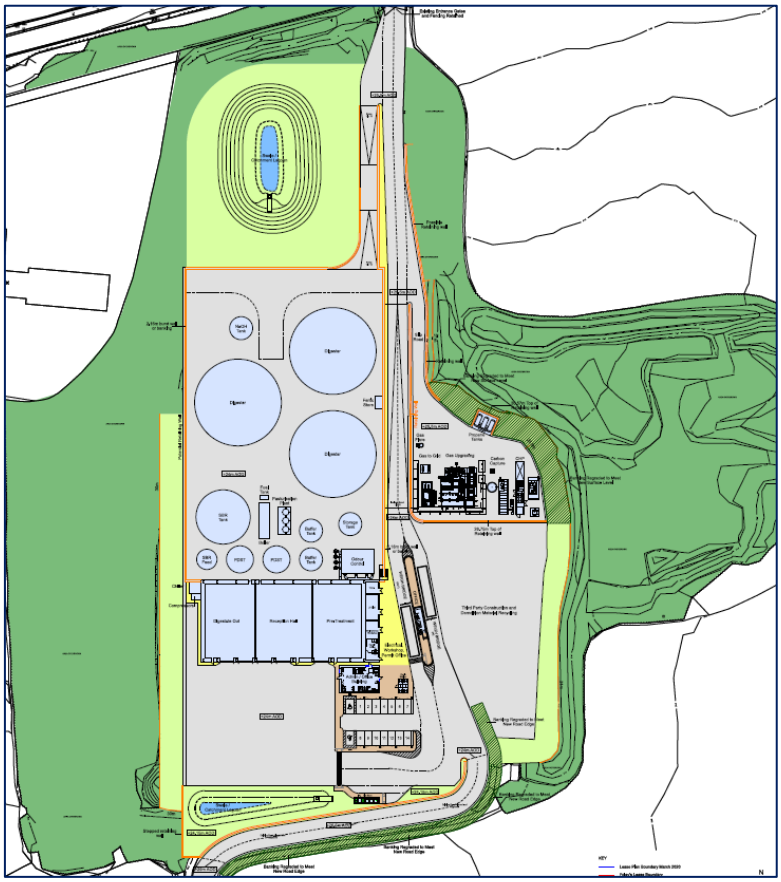
SUEZ, Holloway Lane, West Drayton, UB7 0AE

Noise Assessment

784-B49182



SUEZ Recycling and Recovery UK

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Document prepared on behalf of Tetra Tech Group Limited. Registered in England number: 6595608

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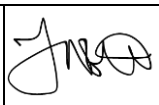
Revision:	0	**Prepared by:**	Joe Nott Senior Environmental Consultant	
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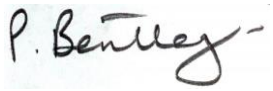
Status:	First Issue	**Approved By:**	Paul Bentley Associate	
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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment undertaken on behalf of SUEZ Recycling and Recovery UK, to support an Environment Agency Permit application to allow the operation of a new Anaerobic Digestion (AD) Facility at the site address Holloway Lane, Sipson, Middlesex, UB7 0AE.

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. Predictions of operational noise at existing receptors have been made using CadnaA noise modelling software, incorporating ISO 9613-2 methodology calculations. This assessment has been undertaken in accordance with the Noise and Vibration Management: Environmental Permits guidance, published by the Environment Agency in January 2022. This report is therefore suitable to accompany an application for an Environmental Permit to Environment Agency.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix B.

1.2 SITE LOCATION AND HISTORY

The Holloway Lane Site address is, Holloway Lane, Sipson, Middlesex, UB7 0AE and is centred at approximate National Grid Reference (NGR) TQ 06719 78035. The sitre layout is shown in Drawing refer to 1451 PL100 titled 'Proposed Site Layout' by Garry Stewart Design Associates for the location and site layout and is presented in Appendix C.

The site forms part of a historic landfill which extends to areas further offsite to the south, east and west, and to the north of Holloway Lane.

The immediate surroundings of the site comprise agricultural land to the east and south, Holloway Lane to the north, stormwater retention ponds, commercial stores and a garden centre to the west. In addition, there is a landfill located to the south of the site off Harmondsworth Lane. The nearest residential properties are located approximately 145m to the south of the site.

Access to the site is achieved by an access road to the north of the site off Holloway Lane.

At present, there are three active permits at the site. The first permit (reference EPR/JB3209LR) is registered to Foley Haulage Limited and allows the operation of a soil recycling facility.

The second permit (reference EPR/JB3400HB) is registered to Powerday PLC (Powerday) and allows the operation of a Material Recycling Facility (MRF). The permit for the MRF was originally issued to SUEZ in September 2002 however, the permit was transferred to Iver Recycling (UK) Limited in October 2012 and has now been transferred to Powerday.

The third permit (reference EPR/NP3139PK) is registered to SUEZ and relates to the Harmondsworth Landfill site. The main landfill site is located to the south of Harmondsworth Lane however, the permit allows the operation of a gas management compound which is centred at approximate National Grid Reference (NGR) TQ 06686 77859. In addition, the permit boundary for Harmondsworth Landfill includes the access road off Holloway Lane which overlaps the application area.

SUEZ is the landowner of the site and the permit areas for the soil recycling facility and the MRF are subject to a lease agreement from SUEZ.

