together.
- Static noise-emitting equipment operating continuously will be housed within suitable acoustic enclosure, where appropriate.
- Where reasonably practicable, maintenance of plant reversing alarms at the minimum safe level.
- Care will be taken when loading or unloading vehicles or moving materials etc to reduce noise emissions. (no dropping material from a height or banging sounds with plant and equipment unnecessarily)
- The use of noisy plant will be limited to core daytime periods where possible
- WBL will undertake a programme of monitoring to establish actual noise effects associated with the works at early stages of the project.
- Keep internal haul routes well maintained and avoid rutting and unnecessary rumbling noises associated with haulage. Speed limit signs to be erected to entrance roads.
- Start-up plant and vehicles sequentially rather than all altogether. This will minimise the number of vehicles/heavy plant at any one time. WBL will ensure that drivers are aware of the potential for noise to cause annoyance/disturbance to local residents.

7.3 Acoustic Screens and Temporary Barriers

- At project commencement stages the erection of acoustic screens and temporary noise barriers will be prioritised. The temporary acoustic barriers will have no gaps or openings in the joints and minimum mass per unit of 7kg/m2. The minimum height the barrier will be erected is 2.4m high.

- Screening banks along the western boundary of the project will be provided with additional noise protection to private residences along the L2005 Kerdiffstown road in consultation with Employers Rep

where deemed a requirement. Straw bales or similar screen with effective mitigation properties for noise will be used where required.

- Screening and barriers will be erected as per drawing outlined in Fig 8.2 (Appendix D)

- Screening barriers are discussed in the section 7 and relevant to the works carried out.

7.4 Vibration Mitigation Measures

WBL will adopt a range of vibration control and mitigation measures aimed at minimising vibration emissions during the project construction phase. Best practicable means will be used to minimise construction through implementation of the recommendations set out in 5228-2:2009 Code of practice for Noise and Vibration Control on Construction and Open Sites: Part 2 – Vibration.

The timing and implementation of the vibration controls will be dependent on the construction schedule. Construction vibration controls and management measures will include:

- Application of construction vibration limits, as set out in section 3, and limiting the hours during which site activities likely to create high levels of vibration are permitted
- Plant will be selected that has a low inherent potential for generation of vibration
- Vibratory plant will be located as far away from sensitive properties and structures as permitted by site constraints
- All site access roads will be kept maintained to mitigate the potential for vibration from lorries and other site vehicles
- Ramped sections will be provided to road joints to alleviate vehicle bounce and consequently banging of vehicle goods/material during transport and particularly adjacent to [redacted]
- WBL will undertake a programme of monitoring (refer to Section 7.0) to establish actual vibration effects associated with the works where required.

Additional vibration control and management measures may be developed during the construction phase of the project. Construction methodologies will be reviewed prior to the commencement of the activities to access potential source of vibration and how to mitigate them.

The site is divided into zones, and this is shown on a drawing in Appendix E.

Also, a detailed receptor map is appended in appendix F. This was included in the EIAR to highlight the sensitive receptors within 1km of the site boundary.

8.0 EARTHWORKS, PROFILING AND LINING

When demolition and site clearance were completed. The earthworks and profiling of the landfill commenced in January 2021. These works will compile of many phases, and these will overlap during the project, and they are summarised below in relation to the noise and vibration of the works. As these works will be subject to change as the project progresses, WBL will be constantly reviewing the mitigation measures in place and monitoring their performance. If the measures are not proving effective, the works will immediately cease, and the measures will be reviewed and improved to minimise noise levels. This document will be updated as the works progress and will be subject to approval from KCC and ER. The following sections give a brief overview of the phasing of the works proposed. Also, the noise levels that were analysed for the works are based on a 2016/2017 survey and model that was generated.

8.1 Earthworks and placement of material

There will be a number of plant working in the various zones as the earthworks commence. WBL will ensure that minimal plant will be operating in the same area at the same time. This in turn will decrease the noise levels at the boundary.

8.1.1 Zone 1/1A

The cut/fill operations are near completion in Zone 1/1A, with the exclusion zone the final area to be completed. Noise levels were calculated to be highest at receptor REC001 which is the closest receptor to reprofiling works of the north-eastern slope of Zone 1. The results indicate that the predicted noise levels associated with these works will not exceed the assessment criteria of to 55dB LAeq,30mins at any of the named NSR locations. These works will vary from imperceptible to moderate at the nearest receptors and will be temporary in duration. Figure 8-1 below shows the earthworks in Zone 1 [redacted]

The placement of the regulation layer 1R, subsoil and topsoil will be ongoing in Zone 1 over the course of Summer and Autumn 2021. The plant involved in this operation will include an excavator, dumpers, roller and a dozer. As shown in Figure 8-1 below the run out of 1R will take place first as this is the layer below the liner. As the liner is installed, this will allow the run out of subsoil over the liner. The number of plant used in this operation will be noted and monitored by the ongoing noise monitoring. Minimising the amount of plant in the same works area will be priority to ensure noise levels are not exceeding the limit.