1.3 ACOUSTIC CONSULTANTS' QUALIFICATIONS AND PROFESSIONAL MEMBERSHIPS

The lead project Acoustic Consultant is Joe Nott. The report has been checked and verified by Paul Bentley. Relevant qualifications, membership and experience are summarised in Table 1.1 below.

Table 1.1: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Joe Nott	BSc 2016	Aug 2016	Aug 2017	
Paul Bentley	BSc 2004 MSc 2005 PgDip 2012	Feb 2008	June 2012	Aug 2016

2.0 ASSESSMENT CRITERIA

2.1 BS 4142:2014 ASSESSMENT CRITERIA

BS 4142:2014+A1:2019 '*Methods for Rating and Assessing Industrial and Commercial Sound*' establishes methodology for assessing the likely effects of sound of an industrial and/or commercial nature on people inside or outside a premises used for residential purposes. In particular, the standard states the following with regard to comparison of incident sound levels in comparison to representative background noise levels:

a) Typically, the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'

In addition to noise levels, the significance of the impact depends on the individuals affected and to the acoustic features present which may be assessed subjectively or objectively as appropriate. Section 9 of BS4142:2014 recommends that correction factors be applied to the specific noise level if the noise contains certain acoustic features such as:

- tonality;
- impulsivity;
- other sound characteristics which are readily distinctive; and
- intermittency.

2.2 NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS

Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration.

The Environment Agency have produced a guidance to help holders and potential holders of permits to apply for, vary, and comply with their permits.

The guidance covers:

- how the environment agencies will assess noise from certain industrial processes
- what the law says you must do to manage noise and vibration
- advice on how to manage noise – in particular, how to carry out a noise impact assessment and what operators should include in a noise management plan.

Once the need for a Noise Impact Assessment has been identified the assessment process should follow these four steps:

1. Desktop Risk Assessment

2. Off-Site Monitoring Survey
3. Source Assessment
4. Best Available Techniques (BAT) or appropriate measures justification

The desktop risk assessment has already been undertaken and the need for further assessment of noise has been identified. Therefore, the contents of this report will highlight the work undertaken to address steps 2 to 4 required for the Noise Impact Assessment. This report has been structured with reference to the guidance contained herein.

Table 2.1 below considers the guidance of noise impact levels in relation to the document *Noise and Vibration Management: Environmental Permits* dated 31st January 2022. It provides the effect levels at sensitive receptors in relation to the closest corresponding BS 4142:2014+A1:2019 criteria for each defined level. A description of the level and the actions required dependant on the level is also included.

Table 2.1: Level of Noise Impact Criteria and Actions

Effect Level	Corresponding BS 4142 Criteria	Description / Actions
No noise, or barely audible or detectable noise	The closest Corresponding BS 4142 descriptor is 'low impact or no impact'	This level of noise means that no action is needed beyond basic appropriate measures or Best Available Techniques (BAT). Low impact does not mean there is no pollution. However, if correctly assessed as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority.
Audible or detectable noise	The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context).	This level of noise means that noise pollution is being (or is likely to be) caused at a receptor. At this level there is a duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if appropriate measures are used. There is a need to rigorously demonstrate that appropriate measures are being used.
Unacceptable level of audible or detectable noise	The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context).	This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures). You must take further action, or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.

3.0 ASSESSMENT METHODOLOGY

3.1 NOISE MODELLING METHODOLOGY

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CadnaA noise modelling software has been used.This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered.

Input data and model settings as given in Table 3.1 below have been used. The CadnaA modelling files have been provided separately and are those listed in Appendix D.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	LIDAR 2m DTM
Building heights – around site	Tetra Tech Observations	8 m height for two storey residential properties, and 4 m for Bungalows.
Receptor positions	Tetra Tech	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid and monitoring locations for validation.
Proposed Plans	Garry Stewart Design Associates	Proposed Site Layout: 1452 PL100 dated February 2023

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 MODEL INPUT DATA

3.2.1 Proposed Anaerobic Digester

The sound pressure levels for each item of plant are presented in Table 3.2 below, sound levels are based measurements obtained during noise source surveys at comparable Anaerobic Digester facilities.

Table 3.2 Fixed Plant - Noise Data

Plant	Octave Band Sound Pressure Level (dB)								Measured Distance	Plant Location	No. of plant items
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz			
Mixer Pasteuriser Tanks	71	66	63	63	65	62	56	49	1m	External	3
Separator	82	83	68	73	72	75	73	66	1m	External	2
CHP	73	68	62	62	61	56	53	41	10m	Inside Container	1
Compressor Gas Treatment	104	93	84	79	77	75	78	67	1m	External	1
Biomix	81	76	77	75	75	74	67	57	1m	Inside Hall	1
Feed Hopper	76	71	72	70	70	69	62	52	1m	Inside Hall	1
Odour Abatement System	79	74	75	81	71	69	61	57	1m	External	1
Biogas Container GUU	78	71	71	74	70	64	61	56	10m	Inside Container	1
Glycol Chiller GUU	68	61	61	64	60	54	51	46	10m	External	1
CO_2 Container	82	82	72	71	69	68	62	54	10m	Inside Container	1

For Plant units located within buildings and/or containers, internal noise levels have been calculated within the noise model. Attenuation through the building façade has been accounted for using the sound reduction indices for the assumed building elements presented within Table 3.3 below.

Table 3.3 Building Façade Sound Reduction

Building ID	Assumed Material	Sound Reduction Index (SRI)								Sound Insulation (R_w)
		63Hz	125Hz	250Hz	500Hz	10kHz	2kHz	4kHz	8kHz	
Treatment Building	1mm Steel Skin	11	14	18	23	28	33	38	38	27

3.2.2 Other Operational Noise Input Data

In addition to the measured data reproduced above, noise data for proposed HGV and Waste Management vehicles has been implemented within the model. Noise levels included within the assessment model are summarized within Table 3.4 below.

Noise of a delivery event has been known to vary from site to site by as much as 22dB L_{Aeq} at 5m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14dB.

As such, the following worst-case calculations have been based on measurements of HGVs delivering goods. All measurements were undertaken by Tetra Tech during a noise survey at a similar development and were in free-field conditions.

In addition to noise from the unloading process, the levels used in the assessment includes noise from the vehicle pulling up to the reception hall, manoeuvring into position and then pulling away once

unloading/loading is complete, together with other sources such as trolleys and reversing bleepers. Table 3.4 summarises the modelled noise sources and the sound pressure levels for the HGV activities.

It should be noted that for the purposes of this worst-case assessment, deliveries are assumed to take place during any given 1-hour period during the daytime (07:00-23:00). This assessment has been based on the assumption that HGV movements will be restricted outside of the hours 07:00 - 19:00 from Monday to Sunday, therefore night-time HGV movements have not been assessed (23:00-07:00).

Table 3.4: Modelled Sound Pressure Levels for Delivery Events

Noise Level	Data Source	Modelled Source Type	Details	Sound Pressure Level Per Point at 3m Distance (dB)		
				Daytime $L_{Aeq,1hour}$	Night-time $L_{Aeq,15minutes}$	Night-time L_{Amax}
HGV Unloading/Loading	Tetra Tech Survey	Point Source	4no. at treatment building	73.8	76.3	89.4
HGV Movements		Line Source (Moving Point)	Daytime: 8no. HGV per 1-hour period Night-time: 1no. HGV per 15-minute period	73.0		

3.2.3 Car Park Noise Data

Noise levels from proposed car parking areas have been determined based upon observations within an existing warehouse unit during a staff changeover period. A $L_{Aeq,T}$ noise levels of 54.0dB at a height of 1.5m has been modelled as an area source to represent the car park.