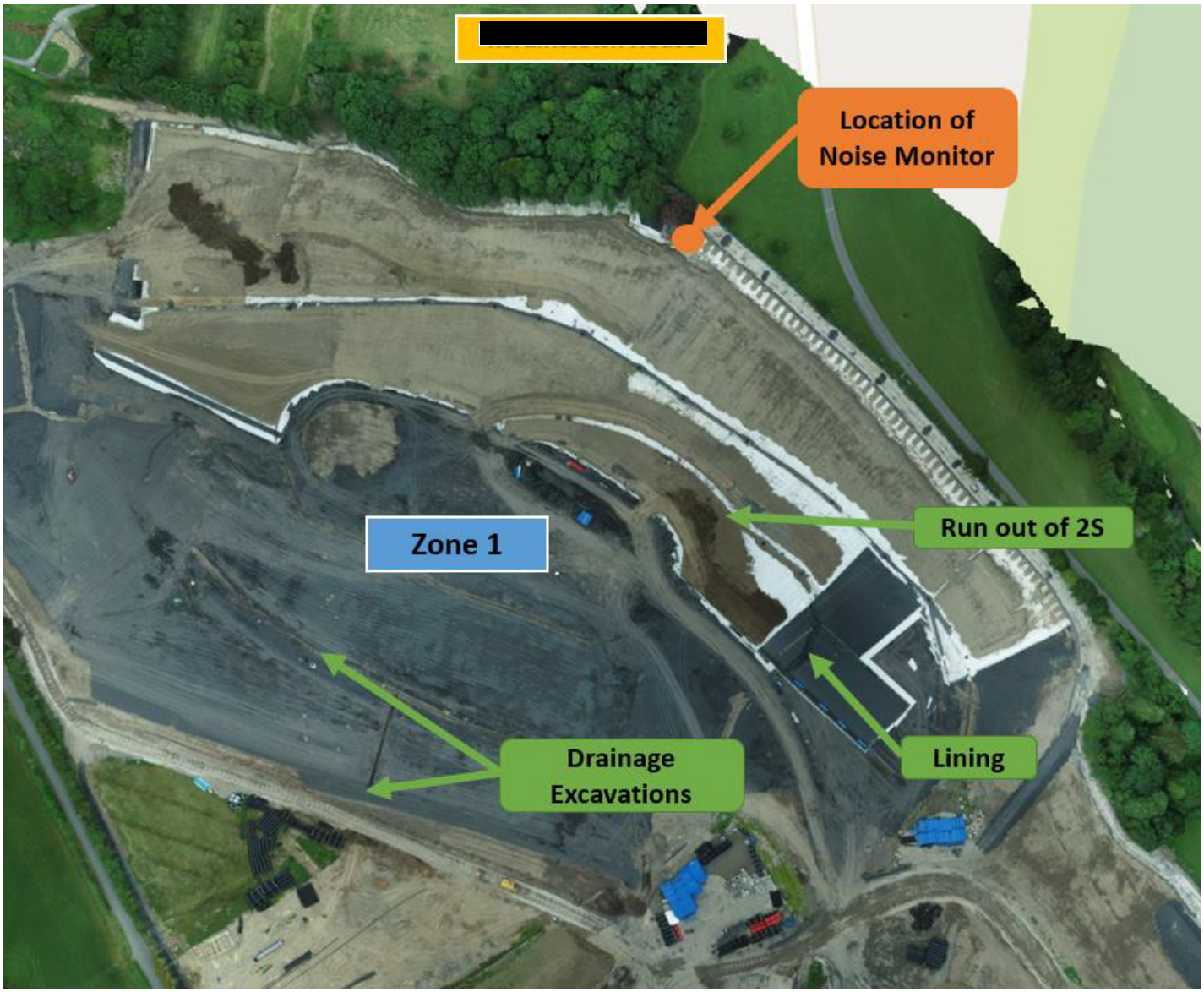


Figure 8-1 Earthworks in Zone 1. Nearest Receptor 001

Figure 8-2 below shows the earthworks in Zone 1A. The nearest receptor to these works is receptor 017. Noise levels were calculated to be highest at receptor REC017 which is the closest receptor to the Zone 1A and REC014 which is the closest receptor to Zone 2A boundary. The results indicate that the predicted noise levels associated with these works will not exceed the assessment criteria of to 55dB LAeq,30mins at any of the named NSR locations.

The infill of the exclusion zone in Zone 1/1A as shown in Figure 8-2 below will be carried out in late August/September subject to the bird nesting season. The plant used for this work will consist of a dozer, roller, excavators, and dumper. WBL will carry out noise monitoring at the boundary during these works and ensuring compliance is adhered too during the works.

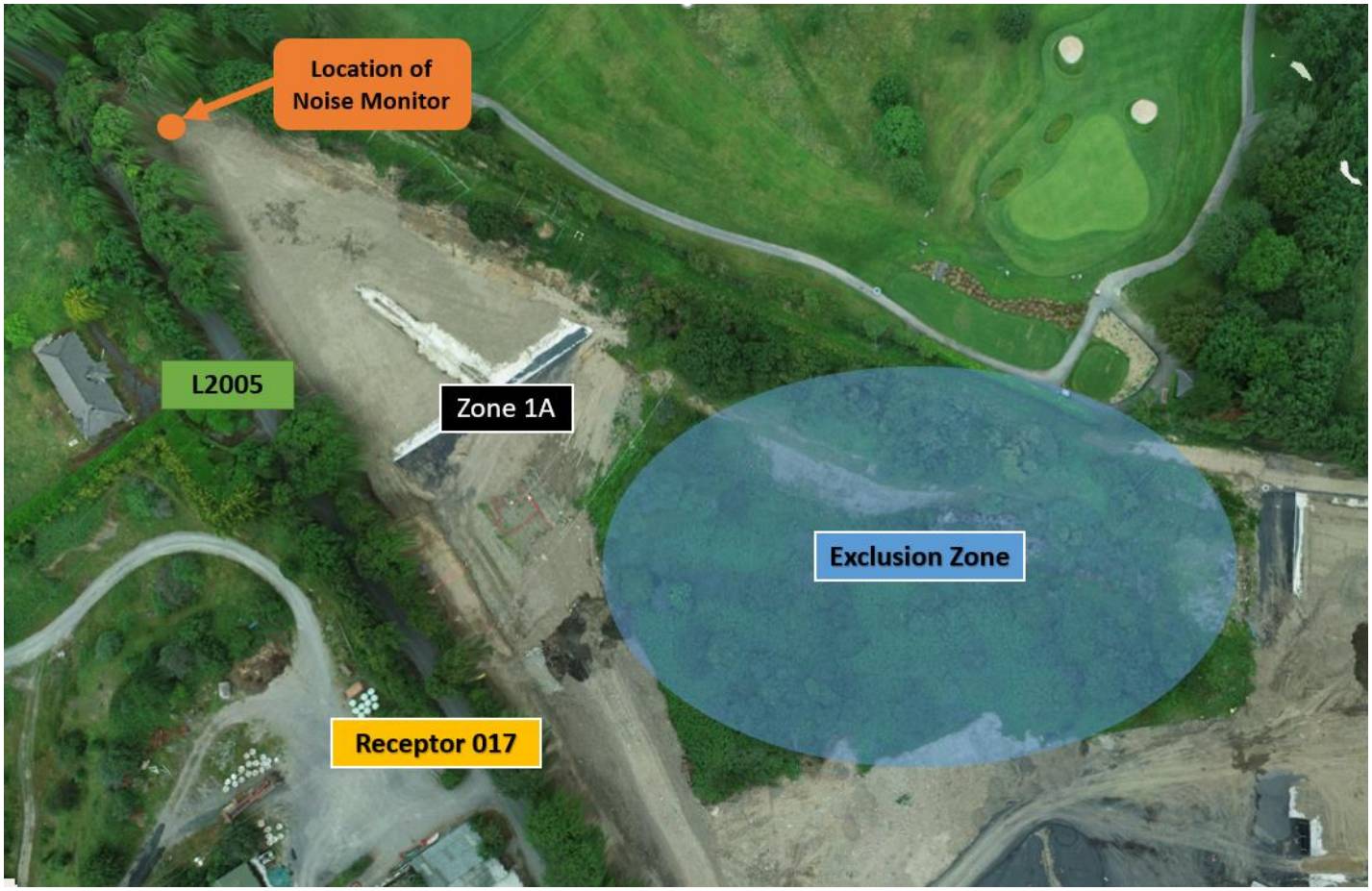


Figure 8-2 Earthworks in Zone 1A. Nearest Receptor 017

8.1.2 Zone 2B/4

As the cut/fill exercise continues throughout the zones, the movement of material is now near completion. Some areas will require further amendments. This will involve WBL considering these works and carry out noise monitoring at the closest boundary. The intensity of the noise generating works increased as this exercise took place over early 2021. However, the plant was spread out over the site in the various zones and not working in proximity. This helped to minimise noise levels recorded at the boundary and all plant operators are to adhere to the 15km/h speed limit on site.

The earthworks in Zone 4 are near completion and the infill of the surface water lagoon is yet to be completed. The plant involved in this operation will primarily consist of an excavator, dumpers, dozer, and roller.

The stockpiling and screening of imported fill material will continue in Zone 2B.

As stated above for Zone 1/1A the placement of the regulation layer 1R, subsoil and topsoil will be ongoing in Zone 2B and 4. The plant involved in this operation will include an excavator, dumpers and a dozer. The number of plant used in this operation will be noted and monitored by the ongoing noise monitoring. Minimising the amount of the plant in the same works area will be priority to ensure noise levels are not exceeding the

limit.

Figure 8-3 Earthworks in Zone 2B & 4. Nearest Receptor 039

Monitoring

The nearby sensitive receptors closest to these work activities would be REC001 [redacted]. A series of noise monitoring was undertaken along the [redacted] boundary. N6 and N8 noise monitoring locations were used.

8.1.3 Zone 3

Figure 8-4 below shows the earthworks taking place in Zone 3. The nearest receptor is 012. Noise monitoring

is to be caried out in this location for the duration of works. The majority of the fill material will come from Zone 4. This is also the shortest journey time from the other zones and therefore minimizing excessive noise levels. As of July 2021, most of the bulk earthwork is near completion. The major earthworks element in Zone 3 is to shape around Zone 3 and to complete the cut/fill around the areas required.

The placement of 1R, subsoil and topsoil will have the potential to add to the noise levels along the boundary, this will be minimised by allowing little as plant as possible in the same works area. Ongoing noise monitoring at the boundary will ensure that these levels are not exceeded.