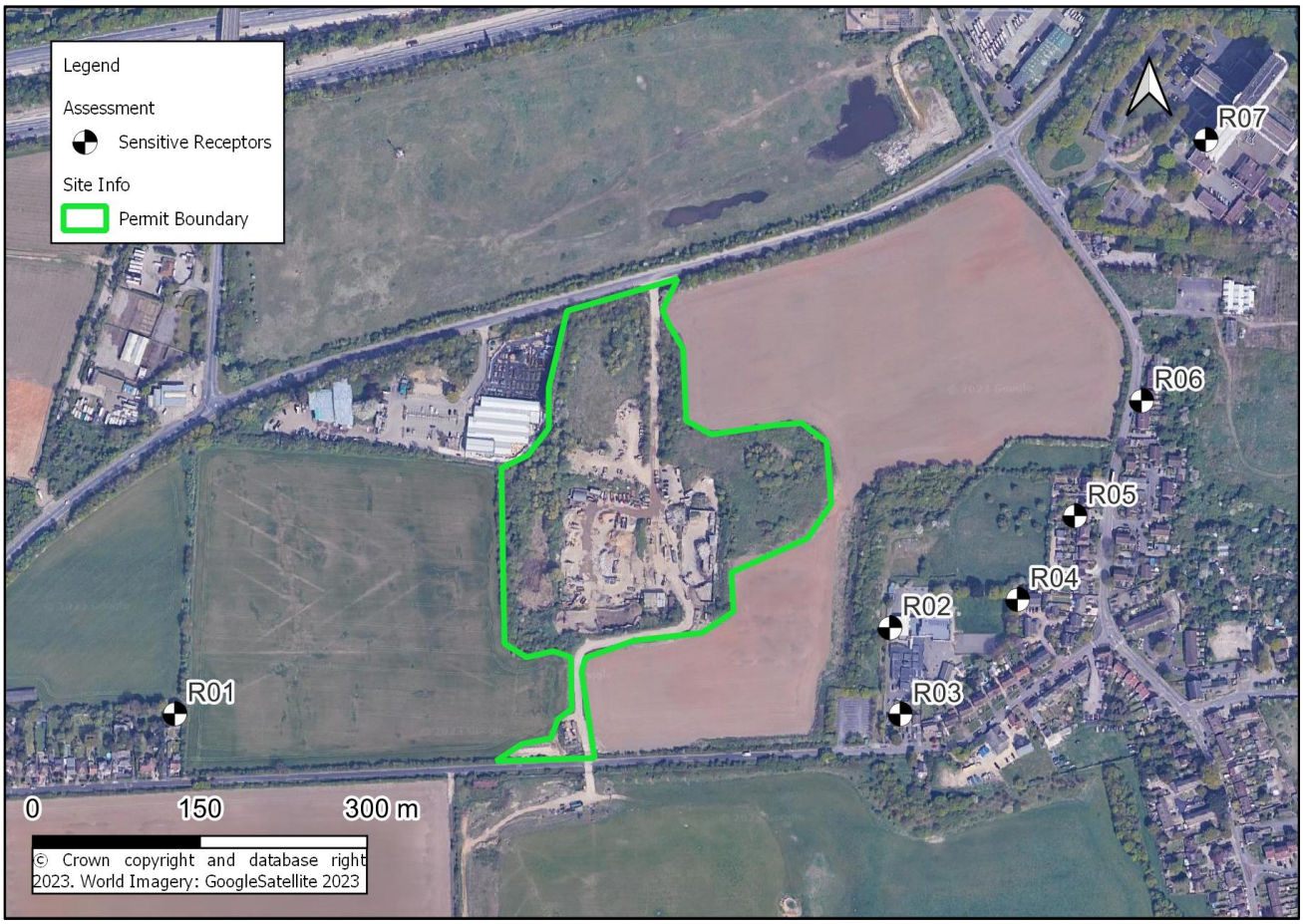
3.3 SENSITIVE RECEPTORS

Table 3.5 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are shown in Figure 3.1 below.

Table 3.5: Existing Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	62a Harmondsworth Lane	Residential	1.5/4.0
R02	Heathrow Primary School	School	1.5
R03	44 Harmondsworth Lane	Residential	1.5/4.0
R04	16 Wykeham Close	Residential	1.5/4.0
R05	366 Sipson Road	Residential	1.5/4.0
R06	261 Sipson Road	Residential	1.5/4.0
R07	Holiday Inn Hotel	Hotel	1.5-23.6

Figure 3.1: Sensitive Receptor Locations



4.0 NOISE SURVEY

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL52	Environmental Noise Analyser	s/n	1221575
Rion NL52	Environmental Noise Analyser	s/n	219904
Rion NL52	Environmental Noise Analyser	s/n	710313
Rion NL52	Environmental Noise Analyser	s/n	810560
Rion NC75	Sound Calibrator	s/n	3421934

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of -0.1 dB was observed on meters s/n 219904 and 810560, and +0.0 dB on meters 1221575 and 710313. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

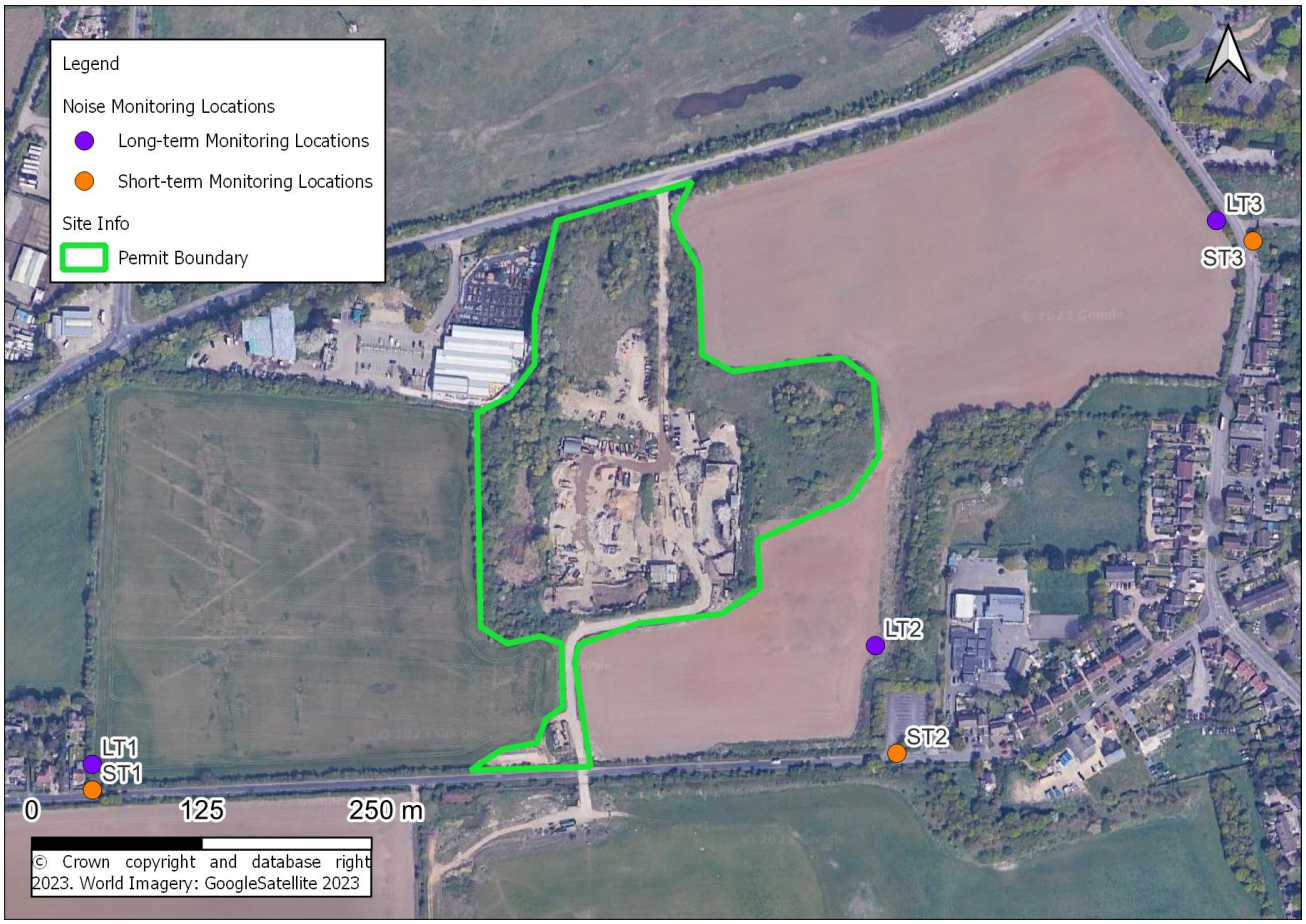
A baseline monitoring survey was undertaken at six locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Wednesday 7th November 2023 to Tuesday 14th November 2023. Attended short term (ST) measurements were undertaken at three locations during day and evening periods with three additional long -term (LT) locations being measured unattended over a 132-hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant south-western wind direction during the survey. The attended noise monitoring meteorological conditions are presented below in Table 4.2.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	East of 52 Harmondsworth Lane
LT2	Approximately 50m West of Heathrow Primary School
LT3	Approximately 50m South of The Plough pub
ST1	Adjacent to 52 Harmondsworth lane
ST2	Adjacent to Heathrow Primary School car park gate
ST3	Approximately 40m North of 241 Sipson Road

Figure 4.1: Noise Monitoring Locations



4.1 NOISE SURVEY RESULTS

The dominant noise sources found in the area, as specified in Table 4.2, include frequent aircraft traffic at Heathrow Airport, and road traffic noise from the M4, M25 and A408. Other contributions to the ambient noise environment consist of trees rustling in the wind and the day-time operational activities from the Powerday waste management site.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5-minute measurement over the stated survey period.

Table 4.2: Meteorological Conditions During the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
ST1	08/11/2023 11:50	12	1-2	SW	8	Distant road traffic noise from the M4 and M25 Constant noise from grounded aircraft at Heathrow Airport
ST2	08/11/2023 13:39	12	1-3	SW	8	Constant noise from grounded aircraft at Heathrow Airport Distant road traffic noise from the M4 and M25 Distant operational activity from Powerday waste management site
ST3	08/11/2023 12:36	12	1-2	SW	8	Frequent road traffic noise on A408 Sipson Road Constant noise from grounded aircraft at Heathrow Airport Distant road traffic noise from the M4 and M25
ST1	13/11/2023 19:50	12	2-4	SW	7	Constant noise from grounded aircraft at Heathrow Airport Distant road traffic noise from the M4 and M25 Wind rustling trees
ST2	13/11/2023 20:09	12	2-4	SW	7	Constant noise from grounded aircraft at Heathrow Airport Distant road traffic noise from the M4 and M25
ST3	13/11/2023 20:27	12	2-4	SW	7	Frequent road traffic noise on A408 Sipson Road Constant noise from grounded aircraft at Heathrow Airport Distant road traffic noise from the M4 and M25 Wind rustling trees

The results of the statistical and frequency measurements conducted during the baseline noise survey are summarised below in Table 4.3. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	53 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 07:00 – 23:00	LT1	56.0	86.8	41.3	58.0	50.0

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Night-time 23:00 – 07:00	31 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 23:00 – 07:00		49.8	79.1	35.5	46.9	40.0
Weekend Daytime 07:00 - 23:00	32 hours	11/11/2023 – 12/11/2023 07:00 – 23:00		58.6	95.2	40.2	58.2	52.0
Weekend Night-time 23:00 – 07:00	16 hours	11/11/2023 – 12/11/2023 23:00 – 07:00		52.8	83.3	37.9	50.7	41.0
Weekday Daytime 07:00 - 23:00	52 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 07:00 – 23:00	LT2	57.2	90.4	46.0	58.6	56.0
Weekday Night-time 23:00 – 07:00	31 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 23:00 – 07:00		52.2	78.5	41.1	51.7	48.0
Weekend Daytime 07:00 - 23:00	32 hours	11/11/2023 – 12/11/2023 07:00 – 23:00		56.4	93.1	41.5	56.4	50.0
Weekend Night-time 23:00 – 07:00	16 hours	11/11/2023 – 12/11/2023 23:00 – 07:00		51.0	88.3	34.8	50.5	48.0
Weekday Daytime 07:00 - 23:00	53 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 07:00 – 23:00	LT3	65.3	95.8	50.9	68.6	60.0
Weekday Night-time 23:00 – 07:00	31 hours	08/11/2023 – 10/11/2023 13/11/2023 – 14/11/2023 23:00 – 07:00		59.8	101.6	43.2	58.9	50.0
Weekend Daytime 07:00 - 23:00	32 hours	11/11/2023 – 12/11/2023 07:00 – 23:00		65.3	102.5	49.9	67.9	56.0
Weekend Night-time 23:00 – 07:00	16 hours	11/11/2023 – 12/11/2023 23:00 – 07:00		59.1	93.9	42.6	59.7	52.0
Daytime 07:00 - 19:00	15 Mins	08/11/2023 11:50	ST1	60.4	81.0	51.5	62.3	53.8
	15 Mins	08/11/2023 13:39	ST2	57.4	76.0	50.2	57.8	51.7
	15 Mins	08/11/2023 12:36	ST3	69.0	82.0	55.9	73.3	58.3
Evening 19:00 - 23:00	15 Mins	13/11/2023 19:50	ST1	56.0	70.0	50.5	57.6	52.6
	15 Mins	13/11/2023 20:09	ST2	57.7	76.9	50.7	57.2	52.7
	15 Mins	13/11/2023 20:27	ST3	64.5	77.0	56.3	68.1	58.8

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

4.2 REPRESENTATIVE BACKGROUND LEVELS

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 4.1. Table 4.4 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area (the lower of the respective daytime and evening measurements have been used to represent daytime noise levels, where appropriate).