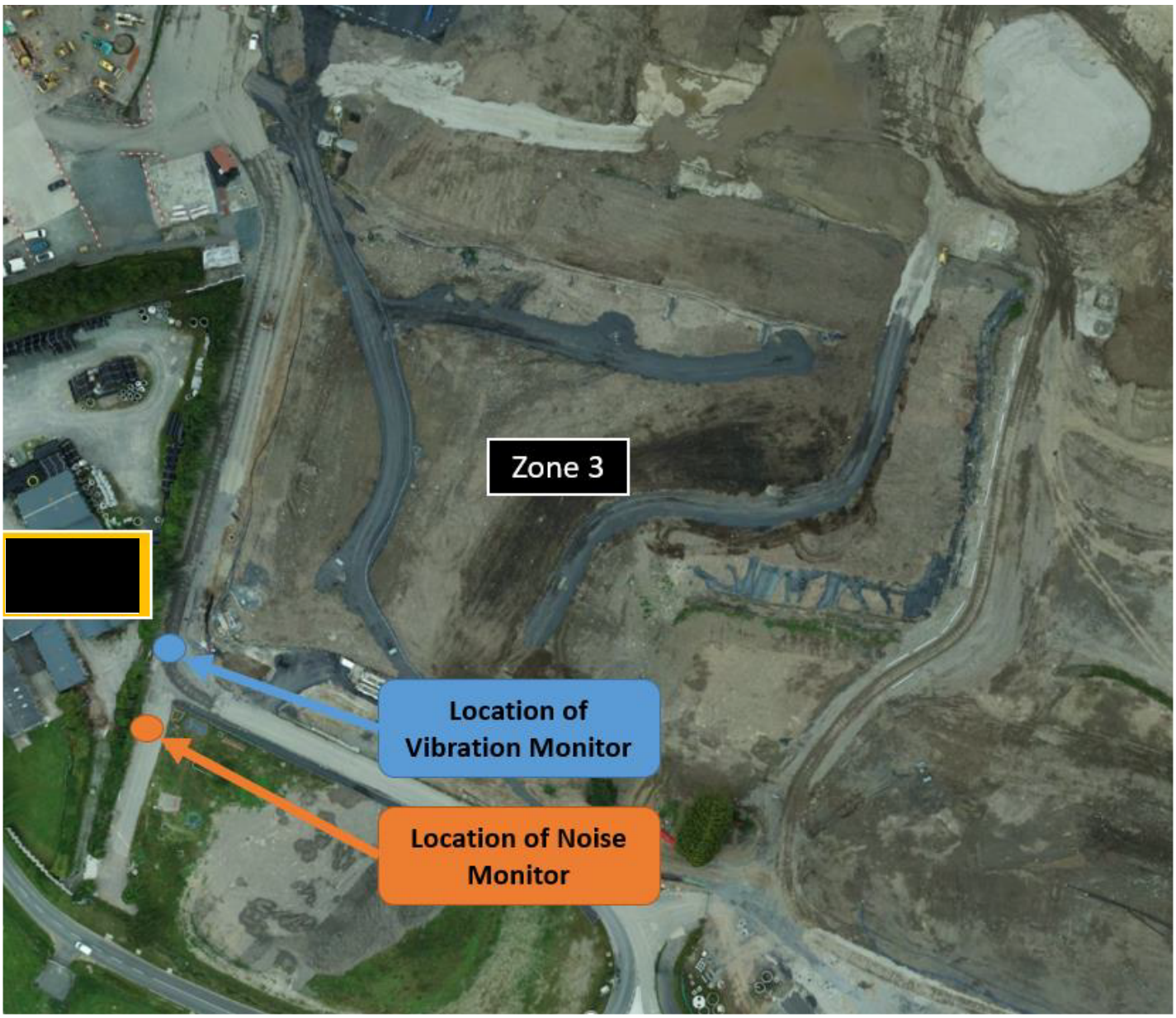


Figure 8-4 Earthworks in Zone 3. Nearest Receptor 012

8.1.4 Tunney's Field

Figure 8-5 below shows the area where earthworks are proposed to take pace in Tunney's Field. The nearest receptor to the works is 014. A haul road is to be constructed in Tunney's field to give access round Zone 1

into Zone 1A[redacted].

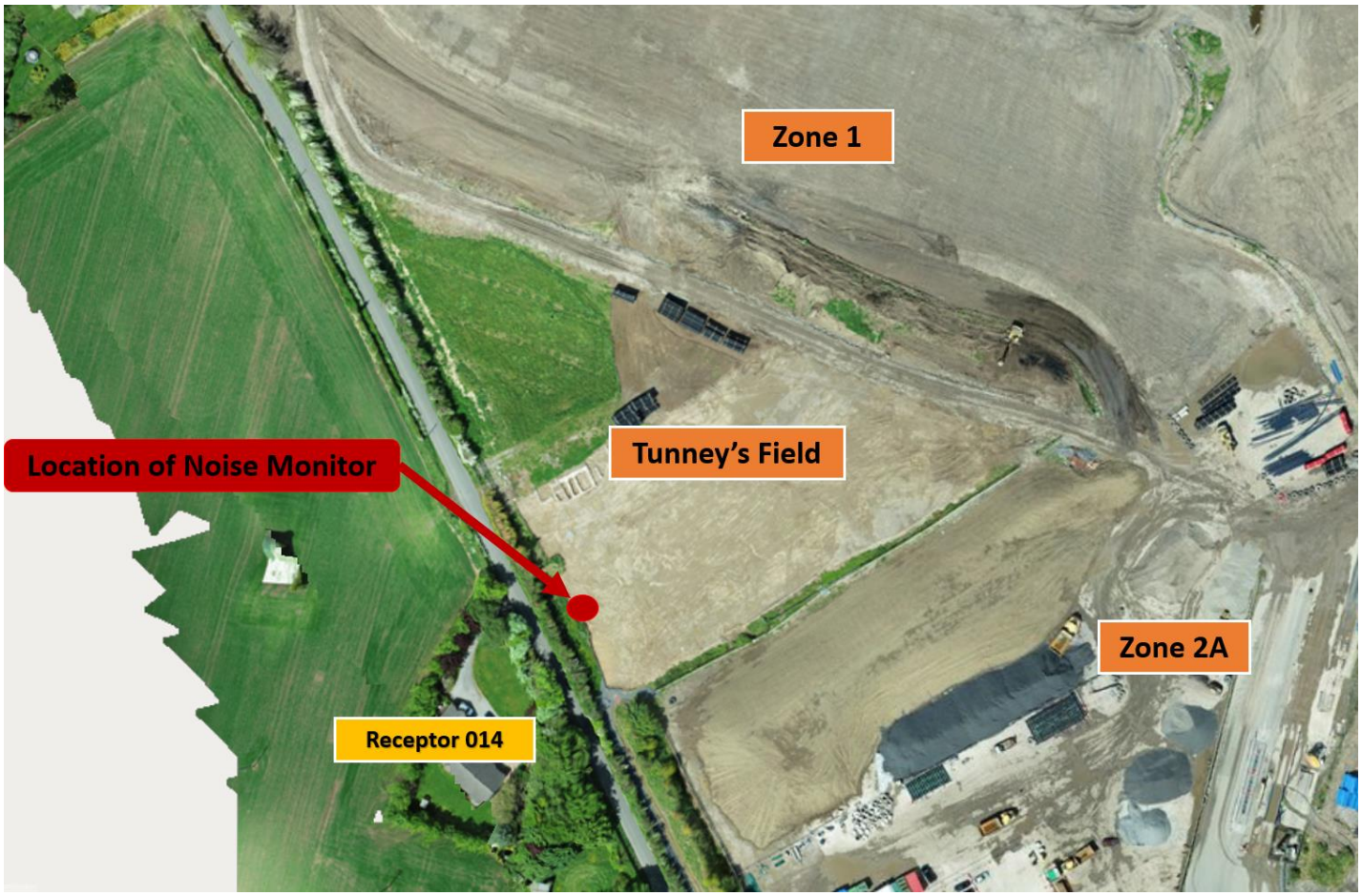


Figure 8-5 Earthworks in Tunney's Field. Nearest Receptor 014

Final Stages of Bulk Earthworks

The intensity of the noise generating works will be further reduced in the daily imports of capping materials for storage and screening in Zone 2B. The main remediation activities will occur in the southern section of Zone 1 and the Southern and Eastern slopes of Zone 3 where the liner is to be found. The works in Zone 2B will be well removed from the nearest receptors and will not have significant impacts on any receptors. It is generally expected that there would be no further significant traffic movement associated with material import which will remain steady. The remainder of the re-profiling and capping of Zone 1 will be completed and the crushed concrete stockpiles in Zone 2B will be used to form access tracks around the site.

8.2 Mitigation Measures - Earthworks

A number of mitigation measures are proposed during the earthworks, placement of material and liner works. They will be constantly under review and ensuring that noise level limits are always adhered too. As already discussed above, the predicted noise levels associated with these works should not exceed the assessment criteria of 55dB $L_{Aeq,30mins}$.

8.2.1 Monitoring

As already discussed in each sub section with regards to works in each zone, WBL will conduct monitoring at each of the sensitive receptors when works are occurring in the vicinity of the receptor.

8.2.2 Best Practice

As previously discussed in section 7.2, the mitigation measures outlined will be enforced throughout the works.

Best Practice shall ensure that the stockpiling will be carried out in a sequence where the stockpile is built up from the boundary nearest to the receptors and added to so that the stockpile can act as a barrier between the noise source and the nearest receptors as the works develop and in agreement with KCC and RPS representatives.

Best Practice measures will ensure that the number of plant items in operation simultaneously close to the NSRs along the L2005 Kerdiffstown Road are managed accordingly to ensure the noise criteria are met. It is also planned to remove the sub-soil stockpile adjacent to the proposed Project entrance during the works, this will be used as suitable fill. The section foreman will co-ordinate management of the workloads and ensure strict control of the number of vehicles allowed in this area at any one-time taking consideration of no. of Artic dumpers highlighted in Section 5, table 8.14. Receptor REC012 is in close proximity to the west end of the stockpile. Works shall commence by removing the stockpile from the eastern end first and working in a direction towards the receptor REC012 so that the stockpile itself can act as an acoustic barrier between the source and receptor for this element of the works. Plants items and sound power levels as detailed in section 5, table 8.14 will be factored into programme.

On-site works involves removing the existing screening bund in Zone 1 and this will be completed last, after the re-profiling and capping works of the south-eastern slopes of Zone 1 have been completed. This is to ensure that the screening bank can act as an acoustic barrier between the noise sources and the nearest receptors for the duration of the capping works in this Zone and minimise noise impacts experienced at the receptor locations.

The significance of the impact for the on-site works will vary from imperceptible to slight at the nearest NSRs and will be temporary in duration. The mitigation measures detailed will be implemented to control the noise and vibration and monitoring carried out to monitor compliance. Plants items and sound power levels as detailed in table 8.14 will be factored into programme.

8.3 Lining

The lining of the site began in May 2021. This activity will be ongoing as the construction of the site progresses. It is envisaged that lining works will not add significant noise level during the works. An excavator will attend

all times in rolling out the liner. The primary method of work will be laborer's rolling out the liner and welding. WBL will carry out noise monitoring at the nearest receptor when the lining works are taking place in order to ensure the noise levels are not being exceeded.

8.4 Drainage

Drainage works commenced in February 2021. This ongoing activity will be closely monitored as the works progresses. Figure 8-6 below shows the proposed drainage for the site. The drainage network is highlighted in blue, red, green and yellow in the drawing below. As some of the drainage network is close to the sensitive receptors, the possibility of noise exceedance is increased. WBL will heightened noise monitoring at the boundary near the sensitive receptors to sure that noise levels are being exceeded.

Figure 8-6 Proposed Drainage

8.4.1 Mitigation Measures - Drainage

In order to combat noise levels during the drilling. WBL will adopt all the measures already discussed in this plan. The primary measure will ensure that drainage crews are working away from other works activities. This

will help minimise the level of construction noise being increased in the event of combined activities.

8.5 Landfill Infrastructural Compound

This phase of the work is expected to take approximately 8 months beginning in January 2021. The landfill infrastructural compound is to be located to the right of the main entrance and positioned to the south of zone 4 close to the road boundary L2005. The sensitive receptor close to this works is REC039. WBL will ensure that daily noise monitoring will take place within this sensitive receptor throughout the works. Further noise modelling from TMS Environment Ltd will be required to ensure noise and vibration limits will not be exceeded from the works at the boundary and appropriate mitigation measures will be put in place. The model will incorporate the distance of the works to the noise sensitive receptor. The plant to the used for the works will be added to the model to give a predicted noise level. Figure 8-7 below shows the location of the Landfill Infrastructural Compound. The nearest receptor to the works in this area is Receptor 039. WBL will adopt noise monitoring in this area to ensure noise monitoring in under compliance.