Table 4.4: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01	LT1	Daytime (07:00 – 23:00)	50
		Night-time (23:00 – 07:00)	40
R02 to R05	LT2	Daytime (07:00 – 23:00)	50
		Night-time (23:00 – 07:00)	48
R06 and R07	LT3	Daytime (07:00 – 23:00)	56
		Night-time (23:00 – 07:00)	50

*Lowest $L_{A90,T}$ value selected from either Weekday or Weekend.

The representative noise levels presented in Table 4.4 have been used to inform the assessment presented in Section 5.0.

5.0 ASSESSMENT OF EFFECTS

5.1 OPERATIONAL PHASE

This assessment has been undertaken to establish the external noise levels from proposed fixed plant installed at the development. The assessment compares the worst-case levels associated with the fixed plant with the existing measured average background noise level L_{A90} at the closest sensitive receptors. In accordance with BS4142:2014 section 9.2, a +5 dB correction has been applied to create the 'Rating Level' at the receptor to account for any perceptible intermittency and just perceptible tonal element within the plant operations.

The results of the assessment are presented within Table 5.1, with noise levels presented illustratively within Figure 5.1. Receptor R07 is a multistorey hotel, therefore the worst effected story has been reported.

Table 5.1: BS4142 Assessment

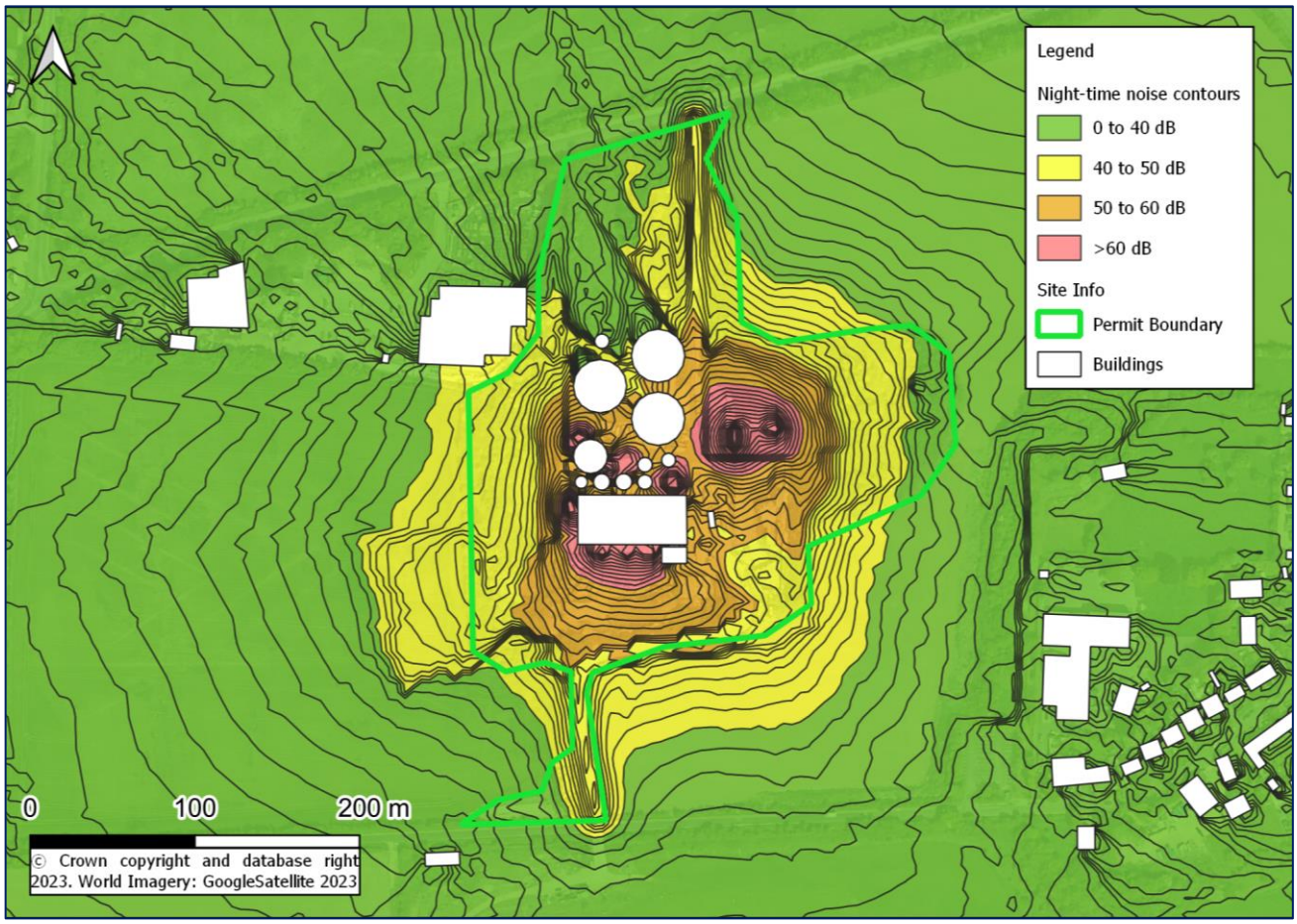
Location	Existing Measured Background ($L_{A,Tr}$)		Specific noise level from plant		Rating level from Operations ($L_{A,Tr}$)		BS 4142 Score	
	Daytime	Night-Time	Daytime	Night-Time	Daytime	Night-Time	Daytime	Night-Time
R01	50	40	28	29	33	34	-17	-6
R02*	50	48	28	~	33	~	-17	-48
R03	50	48	29	31	34	36	-16	-12
R04	50	48	28	30	33	35	-17	-14
R05	50	48	29	29	34	34	-16	-14
R06	56	50	27	27	32	32	-24	-18
R07 (6)	56	50	29	29	34	34	-22	-17