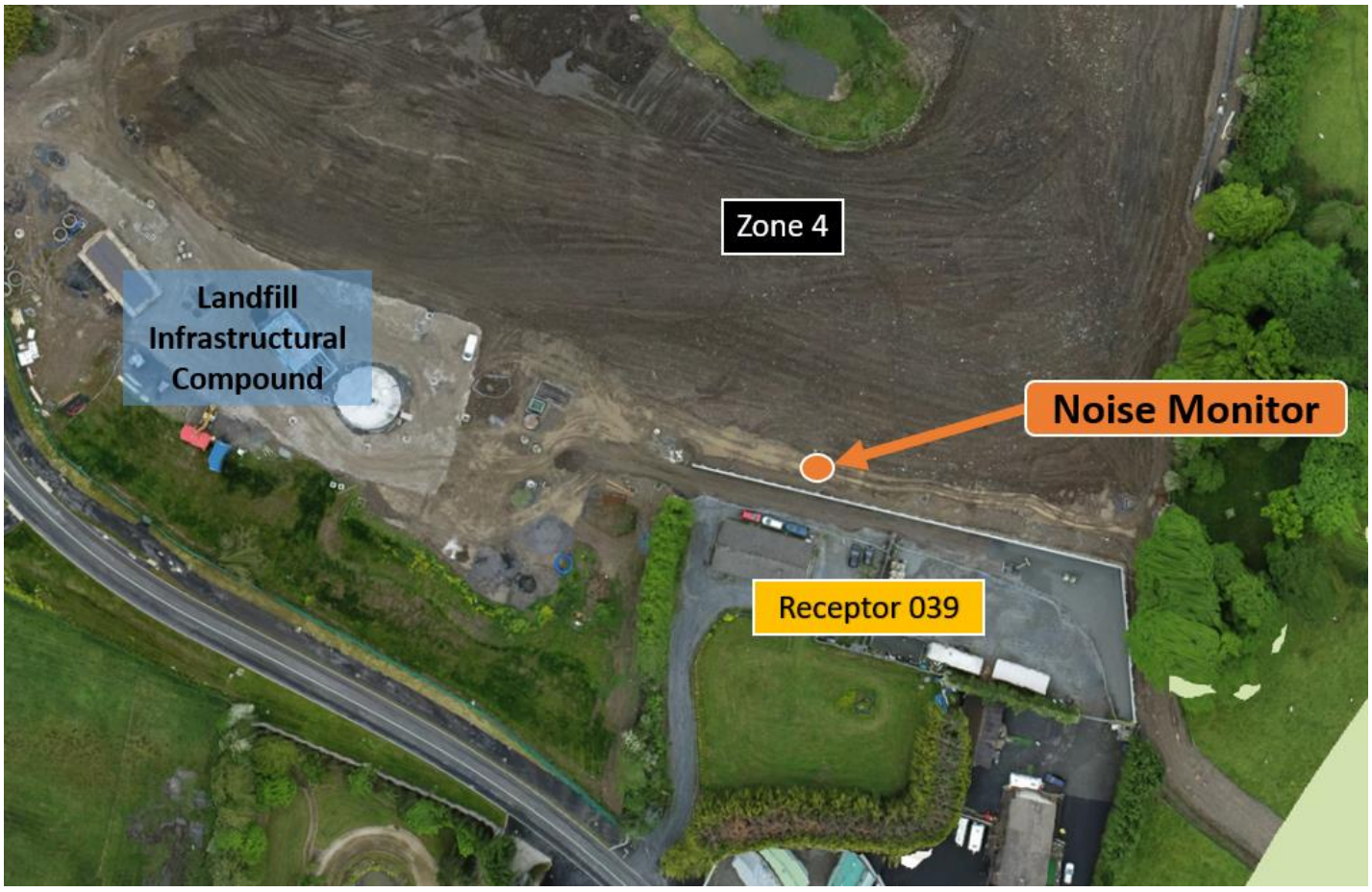


Figure 8-7 Landfill Infrastructure Compound - Receptor 039

8.6 Well drilling

The drilling for the gas wells commenced in June 2021 and is expected to be completed by July 2021. This activity has not increased noise levels at the noise sensitive receptors. The rig is hardly audible at the boundary when operating. When striking some unfavorable conditions such as rebar, the noise level might be raised at that moment. WBL will continue to monitor the noise levels in the event the noise levels increase as the well

drilling progresses. Gas wells are to be installed in Zone 1, 2A, 2B and 3.

8.7 Sports Pitches and Changing Rooms

This final phase of works that will include the construction of the multi-use public park including multi-use sports pitches, a building with changing rooms, public toilets and stores, a car park, children's playground and informal trails. Noise levels are calculated to be highest at Receptor REC014 which is the closest to the construction of the sports pitches. The results indicate that the predicted noise levels associated with this phase of the works will not exceed the assessment criteria of 55dB $LAeq_{,30mins}$ at any of the named receptor locations.

The significance of the impact for these works will vary from imperceptible to slight at the nearest NSRs and will be temporary in duration. The mitigation measures to be implemented at this phase of the works will be reviewed closer to the time of works commencing and will subject to approval by KCC/ER.

8.8 Import of Materials/Deliveries

Figure 8-8 below shows the route which vehicles take on site when delivering imported waste and deliveries onto site. The route is highlighted in red. There are two separate areas depending on whether the delivery is imported waste or product material. As shown on the map, the receptor closest to the route inside the site is receptor 012.

8.8.1 Mitigation measures – Deliveries

- WBL will ensure that all deliveries adhere to the 15km/h speed limit on site.
- WBL will also remind the haulers that speed limit if 60km/h on the L2005 while entering and exiting the site.
- Noise monitoring will take place daily to ensure the noise levels are not exceeded at the boundary.

8.9 Pavement Planing & Service Installation

To facilitate the services running up the access road, the pavement will be planed and the surface course to stripped. As this work will have the tendency to create vibrations, WBL will set up the vibration monitor along the boundary and monitor the vibration values to ensure excessive vibration is not experienced.

The service installation along the access road is due to take place over a number of weeks. The plant involved in these works will involve an excavator and a dumper and other associated plant.

8.9.1 Mitigation measures – Pavement Planing & Service Installation

WBL will carry out extensive noise and vibration monitoring throughout the course of this work along the boundary. These works are within the sensitive vibration zone.

- Minimizing the number of plant in this area if it seen that noise and vibration are to be exceeded.
- Ensuring vehicles switch off their engines when idle and/or on break.

Figure 8-8 Route of imported waste and deliveries on site

9.0 MONITORING AND REPORTING

9.1 Noise and Vibration Monitoring

WBL will carry out fixed continuous noise monitoring at NSR locations on a weekly basis and will be increased to continuous monitoring in agreement with the EPA and the conditions of the IEL once the remediation works begin to approach the NSR locations as per EIAR.

Noise monitoring results will be provided in real time to the KCC Site Manager. A baseline noise survey was carried out in in 2016 and 2017 and reported in the EIAR. Additionally, pre-construction baseline noise survey conducted by TMS in November 2020. These baseline surveys are a key indicator of the noise level expected near the noise sensitive receptor. These results will help to interpret the noise monitoring results collected during the works. The result will be used to assist the scheduling of works to ensure that the noise emissions from the various works are kept within the prescribed noise limits.

WBL will carry out vibration monitoring at the nearest NSR locations during sensitive phases of the remediation works and this data shall be reviewed daily to ensure the limits are being complied with.

9.2 Internal Reviews

Review of work practices and on-site equipment to identify where practices can be improved will be performed prior to moving to new works locations/phases as part of the site design and planning process and if noise and vibration related complaints or concerns are received. This process will involve:

- Identifying the noise and vibration sources particular to the site; (e.g., excavator c/w hydraulic breaker)
- Random audits will be carried out to proactively anticipate noise and vibration issues and instigate a resolution process and to ensure that previously identified control measures continue to be implemented.
- Regularly inspect and maintain on site equipment in good working order so as to generate less noise and vibration. This includes ensuring all noise reduction devices such as silencers and noise attenuators are fitted correctly and operative.

9.3 Noise and Vibration Limit Breaches

In accordance with the contract conditions related to noise and vibrations, all exceedances will be reported immediately and will be brought to the attention of KCC Site Manager and Employers Representative. WBL will determine appropriate remedial action to reduce noise and vibration levels promptly. The noise specific procedures in this document shall include (but not be limited to):

- Inspection of the location from which the exceedance originated.
- Identification of engineering control or management procedure (if appropriate) to be adopted to reduce

the levels at the complainant location i.e., ensuring measures detailed in section 6 and 7 are being implemented.

- Reactive maintenance where required to address increased noise and vibration emissions, replacement of any noise / vibratory defective plant/equipment

Noise and vibration limit breaches will be corrected promptly or as soon as reasonably practical.

9.4 Reporting

WBL will submit all results from noise and vibrations monitoring to KCC Site Manager as obtained and downloaded from either mobile or continuous monitoring equipment for noise and vibration on the project. All reports that include interpretation of data collected will also be provided to KCC. Raw data will be sent onto KCC.

Community engagement with local residents will continue throughout the duration of the project, informing them of the phasing, progress and associated noisy activities and likely durations in line with KCC communication protocol. Prior to any particularly noisy activities, local residents shall be contacted and notified of upcoming works in order to minimise the perceived noise impact. Any liaison by WBL community liaison officer with local residents will be undertaken in agreement with the KCC Site Manager.

10.0 Complaints

Should complaints be made regarding the effect of noise and vibration from the work, they will be treated by WBL in a constructive manner. The specific procedures shall include (but not be limited to):

- Notification to KCC Site Manager/Employers Rep.
- Inspection of the location from which the complaint originated.
- Measurement of noise and vibration levels (as relevant);
- Comparison of the measured levels with compliance criteria.
- Identification of engineering control or management procedure (if appropriate) to be adopted to reduce the levels at the complainant location i.e., ensuring measures detailed in sections 6 and 7 are being implemented, where practical.
- Reactive maintenance where required to address increased noise and vibration emissions, replacement of equipment and the like; and

Each complaint will be thoroughly investigated, and appropriate remedial action carried out promptly.

Where corrective measures have been taken, the complainant will be updated by WBL of the corrective action implemented.

11.0 Records

All records and documents associated with monitoring of the Works will be retained by WBL and issued as part of monthly reporting.

Information retained shall include:

- All monitoring data collected, including data files, and calculations used in processing the data.
- Maintenance schedules and records for the maintenance of the instrumentation and the monitoring system including calibration certificates; and
- Records of systems checks and testing, and commissioning carried out.
- A record of complaints should be maintained and copied to KCC as required by licence.

APPENDIX A

LOCATION OF NOISE SENSITIVE RECEPTORS (NSRs)

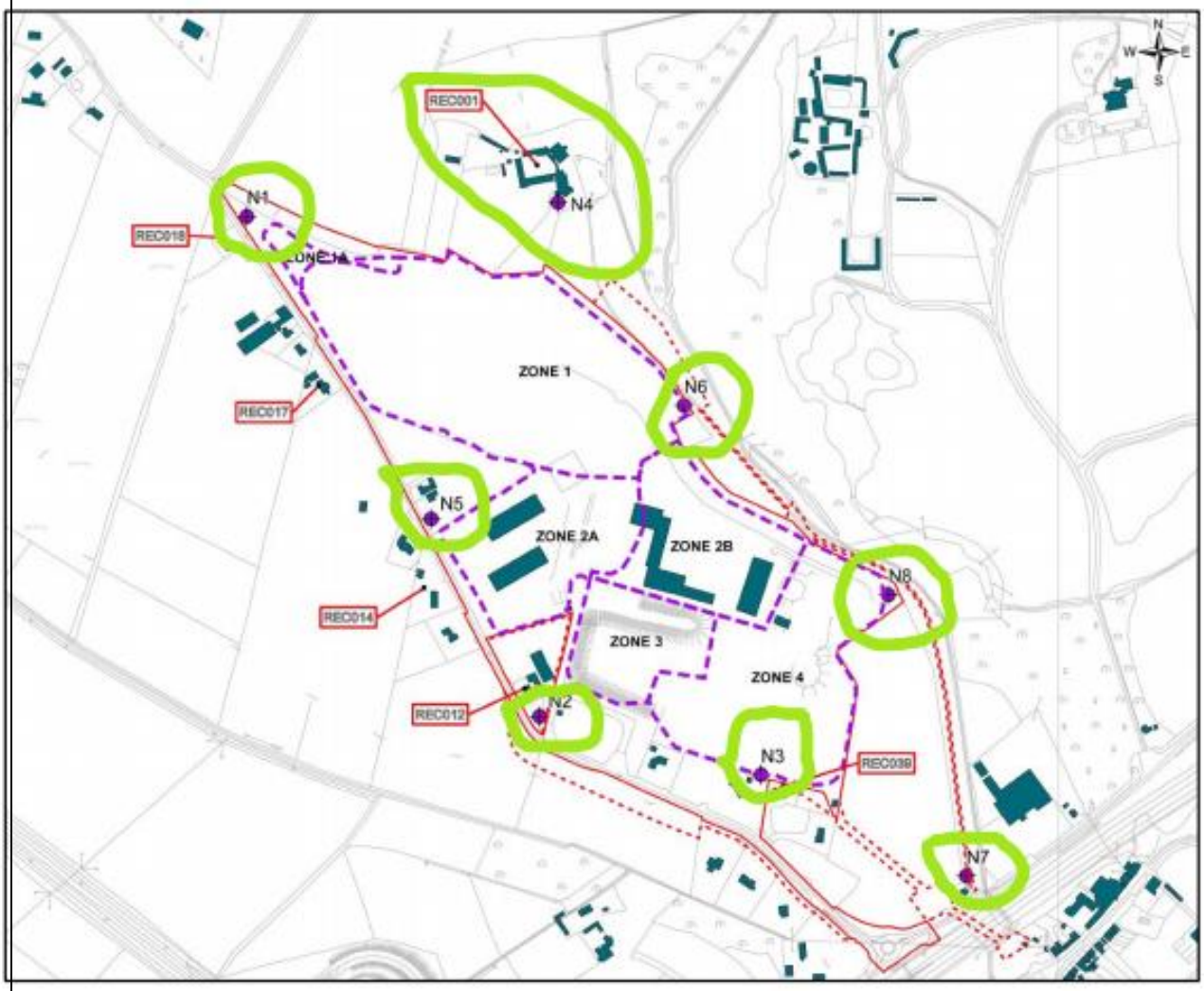


Diagram 1 Location of Noise Sensitive Receptor Locations

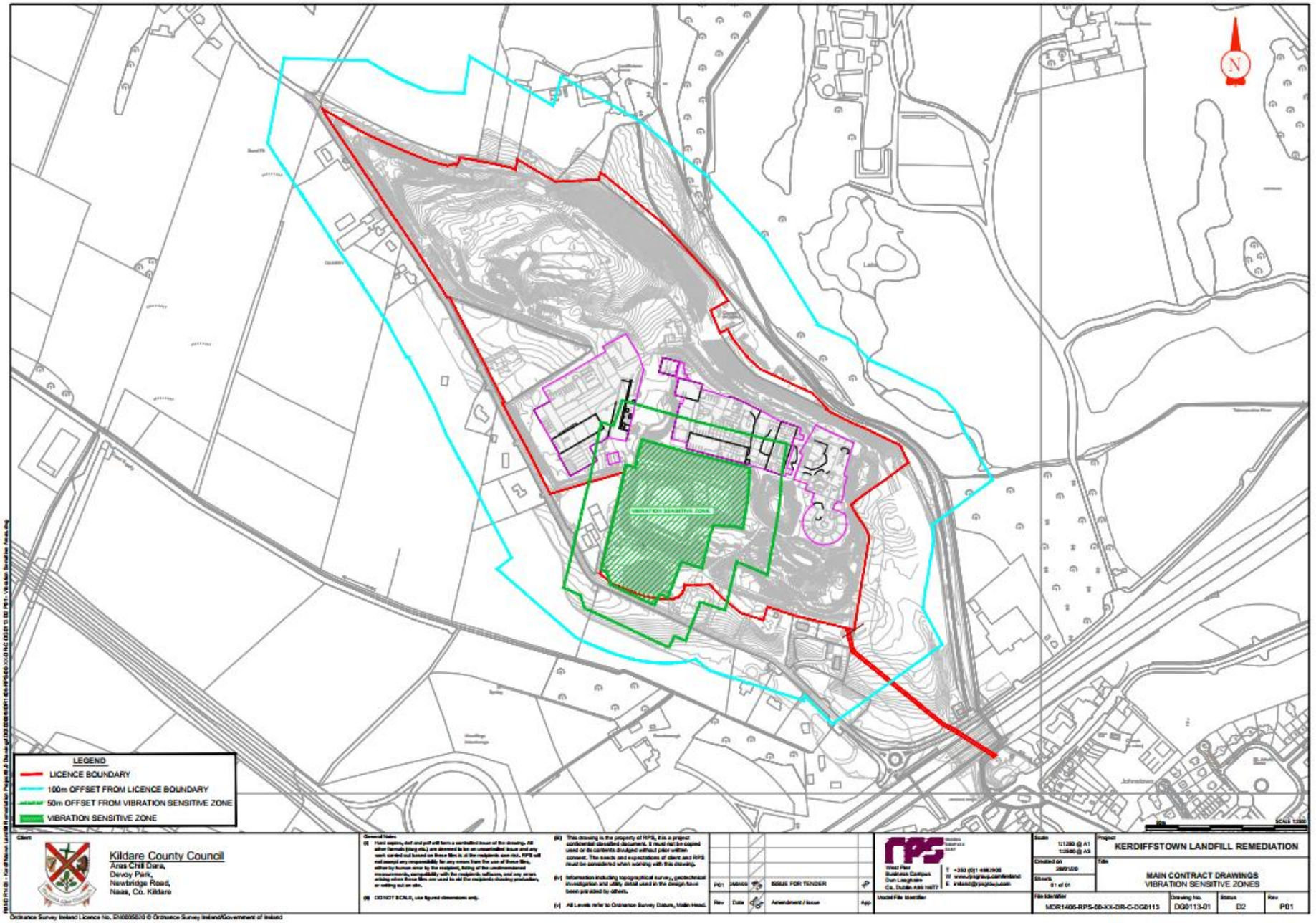
Table 1: Noise Monitoring Locations

Monitoring Location	Description
N1	North-western corner boundary adjacent golf course
N2	Outside private residence adjacent site entrance
N3	Elevated location along southern boundary
N4	On green area 25m from Kerdiffstown House
N5	On western site boundary close to private residence
N6	Elevated location on northern boundary overlooking golf club
N7	In field 30m from the L2005 road
N8	Elevated location on north eastern boundary overlooking golf club

Noise measurements were carried out at or near the boundaries of the NSRs where possible and this noise survey is an accurate representation of the current daytime, evening time and night-time noise levels in the vicinity of the proposed Project.