*R02 is a school and not typically occupied at night-time

All values are sound pressure levels in dBA re: 2x 10^{-5} Pa. All calculations used to derive the above table (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 para 8.6 the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic's in the above table may appear to be up to 1 dB incorrect due to this rounding.

As demonstrated within Table 5.1, external noise levels are predicted to be below the existing background noise levels by at least 6dB during the night-time and 16dB during the daytime. With reference to the operational noise criteria described in Section 2.2 of this report, a *Rating Level* of equal to background or below is an indication of a Low Impact in relation to BS 4142. This would equate to a no noise, or barely audible or detectable noise level with regards to the level of noise impact descriptors taken from Table 2.1 and that no further mitigation measures are required beyond measures incorporated within the design, basic appropriate measures and/or Best Available Techniques (BAT). Night-time noise levels are presented illustratively within Figure 5.1 overleaf.

Figure 5.1: $L_{Aeq,15min}$ Night-Time Noise Contour Plot (4m)



5.2 STATEMENT OF UNCERTAINTY

Despite sound measurement system precision of 0.1dB, all measurements of environmental sound or specific components identified within this report are subject to uncertainty. All noise measurements include elements of intrinsic uncertainty in the measured value, the magnitude and significance of which usually depends upon many factors.

The most obvious factor for measurements undertaken for this assessment is due to instrumentation, but this is minimised by a range of controls set out in Craven & Kerry's *'A Good Practice Guide on the Sources and Magnitude of Uncertainty Arising in the Practical Measurement of Environmental Noise'* (as referenced in BS4142: 2014) including:

- Use of Type 1 sound level analysers
- Bi-annual calibration of sound level analysers and annual calibration of calibrators
- Periodic cross-calibration with other calibrated analysers and monitoring of system's calibration characteristics
- On site calibration checks before and after measurements are taken
- Avoidance and control of interference due to electromagnetic sources, weather, or other factors.

BS 4142 rating penalties include corrections for sound that is tonal, impulsive, intermittent, or has other characteristics that will tend to attract a listener's attention. The significance of these characteristics has been assessed by comparison of the specific and residual sound at the noise sensitive location(s).

The ISO 9613-2 prediction methodology implemented by CadnaA has an uncertainty of ±3dB as per Table 5 in the standard. The predicted Rating Level when this +3dB uncertainty correction is applied is still within the required target criteria for the conclusion reached to remain valid.

It is considered that any uncertainty within the subjective assessment of noise character has been suitably mitigated within this assessment using suitably qualified surveyors and assessors.

6.0 CONCLUSIONS

This report presents the finding of a noise assessment undertaken on behalf of SUEZ in relation to obtaining an environmental permit at the proposed Anaerobic Digestion (AD) Facility at the site, Holloway Lane, Sipson, Middlesex, UB7 0AE. The assessment is focused on both day and night-time operations in comparison to measured existing background noise levels.

Baseline measurements were undertaken at locations representative of nearby sensitive receptors to measure existing background noise levels. These background levels were used throughout the assessments to represent sound levels in the local area.

The assessments consider noise from the machinery and processes dealing with the bio waste, as well as the HGV's arriving, unloading and departing the site. Noise level rating corrections have been applied due to the nature of the activities on the site e.g., movement and unloading of waste.

The daytime predicted Rating Level from the site operations is predicted to be 16dB below background sound levels at the worst-case receptor, which is an indication of low impact in relation to the BS4142 criteria. This low impact is in accordance with what the Environment Agency consider a 'no noise or barely audible or detectable noise level' as it is the closest corresponding BS 4142 criteria and no further mitigation measures are required beyond basic appropriate measures or BAT.

The daytime predicted Rating Level from the site operations is predicted to be 16dB below background sound levels at the worst-case receptor, which is an indication of low impact in relation to the BS4142 criteria. This low impact would be considered a 'no noise or barely audible or detectable noise level 'as it is the closest corresponding BS 4142 criteria. Therefore, no further mitigation measures would be required beyond basic appropriate measures or BAT.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

Acoustic Terminology

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ -\ 23:00}$ for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ -\ 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

APPENDIX B – REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of SUEZ Recycling and Recovery UK ("the Client") for the proposed uses stated in the report by [Tetra Tech Limited] ("Tetra Tech"). Tetra Tech exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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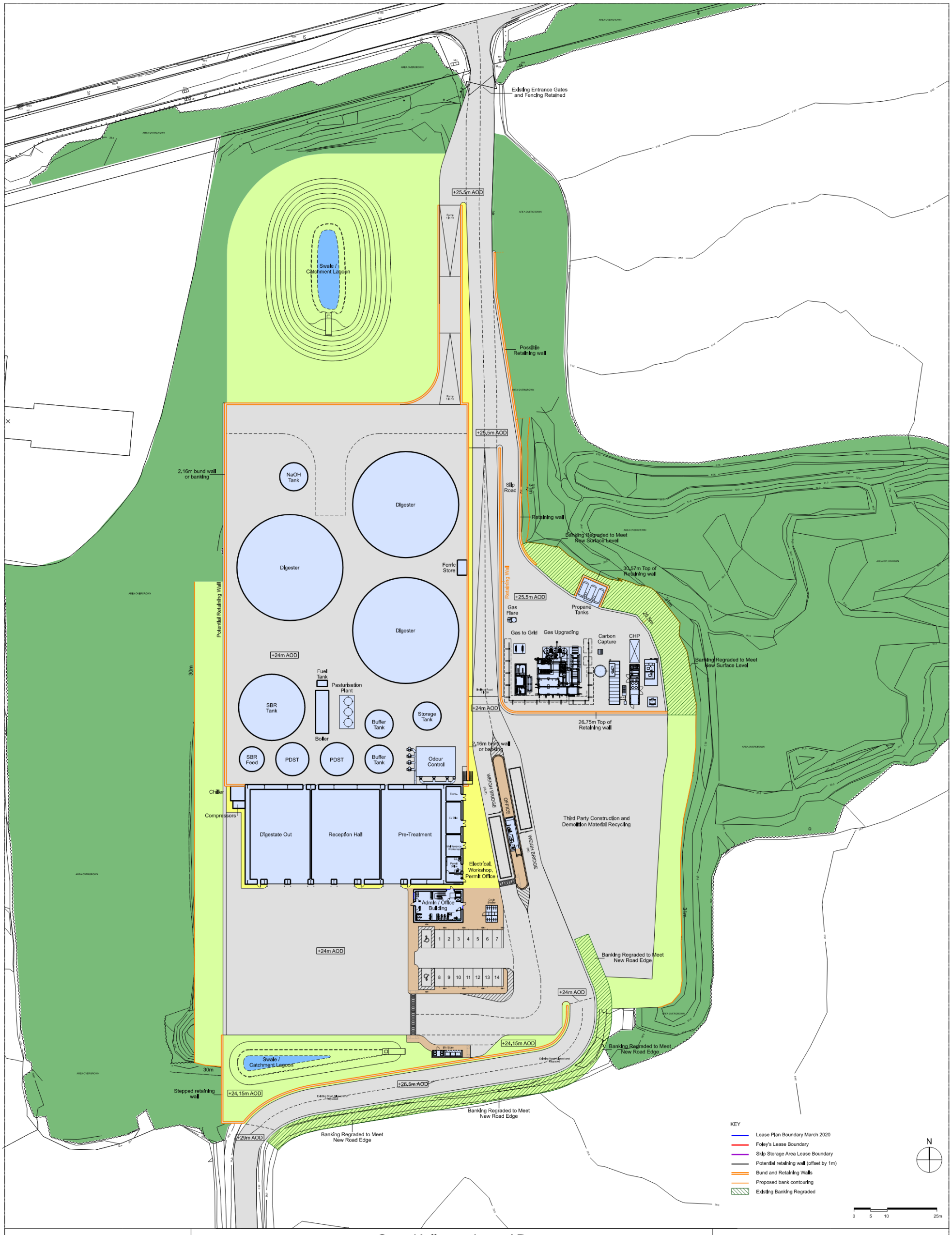
The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.

APPENDIX C - SITE LAYOUT PLAN



NOTE

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3. WHERE ANY DISCREPANCIES ARE FOUND BETWEEN DIMENSIONS THESE MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECTS FOR RESOLUTION.
4. WHERE DISCREPANCIES EXIST BETWEEN REFERENCE OR ASSEMBLY DRAWINGS & DETAIL DRAWINGS, THE LATTER TAKE PREFERENCE.

PROJECT	Suez Holloway Lane AD									
DRAWING	Proposed Site Layout									
FOR PLANNING		-	23/01/13	Issued for planning						
1:500@A1 SCALE	23/01/13 DATE									
1451 PL100 DWG. NO.	- REVISION									

GSDA
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APPENDIX D - NOISE MODELLING DATA

CadnaA noise modelling files have been supplied separately. The models provided are as follows.

File:

Holloway Lane CadnaA Modelling.zip

Location:

\\lds-dc-vm-101\Data\Projects\784-B049182_Holloway_Lane_AD\60 Project Output\61 Work in Progress\Appendix I - Noise Impact Assessment and Management Plan\