APPENDIX B

VIBRATION SENSTIVE ZONES


N
LEGEND
LICENCE BOUNDARY
100m OFFSET FROM LICENCE BOUNDARY
50m OFFSET FROM VIBRATION SENSITIVE ZONE
VIBRATION SENSITIVE ZONE
Kildare County Council
Áras Chill Dara,
Devoy Park,
Newbridge Road,
Naas, Co. Kildare
KERDIFFSTOWN LANDFILL REMEDIATION
MAIN CONTRACT DRAWINGS
VIBRATION SENSITIVE ZONES
MDR1406-RPS-00-XX-DR-C-DG0113
DG0113-01
P01

APPENDIX C

NOISE & VIBRATION INDUCTION

Wills Bros Ltd – Kerdiffstown Landfill Remediation Project
Noise and Vibration Management Plan
November - 2020
Noise & Vibration Management Induction

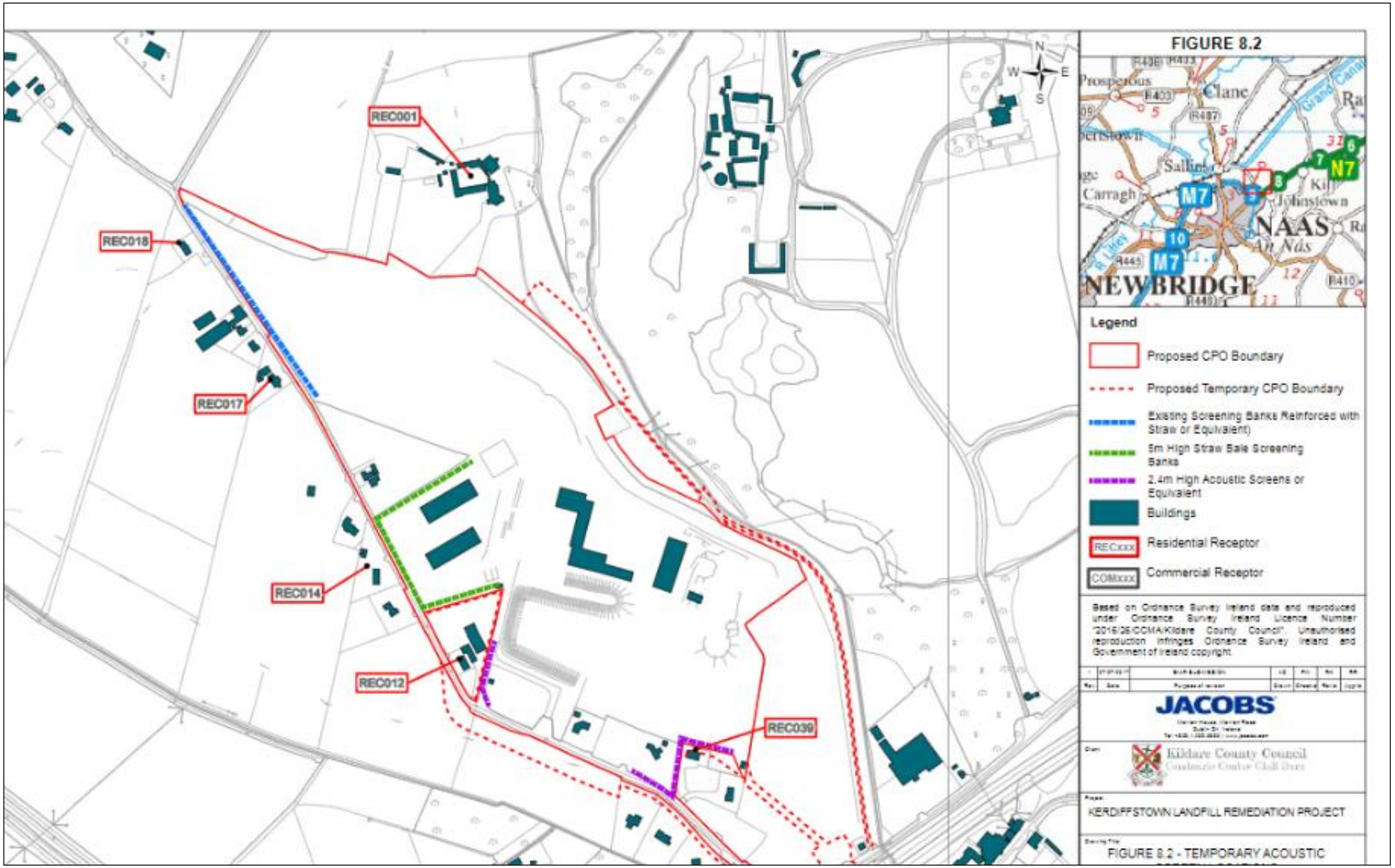
To ensure limits are achieved, all WBL employees and subcontractors are responsible for good noise and vibration management.

1. When arriving at work, please drive slowly on site and keep revs to a minimum. Keep radios at low levels so as not to cause a nuisance.
2. Do not engage vibrator on rollers unless required for compaction activities and switch off again immediately
3. Drive rollers, rubber wheeled plant at slow speed, particularly across an undulation and in proximity to residences/businesses.
4. Avoid excessive tracking with excavators-transport via low loader where practicable.
5. Do not throw tools and equipment around. Place them down when you arrive at your place of work.
6. Do not drag materials along the ground. Place them down when you arrive at your place of work.
7. Equipment and vehicles should not be left running when not in use.
8. When loading trucks try not to drop material from a height.
9. Stationary equipment such as pumps and generators should be located away from site neighbours.
10. All equipment is to be well maintained.
11. If you see anything/anyone making unnecessary noise, then advise them of the correct protocol to reduce noise or report to your Supervisor
12. It is essential that good relationships are maintained with the local community. Any queries from members of the public should be responded to politely and referred to the Contractors Site Supervisor. Staff shall assist the public to contact the Community Liaison Officer. Staff shall not enter into debate or argue with members of the public.
13. Start up plant and vehicles sequentially rather than all together.

Name	Company	Signed	Date

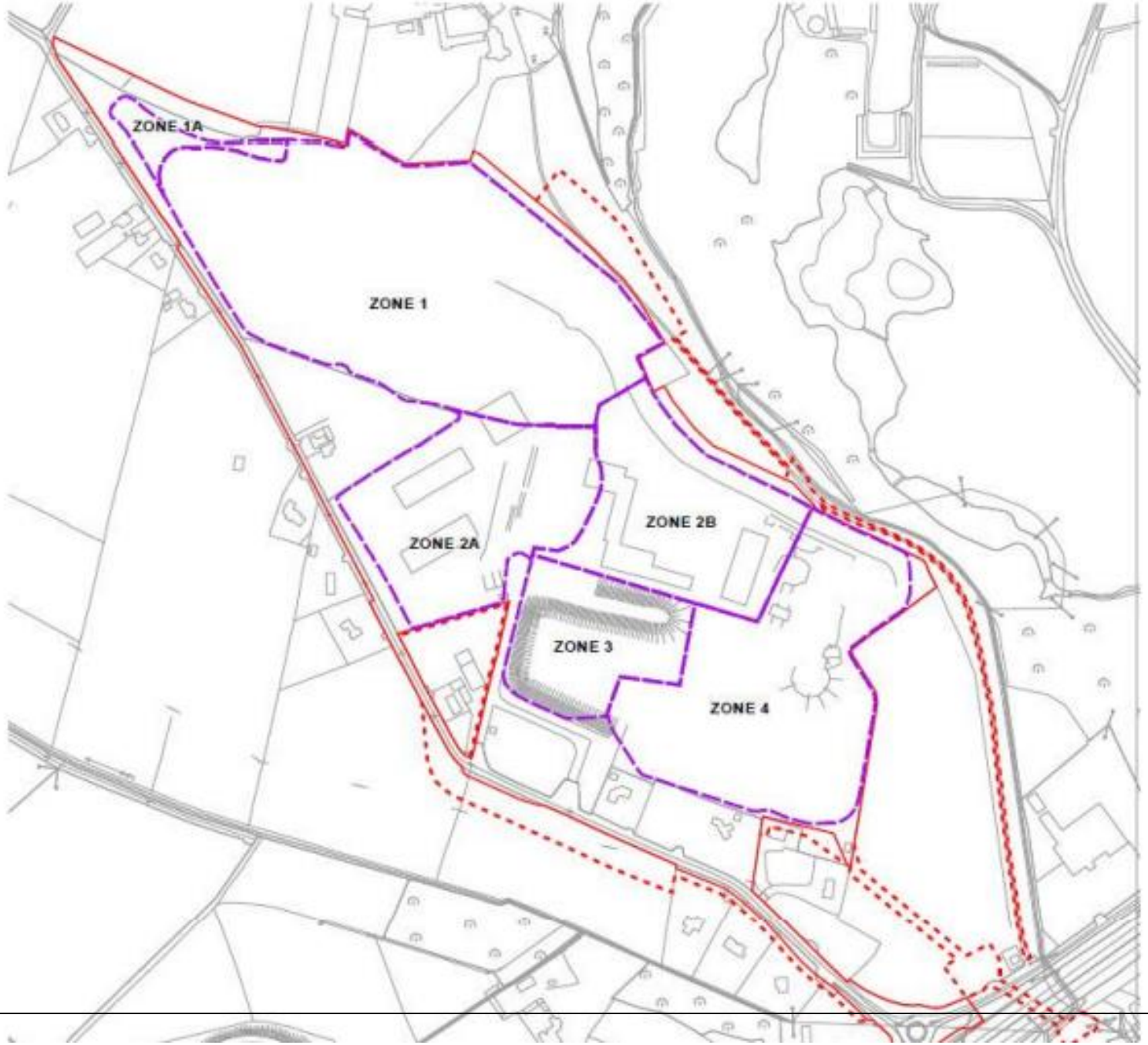
APPENDIX D

TEMPORARY ACOUSTIC SCREEN LOCATIONS


REC001
REC018
REC017
REC014
REC012
REC039
N
W
E
S
FIGURE 8.2
Prosperous
Clane
Sallins
Carragh
Johnstown
NAAS
An Nás
NEWBRIDGE
M7
N7
Legend
Proposed CPO Boundary
Proposed Temporary CPO Boundary
Existing Screening Banks Reinforced with Straw or Equivalent)
5m High Straw Bale Screening Banks
2.4m High Acoustic Screens or Equivalent
Buildings
RECxxx
Residential Receptor
COMxxx
Commercial Receptor
Based on Ordnance Survey Ireland data and reproduced under Ordnance Survey Ireland Licence Number "2016/26/CCMA/Kildare County Council". Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright.
JACOBS
Kildare County Council
KERDIFFSTOWN LANDFILL REMEDIATION PROJECT
FIGURE 8.2 - TEMPORARY ACOUSTIC

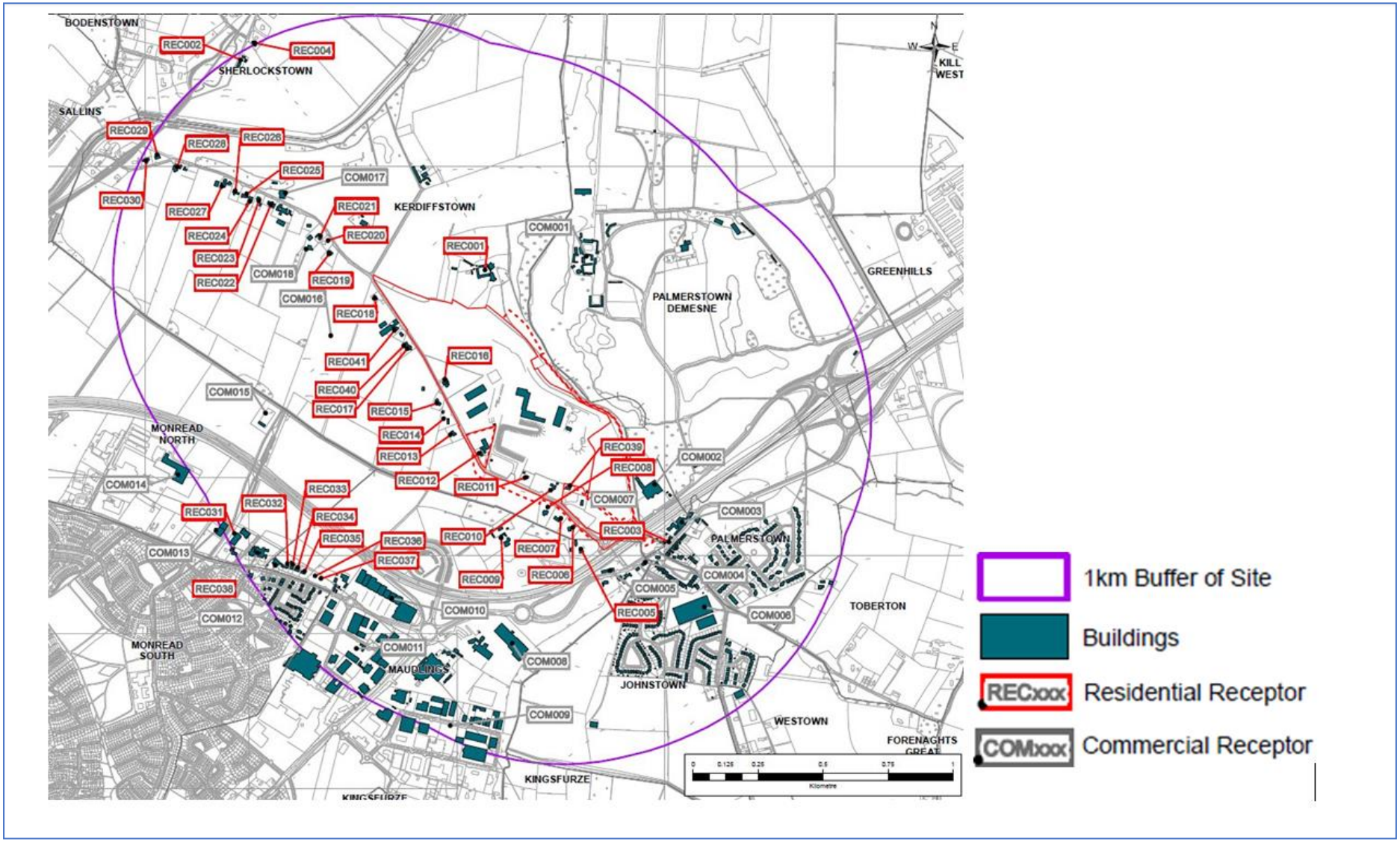
APPENDIX E

SITE ZONES


ZONE 1A
ZONE 1
ZONE 2A
ZONE 2B
ZONE 3
ZONE 4

APPENDIX F

DETAILED RECEPTOR MAP


BODENSTOWN
SHERLOCKSTOWN
SALLINS
KERDIFFSTOWN
GREENHILLS
PALMERSTOWN DEMESNE
MONREAD NORTH
MONREAD SOUTH
PALMERSTOWN
TOBERTON
JOHNSTOWN
WESTOWN
KINGSFURZE
MAUDLINGS
KILL WEST
FORENAGHTS GREAT
1km Buffer of Site
Buildings
RECxxx Residential Receptor
COMxxx Commercial Receptor